SPECIAL SECTION

for

PERPETUAL

TROUBLE SHOOTER'S MANUAL

VOLUME IV

Contents

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AUTHOR'S NOTE

The information in this section of Volume IV of Rider's "Perpetual Trouble Shooter's Manual" is offered with the hope that it will be of aid when you are called upon to analyze some of the special circuits contained in the major volume.

No effort is being made to present these facts in the form of text covering operating principles. It is likely that you,as the reader, may find something which intrigues you, missing from these pages. If so, we ask your indulgence. To describe every innovation present in the radio receivers produced during 1933, would in itself, require another manual as voluminous as Volume IV. The items we have selected for discussion have been the subjects of conversation and correspondence for some time past.

With respect to material missing from this section, may we suggest that you glance through the major volume. You will find numerous explanations of the special circuits employed by the respective manufacturers. It was deemed unnecessary to repeat in this section, any material which appears within the binder of Volume IV.

Since we pay so much attention to vacuum tubes, it might be well to offer certain pertinent suggestions of value during the perusal of this section. Information offered as pertaining to the application of any one type of tube, should be interpreted as being equally applicable to any equivalent tube of like type, although the two tubes may differ in heater rating. As an example, data concerning the circuit design of the 6B7 is applicable to the 2B7, although the latter bears a different heater rating.

At the same time, we wish to call special attention to the fact that these few pages cannot cover all possible applications of tubes and their circuits. In other words, statements made in connection with the application of any one type of tube, does not limit the use of that tube to just the arrangement discussed. Numerous other modes of use may be in force, yet not included in this brief resume.

All statements and opinions contained in this special section, are those of the writer and in no way involve any of the manufacturers or their engineers whose names may be referred to in connection with receiver models.

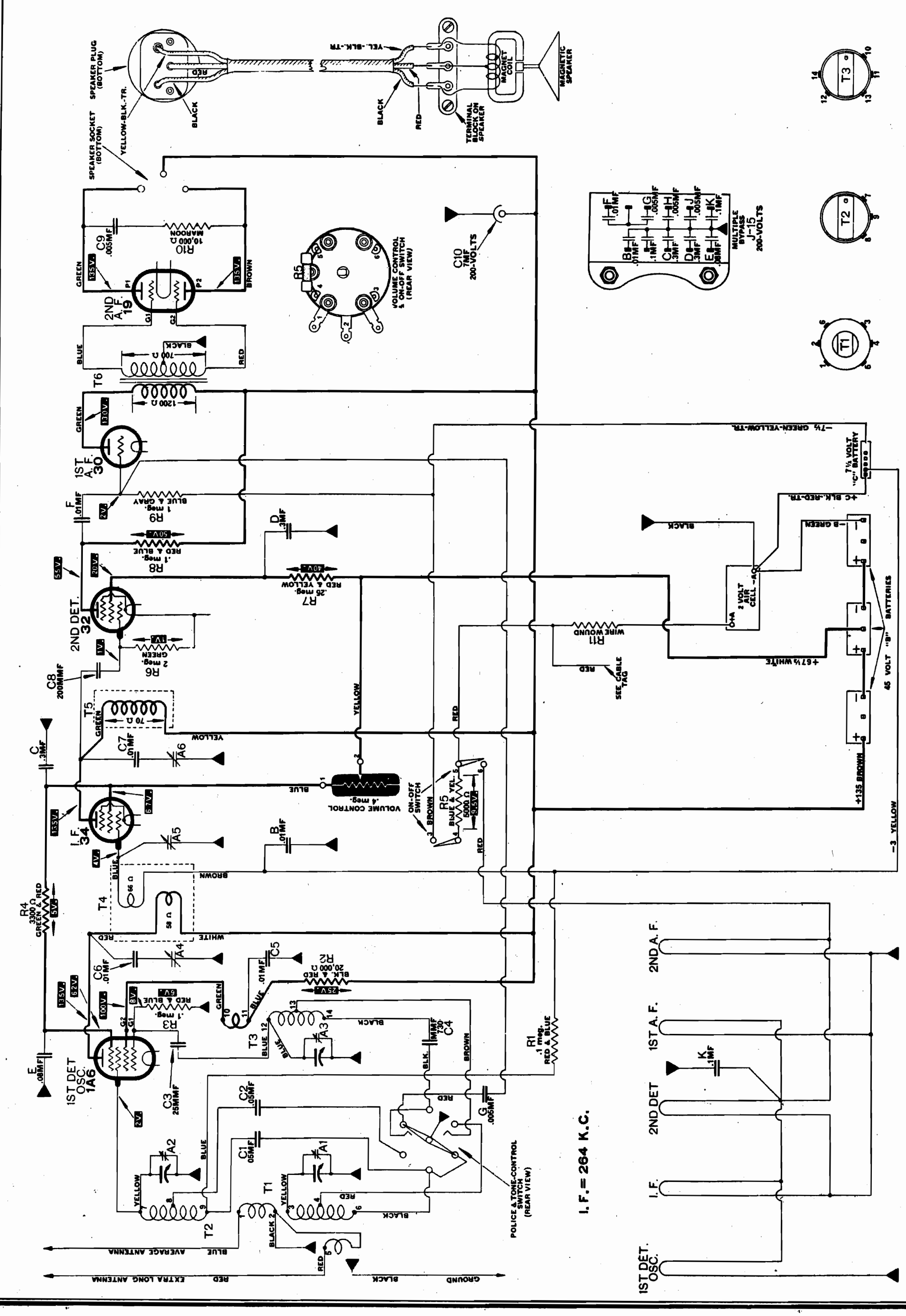
We wish to expressly state that reference to any manufacturer in this section in connection with any circuit does not mean, unless a statement is made to the contrary, that the circuit being discussed is used by that manufacturer only. It is very likely that a large number of manufacturers make use of the system in question. This fact must be remembered.

May we express our thanks to those who were helpful in the preparation of this section

March,1934 John F. Rider

ATWATER KENT MFG. CO.

MODEL 165Q, 525Q
Schematic
Voltage



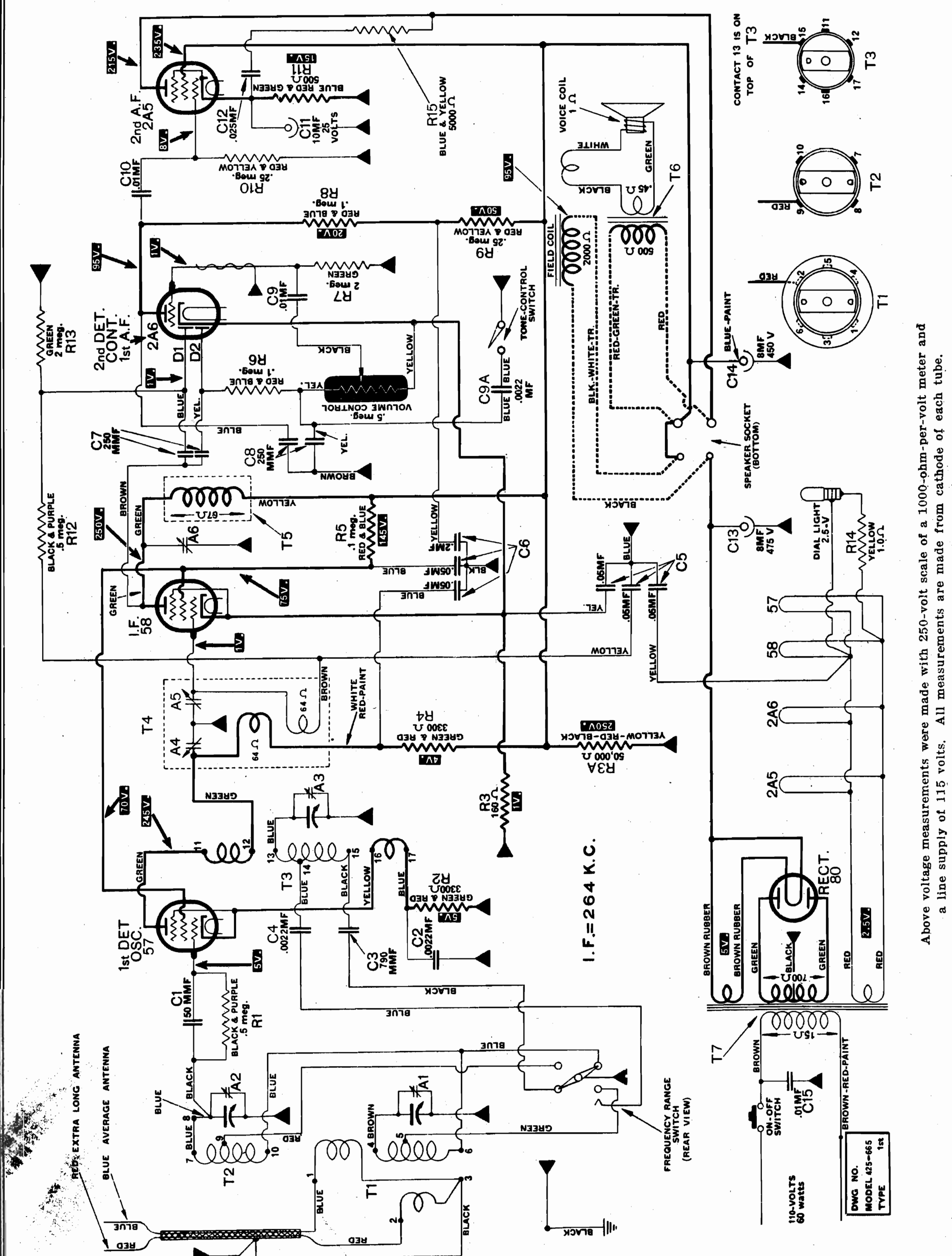
Total "B" voltage at time measurements were made equaled 135 volts. Tube voltages are taken from —F of each tube, using the 250-volt scale of a 1000-ohm-per-volt meter. Resistor R11 is used with 2-volt air cell, but is not used with 2-volt storage cell.

In Model 525Q, a 2-volt air-cell dial light (60 mils.) is connected across the filament circuit.

March, 1934.

MODEL 425,665
Schematic
Voltage

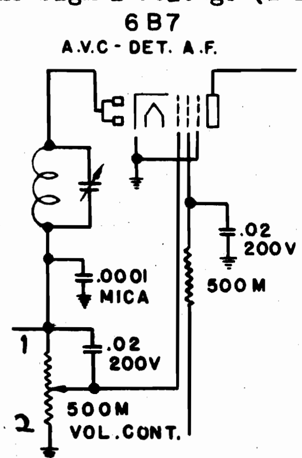
ATWATER KENT MFG. CO.



Duo-Diode Triodes and Pentodes 25-S,55,75,85,2A6,6C7,6B7 and 2B7 and equivalents used as combination detector, AVC and a-f amplifiers.

These tubes are used in any number of receivers and in several ways. In some instances only detector and a-f amplification is accomplished. In other cases all three functions are secured. With respect to the latter arrangement, there are several ways in which the diode elements may be employed. Without any attempt to associate the circuit shown with the receivers in which it is used, we shall show various applications of these tubes, as found in receivers included in Volume IV.

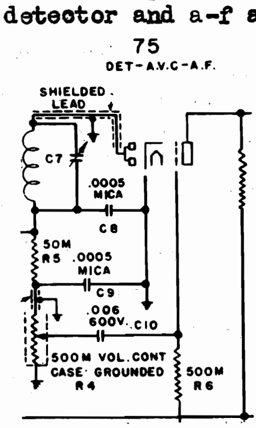
The 6B7 used as an AVC, detector and a-f amplifier is shown to the left. The signal voltage (i-f) is fed into the diode plates. These two plates are joined. The current between the diode plates and the cathode flows through the 500,000 ohm volume control. The direction of this current is such that point (1) is negative with respect to point (2) which is the chassis and also the junction for the 6B7 cathode. The r-f, mixer or i-f tubes, whichever is being subjected to the controlling bias is joined to point (1) along the 500,000 ohm resistor. The d-c voltage developed across this resistor is fed to the tubes being controlled as the automatic volume control bias.

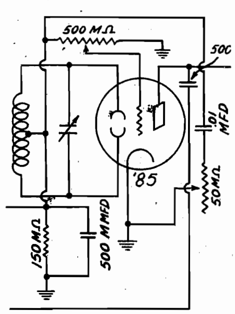


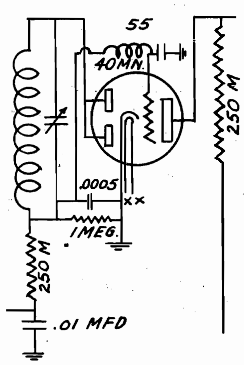
At the same time, the rectified current flowing through the volume control unit is the a-f signal and is picked up by the moveable arm of the potentiometer and is fed into the control grid of the pentode portion of this tube; is amplified and passed to the load unit contained in the plate circuit.

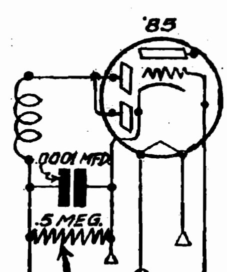
The stronger the i-f signal fed into the 6B7, the greater the current flow through the diode-cathode circuit and the greater the controlling bias fed to the tubes preceding the AVC-detector-a-f amplifier, thus reducing the amplification available with this tube and maintaining the output of the a-f portion of this tube at a constant level. Of course manipulation of the manual control shown, varies the output volume. The bypass condenser shown function to keep the respective currents out of undesired circuits.

The system shown can be considered as being basic with respect to the general use of duo-diode triodes and duo-diode pentodes. The circuit would function in like manner if the tube were a duo-diode-triode in place of the duo-diode pentode. In other words, the circuit function remains unchanged if the screen and suppressor grids are removed. The same is true if, instead of having just one resistor, the 500,000 ohm potentiometer constituting the load on the diode-cathode circuit, several series resistors were used; the fixed resistors apportioning the controlling bias for the other tubes, and the variable resistor (potentiometer) controlling the a-f input into the triode or pentode portion of the tube. A number of different arrangements of such AVC-detector and a-f amplifier circuits is shown below. The second schematic from the left





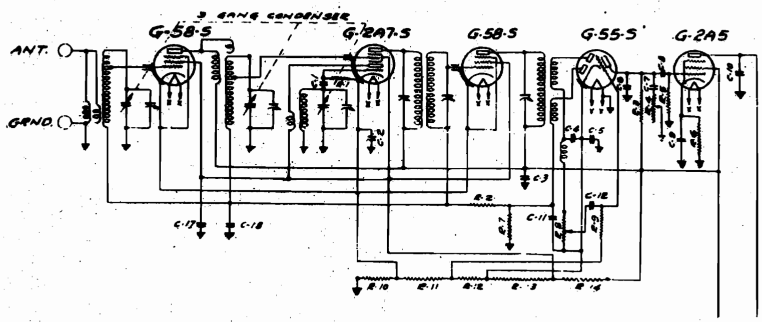




illustrates full wave rectification attained by employing a split or tapped input winding in contrast to the normal half wave form of rectification shown in the other schematics. In some instances filter networks are included so as to keep currents in correct paths.

Delayed AVC Systems

This system is used in many receivers, although not necessarily exactly as shown in the Majestic receiver illustrated. It is usually employed when a element or tube is used for detection and another for AVC.. At the same time, it might be well to state that all of the receivers which employ such use of the duo-diode tubes may not be employing the system for delayed AVC action. The Majestic receiver shown to the right uses two windings to feed the two diode plates.

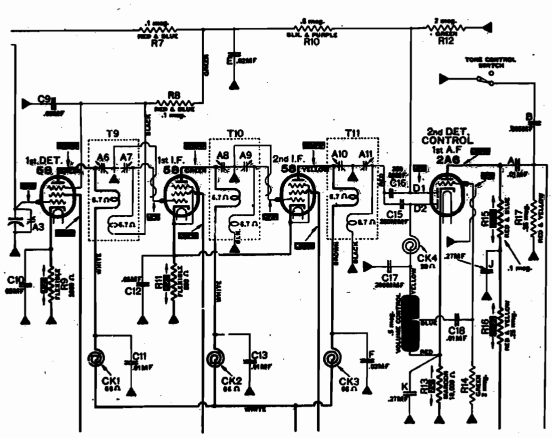


In operation, one diode plate is used for AVC action and the other diode plate is used for detection. Referring to the wiring diagram, the upper plate is used for detection. The rectified current flows between the upper diode plate and the cathode via the potentiometer R-8. The audio voltage devloped across this resistor is fed into the control grid of the triode portion of the tube.

The lower diode plate is used for AVC. The rectified current causes a d-c voltage to be developed across the resistors R-7,R-10,R-11 and R-12. Properly apportioned this voltage is fed to the control grids of the r-f, mixer and i-f tubes. Constants are selected so that the AVC action will take place only after the signal voltage reaches certain pre-determined values.

Automatic Selectivity Control

Use of the individual diode plates in the duo-diode triode for automatic selectivity control is shown to the left, as used in some Atwater-Kent receivers. It is possible that this same or closely similar system is used in other receivers. Examination of this schematic and reference to any other in question, will disclose whether or not the other circuits employ a similar arrangement.



Note that the two diodes receive their signal voltages via two fixed condensers, C-15 and C-16. The upper diode D-1 is used for the AVC action. At the same time,the 1st detector or mixer suppressor is joined to the same circuit. This functions as an automatic selectivity control.

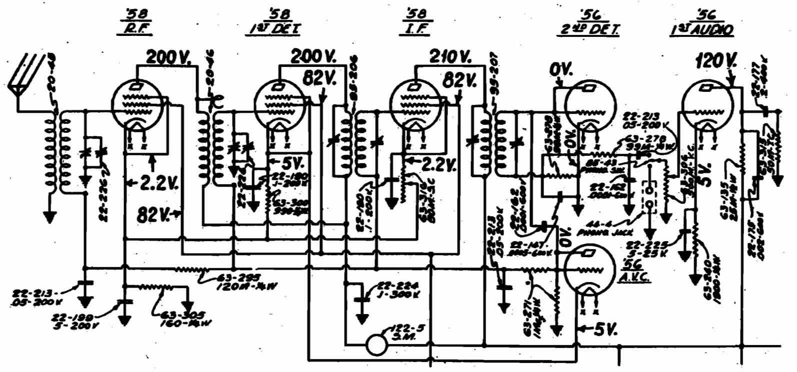
The lower diode, D-2 is used for detection. The rectified current flows thru the volume control potentiometer. The moving arm in series with the 0.01 mfd condenser C-18 feeds the a-f voltage into the control grid of the triode portion of the duo-diode-triode tube.

Referring again to the AVC portion of this receiver, you will note that the control grids of the r-f and i-f tubes are joined to the controlling resistance network.

Several of the Grunow (General Household Utilities) receivers shown in Volume IV make use of AVC and detector operation as stated above.

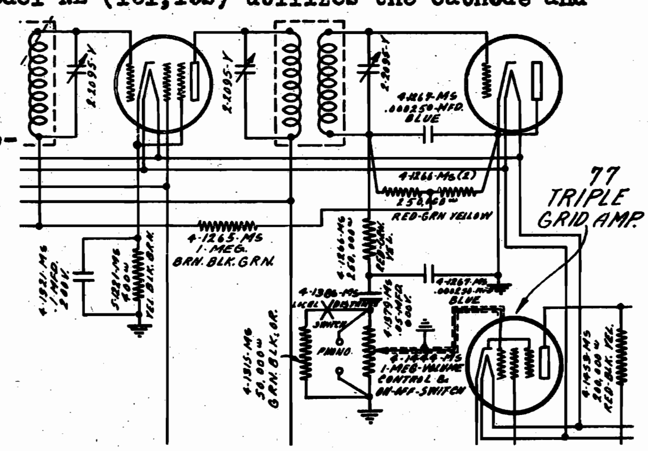
Diode Detectors

Quite a large number of the receivers shown in Volume IV employ the equivalent of two element diode detectors, made by joining the control grid to the plate or the plate to the cathode. Generally such systems employ a separate tube for AVC action and another tube as the 1st a-f amplifier. Several examples of simple diode detectors are shown below. One of these, the system used in the Zenith 770-B,775-B is typical of many. The 2nd detector has its control grid and anode (plate) joined to each other. The 500,000 ohm volume control in series with a 0.05 mfd condenser and a 99,000 ohm resistor is the coupling circuit to feed the a-f system.



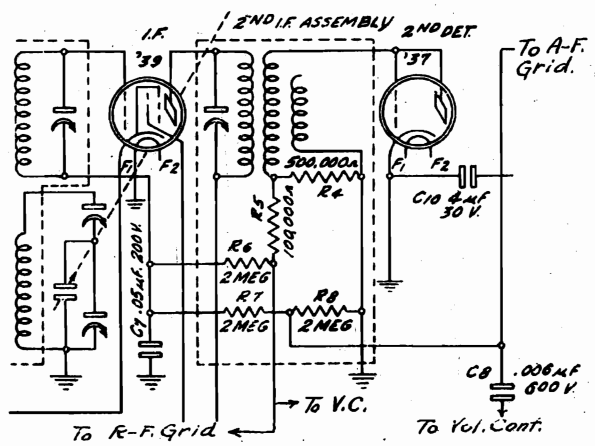
The AVC tube is shown directly beneath the 2nd detector tube. Its plate and grid are joined. The actuating signal is fed to the AVC tube from the high end of the grid winding feeding the 2nd detector tube, via a .0001 mfd fixed condenser. The controlling bias is fed to the grid circuits of the r-f, mixer and i-f tubes.

Some of the Fada receivers employ a diode detector for detection and AVC purposes.The system employed in the model NE (151,152) utilizes the cathode and plate joined. The load on the combination diode detector and AVC is the series combination of resistors connected between the low end of the input coil and the cathode. In reality this resistor arrangement is two resistors of 250,000 ohms each tapped at some suitable point which is at the junction between the two units.



The control bias is taken off at this point and fed to the grid circuits of the i-f and mixer tubes. The 250,000 ohm resistor;the 0.05 mfd condenser and the 1.0 megohm volume control constitute the coupling circuit between the combination 2nd detector-AVC and the 1st a-f tube. The .00025 mfd condenser between the diode cathode and the 0.05 mfd blocking condenser is the r-f bypass unit. The same is true of the .00025 mfd condenser between the diode cathode and the low end of its input winding.

Another interesting application of combination diode detector and AVC is that used in the Autolite 072-A receiver. The schematic is in Volume IV. The circuit to the left is the breakdown of the system.

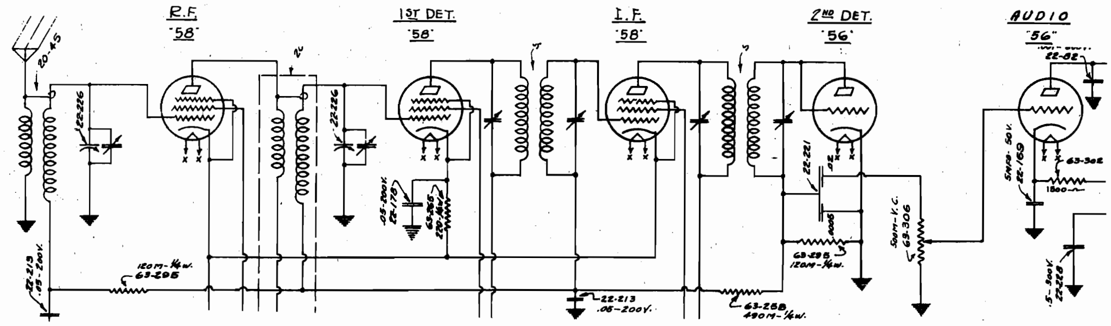


The AVC signal is fed to the i-f grid circuit via the 2.0 megohm unit R-6. The AVC signal for the r-f tube is fed to the control grid circuit via the 1.0 megohm unit R-3. The volume control unit is R-16 rated at 500,000 ohms. The moving arm picks off the desired a-f signal and feeds it to the a-f tube control grid through the .006 mfd condenser. The 2.0 megohm unit R-8 enables the application of the control grid bias to the 1st a-f tube.

When tracing the complete circuit as shown in the manual, remember that the the two plugs shown in the circuit are joined,one within the other.

Diode in Zenith 475,760,765,767 (Chassis 2054)

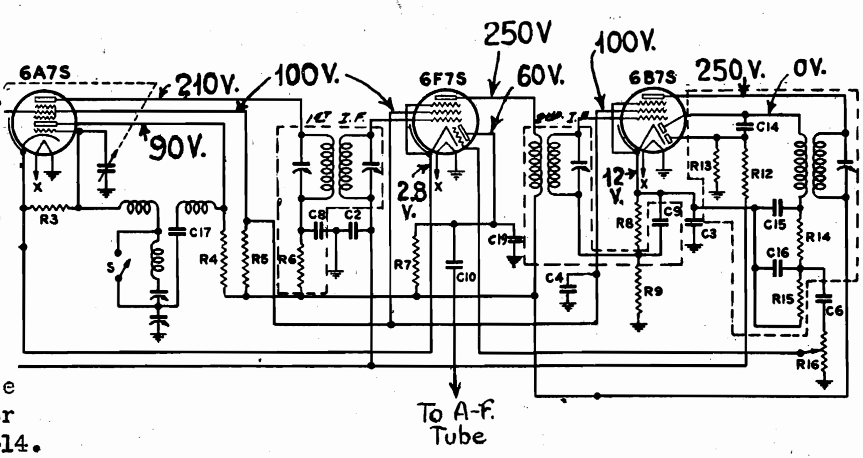
In this receiver, the a-f voltage developed across the diode load resistor is fed to the volume control via a fixed condenser of 0.02 mfd. The AVC voltage is fed to the r-f and i-f tubes, via resistance and capacity filters. The load on the diode rectifier is the 120,000 ohm resistor.



The Majestic 55,59,75,195,500,560,566 (Chassis 500)

An excellent example of reflexing is found in this receiver. The first i-f tube is used for i-f and a-f amplification. The second i-f amplifier is also used for detection and AVC. Reference to the schematic wiring diagram shows this interesting arrangement. Trace the path of the signal voltage into the first i-f tube. The amplified voltage is passed to the 2nd i-f transformer and then into the control grid of the pentode portion of the 6B7S. The amplified signal is fed into the primary of the 3rd i-f transformer.

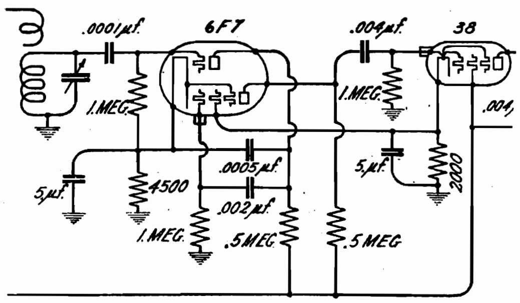
The signal appears in the secondary of this transformer and is fed directly into the upper diode plate and also into the lower diode plate via condenser C-14. The upper diode is used for detection and the lower diode for AVC action. Referring to the detector circuit, the a-f voltage appears across the resistors R-14 and R-15. It is taken off this network at the junction between R-14 and R-15 via the condenser C-6 and the moving arm on the resistor R-16.



It then is fed back to the control grid of the triode portion of the 6F7S tube and the amplified signal is fed to the control grid of the output tube via the coupling condenser C-10. The AVC signal is developed across resistors R-8, R-9 and R-13. Then it is applied to the mixer and i-f tubes (the 1st i-f tube) through the resistance-capacity filters shown.

Emerson "Mickey Mouse" 409,410,411,412 (A-4)

The 6F7 used in this receiver plays a dual role. It serves as a triode detector and a pentode a-f amplifier. The rectified signal appears in the triode plate circuit. The a-f signal is fed back to the control grid of the pentode portion of the tube through the .002 mfd condenser. It reappears, amplified in the plate circuit of the pentode portion and is fed to the output tube through the .004 mfd condenser.



Reflexing in the Wurlitzer C-4,M-4

This receiver is shown on page 4-1 in Volume IV. The 6B7 tube is used to accomplish four functions, namely i-f amplification,detection, AVC and also a-f amplification.

Referring to the diagram, the 6A7 feeds the i-f signal to the control grid of the pentode portion of the tube. The amplified i-f signal appears across the primary of the tuned i-f transformer in the plate circuit. This signal is then fed to the secondary of this transformer and into one of the two diode plates.

Rectification takes place and the a-f signal appears across the 1.0 megohm potentiometer. The a-f signal is taken off the potentiometer (Vol. Control) by means of the moving arm. The 300,000 ohm resistor and the .0002 mfd condenser keep r-f out of the circuit, that is, enable only the a-f signal to pass back to the control grid of the pentode portion of the 6B7. The tuned i-f winding in the grid circuit does not hinder the a-f signal.

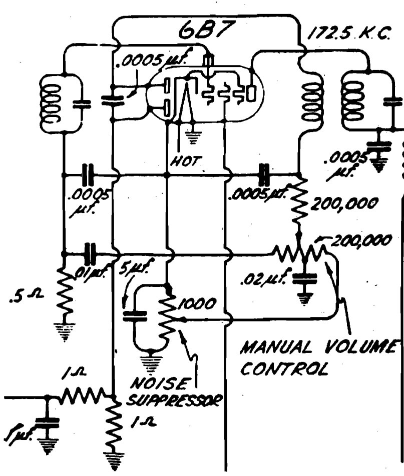
The amplified a-f signal again appears in the plate circuit of the 6B7 and is passed to the a-f output tube through the .01 mfd condenser and 50,000 ohm resistor.

The AVC action is secured by means of the signal which is fed from the pentode plate circuit to the other diode plate through the .00002 mfd condenser. This signal is at the intermediate frequency and represents but a small portion of the total i-f voltage present in the plate circuit. Rectification of the i-f signal causes a d-c voltage across the 1.0 megohm fixed resistor. This control voltage is fed to the control grid of the 6A7 through the 1.0 megohm filter resistor.

The various resistor and condensers which have not been mentioned but are found in the associated circuits, serve to maintain the correct current paths.

Reflexing in the 6B7.(I-f,A-f, Det, AVC)

Another version of reflexing in the 6B7 whereby four functions are accomlished is shown below. This particular circuit is used in the Emerson 678, Type 1. This circuit provides amplification at an intermediate frequency, detection, delayed AVC and a-f amplification.



Referring to the schematic diagram, the i-f transformer feeds into the control grid of the pentode portion of the tube. The amplified i-f signal appears across the i-f transformer primary in the plate circuit. This winding is coupled to the secondary of the same i-f transformer and the i-f signal is fed back to the upper diode plate. It also is fed to the lower diode plate via the .0005 mfd condenser shown connected to the diodes. More about the second diode later.

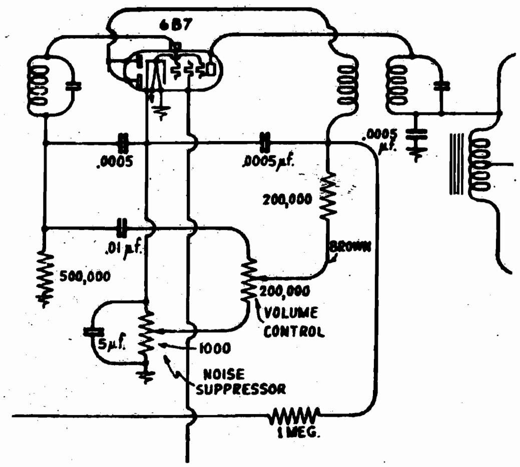
The upper diode is employed for detection. An examination of the circuit shows that the 200,000 ohm volume control potentiometer is a part of the rectifying or detector circuit. The portion of the complete volume control which is present in the detector circuit, depends upon the setting of the control knob. Now, it should be understood that the a-f voltage is developed across whatever portion of this resistor remains in the detector circuit. If the moveable arm were shifted to the extreme left end of the 200,000 ohm potentiometer, the entire unit would be in the circuit and the maximum voltage would be developed. If the arm were moved to the extreme right end of the control, the minimum voltage would be developed.

Assuming that some value of a-f voltage is developed across the volume control potentiometer, it then is passed back to the control grid of the 6B7 pentode via the .01 mfd condenser and the tuned i-f transformer secondary. The 200,000 ohm resistor and the .0005 mfd condenser related to the secondary of the output i-f transformer keep i-f currents out of the reflexed audio system. Thus the action of this a-f volume control is somewhat different than the conventional. After the a-f signal has been passed into the control grid circuit, it again reappears amplified in the plate circuit and passing through the primary of the output i-f transformer, it passes through the primary winding of the a-f transformer.

Referring to the AVC circuit, the i-f signal passed to the lower diode plate is rectified in the diode plate-cathode circuit containing 1.0 megohm resistor and the 1000 ohm noise suppressor resistor, which also supplies the minimum bias for the 6B7 tube. The rectified signal, properly bypassed with condensers develops a d-c voltage across the diode -cathode rectifier and the controlling voltage is fed to the r-f and mixer control grid systems.

While it is true that the system shown in connection with this discussion is native to the Emerson 678, very similar systems are to be found in many other receivers shown in Volume IV.

Another version of reflexing in the 6B7 is shown below. This is very similar to the previous circuit, except for the fact that rectification for the production of the a-f and AVC voltage is accomplished at the same time and with the same diode plates. A brief explanation of this circuit might not be amiss.



The i-f signal is introduced into the control grid circuit of the 6B7. The amplified reproduction appears in the plate circuit; in the primary of the output i-f transformer. Being coupled to the secondary, the i-f signal is fed back to the two diode plates, which are joined to each other.

As is evident in the schematic, the detector circuit contains the 200,000 ohm fixed filter resistor and the .0005 mfd condenser, which tend to keep i-f currents out of the a-f circuit. This circuit also includes the 200,000 ohm potentiometer a-f volume control; that is, that portion of the control left in the circuit between the moveable arm and its connection to the 1000 ohm potentiometer in the 6B7 cathode circuit.

For any a-f volume control adjustment other than maximum volume, the a-f volume control acts as a divider. However, a-f voltage being developed across the active portion of the unit, the audio signal is fed back to the control grid circuit of the 6B7 through the .01 mfd coupling condenser and the tuning i-f winding. The a-f signal, properly amplified reappears in the plate circuit and without being impeded by the i-f transformer primary is passed to a-f winding which feeds the output tubes.

Concerning the AVC voltage, this is developed at the time that the a-f voltage is produced in the detector circuit. By tapping into the detector circuit at the intersection of the output i-f transformer secondary and the 200,000 ohm resistor, the proper AVC voltage is secured for the mixer and r-f tube control grids.

This system like the other, different perhaps in constants, will be found in numerous receivers listed in Volume IV.

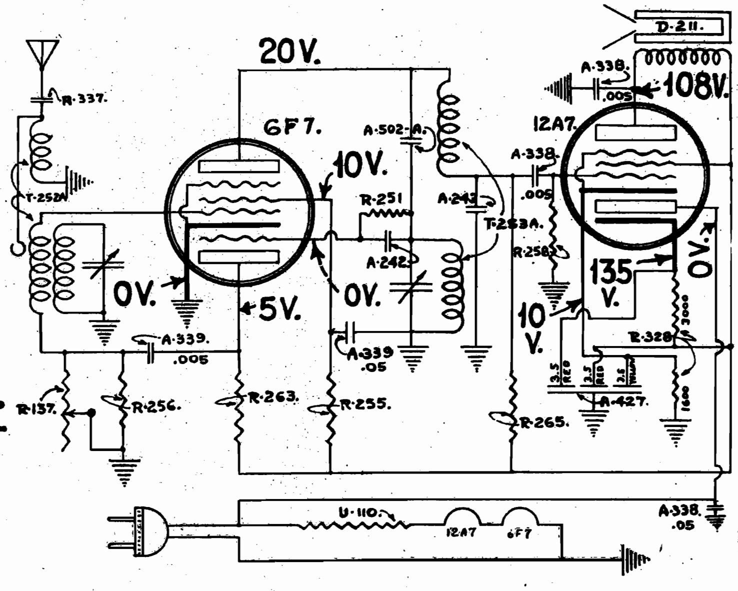
When aligning receivers which employ a separate diode plate for the AVC signal, it is usually possible to ground this plate so as to render the AVC system inactive. However, it is best, whenever possible to avoid grounding any live circuits and to supply as weak a test signal as is available, so that alignment will be possible without setting off the AVC system.

Obviously, those receivers which employ a common junction between the two diode plates and both are used for detection and AVC must be aligned with a weak signal.

Reflexing in the International Kadette Jr. (R-f, Det, A-f)

This receiver employs only two tubes. One of these, a 6F7 accomplishes three functions, namely, r-f amplifier, detector and a-f amplifier. The other tube, a 12A7 is described elsewhere in this supplement.

The production run of this receiver entailed four different changes. All of these types are shown in Volume IV, but only one will be shown in this discussion. It is needless to illustrate all of the types because they differ primarily in the location of the volume control. As far as the reflexing system is concerned one illustration will suffice.



As is evident the tube contains one cathode, four grids and two plates. The cathode is common to all the elements within the tube. Actually this tube is two tubes in one; a pentode and a triode. Reading from bottom to top, the elements are as follows: triode plate, triode control grid, common cathode, pentode control grid, pentode screen grid, pentode suppressor and pentode plate.

The r-f signal is fed into the pentode control grid. Amplified it reappears in the pentode plate circuit (the upper plate). It is significant to note that this plate circuit contains a winding which links the pentode plate with the input of the output tube. At the same time, the plate circuit is also coupled to another tuned circuit through a condenser A-502-A. Since the winding which joins the pentode plate to the output tube offers a high impedance to r-f currents, the signal will pass to the tuned circuit.

As is evident this tuned circuit contains a grid leak and condenser and is a part of the control grid system of the triode portion of the tube. This is the detector input circuit. The rectified signal then appears in the plate circuit of the triode and is fed to the control grid of the pentode via the coupling condenser A-339 of .005 mfd. The volume control is in effect a variable resistor across the control grid to chassis circuit.

The amplified a-f signal again appears in the plate circuit of the pentode, but in this case, its path is through the winding to the blocking condenser A-338 and to the output tube control grid. The actual load upon the plate circuit of the 6F7 pentode at audio frequencies is the 0.25 megohm resistor R-265. The a-f currents do not flow through the previously mentioned coupling condenser A-502-A because its impedance at audio frequencies is very much greater than that of the winding. Thus the 6F7 tube acts as an rf amplifier, detector and a-f amplifier, the first and third functions being performed by the pentode section. The detector action by the triode section.

Tuning and Noise Control In Howard Model "Y"

The schematic wiring diagram of this receiver is shown in Volume IV on Howard Page 4-5. The "Y" designation must be added to the models shown in the corner card listing. The data shown in solid lines constitutes the "X" models. The additions shown in dotted lines comprise the change to the "Y" models.

Referring to the diagram, this receiver provides for tuning and noise control in the following manner. The i-f signal is fed to the diode plates of the 6B7. The load on this portion of the duo-diode pentode tube is the 500,000 ohm resistor

#2763. Current flow through the diode plate-cathode circuit establishes a d-c voltage across this resistor. AVC voltage is fed to the r-f, mixer and i-f tubes through the 200,000 ohm resistor which joins the diode tube load.

At the same time, the a-f voltage which is also developed across the same resistor is fed to the a-f tube through the 200,000 ohm resistor in series with the .05 mfd condenser and the 500,000 potentiometer type of volume control. This unit is designated as 2725. It is significant to note two other facts. One of these is the location of the neon tuning indicator in the plate circuit of the pentode portion of the 6B7. The other is the electrical connection between the control grid of the 6B7 and filter resistor joined to the duo-diode load. At the present moment we are considering only the solid lines.

From what has been said, the 6B7 performs the role of 2nd detector and AVC. If for a moment we assume the passage of a signal through the tube, so that a controlling negative bias is applied to the r-f, mixer and i-f tubes, a negative voltage will also be applied to the contre, grid of the 6B7, since that element joins a common junction with the aforementioned control grid returns.

The application of a negative bias upon the control grid of the 6B7 will naturally reduce its plate current. The reverse is naturally true. If there is no signal passing through the 6B7, its plate current will be maximum, since there is no negative bias being applied to the control grid. This is the situation when the receiver is not tuned to a station. The result is that the neon tube glows with maximum brightness. The design of the receiver is such that this glow flashes the word "detuned".

When a signal is applied, the negative bias is applied; the plate current is reduced and the neon tube contains a shorter column of brilliant light and the word "tuned" is visible. It is apparent that the finer the tuning, the less the light in the neon tube. (Complete instructions pertaining to the adjustment of this tuning light accompany the service data in Volume IV. See page Howard 4-4.)

Now for the noise control. Reference to the schematic wiring diagram will show that the control grid of the noise control tube (shown in dotted lines) also is connected to the point of negative potential which supplies the various tubes in the receiver. Furthermore the screen of the noise control tube joins the screen of the 6B7. On the other hand the plate of the noise control tube joins the screen of the 1st a-f tube. Let us now see what happens.

During the time that the receiver is being tuned and no signal is heard or rather,no signal is passed into the 6B7, the preceding tubes are functioning with maximum gain. Normally this would result in noise. However, since there is no negative bias on the noise control tube, its plate current is quite high. As a matter of fact it is so great that it reduces the voltage at the screen (to which it is joined) of the a-f tube and also the plate voltage of the a-f tube, to the extent that this tube does not amplify. Consequently, the receiver output is quiet.

When a station is tuned in accurately, the maximum bias (negative) is applied to the control grid of the noise suppressor; its plate current is reduced to minimum and the voltage at the screen and plate of the a-f tube are maximum and greatest gain is secured.

The 25-Z-5 Rectifier

This tube, quite commonly used in the modern universal AC-DC receiver is in reality two half wave rectifiers contained in one envelope. The envelope contains two anodes, two cathodes and a double filament or heater. The anodes and cathodes are independent, whereas the two heaters have a common connection and are used in series.

When employed as a conventional half wave rectifier, the two anodes are joined in parallel and the two cathodes are joined in parallel. Because of the design of the rectifier, it is possible to employ each set of anode-cathodes as an individual half wave rectifier. At the same time, one set of elements comprising a half wave rectifier can be employed to feed one load and the other set can be used to feed an entirely separate load.

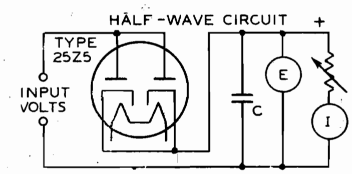
Since the complete rectifier with the elements connected in parallel is rated at 100 milliamperes, it is simple to understand that each pair of elements comprising a half wave rectifier would be rated at 50 milliamperes.

A salient feature of the 25Z5 is the ability to supply an output voltage, when used on an AC line, which,without recourse to a step-up power transformer, will be about twice the value of the input voltage. In other words, the tube can be used in a voltage doubler circuit.

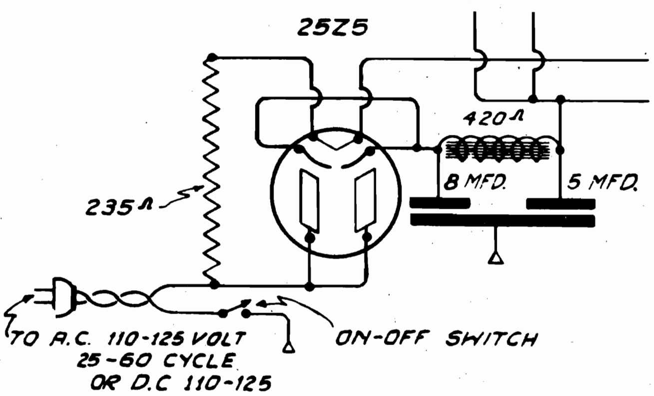
The three items mentioned thusfar are to be found in abundance in AC-DC receivers illustrated in Volume IV. It might be well at this time to offer basic circuits illustrative of the conditions mentioned. This to be followed by some examples of the practical applications.

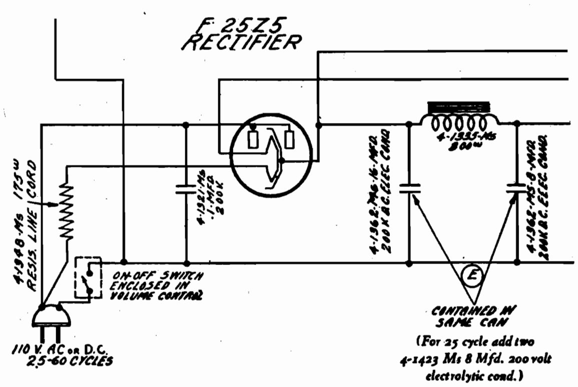
The 25-Z-5 As A Conventional Half Wave Rectifier

An examination of the basic half wave rectifier application of the 25-Z-5 as shown in the schematic wiring diagram to the right will bring to light the fact that the rectifier is located in one leg of the power supply line. The condenser C represents the condenser normally connected across the output of the rectifier system. The normal filter choke is not included since the circuit shown functions as a means of illustrating the elements.



With a d-c input, the output voltage is practically constant regardless of the load. With a-c input, the output voltage is determined to a large measure by the value of the filter condenser C. Furthermore, the regulation is also determined by the value of capacity. The variable resistor shown in the diagram indicates the load resistance. For any constant load and constant value of capacity at C, the output voltage varies if the line voltage is changed. Based upon exact operating conditions and constants, an increase in line voltage of from zero to 12 percent above 110 volts may cause an increase in voltage of from zero to perhaps 18 volts. On the other hand a reduction in line voltage of from zero to about 12 percent below 110 volts may cause a reduction in output voltage of from zero to about 18 volts. Two examples of how the

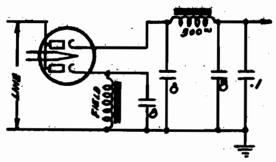




25-Z-5 is used as a conventional half wave rectifier in commercial receivers are shown above. The fixed resistor associated with the rectifier heater is the voltage reducing resistance. The lead emanating from the rectifier heater joins the filaments or heaters in the receiver tubes. In some instances, the schematic wiring diagram may show all the heaters in the receiver isolated from the remainder of the tube elements, inclusive of the rectifier heater, in which case the rectifier envelope would contain the anodes and cathodes only, at least, it would be so illustrated.

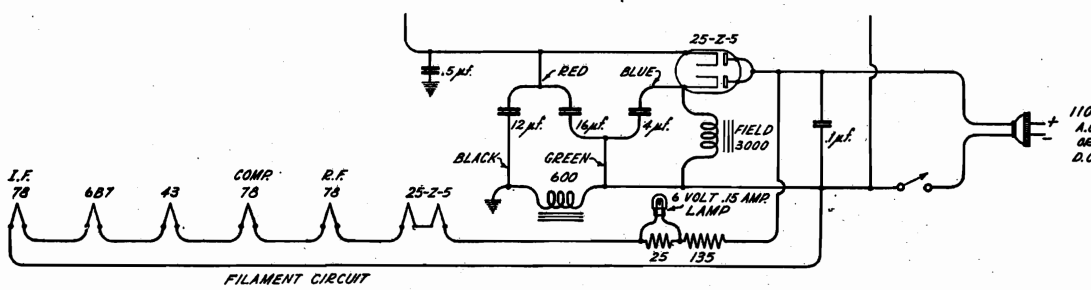
The 25-Z-5 With Split Output

By split output is meant the use of one half wave rectifier section to supply one load circuit and the remaining half wave rectifier section, to supply voltage to some other load. A typical circuit is shown to the left. The two anodes are joined and connect to one side of the power supply line. Each related cathode is connected to its load. In numerous cases, one of the cathodes supplies the field current and the other cathode supplies the tube plate currents.



The advantage gained by employing the 25-Z-5 as two independent half wave rectifiers is one of increased output voltage. Its use is possible when the total receiver tube plate and screen current is less than that required for the excitation of the speaker field. The increased plate voltage is possible because the voltage regulation of the tube is such that greater output voltage is available when the tube plate and screen current load is applied to one rectifier and the field current is the load upon the other rectifier, than when the combined currents constitute the load upon the two rectifiers connected in parallel. In other words a 30 milliampere drain upon one rectifier and a 40 milliampere drain upon the other rectifier will make available greater output voltage for the tubes (which require the 30 mil current) than if the tubes were being supplied by the two rectifiers connected in parallel and being operated at a drain of 70 milliamperes.

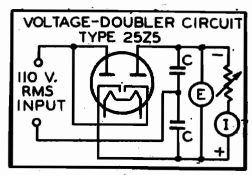
Concerning the illustration shown above, the upper set of elements obviously supplies the plate and screen voltages to the tubes in the receiver. The lower set of elements supplies the field excitation current. The rectifier heaters and the filament or heaters employed in the remaining tubes do not alter the arrangement. Their connection in the circuit is not altered by the arrangement of the rectifying elements. It is of course possible that one or more of the voltage supply leads joined to one of the rectifier cathodes may not be connected through the filter choke, However, this does not alter the fundamental circuit as shown. A practical example of such a rectif-



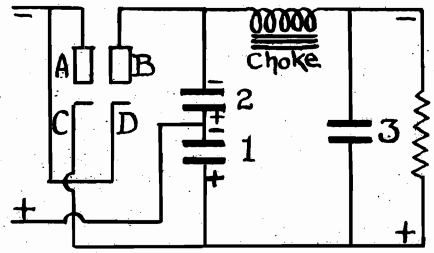
ier system, inclusive of the heater circuits is shown above.

The 25-Z-5 As A Voltage Doubler

We made mention of the fact that this rectifier enables voltage doubling without the use of a step-up power transformer. The action is accomplished by so charging condensers that the charges are additive and when the condensers discharge across the filter system, the voltage across the filter is equal to approximately twice the input a-c voltage. Of course, the voltage doubling action takes place only when the tube is used on a-c power supply lines. The circuit of the basic voltage doubler system as found in the broadcast receivers shown in Volume IV is shown to the right of this paragraph. Let it be known that this system is the most commonly used circuit, although it is not the only possible voltage doubler arrangement.



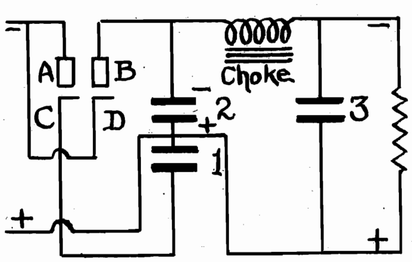
To best comprehend this circuit, it is necessary to first realize the relation between the condensers (C) which are charged by the rectifier output and the load circuit. Neglecting the actual charging action for the moment and assuming that the variable resistor represents all of the related units which follow after the condensers connected across the rectifier output, it is easy to see that when and if the two condensers (C) discharge; they discharge across the entire load. Thus, if a voltage is present across the two condensers, that voltage is present across the terminals of the load resistor. With this in mind, we can progress to a more complete representation of the voltage doubler circuit. The illustration to the right of these lines is the equivalent to be found in commercial radio receivers when the voltage doubler circuit is used and the control switch is set to AC. The actual switching arrangement whereby the circuit is changed to DC and the action taking place under such conditions will be discussed later.



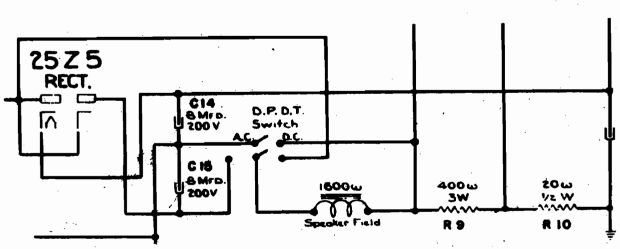
Let us consider the schematic shown above. We note the two anodes "A" and "B" and their respective cathodes "C" and "D". The fixed condensers (1) and (2) are those designated as C in the preceding diagram. The third condenser (3) is the reservoir condenser. Suppose that at one instant, the anode "A" is positive with respect to the other side of the power line. Current will flow between "A" and "C" and condenser (1) will be charged to some value approximating the line voltage and with the polarity shown.

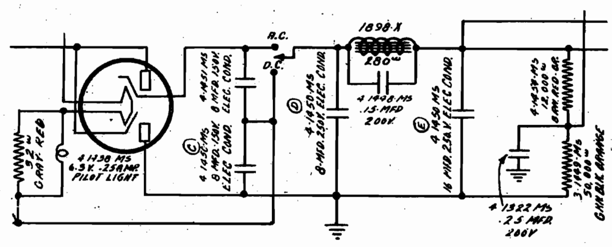
During the next half cycle the other side of the line becomes positive and condenser (2) is charged to the polarity shown and the current path is via anode "B", cathode "D", back to the line. The value of the charge applied to condenser (2) is approximately the line voltage. Now, if you examine the diagram, you will note that the relative polarities are such as to place the two condensers in series, that is, place the two charges in series so that the total charge across the two extreme terminals, (outside terminals) of the series combination, is equal to the sum of the individual charges. Since each condenser is charged to approximately the line voltage, the total voltage across the series combination is equal to approximately twice the line voltage and the voltage doubling action has been attained. The voltage across the condenser (3) will be approximately the voltage across the series combination of (1) and (2). The choke is employed for the purpose of filtering. The output voltage then is appropriated among the various tubes in the receiver.

What happens when the control switch is set to the DC position? This change in circuit wiring is effected in the simplest manner. The transposition of one lead is sufficient to effect the change. Examine the circuit to the left of this paragraph. As far as the number of components is concerned, it is identical to the AC voltage doubling arrangement. But, if you examine closely you will note that the plus or positive lead in the filter system has been disconnected from cathode "C" and has been joined to the power line circuit. Tracing the circuit from the positive power lead, we pass through the filter choke, through the voltage divider resistor or the load resistor, through anode "B", cathode "D", to the negative side of the line. Condenser (3) is still across the output of the filter and condenser (2) is still across the output of the rectifier. Condenser (1) is not used. Neither are the rectifier elements "A" and "C" used.



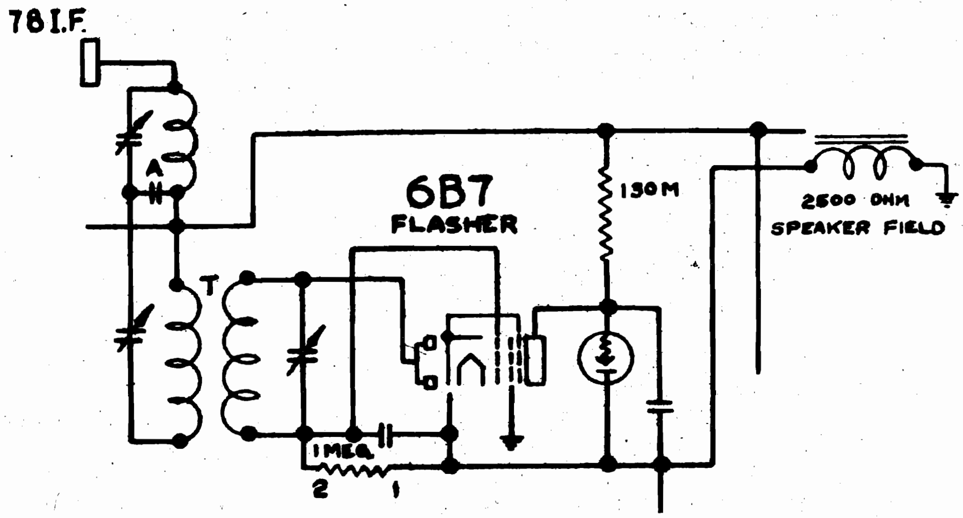
Two examples of AC-DC systems using the voltage doubler on AC are shown below. Note the different switching arrangements when changing to DC.





SILVERTONE 1722,1732,1722X,1732X

A breakdown of this receiver shows the use of a 6B7 tube especially for the tuning light circuit. The complete circuit of the receiver is shown in Volume IV and the breakdown is shown herewith.



The function of this part of the receiver is somewhat on the following order. A portion of the i-f signal voltage, that existing across the condenser "A", is impressed upon the diode part of the 6B7. Note that the two diode plates are joined. The voltage is fed to the 6B7 via the sharply tuned transformer "T", which is wound with litz wire. The rectified signal current flows through the 1.0 megohm resistor from point (1) to point (2), so that point (2) is negative with respect to point (1).

The control grid of the 6B7 is connected to point (2) and the cathode to point (1). As the signal is tuned in, the voltage across the 1.0 megohm resistor increases, increasing the negative control grid bias on the 6B7, thereby reducing its plate current. The reduction of the 6B7 plate current means a decreased voltage drop across the 130,000 ohm resistor, making available an increased voltage across the tuning flasher. When the signal is properly tuned in, the plate current of the 6B7 is sufficiently decreased to allow the neon lamp to glow. Until the signal is tuned in, the 6B7 plate current is sufficiently high to allow sufficient drop across the 130,000 ohm resistor to prevent the neon lamp from lighting. The sharply tuned transformer insures that voltage , that is sufficient voltage, is not developed across the neon flasher until the signal is accurately tuned in.

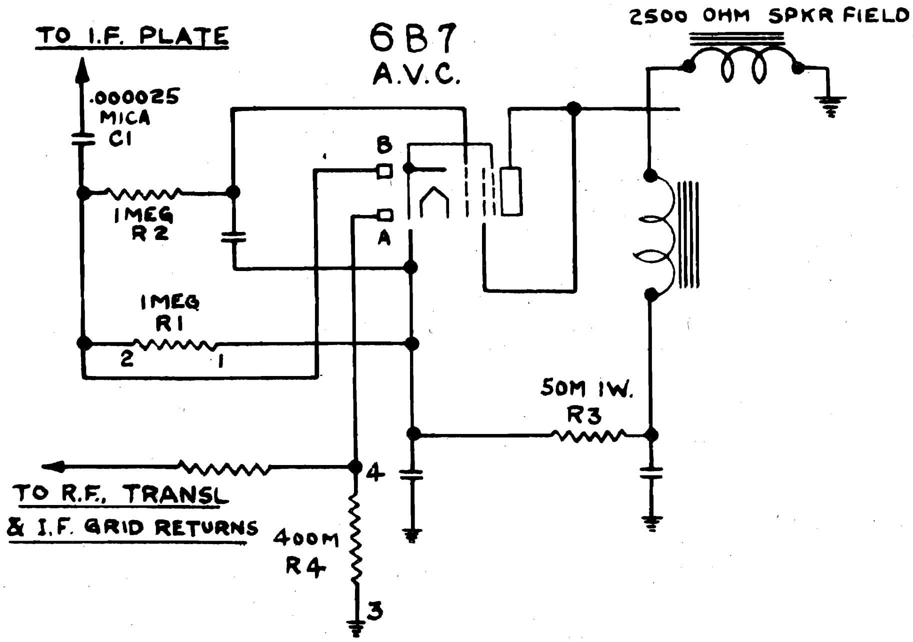
To peak the tuning light flasher transformer, tune in a station whose strength is just about sufficient to operate the neon light. Then try retuning it very accurately by ear. If the flasher transformer is off calibration, the light will go out when the station is tuned in accurately. With the station accurately tuned in, adjust the transformer tuning condensers until the neon bulb lights.

Some of these receivers have a 500 ohm sensitivity control; some have a 1000 ohm unit and some have a 1000 ohm control with a 1000 ohm resistor shunted between the moveable arm of the control and ground. The tuning flasher action of those receivers which have a 1000 ohm sensitivity control, but no 1000 ohm shunting resistor can be made more sensitive by the addition of one. The part number is R-6793, 1 Watt.

These same receivers also employ a special AVC circuit shown on the page following. If there were no plate current through the 6B7, its cathode would be negative with respect to the diode plate "A" by the amount of the voltage drop across the 2500 ohm speaker field winding. However, because of the 6B7 plate current and consequent voltage drop across the 50,000 ohm resistor, the cathode potential of the

6B7 is raised so that it is approximately 15 volts positive to diode plate "A".

A portion of the i-f signal is fed through C-1 to diode plate "B". The resulting current, flowing through R-1 creates a voltage drop across it with point (1) positive with respect to point (2). This voltage is impressed through R-2 onto the control grid of the 6B7. This increased negative control grid bias decreases the plate current and the voltage drop across R-3. As a consequence the cathode bias with respect to ground decreases. This is equivalent to saying that diode plate "A" becomes positive with respect to the cathode. Current therefore flows from diode plate "A" to the cathode, creating a voltage drop across R-4 with point (3) positive with respect to point (4). Since the grid returns of the r-f, translator and i-f stages are connected to point (4), the voltage drop across R-4 is impressed on the control grids of these tubes.



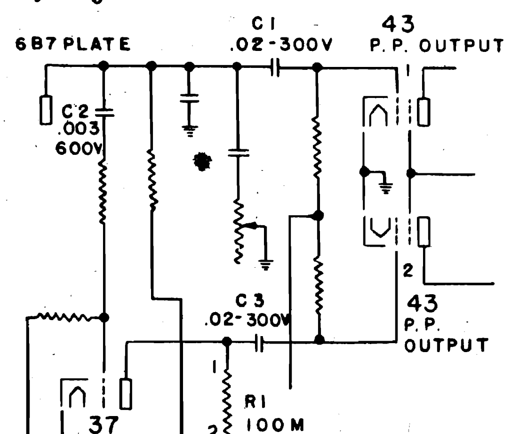
This negative bias, which varies in step with the strength of the signal, controls the amplification of these tubes. An increase in signal strength is offset by a decrease in tube amplification so that the output of the i-f stage tends to remain at a constant level. Because the cathode is 15 volts positive with respect to the diode plate "A", the AVC action is delayed until the received signal is strong enough to cause diode plate "A" to go positive with respect to the cathode. In this way the full sensitivity of the receiver is maintained for weak stations.

In the event that coil replacement makes trimmer re-alignment necessary, proceed as follows: Tune in a weak broadcasting station of known frequency. Set the tuning dial accurately. Then adjust the trimmer condenser mounted on the frequency selecting switch assembly, for maximum output. After the oscillator trimmer has been adjusted, adjust the two trimmers on the pre-selector and transalator sections of the ganged condenser. Then with very weak test signal input, adjust the trimmer mounted on the ganged tuning condenser end plate.

Silvertone 1750

The combination oscillator-mixer and the 6B7 tube used as AVC, 2nd detector and a-f amplifier in this receiver are described elsewhere in this special section, in connection with the 6A7 and the 6B7 tubes. However the phase changer circuit used in the audio frequency amplifier system deserves special mention.

The complete circuit of the receiver is shown in Volume IV. The phase changer circuit is shown to the right of this paragraph. In any push-pull system, the polarity of the signal voltage applied to one of the output tubes, must be opposite to that applied to the other control grid, Ordinarily



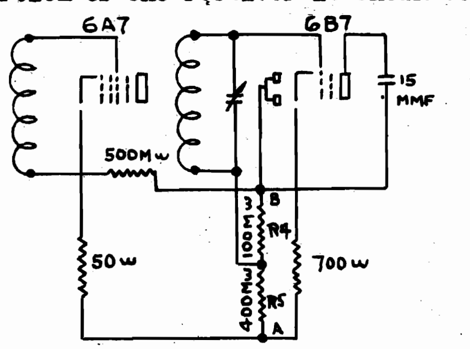
this phase change is secured by means of the push-pull input transformer. However the model 1750 Silvertone receivers do not employ transformer coupling. Instead, resistance -capacity coupling is utilized. Consequently some other means of accomplishing the required phase relation between the signal voltages applied to the output tubes, is required.

The means employed is the use of an added and individual tube, the '37, whose purpose is solely to change the phase of the signal voltage applied to one of the output tubes. This is accomplished as follows: Let us assume that at any one instant the signal voltage at the plate of the 6B7 is positive. Signal voltage of similar polarity is applied to the control grid of output tube 1 and also to the control grid of the phase changer tube. As is shown in the diagram the control grid of output tube 2 is joined to the plate of the phase changer tube through the coupling or blocking condenser C3. The phase relation between voltages in the grid and plate circuits of a vacuum tube is such that approximatly 180 degree rotation is secured. Such is the case in the phase changer tube, so that the signal voltage fed to the control grid of the output tube 2, is 180 degrees out of phase with the signal voltage applied to output tube 1, and the proper phase relation esists across the control grids of the output tubes. The constants of the circuits related to the phase changer tube are so apportioned that the signal voltages applied to the output tube control grids are of like magnitude, despite the amplification gained in the phase changer tube.

This phase changer tube is used in several other models of Silvertone receivers. A system which is similar in basic operation although not necessarily in exact constants, will be found in several receivers shown in Volume IV, made by a number of different manufacturers and which employ resistance coupled audio systems with push-pull output.

Silvertone 1700,7062

The i-f, AVC circuit used in this receiver is quite interesting. This portion of the receiver is shown below. In order to correctly interpret the operation of this circuit, it is necessary to also refer to the wiring diagram of the complete receiver. It should be understood that the 6B7 tube shown is utilized solely for i-f and AVC operation. A separate tube is used for the combination oscillator-translator or mixer and a separate tube is used as the 2nd detector. The breakdown circuit shown to the left does not indicate the i-f transformer connected between the 6B7 plate and the input of the 2nd detector. Neither is the plate winding of the 6A7 tube shown.

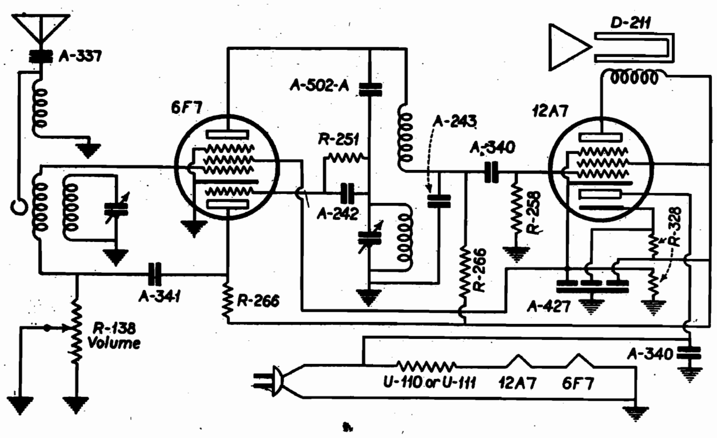


In operation, this system functions on the following order: A portion of the i-f signal existing in the plate circuit of the 6B7 is fed back to the diode plates through the 15. mmfd condenser. This is not necessarily reflexing because the triode portion of this tube is used as the i-f amplifier. The diode current resulting flows through the 100,000 ohm resistor R-4 and the 400,000 ohm resistor R-5. The direction of the current flow is such that point "A" is positive with respect to point "B".

Since the 6A7 tube cathode joins point "A" and its control grid joins point "B", the oscillator-translator is negatively biased by an amount equal to the voltage drop across resistors R-4 and R-5. The minimum or residual bias for the 6A7 is supplied by the 50 ohm resistor. The voltage across R-4 and R-5, consequently the bias applied to the 6A7 by the 6B7 tube, is proportional to the strength of the i-f signal. A portion of this R-4,R-5 voltage is also applied to the control grid of the 6B7. This is the voltage across the R-5 unit. The minimum or residual bias for the 6B7 is developed across the 700 ohm unit. A strong signal increases the drop across R-4 and R-5; the negative bias on both tubes and reduces the amplification available with these tubes. The net result of the system is that the output of the i-f system tends to remain at a constant level. To peak the i-f transformers properly, it is necessary to render the AVC circuit inoperative. This can be done by shorting resistors R-4 and R-5.

Rectifier-Power Pentodes

The 12A7 representative of this tube is used in the International Kadette Jr. F. It consists of a half wave rectifier and a power pentode contained in the same envelope. The elements reading from bottom towards the top are as follows: the rectifier cathode, rectifier anode, power pentode cathode, power pentode control grid, pentode screen, pentode suppressor and pentode plate.



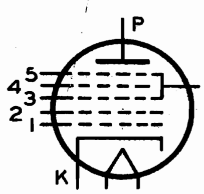
There is nothing really radical in the circuit arrangement of the rectifier-power pentode system, other than that the load on the rectifier system is the plate to chassis, screen to chassis circuit of each tube.

Neglecting the 6F7 system used in this receiver and described elsewhere in this issue, the path of the rectifier system is of the following order. One side of the power supply circuit is grounded. We also note that the cathode of the pentode portion of the tube is connected to the chassis via the lower resistor R-328. We further note that the control grid of the pentode portion is also grounded through the grid leak resistor R-258. The values are not important, since complete details are contained in Volume IV.

If we now trace the other side of the power line, we find that the circuit joins the rectifier plate or anode. Tracing further, we find that the rectifier cathode is connected to the upper resistor R-328 and thence to the pentode plate through the speaker winding and also to the pentode screen direct. Both sides of the resistor in the rectifier cathode circuit are bypassed to ground. The return path from the plate of the pentode to the chassis is via the cathode and the circuit is completed; the tube impedance representing the load on the rectifier. The same is true of the reflexed 6F7 tube.

The 6A7 Tube. (Also 2A7)

The 6A7 tube like some of the other recent innovations is really two tubes in one. The tube is known as a pentagrid converter. It contains a heater, a cathode, five grids and a plate. The electrode arrangement is shown to the left. The usual function of this tube is as a combination mixer and oscillator, with elimination of the normal forms of inductive, capacitative or resistance form of coupling between the oscillator and mixer systems.



ELECTRODE ARRANGEMENT

K=CATHODE
1=OSCILLATOR CONTROL GRID
2=OSCILLATOR ANODE-GRID
3 & 5=INTER CONNECTED GRIDS—IDENTIFIED AS SCREEN
4=SIGNAL CONTROL GRID FOR MIXER FUNCTION
P=PLATE

In as much as the usual methods of showing this tube correspond with the arrangement shown above, it is quite simple to identify the structure and related circuits when examing wiring diagrams. It is significant to note that the anode or plate utilized in the oscillator portion of the receiver is in real ity a grid, employed as a plate.

The 6A7 and the 2A7 differing in heater voltages only are true examples of oscillator-mixer arrangements wherein electronic coupling is employed. Note that the cathode is common to both the oscillator and the mixer portions. Further that the electrons which reach the plate are influenced by the voltages present in the control grid and plate circuits of the oscillator system, in as much as the control grid and plate of the oscillator are located between the common cathode and the mixer plate.

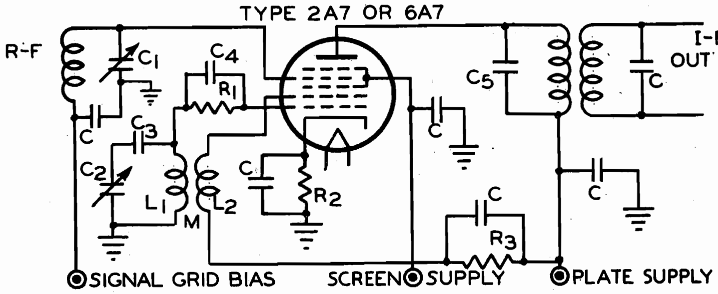
In operation, electrons emitted from the cathode can be controlled in their flow to the oscillator anode (grid 2) by grid 1. The oscillator grid circuit, therefore can be operated to oscillate at whatever frequency is required. The electron stream flowing through grid 1 will naturally be modulated at this frequency. Since the oscillator anode is really a grid, the modulated electron stream also comes under the influence of grid 3, which is operated at a positive potential with respect to the cathode. Consequently the electron stream is accelerated toward the plate P.

Now, the application of a signal voltage to the control grid 4, still further modulates the electron stream, which is already modulated at the oscillator system frequency, thus producing in the plate circuit, currents which are the various combinations of the oscillator and signal frequencies. The plate circuit of the combination mixer-oscillator contains the tuned primary of the i-f transformer, hence is resonant to this one frequency only. The final result is that the intermediate frequency only, is present across the secondary of the i-f transformer.

The basic circuit of the 2A7 and 6A7 pentagrid converter is shown to the right of this paragraph. The constants of the various components shown are of little importance at this time. It should be understood that the circuit as shown is typical of the mode of application, yet, is not a true circuit of any particular receiver. Examples of such will follow later.

TYPICAL PENTAGRID CONVERTER CIRCUIT

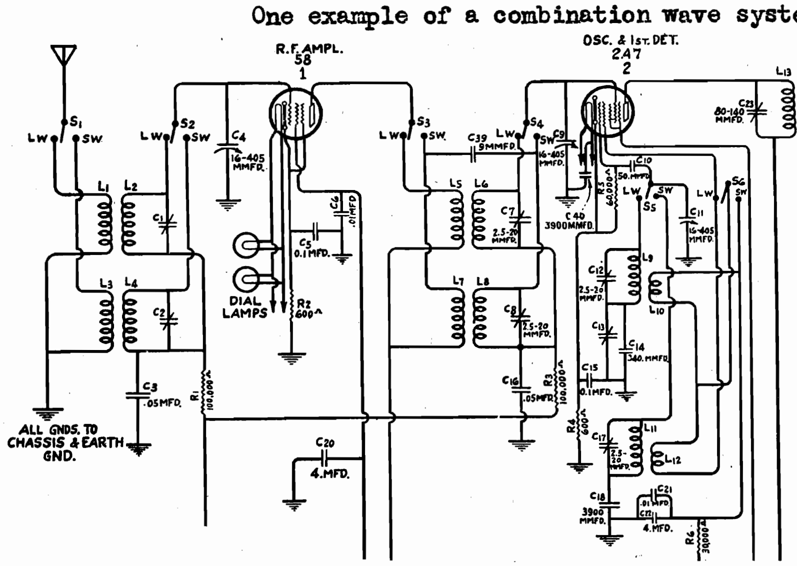
TYPE 2A7 OR 6A7



C = 0.1 μf.
C1 = } GANGED VARIABLE CONDENSERS
C2 = }
C3 = PADDING CONDENSER
C4 = GRID CONDENSER OF 200 $\mu\mu$f.
L1 = OSCILLATOR GRID INDUCTANCE } COUPLED
L2 = OSCILLATOR PLATE INDUCTANCE }
M = MUTUAL INDUCTANCE OF L1 & L2
R1 = OSCILLATOR GRID LEAK
R2 = SELF BIASING RESISTOR
R3 = VOLTAGE REDUCING RESISTOR OF 20,000 OHMS (USED ONLY WHEN PLATE VOLTAGE IS OVER 200 VOLTS)

The major items of interest in this schematic are the connections between the r-f input winding and the tube elements and the connections between the oscillator windings L-1 and L-2 and the tube elements. It is apparant that the circuit shown is intended to function over one band of frequencies only. Receivers designed to cover a band of frequencies are equipped with switches whereby the r-f input circuit and the oscillator grid and plate circuit windings are changed so as to adapt them for the required range or the complete tuned circuits are switched.

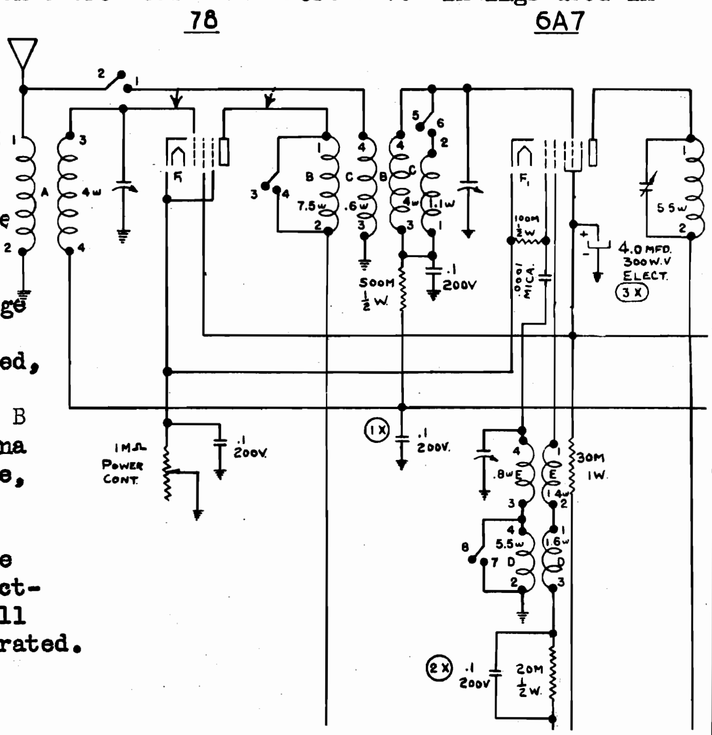
One example of a combination wave system, which employs complete circuit changes in connection with the 2A7 tube is shown to the left. Note how switches 1 and 2 change the complete r-f input transformers from one waveband to the other. Switches 3 and 4 change the detector input r-f transformers. Switches 5 and 6 change the oscillator transformers. Switch 5 controls the grid windings and switch 6 controls the oscillator plate windings. The main tuning condensers required for the various circuits, remain untouched. Examine the oscillator plate circuit. Note that



when switch 6 is in the "LW" position, it short circuits the short wave plate winding

L-12, leaving the broadcast wave oscillator plate winding L-10 in the circuit. On the other hand when S6 is in the "SW" position, it short circuits the broadcast wave plate winding L-10 and keeps L-12 in the circuit. The circuit being discussed is used in the RCA-Victor 121,122 receiver. When the receiver is adjusted to the broadcast band, all of the switches are simultaneously operated.

An interesting wave changing arrangement is shown below. It is used in the Silvertone 1708 receiver. Note that broadcast and short wave windings used in the oscillator plate and grid systems are connected in series. For broadcast reception both pairs of coils E and D remain in series. For short wave reception, the oscillator grid winding D is shorted, leaving only the short wave oscillator grid winding E, in the circuit. However, both oscillator plate coils remain in the circuit.



Concerning the change in the r-f circuit, when switching to the short waves, the 78 tube is not used, and when the switch connected to the antenna is closed, it connects winding B into the circuit and couples the antenna to the detector input. At the same time, the detector input circuit is changed, when its related switch is closed, by shunting the short wave coil across the broadcast coil, thus reducing the inductance to the proper value. Naturally, all of the switches are simultaneously operated.

Wave Changing Arrangements.

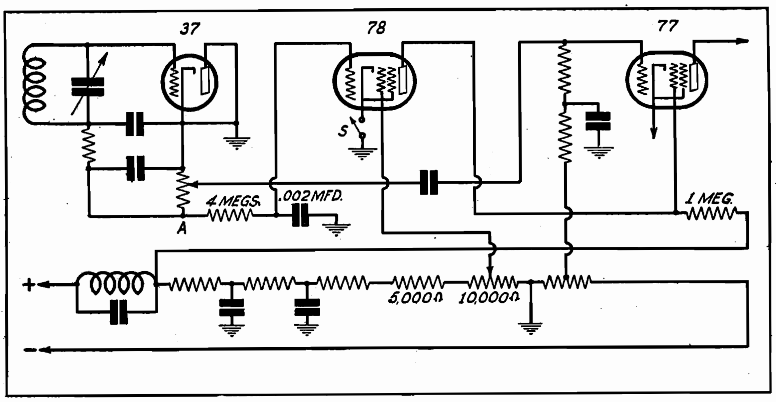
Two forms of wave changing arrangements were discussed in connection with the 6A7 tube. It is of course readily understood that the wave changing system is not limited to any one type of oscillator-mixer system. Various forms of wave changing can be used with separate mixer and oscillator tubes. One of these is shown in the Philco 17 on page 4-12 Philco in Volume IV. Taps are provided upon the respective windings. The entire coil is used for the broadcast band. When required to change to the short wave band, switches close the circuit between the taps and effectively short circuit the portions of the windings between the taps. Only the plate winding or rather the oscillator plate winding of the 6A7 tube remains intact, not being equipped with either taps or switches.

A combination of tapped coils and shunted coils is used in the Stromberg-Carlson model 64 receiver shown on Stromber Page 4-16 in Volume IV. The r-f and mixer input circuits are equipped with tapped coils. The taps are shorted when the set is adjusted for short wave work. On the other hand, the 6A7 oscillator control grid winding is in two parts. One, the larger winding, is used for broadcast reception. For short wave work, another and small winding is shunted across the broadcast coil, thus reducing the inductance of the combined oscillator control grid winding.

Philco Squelch Circuit

Several Philco receivers, notably the models 16 and 17 shown in Vol. IV contain squelch circuits operated in conjunction with AVC. A simplified version of the AVC and QAVC system in the aforementioned receivers is shown upon the page following The diode AVC tube has been omitted, in as much as its function is quite well understood. The a-f volume control shown in the regular schematic has been replaced by the potentiometer A. The actual schematic of the 16 differs somewhat from the 17, but the operation of the squelch system is substantially the same, hence the one simplified diagram will suffice, particularly if it is first studied in connection with the Philco

17 and then applied to the model 16 receiver. Referring to the simplified version shown, the diode 37 rectifies the signal and the a-f signal voltage is fed to the 77 a-f tube through the series condenser.



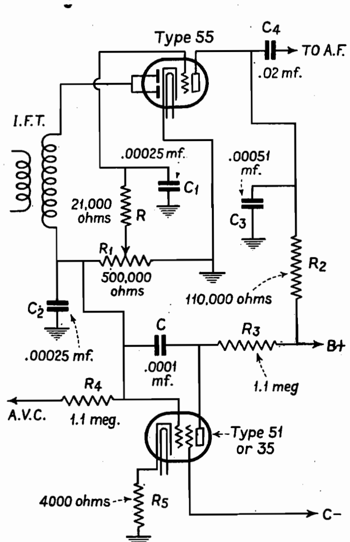
At the same time, the control grid of the 78 squelch tube receives a negative bias, by virtue of the connection to the 4.0 megohm resistor. The switch S in the cathode circuit of the 78 determines its presence in the system. The plate of the 78 is joined to the screen of the a-f amplifier, the 77 and influences this screen voltage in such manner as to allow proper amplification by the 77 tube or to prevent proper amplification by the a-f tube.

The action of the circuit can best be described by considering total absence of a signal. Since the regular AVC tube functions only when a signal of proper magnitude is applied to the control grid of the diode 37, all stages preceding the rectifier would be functioning with maximum gain, until a signal is tuned in. Assuming that there is no signal, the control grid of the squelch tube (the 78) would have no negative potential upon it and the plate circuit would draw considerable current. This high current drain would cause an appreciable drop across the 1.0 megohm resistor and reduce the screen voltage of the 78 to so low a value as to cause cutoff and lack of amplification. Thus absence of noise until the signal is properly tuned in.

When the signal is tuned in, the squelch tube control grid receives a negative potential. This causes a reduction in plate current and a decreased drop across the 1.0 megohm resistor, resulting in the application of the proper potential to the a-f tube screen grid and naturally, proper amplification by that tube.

Stewart-Warner Automatic Tone Control and Noise Suppressor

The model 110 Stewart-Warner receiver employs a novel arrangement whereby the input capacity of a vacuum tube is caused to vary over an extremely wide range, by virtue of the change in mutual conductance of a related tube, caused by the application of an AVC voltage. The net result is noise suppression during the time that the signal voltage is low and the AVC is not functioning in order to afford maximum sensitivity. At the same time the higher audio frequencies are reduced in intensity. The same system is inoperative during the passage of loud signals so that there is no interference with the proper passage of the full range of audio signals. The circuit of the complete receiver is shown in Volume IV, page 4-3. The simplified version is shown to the left of this paragraph.



The operation of the circuit shown is as follows: The i-f signal voltage is applied across the diode-plate-cathode circuit. Rectification takes place and the a-f voltage appears across the 500,000 ohm potentiometer volume control R-1. The moving arm applies the a-f voltage to the control grid of the triode portion of the 55.

If you examine the wiring diagram, you will note that the amplified a-f voltage is passed to the a-f tube via the ,02 mfd condenser. Also that the plate of the triode portion of the 55 is tied to the plate of the 35 or 51 (whichever tube is used),through the resistors R-2 and R-3. In addition, the negative end of the volume control potentiometer is tied to the control grid of the suppressor tube, thus being tied in with the AVC system. A constant minimum negative bias is also applied to the control grid of the suppressor tube because of the 4000 ohm cathode resistor R-5. The 1.1 megohm resistor, R-4, is a filter resistor in the AVC circuit.

You will further note the presence of a .0001 mfd condenser C, connected between the control grid and plate of the noise suppressor tube. It is also significant to mention that the input circuit of the noise suppressor tube is in effect shunted across the output circuit of the diode detector, namely across the 500,000 ohm a-f volume control.

From this point on it is necessary to consider the action taking place within a vacuum tube, with respect to inter-electrode capacity. The effective input capacity of a vacuum tube or the dynamic capacity between the control grid and ground is a function of the various inter-electrode capacities, the mutual conductance of the tube and the operating potentials applied to the tube, which in turn affect the mutual conductance. One of the important inter-electrode capacities is that existing between the control grid and plate. The greater this capacity, with other values constant, the greater the effective input capacity. In addition the greater the mutual conductance of the tube, the greater the input capacity. When working with high mu tubes and if it is possible to realize the full mutual conductance of the tube, it is possible to secure a dynamic input capacity equal to several hundred times the static input capacity, that is, the capacity between control grid and ground, when the tube is static or not operating.

If by arranging the noise suppressor circuit in such manner that a variable condenser is in effect shunted across the 500,000 ohm a-f volume control, and if this variable capacity is actuated by the AVC voltage so that the capacity is high at very low signal intensities and is low at high signal intensities, an effective and automatic tone and noise control is accomplished. Such is the case in this system.

The .0001 mfd condenser C, connected in shunt with the control grid and plate of the suppressor tube furnishes a minimum static capacity between these two elements so that during operation, the dynamic capacity (input) reaches a value that is sufficiently high to properly bypass noise signals and to minimize the high audio frequencies. At the same time, by virtue of the other constants of the circuit, the presence of the .0001 mfd condenser between the suppressor tube control grid and plate does not hinder the audio signals when the suppressor tube is not intended to function.

The operating state of the noise suppressor tube is produced by the absence of a negative bias upon the grid of the suppressor, which condition exists with low signal input into the diode 55. When this condition exists, the mutual conductance of the noise suppressor tube is extremely high and the input capacity is also extremely high, maybe several hundred to perhaps 1000 times as high as the static input capacity. As soon as a signal is applied to the diode, a negative voltage is applied to the suppressor tube and its plate resistance increases and its mutual conductance decreases. This relation continues to advance as the signal strength increases and the tone control action is minimized, due to the reduction of the effective input capacity of the suppressor tube. By suitably apportioning the operating potentials it is possible to so arrange the noise suppressor tube action, that its greatest effectiveness exists during that period when greatest amount of noise may be encountered.

PERPETUAL

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VOLUME IV

by

JOHN F. RIDER

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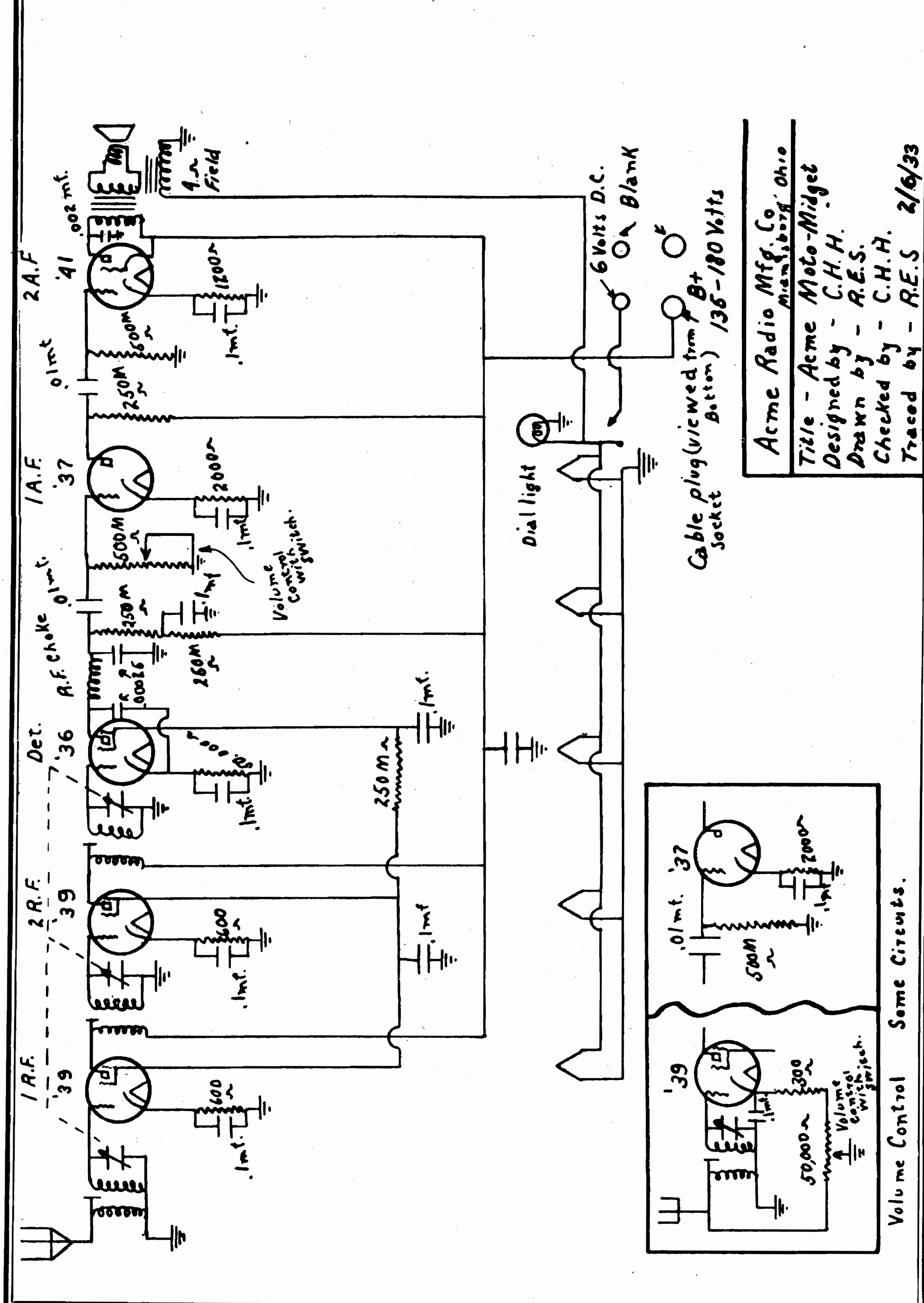
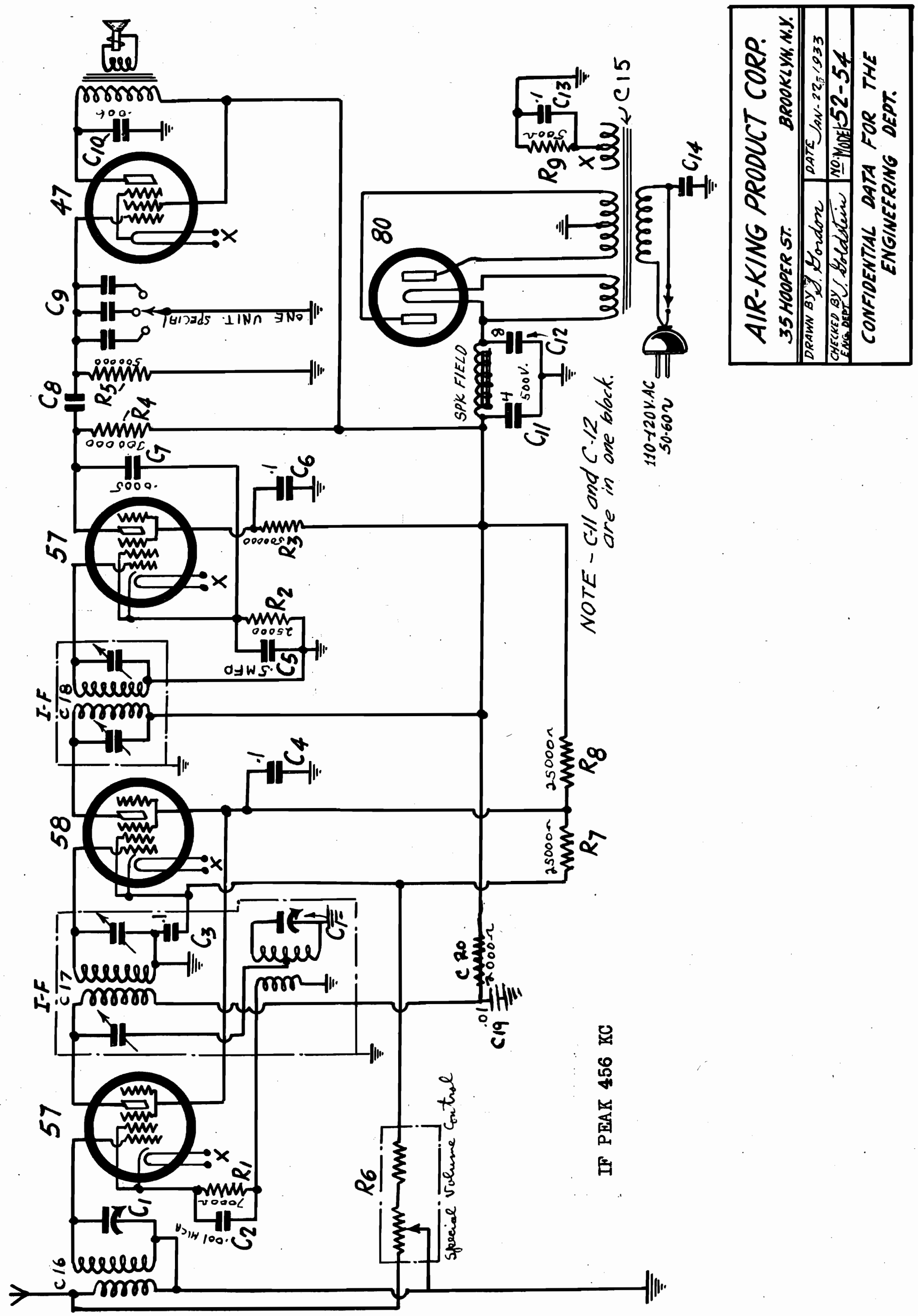
MODEL Moto-Midget

ACME RADIO MFG. CO.



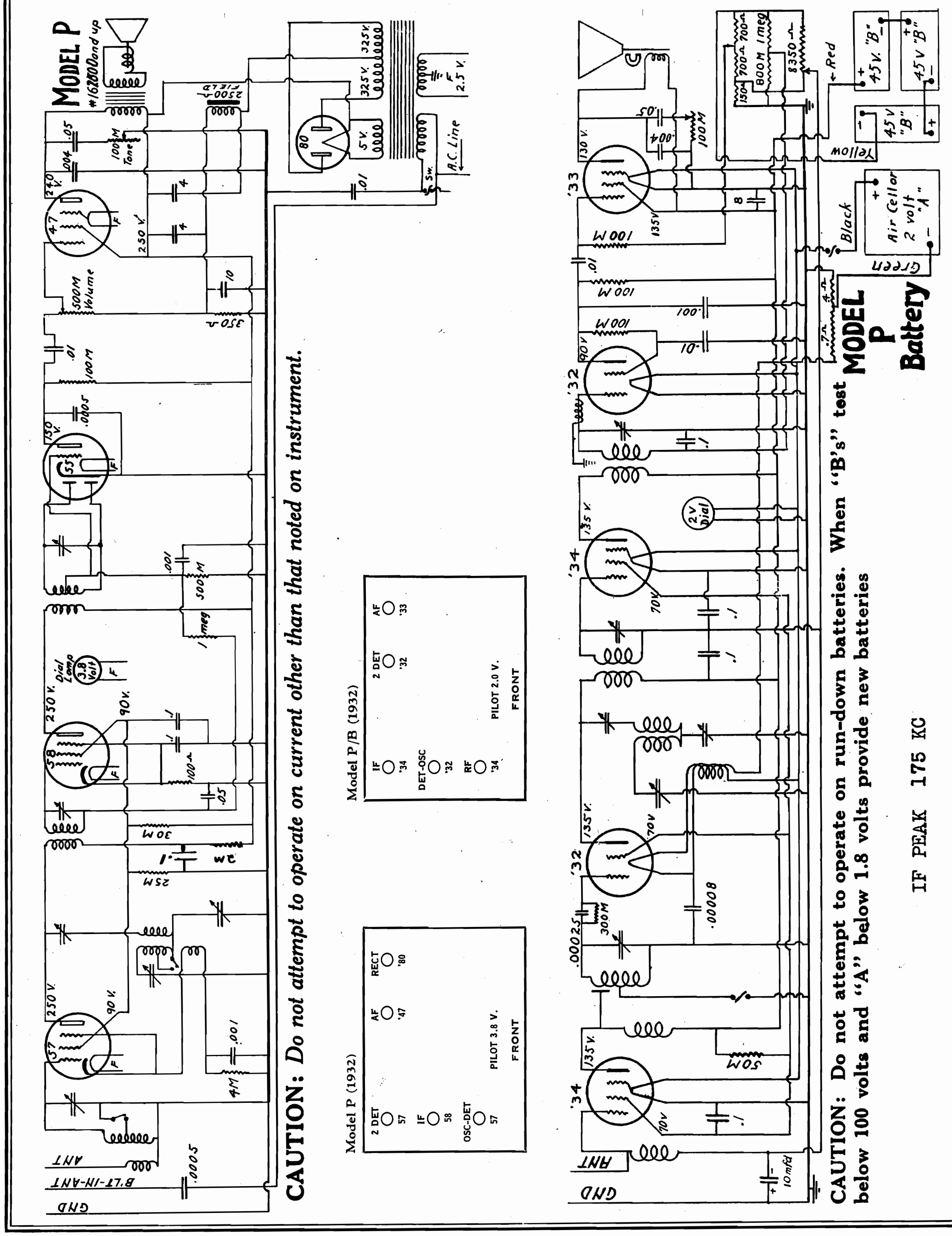
AIR KING PRODUCTS CORP.

MODEL 52-54



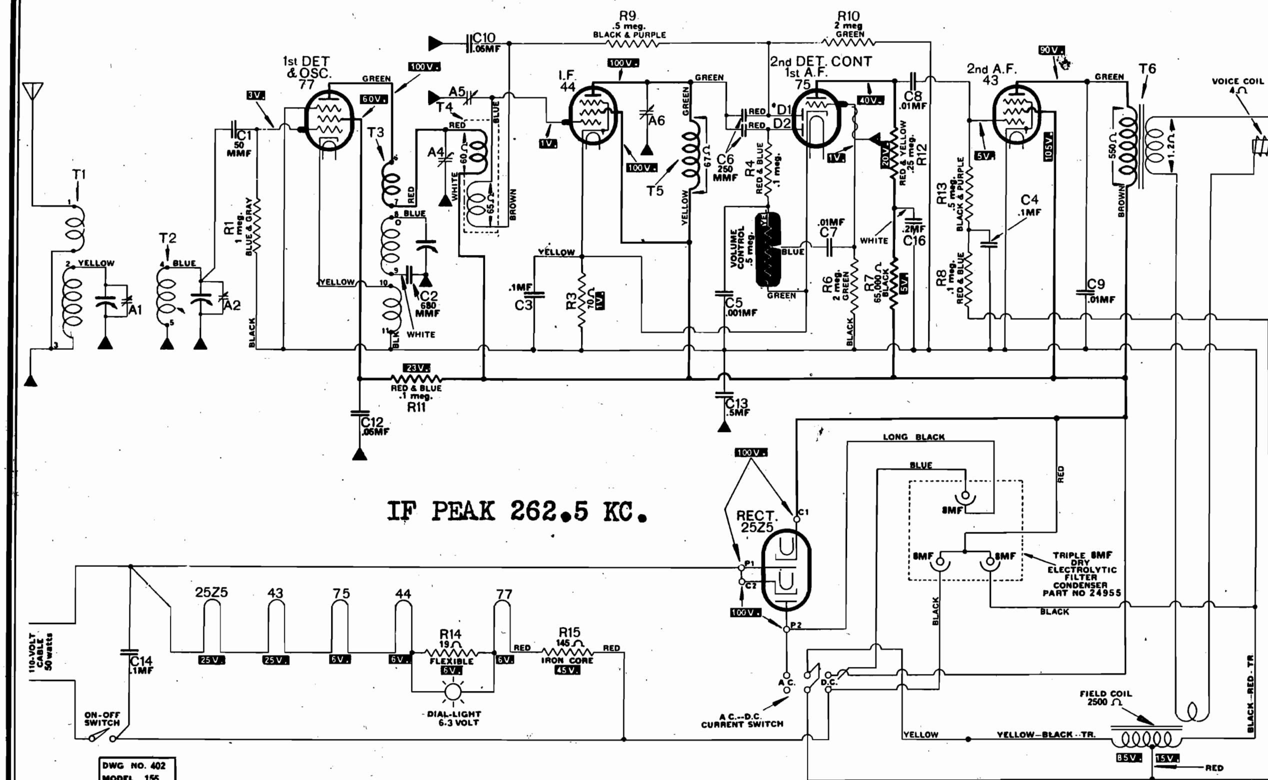
ALLIED RADIO CORP.

MODEL KNIGHT 6 Tube
Dual Wave A-C
KNIGHT 6 Tube
Dual Wave Battery

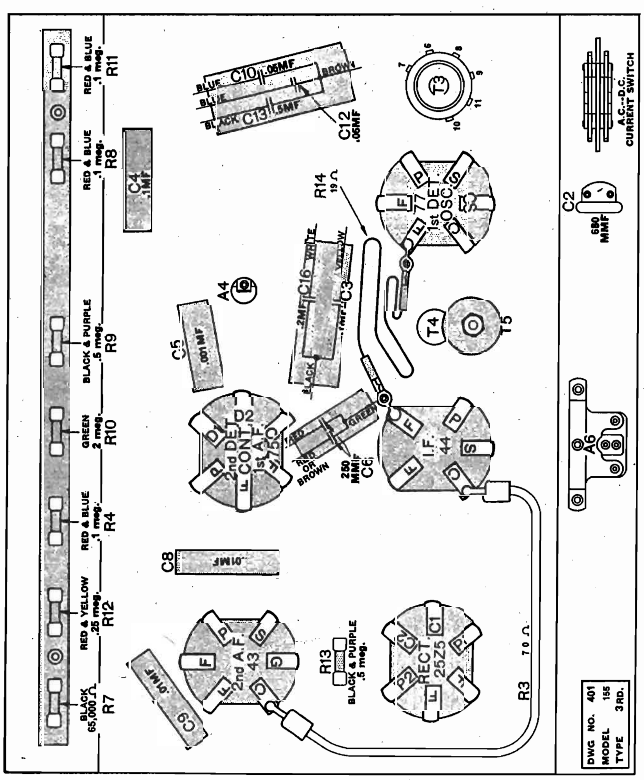


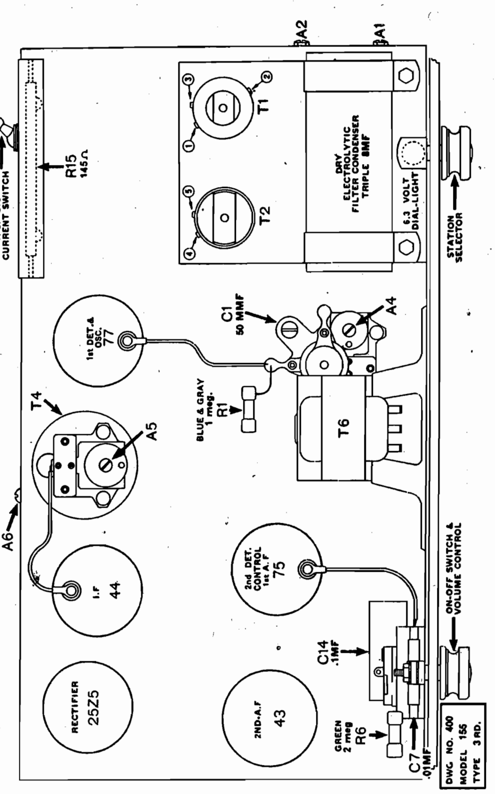
MODEL 155 (3rd type)
above serial 7088700
Schematic, socket

ATWATER KENT MFG. CO.



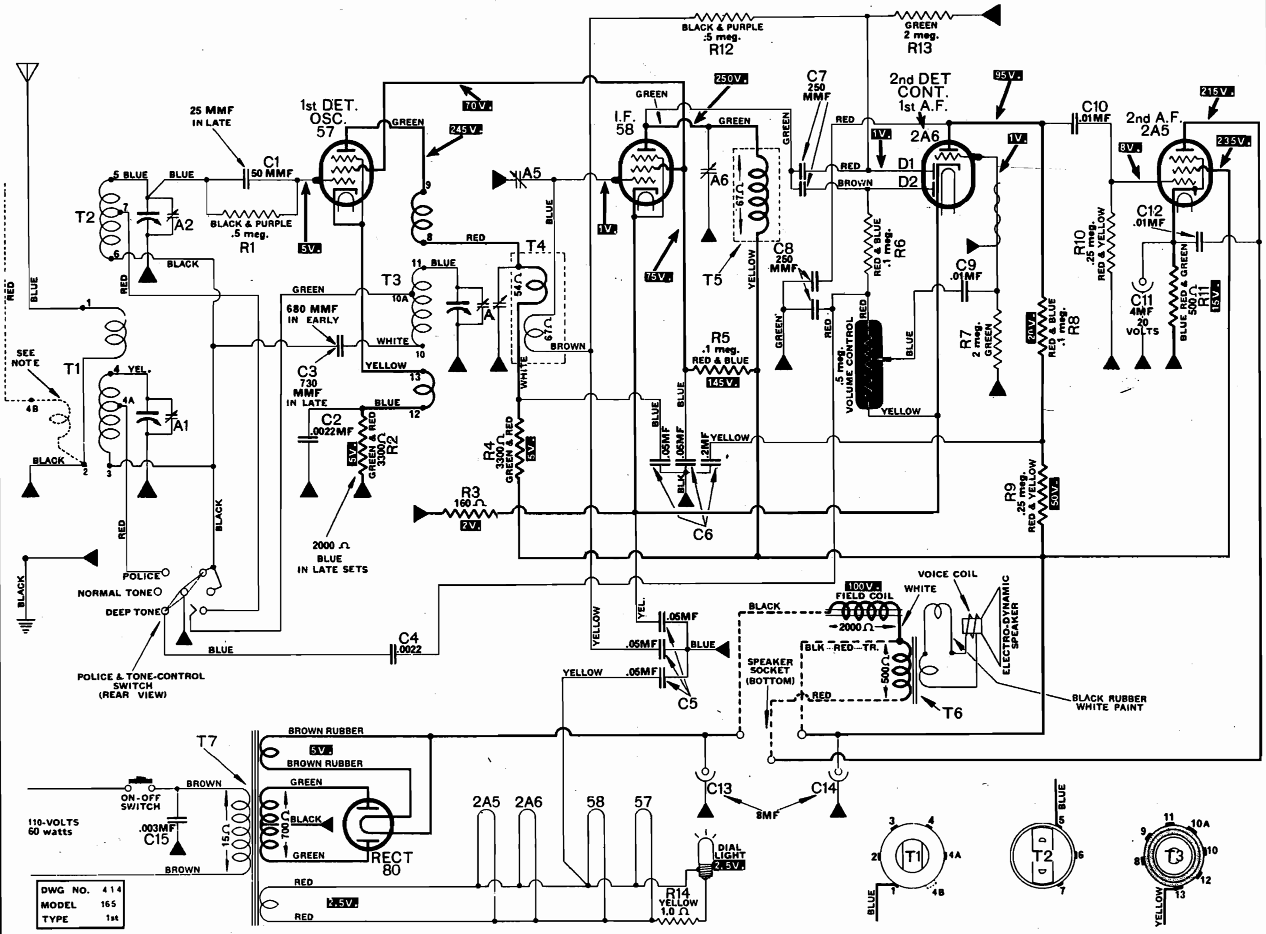
For Parts List see Index



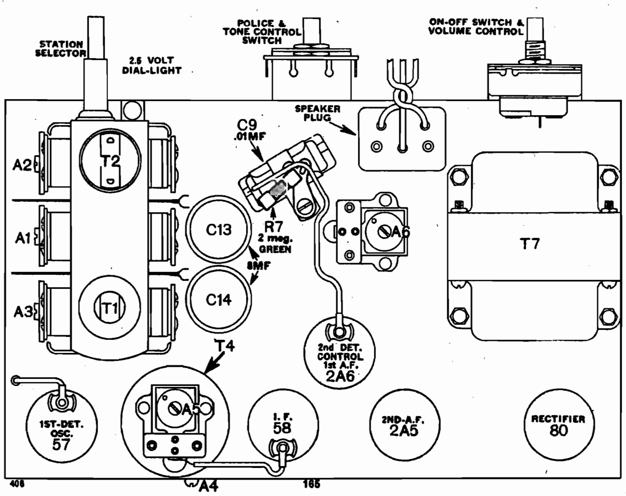


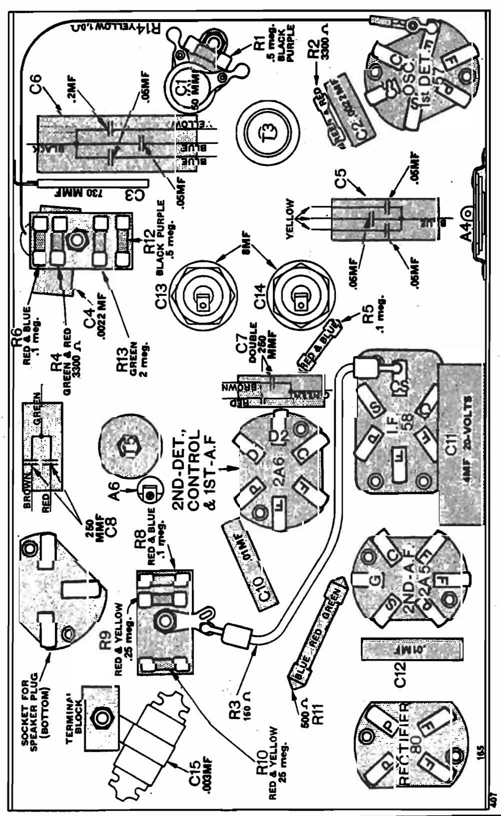
MODEL 165
Schematic, socket

ATWATER KENT MFG. CO.



IF PEAK 262.5 KC.





In late type 165, the 1st-detector bias resistor R2 is 2000 ohms, ⅓ watt (blue).

In a few early 165 sets, the tracking condenser C3 is 680MMF.

In late sets, C1 is 25MMF instead of 50MMF.

The additional primary, shown in dotted lines on No. 1 R.F.T., is used in some 165 sets.

ATWATER KENT MFG. CO.

MODEL 155 (3rd type)
MODEL 165
Parts lists

PARTS AND PRICE LIST FOR 3rd TYPE MODEL 155, No. 32800

ABOVE SERIAL No. 7088700

For parts not listed below, please order by description or name of part and model number of set.

Part No.	Name of Part	List Price
24293	Volume control, complete, less leads, .5 meg.	$ .75
24722	Cabinet complete	3.50
24955	Triple dry electrolytic condenser 8, 8, 8MF, 150 volts	1.50
*25317	Variable condenser rotor stator and frame (23 plates)	2.00

* In 1st and 2nd type Model 155, the variable condenser is No. 24561, list price $2.00 (21 plates).

TRANSFORMERS

Dia. Code No.	Part No.	Name of Part	List Price
T-1	32210	No. 1 R. F. transformer	$1.00
T-2	32220	No. 2 R. F. transformer	1.00
T-3	32190	Oscillator transformer	.70
T-4	31790	No. 1 I. F. transformer	.65
T-5	31780	No. 2 I. F. transformer	.35
T-6	24897	Output transformer	.85

RESISTORS

R-1	30360	Blue-gray	1,000,000 ohms, 1/3 watt	$ .10
R-3	18520	Flexible	70 ohms	.18
R-4	30340	Red-blue	100,000 ohms, 1/3 watt	.10
R-6	30370	Green	2,000,000 ohms, 1/3 watt	.10
R-7	31980	Black	65,000 ohms, 1/3 watt	.10
R-8	30340	Red-blue	100,000 ohms, 1/3 watt	.10
R-9	30350	Black-purple	500,000 ohms, 1/3 watt	.10
R-10	30370	Green	2,000,000 ohms, 1/3 watt	.10
R-11	30340	Red-blue	100,000 ohms, 1/3 watt	.10
R-12	31970	Red-yellow	250,000 ohms, 1/3 watt	.10
R-13	30350	Black-purple	500,000 ohms, 1/3 watt	.10
R-14	16610	Flexible	19 ohms	.15
R-15	31690	Iron core	145 ohms	.30

FIXED CONDENSERS

Dia. Code No.	Part No.		List Price
C-1	30260	50MMF, letter E stamped on washer	$ .15
C-2	31180	680MMF, 100 volts	.35
C-3, C-16	32760	.1MF, and .2MF, 100 volts	.30
C-4	31530	.1MF, 100 volts	.22
C-5	33640	.001MF, 450 volts	.22
C-6	33630	250MMF (double) 450 volts	.25
C-7	23250	.01MF, 450 volts	.31
C-8	27630	.01MF, 200 volts	.20
C-9	27630	.01MF, 200 volts	.20
C-10, C-12, C-13	31890	.05MF, .05MF, and .5MF, 100 volts	.45
C-14	26660	.1MF, 200 volts	.25

No. 24942 SPEAKER

Part No.	Name of Part	List Price
24942	Speaker, complete	$ 3.25
24897	Output transformer (T-6)	.85
25053	Field coil (2500 ohms)	1.25
24895	Cone assembly	1.65

MISCELLANEOUS PARTS

Part No.	Name of Part	List Price
24908	Instruction and log card (F-1056) net	$ .01
24733	110-volt cable and plug	.60
24727	Antenna lead (30 feet)	.75
24278	Knob for volume control or station selector	.10
24892	A. C.—D. C. current switch	.60

PARTS AND PRICE LIST FOR MODEL 165, No. 34,000

Part No.	Name of Part	List Price
25309	Cabinet, complete	$ 4.50
24293	Volume control and on-off switch (.5 meg.)	.75
25022	Variable condenser	2.25
25312	Police and tone control switch, complete	.40
25311	Switch base, complete	.25
25226	Switch shaft and blade	.05

TRANSFORMERS

Dia. Code No.	Part No.	Description	List Price
T-1	32430*	No. 1 R. F. T.	$ 1.00
T-2	32440	No. 2 R. F. T.	1.00
T-3	32450	Oscillator transformer	1.00
T-4	32620	No. I. F. transformer	.75
T-5	32630	No. 2 I. F. transformer	.35
T-6	21672	A. F. output transformer	1.25
T-7	25191**	Power transformer	3.15

*In some sets, T1 has an extra winding as shown in dotted lines on page 3. The part number of this transformer is 33820, list price $1.00.
** Some early Model 165 sets use a 75 tube instead of 2A6. These sets require a No. 25307 power transformer which has an extra winding to provide 6 volts for the 75 filament. The list price of No. 25307 is $3.50.

RESISTORS

R-1	30350	Black and purple, .5 meg., 1/3 watt	.10
*R-2	33250	Blue, 2000 ohms, 1/3 watt	.10
R-3	28950	Flexible, 160 ohms	.17
R-4	30380	Red and green, 3300 ohms, 1/3 watt	.10
R-5	20980	Red and blue, .1 meg., 1/2 watt	.10
R-6	30340	Red and blue, .1 meg., 1/3 watt	.10
R-7	30370	Green, 2 meg., 1/3 watt	.10
R-8	30340	Red and blue, .1 meg., 1/3 watt	.10
R-9	31970	Red and yellow, .25 meg., 1/3 watt	.10
R-10	31970	Red and yellow, .25 meg., 1/3 watt	.10
R-11	32010	Blue, red and green, 500 ohms, 1 watt	.15
R-12	30350	Black and purple, .5 meg., 1/3 watt	.10
R-13	30370	Green, 2 meg., 1/3 watt	.10
R-14	31860	Flexible, 1 ohm, yellow covered	.17

* In early 165, R-2 is No. 30380 red and green, 3300 ohms, 1/3 watt, $.10.

CONDENSERS

*C-1	30260	50MMF. Letter E stamped on washer	$ .15
C-2	33660	.0022MF, 400-volts	.22

* In late sets C1 is 25MMF, No. 33650 list price $.15.

CONDENSERS

Dia. Code No.	Part No.	Description	List Price
**C-3	25638	730MMF, 100-volts	.25
C-4	33660	.0022MF, 450-volts	.22
C-5	32360	.05, .05 and .05MF, 100-volts	.40
C-6	32350	.05, .05 and .2MF, 200-volts	.50
C-7	33630	250MMF (double), 450-volts	.25
C-8	33630	250MMF (double), 450-volts	.25
C-9	23250	.01MF, 450-volts	.31
C-10	27630	.01MF, 200-volts	.20
C-11	25167	4MF, 20-volts dry electrolytic	.40
C-12	27630	.01MF, 200-volts	.20
C-13	25168	8MF, 475-volts, electrolytic	.85
C-14	25168	8MF, 475-volts, electrolytic	.85
C-15	32740	.003MF, 500-volts	.40

** In early 165, C-3 is No. 31180, 680MMF, 100 volts $.35.

MISCELLANEOUS PARTS

Part No.	Description	List Price
25194	Cloth screen	$ .40
25213	Cabinet foot	.02
24278	Station selector and volume control knob	.10
25145	Police and tone control switch knob	.15
24323	Power transformer cover (2 used)	.15
24554	I.F.T. shield and trimmer (A5)	.55
19566	110-volt cable and plug	.45
24732	110-volt plug	.06
15404	2.5-volt dial lamp	.15
22683	Tube shield	.10
24549	Dial assembly	.25
31870	Trimmer A6	.20
24495	Trimmer A4	.25
25196	Speaker socket	.10
24492	Rectifier socket	.10
24494	Small 6-prong socket (3 used)	.10
22733	Large 6-prong socket (1 used)	.10
25049	Instruction and log card (F-1059) net	.01
25186	Switch instruction tag net	.01
25189	Shipping container net	.25

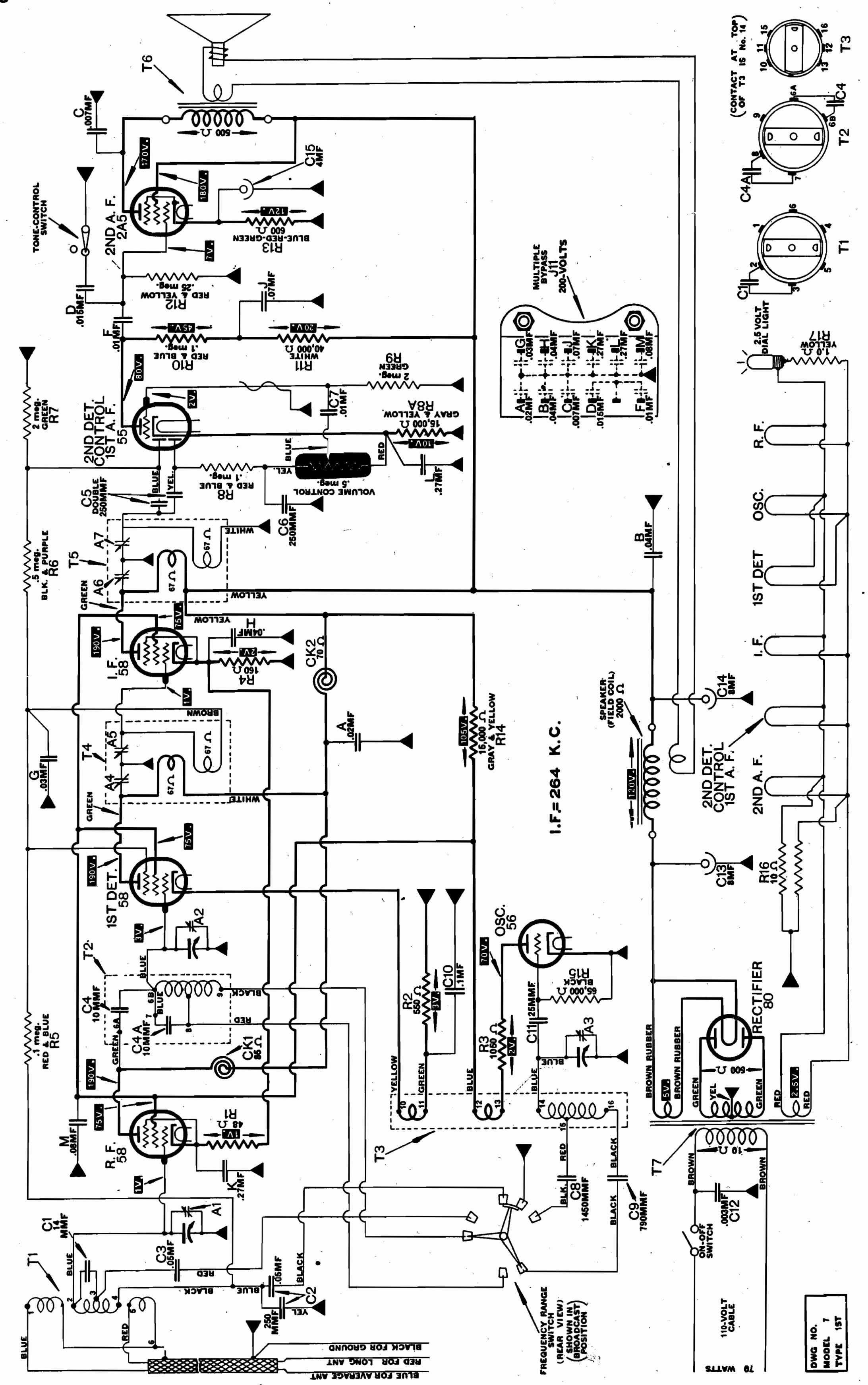
No. 34100 SPEAKER FOR MODEL 165

18870	Field coil (2000 ohms)	$ 1.25
21672	Output transformer (T6)	1.25
21161	Diaphragm	1.05
25179	Cable and plug	.40
25308	Speaker plug (3-prong)	.08

MODEL 217,427,667
Schematic
Voltage

ATWATER KENT MFG. CO.

DIAGRAM OF MODELS 217, 427 AND 667

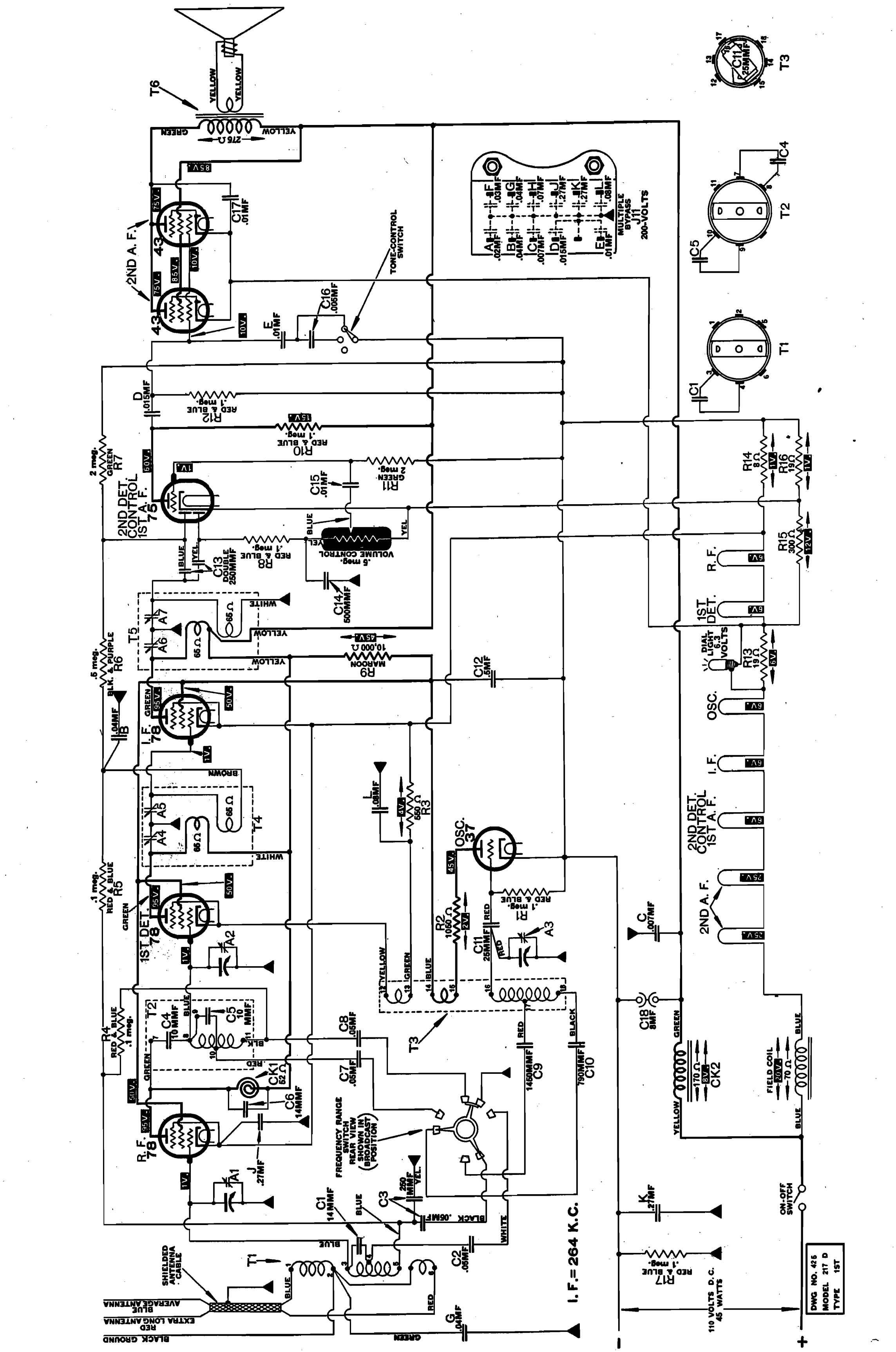


Above voltage measurements were made with 250-volt scale of a 1000-ohm-per-volt meter and a line supply of 110-volts. All measurements are made from cathode of each tube.

ATWATER KENT MFG. CO.

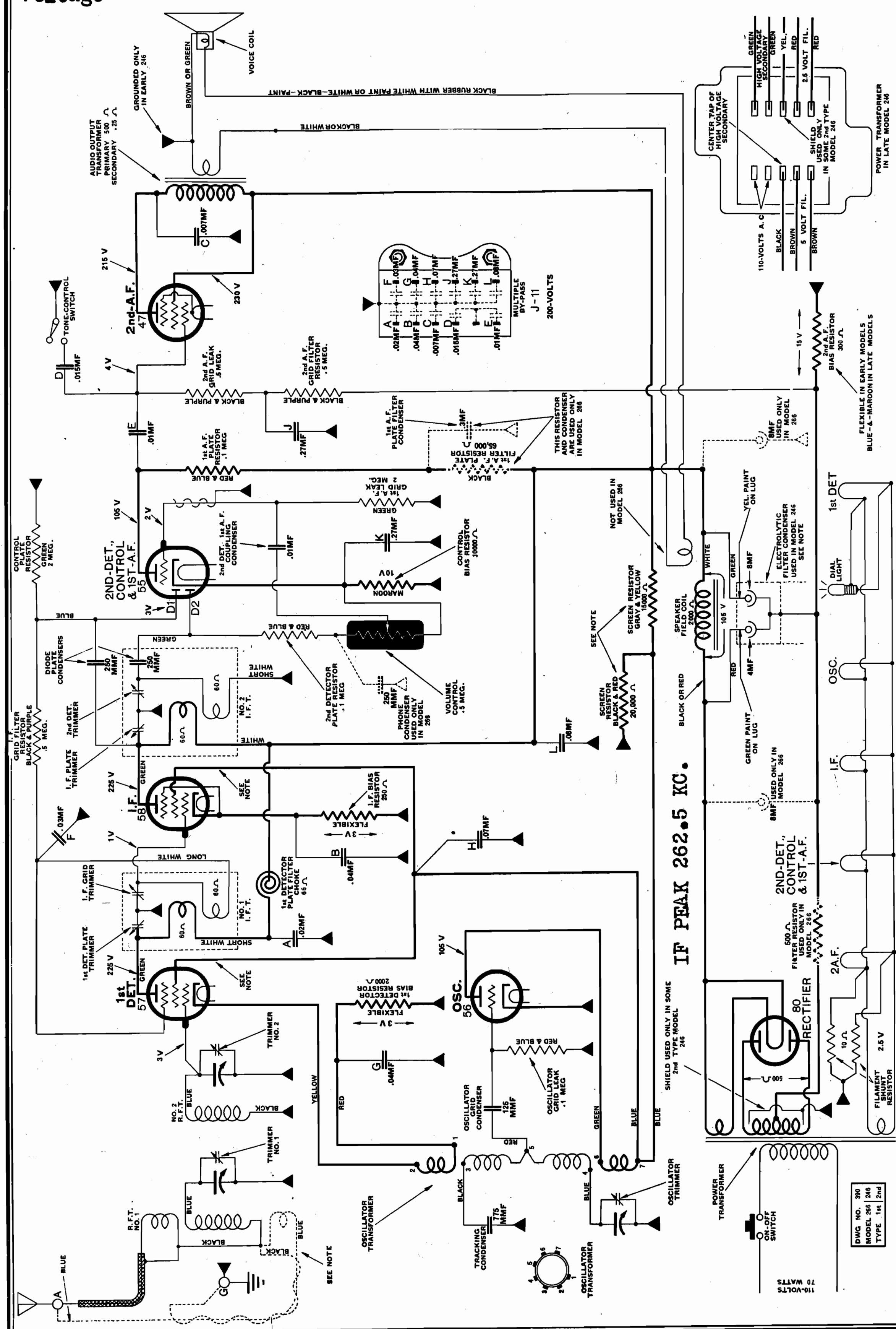
MODEL 217D,427D,667D
Schematic
Voltage

DIAGRAM OF MODELS 217D, 427D AND 667D



MODEL 246,266
(2nd type)
Schematic
Voltage

ATWATER KENT MFG. CO.



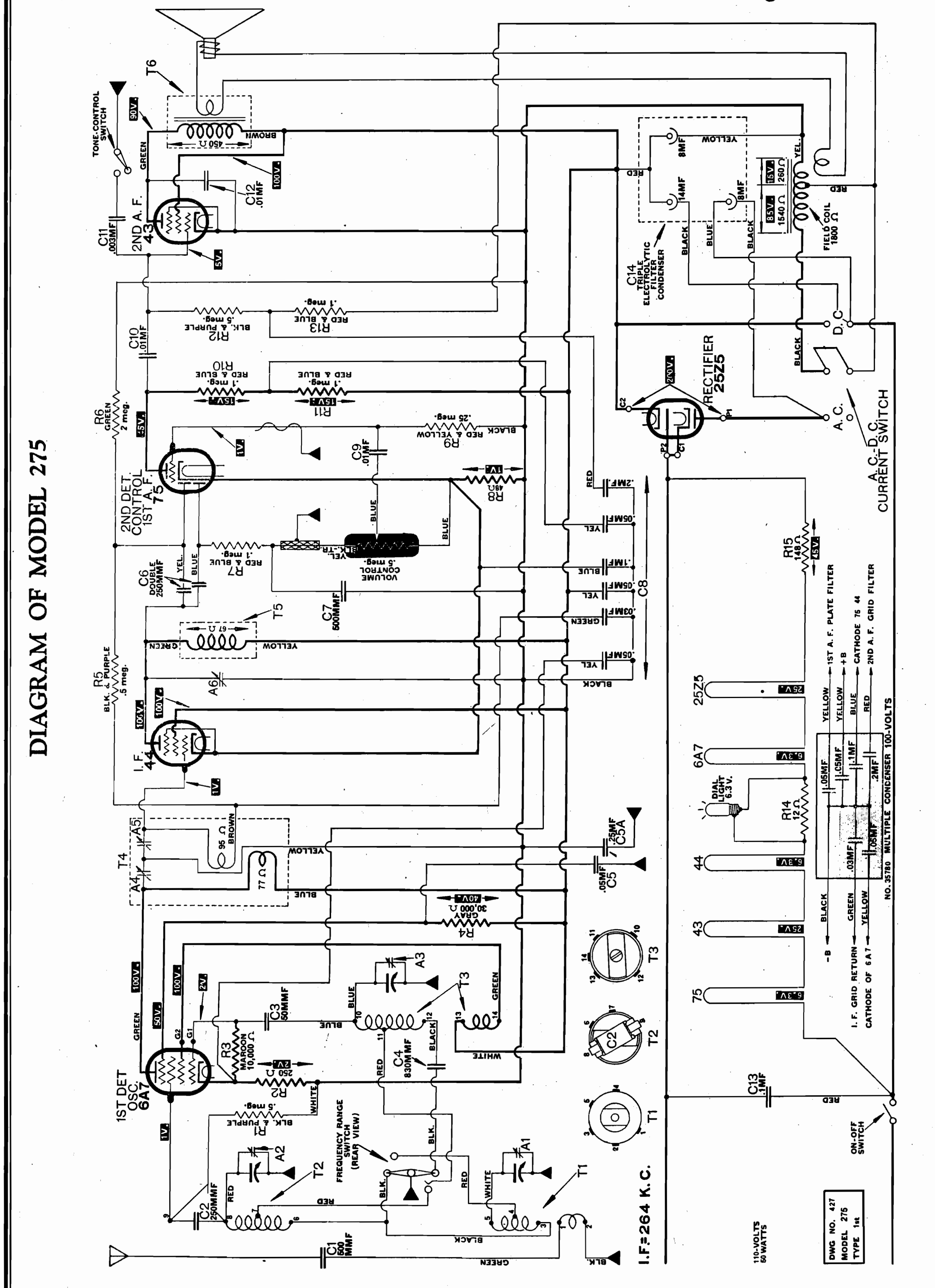
The black and red screen resistor is used only in late Model 246. In early 246, which does not use the black and red screen resistor, the voltage on the plate of the oscillator and on the screens of the 57 and 58 tubes is about 100 volts, and the drop across the gray and yellow screen resistor is about 125 volts. In late 246, the voltage across the gray and yellow screen resistor is about 145 volts, and the voltage across the black and red screen resistor is about 80 volts, thus making the oscillator plate and the 57 and 58 screens about 80 volts also.

The additional primary that is shown in dotted lines on No. 1 R.F.T. is used in some Model 246 and 266 receivers.

In all Model 266, and in late Model 246, the output transformer is mounted on the speaker housing, and the connections are slightly different than shown above.

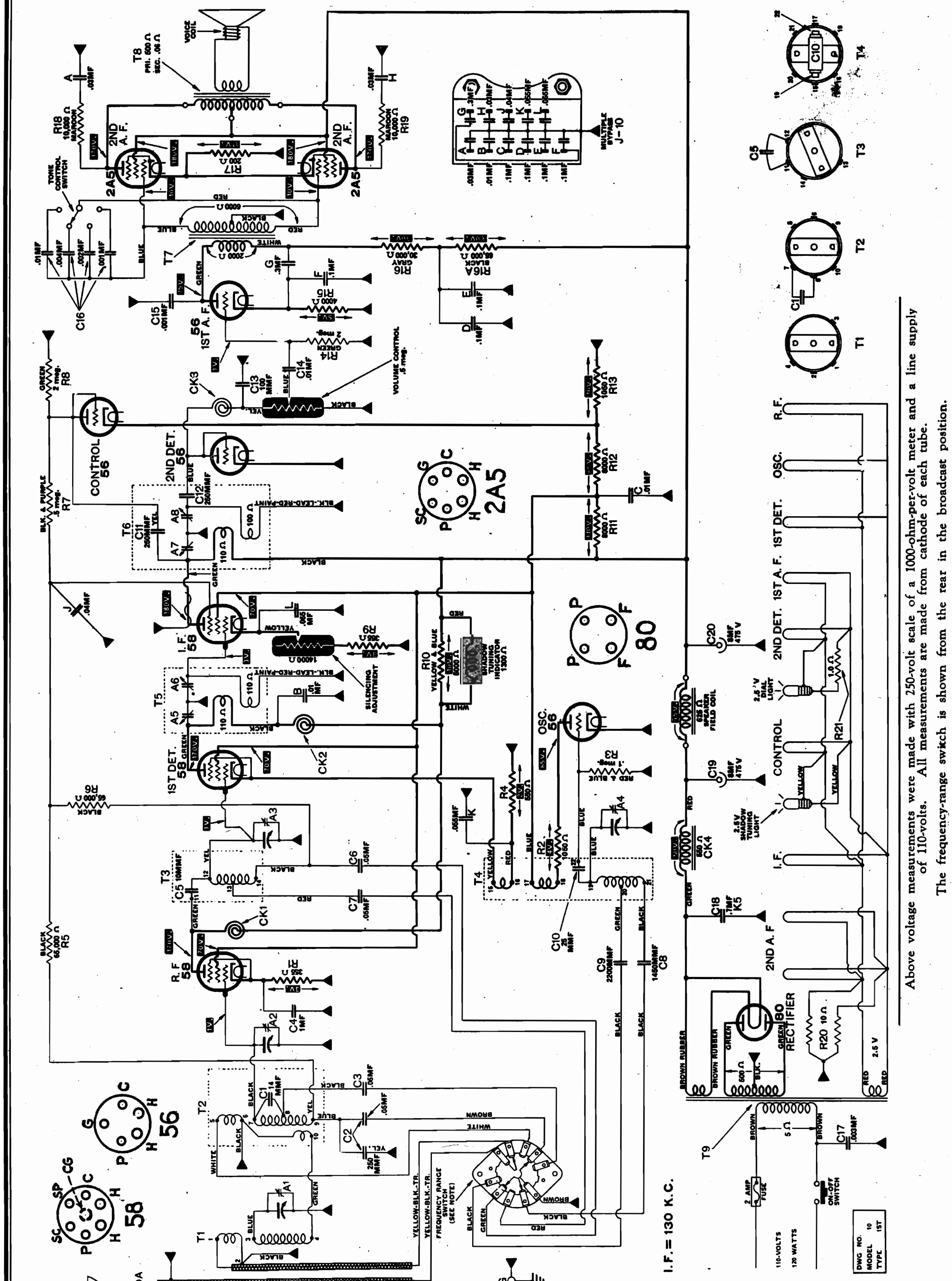
ATWATER KENT MFG. CO.

MODEL 275 (1st type)
Schematic
Voltage



MODEL 310,510
Schematic
Voltage

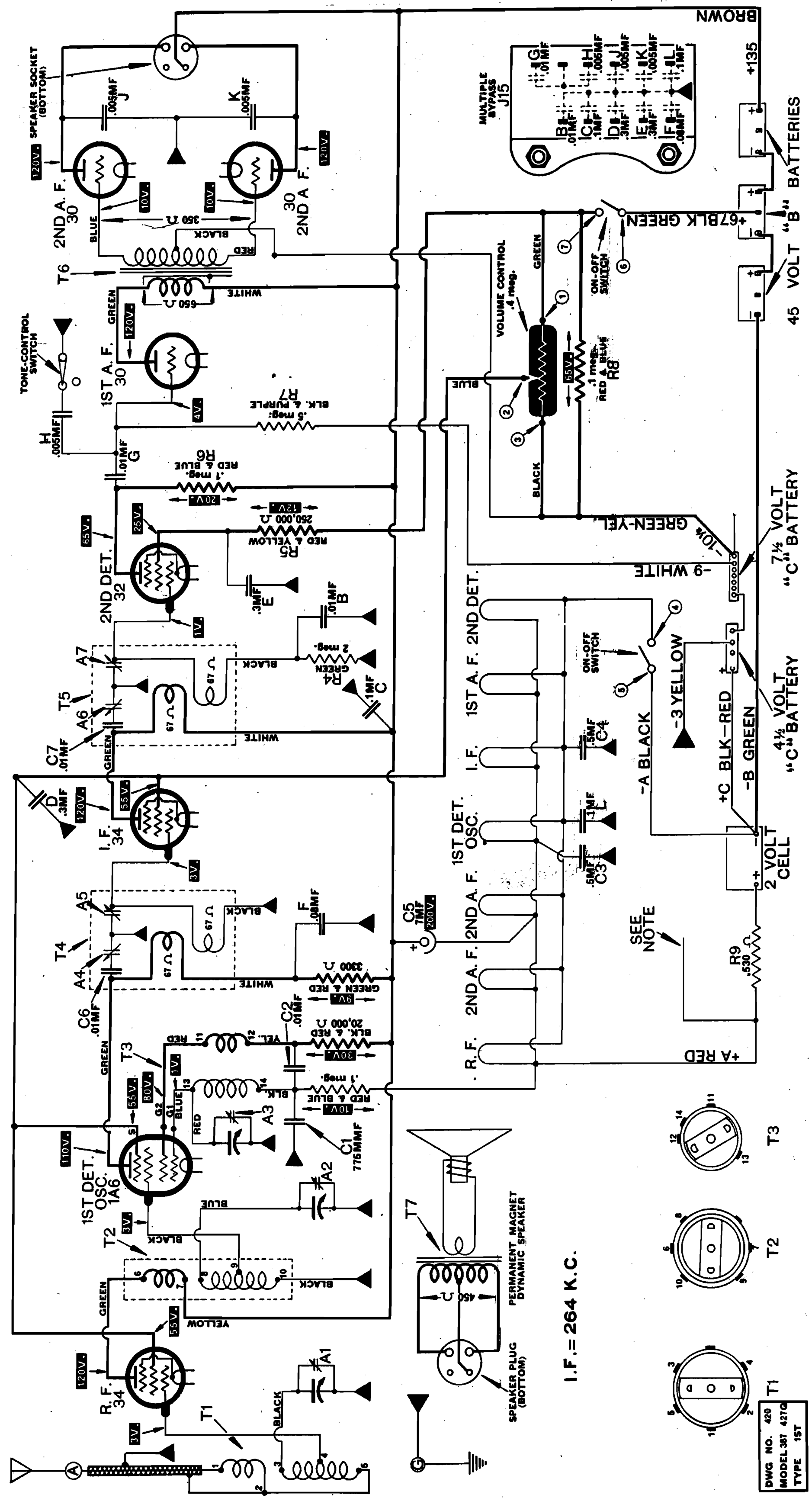
ATWATER KENT MFG. CO.



MODEL 387,427Q
Schematic
Voltage

ATWATER KENT MFG. CO.

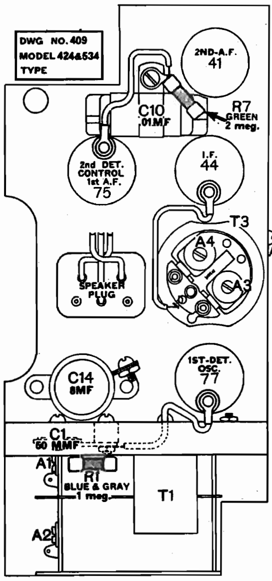
DIAGRAM OF MODELS 387 AND 427Q

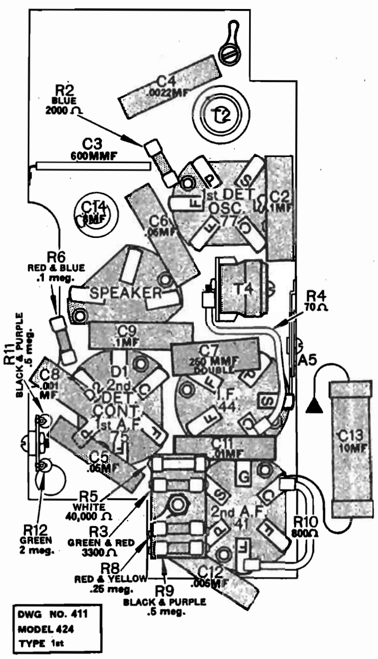


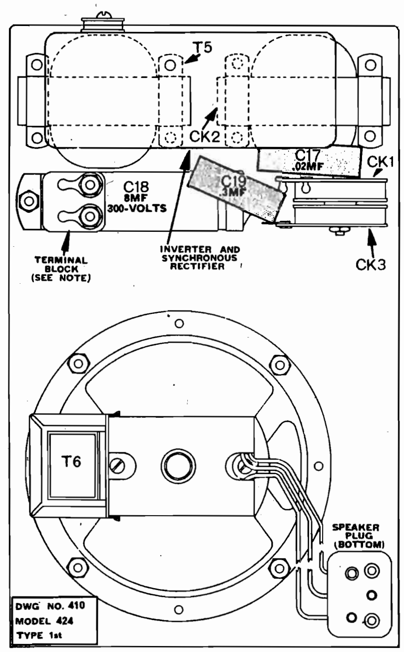
Total "B" voltage at time measurements were made equaled 120-volts. Tube voltages are taken from —F of each tube, using the 250-volt scale of a 1000-ohm-per-volt meter. Resistor R9 is used with 2-volt air cell, but is not used with 2-volt storage cell.

MODEL 424, 534
Socket, Chassis
Parts List

ATWATER KENT MFG. CO.







Top View. Charts of receiver and power unit sections.

PARTS AND PRICE LIST FOR MODEL 424, No. 35000

Part No.	Name of Part	List Price
23482A	Volume control, complete less leads, .5 meg	$ .55
25287	Variable condenser rotor, stator, and frame	1.25
25279	On-off lockswitch	.40
25595	Inverter and synchronous rectifier complete	5.95

TRANSFORMERS

Dia. Code No.	Part No.	Description	List Price
*T1	33140	No. 1 R. F. T	$ .50
T2	33150	No. 2 R. F. T and oscillator trans	.60
T3	25505	No. 1 I. F. T. less trimmers	.55
T4	33360	No. 2 I. F. T.	.35
T5	25371	Power transformer	2.60
T6	25608	Output transformer	.85

*In late sets, T1 is shielded, and the part number is 33750, $.50.

RESISTORS

Dia. Code No.	Part No.	Description	List Price
R1	30360	Blue-gray 1,000,000 ohms, 1/3 watt	$ .10
R2	33250	Blue 2,000 ohms, 1/3 watt	.10
R3	30380	Red-green 3,300 ohms, 1/3 watt	.10
R4	18520	Flexible 70 ohms,	.18
R5	26160	White 40,000 ohms, 1/2 watt	.10
R6	30340	Red-blue 100,000 ohms, 1/3 watt	.10
R7	30370	Green 2,000,000 ohms, 1/3 watt	.10
R8	31970	Red-yellow 250,000 ohms, 1/3 watt	.10
R9	30350	Black-purple 500,000 ohms, 1/3 watt	.10
R10	20120	Flexible 800 ohms,	.15
R11	30350	Black-purple 500,000 ohms, 1/3 watt	.10
R12	30370	Green 2,000,000 ohms, 1/3 watt	.10

CONDENSERS

Dia. Code No.	Part No.	Description	List Price
C1	30260	50MMF Letter E stamped on washer	$ .15
C2	31530	.1MF, 100 volts, N. I.	.22
C3	33280	600MMF, 100 volts, mica	.30
C4	33660	.0022MF, 450 volts, inductive	.22
C5	31160	.05MF, 100 volts, N. I.	.25
C6	26820	.05MF, 200 volts, N. I.	.20
C7	33630	250MMF (double) 450 volts, inductive	.25
C8	33640	.001MF, 450 volts, N. I.	.22
C9	31530	.1MF, 100 volts, N. I.	.22
C10	23250	.01MF (metal case) 450 volts	.31
C11	27630	.01MF, 200 volts, inductive	.20
C12	28040	.005MF, 200 volts, inductive	.20
C13	24379	10MF, 25 volt, dry electrolytic	.40
C14	25385	8MF, 250 volts, dry electrolytic	.65
C15	33070	.05MF, 450 volts	.35
C16	33070	.05MF, 450 volts	.35
C17	29030	.02MF, 450 volts, N. I.	.20
C18	25384	8MF, 300 volts, dry electrolytic	.75
C19	31150	.3MF, 100 volts, N. I.	.25
C20	27630	.01MF, 200 volts, inductive	.20

CHOKES

Dia. Code No.	Part No.	Description	List Price
CK1	17015	R. F. "B" filter choke	.25
CK2	33450	A. F. "B" filter choke	1.20
CK3	23530	R. F. "A" filter choke	.40

TRIMMERS

Dia. Code No.	Part No.	Description	List Price
A3, A4	32880	Double I. F. trimmer	.30
A5	24495	Single I. F. trimmer	.25

SUPPRESSOR PARTS

Part No.	Name of Parts	List Price
21143	Plug suppressor	$ .30
21144	Distributor suppressor	.30
23260	Generator condenser, 1MF, 200 volts	1.05
23520	Ignition filter	2.00

SPEAKER

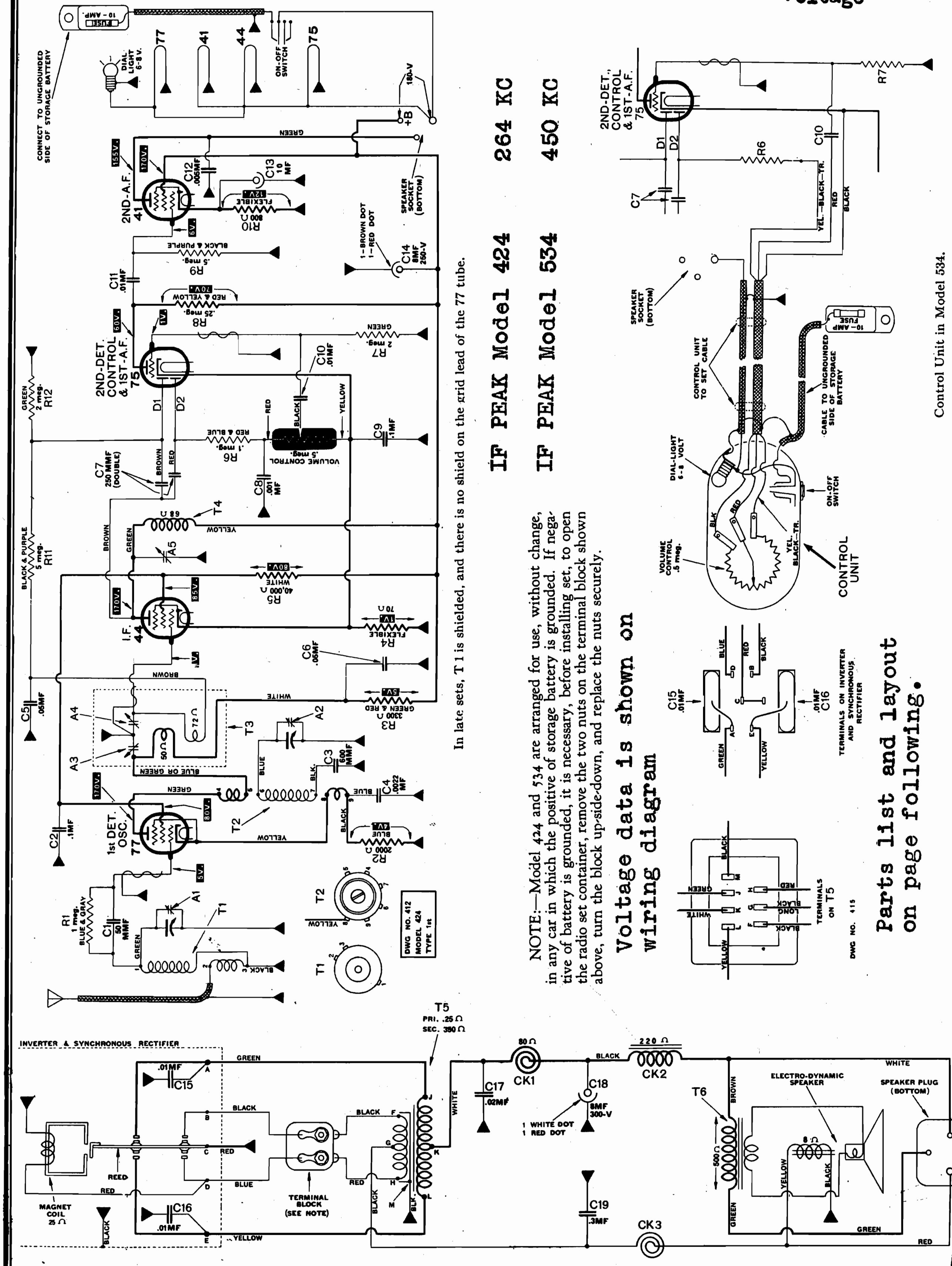
Part No.	Name of Parts	List Price
25386	Speaker complete	3.25
25604	Cone assembly	1.65
25607	Field coil (8 ohms approximately)	.85
25608	Output transformer (T6)	.85

MISCELLANEOUS PARTS

Part No.	Name of Parts	List Price
24169	Dial or volume control knob	.20
21407	Dial lamp 6-8 volts	.20
21406	Fuse (10 amps.)	.05
20976	Lockswitch key	.05
25378	Instruction sheet (F-1071) net	.02

ATWATER KENT MFG. CO.

MODEL 424, 534
Schematic
Voltage



In late sets, T1 is shielded, and there is no shield on the grid lead of the 77 tube.

IF PEAK Model 424 264 KC

IF PEAK Model 534 450 KC

NOTE:—Model 424 and 534 are arranged for use, without change, in any car in which the positive of storage battery is grounded. If negative of battery is grounded, it is necessary, before installing set, to open the radio set container, remove the two nuts on the terminal block shown above, turn the block up-side-down, and replace the nuts securely.

Voltage data is shown on wiring diagram

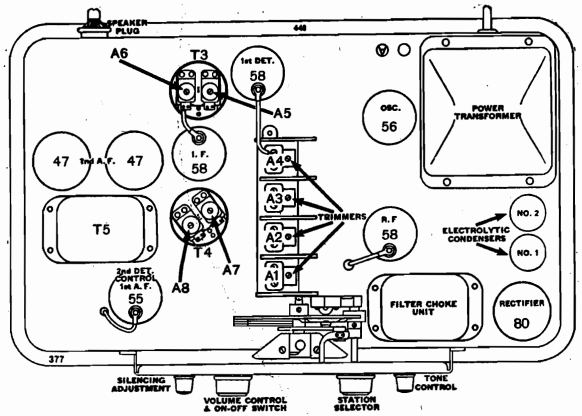
Parts list and layout on page following.

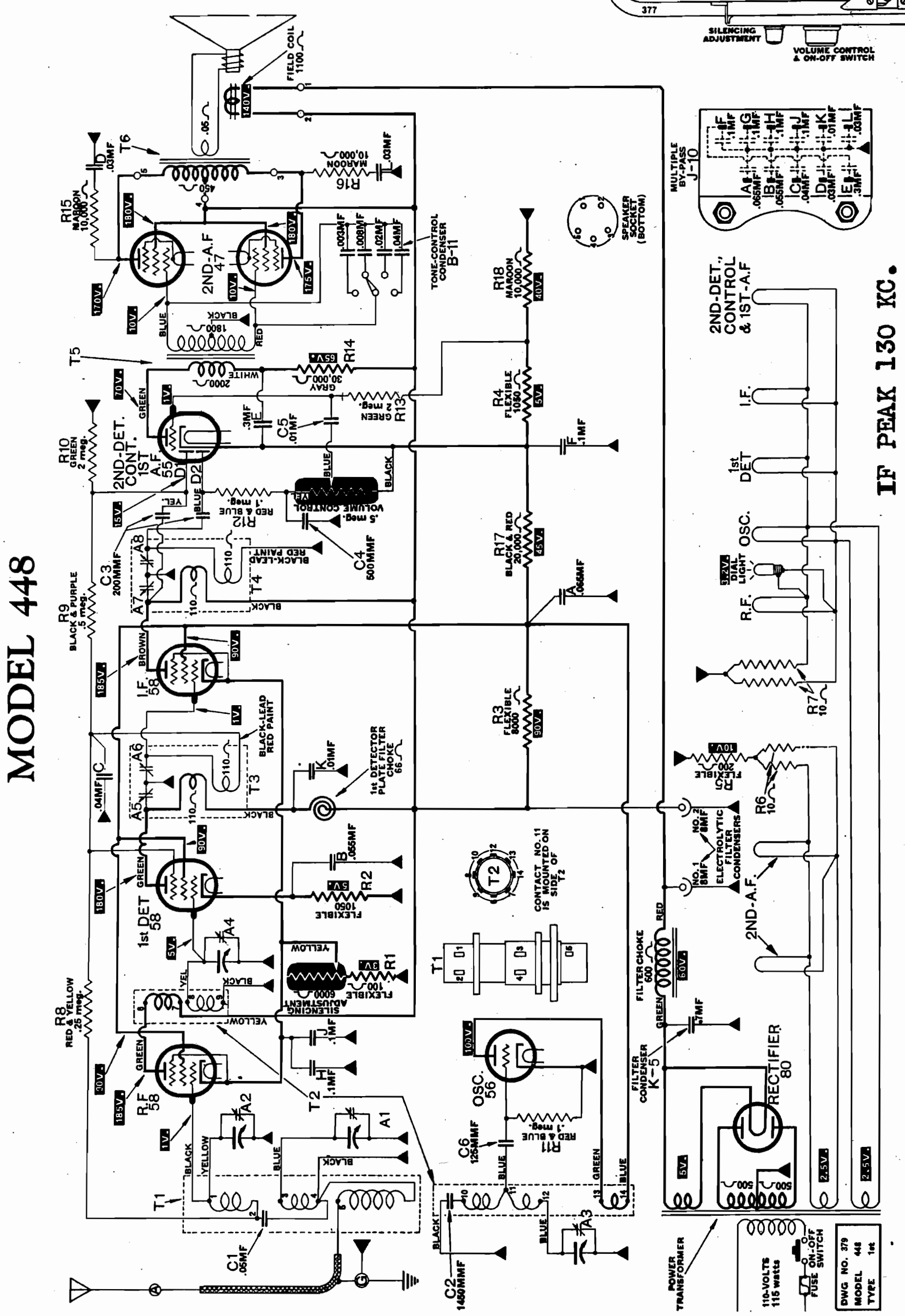
Control Unit in Model 534.

Condensers C15 and C16 are .05MF in late sets.
A fixed condenser (not shown above) is connected across the primary of T5. This condenser is listed as C20, .01MF, 200 volts.

MODEL 448
Schematic, Voltage
Socket

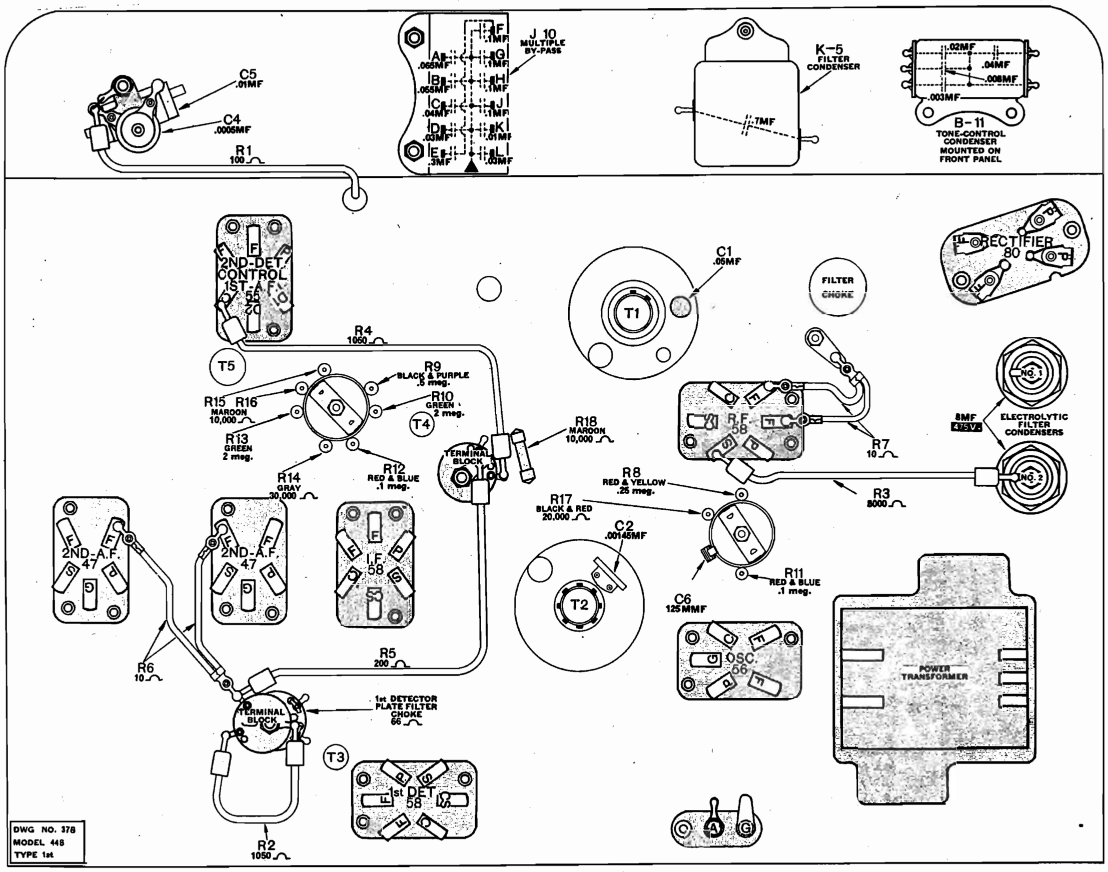
ATWATER KENT MFG. CO.





MODEL 448
Parts List, Chassis

ATWATER KENT MFG. CO.



PARTS AND PRICE LIST FOR MODEL 448 No. 32400

Part No.	Name of Part	List Price
23228	VOLUME CONTROL, complete less leads	$ .75
21530	TONE CONTROL CONDENSER (B-11)	.65
24711	SILENCING ADJUSTMENT	.85
28680	POWER TRANSFORMER	4.75
30910	FILTER CHOKE UNIT	1.55
19210	1st. DETECTOR PLATE FILTER CHOKE	.15
22538	ELECTROLYTIC FILTER CONDENSER NO. 1	1.00
22538	ELECTROLYTIC FILTER CONDENSER NO. 2	1.00
26620	FILTER CONDENSER (K-5) paper and foil	.75
30720	MULTIPLE BY-PASS CONDENSER (J-10)	1.25
18534	LINE FUSE	.03
24211	INSTRUCTION AND LOG CARD F-1041 ....Net	.01
24712	PANEL CARD F-1055 ....Net	.02

TUBULAR RESISTORS (½ Watt)

Dia. Code No.	Part No.	Color	Value	List Price
R- 8	20920	Red-yellow	250,000 Ohms	$ .10
R- 9	20930	Black-purple	500,000 Ohms	.10
R-10	20940	Green	2,000,000 Ohms	.10
R-11	20980	Red-blue	100,000 Ohms	.10
R-12	20980	Red-blue	100,000 Ohms	.10
R-13	20940	Green	2,000,000 Ohms	.10
R-14	20970	Gray	30,000 Ohms	.10
R-15	20950	Maroon	10,000 Ohms	.10
R-16	20950	Maroon	10,000 Ohms	.10
R-17	23120	Red-black	20,000 Ohms	.10
R-18	20950	Maroon	10,000 Ohms	.10

	Dia. Code No.	Part No.	Value	List Price
Small Fixed Condensers	C-1	26820	.05 MF	$ .20
	C-2	26690	1450 MMF	.35
	C-3	30240	250 MMF (2 used)	.15
	C-4	17440	.0005 MF	.15
	C-5	23250	.01 MF	.31
Flexible Resistors	R-1	20040	100 Ohms	.17
	R-2	16320	1050 Ohms	.15
	R-3	24340	8000 Ohms	.21
	R-4	16320	1050 Ohms	.15
	R-5	25950	200 Ohms	.17
	R-6	17077	10 Ohms	.12
	R-7	17077	10 Ohms	.12
		31860	1 Ohm, dial light resistor (late sets)	.17

TRANSFORMERS

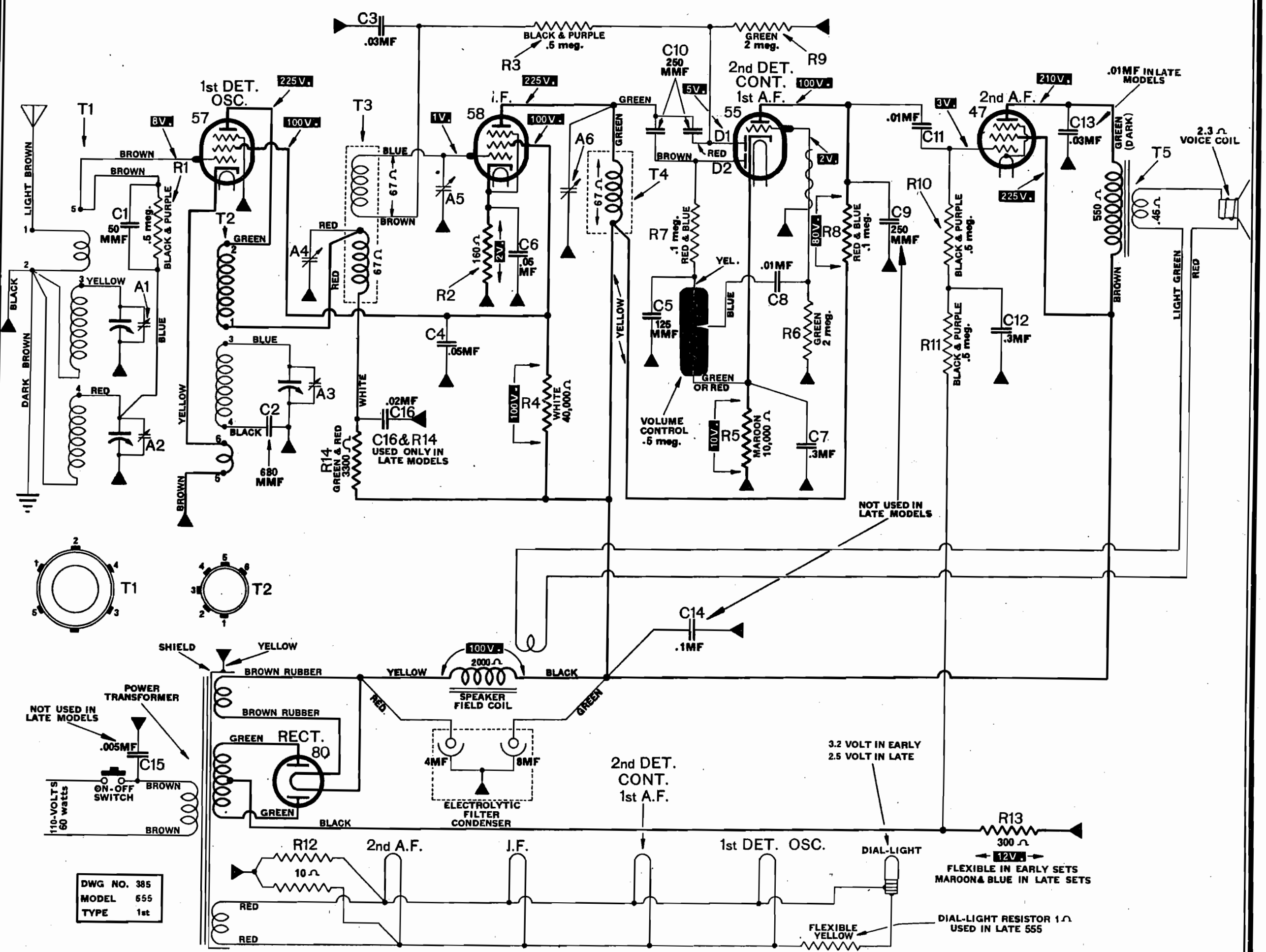
Dia. Code No.	Part No.	Description	List Price
T-1	28480	No. 1 R.F. Transformer	$ 1.00
T-2	30810	No. 2 R.F. Transformer and oscillator	1.00
T-3	23356	No. 1 I.F. Transformer, less trimmers	.75
T-4	22059	No. 2 I.F. Transformer, less trimmers	.75
T-5	30920	Audio transformer unit	1.85
T-6	21693	Output transformer, less case	1.50

No. 28800 TYPE 380 SPEAKER USED IN MODEL 448

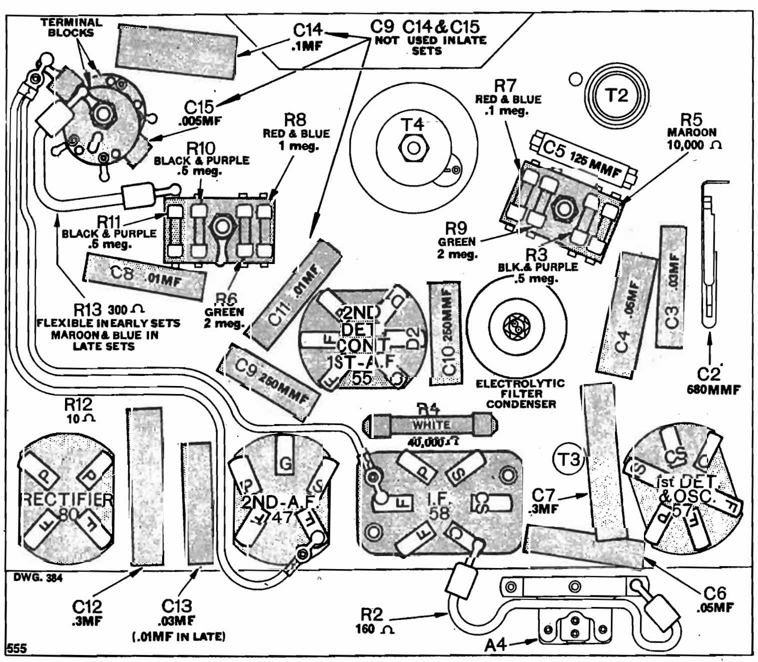
Part No.	Name of Part	List Price	Part No.	Name of Part	List Price
20737	Diaphragm	$ 1.25	20657	Cable and plug assembly	$ .65
21260	Field coil	1.25			

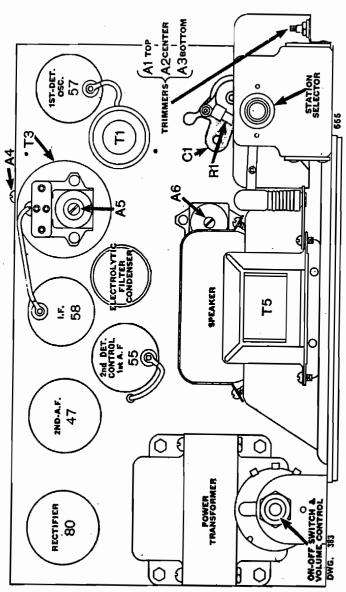
MODEL 555
Schematic, Voltage
Chassis, Socket

ATWATER KENT MFG. CO.



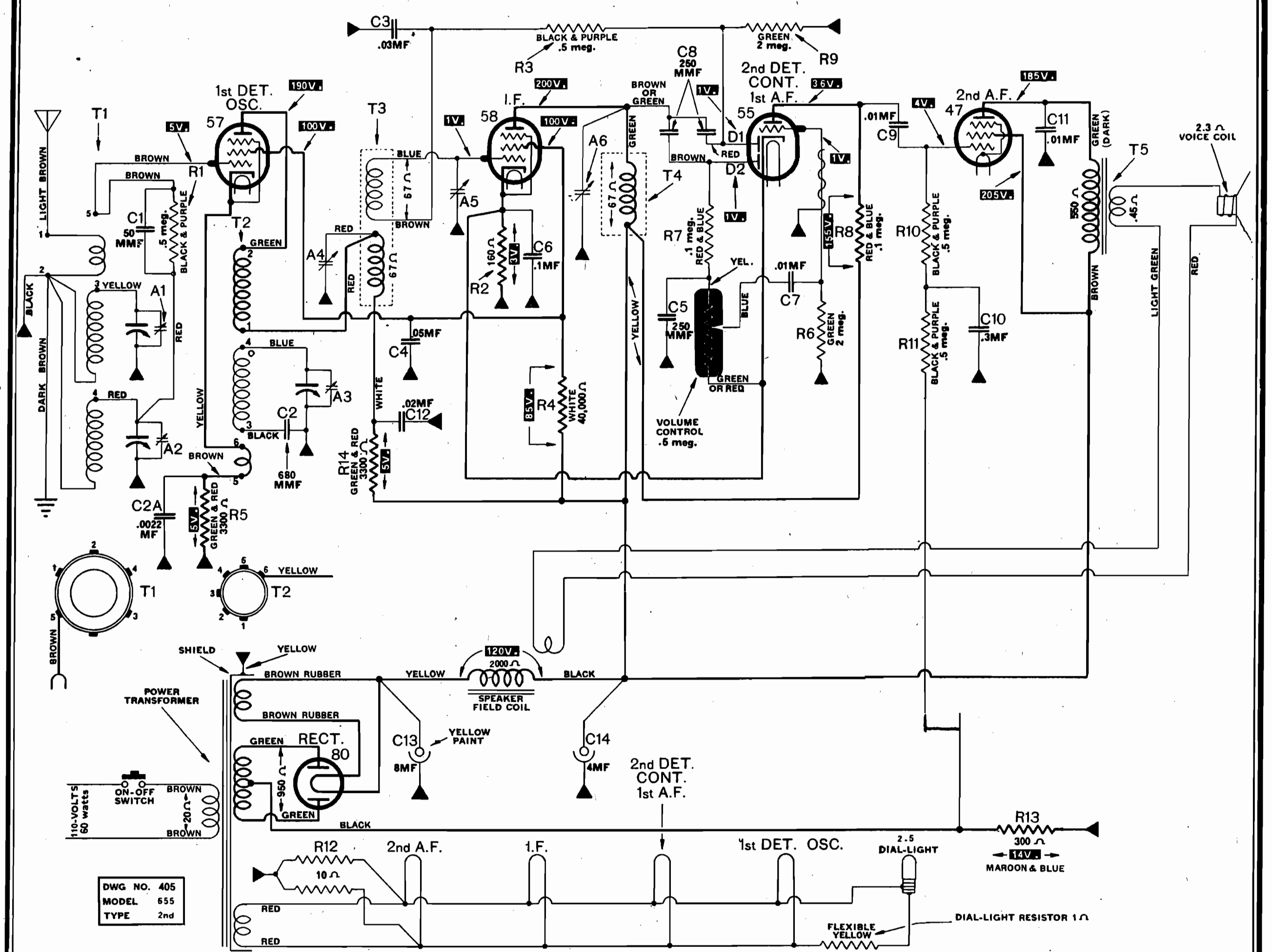
IF PEAK 262.5 KC.



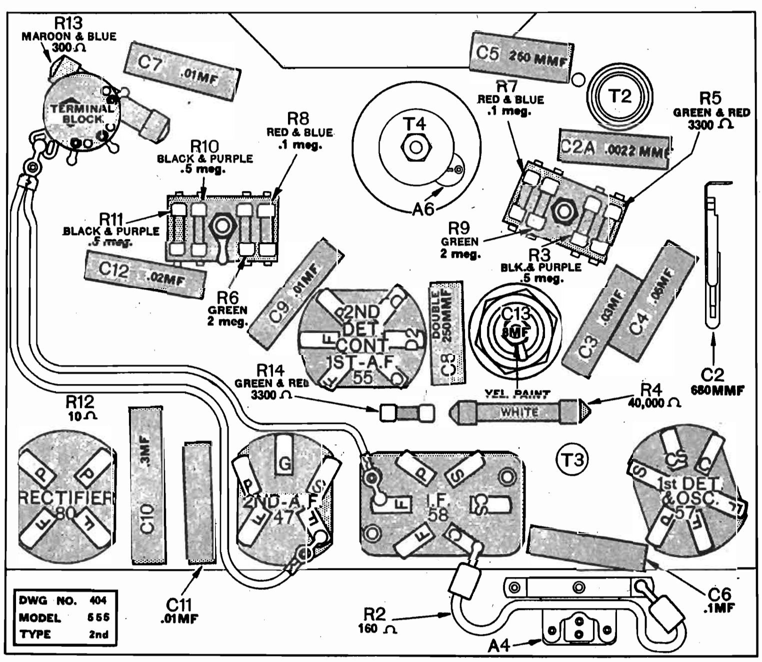


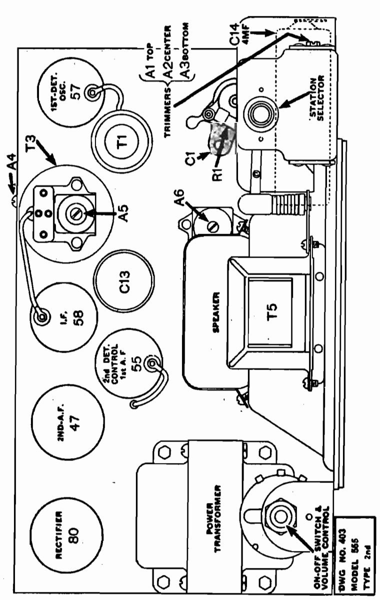
ATWATER KENT MFG. CO.

MODEL 555 (2nd type)
Above serial 5063260
Schematic, voltage



IF PEAK 262.5 KC.





MODEL 636
Parts List

ATWATER KENT MFG. CO.

Part No.	Name of Part	List Price
24472	Set container, less lid	$ 3.60
24335	Set container lid	.40
24473	Tuning dial housing	1.20
24095	Dial assembly	.30
24083	Escutcheon	.70
24334	Escutcheon spacing bushing	.60/C
21407	Dial light 6-8 V	.20
24256	Dial light socket	.12
24169	Dial knob	.20
24098	Volume control .5 meg	.55
24075	Volume control mounting bracket	.10
24169	Volume control knob	.20
20093	Volume control mounting nut	.02
21491	Lock switch	.40
20976	Key	.05
24842	Variable condenser rotor, stator and frame	3.75
24145	Dial knob shaft	.04
20116	Dial knob shaft bracket	.20
17961	Dial rubber and bushing	.15
24142	Dial gear and balance weight	.30
24111	Chassis-to-speaker cable and plug (5 wires 3′ 6″ long)	1.65
18582	Speaker plug (5 prongs)	.15
24452	Antenna lead shielding	.15
24453	Antenna lead insulation (rubber tubing 24″ long)	.05
22027	Antenna lead bushing clamp	.04
24946	Operation & installation instructions, net	.05
24268	Shipping container net	.30

TRANSFORMERS

Dia. Code No.	Part No.	Description	List Price
T-1, T-2, T-3	25013	R. F. Transformer group	$ 3.00
T-4	24296	I. F. Transformer	.70
T-5	24175	Audio input transformer	2.40
T-6	24357	Audio output transformer	1.75

CONDENSERS

C-1	30260	50 MMF, 450-volts	$ .15
C-2	30580	775 MMF (marked "750 MMF" on some units)	.35
C-3	**30240	250 MMF, 200-volts	.15
C-4	**30240	250 MMF, 200-volts	.15
C-5	23250	.01 MF, 450-volts	.31
C-6	30240	250 MMF, 200-volts	.15
C-7	26660	.1 MF, 200-volts	.25
C-8	*27630	.01 MF, 200-volts	.20
C-9	*27630	.01 MF, 200-volts	.20
C-10	26660	.1 MF, 200-volts	.25
C-11	26660	.1 MF, 200-volts	.25
K-8	31670	Double 1 MF, 100-volts	.90
J-8	30470	Multiple by-pass	1.25
	24298	Dry electrolytic filter condenser 8 MF, 250-volts	.65

*In late sets, C-8 and C-9 are combined in one double condenser No. 31190. List Price $.23.
**In late sets, C-3 and C-4 are combined in one double condenser No. 31140. List Price $.20.

RESISTORS

R-1	21030	2000 ohms		$ .16
R-2	20040	100 ohms		.17
R-3	17380	425 ohms		.15
R-4	30350	Black-purple	500,000 ohms 1/3 watt	.10
R-5	30360	Blue-gray	1,000,000 ohms 1/3 watt	.10
R-6	30380	Red-green	3,300 ohms 1/3 watt	.10
R-7	30360	Blue-gray	1,000,000 ohms 1/3 watt	.10
R-8	23120	Red-black	20,000 ohms 1/2 watt	.10
R-9	30360	Blue-gray	1,000,000 ohms 1/3 watt	.10
R-10	30380	Red-green	3,300 ohms 1/3 watt	.10

(R-10 is not used in early sets)

TRIMMER CONDENSERS

A-4 & A-5	30750	Double I. F. Trimmer	$ .35
A-6	30760	Single I. F. Trimmer	.25

CHOKES

Part No.	Name of Part	List Price
24297	I. F. Plate choke	$ .40
30690	2nd Detector plate choke	.30
*19210	1st Detector plate filter choke	.15
17015	R. F. Choke	.25
**31680	"A" Filter choke unit	1.00
22359	"B" Filter choke unit	.85

*Not used on late sets.
**Not used on early sets

SOCKETS

21041	5-Prong tube socket	$ .18
22733	6-Prong tube socket	.10
17377	Socket insulator	.10/C

DYNAMOTOR

30870	DYNAMOTOR & FILTER assembly, complete with container and lid	$19.50
30860	Dynamotor & filter assembly, less container and lid	17.25
24148	Dynamotor container, less lid	1.85
24149	Dynamotor container lid	.40
24146	Dynamotor mounting stud	.10
24164	Dynamotor mounting nut	.30/C
30770	Dynamotor terminal block	.30
24096	Dynamotor only	16.00
24978	Cover	1.55
24984	Cover mounting nut	.04
24985	Cover mounting lockwasher	.02
24979	Field coils (set of 2)	1.60
24993	Field coil wedges	.03
24988	Field studs	.10
24991	Field stud sleeve No. 1	.06
24992	Field stud sleeve No. 2	.06
24981	Armature complete	11.50
24982	Brush holder plate complete with brushes (low voltage side)	1.40
24976	Brush (low voltage side)	.15
24983	Brush holder plate complete with brushes (high voltage side)	1.40
24977	Brush (high voltage side)	.15
24987	Brush holder spring	.10
24986	Brush holder spring insulating eyelet	.02
24994	Brush holder sleeve	.06
24995	End play washer .246″ x 27/32″ x 1/32″	.02
24996	End play washer 17/64″ x 1/2″ x 1/32″	.02
24997	End play washer 17/64″ x 1/2″ x .007″	.02
24989	Insulating bushing (rubber)	.05

MISCELLANEOUS PARTS

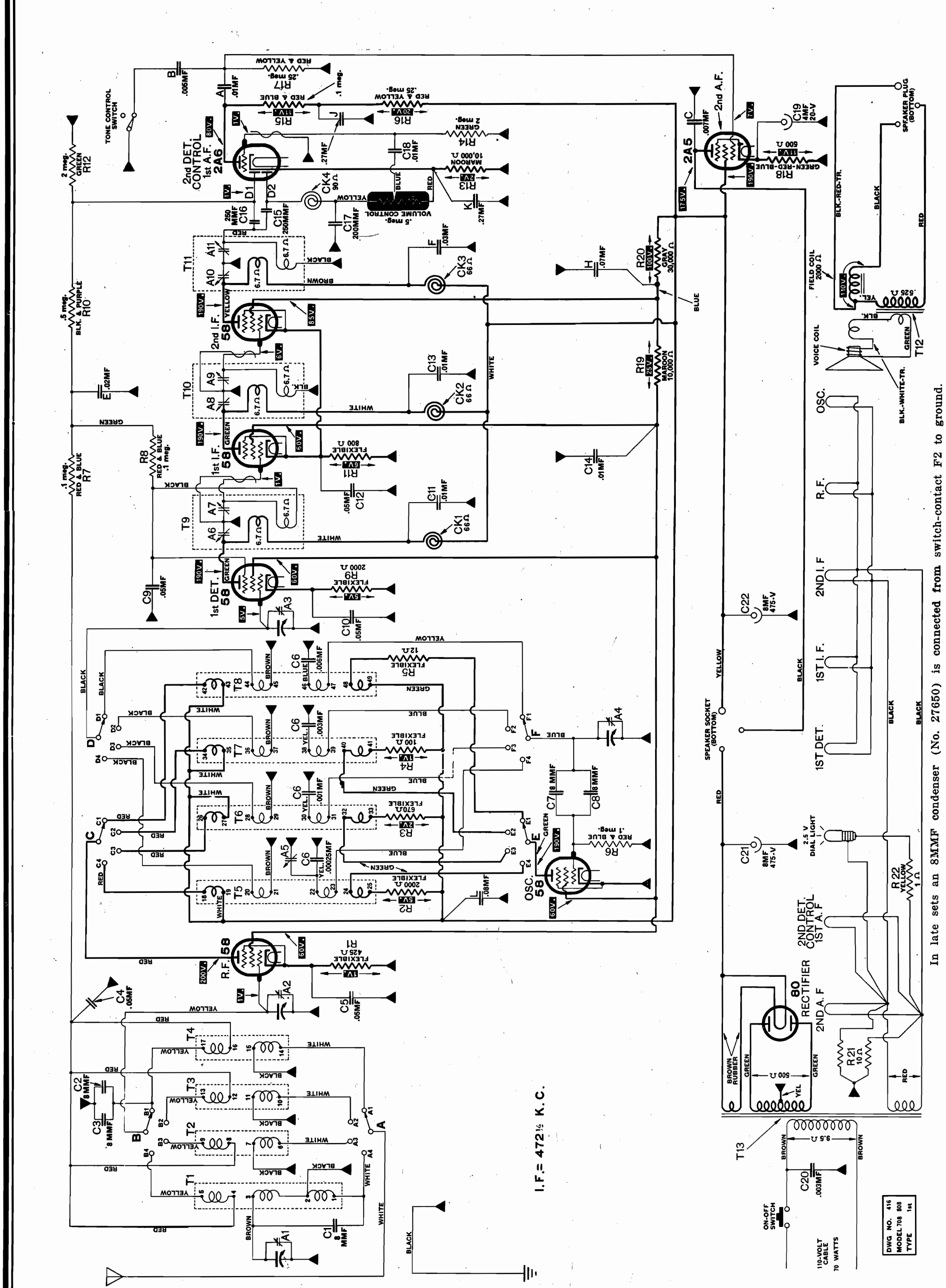
24137	Set container mounting rod	$ .30
24109	Cast dash bushing	.08
24415	Mounting lockwasher 5/16″	.25/C
24416	Mounting nut 5/16″	.55/C
24246	Instrument panel mounting strip	.22
24413	Instrument panel mounting screw, ¼″—1″ long	.35/C
24414	Dynamotor container mounting screw, ¼″—2½″ long	.02
24164	Mounting nut ¼″	.30/C
21142	Mounting washer 5/16″	.60/C
21141	Mounting lockwasher ¼″	.30/C
24418	Ground lead and terminal 2 ft. long	.20
24336	R. F. Transformer shield	.30
24459	I. F. Transformer shield	.25
24458	I. F. Plate choke shield	.20
24273	Shielded grid lead & cap	.10
24409	Aluminum disc shield	.07
24267	Clamp for No. 24111 cable	.03

INTERFERENCE SUPPRESSOR PARTS

21143	Spark plug suppressor	$ .30
21144	Distributor suppressor	.30
23520	Ignition filter	2.00
23260	Generator condenser	1.05

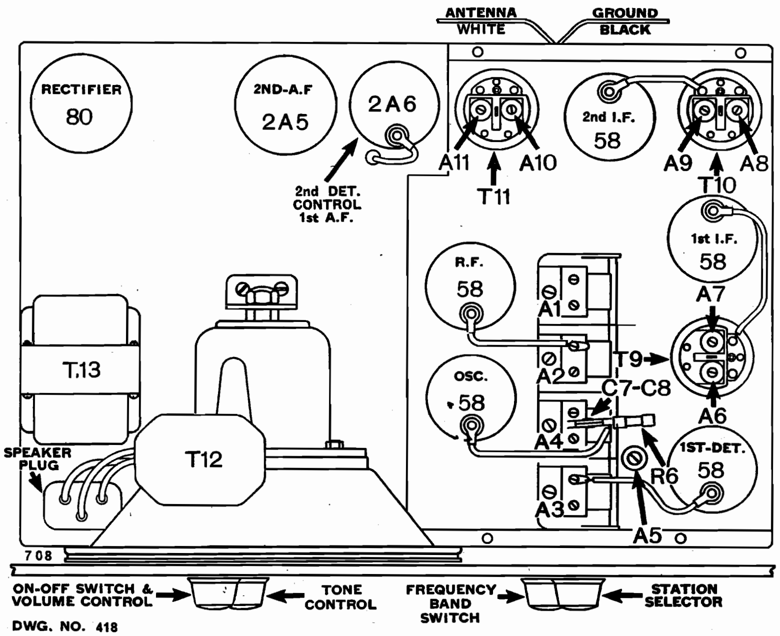
ATWATER KENT MFG. CO.

MODEL 708,808
Schematic,Voltage



MODEL 708,808
Socket,RF Wiring

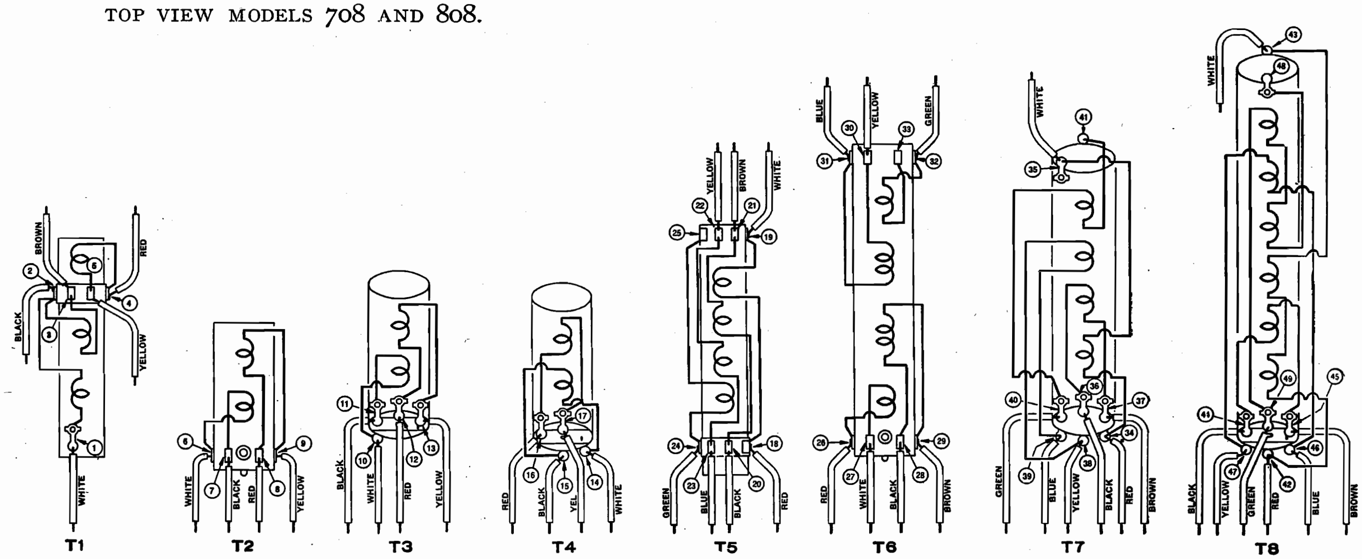
ATWATER KENT MFG. CO.



TOP VIEW MODELS 708 AND 808.

Voltages: Voltages are printed on the diagram of the set Readings are made from the cathode of each tube with the 250-volt scale of a 1000-ohm-per-volt D. C. voltmeter, and a line supply of 110 volts. Readings are made with the set in operation, no antenna, with the dial turned to a quiet point, and with the frequency-range switch in the broadcast position.

As the socket contacts of the R. F., 1st-detector, oscillator, and I. F. tubes are not accessible from the bottom for testing, we suggest use of a 58 tube with eight-inch leads soldered to the plate, screen, and cathode contacts. (Use green for plate, blue for screen, and yellow for cathode.) Insert this tube alternately in the different sockets and measure the voltages by making contact to the leads with the voltmeter prongs.



CONNECTIONS OF R. F. TRANSFORMERS IN MODELS 708 AND 808.

MODEL 708,808
Parts List

ATWATER KENT MFG. CO.

PARTS AND PRICE LIST FOR MODEL 708, PART No. 34200

For parts not listed below, please order by description or name of part and model number of set.

Part No.	Name of Part	List Price
25805	Cabinet, complete	$ 6.75
25023	Variable condenser rotor, stator and frame	2.50
24889	Range switch	1.35
24079	Volume control	.75

TRANSFORMERS

Dia. Code No.	Part No.	Description	List Price
T-1	32650	No. 1 broadcast coil	$ .75
T-2	32670	No. 1 H. F. coil, 1st range	.45
T-3	32690	No. 1 H. F. coil, 2nd range	.65
T-4	32720	No. 1 H. F. coil, 3rd range	.65
T-5	32660	No. 2 broadcast coil	.80
T-6	32680	No. 2 H. F. coil, 1st range	.75
T-7	32710	No. 2 H. F. coil, 2nd range	1.05
T-8	32730	No. 2 H. F. coil, 3rd range	1.35
T-9	25503	No. 1 I. F. transformer, less trimmers	.65
T-10	25503	No. 2 I. F. transformer, less trimmers	.65
T-11	25503	No. 3 I. F. transformer, less trimmers	.65
T-12	21672	Output transformer	1.25
T-13	25221	Power transformer	3.45

CONDENSERS

Dia. Code No.	Part No.	Description	List Price
C-1	27650	8MMF, 500 volts	$ .10
C-2	27650	8MMF, 500 volts	.10
C-3	27650	8MMF, 500 volts	.10
C-4	31160	.05MF, 100 volts, non-inductive	.25
C-5	31160	.05MF, 100 volts, non-inductive	.25
C-6	32480	Tracking condenser assembly	.90
C-7	27650	8MMF, 500 volts	.10
C-8	27650	8MMF, 500 volts	.10
C-9	31160	.05MF, 100 volts, non-inductive	.25
C-10	31160	.05MF, 100 volts, non-inductive	.25
C-11	32810	.01MF, 450 volts, non-inductive	.22
C-12	31160	.05MF, 100 volts, non-inductive	.25
C-13	32810	.01MF, 450 volts, non-inductive	.22
C-14	32810	.01MF, 450 volts, non-inductive	.22
C-15	33620	250MMF, 450 volts	.15
C-16	33620	250MMF, 450 volts	.15
C-17	21160	140-220MMF, 450 volts	.13
C-18	27630	.01MF, 200 volts	.20
C-19	25167	4MF, 20 volts, dry electrolytic	.40
C-20	32740	.003MF, 500 volts	.40
C-21	22538	8MF, 475 volts, electrolytic	1.00
C-22	22538	8MF, 475 volts, electrolytic	1.00
	33060	Multiple by-pass condenser (J-14)	1.25

RESISTORS

Dia. Code No.	Part No.	Description	List Price
R-1	17380	Flexible, 425 ohms	$ .15
R-2	33230	Flexible, 2,000 ohms	.17
R-3	33210	Flexible, 670 ohms	.16
R-4	33220	Flexible, 100 ohms	.16
R-5	33240	Flexible, 12 ohms	.15
R-6	20980	Red-blue, 100,000 ohms, ½ watt	.10
R-7	20980	Red-blue, 100,000 ohms, ½ watt	.10
R-8	20980	Red-blue, 100,000 ohms, ½ watt	.10
R-9	21030	Flexible, 2,000 ohms	.16
R-10	20930	Black-purple, 500,000 ohms, ½ watt	.10
R-11	20120	Flexible, 800 ohms	.15
R-12	20940	Green, 2,000,000 ohms, ½ watt	.10
R-13	20950	Maroon, 10,000 ohms, ½ watt	.10
R-14	20940	Green, 2,000,000 ohms, ½ watt	.10
R-15	20980	Red-blue, 100,000 ohms, ½ watt	.10
R-16	20920	Red-yellow, 250,000 ohms, ½ watt	.10
R-17	20920	Red-yellow, 250,000 ohms, ½ watt	.10
R-18	32010	Blue-red-green, 500 ohms, 1 watt	.15
R-19	20950	Maroon, 10,000 ohms, ½ watt	.10
R-20	29710	Gray, 30,000 ohms, 1½ watts	.20
R-21	17077	Flexible, 10 ohms	.12
R-22	31860	Flexible, 1 ohm	.17

CHOKES

Dia. Code No.	Part No.	List Price
CK-1	19210	$ .15
CK-2	19210	.15
CK-3	19210	.15
CK-4	17015	.25

TRIMMER CONDENSERS

Dia. Code No.	Part No.	Description	List Price
A-5	20190	Single trimmer	$ .25
	32880	Double I. F. trimmer	.30

MISCELLANEOUS PARTS

Part No.	Name of Part	Price
25152	Instruction and log card F-1062	$ .01 net
23184	Wave guide F-1013	.01 net

No. 34300 SPEAKER USED IN MODEL 708

Part No.	Name of Part	List Price
21161	Diaphragm	$ 1.05
18870	Field coil, 2,000 ohms	1.25
21672	Output transformer (T-12)	1.25
25404	Speaker cable and plug	.40

PARTS AND PRICE LIST FOR MODEL 808, PART No. 34600

Below Serial No. 7702748

Only parts different from Model 708 are listed below.

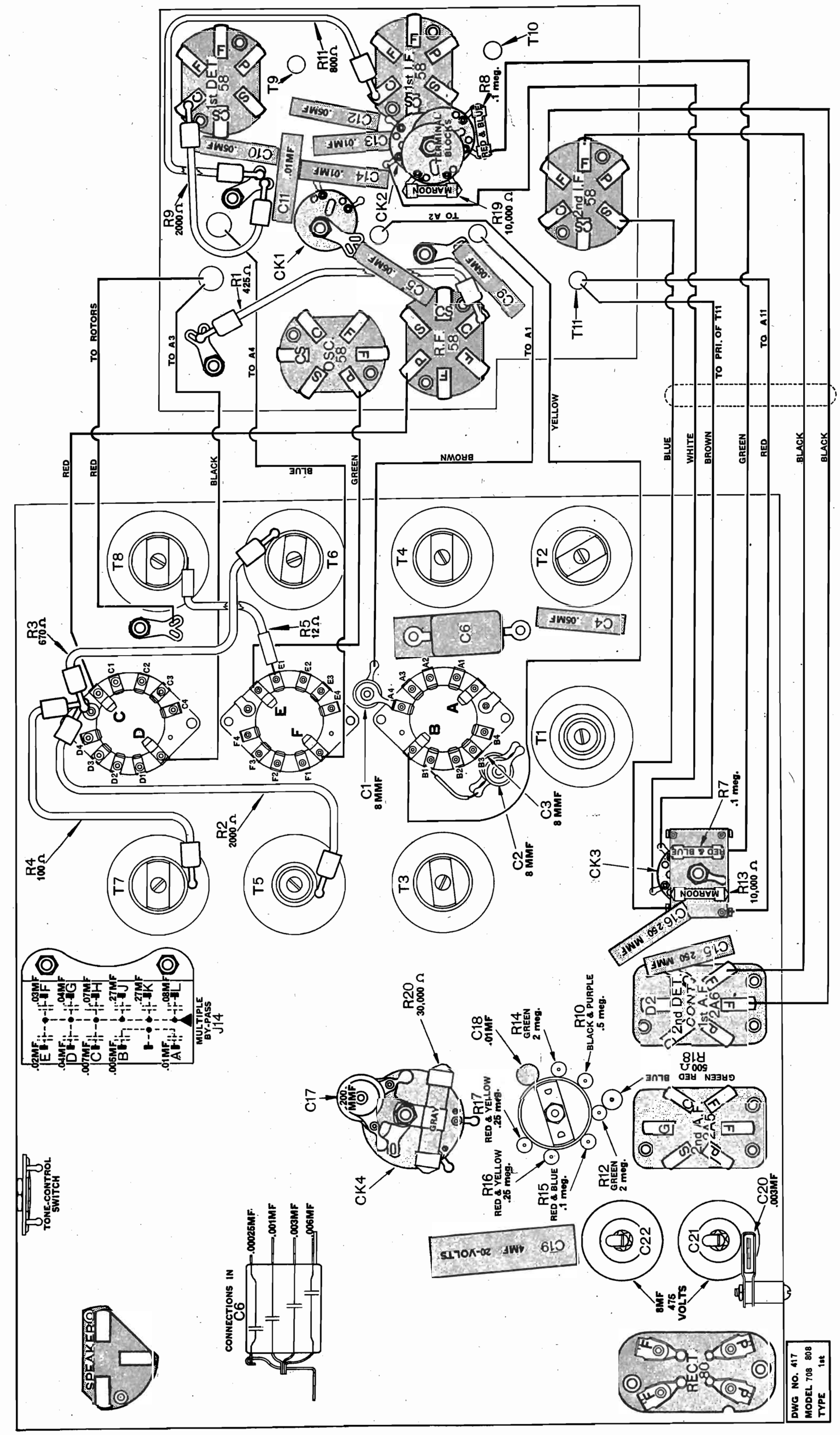
Part No.	Name of Part	List Price
25232	Instruction and log card F-1065	$ .01

No. 34500 SPEAKER USED IN MODEL 808

Part No.	Name of Part	List Price
20737	Diaphragm	$ 1.25
18870	Field coil, 2,000 ohms	1.25
21672	Output transformer (T-12)	1.25
25405	Speaker cable and plug	.50

MODEL 708,808
Chassis

ATWATER KENT MFG. CO.

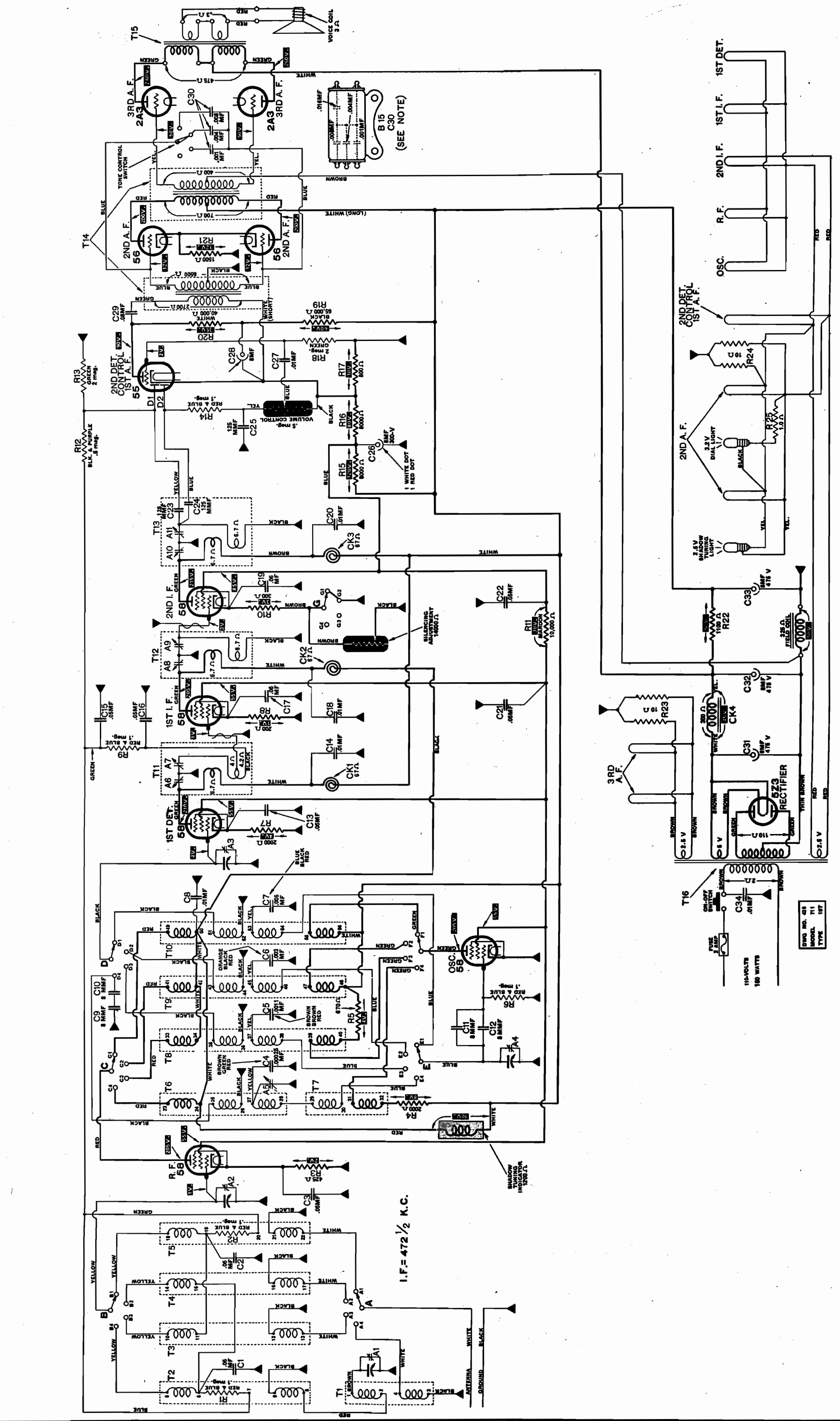


BOTTOM VIEW MODELS 708 AND 808.

MODEL 711
Schematic, Voltage

ATWATER KENT MFG. CO.

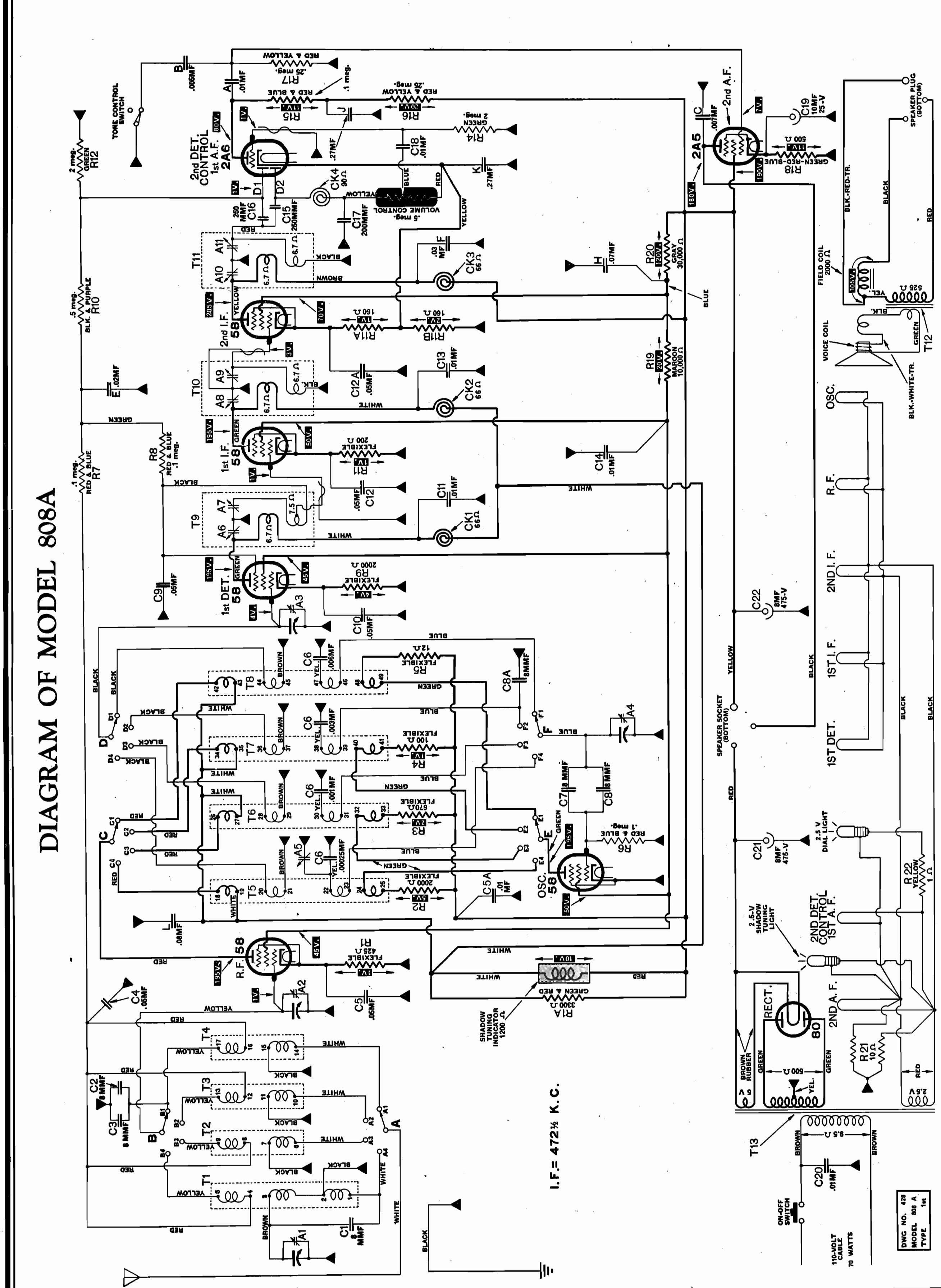
DIAGRAM OF MODEL 711



The values shown above for the B-15 tone control condenser are correct. In the supplement of electrical values (December, 1932) the .001 and the .008 MF condensers are interchanged. Please correct the supplement of electrical values to agree with the above diagram.

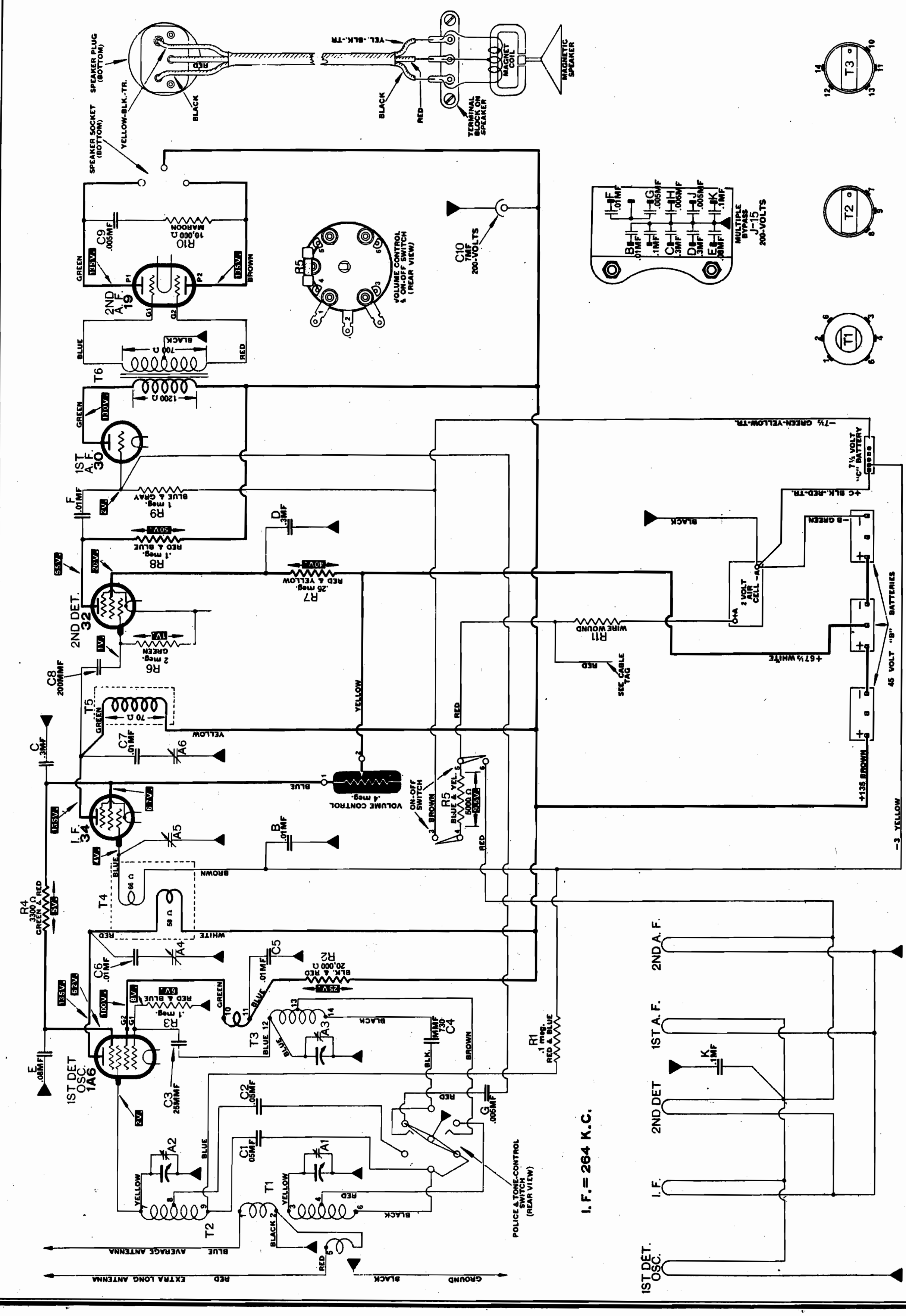
MODEL 808A
Schematic, Voltage

ATWATER KENT MFG. CO.



ATWATER KENT MFG. CO.

MODEL 165Q, 525Q
Schematic
Voltage



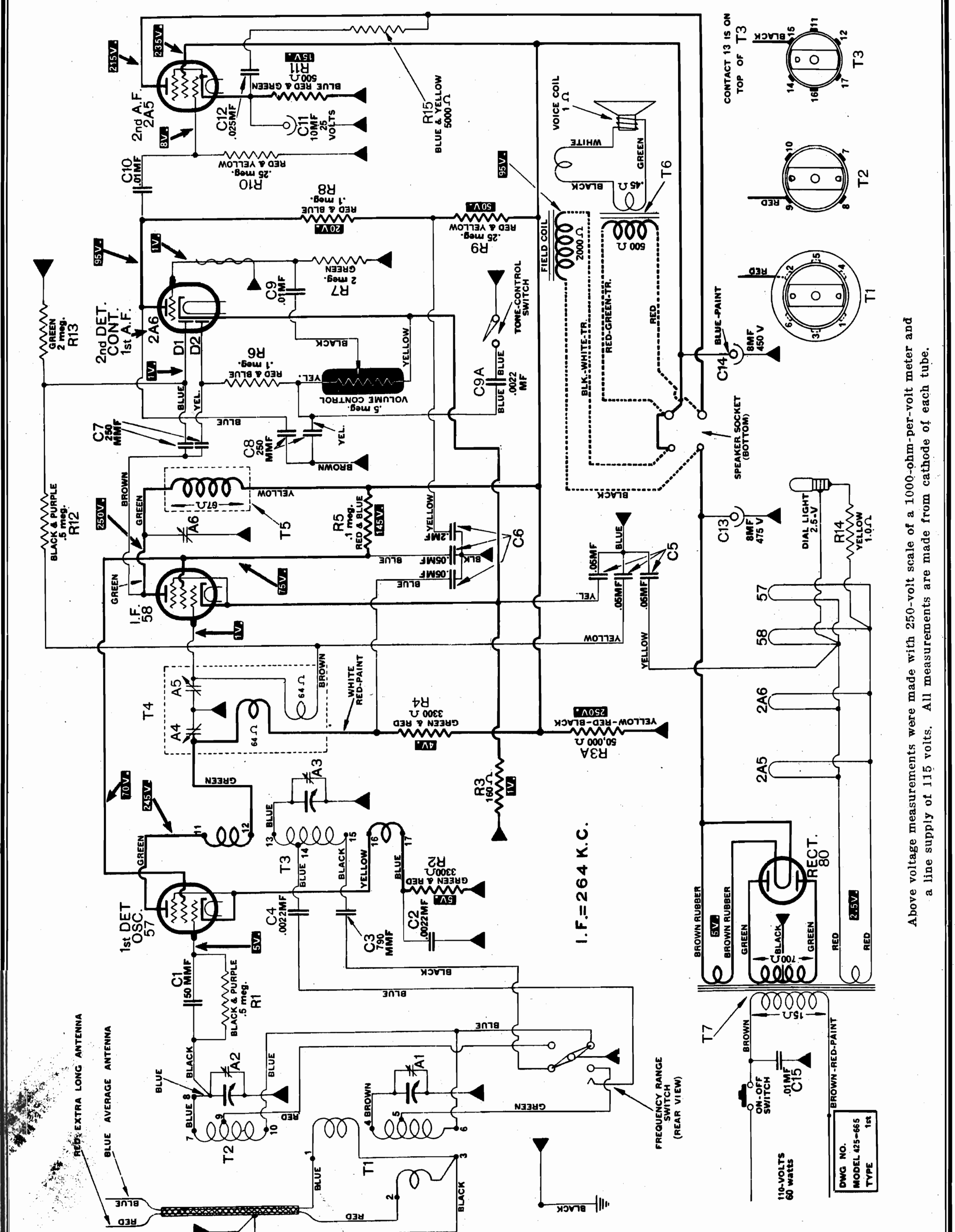
Total "B" voltage at time measurements were made equaled 135 volts. Tube voltages are taken from —F of each tube, using the 250-volt scale of a 1000-ohm-per-volt meter. Resistor R11 is used with 2-volt air cell, but is not used with 2-volt storage cell.

In Model 525Q, a 2-volt air-cell dial light (60 mils.) is connected across the filament circuit.

March, 1934.

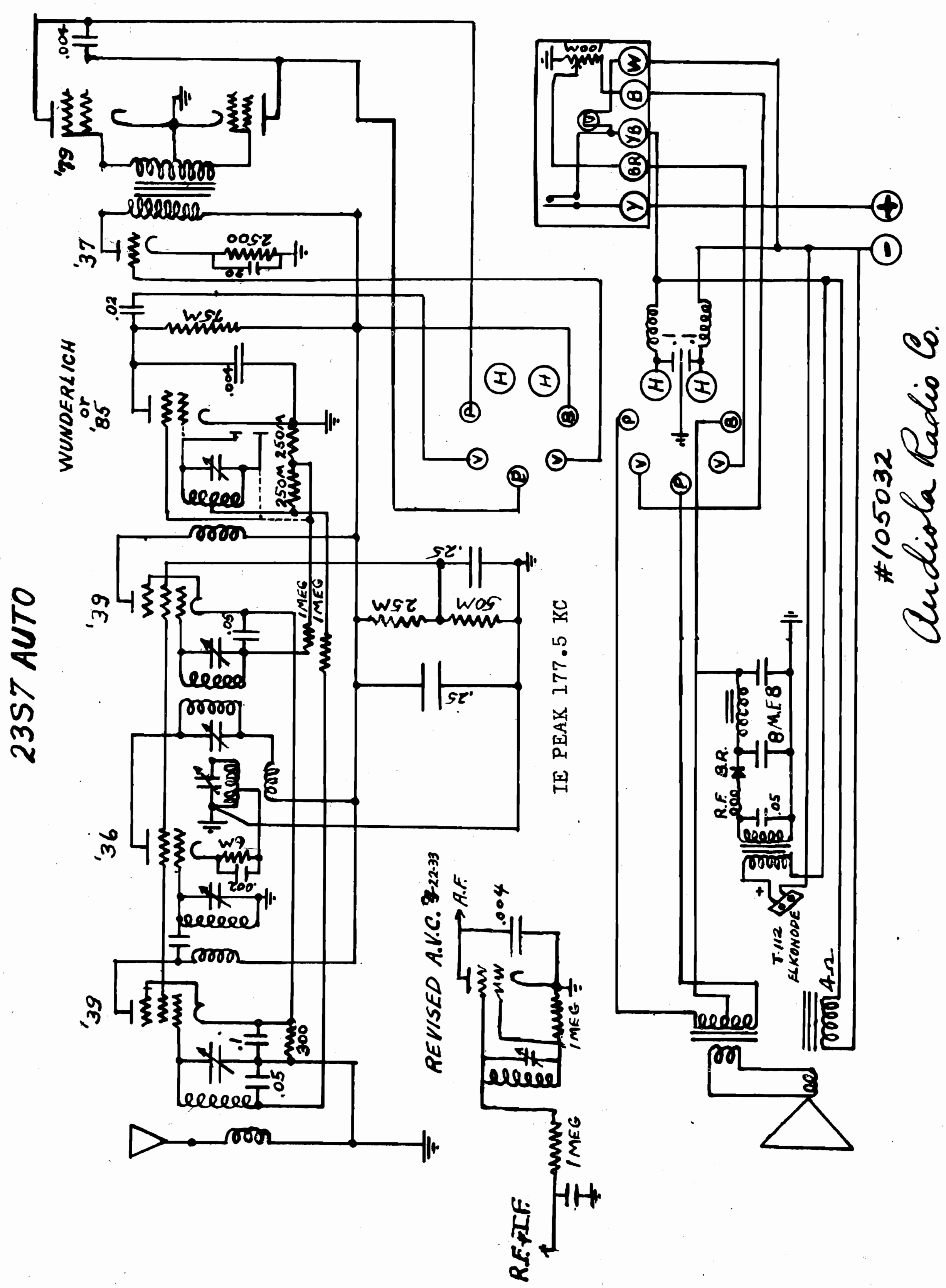
MODEL 425,665
Schematic
Voltage

ATWATER KENT MFG. CO.



AUDIOLA RADIO CO.

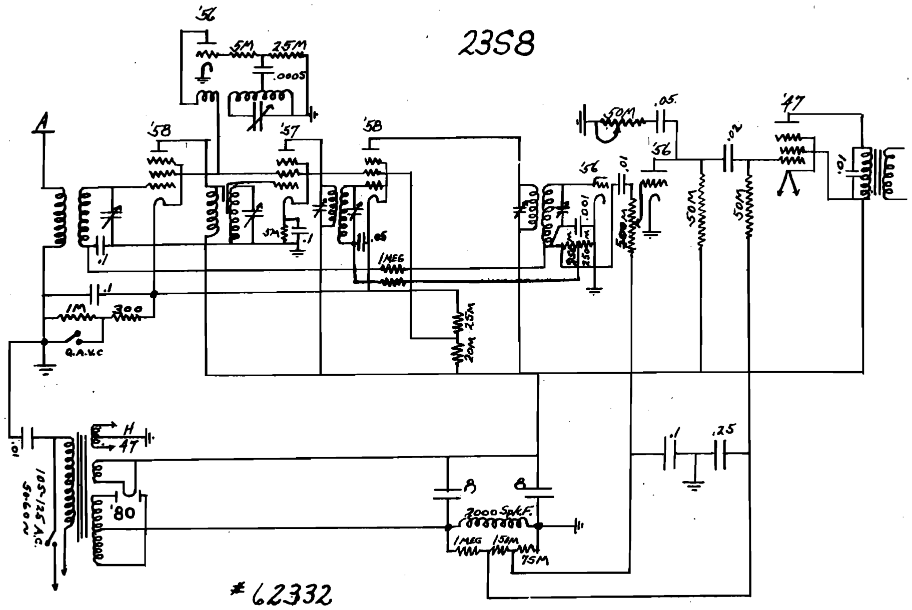
MODEL 23-S-7
Schematic



MODEL 23-S-8
Two types

AUDIOLA RADIO CO.

23S8

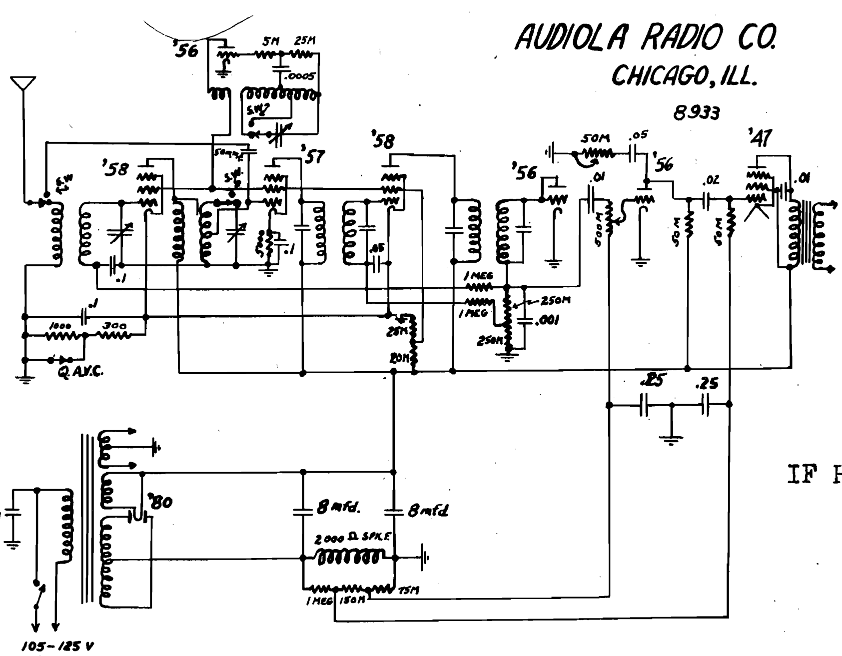


\#62332
Audiola Radio Co.
Chicago

IF PEAK 177.5 KC.

23S8

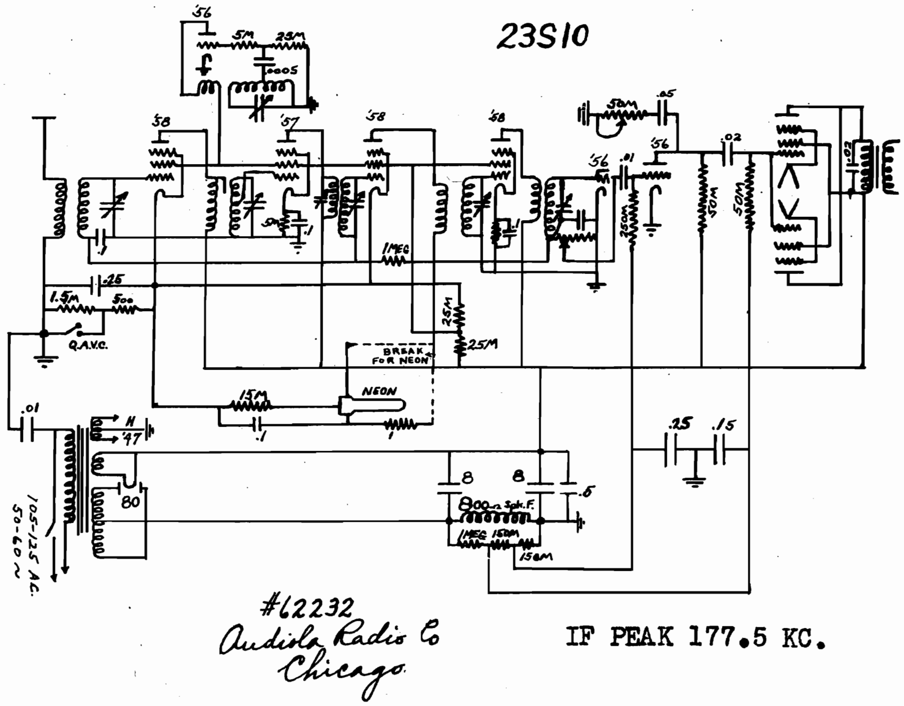
AUDIOLA RADIO CO.
CHICAGO, ILL.
8933



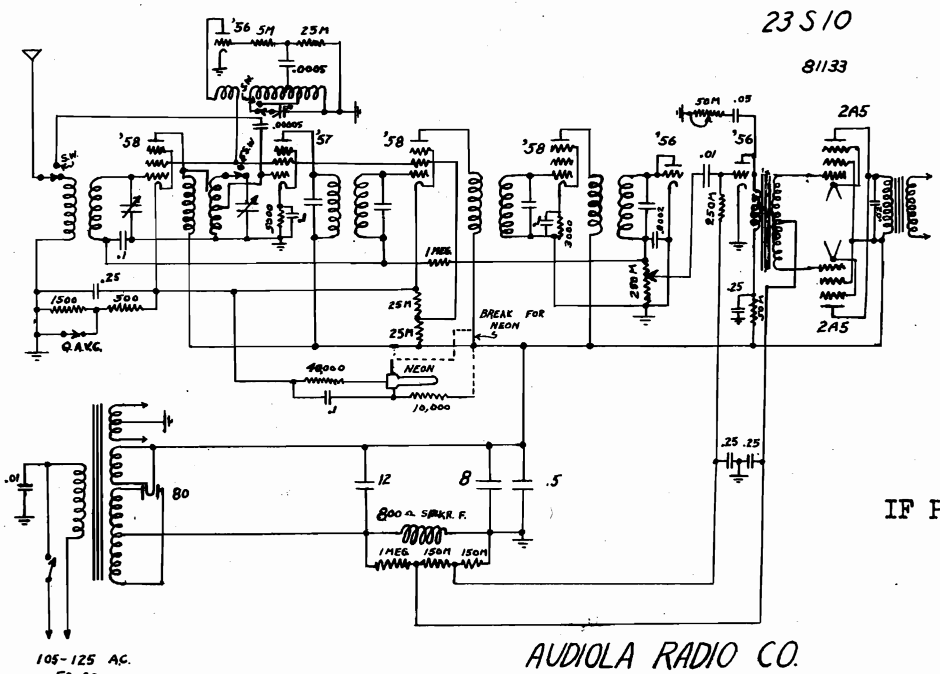
IF PEAK 177.5 KC.

MODEL 23-S-10
Two types

AUDIOLA RADIO CO.



IF PEAK 177.5 KC.



IF PEAK 177.5 KC.

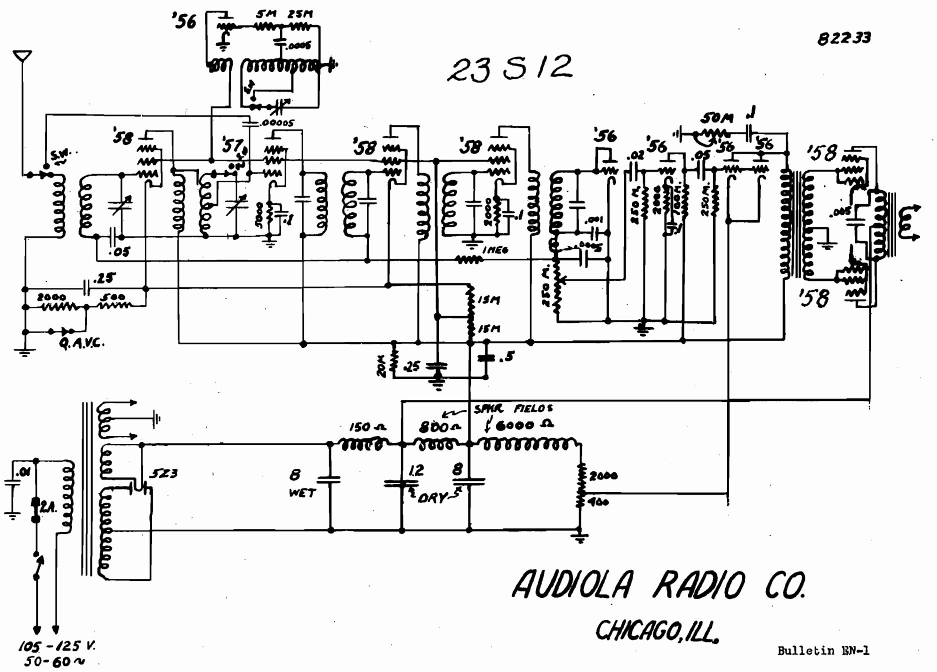
AUDIOLA RADIO CO.
CHICAGO, ILL.

MODEL 23-S-12
MODEL 33-S-8 32V

AUDIOLA RADIO CO.

23S12

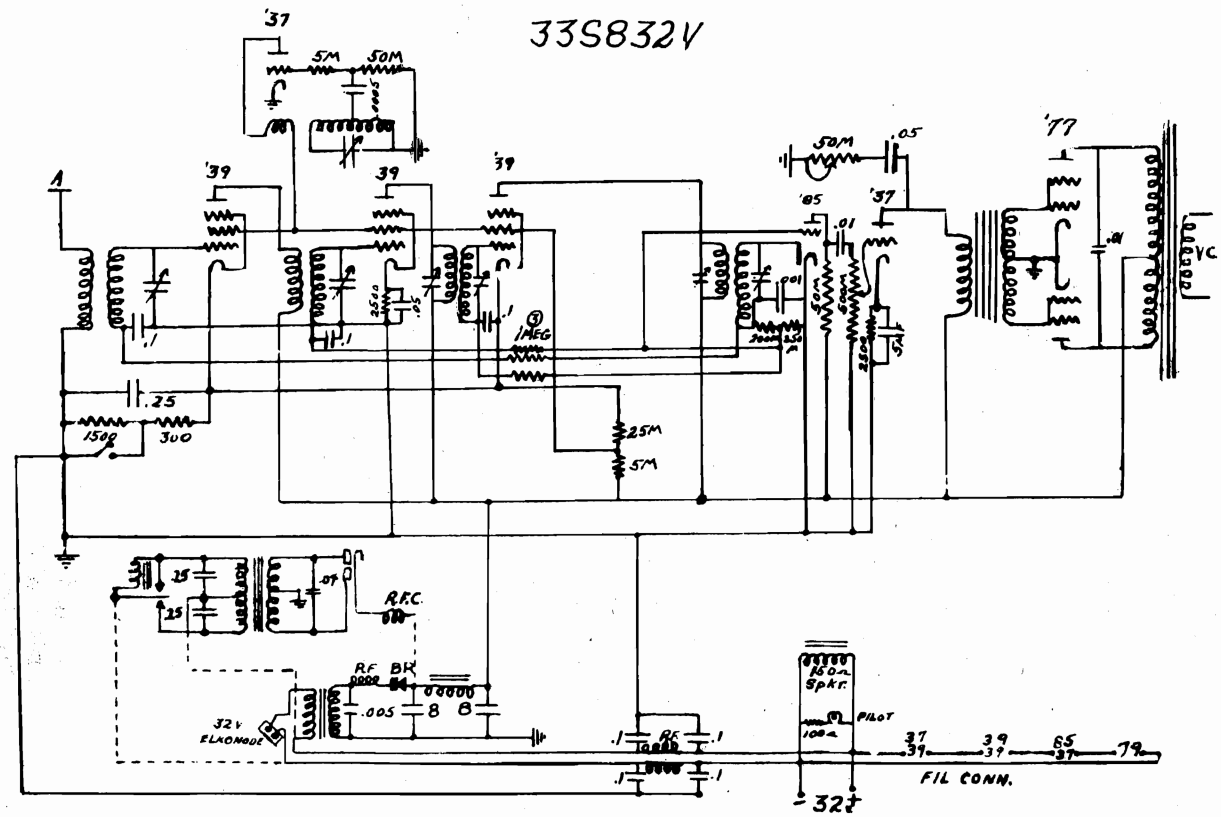
82233



AUDIOLA RADIO CO.
CHICAGO, ILL.

Bulletin BN-1

33S832V

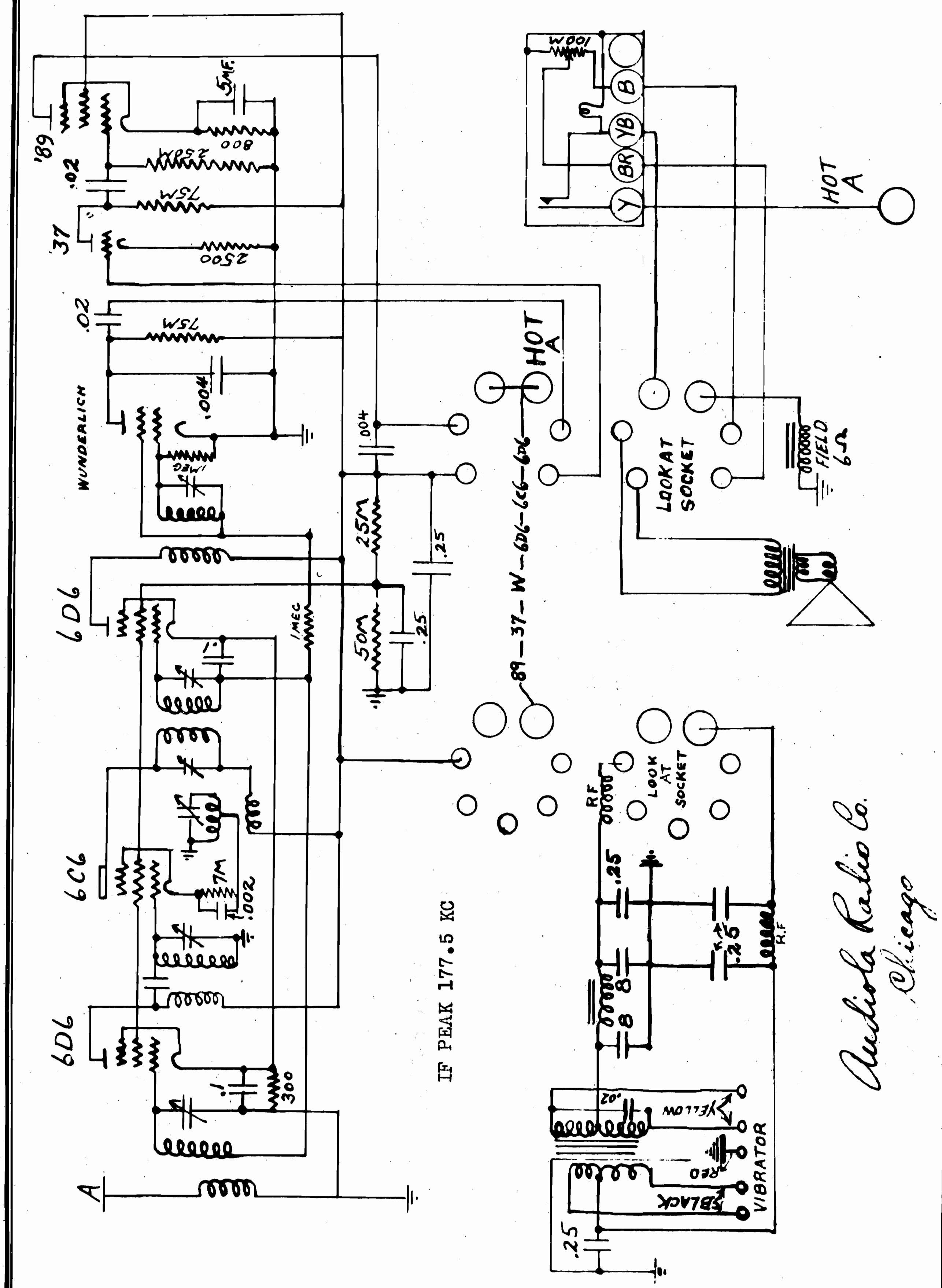


61233

Audiola Radio Co.
Chicago

AUDIOLA RADIO CO.

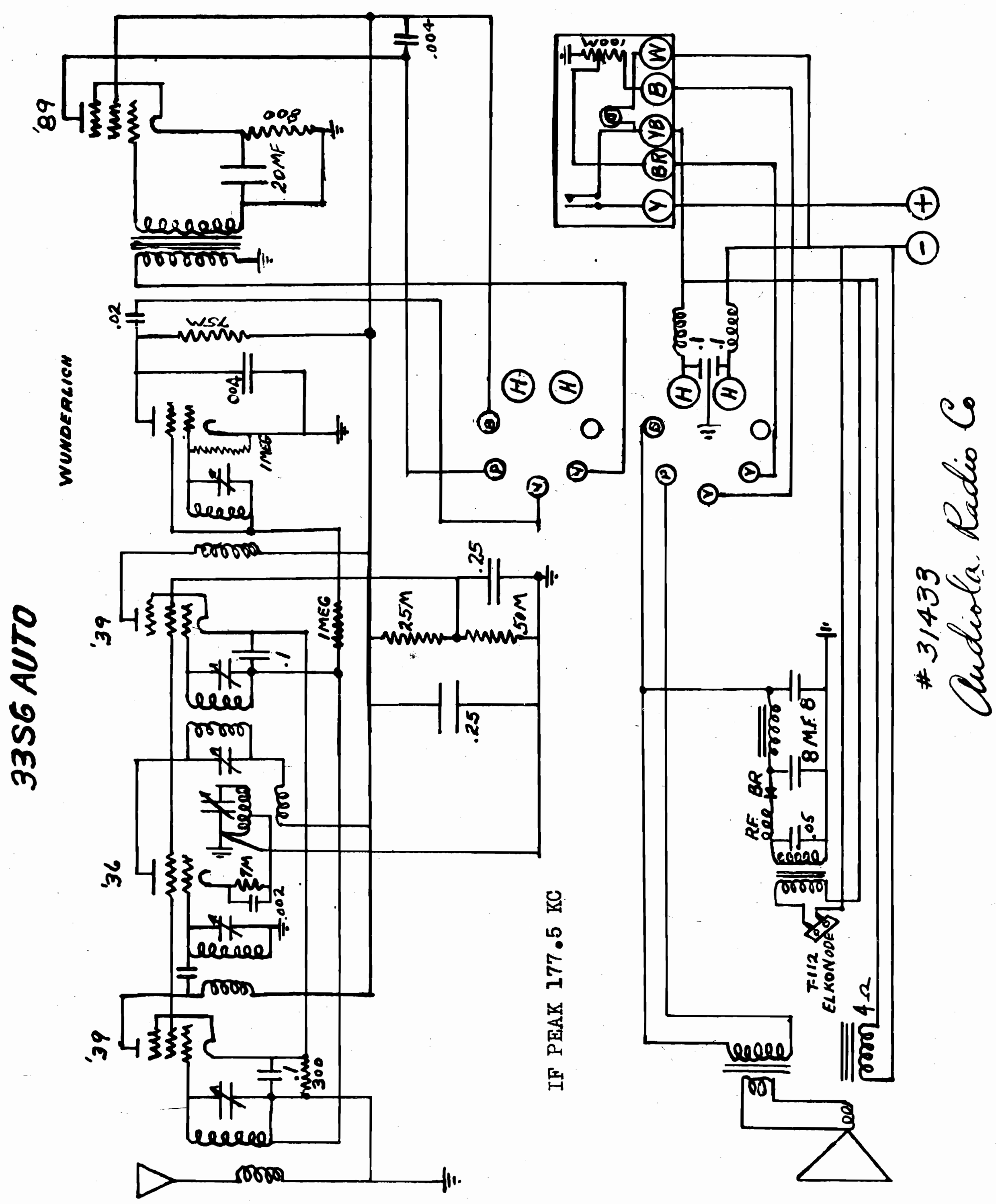
MODEL 33-A-6
Schematic



MODEL 33-S-6
Schematic

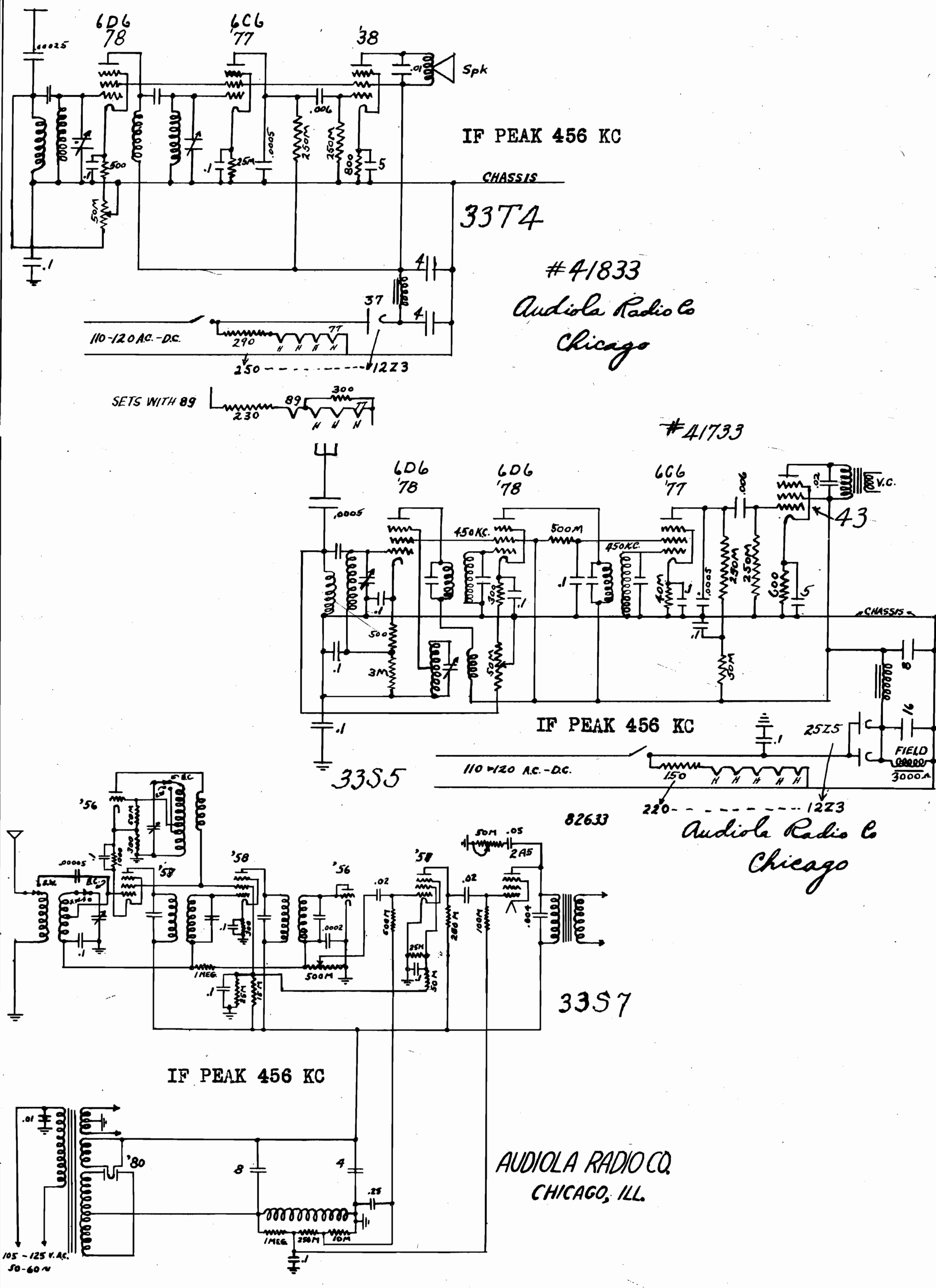
AUDIOLA RADIO CO.

MODEL 33-S-6
Schematic

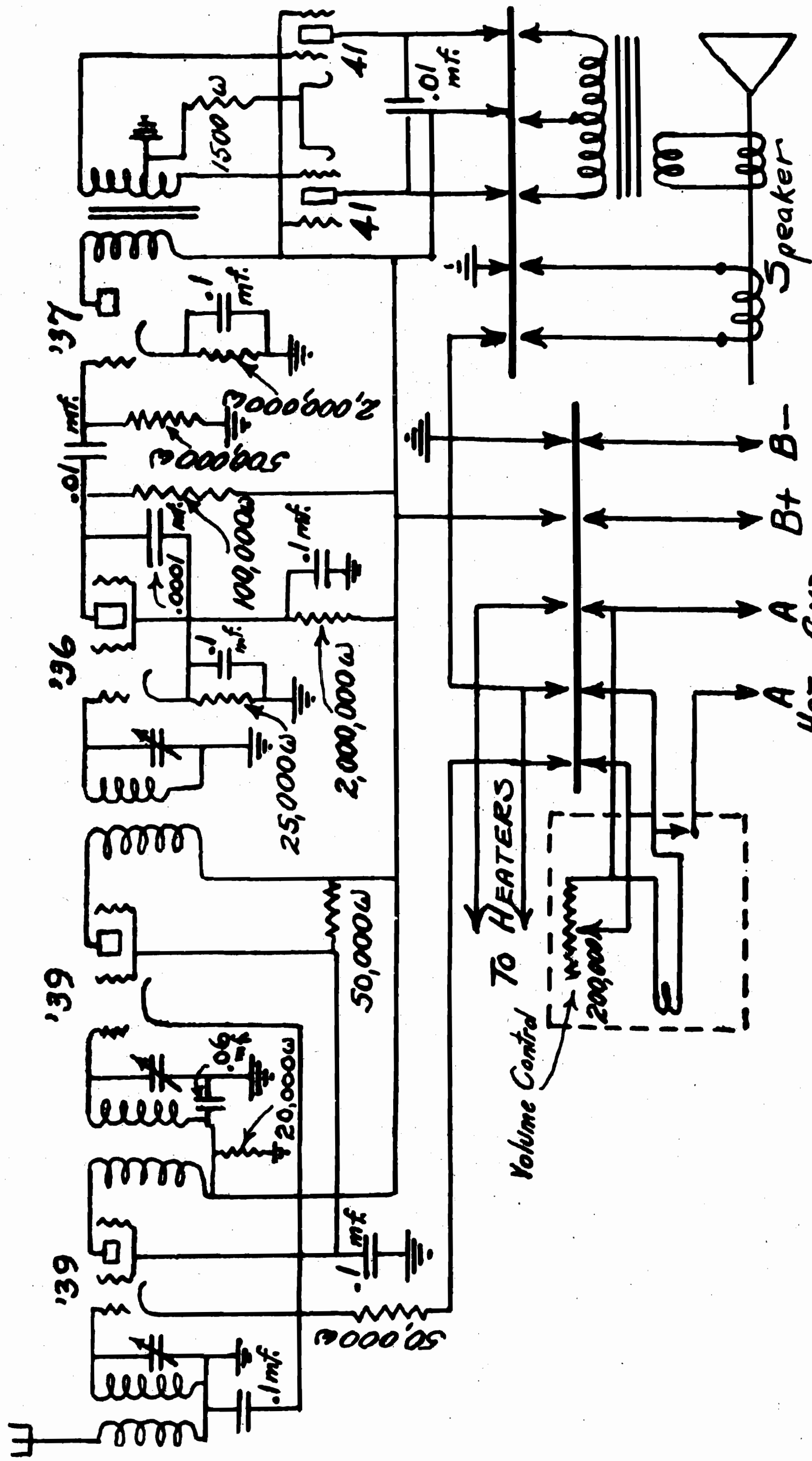


AUDIOLA RADIO CO.

MODEL 33-T-4
MODEL 33-S-5
MODEL 33-S-7

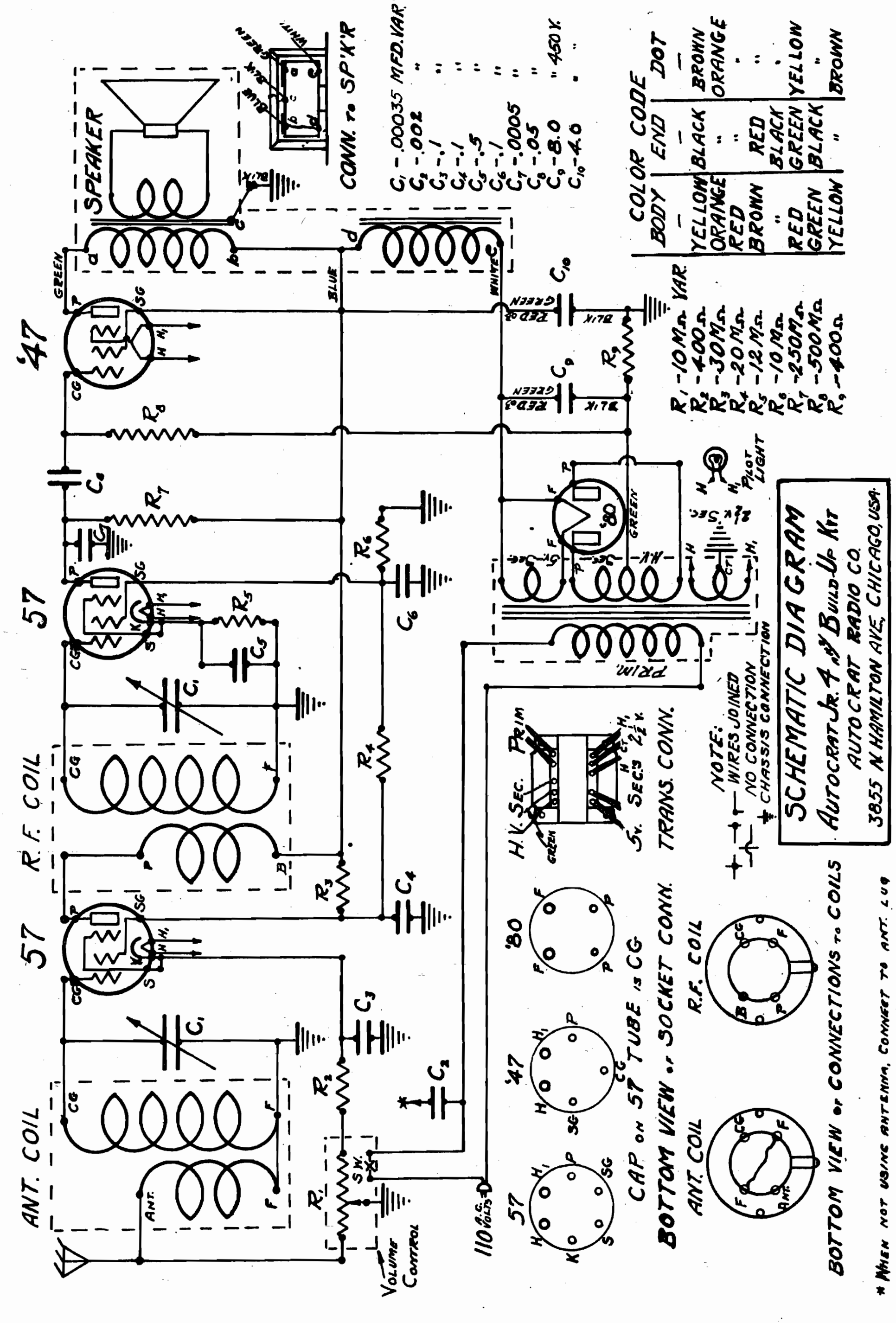


AUTOCRAT RADIO CORP. MODEL TRF-41



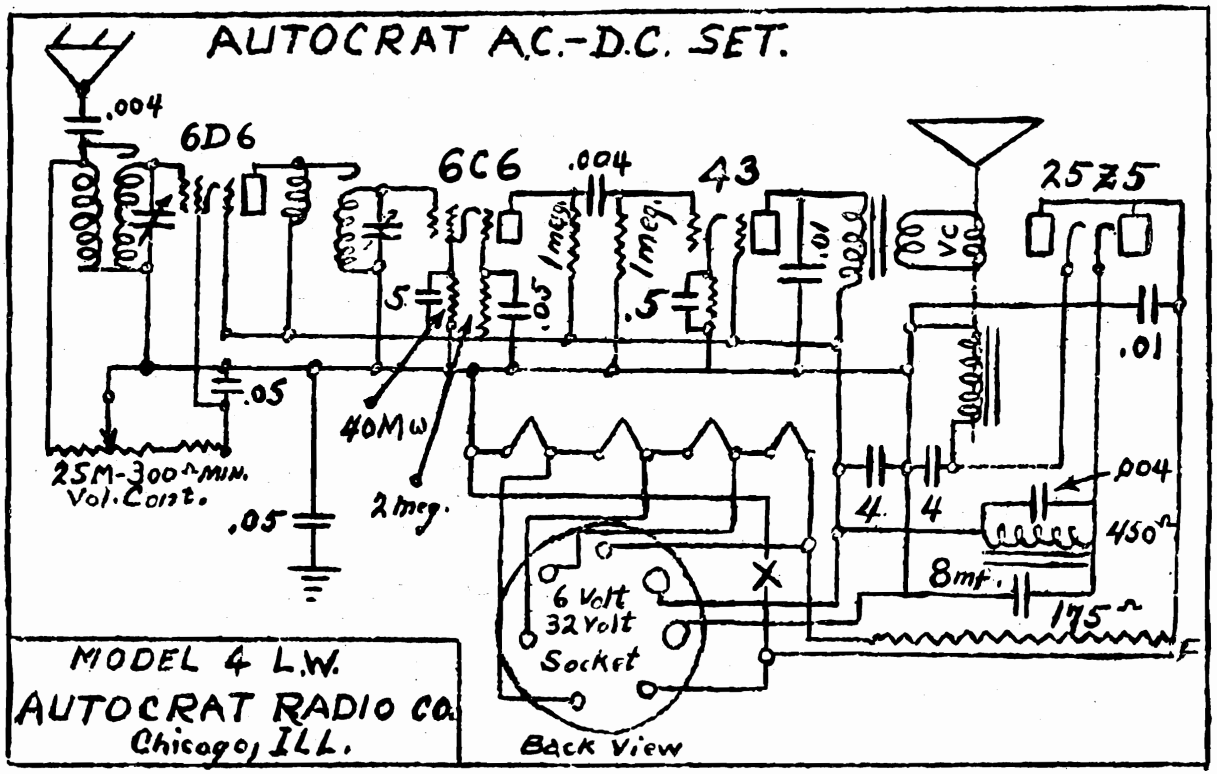
MODEL Autocrat Jr.4

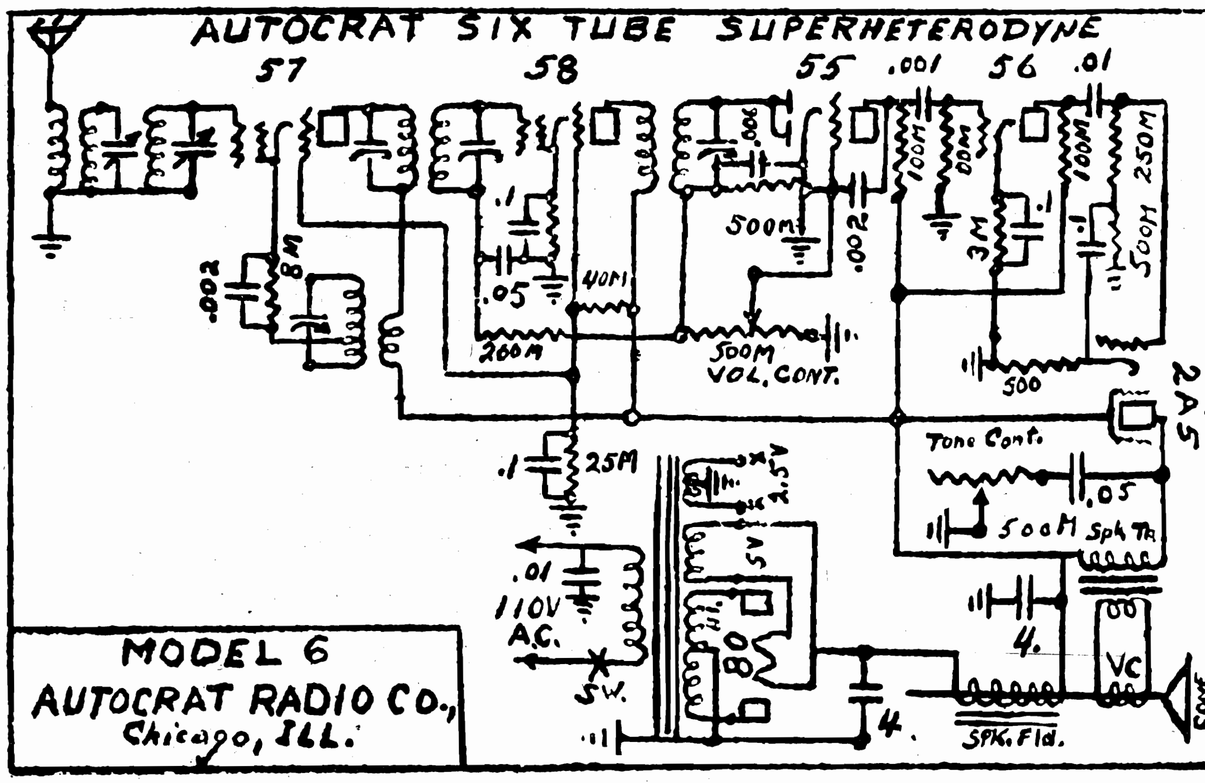
AUTOCRAT RADIO CORP.



MODEL Autocrat 4 LW
MODEL Autocrat 6

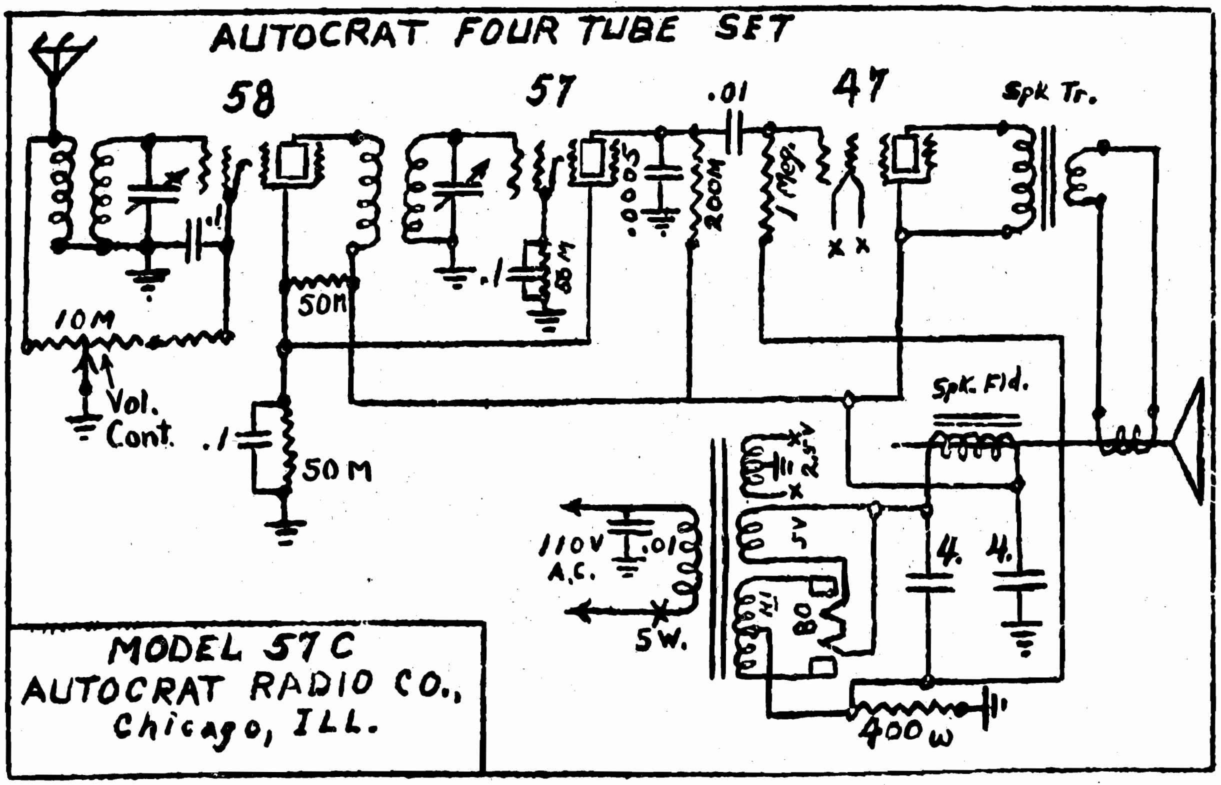
AUTOCRAT RADIO CORP.

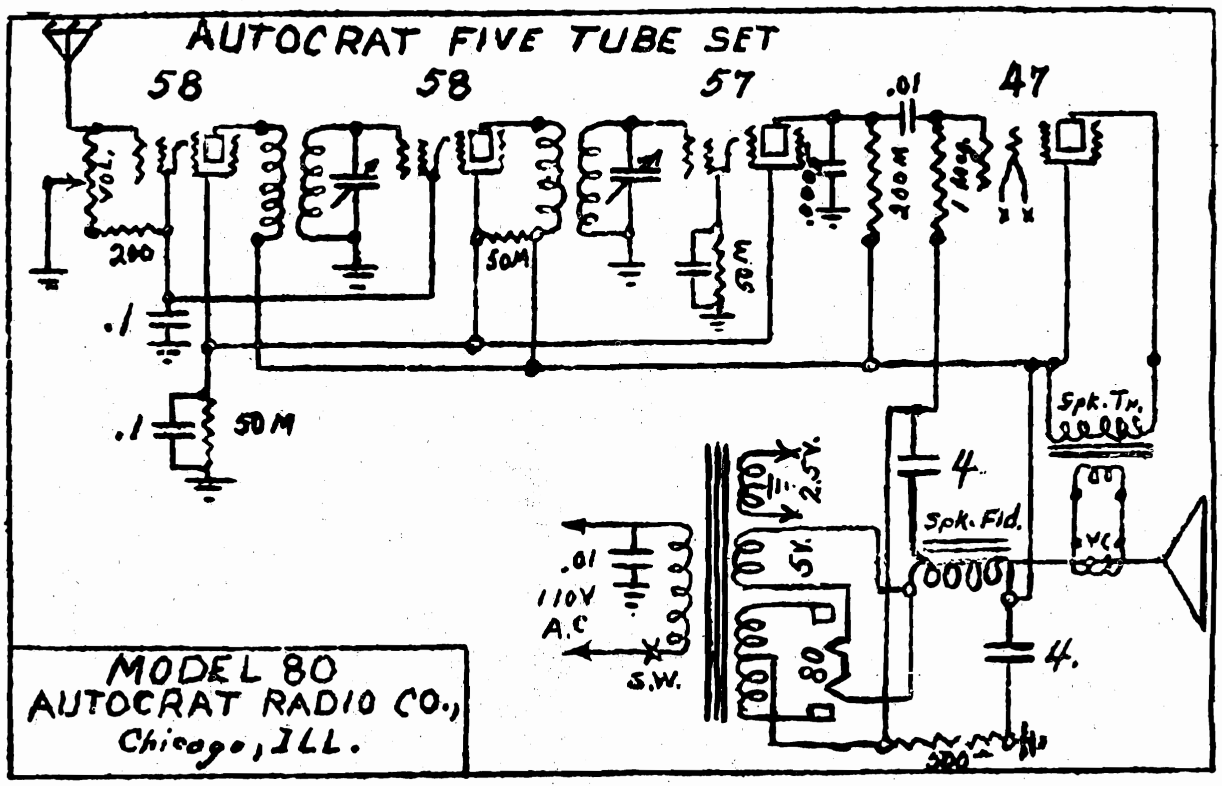




MODEL Autocrat 57 C
MODEL Autocrat 80

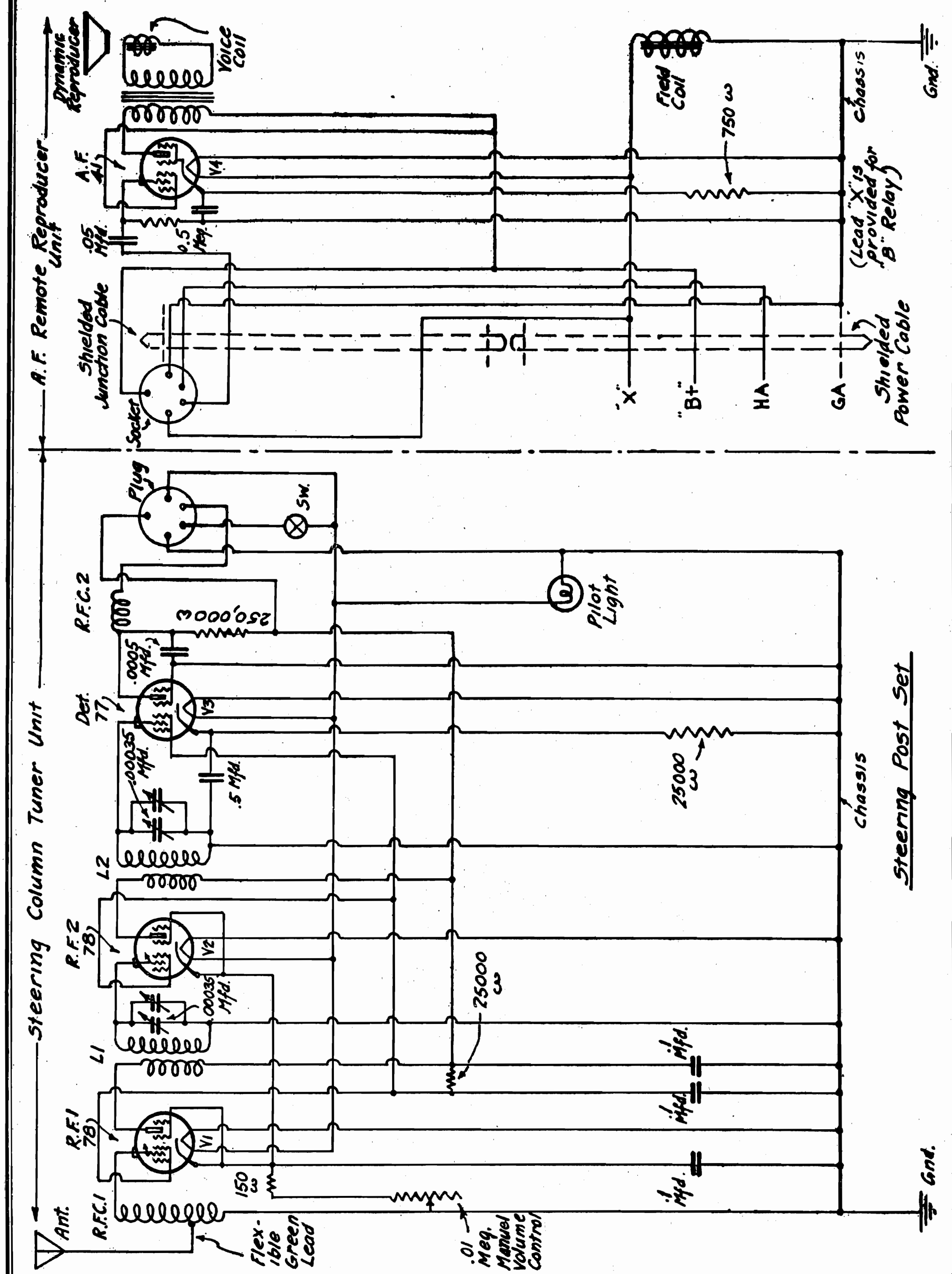
AUTOCRAT RADIO CORP.





AUTOMATIC RADIO MFG. CO.

MODEL Tom Thumb
Steering Post
Schematic



MODEL Tom Thumb
Steering Post
Notes

AUTOMATIC RADIO MFG. CO.

INSTRUCTIONS FOR INSTALLING

This TOM THUMB AUTO RADIO is designed for operation in motor cars and while due to its small size, it may be installed in any convenient part of the automobile, it is recommended for STEERING POST mounting.

Uses the latest type tubes 77's, 78's, 41's; the 41 power tube being mounted in speaker case.

Battery Model

1. Place set in proper position on steering post, either on left side, right side, or on top, and secure with the four screws furnished.

2. Mount speaker in position desired—either under the cowl—to the roof of the car—behind the front seat—or in any other convenient place.

Connect shield cable with plug on end—this coming from the speaker to the five prong socket on radio set. The other cable leading from speaker has two wires, the yellow lead is A ungrounded, the black lead coming from the shield near this yellow lead is grounded.

The brown is B plus, 135 or 180, and the pigtail lead leading from the shield near the brown wire is B minus.

Where B batteries are used, connect as follows:

1. Yellow wire to ungrounded side of storage battery, and Black lead to chassis or grounded side of storage battery, preferably the latter.

2. Connect all of the individual batteries in series, and attach the brown wire to B plus, 135 or 180, preferably 180. Connect the pigtail lead to B minus.

All-Electric Model

1. Place set in proper position on steering post, either on left side, right side, or on top, and secure with the four screws furnished..

2. Mount speaker unit in position under cowl, connect shielded cable with socket attached on end, this coming from speaker, to the five pin plug in side of radio set.

IMPORTANT! CAUTION. CHECK POLARITY OF AUTOMOBILE STORAGE BATTERY. If positive side of battery is grounded to chassis DO NOT DISTURB connections on terminal strip inside of speaker unit. In the event that negative (—) side of battery is grounded to the chassis. Remove screws holding cover on speaker unit. Pull cover slightly forward exposing terminal strip on side of speaker opposite from tube. (See Figure 3.) Reverse connection No 1 and 2, i.e. Place yellow wire on terminal No. 2 and green wire on terminal No. 1.

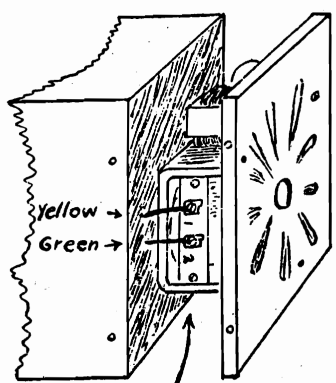
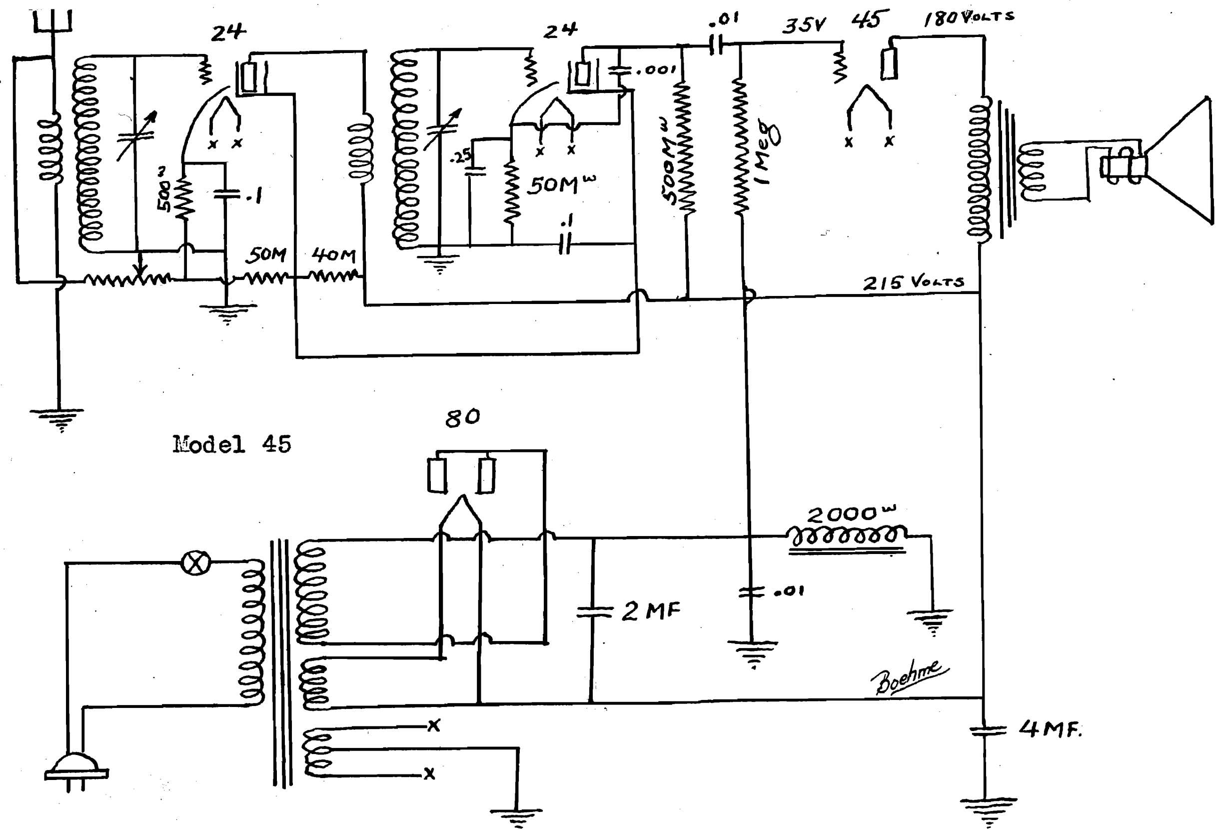


Fig. 3

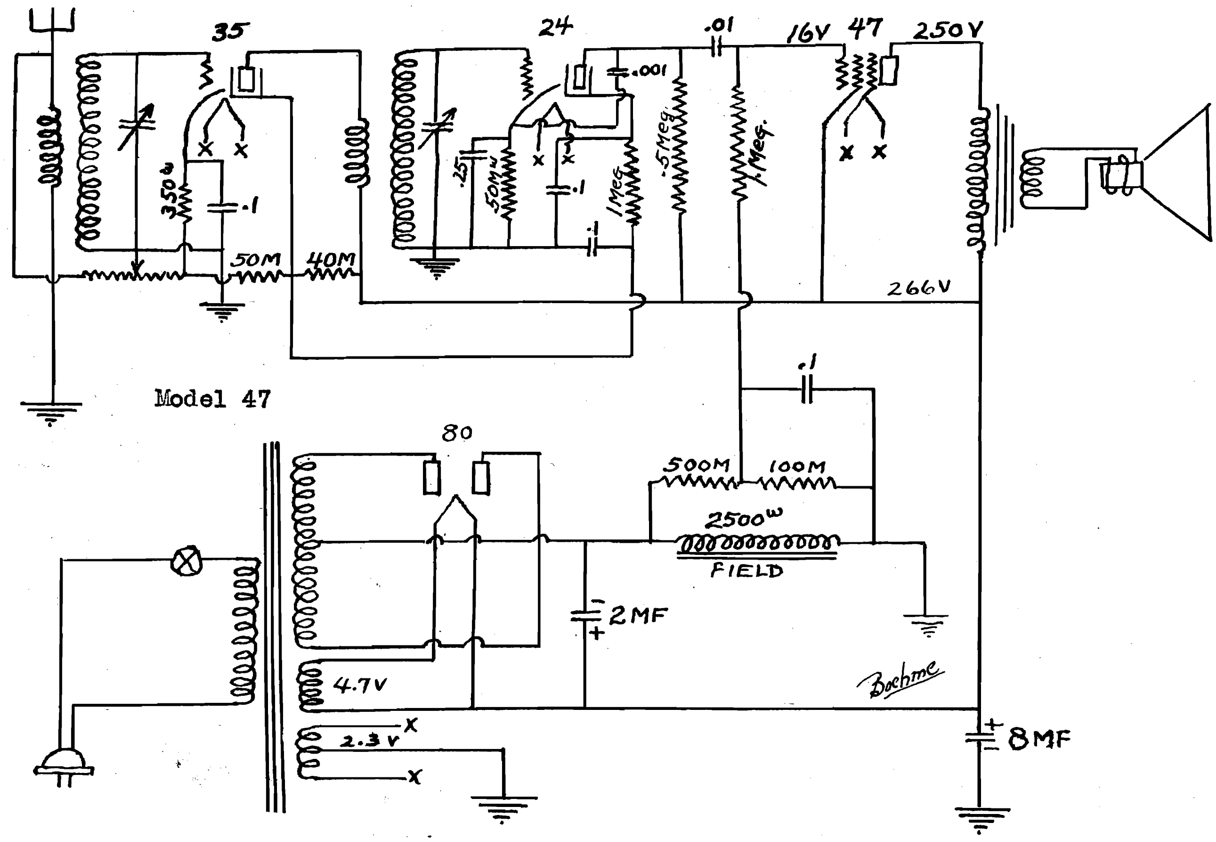
3. Connect YELLOW wire of shielded cable coming from speaker to UNGROUNDED side of storage battery and BLACK lead to GROUNDED side—making sure battery connections are clean and secure. It is also advisable to apply vaseline to battery lugs to prevent corrosion.

MODEL 45
MODEL 47

NATHANIEL BALDWIN & CO.



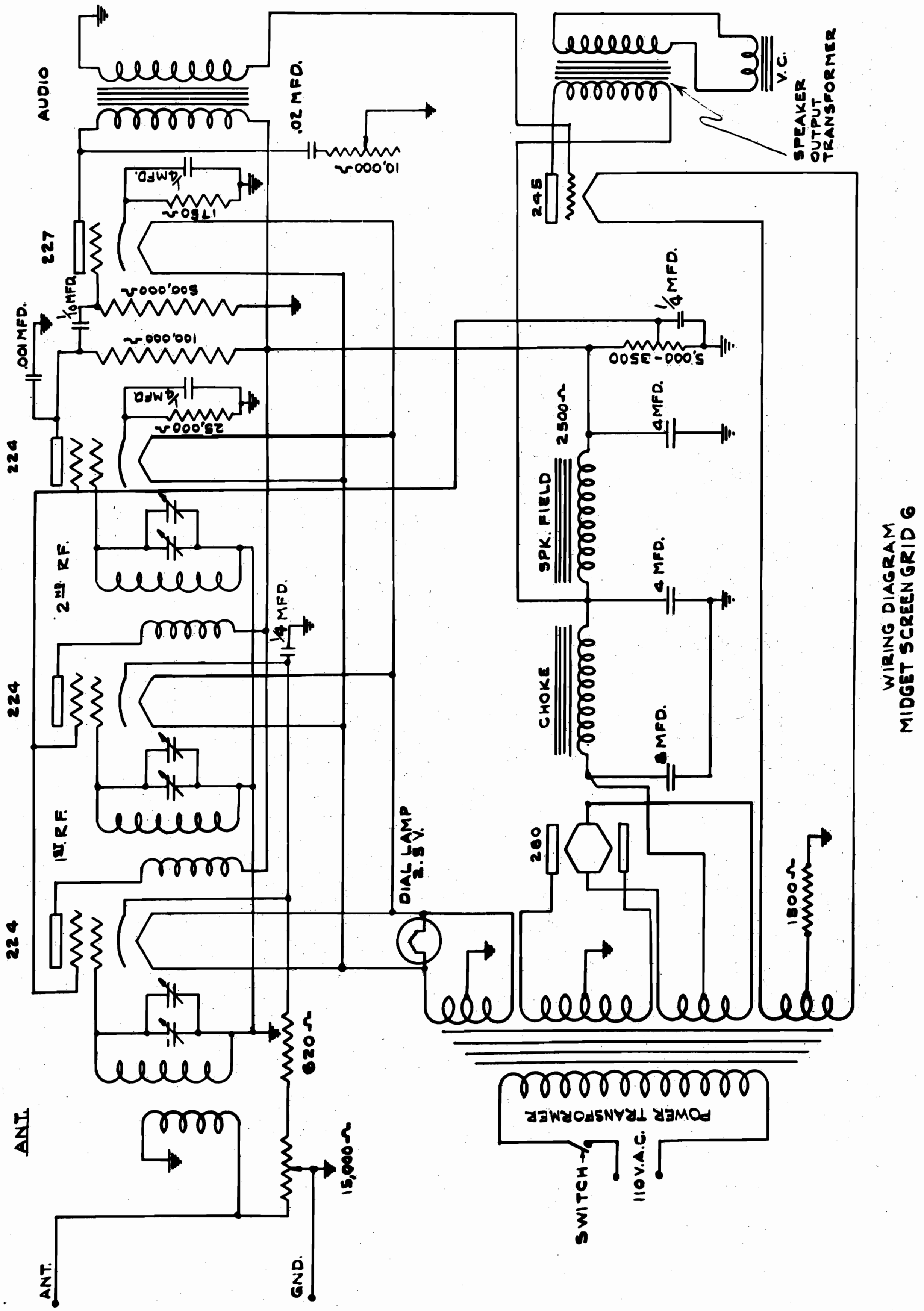
Model 45



Model 47

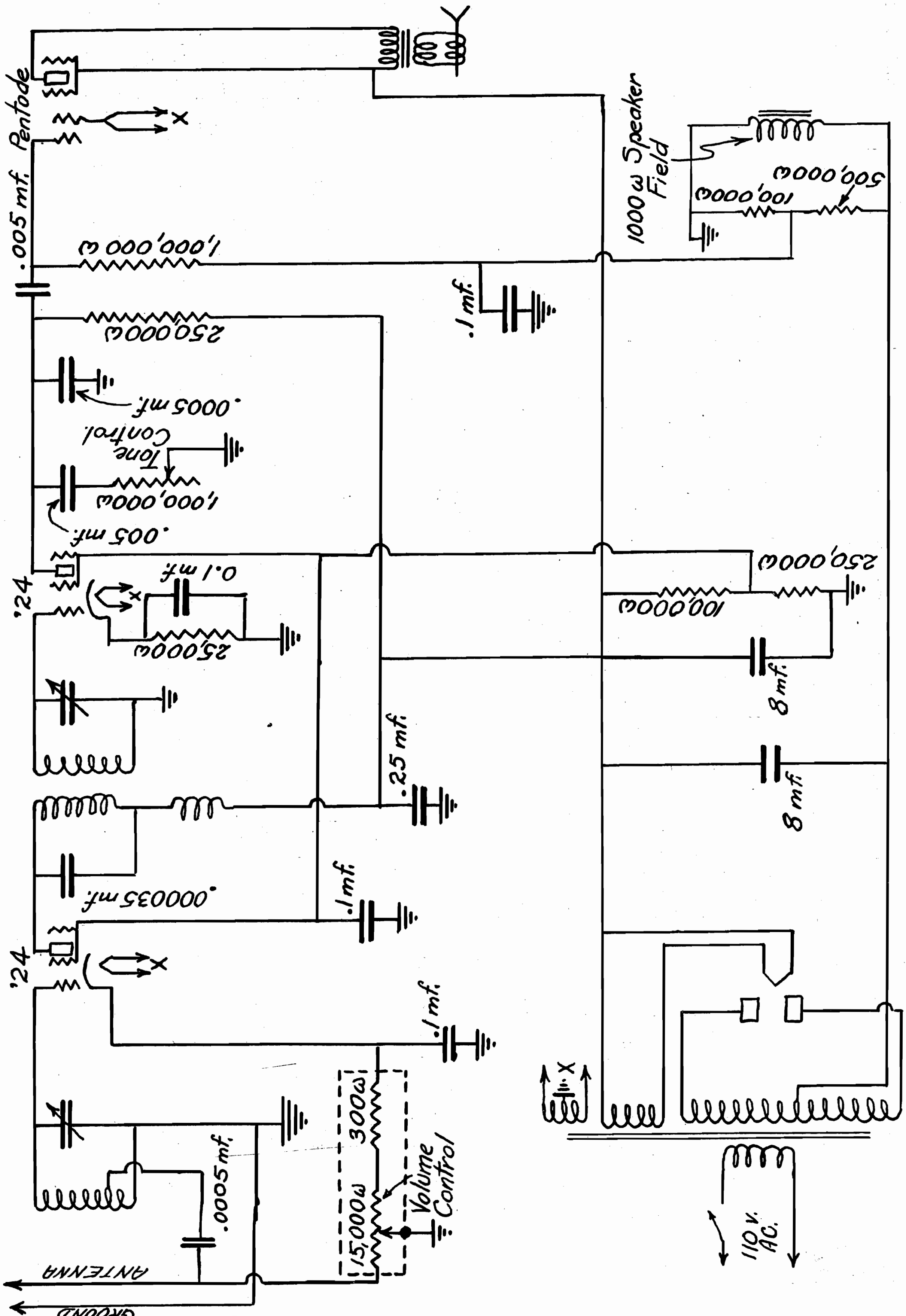
BALKEIT RADIO CO.

MODEL SG-6
Schematic



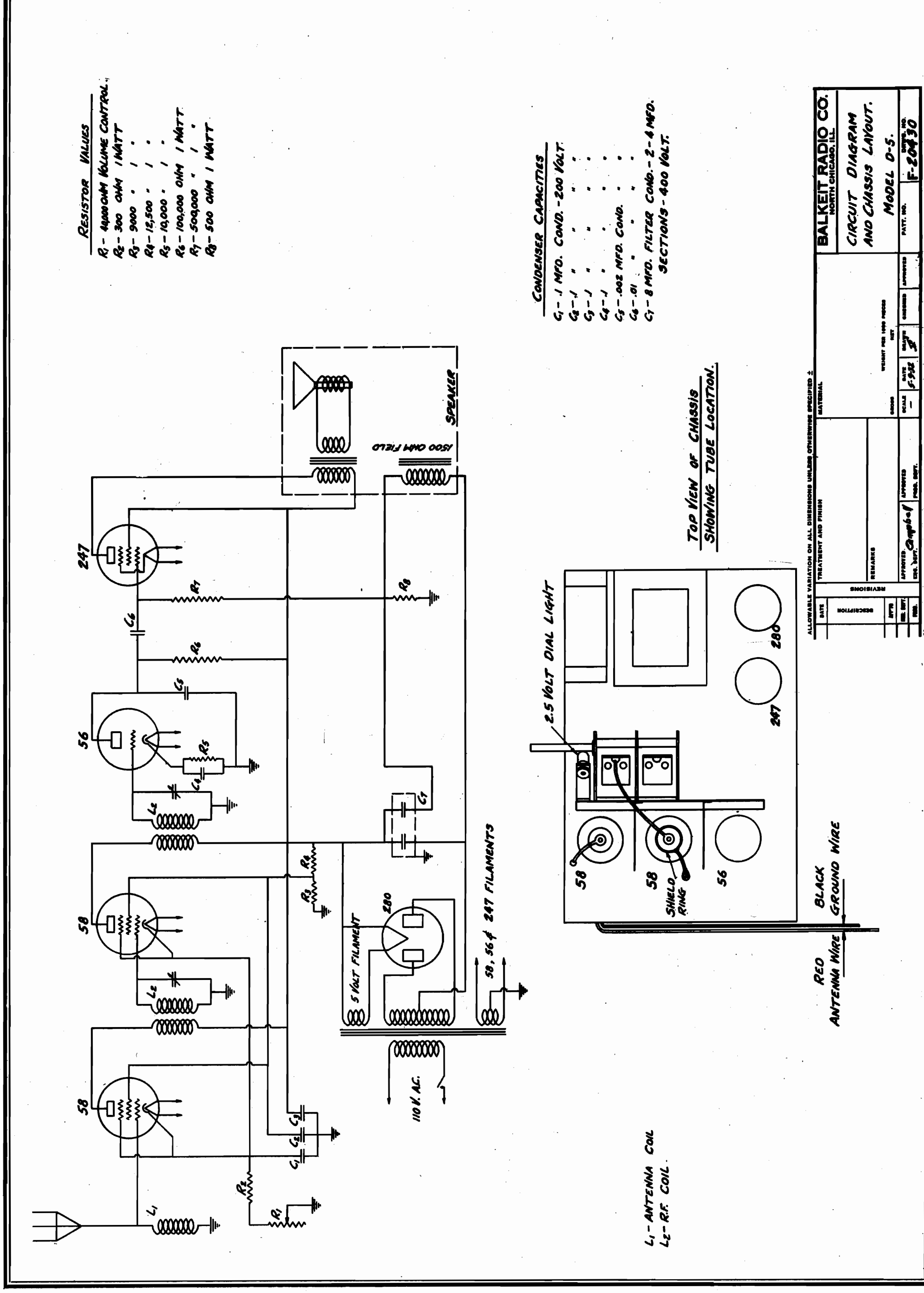
MODEL M
Schematic

BALKEIT RADIO CO.



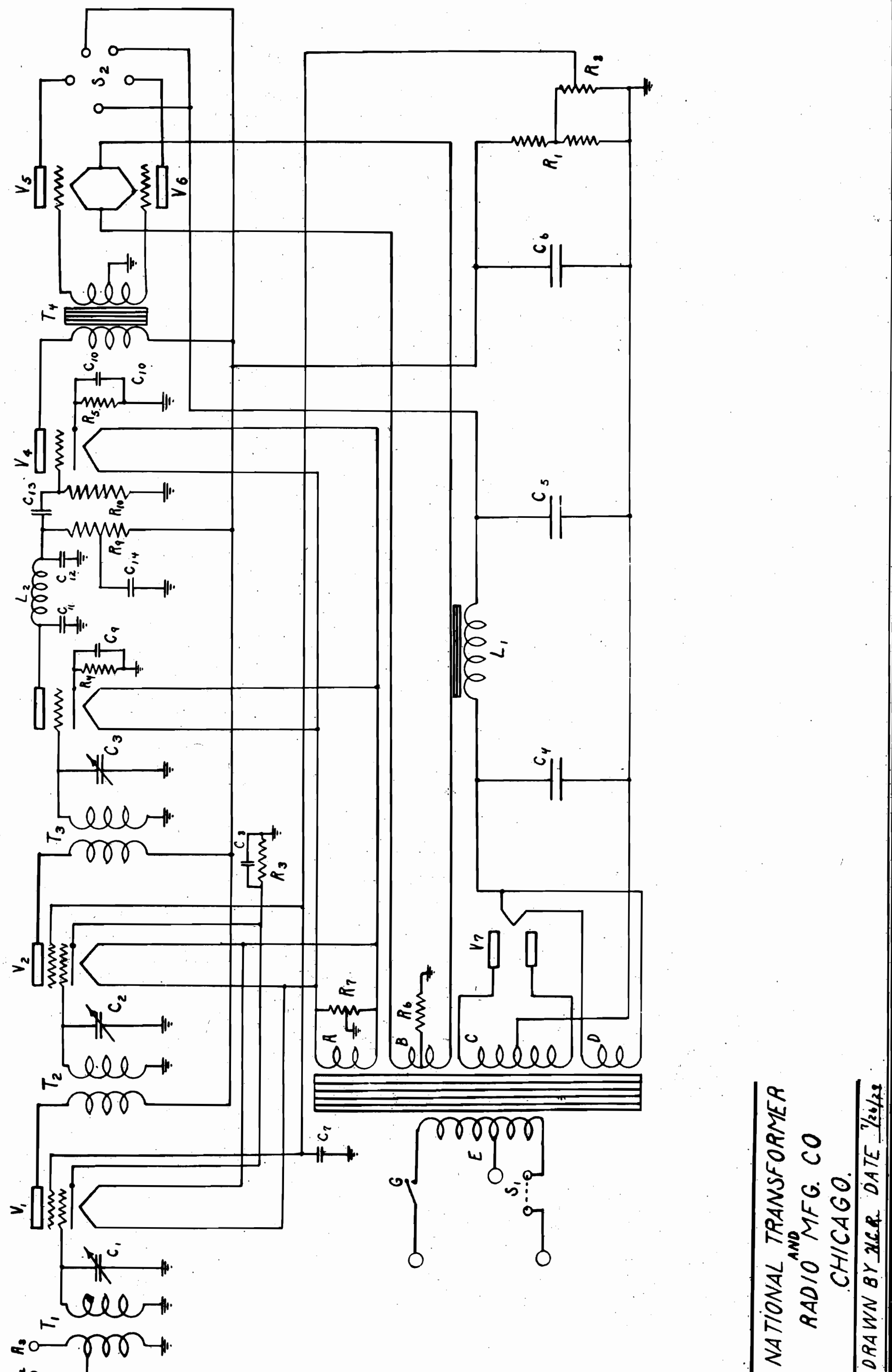
MODEL D-5
Schematic, Socket

BALKEIT RADIO CO.



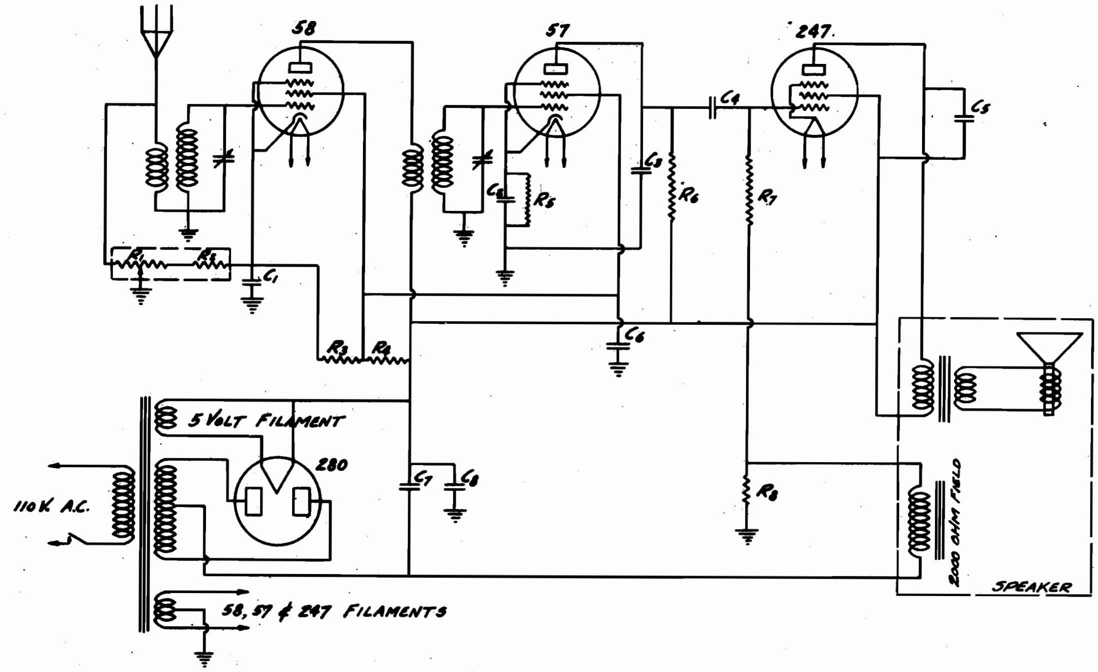
MODEL Windsor 70
Schematic

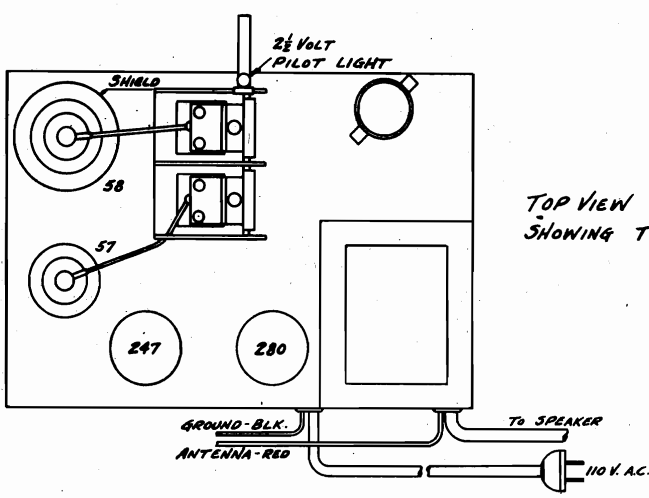
BALKEIT RADIO CO.



BALKEIT RADIO CO.

MODEL 42-E, 42-G
Schematic, Socket





TOP VIEW OF CHASSIS SHOWING TUBE LOCATION.

CONDENSER CAPACITIES

C_1 - .1	MFD.	CONDENSER -	200 VOLT
C_2 - .25	"	"	" "
C_3 - .001	"	"	" "
C_4 - .05	"	"	" "
C_5 - .002	"	"	" "
C_6 - .1	"	"	" "
C_7 - 4	"	"	400 VOLT
C_8 - 4	"	"	" "

RESISTOR VALUES

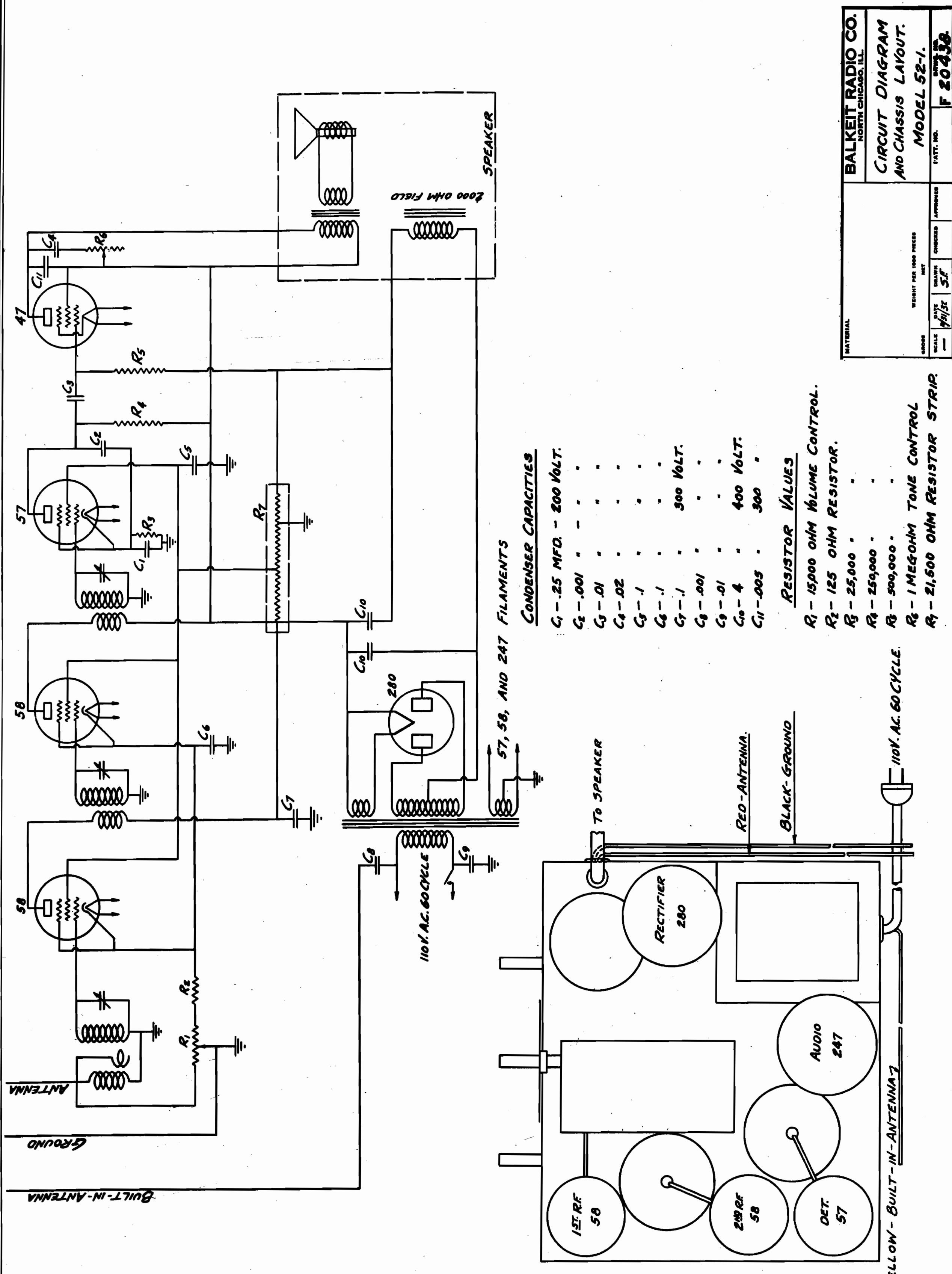
R_1 - 10,000	OHM		WATT
R_2 - 250	"		"
R_3 - 50,000	"	⅓	"
R_4 - 25,000	"	⅓	"
R_5 - 25,000	"	"	"
R_6 - 500,000	"	"	"
R_7 - 1 MEG	"	"	"
R_8 - 450	"	"	"

ALLOWABLE VARIATION ON ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED ±

DATE	TREATMENT AND FINISH	MATERIAL	BALKEIT RADIO CO. NORTH CHICAGO, ILL.
DESCRIPTION / REVISIONS	REMARKS	WEIGHT PER 1000 PIECES: GROSS / NET	CIRCUIT DIAGRAM AND CHASSIS LAYOUT. MODELS 42E. 42G.
APP'D / ENG. DEPT. / PROD.	APPROVED ENG. DEPT. Campbell / APPROVED PROD. DEPT.	SCALE / DATE 8-22-32 / DRAWN J / CHECKED / APPROVED	PATT. NO. / DRWG. NO. F-20433

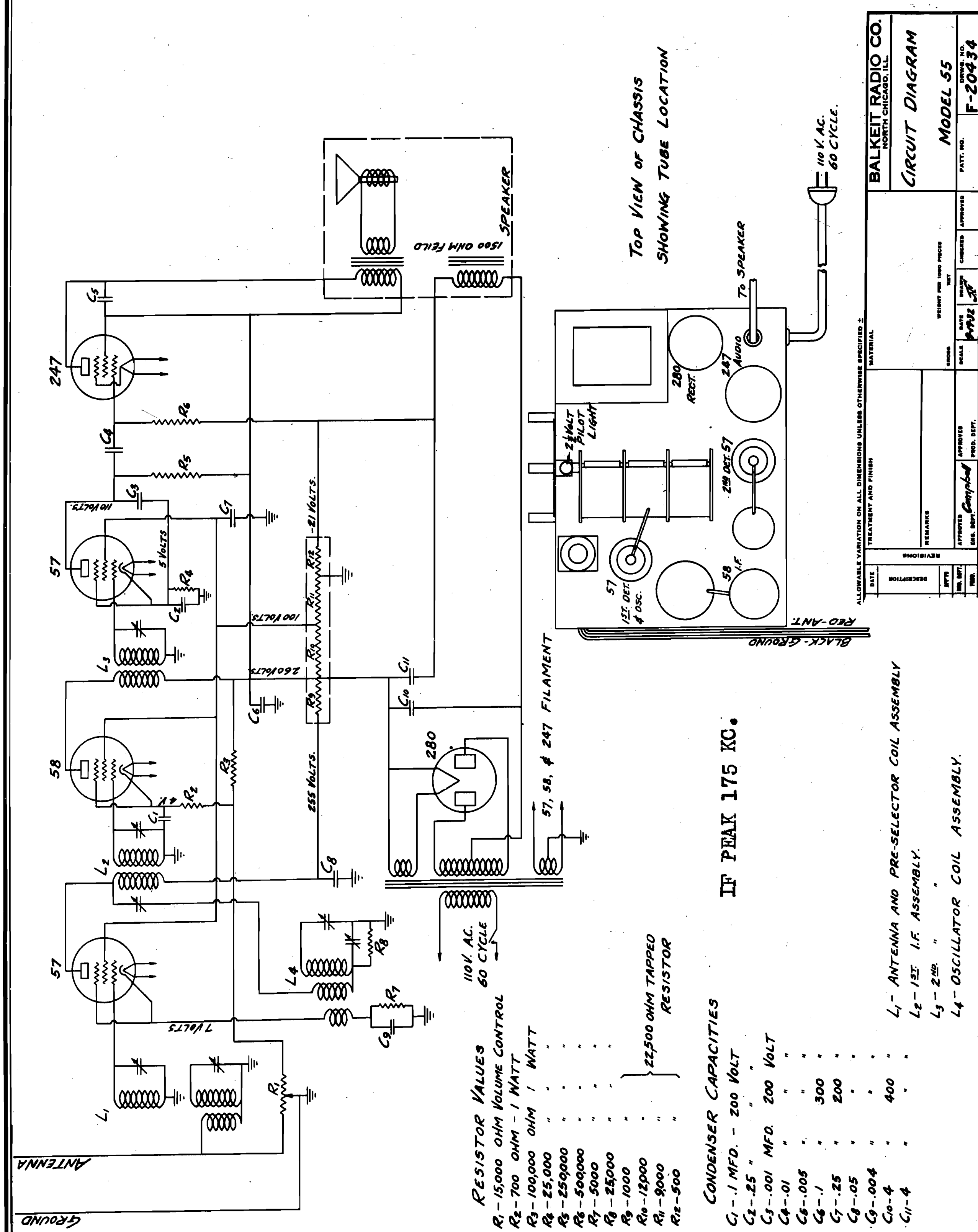
MODEL 52-1
Schematic, Socket

BALKEIT RADIO CO.



BALKEIT RADIO CO.

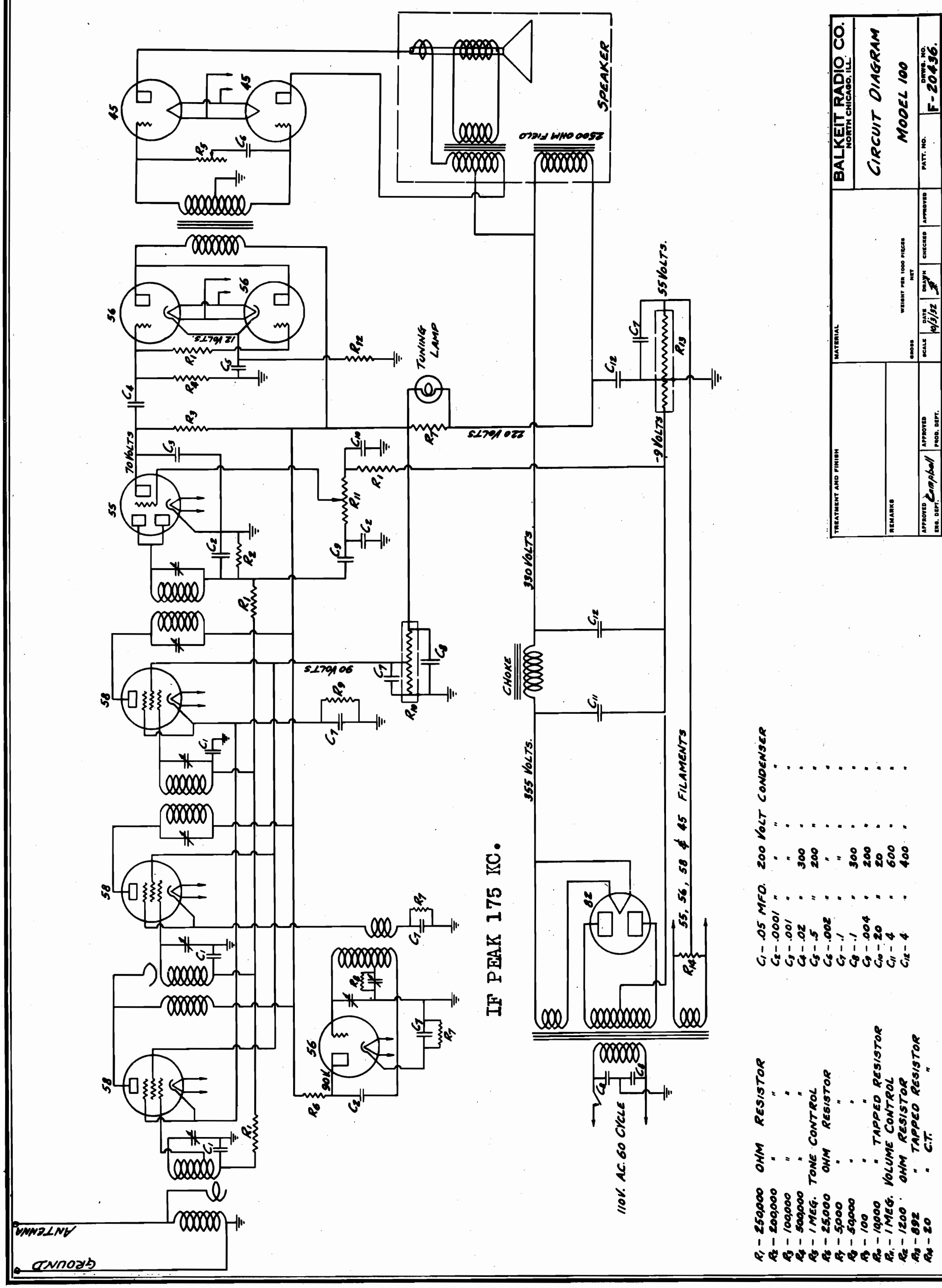
MODEL 55
Schematic, Socket



Compliments of www.nucow.com

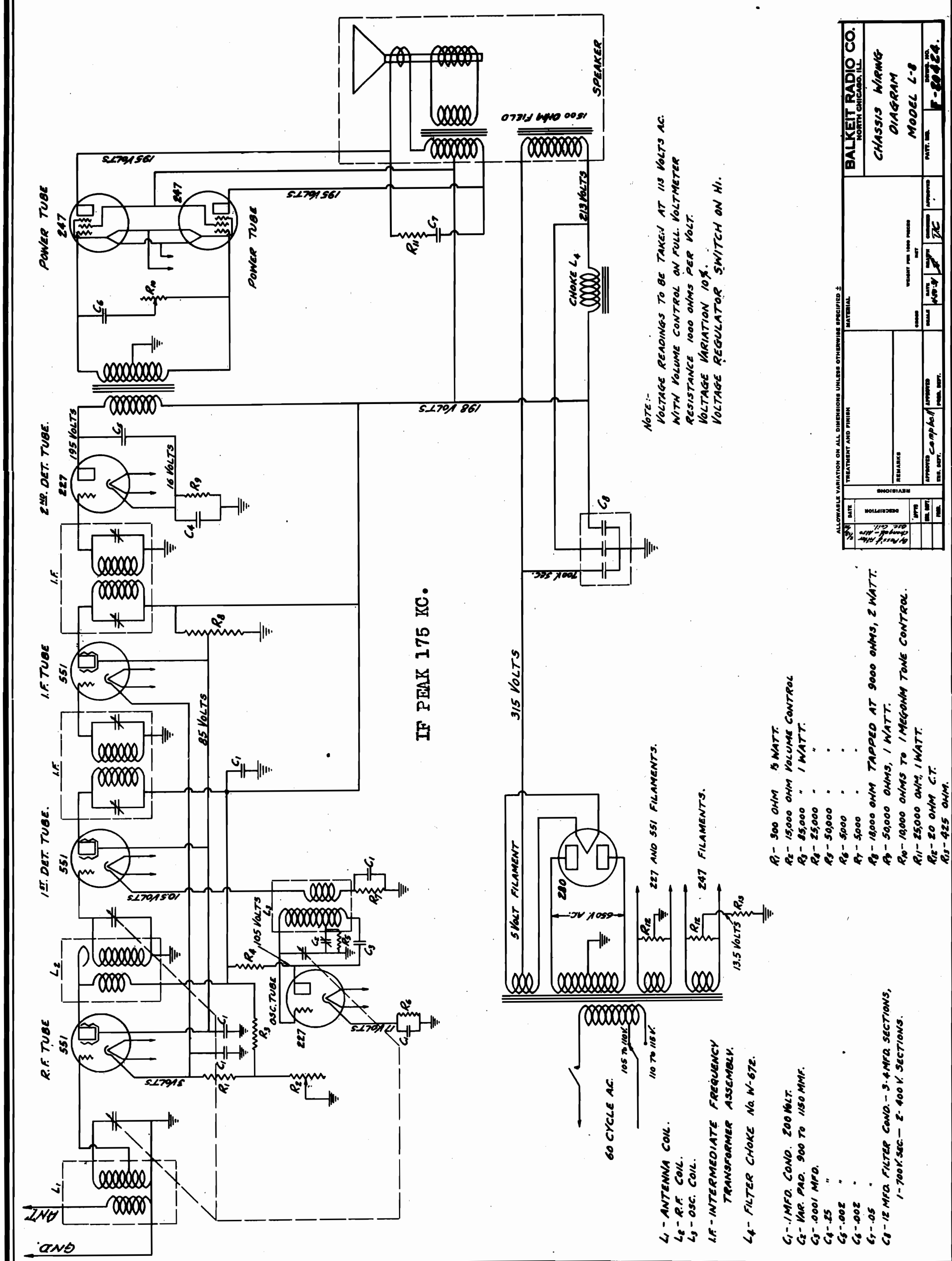
MODEL 100
Schematic

BALKEIT RADIO CO.



BALKEIT RADIO CO.

MODEL L-8
Schematic



MODEL 425
Schematic, Socket

BELMONT RADIO CORP.

SERVICE MANUAL MODEL 425

OPERATING INSTRUCTIONS

1. Carefully remove antenna wire from its compartment and stretch out full length. A properly erected well insulated outdoor antenna about 75 feet in length, including lead-in is recommended for permanent installations. A GROUND IS NOT REQUIRED.
2. After making certain that power supply is 110 volts, insert plug in receptacle.
3. Rotating VOLUME control clockwise (right) from off position turns power switch on, continued rotation increases volume. IF SET DOES NOT OPERATE IN ONE MINUTE ON DIRECT CURRENT REVERSE PLUG IN RECEPTACLE.
4. Advance volume control three-quarters turn, then select the desired station. Tune this station to the loudest point on the scale, then raise or lower volume with VOLUME control. Never regulate volume by detuning station selector, always adjust VOLUME control.

FOUR TUBES, 1—6D7, 1—6E7, 1—43, 1—25Z5.

SERVICE SUGGESTIONS

NOTE—CONNECTING CORD OF SET GETS WARM IN NORMAL OPERATION. DO NOT BECOME ALARMED.

Make sure that all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps on the tops of the tubes.

That the aerial is stretched out and that the connections to an outdoor antenna (if used) are good.

If necessary to change tubes or service chassis, UNDER NO CIRCUMSTANCES REMOVE BACK OR CHASSIS WITHOUT FIRST REMOVING PLUG FROM LIGHT SOCKET.

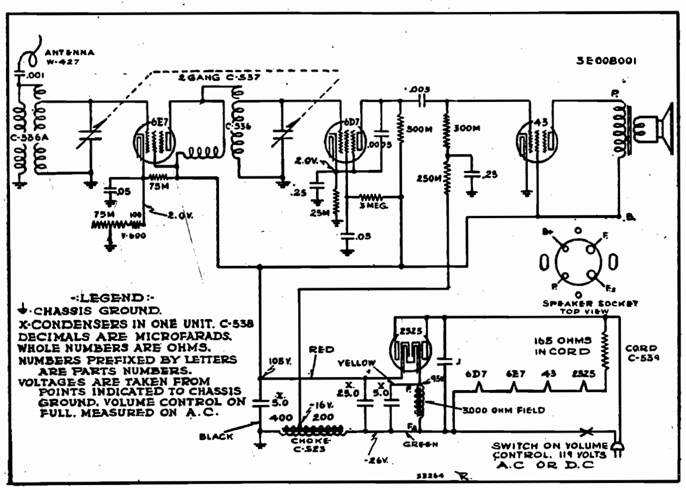
To remove chassis from cabinet, pull off knobs from front, remove back (held with screws to case). Remove four mounting screws, then chassis can be slipped out of case.

IF CABINET IS METAL CAREFULLY NOTE POSITION OF FIBRE WASHER AND THIS CARD AND REASSEMBLE IN THE SAME MANNER, INSULATING CHASSIS FROM CASE.

CIRCUIT DIAGRAM AND PARTS LIST SUPPLIED ON REQUEST—mention serial and model number and enclose stamped, self addressed envelope.

Model 425 AC-DC RECEIVER.

USE ONLY ON 105-115 VOLTS ALTERNATING (any cycles) or DIRECT CURRENT—35 WATTS.



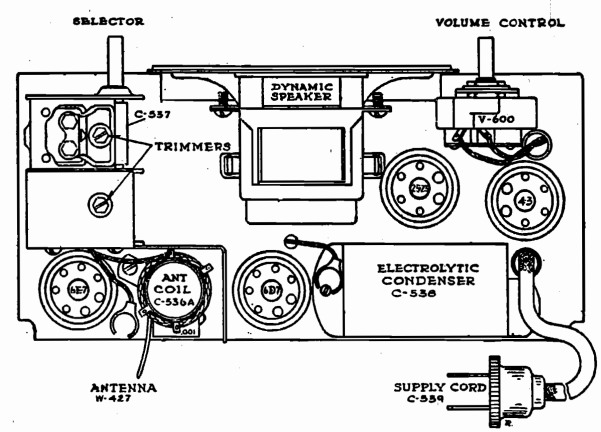
Schematic circuit diagram Model 425 AC-DC Radio Receiver.

Should it be necessary at any time to rebalance this set the procedure is as follows:

Disconnect antenna wire and attach an oscillator in series with a 50 mmfd. condenser to the antenna coil. With variable condenser at its minimum capacity position—at the extreme left of its rotation-touch trimmer condensers for maximum deflection on an output meter connected across the primary of the speaker input transformer, check trimmer adjustment at 1400 kilocycles, then align at 1200-1000-800-600-540 kilocycles, bend slotted plates of variable condenser if necessary.

PARTS LIST

Part No.	Description	List Price
C 145	.1—400 Volt Condenser	$0.25 ea.
C 154	.001 Mica Condenser	.25 ea.
C 155	.0005 Mica Condenser	.20 ea.
C 523	600 Ohm Choke Coil	1.25 ea.
C 531	Dual .05 Condenser	.30 ea.
C 536	R. F. Coil	.50 ea.
C 536A	Antenna Coil	.50 ea.
C 537	2 Gang Condensers	2.50 ea.
C 538	5-25-5 Electrolytic Condenser	2.00 ea.
C 539	Special Cord and Plug	1.25 ea.
C 540	Dual .25-200 V. Condenser	.40 ea.
C 541	.003-400 V. Condenser	.25 ea.
K 214	Knobs	.40 ea.
V 600	Volume Control	1.35 ea.
W427	Antenna Wire	.30 ea.
	All carbon resistors	.20 ea.
	All sockets	.20 ea.
	Dynamic speakers	5.00 ea.
	Cabinets	2.50 ea.
	Carrying cases	2.00 ea.
	Adapters for 220 volt operation	2.25 ea.



BELMONT RADIO CORPORATION
1257 Fullerton Avenue
CHICAGO, ILLINOIS

MODEL 530
Schematic, Socket
Parts List

BELMONT RADIO CORP.

SERVICE MANUAL MODEL 530

OPERATING INSTRUCTIONS

1. Carefully remove antenna wire from its compartment. A properly erected well insulated outdoor antenna about 75 feet in length, including lead-in is recommended. A GROUND IS NOT REQUIRED.
2. After making certain that power supply is 110 volts, insert plug in receptacle.
3. Rotating VOLUME control clockwise (right) from off position turns power switch on, continued rotation increases volume. IF SET DOES NOT OPERATE IN ONE MINUTE ON DIRECT CURRENT REVERSE PLUG IN RECEPTACLE.
4. Advance volume control three-quarters turn, then select the desired station. Tune this station to the loudest point on the scale, then raise or lower volume with VOLUME control. Never regulate volume by detuning station selector, always adjust VOLUME control.

FIVE TUBES, 1—6A7, 1—6D6, 1—75, 1—43, 1—25Z5.

SERVICE SUGGESTIONS

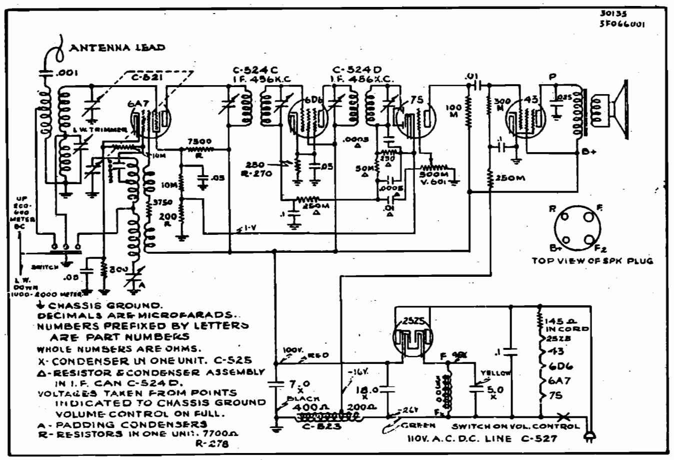
NOTE—CONNECTING CORD OF SET GETS WARM IN NORMAL OPERATION. DO NOT BECOME ALARMED.

Make sure that all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps on the tops of the tubes.

That the aerial is stretched out and that the connections to an outdoor antenna (if used) are good.

If necessary to change tubes or service chassis, UNDER NO CIRCUMSTANCES REMOVE BACK OR CHASSIS WITHOUT FIRST REMOVING PLUG FROM LIGHT SOCKET.

To remove chassis from cabinet, pull off knobs from front, remove back (held with screws to case). Remove four mounting screws, then chassis can be slipped out of case.



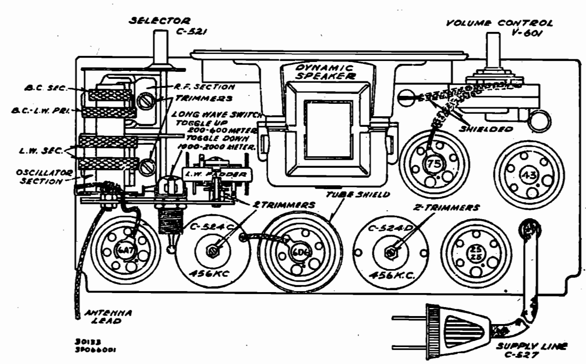
Schematic Circuit Diagram and Aligning Instructions Model 530 AC-DC Superheterodyne
200-600 Meters: 1000-2000 Meters

Should it be necessary, at any time, to rebalance this set the procedure is as follows: Attach a 456 kilocycle oscillator to the grid of the 6A7 tube in back of the variable condenser and adjust the trimming condensers of the I. F. transformers to maximum deflection on an output meter connected across the primary of the speaker input transformer. While adjusting these trimmers, the variable condenser should be at the maximum capacity position—at the extreme right of its rotation.

With switch lever up in 200-600 meter position, disconnect the antenna wire and connect an oscillator in series with a 250 mfd. condenser to the antenna coil, rotate the condenser plates to the minimum capacity position, extreme left turn, and adjust trimmer condenser of the oscillator and rear section of the variable to resonance with the oscillator set at 200 meters, adjust the front section to resonance at 215 meters, align at 250—300—400—500 meters and bend slotted plates of variable condenser if necessary. To adjust long wave, 1000-2000 meters, with switch lever down, set variable at maximum capacity, extreme right turn, and tune generator to maximum output, then peak long wave padder (hexagon nut of L. W. Padder), at the same time tuning oscillator until maximum output is attained. Attach oscillator leads to grid of 6A7 ground, set variable condenser at minimum capacity, extreme left turn, and adjust oscillator to resonance with set. Remove oscillator lead from grid of 6A7 and attach to antenna lead, then adjust long wave R.F. trimmer to maximum output (set screw adjustment of L. W. Padder). Do not disturb either oscillator or variable condenser while making this adjustment.

PARTS LIST

Part No.	Description	List Price
C 145	.1—300 Volt Condenser	$0.25 ea.
C 155	.0005 Mica Condenser	.20 ea.
C 521	Two Gang Condenser	2.50 ea.
C 522	.01—400 Volt Condenser	.25 ea.
C 523	600 Ohm Choke Coil	1.25 ea.
C 538	5-25-5 Electrolytic Condenser	2.00 ea.
C 548	Padding Condenser	.75 ea.
C 525B	5-25-10 Electrolytic Condenser	2.00 ea.
C 524C	I. F. Transformer	1.25 ea.
C 524D	I. F. Transformer	1.25 ea.
C 524E	Combination Antenna Coil	1.25 ea.
C 524F	Combination Oscillator Coil	1.10 ea.
C 527	Special Cord and Plug	1.25 ea.
C 531	Dual .05 Condenser	.30 ea.
C 534	Dual .1-.025 Condenser	.30 ea.
K 214	Knobs	.40 ea.
R 270	250 Ohm—Wire Wound Resistor	.25 ea.
R 278	7700 Ohm Resistor	.50 ea.
S 336	Wave Change Switch	.60 ea.
V 601	Volume Control	1.35 ea.
	All carbon resistors	.20 ea.
	All sockets	.20 ea.
	Dynamic speakers	5.00 ea.
	Cabinets	2.50 ea.
	Carrying cases	2.00 ea.
	Adapters for 220 volt operation	2.25 ea.



BELMONT RADIO CORPORATION

1257 Fullerton Avenue CHICAGO, ILLINOIS

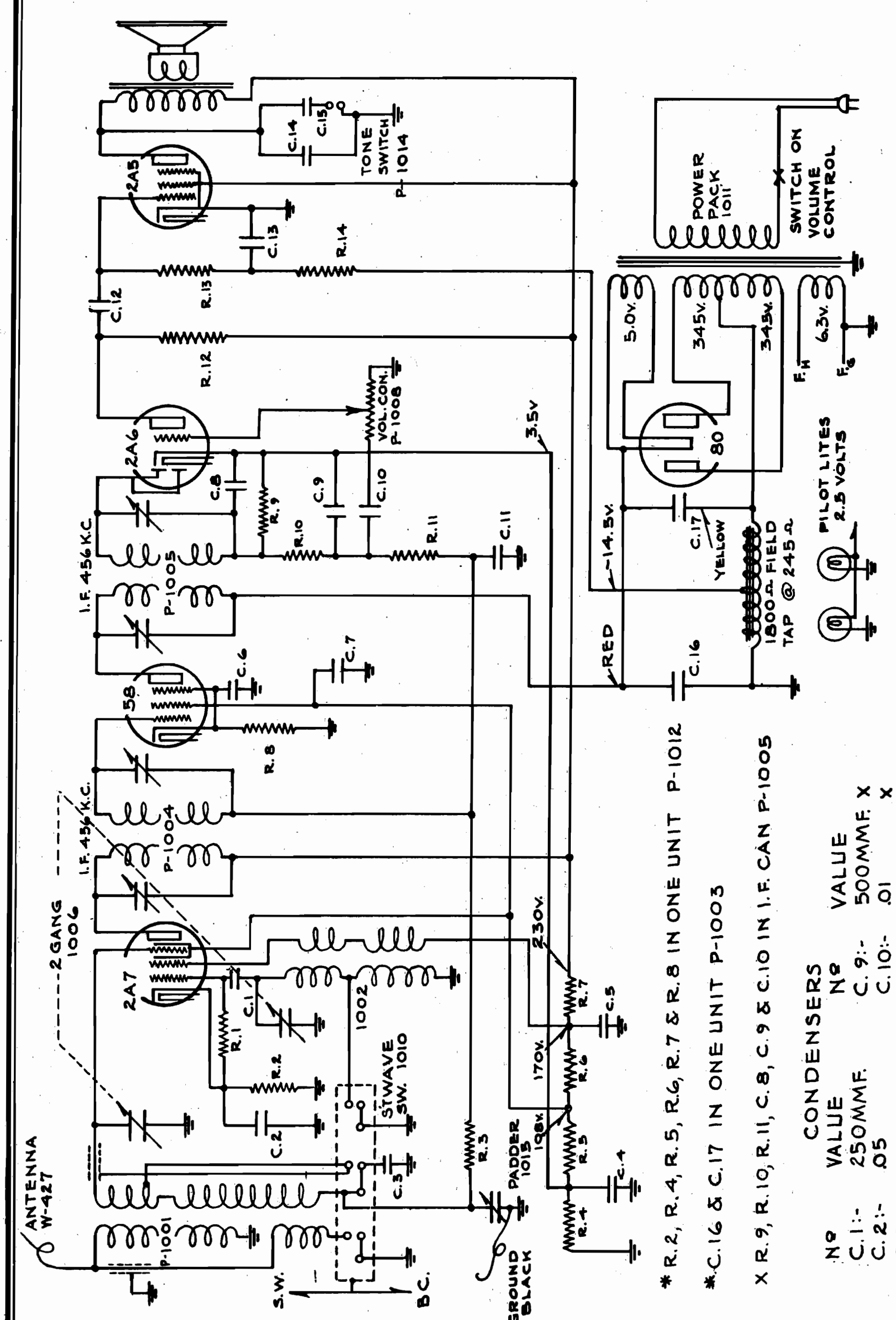
BELMONT RADIO CORP.

MODEL 550
Schematic

SERVICE MANUAL FIVE TUBE TWO BAND SUPERHETERODYNE

WITH A. V. C.

105-115 volts alternating current 50-60 cycles - 60 watts.
GREEN (Broadcast band) 530 - 1550 Kilocycles
RED (Short wave band) 1550 - 14,000 Kilocycles



IF PEAK 456 KC

LEGEND

RESISTORS

Nº	VALUE	Nº	VALUE
R.1:-	50M	R.8:-	300 *
R.2:-	500 *	R.9:-	250M X
R.3:-	250M	R.10:-	50M X
R.4:-	250 *	R.11:-	250M X
R.5:-	20M *	R.12:-	250M
R.6:-	6M *	R.13:-	300M
R.7:-	4M *	R.14:-	250M.

CONDENSERS

Nº	VALUE	Nº	VALUE
C.1:-	250MMF.	C.9:-	500MMF. X
C.2:-	.05	C.10:-	.01 X
C.3:-	.05	C.11:-	.1
C.4:-	.05	C.12:-	.01
C.5:-	.05	C.13:-	.05
C.6:-	.05	C.14:-	.01
C.7:-	.1	C.15:-	.02
C.8:-	500MMF. X	C.16:-	8MF. *
		C.17:-	8MF. *

* R.2, R.4, R.5, R.6, R.7 & R.8 IN ONE UNIT P-1012

* C.16 & C.17 IN ONE UNIT P-1003

X R.9, R.10, R.11, C.8, C.9 & C.10 IN I.F. CAN P-1005

NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
VOLTAGES WITH 119V. A.C. LINE

33248

MODEL 550
Notes, Socket
Parts List

BELMONT RADIO CORP.

SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

To peak I.F. transformers connect oscillator (set at 456 KC) to grid of 2A7 tube and (Black) ground wire. With variable condenser set at minimum capacity, (extreme left of its rotation) adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).

To align Broadcast band, set wave changing switch to Green (right turn) and with variable condenser at minimum capacity disconnect antenna wire and connect 1550 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimmer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimmer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

To align Short wave band, set wave changing switch to RED (left turn) and with input oscillator connected as above and set at 1720 KC, tune in signal, adjust padding condenser on rear of chassis to resonance. Check for output at 1550 KC and at harmonies of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and of 1720 KC (3440 KC). DO NOT BEND PLATES.

For failure to operate over both hands check 2A7 tube and connections to and contacts of wave changing switch.

OPERATING INSTRUCTIONS—READ CAREFULLY

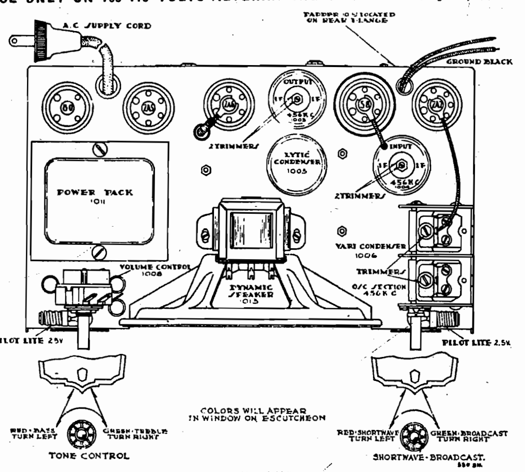
1. Carefully remove antenna wire from its compartment. Stretch out to its full length. A GROUND WHILE NOT REQUIRED IS RECOMMENDED (Black Wire). Outdoor antenna if used should be approximately 60 feet long including lead in.
2. After making certain that power supply is 105-115 volts, 60 cycles, alternating current, insert plug in receptacle.
3. Rotating VOLUME control clockwise (right) from off position turns power switch on, continued rotation increases volume.
4. Advance volume control three-quarter turn, then select the desired station. Tune this station to the loudest point on the scale, then raise or lower volume with VOLUME control. Never regulate volume by detuning station selector, always adjust VOLUME control.
4. Tone modifier below volume control. Green color in window is treble, red is bass.
5. Station selector is functioning on broadcast band (525-1550 k. c.) of scale when color in window is green. Short-wave reception (1500-4000 k. c.) is obtained when knob below station selector is rotated so that color is red.

FIVE TUBES: 1-2A7, 1-58, 1-2A6, 1-2A5, 1-80.

MODEL 550

SUPERHETERODYNE—SHORT WAVE AND BROADCAST RECEIVER, 1500 to 4000 Kilocycles and 525 to 1550 Kilocycles

CIRCUIT DIAGRAM AND PARTS LIST SUPPLIED ON REQUEST—mention serial and model number and enclose stamped, self addressed envelope.
USE ONLY ON 105-115 VOLTS ALTERNATING CURRENT—60 cycles, 50 watts.



INTERMEDIATE FREQUENCY 456 K. C.

SERVICE SUGGESTIONS:

Make certain of the following: That all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps. That the aerial connection is good and not short-circuited to ground. That the ground is secure and direct. (Pilot lights illuminate when set is turned on.)

PILOT LIGHTS: The pilot lights used are 2.5 volt Mazda. No T 41

To replace, remove chassis from cabinet, pull off knobs from front, remove back (held with screws to case). Remove four mounting screws, then chassis can be slipped out of case.

STANDARD WARRANTY

This receiver and tubes were carefully tested and inspected; it was packed in an approved container and left our factory in perfect condition. Should it arrive in a damaged condition, file claim with carrier at once.

We warrant each new radio receiver manufactured by us to be free from defects in material or workmanship under normal use, our obligation under this warranty being limited to making good at our factory any part or parts thereof which shall within ninety days from date of shipment be returned to our factory, carefully packed and transportation charges prepaid.

This warranty will not apply if this card is not returned with set, or if serial number has been effaced or tampered with, or if in our judgment set has been misused, abused or connected otherwise than in accordance with these instructions.

BELMONT RADIO CORPORATION
1257 Fullerton Avenue CHICAGO, ILLINOIS

Part No.	Description	List Price
1001	Antenna Coil	$ 2.50 ea.
1002	Oscillator Coil & Bracket	1.20 ea.
1002	8-8 MFD electrolytic filter condenser.	2.50 ea.
1004	Input I.F. Transformer and can	1.50 ea.
1005	Output I.F. Transformer with can and including parts as indicated on schematic circuit diagram.	2.50 ea.
1006	Two gang gear drive variable condenser.	2.75 ea.
1008	500M Ohm volume control with switch	1.35 ea.
1010	Wave changing switch	.75 ea.
1011	105-115 volt 50-60 cycle power transformer	3.50 ea.
	All carbon resistors	.20 ea.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.

Part No.	Description	List Price
1012	31,050 Ohm metal clad resistor.	1.00 ea.
1014	Tone control switch	.30 ea.
1015	400-300M-MFD Padding condenser	.60 ea.
1017	Special light socket	.10 ea.
1019	Rubber line cord & plug	.50 ea.
1039	Celluloid selector scale	.15 ea.
1040	Celluloid volume scale	.15 ea.
1041	Escutcheon for parts 1039 and 1040	.35 ea.
1044	Color indicating strip assembly.	.25 ea.
5031	Small knobs for wave changing switch & tone control.	.15 ea.
5032	2.5 volt pilot lights	.20 ea.
K214	Knob (selector and volume controls)	.15 ea.
	All molded mica condensers	.25 ea.
	All single section tubular paper bypass condensers.	.25 ea.
	All dual section tubular paper bypass condensers.	.50 ea.

MODEL 625
Schematic, Socket
Parts List

BELMONT RADIO CORP.

SERVICE MANUAL 625

OPERATING INSTRUCTIONS

1. Carefully remove antenna wire from its compartment. A properly erected well insulated outdoor antenna about 75 feet in length, including lead-in is recommended. A GROUND IS NOT REQUIRED.
2. After making certain that power supply is 110 volts, insert plug in receptacle.
3. Rotating VOLUME control clockwise (right) from off position turns power switch on, continued rotation increases volume. IF SET DOES NOT OPERATE IN ONE MINUTE ON DIRECT CURRENT REVERSE PLUG IN RECEPTACLE.
4. Advance volume control three-quarters turn, then select the desired station. Tune this station to the loudest point on the scale, then raise or lower volume with VOLUME control. Never regulate volume by detuning station selector, always adjust VOLUME control.

SIX TUBES, 1—6A7, 2—78, 1—75, 1—43, 1—2525.

SERVICE SUGGESTIONS

NOTE—CONNECTING CORD OF SET GETS WARM IN NORMAL OPERATION. DO NOT BECOME ALARMED.

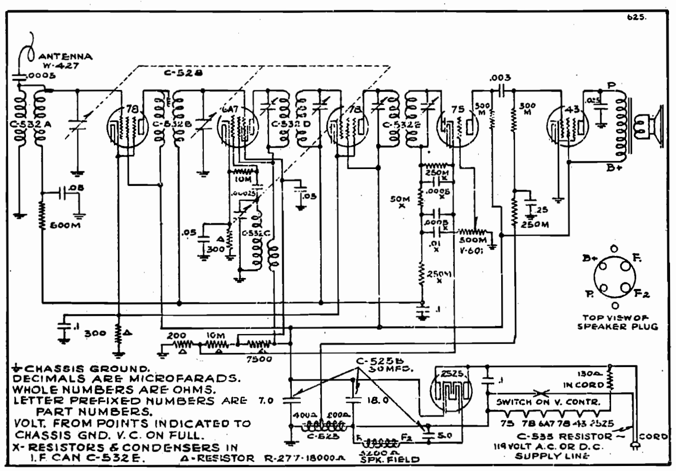
Make sure that all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps on the tops of the tubes.

That the aerial is stretched out and that the connections to an outdoor antenna (if used) are good.

If necessary to change tubes or service chassis, UNDER NO CIRCUMSTANCES REMOVE BACK OR CHASSIS WITHOUT FIRST REMOVING PLUG FROM LIGHT SOCKET.

To remove chassis from cabinet, pull off knobs from front, remove back (held with screws to case). Remove four mounting screws, then chassis can be slipped out of case.

USE ONLY ON 105-115 VOLTS ALTERNATING (any cycles) or DIRECT CURRENT—40 WATTS.

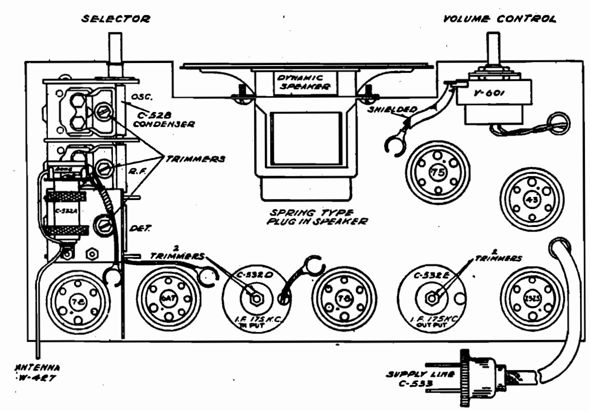


Schematic circuit diagram AC-DC Radio Receiver.

SERVICE NOTES: Should it be necessary at any time to rebalance this set, the procedure is as follows: Disconnect antenna wire and attach an oscillator in series with a 50 mmfd. condenser to the antenna coil. With the variable condenser at its minimum capacity position, at the extreme right of its rotation, and oscillator set at 1720 kilocycles, adjust condenser trimmer of oscillator section (shaft end section) for maximum deflection on an output meter connected across the primary of the speaker input transformer, then adjust antenna and R.F. trimmers at 1400 kilocycles, align at 1200-1000-800-600-530 kilocycles, bend slotted plates of variable condenser if necessary. To align intermediate frequency transformers, proceed as follows: with variable condenser at its maximum capacity position, connect a 175 kilocycle oscillator in series with a .1 mfd. condenser to grid cap of 6A7 tube, peak four I.F. trimmers at 175 kilocycles, an output meter should be used to indicate resonance. NOTE: Both transformers are double tuned, one trimmer is adjusted with a screw driver, the other with a hexagon wrench. see figure 1.

PARTS LIST

Part No.	Description	List Price
C 145	.1—400 Volt Condenser	$0.25 ea.
C 152	.00025 Mica Condenser	.20 ea.
C 155	.0005 Mica Condenser	.20 ea.
C 522	.01—400 Volt Condenser	.25 ea.
C 523	600 Ohm Choke Coil	1.25 ea.
C 525	5-25-10 Electrolytic Condenser	2.00 ea.
C 525B	5-25-10 Electrolytic Condenser	2.00 ea.
C 525C	5-25 Mfd. Electrolytic Condenser	1.50 ea.
C 525D	5 Mfd. Electrolytic Condenser	.50 ea.
C 528	3 Gang Geared Condenser	3.75 ea.
C 531	Dual .05 Condenser	.30 ea.
C 532A	Antenna Coil	.80 ea.
C 532B	Oscillator Coil	.70 ea.
C 532C	I. F. Transformer	1.25 ea.
C 532D	Output I. F. Transformer with Parts	2.50 ea.
C 533	Special Cord and Plug 130 ohms	1.25 ea.
C 535	Dual .1-200 Volt Condenser	.35 ea.
C 536	Dual .025-.05 Condenser	.35 ea.
C 544	.25-200 Volt Condenser	.25 ea.
C 552	.003-400 V. Condenser	.25 ea.
R 277	18,300 ohm resistor	.60 ea.
K 214	Knobs	.40 ea.
V 601	Volume Control	1.35 ea.
W427	Antenna Wire	.30 ea.
	All carbon resistors	.20 ea.
	All sockets	.20 ea.
	Dynamic speakers	5.00 ea.
	Cabinets	3.00 ea.
	Adapters for 220 volt operation	2.25 ea.



Belmont Radio Corporation : : : 1257 Fullerton Avenue, Chicago, Ill.

MODEL 660
Schematic, Socket
Parts List

BELMONT RADIO CORP.

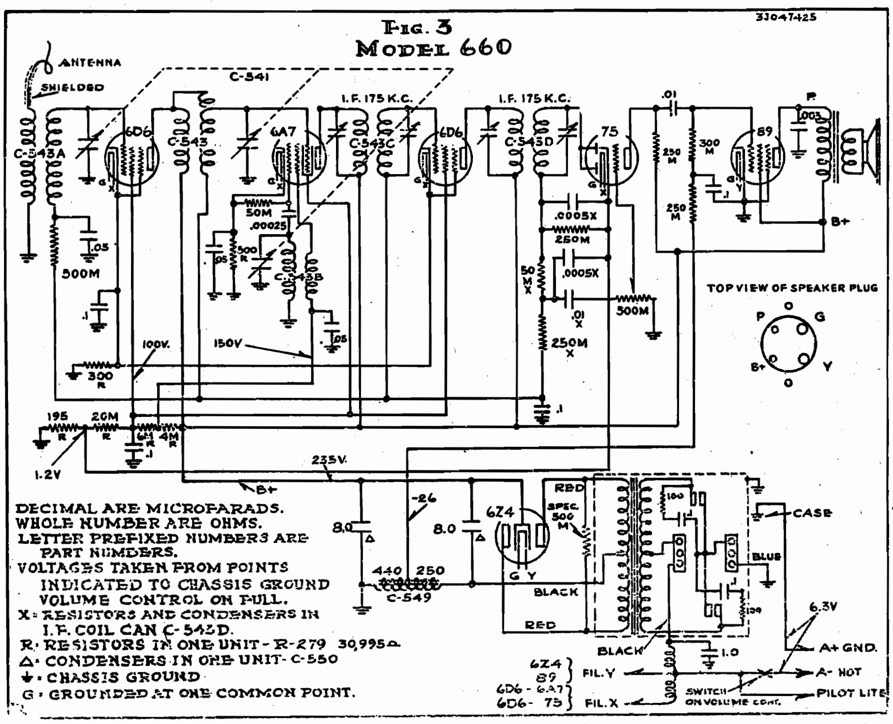


Fig. 3
Model 660

SCHEMATIC CIRCUIT DIAGRAM

MODEL 660 AUTORADIO

See instructions for serial notes etc.

PARTS LIST

Part No.	Description	List Price Each
A 560	Battery Cable—Plug Type	1.75
B 104	Cable Shaft Brackets	.35
B 660	Antenna Cable—Plug Type	.80
C 106	Shaft Couplings	.35
C 117	"A" Choke—Small	.25
C 118	"A" Choke—Large	.35
C 144	Dual .1-200 Volt Condenser	.35
C 152	.00025 Mica Condenser	.20
C 155	.0005 Mica Condenser	.20
C 522	.01-400 Volt Condensers	.25
C 531A	Dual .05 Condenser	.30
C 535	Dual .1—200 Volt Condenser	.35
C 541B	3 Gang Condenser	3.75
C 543	R.F. Coil	.80
C 543A	Antenna Coil	.80
C 543B	Oscillator Coil	.70
C 543C	Input I.F. Transformer	1.25
C 543D	Output I.F. Transformer with Parts	2.50
C 547	.1-200 Volt Condenser	.30
C 549	690 Ohm Choke	1.40
C 550	8-8 Mfd. Electrolytic Condenser	2.25
C 551	1 Mfd.—120 Volt Condenser	.35
C 553	.05-200 Volt Condenser	.25
C 554	.5 Mfd. Generator Condenser	.50
R 232A	Special 500M Ohm Resistor Identified with 2 Yellow Dots	.35
R 279	30,995 Ohm Resistor	.60
R 281	100 Ohm Resistor	.20
S 338	18" Volume Control Shaft	1.25
S 339	18" Selector Control Shaft	1.25
S 338S	Special 24" Volume Control Shaft	1.50
S 339S	Special 24" Selector Control Shaft	1.50
V 660	Complete "B" Unit—OAK	8.00
V 603	Volume Control	1.50
660	Remote Control Head Complete Less Shafts	5.00
	20 Ampere Fuses	.10
	Mounting Bolts	.10
	All carbon resistors	.20
	All sockets	.20
	Dynamic speakers	5.00

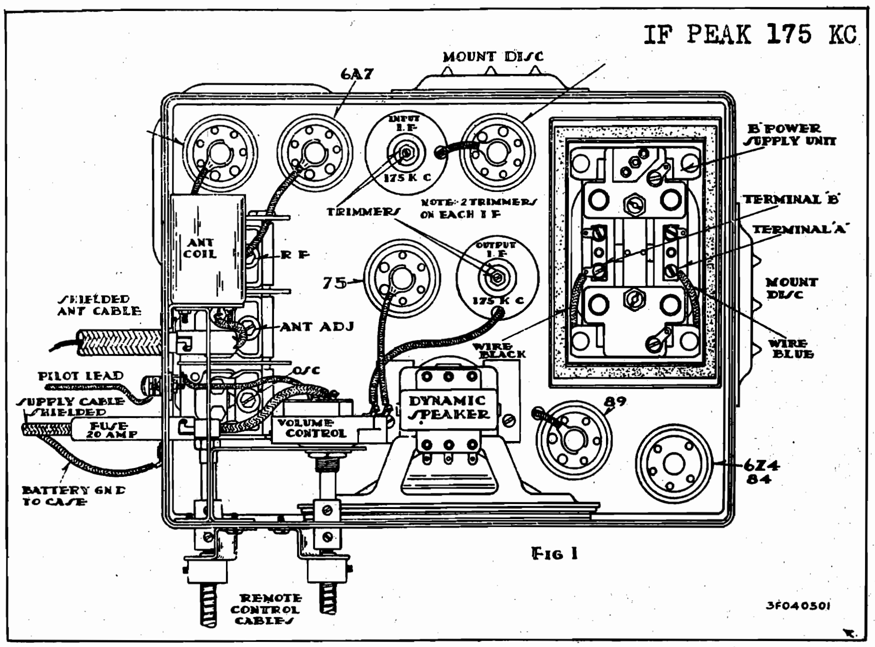


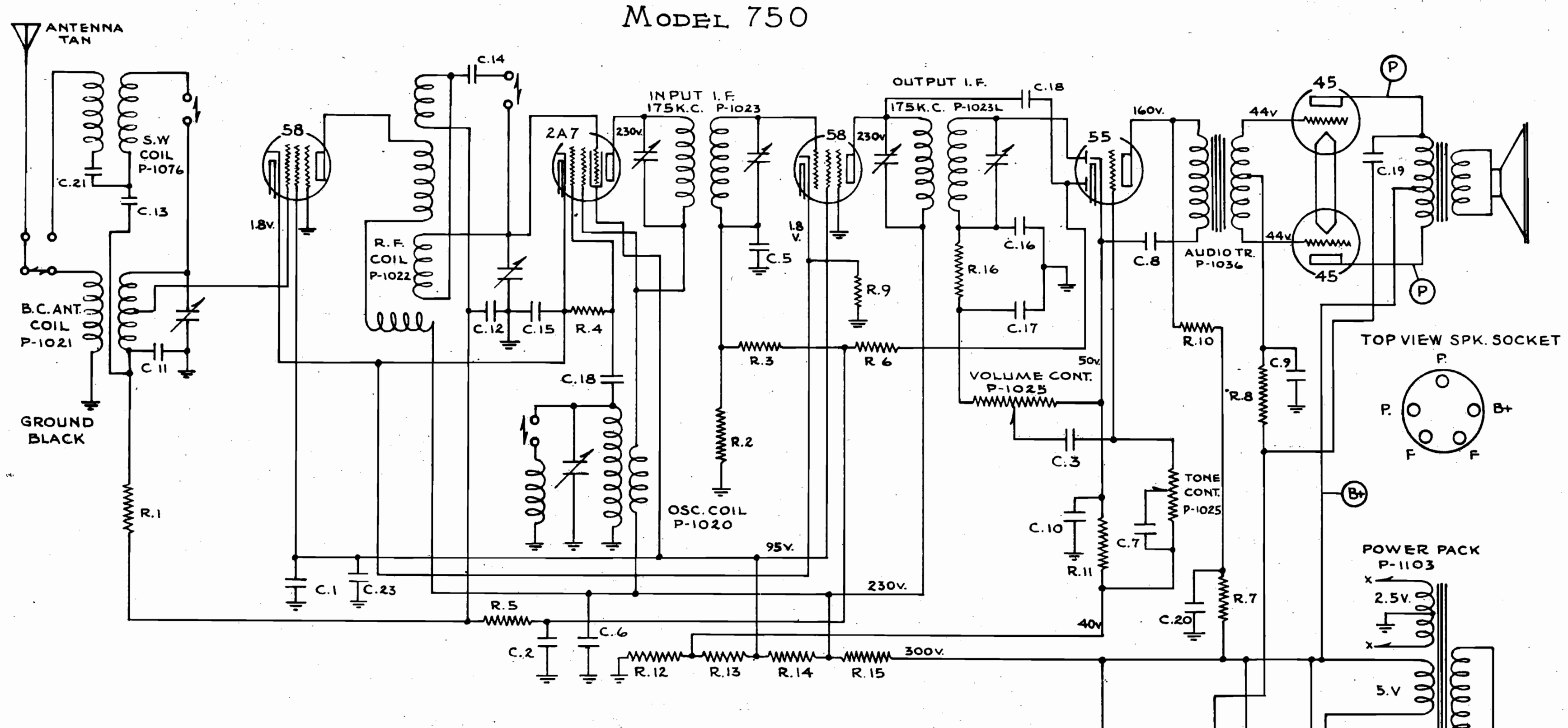
Fig 1

BELMONT RADIO CORP.
1257 Fullerton Avenue
Chicago, Illinois
Made in U. S. A.

BELMONT RADIO CORP.

MODEL 750

Model 750



LEGEND

RESISTORS

Nº	VALUE	
R.1:-	250M	1/3W.
R.2:-	"	"
R.3:-	500M	"
R.4:-	50M	"
R.5:-	250M	"
R.6:-	"	"
R.7:-	30M	"
R.8:-	100M	"
R.9:-	50	1W. *
R.10:-	30M	1/3W.
R.11:-	5M	1/3W.
R.12:-	2500	.7W. *
R.13:-	4500	.85W. *
R.14:-	6500	2.3W. *
R.15:-	1250	2.9W. *
R.16:-	50M	1/3W. x

CONDENSERS

Nº	VALUE
C.1:-	.1 x 200V. } DUAL
C.2:-	.05 x 200V. } DUAL
C.3:-	.05 x 200V.
C.4:-	8MFD. 490V.
C.5:-	.05 x 200V.
C.6:-	.25 x 300V.
C.7:-	.004 x 400V.
C.8:-	.25 x 200V.
C.9:-	.25 x 200V. } DUAL
C.10:-	.25 x 200V. } DUAL
C.11:-	.015 x 200V.
C.12:-	.02 x 200V.
C.13:-	.003 x 600V.
C.14:-	.003 x 600V.
C.15:-	.25 x 200V.
C.16:-	.0001 MICA x
C.17:-	.0001 MICA x
C.18:-	.000020 MICA
C.19:-	.003 x 600V.
C.20:-	.50 x 300V.
C.21:-	.00025 MICA
C.22:-	8MFD. 490V.
C.23:-	5MFD. 150V

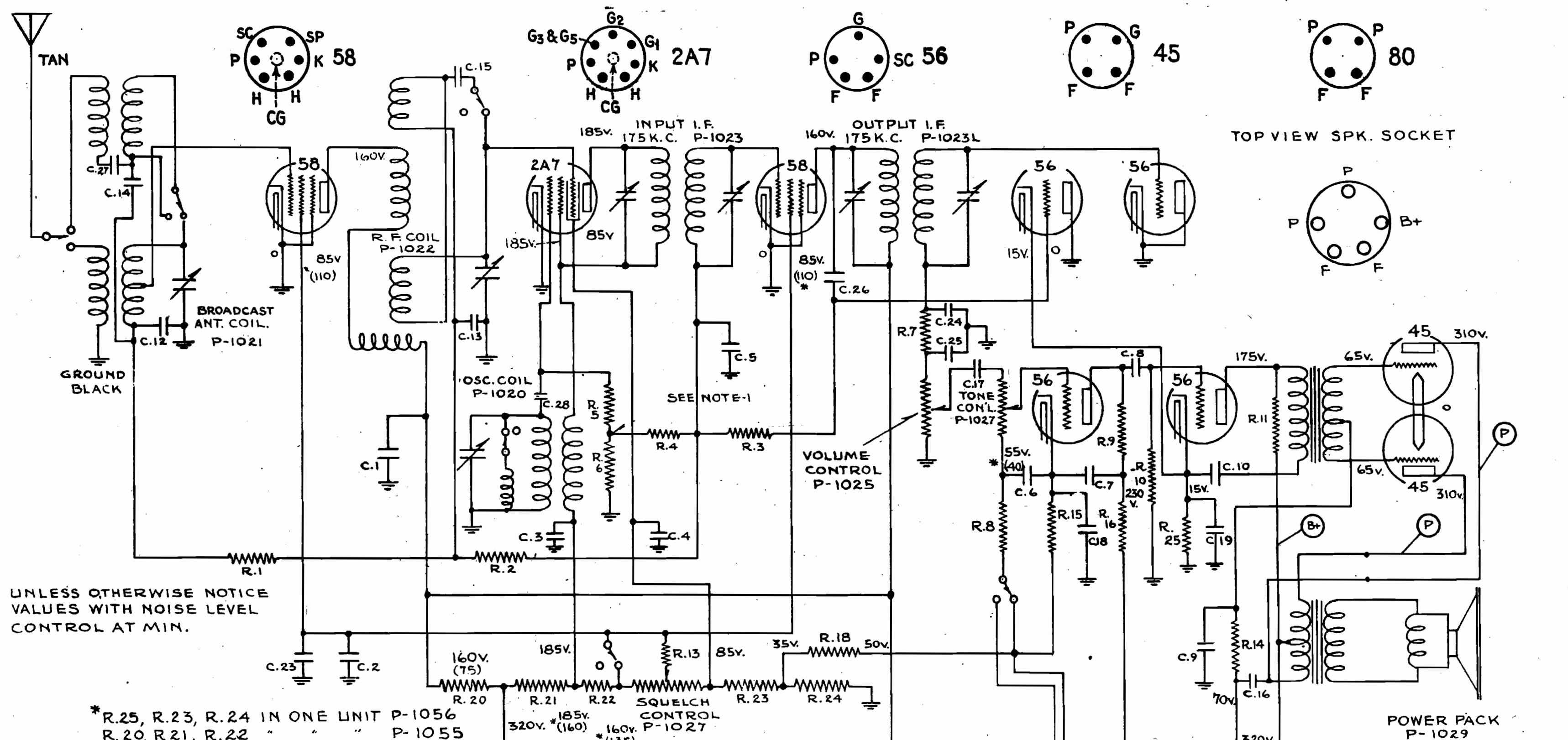
* R.9, R.12, R.13, R.14 & R.15 IN ONE UNIT P-1104

x RESISTOR, R.16 & CONDENSERS, C.16, C.17 IN OUTPUT I.F. CAN.

NOTE:- NUMBERS PREFIXED BY LETTER "P" ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL, WITH 119V. A.C. LINE.

MODEL 1050
Schematic

BELMONT RADIO CORP.



UNLESS OTHERWISE NOTICE VALUES WITH NOISE LEVEL CONTROL AT MIN.

*R.25, R.23, R.24 IN ONE UNIT P-1056
R.20, R.21, R.22 " " " P-1055
C.18, C.19, C.20 " " " P-1038
C.21, C.22 " " " P-1048

LEGEND

RESISTORS

Nº	VALUE		Nº	VALUE		
R.1	:-250M.	1/5 W.	R.14	:-50M.	1/5 W.	
R.2	:- "	"	R.15	:-10M.	"	
R.3	:- "	"	R.16	:-100M.	"	
R.4	:-1MEG.	"	R.17	:-31M.	1/2 W.	
R.5	:-49M.	"	R.18	:-15M.	1/5 W.	
R.6	:-11M.	"	R.19	:-1MEG.	"	
R.7	:-50M.	" X	R.20	:-10M.	2.2W.	*
R.8	:-500M.	"	R.21	:-7M.	3.1W	*
R.9	:-80M.	"	R.22	:-2M	4W	*
R.10	:-500M.	"	R.23	:-9M	1/2 W.	*
R.11	:-100M.	"	R.24	6M	"	*
R.12	:-500M	"	R.25	12M	1/2 W	*
R.13	:-4M.	1/2 W.				

CONDENSERS

Nº	VALUE		Nº	VALUE
C.1	:-.1x200	DUAL	C.15	:-.003x600
C.2	:-.1x200	DUAL	C.16	:-.003x600
C.3	:-.05x200	DUAL	C.17	:-.1x200
C.4	:-.05x200	DUAL	C.18	:-2MF.x50 *
C.5	:-.05x200		C.19	:-5MFx25 *
C.6	:-.01x400		C.20	:-5.9x350 *
C.7	:-.25x200		C.21	:-8MF.x490 *
C.8	:-.05x400		C.22	:-8MF.x490 *
C.9	:-.25x200		C.23	:-5MFx135
C.10	:-.25x200		C.24	:-100MMF. X
C.11	:-.25x200		C.25	:-100MMF. X
C.12	:-.015x200		C.26	:-25MMF.
C.13	:-.02x200		C.27	:-250MMF.
C.14	:-.003x600		C.28	:-250MMF.

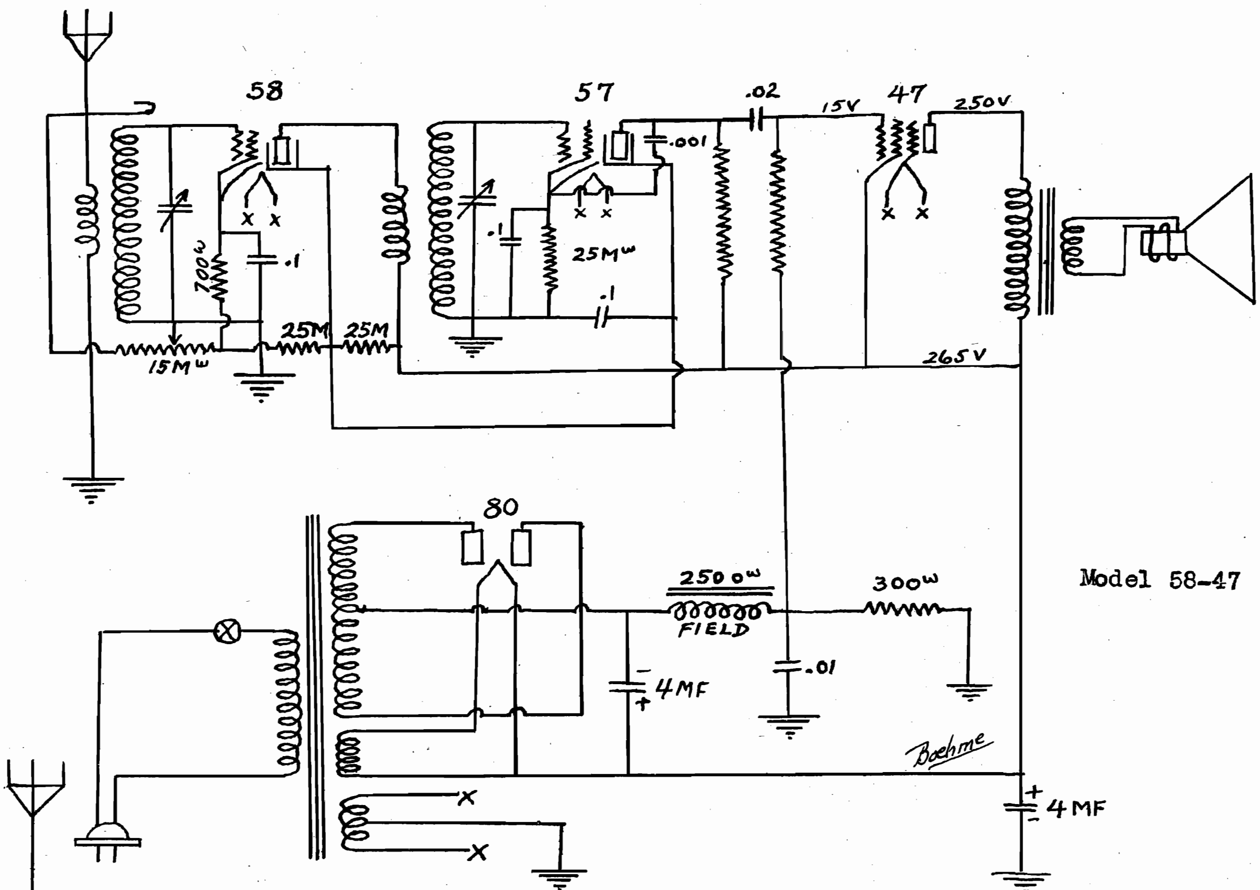
NUMBERS PREFIXED BY LETTER "P" ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.

NOTE:-(1) WITH GOOD TUBE, WILL MEASURE BETWEEN .5V. TO 1V. ON 10,000 OHM SCALE.

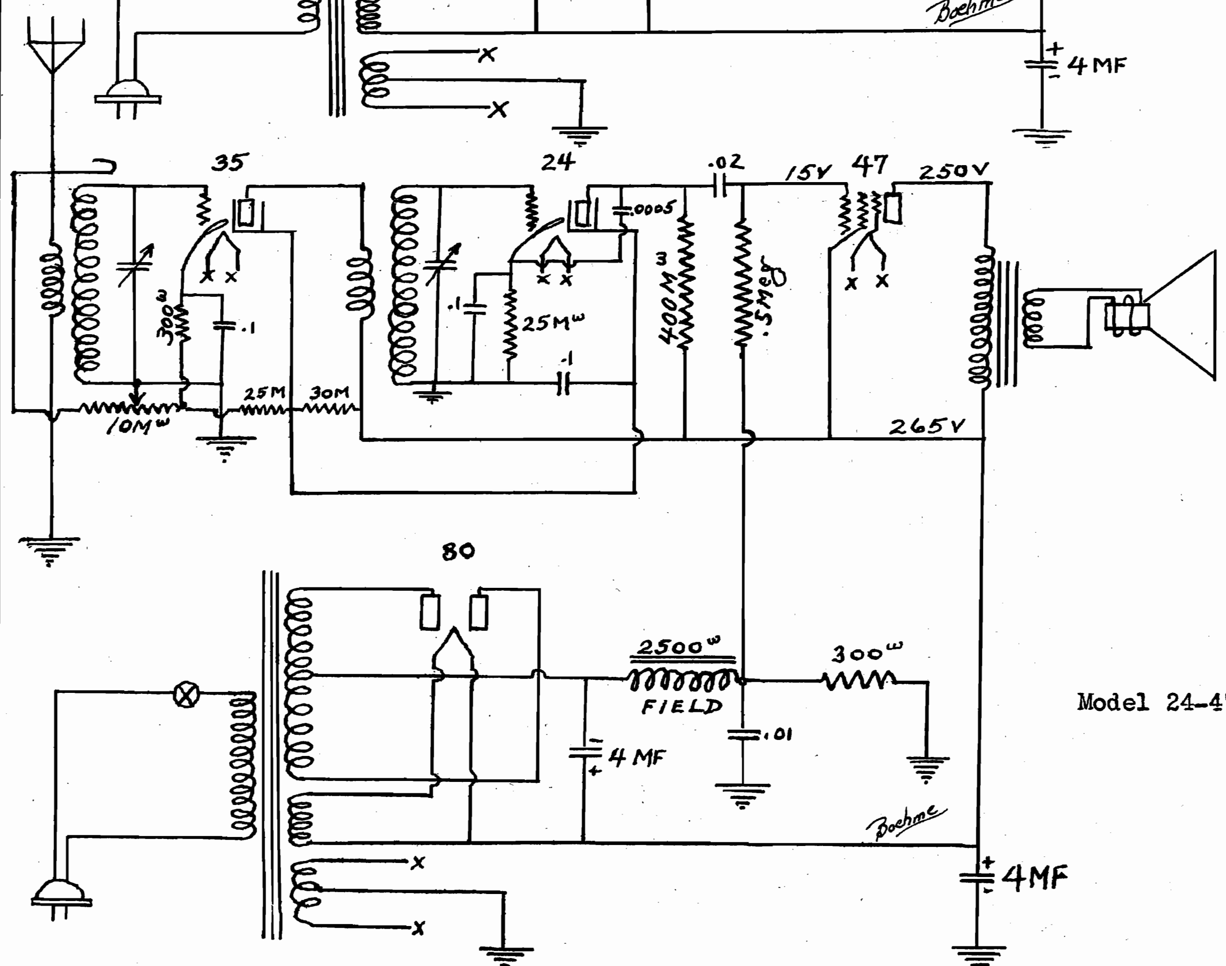
*QAV. IN ( ), QAV CONTROL IN MAX. POSITION.

MODEL 24-45
MODEL 24-27

C.R.C.



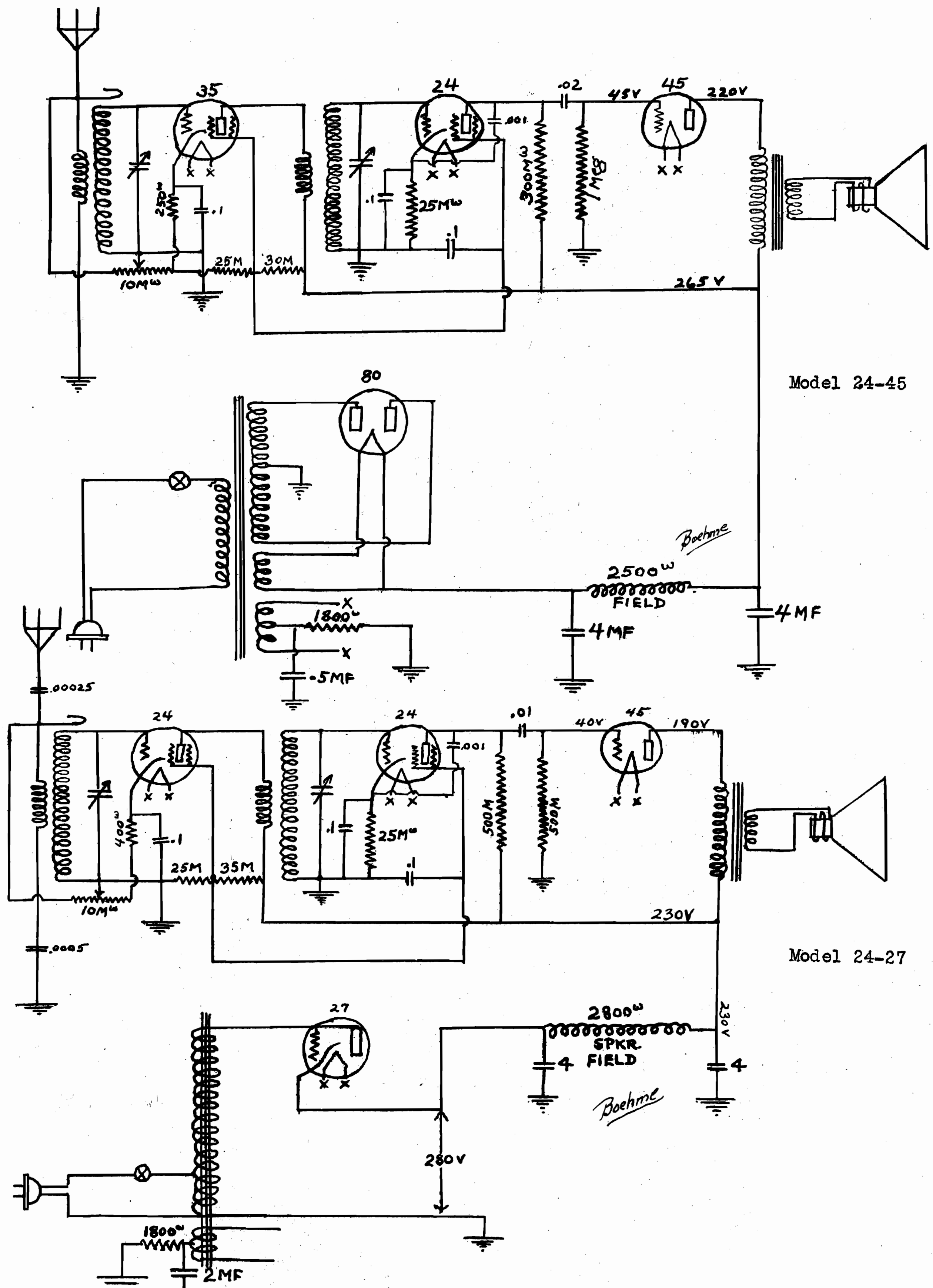
Model 58-47



Model 24-47

MODEL 24-47
MODEL 58-47

C.R.C.



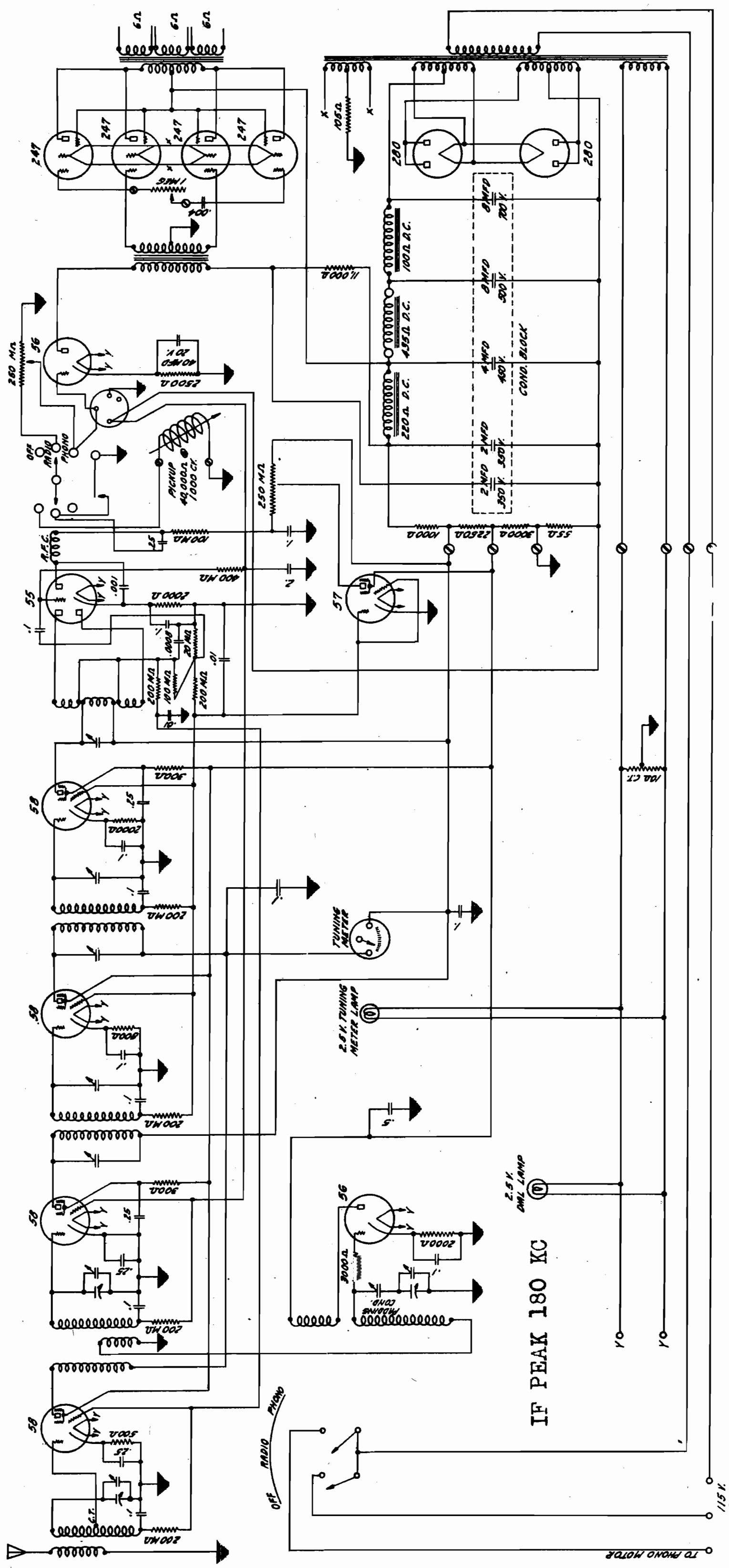
Model 24-45

Model 24-27

CAPEHART CORPORATION

MODEL 400-A Series
Tuner-Amplifier
Schematic

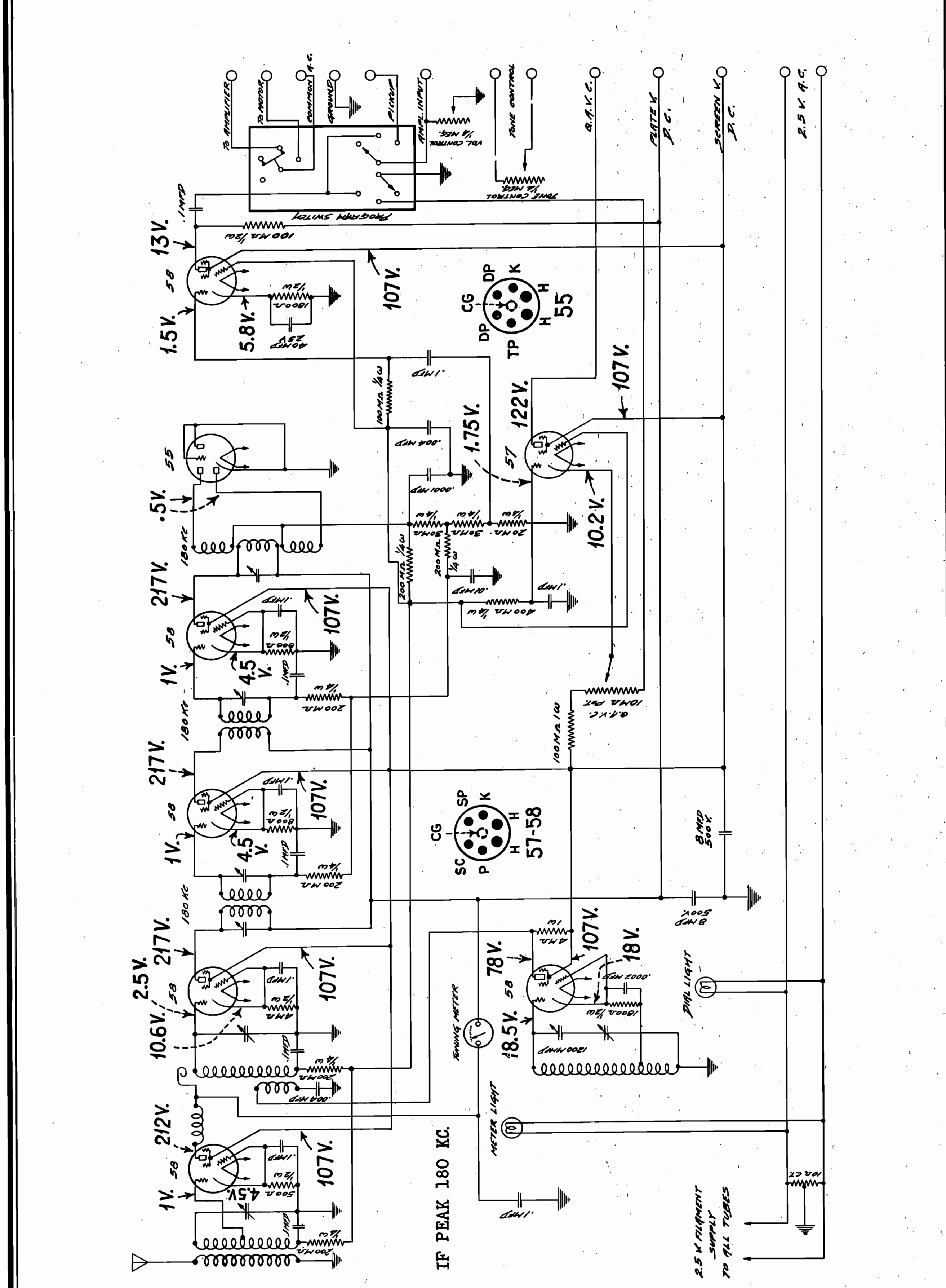
W-820



-SCHEMATIC - CAPEHART TUNER & AMPLIFIER 400-A SERIES-

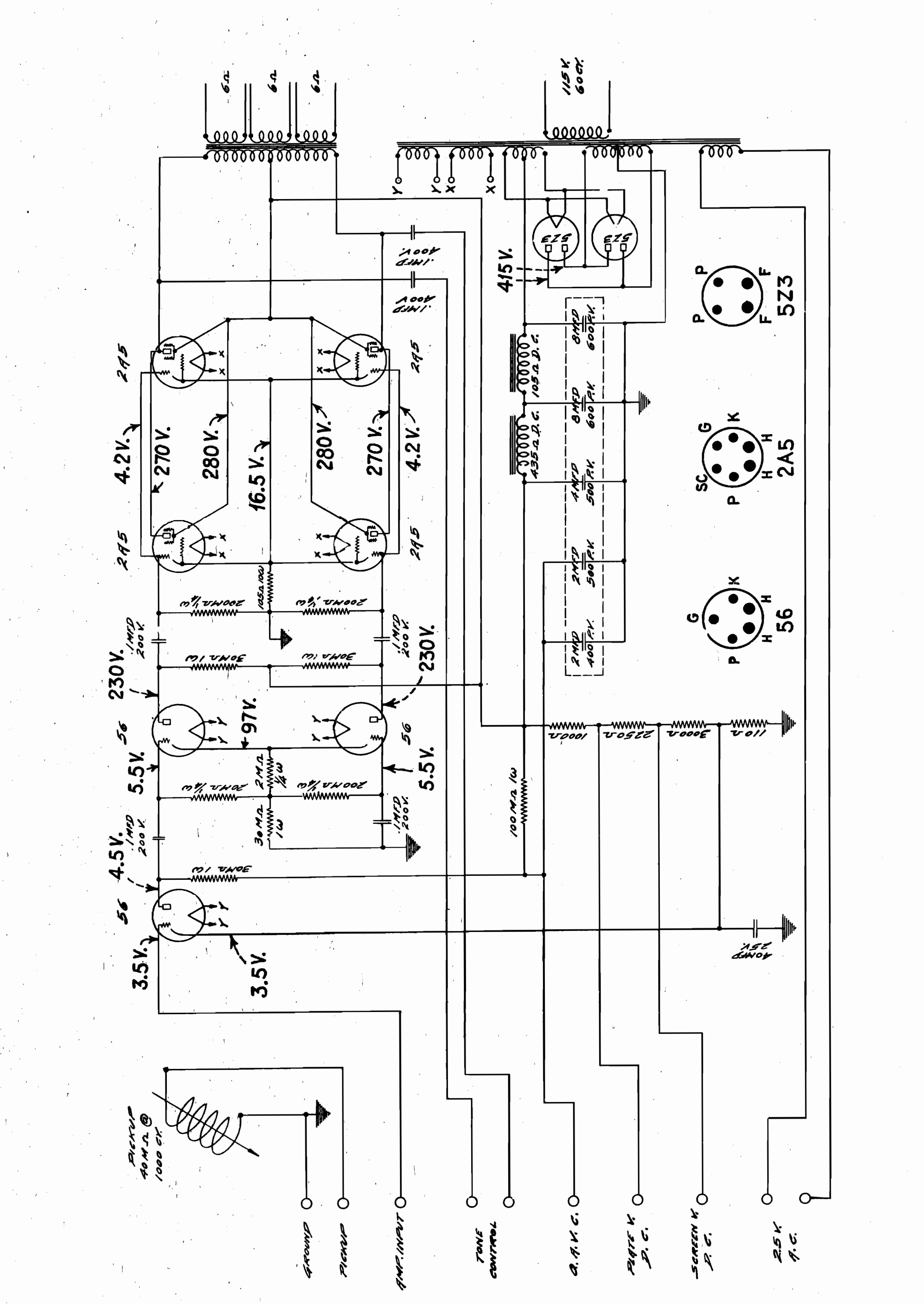
MODEL 400-B
Tuner Schematic

CAPEHART CORPORATION



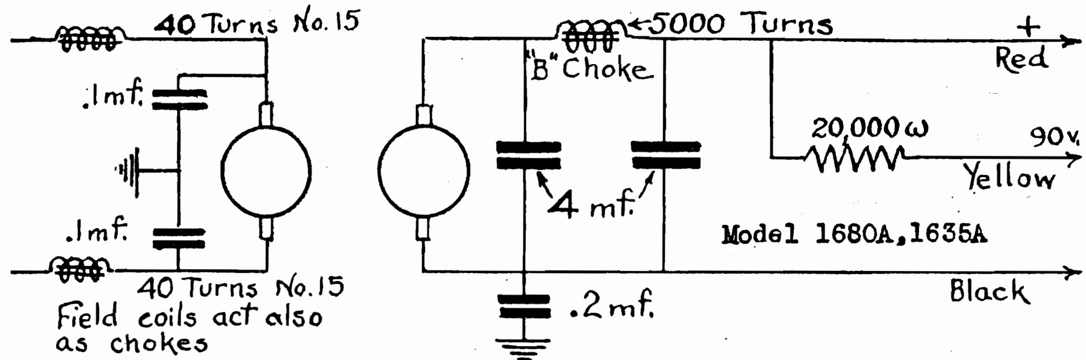
CAPEHART CORPORATION

MODEL 400-B
Amplifier Schematic

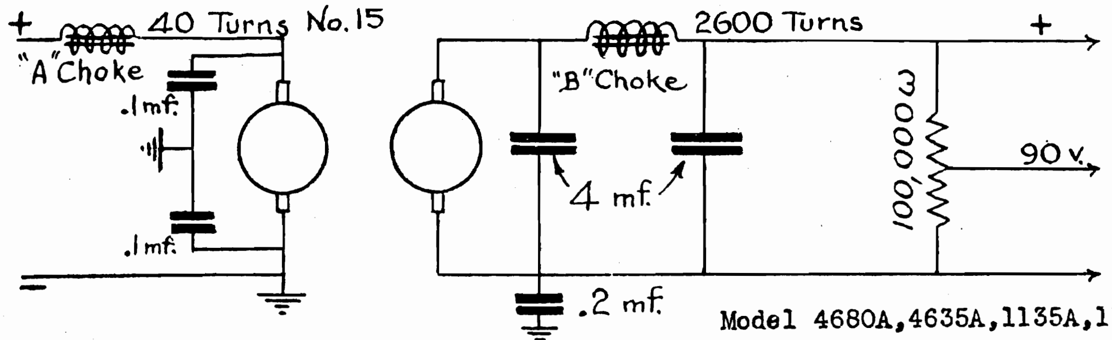


CARTER GENEMOTOR CORP.

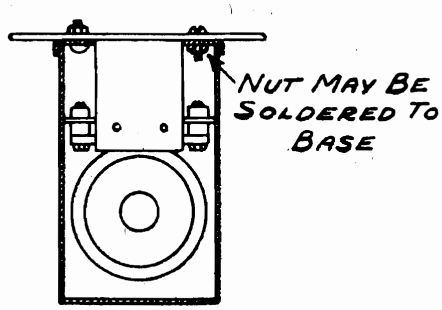
MODEL 1680-A
MODEL 1635-A
MODEL 4680-A
MODEL 4635-A
MODEL 1135-A
MODEL 1180-A



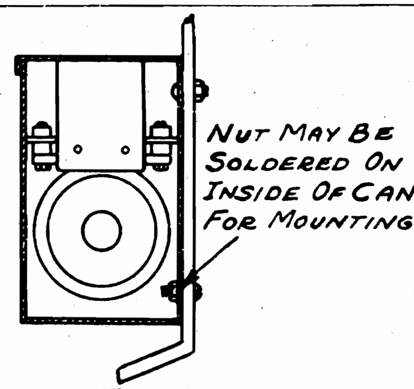
Model 1680A, 1635A



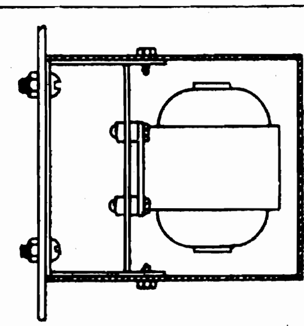
Model 4680A, 4635A, 1135A, 1180A



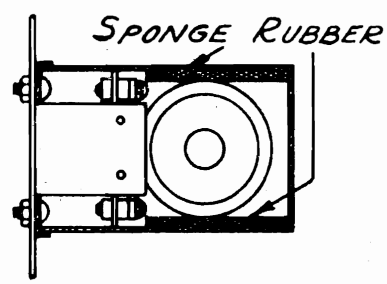
SHOWING UNDER CAR MOUNTING



UNDER THE COWL MOUNTING



DO NOT MOUNT IN THIS POSITION

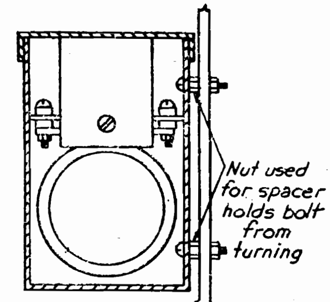


WE DO NOT RECCOMEND THIS TYPE MOUNTING. IF MOUNTED IN THIS POSITION USE SPONGE RUBBER AS SHOWN ABOVE.

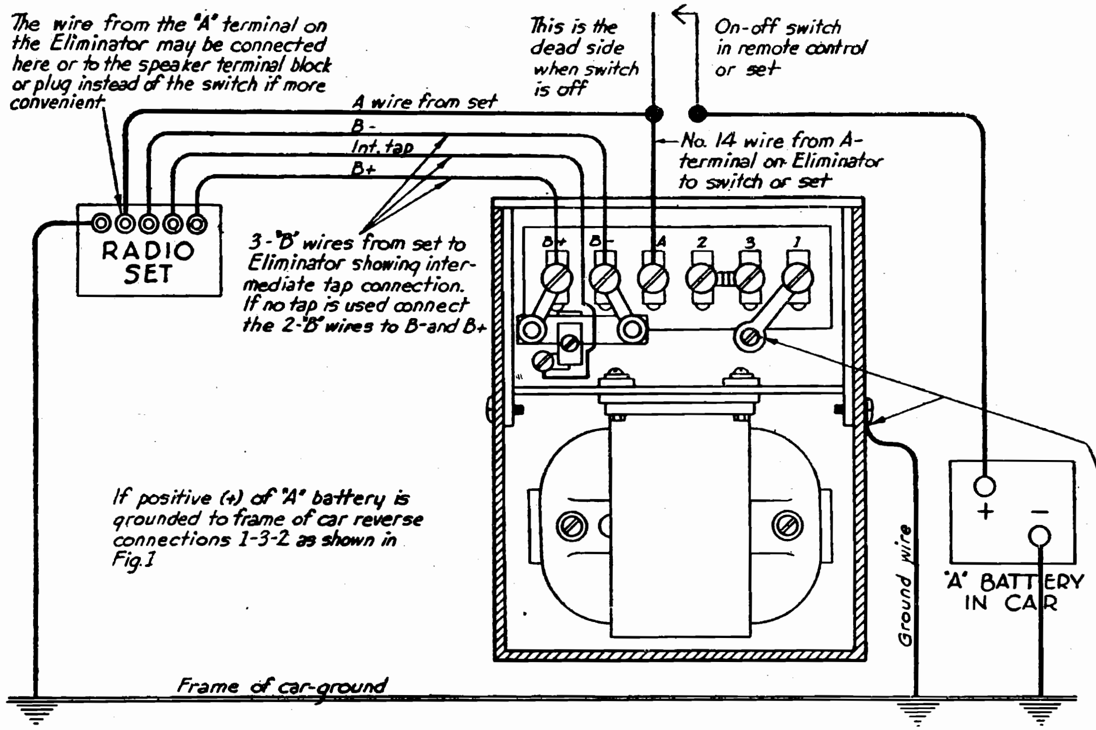
Genemotor Notes

CARTER GENEMOTOR CORP.

Radio sets having only two B. wires do not require an intermediate tap at the Eliminator as the necessary resistors are in the set. Sets having three B wires require an intermediate tap. This tap is set at the factory at 90 volts on 180 volt output and 67½ volts on 135 volt output. Usually this is the proper setting for the average set, and should not be varied unless the set fails to operate properly. To change the intermediate tap voltage, loosen the screw that holds the contact on the resistance unit. The tap may be moved to a position where best results are obtained. Then tighten screw. When Eliminators with intermediate tap are used with set having 2 B wires disregard the intermediate tap, connect the 2 B wires from the set to B- and B+ on the Eliminator. Some sets work better if the B- terminal on the Eliminator is grounded to frame. Others require a small by pass condenser from B to ground.



SHOWING MOUNTING ON BULKHEAD UNDER THE COWL. CAN BE MOUNTED ON MOTOR SIDE OF BULKHEAD IF DESIRED



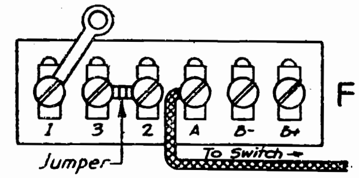


FIG. 2

CONNECT THIS WAY WHEN NEGATIVE OF "A" BATTERY IS GROUNDED

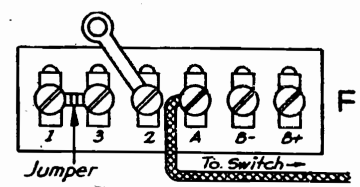


FIG. 1

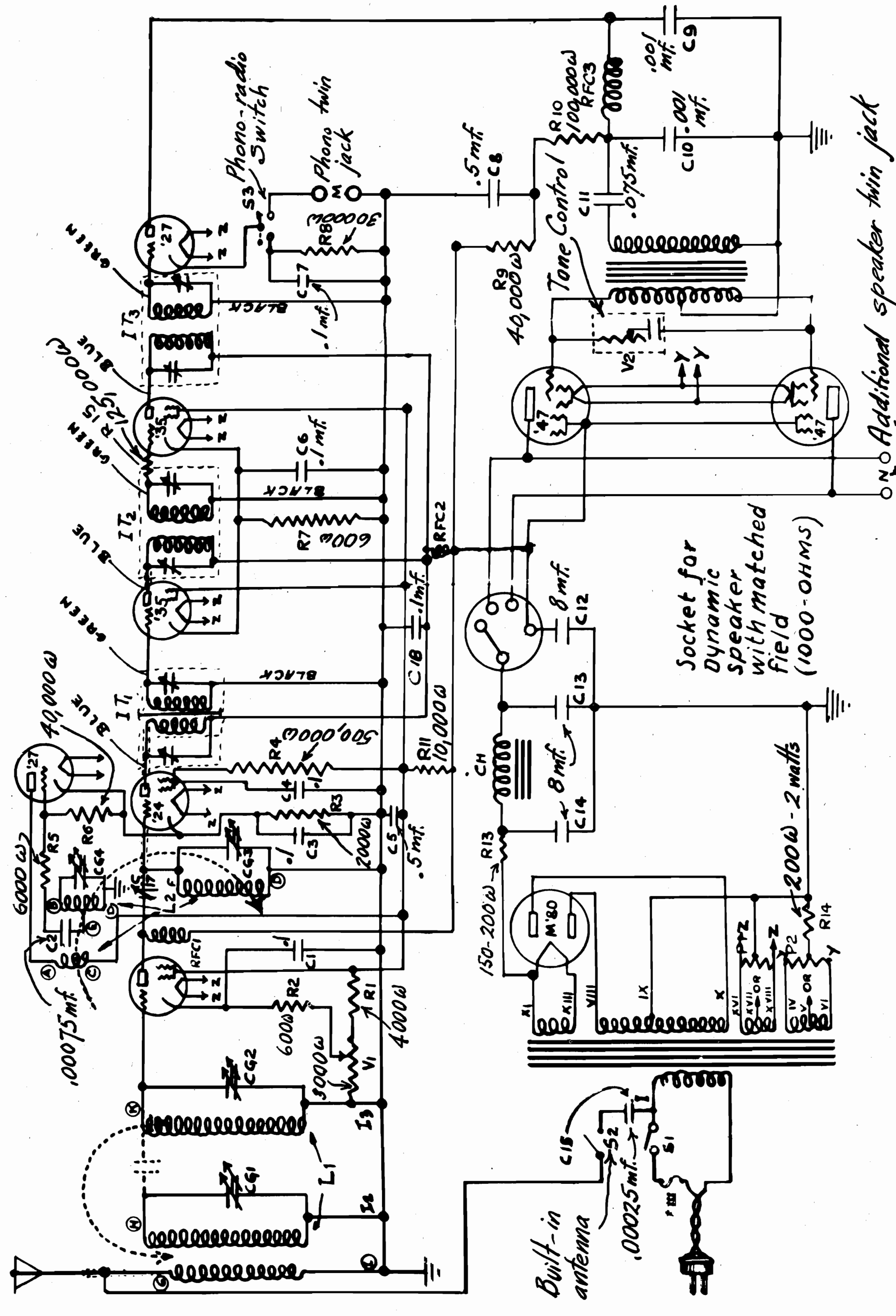
CONNECT THIS WAY WHEN POSITIVE OF "A" BATTERY IS GROUNDED

Carter Genemotor Corp.
361-365 WEST SUPERIOR STREET
CHICAGO, ILL.

JULY 1, 1933

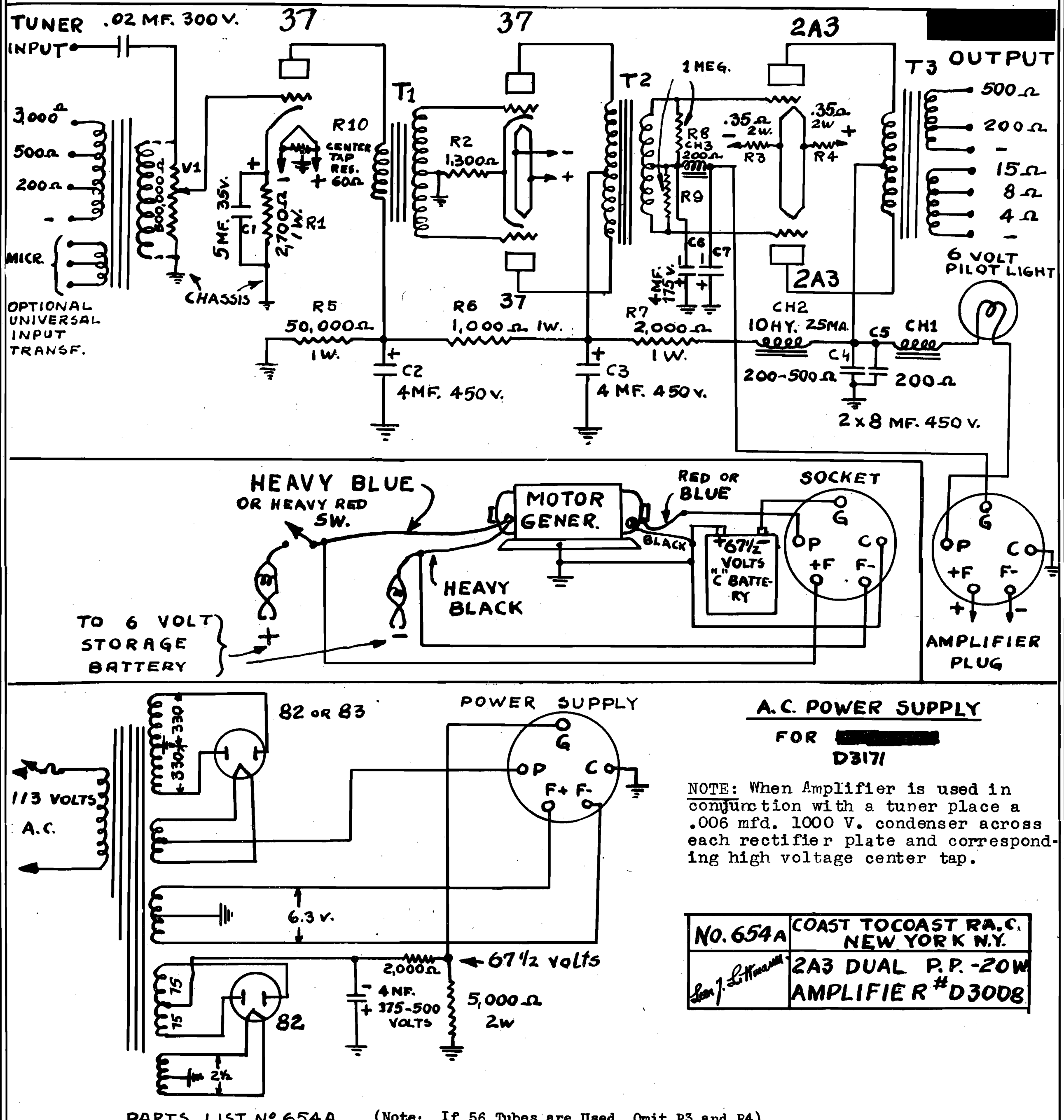
MODEL 525
Schematic

COAST TO COAST RADIO CORP.



MODEL D-3008
Schematic

COAST TO COAST RADIO CORP.



PARTS LIST Nº 654A (Note: If 56 Tubes are Used, Omit R3 and R4)

R1 -1- 2700 ohms 1 Watt Resistor
R2 -1- 1300 " 1 " "
R3 & R4-2 -.35 3 " "
R5 -1- 50,000 ohms 1 Watt "
R6 -1- 1000 " 1 " "
R7 -1- 2000 " 1 " "
R8 & R9 -1 Megohm 1 " "
C1 -1- 10 mfd. 75v. electrolytic condenser
C2 & C3-2-4 mfd. 175v.500v. " "
C4 & C5-2-8 mfd. 500v. " "
C6 & C7-2-4 mfd. 500v. " "
1 6 volt pilot lamp & socket
CH1 -1- 200 ohms 15 hy. 125 MA. filter choke
CH2 -1- 200 " 15 " 60 " " "
CH3 -1- 200 " 15 " 30 " " "
V1 -1-500,000 ohm potentiometer (gain control) and plate
R10 - 60 Ohms Center Tap Resistor

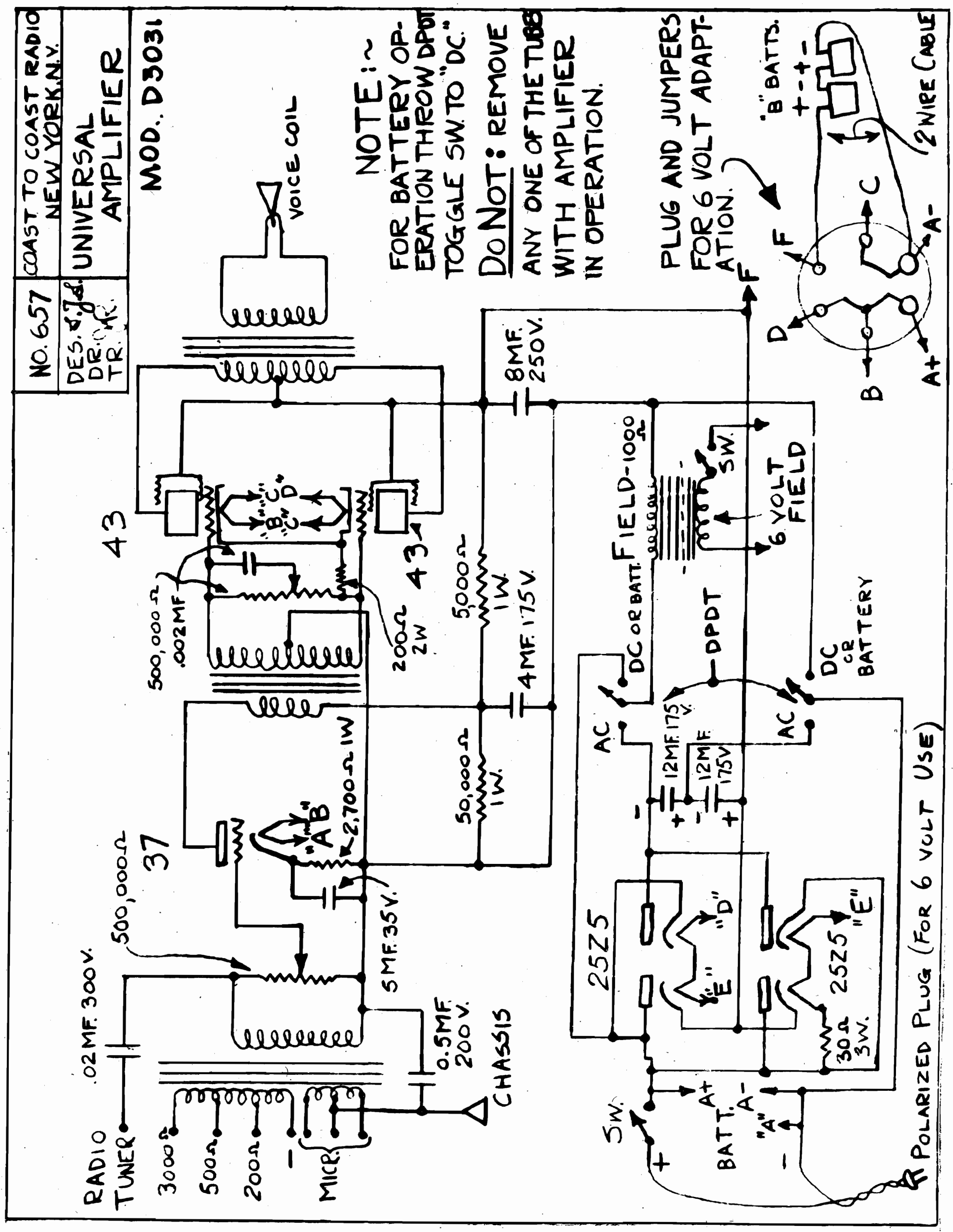
V2 -1- Filtermatic tone cont.(connect across grids of 2A3 tubes) and plate
T1 PP input transformer
T2 PP interstage transformer #164-A
T3 PP output transformer #291
1 Length 7 wire flexible cable
1 Five prong plug
2 Sets triple binding posts
3 Female receptacles for voice coil outlets & hdwe. for mounting.
3 37 or 56 sockets, 2-2A3 sockets
1 Tube shield and base
2 Bakelite knobs
1 Coil filament wire
1 Coil hookup wire
1 Chassis
4 Shield cans

A.C. POWER PACK
1 Power trans.#95or 95A
1 Single Pole single throw toggle switch
1 Fuse block
1 Fuse 2 amp 250v.
2 82 sockets
1 UY type blank socket
1 8mfd 500v.elec.cond.
1 4 " " " "
1 2000 ohm 1 watt res.
1 5000 ohm 2 watt res.

D.C. POWER PACK
1 Motor gen.320v.115MA
1 Single throw single pole toggle switch
1 Blank UY tube socket
2 Binding posts for "C supply

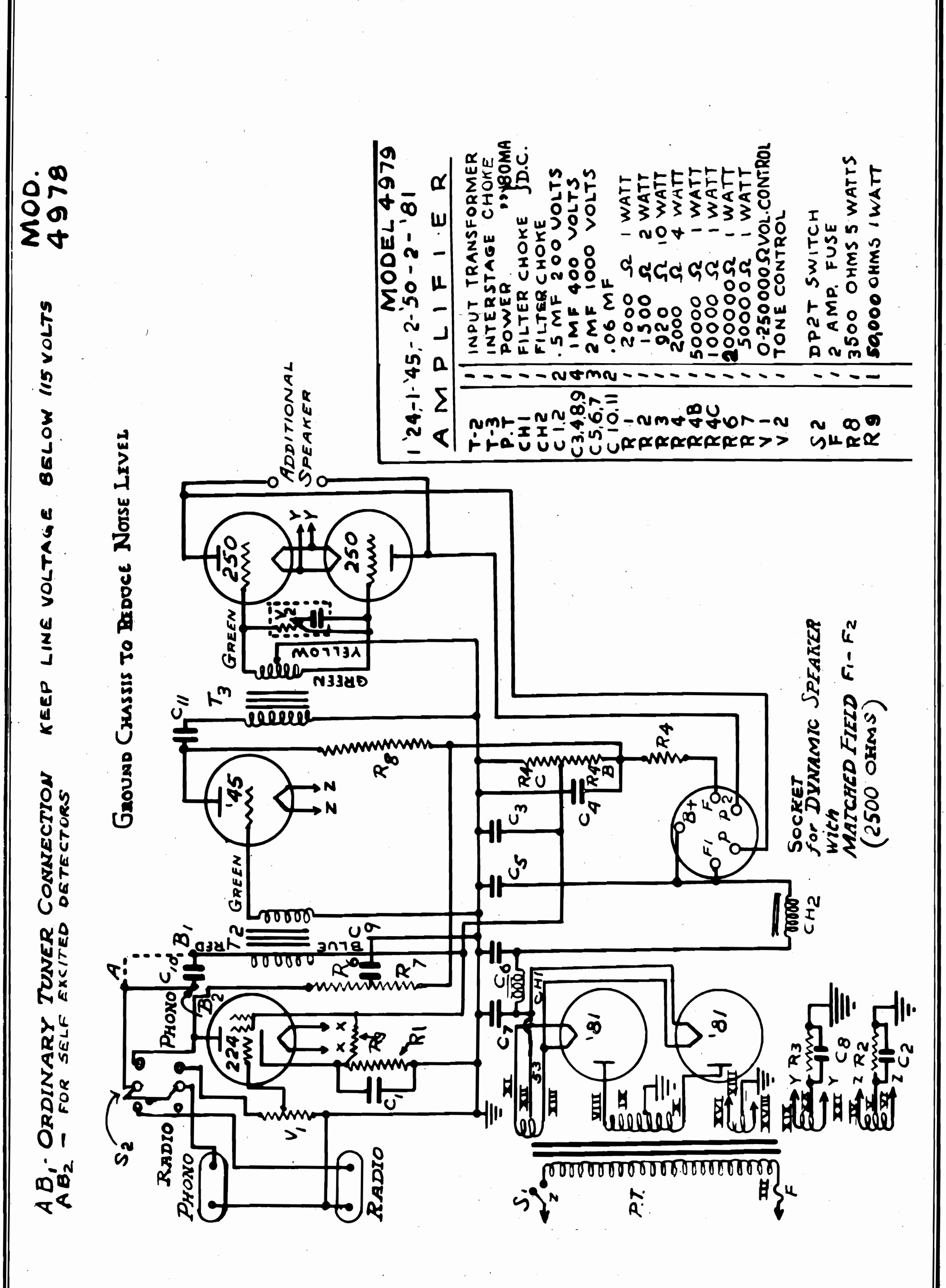
MODEL D 3031
Schematic

COAST TO COAST RADIO CORP.



MODEL 4978
Schematic

COAST TO COAST RADIO CORP.



COLONIAL RADIO CORP.

MODEL 106-B
Notes

SERVICE NOTES

MODEL 106B

INTRODUCTION

The COLONIAL Model 106B automobile receiver is a superheterodyne with automatic volume control and push pull pentode output. In order to minimize the drain on the car's storage battery only six tubes are used, all of the low current automotive type. However, because one tube functions as a combination translator oscillator and because a single duo-diode-triode tube serves as detector, AVC, and first audio, the six tubes fill the same functions that nine tubes would were a separate tube used for each function.

A highly developed power supply unit draws its current from the car's storage battery and supplies all of the "B" and "C" voltages required by the receiver. Built-in filters and complete shielding prevent the introduction of noise or hum.

The total current drawn from the car's storage battery by tubes, power supply and dynamic speaker is only 5.4 amperes, approximately the same as that drawn by a single headlight bulb.

Litz wound coils make it possible to secure the very utmost gain and selectivity from each circuit. The ultra high gain litz wound antenna coil provides high signal input from the necessarily small antenna system used in automobiles, reducing to a minimum the tube hiss which accompanies high amplification and LOW signal input. This special type of antenna coil, in effect, makes the small car antenna the equivalent of a very much larger one used with the ordinary type of antenna coil.

THE COMBINATION OSCILLATOR - TRANSLATOR

The combination oscillator - translator (first detector) is shown schematically in Fig. 32.

Coils (1) and (2) comprise the grid circuit; coils (3), (4) and (5) the plate circuit. The amplified broadcast signal is applied to the grid of the '36 translator - oscillator tube by coil (1) which is tuned to the broadcast signal's frequency. Because Coils (2) and (3) are coupled together through coil (4), feedback occurs and the tube is made to oscillate. The frequency of oscillation, determined by the tuned coil (4) is made 175 kc higher than the frequency of the broadcast signal and of coil (1). Since both the broadcast signal and a frequency 175 kc higher are impressed on the tube's grid, a 175 kc IF signal is created in the plate circuit of the tube. This 175 kc signal is selected by the tuned primary of the IF input transformer and coupled to the grid of the '39 IF tube.

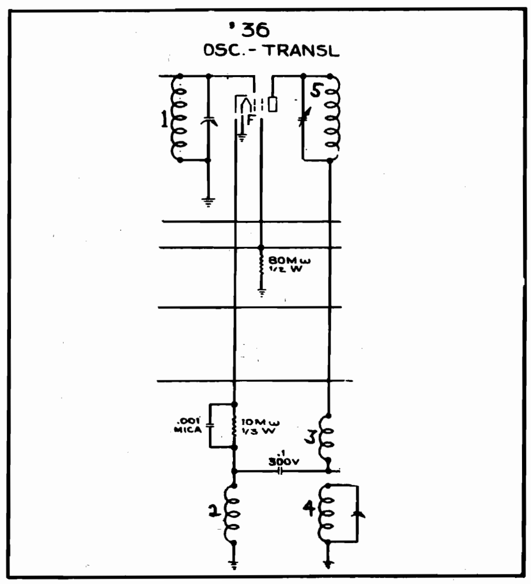


FIG. 32

THE DETECTOR - AVC - AUDIO STAGE

Fig. 33 shows the circuit of the 85 detector - AVC - audio stage. The signal voltage at the secondary of the IF output transformer is impressed across the 200M ohm resistor in series with the diode part of the 85 tube. The plates of the diode are paralleled, affording half wave rectification (detection). The RF component across the 200M ohm resistor is filtered out by the .0005 condenser and the 50M ohm resistor. The AF component is coupled through the .01 condenser to the grid of the triode portion of the 85 tube and there amplified. The 500M ohm variable voltage divider functions as the volume control.

MODEL 106-B
Notes, Cable data
Antenna condenser data

COLONIAL RADIO CORP.

The dc component of the rectified signal voltage across the 200M ohm resistor serves as the variable bias for the '36 RF and '39 IF tubes. Their fixed, residual bias is supplied by the 200 ohm resistor in their cathode circuit. The stronger the incoming signal, the greater becomes the dc drop due to rectified signal voltage across the 200M ohm resistor. This increased dc voltage drop biases the RF and IF tubes more negatively and cuts down their amplification. When the signal is weak, the dc drop across the 200M ohm resistor, is very low, the RF and IF bias is only that furnished by the 200 ohm fixed bias resistor, and amplification is made a maximum. The gain, then, varies inversely with the signal strength and the signal voltage at the input to the detector tends to remain at a constant value.

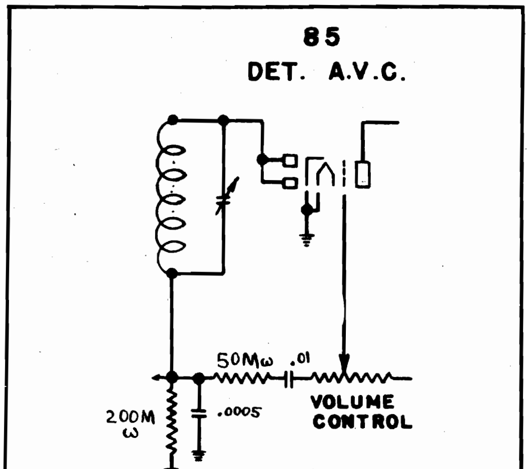


FIG. 33

ADJUSTING THE ANTENNA COMPENSATING CONDENSER

Although it is not necessary to do so, improved results sometimes can be had by adjusting the antenna compensating condenser to match the particular antenna used in the car.

Remove the chassis from its case and support it so that all cables can be plugged into their proper sockets, putting the receiver in playing condition.

Tune accurately to some station between 1000 kc and 1500 kc. Then adjust the antenna compensating condenser, (the one to which the '36 RF tube grid clip is connected), to the point of maximum value. Do NOT touch the other trimmer condensers. If the receiver oscillates, a piece of sheet metal placed over the '36 tubes and touching the dividing shield. will stop it.

REPLACING THE CABLES

There are two cable drives; one within the control unit box; the other, the drive from the box to the condenser drum. To replace the condenser drum drive, proceed as follows:

1. Remove the chassis from its mounting case, loosen the pulley set screws and remove the pulley. Unsolder the broken cable from the pulley.

2. Loosen the condenser drum set screws.

3. Insert the new cable in the pulley and anchor it with solder in the same manner that the original cable was anchored.

4. Turn the Station Selector knob until the dial hits the "55" end stop.

5. Replace the pulley on its shaft, with one set screw facing up and the other facing the right side of the set. (See Fig.34). Wind the cable, which comes from the BOTTOM of the pulley by turning the knob for THREE turns in a counter clockwise direction. Then LOOP the cable around the pulley for one more turn, without turning the pulley.

6. With the condenser plates all the way out, turn the drum so that the slots face upward.

7. With a crochet needle, pull the cable under the drum and put the eye through the slot in the drum. (See Fig. 34). If necessary, turn the knob enough to permit the cable to reach the slot.

8. Loop the other cable around the pulley so that it comes off the top of the pulley. Then loop it around the condenser drum and into the other slot. (See Fig. 34).

9. Stretch the spring between the eyes of the two cables.

10. Turn the knob to the "55" end stop, fully mesh the condenser plates and tighten the drum set screws. Then tune in a station of known frequency of about 1000 kc. If the calibration is off, loosen the drum set screws and turn the knob until the dial reading corresponds to the station's frequency. Then tighten the drum set screws. Leave the station tuned in during the procedure in order to be sure that the drum does not turn.

COLONIAL RADIO CORP.

MODEL 106-B
Drive Cable data

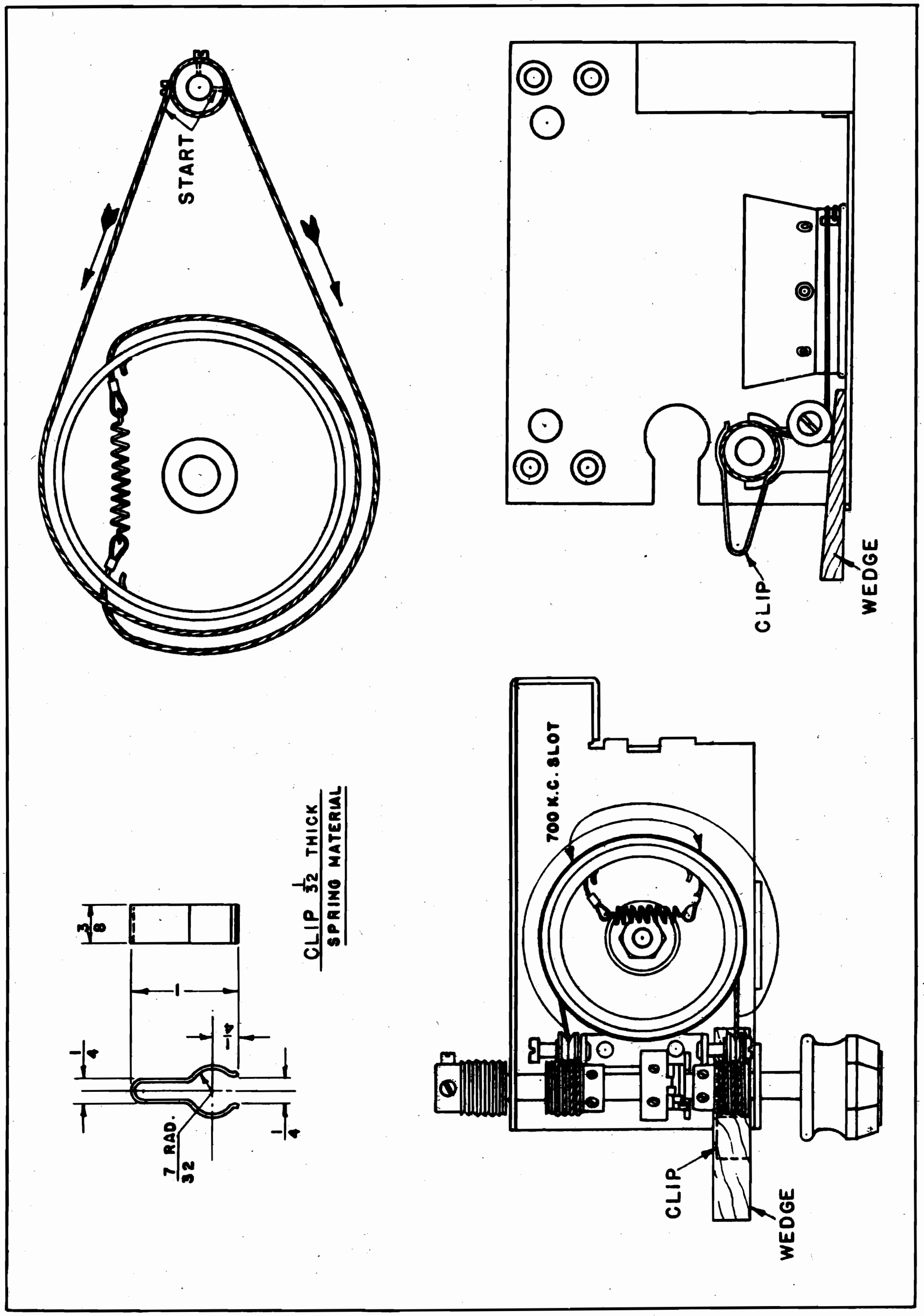


FIG. 34. REPLACING THE DRIVE CABLES

MODEL 106-B
Cable data

COLONIAL RADIO CORP.

TO REPLACE THE CABLES IN THE DRIVE UNIT CASE

1. Remove the chassis from its case; remove the knobs and the escutcheon.

2. Remove the three screws in the sides of the control unit case. Pull the lower half of the case down and around out of the way.

3. Loosen the set screws in the dial drive cables and in the stop collar. Pull the shaft either forward or backward far enough to slip off the pulley with the broken cable. If it is the rear pulley and the shaft must be pulled forward, it will be necessary to remove the condenser drum drive pulley. Wind string around the pulley so that the condenser drum cable will not slip off. Otherwise it will be necessary to go through the procedure, previously outlined, for replacing the condenser drum drive cable.

4. Insert the new cable in the pulley and anchor it with solder in the same manner that the original cable was anchored.

5. Slip the pulley and new cable back on the shaft. Be sure the shaft extends far enough back so that the condenser drum drive pulley can be fastened on.

6. Tighten the set screws in the pulley nearest the knob, leaving the other set screws loose.

7. Put a wedge shaped piece of wood under the front idler pulley so that the cable will not slip off of it. (See Fig. 34).

8. Put the clip shown in Fig. 34, which can be made of spring brass, over the pulley. See Fig.34 . Then wind the cable on the pulley by turning the knob.

9. The eye of the cable should be put into the slot which is at the "70" marking of the dial. Turn the dial drum far enough to take up the slack in the cable. Fasten the spring into the eye of the cable.

10. Clamp the shaft so that it can be turned, but will not turn of its own accord.

11. Loop the other cable around the dial drum (above the first cable) and into the other slot. Fasten its eye in the spring.

12. Then turn the pulley enough to take up the slack in the cable and to stretch the spring. Take care that the cables do not slip off of the drum. The job will be made easier if the stop collars are set so that the shaft will not turn as the cable is wound up.

13. After the slack is taken up and the spring stretched, tighten the pulley set screws.

14. Loosen the stop collar set screws and turn the knob to see that the cables ride freely. The cable which goes into the slot opposite the blank portion of the dial should be nearest the celluloid dial. The cable coming from the slot opposite the "70" marking of the dial should be in the center when the dial is turned to 55.

15. Turn the knob until the dial is one division past the last marking on the 1500 kc end of the scale. Then turn the stop collars counter clockwise as far as they will go and tighten the set screws in the stop collar.

16. Re-assemble the unit. The calibration can be re-set as described in the instructions for replacing the condenser drum drive cables.

REMEDIES FOR IGNITION INTERFERENCE

If a condition is met in which the installation of standard suppressor equipment still leaves objectionable noise, proceed as follows:

1. If any car wires or tubing pass through the same corner post as does the antenna lead-in, connect a 1 mfd. condenser from each of these wires at the point where it enters the corner post, to ground. The leads to condensers used for noise suppression must be kept as short as possible. Bond metal windshield tubing to the nearest ground with heavy copper braid or ribbon.

2. Bond the bulkhead to the nearest point on the motor.

3. Try an additional 1 mfd. condenser from ground to the BATTERY terminal of the ammeter.

4. Accelerate the engine and then cut off the ignition. If a whine is heard, decreasing in pitch as the engine slows down, interference comes from the generator. An additional 1 mfd. condenser from the AMMETER side of the generator cutout to the generator frame should completely eliminate this interference.

COLONIAL RADIO CORP.

MODEL 106-B
Interference data
General notes
Power Supply

5. Disconnect the high tension lead running from the coil to the center of the distributor. Disconnect it both at the coil end and at the distributor end. Turn the ignition switch on and turn the motor over with the hand crank. If clicks are heard as the distributor breaker makes and breaks contact, interference comes from this source. Additional capacity should NOT be put across the breaker points as it will interfere with the proper operation of the coil. (A condenser, connected across the points, is built into all distributors.) Rewire the entire low tension ignition system, using shielded low tension ignition cable which must be well grounded. Do not run the wiring along side of other wiring, but keep it separate, and if possible, along the car chassis channels.

6. If the trouble still persists, it may be necessary to use shielded high tension cable from the distributor to the coil. The shielding must be well grounded.

7. Very often the interference is radiated along dome light wiring, windshield tubing, oil lines running to the pressure gauge on the instrument panel, gasoline gauge lines, etc. When this is the case bi-passing or shielding the dome light wiring, grounding the shielding, will eliminate or minimize the trouble. Bonding the various pipes and cables to ground with heavy copper ribbon or braid will often effect much improvement.

8. In some cars the high tension coil or leads come very close to the motor side of the floor board. As a result, interference is picked up by the occupant's body and transferred to the car antenna. Trouble of this sort is manifested by noisy reception ONLY when a person is sitting in the car. It can be remedied by tacking a grounded metal plate or screen to the motor side of the floor board, or by placing a grounded screen between the floor matting and the floor board.

9. A forty or fifty turn choke, made of #14 wire wound on a 1/2" diameter form, connected in series with the ungrounded A lead, at the battery, often is helpful in eliminating noise. It is particularly worth trying for the new Ford 8's.

It should be understood that it practically never is necessary to apply ALL these remedies. How many of them are needed will depend on the particular car and installation. If it is remembered that the SOURCE of interfering noise is always a spark of some kind, and that the interference may be radiated along any metal conductor which is not grounded to the chassis of the car through extremely low resistance, the problem of interference elimination can be tackled intelligently and overcome.

GENERAL NOTES

To replace the pilot light, remove the two screws which hold the curved cover at the bottom of the control unit. The pilot light socket is fastened to this cover.

Intermittent reception or fading may be due to resistive contact of the fuse in its clips. This will be evidenced by heating of the fuse clips. Sandpaper the fuse and the clips and tighten the tension of the clips by squeezing them together.

Ignition interference will be reduced if the breaker points are adjusted to .01 inches. It is also helpful to build up the rotor arm with solder or to peen it so that it just misses touching (by about .001 inches) the electodes in the distributor cap.

Some spark plugs have suppressor resistors built into them. Such plugs usually are marked "radio". Additional suppressors should not be used lest the car performance be impaired.

Car antennas should be tested for grounds with a high resistance continuity meter connected from antenna to the body of the car. No reading should be had.

THE POWER SUPPLY

The power supply unit is shown schematically in Fig. 36; its location of parts illustration in Fig. 35.

Repeated blowing of the fuse will be due either to a short or to sticking of the vibrator points. Do NOT attempt to repair the vibrator. Return it to your distributor or to the factory.

The relay should close when the key switch is turned on. It should be open when the switch is off.

The following chart will be helpful for making tests of the power supply unit. A continuity meter or ohmmeter may be used.

MODEL 106-B
Power Supply layout
Test data

COLONIAL RADIO CORP.

TEST	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
From B+ to rectifier cathode	Reading	Open RF or filter choke
From B+ to B-(with + of meter connected to B+ of unit)	No reading (except charging current)	Shorted filter condenser
From B- to either plate	Reading	Open power transformer
From B- to side of .02 condenser which has been disconnected from transformer	No reading	Shorted condenser
From terminal #3 to #2	No reading	Relay contacts shorted
From terminal #1 to #3	Reading	Relay coil open
From B- to terminal #3	No reading	.5 mfd condenser shorted
From H to H (with 84 tube out of socket)	No reading	.25 mfd condenser shorted or vibrator contacts stuck.

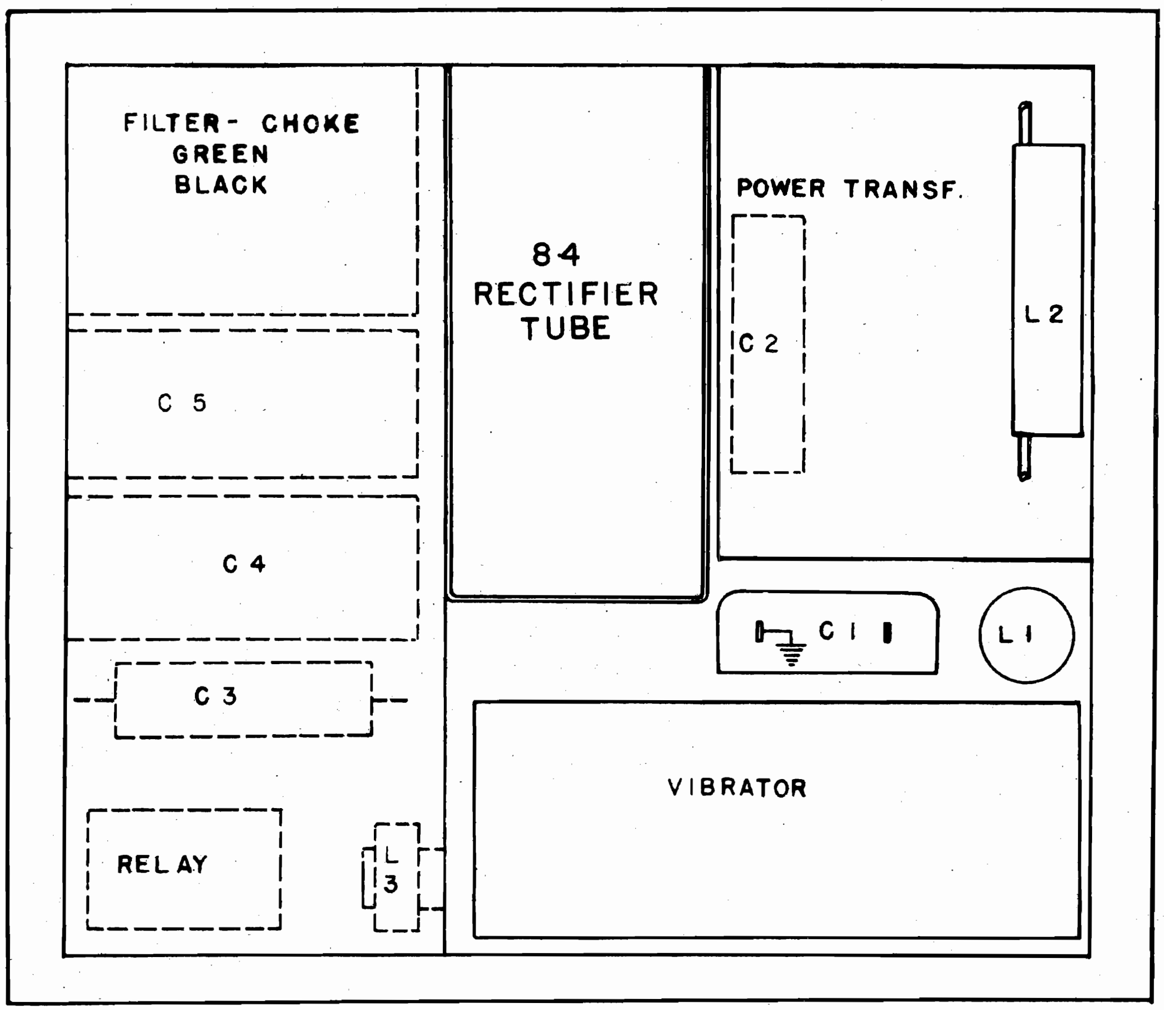


FIG. 35

COLONIAL RADIO CORP.

MODEL 106-B
Power Supply
Schematic

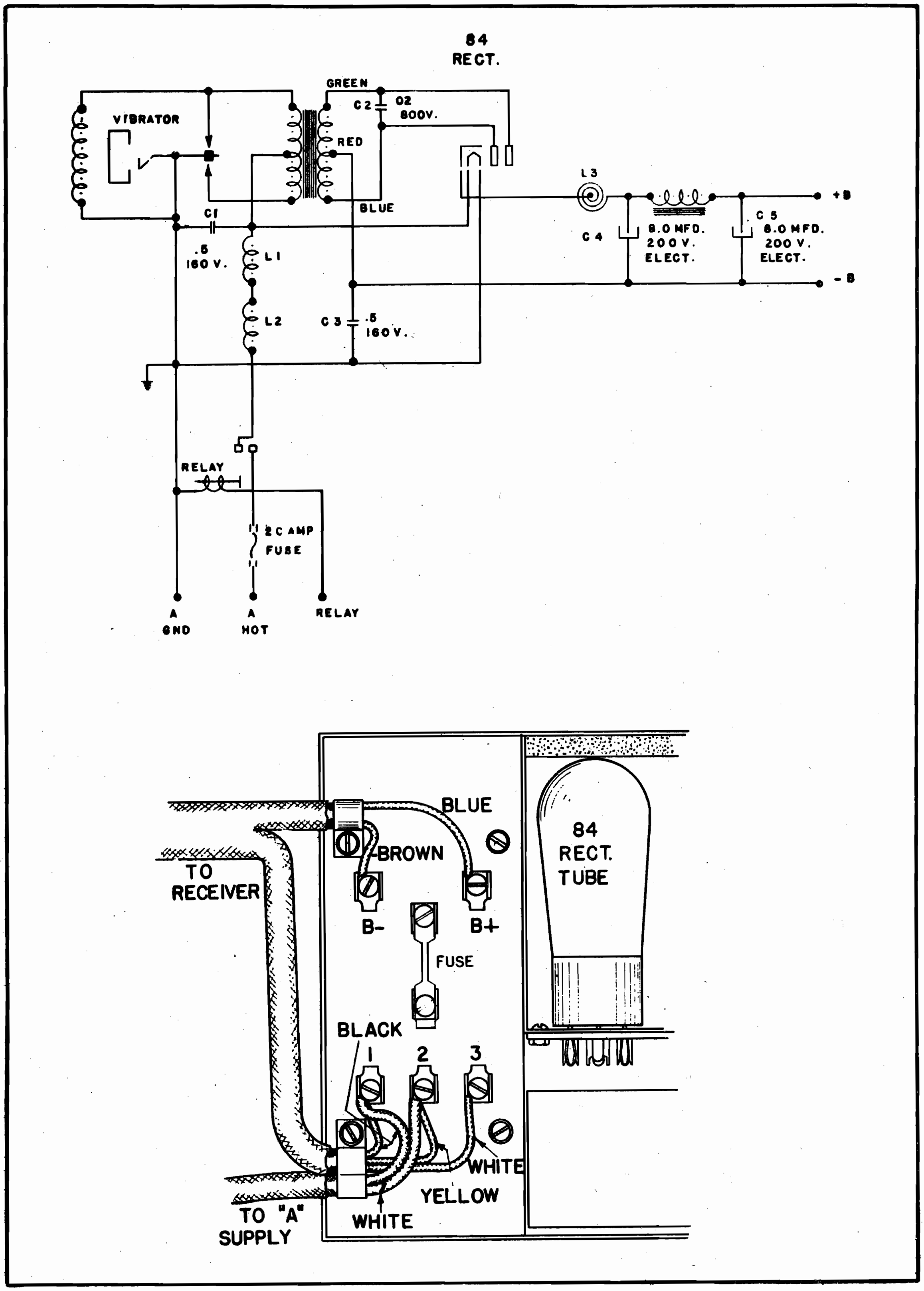
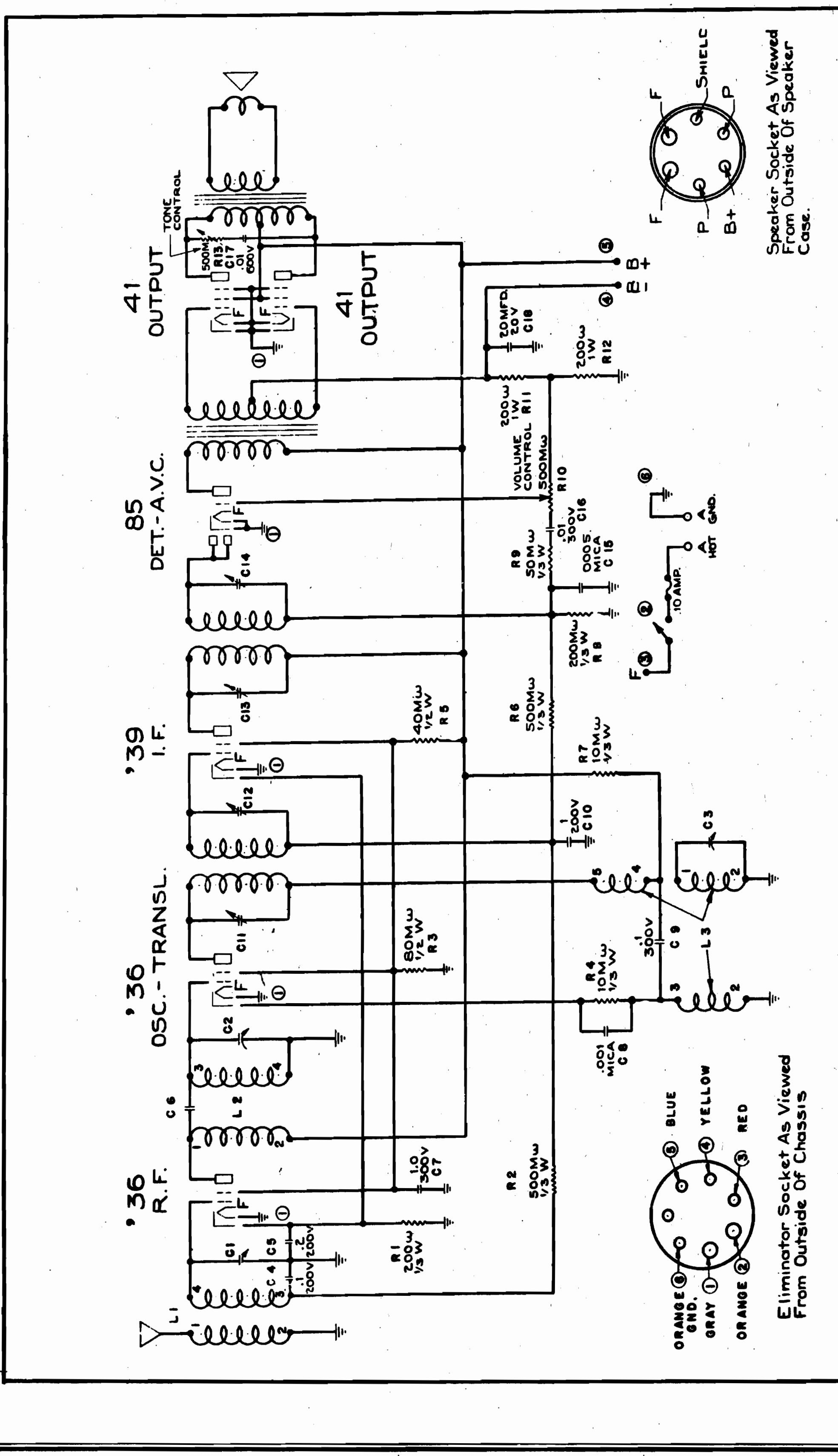


FIG. 36. SCHEMATIC - MODEL 106B POWER SUPPLY UNIT

MODEL 106-B
Schematic

COLONIAL RADIO CORP.



For Voltage Data, see Index

FIG. 37. SCHEMATIC - MODEL 106B

COLONIAL RADIO CORP.

MODEL 106-B
Socket layout
Parts location

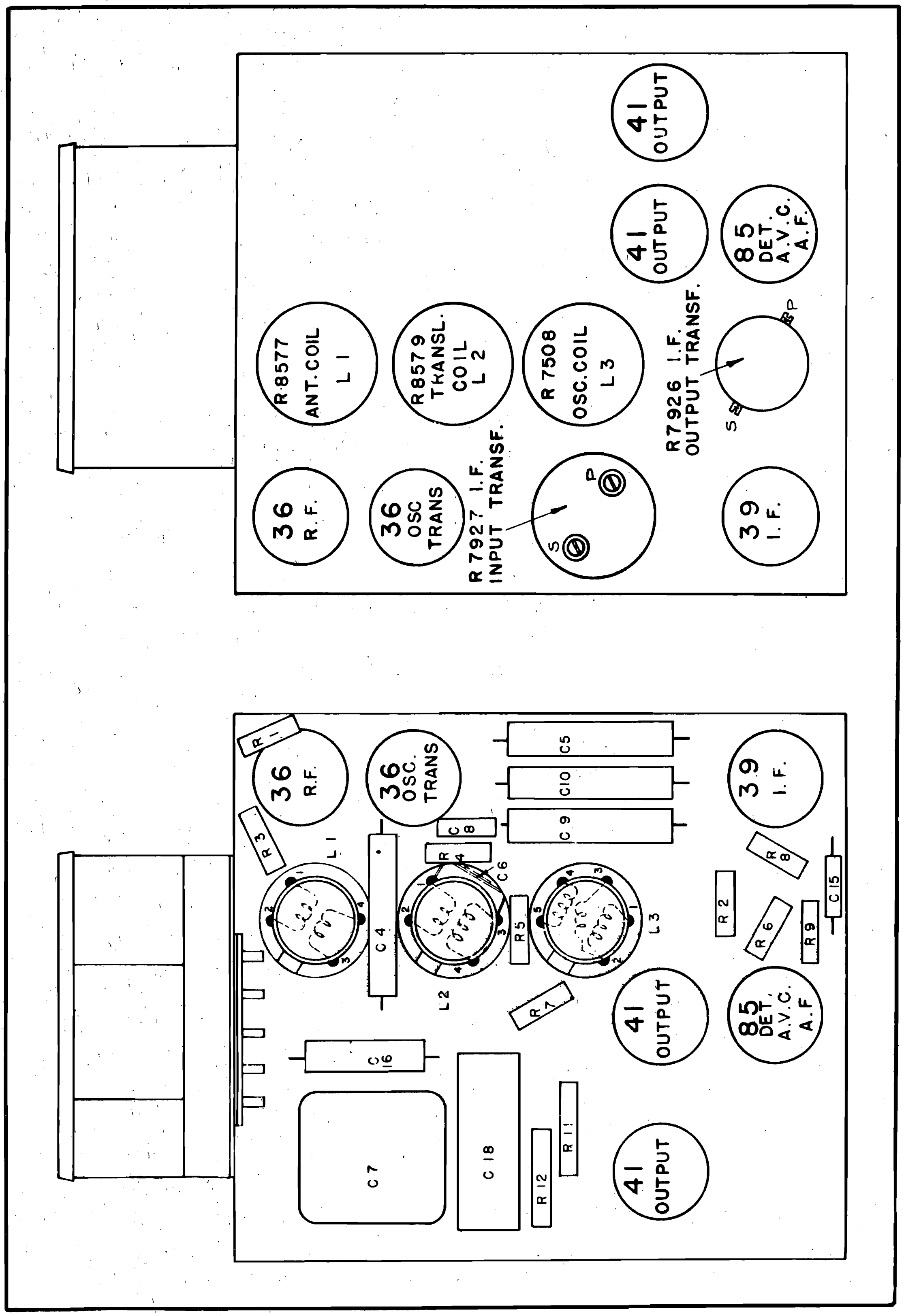


FIG. 38. SERVICE ILLUSTRATIONS - MODEL 106B

MODEL 106-B
Parts List

COLONIAL RADIO CORP.

REPLACEMENT PARTS LIST

PART NO.	DESCRIPTION
R-7901A	Board-Fuse
R-7902A	Bracket-Pulley
R-5330B	Cable-Drive, long
R-5330C	Cable-Drive, short
R-7957A	Cable-Chassis to speaker
R-6381	Clip-Screen grid
R-6381AA	Clip-Screen grid with shielded 13" lead
R-8577	Coil-Antenna
R-8577A	Coil-Antenna, complete with shield
R-7508	Coil-Oscillator
R-7508A	Coil-Oscillator, complete with shield
R-8579	Coil-Translator
R-8579A	Coil-Translator, complete with shield
R-8580	Condenser-Variable tuning
R-7917	Condenser-20 mfd. electro-lytic
R-8030	Condenser-1 mfd. (sup-pressor)
R-7182	Condenser-1 mfd.
R-6380	Condenser-.2 mfd., 200v
R-8286	Condenser-.1 mfd., 200v
R-8581	Condenser-.1 mfd., 300v
R-8582	Condenser-.01 mfd., 300v
R-6759	Condenser-.001 mfd., mica
R-6760	Condenser-.0005 mfd. mica
R-7502A	Drum-Condenser drive
R-7907	Escutcheon
R-7688	Fuse-10 amp
R-7527	Grommet-Rubber
R-7692	Knob
R-2288	Lamp-Pilot
R-7514	Plug-Antenna
R-7588	Pulley-Idler
R-7589	Pulley-Dial drive (large)
R-7590	Pulley-Dial drive (small)
R-7589A	Pulley and cables (large)
R-7590A	Pulley and cables (small)
R1-8018	Resistor-Spark plug sup-pressor
R2-8018	Resistor-Distributor sup-pressor
R-7228	Resistor-500M ohm, 1/3 watt carbon
R-6638	Resistor-200M ohm, 1/3 watt carbon
R-8000	Resistor-80M ohm, 1/2 watt carbon
R-6637	Resistor-50M ohm, 1/3 watt carbon
R-6509	Resistor-40M ohm, 1/2 watt carbon
R-7587	Resistor-10M ohm, 1/3 watt carbon
R-7227	Resistor-200 ohm, 1/3 watt carbon
R-7273	Resistor-200 ohm, 1 watt carbon
R-8291A	Shield-Antenna
R-7550A	Shield-Coil
R-7923A	Shield-2nd I.F.
R-7922A	Shield-Tube
R-8253	Socket-5 prong
R-8092	Socket-6 prong
R-8587	Socket-7 prong
S-8467A	Speaker-Complete
S-7776A	Speaker-cone and voice coil assembly
S-7969	Speaker-field coil
R-8592	Speaker-tone control
R-7070	Speaker-tone control cond. .01 mfd. 600v
S-8472AC	Speaker-transformer
R-7715	Switch
R-7927	Transformer-I.F. input
R-7926	Transformer-I.F. output
R-7926A	Transformer-I.F. output complete with tuning conden-sers
R-7915A	Transformer-PP input

POWER SUPPLY PARTS

PART NO.	DESCRIPTION
R-5509	Board-Terminal (small)
UE-107	Board-Terminal for vibrator connections
UE-108	Board-Terminal (five connection and fuse)
UE-120	Cable-Elim. to chassis
UE-121	Cable-"A" battery
UE-110	Choke-Filter
UE-111	Choke-R.F., solid
UE-112	Choke-R.F., hollow
UE-115	Condenser-8 mfd. 200v
UE-118	Condenser-.5 mfd. 200v, cartridge
UE-117	Condenser-.5 mfd. 200v, metal case
UE-116	Condenser-.02 mfd. 800v
UE-136	Fuse-20amp
R-7963	Plug-7 prong
UE-113	Relay
UE-106	Transformer-Power
UE-104	Vibrator-complete

COLONIAL RADIO CORP.

MODEL 136
Circuit notes

SERVICE NOTES

MODEL 136

The Model 136 is a four tube AC-DC, tuned radio frequency receiver.

A 78 RF tube is impedance - capacity coupled to the tuned input of the 77 detector. The coupling capacity between the choke, L3 and the tuned coil, L4, consists of a single open ended turn of wire at the top of the coil, L3. The audio output of the 77 is fed to the 43 output pentode and then to the dynamic loudspeaker. A 25Z5 is used as a voltage doubling rectifier (on a.c.only).

Some of these receivers have a .001 mfd. antenna series condenser; others do not. Unless a series condenser is used, it is important that the antenna be not connected to any grounded object. To do so would result in severe hum since the chassis is above ground potential. A condenser may be added to those sets which do not have one built in.

THE VOLTAGE DOUBLER

The VOLTAGE DOUBLER circuit is shown in simplified schematic form in Fig. 51. It operates ONLY on AC(of any frequency).

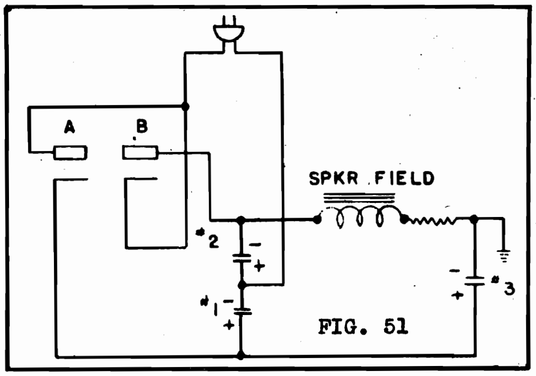


FIG. 51

At some instant plate "A" of the 25Z5 is positive. Current will flow from it to its cathode, through condenser #1, back to the negative side of the line. Condenser #1 is charged, then, to approximately the line voltage, with its polarity as indicated. A half cycle later the other side of the line becomes positive. Current flows through condenser #2, charging it, with polarity as shown, to plate "B", to its cathode and back to the negative side of the line. The result is that condensers #1 and #2 are charged with their potentials in series so that the total voltage across them is approximately double the applied line voltage. This doubled voltage is filtered by the loudspeaker field and condenser #3 and then fed to the plates and screens of the tubes.

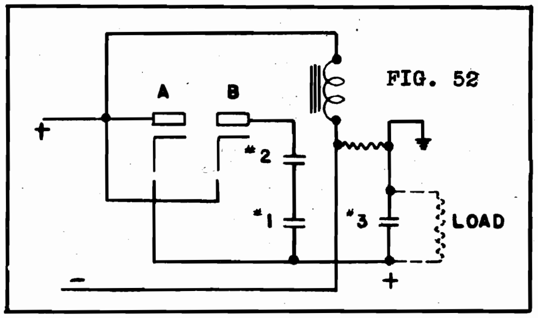
OPERATION ON D. C.

The circuit existing when the AC-DC switch is in the "DC" position is shown in Fig. 52.

Current flows from plate "A", which must be connected to the POSITIVE side of the line, to its cathode, through the load resistance of the receiver (the plate and screen circuits), back to the negative side of the line. Condenser #3, in parallel with the load, provides a large capacity reservoir which filters out hum from the power supply. Plate "B" and condensers #1 and #2 are not used on D.C. and no voltage doubling occurs.

The polarity of the power cord plug is of no importance on a.c., but must be correct if the receiver is operated from d.c.

FIG. 52



MODEL 136
Voltage
Parts List

COLONIAL RADIO CORP.

VOLTAGE AND CURRENT CHART

MODEL 136

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - RF	110	70	-10	.7	.2
77 - Detector	30*	75	-3.5	.2	.1
43 - Output	105	120	*	30	6
25Z5 - Rect.	Doubled voltage = 200V. Plate current = 36m.a.				

Speaker field voltage (a.c. supply) = 70 V.

* Indicates high series resistor.

Readings taken with volume control OFF.

Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, the voltage readings can be taken with a 1000 ohms per volt voltmeter, from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.

If an analyzer is used to measure heater voltages, be sure a tube with heater intact is in the analyzer socket. Otherwise, the full line voltage will be across the heater prongs, possibly damaging the analyzer voltmeter.

The heaters of the tubes are in series so that if one burns out, none will light. The others will light when the burned out tube is replaced.

REPLACEMENT PARTS LIST

R-8228 Antenna
R-8308A Board - Terminal (triple)
R-8297A Board - Terminal (double)
R-9194 Cabinet
R-8047 Clip - Grid
R-8047A Clip - Grid with 7" lead
R-9208 Coil - Antenna
R-8300 Coil - RF
R-8378 Coil - Choke, RF.
R-8296 Condenser - Variable tuning
R-9150 Condenser - Dry electrolytic
R-9156 Condenser - 5 mfd. electrolytic
R-8286 Condenser - .1 mfd. 200v.
R-7680 Condenser - .02 mfd. 300v.
R-8056 Condenser - .006 mfd. 600v
R-6759 Condenser - .001 mfd. mica
R-4592 Condenser - .00025 mfd. mica
R-9151 Control - Volume 15 M ohm
R-9152 Cord - 175 ohm, power
R-9205 Escutcheon - Station Selector
R-8663 Escutcheon - Station Selector
R-8970 Escutcheon - AC-DC
R-9183 Instruction leaflet
R-8664 Knob
R-8319 Pin - Escutcheon
R-6710 Resistor - 400M ohms, 1/3 watt carbon
R-5819 Resistor - 100M ohms, 1/2 watt carbon
R-7291 Resistor - 15M ohms, 1/2 watt carbon
R-7587 Resistor - 10M ohms, 1/3 watt carbon
R-8252 Resistor - 350 Ohms, 1 watt flexible
R-8562 Resistor - 400 ohms, 3 watt flexible
R-8395 Shield - Tube, bottom
R-8396 Shield - Tube, top
R-8523 Shield - Tube, top
R-8092 Socket - 6 prong
S-9157 Speaker
S-8674 Speaker hum bucking coil
S-8643A Speaker cone & voice coil
S-8649 Speaker field coil
S-8640 Speaker clamping ring
S-8641 Speaker clamping ring
S-8651A Speaker transformer
R-9026 Switch - AC-DC.

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MODEL 136
Schematic

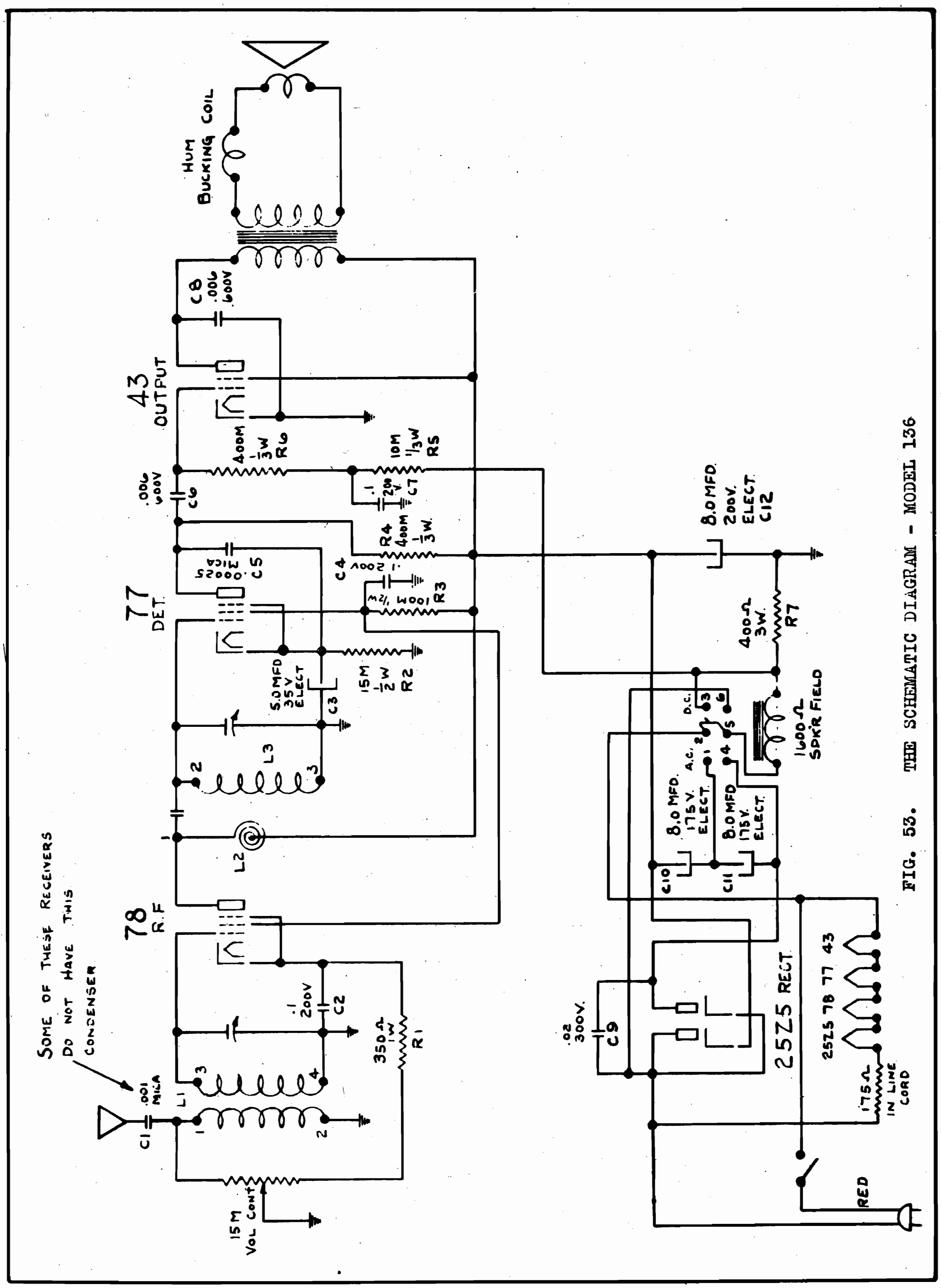

FIG. 53. THE SCHEMATIC DIAGRAM - MODEL 136

MODEL 136
Socket layout
Parts location

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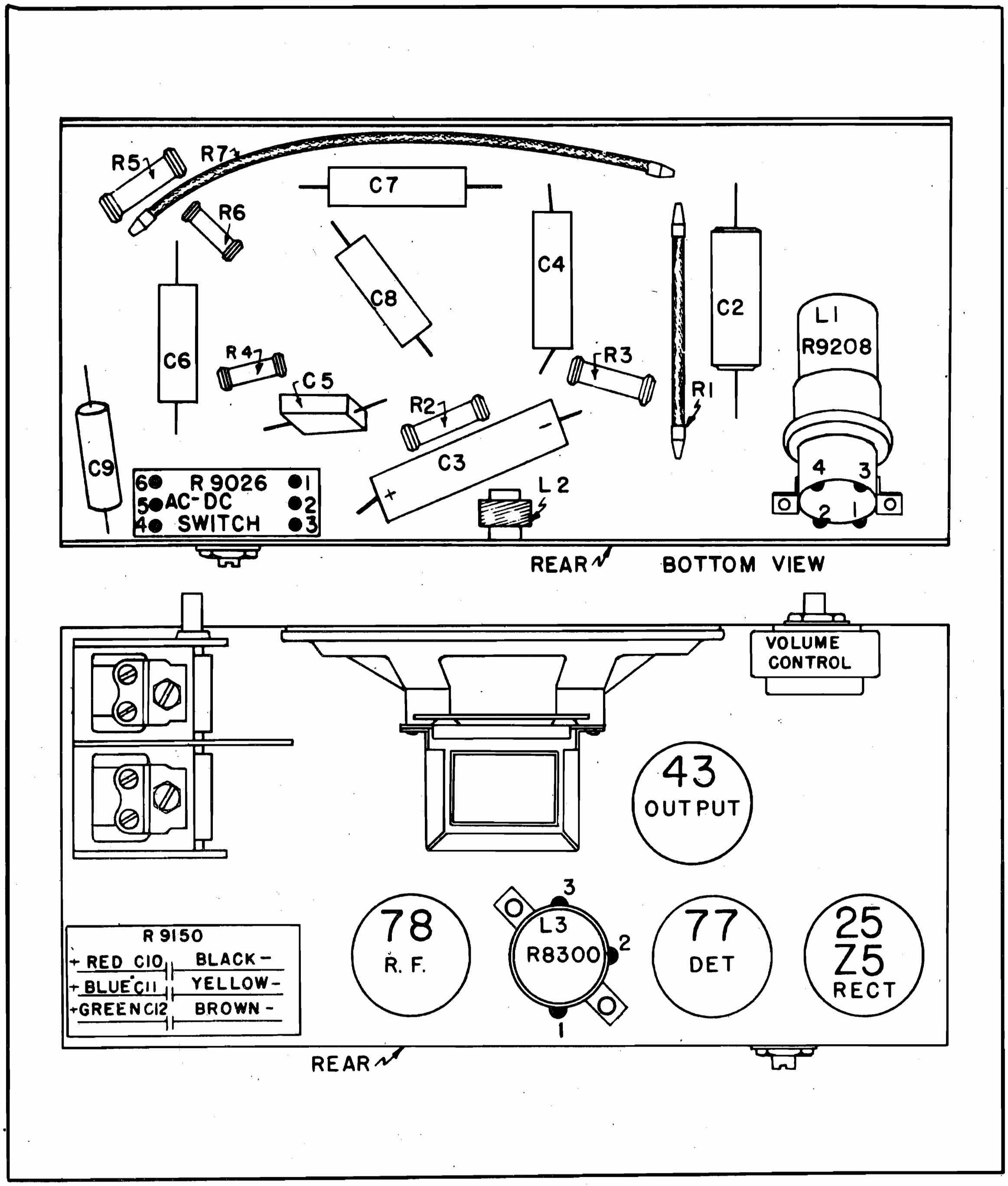


FIG. 54. SERVICE ILLUSTRATIONS - MODEL 136

COLONIAL RADIO CORP.

SERVICE NOTES

MODEL 150

The COLONIAL Model 150 is a completely self contained four tube superheterodyne automobile receiver.

A 6A7 tube combines the functions of oscillator and translator (1st detector). The 480 kc IF signal it creates in its plate circuit is coupled to the 78 IF tube and then to the 75 AVC - Detector - AF stage. A 41 output pentode feeds the dynamic speaker.

Because the 6A7 performs both as oscillator and translator and because the 75 tube fills three functions, the circuit is the equivalent of a seven tube one, were a separate tube used for each function.

A plug-in type mechanical rectifier and vibrator is used in the power supply. It is replaced as easily as a tube. Do NOT attempt to make repairs on it.

Two of the rectifier socket prongs are fitted with terminals for matching the polarity of the receiver to that of the car battery. Their proper connections are fully described in the instruction book which comes with each receiver. Briefly, the red lead is connected to the terminal nearest the side of the chassis when the receiver leaves the factory. This connection is proper ONLY if the grounded terminal of the car battery is the NEGATIVE one. If the POSITIVE terminal is the grounded one, the positions of the red and the green leads must be interchanged so that the GREEN lead is connected to the terminal nearest the side of the Chassis. Damage may be done to the electrolytic condensers if the receiver is connected for any time with incorrect polarity.

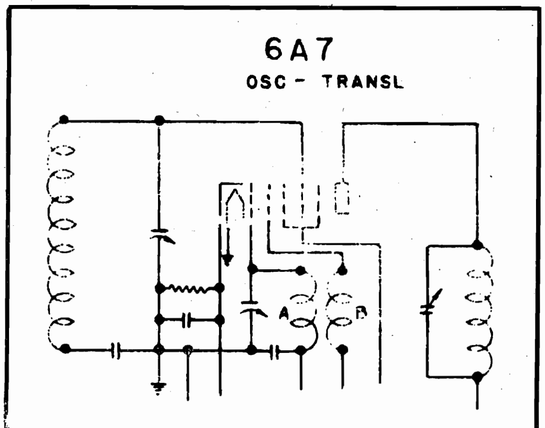


FIG. 39.

THE 6A7 OSCILLATOR - TRANSLATOR

The 6A7 Oscillator Translator circuit is shown schematically in **Fig. 39**. Grid #1 can be thought of as the control grid of an ordinary triode, and grid #2 as the plate. Coil A, tuned by the oscillator section of the ganged condenser, becomes the grid coil of the usual triode oscillator, and coil B the feedback or plate coil. Grid #4 may be considered as the control grid of an ordinary screen grid detector. Grids #3 and #5 comprise the screen. Accordingly, the functions of oscillator and of translator (or first detector) are occuring in the one tube. There remains only the task of combining the oscillator signal and the incoming broadcast signal in order to create the IF signal. Although grids #1 and #2 act as the grid and plate, respectively, of a triode, at the same time they affect the flow of electrons to the plate of the 6A7 inasmuch as they are in the path between cathode and plate. The 6A7 plate current then is controlled both by grids #4 and #3 and #5, which is the translator, and grids #1 and #2 which is the oscillator. Accordingly, the plate circuit contains the combination of the oscillator and broadcast signals, or the IF signal.

THE AVC - DETECTOR - AF CIRCUIT

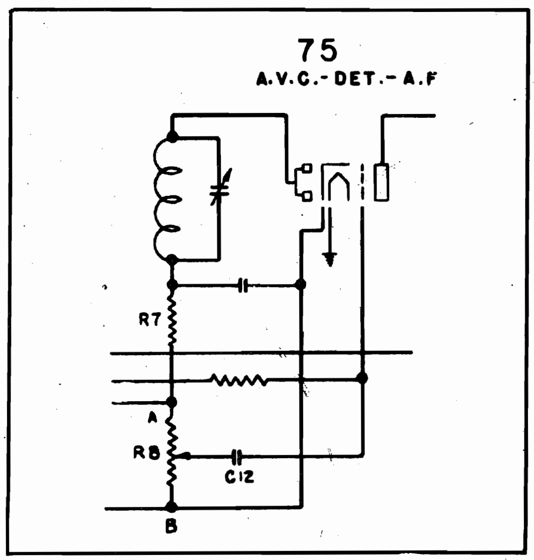


FIG. 40.

The AVC - Detector - AF circuit is shown schematically in Fig.40. The signal at the IF output transformer secondary is impressed across the diode part of the 75 tube in series with R7 and R8,

MODEL 150
Notes, Voltage
MODEL 106-B
Voltage

COLONIAL RADIO CORP.

the volume control. Since the current flows from plate to cathode, point (A) is negative with respect to point (B). Because the cathodes of the 6A7 and 78 tubes are connected to point (B) and their grid returns to point (A), the negative bias, created by the signal, across R8 is impressed on the control grids of these tubes. Any increase in signal strength increases the drop across R8, increases the negative grid bias on the 6A7 and 78, and so decreases their amplification. Increases in signal strength are offset by decreased amplification so that the input to the 75 tube tends to remain at a constant value.

The AF component of the voltage across R8 is picked off by the moving arm of the volume control and fed through C12 to the control grid of the triode portion of the 75 tube where it is amplified and passed on to the 41 output tube.

The power transformer is SOLDERED into the case which contains it and the Elkonode socket and associated apparatus. It is necessary to do this to secure the perfect electrical grounding needed for complete elimination of noise from the power supply. Should the power transformer need replacement, the entire case assembly should be ordered. (Part #R-9036 C). It is removed by taking out the four screws marked (A) in Fig.41 and unsoldering the necessary leads.

TUBE VOLTAGE AND CURRENT CHART - MODEL 150

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
78 - IF	200	120	*	2	.8
75 - AVC-Det-AF	145		*	.3	
41 - Output	175	190	-2.5*	13	1.5
6A7- Osc-Transl	Ep=200v; Eg #1=-6.5v; Eg #2=205v; Eg #3&5=115v; Eg #4=*; Ip=4ma; Ig #2=2.5ma; Ig #3&5=1.8ma				

* - Indicates high series resistor.
Readings taken with antenna disconnected and no signal received. Care should be used if readings are taken with an analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate will stop oscillation. If an analyzer is not used, voltage readings may be taken from the cathode to the respective element of each tube.

TUBE VOLTAGE AND CURRENT CHART - MODEL 106B

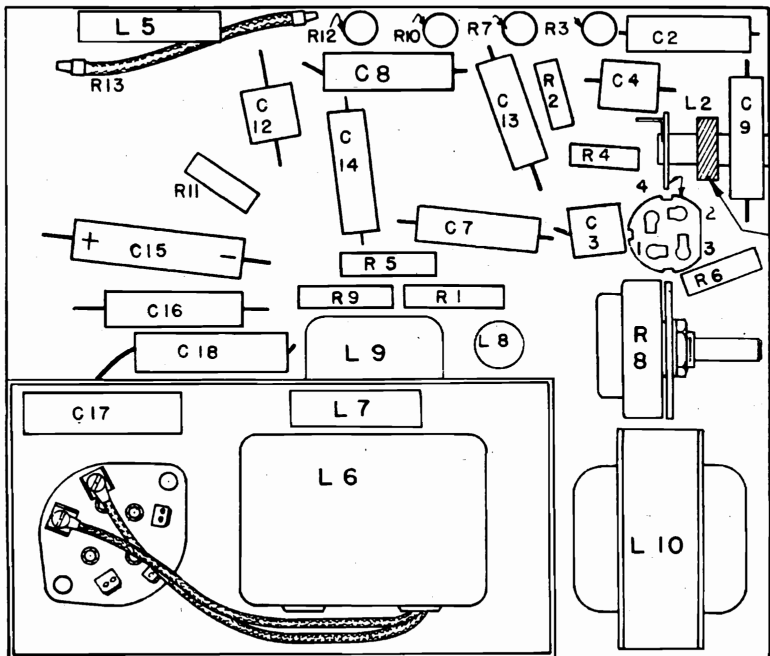
TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
'36 - RF	160	65	*	2.5	.6
'36 - Osc-Transl	150	65	-3.75	.4 to 2(a)	0 to .5(a)
'39 - IF	160	65	*	1.3	.6
41 - Output	160	160	-15	8	1.25
85 - AVC-Det-AF	155		-7.5 volume control off		

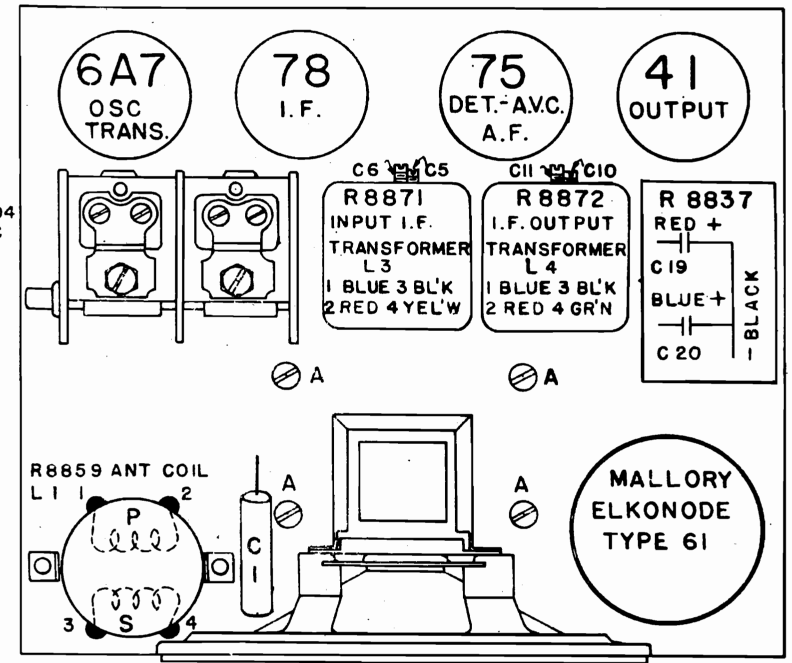
* - High series resistance.
(a) - Dependent upon station selector setting.
Total current drawn by receiver, power supply and speaker - 5.4 amps. Total plate current - 40m.a. (180 volts) with 6.3 volt input.

COLONIAL RADIO CORP.

MODEL 150
Parts location
Socket layout
Parts List

R-9047	Resistor - 750 ohm pigtail	R-6635	Resistor - 25M ohm, 1/3 watt carbon
R-7228	Resistor - 500M ohm,1/3 watt carbon	R-6640	Resistor - 20M ohm, 1/3 watt carbon
R-7586	Resistor - 100M ohm,1/3 watt carbon	R-6636	Resistor - 1M ohm, 1/3 watt carbon
R-6637	Resistor - 50M ohm, 1/3 watt carbon	R-8922	Resistor -100 ohm, 1/3 watt carbon





R-8831	Condenser - Variable tuning	R-9145	Condenser -.05 Mfd. 600 volt
R-8837	Condenser - Dry electrolytic	R-8921	Condenser -.01 Mfd. 200 volt
R-9144	Condenser - 10 Mfd. electrolytic	R-8930	Condenser -.006 Mfd. 800 volt
R-9032	Condenser - .5 Mfd. 160 volt	R-7244	Condenser -.006 Mfd. 600 volt
R-9227	Condenser - .2 Mfd. 200 volt	R-6759	Condenser -.001 Mfd. Mica
R-8931	Condenser - .1 Mfd. 400 volt	R-6760	Condenser - .0005 Mfd. mica
R-8286	Condenser - .1 Mfd. 200 volt	R-4592	Condenser - .00025 Mfd. Mica
R-8920	Condenser -.05 Mfd. 200 volt	R-8030	Condenser - 1 Mfd. noise suppressor

FIG. 41. SERVICE ILLUSTRATIONS - MODEL 150

MODEL 150
Schematic

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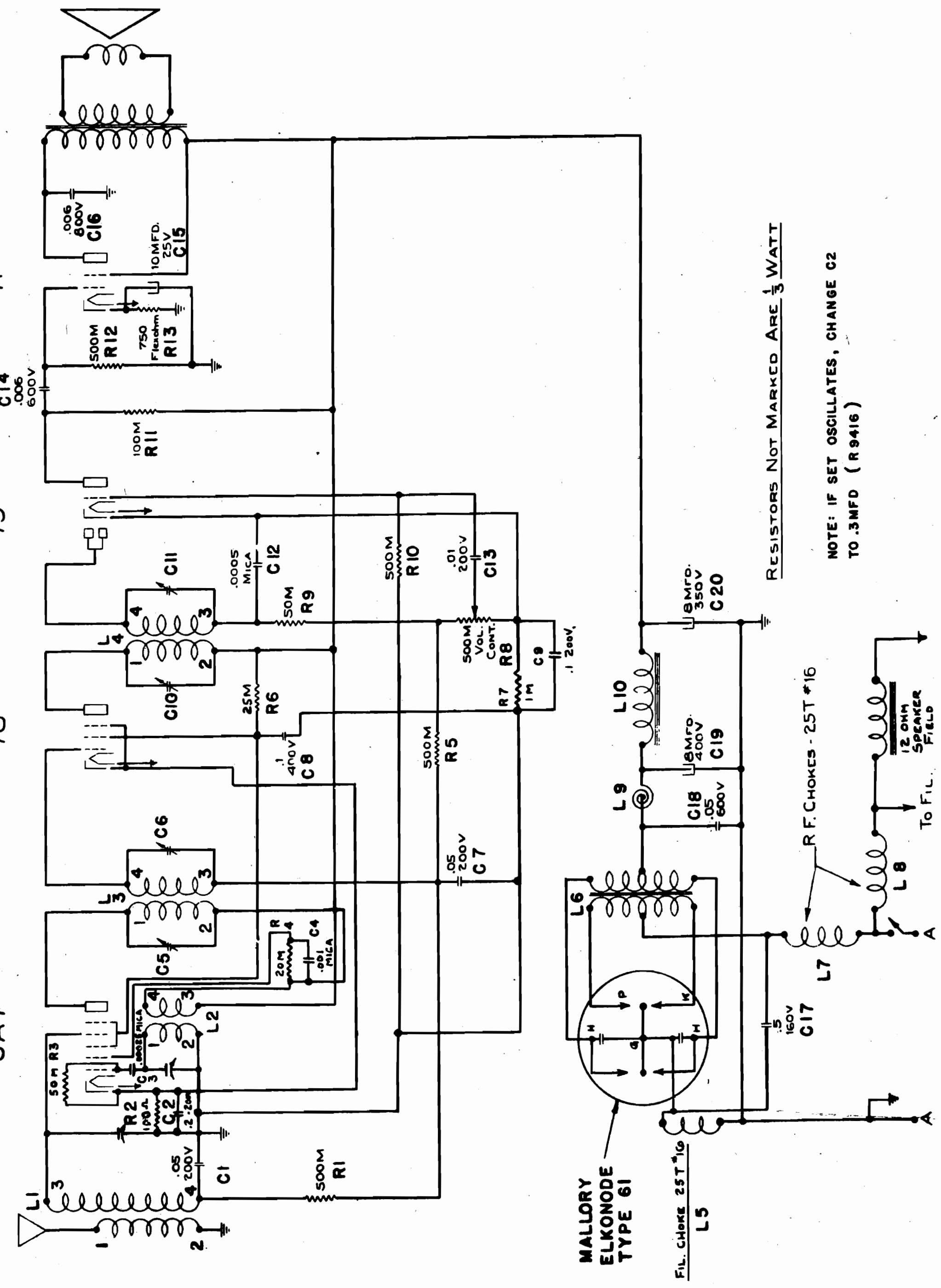


FIG. 42. SCHEMATIC DIAGRAM - MODEL 150

COLONIAL RADIO CORP.

SERVICE NOTES

MODELS 250-279-300

Also 301 and 500

INTRODUCTION

The COLONIAL Models 250, 279 and 300 receivers are five tube superheterodyne compacts embodying the most advanced of design features. They can be operated from direct current or from alternating current of any frequency. The rectifier tube, the newly developed 25Z5, is so connected that it doubles the voltage supplied by the A.C. line. Because the 6A7 tube is used as a combination oscillator-translator and because the 6B7 provides I F amplification as well as AVC action, the circuit is the equivalent of a seven tube one, were a separate tube used for each function.

Highly efficient litz wound coils insure the keenest selectivity and great sensitivity. A geared reduction drive, with springs and split gears to prevent backlash and a dial calibrated in kilocycles make for easy tuning. Except in back, the chassis is entirely steel enclosed. This, together with the fact that the series heater resistor is an integral part of the line cord (insted of being contained in the chassis), prevents overheating and destruction of the cabinet. The speaker is an efficient moving coil dynamic.

THE I.F. - A.V.C. CIRCUIT

The I.F.-A.V.C. circuit is shown in Fig. 17. A portion of the I.F. signal voltage is applied from the pentode plate of the 6B7 through the 15 mmfd. condenser to the diode plates of the 6B7. The diode current resulting flows through the 100M and 400M ohm resistors, creating a voltage drop across them. Since the diode current flows from plate to cathode, the direction of the current through the resistors is from point "A" to point "B", or, point "A" is positive with respect to point "B". Since the cathode of the 6A7 is connected to point "A" and the grid return is connected to point "B", the translator grid of the 6A7 is biased negatively by the amount of the voltage drop across the 100M and 400M ohm resistors. The amount of this drop is propoptional to the strength of the I.F. signal. A portion of this drop (that across the 400M ohm resistor) is also applied to the grid of the 6B7. A strong signal increases the drop, the negative grid bias on these tubes, and so reduces their amplification. The amplification, then, varies inversely as the strength of the incoming signal so that the signal voltage at the I.F. output tends to remain constant. The residual bias for the 6A7 is furnished by the 50 ohm resistor in its cathode circuit. The 700 ohm resistor supplies residual bias for the 6B7.

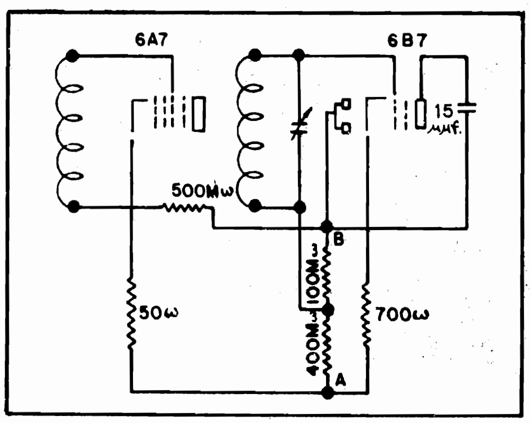


FIG. 17

The A.V.C. action can be rendered inoperative, when peaking the I.F. transformers, by unsoldering one side of the 15 mmfd. coupling condenser. It is mounted across the 6B7 socket. (C7 in illustrations).

The four tuning condenser adjustments for the I.F. transformers are accessible from the front of the chassis and are illustrated in Fig. 18. The I.F. frequency is 175 kc.

GENERAL NOTES

The loudspeaker can be removed for replacement by taking off the 6B7 tube shield and removing the three speaker mounting screws. Be certain that the speaker leads color code, indicated in the schematic, is followed. Improper connection will cause excessive hum due to the hum bucking coil's increasing hum instead of cancelling it out.

Increased pickup can be had by clipping the antenna lead to some metal object having a large surface. However, clipping it to grounded objects, (such as water or steam piping systems) may result in increased noise and hum.

Receivers which are rubber stamped "128 A" on the chassis just above condenser C11 are wired as shown in Schematic "A". Those stamped "128 B" are wired as in Schematic "B".

MODEL 250,279,300,
301,500
Voltage, Tube data

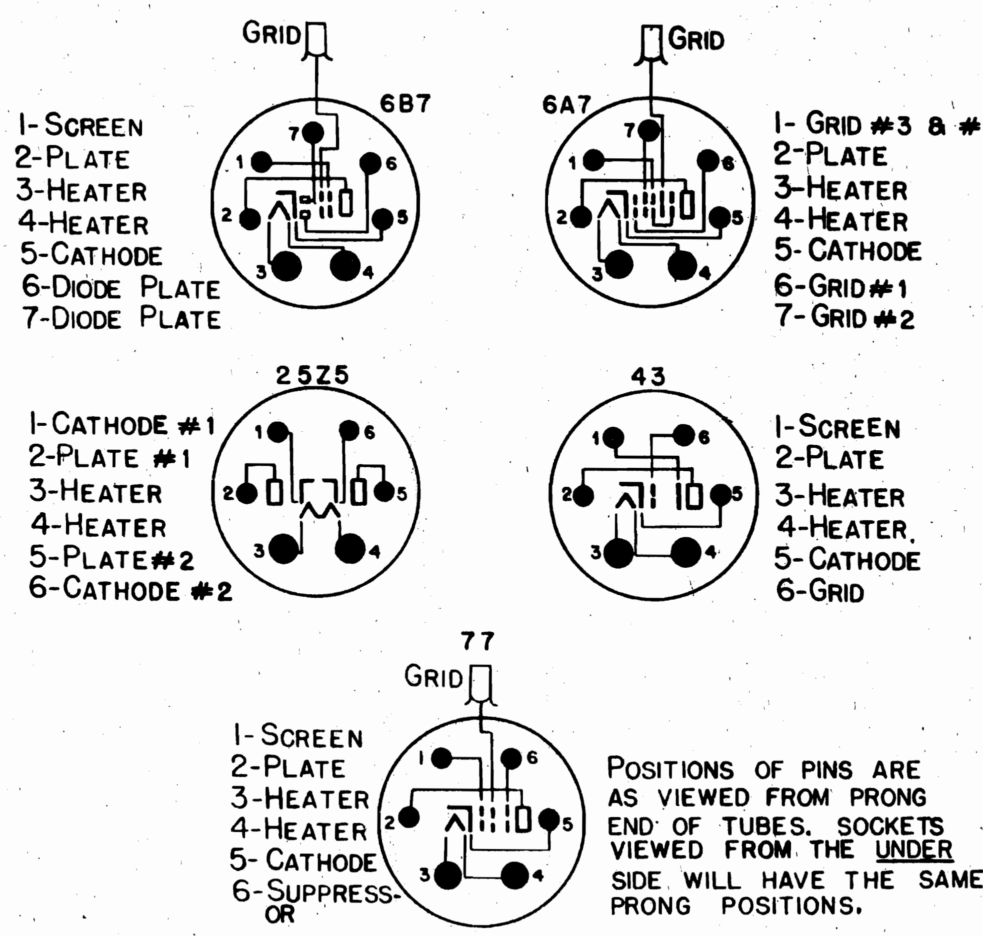
COLONIAL RADIO CORP.

TUBE VOLTAGE AND CURRENT CHART

MODELS 250 - 279 - 300

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
6B7 - IF-AVC	110	55	-7*	.4	.2
77 - Detector	50	22	-1.5	.1	.04
43 - Output	100	120	-10*	26	5
6A7 - Osc-Transl	Ep=105v; Eg#1=-5v; Eg#2=105v; Eg#3&5=55v; Eg#4=*; Ip=2ma Ig#2=1.3ma; Ig#3&5=1.2ma				
25Z5- Rectifier	Plate Current = 40m.a. per plate				

Speaker Field Voltage = 70v.
* - Indicates high series resistor.
Tube heaters are in series so that if one burns out, none will light. These measurements were made with a 500 volt, 1000 ohms per volt meter. Power supply 118 volts A.C. Measurements made with set detuned, and speaker field hot. Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation.



POSITIONS OF PINS ARE AS VIEWED FROM PRONG END OF TUBES. SOCKETS VIEWED FROM THE UNDER SIDE WILL HAVE THE SAME PRONG POSITIONS.

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MODEL 250,279,300,
301,500
Parts location

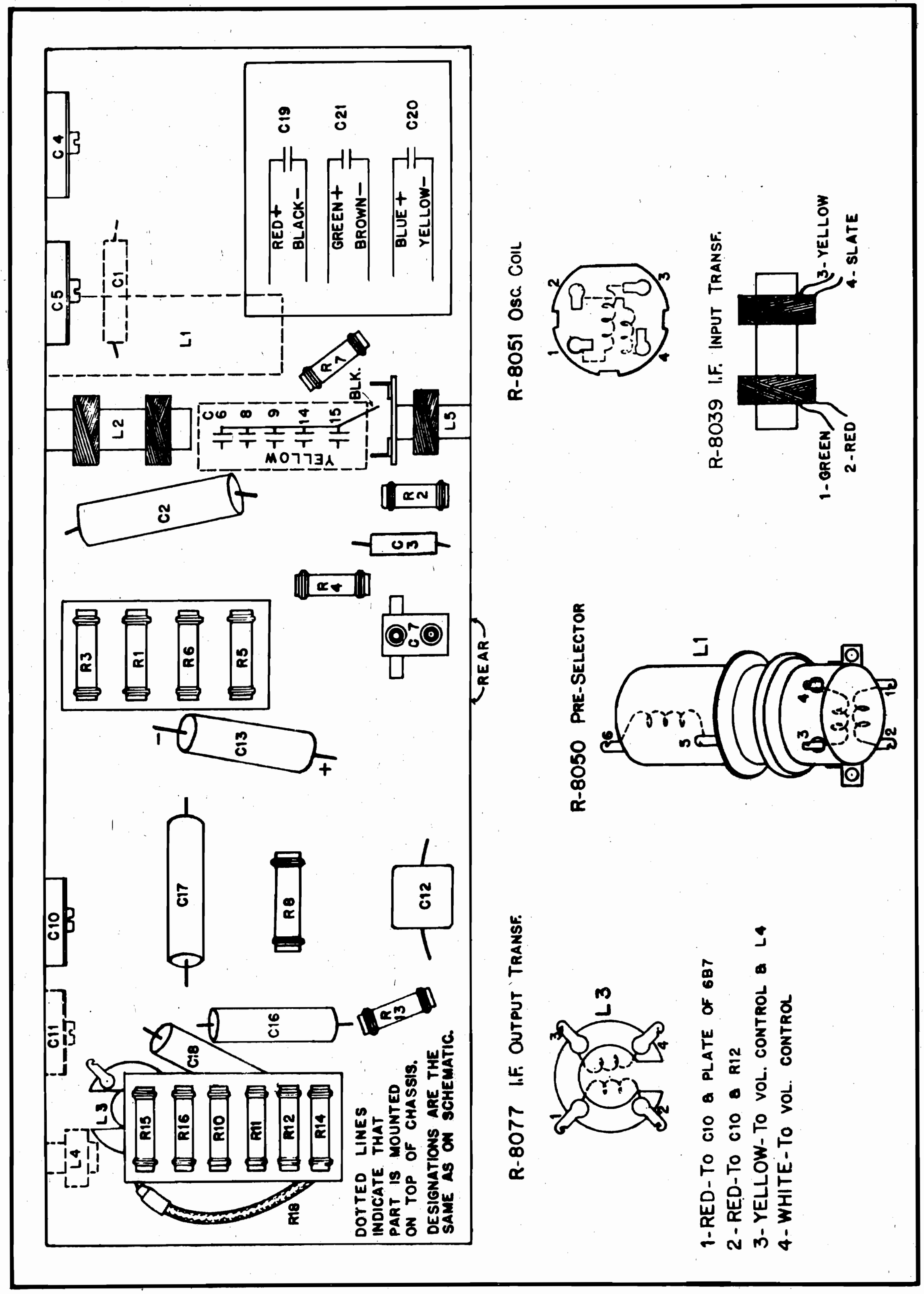

FIG. 18. ILLUSTRATION FOR LOCATION OF PARTS AND COIL CONTINUITY CHECKING.

MODEL 250,279,300,
301,500
Schematic "A"

COLONIAL RADIO CORP.

THE CHASSIS OF MODELS 301 AND 500 IS THE SAME AS THAT OF MODELS 250-300,

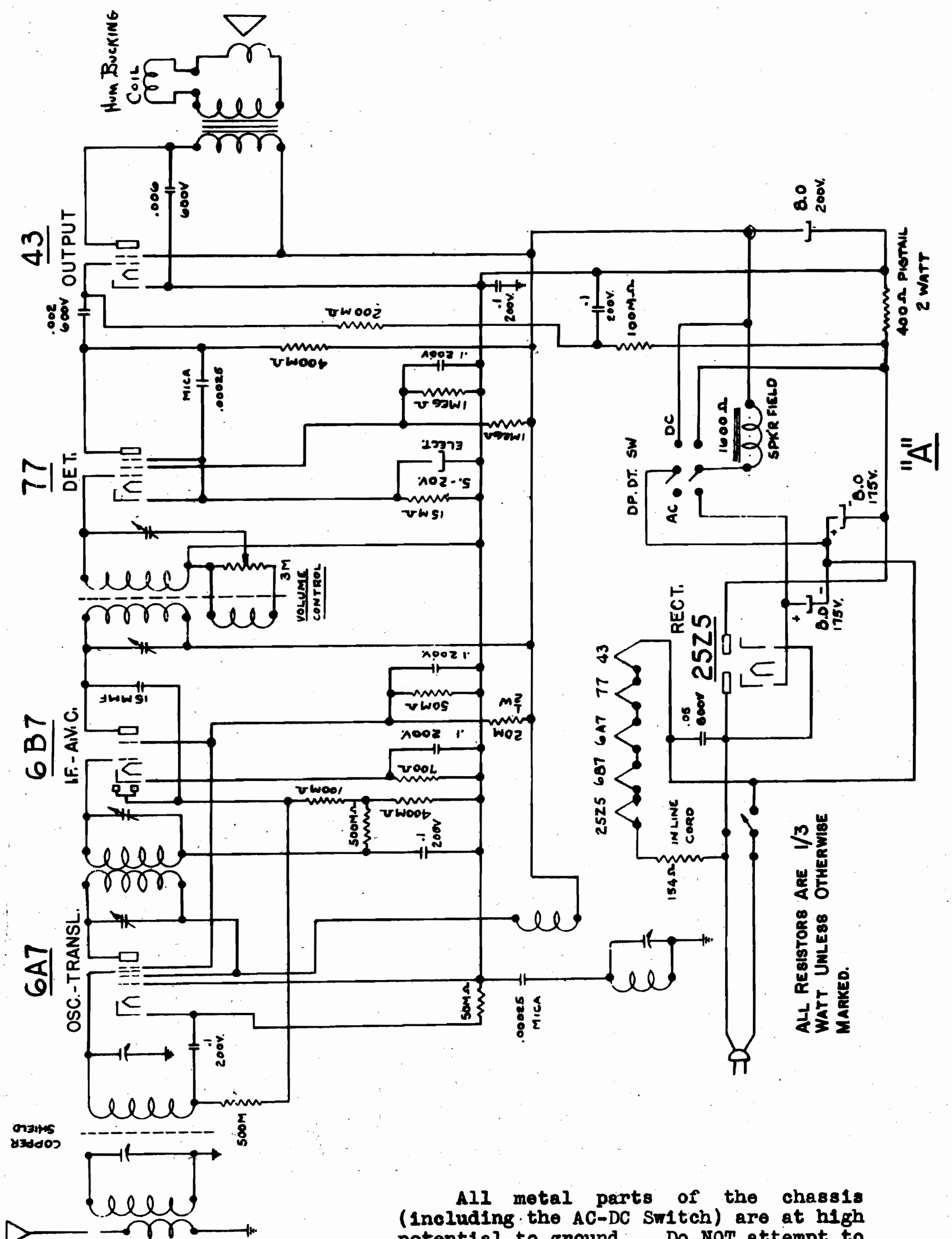

FIG. 19. 128 "A" SCHEMATIC.

All metal parts of the chassis (including the AC-DC Switch) are at high potential to ground. Do NOT attempt to attach a ground connection to the chassis. Do NOT touch the chassis while the line cord is plugged into an outlet.

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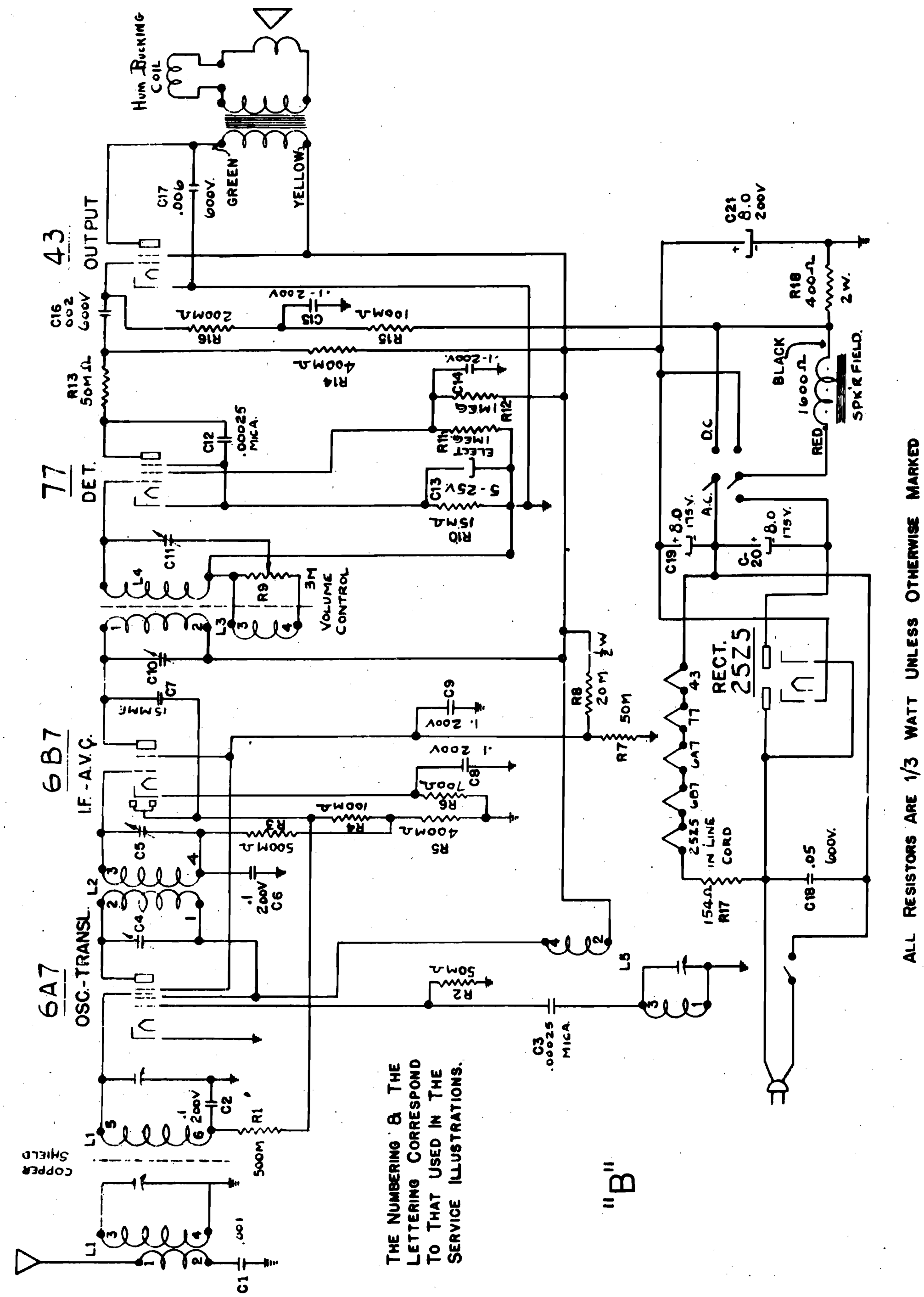
MODEL 250,279,300, 301,500
Schematic "B"



THE NUMBERING & THE LETTERING CORRESPOND TO THAT USED IN THE SERVICE ILLUSTRATIONS.

"B"

ALL RESISTORS ARE 1/3 WATT UNLESS OTHERWISE MARKED

FIG. 20. 128 "B" SCHEMATIC.

MODEL 250,279,300,
301,500
Parts List

COLONIAL RADIO CORP.

REPLACEMENT PARTS

MODELS 250 - 279 - 300

Also 301 and 500

PART NO.	DESCRIPTION
R-8044A	Board-Resistor, 8 terminal
R-8043A	Board-Resistor,10 terminal
R-5509A	Board-Terminal
R-8096	Cabinet-Model 250
R-8035	Cabinet-Model 279
R-8036	Cabinet-Model 300
R-7621	Card-Guarantee
R-8048	Clip-Antenna
R-8047	Clip-Screen Grid
R-8047C	Clip-Screen Grid & 8" lead
R-8051	Coil-Oscillator
R-8095	Coil- Choke, detector input
R-8050	Coil-Pre-selector
R-8053	Condenser-Electrolytic, dry, triple
R-8038	Condenser-I.F. tuning
R-8052	Condenser-Variable tuning
R-8042	Condenser-15 mmfd. AVC
R-4592	Condenser-.00025 mfd. mica
R-6759	Condenser-.001 mfd. mica
R-8055	Condenser-.002 mfd. 600v.
R-8056	Condenser-.006 mfd. 600v.
R-8057	Condenser-.05 mfd. 600v.
R-6444	Condenser-.1 mfd. 200v.
R-8054	Condenser-.1 mfd. 200v. (5 in block)
R-8058	Condenser 5mfd. electrolytic
R-8059	Control-Volume, 3M ohms
R-8060	Cord-Extension, brown
R-8090	Cord-Extension, black
R-8080	Decalcomania-Name plate Models 250 & 279
R-8084	Decalcomania-Name plate Model 300
R-8082	Escutcheon-Station Selector Models 250 & 279
R-8086	Escutcheon-Station Selector Model 300
R-8081	Escutcheon-Volume control Models 250 & 279
R-8085	Escutcheon- Volume control Model 300
R-8202	Feet-Cabinet, Model 300
R-8079	Instruction leaflet
R-8083	Knob-Models 250 & 279
R-8087	Knob-Model 300
R-954	Nut-4/36 100 for
R-951	Nut-6/32 100 for
R-8037	Resistor-700 ohm 1/3 watt carbon
R-6708	Resistor-15M ohm 1/3 watt carbon
R-5821	Resistor-20M ohm 1/2 watt carbon
R-6637	Resistor-50M ohm 1/3 watt carbon
R-7586	Resistor-100M ohm 1/3 watt carbon
R-6638	Resistor-200M ohm 1/3 watt carbon
R-6710	Resistor-400M ohm 1/3 watt carbon
R-7228	Resistor-500M ohm 1/3 watt carbon
R-7585	Resistor-1 megohm 1/3 watt carbon
R-8066	Resistor 400 ohm pigtail
R-661	Screw-4/36x1/4" R.H.
R-7350	Screw-4/36x5/16"R.H.
R-8463	Screw-4/36x5/16
RS-177	Screw-4/36x3/8" R.H.
R-8068	Screw-#4x1/2" wood
R-1738	Screw-6/32x1/4" R.H.
R-1737	Screw-6/32x1/4" F.H.
R-2159	Screw-6/32x3/8" F.H.
R-655	Screw-6/32x3/8" R.H.
R-662	Screw-6/32x1/2" F.H.
R-650	Screw-6/32x5/8" R.H.
R-8067	Screw-6/32x1-1/8"F.H.
R-6910	Screw-6/32x1-1/2"R.H.
R-8069	Screw-#6x1/2" wood
R-4334	Screw-10/32x1/4"R.H.
R-4866	Screw-10/32x1/2"R.H.
R-5409	Screw-10/32x3/4"R.H.
R-8040	Shield-Tube
R-8092	Socket-6 prong
R-8072	Socket-7 prong
R-2414	Spacer-I.F. tuning condenser
R-4374	Spacer-Resistor board
S-8093	Speaker-1600 ohm
R-8074	Sticker-License and tube, Model 250
R-8075	Sticker-License and tube, Model 279
R-8089	Sticker-License and tube, Model 300
R-8076	Switch-"AC-DC"
R-7627	Tag-"DISTRIBUTED BY GRAYBAR" 10 for
R-8039	Transformer-I.F. input
R-8077	Transformer-I.F. output
R-4794	Washer-Insulating, volume control
R-4330	Washer-Lock, #4
R-4327	Washer-Lock, #6
R-4328	Washer-Lock, #8
R-4329	Washer-Lock, #10
R-7471	Washer-Shakeproof, top mounting plate
R-6614	Washer-Shakeproof, volume control

COLONIAL RADIO CORP.

MODEL 250 AC, 279 AC, 300 AC, 301 AC, 250-300 AC
Notes

SERVICE NOTES

MODELS 250AC-279AC-300AC & 250-300

Two models of the Colonial 250-279-300 AC-DC receivers have been put out, as have two models of the corresponding AC receivers. One model covers only the broadcast band. The range of the other has been extended to 2500 kc to include Police Broadcasts. They can be told apart by their frequency range as well as by their tube complement.

The broadcast range Model 250-279-300 AC-DC was described on pages 41 to 47 of the Service Manual. The companion model for AC operation is shown schematically in Fig. 22, and its Location of Parts diagram in Fig. 23.

Except that it uses a power transformer instead of a voltage doubler circuit with series tube heaters, the circuit is similar to that of the AC-DC model. It uses the same IF-AVC circuit shown on page 42 for the AC-DC model.

To render the AVC action ineffective, when peaking the IF stage, adjust the test oscillator to as low an output as possible -- just enough to get an audible signal or readable deflection on the output meter. The volume control of the receiver should be on full. If the oscillator is not equipped with an attenuator, its output lead should be connected in series with a very small capacity in order to reduce its output. Twisting two pieces of wire, insulated from each other, for a few inches will serve.

THE EXTENDED RANGE MODELS

The extended range Model 250-300 AC-DC is shown schematically in Fig. 24; its location of parts diagram in Fig. 25. Its companion AC model is shown in Figs. 26 and 27.

The voltage doubler circuit is the same as that shown on page 41.

The 6A7 tube acts both as oscillator and translator, producing a 175 kc signal which is fed to the 78 IF stage.

The type 75 tube acts as a diode detector, AVC, and 1st audio tube. It is shown schematically in Fig. 28.

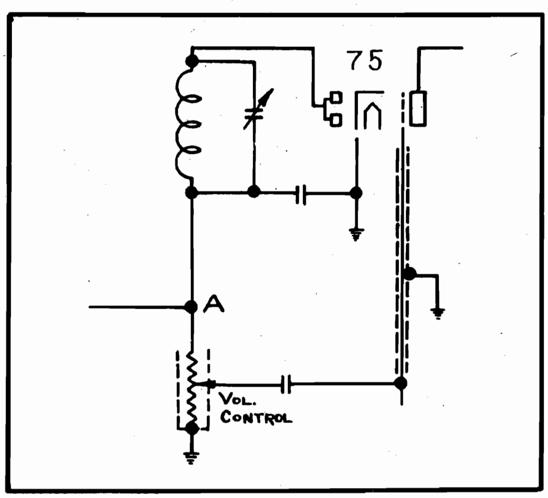


FIG. 28

The 175 kc signal voltage at the IF output transformer secondary is impressed across the diode plates and the cathode of the 75 tube, in series with the 500M ohm volume control. Current flows from the diode plates to the cathode creating a voltage drop across the volume control, with point (A) negative with respect to ground. Since point (A) is connected to the control grids of the 78 IF and 6A7 osc-translator tubes, the negative bias across the volume control is impressed on these tubes. Any increase in signal increases the negative drop across the volume control, increases the negative control grid bias on the 6A7 and 78, reduces their amplification and so tends to maintain the signal at the IF output at a constant value.

Any desired portion of the AF component across the volume control resistance is picked off by the moving arm of the volume control, fed through the .006 condenser to the grid of the triode portion of the 75 tube. It is then amplified and fed to the output tube and then to the speaker.

Use a low output from the test oscillator when peaking the IF, as mentioned previously.

On some of the AC-DC models, it may be found that the receiver will not tune to 1280 kc (its limit). This can be corrected by moving the lead, which goes from the end section of the tuning condenser to lug #3 of coil L4, away from the chassis. The lead can be kept from the chassis by means of a rubber band holding it against the electrolytic condenser block, as shown in Fig. 25.

MODEL 250 AC,279 AC,
300 AC,301 AC,
250-300 AC
Voltage

COLONIAL RADIO CORP.

TUBE VOLTAGE AND CURRENT CHARTS

MODELS 250AC - 279AC - 300AC

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
6B7 - IF	165	80	*	.9	.23
77 - Det	50	45	*	.15	.05
41 - Output	150	165	*	16	2.3
6A7 - Osc-Transl	Ep=165; Eg #1=-4v; Eg #2=165v; Eg #3&5=76v; Eg #4=*; Ip=3.75ma; Ig #2=2.2ma; Eg #3&5=3.5ma.				
84 - Rect	Plate Current = 17m.a. per plate				

MODELS 250 and 300 (Extended Range)

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
78 - IF	105	40	*	2.5	1
75 - AVC-Det-AF	55		*	.2	
43 - Output	90	105	-6*	19	3
6A7 - Osc-Transl	Ep=105v; Eg #2=105v; Eg #3&5=32v; Eg #4=*; Ip=.8ma; Ig #2=1.1ma; Ig #3&5=1ma.				
25Z5- Rect	Plate current - 38m.a. per plate				

MODELS 250AC and 300AC (Extended Range)

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
78 - IF	185	65	*	4	1
75 - AVC-Det-AF	105		*	.75	
41 - Output	175	185	-10*	17	2.5
6A7 - Osc-Transl	Ep=185v; Eg #2=185v; Eg #3&5=60v; Eg #4=*; Ip=2.5ma; Ig #2=2.75ma; Ig #3&5=1.75ma.				
84 - Rect	Plate current = 15m.a. per plate; DC voltage = 275.				

* - Indicates high series resistance.
Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, the voltage readings can be taken with a 1000 ohms per volt voltmeter, from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.

COLONIAL RADIO CORP.

MODEL 250 AC, 279 AC, 300 AC, 301 AC
Schematic

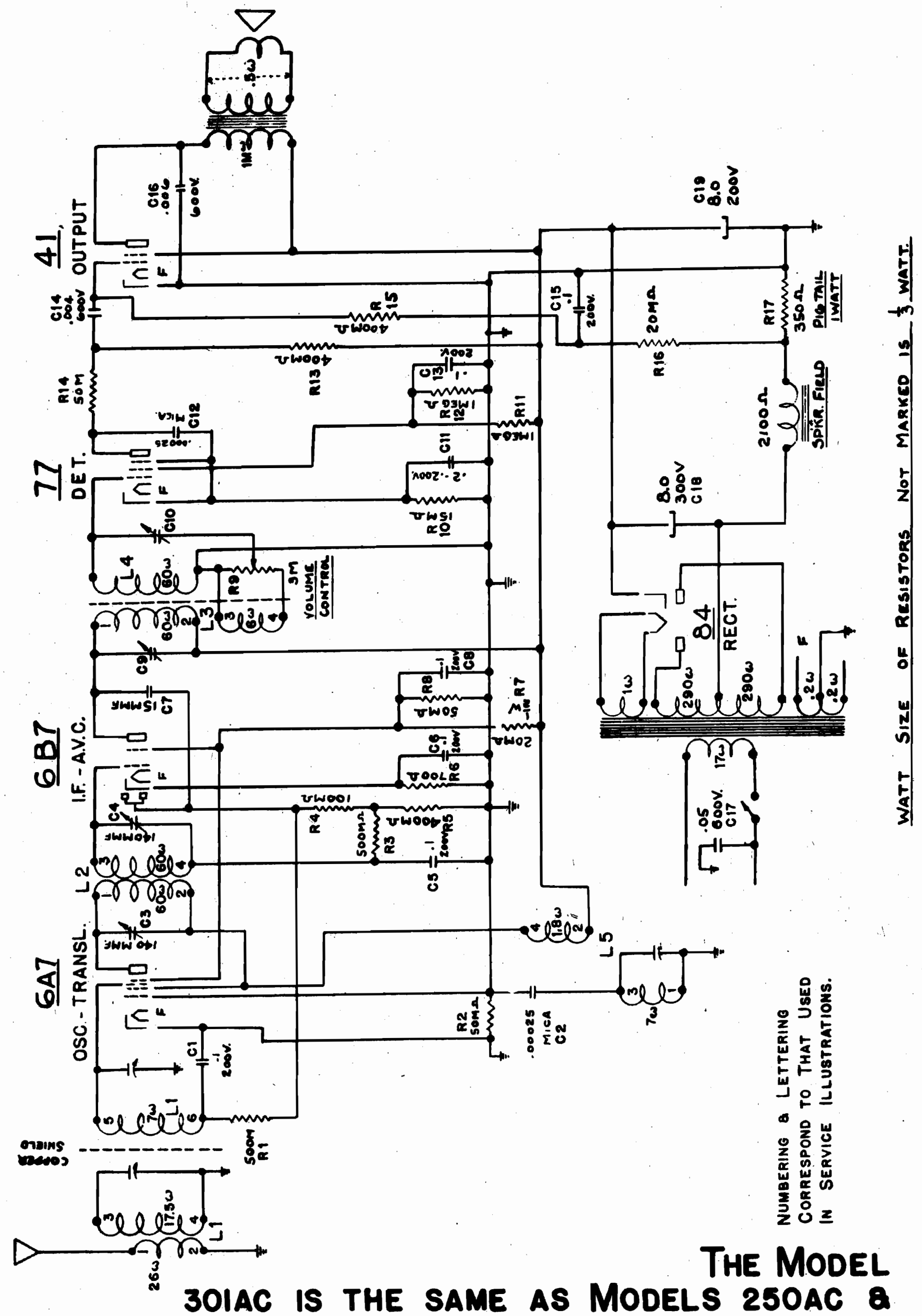


FIG. 22. SCHEMATIC - MODELS 250AC, 279AC and 300AC

THE MODEL 301AC IS THE SAME AS MODELS 250AC & 300AC.

MODEL 250 AC, 279 AC,
300 AC, 301 AC,
Parts location

COLONIAL RADIO CORP.

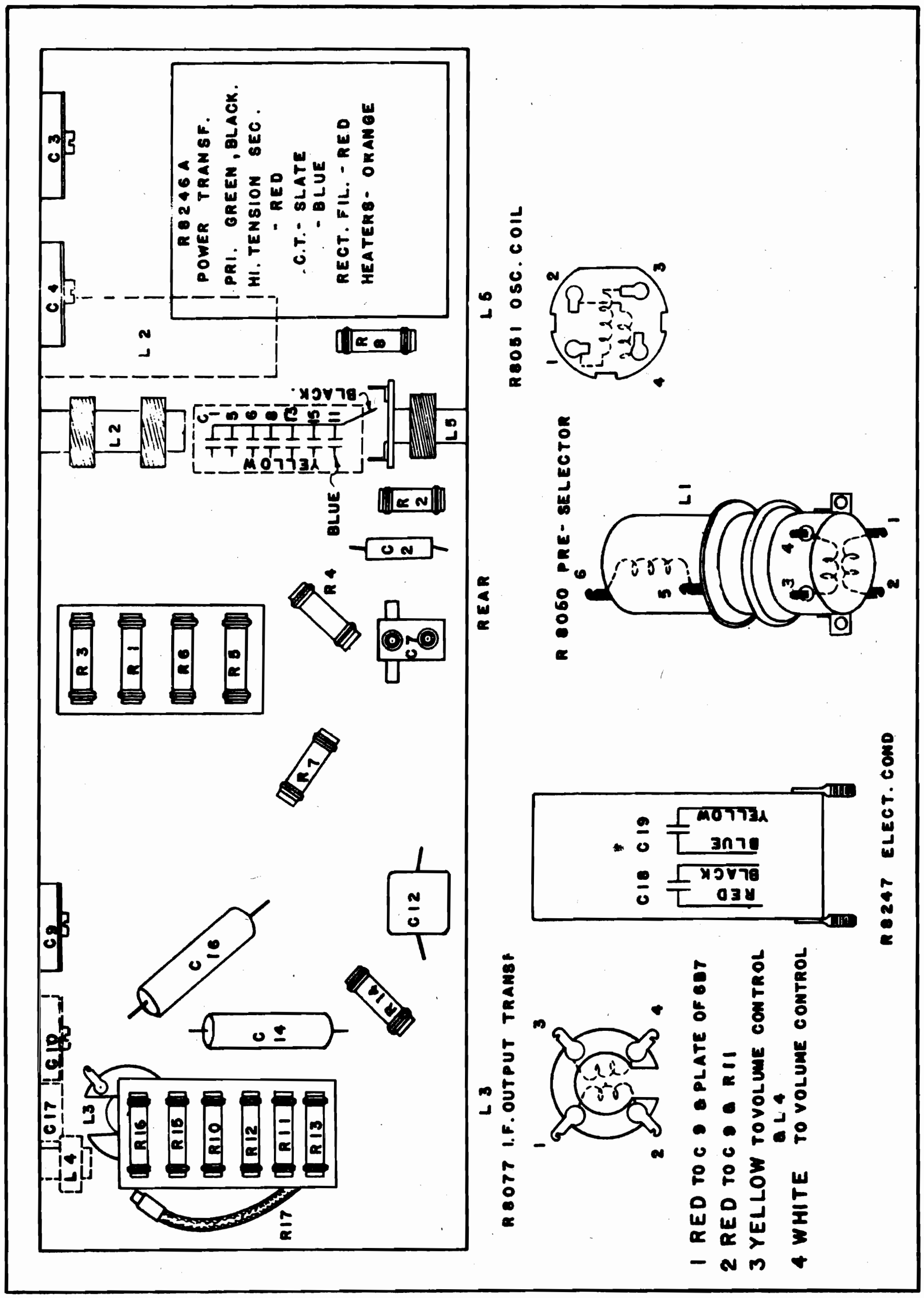


FIG. 23. SERVICE ILLUSTRATIONS - MODELS 250AC, 279AC and 300AC

COLONIAL RADIO CORP.

MODEL 250-300 AC-DC
Schematic

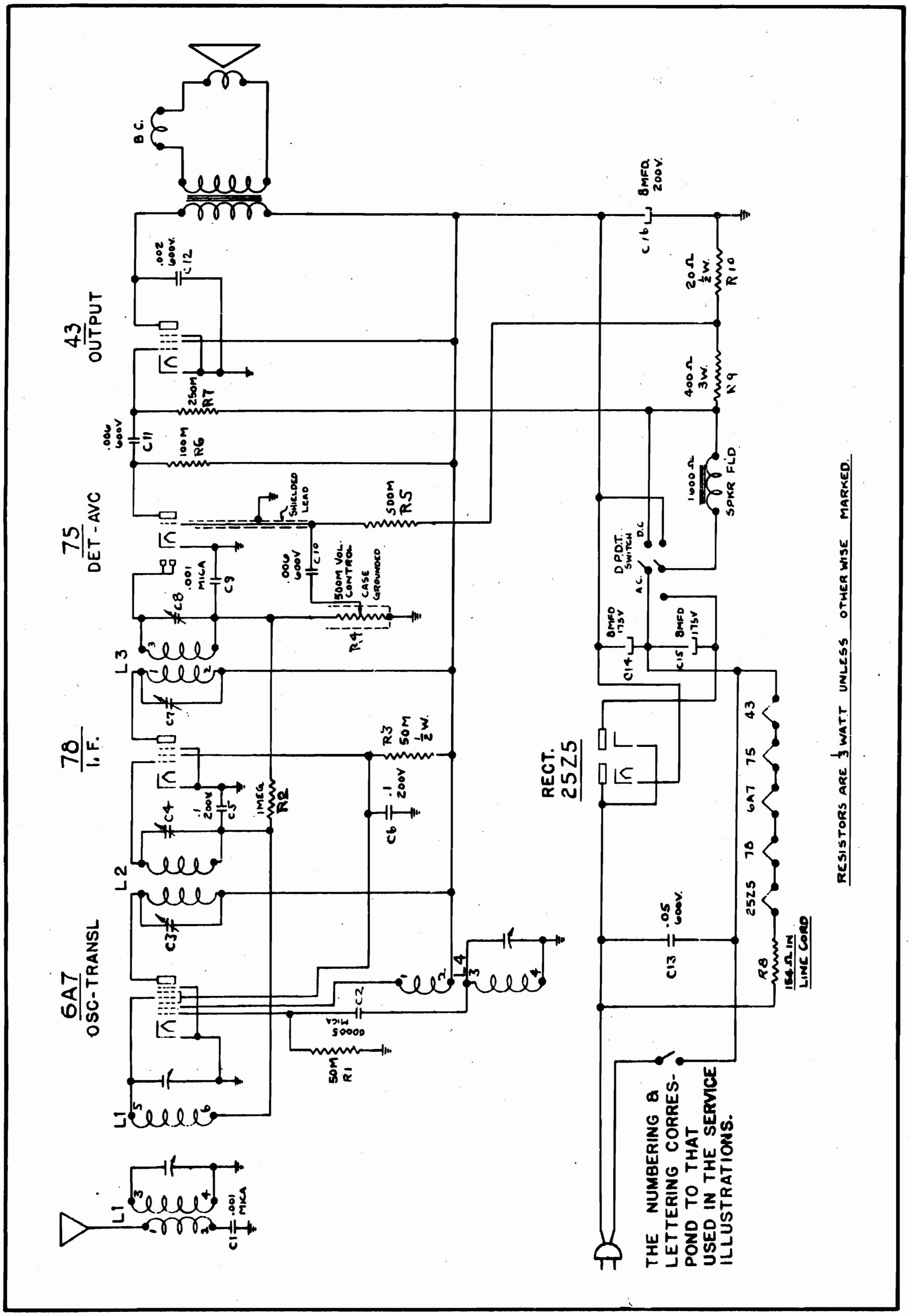


FIG. 24. SCHEMATIC - MODELS 250 - 300 (Extended Range AC-DC)

MODEL 250-300 AC-DC
Parts location

COLONIAL RADIO CORP.

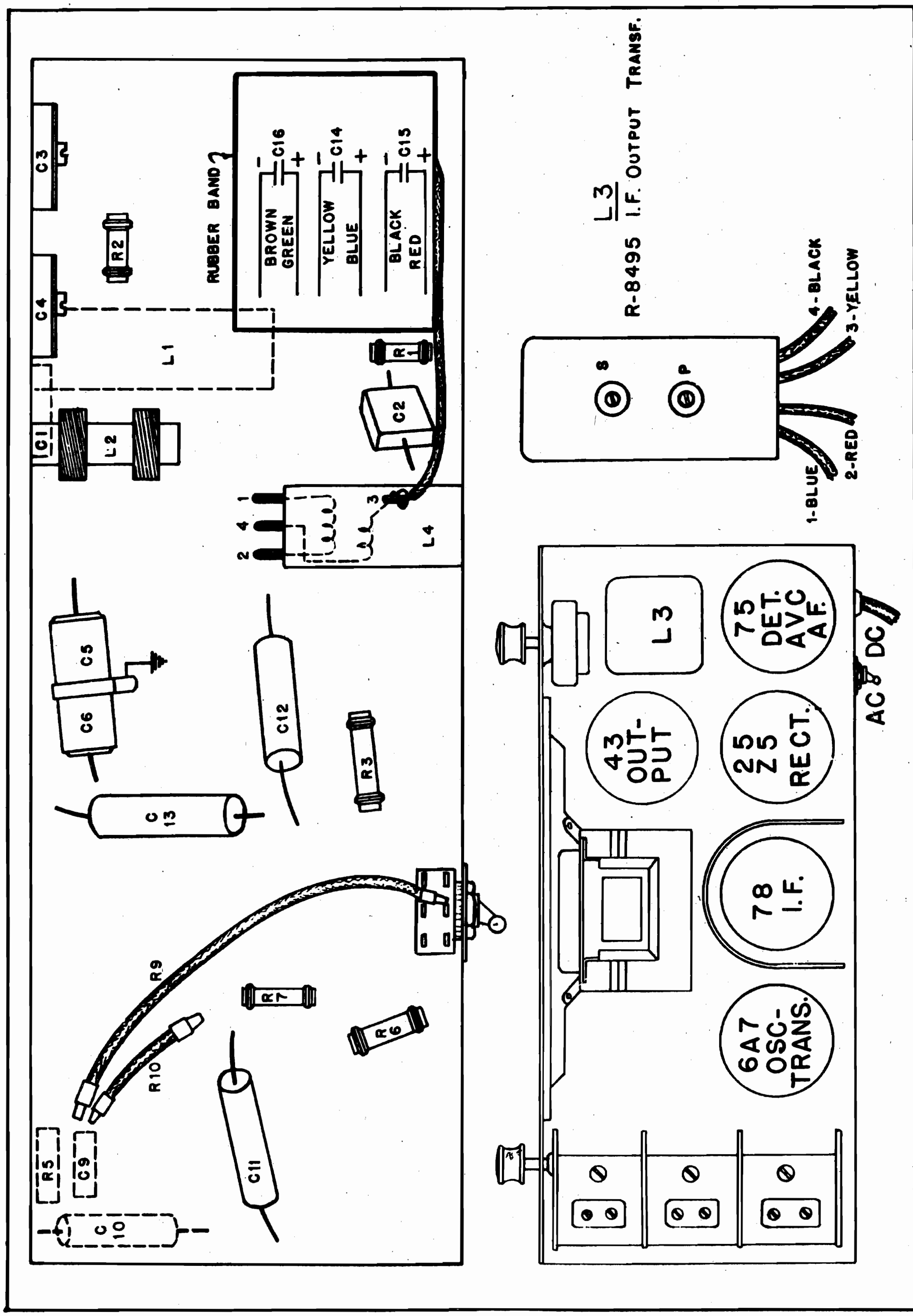


FIG. 25. SERVICE ILLUSTRATION - MODELS 250 - 300 (Extended Range AC-DC)

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MODELS 250 AC, 300 AC
Extended range
Schematic

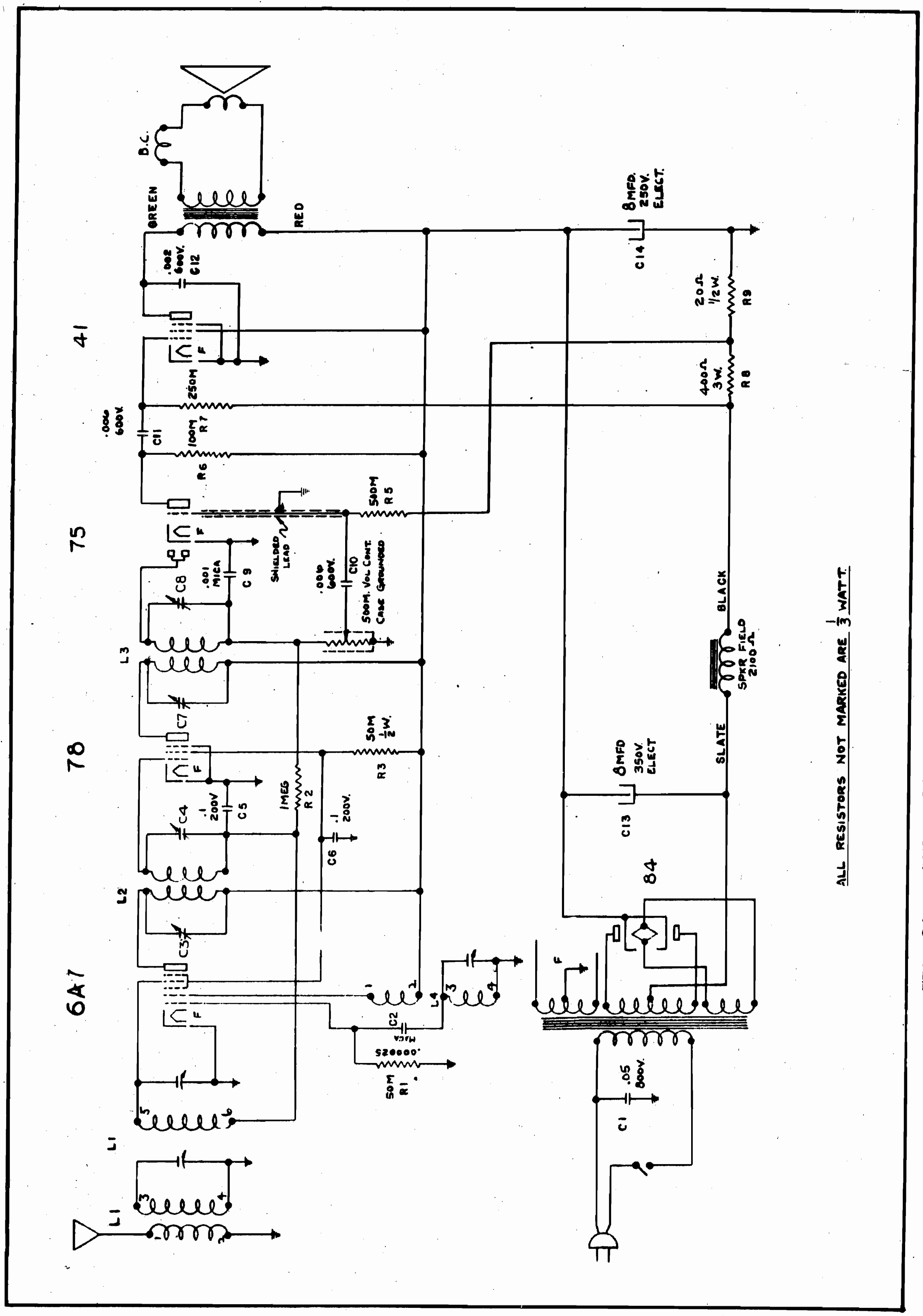

FIG. 26. SCHEMATIC - MODELS 250AC and 300AC (Extended Range)

MODEL 250 AC, 300 AC
Extended range
Parts location

COLONIAL RADIO CORP.

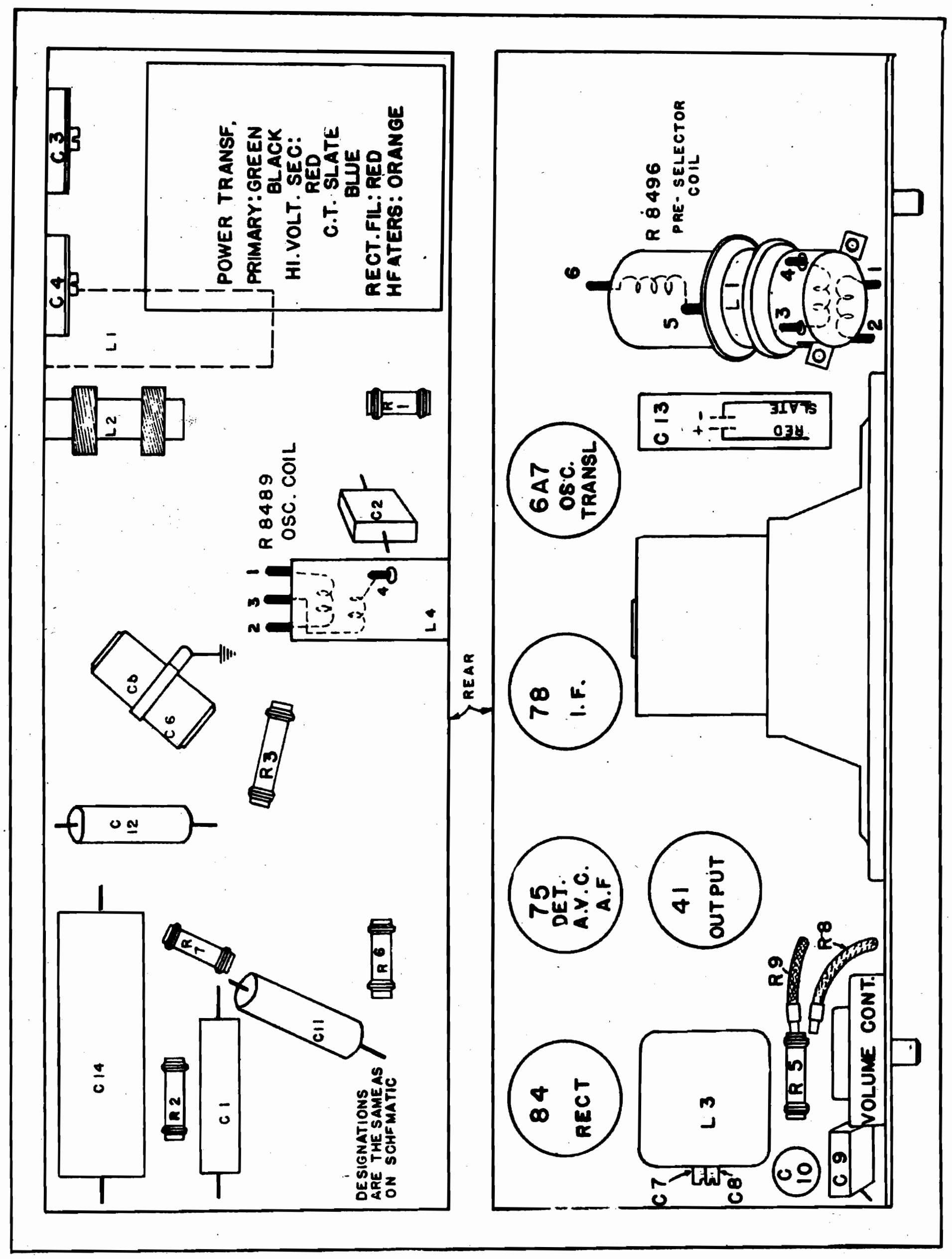

FIG. 27. SERVICE ILLUSTRATION - MODELS 250AC and 300AC (Extended Range)

COLONIAL RADIO CORP.

MODEL 250 AC, 279 AC, 300 AC, 301 AC, 250-300
Parts List

REPLACEMENT PARTS LIST
MODELS 250AC, 279AC and 300AC

PART NO.	DESCRIPTION
R-8045A	Board-Resistor, 10 terminal
R-8044A	Board-Resistor, 8 terminal
R-5509A	Board-Terminal
R-8096	Cabinet-Model 250AC
R-8035	Cabinet-Model 279AC
R-8036	Cabinet-Model 300AC
R-7621	Card-Guarantee
R-8048	Clip-Antenna
R-8047	Clip-Screen Grid
R-8047C	Clip-Screen Grid with 8" lead
R-8095	Coil-Choke detector input
R-8051	Coil-Oscillator
R-8050	Coil-Pre-Selector
R-8247	Condenser-Double, dry electrolytic
R-8038	Condenser-I.F. tuning
R-8052	Condenser-Variable tuning
R-8042	Condenser-.000015 mfd.-AVC coupling
R-4592	Condenser-.00025 mica
R-8248	Condenser-.004 mfd.-600v.
R-8056	Condenser-.006 mfd.-600v.
R-8443	Condenser-.05 mfd. 800v.
R-8097	Condenser-Block of 6-.1 mfd. and 1-.2 mfd.
R-8059	Control-Volume, 3M ohm
R-8279	Cord-Extension, brown
R-8271	Cord-Extension, black
R-8084	Decalcomania-name plate
R-8082	Escutcheon-Station Selector, 250AC and 279AC
R-8086	Escutcheon-Station Selector, 300AC
R-8081	Escutcheon-Volume Control, 250AC and 279AC
R-8614	Escutcheon-Volume Control, 300AC
R-8230	Instruction leaflet
R-8612	Knob-Model 300AC
R-8083	Knob-Model 250AC and 279AC
R-8616	Nut-4/36
R-8462	Nut-6/32
R-3760	Nut-8/32
R-8319	Pin-Escutcheon
R-8252	Resistor-350 ohm pigtail
R-8037	Resistor-700 ohm 1/3 watt carbon
R-6708	Resistor-15M ohm 1/3 watt carbon
R-5821	Resistor-20M ohm 1/2 watt carbon
R-6640	Resistor-20M ohm 1/3 watt carbon
R-6637	Resistor-50M ohm 1/3 watt carbon
R-7586	Resistor-100M ohm 1/3 watt carbon
R-6710	Resistor-400M ohm 1/3 watt carbon
R-7228	Resistor-500M ohm 1/3 watt carbon
R-7585	Resistor-1 megohm 1/3 watt carbon
R-8253	Socket-5 prong
R-8092	Socket-6 prong
R-8072	Socket-7 prong
R-2414	Spacer-I.F. tuning cord
R-4374	Spacer-Resistor board
S-8094	Speaker-2100 ohm
R-8255	Sticker-License and tube layout 250AC
R-8256	Sticker-License and tube layout 279AC
R-8257	Sticker-License and tube layout 300AC
R-7627	Tag-"Distributed by Graybar
R-8039	Transformer-I.F. input
R-8077	Transformer-I.F. output
R-5434	Washer-Chassis to cabinet
R-4794	Washer-Insulating, volume control
R-4330	Washer-Lock #4
R-4327	Washer-Lock #6
R-4328	Washer-Lock #8
R-4329	Washer-Lock #10
R-6614	Washer-Shakeproof, volume control

REPLACEMENT PARTS LIST
MODELS 250 and 300 (Extended Range)

PART NO.	DESCRIPTION
R-8297A	Board-Terminal
R-8308A	Board-Terminal double
R-5509A	Board-Terminal
R-8096	Cabinet-Model 250
R-8036	Cabinet-Model 300
R-8048	Clip-Antenna
R-6381	Clip-Screen Grid
R-6381R	Clip-Screen Grid with 8" lead
R-8489	Coil-Oscillator
R-8496	Coil-Pre Selector
R-8053	Condenser-Electrolytic, triple, dry
R-8038	Condenser-IF tuning
R-8622	Condenser-Tuning
R-8621	Condenser-.00005 mfd. mica
R-6759	Condenser-.001 mfd. mica.
R-8055	Condenser-.002 mfd. 600v.
R-8056	Condenser-.006 mfd. 600v.
R-8057	Condenser-.05 mfd. 600v.
R-8301	Condenser-.1 mfd., dual, 200v.
R-8564	Control-Volume-500M ohm
R-8060	Cord-Extension, brown
R-8090	Cord-Extension, black
R-8080	Decalcomania-Name Plate-Model 250

MODEL 250-300
Extended range
MODEL 250 ACand 300 AC
Extended range
Parts List

COLONIAL RADIO CORP.

R-8084	Decalcomania-Name Plate-Model 300
R-8671	Escutcheon-Station Selector Model 250
R-8613	Escutcheon-Station Select. Model 300
R-8663	Escutcheon-Volume Control, Model 250
R-8614	Escutcheon-Volume Control, Model 300
R-8566	Instruction leaflet
R-8664	Knob-Model 250
R-8612	Knob-Model 300
R- 954	Nut-4/36
R- 951	Nut-6/32
R-8491	Resistor-20 ohm pigtail
R-8562	Resistor-400 ohm pigtail
R-6445	Resistor-50M ohm 1/2 watt carbon
R-6637	Resistor-50M ohm 1/3 watt carbon
R-7586	Resistor-100M ohm 1/3 watt carbon
R-7584	Resistor-250M ohm 1/3 watt carbon
R-7228	Resistor-500M ohm 1/3 watt carbon
R-7585	Resistor-1 Megohm 1/3 watt carbon
R-8092	Socket-6 prong
R-8072	Socket-7 prong
S-8093	Speaker-1600 ohm
R-8493	Sticker-License and tube layout-Model 250
R-8596	Sticker-License and tube layout-Model 300
R-7856	Sticker-RMA
R-8076	Switch-AC-DC
R-8039	Transformer-IF input
R-8495	Transformer-IF output

REPLACEMENT PARTS LIST

MODELS 250AC and 300AC (Extended Range)

PART NO.	DESCRIPTION
R-8228A	Antenna wire and clip
R-5509A	Board-Terminal
R-8308A	Board-Terminal double
R-8096	Cabinet-Model 250AC
R-8036	Cabinet-Model 300AC
R-8048	Clip-Antenna
R-6381	Clip-Grid
R-6381R	Clip-Grid with 8" lead
R-8489	Coil-Oscillator
R-8496	Coil-Pre-Selector
R-8748	Condenser-Electrolytic, 8 mfd. 250v
R-8749	Condenser-Electrolytic, 8 mfd. 350v
R-8038	Condenser-I.F. tuning
R-8622	Condenser-Variable tuning
R-8301	Condenser-.1 mfd., 200v dual
R-8443	Condenser-.05 mfd., 800v
R-8056	Condenser-.006 mfd., 600v
R-8055	Condenser-.002 mfd., 600v
R-6759	Condenser-.001 mfd., mica
R-8621	Condenser-.00005 mfd.,mica
R-8747	Control-Volume, 500M ohm
R-8271	Cord-Extension, black
R-8279	Cord-Extension, brown
R-8080	Decalcomania-Name plate Model 250AC
R-8084	Decalcomania-Name plate Model 300AC
R-8671	Escutcheon-Station Selector, Model 250AC
R-8613	Escutcheon-Station Selector, Model 300AC
R-8663	Escutcheon-Volume Control Model 250AC
R-8614	Escutcheon-Volume Control Model 300AC
R-8752	Instruction leaflet
R-8664	Knob-Model 250AC
R-8612	Knob-Model 300AC
R- 954	Nut-4/36
R-8462	Nut-6/32
R-3760	Nut-8/32
R-8491	Resistor-20 ohm, pigtail
R-8562	Resistor-400 ohm 3 watt pigtail
R-6445	Resistor-50M ohms, 1/2 watt, carbon
R-6637	Resistor-50M ohms, 1/3 watt, carbon
R-7586	Resistor-100M ohms, 1/3 watt, carbon
R-7584	Resistor-250M ohms, 1/3 watt, carbon
R-7228	Resistor-500M ohms, 1/3 watt, carbon
R-7585	Resistor-1 megohm, 1/3 watt, carbon
R-8253	Socket-5 prong
R-8092	Socket-6 prong
R-8072	Socket-7 prong
S-8631	Speaker-2100 ohms
R-8750	Sticker-License and tube layout, Model 250AC
R-8751	Sticker-License and tube Layout, Model 300AC
R-7856	Sticker-RMA
R-7627	Tag-"Distributed by Graybar"
R-8039	Transformer, IF input
R-8495	Transformer, IF output

COLONIAL RADIO CORP.

SERVICE NOTES
MODEL 400

The Colonial Model 400 is a six tube superheterodyne with frequency range from 540 kc to 4300 kc.

A 78 RF stage precedes the 6A7 oscillator-translator. A 78 IF amplifier feeds into the 85 tube which provides AVC, detection and audio amplification. A 41 output tube and an 84 rectifier complete the tube complement.

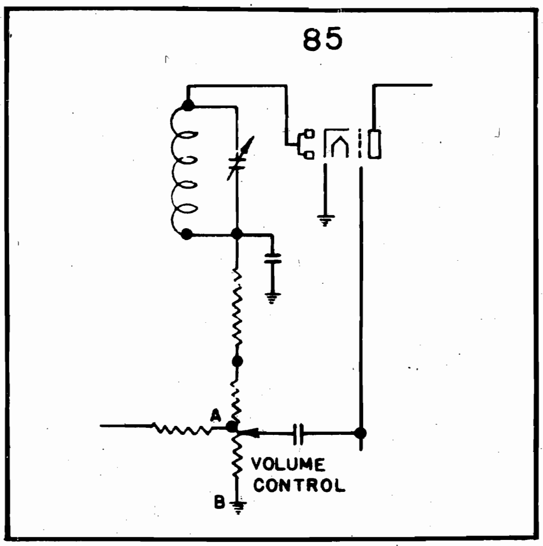

FIG. 28

The AVC-Det-AF circuit is shown in Fig.28. The 175 kc IF signal from the 78 tube is impressed between the diode plates and the cathode of the 85 tube, in series with the 100M resistor and the 725M ohms of the volume control. Since the current flows from the diode plates to the cathode, point (A) is negative with respect to point (B). But since the grid returns of the 78 RF and IF tubes are connected to point (A), the potential across A and B is applied to these grids. Any increase in signal strength increases the current through the diode part of the 85 tube, increases the drop from A to B, increases the negative bias on the 78 tubes and so decreases their amplification. Increases in signal strength are offset by the decrease in amplification so that the input to the detector tends to remain at a constant level.

Residual bias for the 78 tubes is supplied by the 600 ohm "power" or sensitivity control.

The larger the proportion of the 600 ohms included in the circuit, the higher the residual negative bias on the 78 tubes, and the less the sensitivity of the receiver. This sensitivity control should not be advanced more than necessary to secure satisfactory reception in any particular location. Excessive sensitivity will result in undue between-station noise.

The audio voltage existing across the volume control resistance is picked off by the moveable arm of the volume control, and fed through the .02 mfd. condenser to the grid of the triode portion of the 85 tube.

A low value of output from the test oscillator should be used when peaking the IF stage, as explained in the Model 250AC notes.

TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
78 - RF	155	70	*	4.25	1
78 - IF	155	85	*	5	1.25
85 - AVC-Det-AF	120		*	.75	
41 - Output	155	160	*	12	1.75
6A7 - Osc-Transl	Ep=155v; Eg #2=155v; Eg #3&5=65v; Eg #4=*; Ip=2ma; Ig #2=3.5ma; Ig #3&5=2.5ma.				
84 - Rect	Plate current = 17m.a. per plate				

* - Indicates high series resistance.

MODEL 400
Schematic

COLONIAL RADIO CORP.

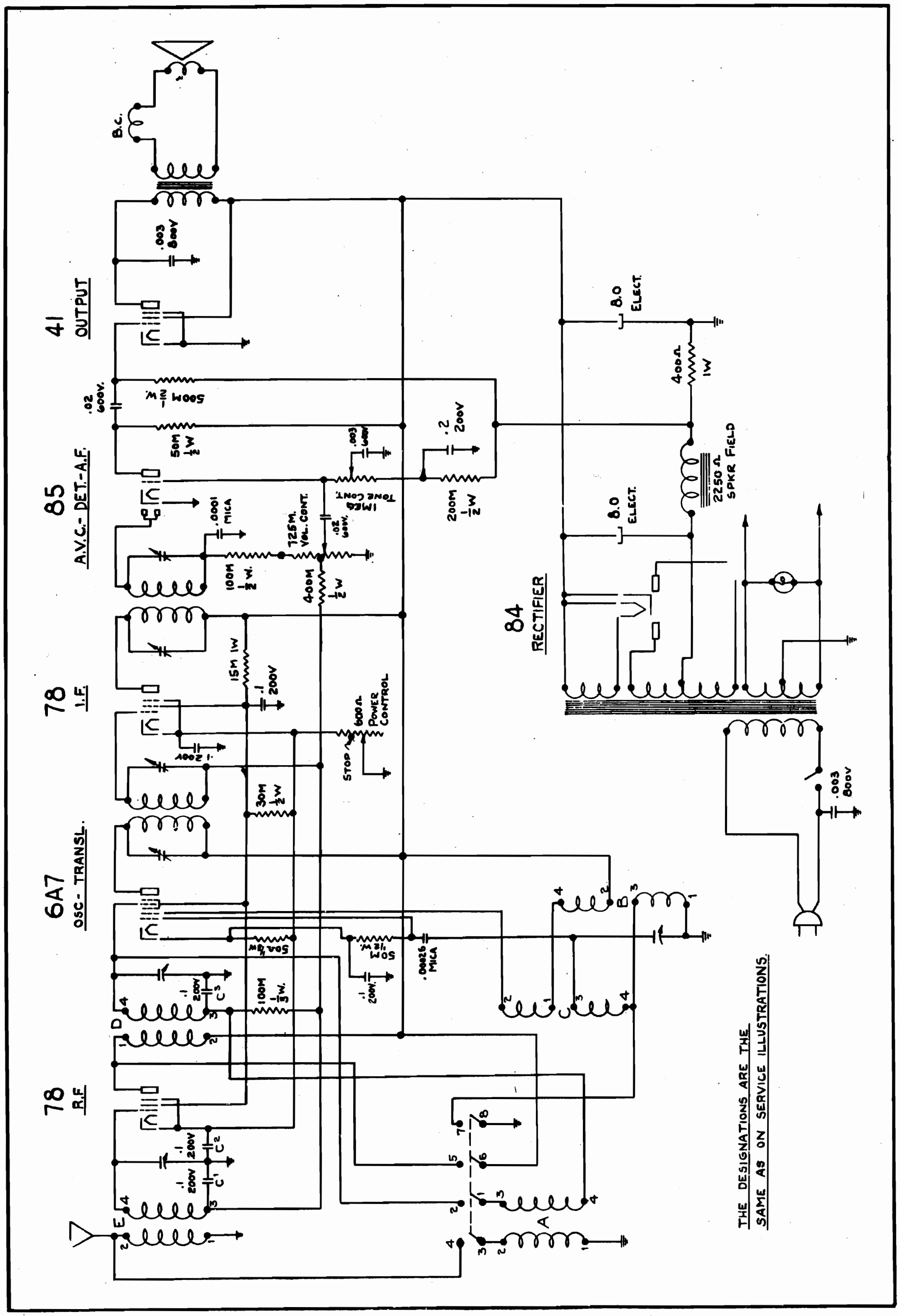

FIG. 29. SCHEMATIC - MODEL 400

MODEL 400
Socket layout

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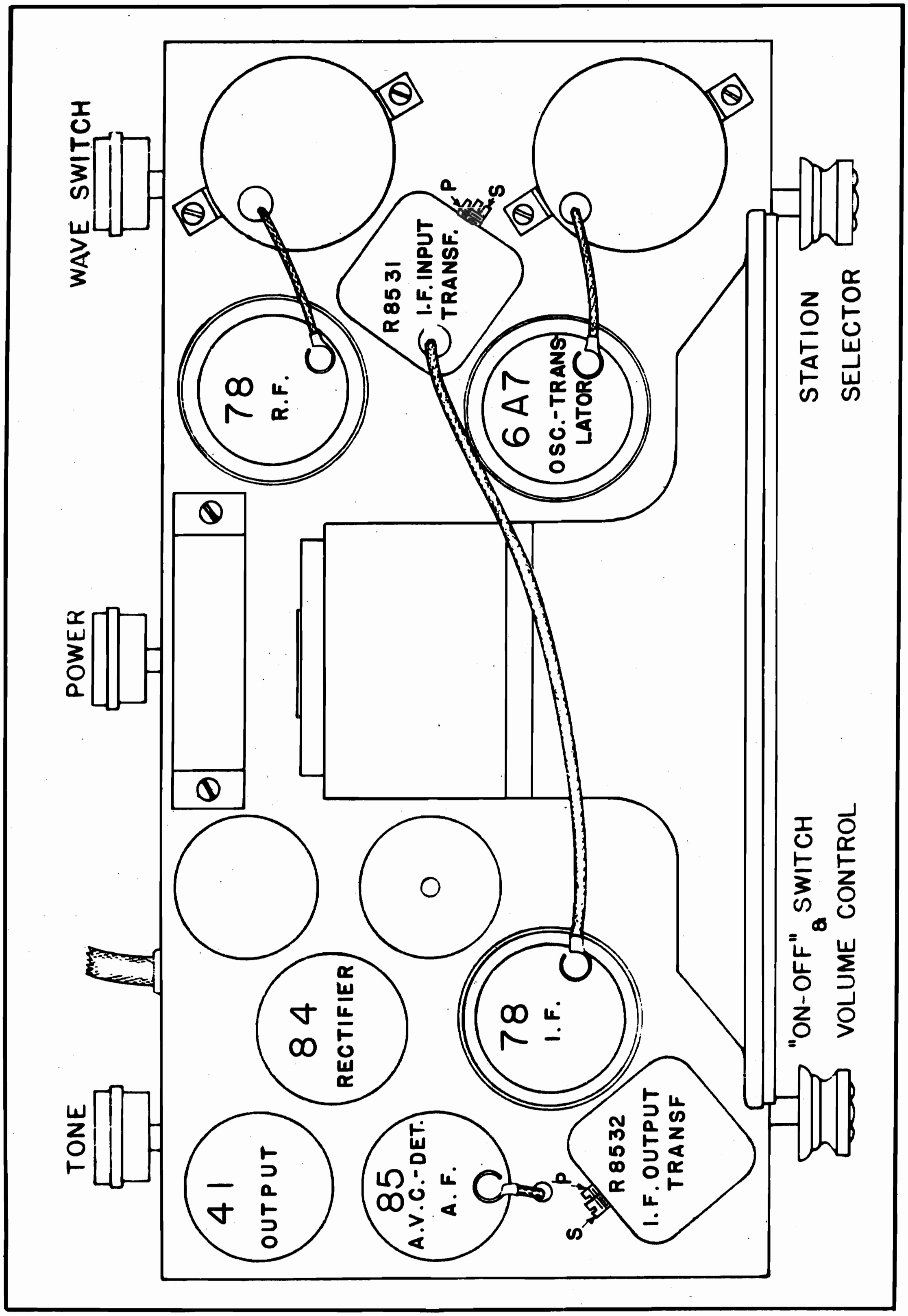
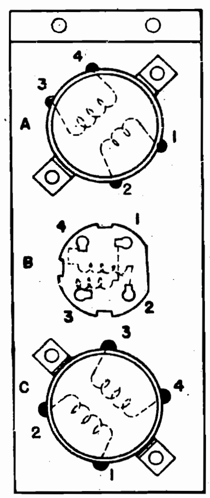


FIG. 30. SERVICE ILLUSTRATION - MODEL 400

MODEL 400
Coil wiring data
Parts List

COLONIAL RADIO CORP.

R-8624	Condenser-Electrolytic 8 mfd.
R-8514	Condenser-Block of 4-.1 mfd. and 1.2 mfd.
R-6444	Condenser-.1 mfd.-200v
R-6761	Condenser-.02 mfd.-600v
R-6461	Condenser-.003 mfd.-800v
R-7681	Condenser-.003 mfd.-600v
R-8512	Condenser-.0018 mfd.- 600v
R-4592	Condenser-.00025 mica
R-4303	Condenser-.0001 mica
R-6179	Resistor 500M ohm, 1/2 watt carbon
R-5822	Resistor-400M ohm, 1/2 watt carbon
R-5830	Resistor-200M ohm, 1/2 watt carbon
R-5819	Resistor-100M ohm, 1/2 watt carbon

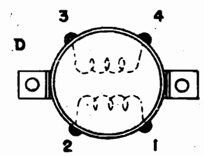


A-R8507 ANTENNA COIL SHORT WAVE
LUG 1 - TO COIL B LUG 1
LUG 2 - TO SWITCH LUG 3
LUG 3 - TO SWITCH LUG 1
LUG 4 - TO 100M RESISTOR & 1MFD. COND.

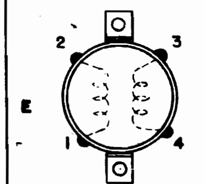
B-R8506 OSCILLATOR COIL BROADCAST
LUG 1 - TO SWITCH LUG 8 & GND.
LUG 2 - TO SWITCH LUG 6
LUG 3 - TO COIL C LUG 4
LUG 4 - TO COIL C LUG 1

C-R8508 OSCILLATOR COIL SHORT WAVE
LUG 1 - TO COIL B LUG 4
LUG 2 - TO 6A7 GRID 2
LUG 3 - TO .00025 COND. & STATOR OF FRONT SECTION OF VARIABLE TUNING CONDENSER
LUG 4 - TO COIL B LUG3 & SWITCH LUG 7

COILS MOUNTED ON TOP OF CHASSIS

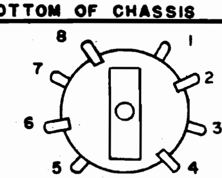


D - R8505 TRANSLATOR COIL-BROADCAST
LUG 1 - TO SWITCH LUG 5 & PLATE OF 78 TUBE
LUG 2 TO SWITCH LUG 6
LUG 3 - TO 100M OHM RESISTOR & .1 MFD. COND.
LUG 4 - TO #4 GRID OF 6A7



E - R8504 ANTENNA COIL-BROADCAST
LUG 1 - TO GND.
LUG 2 - TO ANT & SWITCH LUG 4
LUG 3 - TO 100M OHM RESISTOR & .1 MFD. COND
LUG 4 - TO CONTROL GRID OF 78 & STATOR, REAR SECTION OF VARIABLE TUNING COND.

BOTTOM OF CHASSIS



R 8529 - WAVE SWITCH

LUG 1 - TO COIL A LUG 3
LUG 2 - TO STATOR, MIDDLE SECTION OF VARIABLE COND
LUG 3 - TO COIL A LUG 2
LUG 4 - TO ANT. & COIL E LUG 2.
LUG 5 - TO COIL D, LUG 1 & PLATE OF 78 TUBE.
LUG 6 - TO COIL D LUG 2, COIL B LUG 2, B+ OF I.F INPUT TRANSFORMER & B+
LUG 7 - TO COIL C LUG 4 & COIL B LUG 3
LUG 8 - TO GND. & COIL B LUG 1

R-6156	Resistor-30M ohm, 1/2 watt carbon
R-6504	Resistor-15M ohm, 1 watt carbon
R-8522	Resistor-400 ohms, 1 watt carbon
R-6632	Resistor-50 ohms, 1/3 watt
S-8466C	Speaker-2500 ohm
R-7586	Resistor-100M ohm, 1/3 watt carbon
R-6445	Resistor-50M ohm, 1/2 watt carbon

FIG. 31. SERVICE ILLUSTRATION - MODEL 400

COLONIAL RADIO CORP.

SERVICE NOTES

MODELS 501 & 501AC

The Model 501 is a five tube AC-DC superheterodyne. It uses a 6A7 oscillator - translator, which creates a 175 kc signal to be amplified by the 78 IF stage. A type 75 tube provides AVC, diode detection and audio amplification. The audio output of the 75 tube is fed to a 43 power output pentode and then to the dyanmic loudspeaker. A 25Z5 acts as a voltage doubling rectifier (on a.c. only). The tube heaters are in series so that if one burns out, none will light. It is necessary, of course, to replace only the burned out tube. The others then will light. A 154 ohm resistor built into the line cord drops the line voltage by approximately 46 volts, leaving the difference to be applied to the tube heaters.

The Model 501 AC is the corresponding AC Model. It has a 41 output pentode and an 84 rectifier. A power transformer is used and all of the tube heaters (6.3 volt) are in parallel.

The 75 AVC - Detector - AF circuit is the same for both receivers. The IF signal is impressed between the diode plates and the cathode of the 75 tube, in series with the 500 M ohms of the volume control. Diode current flows, creating a voltage drop across the volume control with the grounded end at a positive potential to the other, the grid return end. Any increase in signal increases the voltage drop across the volume control and so increases the negative grid bias on the 6A7 and 78 tubes since their cathodes connect to the grounded end of the control and their grid returns to the other end. Since increases in signal strength are offset by decreases in tube amplification due to the increased negative grid bias, the input to the detector tends to remain at a constant value.

Any desired portion of the audio component across the volume control may be picked off by the moveable arm and fed through the .006 mfd. condenser to the control grid of the triode portion of the 75 tube. It is there amplified and then coupled to the output pentode.

When peaking the IF transformers, use a very low output from the test oscillator in order to render the AVC action inoperative.

THE MODEL 501 VOLTAGE DOUBLER

The voltage doubler used in the Model 501 is shown in simplified schematic form in Fig. 59.

At some instant plate "A" of the 25Z5 is positive. Current will flow from it to its cathode, through condenser #1, back to the negative side of the line. Condenser #1 is charged, then, with polarity as shown. One half cycle later the other side of the line becomes positive. Current then flows through condenser #2, charging it as shown, to plate "B", to its cathode and the negative side of the line. The result is that condensers #1 and #2 are charged with their potentials in series so that the total voltage across them is approximately double the applied line voltage. This doubled voltage is filtered by condensers #3 and #4 and the loudspeaker field and then fed to the plates and screens of the tubes.

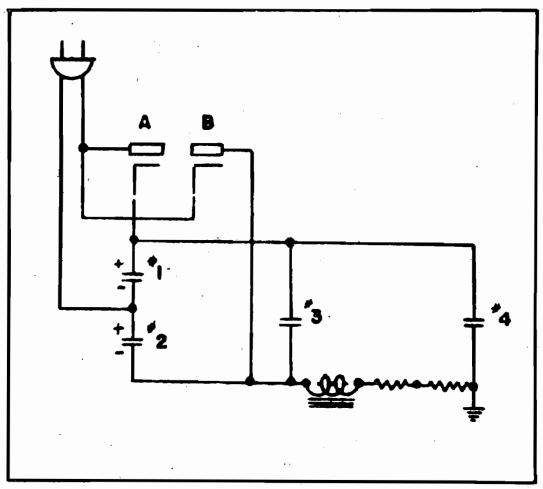


Fig. 59

MODEL 501, 501AC
Condenser drive data

COLONIAL RADIO CORP.

OPERATION ON D. C.

The circuit existing when the AC-DC switch is in the d.c. position is shown in Fig. 60. Current flows from the positive side of the line and plate "A" to its cathode, through the load resistance of the receiver (the receiver's plate and screen circuits), back to the negative side of the line. Condenser #4, is parallel to the load, provides filtering. Condensers #1, #2 and #3 and plate "B" are not used for d.c. operation. The speaker field is connected directly across the line.

Polarity of the plug is of no importance with a.c. supply but must be correct when the receiver is operated from d.c. No voltage doubling occurs with d.c.

Both Model 501 and 501 AC are designed to operate without a ground connection. The chassis of Model 501 is above ground potential so that it is important that it be not allowed to come in contact with a grounded object. An antenna series condenser is used so that the antenna of either model may be connected to a grounded object (such as a steam radiator) for increased pickup.

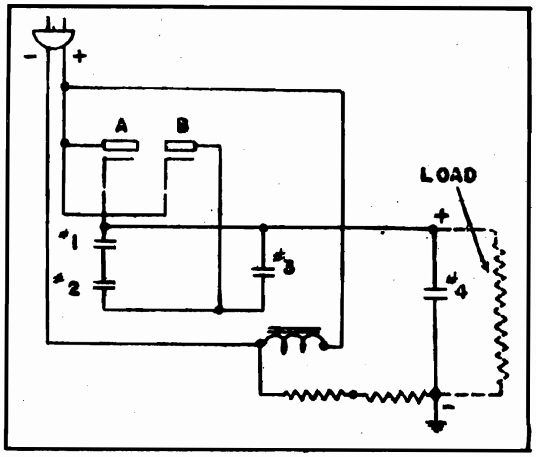


Fig. 60

REPLACING THE CONDENSER DRIVE CABLES

If the following procedure is carefully observed, no difficulty will be experienced in making replacement of broken condenser drive cables.

1. Remove the dial.

2. Put the free end of the cable through the hole in the threaded brass drum. Put a knot in the end of the cable so that the overall length is 14½", and solder the knot. Examination of the old cable will make this clear.

3. Loosen the set screws in the threaded drum, push the drum toward the back of the shaft, and tighten the set screws so that the drum turns stiffly.

4. Turn the threaded drum all the way clockwise and the condensers all the way out. One set screw on the condenser drum then should face straight up and the other should face left.

5. Wind the upper cable on the threaded drum by turning the drum counter clockwise as far as it will go. Then pass the cable across the top of the drum for another quarter turn.

6. Pass the cable around the top of the condenser drum and put its eyelet through the lower slot in the drum. Secure it in place with a wooden wedge in the slot.

7. Wind the other cable around the threaded drum for 1 1/4 turns. Pass it under and around the condenser drum until its eyelet can be put through the upper slot of the drums.

8. Stretch the spring between the eyelets and remove the wooden wedge.

9. If necessary, "dress" the cables so that they are in the proper grooves in the threaded drum. The upper cable should ride on the rear part of the condenser drum without crossing the lower cable which rides on the forward portion of the drum.

10. Loosen the set screws in the threaded drum and back the drum off slightly so that it turns easily.

11. Turn the threaded drum all the way counter clockwise to its stop. Loosen the condenser drum set screws and turn the condenser all the way out until it hits its stop. Then tighten the drum set screws.

12. Tune in a station of known frequency at about 1000 kc and set the dial so that its reading coincides with the station's frequency. Then tighten the dial set screws.

MODEL 501, 501AC
Voltage
Parts List

COLONIAL RADIO CORP.

TUBE VOLTAGE AND CURRENT CHART

MODEL 501

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	125	40	2.6	.6
75 - AF-DET-AVC	80		1	
43 - Output	110	125	28	5.5
6A7 - Osc-transl	Ep=125v; Eg #2=125v; Eg #3&#5=30v; Ep=1.7m.a.; Ig#2=2.5m.a.; Ig#3&#5=1.5m.a.			
25Z5 - Rect.	Doubled voltage = 200v. D.C. Plate current = 40m.a.			

TUBE VOLTAGE AND CURRENT CHART

Model 501 AC

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	210	70	6.5	1.5
75 - AF-DET-AVC	75		1.5	
41 - Output	200	210	22	3.4
6A7 - Osc-Transl	Ep=210v; Eg#2=210v; Eg#3&#5=70v; Ip=3.6m.a.; Ig#2=3.1 m.a.; Ig #3&#5=1.9m.a.;			
84 - Rect.	D.C. voltage =315v. Plate current = 22 m.a. per plate.			

* - Indicates high series resistance.

Readings taken with a 1000 ohms per volt meter. Care must be used if measurements are made with an analyzer since the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, voltage readings can be made from cathode to the respective elements of each tube.

REPLACEMENT PARTS LIST

Model 501

PART NO.	DESCRIPTION
R-8228-A	Antenna Wire & clip
R-5509-A	Board - Terminal, single
R-8297-A	Board - Terminal, double
R-8308-A	Board - Terminal, triple
R-9230	Cabinet
R-5330-D	Cable - Drive
R-8048	Clip - Antenna
R-6381	Clip - Grid
R-6381AD	Clip - Grid with shielded lead
R-9228	Coil - Pre-selector
R-8489	Coil - Oscillator
R-9213	Condenser - Variable tuning
R-8053	Condenser - Dry electrolytic triple
R-8038	Condenser - IF tuning
R-9229	Condenser - 8 mfd. dry electrolytic
R-8301	Condenser - .1 mfd. 200 volt, dual
R-9145	Condenser - .05 mfd. 600 volt
R-7070	Condenser - .01 mfd. 600 volt
R-8056	Condenser - .006 mfd. 600 volt
R-8055	Condenser - .002 mfd. 600 volt
R-6759	Condenser - .001 mfd. mica
R-6760	Condenser - .0005 mfd. mica
R-4303	Condenser - .0001 mfd. mica
R-8711	Condenser - .000025 mfd. mica
R-9235	Control - Tone
R-9234	Control - Volume, 500 M ohm
R-8060	Cord - Power, brown

MODEL 501, 501AC
Parts List

COLONIAL RADIO CORP.

PART NO.	DESCRIPTION
R-8090	Cord - Power, black
R-9214-A	Dial and indicator
R-7502-B	Drum - (condenser)
R-9217	Drum - Drive, threaded
R-9217A	Drum - threaded, and drive cables
R-9306	Escutcheon
R-9231	Instructions
R-9214	Indicator
R-9312	Knob
R-9313	Knob - Large
R-9168	Lamp - Pilot
R-5321	Pin - Escutcheon
R-8091	Plate - AC-DC
R-7585	Resistor - 1 megohm, 1/3 watt carbon
R-7228	Resistor - 500 M ohms, 1/3 watt carbon
R-7584	Resistor - 250 M ohms, 1/3 watt carbon
R-7586	Resistor - 100 M ohms, 1/3 watt carbon
R-6637	Resistor - 50 M ohms, 1/3 watt carbon
R-6445	Resistor - 50 M ohms, 1/2 watt carbon
R-8562	Resistor - 400 ohm, 3 watt, flexible
R-8491	Resistor - 20 ohm, 1/2 watt, flexible
R-9270	Socket - Pilot light
R-8315	Socket - 4 prong
R-8092	Socket - 6 prong
R-8072	Socket - 7 prong
S-9117C	Speaker - 8", 1400 ohm
S-7776B	Speaker - cone and voice coil and suspension assembly
S-9124	Speaker - field coil
S-7893	Speaker - hum bucking coil
S-7769	Speaker - cardboard clamping ring
S-7770	Speaker - cardboard clamping ring
S-7414	Speaker - 4 prong plug
S-9125AC	Speaker - Transformer
R-7687	Spring - Drive drum
R-9219	Sticker - License and tube lay-out
R-8076	Switch - AC-DC
R-8039	Transformer - IF input
R-8495	Transformer - IF output

REPLACEMENT PARTS LIST

MODEL 501AC

PART NO.	DESCRIPTION
R-8228-A	Antenna wire with clip
R-5509-A	Board - Terminal, single
R-8297-A	Board - Terminal, double
R-8308-A	Board - Terminal, triple
R-9446-A	Board - Terminal, 4 terminals
R-8900-B	Board - Terminal, 5 terminals
R-9230	Cabinet
R-5330-D	Cable - Drive
R-8048	Clip - Antenna
R-6381	Clip - Grid
R-8489	Coil - Oscillator
R-9228	Coil - Pre-selector
R-9213	Condenser - Variable tuning
R-8038	Condenser - IF tuning
R-9344	Condenser - 8 mfd. 350 volt, electrolytic
R-9345	Condenser - 8 mfd. 400 volt, electrolytic
R-8301	Condenser - .1 mfd. 200 volt, dual
R-8286	Condenser - .1 mfd. 200 volt
R-8443	Condenser - .05 mfd. 800 volt
R-6761	Condenser - .02 mfd. 600 volt
R-8056	Condenser - .006 mfd. 600 volt
R-8055	Condenser - .002 mfd. 600 volt
R-6759	Condenser - .001 mfd. mica
R-8711	Condenser - .000025 mfd. mica
R-9235	Control - Tone
R-9277	Control - Volume, 500 M ohm
R-8279	Cord - Extension, brown
R-8271	Cord - Extension, black
R-9214-A	Dial and indicator
R-7502-B	Drum (condenser)
R-9217	Drum - drive, threaded
R-9217-A	Drum - drive, threaded with cables
R-9306	Escutcheon
R-9264	Instructions
R-9214	Indicator
R-9312	Knob
R-9313	Knob - large
R-2288	Lamp - Pilot
R-5321	Pin - Escutcheon
R-7585	Resistor - 1 megohm, 1/3 watt carbon
R-7228	Resistor - 500 M ohms, 1/3 watt carbon
R-7584	Resistor - 250 M ohms, 1/3 watt carbon
R-7586	Resistor - 100 M ohms, 1/3 watt carbon
R-6637	Resistor - 50 M ohms, 1/3 watt carbon
R-6445	Resistor - 50 M ohms, 1/2 watt carbon
R-9335	Resistor - 12 M ohms, 1/3 watt carbon
R-8562	Resistor - 400 ohms, 3 watt, flexible
R-8491	Resistor - 20 ohms, 1/2 watt flexible
R-4128	Socket - Pilot light
R-8315	Socket - 4 prong
R-8253	Socket - 5 prong
R-8092	Socket - 6 prong
R-8072	Socket - 7 prong
S-9267-C	Speaker - 8", 2500 ohm
S-7776-B	Speaker - Cone, voice coil and suspension assy.
S-9269	Speaker - Field coil
S-7893	Speaker - hum bucking coil
S-7414	Speaker - plug, 4 prong
S-9266AS	Speaker - Transformer
R-7687	Spring - Drive drum
R-8039	Transformer - IF input
R-8495	Transformer - IF output
R-9324-A	Transformer - 60 cycle power

MODEL 501
Schematic

COLONIAL RADIO CORP.

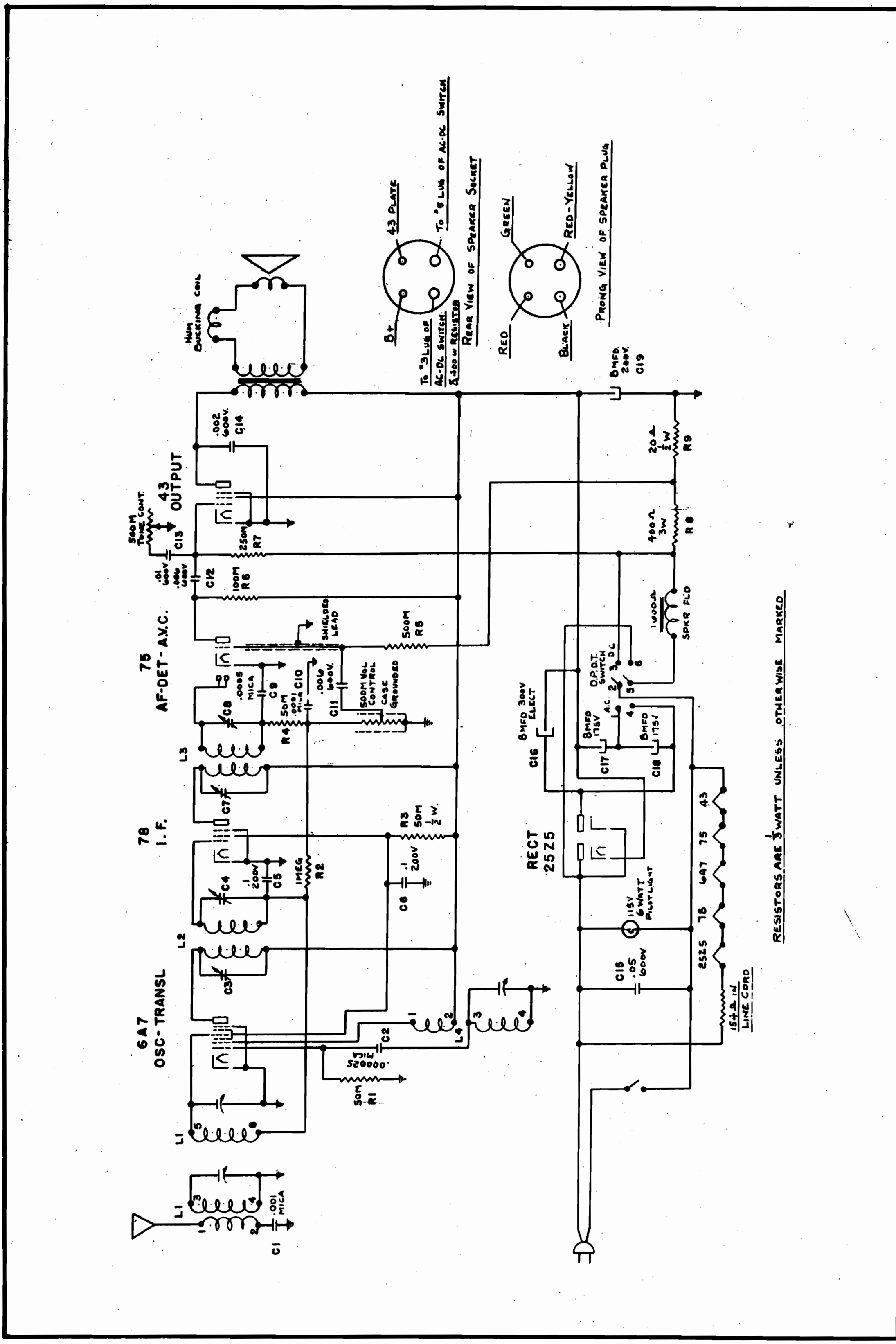


FIG. 61 - THE SCHEMATIC DIAGRAM - MODEL 501

MODEL 501
Socket layout
Parts location

COLONIAL RADIO CORP.

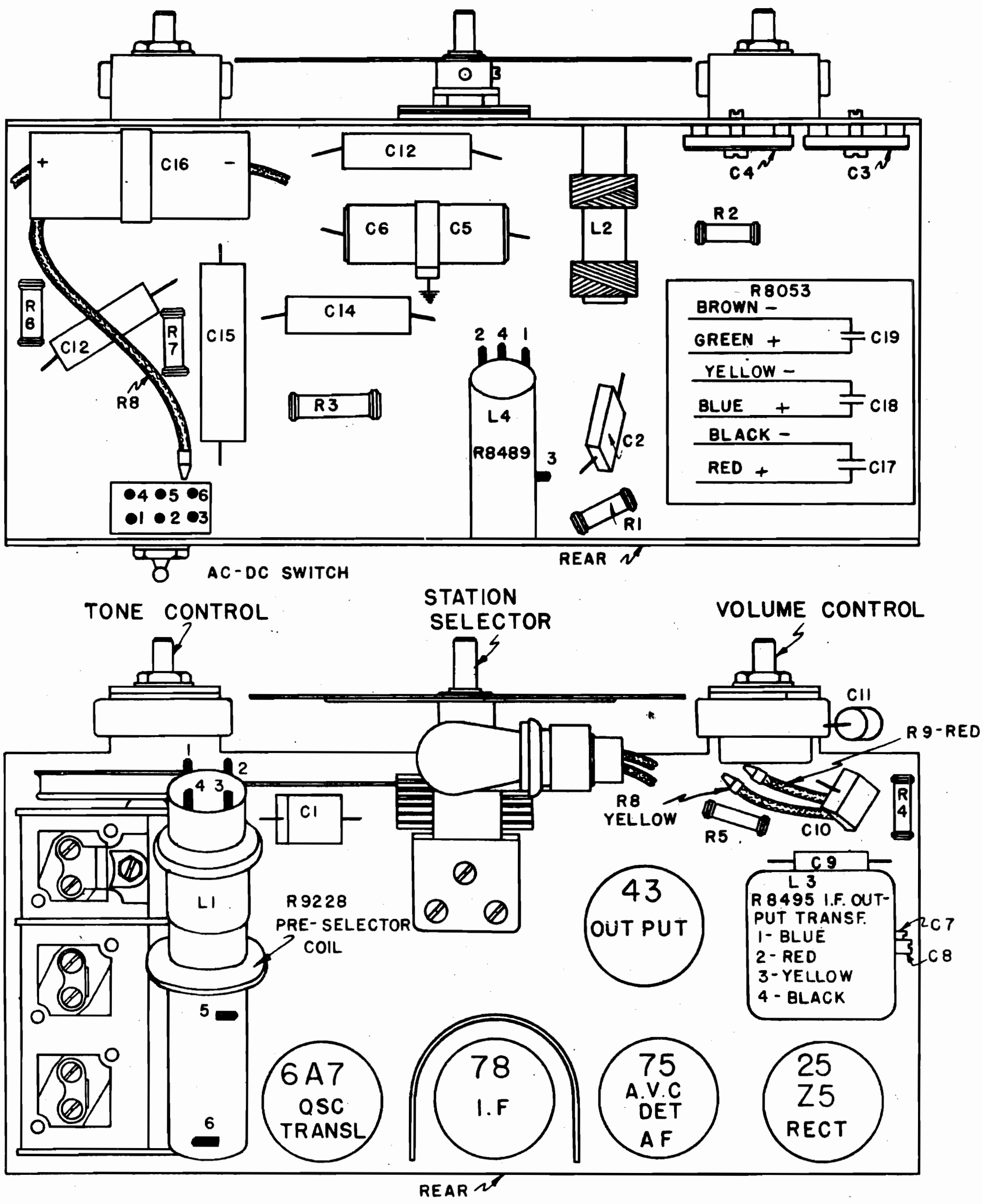


FIG. 63 - SERVICE ILLUSTRATIONS - MODEL 501

MODEL 501 AC
Schematic

COLONIAL RADIO CORP.

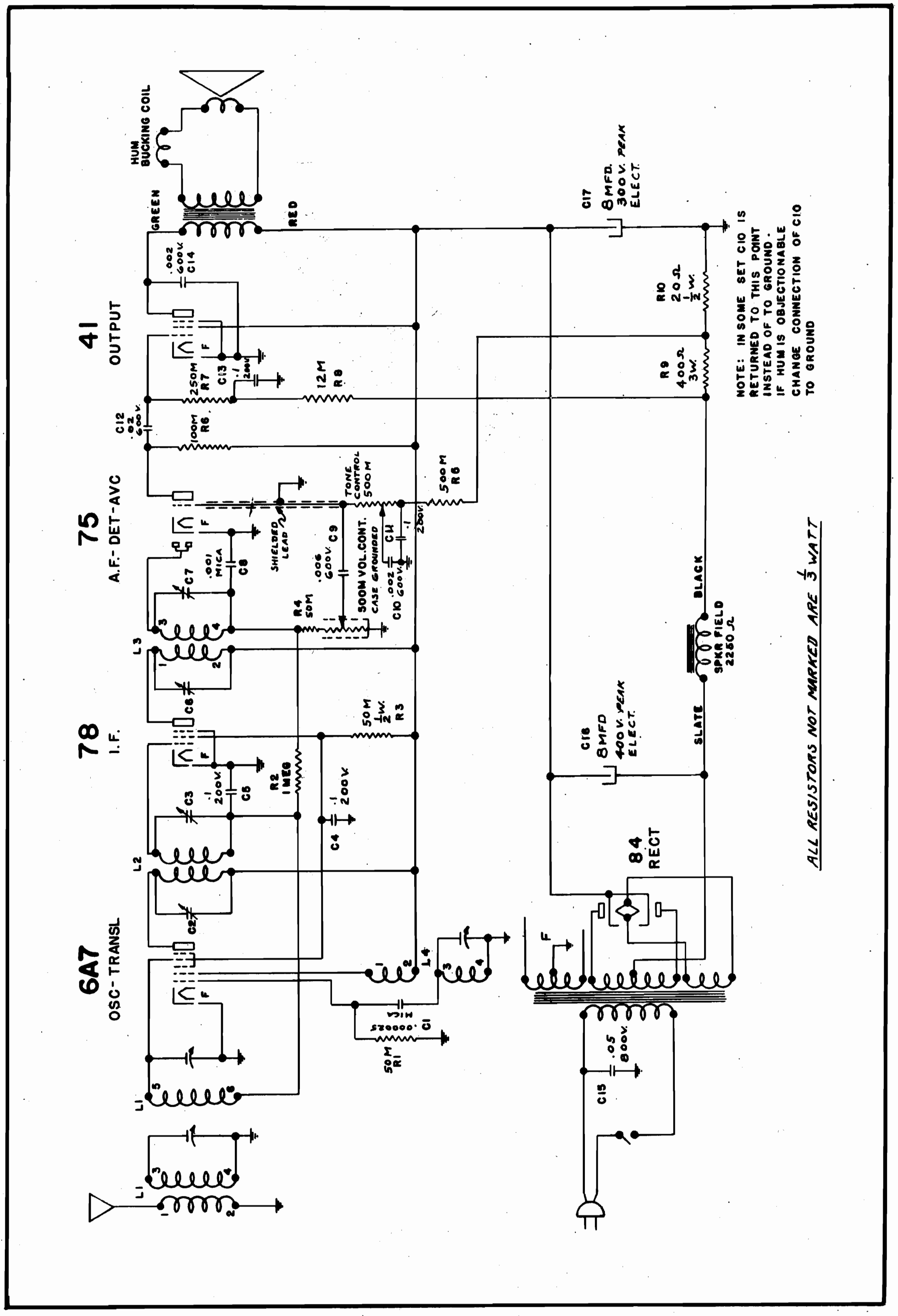


FIG. 62 - THE SCHEMATIC DIAGRAM - MODEL 501AC

MODEL 501 AC
Socket layout
Parts location

COLONIAL RADIO CORP.

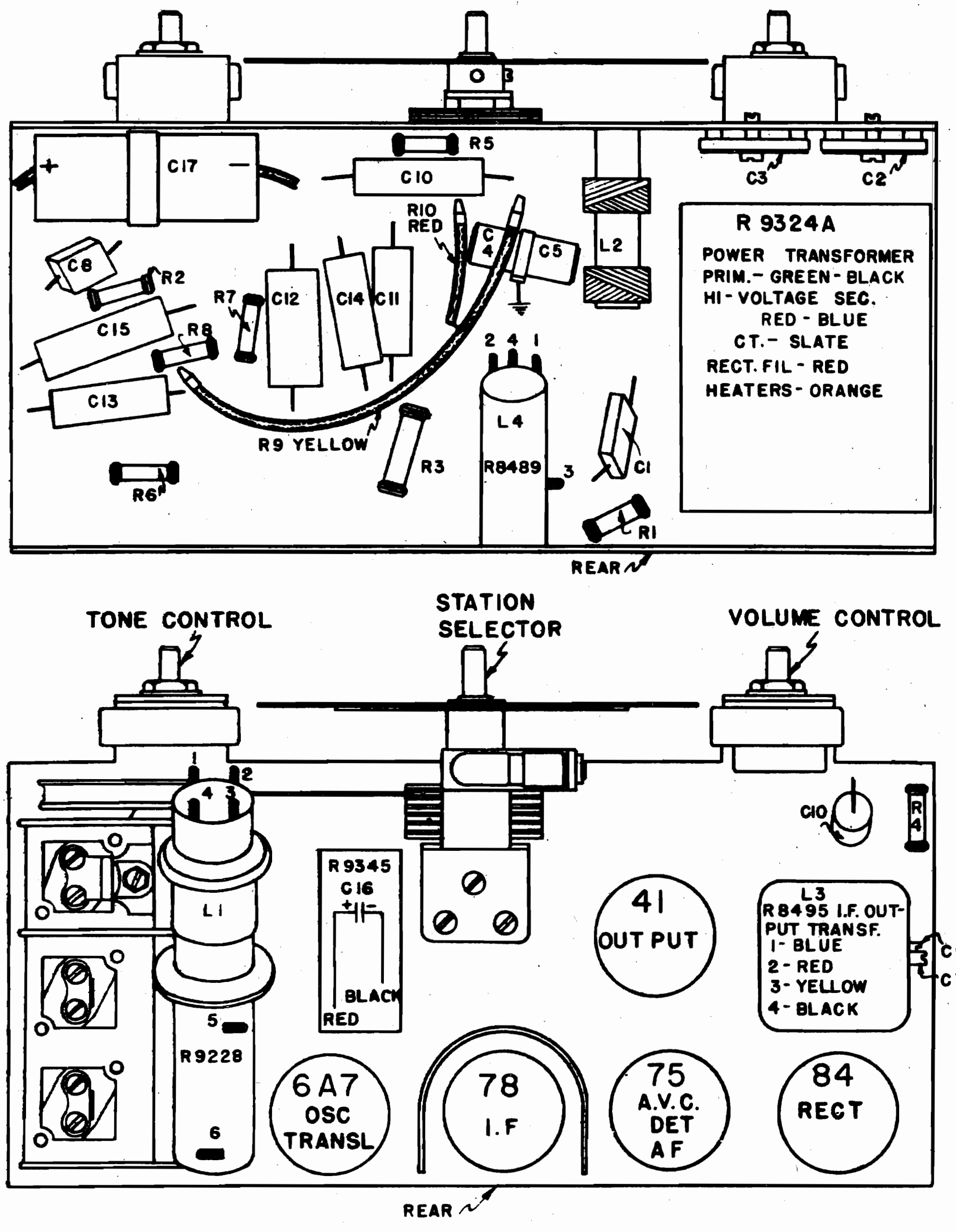


FIG. 64 - SERVICE ILLUSTRATION - MODEL 501AC

MODEL 600, 600-A
Circuit notes
Voltage

COLONIAL RADIO CORP.

SERVICE NOTES

MODELS 600 & 600A

INTRODUCTION

The Colonial Models 600 and 600-A are six tube superheterodynes with frequency range extended to 2500 kc. The circuit is shown in block form in Fig.65 and schematically in Fig. 66.

Resistance input coupling is used to the 78 RF tube. A 6A7 pentagrid converter functions as oscillator and translator. Litz wound coils are used in the RF, translator, and oscillator circuits. The 175 kc signal generated in the 6A7 plate circuit is amplified by the 78 IF stage and then coupled to the 85 tube. This tube provides AVC, diode detection and audio amplification. Its audio output is fed to the 41 pentode output tube and thence to the dynamic loud speaker.

THE AVC - DETECTOR - AF CIRCUIT

The IF signal is impressed between the diode plates and cathode of the 85 tube,in series with R7, R8 and R9. (See schematic diagram.) Diode current flows, creating voltage drops across these resistors. R9 is merely a filter resistor. R7 and R8 form a voltage divider for the AVC voltage. The voltage across R7 is impressed on the control grids of the RF, oscillator-translator, and IF tubes. An increase in signal strength increases the diode current, increases the drop across R7, increases the negative grid bias on the 6A7 and 78 tubes and so reduces their amplification. Increases in signal strength are offset by corresponding decreases in tube amplification so that the IF output tends to remain at a constant value.

The voltage across R7 and R8 also is across the volume control. The audio frequency component of this voltage is picked off by the moveable arm of the volume control and fed through C14 to the control grid of the triode portion of the 85 tube where it is amplified.

When peaking the IF transformers use a signal from the test oscillator just strong enough to give a readible deflection on the output meter or an audible signal from the loud speaker.

TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M.A.	SCREEN M. A.
78 - RF	225	105	7	1.6
78 - IF	225	105	7	1.6
85 - AVC-Det-AF	165		3.5	
41 - Output	220	230	21	3.5
6A7 - Osc-Transl	Ep=225v; Eg#2=105v; Eg#3&#5=70v; Ip=2m.a.; Ig#2= 2m.a.; Ig#3&#5=2m.a.;			
80 - Rect.	Max. d.c. voltage = 370 volts. Plate current = 28 m. a. per plate			

Readings taken with antenna disconnected and no signal received. Care should be used if readings are taken with an analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate will stop oscillation. If an analyzer is not used, voltage readings may be taken from the cathode to the respective element of each tube.

MODEL 600, 600-A
Parts List
Block schematic

COLONIAL RADIO CORP.

REPLACEMENT PARTS LIST

MODELS 600 AND 600A

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
R-5509A	Board - Terminal, single	R-7584	Resistor - 250 M ohms, 1/3 watt carbon
R-8297A	Board - Terminal, double	R-6638	Resistor - 200 M ohms, 1/3 watt carbon
R-8308A	Board - Terminal, triple	R-7586	Resistor - 100 M ohms, 1/3 watt carbon
R-8900B	Board - Terminal, 5 terminals	R-6210	Resistor - 75 M ohms, 1/2 watt carbon
R-9305	Cabinet - Model 600	R-6637	Resistor - 50 M ohms, 1/3 watt carbon
R-9395	Cabinet - Model 600A	R-5095	Resistor - 20 M ohms, 1 watt carbon
R-4715	Clamp - Ant. & gnd. leads	R-6634	Resistor - 2 M ohms, 1/3 watt carbon
R-7011A	Clip - Ant. & gnd. leads	R-6276	Resistor - 200 ohms, 1/2 watt carbon
R-6381	Clip - Grid	R-8562	Resistor - 400 ohms, flexible
R-6381W	Clip - Grid with 7½" lead	R-6006B	Shaft - Dial drive
R-7031	Clip - Pilot light	R-7235	Shield - Electrolytic cond.
R-9323	Coil - Oscillator	R-8803A	Shield - IF transformer
R-9322	Coil - Pre-selector	R-5323A	Shield - Tube, bottom
R-9310	Condenser - Variable tuning	R-5322	Shield - Tube, top
R-6565-	Condenser - IF tuning	R-8366	Socket - 4 prong
R-7236	Condenser - 14 mfd. electrolytic	R-8368	Socket - 6 prong
D-4758P	Condenser - 8 mfd. electrolytic	R-8369	Socket - 7 prong
R-6444	Condenser - .1 mfd. 200 volt	R-5153-7½	Spaghetti - For grid lead
R-8301	Condenser - .1 mfd. 200 volt, dual	S-8465C	Speaker - 8", 2500 ohm
R-6761	Condenser - .02 mfd. 600 volt	S-7776B	Speaker - 8", cone & voice Coil
R-7070	Condenser - .01 mfd. 600 volt	S-8569	Speaker - 8", field coil
R-7244	Condenser - .006 mfd. 600 volt	S-7893	Speaker - 8", hum bucking coil
R-7681	Condenser - .003 mfd. 600 volt	S-7414	Speaker - 8", plug
R-4592	Condenser - .00025 mfd. mica	S-8470AS	Speaker - 8", transformer
R-4303	Condenser - .0001 mfd. mica	R-9331	Sticker - License & tube layout 60 cycle, Model 600
R-8711	Condenser - .00001 mfd. mica	R-9332	Sticker - License & tube layout 25 cycle, Model 600
R-6571	Control - Tone	R-9409	Sticker - License & tube layout 60 cycle, Model 600A
R-9296	Control - Volume	R-9410	Sticker - License & tube layout 25 cycle, Model 600A
R-7566	Cord - Power supply	R-8801	Transformer - IF
R-9348A	Cover - Ant. resistor and cond.	R-8801G	Transformer - IF input, less shield
R-9333A	Dial and Indicator	R-8802G	Transformer - IF output, less shield
R-9311	Escutcheon	R-9325A	Transformer - 60 cycle power
R-9330	Instructions	R-9326A	Transformer - 25 cycle power
R-9314	Knob - Large		
R-9313	Knob - Medium		
R-2288	Lamp - Pilot		
R-5346B	Lead - Ant. with clip		
R-5345D	Lead - Gnd. with clip		
R-5321	Pin - Escutcheon		
R-7585	Resistor - 1 megohm, 1/3 watt carbon		
R-7228	Resistor - 500 M ohms, 1/3 watt carbon		

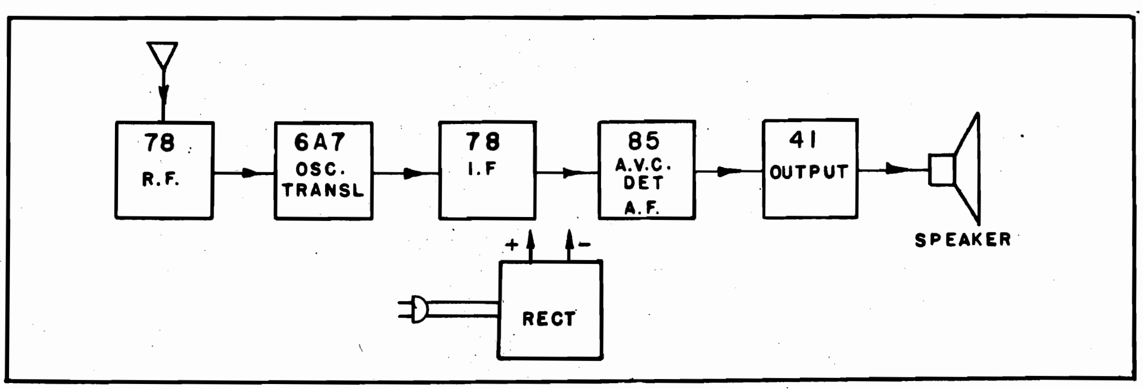


FIG. 65

COLONIAL RADIO CORP.

MODEL 600, 600-A
Schematic

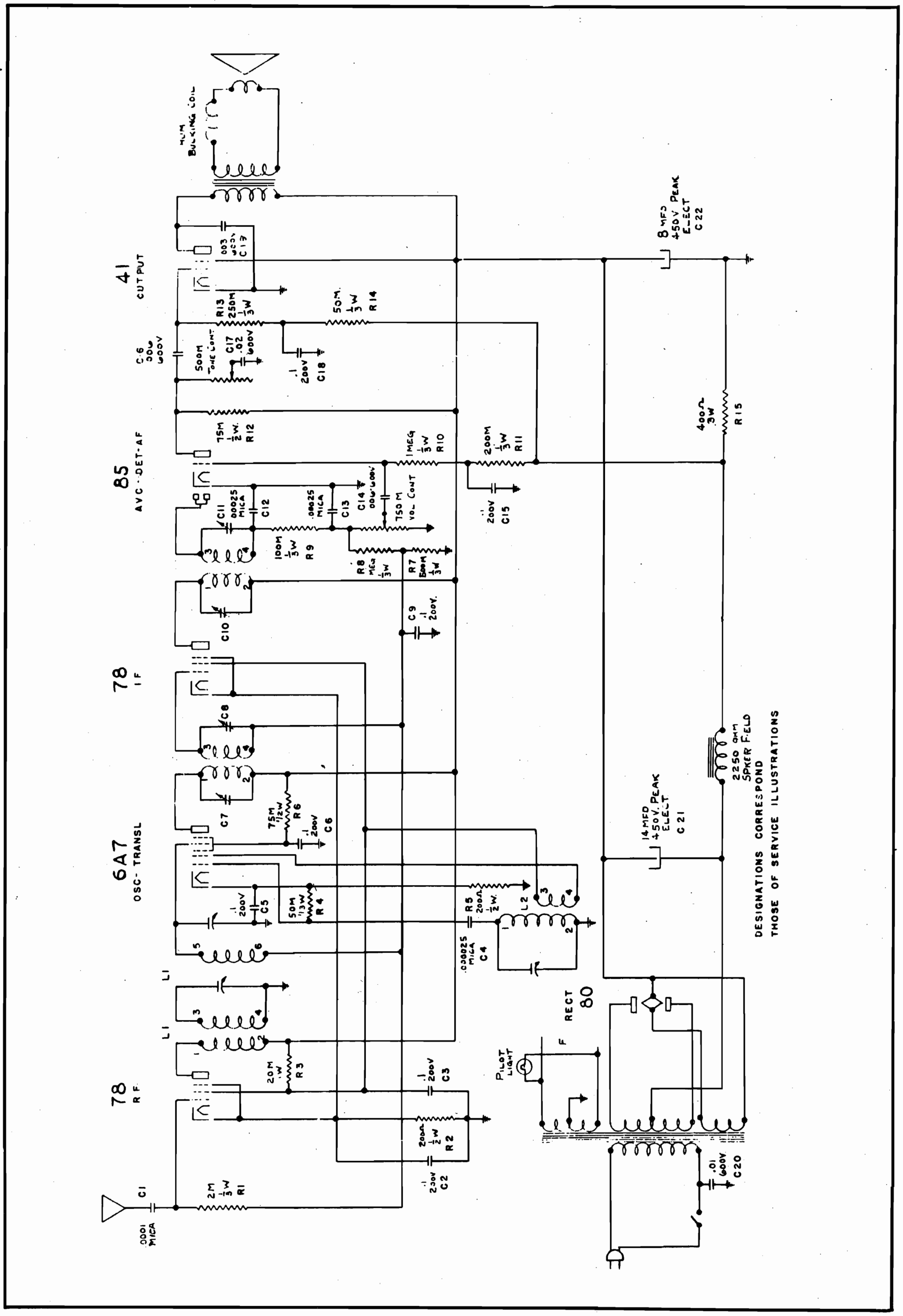


FIG. 66. THE SCHEMATIC DIAGRAM - MODELS 600 and 600A

MODEL 600, 600-A
Parts location
Socket layout

COLONIAL RADIO CORP.

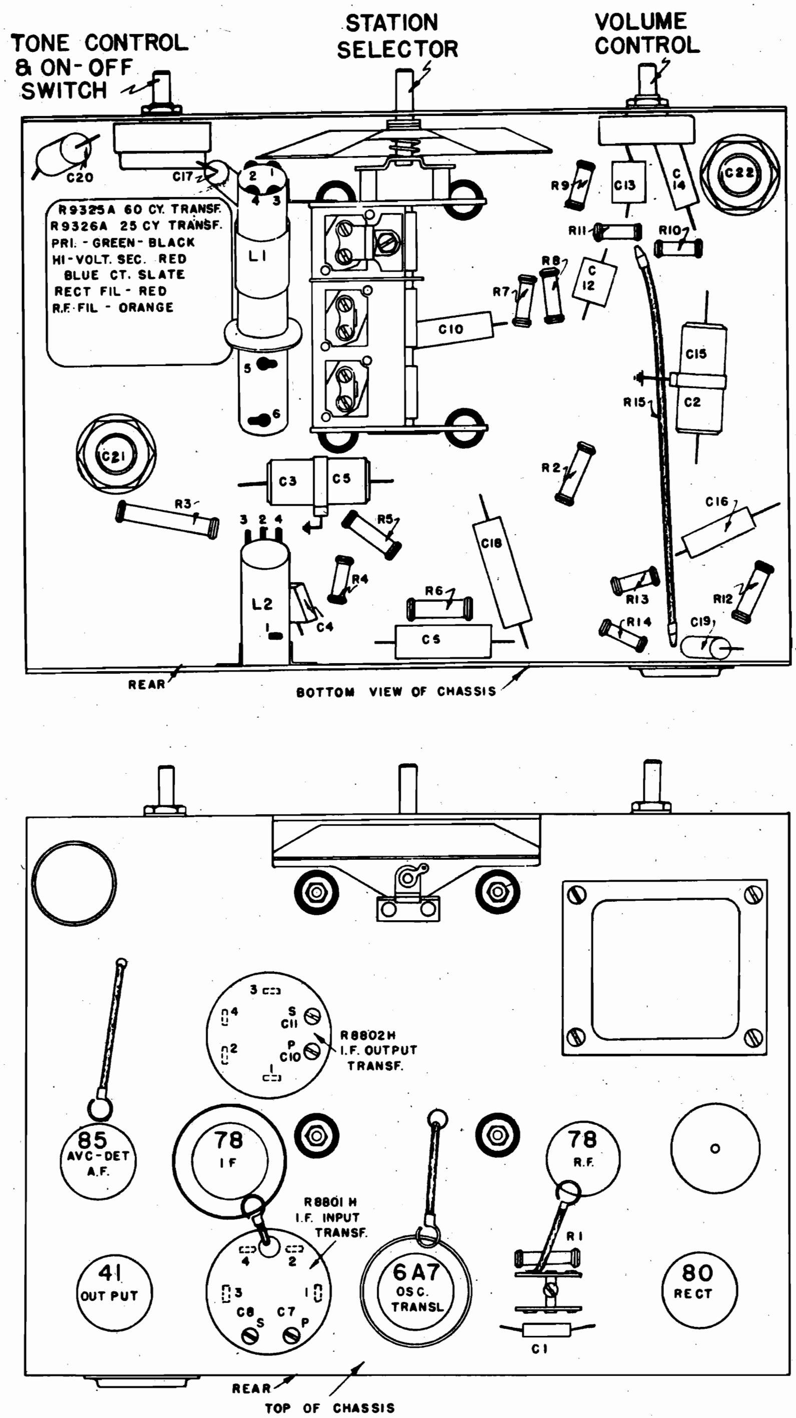


FIG. 67. SERVICE ILLUSTRATIONS - MODELS 600 and 600A

COLONIAL RADIO CORP.

SERVICE NOTES

MODEL 601

INTRODUCTION

The COLONIAL Model 601 is a ten tube superheterodyne with a parallel push pull output stage and a push pull driver stage. In addition to the broadcast range, there is a short wave range extending to 4600 kc. A separate sensitivity control permits matching the receiver to the reception conditions in any particular location.

The circuit is shown in block form in Fig. 68,and schematically in Fig. 69.

A 78 RF tube is used in the broadcast position only. For short wave reception, switch contacts #3 and #4 connect the antenna to the primary of L5. Its secondary is connected directly to the control grid of the 6A7 through switch contacts #1 and #2.

Coils L3 and L4 in series comprise the oscillator coil for broadcast reception. For short waves,Coil L3 is shorted out by switch contacts #7 and #8.

The 175 kc signal created in the plate circuit of the 6A7 oscillator-translator tube is transformer coupled to the 78 IF tube. Its output is transformer coupled to the 75 tube which provides AVC, diode detection and audio amplification. The audio output of the 75 is split up. Part of it is coupled directly to one pair of the parallel push pull '45 output tubes. The remainder is coupled to a '37 phase changer and thence to the other pair of '45's. The combination of the '37 phase changer and the triode portion of the 75 forms a push pull stage to drive the push pull output stage. A 12 inch dynamic speaker is used.

THE 75 AVC-DETECTOR-AF

The IF output is impressed between the cathode and the diode plates of the 75, in series with R5 and the 500 M ohms of the volume control. Diode current flows, creating a voltage drop across R5 and the volume control. The drop across the volume control is positive at the grounded end of the control, with reference to the other end. R5 serves only as a filter resistor. The grid returns of the RF, oscillator-translator, and IF tubes are connected to the volume control so that the negative bias across it is impressed upon the control grids of these tubes. An increase in signal strength increases the diode current,increases the drop across the volume control, increases the negative bias on the 6A7 and 78 tubes, and so decreases their amplification. Increases in signal strength are offset by decreases in tube amplification so that the input to the 75 tends to remain at a constant value.

The residual bias on the 78 RF and 6A7 tubes is controlled by the variable 1000 ohm "Power" or "Sensitivity" control. When all of its resistance is shorted out, maximum sensitivity is obtained.

The audio component of the voltage across the volume control is picked off by the moveable arm of the control and fed through C14 to the control grid of the triode portion of the 75 tube.

THE 75 - '37 PUSH PULL DRIVER

In any push pull circuit,the polarity of the signal voltage at the plate of one of the tubes must be opposite to that at the other tube. Ordinarily, a push pull transformer would be used to obtain the polarity opposition or phase change at the grids of the 45 output tubes. In the Model 601 circuit, this phase change is obtained as follows:

Suppose at some particular instant the signal voltage at the plate of the 75 tube is becoming increasingly positive. This voltage is applied directly through C20 to the grids of one pair of '45's. These grids then are positive. At the same time the positive voltage of the 75 is impressed upon the grid of the '37 phase changer tube through C18. As its grid becomes more positive,its plate current increases. This increase in plate current causes an increased voltage drop across R12, with the plate end of the resistor negative with respect to the other end. This negative voltage is fed through C19 to the grids of the other pair of '45's. Thus phase opposition is accomplished. Constants are so chosen that the signal voltage applied to the grids of one pair of '45's is equal to the signal voltage applied to the other pair.

MODEL 601
Voltage
Parts List

COLONIAL RADIO CORP.

PART NO.	DESCRIPTION
R-9315	Bezel - Sensitivity control
R-8297A	Board - Terminal, double
R-8308A	Board - Terminal, triple
R-9300	Cabinet
R-7011-A	Clip - Ant. and gnd. leads
R-6381	Clip - Grid
R-6381W	Clip - Grid with 7½" lead
R-7031	Clip - Pilot light
R-8504	Coil - Antenna
R-9046	Coil - Antenna short wave
R-8757	Coil - Translator
R-8728	Coil - Oscillator
R-9294	Coil - Oscillator, short wave
R-6565	Condenser - IF tuning
R-8759	Condenser - Variable
D-4758P	Condenser - 8 mfd. electrolytic
R-7236	Condenser - 14 mfd. electrolytic
R-9237	Condenser - 4 mfd. dry electrolytic
R-6451	Condenser - .5 mfd. 200 volt
R-6444	Condenser - .1 mfd. 200 volt
R-6761	Condenser - .02 mfd. 600 volt
R-7681	Condenser - .003 mfd. 600 volt
R-6461	Condenser - .003 mfd. 800 volt
R-6933	Condenser - .002 mfd. 600 volt
R-4303	Condenser - .0001 mfd. mica
R-6570	Control - Tone. Volume
R-8552	Control - Sensitivity
R-7566	Cord - Power Supply
R-9297A	Dial and Indicator
R-9311	Escutcheon
R-9301	Instruction leaflet
R-9314	Knob - Large
R-9312	Knob - Small
R-8520	Knob - Sensitivity control
R-2288	Lamp - Pilot
R-5346B	Lead - Antenna, with clip
R-5345A	Lead - Ground, with clip
R-5321	Pin - Escutcheon
R-6179	Resistor - 500 M ohms, 1/2 watt carbon
R-5822	Resistor - 400 M ohms, 1/2 watt carbon
R-5830	Resistor - 200 M ohms, 1/2 watt carbon

PART NO.	DESCRIPTION
R-8683	Resistor - 150 M ohms, 1/2 watt carbon
R-5819	Resistor - 100 M ohms, 1/2 watt carbon
R-6210	Resistor - 75 M ohms, 1/2 watt carbon
R-6689	Resistor - 30 M ohms, 1 watt carbon
R-5821	Resistor - 20 M ohms, 1/2 watt carbon
R-8685	Resistor - 70 ohms, 3 watt, flexible
R-8684	Resistor - 8 ohms, 1 watt, flexible
R-6006B	Shaft - Dial drive assembly
R-6018A	Shield - Ant. & translator coils
R-7235	Shield - Electrolytic condenser
R-8687A	Shield - IF transformer
R-5323A	Shield - Tube, bottom
R-5322	Shield - Tube, top
R-8366	Socket - 4 prong
R-8367	Socket - 5 prong
R-8368	Socket - 6 prong
R-8369	Socket - 7 prong
S-9304C	Speaker - 12", 540 ohm
S-7606A	Speaker - Cone and voice coil
S-9320	Speaker - field coil
S-9090	Speaker - hum bucking coil
S-7415	Speaker - plug, 5 prong
S-7106	Speaker - ring, cone mounting
S-9321A	Speaker - transformer
R-9302	Sticker - Tube & license - 60 cycle
R-9303	Sticker - Tube & license - 25 cycle
R-6964	Switch - AC
R-8422	Switch - Wave
R-8782	Transformer - IF input (core and coils)
R-8782A	Transformer - IF input complete, less shield
R-8783	Transformer - IF output
R-8783A	Transformer - IF output, complete less shield
R-8677A	Transformer - 60 cycle power
R-8678A	Transformer - 25 cycle power

TUBE VOLTAGE AND CURRENT CHART

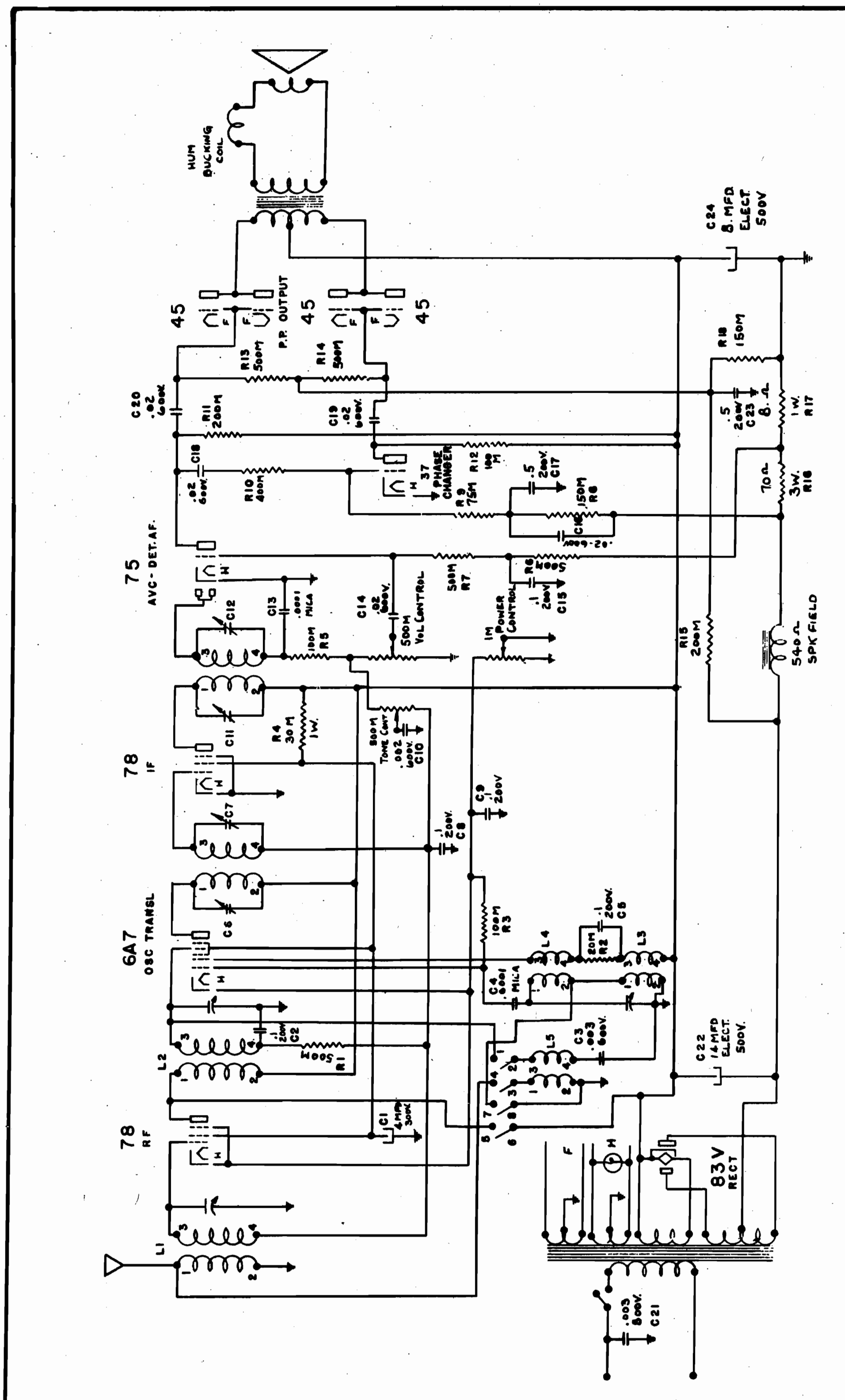
MODEL 601

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M.A.	SCREEN M. A.
78 - R F	255	100	8	2
78 - I F	255	100	8	2
75 - AVC-Det-AF	125		.5	
'37 - Phase Changer	190		1.5	
'45 - Output	245		32	
6A7 - Osc-Transl	Ep = 255v; Eg#1 = -10v; Eg#2 = 200v; Eg#3&#5 = 82v; Ip = 3.75m.a.; Ig#2 = 3.5m.a.; Ig#3&#5 = 2.25m.a.			
83-V - Rect.	Maximum d.c. volts = 390v. Plate current = 84m.a. per plate			

Readings taken with 1000 ohms per volt meter; antenna and ground shorted together; volume control on full, and no signal received. Care must be used if measurements are made with an analyzer since the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation.

MODEL 601
Schematic

COLONIAL RADIO CORP.

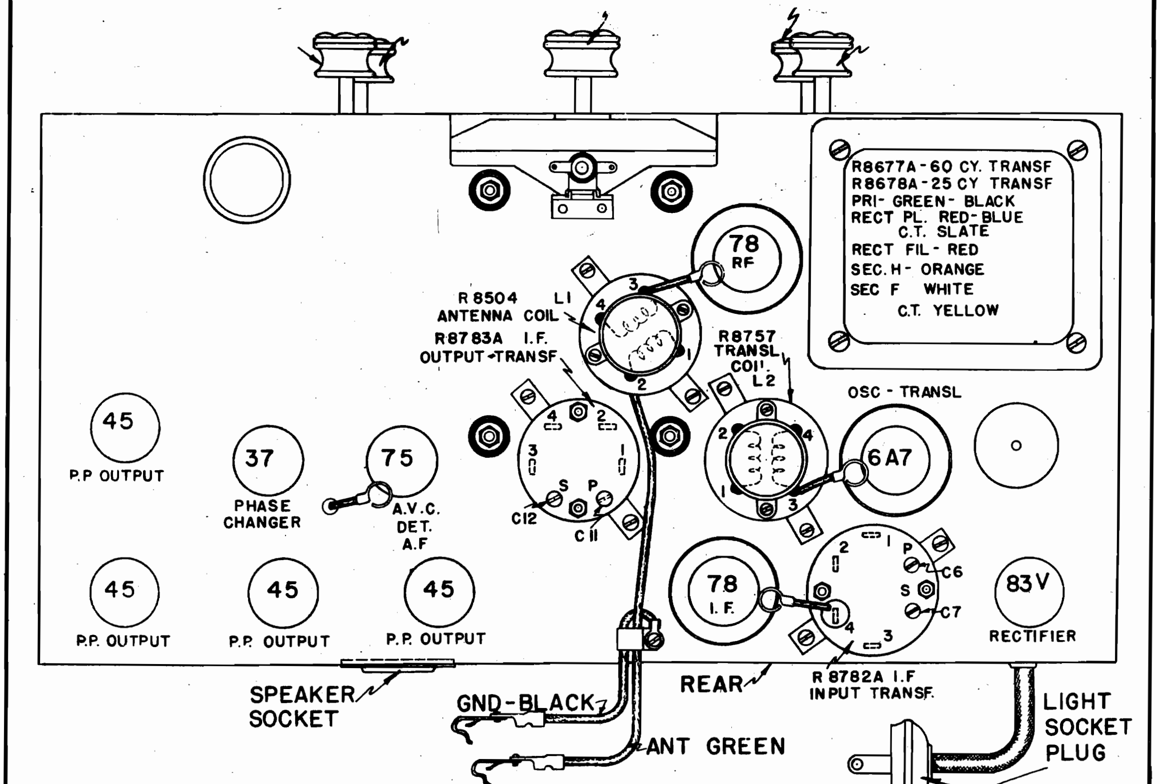


RESISTORS ARE ½ WATT SIZE UNLESS OTHERWISE SPECIFIED

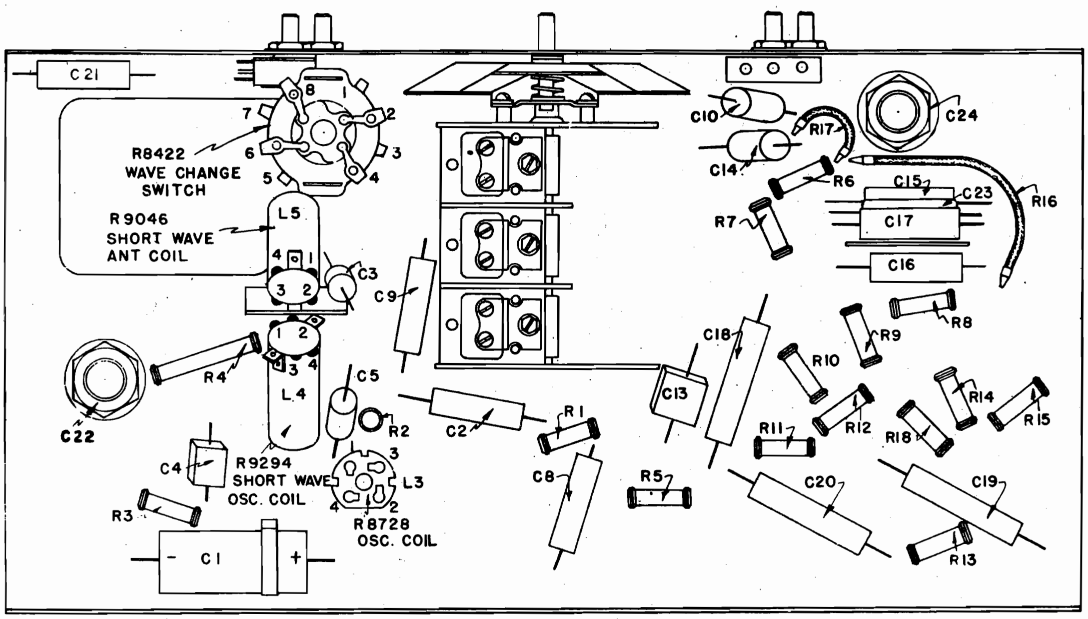
FIG. 69. THE SCHEMATIC DIAGRAM - MODEL 601

MODEL 601
Parts location
Socket layout

COLONIAL RADIO CORP.



TOP VIEW OF CHASSIS



REAR
BOTTOM VIEW OF CHASSIS

FIG. 70. SERVICE ILLUSTRATIONS - MODEL 601

MODEL 700,701,702
Notes on circuit
Mechanical notes

COLONIAL RADIO CORP.

MODELS 700 - 701 - 702

THE AVC-DETECTOR-AF CIRCUIT

The AVC - Detector AF circuit is shown schematically in Fig. 45.

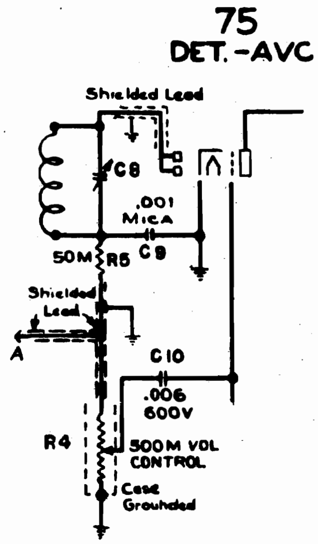


FIG. 45

The 175 kc signal at the IF output transformer secondary is impressed between the 75 tube's cathode and its diode plates, in series with the 500 M ohm volume control. Diode current flows, making point (A) negative with respect to ground. Since the translator and IF grid returns are connected to point (A), any increase in signal increases the drop across the volume control, increases the negative control grid bias on the 6A7 and 78, reduces their amplification, and so tends to maintain the signal at the IF output at a constant value.

Any desired portion of the AF component across the volume control resistance is picked off by the moving arm of the control, fed through the .006 condenser to the grid of the triode portion of the 75 tube. It is there amplified and fed to the output tube and then to the dynamic loudspeaker.

When peaking the IF transformers, use a low enough output from the test oscillator to render the AVC action inoperative.

Some of these receivers use wet electrolytics for C14 and C15 (part No. R9204); others use dry electrolytics almost identical in appearance(part No. R9397). If replacement of either of these condensers ever becomes necessary, use the R9397. The pre-selector coil may be bent out of the way to permit removal of the condensers.

The chassis and shafts are above ground potential, making it necessary to insulate the knobs and the equatorial ring from the shafts by means of fibre bushings. Note that the bushing in the knob is closed in on one end to prevent the end of the shaft from touching the knob. Be sure these insulating bushings are properly replaced after dis-assembling the Globe.

MECHANICAL ASSEMBLY OF THE RECEIVER

The receiver consists of six parts;

1. The upper half globe
2. The lower half globe
3. The chassis assembly
4. The goose neck
5. The base
6. The loudspeaker assembly

The top half globe is removed by unscrewing the acorn shaped ornamental nut and the knurled nut that it covers. The half globe then can be lifted off. Do not neglect to replace the felt washer on the mounting stud when putting the top half globe back into position.

The chassis can be removed from the bottom half globe by unscrewing the three screws that hold the equatorial ring, removing it, and then taking out the screws which mount the chassis to the tapped bosses moulded in the bottom half globe. Then remove the cable clamp and unsolder the wires from the terminal board, releasing the chassis.

To remove the bottom half globe, proceed as follows:

1. Unscrew the round jam nut. This can be done readily by inserting the ends of a pair of long nose pliers in the holes in the nut.

2. Unscrew the hexagonal adjusting nut.

3. Pry up the keyed stop washer.

4. The bottom half globe then can be pulled off of the gooseneck.

Should replacement of the bottom half globe be made, be sure to put the bracket on in its proper position. The stop which is punched in the bracket should face the side of the globe which has the EQUATION OF TIME CHART. Tighten the hexagonal nut only enough to secure the amount of tension needed for proper turning of the globe. If it is made too tight, the globe can not be rotated. After the hexagonal nut has been adjusted, tighten the round jam nut down on it. Do not allow the hexagonal nut to be turned by the jam nut.

MODEL 700,701,702
Voltage
Mechanical notes

COLONIAL RADIO CORP.

When ordering replacement half globes mention the color of the dot of paint on the inside of the globe. This daub of paint identifies the classification of the globe for matching purposes.

To remove the speaker assembly from the globe base, unscrew the six felt covered screws that hold the bottom plate. Then remove the two screws that bind the speaker assembly to the tapped bosses in the globe base.

To dis-assemble the globe base from the gooseneck, loosen the set screw in the hexagonal nut and then remove the nut. If replacement of the globe base is made, be sure the gooseneck is mounted in its proper position. It should face left when the back grille opening faces you. (The back grille can be identified by the notch cut in it for the power cord.) After tightening the hexagonal nut, drill a shallow hole in the bakelite for the setscrew point and then replace and tighten the setscrew.

If light shines through the crack between the two half globes, paint the pilot light bulb with black paint. Then scrape clear a window large enough and in the proper position to illuminate the dial.

If the terminal board on the chassis is removed, be sure to replace BOTH washers under the heads of each mounting screw when putting the board back in position. Otherwise the screws may project far enough to scrape the dial. Turn the dial slowly and carefully at first to be sure that it does not scrape.

The dial can be replaced without removing the drum from the chassis. Cut the celluloid away and clip the eyelets with a pair of diagnol pliers. Small screws and nuts can be used to mount the replacement dial. In a few cases it may be necessary to file some of the screw heads to insure sufficient clearance for the dial.

Do not use any kind of abrasive metal polish on any of the gold plated parts of the globe. Ordinary furniture polish, suggested in the Instruction Leaflet, will clean the metal parts as well as the moulded parts.

TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M. A.	SCREEN M. A.
78 - IF	105	40	*	2.5	1
75 - AVC-Det-AF	55		*	.2	
43 - Output	90	105	-6*	19	3
6A7 - Osc-Transl	Ep=105v; Eg #2-105v; Eg #3&5-32v; Eg #4-*; Ip-.8ma; Ig #2-1.1ma; Ig #3&5-1ma.				
25Z5 - Rect.	Plate current - 38m.a. per plate				

* - Indicates high series resistance

Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, the voltage readings can be taken with a 1000 ohms per volt voltmeter, from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.

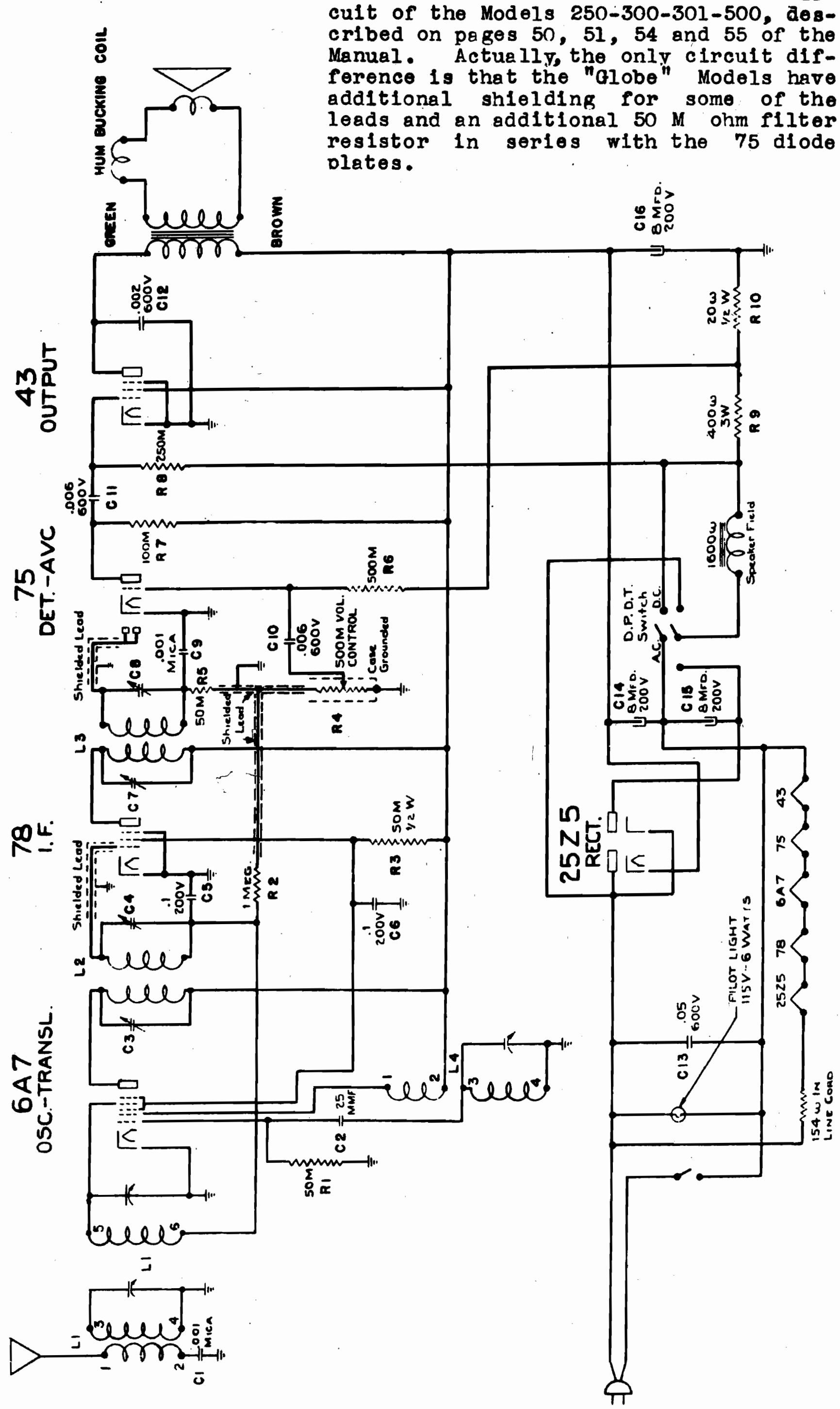
If an analyzer is used to measure heater voltages, be sure a tube with heater intact is in the analyzer socket. Otherwise, the full line voltage will be across the heater prongs, possibly damaging the analyzer voltmeter.

The heaters of the tubes are in series so that if one burns out, none will light. The others will light when the burned out tube is replaced.

An open power cord resistor also will prevent the tubes from lighting. This can be tested for by connecting a continuity meter between points 17 and 18 of the speaker terminal board. (The receiver must be disconnected from the line.) If no reading is obtained, the power cord is defective and should be replaced.

COLONIAL RADIO CORP.

The circuit of these AC-DC "Globe" models is almost identical with the circuit of the Models 250-300-301-500, described on pages 50, 51, 54 and 55 of the Manual. Actually, the only circuit difference is that the "Globe" Models have additional shielding for some of the leads and an additional 50 M ohm filter resistor in series with the 75 diode plates.



Resistors Are $\frac{1}{3}$ Watt Unless Otherwise Marked.

NUMBERING & LETTERING CORRESPONDS TO THAT OF SERVICE ILLUSTRATIONS

FIG. 47. SCHEMATIC DIAGRAM - MODELS 700 - 701 - 702

MODEL 700,701,702
Chassis view
Parts List

COLONIAL RADIO CORP.

R-9168	Lamp - Pilot - 6 watt
R-9385BL	Lamp - Pilot - 3 watt (Ivory Globe only)
R-8987	Nut - Globe mtg.
R-9279	Nut - Globe Mtg. jam
R-8983	Nut - Knurled
R-9009	Nut - Base Mtg.
R-8937	Nut - Cap
R-8091	Plate - AC-DC switch
R-7585	Resistor - 1 megohm, 1/3 watt carbon
R-7228	Resistor - 500 M ohms, 1/3 watt Carbon
R-7584	Resistor - 250 M ohms, 1/3 watt carbon
R-7586	Resistor - 100 M ohms, 1/3 watt carbon
R-6637	Resistor - 50 M ohms, 1/3 watt carbon
R-6445	Resistor - 50 M ohms, 1/2 watt carbon

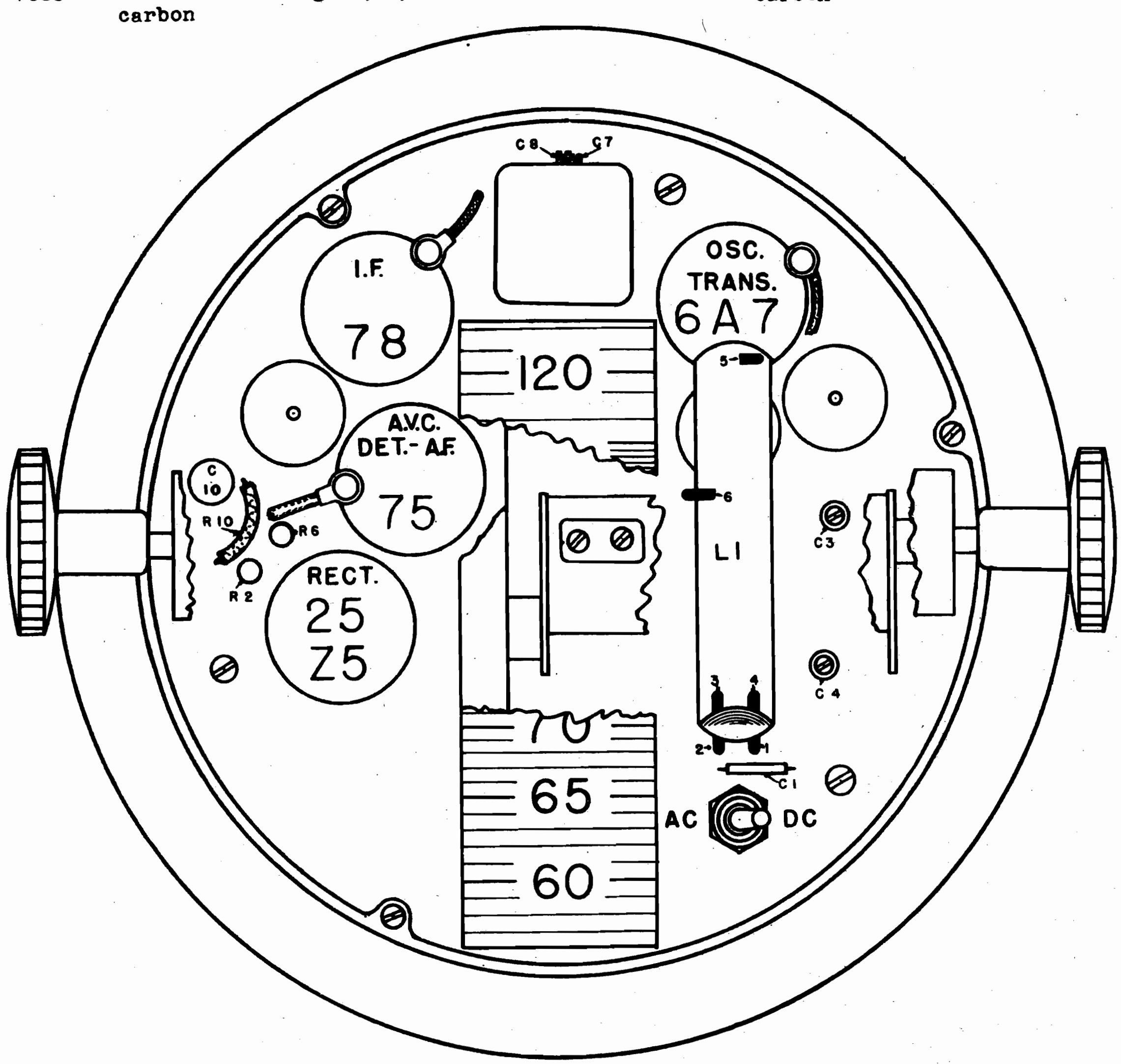
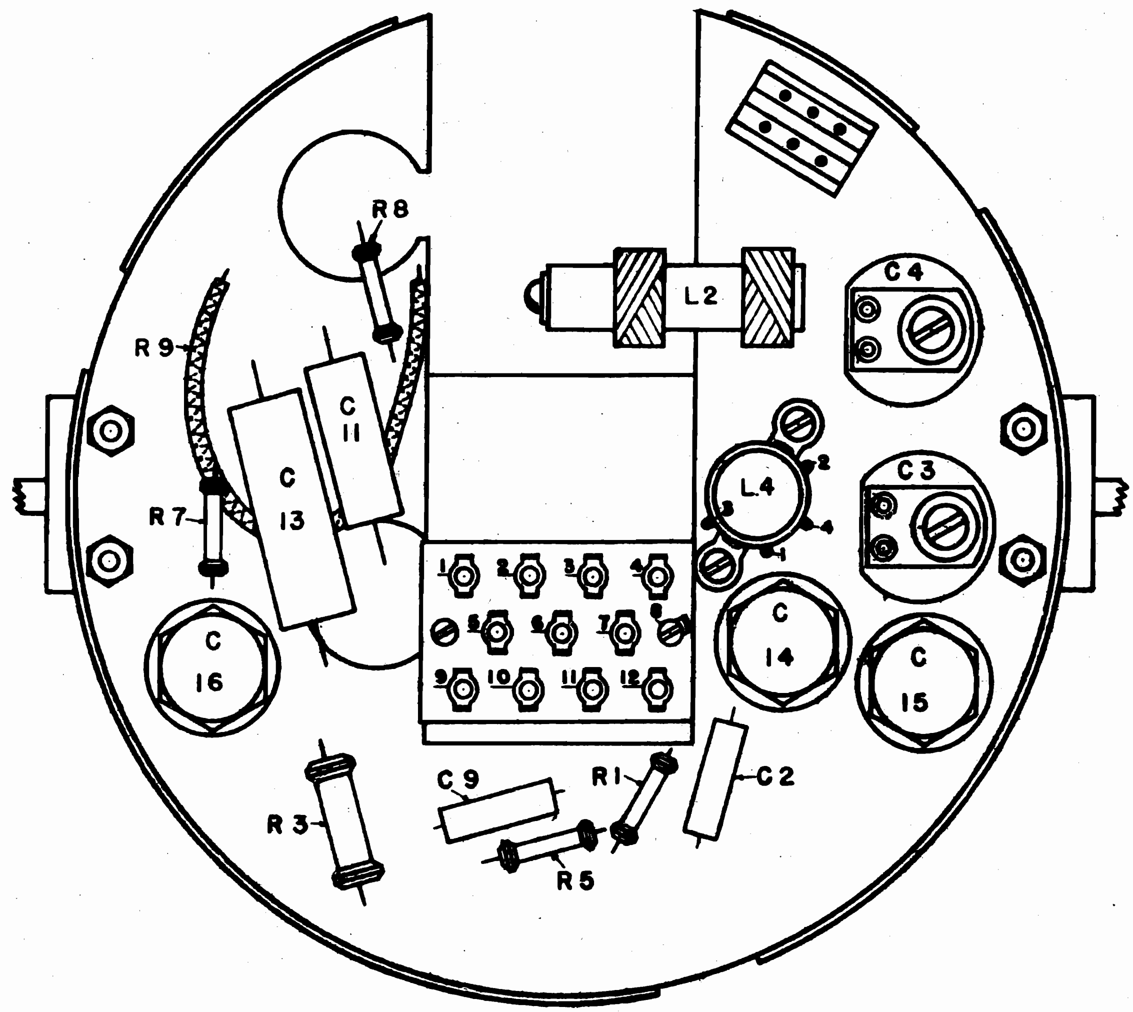


FIG. 48. TOP VIEW OF CHASSIS - MODELS 700 - 701 - 702

R-8990	Condenser - Variable tuning
R-8038	Condenser - IF tuning
R-9397	Condenser - 8 mfd. dry electrolytic
R-8301	Condenser - .1 mfd. 200 volt, dual
R-9145	Condenser - .05 mfd. 600 volt,
R-8056	Condenser - .006 mfd. 600 volt,
R-8055	Condenser - .002 mfd. 600 volt,
R-6759	Condenser - .001 mfd. mica
R-8711	Condenser - .000025 mfd. mica
R-8996	Control - Volume
R-9004	Cord - Maroon
R-9377	Cord - Ivory
R-9378	Cord - Black
R-9005A	Cover - Bottom
R-9064	Dial - Time
R-9012	Felt washer
R-9281	Foot - Felt covered, base
R-8927	Globe - Top, Maroon
R-8923	Globe - Bottom, Maroon
R-9373	Globe - Top, Ivory
R-9375	Globe - Bottom, Ivory
R-9374	Globe - Top, Black
R-9376	Globe - Bottom, Black

COLONIAL RADIO CORP.

MODEL 700,701,702
Parts location



1----TO 43 TUBE HEATER
2---TO 43 TUBE GRID
3-- + FIELD
4-- — FIELD
5---TO JUNCTION OF PLATE & CATHODE OF 25Z5 TUBE
6---GROUND & 43 TUBE'S CATHODE
7---ANTENNA
8---GROUND
9---"ON-OFF" SWITCH
10---OTHER SIDE OF "ON-OFF" SWITCH & OTHER 43 HEATER PRONG
11---TO 25Z5 HEATER
12--TO 43 TUBE'S SCREEN

FIG. 49. UNDER VIEW OF CHASSIS - MODELS 700 - 701 - 702

MODEL 700,701,702
Parts List
Terminal board data

COLONIAL RADIO CORP.

R-9030A	Antenna - Maroon
R-9379A	Antenna - Ivory
R-9380A	Antenna - Black
R-8935	Base - Globe, Maroon
R-9371	Base - Globe, Ivory
R-9372	Base - Globe, Black
R-8297A	Board - Terminal, single
R-8308A	Board - Terminal, double
R-8994A	Board - Terminal, chassis
R-9003	Bracket - Globe support
R-9407	Cable - Chassis to Speaker
R-6718	Clamp - Cable
R-8048	Clip - Antenna
R-6381	Clip - Grid
R-6381AH	Clip - Grid with shielded lead
R-9057	Coil - Oscillator
R-8995	Coil - Pre-Selector
R-8940	Ring - Equatorial
R-2284	Screw - Set, knobs
R-9453	Screw - Set, dial
R-8524	Shield - Electrolytic Condenser
R-8092	Socket - 6 prong
R-8072	Socket - 7 prong
R-2414	Spacer - Terminal Board Mtg.
R-8076	Switch - AC-DC
S-9451	Speaker
S-9080	Speaker field coil
S-9450A	Speaker - Cone & Voice Coil
S-8640	Speaker - Clamping ring
S-8641	Speaker - Clamping ring
S-8666	Speaker - Suspension spacer
S-8343A	Speaker - Terminal board (3)
S-9068A	Speaker - Terminal board (8)
S-8674	Speaker - Hum bucking coil
S-9449A	Speaker - Transformer
R-9045	Sticker - Tube layout
R-8039A	Transformer - IF input
R-9002A	Transformer - IF output
R-4794	Washer - Insulating - Volume Control
R-8533	Washer - Insulating - Electrolytic Condenser

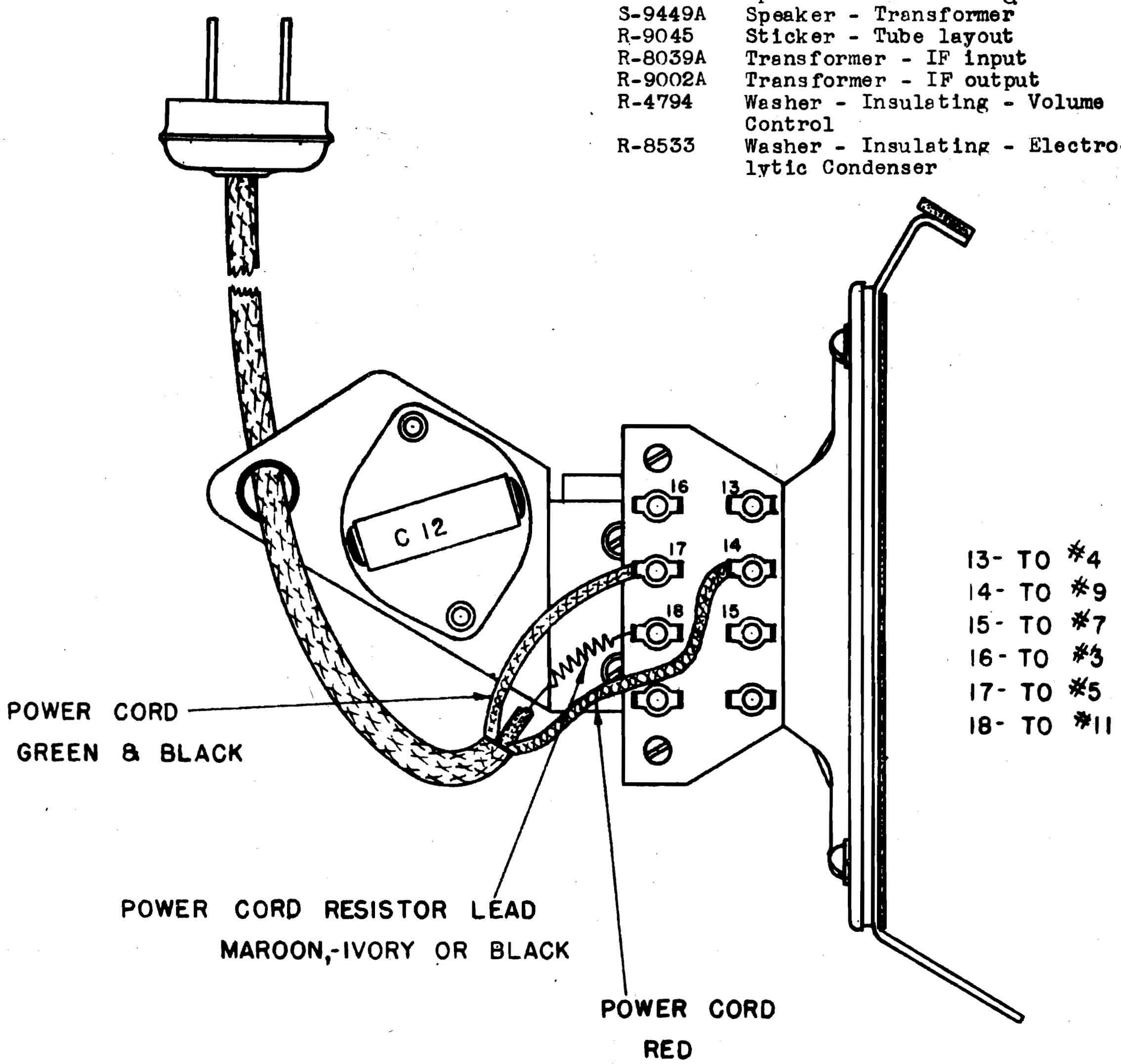


FIG. 50. SPEAKER TERMINAL BOARD CONNECTIONS - MODELS 700 - 701 - 702

COLONIAL RADIO CORP.

MODEL 700 AC, 701 AC, 702 AC
Circuit notes
Voltage

SERVICE NOTES

MODELS 700AC - 701AC - 702AC

These AC "Globe" receivers are five tube superheterodynes with a frequency range extending to 2480 kc.

A 6A7 pentagrid converter fills the function of oscillator and of translator. The 175 kc signal created in its plate circuit is amplified by the 78 IF stage and then coupled to the 75 tube. Diode detection, AVC action and hi mu audio amplification are all obtained from the 75. Its audio output is amplified by the 41 power output pentode and then fed to the dynamic loudspeaker. An 84 rectifier is used.

THE 75 AVC - DETECTOR - AF CIRCUIT

The IF signal is impressed between the diode plates and the cathode of the 75 tube, in series with the 500 M ohm volume control and the 50 M ohm resistor. Diode current flows through the volume control and resistor creating a voltage drop across them with the grounded end of the volume control positive with respect to the grid return end of the 50 M ohm resistor. Since 6A7 and 78 grid returns are connected to the 50 M ohm resistor, the negative potential due to diode current is impressed upon the grids of these tubes. An increase in signal strength increases the diode current, increases the negative bias on the 6A7 and 78, reduces their amplification and so tends to maintain the input to the detector at a constant value since signal strength increases are offset by tube amplification decreases.

The audio component across the volume control is picked off by the move-

The audio component across the volume control is picked off by the moveable arm and fed through the .006 condenser to the control grid of the triode portion of the 75, where it is amplified.

The mechanical assembly of the globe is identical with that of the Models 700 -701-702 AC-DC globes,described on pages 81 and 82.

TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M. A.	SCREEN M. A.
78 - IF	185	65	*	4	1
75 - AVC-Det-AF	105		*	.75	
41 - Output	175	185	-10*	17	2.5
6A7 - Osc-Transl	Ep=185v; Eg #2=185v; Eg #3&5=60v; Eg #4=*; Ip=2.5ma; Ig #2=2.75mc;				
84 - Rect	Plate current = 15m.a. per plate; DC voltage = 275.				

* - Indicates high series resistance.

Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used,the voltage readings can be taken with a 1000 ohms per volt voltmeter, from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.

MODEL 700 AC, 701 AC, 702 AC
Schematic

COLONIAL RADIO CORP.

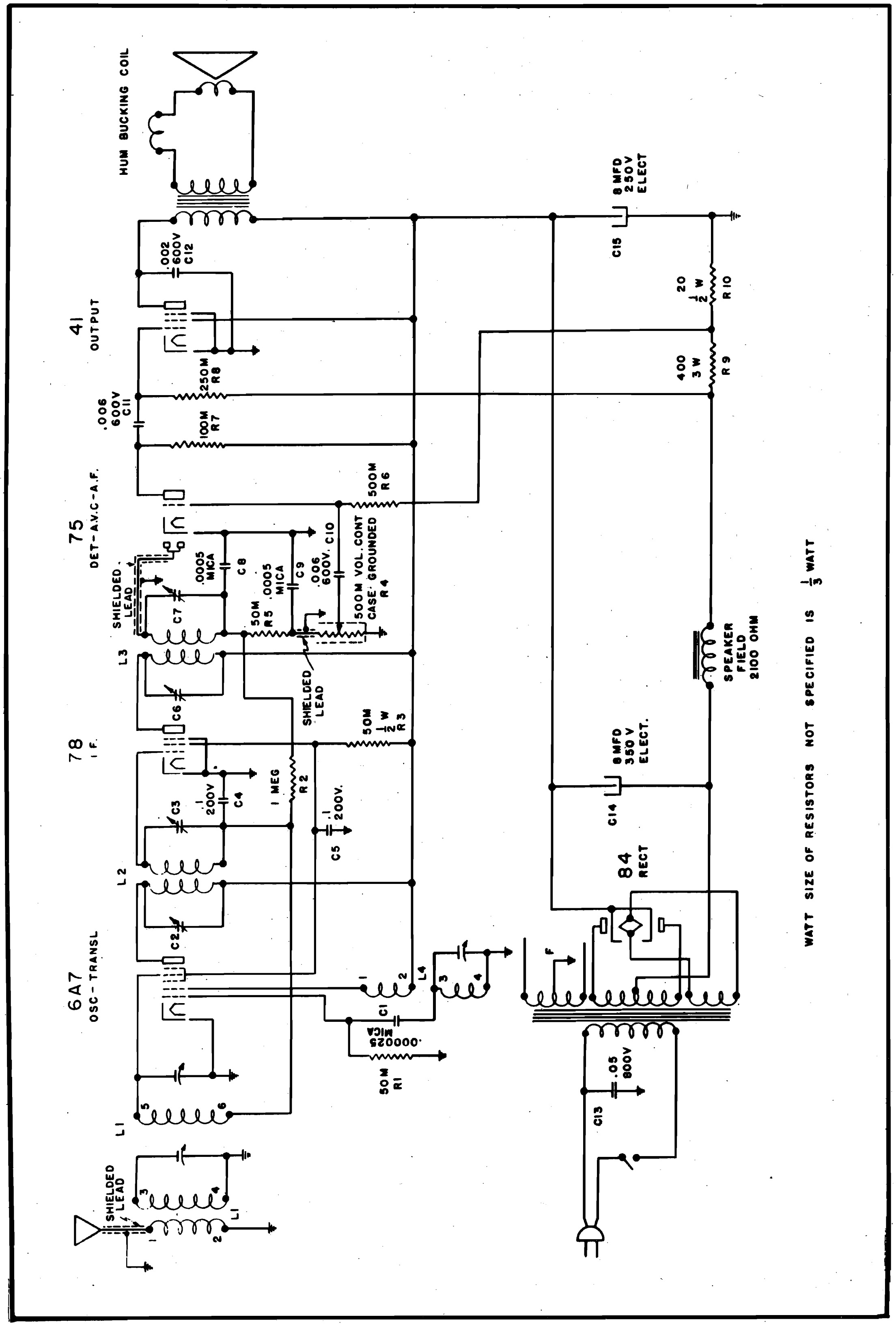


FIG. 55. THE SCHEMATIC DIAGRAM - MODELS 700AC - 701AC - 702AC

MODEL 700 AC, 701 AC, 702 AC
Parts location
Speaker terminal data

COLONIAL RADIO CORP.

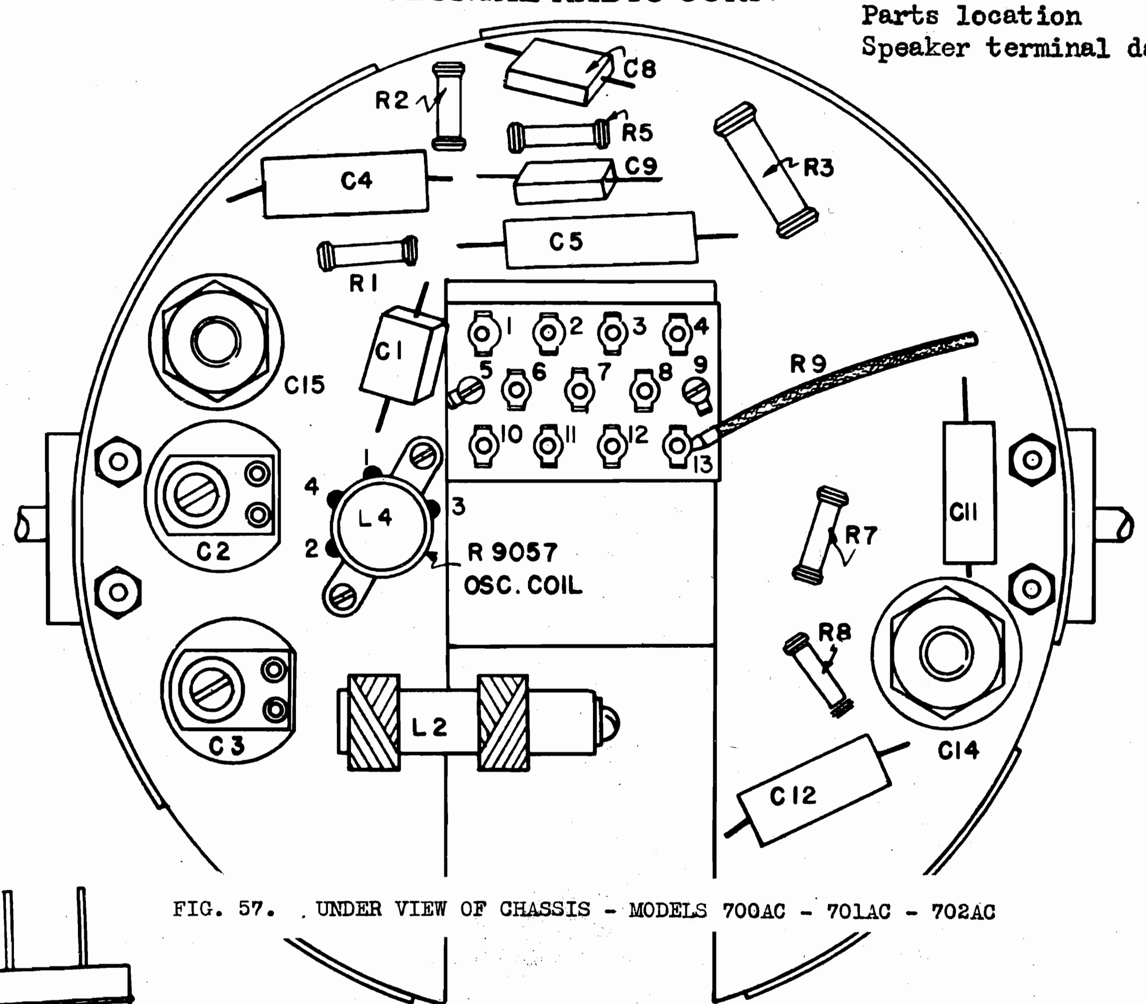


FIG. 57. UNDER VIEW OF CHASSIS - MODELS 700AC - 701AC - 702AC

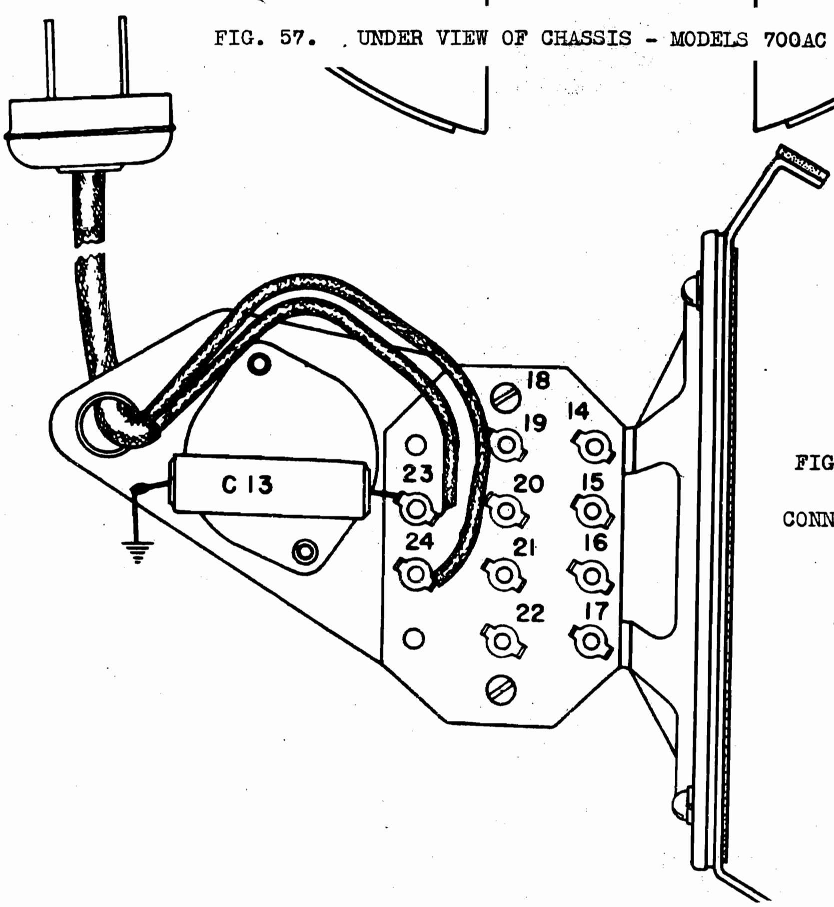


FIG. 58. SPEAKER TERMINAL BOARD CONNECTIONS - MODELS 700AC - 701AC - 702AC

MODEL 700 AC, 701 AC,
702 AC

COLONIAL RADIO CORP.

Socket layout
Parts List

R-7585	Resistor - 1 megohm, 1/3 watt carbon
R-7228	Resistor - 500 M ohms, 1/3 watt carbon
R-7584	Resistor - 250 M ohms, 1/3 watt carbon
R-7586	Resistor - 100 M ohms, 1/3 watt carbon
R-6637	Resistor - 50 M ohms, 1/3 watt carbon
R-6445	Resistor - 50 M ohms, 1/2 watt carbon
R-8562	Resistor - 400 ohms, 3 watt flexible
R-8491	Resistor - 20 ohms, 1/2 watt flexible
R-8624	Condenser - 8 mfd. 300 volt electrolytic
R-9204	Condenser - 8 mfd. 200 volt electrolytic
R-8990	Condenser - Variable tuning
R-8038	Condenser - IF tuning
R-8286	Condenser - .1 mfd. 200 v.
R-8443	Condenser - .05 mfd. 800 v.
R-8056	Condenser - .006 mfd. 600 v.
R-8055	Condenser - .002 mfd. 600 v.
R-6760	Condenser - .0005 mfd. mica
R-8711	Condenser - .000025 mfd. mica

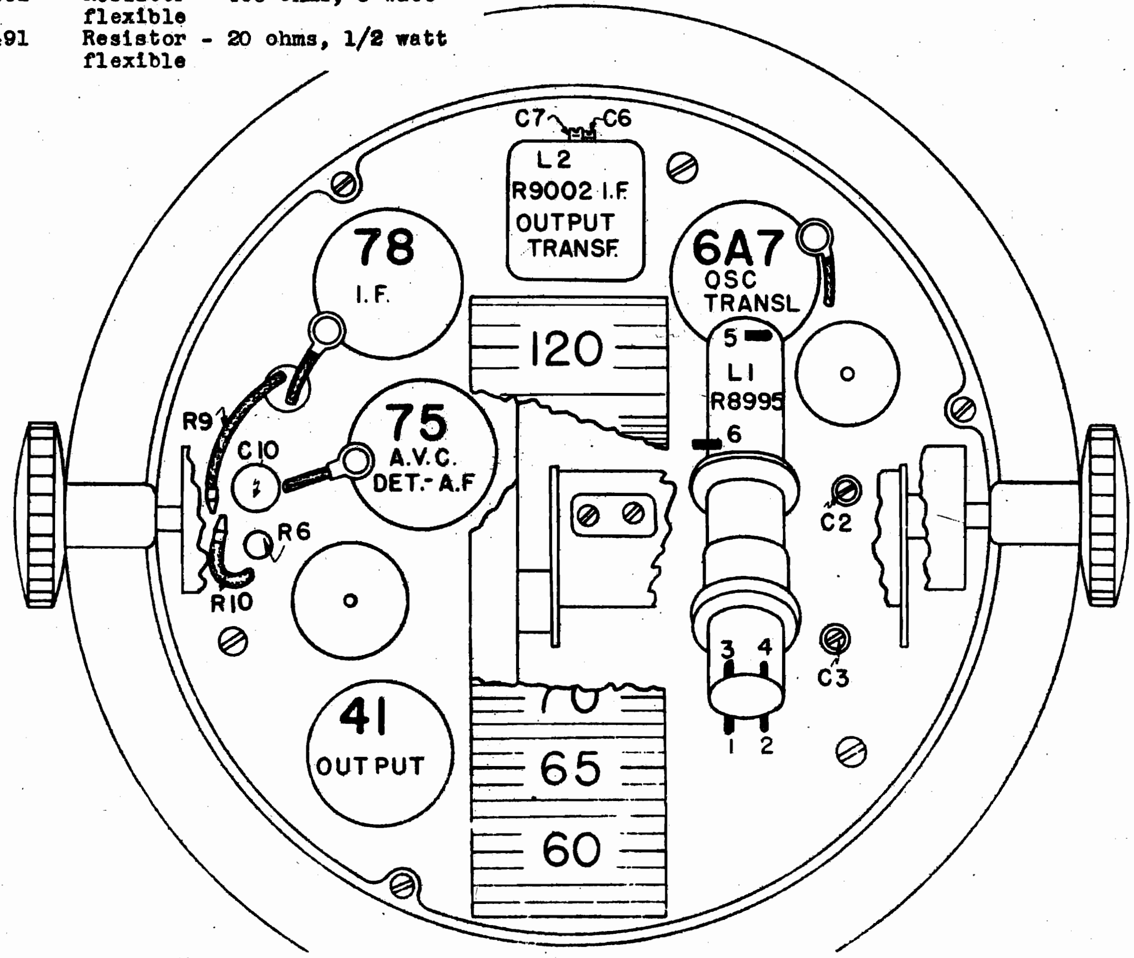


FIG 56. TOP VIEW OF CHASSIS - MODELS 700AC - 701AC - 702AC

R-9396	Control - Volume
R-9362	Cord - Power (Maroon)
R-9382	Cord - Power (Gold)
R-9383	Cord - Power (Black)
R-9005	Cover - Bottom
R-9064	Dial - Time
R-9281	Foot - Felt covered
R-8927	Globe - Top (Maroon)
R-8923	Globe - Bottom (Maroon)
R-9373	Globe - Top (Ivory)
R-9375	Globe - Bottom (Ivory)
R-9374	Globe - Top (Black)
R-9376	Globe - Bottom (Black)
R-8997	Indicator - Station Selector (Maroon)
R-9381	Indicator - Station Selector (Gold)
R-8940	Ring - Equatorial
R-8625	Shield - Electrolytic cond.
R-9360	Shield - Tube
R-8092	Socket - 6 prong
R-8072	Socket - 7 prong
S-9363-A	Speaker - complete
S-9450-A	Speaker - Cone and Voice Coil
R-9368	Speaker - field coil
R-8674	Speaker - hum bucking coil
R-8640	Speaker - cardboard clamping ring
S-8641	Speaker - cardboard clamping ring
S-9386-A	Speaker - Terminal board
S-9454-A	Speaker - Transformer
R-8039	Transformer - IF input
R-9002	Transformer - IF output
R-9356-A	Transformer - Power, 60 cycle

COLONIAL RADIO CORP.

MODEL T-345, C-399, C-995
Speaker replacement Notes, Parts List

Replacing the Cone in S-7592AC Speakers Used in Model C-995, and S-7804AC Speakers Used in Models T-345 & C-399

1. Rip out the old cone thereby making it easy to get at the three suspension mounting screws.
2. Unsolder the voice coil leads from the terminal strip.
3. Remove the three suspension mounting screws.
4. Drill out the cone mounting eyelets or cut off the small head ends with a chisel and hammer. If care is used, the cardboard mounting rings will not be damaged.
5. Remove the cone and blow out any dirt from the air gap.
6. Put the three metal spacer blocks back in position.
7. Put the three suspension clamps and mounting screws in position in the spider and replace the cone and cardboard mounting rings in their original order. The eyeleting tool illustrated is recommended.
8. Screw up the suspension mounting screws by hand. Leave them loose enough so that the suspension can be shifted around.
9. Insert four strips about 3" long, 1/8" wide and .1" thick (cut from a calling card) between the inside of the voice coil and the pole stem. They should be evenly spaced around the pole stem.
10. Tighten the three suspension mounting screws with a 5/16" open end wrench.
11. Replace the eyelets around the edge of the cone, leaving four holes blank for the speaker to baffle mounting screws.
12. Solder the voice coil leads to the terminal strip lugs.
13. Remove the four spacer strips.
14. If it should happen that the cone is not properly centered after the replacement, loosen the three suspension mounting screws and move the cone around until proper centering is secured. Then re-tighten the screws. Sometimes several attempts are necessary before proper centering can be had.

Replacement Parts For The S-7592AC Speaker Are:

PART NO.	DESCRIPTION	NUMBER REQUIRED
S-7106	Cardboard Mounting Ring	3
S-7606A	Cone and Voice Coil Assembly	1
S-7174	Eyelet	14
S-8033	Eyeleting Tool	1

Replacement Parts For The S-7804AC Speaker Are:

PART NO.	DESCRIPTION	NUMBER REQUIRED
S-7769	Cardboard Mounting Ring	1
S-7770	Cardboard Mounting Ring	2
S-7776A	Cone and Voice Coil Assembly	1
S-7789	Eyelet	8
S-8033	Eyeleting Tool	1

MODEL T-397, C-495, C-595, C-695
Speaker replacement Notes, Parts List

COLONIAL RADIO CORP.

REPLACING THE CONE IN S-6294AC SPEAKERS USED IN MODELS T-397, C-495, C-595 & C-695

1. Unsolder the voice coil leads from the terminal strip.
2. Remove the cone mounting screw and washers.
3. Drill out the cone mounting eyelets or cut off the small head ends with a chisel and hammer. If care is used, the cardboard mounting rings will not be damaged.
4. Remove the cone and blow out any dirt from the air gap.
5. Replace the new cone and the cardboard mounting rings in their original order.
6. Insert three strips about 3" long, 1/8" wide and .01" thick (cut from a calling card) between the inside of the voice coil and the pole stem. They should be spaced evenly around the pole stem.
7. Replace and tighten the cone mounting screw and washers.
8. Replace the eight eyelets around the edge of the cone, leaving four holes blank for the speaker to baffle mounting screws. The eyeleting tool illustrated is recommended.
9. Remove the three inserted spacer strips.
10. Solder the voice coil leads to the two outside lugs of the three on the terminal strip.
11. If it should happen that the cone is not properly centered after completing the replacement, loosen the cone mounting screw until proper centering is secured. Then retighten the screw. Sometimes several attempts are necessary before proper centering can be had.

Replacement Parts Are:

PART NO.	DESCRIPTION	NUMBER REQUIRED	PRICE
S-6299	Cardboard Mounting Ring	2	.06 each
S-6300A	Cone and Voice Coil Assembly	1	1.14 each
S-6311	Eyelet	8	.53 per 100
R-4329	Lockwasher for R-4868	1	.03 per 10
R-4868	Screw, Cone mounting	1	.03 per 10
R-5496	Washer, Flat	1	.03 per 10
S-8033	Eyeleting Tool	1	3.25 each

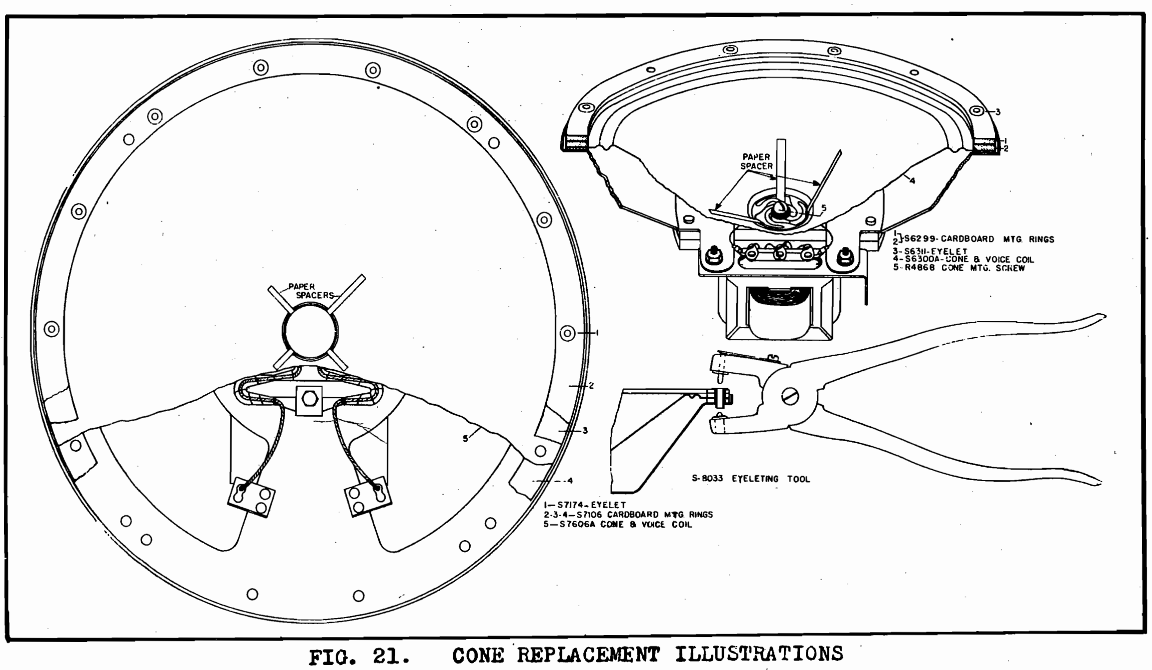


FIG. 21. CONE REPLACEMENT ILLUSTRATIONS

CROSLEY RADIO CORP.

MODEL 10 Schematic
MODEL 38 Schematic

1	G2-30173	ANTENNA COIL
2	G1-30173	OSC. COIL
3	B-30079	VAR. CONDENSER
4	B-30192	A-47-SWITCH
5	G2-29699	B-14 TRIMMER COND.
6	~~W-28660-A~~	~~COND. (.0001 MFD.)~~
7	26577	3 MEG. RESIS.
8	~~W-24043A~~	~~COND. (.1 MFD.)~~ 200V.
9	21875	100,000 Ω RESIS.
10	W-28619	COND. (.006 MFD.) 200V.
11	~~G1-24034~~	~~CHOKE~~
12	LW-30113	SHIELDED LEAD
13	W-28619	COND. (.006 MFD.) 200V.
14	21896	10,000 Ω RESIS.
15	21237-A	60,000 Ω RESIS.
16	G1-28884	PADDING COND.
17		PADDING COND.
18	W-30180	COND. (.0012 MFD.) 200V.
19	W-27885 A	CORD & PLUG
20	G1-30078	AC RECEPTACLE
21	W-30081	SWITCH D.P.D.T.
22		SWITCH S.P.S.T.
23	W-27676	COND. 4 MFD. 150V.
24		COND. 4 MFD. 150V.
25	G6-28168	FILTER CHOKE
26	~~W-28864A~~	~~305-30 Ω RESIS.~~
27	W-4099A	DIAL LAMP 6V.
28	LW-20264	ANT.-GND.-TERM.
29	G38-27975	SOCKET '77
30	G12-27975	SOCKET '37
31	G6-29699	TRIMMER COND.
32	G3-24234	R.F. CHOKE
33	W-28619	.006 MFD. COND. 200V.
34	W-7847A	COND. (.0001 MFD.) 200V.
35	W28864B	285 Ω ±5% 26.1 ±5% WITH 200°F SURFACE TEMP.
36	W-30488	COND. .02 MFD. 400 V.
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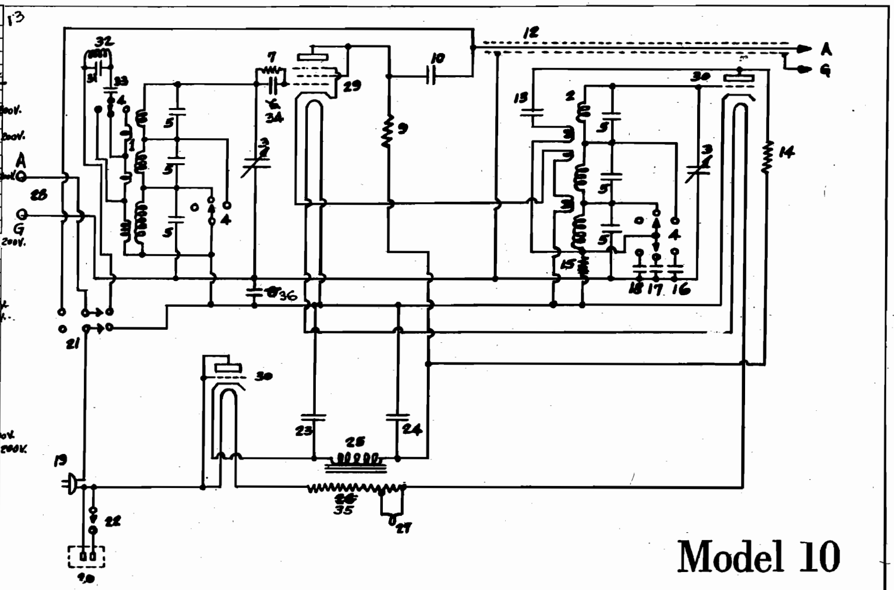

Model 10

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78			94		

	RECORD OF CHANGES	Change No.
A	ITEM 6 REPLACED WITH ITEM 34 7-25-33	3475
B	ITEM 26 REPLACED BY ITEM 35 8-4-33 R.E.D.	3491
C	ITEM 8 REPLACED BY ITEM 36 8-7-33	3483

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO
10 WIRING DIAGRAM
APPROVED 7-18-33 | DATE 6/16/33 | ADB | DWG. NO. B-30102

1	W29951	A 57 CORD
2	~~W-29953~~	~~197 Ω RESIS.~~
3		~~28 Ω RESIS.~~
4	G51-28807	25Z5 SOCKETS
5	W4099A	PILOT LIGHT
6	~~W-29806~~	~~16 MFD. 125 V.~~
7		~~16 MFD. 100 V.~~
8		~~16 MFD. 100 V.~~
9	G2-24628	F.U.7 CHOKE
10	~~G1-24393~~	~~TERM. BOARD~~
11	G4-24393	TERM. BOARD
12	~~W-28808~~	~~SWITCH~~
13	W29755	CORD & SPKR. PLUG
14	W-29806A	16 MFD. 125 V.
15		16 MFD. 100 V.
16	W-30119	CABLE
17	W28607-A	SWITCH
18	G4-24393	TERM. BOARD
19	W-29592A	.003 MFD. 400 V.
20	W-29953-A	184.5 Ω RESIS.
21		26.9 Ω RESIS.
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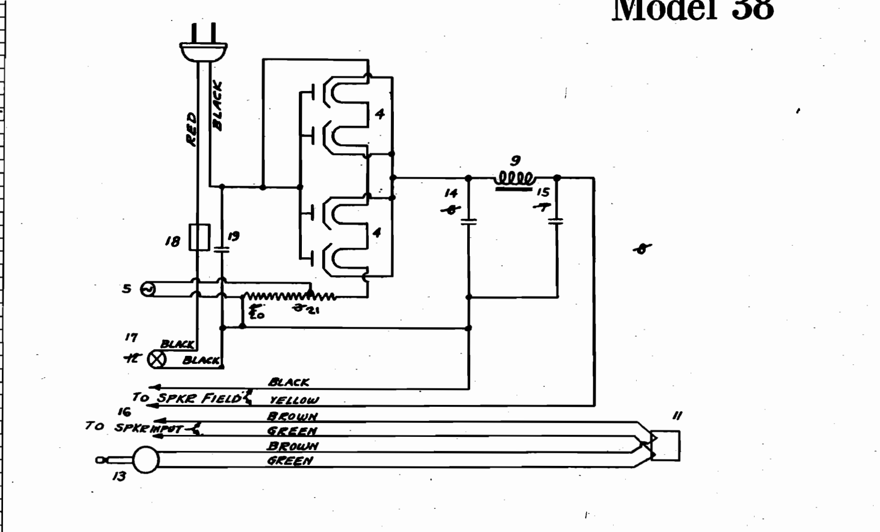
Model 38



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65			81		
66			82		
67			83		
68			84		
69			85		
70			86		
71			87		
72			88		
73			89		
74			90		
75			91		
76			92		
77			93		
78			94		

	RECORD OF CHANGES	Change No.
A	ITEMS 6-7-8 REPLACED BY ITEMS 14-15 6-14-33	3317
B	CABLE ADDED ITEM 16 6-19-33	3331
C	ITEM 12 REPLACED BY ITEM 17 6-20-33	3430
D	ITEM 10 REPLACED BY ITEM 18 6-22-33	3335
E	CIRCUIT CHANGED ITEM 19 ADDED 6-30-33	3457
F	ITEMS 2-3 REPLACED BY ITEMS 20-21 8-7-33	3483

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO
MODEL 38 AC-DC SPEAKER FIELD SUPPLY
APPROVED 6-10-33 | DATE 5-26-33 | | DWG. NO. B-29957

MODEL 98
Schematic
Voltage

CROSLEY RADIO CORP.

Model 98

Specifications

Model 98 is a five tube superheterodyne designed for automobile operation. The intermediate frequency is 181.5 KC. The "A" supply is furnished by the automobile storage battery and the "B" supply by the automobile storage battery used in connection with a Crosley Syncronode. Service information on the Syncronode is furnished in a separate bulletin.

Tubes and Voltage Limits

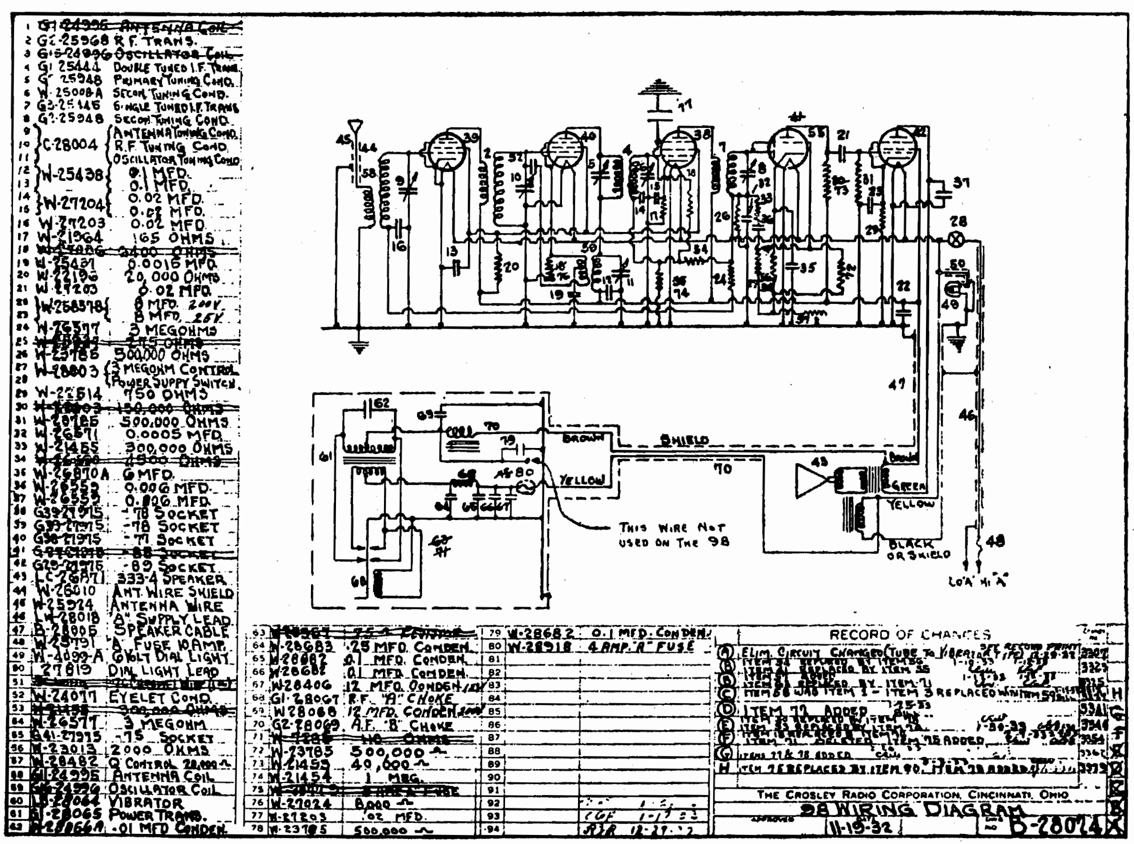
The following chart gives the tubes, their functions, and voltages, measured with the receiver in operating condition but with no signal to the antenna circuit. Use a high resistance D. C. voltmeter (1000 ohms per volt or more) for all measurements. The voltage limits are + or — 10% of the values given.

All voltages are measured from tube contact to chassis with 6.3 volts at the battery and 180 volts from the Syncronode.

The "Q" control should be entirely off.

Tube	Position	Voltages: Plate	Screen Grid	Cathode	Supp. Grid	Fil.
-78	R. F. Amplifier	180	85	0	0	6.0
-77	Oscillating detector	180	85	4.5	4.5	6.0
-78	I. F. Amplifier	180	85	2.0	0	6.0
-75	Diode—A. F. Amplifier	130		1.5		6.0
-89	Output (Class A Pentode)	180	180	17.0	17.0	6.0

"A" battery drain—4.6 amp. at 6.3 volts.



MODEL 99
Schematic
Voltage

CROSLEY RADIO CORP.

Model 99

Specifications

Model 99 is a six tube superheterodyne designed for automobile operation. The intermediate frequency is 181.5 KC. The "A" supply is furnished by the automobile storage battery and the "B" supply by the automobile storage battery used in connection with a Crosley Syncronode. Service information on the Syncronode is furnished in a separate bulletin.

Tubes and Voltage Limits

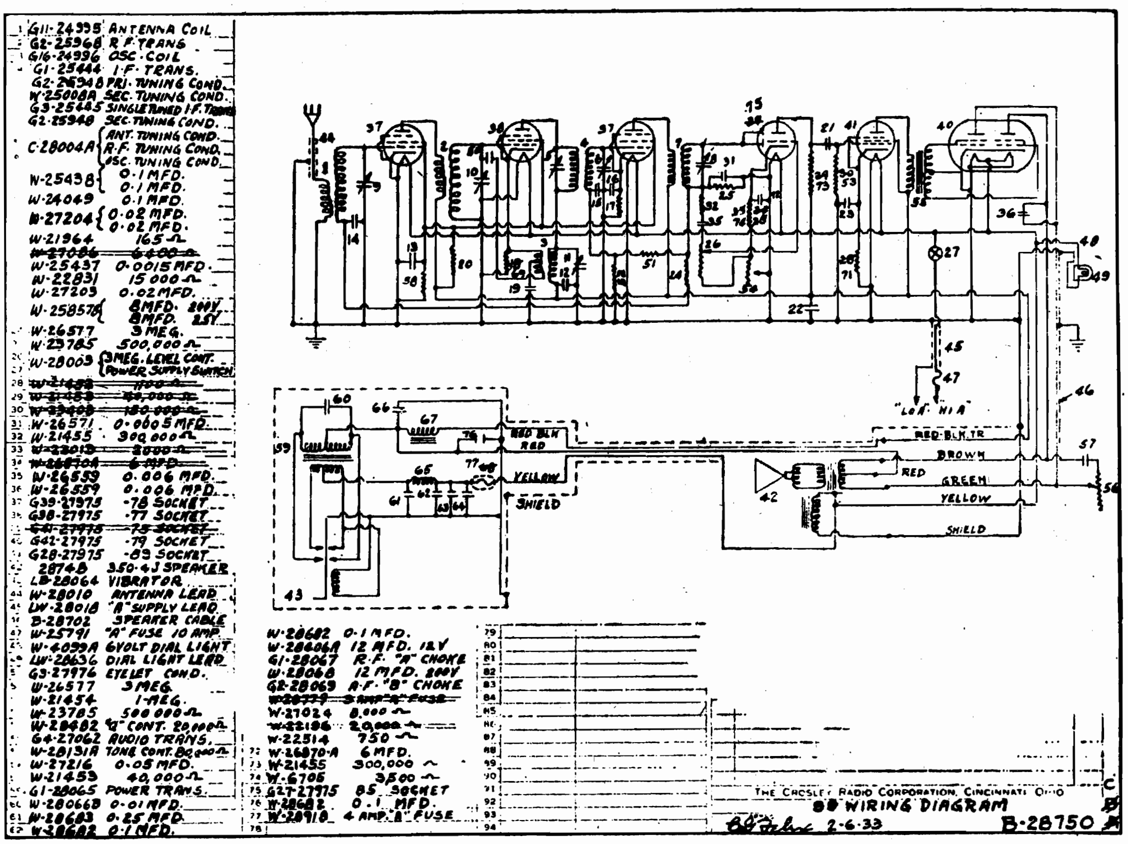
The following chart gives the tubes, their functions, and voltages measured with the receiver in operating condition but with no signal to the antenna circuit. Use a high resistance D. C. voltmeter (1000 ohms per volt or more) for all measurements. The voltage limits are + or — 10% of the values given.

All voltages are measured from tube contact to chassis with 6.3 volts at the battery and 170 volts from the Syncronode.

The "Q" control should be entirely off.

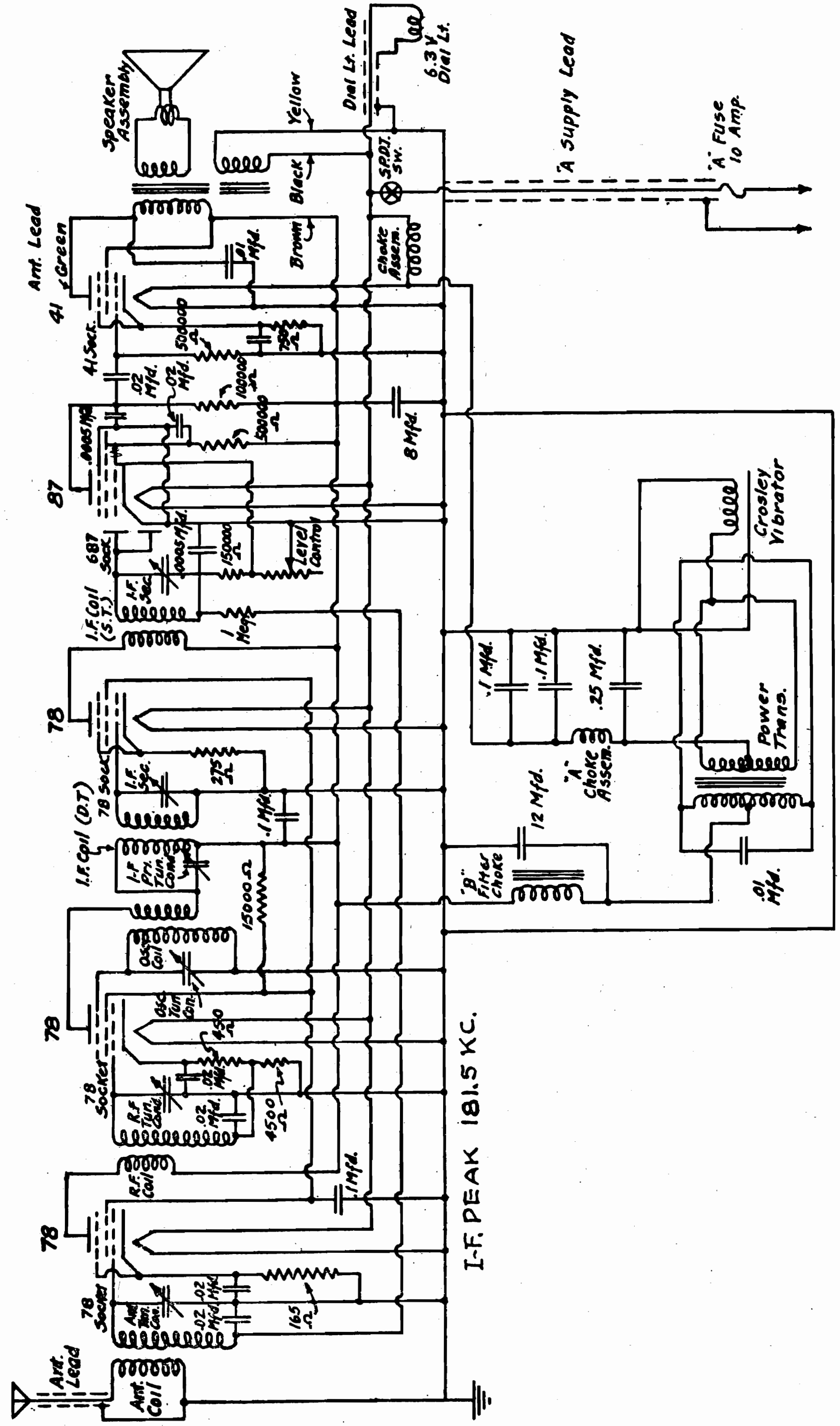
		Voltages				
Tube	Position	Plate	Screen Grid	Cathode	Supp. Grid	Fil.
-78	R. F. Amplifier	170	80	0	0	6.0
-77	Oscillating detector	170	80	4.0	4.0	6.0
-78	I. F. Amplifier	170	80	1.5	1.5	6.0
-85	Diode—A. F. Amplifier	25		2.0		6.0
-89	A. F. Amplifier	170	170	17	17	6.0
-79	Output (Class B)	170		0		6.0

"A" battery drain—5.3 amp. at 6.3 volts.



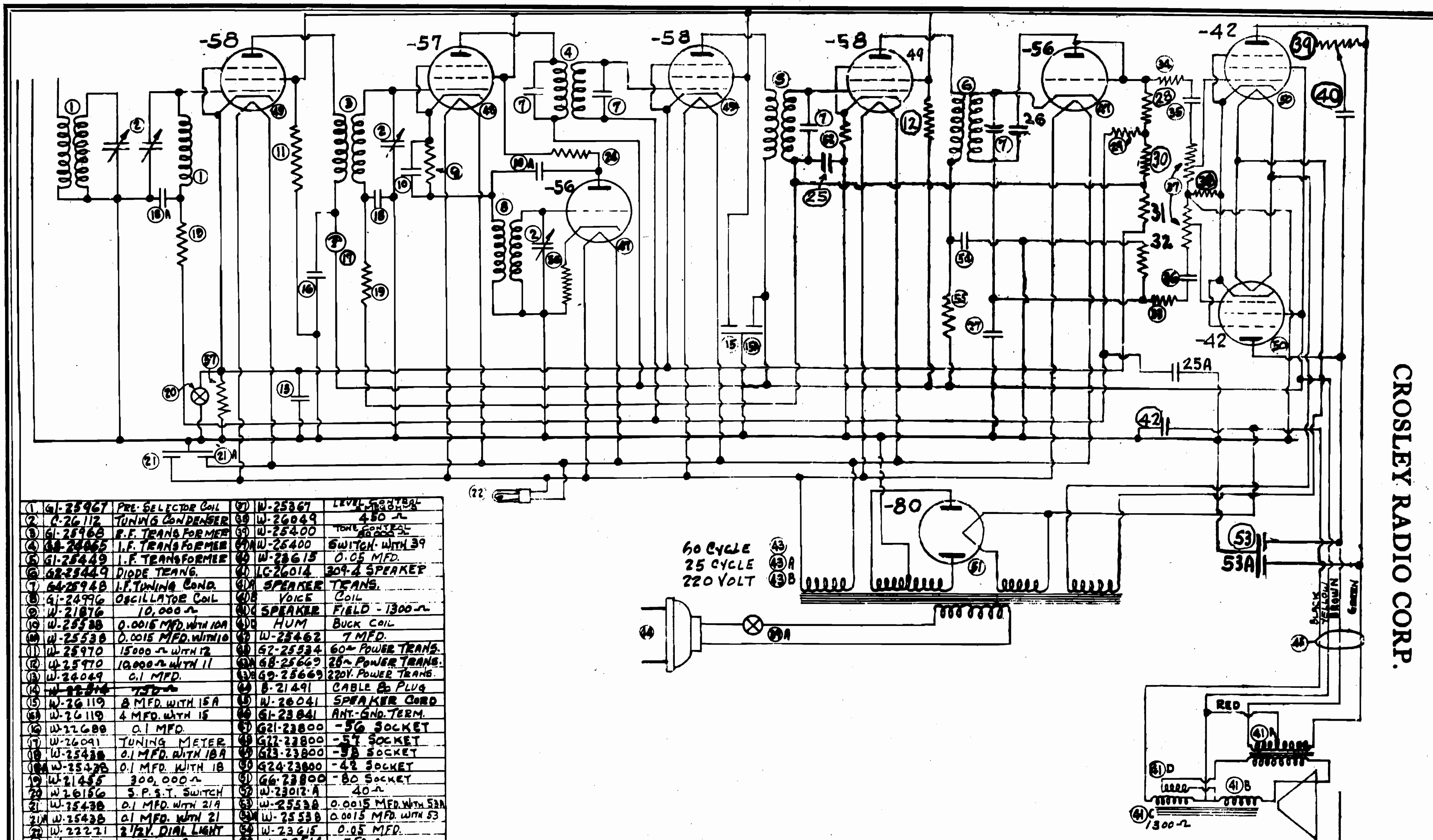
MODEL 102
Schematic

CROSLEY RADIO CORP.



CROSLEY RADIO CORP.

MODEL 130
Schematic



1	G1-25967	PRE-SELECTOR COIL	37	W-25367	LEVEL CONTROL 1 MEGOHM
2	C-26112	TUNING CONDENSER	38	W-26049	450 Ω
3	G1-25968	R.F. TRANSFORMER	39	W-25400	TONE CONTROL 50,000 Ω
4	G1-26065	I.F. TRANSFORMER	39A	W-25400	SWITCH-WITH 39
5	G1-25449	I.F. TRANSFORMER	40	W-23615	0.05 MFD.
6	G2-25449	DIODE TRANS.	41	LC-26014	309-4 SPEAKER
7	G4-25948	I.F. TUNING COND.	41A	SPEAKER	TRANS.
8	G1-24996	OSCILLATOR COIL	41B	VOICE	COIL
9	W-21876	10,000 Ω	41C	SPEAKER	FIELD - 1300 Ω
10	W-25538	0.0015 MFD. WITH 10A	41D	HUM	BUCK COIL
10A	W-25538	0.0015 MFD. WITH 10	42	W-25462	7 MFD.
11	W-25970	15000 Ω WITH 12	43	G2-25534	60~ POWER TRANS.
12	W-25970	10,000 Ω WITH 11	43A	G8-25669	25~ POWER TRANS.
13	W-24049	0.1 MFD.	43B	G9-25669	220V. POWER TRANS.
14	~~W-22514~~	~~750 Ω~~	44	B-21491	CABLE & PLUG
15	W-26119	8 MFD. WITH 15A	45	W-26041	SPEAKER CORD
15A	W-26119	4 MFD. WITH 15	46	G1-23841	ANT.-GND. TERM.
16	W-22688	0.1 MFD.	47	G21-23800	-56 SOCKET
17	W-26091	TUNING METER	48	G22-23800	-57 SOCKET
18	W-25438	0.1 MFD. WITH 18A	49	G23-23800	-58 SOCKET
18A	W-25438	0.1 MFD. WITH 18	50	G24-23800	-42 SOCKET
19	W-21455	300,000 Ω	51	G6-23800	-80 SOCKET
20	W-26156	S.P.S.T. SWITCH	52	W-23012-A	40 Ω
21	W-25438	0.1 MFD. WITH 21A	53	W-25538	0.0015 MFD. WITH 53A
21A	W-25438	0.1 MFD. WITH 21	53A	W-25538	0.0015 MFD. WITH 53
22	W-22221	2 1/2 V. DIAL LIGHT	54	W-23615	0.05 MFD.
24	W-21876	10,000 Ω	55	W-22514	750 Ω
25	W-25438	0.1 MFD. WITH 25A	56	W-25937	275 Ω RESISTOR
25A	W-25438	0.1 MFD. WITH 25	57	W-24097	350 Ω
26	W-26152A	0.0001 MFD. WITH 27			
27	W-26152	0.00015 MFD. WITH 26			
28	W-21455	300,000 Ω			
29	W-22215	3 MEGOHM			
30	W-21875	100,000 Ω			
31	W-21453	40,000 Ω			
32	W-23785	500,000 Ω			
33	W-23785	500,000 Ω			
34	W-23785	500,000 Ω			
35	W-25435	0.003 MFD.			
36	W-25435	0.003 MFD.			

MATERIAL — ALL FRACTIONAL DIMENSIONS ARE + OR −

56 ITEM 56 ADDED C.W. 7-8-32 3103
14 ITEM 14 REPLACED BY 57 C.W. 7-11-32 3106

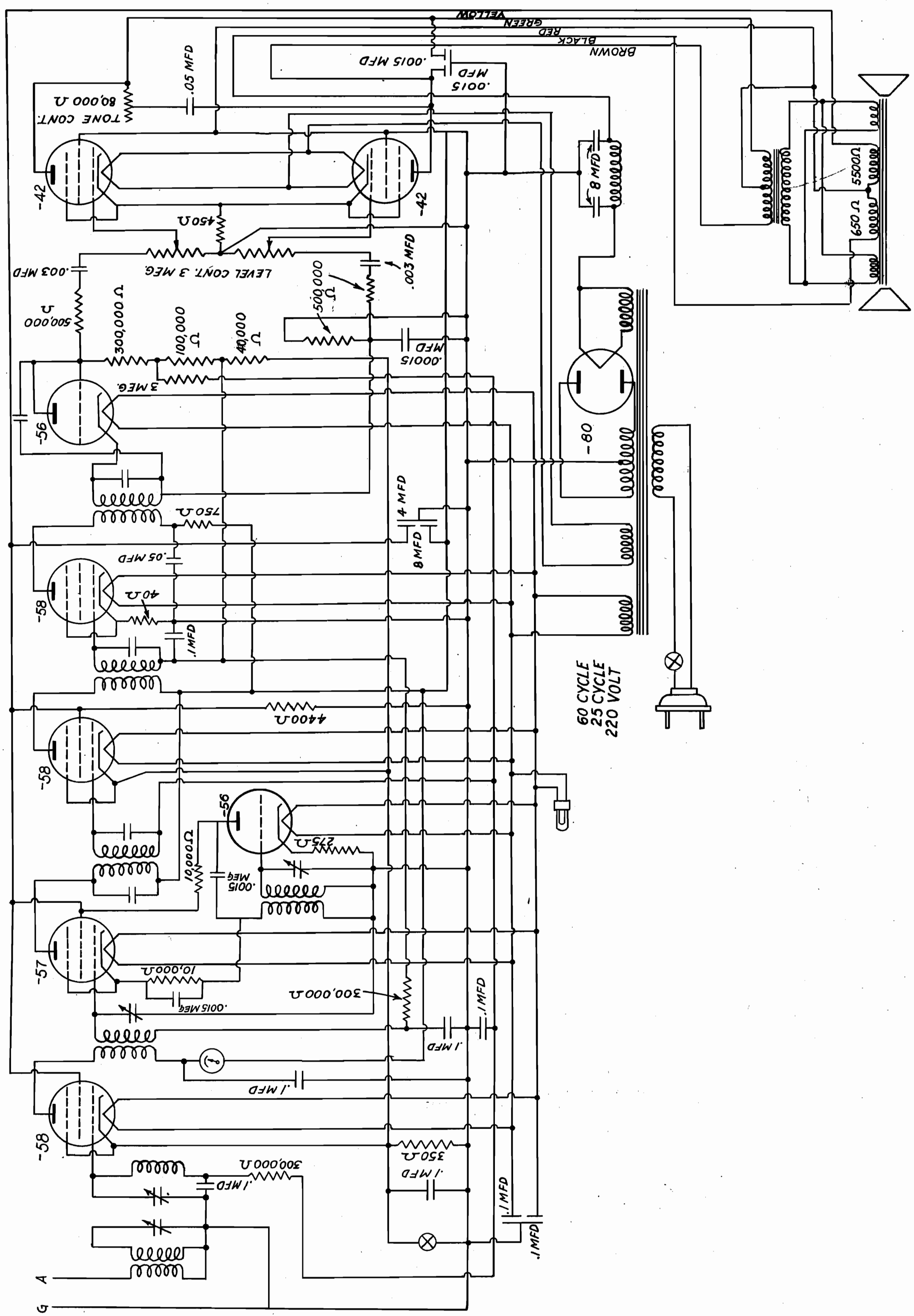
130 CHASSIS ASSEMBLY
WIRING DIAGRAM

6-2-32 SCHAEFER

C-26234-A

MODEL 130-1
Schematic

CROSLEY RADIO CORP.



CROSLEY RADIO CORP.

MODEL 143
Schematic
Voltage

Model 143

Specifications

Model 143 is an eight tube superheterodyne designed for operation from a 2 volt "A" battery; 135 volts of "B" battery and 22½ volts of "C" battery. The intermediate frequency is 181.5 Kc.

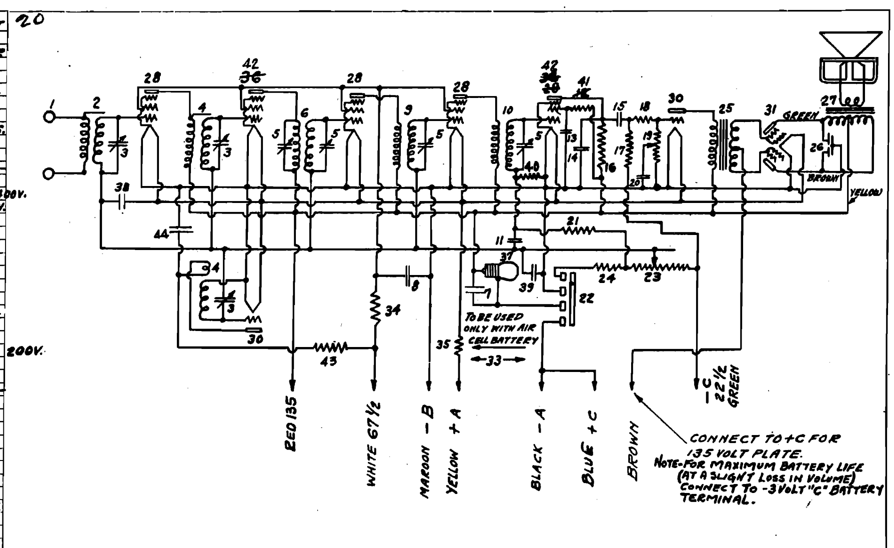
Tubes and Voltage Limits

The tubes and voltages are given in the following table. All voltages, except bias, are measured with a 250 volt D.C. voltmeter (1000 ohms per volt, from "B-" to tube contact; with the receiver in operating condition, but no signal to the antenna circuit. Bias voltages are measured from negative filament to grid.

Tube	Position	Plate	Screen Grid	Bias	Filament
34	R. F. Amplifier	135	50	4	2.0
30	Oscillator	15		0	2.0
34	Modulator	135	50	4	2.0
34	I. F. Amplifier	135	50	4	2.0
34	I. F. Amplifier	135	50	4	2.0
34	Detector	80	20	0.5	2.0
30	A. F. Amplifier	135		1.5	2.0
19	Output	135		0	2.0

Voltage limits are plus or minus 10% of values given.
Voltages between "B-" and chassis is 4 volts, used for R. F., I. F., and modulator bias.

1	LW-20264	ANT. & GND. POST
2	G10-24995	ANTENNA COIL
3	C-26442C	TUNING CONDENSER
4	G2-27937	INT. & OSC. COIL
5	G3-25948	I.F. TUNING COND.
6	G8-24065	FIRST I.F. TRANS.
7	W-24779	8 MFD. 150V.
8	W-28869	2 MFD. 200V.
9	G2-25449	SECOND I.F. TRANS.
10	G2-25449	THIRD I.F. TRANS.
11	W-27203	0.02 MFD. 200V
12	~~W-26577~~	~~3-MEGOHM~~
13	W-24049A	0.1 MFD. 200V
14	W25969A	0.00017 MFD. 400V.
15	W25969A	0.03 MFD. 400V.
16	21455	300,000 Ω
17	W-26577	3-MEGOHM
18	23785	500,000 Ω
19	W-25666A	TONE CONT. 3-MEG
20	W-6754	0.001 MFD.
21	W-21454	1-MEGOHM
22	W28766A	SWITCH
23	W28766A	VOL. CONT. 10,000 Ω
24	W-24535	2850 Ω
25	G3-24765	A.F. TRANS.
26	W-28771	TWO 0.06 MFD. 200V.
27	28782	349-4 SPEAKER
28	G31-27456	-34 SOCKET
29	~~W-28823~~	~~-32 FLEX. SOCKET~~
30	G9-27456	-30 SOCKET
31	G44-27456	-19 SOCKET
32	~~W-27329A~~	~~SPEAKER CABLE~~
33	B-28770A	BATTERY CABLE
34	23868	6500 Ω
35	G3-23300	.372 Ω
36	~~G1-28824~~	~~-34 FLEX. SOCKET~~
37	W-24885	NEON LAMP
38	W-25516	0.25 MFD. 200V.
39	W-25516	0.25 MFD. 200V.
40	21454	1 MEGOHM
41	21454	1 MEGOHM
42	G1-29082	-34 FLEX. SOCKET
43	22196	20,000 Ω
44	W-24049A	0.1 MFD. 200V.



IF. PEAK 181.5 KC

	RECORD OF CHANGES	Change No
A	3 MEG REPLACED WITH 1 MEG, -32 REPLACED WITH -34	3384
A	1 MEG ADDED	3384
B	TYPE OF -34 FLEX. SOCKET CHANGED 3-25-33 Schaefer	3385
B	ITEMS 22 & 23 WAS W-28766 4-3-33 R.E.D.	3396
C	SEE RECORD PRINT 6-5-33 Schaefer	3443

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO
143 WIRING DIAGRAM
APPROVED 2-24-33 DATE 2-7-33 DWG NO B-28781

MODEL 159
Schematic
Voltage

CROSLEY RADIO CORP.

Model 159

Specifications

Model 159 is a five tube superheterodyne designed for operation from a 32 volt D.C. lighting system. It receives its "B" supply from a Crosley Syncronode. The intermediate frequency is 456 Kc.

Tubes and Voltage Limits

The tubes and voltages are given in the following table. All voltages are measured with a 300 volt D.C. voltmeter (1000 ohms per volt) with a line voltage of 32 volts, from tube contact to chassis. The receiver should be in operating condition, but with no signal to the antenna circuit.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
78	R. F. Amplifier	130	130	4.5	4.5	6.0
78	Oscillator Modulator	147	130	33.0	0	6.0
78	I. F. Amplifier	147	130	4.5	4.5	6.0
77	Detector	53	26.5	6.0	6.0	6.0
43	Output	146	147	6.0		24.0

Voltage limits are plus or minus 10% of values given.

1	G11-24995	ANTENNA COIL
2	G3-25968	R.F. TRANSFORMER
3	G12-24996	OSCILLATOR COIL
4	B-28974	VAR. CONDENSER
5	G7-25444	1ST I.F. TRANS.
6	G2-25948	1ST I.F. TRANS. PRI. TUN. COND.
7	W-25008A	1ST I.F. TRANS. SEC. TUN. COND.
8	W-25008A	2ND I.F. TRANS. SEC. TUN. COND.
9	G9-25445	2ND I.F. TRANS.
10	W-25537A	0.0006 MFD. 400V
11	W-25537A	0.03 MFD. 400V
12	23403	150,000 Ω
13	23785	500,000 Ω
14	29090	338-3M SPEAKER
15	~~W-26573A~~	~~VOLUME CONTROL~~
16	~~W-26573A~~	~~S.P.S.T. SWITCH~~
17	W-25438	0.1 MFD. 200V.
18	W-25438	0.1 MFD. 200V.
19	W-27204	0.02 MFD. 200V.
20	W-27204	0.02 MFD. 200V.
21	W-25937	275 Ω
22	26690	4500 Ω
23	W-23907	750 Ω
24	23616	15,000 Ω
25	W-24784	0.25 MFD. 200V.
26	~~W-26576~~	~~0.02 MFD.~~
27	~~W-26576~~	~~0.02 MFD.~~
28	22199A	25,000 Ω
29	23785	500,000 Ω
30	W-23907	750 Ω
31	W-26870A	6 MFD. 25V.
32	W-28976	8 MFD. 200V.
33	W-28977	6 Ω
34	W-28977	9 Ω
35	W-4099B	6.3V. DIAL LIGHT
36	B-21491A	CORD & PLUG
37	LW-20264	ANT.-GND. TERM.
38	W-23635	0.006 MFD. 400V.
39	~~W-23142~~	~~0.02 MFD.~~
40	G39-27456	78 SOCKET
41	G38-27456	77 SOCKET
42	G30-27456	43 SOCKET
43	W-7983A	3 AMP. FUSE
44	W-7983A	3 AMP. FUSE
45	W-29012	2.5 MFD. 80V. AC.
46	W-29012	12 MFD. 40V.
47	W-28682	0.1 MFD. 200V.
48	W-28682	0.1 MFD. 200V.
49	G5-28168	"A" FILTER CHOKE
50	G2-28069	"B" FILTER CHOKE
51	W-28978	12 MFD. 125V.
52	~~W-28682~~	~~0.1 MFD.~~
53	L-28949	VIBRATOR ASSEM.
54	G2-28065	POWER TRANSFORMER
55	W-28980A	"A" & "B" SUPPLY CABLE
56	~~W-28682~~	~~0.1 MFD.~~
57	W-24049A	0.1 MFD. 200V.
58	W-24049A	0.1 MFD. 200V.
59	21453	40,000 Ω
60	W-28066B	.01 MFD. 600V. A.C.
61	W29089	0.02 MFD. 400V.
62	W29089	0.016 MFD. 400V.
63	W26573B	VOLUME CONTROL
64	W26573B	S.P.S.T. SWITCH
65	W25438	0.1 MFD. 200V.
66	W25438	0.1 MFD. 200V.
67	W-23012A	40 Ω
68	W-22688	0.1 MFD. 400V.
69	W-30367	0.25 MFD. 160V.
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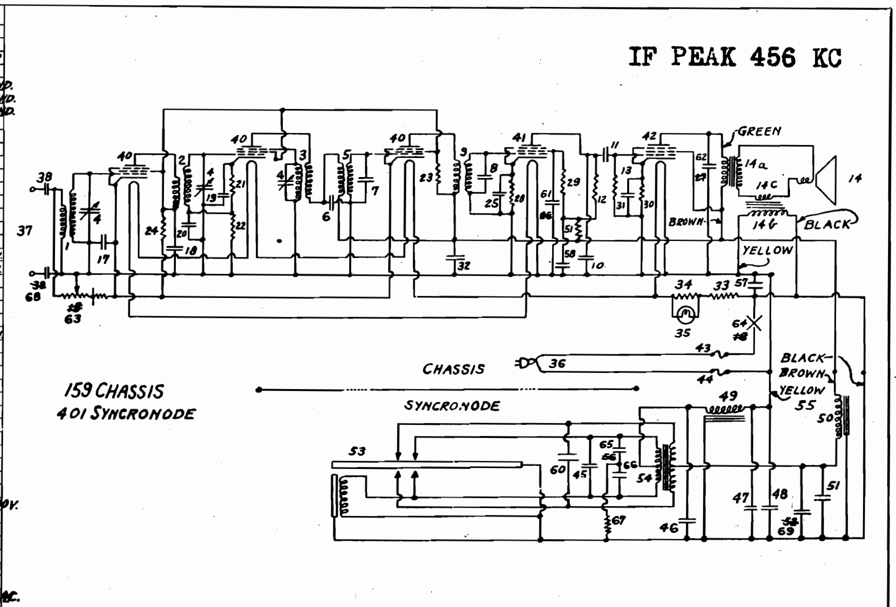


	RECORD OF CHANGES	Change No.
A	ADDED 0.1 MFD. AND .01 MFD. COND'S. ALSO 40,000 Ω β	3384
B	ITEMS 26 & 27 REPLACED WITH ITEMS 61 & 62 β	3395
C	ITEMS 15 & 16 REPLACED WITH ITEMS 63 & 64	3396
C	ITEM 14 WAS 28997-339-3 SPEAKER 4-3-33	S-227
D	ITEM 56 DELETED, ITEMS 65, 66 & 67 ADDED 4-26-33 Schaefer β	3416
E	ITEMS 39 & 52 REPLACED WITH ITEMS 68 & 69 7-25-33	3425

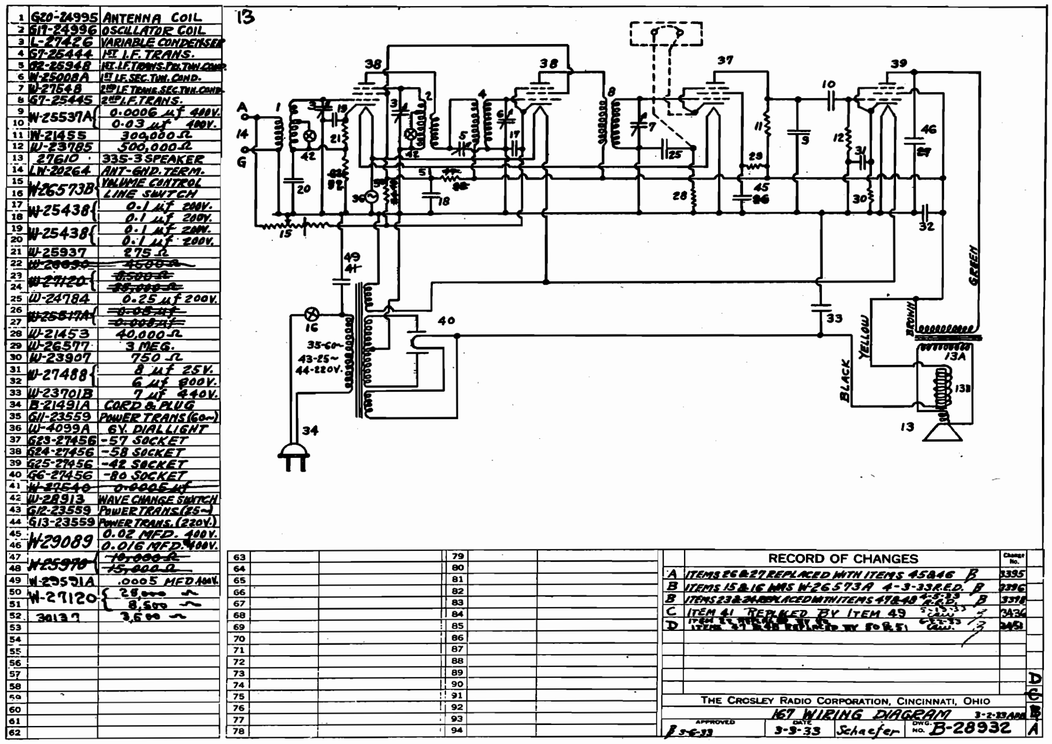
THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

159 WIRING DIAGRAM

APPROVED β DATE 3-6-33 DWG. NO B-28984

MODEL 167
Schematic
Parts List

CROSLEY RADIO CORP.



PARTS LIST—MODEL 167

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.

* Figures in 2nd last column refer to parts shown in diagram.

Qty.	Part No.	Description	*	List Price Each	Qty.	Part No.	Description	*	List Price Each
1	G20-24995	Antenna coil	1	.65	3	G1-23472	Knobs		.10
1	G17-14996	Oscillator coil	2	.80	1	W-27478	Escutcheon		.15
2	W-25025	Coil shield		.10	3	S-27	Escutcheon screws		.05
1	G7-25444	First I. F. transformer	4	.60	1	B-28478	Back		.25
1	G7-25445	Second I. F. transformer	8	.60	1	W-23880	Thumb screw for back		.05
2	W-25024	I. F. Transformer shield		.10			**POWER TRANSFORMING**		
4	W-25200	Coil Socket		.05	1	G11-23559	Power Trans. (100 volt, 60 cy.) (-42 output)	35	2.25
4	W-21451	Retaining ring		.05					
2	W-24360	Insulating washer		.05	1	G12-23559	Power trans. (110 volt, 25 cy.) (-42 output)	43	3.00
1	W-30414	Wave-change switch		.40					
1	W-27425	Variable condenser assem.	3	2.75	1	G13-23559	Power trans. (220 volt, 25 cy.) (-42 output)	44	3.00
1	G1-27812	Dial light socket		.20					
1	G5-25050	Dial Assembly		.40	1	G20-23559	Power trans (110 volt, 60 cy.) (-2A5 output)	53	2.75
1	G2-25948	I. F. condenser blade (1st I. F. primary)	5	.30	1	G21-23559	Power trans. (110 volt, 25 cy.) (-2A5 output)	54	4.25
1	W-25008	I. F. condenser blade (1st I. F. secondary)	6	.05	1	G22-23559	Power trans. (220 volt, 25 cy.) (-2A5 output)	55	4.25
1	W-27548	I. F. condenser blade (2nd I. F. secondary)	7	.05			**FILTER & BYPASS CONDENSERS**		
2	W-25446	Bakelite washer (large)		.05					
2	W-25584	Mica insulator		.05	1	W-25537	Condenser .03 -.0006 Mfd.	9-10	.30
2	R-80	4-36x⅜ R. H. M. screw		.05	2	W-25438	Condenser .1 - 1 Mfd.	17-18	
2	W-26069A	Adjusting nut		.05				19-20	
2	W-24865	Metal washer		.05	1	W-24784	Condenser .25 Mfd.	25	.20
2	W-25450	Insulating washer		.05	1	W-29089	Condenser .02 -.016 Mfd.	45-46	.25
2	W-25007	Insulating washer		.05	1	W-29591	Condenser .0005 Mfd.	49	.20
2	O-4	No. 4 Flat washer		.05	1	W-29150A	Condenser 6.-7.-8. Mfd. or	59-60	
2	M-20	Rivet		.05				61	2.90
1	W-20264	A. G. Terminal strip	14	.15	1	W-27488	Condenser 6.-8. Mfd.	31-32	1.10
1	G23-27456	Socket -57	37	.10	1	W-23701	Condenser 7. Mfd.	33	.80
2	G24-27456	Socket -58	38	.10			**RESISTORS**		
1	G43-27456	Socket -2A5 or	57	.10	1	W-21455	Resistor 300,000 ohm	11	.15
1	G25-27456	Socket -42	39	.10	1	W-23785	Resistor 500,000 ohm	12	.15
1	G6-27456	Socket -80	40	.10	1	W-21453	Resistor 40,000 ohm	28	.15
3	W-26010	Tube shield base		.05	1	W-23907	Resistor 750 ohm	30	.20
3	B-26009	Tube shield		.10	1	W-25937	Resistor 275 ohm	21	.15
1	B-21491	AC cable	34	.25	1	W-30137	Resistor 3,500 ohm	52	.20
1	W-31009	Speaker cable	62	.25	1	W-27120	Resistor 25,000-8500 ohm	50-51	.40
1	W-26573	Vol. Control & switch	15-16	1.00	1	W-26577	Resistor 3 Megohm	29	.15

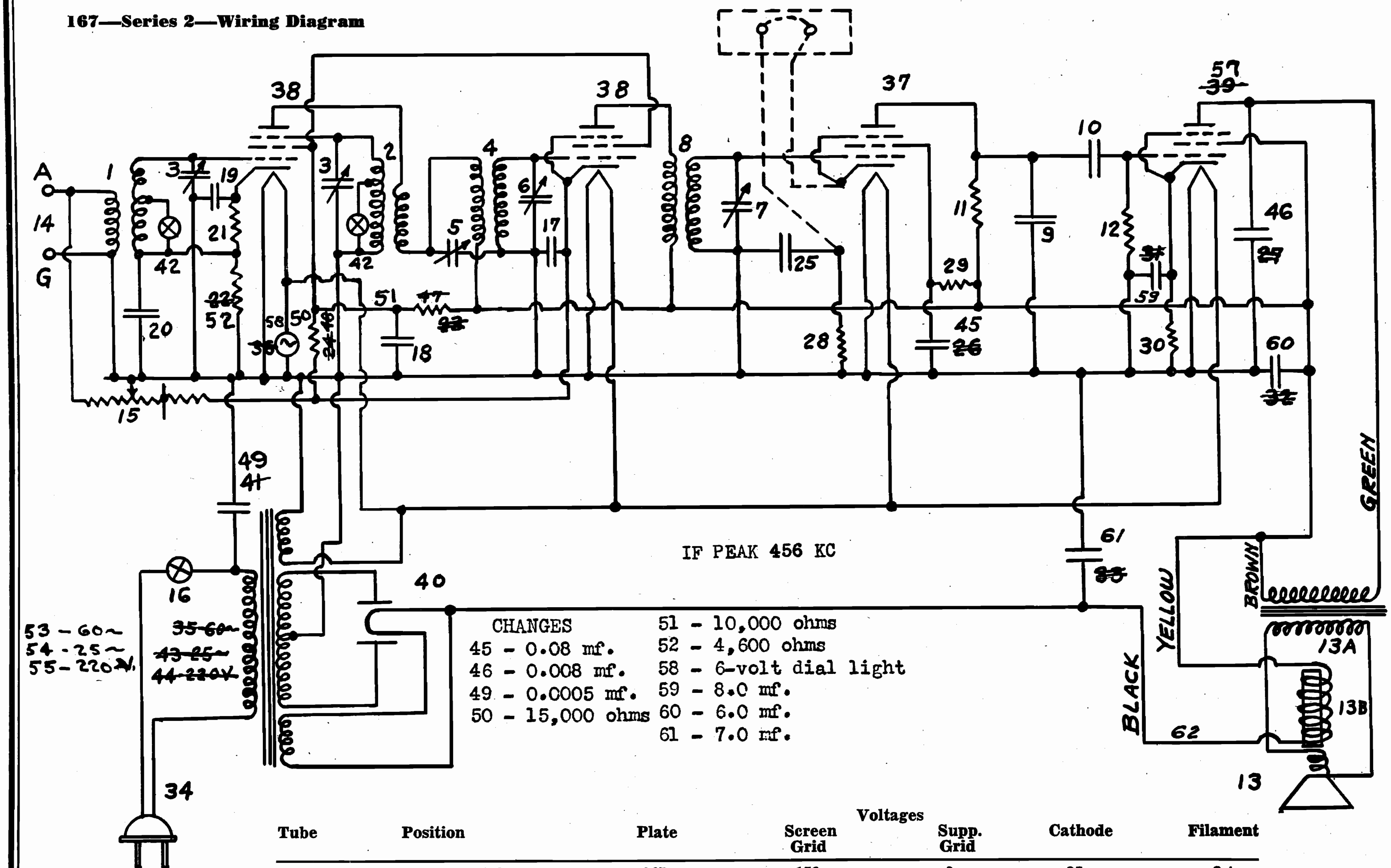
SPEAKER PARTS

	Magnavox 335—3M Spec. 715	Magnavox 335—3M Spec. 1602	Jensen 335—3J Spec. 3452	Rola 335—3R Spec. F-5-A	Crosley 335—3C			
1	27452	30675	30658	30955	G2-29529	Cone Assem.	13	2.50
1	27658	30676	30659	30580	W-29764	Field Coil	13B	1.10
1	27660	30677	30660	30956	G2-29535	Transformer	13A	1.25

MODEL 167 Series 2
Schematic, Voltage

CROSLEY RADIO CORP.

167—Series 2—Wiring Diagram



IF PEAK 456 KC

CHANGES

45 - 0.08 mf.
46 - 0.008 mf.
49 - 0.0005 mf.
50 - 15,000 ohms
51 - 10,000 ohms
52 - 4,600 ohms
58 - 6-volt dial light
59 - 8.0 mf.
60 - 6.0 mf.
61 - 7.0 mf.

Tube	Position	Plate	Screen Grid	Supp. Grid	Cathode	Filament
		Voltages				
58	Oscillator modulator	267	150	0	35	2.4
58	I. F. Amplifier	267	150	3.5	3.5	2.4
58	Detector	150	48	6.5	6.5	2.4
2A5	Output	250	267		21.5	2.4
80	Rectifier	340				4.7

Voltage limits are plus or minus ten percent of the values given.

CROSLEY RADIO CORP.

MODEL 164
Schematic
MODEL 176
Schematic

Model 164

1	G7-24995	ANTENNA COIL
2	G2-25968	INTERSTAGE COIL
3	G14-24996	OSCILLATOR COIL
4	C-26442C	TUNING CONDENSER
5	G5-24065	1ST I.F. TRANS.
6	G10-24065	2ND I.F. TRANS.
7	G8-25948	I.F. TUNING COND.
8	G3-25948	I.F. TUNING COND.
9	W-23013	2000 Ω
10	W-24087	350 Ω
11	W-21964	165 Ω
12	W-28471	25,000 Ω
13		8500 Ω
14	W-28097A	8 MFD. 250V.
15		8 MFD. 350V.
16		8 MFD. 450V.
17	21454	1 MEG.
18	W-25969A	0.00017 MFD. 400V.
19		0.03 MFD. 400V.
20	21455	300,000 Ω
21	W-25666A	LEVEL CONT. (2 MEG)
22	21237A	60,000 Ω
23	W-28615	0.05 MFD. 400V.
24	21455	300,000 Ω
25	21453	40,000 Ω
26	W-23018	2000 Ω
27	W-23013	2000 Ω
28	21237A	60,000 Ω
29	W-28618	0.05 MFD. 400V.
30	21455	300,000 Ω
31	W-22873	220 Ω
32	W-25517A	0.008 MFD. 400V.
33		0.05 MFD. 400V.
34	W-25594B	TONE CONT. (1 MEG)
35		S.P.S.T. SWITCH
36	G1-24628	FILTER CHOKE
37	W-23705-A	12 MFD. 440V.
38	26577	3 MEG.
39	B-21491A	CABLE & PLUG
40	G25-25669	POWER TRANS. (60~)
41	27622	317-4M SPKR.
42	G24-27456	58 SOCKET
43	G23-27456	57 SOCKET
44	G43-27456	2A5 SOCKET
45	G18-27456	56 SOCKET
46	G6-27456	80 SOCKET
47	W-22221	2.5V. DIAL LIGHT
48	LW-20264	ANT.-GND. TERM.
49	23409	150,000 Ω
50	W-25438	0.1 MFD. 200V.
51		0.1 MFD. 200V.
52	G26-25669	POWER TRANS. (25~)
53	G27-25669	POWER TRANS. (220V.)
54	W-27203	0.02 MFD. 200V.
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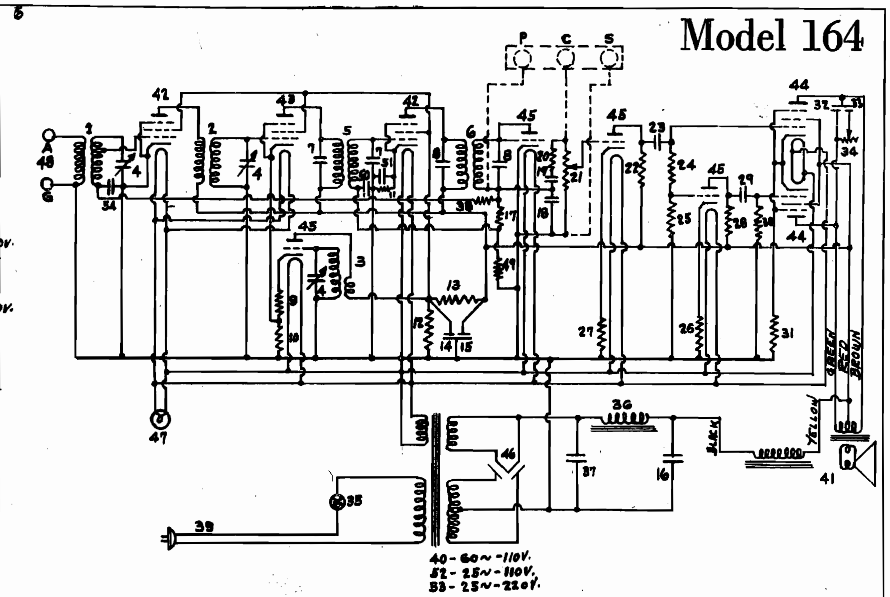

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	RECORD OF CHANGES	Change No.
A	ITEM 4 WAS C-29020 4-11-33 R.E.D.	5232

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

164 WIRING DIAGRAM

APPROVED 4-6-33 | DATE 4-5-33 | Schaefer TR. BILL | DWG. NO. B-29130 | A

Model 176

1	G15-24995	ANTENNA COIL
2	G20-24996	OSCILLATOR COIL
3	G7-25444	1ST I.F. TRANS.
4	G9-25445	2ND I.F. TRANS.
5	B-28592 E	TUNING CONDENSER
6	G8-25948	1ST I.F. PRI. TRIMMER
7		1ST I.F. SEC. TRIMMER
8	G9-25948	2ND I.F. SEC. TRIMMER
9	~~W-27203~~	0.02 MFD. 200V.
10		0.02 MFD. 200V.
11	W-29271	0.02 MFD. 400V.
12		0.02 MFD. 400V.
13	W-28620	0.003 MFD. 200V.
14	W-28622	0.1 MFD. 200V.
15		0.1 MFD. 200V.
16	W-29445	0.0001 MFD. 200
17		0.006 MFD. 200V.
18	~~W-26559~~	~~0.006 MFD.~~
19	W-25857B	8 MFD. 25V.
20		8 MFD. 200V.
21	W-26870 A	6 MFD. 25V.
22	W-28068	12 MFD. 200V.
23	G1-28859	POWER SUPPLY FILTER CHOKE
24	W-4080 A	6.3V. DIAL LIGHT
25	W-27885A	CORD & PLUG
26	~~W-29447~~	~~246-28 Ω~~
27	W-28589	350 Ω
28	28588	2700 Ω
29	21237A	60,000 Ω
30	21454	1 MEG.
31	26577	3 MEG.
32	26578	5 MEG.
33	W-22516	750 Ω
34	21455	300,000 Ω
35	4921-G	10,000 Ω
36	W-28594-A	VOLUME CONTROL
37		S.P.S.T. SWITCH
38	W-28859A	WAVE CHANGE SWITCH D.P.S.T.
39	W-29547	EXTENSION SPKR. JACK
40	28867	343-2M SPEAKER
41	G39-28807	78 SOCKET
42	G11-28807	36 SOCKET
43	G15-28807	38 SOCKET
44	G50-28807	12-Z-3 SOCKET
45	W-28623	.02 MFD. 200V.
46		.02 MFD. 200V.
47	W-28619	.006 MFD. 200V.
48	W-29447-A	224 Ω
49		26.7 Ω
50	W-29784A	ANTENNA ASSEM. 30FT.
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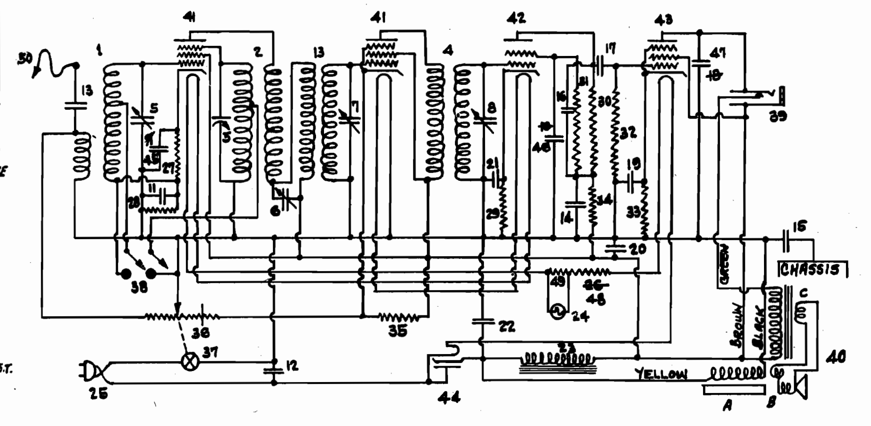

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	RECORD OF CHANGES	Change No.
A	ITEMS 9 & 10 REPLACED BY 45 & 46 ITEM 18 REPLACED BY 47 5-17-33	3422
B	SPK'R. COLOR CODE ADDED 6-7-33	5388
C	ITEM 26 REPLACED BY ITEMS 48 & 49 6-22-33	3453

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

176 WIRING DIAGRAM

APPROVED 5/15/33 | DATE 5-18-33 | TR. BILL | DWG. NO. B-29514 | C

MODEL 166
Schematic, Voltage
MODEL 172
Schematic, Voltage

CROSLEY RADIO CORP.

Specifications

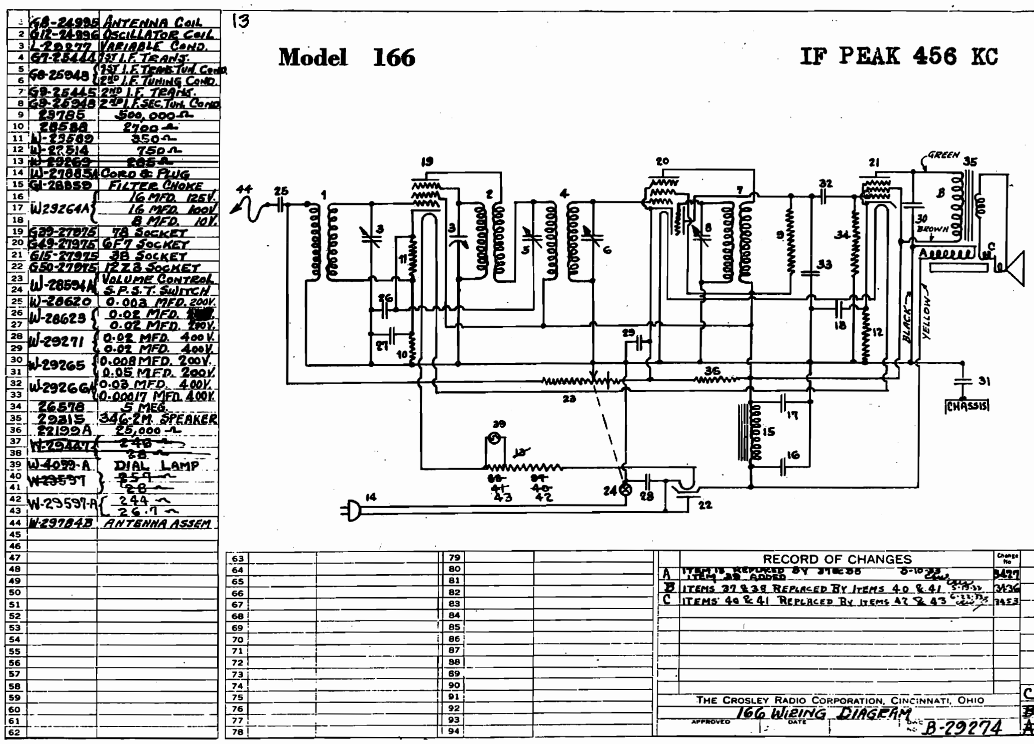
Models 166 and 172 are four tube superheterodyne receivers designed for operation on 110 volt D.C. or 25 to 60 cycle A.C. The intermediate frequency is 456 Kc. The only difference between these sets is that Model 172 is a dual band receiver and Model 166 is a broadcast band receiver only.

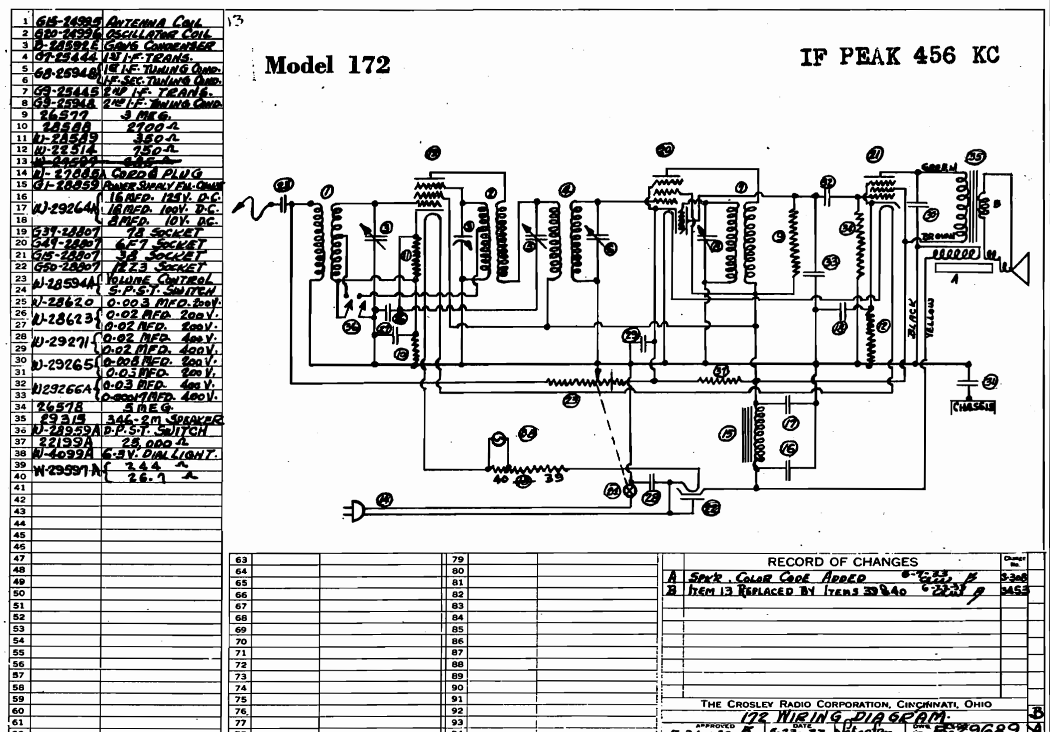
Tubes and Voltage Limits

The following are the voltages measured with the receiver in operating condition but with no signal to the antenna circuit. Line voltage is 117.5 volts, 60 cycle A.C. All voltages, except filament, are measured with 300 volt D.C. voltmeter (1000 ohms per volt) from tube contact to gang condenser frame. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
78	Oscillator Modulator	101	101	20	0	6.0
6F7	I. F. Amplifier and Detector	101	101	4.5		6.0
38	Output	Triode 7.5	101	2.0		6.0
12Z3	Rectifier	98		117.5		12.0

Voltages on D. C. are approximately 10% lower than the values given.
Voltage limits are plus or minus 10% of values given.





MODEL 168
Schematic
Voltage

CROSLEY RADIO CORP.

Model 168

Specifications

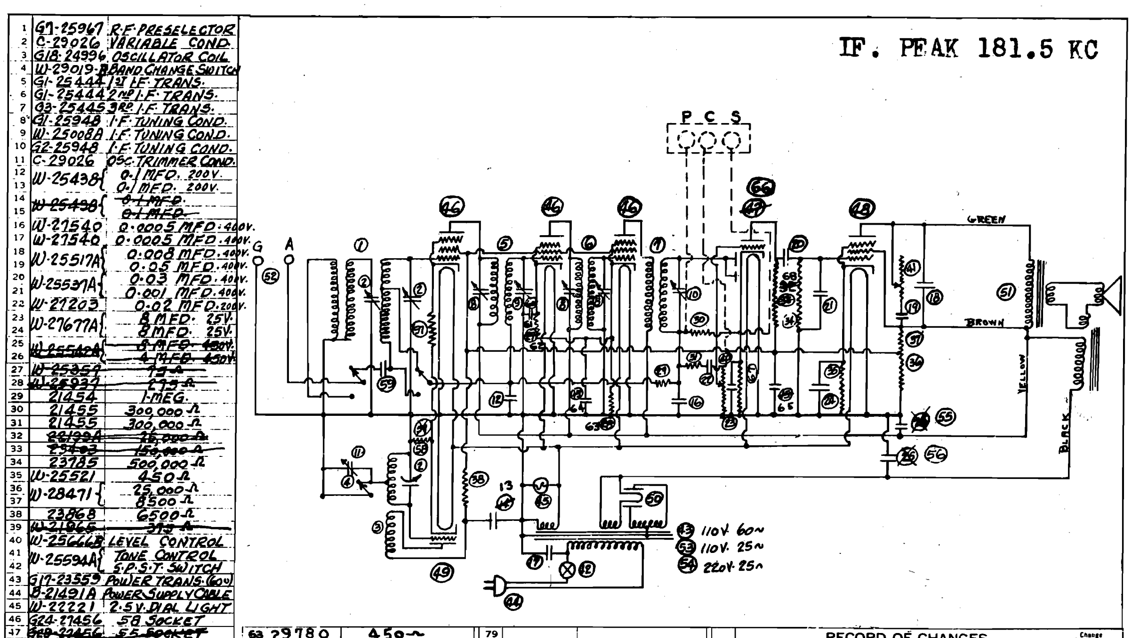
Model 168 is a seven tube dual band superheterodyne designed for operation from A.C. electric circuits. The intermediate frequency is 181.5 Kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit. Line voltage should be 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured from tube contact to chassis with a 500 volt D.C. voltmeter (1000 ohms per volt). Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
56	Oscillator	66		6.5		2.5
58	Modulator	270	122	8.0	8.0	2.5
58	I. F. Amplifier	270	122	8.5	8.5	2.5
58	I. F. Amplifier	270	122	7.0	7.0	2.5
2A6	Detector and A. F. Amplifier	231		2.0		2.5
2A5	Output	257	270	18.0		2.5
80	Rectifier	380				4.9

Voltage limits are plus or minus 10% of values given.



MODEL 169
Schematic
Voltage

CROSLEY RADIO CORP.

Model 169

Specifications

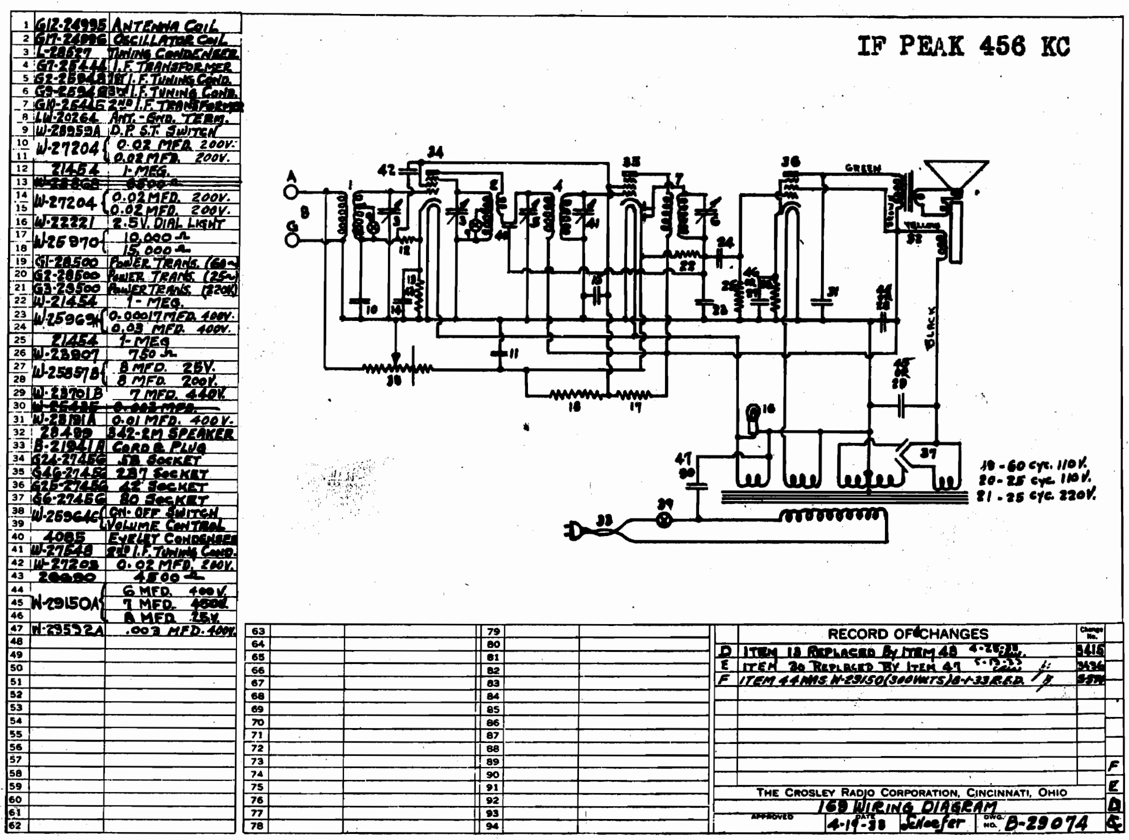
Model 169 is a four tube dual band superheterodyne designed for operation from A.C. electric circuits. The intermediate frequency is 456 Kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured with a 500 volt D.C. voltmeter (1000 ohms per volt) from tube contact to chassis. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
58	Oscillator-Modulator	188	88	28	0	2.5
2B7	I. F. Amplifier and Detector	188	88	2		2.5
42	Output	178	188	14.5		2.5
80	Rectifier	322				4.9

Voltage limits are plus or minus 10% of values given.



CROSLEY RADIO CORP.

MODEL 170
Schematic
Voltage

Model 170

Specifications

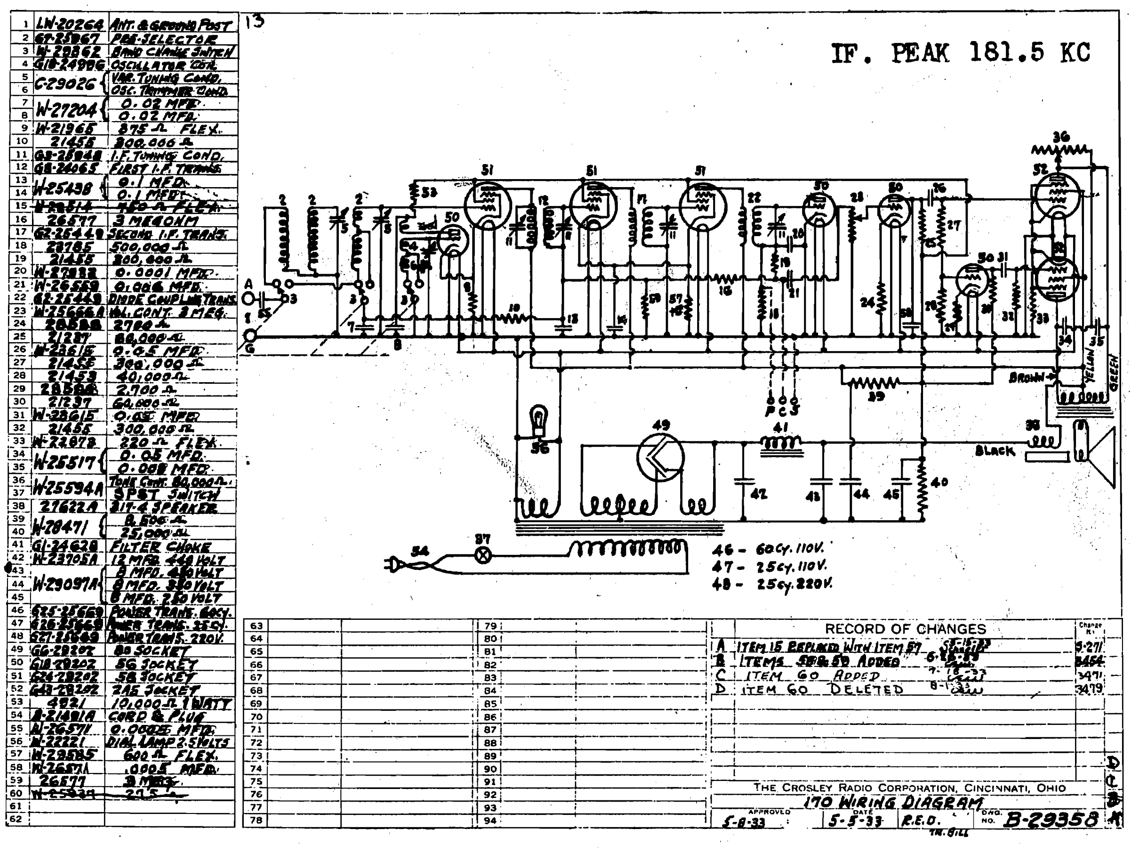
Model 170 is a ten tube dual band superheterodyne designed for operation from A.C. electric circuits. The intermediate frequency used is 181.5 Kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured with a 500 volt D.C. voltmeter (1000 ohms per volt) from tube contact to chassis. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
58	Modulator	276	120	6.0	6.0	2.5
56	Oscillator	50		6.0		2.5
58	I. F. Amplifier	276	120	8.0	8.0	2.5
58	I. F. Amplifier	276	120	8.0	8.0	2.5
56	Detector	0				
56	Phase Shifter	55		0		2.5
56	A. F. Amplifier	56		2.0		2.5
2-2A5	Output	269		3.0		2.5
80	Rectifier	355	276	18.0		2.5
						4.9

Voltage limits are plus or minus 10% of values given.



CROSLEY RADIO CORP.

Model 171

Specifications

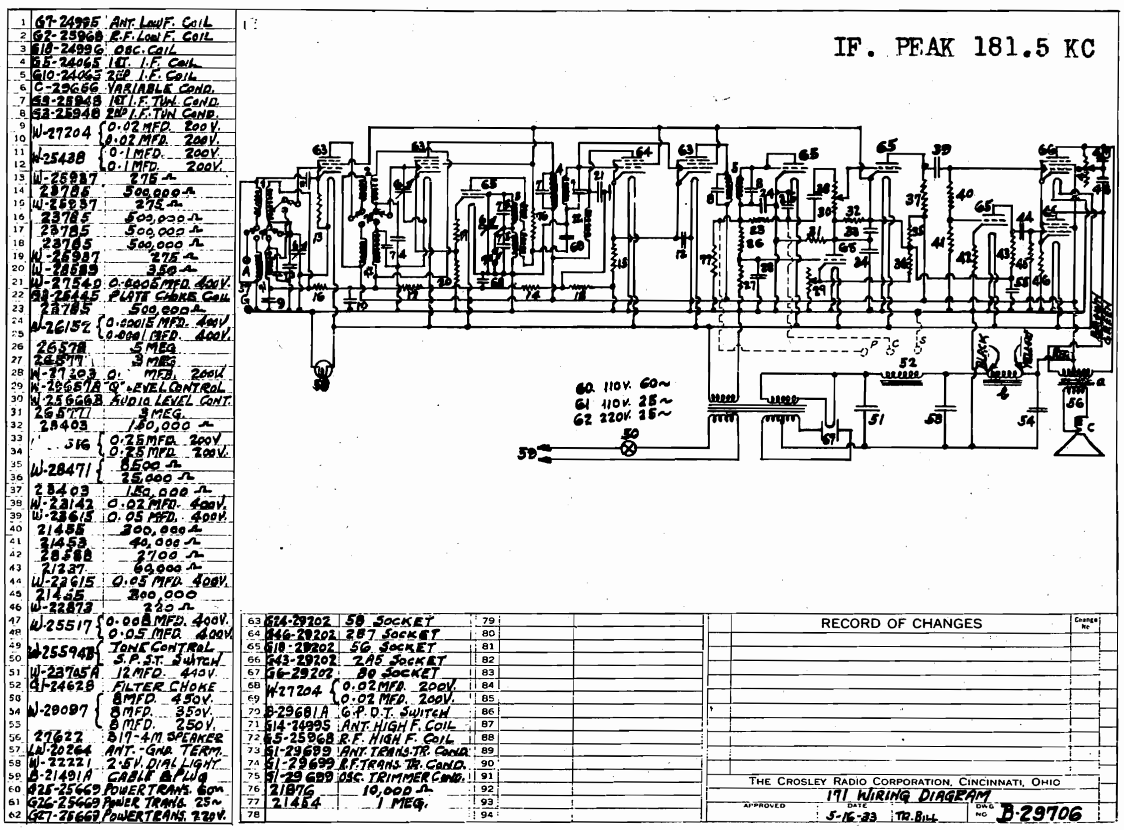
Model 171 is a twelve tube dual band superheterodyne designed for operation from A.C. electric circuits. The intermediate frequency is 181.5 Kc.

Voltages and Tube Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament are measured with a 500 volt D.C. voltmeter (1000 ohms per volt) from tube contact to chassis. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
58	R. F. Amplifier	267	115	3.0	3.0	2.5
56	Oscillator	60		7.0		2.5
58	Modulator	267	115	5.5	5.5	2.5
58	I. F. Amplifier	267	115	4.5	4.5	2.5
2B7	A. V. C. Tube	267	115	4.5	4.5	2.5
56	QAVC Tube	70		0-20.0*		2.5
56	Detector	0		0		2.5
56	Phase Shifter	58		2.5		2.5
56	A. F. Amplifier	170		115		2.5
2-2A5	Output	260	267	17.5		2.5
80	Rectifier	355				4.9

Voltage limits are plus or minus 10% of values given.
***Voltage depends on position of "Q" control.**



CROSLEY RADIO CORP.

MODEL 173,173-5
Schematic
Voltage

Models 173 and 173-5

Specifications

Models 173 and 173-5 are six tube dual band superheterodynes. Model 173 is designed for operation from 110 volts D.C. or 60 cycle A.C. Model 173-5 is designed for operation on 110 volts D.C. or 25 to 60 cycle A.C. The circuits of the two sets are similar except for the filter system. In Model 173-5, choke G6-28069 is substituted for choke G3-24628 used in the 173, and the condenser W-27216 is omitted. These models can be used with Model 38 power pack and remote speaker 390-6. The intermediate frequency is 456 Kc.

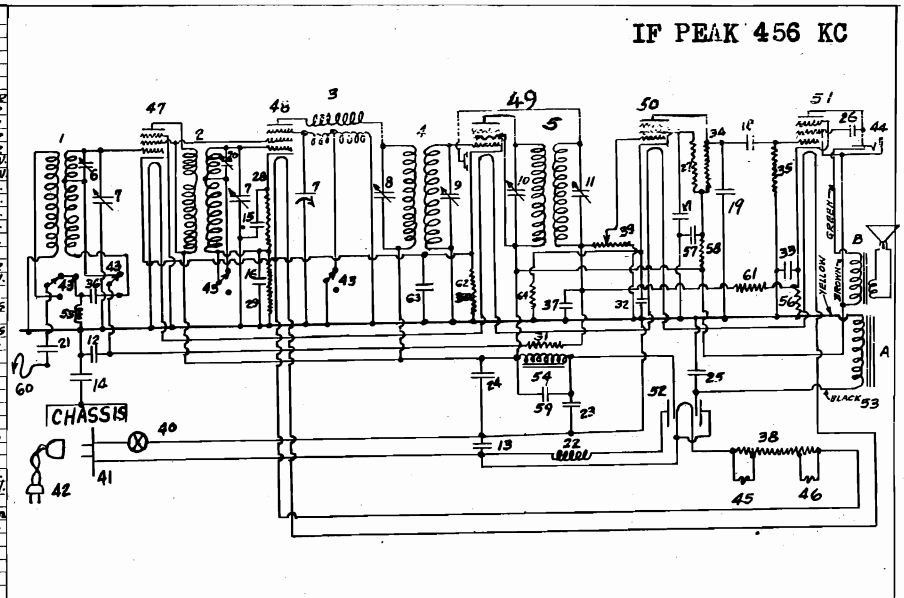
Tubes and Voltages

The following are the tubes and voltages measured with the receiver in operating condition, but with no signal to the antenna circuit, and with a line voltage of 117.5 volts 60 cycle A.C. All voltages, except filament, are measured with a 300 volt D.C. voltmeter (1000 ohms per volt) from tube contact to frame of condenser gang. Filament voltages are measured with a low range A.C. or D.C. meter (depending on supply).

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
78	R. F. Amplifier	112	112	4	0	6.3
78	Oscillator Modulator	112	112	20	0	6.3
6B7	I. F. Amplifier and Detector	112	112	4		6.3
78	A. F. Amplifier	7.5	12.5	4	4	6.3
43	Output	101	112	16.5		25
25Z5	Rectifier			125		25

Voltage limits are plus or minus 10% of values given.
D. C. voltages are 10% less than values given.

1	G17-24995	ANTENNA COIL
2	G1-30082	R.F. INTER. COIL
3	G22-24996	OSCILLATOR COIL
4	G7-25444	FIRST I.F. TRANS.
5	G7-25444	SECOND I.F. TRANS.
6	G4-29699	SHORT WAVE TRIMMER
7	C-30019 C	TUNING CONDENSER
8	G11-25948	FIRST I.F. PRI. TRIMMER
9		FIRST I.F. SEC. TRIMMER
10	G11-25948	2ND. I.F. PRI. TRIMMER
11		2ND. I.F. SEC. TRIMMER
12	W-30324	0.02 MFD. 400V.
13		0.02 MFD. 400V.
14	W-25438	0.1 MFD. 200V.
15		0.1 MFD. 200V.
16	W-25438	0.1 MFD. 200V.
17		0.1 MFD. 200V.
18	W-30322	0.006 MFD. 200V.
19		0.00017 MFD. 200V.
20	G5-29699	SHORT WAVE TRIMMER
21	W-30325	0.003 MFD. 200V.
22	G2-24234	MODULATION CHOKE
23	W-30124	16 MFD. 125 VOLTS
24		16 MFD. 100 VOLTS
25		8 MFD. 125 VOLTS
26	W-30323	0.01 MFD. 200V.
27	23785	500,000 Ω
28	W-28589	350 Ω FLEX.
29	28588	2700 Ω
30	~~W-21964~~	~~165 Ω FLEX.~~
31	26577	3-MEGOHMS
32	W27677A	8 MFD. 25 VOLTS
33		8 MFD. 25 VOLTS
34	23403	150,000 Ω
35	23785	500,000 Ω
36	W26571	0.0005 MFD. 200V.
37	W-26571	0.0005 MFD. 200V.
38	W-30033A	88 Ω 26.5 Ω 26.5 Ω
39	W-30031C	LEVEL CONT. 500,000 Ω
40		SWITCH. S.P.S.T. 3A-110V.
41	W-30084	JUNCTION BOX
42	G1-30092	POWER SUPPLY CABLE
43	W-30032A	WAVE CHANGE SWITCH
44	G1-30085	SPEAKER JACK
45	W-4099A	DIAL LIGHT 6.3V.
46	W-4099A	DIAL LIGHT 6.3V.
47	G39-27975	78 SOCKET
48	G39-27975	78 SOCKET
49	G48-27975	6B7 SOCKET
50	G39-27975	78 SOCKET
51	G30-27975	43 SOCKET
52	G51-27975	25Z5 SOCKET
53	29923	347-3 SPEAKER
54	G3-24628	FILTER CHOKE
55	G1-24234	HUM FILTER CHOKE
56	W-23907	750 Ω FLEX.
57	W-24784	0.25 MFD. 200 VOLT.
58	21875	100,000 Ω
59	W-27216	0.05 MFD. 200 VOLT
60	W-29784B	ANTENNAE ROLL
61	26577	3 MEGOHMS
62	W-25357	75 Ω FLEX.



63	W-24049A	0.1 MFD. 200V.	79		
64	28588	2700 Ω	80		
65			81		
66			82		
67			83		
68			84		
69			85		
70			86		
71			87		
72			88		
73			89		
74			90		
75			91		
76			92		
77			93		
78			94		

	RECORD OF CHANGES	Change No.
A	ITEM 30 REPLACED BY 62. ITEMS 63 & 64 ADDED 8-7-33 R.E.B.	

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO
173 WIRING DIAGRAM
APPROVED 7/25/33 | DATE 7/12/33 | DWG. NO. B-30074

MODEL 174
Schematic
Voltage

CROSLEY RADIO CORP.

Model 174

Specifications

Model 174 is a four tube dual band superheterodyne designed for operation from 110 volt D.C. or 25 to 60 cycle A.C. electric circuits. The intermediate frequency used is 456 Kc.

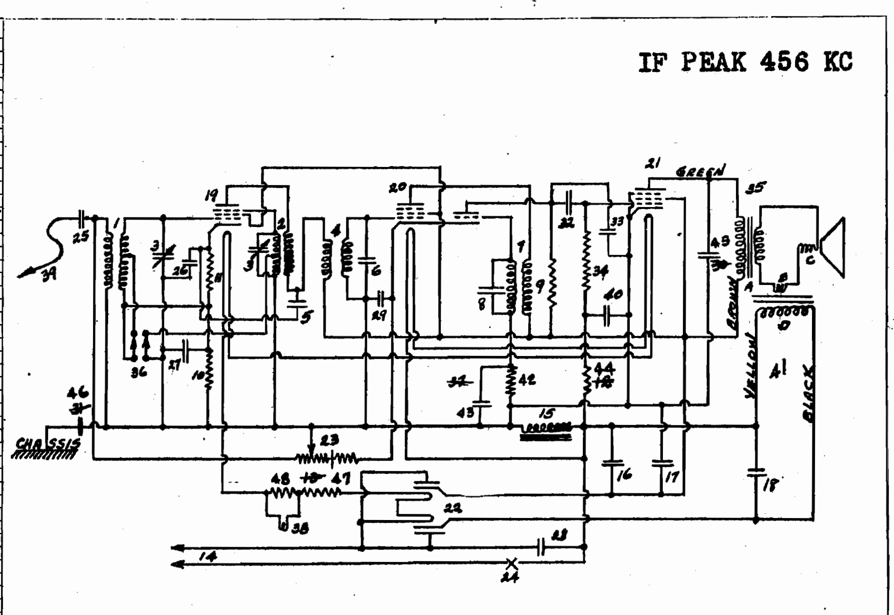
Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts A.C., 60 cycles. All voltages, except filament, are measured with a 300 volt D.C. voltmeter (1000 ohms per volt) from tube contact to frame of condenser gang. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
78	Oscillator-Modulator	108	108	21	0	6.0
6F7	I. F. Amplifier and Detector	20 108	108	3.5		6.0
43	Output	104	110	0		25.
25Z5	Rectifier				110	25.

Voltage limits are plus or minus 10% of values given.
D. C. Voltages are 10% lower than values given.
Condenser frame to "B-" 20 volts, used to furnish bias to output system.

1	G15-24995	ANTENNA COIL
2	G20-24996	OSCILLATOR COIL
3	B-28592 E	GANG CONDENSER
4	G7-25444	1ST I.F. TRANS.
5	G8-25948	1ST I.F. TUNING COND.
6		1ST I.F. TUNING COND.
7	G9-25445	2ND I.F. TRANS.
8	G9-25948	2ND I.F. TUNING COND.
9	23785	500,000 Ω
10	28588	2700 Ω
11	W-28689	350 Ω
12	[illegible]	[illegible]
13	[illegible]	[illegible]
14	W-27885	CORD & PLUG
15	G1-28859	POWER FILTER CHOKE
16	W29804A	16 MFD. 185V.
17		25 MFD. 100V.
18		8 MFD. 125V.
19	G39-28807	78 SOCKET
20	G49-28807	6F7 SOCKET
21	G30-28807	43 SOCKET
22	G51-28807	25Z5 SOCKET
23	W-28594A	VOLUME CONTROL
24		S.P.S.T. SWITCH
25	W-28620	0.003 MFD. 200V.
26	W-28623	0.02 MFD. 200V.
27		0.02 MFD. 200V.
28	W-29271	0.02 MFD. 400V.
29		0.02 MFD. 400V.
30	[illegible]	[illegible]
31		[illegible]
32	W-29266A	0.03 MFD. 400V.
33		0.00017 MFD. 400V.
34	23785	500,000 Ω
35	29894	348-4 SPEAKER
36	W-28959A	D.P.S.T. SWITCH
37	[illegible]	[illegible]
38	W-4099A	6V. DIAL LIGHT
39	W-29784	ANTENNA LEAD
40	W-29910	0.25 MFD. 200V.
41	W-29912	SPEAKER CABLE
42	21454	1 MEG.
43	W-28621	0.02 MFD. 200V.
44	21455	300,000 Ω
45	W-30038	0.016 MFD. 200 V.
46		0.05 MFD. 200 V.
47	W-29911-A	144 Ω
48		26.7 Ω



RECORD OF CHANGES

		Change No.
A	ITEMS 30 & 31 REPLACED BY 45 & 46 ITEM 12 REPLACED BY 44 6-14-33	[illegible]
B	ITEM 13 REPLACED BY ITEMS 47 & 48 6-26-33	[illegible]
C	ITEM 17 WAS W-29804 (16 MFD.) ITEM 37 DELETED 7-31-33	5373

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO
CHASSIS 174
APPROVED 6-9-33 DATE 6-7-33 DWG. NO. B-29942

CROSLEY RADIO CORP.

MODEL 175
Schematic
Voltage

Model 175

Specifications

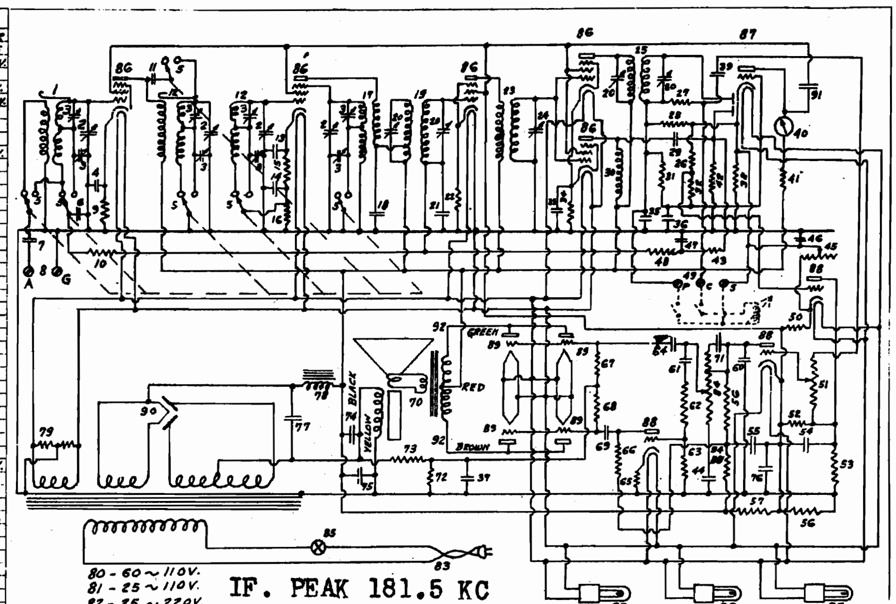
Model 175 is a fourteen tube dual band superheterodyne designed for operation from A.C. electric circuits. The intermediate frequency is 181.5 Kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 for 220 volt receivers). All voltages, except filament, are measured with 300 volt D.C. voltmeters (1000 ohms per volt) from tube contact to chassis. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
58	R. F. Amplifier	280	90	2.5	2.5	2.5
58	Oscillator Modulator	280	90	32.0	0	2.5
58	I. F. Amplifier	280	90	5.0	5.0	2.5
58	I. F. Amplifier	280	90	4.5	4.5	2.5
58	A. V. C.	280	90	4.5	4.5	2.5
55	Detector	80		15.5		2.5
56	"Q" Control Tube	70		0-22.0*		2.5
56	A. F. Amplifier	165		90.0		2.5
56	Phase Shifter	125		6.0		2.5
4-45	Output	280		0		2.5
5Z3	Rectifier	295				5.0

Voltage limits are plus or minus 10% of values given.
***Voltage depends on position of "Q" control.**
Chassis to "B-" 75 volts of which 55 volts is used for biasing output tubes.



1	G16-24995	ANTENNA COIL
2	C-30054	TUNING CONDENSER
3		TRIMMING CONDENSERS
4	W-27203	0.02 MFD. 200V.
5	B-29813	SEVEN S.P.D.T. SWITCH
6	W-24049	0.1 MFD. 200V.
7	W-26571	0.0005 MFD. 200V.
8	LW-20264	ANT. & GROUND TERM.
9	W-21964	165 Ω FLEX.
10	21455	300,000 Ω
11	W-27540	0.0005 MFD. 400V.
12	G8-25967	DOUBLE TUNED R.F. TRANS.
13	W-25438	0.1 MFD. 200V.
14		0.1 MFD. 200V.
15	W-21965	375 Ω FLEX.
16	24814	7,000 Ω
17	G21-24996	OSCILLATOR COIL
18	W-30270	0.001 MFD. 400V.
19	G13-25444	1ST I.F. TRANS.
20	G3-25948	I.F. TUNING COND.
21	W-27203	0.02 MFD. 200V.
22	W-22514	750 Ω
23	G[illegible]-25445	I.F. TRANS.
24	W-25008A	I.F. TUNING COND.
25	G6-25444	DIODE TRANS.
26	26577	3 MEG.
27	21455	300,000 Ω
28	23785	500,000 Ω
29	W-27540	0.0005 MFD. 400V.
30	G11-25445	I.F. TRANS.
31	26578	5 MEG.
32	26577	3 MEG.
33	W-24049	0.1 MFD. 200V.
34	W-30127	450 Ω
35	W-27932	0.0001 MFD. 200V.
36	W-24049A	0.1 MFD. 200V.
37	W-30321	1. MFD. 160V.
38	W-22180	1650 Ω
39	W-23191	0.01 MFD. 400V.
40	W-26091B	TUNING METER
41	W-30147	25,000 Ω
42	23785	500,000 Ω
43	21454	1 MEG.
44	W-30251	0.015 MFD. 400V
45	W-30057	"Q" CONTROL
46	W-27204	0.02 MFD. 200V.
47		0.02 MFD. 200V.
48	23785	500,000 Ω
49	LW-20266	PHONO. TERMINAL
50	21453	40,000 Ω
51	W-30056	VOLUME CONTROL
52	23403	150,000 Ω
53	26578	5 MEG.
54	W-25516	0.25 MFD. 200V.
55		0.25 MFD. 200V.
56	W-27651	10,000 Ω 1.5 W.
57		10,000 Ω 3.25 W.
58	~~22196~~	~~20,000 Ω~~
59	21237A	60,000 Ω
60	W-27540	0.0005 MFD. 400V.
61	W-23142	0.02 MFD. 400V.
62	21454	1 MEG.
63	23403	150,000 Ω
64	W-23615	0.05 MFD. 400V.
65	28588	2700 Ω
66	21237A	60,000 Ω
67	21455	300,000 Ω
68	21455	300,000 Ω
69	W-23615	0.05 MFD. 400V.
70	29919	391-6J SPEAKER
71	W-25435	0.003 MFD. 400V.
72	21454	1 MEG.
73	21455	300,000 Ω
74	W-30059	8 MFD. 450V.
75		8 MFD. 450V.
76		8 MFD. 250V.
77	W-26194B	12 MFD. 475V.
78	G2-24628	FILTER CHOKE
79	W-22417A	10 Ω & 10 Ω
80	G29-25669	POWER TRANS. 60~
81	G30-25669	POWER TRANS. 25~
82	G31-25669	POWER TRANS. 220V.
83	B-30375	CORD & PLUG
84	W-30058B	TONE CONTROL
85		S.P.S.T. SWITCH
86	G24-27456	58 SOCKET
87	G29-27456	55 SOCKET
88	G18-27456	56 SOCKET
89	G52-27456	45 SOCKET
90	G53-27456	5Z3 SOCKET
91	W-24784	0.25 MFD. 200V.
92	W-30121	FIVE LEAD SPKR. CORD
93	W-22221	2.5V. DIAL LIGHT
94	27121	5,000 Ω

	RECORD OF CHANGES	Change No.
A	ITEM 58 REPLACED WITH ITEM 94 7-25-33 SCHAEFER	3475

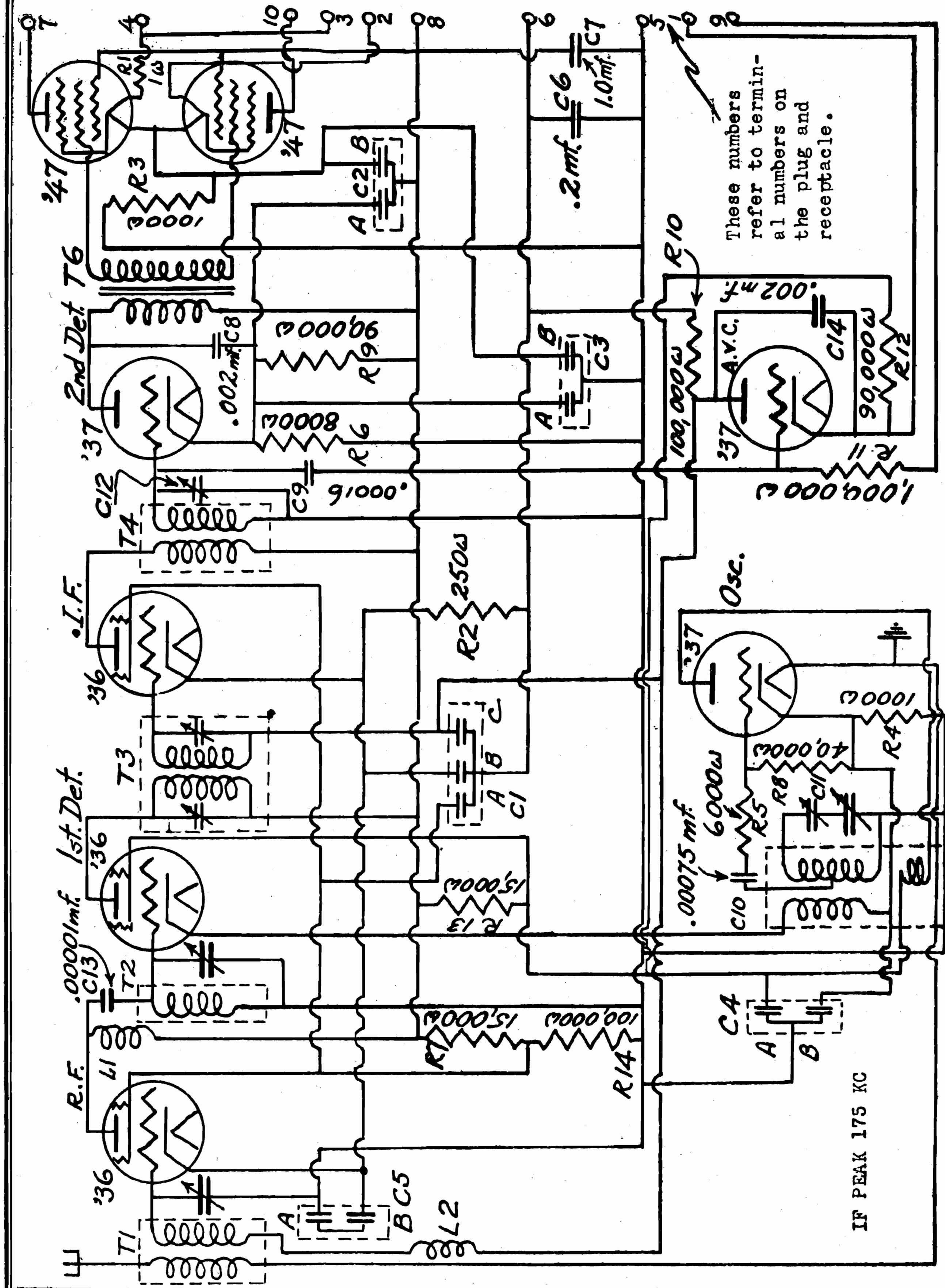
THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

175 WIRING DIAGRAM

APPROVED | DATE 7-19-33 | L.W. | DWG. NO. B-30105 A

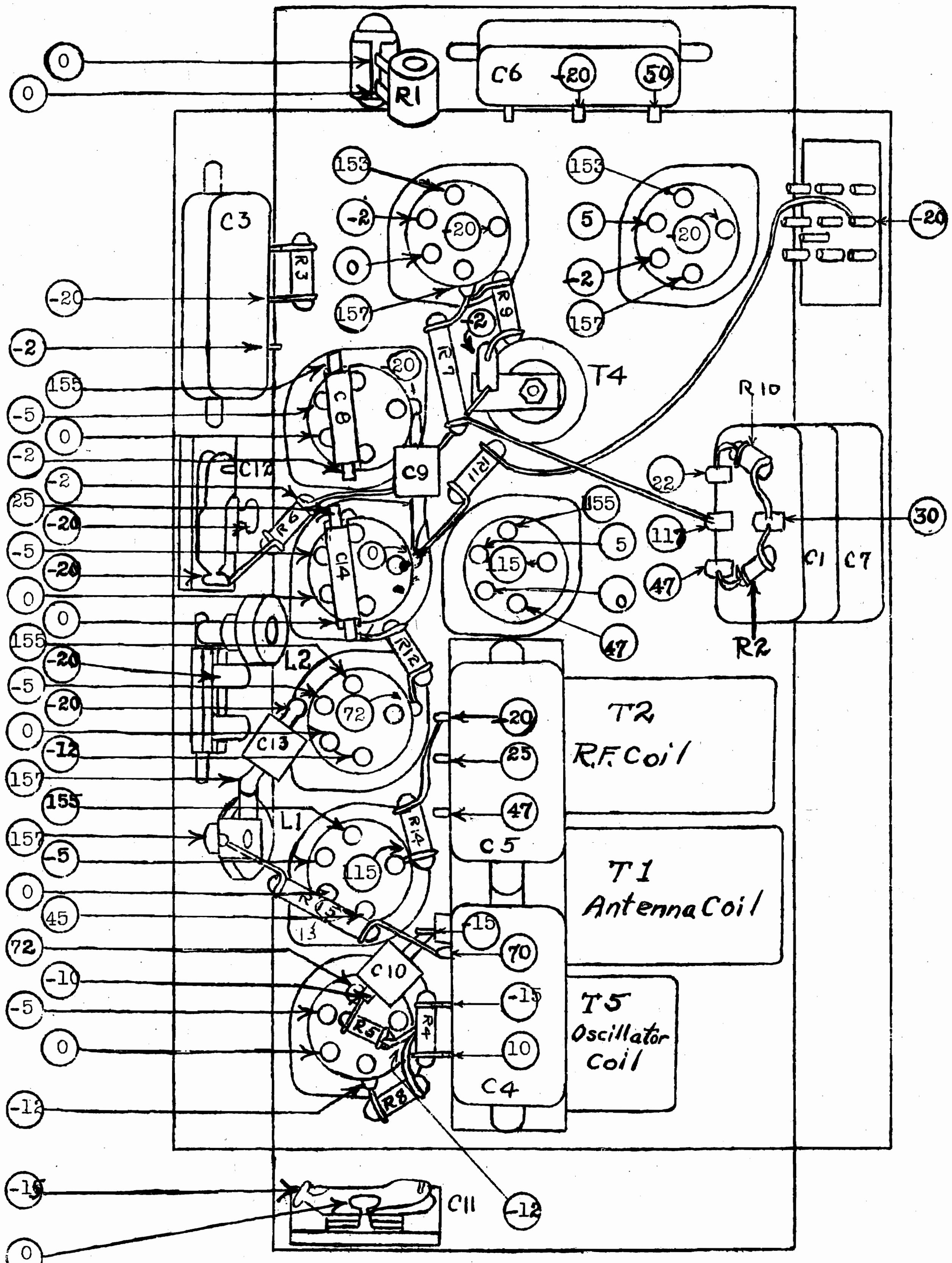
DELCO RADIO CORP.

MODEL 3026
Schematic



MODEL 3026
Chassis Layout
Below Serial 1400

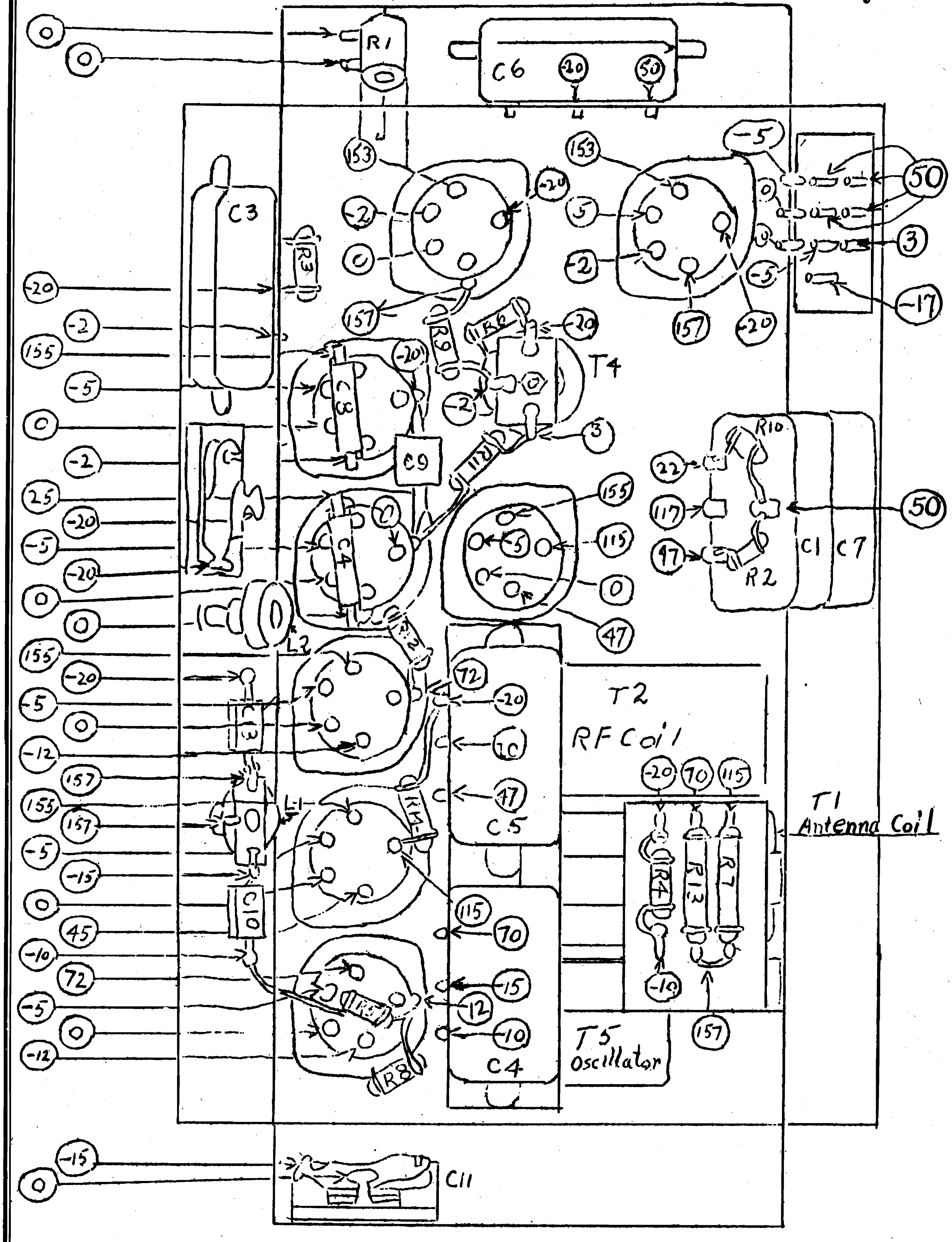
DELCO RADIO CORP.



BOTTOM OF CHASSIS
For sets with serial numbers below 1400

DELCO RADIO CORP.

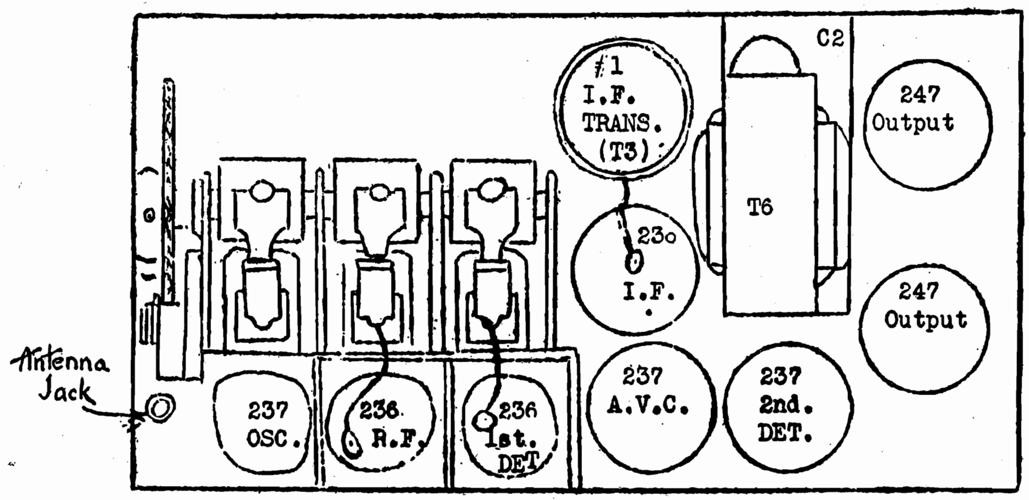
MODEL 3026
Above serial 1400
Chassis layout



Bottom of Chassis
For Sets with Serial Numbers above 1400

MODEL 3026
Socket layout
Cable data

DELCO RADIO CORP.



CABLE COLOR CODE:

BATTERY CABLE

Color	Battery end	Terminal No. (Plug on Receiver Case)
Red	B + 180V.	8
Maroon	B + 67½ V.	6
Yellow	B-	12
Black-Yellow	A (hot side)	11
Black	A (ground side)	2

CONTROL UNIT CABLE

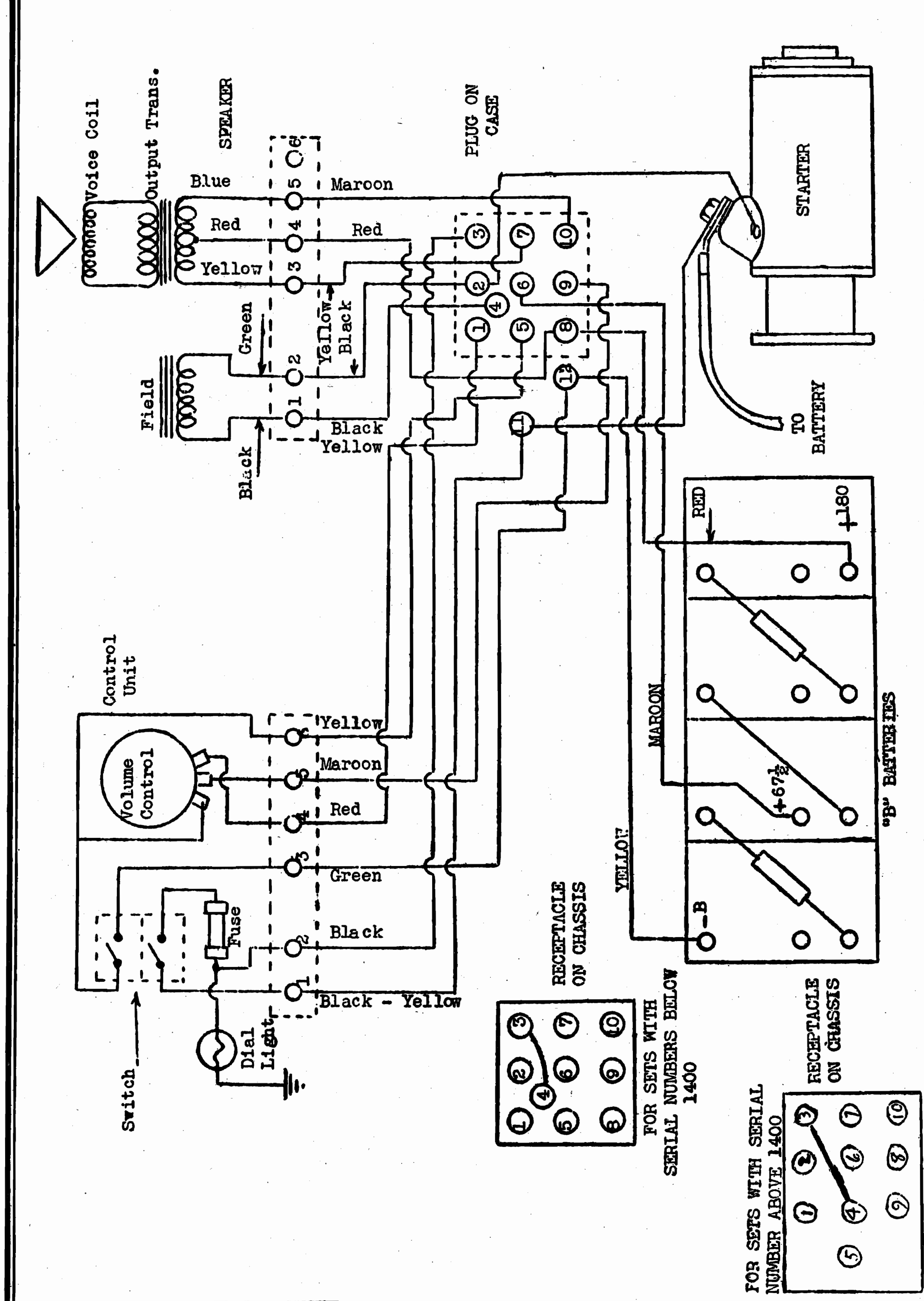
COLOR	FROM TERMINAL NO. (Control Unit Term. Strip)	TO TERMINAL NO. (Plug on Rec. Case)	CONNECTS
Black-Yellow	1	11	A (hot side) to switch
Black	2	3	Switch to filament
Green	3	12	B- from Battery
Red	4	1	A.V.C. cathode to high resistance side of Vol. Control.
Maroon	5	9	Grid resistor of A.V.C. tube to center tap of Vol. Control.
Yellow	6	5	B- to low resistance side of Vol. Control and to the switch

SPEAKER CABLE

COLOR	FROM TERMINAL NO. (Spkr. Term. Strip)	TO TERMINAL NO. (Plug on Rec. Case)	CONNECTS
Black-Yellow	1	4	One side of speaker field thru fuse to hot side of "A" Battery
Black	2	2	Other side of speaker field to ground side of "A" Battery
Yellow	3	7	Yellow lead of output trans. to plate of one 247 tube.
Red	4	8	Red lead of output trans. (center tap) to + 180 "B" Battery.
Maroon	5	10	Blue lead of output trans to plate of the other 247 tube.

DELCO RADIO CORP.

MODEL 3026
Terminal data



MODEL 3026
Control drive data

DELCO RADIO CORP.

Remove the control drive cable from the rear of control unit.

Remove the control unit from the dash. Remove the top of the control unit. and the escutcheon plate.

Remove the stop pin from the selector drive shaft and loosen the two set screws in the cable windlass and the set screws in the selector shaft collar. Then push the selector drive shaft to the rear far enough to remove the windlass and cable assembly.

Hold the new windlass and cable, with the end containing the set screws in the left hand, and wind one complete turn of the short end of the cable around the windlass, in a clockwise direction, winding the cable in the groove away from the set screws.

Then wind three and one half turns of the long end of the cable around the windlass in a counter-clockwise direction, winding the cable in the groove toward the set screws.

Slip the cable clamp, Tool No. 1001, over the windlass to hold the cable in place

Place the windlass and cable in position with the set screws to the rear and push the selector drive shaft forward into position through the windlass. The long end of the cable should lead away from the windlass at the bottom. The short end of the cable should lead away from the windlass at the top.

Pull the long end of the cable under the small idler pulley near the windlass and around the larger idler pulley from bottom to top. Hook the spring on the loop at the end of the long section of the cable then lead the cable through the slot in the face of the selector dial drum and hook the free end of the spring over the ear in the drum, nearest the 50 mark.

Lead the short end of the cable once around the outside of the selector drum in a counter-clockwise direction and through the slot in the face of the drum. Hook the loop at the end of the cable over the ear in the drum nearest the 150 mark.

NOTE:
On a number of sets of early production, the two ends of the cable are connected by the cable spring. The selector drum in this case has two notches and the cable is wound around the drum with the spring in the position shown in Figure 8

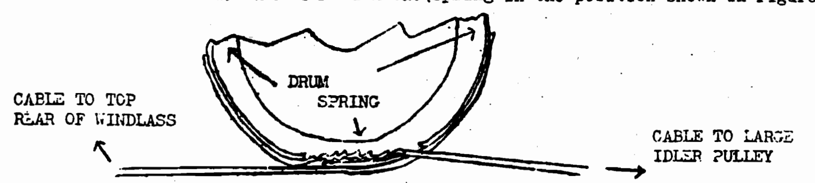


Figure 8

If it should be necessary to replace either the windlass and cable assembly or the dial and drum assembly described above, both parts should be replaced by the later type as listed in the part section of this manual.

Be sure that four selector shaft stop washers and four plain washers are in position on the shaft. These washers should be arranged alternately with one plain washer against the rear bearing.

Replace the selector shaft stop pin, and with the windlass loose on the shaft, turn the shaft as far as it will go in a clockwise direction.

Hold the escutcheon plate in place on the front of the control unit and turn the selector dial until the last line beyond the 150 mark is lined up with the indicating pointers.

Place the windlass close enough to the front bearing to allow approximately 1/64" end play and tighten the two set screws in this position.

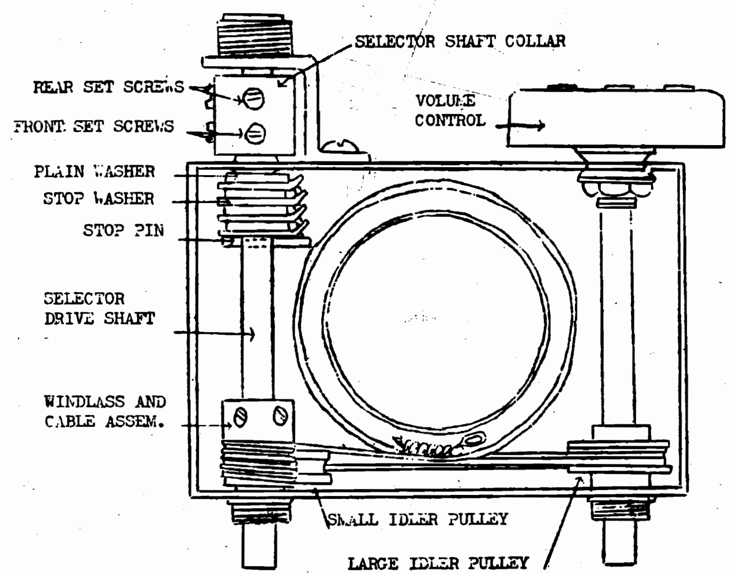


Figure 7

DELCO RADIO CORP.

MODEL 3026
Voltage, Resistance
Plug data

Type of Tube	Position of Tube	Fil. Volts	Plate Volts	Control Grid Volts	Screen Grid Volts	Cathode Volts	Pentode Screen Volts	Normal Plate Current	Grid Test
37	Oscillator	5.5	65	-----	----	5.0	----	6.0	7.5
36	R. F.	5.5	105	.15	65	55.0	----	2.5	3.5
36	1st Detector	5.5	165	5.50	80	5.0	----	1.3	2.5
36	I. F.	5.5	110	2.50	75	52.0	----	.5	3.0
37	A.V.C.	5.5	15	-----	----	7.5	----	---	---
37	2nd Detector	5.5	150	10.00	----	5.0	----	---	---
47*	A.F.	2.5	150	18.00	----	----	160	7.0	25.0
47*	A.F.	2.5	150	18.00	----	----	160	7.0	25.0
GA#	A.F.	5.0	150	18.00	----	----	160	7.0	25.0

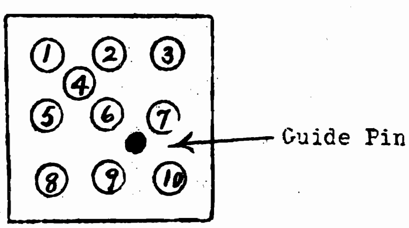
Volume Control on Max. "B" Battery Voltage 180

*Do not attempt to take readings on the type 47 (Pentode) tube unless your set analyzer is equipped to test sets using this type of tube. Otherwise, readings taken at the 47 sockets will be misleading.

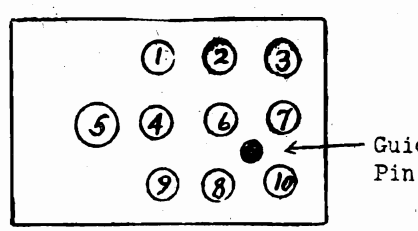
#GA pentode used in Models 2027-A and 2029-A in place of '47 pentode output tubes.

NOTE: It should be noted that readings obtained with different set analyzers will vary with battery voltage and with different tubes. The readings shown, therefore, are only average readings. For this reason, each service man should compile a chart similar to the one illustrated, using his own set analyzer with a set, and batteries that are known to be operating properly.

Test from contact No.	to contact No.	Correct Voltage Readings Min.	Max.	Probable cause of trouble if voltage is below Min. Limit
5	8	120	180	Low "B" Batteries
5	6	45	67½	Low "B" Batteries
1	8	120	180	Open volume control
9	8	120	180	Defective volume control
5	7	120	180	Open speaker transformer
5	10	120	180	Open speaker transformer
2	3	6.0	6.8	Low storage battery
3	4	6.0	6.8	Open speaker field
8	2	No Reading		(If reading is obtained "B" Batteries may be grounded or "B" Battery wires may be grounded due to moisture between the Batteries and "B" Battery box.)
6	2	No Reading		



Sets with serial numbers Below 1400



Sets with serial numbers Above 1400

View of plug in case with chassis removed.

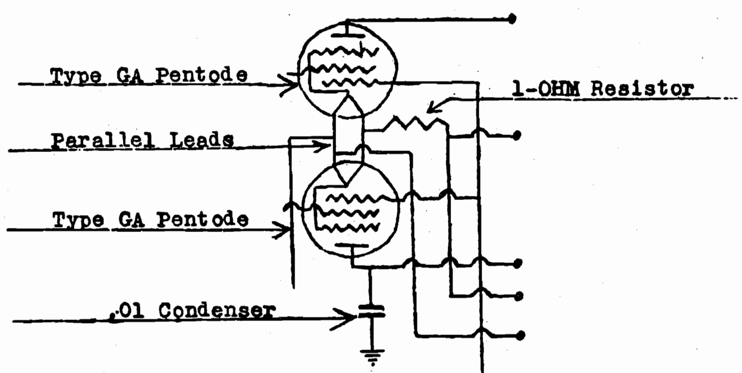
MODEL 3026
Values, Changes

DELCO RADIO CORP.

MODELS 2027-A AND 2029-A

WIRING CHANGE FROM TYPE 247 PENTODE TO TYPE GA PENTODE

In order to re-operate the 2027 or 2029 chassis to the new 2027-A or 2029-A, there are three distinct operations which are as follows:



1. Change Filament leads which are connected in series, for use with the 247 tube, to parallel connections.
2. Insert the Black tubular 1-OHM Resistor in the positive lead. This does not necessitate moving the resistor.
3. Connect a .01 Mfd. condenser from the plate terminal on one pentode socket to ground.

The choke coils, which were mounted on the 2027-A and 2029-A sets received from the factory, are not necessary in making this change.

TABLE OF CONDENSERS AND RESISTORS:

CONDENSERS

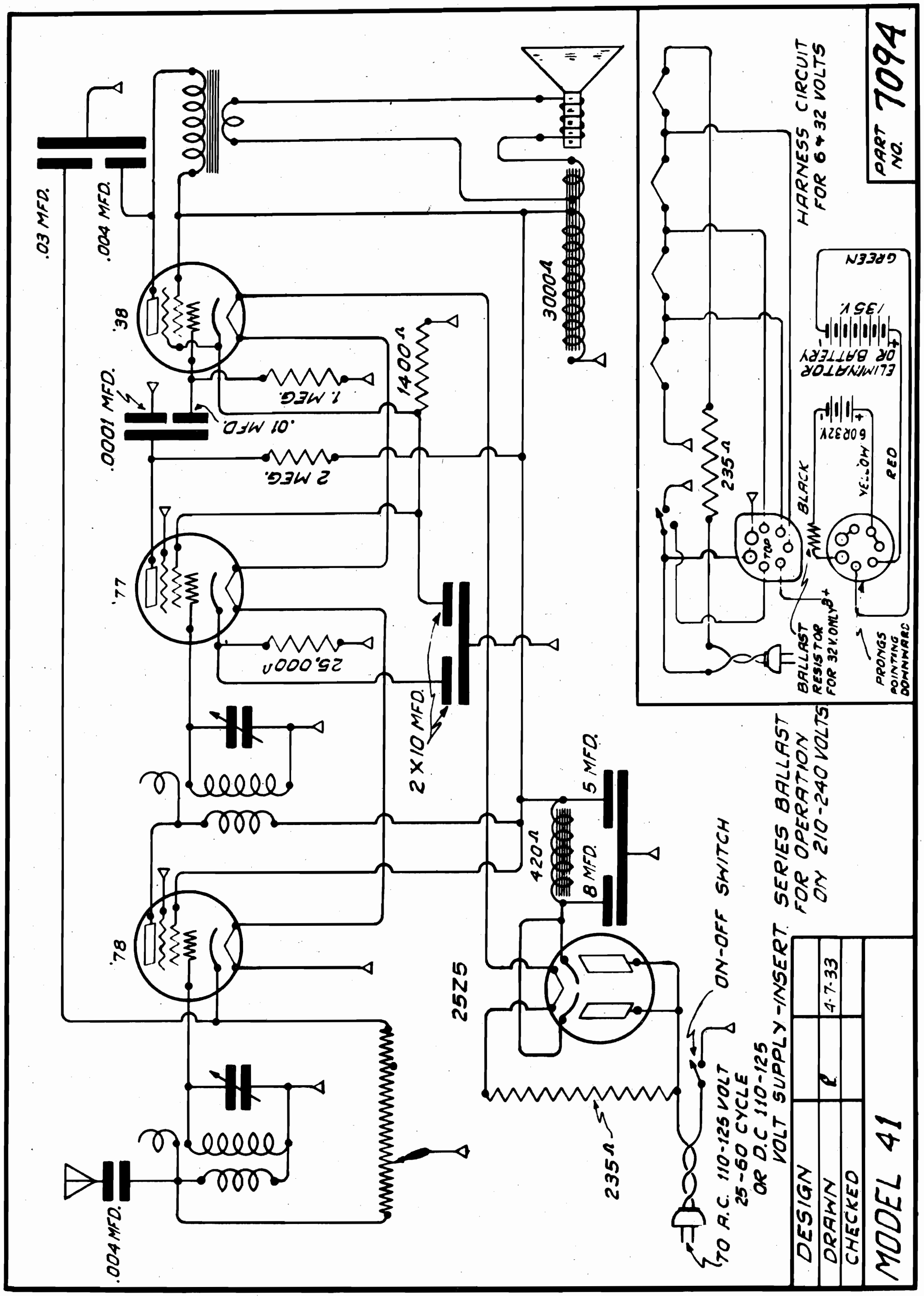
Wiring Diagram Code	Section of Condenser	Capacity	Part No.
C-1	A	.1 Mfd.	1206834
C-1	B	.1 Mfd.	1206834
C-1	C	.5 Mfd.	1206834
C-2	A	1.0 Mfd.	1206156
C-2	B	3.0 Mfd.	1206156
C-3	A	.1 Mfd.	1206397
C-3	B	.1 Mfd.	1206397
C-4	A	.1 Mfd.	1206397
C-4	B	.1 Mfd.	1206397
C-5	A	.1 Mfd.	1206397
C-5	B	.1 Mfd.	1206397
C-6		.2 Mfd.	1206397
C-7		1.0 Mfd.	1207239
C-8		.002 Mfd.	1203894
C-9		.00016 Mfd.	1203387
C-10		.00075 Mfd.	
	Below Serial No. 1400		1200422
	Above Serial No. 1400		1200423
C-11	Oscillator Series Trimmer.		1204265
C-12	No. 2 I.F. Trimmer		1206749
C-13		.00001 Mfd.	
	Below Serial No. 1400		1203388
	Above Serial No. 1400		1203386
C-14		.002 Mfd.	1203894

RESISTORS

CODE	OHMS	WATTS	BODY	END	SPOT	PART NO.
R1	1	5	Tubular Enameled Resistor			1206977
R2	250	1/2	Red	Green	Brown	1204109
R3	1,000	1/2	Brown	Black	Red	1201630
R4	1,000	1	Brown	Black	Red	1201615
R5	6,000	1/2	Blue	Black	Red	1204106
R6	8,000	1/2	Gray	Black	Red	1204132
R7	15,000	1	Brown	Green	Orange	1204111
R8	40,000	1/2	Yellow	Black	Orange	1201636
R9	90,000	1/2	White	Black	Orange	1204133
R10	100,000	1/2	Brown	Black	Yellow	1201635
R11	1,000,000	1/2	Brown	Black	Green	1201618
R12	90,000	1/2	White	Black	Orange	1204133
R13	15,000	1/2	Brown	Green	Orange	1204111
R14	100,000	1/2	Brown	Black	Yellow	1201635

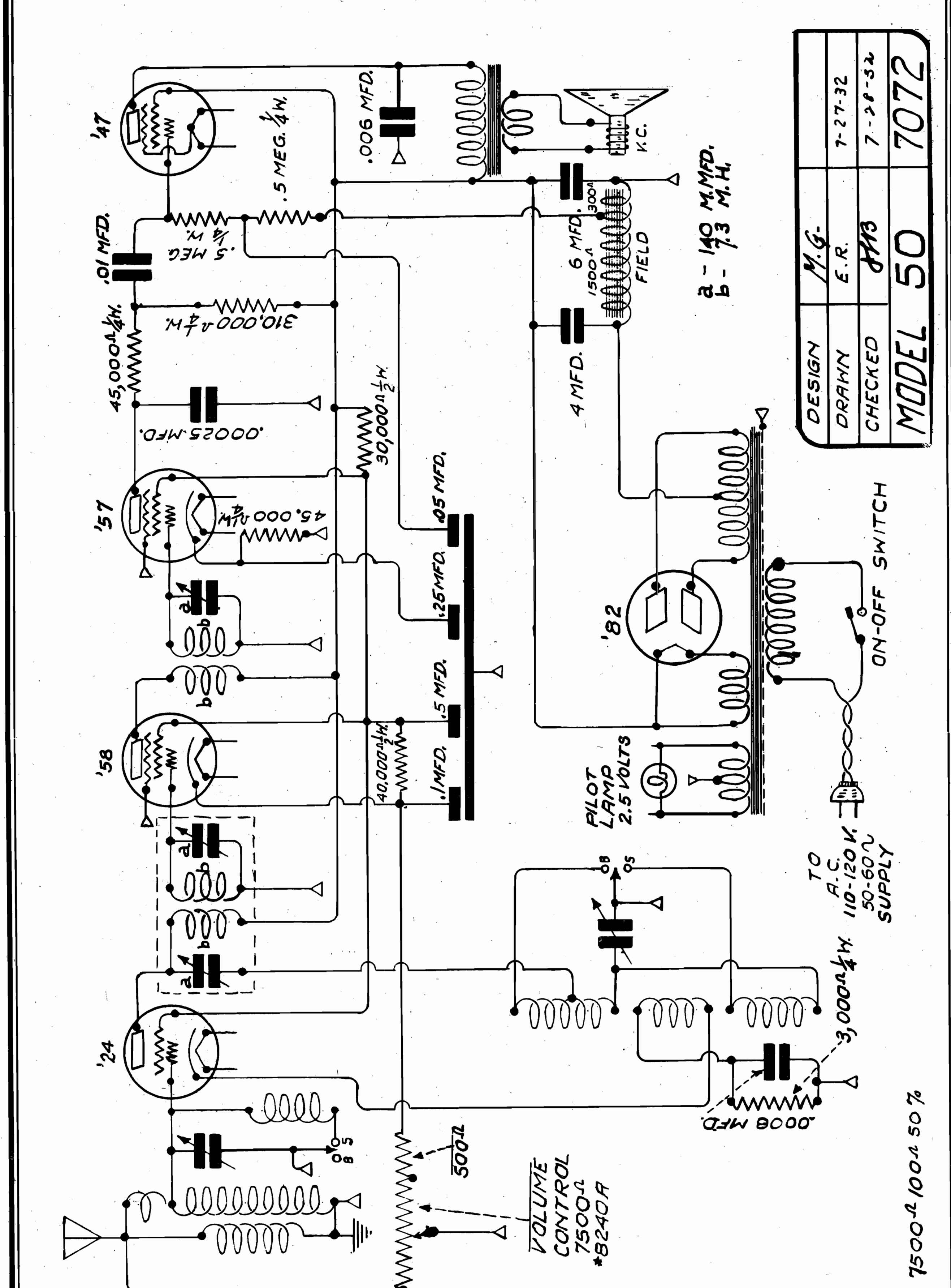
DEWALD RADIO

MODEL 41
Schematic



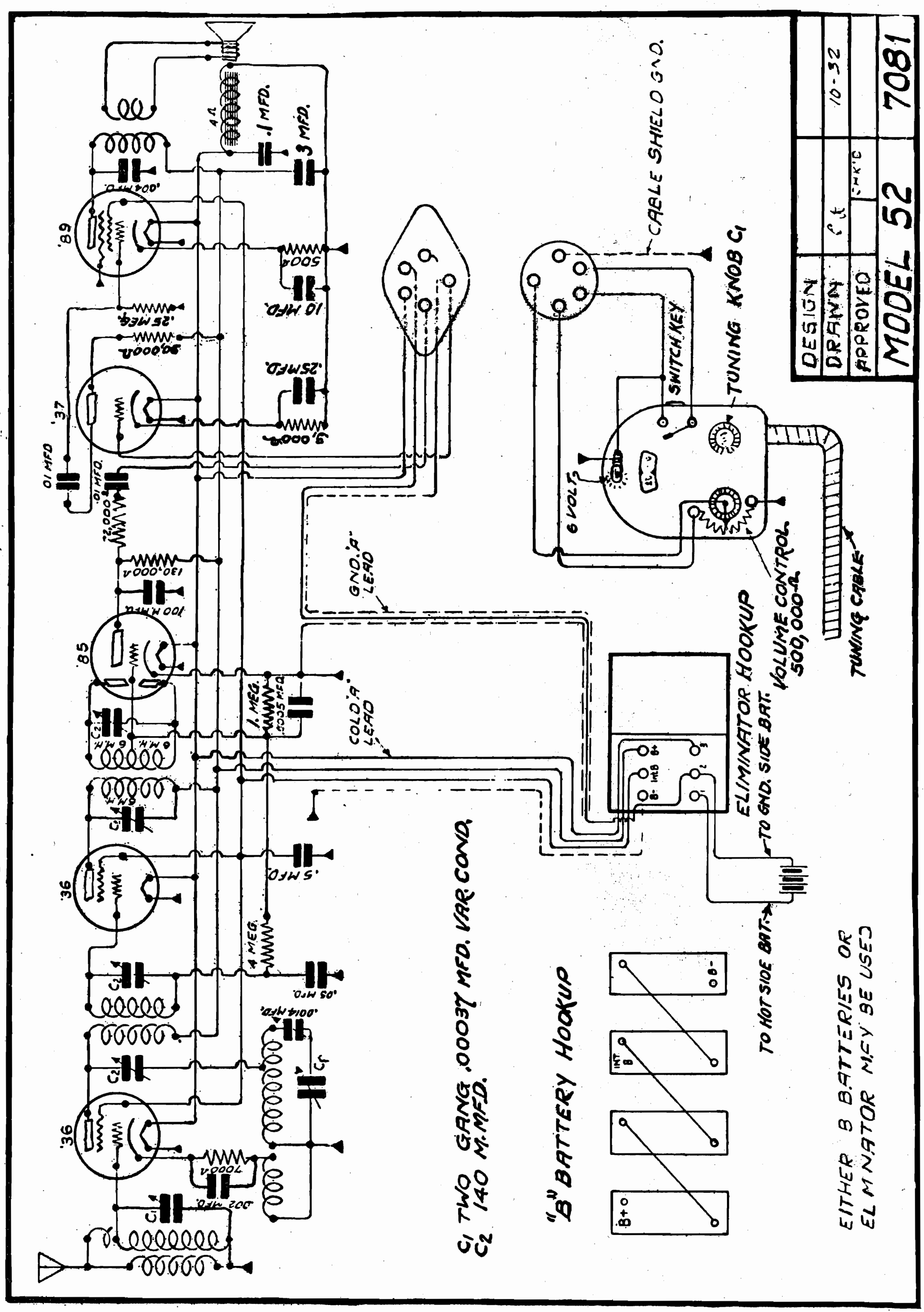
MODEL 50
Schematic

DEWALD RADIO



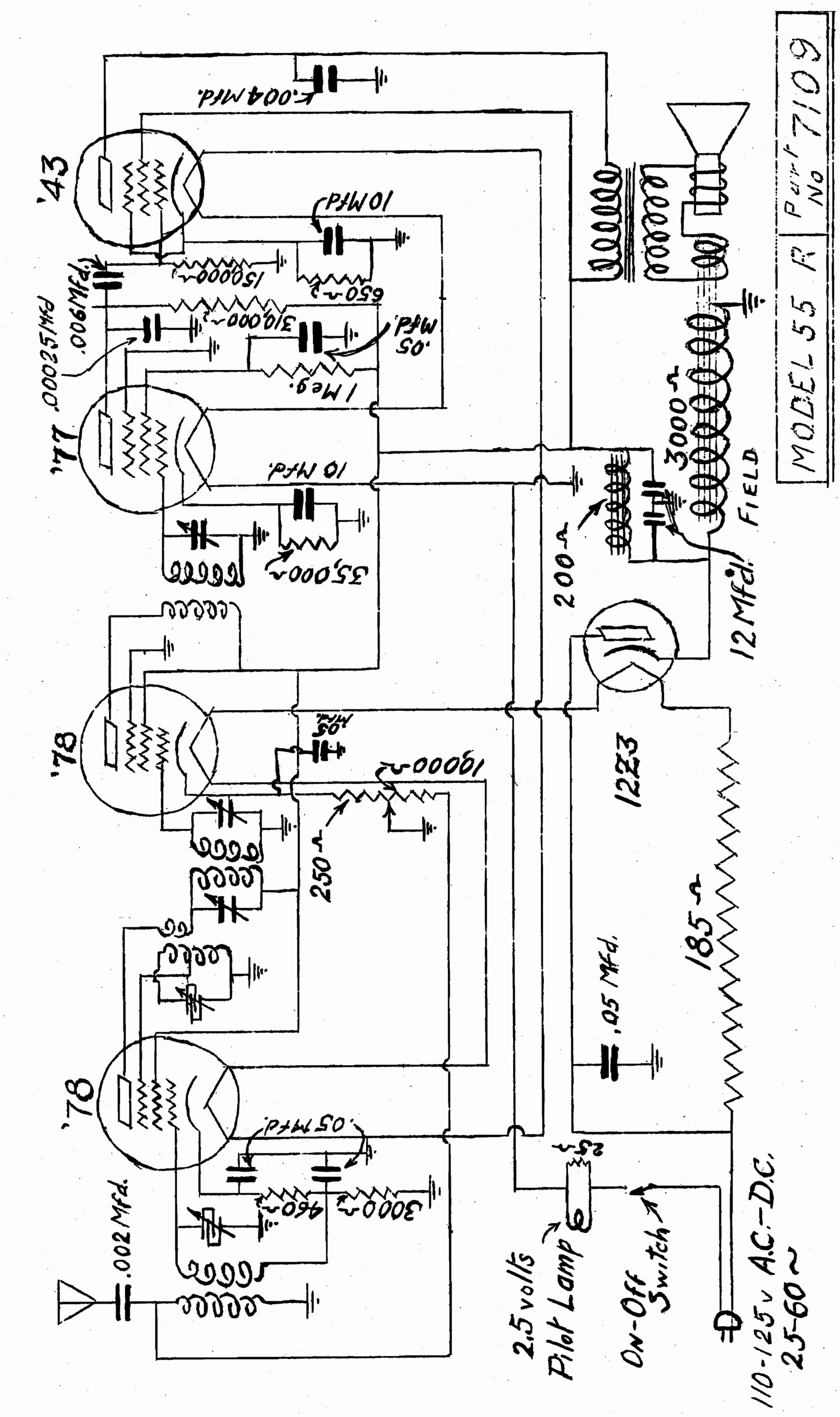
MODEL 52
Schematic

DEWALD RADIO



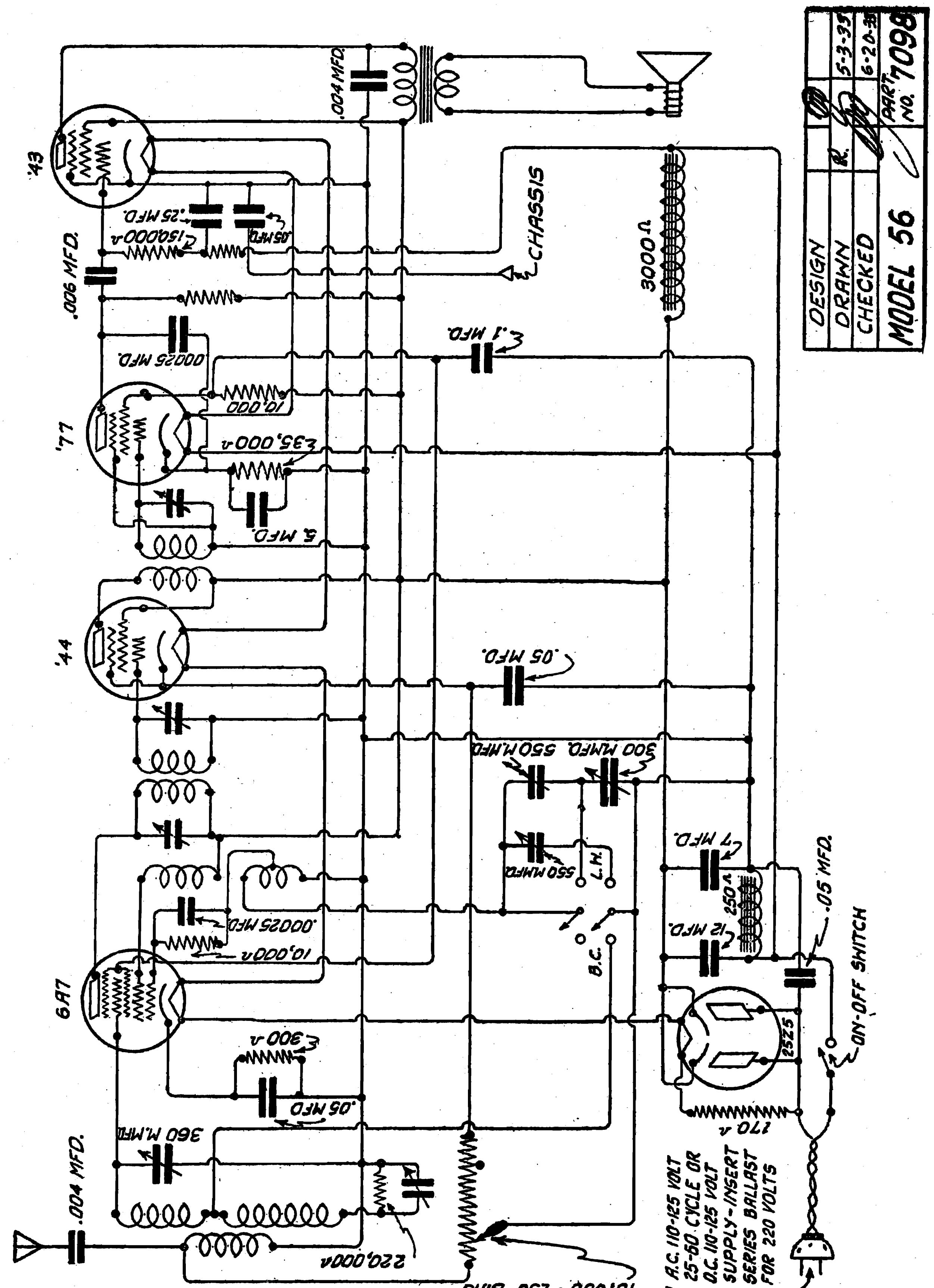
MODEL 55 R
Schematic

DEWALD RADIO



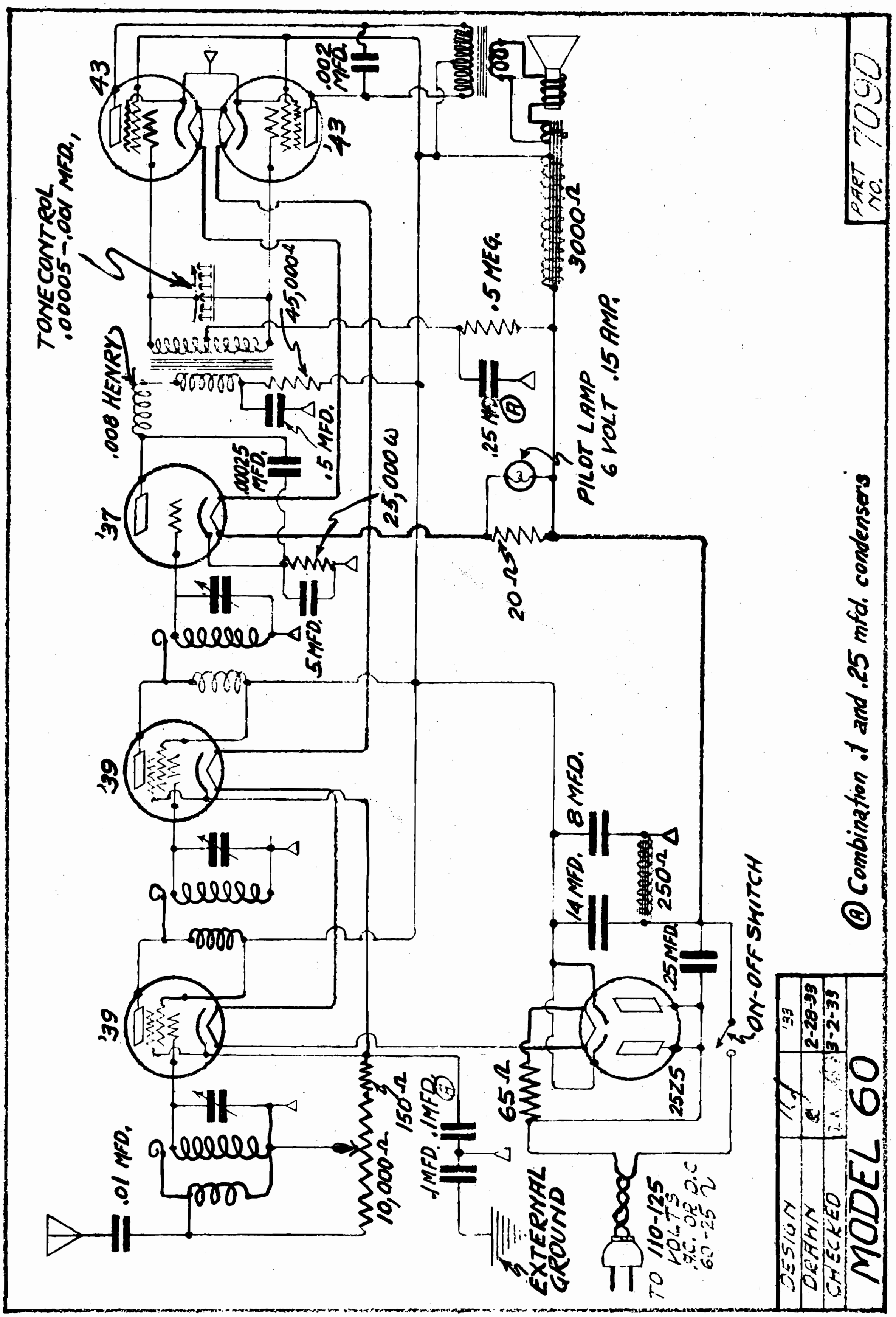
DEWALD RADIO

MODEL 56
Schematic



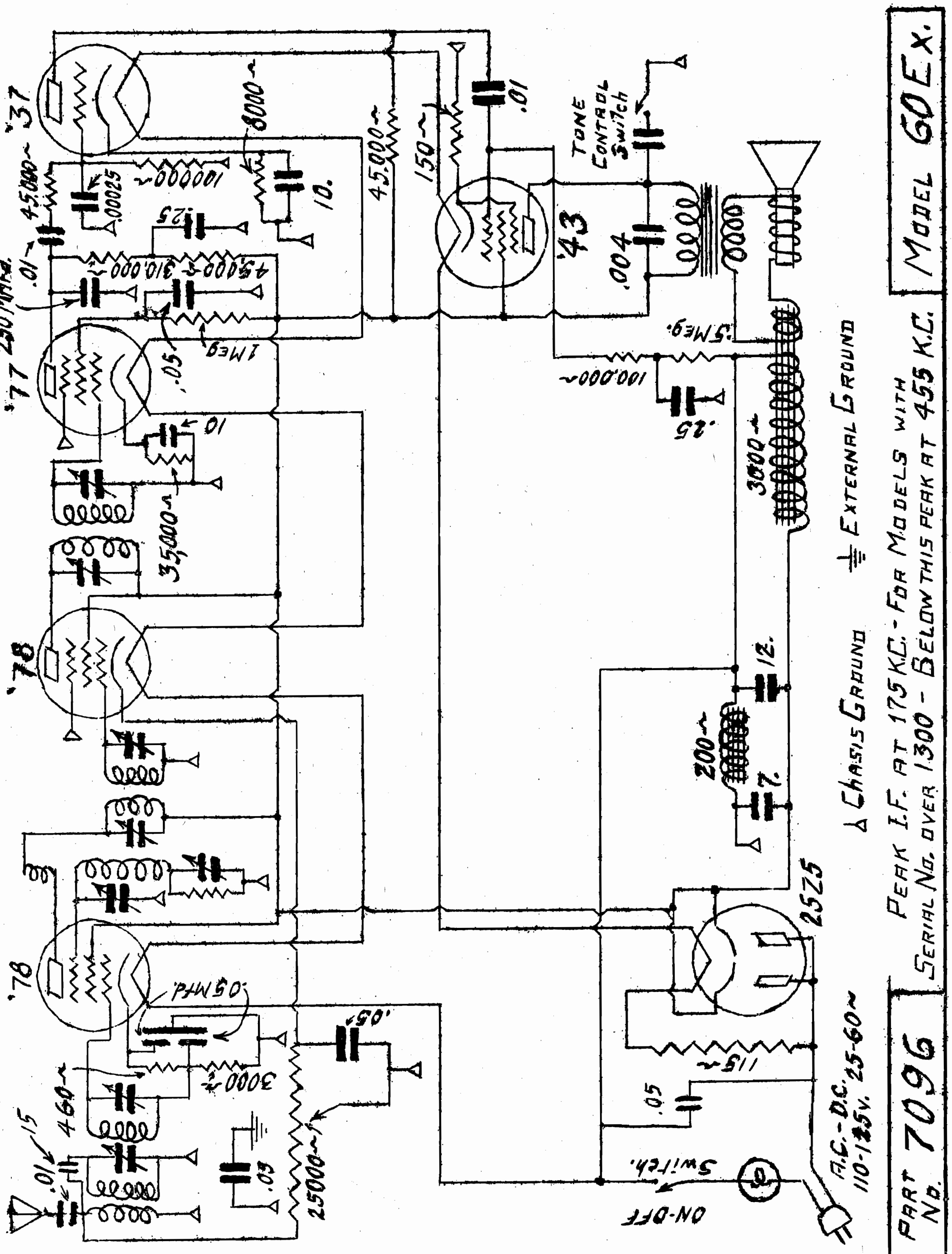
MODEL 60
Schematic

DEWALD RADIO



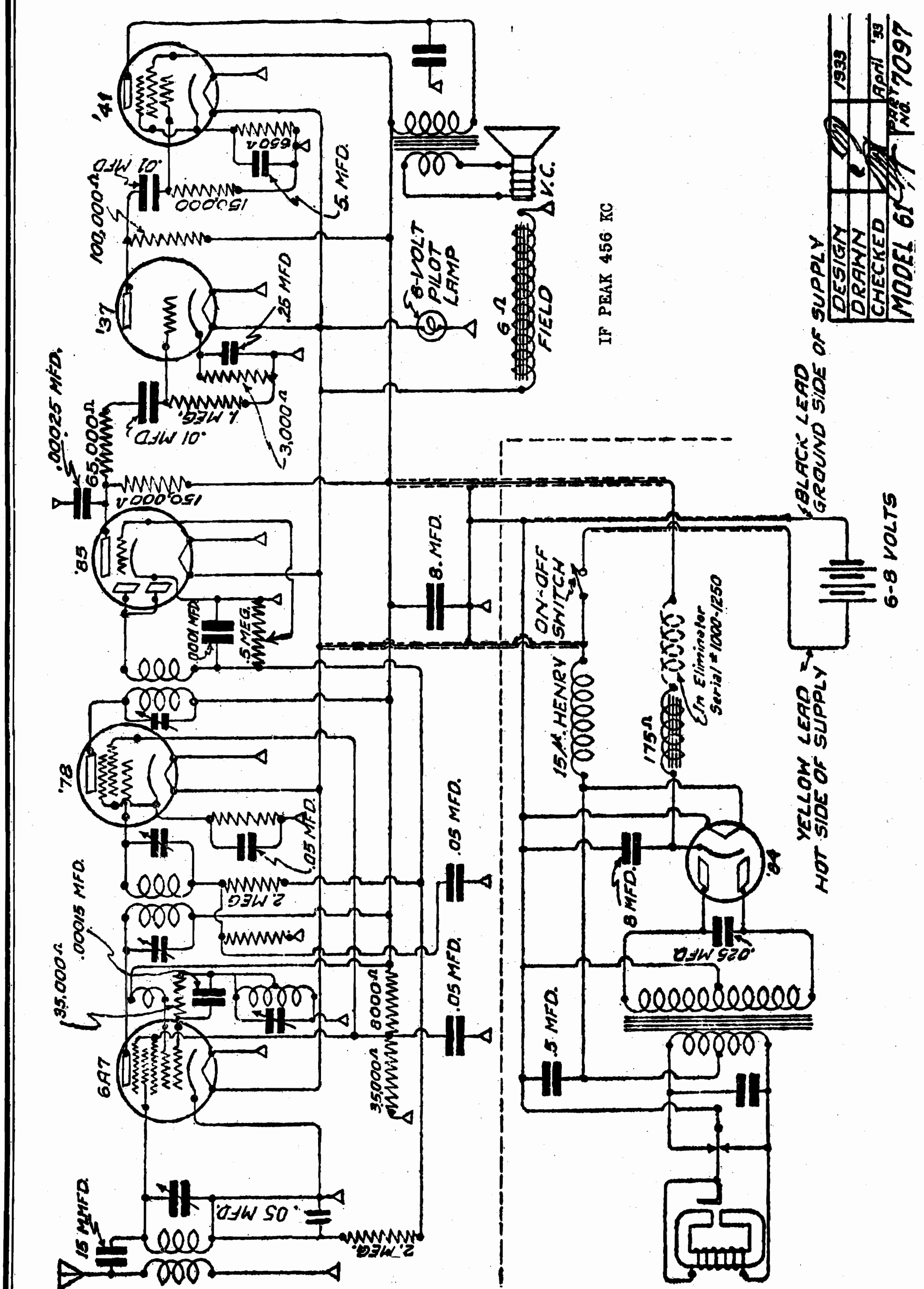
DEWALD RADIO

MODEL 60 Ex
Schematic



MODEL 61
Schematic

DEWALD RADIO



DEWALD RADIO

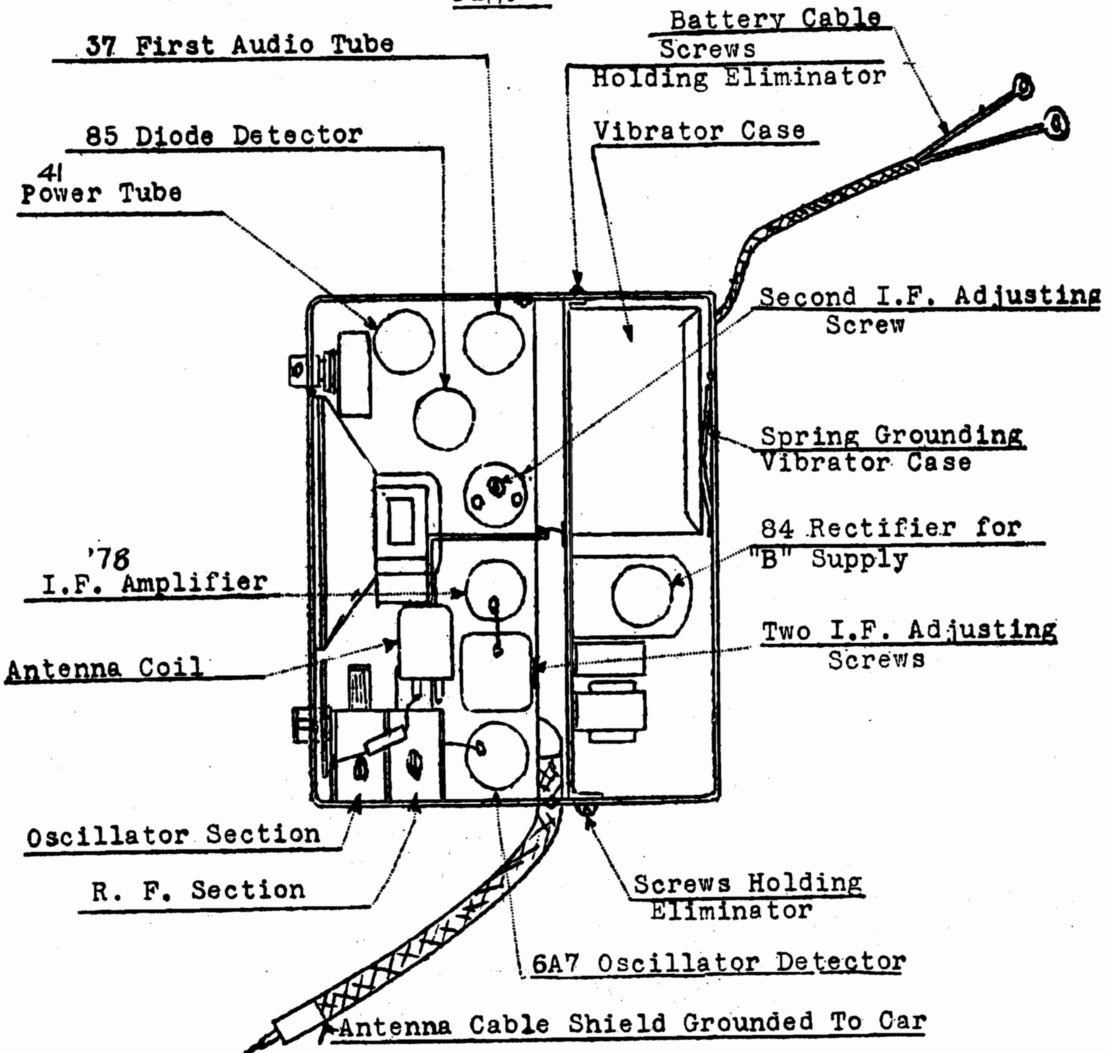
MODEL 61
Socket layout
Alignment

RECEIVER ALIGNMENT — To align the I.F. circuit, an oscillator supplying 456 K.C. should be connected to the control grid of the 6A7 and the variable condenser frame. The grid cap normally on the 6A7 should be removed. The oscillator section of the variable condenser should be short circuited. This may be done by putting a small clip on the terminal of the oscillator condenser trimmer and running a wire to ground. It is preferable to use an output meter for accurate work, which may be connected into circuit of the 41 by means of an adapter having leads brought out from plate and screen through a .5 mfd stopping condenser. See Fig. #4.

The volume control on the receiver should be turned to maximum and the three I.F. adjusting screws shown in Fig. #2 set to give maximum on the output meter. This operation may be performed with the receiver in the can if a pair of long nose pliers or offset screw driver is used.

For R.F. alignment, remove oscillator condenser short circuit, replace grid cap on 6A7 and connect oscillator covering broadcast range to antenna wire and its shield.

Fig. 2



MODEL 61
Notes

DEWALD RADIO

Be sure shield of battery cable is soldered to can at left side of receiver.

When cover is placed on can, a heavy spring on the inside grounds the top of "B" supply unit. Be sure contacts is good and pressure heavy.

Condenser from antenna transformer should run to front of variable condenser. If further difficulty is experienced check ground of chassis and "B" supply unit to can at various points with heavy screw driver.

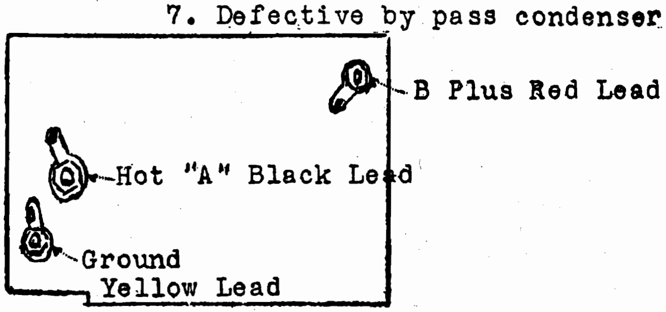
The wire on vibrator which runs from its coil to the frame, should be securely soldered on frame and on inside of vibrator case.

POSSIBLE SET TROUBLES

A. Low volume or weak signals
1. Defective tubes.
2. Poor antenna (small size shielded wire must not be used to extend present antenna, as capacity between shield and inside is too great.
3. Open circuit in radio frequency or audio stage.
4. Defective resistors.
5. Defective by pass condensers.
6. Defective volume control
7. Low "B" voltage.

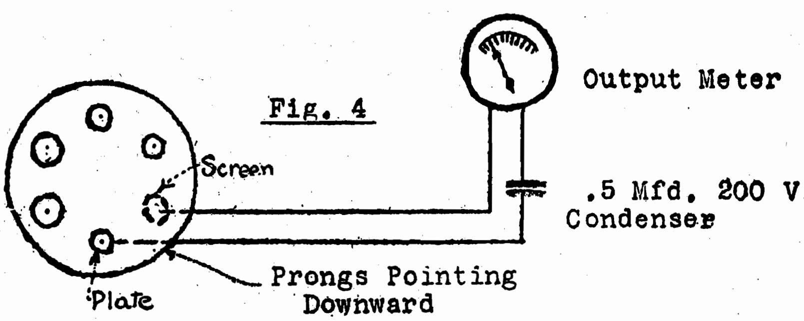
B. Intermittent reception.
1. Antenna shorting (use high resistance continuity to check car antenna-set disconnected)
2. Defective tubes.
3. Loose connection.
4. Film breaking down in electrolytic condenser
5. Defective speaker
6. Defective volume control
7. Defective by pass condenser

Fig. 3b



View Showing Eliminator Three Terminals & Color Code of Connections

Fig. 4



Adapter for 41 Showing Wires to Screen Grid & Plate Plus Circuit

DEWALD RADIO

MODEL 61
Vibrator data

VIBRATOR ADJUSTMENT — To examine vibrator, remove "B" supply unit from can by unsoldering 3 leads (see Fig.3) removing 6 screws at ends of unit. Take cover off vibrator case and vibrator may be removed without unsoldering its lead wires. It will be seen that there are a top and a bottom set of contacts. The normal clearance on these contacts is .003" to .004" and this may be adjusted with screws provided.

Any dirt on contacts should be removed with pipe cleaner before adjustment. If top clearance is too great vibrator may operate but not close this circuit (operate half wave) and the voltage will be low. If bottom clearance is too great, vibrator will pull down but not vibrate. Too small a bottom clearance may short bottom contacts and cause inoperative vibrator and heavy current drain.

If both contact clearances are small, the vibrator will operate at a higher pitch and voltage, but sparking will occur.

Check of vibrator operation may be made by running three temporary jumpers from "B" supply unit outside can to the receiver, (See Fig.3) and operating the vibrator outside its case so it is visible. The tone should be low pitched, even and regular, and no appreciable sparking should occur. To remove vibrator for replacement purposes, unsolder the three vibrator wires at the terminals of the step up transformer and at the ground terminal near the tube. Leads should be left attached to vibrator.

If set is not available or is in doubtful condition a 4000 ohm load resistance of 5 watts or larger may be used from plus "B" to ground of eliminator in place of set. The 6-volt supply is applied to the two terminals at the vibrator end of "B" unit.

If gaps are okay, and sparking persists, check for dirty contacts or open condenser across primary of step-up transformer.

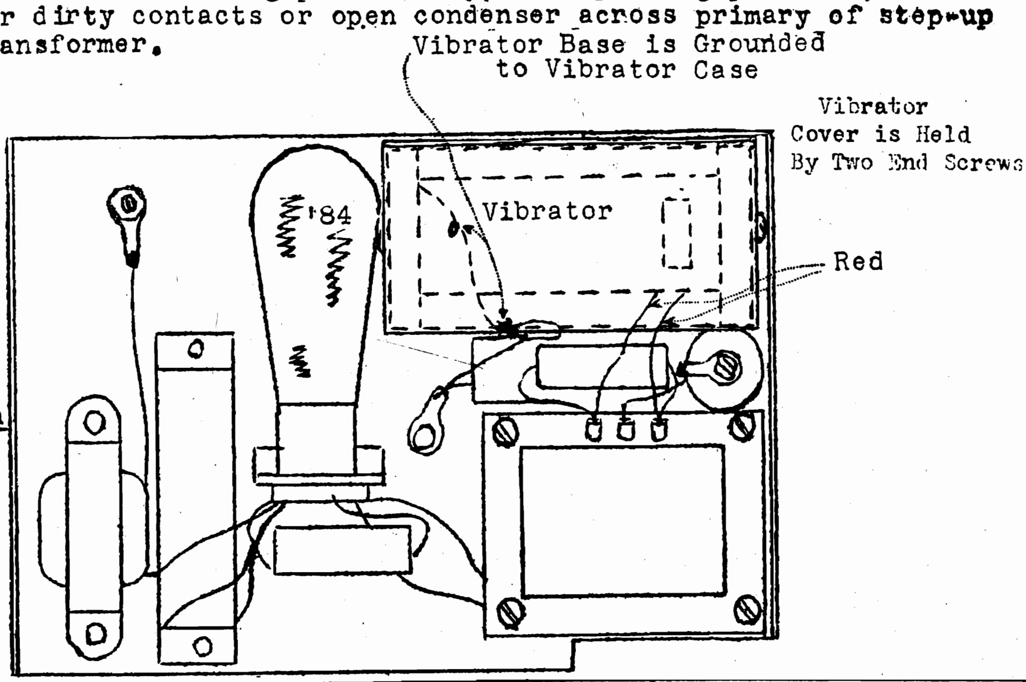


Fig 3a

MODEL 61
Parts List
Alignment

DEWALD RADIO

Set test oscillator at 1500 K.C. and receiver variable condenser at minimum capacity. Adjust to maximum output with trimmers on top of variable condenser.

Apply 600 K.C. from test oscillator, tune in on receiver and check variable condenser alignment by bending one R.F. condenser rotor plate in or out slightly to give maximum output. Repeat procedure at 800, 1000, and 1200 kilocycles.

MODEL #61 RECEIVER

NUMBERS AND LIST PRICES OF REPLACEMENT PARTS

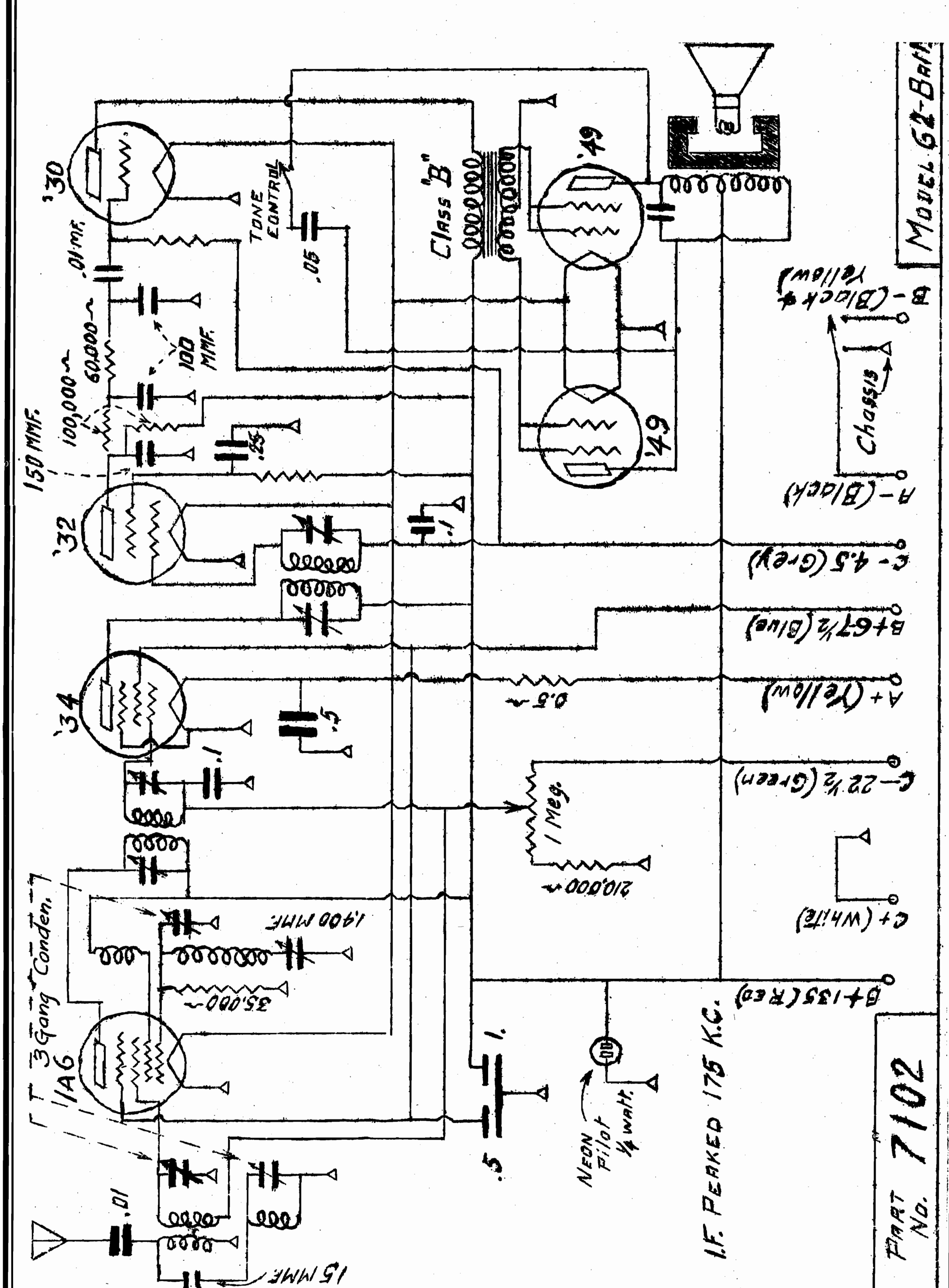
1165	Second Detector Transformer	$ 1.40
1166	Dual I.F. Tuned Transformer	1.70
1168	Oscillator Coil	.70
1169	Antenna Coil	.85
2033	.25 Cub Condenser	.35
2046	.05 Cub Condenser	.35
2047	.00025 Mica Condenser	.35
2056	.01 Cub Condenser	.35
2081	.00015 Mica Condenser	.35
2123	.0001 Mica Condenser	.35
2133	5 Mfd Elect. Condenser	.75
2135	2 X .05 Cub Condenser	.45
2147	8 Mfd Elec. Condenser	1.00
2152	.25 Gen. Condenser	.50
3192	Spark Plug Suppressor	.50
3193	Distributor Suppressor	.50
5064	Antenna Cable	.50
5069	Battery Cable	.90
7095	Speaker	5.20
8308	Combination Controls (Vol Cont. & Switch)	1.15
9257	Drive Cover	.50
9270	Baffle Board	.15

MODEL #61 ELIMINATOR

1163	Choke R.F	.60
1162	Transformer	2.50
2070	.5 Mfd Cub Condenser	.35
2033	.25 Cub Condenser	.35
2145	.025 Mfd Cub Condenser	.35
2147	8 Mfd Elect. Condenser	1.00
8304	Vibrator	5.00
9289	T. & B. Cushion 3/8 X 2-1/16 X 4-3/8	.25
9290	Side Cushion 3/8 X 1-3/16 X 3-5/8	.20
9291	End Cushion 3/8 X 1-3/16 X 2-1/16	.20
1161	Filter Choke	.75
9202-9203	Drive Cable Ably	1.75
8317	Driven Gear Ably	1.00

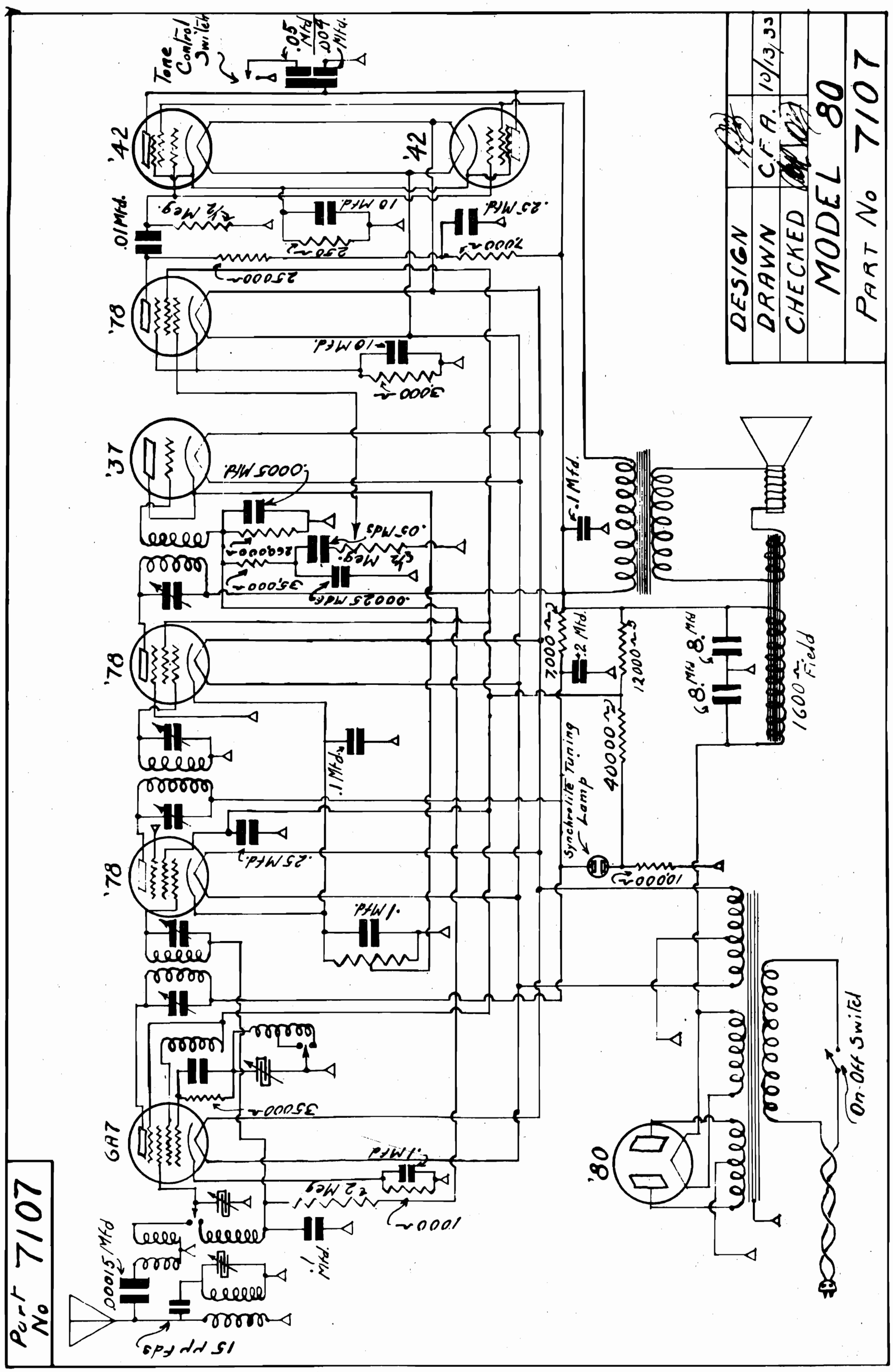
DEWALD RADIO

MODEL 62 Batt. Schematic



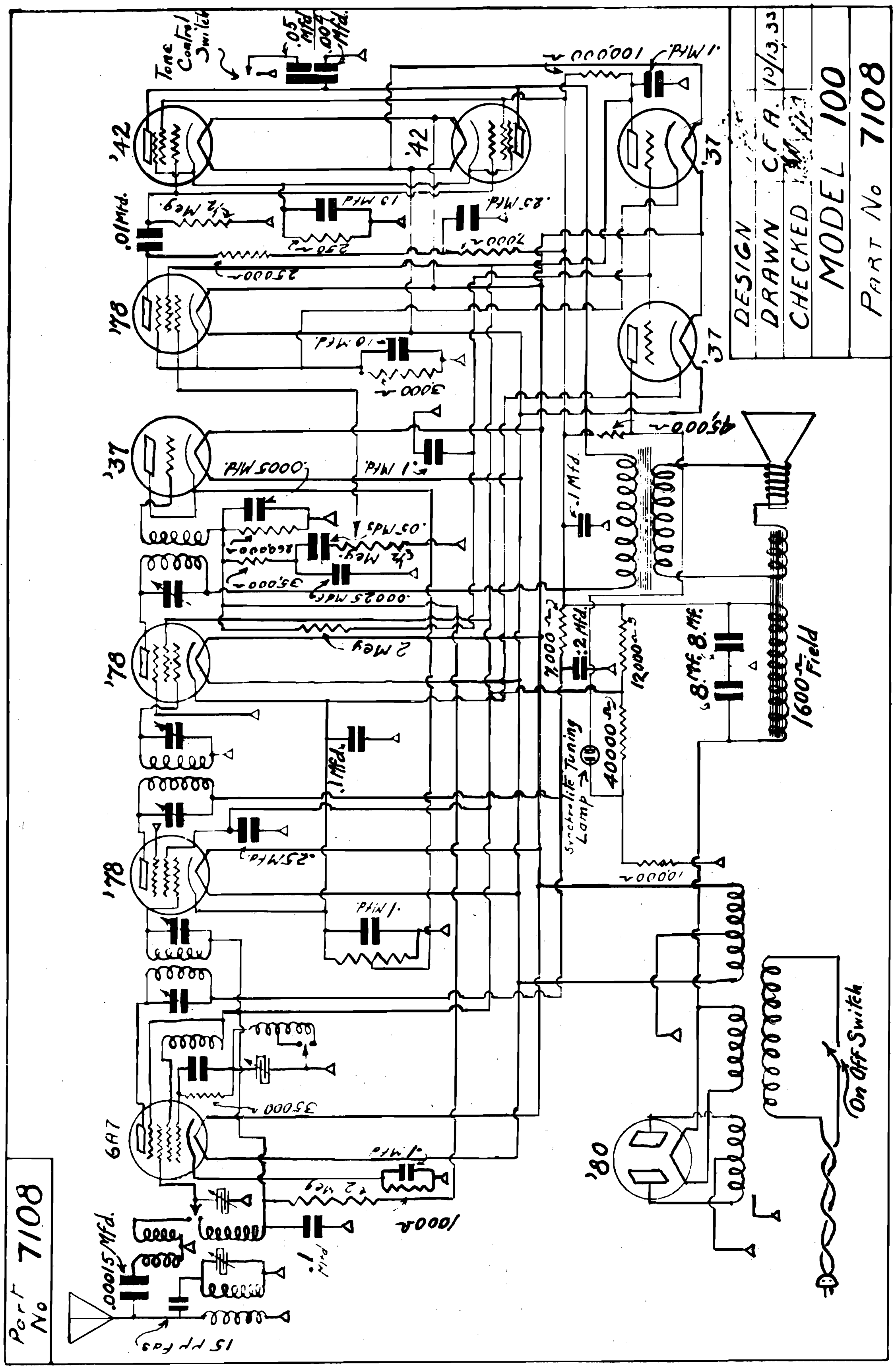
MODEL 80
Schematic

DEWALD RADIO



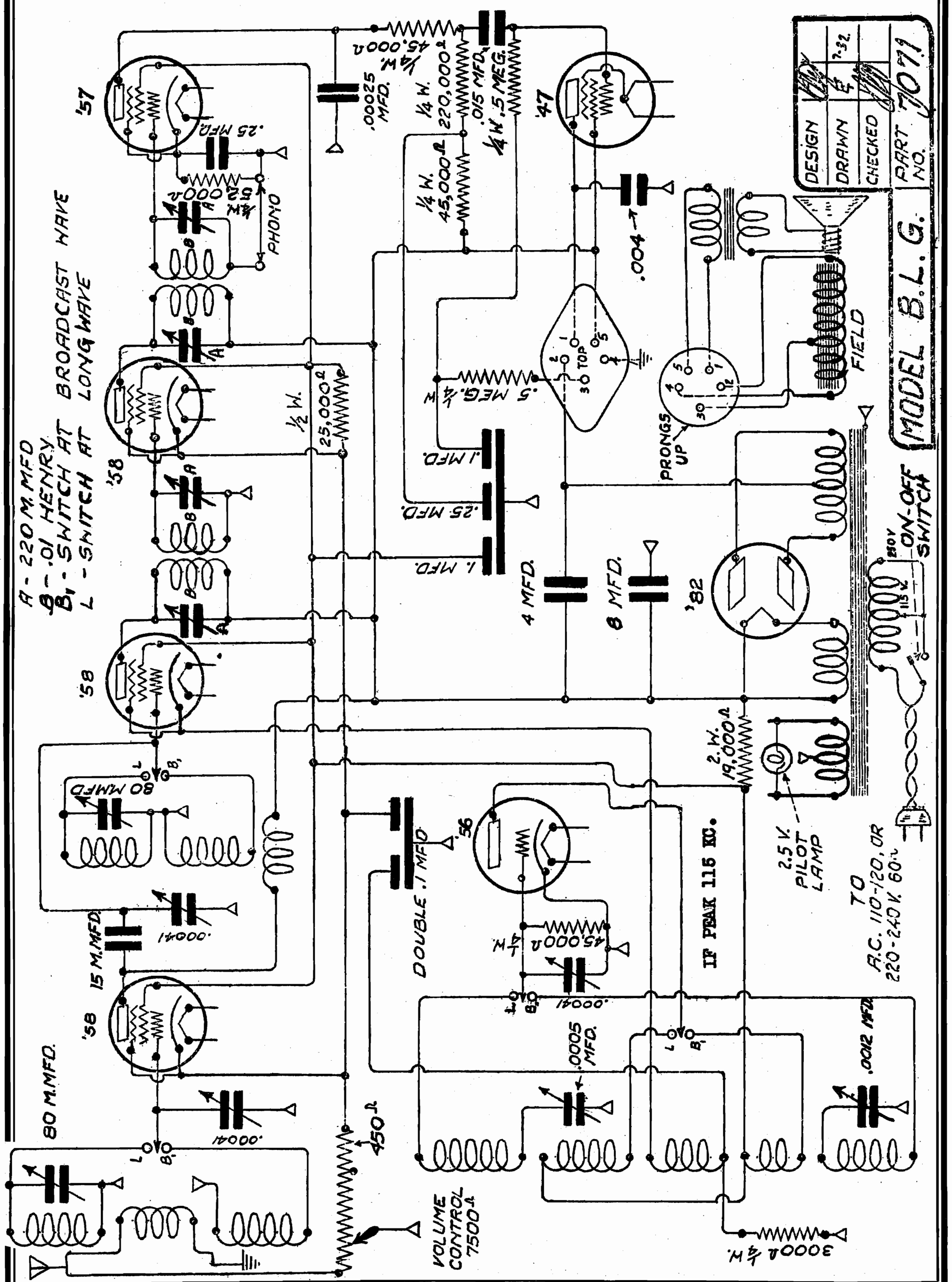
DEWALD RADIO

MODEL 100
Schematic



MODEL B-L-G
Schematic

DEWALD RADIO



THOMAS A. EDISON, INC.

MODEL "Light-O-Matic"
Cable drive data

1. DRIVE MECHANISM. Twenty pound test line is specified and used for driving the dial mechanism. Each end of the belt is secured to the large pulley wheel. The ends pass through holes on opposite sides of this pulley and are held by knots tied in the belt itself. The belt passes over two smaller pulleys in a spring-actuated take-up assembly, thence to a worm which slips over the tuning knob shaft. Five turns are made by the belt around this worm. The worm is not directly secured to the tuning knob shaft but is held in position between two collars locked to the shaft. A spring washer is inserted between the worm and the front collar. The spring washer being adjusted so as to provide friction to a sufficient degree, exceeding the driving resistance of the dial mechanism itself and its associated condensers; yet insufficient friction to resist continued rotation of the tuning knob when the dial mechanism has been rotated to either extreme end, thus preventing slippage or breakage of the belt after proper adjustment has once been made.

2. SPRING-WASHER. Receiver units bearing serial numbers ranging above 725000 have been equipped with a spring washer of improved design, greatly diminishing the possibility of dial slippage. The improved washer may be distinguished from the earlier style washer by its cup-shaped appearance, much of which it retains even when adjusted to a position for maximum friction.

3. DIAL SLIPS OR STICKS. Sticking or slipping of the dial may result if the spring washer is not adjusted for sufficient friction against the drive worm or if the belt is too loose.

4. ADJUSTMENT OF SPRING WASHER FOR INCREASED FRICTION. Note Figure 12. Observe the relative positions of front collar, spring washer, drive worm, rear collar and bearing plate "B".

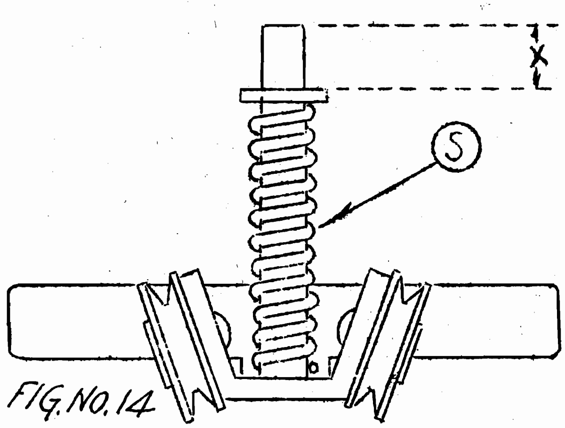


FIG. NO. 14

NOTE: If dial slips and continues to slip after collar has been forced forward for maximum friction of spring washer against worm, then inspect "take-up assembly. If distance "x" is less than 1-16th inch, belt should be tightened in accordance with instructions.

MODEL "Light-O-Matic"
Cable drive data

THOMAS A. EDISON, INC.

Rotate dial to approximate position as shown in Figure No. 12 so that these parts are most readily accessible with long blade screw driver. Loosen both set screws in rear collar. Insert screw driver blade between rear collar and bearing bracket, indicated by "Z". Force the rear collar forward, in the direction of the tuning knob, by twisting the blade or prying against the bearing bracket. This action compresses the spring washer between the worm and front collar, providing greater friction. Then, with a narrow blade screw driver, tighten set screws in rear collar, making sure that rear collar does not shift before the second set screw is tightened. This operation properly performed will eliminate slippage of the worm.

5. OIL should not be applied to the spring washer or worm. The application or presence of oil on these parts promotes slipping and will defeat proper functioning.

6. TO TIGHTEN BELT. Although not absolutely necessary greater accessibility may be had by removal of the front panel. Then remove the right hand variable condenser shield. Loosen the two set screws in dial mechanism that hold the shaft of the right hand variable condenser, and then push the rotor plate assemblies into position of maximum capacity so that the possibility of damage to them is reduced to a minimum. Consult Figure No. 13. Rotate the tuning knob until the large pulley with the knot "K" is in the approximate relative position shown in Figure No. 13. Insert screw driver blade as shown between chassis shelf and take-up assembly bracket. Lift upward on this screw driver, compressing take-up assembly spring "S", and loosening belt "B". Block screw driver blade as illustrated at point "X", thus maintaining looseness of belt. Then pull knot "K", taking up slack in belt "B". Then tie a new knot in this belt as near as possible to the pulley face. It is usually advisable, if possible, to untie the original knot to avoid its rubbing against the condenser shield. When the new knot has been formed, remove the screw driver, rotate the tuning knob in a counter clockwise direction (to the left), turning it as far as possible. Then tighten the set screws that hold the dial mechanism to the shaft of the right hand variable condenser. Replace the right hand condenser shield, front panel and knobs.

7. NOTE. It is always advisable, after removal or replacement of panel or when any adjustment of the variable condensers is made, to reneutralize and then recompensate to insure most accurate calibration. These operations are explained in detail in bulletins numbered 3 and 4.

MODEL "Light-O-Matic"
Cable drive data

THOMAS A. EDISON, INC.

1. A cup-shaped friction washer is now being used on Light-O-Matic Models to prevent slipping of the belt driving worm.

2. It is recommended that this cup-shaped friction washer be installed in addition to the regular friction washer wherever the worm has a tendency to slip. This is done in the following manner.

3. Remove left hand gang condenser shield housing.

4. Loosen both set screws in clutch collars "A" and "B". (See Figure No. 9.)

5. Pull out tuning knob shaft slowly about ½ inch or until collar "A" can be removed, taking care to hold shaft straight so drive cord will not change its position on worm.

6. Push tuning shaft back in slightly and place cup-shaped washer on end of this shaft.

7. Replace collar "A" in position and push tuning knob shaft through into its original position.

8. Tighten both set screws in collar "B".

9. Insert a screw driver between collar "A" and frame bearing at point "C".

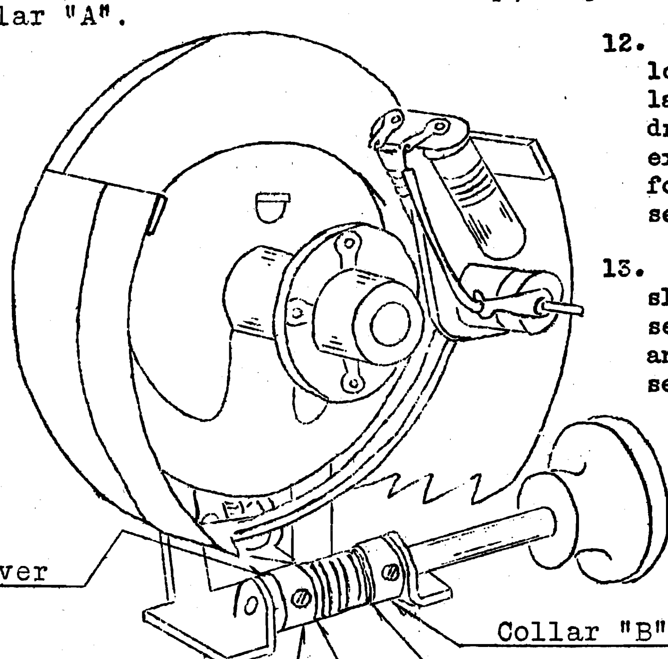
10. Twist screw driver, forcing collar "A" toward panel thereby compressing friction washer, and while holding it in this position, tighten one set screw.

11. If friction clutch does not slip, tighten the other set screw in collar "A".

12. If clutch still slips, loosen set-screw in collar "A", reinsert screw-driver at point "C" and exert greater twisting force before tightening set-screw.

13. If the clutch does not slip, tighten the other set-screw in collar "A" and replace gang condenser shield housing.

FIG. NO. 9

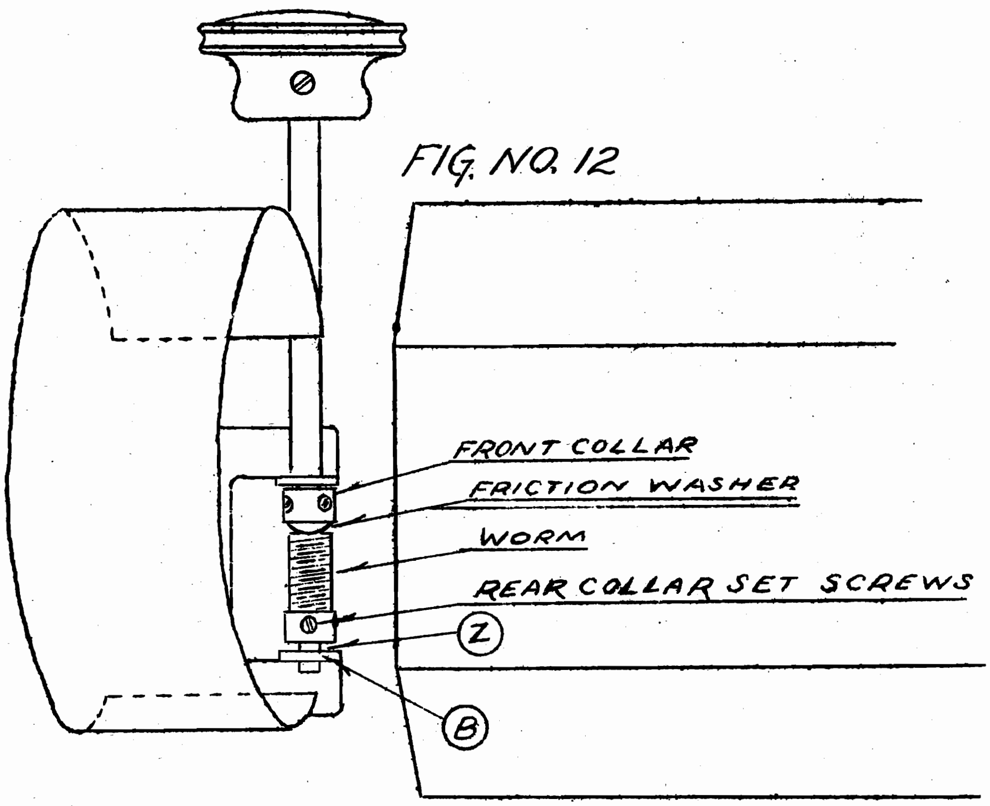


INSTALLATION OF
NEW CUP-SHAPED FRICTION WASHER

MODEL "Light-O-Matic"
Cable drive data

THOMAS A. EDISON, INC.

FIG. NO. 12



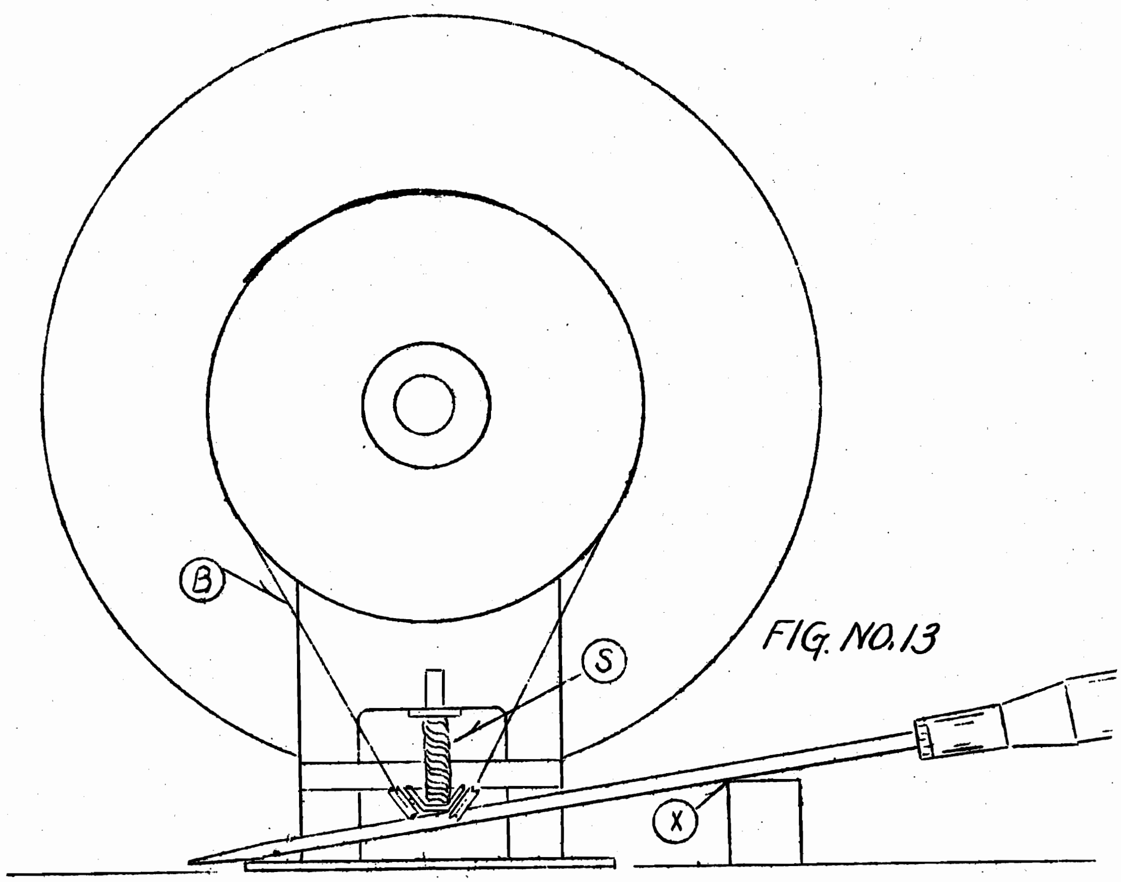
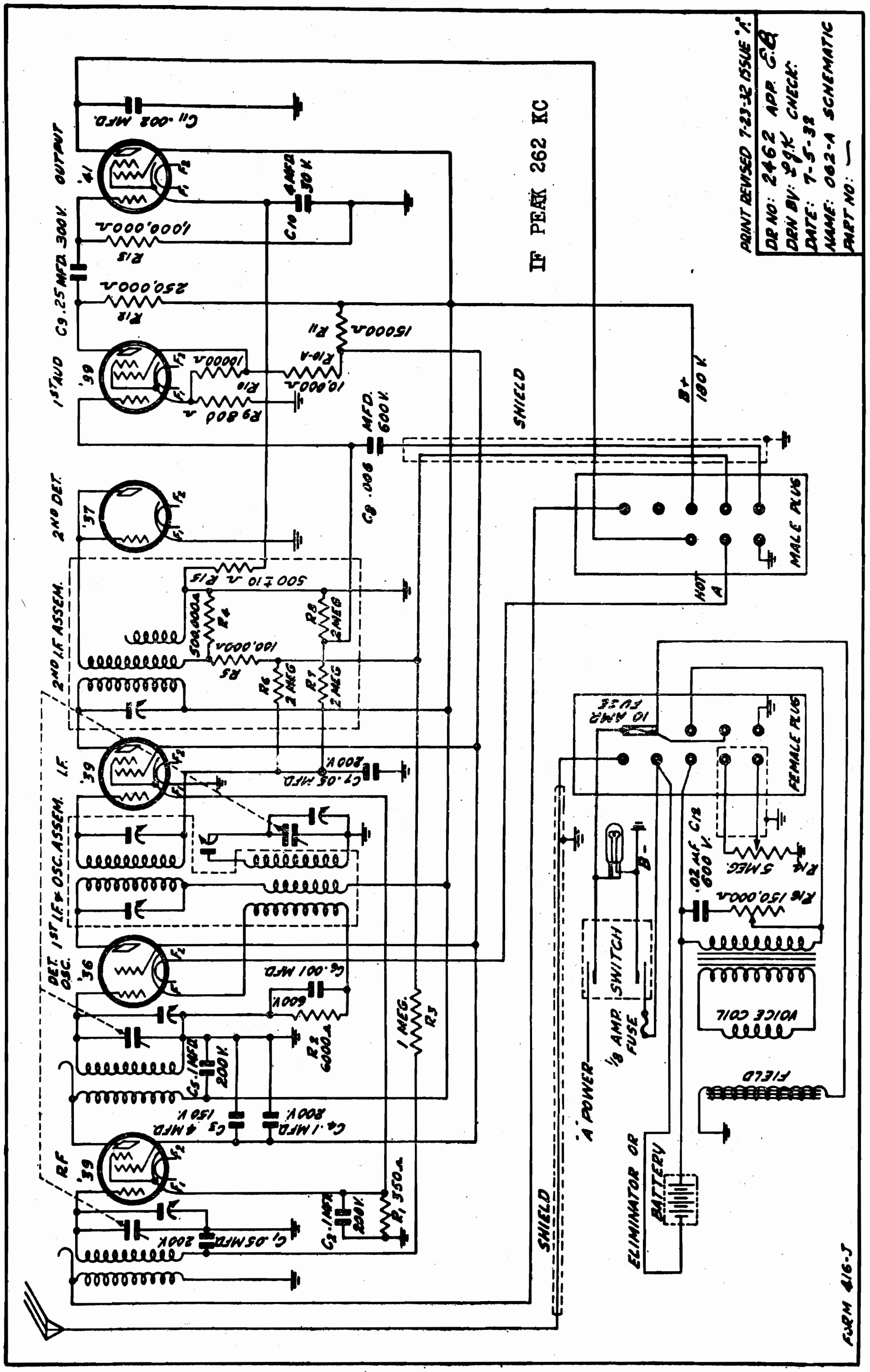


FIG. NO. 13

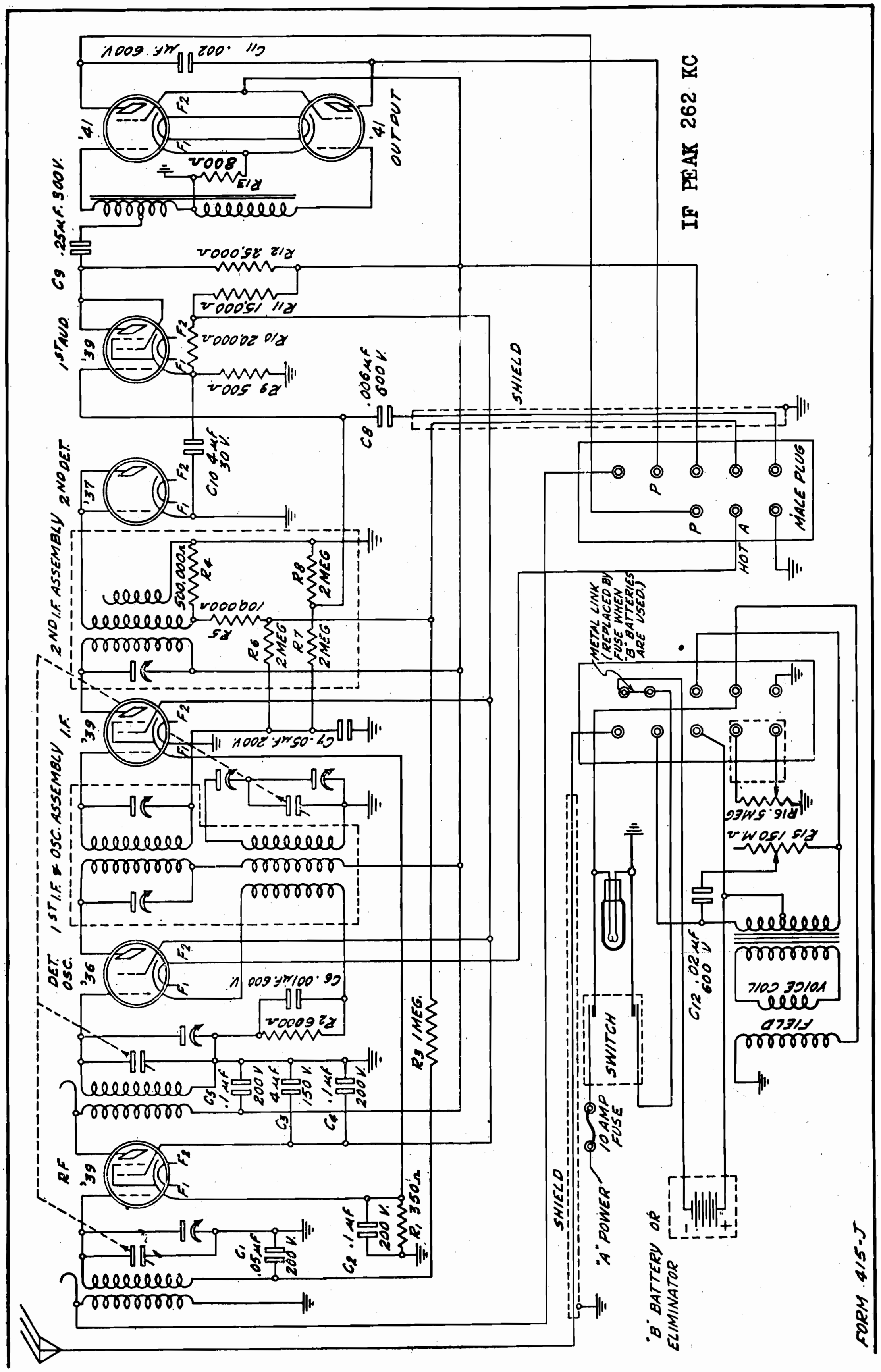
ELECTRIC AUTO LITE CO.

MODEL 062-A
Schematic



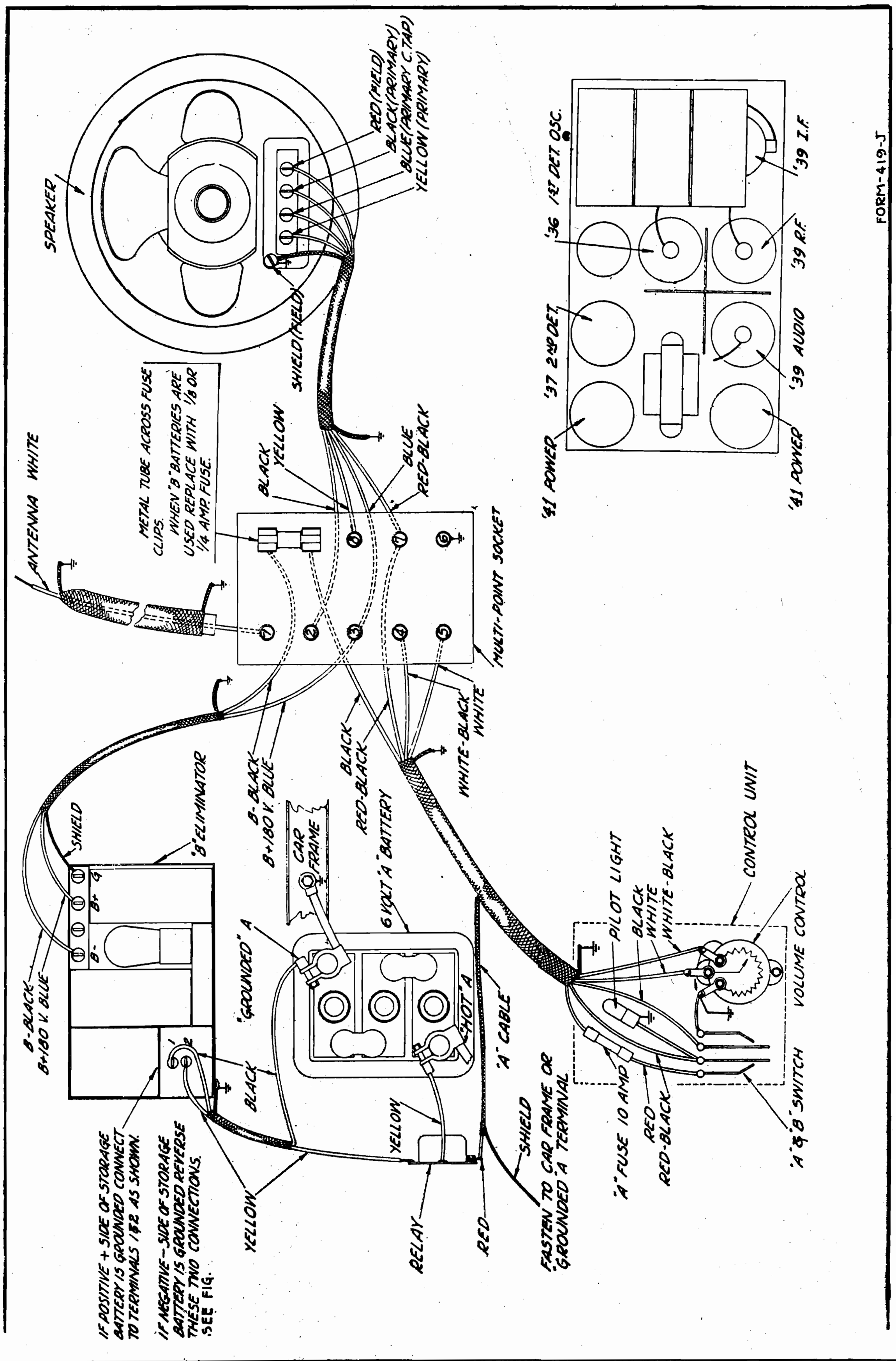
MODEL 072-A
Schematic

ELECTRIC AUTO LITE CO.



ELECTRIC AUTO LITE CO.

MODEL 072-A
Assembly Wiring



MODEL 072-A
Installation notes

ELECTRIC AUTO LITE CO.

The chassis is received with the condenser pulley, spring and centering ring mounted in the proper position on the tuning condenser and the cable chuck through which the drive cable passes mounted on the chassis box.

All that it is necessary to do is to mount the control unit on the steering column, cut the cable and housing to length if necessary, attach the cable to the drive pulley, and secure the housing in the chuck.

MOUNTING THE CONTROL UNIT

The control unit is mounted on the steering column with the knobs extending toward the right hand side. The proper distance below the steering wheel can be determined by trial.

Two clamps are provided to secure the control unit to the steering column. Use the lockwashers supplied under the heads of the clamp screws to secure the clamps on the control unit.

If the steering column is 1½" in diameter, use the leather spacers supplied. If 1-5/8", split the spacers or wrap the column with about 1/16" of friction tape under the brackets. If the column is 1-3/4", no spacers are required.

ATTACHING THE CABLE

The drive cable should be run in as straight a line as possible. Avoid any sharp bends.

After the control unit has been mounted and before securing the drive cable and housing at the chassis, cut it to length if necessary. Be sure that enough cable is allowed to avoid any sharp bends. Do not coil the excess length in short loops.

To cut the cable proceed as follows: With a sharp three-corner file, file across one of the turns of the tubular housing until it is practically severed. Then bend it only slightly back and forth until it breaks off. Do not bend sharply as in so doing permanent injury to the inner element of the cable might result.

Turn the station selector knob on the control unit as far as it will go in a counter-clockwise direction. The cable will then extend out of the housing the greatest distance.

Loosen the large jam nut on the cable chuck. Insert the free end of the cable and its tubular housing. Be sure that the housing with its weatherproof covering is inside the chuck. Then tighten the jam nut. This will secure the housing and weatherproof braid in place. As explained above, the station selector knob should be turned to the extreme counter-clockwise position. The rotor of the tuning condenser is held at the extreme clockwise position by the action of the spring. Bring the free end of the cable around the pulley, loosen the cable clamp screw at the top of the pulley, insert the cable under the clamp washer and then tighten in place. Cut off any excess cable to prevent tangling with other parts of the receiver. Care should be taken not to put a sharp bend in the exposed portion of the drive cable, as the latter may be permanently injured.

After the cable head is in place on the chassis and after the drive cable is attached to the pulley, check the centering of the cable chuck with the pulley. If necessary to re-center, loosen the nut which secures the chuck to the chassis box. Then move the chuck until the cable is centered relative to the groove in the pulley and re-tighten the nut.

DIAL LAMP

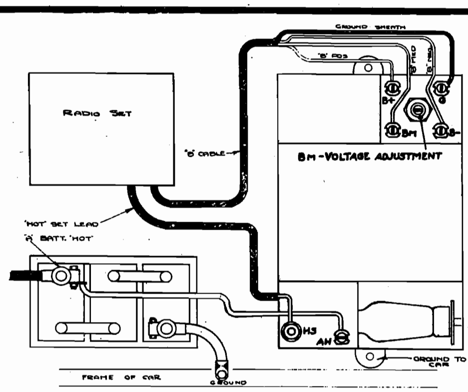
The dial lamp may be replaced by removing the station selector knob and the two screws on the sides of the control housing. Use a standard 6-8 V. screw base lamp which may be procured from the factory. As a temporary measure, a 6 volt pilot light bulb may be procured from any radio store.

ELECTRONIC LABORATORIES, INC. MODEL "Electronic B" Schematic, Notes

INSTRUCTIONS FOR INSTALLING ELECTRONIC "B" POWER SUPPLY

1. INSTALL ELIMINATOR IN MOST CONVENIENT POSITION IN CAR, BEING SURE THAT ELIMINATOR IS SECURELY GROUNDED TO SOME GROUNDED METAL PART OF THE CAR.
2. CONNECT "HOT" SET LEAD TO H.S. TERMINAL OF ELIMINATOR.
3. CONNECT "HOT" BATTERY LEAD TO A.H. TERMINAL OF ELIMINATOR.
4. CONNECT NEGATIVE RADIO SET LEAD TO B- TERMINAL OF ELIMINATOR.
5. CONNECT POSITIVE RADIO SET LEAD TO B + TERMINAL OF ELIMINATOR.
6. IF RADIO SET HAS AN INTERMEDIATE VOLTAGE TAP, CONNECT IT TO B_M TERMINAL OF ELIMINATOR. THIS INTERMEDIATE VOLTAGE SHOULD BE ADJUSTED IN ACCORDANCE WITH SET MANUFACTURER'S INSTRUCTIONS, THE VOLTAGE BEING MEASURED WITH A HIGH RESISTANCE VOLTMETER. IF THIS IS NOT AVAILABLE, THE SLOTTED ADJUSTING SHAFT IN THE CENTER OF THE B TERMINAL STRIP SHOULD BE TURNED TO ABOUT THE CENTER POSITION AND VARIED A LITTLE EITHER WAY UNTIL BEST RADIO RECEPTION IS OBTAINED.
7. IF RADIO SET B CABLE HAS SHIELDING, CONNECT IT TO THE G TERMINAL OF ELIMINATOR.

NOTE:-SOME RADIO SETS HAVE ONLY ONE B LEAD WHICH IS POSITIVE, THE NEGATIVE LEAD BEING THE SHIELDING. IN THIS CASE CONNECT THE SHIELDING TO THE B- TERMINAL AND TO THE G TERMINAL.



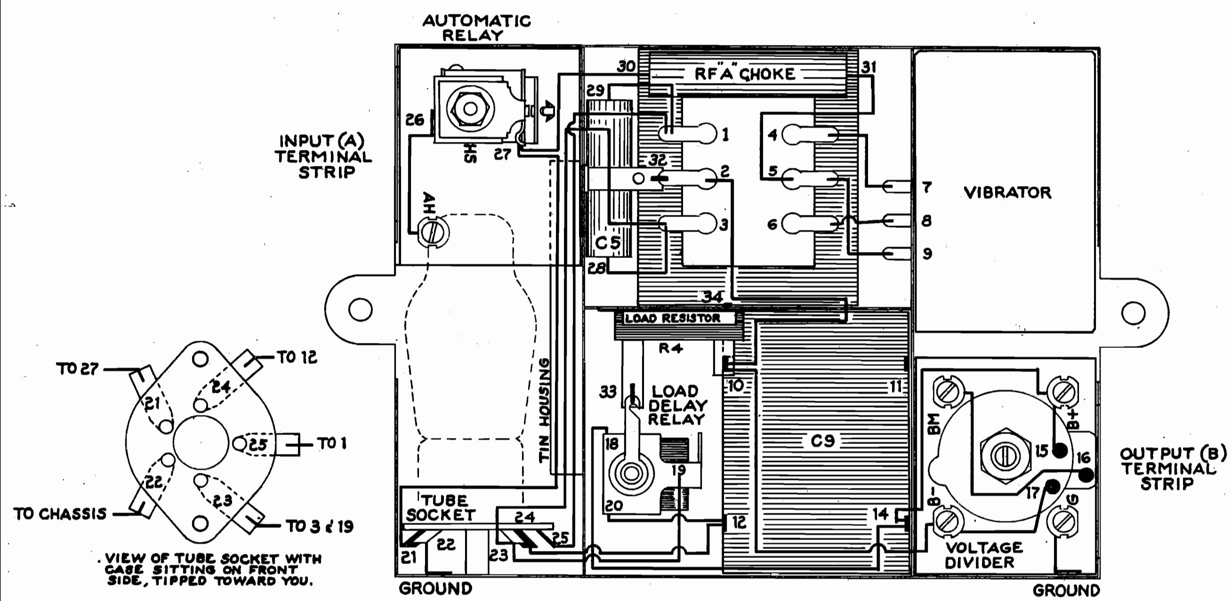


FIG. 1

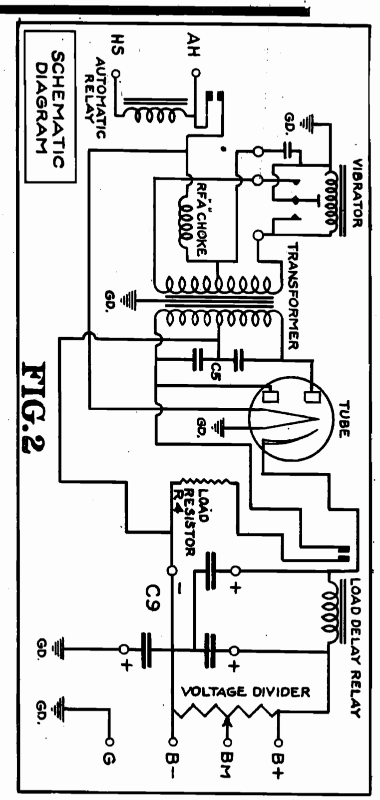
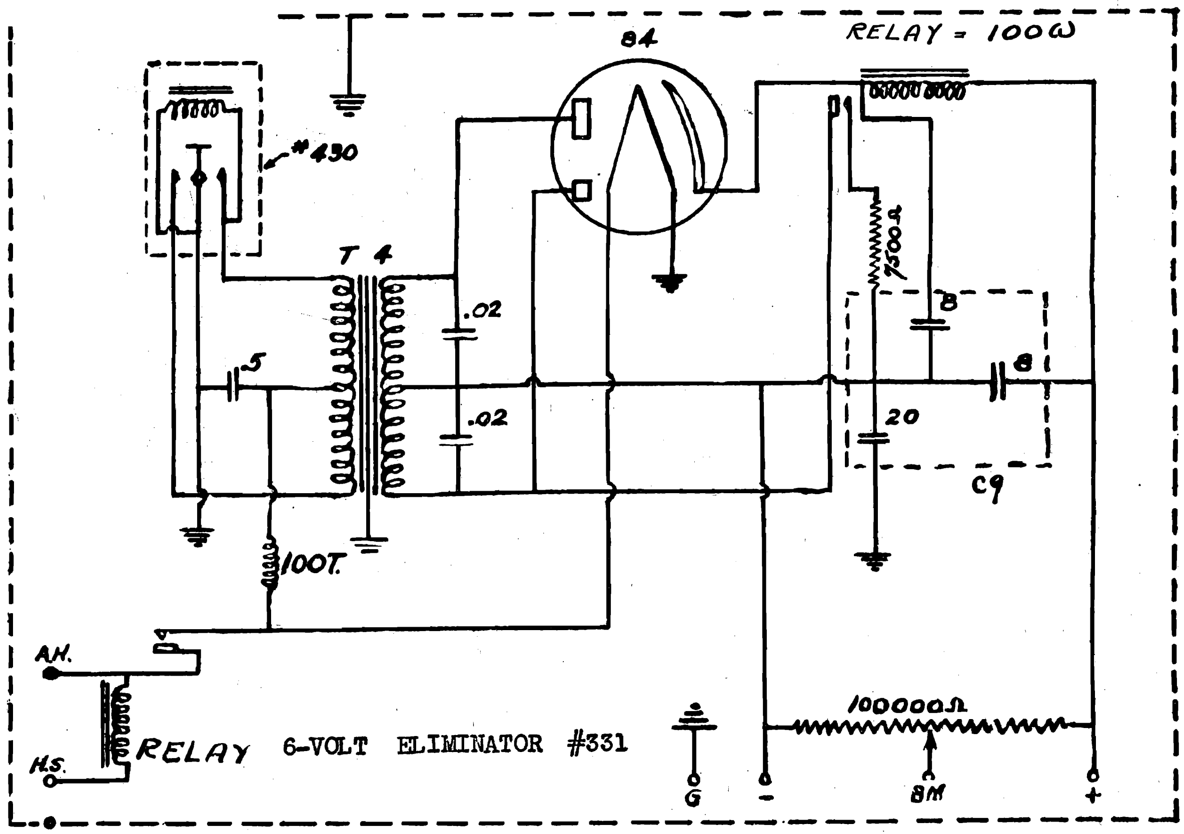


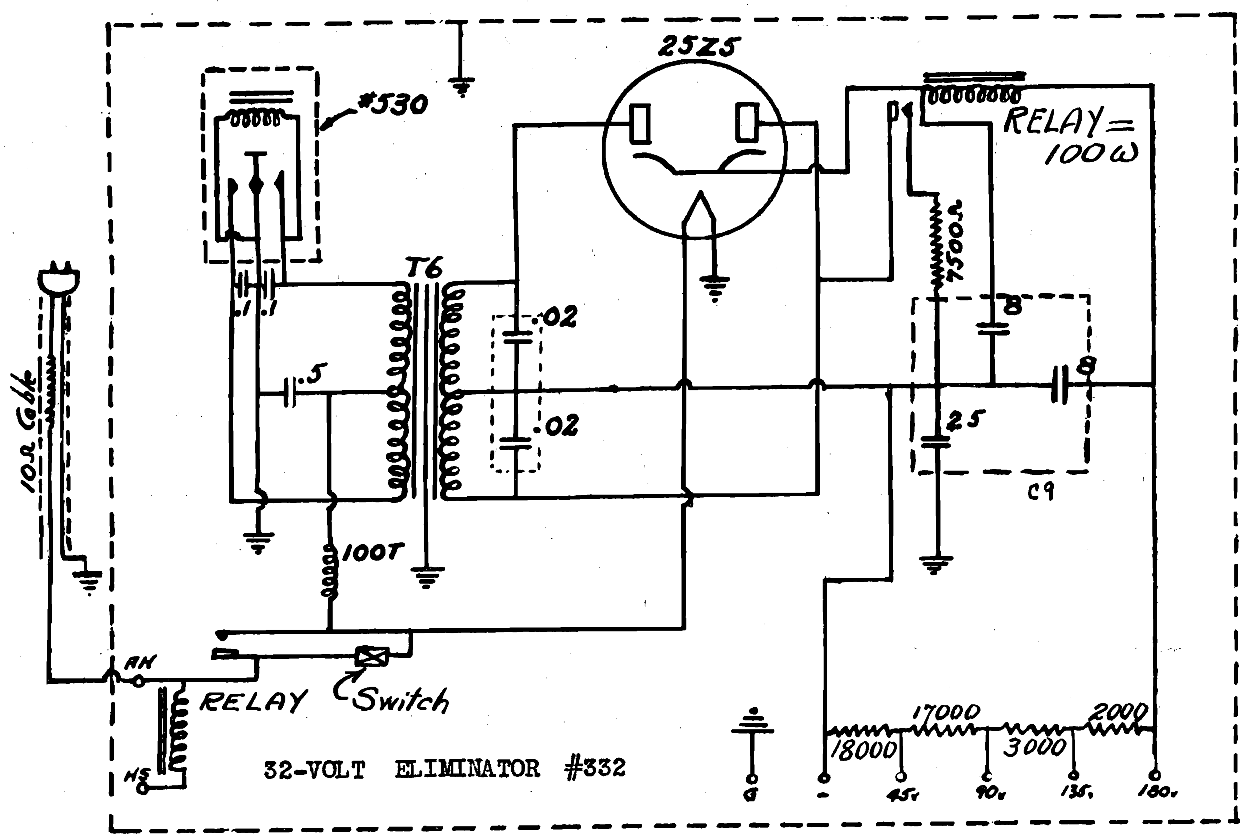
FIG. 2

MODEL 331 6 Volt
Eliminator Schematic

ELECTRONIC LABORATORIES, INC.

MODEL 332 32 Volt
Eliminator Schematic





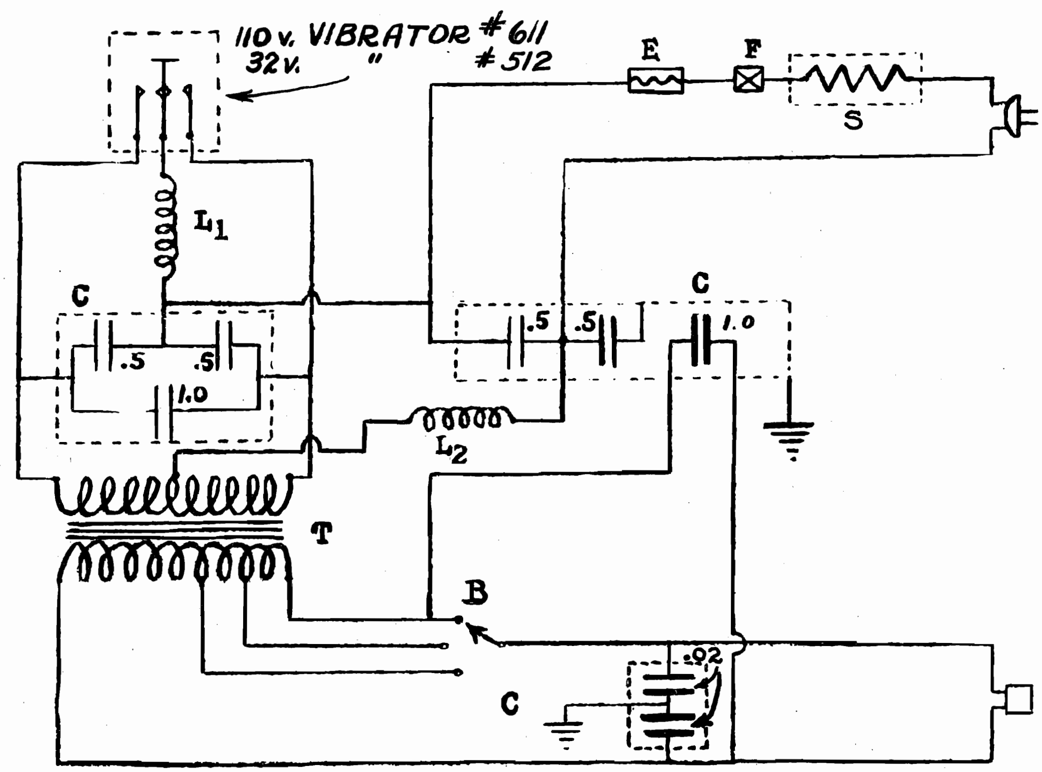
MODEL 338,339
DC Converters
Schematic

ELECTRONIC LABORATORIES, INC.

ENGINEERING SPECIFICATIONS | **PART No.** F 27A.

SUBJECT: CIRCUIT DIAGRAM OF 32 AND 110-VOLT D-C. CONVERTERS TYPES 338 AND 339

PARTS LIST	MATERIAL	FINISH

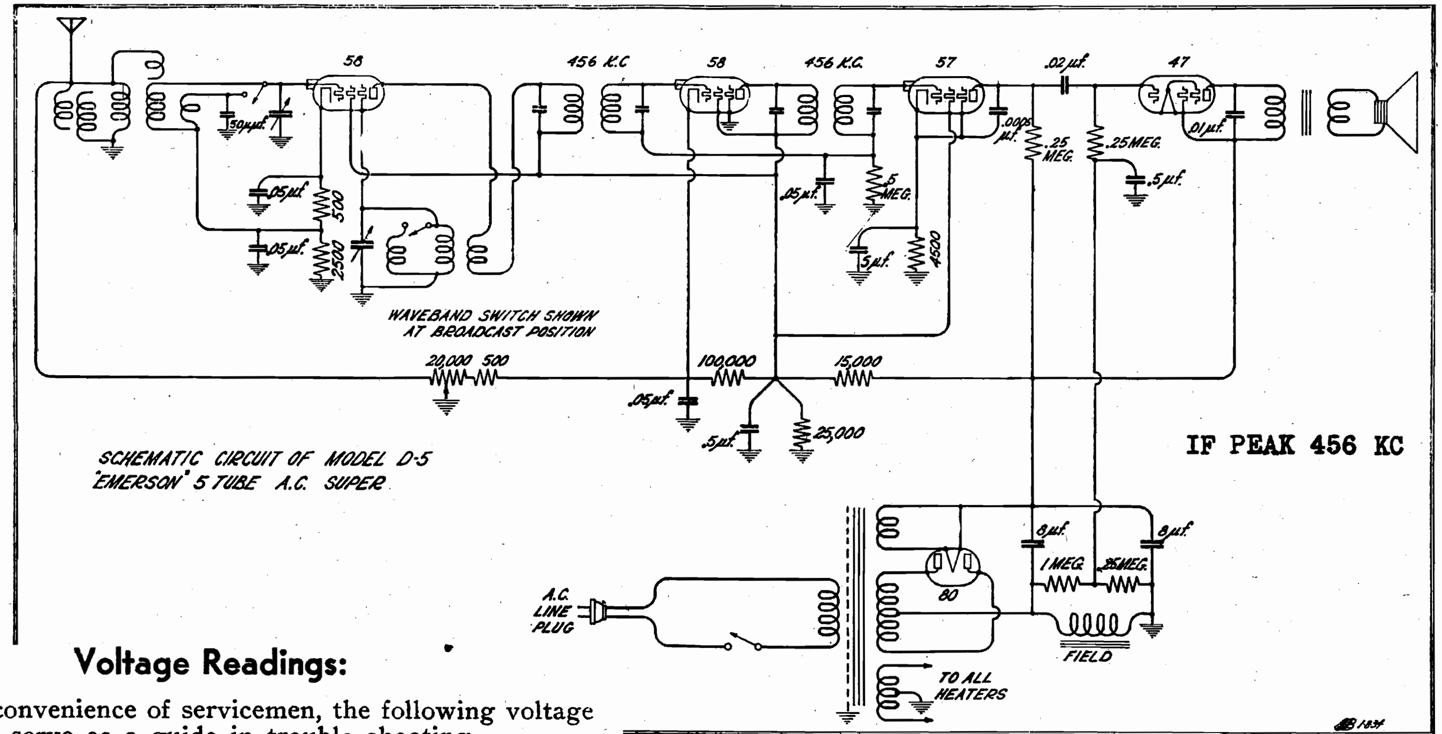


B Tap Switch
C Condenser Block
E Fuse
F Toggle Switch
L-1 Choke (32 volts, 10 turns)
L-2 Choke (100 turns)
S Resistance Cord (32 volts, 1 ohm; 110 volts, 10 ohms)
T Transformer

CHANGES	DATE	SUPPLIERS	THEIR PART NO.	PRICE	ELECTRONIC LABORATORIES, INC. 122 W. NEW YORK ST., INDIANAPOLIS, IND.	
A CHOKES L_1 + L_2	11-22			[redacted]	DRAWN BY LK	DATE 11-22-33
B					APPRD. BY W.M.	DATE
					USED ON	SEE ASS. PART NO.

MODEL 26
Schematic
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION



SCHEMATIC CIRCUIT OF MODEL D-5 "EMERSON" 5 TUBE A.C. SUPER

Voltage Readings:

For the convenience of servicemen, the following voltage readings will serve as a guide in trouble shooting.

Readings are to be taken with all the tubes in their places, volume control turned on full and antenna wire grounded to chassis.

The D.C. Voltmeter used should be 1000 ohms per volt, or over. Line volts 117 A.C.

	Fil.	Ground to Plate	Ground to Screen	Ground to Cathode	Ground to Suppressor
58 Osc. 1st Det.	2.4 A.C.	80 D.C.	80 D.C.	2. D.C.	....
58 Osc. I. F. Amplifier	2.4 A.C.	80 D.C.	80 D.C.	11. D.C.	....
57 2nd Det.	2.4 A.C.	75 D.C.	80 D.C.	4.5 D.C.	4.5 D.C.
47 Output	2.4 A.C.	245 D.C.	255 D.C.	....	....
80 Rectifier	5.0				

Voltage across speaker field, 90.

Above voltages were taken with a high resistance voltmeter of 1000 ohms per volt and may vary somewhat with different sets and with the resistance of the voltmeter.

Model D-AC-5

FIVE-TUBE BROADCAST AND SHORT-WAVE SUPERHETERODYNE

110-120 Volts . . A.C. . . 60 Cycles

Broadcast	Short Wave
540—1500 Kilocycles	1500—3000 Kilocycles
550— 200 Meters	200— 100 Meters

MODEL 30 AW, 33 AW, 250 AW, 321 AW, 350 AW
Schematic, Voltage, Socket

EMERSON RADIO AND PHONOGRAPH CORPORATION

Voltage Readings:

Readings should be taken with Volume Control fully on. Tuning control set for 550 K.C., and antenna outside the set. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

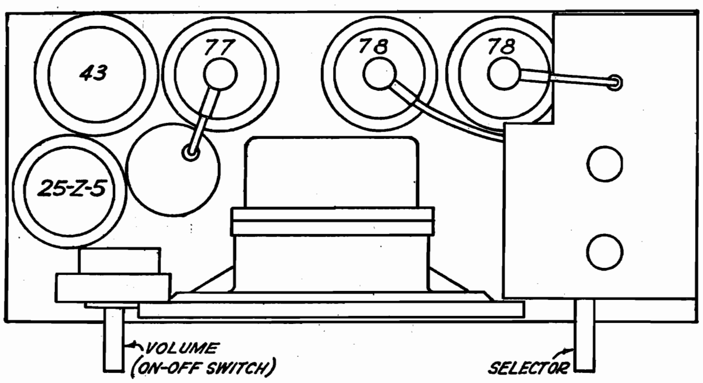
Using	300-volt scale Plate to Ground	300-volt scale Screen to Ground	30-volt scale Cathode to Ground
78—Detector Oscillator ..	98	98	1.6
78—I. F. Amplifier........	98	98	2.8
77—2nd Detector	35	25	1.5
43—Power Amplifier	92	98	..
25Z5—Rectifier	..	..	98

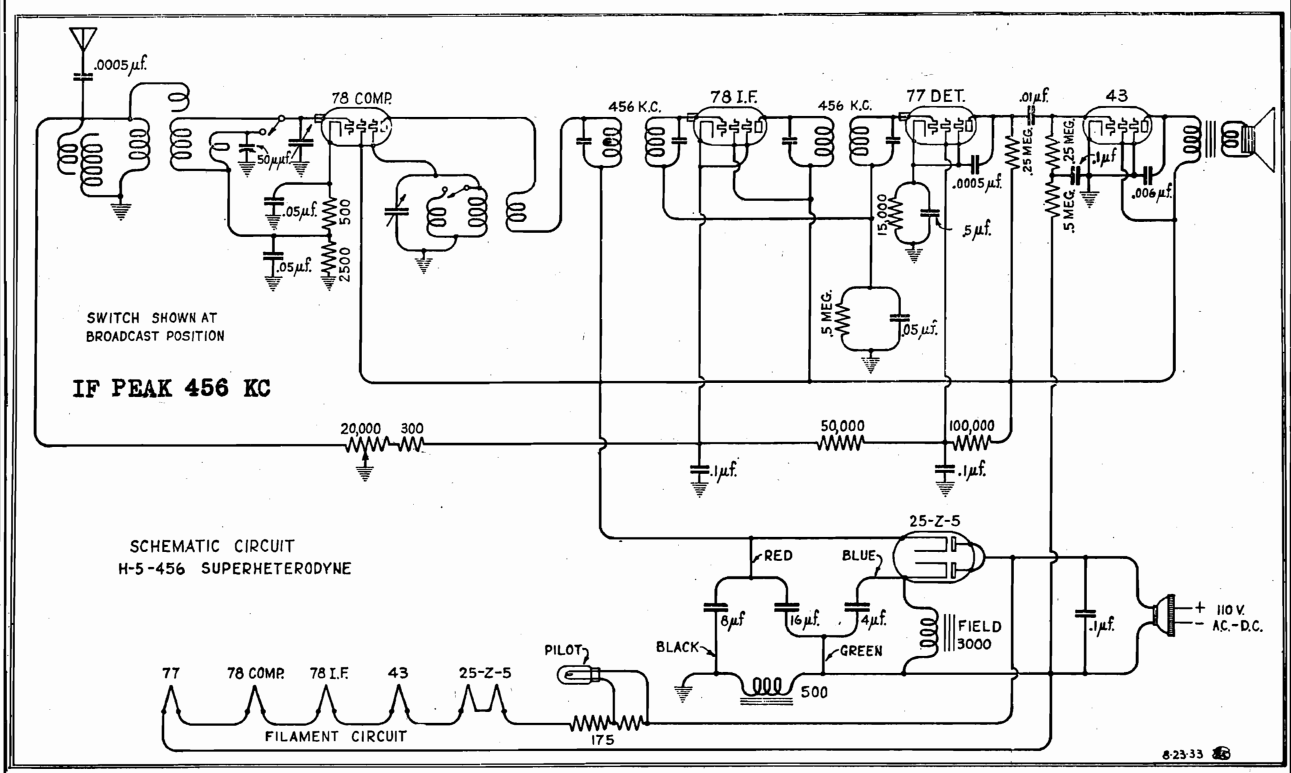
A.C.-D.C. . . 100-135 Volts . . 25-70 Cycles
Also Available for 220 Volts.

Broadcast	Short Wave
540—1500 Kilocycles	1500—3000 Kilocycles
550— 200 Meters	200— 100 Meters

Voltage across speaker field 100 volt.

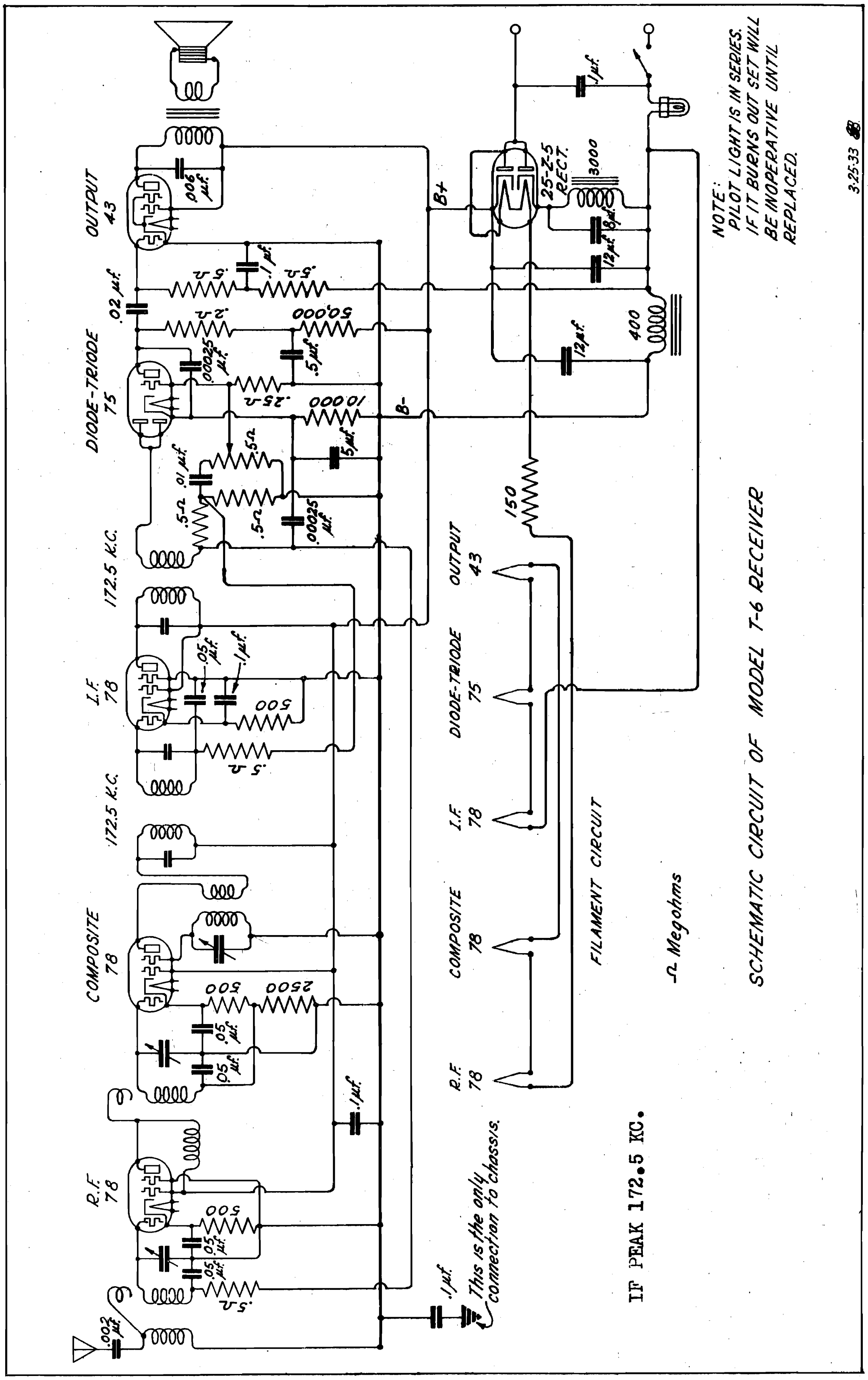
Bias for 43 tube is measured across filter choke and should be 15 to 18 volts.





EMERSON RADIO AND PHONOGRAPH CORPORATION

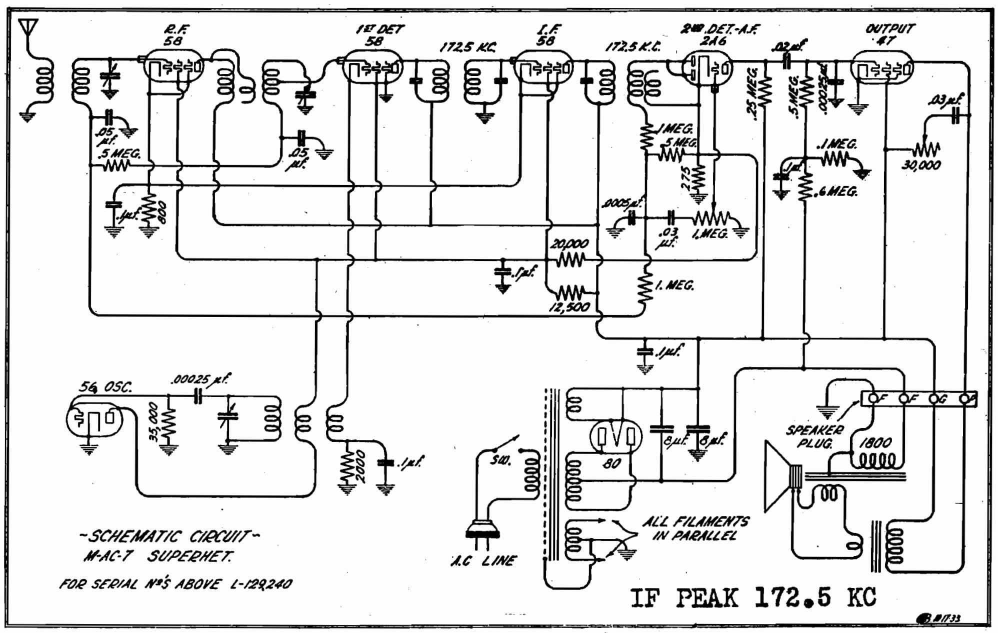
MODEL 35 (T-6)
Schematic

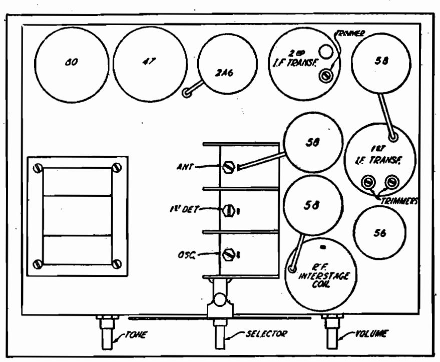


MODEL 77
Schematic
Layout
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION

CIRCUIT DIAGRAM





Voltage readings:

(Readings in other bulletin are void).

Readings should be made with the Volume Control fully on and the receiver tuned to a position on the dial where no broadcast comes through.

Use only a high resistance d.c. voltmeter.

Ground To:	Plate	Screen	Cathode
56 Oscillator	90-110	——	——
58 R.F. Amplifier	235-250	90-110	5-6
58 First Detector	235-250	90-110	5-7
58 I.F. Amplifier	235-250	90-110	5-6
2A6 Audio Amplifier	125-135	——	1.2-1.4
47 Output Pentode	215-225	235-250	——

Line Voltage — 115

The bias on the 47 cannot be read with the voltmeter.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 33 LW, 30 LW, 250 LW, 321 LW, 350 LW
Schematic, Voltage Socket layout

Universal Compact Radio

FIVE TUBE SUPERHETERODYNE - - 200 - 2000 METERS
Either A. C. or D. C. - - 110-120 Volts - - 25 to 60 Cycles
Adaptable for 220 Volt Operation, with use of 220 Volt Resistor

Voltage Readings:

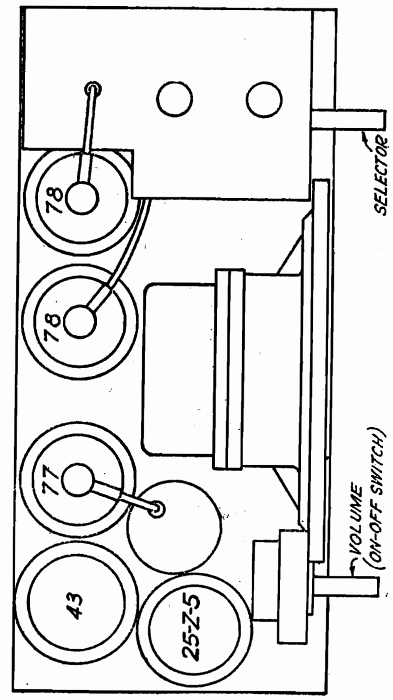
Readings should be taken with Volume Control fully on. Tuning control set for 550 K.C., and antenna outside the set. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

Using	300-volt scale Plate to Ground	300-volt scale Screen to Ground	30-volt scale Cathode to Ground
78—Detector Oscillator ..	98	98	1.6
78—I. F. Amplifier........	98	98	2.8
77—2nd Detector	35	25	1.5
43—Power Amplifier	92	98	..
25Z5—Rectifier	..	..	98

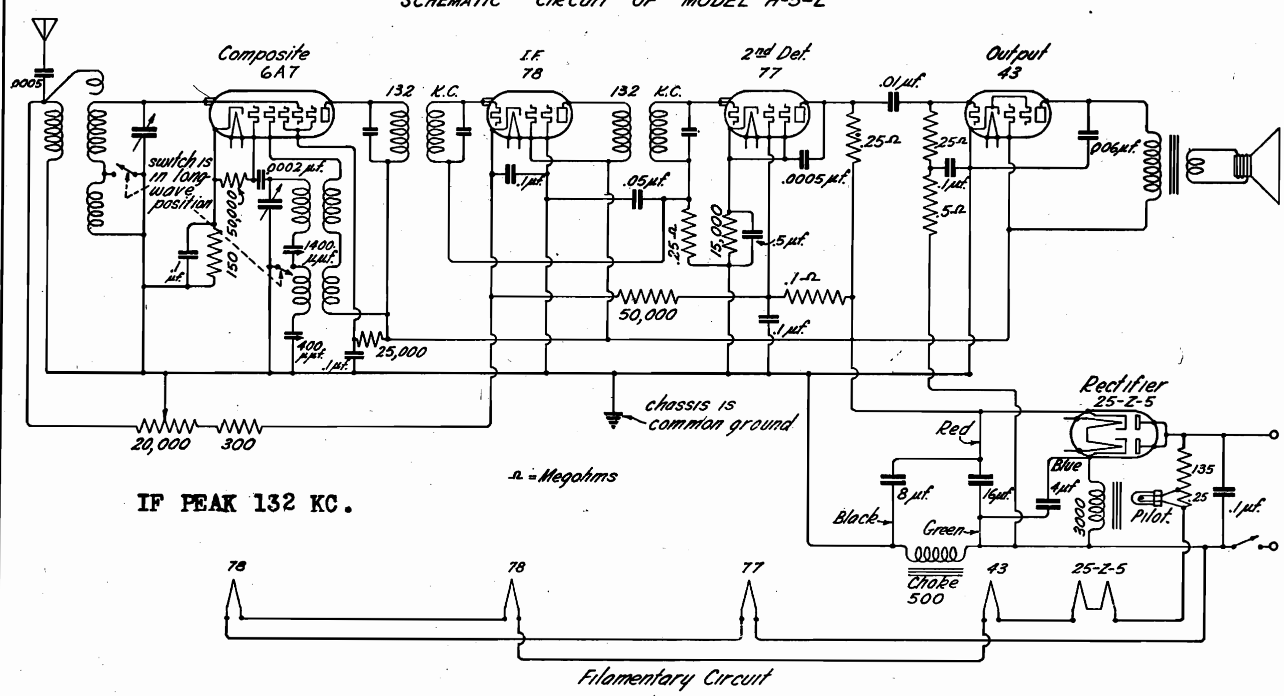
Voltage across speaker field 100 volt.

Ground is the electrical ground of the circuit and is not the chassis proper.

Bias for 43 tube is measured across filter choke and should be 15 to 18 volts.

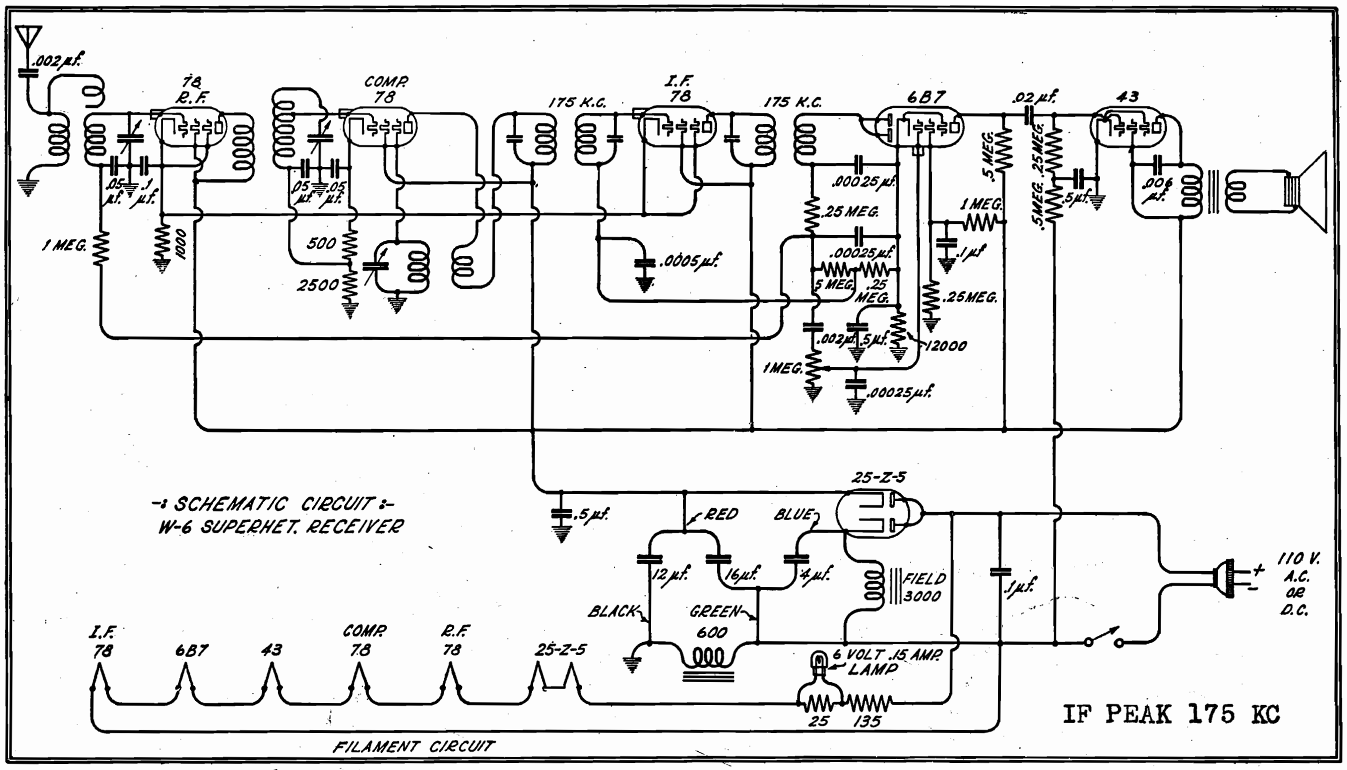


SCHEMATIC CIRCUIT OF MODEL H-5-L



MODEL 40, 375
Schematic, Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION



CAUTION! Do not attach a ground wire to chassis except through a small condenser of about .1 mfd. capacity

Voltage Readings:

All readings were made with Volume Control fully on.

A Voltmeter having a resistance of 1000 ohms per volt was used.

LINE VOLTAGE—115-V - A.C.

Voltmeter Scale	300-volt Plate to B-	300-volt Screen to B-	30-volt Cathode to B-	30-volt Suppressor to B-
78 First Radio Frequency ...	105	105	7	7
78 First Detector Oscillator .	105	105	16	0.0
78 I. F. Amplifier..........	105	105	7	7
75 Second Detector A. V. C..	25	15	2	—
43 Power Amplifier	92	105	0.0	—

For List of Parts, see Index

Note:

'The cathode voltage on the R.F. and I.F. tubes is measured with the ant. grounded to the chassis.

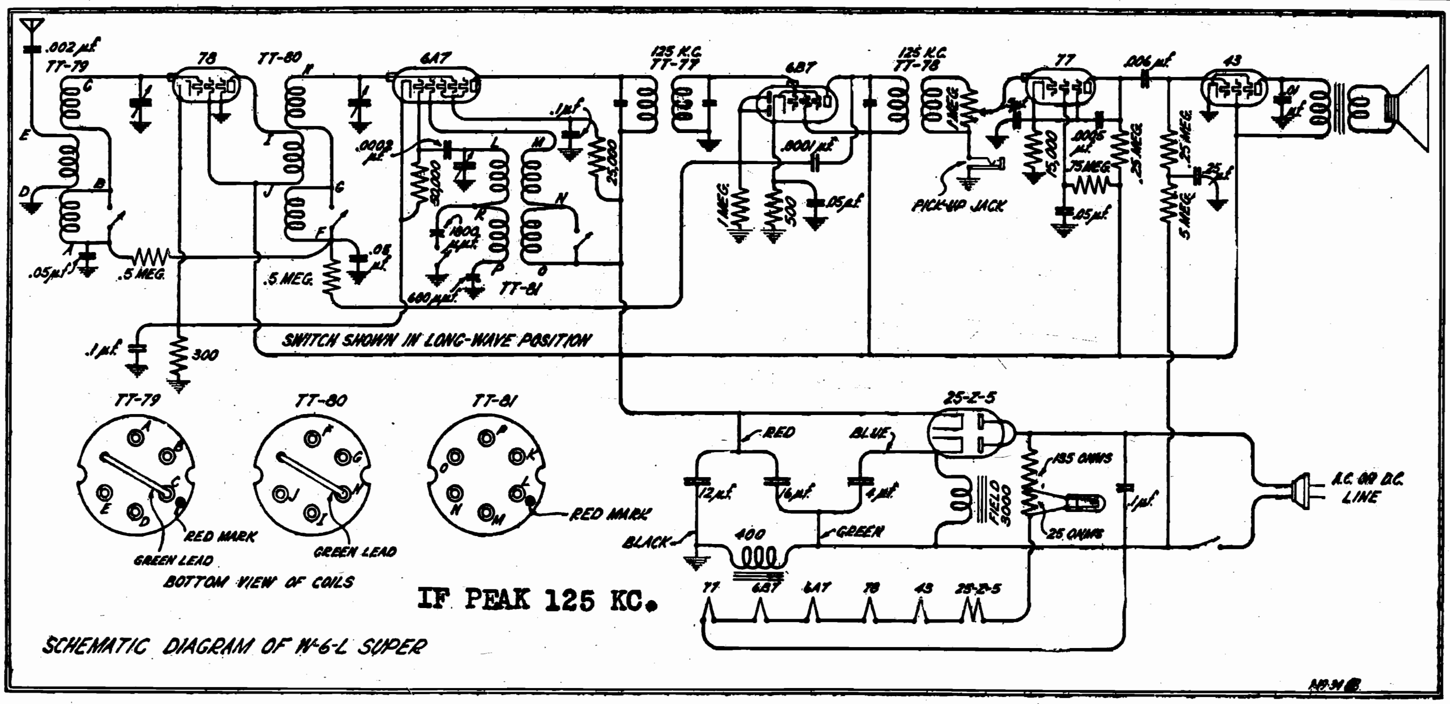
B- refers to the electrical ground of the set and may be obtained at the chassis.

Bias for the 43 tube is measured across the filter choke and should be 15 volts.

Voltage across speaker-field — approximately 105 V.

MODEL 375-LW
Schematic
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION



SCHEMATIC DIAGRAM OF W-6-L SUPER

		Plate to -B	Screen to -B	Cathode to -B	Suppressor to -B
78	R.F.	100	100	3	0
6A7	1st Det-Osc	100		3	-
6B7	I.F.-AVC	100	100	3	-
77	2nd Det.	30	20	2	2
43	Pwr.Amp.	98	100	—	-
25Z5	Rect.			100 85	-

Bias for 43 tube measured across filter choke and should be 15 to 18 volts.
Volume control on full. Line voltage 115 volts, a-c.

Broadcast	Long Wave
540—1500 Kilocycles	150— 300 Kilocycles
550— 200 Meters	2000—1000 Meters

Description:

This *Universal Compact* is a complete, compact universal electric screen-grid superheterodyne receiver adapted for use on common commercial power available, i.e. 100 to 135 volts, A.C. or D.C., 25-70 cycles. On 220 volt operation, Special Ballast Resistor is required.

Although extremely compact, highest efficiency is attained through the utilization of a new Electro-Dynamic Speaker in conjunction with radically new tubes including a large Power Tube, a Dual Rectifier and new R.F. Pentodes.

The wave band selector switch is mounted on the rear of the chassis and should be thrown to the right for broadcast reception or to the left for long wave reception.

SIX-TUBE SUPERHETERODYNE RECEIVER

A.C.-D.C. . . 100-135 Volts . . 25-70 Cycles

Also available for 220 Volts.

MODEL 409,410,411 (A-4) (Mickey Mouse) Schematic, Voltage Parts List

EMERSON RADIO AND PHONOGRAPH CORPORATION

Part No.	Description	List Price
RT-71	Antenna Coil	$ .75 each
RT-72	R. F. Coil	.75 "
RT-70	Filter Choke	.60 "
RC-79	Variable Condenser	1.50 "
RC-84	Filter Condenser (dual 8 x 4 mfd. Electrolytic)	1.00 "
RC-85	Electrolytic Bipass Condenser (dual 5 x 5 mfd.)	.60 "
	Roll-type Paper Condensers—Give capacity or location in circuit	.12 "
	Sockets—Give tube number	.10 "
	Carbon Resisters—Give ohmage or location in circuit	.12 "
RW-31	Combined Line Cord and Ballast Resistor	.60 "
RW-82	Volume Control with Switch	.80 "
RS-50	Magnetic Speaker	4.50 "
	220-Volt Ballast Resistor for 220-volt operation	2.00 "

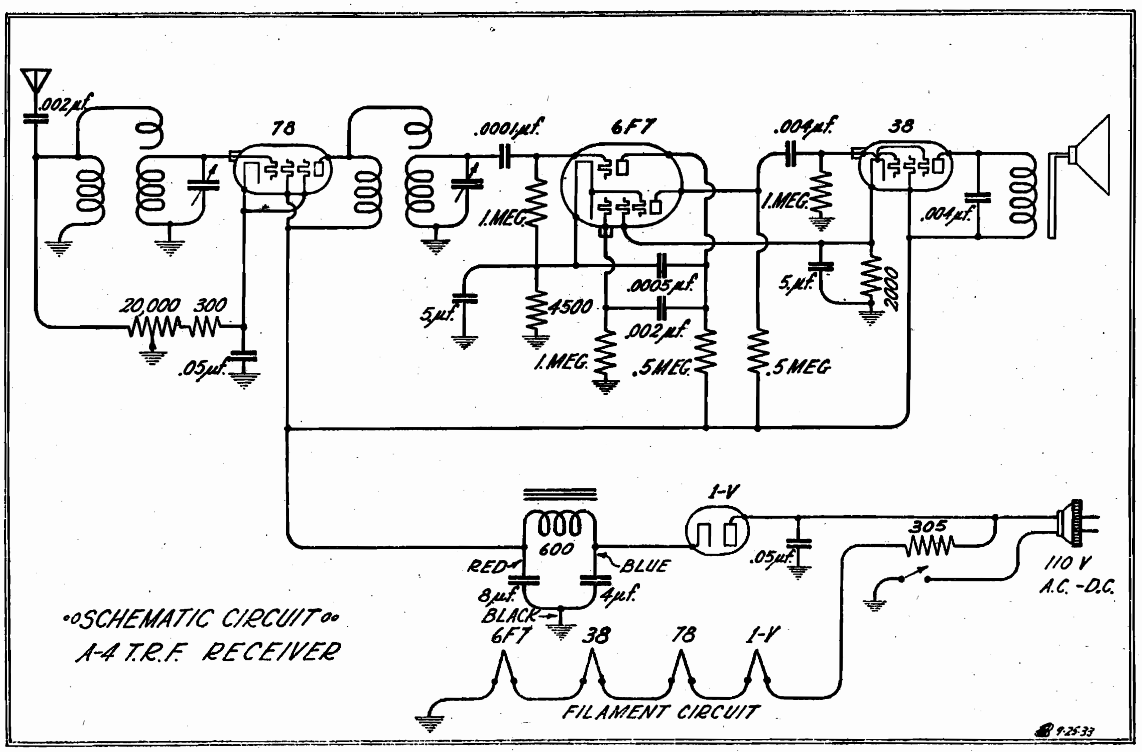
Voltage Readings:

All readings were made with a voltmeter having a resistance of 1000 ohms per volt, and are subject to slight variations

Line Voltage—115 V A.C.

Scale		300 Volts Plate	300 Volts Screen	30 Volts Cathode	30 Volts Suppresor
78		105	105	2.5	2.5
6F7	Triode	15	—	1.5	—
	Pentode	35	11	1.5	—
38		103	105	11.	—

All above voltages measured to chassis



•oSCHEMATIC CIRCUITo•
A-4 T.R.F. RECEIVER

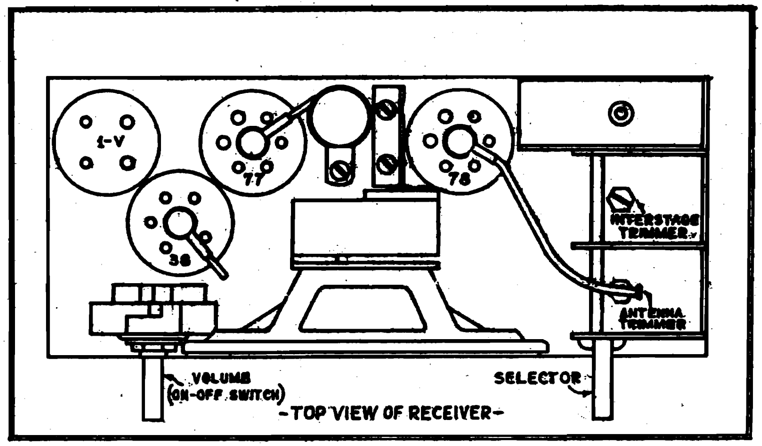
Caution: Do not connect a ground wire to this set, except through a small condenser of about 0.1 Mfd. capacity and rated at least 200 Volts.

MODELS 415,416
Schematic
Layout
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION

Universal Compact

Operates on either AC or DC
110-120 Volts, 25-60 Cycles
Adaptable for 220-Volt Current with use of 220-Volt Resistor



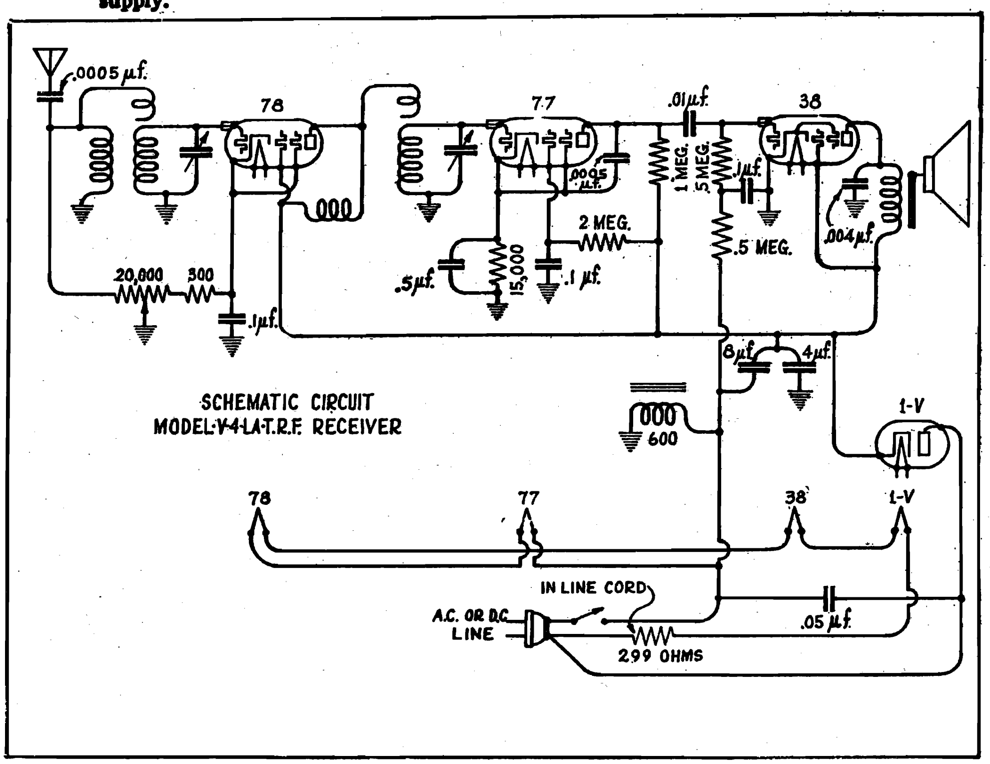
Voltage Readings:

Readings should be taken with Volume Control fully on, Tuning Control set for 550 KC., and antenna outside of set. Use a D. C. voltmeter having a resistance of 1000 ohms per volt.

Chassis	*To— Plate*	*Screen*	*Cathode*
77—Detector	10- 15	9- 12	1- 2
78—R.F. Amplifier	105-115	105-115	2- 3
38—Output Pentode	105-115	105-115	——

Voltage across filter choke is "C" bias for 38 Tube=10v.

Readings will not change materially regardless of type of power supply.



Circuit Wiring Diagram

MODEL 420 (V-4)
Schematic, Voltage
Socket layout, Notes

EMERSON RADIO AND PHONOGRAPH CORPORATION

Voltage Readings:

Readings should be taken with Volume Control fully on, Tuning Control set for 550 KC., and antenna outside of set. Use a D. C. voltmeter having a resistance of 1000 ohms per volt.

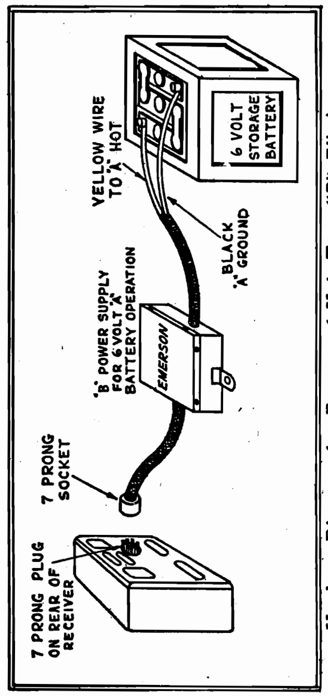
Chassis	To— Plate	Screen	Cathode
77—Detector	10- 15	9- 12	1- 2
78—R.F. Amplifier	105-115	105-115	2- 3
38—Output Pentode	105-115	105-115	———

Voltage across filter choke is "C" bias for 38 Tube=10v.

Readings will not change materially regardless of type of power supply.

Model V4

For EITHER AC or DC—25 to 70 Cycles
100 to 135 Volts—Also 6 Volts, 32 Volts and 220 Volts



Hook-up Diagram for Emerson 6-Volt Type "B" Eliminator

For Automobiles, Motorboats and Homes Not Wired for Electricity—Farms, etc.

Directions for 6-Volt (Automobiles, Motorboats, etc.)

Attachment required: 1-EMERSON 6-volt Type "B" Eliminator.

Remove the Antenna from its compartment and place as indicated for homes or, in the case of automobiles, connect to the automobile antenna system.

Remove the regular power cord and plug from the set.

Attach the 7-prong socket on the eliminator cable to the 7-prong plug in rear of the set. Attach the 2-conductor cable from the eliminator to the 6-volt battery.

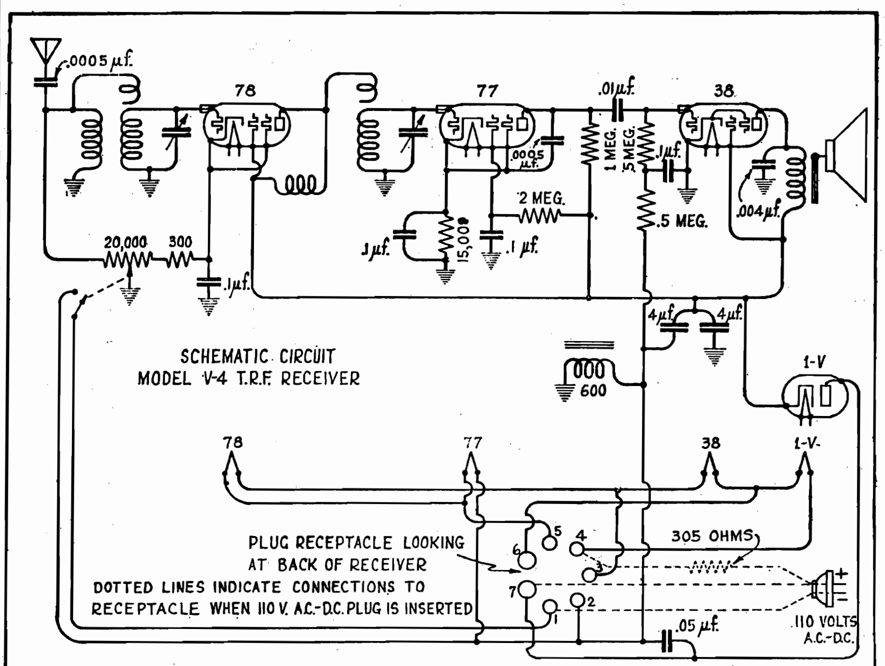
Where 12-Volt "A" Battery is used in automobile, care should be exercised that cable is so connected that only 6 Volts is applied to the set.

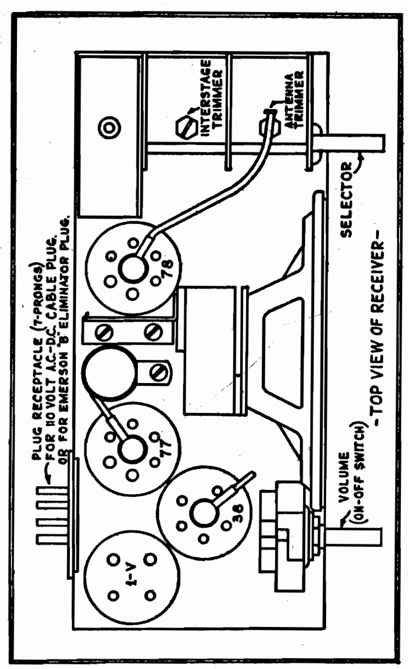
Directions for 32-Volt Farm Lighting Systems—The only additional equipment required is one EMERSON 32-volt type "B" Eliminator. The regular Power Cord and plug are not used and should be removed.

Attach the 7-prong socket on the eliminator cable to the plug in the rear of set. Connect the 2-prong plug to the 32-volt light socket and the set is ready for operation.

Directions for 220 Volt AC-DC—The 220-volt Ballast Adapter is required. Insert the 220-volt Ballast Adapter in the 220-volt supply and insert the two-prong set plug into the adapter socket; then follow instructions for operation for home use.

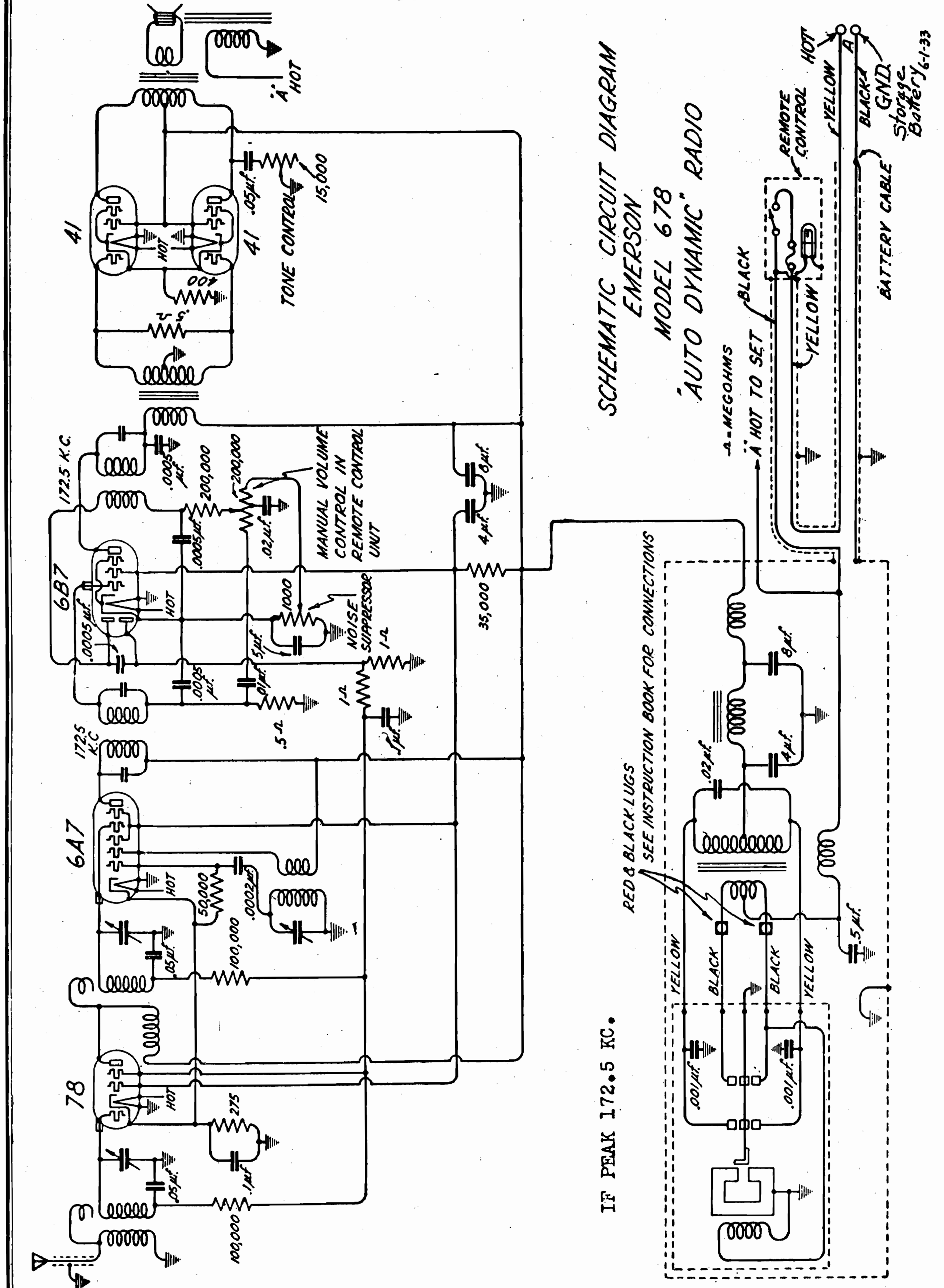
For List of Parts, see Index





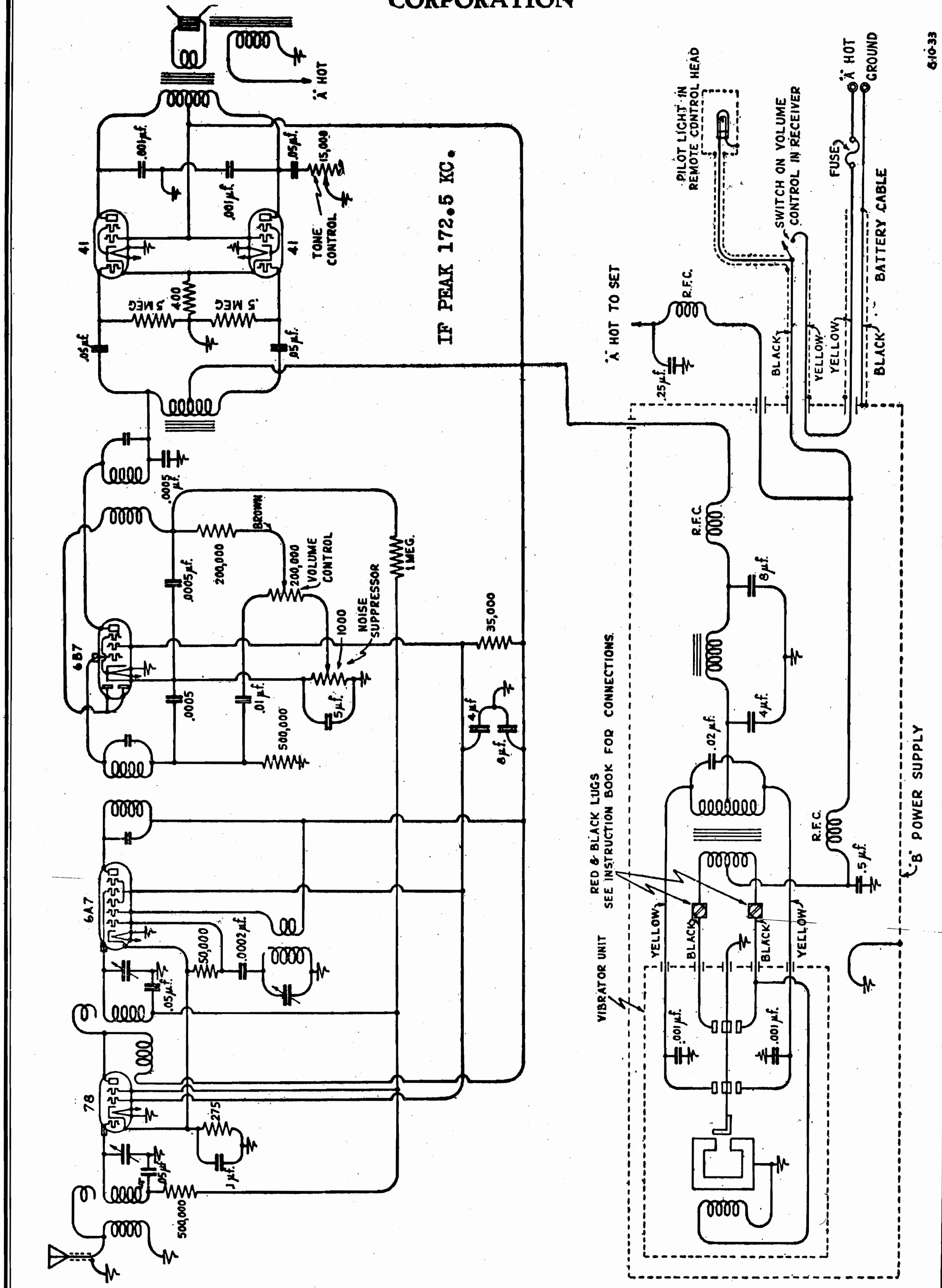
MODEL 678
Schematic Type 1

EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL 678
Schematic Type 2

EMERSON RADIO AND PHONOGRAPH CORPORATION



EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 678
Installation Notes

INSTALLATION PROCEDURE

(Follow closely for easy installation)

1. Open carton, unpack set and check equipment furnished.

2. Remove the two thumb-screws holding the mounting plate to the radio cabinet proper. Tip the mounting plate back and unhook it.

3. Remove the top cover and check visually conditions in general, i.e., tubes, grid caps, remote tuning drive, etc.

4. Using the mounting plate (Figure I) for exploring, determine the most satisfactory position for mounting in the car. As the mounting plate has the same area as the frontal area of the radio cabinet, any space which will accommodate the mounting plate will be satisfactory, (allowing clearance for the set to tilt forward for inspection after being installed).

5. Using the mounting plate as a template, locate the holes for the three mounting bolts. Check under engine hood to see if bolts will be clear. Optional mountings may utilize 2, 3, 4 or 5 mounting bolts.

6. Drill these three holes. Suggest using 1/8" drill as a pilot hole then finish with 3/8" drill.) Put one lock washer on each 5/16" bolt and insert thru the plate. Put a nut on each bolt and fasten securely against plate. Put a spacer nut and lock-washer on each bolt and mount the plate on auto bulk-head. Allow 1/2" to 1" clearance between back of mounting plate and bulk-head for ventilation and good tone quality. Now tighten the bolts from the engine side of the bulk-head using a lock-washer and nut for each bolt.

7. Before proceeding further, at this time, check the polarity of the car battery; that is, determine which side of the battery is grounded. This may be done most conveniently with a low reading D.C. volt-meter. However, experienced mechanics may recognize the positive terminal of the battery by the fact that it is usually larger and blacker than the negative terminal. If there is any corrosion present, GREEN corrosion will be found at the POSITIVE terminal. ***Do not take chances or guess at the polarity but use every means to determine it correctly, as the wrong connections may cause serious damage to the receiver and car battery!***

8. If the POSITIVE terminal of the battery is grounded, no changes are necessary and the installation may proceed.

If the NEGATIVE terminal of the battery is GROUNDED, it is required to make a slight change in the receiver. This is done quite conveniently by removing the top screw and loosening the bottom screw holding the serial number plate to the right side of the receiver cabinet. Tip the plate down and reverse the red and black-marked spade lugs. When this is done, the black-marked lug will be on top and the red-marked lug will be the lower one. (See Figure II and red tag on battery cable.)

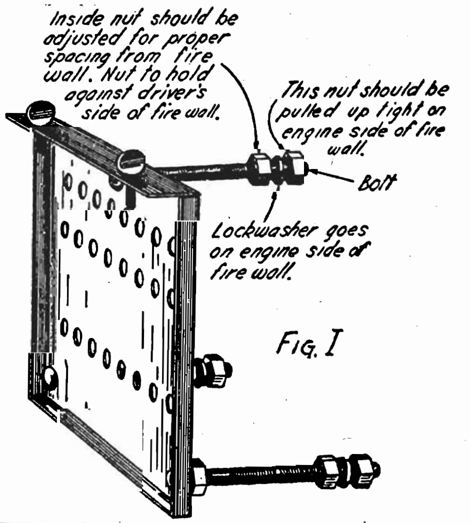
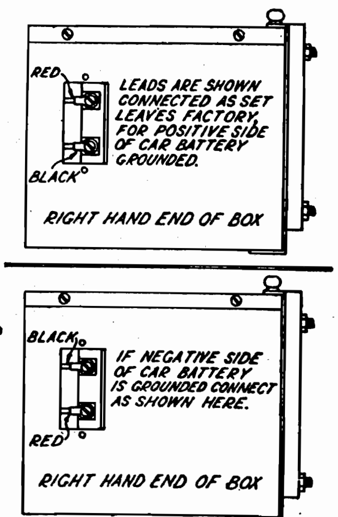


FIG. I

FIG. 2



MODEL 678
Installation Notes

EMERSON RADIO AND PHONOGRAPH CORPORATION

9. Replace the top cover on the receiver cabinet, using the screws to fasten it and attach the radio cabinet to the mounting plate; first, by hooking the two hooks on rear of the cabinet into the slots of the mounting plate; second, by inserting the two thumb-screws into the holes on the top of the mounting plate and screwing them into the holes of the cabinet. This completes the mounting of the radio cabinet.

10. Attach Remote-Control Unit to a convenient position on the steering wheel column, allowing the cables to take a smooth path to the set. Leather strips are furnished to accommodate unusual size steering wheel columns and also to prevent marring finish. ***Screw down the set screws in the center of the clamps in order to ground the remote-control unit to the steering post.*** Fasten the cable to the steering column and other points in order to prevent vibration and interference with the operation of the car.

11. Connect the two-conductor shielded cable to the battery, the BLACK wire always connects to the GROUNDED terminal of battery and the YELLOW wire always connects to the HOT terminal of battery regardless of polarity. (Re-read and check paragraph 7.) It is advisable to run this cable as directly as possible to the battery, keeping away from the engine compartment and other high tension wires. Grounding the cable as often as possible along its entire length reduces motor noise and is recommended. Poor connections at the battery terminals cause noise; therefore, clean the terminals and make good connections. (Connections to the ammeter are not recommended, in general.)

12. Before connecting the antenna, check it for a possible ground. If ungrounded, connect to the antenna lead of the radio by splicing a good connection, taping the joint and sliding the section of insulated tubing over the connection. In the event that the antenna lead-in is shielded, do not neglect to connect the shielding to the shielding on the antenna lead from the set. A word of caution here: ***Do not run the antenna lead-in thru the engine compartment and keep it away from all high-tension parts and leads.*** Ground the shielding of the antenna lead-in along its entire length, if possible.

13. Turn switch-key halfway in remote control unit. The dial should light up immediately if everything is correct. Turn volume control (small knob) clockwise to a position for loud volume and when the tubes are warmed up, turning the station dial (large knob) will tune in stations. Adjust volume by the volume control knob, never by detuning the station, as this ruins quality. The separate, delayed automatic volume control will counteract fading and blasting and requires little or no adjustment by the manual control.

14. If the installation thus far has been carefully followed, starting and running the motor causes very little interference generally. However, the amount of motor noise WITHOUT SUPPRESSION may be noted as a check on a good installation.

15. Fasten the condenser supplied for generator-noise-suppression by slipping the grounded lug of the condenser under a screw in the generator frame. Connect the live lead of the condenser to the generator side of the cut-out relay mounted on the generator (connecting the live lead to the battery side of the cut-out relay is more effective in some cases. This may be determined by test.)

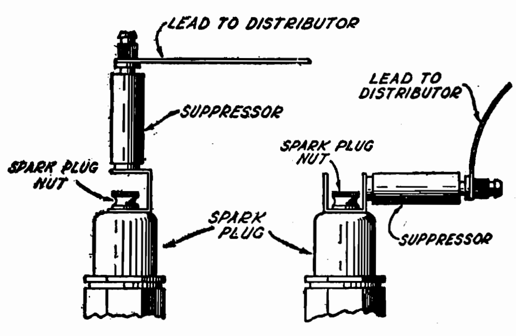


Fig. 111

16. Fasten a spark plug suppressor to each spark plug (see Figure III) and the distributor suppressor in the head of the distributor. Fasten the suppressors firmly to the plugs and to the leads so that the connections will not shake loose and ground. If special types of suppressors are required for certain cars, these may be obtained.

17. In general, this should suppress motor noise effectively. However, an auxiliary suppressor condenser connected from ground to battery side of ammeter may sometimes prove effective. (See further details under "Notes on Ignition Suppression.")

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 678
Voltage, Socket, Adjustments

Tubes: 1—78, 1—6A7, 1—6B7, 2—41 (5 tubes).
Total Battery Drain: 4.8 amperes.
Max. output: 4 watts.
Electro-Dynamic Speaker Field Resistance: 6 ohms.
Vibrator: Full wave synchronous rectifier.

Tube-Functions and circuit analysis:

78 { 1 Radio-frequency amplifier
2 Automatic fidelity control
3 Automatic selectivity control }

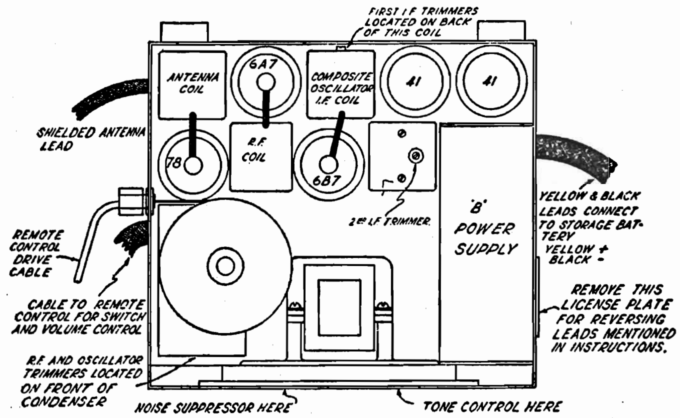
6A7 { 4 High gain modulator
5 Electron coupled oscillator }

6B7 { 6 High gain I. F. Amplifier
7 Neutralized space-charge diode detector
8 Separate delayed automatic volume control
9 Automatic noise suppression
10 Reflexed audio-frequency amplifier }

41 11 Push-pull output tube Class A"

41 12 Push-pull output tube Class A"

13 Full wave synchronous vibrator rectifier



- TOP VIEW OF RECEIVER WITHOUT COVER -
Fig. IV

VOLTAGE ANALYSIS

Use a high resistance voltmeter. Storage battery should be fully charged. Readings taken with no signals received.

Tube	*Cathode to Ground*	*Screen Grid to Ground*	*Plate to Ground*	*Heater to Ground*
78	3- 3.5V.	75-85V.	200-210V.	6V.
6A7	3- 3.5	75-85	200-210	6
6B7	3.5-4.5	75-85	200-210	6
41	14-18	200-210	190-200	6
41	14-18	200-210	190-200	6

Voltage across speaker field—6 volts.

ADJUSTMENTS

The receiver was carefully adjusted and aligned when it left the factory. Under no conditions should these adjustments be disturbed unless there is no question that it is absolutely necessary.

Intermediate-Frequency

To line up the Intermediate Frequency Amplifier, use a good modulated oscillator giving 172½ K.C. and a rectifier type output meter. Connect the oscillator output to the grid cap of the 6A7 and ground. Connect the output meter across the voice coil of the speaker or across primary of speaker transformer.

Ground the antenna lead and turn the tuning dial so that no signal is received (other than the test oscillator), with the volume control set at maximum volume.

Using the smallest output from the test oscillator to get an output reading, adjust the double-tuned input transformer and the single tuned output transformer for maximum output. It is preferable to use a non-metallic screw driver for this purpose. (See Figure IV.)

Radio-Frequency

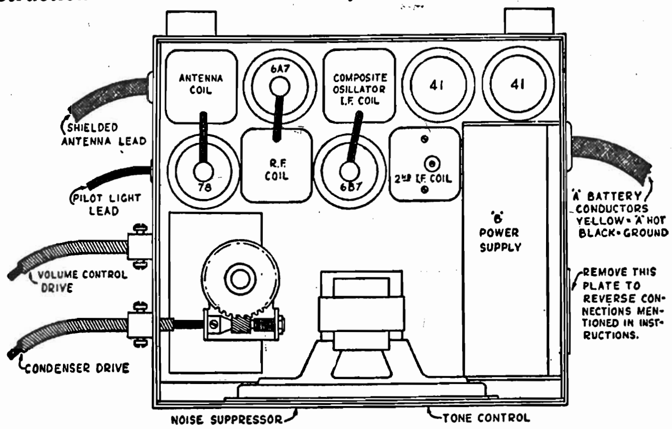
To line up the R. F. section, due to the extreme sensitivity of the receiver, use only a high-grade oscillator. Couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Attach the output meter to the voice coil of the speaker and align the trimmers on the variable condenser for a weak high frequency signal (between 1350—1450 K.C.). Readjust the trimmers to get accurate settings. (See Figure IV.)

If a high grade oscillator and output meter is not available, it is suggested that the alignments be made on broadcast. Tune in a weak station between 1350—1450 K.C. and align the trimmers carefully. Readjust the trimmers as above.

MODEL 678
Notes, Changes

EMERSON RADIO AND PHONOGRAPH CORPORATION

The following changes and additions are the effects of improvements in mechanical and electrical construction made on the "Auto Dynamic"—Model 678—since the release of the "Service Manual."



-TOP VIEW OF RECEIVER WITHOUT COVER-

FIG. IV (Substitute for Fig. IV. now appearing in "Service Manual".)

Paragraph 10 of the section "Installation Procedure" should read:

10. By means of the adjustable strap supplied, fasten the remote-control-unit in a convenient position on the steering column, allowing the cables to take a smooth path to the set. The procedure to follow being to place the end of the strap with a single hole under one of the holes in either flange on the control head. Place a bolt through the holes, slipping a lockwasher and nut on the other end. Do not fasten the bolt; leave it loose temporarily. Twist the strap through a radius around the steering column so that with a snug fit one of the three remaining holes in the strap lines up with the hole in the other flange of the control head. Insert a bolt through the two holes that line up under these conditions and slip a lockwasher and nut on this bolt. Finally fasten both bolts securely so that the control head will not turn. Bond the cables at numerous points along the steering column to eliminate vibration and prevent interference with the operation of the car.

* * * * *

Paragraph 13 of the same section should read:

13. Place the switch-key in the slot provided for it and turn clockwise until a snap is felt and the dial illuminated. The light will indicate that the receiver is properly wired and ready to operate or ready for advance in installation procedure. Turn the volume control completely clockwise by means of the switch key to the maximum volume level. When the receiver is warmed up (this will be indicated by noise) tune a station carefully to resonance by means of the right-hand knob. Re-adjust the volume to a satisfactory level. Never attempt volume attenuation by de-tuning the station, as this will distort the quality of tone translation. The separate, delayed-automatic-volume control incorporated internally will tend to counteract fading and blasting, retaining the volume at the level determined by the manual volume control.

The illuminated dial and the tuning control mechanism are mutually self-aligning. If the calibration of the dial does not check reasonably well with the frequencies of the stations received, it is only necessary to turn the tuning control knob slowly clockwise until it stops. If the dial pointer is at the extreme counter-clockwise position they are aligned. If not, turn the knob slowly, counter-clockwise, until it stops and the dial is completely clockwise. If either or both these instructions are carried out the calibration should check.

* * * *

THE FOLLOWING NOTES APPLY TO THE SERVICE SECTION

If it becomes necessary to disconnect the remote control unit; progress by loosening the two set screws which clamp the volume control cable to the lower stud on the receiver case, and by pulling the cable totally out of the recess provided for it. To detach the turning control cable, remove the cover of the receiver box and loosen the set screws which hold the cable to the worm gear drive. Unbind the two set screws which hold the cable to the receiver box and pull the cable out. Lastly, remove the bottom of the set and unsolder the two connections for the pilot light, pull it out of the grommet and the operations are complete.

To replace the control unit, it is only necessary to reverse the above process, being sure that the "tongue" of the volume control cable slips into the slot provided for it. This may be accomplished by rotating the volume control knob slowly, and pushing the cable in simultaneously until the tongue engages the slot.

Replacement of the fuse in the event of a burn-out requires a removal of the floor board of the car. Remove both cables from the battery and unlock the fuse receptacle in the yellow lead, the fuse should drop out easily. A fuse of 10 ampere capacity, as indicated on the defective fuse, should replace it. The cause for the burn-out of the fuse should be determined before a new one is put in.

TONE CONTROL ADJUSTMENT

The adjustment as the receiver leaves the factory is set for full register reproduction. This is recommended for closed cars and for vocal programs. Turning the control clockwise brings up the low tones and is recommended for open cars and musical programs. Incidentally in this position, static and other noises are decreased greatly. Do not turn clockwise more than necessary as definition of speech may be lost due to the attenuation of higher tones by the car interior.

MODEL L-755, 50-L
Schematic, Voltage
Socket layout, Note

EMERSON RADIO AND PHONOGRAPH CORPORATION

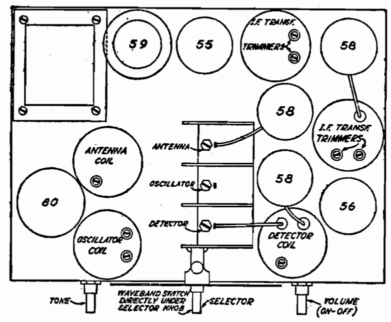
The L-755 is a de luxe superheterodyne receiver incorporating the latest features in medium and long wave receiver design to achieve unusual performances on both the 1500-535 kilocycle and 150-320 kilocycle bands.

The upper center knob is the Station Selector Control governing the frequency calibrated dial directly above it. The lower center knob is the Band Selector; when turned to the left (counter-clockwise) the medium frequency band is the reception band and the lower dial numbers indicate the frequency; when turned to the right (clockwise), the low frequency band will be received and the upper numbers will indicate the frequency.

The left hand knob is the Tone Control; the right hand knob the Combined Volume Control and Switch.

The black wire protruding from the rear of the chassis is the ground wire; the colored wire next to it is the lead to be connected to the antenna.

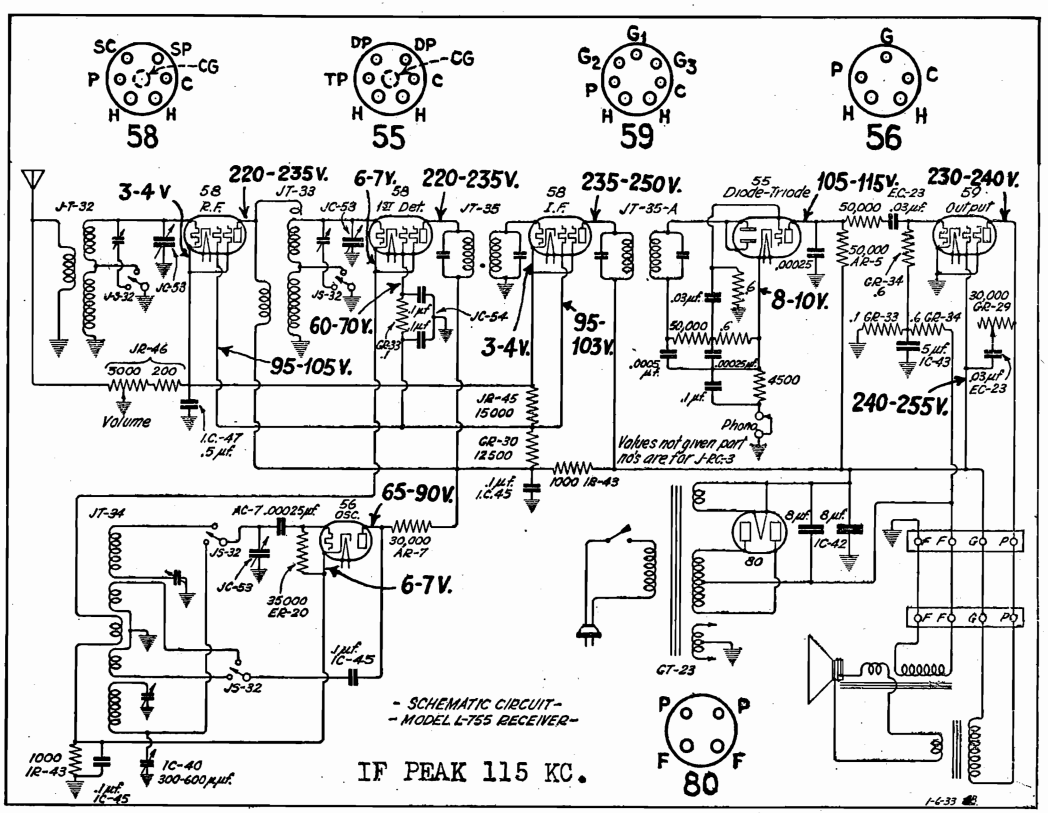
TUBE LAYOUT



Voltage Readings

Readings should be taken with the Volume Control turned clockwise as far as it will go and the Station Selector set for 550 K. C. Use a high resistance (1000 ohms per volt) voltmeter.

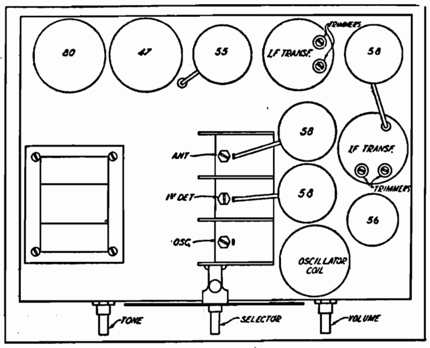
For List of Parts, see Index



Corrections: Omit 50,000 ohm Resistor from Triode Plate to Coupling Condenser. GR-34, 59 Grid Resistor changed to JR-47, 3 meg. Resistor.

MODEL M-755, 50-M
Schematic, Voltage
Parts List

EMERSON RADIO AND PHONOGRAPH CORPORATION



M-AC-7

Part No.	Description	List Price
GT-20	Antenna Coil	$ .65 each
GT-21	Interstage R.F. Coil	.65 "
GT-22	Oscillator Coil	.65 "
ET-17	I. F. Transformer	1.15 "
GT-23	Power Transformer	1.95 "
GR-28	Volume Control	.80 "
GR-29	Tone Control	.60 "
GR-30	12,500 ohm 2 wt. Resistor	.25 "
	Any other Carbon Resistor (specify Part No. and value—refer to diagram for value)	.15 "
EC-16	3-Gang Variable Condenser	2.45 "
BC-9	8 & 8 mfd. Electrolytic Condenser	.65 "
	Any Size Tubular or Mica Condenser (specify Part No. and Value — Refer to diagram for Value)	.10 "
	Any socket (specify tube number marked on socket)	.08 "
GD-5	Dial Assembly	.90 "
AL-2	Pilot Light	08 "
AK-1	Knobs	.10 "
GS-19	Dynamic Speaker	5.65 "

Voltage Readings:

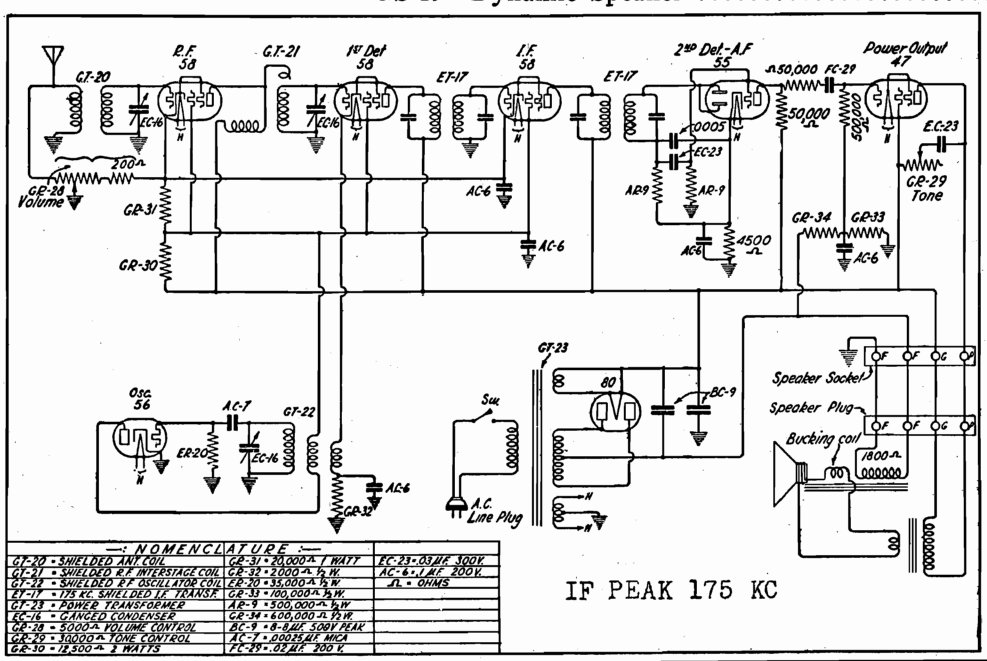
Readings should be taken with the Volume Control fully on and the Station Selector set for 550 K.C.

Use a high resistance D.C. voltmeter.

Ground to—	Plate	Screen	Cathode
56 Oscillator	80—100	—	—
58 R.F. Amplifier	235—250	90-110	3—5
58 1st Detector	235—250	90-110	5—7
58 I.F. Amplifier	235—250	90-110	3—4
55 Second Detector	125—135	—	8—11
47 Output Pentode	215—225	235-250	—

Line Voltage—115

The bias on the 47 cannot be read with the voltmeter.



IF PEAK 175 KC

MODEL S-755, S-50
Schematic, Voltage
Socket layout

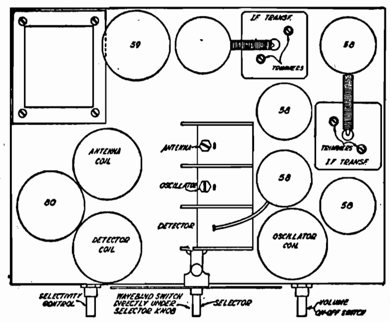
EMERSON RADIO AND PHONOGRAPH CORPORATION

Voltage Readings:

Readings should be made using a D.C. voltmeter having a resistance of 1,000 ohms per volt. Volume control should be on full.

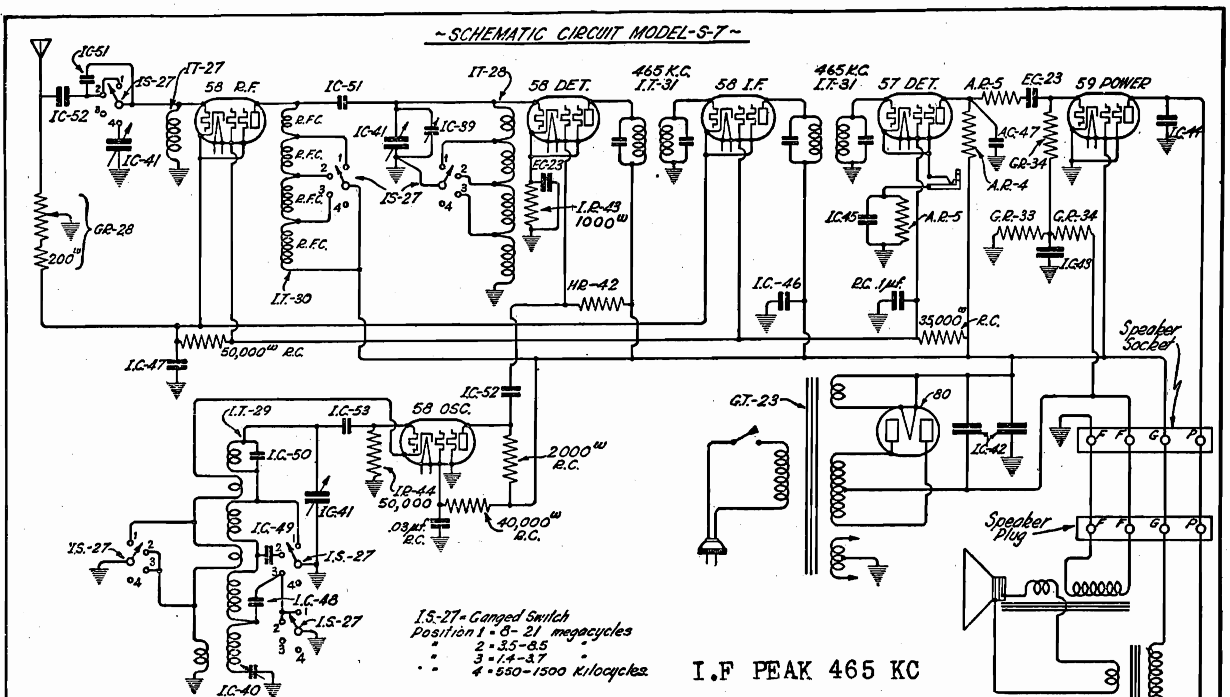
58 Oscillator	Ground to plate 230-245	Screen 120-140	Cathode	....
58 R.F. Amplifier	" " " 235-250	" 90-110	"	3-4
58 1st Detector	" " " 235-250	"	"	1-2
58 I.F. Amplifier	" " " 235-250	" 90-110	"	3-4
57 2nd Detector	" " " 100-125	" 90-110	"	4-6
59 Output tube	" " " 230-245	" 235-250	"	—

Line voltage, 115v.



The bias on the 59 and the screen voltage of the 1st detector cannot be read with the usual voltmeter.

For List of Parts, see Index



NOMENCLATURE

I.T-27 = Antenna Coil	I.C-40 = 300-600 μμf. Semi-Variable	I.C-45 = .1μf. 300V.	I.C-51 = 10 μμf. mica	H.R-42 = 2 meg.
I.T-28 = Detector Coil	I.C-41 = 365 μμf. 3 Gang	I.C-46 = .5 μf. 300V.	I.C-52 = .002 μf. mica.	G.R-33 = 100,000 ω
I.T-29 = Oscillator Coil	I.C-42 = 8-8 μf. Electrolytic.	I.C-47 = .5 μf. 200V.	I.C-53 = .0001 μf. mica	G.R-34 = 600,000 ω
I.T-30 = 4 Section Choke Coil	I.C-43 = 5 μf. Electrolytic	I.C-48 = .001 μf. mica.	A.C-47 = .0005 μf mica	G.R-28 = 5000 ω Volume
G.T-23 = Power Transformer	I.C-44 = .004 μf. 300V.	I.C-49 = .0017 μf. mica.	A.R-4 = 250,000 ω	ω = ohms
I.C-39 = 35 μμf variable	E.C-23 = .03 μf. 300V.	I.C-50 = 34 μμf. mica.	A.R-5 = 50,000 ω	R.C. = Res.+Cond. Assy. R.C-2

12-8-32

MODEL 375, 40
MODEL 420
MODEL S-755, S-50
MODEL L-755, L-50

EMERSON RADIO AND PHONOGRAPH CORPORATION

Model 375,40

Parts List	Description	LIST PRICE
P-T-67	Antenna Coil in Shield	$ .80 each
P-T-68	Interstage R.F. Coil in Shield	.80 "
P-T-66	Composite I.F. and Oscillator Coil	1.20 "
L-T-41	2nd I.F. Transformer in Shield	1.20 "
L-T-45	Filter Choke	.60 "
P-C-82	Variable Condenser—3-Gang	2.40 "
P-C-83	Filter Condenser—Triple 4, 12 and 16	1.40 "
I-C-43	Roll Type Electrolytic Condenser—5 Mfd.	.50 "
E-C-19	.5 Mfd. Roll Type Paper Condenser	.20 "
	Any other Roll Type Paper Condenser. Give size or location in the circuit.	.12 "
	Any Socket—Give Tube Number	.12 "
	Any Carbon Resistor. Give value or location in circuit.	.14 "
L-R-59	Ballast-Resistor 160-ohm 15-watt Wire Wound	.40 "
P-D-9	Vernier Dial Complete	.60 "
L-B-3	Pilot Lamp Socket	.10 "
K-L-6	Pilot Lamp Bulb	.15 "
PR-81	Volume Control with Switch	.90 "
PS-52	Dynamic Speaker	4.50 "
	Special 220-Volt Ballast Resistor. For operation on 220-volts.	2.00 "

Model 420

No.	Description	Price
No. 1	EMERSON 6-Volt "B" Eliminator and Cable. (For automobiles and motorboats, camps, etc.)	$15.00 each
No. 2	220-Volt Ballast Adapter (where 220-volt AC or DC current is available)	2.00 "
No. 3	EMERSON 32-Volt "B" Eliminator and Cable (for farm lighting plants and wherever 32-volt power is used)	15.00 "
V4Z	Zipper Type Carrying Case	2.00 "
HT-24	Antenna Coil	.60 "
HT-25	R. F. Coil	.60 "
QT-61	Filter Choke	.60 "
QR-77	Volume Control and Switch	.90 "
QC-77	Variable Condenser	1.80 "
QC-78	Dual 4-mfd. Electrolytic Condenser	1.05 "
QW-28	Power Cord and Resistor with 7-prong Socket and Line Plug	1.20 "
HS-24	Speaker	4.50 "
	Any Carbon Resistor. (Order by size)	.15 "
	Any Tubular Condenser or Mica Condenser. (Order by part number)	.15 "
	Any Socket. (Order by tube number)	.10 "

Model S-755, S-50

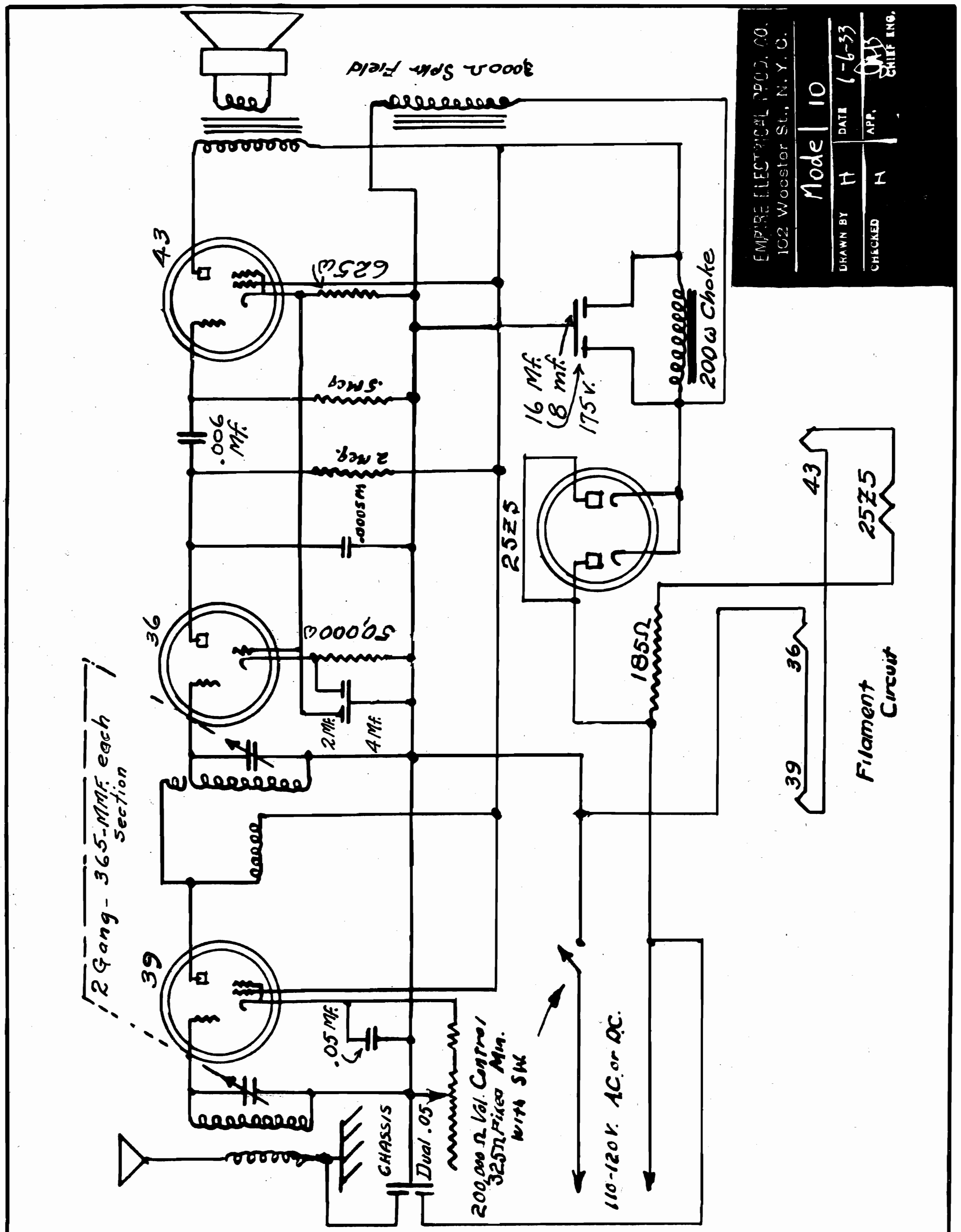
Part No.	Description	List Price
IT-27	Antenna Coil	$ .90 each
IT-28	R. F. Coil	.90 "
IT-29	Oscillator Coil	.90 "
IT-31	I. F. Transformer	1.05 "
GT-23	Power Transformer	2.25 "
GR-28	Volume Control	.80 "
	Any Carbon Resistor (specify Part No. and Value—refer to Diagram for Value)	.12 "
IC-41	3-Gang Variable Condenser	2.30 "
IC-42	Double 8 Mfd. Electrolytic Condenser	1.25 "
	Any size Tubular or Mica Condenser (specify Part No. and Value—refer to Diagram for Value)	.20 "
	Any Socket (specify Tube No. marked on Socket)	.10 "
ID-6	Dial Assembly	.90 "
AL-2	Pilot Light	.12 "
	Knobs	.15 "
IS-29	Dynamic Speaker	5.90 "
IT-30	Four Section Universal Choke Coil	.45 "
IC-39	Selectivity Control Condenser	.60 "
IS-27	Band Switch	1.50 "
IC-40	Adjustable Padding Condenser	.60 "
IZ-29	Phonograph Jack	.30 "

Model L-755, L-50

Part No.	Description	List Price
JT-32	Antenna Coil	$1.75 each
JT-33	Interstage Coil	1.75 "
JT-34	Oscillator Coil	2.00 "
JT-35	I. F. Transformer	1.10 "
JT-35A	I. F. Transformer	1.10 "
GT-23	Power Transformer	1.95 "
JR-46	Volume Control	.80 "
GR-29	Tone Control	.60 "
GR-30	12,500 ohm 2 wt. Resistor	.25 "
	Any other Carbon Resistor (Specify Part No. and Value—Refer to Diagram	.15 "
JS-32	Wave-Change Switch	1.25 "
JC-53	3-Gang Variable Condenser	2.25 "
IC-42	Dual Electrolytic Condenser	1.25 "
IC-54	Dual .1 Condenser	.20 "
IC-43	5 mfd. Tubular Condenser	.45 "
IC-40	Adjustable Padder Condenser	.60 "
	Any Other Size Tubular or Mica Condenser (Specify Part No., and Value (Refer to Diagram)	.20 "
	Any Socket (Specify Tube No.)	.10 "
JD-7	Dial Assembly	.90 "
AL-2	Pilot Light	.15 "
AK-1	Knobs	.10 "
JS-29	Dynamic Speaker	4.75 "
JRC-3	Resistor and Condenser Assembly	1.50 "

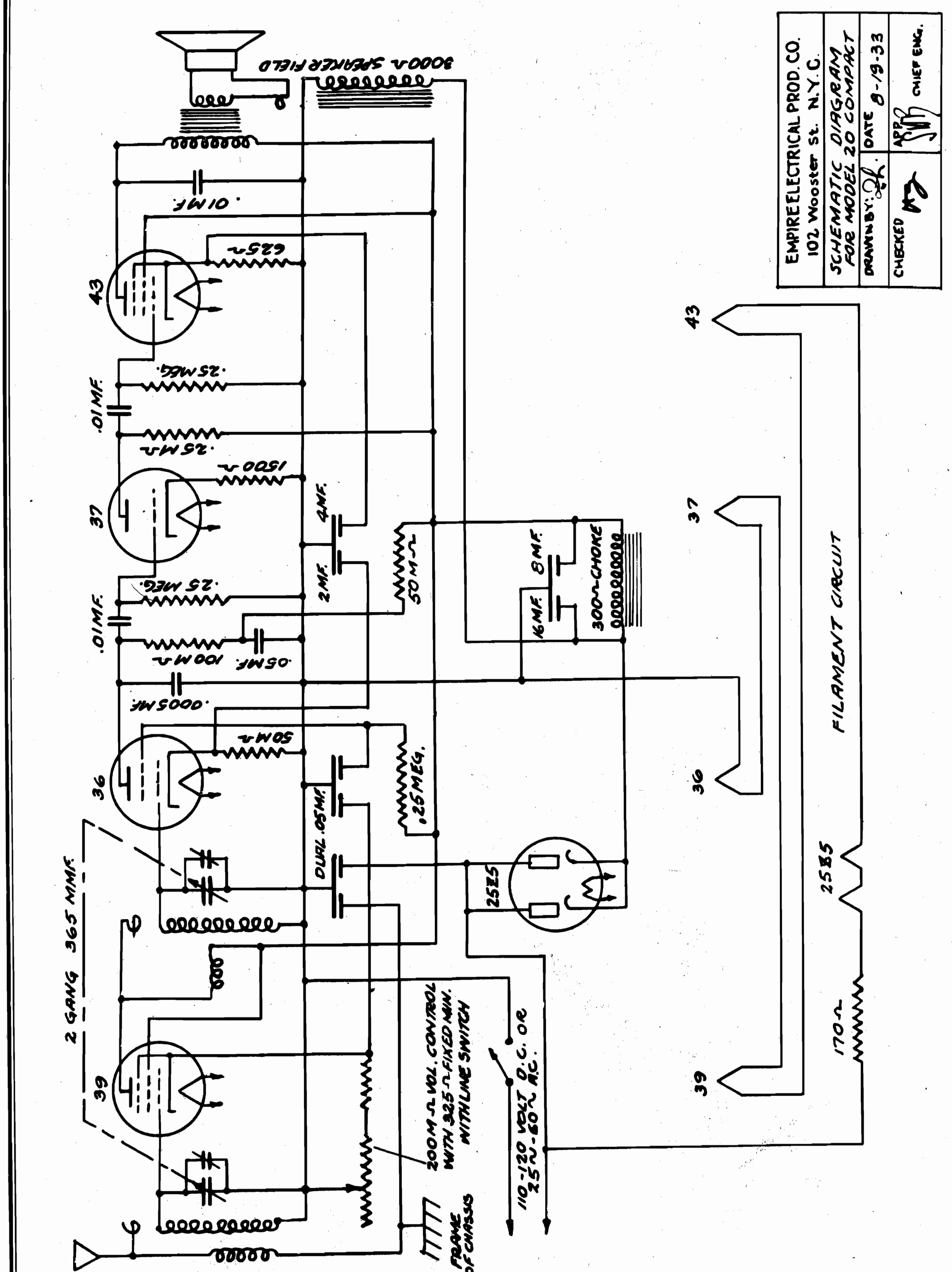
MODEL 10
Schematic

EMPIRE ELECTRICAL PRODUCTS



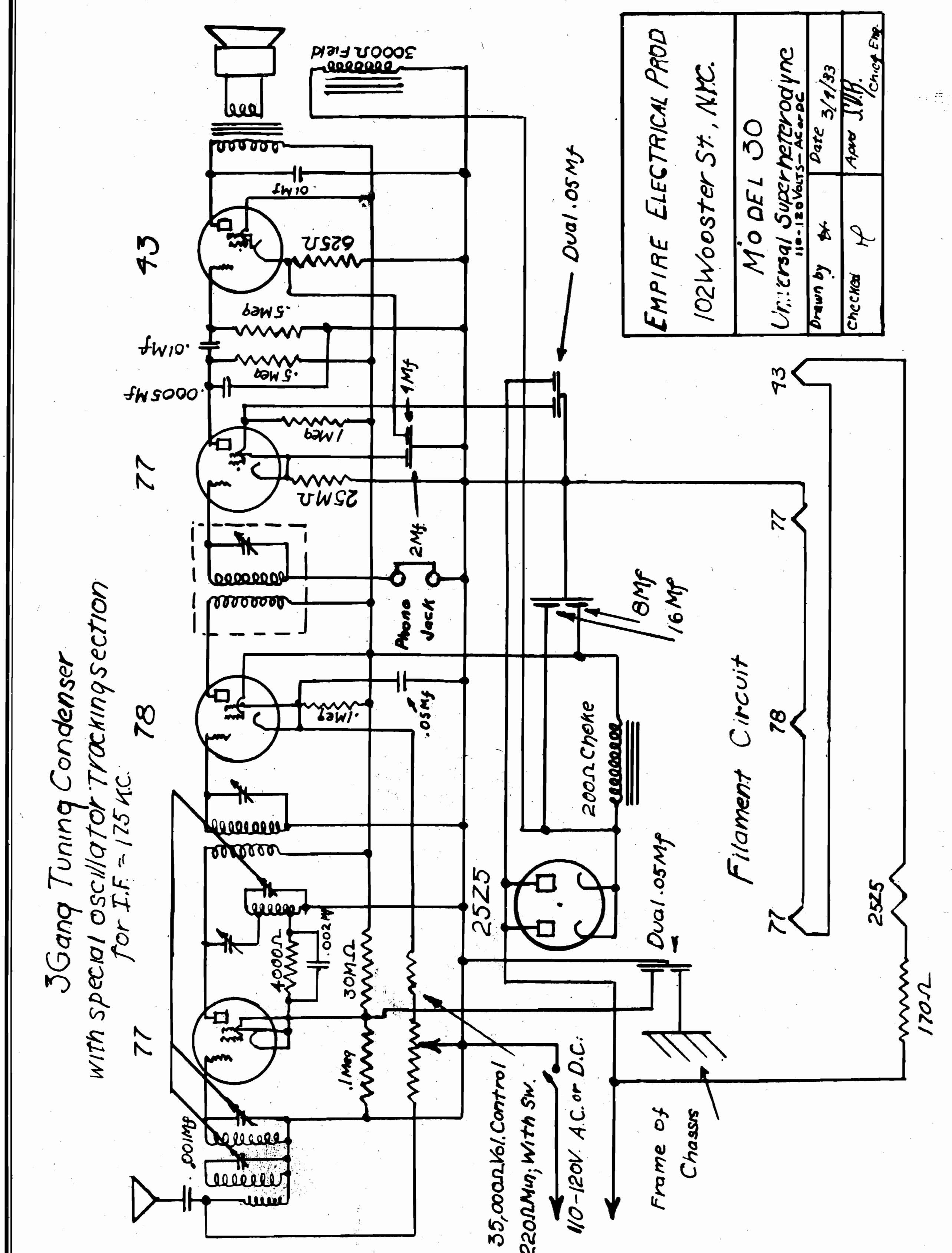
MODEL 20
Schematic

EMPIRE ELECTRICAL PRODUCTS



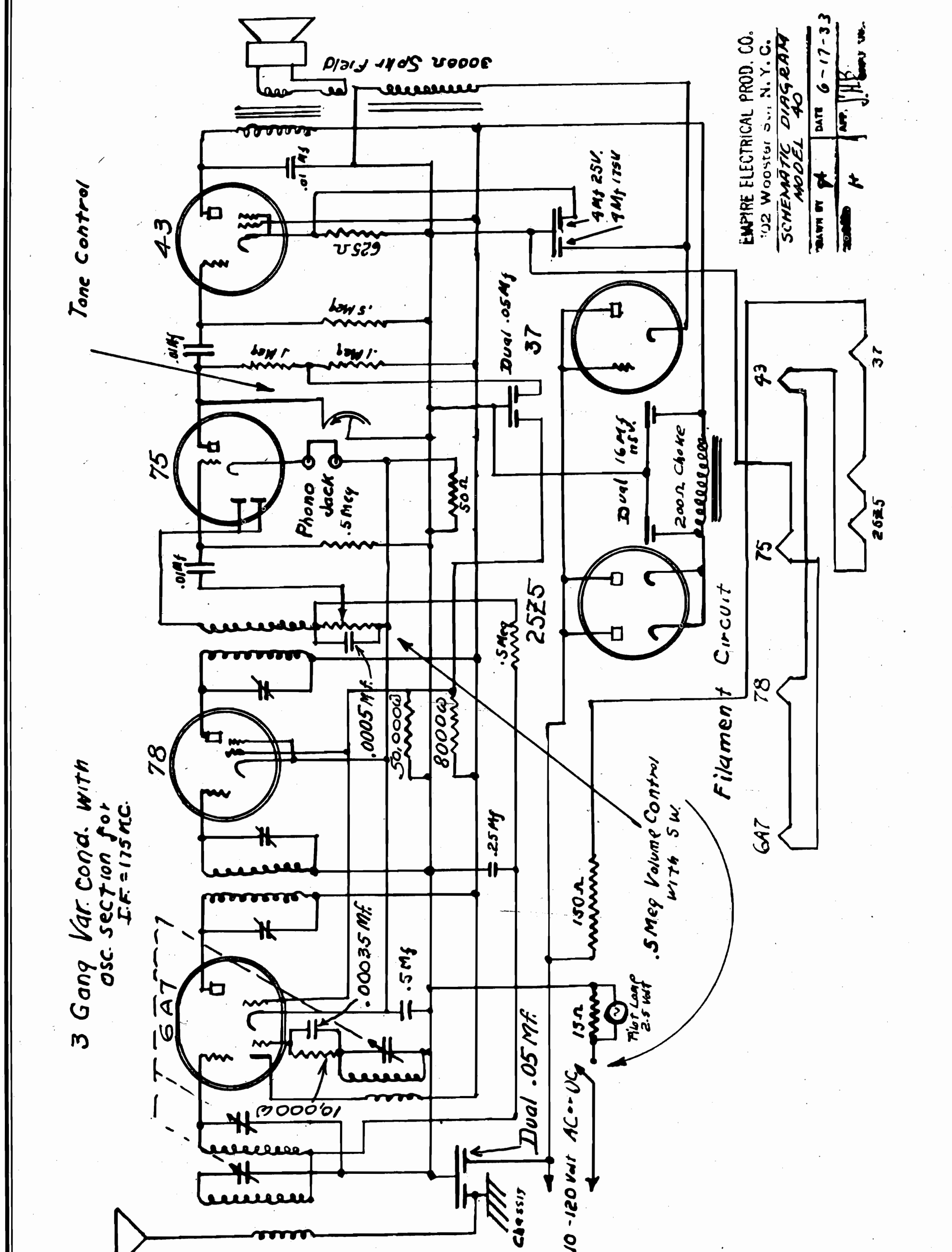
EMPIRE ELECTRICAL PRODUCTS

MODEL 30
Schematic



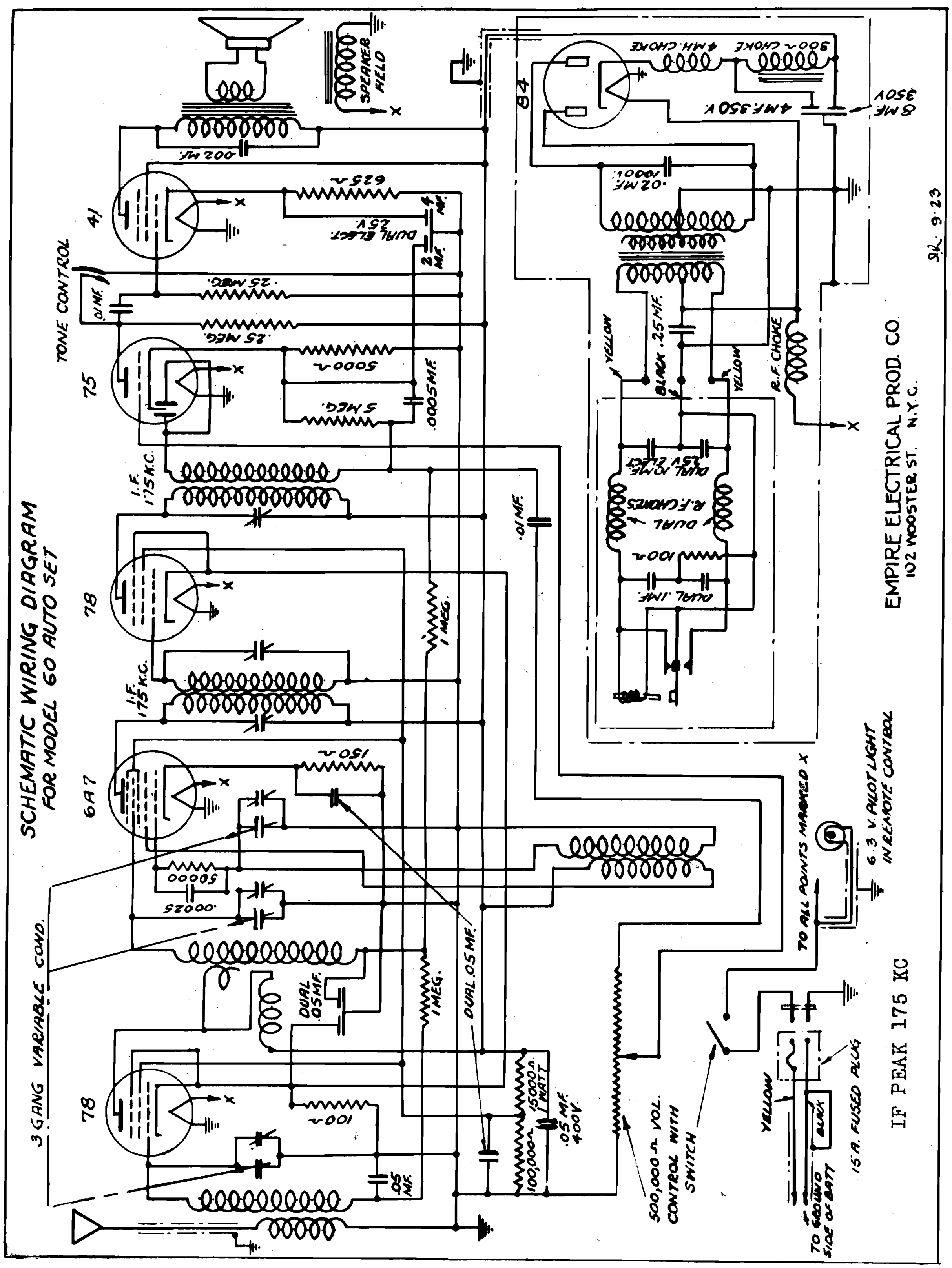
MODEL 40
Schematic

EMPIRE ELECTRICAL PRODUCTS



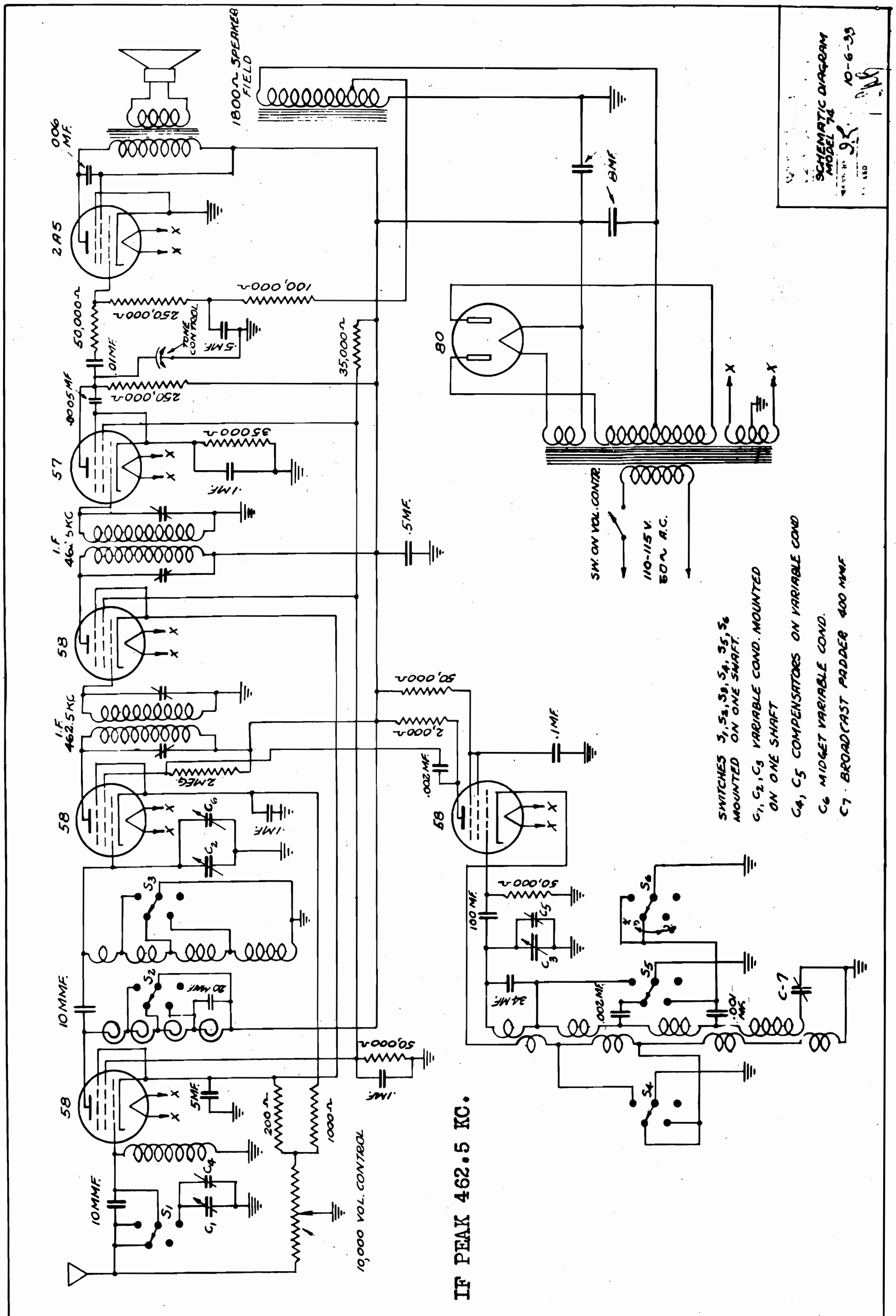
EMPIRE ELECTRICAL PRODUCTS

MODEL 60
Schematic



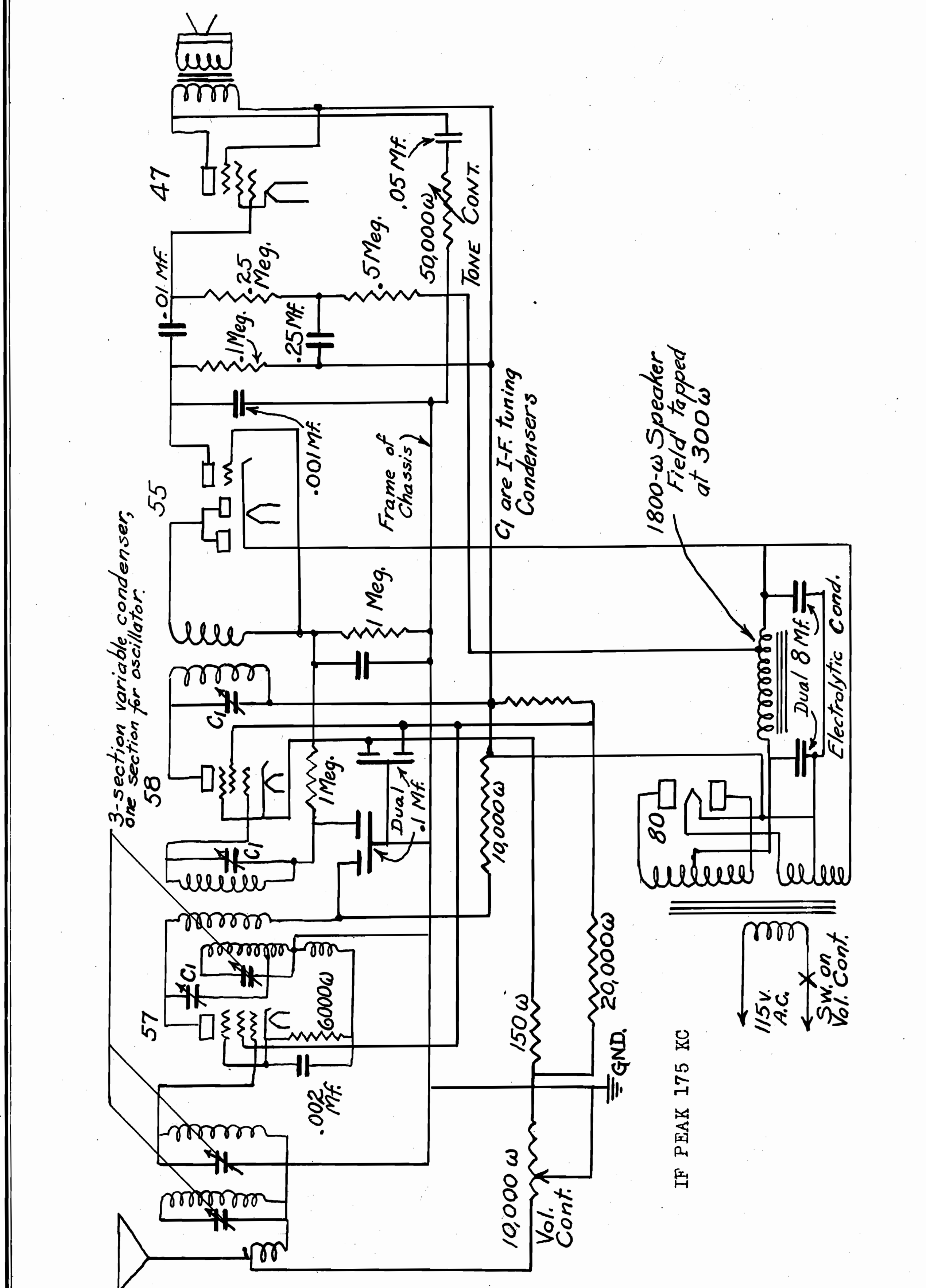
MODEL 74
Schematic

EMPIRE ELECTRICAL PRODUCTS



MODEL 575
Schematic

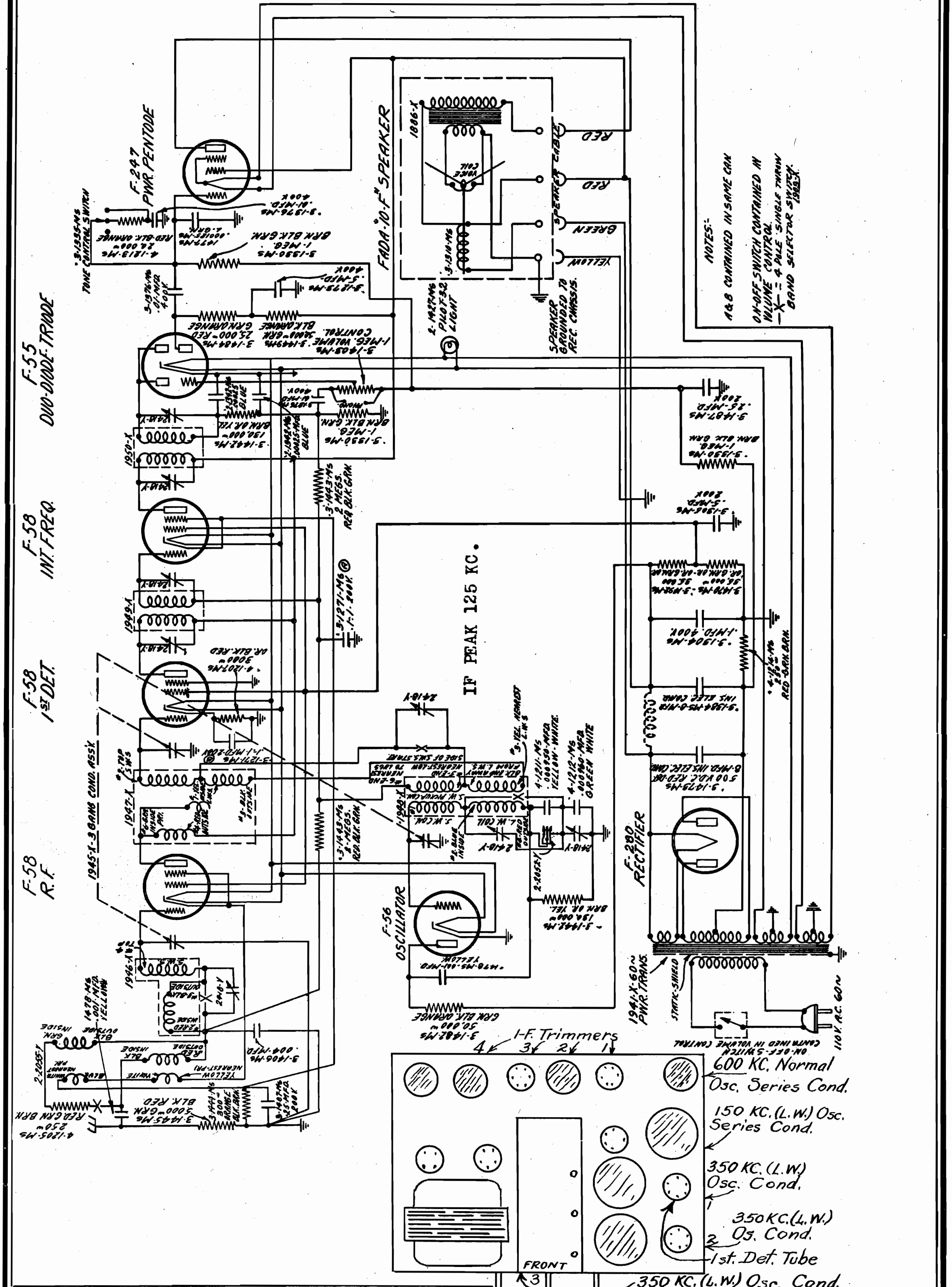
EMPIRE ELECTRICAL PRODUCTS



IF PEAK 175 KC

FADA RADIO & ELECTRIC CORP.

MODEL "RX"
Schematic



MODEL "RX"
Alignment data

FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR

RX RECEIVER - MODELS 93 & 95

In order to accurately adjust the various trimmer condensers of this Receiver in accordance with the following instructions, it is essential to use a shielded generator capable of giving a modulated carrier frequency which can be accurately attenuated at 2402 meters (125 kilocycles), 1999 meters (150 kilocycles), 856.6 meters (350 kilocycles), 499.7 meters (600 kilocycles) and 214.2 meters (1400 kilocycles).

ADJUSTMENT OF I.F. CONDENSERS

The four (4) I.F. condensers are located in the rear of the chassis as indicated in the sketch.

1st - Disconnect the outside antenna system from the Receiver.

2nd - Connect a lead wire from the output system of the signal generator to the control grid of the first detector tube. Do not disconnect the control grid connector from the tube nor remove the tube shield. Connect the ground (slate) lead of the Receiver to the ground post of the signal generator. Install a 250 mmfd. condenser in series with the signal generator lead wire.

3rd - Place an output meter across the secondary of the Receiver output transformer (which is mounted on the speaker) so that the variations in signal output can be noted.

4th - Turn the band selector switch to the long-wave position.

5th - Place the signal generator in operation and adjust the frequency output to 2402 meters (125 kilocycles). Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the Receiver.

6th - With the aid of a 1/4" (#4) socket wrench, adjust the four (4) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER COMPENSATORS

The compensators are located at the top of their respective tuning condensers and can be adjusted with the aid of an ordinary screw driver. There are three (3) holes in the overall condenser shield housing cover to permit the insertion of a screw driver for compensating purposes.

1st - Remove the lead wire which is connected to both the control grid of the first detector tube and to the antenna system of the signal generator.

2nd - Connect the antenna (red) wire of the Receiver to the output system of the signal generator. The ground (slate) wire should remain connected to the ground post of the signal generator.

3rd. - Set the band selector switch to the normal-wave position.

4th - Adjust the carrier frequency output of the signal generator to 214.2 meters (1400 kilocycles).

5th - Set the calibrated dial of the Receiver to read 214.2 meters (1400 kilocycles).

6th - Adjust each compensator in the order given on the sketch, that is, first, second, etc. for maximum signal output as indicated on the output meter. Do not disturb the setting of the gang condenser during these operations. Leave the volume control at maximum and regulate the signal output with the attenuator control of the signal generator.

ADJUSTMENT OF THE NORMAL WAVE OSCILLATOR SERIES CONDENSER

The oscillator series condenser can be adjusted through the hole in the side of the chassis as indicated in the sketch.

1st - Adjust the carrier frequency output of the signal generator to 499.7 meters (600 kilocycles).

2nd - Set the calibrated dial of the Receiver to read 499.7 meters (600 kilocycles).

3rd - With the aid of a 1/4" (#4) socket wrench, adjust the normal wave oscillator series condenser until a maximum output signal is indicated on the output meter. To insure perfect adjustment it is necessary to "rock" the variable gang condenser back and forth in order to follow the maximum signal output.

4th - After the normal wave oscillator series condenser is properly adjusted, turn the calibrated dial of the Receiver to 214.2 meters (1400 kilocycles) and set the signal generator to the same frequency. Readjust all variable condenser compensators as outlined in the foregoing instructions.

MODEL "RX"
Alignment data

FADA RADIO & ELECTRIC CORP.

ADJUSTMENT OF LONG-WAVE PADDING COMPENSATORS

Two (2) of the compensators are located on the right side of the chassis and one in the front as indicated in the sketch. These compensators can be readily identified by the red mark placed on the adjustment hole.

1st - Turn the band selector switch to the long-wave position and adjust the carrier frequency output of the signal generator to 856.6 meters (350 kilocycles).

2nd - Set the calibrated dial of the Receiver to read 856.6 meters (350 kilocycles).

3rd - With the aid of a 1/4" (#4) socket wrench, adjust all three (3) padding compensators in the order marked in the sketch.

ADJUSTMENT OF LONG-WAVE OSCILLATOR SERIES CONDENSER

The long wave oscillator series condenser can be adjusted through the hole in the side of the chassis as indicated on the sketch.

1st - Adjust the carrier frequency output of the signal generator to 1999 meters (150 kilocycles).

2nd - Set the calibrated dial of the Receiver to read 1999 meters (150 kilocycles).

3rd - With the aid of a 1/4" (#4) socket wrench, adjust the long wave oscillator series condenser until a maximum output signal is indicated on the output meter. To insure perfect adjustment it is permissible to "rock" the variable condenser back and forth in order to follow the maximum signal output.

RESISTOR-CONDENSER Specifications

FADA RADIO & ELECTRIC CORP.

IDENTIFYING BY-PASS CONDENSERS

PART #	CAP.	VOLTS	TYPE
1238 Ms	1.0 Mfd	200 Volts	I
1239 Ms	2.0	200	I
1240 Ms	1.0	400	I
1241 Ms	0.5	200	I
1242 Ms	0.5	200	I
1418 Ms	.25-25	200-400	II
1419 Ms	.5	400	I
1490 Ms	.15	400	I
1225 Ms	.25	400	I
2-1307 Ms	.07	400	I
2-1340 Ms	.25	200	I
2-1341 Ms	.25-25	400-400	III
2-1353 Ms	.25-25	200-200	II
2-1360 Ms	.25-25	200-200	III

On the above, type I has two lugs. Type II has three leads and a red lead connects to a 400 volt section, a brown lead to a 200 volt section and the black lead is common.

Type III condensers have four leads. A red lead connects to 400 volt sections and a brown lead to 200 volt sections. Thus a 400-400 condenser has two red leads and two black leads, a 200-200 condenser has two brown leads and two black leads. The black leads are not ommon in type III.

Wound Resistances in Fada Sets

Wire wound resistances used in Fada receivers are identified by spots of color in accordance with the listing below. If you wish to order any of these resistances, be sure to specify both the part number and the value of the resistance in ohms. Your careful attention to this detail will result in our being able to give you much prompter service.

Our Part No.	Resistance in Ohms	Identification
1458-Ms	75	Red & White
1414-Ms	250	Yellow & White
1459-Ms	500	Blue & Green
1460-Ms	600	Red & Blue
1461-Ms	750	Red & Green
1328-Ms	1,000	Yellow
2-1219-Ms	1,200	Green & Yellow
1415-Ms	2,000	Green & White
2-1218-Ms	2,500	Blue & White
1416-Ms	3,000	White & White
1462-Ms	6,000	Red & Yellow
1463-Ms	10,000	Blue & Yellow
2-1249-Ms	65	Red
2-1250-Ms	65 Tap at 40	Blue
2-1251-Ms	10	Yellow
2-1311-Ms	20	White
2-1312-Ms	200 taps at 10 & 160	Green
2-1379-Ms	1500	Red & Red
2-1390-Ms	5000	Blue & Blue

How to Identify Fada Carbon Resistances

All fixed resistances used in Fada sets are identified by color. If you wish to order any of these resistances, please be sure to specify both the part number and the value of the resistance in ohms. This will result in giving you much prompter service.

Our Part No.	Resistance Ohms ± 10%	Identification	Diameter in Inches
1408-Ms	2-Megs	Red	1/4"
2-1299-Ms	250	Light Brown	1/4"
2-1300-Ms	750	Green	3/8"
2-1207-Ms	2000	Black	1/4"
1265-Ms	3000	White	1/4"
2-1308-Ms	5000	Orange	1/4"
1341-Ms	20,000	Green	1/4"
1417-Ms	50,000	Blue	1/4"
2-1315-Ms	70,000	Violet	1/4"
1375-Ms	125,000	Gray	1/4"
1311-Ms	250,000	Yellow	1/4"
1394-Ms	500,000	Brown	1/4"
1467-Ms	2000	None	3/8"
2-1330-Ms	3000	White	3/8"
2-1334-Ms	1200	Dark Green	1/4"
2-1344-Ms	1000	Green with yellow end	3/8"
2-1345-Ms	2500	Red with yellow end	3/8"
2-1346-Ms	125	Gray with yellow end	1/4"
2-1347-Ms	10,000	Blue with yellow end	1/4"
2-1358-Ms	500	Brown with blue end	1/4"
2-1364-Ms	7500	Yellow with blue end.	1/4"

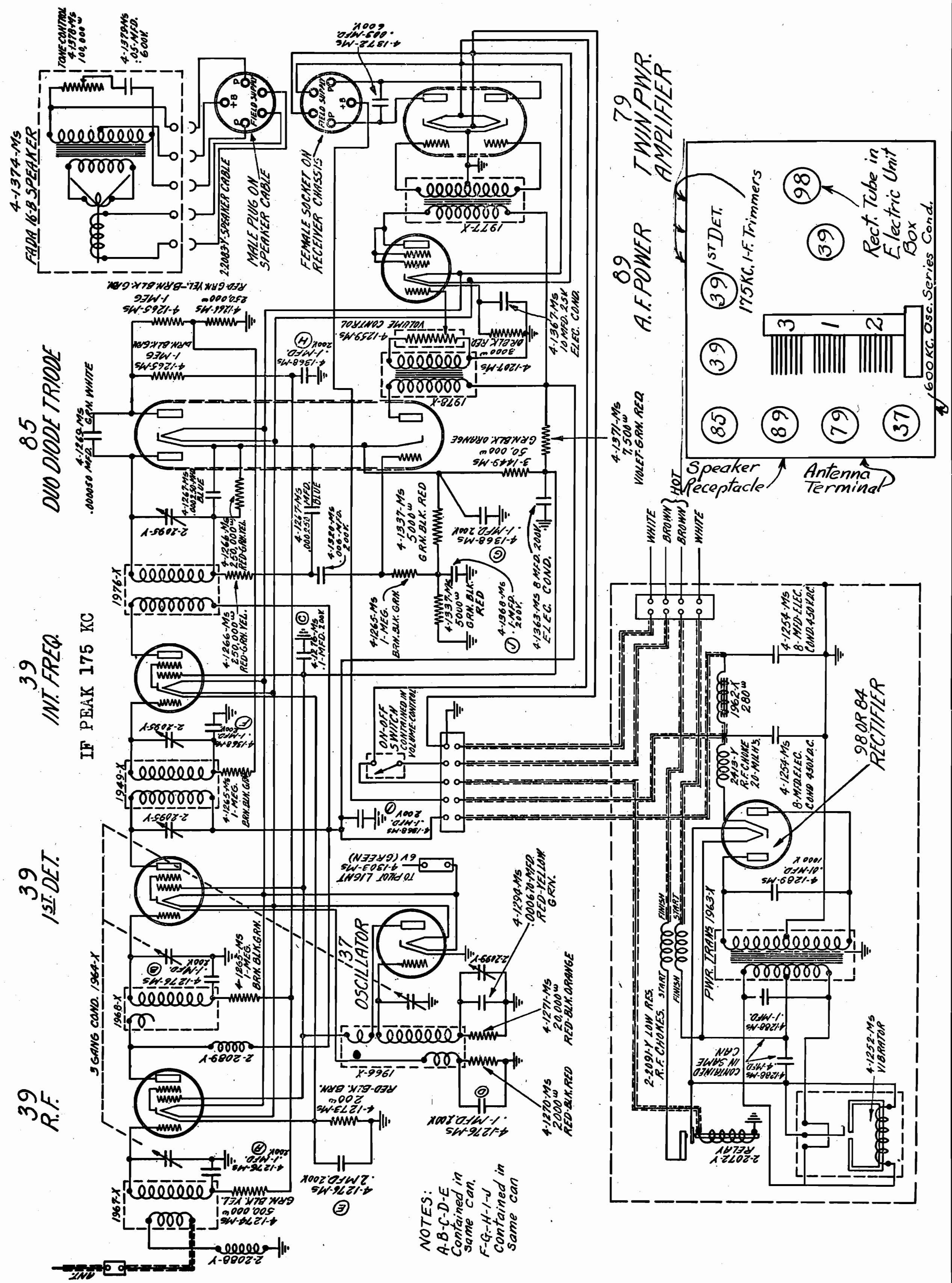
Carbon Resistances

Carbon resistances it will be noticed are of two different styles. The black units with tinned ends have small spots of paint for identification of their resistance values. Another type have leads soldered on them and the entire unit dipped in an insulating paint of identifying color. In addition some of these units will have the part number stamped on them. The following is a table of identification.

Part No.	*Resistance*	*Black Unit Identification*	*Other Type Unit Identification*
1265-MS	3,000 ohms	White and Yellow	....
1311-MS	250,000 ohms	Gray and Yellow	Yellow
1341-MS	20,000 ohms	Red and Green	Green
1375-MS	125,000 ohms	Gray and Green	Gray
1394-MS	500,000 ohms	Yellow and Black	....
1408-MS	2 megs	....	Red
1417-MS	50,000 ohms	....	Blue

MODEL 102 (RP)
Schematic

FADA RADIO & ELECTRIC CORP.



MODEL 102 (RP)
Alignment notes

FADA RADIO & ELECTRIC CORP.

MOTOSET -- MODEL 102

In order to accurately adjust the various trimmer condensers of the MOTOSET in accordance with the following instructions; it is essential to use a shielded signal generator capable of giving a modulated carrier frequency which can be accurately attenuated at 175 K.C., 600 K.C. and 1400 K.C.

The MOTOSET is equipped with an automatic volume control which necessitates setting the manual volume control of the Receiver to its maximum position, to insure accuracy in alignment of compensators. To control the signal output of the Receiver it will be necessary to use the attenuator of the signal generator.

Before any adjustments can be made it will be necessary to remove the chassis from its housing in accordance with "Instructions For Removing MOTOSET chassis from its Housing."

ADJUSTMENT OF I.F. COMPENSATORS

The three (3) I.F. compensators are located in the side of the chassis itself as indicated in the sketch.

(1) Insert the speaker plug into the receptacle of the MOTOSET chassis.

(2) Connect a lead wire from the output of the signal generator to the control grid of the first detector tube. Do not disconnect the control grid connector from the tube.

(3) Connect a wire from the ground terminal of the signal generator to some part of the MOTOSET chassis proper.

(4) Remove the F-37 oscillator tube from the Receiver socket.

(5) Place the signal generator in operation and adjust the carrier frequency output to 175 K.C. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. compensators of the MOTOSET.

(6) With the aid of a #4 Stevens Spintite Socket Wrench or its equivalent, adjust the compensators to resonance as indicated by the loudest signal from the speaker.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER COMPENSATORS

The compensators are located at the top of their respective tuning condensers and can be adjusted with the aid of a screw driver.

(1) A six (6) inch length of 1/4" brass rod with a standard tuning knob attached can be inserted in the condenser coupling for test purposes, thus eliminating the necessity of using the remote control.

(2) The wire from the output of the signal generator should be removed from the control grid of the first detector tube and attached to the antenna terminal of the MOTOSET instead.

(3) Place the F-37 oscillator tube back in its socket.

(4) Adjust the carrier frequency output of the signal generator to 1400 K.C.

(5) With the aid of the brass shaft inserted in the condenser coupling, turn the gang condensers until the 1400 K.C. signal is tuned in.

(6) Adjust each compensator in the order given (that is, 1st, 2nd, 3rd) in the sketch, for maximum signal output as indicated by the loudest signal from the speaker. Do not disturb the setting of the gang condenser during these operations. Leave the volume control on full and regulate the signal output with the attenuator of the signal generator.

ADJUSTMENT OF OSCILLATOR SERIES CONDENSER

The oscillator series condenser can be adjusted through the hole in the side of the chassis as indicated in the sketch. It will be noted that it is close to the F-37 oscillator tube.

(1) Adjust the carrier frequency output of the signal generator to 600 K.C.

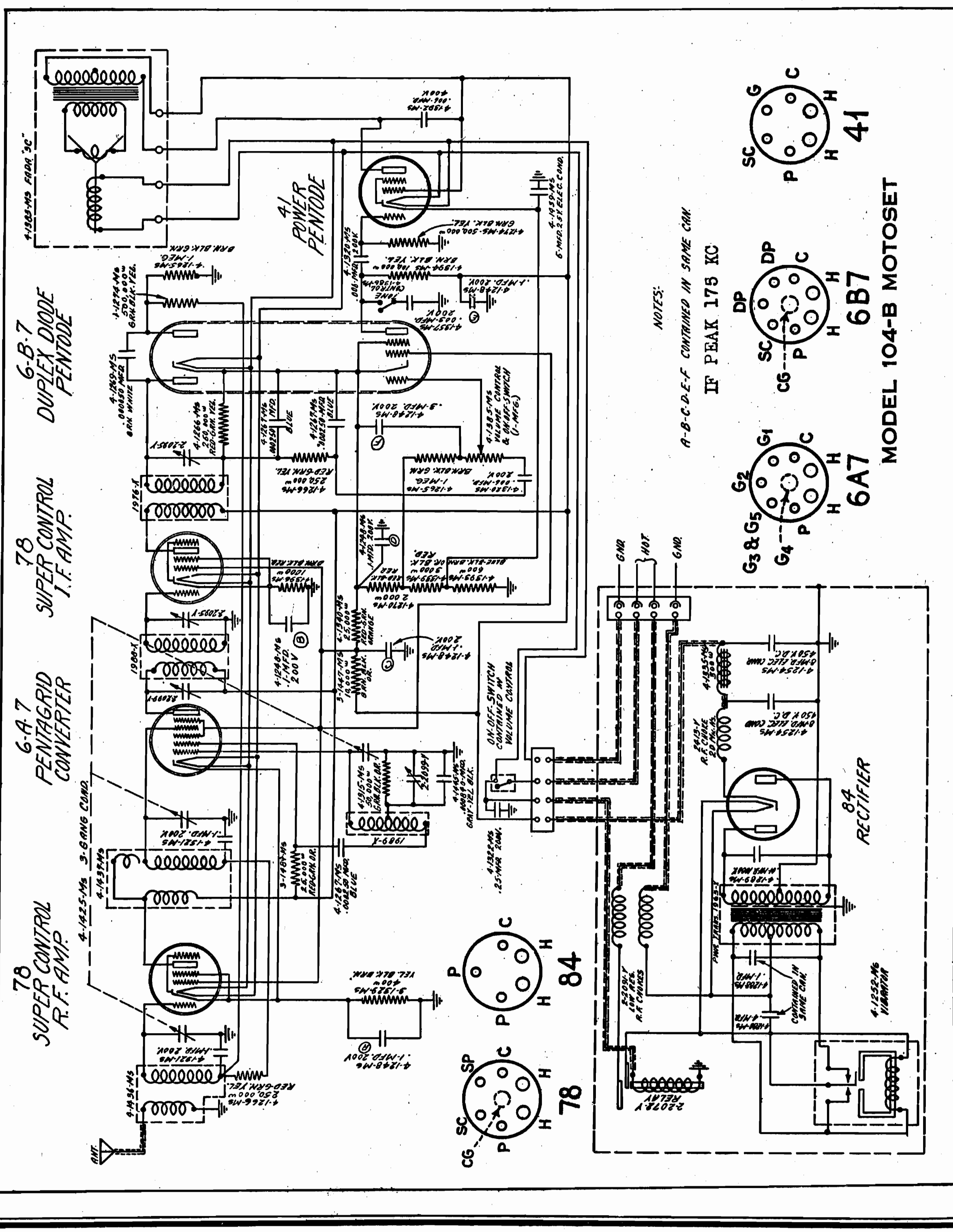
(2) With the aid of the brass rod inserted in the condenser coupling, turn the gang condensers until the 600 K.C. signal is received from the signal generator.

(3) With the aid of a #4 Stevens Spintite Socket Wrench or its equivalent, adjust the oscillator series condenser until the loudest possible signal is heard through the speaker. In order to adjust the oscillator series condenser to its maximum peak it will be necessary to "rock" the variable gang condenser back and forth to follow the strongest signal.

(4) After the oscillator series condenser is properly adjusted, set the signal generator in operation at 1400 K.C. and tune in the signal on the MOTOSET, then readjust all variable condenser compensators as outlined in the foregoing instructions.

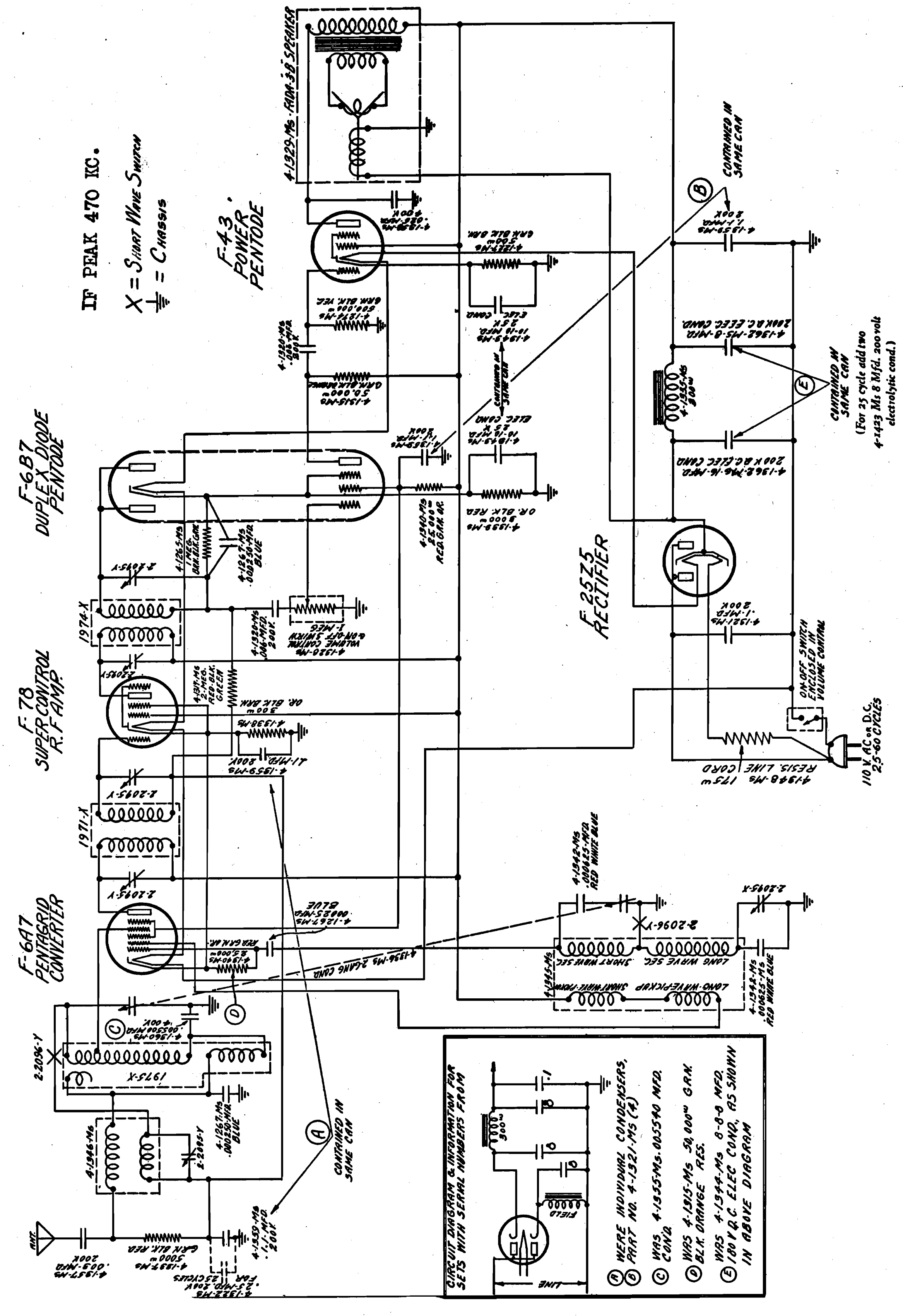
FADA RADIO & ELECTRIC CORP.

MODEL "RV" (104-B) Auto Schematic



MODEL "RN" (105,106,107)
Schematic

FADA RADIO & ELECTRIC CORP.



FADA RADIO & ELECTRIC CORP.

MODEL "RN" (105,106, 107)
Voltage
Point to Point Data

RESISTANCE CONTINUITY READINGS FOR RN CHASSIS -- MODELS 106 and 107

Tests to be made with all tubes removed from chassis and line plug disconnected from electric socket.

K-Cathode P-Plate D-Detector
Cg-Control grid Sg-Screen grid

TEST FROM	CORRECT-OHM	IF INCORRECT CHECK:-
Osc. grid to K	25,000.	(1) 4-1340-Ms
Osc. P to IF Sg	7.6	(2) 4-1345-Ms
1 D P to IF Sg	45.	(3) 1971-X, 2-2095-Y
IF Cg to antenna series cond. (.003 mfd.) wave-band switch set to 75-200 meters	68.	(4) 1975-X, 4-1346-Ms 4-1336-Ms, 4-1360-Ms See (3) & (17)
IF K to chassis	300.	(5) 4-1338-Ms, 4-1359-Ms
IF P to Sg	45.	(6) 1974-X, 2-2095-Y
2 D K to chassis	3,000.	(7) 4-1339-Ms, 4-1343-Ms
2 D P to K	1,000,000.	(8) 1974-X, 4-1267-Ms 4-1320-Ms, 4-1265-Ms
1 AF Sg to chassis	29,300.	(9) 4-1340-Ms, 4-1359-Ms 4-1362-Ms, 4-1335-Ms speaker field
1 AF P to chassis	54,300.	(10) See (9) 4-1320-Ms 4-1315-Ms
Pwr. Cg to chassis	500,000.	(11) 4-1274-Ms, 4-1320-Ms
Pwr. Sg to chassis	4,300.	(12) See (9)
Pwr. Sg to P	368.	(13) 4-1358-Ms, Input trans. primary
Pwr. K to chassis	500.	(14) 4-1227-Ms, 4-1343-Ms
1 AF Cg to chassis (Vc.max.)	1,000,000.	(15) 4-1328-Ms, 4-1320-Ms
Rect. K to Pwr. Sg	300.	(16) 4-1335-Ms
IF Cg to 1 AF K	3,000,000.	(17) 4-1359-Ms, 1971-X 4-1267-Ms, 4-1265-Ms 4-1317-Ms

GENERAL DATA

It may develop that the serviceman becomes confronted with a "no signal" condition which cannot be tracked down with the aid of the continuity data supplied above, in which case he should check the antenna wire and antenna series condenser for open circuit.

Failure of the tubes to light may be due to one or more open heaters in the tubes, a defective on-off switch (4-1328-Ms), or defective line cord assembly (4-1348-Ms).

NOTE:- Readings taken on series of Receivers which had cathodes of 25-Z-5 rectifier tube connected together.

CONTINUITY AND VOLTAGE READINGS ON RN RECEIVER - MODELS 106 and 107

Line voltage 110 volts A.C. - Input watts 41
(Voltage readings will be slightly lower on D.C. line)

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CONTROL GRID VOLTS	SCREEN GRID VOLTS
F-6-A-7	1st Det. Osc.	98	1.2	4.2	49*
F-78	Int. Freq.	98	8.7	4.2	92
F-6-B-7	2nd Det. A.F. amp.	34*	1.1	3.1	48*
F-43	Pwr. Pentode	82	20.	12.	90
F-25-Z-5	Rectifier		60. total		

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

Bias readings are to be taken across each respective bias resistor.

VOLTAGES ACROSS ELECTROLYTIC CONDENSER (4-1362-Ms)

1st section	2nd section
116 volts	102 volts

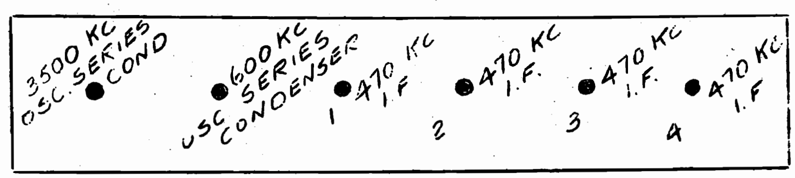
Voltage across 4,000 ohm speaker field (3-B) 120 volts
" " 300 " A.F. choke (4-1335-Ms) 8 "

D.C. RESISTANCE VALUES

		PRIMARY	SECONDARY
4-1346-Ms	Antenna Coil	8.7 ohms	2.5 ohms
4-1345-Ms	Oscillator Coil	7.6 "	7.5 "
1975-X	R.F. coil	4.3 "	8.0 "
1971-X	I.F. transformer	45.0 "	45.0 "
1974-X	I.F. transformer	45.0 "	45.0 "
4-1335-Ms	A.F. choke	300.0 "	---- "
3-B	Speaker field	4,000.0 "	---- "
3-B	Speaker input transformer	368.3 "	.31 "

NOTE:- Above voltage readings taken on series of Receivers which had cathodes of 25-Z-5 rectifier tube connected together.

TOP EDGE

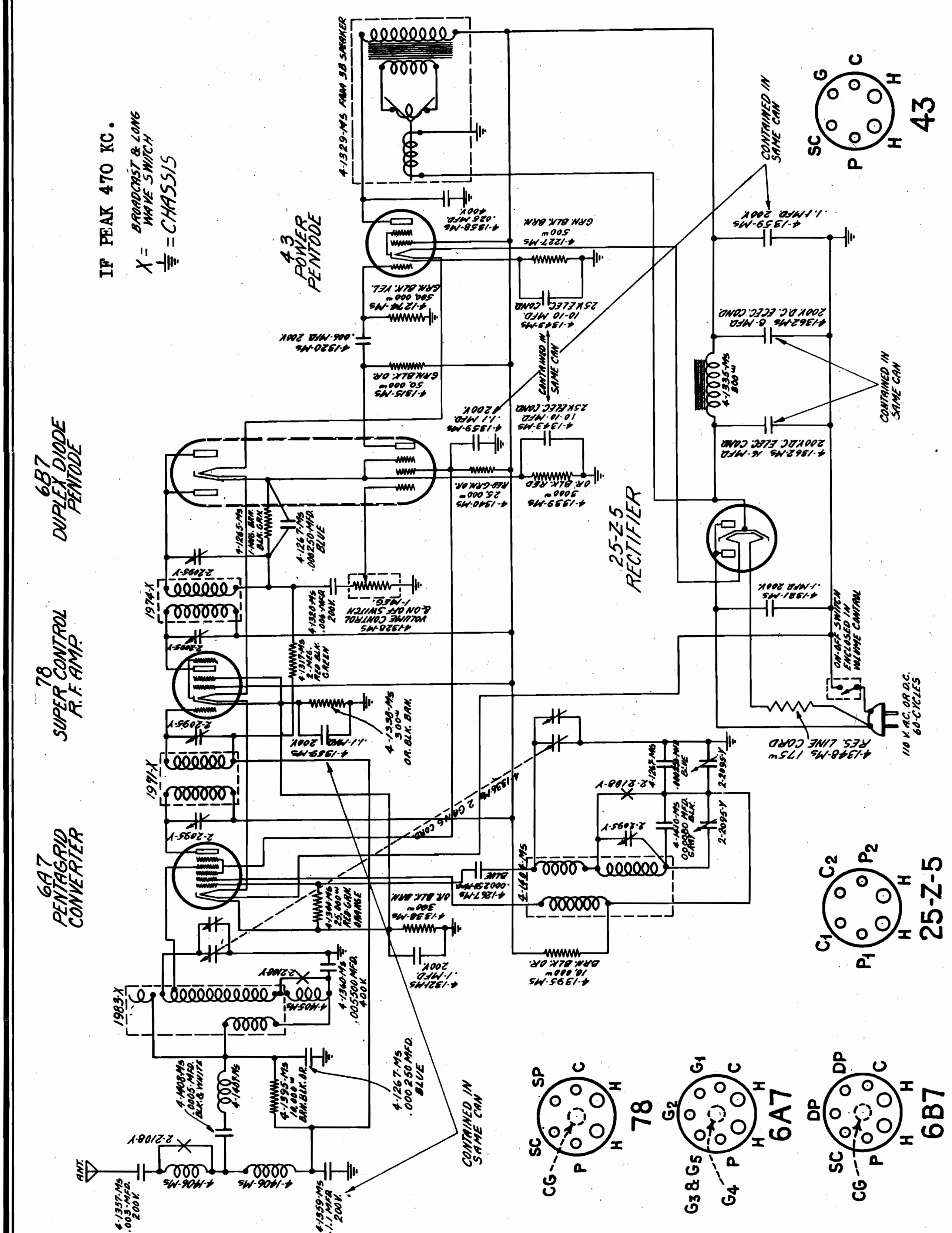


BOTTOM EDGE

REAR VIEW OF CHASSIS

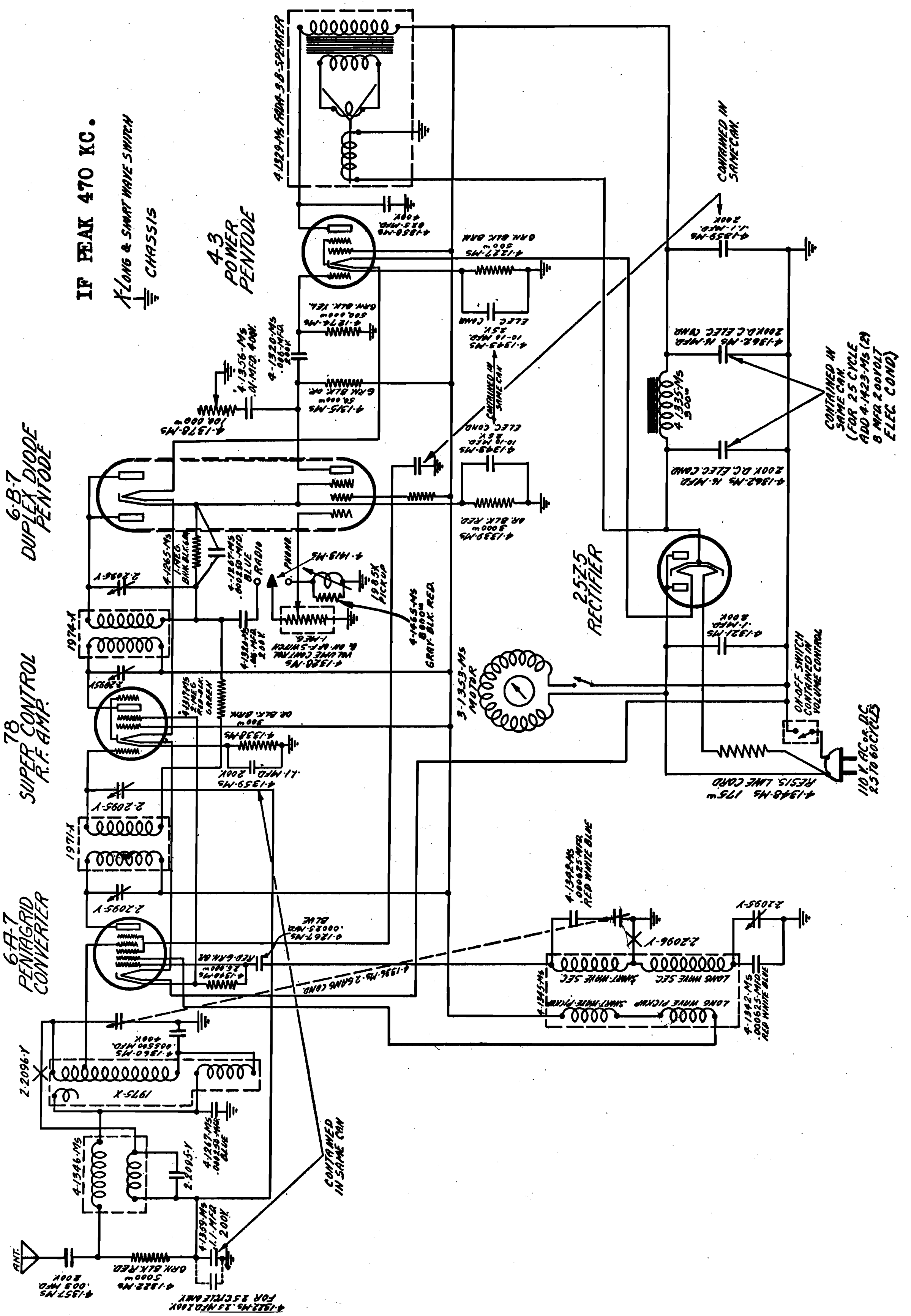
MODEL "RY"
Schematic

FADA RADIO & ELECTRIC CORP.



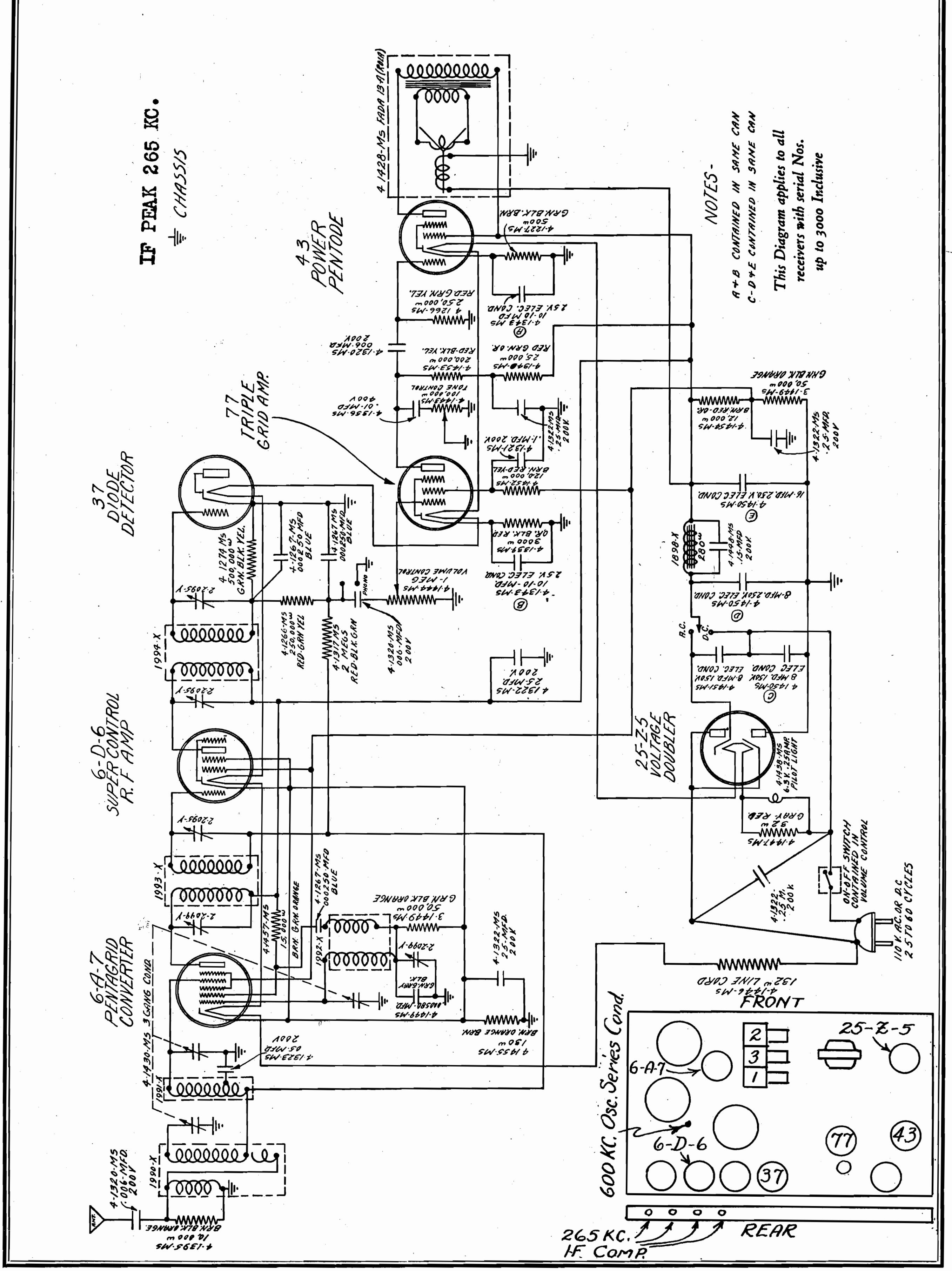
FADA RADIO & ELECTRIC CORP.

MODEL "RS" (112)
Schematic



MODEL "RU" (131,132)
Schematic

FADA RADIO & ELECTRIC CORP.



FADA RADIO & ELECTRIC CORP.

MODEL "RU" (131,132)
Alignment notes

COMPENSATING INSTRUCTIONS FOR RU RECEIVER MODELS 131 and 132 -- AC-DC

In order to accurately adjust the various trimmer condensers of the Receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier frequency which can be accurately attenuated at 265 KC., 600 KC. and 1400 KC.

This Receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the Receiver to its maximum position, to insure accuracy in alignment. To control the signal output of the Receiver it will be necessary to use the attenuator of the signal generator.

It will be found advantageous to change the capacity in the output circuit of the signal generator from the conventional 250 mmfd. to 100 mmfd. in order to insure correct alignment of the antenna compensator.

ADJUSTMENT OF THE I.F. CONDENSERS

The four (4) I.F. condensers are located at the rear of the chassis as shown in the sketch.

(1) Turn rotor plates of variable condensers all the way out to avoid possible interference from broadcast stations.

(2) Disconnect the outside antenna system from the Receiver antenna.

(3) Connect a wire from the dummy antenna system of the signal generator to the control grid of the 6-A-7 tube. Do not disconnect the control grid connector from the tube, nor remove the tube shield.

(4) A thermo-galvanometer (Weston type 425) with a 2½ volt pilot light in series can be placed directly across the speaker voice coil as a means of obtaining visual readings of the Receiver output in addition to the audible signal.

(5) Place the signal generator in operation and adjust the carrier frequency output to 265 KC. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the Receiver.

(6) With the aid of a #4 Stevens Spintite Socket Wrench (or equivalent) adjust the four (4) I.F. condensers in the order given in the sketch.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER COMPENSATORS

The compensators are located at the top of their respective tuning condensers, and can be adjusted with the aid of a screw driver.

(1) Remove the lead wire which is connected to both the control grid of the 6-A-7 tube and the output of the signal generator.

(2) Connect the Receiver antenna wire directly to the output terminal of the signal generator.

(3) Adjust the carrier frequency output of the signal generator to 1400 KC.

(4) Tune the Receiver to pick-up the 1400 KC. signal from the signal generator.

(5) Adjust the compensators to maximum signal as indicated by the greatest swing of the needle on the output meter or galvanometer. The oscillator condenser compensator (marked #1 in sketch) should be adjusted first.

ADJUSTMENT OF OSCILLATOR SERIES CONDENSER

The oscillator series condenser is located in the top of the chassis (see sketch) and can be adjusted with the aid of a #4 Stevens Spintite Socket Wrench (or equivalent).

(1) Adjust the carrier frequency output of the signal generator to 600 KC.

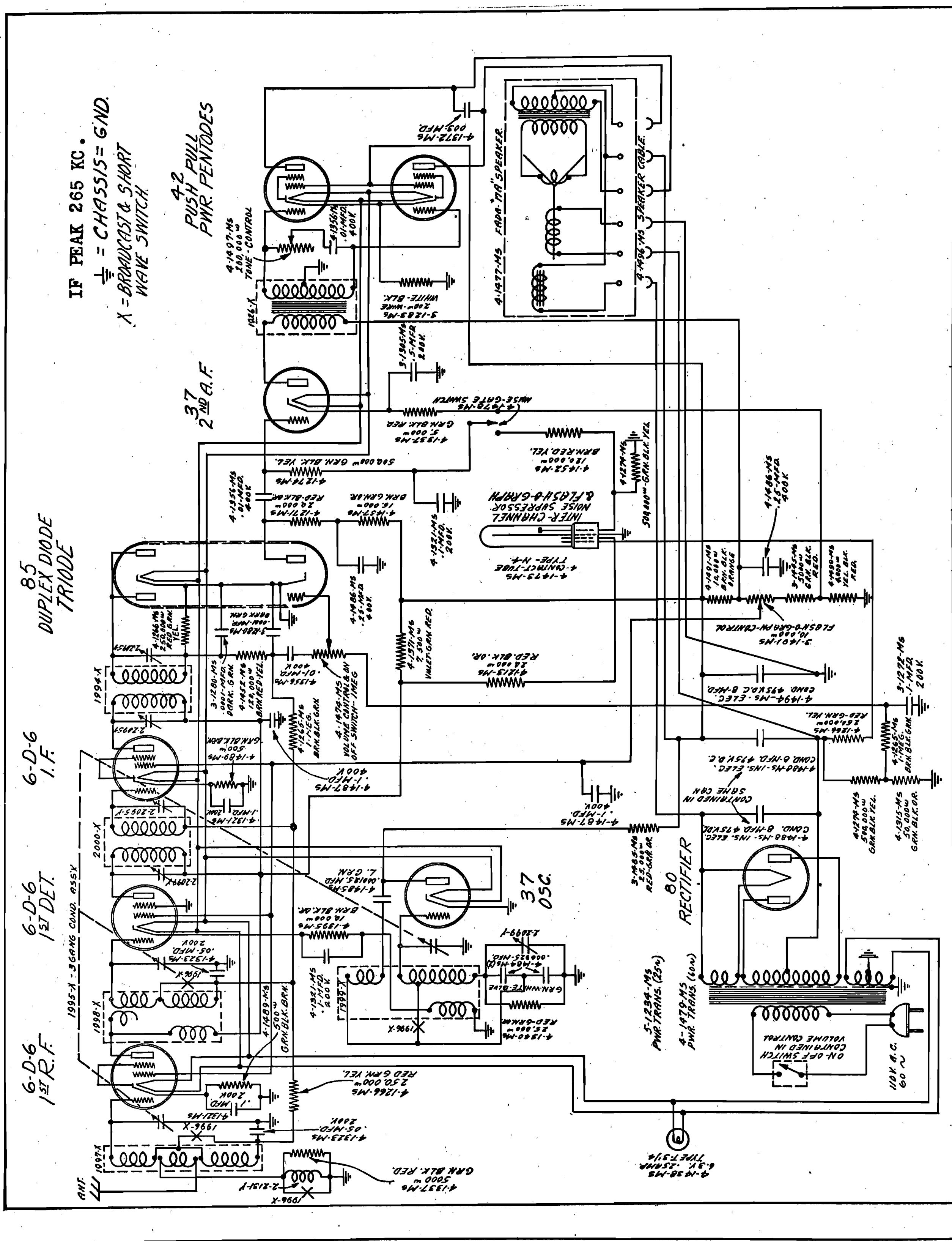
(2) Tune the Receiver to 600 KC. signal of the signal generator.

(3) With the aid of a #4 Stevens Spintite Socket Wrench (or equivalent) adjust the oscillator series condenser until a maximum signal output is indicated by the greatest swing of the needle on the galvanometer or output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

(4) After the oscillator series condenser is properly adjusted, tune the Receiver to 1400 KC., set the signal generator to 1400 KC., and then readjust the three variable condenser compensators as outlined in the foregoing instructions.

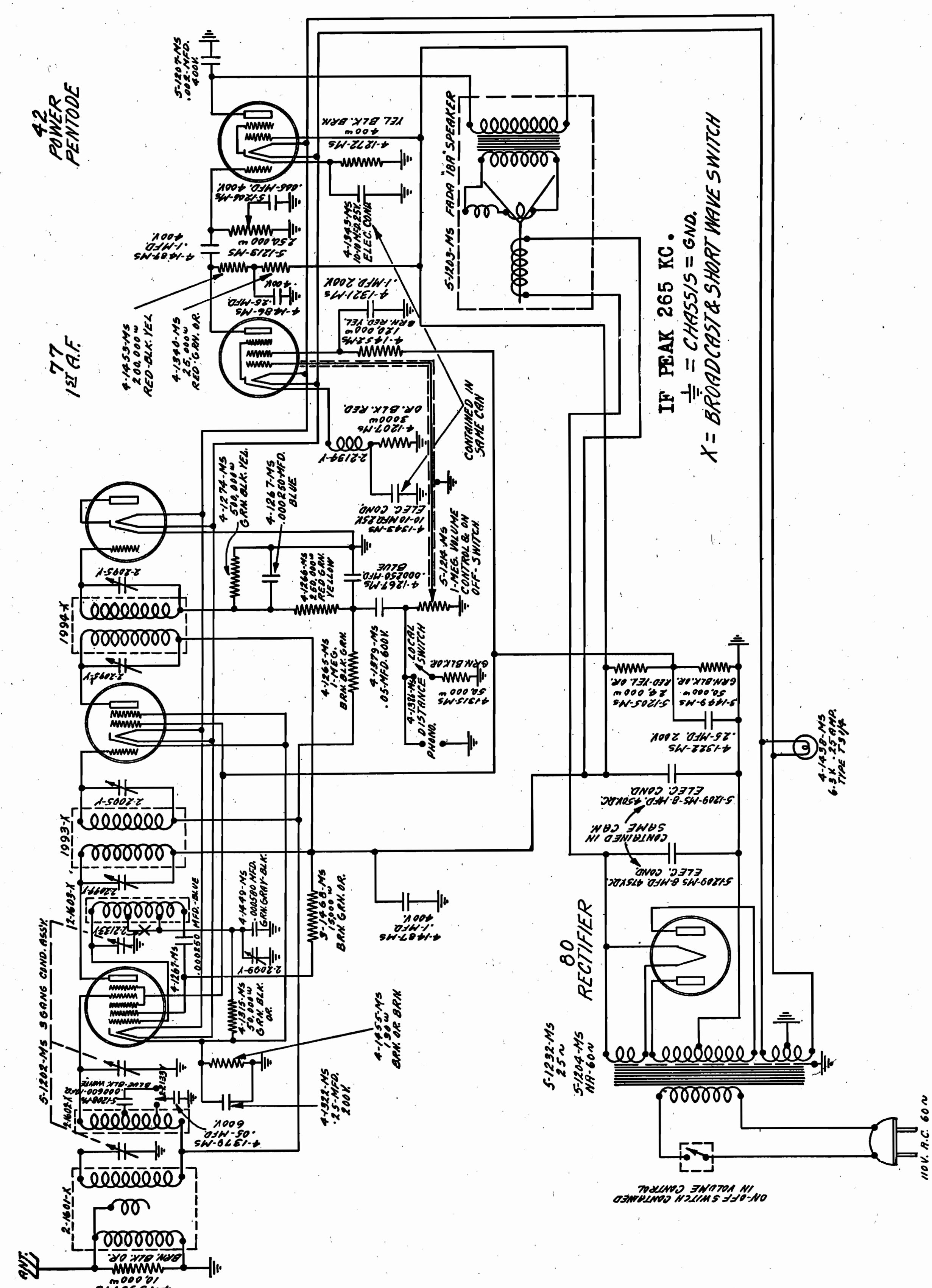
FADA RADIO & ELECTRIC CORP.

MODEL "RW" (133,134,135
Schematic 78-10,79-10,
97-10



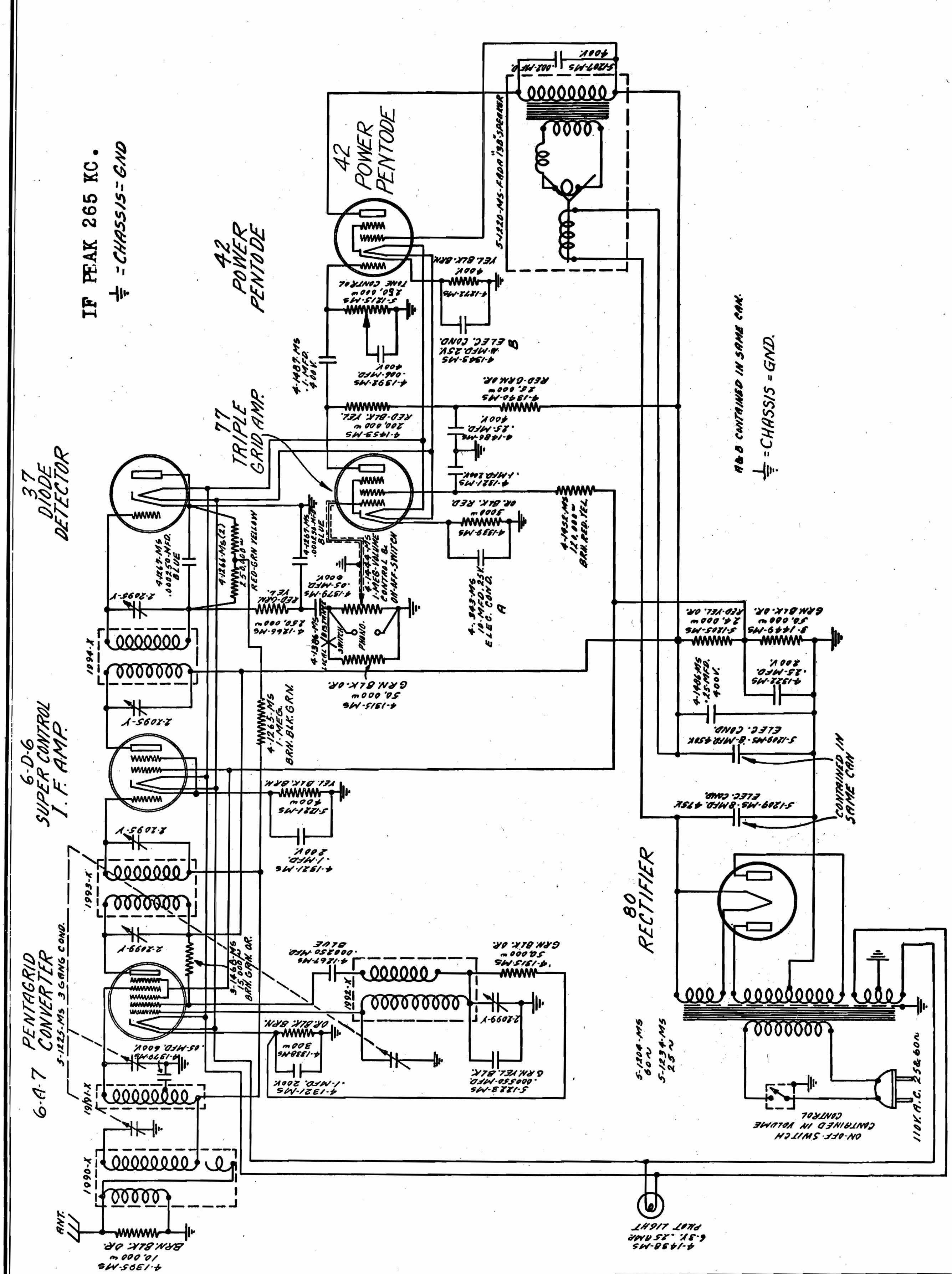
FADA RADIO & ELECTRIC CORP.

MODEL "NA" (141
Schematic



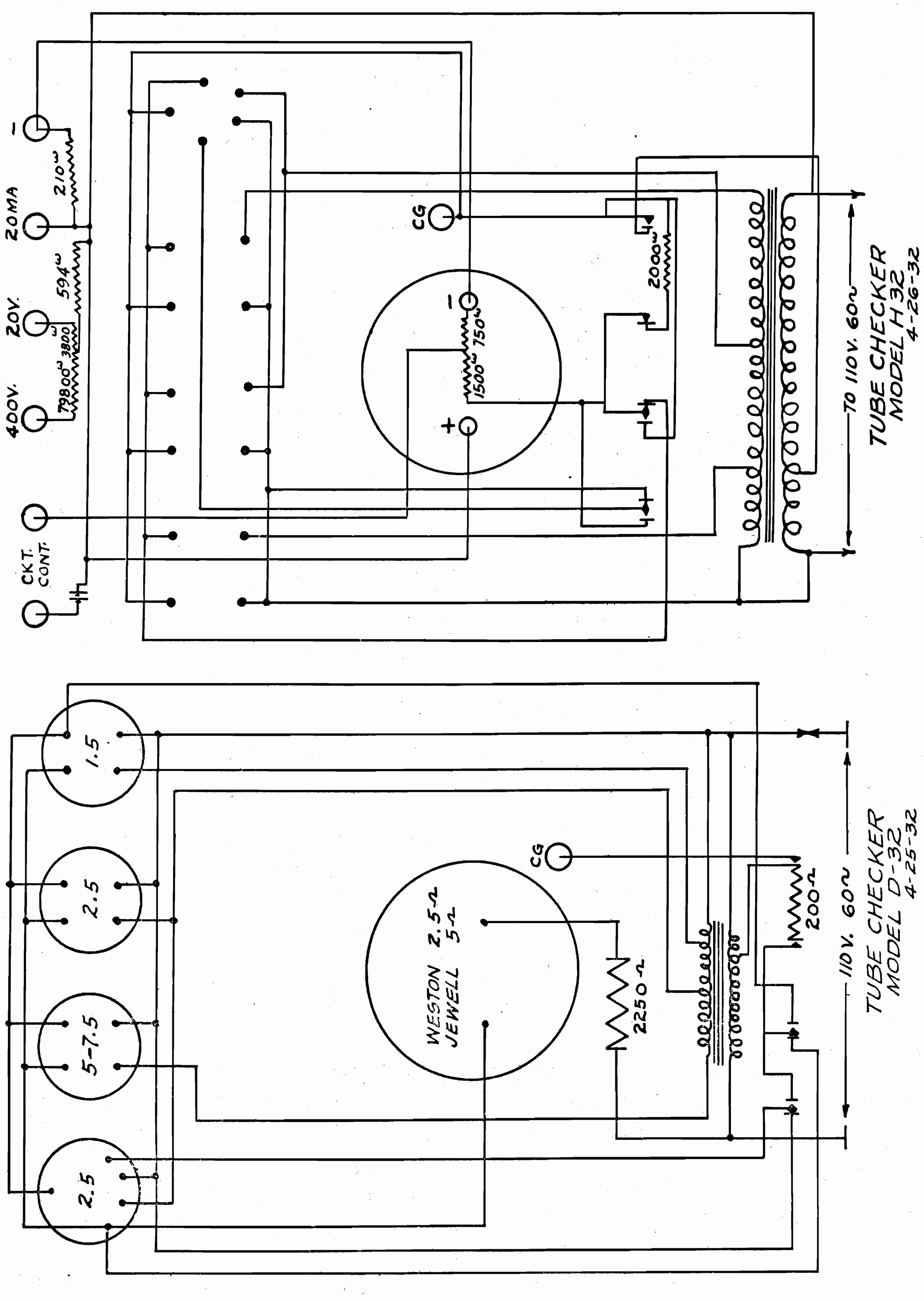
MODEL "NE" (151,152)
Schematic

FADA RADIO & ELECTRIC CORP.



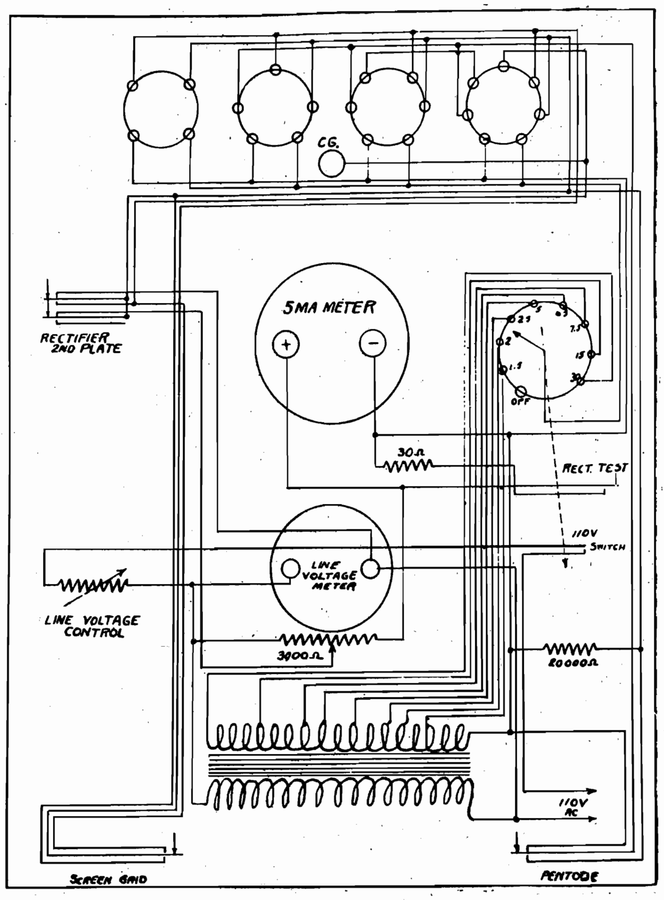
MODEL D-32
MODEL H-32

FRANKLIN RADIO CORP.

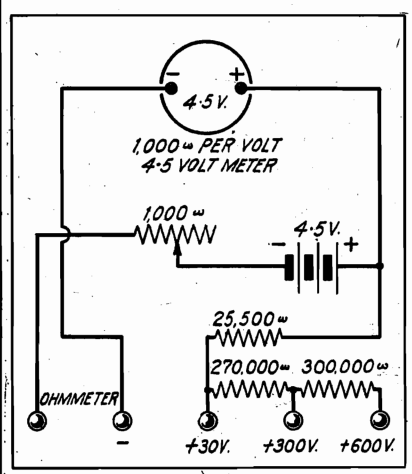


MODEL 1
MODEL H-33
MODEL "English Reading Tube Checker"

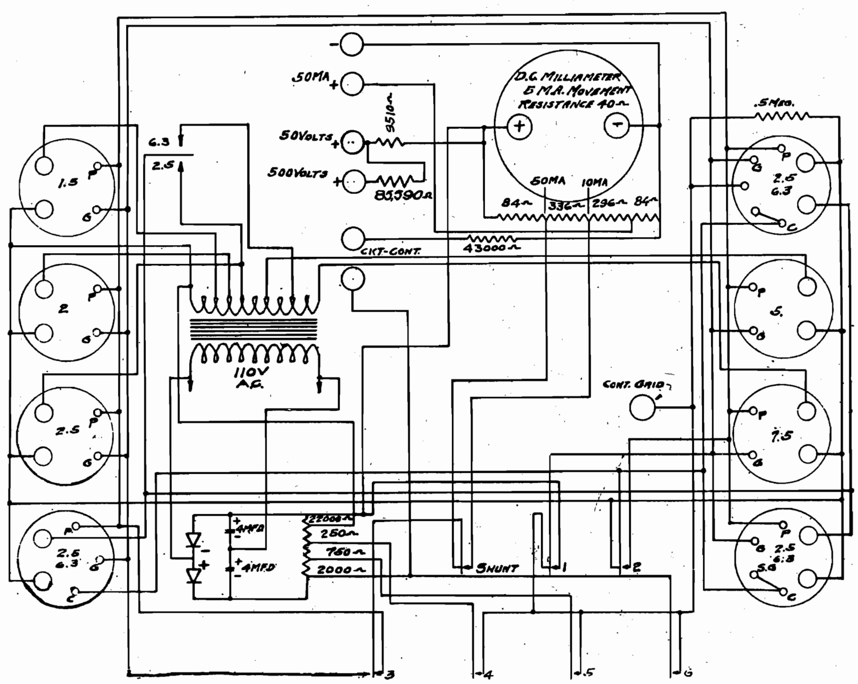
FRANKLIN RADIO CORP.



Here is the complete schematic diagram of the Franklin English Reading Tube Checker. The 3000-ohm variable resistance just below the line-voltage meter operates in conjunction with the knob and scale on the front panel of the instrument. There is a particular adjustment for each type of tube



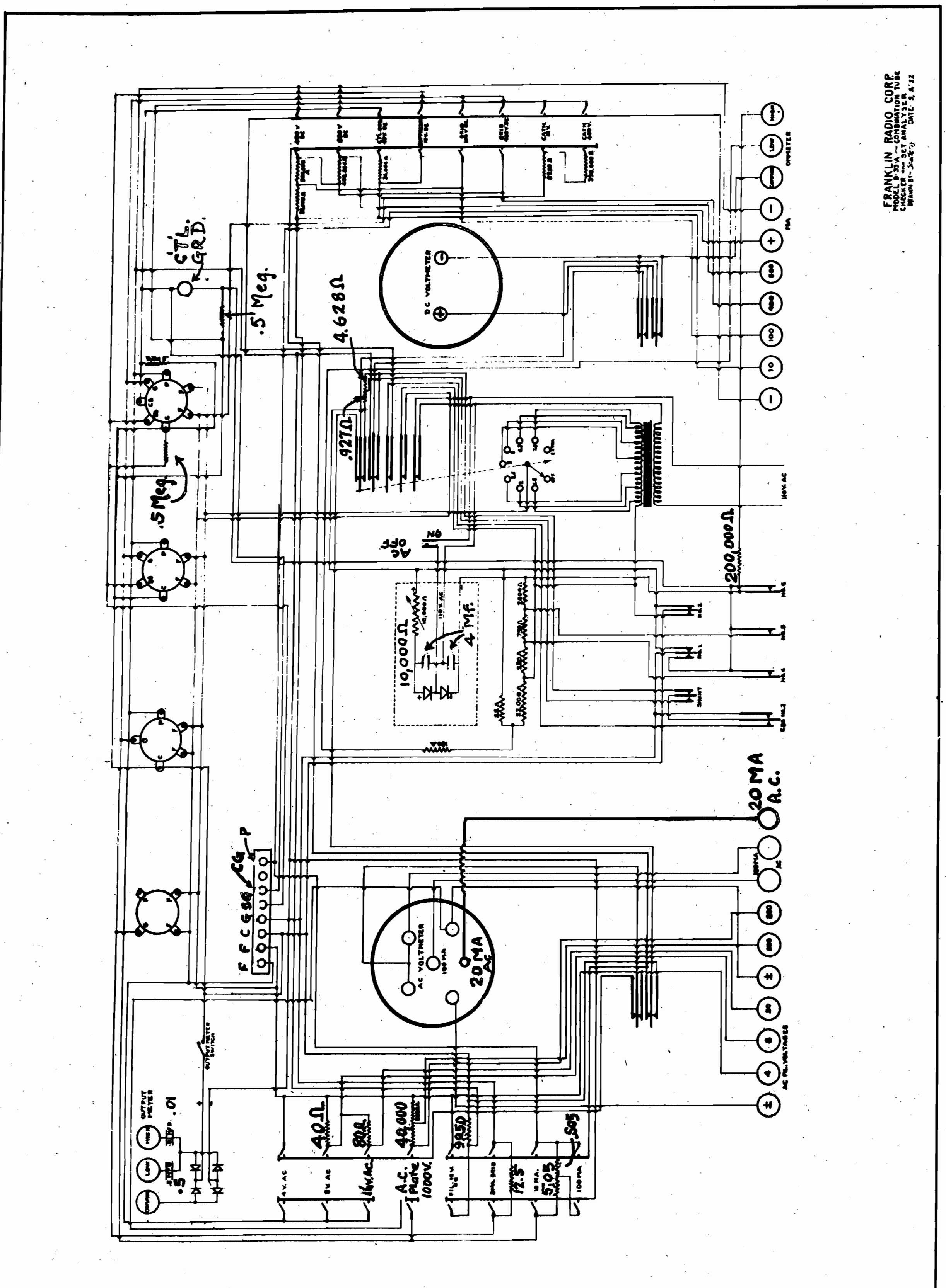
Complete schematic diagram of the Franklin Model 1 Volt-Ohmmeter



Above: Schematic diagram of the Franklin H-33 Tube Checker. Note that provisions are made for resistance and continuity testing. Below: Panel view of the Franklin D-33 Tube Checker

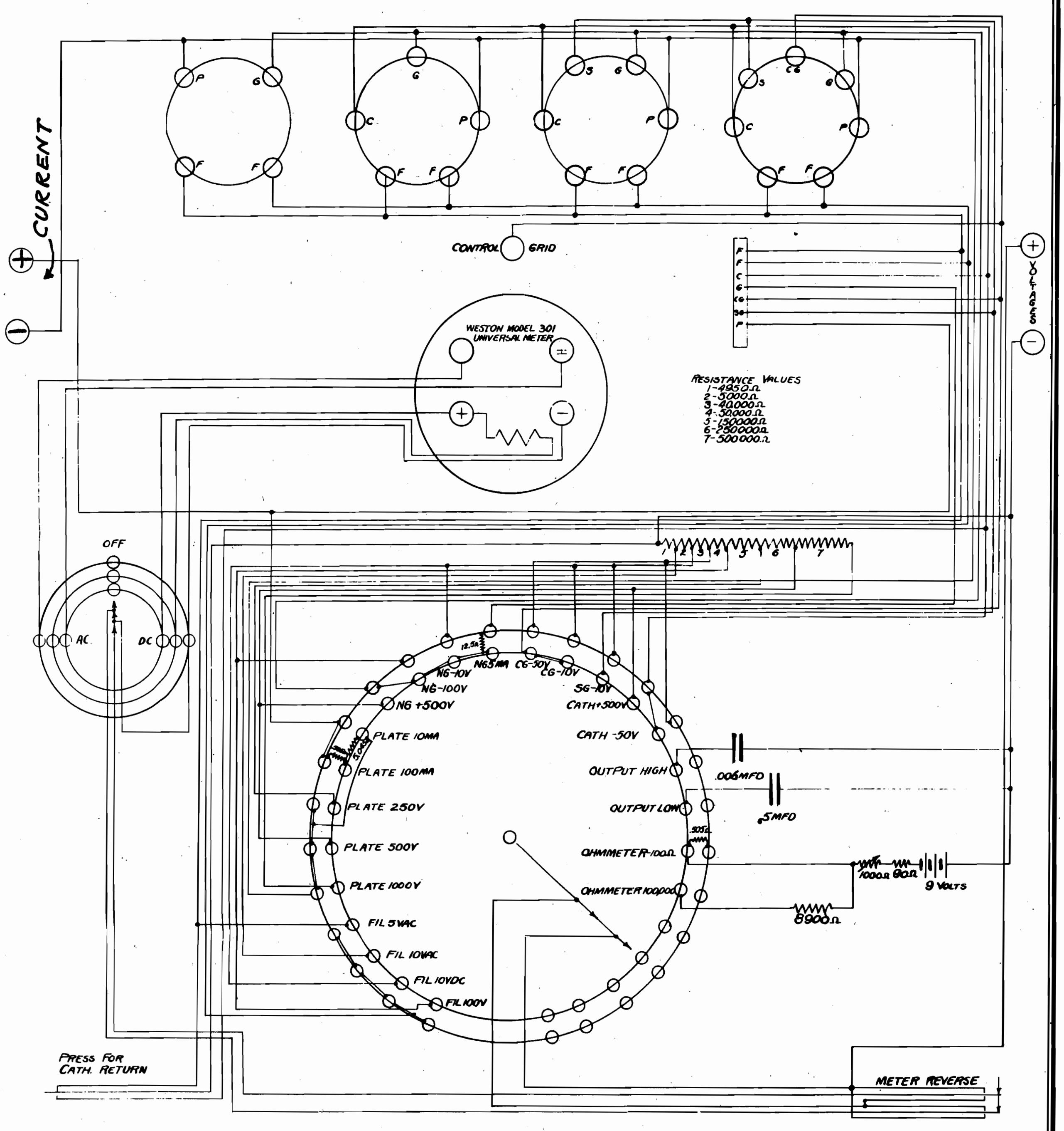
MODEL 33-A
Checker-Analyzer
Schematic

FRANKLIN RADIO CORP.



MODEL 33-B Analyzer Schematic

FRANKLIN RADIO CORP.

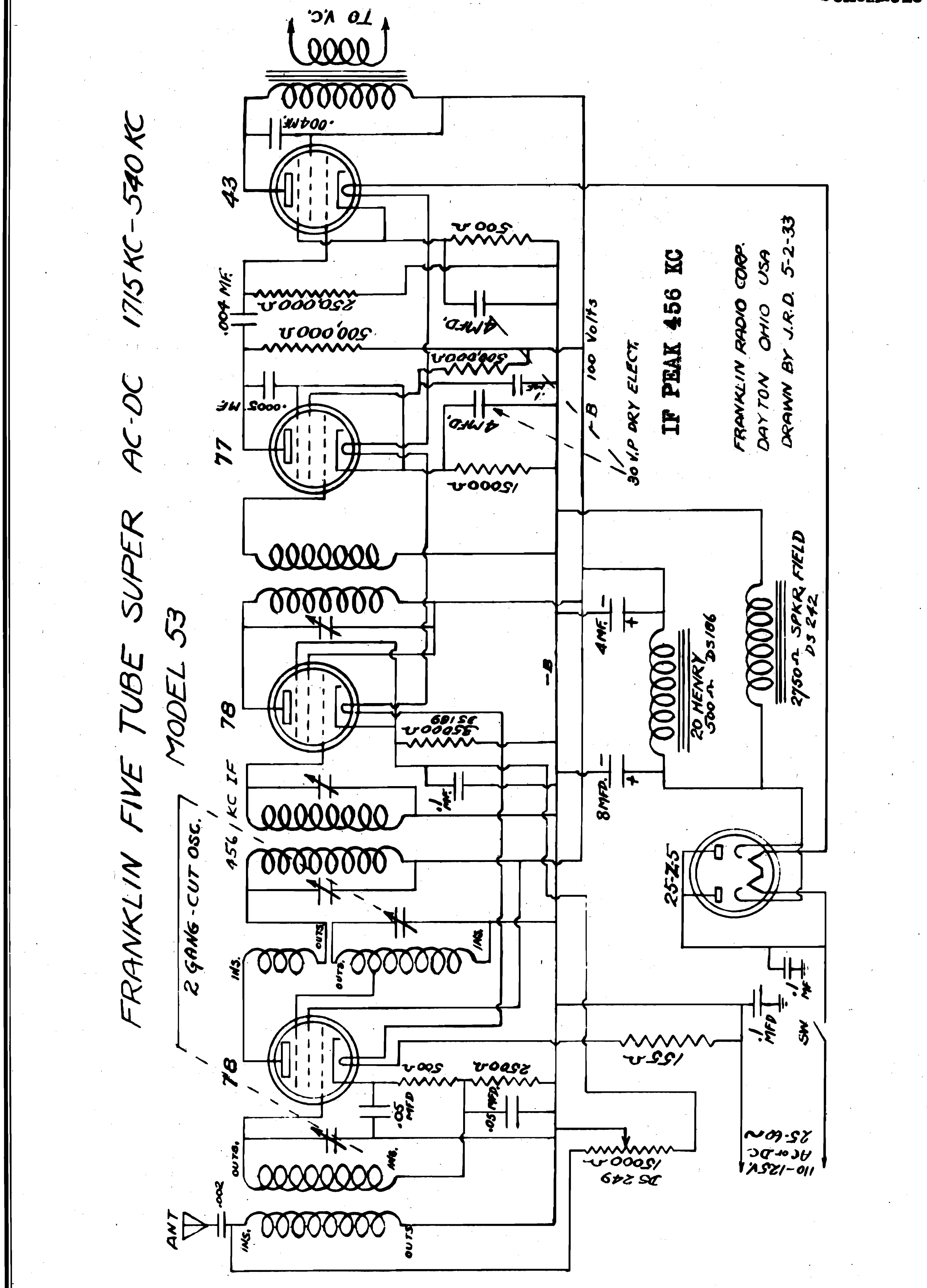


RADIO SET ANNALYZER MODEL 33-B
MANUFACTURED BY
THE FRANKLIN RADIO CORPORATION
DAYTON, OHIO USA

BRADEN 10-21-32

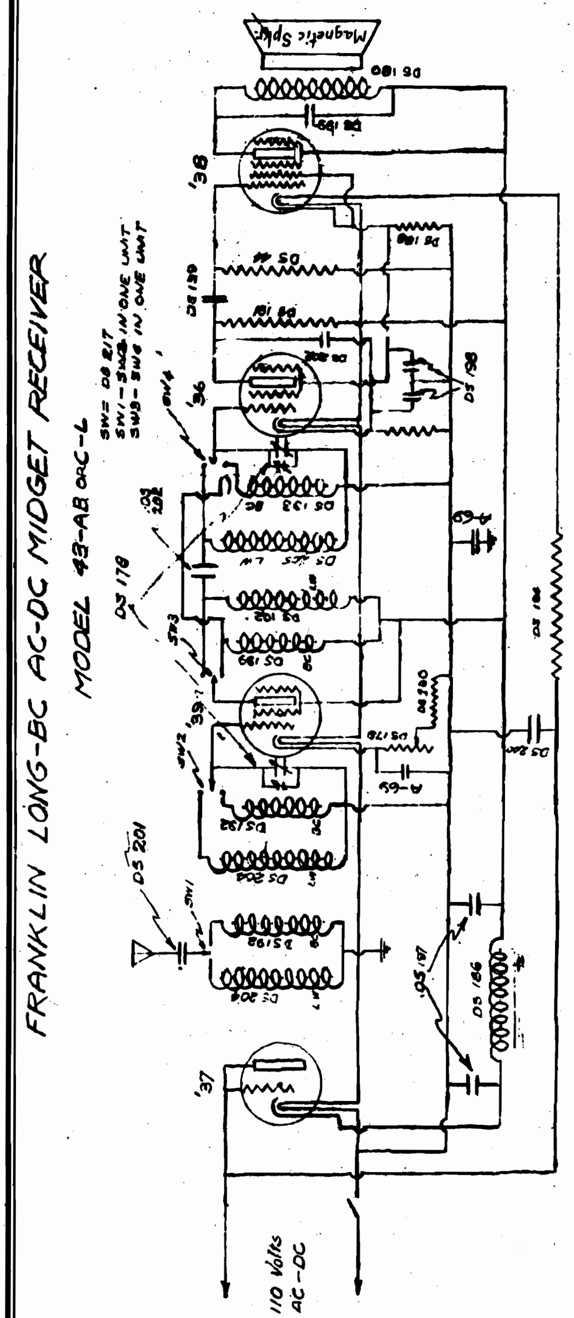
MODEL 53
Schematic

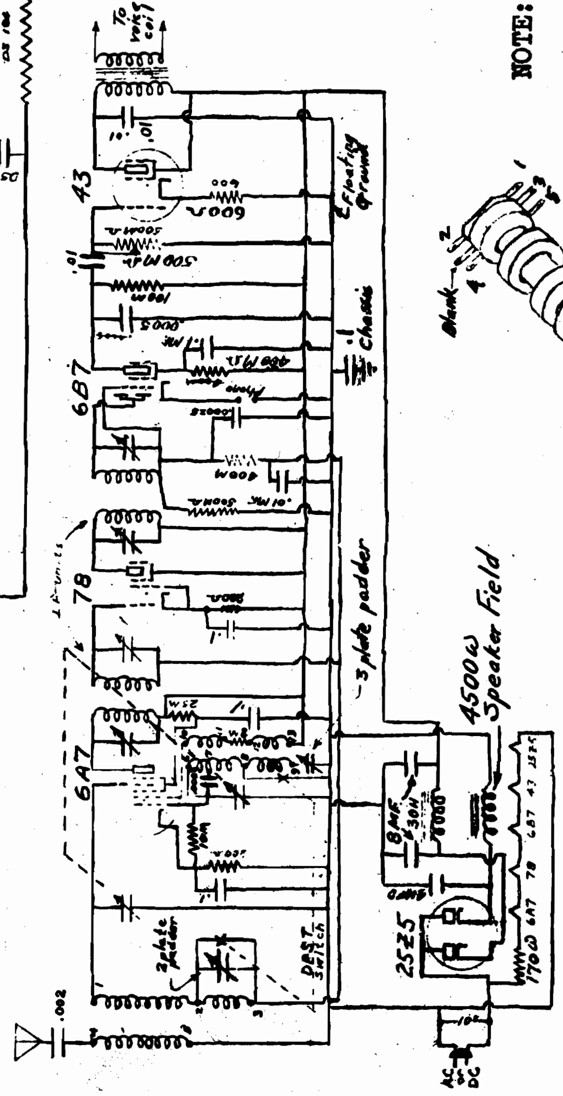
FRANKLIN RADIO CORP.

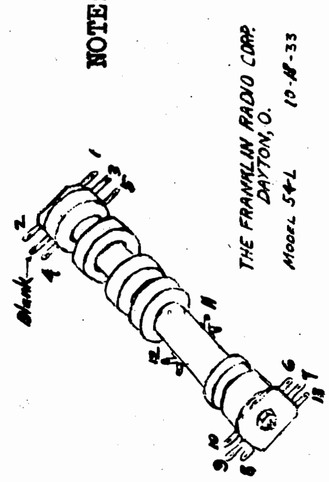


MODEL 43 AB or C-L
Schematic
MODEL 54-L
Schematic

FRANKLIN RADIO CORP.





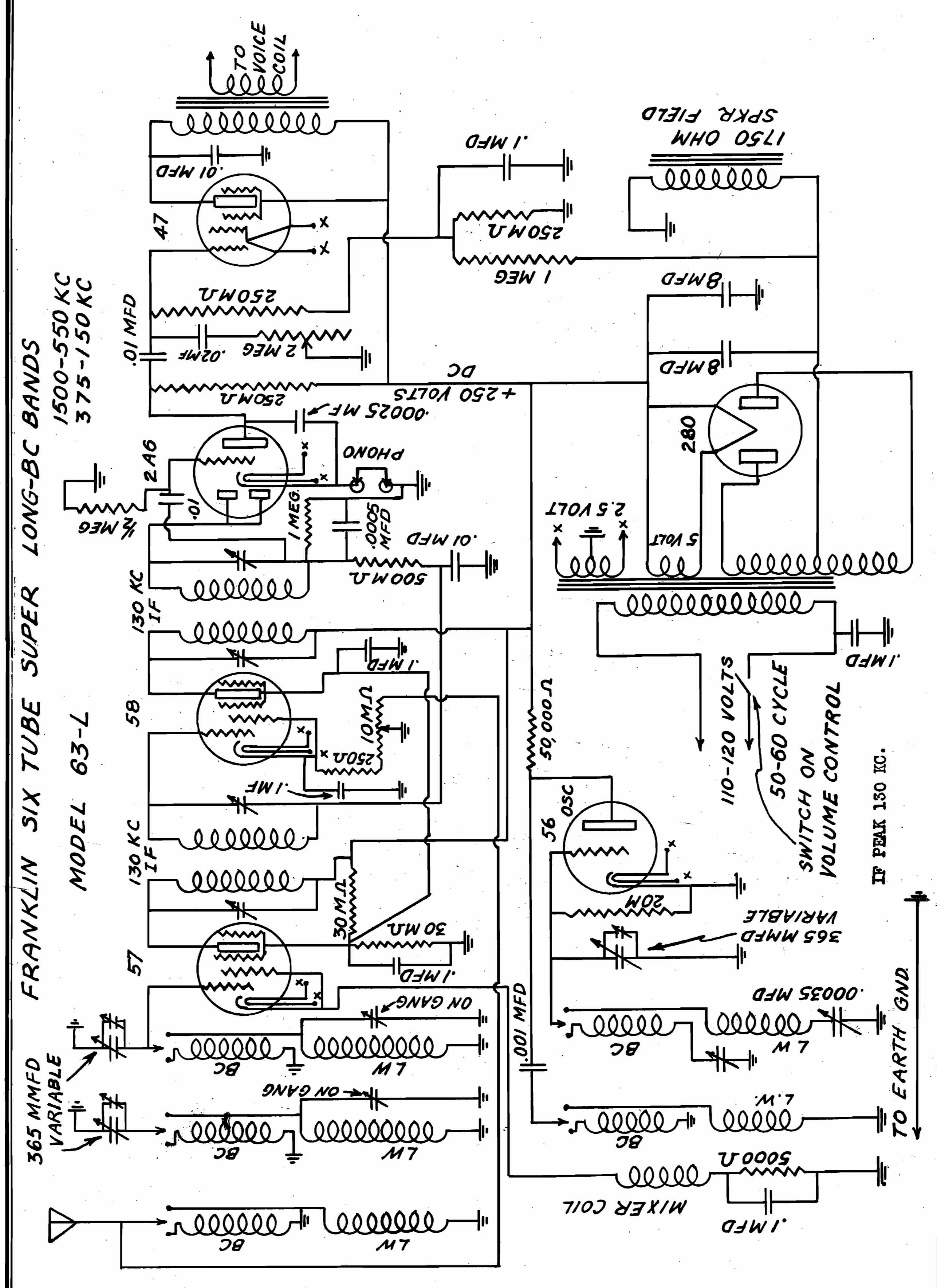


IF PEAK 456 KC.

NOTE: Model 54-L covers a waveband of 200-560 and 1000-2000 meters. Model 54 covers a waveband of 200-560 meters and does not contain the padding condensers or coils 2-3 and 8-9.

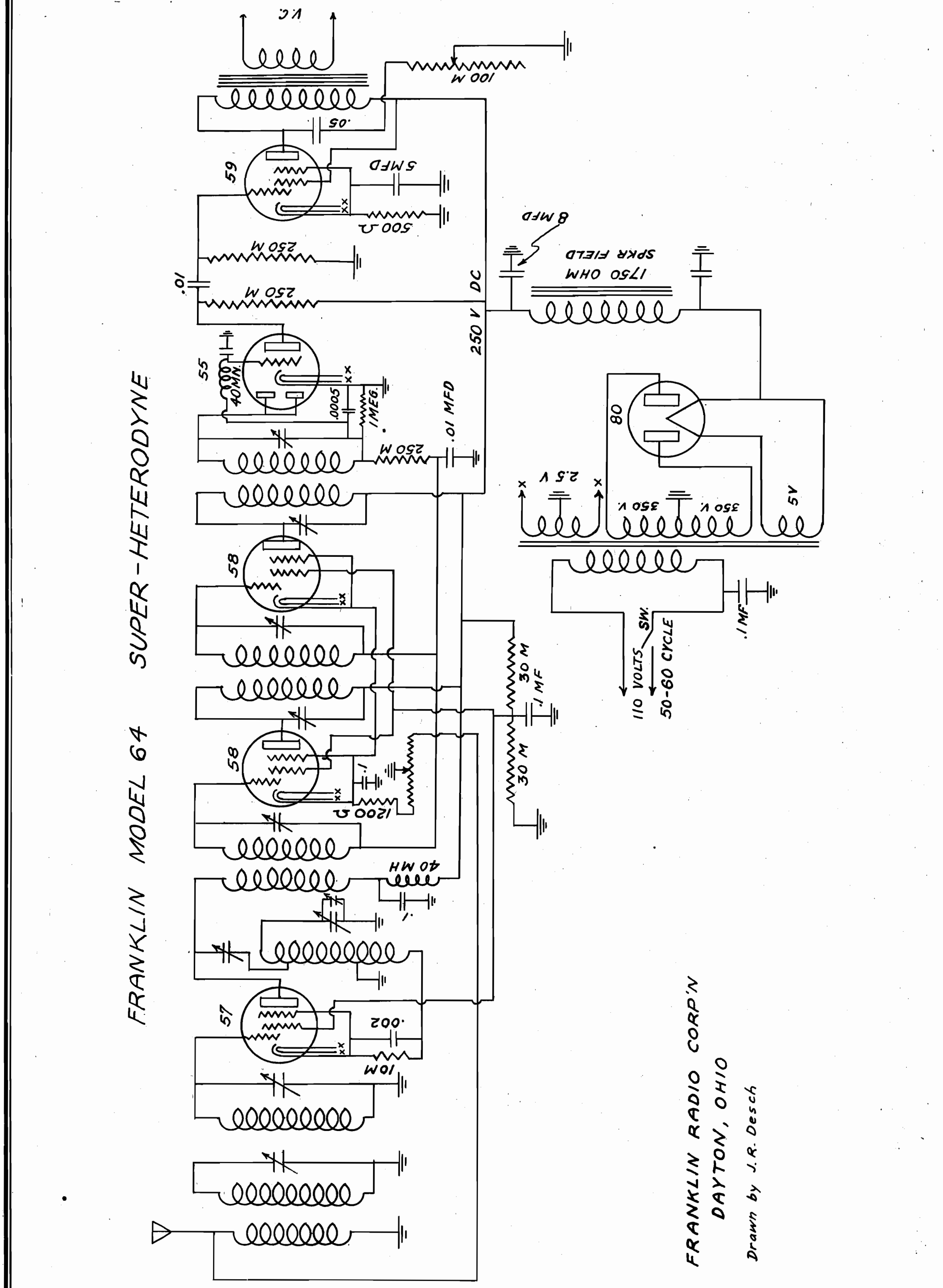
MODEL 63-L
Schematic

FRANKLIN RADIO CORP.



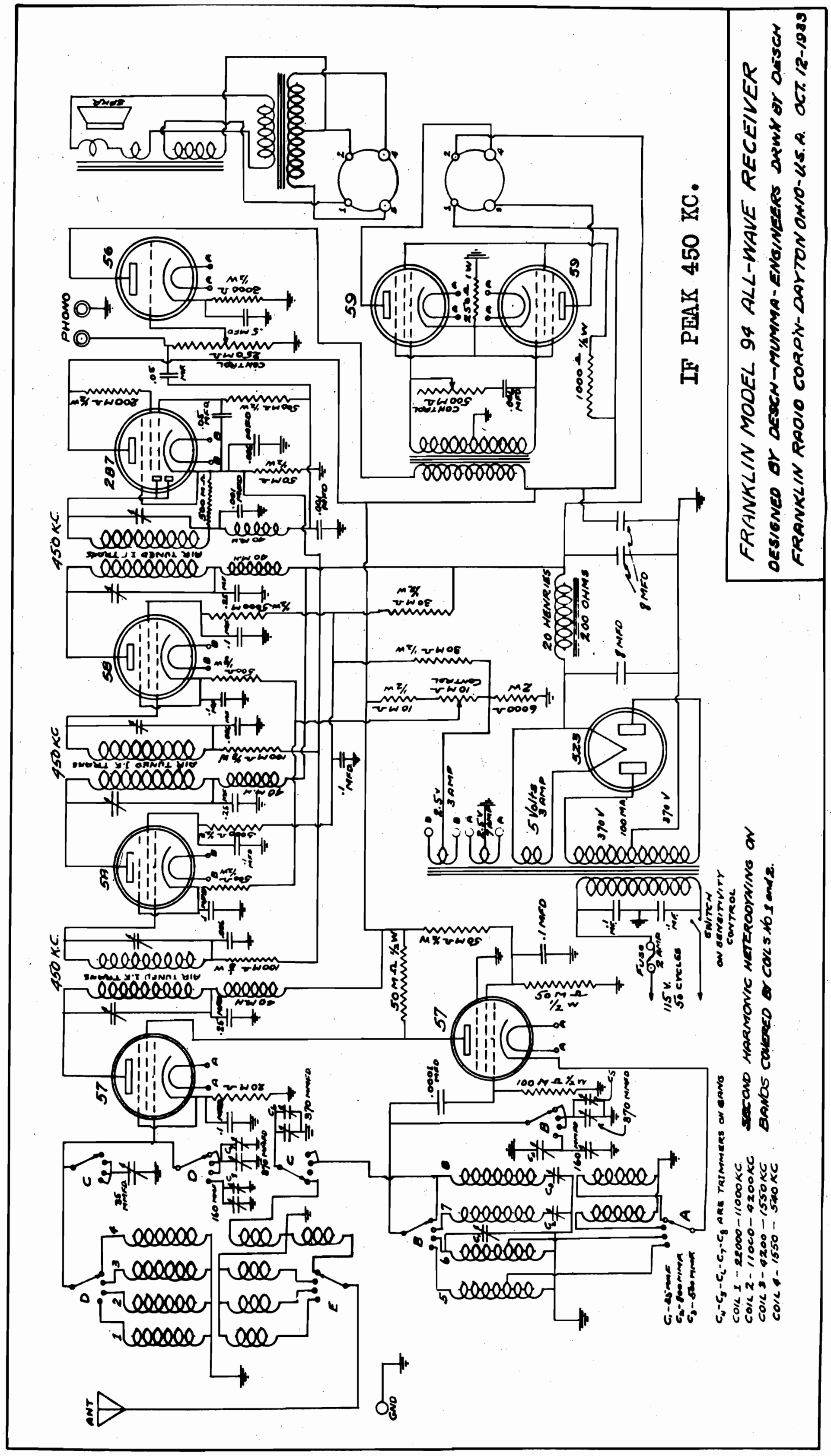
MODEL 64
Schematic

FRANKLIN RADIO CORP.



MODEL 94
Schematic

FRANKLIN RADIO CORP.



MODEL 94
Notes

FRANKLIN RADIO CORP.

ALIGNMENT OF FRANKLIN MODEL 94 ALL-WAVE RADIO RECEIVER

Receiver should be circuit tested, and any high or low voltages should be corrected. This will reasonably insure the correct use of the resistors. However a visual inspection of the resistors and condensers should be made so that the alignment operations which are to follow will not be frustrated. A table of voltages which are to appear at the various terminals is appended. When circuit testing is completed, proceed as follows:

(1) Set up signal of exactly 450 Kc, 30% modulation, 400-1000 cycles, oscillator to be very stable.

(2) Either apply high resistance voltmeter (AC) across plates of 59 tubes, or insert 15 MA DC Meter in the common cathode lead of the I.F. tubes (in lead to rotor of sensitivity control),or if tuning meter is used simply observe tuning meter variations.

(3) Apply I.F. Osc. signal lead to grid of #2 I.F. tube.

(4) Adjust trimmers on #3 I.F. Transformer for max. signal and max. reading on sensitivity indicators.

(5) Apply I.F. Osc. signal lead to grid #1 I.F. tube and repeat operation #4 adjusting trimmers on #2 I.F. Transformer.

(6) Apply I.F. Osc. signal lead to antenna post and adjust trimmers on #1 I.F. Transformer and observe as in #4.

NOTE: Speaker is never disconnected so that audible signal is always present to aid peaking operations.

(7) Set wave band selector switch on B.C. Band (Farthermost clockwise position).

(8) Set tuning dial at 1500 Kc., checking that dial reads 100 when gang condenser is completely closed.

(9) Apply 1500 Kc. Osc. signal (30% mod. 400-1000 cycles) to ant-gnd posts.

(10) Adjust trimmer on osc. section of gang condenser (section #1) for maximum signal.

(11) Adjust trimmer on first detector grid coil (Trimmer on section #4 of gang) for max. signal.

(12) Adjust trimmer on B.C. Preselector circuit (Trimmer on section #3 of gang) for max. signal.

(13) Set tuning dial on 570 Kc. and adjust osc. signal to exactly 570 Kc.

(14) Adjust series osc. padding condenser for max. signal (condenser C-3 on circuit diagram) (this condenser is located beneath chassis but is adjusted from top of chassis thru hole in chassis. It is the trimmer located nearest to front of set).

(15) Check peaking at 1500 Kc and make minor adjustment if necessary repeating operation 10.

FRANKLIN RADIO CORP.

MODEL 94
Notes

(16) Check alignment at about 800 Kc to see if osc. and 1st det. are tracking.

(16-A) If when checking alignment at 800 Kc. and it is found that 1st det. does not track with oscillator, necessitating an increase of trimmer capacity on section 4 (also then on pre-selector section #3) then proceed as follows:

(a) Turn dial to 1500 Kc.
(b) Loose set screw on dial and turn dial on the condenser shaft about 1 or 2 degrees counterclockwise and re-lock with set screw.
(c) Then proceed with operations #8, #9, #10, #11, #12, #13, #14, #15 and #16.

Alignment should now be better at 800 Kc. or perfect. If not, repeat operation set down in #16-A. Of course if in 16-A it was found that trimmer condenser had to be reduced in capacity on section #4 (also then section #3) then reverse the direction in which the dial was slipped on the gang cond. shaft (move it clockwise in this case). Repeat the same operations as outlined in 16-A-c above.

(17) Move band selector switch to next higher freq. band (1550-4200 Kc.) counterclockwise one notch.

NOTE: AFTER COMPLETION OF OPERATION 16-A DO NOT TOUCH TRIMMERS ON SECTIONS #1, #3, and #4 OF GANG CONDENSER.

(18) Set up 4000 Kc. Osc. signal and connect leads from oscillator to ant-gnd posts on set. Turn dial of set to max. signal (will be close to 0 or 1500 Kc. on tuning dial).

(19) Adjust 1st det air-trimmer (located on control panel, second knob from left) for max. signal. If max. signal is secured at either extremity of this control travel, then it will be necessary to make coil adjustments.

(a) If this trimmer peaked or attempted to peak at its max. capacity then 1st det coil lacks sufficient inductance (too few turns or coil diameter incorrect).
(b) If this trimmer peaked or attempted to peak at its min. capacity (farthermost counterclockwise position) then 1st det. coil has too high an inductance (too many turns). Remove 1 turn and repeat operation 19 until this first detector trimmer peaks the 4000 Kc. signal at 1/4 of its total travel from its farthermost counterclockwise position.

(20) Set up oscillator signal at 1550 Kc. and turn tuning dial to farthermost counterclockwise position (max. capacity).

(21) Adjust series osc. trimmer (C-2) (second from front of set, located beneath chassis but adjustable from top of chassis) until max. signal is secured. 1st det. air-trimmer should peak this 1550 Kc. signal somewhere in its range.

NOTE: If in operation #18, tuning dial did not pick up 4000 Kc. signal at 10 or nearly 10 on dial, then oscillator coil for this band is in error having a wrong number of turns. This difficulty must be corrected before proceeding with operations #19, #20 and #21.

(22) Move band selector switch to next high freq. band (CC one notch) (11000 to 4200 Kc.).

MODEL 94
Notes

FRANKLIN RADIO CORP.

(23) Set up oscillator signal at 11000 Kc. Move tuning dial and gang condenser to farthermost clockwise position (min. cap.). Adjust cap. C-1 for max. signal. (For operations which are to follow set must be standing on LEFT END. Condenser (C-1) is mounted on rectangular coil and switch shield beneath chassis.

(24) If 11000 Kc. signal cannot be tuned in with gang condenser at min. cap. even after adjusting C-1, then osc. coil inductance is either high or low. If inductance is low then 11000 Kc. signal can be tuned in by increasing gang cond. cap. (rotating gang). If osc. inductance is too high then this fact can be determined by varying Oscillator signal to some lower frequency until signal is audible in receiver.
If this osc. coil inductance is incorrect, examine the coil for correct turns and diameter. Inductance can be lowered by sliding last turn or last 2 turns away from rest of turns of coil.

(25) Check at what position the 1st det. air-trimmer peaks this 11000 Kc. signal. Max. signal should be obtained at about 1/4 total travel of this condenser from its min. cap. setting. If this does not occur, then first det. coil has wrong inductance value and must be adjusted by sliding end turn or turns. Sliding turns outward away from main body of coil decreases inductance.

(26) Set up 4200 Kc. Osc. signal and move tuning dial and gang to Max. Cap. Signal should be heard close to 100 on dial. Check 1st det. trimmer to see that it peaks this 4200 Kc. signal within its tuning range.

(27) If in checking in #26 the 4200 Kc. signal cannot be heard (receiver does not tune to 4200 Kc. signal) then the osc. coil inductance for this band is too low and consequently C-1 in operation 24 was adjusted to too high a capacity so that the facts in the case are that the osc. ind. is too low and distributed cap. too high. Therefore add 1 or ½ turn to osc. coil and repeat operations 23, 24, 25 and 26.

(28) Check 1st det. trimmer at several points in this band to see that it peaks properly.

(29) Move band selector switch to next higher freq. band (22000 Kc. to 11000 Kc.) (farthermost CC position).

(30) Set up osc. signal at 21800 Kc. and move gang condenser to min. capacity setting. Adjust trimmer on #2 section of gang cond. until signal is heard.

(31) If signal cannot be tuned in then osc. coil has too high an inductance and must be corrected and same procedure followed as in #24 except that in this case higher frequencies are used.

(32) Peak 1st det. trimmer at 21800 Kc. signal. (Be sure that #5 trimmer is set at min. cap.). Should peak at 1/4 trimmer condenser travel from min. setting. If this does not occur then ind. of 1st det. coil is incorrect and must be corrected. If air-trimmer closes more than 1/4 its travel the inductance of 1st det. coil is too low and conversely too high if trimmer cond. does not close 1/4 its travel. Adjust ind. of coil by sliding turns inward or outward.

FRANKLIN RADIO CORP.

MODEL 94
Voltage, Notes

(33) Set up osc. signal at 11000 Kc. and move tuning dial and cond. toward max. cap. At 100 or close thereto the signal should be heard. Be sure the signal received is the fundamental of osc. First det. trimmer should peak within its tuning range. No trouble should be encountered here unless some high distributed or lumped capacity has been introduced in 1st det. circuit which should not be present. This must be corrected if 1st det. trimmer does not peak correctly at 11000 Kc. signal freq.

(34) If signal is received at a much lower (5 to 10 div.) than 100 on dial then osc. coil inductance is too high and should be reduced. Then repeat operations #30, #31, #32, #33 which will give a high capacity setting on trimmer on section #2 of gang.

(35) Check air-trimmer of 1st det. in various settings of gang between high and low freq. extremes to see that trimmer peaks at these points.

NOTE: When performing operations set down for the two high frequency bands no violent or sudden changes should occur in 1st detector air-trimmer settings. If such is experienced then operator has peaked trimmer on frequency on wrong side of oscillator.

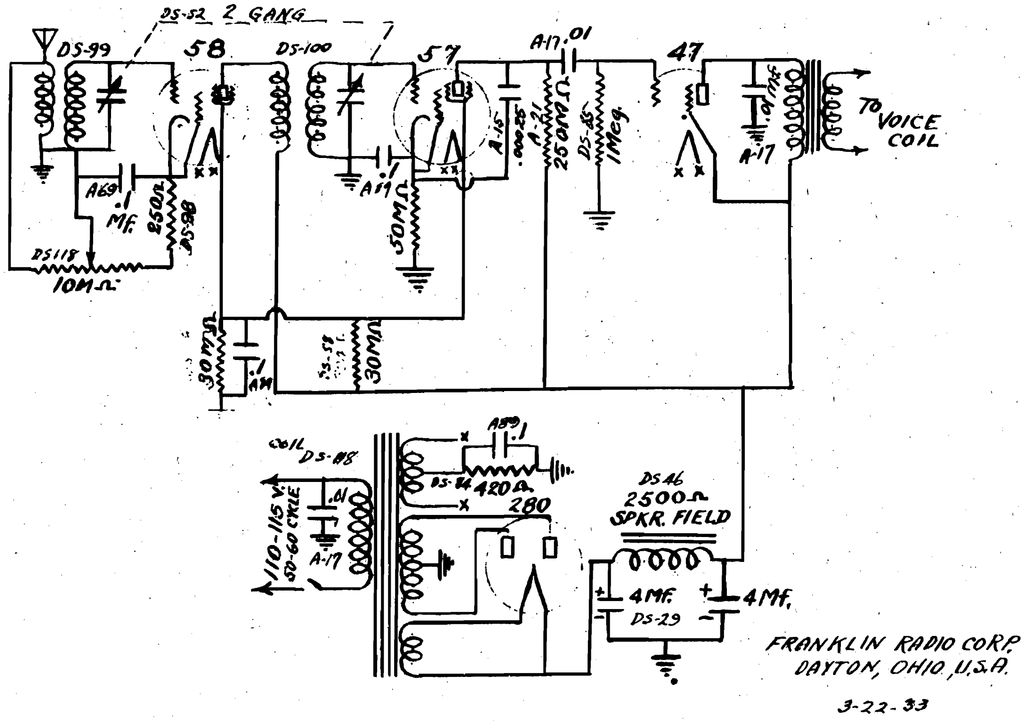
CIRCUIT TEST VOLTAGES FOR MODEL 94 ALL-WAVE

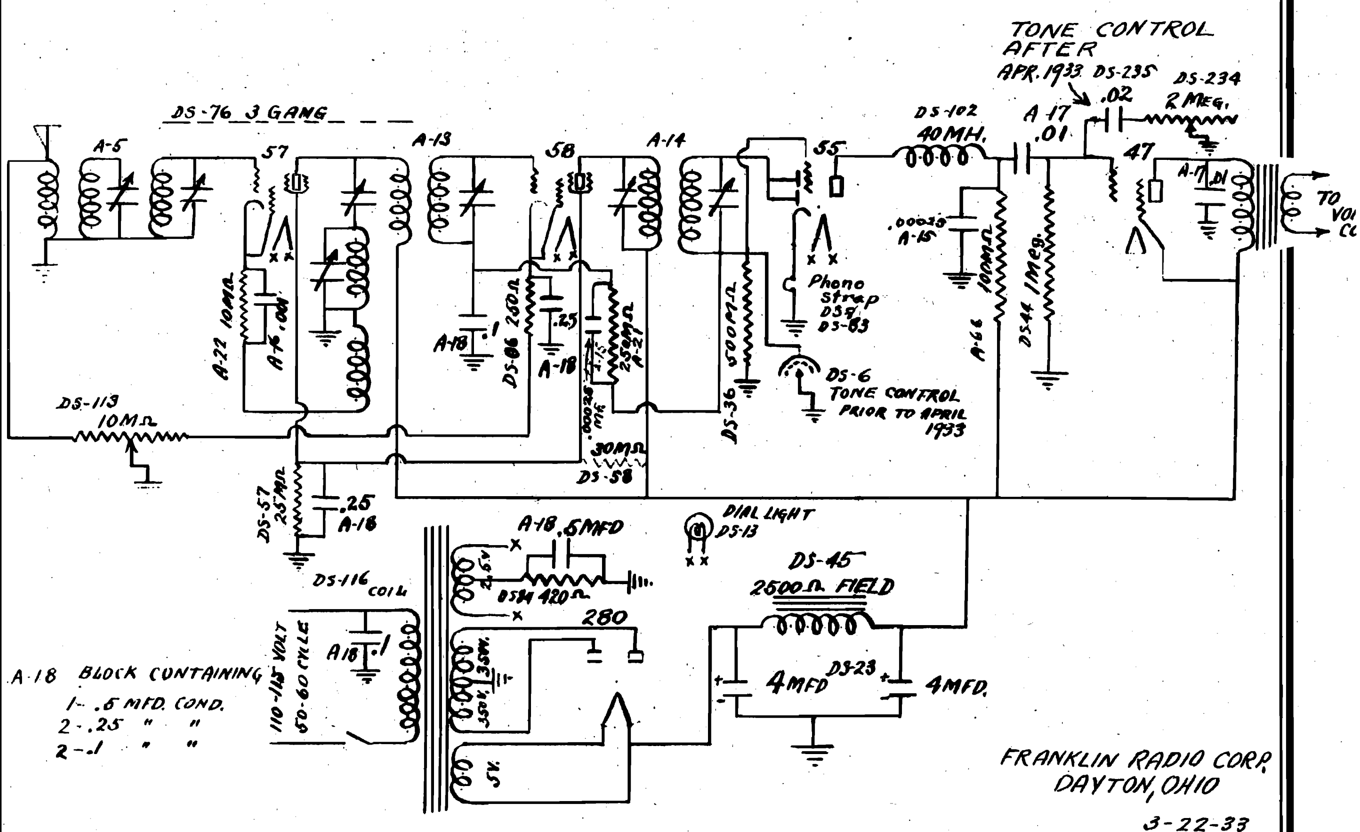
Cathode 1st det. to gnd.-------- $6\frac{1}{2}$	volts-------	30 volt scale
Cathode oscillator to gnd.-----0	volts-------	
Cathode 59 tubes to gnd.--------18	volts-------	30 volt scale
Cathode 56 tube-----------------13.5	volts-------	30 volt scale
Cathode 2B7 to gnd.-------------115.0	volts-------	300 volt scale
Cathode I.F. Tubes to gnd.-----130.0	volts-------	300 volt scale
Plate 1st Det. to gnd.----------280.0	volts-------	600 volt scale
Plate I.F. Tubes to gnd.--------370.0	volts-------	600 volt scale
Plate 2B7 to gnd.---------------280.0	volts-------	600 volt scale
Plate 56 to gnd.----------------270.0	volts-------	600 volt scale
Plate 59 tubes to gnd.----------260.0	volts-------	600 volt scale
Plate 57 osc. tube to gnd.-----140.0	volts-------	600 volt scale
Screen 1st det. tube to gnd.---140.0	volts-------	600 volt scale
Screen I.F. Tubes to gnd.------270.0	volts-------	600 volt scale
Screen 2B7 to gnd.--------------140	volts-------	600 volt scale
Screen 59 Tubes to gnd.---------260	volts-------	600 volt scale
Screen 57 osc. Tube to gnd.----120	volts-------	600 volt scale
Drop across 20 Henry choke-----30	volts-------	30 volt range
Drop across field coil----------105	volts	

Normal "B" Voltage DC from filament 5Z3 to C.T. HV Trans.-----400 volts
Potential between cathode of 2B7 and cathodes of 58 tubes-----3 volts
(Use 300 volt range) This is effective grid bias (no signal)
Also observe this polarity. Cathodes of I.F. Tubes should be positive with respect to cathode of 2B7.

MODEL 105
MODEL 106
Schematic

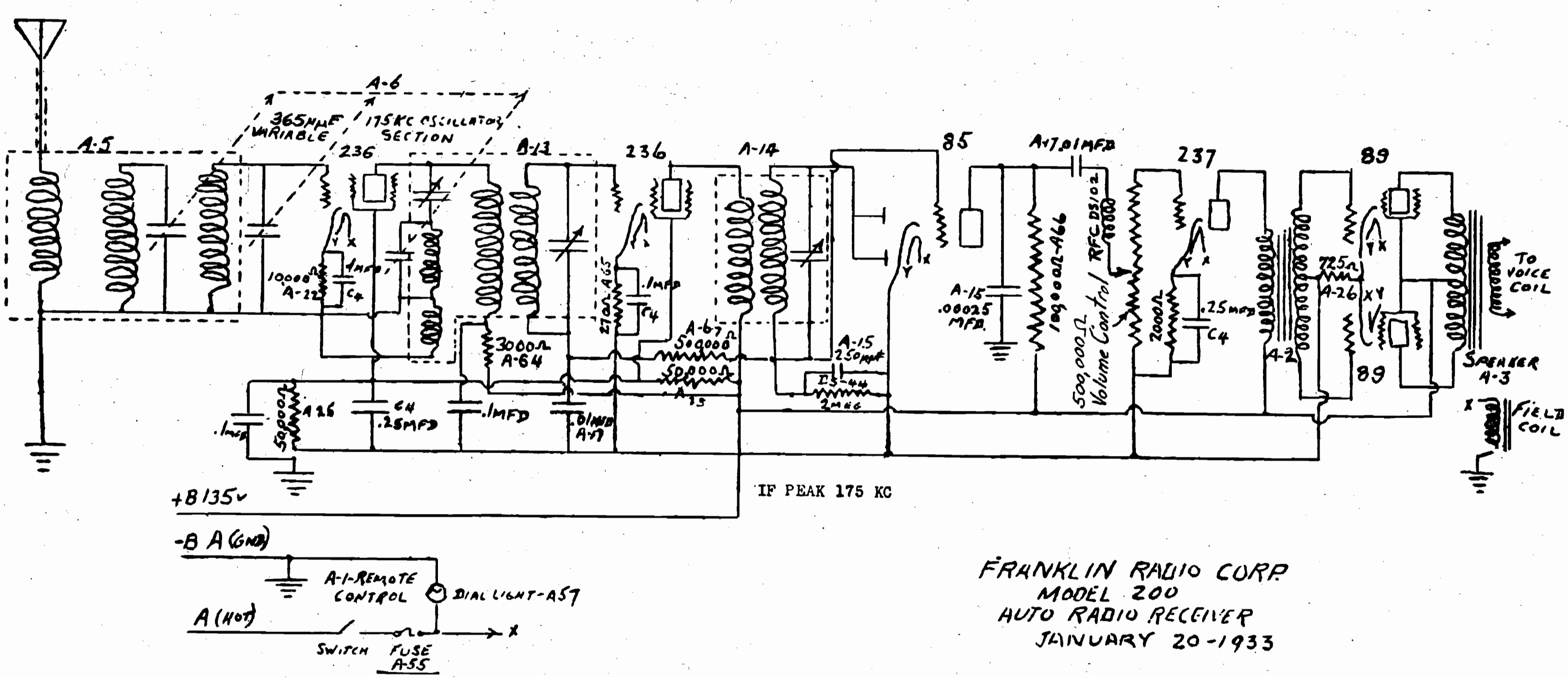
FRANKLIN RADIO CORP.





MODEL 200
Schematic
Installation notes

FRANKLIN RADIO CORP.



IF PEAK 175 KC

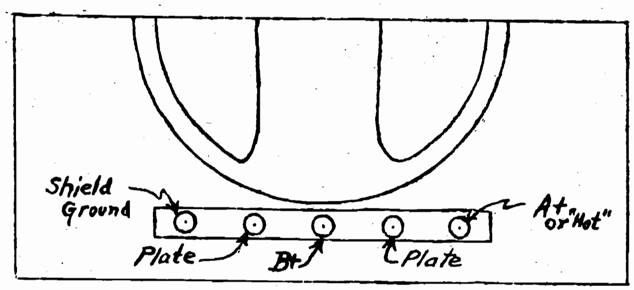
FRANKLIN RADIO CORP.
MODEL 200
AUTO RADIO RECEIVER
JANUARY 20-1933

INSTALLATION OF SET CHASSIS AND CONNECTION OF REMOTE CONTROL

Remove radio chassis from housing and fasten steering column mounting bracket to bottom of housing with machine screws that are furnished, or if steering column can not be used, use the bolts that are furnished, to fasten housing to bulkhead of car, drawing the three bolts through the three mounting holes in back of housing. In this case, be sure to allow housing to extend about 3/4" to 1" away from bulkhead, by adjustment of a series of nuts furnished for this purpose. This will relieve any warping of housing and chassis, so as not to throw radio set out of balance.

Now pass driving control cable through grommeted hole in front cover of housing. With radio chassis still removed from housing, set dial scale on remote control at 0. Using a small wrench or pair of pliers, unscrew bushing headnut on variable condenser back plate about three-fourths of the way, and pass control wire through hole in bushing headnut, and with dial scale still at 0, grasp the condenser pulley in one hand and revolve same until condenser plates are all the way open and will not turn further in that direction. Holding condenser in this position, loosen clamp screw at top of the pulley and run control wire under clamp until all the slack is taken out of the wire. Then tighten clamp screw down tight on wire. Put chassis back in housing and bolt down as before removing it from housing.

The following diagram shows the connections for speaker cable, and is supplied for service purposes only, as the speaker is already connected to the plug of the chassis.



Bottom of Magnavox Speaker

MODEL 200
Installation notes

FRANKLIN RADIO CORP.

MOUNTING THE RADIO SET AND SPEAKER

WARNING--

When locating a position for the receiver, always bear in mind that you must allow sufficient room for mounting the speaker.

The Franklin Auto Radio has been designed to be mounted on the steering column or dash board. You may mount the set either in the driver's compartment of the car, or in the motor compartment. When locating the three mounting holes for radio, be sure that you locate them accurately. The reason for this is that if the holes are not perfectly in line with the bolts on chassis, you will badly warp the receiver can on mounting it to the dash board.

After mounting the radio receiver, the next operation is to mount the speaker. We recommend that you mount the speaker as high as possible behind the instrument panel, the reason for this being that when mounted in this position, the speaker receives full advantage of the resonance effect of this space behind the instrument panel. You can easily prove this for yourself, by turning on the radio receiver and placing the speaker in various positions in the car.

You will then note the advantage of placing the speaker according to our instructions. After mounting the radio receiver, drill a 3/8" hole directly below the receiver in buck board. This hole is to be used for allowing A and B battery wires to pass through into the motor compartment. Directions for connecting these wires will be found in the following sheets.

The tuning control should be clamped on to the steering column at a height equal to that of the top of shift lever, as this makes tuning a natural motion. In cases where the steering column is of a smaller diameter than that of the clamp, use the leather shims furnished with the tuning control.

When running the wires and tuning control cable from radio to control be sure that you do not kink them excessively, as this will make the tuning control work hard. Always be sure to securely tape the tuning control at about every six inches along its length to some solid part of the car. If you do not do this and the control is left free to swing, it will de-tune the radio.

CONNECTING "A" BATTERY

The "A" battery connections of the Franklin Auto Radio have no polarity. By this we mean, neither negative or positive, but the heavy green wire with tracer must always be attached to the "hot" side of storage battery (the un-grounded side of storage battery) The sheath may be attached to any convenient ground connection, such as any bolt passing into the frame of the car or direct to the grounded terminal of the storage battery.

The heavy green wire with tracer may be attached either directly at the "hot" side of the storage battery or to the heavy cable running to the starter switch. Never, under any circumstances, attach this heavy green wire with yellow tracer to any of the ignition wires or light wires. Special warning is given against connecting this wire to the generator wire anywhere along its length. It is also convenient and advantageous to connect this wire to one side of the car ammeter, so that when the receiver is turned on, the battery load is indicated on the ammeter.

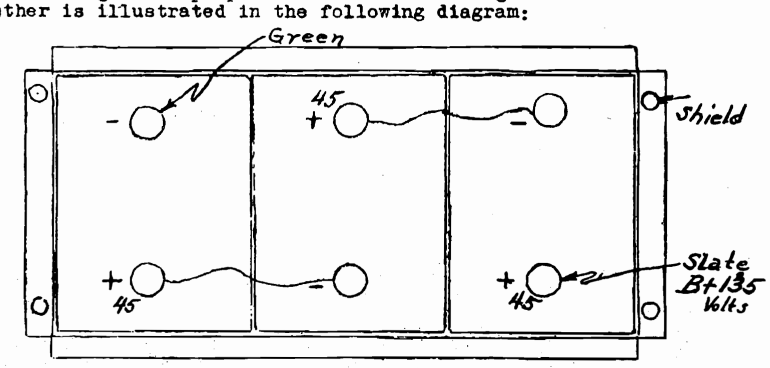
MOUNTING "B" BATTERY CONTAINER

Included with each radio is a special container for the "B" batteries. This container is to be mounted through the floor boards of the car, wherever possible. In mounting this "B" battery box, be sure that you check underneath the floor boards to see that there are no brake rods, mufflers, storage batteries or other parts of the car located directly below the space in the floor boards. The proper method for locating the place for the "B" battery container is to hold it against the floor boards from underneath car, drilling four small holes up through the floor board at the four corners of the box. After doing this, you can cut the hole from above and feel assured that you will not run into obstructions underneath the floor boards.

If it is a wooden floor board, you can very easily cut this with a key-hole saw. If, however, the floor boards are metal, we recommend cutting the hole with a cold chisel and a hammer, using a shearing action by holding the cold chisel as nearly parallel to the floor boards as possible. By using this method, you will find it very easy to cut these metal floors.

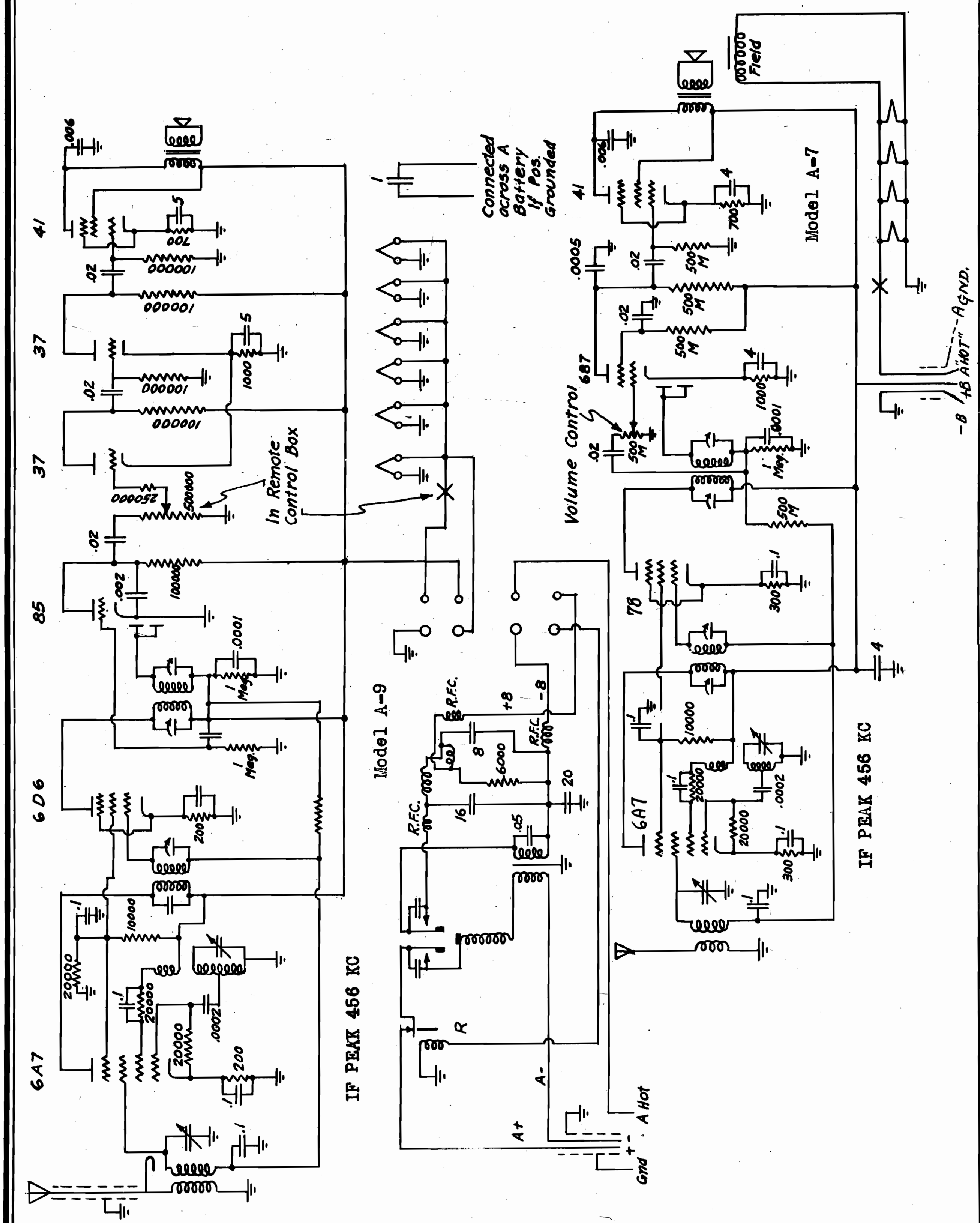
Whenever cutting through floor boards, be sure to do it in such a manner so as not to weaken floor boards of the car. In some cases, you will have to fasten braces underneath the floor boards at the edge of "B" battery can to strengthen the floor of car, due to the fact that sometimes the only location for the "B" battery can necessitates cutting through the whole width of one floor board.

When placing "B" batteries in "B" battery container, wedge cardboard or wooden shims beside the batteries to hold them securely from rattling. The proper method of connecting these batteries together is illustrated in the following diagram:



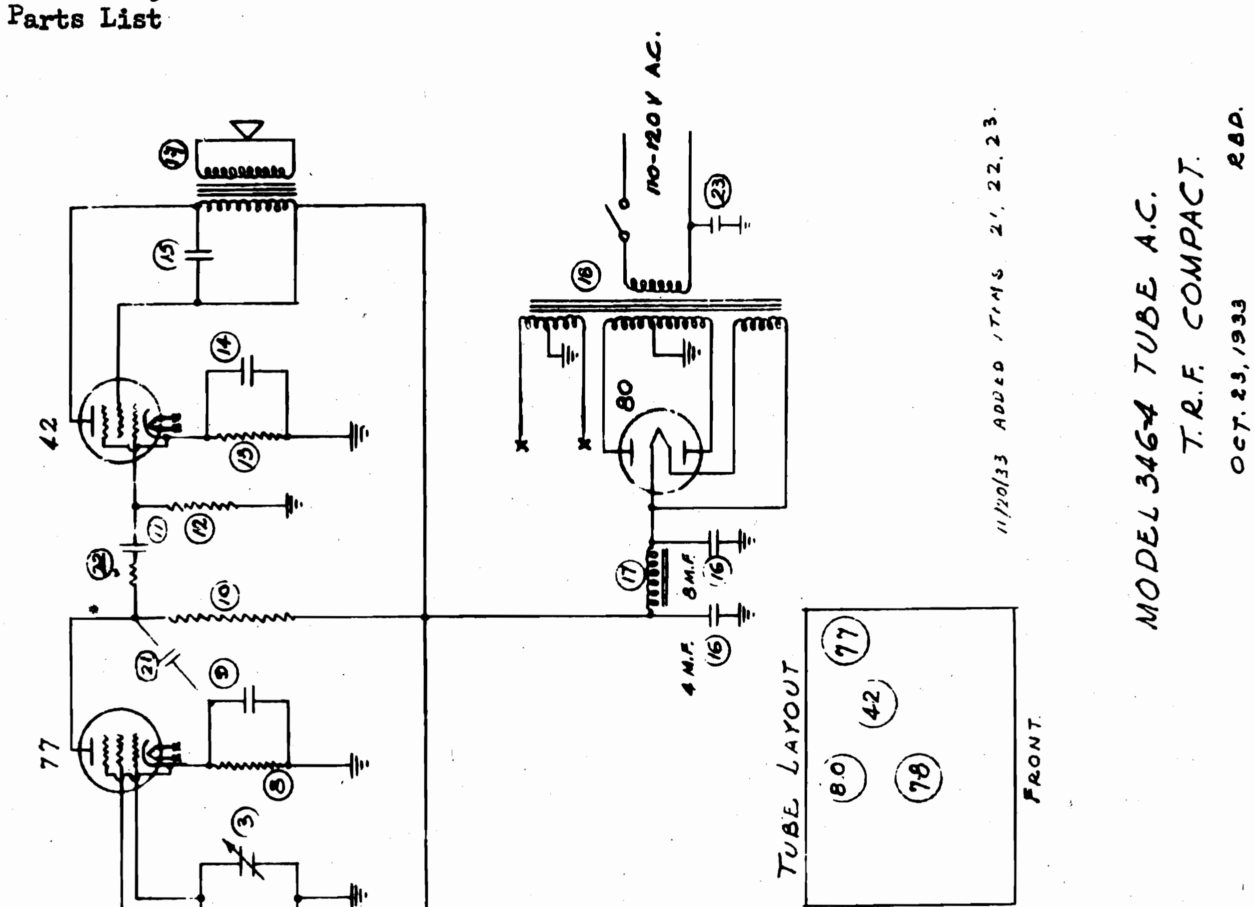
FREED RADIO AND TELEVISION CORP.

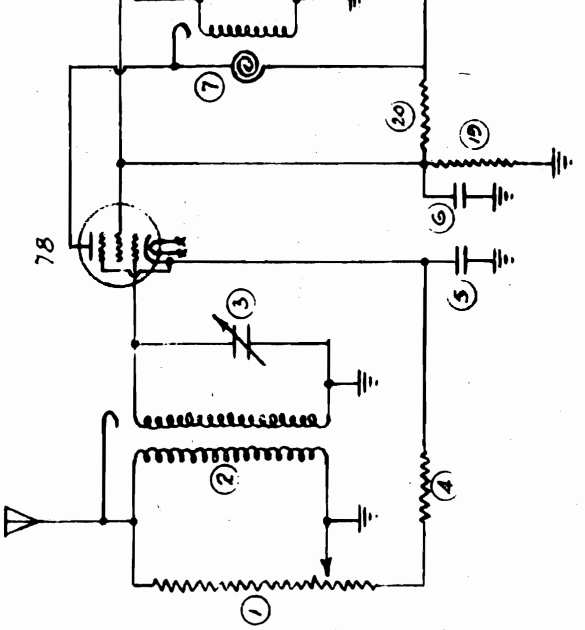
MODEL A-7
MODEL A-9
Schematic



MODEL 346-4
Schematic, Socket
Parts List

FREED RADIO AND TELEVISION CORP.





1 - Volume control- 10,000 ohm
2 - Antenna coil
3 - Variable condenser
4 - 300 ohm 1/3 watt resistor
5 - .05 mf 200 volt condenser

6 - .5 mf 200 volt condenser
7 - Detector coil
8 - 30,000 ohm 1/3 watt resistor
9 - 5 mf electrolytic condenser
10 - 250,000 ohm 1/3 watt resistor

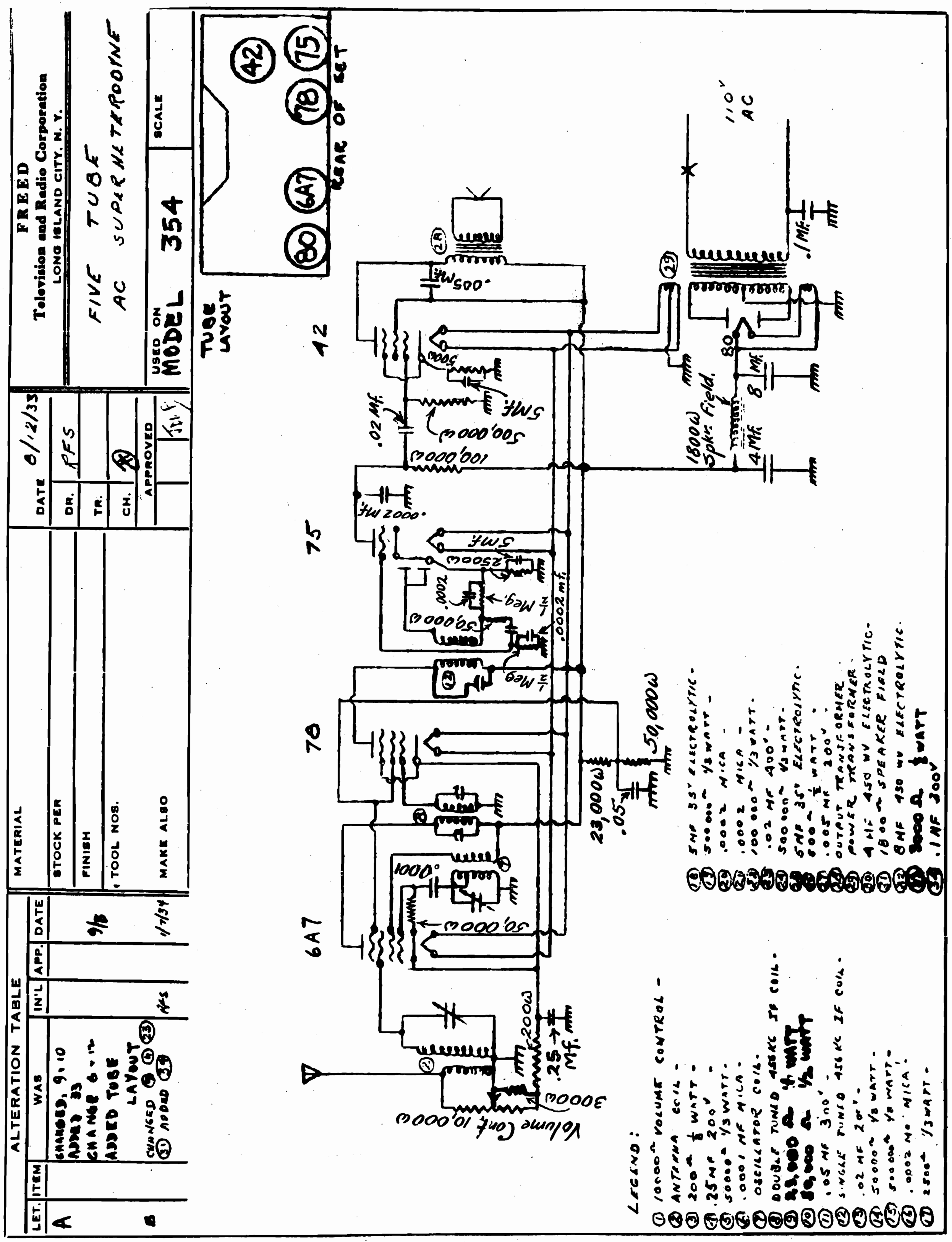
11 - .02 mf 400 volt condenser
12 - 500,000 ohm 1/3 watt resistor
13 - 500 ohm 1/2 watt resistor
14 - 5 mf electrolytic condenser
15 - .005 mf 200 volt condenser

16 - 4 mf & 8 mf filter block
17 - 1800 ohm field
18 - Power Transformer
19 - 10,000 ohm 1 watt resistor
20 - 10,000 ohm 2 watt resistor

21 - .0002 mica condenser
22 - 50,000 ohm 1/3 watt resistor
23 - .1 mf 200 volt condenser

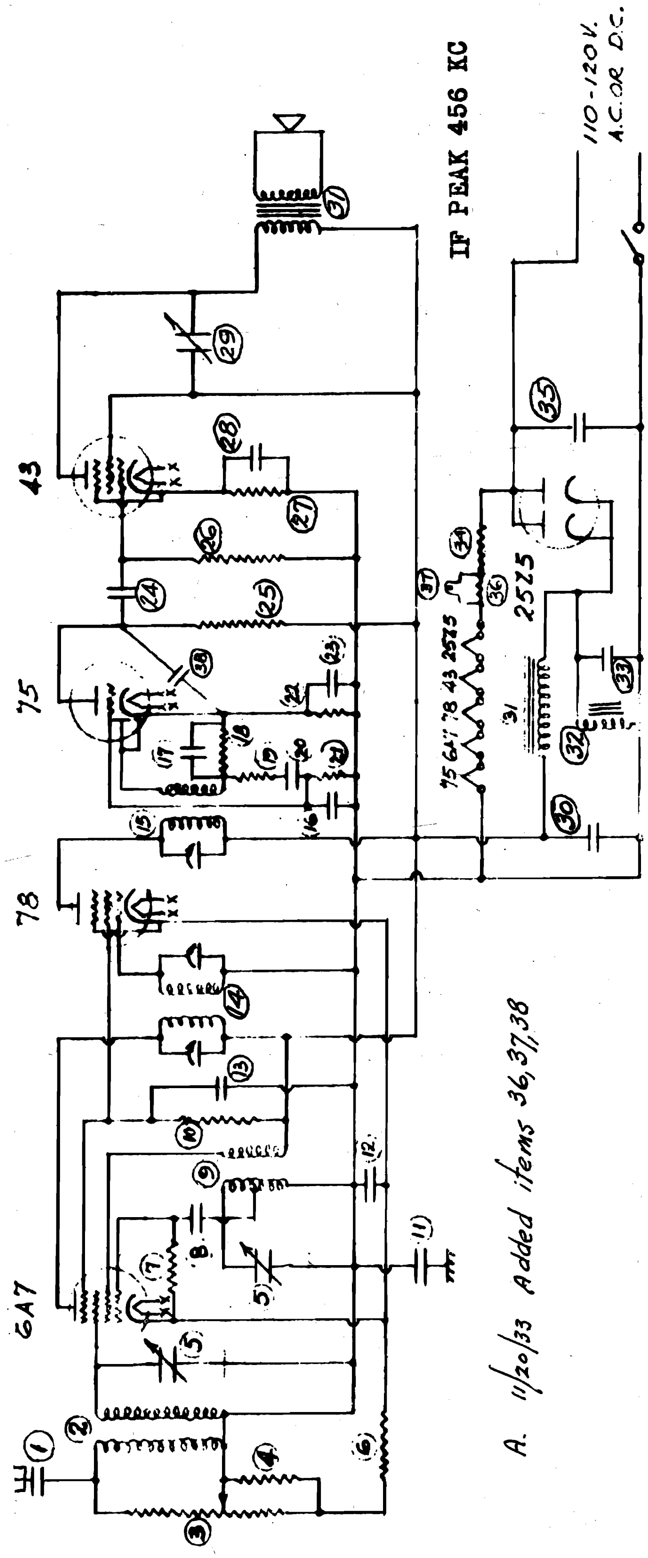
FREED RADIO AND TELEVISION CORP.

MODEL 354
Schematic, Socket



MODEL 355
Schematic
Socket layout

FREED RADIO AND TELEVISION CORP.



1 - .002 mf 200 Volts
2 - Antenna coil
3 - 10,000 ohm volume control
4 - 3,000 " 1/3 watt
5 - Variable condensers

6 - 400 ohm 1/3 watt
7 - 50,000 ohm 1/3 watt
8 - .0001 mf mica
9 - Oscillator coil
10 - 30,000 ohm 1/3 watt
11 - .1 mf 200 volt
12 - .1 mf 200 volt
13 - .05 mf 200 volt
14 - 456 KC Double tuned IF coil
15 - 456 KC Single " " "

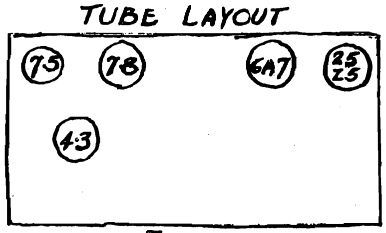
16 - .0002 mf mica
17 - .0002 mf mica
18 - 500,000 ohm 1/3 watt
19 - 50,000 " " "
20 - .02 mf 200 volt

21 - 500,000 ohm 1/3 watt
22 - 2,500 " " "
23 - 5 mf 35 volt elec.
24 - .02 mf 200 volt
25 - 100,000 ohm 1/3 watt

26 - 500,000 ohm 1/3 watt
27 - 750 " 1/2 "
28 - 5 mf 35 volt elec.
29 - .005 mf 200 volt
30 - 14 mf filter cond.

31 - 270 ohm "B" choke
32 - 3,000 ohm speaker
33 - 25 mf filter cond.
34 - 160 ohm line cord.
35 - .1 mf 200 volt
36 - 15 ohm Pilot Light Socket
37 - 6.3 Pilot Light
38 - .0002 mf mica condenser

TUBE LAYOUT



FRONT

MODEL 355
5 TUBE UNIV. SUPER

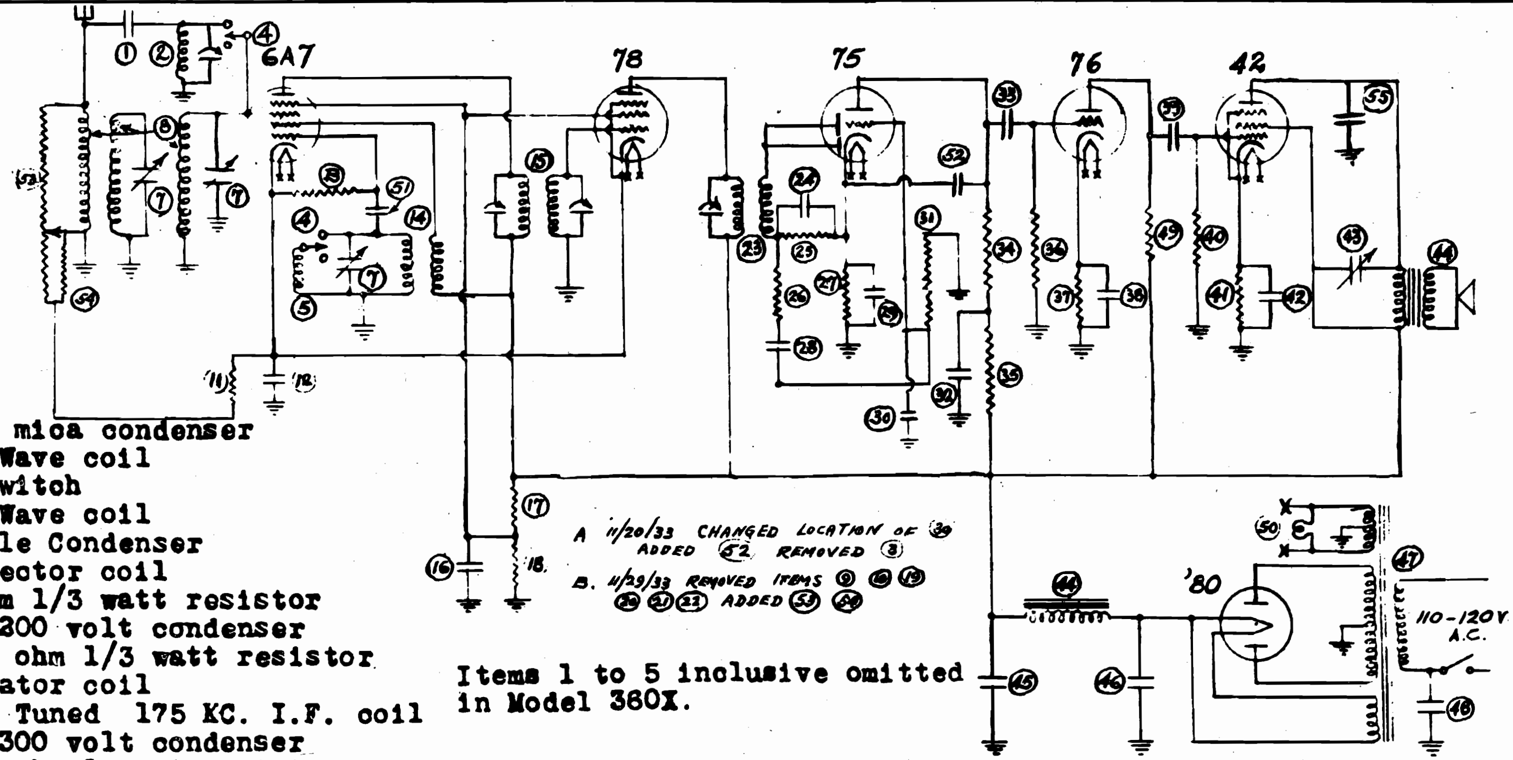
OCT. 26, 1933 R.B.D.

FREED RADIO AND TELEVISION CORP.

MODEL 360, 360X
Schematic
Socket layout

MODELS 360 & 360X.
6 TUBE A-C SUPER

OCT. 26, 1933 R.B.D.

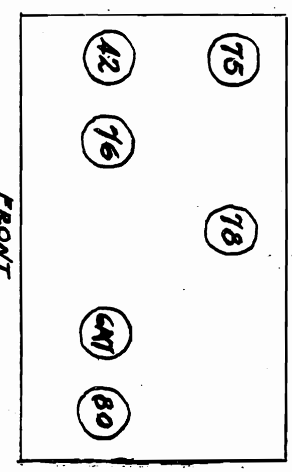


Items 1 to 5 inclusive omitted in Model 360X.

IF PEAK 175 KC.

1 - 10 mmf mica condenser
2 - Short Wave coil
4 - Band Switch
5 - Short Wave coil
7 - Variable Condenser
8 - Preselector coil
11 - 300 ohm 1/3 watt resistor
12 - .5 mf 200 volt condenser
13 - 50,000 ohm 1/3 watt resistor
14 - Oscillator coil
15 - Double Tuned 175 KC. I.F. coil
16 - .1 mf 300 volt condenser
17 - 25,000 ohm 1 watt resistor
18 - 50,000 ohm 1/2 watt resistor
23 - Single Tuned 175 KC. I.F. coil
24 - .0002 mf mica condenser
25 - 500,000 ohm 1/3 watt resistor
26 - 50,000 ohm 1/3 watt resistor
27 - 1,500 ohm 1/3 watt resistor
28 - .02 mf 200 volt condenser
29 - 5 mf 35 volt electrolytic condenser
30 - .0002 mf mica condenser
31 - 500,000 ohm 1/3 watt resistor
32 - .1 mf 400 volt condenser
33 - .02 mf 400 volt condenser
34 - 100,000 ohm 1/3 watt resistor
35 - 50,000 ohm 1/3 watt resistor
36 - 50,000 ohm 1/3 watt resistor
37 - 3,000 ohm 1/3 watt resistor
38 - 5 mf 35 volt electrolytic condenser
39 - .02 mf 400 volt condenser
40 - 500,000 ohm 1/3 watt resistor
41 - 500 ohm 1/2 watt resistor
42 - 5 mf 35 volt electrolytic condenser
43 - Filtermatic tone control
44 - Speaker - 1800 ohms - 1/42
45 - 4 mf 450 volts filter condenser
46 - 8 mf 450 " " "
47 - Power transformer
48 - .1 mf 200 volt condenser
49 - 25,000 ohm 1/3 watt resistor
50 - 6 volt pilot light
51 - .0001 mf mica condenser
52 - .0002 mf mica condenser
53 - 10,000 ohm volume control
54 - 5,000 ohm 1/3 watt resistor

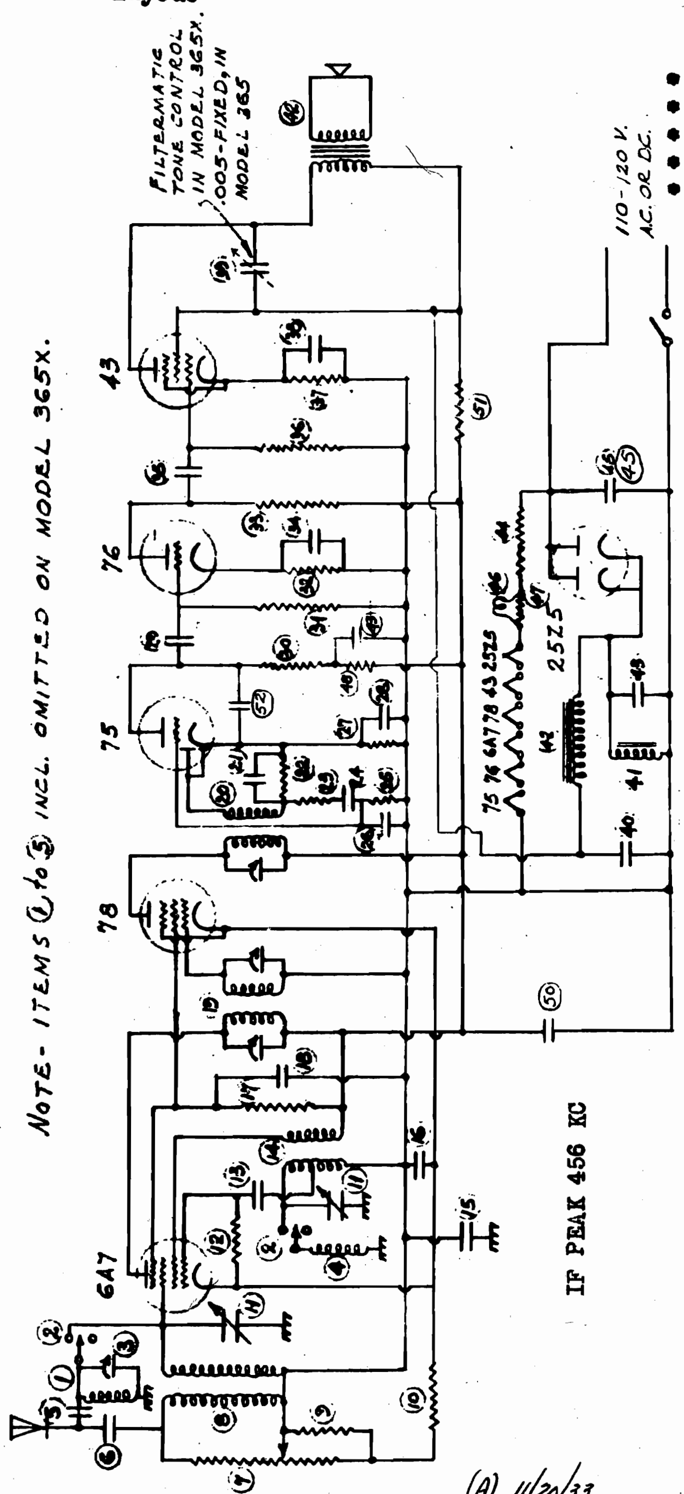
TUBE LAYOUT



FRONT

MODEL 365, 365X
Schematic
Socket layout

FREED RADIO AND TELEVISION CORP.



- • 1 - Short wave coil
- • 2 - Band switch
- • 3 - 50-100 mmf padder
- • 4 - Short wave coil
- • 5 - 10 mmf mica
- 6 - .002 mf
- 7 - 10,000 ohm volume control
- 8 - Antenna coil
- 9 - 3,000 ohm 1/3 watt
- 10 - 400 ohm " "
- 11 - Variable condensers
- 12 - 50,000 ohm 1/3 watt
- 13 - .0001 mf mica
- 14 - Oscillator coil
- 15 - .1 mf 200 volt
- 16 - .1 " " "
- 17 - 30,000 ohm 1/3 watt
- 18 - .05 mf 200 volt
- 19 - 456 KC Double tuned I.F. coil
- 20 - 456 KC Single " " "
- 21 - .0002 mf mica
- 22 - 500,000 ohm 1/3 watt
- 23 - 50,000 " " "
- 24 - .02 mf 200 volt
- 25 - 500,000 ohm 1/3 watt
- 26 - .0002 mf mica
- 27 - 2,500 ohm 1/3 watt
- 28 - 5 mf 35 volt elec.
- 29 - .02 mf 200 volt
- 30 - 100,000 ohm 1/3 watt
- 31 - 50,000 " " "
- 32 - 3,000 " " "
- 33 - 25,000 " " "
- 34 - 5 mf 35 volt Electrolytic
- 35 - .02 mf 200 volt
- 36 - 500,000 ohm 1/3 watt
- 37 - 750 " 1/2 "
- 38 - 5 mf 35 volt elec.
- 39 - (Filtermatic T.C. in 365X
  (.005 mf 200 volt in 365
- 40 - 14 mf filter cond.
- 41 - 3,000 ohm field
- 42 - 270 " "B" choke
- 43 - 25.7 mf filter cond.
- 44 - 135 ohm line cord
- 45 - .1 mf 200 volt
- 46 - 6 volt pilot lamp
- 47 - 15 ohm Res.

* Omitted from 365X

- 48 - 50,000 Ohm, 1/3 watt resistor
- 49 - .1 mf 200 volt condenser
- 50 - 6 mf 150 volt electrolytic con
- 51 - 1000 ohm, 1/3 watt resistor
- 52 - .0002 mf mica condenser

(A) 11/20/33
Added items
48-52 inclusive

TUBE LAYOUT

43 76 78 6A7 25Z5

75

FRONT.

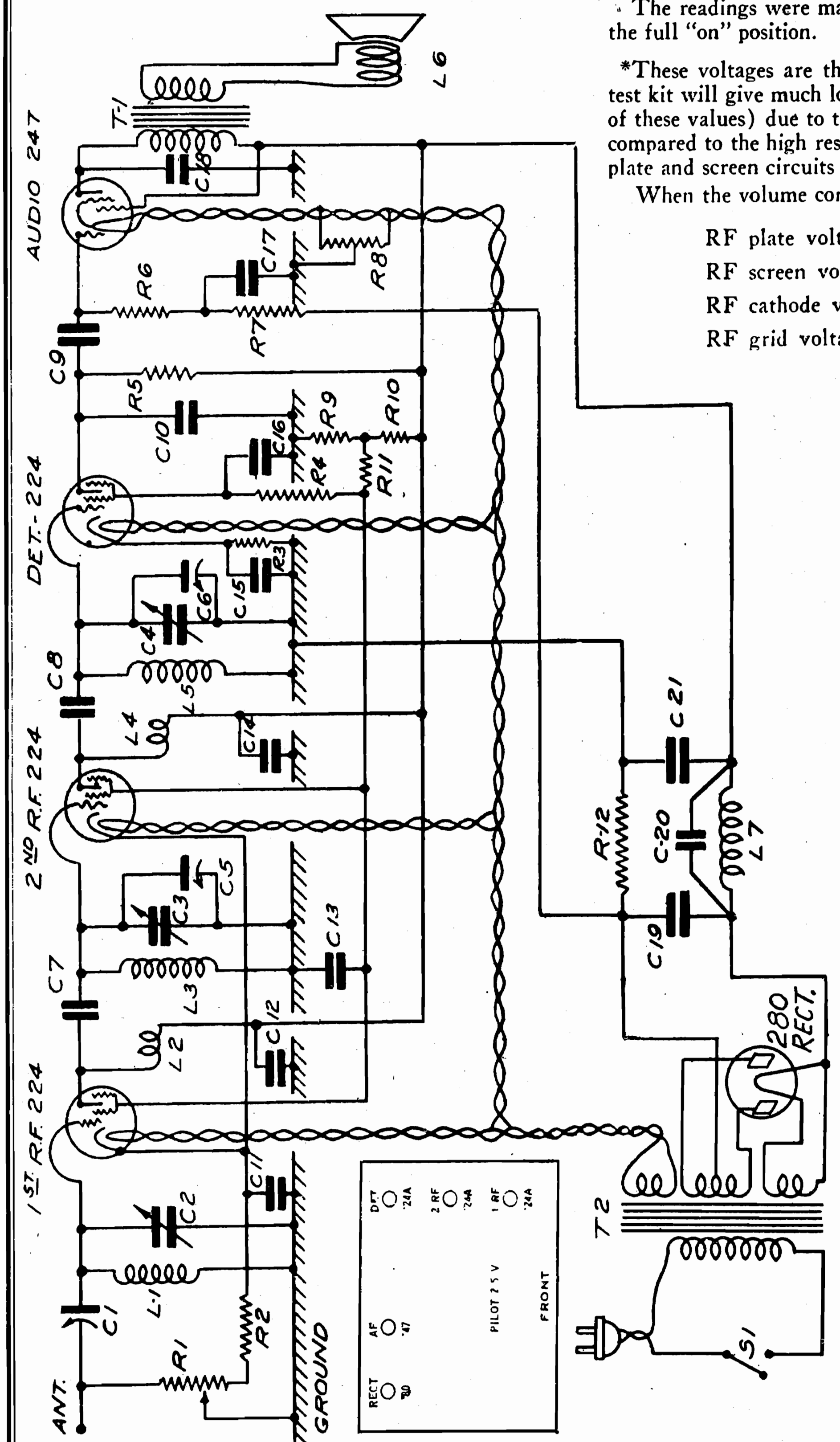
MODELS 365 & 365X.
6 TUBE UNIV. SUPER

OCT. 26, 1933

R.B.D.

FROST-MINTON

MODEL 4 PW
Schematic, Voltage
Socket layout



The readings were made with the volume control in the full "on" position.

*These voltages are the correct values. The average test kit will give much lower readings, (as low as 1/10 of these values) due to the low resistance of the meters compared to the high resistance included in the detector plate and screen circuits and the audio grid circuit.

When the volume control is reduced the

RF plate voltage remains constant
RF screen voltage increases
RF cathode voltage increases
RF grid voltage increases

SOCKET VOLTAGES

Stage	Tube	Fil.	Plate	Screen	Cathode	Grid	Plate MA
1st RF	224	2.3	250	90	2.5	2.5	4.5
2nd RF	224	2.3	250	90	2.5	2.5	4.5
Det.	224	2.3	*150	*20	3.0	1.5	.5
Audio	247	2.3	250	250	......	*16	32
Rect.	280	4.8					Plate current of each plate—20

MODEL 4 PW
Electrical values
Transformer notes

FROST-MINTON

NOMENCLATURE

C 1—Antenna Trimmer Condenser
C 2—Tuning Condenser
C 3—Tuning Condenser
C 4—Tuning Condenser
C 5—Alignment Condenser
C 6—Alignment Condenser
C 7—Coupling Capacity
C 8—Coupling Capacity
C 9—Audio Coupling Condenser .006 mfd.
C 10—Det. plate By-pass .0001 mfd.
C 11—RF Cathode By-pass .05 mfd.
C 12—RF Plate By-pass .05 mfd.
C 13—RF Screen By-pass .25 mfd.
C 14—RF Plate By-pass .05 mfd.
C 15—Det. Cathode By-pass 1.00 mfd.
C 16—Det. Screen By-pass .25 mfd.
C 17—Audio Grid By-pass .01 mfd.
C 18—Audio Plate By-pass .01 mfd.
C 19—Filter Condenser 4. mfd.
C 20—Field Condenser .08 mfd.
C 21—Filter Condenser 4. mfd.
R 1—Volume Control 10,000 ohms
R 2—RF Cathode Resistor 300 ohms
R 3—Det. Cathode Resistor 50,000 ohms
R 4—Det. Screen Resistor 2 megohms
R 5—Det. Plate Resistor 1 megohm
R 6—Audio Grid Resistor ½ megohm
R 7—Audio Grid Resistor 100,000 ohms
R 8—Mid Tap Resistor
R 9—Divider Resistor 50,000 ohms
R 10—Screen Resistor 50,000 ohms
R 11—Screen Resistor 10,000 ohms
R 12—Audio Bias Resistor 400 ohms
L 1—Antenna Coil
L 2—Primary } of RF Coil
L 3—Secondary } of RF Coil
L 4—Primary } of RF Coil
L 5—Secondary } of RF Coil
L 6—Speaker Moving Coil
L 7—Speaker Field Coil

T 1—Audio Output Transformer
T 2—Power Transformer

Filter Condenser

The three leads from the main filter condenser are connected as follows:

Black —to center tap of 280 plate winding
Green—to filament terminal of 280 socket
Red —to +B connection on terminal strip

By-pass Condenser Assembly

The condensers incorporated in this unit are identified as follows:

1.0 mfd.	Green Leads
.01 mfd.	Green and White Leads
.05 mfd.	Black Leads
.25 mfd.	Red Leads

Resistors

300 ohms—Orange, Black, Brown
400 ohms—Yellow, Black, Brown
10,000 ohms—Blue, Yellow
50,000 ohms—Green, White
100,000 ohms—Blue, White
½ megohm—Gray
1 megohm—Black
2 megohm—Black, White

Power Transformer

Six leads are brought out of the transformer winding on the side next to the terminal strip. Three are located on the opposite side. The transformer is connected as follows:

Primary Winding—Stranded wires, terminal strip side

224 and 247 filaments—Heavy wires, terminal strip side

280 filament—Small wires, terminal strip side

280 plates—Two leads nearest front of set, opposite side

280 center tap—Lead nearest back of set, opposite side

The trimmer condenser mounted on the loud speaker must be adjusted for maximum volume.

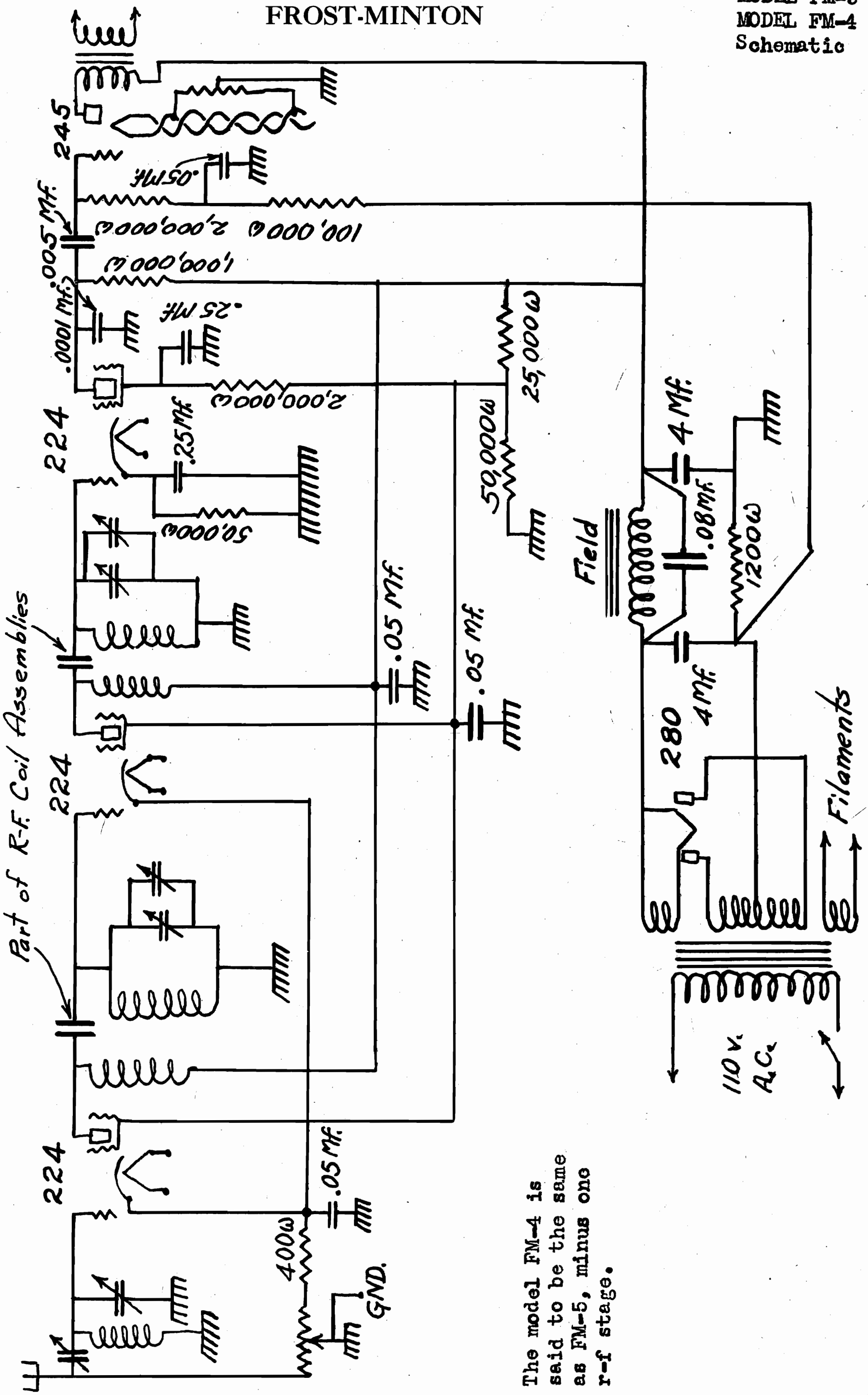
Some types of the 247 Pentode operate normally with a blue glow. This action does not, therefore, denote that the tube is defective due to gas.

It is very important that no tube is removed from its socket with the receiver "on" as to do this will damage the receiver or the Pentode tube.

Make sure that the lead from the top of each 224 tube to the variable condenser follows closely along the metal partition between the tubes. Oscillation may occur if this lead lies too close to the tube itself.

FROST-MINTON

MODEL FM-5
MODEL FM-4
Schematic



The model FM-4 is said to be the same as FM-5, minus one r-f stage.

GALVIN MFG. CO.

MOTOROLA
Antenna data

ANTENNAS

There are various ways to obtain energy or antenna signals. Different makes and types of cars have various conditions and each must be coped with individually. Experience has shown that the roof antenna, if properly installed, is the most satisfactory.

The most satisfactory roof antenna is a piece of copper or galvanized screen, approximately 3 feet square installed between the head-lining and roof of the car. This is done by dropping the headlining back for a distance of one yard or more and tacking the screen to the ribs. The screen should not come closer than 8 inches to the metal on top at the front of the car and to within 4 inches of the metal on the sides of the top.

If after dropping the headlining it is discovered that chicken wire is used in the construction of the top, it will not be satisfactory to install the screen as described in the above paragraph. Instead check the chicken wire with a continuity meter to see if it is grounded. If it is not, a lead may be attached and the chicken wire used as an aerial. If it proves to be grounded it must be freed in the manner described in a later paragraph on "Roof Antenna in Model A Fords".

The following automobile manufacturers announce roof antenna in various 1932 models:

TYPE AUTOMOBILE	YEAR MODEL	REMARKS
Chrysler	1932	Roof antenna with lead-in and provisions for "B" Battery Box.
Dodge	1932	Roof antenna with lead-in and provisions for "B" Battery Box.
DeSoto	1932	Roof antenna with lead-in and provisions for "B" Battery Box.
Plymouth	1932	Roof antenna with lead-in and provisions for "B" Battery Box.
Reo	1932	Equipped with roof antenna and lead-in.
Rockne	1932	Equipped with roof antenna and lead-in.
Studebaker	1932	Equipped with roof antenna and lead-in.
Buick	All Models	$6.00 additional for antenna installation.
Franklin	1932	Roof antenna, no lead-in.
Cunningham	All Models	Additional charge for antenna installation.
Ford	1932	Roof antenna,but no lead-in.

1933 Cars Equipped With

Overhead Aerials

Buick.	33-50	Cadillac	V-12
Buick.	33-60	Cadillac	V-16
Buick.	33-80		
Buick.	33-90	Chevrolet. . . .	....
Cadillac	V-8	Chrysler	6
Chrysler	Royal 8	Oldsmobile . . .	8
Chrysler	Imp. 8		
Chrysler	Imp. Cust. 8	Pierce Arrow . .	836
		Pierce Arrow . .	1236
DeSoto	6	Pierce Arrow . .	1242
		Pierce Arrow . .	1246
Dodge.	6		
Dodge.	8	Plymouth	6
Hupmobile. . . .	321	Pontiac.	8
Hupmobile. . . .	322		
Hupmobile. . . .	326	Reo, Royal . . .	....
LaSalle.	....	Rockne	6
Lincoln.	V-8	Studebaker . . .	6
Lincoln.	V-12	Studebaker . . .	Comm. 8
		Studebaker . . .	Pres. 8
Nash	6	Studebaker . . .	Spd.Pres. 8
Nash	Std. 8		
Nash	Spec. 8		
Nash	Adv. 8		
Nash	Amb. 8	Willys	99

CHECK THE ANTENNA

The antennas that are installed by the manufacturers will need to be checked very thoroughly. It can be easily checked by simply trying to peak the antenna stage. If you are unable to reach a peak on the antenna assembly you have either a bad, leaky antenna, or one with too great capacity.

After the set is installed ready for operation, it may be necessary to balance the set with the antenna. This is done by adjustment of the first antenna trimmer. Openings for this adjustment are provided for in the various models.

In making this adjustment be absolutely sure you have properly tuned in a very weak station around 20 or 30 on the dial, adjust the trimmer in and out with a screw driver until the point of maximum volume is reached.

Check for grounded antenna by means of a very sensitive voltmeter, such as 200 volt, 1000 ohm per volt voltmeter placed in series with 200 volts of "B" battery, touching one end of the meter to the antenna and the other end of the batteries to the chassis of the car. With this sensitive meter and this high voltage, you should not get over a 2-volt deflection on the meter, even on a damp day. If you do get over a 2-volt deflection it indicates the antenna is either fully or partially grounded, depending on reading. If a reading is obtained it will be necessary to remove the headlining and cut a strip three or four inches wide out of the screen wire or around its edge, thereby insulating and isolating it from the frame of the car. If a dome light is installed in the car, a circle should be cut out of the screen so it will not be near the dome light.

An effective area of this screen need not be greater than 9 square feet. Bearing this in mind, you will find it necessary to take the headlining down all the way back. Generally to the second rib is sufficient. If, after freeing the screen from the end supports, it is detected that there is a chance of the screen shifting, tacking the screen to one of the ribs will hold it in place.

The lead-in for any of the above type of installations, must be given consideration and it should be brought down on the same side of the car where the Radio is mounted and down the front corner post, either right or left, depending of course on the position of the Radio. On many cars, you will find the windlass is composed of a hollow rubber tube and makes a very nice housing for the lead-in wire and having a distinct electrical advantage insofar as it keeps the wire away from the metal of the car, maintaining the capacity of the lead-in very low.

PLATE ANTENNA

If it is desired, a plate antenna may be used. The plate consists of a piece of metal, approximately 2½ square feet in area, rigidly held to the car and the closer to the ground this is placed, the greater efficiency within of course practical limits. It may be placed under the running boards or fastened to the channel frame. These plates may be obtained from Galvin Manufacturing Corporation on special order, and are fastened by means of clamps to the frame of the car, no drilling being necessary.

In the use of a plate or under-car aerial, some additional shielding may be needed on the antenna lead. If the unshielded portion of the antenna lead is over one foot in length a piece of loom, similar to that used on the shielded part of the lead, should be used to keep the shielding from coming too close to the antenna lead wire. Enough of this loom should be slipped over the wire to reach within about four inches of where the lead attaches to the aerial proper. Braided sheathing is then slipped over this loom, and joined to the shielding of the shielded lead from the set so as to make a continuous shielded lead from the set to within about four inches of aerial proper. The end of shield nearest the aerial should then be grounded to frame of car.

UNDER-CAR ANTENNA

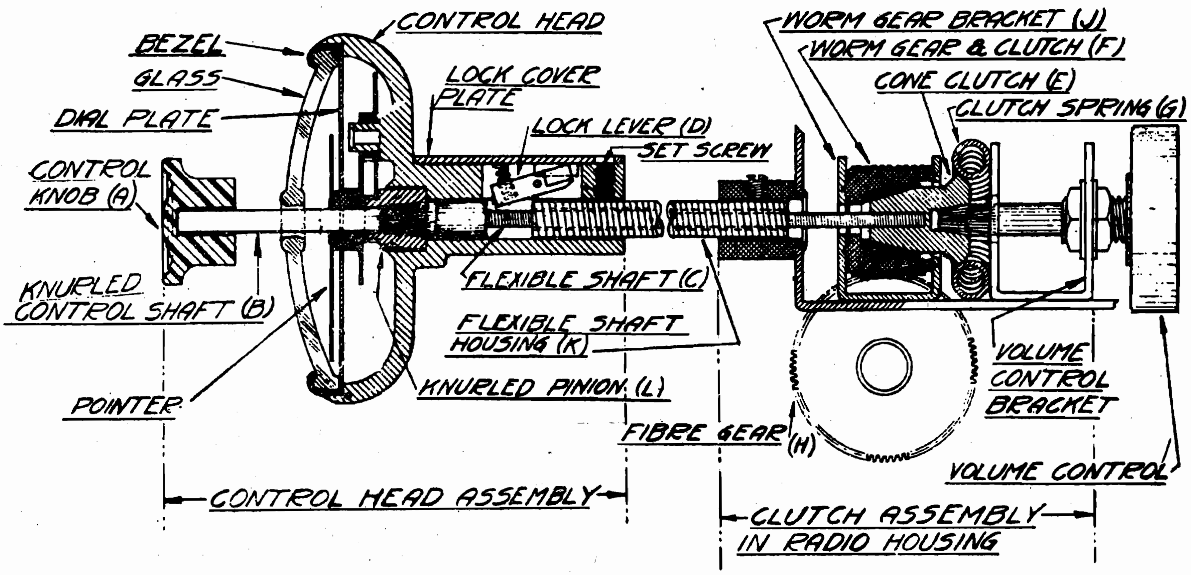
The under-Car antenna consists of a wire fastened from the lower point on the right hand side of the rear axle to the lowest point under the motor, then back to the lowest point on the left hand side of the rear axle, thus forming a "V". At the vertex of the "V" a heavy coil spring should be attached to keep up slack, the spring being insulated from the motor, as well as the other two ends of the wire. The lead-in, of course, is fastened at the vertex.

ROOF ANTENNA ON MODEL "A" FORDS

In the application of the roof antenna on the Model "A" 1930 Fords, when the top is dropped you will notice that No. 2 rib is a steel rib, and it will be necessary in order to get full effect from the antenna. that the screen be cut clear of this steel rib

MOTOROLA Airplane
Type Control Notes

GALVIN MFG. CO.



CROSS-SECTION OF AIRPLANE TYPE CONTROL ASSEMBLY.
PATENT APPL'D. FOR.

Adjusting Instructions for Motorola Airplane Type Control

The above cross section view of the Motorola Airplane Type Control identifies the principal parts of the Control Head and Clutch Assembly.

The simplicity of the Assembly and Operation is quickly apparent. A few minutes careful observation of the above cross section view will give you a clear picture of the full Assembly, which can be divided in two main assemblies. (1) The Control Head Assembly which installs on the steering post. (2) The Clutch Assembly which is in the radio set housing.

Two positions operate the control. (1) "Tuning Position." (2) "Volume Control Position." When the knob is pulled toward you it is in the Tuning or "OUT" Position. When pressed toward the control head it is in the Volume Control or "IN" Position which turns set on and off and controls the volume.

Smooth, positive operation in either position is but a matter of simple installation. Therefore, it is important that you spend a few minutes familiarizing yourself with principal parts of the control in relation to the functioning of the Control Head and Clutch Assemblies.

The above cross section view is illustrated as being in the "OUT" Position. The Control Knob (A) is fastened to a Knurled Control Shaft (B) connecting and engaging the Flexible Shaft (C) which runs through the Flexible Housing (K) from the Control Head to the Clutch Assembly.

In the "OUT" Position the Flexible Shaft causes the Cone Clutch (E) to engage inside of the Worm Gear and Clutch (F) operating the Fibre Gear. Note particularly that the Fibre Gear (H) is meshed with the Worm Gear. This Fibre Gear is attached to the shaft of the variable condenser.

The Clutch Spring (G) in the "OUT" Position is in back of the high point on the Cone Clutch (E) bearing pressure on the Cone Clutch into the Worm Gear.

When in the "OUT" Position you will observe that the pointer is engaged with the Knurled Pinion (L). In this position, upon rotation of the knob, the Knurled Control Shaft operates the pointer at the same time the Worm Gear engages the Fibre Gear and rotates the variable condenser.

When the knob is pressed toward the head or "IN" Position, the Knurled Control Shaft and the Worm Gear and Clutch are disengaged, permitting the Flexible Shaft to throw the Cone Clutch into the "ON", "OFF" and Volume Control Positions.

ADJUSTMENT OF THE AIRPLANE TYPE CONTROL

Visualizing the positiveness and simplicity of the action of this Control Assembly, you can readily see there are only two things which can cause the rotation of the Condensers in the Clutch Assembly and the Arrow Pointer in the Control Head to get out of step.

(1) There is a possibility of the Cone Clutch (E) slipping in the Worm Gear (F). The remedy is simple. Merely remove Clutch Spring (G) and cut out a few coils of the spring in order to tighten it and replace in position. Occasionally the Fibre Gear may press the Worm Gear too snug. This friction creates a binding which may cause the Clutch to slip. To correct this, slightly relieve the tension of the small spring which you will observe on the chassis that holds the Condenser in place.

(2) The other point to get out of adjustment is where the tapered knurled portion of the Knurled Control Shaft (B) engages the Knurled Pinion (L) in the Control Head Assembly. This can be out of adjustment when the Knurled Control Shaft (B) which is attached to the Flexible Shaft (C) and which is inside the shaft housing, is adjusted too FAR BACK in the Control Head. In this position it WILL NOT ENGAGE the knurled portion of the Knurled Pinion (L). This can also occur when the set screw holding the Flexible Shaft in place in the Control Head becomes loose allowing the entire Flexible Shaft to work back out of position.

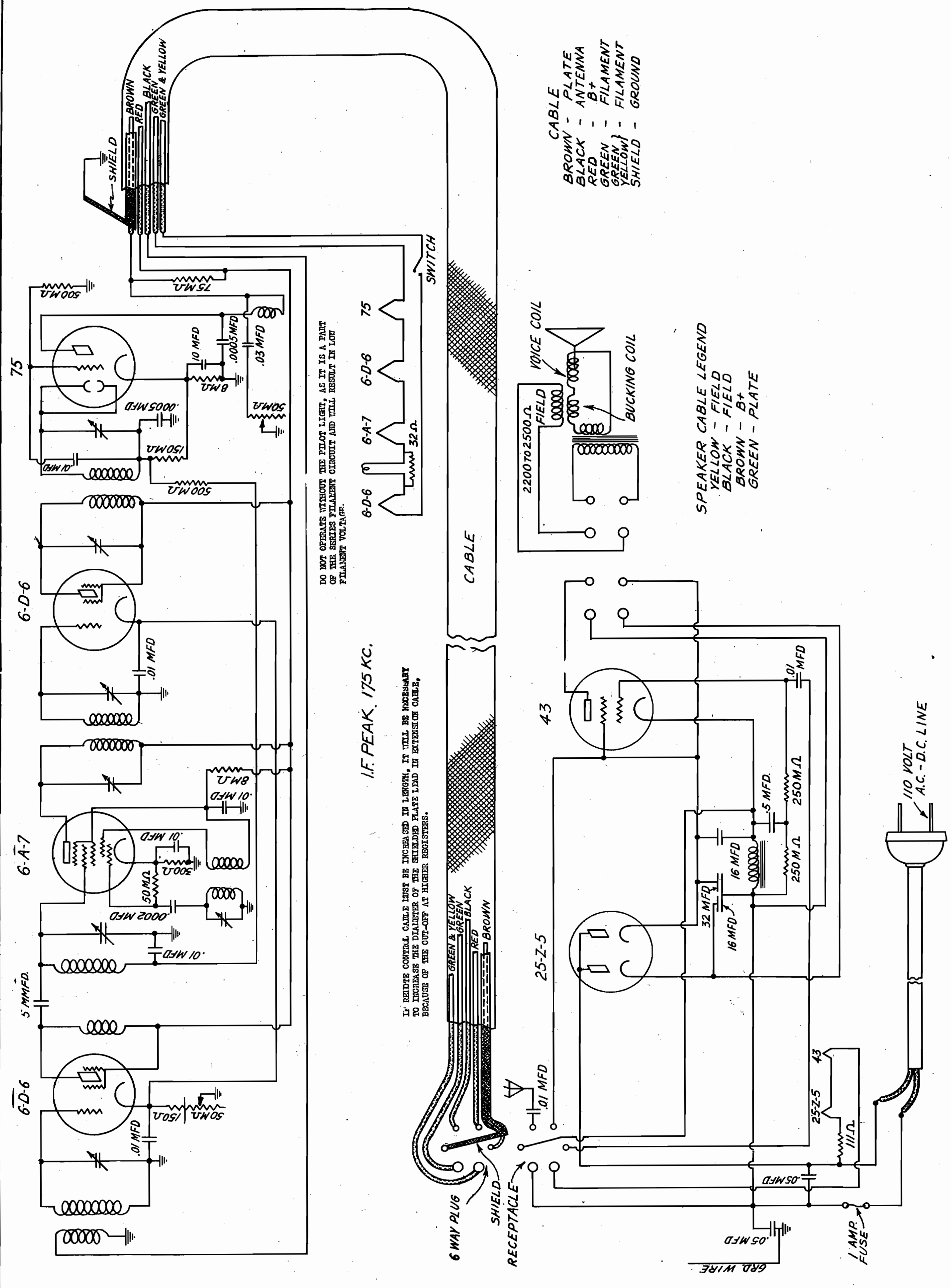
It is a very easy matter to determine if adjustment is correct at the Control Head. If you can lock the set it is in proper adjustment. If you cannot lock the set adjust as follows: Put key into position. Pull the knob to the "OUT" Position. Then remove the knob and loosen the set screws. Pull the Flexible Shaft out of the Control Head about an inch and a half. Then REMOVE THE KEY. Re-insert Flexible Shaft into the Control Head, moving it slowly into position, until you hear the lock tumbler "click", which indicates that the Knurled Control Shaft has passed the end of the lock lever. Now pull shaft back slightly. Then tighten the set screws and the whole assembly will be held in proper position. Replace the tuning knob and key.

NOTE: When re-inserting the Flexible Shaft and when the Knurled Control Shaft passes the lock lever, a slight "click" will be heard when the raised portion on the Knurled Control Shaft passes the lock lever, but when you notice a pronounced "click" and at the same time when the knob end of Knurled Control Shaft extends out of the front of the control about three-quarters of an inch, you can then be sure it is in proper position.

The operation of the airplane type control is positive in its action and whenever slippage of the pointer or slippage of the clutch is encountered, one or the other of the above adjustments will correct this condition, and when correctly adjusted after the installation is made it will remain in adjustment thereafter.

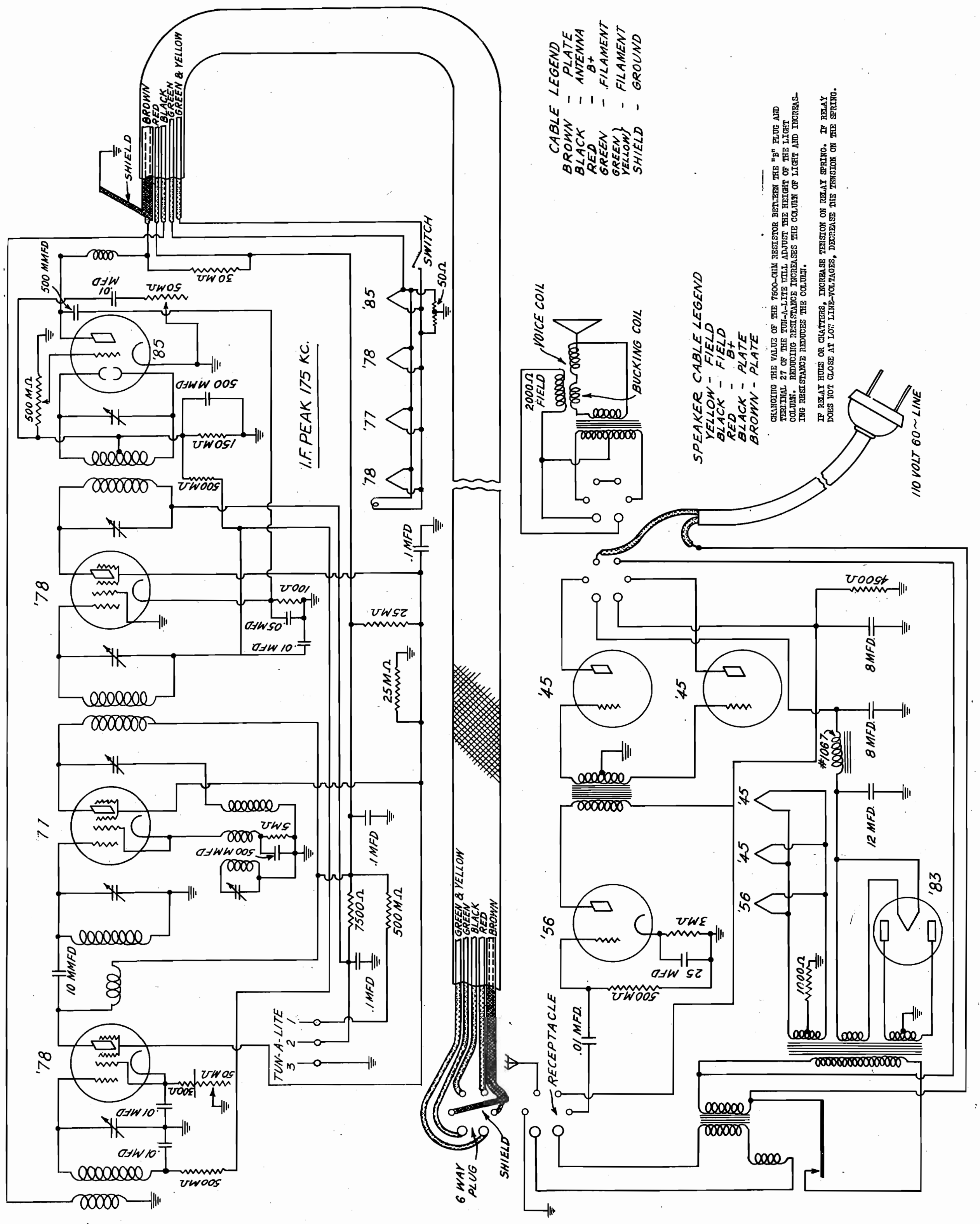
GALVIN MFG. CO.

MODEL Motorola J-8
Schematic



MODEL Motorola S-10
Schematic

GALVIN MFG. CO.



GALVIN MFG. CO.

MODEL Motorola 44
Schematic

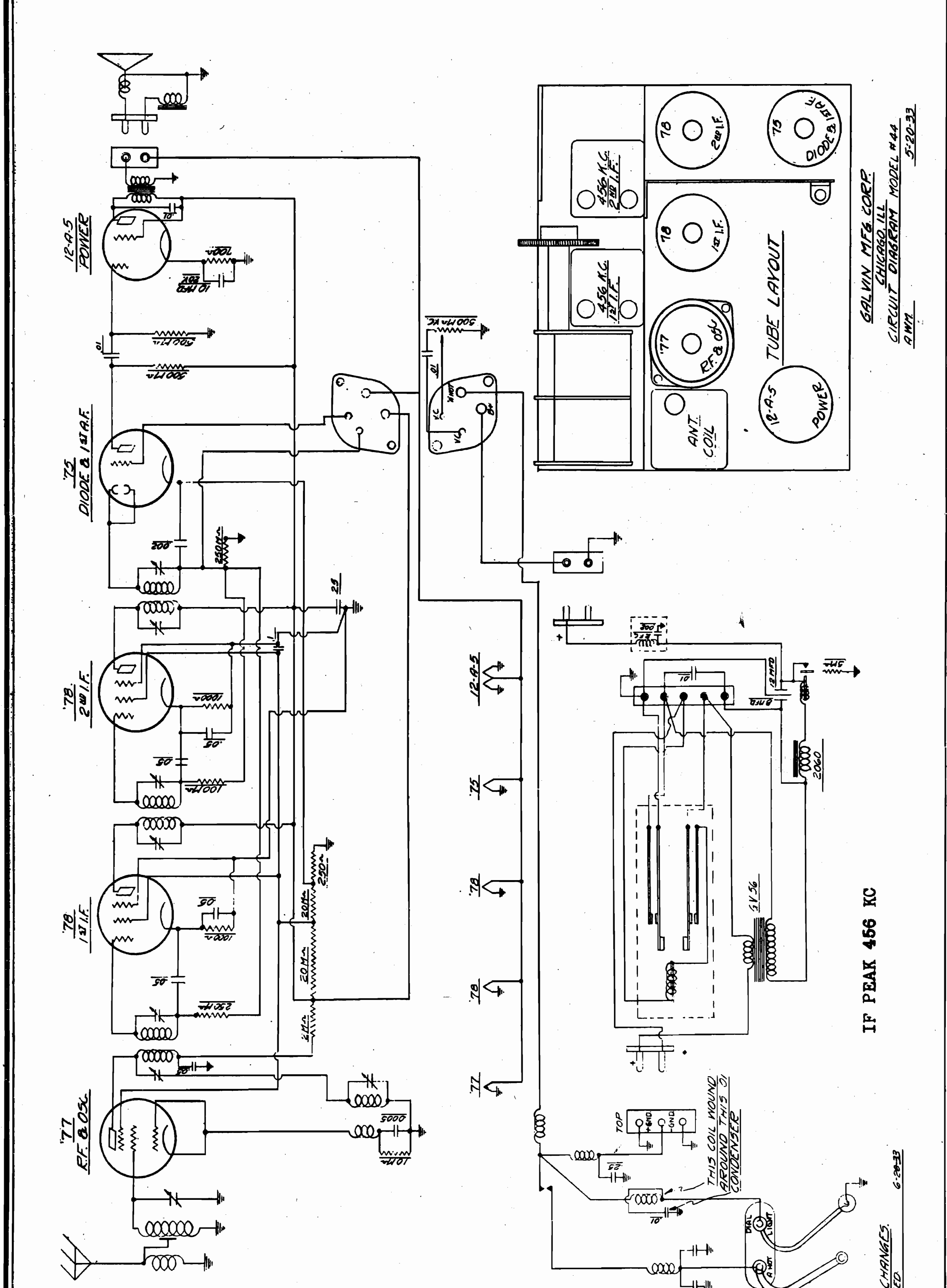


Figure 10

MODEL 44
Data

GALVIN MFG. CO.

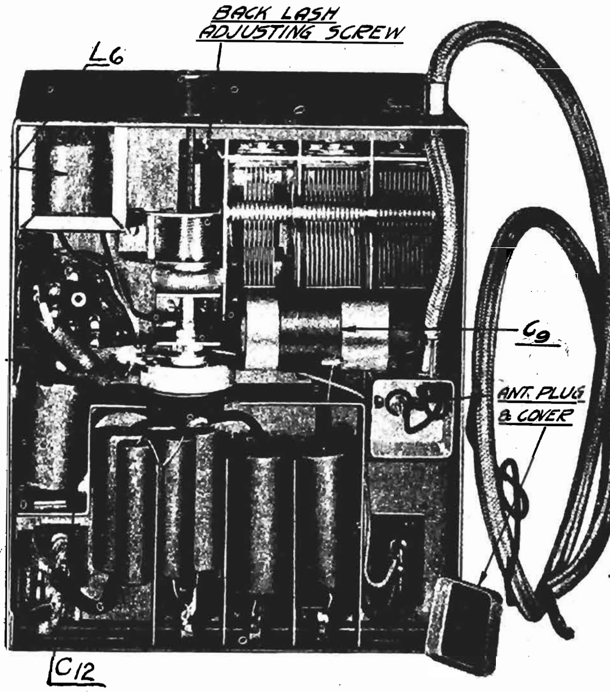


FIGURE 5

The backlash adjusting screw on Model "77" and Model "44".

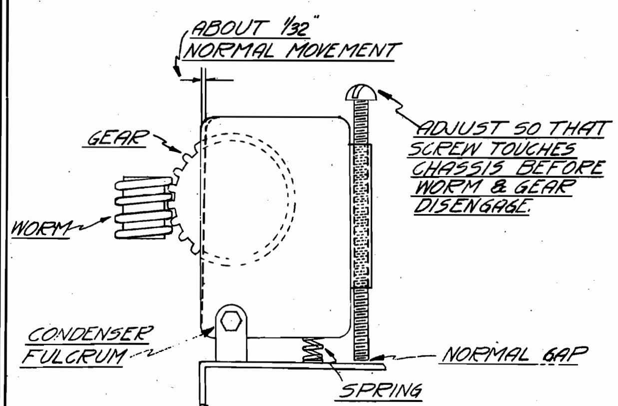


FIGURE 6

MODEL "44"

The Motorola Model "44" is a 5-tube superheterodyne different from the previous Motorola circuits in that it does not have a radio frequency stage. The antenna is fed into a specially designed antenna coil to give the full gain in the antenna coil throughout the broadcast band, which antenna coil feeds into the grid of the type 77 autodyne tube, whose function as an autodyne has been previously described.

From the plate circuit of the "77" it feeds into the first I.F. tube with the grounded end of the secondary left open for the insertion of negative A.V.C. voltages. The plate of this first I.F. feeds into the grid circuit of a second I.F. tube with the grounded end of this secondary left open for the insertion of negative A.V.C. voltages. From the plate of the second I.F. tube it feeds into the diode circuit, with the voltages of the secondary of this transformer being rectified with the diode section of the 75 tube. From the plate of this 75 tube it is resistance coupled into the 12-A-5 power tube.

The 12-A-5 power tube is a low impedance Pentode output tube, it having 2 cathodes plus heaters hooked in parallel. The plate impedance of this tube is low in comparison with all other types of Pentodes. Each and every tube of the set is self-biased and by so doing it allows extreme flexibility in the use of power packs. It will be observed in Figure 9 a view is shown of 3 different packs. Any one of the three will work in the Model "44".

The Motorola eliminode circuit is included in the "44" as shown in Figure all wires being filtered, including the dial light wire.

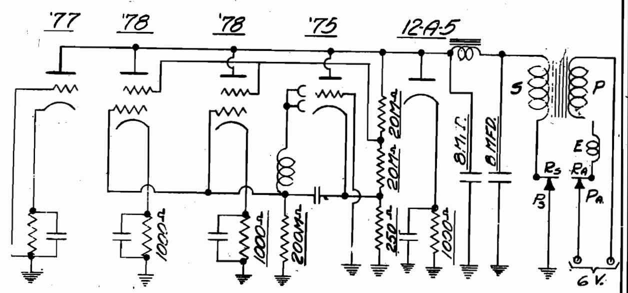


FIGURE 7

Figure 7 shows in simplified form, the method of obtaining bias, principally the 75 tube. You will also observe a simplified "B" supply wiring with all point condensers, etc., left off. This is so the service man can more clearly understand the action of tubeless type power supply.

A little description of the operation of tubeless type "B" supply will install in the serviceman's mind a better feeling of confidence with easier isolation of trouble.

The reed or pendulums marked R_s for secondary side and R_a for primary side are as shown in normal position, that is closed. Upon applying a 6 volt D.C. source at the two terminals marked 6V. the circuit is completed through contact point P_a, through reed R_a, through exciting coil E, then primary of transformer P.

By virtue of the surge of D.C. a flux is immediately set up in the transformer, the flux then producing a voltage much more in the secondary S than in P due to the turn ratio of the two windings. This voltage then, of course, charges up the system.

Due to the current flowing in coil E the reeds are pulled away from their contacts P_s and P_a, but they, being of considerable mass do not move instantly; their motion must be made at their natural period. They are so made mechanically that when the point of saturation of the transformer is reached reed R_s and contact P_s open before contact P_m and reed R_a do. This is accomplished by the amplitude of the secondary being less than the primary (although they are exact in frequency). That allowed the secondary points to open without sparking. Following then the primary points R_a and P_a open, allowing the flux to collapse, this reverse flux discharged through the buffer condenser on secondary and point condenser on primary side.

Since the primary points opened R_a and P_a their exciting coil E could not longer pull on the reed. Due to their natural period they will complete the cycle and return to the original position.

The action of full wave tubeless is identical in principle except the collapse of flux is utilized and aided by use of duplicate windings of P and S on transformer, plus an extra set of points to make reverse contact to reeds.

GALVIN MFG. CO.

MODEL 44
Voltage,
Resistance data
Adjustment notes

TESTING MODEL "44"

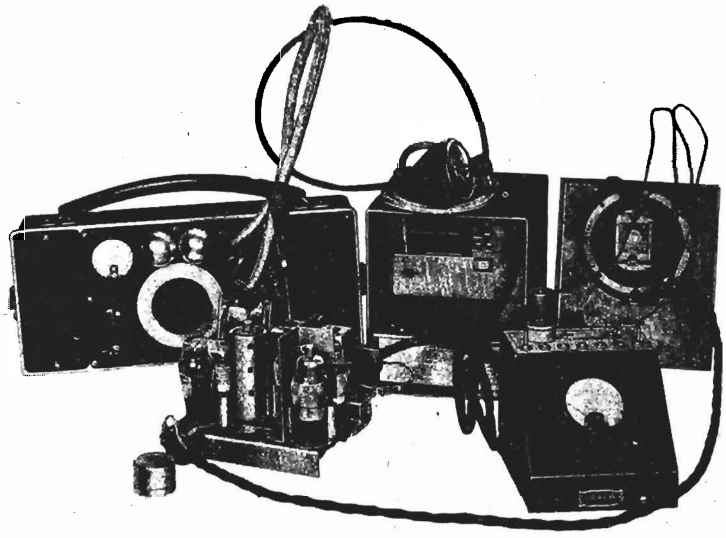


FIGURE 8

The extreme advantage and flexibility of plug-in units is clearly illustrated in Figure 8. Set-up of this nature can be made in the car as well as bench. You will observe in the Figure a Weston Service Oscillator, although any good oscillator should be satisfactory if it attenuates to zero, does not change in frequency when doing so, and at least 30% or better modulation. The Motorola Utility Meter is here shown set for output measurement in its most sensitive position, which is very satisfactory for output measurements across the voice coil where the testing voltage is generally not over 1 volt, maximum of 2.5 volts. The voice coil resistance of the Model "44" speaker is 2.7 ohms.

The oscillator is shown in proper position for I.F. alignment with screw driver in position, for aligning the plate coil of first intermediate transformer. A socket wrench is necessary to align the secondary.

In case it is desired to examine the power pack under operation, two speaker extension cables can be used. This may introduce a little hash but will not interfere in any way with the voltage or an investigation of a bad connection.

With the radio set out as shown in Figure 8 and by referring to Figure 9 , the data given in Table 1 was all taken with a Motorola Utility Meter; or any 1000 per volt voltmeter will be satisfactory.

Figure 9 gives the location of all special positions referred to in the Table. As an additional help we have given a table giving the resistance and inductance of all the coils used in Model "44".

Secondary output transformer (Utah)	.4 ohms	
Primary output transformer	100 ohms	
Primary antenna coil	24 ohms	480 microhenrys
Secondary antenna coil	5 ohms	330 microhenrys
Secondary oscillator coil	4 ohms	137 microhenrys
Primary first I.F.	10 ohms	154 millihenrys
Secondary first I.F.	10 ohms	154 millihenrys
Primary second I.F.	10 ohms	154 millihenrys
Secondary second I.F.	10 ohms	154 millihenrys
Primary diode feeder	15 ohms	2 millihenrys
Secondary diode feeder	15 ohms	2 millihenrys
Speaker voice coil resistance (Utah)	2.7 ohms	

By using the Motorola Utility Meter as a 0 to 1 mill D.C. meter only, the automatic volume control characteristics can be very accurately determined. By placing the 0 to 1 meter across the 200,000 ohm A.V.C. grounding resistor and connecting the antenna onto the radio set:

1. Noise level should produce 1 mill.
2. Strong local stations should produce a 95 mill reading on the meter. The intensity of this reading of course will vary with the field strength of your local station.

By connecting this meter at the .05 condenser in the A.V.C. of the first I.F., as the position shown in Figure 9, the meter should read 1 mill on a station and 0 off station. By connecting the meter between the .05 condenser in the A.V.C. of the second I.F. and ground, the meter should read 15 mills on strong local stations and then go to 0 off stations.

A continued overall audio gain check can be made by applying 110 volts 60 cycle, connecting the grounded end of the 60 cycle to the chassis and working the hot end through a .001 condenser, then completing the circuit through the grid of the 75 tube. With the Motorola Utility Meter connected as shown in Figure 8, a .2 mill reading should be obtained. A slight variation of this might be obtained, but if there is any trouble in the audio circuit it will show up as practically no reading or very slight on the Utility Meter. However, a rough check can be made by just tipping your soldering iron while it is connected to the 110 line onto the grid of the "75". There is enough stray capacity in the soldering iron to produce a 60 cycle hum in the speaker or approximately .2 mill reading on the Utility Meter.

VOLTAGE TEST OF MODEL "44"

A Battery = 6.5 Volts
Power Supply = 200 Volts

AUTODYNE OR 77 TUBE

	Voltage drop across Cathode Resistor			S.G. Volts	Drop Across 2000 Ohm Isolating Resistor In Voltage Divider
	1500 K.C.	1000 K.C.	600 K.C.		
No Signal	4.0 Volts	5.2 Volts	10.5 Volts	112 Volts	.75 Volts
Local Signal	5.5 Volts	7.2 Volts	12.5 Volts	104 Volts	.82 Volts

1ST AND 2ND I.F. OR 78 TUBE

	Voltage Drop Across Cathode Resistor	S.G. Volts
No Signal	4.0 Volts	112 Volts
Local Signal	1.4 Volts	104 Volts

A.V.C. AND 1ST AUDIO OR 75 TUBE

Voltage Drop Across Cathode Resistor. Measurement Made Across 250 ohms at Grounded End of Voltage Divider. 1.1 to not more than 1.5 Volts.	Drop Across 500,000 Ohm Plate Resistor. Use 200 Volt Scale of 1000 Ohm Per Voltmeter	
	No Signal	= 80 Volts
	Local Signal Volume Full On	= Peaks Vary 50 to 80 Volts

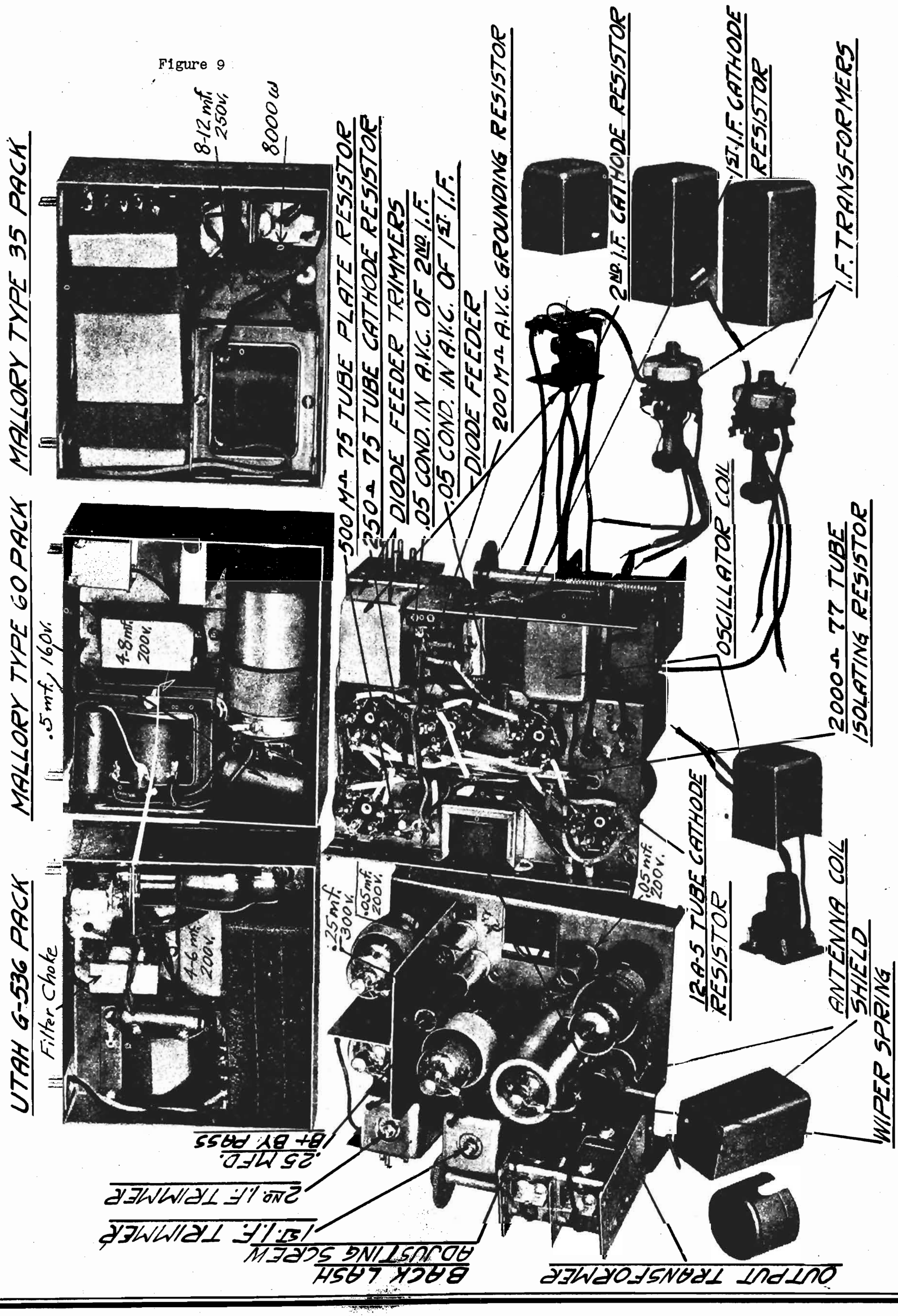
OUTPUT TUBE OR 12-A-5

Two Heaters. Both Should be Lighted.	Voltage Drop Across Cathode Resistor.	D.C. Voltage Drop Across Output Transformer Due to Plate Current.
	28 Volts	18 Volts

MODEL 44
Chassis views

GALVIN MFG. CO.

Figure 9



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MODEL 55
Schematic
Alignment

Motorola Model "55" is a 5-tube superheterodyne. The chassis, "B" power supply and dynamic speaker are assembled in one unit. The "55" is so designed that all component parts are assembled on the speaker plate. By removing all screws except the six hexagon head screws and four round head screws located at the edge of the speaker drill, the entire set may be dropped out of the outer housing for servicing or tube replacement.

SERVICING MODEL "55"

After removing the outer housing, the chassis can be inverted and the six hexagon head screws removed. After removing these screws, the speaker plate and speaker may be lifted off and placed at the side of the chassis without disconnecting the speaker wires. After this has been done, all wiring will be exposed and easily accessible for service.

Care should be used in reassembling so the speaker wires do not get pinched under the speaker "pot".

Reference to the circuit diagrams will show that resistance values from the various parts are given so the set may be completely analyzed by resistance method.

ALIGNMENT OF I.F. TRANSFORMERS AND TUNING CONDENSERS

The method of aligning the I.F. transformers at 456 kilocycles and the alignment of the gang tuning condensers is the same as used in Model "77".

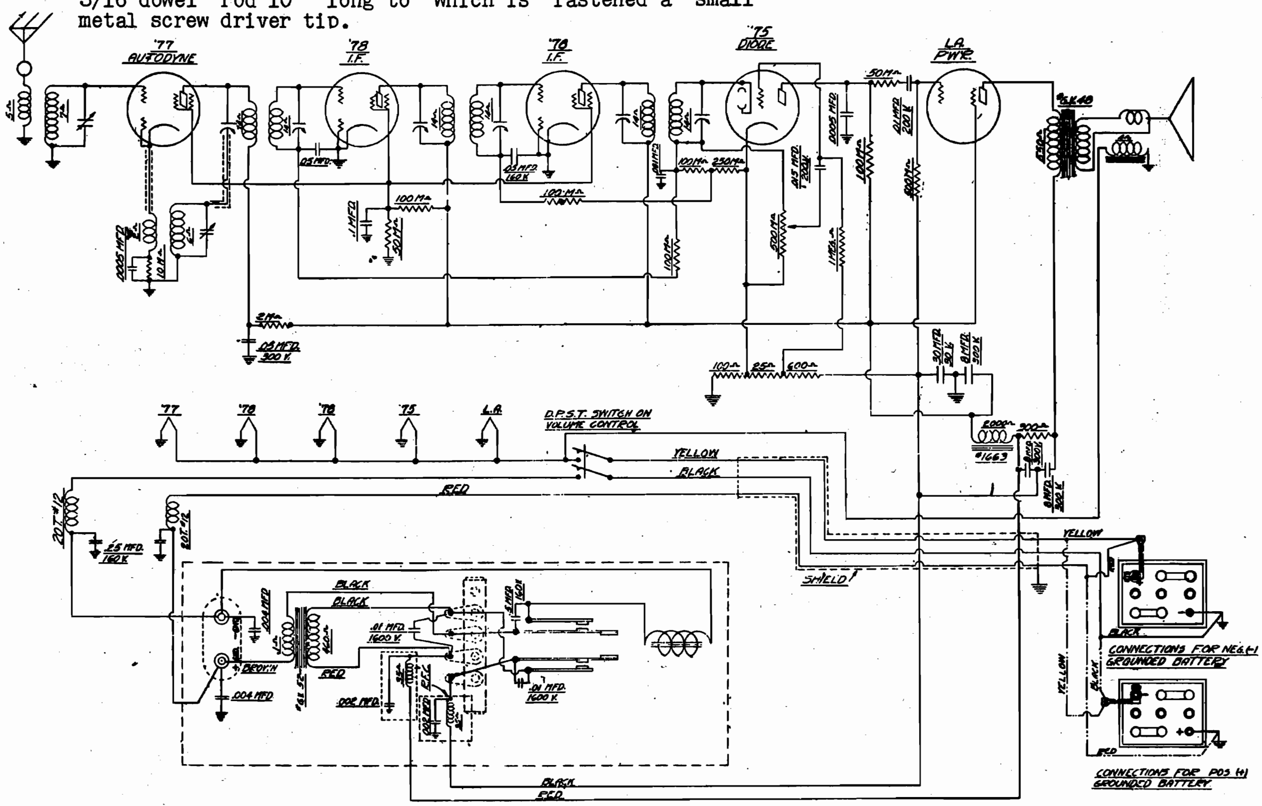
In the alignment of I.F. transformers it will be noted that the third I.F. transformer or diode feeder may be reached with a non-metallic screw driver inserted in the hole provided in the upper part of the chassis located between the first I.F. transformer and the "B" power supply housing. This screw driver may be a piece of 3/16 dowel rod 10" long to which is fastened a small metal screw driver tip.

Any of the various units of the Model "55" may be removed individually for repairing or replacement without disturbing other units.

"B" POWER SUPPLY

The self-rectifying Elkonode is also used in the Model "55". This along with the power transformer are housed in a single unit in the upper right corner of the chassis. The complete power unit may be removed by disconnecting the two "A" supply leads at the power unit terminal strip and disconnecting the B- (minus and B plus) leads at their respective terminals located on the set chassis. Should the Elkonode require replacement it may be removed by disconnecting the four wires extending from its sponge rubber housing and connecting the new unit as shown in Figure CH-55-B

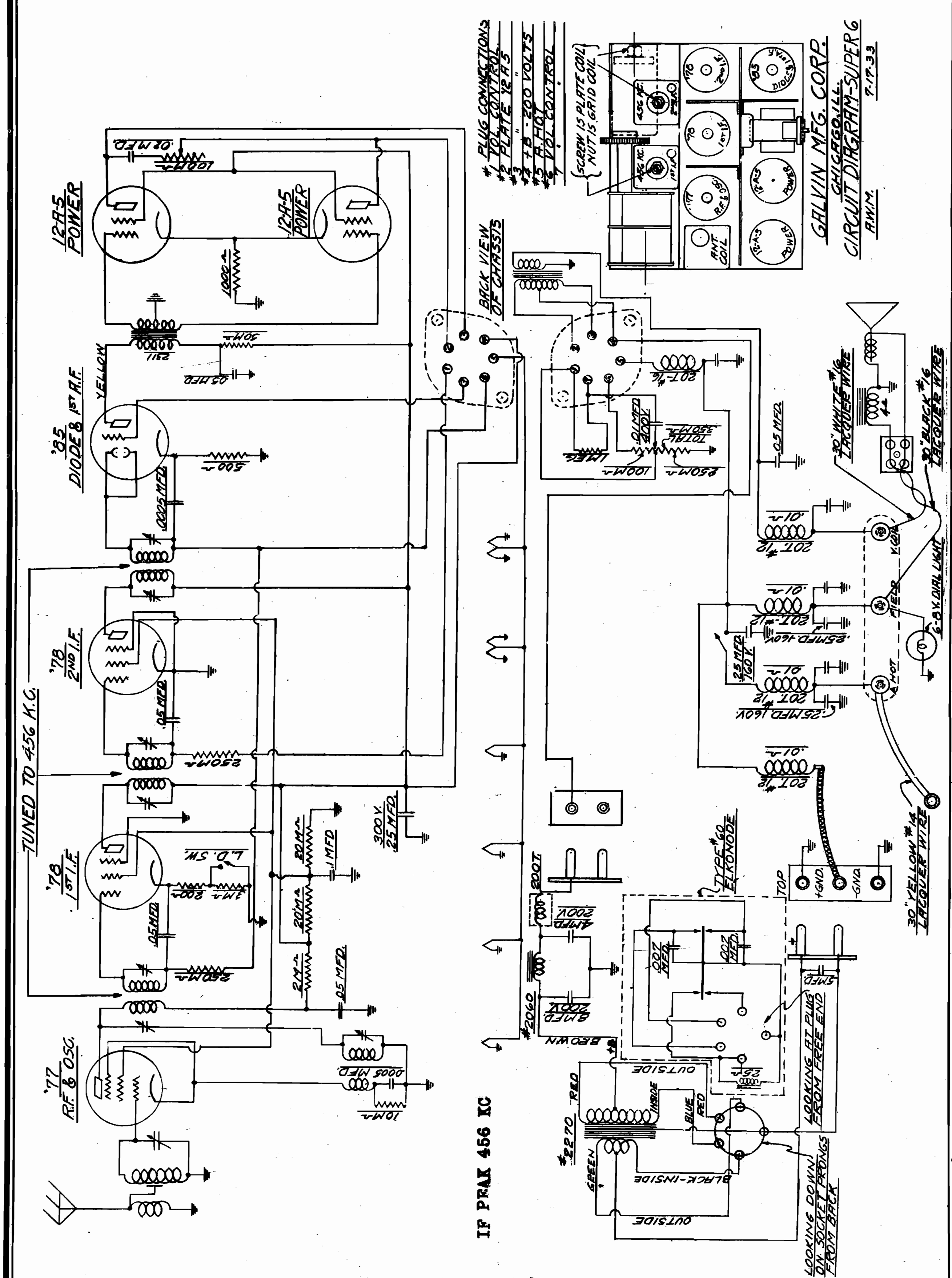
CAUTION: Do not attempt to make any adjustments to Elkonode.



GALVIN MFG. CORP.
CHICAGO ILL.
CIRCUIT DIAGRAM MODEL #55

MODEL 66
Schematic
Socket layout

GALVIN MFG. CO.



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MODEL 77
Schematic

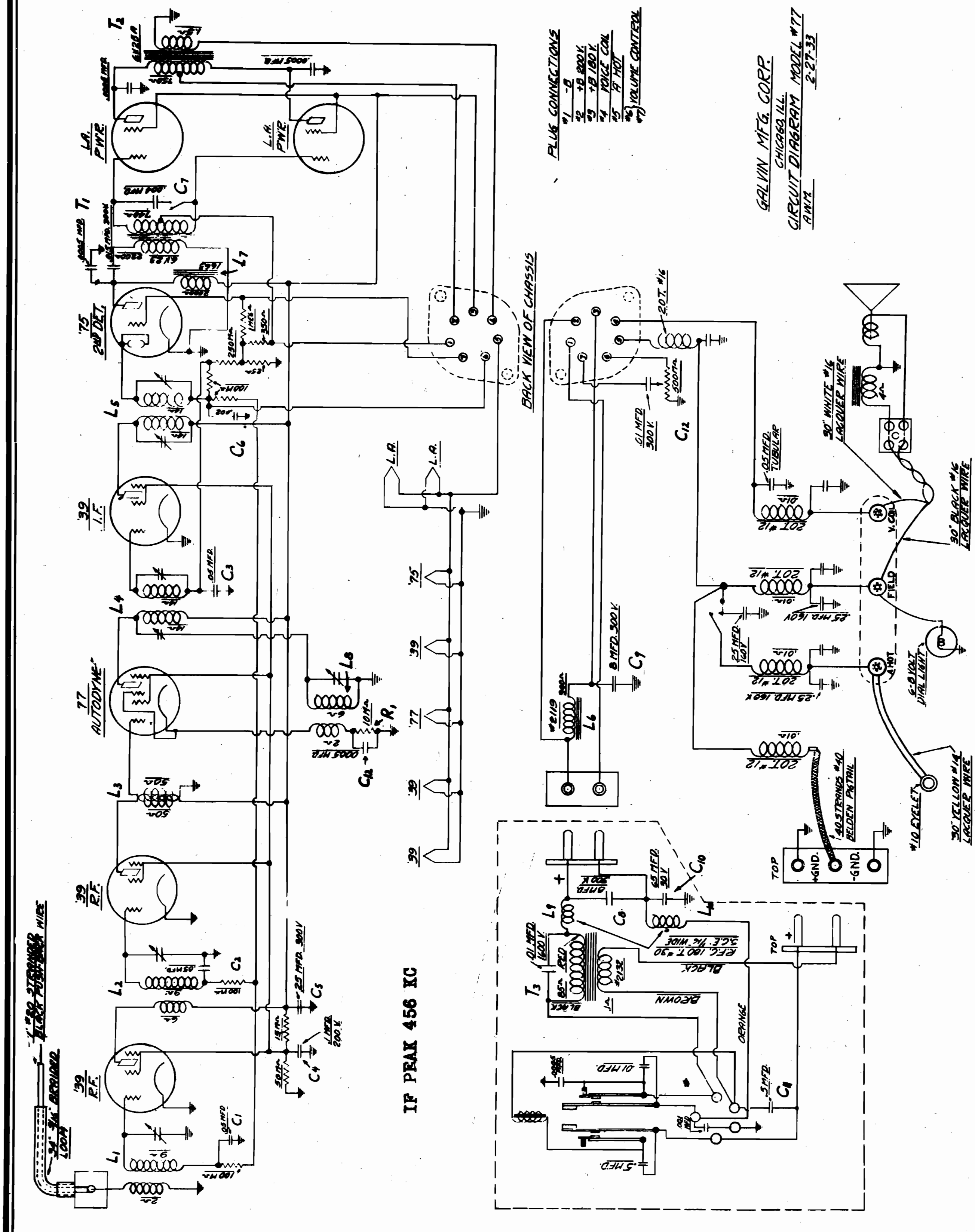

Figure 2

MODEL 77-A
Schematic

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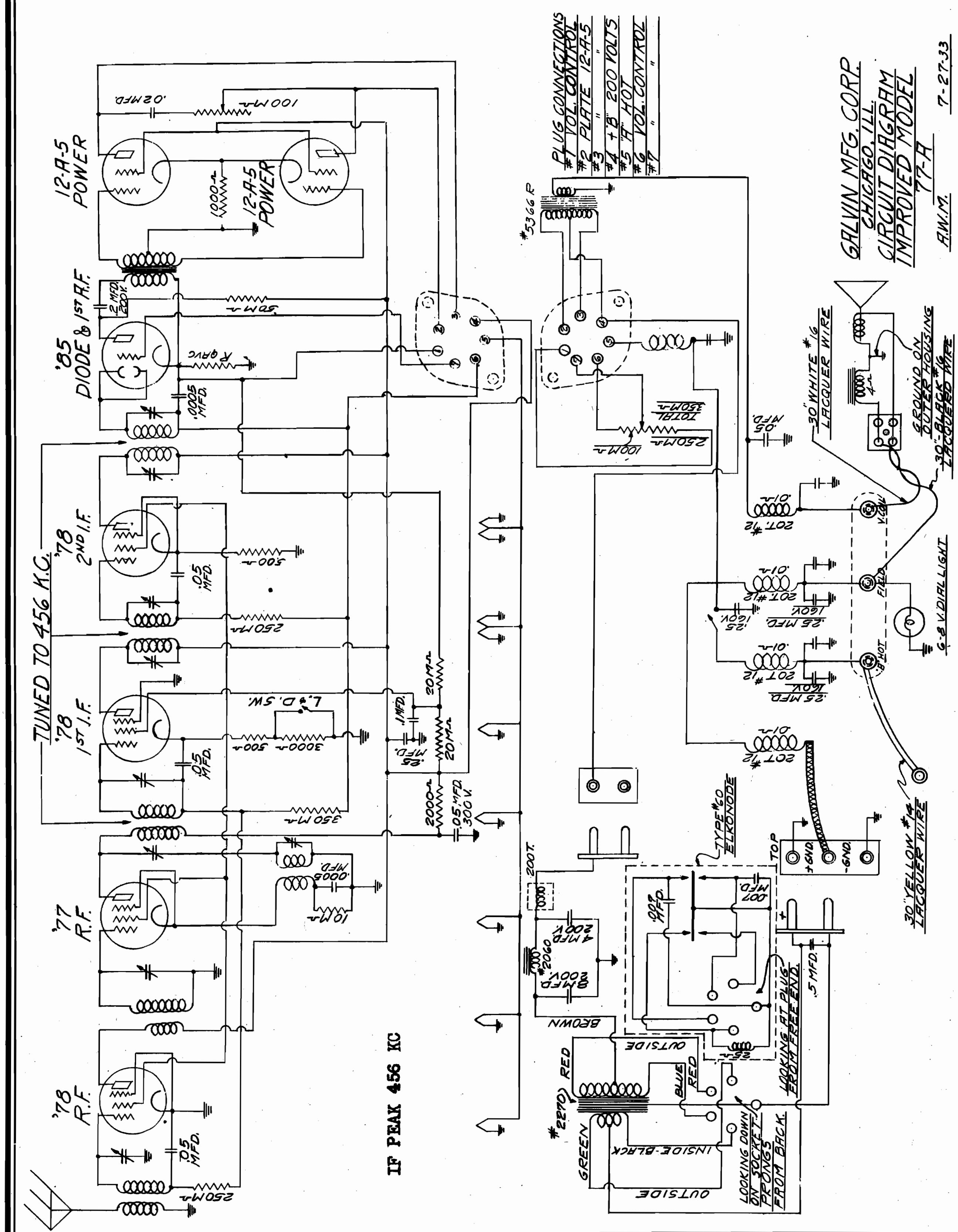

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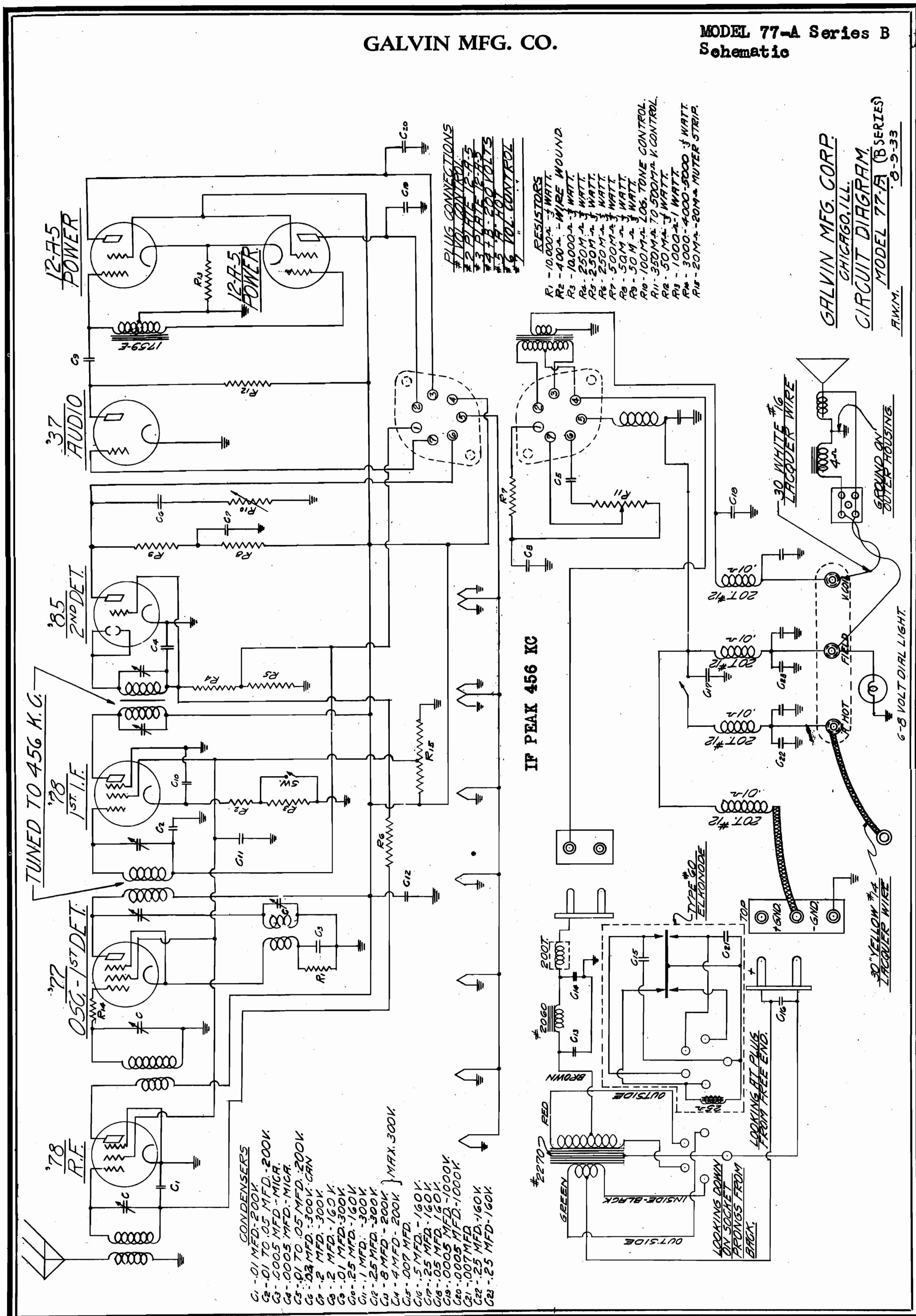
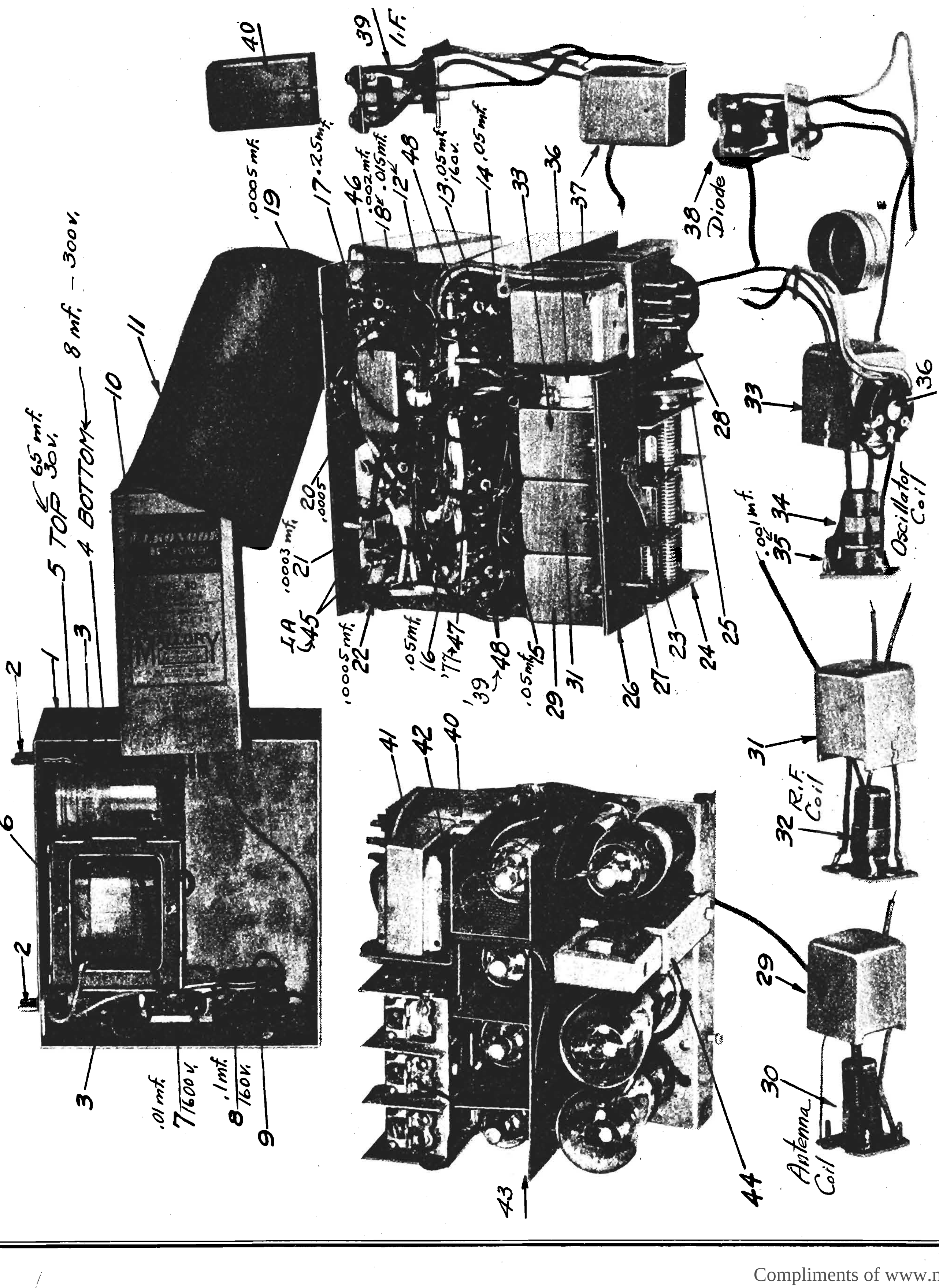
MODEL 77-A Series B
Schematic



MODEL 77
Chassis views

GALVIN MFG. CO.



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MODEL 77
Notes

SERVICING "77"

In servicing the Model 77 use of the service extension cable is highly recommended and its convenience either in the car or on a bench is clearly illustrated in Photograph Extension Cable Test, Figure 8, Page 17.

(While photograph shows the Model "44" the same method and instrument apply to the "77") you will note the extension cable plugged into the housing and a test oscillator applied to the grid of the "77" autodyne. The output meter has been connected across the voice coil, one connection at the voice coil, the other connection at the output meter to ground and the output meter set on the one volt scale. This method should be satisfactory in the Model "77" if the percentage of modulation of your local test oscillator is at least 30%, but in case in trying to align the I.F.'s in accordance with information given on Page 9, you find that you are not able to reach satisfactory resonance point with the I.F.'s, then a sensitive D.C. instrument such as a microammeter or not greater than a 0 to 1 milliammeter will have to be placed from terminal No.6 on the chassis plug to ground. This places the meter across the diode network, reading the actual R.F. component in the diode circuit. Then with that combination pronounced peaks can be very easily noticed, provided the I.F. transformers are in proper condition. After the I.F.'s have been properly aligned the procedure, as outlined on Page 9, should be carried out to conclusion. For those servicemen equipped with standard signal generators, the A.V.C. curve of this radio should begin flattening out at 10 microvolts and be on a complete flat portion of the curve at 30 to 40 microvolts and should remain absolutely flat from thereon out to 1 volt.

"77" "B" POWER SUPPLY

Model "77" uses a self-rectifying Elkonode which eliminates the rectifier tube used in former Motorola all-electric models. The yellow "A" lead of the "77" may be connected to any point on the electrical system of the car....ammeter, starter button or battery.

It is necessary to maintain a definite polarity at the Elkonode. For this purpose a polarity changing switch has been provided at the rear of the set housing. The polarity is indicated through a small hold at the lower right rear corner of the set housing. If a red disc appears in the window which reads plus (+) ground, it means that the "B" supply unit is set to be used in cars having the positive side of the battery grounded. If a black disc appears which reads minus (-) ground, it means that the "B" supply unit is set to be used in cars having the negative side of battery grounded. Be sure to determine exactly which side of the car battery is grounded. Then be sure that the marking on the indicator corresponds with it. To change the polarity proceed as follows:

(1) Remove "B" supply unit by prying with screw driver in the slots provided on either side of the "B" power unit.

(2) After removal of the "B" power unit you will observe two receptacles on the rear partition - one on the left and one on the right. The one on the left side requires no adjustments but the one on the right side may be moved up or down in its slot.

(3) Insert a small shank screw driver or ice pick in one of the jacks of this receptacle and adjust up or down for desired indication in window.

(4) Replace "B" power supply.

MAKES OF CARS HAVING "POSITIVE" GROUND - Marmon - De Soto - Cadillac - Pierce-Arrow - Dodge - Packard - Graham - Plymouth - Studebaker - Auburn - Hupp. - Franklin - Rockne - Ford - Chrysler - Nash Twin Ignition.

MAKES OF CARS HAVING "NEGATIVE" GROUND - Reo - Chevrolet - Stutz - Willys-Overland - James Cunningham - Lincoln - Continental - Buick - Oldsmobile - Pontiac - Hudson - Essex - Nash Single Ignition.

For any cars not listed phone earest car distributor or dealer.

Access may be gained to the interior of power supply for service by removing the round head screws which hold the bottom cover plate and remove this plate.

It will be noted that the connections to the Elkonode are made by means of a floating socket and to replace, it is only necessary to pull the Elkonode out of the socket.

CAUTION: When replacing Elkonode make sure that it lies with the label either down or up, but not on the sides. This is extremely important for if placed on the side the vibrating reeds will pull against gravity and their life will be shortened.

REMOVAL OF "77" PARTS FOR REPLACEMENT

Almost all the parts of the chassis assembly, "B" power assembly and outer housing assembly may be removed for replacement without disturbing any other units. There are several, however, which cannot be removed individually. Therefore, to remove the antenna coil, the second R.F. coil or the oscillator coil, it will be necessary to remove the tubes from the chassis and remove the tube shield which is held in place by two sheet metal screws. The screws holding the coil cans may now be reached and removed.

To remove the I.F. transformer it will be necessary to remove the transformer mounting bracket to which the I.F. unit is attached.

To remove the diode feeder, loosen the transformer mounting bracket and it can be moved sufficiently to get at the screws holding the diode feeder unit. To remove volume control unit (located in the rear of the set housing) remove screws holding worm gear bracket and volume control bracket. Disconnect all leads to the switch and volume control. The volume control assembly may now be removed and replaced with a new unit, care being taken in reassembling.

All by-pass condensers except the R.F. plate by-pass are of the tubular type and are set in thimbles in the chassis. Should any one prove defective it may be pushed out and replaced.

On Models "44" and "77" if complaints are made of noisy reception over bumpy road and tapping each tube does not disclose a bad tube, pounding chassis does not show a defective solder joint, tapping roof antenna does not show a vibrating ground, plugs are clean and making good contact, check the condition of ground of variable condenser to chassis. On Model "77" there should be a wire grounding variable condenser to chassis wiper Figure 5. On Model "44" clean off wiper spring to insure its making good ground. Then by placing a screw driver through the antenna trimmer hole check the back-lash in worm gear, driving variable condenser. It frequently occurs when chassis has been exchanged in housing, that the new chassis has not had proper backlash adjustment. This allows the variable to jump off station on bumpy roads and chatter.

MOTOROLA
Testing data
Alignment data

GALVIN MFG. CO.

TESTING PRACTICE

The success of a Superheterodyne rests, to a large extent, on the proper choice and use of an intermediate frequency unit. The frequency to which they are aligned, of course, is determined by the mechanical design of the variable condenser. The plates of the variable condenser used in our design are laid out mechanically to produce a frequency differential of 175 kilocycles, or 456 kilocycles, depending upon model, and if the setting of the oscillator trimmer with respect to the radio frequency trimmer has been disturbed it will be necessary to realign. The realignment is accomplished by the use of an oscillator. The circuit diagram of the oscillator is shown on the left hand side of Figure F with its proper application to a Motorola.

In case an oscillator set-up similar to Figure F, is used, some means of reading the output of this oscillator must be provided. The oscillator may be modulated by inserting a bell ringing transformer at point "X" or the "B"

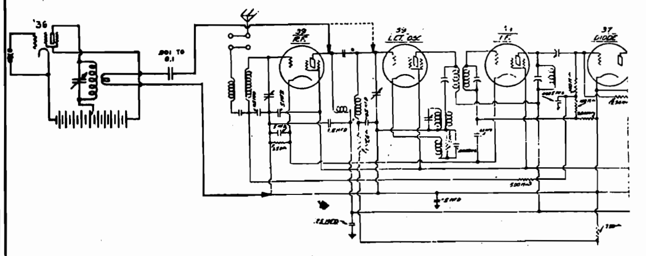

FIGURE F

supply may be taken from the 110 A.C. lines. Since most oscillators furnished with service kits are modulated, the only problem is that of reading the output.

While the ear can be used for some purposes, it is not dependable and when there are so many output meters on the market it is folly to use the ear for any kind of service work except harmonic analysis. It is not recommended that intermediate frequency units be adjusted by the ear or by air test. The only safe and sure way is by means of the modulated oscillator fitted into either one of the two points shown in Figure F, depending, of course, upon the strength of the local oscillator and by reading the output with an output meter across the plate terminal of the speaker or voice coil

ALIGNMENT OF CUT PLATE VARIABLE CONDENSERS

The alignment of cut plate variable condensers, the type used in Motorola, differs from the alignment of the variable condenser with a padder, in that the cut plate condenser has a fixed mechanical ratio between the capacities of its sections. In the past it has been possible with padders to align the condenser with an accuracy of ten degrees of rotation of the condenser plates - that is, it could be set at the high frequency end with all trimmers in alignment and then could be re-aligned at the low frequency end by rocking the condenser while adjusting the padder, thereby finding the point of proper alignment. This procedure cannot be used with a cut plate condenser.

The simplest and easiest way to align a cut plate condenser is as follows: Use a standard test service oscillator and output meter. Connect a 200 mfd. condenser in series with the antenna lead of the oscillator and connect to the antenna of the radio set. CAUTION: Before proceeding be sure that the I. F. transformers have been tuned to exactly I. F. frequency. This is absolutely necessary otherwise the proper alignment of the variable condensers can never be attained. After assurance that the I. F.'s are in correct alignment, set the test oscillator to approximately 1400 kilocycles and apply this energy to the antenna post of the radio set. If this frequency is accurately known you can get approximately the correct starting position by setting the pointer on Model "77" to the indicated frequency. However, if it is not known it is not essential.

Align all three trimmers to 1400 kilocycles. Then move the variable condenser to approximately the 600 kilocycle position and check the alignment of the second radio frequency trimmer. If it is found that the trimmer must be moved either in or out to return to resonance it is an indication that the variable condenser is not at correct starting position for the initial setting of the test oscillator. If, for example, it is found that the trimmer must be screwed down, it is an indication that the radio frequency tuning condenser requires more capacity at the low frequency end. Therefore, return to the initial high frequency setting of the condenser. Change your test oscillator to correspond with this setting of the condenser. It is not necessary to return to the exact setting you originally had. Readjust the second radio frequency trimmer which was moved when it was in the low frequency position. This will restore it to its initial setting of the oscillator trimmer.

Remember the second radio frequency condenser needs more capacity at the low frequency end so it is necessary to move the condenser a few degrees inward, which gives more capacity to this condenser, leaving the test oscillator in the same position. Screw the oscillator trimmer until the signal is brought back, then go over all three trimmers to assure yourself that they are in perfect alignment. Move the variable condensers back to approximately 600 kilocycles and re-check the second radio frequency trimmer the second time, and if the condenser had been moved sufficiently while you were at the high frequency end the R.F. trimmer will show resonance. If it was moved too far it will be indicated by having to move the radio frequency trimmer out instead of having to tighten it, as was necessary in the first trial.

After having found the proper starting point so that the second R.F. and oscillator trimmers are in alignment, the antenna stage should fall in exact alignment with the second radio frequency condenser. If it does not it may be necessary to bend the end plate sections slightly in order to align it with the second R. F. tuning condenser.

In the above set-up caution should be taken to see that the points chosen in which to align the radio set are in channels that are not occupied by a local broadcast station. This often upsets the measurements and you find you are tuning to the heterodyne beat occurring between your local test oscillator and the local broadcast station. This, of course, will tend to give a double peak.

You realize the value of isolating the trouble in a radio before starting to repair it. If the tone quality is bad, the first thing to do is check the output tubes and read their plate currents so as to get a suitable match. If that checks O. K. the following suggestion might be helpful.

Examine the speaker for rubbing voice coil, this being a quite common occurrence in all automobile installations as the speaker in auto radios is exposed to a great deal more direct dust and mechanical vibrations than home set speakers and as a result speaker failures are a little more frequent in auto sets than in home sets. The examination for rubbing a voice coil requires a little practice and we suggest that you get the feel of the cone movement of a speaker known to be good and listen while moving to see if the voice coil is rubbing. Observe while testing this speaker known to be good how easily a voice coil can be made to rub by unequal pressure on the side of the cone. Therefore, while checking the speaker suspected to be bad, profit by the experience gained from the good speaker.

A rubbing voice coil sounds similar to two pieces of sand paper being very lightly rubbed together. If you are still in doubt the application of 50 volts 60 cycle across the two outside terminals of the output transformer, the two "B" terminals, will cause the speaker to pump sufficiently, and if the voice coil is rubbing, noise will emit from the speaker instead of a perfectly free hum.

If the speaker sounds satisfactory see if the hum is equal on both halves of the output transformer, and if the speaker passes the above test it is evidently not the cause of the trouble. A customary set analysis as to the bias readings, etc., should indicate the trouble.

All of the above tests can be simplified if the service man has a spare chassis known to be good or a spare speaker which can be substituted to quickly isolate the trouble.

GENERAL ELECTRIC CO.

General Electric Modern Longfellow Grandfather Clock-Radio

Models H-91 and H-91-R

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts
Frequency Rating	50–60 Cycles or 25–40 Cycles
Power Consumption	120 Watts
Recommended Antenna Length	25–75 Feet
Type of Circuit	A. C. Screen Grid Super-Heterodyne
Number of Radiotrons	3 RCA-235, 1 UY-224, 3 UY-227, 2 RCA-247, 1 UX-280—Total of 10
Number of Radio Frequency Stages	One
Type of First Detector	Tuned Input Grid Bias
Number of Intermediate Stages	Two
Type of Second Detector	Power Grid Bias
Type of Automatic Volume Control	UY-227
(Controlling bias voltage on R. F. and I. F. stages by means of drop across resistor in plate circuit)	
Number of Audio Stages	One (Push-Pull)
Type of Rectifier	Full Wave, UX-280
Type of Loudspeaker	Dynamic with Special High Frequency Filter
Wattage Dissipation in Loudspeaker Field	Ten
Undistorted Output	Four Watts

PHYSICAL SPECIFICATIONS

Height	78 Inches
Depth	14¼ Inches
Width	17½ Inches
Weight (Packed for Shipment)	205 Pounds
Weight (Alone)	136 Pounds
Packing Case Dimensions	81½ Inches x 21¼ Inches x 19 Inches

INTRODUCTION

General Electric Radio, Models H–91 and H–91–R are ten tube, Super-Heterodyne type radio receivers incorporated in the cabinet of a massive electric Grandfather clock. Mechanical and electrical excellence together with the beauty of fine period furniture characterize this instrument.

Model H–91 is a straight radio receiver and model H–91–R is of the remote control type. Ten Radiotrons are used, three RCA-235 as R. F., and I. F. stages one UY-224 as first detector, three UY-227 as oscillator, automatic volume control and 2nd detector; two RCA-247 as the power output stage and one UX-280 as the rectifier.

These instruments, with the exception of the cabinet are similar to the model H–51 and H–51–R except than an automatic volume control tube and Radiotrons RCA-235 and RCA-247 in the R. F., I. F. and Power stages, have been included. For service data other than on the remote control unit that is applicable to vertical operation and on the automatic volume control circuit, reference should be made to the Service Notes already issued on the Model H–51 and H–51–R.

MODEL H-91
Schematic

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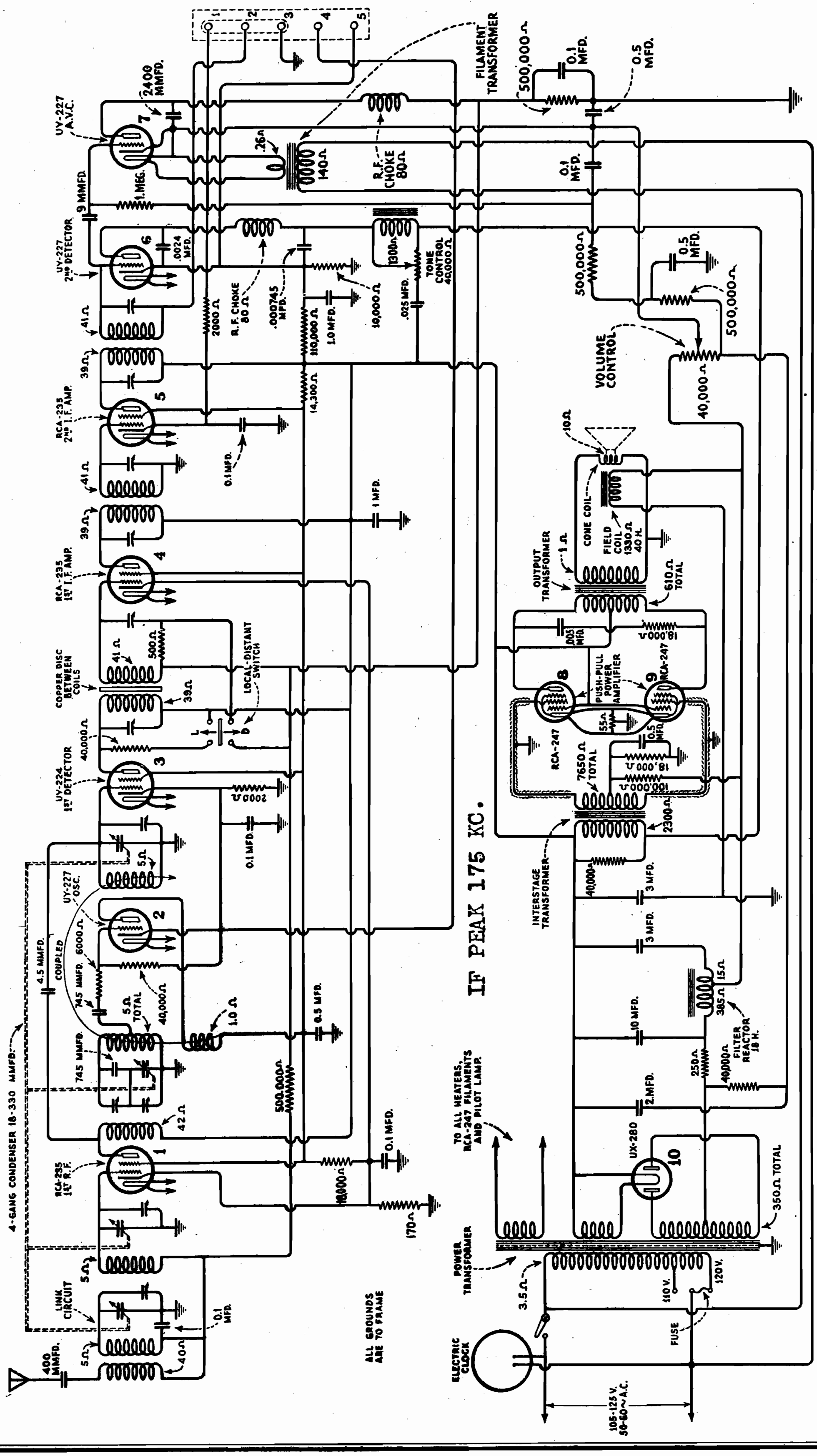


Figure 1—Schematic Diagram of Model H-91

GENERAL ELECTRIC CO.

ELECTRICAL DESCRIPTION OF CIRCUIT

With the exception of the automatic volume control, the circuit used in the H–91 and H–91–R is identical to that used in the model H–51. A description of the functioning of the circuit is contained in the H–51 Service Notes. A description of the automatic volume control circuit follows:

The automatic volume control is so arranged that it will maintain the same level of output volume over a wide range of signal intensities. This is accomplished by means of a UY-227 so arranged in the circuit, that its grid swings with that of the second detector and its plate voltage is obtained from a position more negative in the circuit than that of the R. F. and I. F. amplifiers.

Referring to Figures 1 or 2 it will be seen that when a signal is received the second detector and the automatic volume control grids will swing together due to their grids being connected together through the 9 mmfd. condenser. Assume the grid voltage to be at such a value as to increase the plate current in each tube. Examining the volume control tube we find an increase of plate current will cause a greater voltage drop across the 500,000 ohm resistor than would exist when no signal was tuned in. Examining the connections to each side of this resistor we find that the voltage drop across it constitutes the grid bias for the R. F. and first I. F. amplifier. Thus a loud signal will increase the voltage drop across this resistor and increase the bias on the R. F. and first I. F. amplifier. This in turn reduces the signal at the volume control grid.

The manual volume control is a potentiometer for regulating the bias on the volume control tube, this in turn regulating the amount of plate current in the tube, which consequently regulates the intensity of the input signal applied to the second detector. A setting of the manual volume control that will give maximum plate current will give a maximum bias and a minimum volume. A setting giving minimum plate current will therefore give the greatest volume.

SERVICE DATA

A reference to the Service Notes already published on Models H–31, H–51 and H–51–R will give the details of any service work necessary in Models H–91 and H–91–R. The diagrams are somewhat different however and are contained in the following pages. The replacement parts are given on pages 16, 17 and 18.

(1) R. F., OSCILLATOR AND I. F. ADJUSTMENTS

In making any adjustments on these receivers that involve the use of an output meter to indicate the correct setting of capacitors, the volume control tube will function to defeat the use of an output device. It is therefore necessary to remove the Radiotron UY-227 from the volume control socket and substitute a "dummy" Radiotron UY-227 for it. (A "dummy" Radiotron is one that has one heater prong removed but is otherwise O. K.) Do not attempt to make these adjustments by setting the volume control at maximum as incorrect results will be obtained.

(2) ADJUSTMENT OF ARMATURE IN MODEL H–91–R

The remote control mechanism used in Model H–91–R is the same as that used in the H–51–R with the exception of slight changes made necessary for vertical operation. The spring in the H–51 that holds the armature in the "volume control" position has been omitted. An additional spring has been added at the lower end of the motor to help overcome the effects of gravity. The spring is so adjusted that the volume control voltage (18 volts) will not cause the armature to rise. The station selector voltage (23 volts) however, does cause the armature to rise and thereby engage the station selector gear. To adjust the armature spring in Model H–91–R refer to Figure 3 and proceed as follows:

1. Place the instrument in operation in the usual manner. Remove the cover over the remote control unit. If chassis has been removed from cabinet adjustments *must* be made in a vertical position. Do not use the manual station selector unless the chassis is vertical as damage to the gears will result.
2. Push either the + or the — volume control button on the control panel. The armature should not rise and engage the station selector gear.
3. Push one of the station selector buttons. The armature should rise and completely engage the station selector gear. If this does not occur, then the tension of the spring must be increased.

MODEL H-91-R
Schematic

GENERAL ELECTRIC CO.

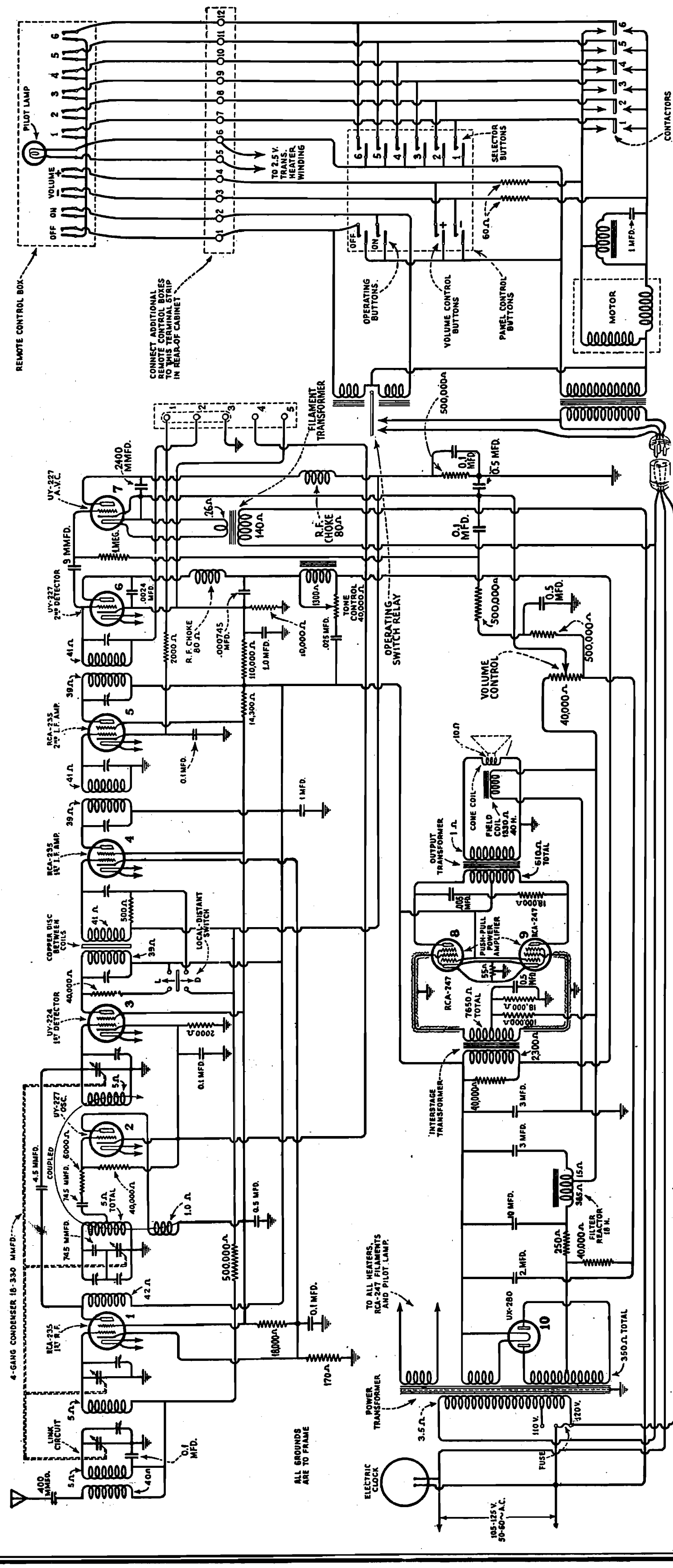


Figure 2—Schematic Diagram of Model H-91-R

IF PEAK 175 KC.

GENERAL ELECTRIC CO.

MODEL H-91, H-91-R
Remote control notes
Voltage data

4. With a small end wrench loosen the nuts and increase the tension of the spring until the armature just rises when the volume control buttons are pressed. Then decrease the tension slightly until the armature fails to rise when the volume control buttons are pressed.

When the station selector buttons are pressed the increased speed of the motor will now cause the armature to rise easily and fully engage the station selector gear.

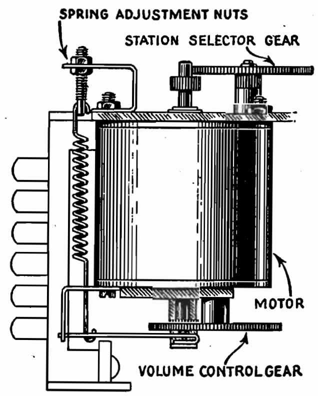


Figure 3—View of remote control motor

(3) VOLTAGE READINGS AT RADIOTRON SOCKETS

The following voltages taken at each Radiotron socket with the receiver in operating condition should prove of value when checking with test sets such as the Weston Model 547, or others giving similar readings. The plate currents shown are not necessarily accurate for each tube, as the cable in the test set will cause some circuits to oscillate, due to its added capacity. Small variations of voltages will be caused by different tubes and line voltages. Therefore, the following values must be taken as approximately those that will be found under varying conditions. The numbers in column 1 indicate the tube socket numbers shown in Figures 8 and 9.

RADIOTRON SOCKET VOLTAGES

120 VOLTS A. C. LINE

These Voltages are obtained with the usual set analyzer and are not the exact voltages at which the Radiotrons operate.

VOLUME CONTROL AT MINIMUM

Radiotron No.	Cathode to Heater Volts	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Screen Grid Current M. A.	Heater or Filament Volts
1	*0	*0	85	240	0	0	2.2
2	10	0	—	60	5.5	—	2.2
3	8.0	8.0	80	230	0.5	0	2.2
4	0	50	85	240	0	0	2.2
5	6.0	6.0	80	230	3.0	0.5	2.2
6	20	20	—	205	0.5	—	2.2
7	0	0	—	20	0	—	2.2
8	—	*12	245	235	22	6.0	2.2
9	—	*12	245	235	22	6.0	2.2

VOLUME CONTROL AT MAXIMUM

Radiotron No.	Cathode to Heater Volts	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Screen Grid Current M. A.	Heater or Filament Volts
1	*0	*0	72	235	5.0	0.75	2.2
2	8	0	—	55	5.0	—	2.2
3	6.5	6.5	65	225	0.5	0	2.2
4	0	0	75	240	5.0	0.75	2.2
5	4.5	4.5	70	225	2.5	0.5	2.2
6	20	20	—	200	0.5	—	2.2
7	0	0	—	25	0	—	2.2
8	—	*12	245	235	22	6.0	2.2
9	—	*12	245	235	22	6.0	2.2

* Not true reading due to resistance in circuit.

MODEL H-91
Chassis wiring of
receiver

GENERAL ELECTRIC CO.

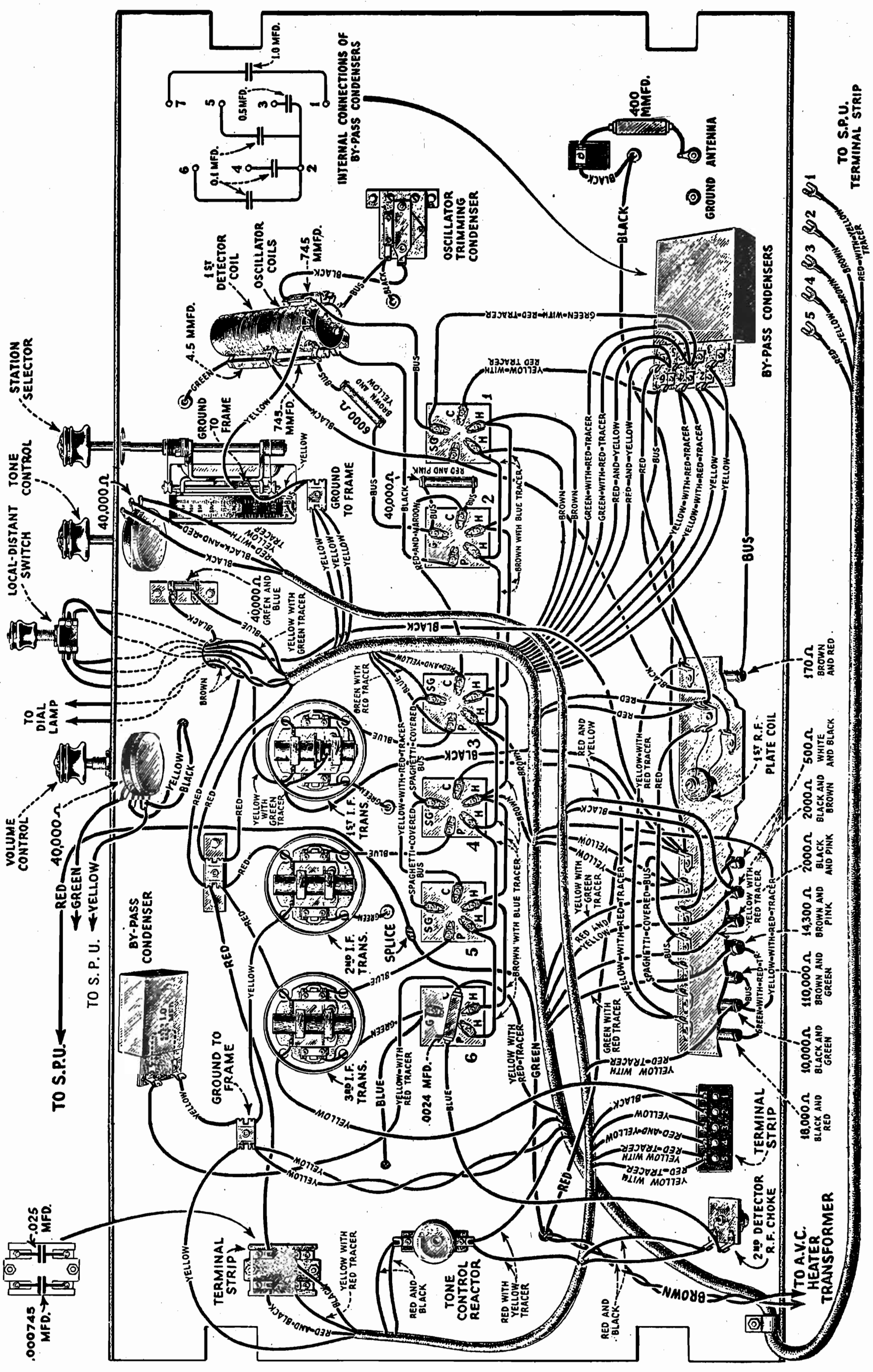


Figure 4—Wiring Diagram of Model H-91 Receiver Assembly

GENERAL ELECTRIC CO.

MODEL H-91-R
Chassis wiring of receiver

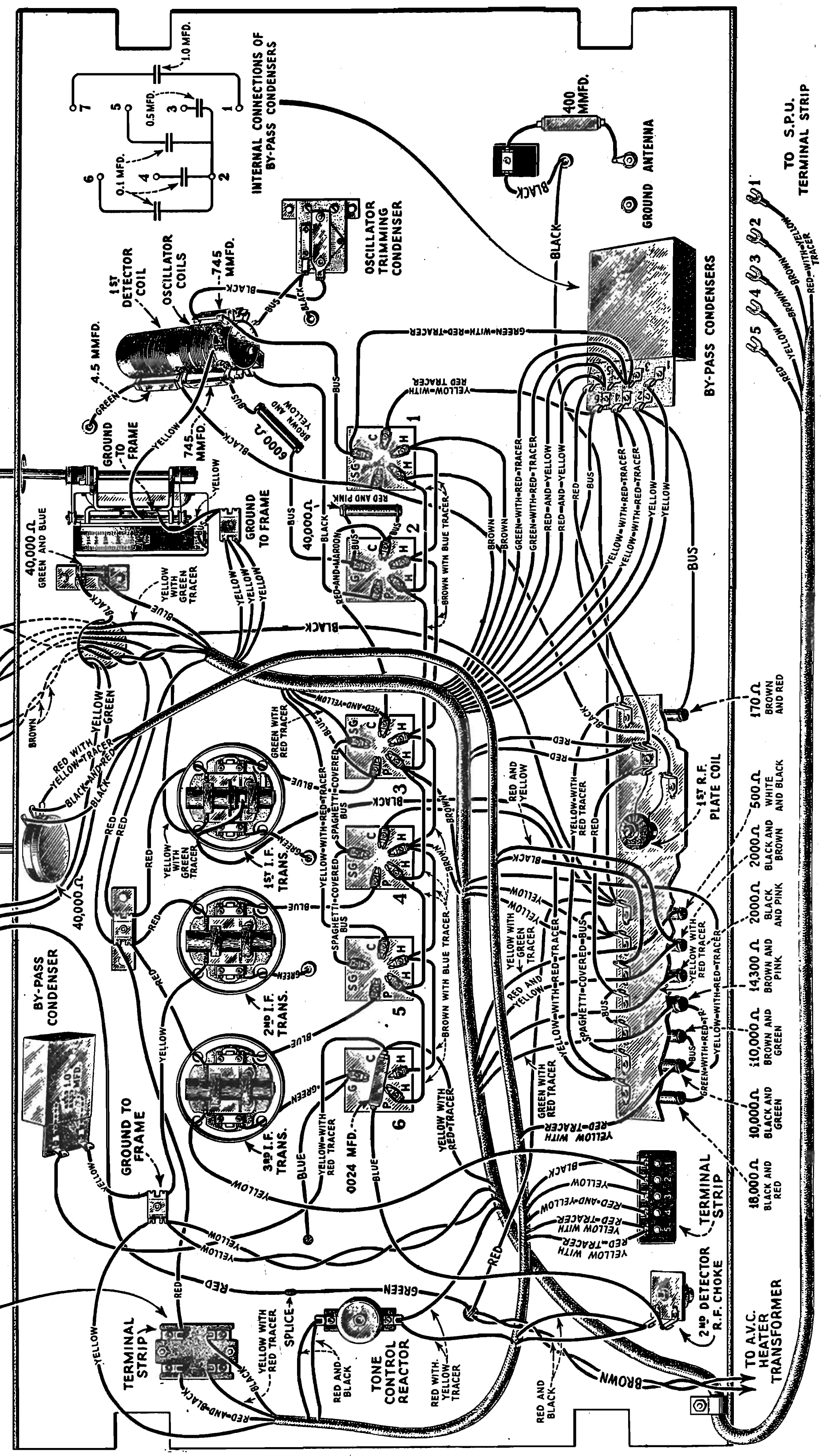


Figure 5—Wiring Diagram of Model H-91-R Receiver Assembly

MODEL H-91 SPU
Chassis wiring

GENERAL ELECTRIC CO.

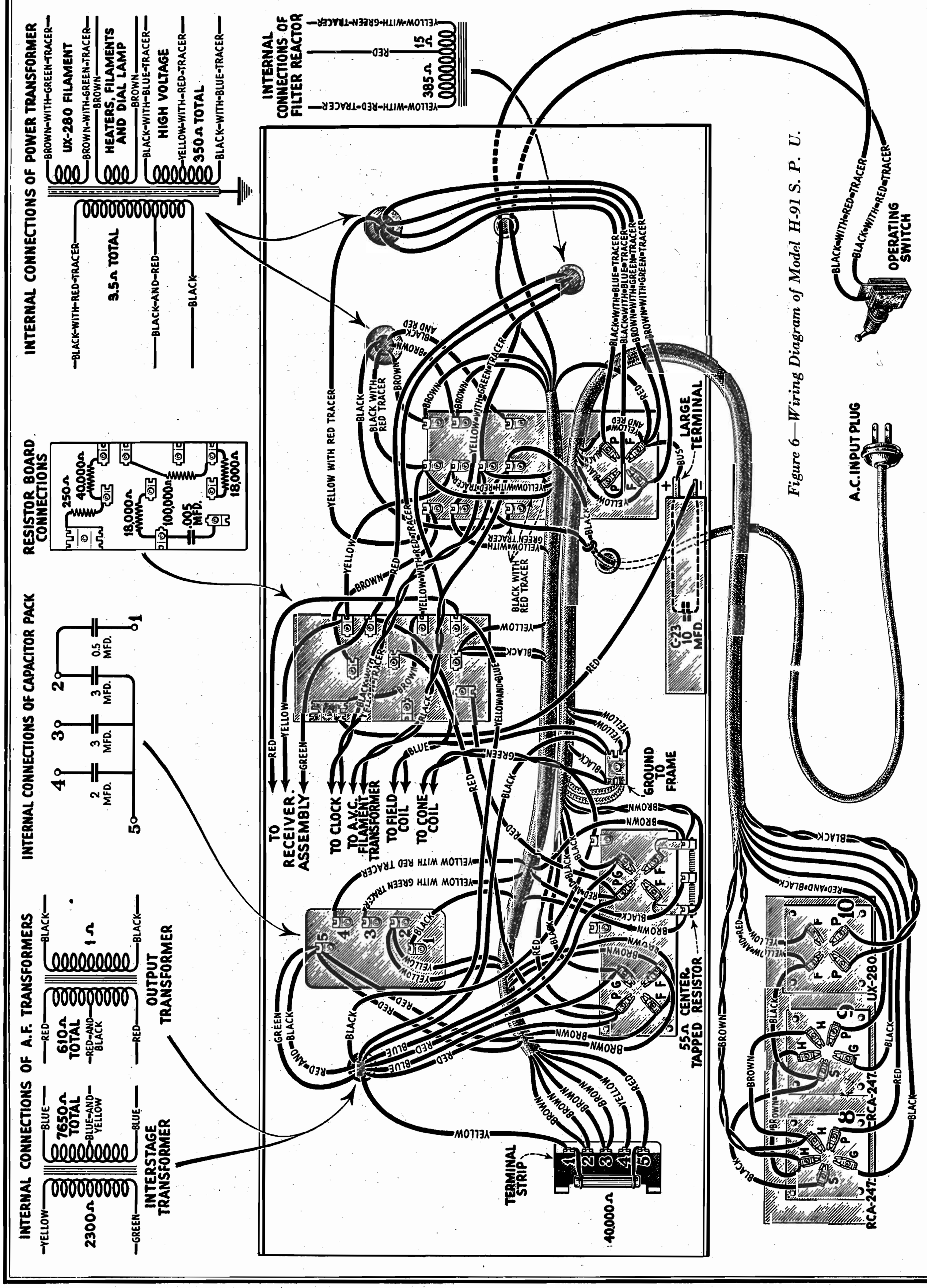


Figure 6—Wiring Diagram of Model H-91 S. P. U.

GENERAL ELECTRIC CO.

MODEL H-91-R SPU
Chassis wiring

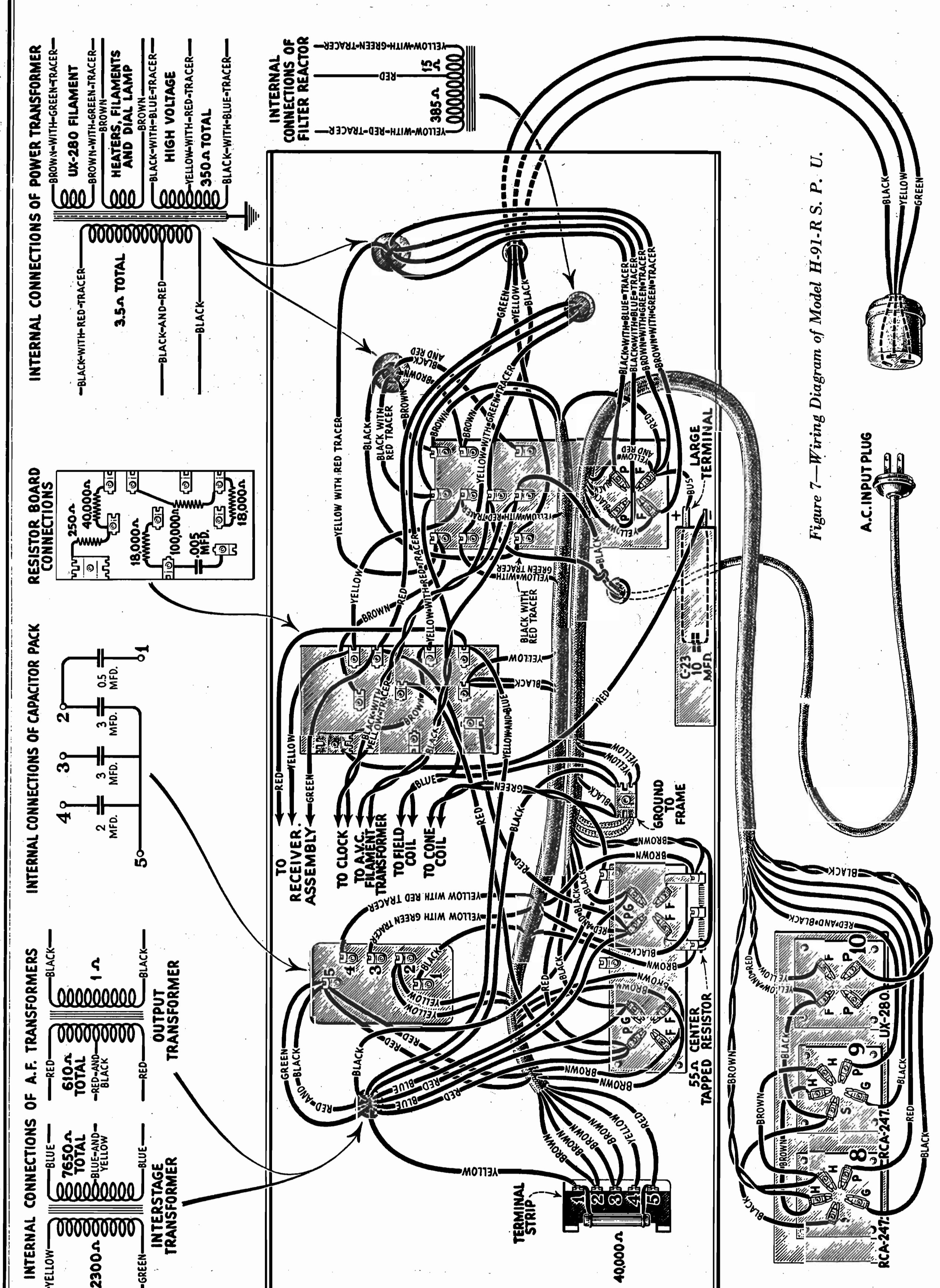


Figure 7—Wiring Diagram of Model H-91-R S. P. U.

MODEL H-91-R
Assembly wiring

GENERAL ELECTRIC CO.

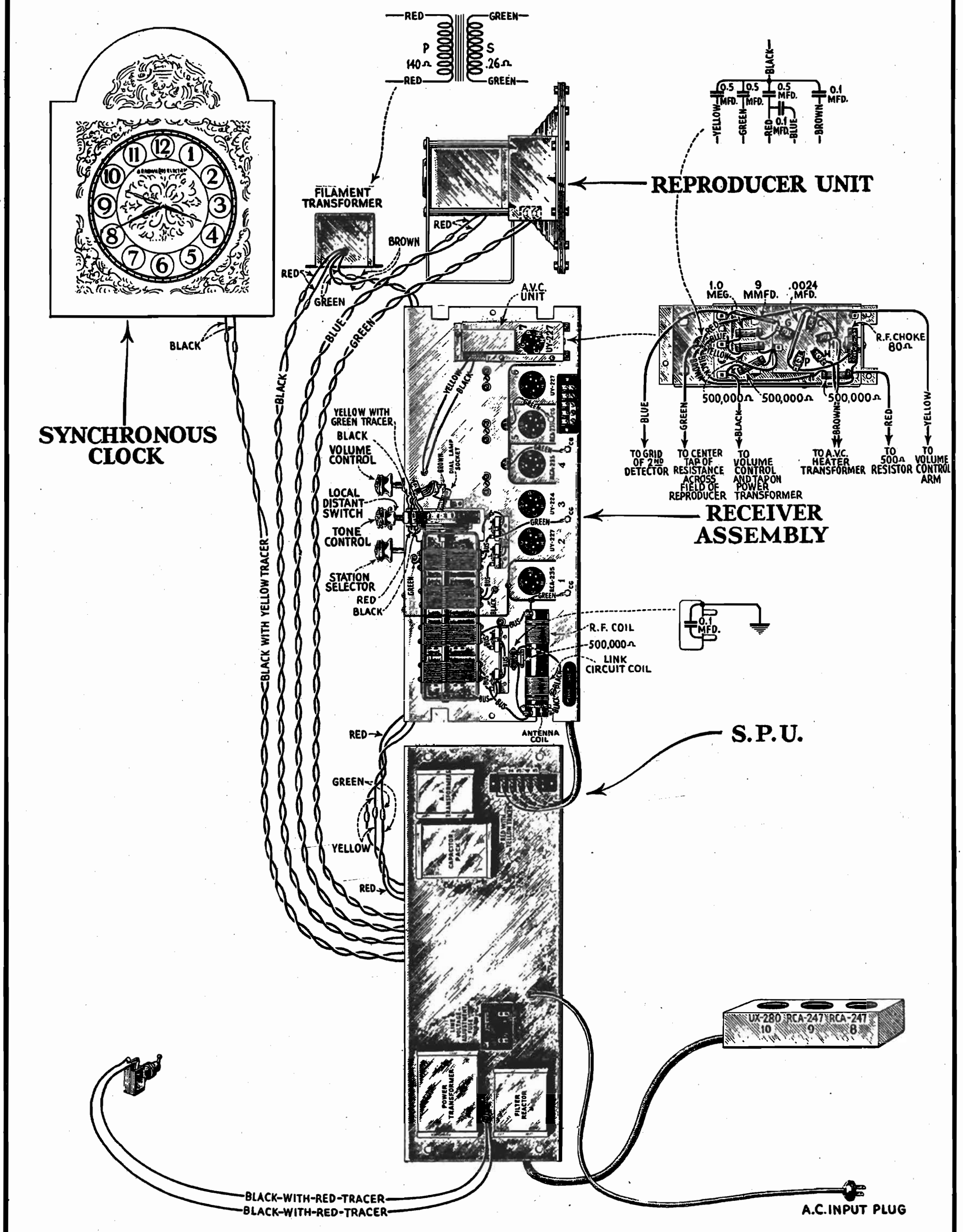


Figure 8—Assembly Wiring of Model H-91

MODEL H-91
Assembly wiring

GENERAL ELECTRIC CO.

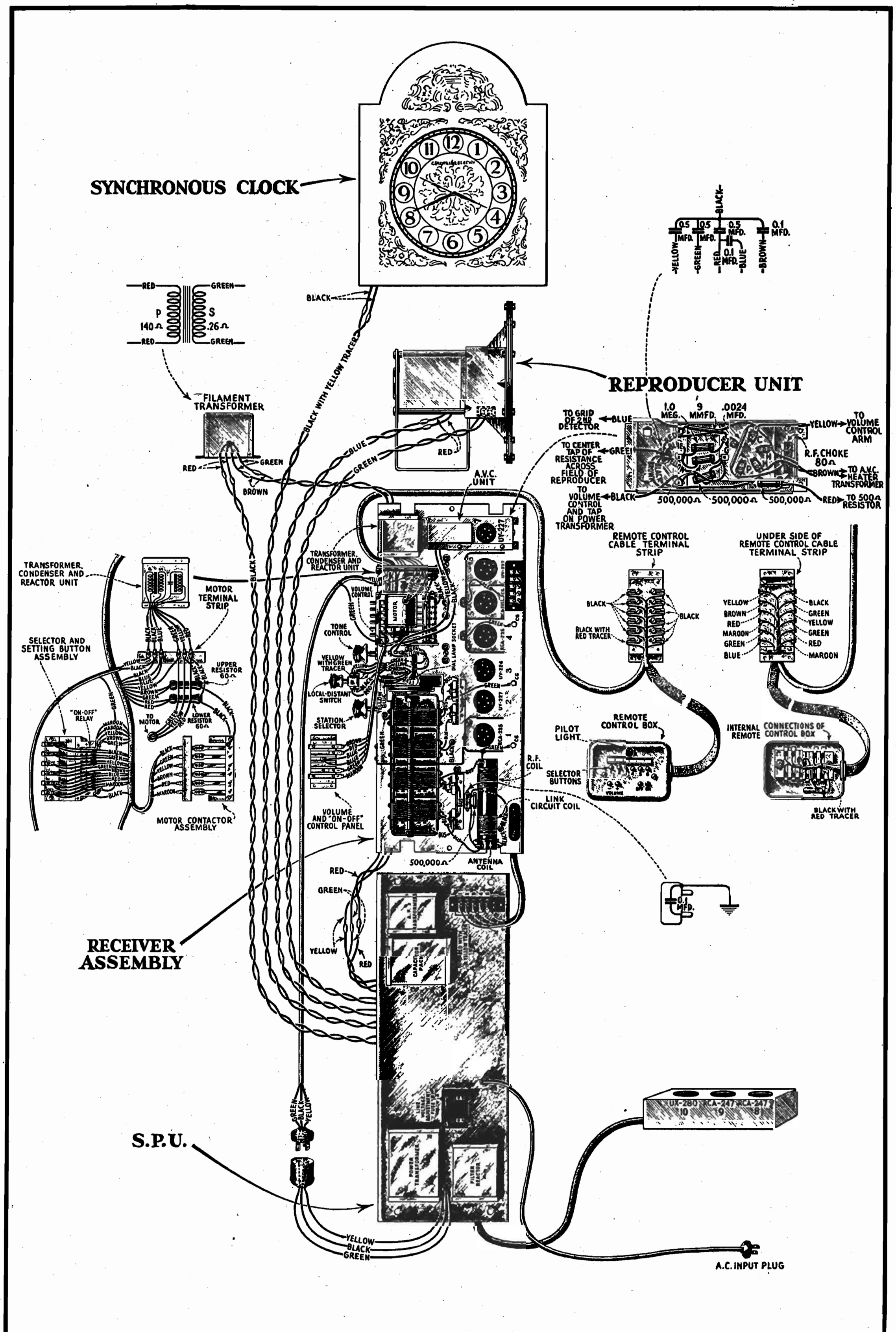


Figure 9—Assembly Wiring of Model H-91-R

MODEL H-91, H-91-R
Parts List

GENERAL ELECTRIC CO.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLY	
2547	Resistor—2,000 ohm—Carbon type—Used as first detector bias or second intermediate bias resistor—Package of 5	$3.00
2563	Resistor—6,000 ohm—Carbon type—Package of 5	3.00
2726	Socket—UY Radiotron socket	.70
2727	Terminal strip — Micarta terminal strip with one terminal, bottom strip, mounting screws, lock washers and nuts	.50
2728	Terminal strip — Micarta terminal strip (top and bottom) with 40,000 ohm resistor	1.00
2729	Shield—Micarta protective shield for top of Radiotron socket	.50
2730	Resistor—18,000 ohm—Carbon type—Used as screen grid bleeder resistor—Package of 5	2.00
2731	Resistor—10,000 ohm—Carbon type—Used as second detector bias resistor—Package of 5	2.00
2732	Resistor—110,000 ohm—Carbon type—Used as second detector bleeder resistor—Package of 5	2.00
2733	Resistor—14,300 ohm—Carbon type—Used as voltage divider resistor—Package of 5	3.00
2734	Capacitor—745 mmfd.—Package of 5	2.20
2735	Resistor—500 ohm—Carbon type—Used in series with secondary coil of first I. F. transformer—Package of 5	2.00
2736	Resistor—170 ohm—Carbon type—Used as amplifier bias resistor—Package of 5	2.00
2738	Coil—R. F. plate coil	.90
2739	Coil—Second detector plate choke coil mounted on Micarta strip	1.00
2740	Cord—Condenser drive cord—Package of 5	1.00
2741	Idler—For condenser drive cord—Package of 5	.80
2742	Spring—Condenser drive cord tension spring—Package of 5	.50
2745	Screws—Special No. 4-40—Used to adjust trimming condenser—Package of 10	.50
2746	Socket—Lamp socket	.50
2747	Cap—Grid contact cap—Package of 5	.50
2748	Binding post—Ground and antenna twin binding post—Complete with washers and nuts	.50
2749	Condenser — Fixed condenser — 2400 mmfd.—Used as second detector plate by-pass condenser	1.50
2753	Knob — Walnut knob — Local-distant switch knob—Package of 5	2.50
2754	Knob — Walnut knob — Station selector, volume control or tone control knob—Package of 5	2.50
2756	Capacitor—0.025 mfd.	.80
2857	Plug—Three prong plug—Male section for H-91-R receiver assembly	.70
3024	Capacitor—Capacity 9 mmfd.—Package of 2	.50
3045	Resistor—40,000 ohm—Package of 5	2.50
3048	Resistor—500,000 ohm—Carbon type—Package of 5	2.50
3076	Resistor—1 megohm—Carbon type—Package of 5	2.50
3085	Capacitor—400 mmfd.	$0.60
G5005	Coil—Automatic volume control R. F. coil	.70
G5019	Terminal strip—Complete with one terminal and insulating strip—For mounting antenna capacitor—Package of 2	.70
6034	Cushions—Sponge rubber cushions—Package of one set of four	1.20
7057	Terminal board assembly—Comprising terminal board with 7 carbon resistors, R. F. plate coil and 5 flexible leads—Assembled	4.50
7058	Capacitor pack—One assembly in metal container—Comprising three 0.1 mfd., one 0.5 mfd. and one 1 mfd. condenser	4.00
7059	Condenser—One 1 mfd. condenser in metal container	1.70
7062	Condenser—Adjustable trimming condenser—Capacity 15 to 70 mmfd.	1.00
7063	Condenser—Adjustable trimming condenser—Capacity 5 to 40 mmfd.	1.00
7064	Switch—Local-distant switch—Package of 5	5.00
7067	Scale—Dial scale—Package of 5	2.00
7071	Capacitor strip—Comprising Micarta strip with one 745 mmfd. by-pass condenser and one 0.025 mfd. tone control condenser	1.80
7072	Terminal strip—With 5 complete terminals and link	.80
7073	Inductor—Tone control inductor	1.00
7074	Potentiometer—Volume control or tone control potentiometer — Complete with mounting nuts and washers	1.80
7101	Cable—Braided cable from tone control potentiometer to inductor, plate choke coil, resistor board, terminal strip and tone control capacitor strip	1.50
G7809	Transformer — First intermediate transformer	3.00
G7810	Capacitor—0.1 mfd. capacitor	1.70
G7811	Capacitor — Comprising three 0.05 mfd. and two 0.1 mfd. in metal container	4.00
8561	Condenser—Tuning condenser assembly—Comprising four condensers, drive, drive cord, spring and dial drum—Assembled—For H-91 only	12.00
8563	Coils—R. F. coil assembly complete with mounting brackets	2.30
8564	Coils—Detector and oscillator coil assembly—Complete with mounting bracket	2.80
8565	Transformer — Second intermediate transformer in metal container	3.00
8566	Transformer — Third intermediate transformer in metal container	3.00
8569	Cable—Receiver wiring cable—Small	1.80
8700	Condenser—Tuning condenser assembly — Comprising 4 condensers, drive, drive cord, spring and dial drum—Assembled—For H-91-R only	12.00
G8905	Cable—Receiver wiring cable—Large	2.60
G8906	Control board—Automatic volume control board—Less resistors and coil assembly	2.50

Order By Stock Number Only

MODEL H-91, H-91-R
Parts List

GENERAL ELECTRIC CO.

REPLACEMENT PARTS—Continued

Stock No.	DESCRIPTION	List Price
	AMPLIFIER ASSEMBLY	
2721	Socket—Double socket—On amplifier base	$1.00
2722	Resistor — 55 ohm — Mid.-tapped filament resistor	1.00
2723	Switch—Power line switch—Toggle type—Package of 5	3.00
2725	Fuse—1.5 amperes—Cartridge type fuse—Package of 5—For 60 cycle receivers	.50
2726	Socket—RCA-247 socket	.70
2735	Resistor—500 ohms—Carbon type—Package of 5	2.00
3058	Resistor—100,000 ohms—Carbon type —Package of 5	2.50
3079	Resistor—40,000 ohms—Carbon type —Package of 5	2.50
3099	Capacitor—0.005 mfd.	.75
3173	Plug—Three prong plug—Female end	1.30
3219	Resistor—18,000 ohms—Carbon type —Package of 5	2.75
G5020	Capacitor—10 mfd.—Electrolytic type	1.95
7052	Terminal strip — Micarta terminal strip with terminals and terminal screws	.80
7054	Power cord—Flexible twin conductor with male plug	1.00
7075	Socket—Socket strip assembly—Complete with fuse clips	1.80
7122	Socket—Single socket for Radiotron UX-280—Complete with insulation strip	.60
7123	Socket—Two gang four prong socket	1.00
G7824	Board—Resistor mounting board—Complete less all resistors	.50
G7825	Transformer—Audio transformer assembly	5.50
G7826	Cable—From amplifier to socket assembly	1.70
8553	Capacitor pack—One assembly in metal container—Comprising two 3 mfd., one 2 mfd. and one 0.05 mfd. condenser	16.00
8555	Reactor—Tapped filter reactor	4.00
8556	Transformer—Power transformer 105 -120 volts, 50-60 cycles	12.00
8596	Transformer—Power transformer 105 -120 volts, 25 cycles	16.00
8597	Condenser—Extra filter condenser for 25 cycles	8.00
G7832	Cable—S. P. U. wiring cable for model H-91	2.00
G7833	Cable—S. P. U. wiring cable for model H-91-R	2.00
10907	Fuse—3 amperes—For 25 cycle models —Package of 5	.50
	REPRODUCER ASSEMBLIES	
7055	Bolt, lock washer and nut assembly—Used to mount cone support—Package of one set of 4	.50
7056	Ring—Felt spacing ring—3" I. D., 1⅛" O. D., 1⅛" thick—Package of one set of 2	.50
8557	Support—Metal cone support with terminal board	1.50
8558	Cone—Complete with voice coil	4.00
8559	Ring—Cone retaining ring	.80
8560	Coil—Field coil	5.00

Stock No.	DESCRIPTION	List Price
	DRIVING UNIT ASSEMBLY H-91-R ONLY	
2837	Button—Bronze colored push button —Package of 2	$0.50
2844	Contactor terminal strip—Complete with six terminals, mounting screws, spacers and nuts	1.20
2846	Gear—Micarta bendix gear, pinion and taper pins—Located near porcelain resistors	1.00
2847	Switch assembly—Operating switch relay—Complete with contactor and mounting screws	5.00
2848	Contactor—Motor contactor—Complete with clamping plate and mounting screws	.60
2850	Plunger — Oxidized finish — Brass plunger—Package of 2	.50
2851	Gear—Micarta, bendix gear, pinion and taper pin—Volume control drive gear	1.00
2852	Gear—Micarta, intermediate drive gear, pinion and taper pin—For volume control	1.00
2853	Gear—Star gear and taper pin—Located on end of condenser shaft and fits into ring gear	1.00
2854	Contact—Contact screw and lock nut —Located on contact strip No. 7158—Package of 5	.50
2855	Switch assembly—Plunger switch—Comprising Micarta strip with six contact blades and two mounting screws	1.20
2856	Spring—Tension spring assembly for plunger—Complete with mounting screws—Package of 5	.50
2857	Plug—Male section of three prong polarity plug	.70
3008	Spring contacts — Remote control relay contact springs—One set of four pairs	.50
3025	Spring — Spiral spring for holding motor thrust arm—Package of 8	.50
3026	Arm—Motor thrust arm	.50
3027	Screw—Tension adjusting screw for spiral spring—Package of 5	.50
7155	Resistor—60 ohm—Porcelain type resistor	.80
7156	Rheostat—Volume control rheostat with bracket and gear assembled—Complete with mounting screws	3.00
7157	Gear—Ring gear with taper pin—Located on end of cam shaft	2.00
7158	Strip—Contact strip—Complete with six contacts, six lock nuts and mounting screws	1.50
7159	Cable—Braided cable—From driving unit to terminal board	2.00
	CONTROL BOX ASSEMBLY H-91-R ONLY	
2833	Button—Red color push button—Package of 2	.50
2834	Button—Red color push button with white insert—Package of 2	.50
2835	Button—Black color push button—Package of 2	.50
2836	Button—Black color push button with white insert—Package of 2	.50
2837	Button—Bronze color push button—Package of 2	.50

Order By Stock Number Only

MODEL H-91, H-91-R
Parts List

GENERAL ELECTRIC CO.

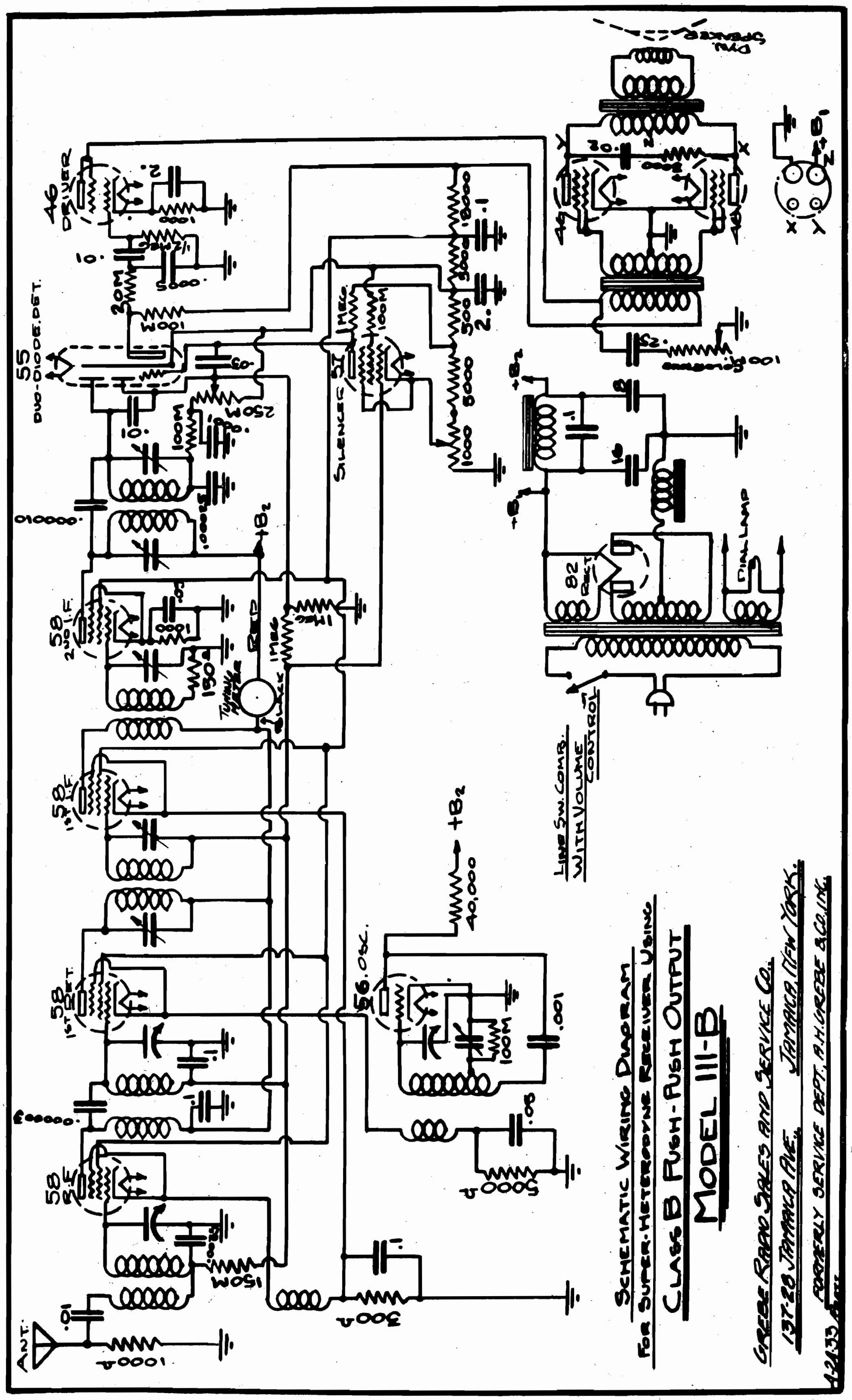
REPLACEMENT PARTS—Continued

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
				TOOLS	
2838	Bullseye — Pilot lamp indicator — Package of 2	$1.30	2930	Screw driver—4 inch—Right angle—For remote control adjustments	$0.80
2839	Switch assembly—Dilecto strip with 10 contacts (inside of control box)—Package of 5	9.20	3064	Screw driver—2½ inch—Right angle—For remote control adjustments	.80
2840	Socket—Miniature base pilot lamp socket with mounting bracket, screws, nut and washer	.50	3065	Wrench—$\frac{3}{16}$ inch wrench—For remote control contact locking nut adjustments	.50
2841	Log strip assembly—Comprising three paper log strips and one metal holder	.50		**CABINET AND CLOCK ASSEMBLIES**	
2842	Cover—Metal cover with mounting screws, rubber bushings, button guide plate and studs	5.00	2829	Knob—Door knob and screw—Package of 2	.50
2843	Base assembly—Comprising base, felt and clamping plate	1.40	G5004	Hinge—Door hinge with mounting screws—One set of 4	1.50
7154	Cable—Flat type—25 feet long—Complete with terminals	10.00	W5005	Screw and washer—For back panel—Package of 10	.50
7161	Terminal board—Comprising Micarta strip with 12 terminals, 12 screws and 2 mounting brackets, 1 rubber bushing and 4 mounting screws	2.00	G5006	Screw assembly—Comprising clock mounting screw, clock mounting separator, clock mounting nut, clock mounting lock washer—Set of 4 each—Package of 2 sets	.50
8619	Control box assembly—Complete less cable	12.00	G5007	Screw—Dial mounting screws—One set of 8—Package of 4 sets	.50
8620	Control box assembly—Complete with 25 foot cable	22.00	G5008	Hand—Clock hour, minute and second hand—One set of three hands	.75
7160	Cable—Braided cable and male section of polarity plug—From driving unit to power supply	2.00	G7807	Pad—Cone pad—Package of 2	.50
7162	Switch—Auxiliary switch assembly—Comprising Micarta strip with four contacts and one common plate—Located on control panel	1.50	G8907	Turning—Located on front top center of cabinet	1.10
7163	Escutcheon — Auxiliary switch escutcheon—Complete with mounting screws, nuts and spacer blocks	2.00	G8908	Mechanism—Telechron clock mechanism—Less dial and hands—60 cycles	12.25
8616	Motor—Complete with two pinion gears	16.00	G8909	Mechanism—Telechron clock mechanism—Less dial and hands—25 cycles	12.25
8617	Capacitor pack—In metal container—Complete with mounting screws, lock washers and nuts	11.00	G8914	Clock—Telechron clock mechanism—Less dial and hands—50 cycles	12.25
			G9524	Cabinet—Less control panel	140.00
			G9525	Door—Control door	6.00
			G9526	Board—L. H. baffle board—Complete with grille cloth	.50
			G9527	Board—R. H. baffle board—Complete with grille cloth	.50
			G9528	Door—Top glass door	11.25
			G9529	Panel—Control panel—For model H-91	6.00
			G9530	Panel—Control panel—For model H-91-R	6.50
			G9531	Dial—Clock dial	12.25

Order By Stock Number Only

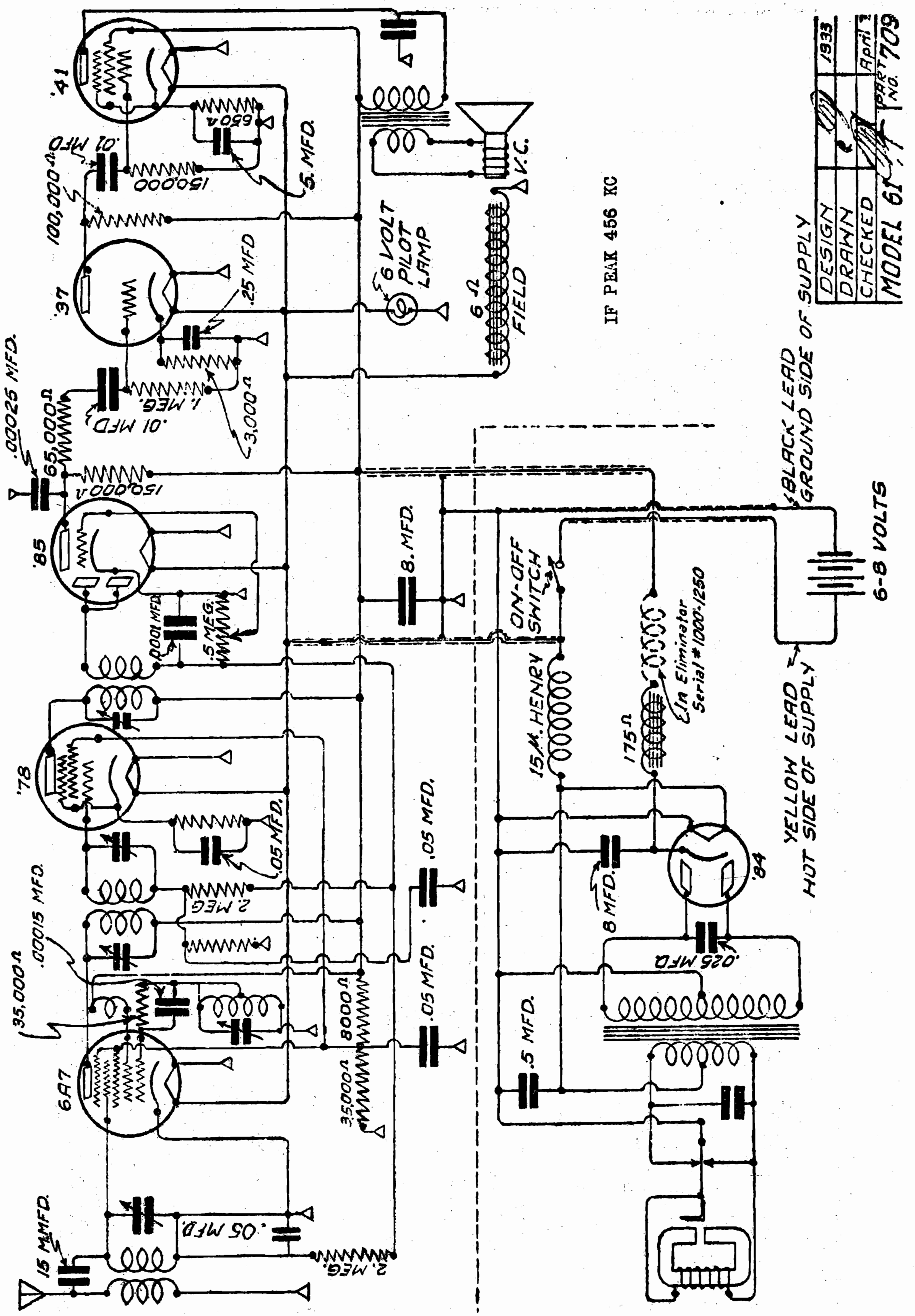
A. H. GREBE & CO.

MODEL HS-11
Schematic



MODEL 61-R
Schematic

A. H. GREBE & CO.



A. H. GREBE & CO.

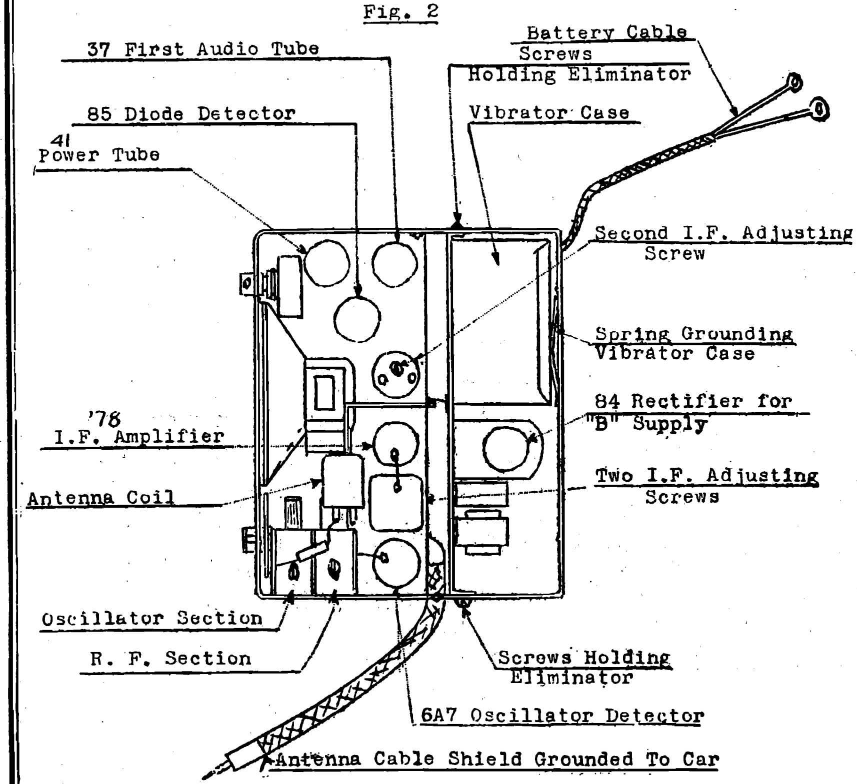
MODEL 61-R
Socket layout
Alignment data
Vibrator data

RECEIVER ALIGNMENT — To align the I.F. circuit, an oscillator supplying 456 K.C. should be connected to the control grid of the 6A7 and the variable condenser frame. The grid cap normally on the 6A7 should be removed. The oscillator section of the variable condenser should be short circuited. This may be done by putting a small clip on the terminal of the oscillator condenser trimmer and running a wire to ground. It is preferable to use an output meter for accurate work, which may be connected into circuit of the 41 by means of an adapter having leads brought out from plate and screen through a 5 mfd stopping condenser. See Fig. #4.

The volume control on the receiver should be turned to maximum and the three I.F. adjusting screws shown in Fig. #2 set to give maximum on the output meter. This operation may be performed with the receiver in the can if a pair of long nose pliers or offset screw driver is used.

For R.F. alignment, remove oscillator condenser short circuit, replace grid cap on 6A7 and connect oscillator covering broadcast range to antenna wire and its shield.

Fig. 2



VIBRATOR ADJUSTMENT — To examine vibrator, remove "B" supply unit from can by unsoldering 3 leads. (see Fig.3) removing 6 screws at ends of unit. Take cover off vibrator case and vibrator may be removed without unsoldering its lead wires. It will be seen that there are a top and a bottom set of contacts. The normal clearance on these contacts is .003" to .004" and this may be adjusted with screws provided.

Any dirt on contacts should be removed with pipe cleaner before adjustment. If top clearance is too great vibrator may operate but not close this circuit (operate half wave) and the voltage will be low. If bottom clearance is too great, vibrator will pull down but not vibrate. Too small a bottom clearance may short bottom contacts and cause inoperative vibrator and heavy current drain.

If both contact clearances are small, the vibrator will operate at a higher pitch and voltage, but sparking will occur.

Check of vibrator operation may be made by running three temporary jumpers from "B" supply unit outside can to the receiver, (See Fig.3) and operating the vibrator outside its case so it is visible. The tone should be low pitched, even and regular, and no appreciable sparking should occur. To remove vibrator for replacement purposes, unsolder the three vibrator wires at the terminals of the step up transformer and at the ground terminal near the tube. Leads should be left attached to vibrator.

If set is not available or is in doubtful condition a 4000 ohm load resistance of 5 watts or larger may be used from plus "B" to ground of eliminator in place of set. The 6-volt supply is applied to the two terminals at the vibrator end of "B" unit.

If gaps are okay, and sparking persists, check for dirty contacts or open condenser across primary of stepup transformer.

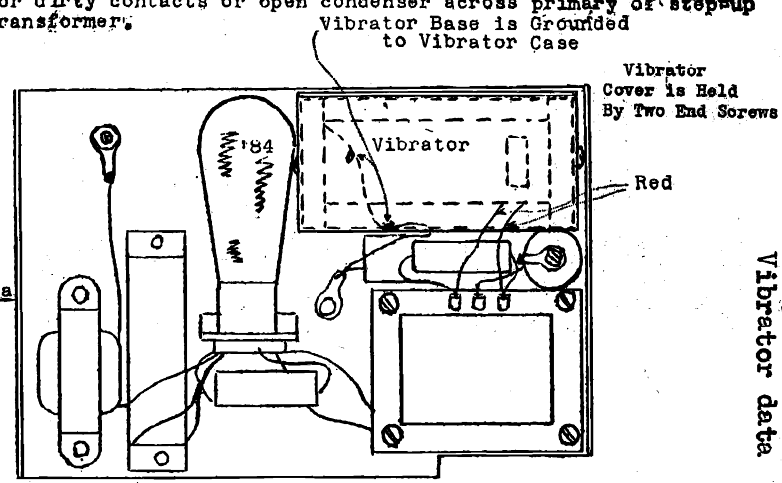
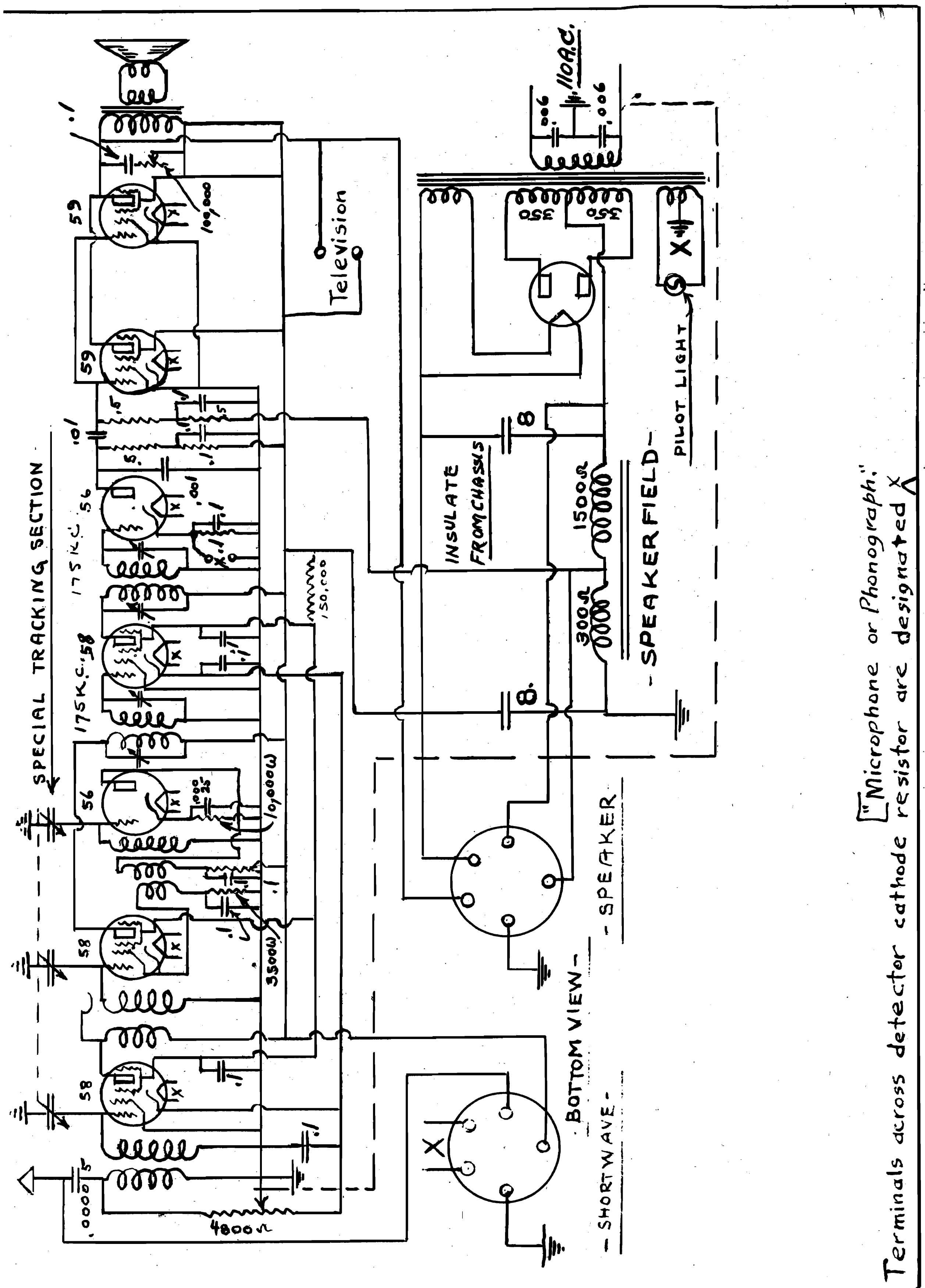


Fig. 3a

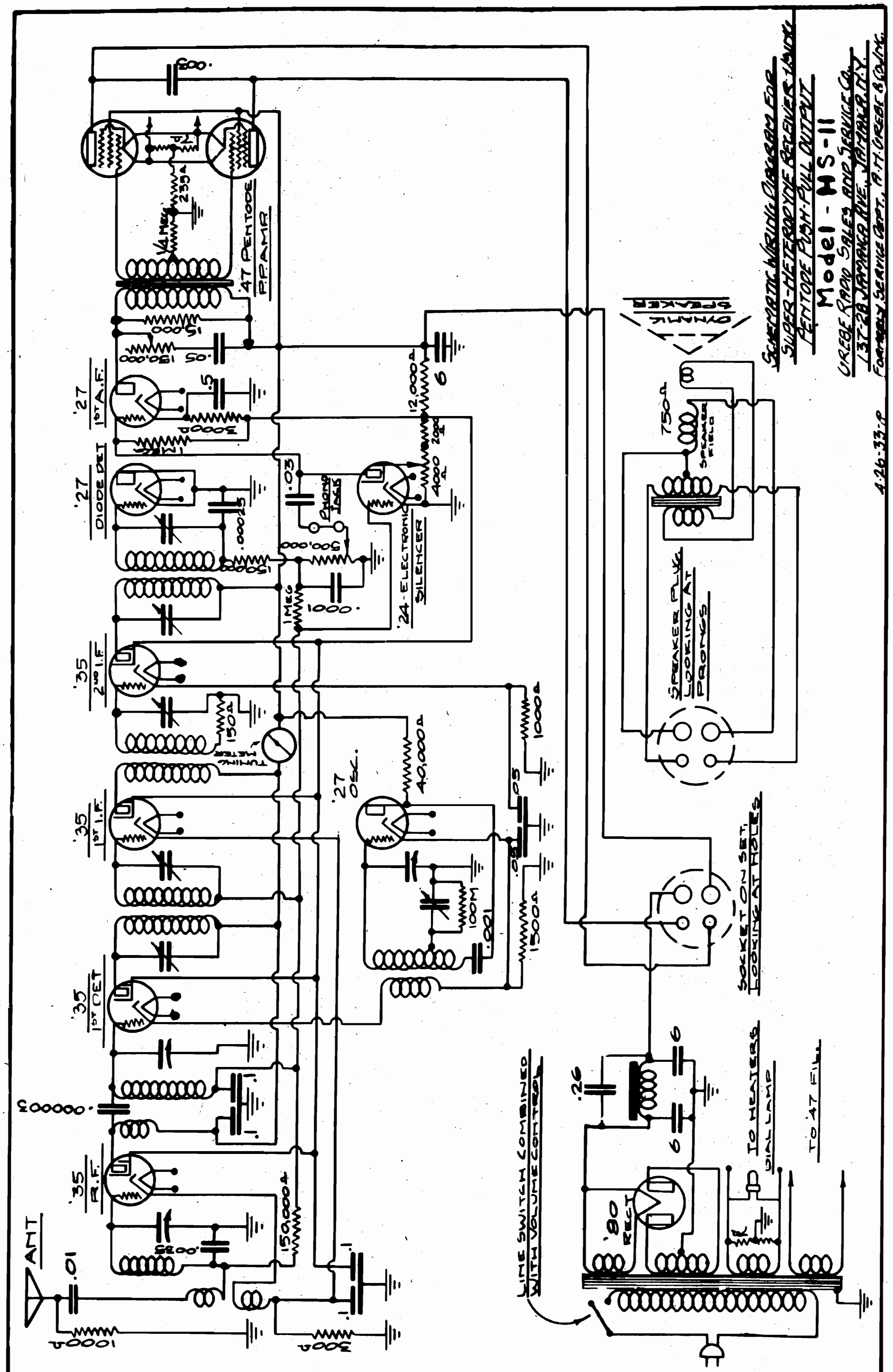
MODEL 89
Schematic

GREBE



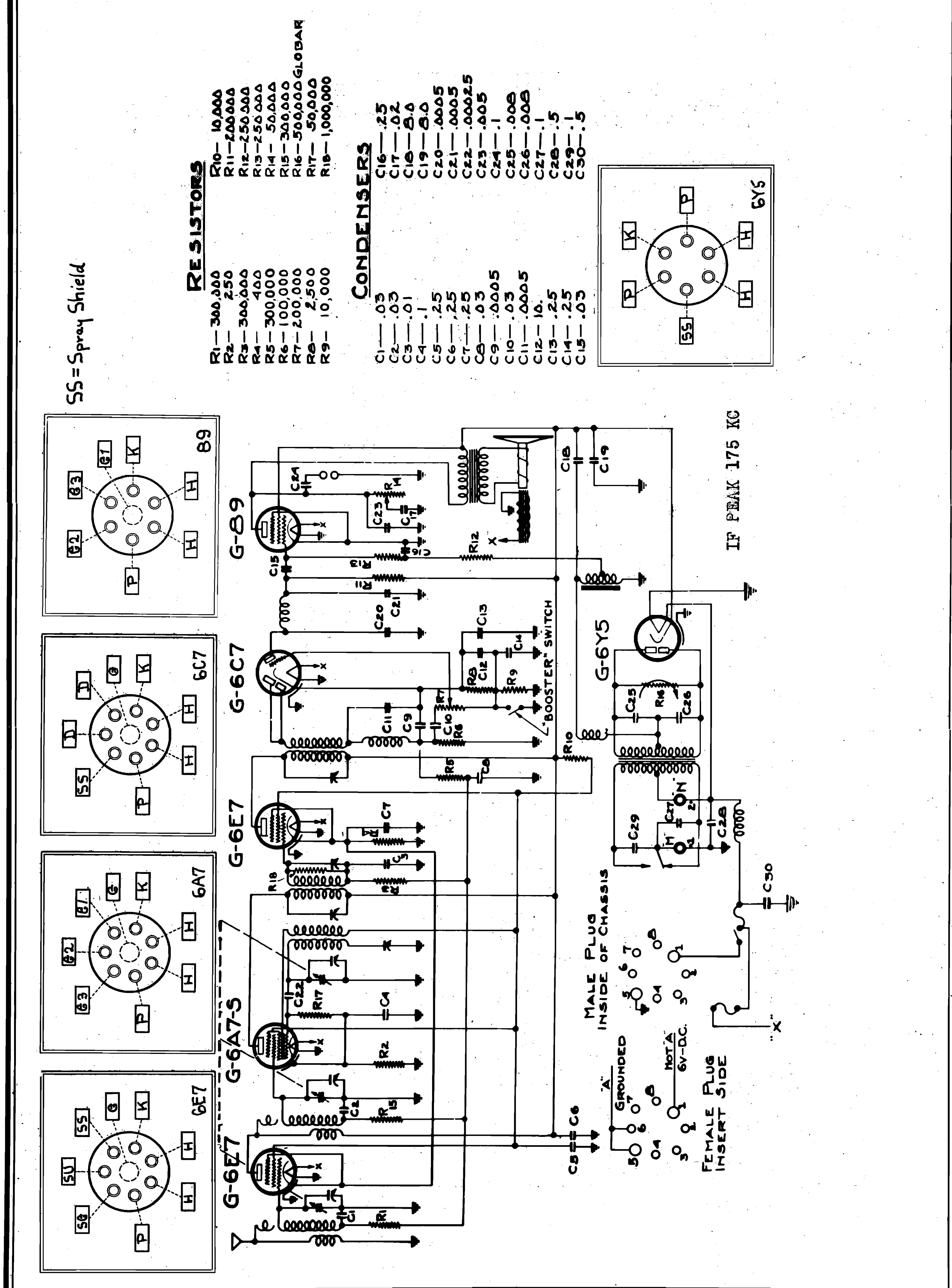
A. H. GREBE & CO.

MODEL 111-B
Schematic



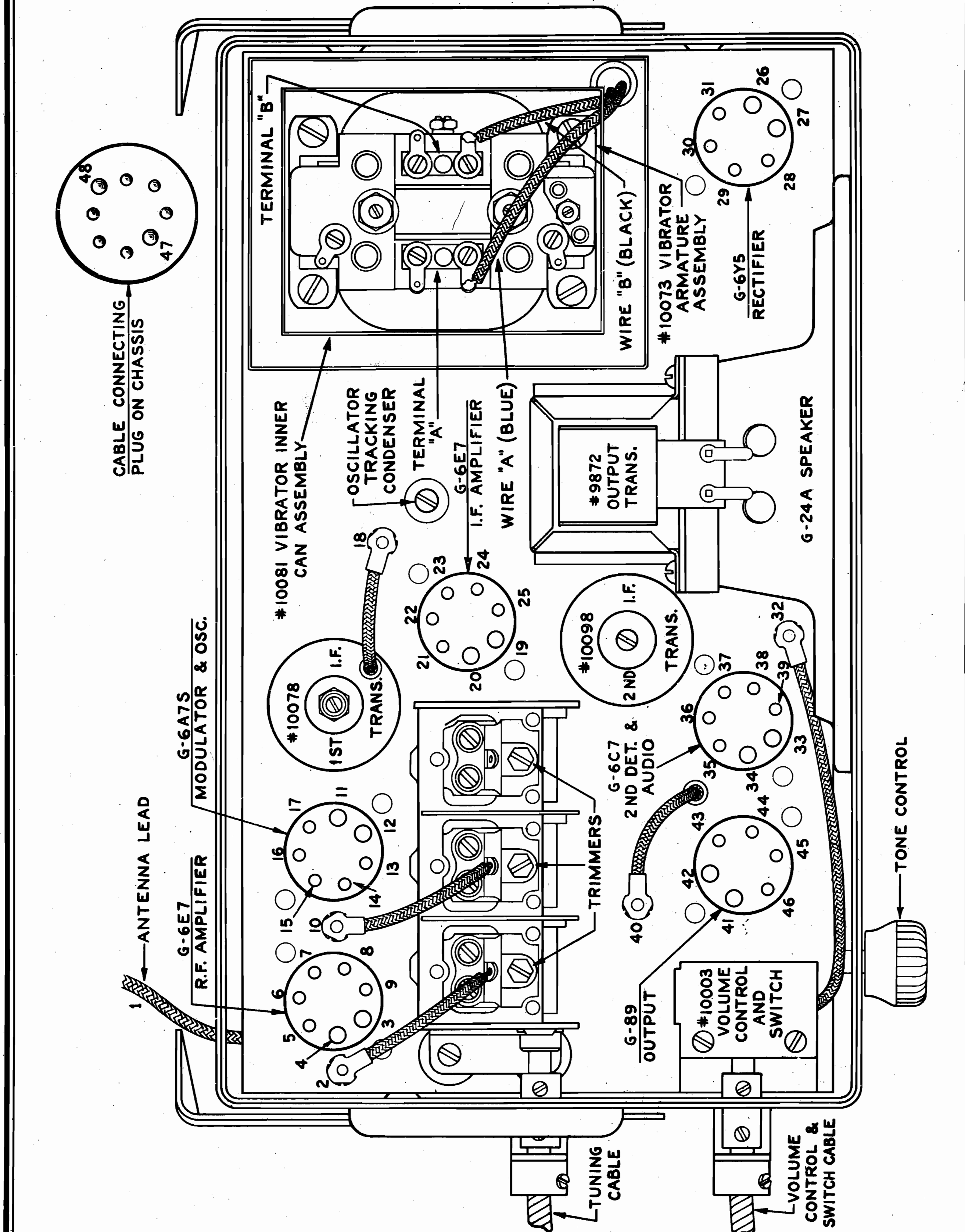
GRIGSBY - GRUNOW CO.

MODEL 66
Schematic



MODEL 66
Chassis view

GRIGSBY - GRUNOW CO.



GRIGSBY - GRUNOW CO.

MODEL 66
Point-to-point data

MODEL 66 RESISTANCE CHART

All readings are taken from designated points to ground except those marked with an asterisk (*) which are taken to terminal No. 29, with all tubes removed from their sockets, volume control turned to maximum clockwise position, and the speaker connected in the circuit.

TERMINAL NUMBER	RESISTANCE IN OHMS	IF RESISTANCE DIFFERS GREATLY FROM VALUE SHOWN, CHECK THE FOLLOWING:
1	21	Primary of antenna coil
2	700,000	Secondary of antenna coil, R-1, C-1, R-5, C-8 and R-6
3	0	Ground connection
4	.135	Primary of vibrator trans., Field Coil, C-30, C-28, C-27 and C-29
5	400	R-4 and C-7
6	0	Ground connection
7	Same as #5	
* 8	10,000	R-10
9	112	Primary of R.F. transformer
10	700,000	Secondary of R.F. transformer, C-2 and R-15
11	Same as #4	
12	0	Ground connection
13	250	R-2 and C-4
14	50,250	R-17
*15	10,000	Secondary of oscillator coil and R-10
16	Same as #8	
*17	88	Primary of 1st I.F. transformer
18	700,000	Secondary of 1st I.F. transformer, C-3, and R-3
19	Same as #4	
20	0	Ground connection
21	Same as #5	
22	0	Ground connection
23	Same as #5	
24	Same as #8	
*25	165	Primary of 2nd I.F. transformer
26	Same as #4	
27	0	Ground connection
28	1250	Secondary of vibrator trans., C-26, C-25, R.F. buzzer choke, and "B" filter choke
29	0	C-18, C-19, C-5 and C-6
30	Same as #28	
31	0	Ground connection
32	210,000	C-10, R-7, R-9, C-14 and C-13
33	Same as #4	
34	0	Ground connection
35	12,500	R-8, R-9, C-12, C-13, C-14 and C-10
36	100,284	Secondary of 2nd I.F. trans., R.F.C., R-6, C-11, C-9 and C-10
37	Same as #36	
38	0	Ground connection
*39	200,035	C-20, C-21, R.F.C., C-15 and R-11
40	500,450	R-13, R-12, C-16 and "B" filter choke
41	Same as #4	
42	0	Ground connection
43	0	Ground connection
44	Same as #43	
*45	0	Connections
46	43C	Primary of output transformer
47	0	Ground connection
48	Same as #4	

Due to manufacturing tolerances on carbon resistors, the values given above may be expected to differ plus or minus 15 per cent.

MODEL 66
Installation notes

GRIGSBY - GRUNOW CO.

INSTRUCTIONS FOR INSTALLATION

MOUNTING OF RECEIVER

The receiver is designed to be installed on the inside of the fire-wall behind the instrument panel, preferably in a horizontal position and close enough to the steering column for the control cables to reach the receiver. Only in cases where it is impossible to install in a horizontal position should it be mounted vertically. Mount the two adjustable brackets, one on each end of the receiver, then determine the best location for the receiver by holding it against the fire-wall, being careful to avoid interference with mechanical controls of the car. It may be necessary to reverse the brackets to accomplish this. After the best location has been determined, drill four holes using the template furnished with receiver for marking their location. Figure #1 shows how the brackets should look after being bolted to the fire-wall. Before permanently bolting the receiver to the brackets, the plug of the battery cable should be inserted into the rear of the receiver.

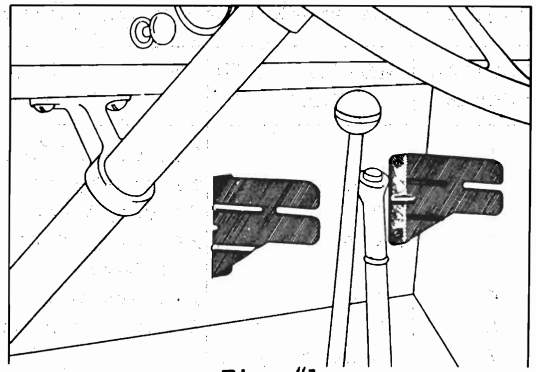


Fig. #1

CAUTION - All mounting nuts and bolts must be drawn tight.

CONNECTING CONTROL

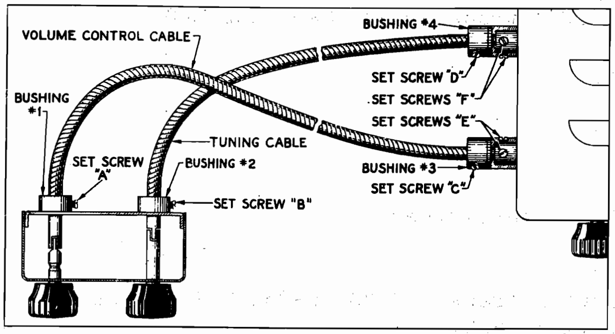


Fig. #2

Two flexible drive shafts are furnished with the Model 66 receiver. The volume control shaft has a slotted fitting on one end while the tuning shaft is similarly provided with a key fitting. To assemble the control unit the end of the volume control shaft with the slotted fitting should be inserted into bushing No. 1 on the control unit. (See Fig. #2). Make sure the outside casing of the shaft goes about five-sixteenths of an inch into the bushing. Then tighten the set screw "A" so that the outer casing of the cable will be securely held. Now connect in the same manner, the key end of the tuning cable to bushing No. 2, securing it with set screw "B". After the two cables are so connected, to sure that the knobs on the control head turn smoothly and without binding. Binding might be caused by the cables being pushed too tightly into the control unit.

The left hand or volume control cable should now be connected to bushing No. 3 on the end of the receiver. Pass the cable through the bushing so that the fitting on the end of the cable fits into the coupling on the volume control and the outer casing of the cable comes flush with the inside edge of bushing No. 3. Tighten set screw "C" so that it will securely hold the outer casing.

Next, connect in the same manner, the tuning cable to bushing No. 4, securing it with set screw "D". If the cables are properly connected they will cross. <u>Set screws "E" and "F" should not be tightened until the control unit and cables are permanently mounted.</u>

Now mount the control unit on the steering column in the most convenient place. Fasten drive cables securely wherever convenient so that they will not interfere with operation of the car, and then tighten the set screws "E" and "F"

GRIGSBY - GRUNOW CO.

MODEL 66
Voltage
Installation data

Battery Terminal Volts	5.5	6.3	7.5	* Measured with 300,000 ohm meter.
B+ to B- (Volts)	216	261	322	All voltages measured with no input signal.
B+ to Ground (Volts)	184	218	257	All voltages to ground from socket unless otherwise stated.
Total Battery Drain (Amps)	6.15	7.25	8.50	

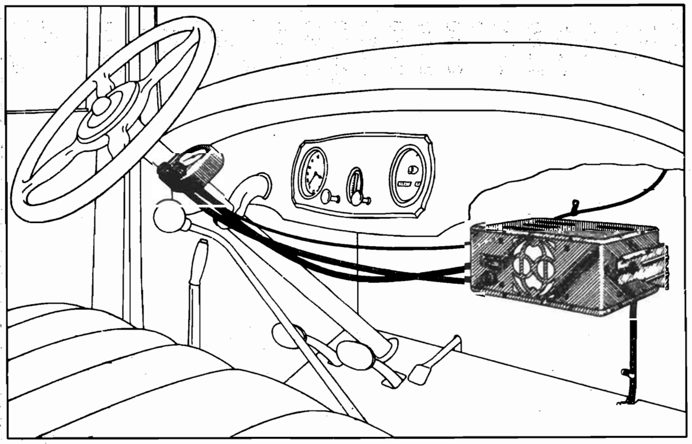


Fig. #3

in the couplings. If these are tightened before the control unit has been mounted, binding of the controls might result. Binding might also be caused by the bushings on the end of the receiver not being directly in front of the couplings. By loosening the screws that hold the bushings and then re-adjusting the bushings, this condition should be remedied. After control unit and receiver are mounted, they should appear as in Figure #3.

After the control unit and cables have been connected, the dial pointer should be adjusted. This is accomplished by slowly rotating the tuning control knob to the right until a definite stop is reached. Do not force the knob after the stop has been encountered as this may seriously damage the mechanism. Then rotate the knob slowly to the left until another definite stop is reached. In most cases it will be natural for either the pointer to come to the end of the dial strip before the stop is reached, or for the stop to be reached before the pointer comes to the end of the dial strip. In this manner the dial pointer is automatically adjusted to indicate correct frequency readings.

VOLTAGE TABLE FOR MODEL 66 AUTO RECEIVER

	PLATE VOLTS			SCREEN VOLTS			CATHODE VOLTS			GRID VOLTS		
Battery Terminal Volts	5.5	6.3	7.5	5.5	6.3	7.5	5.5	6.3	7.5	5.5	6.3	7.5
R. F. (G-6E7)	182	217	256	88	99	109	8.0	9.3	12.5	8.0	9.3	12.5
G-6A7S Det.	182	217	256	88	99	109	2.7	3.4	4.2	2.7	3.4	4.2
G-6A7S Osc.	88	99	109	-	-	-	-	-	-	7.0*	8.0*	8.0*
I. F. (G-6E7)	182	217	256	88	99	109	8.0	9.3	12.5	8.0	9.3	12.5
Audio (G-6C7)	51	60	61	-	-	-	7.5	9.2	9.5	1.8	2.2	2.3
Output (G-89)	177	209	248	184	218	257	-	-	-	23.0	27.0	35.0

MODEL 66
Parts List

GRIGSBY - GRUNOW CO.

RECEIVER PARTS

PART NO.	DESCRIPTION	LIST PRICE
10065	"A" Battery Cable Assembly with Plug	1.60
9977	"B" Choke Assembly	1.65
8857	Detector Plate R. F. Choke Coil	.60
10057	Choke Coil "A" Supply	.55
10135	R. F. Buzzer Choke Coil	.30
10017	Antenna Coil Assembly Complete	1.60
10018	Antenna Coil Assembly less Can	.95
10020	Oscillator Coil Assembly Complete	.80
10021	Oscillator Coil Assembly less Can	.60
10013	R. F. Coil Assembly Complete	1.75
10014	R. F. Coil Assembly less Can	1.10
10074	Adjustable Condenser for I. F. (Double)	.50
10075	Adjustable Condenser for I. F. (Single)	.35
9984	By-pass Condenser Assembly, C-4 to C-7	1.20
9981	By-pass Condenser Assembly, C-10, C-13, C-14, C-16 and C-17	1.40
9410	Condenser Assembly, .005 Mfd. C-23	.30
8279	Condenser Assembly, .01 Mfd. C-3	.35
9437	Condenser Assembly, .03 Mfd. C-1, C-2, C-8, C-10	.30
10189	Condenser Assembly, .1 Mfd. C-24	.45
10184	Condenser Assembly, .5 Mfd. C-28, C-30	.40
9979	Electrolytic Condensers Dual 8 Mfd. C-18, C-19	2.50
10067	Electrolytic Condenser, 10 Mfd. C-12	.70
6242	Mica Condenser, .0005 Mfd. C-9, C-11, C-20, C-21	.20
6641	Mica Condenser .00025 Mfd. C-22	.25
7253	Resistor 300,000 ohms, R-1, R-3, R-5, R-15	.20
9691	Resistor 250 ohms, R-2	.25
10285	Resistor 400 ohms, R-4	.20
5059	Resistor 100,000 ohms, R-6	.25
9944	Resistor 2,500 ohms, R-8	.20
5219	Resistor 10,000 ohms, R-9	.25
10252	Resistor 10,000 ohms, R-10	.45
5060	Resistor 200,000 ohms, R-11	.30
7259	Resistor 250,000 ohms, R-12, R-13	.25
9887	Resistor - Globar, R-16	.45
7498	Resistor 50,000 ohms, R-17	.20
9223	Resistor 1,000,000 ohms, R-18	.20
9863	Model G-24-A Speaker	6.15
9884	Field Coil (5.4 ohms)	1.20
9876	Cone Assembly	1.30
9872	Output Transformer	1.70
10078	1st I. F. Transformer Assembly Complete	2.30
10079	1st I. F. Transformer Assembly less Can	2.10
10098	2nd I. F. Transformer Assembly Complete	2.70
10099	2nd I. F. Transformer Assembly less Can	2.50
10081	Vibrator Inner Can Assembly	13.00
10073	Vibrator Armature Assembly	6.25
10004	Tone Control	.85
10003	Volume Control & Switch	1.25
9211	Sockets (6 prong)	.15
10107	Sockets (7 prong)	.10
9986	Female Connector Plug - 8 contact	.35
9985	Male Plug (8 prong)	.15
9970	Twin Tip Jack Assembly	.15
9969	Fuse Board Assembly	.30
10101	Fuse 15 Amp.	.05
9999	Gang Condenser	4.15

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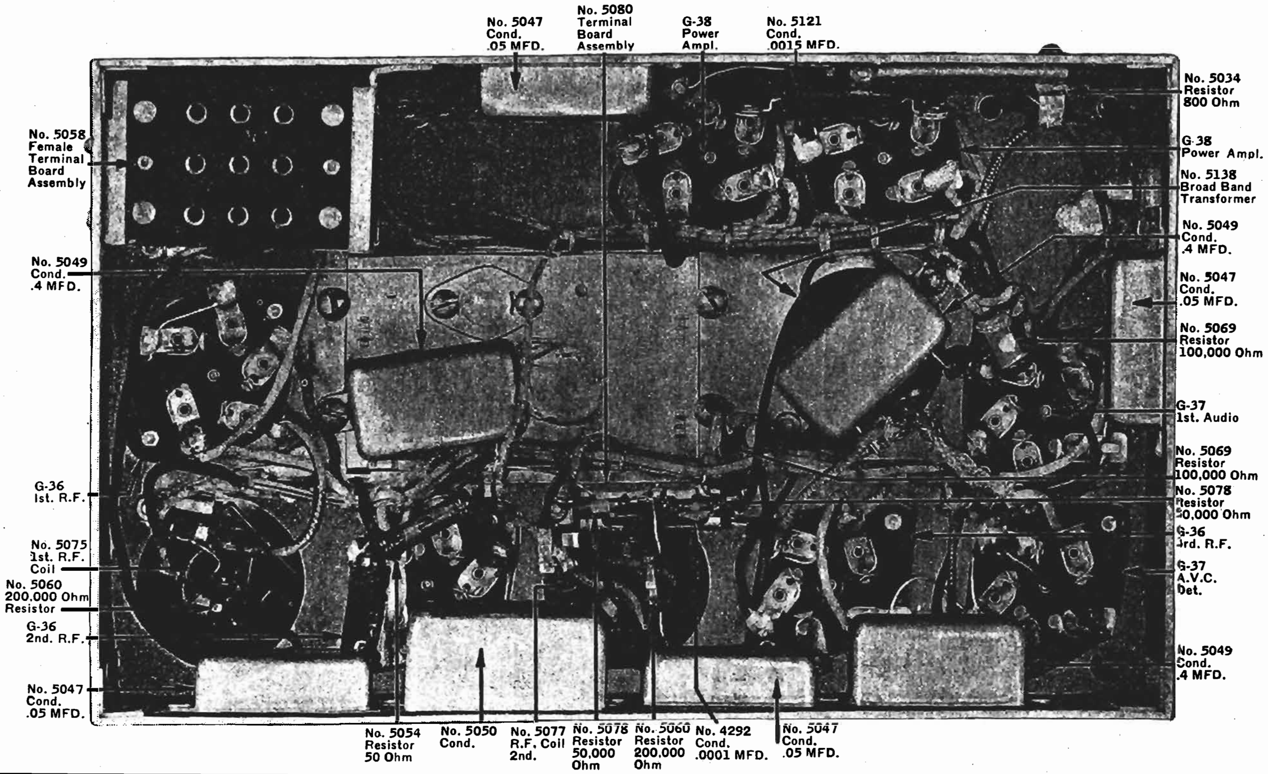
MODEL 110
Chassis view
Voltage, Parts List



CHASSIS PARTS

PART No.	DESCRIPTION	DEALER'S NET PRICE
5083	Antenna Coil	$1.08
5025	Battery Can, without cover	.72
5026	Cover for Battery Can	.45
4641	By-Pass Condenser, Generator	.32
	Cables	
5020	Control Cable	1.38
5022	"A" Battery Cable	.37
5023	"B" Battery Cable	.49
5151	Drive Cable, 8 ft.	.95
5177	Drive Cable, 10 ft.	1.67
5178	Drive Cable, 12 ft.	1.89
5179	Drive Cable, 14 ft.	3.14
5100	Chassis Container Cover	.11
5033	Chassis Container Mounting Strap	.08
5149	Clamp, for Steering Column	.11
5150	Clock Spring, Flat	.22
5145	Collet Assembly	.22
	Condensers	
4292	.0001 MFD.	.16
5121	.0015 MFD.	.15
5047	.05 MFD.	.25
5140	.25 MFD.	.33
5049	.4 MFD.	.30
5050	.6 MFD.	.49
5064	Condenser, Gang	2.95
5146	Condenser Pulley	.27
5102	Control Unit, Complete	7.42
5185	Control Terminal Board	.54
5147	Dial Lamp, 6 Volt. See Page 95.	
5196	Dial Drive Shaft	.29
5182	Dial Strip	.16
5183	Dial Strip and Gear Assembly	.51
5118	Fuse, 1/8 Amp.	.10
4663	Fuse, 10 Amp. for Control Unit	.08
5119	Fuse Clip	.03
5170	Gasket for Lid, Rubber	.06
5088	Input Transformer, Grid Clip Assembly	2.29
5148	Key	.06
5144	Knob for Selector	.22
5143	Knob for Volume Control	.16
5153	Output Transformer	.90
	Resistors	
5054	50 Ohm	.13
4621	750 Ohm	.13
5034	800 Ohm	.12

CHASSIS PARTS

PART No.	DESCRIPTION		DEALER'S NET PRICE
5078	50,000 Ohm		$0.13
5059	100,000 Ohm		.13
5060	200,000 Ohm		.12
5075	R. F. 1st Coil, Comp.		1.08
5077	R. F. Coil, 2nd Comp.		.99
	Screws and Nuts		
2285	Screw for Control Clamp	Per 10	.02
2269	Screw 8/32x1⅜"	Per 10	.03
2331	Nut for Above	Per 10	.02
2462	Screw R. H. I. M. 12/24x2⅜"		.01
2603	Nut for Above		
2339	Nut 10/32	Per 10	.04
2460	Washer for Nut No. 2339	Per 10	.04
5152	Switch Assembly Comp.		.54
4640	Suppressor for Spark Plug		.21½
5199	Suppressor, Screw Type		.21½
5122	Suppressor for Distributor		.21½
5010	Terminal Board, Male		.08
5008	Terminal Board, Female		.09
5138	Transformer, Broad Band		.89
5069	Tube Socket, G-36		.12
5070	Tube Socket, G-37		.12
5071	Tube Socket, G-38		.12
5072	Volume Control		.60

SPEAKER

5135	Speaker Complete with Output Transformer, Magnavox	$4.17
61619	Speaker Cabinet, Less Back	1.57
61618	Speaker Back, Complete	.18
5116	Speaker Bracket	.05
5021	Speaker Cable	1.31
5116	Speaker Mounting Brackets	.05
5194	Cone for Magnavox	1.25
5195	Cone for Utah	1.30
5188	Field Coil (Magnavox)	.95
5189	Field Coil (Utah)	.90

TABLE OF VOLTAGES

Tube Purpose	Type	Fil. D.C.	Plate D.C.	Screen D.C.	Cathode D.C.
1st R. F.	G-36	6.3	175	90	0
2nd R. F.	G-36	6.3	175	90	0
3rd R. F.	G-36	6.3	175	90	0
Diode Det. & A.V.C.	G-37	6.3	7.5	...	7.5
1st Audio	G-37	6.3	50	...	0
P. P. Power	G-38	6.3	150	180	12
P. P. Power	G-38	6.3	150	180	12

MODEL 114
Chassis view
Voltage
Parts List, Notes

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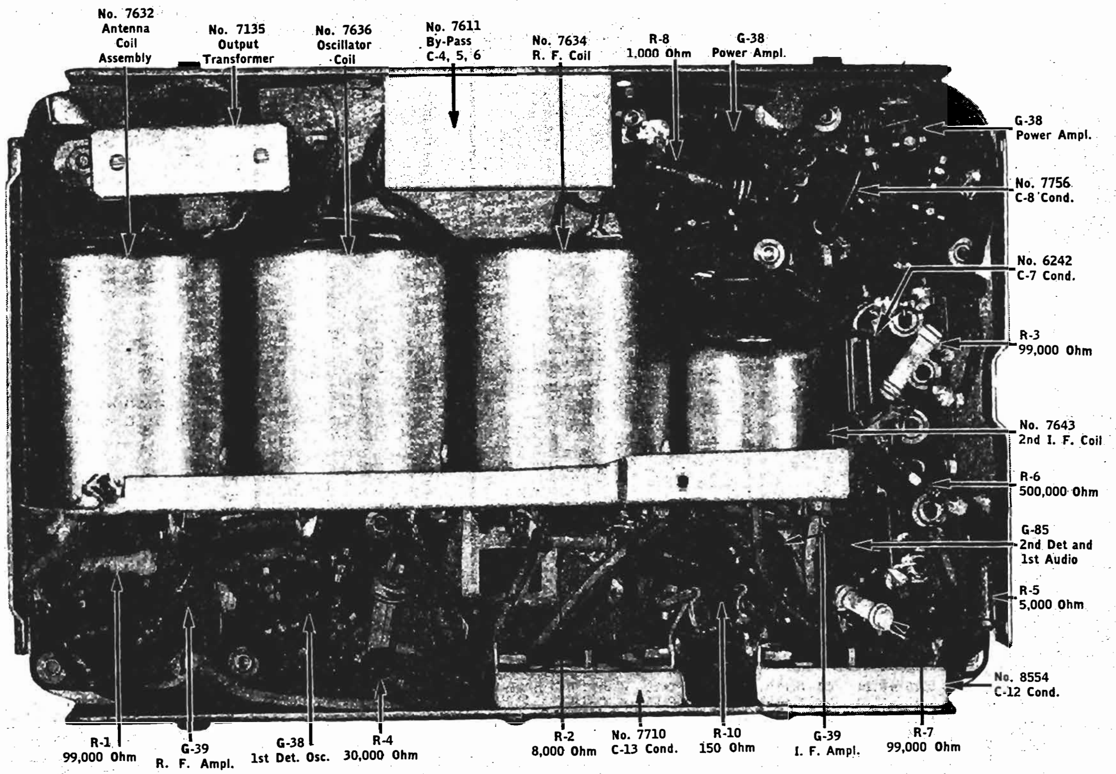


CHASSIS PARTS

PART No.	DESCRIPTION	DEALER'S NET PRICE
7632	Antenna Coil Assembly, Less Can	$0.81
7746	Antenna Spring and Bracket Assembly	.05
7611	By-Pass Condenser C-4, C-5, C-6	.67
8575	Chassis Container	1.16
	Condensers	
6242	.0005 MFD., C-7	.12
7756	.0015 MFD.	.11
	Condenser Assembly	
8279	.01 MFD.	.19
7693	.03 MFD.	.16
8554	Adjustable, C-12	.12
7710	Adjustable, C-13	.32
7210	Adjustable for I. F. Transformer, C-11	.14
8286	Condenser, Electrolytic 5. MFD., C-9	.39
7784	Condenser, Electrolytic 20 MFD.	.32
7619	Condenser, Three Gang	2.95
8563	Condenser Pully	.49
7664	Lid Gasket	.09
7676	Lid for Container	.18
8323	I. F. Transformer Assembly, 1st	1.23
7643	I. F. Transformer Assembly, 2nd	.54
7636	Oscillator Coil Assembly, Less Can	.54
7135	Output Transformer Assembly	1.08
	Resistors	
7751	150 Ohm, R-10	.11
7606	1,000 Ohm, R-8	.11
7125	2,000 Ohm, R-5	.11
7672	8,000 Ohm, R-2	.11
7755	30,000 Ohm, R-4	.11
7671	99,000 Ohm, R-1, 3 7	.11
7482	500,000 Ohm, R-6	.11
7634	R. F. Coil Assembly, Less Can	.67
7615	Transformer Assembly, Push-Pull Input	1.67
	Tube Sockets	
7705	5-Contact plain	.06
7762	5-Contact for G-38	.06
7763	5-Contact for G-39	.06
7608	6-Contact for G-85	.06

"B"—SUPPLY PARTS

8254	"A" Supply Choke Assembly	$0.49
7674	"B" Supply Container	.89
7739	"B" Filter Choke Assembly	.62

All Above Prices Subject to 2% Federal Tax

TABLE OF VOLTAGES

Tube	Purpose in Circuit	Plate Voltage	Screen Voltage	Cathode Voltage
G-39	R.F. Amplifier	180	85	0
G-38	1st Detector Oscillator	180	85	15.
G-39	I.F. Amplifier	180	85	1.1
G-85	2nd Detector and 1st Audio Amplifier	A.F. Plate 50	...	2
G-38	Power Amplifier	170	180	17
G-38	Power Amplifier	170	180	17

NOTE: Measurements made with a 1000 ohm per volt, 300 volt range, D.C. voltmeter, all tubes in their sockets and receiver connected to a storage battery supply delivering **6 volts** at the cable terminals, under load.

Tubes should be previously tested to assure that they are in good condition.

Readings to be taken from designated points to ground, with the condenser gang fully meshed and with no signal supplied to the receiver.

THE CIRCUIT

Superheterodyne with "B" Supply of the motor type.

AUTOMATIC VOLUME CONTROL

Referring to the schematic diagram it will be seen that the signal voltage across the 2nd I.F. coil (L-11) is rectified by the diode plates of the G-85 second detector tube, causing space current to flow around the circuit composed of the diode plates, cathode, resistor R-5, volume control R-7; and resistor R-3. This in turn establishes a direct current voltage across R-3 in which the end toward the plates is negative with respect to the end toward the cathode. As the grids of the G-39 tubes are connected to the negative potential end of R-3, these grids become negative with respect to ground and hence negative with respect to their own cathodes.

This negative bias reduces the mutual conductance and hence the amplification of the G-39 tubes. The signal at the coil L-11 is, therefore, reduced until a balanced condition is reached. It will be evident that the effect is to maintain practically constant the signal at the diode plates independently of the received strength, within the limits of the A.V.C. system. This does away with blasting and fading.

By connecting the two diode plates together it is possible to obtain almost twice as much A.V.C. voltage as could be obtained with the full wave connection, and it is possible to obtain good A.V.C. at the small signals encountered in automotive receivers.

GRIGSBY - GRUNOW CO.

MODEL 116
Chassis views
Alignment data

ALIGNMENT

If, for any reason it becomes necessary to align the Model No. 116 Auto Radio, the following procedure should be carefully followed.

It will be necessary to remove the chassis container and cover to align the receiver.

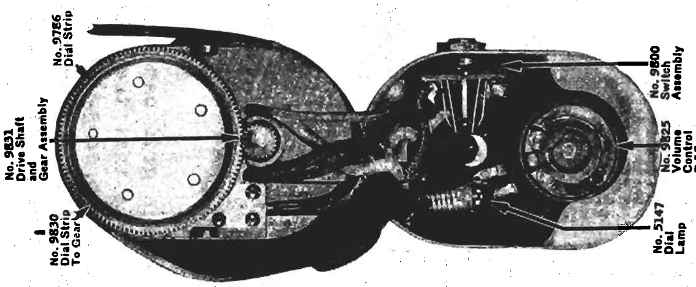
1. Set the volume control at maximum, insert all tubes in their proper sockets and connect the battery cable to a six (6) volt storage battery.

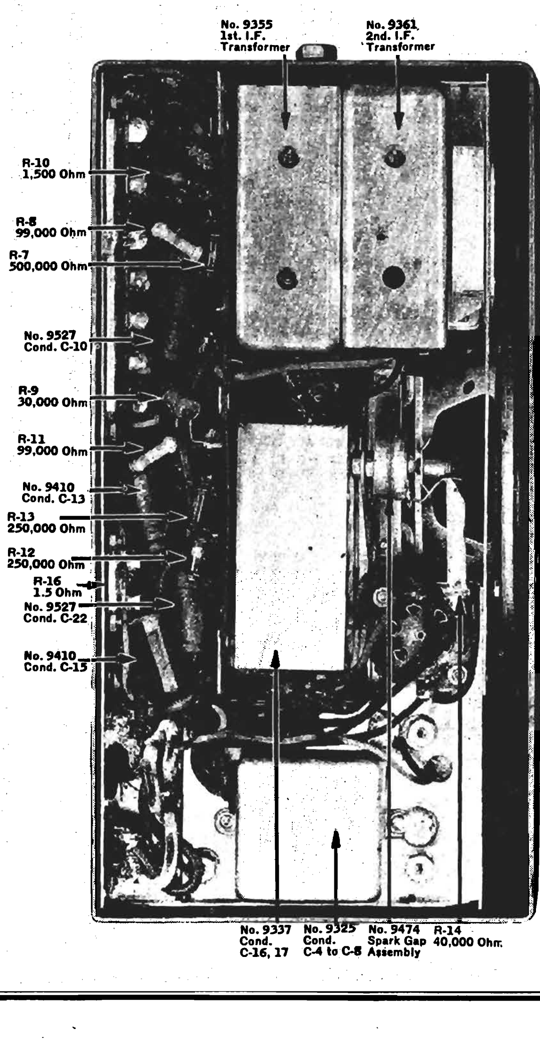
2. Supply a 456 Kilocycle signal to the grid of the first detector tube and align for maximum output the three (3) I.F. aligning condensers that are located on the bottom right hand side of the chassis and the one (1) I.F. aligning condenser located on the upper part of the chassis behind the speaker.

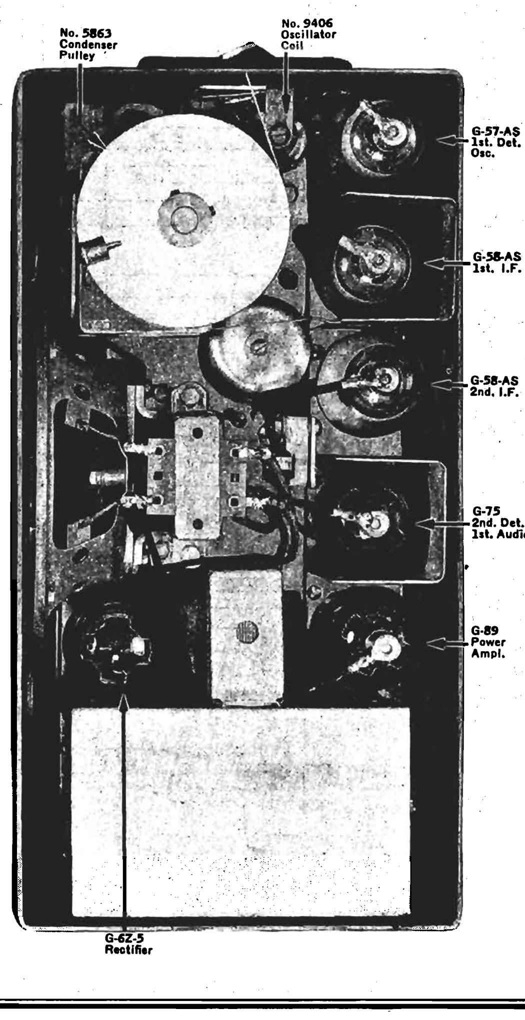
The shielding is to be connected to the grounded side of the battery and the two wires emerging from the shielding are both connected to the hot side. The polarity of the battery need not be considered when making these connections. When making the ground connections, scrape away any corrosion, paint or rust so as to make a good electrical contact.

TO OBTAIN BEST RESULTS FROM THIS RECEIVER, ADVANCE THE CAR GENERATOR TO KEEP THE STORAGE BATTERY FULLY CHARGED.

The cable must be securely clamped and must not come in contact with the battery in order to avoid the possibility of corrosion and shorting the battery.







MODEL 400-A, 411-A, 413-A
Schematic, Notes

GRIGSBY - GRUNOW CO.

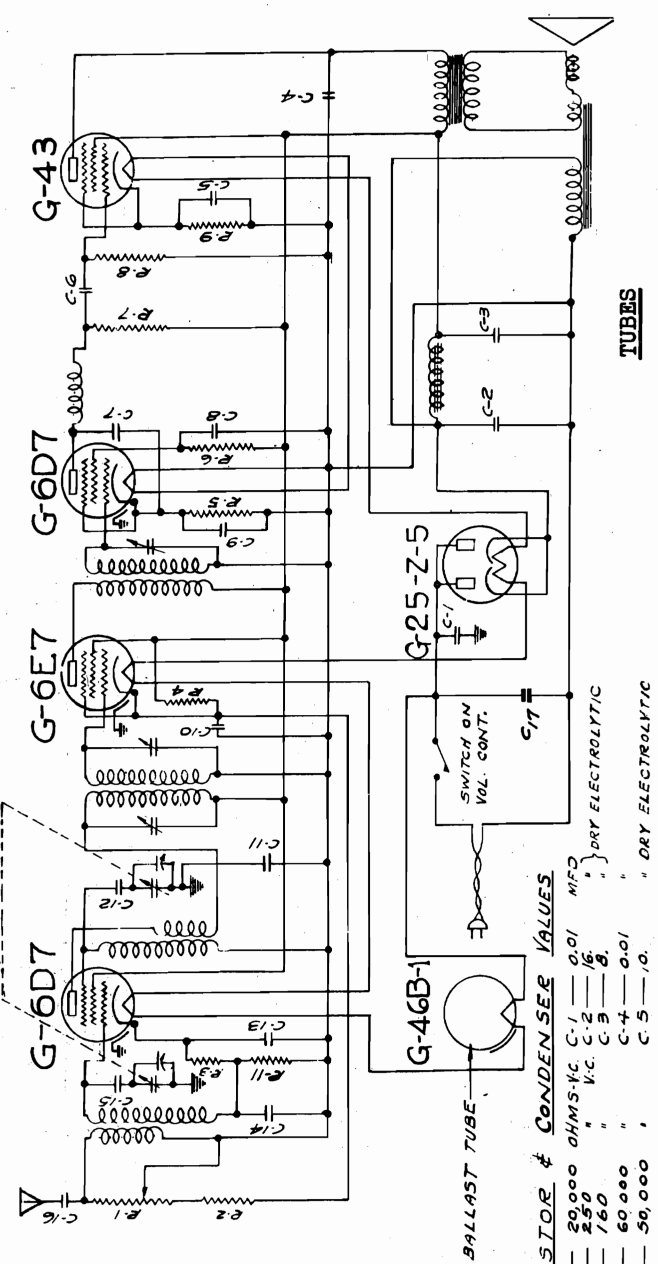
TABLE OF VOLTAGES TO "B—"

Tube Purpose	Type	Filament A.C.-D.C.	Plate D.C.	Screen D.C.	Cathode D.C.
Modulator and Oscillator	G-6D7	6.3	105	105	13
I. F. Amp.	G-6E7	6.3	105	105	*3 to 30
2nd Det.	G-6D7	6.3	18	18	2
Power Output	G-43	25.0	96	105	16
Rectifier	G-25-Z5	25.0	...	...	118
Ballast	G-46B-1	46.1	...	...	...

Line Voltage—115 A. C.

*Varies according to setting of volume control

SCHEMATIC DIAGRAM OF MAJESTIC SCREEN GRID A.C.-D.C. SUPERHETERODYNE RECEIVER MODEL - 400-A



RESISTOR & CONDENSER VALUES

Resistor	Ohms	Condenser	MFD
R-1	20,000 OHMS-V.C.	C-1	0.01
R-2	250 " V.C.	C-2	16.
R-3	160 "	C-3	8.
R-4	60 000 "	C-4	0.01
R-5	50,000 "	C-5	10.
R-6	1,000,000 "	C-6	0.10
R-7	500,000 "	C-7	0.0005
R-8	500,000 "	C-8	0.10
R-9	700 "	C-9	0.25
R-10	—	C-10	0.25
R-11	2500 "	C-11	0.25
		C-12	0.01
		C-13	0.25
		C-14	0.10
		C-15	0.01
		C-16	0.001
		C-17	0.10

(C-2 and C-3: DRY ELECTROLYTIC; C-5: DRY ELECTROLYTIC)

GRIGSBY-GRUNOW CO.
CHICAGO, U.S.A.
L.J.W. 4-14-33

Notes on this page denote differences between chassis of Model 400 and Model 400-A.

TUBES

The type G-6D7 is a seven prong tube with a grid cap connection. It is electrically the same as the G-57A-S except that the filament requires only 300 milliamperes instead of 400 milliamperes. This tube is spray shielded and the spray shield is connected to the seventh prong on the base instead of to the cathode, as is usually the practice.

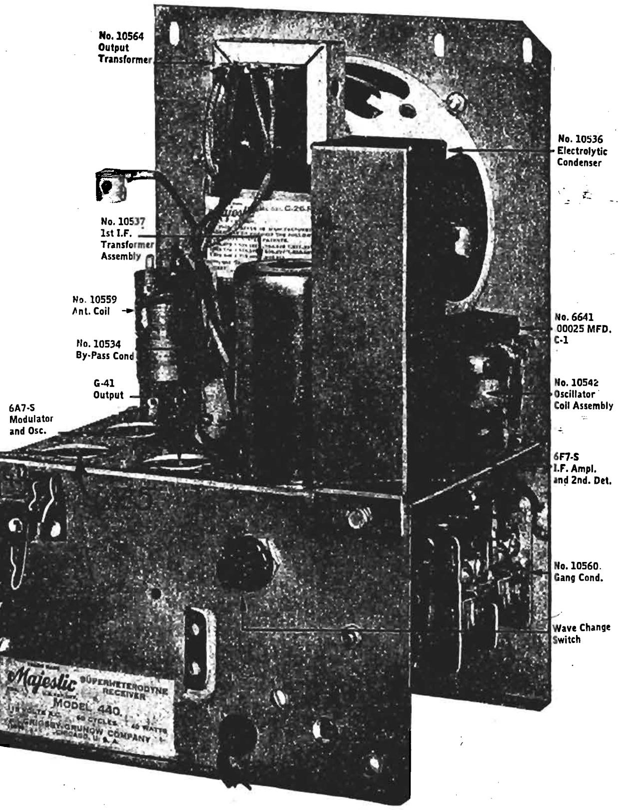
The G-6E7 tube differs from the G-58A-S in the same respects that the G-6D7 differs from the G-57A-S.

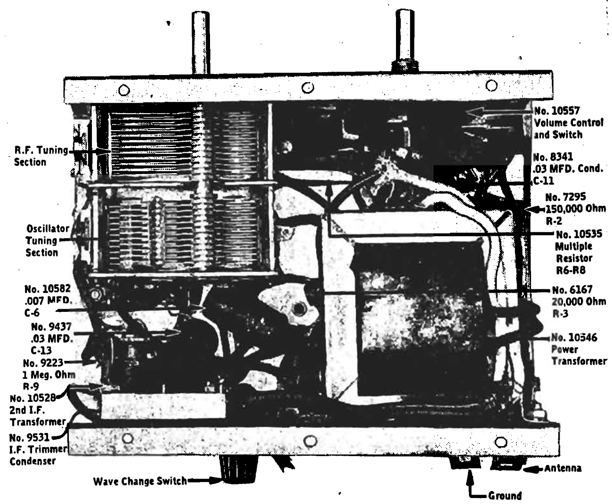
The G-46B-1 ballast dissipates 46.1 volts at 300 milliamperes.

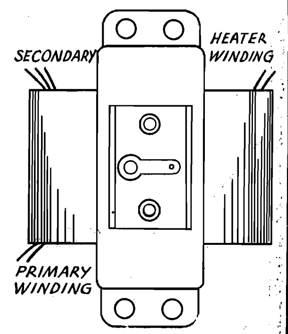
In view of the fact that the current consumption for the filaments of all the tubes used in the 400-A chassis is 300 milliamperes, it is not necessary to use the 500 resistor, R-10.

GRIGSBY - GRUNOW CO.

MODEL 44,49,194,440
Chassis views
Voltage, Parts List







Power Transformer Connections

CHASSIS 440

Models 44, 49 and 194

TABLE OF VOLTAGES

Purpose	Tube Type	Fil. Volt A.C.	Plate Volts	Screen Volts D.C.	Cathode Volts D.C.
Modulator	6A7-S	6.3	255 D.C.	92	3.5 to 40
Oscillator			92 D.C.	—	3.5 to 40
I. F. Amp.	6F7-S	6.3	255 D.C.	92	12
2nd Det.			*100 D.C.	—	12
Output	41	6.3	240 D.C.	255	18
Rectifier	6Z5	6.3(Parallel)	285 A.C.	—	315

Line Voltage—115 Volts, 60 Cycle. *Measured with 600,000 ohm Meter.

THE CIRCUIT

The chassis 440 employs an exceedingly efficient superheterodyne circuit utilizing four tubes including a rectifier. In the combination of tubes as shown above, a performance quality equal to six tubes is realized.

TWO WAVE BAND RECEPTION

Reception is provided on two wave bands. One position of the switch gives reception between 535 and 1530 kilocycles, and the second position between 1470 and 3500 kilocycles.

SPEAKER

Model G-26-F with a field resistance of 980 ohms is capable of tremendous amount of power for its size. Faithful reproduction over a wide range of the musical scale is given without distortion.

CONTROLS

On the back of the chassis is located the wave switch knob. Clockwise direction gives short wave and counter-clockwise direction gives the regular broadcast reception.
The combination volume control and the "on-off" switch is located on the right hand side while the tuning control is located on the left.
The addition of zero to the numbers on the dial will give the frequency reading in kilocycles. The inner circle of numbers is for the broadcast and the outer circle for the short wave band.

MISCELLANEOUS

The output is approximately 2.5 watts. The recommended antenna length for outside aerial is 50 feet.

ALIGNMENT PROCEDURE

1. Set wave switch in broadcast position (counter-clockwise as viewed from rear of receiver), volume control in maximum volume position and turn gang condenser to full mesh.
2. Supply a 456 kilocycle signal to the 6A7 converter grid and align the three I. F. tuning condensers for maximum sensitivity.
3. Supply a 1500 kilocycle signal to the input of the receiver, and after tuning the receiver to this signal, align the oscillator and radio frequency circuits for maximum sensitivity.

CHASSIS PARTS

PART No.	DESCRIPTION
10531	Chassis Only, Model 440............
10559	Antenna Coil Assembly, Complete...
10543	Antenna Coil Assembly............
10534	By-Pass Condenser Assembly, C-2, 3, 5, 7, 14........................
	Condenser Assembly
10582	.007 MFD., C-6 ....
8341	.03 MFD., C-11 ....
9437	.03 MFD., C-13 ....
10536	Condenser, Electrolytic, 6-4-10 MFD., C-8, 9, 10........................
	Condenser, Mica
6641	.00025 MFD., C-1 ....
8990	.001 MFD., C-4 ....
10560	Condenser, Two Gang..............
10572	Fahnestock Clip ....4 for
10537	I. F. Transformer, 1st, Complete.....
10538	I. F. Transformer Coil, 1st.........
10528	I. F. Transformer Assembly, 2nd, Complete ....
10541	I. F. Transformer Coil, 2nd.........
9531	I. F. Trimmer Condenser...........
10529	Oscillator Coil Assembly, Complete..
10542	Oscillator Coil Complete ....
10546	Power Transformer Assembly ......
	Resistors
6167	20,000 Ohm, R-3 ....
7295	150,000 Ohm, R-2 ....
7482	500,000 Ohm, R-5 ....
10571	700,000 Ohm, R-4 ....
9223	1,000,000 Ohm, R-9 ....
10535	Wire Wound, R-6 to R-8...........

MODEL 44,49,194 (440)
Schematic, Parts List
Point-to-point data
Socket layout

GRIGSBY - GRUNOW CO.

RESISTANCE VALUES

ANTENNA COIL
Primary .... .795 ohm
Secondary
Total ....5.22 ohm
Tap to Ground 3.77 ohm

OSCILLATOR COIL
Primary ....1.73 ohm
Secondary
Total ....2.93 ohm
Tap to Ground 1.81 ohm

1ST I. F. TRANS-FORMER
Primary ....26.5 ohm
Secondary .....27 ohm

2ND I. F. TRANS-FORMER
Primary ....55.5 ohm
Secondary .....55.5 ohm

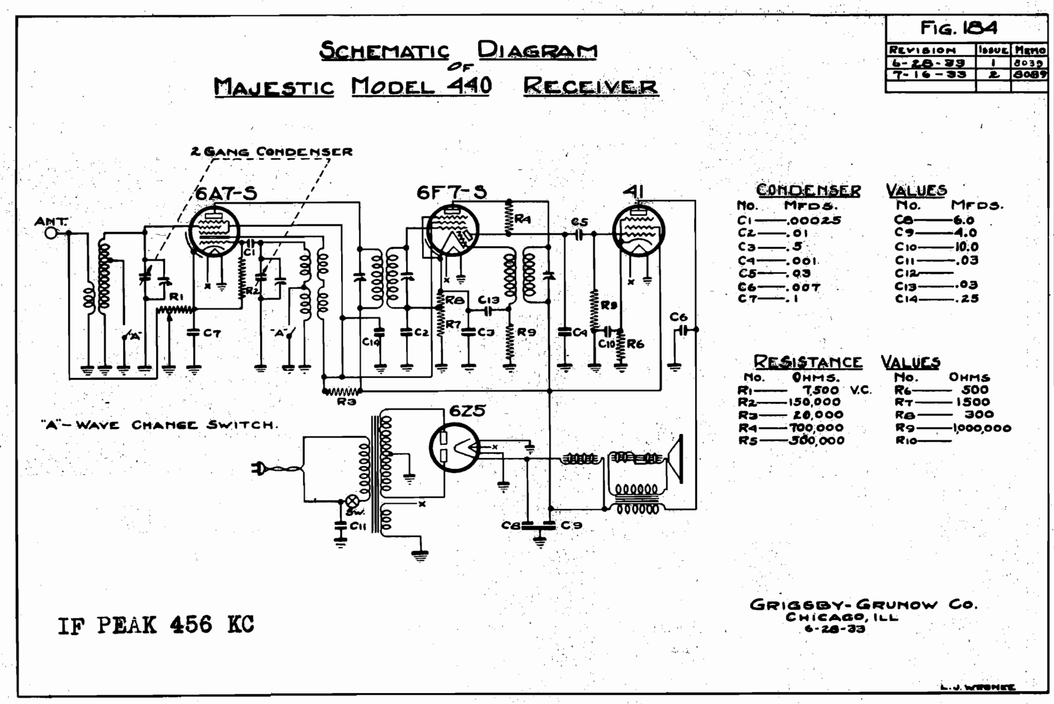
FILTER CHOKE
980 ohm

OUTPUT TRANS-FORMER
Primary ......550 ohm

FIELD COIL
980 ohm

HIGH VOLTAGE SECONDARY
Each Side.....405 ohm

VOICE COIL
1.8 ohm



Schematic Diagram Chassis 440

CHASSIS PARTS

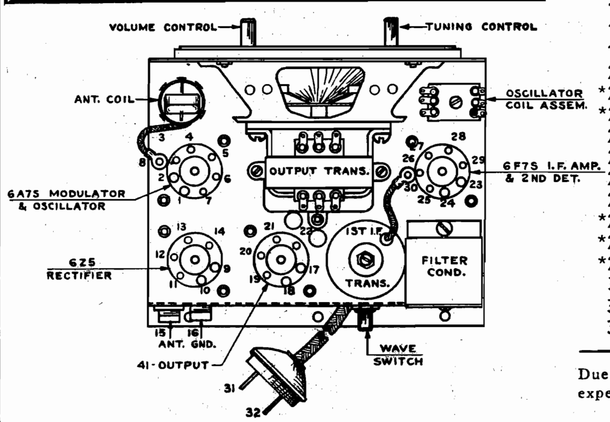
PART No.	DESCRIPTION
	Tube Socket
10107	7 Prong
10758	6 Prong
10557	Volume Control and Line Switch
10544	Wave Change Switch

MODEL G-26-F SPEAKER

10581	Model G-26-F Speaker Complete
9476	Cone Assembly
10563	Field Coil (980 Ohm)
9593	Hum-Buck Coil
10564	Output Transformer Assembly

CABINET PARTS MODELS 44 AND 49

67164	Cabinet Model 44, Complete
67184	Cabinet Model 49, Complete
67170	Baffle
10597	Escutcheon
67178	Grill Cloth
	Per Unit 8¾" x 7¼"
	Per yard, 50 inches wide
	Knobs
10598	For Controls
7401	For Wave Switch



RESISTANCE TABLE

All readings are taken from designated points to ground except those marked with an asterisk (*) which are taken to terminal No. 12, with all tubes removed from their sockets, volume control turned to maximum clockwise position, and the speaker connected in the circuit.

Terminal Number	Resistance In Ohms	If Resistance Differs Greatly From Value Shown, Check the Following
1	.34	Filament connection and ground connection
2	0	Ground connection
3	0	Volume control and C-7
4	150,000	C-1 & R-2. Also see terminal No. 2
*5	20,982	Pri. of oscillator coil, R-3 and filter choke
*6	20,980	R-3 and C-14
*7	1,006	Pri. of 1st I. F. trans.
8	5.22	Secondary of ant. coil
9	Same as No. 1	
10	0	Ground connection
11	405	One-half of hi-voltage secondary
12	Very high	C-8, C-9 and filter choke
13	Same as No. 11	
14	0	Ground connection
15	.79	Pri. of antenna coil
16	0	Ground connection
17	Same as No. 1	
18	Same as No. 2	
19	500	R-6 and C-10
20	500,000	R-5 and C-5
*21	980	Filter choke
*22	1,530	Pri. of output trans. and C-6. Also term. No. 21
23	Same as No. 2	
24	Same as No. 1	
*25	1,800	R-7, R-8, C-2 and C-3
26	1,000,000	Secondary of 2nd I. F., R-9 and C-13
*27	701,035	C-4, R-4 and pri. of 2nd I. F. trans.
*28	20,980	R-3 and C-14
*29	1,035	Pri. of 2nd I. F. trans. and filter choke
30	1,527	Sec. of 1st I. F. trans., C-2 and R-7
31	0	C-11, A. C. switch and pri. of power trans.
32	Same as No. 31	

Due to manufacturing tolerances on carbon resistors, the values given above may be expected to differ plus or minus 15 per cent.

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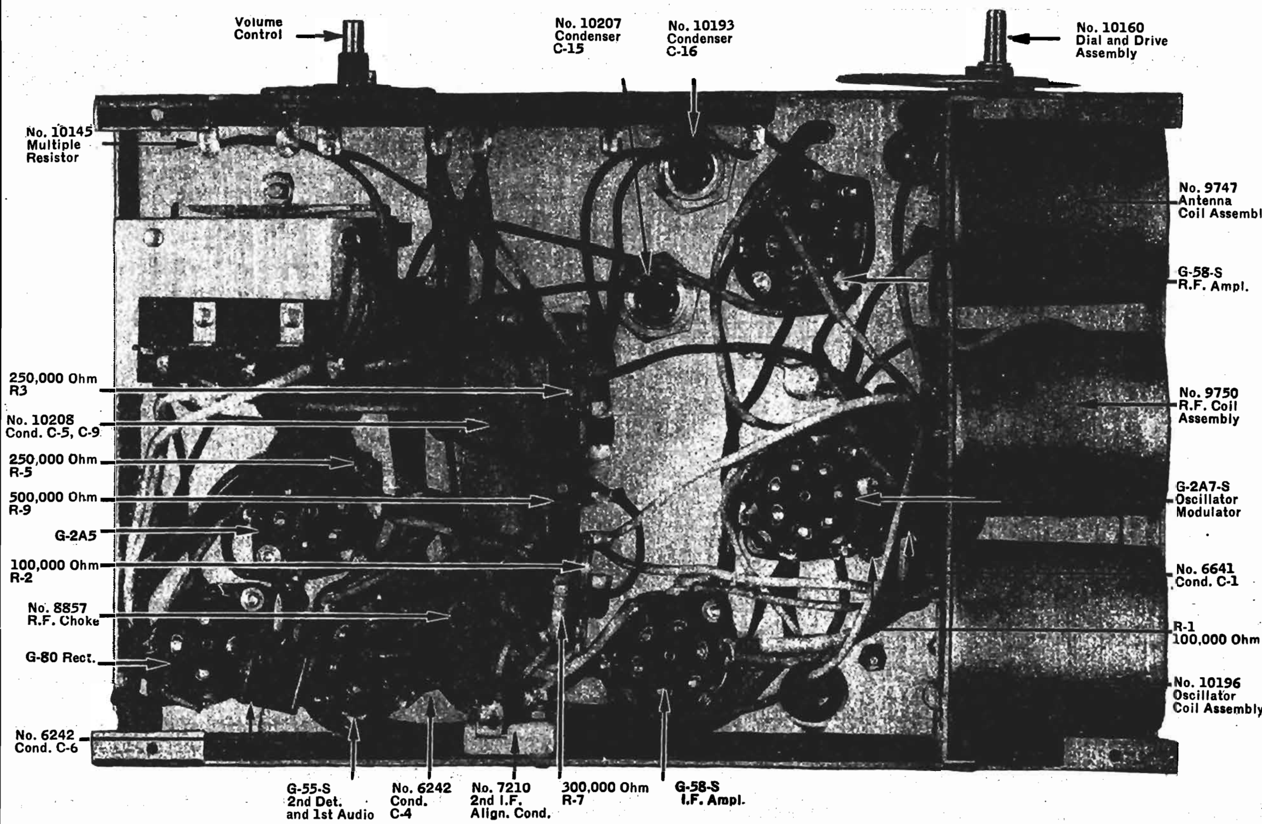
MODEL 460,461,463
Chassis view,Voltage
Parts List, Notes



CHASSIS 460

Models 461 and 463

TABLE OF VOLTAGES

Tube Purpose	Type	Filament Volts—A.C.	Plate Volts—D.C.	Screen Volts—D.C.	Cathode Volts—D.C.
R. F. Amp.	G-58-S	2.5	260	92	4.2
Modulator / Oscillator	G-2A7-S	2.5	260 / 92	92 / ...	4.2
I. F. Amp.	G-58-S	2.5	260	92	4.2
2nd Det. and 1st A.F.	G-55-S	2.5	*Triode 65	...	23.0
Output	G-2A5	2.5	243	260	15.0
Rectifier	G-80	5.0	...	...	...

Rectifier Filament to Ground—340 volts D.C.
Line Voltage—115 volts A.C.
Volume Control in Maximum Position.

*NOTE: Actual voltage at plate of tube. This reading will be much lower when a common voltmeter is used to measure this voltage because of the drop across the 250,000 ohm plate resistor.

THE CIRCUIT

The six tube Model 460 chassis employed in the Model 461 and 463 receivers is largely conventional except for the delayed A.V.C. system and the improved pre-selector system. The circuit continuity is as follows: G-58-S R.F. Amplifier, G-2A7-S Composite Modulator Oscillator, G-58-S I.F. Amplifier, G-55-S Second Detector and First Audio Amplifier, G-2A5 Pentode Output and G-80 Rectifier. The improved pre-selector circuit gives a greater image attenuation and greater stage gain, resulting in a much lower percentage of noise for a given output level. In these receivers very careful design work was carried out to insure excellent high frequency response, giving greater clarity and brilliance.

DELAYED AUTOMATIC VOLUME CONTROL

The Model 460 has a new A.V.C. circuit incorporated in it which follows the modern trend of having an improved over-load and A.V.C. action, but without the customary disadvantages of the more conventional circuits. This is accomplished by utilizing one diode plate for audio development only, and the other for A.V.C. voltage only. It is, therefore, possible to design an audio circuit and an A.V.C. circuit of optimum constants without any sacrifice of one to aid the other as has been the case in previous receivers. The result of this is a much greater power output for very weak, as well as strong, signals and a very constant output level over an extremely wide range of signal inputs, which of course, effectively overcomes "fading."

DESCRIPTION OF NEW TUBES

The G-2A7-S Pentagrid Converter is used in a composite oscillator modulator circuit and has two definite advantages. First, it gives a very flat sensitivity over the band covered and second, it makes it possible to control this stage with the automatic volume control voltage. The filament requires .80 amperes at 2.5 volts.

The G-2A5 is a new Power Amplifier Pentode capable of giving a large power output with a relatively small input signal voltage. The power handling ability of the G-2A5 is essentially the same as that of the G-59 with pentode connection. The filament requires 1.75 amperes at 2.5 volts.

CHASSIS PARTS

PART No.	DESCRIPTION	DEALER'S NET PRICE
10137	Chassis 460, Complete	$21.60
9747	Antenna Coil, Complete with Can	.62
9748	Antenna Coil Assembly, Less Can	.51
10143	By Pass Condenser Assembly, C-2, 3, 17, 18	.68
10144	By Pass Condenser Assembly, C-7, 8, C-10 to C-14	1.00
10200	Cable, Internal Chassis	.14
10193	Condenser, Electrolytic, 8 MFD., C-16	.76
10208	Condenser, Electrolytic, 10-10 MFD., C-5, 9	.59
10207	Condenser, Electrolytic, 16 MFD., C-15	1.16
6641	Condenser, Mica, .00025 MFD., C-1	.13
6242	Condenser, Mica, .0005 MFD., C-4, 6	.12
9753	Condenser, Three Gang	2.24
10160	Dial and Drive Assembly	.59
10148	I. F. Transformer Assembly, 1st, Complete	.92
10149	I. F. Transformer Assembly, 1st, Less Can	.78
10253	I. F. Transformer Coil, 2nd	.51
10196	Oscillator Coil, Complete with Can	.38
10197	Oscillator Coil Assembly, Less Can	.27
10190	Power Transformer Assembly	2.35
10278	Power Transformer Universal	4.32
	RESISTORS	
5059	100,000 Ohm, R-1, 2	.13
7259	250,000 Ohm, R-3, 5	.11
7253	300,000 Ohm, R-7	.12
7482	500,000 Ohm, R-9	.11
10145	Wire Wound, Multiple, R-6, 10, 11, 12, 13, 14	.51
8857	R. F. Choke Assembly	.32
9750	R. F. Coil Assembly, Complete with Can	.62
9751	R. F. Coil Assembly, Less Can	.51
10753	Spring for Tension on Drive Assembly	.07
10242	Tone Control and Switch (2 Leads and 2 Lugs)	.68
9587	Tube Socket, 4 Prong	.05
10758	Tube Socket, 6 Prong	.07
10107	Tube Socket, 7 Prong	.06
10183	Volume Control	.49

MODEL 460,461,463
Schematic, Alignment,
Color codes, Notes

GRIGSBY - GRUNOW CO.

RESISTANCE VALUES

ANTENNA COIL
Primary . . . 22.16 ohm
Secondary (total) . . 5.38 ohm

R. F. COIL
Primary . . 146 ohm
Secondary (total) . 5.15 ohm

OSCILLATOR COIL
Primary . . . 2.7 ohm
Secondary . . 2.13 ohm

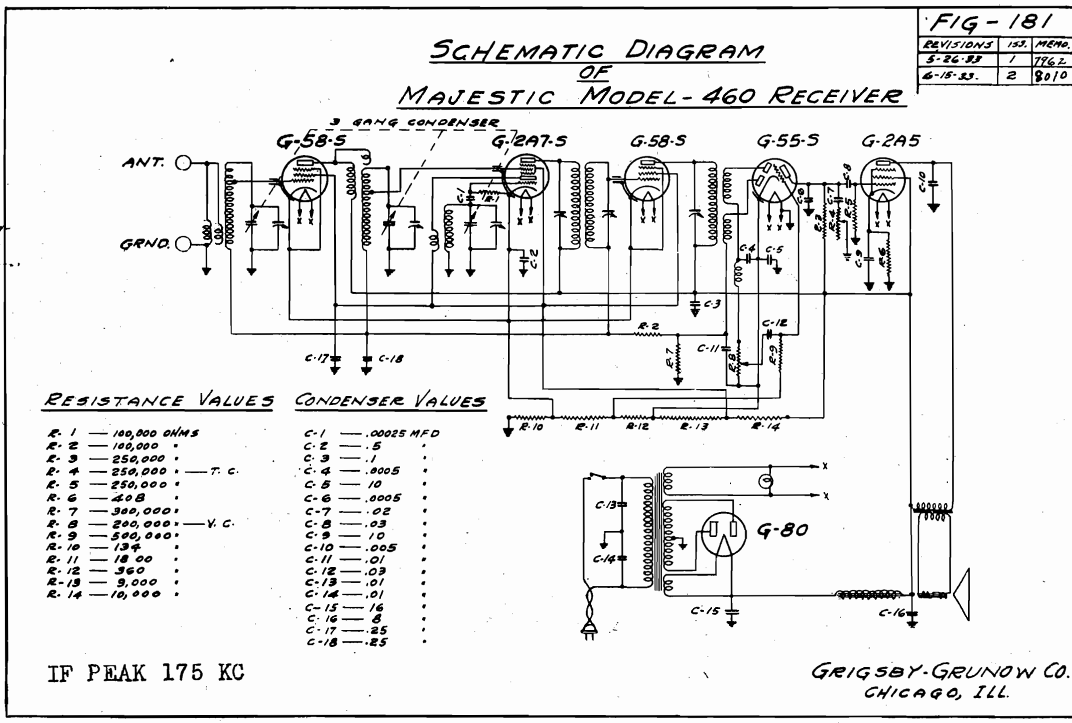
1st I. F. TRANSFORMER
Primary . . . . 125 ohm
Secondary . . 122 ohm

2nd I. F. TRANSFORMER
Primary. . . . 148 ohm
Secondary
Audio . . . 69.3 ohm
A.V.C. . . 68.3 ohm

OUTPUT TRANSFORMER
Primary . . . 500 ohm

FIELD COIL
. . . . 1070 ohm

HIGH VOLTAGE SECONDARY
Each Side. . . 360 ohm



Schematic Diagram Chassis 460

SPEAKER MODEL G-24-C

PART No.	DESCRIPTION	DEALER'S NET PRICE
10171	Model G-24-C Speaker Complete	$3.73
9876	CONE Assembly	.70
10173	Field Coil (1070 Ohm)	1.00
10174	Humbuck Coil	.05
10175	Output Transformer Complete	.70

CABINET PARTS Model 461

67138	Cabinet Only, Model 461	$8.10
10246	Escutcheon, Main	.19
10268	Escutcheon for Volume Control	.19
67134	Escutcheon Plate for Tone Control	.19
70609	Escutcheon Screws, Chrome Finish........Per 10	.01
67133	Grill	.65
10245	Knobs	.08
67141	Packing Carton	.59
2841	Screws, 1", with fancy Chrome Heads	.04
10002	Tube Shield Caps	.06

CABINET PARTS Model 463

67100	Cabinet Only, Model 463	$8.37
10220	Escutcheon Plate, Main	.22
67096	Escutcheon Plate for Tone Control	.19
66912	Grill Cloth ....Per Sq. Ft.	.14
67086	Grill-Metal	1.00
10216	Knobs	.08
67097	Packing Carton	.54
10002	Tube Shield Caps	.06

ALIGNMENT PROCEDURE

1—The receiver must be aligned with volume control in maximum position.

2—Supply a 175 K.C. signal to the grid of the G-2A7-S modulator tube, and adjust the three I.F. tuning condensers for maximum sensitivity.

3—Set the gang condenser in minimum capacity position (all the way out of mesh), supply a 1730 K.C. signal to the input of the receiver and align the three gang condenser trimmers for maximum sensitivity.

After the receiver is aligned the sensitivity for 100 milliwatts output at 30% modulation should be 10 microvolts or less.

WIRING COLOR CODE

With the hope that we shall eventually have a uniform color code, we are setting up the following tentative specifications:

Blue—Yellow Tracer	— High V. from Rect. (filter input)
Red	— B Plus
Orange	— Cathodes
White	— Screen
Blue	— Filament
Black	— Filament and Grounds
Green	— Grid Returns
Brown	— Cathode Returns
Black—Red Tracer	— Grid
White—Red Tracer	— Grid (Cond.)
Orange—Black Tracer	— Suppressor Grid
Black—Yellow Tracer	— Special Plate
Blue—Red Tracer	— Special Screens
Yellow	— All Plates
White R.C.	— A.V.C. Circuits
Yellow R.C.	— Special A.V.C. Circuits
Black and Red Twisted	— Pilot Lamp

For some time to come there will be cases where substitutions will be made for the purpose of using up inventory. There may also be cases which arise where it will be impossible to obtain the specific wire when needed, in which case a substitution will be made. In general, however, the above code will be strictly adhered to.

COLOR CODE FOR CONDENSERS AND RESISTORS
Standard R.M.A. Code

FIGURE CODE
Ten colors have been assigned to the figures as follows:

0—Black, 2—Red, 4—Yellow, 6—Blue, 8—Gray
1—Brown, 3—Orange, 5—Green, 7—Purple, 9—White

RESISTORS

Using the above code, the body of the resistor is colored to represent the first figure of the resistance value.
One end of the resistor is colored to represent the second figure of the resistance value.
A dot, located within the body color, represents the number of ciphers following the first two figures.
EXAMPLES: Brown body, black end and yellow dot—100,000 ohms.
Purple body, red end, and brown dot— 720 ohms.

MICA CONDENSERS

The three colored dots on a mica condenser indicate its capacity and the two colored dots, its D.C. working voltage.
On condensers having three dots on one side and two on the other, the designations are to be read with the capacity rating (3 dots) at the bottom, while on condensers having all five dots on one side the designations are to be read with the capacity rating on the top.
CAPACITY: Referring to the "figure code" the first color indicates the first digit of the capacity expressed in Mmfd. (micro-microfarads).
The second color indicates the second digit of the capacity expressed in Mmfd.
The third color indicates the number of ciphers following the second digit of the capacity.
EXAMPLES: Red, green and brown dots— 250 mmfd. or .00025 mfd.
Brown, black and red dots—1000 mmfd. or .001 mfd.
VOLTAGE: Referring to the "figure code" the first colored dot indicates multiples of 100 volts and the second one indicates multiples of 10 volts.
EXAMPLES: Orange and green dots—350 volts.
Blue and black dots —600 volts.

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MODEL 490,491,493
Circuit notes

THE CIRCUIT

The six tube Model 490 chassis employed in the Models 491 and 493 is designed for operation on 32 volt direct current lighting systems. It is practically identical to the Model 460 chassis in the radio frequency end except that it employs 6 volt tubes instead of 2.5 volt tubes. A type 85-S tube is employed as a second detector and first audio frequency amplifier and a type 42 for the output stage. The rectifier is a 6Y5 of the mercury vapor full wave type.

The normal line voltage on which the chassis is designed to operate is 35 volts. Under no circumstances should it ever be connected to a 110 volt source, either A.C. or D.C. The set operates over a line voltage of 26 to 45 volts.

The chassis is equipped with two fuses rated at 3 amperes and these should never be replaced with fuses of higher rating. Due to the series parallel connection of the tube heaters the line switch must never be left "on" if a tube is to be changed or taken out of the socket for any reason. If this precaution is not observed the tube in parallel with the one removed will be greatly overloaded and there is danger of the tube heater being burned out. If a tube should burn out in service, the receiver should be turned "off" and left "off" until a replacement is effected. It is also important that the receiver be turned "off" if the pilot light burns out. The defective pilot light should be replaced as quickly as possible with one rated at 200 milliamperes at 6.3 volts. A larger size pilot lamp will overload the 42 and 6Y5 heaters.

SPEAKER

The Model G-24-H dynamic speaker is employed in conjunction with the Model 490 chassis in both the Model 491 and 493 receivers. This speaker is adequate in size to handle with excellent fidelity all normal output levels necessary for home receivers. The field coil has a resistance of 14.5 ohms at 70° F. and it is connected in series with the tube heaters.

SERVICE SUGGESTIONS

It is imperative that an excellent ground be installed and connected to the chassis. Either a galvanized pipe driven at least three feet into the earth in a damp place or, if available, a lightning rod ground conductor at its grounded end should be used for a ground return.

In order to eliminate any possibility of picking up noise, the antenna and line cord should be kept apart at the back of the receiver. If excessive interference is being experienced, it will be well to inspect the antenna lead-in to see that it is as far away as possible from all lighting plant wiring, and at right angles to whatever wiring it might be necessary to pass, including that in the walls.

The chassis is non-polarized and therefore it makes no difference which side of the line cord goes to the positive or negative side of the direct current line.

MODEL 490,491,493
Vibrator notes,
Voltage

GRIGSBY - GRUNOW CO.

VIBRATOR ARMATURE ADJUSTMENT

The vibrator adjustment is a very delicate procedure and under no circumstances should it be attempted without meters in the circuit. A primary circuit D.C. ammeter (0 to 1 Amp.) is the most important indicator used during adjustments, and should be connected in series with the fuse of the vibrator circuit. A 0-300 D.C. voltmeter, 1,000 ohms per volt, should be connected between ground and "B" plus. A 0-100 D.C. milliammeter should be connected between ground and the ground end of the "B" filter choke, which is first removed from ground.

With normal tubes which have been heating at least one minute, the following values should be read when the vibrator is properly adjusted:

INPUT	OUTPUT
35 Volts, .58 Amperes	285 Volts, 53 Milliamperes

If the voltage at the vibrator is higher or lower than 35 volts, the other readings will be correspondingly more or less. The following table gives the output voltage at different line voltages:

LINE VOLTS	TOTAL "B" VOLTS
26	220
30	250
35	285
40	325

Readjustment of the vibrator will be necessary if for the above input voltage the output current and voltage are low.

After long continued operation the vibrator contacts may become sufficiently worn that they will require readjustment, the surfaces of the contacts should the be honed with a carborundum stone until they are flat and bright. It is necessary only to remove high points and scale which may have formed, and it is not necessary to endeavor to hone out the deeper pits which may have formed on the contact surfaces.

The simplest and most usual adjustment required is a slight increase of spring tension by turning down the spring tension adjusting screw one or two turns. This adjustment is not critical, but if one or two turns do not improve the operation this adjustment should be locked, and attention turned to the contact adjusting screws. Do not attempt to turn any adjusting screws without first loosening the lock nuts, and do not try any one adjustment as final without tightening the lock nut, as tightening the nut is apt to change things.

The second adjustment, and the one likely to do the most good, is to turn the #1 contact adjusting screw (the one farthest from the spring tension adjustment) down very carefully, at the same time watching the ammeter. Usually not more than 1/8 to 3/8 of a turn will be necessary, but when the right adjustment is reached the ammeter will show .58 ampere. If the armature suddenly begins to clatter against the core,the #1 contact is down too far and should be

GRIGSBY - GRUNOW CO

MODEL 490,491,493
Vibrator notes
Coil resistances

backed off. If proper operation is not obtained by adjusting the #1 contact it should be set at a little less than .58 ampere and attention turned to the #2 contact (the one closest to the spring tension adjusting screw). Turn the #2 adjusting screw down carefully until the ammeter shows .58 ampere at standard output. The vibrator should then be operating steadily and smoothly, and the input fluctuation should be very little. If after a few trial adjustments the vibrator is obviously completely out of adjustment it is wise to proceed as follows:

Turn the #2 contact all the way out so that it does not make contact to the armature. Turn the #1 contact down until the armature clatters against the core, then back it off about 1/2 turn so that the clatter stops. Then turn down the #2 contact until the ammeter reading starts to rise and adjust to .58 ampere. Note that a point will be reached in this adjustment at which the output current and voltage do not increase even though the input current is increased. This point will be near .58 ampere input, and is the point of correct adjustment.

If the reflection of a green arc is seen from the #1 contact it is necessary to check the vibrator adjustment again. A vibrator operating with a green arc is apt to be a source of r.f. interference in the receiver. Incidentally, have no alarm if r.f. interference, or "buzzer noise" is observed while both lids are off the vibrator container. Usually, a green arc at the #1 contact is an indication of too much tension on the adjusting spring, or of a no-load condition in the output circuit - the latter being no fault of vibrator adjustment.

Before closing the vibrator container after adjustments have been made, make sure that all connections and lock-nuts are tight.

MISCELLANEOUS RESISTANCES

ANTENNA COIL	
Primary	22.16 ohms
Secondary (total)	5.38 ohms
R.F. COIL	
Primary	146 ohms
Secondary (total)	5.15 ohms
OSCILLATOR COIL	
Primary	2.7 ohms
Secondary	2.13 ohms
IST I.F. TRANSFORMER	
Primary	125 ohms
Secondary	122 ohms
2ND I.F. TRANSFORMER	
Primary	148 ohms
A.V.C. Secondary	68.3 ohms
Audio Secondary	69.3 ohms

OUTPUT TRANSFORMER	
Primary	450 ohms
Secondary	.238 ohms
SPEAKER	
Field	14.5 ohms
Voice Coil	1.8 ohms
VIBRATOR TRANSFORMER	
Primary (total)	5.06 ohms
Secondary (total)	644 ohms
CHOKES	
R.F. Choke	85 ohms
Audio Choke (Filter) Total	500 ohms
Audio Choke (Filter)Tap toGrd	435ohms
R.F. Buzzer Choke	65 ohms
R.F. Choke (Fuse to Vibrator)	.09 ohms
R.F. Choke (Line Filter)	.09 ohms
R.F. Choke (Line Filter)	.09 ohms

MODEL 490,491,493
Alignment, Voltage

GRIGSBY - GRUNOW CO.

ALIGNMENT PROCEDURE

1. The volume control and tone control should be set at maximum clockwise position

2. Supply a 175 k.c. signal to the 6A7-S modulator grid and adjust all the I. F. aligning condensers for maximum sensitivity.

*3. Turn the gang condenser completely in mesh. Set the dial to the gauge mark beyond 540 k.c., and lock dial in place.

4. With gang condenser in minimum capacity position (out of mesh), supply a 1730 k.c. signal to the input of the receiver and align the three (3) radio frequency circuits for maximum sensitivity.

NOTE:- The power line should never be connected to the receiver until the pilot light and all tubes are inserted and the speaker connected to the set.

* Paragraph #3 is only followed when it is necessary to recalibrate the dial.

TABLE OF VOLTAGES

(To Ground)

TUBE TYPE	PURPOSE	FILAMENT VOLTS-D.C.	FILAMENT AMPERES-D.C	PLATE VOLTS-D.C.	SCREEN VOLTS-D.C.	CATHODE VOLTS-D.C.	GRID VOLTS
6E7	R.F. AMP.	† 6.3	.3	256	103	4.7	0
6A7-S	Modulator	† 6.3	.3	256	103	4.7	0
	Oscillator			103	---		
6E7	I.F. AMP.	† 6.3	.3	256	103	4.7	0
85-S	2nd Det.& 1st Audio	† 6.3	.3	*Triode 64	---	24	0
42	Output	† 6.3	.7	226	256	0	24
6Y5	Rectifier	† 6.3	.8	---	---	256	---

LINE VOLTAGE - 35 Volts D.C.

*NOTE: Actual voltage at plate of tube. This reading will be much lower when a common voltmeter is used to measure this voltage because of the drop across the 250,000 ohm plate resister.

† These values may vary considerably with different tubes; from 5.7 to 6.8 volts.

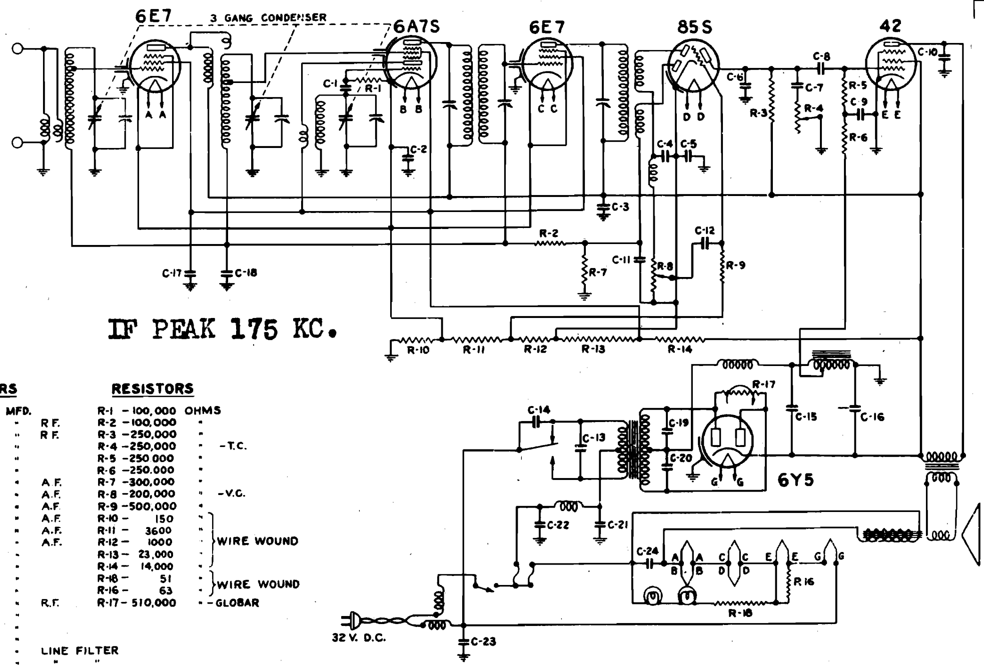
GRIGSBY - GRUNOW CO.

MODEL 490,491,493
Schematic
Socket layout
Condenser assembly

FIG. - 186

REVISIONS	ISSUE	MEMO.
7-18-33	1	8090
12-9-33	2	8497

SCHEMATIC DIAGRAM OF MAJESTIC MODEL 490 RECEIVER



IF PEAK 175 KC.

CONDENSERS

C-1	.00025	MFD.	
C-2	.5	"	R.F.
C-3	.1	"	R.F.
C-4	.0005	"	
C-5	10	"	
C-6	.0005	"	
C-7	.02	"	A.F.
C-8	.03	"	A.F.
C-9	.25	"	A.F.
C-10	.005	"	A.F.
C-11	.01	"	A.F.
C-12	.03	"	A.F.
C-13	.5	"	
C-14	.5	"	
C-15	8	"	
C-16	8	"	
C-17	.25	"	R.F.
C-18	.5	"	
C-19	.008	"	
C-20	.008	"	
C-21	.5	"	LINE FILTER
C-22	.5	"	" "
C-23	.5	"	" "
C-24	10	"	N.P.

RESISTORS

R-1	100,000	OHMS	
R-2	100,000	"	
R-3	250,000	"	
R-4	250,000	"	T.C.
R-5	250,000	"	
R-6	250,000	"	
R-7	300,000	"	
R-8	200,000	"	V.C.
R-9	500,000	"	
R-10	150	"	WIRE WOUND
R-11	3600	"	WIRE WOUND
R-12	1000	"	WIRE WOUND
R-13	23,000	"	WIRE WOUND
R-14	14,000	"	WIRE WOUND
R-18	51	"	WIRE WOUND
R-16	63	"	WIRE WOUND
R-17	510,000	"	GLOBAR

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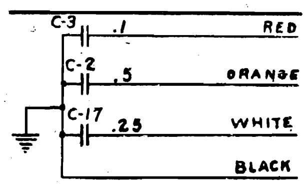
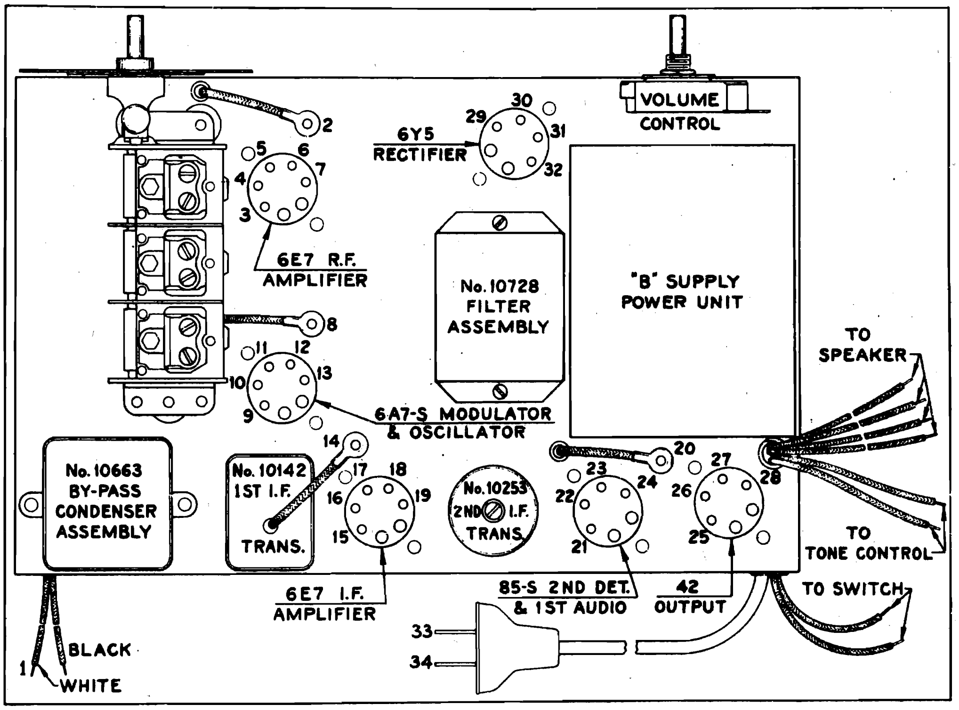
CHICAGO, U.S.A.

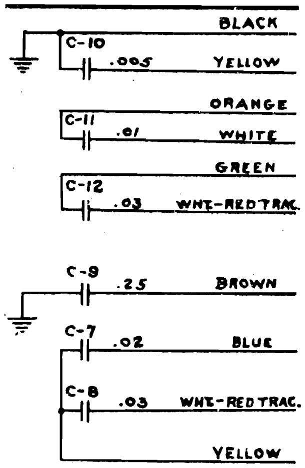


PART #10663 BYPASS CONDENSER ASSEMBLY

SCHEMATIC DIAGRAM OF MODEL 490 CHASSIS



RESISTANCE CHART DIAGRAM.



PART #10637 BYPASS CONDENSER ASSEMBLY

MODEL 490,491,493
Point-to-point data

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RESISTANCE CHART

All readings are taken from designated points to ground except those marked with an asterisk (*) which are taken to terminal No. 30, with all tubes removed from their sockets, and the speaker connected in the circuit.

TERMINAL NO.	RESISTANCE IN OHMS	IF RESISTANCE DIFFERS GREATLY FROM VALUE SHOWN, CHECK THE FOLLOWING
1	22.16	Primary of antenna coil.
2	400,004	Secondary of antenna coil, C-18,R-2,R-7,and C-11.
3	150	R-10 & C-2.
4	0	Ground connection
5	Same as #3	
*6	14,000	R-14.
6	Open	C-17, C-16 or C-15.
*7	146	Primary of R.F. coil.
7	Open	C-3, Also see terminal #6.
8	400,004	Secondary of R.F. coil, C-18, R-2, R-7 and C-11.
9	Same as #3	
10	100,150	R-1, C-1, C-2 and R-10.
*11	14,002.7	Primary of oscillator coil and R-14.
12	Same as #6	
*13	125	Primary of 1st I.F. transformer
14	400,122	Secondary of 1st I.F. trans.,R-2,R-7,C-18 & C-11.
15	Same as #3	
16	0	Ground Connection
17	Same as #3	
18	Same as #6	
19	148	Primary of 2nd I.F. transformer
20	503,750	R-9, R-10, R-11, C-12 and C-2.
21	4,750	C-5,R-12,R-11 and R-10.
†22	204,904.3	Audio Sec. of 2nd I.F.,R.F.choke,R-8,C-5,C-12. R-12, R-11, and R-10
†23	300,068.3	A.V.C. sec. of 2nd I.F., R-7 and C-11
* 24	250,000	R-3.
24	Open	C-6, C-7 and C-8
25	0	Ground connection
26	500,436	R-5, C-9, R-6 and filter choke
*27	0	Connections
*28	450	Primary of output transformer
28	Open	C-10 and primary of output transformer
29	822	Secondary of "B"supply trans.,C-20,C-19, R.F. buzzer choke and filter choke
30	Open	C-15, C-16, C-10, C-3 and C-17
31	Same as #29	
32	0	Ground connection.
33	Open	C-23, C-22 and C-21.
34	Same as #33	

†The connections to these two diode plates may be reversed without any apparent effect.

NOTE: - Due to manufacturing tolerances on carbon resistors the values shown above may be expected to differ plus or minus 15 per cent.

GRIGSBY - GRUNOW CO.

MODEL 490,491,493
Parts List

MODEL 490 CHASSIS PARTS

PART NO.	DESCRIPTION	DEALER'S NET PRICE
10728	"A" Filter Assembly (Includes C-21,22,23 & 3 chokes)	$ 2.25
9747	Antenna Coil	.62
10637	By-Pass Condenser, C-7 to C-12	1.26
10663	By-Pass Condenser, C-2, 3, 17, R.F.	.63
10740	Cable, Shielded for Volume Control	.12
8857	Choke Assembly, R.F.	.32
10641	Choke Coil Assembly, "B"	.96
10638	Choke Coil Assembly, R.F. Buzzer	.34
10184	Condenser Assembly, .5 Mfd., C-18	.22
10630	Condenser, Electrolytic,Dual 8 & 10 Mfd.,C-15,16,5	1.62
10946	Condenser, Electrolytic, 10 Mfd., C-24	.54
6641	Condenser, Mica, .00025 Mfd., C-1	.13
6242	Condenser, Mica, .0005 Mfd., C-4, 6	.12
9753	Condenser Gang	2.24
10160	Dial and Drive Assembly	.59
5147	Dial Lamp	.08
998	Fuse, 3 Amp.	.03
10725	Fuse Board and Bracket Assembly	.12
10148	I.F. Transformer, 1st, Complete	.92
10149	I.F. Transformer, 1st, Less Can	.78
10253	I.F. Transformer, 2nd	.51
10196	Oscillator Coil	.38
	RESISTORS	
5059	100,000 Ohm, R-1, 2	.13
7259	250,000 Ohm, R-3, 5, 6	.11
7253	300,000 Ohm, R-7	.12
7482	500,000 Ohm, R-4	.11
10675	Globar, R-17	.24
10636	Multiple, Wire Wound, R-10 to R-14	.59
10727	Multiple, Wire Wound, R-15, 16	.28
9750	R.F. Coil	.62
11597	Tone Control and Line Switch	.68
10758	Tube Socket, 6 prong	.07
10107	Tube Socket, 7 prong	.06

MODEL 490,491,493
Parts List

GRIGSBY - GRUNOW CO.

PART NO.	DESCRIPTION	DEALER'S NET PRICE
10648	Vibrator Assembly, Complete	$ 8.10
10655	Vibrator Armature Assembly	3.50
10649	Vibrator Inner Can Assembly	7.44
10664	Volume Control	.51

MODEL G-24-H SPEAKER

PART NO.	DESCRIPTION	DEALER'S NET PRICE
10610	Model G-24-H Speaker Complete	$ 3.66
9876	Cone Assembly	.70
10612	Field Coil (14.5 Ohm)	.78
9084	Gasket for Cone Assembly	.02
10613	Output Transformer Assembly	.93

CABINET PARTS-MODEL 491

PART NO.	DESCRIPTION	DEALER'S NET PRICE
67735	Cabinet only, Model 491	$ 3.90
2840	Chassis Mounting Screws	.01
10999	Escutcheon Plate, Dial	.16
10998	Escutcheon Plate, Volume	.16
67544	Escutcheon, Name Plate, "Majestic"	.10
2895	Fancy Head Thru-Bolts, No. 8-32 x 1" .... 2 for	.01
66912	Grill Cloth, 8" High by 10" Wide .... per Sq.ft.	.14
10222	Knob, Round	.07
10245	Knob, Square	.08
10002	Tube Shield Caps	.06
12019	Celluloid for Volume Escutcheon	.05

CABINET PARTS-MODEL 493

PART NO.	DESCRIPTION	DEALER'S NET PRICE
68441	Cabinet only, Model 493	$ 17.35
2840	Chassis Mounting Screws	.01
10999	Escutcheon Plate, Dial	.16
10998	Escutcheon Plate, Volume	.16
2455	Escutcheon Screws .... 10 for	.04
2564	Fancy Head Thru-Bolts, No. 8-32 x $1\frac{1}{4}$" .... 10 for	.10
66912	Grill Cloth, 15" High by 12" Wide .... per Sq.Ft.	.14
10222	Knob, Round	.07
10245	Knob, Square	.08
10002	Tube Shield Caps	.06
12019	Celluloid for Vol. Escutcheon	.05

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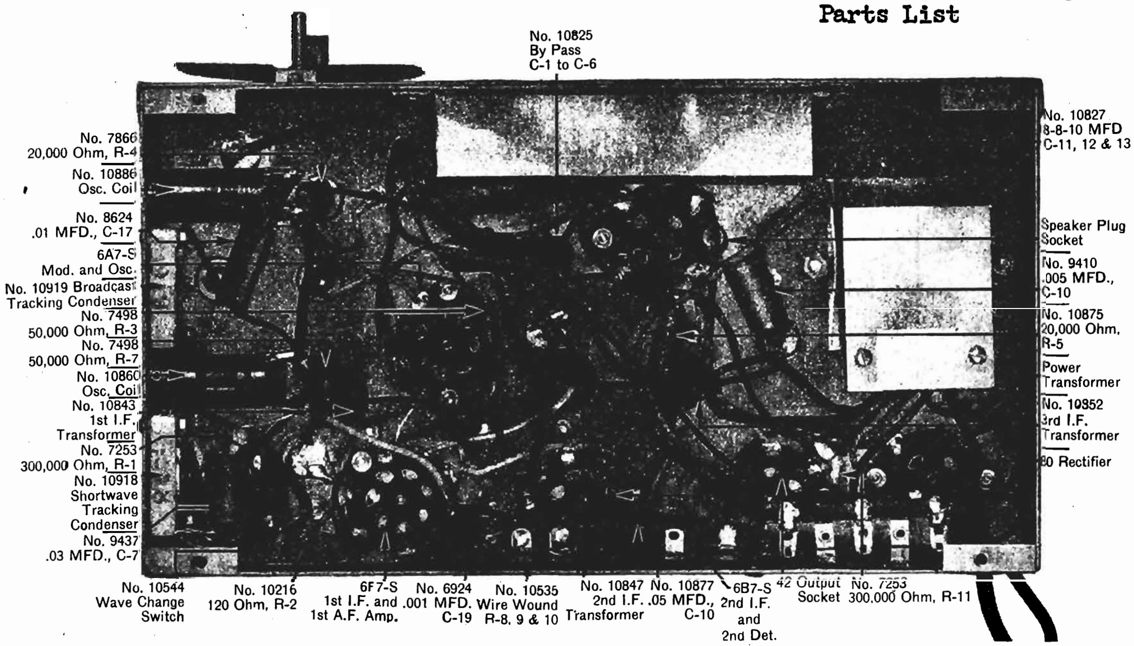
PART NO.	DESCRIPTION	DEALER'S NET PRICE
10816	Vibrator Adjustment Wrench, Small	$ 1.00
10817	Vibrator Adjustment Wrench, Large	1.75

GRIGSBY - GRUNOW CO.

MODEL 55,59,75,195,560,566
(Chassis 500)
Chassis view, Alignment
Parts List



CHASSIS 500

Models 55, 59, 75, 195, 560 and 566

THE CIRCUIT

Chassis 500 is in many ways a radical departure from conventional design and accomplishes the maximum performance with a minimum number of tubes through the use of the new Majestic DUO-VALVE tubes and circuit.

Good pre-selection is obtained through the use of an extremely low loss antenna coil. The tuned antenna circuit is fed into a duo-valve 6A7-S, which serves the double purpose of oscillator and modulator. The intermediate frequency output of this tube is fed through a double tuned I. F. transformer into the first intermediate frequency amplifier, the pentode section of the duo-valve 6F7-S. This is coupled through the second I. F. transformer to the pentode section of the duo-valve 6B7-S. The intermediate frequency output of this tube is then fed separately into the two diode plates of the same tube. One of these diodes is used for the audio or signal channel, and the other for automatic volume control. The use of separate diodes for these two purposes results in exceptional fidelity, since the audio diode is not negatively biased, and results in extremely good automatic volume control action, since full automatic volume control may be exercised on three of the tubes of the five-tube set. The detected audio output of the 6B7 diode is then fed into the grid of the triode section of the duo-valve 6F7-S where it is amplified, finally driving the 42 output tube. The familiar type 80 tube is used as the power supply rectifier.

TWO WAVE BAND RECEPTION

Reception is provided on two wave bands, the broadcast band extending from 535 to 1550 K. C., the short wave band overlapping it from 1480 to 4440 K. C. The change from one band to the other is accomplished by the turn of a switch located on top of the chassis frame and easily accessible from the rear of the cabinet.

CONTROLS

A decidedly new feature is employed in the mechanical construction of the dial assembly and drive shaft. The gang condenser is fitted with a planetary drive, having a ratio of 5½ to 1. The knob is attached to the inner shaft while the dial scale and rotor plates of the gang condenser are attached to the outer drive making fine adjustment of condenser possible.

ALIGNMENT PROCEDURE

Chassis 500

The receiver must be aligned with the volume control in maximum position.

1. Set wave change switch in broadcast position and gang condenser in full mesh. Supply a 456 kilocycle signal to the 6A7 converter grid and align all the I. F. tuning condensers for maximum sensitivity.

2.* Turn the gang condenser completely out of mesh. Set the dial to the calibration line for 4400 K. C. and lock the dial to the condenser shaft.

3. Set the dial at 1500 K. C. and after supplying a 1500 K. C. signal to the input of the receiver, align the gang condenser trimmers for maximum output.

4. Set wave change switch to short wave position. Supply a 1500 K. C. signal to the input of the receiver and then tune the shortwave tracking condenser (rear of left side of chassis) and the gang condenser simultaneously for maximum output. For each adjustment of the tracking condenser there will be a different gang condenser setting which gives maximum output. The combination of gang setting and tracking condenser adjustment which gives maximum output, disregarding setting, is the correct adjustment.

5. Set wave change switch to broadcast position. Supply a 600 K. C. signal to the input of the receiver and then adjust the broadcast tracking condenser (front of left side of chassis) and the gang condenser simultaneously for maximum output. Adjustment should be made in the same manner as directed in paragraph No. 4. If necessary, readjust gang condenser trimmers as in No. 3 above.

*Note—Paragraph No. 2 is only followed when it is necessary to replace or recalibrate the dial.

CHASSIS PARTS

PART No.	DESCRIPTION	DEALER'S NET PRICE
10857	Antenna Coil Assembly	$ 0.66
10828	By-Pass Condenser Assembly, C-1 to C-6	.96
7310	Condenser Assembly, .03 MFD., C-9	.13
	Condenser, Cartridge	
9437	.03 MFD., C-7	.16
10877	.05 MFD., C-10	.16
8624	.01 MFD., C-17	.19
9410	.005 MFD., C-18	.16
10827	Condenser, Electrolytic, 8-8-10 MFD., C-11, 12, 13	1.32
	Condenser, Mica	
6641	.00025 MFD., C-16	.13
6242	.0005 MFD., C-15	.12
8990	.001 MFD., C-14	.14
10918	Condenser, Trimmer, Short Wave	.34
10919	Condenser, Trimmer, Broadcast Wave	.19
10871	Condenser, Two Gang	1.32
10870	Dial Scale	.18
10858	Dial Light Bulb, 6.3 Volt	.08
10572	Fahnestock Clip, Antenna 4 for	.05
9459	Fahnestock Clip, Ground 4 for	.05
10843	I. F. Transformer Assembly, 1st Complete	1.49
11705	I. F. Transformer Assembly, 2nd Complete	1.32
10852	I. F. Transformer Assembly, 3rd Complete	2.41
10860	Oscillator Coil Assembly, Low Frequency	.29
10866	Oscillator Coil Assembly, High Frequency	.36
10835	Power Transformer, 115 Volt, 50-60 Cycle	2.52
11201	Power Transformer, Universal, 115-240 Volts, 25-133 Cycle	5.61
	Resistors	
0126	120 Ohm, R-2	.11
7481	10,000 Ohm, R-6	.11
7866	20,000 Ohm, R-4	.13
10875	20,000 Ohm, R-5	.21
9058	20,000 Ohm, R-14	.11
7498	50,000 Ohm, R-3, 7	.12
5060	200,000 Ohm, R-13, 15	.12
7253	300,000 Ohm, R-1, 11, 12	.12
10535	Multiple Wire Wound, R-8, 9, 10	.21
	Sockets, Tube	
10840	4 Prong, Rectifier and Speaker Socket	.06
10758	6 Prong	.07
10107	7 Prong	.06
10868	Volume Control	.69
10544	Wave Change Switch	.23
10293	WRENCH for balancing I. F. Transformers	.81

MODEL G-26-H SPEAKER

Used in Cabinets 55, 59, 195 and 566
This type speaker incorporated in chassis

PART No.	DESCRIPTION	DEALER'S NET PRICE
10881	Model G-26-H Speaker Complete	$ 3.25
9476	Cone Assembly	.51
10883	Field Coil (980 Ohm)	.60
8839	Gasket for Cone	.03
10891	Humbuck Coil	.10
10884	Output Transformer Assembly	.78
10319	Plug, Male, 4 Prong	.05

MODEL G-24-M SPEAKER

Used in Models 75 and 560

PART No.	DESCRIPTION	DEALER'S NET PRICE
11390	Model G-24-M Speaker Complete	$ 4.14
9876	Cone Assembly	.70
11385	Field Coil (1,000 Ohm)	1.02
9084	Gasket for Cone	.02
11387	Output Transformer	.84

MODEL 55, 59, 75, 195, 560, 566
(Chassis 500)
Schematic, Parts List
Point-to-point data, Coil resistances. Socket layout

GRIGSBY - GRUNOW CO.

RESISTANCE VALUES

ANTENNA COIL
Primary ....27 ohms
Secondary ....3.9 ohms

HI-FREQUENCY OSCILLATOR COIL
Primary ....1.3 ohms
Secondary ....1.1 ohms

LOW FREQUENCY OSCILLATOR COIL
4.5 ohms

1ST I. F. TRANSFORMER
Primary ....20 ohms
Secondary ....20 ohms

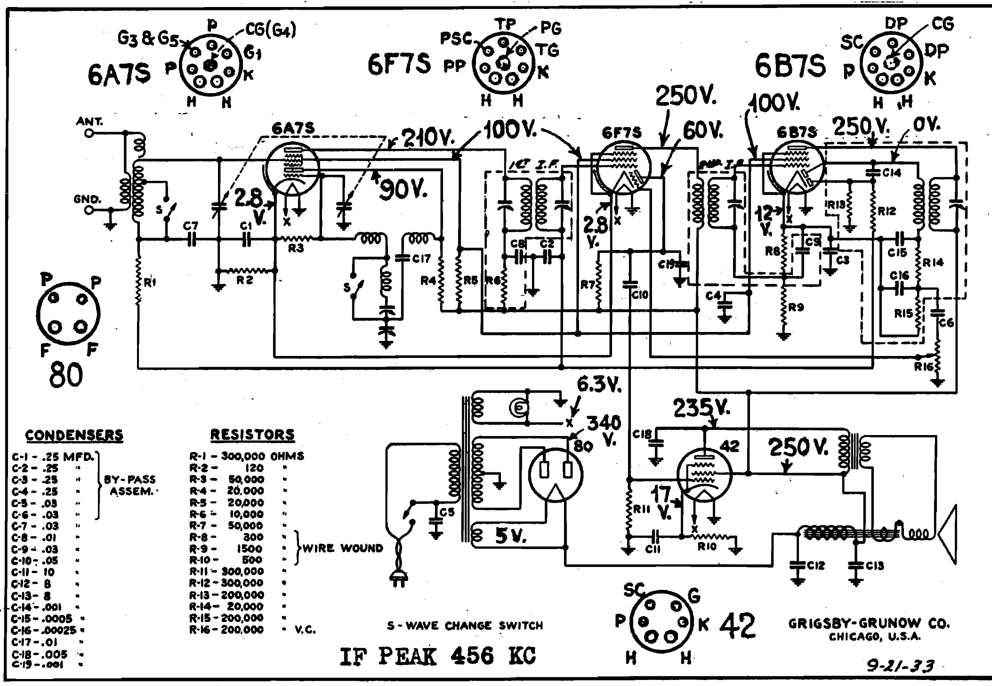
2ND I. F. TRANSFORMER
Primary ....20 ohms
Secondary ....20 ohms

3RD I. F. TRANSFORMER
Primary ....46 ohms
Secondary ....46 ohms

POWER TRANSFORMER
Primary ....9.7 ohms
Hi-voltage sec. ....982 ohms
Heater winding ....36 ohms
Rectifier filament .... .24 ohms

SPEAKER
Voice coil...............1.35 ohms
Field coil ....980 ohms

OUTPUT TRANSFORMER
Primary ....425 ohms



CABINET PARTS MODEL 55

PART No.	DESCRIPTION	DEALER'S NET PRICE
67336	Model 55 Cabinet only	$ 6.18
2828	Chassis Mounting Screws.........Per 10	.05
67326	Escutcheon Plate	.16
70609	Escutcheon Screws for above.........Per 10	.01
61181	Felt discs for bottom.........Per Pair	.01
67325	Grill—Aluminum	.34
67327	Grill Cloth—5⅞" H. x 6⅝" W.......Per Sq. Ft.	.20
67331	Knobs for controls	.08
7401	Knob for wave change switch	.03
7433	Spring for Wave Change Knob (7401)	.01

CABINET PARTS MODEL 59

PART No.	DESCRIPTION	DEALER'S NET PRICE
67353	Model 59 Cabinet only	$ 9.21
2828	Chassis Mounting Screws.........Per 10	.05
10246	Escutcheon Plate (Dial)	.19
10268	Escutcheon Plate (Volume)	.19
70609	Escutcheon Screws.........Per 10	.01
61181	Felt discs for bottom.........Per Pair	.01
67346	Grill—Aluminum	.84
67327	Grill Cloth—8¼" H. x 6⅝" W.....Per Sq. Ft.	.20
67351	Knobs for Control	.08
7401	Knob for Wave Change Switch	.03
67352	Nameplate—Majestic	.03

CABINET PARTS MODEL 75

PART No.	DESCRIPTION	DEALER'S NET PRICE
68362	Model 75 Cabinet only	$26.40
10999	Escutcheon Plate (Dial)	.16
10998	Escutcheon Plate (Volume)	.16
2895	Fancy Head Thru Bolts No. 8—32x1"......2 for	.01
66459	Grill Cloth, 8" H. x 8" W.........Per Sq. Ft.	.16
10222	Knobs for controls	.07
7401	Knob for Wave Change Switch	.03

CABINET PARTS MODEL 195

PART No.	DESCRIPTION	DEALER'S NET PRICE
67697	Model 195 Cabinet only	$ 3.60
2828	Chassis Mounting Screws.........10 for	.05
10999	Escutcheon Plate (Dial)	.16
10998	Escutcheon Plate (Volume)	.16
10222	Knobs for Control	.07
7401	Knob for Wave Change Switch	.03
66912	Grill Cloth—8" H. x 10" W.........Per Sq. Ft.	.14

CABINET PARTS MODEL 560

PART No.	DESCRIPTION	DEALER'S NET PRICE
67807	Model 560 Cabinet only	$17.28
10999	Escutcheon Plate (Dial)	.16
10998	Escutcheon Plate (Volume)	.16
2895	Fancy Head Thru Bolts No. 8—32x1"......2 for	.01
66912	Grill Cloth, 15" H. x 12" W.........Per Sq. Ft.	.14
10222	Knobs for control	.07
7401	Knob for Wave Change Switch	.03
67544	Name Plate—Majestic	.10

CABINET PARTS MODEL 566

PART No.	DESCRIPTION	DEALER'S NET PRICE
68151	Model 566 Cabinet only	$16.80
68145	Drawer Pulls	.18
10999	Escutcheon Plate (Dial)	.16
66912	Grill Cloth, 9" H. x 7½" W.........Per Sq. Ft.	.14
68144	Knobs for controls	.08
7401	Knob for Wave Change Switch	.03
67544	Name Plate—Majestic	.10

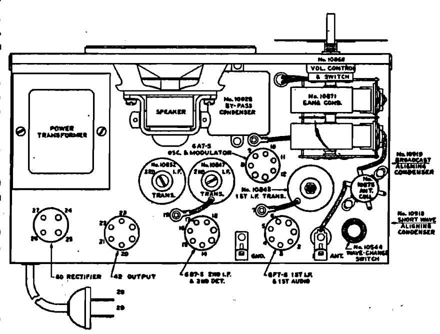
RESISTANCE CHART

All readings are taken from designated points to ground except those marked with an asterisk (*) which are taken to terminal No. 25, with all tubes removed from their sockets, volume control in maximum position and the speaker connected in the circuit.

Terminal Number	Resistance in Ohms	If resistance differs greatly from value shown, check the following
1	27	Primary of antenna coil.
2	120	R-2 and C-1.
3	200,000	Volume Control.
4	Very high	C-4, C-10, C-13, C-12 and C-8.
*4	50,980	R-7 and field coil.
*5	20,980	R-5 and field coil.
*6	1,000	Primary of 2nd I. F. Transformer and field coil.
7	500,020	Secondary of 1st I. F. Trans. C-2, R-12 and R-13.
8	Same as No. 2	
9	50,120	R-2, R-3 and C-1.
*10	20,980	R-4 and field coil.
*11	Same as No. 5	
*12	11,000	Primary of 1st I. F. Transformer, R-6 and field coil.
13	800,003.9	Secondary of ant. coil, C-7 and R-1. Also see terminal No. 7.
14	1,800	R-8, C-9, C-3 and R-9.
†15	200,000	R-13.
†16	221,846	R-14, C-15, C-16, R-15, C-6, C-3, C-9, R-8 and R-9.
*17	Same as No. *5	
*18	1,026	Primary of 3rd I. F. Transformer and field coil.
19	1,520	Secondary of 2nd I. F. Transformer, R-9, C-9, R-8 and C-3.
20	500	R-10 and C-11.
21	300,000	R-11.
*22	980	Field coil.
*23	1,405	Primary of output transformer and field coil.
*24	.24	Rectifier filament winding.
25	Very high	C-12, C-13, C-8 and C-4.
26	490	Hi-voltage secondary of power transformer.
27	490	Hi-voltage secondary of power transformer.
28	Open	Primary of power transformer, C-5 and "On-off" Switch.
29	Open	See terminal No. 28.

†The connections to these two diode plates may be reversed with no effect.

Due to manufacturing tolerances on carbon resistors, the values given above may be expected to differ plus or minus 15 per cent.



POWER TRANSFORMER COLOR CODE
115 Volt, 50-60 Cycle

Primary.......Stranded yellow
Hi-voltage........Stranded red
Hi-voltage C.T...Stranded black
Heater............Solid black
Rect. filament.....Solid yellow

INTERFERENCE REJECTOR
Eliminates interference from stations on frequencies within close proximity to intermediate frequency.
No. 11491 ....$0.52½

GRIGSBY - GRUNOW CO.

MODEL 95, 105
(Chassis 520)
Notes

TECHNICAL DATA PERTAINING TO MODEL 520 CHASSIS
(Employed in Models 95 and 105 Receivers)

THE CIRCUIT

The six tube Model 520 chassis employed in the No. 95 Console and No. 105 Table Models is designed for efficient battery operation. The batteries required for its operation are as follows:-

1 - Air-cell "A" battery or equivalent
3 - 45 volt "B" batteries
1 - 22½ volt "C" battery

The receiver employs an intermediate frequency of 175 k.c. and the tuning range is between 535 and 1730 k.c. The current consumption from the "B" batteries is approximately 30 milliamperes, which is very low considering the excellent performance and power of the receiver.

A double pole switch is employed to turn the receiver "on" and "off". One pole of the switch is connected between the positive side of the "A" battery and ground and the other pole is connected between the negative side of the "B" batteries and ground; thus, when the set is in the "off" position, there is no flow of current from any of the batteries.

Control of the volume is obtained by using a 200,000 ohm potentiometer which varies the audio input to the grid of the type 25 tube. This method of volume control in no way effects the sensitivity or fidelity of the receiver.

It is imperative that a good ground connection be employed with the receiver. Unlike receivers designed for operation on alternating current where a ground return is sometimes unnecessary due to the fact that a return is obtained through the A.C. line, it is very important that the receiver employ a good ground connection.

DELAYED AUTOMATIC VOLUME CONTROL

In the automatic volume control system employed in the Model 520 chassis, one diode plate of the 25 tube is used for audio development only, and the other diode plate for A.V.C. development only. With this arrangement it is possible to get away from negatively biasing the audio circuit; resulting in better fidelity and greater A.V.C. action.

SPEAKER

The speaker employed in conjunction with the Model 520 chassis is of the permanent magnet dynamic type. The large magnet employed on this speaker provides field flux about equal to that obtained in the conventional field coil excited type dynamic speaker. The use of the permanent magnet for field excitation greatly reduces the amount of current that would be consumed from the "B" batteries to operate a dynamic speaker. The output and excellent fidelity obtained from this permanent magnet dynamic speaker is comparable to that obtained from the field coil excited type dynamic speaker.

MODEL 95, 105
(Chassis 520)
Voltage, Alignment
Coil resistances

GRIGSBY - GRUNOW CO.

ALIGNMENT PROCEDURE

1 - The receiver must be aligned with volume control in maximum position.

2 - Supply a 175 k.c. signal to the grid of the 1A6 modulator tube and adjust the three I.F. tuning condensers for maximum sensitivity.

3 - Set the gang condenser in minimum capacity position (all the way out of mesh), supply a 1730 k.c. signal to the input of the receiver and align the three gang condenser trimmers for maximum sensitivity.

TABLE OF VOLTAGES

(To Ground)

TYPE	PURPOSE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS
34	R.F. Amp.	135	67.5	-3
1A6	Modulator	135	67.5	-3
	Oscillator	67.5	----	0
34	I.F. Amp.	135	67.5	-3
25	2nd Det. & 1st Audio	Triode *70	----	-3
33	Output	130	135	-16.5

* Actual voltage at plate of tube. This reading will be much lower when a common voltmeter is used to measure this voltage because of the drop across the 300,000 ohm plate resistor, R-6.

NOTE: The voltages shown above are taken with "A", "B" and "C" voltages supplied to the receiver as indicated on the schematic diagram.

MISCELLANEOUS RESISTANCES

ANTENNA COIL
- Primary - 22.16 ohms
- Sec. (Total) - 5.38 ohms

R.F. COIL
- Primary - 146 ohms
- Sec. (Total) - 5.15 ohms

OSCILLATOR COIL
- Primary - 2.7 ohms
- Sec. - 2.13 ohms

IST. I.F. TRANSFORMER
- Primary - 125 ohms
- Sec. - 122 ohms

2ND I.F. TRANSFORMER
- Primary - 148 ohms
- Audio Sec. - 69.3 ohms
- A.V.C. Sec. - 68.3 ohms

OUTPUT TRANSFORMER
- Primary - 450 ohms
- Sec. - .42 ohms

R.F. CHOKE ---- 85 ohms

VOICE COIL ---- 1.73 ohms

BATTERY CABLE COLOR CODE

Red - B+ 135 Volts
Brown - B-
White - B+ 67½ Volts
Blue - A-
Black - A+

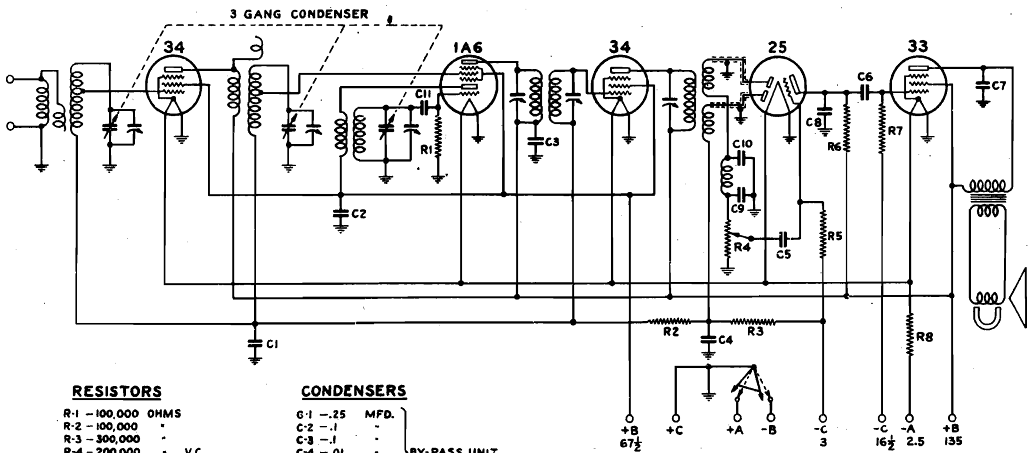
GRIGSBY - GRUNOW CO.

MODEL 95, 105
(Chassis 520)
Schematic, Socket layout
Condenser assembly

FIG. 191

REVISIONS	ISSUE	MEMO
10-2-33	1	8324

SCHEMATIC DIAGRAM OF MAJESTIC MODEL 520 BATTERY RECEIVER



RESISTORS

R-1	100,000	OHMS
R-2	100,000	"
R-3	300,000	"
R-4	200,000	" V.C.
R-5	500,000	"
R-6	300,000	"
R-7	500,000	"
R-8	0.66	"

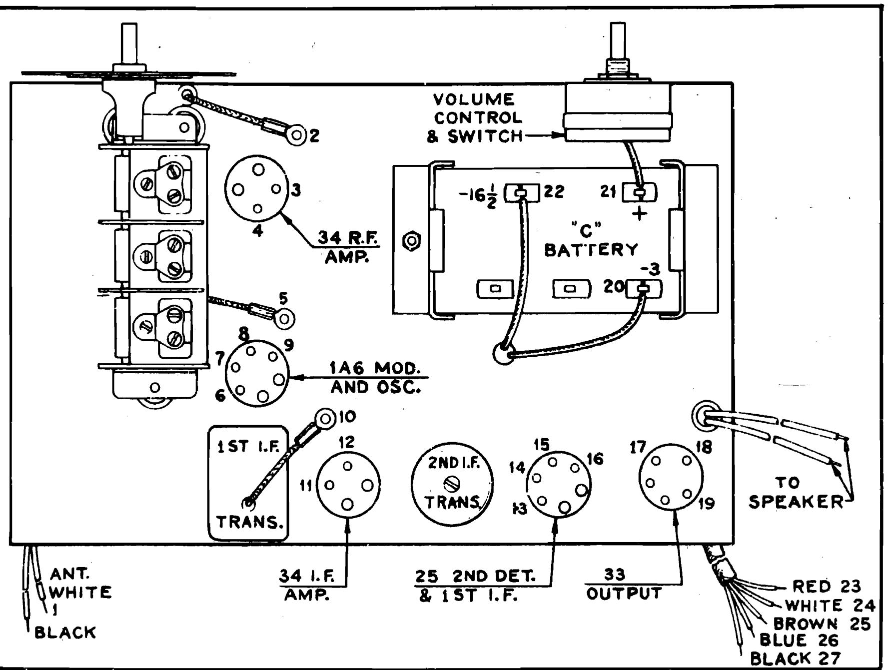
CONDENSERS

C-1	.25	MFD.	BY-PASS UNIT
C-2	.1	"	BY-PASS UNIT
C-3	.1	"	BY-PASS UNIT
C-4	.01	"	BY-PASS UNIT
C-5	.03	"	BY-PASS UNIT
C-6	.03	"	BY-PASS UNIT
C-7	.005	"	BY-PASS UNIT
C-8	.0005	"	
C-9	.0005	"	
C-10	.0005	"	
C-11	.00025	"	

IF PEAK 175 KC.

GRIGSBY-GRUNOW CO.
CHICAGO, U.S.A.

SCHEMATIC DIAGRAM OF MODEL 520 CHASSIS



RESISTANCE CHART DIAGRAM

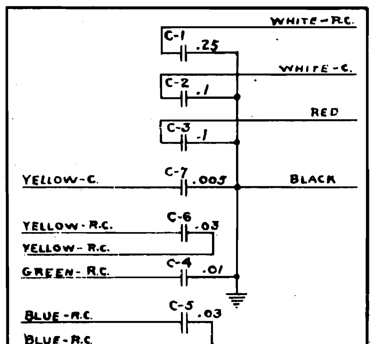


Diagram showing internal connections of #11245 Bypass Condenser Assembly. Reference numbers correspond to those used in the schematic diagram.

MODEL 95, 105
(Chassis 520)
Point-to-point data

GRIGSBY - GRUNOW CO.

RESISTANCE CHART

All readings are taken between the two designated terminals with speaker connected, all tubes removed from their sockets, batteries disconnected and switch in "on" position.

FROM TERMINAL	TO TERMINAL	RESISTANCE IN OHMS	IF RESISTANCE DIFFERS GREATLY FROM VALUE SHOWN CHECK THE FOLLOWING:
1	Ground	22.16	Primary of Ant. Coil
2	20	400,004	Sec. of ant. Coil, R-2 and R-3
2	Ground	Open	C-1, C-4 and C-5.
3	24	0	Connections.
3	Ground	Open	C-2.
4	23	146	Pri. of R.F. Coil
4	Ground	Open	C-3, C-8 and C-7.
5	20	400,004	Sec. of R.F. Coil, R-2 and R-3.
6	24	0	Connections
7	Ground	100,000	R-1 and C-11
8	24	2.7	Pri. of Osc. Coil.
9	23	125	Pri. of 1st I.F. Trans.
10	20	400,122	Sec. of 1st I.F. Trans., R-2 and R-3.
11	24	0	Connections.
12	23	148	Pri. of 2nd I.F. Trans.
13	20	500,000	R-5.
13	Ground	Open	C-5
14	20	300,068.3	A.V.C. secondary of 2nd I.F. Trans. and R-3.
15	Ground	200,154.3	Audio sec. of 2nd I.F. Trans.,R.F.C.,R-4,C-10 &C-9.
16	23	300,000	R-6
16	Ground	Open	C-8, C-3 and C-7
16	18	Open	C-6.
17	23	0	Connections.
18	22	500,000	R-7.
19	23	450	Primary of output trans.
20	Ground	Open	C-4, C-1, and C-5.
21	Ground	0	Connections.
23	Ground	Open	C-7, C-8 and C-3.
24	Ground	Open	C-2.
25	Ground	0	Connections and switch
27	Ground	0	Connections and switch

Due to manufacturing tolerances on carbon resistors, the readings given above may be expected to differ plus or minus 15 per cent.

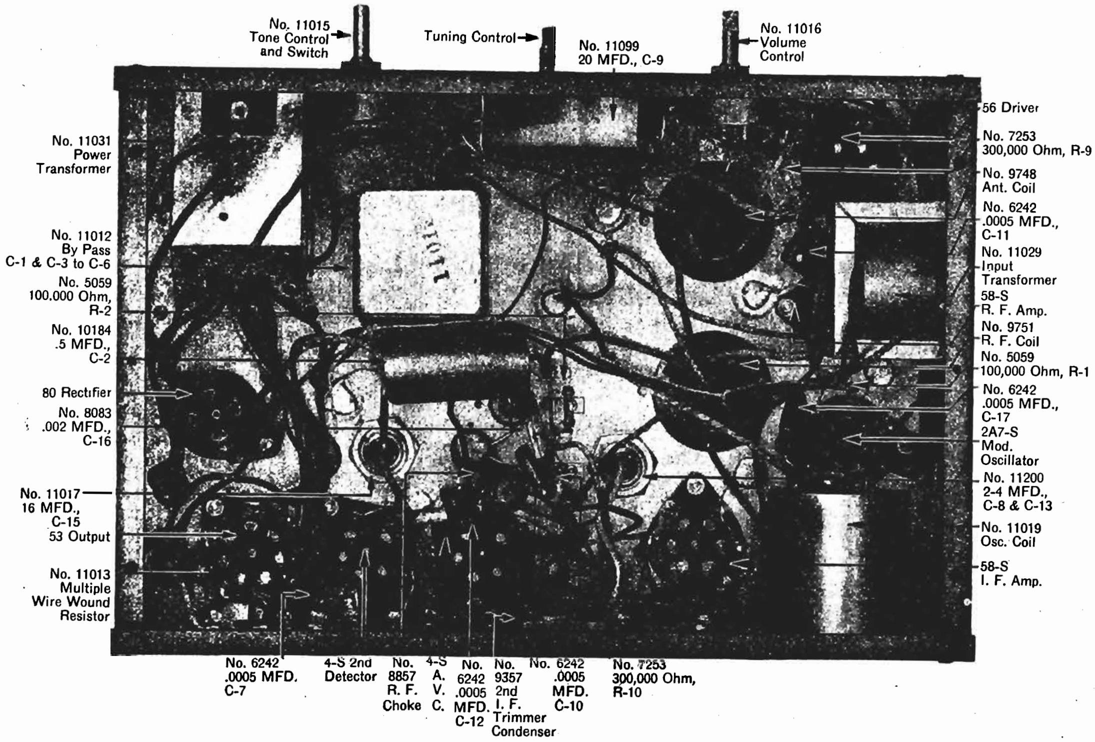
MODEL 95, 105
(Chassis 520)
Parts List

GRIGSBY - GRUNOW CO.

PART NO.	CHASSIS PARTS	DEALER'S NET PRICE
11241	Chassis Only, Model 520	$ 15.00
9748	Antenna Coil.	.51
11636	Battery Cable (Console Model 95).	.48
11637	Battery Cable (Table Model 105)	.76
11245	By-Pass Condenser Assembly, C-1 to C-7.	1.15
6641	Condenser, Mica, .00025 MFD., C-11.	.13
6242	Condenser, Mica, .0005 MFD., C-8, 9, 10	.12
9753	Condenser, Three Gang	2.24
11248	Dial and Drive Assembly	.72
10753	Spring for above Dial Assembly.	.02
10148	I.F. Transformer, 1st.	.92
11361	I.F. Transformer, 2nd.	.78
10197	Oscillator Coil	.27
	RESISTORS	
5059	100,000 ohm, R-1, 2	.13
7253	300,000 ohm, R-3, 6	.12
7482	500,000 ohm, R-5, 7	.11
11256	Wire Wound with Terminal Strip, R-8	.22
8857	R.F. Choke Assembly	.32
9751	R.F. Coil	.51
	TUBE SOCKETS	
10840	4 Prong	.06
9659	5 Prong	.06
10758	6 Prong	.07
11378	Volume Control and Switch	.65
	SPEAKER PARTS	
11383	P.M. Dynamic Speaker, Complete.	6.90
11608	Cone Assembly.	1.71
11609	Output Transformer.	1.47
11610	Permanent Magnet with Cone Assembly	3.30
	CABINET PARTS - MODELS 95 and 105	
68413	Cabinet Model 95, Complete.	18.25
67714	Cabinet Model 105, Complete	3.90
11546	Escutcheon Plate, Dial.	.15
10998	Escutcheon Plate, Volume.	.16
10222	Knobs for Control	.07
12019	Celluloid for Volume Escutcheon	.05

MODEL 85, 86, 998
(Chassis 800)
Chassis view, Voltage
Notes, Parts List

GRIGSBY - GRUNOW CO.



CHASSIS 800

Models 85, 86 and 998

TABLE OF VOLTAGES

Tube Type	Purpose	Plate	Screen D.C.	Cathode D.C.	Grid D.C.
58-S	R. F. Amp.	250 D.C.	103	0	—3
2A7-S	Modulator	250 D.C.	103	0	—3
	Oscillator	103 D.C.	...	0	0
58-S	I. F. Amp.	250 D.C.	103	0	—3
4-S	2nd Det.	0 D.C.	...	12.5	...
4-S	A. V. C.	0 D.C.	...	12.5	...
56	Driver	245 D.C.	...	12.5	0
53	Output	245 D.C.	...	—3	—3
80	Rectifier	315 A.C.	...	...	...

Line Voltage—115 Volts A.C.

THE CIRCUIT

Chassis 800 provides full range tone control, police call reception, excellent automatic volume control and class "B" output from a single tube. Due to the dual operation of one of the tubes, nine tube performance is realized.

The intermediate frequency is 175 K. C. The tuning range is 535 to 1730 K. C. A separate 4-S tube is used for the audio or signal channel, and another 4-S tube for the automatic volume control.

CLASS "B" OUTPUT

Part of the circuit consists of class "B" amplification for which a type 56 tube is used as a driver and a type 53 tube as the output. This output tube is a double triode amplifier having two plates and two control grids, thus doing the work of two tubes and making possible tremendous output.

ALIGNMENT PROCEDURE

The receiver must be aligned with the volume control in maximum position.

1. Supply a 175 K. C. signal to 2A7-S converter grid and adjust the 3 I. F. aligning condensers for maximum sensitivity. Use a weak signal that is just strong enough to give a reading on the output meter.
*2. Turn the gang condenser completely in mesh. Set the dial to the gauge mark beyond 540 K. C. and secure it to the gang condenser shaft.
3. With the gang condenser completely out of mesh, supply a 1730 K. C. signal to the input of the receiver and align the 3 gang condenser trimmers for maximum sensitivity.

*Note—Paragraph No. 2 is only followed when it is necessary to replace or recalibrate the dial.

ALWAYS USE A GOOD OUTPUT METER TO INDICATE MAXIMUM SENSITIVITY.

CHASSIS PARTS

PART No.	DESCRIPTION	DEALER'S NET PRICE
9748	Antenna Coil	$0.51
11012	By-Pass Condenser Assembly, C-1 and C-3 to C-6	1.23
7210	Condenser Assembly for I. F., ADJUSTABLE	.14
10184	Condenser, .5 MFD., C-2	.22
	Condenser, Electrolytic	
11200	2-4 MFD., C-8 and C-13	.61
11017	16 MFD., C-15	1.20
11099	20 MFD., C-9	.48
	Condenser, Mica	
6242	.0005 MFD., C-7, 10, 11, 12, 17	.12
8083	.002 MFD., C-16	.14
11022	Condenser, Gang	2.49
11025	Dial and Drive Assembly	.70
1741	Dial Light, 2.5 Volt. See Main Catalog Page 95	
7821	I. F. Transformer Assembly, 1st	1.09
11014	I. F. Transformer Coil, 2nd	.49
11019	Oscillator Coil	.39
	RESISTORS	
5059	100,000 Ohm, R-1, 2	.13
7253	300,000 Ohm, R-9, 10	.12
11013	Multiple, Wire Wound, R-3 to R-8	.78
8857	R. F. Choke Coil Assembly	.32
9751	R. F. Coil	.51
	TRANFORMERS	
11029	Input Audio	1.22
11031	Power, 115 Volt, 60 Cycle	2.85
11036	Power, Universal, 110-240 Volts, 25-133 Cycle	7.41
11015	Tone Control and Line Switch	.45
	TUBE SOCKETS	
11011	4 Prong, Rectifier	.07
8852	5 Prong	.06
8851	6 Prong	.08
11010	7 Prong, for 2A7 and 53	.08
11016	Volume Control	.66

MODEL G-22-L SPEAKER

11054	Model G-22-L Speaker Complete	$6.12
9118	Cone Assembly	.73
8361	Condenser Assembly, .07 MFD., C-14	.23
8925	Field Coil (970 Ohm)	1.40
8932	Gasket for Cone	.11
9149	Output Transformer	.97

CABINET PARTS MODEL 998

68308	Model 998 Cabinet Only	
2537	Chassis Mounting Screws	$0.02
68306	Escutcheon Plate—Chromium	.21
2455	Escutcheon Screws—Chromium ... Per 10	.04
2841	Fancy Head Thru Bolts for Speaker	.04
67327	Grill Cloth, 20½" H. x 11½" W. ... Per Sq. Ft.	.20
68302	Knob for Controls	.08
2626	Rubber Washers for Mounting Chassis	.01

GRIGSBY - GRUNOW CO.

MODEL 85, 86, 998
(Chassis 800)
Schematic, Parts List
Socket layout,
Point-to-point data

RESISTANCE VALUES

ANTENNA COIL
Primary ....21 ohms
Secondary ....5.3 ohms

R. F. COIL
Primary ....142 ohms
Secondary ....5.2 ohms

OSCILLATOR COIL
Primary ....2.6 ohms
Secondary ....2.3 ohms

1ST I. F. TRANSFORMER
Primary ....89 ohms
Secondary ....92 ohms

2ND I.F. TRANSFORMER
Primary ....140 ohms
A. V. C. Secondary.70 ohms
Audio Secondary...70 ohms

R. F. C.
85 ohms

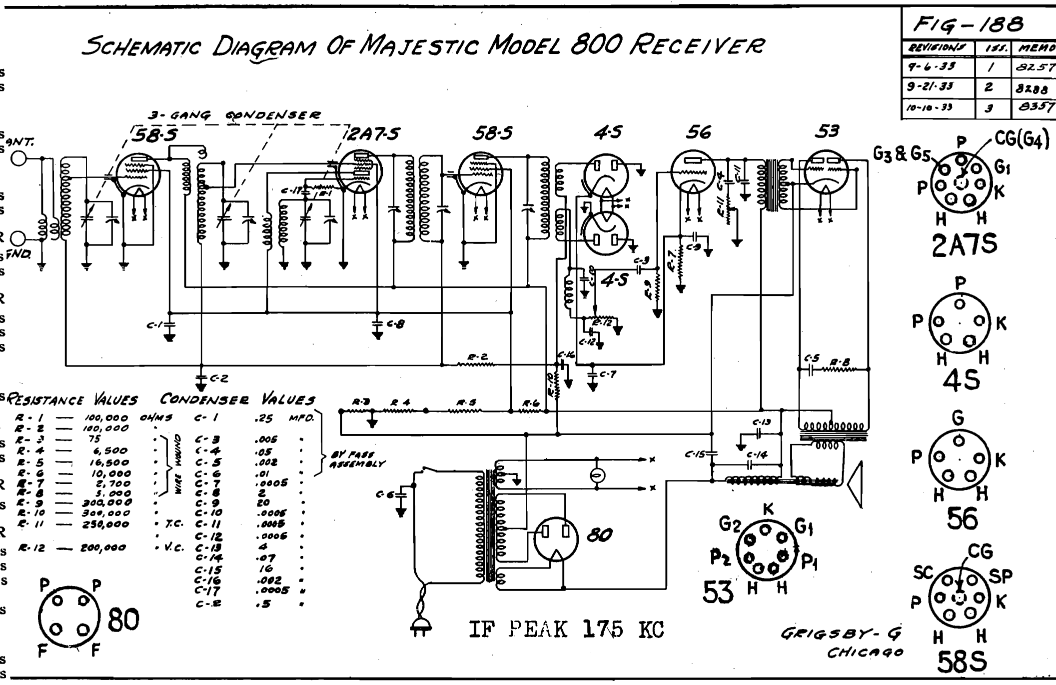
INPUT TRANSFORMER
Primary ....780 ohms
Total Secondary...282 ohms

OUTPUT TRANSFORMER
Primary ....395 ohms

POWER TRANSFORMER
Primary ....4.3 ohms
Heater .... .035 ohms
Rectifier Filament .17 ohms
Hi-Volt Sec. (total)
320 ohms

SPEAKER
Field Coil.........970 ohms
Voice Coil ....2.25 ohms

SCHEMATIC DIAGRAM OF MAJESTIC MODEL 800 RECEIVER



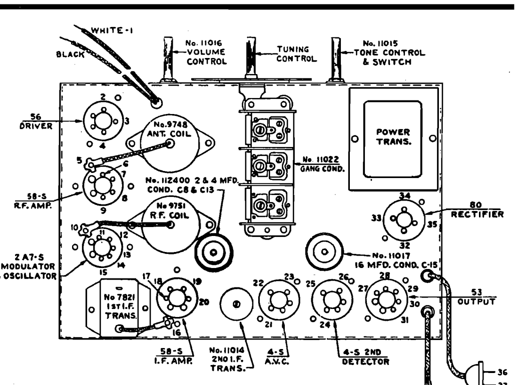
Schematic Diagram Chassis 800

CABINET PARTS MODEL 85

PART No.	DESCRIPTION	DEALER'S NET PRICE
67650	Model 85 Cabinet Only........................	$51.06
67651	Base Bracket, Right...........................	.30
67640	Base Bracket, Left............................	.30
66588	Bullet Catches and Strike.....................	.02
67627	Doors	2.99
67462	Door Pulls	.87
7888	Escutcheon Plate	.16
2455	Escutcheon Screws...................Per 10	.04
67327	Grill Cloth, 12⅛" H. x 14¾" W......Per Sq. Ft.	.20
67649	Hinge for Bottom. Specify Left or Right.......	.12
67648	Hinge, Left Top...............................	.12
67652	Hinge, Right Top..............................	.12
67641	Knob for Controls.............................	.06
67637	Post, Right Front.............................	.30
67639	Post, Right Rear..............................	.27
67636	Post, Left Front..............................	.30
67638	Post, Left Rear...............................	.27

CABINET PARTS MODEL 86

PART No.	DESCRIPTION	DEALER'S NET PRICE
67546	Model 86 Cabinet Only.........................	$33.02
2537	Chassis Mounting Screws.......................	.02
7888	Escutcheon Plate	.16
2455	Escutcheon Screws ....Per 10	.04
2564	Fancy Head Thru Bolts for Speaker.....Per 10	.10
67392	Grill Cloth, 18¼" H. x 10" W........Per Sq. Ft.	.21
10222	Knob for Controls.............................	.07
2626	Rubber Washers for Mounting Chassis...........	.01



POWER TRANSFORMER COLOR CODE

115 Volts, 50-60 cycle

Primary........Stranded yellow	Heater.............Solid black
Hi-voltage ....Stranded red	Heater C. T.....Stranded black
Hi-Voltage C.T..Stranded brown	Rectifier filament..Solid yellow

RESISTANCE CHART

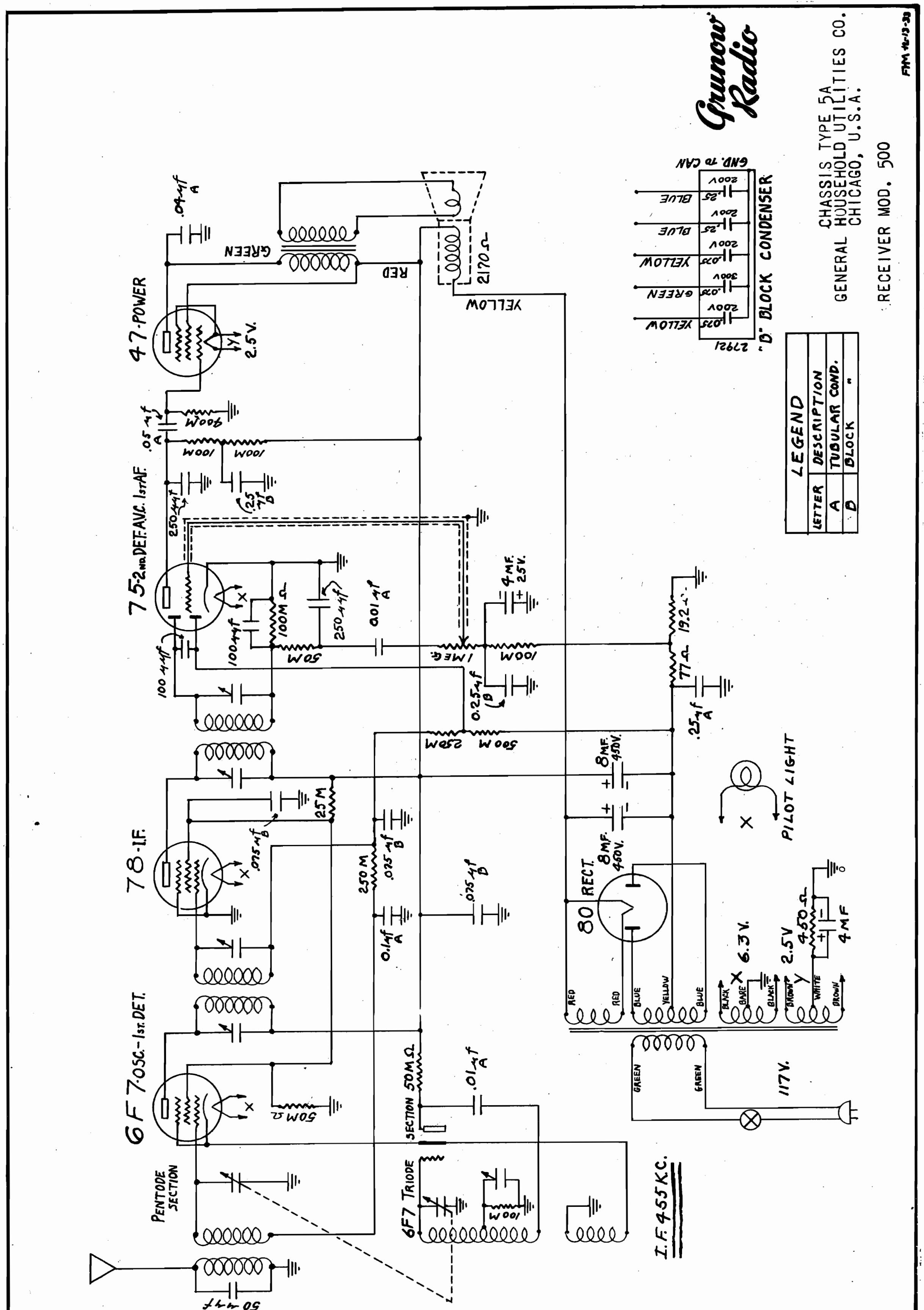
All readings are taken from designated points to ground except those marked with an asterisk (*) which are taken to terminal No. 33, with all tubes removed from their sockets, and the speaker connected in the circuit.

Terminal Number	Resistance in Ohms	If resistance differs greatly from value shown, check the following
1	21	Primary of Antenna coil.
2	2,700	R-7 and C-9.
3	300,000	R-9 and C-3.
4	Very high	C-4, C-11, C-13, C-14 and C-15.
*4	1,750	Primary of input transformer and field coil.
5	400,078.3	Secondary of ant. coil, C-2, R-2, C-16, R-10 and R-3.
6	0	Ground connection.
7	0	Ground connection.
8	23,000	R-4, R-5, C-7, C-13, C-1 and C-8.
*8	10,970	R-6, and field coil.
*9	1,112	Primary of R.F. coil and field coil.
10	400,078.3	Secondary of R.F. coil, C-2, R-2, C-16, R-10 and R-3.
11	0	Ground connection.
12	100,000	R-1 and C-17.
*13	10,972.6	Primary of oscillator coil, R-6 and field coil.
14	Same as No. 8	
*14	Same as No. *8	
*15	1,059	Primary of 1st I. F. Transformer and field coil.
16	400,167	Secondary of 1st I. F. Trans., R-2, C-16, R-10 and R-3.
17	0	Ground connection.
18	0	Ground connection.
19	Same as No. 8	
*20	1,110	Primary of 2nd I. F. Transformer and field coil.
21	6,500	R-4 and C-7.
22	300,145	A. V. C. secondary of 2nd I. F. Trans., C-16, R-10 and R-3.
23	0	Ground connection.
24	0	Ground connection.
25	200,155	Audio secondary of 2nd I. F. Trans., R. F. C., C-10, C-12 and R-12.
26	0	Ground connection.
27	Very high	Primary of output trans. for ground, C-13 and C-15.
*27	1,167	Primary of output transformer and field coil.
28	216	Secondary of input transformer and R-3.
29	75	R-3.
30	Same as No. 28	
31	Same as No. 27	
*31	Same as No. *27	
32	Very high	C-15, C-14 and C-13.
33	Same as No. 32	
34	235	Hi-voltage Secondary and R-3.
35	Same as No. 34	
36	Open	C-6, line switch and primary of power transformer.
37	Same as No. 36	

Due to manufacturing tolerances on carton resistors, the readings given above may be expected to differ plus or minus 15 per cent.

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 500 (Chassis 5-A)
Schematic, Condenser assembly



MODEL 500 (Chassis 5-A) Parts List

GENERAL HOUSEHOLD UTILITIES CO.

PARTS PRICE LIST
5A CHASSIS

Part No.	Description	No. Req.	List Price
20861	Line Cord & Plug	1	.35
20929	Resistor, 50,000 Ohm Carbon, 1 Watt	1	.25
20962	Grid Cap Only	3	.02
22333	Ant. Binding Post Assembly	1	.10
22757	Tube Socket - 47	1	.15
23368	Resistor, 400,000 Ohm Carbon, 1/4 Watt	1	.25
23370	" 100,000 " " 1/4 "	5	.25
23849	" 500,000 " " 1/4 "	1	.25
23853	" 50,000 " " 1/4 "	2	.25
23998	" 250,000 " " 1/4 "	2	.25
24251	Condenser, 100 Mmf. Mica	2	.20
24487	Condenser, 250 Mmf. Mica	2	.20
24789	Electrolytic Condenser, 4 Mfd. - 25 Volt	1	.60
26217	Tube Socket - 75	1	.15
26218	" " - 78	1	.15
26219	" " - (6F7)	1	.15
26514	Resistor, 25,000 Ohm Carbon, 1/2 Watt	1	.25
26564	Tube Shield Base	2	.10
26814	Tube Socket - 80	1	.15
26898	Tube Shield (Goat)	2	.10
27172	Pilot Light Bracket Assembly	1	.15
27188	Trimmer Assembly (Oscillator)	1	.35
27283	Shield Can for 2nd I.F. Transformer	1	.40
27492	Walnut Knob - Station Selector and Volume Control	2	.15
27712	Electrolytic Condenser, 8 Mfd. 450 Volt	1	1.15
27713	" " 8 " 450 Volt (Chrome)	1	1.20
27828	Power Transformer	1	4.00
27830	Tuning Condenser	1	2.40
27834	Volume Control	1	1.10
27835	Insulated Terminal (1 lug)	2	.05
27836	Resistor, 450 - 19.2 - 77 Ohm, Wire Wound	1	.30
27838	Electrolytic Condenser, 4 Mfd. - 25 Volt (Dry)	1	.50
27914	Shield Assembly (Antenna Coil)	1	.15
27918	2nd I.F. Transformer, - Less Shield Can	1	2.90
27919	1st I.F. Transformer with Shield Can	1	1.50
27921	Bypass Condenser Block	1	2.00
27926	Antenna Transformer	1	.90
27927	Terminal Strip (3 Lug)	1	.05
27928	Oscillator Transformer	1	.70
27930	Resistor Panel & Lug Assembly	1	.10
27935	Dial Plate & Chart	1	.30
28045	Pilot Lamp 6-8 Volt	1	.15
28721	Condenser, .01 Mfd. 400 Volt, Tubular	2	.25
28722	" .04 " 400 " "	1	.25
28723	" .05 " 400 " "	1	.25
28728	" .25 " 200 " "	1	.25
63839	Felt Knob Washer 3/4"	2	.01

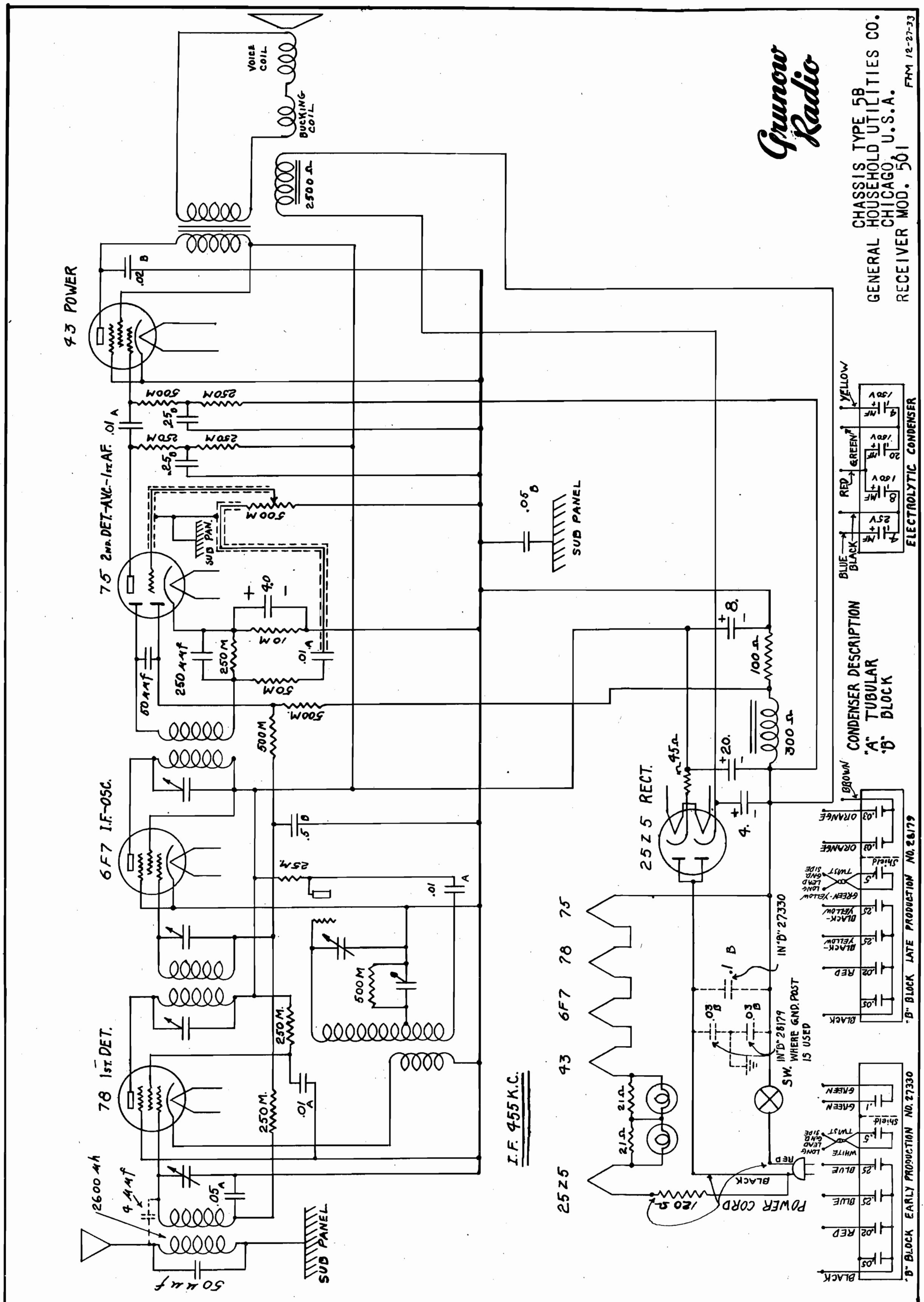
SPEAKER PARTS

27936	6" Electrodynamic Speaker	1	8.00
28837	Cone & Voice Coil Assembly	1	2.60
28838	Output Transformer with Mounting Bracket	1	2.25
28839	Field Coil	1	2.50
28840	Terminal Strip	1	.15

COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 501
(Chassis 5-B)
Schematic
Condenser assembly



MODEL 501
(Chassis 5-B)
Parts List

GENERAL HOUSEHOLD UTILITIES CO.

PARTS PRICE LIST
5B CHASSIS

Part No.	Description	No. Used in Set	List Price Each
20962	Grid Cap Only	3	.02
22333	Insulated Antenna Binding Post	1	.10
22856	Resistor, 25,000 Ohm, 1/4 Watt	1	.25
23358	Vertical Insulated Terminal	1	.05
23849	Resistor, 500,000 Ohm Carbon, 1/4 Watt	3	.25
23852	Resistor, 10,000 Ohm Carbon, 1/4 Watt	1	.25
23853	Resistor, 50,000 Ohm Carbon, 1/4 Watt	1	.25
23998	Resistor, 250,000 Ohm Carbon, 1/4 Watt	6	.25
24355	Condenser, 50 Mmf. Mica	1	.20
24416	Terminal Assembly	1	.03
24487	Condenser, 250 Mmf. Mica	1	.20
26198	Oscillator Transformer Shield Can	1	.10
26215	Tube Socket - 25Z5	1	.15
26216	Tube Socket - 43	1	.15
26217	Tube Socket - 75	1	.15
26218	Tube Socket - 78	1	.15
26219	Tube Socket - 6F7	1	.15
26247	I.F. Transformer Shield Can	2	.15
26564	Tube Shield Base	2	.10
26898	Tube Shield (Goat)	2	.10
27151	Electrolytic Filter Condenser Block	1	2.75
27153	Resistor, 100 Ohm, Wire wound	1	.20
27155	Resistor, 21 - 21 Ohm, Wire wound Tapped	1	.25
27163	Volume Control and Power Switch	1	1.10
27170	Tuning Condenser Assembly	1	2.75
27171	Volume Control Pilot Lamp Socket Assembly	1	.25
27182	Tuning Condenser Pilot Lamp Socket Assembly	1	.25
27184	Oscillator Transformer	1	.50
27185	1st I.F. Transformer	1	1.30
27186	2nd I.F. Transformer	1	1.75
27188	Oscillator Trimmer Condenser	1	.35
27330	Bypass Condenser Block (Replace with 28179)	1	2.50
27331	Filter Choke Assembly	1	1.10
27404	Power Cord	1	.70
27466	Control Knobs	2	.25
27643	Antenna Hank with Terminal	1	.35
27686	Antenna Transformer Assembly	1	1.15
27740	Selector Dial Assembly	1	.25
27741	Volume Control Dial Assembly	1	.25
27992	Resistor, 45 Ohm Wire Wound	1	.20
28045	Pilot Lamp	1	.15
28125	Insulated Ground Binding Post	1	.10
28127	Antenna Hank less terminal	1	.30
28179	Bypass Condenser Block (Replaces 27330)	1	2.50
28721	Condenser, Tubular, .01 Mfd. 400 Volt	4	.25
28723	Condenser, Tubular, .05 Mfd. 400 Volt	1	.25

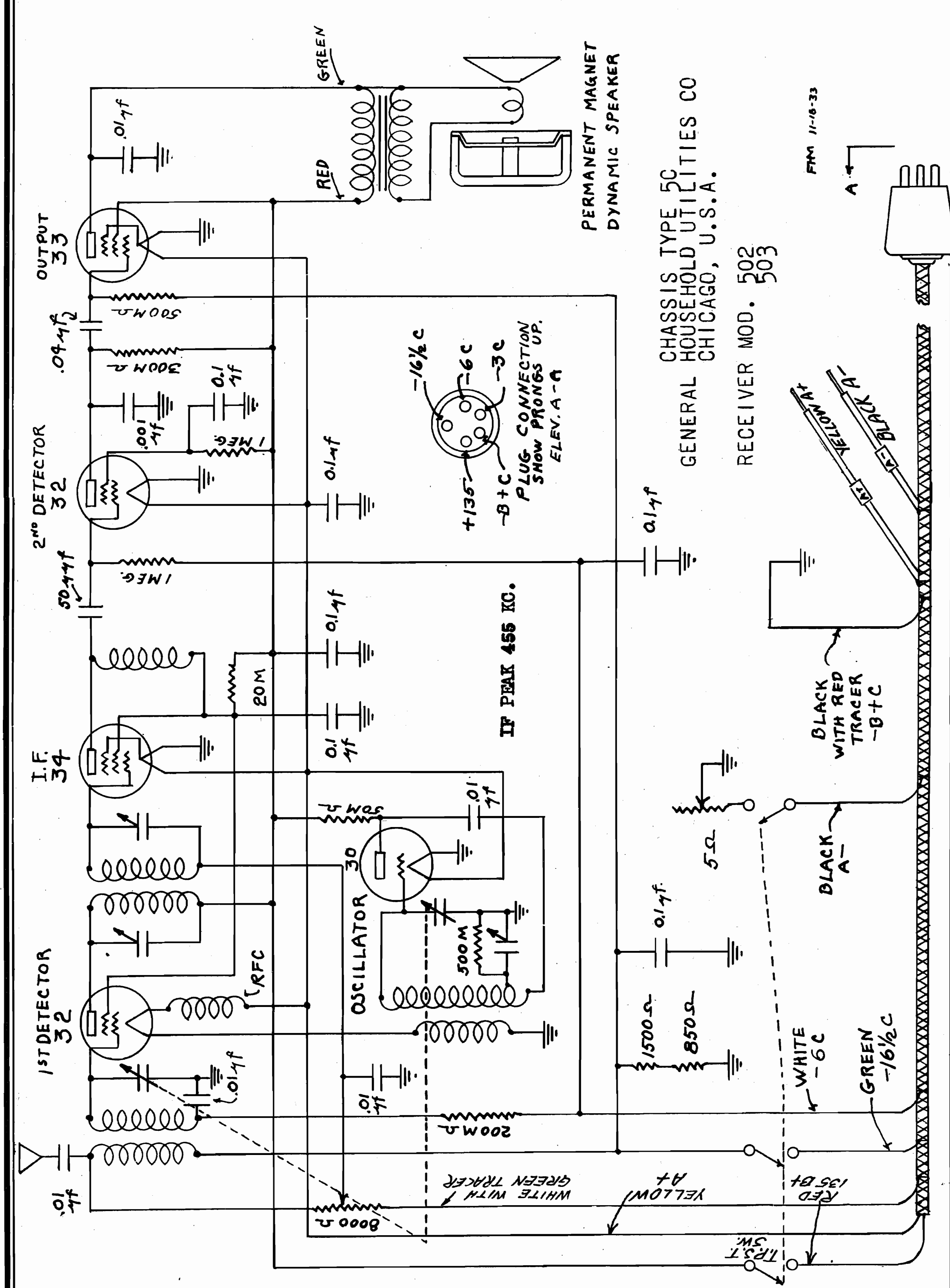
SPEAKER PARTS

26321	Cone Head Assembly	1	2.70
27152	5" Electrodynamic Speaker	1	5.50
28435	Field Coil	1	1.10
28436	Bucking Coil	1	.30
28437	Output Transformer	1	1.40

COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT.

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 502,503
(Chassis 5-C)
Schematic



MODEL 502,503
(Chassis 5-C) GENERAL HOUSEHOLD UTILITIES CO.
Part List

PARTS PRICE LIST

5C CHASSIS

Part No.	Description	No. Req.	List Price
20929	Resistor, 50,000 Ohm Carbon, 1 Watt	1	.25
20962	Grid Cap Only	3	.02
21598	Rubber Grommet	1	.02
22713	Knob 1 1/8" Bakelite	1	.20
22858	Resistor, 1 Meg. Carbon, 1/4 Watt	2	.25
23369	Resistor, 20,000 Ohm Carbon, 1/4 Watt	1	.25
23537	" 300,000 " " 1/4 "	1	.25
23538	" 200,000 " " 1/4 "	1	.25
23849	" 500,000 " " 1/4 "	2	.25
24254	Condenser, .001 Mfd. Mica	1	.25
24355	" 50 Mmf. Mica	1	.20
24372	Insulated Terminal Strip (2 Lug)	1	.05
24467	Tube Shield Bracket	1	.05
25189	Tube Socket - 34	1	.15
25190	" " - 32	2	.15
25191	" " - 30	1	.15
25229	Terminal Strip & Bracket Assembly (2 Lug)	2	.10
25630	Tube Socket - 33	1	.15
26098	Rheostat (5 Ohm)	1	.75
26099	Volume Control	1	.90
26108	Resistor, 1500 - 850 Ohm - Wire Wound	1	.20
26114	Oscillator Transformer	1	.75
26115	Antenna Transformer	1	.75
26120	Dial Chart Assembly	1	.35
26127	Trimmer Assembly (Oscillator)	1	.35
26129	Variable Condenser Assembly	1	2.00
26130	Choke Coil Assembly (Filament)	1	.30
26131	I.F. Plate Coil Assembly	1	.45
26273	Battery Switch	1	1.50
27492	Walnut Knob 7/8"	3	.15
27549	Tube Shield (Aluminum)	1	.25
27601	Battery Cable with Plug	1	1.15
27602	Shield Top (I.F.)	1	.15
27750	Oscillator & I.F. Assembly (Combination)	1	2.75
27753	Coil Shield Assembly (Antenna)	1	.30
28721	Condenser, .01 Mfd. 500 Volt Tubular	4	.25
28722	" .04 " 500 " "	1	.25
28726	" .1 " 400 " "	7	.25
28948	Battery Cable Plug	1	.30

SPEAKER PARTS

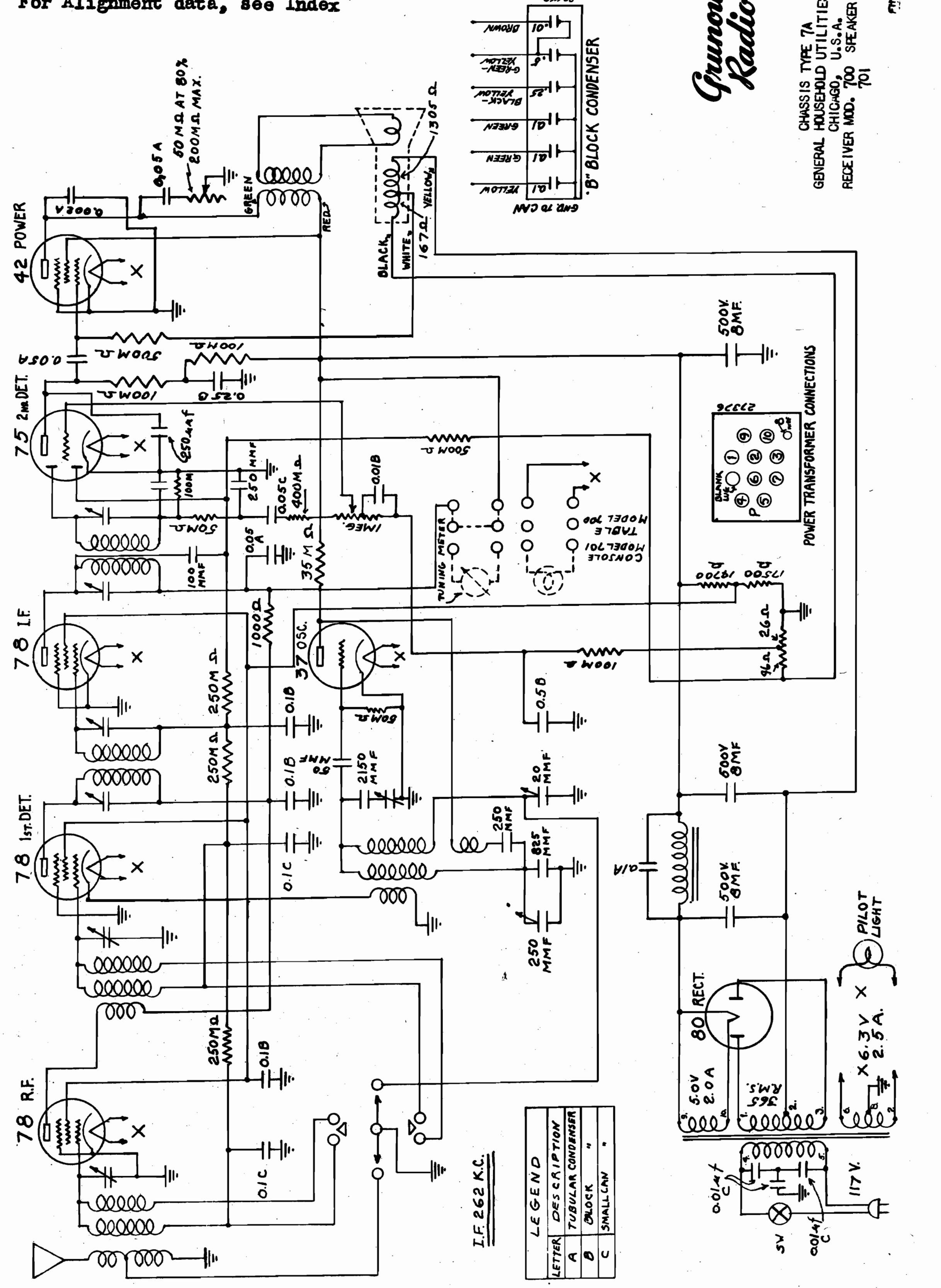
26883	6" Permanent Magnet Speaker	1	16.00
28841	Magnet Housing Assembly	1	10.00
28842	Transformer & Bracket Assembly	1	2.50
28843	Cone, Voice Coil & Terminal Strip Assembly	1	2.75

COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 700 w/8A1 Spkr (Chassis 7-A)
MODEL 701 w/10A2 Spkr (Chassis 7-A)
Schematic
Condenser assembly

For Alignment data, see Index



MODEL 700,701
(Chassis 7-A)
Parts List

GENERAL HOUSEHOLD UTILITIES CO.

7A CHASSIS

Part No.	Description	No. Req.	List Price
20141	Headless Set Screw 8/32 x 1/4"	2	.01
20861	Line Cord and Plug	1	.35
20962	Grid Cap Only	4	.02
22333	Insulated Antenna Binding Post	1	.10
23358	Vertical Insulated Terminal	3	.05
23368	Resistor, 400,000 Ohm Carbon, 1/4 Watt	1	.25
23370	Resistor, 100,000 Ohm Carbon, 1/4 Watt	4	.25
23849	Resistor, 500,000 Ohm Carbon, 1/4 Watt	2	.25
23853	Resistor, 50,000 Ohm Carbon, 1/4 Watt	2	.25
23998	Resistor, 250,000 Ohm Carbon, 1/4 Watt	3	.25
24251	Condenser, 100 Mmf., Mica	2	.20
24254	Condenser, 1000 Mmf., Mica	1	.25
24355	Condenser 50 Mmf., Mica	3	.20
24487	Condenser 250 Mmf., Mica	3	.20
26217	Tube Socket - 75	1	.15
26218	Tube Socket - 78	3	.15
26256	Tube Shield Base	5	.05
26814	Tube Socket - 80	1	.15
27251	Variable Tuning Condenser, 3 Gang	1	3.75
27254	Drive Drum Spring	1	.05
27259	Drive Shaft Bearing	1	.15
27260	Drive Shaft	1	.05
27297	Drive Cable Assembly	1	.10
27299	Dial Pointer Bracket & Pointer Assembly	1	.15
27300	Dial Chart Assembly	1	.80
27301	Resistor Panel Assembly - less resistors	1	.15
27303	Pilot Light Socket Assembly	1	.25
27329	Variable Condenser Shield	1	.60
27374	Tube Socket - 37	1	.15
27375	" " - 42	1	.15
27376	Power Transformer	1	6.00
27382	Trimmer Condenser Assembly (Broadcast)	1	.35
27384	Trimmer Condenser Assembly (Oscillator)	1	.75
27387	Filter Choke	1	1.50
27388	I.F. Transformer Shield Can	1	.30
27390	Oscillator Transformer Shield Can	1	.30
27393	1st Detector Transformer	1	.85
27395	Antenna Transformer	1	1.15
27407	Oscillator Transformer	1	1.80
27413	Electrolytic Condenser, 8 Mfd. 500 Volt	2	1.25
27414	Electrolytic Condenser, 8 Mfd. 500 Volt	1	1.50
27416	Resistor, 14,700 - 17,500 - 26 - 46 Ohm, Wire Wound	1	.75
27417	Range Switch	1	.75
27418	Line Switch	1	.35
27419	Volume Control	1	1.00
27420	Tone Control	1	.75
27450	1st I.F. Transformer	1	1.60
27451	2nd I.F. Transformer	1	1.50
27453	Tube Shield Cap - 78	4	.10
27454	Tube Shield Body - 78	4	.15
27455	Tube Shield - 37	1	.15
27467	Condenser, .05 Mfd. - 200 Volt (Type "C")	1	.50
27468	Resistor, 35,000 Ohm Carbon, 1 Watt	1	.25
27469	Bypass Condenser Block	1	2.50
27490	Resistor, 1,000 Ohm Carbon, 1/4 Watt	1	.25
27492	Walnut Knob, Tone - Volume - Power Switch	3	.15
27508	Walnut Knob, Station Selector	1	.20
27520	Condenser, 2310 Mmf. Mica	1	.50
27524	Condenser .1 - .1 Mfd. 200 Volt (Type "C")	1	.75
27589	Walnut Knob, 7/8" (Range Switch)	1	.25
27617	Drive Drum Assembly	1	.50
27644	Tuning Meter Bracket	1	.10
27661	Tuning Meter with Lamp	1	2.50
27854	Condenser .01 - .01 Mfd. 200 Volt (Type "C")	1	1.00
27972	Condenser .01 - .01 - .01 Mfd. 200 Volt (Type "C")	1	1.25
28045	Pilot Lamp	1	.15
28135	Tube Shield - 42	1	.25
28326	Thumb Screw	2	.05
28377	Condenser, 825 Mmf. Mica	1	.25
28378	" 2150 " "	1	.50
28717	" .002 " 700 Volt (Tubular)	1	.25
28723	Condenser .05 Mmf. 400 Volt (Tubular)	3	.25
28726	Condenser .1 Mmf. 400 Volt (Tubular)	1	.25
28757	Tuning Meter Lamp	1	.15
63838	Felt Knob Washer 7/8"	1	.01
63839	" " " 3/4"	3	.01

SPEAKER PARTS

Part No.	Description	No. Req.	List Price
27245	Type 8 A 1 Speaker - Model 700	1	8.50
27624	Type 10 A 2 Speaker- Model 701	1	11.00
20047	Speaker Terminal Strip	1	.25
20048	Terminal Strip Cover	1	.15
27213	Field Coil for 8 A 1 Speaker	1	2.50
27506	Field Coil for 10 A 2 Speaker	1	2.75
27591	Output Transformer for 8 A 1 and 10 A 2 Speaker	1	2.00
28754	Cone and Voice Coil Assembly for 8 A 1 Speaker	1	3.10
28755	Cone and Voice Coil Assembly for 10 A 2 Speaker	1	3.30

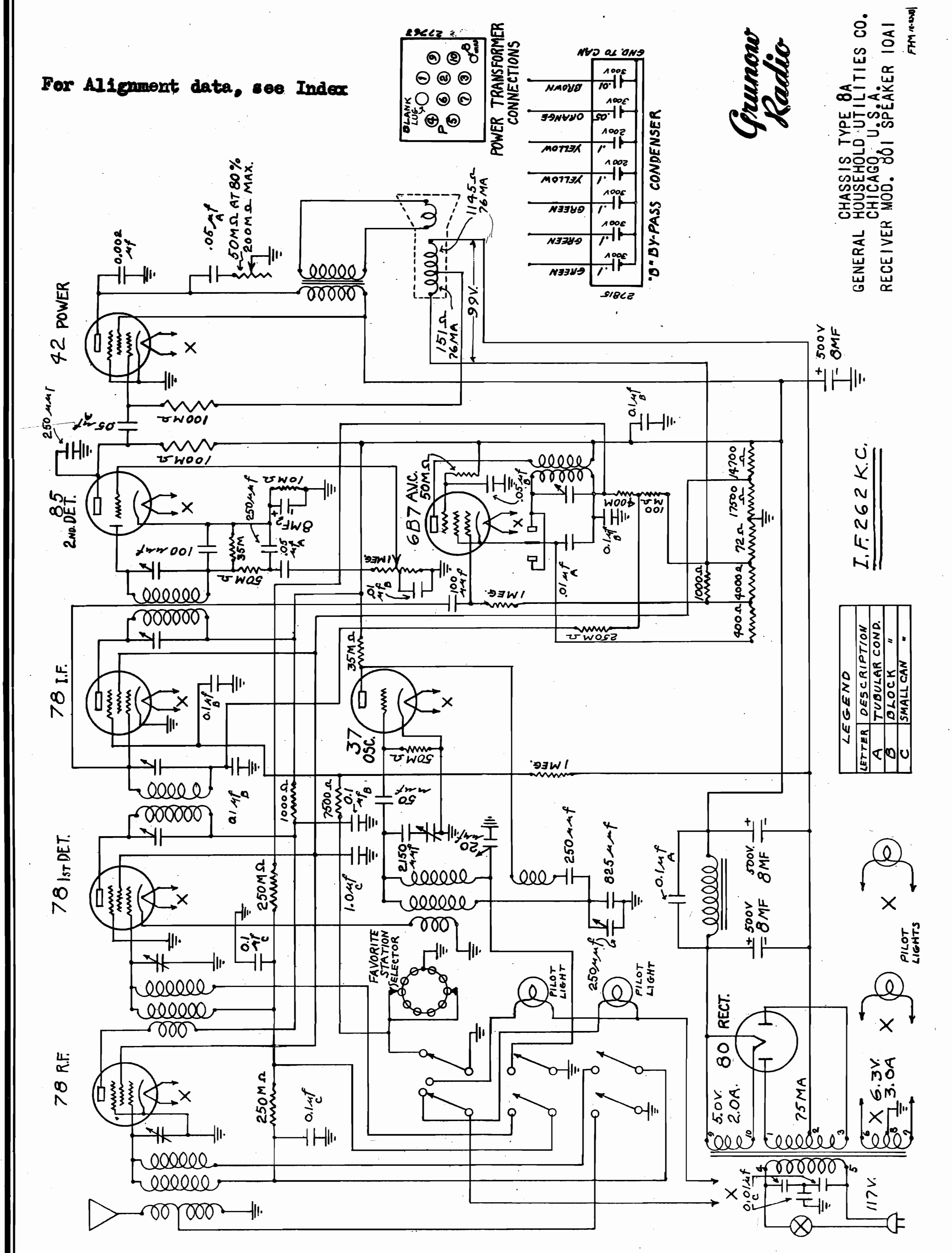
COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT

Prices Subject to change without notice.

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 801
(Chassis 8-A)
Schematic, Data

For Alignment data, see Index



MODEL 801
(Chassis 8-A) GENERAL HOUSEHOLD UTILITIES CO.
Parts List

PARTS PRICE LIST

8A CHASSIS

Part No.	Description	No. Req.	List Price
20141	Headless Set Screw 8/32 x 1/4	2	.01
20861	Line Cord & Plug	1	.35
20962	Grid Cap Only	5	.02
22333	Antenna Binding Post Assembly	1	.10
22857	Resistor, 10,000 Ohm Carbon, 1 Watt	1	.25
22858	Resistor, 1 Megohm Carbon, 1/4 Watt	1	.25
23358	Vertical Insulated Terminal	1	.05
23368	Resistor, 400,000 Ohm Carbon, 1/4 Watt	1	.25
23370	Resistor, 100,000 Ohm Carbon 1/4 Watt	3	.25
23853	Resistor, 50,000 Ohm Carbon, 1/4 Watt	1	.25
23998	Resistor, 250,000 Ohm Carbon, 1/4 Watt	3	.25
24251	Condenser, 100 Mmf. Mica.	2	.20
24254	Condenser, 1000 Mmf. Mica	1	.25
24355	Condenser, 50 Mmf. Mica	1	.20
24487	Condenser, 250 Mmf. Mica	1	.20
24754	Tube Socket - 85	1	.15
26218	Tube Socket - 78	3	.15
26256	Tube Shield Base	6	.05
26814	Tube Socket (80)	1	.15
27165	Pilot Lamp	4	.15
27260	Drive Shaft	1	.05
27269	Tuning Condenser - 3 Gang	1	4.50
27272	Electrolytic Condenser Shield	1	.30
27276	Thumb Screw	2	.10
27301	Resistor Panel - Less resistors	1	.15
27342	Pilot Light Shield	2	.05
27374	Tube Socket - 37	1	.15
27375	Tube Socket - 42	1	.15
27382	Trimmer Assembly (Broadcast)	1	.35
27387	Filter Choke Assembly	1	1.50
27413	Electrolytic Condenser, 9 Mfd. 500 Volt	2	1.25
27414	Electrolytic Condenser, 8 Mfd. 500 Volt (Chrome)	1	1.50
27446	Resistor, 400 - 4,000 - 72 - 17,500 Ohm (Wire Wound)	1	.80
27453	Tube Shield Cap	5	.10
27454	Tube Shield Body	5	.15
27455	Tube Shield - 37 - Not used on all sets	1	.15
27465	Volume & Tone Control Shaft Bracket	3	.10
27468	Resistor, 35,000 Carbon, 1 Watt	2	.25
27487	Tube Socket - 6B7	1	.15
27488	Speaker Cable Socket	1	.15
27490	Resistor, 100 Ohm Carbon, 1/4 Watt	2	.25
27492	Walnut Knob - Tone and Volume Control	2	.15
27508	Walnut Knob - Station Selector	1	.20
27520	Condenser, 2310 Mmf. Mica	1	.50
27524	Condenser .1 - .1 - 200 Volt (Type "C")	1	.75
27533	Selector Switch Assembly	1	3.50
27542	Trimmer Assembly (Oscillator)	1	.75
27614	Station Finder Clamp Nut	6	.02
27617	Drive Drum & Bushing Assembly	1	.50
27628	Dial Chart Assembly	1	1.60
27646	Tone Control	1	.75
27667	Walnut Knob (Range Switch)	1	.20
27668	Electrolytic Condenser, 8 Mfd. 25 Volt	1	.75
27687	Volume Control	1	1.15
27763	Power Transformer	1	7.00
27805	Oscillator Transformer	1	1.60
27806	Oscillator Transformer Shield Can	1	.30
27808	3rd I.F. Transformer (AVC)	1	1.00
27809	1st Detector Transformer	1	.60
27810	Antenna Transformer	1	1.50
27811	Dual Coil Shield Can	1	.65
27812	1st I.F. Transformer with Shield Can	1	2.10
27813	2nd I.F. Transformer - less Shield Can	1	1.90
27815	Bypass Condenser Block	1	2.30
27821	Condenser - Resistor Panel & Bracket Assembly	1	.15
27823	Variable Condenser Cover Assembly	1	.60
27824	A.V.C. I.F. Shield Can Assembly	1	.25
27829	Dial Pointer Bracket & Pointer Assembly	1	.10
27832	Dial Pilot Light Socket Assembly	1	.25
27886	Si-Lec-Trol Screw Driver	1	.10
27976	Volume and Tone Control Dial Assembly	2	.30
27977	Volume Control Pilot Light Socket Assembly	1	.25
27978	Tone Control Pilot Light Socket Assembly	1	.25
28011	Contact Plate Lug and Insulator (Si-Lec-Trol)	2	.25
28015	Shifter Cam. Plate & Pigtail Assembly	1	.75
28016	Station Finder Arm & Contact	10	.10
28017	Contact Plate Shifting Arm and Mtg. Hub	1	.50
28135	Tube Shield - 42 - (Not used on all sets)	1	.25
28138	Condenser 1 Mfd. (Type "B")	1	1.25
28172	Station Finder Clamp Nut	4	.02
28326	Thumb Screw	2	.05
28377	Condenser 825 Mmf. Mica	1	.25
28378	Condenser 2150 Mmf. Mica	1	.50
28532	Drive Cable Assembly	1	.30
28717	Condenser, .002 Mfd. 700 Volt - Tubular	1	.25
28723	Condenser, .05 " 400 Volt - Tubular	3	.25
28726	Condenser, .1 " 400 Volt - Tubular	2	.25
61054	Screw, Filister Head (Si-Lec-Trol)	10	.02
63001	Hex. Head Dial Set Screw	3	.04
63829	Washer, Si-Lec-Trol Finder Arm	10	.01
63838	Felt Knob Washer 1 1/8"	1	.01
63839	" " " 7/8 "	3	.01

SPEAKER

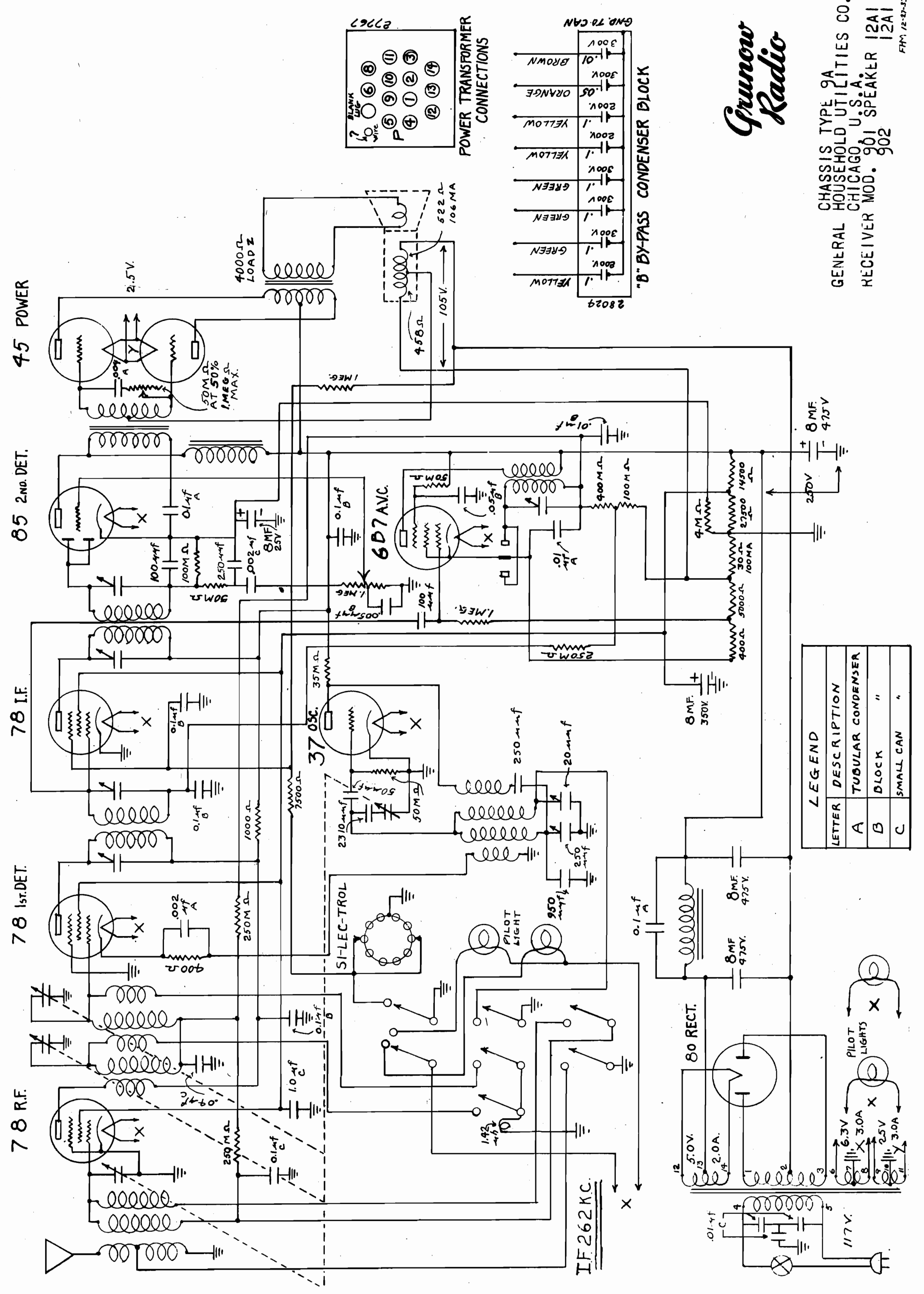
Part No.	Description	No. Req.	List Price
27247	10A1 Speaker Complete	1	11.00
20047	Terminal Strip	1	.25
20048	Terminal Strip Cover	1	.15
27839	Speaker Cable Plug	1	.35
27840	Speaker Cable, less plug	1	.35
27506	Field Coil	1	3.00
27591	Output Transformer	1	2.00
28755	Cone and Voice Coil Assembly	1	3.30

COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT
Prices subject to change without notice.

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 901, 902
(Chassis 9-A)
Schematic, Data

For Alignment data, see Index



MODEL 901, 902 (Chassis 9-A) GENERAL HOUSEHOLD UTILITIES CO.
Parts List

PARTS PRICE LIST

9A CHASSIS

Part No.	Description	No. Req.	List Price
20141	Dial Set Screw 8 - 32 x 1/4"	2	.01
20861	Line Cord & Plug	1	.35
20962	Grid Cap	5	.02
21348	Resistor, 100,000 Ohm, Carbon 1 Watt	1	.25
22333	Antenna Binding Post Assembly	1	.10
22858	Resistor, Carbon, 1 Meg.	1	.25
23187	Sponge Rubber Mtg. Washers 9/16" Thick	4	.05
23188	Sponge Rubber Mtg. Washers 3/8" Thick	4	.05
23358	Vertical Insulated Terminal, 1 Lug	5	.05
23370	Resistor, 100,000 Ohm Carbon, 1/4 Watt	2	.25
23853	Resistor, 50,000 Ohm Carbon, 1/4 Watt	4	.25
24251	Condenser, 100 Mmf. Mica	3	.20
24254	" 1000 Mmf. Mica	1	.25
24355	" 50 " "	1	.20
24487	" 250 " "	1	.20
24754	Tube Socket - 85	1	.15
26218	" " - 78	3	.15
26256	Tube Shield Base	6	.05
26814	Tube Socket - 80	1	.15
27033	Vertical Insulated Terminal, 2 Lug	2	.05
27254	Tuning Condenser Drive Spring	1	.05
27259	Tuning Condenser Drive Shaft Bearing	1	.15
27260	Tuning Condenser Drive Shaft	1	.05
27342	Pilot Light Shield	2	.05
27374	Tube Socket - 37	1	.15
27382	Trimmer Assembly - Broadcast	1	.35
27447	Resistor, 400 - 5,000 - 30 - 4,000 Ohm Wire Wound	1	.60
27453	Tube Shield Cap	5	.10
27454	Tube Shield Body	5	.15
27455	Tube Shield	1	.15
27465	Tone, Volume Control & Switch Mtg. Bracket	3	.10
27468	Resistor, 35,000 Ohm, Carbon, 1 Watt	1	.25
27487	Tube Socket - 6B7	1	.15
27488	Speaker Socket	1	.15
27489	Tube Socket - 45	2	.15
27490	Resistor, 1000 Ohm, 1/4 Watt	1	.25
27492	Walnut Knob, Tone and Volume Control	2	.15
27508	Walnut Knob, Station Selector	1	.20
27520	Condenser, 2310 Mmf. Mica	1	.50
27534	Selector Switch	1	3.50
27540	Resistor, 27,500 - 14,500 Ohm, Wire Wound	1	.65
27542	Trimmer Assembly (Oscillator)	1	.60
27614	Station Finder Clamp Nut (Si-Lec-Trol)	6	.02
27616	Contact Plate Shift Arm	1	.20
27617	Drive Cable Drum & Bushing Assembly	1	.50
27645	Volume Control	1	1.15
27667	Walnut Knob, Si-Lec-Trol	1	.20
27670	Dual Electrolytic Condenser, 8 Mfd. 350 V - 8 Mfd. 25 V	1	1.60
27710	Electrolytic Condenser, 8 Mfd.-475 Volt (Chrome)	1	1.15
27711	Electrolytic Condenser, 8 Mfd. - 475 Volt	2	1.10
27726	Audio Choke Assembly	1	1.50
27748	Dial Assembly	1	1.60
27767	Power Transformer Assembly	1	10.50
27777	Filter Choke Assembly	1	2.65
27779	Audio Transformer	1	3.60
27784	Resistor, 400 Ohm, Carbon, 1/4 Watt	1	.25

Part No.	Description	No. Req.	List Price
27790	Dual Condenser, .04 - .1 Mfd. Type C	1	.70
27812	1st I.F. Transformer with Shield Can	1	2.10
27829	Dial Indicator Assembly	1	.15
27832	Dial Pilot Light Socket Assembly	1	.25
27887	Thumb Screw	1	.05
27974	Coupling Inductance Coil Assembly - 1.42 MH	1	.25
27976	Tone and Volume Control Dial	2	.30
28000	3rd I.F. Transformer - AVC	1	1.70
28002	R.F. Coil Shield Can Assembly (3 Stage)	1	.85
28006	Oscillator Transformer	1	2.50
28011	Contact Plate Lug & Insulator - (Si-Lec-Trol)	2	.25
28015	Shifter Cam Plate & Pig Tail (Si-Lec-Trol)	1	.75
28016	Finder Arm & Contact (Si-Lec-Trol)	10	.10
28017	Contact Plate Shifting Arm & Mtg. Bracket (Si-Lec-Trol)	1	.50
28024	Bypass Condenser Block	1	2.25
28033	Resistor Panel Assembly - Less Resistors	1	.20
28035	1st Detector Transformer	1	.85
28036	Antenna Transformer	1	1.40
28037	Bi-Selector Transformer	1	1.20
28038	Variable Condenser Cover Assembly	1	.45
28045	6 - 8 Volt Pilot Light	4	.15
28064	Volume Control Pilot Light Socket	1	.25
28150	2nd I.F. Transformer	1	2.80
28172	Station Finder Clamp Nut	6	.02
28183	Resistor, 7500 Ohms Carbon, 1 Watt	1	.25
28300	Tube Shield - 37	1	.25
28302	Resistor, 1000 Ohm, Wire Wound	1	.30
28316	Tone Control	1	.75
28326	Thumb Screw - Pilot Light	1	.04
28400	Electrolytic Condenser, 8 Mfd. - 475 Volt Dual	1	2.40
28441	Condenser, 950 Mmf. Mica	1	.25
28532	Dial Drive Cable	1	.30
28717	Condenser, .002 Mfd. - 700 Volt Tubular	1	.25
28719	Condenser, .004 Mfd. - 700 Volt Tubular	1	.25
28721	Condenser, .01 Mfd. - 500 Volt Tubular	1	.25
28726	Condenser, .1 Mfd. - 400 Volt Tubular	1	.25
61054	Finder Arm Fil. Head Screw (Si-Lec-Trol)	10	.02
63001	Hex Head Set Screw 10/32	3	.04
63829	Station Finder Arm Washer (Si-Lec-Trol)	10	.01
63838	Felt Knob Washer 1 1/8"	1	.01
63839	" " " 7/8 "	3	.01

SPEAKER

Part No.	Description	No. Req.	List Price
20047	Terminal Strip	1	.25
20048	Terminal Strip Cover	1	.15
27248	Speaker Complete 12A1	1	14.00
27507	Field Coil Assembly	1	4.30
27682	Output Transformer	1	2.25
27839	Speaker Cable Plug	1	.35
27841	Speaker Cable Less Plug	1	.55
28756	Cone & Voice Coil Assembly	1	4.00

COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT

Prices subject to change without notice.

GENERAL HOUSEHOLD UTILITIES CO. MODEL 700,701,801, 901,902
Alignment of I-F

ALIGNMENT PROCEDURE

DUAL WAVE RECEIVERS

Chassis Type 7A, 8A and 9A

1. EQUIPMENT -

(a) Oscillator.

A modulated oscillator capable of producing signals at 262 Kilocycles, 600 Kilocycles, and 1400 Kilocycles is necessary for alignment of the Dual-Wave Grunow receivers. There are a number of standard test oscillators on the market which meet these requirements and which also supply standard frequencies of 130 Kilocycles, 175 Kilocycles, 455 Kilocycles and 1000 Kilocycles in addition to the three frequencies necessary in aligning the above Grunow receivers. Such an oscillator is described in the bulletins of Clough-Brengle Company and Weston Electrical Instrument Corporation.

(b) Output Meter.

This may be any of the standard output meters available on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

(c) Coupling Condensers.

Coupling Condensers of .0002 and .25 Mfd. should be provided for coupling the oscillator to the receiver during alignment. These are necessary to prevent disturbance of the receiver bias voltages.

2. I. F. ALIGNMENT -

Place oscillator in operation at 262 Kilocycles and connect signal lead through .25 Mfd. condenser to control grid contact of the first detector tube. Connect output meter in accordance with instructions accompanying the meter, and turn receiver Volume Control to maximum. Attenuate oscillator output to the lowest value possible consistent with obtaining a readable indication on the output meter. Refer to the chassis layout diagrams in this bulletin for the location of the I.F. Trimmer screws and adjust these screws until maximum output is indicated upon the output meter.

If readjustment of the trimmers increases the output to a considerable extent the oscillator signal should be reduced further, always maintaining it at as low a value as will allow obtaining of accurate adjustment.

MODEL 700,701,801
901,902 GENERAL HOUSEHOLD UTILITIES CO.
Alignment

3. A.V.C. TRANSFORMER ALIGNMENT -

This adjustment is made on Chassis 8A and 9A, which utilize shunt A.V.C., but not on Chassis 7A.

Connect the shunt across the Output Meter or disconnect the Output Meter from the receiver. Then increase the output of the oscillator to maximum or to the point where the receiver begins to distort. Reduce the output volume to a low value by means of the receiver Volume Control and remove the shunt from the output meter or reconnect the meter to the receiver.

Turn the A.V.C. Trimmer screw in a clockwise direction to the point of minimum capacity without paying attention to the reading of the output meter. Then gradually turn this screw in a counter-clockwise direction, watching the action of the Output Meter while increasing the capacity of the trimmer. A graphical picture of the results obtained in this adjustment is given in Fig. 2 which shows that as the capacity of the trimmer is increased an output peak will be reached, followed by a dropping off in output to a minimum value. Further increase of the trimmer capacity causes the output to again rise to a peak after which it drops to a low value, which is not affected by further increase of the trimmer capacity. The proper setting of this trimmer is that which gives the minimum output between the two high output peaks.

Be very careful in making this adjustment that the trimmer is adjusted to give operation between the two output peaks, rather than the minimum output obtained by either a high or low capacity setting.

4. SHORTWAVE ALIGNMENT

Place the oscillator in operation at 600 Kilocycles and connect signal lead to Antenna Binding Post through a .002 Mfd. Condenser. Throw the receiver Band Selector Switch to the shortwave position.

Check setting of Tuning Dial by turning dial until condenser rotor plates are fully meshed. The last mark on the shortwave dial calibration should now be directly over the dial indicator. If it is not, loosen the three screws which hold the Tuning Dial on its hub and set dial correctly.

Set the Tuning Dial to exactly 3.6 Megacycles (6th harmonic of 600 K.C.) and adjust Oscillator Trimmer (See Chassis layout diagrams for location) until maximum output is indicated on the output meter. In adjusting the Oscillator Trimmer, it will be noted that there are two settings at which the signal will be received. Use the setting giving least capacity, that is, the setting at which the trimmer screw is farthest out.

5. 1400 KILOCYCLE ALIGNMENT -

Place oscillator in operation at 1400 Kilocycles and throw Band Selector Switch to broadcast position. Turn the Tuning Dial until it reads exactly 1400 Kilocycles.

Adjust the 1400 Kilocycle Trimmer until the maximum output is indicated upon the output meter. Then adjust R.F. and first detector trimmers for maximum output. On the 9A Chassis also adjust the Bi-Selector Trimmer. These adjustments should be made in rotation at least three times as they interlock to a certain extent.

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 700,701,801
901,902
Alignment

6. 600 KILOCYCLE ALIGNMENT -

(a) Tune in 600 K.C. signal regardless of where it appears on dial.

(b) Change the value of the padding condenser in either direction and retune signal. If the output has increased, it is indicated that the direction in which the padding condenser was turned is correct and that this operation of adjusting the padding condenser and then the dial should be continued until maximum output is obtained.

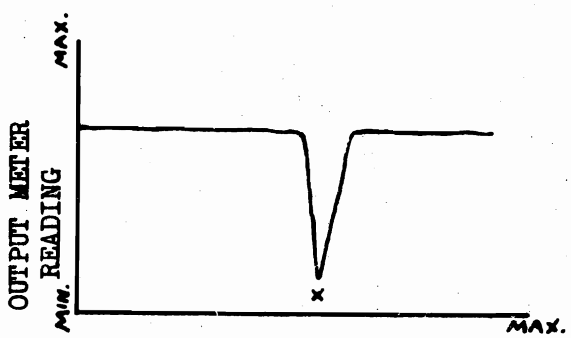
(c) If the first adjustment of the padding condenser shows a decrease, it is an indication that it must be turned the opposite direction.

(d) THIS OPERATION IN ITS ENTIRETY IS TO BE PERFORMED IRRESPECTIVE OF DIAL SETTING.

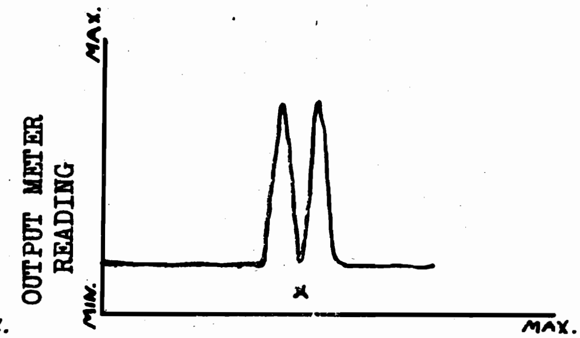
(e) In most instances it is wise to retune the oscillator trimmer condenser at the high frequency position to insure against its being affected by a large change necessitated in the Oscillator Series Padding Condensers.

7. DIAL CALIBRATION -

If after all trimmer and padding condensers have been adjusted to maximum output (omitting of course, the shunt AVC circuits in the 8A, 9A and 9B Chassis) the dial calibration is found to be incorrect it will be necessary to reset the dial on the hub of the condenser shaft or drive hub, as the case may be. Do not loosen the set screws on the drive hubs that are used to fasten the hub to the condenser shaft, but use the three set screws in the front of the dial for this purpose.



CAPACITY OF A.V.C. TRIMMER
CHASSIS TYPE 8A



CAPACITY OF A.V.C. TRIMMER
CHASSIS TYPE 9A

Fig.2.

MODEL 700,701,801
901,902
Socket layouts

GENERAL HOUSEHOLD UTILITIES CO.

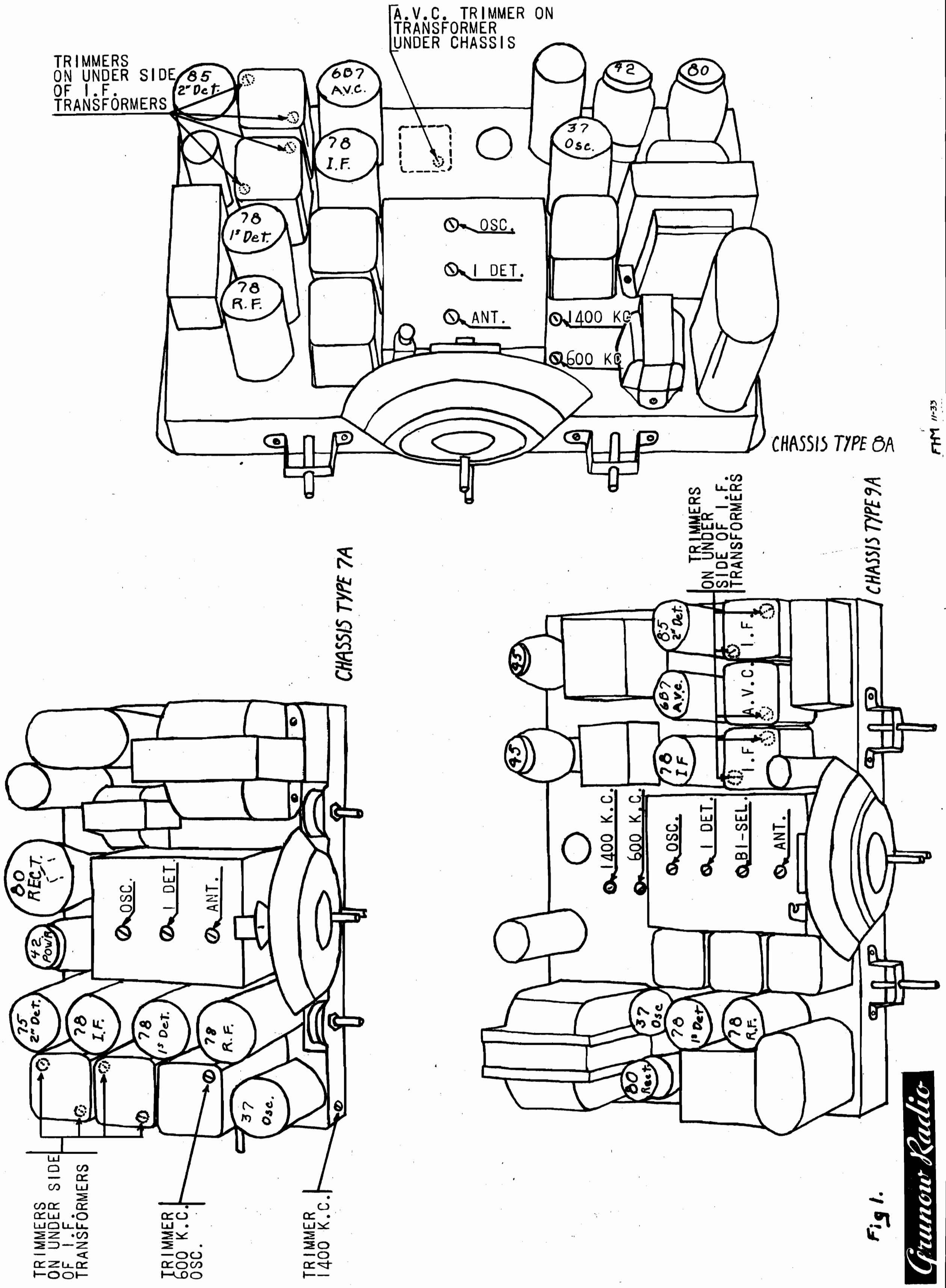
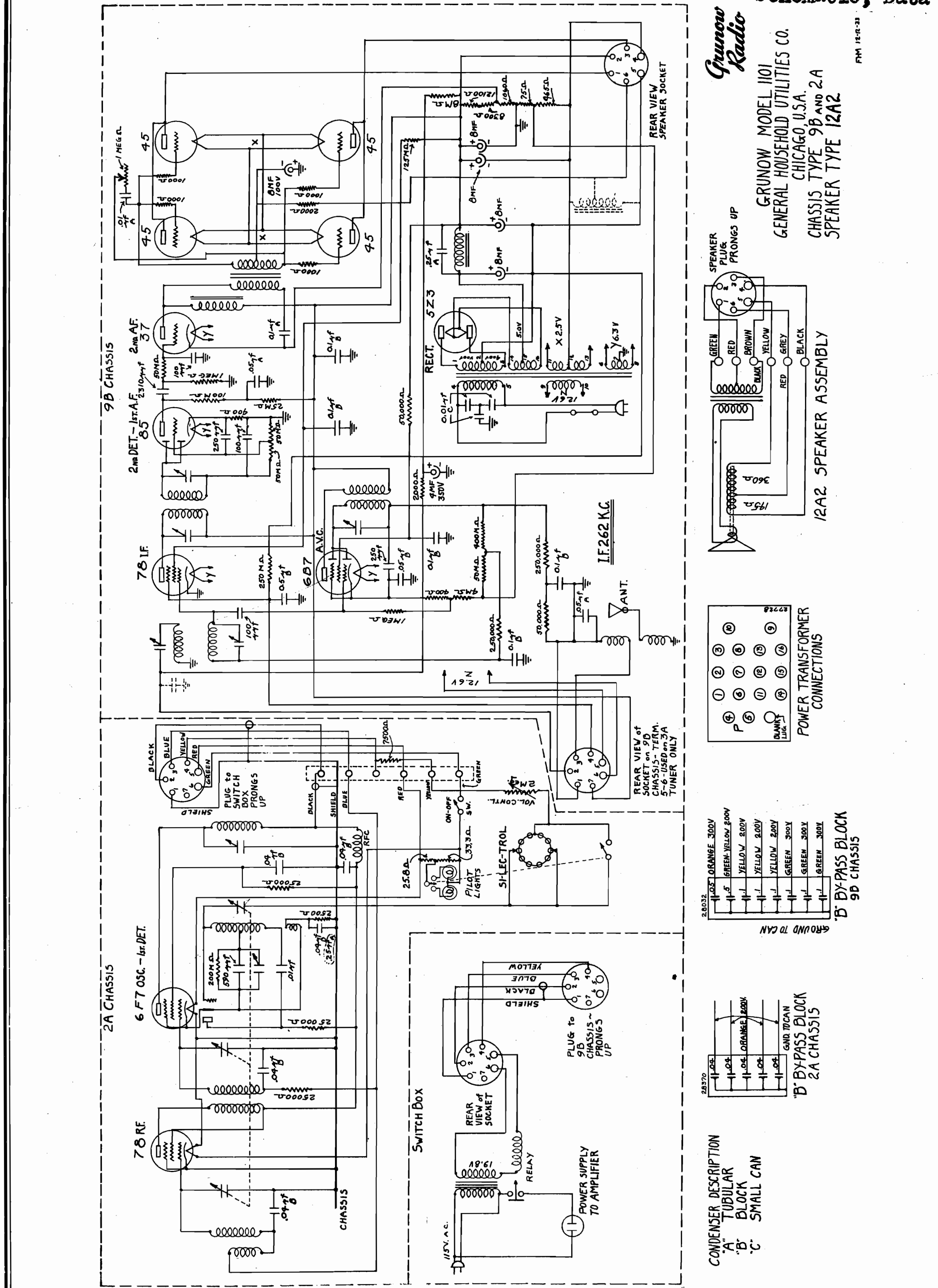


Fig 1.

Grunow Radio

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 1101
(Chassis 9-B,2-A)
Schematic, Data



MODEL 1101
(Chassis 9-B,2-A) GENERAL HOUSEHOLD UTILITIES CO.
Alignment;

Alignment Procedure --- GRUNOW MODEL 1101
Chassis 2A & 9B

I. F. ALIGNMENT

A. Connect signal lead of oscillator to grid of 6F7 (1st. Detector) tube in 2A Chassis through .25 mfd. condenser and ground lead of oscillator to 2A Chassis.
B. Place oscillator in operation at 262 K.C.
C. Turn receiver volume control to maximum.
D. Attenuate oscillator output to lowest value consistent with obtaining a readable indication on the output meter.
E. Adjust the five (5) I. F. Trimmers on the 2A and 9B chassis until maximum output is indicated on the output meter.
F. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

DIAL SETTING

a. The last mark on the low frequency end of the dial should be directly over the dial indicator.
b. To set dial correctly, turn dial knob to low frequency end until condenser is fully meshed, then loosen three set screws that hold dial and reset, then tighten screws.

1400 K. C. ALIGNMENT

a. Connect signal lead of oscillator through .0002 mfd. condenser to antenna binding post and ground lead to ground post of 9B Chassis.
b. Place oscillator in operation at 1400 K.C.
c. Turn tuning dial to exactly 1400 K.C.
d. Align oscillator trimmer to maximum output.
e. Align antenna trimmer to maximum output.
f. Align 1st. Detector trimmer to maximum output.
g. Repeat operation d-e-f in rotation at least three times.

600 K. C. ALIGNMENT

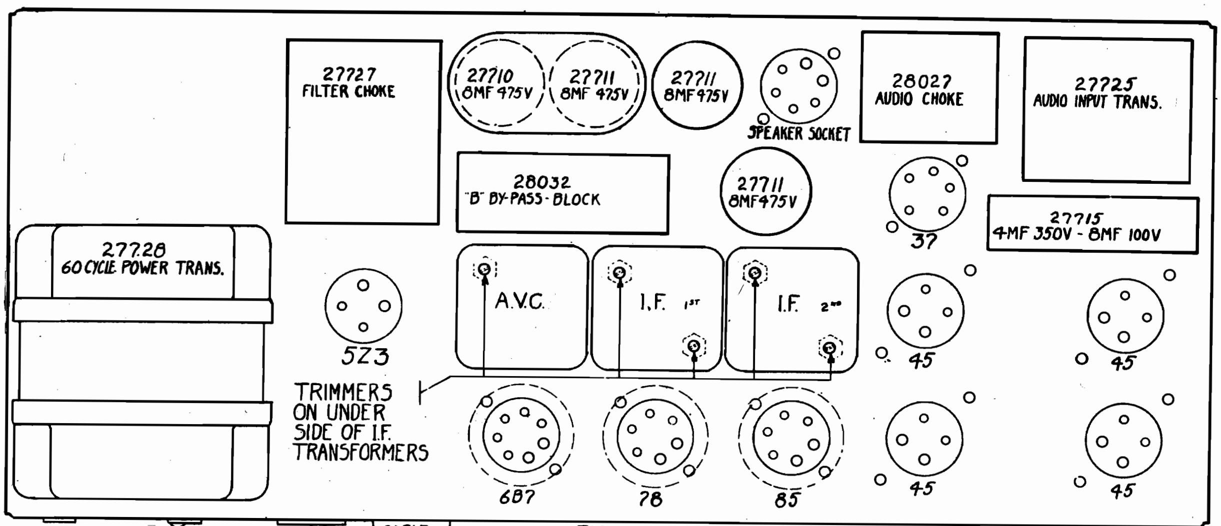
a. Place oscillator in operation at 600 K.C.
b. Tune in signal to maximum (this point does not have to be exactly at the 600 K.C. dial setting)
c. Adjust the 600 K.C. Trimmer (padding condenser) in the direction of greatest signal increase and at the same time turn the 2A dial back and forth through resonance. Continue this procedure until maximum signal is obtained on the output meter.

A.V.C. ALIGNMENT

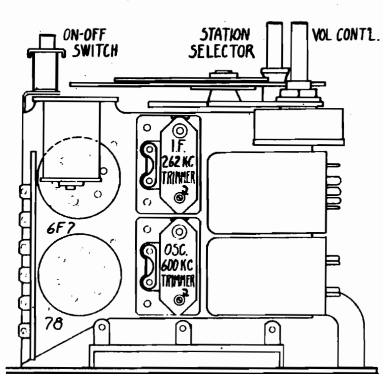
a. Place oscillator in operation at 600 K.C. as above.
b. Connect shunt across the output meter or disconnect the output meter from the receiver. Then increase the output of the oscillator to maximum or to the point where the receiver begins to distort. Reduce the output volume to a low value by means of the receiver volume control and remove the shunt from the output meter or reconnect the meter to the receiver.

MODEL 1101
(Chassis 9-B,2-A)
Socket layout
Alignment

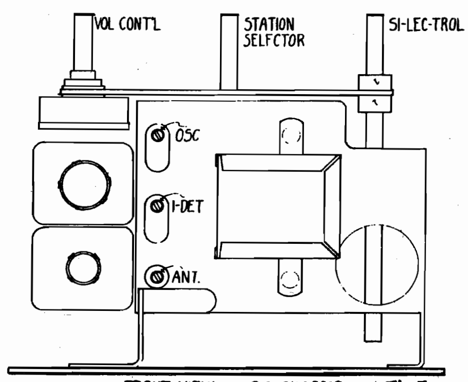
GENERAL HOUSEHOLD UTILITIES CO



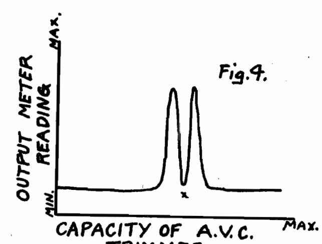
TOP VIEW 9B CHASSIS Fig. 1.



LEFT SIDE VIEW 2A CHASSIS Fig. 2.



FRONT VIEW 2A CHASSIS Fig. 3.



CAPACITY OF A.V.C.
TRIMMER.
MOD. 1101- CHASSIS 2A & 9B.

Alignment Procedure (Continued)

c. Turn the A.V.C. trimmer screw in a clockwise direction to the point of minimum capacity without paying attention to the reading of the output meter. Then gradually turn this screw in a counter-clockwise direction, watching the action of the output meter while increasing the capacity of the trimmer. A graphical picture of the results obtained in this adjustment is given in Figure 4 which shows that as the capacity of the trimmer is increased an output peak will be reached, followed by a dropping off in output to a minimum value. Further increase of the trimmer capacity causes the output to again rise to a peak after which it drops to a low value, which is not affected by further increase of the trimmer capacity. The proper setting of this trimmer is that which gives the minimum out-put between the two high output peaks.

d. Be very careful in making this adjustment that the trimmer is adjusted to give operation between the two output peaks, rather than the minimum output obtained by either a high or low capacity setting.

e. After the A.V.C. has been adjusted, it may be necessary in some cases to re-align the I.F. system to obtain maximum gain.

MODEL 1101
(Chassis 9-B,2-A)

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 1101

Part No.	Description	No. Req.	Price
	TUNER (2A CHASSIS)		
20962	Grid Cap Only	2	.02
22856	Resistor, 25,000 Ohm, Carbon, 1/4 Watt	1	.25
23538	Resistor, 200,000 Ohm, Carbon, 1/4 Watt	1	.25
26199	Oscillator Transformer Mounting Washer	1	.02
26218	Tube Socket - 78	1	.15
26219	Tube Socket - 6F7	1	.15
27342	Pilot Light Shield	1	.02
27492	Walnut Knob	3	.15
27614	Finder Arm Clamp Nut	6	.02
27722	Power Switch	1	.35
27733	Interstage Coil Shield	1	.20
27734	Oscillator Transformer Shield	1	.20
27739	Trimmer Condenser Assembly	2	.35
27784	Resistor, 400 Ohm Carbon, 1/4 Watt (Replace with 28746)	1	.25
27788	Removable Cover	1	.15
27831	Pilot Lamp Bracket Assembly	1	.15
27853	Pilot Lamp Switch	1	.95
27886	Screw Driver	1	.10
27887	Thumb Screw	1	.02
27890	Crank Arm	1	.02
27891	Connecting Rod	1	.02
27971	Volume Control	1	.80
27985	Resistor, 33.3-25.8 Ohm, Wire Wound	1	.50
28020	Shifter Cam Plate Assembly	1	.30
28045	Pilot Lamp	2	.15
28086	Antenna Transformer Shield Assembly	1	.20
28093	Dial Indicator	1	.15
28172	Station Finder Arm Clamp Nut	4	.02
28174	Resistor, 7500 Ohm, Carbon, 1/4 Watt	1	.25
28341	Disengager Shaft Assembly	1	.80
28343	Contact Arm and Hub Assembly	1	2.00
28354	Remote Control Cable, less plug	1	2.75
28365	Oscillator Transformer	1	.90
28366	Oscillator Transformer Mounting Strip	1	.05
28368	Interstage Coil Assembly	1	1.40
28370	Bypass Condenser Block	1	1.35
28375	Remote Control Cable Plug	1	.40
28404	R.F. and I.F. Choke Assembly	1	1.25
28405	Terminal Strip Assembly	1	.30
28409	Tuning Condenser, 3 Gang	1	4.25
28414	Station Finder Arm and Contact	10	.10
28416	Antenna Transformer	1	.75
28424	Dial Chart Assembly	1	1.35
28450	Condenser, 590 Mmf. Mica (Replace with 28585)	1	.20
28585	Condenser, 570 Mmf. Mica, (Supersedes 28450)	1	.20
28721	Condenser, .01 Mfd., 400 Volt Tubular	2	.25
28728	Condenser, .25 Mfd., 100 Volt Tubular	1	.25
28746	Resistor, 2500 Ohm Carbon, 1/4 Watt (Supersedes 27784)	1	.25
61054	Station Finder Arm Screw	10	.02
63829	Washer, Station Finder Arm	10	.01
63839	Felt Knob Washer	3	.01
	RELAY BOX		
28455	Relay Box Complete	1	11.00
20861	Line Cord and Plug	1	.35
27730	Control Cord Socket	1	.15
28350	Relay Box Cover	1	.45
28355	Control Cable, less Plug	1	.45
28375	Control Cable Plug	1	.40
28443	Line Socket	1	.50
28458	Relay	1	3.00
28465	Power Transformer, 105 - 125 Volts, 50 - 60 Cycles	1	2.50
	AMPLIFIER (9B CHASSIS)		
20962	Grid Cap Only	3	.02
21348	Resistor, 100,000 Ohm, Carbon, 1 Watt	1	.25
21598	Rubber Grommet	3	.02
22027	Fibre Grommet	3	.02
22333	Antenna Binding Post Assembly	1	.10

MODEL 1101
(Chassis 9-B)
Parts List

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 1101

Part No.	Description	No. Req.	Price
	AMPLIFIER (9B CHASSIS) (Continued)		
22846	I.F. Coil Assembly	1	.50
22858	Resistor, 1 Meg. Carbon, 1/4 Watt	1	.25
23119	Intermediate Shield	1	.10
23358	Vertical Insulated Terminal Assembly	5	.05
23368	Resistor, 400,000 Ohm, Carbon, 1/4 Watt	1	.25
23370	" 100,000 " " 1/4 "	2	.25
23853	" 50,000 " " 1/4 "	4	.25
23998	" 250,000 " "	3	.25
24251	Condenser, 100 Mmf. Mica	3	.20
24487	Condenser, 250 Mmf. Mica	1	.20
24754	Tube Socket - 85	1	.15
26218	Tube Socket - 78	1	.15
26232	Round Shield Cap	1	.05
26256	Tube Shield Base	3	.05
26552	R.F. and Ant. Shield Can Eyebolt Assembly	1	.20
27272	Electrolytic Shield Can Assembly	1	.25
27282	I.F. Shield Can Assembly	1	.35
27283	" " " "	1	.40
27301	Resistor Panel Bracket Assembly	2	.15
27347	Tube Socket - 37	1	.15
27388	I.F. Shield Can Assembly	1	.30
27445	Resistor, 400 - 4,000 Ohm (Wire Wound)	1	.50
27448	" (" ")	1	1.50
27477	Electrolytic Plain Washer	3	.02
27478	Electrolytic Ground Terminal	2	.02
27487	Tube Socket (6B7)	1	.15
27488	Speaker Cable Socket	1	.15
27489	Tube Socket - 45	4	.15
27490	Resistor, 1000 Ohm, 1/4 Watt	4	.25
27710	Electrolytic Condenser, 8 Mfd. 475 Volt (Chrome)	1	1.15
27711	Electrolytic Condenser, 8 Mfd. 475 Volt	3	1.10
27715	Dual Electrolytic Condenser, 8 Mfd. - 100 Volt-4 Mfd.- 350 Volt	1	1.90
27723	Tube Socket - 5Z3	1	.15
27725	Audio Input Transformer Assembly	1	4.00
27726	Audio Choke Assembly	1	1.50
27727	Filter Choke Assembly	1	3.00
27728	Power Transformer Assembly	1	12.00
27730	Cable Socket (7 Prong)	1	.15
28032	Bypass Condenser Assembly	1	2.75
28043	Condenser, .01 - .01 - .01 Mfd. Type "C"	1	.80
28380	I.F. Input Assembly	1	2.60
28381	A.V.C. & I.F. Assembly	1	2.35
28382	I.F. Diode Assembly	1	2.70
28385	Vertical Terminal & Resistor Panel Assembly	1	.85
28399	Vertical Insulated Terminal	1	.05
28401	Resistor, 8,000 Ohm (Wire Wound)	1	.40
28403	Tone Control	1	.75
28420	Resistor, 5,000 Ohm, Carbon, 1 Watt	1	.25
28421	" 2,000 " " 1 Watt	1	.25
28438	" 150,000 " " 1/2 Watt	1	.25
28449	" 125,000 " " 1/2 Watt	1	.25
28451	Junction Terminal Board	1	.05
28721	Condenser, .01-500 Volt, Tubular	1	.25
28723	" .05-400 " "	1	.25
28726	" .1 -400 " "	1	.25
28728	" .25-100 " "	1	.25
	SPEAKER PARTS		
27625	12A2 Speaker Complete	1	15.00
20047	Terminal Strip	1	.25
20048	Terminal Strip Cover	1	.15
27215	Field Coil	1	4.50
27706	Output Transformer	1	2.50
27839	Speaker Cable Plug	1	.35
27841	Speaker Cable, Less Plug	1	.55
28756	Cone & Voice Coil Assembly	1	4.00

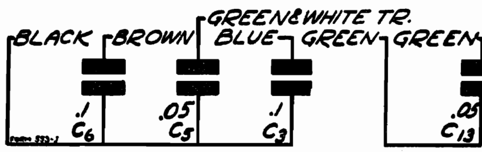
COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT

GULBRANSEN CO.

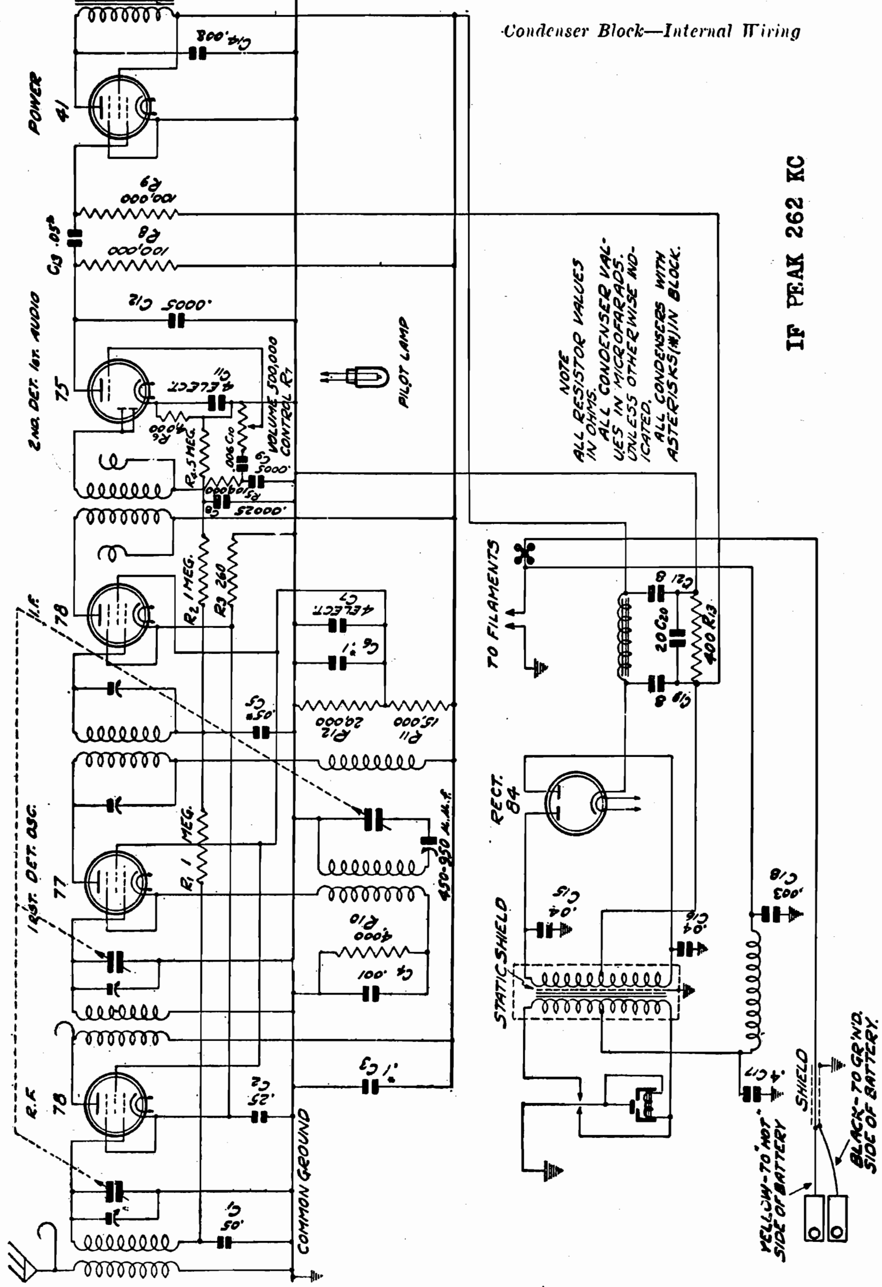
MODEL V6Z2
Schematic
Voltage

	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78 R.F.	6.1	182	80	3*	7.0
77 1st Det. & Osc.	6.1	178	77	5**	1.3**
78 I.F.	6.1	182	80	3.*	7.0
75 2nd Det. 1st Audio	6.1	70x		1.4*	.35
41 Output	6.1	172.5	176.5	12.5xx	16.0
84 Rect.	6.1	205			17.5 per plate

*-Cathode to Ground. **-Subject to Variation. x-Triode Plate to Cathode
xx-Read Across 400-Ohm Resistor, R13



Condenser Block—Internal Wiring



IF PEAK 262 KC

Trying Out the Set and Adjusting

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer. The location of the tubes is shown in Fig. 7. To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 K.C. with the volume control about three-fourths on. On one end of the chassis box is a small metal plate. Remove this plate. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

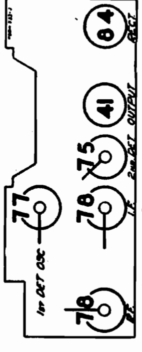


Fig. 7—Location of Tubes

MODEL V6Z2
Alignment
Antenna notes

GULBRANSEN CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 9 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Antenna

A roof antenna is recommended, as by far the best results will be obtained. A large percentage of cars at the present time come equipped by the factory with built-in roof antennas. In those cars which do not have an antenna, one will have to be put in.

First determine if the top has a grounded chicken wire mesh. To do this, use a continuity meter. By means of a wire, attach a darning needle to one of the prods. Poke the darning needle into the roof material and turn it around until it comes in contact with the chicken wire. Then ground the other prod and if the continuity meter shows a complete circuit, the chicken wire mesh is grounded. In a case of this kind, it will be necessary to get inside of the roof and it is advisable to employ the services of an auto "top man" or an upholsterer.

It will be necessary to remove the top material and cut away the chicken wire from the side supports until it is at least 3″ away from ground at any point. It should also be at least 3″ away from the dome light and the dome light wiring. The chicken wire may then be laced to the points from which it was cut with a heavy, waxed cord. The chicken wire will then make a satisfactory antenna, or a copper screen may be used.

If the chicken wire is not grounded, it may be used as the antenna by taking down the roof material at one corner and soldering the lead-in wire to it. If it is not desired to take down the roof material a piece of copper screening can be tacked to the roof on the inside of the car. At least six square feet should be used. Keep it at least 3″ away from any grounded metal parts on all sides. After the screen is in place, it can be covered over with cloth which matches the roof material. Solder the lead-in wire to the screen and bring it down the front corner post nearest to the set.

Another, and a very simple way in which an antenna can be secured to the inside of the car roof is to use one of the car-roof antennas which are now being made up especially for this purpose. There is one type of antenna which consists of copper strips laid back and forth between two pieces of cardboard. The cardboard is then covered over with material which matches the roof material. This antenna can be had in several colors and is tacked in place on the inside of the car roof in a few minutes.

If the Receiver Fails to Operate

"A" Fuse— Check the "A" line fuse in the chassis box.

"A" Line Open—See if power is being supplied to the speaker, tube heaters, and "B" eliminator.

"B" Eliminator Not Working—See if the "B" eliminator is in proper working order by checking the high voltage points at the tube plate terminals (see Fig. 9).

Antenna and Lead—See if antenna is properly connected to lead-in wire and antenna lead from set. Be sure antenna system is not grounded at any point.

All Tubes Not Inserted—See if all tubes are inserted as per Fig. 7.

Defective Tubes—Try out a new set of tested tubes.

Grid Caps Not Connected—See if all grid caps are properly connected to top of top grid connection tubes.

Variable Condenser Plates Shorted—Check condenser sections in chassis carefully for foreign particles or rotor stator rubbing.

Weak Reception

Defective Tubes—Try out a new set of tested tubes and note any difference in performance.

Poor Antenna—To try out the effectiveness of the antenna used, check the volume against the volume when using a straight length of wire about 15′ long, run out of the car through one of the windows. If, upon test, the external wire is found to be much superior as far as volume is concerned, the antenna is not satisfactory and will have to be re-vamped or a new one installed. The antenna or lead-in may be too near grounded metal portions of the car frame or body resulting in a high capacity to ground. There may be grounded metal mesh in the car roof. There may be a poor soldered connection between the antenna, lead-in, or antenna lead from the set. The antenna system may be partially grounded at some point.

Antenna Trimmer Not Adjusted—See article "Trying Out the Set and Adjusting."

Car in Shielded Location—If the car is within or near a steel structure, the signals may be weakened by absorption.

Storage Battery Run Down—Check the condition of the battery.

Defective "B" Eliminator—Check "B" voltage at sockets (see voltage chart and Fig. 9).

Misalignment of Variable Tuning Condensers—Instructions for realigning are contained in this manual. Do not, however, attempt realignment unless other causes of low volume have first been investigated.

Wrong Voltages—Check voltages at the sockets (see voltage chart).

Other Causes of Low Volume—Defective speaker, poor battery, antenna, grid cap or other connections, defective A.V.C. system in the receiver, and various opens, grounds and shorts in the receiver assembly.

Distorted Reproduction

Receiver Oscillating—See article on oscillation.

Defective Tubes—Try out a new set of tubes.

Incorrect Voltages—Check the voltages at the sockets (see voltage chart).

Incorrect Tuning—The signal must be carefully tuned in to the clearest and loudest point. It must not be tuned "off resonance."

Defective Speaker—Try out a new one if it is available.

Defective Audio System in the Receiver—Make continuity resistance tests using as a guide Fig. 9.

Signal Transmission—Quality fading in the signal transmission can cause poor tone quality.

Oscillation

Cover of Box—May not be on or if on, may not be sufficiently tightened down.

Off Characteristic Tubes—Tubes whose characteristics vary considerably from the standard may cause oscillation. Try out some new ones.

Open Bypass Condensers—Check the bypass condensers and leads to them for open circuit.

Poor Ground Connections—Check the ground connections in the chassis for poor contact.

Grid Caps and Leads—The grid caps may not be making good contact to the tops of the tubes or the wires of the grid caps may be too close together.

MODEL V6Z2
Service notes

GULBRANSEN CO.

Care and Maintenance

Advancing Generator Charging Rate

The installation of the automobile radio imposes an additional drain on the car storage battery. This can be compensated for by advancing the charging rate of the car generator. Check the state of charge of the storage battery about a week after the installation of the automobile radio is made and adjust the charging rate accordingly.

Tubes

The type of tubes used and location of these tubes in the chassis are shown in Fig. 7. These tubes are of a sturdy, rugged construction designed especially for an auto receiver. Most of them, under normal usage, will last for many months and in some cases, years. Some of them, however, may become faulty after a few months of operation.

For that reason, it is advisable to secure a new set of tested tubes at intervals of three to six months and have these inserted in the receiver one at a time, noting any difference in performance.

Pilot Lamp

The pilot lamp is located in the control unit. A 6-8 volt miniature base lamp is used. To replace the lamp, first turn the receiver off. Remove the two control knobs and the key entry nut. Then take out the screw holding the control box cover in place after which the cover can be taken off. The pilot lamp socket is secured to a spring clip which is on a bracket in the control unit. Push this clip and socket over far enough to get at the lamp, after which the bulb can be replaced and the control unit reassembled.

Fuse

A 10 amp. automobile fuse is used for the "A" line. This fuse is mounted on a block on the power transformer in the chassis. To change the fuse, it will be necessary to remove the cover of the chassis box.

Electrical Condition of Car

Dirty spark plugs, incorrect spacing of distributor points, faulty distributor condenser, and various other items in the car electrical system can cause noisy operation. If the customer complains of noise in the receiver after it has been in use for some time, check the items mentioned as well as other parts of the car electrical system for poor connections, grounds, and other faults which may be responsible for the noise.

Circuit

The circuit consists of an antenna stage, a 78 R.F. stage, a 77 1st detector-oscillator stage, a 78 I.F. stage, a 75 dual diode-triode tube, which functions as a diode 2nd-detector and triode 1st audio stage, and a single 41 output stage. An 84 full wave rectifier is used in the power unit. The intermediate frequency is 262 K.C. The diode current establishes a drop across a resistor which is used as additional bias voltage for the R.F. and I.F. tubes giving automatic volume control action. Noise suppression between stations is obtained by the resistor in the cathode circuit of the 75 tube, the drop across which must be overcome before rectification in this tube begins. The manual volume control varies the audio voltage applied to the grid of the 75 tube.

A vibrator interrupts the current through the primary of the power transformer in the power unit. This, together with the turns ratio in this transformer, results in the high voltage AC being present in the secondary of the transformer. The full wave rectifier tube, filter choke, and filter condensers convert this high voltage AC into high voltage DC for the plate and screen circuits.

Current for the receiver is obtained from the car storage battery.

Rattle

If rattle is experienced when a signal is being received, it is, in practically all cases, due to mechanical vibration at some point in the chassis. Inspect the chassis and look for a loose tube shield or a loose part at some point which can rattle against another part. When the vibrating part is found, secure it in place in some manner. This can generally be done with a wedge made of a piece of paper, cardboard or wood. Rattle may, in some instances, be due to a loose cover. If this is the case, remove the cover and bend the edge of the chassis box outward between the screw holes so that the cover will fit tightly when it is put on.

GULBRANSEN CO.

MODEL V6Z2
Parts List

Replacement Parts for Series V6Z2 Receivers

CHASSIS PARTS

Part No.	Description	List Price
P-1780	No. 75 Tube Socket	$0.10
P-1761	No. 77 Tube Socket	.10
P-1762	No. 78 Tube Socket	.10
P-1665	No. 41 Tube Socket	.10
P-1803	No. 84 Tube Socket	.10
P-1805	Single Pin Jack	.10
P-1799	Tube Shield Assembly	.25
P-20681	Chassis Box	4.00
P-20657	Chassis Box Cover	1.10
P-20680	Angle Plate	.25
P-70740	Shielded Antenna Lead	.40
P-70744	Shielded "A" Battery Lead	1.15
P-1824	Anchor Bushing, complete with nuts and washers	.35
P-1804	Vibrator Unit (in cast metal case)	6.00
P-10266	Vibrator Unit Rubber Cushion, pair	.10
P-20660	Vibrator Unit Box	.70
P-20661	Vibrator Unit Box Cover	.20
P-1572	Fuse Clip Assembly	.10
P-10260	Cardboard Baffle	.20
P-1624	10 Amp. Fuse	.10
P-1774	Electrodynamic Speaker	3.75
P-20675	Volume Control and Pinion Gear Bracket	.15
P-20545	Pinion Bearing	.10
P-20546	Pinion Compression Spring	.10
P-20544	Pinion Bracket	.10
P-20586	Drive Pinion	.10
P-20585	Cond. Drive Gear	.25
P-30417	Volume Control Coupling	.10
P-10263	Rubber Tube Bumper—Square	.10
P-10210	Rubber Tube Bumper—Round	.10
P-10213	Rubber Band for Tube	.10
P-50569	Filter Choke Assembly	1.60
P-50585	Power Trans. Assembly—Less condensers and brackets	3.25
P-5099	Antenna R. F. Transformer—Less Can	1.20
P-5065	Interstage R. F. Transformer—Less Can	1.00
P-5105	Second I. F. Transformer and Can Assembly	.95
P-5096	First I. F. and Oscillator Transformer and Can Assembly	2.70
P-5097	Single Solenoid "A" Choke	.25
P-40431	Antenna R. F. Can	.15
P-1826	Interstage R. F. Can	.10

Resistors

Part No.	Code No.	Resistance	Type	List Price
P-A95105	R-1	1 Megohm	Carbon	$0.25
P-A95105	R-2	1 Megohm	Carbon	.25
P-B94261	R-3	260 ohm	Carbon	.35
P-A95504	R-4	.5 Megohm	Carbon	.25
P-A95104	R-5	100,000 ohm	Carbon	.25
P-A94402	R-6	4,000 ohm	Carbon	.20
P-A91061	R-7	0-500,000 ohm	Volume Control and Switch	$1.15
P-A95104	R-8	100,000 ohm	Carbon	.25
P-A95104	R-9	100,000 ohm	Carbon	.26
P-A94402	R-10	4,000 ohm	Carbon	.20
P-B94153	R-11	15,000 ohm	Carbon	.25
P-B94203	R-12	20,000 ohm	Carbon	.25
P-C94401	R-13	400 ohm	Carbon	.20

Condensers

Part No.	Code No.	Capacity	Voltage	Type	List Price
P-80862	C-1	.05 mfd.	200 V.	Tubular	$0.30
P-80888	C-2	.25 mfd.	200 V.	Tubular	.35
P-80821-B	C-4	.001 mfd.	600 V.	Molded	.25
P-80937	C-7 C-11	4.0 mfd. 4.0 mfd.		Electrolytic Block in can	1.25
P-80919	C-8	.00025 mfd.	600 V.	Molded	.20
P-80945	C-9	.0005 mfd.	600 V.	Molded	15
P-80898	C-10	.006 mfd.	600 V.	Tubular	15
P-80945	C-12	.0005 mfd.	600 V.	Molded	.15
P-80966	C-14	.008 mfd.	600 V.	Tubular	20
P-80963	C-15 C-16	.04 mfd. .04 mfd.	400 V. 400 V.	Dual Tubular	.30
P-80960	C-17	.4 mfd.	15 V.	In Metal Can	.50
P-80959	C-18	.003 mfd.	600 V.	Molded	.35
P-80956	C-19 C-20 C-21	8.0 mfd. 20.0 mfd. 8.0 mfd.	225 V. 25 V. 225 V.	Electrolytic Block in Can	2.25
P-80955	C-3 C-5 C-6 C-13	.1 mfd. .05 mfd. .1 mfd. .05 mfd.	300 V. 200 V. 200 V. 300 V.	Bypass Block in Can	1.35
P-1539	600 K. C. Trimmer Condenser				.45
P-80957	Three-Gang Variable Condenser				3.00

CONTROL UNIT PARTS

Part No.	Description	List Price
P-1816	Celluloid Dial Strip Only	$0.15
P-1825	Dial Gear and Strip Assembly	.40
P-20509B	Control Unit Swivel	.15
P-20510A	Steering Post Apron	.30
P-20511	Steering Post Clamp	.15
P-20689	Control Unit Cover	.35
P-70746	Pilot Lamp Cable Only	.40
P-1415A	Pilot Lamp Socket and Clip	.15
P-1563A	6-8 Volt Pilot Lamp	.25
P-20692	Volume Control Drive Shaft	.10
P-20703	Drive Shaft Pinion	.15
P-20691	Dial Gear Pinion (Hollow Center)	.15
P-30413	Entry Plate Assembly for Key	.30
P-30414	Key	.15
P-1813	Small Knob	.15
P-1814	Large Knob	.20

ADDITIONAL ITEMS

1— 1550	14" Flexible Drive Shaft	.90 ea.
1— 1553	20" Flexible Drive Shaft	1.25 ea.
1— 1551	34" Flexible Drive Shaft	1.65 ea.
1— 1552	45" Flexible Drive Shaft	2.00 ea.
1—91011	Spark Plug Suppressor	.50 ea.
1—91012	Distributor Suppressor, Wood Screw Ends	.50 ea.

MODEL V6Z2
Mounting notes

GULBRANSEN CO.

Mounting the Chassis

The chassis is mounted on the dash by means of two brackets as shown in Fig. 2. Two mounting screws are used to secure each bracket to the end of the chassis box. Six embossings with inset nuts are provided on each end of the chassis box. Any two of these may be used for the bracket screws, thus providing great flexibility in mounting.

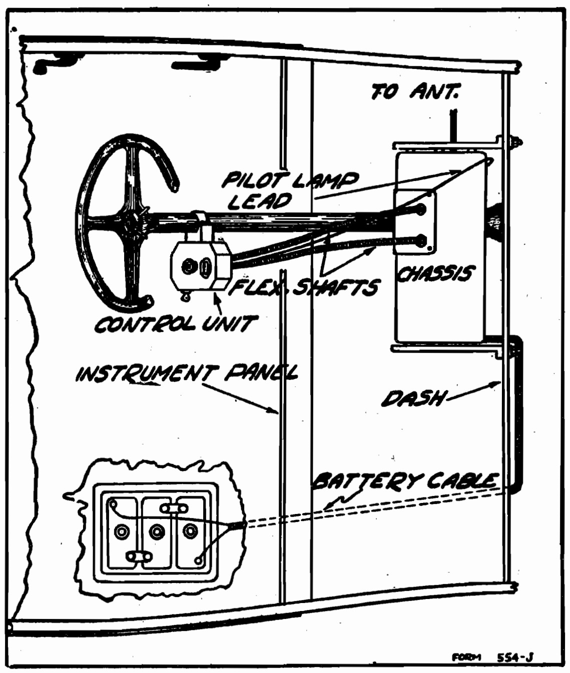


Fig. 2—General Installation—Top View

Each nut has a mounting screw in it and if any of these are in the way of the mounting bracket, they can be taken out.

The chassis should be mounted with the speaker grill facing toward the driver. In this position, the anchor bushings in which the flexible drive shafts are placed will come out of the top.

The location of the chassis will very often depend on the space available. To the left of the center, as shown in Fig. 2, is a good location. The chassis should be mounted in such a way that the flexible drive shafts to the control unit will be in as straight a line as possible or with large radius bends. *In general, it will be advisable to consider the possibility of a car heater installation at the right side of the dash (facing forward).* In practically every case no difficulty will be experienced in mounting the heater and chassis on the dash.

The possibility of interference with the legs of the driver or passenger in the front seat and the possibility of interference with the controls of the car should also be considered before the location of the chassis is definitely decided on.

Before mounting the chassis read the section on "Attaching the Flexible Drive Shafts."

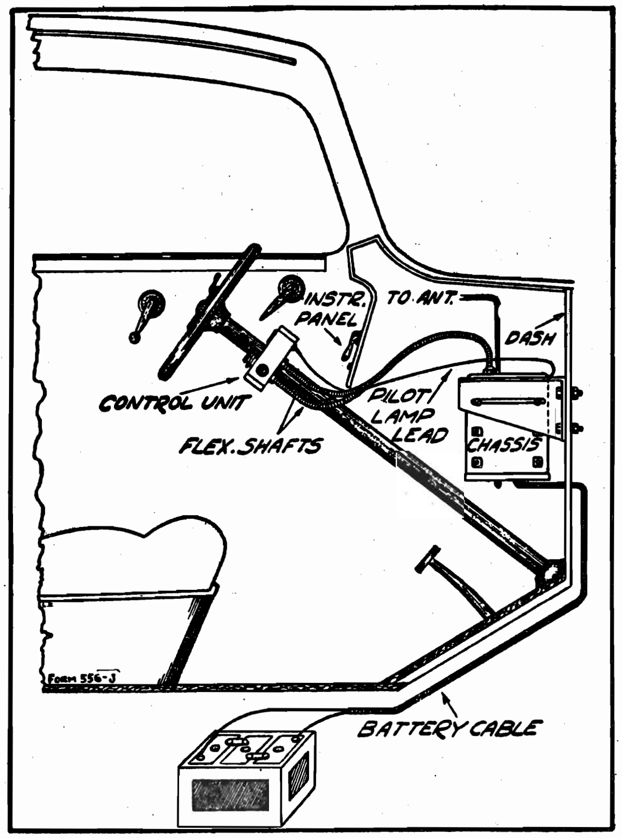


Fig. 3—General Installation—Side View

When the location is decided on, drill the four mounting holes required. The location and size of these holes is shown in Fig. 4. A template for drilling these holes is supplied with the receiver. Four ¼" mounting bolts, four washers, four lockwashers, and four nuts are provided. The mounting bolt is put through the bracket and dash with the shank

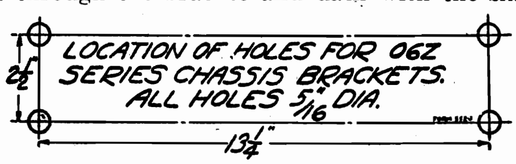


Fig. 4—Mounting Hole Location

extending into the engine compartment. A washer, the lockwasher and nut, are then put on. Mount the brackets permanently, but do not mount the chassis permanently until all connections are completed, the tubes are all inserted, the receiver tried out, and the antenna trimmer adjusted (explained later).

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MODEL V6Z2
Flexible drive

Attaching the Flexible Drive Shafts

After the control unit and chassis are in position, the flexible drive shafts may be attached. Two 34" shafts are supplied, unless otherwise specified. These shafts may also be had in 14", 20", and 45" lengths.

The flexible drive shafts should always be installed with a minimum amount of bending. Always keep the radius of the bend as large as possible.

The 34" shafts supplied with the receiver may be cut to a shorter length if necessary. The shaft (inside portion) should first be brazed at the point to be cut. It should then be cut with a three-corner file or edge of a grinding wheel. *Do not use a hack saw.* After the shaft is cut, file it down in one place a slight amount to provide a flat surface for the set screw. The casing which is 1½" shorter must be cut to correspond. This should be tinned or brazed first at the point to be cut and may then be cut with a hack saw.

After the length and position of the shafts is decided on they may be secured to the chassis. The shafts are already secured at the control unit. It is advisable to attach the flexible shafts with the chassis on the mounting brackets, but if the chassis is accessible, it may be removed from the brackets. Keep it as close to its regular position as possible so that the flexible shaft will not turn after the chassis is replaced on the brackets. In general, it may be moved up or down, but should not be moved sideways or be turned. Just over the speaker grill on the chassis box will be seen an angle plate. Remove this plate. Before proceeding further with attachment of the shafts see if the receiver is in working order by operating it with the cover off and necessary connections completed, as explained further in this manual.

In Fig. 5 is shown a cross-sectional view of the flexible drive shaft connections at the chassis end. First put the angle plate on the chassis box temporarily with two screws. Then center the volume control anchor bushing on this plate. To do this, loosen the nut which holds this bushing in place (see Fig. 5). Center the bushing by eye so that the center of it is in a line with the center of the volume control coupling. Then tighten the nut down.

Next, take the angle plate off. Extend the volume control flexible shaft and casing several inches through the hole in the anchor bushing of the angle plate so that the plate will be on the casing and out of the way. Turn the volume control coupling counter-clockwise until the switch is snapped to the off position. Lock the receiver on the control unit and turn the volume control knob counter-clockwise until it is in the locked position. Then loosen both set screws in the volume control coupling and insert the flexible shaft in the coupling (see Fig. 5). Tighten the outer set screw first on one of the *four flat faces* of the flexible shaft and then tighten the inner set screw. For purposes of illustration, the set screws in Fig. 5 are shown extending sideways in the coupling, but should actually extend towards the box opening in order to get at them. Then temporarily place the chassis on the mounting brackets if it has been taken off and check the operation of the switch, volume control, and lock. The switch should be off when the volume control knob is in the locked position. It may be necessary to loosen the inner set screw and do a slight amount of adjusting until the proper setting is obtained.

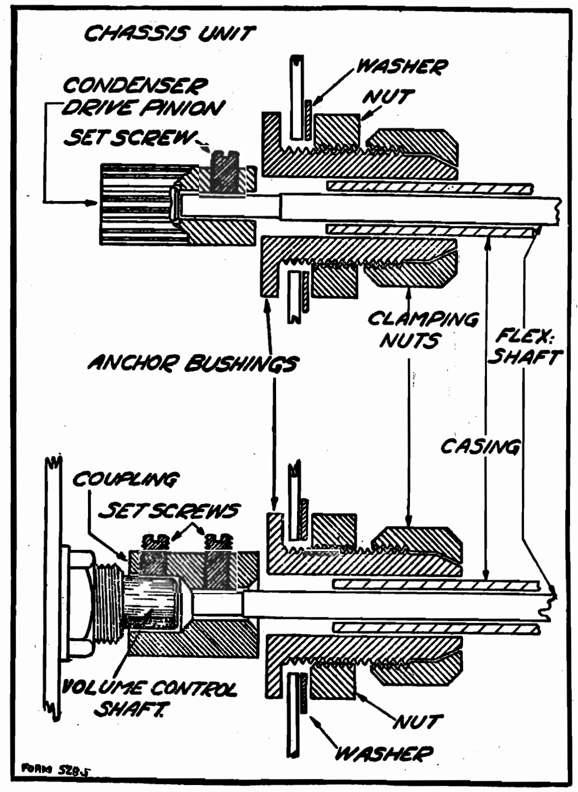

Fig. 5—Details of Flexible Drive Shaft Connections

To attach the tuning condenser flexible shaft, first center the anchor bushing by eye as was explained above. Then extend the tuning condenser flexible shaft into the hole at the center of the tuning condenser drive pinion. Turn the large gear on the tuning condenser rotor shaft until the rotor plates are completely in mesh. Then turn the station selector knob on the control unit until the dial gear is at the low frequency end stop. The set screw in the drive pinion should then be tightened down on one of the four flat faces of the shaft.

The operation of this control should also be tried out after the shaft is in place. In order to get accurate calibration it may be necessary in some instances to loosen the set screw of the large gear on the tuning condenser rotor shaft and adjust the setting of this gear.

Next, slide the angle plate into position and fasten it in place by means of the four screws. Then tighten down the clamping nuts on the two flexible shaft casings, *but do not tighten these nuts excessively.*

MODEL V6Z2
Control unit

GULBRANSEN CO.

Mounting the Control Unit

The control unit is mounted on the steering column under the steering wheel as shown in Figs. 2 and 3. A clamp is used to hold it in position.

The outer portion of the clamp is screwed to the inner portion by means of the four 8-32x3/8" fillister head screws supplied with the receiver. See Fig. 1.

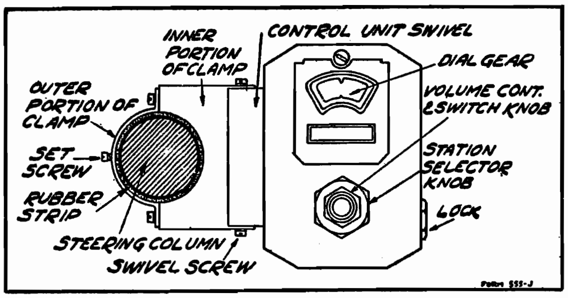

Fig. 1—Method of Mounting Control Unit

Two rubber strips are provided, one 1/8" thick and the other 1/16" thick. These are wrapped around the steering column under the clamp. Either or both of these strips may be used, depending on the thickness of the column. Wrap the rubber strips around the column in such a way as to allow the set screws which hold the clamp in position to pass through. When the clamp is in place, take the two 8-32 headless cup point set screws and screw them down on the steering column through the tapped holes in the clamp.

The control unit is generally about 4" below the wheel, but this will vary with individual cases. The length of the drive shaft and interference with driver's legs will also govern the location of the control unit.

There are two screws which hold the inside portion of the clamp to the control unit swivel. By loosening these two screws, the box can be swung around if such a position is handier from the standpoint of the person operating the set. Instructions for attaching the pilot lamp lead are contained in the article "Completing the Wiring Connections."

Completing the Wiring Connections

Pilot Lamp

The pilot lamp lead is in a shielded cable which extends out from the control unit box. On the rear wall of the chassis, near one of the ends, will be seen a tip jack. Insert the tip on the end of the pilot lamp lead into this jack. There is also a pigtail or shield extension at the end of this lead. Ground this pigtail with one of the angle plate screws (see Fig. 6). Double up the pilot lamp lead if it is too long—*Do not cut this lead.*

Antenna Cable

Bring the antenna cable of the receiver in the most direct manner possible to the lead-in from the antenna and connect it to the latter. Keep it as high as possible and as far away from any car wiring as possible. Care should be taken not to have the antenna wire come in contact with the shield wires. Ground the pigtail of the antenna cable shield at the antenna end. The pigtail of this shield at the chassis end is grounded under one of the chassis mounting screws.

In some cases the shielded antenna lead from the receiver is not long enough to reach to the column at which the antenna lead-in comes down. In a case of this kind, cover the exposed portion of the lead-in wire with braided shield from the point where it leaves the column to the point of connection to the antenna lead of the receiver. Connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire.

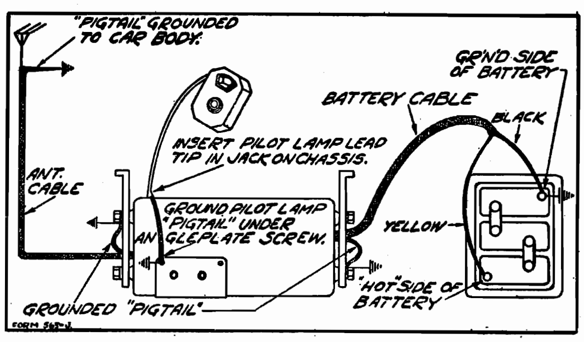

Fig. 6—External Wiring Connections

Battery Cable

The battery cable should be brought over to the storage battery in the most convenient manner possible. In Figs. 2 and 3 it is shown passing through a hole in the dash, thence down and under the floor board to the battery. In other installations, it may be more convenient to bring this cable down in back of one of the side pads and thence to the battery. The lug on the yellow lead of this cable is connected to the "Hot" or ungrounded side of the battery (the "Hot" or ungrounded side may be positive or negative, depending on the make of car). The lug on the black lead is connected to the grounded side of the battery. The pigtail of the shield of this cable at the chassis end should be grounded under one of the chassis mounting screws.

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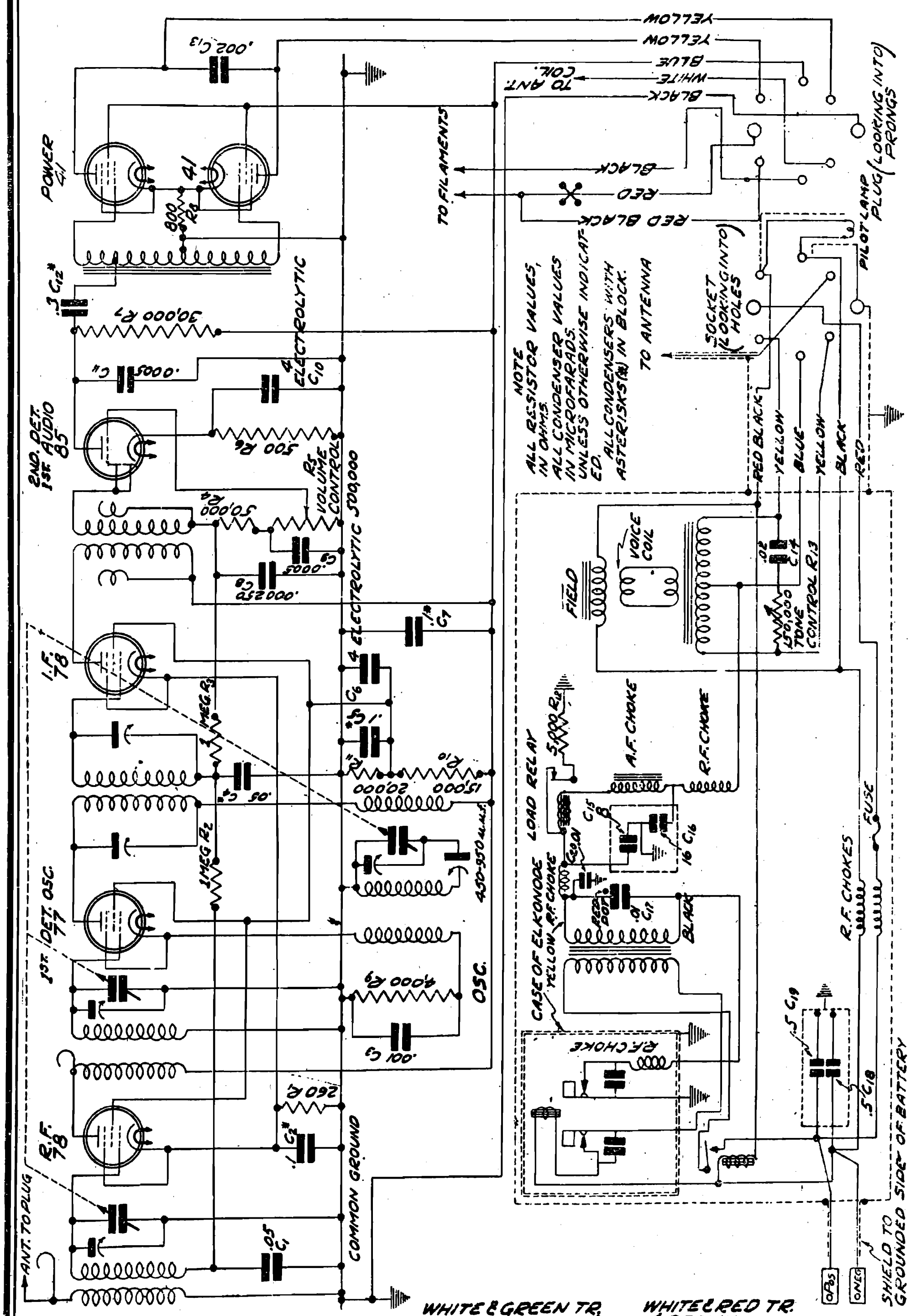
MODEL 06-W
Schematic, Voltage
Socket layout

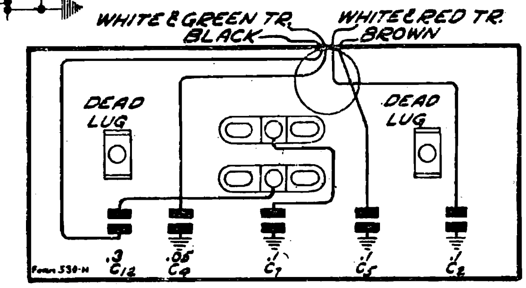


	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78 R.F.	6.1	182	80	3**	7.0
77 1st Det.& Osc.	6.1	178	77	5 x	1.3 x
78 I.F.	6.1	182	80	3**	7.0
85 2nd Det.& 1st A.F.	6.1	70*		1.8**	3.5
41 Output	6.1	162	168.5	17	11.0

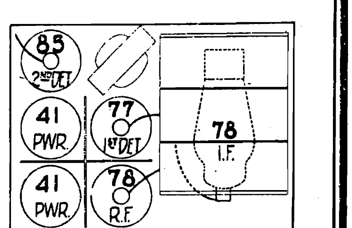
*-Triode Plate to Cathode. **-Cathode to Ground x-Subject to variation

NOTE:- All voltages are at 185 volts input from "B" Eliminator

IF PEAK 262 KC



Condenser Block—Internal Wiring



Location of Tubes

MODEL 06-W
Alignment

GULBRANSEN CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

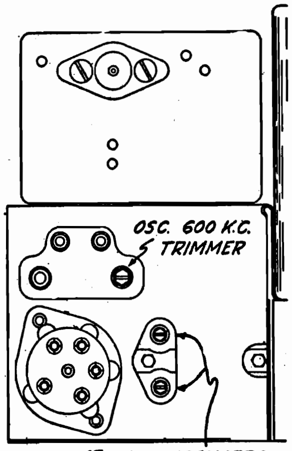


Fig. 12—Location of Trimmers

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. The location of the adjusting screws for these condensers is shown in Fig. 12.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first (section farthest from drive gear).

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The location of this condenser is shown in Fig. 12.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Circuit

The circuit consists of an antenna stage, a 78 R.F. stage, a 77 1st detector-oscillator stage, a 78 I.F. stage, an 85 duo-diode-triode tube which functions as a diode 2nd detector and triode 1st audio stage, and two 41 tubes in a semi-Class "B" output stage. The intermediate frequency is 262 K.C. The diode current establishes a drop across a resistor which is used as additional bias voltage for the R.F. and I.F. tubes giving automatic volume control action. Noise suppression between stations is obtained by the resistor in the cathode circuit of the 85 tube, the drop across which must be overcome before rectification on this tube begins. The manual volume control varies the audio voltage applied to the grid of the 85 tube.

The "B" eliminator and speaker are in one box. A vibrator interrupts the current through the primary of the transformer in the "B" eliminator. Another vibrator in the secondary circuit operating at the same frequency acts as a rectifier. The on-off relay in the "B" eliminator closes the primary circuit when the set switch is turned on. The load relay provides a load current for the secondary circuit if the "B" line is drawing less than normal current.

Trying Out the Set and Adjusting

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer condenser. The location of the tubes is shown in Fig. 8. Do not start the engine of the car yet.

To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 KC with the volume control about three-quarters on. On one end of the chassis box is a small metal plate. Remove the two screws which hold this plate in place. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

If the receiver fails to operate, check the items as given under the article by that name.

GULBRANSEN CO.

MODEL 06-W
Mounting data

Mounting the Control Unit

The control unit is mounted on the steering column under the steering wheel as shown in Figs. 1 and 2. A clamp is used to hold it in position.

The outer portion of the clamp is screwed to the inner portion by means of the four 8-32x3/8" fillister head screws supplied with the receiver.

Two rubber strips are provided, one 1/8" thick and the other 1/16" thick. These are wrapped around the steering column under the clamp. Either or both of these strips may be used, depending on the thickness of the column. Wrap the rubber strips around the column in such a way as to allow the set screws which hold the clamp in position to pass through. When the clamp is in place, take the two 8-32 headless cup point set screws and screw them down on the steering column through the holes in the clamp.

The control unit is generally about 4" below the wheel, but this will vary with individual cases. The length of the drive shaft and interference with driver's legs will also govern the location of the control unit.

There are two screws which hold the inside portion of the clamp to the bracket on the box. By loosening these two screws, the box can be swung around if such a position is handier from the standpoint of the person operating the set. Instructions for attaching the pilot lamp are contained in the article "Completing the Wiring Connections."

Mounting the Chassis

The chassis is mounted in back of the dash as shown in Figs. 1 and 2. It should be mounted in such a way that the flexible drive shafts to the control unit will be in as straight a line as possible. The chassis is mounted with the anchor bushing into which the flexible drive shafts go, facing the control unit. In the illustrations mentioned above, the chassis is on the right side of the dash which is a good location from the standpoint of flexible drive shaft arrangement. *Before mounting the chassis read the section on "Attaching the Flexible Drive Shafts."*

The chassis is secured to the dash by means of the dash mounting plate (see Fig. 3). First drill the three mounting holes required for the dash mounting plate. The location and size of these holes is shown in Fig. 3. A template for drilling these holes is supplied with the set. Three 4" square head mounting bolts are supplied. Take two of these,

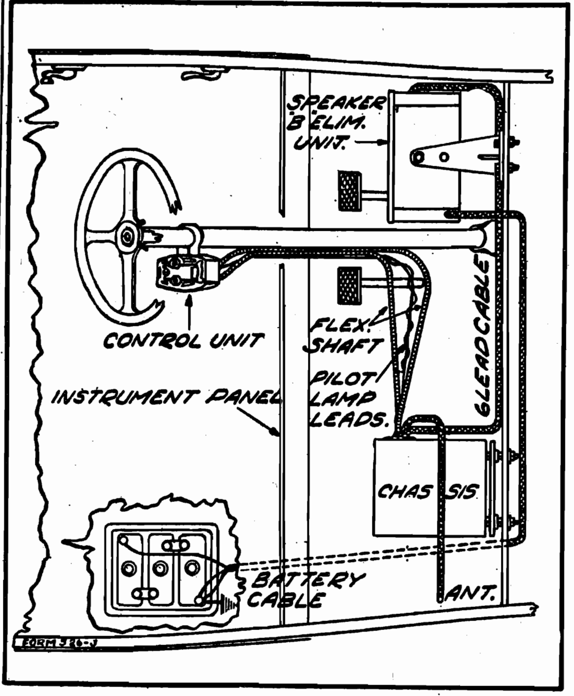


Fig. 1—General Installation—Top View

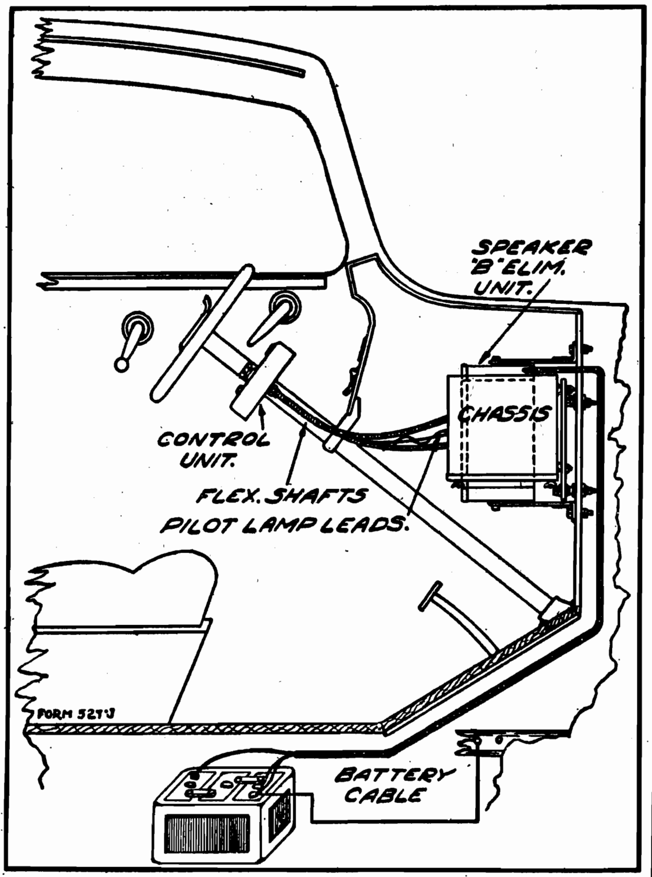


Fig. 2—General Installation—Side View

MODEL 06-W
Mounting data

GULBRANSEN CO.

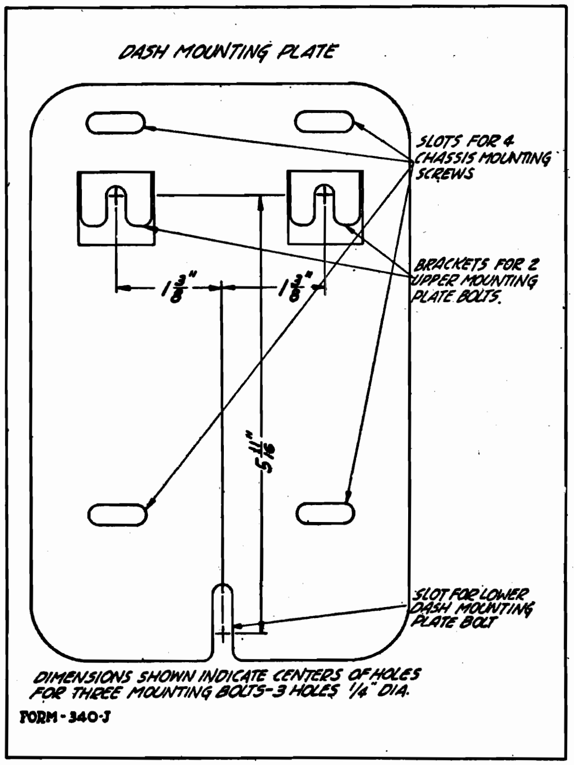


Fig. 3—Dash Mounting Plate

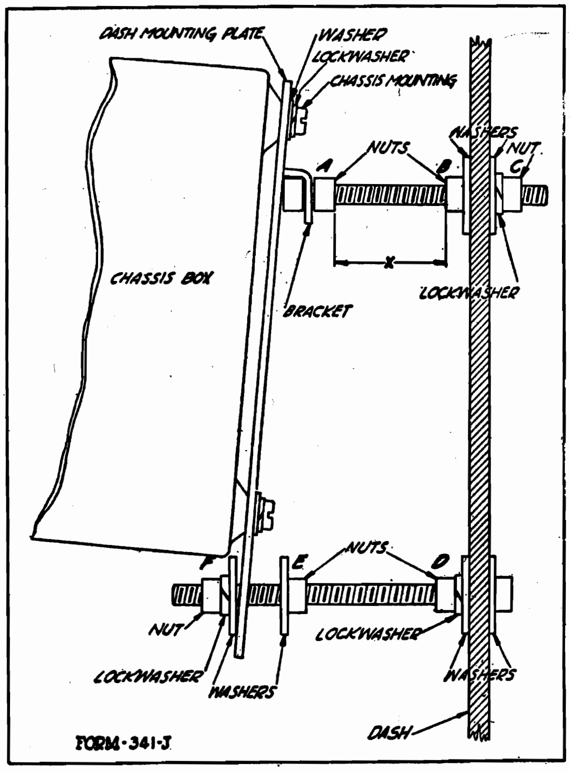


Fig. 4—Details of Chassis Mounting on Dash.

which will be used for the upper part of the mounting plate and screw on nut "A" (see Fig. 4). The nut should be just far enough away from the head of the bolt to permit the bracket of the mounting plate to slip down as shown in the illustration. Then put on nut "B" and the washer, after which the two bolts can be put through the dash, with the shanks extending into the engine compartment, as shown in Fig. 4. A washer, lockwasher, and nut are then put on these bolts from the front of the dash to hold them in place.

The distance "X" between nuts "A" and "B" determines how far out the chassis is mounted from the dash. When there is a lot of apparatus in back of the dash, such as wires, tubing, etc., the chassis will have to set out far enough to clear it. However, in most cars, there is no interfering apparatus and therefore the distance "X" will be zero.

Then put a washer on the third mounting bolt and put this bolt through the lower mounting hole with the head on the engine side of the dash, as shown in the illustration. Put on a washer, lockwasher, and nut "D" and tighten it up. Then put on nut "E" with a washer as shown. Nut "E" should be screwed down until it is about ¼" from nut "D," when distance "X," as explained above, is zero.

Next, secure the dash mounting plate to the chassis box by means of the four chassis mounting screws. Note that the broad or narrow face of the chassis box can be secured to the dash mounting plate. Use whichever side will be best from the standpoint of attachment of the flexible drive shafts.

All the tubes should be in the sockets, the antenna trimmer adjusted (as explained later) and the flexible drive shafts connected before the chassis is permanently installed. Complete information on the latter procedure is contained in the article on attaching the flexible drive shafts.

The four mounting screws pass through the four slots in the mounting plate (Fig. 3). After they are in place and tight, the dash mounting plate with chassis attached is slipped over the three mounting bolts. The two upper brackets on the plate slip down in back of nut "A" as shown in Fig. 4 and the slot at the bottom of the plate slips over the shank of the lower mounting bolt in back of nut "E.". The plate will then hang with the bottom farther away from the dash than the top. A washer, lockwasher, and nut "F" are then put on the lower mounting bolt. Nut "F" is screwed on until the mounting plate is tight up against the washer in back of nut "E." In this position, the bracket at the top of the mounting plate should butt up against nut "A" and be tight. Also the mounting plate will be approximately parallel with the dash.

Mounting the Speaker-"B" Eliminator

The speaker-"B" eliminator is mounted on the back of the dash by means of two brackets, as shown in Fig. 5. Usually the space available will govern the location of the speaker and position of it on the mounting brackets. However, the matter of acoustics should be given careful consideration. One of the most desirable positions from the standpoint of acoustics is that shown by the solid lines in Fig. 5 (A). In this position the sound waves travel in the most direct lines toward the listener. After the speaker is mounted and regardless of the position of the brackets, loosen the bracket bolts and turn it to several positions in order to get the best one from the standpoint of tone quality.

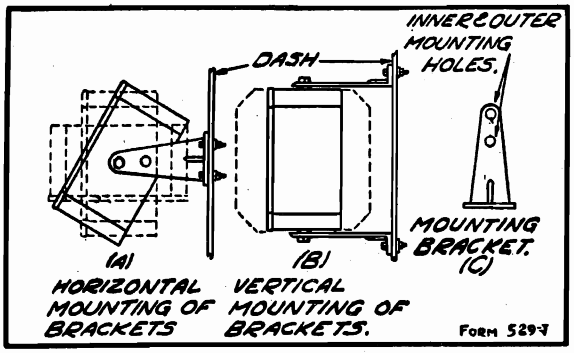


Fig. 5—Method of Mounting Speaker

Other considerations governing the location of the speaker are the cables and the tone control. The speaker should be so mounted that the two shielded cables, one to the storage battery and one to the chassis, will be long enough and can be most conveniently brought over. The tone control knob on the speaker box should be preferably on the bottom, so that it can be reached easily.

After the position of the speaker is decided on, drill the four $\frac{5}{16}''$ holes required for the bracket mounting bolts. A template for these holes is supplied with the receiver. The holes are arranged in a rectangle. The centers of the holes, the small dimension are $2\frac{3}{8}''$ apart and the long dimension 10" apart. In Fig. 5 is shown how the brackets can be mounted horizontally (A) or vertically (B), and the different positions in which the speaker itself can be placed. There are two holes in each bracket as shown in Fig. 5 (C) which determine the distance of the speaker box from the dash. The grilled portion of the box at the front should face the listener.

Antenna

A roof antenna is recommended, as by far the best results will be obtained. A large percentage of cars at the present time come equipped by the factory with built-in roof antennas. In those cars which do not have an antenna, one will have to be put in.

First determine if the top has a grounded chicken wire mesh. To do this, use a continuity meter. By means of a wire, attach a darning needle to one of the prods. Poke the darning needle into the roof material and turn it around until it comes in contact with the chicken wire. Then ground the other prod and if the continuity meter shows a complete circuit, the chicken wire mesh is grounded. In a case of this kind, it will be necessary to get inside of the roof and it is advisable to employ the services of an auto "top man" or an upholsterer.

It will be necessary to remove the top material and cut away the chicken wire from the side supports until it is at least 3" away from the ground at any point. It should also be at least 3" away from the dome light and the dome light wiring. The chicken wire may then be laced to the points from which it was cut with a heavy, waxed cord. The chicken wire will then make a satisfactory antenna, or a copper screen may be used.

If the chicken wire is not grounded, it may be used as the antenna by taking down the roof material at one corner and soldering the lead-in wire to it. If it is not desired to take down the roof material a piece of copper screening can be tacked to the roof on the inside of the car. At least six square feet should be used. Keep it at least 3" away from any grounded metal parts on all sides. After the screen is in place, it can be covered over with cloth which matches the roof material. Solder the lead-in wire to the screen and bring it down the front corner post nearest to the set.

Another, and a very simple way in which an antenna can be secured to the inside of the car roof is to use a car-roof antenna which is made up especially for this purpose. This antenna consists of copper strips laid back and forth between two pieces of cardboard and the center being covered over with material which matches the roof material. It can be had in several colors and is tacked in place on the inside of the car roof in a few minutes.

MODEL 06-W
Flexible drive

GULBRANSEN CO.

Attaching the Flexible Drive Shafts

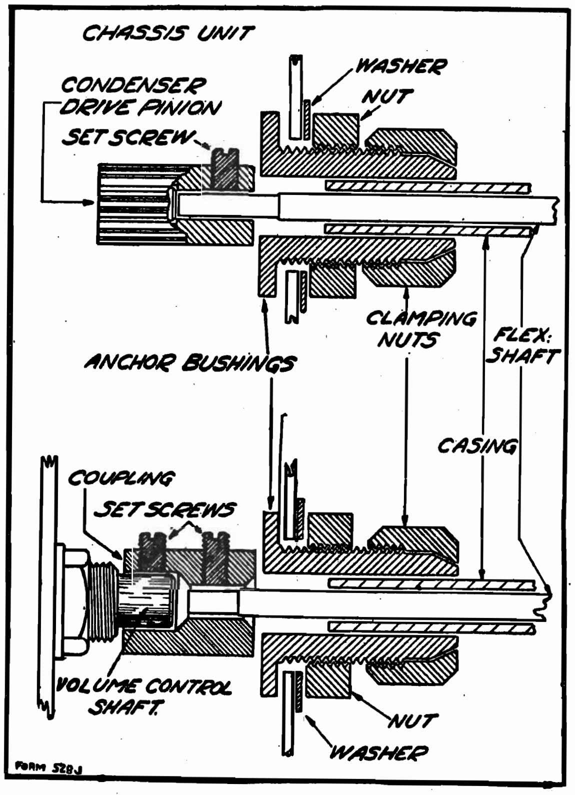


Fig. 6—Details of Flexible Drive Shaft Connections

After the control unit and chassis are in position, the flexible drive shafts may be attached. Two 34″ shafts are supplied, unless otherwise specified. These shafts may also be had in 14″, 20″, and 45″ lengths.

The flexible drive shafts should be put on with a minimum amount of bending. In general, one large radius 90° bend is all that is necessary.

The 34″ shafts supplied with the receiver may be cut to a shorter length if necessary. The shaft (inside portion) should first be brazed at the point to be cut. It should then be cut with a three-corner file or edge of a grinding wheel.* *Do not use a hack saw.* The casing which is 1½″ shorter must be cut to correspond. This should be tinned or brazed first at the point to be cut and may then be cut with a hack saw.

After the length and position of the shafts is decided on, remove the chassis and mounting plate from the mounting bolts. As the shafts are already secured at the control unit, it is necessary only to secure them at the chassis end. Before attaching the shafts, see if the set is in working order. Put the 8-prong socket in place on the chassis and operate the set with the cover off.

In Fig. 6 is shown a cross-sectional view of the flexible drive shaft connections at the chassis end. First put the tube cover plate on the chassis box temporarily with two screws. This is the large plate held in position ordinarily by means of five screws. Then center the volume control anchor bushing on this plate. To do this, loosen the nut which holds this bushing in place (see Fig. 6). Center the bushing by eye so that the center of it is in a line with the center of the volume control coupling. Then tighten the nut down.

Next, take the tube cover plate off. Extend the volume control flexible shaft and casing several inches through the hole in the anchor bushing of the tube cover plate so that the plate will be on the casing and out of the way. Turn the volume control coupling counter-clockwise until the switch is snapped to the off position. Lock the receiver on the control unit and turn the volume control knob counter-clockwise until it is in the locked position. Then loosen both set screws in the volume control coupling and insert the flexible shaft in the coupling (see Fig. 6). Tighten the outer set screw first on one of the four flat faces of the flexible shaft and then tighten the inner set screw. Then again temporarily hang the chassis on the mounting bolts. Next, check the operation of the switch, volume control and lock. The switch should be off when the volume control knob is in the locked position. It may be necessary to loosen the inner set screw and do a slight amount of adjusting until the proper setting is obtained.

Next, slide the tube cover plate into position and fasten it in place by means of the five screws. Then tighten down the clamping nut on the volume control shaft casing but *do not tighten this nut excessively.*

To attach the tuning condenser flexible shaft, first center the anchor bushing by eye as was explained above. Then extend the tuning condenser flexible shaft into the hole at the center of the tuning condenser drive pinion. With the rotor plates completely in mesh, turn the dial gear in the control unit until it is at the low frequency end stop. The set screw may then be tightened and the clamping nut secured on the casing as was explained above. In some instances, it may be necessary to loosen the set screw of the large gear on the tuning condenser rotor shaft and adjust the setting of this gear in order to get an accurate calibration.

***If the flexible shaft is cut as mentioned above, file it down in one place a slight amount to provide a flat surface for the set-screw.**

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MODEL 06-W
Wiring notes
Maintenance

Completing the Wiring Connections

Pilot Lamp

The pilot lamp cable is 4 feet long and is attached to the 8-prong socket. At the end of the cable is the pilot lamp socket and spring clip. After the control unit and chassis are mounted, remove the cover of the control unit by taking off the two knobs, the key entry nut and the cover screw. Bring the pilot lamp cable through the notch at the side of the back of the unit. Then, clip the pilot lamp socket clip over the right hand bracket as shown in Fig. 7, with the two leads going over the top of the lamp as illustrated. It is not necessary to remove the dial gear. There is a "pigtail" on the end of the shield of the pilot lamp cable. Pull this "pigtail" through the hole beneath the slot, as shown in the illustration. Then insert the round head 3/8" 8-32 screw through this hole with the head on the outside of the box and secure it in place with the lockwasher and nut provided. This holds the "pigtail" in position and grounds it. Cut off the excess length of "pigtail." Double up the pilot lamp leads if too long—do not cut them.

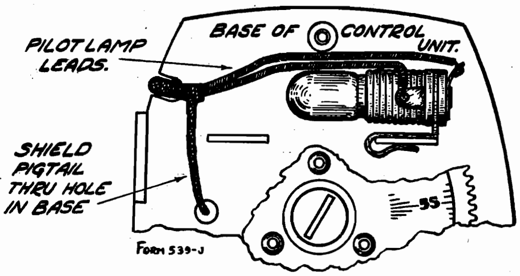


Fig. 7—Pilot Lamp Attachment

Antenna Cable

Bring the antenna cable of the receiver in the most direct manner possible to the lead-in from the antenna and connect it to the latter. Keep it as high as possible and as far away from any car wiring as possible. Care should be taken not to have the antenna wire come in contact with the shield wires. Ground the shield of the antenna cable at the antenna end.

Battery Cable and Six Lead Cable

The battery cable should be brought over to the storage battery in the most convenient manner possible. In Figs. 1 and 2 it is shown passing through a hole in the dash, thence down and under the floor board to the battery. In other installations, it may be more convenient to bring this cable down in back of one of the side pads and thence to the battery. The lug on the lead marked "positive" is connected to the positive side of the battery and the lug on the negatively marked lead is connected to the negative side of the battery. Ground the pigtail of the shield by screwing the No. 6 Parker Kalon screw through the end of the pigtail and through the hole in the lug which is grounded.

The six-lead cable between the chassis and the speaker—"B" eliminator is usually brought over along the dash in the most convenient manner possible.

Care and Maintenance

Advancing Generator Charging Rate

The installation of the automobile radio imposes an additional drain on the car storage battery. This can be compensated for by advancing the charging rate of the car generator. Check the state of charge of the storage battery about a week after the installation of the automobile radio is made and adjust the charging rate accordingly.

Tubes

The type of tubes used and location of these tubes in the chassis are shown in Fig. 8. These tubes are of a sturdy, rugged construction designed especially for an auto receiver. Most of them, under normal usage, will last for many months and in some cases, years. Some of them, however, may become faulty after a few months of operation.

For that reason, it is advisable to secure a new set of tested tubes at intervals of three to six months and have these inserted in the receiver one at a time, noting any difference in performance.

Pilot Lamp

The pilot lamp is located in the control unit. A 6-8 volt miniature base lamp is used. To replace the lamp, first turn the receiver off. Remove the two control knobs and the key entry nut. Then take out the screw holding the control box cover in place after which the cover can be taken off. The pilot lamp socket is secured to a spring clip which is on a bracket in the control unit. Push this clip and socket over far enough to get at the lamp, after which the bulb can be replaced and the control unit reassembled.

Fuse

A 10 amp. automobile fuse is used for the "A" line. This fuse is mounted in the speaker—"B" eliminator box and is on one of the walls near the back. To change the fuse, it will be necessary to loosen the bracket bolts so that the box can be swung around to get at the back.

Electrical Condition of Car

Dirty spark plugs, incorrect spacing of distributor points, faulty distributor condenser, and various other items in the car electrical system can cause noisy operation. If the customer complains of noise in the receiver after it has been in use for some time, check the items mentioned as well as other parts of the car electrical system for poor connections, grounds, and other faults which may be responsible for the noise.

MODEL 06-W
Service notes

GULBRANSEN CO.

If the Receiver Fails to Operate

"A" Fuse—Check the "A" line fuse in the speaker box.

"A" Line Open—See if power is being supplied to the speaker, tube heaters, and "B" eliminator.

"B" Eliminator Not Working—See if the "B" eliminator is in proper working order by checking the high voltage points at the speaker-terminal strip and at the tube plate terminals (see Fig. 10).

Antenna and Lead—See if antenna is properly connected to lead-in wire and antenna lead from set. Be sure antenna system is not grounded at any point.

All Tubes Not Inserted—See if all tubes are inserted as per Fig. 8.

Grid Caps Not Connected—See if all grid caps are properly connected to top of top grid connection tubes.

Variable Condenser Plates Shorted—Check condenser sections in chassis carefully for foreign particles or rotor stator rubbing.

Reversed Storage Battery Connections—Check storage battery connections for correctness.

Weak Reception

Defective Tubes—Try out a new set of tested tubes and note any difference in performance.

Poor Antenna—To try out the effectiveness of the antenna used, check the volume against the volume when using a straight length of wire about 15′ long, run out of the car through one of the windows. If, upon test, the external wire is found to be much superior as far as volume is concerned, the antenna is not satisfactory and will have to be re-vamped or a new one installed. The antenna or lead-in may be too near grounded metal portions of the car frame or body resulting in a high capacity to ground. There may be grounded metal mesh in the car roof. There may be a poor soldered connection between the antenna, lead-in, or antenna lead from the set. The antenna system may be partially grounded at some point.

Antenna Trimmer Not Adjusted—See article "Trying Out the Set and Adjusting."

Car in Shielded Location—If the car is within or near a steel structure, the signals may be weakened by absorption.

Storage Battery Run Down—Check the condition of the battery.

Defective "B" Eliminator—Check "B" voltage at sockets and speaker terminal strip (see voltage chart and Fig. 10).

Misalignment of Variable Tuning Condensers—Instructions for realigning are contained in this manual. Do not, however, attempt realignment unless other causes of low volume have first been investigated.

Wrong Voltages—Check voltages at the sockets (see voltage chart).

Other Causes of Low Volume—Defective speaker, poor battery, antenna, grid cap or other connections, defective A.V.C. system in the receiver, and various opens, grounds and shorts in the receiver assembly.

Distorted Reproduction

Receiver Oscillating—See article on oscillation.

Defective Tubes—Try out a new set of tubes.

Incorrect Voltages—Check the voltages at the socket (see voltage chart).

Incorrect Tuning—The signal must be carefully tuned in to the clearest and loudest point. It must not be tuned "off resonance."

Defective Speaker—Try out a new one if it is available.

Defective Audio System in the Receiver—Make continuity resistance tests using as a guide Fig. 10.

Signal Transmission—Quality fading in the signal transmission can cause poor tone quality.

Oscillation

Cover of Box—May not be on or if on, may not be sufficiently tightened down.

Off Characteristic Tubes—Tubes whose characteristics vary considerably from the standard may cause oscillation. Try out some new ones.

Open Bypass Condensers—Check the bypass condensers and leads to them for open circuit.

Poor Ground Connections—Check the ground connections in the chassis and speaker—"B" eliminator box for poor contact.

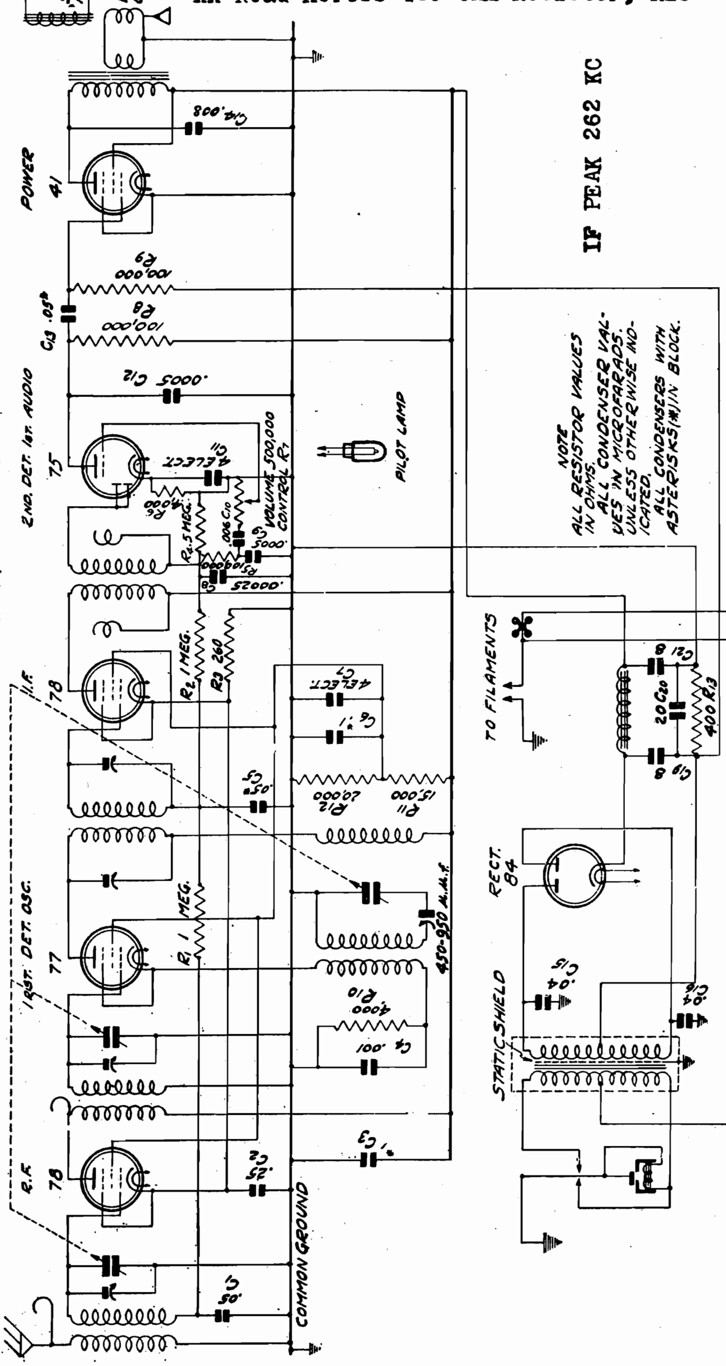
Grid Caps and Leads—The grid caps may not be making good contact to the tops of the tubes or the wires of the grid caps may be too close together.

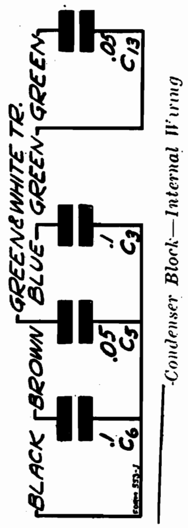
GULBRANSEN CO.

MODEL Z6Z1
Schematic, Voltage
Socket layout

	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78 R.F.	6.1	182	80	3*	7.0
77 1st Det. & Osc.	6.1	178	77	5**	1.3**
78 I.F.	6.1	182	80	3.*	7.0
75 2nd Det. 1st Audio	6.1	70x		1.4*	.35
41 Output	6.1	172.5	176.5	12.5	16.0
84 Rect.	6.1	205			17.5per plate

*-Cathode to Ground. **-Subject to Variation. x-Triode Plate to Cathode
xx-Read Across 400-Ohm Resistor, R13





—Condenser Block—Internal Wiring

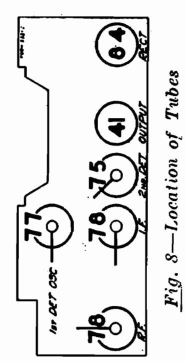


Fig. 8—Location of Tubes

Trying Out the Set and Adjusting

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer. The location of the tubes is shown in Fig. 8. To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 K.C. with the volume control about three-fourths on. On one end of the chassis box are two small metal plates. Remove the smaller of these two plates. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

MODEL Z6Z1
Alignment, Wiring

GULBRANSEN CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a 05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output. adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting. at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Completing the Wiring Connections

Antenna Cable

Bring the antenna cable of the receiver in the most direct manner possible to the lead-in from the antenna and connect it to the latter. Keep it as high as possible and as far away from any car wiring as possible. Care should be taken not to have the antenna wire come in contact with the shield wires. Ground the pigtail of the antenna cable shield at the antenna end. The pigtail of this shield at the chassis end is grounded under one of the chassis mounting screws.

In some cases the shielded antenna lead from the receiver is not long enough to reach to the column at which the antenna lead-in comes down. In a case of this kind, cover the exposed portion of the lead-in wire with loom and braided shield from the point where it leaves the column to the point of connection to the antenna lead of the receiver. Connect the two wires together and connect the two shields together. care being taken that no strand of the shield touches the antenna wire.

Battery Cable

The battery cable should be brought over to the storage battery in the most convenient manner possible. In Figs. 4 and 5 it is shown passing through a hole in the dash, thence down and under the floor board to the battery. In other installations, it may be more convenient to bring this cable down in back of one of the side pads and thence to the battery. The lug on the yellow lead of this cable is connected to the "Hot" or ungrounded side of the battery (the "Hot" or ungrounded side may be positive or negative, depending on the make of car). The lug on the black lead is connected to the grounded side of the battery. The pigtail of the shield of this cable at the chassis end should be grounded under one of the chassis mounting screws.

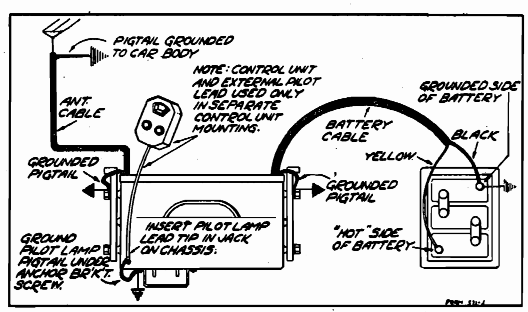


Fig. 7—External Wiring Connections

Pilot Lamp (For Separate Control Unit Only)

When a separate control unit is used connect the pilot lamp as follows:

The pilot lamp lead is in a shielded cable which extends out from the control unit box. On the rear wall of the chassis, near one of the ends, will be seen a tip jack. Insert the tip on the end of the pilot lamp lead into this jack. There is also a pigtail or shield extension at the end of this lead. Ground this pigtail with one of the anchor bracket screws (see Fig. 7). Double up the pilot lamp lead if it is too long—*Do not cut this lead.*

GULBRANSEN CO.

MODEL Z621
Antenna
Mounting notes

Antenna

A roof antenna is recommended, as by far the best results will be obtained. A large percentage of cars at the present time come equipped by the factory with built-in roof antennas. In those cars which do not have an antenna, one will have to be put in.

First determine if the top has a grounded chicken wire mesh. To do this, use a continuity meter. By means of a wire, attach a darning needle to one of the prods. Poke the darning needle into the roof material and turn it around until it comes in contact with the chicken wire. Then ground the other prod and if the continuity meter shows a complete circuit, the chicken wire mesh is grounded. In a case of this kind, it will be necessary to get inside of the roof and it is advisable to employ the services of an auto "top man" or an upholsterer.

It will be necessary to remove the top material and cut away the chicken wire from the side supports until it is at least 3″ away from ground at any point. It should also be at least 3″ away from the dome light and the dome light wiring. The chicken wire may then be laced to the points from which it was cut with a heavy, waxed cord. The chicken wire will then make a satisfactory antenna, or a copper screen may be used.

If the chicken wire is not grounded, it may be used as the antenna by taking down the roof material at one corner and soldering the lead-in wire to it. If it is not desired to take down the roof material a piece of copper screening can be tacked to the roof on the inside of the car. At least six square feet should be used. Keep it at least 3″ away from any grounded metal parts on all sides. After the screen is in place, it can be covered over with cloth which matches the roof material. Solder the lead-in wire to the screen and bring it down the front corner post nearest to the set.

Another, and a very simple way in which an antenna can be secured to the inside of the car roof is to use one of the car-roof antennas which are now being made up especially for this purpose. There is one type of antenna which consists of copper strips laid back and forth between two pieces of cardboard. The cardboard is then covered over with material which matches the roof material. This antenna can be had in several colors and is tacked in place on the inside of the car roof in a few minutes.

Integral Mounting of Chassis

By integral or all-in-one mounting of the chassis is meant operating the receiver by means of the controls on the chassis box (and not with a separate control unit). This method is the simplest, as no changes are required on the receiver. It can be installed in several ways, as explained below and as illustrated in Fig. 1. Still other methods of mounting and locations for the chassis will suggest themselves, depending on the space available and variations in the construction of different cars.

Floor or Shelf Mounting

In Fig. 1(A) is shown how the chassis can be placed on the floor in front of the front seat. There are four rubber mounting feet on the bottom of the box, on which it stands. It may also be placed in back of the front seat (B) so as to be in the rear compartment of the car. In some cars, there is room enough between the two front seats for the chassis box to be placed. In coupes, the chassis may be placed on the shelf in back of the seat. Still other locations, as mentioned above, can be used, depending on the space available in different cars.

After the position is decided on, the chassis is permanently mounted in place by means of the two case mounting feet supplied for this method of mounting. These mounting feet are shown in Fig. 1. One side of the foot, which is a small angle bracket, is secured to the end of the chassis box by means of one of the chassis mounting screws. The other side of the foot is screwed to the floor board or surface on which the chassis is resting, with a wood screw. The two feet are placed diagonally, that is on one end of the chassis box it is at the front, while on the other end it is at the rear.

Flush Mounting of Chassis

In Fig. 1(C) is also shown how the chassis can be mounted on the dash by means of brackets, in such a way that the front portion of the box with the controls, is flush, or nearly so, with the instrument panel. This is a very desirable method of installation, as the receiver is rigidly in place, out of the way, and the controls are very accessible.

When mounted this way, two side case brackets (long type) are used, one on each end of the box, as shown in Fig. 1. Two mounting screws are generally used to secure each bracket to the end of the chassis box. Three may be used in cases where the distance between the instrument panel and dash is small. Six embossings with inset nuts are provided on each end of the chassis box. Any two of these or

MODEL Z621
Mounting notes

GULBRANSEN CO.

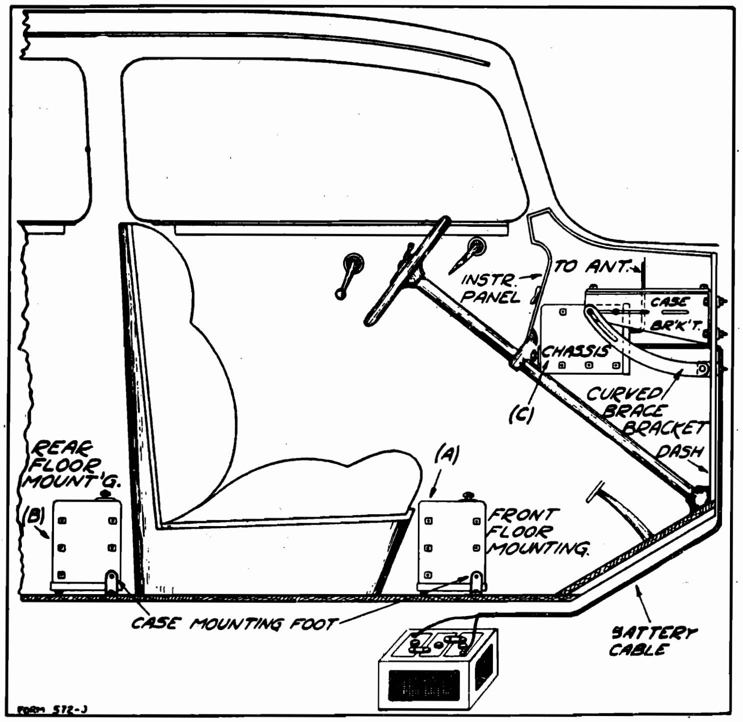


Fig. 1—Integral Mounting—Side View

three, as mentioned above, may be used for the bracket screws, which, together with the slots in the brackets, provides great flexibility in mounting. In addition to the side case brackets, two curved brace brackets and one cross strap brace as shown in Figs. 1 and 2 are used.

The chassis should be mounted as close to the center of the instrument panel as possible. This makes the controls accessible to people in either front seat. As stated above, it should be mounted so that the front side of the box with the controls, is flush or nearly so with the instrument panel of the automobile. If car apparatus or space available prevent the mounting of the chassis at the center, it may have to be moved to either side. In some instances, it can be mounted at the center of the instrument panel, but may have to be moved down and nearer to the dash than as shown in Fig. 1. Consideration should be given to the possibility of interference with the legs of the driver or passenger in the front seat and also to the possibility of interference with the controls of the car, such as pedals, gear shift lever, and hand brake lever, before the location is definitely decided on. The possibility of a car heater installation may also be considered After the location is decided on, drill the four mounting holes required The location and size of these holes is shown in Fig. 3. A template for drilling these holes is supplied with the receiver. Six 1/4" mounting bolts, six washers, six lockwashers and six nuts are provided. The mounting bolt is put through the bracket and dash with the shank extending into the engine compartment. A washer, the lockwasher and nut, are then put on. Mount the brackets permanently, but do not mount the chassis permanently until the wiring connections are completed, the tubes are all inserted, the receiver tried out, and the antenna trimmer adjusted (explained later).

When the case brackets are in place, the curved brace brackets can be installed. These can be put on in a number of different ways. The front or back case bracket screw can be used and the brace bracket itself can be mounted upward or downward. As a general rule it is mounted on the bracket screw farthest away from the dash and downward as shown in Fig. 1. The small angle brackets supplied with the receiver are secured at the base of the curved brace brackets as shown in Figs. 1 and 2, by means of the No. 10-32 3/8" Round Head Screw, nut and washer supplied. After the position of the brace brackets is decided on, put them in place and start the holes for them with a center punch. These brackets are bolted to the dash in the same manner as explained above for the case brackets.

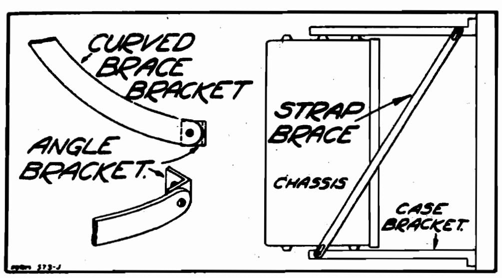


Fig. 2—Angle Brackets and Strap Brace

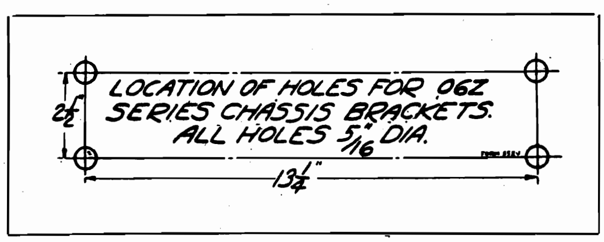


Fig. 3—Mounting Hole Location

Next, put the strap brace in place. This is mounted diagonally across the two brace brackets as shown in Fig. 2. There is a tapped hole at either end of the top flange of the case brackets which are used for this purpose. Two 10-32 1/4" long bolts are provided for the strap brace.

Separate Control Unit Mounting of Chassis

In this method of mounting, the chassis is mounted on the dash and is operated from a separate remote control unit which is on the steering column. Two flexible shafts mechanically connect

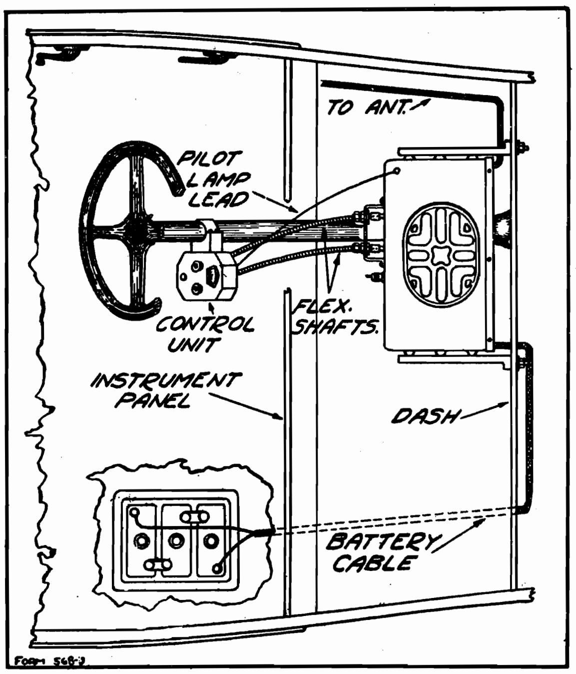


Fig. 4—Chassis with Control Unit—Top View

the control unit and the chassis. This method of mounting is very desirable as the controls are most accessible to the driver. The items required for this method of mounting are shown in the installation list at the back of the manual. The procedure for this method of installation is as follows:

Mounting the Control Unit

The control unit is mounted on the steering column under the steering wheel as shown in Figs. 4 and 5. A clamp is used to hold it in position.

The outer portion of the clamp is screwed to the inner portion by means of the four 8-32x⅜″ fillister head screws supplied with the receiver.

Two rubber strips are provided, one ⅛″ thick and the other $\frac{1}{16}$″ thick. These are wrapped around the steering column under the clamp. Either or both of these strips may be used, depending on the thickness of the column. Wrap the rubber strips around the column in such a way as to allow the set screws which hold the clamp in position to pass through. When the clamp is in place, take the two 8-32 headless cup point set screws and screw them down on the steering column through the tapped holes in the clamp.

The control unit is generally about 4″ below the wheel, but this will vary with individual cases. The length of the drive shaft and interference with driver's legs will also govern the location of the control unit.

There are two screws which hold the inside portion of the clamp to the control unit swivel. By

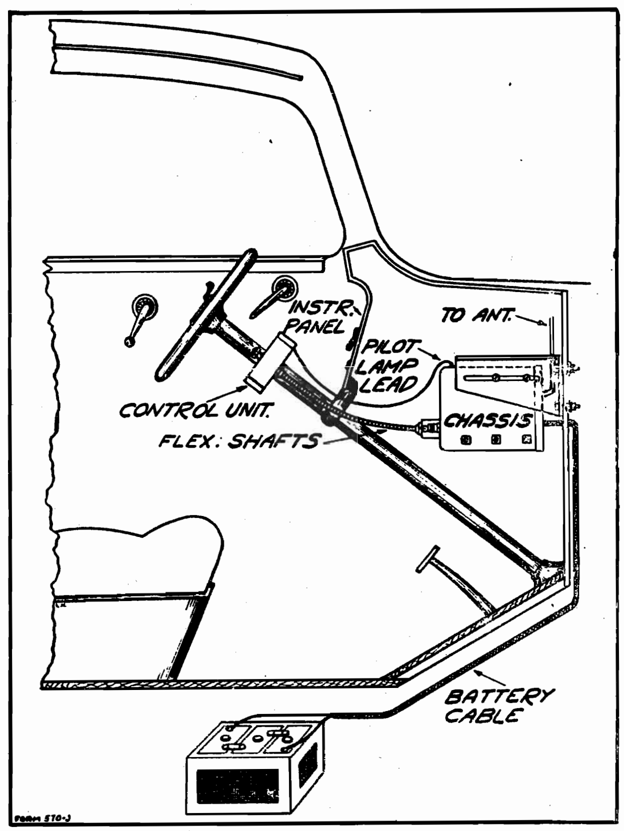


Fig. 5—Chassis with Control Unit—Side View

loosening these two screws, the box can be swung around if such a position is handier from the standpoint of the person operating the set. Instructions for attaching the pilot lamp lead are contained in the article "Completing the Wiring Connections."

Mounting the Chassis

The chassis is mounted on the dash by means of two short brackets, as shown in Figs. 4 and 5. Two or three mounting screws are used to secure each bracket to the end of the chassis box. Three are used if the chassis is close to the dash and two if it is set out some distance. In general, keep the chassis as close to the dash as possible. The procedure for attaching the brackets to the chassis box and to the dash is the same as explained above for mounting the side case brackets under the article, "Flush Mounting of Chassis." No curved brace brackets or strap braces are used in this method of mounting.

The chassis should be mounted with the speaker grill facing down and the side with lock and controls facing the listener, as shown in Fig. 4. Before mounting the chassis, the flexible drive shaft con-

MODEL Z6Z1
Flexible drive

GULBRANSEN CO.

nections as explained in the next article must be made.

The location of the chassis will very often depend on the space available. To the left of the center, as shown in Fig. 4, is a good location. The chassis should be mounted in such a way that the flexible drive shafts to the control unit will be in as straight a line as possible or with large radius bends. *In general, it will be advisable to consider the possibility of a car heater installation at the right side of the dash (facing forward).* In practically every case no difficulty will be experienced in mounting the heater and chassis on the dash. The chassis should be mounted in such a way that the lock *which remains on the chassis box will be accessible.*

The possibility of interference with people in the front seats and with car controls, as mentioned previously, should also be considered.

When the location is decided on, drill the four mounting holes required as shown in Fig. 3 and proceed as explained above. Mount the brackets permanently, but do not mount the chassis permanently until the wiring connections are completed, all tubes are in the sockets, the flexible drive shafts connected, and the antenna trimmer adjusted (explained later).

Attaching the Flexible Drive Shafts

After the control unit is mounted and the chassis is temporarily mounted, the flexible drive shafts may be attached. Two 34″ shafts are supplied unless otherwise specified. These shafts may also be had in 14″, 20″ and 45″ lengths.

The flexible drive shafts should always be installed with a minimum amount of bending. Always keep the radius of the bend as large as possible. The larger the radius of the bend, the easier the shaft will turn.

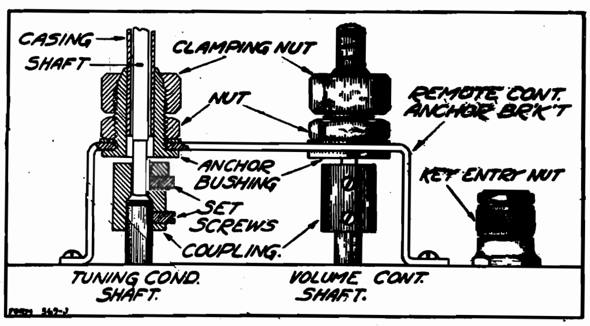


Fig. 6—Details of Flexible Drive Shaft Connections

The 34″ shafts supplied with the receiver may be cut to a shorter length if necessary. The shaft (inside portion) should first be brazed at the point to be cut. It should then be cut with a three-corner file or edge of a grinding wheel. *Do not use a hack saw.* After the shaft is cut, file it down in one place a slight amount to provide a flat surface for the set screw. The casing which is 1½″ shorter must be cut to correspond. This should be tinned or brazed first at the point to be cut and may then be cut with a hack saw.

It is advisable to attach the flexible shafts with the chassis on the mounting brackets, but if the chassis is inaccessible, it may be removed from the brackets. Keep it as close to its regular position as possible so that the flexible shaft will not turn after the chassis is replaced on the brackets. In general, it may be moved up or down, but should not be moved sideways or be turned.

To attach the flexible shafts to the chassis, first turn the on-off switch knob to the off position and the station selector knob to the low frequency end stop. Then remove the two knobs. These two knobs are then put on the control unit. Loosen the set screws on the two couplings and slip them over the two shafts as shown in Fig. 6. Then secure the remote control anchor bracket in place on the chassis box by means of the four 6-32-¼″ screws. The dial gear and pilot lamp remain in the chassis box.

Next, center the two anchor bushings on the anchor bracket. To do this, first loosen the nut which holds the bushing in place. Center the bushing so that the center of it is in line with the center of the shaft below. Then tighten the nut. Turn the on-off switch and volume control knob on the control unit to the extreme counter-clockwise position. Then extend the volume control flexible shaft into the coupling and tighten the two set screws in this coupling. The outside set screw should be tightened down *on one of the four flat faces* of the shaft. Then tighten down the clamping nut on the volume control shaft casing, *but do not tighten this nut excessively.*

To attach the tuning condenser flexible shaft, proceed in the same manner as above, except that the dial gear in the control unit should first be turned to the low frequency end stop. After the two shafts are connected, mount the chassis in place temporarily if it has been taken off and check the operation of both tuning condenser and volume control. The switch should be off when the volume control knob is in the locked position. It may be necessary to loosen the inner set screw and do a slight amount of adjusting until the proper setting is obtained. In case the dial gear in the control unit is not correctly calibrated or does not coincide with the dial gear calibration in the chassis box, further adjustment of this control can be brought about in the same manner, that is, by first loosening the inner set screw of the coupling. The clamping nut of the tuning condenser shaft anchor bushing is tightened down as explained above.

GULBRANSEN CO

MODEL Z6Z1
Service notes

If the Receiver Fails to Operate

"A" Fuse— Check the "A" line fuse in the chassis box.

"A" Line Open—See if power is being supplied to the speaker, tube heaters, and "B" eliminator.

"B" Eliminator Not Working—See if the "B" eliminator is in proper working order by checking the high voltage points at the tube plate terminals (see Fig. 10).

Antenna and Lead—See if antenna is properly connected to lead-in wire and antenna lead from set. Be sure antenna system is not grounded at any point.

All Tubes Not Inserted—See if all tubes are inserted as per Fig. 8.

Defective Tubes—Try out a new set of tested tubes.

Grid Caps Not Connected—See if all grid caps are properly connected to top of top grid connection tubes.

Variable Condenser Plates Shorted—Check condenser sections in chassis carefully for foreign particles or rotor stator rubbing.

Weak Reception

Defective Tubes—Try out a new set of tested tubes and note any difference in performance.

Poor Antenna—To try out the effectiveness of the antenna used, check the volume against the volume when using a straight length of wire about 15′ long, run out of the car through one of the windows. If, upon test, the external wire is found to be much superior as far as volume is concerned, the antenna is not satisfactory and will have to be re-vamped or a new one installed. The antenna or lead-in may be too near grounded metal portions of the car frame or body resulting in a high capacity to ground. There may be grounded metal mesh in the car roof. There may be a poor soldered connection between the antenna, lead-in, or antenna lead from the set. The antenna system may be partially grounded at some point.

Antenna Trimmer Not Adjusted—See article "Trying Out the Set and Adjusting."

Car in Shielded Location—If the car is within or near a steel structure, the signals may be weakened by absorption.

Storage Battery Run Down—Check the condition of the battery.

Defective "B" Eliminator—Check "B" voltage at sockets (see voltage chart and Fig. 10).

Misalignment of Variable Tuning Condensers—Instructions for realigning are contained in this manual. Do not, however, attempt realignment unless other causes of low volume have first been investigated.

Wrong Voltages—Check voltages at the sockets (see voltage chart).

Other Causes of Low Volume—Defective speaker, poor battery, antenna, grid cap or other connections, defective A.V.C. system in the receiver, and various opens, grounds and shorts in the receiver assembly.

Distorted Reproduction

Receiver Oscillating—See article on oscillation.

Defective Tubes—Try out a new set of tubes.

Incorrect Voltages—Check the voltages at the sockets (see voltage chart).

Incorrect Tuning—The signal must be carefully tuned in to the clearest and loudest point. It must not be tuned "off resonance."

Defective Speaker—Try out a new one if it is available.

Defective Audio System in the Receiver—Make continuity resistance tests using as a guide Fig. 10.

Signal Transmission—Quality fading in the signal transmission can cause poor tone quality.

Oscillation

Cover of Box—May not be on or if on, may not be sufficiently tightened down.

Off Characteristic Tubes—Tubes whose characteristics vary considerably from the standard may cause oscillation. Try out some new ones.

Open Bypass Condensers—Check the bypass condensers and leads to them for open circuit.

Poor Ground Connections—Check the ground connections in the chassis for poor contact.

Grid Caps and Leads—The grid caps may not be making good contact to the tops of the tubes or the wires of the grid caps may be too close together.

MODEL Z6Z1
Parts List

GULBRANSEN CO.

Replacement Parts for Series Z6Z1 Receivers

CHASSIS PARTS

Part No.	Description	List Price
P-1780	No. 75 Tube Socket	$0.10
P-1761	No. 77 Tube Socket	.10
P-1762	No. 78 Tube Socket	.10
P-1665	No. 41 Tube Socket	.10
P-1803	No. 84 Tube Socket	.10
P-1805	Single Pin Jack	.10
P-1799	Tube Shield Assembly	.25
P-20656	Chassis Box	4.00
P-20657	Chassis Box Cover	1.10
P-70740	Shielded Antenna Lead	.40
P-70744	Shielded "A" Battery Lead	1.15
P-1804	Vibrator Unit (in cast metal case)	6.00
P-10266	Vibrator Unit Rubber Cushion, pair	.10
P-20660	Vibrator Unit Box	.70
P-20661	Vibrator Unit Box Cover	.20
P-1572	Fuse Clip Assembly	.10
P-10260	Cardboard Baffle	.20
P-1624	10 Amp. Fuse	.10
P-1774	Electrodynamic Speaker	3.75
P-20585	Cond. Drive Gear	.25
P-1801	Volume Control and Drive Bracket	.30
P-20635	Cond. Drive Pinion	.15
P-20677	Pinion Adjustment Plate	.10
P-20614	Lock Lever	.10
P-20658	Tension Spring	.10
P-30419	Entry Plate Assembly	.10
P-1830	Dial Gear and Strip Assembly	.40
P-1816	Celluloid Dial Strip only	.15
P-1810	Pilot Lamp Socket and Spring Clip	.10
P-1563	6-8 Volt Pilot Lamp	.25
P-10263	Rubber Tube Bumper—Square	.10
P-10210	Rubber Tube Bumper—Round	.10
P-10213	Rubber Band for Tube	.10
P-50569	Filter Choke Assembly	1.60
P-50585	Power Trans. Assembly—Less condensers and brackets	3.25
P-5099	Antenna R. F. Transformer—Less Can	1.20
P-5065	Interstage R. F. Transformer—Less Can	1.00
P-5105	Second I. F. Transformer and Can Assembly	.95
P-5096	First I. F. and Oscillator Transformer and Can Assembly	2.70
P-5097	Single Solenoid "A" Choke	.25
P-40431	Antenna R. F. Can	.15
P-1826	Interstage R. F. Can	.10

Resistors

Part No.	Code No.	Resistance	Type	List Price
P-A95103	R-1	1 Megohm	Carbon	$0.25
P-A95105	R-2	1 Megohm	Carbon	.25
P-B94261	R-3	260 ohm	Carbon	.35
P-A95504	R-4	.5 Megohm	Carbon	.25
P-A95104	R-5	100,000 ohm	Carbon	.25
P-A94402	R-6	4,000 ohm	Carbon	.20
P-91066	R-7	0-500,00 ohm	Volume Control and Switch	$1.15
P-A95104	R-8	100,000 ohm	Carbon	.25
P-A95104	R-9	100,000 ohm	Carbon	.25
P-A94402	R-10	4,000 ohm	Carbon	.20
P-B94153	R-11	15,000 ohm	Carbon	.25
P-B94203	R-12	20,000 ohm	Carbon	.25
P-C94401	R-13	400 ohm	Carbon	.20

Condensers

Part No.	Code No.	Capacity	Voltage	Type	List Price
P-80862	C-1	.05 mfd.	200 V.	Tubular	$0.30
P-80888	C-2	.25 mfd.	200 V.	Tubular	.35
P-80821-B	C-4	.001 mfd.	600 V.	Molded	.25
P-80937	C-7 C-11	4.0 mfd. 4.0 mfd.		Electrolytic Block in can	1.25
P-80919	C-8	.00025 mfd.	600 V.	Molded	.20
P-80945	C-9	.0005 mfd.	600 V.	Molded	.15
P-80898	C-10	.006 mfd.	600 V.	Tubular	15
P-80945	C-12	.0005 mfd.	600 V.	Molded	15
P-80966	C-14	.008 mfd.	600 V.	Tubular	20
P-80963	C-15 C-16	.04 mfd. .04 mfd.	400 V. 400 V.	Dual Tubular	.30
P-80960	C-17	.4 mfd.	15 V.	In Metal Can	.50
P-80959	C-18	.003 mfd.	600 V.	Molded	.35
P-80956	C-19 C-20 C-21	8.0 mfd. 20.0 mfd. 8.0 mfd.	225 V. 25 V. 225 V.	Electrolytic Block in Can	2.25
P-80955	C-3 C-5 C-6 C-13	.1 mfd. .05 mfd. .1 mfd. .05 mfd.	300 V. 200 V. 200 V. 300 V.	Bypass Block in Can	1.35
P-1539	600 K. C. Trimmer Condenser				.45
P-80957	Three-Gang Variable Condenser				3.00

CONTROL UNIT PARTS

(When Separate Control Unit Is Used)

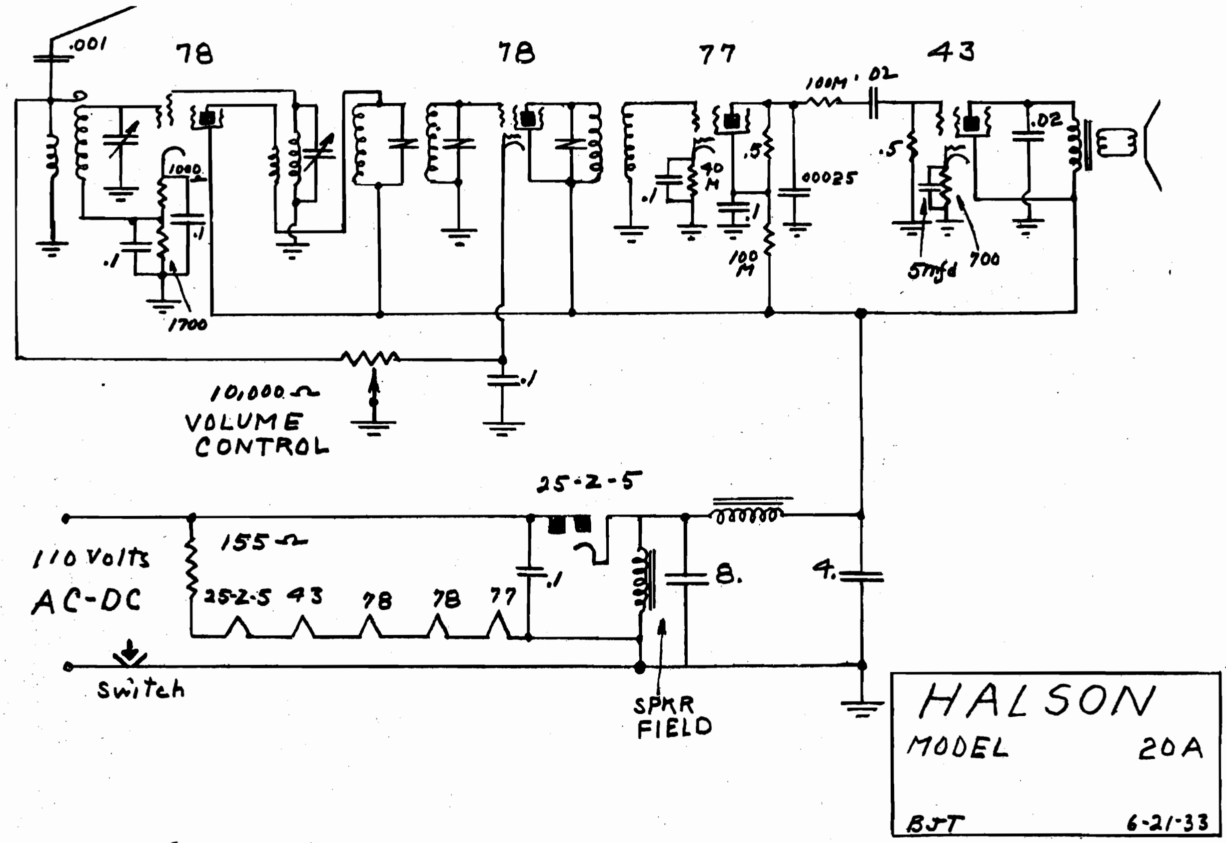
Part No.	Description	List Price
P-1816	Celluloid Dial Strip	$0.15
P-1825	Dial Gear and Strip Assembly	.40
P-20509B	Control Unit Swivel	.15
P-20510A	Steering Post Apron	.30
P-20511	Steering Post Clamp	.15
P-20693	Control Box Cover	.35
P-20635	Cond. Drive Pinion	.15
P-70746	Pilot Lamp Cable only	.40
P-1415A	Pilot Lamp Socket and Clip	.15
P-1563A	6-8 Volt Pilot Lamp	.25
P-30426	Ornamental Plug	.10
P-30414	Key	.15

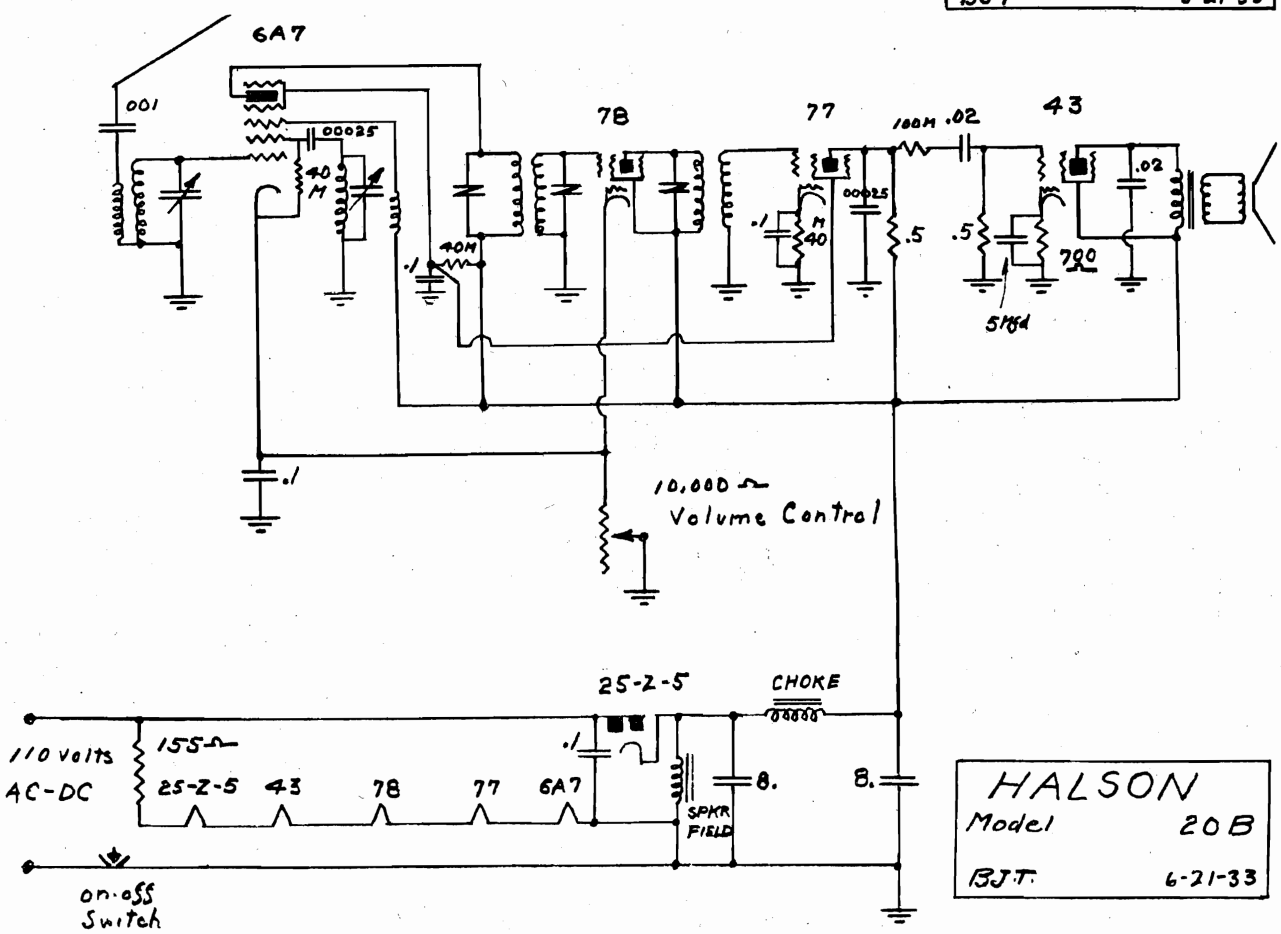
ITEMS WHICH MAY BE REQUIRED IN SOME CASES

1— 1550	14" Flexible Drive Shaft—For Control Unit Mounting	$ .90 ea.
1— 1553	20" Flexible Drive Shaft—For Control Unit Mounting	1.25 ea.
1— 1551	34" Flexible Drive Shaft—For Control Unit Mounting	1.65 ea.
1— 1552	45" Flexible Drive Shaft—For Control Unit Mounting	2.00 ea.
1—91011	Spark Plug Suppressor—All methods of mounting	.50 ea.
1—91012	Distributor Suppressor, Wood Screw Ends—All methods of mounting	.50 ea.

MODEL 20-A
MODEL 20-B
Schematics

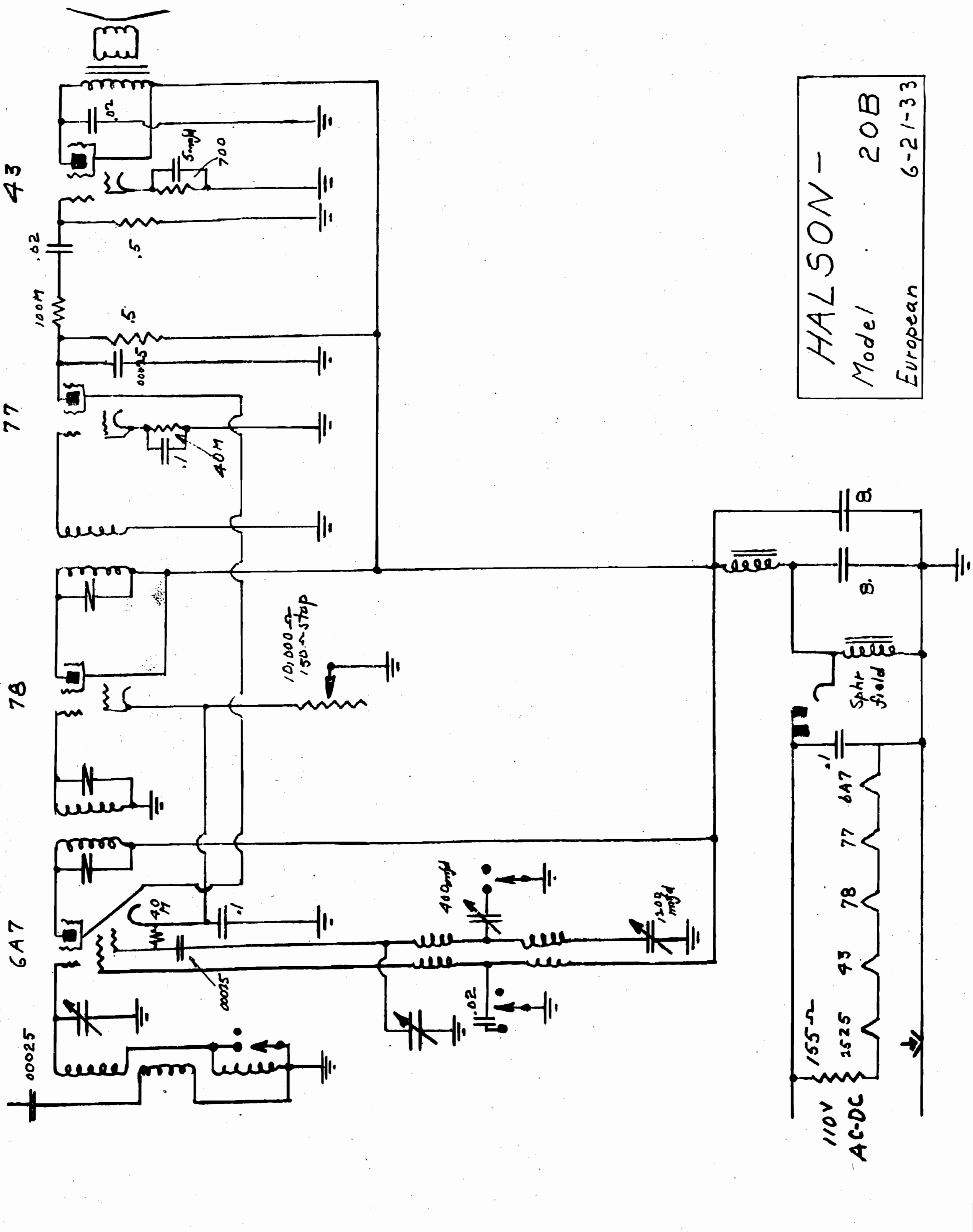
HALSON RADIO CORP.





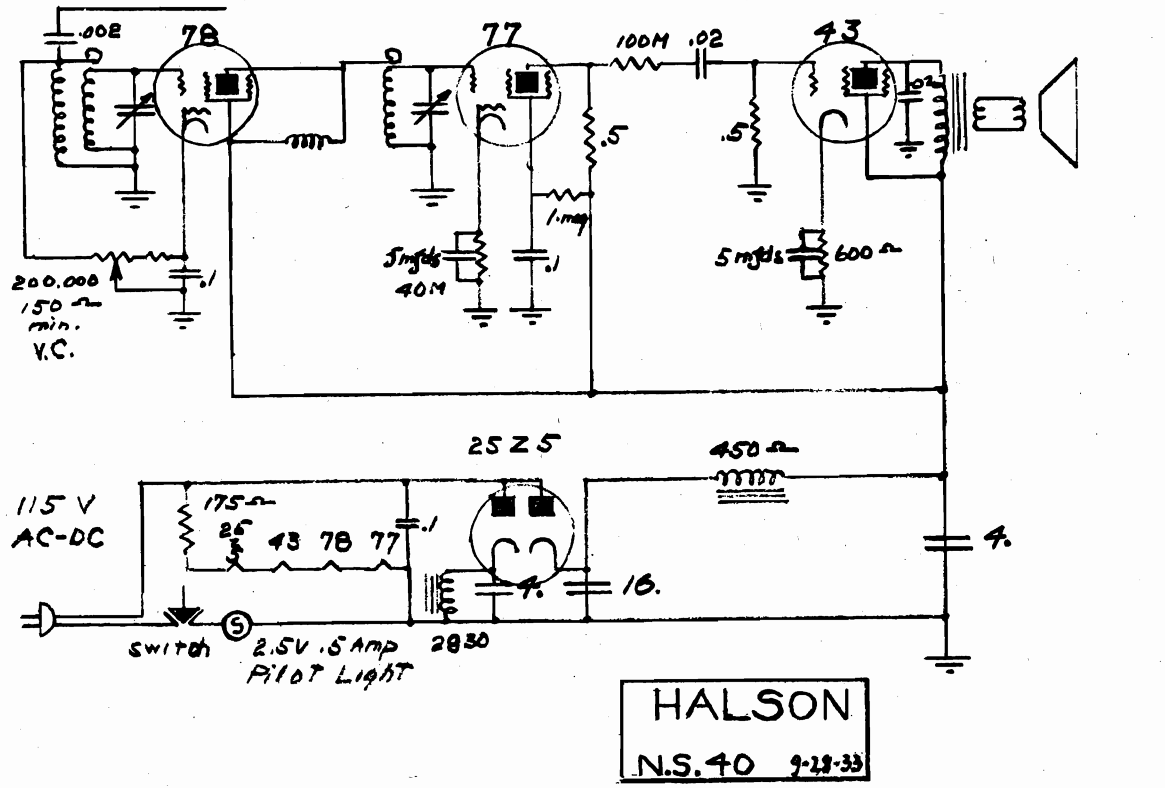
MODEL 20-B
Schematic

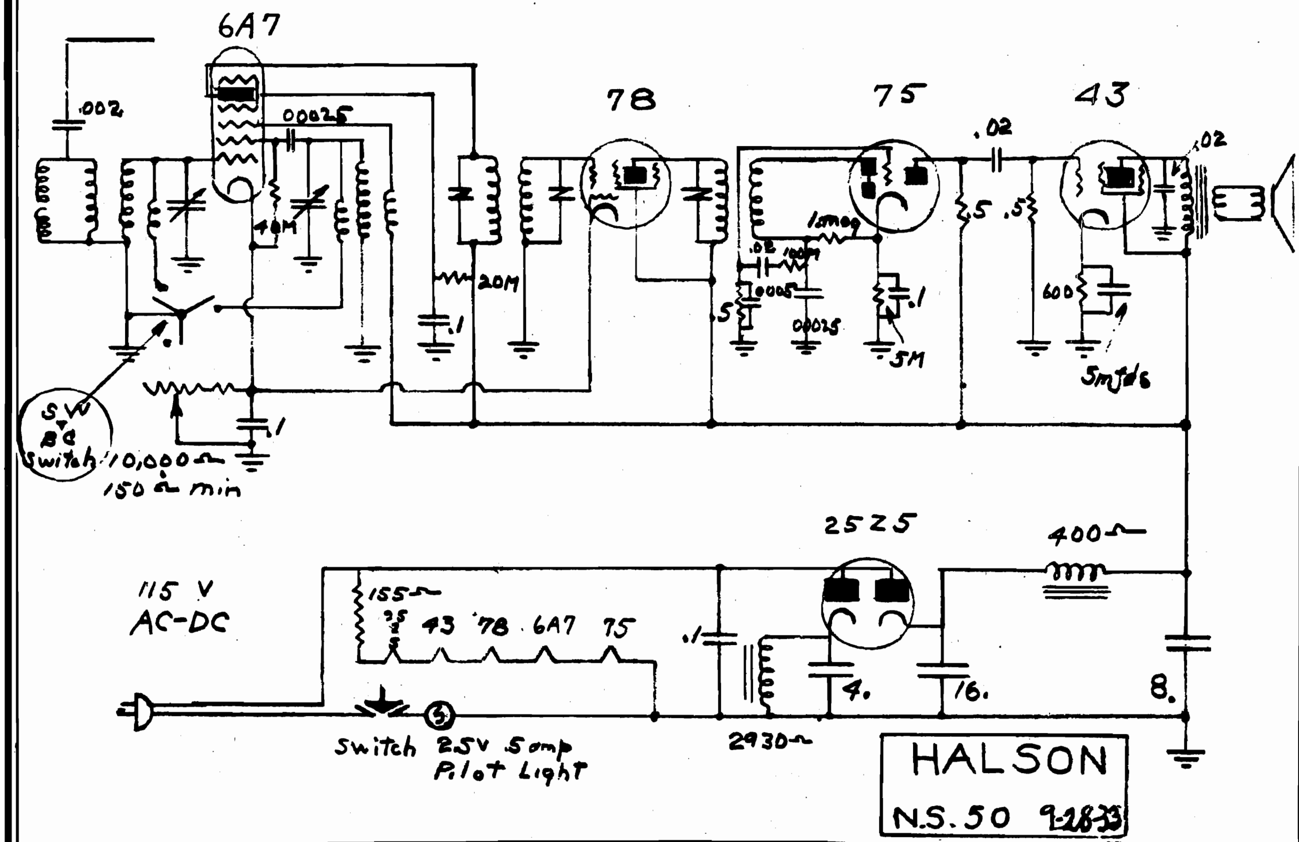
HALSON RADIO CORP.



HALSON RADIO CORP.

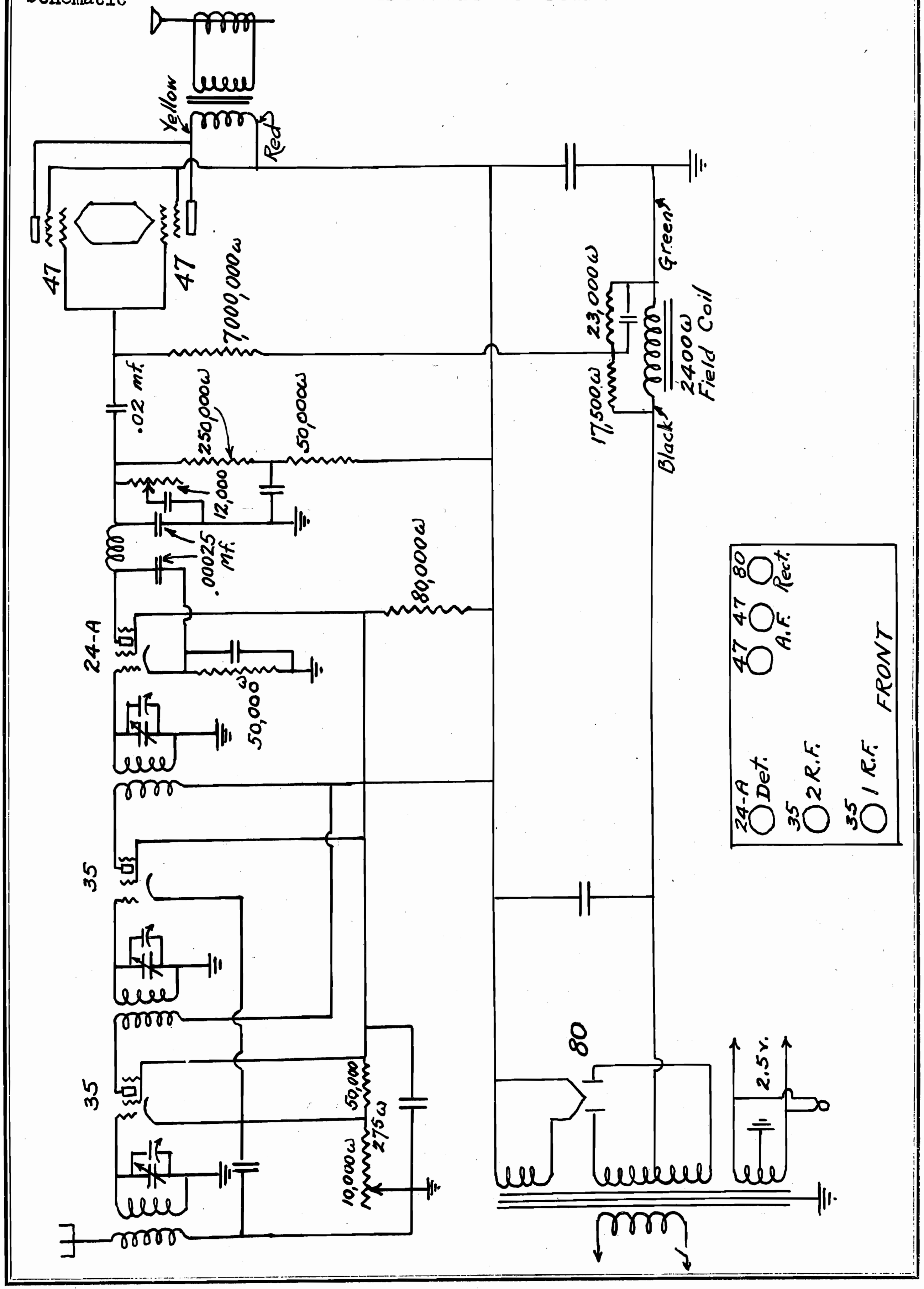
MODEL N.S. 40
Schematic
MODEL N.S. 50
Schematic





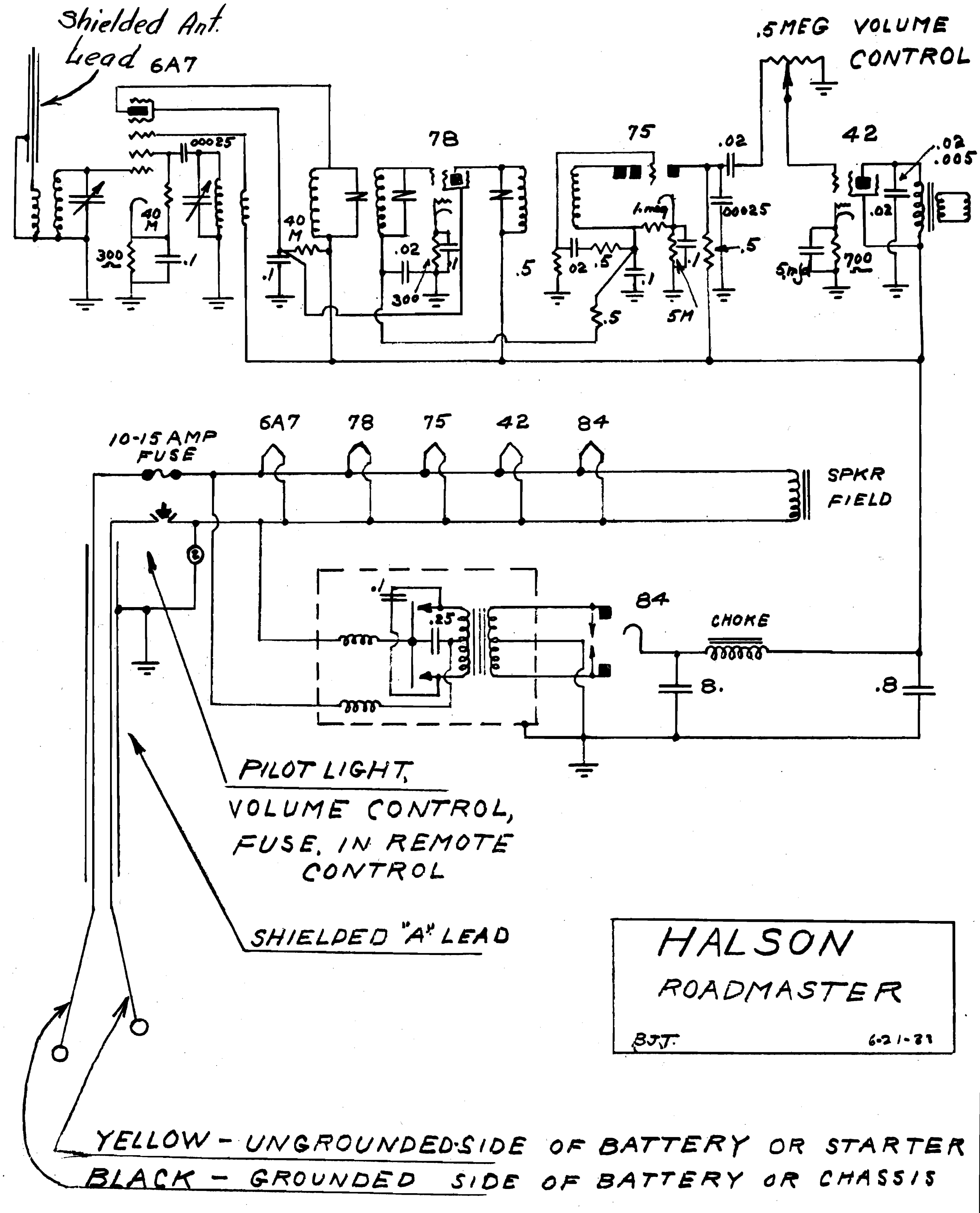
MODEL 610
Schematic

HALSON RADIO CORP.



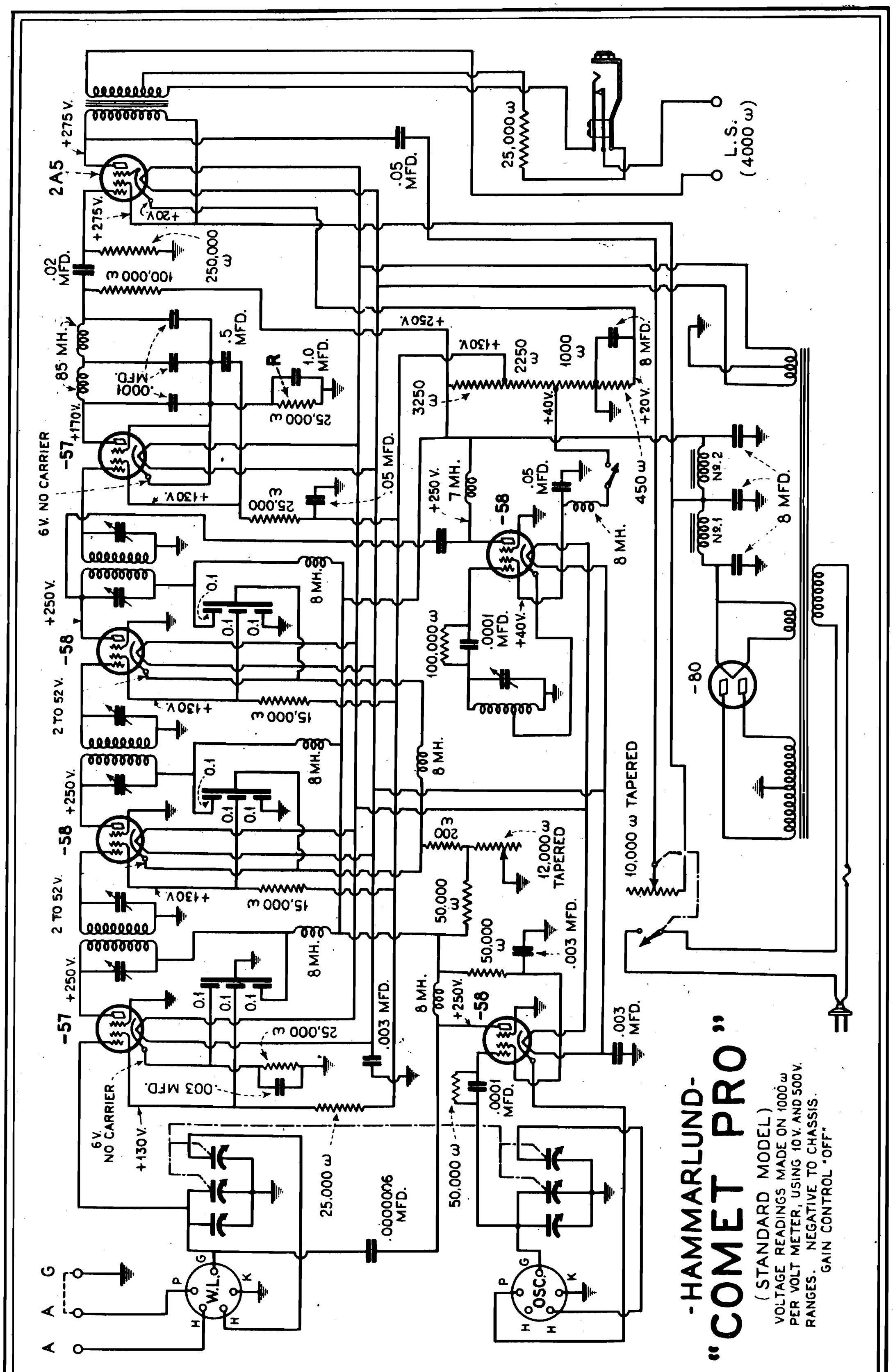
HALSON RADIO CORP.

MODEL "Roadmaster"
Schematic



MODEL "Comet Pro"
(Standard)
Schematic

HAMMARLUND MFG. CO.

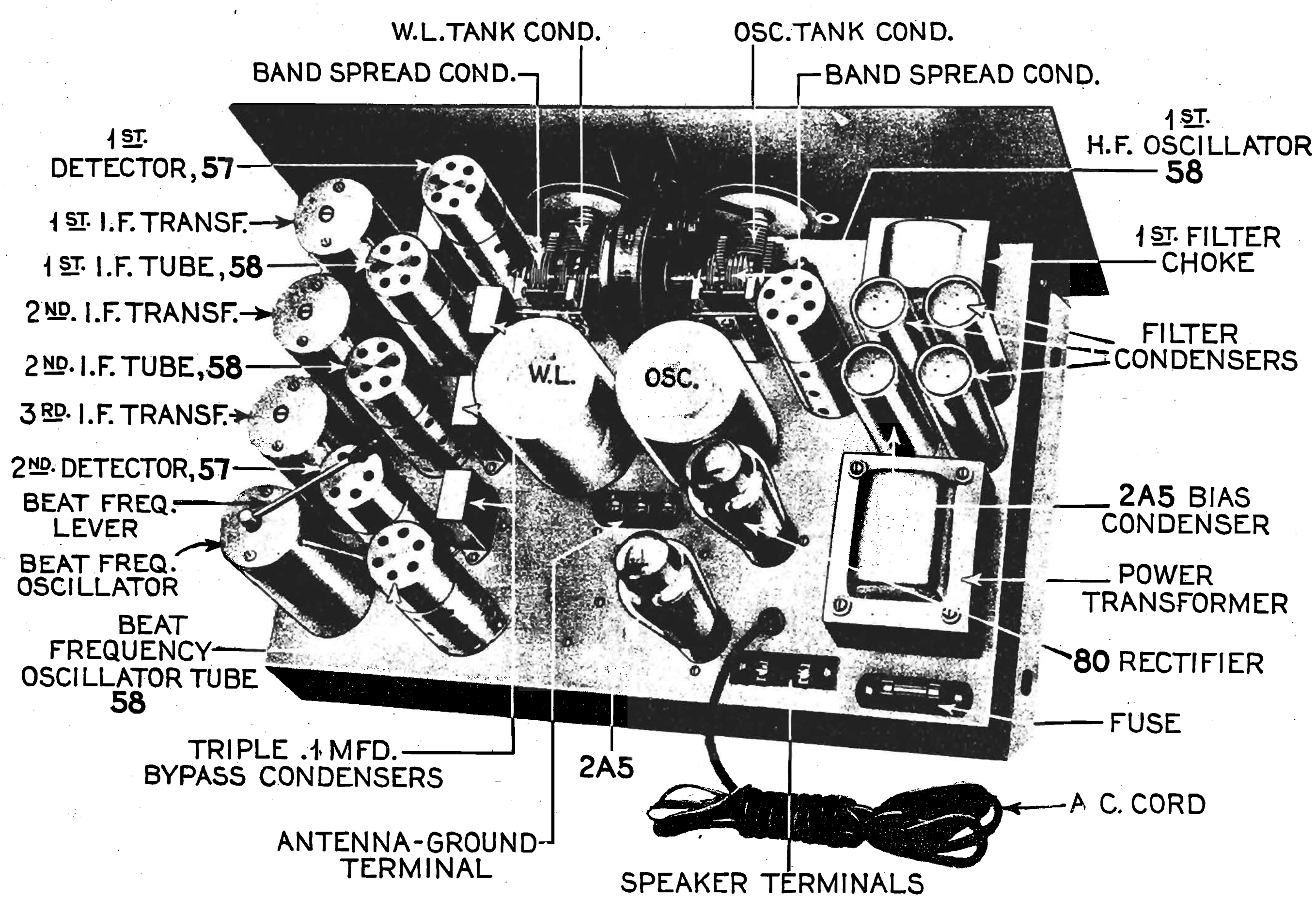


MODEL "Comet Pro" (Standard)
Chassis view

HAMMARLUND MFG. CO.

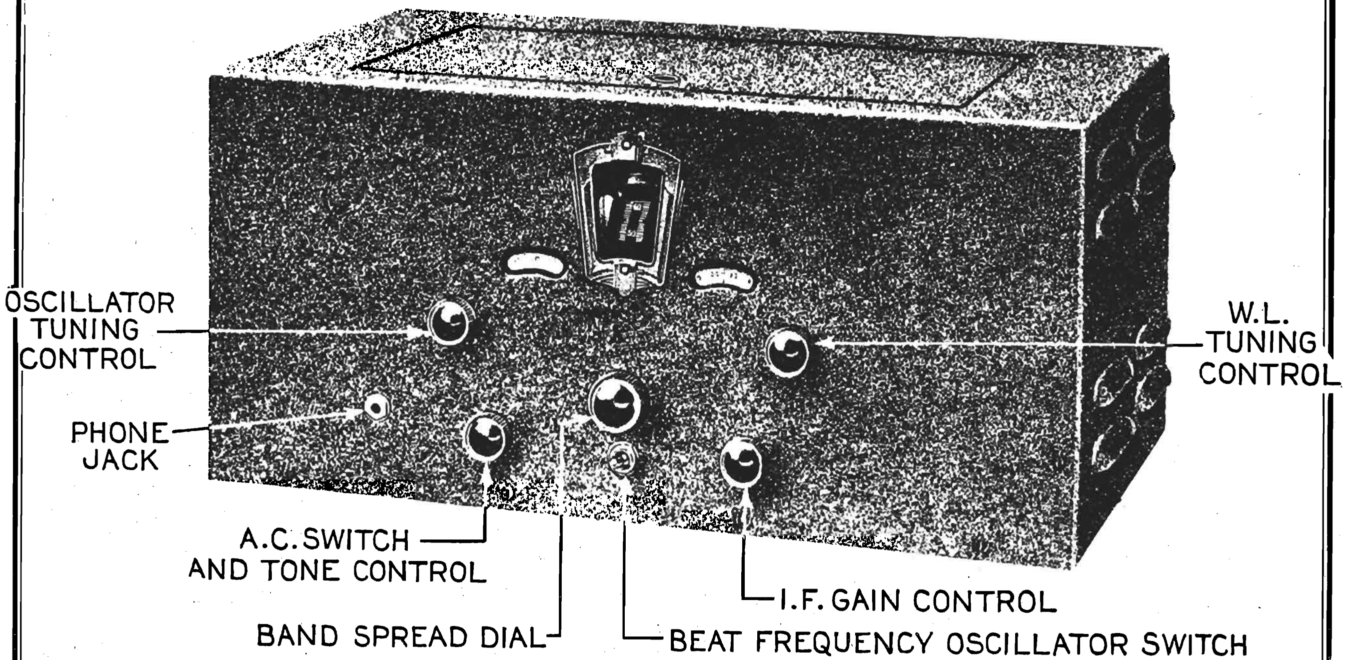
formers. Finally repeat this whole process, readjusting each condenser a second time to insure exactness of resonance.

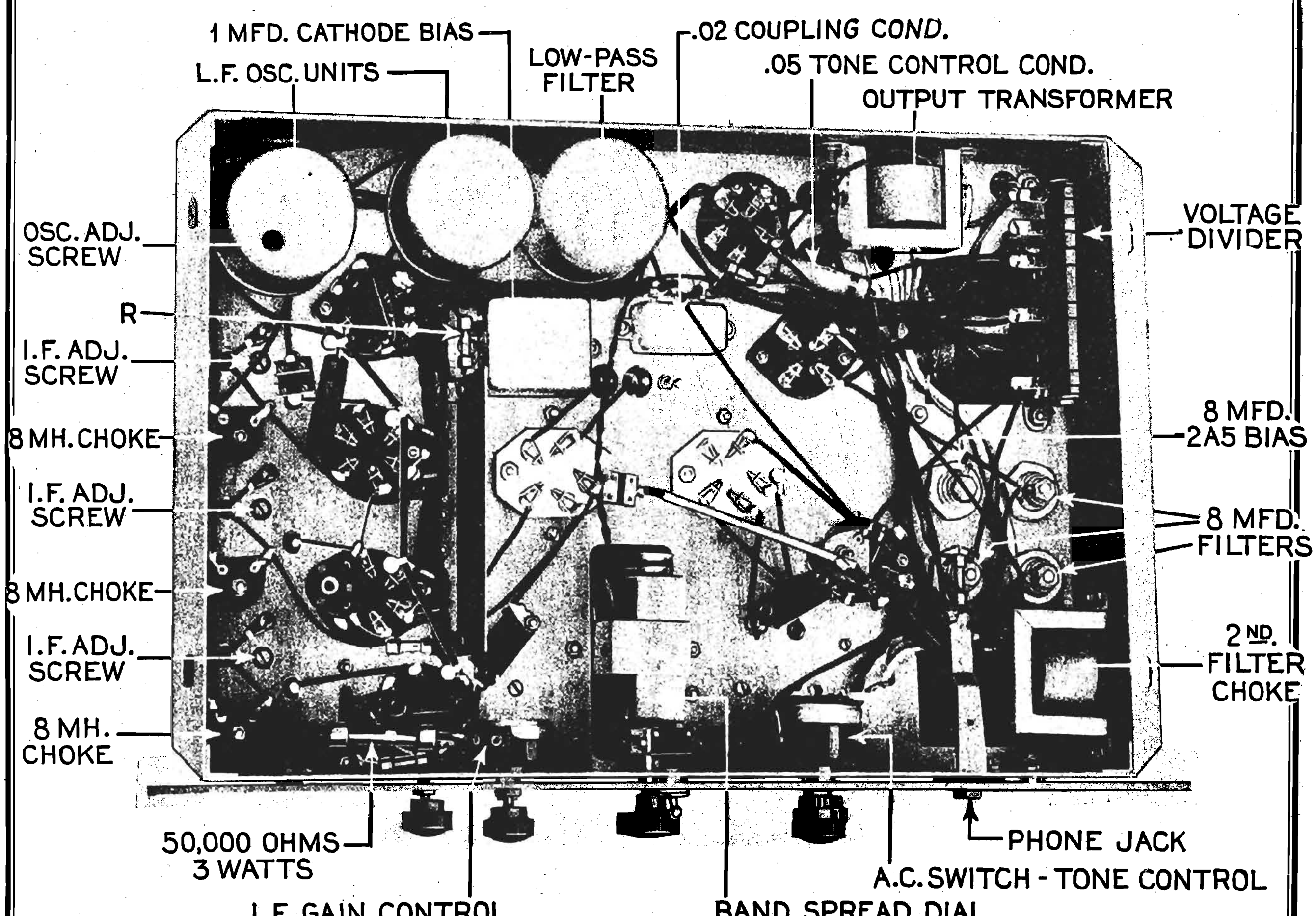
After the i.f. stages are thus accurately lined up, turn on the heterodyne-beat oscillator and set its top lever so that it points diagonally away from the rear right-hand corner of the chassis. Then adjust the bottom adjustment screw on this transformer for exact zero beat. When this has been accomplished the receiver is in accurate alignment.



MODEL "Comet Pro"
(Standard)
Chassis view

HAMMARLUND MFG. CO.





MODEL "Comet Pro"
(Standard)
Service notes

HAMMARLUND MFG. CO.

SERVICE DATA

Should it be necessary to remove the Comet "Pro" chassis from its shield cabinet it is easily accomplished by removing the four machine screws which extend through the bottom of the cabinet and the twelve screws around the edge of the front panel. The entire panel and chassis assembly may then be slipped out of the cabinet by drawing it forward. When thus removed all parts and wiring located beneath the chassis are exposed for examination or test. The shield cans found under the chassis may be removed if necessary by pulling them off.

The voltage values at various points of the circuit and the values of all resistors and condensers are shown on the circuit diagram.

Should the "Pro" fail to function in its normal manner at any time the recommended procedure is to first carefully check up on the antenna and ground. Then check the tubes as they are, of course, the most vulnerable part of any well-designed and well-built receiver. Beyond this the entire receiver should next be checked for "shorts" or "opens" and in this a test of the voltages as shown in the circuit diagram will be simple and helpful. The voltages shown are those read on the 10 volt and 500 volt ranges of a standard meter having a sensitivity of 1000 ohms per volt. If a meter offering lower resistance is employed in checking, some of these readings will vary considerably and due allowance must accordingly be made for this factor of error. In making these tests the sensitivity control should be set at the full "off" position.

It is also desirable to disconnect the antenna - or at least detune the receiver so that no signal is present in the circuits under measurement. In measuring cathode voltages on the two i.f. tubes the gain control should be swung through its entire range to show minimum and maximum bias. The voltage should vary from approximately 3 volts to 50 volts, respectively.

While the use of air-dielectric variable condensers for tuning the i.f. and beat-frequency oscillator transformers provide an exceptional degree of permanence of adjustment, it is of course possible that eventually some of these circuits may become slightly detuned. In such an event they may be realigned in the following manner.

First remove the chassis from the cabinet and prop it up on its rear edge so that both the top and bottom are accessible. Then connect the 10 ohm range of a 1000 ohm per volt voltmeter across the 25,000 ohm resistor between the cathode of the second detector and ground. This resistor is marked "R" in the view of the bottom of the chassis, as shown on page 9. This meter will function as a resonance indicator, showing maximum deflection when exact resonance is obtained.

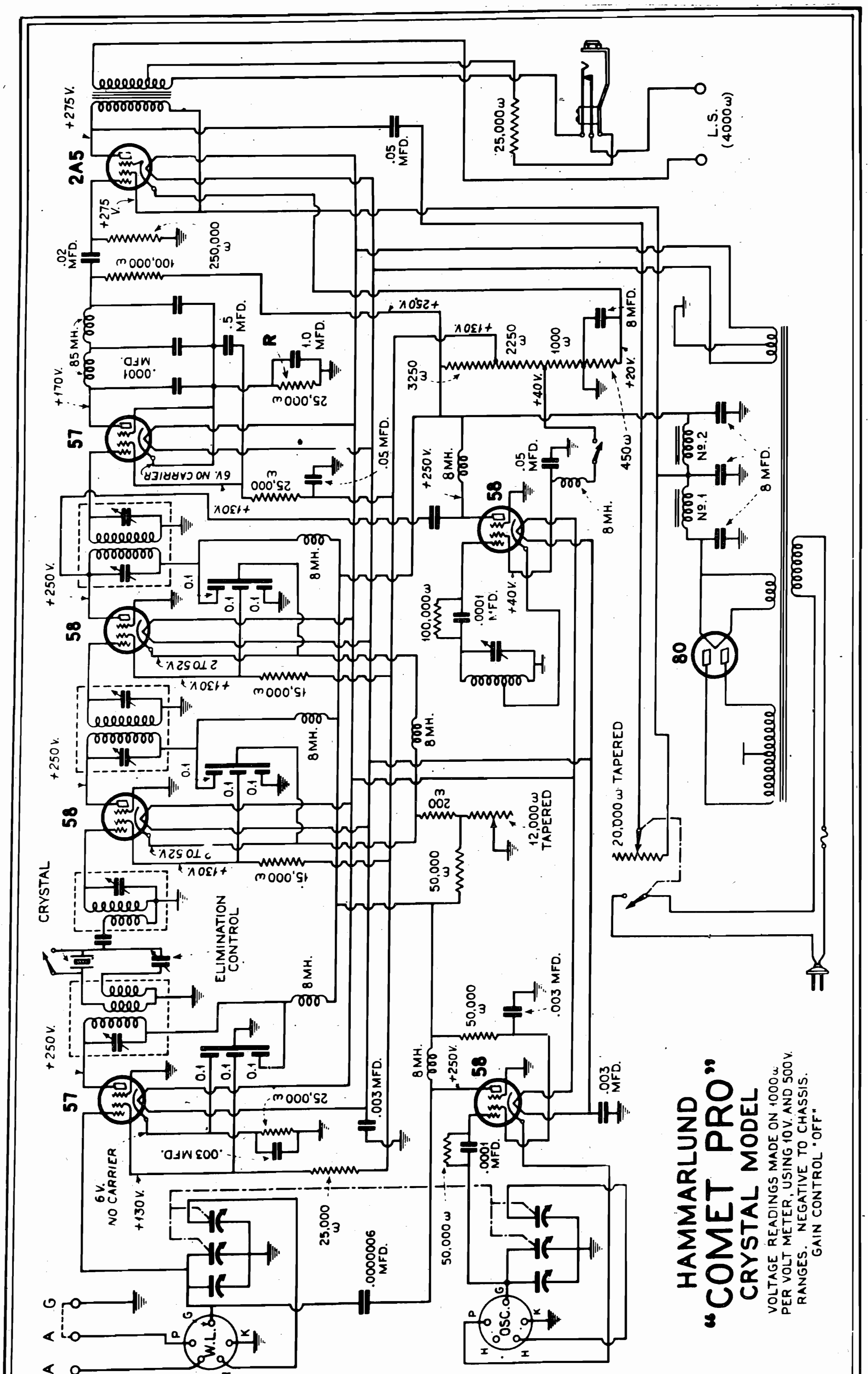
Next provide a signal source. If an oscillator is available, tune it to 465 kc. and couple it to the receiver. If such an oscillator is not at hand the carrier of a fairly powerful station may be employed provided the station selected is one which is free from fading and interference. This signal should be tuned in on the receiver in the usual way and the gain control adjusted to cause an increase of about 2 volts in the voltmeter reading.

The actual alignment can now proceed. First adjust the bottom condensers of the three i.f. transformers. These are accessible from the under side of the chassis. Adjust them one after the other until maximum deflection of the resonance indicating meter is obtained. If the meter reading increases materially during this process retard the gain control to bring it back to the original plus 2 volts reading. Then make a similar adjustment of the condensers at the tops of the three i.f. trans

HAMMARLUND MFG. CO.

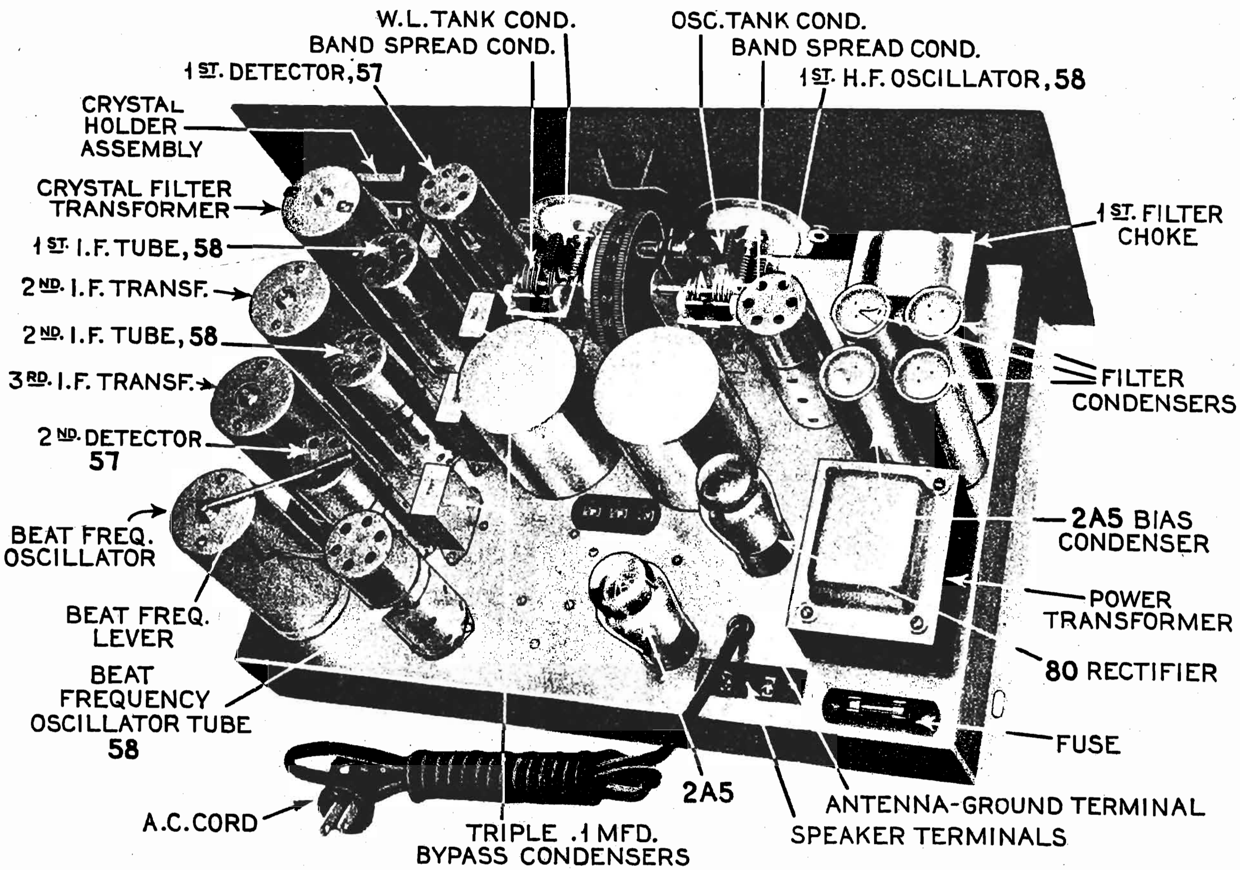
MODEL "Comet Pro" (Crystal)

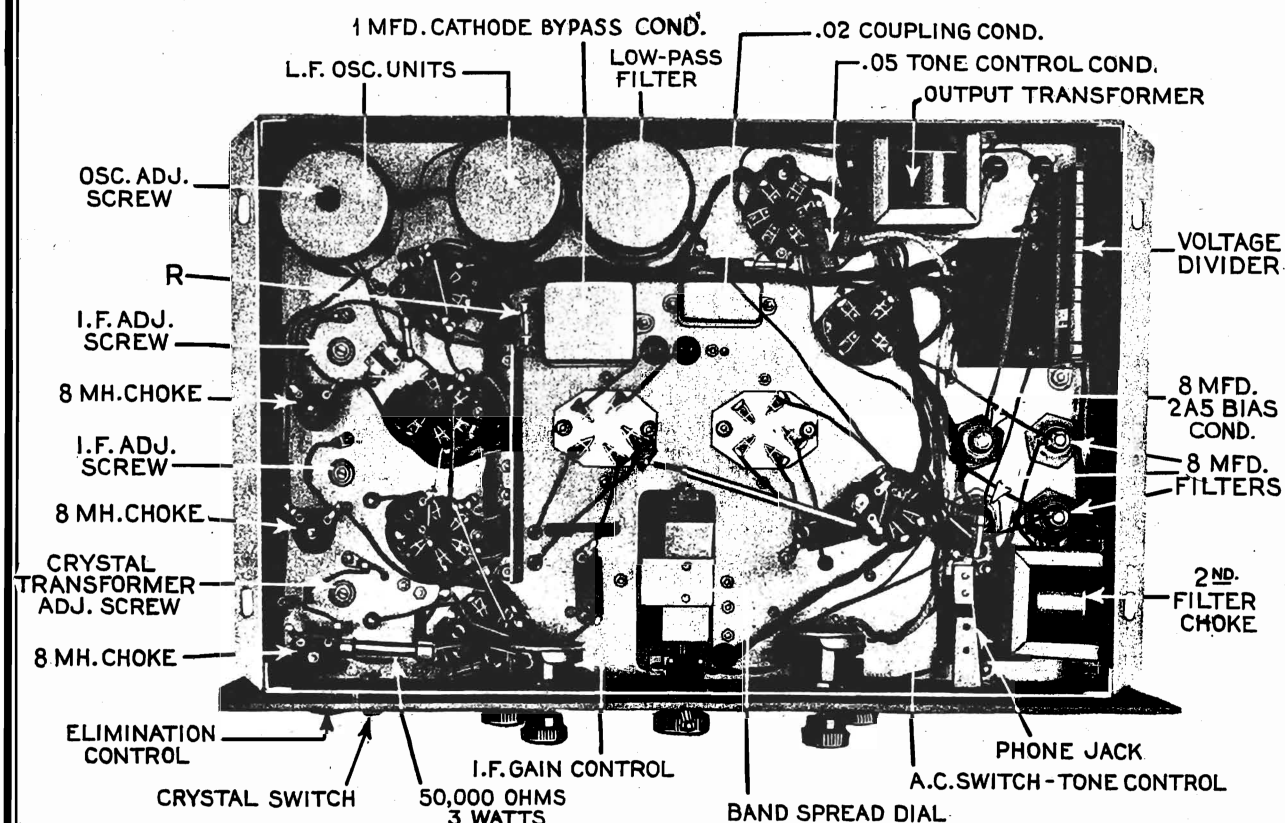
Schematic



MODEL "Comet Pro"
(Crystal)
Chassis views

HAMMARLUND MFG. CO.





MODEL "Comet Pro" (Crystal) Service notes

HAMMARLUND MFG. CO.

SERVICE DATA

Should it be necessary to remove the Comet "Pro" chassis from its shield cabinet it is easily accomplished by removing the four machine screws which extend through the bottom of the cabinet and the twelve screws around the edge of the front panel. The entire panel and chassis assembly may then be slipped out of the cabinet by drawing it forward. When thus removed all parts and wiring located beneath the chassis are exposed for examination or test. The shield cans found under the chassis may be removed if necessary by pulling them off.

The voltage values at various points of the circuit and the values of all resistors and condensers are shown on the circuit diagram.

Should the "Pro" fail to function in its normal manner at any time the recommended procedure is to first carefully check up on the antenna and ground. Then check the tubes as they are, of course, the most vulnerable part of any well-designed and well-built receiver. Beyond this the entire receiver should next be checked for "shorts" or "opens" and in this a test of the voltages as shown in the circuit diagram will be simple and helpful. The voltages shown are those read on the 10 volt and 500 volt ranges of a standard meter having a sensitivity of 1000 ohms per volt. If a meter offering lower resistance is employed in checking, some of these readings will vary considerably and due allowance must accordingly be made for this factor of error. In making these tests the sensitivity control should be set at the full "off" position.

It is also desirable to disconnect the antenna - or at least detune the receiver so that no signal is present in the circuits under measurement. In measuring cathode voltages on the two i.f. tubes the gain control should be swung through its entire range to show minimum and maximum bias. The voltage should vary from approximately 3 volts to 50 volts, respectively.

While the use of air-dielectric variable condensers for tuning the i.f. and beat-frequency oscillator transformers provide an exceptional degree of permanence of adjustment, it is of course possible that eventually some of these circuits may become slightly detuned. In such an event they may be realigned in the following manner.

First remove the chassis from the cabinet and prop it up on its rear edge so that both the top and bottom are accessible. Then connect the 10 volts range of a 1000 ohm per volt voltmeter across the 25,000 ohm resistor between the cathode of the second detector and ground. This resistor is marked "R" in the view of the bottom of the chassis, as shown on page 9. This meter will function as a resonance indicator, showing maximum deflection when exact resonance is obtained.

Next provide a signal source. If an oscillator is available, tune it to 465 kc. and couple it to the receiver. If such an oscillator is not at hand the carrier of a fairly powerful station may be employed provided the station selected is one which is free from fading and interference. This signal should be tuned in on the receiver in the usual way and the gain control adjusted to cause an increase of about 2 volts in the voltmeter reading.

The actual alignment can now proceed. First adjust the bottom condensers of the three i.f. transformers. These are accessible from the under side of the chassis. Adjust them one after the other until maximum deflection of the resonance indicating meter is obtained. If the meter reading increases materially during this process retard the gain control to bring it back to the original plus 2 volts reading. Then make a similar adjustment of the condensers at the tops of the three i.f. transformers.

MODEL "Comet Pro"
(Crystal)
Service notes

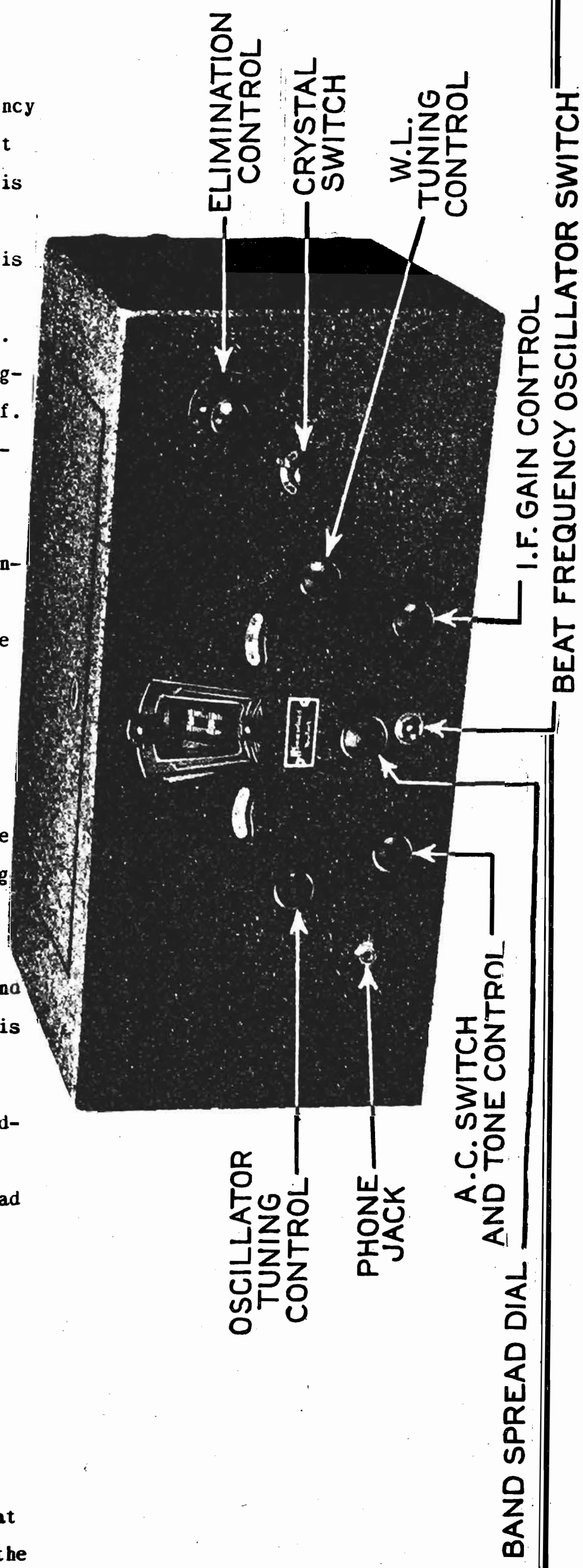
HAMMARLUND MFG. CO.

The i.f. amplifier is now accurately aligned at a frequency which is presumed to be 465 kc. but it may not be exactly that frequency. In any event steps must now be taken to retune this amplifier to exact resonance with the crystal frequency which may be slightly more or less than 465 kc. To proceed with this adjustment plug in the "DD" coils (or the special "EE" broadcast-band coils if available) and tune in a broadcast station. A local station is to be preferred because a rather strong signal which is not subject to fading is required. Or, if an r.f. oscillator which can be tuned to the broadcast range is available it may be used as the signal source, instead of a broadcast station. Whatever signal is used tune it in precisely, with the two tank-tuning controls, leaving the band-spread control set at 50. Then retard the sensitivity control to some point below the halfway adjustment. This is necessary because if the receiver is adjusted for high sensitivity, the weaker, spurious resonant frequencies of the crystal may cause confusion, particularly as one such point occurs less than 10 kc. from the primary resonant frequency.

Now, throw the crystal into the circuit and, watching the resonance indicator meter closely, move the band-spread tuning control <u>very</u> <u>slowly</u> a slight distance one way and then the other from 50 until a sudden increase is noticed in the meter reading indicating resonance with the crystal. Adjust the band spread dial exactly for maximum deflection of the meter at this point.

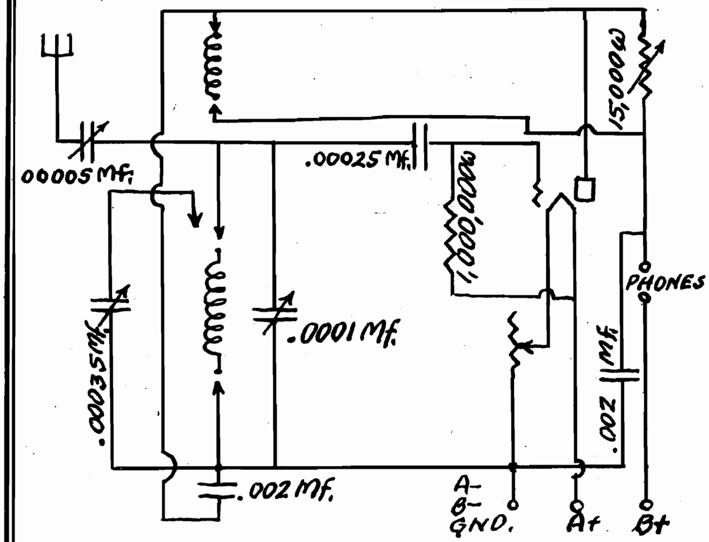
Next the crystal switch is turned "off" and the bottom adjustment screws of the i.f. transformers are retuned to this new frequency. The crystal is again cut in and the band-spread control retuned for the point where the meter "kicks up." Cutting the crystal out once more, the top adjustments of the i.f. transformers are made. At this point the i.f. amplifier should be in exact resonance with the crystal frequency, but just to make double sure it is advisable to repeat the whole process.

After the i.f. stages are thus accurately lined up, turn on the heterodyne-beat oscillator and set its top lever so that it points diagonally away from the rear-right-hand corner of the chassis. Then adjust the bottom adjustment screw on this transformer for exact zero beat. When this has been accomplished the receiver is in accurate alignment.

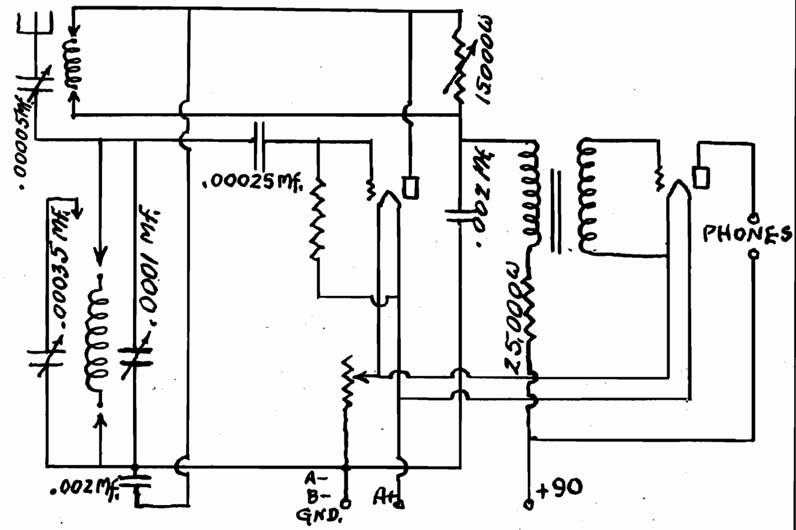


CHARLES HOODWIN CO.

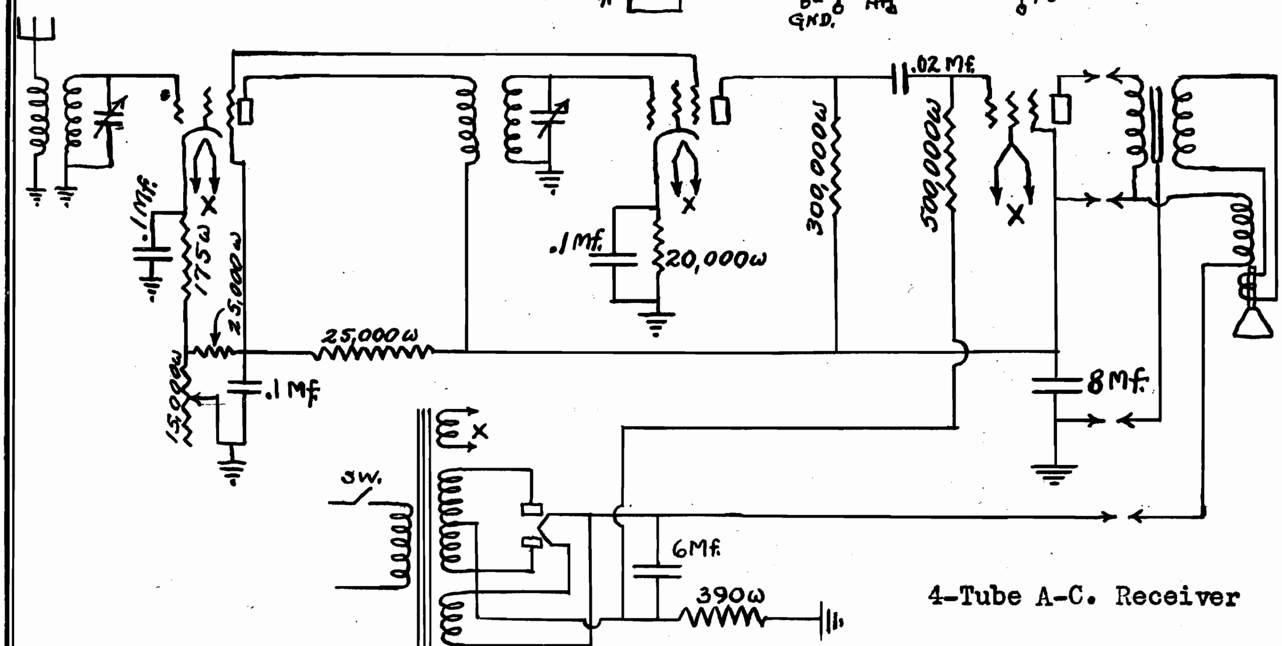
MODEL 1 Tube SW
MODEL 2 Tube SW
MODEL 4 Tube AC
Schematics



1-Tube Short-Wave Receiver



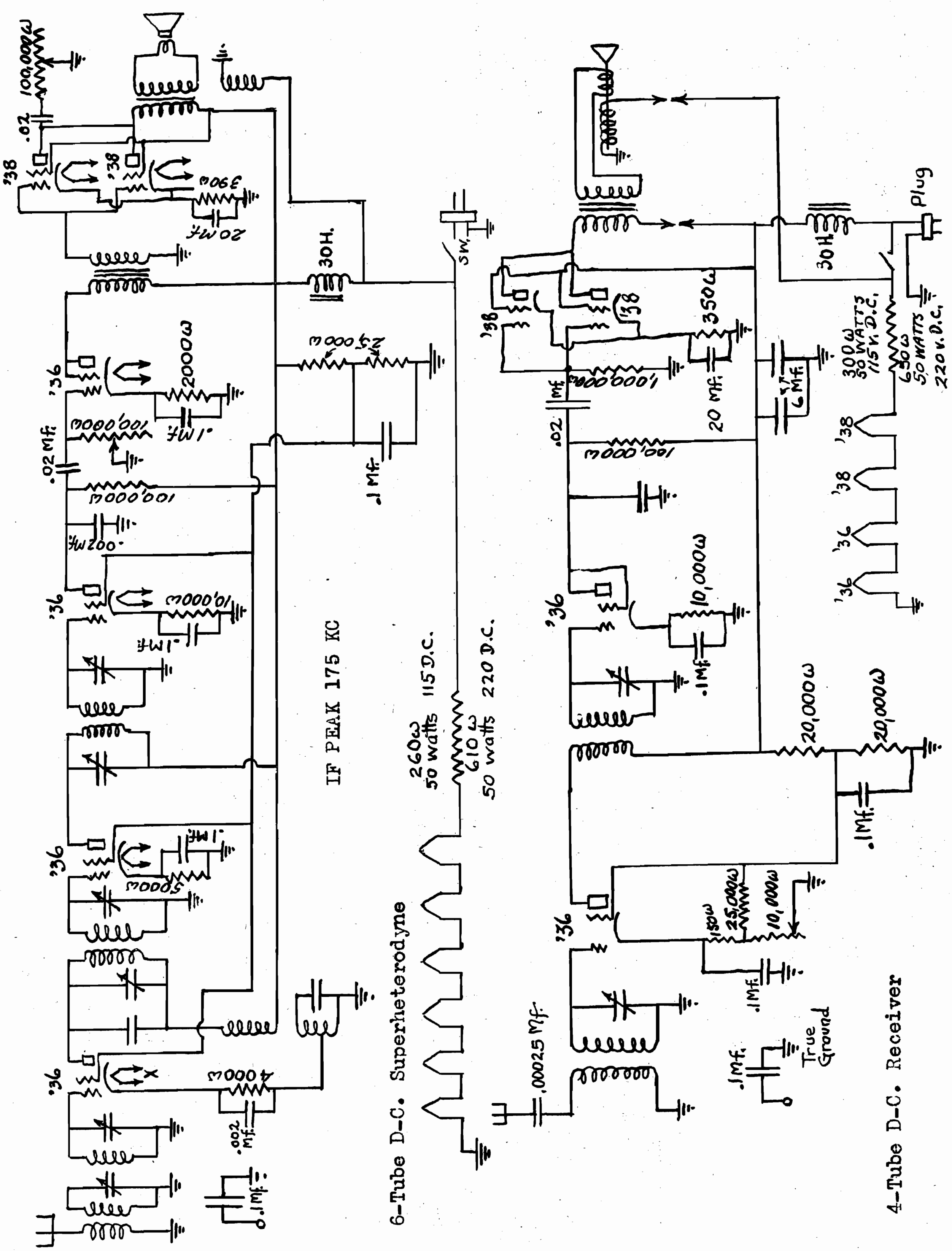
2-Tube World-Wide Receiver



4-Tube A-C. Receiver

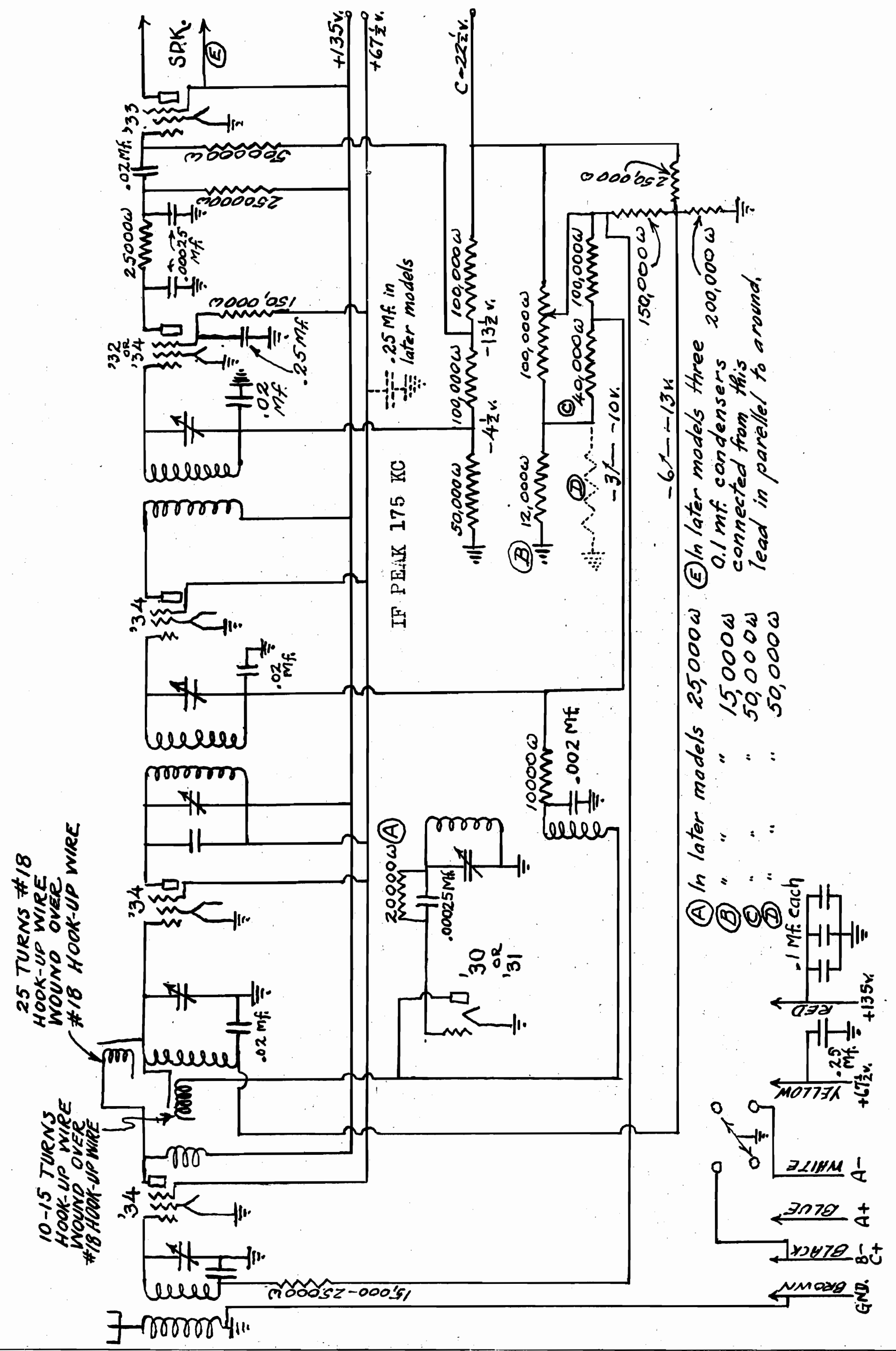
MODEL 4 Tube DC
MODEL 6 Tube DC Super
Schematics

CHARLES HOODWIN CO.



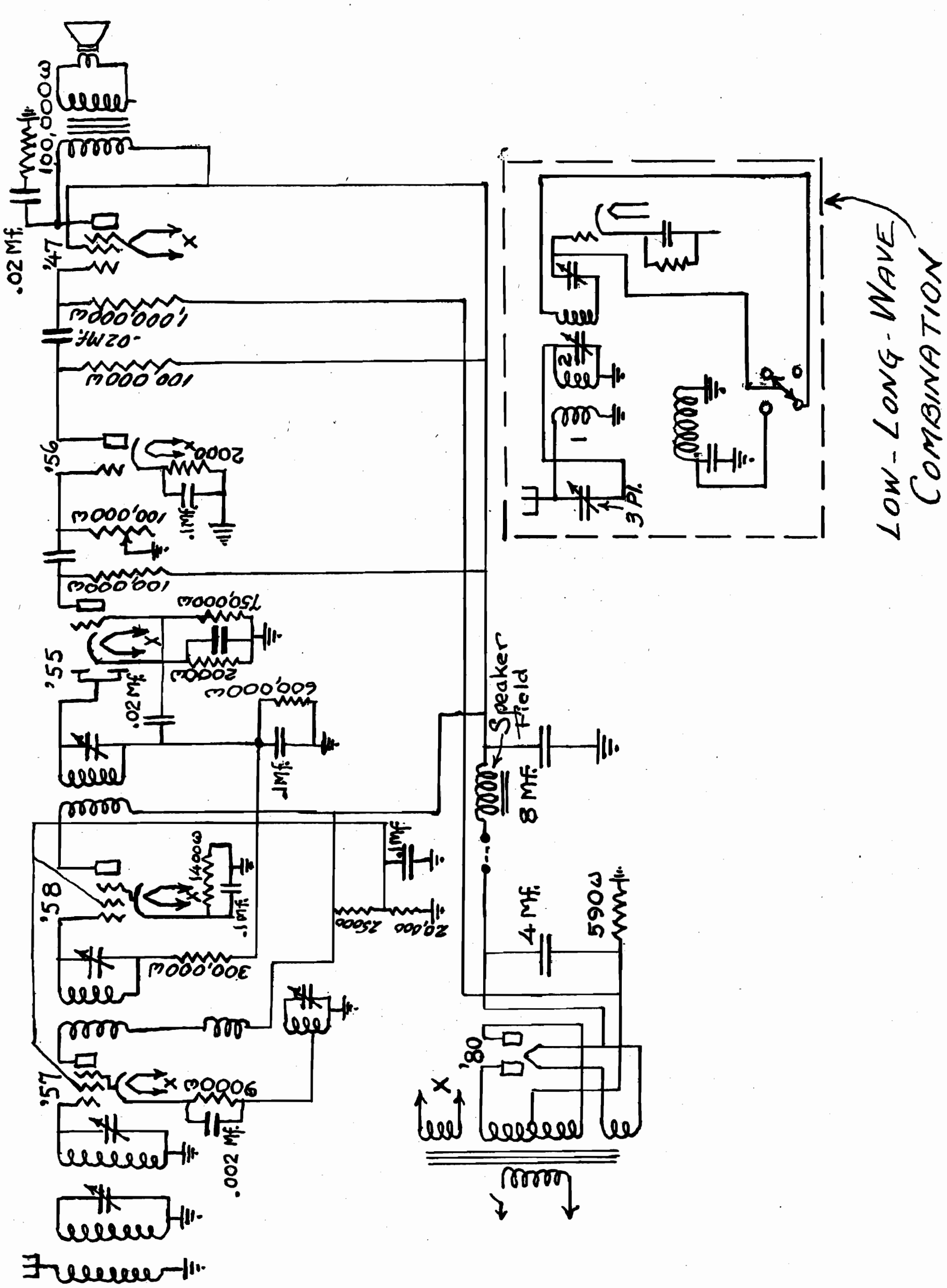
CHARLES HOODWIN CO.

MODEL 6 Tube Batt. Super
Schematic



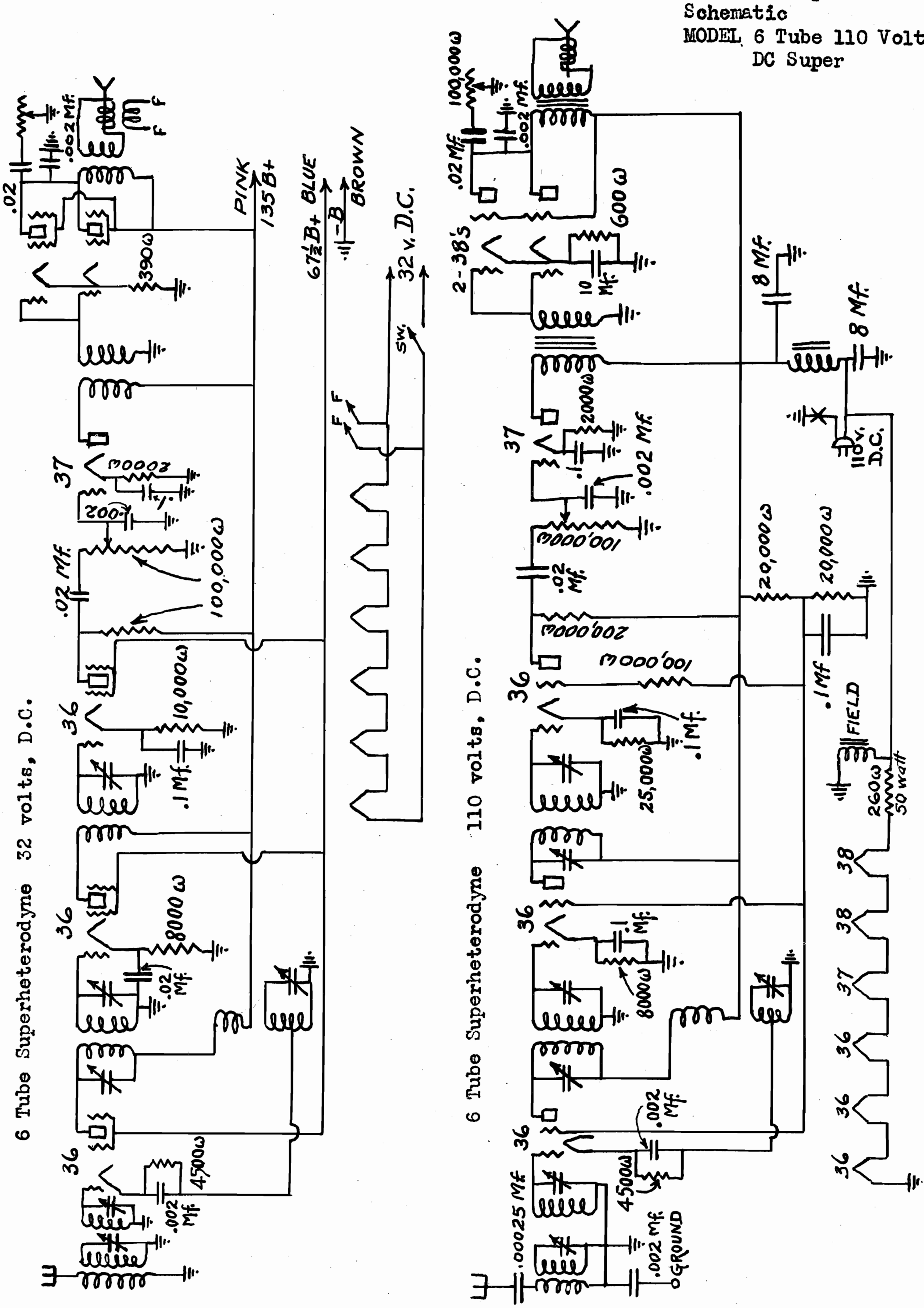
MODEL 6 Tube AC Super
Schematic

CHARLES HOODWIN CO.



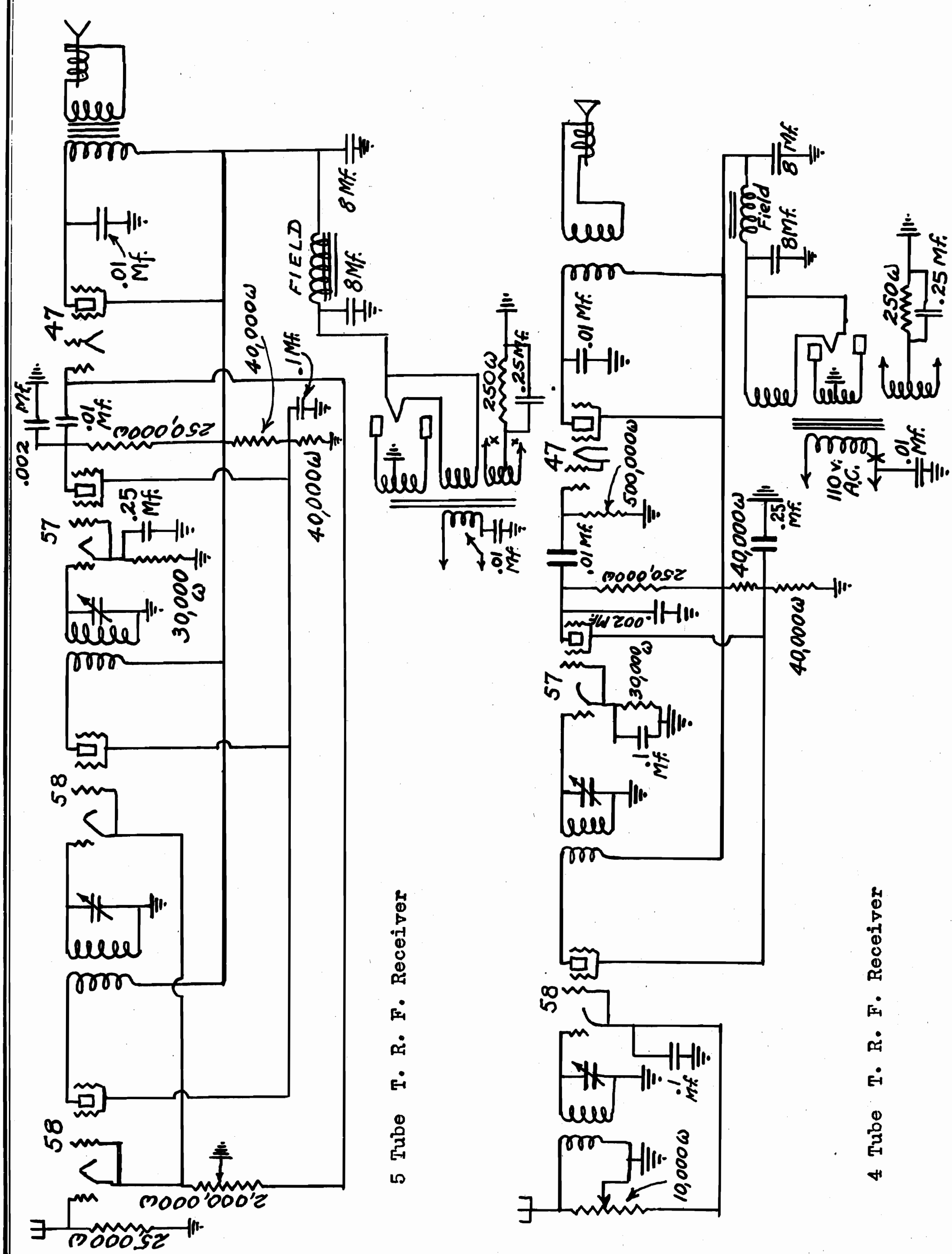
CHARLES HOODWIN CO.

MODEL 6 Tube 32 Volt
DC Super.
Schematic
MODEL 6 Tube 110 Volt
DC Super



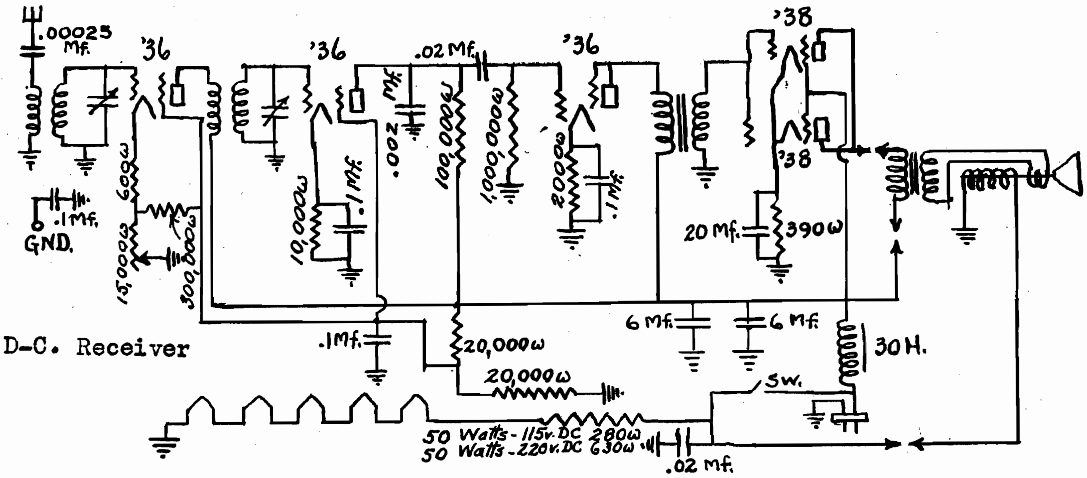
MODEL 5 Tube TRF
MODEL 4 Tube TRF
Schematic

CHARLES HOODWIN CO.

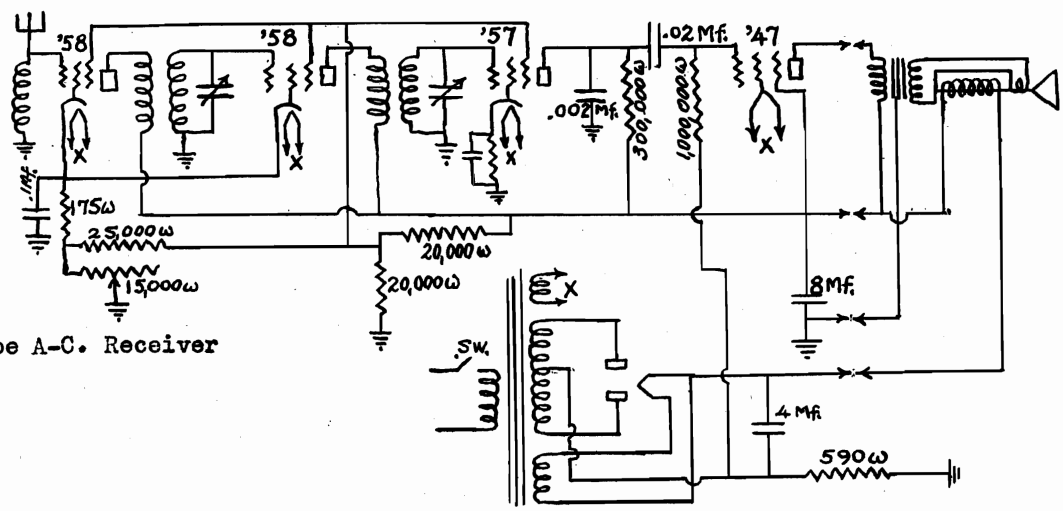


CHARLES HOODWIN CO.

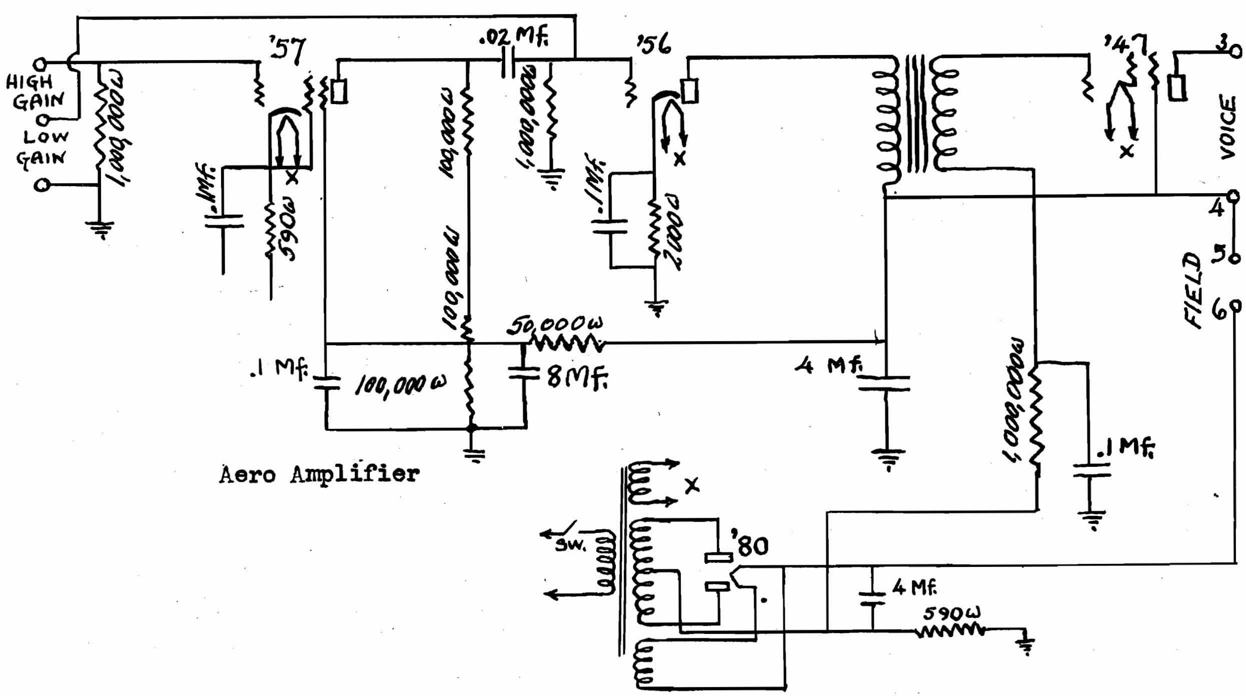
MODEL 5 Tube DC
MODEL 5 Tube AC
MODEL Aero AF Amp.
Schematics



5-Tube D-C. Receiver



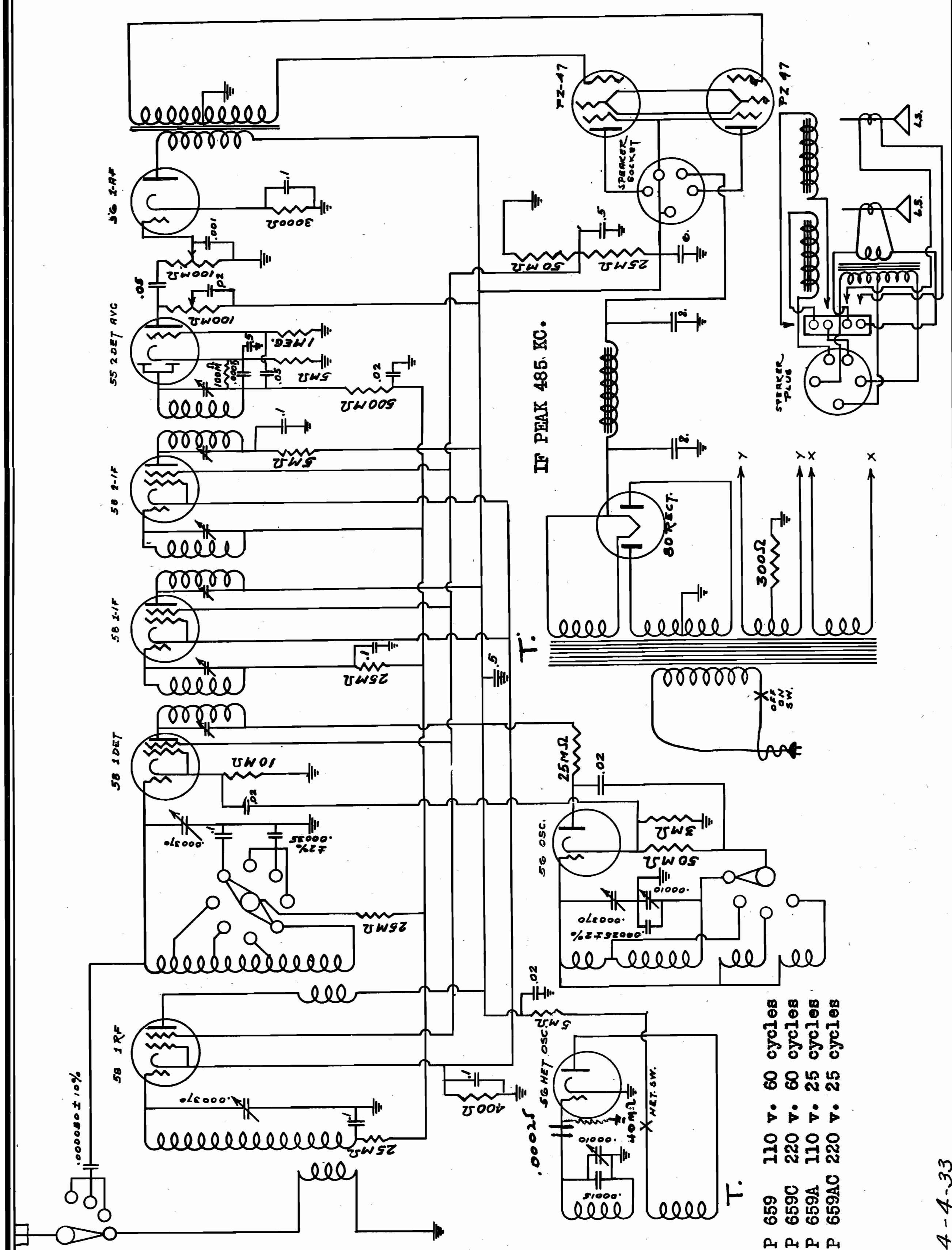
5-Tube A-C. Receiver



Aero Amplifier

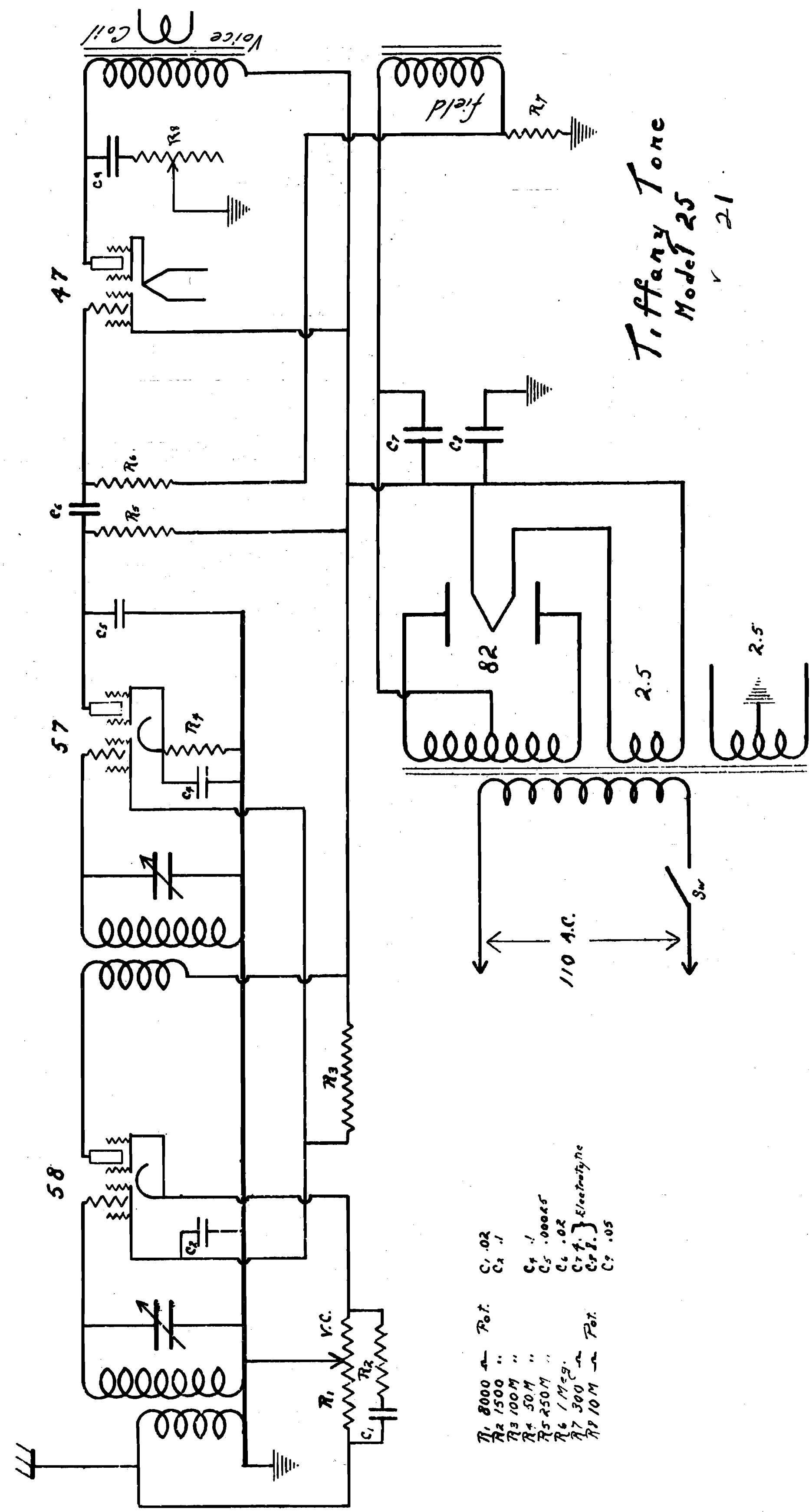
MODEL "International Aero"
11 Tube All-Wave
Schematic

CHARLES HOODWIN CO.



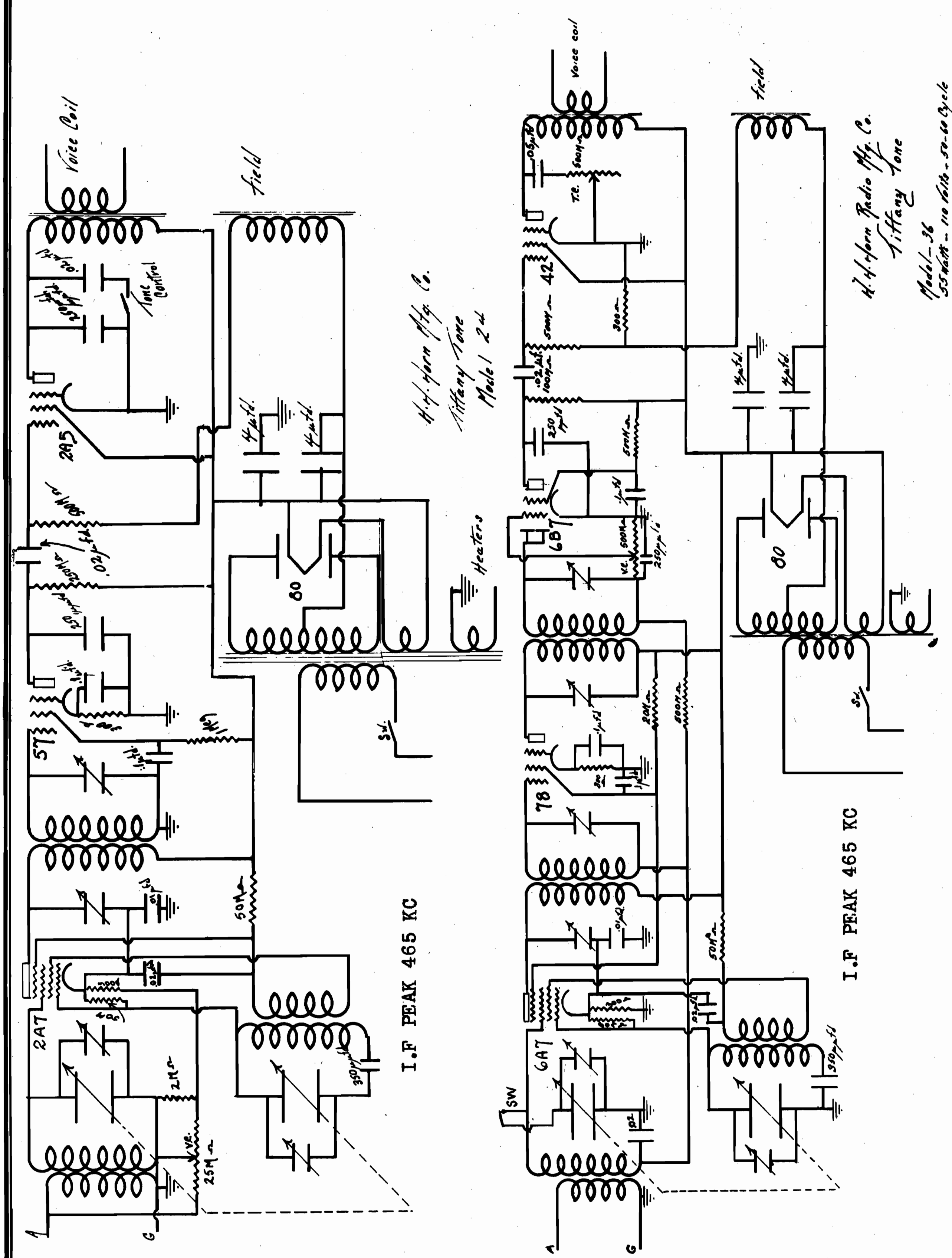
HERBERT H. HORN

MODEL 21,25
Schematic



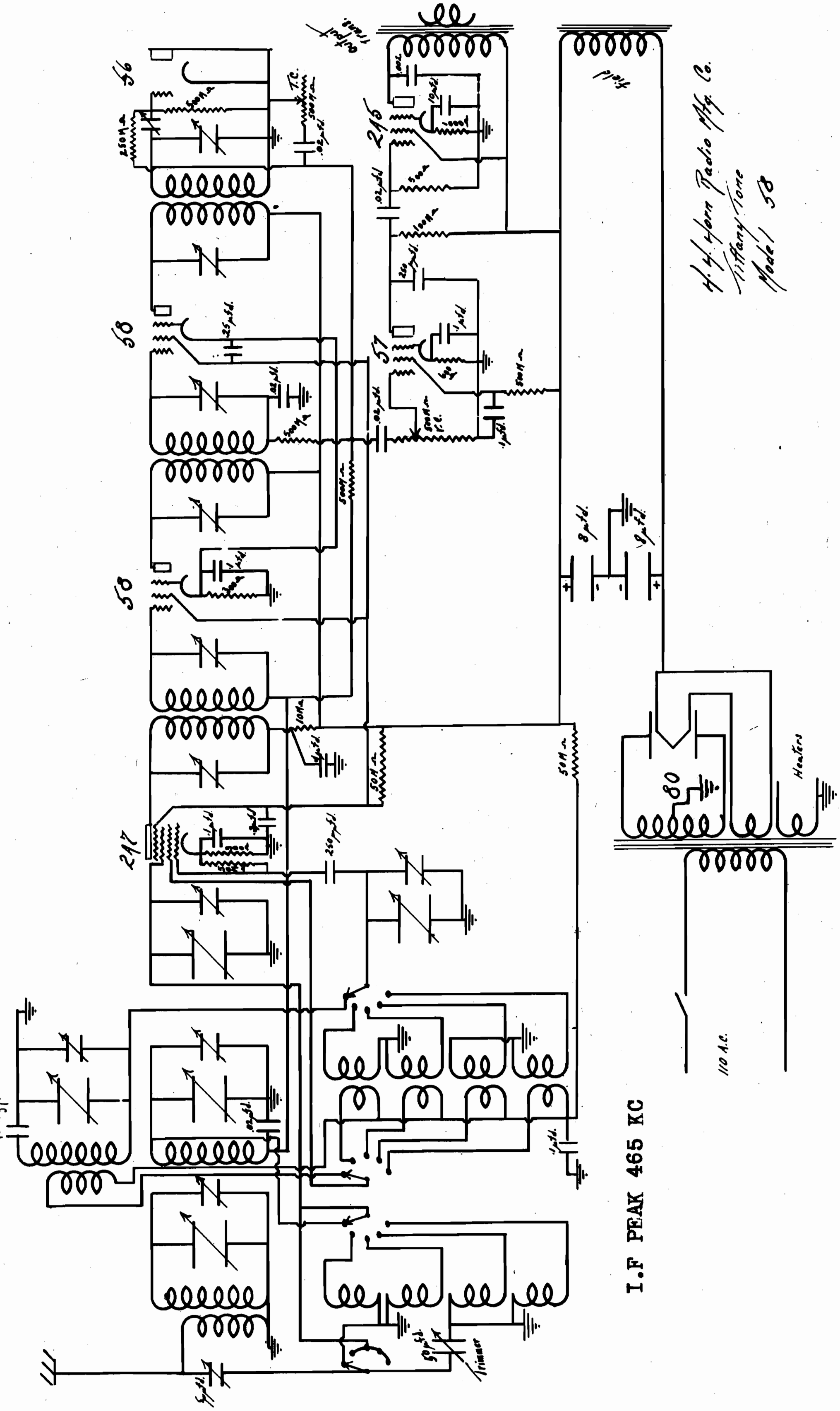
MODEL 24
MODEL 36
Schematic

HERBERT H. HORN



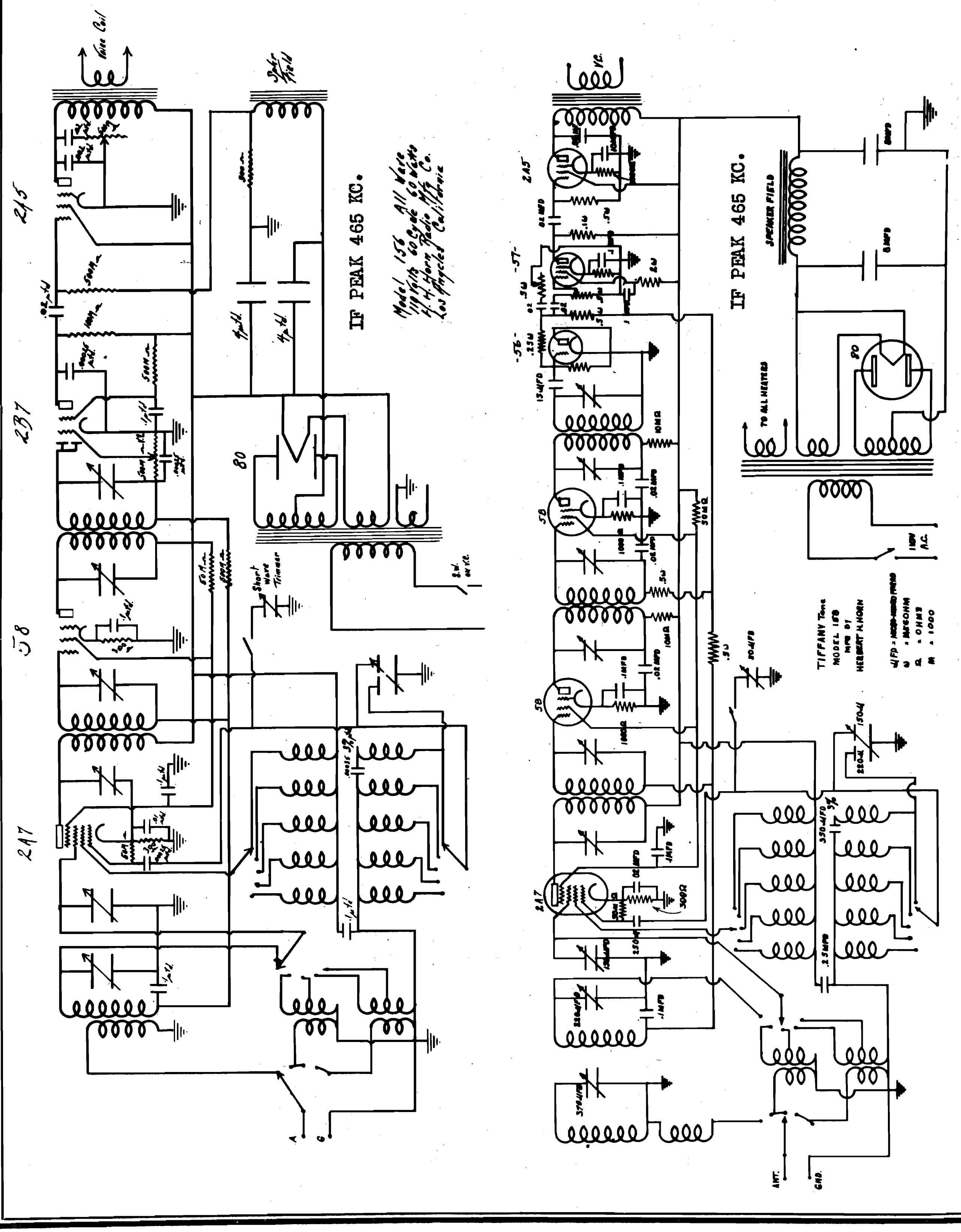
HERBERT H. HORN

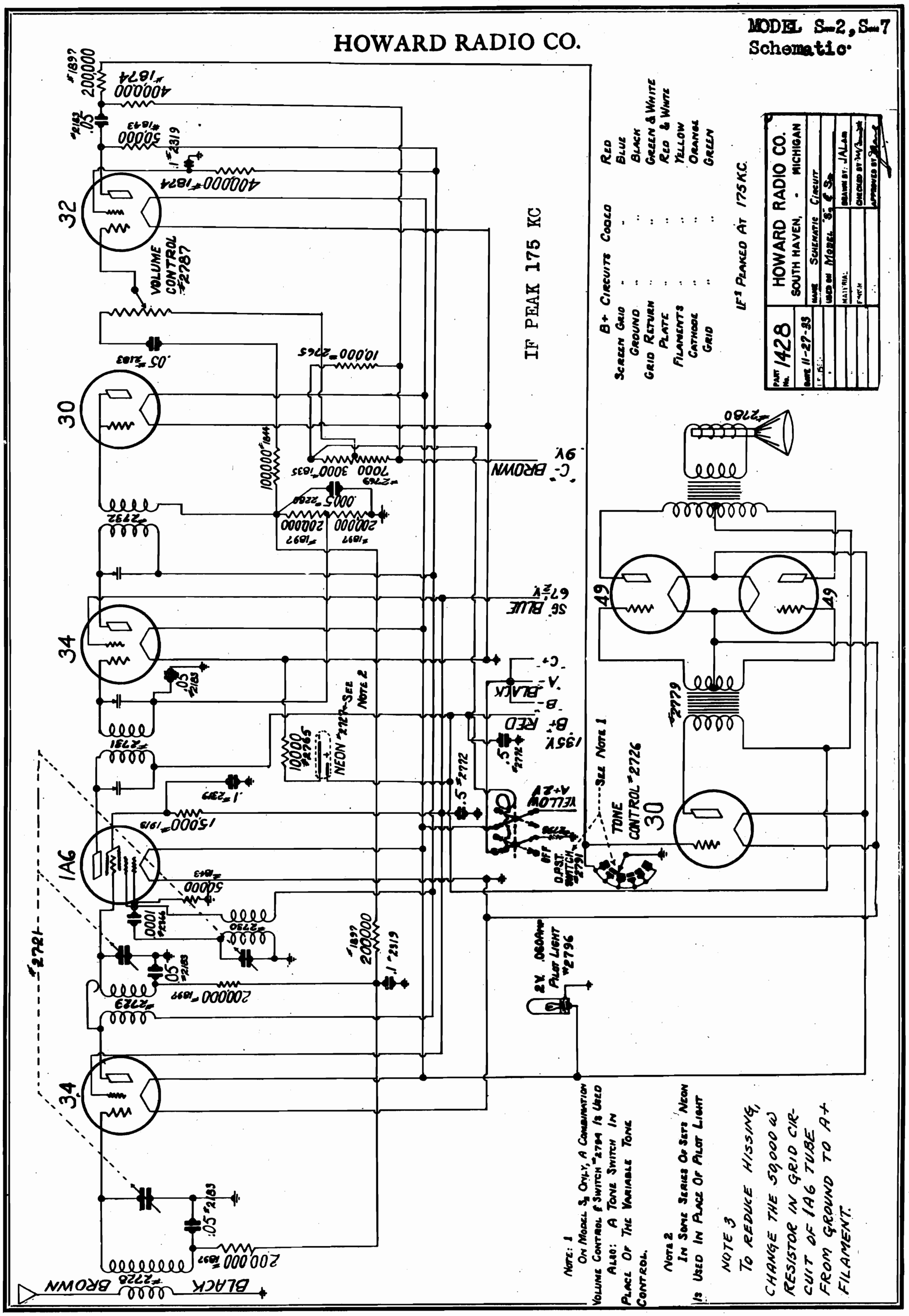
MODEL 58
Schematic



MODEL 156
MODEL 158
Schematic

HERBERT H. HORN




HOWARD RADIO CO.
MODEL S-2, S-7
Schematic
IF PEAK 175 KC
B+ Circuits Coded Red
Screen Grid " Blue
Ground " Black
Grid Return " Green & White
Plate " Red & White
Filaments " Yellow
Cathode " Orange
Grid " Green
IF¹ Peaked At 175 K.C.
HOWARD RADIO CO.
SOUTH HAVEN, - MICHIGAN
Part No. 1428
Date 11-27-33
Name Schematic Circuit
Used on Model "S2 & S7"
Note: 1
On Model S2 Only, A Combination Volume Control & Switch #2794 Is Used
Also: A Tone Switch In Place Of The Variable Tone Control.
Note 2
In Some Series Of Sets Neon Is Used In Place Of Pilot Light
Note 3
To reduce hissing, change the 50,000 ω resistor in grid circuit of 1A6 tube from ground to A+ filament.

MODEL Q
Alignment Data

HOWARD RADIO CO.

ALIGNMENT

The R.F. and oscillator stages are adjusted in the usual way.

Set the pointer on the dial to about 540 with the condenser rotors fully in.

Align the set at 1400 with the pointer slightly less than 1400 or about 1395.

The I.Fs are tuned to 170 K.C. as mentioned above.

NOTE B -- In certain localities near certain stations there may be a point on the dial where a so-called "tweet" is objectionable; a few lesser tweets are natural and to be expected. However, if necessary, the I.Fs can be changed to a slightly different frequency such as 171 K.C. or 169 K.C. or any point where the tweet will be shifted to a point where it is not objectionable. It is not advisable to go more than 5 K.C. each way from 170 K.C.

NOTE C -- When making the alignment in any circuit with a signal generator, always keep the input low so that overloading will not take place and a more accurate adjustment can be made.

NOTE D -- The phonograph attachment can be made (if the set has not been ordered for phonograph arrangement and is already changed) by feeding the high impedance pick-up directly into the grid of the 77 Audio tube. The volume control wiring can be revised to also control the phonograph reproduction. However, if the arrangement is only for temporary use, merely without removing chassis from cabinet remove the grid cap and feed directly into the 77 tube.

NOTE E -- In case of oscillation, it is suggested that the .1 mfd condenser #2319 on the common cathode circuits of the three tubes be changed to a .25 mfd condenser.

This condenser has already been changed on sets starting with number 70550 and also on certain sets between 70400 and 70550.

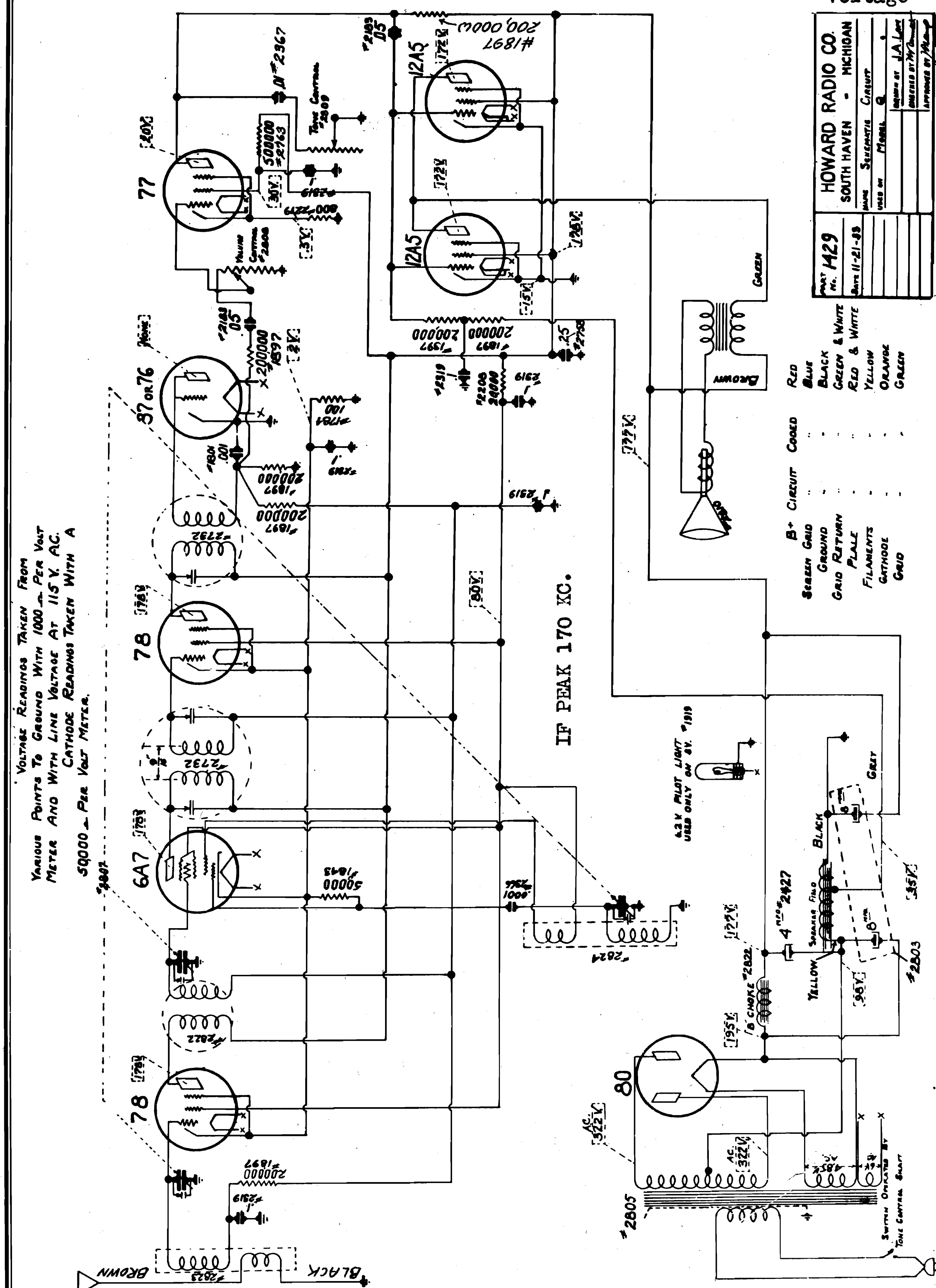
NOTE F -- On sets with serial number 70400 and above, the last I.F. stage is changed to a double tuned unit. This is for the purpose of improving the selectivity. The part number of this unit is 2731.

NOTE G -- When checking for oscillation, be sure the tube shields are properly grounded.

NOTE H -- Motor-boating may be caused by rosin connections around the grid returns of the AVC circuits.

HOWARD RADIO CO.

MODEL Q
Schematic
Voltage



MODEL X-2,X-3,X-8
Alignment Data

HOWARD RADIO CO.

GAINING

This receiver uses an intermediate frequency of 175 kc. There are no over-coupled stages in this receiver, and due to the fact that the Neon light operates as a vacuum tube voltmeter, you may use the Neon light as a tuning indicator in the following manner: 175 kc fed into the grid of the 6-A-7 may be increased to the point where the Neon light begins to get dim. Then tune the three I.F. circuits until the light either goes out or dims somewhat. If the light goes out, decrease the input from your oscillator until it lights again; then gain the set again. Keep this up until you can't make the Neon light dim. This will indicate exact resonance. The same procedure can be taken with the R.F. circuit; also the oscillator. The oscillator circuit is a so-called cut plate condenser, and it is only necessary to adjust this receiver at 1400 kc, and then check at 600 kc. If 600 kc does not come on the right place, adjust the plates of this condenser slightly to take care of this condition.

ADJUSTMENT OF THE TUNING MECHANISM

The proper amount of friction between the rubber pulley and the large drive pulley is obtained by merely loosening the screw just left of the tuning shaft, and since the screw hole is elongated, this allows the rubber to be pressed against the drive pulley. If this pressure is made too tight, the tuning knob will turn too hard. Not enough pressure will naturally cause slipping. The best way to determine the right amount of friction is to turn the variable condenser to maximum rotation of the top of the dial and adjust the friction rubber until it is tight, yet not so tight that it can not be slipped by using extra effort to do so.

Slack in the drive cord may be taken up by loosening the screw holding the lug on the drive pulley and pulling the string tighter by shifting the lug. (On some of the earlier sets the lug is not used and the slack in the cord is taken up by removing the same screw and twisting the loop end of the cord around a few times.

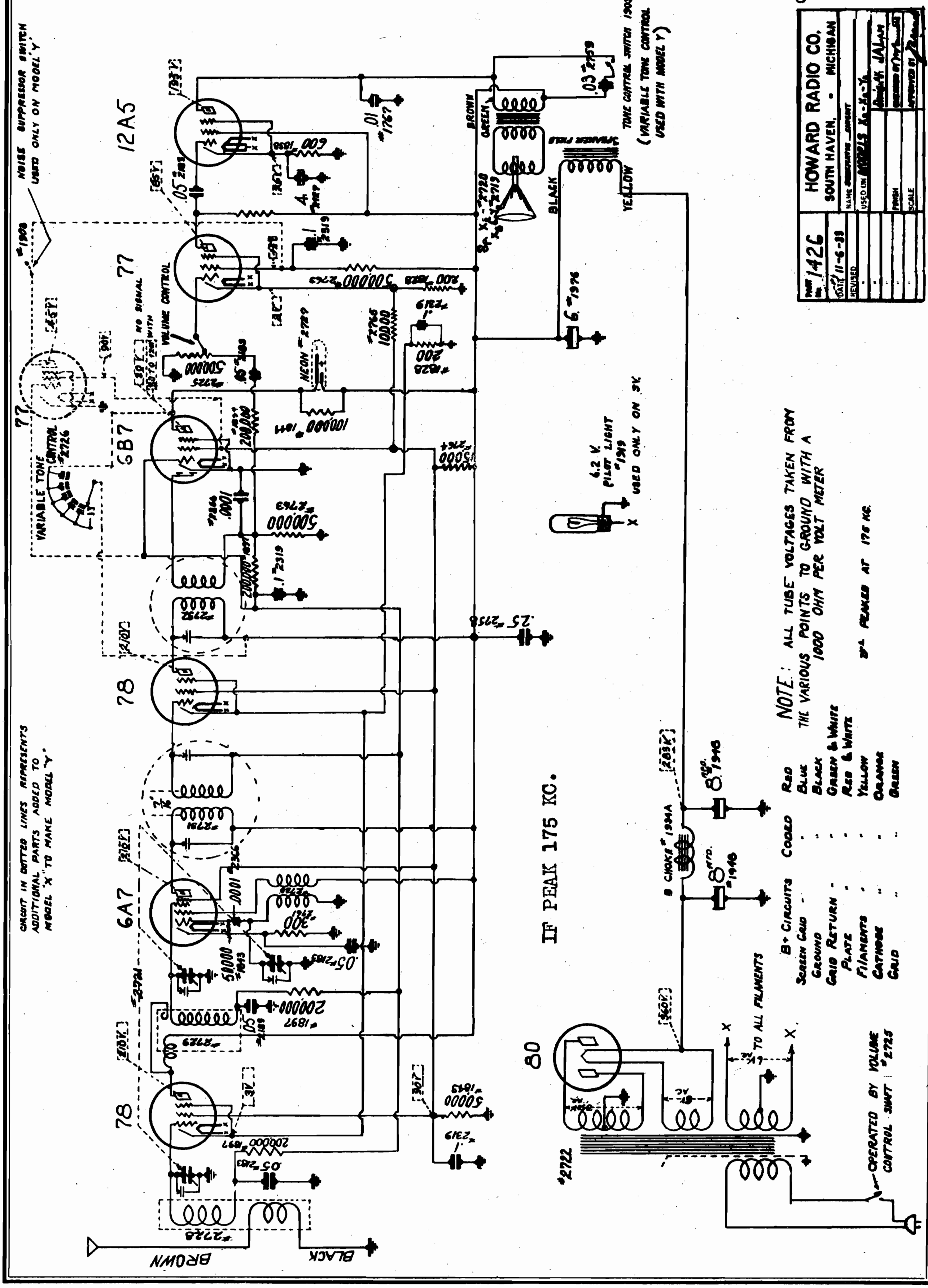
The moving indicator is pulled up and down with the drive cord connected at opposite corners. This is to avoid any danger of back-lash. This also means that the slider only rides against the outside edges of the slide track at only two points.

The adjustment between the slider and the track is accomplished by loosening the right-hand track at each end and allowing sufficient clearance. Too much clearance will cause the slider to tilt, while not enough will cause it to bind and the drive to turn hard. This track is lubricated with oil-dag.

NOTE 1 - In certain localities, especially close to the broadcasting stations, trouble may be encountered that the volume control will not bring the signal down to complete shut-off even when the control is turned to the extreme left rotation. This may be corrected by isolating the 77 Audio tube in regard to the common cathode from the rest by inserting an 800 ohm resistor from the cathode to ground and disconnect the wire running from that point to the other cathodes.

NOTE 2 - The sensitivity of these receivers is very good. Therefore, it may be advisable in noisy districts to place a 50,000 or 100,000 ohm resistor across one of the I.F. primaries. The sensitivity is so high that this will not impair the performance of the set to any extent.

MODEL X-2,X-3,X-8
Schematic
Voltage



MODEL Z-4
Alignment Data

HOWARD RADIO CO.

GAINING

This receiver uses an intermediate frequency of 175 kc. There are no over-coupled stages in this receiver, and due to the fact that the Neon light operates as a vacuum tube voltmeter, you may use the Neon light as a tuning indicator in the following manner: 175 kc fed into the grid of the 6-A-7 may be increased to the point where the Neon light begins to get dim. Then tune the three I.F. circuits until the light either goes out or dims somewhat. If the light goes out, decrease the input from your oscillator until it lights again; then gain the set again. Keep this up until you can't make the Neon light dim. This will indicate exact resonance. The same procedure can be taken with the R.F. circuit; also the oscillator. The oscillator circuit is a so-called cut plate condenser, and it is only necessary to adjust this receiver at 1400 kc, and then check at 600 kc. If 600 kc does not come on the right place, adjust the plates of this condenser slightly to take care of this condition.

ADJUSTMENT OF THE TUNING MECHANISM

The proper amount of friction between the rubber pulley and the large drive pulley is obtained by merely loosening the screw just left of the tuning shaft, and since the screw hole is elongated, this allows the rubber to be pressed against the drive pulley. If this pressure is made too tight, the tuning knob will turn too hard. Not enough pressure will naturally cause slipping. The best way to determine the right amount of friction is to turn the variable condenser to maximum rotation of the top of the dial and adjust the friction rubber until it is tight, yet not so tight that it can not be slipped by using extra effort to do so.

Slack in the drive cord may be taken up by loosening the screw holding the lug on the drive pulley and pulling the string tighter by shifting the lug. (On some of the earlier sets the lug is not used and the slack in the cord is taken up by removing the same screw and twisting the loop end of the cord around a few times.)

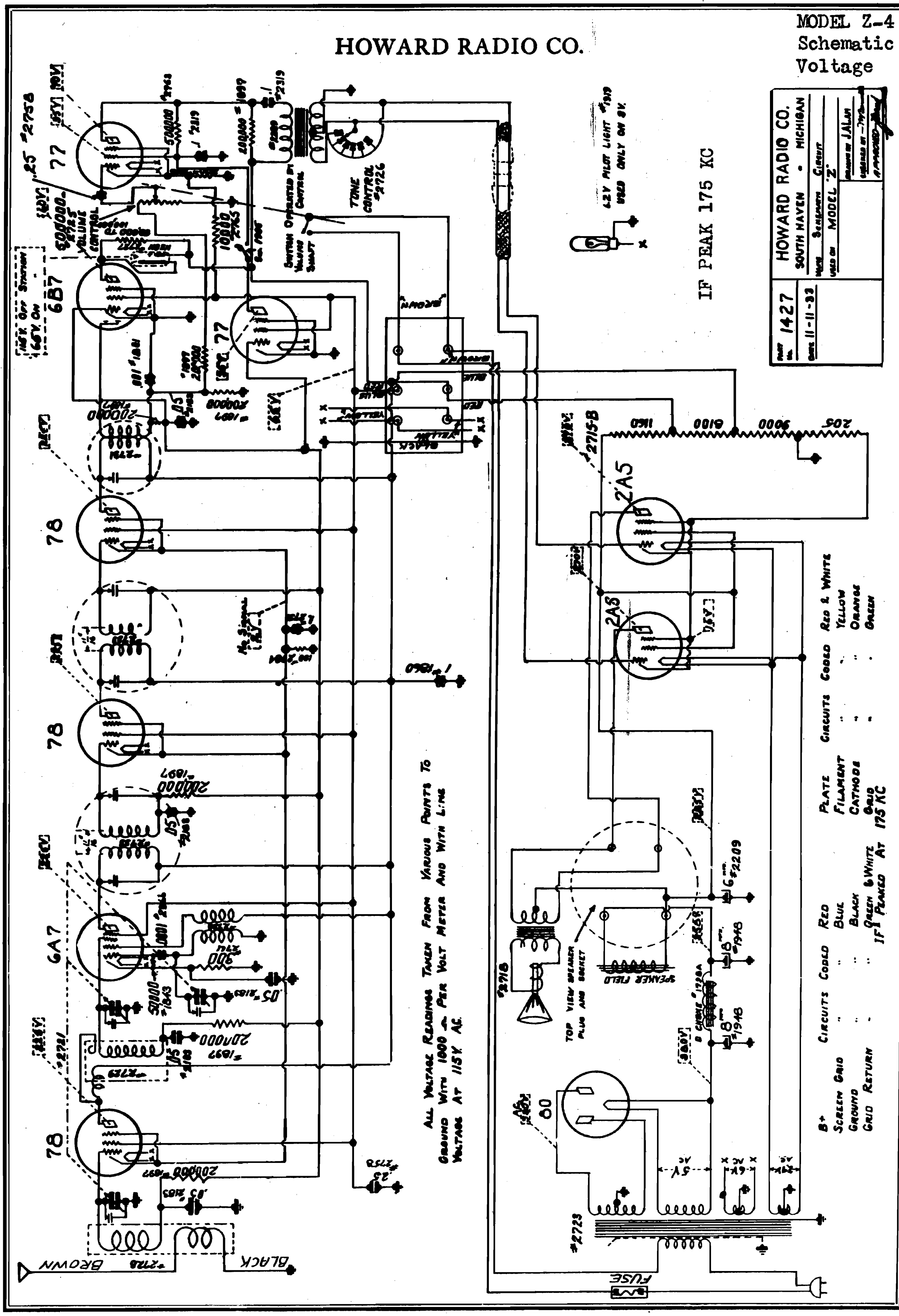
The moving indicator is pulled up and down with the drive cord connected at opposite corners. This is to avoid any danger of back-lash. This also means that the slider only rides against the outside edges of the slide track at only two points.

The adjustment between the slider and the track is accomplished by loosening the right-hand track at each end and allowing sufficient clearance. Too much clearance will cause the slider to tilt, while not enough will cause it to bind and the drive to turn hard. This track is lubricated with oil-dag.

The 6-volt pilot light is only being used on 3 volts and should never burn out. If the light goes out, check first to determine if the bulb is merely loose in its socket.

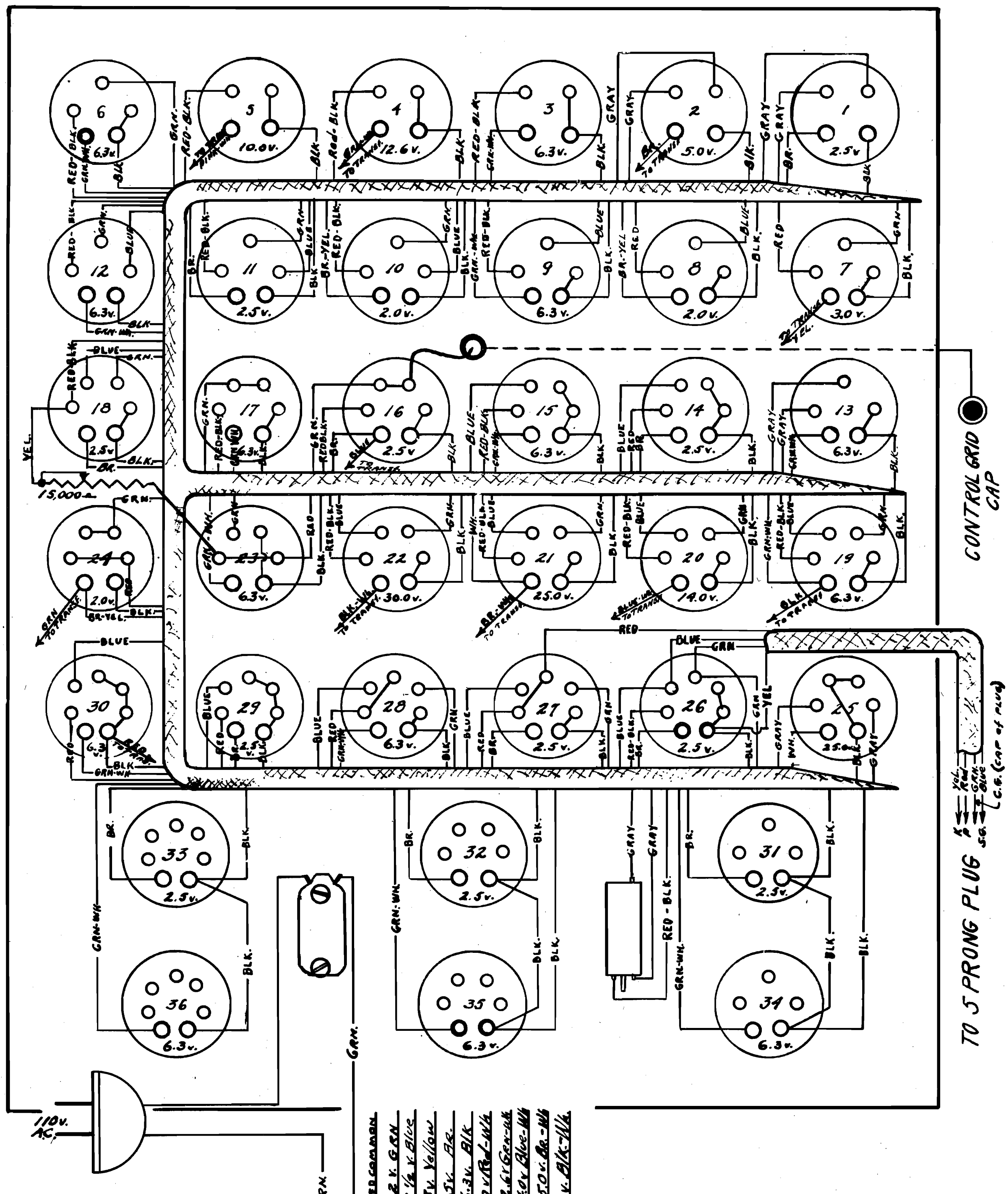
MODEL Z-4
Schematic
Voltage

HOWARD RADIO CO.



INSULINE CORP. OF AMERICA

MODEL Auxiliary Tube Checker
Schematic



Issue 2. Aug. 7, 1933

The following changes made in cable color code.
(Transformer lead colors unchanged.)

RED-WH.	Replaced by	RED-BLK
TAN	" "	BR.-YEL.
BLUE-WH.	" "	GRN.-WH.

ICA AUXILIARY TUBE TESTER	
DATE~AUG. 3, 1933.	
DRAWN~F.H.	MODEL~ A.C. 25~ or 60~
CHECKED~B.E.	
DESIGNED~R.H.S.	
APPROVED~A.G.H.	

INSULINE CORP. OF AMERICA.
23-25 PARK PLACE, NEW YORK, N.Y. U.S.A.

MODEL Auxiliary Tube Checker Chart INSULINE CORP. OF AMERICA

AUXILIARY TUBE TESTER SOCKET CHART

1	2	3	4	5	6
82 2Y3	80 83 5Z3 RE-1 AG	1 1-V KR1	12Z3	KR96-31	37 67

7	8	9	10	11	12
485	15 G2 G4	'36 64 '38 65 '39 68 '44	'33 '49	'46 '47 PZ	'52 LA 6A4

13	14	15	16	17	18
84 KR98-28 6Z4	'57 '58	77 87F 78 88F 89 6C6 6D6	55 90 29 AH Wund.2.5 v. 2A6	75 85 69 Wund.6.3 v. 92	2A5 PZH 95

Grid Clip Lead

19	20	21	22	23	24
41 42	18	43	48	79 6Y5	19

25	26	27	28	29	30
25Z5	59 2B6	2A7 2F7	6A7 6E7 6F7	2B7 2D7	6B7 6D7

Preheater Sockets

31	32	33
5 prongs 2.5 v.	6 prongs 2.5 v.	7 prongs 2.5 v.

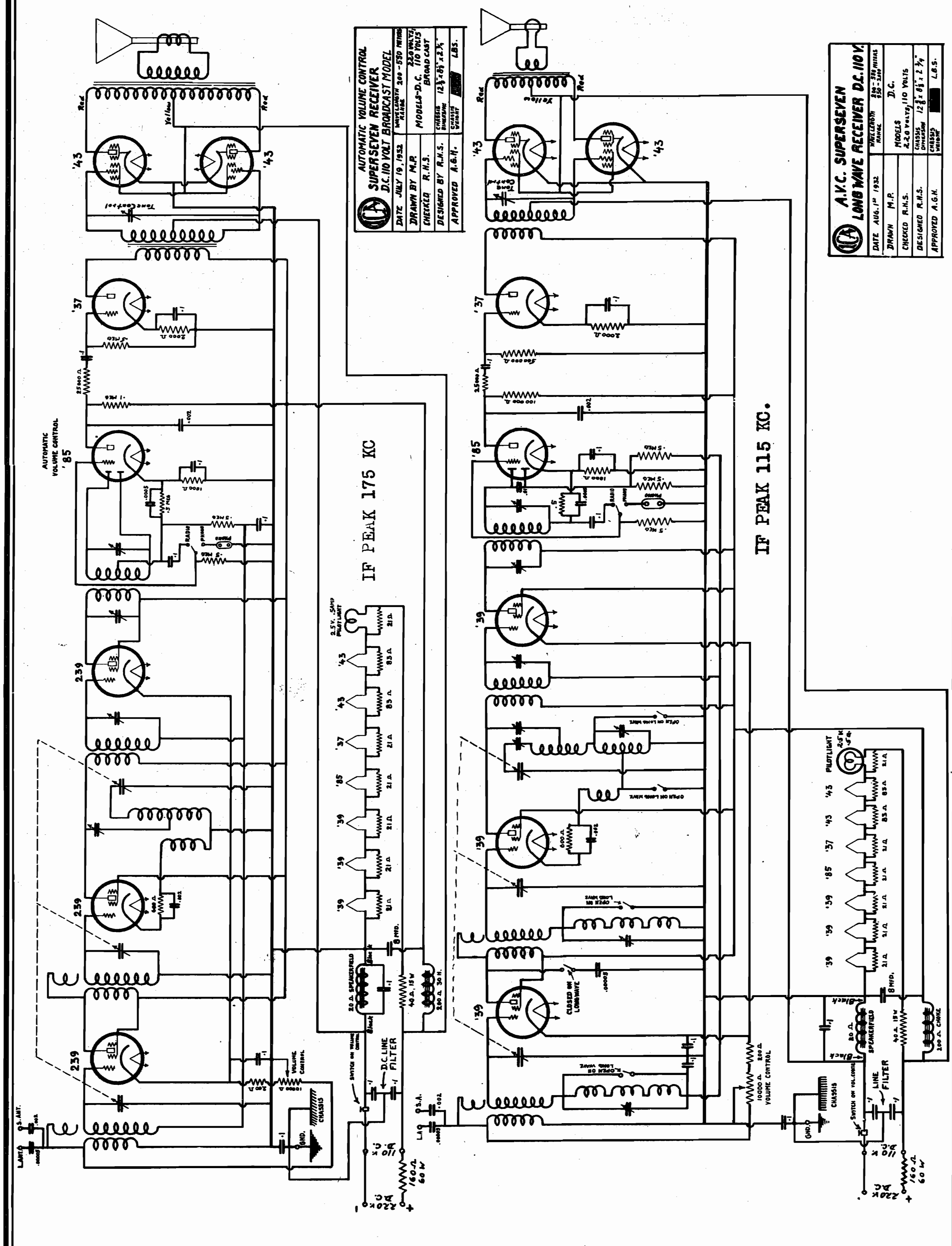
Rectifier Switch: P1 / P2

Power Switch: ON / OFF

34	35	36
5 prongs 6.3 v.	6 prongs 6.3 v.	7 prongs 6.3 v.

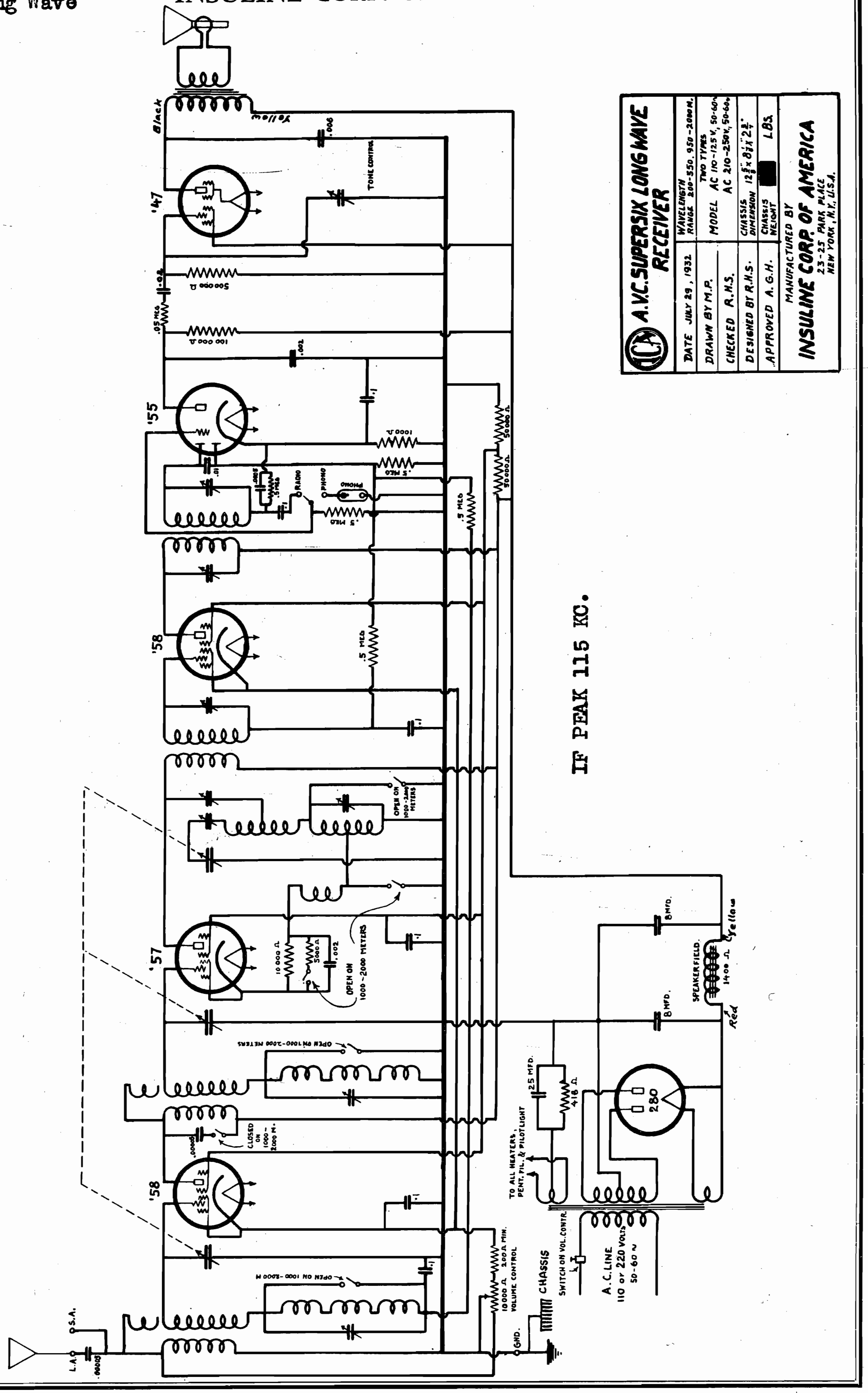
INSULINE CORP. OF AMERICA

MODEL DC 110 Volt AVC
Super Seven
Long Wave
Broadcast



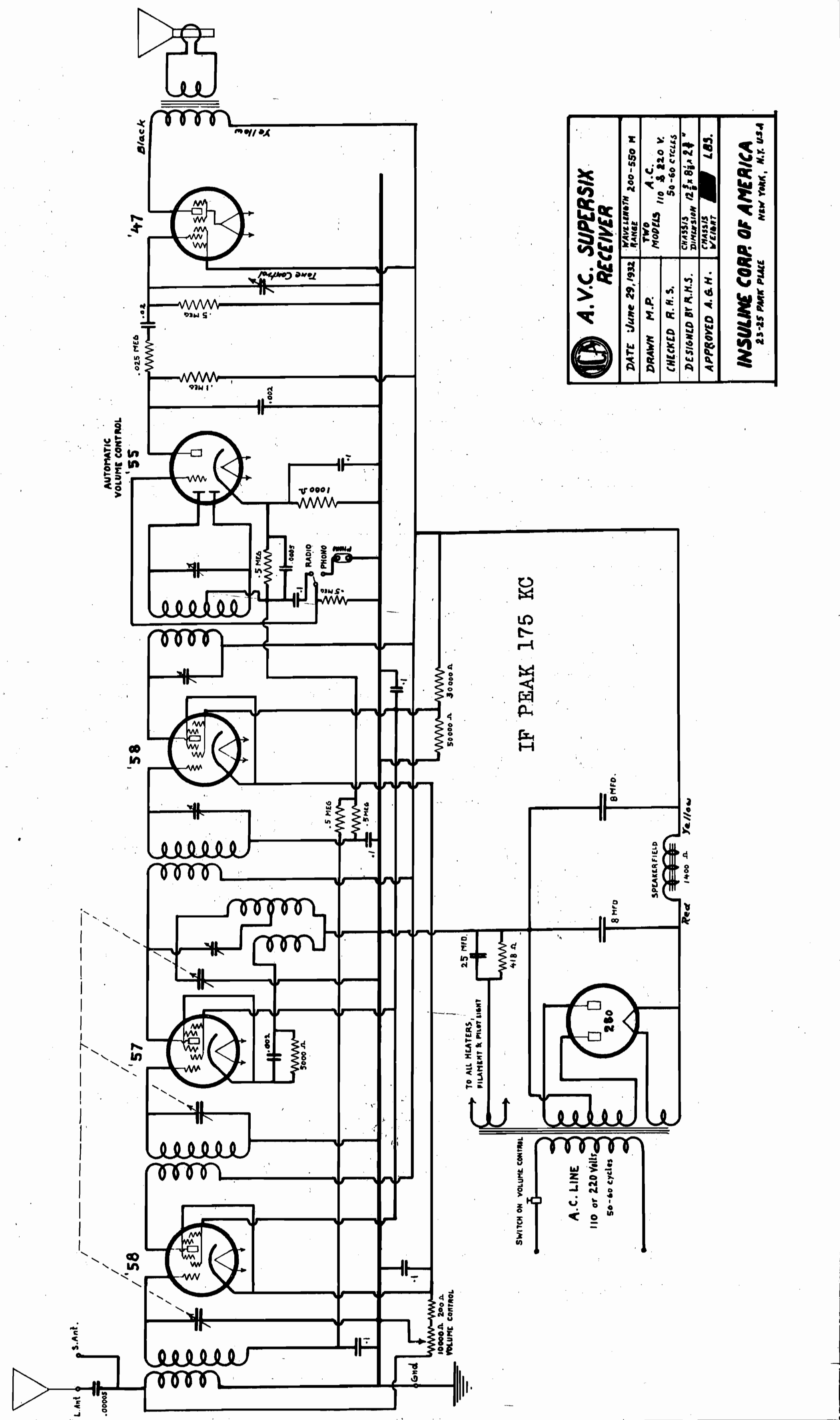
MODEL Super Six AVC
Long Wave

INSULINE CORP. OF AMERICA



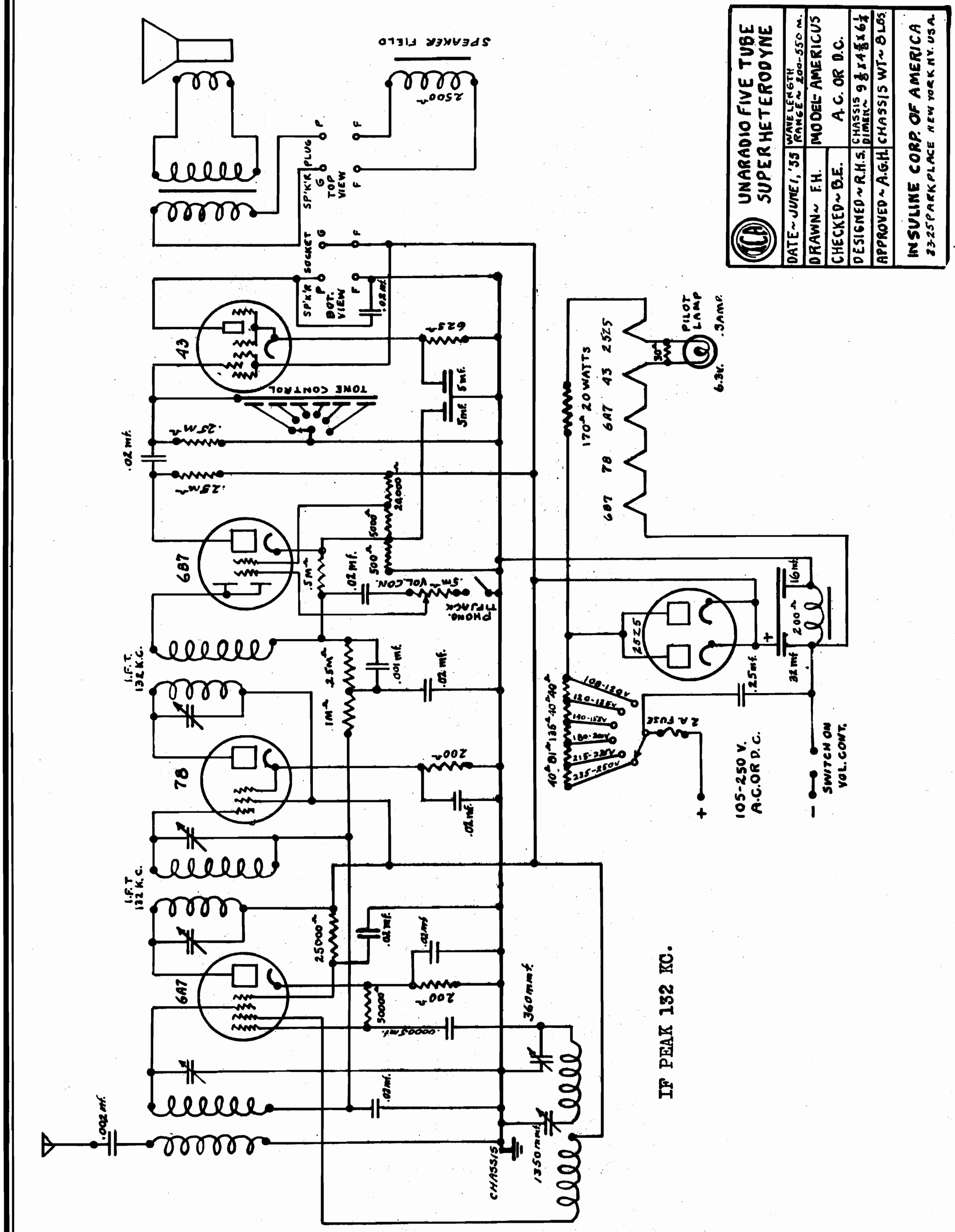
INSULINE CORP. OF AMERICA

MODEL Super Six AVC
Broadcast



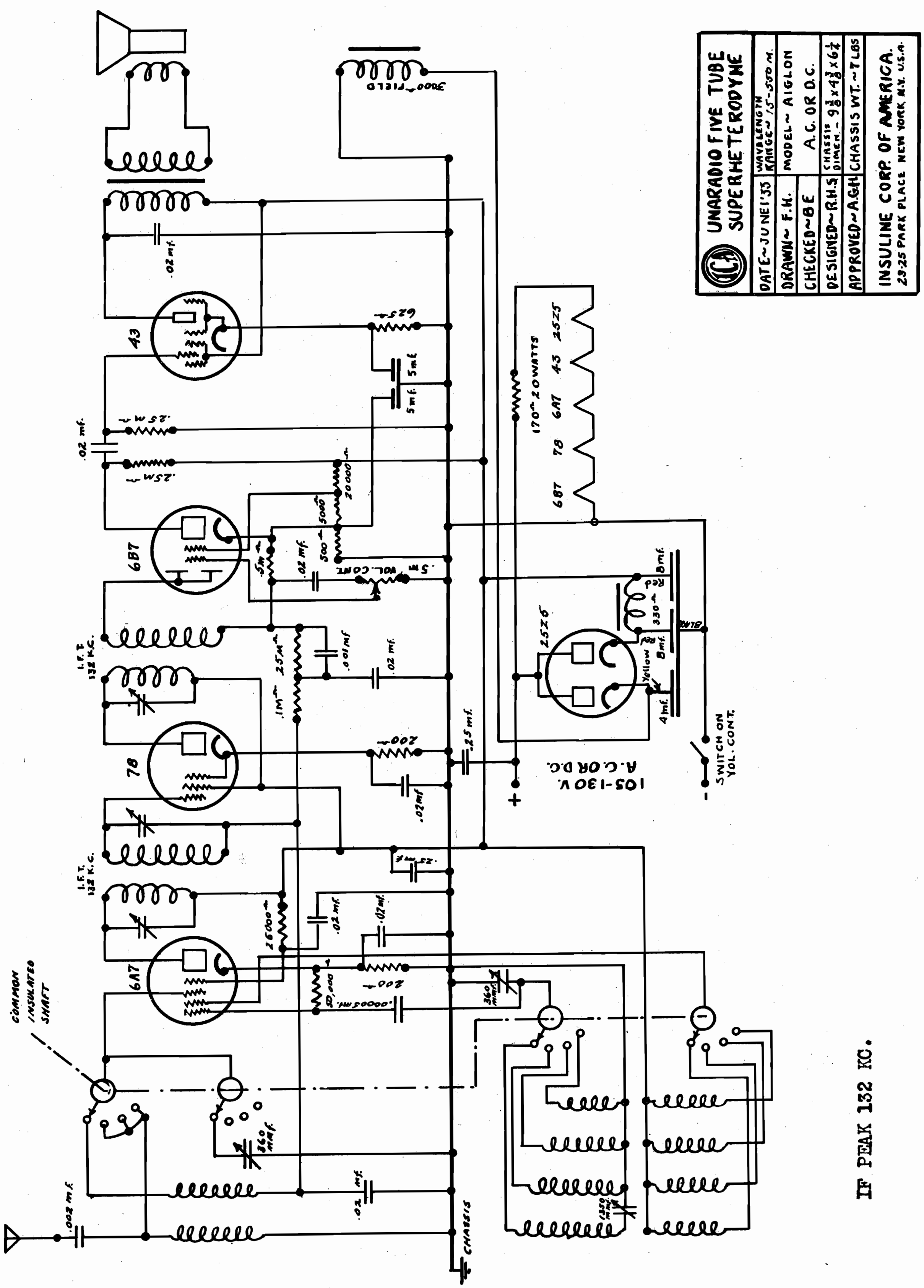
MODEL 5 Tube Unaradio
Super. AC-DC
"Amerious"

INSULINE CORP. OF AMERICA



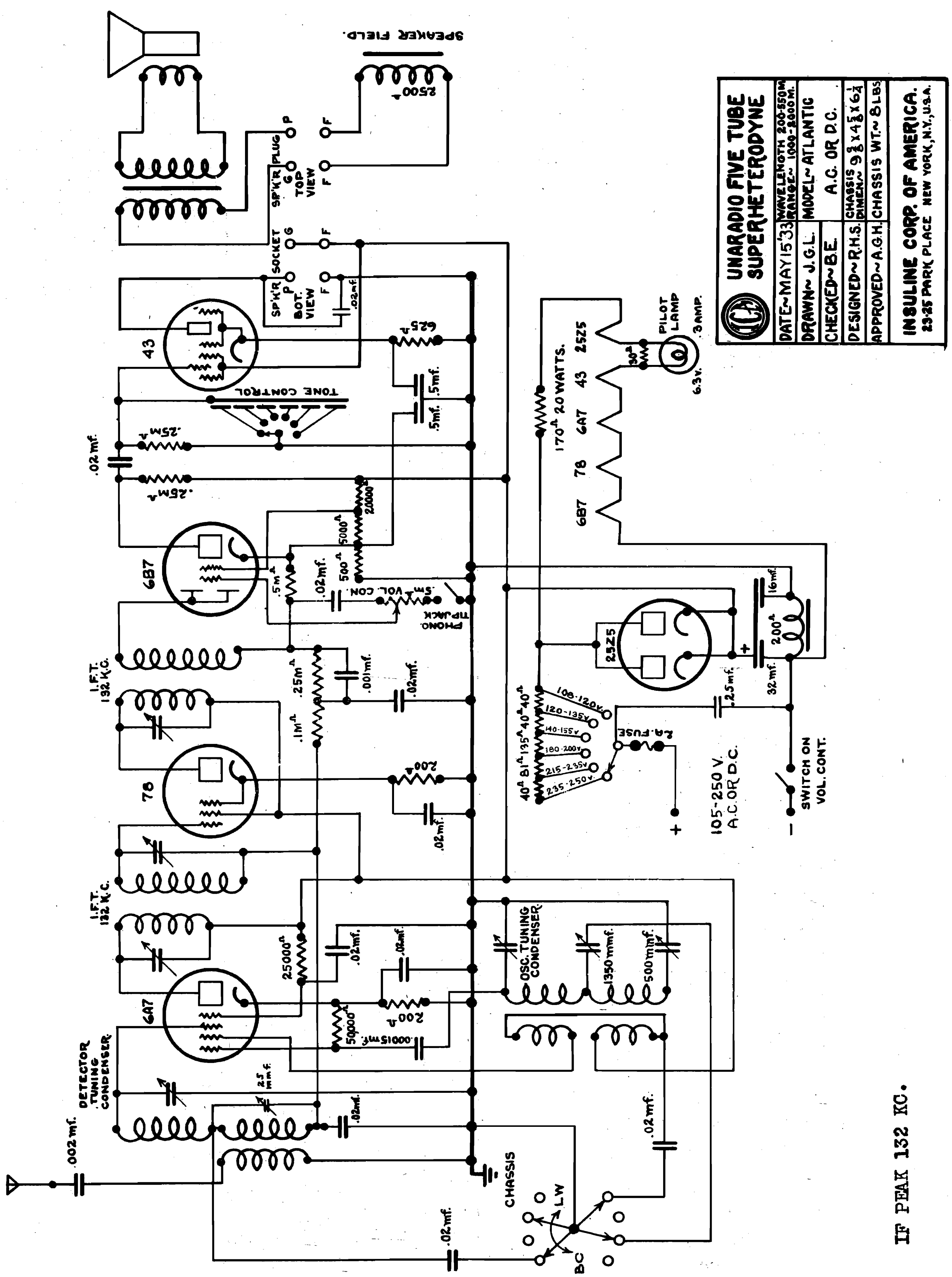
INSULINE CORP. OF AMERICA

MODEL 5 Tube Unaradio
Super. AC-DC
"Aiglon"



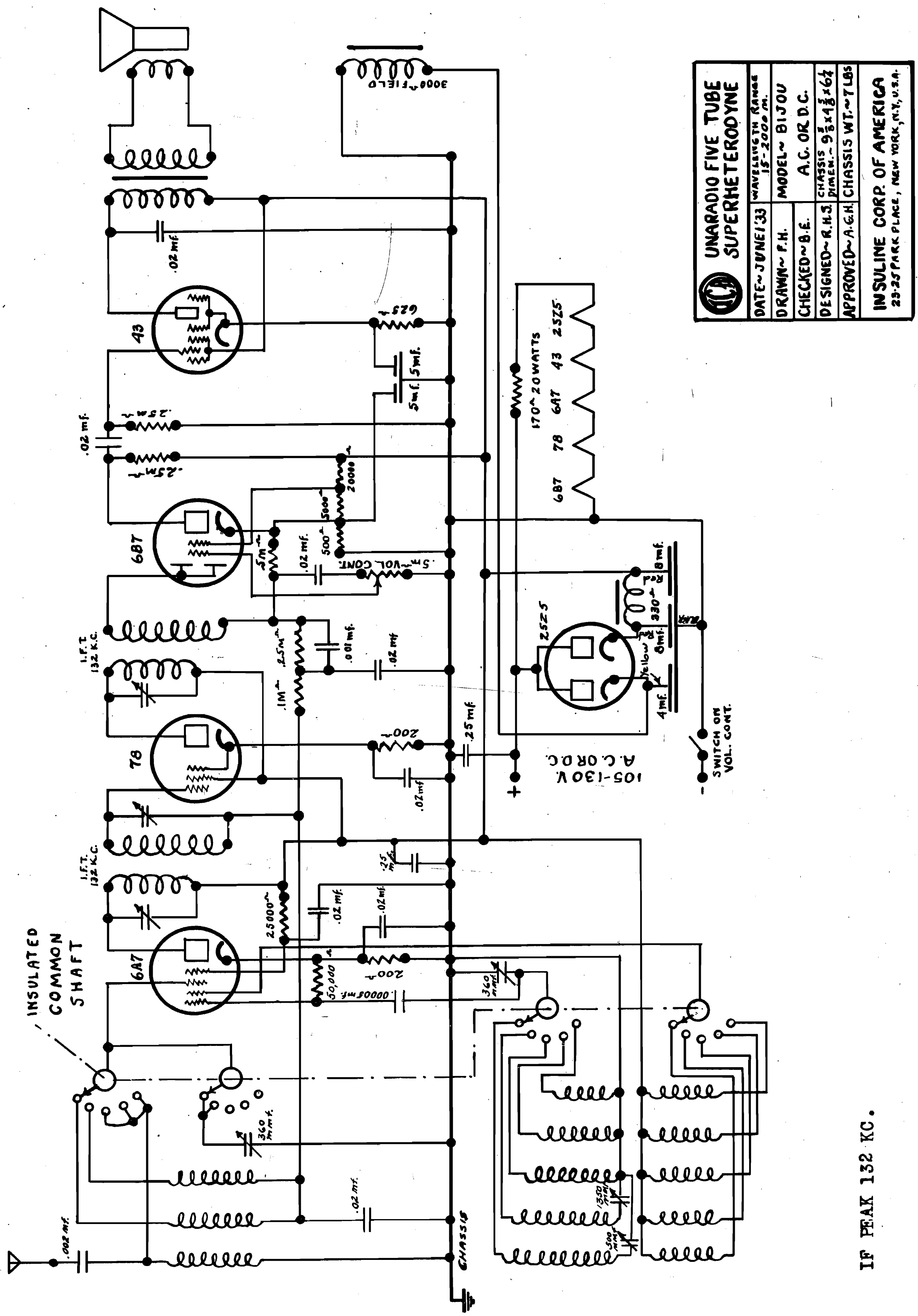
MODEL 5 Tube Unaradio
Super. AC-DC
"Atlantic"

INSULINE CORP. OF AMERICA



INSULINE CORP. OF AMERICA

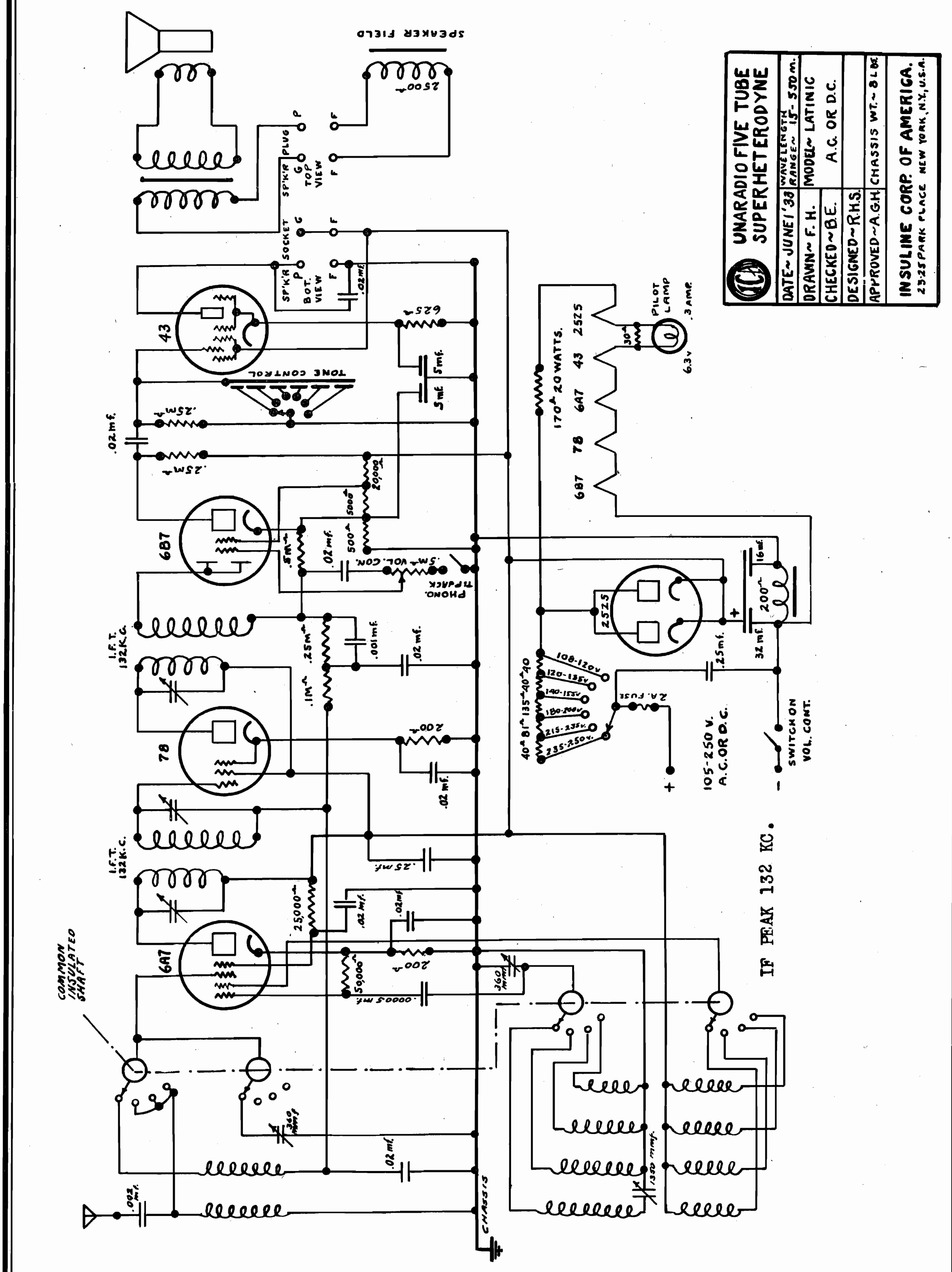
MODEL 5 Tube Unaradio Super. AC-DC "Bijou"



IF PEAK 132 KC.

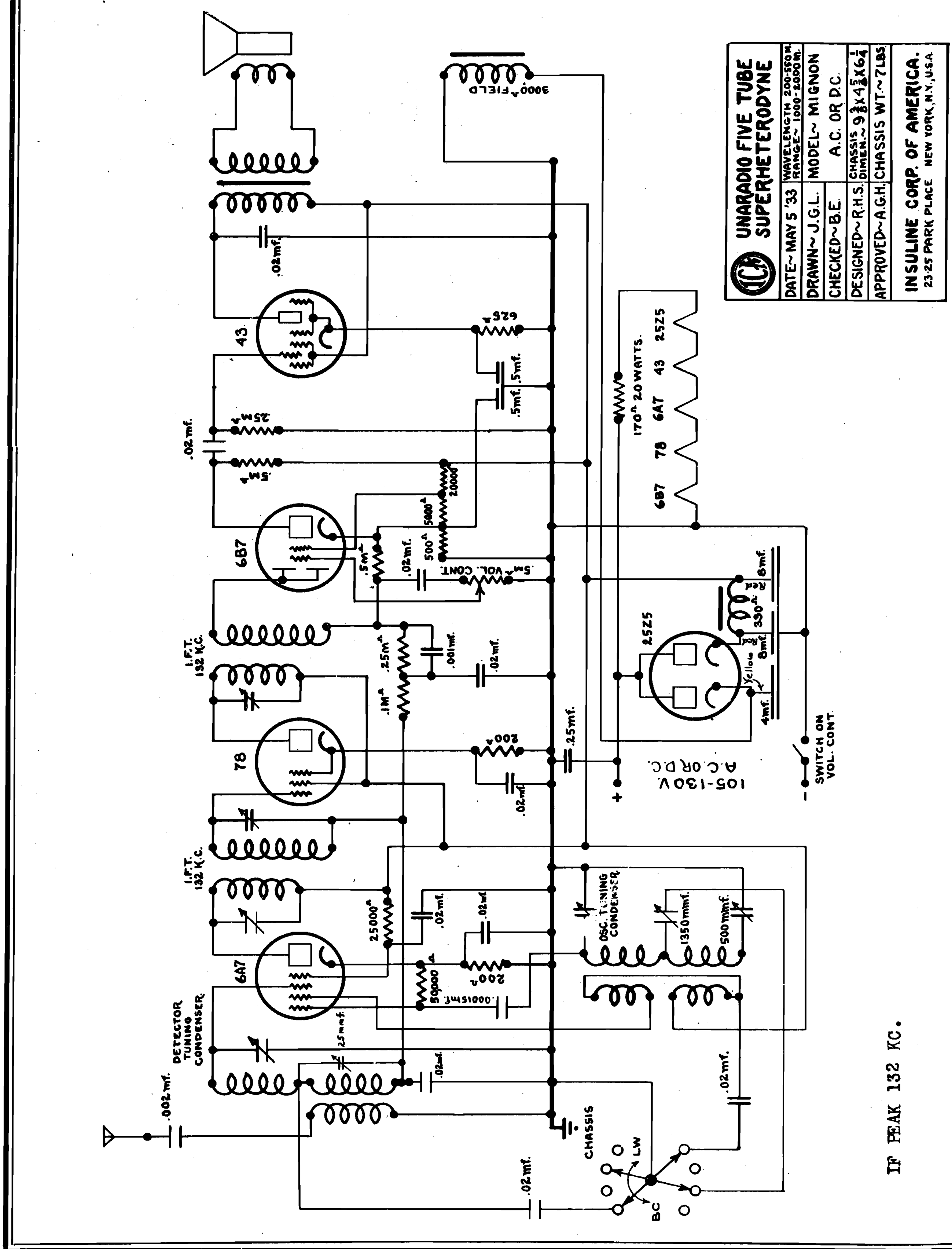
MODEL 5 Tube Unaradio Super. AC-DC "Latinic"

INSULINE CORP. OF AMERICA



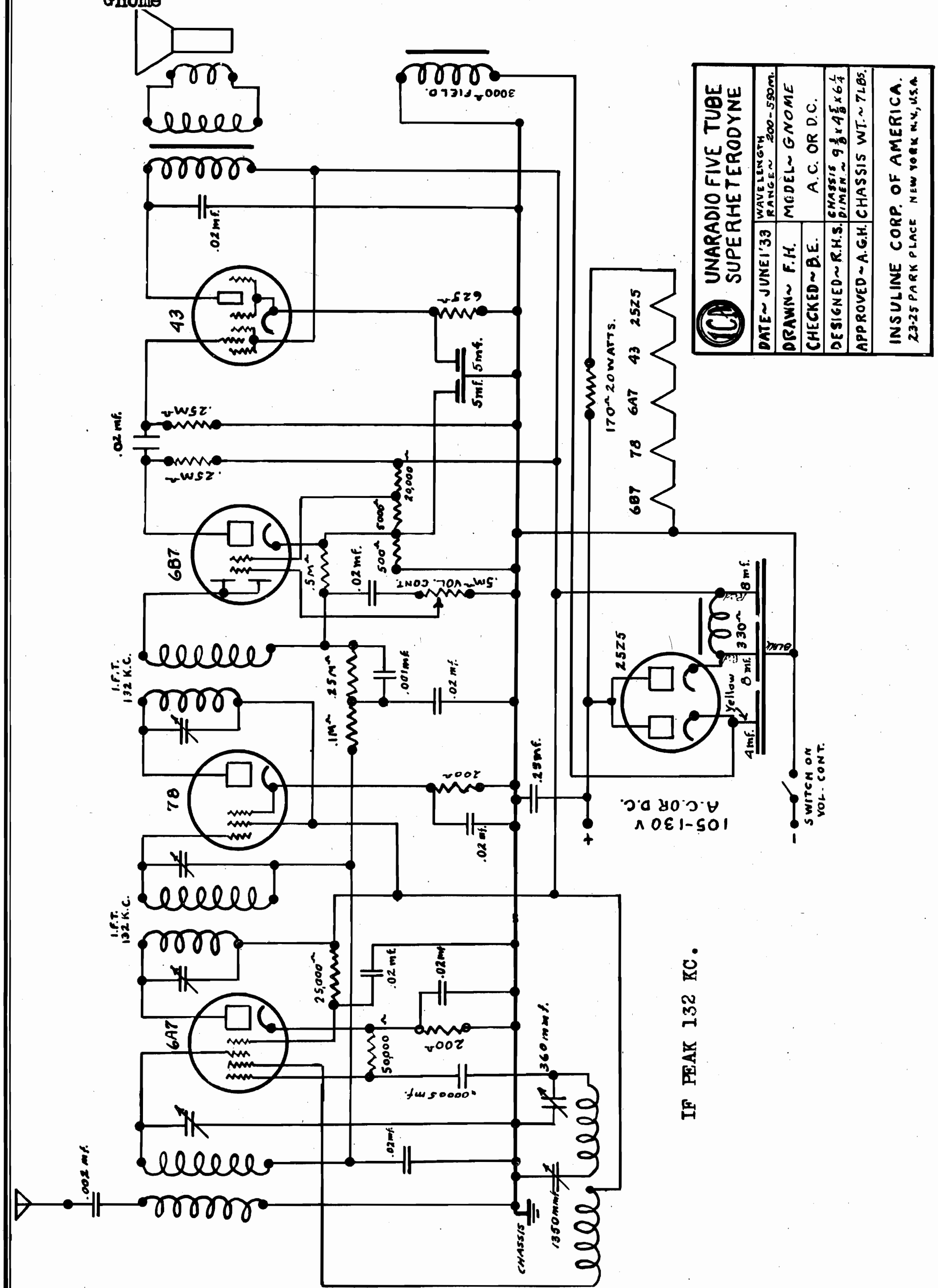
INSULINE CORP. OF AMERICA

MODEL 5 Tube Unaradio Super. AC-DC "Mignon"



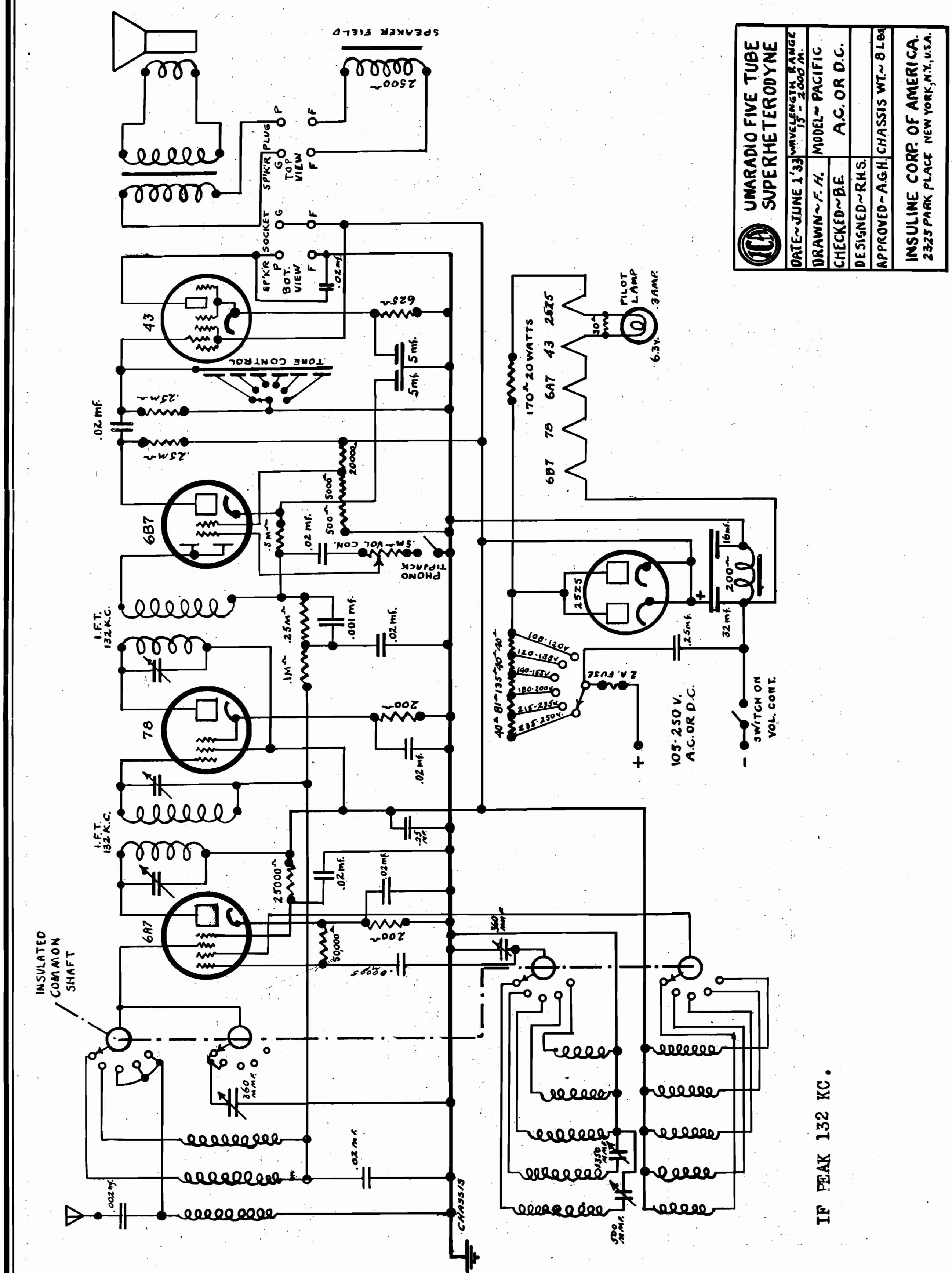
MODEL 5 Tube Unaradio
Super. AC-DC
"Gnome"

INSULINE CORP. OF AMERICA



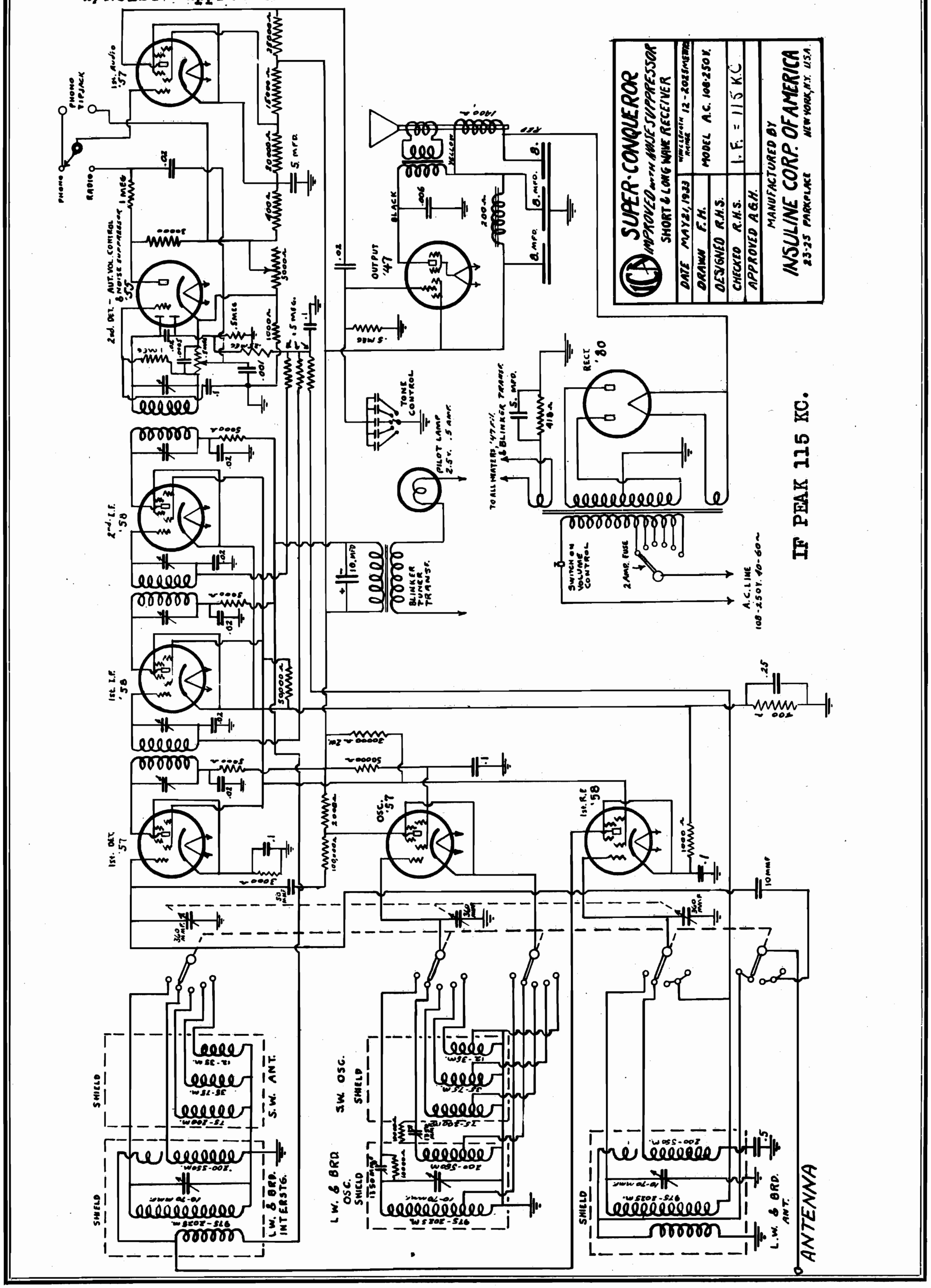
INSULINE CORP. OF AMERICA

MODEL 5 Tube Unaradio Super. AC-DC "Pacific"



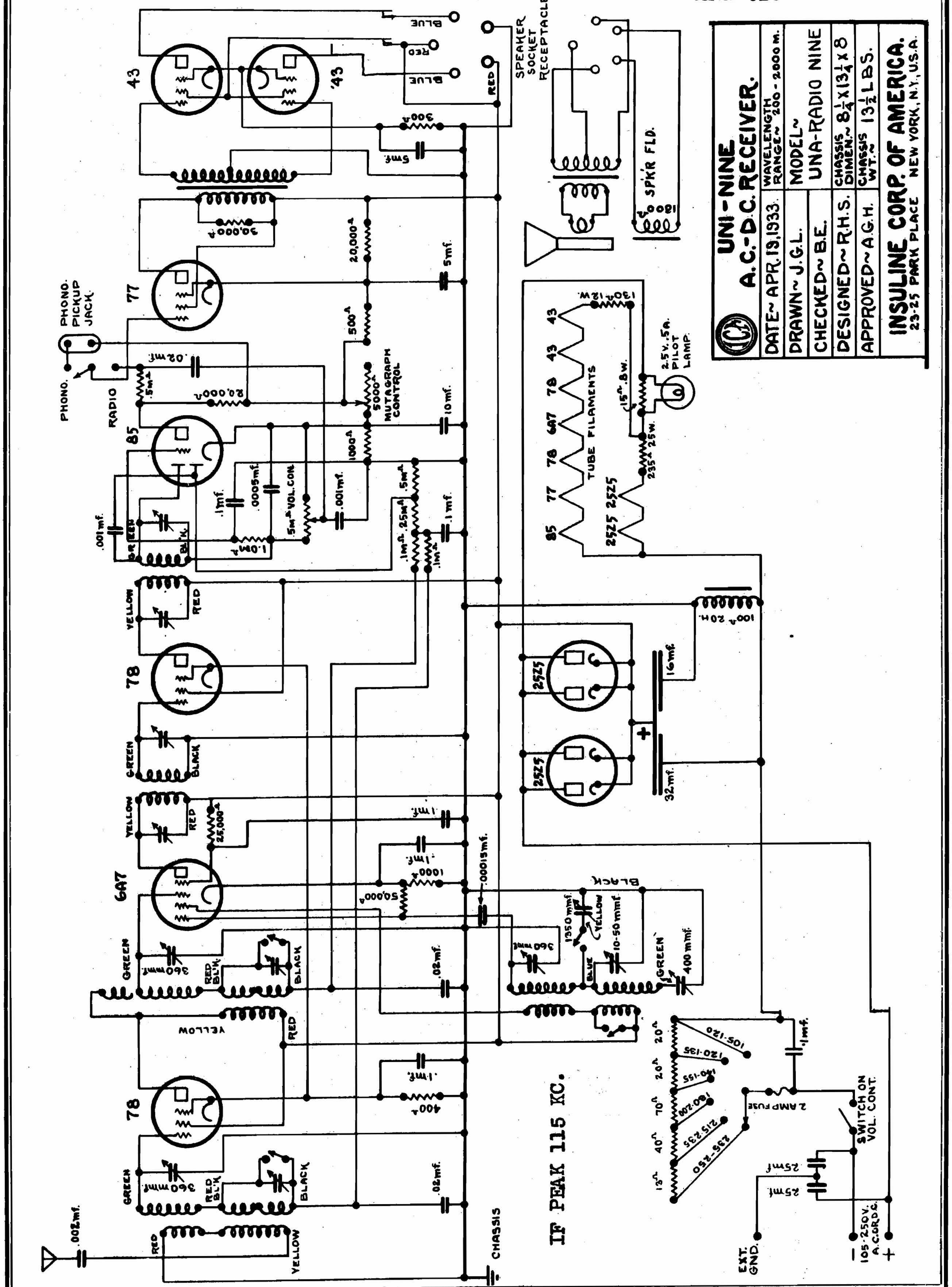
MODEL "Super-Conqueror"
AC 108-250 Volt
w/Noise Suppressor

INSULINE CORP. OF AMERICA



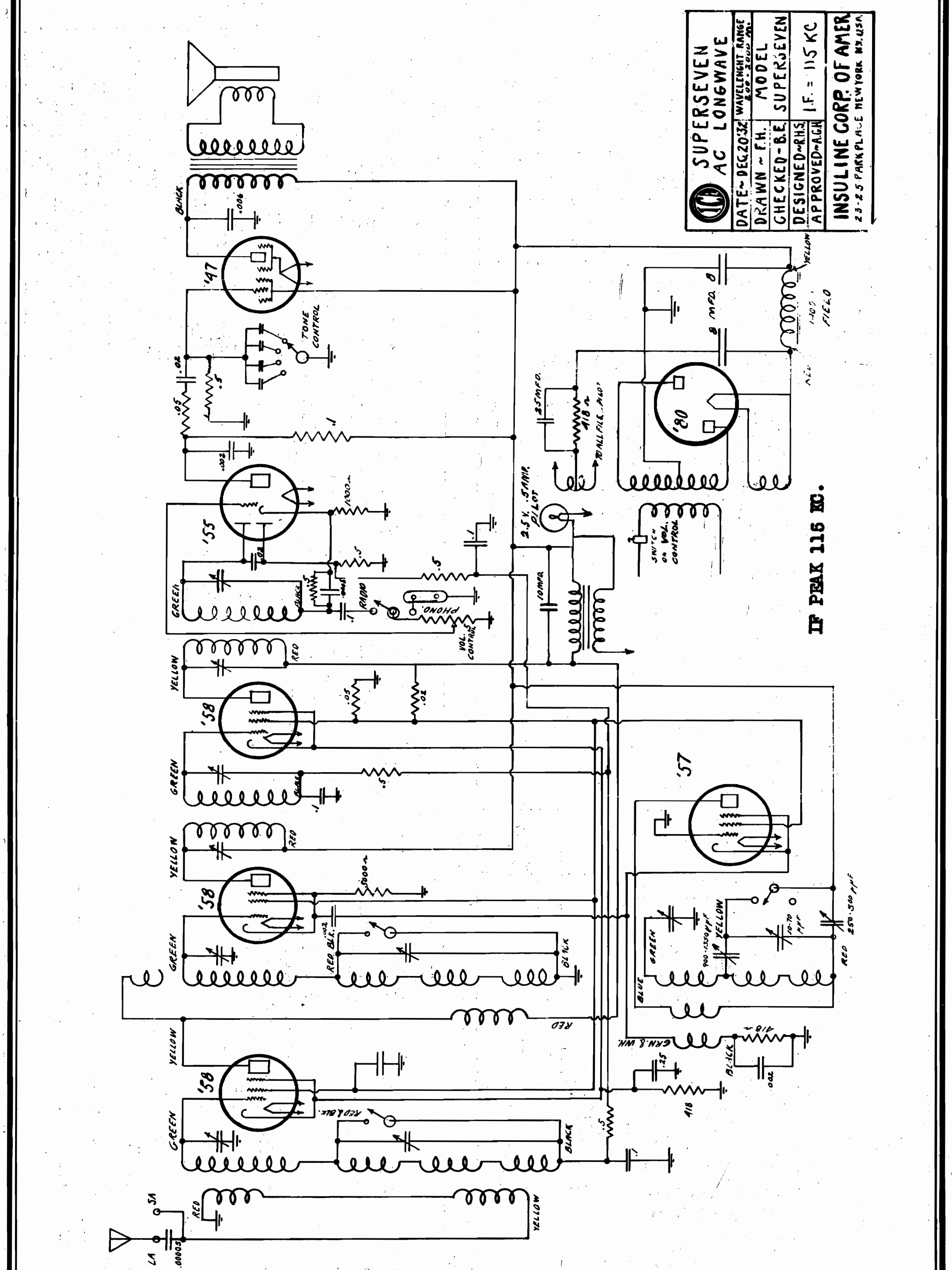
INSULINE CORP. OF AMERICA

MODEL "Una-Radio Nine"
AC-DC
Schematic



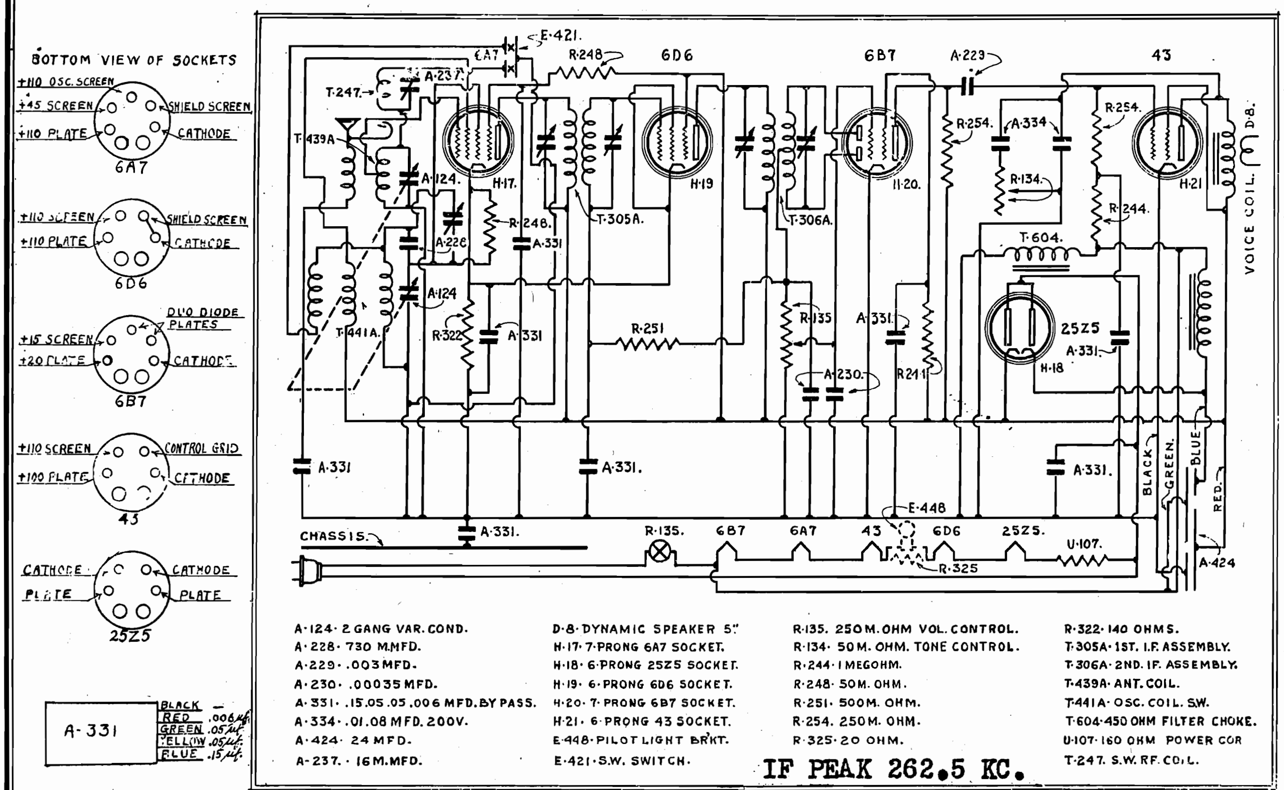
MODEL "Superseven"
AC Long Wave

INSULINE CORP. OF AMERICA



MODEL A, B Kadette
Schematic, Parts List

INTERNATIONAL RADIO CORP.



Part No.	Name	List Price
A-124	Two gang condenser	$ 1.50
A-228	.00073 Mfd. mica condenser	.20
A-229	.003 Mfd. mica condenser	.20
A-230	.00035 Mfd. mica condenser	.20
A-237	16 Mmfd. condenser	.15
A-331	.006 Mfd. paper condenser .05 Mfd. paper condenser .05 Mfd. paper condenser .15 Mfd. paper condenser	.40
A-334	.08 Mfd. paper condenser .01 Mfd. paper condenser	.15
A-424	Electrolytic condenser	1.35
D-8	Dynamic Speaker	3.50
E-131	B Knob, Large	.10
E-140	B Knob, Small	.10
E-133	A Knob, Large	.10
E-132	A Knob, Small	.10
E-405	Pilot Light	.15
E-421	Short wave switch	.45
E-448	Pilot Light bracket and socket	.15
H-17	6A7 Tube Socket	.10
H-18	25Z5 Tube Socket	.10
H-19	6D6 Tube Socket	.10
H-20	6B7 Tube Socket	.10
H-21	43 Tube Socket	.10
R-134	Tone Control	.55
R-135	Volume Control and Switch	.70
R-244	1 Meg. resistor	.20
R-248	50 M ohm resistor	.20
R-251	500 M ohm resistor	.20
R-254	250 M ohm resistor	.20
R-322	150 ohm flexible resistor	.15
R-325	20 ohm wire wound resistor	.25
T-247	SW RF coil	.20
T-305A	1st IF assembly, 262½ Kc.	1.50
T-306A	2nd IF assembly, 262½ Kc.	1.50
T-439A	Antenna coil assembly	.75
T-441A	Oscillator coil assembly	1.00
T-604	Choke	.60
U-107	Power Cord and Plug	.50
WL-20	Antenna wire, 22 feet	.10
	Model A Bakelite Standard Mahogany Cabinet only	1.75
	Model A Bakelite Standard Mahogany Back only	1.25
	Model A Bakelite Circassian Walnut Cabinet only	2.50
	Model A Bakelite Circassian Walnut Back only	1.50
	Model A Plaskon Ivory Cabinet only	2.50
	Model A Plaskon Ivory Back only	1.50
	Model B Standard Cabinet with Back	2.75
	Model B DeLuxe and Special Colors Cabinet with Back	3.75

MODEL A, B Kadette
Alignment

INTERNATIONAL RADIO CORP.

Instructions for Balancing and Aligning

Great accuracy can be maintained using equipment such as listed but a fair degree of accuracy can be obtained when adjusting entirely by ear if adjustments are made on a very weak signal. By a weak signal is meant one that can be just easily heard when the volume control is in the "Full On" position. A weak signal is necessary to get below the action of the automatic volume control. The following instructions will apply to either method.

Since this model uses an A. V. C. tube it is impractical to use the conventional AC output meter in the output circuit when balancing the set. Instead a sensitive micro-ammeter is used to measure the bias potential applied by the A. V. C. tube to the 6D6 IF amplifier. A one megohm variable resistor (our part R-133) is placed in one of the leads of the meter. The positive lead is fastened to the ground which is the rotor plates or frame of the variable condenser while the negative lead is attached to the mid-point of the secondary of the second IF (the bottom connection of the volume control). To align the IF units, connect the test oscillator output wire to the grid of the 6A7 tube. The positive lead of the meter is to be inserted between the plates of the oscillator section of the variable condenser in such a manner as to short out this condenser so that the oscillator is not operating. This is the section nearest the rear of the set. Turn the test oscillator to 262½ kilocycles and with the volume control turned full "ON" the modulated signal from the test oscillator will be heard through the speaker of the set. An indication will also be noted on the micro-ammeter. CAUTION—Keep the one megohm variable resistor attached to the micro-ammeter so adjusted that all of its resistance is in series with the meter movement when first putting same into use. This acts not only as a protective device but serves to adjust the scale readings to the most convenient part of the dial. With the No. 4 insulated trimmer wrench adjust the four nuts at the ends of the IF units. This must be done very carefully and one at a time. The result desired is to obtain the greatest possible deflection of the micro-ammeter, or when adjusting by ear, the greatest volume.

When the IF's have been properly checked, the next step is to adjust the alignment of the 2-gang variable condenser on broadcast band. Be sure the switch in the rear of the set is turned to the long wave, i.e. broadcast, side. Remove the positive lead of the meter from between the plates of the oscillator condenser and attach same to the frame of the variable condenser. It has been found quite convenient to slide the wire beneath the wiper spring of this section. Remove the test oscillator output wire from the 6A7 grid clip and attach it through a .0001 mfd. fixed condenser to the antenna wire. With the test oscillator set at 1500 kilocylces, open up the variable condenser until maximum reading is indicated on the micro-ammeter. Adjust the trimmer on the antenna section of the variable condenser until maximum reading of the meter is indicated.

Next turn the test oscillator to 550 kilocycles and close the condenser slightly back and forth while tightening or loosening the screw which adjusts to the point of highest indication on the meter. When this has been found, rock the condenser slightly back and forth while tightening or loosening the screw which adjusts the series padder condenser on the end of the oscillator coil. By tightening or loosening this screw the series capacity of the oscillator circuit can be so fixed that the antenna and oscillator circuits are properly matched.

Next reset the test oscillator to 1000 kilocycles and with a thin bakelite, celluloid, or mica feeler strip inserted between the plates of the variable condenser determine whether or not the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces results in an increase of capacity. Open the variable condenser just enough to indicate two to three points below maximum reading on the micro-ammeter. By inserting the feeler strip the reading on the meter should first rise to approximately the previous maximum indicated and drop back as the strip is inserted farther into the condenser. This method should be used on both sections. Should the meter fail to show a rise when the strip is inserted in either one of the sections, too great a capacity is indicated for that particular section. This can be corrected by bending the outside rotor plates out at the point where they enter the stator. If it has been necessary to bend plates at the 1000 kilocycle setting, it will be necessary to recheck the 550 setting.

To adjust the short wave section, snap the switch in the rear of the set to the short wave position. Select a harmonic of the test oscillator which is found with the rotor condenser plates in approximately the same position found while the set was being aligned at 1500 kilocycles on the broadcast band. With the insulated screw driver adjust the small trimmer condenser attached to the short wave antenna coil until maximum reading of the micro-ammeter is obtained. Next, select another harmonic of the test oscillator which will be found with the rotor plates of the variable condenser at about the same position that was experienced at the 550 kilocycle test of the broadcast band. Open the variable condenser just enough to cause a two or three point drop from maximum on the micro-ammeter and with the insulated feeler strip once more, determine whether or not the condenser sections are in alignment. Should the antenna stage appear to have too little capacity, it will be necessary to spread very carefully one or two turns of the short wave winding of the oscillator coil. This is the narrow winding next the padder on the oscillator coil. Great care must be taken that the wire is not broken while being spread. On the other hand if the antenna section appears to have too much capacity, a few turns may be spread on the short wave antenna coil.

Do not change the adjustment of the trimmers on the condenser gang or the padder condenser on the oscillator coil when checking on the short wave position.

INTERNATIONAL RADIO CORP.

MODEL F Kadette Jr. (Four types) Schematic, Parts List

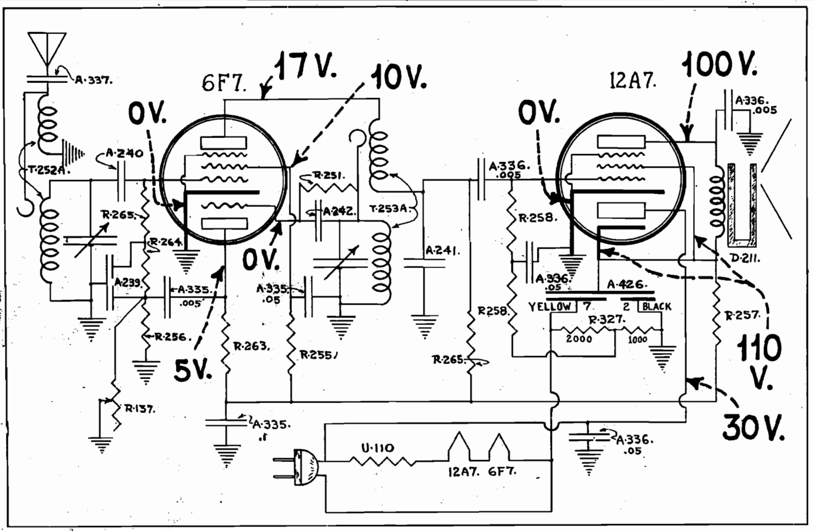


DIAGRAM NO. 1

A-239	dual .00025 mfd.	R-251	½ meg.
A-240	.00025 mfd.	R-255	1¼ meg.
A-241	.0001 mfd.	R-256	2 meg.
A-242	.00025 mfd.	R-257	50 M ohms.
A-335	values on diagram.	R-258	1 meg.
A-336	values on diagram.	R-263	3 meg.
A-337	.001 mfd.	R-265	¼ meg.
A-426	values on diagram.	R-327	2000-1000 ohm.
R-137	2½ meg. vol. cont.		

A-243	.0005 mfd
A-340	.005 mfd grid coupling .05 mfd line bypass
A-341	.005 mfd
A-342	.005 mfd
A-346	.007 mfd
R-138	1¾ meg.
R-266	175 M ohms

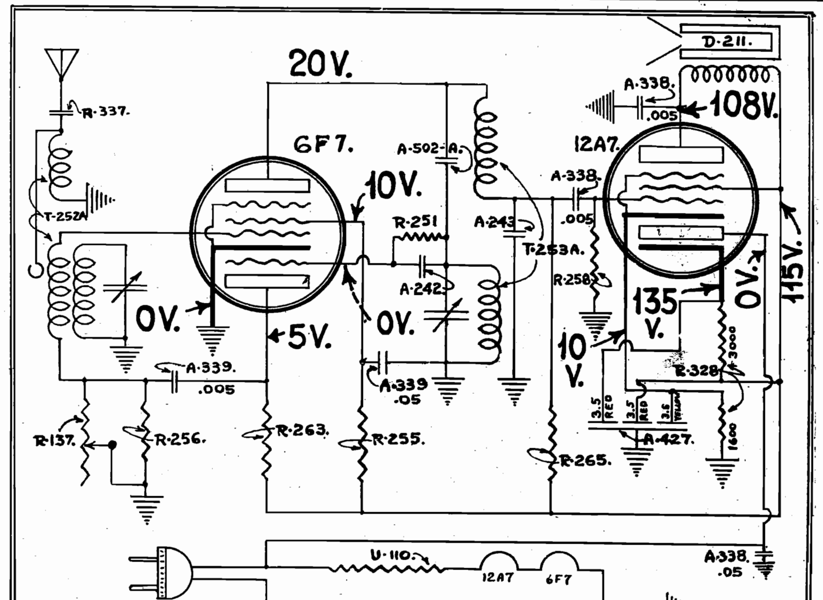
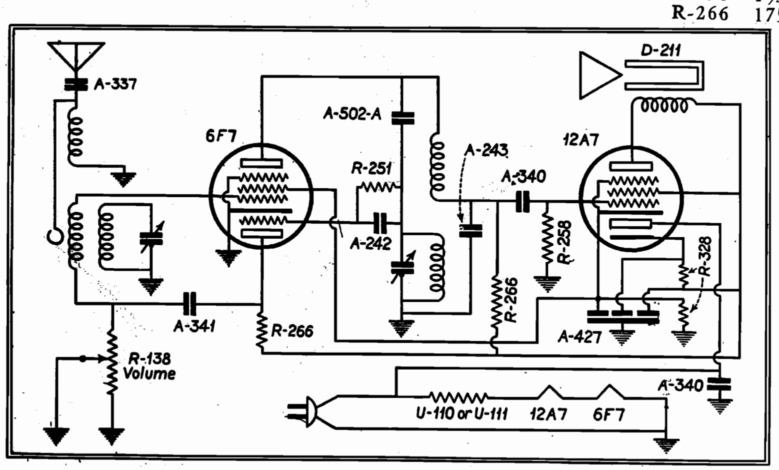
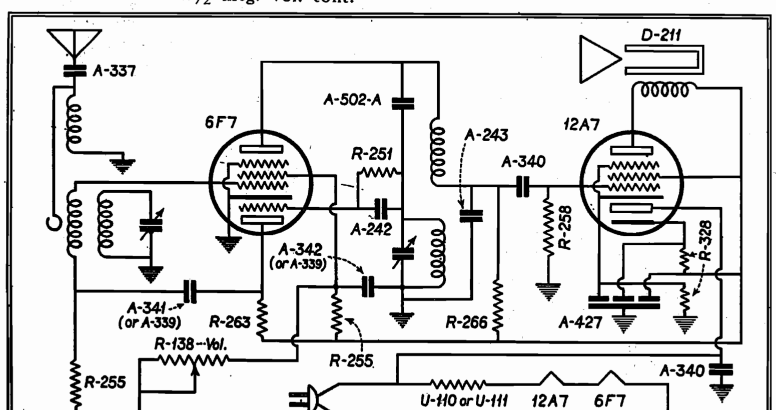


DIAGRAM NO. 2

A-242	.00025 mfd.	R-251	½ meg.
A-243	.0005 mfd.	R-255	1¼ meg.
A-337	.001 mfd.	R-256	2 meg.
A-338	values on diagram.	R-258	1 meg.
A-339	values on diagram.	R-263	3 meg.
A-427	values on diagram.	R-265	¼ meg.
A-502A	18 mmfd. coupling.	R-328	3000-1600 ohm.
R-137	2½ meg. vol. cont.		



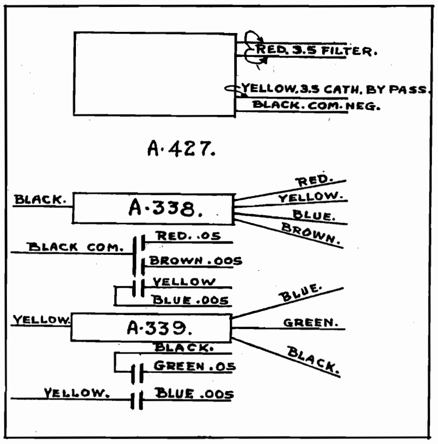
The circuit diagram of the third type of the Kadette Jr., Model F.

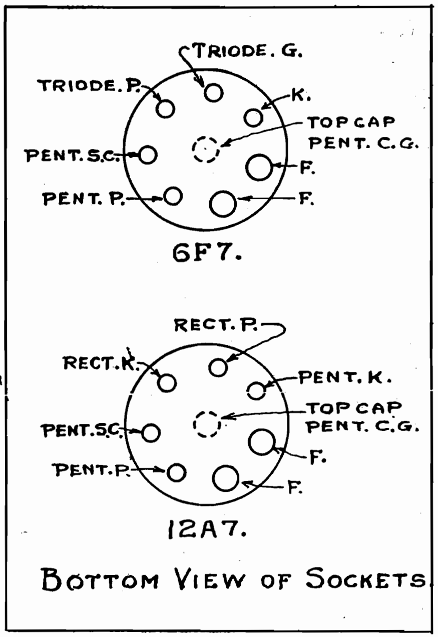


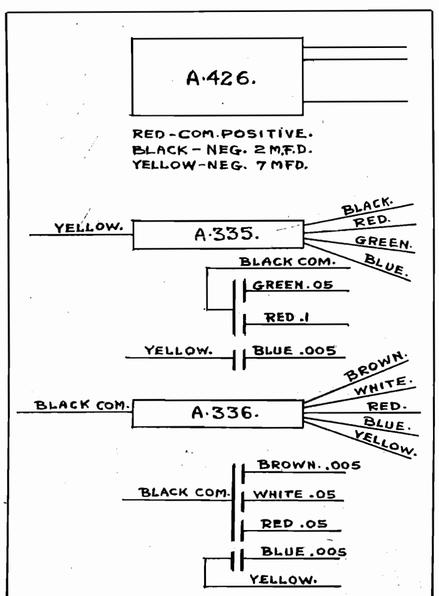
Circuit of the final run on the Kadette Jr., Model F.

MODEL F Kadette Jr.
Voltage, Condensers,
Notes

INTERNATIONAL RADIO CORP.







POWER CORD

Please refer to the circuit diagram. It will be noted there is a 330 ohm resistance in series with the tube filaments. This resistance is contained in the power cord and causes the cord to become quite warm when the set is in operation. This heat is not dangerous as the resistance wire is enclosed in a layer of asbestos, however, the cord should be kept out in the open to allow the heat generated to radiate. *The power cord should not be shortened* as this would decrease the resistance and the filament voltage would rise to the point where the tubes would burn out rapidly.

Voltage Readings

The following voltage readings are approximate when set is operated on a 115 volt AC line with volume control in full on position.

Readings taken with a 1000 ohm per volt 300 volt D. C. voltmeter. Readings taken from socket prongs to chassis which is B-. The circuit diagrams show two different circuits, one having the filter in the negative leg and the latest having the filter in the positive leg. The Muter metal covered resistance above the 12A7 socket in the first circuit has only 3 lugs while in the latest circuit it has 4. By noticing this part you may easily distinguish between the two types.

FIRST CIRCUIT

6F7		12A7	
Pentode plate	17	Pentode plate	100
Pentode screen	10	Pentode screen	110
Triode plate	5	Rectifier cathode	110
Triode grid	0	Rectifier plate	-30
Cathode	0	Pentode cathode	0

Second Circuit

6F7		12A7	
Pentode plate	20	Pentode plate	108
Pentode screen	10	Pentode screen	115
Triode plate	5	Rectifier cathode	135
Triode grid	0	Rectifier plate	0
Cathode	0	Pentode cathode	10

CIRCUITS 3 AND 4

6F7		12A7	
Pentode plate	33	Pentode plate	107
Pentode screen	10	Pentode screen	115
Triode plate	5	Rectifier cathode	135
Triode grid	0	Rectifier plate	0
Cathode	0	Pentode cathode	10

INSTRUCTIONS FOR BALANCING AND ALIGNING

Adjustments have been carefully made at the factory and should not need to be changed unless it has been necessary to replace a coil or the adjustments have been tampered with. The trimmers on the variable condenser may be adjusted by ear. However, greater accuracy may be had by using an oscillator and output meter. If this equipment is not available a weak broadcast signal may be substituted for the oscillator signal and adjustments made for greatest volume.

If an oscillator is to provide the signal for balancing it should be coupled to the antenna wire on the receiver and an output meter should be connected from the 12A7 pentode plate to chassis. The output meter may consist of a 0-5 or 0-10 volt AC meter with a .1 mfd. condenser inserted in one lead.

It will be noted there are three trimmer screws on each section of the variable condenser. Adjust the condenser so the leading edge of the condenser rotor is at the middle of the first split stator section. The dial reading for this setting is about 25. Tune the oscillator to this frequency which is approximately 1000 KC. Adjust the two diagonally opposite trimmer screws for maximum output. Then in succession change the condenser setting to center of 2nd and 3rd sections re-balancing in same manner for maximum output not re-trimming preceeding split plates. Then re-seal with wax.

MODEL F Kadette Jr.
Parts List, Notes

INTERNATIONAL RADIO CORP.

PART No.	NAME	LIST PRICE
A-125	Variable condenser assem. less dial	$3.00
A-239	Dual .00025 mfd. mica condenser	.35
A-240	.00025 mfd. mica condenser	.20
A-241	.0001 mfd. mica condenser	.20
A-242	.00025 mfd. mica condenser	.20
A-335	.05 mfd. paper condenser .1 mfd. paper condenser .005 mfd. paper condenser	.50
A-336	.005 mfd. paper condenser .05 mfd. paper condenser .05 mfd. paper condenser .005 mfd. paper condenser	.60
A-337	.001 mfd. paper condenser	.15
A-338	.05 mfd. paper condenser .005 mfd. paper condenser .005 mfd. paper condenser	.50
A-339	.05 mfd. paper condenser .005 mfd. paper condenser	.40
A-426	2 mfd. 7 mfd. electrolytic condenser	.90
A-427	3½ mfd., 3½ mfd., 3½ mfd. electrolytic con.	1.00
A-502A	18 mmfd. coupling condenser	.10
B-136	Volume control slider bracket	.05
E-144	Volume control slider with knob	.15
E-233	Calibrated dial strip only	.10
E-234	Dial wheel with calibrated strip	.40
H-22	6F7 socket	.10
H-23	Output socket	.10
H-121	4 prong female socket	.10
I-120	Special volume control screws	.07
R-137	Volume control resistor strip -2½ meg	.20
R-251	½ megohm resistor	.20
R-255	1¼ megohm resistor	.20
R-256	2 megohm resistor	.20
R-257	50M ohm resistor	.20
R-258	1 megohm resistor	.20
R-263	3 megohm resistor	.20
R-265	¼ megohm resistor	.20
R-327	2000-1000 ohm metal covered resistor	.25
R-328	3000-1600 ohm metal covered resistor	.25
S-311	Volume control springs	.02
T-252A	Antenna coil assembly	.90
T-253A	R. F. coil assembly	.90
U-110	Power cord (no switch)	1.25
U-111	Power cord (with switch)	2.00
Model F. Cabinet only-less back (specify color)		2.00
Model F Back only (specify color)		.50

Supplementary Parts Price List

A-243	.0005 mfd. mica condenser	$ .20
A-340	.05-.005 mfd. paper condenser	.50
A-341	.005 mfd. paper condenser	.50
A-342	.005 mfd. paper condenser	.15
A-346	.007 mfd. paper condenser	.15
D-215	Speaker cone only	.35
D-217	Speaker coil	.70
D-230A	Complete speaker assembly with volume control	3.00
R-138	1¾ meg. volume control strip (2 lugs)	.20
R-266	175 M ohm resistor	.20

By Pass Condensers

In ordering parts for your service stock, a saving can be effected in regard to the "fire cracker type" condensers mounted vertically at each side of the speaker. In diagram No. 1 these are Nos. A-335 and A-336.

In diagram No. 2 part No. A-339 is the same as A-335, with the exception that the .1 mfd section (red wire) is omitted. A-338 is the same as A-336 with one .05 mfd section (white wire) left out.

In diagrams Nos. 3 and 4 these "firecrackers" are A-340 and A-341. The A-340 may be made from A-336 by cutting off the brown and white wires. The A-341 may be made from A-335 by cutting off the black, green and red wires.

The A-335 and A-336 condensers may therefore be used for repairs in any of the circuits and it will not be necessary to carry the later numbers in your service stock.

CHANGES IN CIRCUIT

There have been a few minor changes in the circuit since the first sets were produced. Diagram No. 1 shows the original circuit. A few of these were produced and then the circuit was changed so that the 6F7 circuit was the same as in diagram No. 2 while the 12A7 circuit remained the same. The last change is shown in diagram No. 2.

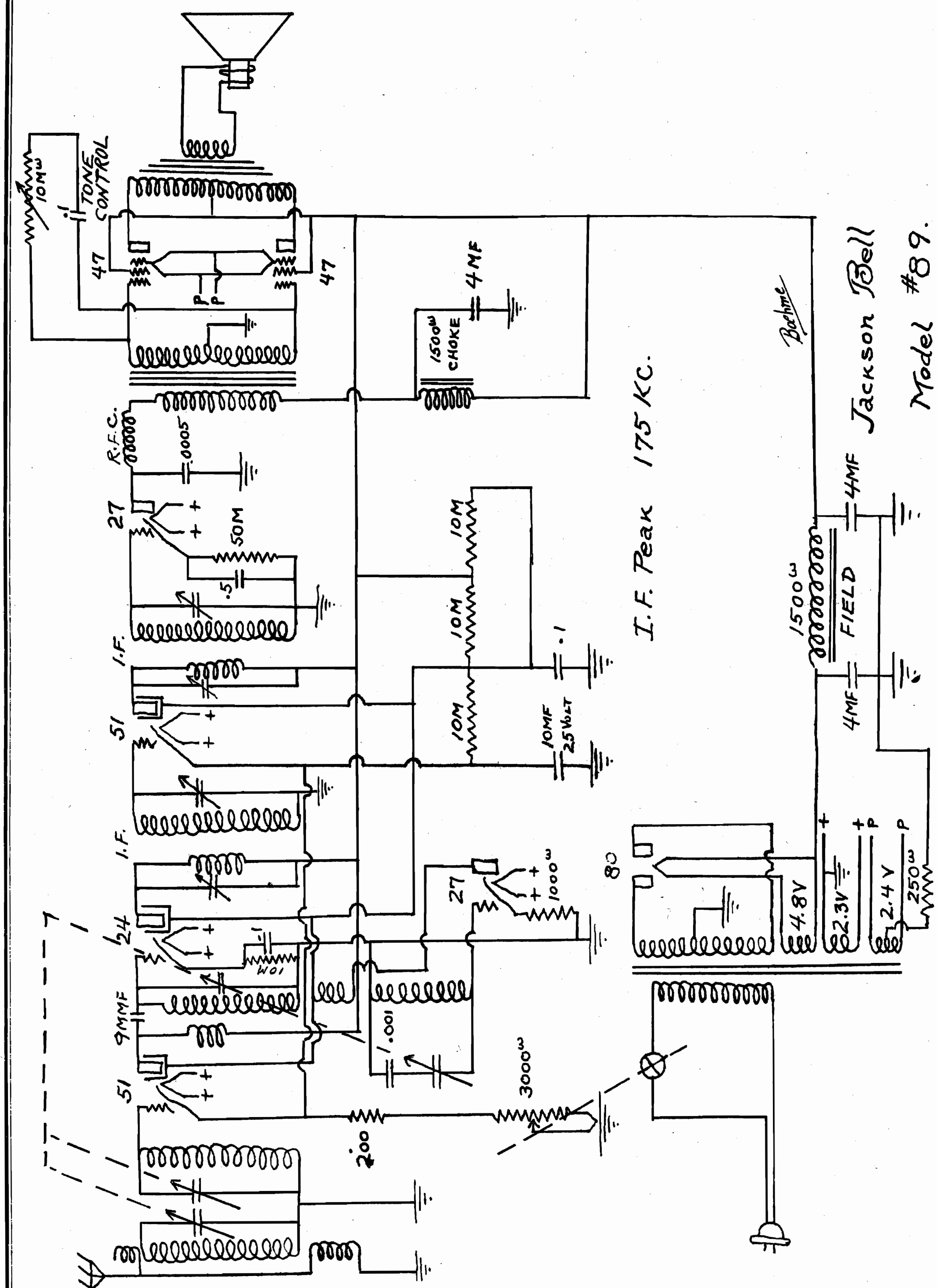
If it is necessary to replace an antenna coil in one of the early sets it is suggested that the latest coils be used and the 6F7 circuit be changed to conform with Diagram No. 2.

It will be noted there are two secondaries on the T252A antenna coil in diagram No. 2. The secondary winding is of "Litz" wire consisting of one heavy strand surrounded by nine fine strands. The heavy strand is separated from the others and connects to the control grid of the 6F7. The nine fine strands are tuned by the variable condenser.

The circuits shown in diagrams Nos. 3 and 4 greatly resemble diagram No. 2 in Service Bulletin F-1. It will be noted however the system of controlling volume has been changed somewhat. Also the values of some condensers and resistors have been changed and some condensers and resistors omitted.

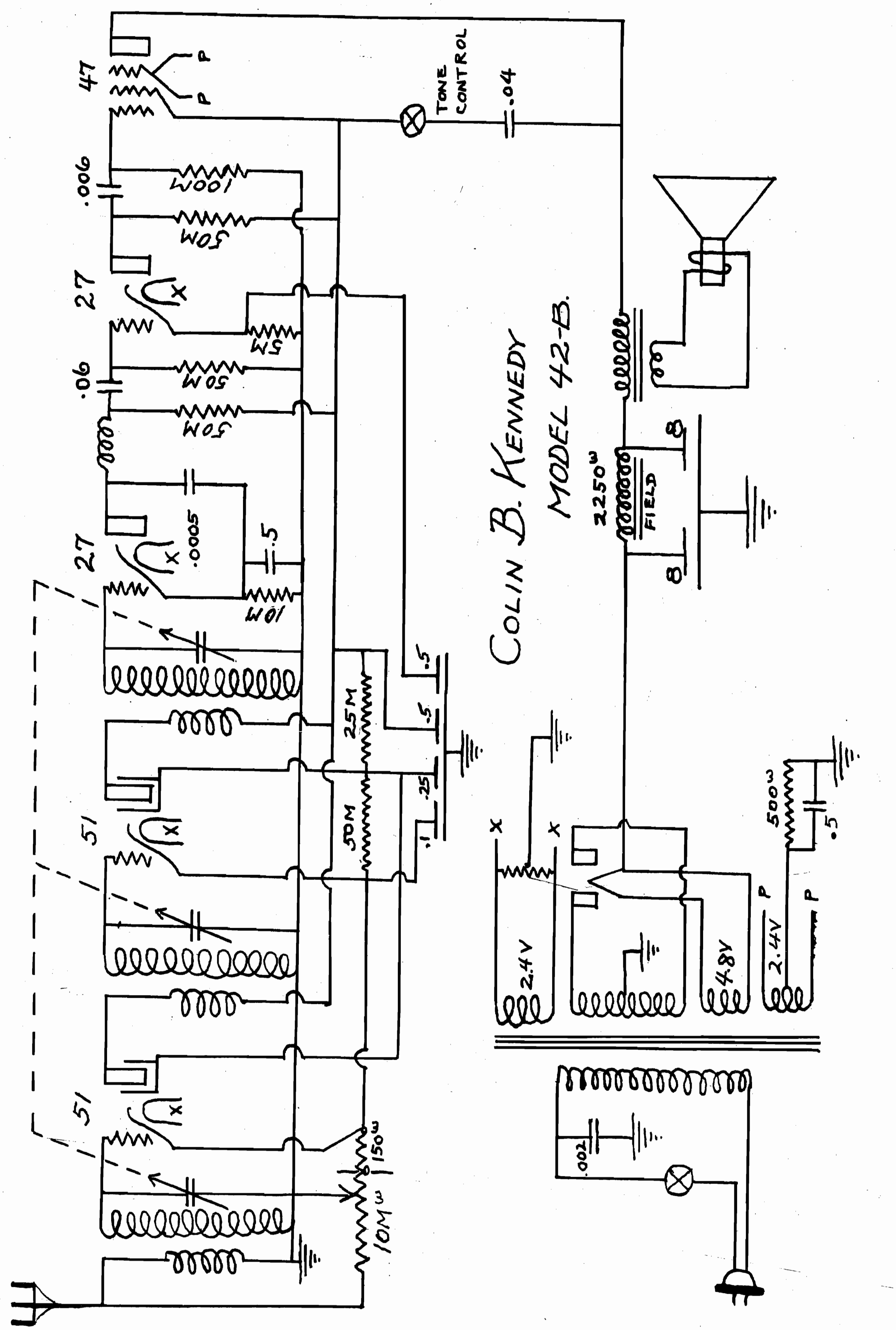
JACKSON-BELL CO., LTD.

MODEL 89
Schematic



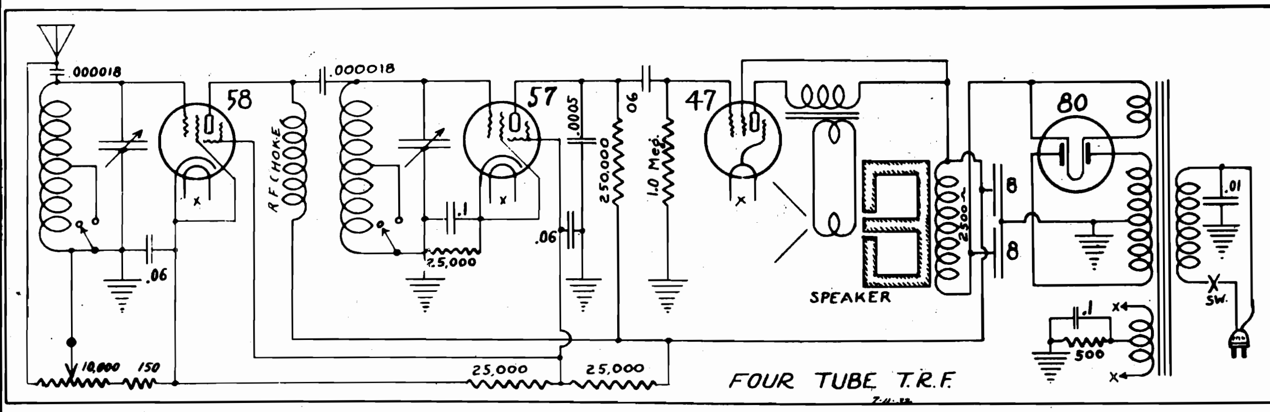
MODEL 42-B
Schematic

COLIN B. KENNEDY CORP.



MODEL 55
Voltage, Socket
Data

COLIN B. KENNEDY CORP.

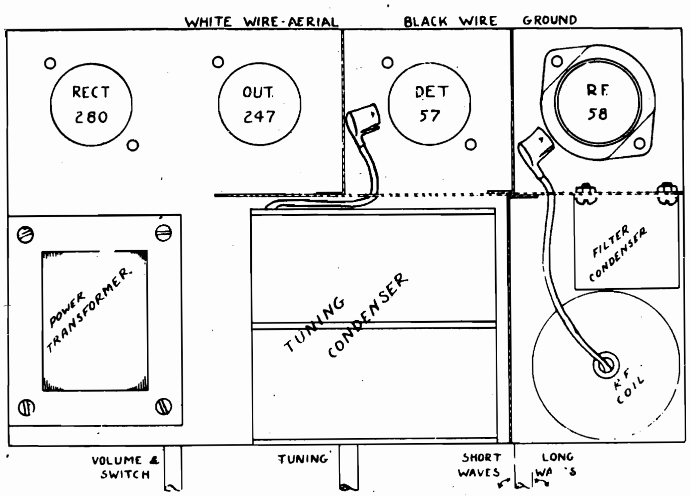


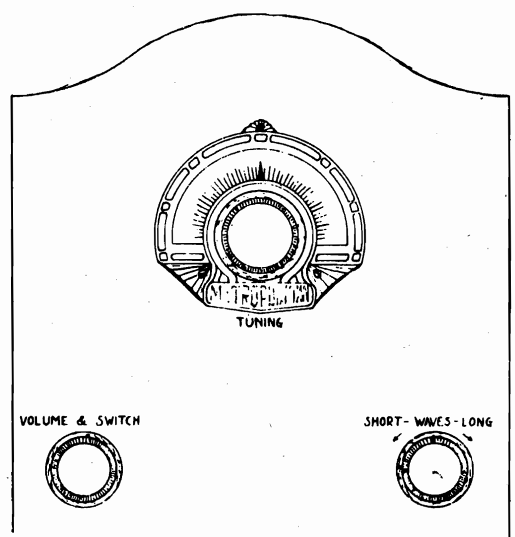
The tubes employed in this four tube tuned radio frequency receiver are as follows, all being operated at their rated voltages and biases:

R.F....... 58	Audio Output...... 247
Det....... 57	Rectifier 280

An inspection of the circuit diagram above will indicate that the circuits are conventional in every respect. The R.F. coils are tapped, a portion being grounded out leaving sufficient inductance to permit tuning in local short wave and police stations between 75 and 200 meters. The volume control acts simultaneously to increase the bias on the variable mu R.F. tube and to "short" the antenna circuit.

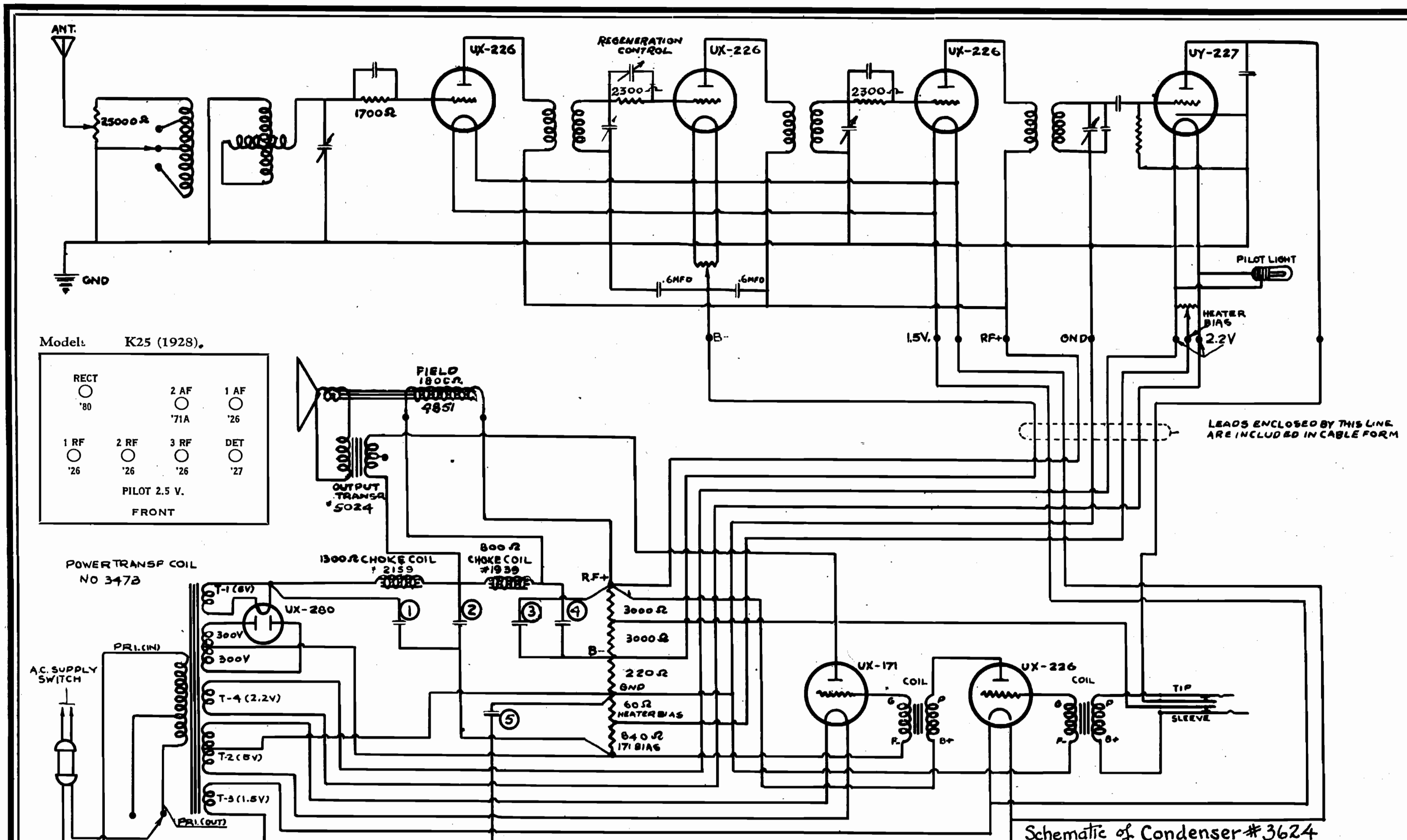
Service parts may be obtained by giving description of the part needed, and the receiver model and serial numbers.



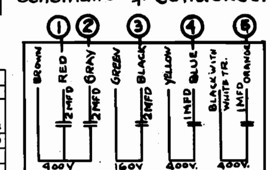


MODEL K-25
Schematic
Voltage

KOLSTER RADIO, INC.



Schematic of Condenser #3624

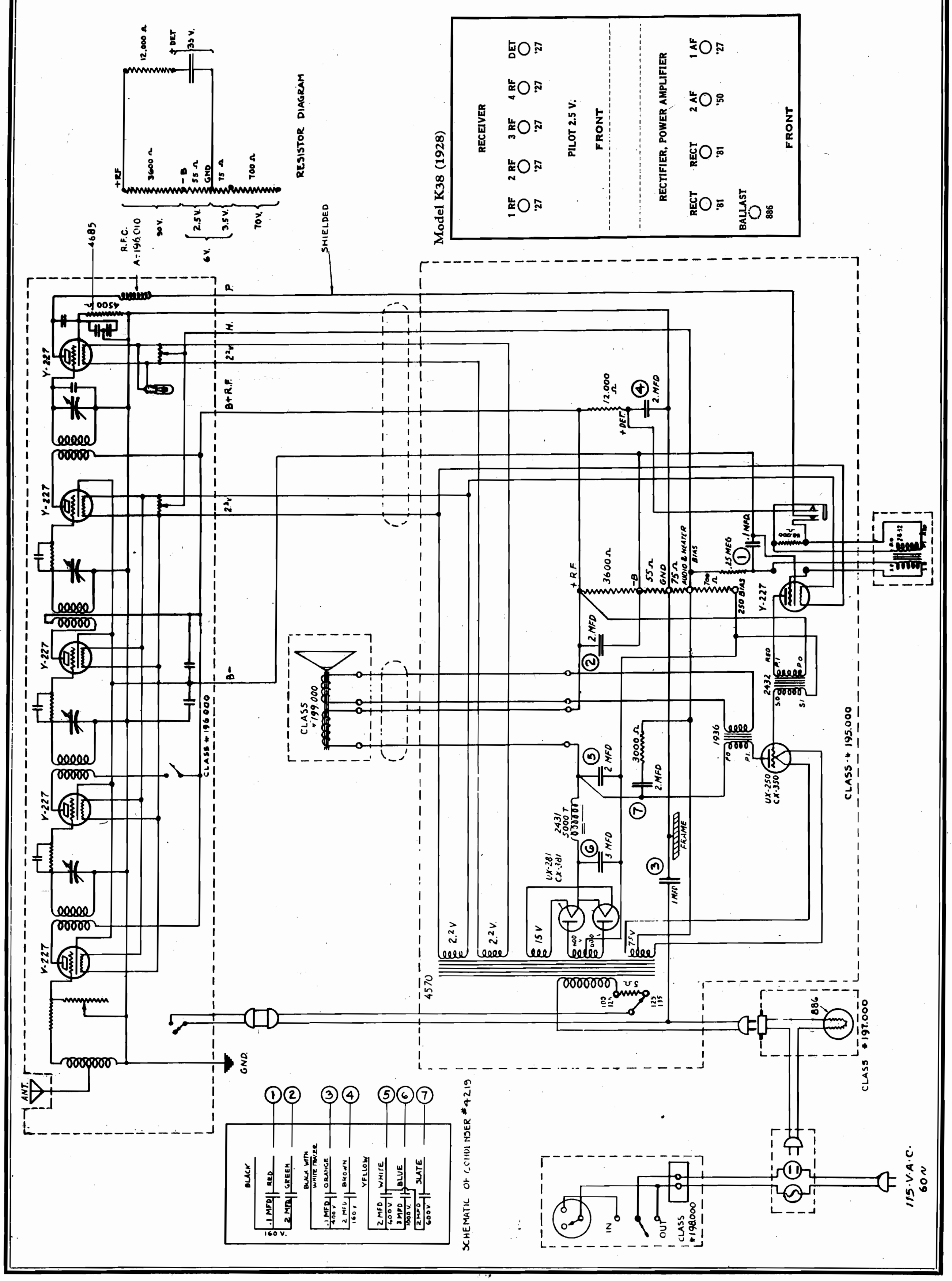


Line Voltage 116

TUBE NO. IN ORDER	TYPE OF TUBE	POSITION OF TUBE 1ST R.F DET. ETC.	READINGS, PLUG IN SOCKET OF SET								
			TUBE OUT		TUBE IN TESTER						
			A VOLTS	B VOLTS	A VOLTS	B VOLTS	C VOLTS	CATHODE VOLTS	NORMAL PLATE M.A	PLATE M.A GRID TEST	PLATE M.A CHANGE
1	226	1 RF	1.43	95	1.35	89	6.0		3.25	6.5	3.25
2	226	2 RF	1.43	95	1.35	89	6.0		3.40	6.6	3.2
3	226	3 RF	1.43	95	1.35	89	6.0		3.40	6.6	3.2
4	227	DET	2.30	50	2.00	42	5.0		3.10	3.1	0.0
5	226	1 AF	1.56	92	1.45	86	5.5		3.60	6.5	2.9
6	171	2 AF	5.50	246	5.00	184	41.0		17.50	19.5	2.0
7											
8	280	Rectifier	.	-	5.0	-	-		22	-	-
9											
10											

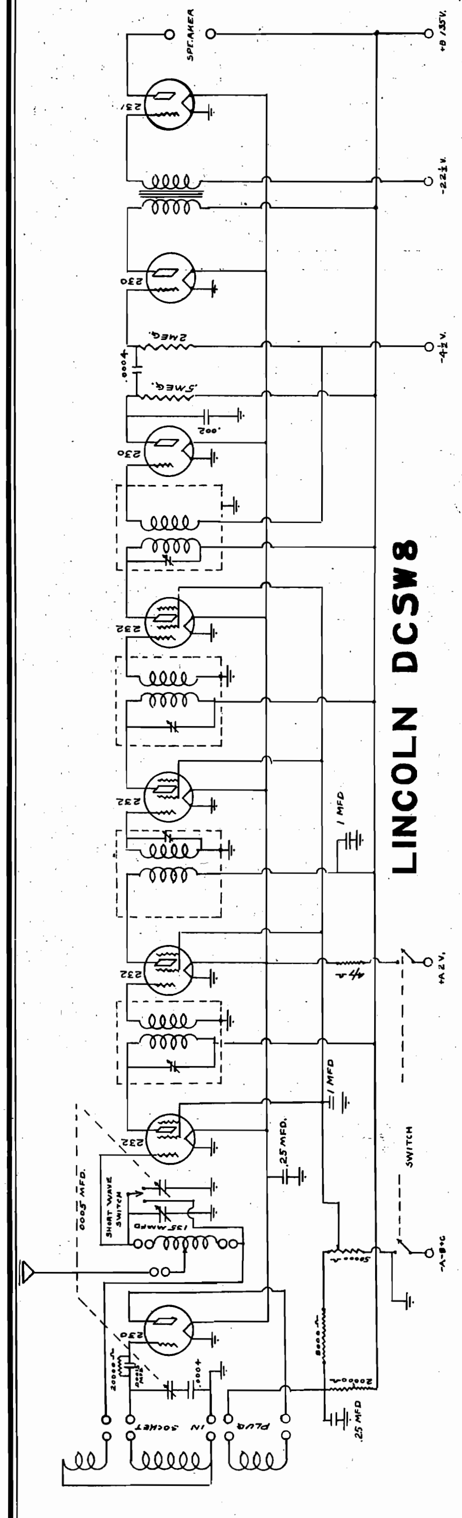
MODEL K-38
Schematic
Socket layout

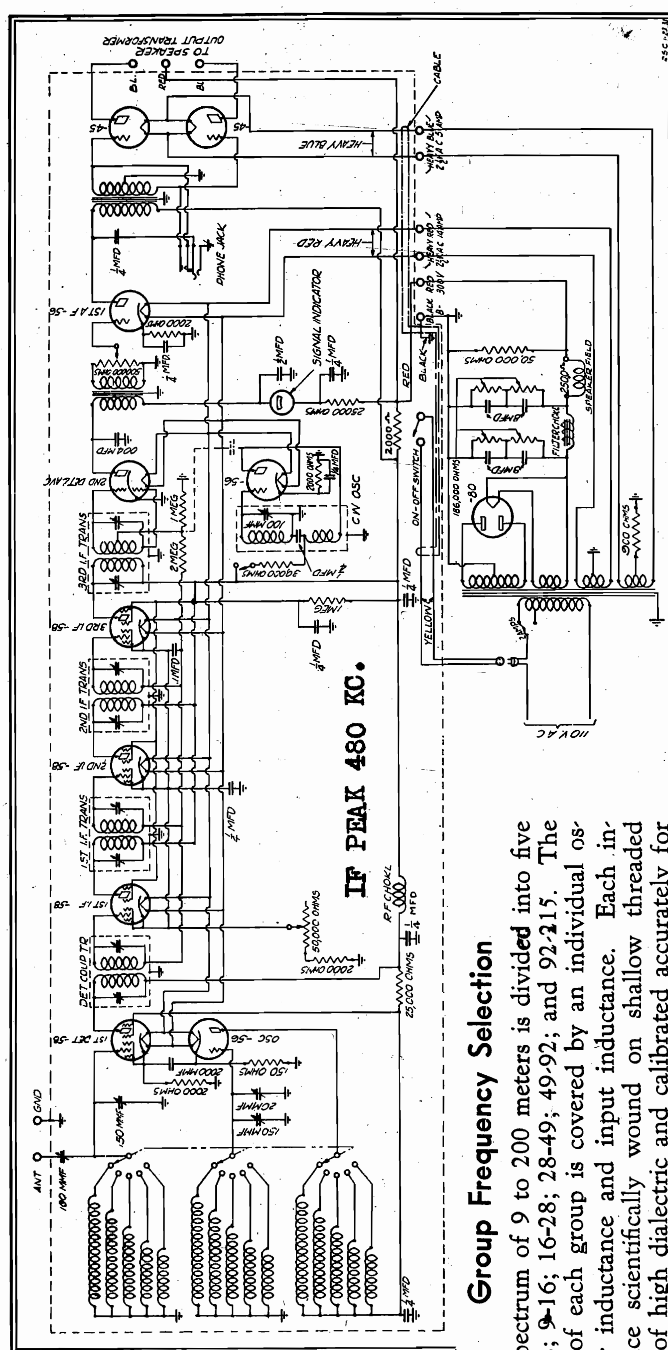
KOLSTER RADIO, INC.



MODEL DC SW 8
Schematic
MODEL R-9
Schematic

LINCOLN RADIO CORP.





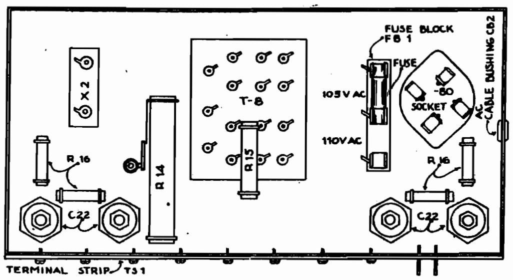
Model R-9

Group Frequency Selection

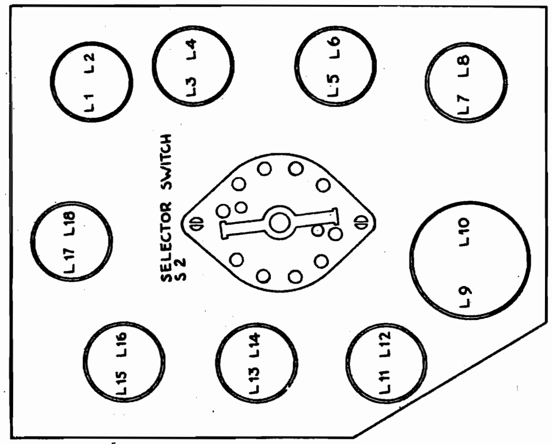
The spectrum of 9 to 200 meters is divided into five groups; 9-16; 16-28; 28-49; 49-92; and 92-215. The range of each group is covered by an individual oscillator inductance and input inductance. Each inductance scientifically wound on shallow threaded forms of high dialectric and calibrated accurately for frequency register. The live leads from these coils are not brought down inside the form, causing a short circuiting effect, but directly away from the outside of the winding by short lead (¾" to 1½")

MODEL DeLuxe SW 33
Schematic, Socket
Coil assembly

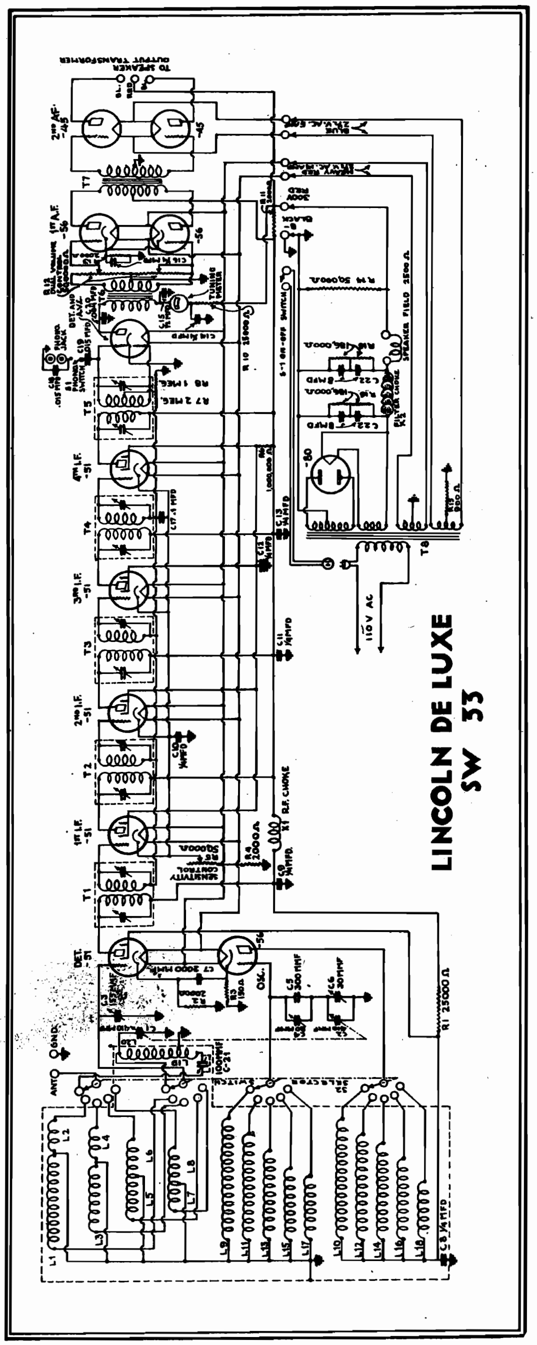
LINCOLN RADIO CORP.



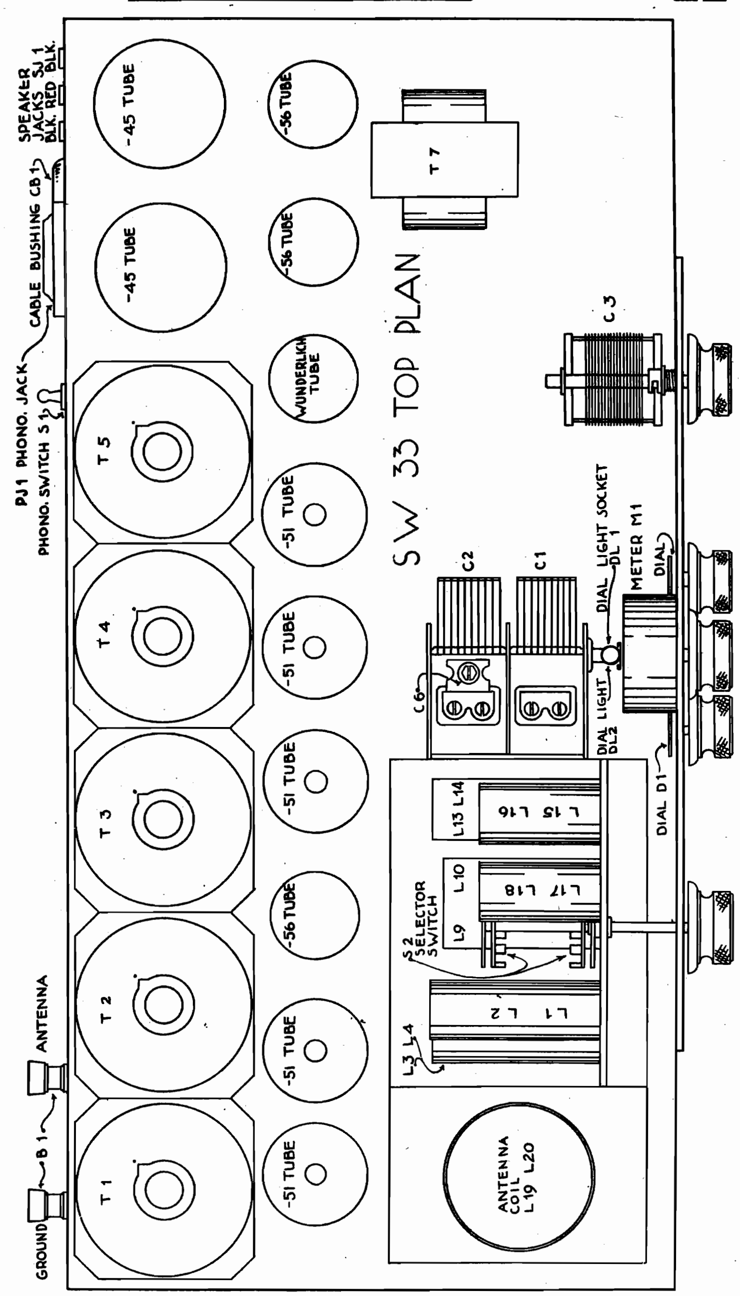
LINCOLN DE LUXE SW33 — POWER PACK
BOTTOM PLAN



LINCOLN DE LUXE SW 33
PLAN OF COIL ASSEMBLY



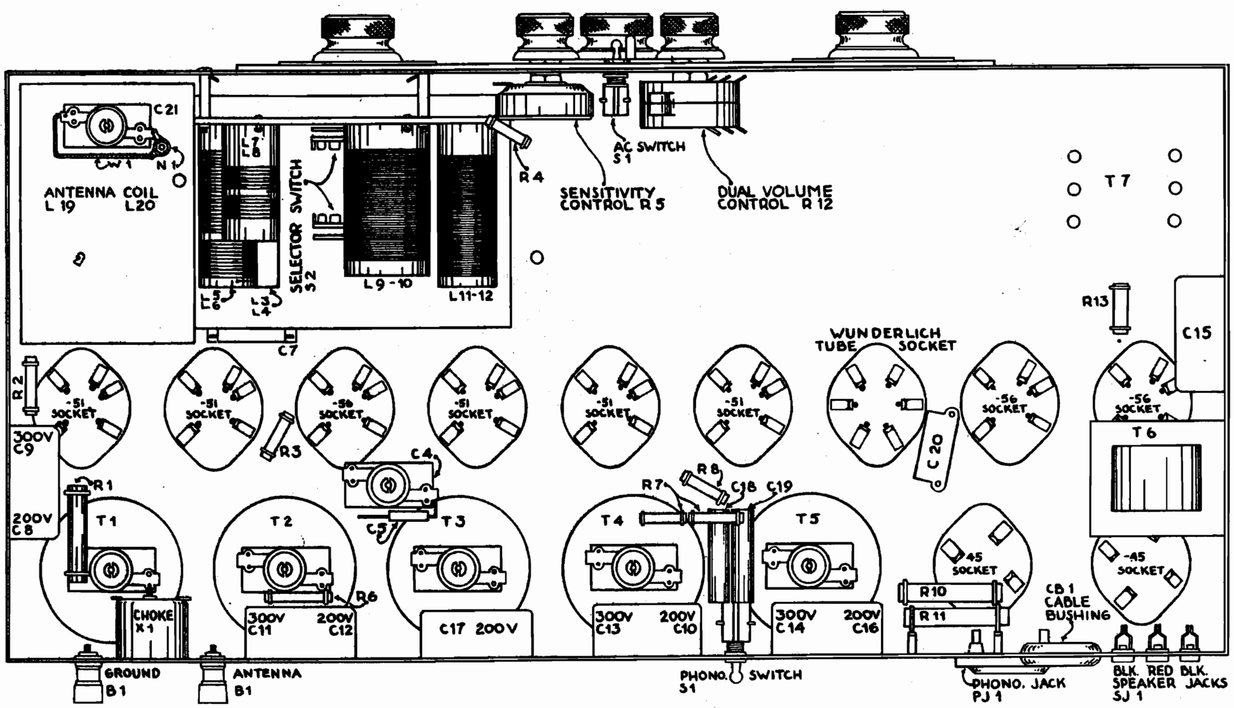
LINCOLN DE LUXE
SW 33



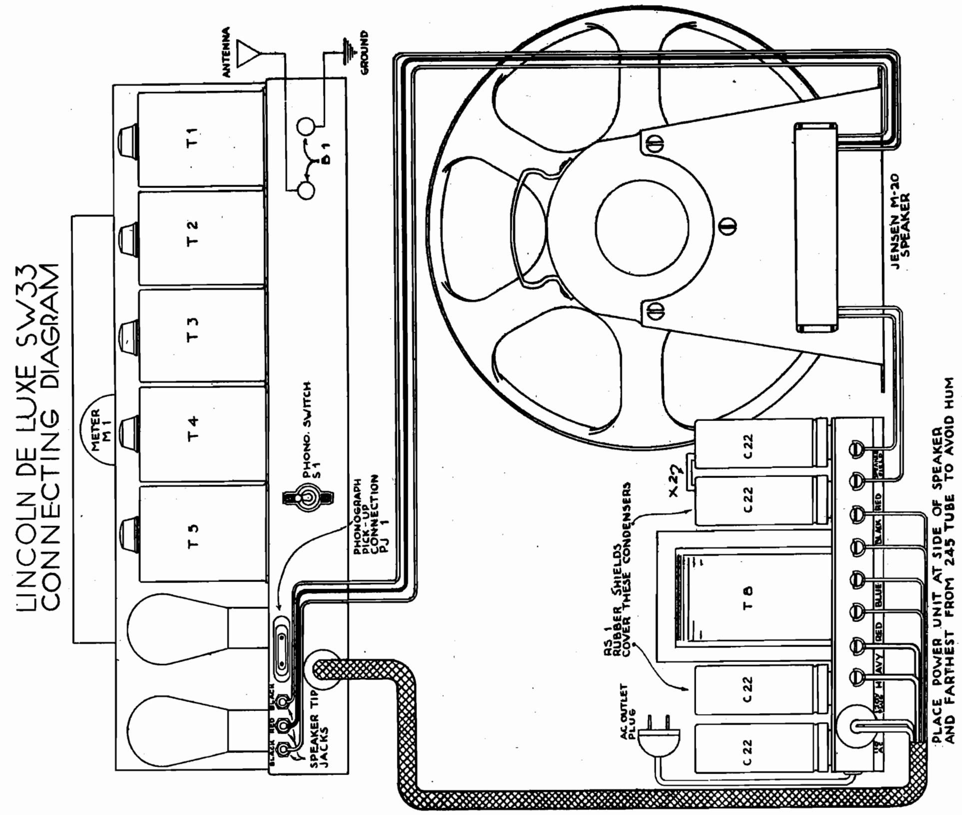
SW 33 TOP PLAN

LINCOLN RADIO CORP.

MODEL Deluxe SW 33
Bottom view
Terminal connections

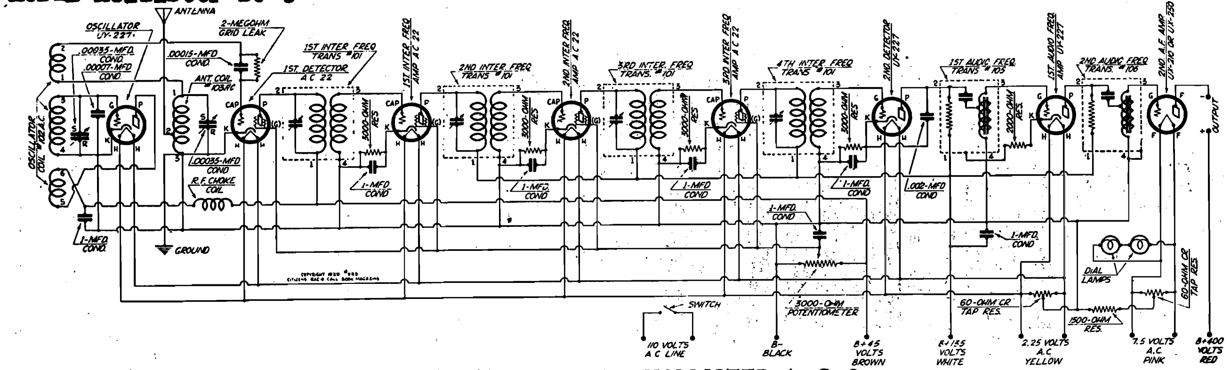


LINCOLN DE LUXE SW 33 BOTTOM PLAN

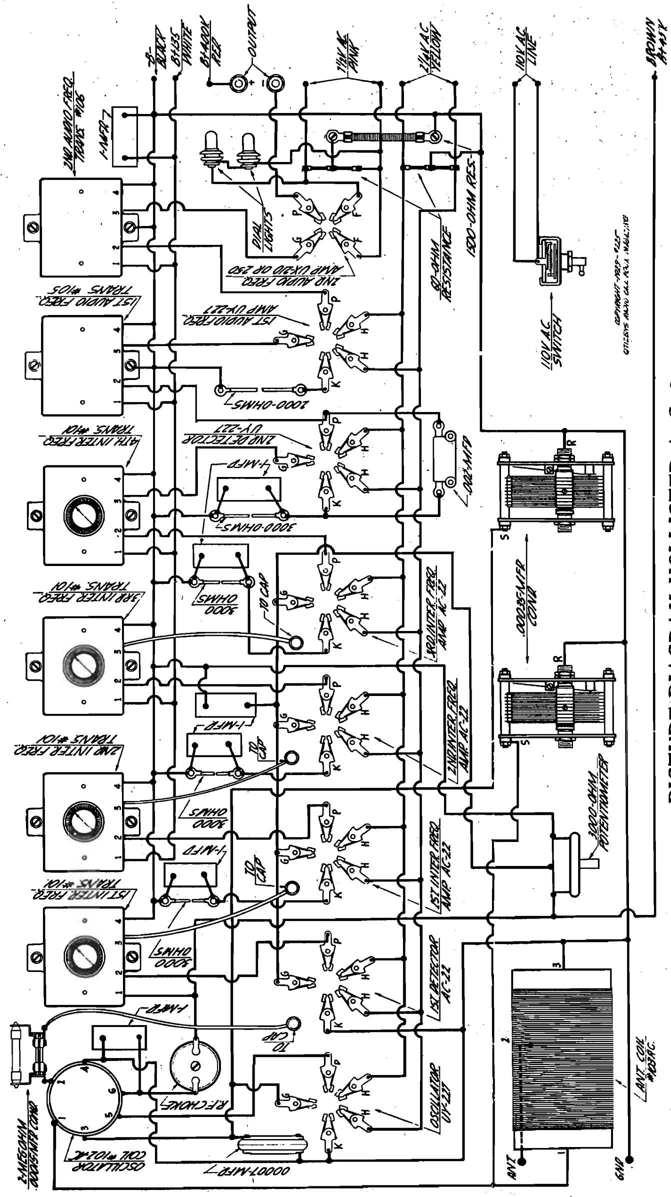


MODEL Hollister AC 8
Schematic, Chassis wiring.
MODEL Hollister DC 8

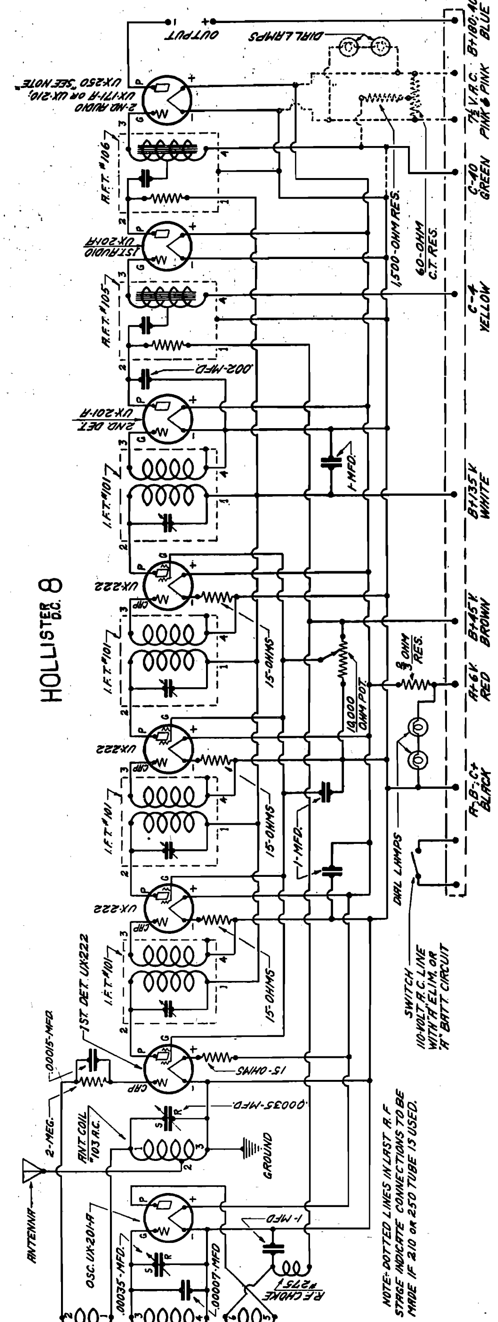
LINCOLN RADIO CORP.



SCHEMATIC DIAGRAM HOLLISTER A. C. 8



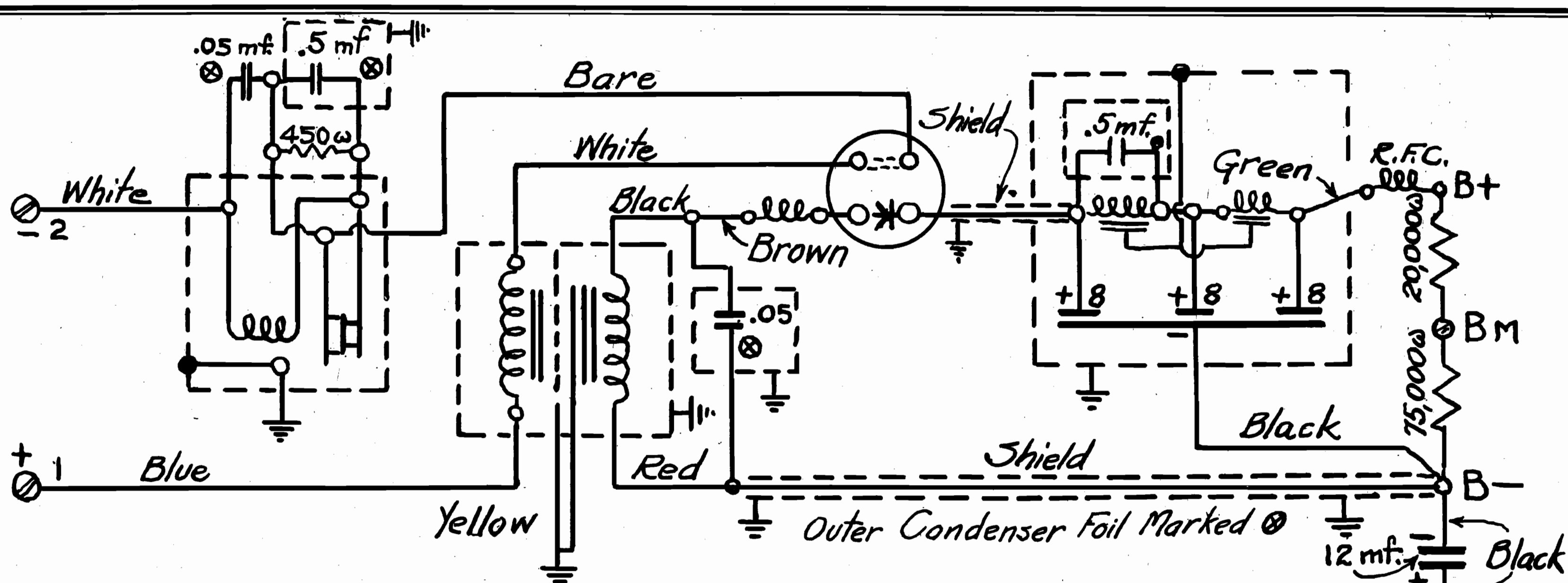
PICTURE DIAGRAM HOLLISTER A. C. 8

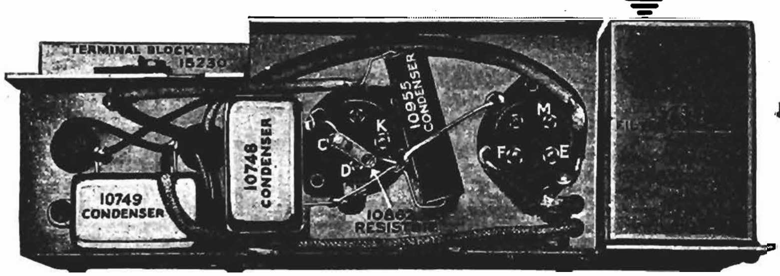


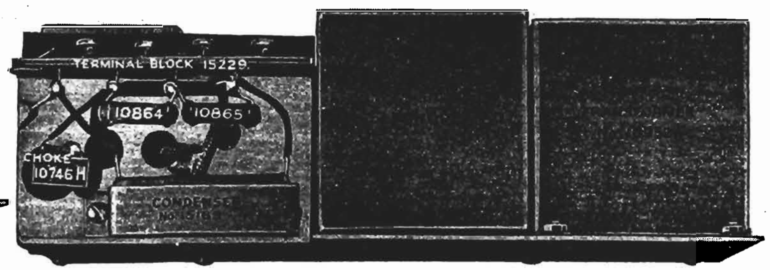
HOLLISTER D.C. 8

MODEL Elkon
Standard Type
Auto "B" Elim.
Schematic

P. R. MALLORY & CO.







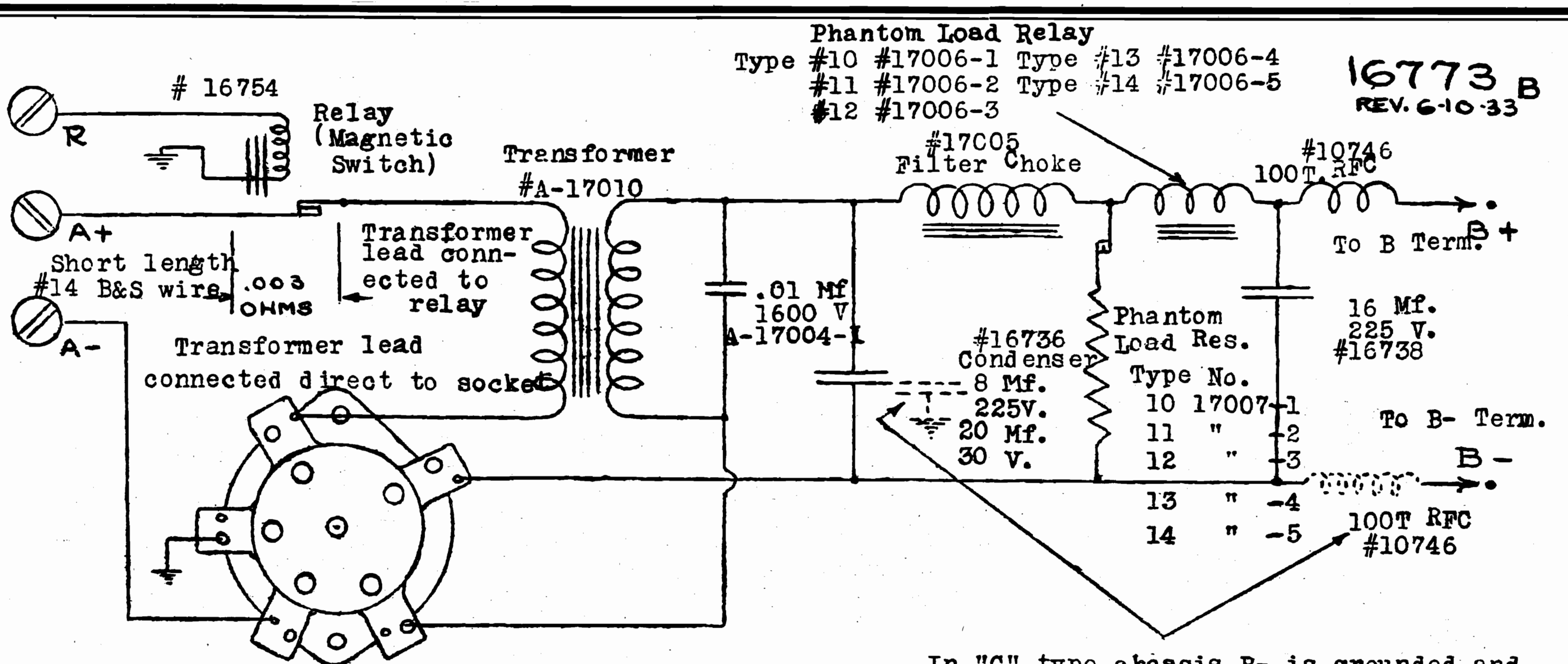
Mallory B-Eliminators: The following are the specifications for the new Mallory Auto-Radio B eliminators.

When checking these elminators for servicing, never connect the eliminator to a storage battery until there is a load resistor connected across the B minus to B plus terminals of the eliminator. If the storage battery is ungrounded, that is, is not in the car, then connect the A plus terminal to eliminator terminal 1, and the A minus terminal to the eliminator terminal 2, using not smaller than No. 14 B and S wire. When testing the eliminator the load resistor should be rated at 6000 ohms and 25 watts. While it is true that a 10-watt resistor is within the actual current rating, the 25-watt resistor is preferred. Resistances rated at less than 10 watts, will overheat very badly. The 6000 ohm load resistance is the equivalent of the average radio receiver.

Type	Amperes Input	Current At 180 V	Current at 135 V.
6	2.45	35 ma.	46 ma.
5	2.1	30 ma.	40 ma.
4	1.8	25 ma.	33 ma.
3	1.5	20 ma.	27 ma.
2	1.2	15 ma.	20 ma.
1	1.1	12 ma.	16 ma.

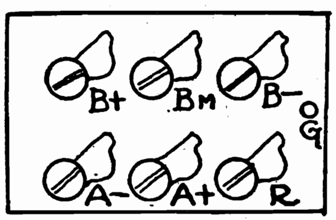
MODEL Elkon Type C
Eliminator
Schematic

P. R. MALLORY & CO.



In "C" type chassis B- is grounded and condenser and choke are omitted.

It is imperative that the total resistance of the cable connecting the eliminator "A" and "A"- terminals to the battery terminals be .042 ohms or less



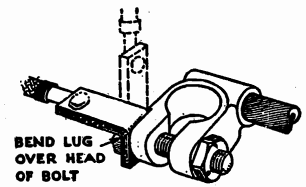
THE APPROVED MALLORY-ELKON "B" ELIMINATOR FOR LEADING AUTO RADIO RECEIVERS

Make	Model No.	Type	Make	Model No.	Type
Ajax		11 C	Motorola	7 T 38	10
Auto Lite	82	12	Motorola	7 T 47 A	10
Autotone	(Republic)	10	Ohio	6 Tube	11 C
Bosch	80	14	Philco	3	12*
Bosch	84	14	Philco	6	11 C
Bosch	9:20	11 PC	Philco	7 (using '38 Output Tube)	12 P
Cadillac	7 Tube	11 C	Philco	7 (using '41 Output Tube)	11 P
Colonial	53	11	Philco	8	10 C
Colonial	54	13	R.C.A. Victor	M 32	11 C
Crescent	1931	11	Sparton	AR 19	12 PC
Crosley	95 (using '38 Output Tube)	12 C	Sparton	34	10 ST
Crosley	95 (using '41 Output Tube)	11 C	Sparton	40	13 S
Crosley	96	11 C	Roamio	91	13*
Erla	261	12 PC	Roamio	92	11
Gulbransen	6 Tube	11 C	Truetone	6 Tube	11 C
Gulbransen	7 Tube	11 C	Universal	57	11
Majestic	110	11	Universal	70	11
Majestic	114	11 C	Universal	77	11
Motometer		12 C	Wells Gardner	6 Tube	11 C
Motorola	5 Tube	11 M	Wells Gardner	7 Tube	11 C
Motorola	6 Tube	10			
Motorola	5 T 71	11 M			

* Mallory "A" Choke Required.

P. R. MALLORY & CO.

THE CABLE for the new Mallory-Elkon "B" Eliminator consists of two wires within a braided metal covering. The **red** wire of this cable is positive "A," and the **green** wire is negative "A." Positive and negative "A" battery lugs are provided on the battery end of this cable (see illustration at right for method of connecting to battery). The braided metal strap at battery end should be screwed into the harness lug which is connected to the *grounded* post of storage battery. The other end of the cable should be attached to the "A" terminal screws on the terminal board of the eliminator, and proper polarity of these terminals must be observed, **red** to A+ and **green** to A−. Connect braided metal strap to one of Eliminator lid screws.



> **CAUTION: Never use anything except the Standard Mallory-Elkon Cable Assembly and never connect it to any point except directly to both the storage battery terminals.**
>
> **REASON: Any deviation from this use of cable will affect time constant of vibrator and seriously shorten life of vibrator points.**

THE TERMINAL MARKED "R" on the terminal board is for the operation of the relay which is contained in the eliminator housing, and this connection is made as follows:

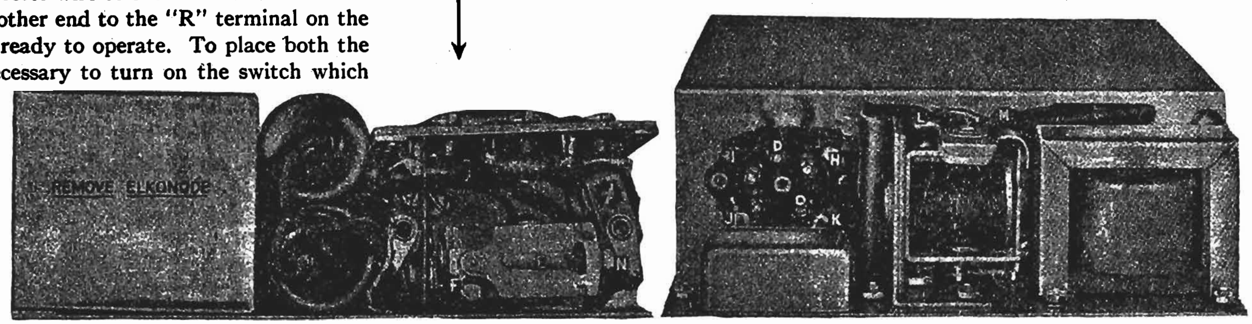
1. Ascertain the "hot A" terminal on the terminal board of your loud speaker by turning set switch on and connecting an ordinary automobile dash lamp in series between the frame of the car or any grounded point and the "hot A" terminal of the speaker. There are four or more terminals on the terminal board of your speaker and the one which permits this test lamp to light will be the "hot A" terminal. (Permanent magnet type speakers having no terminals, require that relay wire be connected to load side of set switch, either in control-head or in set.) Turn set switch off while test-lamp is still connected, making sure lamp turns off with switch.

2. Attach one end of the special relay connector wire to the "hot A" terminal on the loud speaker terminal board and connect the other end to the "R" terminal on the eliminator terminal board. Your receiver is now ready to operate. To place both the receiver and the eliminator in operation, it is necessary to turn on the switch which operates the receiver. An automatic switch device is incorporated in the eliminator which turns the eliminator on when the receiver is turned on and turns it off when the receiver is turned off. From 30 to 60 seconds may be required before a signal is heard from the loud speaker, this being the time required by various types of tubes to reach proper operating heat.

5. CONTINUITY AND SERVICE TEST. This test is to be made with the Elkonode removed from the eliminator.

It is assumed that before these tests are made the eliminator will be examined for poorly soldered or broken connections.

Continuity Between	Correct Continuity	Incorrect Continuity	Defect	Correction
R to GND	220 Ohms	Open	Open relay coil	Replace relay
"A+" to E	Closed	Open	Broken connection	Resolder
F to H	Closed	Open	Open transformer primary	Replace transformer
I to "A—"	Closed	Open	Broken connection	Resolder
H to GND	Open	Closed	Grounded transformer primary	Replace transformer
D to GND	Closed	Open	Broken connection	Resolder
J to K	90 Ohms	Open	Open transformer secondary	Replace transformer
J to K	90 Ohms	Closed	Shorted buffer condenser	Replace buffer condenser
J to GND	Open	Closed	Grounded transformer secondary or defective filter condenser	Replace transformer Replace 8 mfd. filter condenser
K to L	230 Ohms	Open	Open filter choke	Replace filter choke
K to GND	Open or 5000 to 12,000 Ohms	Closed	Grounded filter choke or shorted filter condenser	Replace filter choke or 8 mfd. filter condenser
L to M	40 to 80 Ohms	Open	Open relay coil	Replace relay
L to O	5,000 Ohms to 12,000 Ohms	Open	Open phantom load resistor	Replace load resistor
M to N	Closed	Open	Broken connection	Resolder
O to "B—"	Closed	Open	Broken connection or defective R. F. C.	Resolder or replace R. F. C.
N to "B+"	Closed	Open	Defective R. F. C.	Replace R. F. C.
"B—" to "B+"	5,000 to 12,000 Ohms	Short 270 to 310 Ohms	Shorted 16 MF Shorted 8 MF	Replace Replace



MODEL Elkon Auto "B" Eliminator Power Connections

P. R. MALLORY & CO.

Auto-Lite Model 82 — **Eliminator** Type 5

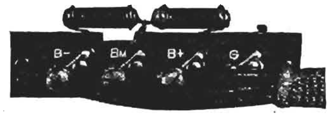
Remove Resistors

Green Red Shield

Connect "A" Hot of Radio Set to Relay

Atwater Kent Model 81 — **Eliminator** Type 4

75,000 20,000

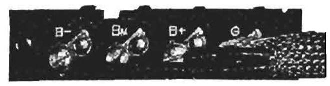


Black Red White

Connect "A" Hot of Radio Set to Relay
Use Regular "C" Batteries

Atwater Kent Model 91 — **Eliminator** Type 6

Remove Resistors

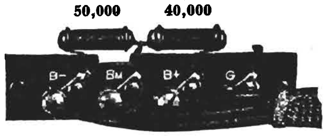


Black White Shield

Connect "A" Hot (from Speaker) to Relay
Use Regular "C" Batteries

Bosch Model 9:20 — **Eliminator** Type 5P

50,000 40,000

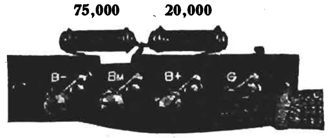


Black White Red

Connect Black Wire from Radio Set to Relay

Majestic Model 110 — **Eliminator** Type 6

75,000 20,000

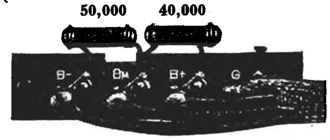


Black Yellow Red

Connect White Wire to Relay—Black to Grounded Battery Post

Philco Model 7 / {Model 7, Chassis Code 121} — **Eliminator** Type {3P for 135V, 5P for 180V}

50,000 40,000

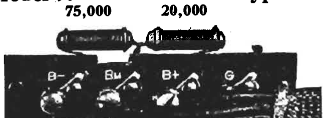


Black Green Blue Shield
White White White

Connect No. 14 Wire from "B—" to Relay, Preferably Shielded

Crosley Model 90 — **Eliminator** Type 3

75,000 20,000

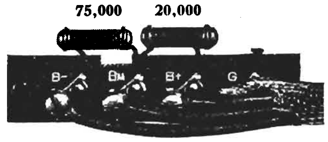


Black White Red

Connect "A" Hot of Radio Set to "A" Choke. "A" Choke to Relay
Use Regular "C" and "D" Batteries

Motorola Model 7-T-38 — **Eliminator** Type 6
Model 7-T-47-A — Type 6

75,000 20,000

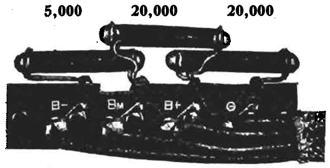


White Green Red Shield

Connect Yellow Wire to Relay. Black Wire to Grounded Battery Post

Sparton Model 40 — **Eliminator** Type 6 Spcl.*

5,000 20,000 20,000



Yellow Ground Brown Red

Connect Black and Red Wire to Relay

Crosley Model 91 — **Eliminator** Type 4
Model 92 — Type 6

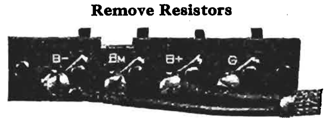
Remove Resistors

Green Red

Connect "A" Hot of Radio Set to "A" Choke. "A" Choke to Relay

Motorola Model 6 Tube — **Eliminator** Type 6

Remove Resistors



White Red

Connect Red Wire to Relay. Black Wire to Grounded Battery Post

Universal Models 60 and 70 — **Eliminator** Type 6

Remove Resistors

Red Shield

Connect White Wire to Relay. Black Wire to Grounded Battery Post

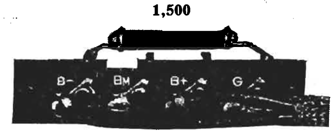
Crosley Model 95 — **Eliminator** Type 4

Remove Resistors

Connect "A" Hot of Radio Set to Relay

Motorola Model 5-T-71 — **Eliminator** Type 4 Spcl.

1,500

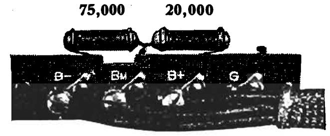


White Red Shield

Connect Two 8 MFD. 275 Volt Elkon Condensers Across the Output (B – to B +)
Connect Red Wire to Relay

Colonial Model 53 — **Eliminator** Type 5
Model 54 — Type 4

75,000 20,000

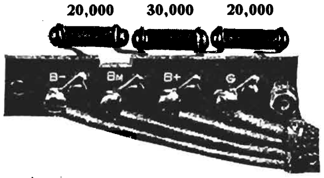


Black Yellow Red

Connect White Wire to Relay—Black Wire to Grounded Battery Post

Delco Model 3010 — **Eliminator** Type 3 Spcl.* †

20,000 30,000 20,000



Yellow Maroon Black Red
Red Tr.

Connect Black and Yellow Wire from Radio Set to "A" Choke. "A" Choke to Relay

Philco Model 3 — **Eliminator** Type 6

Remove Resistors

Green-White Blue-White

Connect Black-White Wire to "A" Choke. "A" Choke to Relay

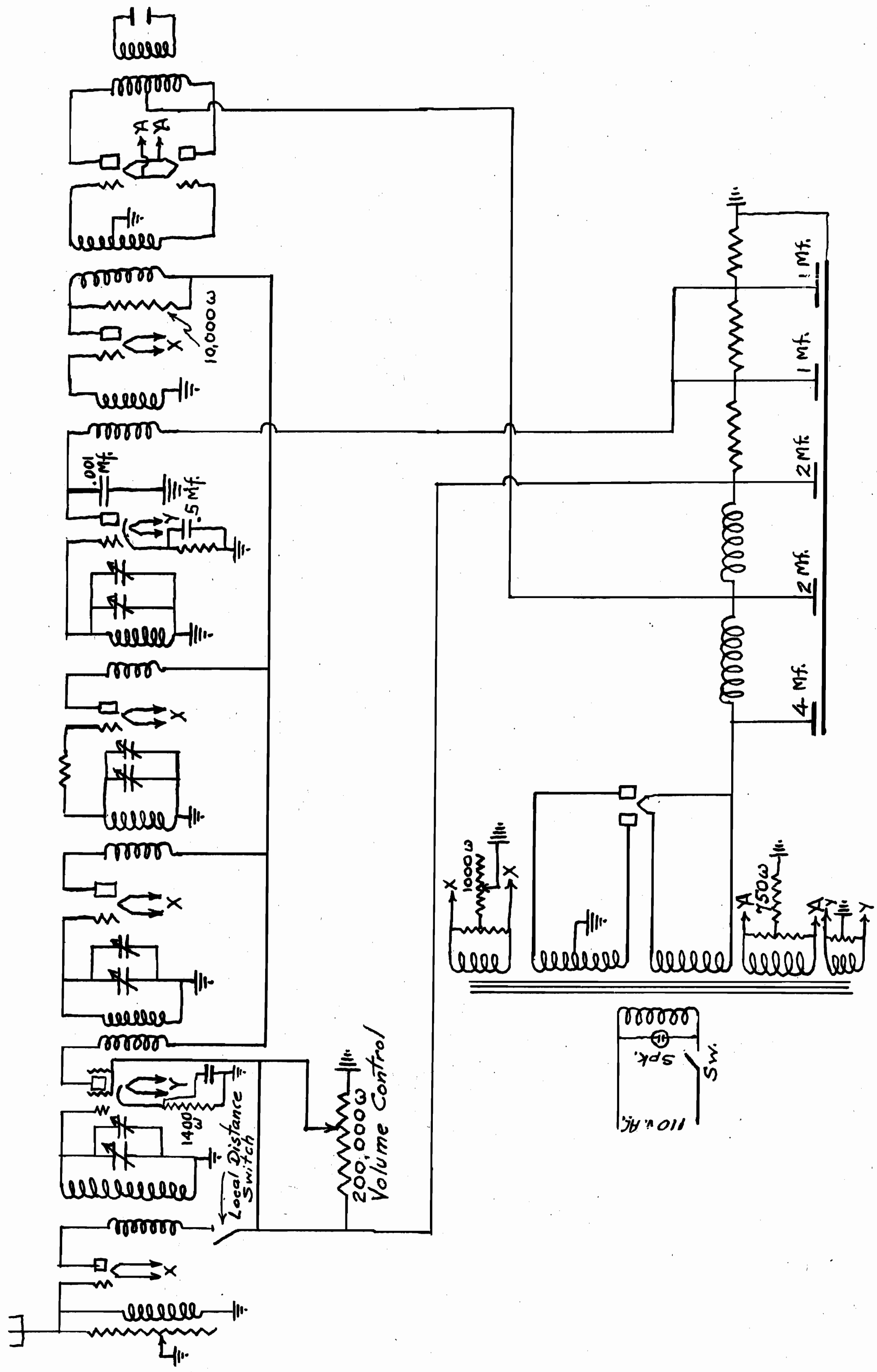
*Remove wire leading to "G" terminal. Move wire fastened to "B+" terminal to "G" terminal, making the "G" terminal, B+. Install resistors as shown.

†If shielded "B" cable is used remove the rivet from the right end of the terminal strip and replace with screw and nuts.

Fasten shield to bolt.

MODEL Miraco 1SG-226

MID-WEST RADIO CORP.



MODEL RT-9, G-9, F-9, H-9 (9-34)

Schematic

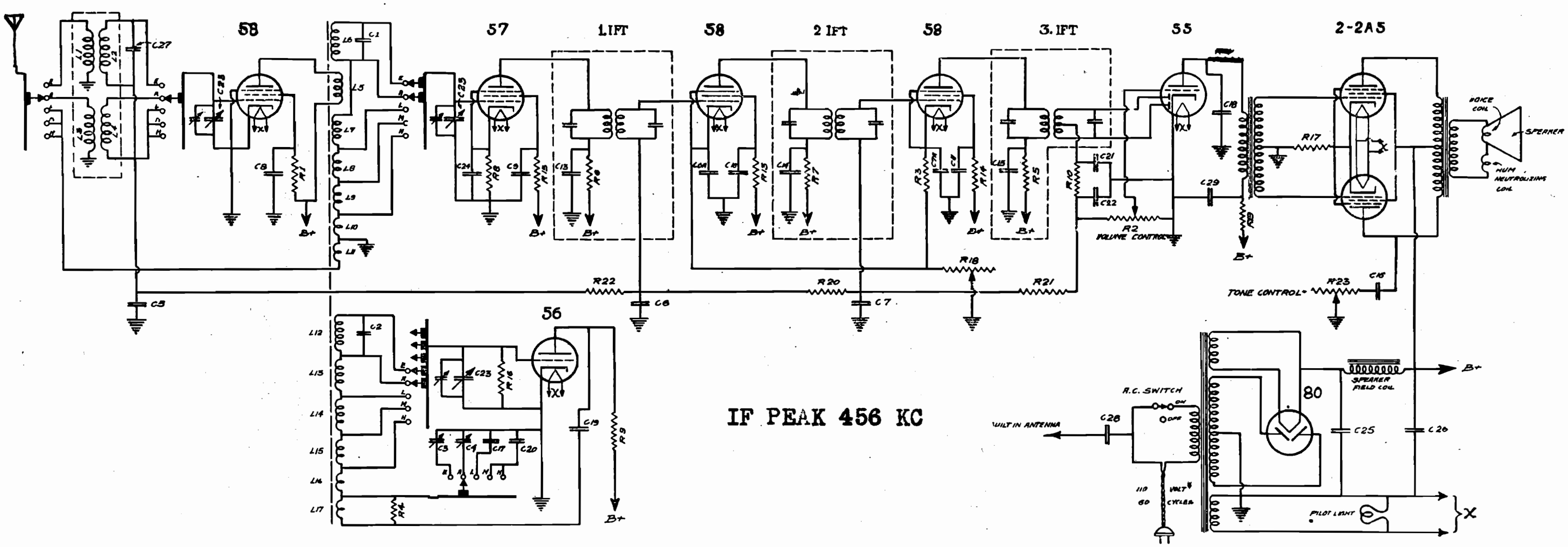
MID-WEST RADIO CORP.

C1 - TRIMMER - 35 MMFD } DUAL
C2 - TRIMMER - 35 MMFD }
C3 - 70 MMFD - E-PAD
C4 - 350 MMFD - A-PAD
C5 - .05 MFD - 200 V
C6 - .05 MFD - 200 V
C6A - .05 MFD - 200 V
C7 - .05 MFD - 200 V
C7A - .05 MFD - 200 V.
C8 - .05 MFD - 400 V.
C9 - .05 MFD - 400 V.
C10 - .05 MFD - 400 V.
C11 - .05 MFD - 400 V.
C13 - .05 MFD - 400 V.
C14 - .05 MFD - 400 V.
C15 - .05 MFD - 400 V.
C16 - .05 MFD - 400 V.
C17 - 1000 MMFD - MICA - L-PAD
C18 - 500 MMFD - MICA
C19 - 2000 MMFD - MICA
C20 - 3000 MMFD - MICA - M and H-PAD

C21 - 250 MMFD - MICA } DUAL
C22 - 250 MMFD - MICA }
C23 - TUNING - CONDENSERS
C24 - .05 MFD - 200 V
C25 - 8 MFD - 450 VOLT - ELECTROLYTIC
C26 - 8 MFD - 450 VOLT - ELECROLYTIC
C27 - TRIMMER 35 MMFD
C28 - 250 MMFD - MICA
C29 - 1 MFD - 300 VOLT - ELECTROLYTIC

R1 - 100 000 Ω ¼ WATT
R2 - 500 000 Ω VOLUME CONTROL
R3 - 1 000 Ω ¼ WATT
R4 1 500 Ω ¼ WATT
R5 - 5 000 Ω ¼ WATT
R6 5 000 Ω ¼ WATT
R7 5 000 Ω ¼ WATT
R8 - 5 000 Ω ¼ WATT
R9 - 10 000 Ω ¼ WATT
R10 - 25 000 Ω ¼ WATT
~~R11 - 25 000 Ω ¼ WATT~~
R13 - 100 000 Ω ¼ WATT
R14 - 100 000 Ω ¼ WATT
R15 - 200 000 Ω ¼ WATT
R16 - 500 000 Ω ¼ WATT
R17 - 210 Ω FLEXIBLE
R18 - 1 000 Ω VARIABLE
R19 - 25 000 Ω ¼ WATT
R20 - 500 000 Ω ¼ WATT
R21 - 500 000 Ω ¼ WATT
R22 - 500 000 Ω ¼ WATT
R23 - 50 000 Ω TONE CONTROL

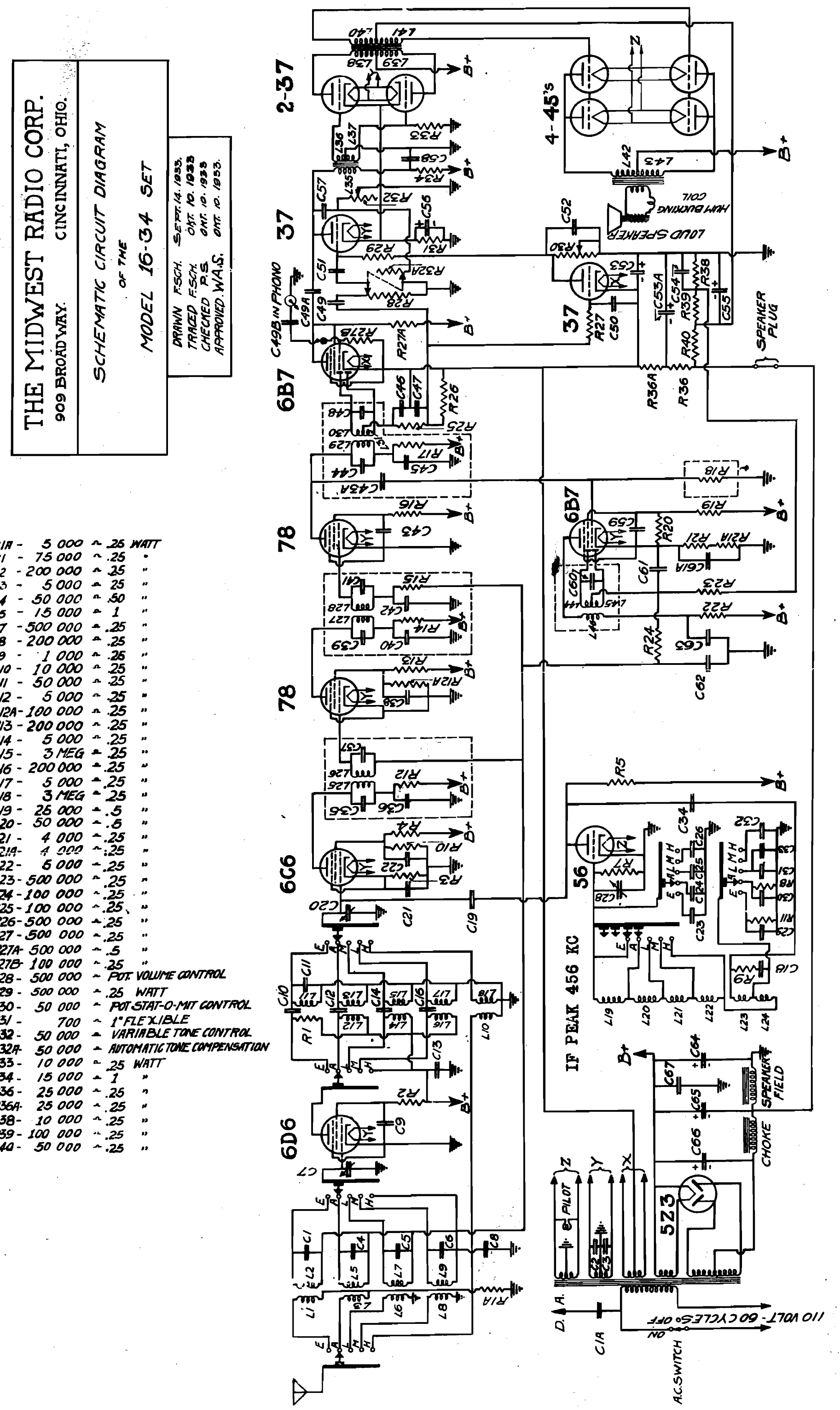
THE MIDWEST RADIO CORP. 909 BROADWAY. CINCINNATI, OHIO.	
SCHEMATIC DIAGRAM OF THE MODEL 9-34 SET	
DRAWN F.SCH. SEPT. 27. 1933	CHECKED - SEPT 29 33. P. Smith
TRACED F.SCH. SEPT 28 1933	APPROVED - SEPT 29.33 WAS.
REVISED	



MID-WEST RADIO CORP.

MODEL RT-16, A-16, B-16, D-16, PR-16, RM-16 (16-34)

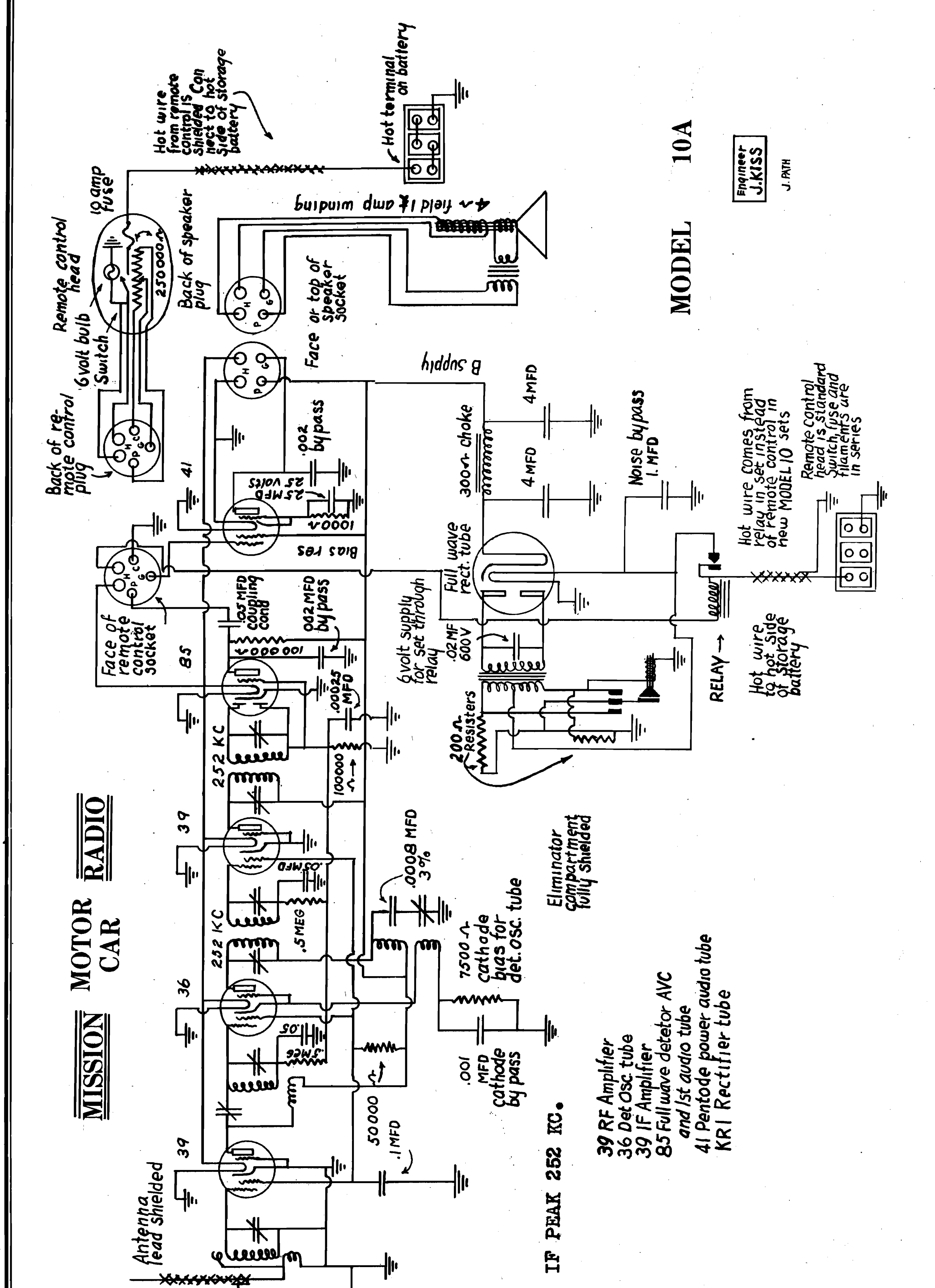
Schematic



C1A - 250 MMFD - MICA	R1A - 5 000 Ω .25 WATT
C1 - 80 " - TRIMMER	R1 - 75 000 Ω .25 "
C2 - .05 MFD - 200 VOLT	R2 - 200 000 Ω .25 "
C3 - .05 " - 200 "	R3 - 5 000 Ω .25 "
C4 - 20 MMFD - TRIMMER	R4 - 50 000 Ω .50 "
C5 - 20 " - "	R5 - 15 000 Ω 1 "
C6 - 20 " - "	R7 - 500 000 Ω .25 "
C7 - 365 " - TUNING CONDENSER	R8 - 200 000 Ω .25 "
C8 - .05 MFD - 200 VOLT	R9 - 1 000 Ω .25 "
C9 - .05 " - 400 "	R10 - 10 000 Ω .25 "
C10 - 25 MMFD - MICA	R11 - 50 000 Ω .25 "
C11 - 80 " - TRIMMER	R12 - 5 000 Ω .25 "
C12 - 20 " - "	R12A - 100 000 Ω .25 "
C13 - .05 MFD - 400 VOLT	R13 - 200 000 Ω .25 "
C14 - 20 MMFD - TRIMMER	R14 - 5 000 Ω .25 "
C16 - 20 " - "	R15 - 3 MEG Ω .25 "
C18 - 25 " - MICA	R16 - 200 000 Ω .25 "
C19 - 20 " - TRIMMER	R17 - 5 000 Ω .25 "
C20 - 365 " - TUNING CONDENSER	R18 - 3 MEG Ω .25 "
C21 - .05 MFD - 200 VOLT	R19 - 25 000 Ω .5 "
C22 - .05 " - 200 "	R20 - 50 000 Ω .5 "
C23 - 80 MMFD - TRIMMER	R21 - 4 000 Ω .25 "
C24 - 20 " - "	R21A - 4 000 Ω .25 "
C25 - 20 " - "	R22 - 6 000 Ω .25 "
C26 - 20 " - "	R23 - 500 000 Ω .25 "
C28 - 365 " - TUNING CONDENSER	R24 - 100 000 Ω .25 "
C29 - 160 " - PADDER	R25 - 100 000 Ω .25 "
C30 - 360 " - "	R26 - 500 000 Ω .25 "
C31 - 700 " - "	R27 - 500 000 Ω .25 "
C32 - 3000 " - MICA	R27A - 500 000 Ω .5 "
C33 - 500 " - "	R27B - 100 000 Ω .25 "
C34 - 2000 " - "	R28 - 500 000 Ω POT. VOLUME CONTROL
C35 - I.F.T - TRIMMER	R29 - 500 000 Ω .25 WATT
C36 - .05 MFD - 400 VOLT	R30 - 50 000 Ω POT STAT-O-MIT CONTROL
C37 - I.F.T. - TRIMMER	R31 - 700 Ω 1" FLEXIBLE
C38 - .05 MFD - 400 VOLT	R32 - 50 000 Ω VARIABLE TONE CONTROL
C39 - I.F.T. - TRIMMER	R32A - 50 000 Ω AUTOMATIC TONE COMPENSATION
C40 - .05 MFD - 400 VOLT	R33 - 10 000 Ω .25 WATT
C41 - I.F.T - TRIMMER	R34 - 15 000 Ω 1 "
C42 - .05 MFD - 200 VOLT	R36 - 25 000 Ω .25 "
C43 - .05 " - 400 "	R36A - 25 000 Ω .25 "
C43A - 25 MMFD - MICA	R38 - 10 000 Ω .25 "
C44 - I.F.T. - TRIMMER	R39 - 100 000 Ω .25 "
C45 - .05 MFD - 400 VOLT	R40 - 50 000 Ω .25 "
C46 - 250 MMFD - MICA } DUAL	
C47 - 250 " - MICA } DUAL	
C48 - I.F.T. - TRIMMER	
C49 - .05 MFD - 200 VOLT	
C49A - .05 " - 400 "	
C49B - .05 " - 200 " IN PHONO	
C50 - .05 " - 200 "	
C51 - .05 " - 200 "	
C52 - .01 " - 200 "	
C53 - 25 " - 50 "	
C53A - 10 " - 75 "	
C54 - .05 " - 200 "	
C55 - 25 " - 50 "	
C56 - 12 " - 25 "	
C57 - .05 " - 400 "	
C58 - 1 " - 300 "	
C59 - .05 " 400 "	
C60 - I.F.T. - TRIMMER	
C61 - .001 MFD - 600 VOLT	
C61A - .05 " - 200 "	
C62 - .001 " - 600 "	
C63 - .05 " - 400 "	
C64 - 8 " - ELECTROLYTIC	
C65 - 8 " - "	
C66 - 8 " - "	
C67 - .25 " - 400 VOLT	

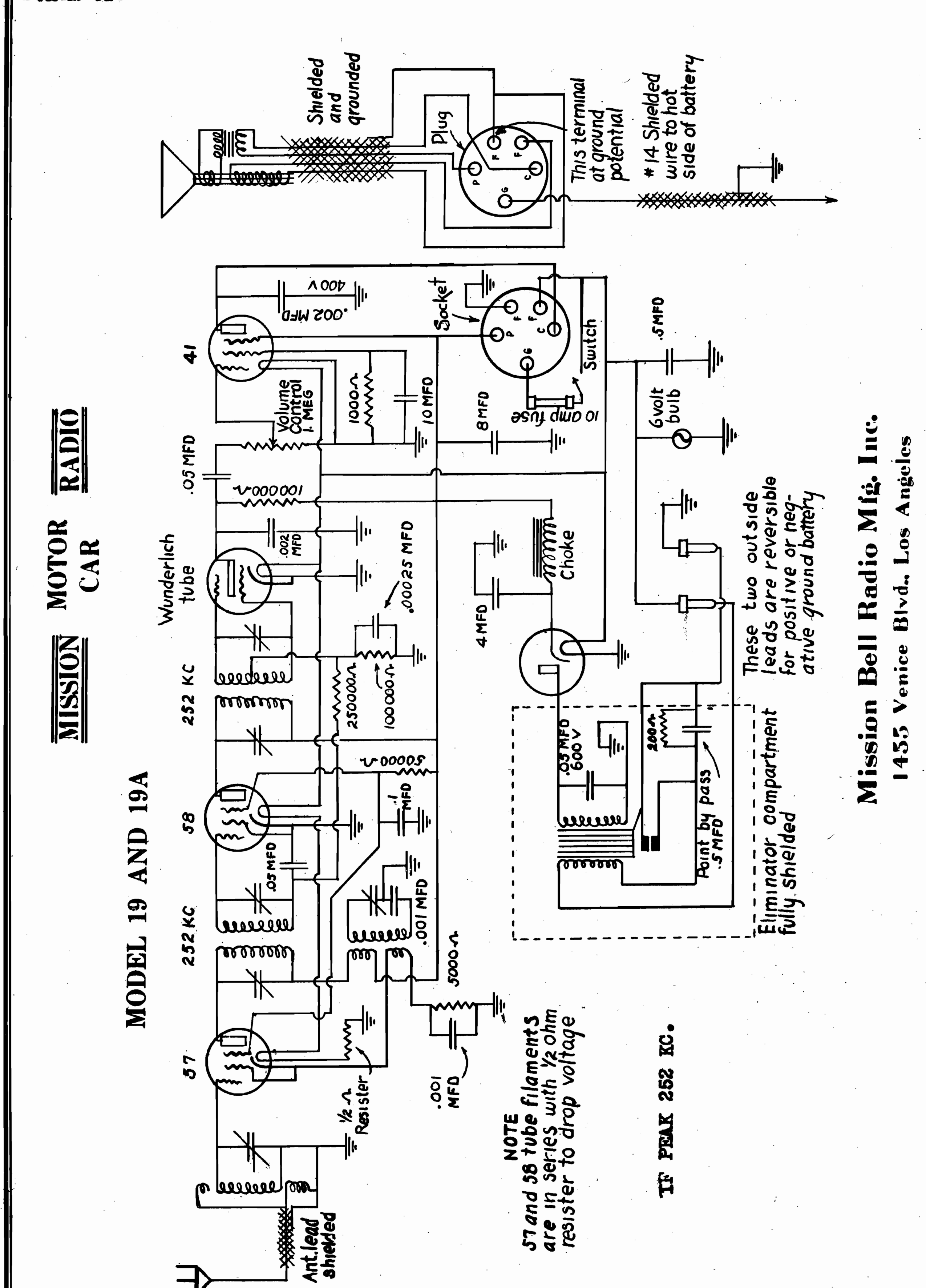
MISSION BELL RADIO MFG. CO., INC.

MODEL 10-A
Schematic



MODEL 19,19-A
Schematic

MISSION BELL RADIO MFG. CO., INC.



MISSION BELL RADIO MFG. CO., INC. MODEL 10-A,19,19-A Vibrator data

SERVICE DATA ON FULL-WAVE INTERRUPTOR

****

An O to 5 Ammeter is absolutely necessary in servicing.
The Model 10A and 19-A and Model 5 should draw approximately $5\frac{1}{2}$ to $5\frac{3}{4}$ amps. There is no voltage regulator, Your reading of output voltage can be secured most conveniently from the adjusting screws on top of intermediate frequency coil.
If the set draws $5\frac{1}{2}$ to $5\frac{3}{4}$ amps. with no resulting output voltage, then check AC volts from transformer. Test rectifier tube - a shorted filter condenser will increase the drain approximately 2 amps. A shorted bugfer condenser will increase drain 5 amps. Either of which cause the points to labor and heat up. Visually, this is indicated by excessive arc-ing and small movement of armature (weight on end of center spring). Shorted rectifier tube will show 8 amps short.
If transformer primary is shorted, due to contact points failing to move apart, you will receive a reading of from 18 to 26 amps - which will blow the fuse inside the set on Model 10A, 19A and 5, or in remote control on Model 19B. Usually, tightening the 2 6/32 nuts on the assembly, or giving the inside point next to the starting coil a gap of ten thousandths (.010), either by bending metal stop to push the points apart, or bending spring stock away from center point is all that is necessary.

If above conditions are normal and the vibrator fails to start, the points are spaced too far apart, or the armature is too far from the magnet or core - providing you have battery voltage to the poimts.

Bench Adjustment:- Weight on center spring (call Armature) should not be closer than 1/8" to magnet or core. The copper rivet fastening weight to spring should keep the weight from touching the core. The outside point should have a tension of not more than five thousandths (.005). The inside point should be open about eight to twelve thousandths (.008 to.012). The main consideration is to secure as wide a spacing as possible on the inside point, and yet not so wide that when set is turned off and on continuously there would be failube to start (or point make contact). It is also satisfactory to adjust so that the outside point has a small gap - but a closed contact on the outside point will assist in starting.

Adjustment of Interruptor of Open Frame Type: -(This frame is not a closed or complete rectangle). If the points work vigorously, of if the weight is pulled all the way to the core when switch is turned on, it is advisable to bend the frame to bring the weight farther away from the magnet. This can be accomplished with a large pair of pliars. If the weight is too far away and magnet will not pull weight down enough to contact lower point, bend opposite way. In either operation make the bend at the top end of frame. Other spacing and adjustments same as above directed.

ADJUSTMENT HALF-WAVE POINTS MODEL 10

****

Battery voltage should be not less than $5\frac{1}{2}$ volts at terminals on the outside of Junction Block. (This is the small fiber strip attached to the side of Eliminator Box).
Put an O to 5 Ammeter in series with the hot or ungrounded wire on the Junction Block.

Second: - The lower spring should rest close to the transformer, 1/32 of an inch, no more, above the transformer. The lamentations at the groove should be level, and can be made so by tapping with a hammer. When installing a new assembly, see that adjusting screw does not touch the transformer until the point assembly is securely fastened down. On new assemblies as received from the factory, note carefully the tension and movement of the points, in case it should be necessary to bend the lower spring to secure right distance from transformer - you can then bend the upper spring enough to get this same tension again.

Third:-It is absolutely necessary to have an ammeter hooked in series with the hot wire on junction block, as the input voltage reading should never exceed a maximum of more than 2 amps. This voltage and also the output voltage can be regulated to some extent with the adjusting screw. If the points should be drawing more than two amps, they will get hot and pit and burn.
Fourth:- The tension on the top point is very important. These should be adjusted for maximum swing or up and down movement of both points when in operation.

Fifth:-With lower point adjusted to 1/32" from transformer, the upper spring should have enough tension to follow nor move down approximately 30/1000ths as the lower spring is pulled down to the core or lamentations. There should be a 30/1000ths gap between the points when the lower point reaches its maximum downward movement. Either decreasing or increasing the tension of the springs regulates the INPUT and OUTPUT VOLTAGE. The output voltage can be secured most conveniently from the upright intermediate frequency coil. One of the brass screws is B positive - B negative being the ground.

NOTE:-In case the negative of the car storage battery is grounded, then you must make the same polarity hook-up on the bench. Should the set be changed from a negative grounded car to a positive grounded car, then the two wires on the outside, and the same side of the junction block, must be reversed.
Should the points have been run backwards from hooking up wrong polarity, a few strokes of a thin file between the points will remove excess metal on surface of points, and then can be re-adjusted - unless they have been so hot that the temper is out of the metal.
To bend the springs use long nose pliars at the back end of spring, twisting either down or up, depending on desired effect.

Discussion of R. F. DISTURBANCE IN RELATION TO GROUNDS.

With reference to R. F. noise or disturbance created by the interruptor or eliminator, as applied to demonstrating boards and bench installation for testing and demonstrating.

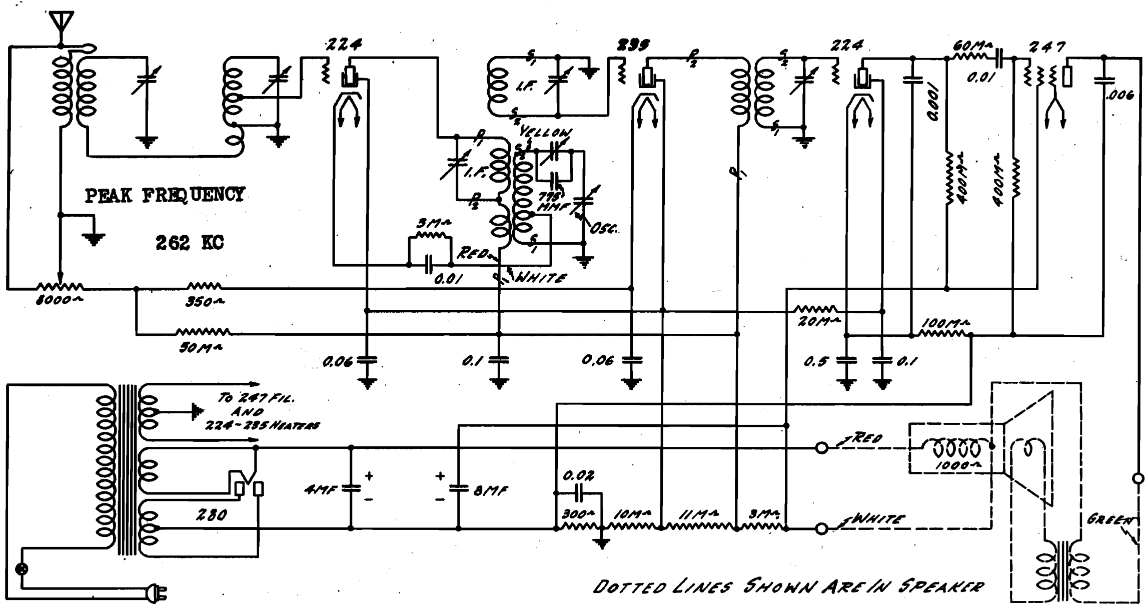
Inasmuch as all transmitting stations use a good ground or counterpoise ground to properly dissipate R.F. energy - and the best of the receiving systems employ good ground or counter-poise for proper reception - it is quite evident that when a set of this nature is hooked up on a display board or on the bench, that the chassis or set connected to the battery or to the shielded cable forms a very poor ground - especially when the source of the interference is located inside of the set. Therefore, if proper dissipation of the R.F. disturbanse is not provided in the form of a ground, the antenna will pick up considerable interference from the set, battery and battery leads.

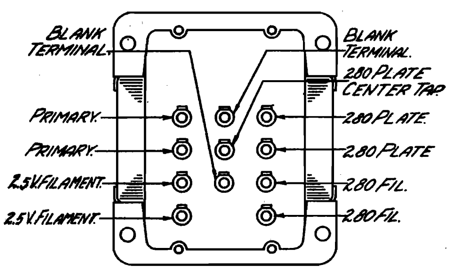
For installation on boards and bench testing, it has been found, after exhaustive tests, that a ground must be provided in the form of an outside type, or one of counter-poise effect constructed sufficient to offset the antenna pickup of this interference. An antenna of from three feet not to exceed ten feet is recommended, as it is generally possible to secure an outside ground sufficient to counteract this pickup of R.F. interference.

An automobile has proven to be one of the best counter-poise ground systems obtainable, and Mission Automobile Receivers have been designed for this type of ground system. The outside ground corresponds to the ground system in the car. The bolting of the receiver to the dash with the three studs gives considerably more ground effect than fastening an outside ground to one stud of the case when operating on the bench.
Do not confuse the car battery as your ground system; it is merely your six-volt source of supply. The car-frame, motor and body become a very large and efficient counter-poise ground - and being situated right under the antenna input, becomes the dissipating agency for the R.F. noise that is created by the interruptor. That is the reason that the antenna in the car does not pick up the R.F. interference when the set is properly mounted in the car - but the same set would, no doubt, appear to be producing considerable amount of R.F. on the bench.

MODEL 13,15,16,16X, 17,18,18X

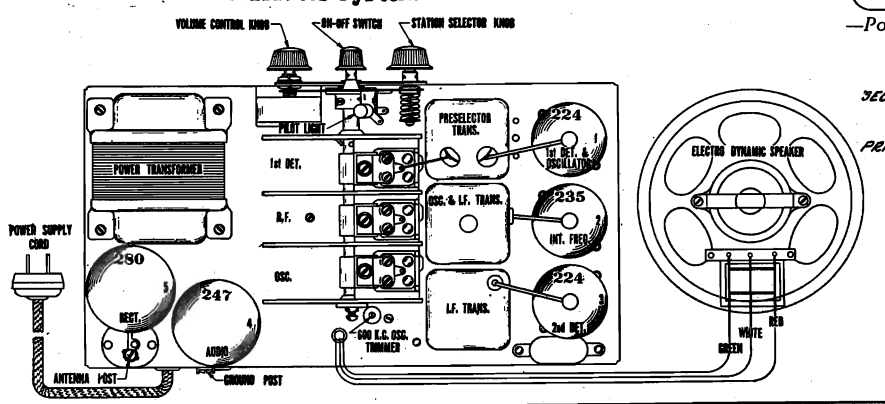
MONTGOMERY-WARD & CO.

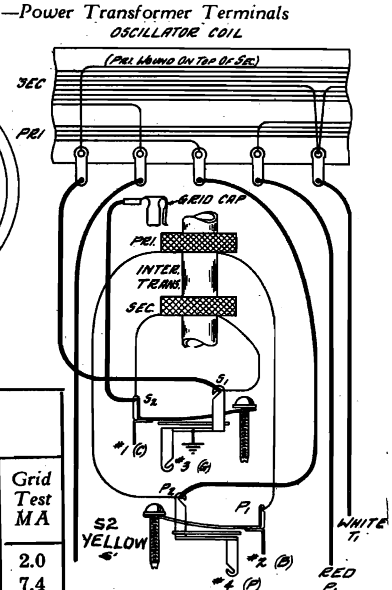




—Power Transformer Terminals

There are certain features to be noted in this receiver. The mixer is of the autodyne type, wherein it functions as a mixer (1st detector) and also as an oscillator. Also that the grid lead from the mixer tube joins the grid coil at a tap upon this winding. This tap is so apportioned that the circuit acts to suppress the tranmission of image frequency signals, in this case 524 KC higher than the frequency setting of the tuhed circuit. The IF transformer is also of special structure combining the coupling transformer and also the oscillator system.





Wiring Diagram, Osc. and I.F. Assembly

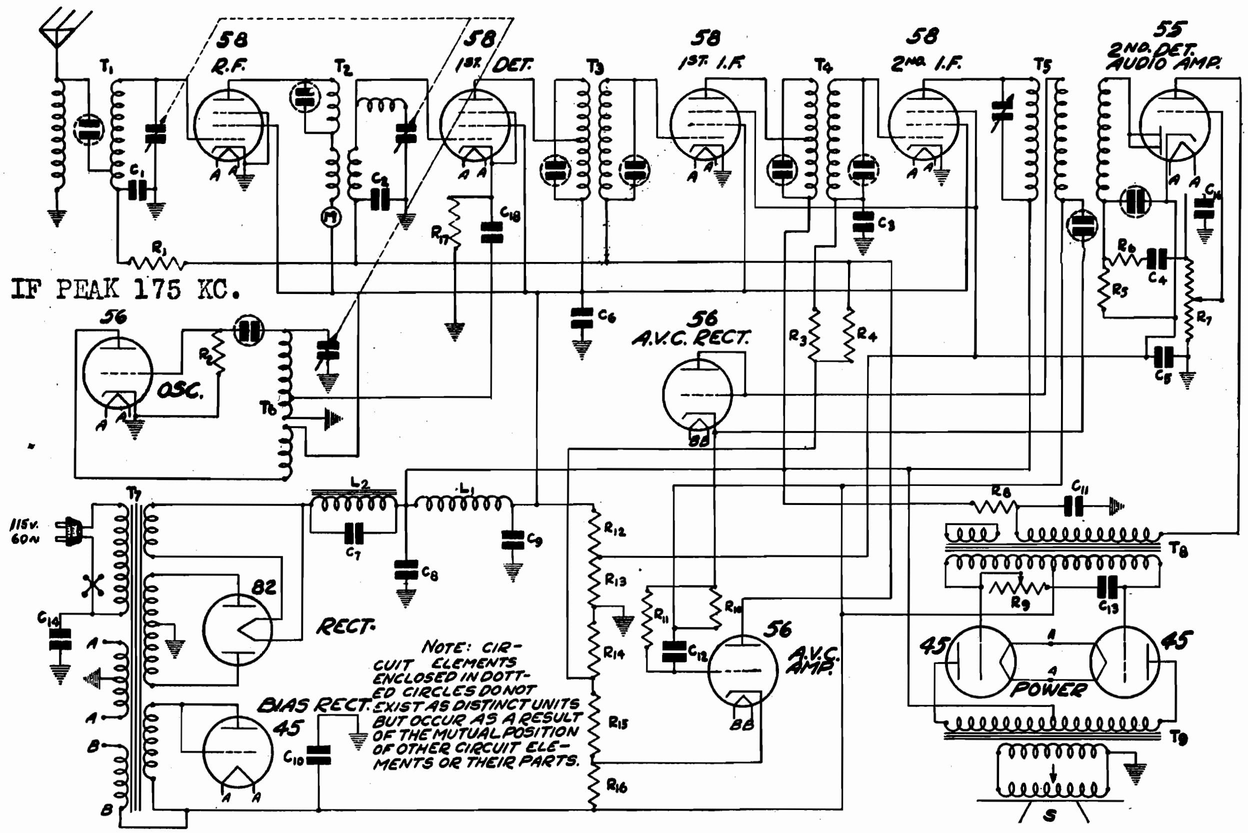
VOLTAGES AT SOCKETS
LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate MA	Grid Test MA
224	1	1st Det. & Osc.	2.25	165	4.5–5.25 (1)	65	.4	4.5–5.25 (1)	1.3	2.0
235	2	I.F.	2.25	165	2.5	65	1.5	2.5	6.4	7.4
224	3	2nd Det.	2.25	128	6.5	60 (2)	.05	6.5	.22	.23
247	4	Audio	2.25	205	16. (3)	225	8.0		29.	33.
280	5	Rect.	4.9						27. Per Plate	

(1) Varies with frequency setting of dial approximately as shown.
(2) Voltage as measured with 600,000 ohm meter.
(3) Measured across 300 ohm section of voltage divider resistor.

MODEL 62-89
Schematic, Socket
Values

MONTGOMERY-WARD & CO.



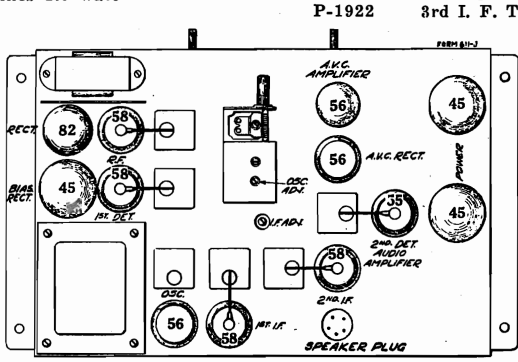
RESISTORS

Part No.	Code	Resistance	Type
P-A95204	R1	200,000 ohm	Carbon
P-A95504	R2	.5 megohm	Carbon
P-A95105	R3	1 megohm	Carbon
P-A95504	R4	.5 megohm	Carbon
P-B94803	R5	80,000 ohm	Carbon
P-A95104	R6	100,000 ohm	Carbon
P- 96005	R7	2 megohm	Vol. Con. & Switch
P-C94403	R8	40,000 ohm	Carbon
P- 97003	R9	3 megohm	Tone Control
P-A95204	R10	200,000 ohm	Carbon
P-A95105	R11	1 megohm	Carbon
P- 98003	R12 R13	4000 ohm 390 ohm	Armoured Wire Wound
P-A94902	R14	9,000 ohm	Carbon
P-A94154	R15	150,000 ohm	Carbon
P-A94353	R16	35,000 ohm	Carbon
P-A95352	R17	3,500 ohm	Carbon

"A" preceding the number signifies .2 watt
"B" preceding the number signifies .5 watt
"C" preceding the number signifies 1.0 watt

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80862	C1	.050 mfd.	200 V.	Tubular
P-80987	C2	.150 mfd.	200 V.	Tubular
P-80862	C3	.050 mfd.	200 V.	Tubular
P-80862	C4	.050 mfd.	200 V.	Tubular
P-80888	C5	.250 mfd.	200 V.	Tubular
P-80888	C6	.250 mfd.	200 V.	Tubular
P-80985	C7	.150 mfd.	200 V.AC	Tubular
P-80984	C8 C9 C10 C11	16. mfd. 6. mfd. 8. mfd. 4. mfd.	450 V. 150 V. 100 V. 350 V.	Electrolytic Block
		16 mfd. Section—Term. 3+, Term. 1–		
		6 mfd. Section—Term. 5+, Term. 1–		
		4 mfd. Section—Term. 4+, Term. 1–		
		8 mfd. Section—Term. 6+, Term. 2–		
P-80862	C12	.050 mfd.	200 V.	Tubular
P-80863	C13	.004 mfd.	600 V.	Tubular
P-80997	C14	.010 mfd.	600 V.	Metal Can
P-80919	C16	.00025 mfd.	600 V.	Moulded
P-80914	C18	.002 mfd.	200 V.	Tubular
P-80991	3 Gang Condenser			
P-1922	3rd I. F. Trimmer Condenser			



Tube Arrangement

MONTGOMERY-WARD & CO.

MODEL 62-89
Voltage data
Alignment

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K. C. and accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the 3rd I. F. primary condenser for maximum output. The adjusting screw for this condenser is reached from the top of the sub-panel and will be seen in back of the tuning condenser.

Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

The tuning condensers are all adjusted at the factory for the correct relative capacity between the oscillator section and the other two sections. As a rule no adjustment other than at 1400 K. C., as mentioned above, is required. If, after the receiver has been aligned at 1400 K. C., the sensitivity is still low at some portion of the band, adjust the signal generator to that setting and tune for maximum output with the station selector knob on the receiver. Then, without readjusting the trimmers, bend the slotted rotor plates on the **front two sections** of the gang to obtain maximum output. Care should be taken not to bend these plates too far in an inward direction as the condenser may short as a result.

After any adjustment of this nature, set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Caution

Never operate the receiver with the bias rectifier tube out of the socket. When this condition exists all of the tubes which secure bias voltage from the action of this tube will be operating without bias voltage and as a result, excessive plate current will flow. In the case of the 45 output tubes, the very high plate current may ruin these tubes completely.

Replacing Rubber Drive Pinion

The vernier tuning drive on this chassis uses a rubber pinion. Under normal operating conditions, this rubber will last for a number of years. Should it become worn it can be replaced as follows:

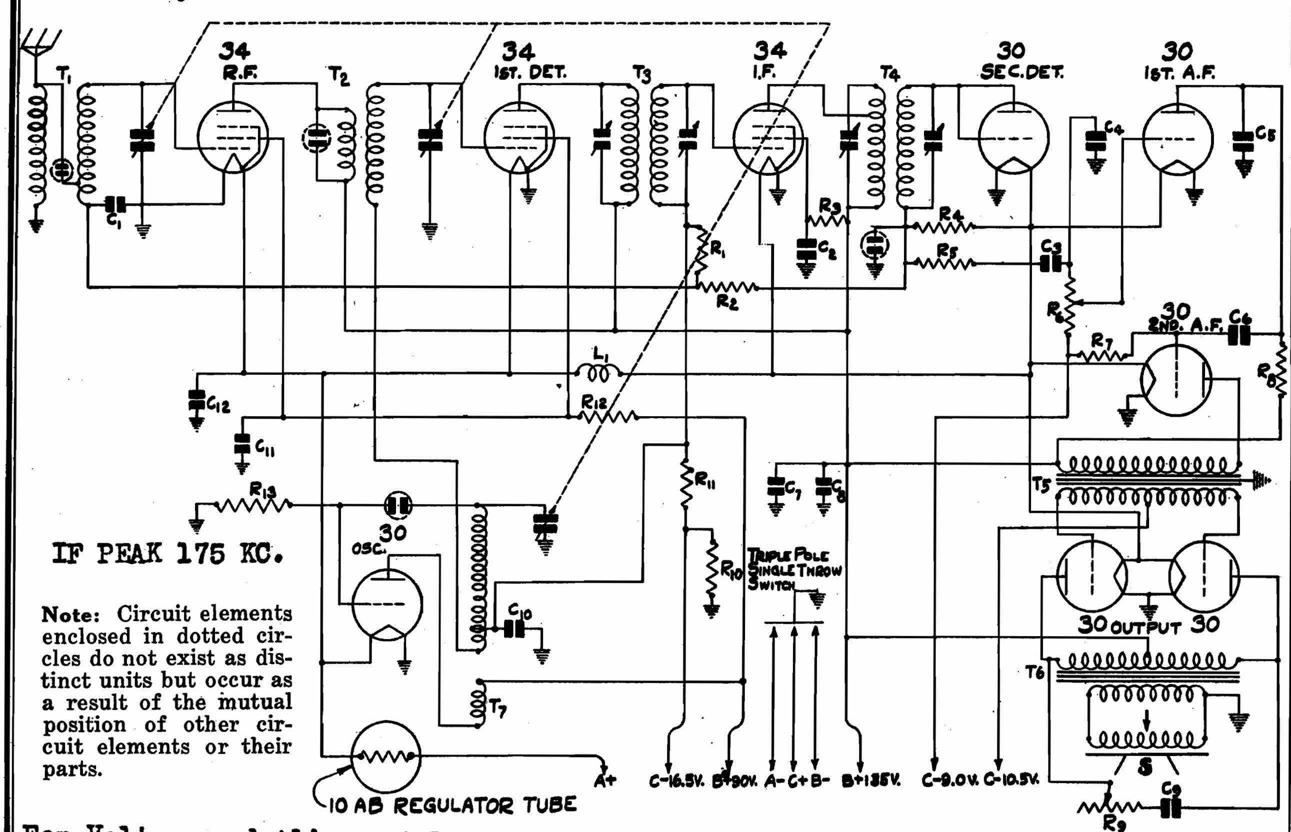
Loosen the set screw of the brass drive bushing and also the retaining screw on the station selector shaft end bearing which is attached to the tuning condenser. Then pull out the station selector shaft. Pull the old rubber pinion off of the brass bushing and put the new one on. The rubber pinion fits tight. Next slip the station selector shaft back in position through the bushing and tighten the two screws.

TYPE	FUNCTION	Fil-Htr. Volts	Plate to Cathode	Screen to Cathode	Cont.Grid to Cath.	Supp.Grid to Cath.	Plate MA
58	R.F.	2.5	116	122	4.5*	—	7.5
58	1st Det.	2.5	112	112	13.0**	—	2.2
56	Osc.	2.5	122	—	0	—	5.0
58	1st I.F.	2.5	405	120	4.5*	13	8.0
58	2nd I.F.	2.5	405	120	4.5*	13	8.0
56	AVC Rect.	2.5	0	-	-	—	0
56	AVC Ampl.	2.5	75°	-	17.0 z	—	0
55	2nd Det.	2.5	160°°	-	13.0 x	—	5
45	Power	2.5	405	-	103.0	—	22
45	Bias Rect	2.5	105	-	—	—	0.5
82	Rect.	2.5	1040 v. AC plate to plate				52 per plate

* As read across R-14
** As read across R-17 and R-14
° As read across R-15 with 1,000,000-ohm meter
°° As read across R-16
z Triode plate to cathode
x Volume control at minimum

MODEL 62-91
Schematic, Values
Socket layout

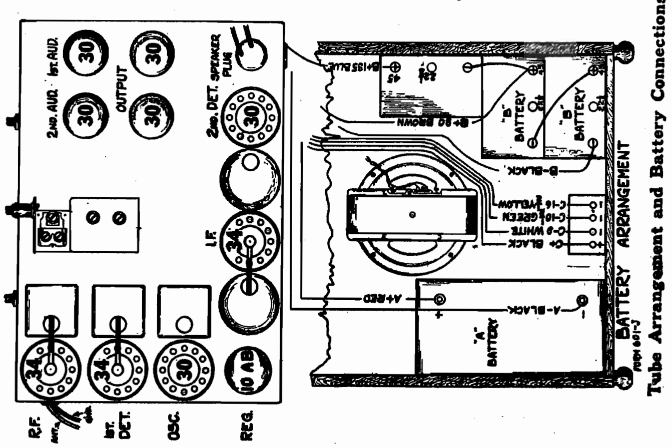
MONTGOMERY-WARD & CO.



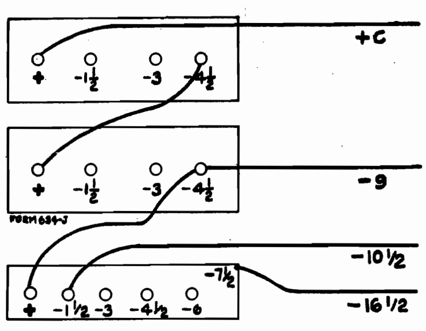
IF PEAK 175 KC.

Note: Circuit elements enclosed in dotted circles do not exist as distinct units but occur as a result of the mutual position of other circuit elements or their parts.

For Voltage and Alignment Data, see Index



Tube Arrangement and Battery Connections



Optional "C" Battery Connections

CONDENSERS

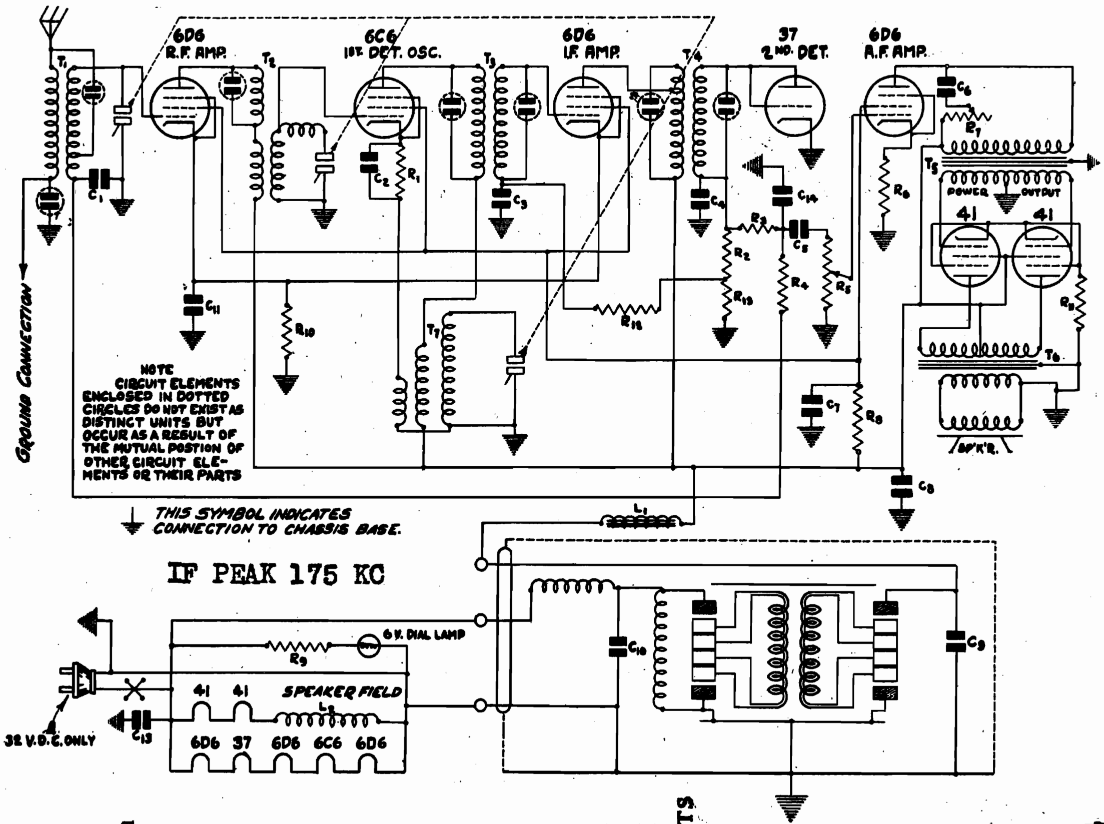
Part No.	Code	Capacity	Voltage	Type
P-80864	C1	.10 mfd.	200 V.	Tubular
P-80862	C2	.050 mfd.	200 V.	Tubular
P-80862	C3	.050 mfd.	200 V.	Tubular
P-80919	C4	.00025 mfd.	600 V.	Moulded
P-80919	C5	.00025 mfd.	600 V.	Moulded
P-80862	C6	.050 mfd.	200 V.	Tubular
P-80968	C7	4.00 mfd.	150 V.	Electrolytic
P-80862	C8	.050 mfd.	200 V.	Tubular
P-80940	C9	.02 mfd.	400 V.	Tubular
P-80981	C10	.01 mfd.	400 V.	Tubular
P-80888	C11	.25 mfd.	200 V.	Tubular
P-80888	C12	.25 mfd.	200 V.	Tubular
P-80980	Three Gang Variable Condenser			

RESISTORS

Part No.	Code	Resistance	Type
P-A95504	R1	.5 megohm	Carbon
P-A94105	R2	1.0 megohm	Carbon
P-A95353	R3	35,000 ohms	Carbon
P-A94204	R4	200,000 ohms	Carbon
P-A95104	R5	100,000 ohms	Carbon
P- 96003	R6	1 megohm	Volume Control
P-A94105	R7	1 megohm	Carbon
P-A95104	R8	100,000 ohms	Carbon
P- 97001	R9	150,000 ohms	Tone Control
P-A94153	R10	15,000 ohms	Carbon
P-A94405	R11	4 megohms	Carbon
P-A94153	R12	15,000 ohms	Carbon
P-A95504	R13	.5 megohm	Carbon

MONTGOMERY-WARD & CO.

MODEL 62-93
Schematic, Voltage, Socket layout



IF PEAK 175 KC

RESISTORS

Part No.	Code	Resistance	Type
P-A93452	R1	4,500 ohm	Carbon
P-A94154	R2	150,000 ohm	Carbon
P-A95104	R3	100,000 ohm	Carbon
P-A95205	R4	2 megohm	Carbon
P- 96004	R5	1 megohm	Volume Control
P-A95102	R6	1,000 ohm	Carbon
P- 97002	R7	40,000 ohm	Tone Control
P-B93203	R8	20,000 ohm	Carbon
P- 91053	R9 / R11	144 ohm / 340 ohm	Armoured Wire Wound
P-A94201	R10	200 ohm	Carbon
P-A95105	R12	1 megohm	Carbon
P-A94503	R13	50,000 ohm	Carbon

"A" preceding the number signifies .2 watt
"B" preceding the number signifies .5 watt
"C" preceding the number signifies 1.0 watt

CONDENSERS

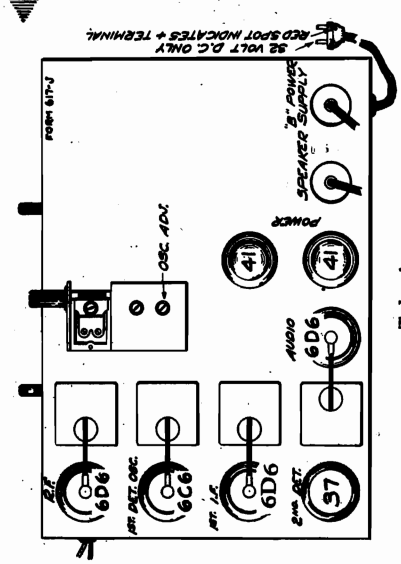
Part No.	Code	Capacity	Voltage	Type
P-80862	C1	.050 mfd.	200 V.	Tubular
P-80914	C2	.002 mfd.	600 V.	Tubular
P-80862	C3	.050 mfd.	200 V.	Tubular
P-80919	C4	250 mmf.	600 V.	Moulded
P-80862	C5	.050 mfd.	200 V.	Tubular
P-80862	C6	.050 mfd.	200 V.	Tubular
P-80988	C7	1.50 mfd.	140 V.	Tubular
P-80989	C8	8.00 mfd.	250 V.	Electrolytic
P-80887A	C11	.10 mfd.	400 V.	Tubular
P-80974	C13	.50 mfd.	120 V.	Tubular
P-80919	C14	250 mmf.	600 V.	Moulded
P-80980	3 Gang Condenser			

"B" POWER UNIT PARTS

Part No.	
P-60680	"A" Choke Coil L3
P-70735	Cable and Plug
P-10272	Rubber Mtg. Feet
P-80925	C9 .25 mfd. 300 V. Tubular Condenser
P-80974	C10 .50 mfd. 120 V. Tubular Condenser
P-1908	32 Volt Dynamotor Complete

INTERFERENCE ELIMINATION PARTS

Part No.	
62-5424	Spark Plug Suppressor
P-80933	Dual .5 mfd. Generator Condenser



Tube Arrangement

TYPE	FUNCTION	Heater Volts	Plate to Cathode	Screen to Cathode	Grid to Cathode	Plate MA
6D6	R.F.	6.4	190	96	3.0*	7.5
6C6	1st Det-Osc.	6.4	185	91	7.0	1.6
6D6	I.F.	6.4	190	96	3.0*	7.5
37	2nd Det.	6.4	0	—	0	0
6D6	1st A.F.	6.4	170	94	4.8*	5.0
41	Output	6.4	175	177	14.0	18.0

* Cathode to ground

For Noise Elimination Data, see Index

MODEL 62-93
Noise Elimination
MODEL 77, 95
Alignment

MONTGOMERY-WARD & CO.

MODEL 62-93

Eliminating Ignition and Generator Noise

After the receiver is in working order, the following procedure must be followed in practically all cases to eliminate ignition and generator noise caused by the charging plant. If the charging plant causes no noise, then of course, these steps do not have to be taken.

One spark plug suppressor must be placed on each spark plug of the engine. One spark plug for example would be required on a one-cylinder engine and four must be used on a four-cylinder engine. To connect the spark plug suppressor, remove the wire from the top of the plug, put the suppressor on and attach the wire to the other end of the suppressor.

The generator condenser consists of two .5 mfd. sections in one unit. The two sections have one side grounded to the metal case of the condenser. Mount the condenser on the frame of the charging plant. This will ground it. Then connect the two leads to the charging switch, one on each side of the line.

In some large installations, where the charging unit is on only two or three times a week, the above steps do not have to be taken, as interference is only caused when the generating plant is in operation.

If the reception is noisy only when the generating plant is in operation, then the noise is due to the latter and several things can be done. There may be loose parts in the generator plant rubbing together. Tighten up all parts and be sure that all parts of the engine are well grounded. Dirty spark plugs may cause noise. Clean and respace the plugs or try out a new set. In some instances it may be necessary to filter the power supply line to the receiver.

If any motor driven devices, such as pumps, are operated from the 32 volt line, the motor may cause noisy reception in the receiver. This can be corrected in most cases by connecting one of the dual .5 mfd. condensers mentioned above across the line at the motor. The common connection to the two condensers which is grounded to the can is grounded externally by mounting the unit on the motor or on a nearby point which is well grounded.

A faulty "B" unit may cause noisy operation. This will manifest itself as a low frequency hum or as an R. F. noise. The choke and condensers in the power unit box can be tested and replaced if necessary. The noise may be due to some cause in the dynamotor itself such as improperly seated brushes, and, if this is the case, the entire power unit box should be returned for repairs or replacement. Substitution of 200 volts from a "B" battery source for the "B" power unit will determine if the latter is causing noisy operation.

Noise Due to Antenna Location. *Run the antenna at right angles to any 32 volt lines and keep it as far away from these lines as possible,* in order to avoid line noise being carried into the set via the antenna. In all cases of noise, disconnect the antenna from the set. If the noise is still present, it is probably in the receiver, dynamotor or 32 volt lines. If the noise disappears when the antenna is disconnected, it is being brought in on the antenna or lead-in and these should be changed to another location.

The 41 Tubes Do Not Light. The filaments of the two 41 tubes and the speaker field are in series across the 32 volt line. If either of the 41 tubes is out of the socket or has an open filament, or if the speaker plug is not inserted, neither of the 41 tubes will light.

MODELS 77,95

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and an output indicating meter are advisable. The procedure is as follows:

As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 175 K.C. is required.

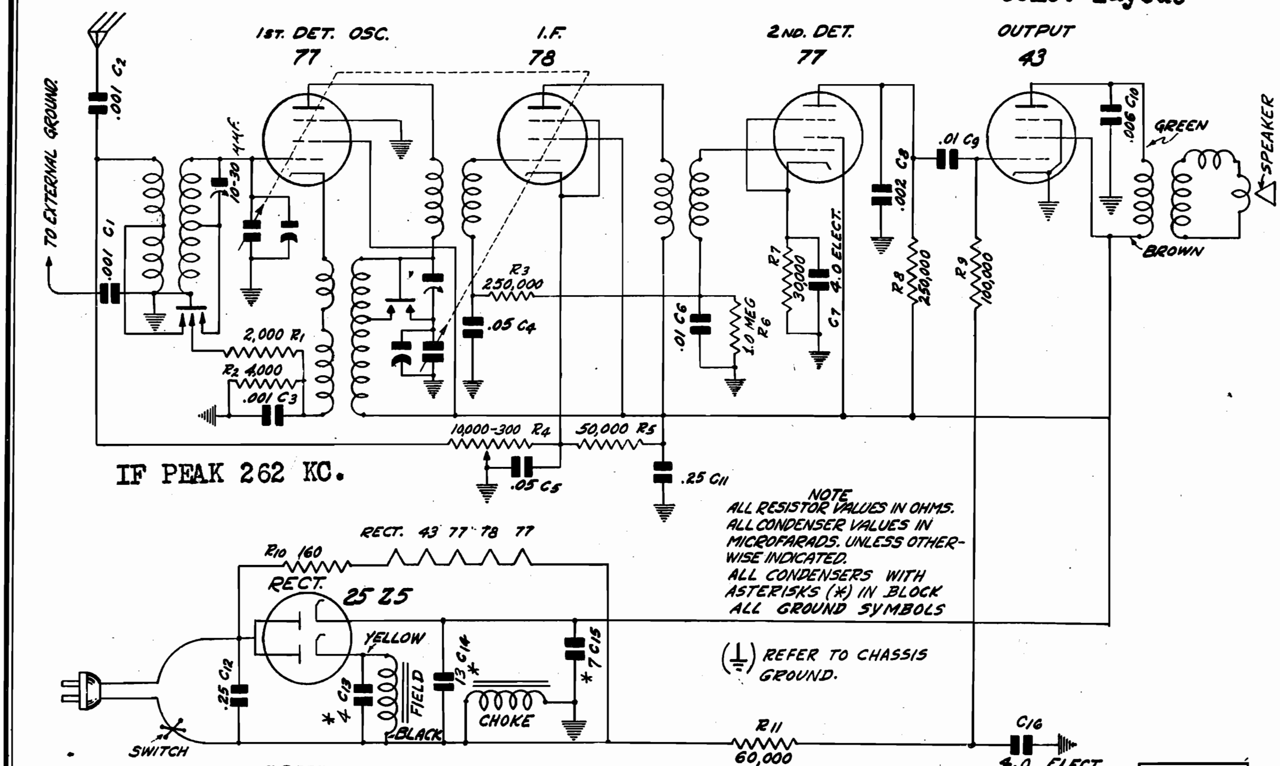
First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw will be seen at the side of the tuning condenser and is reached from the top of the chassis. A non-metallic screw-driver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

MONTGOMERY-WARD & CO.

MODEL 62-96
Schematic, Voltage Socket layout



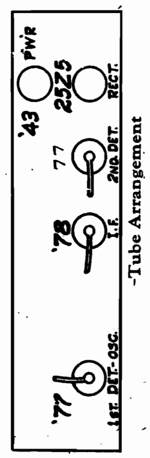
CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80821-B	C-1	.001 mfd.	600 V.	Moulded
P-80821-B	C-2	.001 "	600 V.	Moulded
P-80905-A	C-3	.001 "	400 V.	Tubular
P-80862-C	C-4	.05 "	200 V.	Tubular
P-80862-C	C-5	.05 "	200 V.	Tubular
P-80872-B	C-6	.01 "	600 V.	Tubular
P-80936-C	C-7	4.0 "	30 V.	Electrolytic
P-80914	C-8	.002 "	600 V.	Tubular
P-80872-B	C-9	.01 "	600 V.	Tubular
P-80898	C-10	.006 "	600 V.	Tubular
P-80888-A	C-11	.25 "	200 V.	Tubular
P-80888-A	C-12	.25 "	200 V.	Tubular
P-80944	C-13	4.0 "	150	Elec. Block
	C-14	13.0 "	150	
	C-15	7.0 "	150	
P-80878-C	C-16	4.0 "	150 V.	Electrolytic

P-1539 600 K.C. Trimmer Cond.
P-80951 Short-wave antenna Trimmer
P-80943 2-gang Cond.—Direct Drive (Used on early Sets)
P-80954 2-gang Condenser—Gear Drive

RESISTORS

Part No.	Code	Resistance	Type
P-A-90906	R-1	2,000 ohm	Carbon
P-A-90947	R-2	4,000 ohm	Carbon
P-A-90954	R-3	250,000 ohm	Carbon
P-91019C	R-4	300-10,000 ohm	Vol. Con. and Switch
P-A-90941	R-5	50,000 ohm	Carbon
P-A-90948	R-6	1 Megohm	Carbon
P-A-90956	R-7	30,000 ohm	Carbon
P-A-90954	R-8	250,000 ohm	Carbon
P-A-90912	R-9	100,000 ohm	Carbon
P-91064	R-10	160 ohm	Armored Wire Wound
P-A-91036	R-11	60,000 ohm	Carbon



-Tube Arrangement

Voltages at Sockets

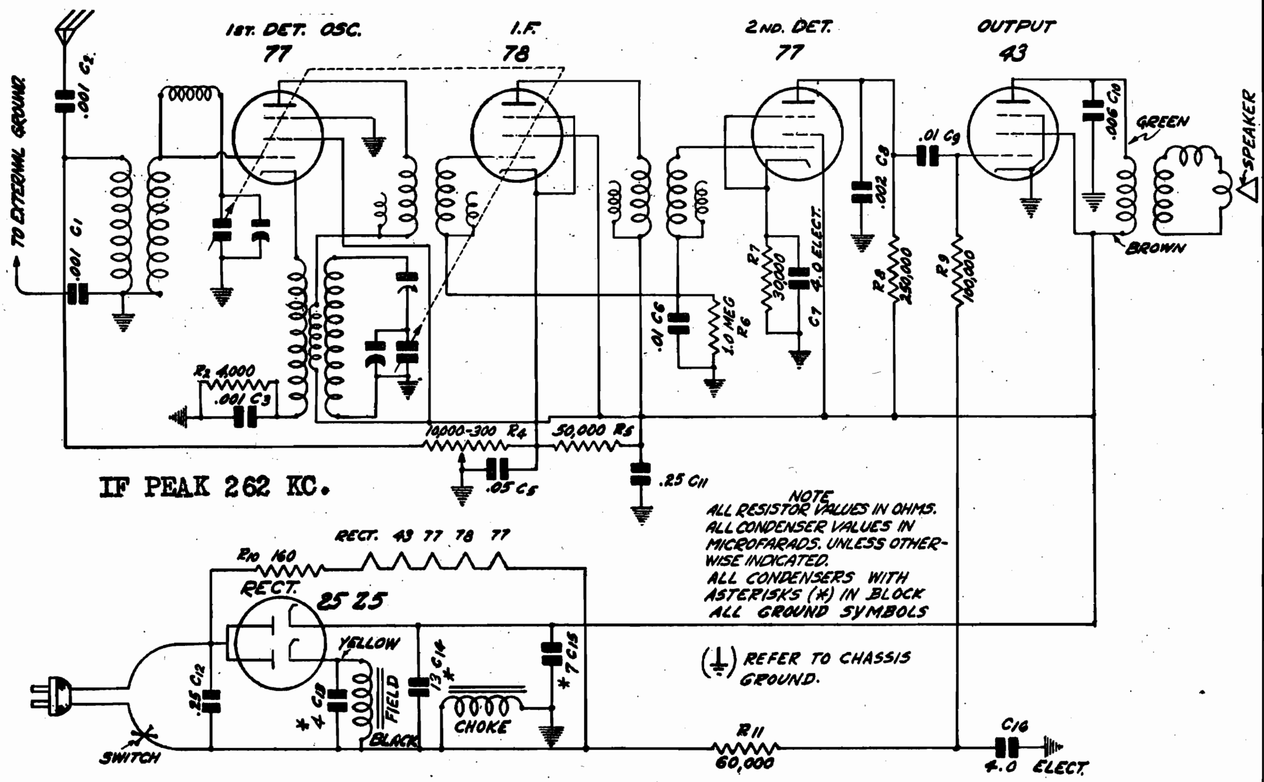
Antenna lead connected to ground lead (not external ground).—Volume Control at Maximum.
CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

		A.C. Line Voltage—115. Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements					D.C. Line Voltage—110. Use High Resistance D.C. Meter for Heater Voltage Measurements				
Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
77	1st Det. Osc.	5.8	106	106	5.2	.8	5.6	87	87	4.3	.6
78	I.F.	5.8	108	108	3.0 (1)	7.4	5.6	88	88	2.4 (1)	6.0
77	2nd Det.	5.8	65 (2)	104	6.0 (3)	.14	5.6	58 (2)	82	5.0 (3)	.11
43	Output	24.	95	110	18.0 (4)	22.0	23.0	80	90	15.0 (4)	17.0
25Z5	Rect.	24.	110, 155 (5)			84.0 Total	23.0	5.0, 6.0 (5)			74.0 Total

(1) Cathode to Ground.
(2) With 1,000,000 ohm meter—reading will be lower with lower resistance meter.
(3) Cathode to ground—read with 100,000 ohm meter.
(4) Read across filter choke.
(5) Readings from plate to two cathodes with 250,000 ohm meter

MODEL 62-98
Schematic, Values
Hum notes

MONTGOMERY-WARD & CO.



CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80821-B	C-1	.001 mfd.	600 V.	Moulded
P-80821-B	C-2	.001 "	600 V.	Moulded
P-80905-A	C-3	.001 "	400 V.	Tubular
P-80862-C	C-4	.05 "	200 V.	Tubular
P-80862-C	C-5	.05 "	200 V.	Tubular
P-80872-B	C-6	.01 "	600 V.	Tubular
P-80936-C	C-7	4.0 "	30 V.	Electrolytic
P-80914	C-8	.002 "	600 V.	Tubular
P-80872-B	C-9	.01 "	600 V.	Tubular
P-80898	C-10	.006 "	600 V.	Tubular
P-80888-A	C-11	.25 "	200 V.	Tubular
P-80888-A	C-12	.25 "	200 V.	Tubular
P-80944	C-13	4.0 "	150	Elec. Block
	C-14	13.0 "	150	
	C-15	7.0 "	150	
P-80878-C	C-16	4.0 "	150 V.	Electrolytic
P-1539	600 K.C. Trimmer Cond.			
P-80951	Short-wave antenna Trimmer			
P-80943	2-gang Condenser—Direct Drive (Used on early Sets)			
P-80954	2-gang Condenser—Gear Drive			

RESISTORS

Part No.	Code	Resistance	Type
P-A-90906	R-1	2,000 ohm	Carbon
P-A-90947	R-2	4,000 ohm	Carbon
P-A-90954	R-3	250,000 ohm	Carbon
P-91019C	R-4	300-10,000 ohm	Vol. Contr. & Switch
P-A-90941	R-5	50,000 ohm	Carbon
P-A-90948	R-6	1 Megohm	Carbon
P-A-90956	R-7	30,000 ohm	Carbon
P-A-90954	R-8	250,000 ohm	Carbon
P-A-90912	R-9	100,000 ohm	Carbon
P-91064	R-10	160 ohm	Armored Wire Wound
P-A-91036	R-11	60,000 ohm	Carbon

Part No.	Item
P-5091	Antenna R. F. Transformer Assembly
P-5092	Oscillator Coil Assembly
P-40428	Can Only for Antenna R. F. Transformer
P-40428	Can Only for Oscillator
P-5101	1st I. F. Trans. Complete with can
P-5102	2nd I. F. Trans. Complete with can
P-50584	Filter Choke
P-1777	No. 77 Tube Socket
P-1778	No. 78 Tube Socket
P-1776	No. 43 Tube Socket
P-1779	No. 25Z5 Tube Socket
P-1783	Broadcast Short-wave Switch
P-20632	Tube Shield
P-20631	Tube Shield Base
P-20633	Tube Shield Cap
P-70739	Power Cord and Plug
P-30342	Grid Cap
P-1786	Five-Lug Terminal Strip
P-1773	Electro-Dynamic Speaker
P-1421	Single Lug Terminal Strip

Excessive Hum

Defective tubes especially the 43 and 25Z5 are very often the cause of excessive hum. Try out a complete new set of tubes and note any difference. The hum may be due to external pick-up. Disconnect the antenna and ground and see if the hum disappears.

Open filter condensers will cause excessive hum. Inspect these condensers and the leads to them for continuity of circuit. A shorted filter choke or shorted hum bucking coil in the speaker will cause excessive hum. Other causes of excessive hum are condensers C-12 or C-16 open and open 77 control grid.

The early models of this receiver did not have a 4 Mfd. condenser connected between the 2nd det. cathode and ground as shown in Fig. 1. If the 77 2nd det. tube in these sets has cathode to heater leakage, the set will hum excessively. This can be corrected by connecting a 4 Mfd. electrolytic condenser between the points mentioned above.

MONTGOMERY-WARD & CO.

MODEL 62-98
Voltage, Alignment
Socket layout

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and an output indicating meter are advisable. The procedure is as follows:

As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 262 K.C. is required.

First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. In order to do this, it will be necessary to put the chassis back in the cabinet. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. This adjusting screw will be seen on the back panel of the chassis. A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Polarity of D.C. Supply

IMPORTANT—When operated on D.C., the polarity of the power supply to the receiver must be observed. Use a receptacle from which the plug will not have to be removed after it has once been correctly inserted.

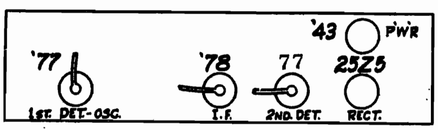
To determine the correct polarity, insert the plug both ways, allowing the tubes time to heat up. With the plug in one way, the receiver will operate and the other way it will not.

CAUTION—Read the Following:

To avoid the danger of damage to the receiver and shock to the person working on the receiver, the following facts should be understood.

The metal chassis is connected to one side of the line through the filter choke—See Fig. 1. Both A.C. and D.C. power supplies are generally grounded on one side. If the side of the line, not connected to the metal chassis, is grounded and the metal chassis comes in contact with the external ground, the entire line voltage will be impressed across the filter choke, resulting in an excessive current. Also, if the service technician working on the set is in contact with any ground, such as the grounded metal top of a bench, and touches the metal chassis when the above condition exists, he will receive a shock.

In any service work, therefore, on the A.C.-D.C. chassis keep it on a wood or other insulated surface. Disconnect the antenna and ground leads to avoid the possibility of any external ground contacts with the chassis. The person working on the set should avoid coming in contact with any ground.



Tube arrangement.

Voltages at Sockets

Antenna lead connected to ground lead (not external ground).—Volume Control at Maximum.
CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

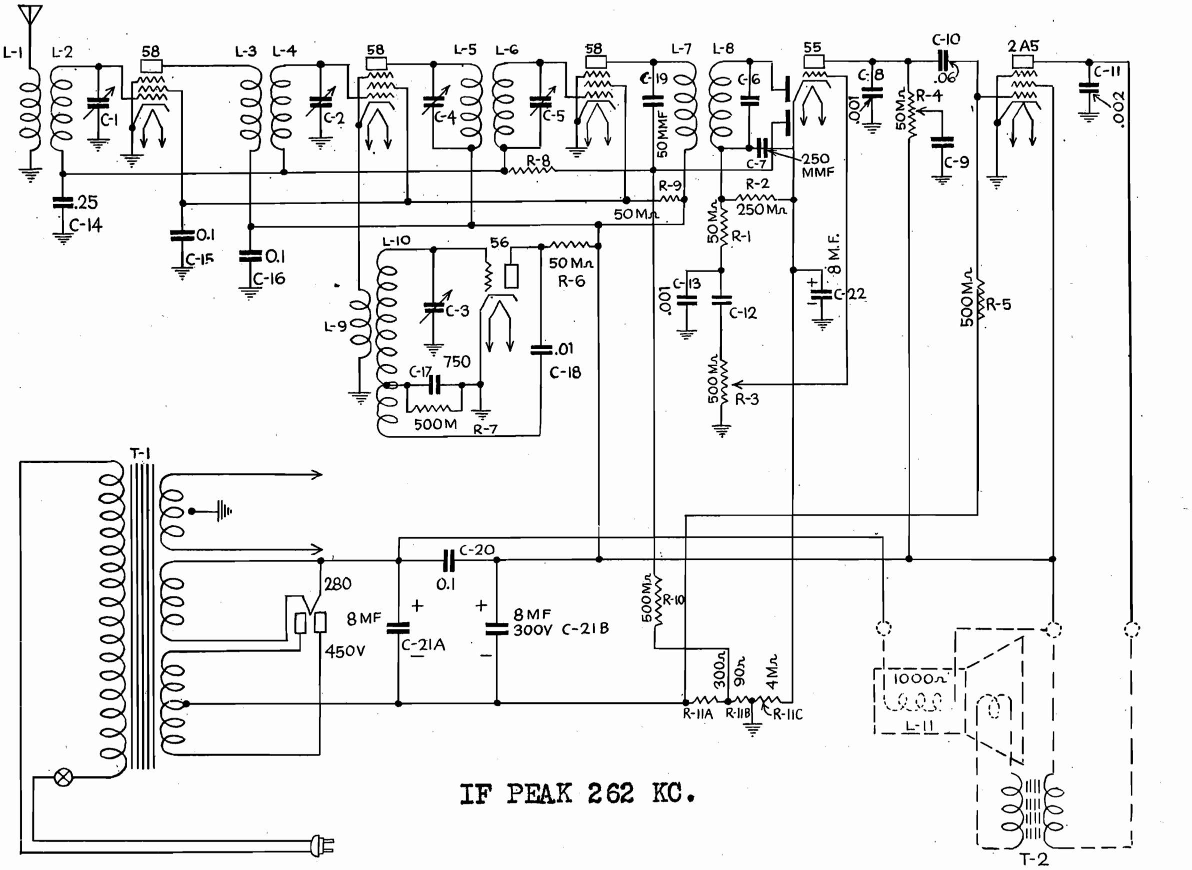
		A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements					D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements				
Type of Tube	*Function*	*Across Heater*	*Plate to Cathode*	*Screen to Cathode*	*Grid to Cathode*	*Normal Plate M. A.*	*Across Heater*	*Plate to Cathode*	*Screen to Cathode*	*Grid to Cathode*	*Normal Plate M. A.*
77	1st Det. Osc.	5.8	106	106	5.2	.8	5.6	87	87	4.3	.6
78	I F.	5.8	108	108	3.0 (1)	7.4	5.6	88	88	2.4 (1)	6.0
77	2nd Det.	5.8	65 (2)	104	6.0 (3)	.14	5.6	58 (2)	82	5.0 (3)	.11
43	Output	24.	95	110	18.0 (4)	22.0	23.0	80	90	15.0 (4)	17.0
25Z5	Rect.	24.	110 / 155 (5)			84.0 Total	23.0	5.0 / 6.0 (5)			74.0 Total

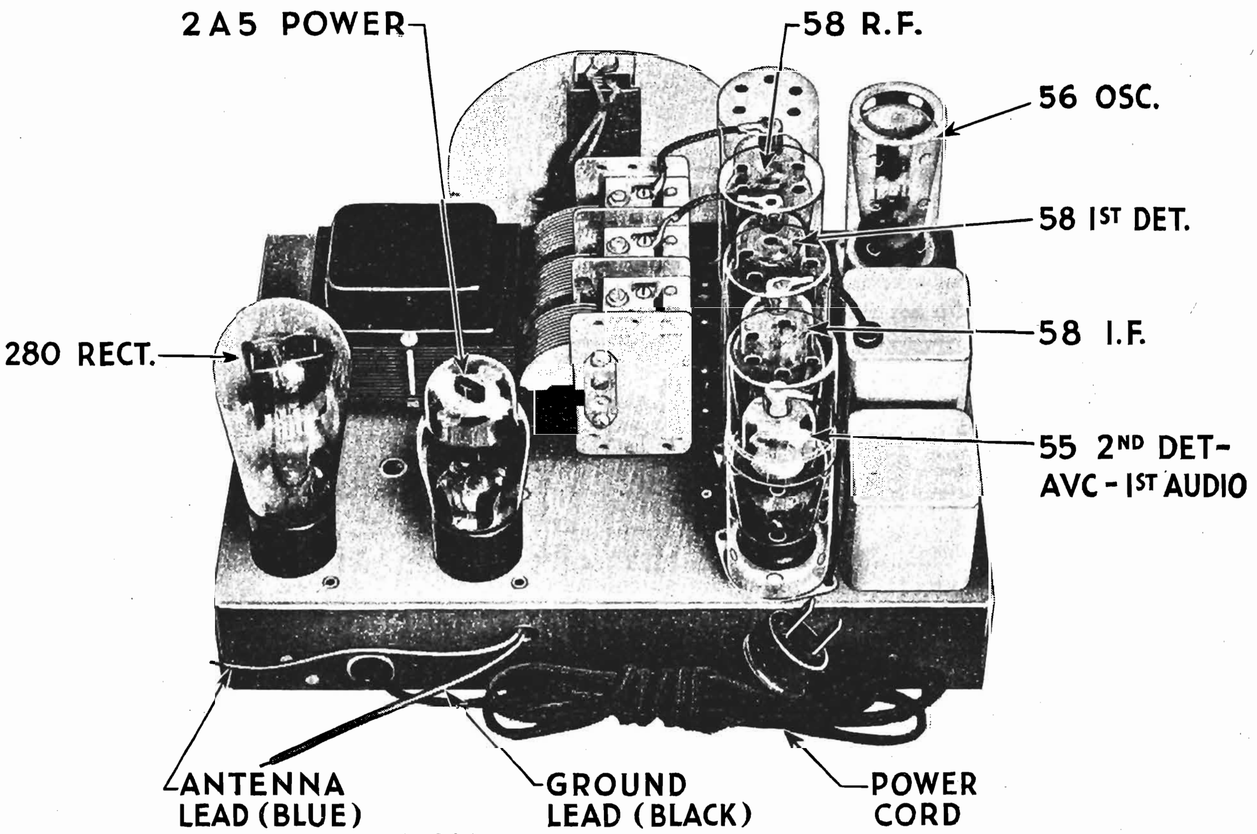
(1) Cathode to Ground.
(2) With 1,000,000 ohm meter—reading will be lower with lower resistance meter.
(3) Cathode to ground—read with 100,000 ohm meter.
(4) Read across filter choke.
(5) Readings from plate to two cathodes with 250,000 ohm meter

**MODEL 62-97, 62-99
62-97X, 62-99X**

MONTGOMERY-WARD & CO.

**Schematic
Socket layout**





MONTGOMERY-WARD & CO.

MODEL 62-97, 62-99 62-97X, 62-99X Voltage, Alignment

Alignment

An accurately calibrated signal generator is necessary for the proper alignment of the R. F. and I. F. circuits. This generator must produce an I. F. signal at 262 K. C. as well as R. F. signals throughout the broadcast band of 540 to 1500 K. C. An output meter for determining the maximum output of the receiver is also essential.

The necessity for realignment of the R. F. or I. F. circuits will be indicated by poor sensitivity and selectivity but realignment should not be attempted until all other possible causes for the same condition such as defective tubes, poor antenna installation, shielded location or low line voltage have been checked and eliminated.

Aligning Intermediate Condensers—It is essential that the I. F. stages be correctly tuned for maximum deflection upon the output meter before the R. F. and Oscillator Circuits can be aligned. Connect the signal lead from the signal generator to the control grid contact of the first detector tube. The ground lead from the signal generator is connected to the ground post on the rear of the chassis. Place the signal generator in operation at 262 K. C. and attenuate its output until as low a signal as will give satisfactory deflection on the output meter is obtained. It is important that the signal be maintained at a low value in order to prevent any action of the Automatic Volume Control. *The manual Volume Control should be set at maximum during alignment.*

Then adjust the three Intermediate Condenser screws until maximum output is obtained on the output meter. After all three screws have been adjusted the first time go over them again and check the setting for maximum output. The Intermediate Condenser screws are accessible from beneath the chassis and protrude through the porcelain bases of the I. F. Transformers.

Aligning R. F. and Oscillator Condensers—Place the signal generator in operation at 1400 K. C. and connect the signal lead to the antenna post on the back of the chassis. Turn the Tuning Condenser rotor until the dial pointer is at exactly 1400 on the dial scale. Then adjust the three trimmers on the Tuning Condenser for maximum output, adjusting the Oscillator Trimmer first (Trimmer nearest back of chassis). Turn the screws up or down until greatest deflection on the output meter is obtained. The output of the signal generator should, of course, be attenuated to as low a value as possible consistent with the obtaining of an easily readable deflection on the output meter.

The signal generator should then be adjusted to 600 K. C. and the Tuning Condenser rotor turned until maximum deflection is obtained on the output meter. If the dial pointer does not indicate correct calibration at this setting, the set screws which secure the drive to the Tuning Condenser shaft should be loosened and the pointer shifted to the other side of the 600 mark on the dial by an amount equal to one-half the original variation from the 600 mark. For instance, if the dial reading was 610 when the 600 K. C. signal was tuned in, it should be moved so that the new reading will be 595. Be careful not to move the Tuning Condenser rotor when changing the setting of the dial. After changing the dial setting, tighten the two set screws.

Set the signal generator again for a 1400 K. C. signal and check the adjustment of the Tuning Condenser trimmers at this frequency for maximum output. Then set the signal generator for a signal of 1000 K. C. and turn the Tuning Condenser rotor until the output meter indicates maximum deflection. Then bend the slotted rotor plate sections which are last in mesh, on the R. F. and first detector Tuning Condensers, until maximum output is obtained. Tune in a signal at 750 K. C. and then at 600 K. C. and follow the same procedure, bending the rotor plate sections last in mesh, on the R. F. and first detector Tuning Condensers, until maximum output is indicated. Do not bend the end plates on the oscillator Tuning Condenser.

Testing Condensers

The simplest method of locating an open condenser is to shunt each one in the chassis with another of similar capacity, known to be in good condition, until the defective unit is located.

Open Bypass Condensers will usually be indicated by oscillation or distorted reproduction. Open Filter Condensers will cause excessive hum and in the case of the condenser connected to the filament of the 280 tube, a reduction in all D. C. voltages. An open circuit in the condenser connected across the speaker field will cause an excessive hum.

Voltages at Sockets

Line Voltage 115—Volume Control at Maximum

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Grid Volts	Screen Current MA	Plate Current MA	Cathode Volts
56	1	Osc.	2.3	110	15–30(1)	......	...	3–3.4(1)	0
58	2	R. F.	2.3	260	2.0(2)	90(3)	1.2	4.8	0
58	3	1st Det.	2.3	260	2.0(2)	90(3)	1.3	5.4	0
58	4	I. F.	2.3	260	2.0(2)	90(3)	1.2	4.6	0
55	5	2nd Det.	2.3	Diode 1-0					
		AVC-1st		Diode 2-3					
		Audio		Triode 135	2.0(5)	......	...	4.6	12
2A5	6	Power	2.3	255	3.0(6)	260	...	....	0
80	7	Rectifier	4.8	....	....	....	...	26 Per Plate	....

(1)Varies with frequency approximately as shown.
(2)Voltage as read with 60,000 ohm meter—across 90 ohm section of R-11—50 volts.
(3)Voltage as read with 600,000 ohm meter.
(4)Not actual voltage due to resistance in circuit—tone voltage—17 volts.
(5)Voltage as read with 60,000 ohm meter—across 4000 ohm section of R-11—12 volts.
(6)Voltage as read with 60,000 ohm meter—across 300 and 90 ohm section of R-11—22 volts.

25 Cycle Chassis

The 25 cycle chassis is similar to the 60 cycle chassis with the exception that it is designed to operate on a power supply of from 105 to 125 volts, 25 cycles. A different Power Transformer is used in the 25 cycle chassis from that used in the 60 cycle chassis, and the .1 Mfd. Condenser connected across the speaker field is omitted. The proper Power Transformer is given in the parts list.

The 25 cycle chassis may be used on a Power Supply of from 105 to 125 volts, 60 cycles, but may produce an excessive hum as the field Tuning Condenser is not incorporated in the chassis. The reverse is not true, however, and under no circumstances should it be attempted to operate the 60 cycle chassis on 25 cycle power.

Voltages

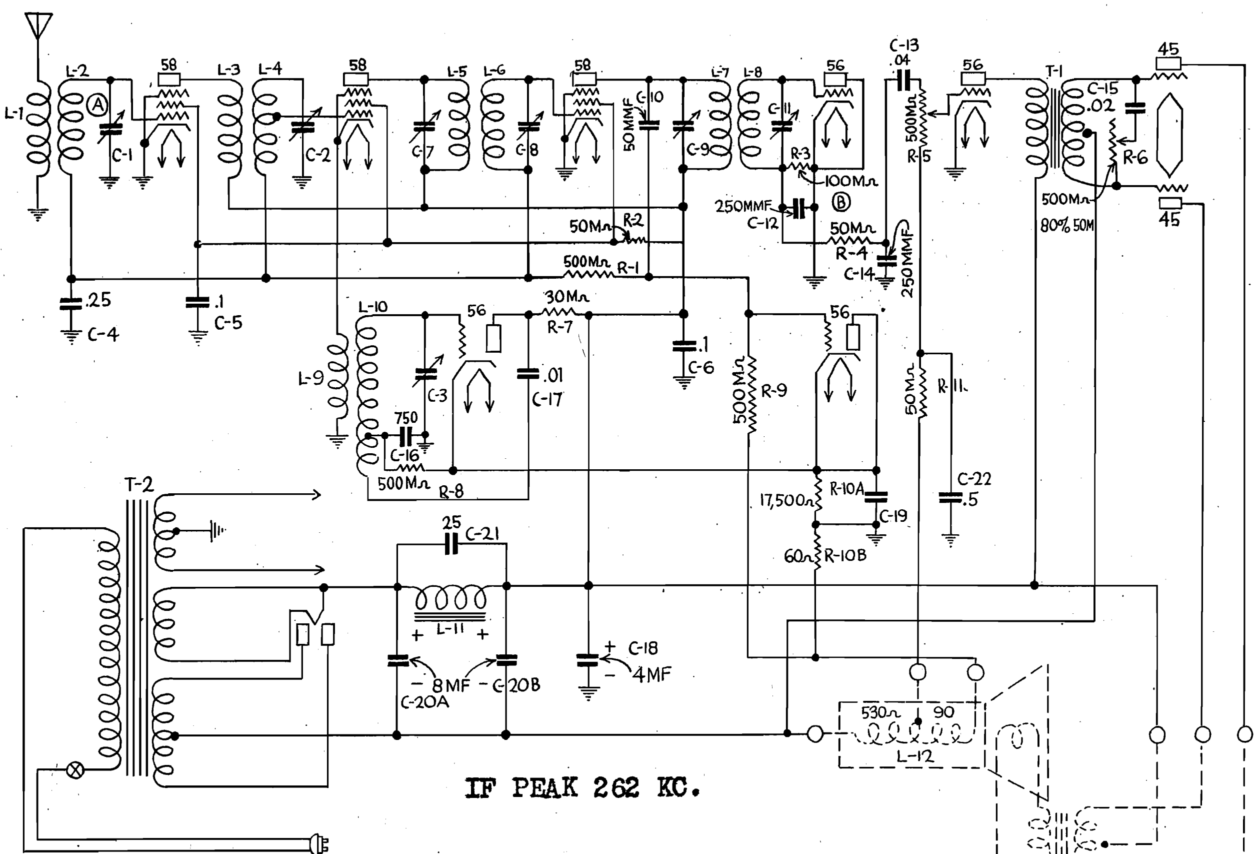
The voltages should be read at the sockets by means of a set analyzer or accurate high resistance meters.

The Voltage Chart shows the voltages and currents with all tubes in, speaker connected and the set otherwise in operating condition. When checking voltages, the set must be correctly installed for operation in all respects. All tube shields with the exception of the one on the socket in which the analyzer plug is inserted should be in position so as to avoid as far as possible any tendency toward oscillation. Oscillation may be brought about by coupling between leads in the analyzer cable and if such is the case it can be overcome by connecting a .1 Mfd. Condenser from the control grid connection on the analyzer plug to the chassis of the receiver.

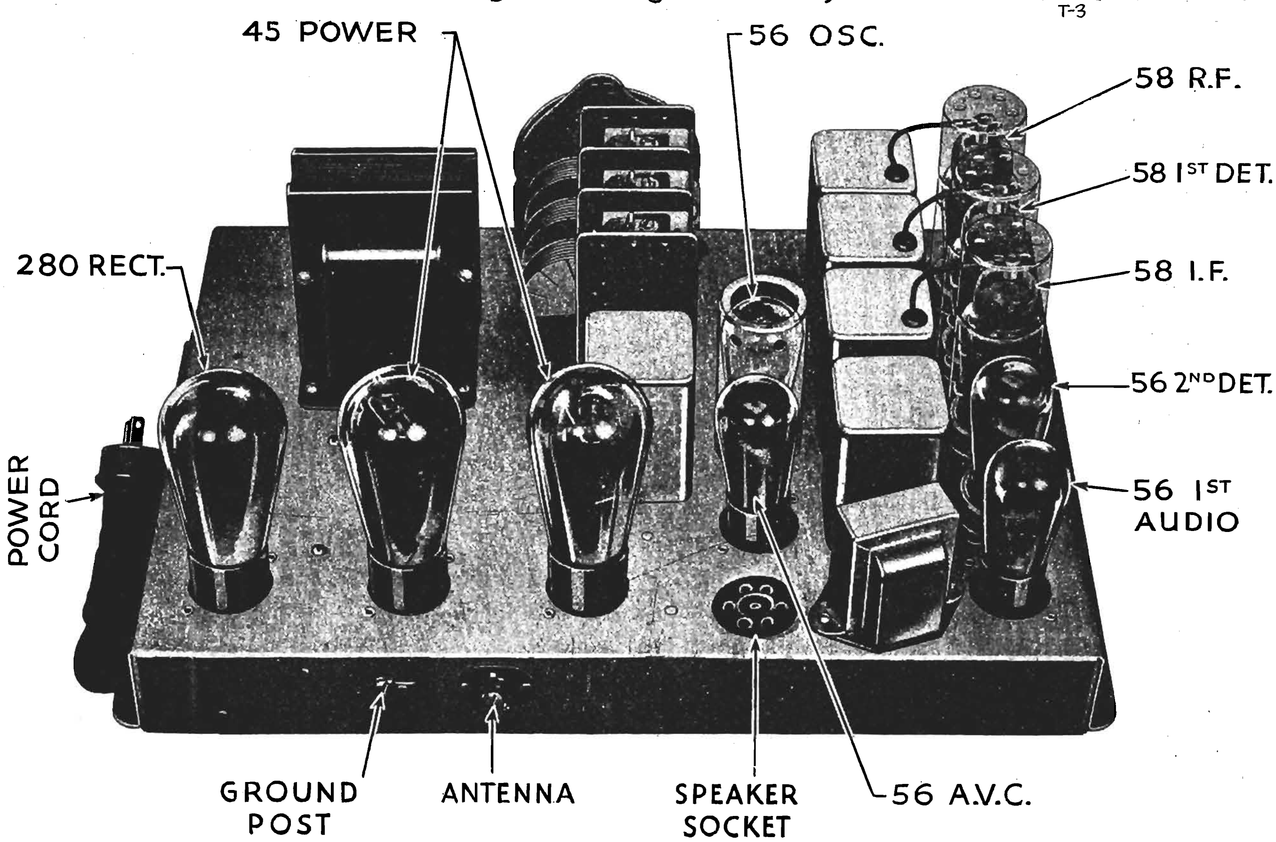
As indicated in the footnotes some of the voltages cannot be read accurately at the sockets. This is due to voltage drop in certain circuits brought about by the meter current flowing through resistances associated with these circuits. The higher the resistance of the meter used in making such measurements the more accurate the readings will be. In certain cases it is desirable to measure the voltages at the point in the chassis where they originate rather than at the sockets.

MODEL 62-101, 62-101X
Schematic, Socket data

MONTGOMERY-WARD & CO.



For Voltage and Alignment Data, see Index



MODEL 62-91
Voltage, Alignment
MODEL 62-101

MONTGOMERY-WARD & CO.

MODEL 62-91
Voltages at Sockets

Antenna Shorted to Ground
Batteries Up to Rated Voltages. See Fig. 1
Voltages Read From Negative Filament Terminal

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
34	R.F.	2.0	135	65	3.0(1)	2.6
34	1st Det.	2.0	135	65	4.5(1)	2.5
30	Osc.	2.0	90		2–4(2)	3.3
34	I.F.	2.0	135	90	4.5(1)	3.0
30	2nd Det.	2.0				
30	1st Audio	2.0	90		9.0(3)	.45
30	2nd Audio	2.0	130		9.0(4)	3.4
30	Output	2.0	135		10.5	2.5

(1) Computed figure—cannot be read because of high resistance circuit.
(2) Varies with frequency setting.
(3) Volume Control at minimum.
(4) As read at battery.

MODEL 62-91
Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K. C. and accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

The tuning condensers are all adjusted at the factory for the correct relative capacity between the oscillator section and the other two sections. As a rule no adjustment other than at 1400 K. C., as mentioned above, is required. If, after the receiver has been aligned at 1400 K. C., the sensitivity is still low at some portion of the band, adjust the signal generator to that setting and tune for maximum output with the station selector knob on the receiver. Then, without readjusting the trimmers, bend the slotted rotor plates on the **front two sections** of the gang to obtain maximum output. Care should be taken not to bend these plates too far in an inward direction as the condenser may short as a result.

After any adjustment of this nature, set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

VOLTAGE DATA FOR MODEL 62-101
Line Voltage—115—Volume Control at Maximum

Position of Tube	Type of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Grid Volts	Screen Current MA	Plate Current MA	Cathode Volts
1	58	R. F.	2.35	270	1.2(1)	70(2)	1.3	5.0	0
2	58	1st Det.	2.35	270	1.2(1)	70(2)	1.3	6.0	0
3	58	I. F.	2.35	270	1.2(1)	70(2)	1.3	5.6	0
4	56	2nd Det.	2.35	0	0	....	....	0	0
5	56	1st Audio	2.35	250	2.0(3)	....	....	7.2	0
6	56	Osc.	2.35	100	8.0–12.0(4)	....	....	32–3.4(4)	53
7	56	AVC	2.35	0	15.0(5)	....	....	0	53
8	45	Power	2.35	265	57.0	....	....	25.0	...
9	45	Power	2.35	265	57.0	....	....	25.0	...
10	80	Rectifier	4.9	.....	....	....	....	43 Per Plate	...

(1)Actual voltage developed across 60 ohm section of R-10—5.0.
(2)Voltage as read with 120,000 ohm meter.
(3)Actual voltage across 90 ohm section of L-12 and 60 ohm section of R-10 and 12.0.
(4)Varies with frequency approximately as shown.
(5)Actual voltage across R-10—58 volts.

ALIGNMENT DATA FOR MODEL 62-101

An accurately calibrated signal generator is necessary for the proper alignment of the R. F. and I. F. circuits. This generator must produce an I. F. signal at 262 K. C. as well as R. F. signals throughout the broadcast band of 540 to 1500 K. C. An output meter for determining the maximum output of the receiver is also essential.

The necessity for realignment of the R. F. or I. F. circuits will usually be indicated by poor sensitivity and selectivity, but realignment should not be attempted until all other possible causes for the same condition, such as defective tubes, poor antenna installation, shielded location or low line voltage have been checked and eliminated as contributing causes.

During the following alignment procedure the 56 AVC Tube should be replaced with a dummy tube (one from which one filament prong has been cut). This will prevent any possibility of AVC action which would make it difficult to determine the exact point of the output peak when adjusting the trimmer condensers. The signal applied to the receiver during alignment should be maintained at as low a value as will give an indication on the output meter sufficient to insure accurate adjustment of the trimmer condensers.

Aligning Intermediate Condensers—It is essential that the I. F. stages be correctly tuned for maximum deflection upon the output meter before the R. F. and oscillator circuits can be aligned.

Remove the 56 oscillator tube and connect the signal lead from the signal generator to the control grid contact of the first detector tube. The ground lead from the signal generator is connected to the ground post on the rear of the chassis. Place the signal generator in operation at 262 K. C. and attenuate its output until as low a signal as will give satisfactory deflection on the output meter is obtained. The manual volume control should be set at maximum during alignment.

Then adjust the four intermediate condenser screws until maximum output is indicated on the output meter. After all four screws have been adjusted the first time go over them again and check the setting for maximum output. The intermediate condenser screws are accessible from beneath the chassis and protrude through the porcelain bases of the I. F. Transformers.

Aligning R. F. and Oscillator Condensers—Replace the 56 oscillator tube and place the signal generator in operation at 1400 K. C. Connect the signal lead to the antenna post on the back of the chassis and turn the tuning condenser rotor until the dial pointer is at exactly 1400 on the dial scale. Then adjust the three trimmers on the tuning condenser for maximum output, adjusting the oscillator trimmer first (trimmer nearest back of chassis). Turn the screws up or down until greatest deflection on the output meter is obtained. The output of the signal generator should, of course, be attenuated to as low a value as is consistent with the obtaining of an easily readable deflection on the output meter.

The signal generator should then be adjusted to 600 K. C. and the tuning condenser rotor turned until maximum deflection is obtained on the output meter. If the dial pointer does not indicate correct calibration at this setting, the set screws which secure the drive to the tuning condenser shaft should be loosened and the pointer shifted to the other side of the 600 mark on the dial by an amount equal to one-half the original variation from the 600 mark. For instance, if the dial reading was 610 when the 600 K. C. signal was tuned in, it should be moved so that the new reading will be 595. Be careful not to move the tuning condenser rotor when changing the setting of the dial. After changing the dial setting, tighten the two set screws.

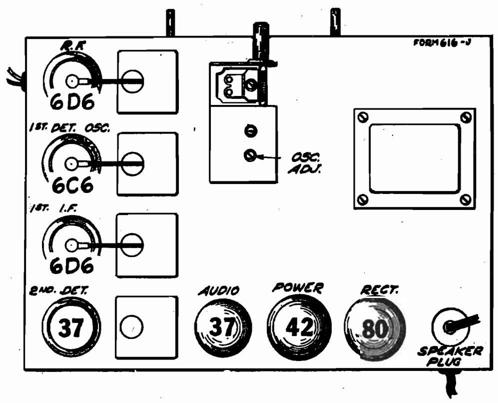
Set the signal generator again for a 1400 K. C. signal and the tuning condenser trimmers for maximum output. Then set the signal generator for a signal of 1000 K. C. and turn the tuning condenser rotor until the output meter indicates maximum deflection. Then bend the slotted rotor plate sections which are last in mesh, on the R. F. and detector tuning condensers, until maximum output is indicated. Tune in signal at 750 K. C. and then at 600 K. C., and follow the same procedure, bending the rotor plate sections last in mesh on the R. F. and 1st detector tuning condensers until maximum output is obtained.

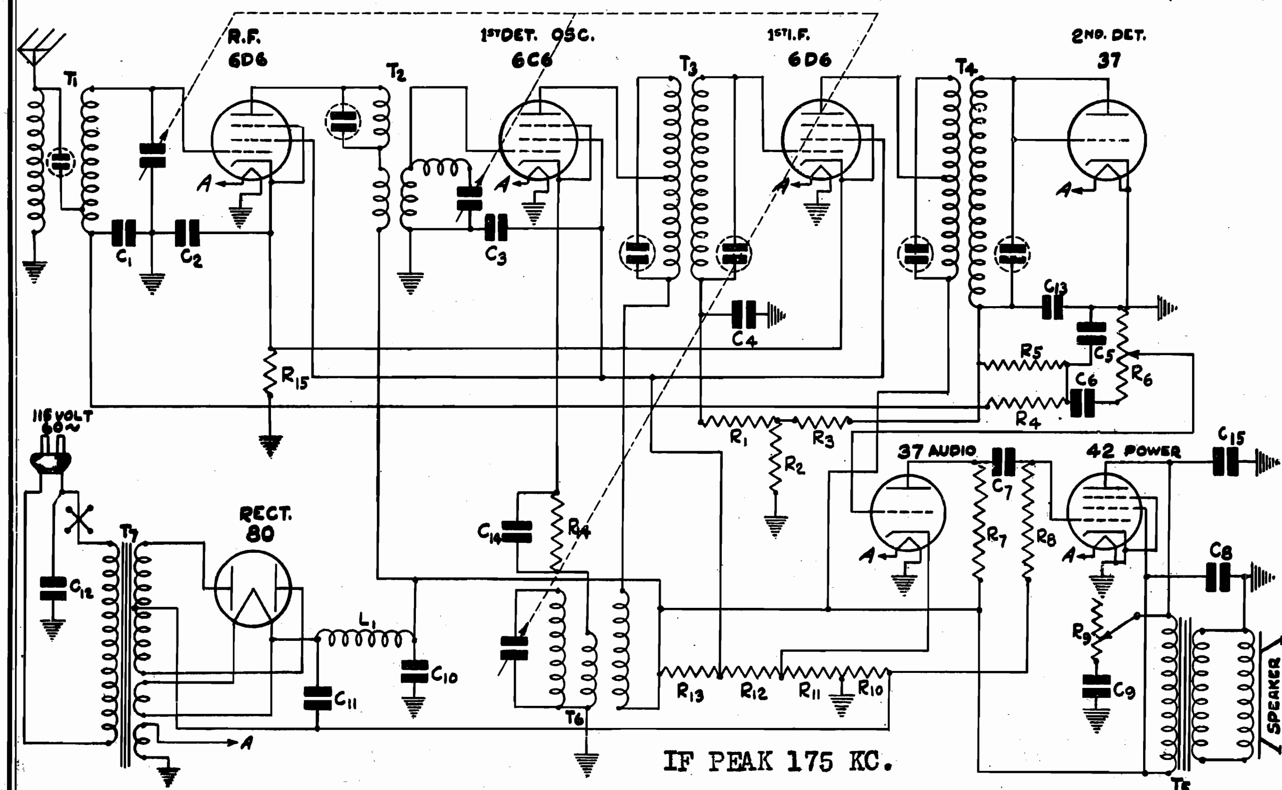
MODEL 62-103, 62-105
Schematic, Values
Socket layout, Changes

MONTGOMERY-WARD & CO.

Changes in Later Models

In later models a condenser has been added which is connected from the First Audio cathode to ground. This condenser is not shown in the circuit diagram, Fig. 1. An 8 mfd. 25 Volt electrolytic condenser is used. The reason for this change is to avoid hum caused by some type 37 tubes used in the first audio stage. All chassis with a yellow paint spot at the back of the subpanel base have this condenser. In case hum is experienced in some of the first models which do not have this condenser, try out some new 37 tubes in the first audio socket. If no relief from this source of hum can be obtained, connect an 8 mfd. condenser as mentioned above, from the first audio cathode to ground.





IF PEAK 175 KC.

RESISTORS

Part No.	Code	Resistance	Type
P-A95105	R1	1 megohm	Carbon
P-A95503	R2	50,000 ohm	Carbon
P-A95154	R3	150,000 ohm	Carbon
P-A95205	R4	2 megohm	Carbon
P-A95104	R5	100,000 ohm	Carbon
P- 96004	R6	1 megohm	Vol. Control & Switch
P-A95204	R7	200,000 ohm	Carbon
P-A95204	R8	200,000 ohm	Carbon
P- 97007	R9	150,000 ohm	Tone Control
P-A98002	R10	250 ohm	Arm. Wire Wound
	R11	800 ohm	
	R12	20,000 ohm	
	R13	18,000 ohm	
P-A93452	R14	4,500 ohm	Carbon
P-A94201	R15	200 ohm	Carbon

"A" preceding the number signifies .2 watt.
"B" preceding the number signifies .5 watt.
"C" preceding the number signifies 1.0 watt.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80862	C1	.050 mfd.	200 V.	Tubular
P-80864	C2	.10 mfd.	200 V.	Tubular
P-80888	C3	.25 mfd.	200 V.	Tubular
P-80862	C4	.050 mfd.	200 V.	Tubular
P-80919	C5	250 mmfd.	600 V.	Moulded
P-80862	C6	.050 mfd.	200 V.	Tubular
P-80890	C7	.050 mfd.	400 V.	Tubular
P-80930	C8	.25 mfd.	400 V.	Tubular
P-80890	C9	.050 mfd.	400 V.	Tubular
P-80916	C10	8.0 mfd.	450 V.	Electrolytic
P-80990	C11	16.0 mfd.	450 V.	Electrolytic
P-80997	C12	.010 mfd.	600 V.	Metal can
P-80919	C13	250 mmfd.	600 V.	Moulded
P-80914	C14	.002 mfd.	600 V.	Tubular
P-80914	C15	.002 mfd.	600 V.	Tubular
P-80991	Three Gang Condenser			
P-50603	Power Transformer 60 cycle 110 Volt			
P-50604	Power Transformer 25 cycle 110 Volt			

MONTGOMERY-WARD & CO. **MODEL 62-103, 62-105 Voltage, Alignment**

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

As the I. F. stages are fixed tuned, no I. F. alignment at the intermediate frequency of 175 K. C. is required.

First set the signal generator for a signal of exactly 1400 K. C. Connect the antenna lead from the signal generator to the antenna lead of the receiver, and the ground lead from the signal generator to the ground lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

The tuning condensers are all adjusted at the factory for the correct relative capacity between the oscillator section and the other two sections. As a rule no adjustment other than at 1400 K. C., as mentioned above, is required. If, after the receiver has been aligned at 1400 K. C., the sensitivity is still low at some portion of the band, adjust the signal generator to that setting and tune for maximum output with the station selector knob of the receiver. Then, without readjusting the trimmers, bend the slotted rotor plates on the **front two sections** of the gang to obtain maximum output. Care should be taken not to bend these plates too far in an inward direction as the condenser may short as a result.

After any adjustment of this nature, set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Replacing Rubber Drive Pinion

The vernier tuning drive on this chassis uses a rubber pinion. Under normal operating conditions, this rubber will last for a number of years. Should it become worn it can be replaced as follows:

Loosen the set screw of the brass drive bushing and also the retaining screw on the station selector shaft end bearing which is attached to the tuning condenser. Then pull out the station selector shaft. Pull the old rubber pinion off of the brass bushing and put the new one on. The rubber pinion fits tight. Next slip the station selector shaft back in position through the bushing and tighten the two screws.

Excessive Hum

Defective tubes are very often the cause of excessive hum. Try out a complete new set of tubes and note any difference. The hum may be due to external pick-up. Disconnect the antenna and ground and see if the hum disappears.

Hum due to line pick-up can often be reduced by reversing the plug. In severe cases of this nature an external filter in the line may be required.

Open filter condensers can cause excessive hum. Inspect these condensers and the leads to them. Other causes of excessive hum are, unequal rectifier plate currents, defects in grid circuits and defective power transformer.

If Microphonic hum or howl is encountered, switch the tubes of the same type around in the sockets and try out some new ones.

Low Volume

Probably the most common cause of low volume is defective tubes. In any case of low volume, therefore, procure a new set of tubes that have been tested or have been operating satisfactorily in another receiver. Insert these in the chassis one at a time and note any difference in performance.

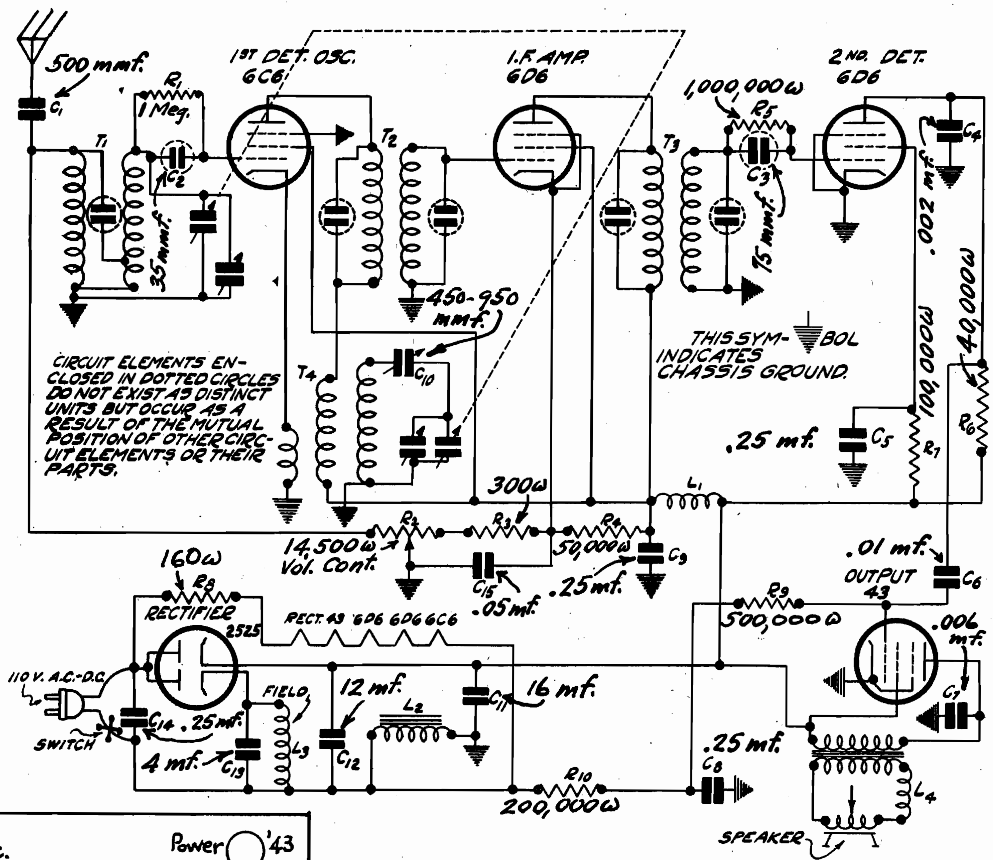
TYPE	FUNCTION	Fil. Volts	Plate to Cathode	Screen to Cathode	Grid to Cathode	Plate MA
6D6	R.F.	6.2	260	100	3.0*	8.0
6C6	1st Det.	6.2	255	96	12.0	1.0
6D6	I.F.	6.2	260	100	3.0*	8.0
37	2nd Det.	6.2	0	—	0	0
37	A.F.	6.2	60	—	4.6	0.9
42	Output	6.2	246	263	16.0°	33
80	Rect.	5.0	725 V.AC plate to plate			35 per Plate

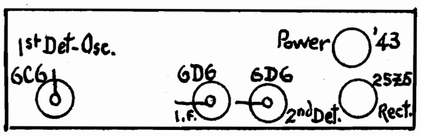
* Cathode to ground

° As measured across R-10 in voltage divider

MODEL 62-104
Schematic, Voltage
Socket layout

MONTGOMERY-WARD & CO.





IF PEAK 262 KC.

Voltages at Sockets

Antenna lead connected to subpanel.—Volume Control at Maximum.

CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

		A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements					D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements				
Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
6C6	1st Det.	5.8	108	108	12.0 (1)	6.0 (1)	5.6	90	90	10.0 (1)	4.0 (1)
6D6	I.F.	5.8	105	105	3.0	7.5	5.6	86	86	2.4	6.0
6D6	2nd Det.	5.8	20 (2)	40 (2)	.3	2.3	5.6	17 (2)	34 (2)	.2	2.0
43	Output	24.0	95	108	17.0 (3)	20.0	23.0	80	90	14.0 (3)	17.0
25Z5	Rect.	24.0	105 } 125 } (4)			84.0 Total	23.0	6 } 7 } (4)			74.0 Total

(1) Subject to variation.

(2) As read with 1,000,000 ohm meter.

(3) Read across filter choke.

(4) Readings from plate to two cathodes.

MONTGOMERY-WARD & CO.

MODEL 62-106, 62-107, 62-121
Schematic, Voltage

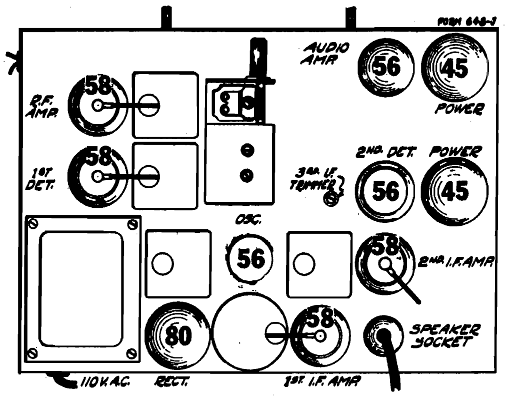


Fig. 2—Tube Arrangement

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty-cycle, receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty-cycle power supply. However, the reverse is not true, the sixty-cycle receiver cannot be operated from a twenty-five cycle power supply.

A 110-220 Volt, 40-60 cycle Power Transformer is also available for this model.

Voltages at Sockets

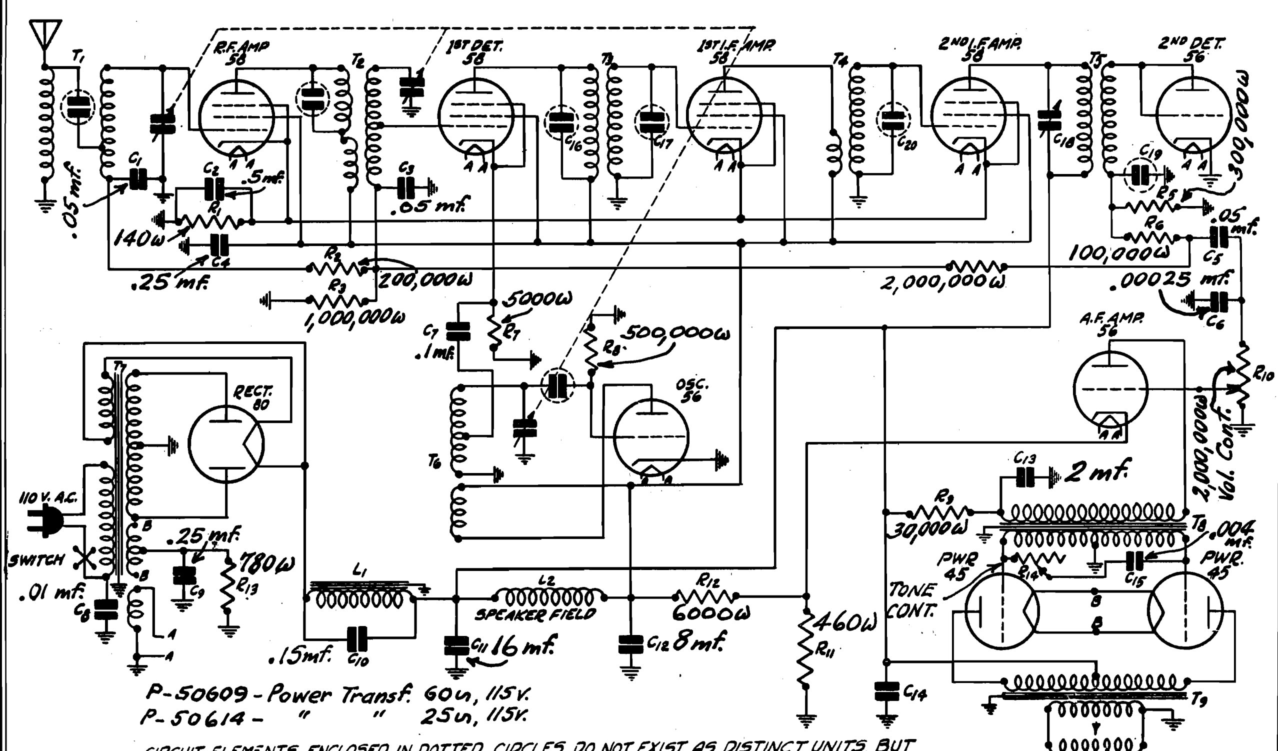
Line Voltage, 115

Antenna Shorted to Ground

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Control Grid to Cathode	Normal Plate M.A.
58	R.F.	2.3	93	93	3 (1)	6.4
58	1st Det.	2.3	85	85	11 (2)	1.7
56	Osc.	2.3	96		2 (3)	2.8
58	1st I.F.	2.3	93	93	3 (1)	6.4
58	2nd I.F.	2.3	315	93	3	6.6
56	2nd Det.	2.3	0		0	0
56	A.F. Amp.	2.3	170		8 (4)	4.4
45	Power Amp.	2.4	255		50	32.
80	Rectifier	4.7	850 Volts A. C. plate to plate			55 per plate.

(1) Read across R1
(2) Read across R7
(3) Subject to variation
(4) Read across R11

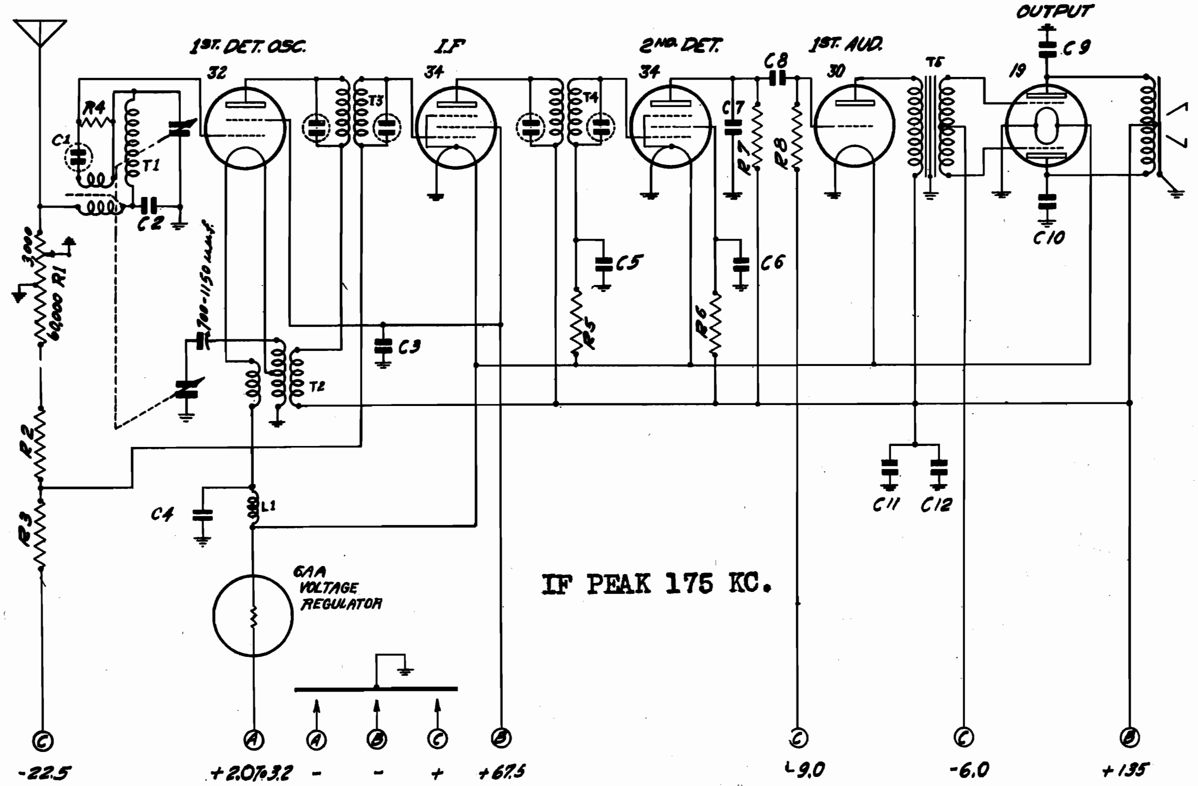
IF PEAK 175 KC.

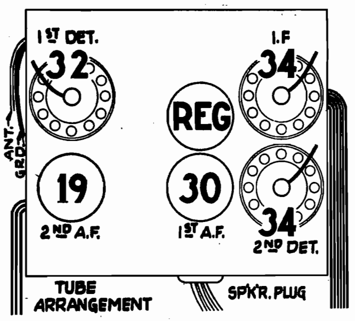


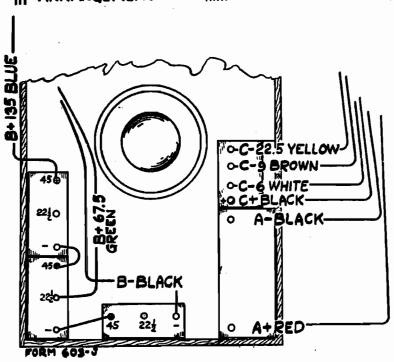
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS, BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

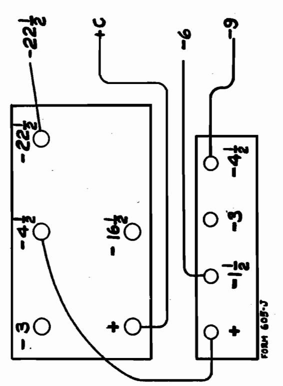
MODEL 77, 95
Schematic, Voltage
Socket layout

MONTGOMERY-WARD & CO.









Optional "C" Battery Connections

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80972	C2	.0023 mfd.	400 V.	Tubular
P-80862	C3	.05 mfd.	200 V.	Tubular
P-80888	C4	.25 mfd.	200 V.	Tubular
P-80977	C5	.0001 mfd.	600 V.	Moulded
P-80888	C6	.25 mfd.	200 V.	Tubular
P-80970	C7 / C8	.004 mfd. / .004 mfd.	400 V. / 400 V.	Dual Tubular
P-80918	C9 / C10	.01 mfd. / .01 mfd.	600 V. / 600 V.	Dual Tubular
P-80862	C11	.05 mfd.	200 V.	Tubular
P-80968	C12	4.0 mfd.	150 V.	Electrolytic
P-1442	600 K. C. Trimmer Cond.			
P-80983	Gang Condenser			
P-20711	Shield for Two Gang Cond.			

C1 - 40 mmf.

RESISTORS

Part No.	Code	Resistance	Type
P- 96001	R1	63,000 ohm	Volume Control
P-A94901	R2	900 ohm	Carbon Resistor
P-A94652	R3	6,500 ohm	Carbon
P-A94205	R4	2 megohm	Carbon
P-A95105	R5	1 megohm	Carbon
P-A94104	R6	100,000 ohm	Carbon
P-A94403	R7	40,000 ohm	Carbon
P-A95105	R8	1 megohm	Carbon

TYPE	FUNCTION	Fil. Volts.	Plate to Cathode	Screen to Cathode	Grid to Cathode	Plate MA
32	1st Det-Osc.	2.0	139	70	5	5
34	I.F.	2.2	139	70	2.5	6
34	2nd Det.	2.2	34	40	0	2.5
30	1st A.F.	2.2	135	——	9*	3.0
19	Output	2.2	136	——	6	2.1

* As read at C battery

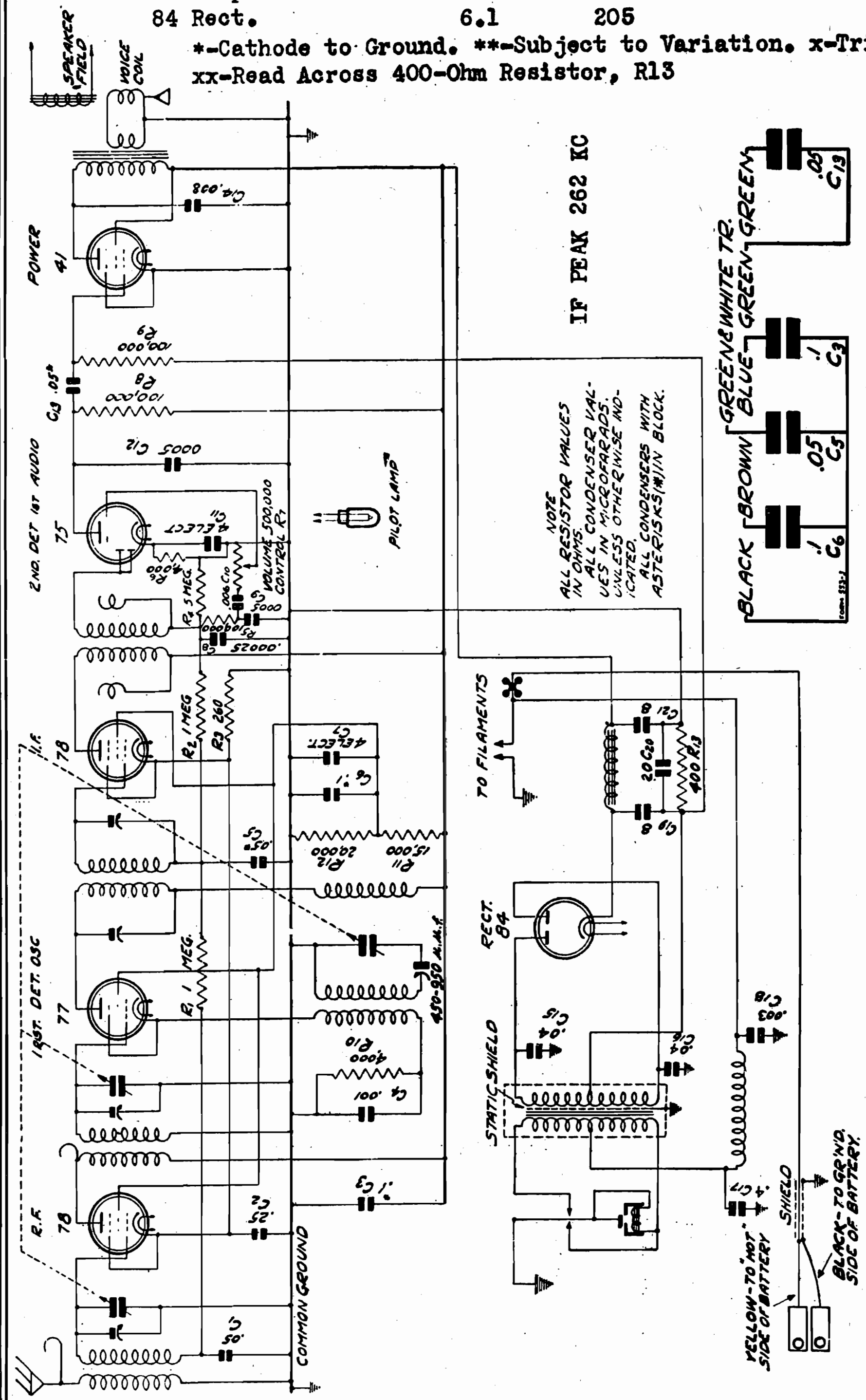
For Alignment Data, see Index

MONTGOMERY-WARD & CO.

MODEL 87
Schematic
Voltage
Socket

	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78 R.F.	6.1	182	80	3*	7.0
77 1st Det. & Osc.	6.1	178	77	5**	1.3**
78 I.F.	6.1	182	80	3.*	7.0
75 2nd Det. 1st Audio	6.1	70x		1.4*	.35
41 Output	6.1	172.5	176.5	12.5xx	16.0
84 Rect.	6.1	205			17.5per plate

*-Cathode to Ground. **-Subject to Variation. x-Triode Plate to Cathode
xx-Read Across 400-Ohm Resistor, R13



Condenser Block—Internal Wiring

Trying Out the Set and Adjusting

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer. The location of the tubes is shown in Fig. 8. To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 K.C. with the volume control about three-fourths on. On one end of the chassis box are two small metal plates. Remove the smaller of these two plates. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

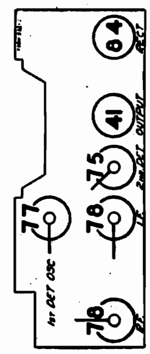


Fig. 8—Location of Tubes

MODEL 87
Alignment
Wiring

MONTGOMERY-WARD & CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Completing the Wiring Connections

Antenna Cable

Bring the antenna cable of the receiver in the most direct manner possible to the lead-in from the antenna and connect it to the latter. Keep it as high as possible and as far away from any car wiring as possible. Care should be taken not to have the antenna wire come in contact with the shield wires. Ground the pigtail of the antenna cable shield at the antenna end. The pigtail of this shield at the chassis end is grounded under one of the chassis mounting screws.

In some cases the shielded antenna lead from the receiver is not long enough to reach to the column at which the antenna lead-in comes down. In a case of this kind, cover the exposed portion of the lead-in wire with loom and braided shield from the point where it leaves the column to the point of connection to the antenna lead of the receiver. Connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire.

Battery Cable

The battery cable should be brought over to the storage battery in the most convenient manner possible. In Figs. 4 and 5 it is shown passing through a hole in the dash, thence down and under the floor board to the battery. In other installations, it may be more convenient to bring this cable down in back of one of the side pads and thence to the battery. The lug on the yellow lead of this cable is connected to the "Hot" or ungrounded side of the battery (the "Hot" or ungrounded side may be positive or negative, depending on the make of car). The lug on the black lead is connected to the grounded side of the battery. The pigtail of the shield of this cable at the chassis end should be grounded under one of the chassis mounting screws.

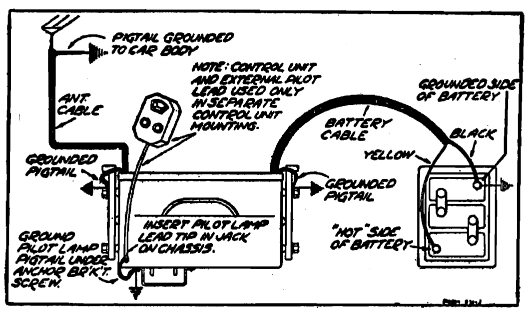


Fig. 7—External Wiring Connections

Pilot Lamp (For Separate Control Unit Only)

When a separate control unit is used connect the pilot lamp as follows:

The pilot lamp lead is in a shielded cable which extends out from the control unit box. On the rear wall of the chassis, near one of the ends, will be seen a tip jack. Insert the tip on the end of the pilot lamp lead into this jack. There is also a pigtail or shield extension at the end of this lead. Ground this pigtail with one of the anchor bracket screws (see Fig. 7). Double up the pilot lamp lead if it is too long—*Do not cut this lead.*

Antenna

A roof antenna is recommended, as by far the best results will be obtained. A large percentage of cars at the present time come equipped by the factory with built-in roof antennas. In those cars which do not have an antenna, one will have to be put in.

First determine if the top has a grounded chicken wire mesh. To do this, use a continuity meter. By means of a wire, attach a darning needle to one of the prods. Poke the darning needle into the roof material and turn it around until it comes in contact with the chicken wire. Then ground the other prod and if the continuity meter shows a complete circuit, the chicken wire mesh is grounded. In a case of this kind, it will be necessary to get inside of the roof and it is advisable to employ the services of an auto "top man" or an upholsterer.

It will be necessary to remove the top material and cut away the chicken wire from the side supports until it is at least 3" away from ground at any point. It should also be at least 3" away from the dome light and the dome light wiring. The chicken wire may then be laced to the points from which it was cut with a heavy, waxed cord. The chicken wire will then make a satisfactory antenna, or a copper screen may be used.

If the chicken wire is not grounded, it may be used as the antenna by taking down the roof material at one corner and soldering the lead-in wire to it. If it is not desired to take down the roof material a piece of copper screening can be tacked to the roof on the inside of the car. At least six square feet should be used. Keep it at least 3" away from any grounded metal parts on all sides. After the screen is in place, it can be covered over with cloth which matches the roof material. Solder the lead-in wire to the screen and bring it down the front corner post nearest to the set.

Another, and a very simple way in which an antenna can be secured to the inside of the car roof is to use one of the car-roof antennas which are now being made up especially for this purpose. There is one type of antenna which consists of copper strips laid back and forth between two pieces of cardboard. The cardboard is then covered over with material which matches the roof material. This antenna can be had in several colors and is tacked in place on the inside of the car roof in a few minutes.

Integral Mounting of Chassis

By integral or all-in-one mounting of the chassis is meant operating the receiver by means of the controls on the chassis box (and not with a separate control unit). This method is the simplest, as no changes are required on the receiver. It can be installed in several ways, as explained below and as illustrated in Fig. 1. Still other methods of mounting and locations for the chassis will suggest themselves, depending on the space available and variations in the construction of different cars.

Floor or Shelf Mounting

In Fig. 1(A) is shown how the chassis can be placed on the floor in front of the front seat. There are four rubber mounting feet on the bottom of the box, on which it stands. It may also be placed in back of the front seat (B) so as to be in the rear compartment of the car. In some cars, there is room enough between the two front seats for the chassis box to be placed. In coupes, the chassis may be placed on the shelf in back of the seat. Still other locations, as mentioned above, can be used, depending on the space available in different cars.

After the position is decided on, the chassis is permanently mounted in place by means of the two case mounting feet supplied for this method of mounting. These mounting feet are shown in Fig. 1. One side of the foot, which is a small angle bracket, is secured to the end of the chassis box by means of one of the chassis mounting screws. The other side of the foot is screwed to the floor board or surface on which the chassis is resting, with a wood screw. The two feet are placed diagonally, that is on one end of the chassis box it is at the front, while on the other end it is at the rear.

Flush Mounting of Chassis

In Fig. 1(C) is also shown how the chassis can be mounted on the dash by means of brackets, in such a way that the front portion of the box with the controls, is flush, or nearly so, with the instrument panel. This is a very desirable method of installation, as the receiver is rigidly in place, out of the way, and the controls are very accessible.

When mounted this way, two side case brackets (long type) are used, one on each end of the box, as shown in Fig. 1. Two mounting screws are generally used to secure each bracket to the end of the chassis box. Three may be used in cases where the distance between the instrument panel and dash is small. Six embossings with inset nuts are provided on each end of the chassis box. Any two of these or

MODEL 87
Mounting Notes

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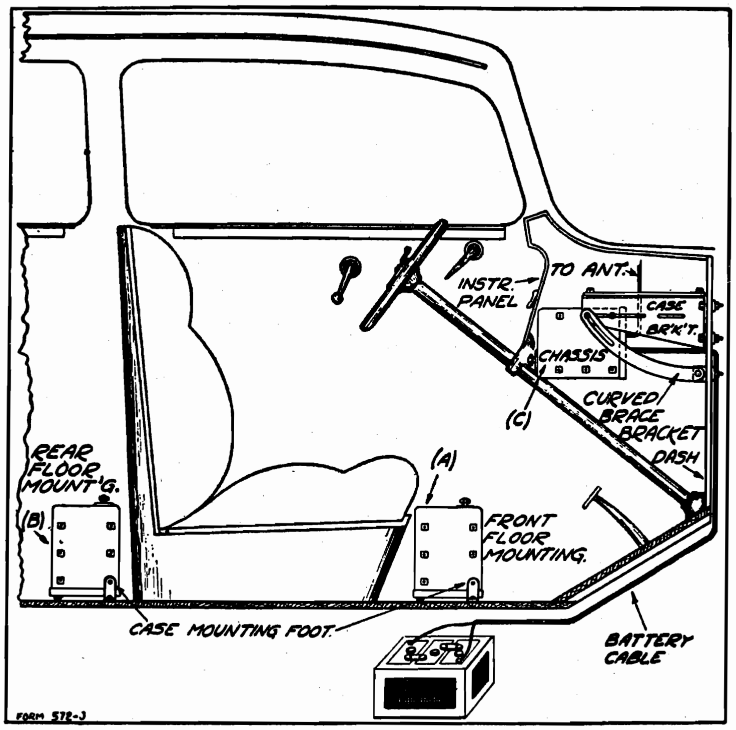


Fig. 1—Integral Mounting—Side View

three, as mentioned above, may be used for the bracket screws, which, together with the slots in the brackets, provides great flexibility in mounting. In addition to the side case brackets, two curved brace brackets and one cross strap brace as shown in Figs. 1 and 2 are used.

The chassis should be mounted as close to the center of the instrument panel as possible. This makes the controls accessible to people in either front seat. As stated above, it should be mounted so that the front side of the box with the controls, is flush or nearly so with the instrument panel of the automobile. If car apparatus or space available prevent the mounting of the chassis at the center,

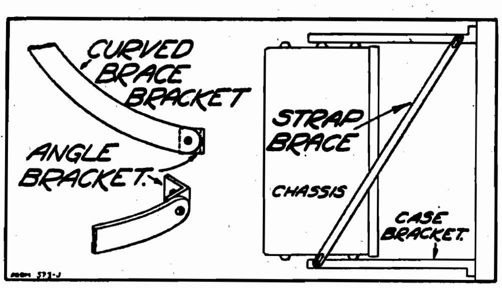


Fig. 2—Angle Brackets and Strap Brace

it may have to be moved to either side. In some instances, it can be mounted at the center of the instrument panel, but may have to be moved down and nearer to the dash than as shown in Fig. 1. Consideration should be given to the possibility of interference with the legs of the driver or passenger in the front seat and also to the possibility of interference with the controls of the car, such as pedals, gear shift lever, and hand brake lever, before the location is definitely decided on. The possibility of a car heater installation may also be considered. After the location is decided on, drill the four mounting holes required. The location and size of these holes is shown in Fig. 3. A template for drilling these holes is supplied with the receiver. Six 1/4" mounting bolts, six washers, six lockwashers and six nuts are provided. The mounting bolt is put through the bracket and dash with the shank extending into the engine compartment. A washer, the lockwasher and nut, are then put on. Mount the brackets permanently, but do not mount the chassis permanently until the wiring connections are completed, the tubes are all inserted, the receiver tried out, and the antenna trimmer adjusted (explained later).

When the case brackets are in place, the curved brace brackets can be installed. These can be put on in a number of different ways. The front or back case bracket screw can be used and the brace bracket itself can be mounted upward or downward. As a general rule it is mounted on the bracket screw farthest away from the dash and downward as shown in Fig. 1. The small angle brackets supplied with the receiver are secured at the base of the curved brace brackets as shown in Figs. 1 and 2, by means of the No. 10-32 3/8" Round Head Screw, nut and washer supplied. After the position of the brace brackets is decided on, put them in place and start the holes for them with a center punch. These brackets are bolted to the dash in the same manner as explained above for the case brackets.

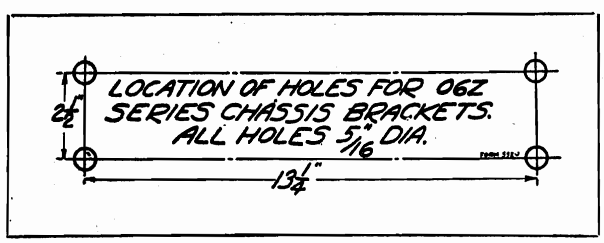


Fig. 3—Mounting Hole Location

Next, put the strap brace in place. This is mounted diagonally across the two brace brackets as shown in Fig. 2. There is a tapped hole at either end of the top flange of the case brackets which are used for this purpose. Two 10-32 1/4" long bolts are provided for the strap brace.

Separate Control Unit Mounting of Chassis

In this method of mounting, the chassis is mounted on the dash and is operated from a separate remote control unit which is on the steering column. Two flexible shafts mechanically connect the control unit and the chassis. This method of mounting is very desirable as the controls are most accessible to the driver. The items required for this method of mounting are shown in the installation list at the back of the manual. The procedure for this method of installation is as follows:

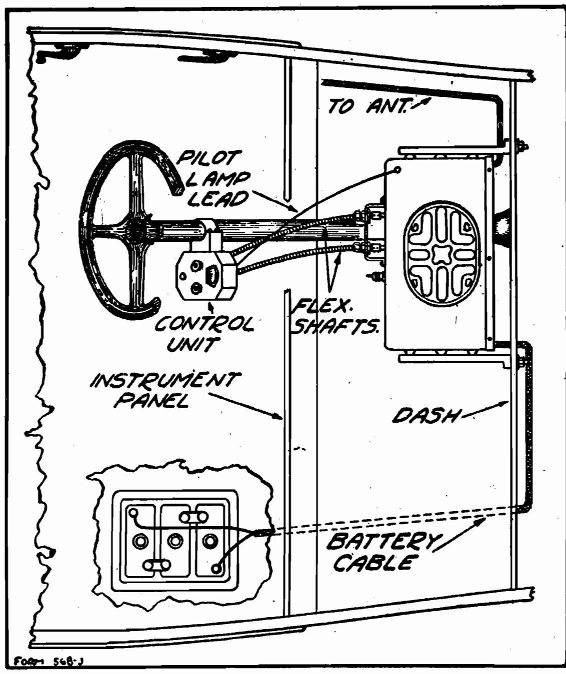


Fig. 4—Chassis with Control Unit—Top View

Mounting the Control Unit

The control unit is mounted on the steering column under the steering wheel as shown in Figs. 4 and 5. A clamp is used to hold it in position.

The outer portion of the clamp is screwed to the inner portion by means of the four 8-32x3/8" fillister head screws supplied with the receiver.

Two rubber strips are provided, one 1/8" thick and the other 1/16" thick. These are wrapped around the steering column under the clamp. Either or both of these strips may be used, depending on the thickness of the column. Wrap the rubber strips around the column in such a way as to allow the set screws which hold the clamp in position to pass through. When the clamp is in place, take the two 8-32 headless cup point set screws and screw them down on the steering column through the tapped holes in the clamp.

The control unit is generally about 4" below the wheel, but this will vary with individual cases. The length of the drive shaft and interference with driver's legs will also govern the location of the control unit.

There are two screws which hold the inside portion of the clamp to the control unit swivel. By loosening these two screws, the box can be swung around if such a position is handier from the standpoint of the person operating the set. Instructions for attaching the pilot lamp lead are contained in the article "Completing the Wiring Connections."

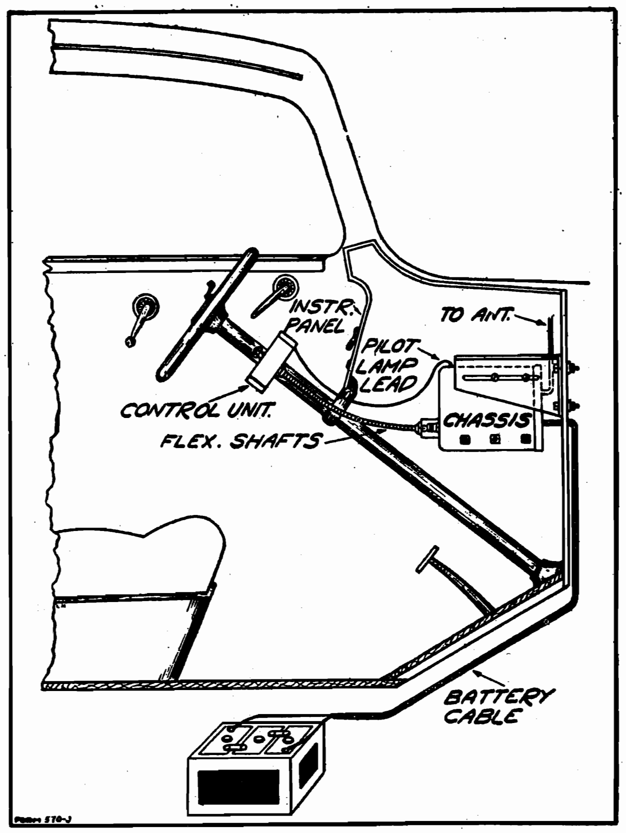


Fig. 5—Chassis with Control Unit—Side View

Mounting the Chassis

The chassis is mounted on the dash by means of two short brackets, as shown in Figs. 4 and 5. Two or three mounting screws are used to secure each bracket to the end of the chassis box. Three are used if the chassis is close to the dash and two if it is set out some distance. In general, keep the chassis as close to the dash as possible. The procedure for attaching the brackets to the chassis box and to the dash is the same as explained above for mounting the side case brackets under the article, "Flush Mounting of Chassis." No curved brace brackets or strap braces are used in this method of mounting.

The chassis should be mounted with the speaker grill facing down and the side with lock and controls facing the listener, as shown in Fig. 4. Before mounting the chassis, the flexible drive shaft connections as explained in the next article must be made.

The location of the chassis will very often depend on the space available. To the left of the center, as shown in Fig. 4, is a good location. The chassis should be mounted in such a way that the flexible drive shafts to the control unit will be in as straight a line as possible or with large radius bends. *In general, it will be advisable to consider the possibility of a car heater installation at the right side of the dash (facing forward).* In practically every case no difficulty will be experienced in mounting the heater and chassis on the dash. The chassis should be mounted in such a way that the lock *which remains on the chassis box will be accessible.*

The possibility of interference with people in the front seats and with car controls, as mentioned previously, should also be considered.

When the location is decided on, drill the four mounting holes required as shown in Fig. 3 and proceed as explained above. Mount the brackets permanently, but do not mount the chassis permanently until the wiring connections are completed, all tubes are in the sockets, the flexible drive shafts connected, and the antenna trimmer adjusted (explained later).

Attaching the Flexible Drive Shafts

After the control unit is mounted and the chassis is temporarily mounted, the flexible drive shafts may be attached. Two 34" shafts are supplied unless otherwise specified. These shafts may also be had in 14", 20" and 45" lengths.

The flexible drive shafts should always be in-

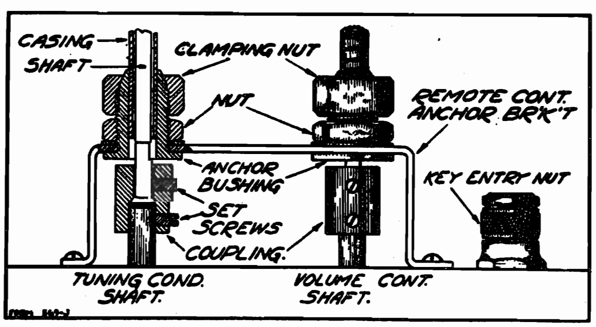


Fig. 6—Details of Flexible Drive Shaft Connections

stalled with a minimum amount of bending. Always keep the radius of the bend as large as possible. The larger the radius of the bend, the easier the shaft will turn.

The 34" shafts supplied with the receiver may be cut to a shorter length if necessary. The shaft (inside portion) should first be brazed at the point to be cut. It should then be cut with a three-corner file or edge of a grinding wheel. *Do not use a hack saw.* After the shaft is cut, file it down in one place a slight amount to provide a flat surface for the set screw. The casing which is 1½" shorter must be cut to correspond. This should be tinned or brazed first at the point to be cut and may then be cut with a hack saw.

It is advisable to attach the flexible shafts with the chassis on the mounting brackets, but if the chassis is inaccessible, it may be removed from the brackets. Keep it as close to its regular position as possible so that the flexible shaft will not turn after the chassis is replaced on the brackets. In general, it may be moved up or down, but should not be moved sideways or be turned.

To attach the flexible shafts to the chassis, first turn the on-off switch knob to the off position and the station selector knob to the low frequency end stop. Then remove the two knobs. These two knobs are then put on the control unit. Loosen the set screws on the two couplings and slip them over the two shafts as shown in Fig. 6. Then secure the remote control anchor bracket in place on the chassis box by means of the four 6-32-¼" screws. The dial gear and pilot lamp remain in the chassis box.

Next, center the two anchor bushings on the anchor bracket. To do this, first loosen the nut which holds the bushing in place. Center the bushing so that the center of it is in line with the center of the shaft below. Then tighten the nut. Turn the on-off switch and volume control knob on the control unit to the extreme counter-clockwise position. Then extend the volume control flexible shaft into the coupling and tighten the two set screws in this coupling. The outside set screw should be tightened down *on one of the four flat faces* of the shaft. Then tighten down the clamping nut on the volume control shaft casing, *but do not tighten this nut excessively.*

To attach the tuning condenser flexible shaft, proceed in the same manner as above, except that the dial gear in the control unit should first be turned to the low frequency end stop. After the two shafts are connected, mount the chassis in place temporarily if it has been taken off and check the operation of both tuning condenser and volume control. The switch should be off when the volume control knob is in the locked position. It may be necessary to loosen the inner set screw and do a slight amount of adjusting until the proper setting is obtained. In case the dial gear in the control unit is not correctly calibrated or does not coincide with the dial gear calibration in the chassis box, further adjustment of this control can be brought about in the same manner, that is, by first loosening the inner set screw of the coupling. The clamping nut of the tuning condenser shaft anchor bushing is tightened down as explained above.

MONTGOMERY-WARD & CO.

Replacement Parts for Series Z6Z1 Receivers

CHASSIS PARTS

Part No.	Description
P-1780	No. 75 Tube Socket
P-1761	No. 77 Tube Socket
P-1762	No. 78 Tube Socket
P-1665	No. 41 Tube Socket
P-1803	No. 84 Tube Socket
P-1805	Single Pin Jack
P-1799	Tube Shield Assembly
P-20656	Chassis Box
P-20657	Chassis Box Cover
P-70740	Shielded Antenna Lead
P-70744	Shielded "A" Battery Lead
P-1804	Vibrator Unit (in cast metal case)
P-10266	Vibrator Unit Rubber Cushion, pair
P-20660	Vibrator Unit Box
P-20661	Vibrator Unit Box Cover
P-1572	Fuse Clip Assembly
P-10260	Cardboard Baffle
P-1624	10 Amp. Fuse
P-1774	Electrodynamic Speaker
P-20585	Cond. Drive Gear
P-1801	Volume Control and Drive Bracket
P-20635	Cond. Drive Pinion
P-20677	Pinion Adjustment Plate
P-20614	Lock Lever
P-20658	Tension Spring
P-30419	Entry Plate Assembly
P-1830	Dial Gear and Strip Assembly
P-1816	Celluloid Dial Strip only
P-1810	Pilot Lamp Socket and Spring Clip
P-1563	6-8 Volt Pilot Lamp
P-10263	Rubber Tube Bumper—Square
P-10210	Rubber Tube Bumper—Round
P-10213	Rubber Band for Tube
P-50569	Filter Choke Assembly
P-50585	Power Trans. Assembly—Less condensers and brackets
P-5099	Antenna R. F. Transformer—Less Can
P-5065	Interstage R. F. Transformer—Less Can
P-5105	Second I. F. Transformer and Can Assembly
P-5096	First I. F. and Oscillator Transformer and Can Assembly
P-5097	Single Solenoid "A" Choke
P-40431	Antenna R. F. Can
P-1826	Interstage R. F. Can

Resistors

Part No.	Code No.	Resistance	Type
P-A95105	R-1	1 Megohm	Carbon
P-A95105	R-2	1 Megohm	Carbon
P-B94261	R-3	260 ohm	Carbon
P-A95504	R-4	.5 Megohm	Carbon
P-A95104	R-5	100,000 ohm	Carbon
P-A94402	R-6	4,000 ohm	Carbon
P-91066	R-7	0-500,00 ohm	Volume Control and Switch
P-A95104	R-8	100,000 ohm	Carbon
P-A95104	R-9	100,000 ohm	Carbon
P-A94402	R-10	4,000 ohm	Carbon
P-B94153	R-11	15,000 ohm	Carbon
P-B94203	R-12	20,000 ohm	Carbon
P-C94401	R-13	400 ohm	Carbon

Condensers

Part No.	Code No.	Capacity	Voltage	Type
P-80862	C-1	.05 mfd.	200 V.	Tubular
P-80888	C-2	.25 mfd.	200 V.	Tubular
P-80821-B	C-4	.001 mfd.	600 V.	Molded
P-80937	C-7 C-11	4.0 mfd. 4.0 mfd.		Electrolytic Block in can
P-80919	C-8	.00025 mfd.	600 V.	Molded
P-80945	C-9	.0005 mfd.	600 V.	Molded
P-80898	C-10	.006 mfd.	600 V.	Tubular
P-80945	C-12	.0005 mfd.	600 V.	Molded
P-80966	C-14	.008 mfd.	600 V.	Tubular
P-80963	C-15 C-16	.04 mfd. .04 mfd.	400 V. 400 V.	Dual Tubular
P-80960	C-17	.4 mfd.	15 V.	In Metal Can
P-80959	C-18	.003 mfd.	600 V.	Molded
P-80956	C-19 C-20 C-21	8.0 mfd. 20.0 mfd. 8.0 mfd.	225 V. 25 V. 225 V.	Electrolytic Block in Can
P-80955	C-3 C-5 C-6 C-13	.1 mfd. .05 mfd. .1 mfd. .05 mfd.	300 V. 200 V. 200 V. 300 V.	Bypass Block in Can
P-1539	600 K. C. Trimmer Condenser			
P-80957	Three-Gang Variable Condenser			

CONTROL UNIT PARTS

(When Separate Control Unit Is Used)

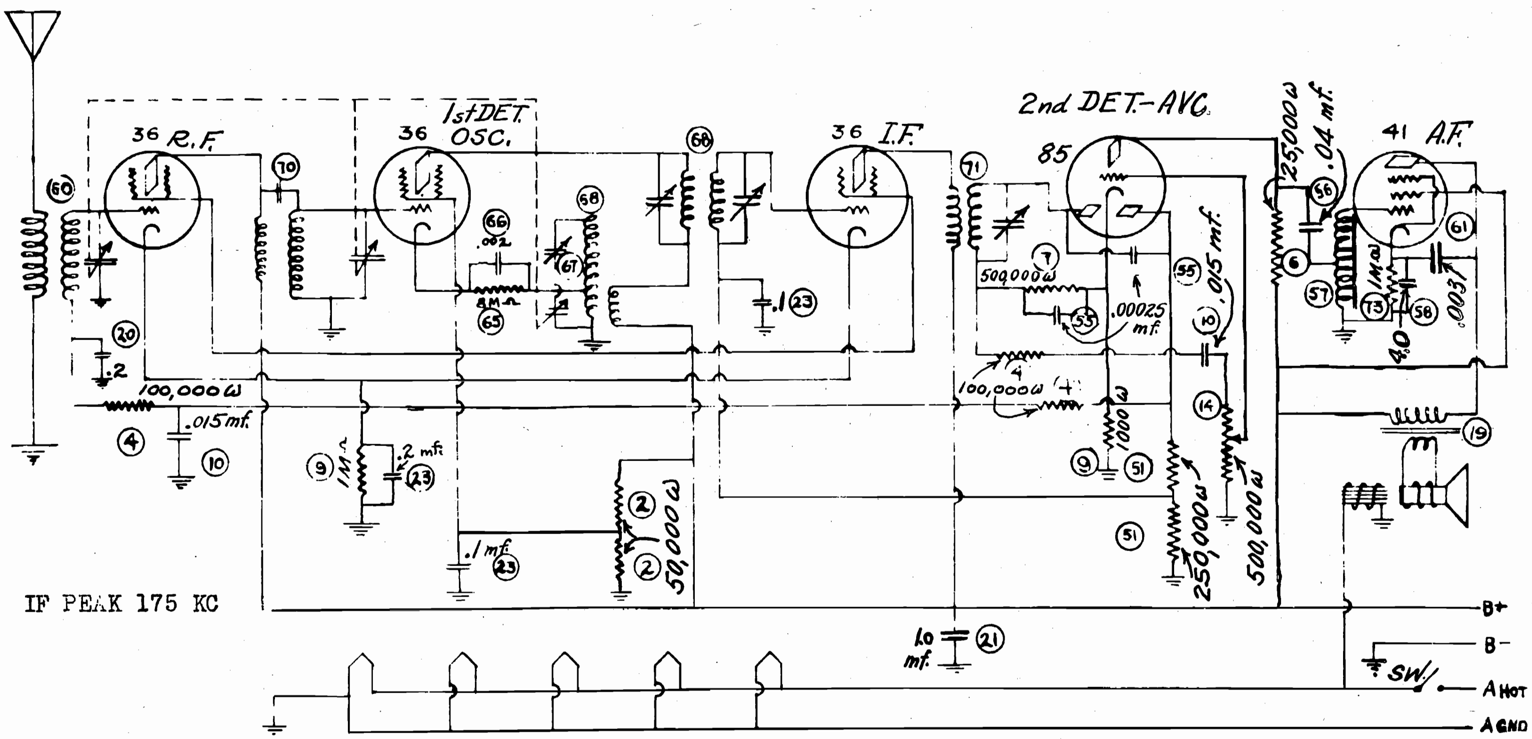
Part No.	Description
P-1816	Celluloid Dial Strip
P-1825	Dial Gear and Strip Assembly
P-20509B	Control Unit Swivel
P-20510A	Steering Post Apron
P-20511	Steering Post Clamp
P-20693	Control Box Cover
P-20635	Cond. Drive Pinion
P-70746	Pilot Lamp Cable only
P-1415A	Pilot Lamp Socket and Clip
P-1563A	6-8 Volt Pilot Lamp
P-30426	Ornamental Plug
P-30414	Key

ITEMS WHICH MAY BE REQUIRED IN SOME CASES.

1— 1550	14" Flexible Drive Shaft—For Control Unit Mounting
1— 1553	20" Flexible Drive Shaft—For Control Unit Mounting
1— 1551	34" Flexible Drive Shaft—For Control Unit Mounting
1— 1552	45" Flexible Drive Shaft—For Control Unit Mounting
1—91011	Spark Plug Suppressor—All methods of mounting
1—91012	Distributor Suppressor, Wood Screw Ends—All methods of mounting

MOTO-METER GAUGE & EQUIPMENT CO.

MODEL Moto-Vox 10-A
Above # 500
Schematic



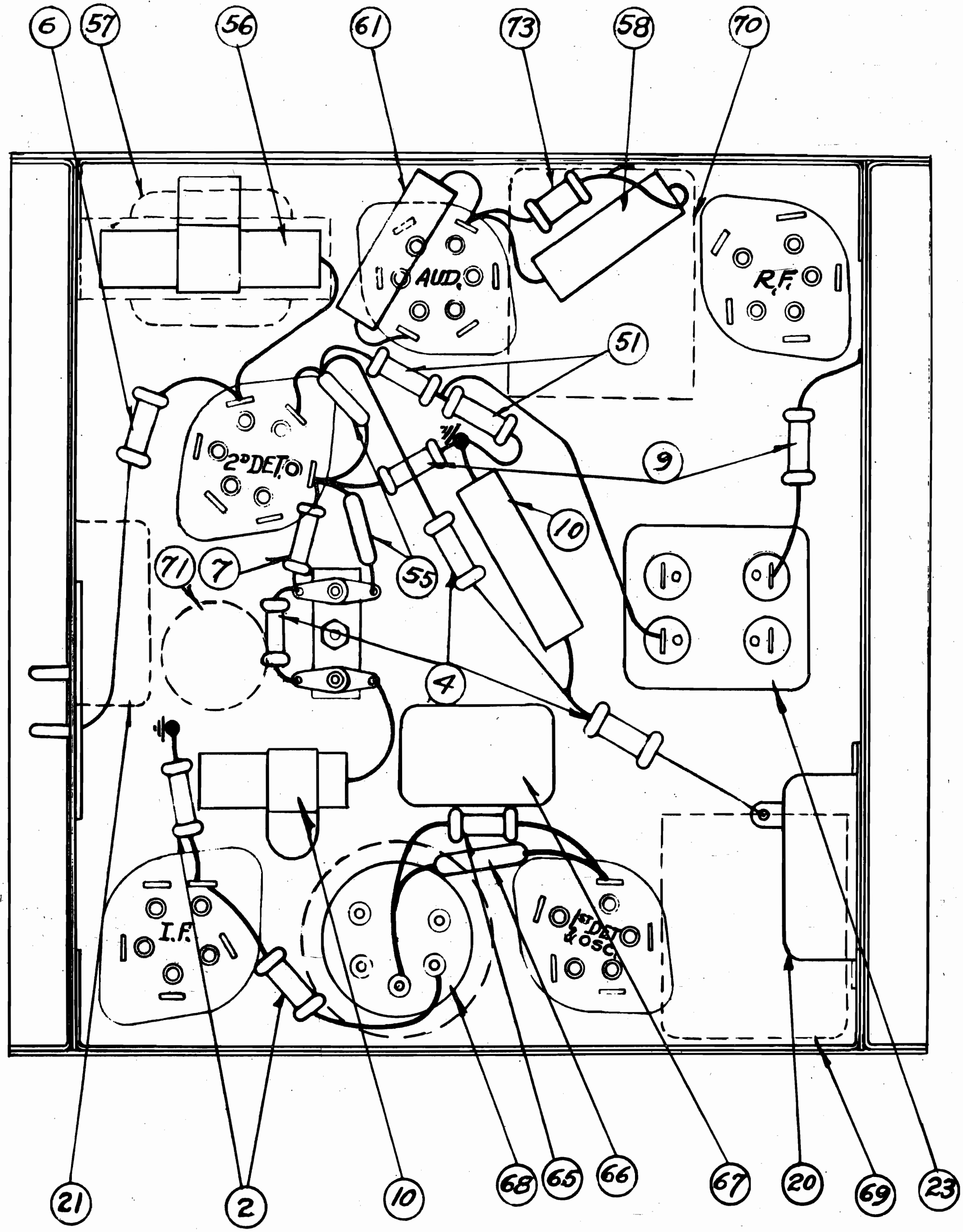
TUBE			CATHODE TO GROUND	CATHODE TO SCREEN	CATHODE TO PLATE
TYPE	PURPOSE	FILAMENT			
36	R.F.	5.6	3.5	82.0	196.0
36	1st Det. & Osc.	5.6	7.0	79.0	193.0
36	I.F.	5.6	3.5	82.0	196.0
85	2nd Det. & A.V.C.	5.6	4.2	——	82.0
41	A.F.	5.6	16.3	182.0	172.0

Take readings at tube sockets, when receiver is tuned off signal.

Total drain with input of 5.7 volts. 28 mils at 200 volts.

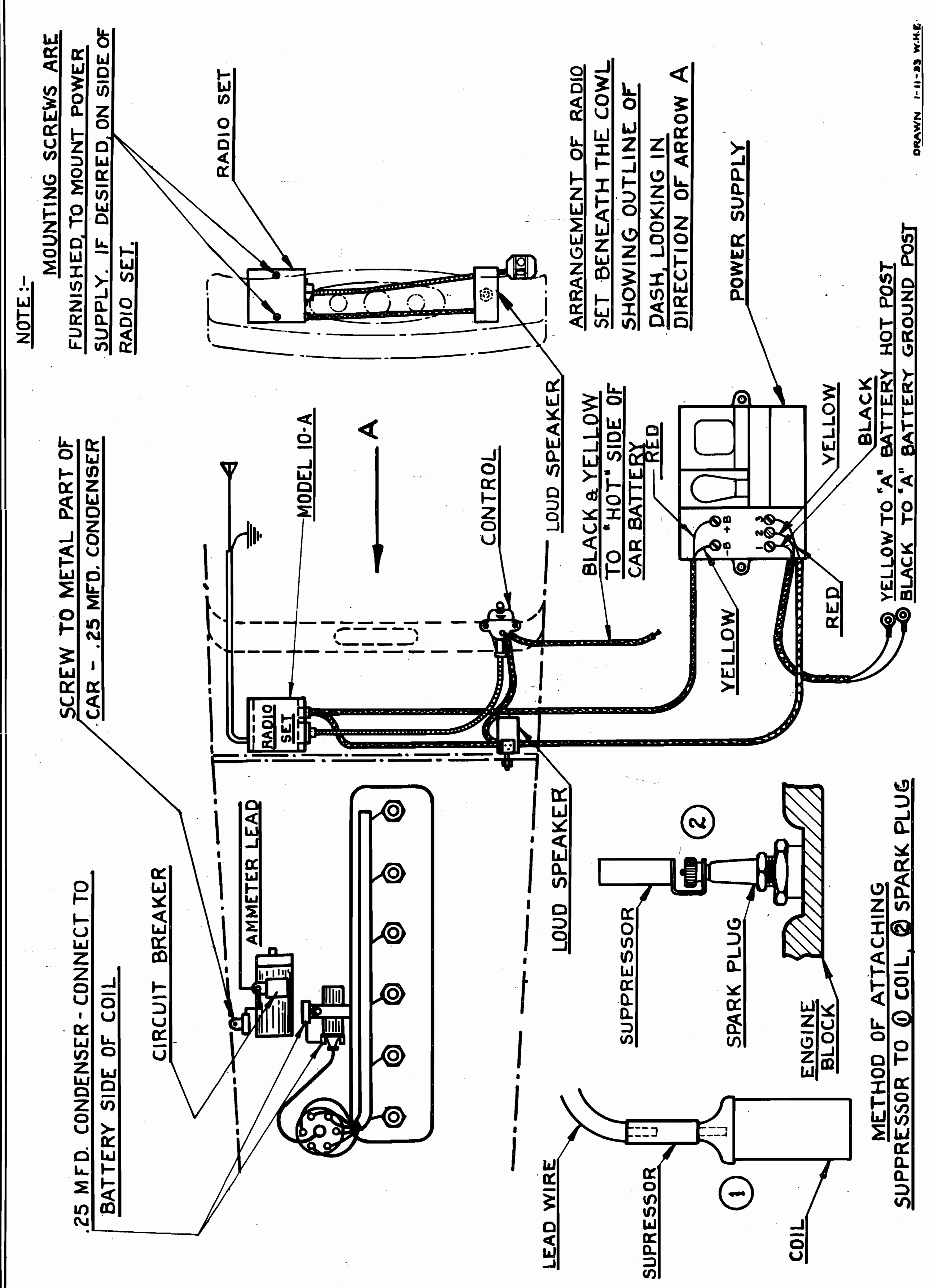
MODEL 10-A
Moto-Vox
Chassis Wiring
Above Serial 500

MOTO-METER GAUGE & EQUIPMENT CO.



MOTO-METER GAUGE & EQUIPMENT CO.

MODEL Moto-Vox 10-A
Assembly wiring



MODEL Moto-Vox 10-A
10-E MOTO-METER GAUGE & EQUIPMENT CO.
General notes

SPECIAL INSTRUCTIONS - MODEL "10 A" ALL ELECTRIC ONLY

POWER SUPPLY

Provision has been made for mounting the power supply on the bottom of the receiver by means of two self-tapping 1/4" screws, which are assembled in the bottom.

The power supply may also be mounted beneath or behind either front or rear seat.

Mount the power supply. Run the separately shielded Red lead, assembled in the speaker, to the terminal #3.

Assemble the Red lead in the radio cable to the B-plus terminal in the supply and the Yellow lead to the B-minus terminal, making certain that the shield of the cable is anchored by the mounting clamp provided in the power supply. If the cable is too long, do not cut it off, but double it up neatly and place out of sight. Make certain that the shielding on the cable is grounded to the metal part of the car in several places.

Now connect the Black with Yellow tracer lead of the tuning control along with the Yellow lead from the power supply terminal #2 to the Ungrounded post of the battery. Assemble the Black lead from terminal #1 of power supply to the grounded battery post.

IMPORTANT: MAKE CERTAIN THAT THESE CONNECTIONS TO THE BATTERY ARE CORRECT.

The receiver is now ready to be connected up. Plug the cable assembly into the receiver. MAKE SURE THAT THE PLUG IS NOT FORCED ONTO THE RECEPTACLE ON THE RECEIVER BUT THAT IT IS ASSEMBLED PROPERLY. Then remove one of the screws in the end of the chassis and fasten the clip at the end of the shield to the chassis holding it in place by means of this screw.

Pull the switch underneath the tuning control forward. Never turn this switch on unless the receiver is plugged into the harness assembly, thus making sure that the power supply is operating under load.

FINAL ADJUSTMENT - MODEL "10 A" ALL ELECTRIC AND MODEL "10 E" BATTERY TYPE

The installation is now complete with the exception of the elimination of certain noises known as interference, caused by the ignition system. You will find in the MotoVox package a complete set of suppressors for both coil and spark plugs for a six cylinder automobile. Assemble a spark plug resistor on each plug, (Diagrams #1 and #2) making sure that all connections are tight, as a loose connection at this particular point will render the resistor useless as well as interfere with the operation of the motor. Install the single coil suppressor provided in the top of the distributor.

In most cases the standard suppressors are very easily mounted. However, in the case of certain valve-in head motors, such as the Buick, it is necessary to use the MotoVox screw-in type suppressor which can be screwed into the ignition cable and then snapped over the plug. Be certain at all times that in the case of a two coil system, that there is one coil suppressor in each high tension lead going to each coil at the distributor. the screw-in type suppressor can be purchased from Moto Meter at a nominal charge.

In addition to the suppressors, there are two by-pass condensers provided. One of these by-pass condensers should be placed on the live side of the generator, mounting the condenser bracket under the relay mounting screw and connecting the lead to the relay battery terminal. The other condenser should be mounted on the battery side of the coil. The can of condenser must be grounded.

MOTO-METER GAUGE & EQUIPMENT CO. MODEL 10-A,10-E Moto-Vox Notes

ALIGNING RECEIVER WHEN REPLACING COILS

Since all of the adjustable condensers in this receiver have been accurately aligned in the process of manufacturing, it will only be necessary to adjust them when replacing one or more coils. This operation may be divided into two parts namely, First, Aligning intermediate frequency transformer trimmers and Second, Aligning gang condenser and series condenser trimmers.

ALIGNING INTERMEDIATE FREQUENCY TRANSFORMER TRIMMERS WHEN REPLACING INTERMEDIATE FREQUENCY TRANSFORMER "71" PART #76502 OR COMPOSITE UNIT "68" PART #76499.

Remove any external antenna from chassis and ground antenna on chassis during test. Connect one of the output leads of a 175 K.C. test oscillator to the control grid (top) cap of first detector tube (leaving grid cap terminal of lead in place on tube) and the other to the base of chassis. Connect an output meter in parallel with the primary of speaker output transformer at the terminal strip in the speaker housing. Turn the rotor plates entirely out of stator plates and adjust the adjustable trimmer in the top of coil "71" to the maximum meter reading. Then adjust the trimmers in the top of composite "68" to maximum reading in the same manner. When this is accomplished the intermediate frequency of the receiver has been aligned to 175 K.C.

ALIGNING GANG CONDENSER TRIMMER AND SERIES TRIMMERS

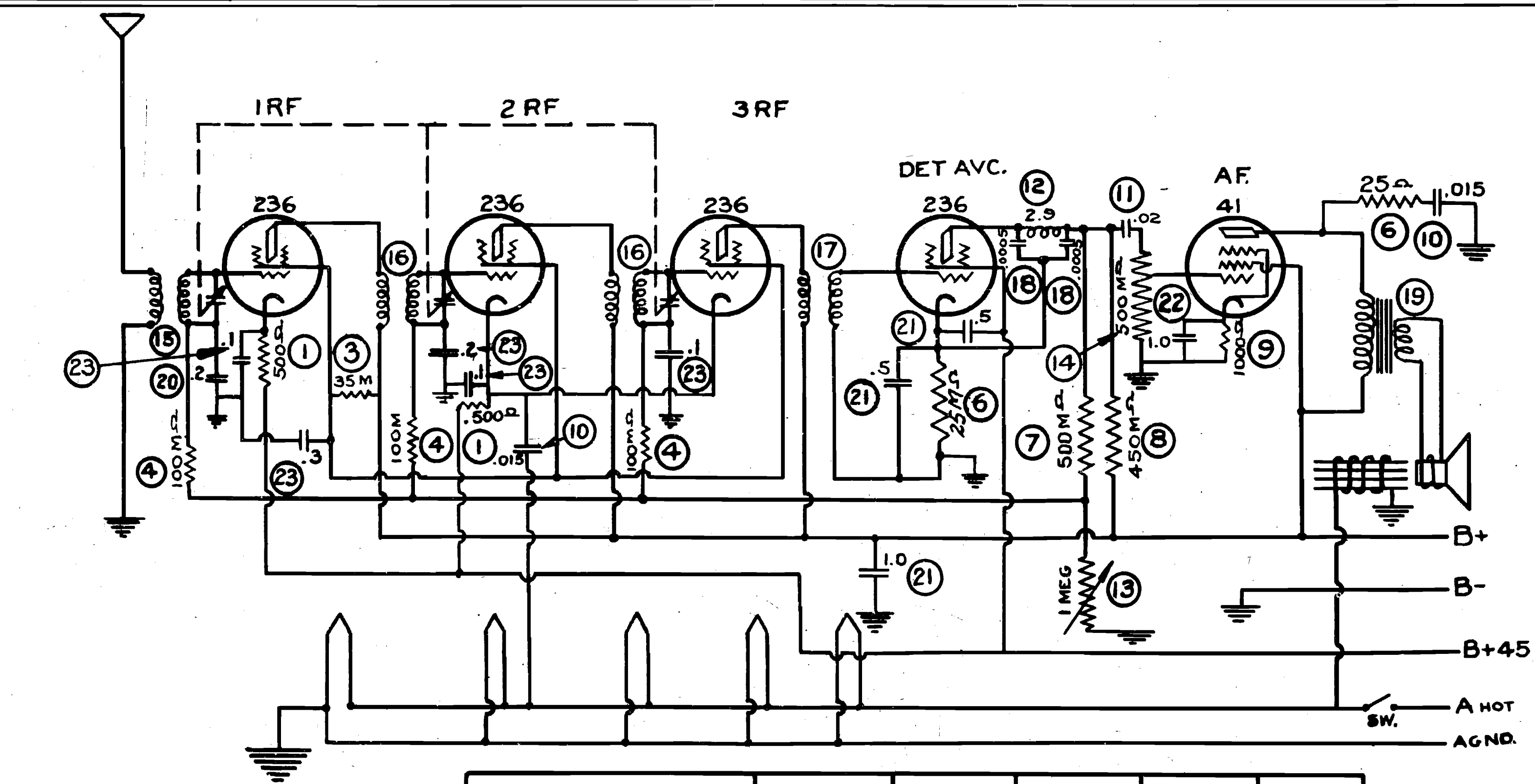
When replacing a gang condenser, series trimmers, composite, antenna, or R.F. coil it is necessary to realign the series trimmer and gang condenser trimmers. To do this fasten the tuning control to the chassis, turning the rotor blades all the way into the stator and setting the dial on 540 K.C. Now adjust a test oscillator to 600 K.C. and place one terminal on the base of the chassis and the other on the antenna post of the receiver. (Remove the ground from this post). Connect the output meter as described above. Now rotate the tuning mechanism slowly back and forth at approximately 600 K.C. on the dial and adjust the series trimmer so that maximum reading is shown on the meter. During these measurements reduce the signal from the oscillator to approximately one half scale reading.

Now adjust the test oscillator to 1400 K.C., tune the receiver to 1400 K.C. on the dial and adjust the three trimmer condensers on the gang condenser to the maximum meter reading.

If the proper coil is used and the tuning condenser is calibrated properly, the maximum output will be obtained at each of the other frequencies. In some cases, however, after aligning at 1400, it may be necessary to bend the outside blades at the other frequencies to track properly. This should only be done by an experienced radio service man and the receiver should always be aligned last at 1400 K.C.

MODEL 10-E
Moto-Vox
Schematic
Voltage

MOTO-METER GAUGE & EQUIPMENT CO.



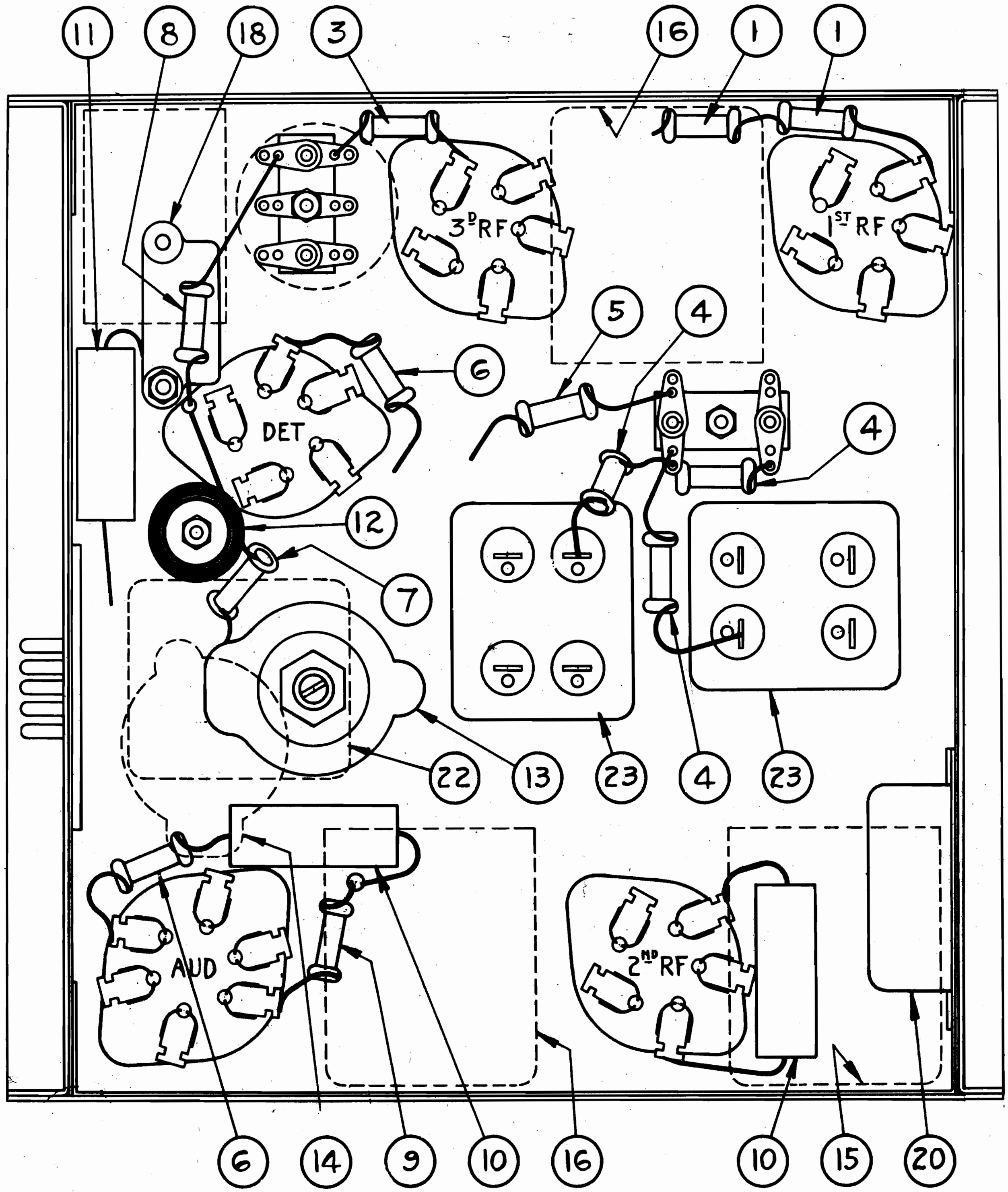
TUBE		FILAMENT	CATHODE to GROUND	CATHODE to SCREEN	CATHODE to PLATE	Plus 45 to CATHODE
TYPE	PURPOSE					
36	1st. R.F.	5.6	-	60	135	1.9
36	2nd. R.F.	5.6	-	59	134	3.0
36	3rd. R.F.	5.6	-	59	134	3.0
36	Detector	5.6	3 to 4	40	60 to 70	-
41	Audio	5.6	16.0	165	155	-

Take readings at tube socket contacts when receiver is tuned off signal.

Total Drain 19 milliamperes.

MOTO-METER GAUGE & EQUIPMENT CO.

MODEL 10-E
Moto-Vox
Chassis
Socket



MODEL 10-E BATTERY OPERATED

MODEL Moto-Vox 10-E
Battery
General notes

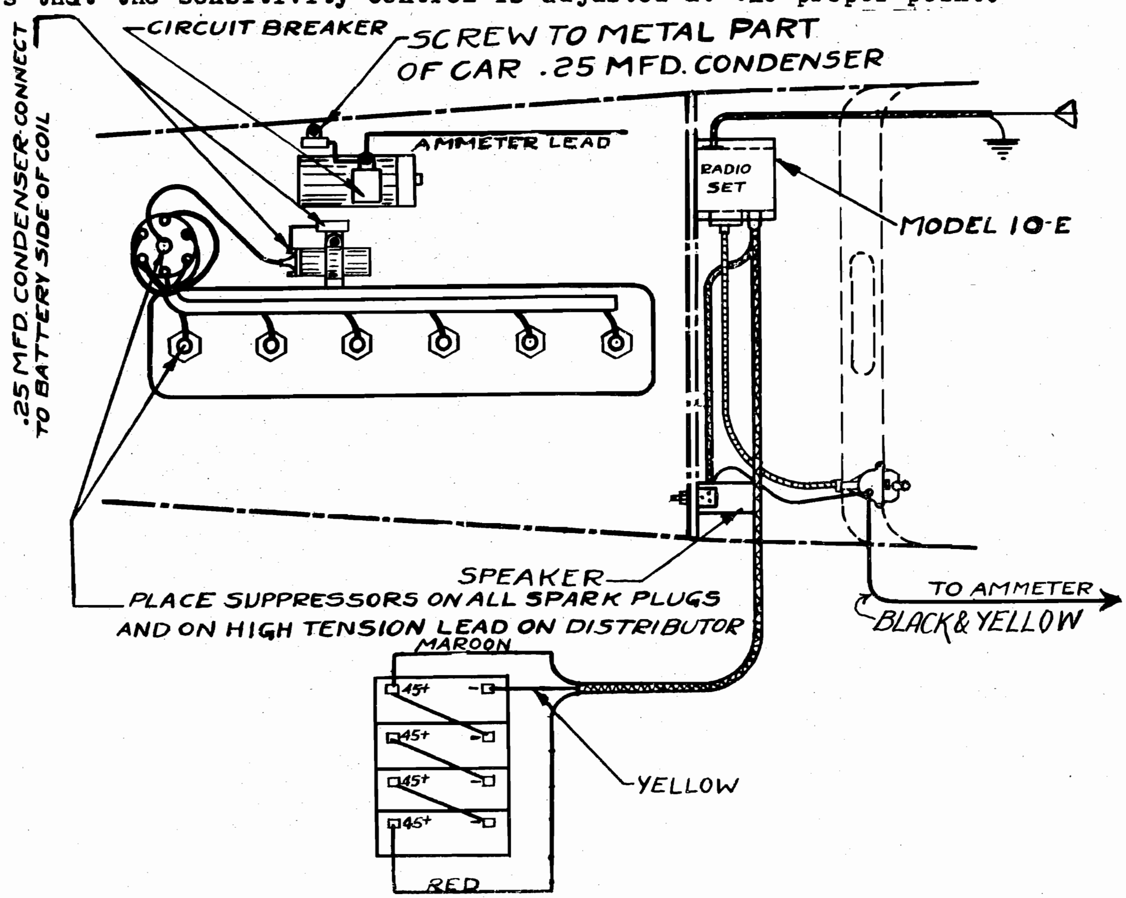
MOTO-METER GAUGE & EQUIPMENT CO.

SPECIAL INSTRUCTIONS FOR MODEL "10 E" BATTERY RECEIVER

In the case of Model "10 E", it is only necessary to assemble the Yellow lead in the "B" harness to the minus tap of 180 volts of battery. (Schematic Diagram #2) Four Type 2308 Burgess Batteries are recommended for this purpose. Then the Maroon lead is assembled onto plus 45 and the Red lead is assembled to plus 180. A 1/4 amp. 250 mil. fuse is provided in the plus 180 line to avoid possible damage due to short circuits to different parts of the radio circuit.

In most cases it is possible to mount the batteries underneath the seat, or in rear of either front or back seat. In case this is not possible a battery box can be obtained at a very nominal cost from the factory. It must be remembered that Model "10 A" and "10 E" are not interchangeable as far as hook-up is concerned. Model "10 A" is an All Electric Set and Model "10E" is Battery Operated and these circuits are wired accordingly. Therefore, it is not possible to operate the Model "10 A" as a battery receiver and the Model "10 E" as an all electric.

After the installation is completed, the receiver is now ready for sensitivity adjustment. Turn the receiver switch on and turn the dial off of a broadcast station between 1300 and 1500 kilocycles. The noise level at this point should be fairly high. Now turn the sensitivity control, AN EXCLUSIVE MOTOVOX FEATURE, located in the bottom of the receiver, entirely to the right or clockwise to the "Stop", then turn back counter-clockwise or to the left, until the point is reached at which the static level becomes very high. This is the point of maximum sensitivity. Any point beyond this in a counter-clockwise direction or to the left, will result in a lower sensitivity level and in a clockwise or right direction will result in a lack of sensitivity and automatic volume control. It is suggested that the control be set at a point just below the maximum sensitivity to reduce engine interference. Therefore, be certain at all times that the sensitivity control is adjusted at the proper point.



MODEL Moto-Vox 10-A
10-E

MOTO-METER GAUGE & EQUIPMENT CO.

Special notes

INSTALLATION PROCEDURE

The model installation which is strongly recommended is to place the chassis on the right hand side of the dash as far up in the corner as it is possible and to place the tuning control unit on the left hand side of the instrument panel putting the speaker directly back of tuning control on the left hand side of dash.

The chassis may be mounted in any desired position. It is necessary to drill four clearance holes for 1/4" bolts and it is recommended that the four mounting bolts provided be secured to the case with the nuts provided, and then the complete chassis can be held against the dash marking the location of the four holes.

If it is desired, MotoVox has an accessory mounting bracket #76495, which can be obtained at all MotoVox distributors at a very nominal cost. This bracket permits the receiver to be mounted by drilling only one hole in the dash. In removing the receiver it is unnecessary to remove the bracket, but merely two mounting screws which secure the receiver to the bracket. For further instructions see directions accompanying the bracket.

The tuning control and speaker cable assembly are all completely attached and assembled together at the factory and it is only necessary to drill a clearance hole for a 3/8" bolt to mount the speaker on the dash. In case the bracket mounting which is provided for the speaker is not adaptable to the particular installation at hand, it is necessary to remove the cover, unfasten the mounting bolt and screw the mounting bolt in place in the tapped stud in the rear of the speaker. If this mounting is used be sure to space the speaker away from the dash at least 1½". In using the conventional mounting the speaker should be placed in such a manner that the face of the speaker, that is, the side on which screw heads show, should be mounted toward the center of the car, thus, giving a clear tone. The tuning control is fastened to the edge of instrument panel with two 1/4" screws provided.

MOUNTING CHASSIS AND TUNING CONTROL

In mounting the chassis to the dash, make sure that the tuning control bracket on the case is mounted in such a manner that it faces towards the tuning control, then assemble the tuning control to the chassis proper. Pull the short shaft and coupling extending through the side of the chassis entirely out and turn as far clockwise as possible. Then turn the tuning control knob in the same position and insert the driver on the end of the flexible shaft in the coupling. Then tighten the two screws in the coupling. Now insert the metal conduit on the outside of the flexible shaft in the tuning control bracket on the end of the case and tighten the two set screws in this bracket.

Run the drive shaft and the tuning control to the chassis in as direct a manner as possible, thus eliminating all kinks and bends which would tend to make the drive bind. REMEMBER THAT THE SUCCESS OF THIS PARTICULAR TYPE OF CONTROL DEPENDS UPON SMOOTH OPERATION AND THIS CAN ONLY BE ACCOMPLISHED BY PROPERLY LINING UP THE PARTS. Care has been taken in the manufacture of these parts in the factory and only by properly assembled jobs in the field can good results be obtained.

The final adjustment on the dial calibrations can be obtained after the power supply and the receiver are completely hooked up by tuning in on broadcasting stations. It is then a comparatively simple operation to loosen the coupling on the flexible cable by means of the two set screws, rotate the dial to the proper position and re-tighten these screws. Be sure that the screw which holds the tuning control conduit in the tuning control housing does not bind too tightly as this may cause an excessive bind on the flexible cable. It is recommended that the Receiver be tuned on a Broadcasting Station approximately 700 Kilocycles in making the above adjustment.

MODEL 10-A, 10-E
Parts List

MOTO-METER GAUGE & EQUIPMENT CO.

SERVICE PARTS

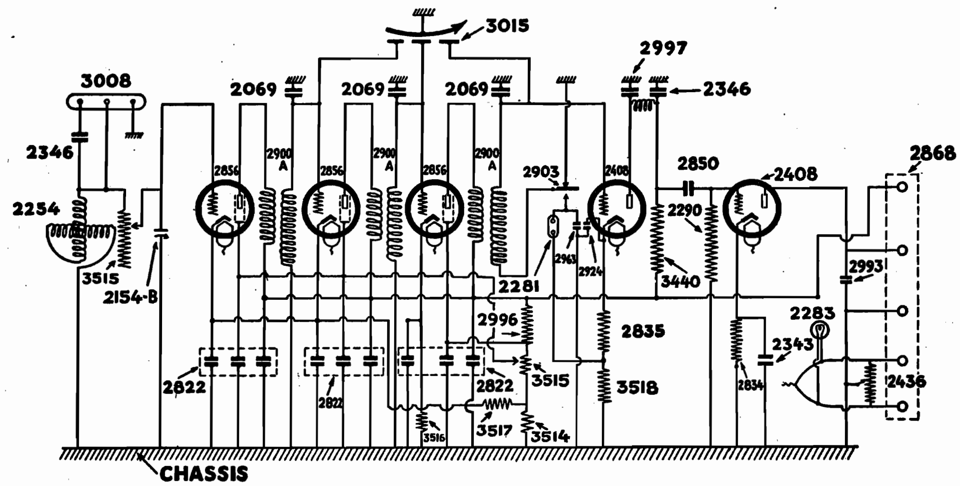
DESCRIPTION	NAME	MOTO METER PART NO.
1	Resistor 500 ohms	76303
2	Resistor 50,000 ohms	76309
3	Resistor 35,000 ohms	76302
4	Resistor 100,000 ohms	76300
5	Resistor 1,000,000 ohms	76308
6	Resistor 25,000 ohms	76301
7	Resistor 500,000 ohms	76304
8	Resistor 450,000 ohms	76305
9	Resistor 1000 ohms	76306
10	Condenser .015 mfd.	76350
11	Condenser .02 mfd.	76351
12	Choke Coil	76071
13	Sensitivity Control	76069
14	Volume Control	76460
15	Antenna Coil Assembly	76058
16	R.F. Coil Assembly	76060
17	Untuned Transformer Assembly	76039
18	Condenser .0005 mfd.	76251
19	Output Transformer	76450
20	Condenser 0.2 mfd.	76063
21	Condenser .5, .5 and 1.0 mfd.	76050
22	Condenser 1.0 mfd.	76045
23	Condenser .1, .1.1 and .1 mfd.	76064
24	Case Assembly Drive Screws	76002
25	Terminal Plug (Male)	76015
26	R.F. Tube (Type 36)	76020
27	Output Tube (Type 41)	76021
28	Tuning Condenser	76080
29	Volume Control Pinion	76051
30	Tube Socket (Type 36)	76065
31	Tube Socket (Type 41)	76067
32	Terminal Strip	76072
33	Antenna Lead-in Assembly	76407
34	Tuning Control Bottom Cover Assembly	76081
35	Switch & Nut	76083
36	Dial Light Bulb	76086
37	Control Housing	76091
38	Control Knob	76095
39	Dial Assembly	76094
40	Flexible Conduit	76402
41	Control Cable Assembly	76098
42	Control Harness Assembly	76412
43	Cable Plug (Female)	76414
44	Spark Suppressor (Standard)	76415
45	Coil Suppressor (Standard)	76416
46	Screw-In Suppressor	76449
47	1/4 amp. Fuse	76418
48	Interference Eliminator Condenser	76421
49	Speaker Assembly less Case	76431
50	Speaker Cone Assembly	76496
51	Resistor (250,000 ohms)	76307
52	Condenser (2.0 mfd.)	76451
53	Choke (Low Frequency)	76459
54	Choke (High Frequency)	76462
55	Condenser (.00025 mfd.) Bakelite	76456
56	Condenser (.04 mfd.) 200 volt	76457
57	Autoformer	76463
58	Condenser (4.0 mfd.) 25 Volt Electrolytic	76458
59	Condenser (.001 mfd.) Bakelite	76253
60	Resistor (10,000 ohms)	76310
61	Condenser (.003 mfd.) 200 volts	76353
62	Resistor (250 ohms)	76312
63	Tube Socket (Type 85)	76454
64	Output Tube (Type 85)	76455

SERVICE PARTS
MODEL 10A ALL ELECTRIC
SERIAL NOS. ABOVE 500.

DESCRIPTION	NAME	MOTO METER PART NO.
65	Resistor (8000 ohms.)	76313
66	Condenser (.002 Mfd.)	76254
67	Series Trimmer	76498
68	Composite Unit	76499
69	Antenna Coil	76500
70	R F Coil	76501
71	Intermediate Freq. Transformer	76502
72	Type 36 Socket (1-1/8" Mtg. Center	76503
73	Resistor (1000 ohms) ½ Watt.	76311

NATIONAL CARBON CO.

MODEL 52, 53, 54
Changes



Part No. 3515—Variable resistance in the antennae circuit functions only during the last quarter turn as the volume control is rotated counterclockwise.

Schematic diagram of wiring for Series 50 R. F. Unit as shown on blueprint of WMD **3048-B.**
The following lists are of parts added to and omitted from schematic diagram of R. F. Unit shown on page 41.

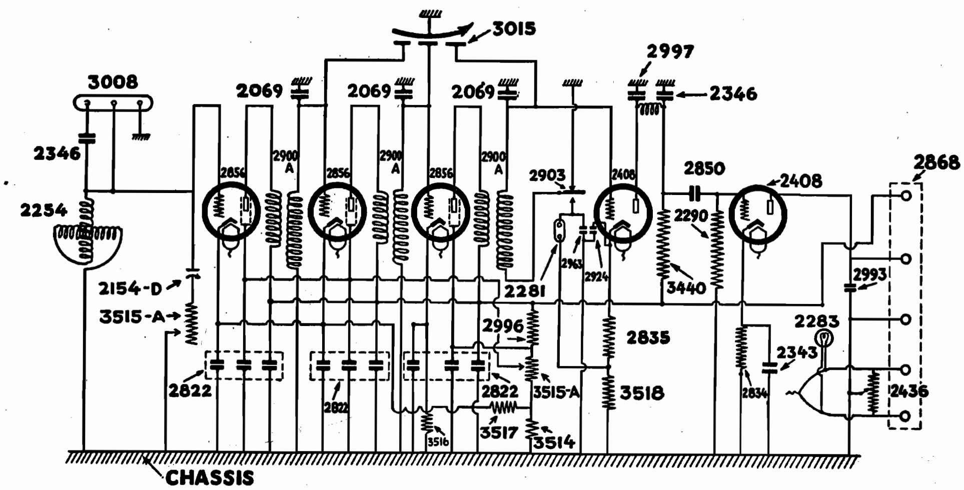
Parts Added

No.	Description
2406	Volume control insulating washer
2407	Volume control insulating bushing
3514	35 ohm wire wound resistor
3515	Volume control:—Wire wound
3516	1150 ohm carbon resistor
3517	260 ohm carbon resistor
3518	50000 ohm carbon resistor

Parts Omitted

No.	Description
2338	2500 ohm wire wound resistor
*2835	4000 ohm carbon resistor
2917	Volume control
3004	200 ohm carbon resistor

*One part No. 2835 remains in R. F. Unit.



Part No. 3515A—Variable resistance in the antennae circuit functions only during the last quarter turn as the volume control is rotated counterclockwise.

Schematic diagram of wiring for Series 50 R. F. Unit as shown on blueprint of WMD **3048-C.**
The following lists are of parts added to and omitted from schematic diagram of R. F. Unit shown at top of this page.

Parts Added

No.	Description
2154-D	Trimming condenser
3515-A	Volume control

Parts Omitted

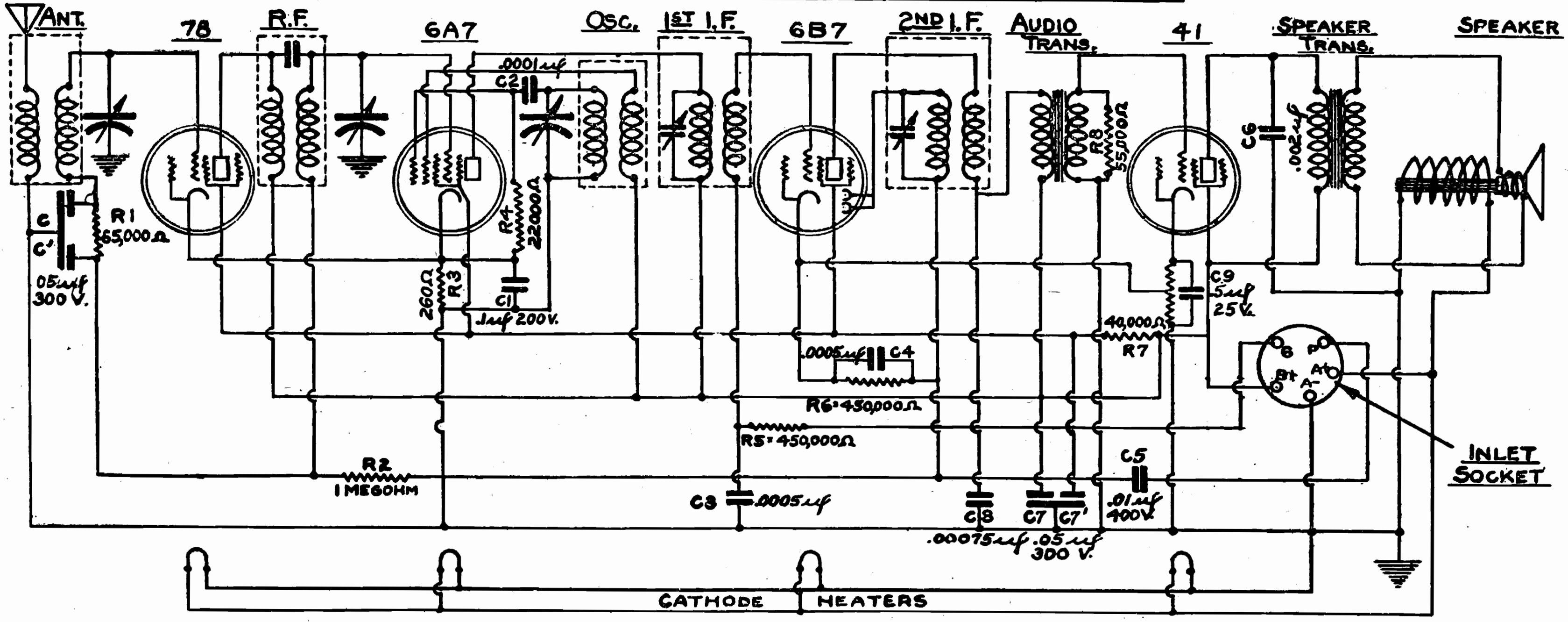
No.	Description
2154-B	Trimming condenser
2406	Volume control insulating washer
2407	Volume control insulating bushing
3515	Volume control

NOBLITT SPARKS INDUSTRIES

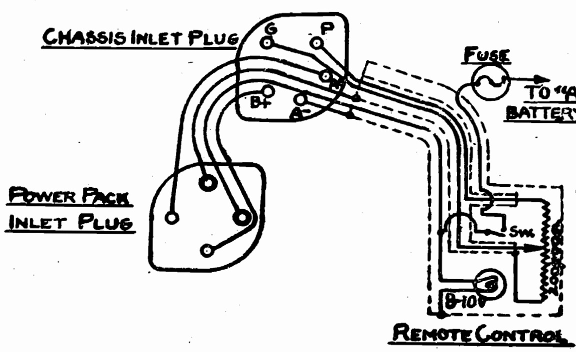
MODEL Arvin 10-A
Schematic

ARVIN CAR RADIO MODEL 10A

RADIO FREQUENCY, SPEAKER & REMOTE CONTROL CIRCUIT DIAGRAM



IF PEAK 175 KC



	WIRING COLOR CODE		CAPACITY VALUES SIGN	uf	P.V.D.C.	RESISTANCE VALUES SIGN	Ω	WATTS
R.F. CHASSIS	CATHODES	YELLOW						
	NEG."A", NEG. HEATER & GROUND	BLACK	C	.5 TWIN	300	R1	65,000	
	POS."A" & POS. HEATER	YELLOW	C'	.5	300	R2	1,000,000	
	CONTROL GRIDS	GREEN	C1	.1	200	R3	260	
	PLATES	BLUE	C2	.0001		R4	22,000	
	"B" POS. & SCREEN GRIDS	RED	C3	.0005		R5	450,000	
SPEAKER	"A" POS. TO SPEAKER	YELLOW	C4	.0005		R6	450,000	
	"A" NEG. TO SPEAKER	BLACK	C5	.01	400	R7	40,000	
	SPEAKER TRANS. LEAD	RED	C6	.002	600	R8	55,000	
	SPEAKER TRANS. RETURN LEAD	BROWN	C7	.5 TWIN	300			
REMOTE CONTROL	"A" POS. BATTERY TO SWITCH	BLACK	C7'	.5	300			
	SWITCH TO POWER PACK	YELLOW	C8	.00075				
	"G" TO ROTATING CONTACT	GREEN	C9	.5	.25			
	"P" TO VOLUME CONTROL	BLUE						
	SWITCH TO LAMP BULB	RED						

MODEL Arvin 10-A
Notes

NOBLITT SPARKS INDUSTRIES

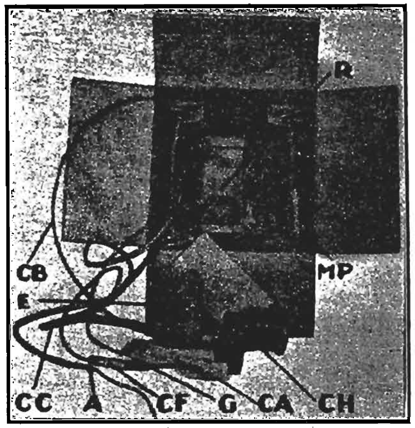


FIGURE 15

You can play the radio before taking it from the carton. To do so attach antenna lead A to any convenient aerial. Connect the wires CA and G to a six-volt storage battery. Obtain the key from sack E and turn on the switch in the center of the control head. Now tune the radio by rotating the large bakelite control knob.

Here's how it looks when first taken from the carton and spread out for examination. Please examine these parts carefully and identify them by the following key:

- A —Shielded antenna lead
- CA —Ammeter lead
- CB —Bowden wire
- CC —Control cable
- CF —Fuse
- CH —Remote control
- EA —Steering column strap
- EB —Strap screws
- EC —Felt pad
- EE —Suppressors
- EF —Generator condenser
- EG —Bonding ribbon
- EH —Cable tie down strap
- EK —Key
- MB —Mounting bolts
- MP —Mounting plate
- SB —Stabilizing bracket
- SBB —Stabilizing bracket bolts

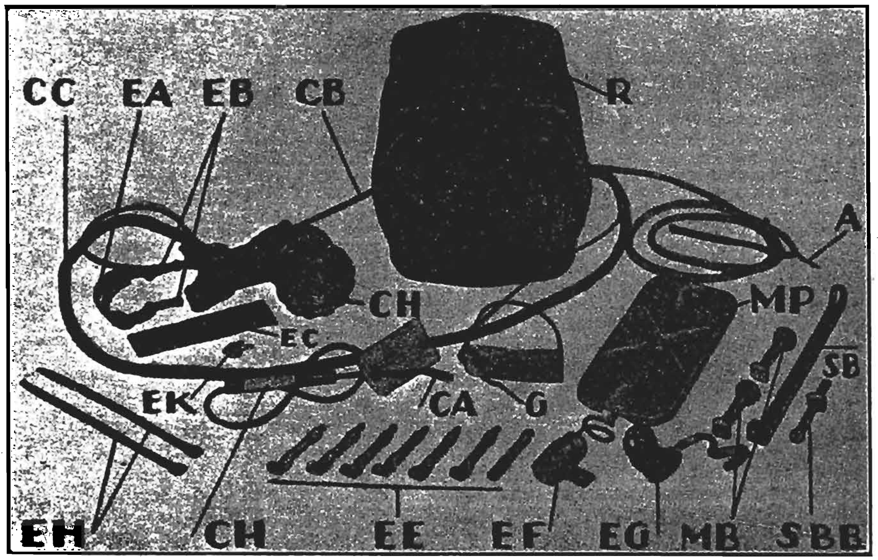


FIGURE 16

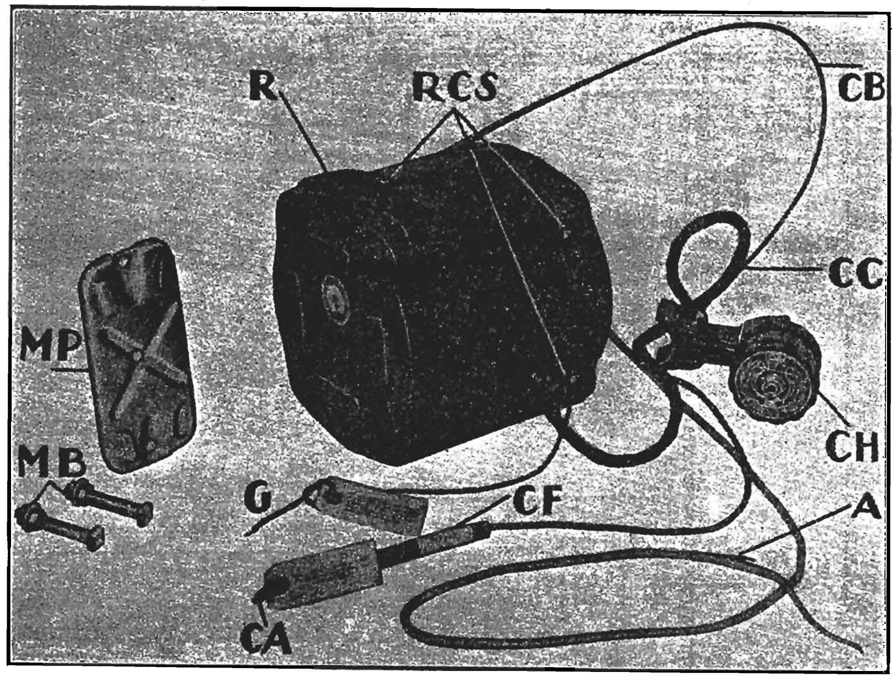


FIGURE 17

TO INSTALL: The model 10A has been designed to permit easy installation. By careful attention to the following instructions any one should be able to properly install an Arvin Model 10A with satisfactory results. The entire radio mounts under the dash of the car on mounting plate MP. Using this plate as a template mark the holes for mounting on the bulkhead. In selecting this position on the bulkhead care should be taken to see that the relationship between the remote control on the steering column and the radio on the bulkhead is such that the Bowden control cable will be as short and straight as possible. This will tend to make the control turn smoothly and be more uniformly accurate. Drill the holes in the bulkhead as marked using a 17/32 diameter drill.

Due to the unique Arvin design the radio may be mounted either horizontally or vertically and by one, two or three bolts. Two bolts MB are supplied as this type of mounting has been found most tisfactory. Next slide MP with bolt MB in place on to the tapered wedges on the back of radio case R, making sure that the sides of these wedges take hold in the channels of the mounting plate MP, as shown in figure 18. Using a light hammer tap this plate in place to make sure of a solid mounting. Next put the bolts in the bulkhead and secure them with the washers and nuts furnished. Pull these nuts up as tight as possible to make the bulkhead insulation pack down solid.

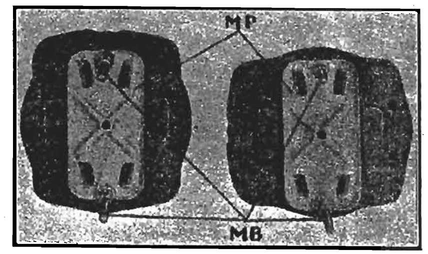


FIGURE 18

NOBLITT SPARKS INDUSTRIES

To Change Remote Control or Shorten Bowden Wire Cable

First, remove screw RT from the radio chassis (figure 22) and raise strap TS up out of the way pivoting it at the rivet on the front end of the chassis. This will give you ample room to work on the condenser pulley wheel and on the Bowden wire cable. To remove this cable it is merely necessary to remove or loose screw CPS on the pulley wheel to allow the tiller wire to be taken loose and then to loosen screw CBS on Bracket CBC to allow the Bowden wire to be pulled out of the clamp. Now measure the Bowden wire to obtain the proper length which will give the most efficient control. Set the remote control dial at zero and cut off the Bowden cable by proceeding as follows. To cut the cable armor score slightly with a file on opposite sides and break by bending. This avoids danger of cutting into a cable strand causing it to tangle. Next, cut the tiller wire approximately four inches from the end of the Bowden cable. This will allow you sufficient slack to be sure you do not have the tiller wire short. Now replace the Bowden wire in the cable clamp on the condenser frame and tighten down screw CBS. Then turn the remote control dial to 100 and wrap the tiller wire around the pulley screw and under the washer on screw CPS. Tighten this screw down tight. Then cut off any excess strands of tiller wire to prevent this wire from tangling or scraping on any of the surrounding metal parts of the chassis.

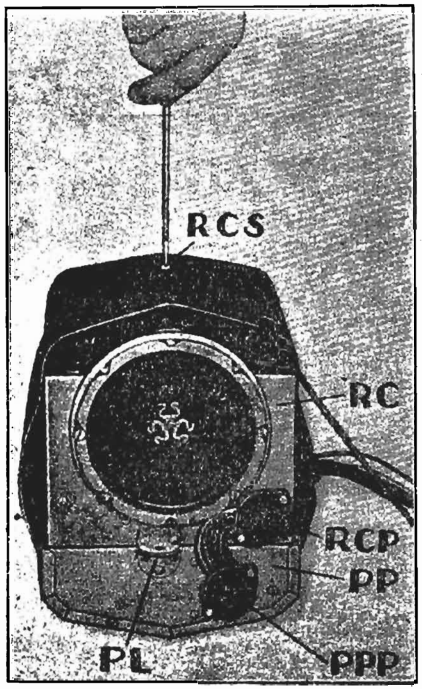


FIGURE 20

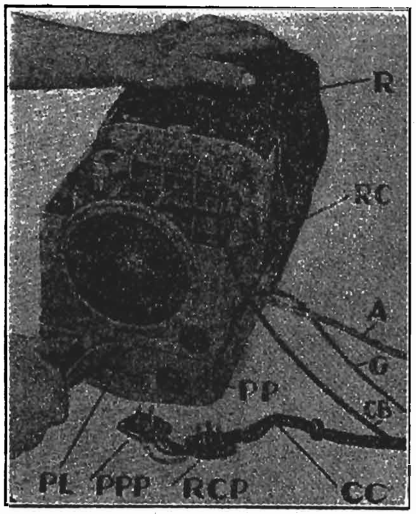


FIGURE 21

To Replace Tubes

No special instructions are necessary for replacing tubes in the model 10A chassis as every tube is very accessible. However, a word of caution—tubes with six and seven prongs such as 78, 6A7 and 6B7 have a very considerable socket contact friction and therefore it is wise to be sure you have pressed the tubes down firmly in place. Be sure that the tubes are seated all the way home, otherwise the grid cap may touch the mounting case of the radio and short out. A little precaution in this matter may save considerable trouble from a service standpoint after the radio has been installed. Also make sure that the grid clips on the tops of the tubes make good contact by pinching these clips slightly before placing them on the tube caps.

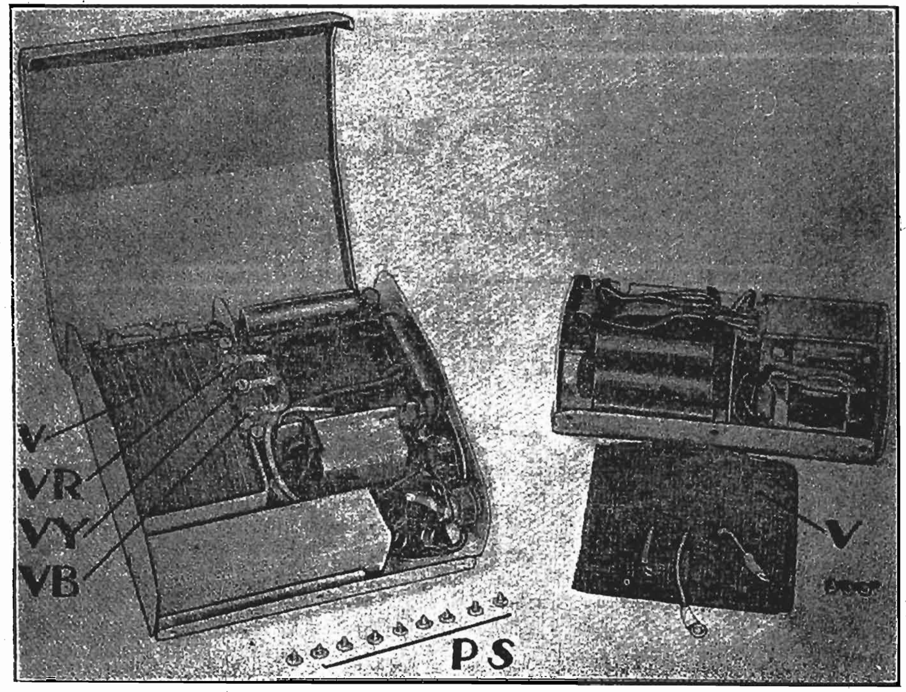


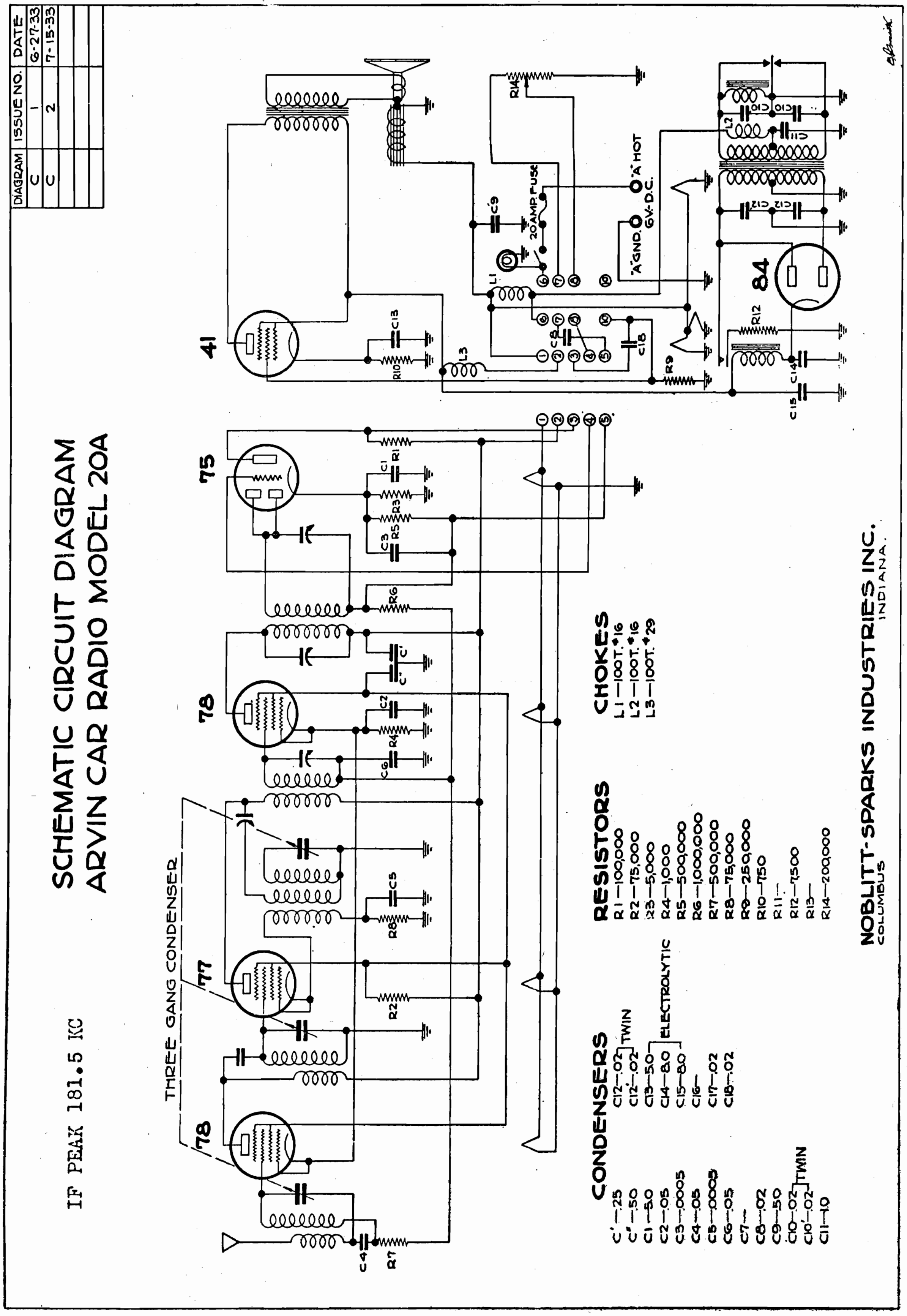
FIGURE 23

To Replace Vibrator

Remove power pack cover screws PS (figure 23) and lift off the cover. The entire power pack assembly and parts will then be exposed to view. To remove the vibrator remove screws VR, VY and VB and lift the rubber case in which the vibrator is packed out of the vibrator well. When replacing the vibrator make sure that the red lead is fastened under screw VR, the yellow lead under screw VY and the blue lead under screw VB. Then replace the cover in reverse order as it was taken off, making sure that the screws are pulled up tight to hold the cover on. This is very important and has a very definite bearing in relation to the amount of RF interference which the power pack will radiate.

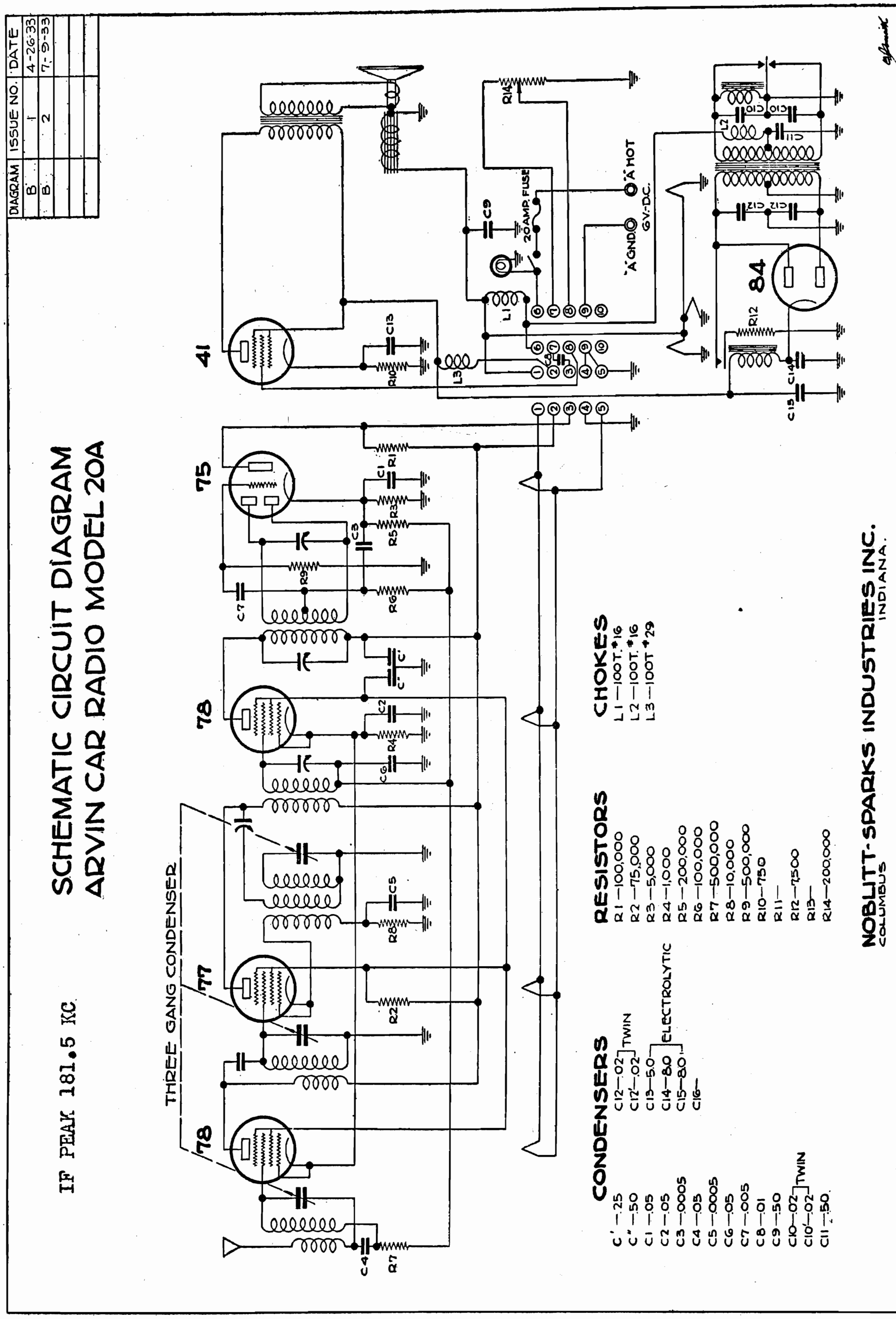
MODEL Arvin 20-A
Schematic
Type 2

NOBLITT SPARKS INDUSTRIES



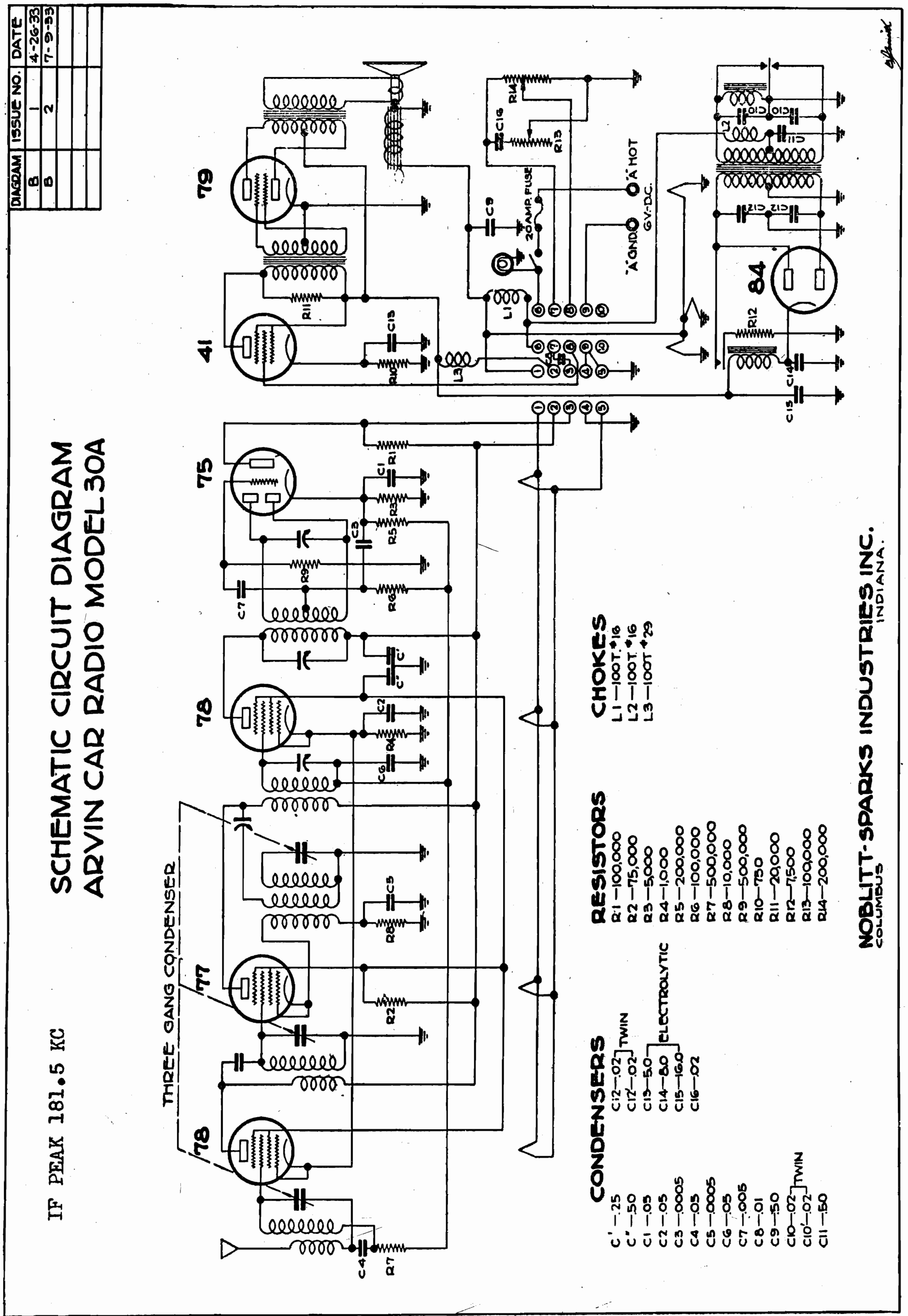
NOBLITT SPARKS INDUSTRIES

MODEL Arvin 20-A
Schematic
Type 1



MODEL Arvin 30-A
Schematic
Type 1

NOBLITT SPARKS INDUSTRIES



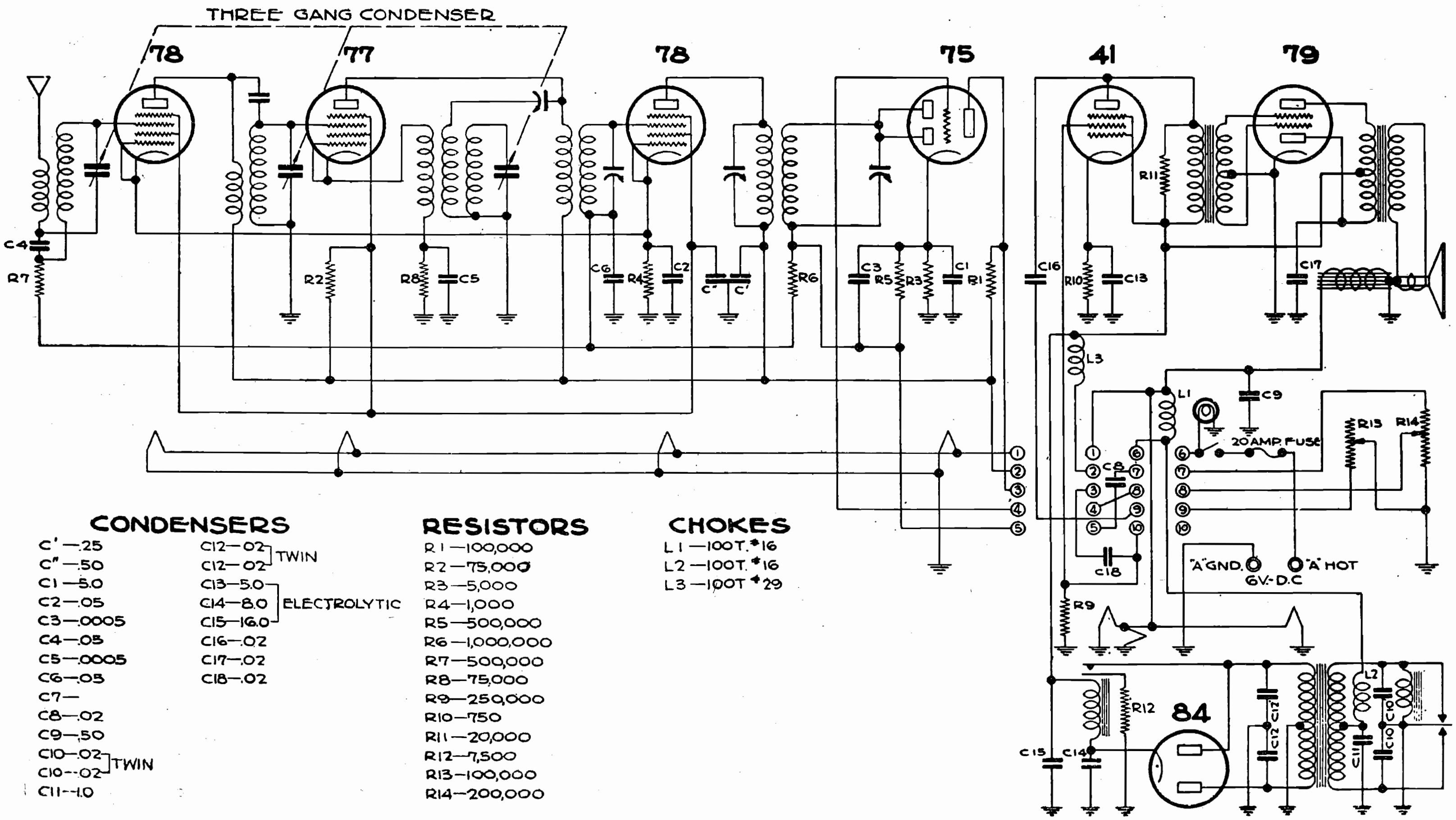
NOBLITT SPARKS INDUSTRIES

MODEL Arvin 30-A
Schematic
Type 2

DIAGRAM	ISSUE NO.	DATE
C	1	6-27-33
C	2	7-15-33

IF PEAK 181.5 KC

SCHEMATIC CIRCUIT DIAGRAM
ARVIN CAR RADIO MODEL 30A



CONDENSERS

C' —.25
C" —.50
C1 —5.0
C2 —.05
C3 —.0005
C4 —.05
C5 —.0005
C6 —.05
C7 —
C8 —.02
C9 —.50
C10 —.02 ┐ TWIN
C10 —.02 ┘
C11 —1.0
C12 —.02 ┐ TWIN
C12 —.02 ┘
C13 —5.0 ┐
C14 —8.0 │ ELECTROLYTIC
C15 —16.0 ┘
C16 —.02
C17 —.02
C18 —.02

RESISTORS

R1 —100,000
R2 —75,000
R3 —5,000
R4 —1,000
R5 —500,000
R6 —1,000,000
R7 —500,000
R8 —75,000
R9 —250,000
R10 —750
R11 —20,000
R12 —7,500
R13 —100,000
R14 —200,000

CHOKES

L1 —100T. #16
L2 —100T. #16
L3 —100T. #29

NOBLITT-SPARKS INDUSTRIES INC.
COLUMBUS INDIANA

MODEL Arvin 30-A
Resistance Data
Voltage Data

NOBLITT SPARKS INDUSTRIES

RESISTANCE CHART

(A plus, A minus and B minus must be connected together on terminal strip while making resistance check.)

1ST STAGE—78 TUBE

	MAXIMUM	MINIMUM
Control grid to ground	705,000 ohms	600,000
Control grid to common between R4 and R6	500,000 ohms	400,000
Antenna Post on Coil to ground	4 ohms	2.5 ohms
Screen Grid to Plate No. 75 Tube	190,000	150,000
Plate to Plate No. 75 Tube	100,000	80,000
Suppressor Grid to Cathode	0	0
Suppressor Grid and Cathode to Ground	1,000	850
Plate to Screen Grid	75,000	60,000
Plate to B plus	45	45
Filaments	0	0

2ND STAGE—77 TUBE

Control Grid to Ground	7.5	6.5
Screen Grid to Plate No. 75 Tube	120,000	150,000
Plate to Plate No. 75 Tube	100,000	80,000
Screen Grid to Plate	75,000	60,000
Suppressor Grid to Cathode	0	0
Suppressor Grid and Cathode to Ground	10,000	8,500
Plate to B plus	30	30
Filaments	0	0
No. 2 Terminal first I. F. to Ground	5 ohms	3.5 ohms
Stator Oscillator Variable Condenser to Ground	4 ohms	3 ohms

3RD STAGE—78 TUBE

Control Grid to Ground	210,000	190,000
Control Grid to common between R5 and R6	50 ohms	50 ohms
Screen Grid to Plate No. 75 Tube	190,000	150,000
Plate to Screen Grid	75,000	60,000
Plate to Plate of No. 75 Tube	100,000	80,000
Plate to B plus	50 ohms	50 ohms
Suppressor Grid to Cathode	0	0
Suppressor Grid and Cathode to Ground	1,000	850
Filaments	0	0

4TH STAGE—75 TUBE

Centrol Grid to Ground	500,000	400,000
Cathode to Ground	5,500	4,500
Diode Plate to Ground	325,000	275,000
Diode Plate to Ground	325,000	275,000
Diode Plate to Diode Plate	50	45
Diode Plate to common between R6 and C3	25	22
Diode Plates to Cathode	300,000	275,000
Plate to B plus	100,000	80,000
Plate to all other Plates	100,000	80,000
Filaments	0	0

VOLTAGE CHART

(Test with Radio in operation 1000 ohms per volt meter)

B plus on terminal strip to B minus or ground on strip, 175V to 195V.

Chassis to Plate of No. 75 Tube, 125V to 140V.

Chassis to all other Plates, 175V to 195V.

Chassis to Cathode of No. 75 Tube, 1.7V to 2V.

Chassis to Cathodes of No. 78 Tubes, 5V to 6.5V.

Chassis to Cathode of No. 77 Tubes, 5V Min. 6.5V Max.

NOTE: If voltage runs as high as 7 to 9 volts there are shorted turns on cathode coil of oscillator.

Excessive voltage from 30 to 35V. indicates open circuit between Cathode of 77 Tube through Cathode coil, resistor R8 to No. 2 terminal on first I. F. Coil.

Chassis to all screen Grids, 60V to 75V.

NOBLITT SPARKS INDUSTRIES

MODEL Arvin 30-A
Condenser Data
Control Data

CAPACITY CHART

C4—To check this condenser a continuity test across the antenna section of the variable condenser should show no reading if both the variable condenser and the C4 are O. K. If one or the other is shorted the meter will show full scale deflection. If apparently shorted, check variable condenser by turning the plates in and out of mesh. If the variable condenser is at fault the meter will tend to flicker as the plates are rotated in and out of mesh.

C5—No check.

C6—Continuity check from common between R5 and R6 to ground should show no deflection on meter.

C7—Continuity check from control grid of No. 15 Tube to diode plate should show no deflection on meter.

C′—Using a capacity reading AC Voltmeter Millameter.

Check should show .25mfd.

C′—Using a capacity reading AC Voltmeter Milliameter Check should show .5 mfd.

C1—Coninuity check from cathode No. 75 Tube to ground should never show full scale deflection.

C2—Continuity check from cathode No. 78 Tube to ground should never show full scale deflection.

C3—Continuity check across this condenser should never show full scale deflection.

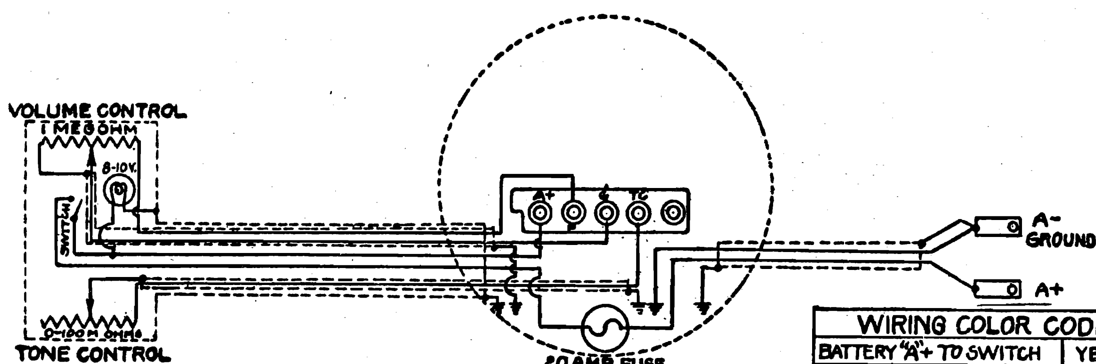
GENERAL CHART

(ANTENNA COIL.)

To check a bad antenna coil, remove the control grid clip from the top of the first No. 78 Tube and touch the grid cap on the tube with the antenna wire lead. If the radio plays after this is done—and did not before—it indicates an open circuit in the antenna coil.

(POWER PACK.)

To check quickly the power pack and remote control remove the grid clip from the control grid of the No. 75 Tube and touch the cap with your finger, if the volume and tone control are turned full on, a distinct roar will be heard in the speaker. A voltage check on the power pack should test 175V to 190V from BX to ground.



ARVIN CAR RADIO MODEL 30A
REMOTE CONTROL CIRCUIT DIAGRAM

WIRING COLOR CODE	
BATTERY "A"+ TO SWITCH	YELLOW
BATTERY "A"- TO TERMINAL	BLACK
"A"+ TERMINAL TO SWITCH	BLACK
"G" TO ROTATING CONTACT	GREEN
"F" TO VOLUME CONTROL	BLUE
SWITCH TO DIAL LAMP	RED
VOL. CONTROL TO GROUND	BRAIDED SHIELDING
TONE CONTROL TO GROUND	BRAIDED SHIELDING
TONE CONTROL TO TERMINAL	BROWN

MODEL Arvin 20-A,30-A
Notes

NOBLITT SPARKS INDUSTRIES

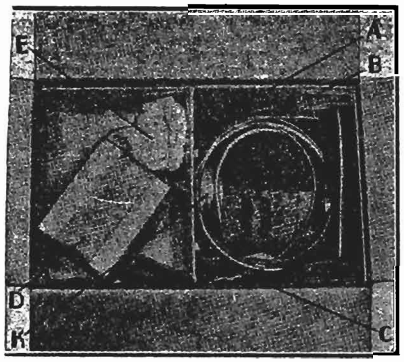


FIGURE 1.

You can play the Radio before taking it from the carton To do so, attach the antenna wire to any convenient aerial, and the battery cables to a 6-volt storage battery Lift remote control "D" from its carton, get key from muslin sack, turn on the current and tune it in.

FIGURE 2. (BELOW)

Here's how it looks when first taken from carton and spread out for examination. Now please examine its carefully and identify the parts by the following key letters:

"A"—Packing board (represents dash of car).

"B"—End of antenna lead

"C"—Remote control

"E"—Sack—containing

- EF Generator condenser
- EE Suppressors
- ED Carriage bolt
- EG Grounding ribbon
- EC Felt Pad
- EA Steering column strap
- Strap screws
- Straps

"F"—Hollow mounting studs.

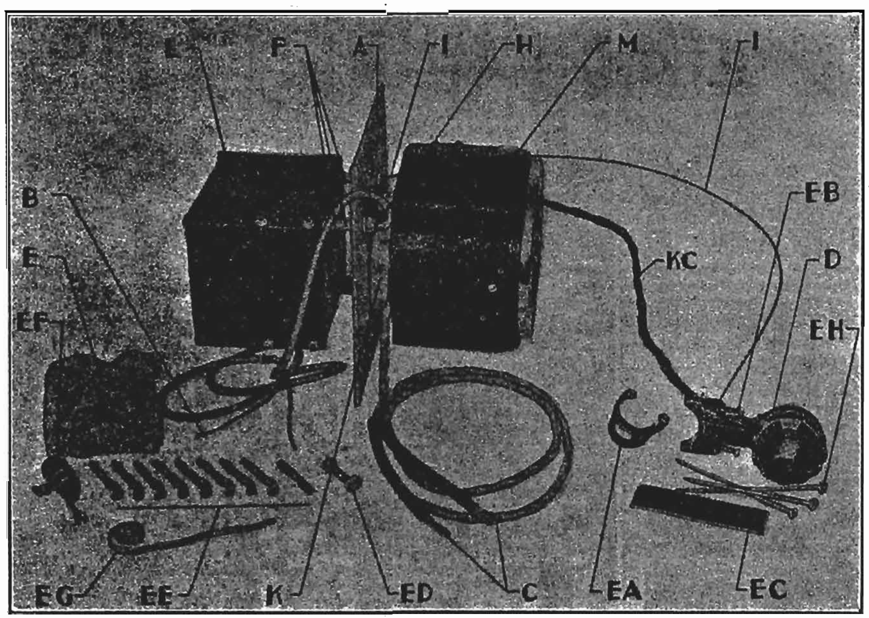


FIGURE 2.

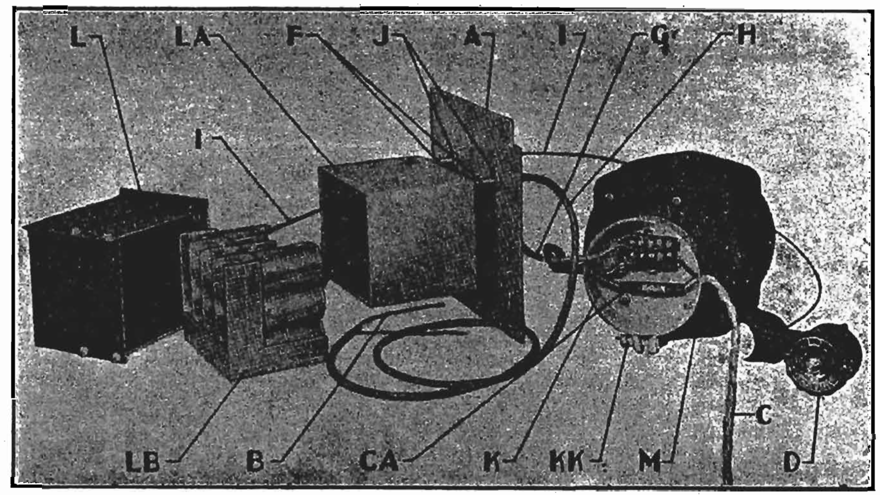


FIGURE 3.

Partly disassembled to show how various parts fit into and onto each other.

TO INSTALL.

FIRST—

Take a look at Figure 1-A. This will give you a general idea how your complete job will look. The remote control is shown, merely for convenience of illustration, standing upright from steering column. However, the dial is set for the remote control to be mounted in a horizontal position to the RIGHT of the steering column.

Examine carefully how the chassis and speaker units are mounted on the packing board "A" which represents the dash of your car. The square shaped part "L" goes on the engine side of the dash. The Speaker "M" will be on the passenger side of the dash. The Radio is attached to the dash by three hollow studs, "F". (You'll find a templet for making the dash.) The 1-inch hollow stud at the lower part of the Radio case interconnects the chassis and the speaker units by inter-set wires "G" which pass through it.

One hollow stud at the top conveys the antenna wire "B" into the Radio chassis through the shielded case "H" which is attached to the hollow stud with an adapter nut. The other hollow stud at the top carries the Control wire (Borden wire) "I" to the variable condenser.

Extra nuts "J" are used to draw the studs up snug. An outlet box (Fig. 2, 3, 4) is made of two units—"K" on back of speaker and "KA" on dash. When these are clamped together by a friction band they hold the speaker to the dash. (See Figures 3 and 4.)

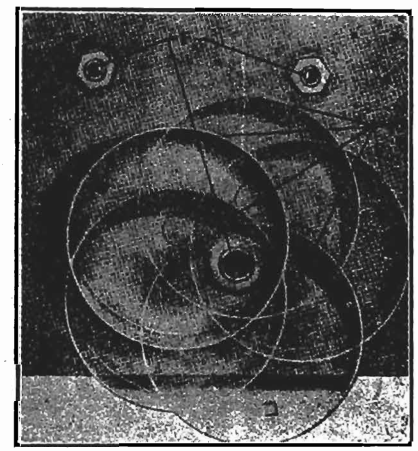


FIGURE 4.

Shows how outlet box KA can be located in various positions from 1" hollow stud.

NOBLITT SPARKS INDUSTRIES MODEL Arvin 20-A,30-A Notes

Mechanical Description of Speaker Chassis Models 20A and 30A

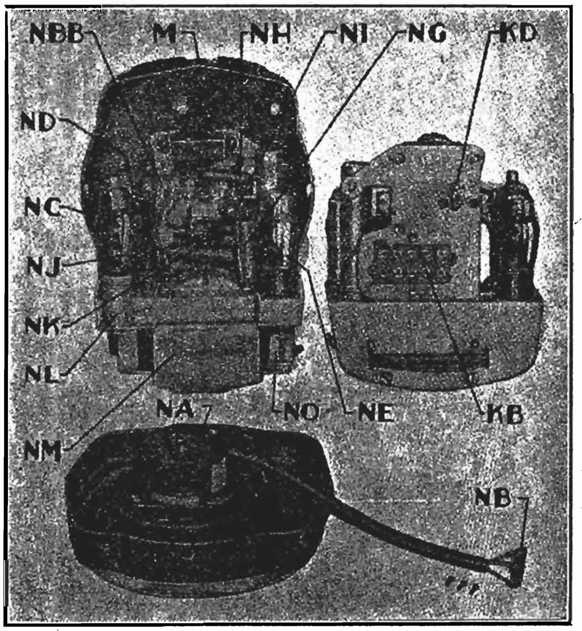


Figure 11

Figure 11 shows the speaker front removed, giving a clear indication of how the speaker is mounted. Its interconnecting cable shows the chassis proper loosened from can, a front and rear view.

Figure 12 shows the quarter view of either side of a No. 30A speaker chassis. Figure 12A shows quarter view of No. 20A speaker chassis.

Figure 13 shows speaker chassis laid on its back and the bottom coverplate disassembled so as to see into the bottom, indicating the location of the vibrator and how it is attached.

Figure 14, with step plate removed, and the location of power transformer, buffer condenser and RF choke indicated.

Following is the list and description:

NA—Speaker
6" used in Model 30A
5" used on Model 20A

NB—is terminal strip attached to NBB terminal strip on speaker chassis proper.

NC—is the 79 tube used only on Model 30A chassis.

ND—is 41 tube used on both 30A and 20A chasses.

NE—is 84 tube used on both 30A and 20A, a power rectifier tube.

NF—are filter condensers smoothing out AC waves as they come from power transformer for the high voltage "B" current.

NG—is RF by-pass condenser in the 6 volt circuit.

NH—is a condenser used only across the plates of the 79 tube and only on the 30A. It is used to reduce the high frequency response of the speaker.

NI—is a choke in the B circuit.

NJ—is a condenser.

NK—is an RF choke on the shunt side of the A or 6 volt circuit.

NL—a condenser cathode of the 41 tube.

NM—indicates the bottom plate power eliminator cover which houses the vibrator and power transformer assembly, having shelves on either side for attaching of load delay relay and audio transformer, held in place by two screws at rear of the chassis.

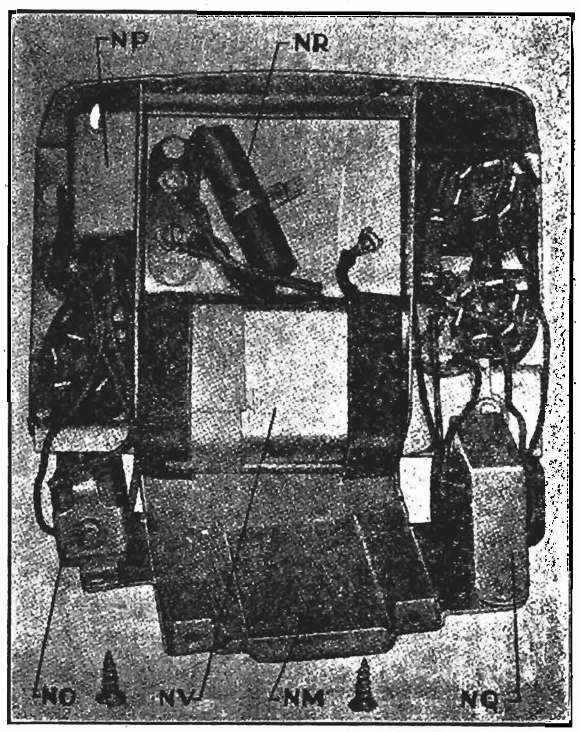


Figure 13

MODEL Arvin 20-A,30-A
Notes

NOBLITT SPARKS INDUSTRIES

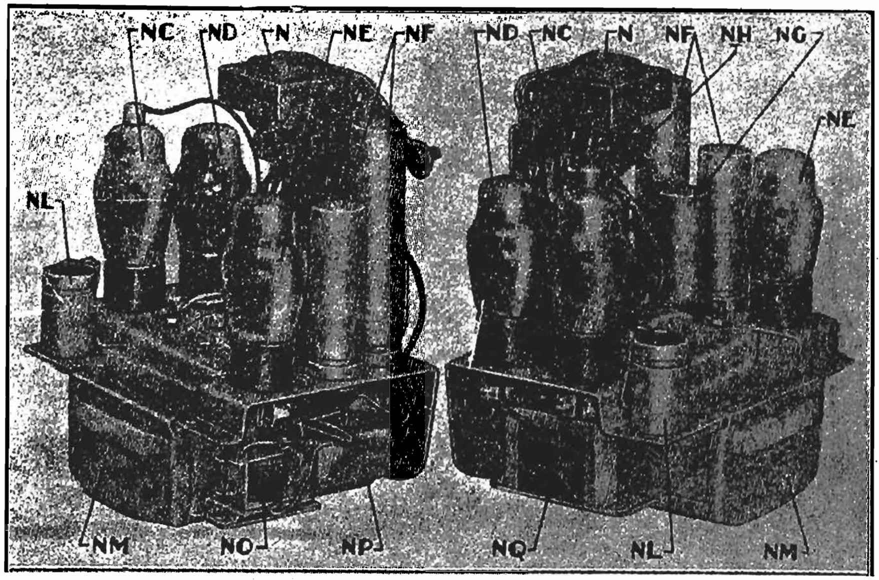
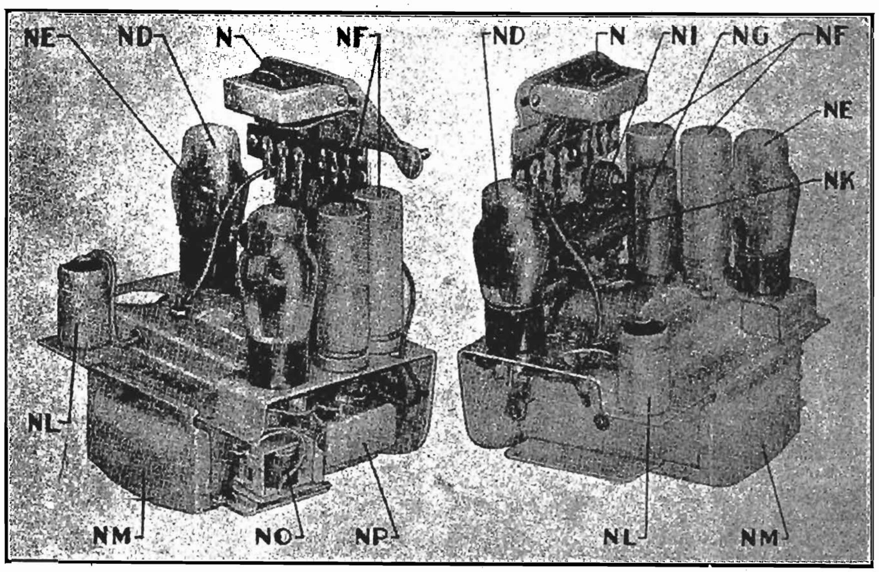


Figure 12 (above)
Figure 12-A (below)



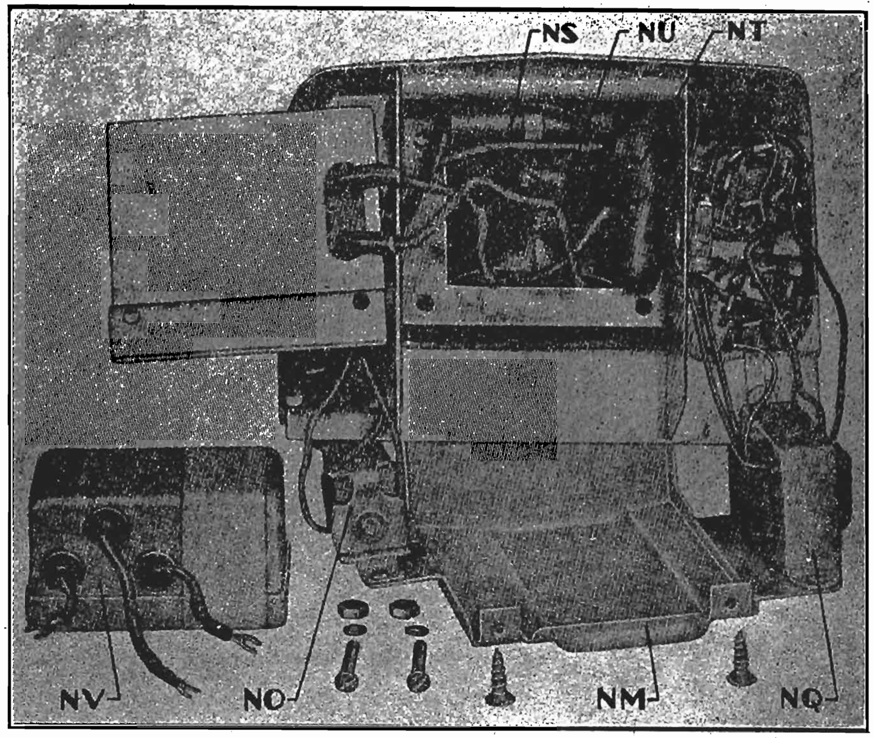


Figure 14

NO—is a relay and resistor mounted by its side which operates in combination to furnish load delay to dissipate the energy produced by the vibrator and power transformer until the tubes have heated so they can receive this power.

NP—by pass condenser on the center tap of the primary side of the power transformer.

NQ—audio transformer used only in the Model 30A.

NR—a twin condenser across the two hot 6 volt leads of the vibrator.

NS—buffer condenser on the B side of the power transformer.

NT—RF choke in the center tap of the primary of power transformer.

NU—is power transformer held in place by four screws, two of which hold step plate—and two of which hold upper part of the chassis carrying terminal strips.

NV—is vibrator equipped with three leads—one short or ground attached to step plate—the other two attached to two screws at the same point where the condenser NR is attached, which couples in the other two outside windings of the power transformer with the vibrator. The vibrator lead is supported by two rubber or felt pads.

The above description, together with outlines indicated in circuit wiring diagrams will more than serve to show you how the wiring is arranged in the chassis.

The following Bulletins are obtainable upon application:

Bulletin No. 1—Installation Instructions.

Bulletin No. 2—Motor Noise Interference Elimination Procedude.

Bulletin No. 3—Mechanical Description of Radio Chassis.

Bulletin No. 5—Wiring Diagram and Electrical Measurement and Trouble Shooting.

NOBLITT SPARKS INDUSTRIES

ARVIN CAR RADIO

MOTOR NOISE ELIMINATION PROCEDURE

STANDARD SUPPRESSION

Standard suppression consists of the following parts: six spark plug suppressors for six cyclinder cars or eight spark plug suppressors for eight-cylinder cars, one secondary coil suppressor, and the generator condenser to be grounded with the lug on the side of the condenser can on the frame of the generator, and the wire lead is to be fastened to the hot side of the relay which in most cases is mounted above or on the side of the generator.

These parts along with a piece of tinned copper ribbon, are supplied as standard equipment with the Radio when purchased. The copper ribbon is to be used to ground the passenger compartment through the motor bulkhead into the engine compartment—suc has gas lines, chokes, free wheeling controls, Borden wires, and all other tubing and wiring shielding such as electro-lock tubing, that pacc through this bulkhead.

On most cars this standard suppression will be all that is necessary to completely eliminate motor noise in the Radio.

Special Instructions For Elimination of Motor Noise Not Removed by Standard Suppression.

After you install the Radio receiver refer to the tabulated data on suppression of motor noise interference on the particular make car in which the Radio is installed. By reading down the column beneath the "year", "serial number" or "model car", you will find certain grounds that are recommended to be made on the chassis and certain changes in the electrical connections or wiring. In most cases these recommendations will be all that are necessary to complete a perfect job.

Additional Information On Individual Makes of Cars.

AUBURN

Shield the high tension lead from coil to distributor and ground the shielding to the motor and to the frame of the distributor. Install generator condenser at ammeter and ground to the dash. On Auburns that do not have a factory equipped antenna, shield the lead in as mentioned in Special Antenna Installation Bulletin. On cars equipped with antenna at factory, push a piece of braided shielding loom over the antenna lead up into the roof structure as far as possible without grounding this loom on the antenna itself.

BUICK

Ground spark plug cover case with big tail leads to water pump nut at front of the motor and oil lines at rear end of motor. Splice one piece of large loom over all wires leading from distributor to the spark plug cover and ground this shield at cover. Solder the shielding firmly in place and make certoin that it does not come close enough to the distributor that there will be any possibility of sparks jumping over, shorting out the distributor. In some extreme cases on old model Buicks it has been found necessary to entirely shield the distributor head by taking a piece of copper screen wire approximately 4" wide by 12" or 15" long and wrapping it around and over the top of the distributor and around, between, and over the shielded lead from the coil ond the wire to the spark plugs.

Solder this screen wire in place to the shielding in both cases and tack all the ends and edges down with solder so that it remains firmly in place. In doing this make sure that you do not short the screen out on the hot wire from the battery which connects to the base of the distributor or to the adjusting screw on the back of the distributor head. Also keep this screen as far as possible away from the suppressor which you place in the top of the distributor to prevent shorting out this wire on the suppressor. Disconnect the dome light wire. Install dome light switch at the left-hand side of the dash. In extreme cases it may be found necessary to also shield the dome light wire throughout its entire length, grounding the shielding at both ends to some metal part of the car. Bond the metal mounting screws which hold the panel above the windshield in place and carry the ground lead clear to the dash of the car if necessary. Install a suppressor at the distributor and in some cases it is also necessary to install a suppressor at the coil itself in addition to the one on the distributor. It is not necessary to install suppressors at the spark plugs because the spark plug housing is grounded and effectively shields the plugs.

CHEVROLET
1930 to 1932 Inclusive

It is necessary in all Chevrolet cars to install antenna. Refer to aerial installation instructions. Carry shielding down the right hand door post and ground at the dash, as well as at the roof. The dome light wire should be disconnected and shielded up into the door post as far as possible and a dome light switch installed at the dash. This and standard suppression are generally all that are necessary.

However, in some extreme cases it is necessary to shield the high tension ignition lead from the coil to distributor, making sure that the shielding does not come close enough at either end to arc over and short out the distributor. And in some cases it is also necessary to run a separate primary lead from the switch to the distributor and shield this lead. Remove the old primary wire from the switch to the coil entirely. The three wires that run down through the loom should be removed and run through separate shielded cables. This will be found necessary only in a car that has had quite a lot of use and ignition wires are badly worn. It will sometimes help if the primary leads to the ignition coil are reversed and the two are twisted together as they come from the dash to the coil.

CHEVROLET—1933

In the 1933 Chevrolet the antenna is already installed and it is necessary to shield the lead-in from the antenna up the door post as far as possible by pushing a piece of metallic loom over the antenna lead already installed in the car. Connect the antenna lead of the Radio set to the antenna wire of the car. Tape the joint, then slide metallic shielding over this joint where the loom enters the door post, pig-tails should be attached and grounded to the dash of the car. A dome light switch should be installed and the dome light wire shielded as far up the door post as possible in all models equipped with the dome light switch either on the door post or at the roof.

On all General Motors cars in which a difficulty is encountered in removing motor noise, that difficulty may be overcome by proceeding to shield the distributor head as mentioned under BUICK in the preceding paragraph. This is not recommended, however, except as a last resort.

FORDS—Models A and B

First, see instructions for installation of antenna in any automobile. The Ford chicken wire is generally grounded all the way around and also to the center steel ribs which support the top cover. The chicken wire should be cut away from all metal parts in order that it will not be grounded and may then be used as an antenna or an extra copper screen wire installed for antenna.

The armored cable which carries the primary wire from the switch to the distributor should be grounded at the metal bulkhead and the spark control rod should be grounded to the motor block. It is not generally necessary, except in extreme cases, to shield the wire leading from the distributor to the coil. It will sometimes be found necessary to install an extra switch for the dome light and to shield the dome light wires up into the body as far as possible.

FORD—Model V-8.

On the Ford V-8 it is impossible to use a distributor suppressor so that standard suppression is not possible. It is therefore necessary to build up the rotor contacts in the distributor head so that they clear the rotor approximately .002 to .003 inch. This is best done by soldering a small bit of solder to each point of the rotor on either side, then filing down each point until they just clear. The primary wire running in the conduit that carries the high tension spark plug wire should be taken out of this conduit and shielded from the distributor through the dash. The dome light wire should also be disconnected and shielded up into the door post. The antenna lead in should be brought down the left hand door post. In most cases the dome light wire goes down the right hand door post and in that way there will be no interference between these two leads.

FRANKLIN 1930-31-32

Remove boot covering distributor and cut about six inches of conduit off which carries high tension ignition wires to plug.

This makes possible the installation of a suppressor at the distributor. Peen out the rotor arm so that clearance between the rotor and contacts is .003".

Ground conduit carrying ignition wires to bulkhead on the motor side of the dash and ground coil frame to the oil line in driver's compartment.

Shield secondary lead from coil to dash and ground at dash. Cut the dome light wire and install switch at dash, close to the door post up which the wire passes. Shield the antenna lead up the right hand door post and bond to the dash.

MODEL Arvin
Car Data

NOBLITT SPARKS INDUSTRIES

LA SALLE
the Same as for Chevrolet

LINCOLN—All Models

In the Lincoln motor car there are two ignition coils which are mounted in the driver's compartment on the dash. The high tension leads pass through the dash into metal conduits to the distributor which is located on the motor. The leads from the coil should be well shielded and bonded to the bulkhead. A filter network is generally necessary for the dome light wire because of the complex wiring. This usually consists of a choke in series with each of the leads, by passed by condensers to ground. These chokes can be made by winding about thirty turns of No. 18 wire on a wood dowel, just about the size of a lead pencil, and are about as effective as any manufactured choke. The condenser to be used should be approximately ½ to 1 mfd. capacity and of the common paper insulated type.

MARMON
All Models Except 16 Cyl.

If the antenna is not already installed it will be necessary to install it, following the general antenna installation procedure.

Bring the lead in down the left hand door post and the dome light switch should be installed at the dash. Standard interference suppression will generally suffice for all installations with the exception that it is necessary to reduce the rotor clearance to about .002 to .003 inch.

OAKLAND
Same as for Chevrolet

OLDSMOBILE
Same as for Chevrolet

PLYMOUTH
1931 and '32 Models

Standard suppression should be followed. The distributor clearance should be reduced to .003 inch. The coil lead from the coil mounted on the dash should be shielded to the metal bulkhead and thne grounded to the oil line. The oil line should be grounded on the motor side of the dash to the metal bulkhead. The primary lead which goes from the coil to the distributor should be wrapped around this shielding about three times and reconnected. Occasionally it is necessary to install a generator condenser at the coil on the battery side to ground. The dome light switch should be installed as close to the left hand side of the dash as possible. The pigtail on the end of the antenna shield should be grounded to the dash on the right side. The antenna shield should be shoved as far up the door post as it will reach.

This procedure applies to DODGE, CHRYSLER and DE SOTO.

PONTIAC - 6
Same as for Chevrolet

PONTIAC 8 — 1933

Shield the high tension lead from coil to distributor to the end of conduit, carrying ignition wires in motor compartment.

Shield and twist, after shielding primary and secondary wire to the coil, and continue shield through the dash to distributor, and ground to screws holding ignition cover to the side of the motor block. Ground the generator and radiator shell with pigtails to same point.

The Radio may be connected to the starter and ground lug to the steering column. Shield the lead in from the antenna up the right hand door post. Install dome light switch just to the right of the oil gauge. Ground aerial pigtail at right hand door post on the bolt in the lower right hand corner of instrument panel.

STUDEBAKER

Reduce the clearance between rotor and distributor coils. Shield high tension leads from coil to distributor. Ground pigtail on the end of the antenna cable to the instrument panel where antenna cable enters the door post.

ROCKNE

It is necessary on the Rockne automobile to reduce the spark gap between the distributor and rotor and to install a shielded cable between the coil and the distributor. Ground metal shielding to the oil line. Ground oil line on the motor side of the bulkhead. The dome light wire should be disconnected and a switch installed and the wire shielded from the switch to the cowl and up into the door post as far as possible. The bare antenna lead under no circumstances is to be brought down and under the cowl and exposed at any point. The shielding should be pushed up as far as possible into the door post.

Miscellaneous General Information Relative to Removing Motor Noise.

When primary wires to the coil run through the same conduit as the secondary or spark plug wire run—remove this wire from the conduit and shield it if necessary, grounding the shielding at both ends to some part of the motor block or the bulkhead between the passenger's compartment and the motor.

Also, be sure when shielding the secondary lead from the coil to the distributor to ground both ends of this shield, either to the motor or to the bulkhead. On some few cars the hood over the engine appears to be ungrounded or at least is a very high resistance ground and should be grounded with pigtails of shielding cable soldered to both sides of the hood and also to the motor bulkhead or motor block.

On cars equipped with co-incidental lock on the steering post an extra generator condenser should be installed from one switch terminal to ground. The exact terminal on which to install this condenser can be determined only by experiment. The condenser body should be grounded to the dash or to the motor bulkhead. On some Ford V-8's it is necessary to install an extra generator condenser on the generator to the other terminal of the cut-out relay, thus making two condensers on the same relay—one on each terminal to ground.

On some Chevrolets, generally of the older models, it is necessary to install an extra condenser from the primary of the ignition coil to ground. The exact terminal to connect this condenser to can only be determined by experiment. Be sure that the grounding of this condenser is solid, preferably to the motor block or to the motor bulkhead.

On all cars equipped with "Electrolock" it may be found necessary to remove the primary return wire from the switch to the coil and replace it with a new wire run through a piece of shielding loom grounded near the switch and also to the metal bulkhead on the motor side of the dash. This lead should be brought out through the dash as far as possible from the rest of the electrical wiring of the car.

It may be pointed out that loose connections anywhere in the electrical circuit of the car will cause motor noise or what appears to be motor noise. If this condition exists it is wise to check the entire electrical circuit of the car and make sure that all connections are tight before trying any other extreme methods of motor noise elimination.

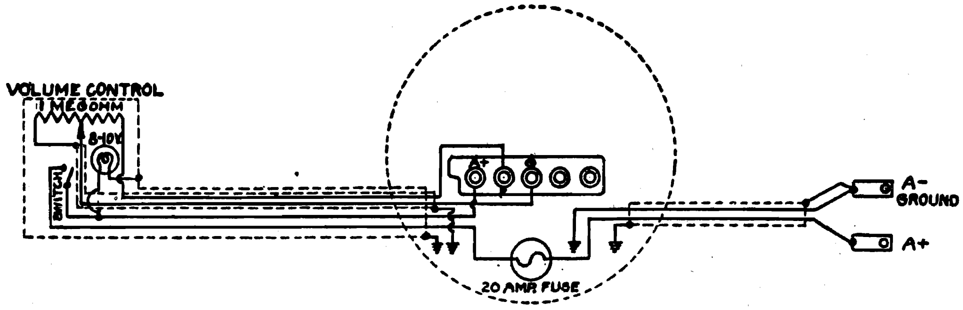
For information on cars not listed, refer to tabulated data which includes practically all makes of cars.

From time to time, as experimental work progresses, additional bulletins will be issued to supplement this information already given, and may be obtained upon application to Noblitt-Sparks Industries, Inc., Columbus, Indiana.

Noblitt-Sparks Industries Inc.,
Columbus, Indiana

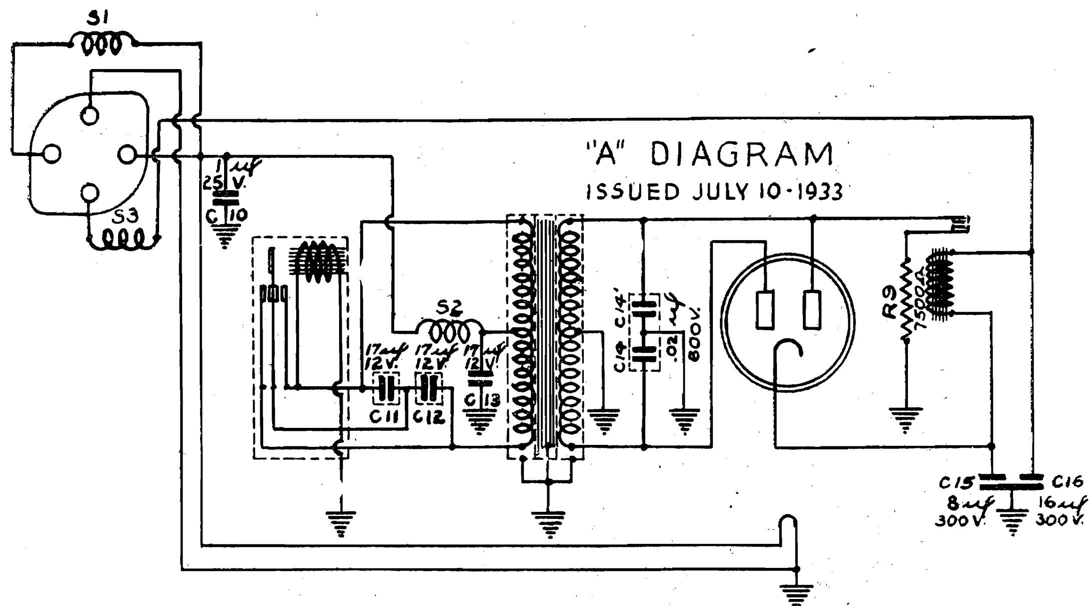
NOBLITT SPARKS INDUSTRIES

MODEL Arvin 10-A
B Supply Schem.
MODEL Arvin 20-A
Control Schem.



ARVIN CAR RADIO MODEL 20A
REMOTE CONTROL CIRCUIT DIAGRAM

WIRING COLOR CODE	
BATTERY "A"+ TO SWITCH	YELLOW
BATTERY "A"- TO TERMINAL	BLACK
"A"+ TERMINAL TO SWITCH	BLACK
"G" TO ROTATING CONTACT	GREEN
"P" TO VOLUME CONTROL	BLUE
SWITCH TO DIAL LAMP	RED
VOL. CONTROL TO GROUND	BRAIDED SHIELDING



"A" DIAGRAM
ISSUED JULY 10-1933

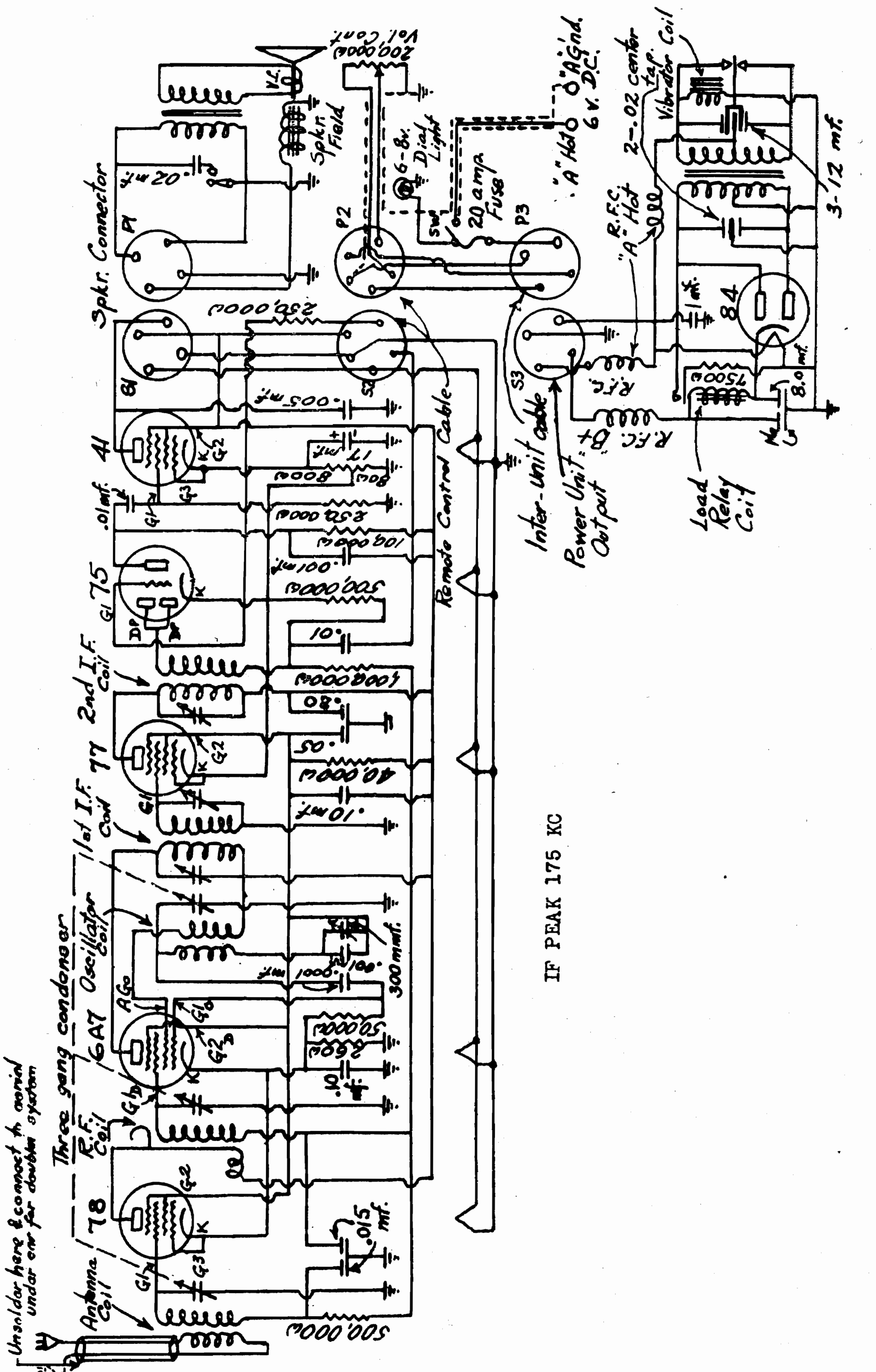
ARVIN CAR RADIO MODEL 10A
"B" POWER SUPPLY

CAPACITY VALUES			RESISTANCE VALUES		
SIGN	uf	P.V.D.C.	SIGN	Ω	WATTS
C10	1	10	R9	7500	1
C11	17	12			
C12	17	12	CHOKE SPEC.		
C13	17	12	SIGN	TURNS	GAUGE
C14	02	200	S1	100	#16
C14'	02	200	S2	100	#16
C15	8	300	S3	750	#29
C16	16	300			

CHASSIS WIRING COLOR CODE	
CATHODE & GROUND	YELLOW
PLATES	BLUE
"B" POSITIVE	RED
HEATERS	BLACK
POWER TRANS. PRIM. MID-TAP	BLACK
POWER TRANS. PRIM. END-TAP	BLUE WITH RED TRACER

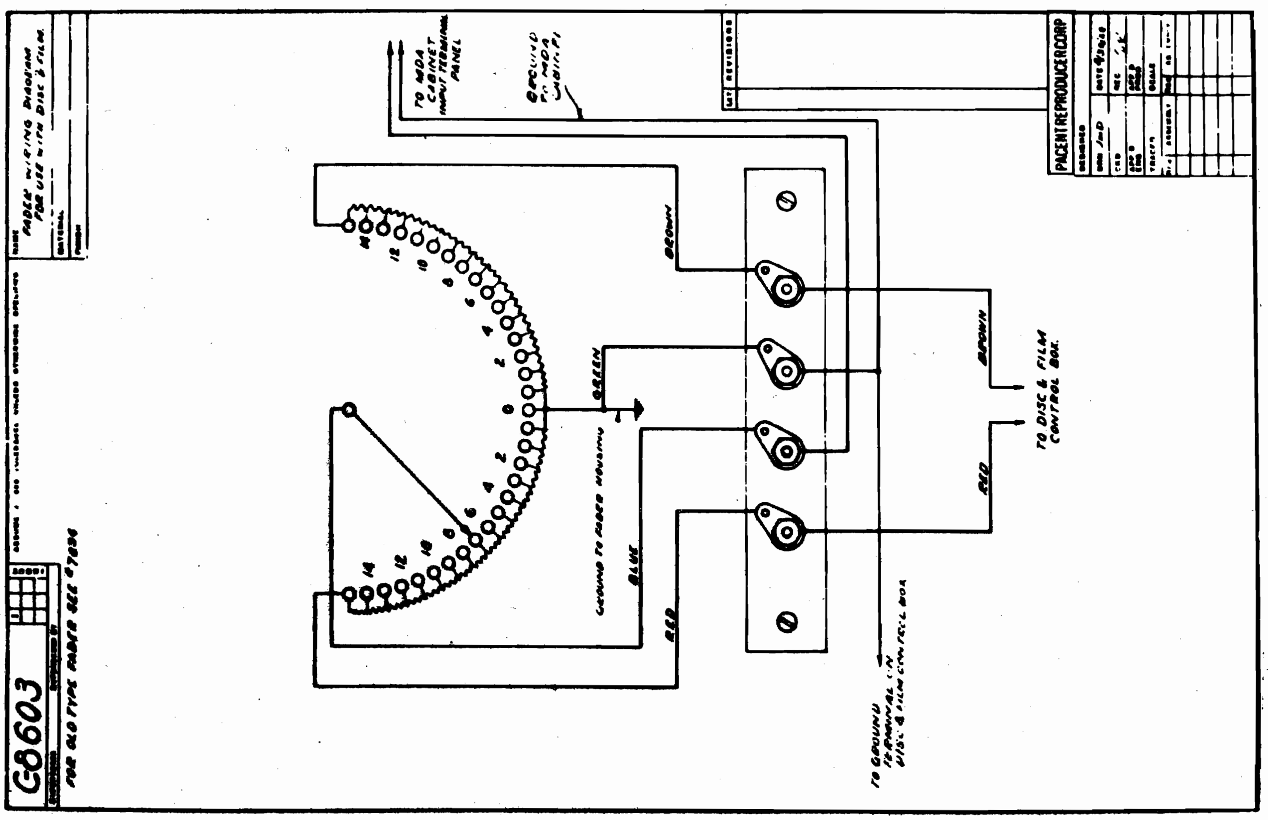
MODEL 20-B
Schematic

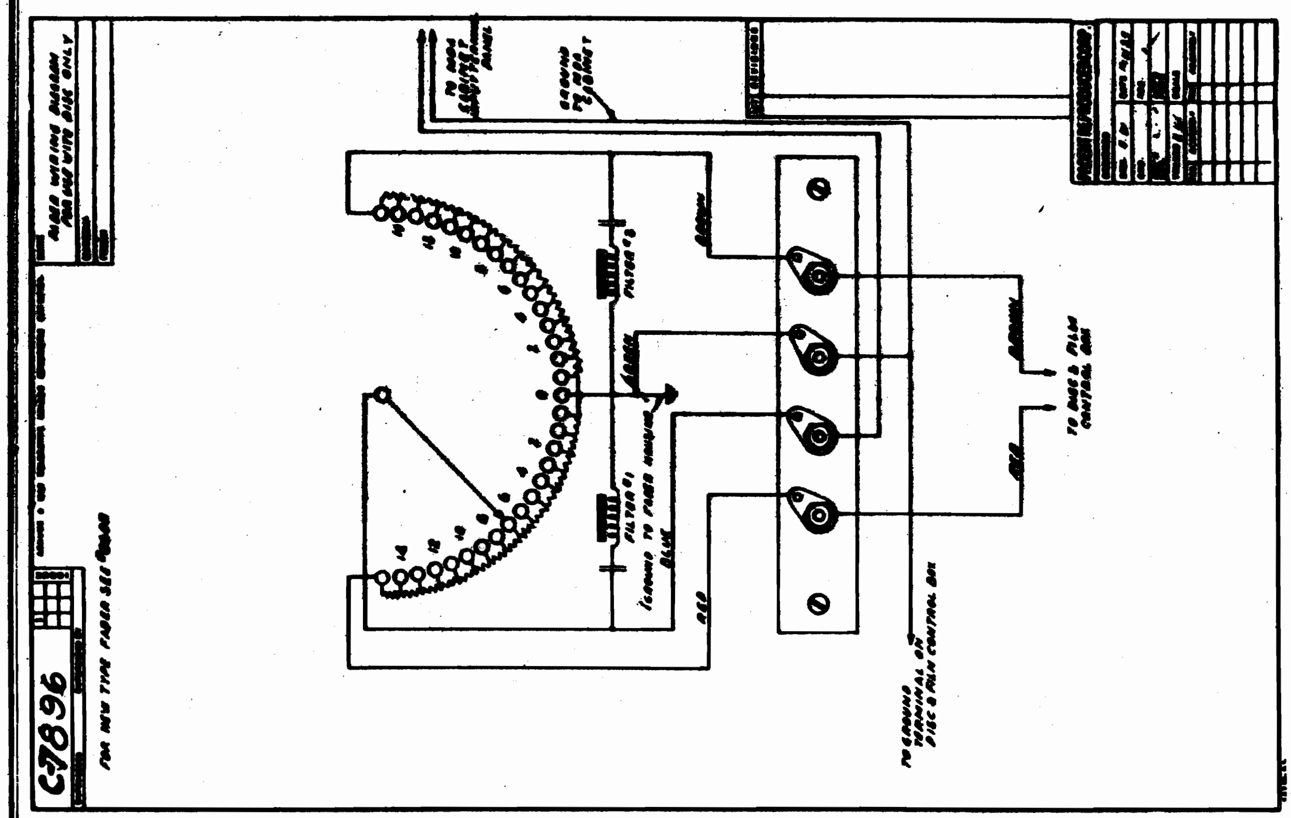
NOBLITT SPARKS INDUSTRIES



PACENT REPRODUCER CORP.

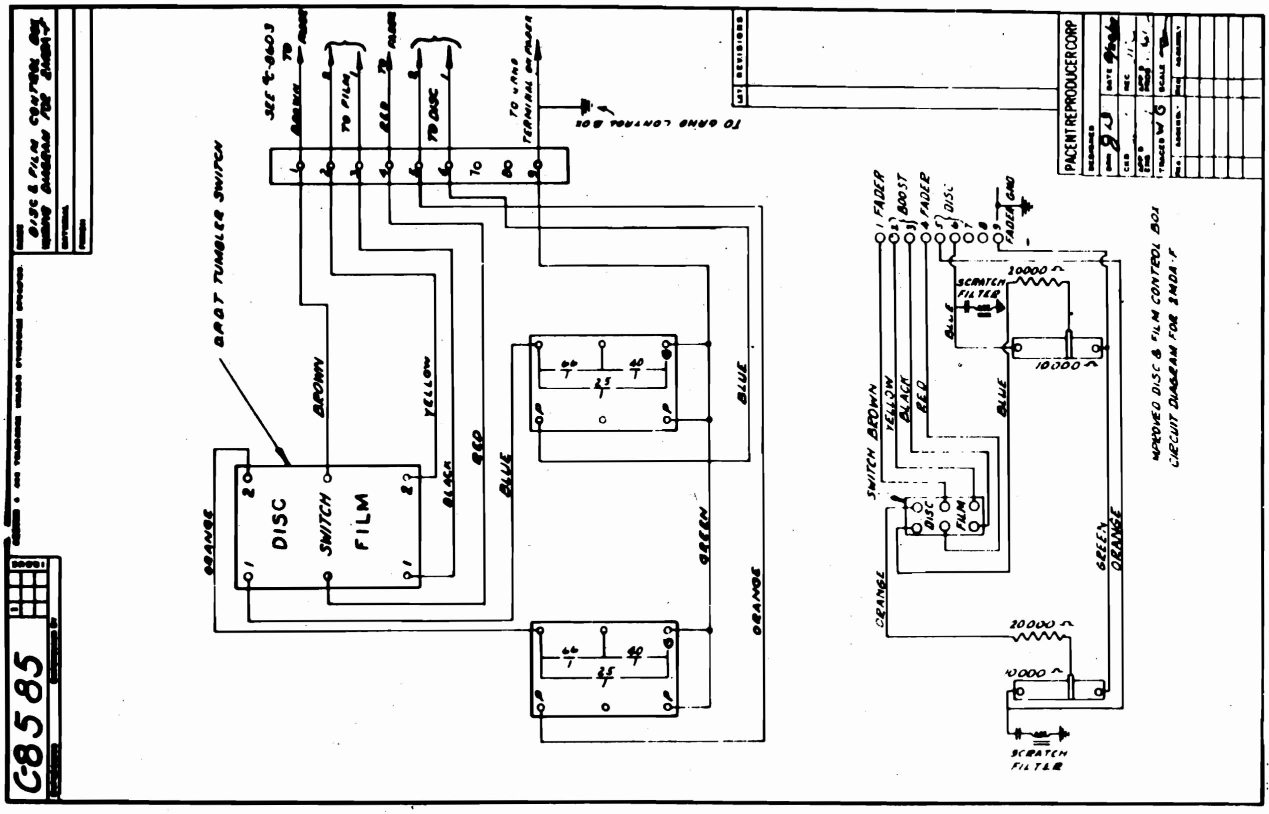
MODEL Fader Units
Two types

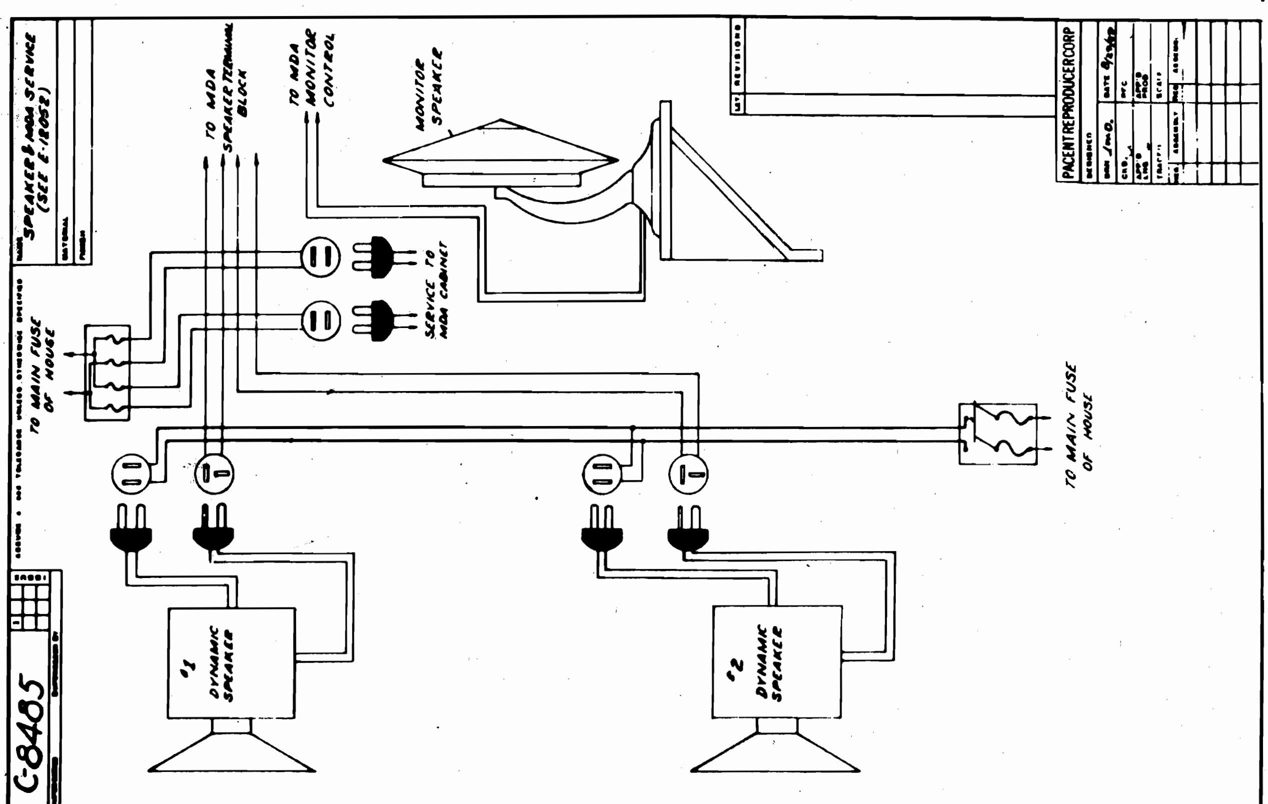




MODEL MDA Service
Schematic
MODEL 2-MDA-F
Control Box
Schematic

PACENT REPRODUCER CORP.

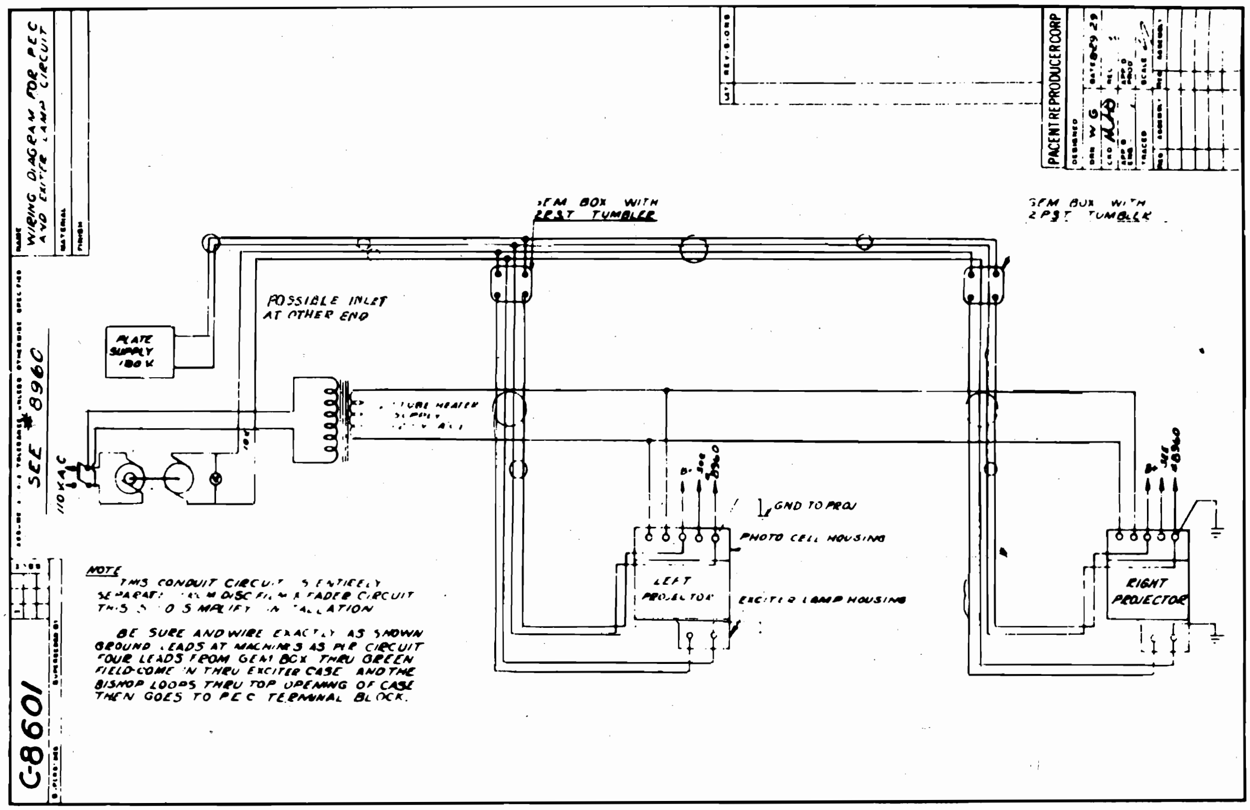


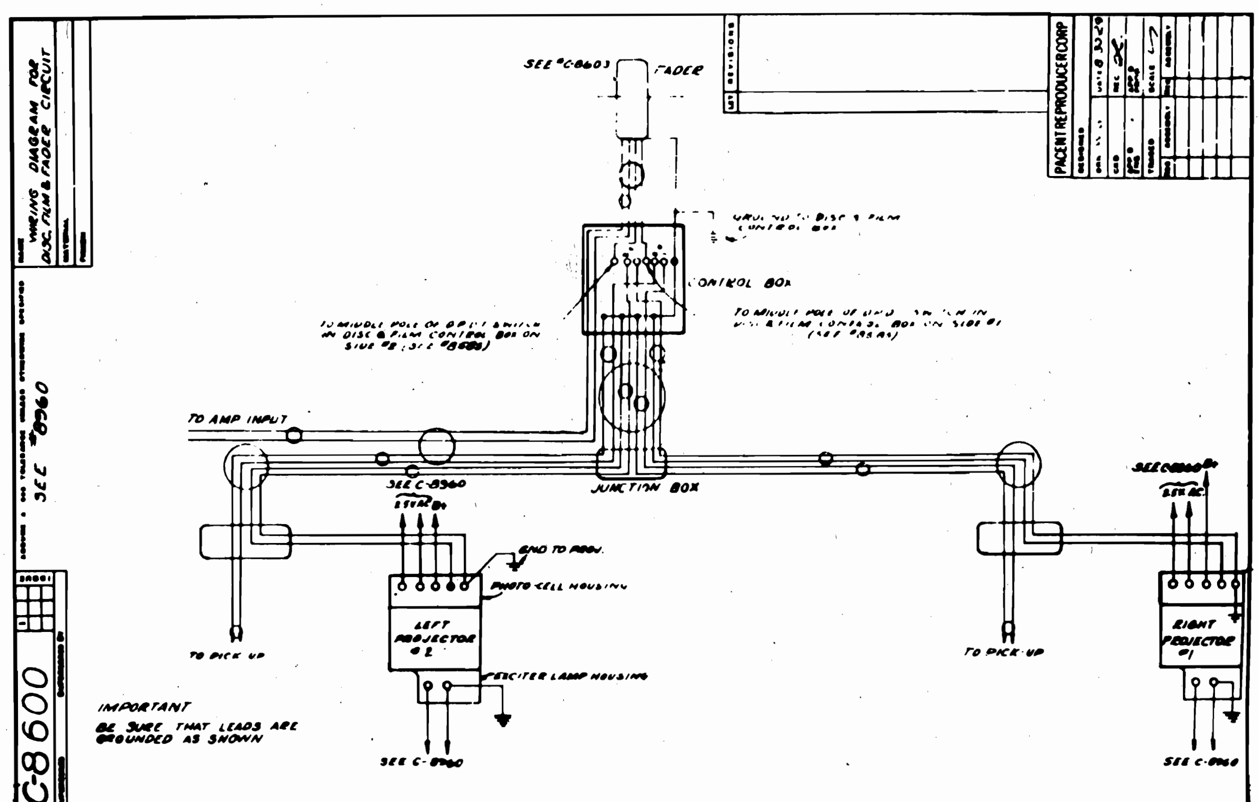


PACENT REPRODUCER CORP.

MODEL Disc, Film and Fader Service Schematic

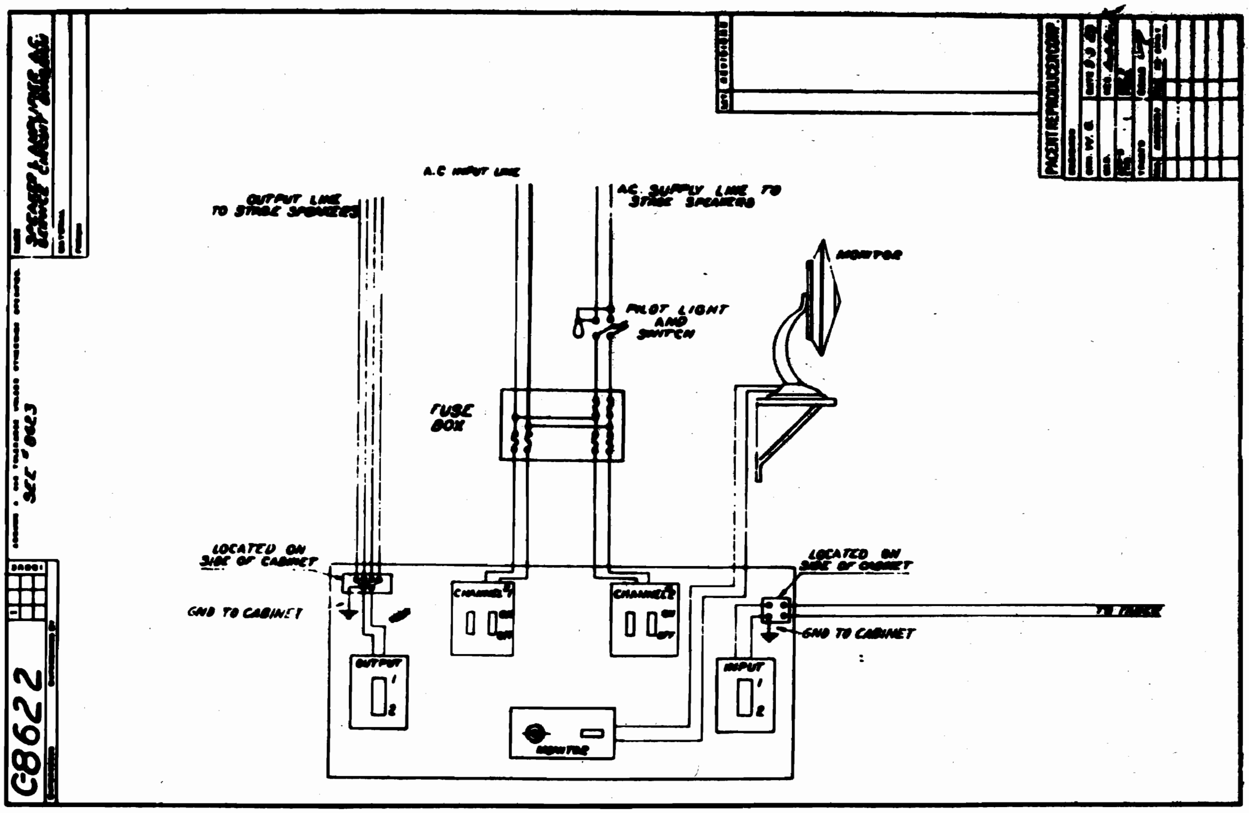
MODEL PEC-Xiter Service Schematic

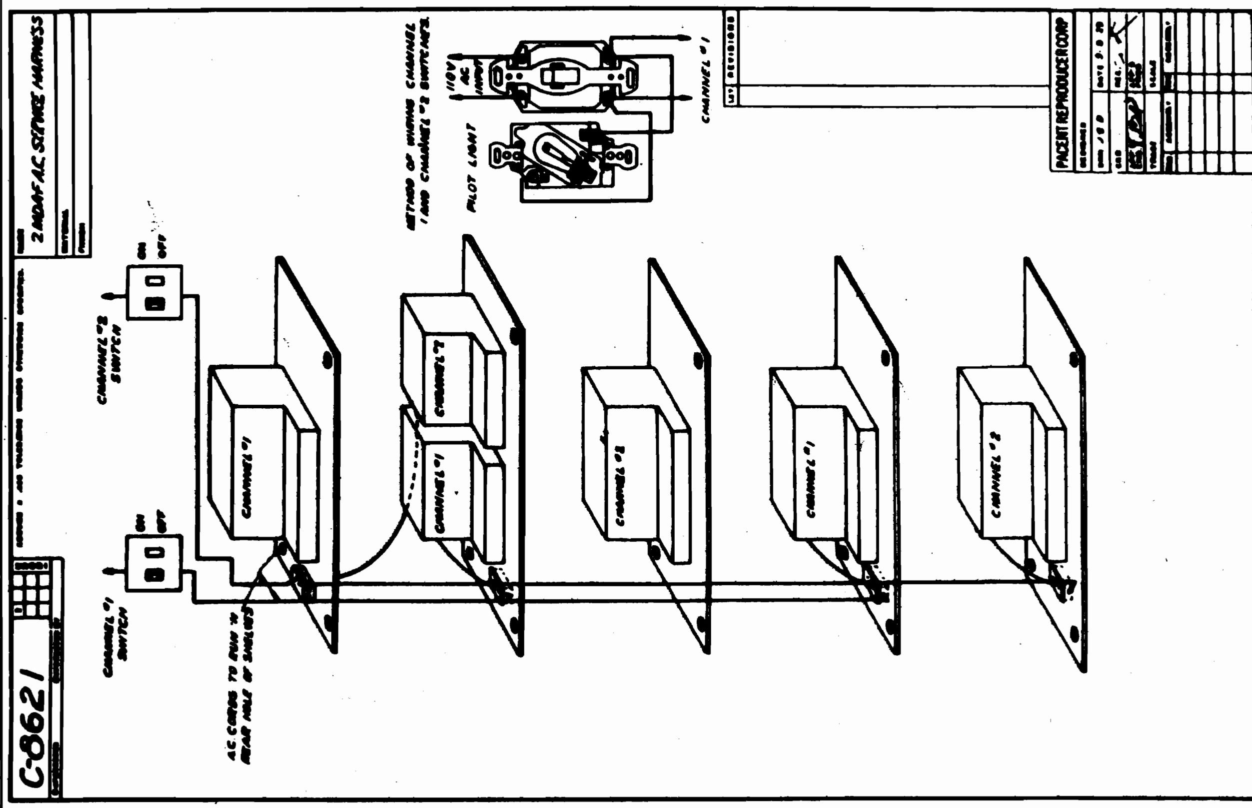




MODEL ZMDA-F
Harness
MODEL Spkr.-Amp. AC
Service
Schematic

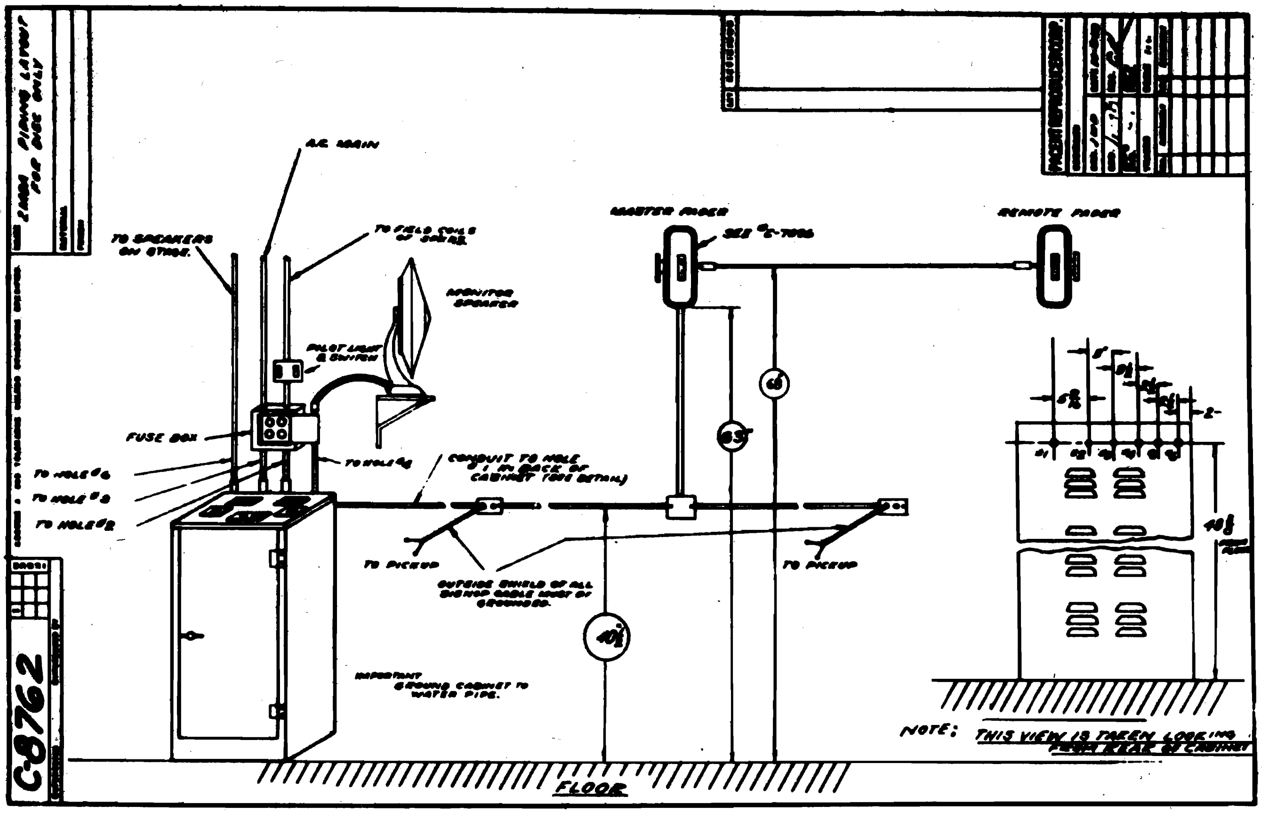
PACENT REPRODUCER CORP.

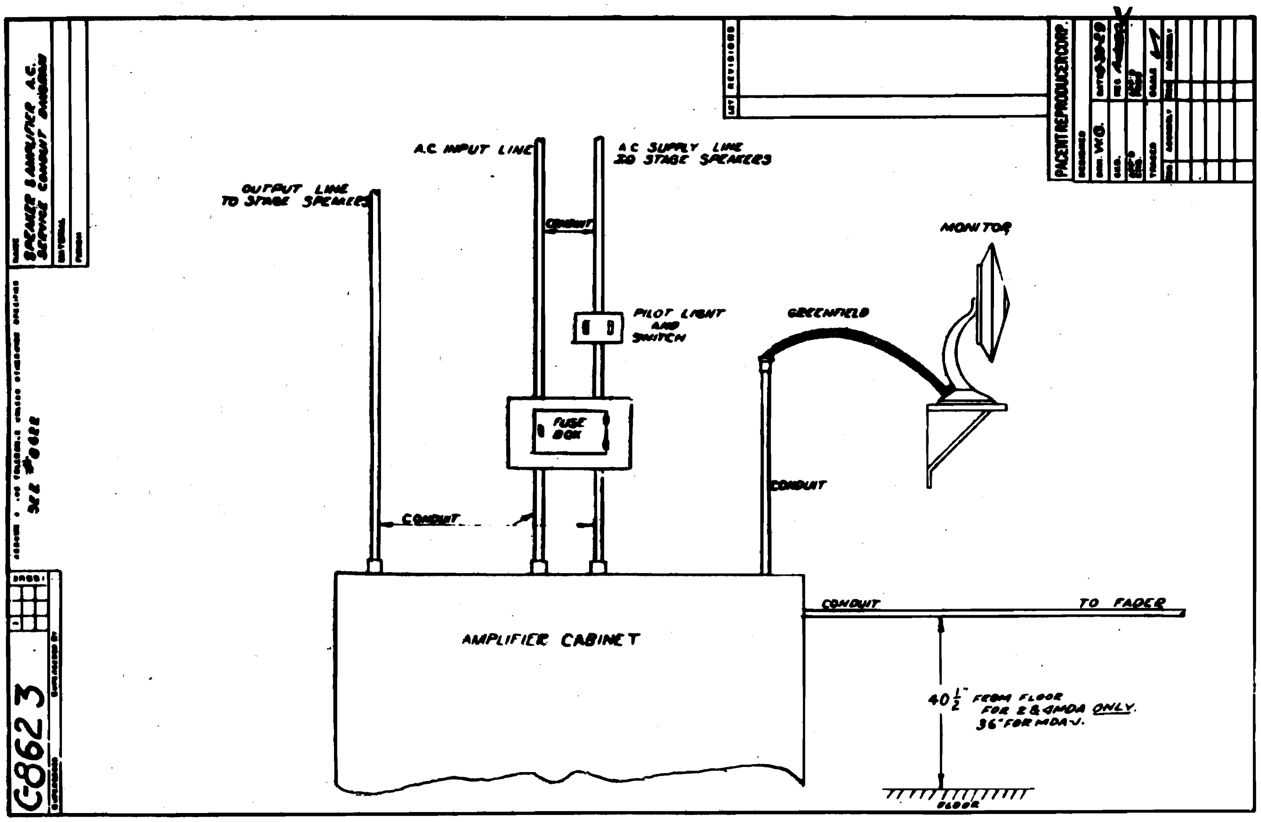




PACENT REPRODUCER CORP.

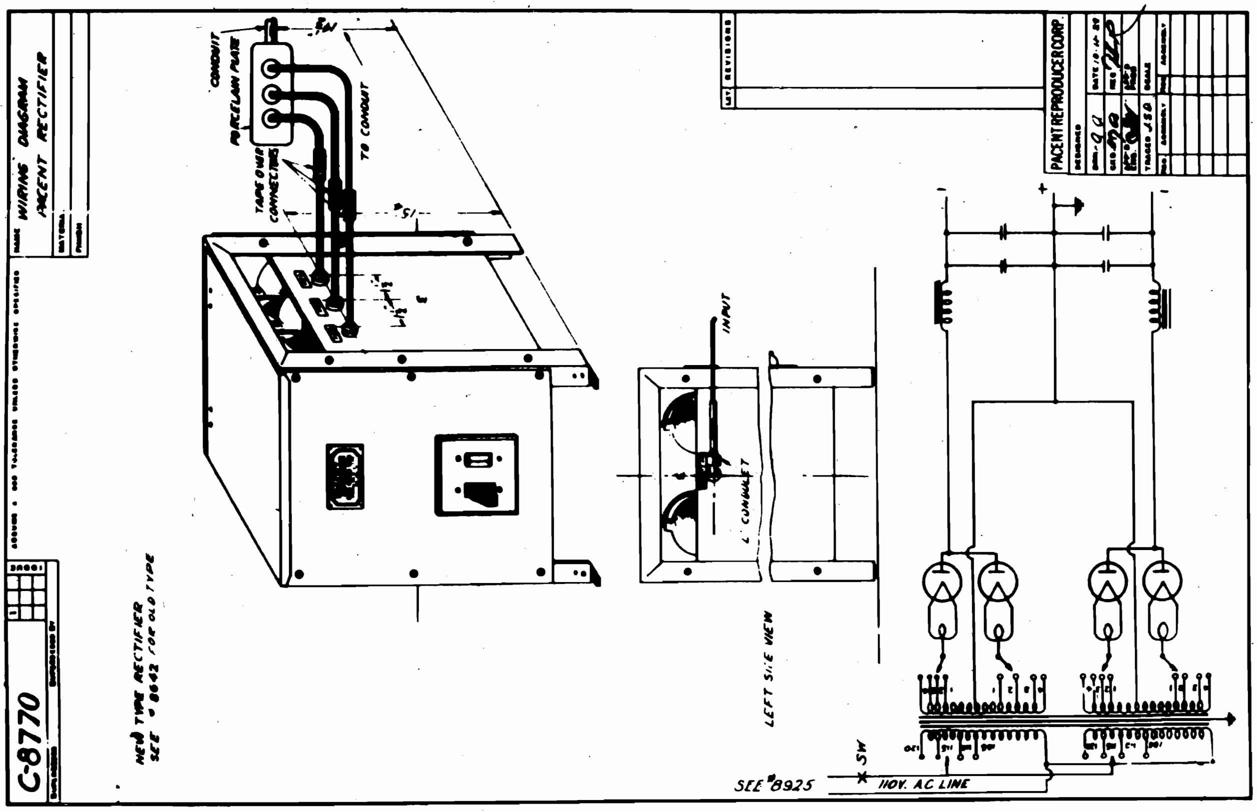
MODEL Spkr.-Amp. AC Service Schem.
MODEL 2 MDA-F Piping Schematic

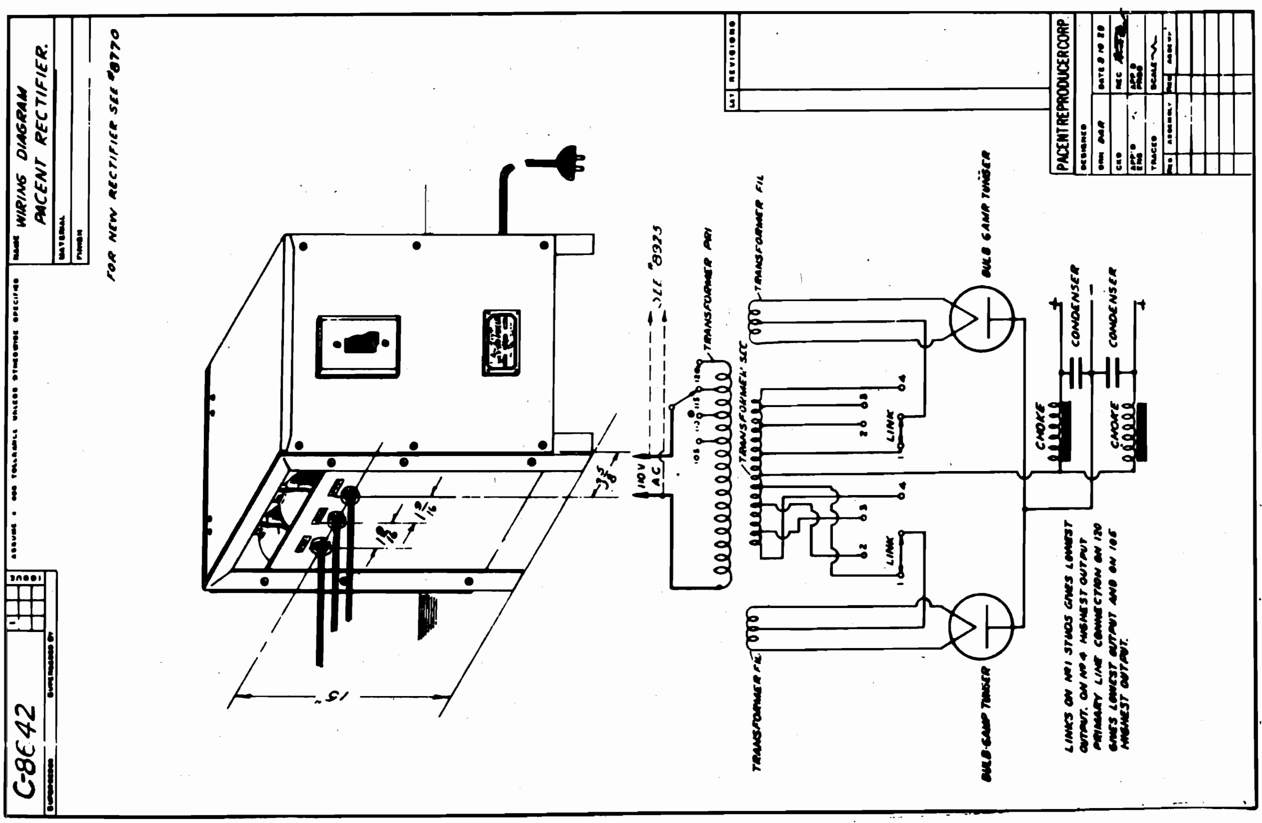




MODEL Pacent Rectifiers
Two types

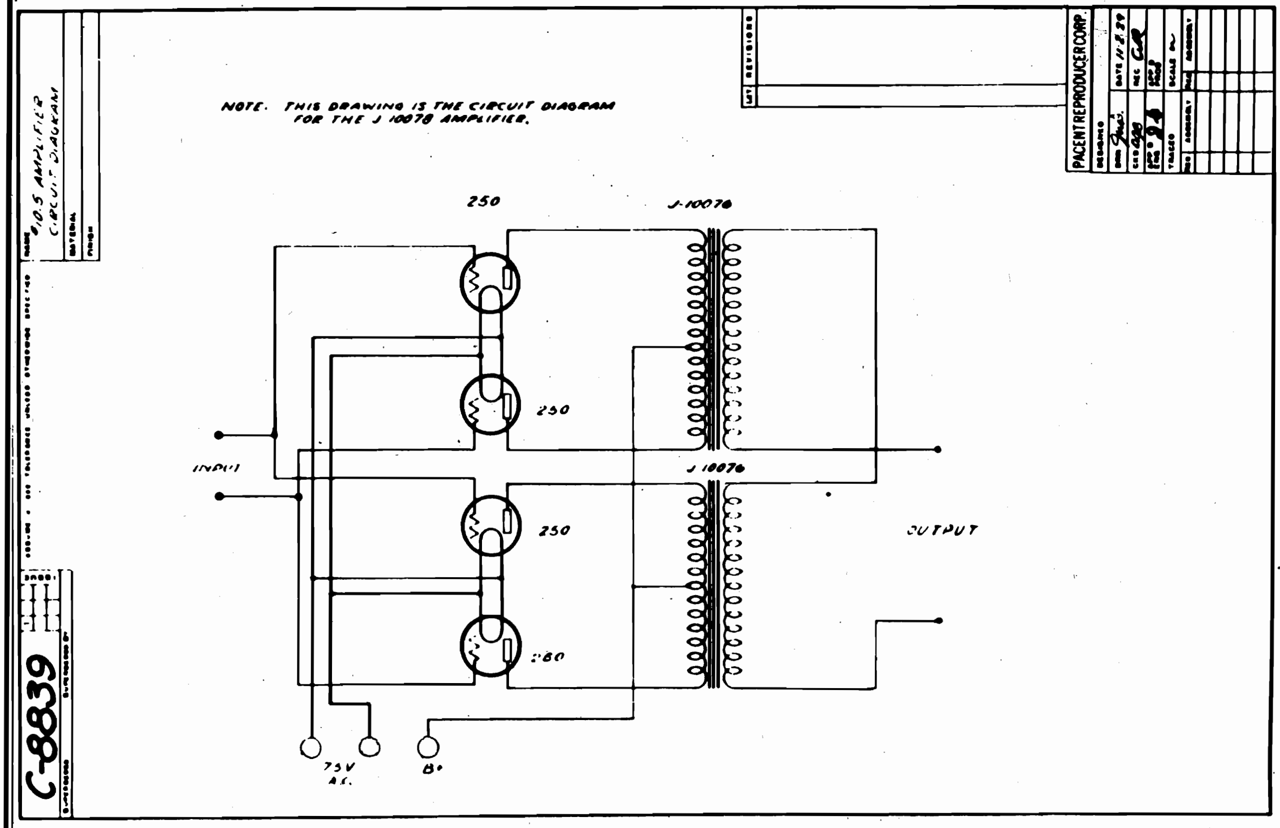
PACENT REPRODUCER CORP.

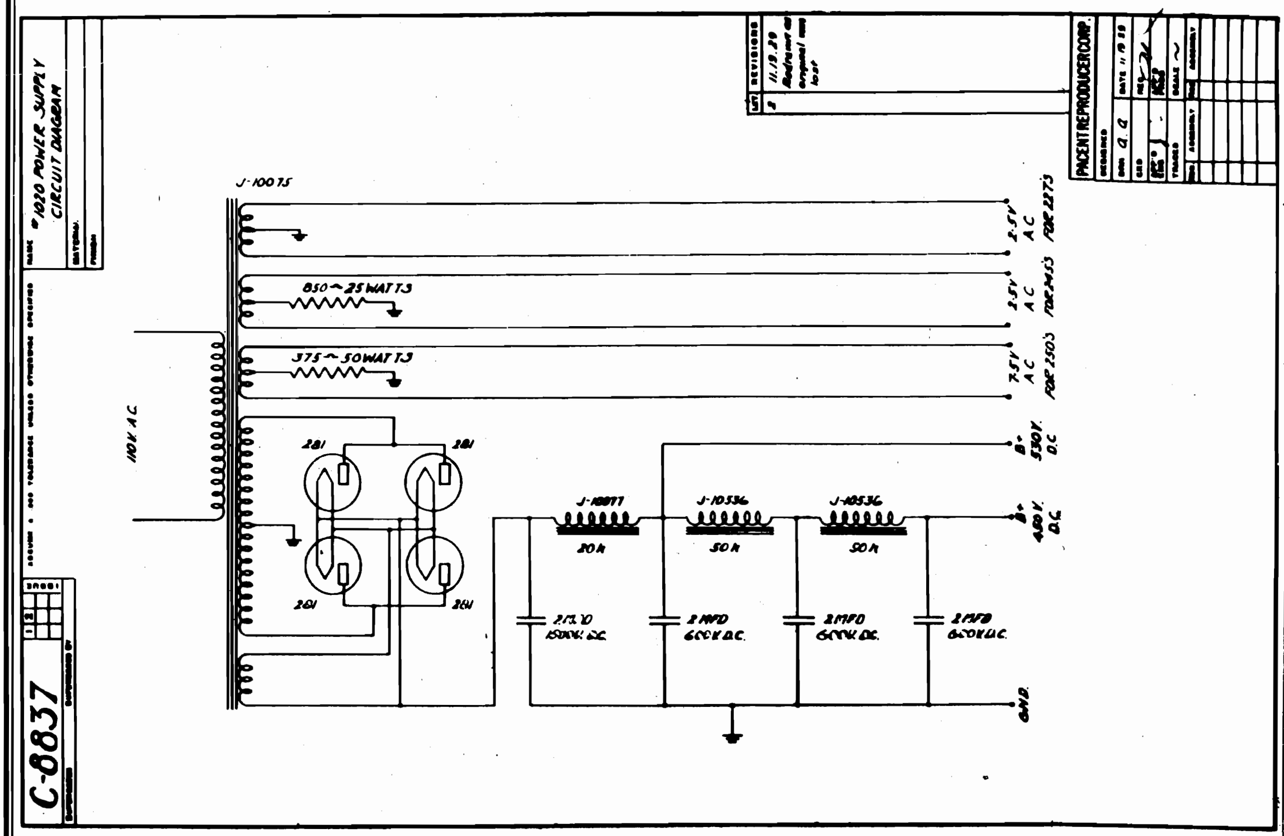




PACENT REPRODUCER CORP.

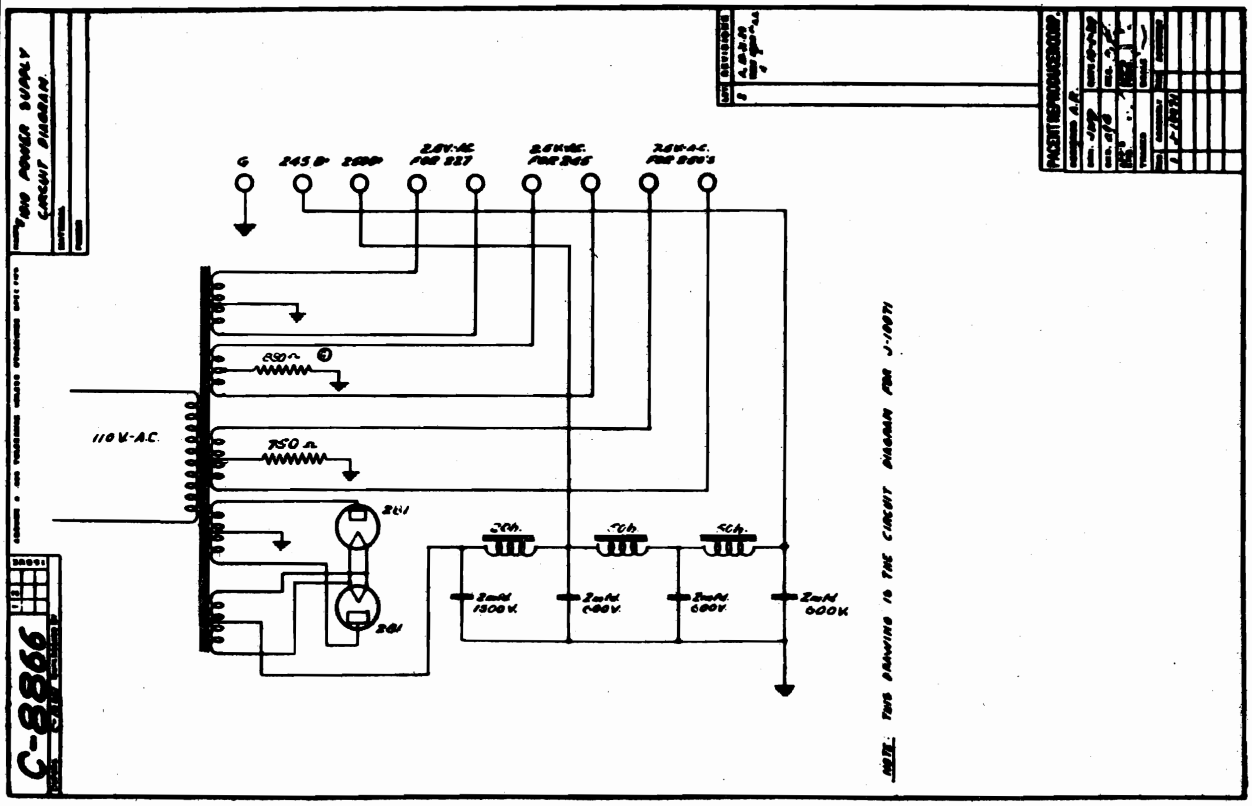
MODEL 1015 Amplifier Schematic
MODEL 1020 SPU Schematic

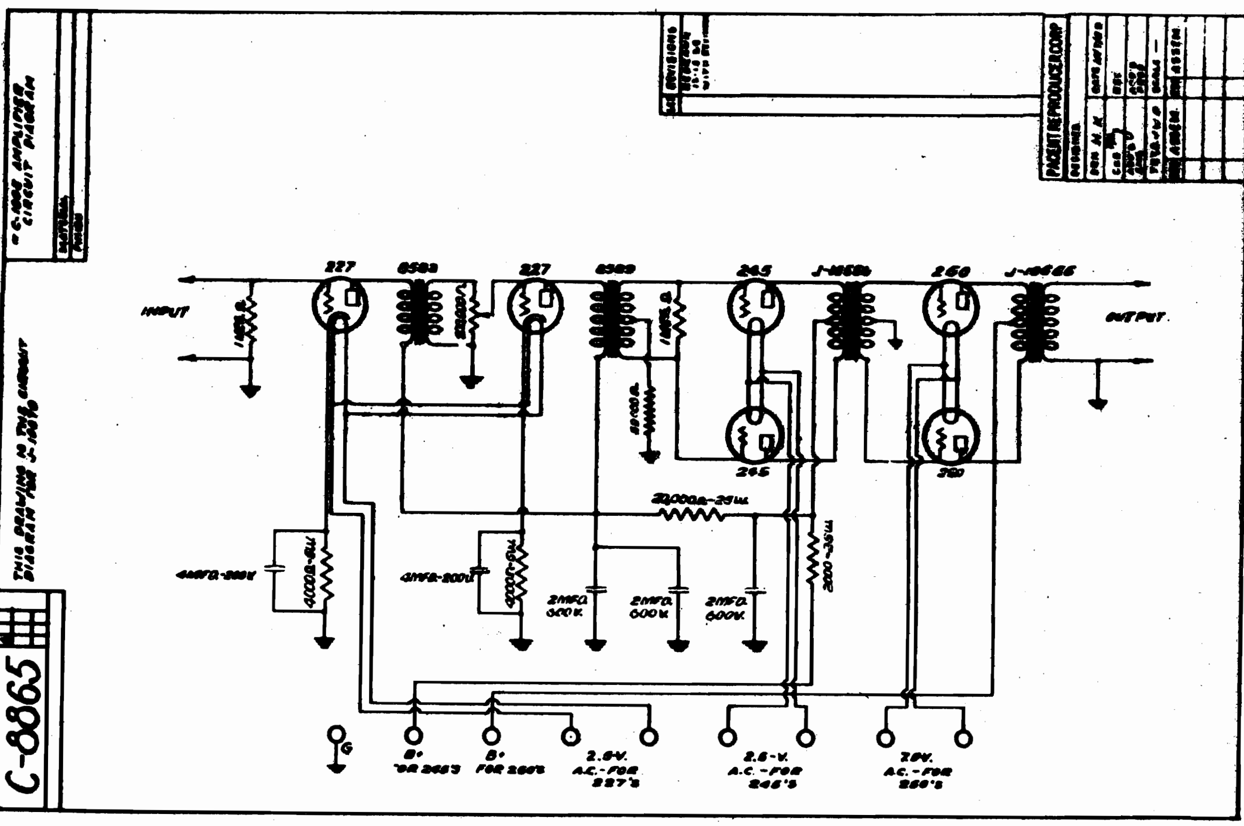




MODEL 1005 Amplifier
Schematic
MODEL 1010 SPU
Schematic

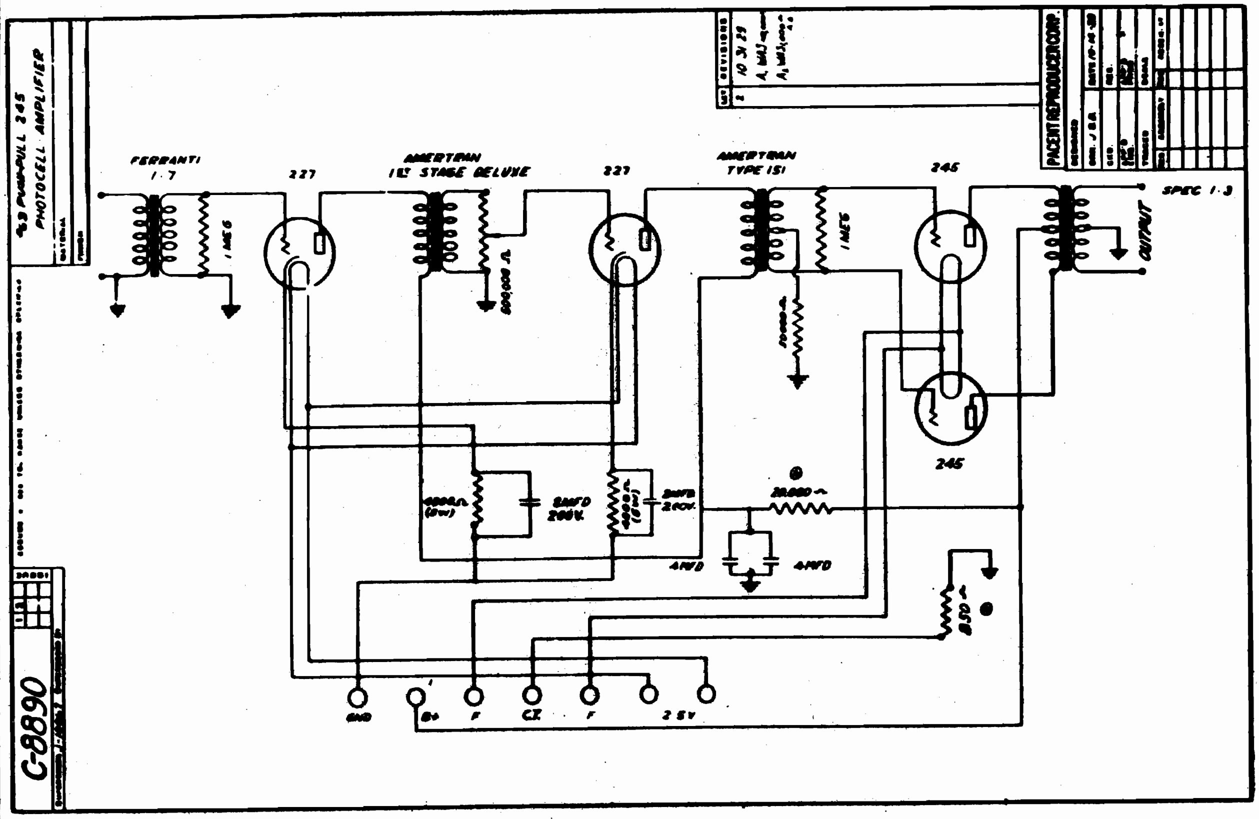
PACENT REPRODUCER CORP.

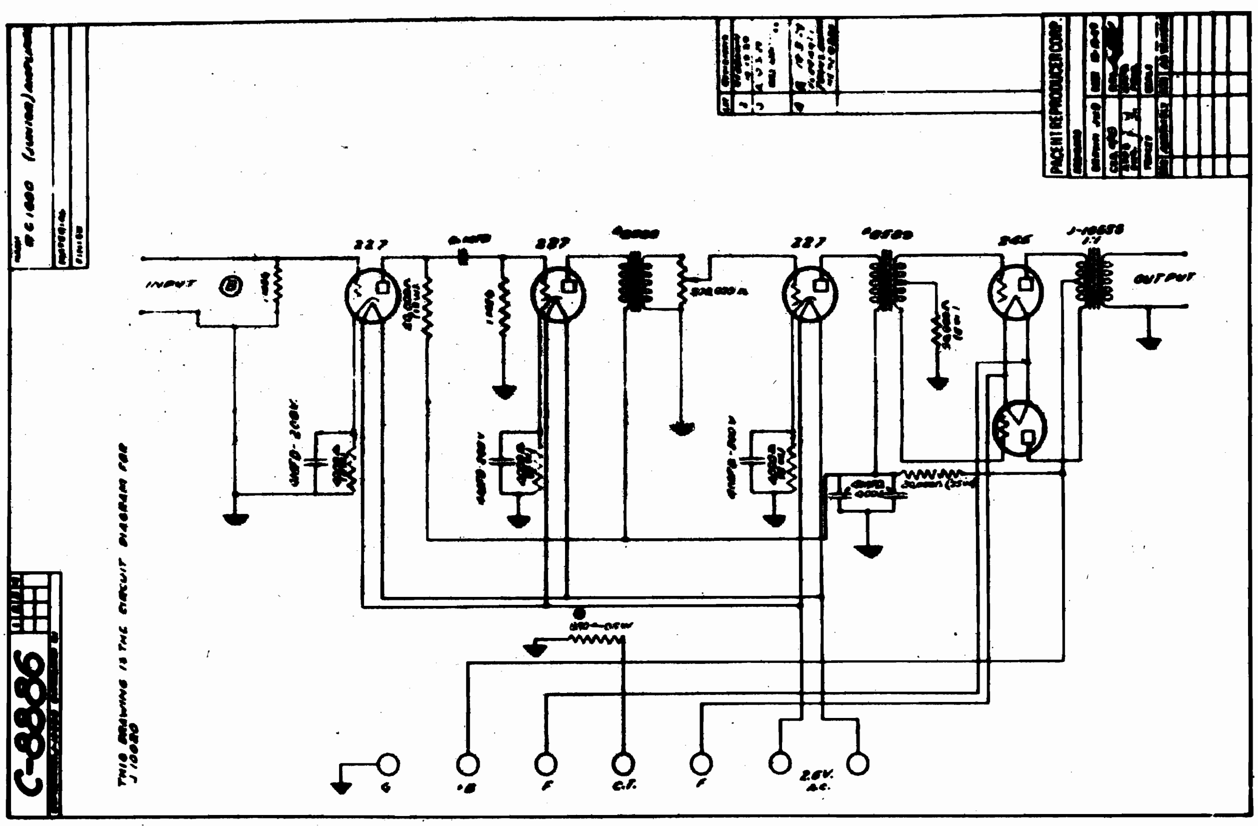




PACENT REPRODUCER CORP.

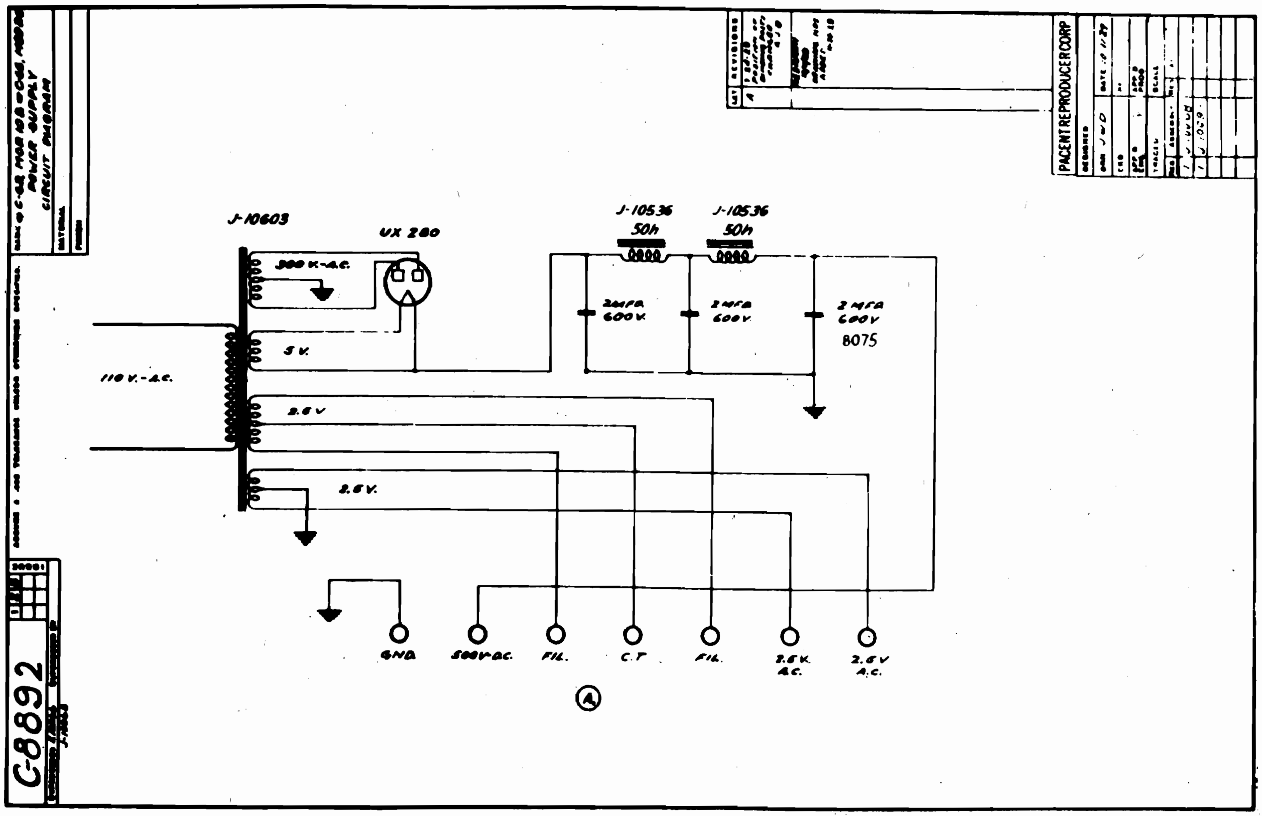
MODEL 63 PEC Amp. Schematic
MODEL C-1000 Jr. Schematic

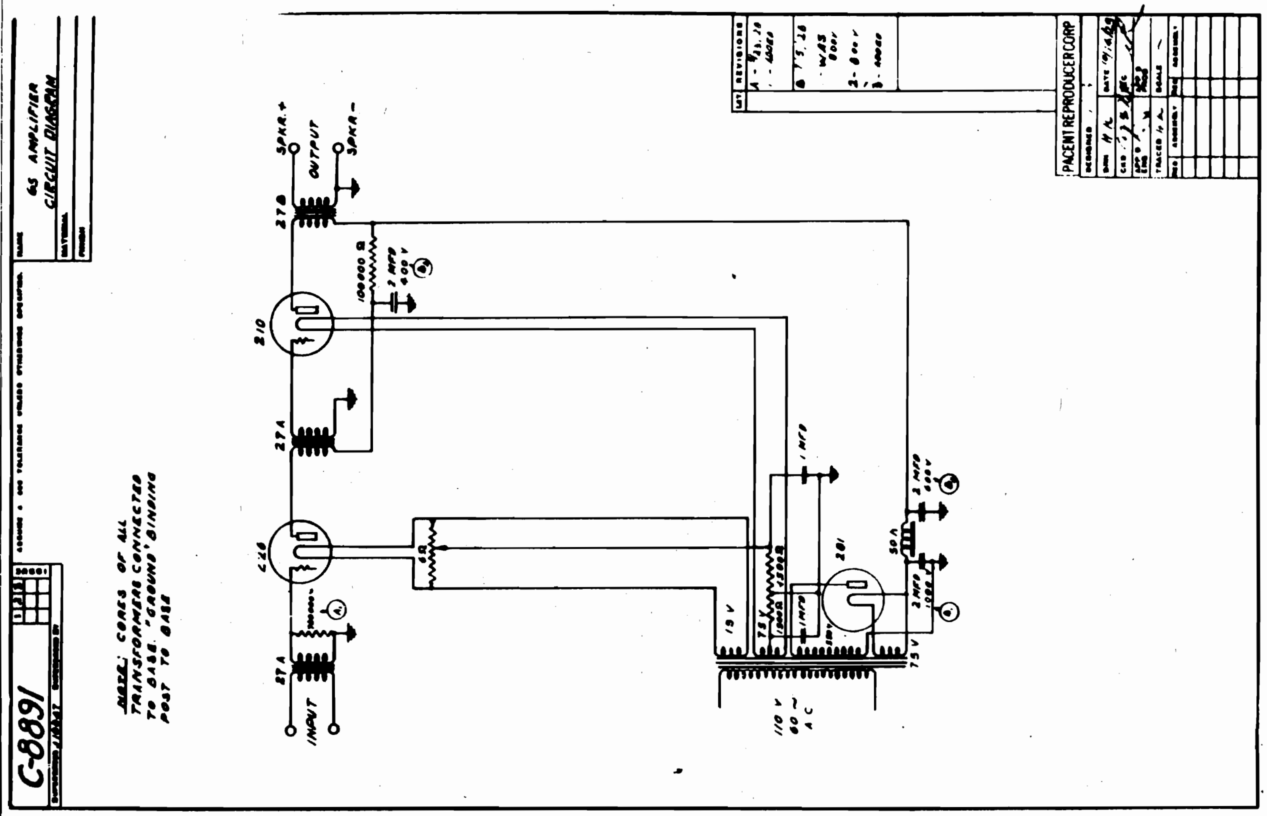




MODEL 65 Amplifier
Schematic
MODEL C-62(102),
C-66(20)
Schematic

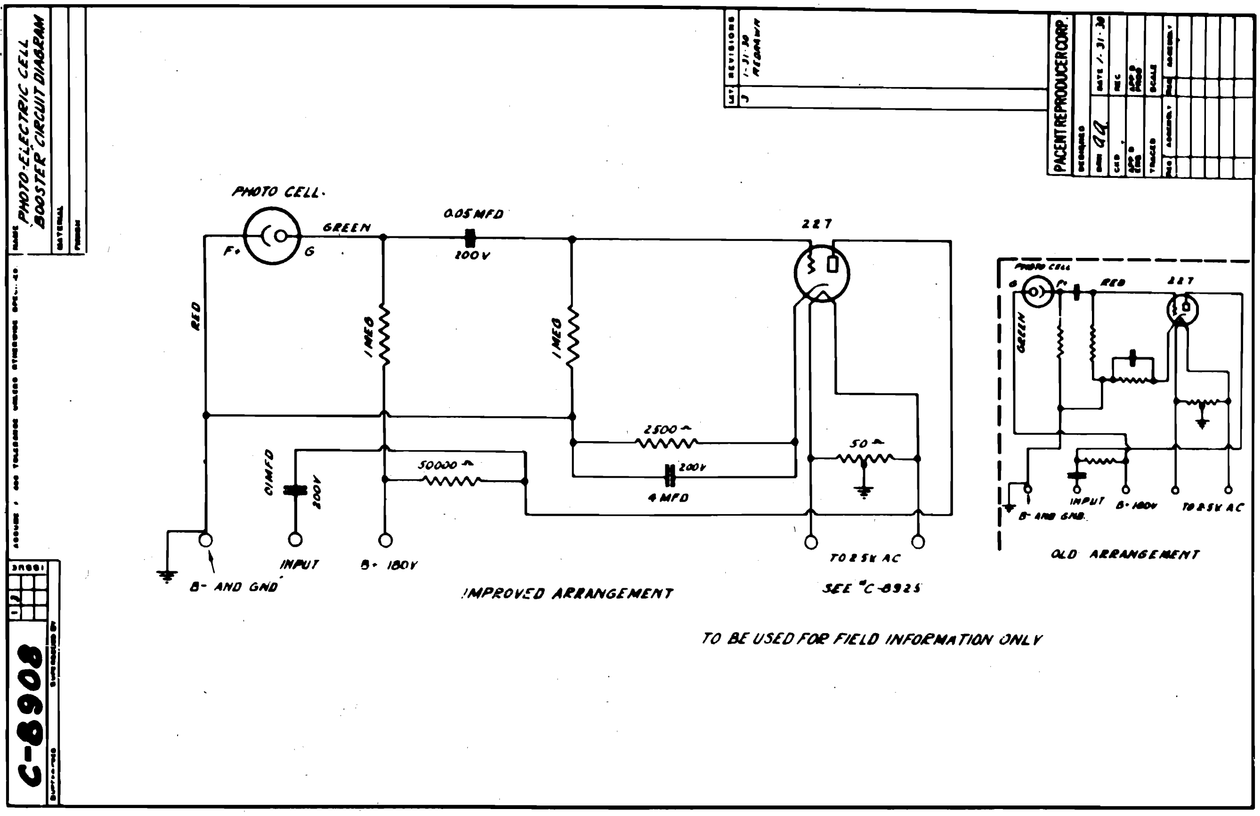
PACENT REPRODUCER CORP.

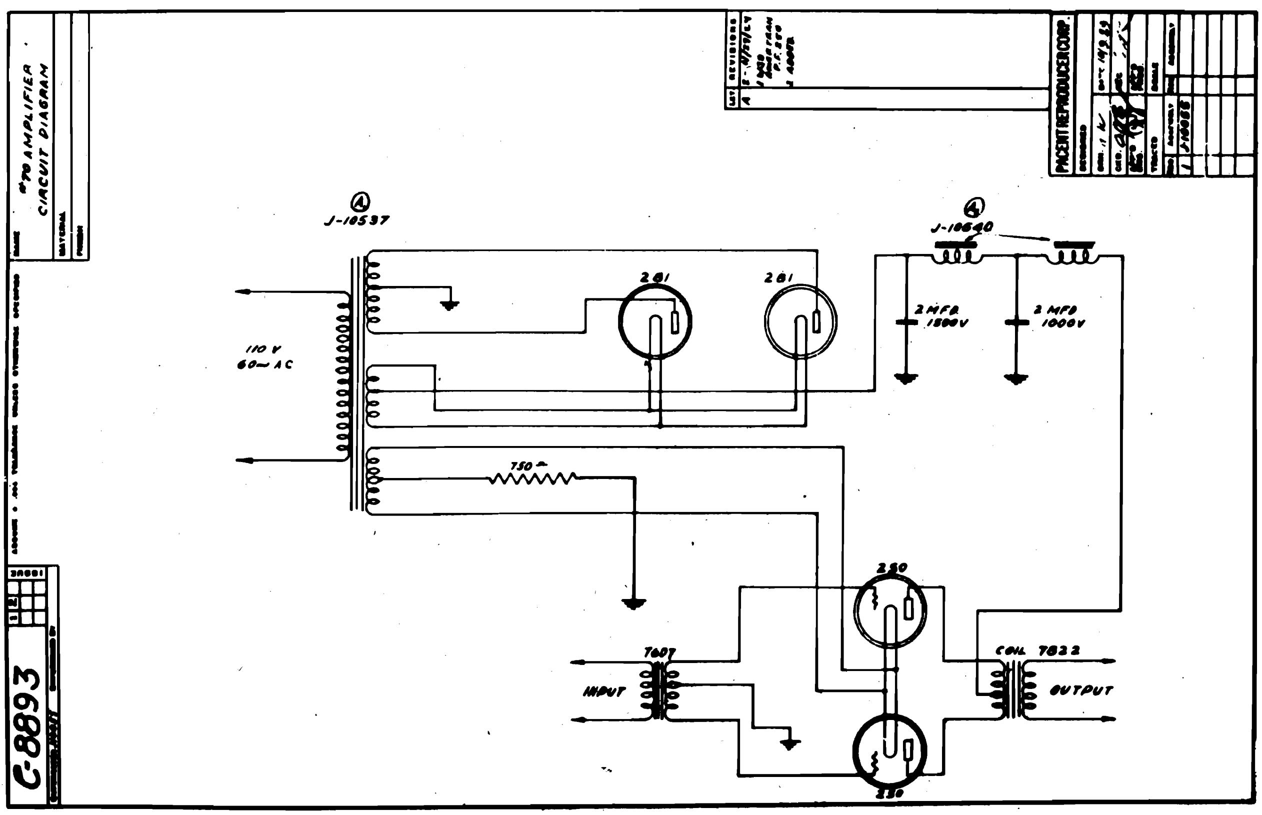




PACENT REPRODUCER CORP.

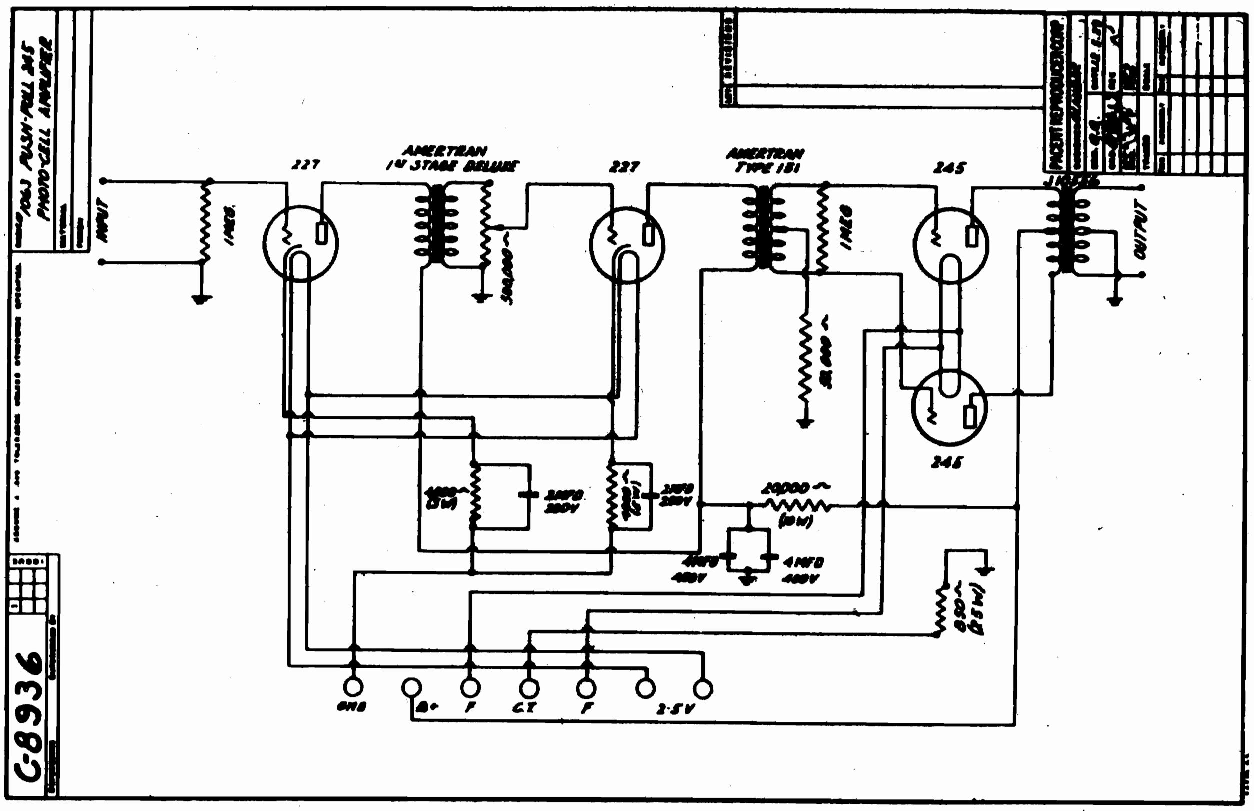
MODEL 70 Amplifier Schematic
MODEL PEC Booster Schematic

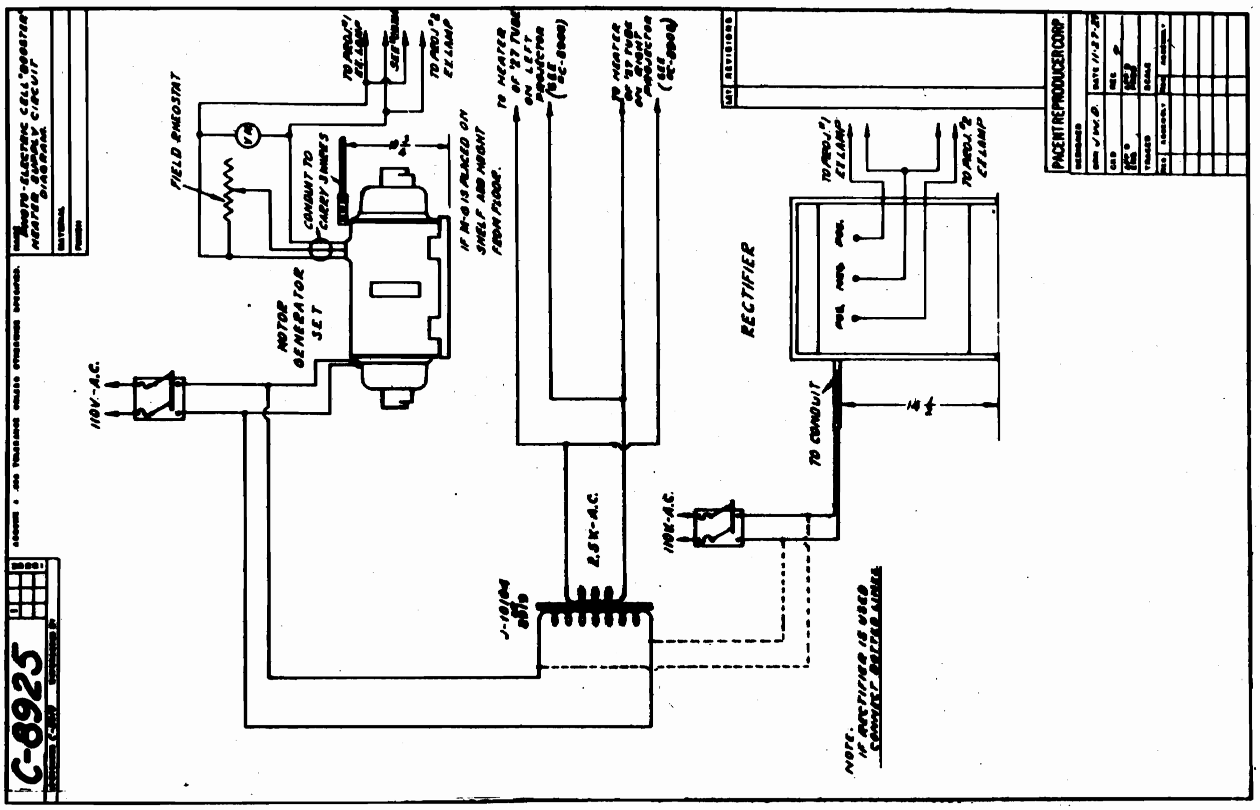




MODEL PEC Booster
Heater Supply
Schematic
MODEL 1063 PEC Amp
Schematic

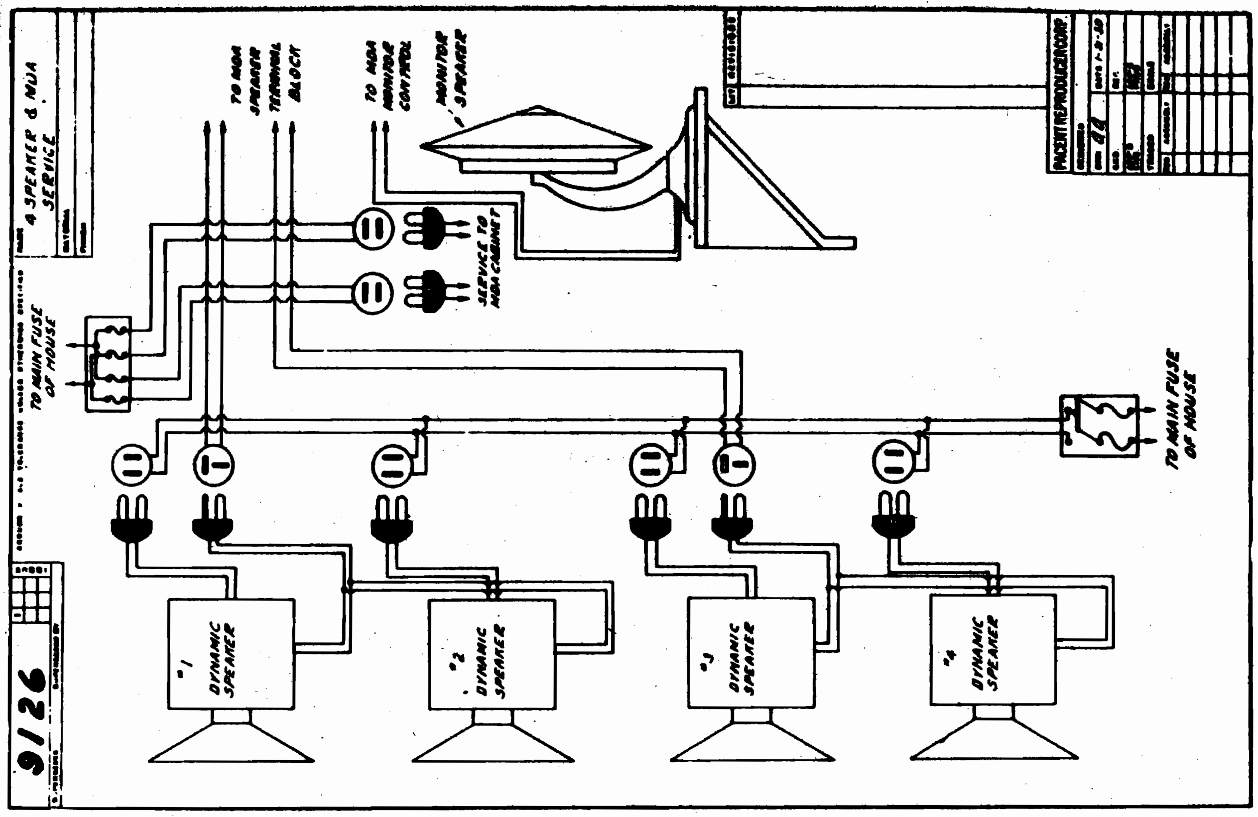
PACENT REPRODUCER CORP.

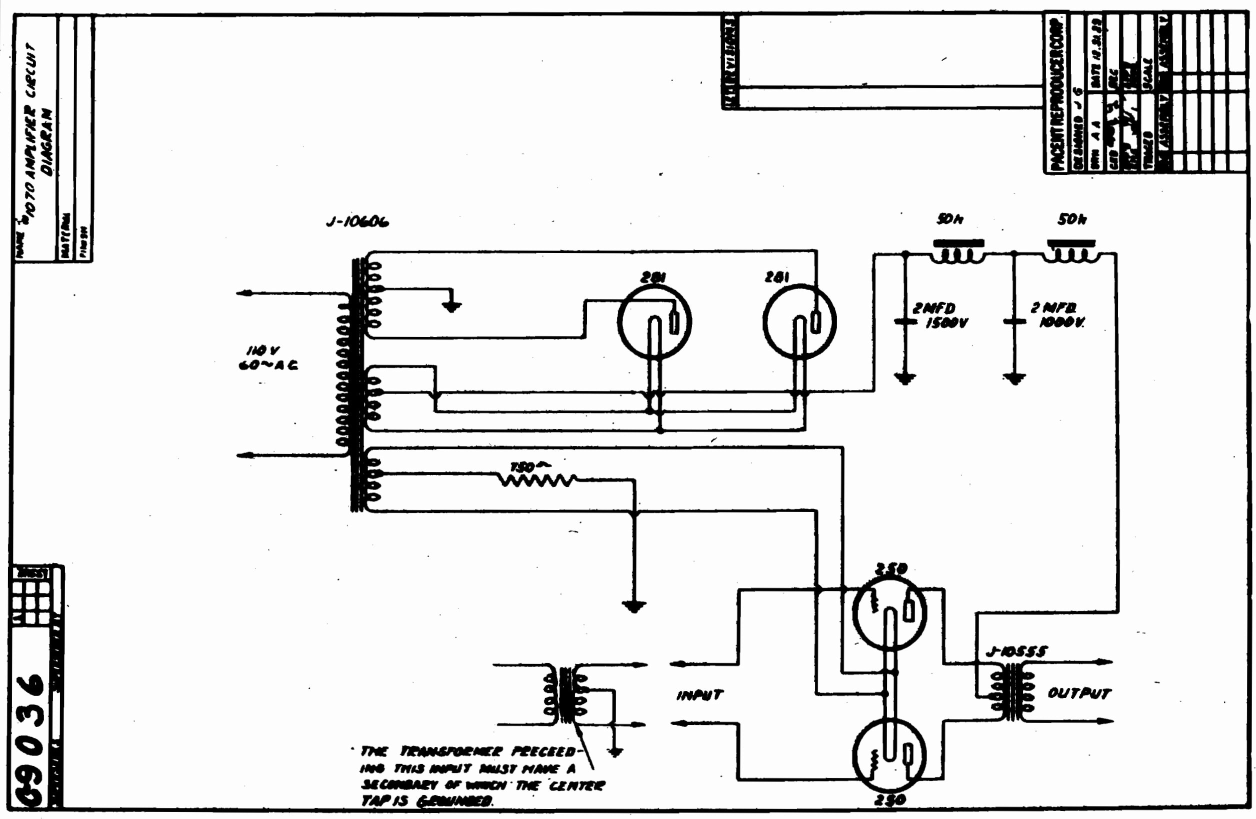




PACENT REPRODUCER CORP.

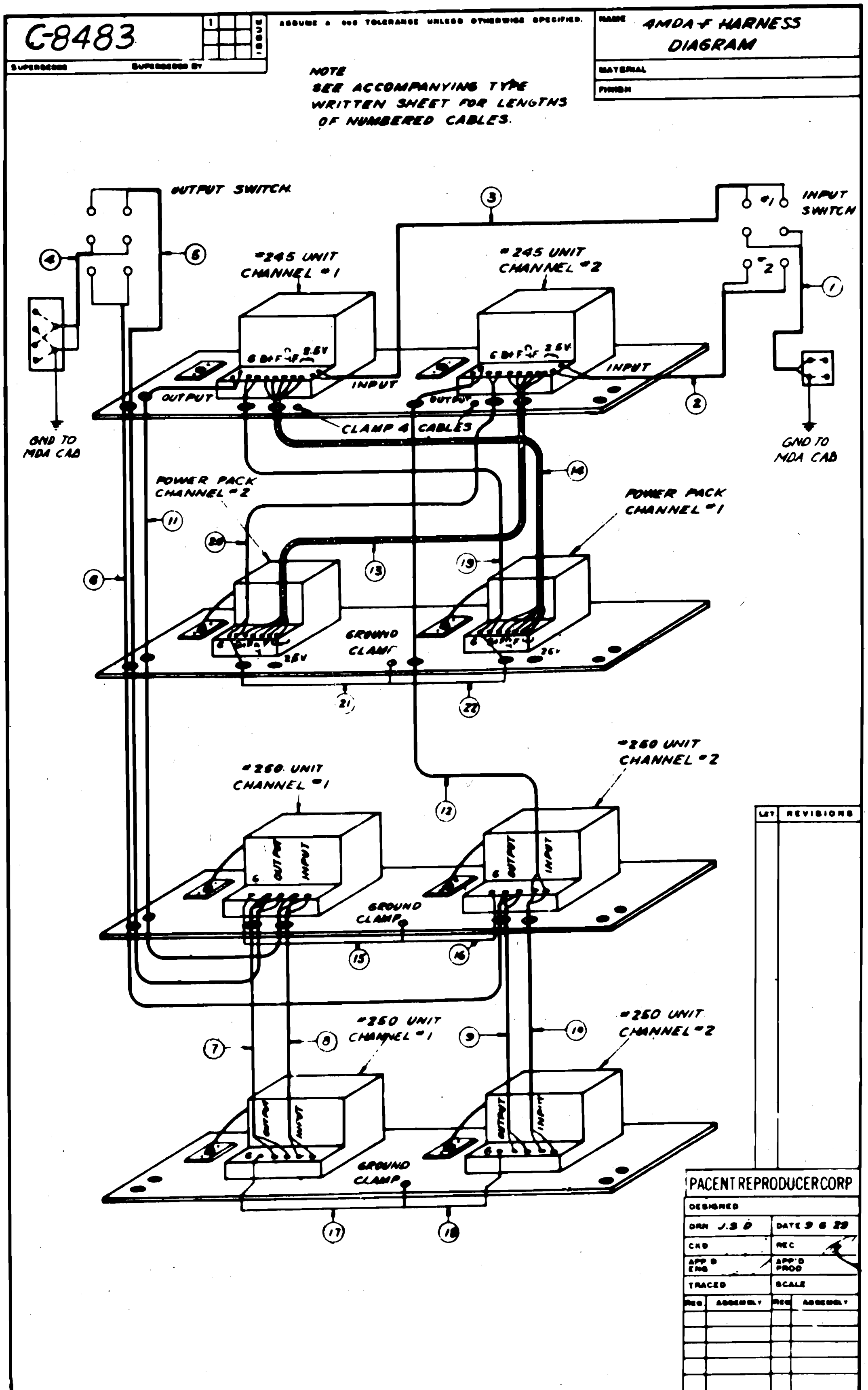
MODEL 1070 Amp. Schematic
MODEL 4 Spkr-MDA Service Schematic





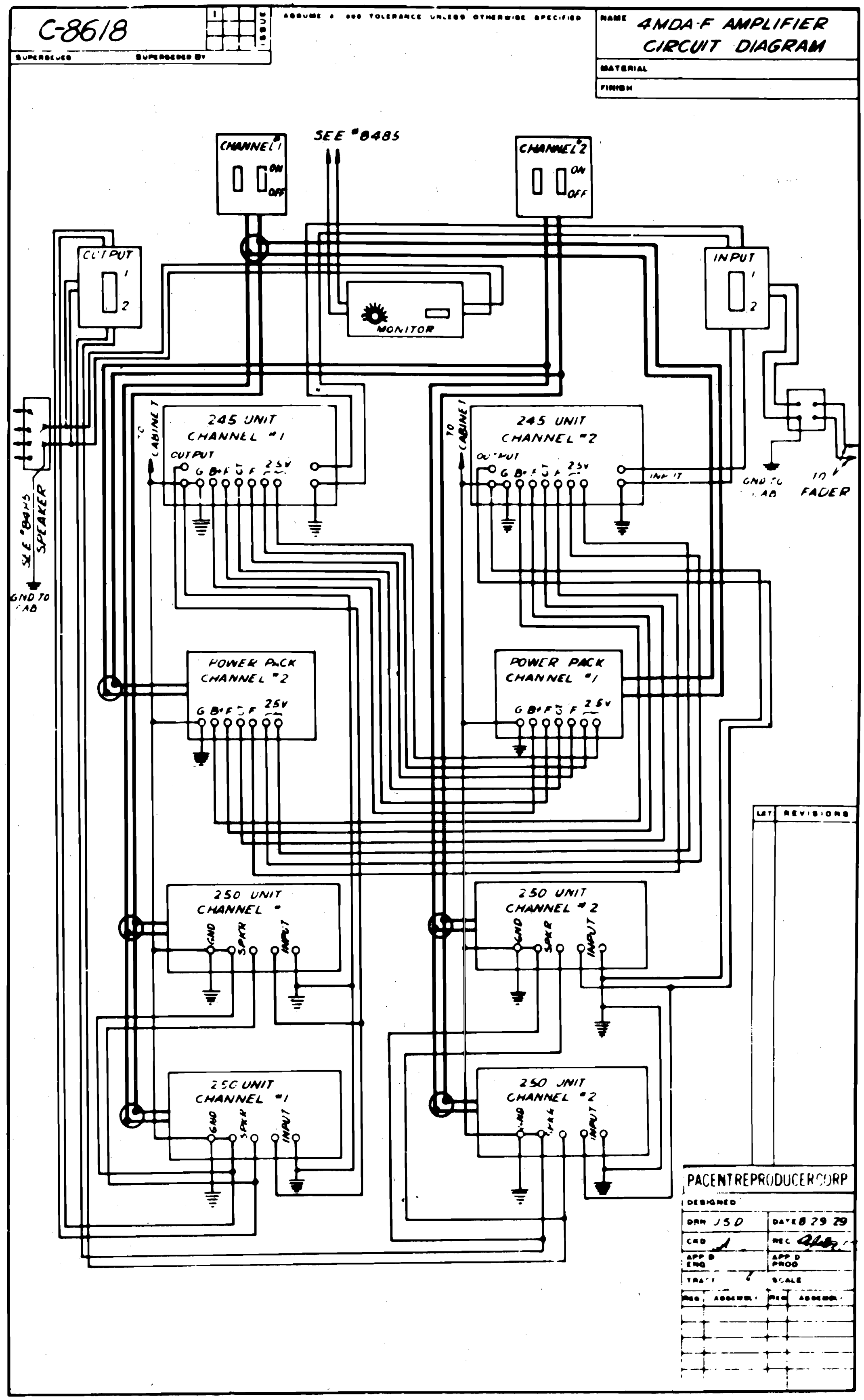
MODEL 4-MDA-F
Harness

PACENT REPRODUCER CORP.



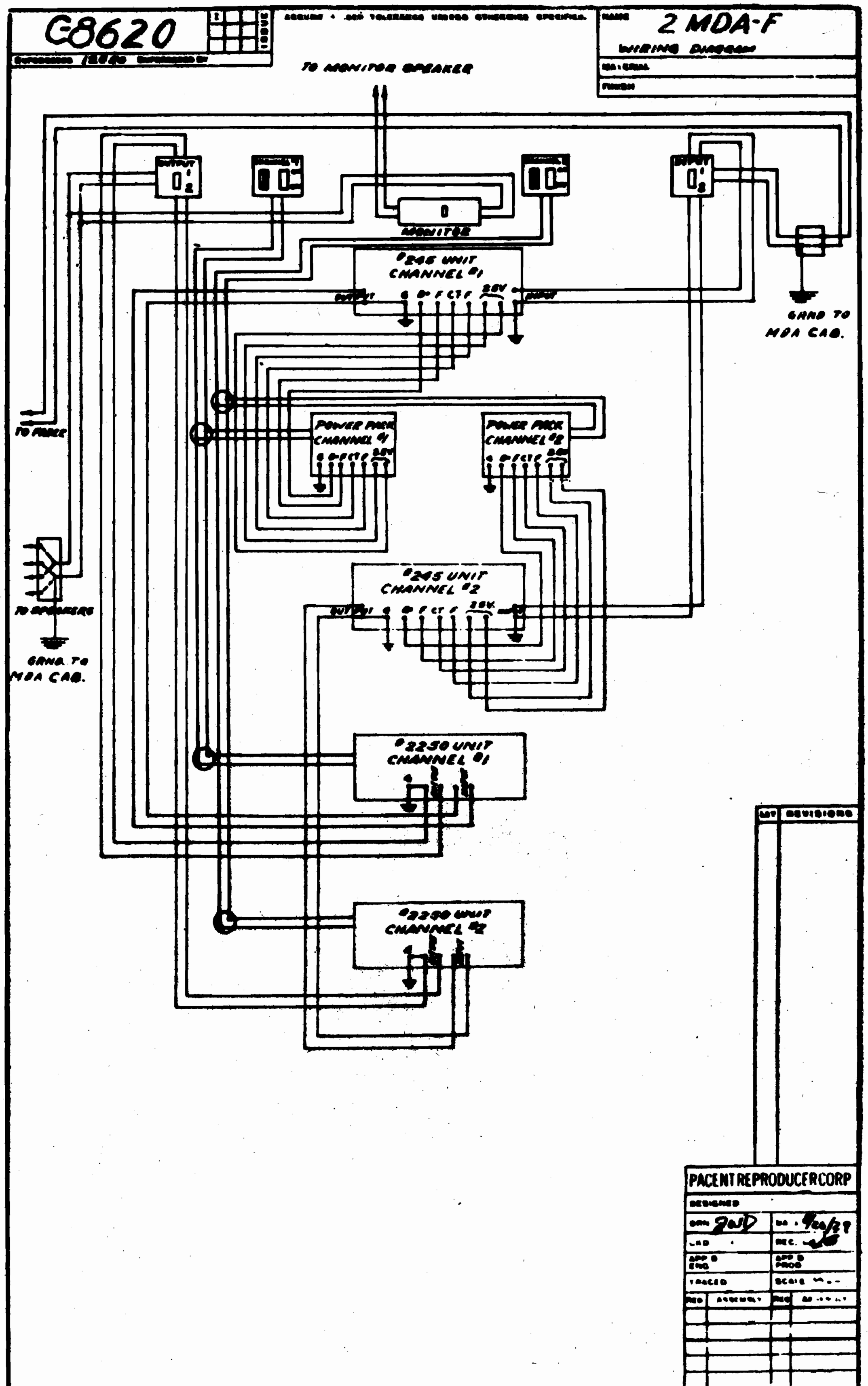
PACENT REPRODUCER CORP.

MODEL 4-MDA-F Amp.
Assembly wiring



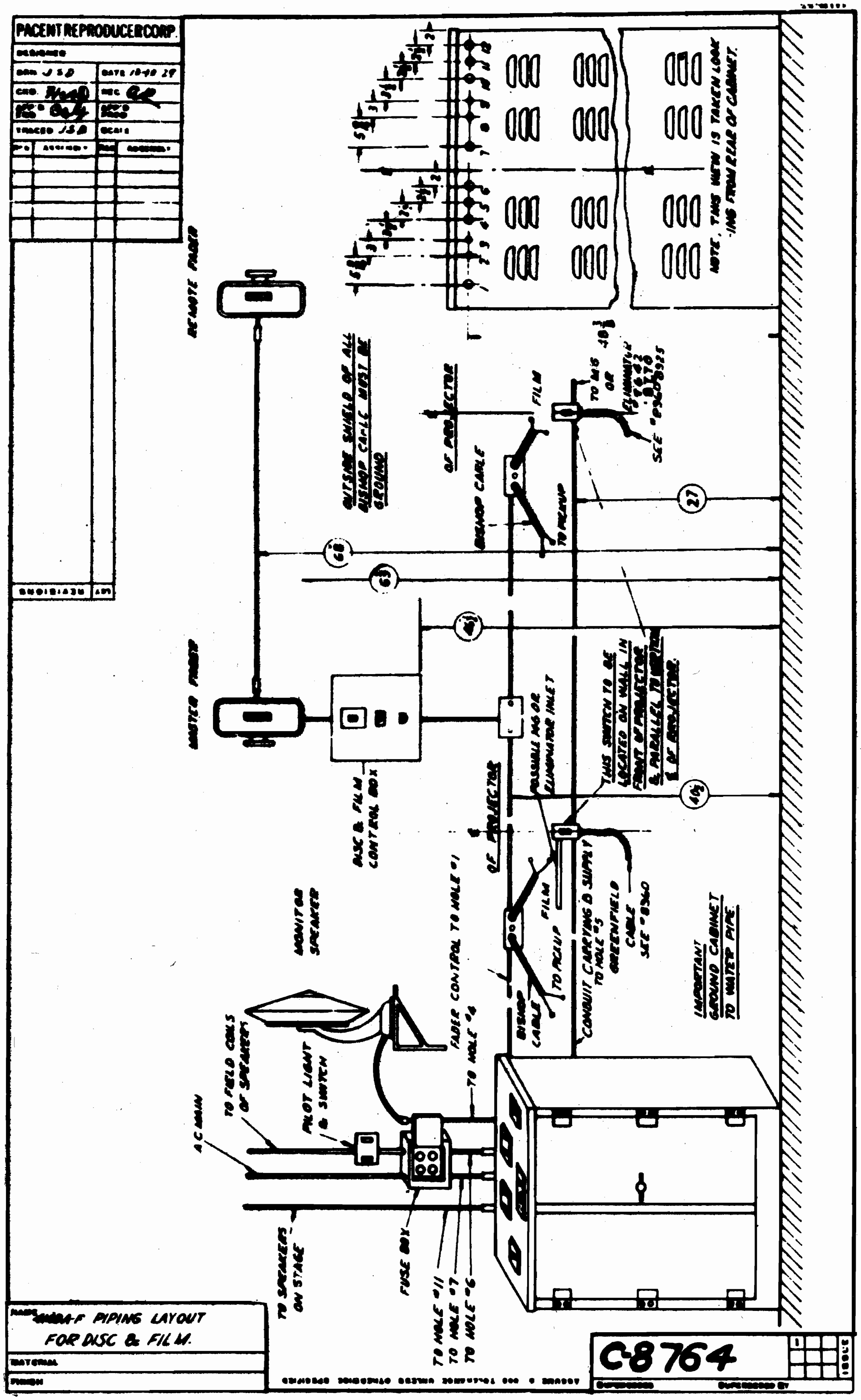
MODEL 2-MDA-F
Assembly wiring

PACENT REPRODUCER CORP.



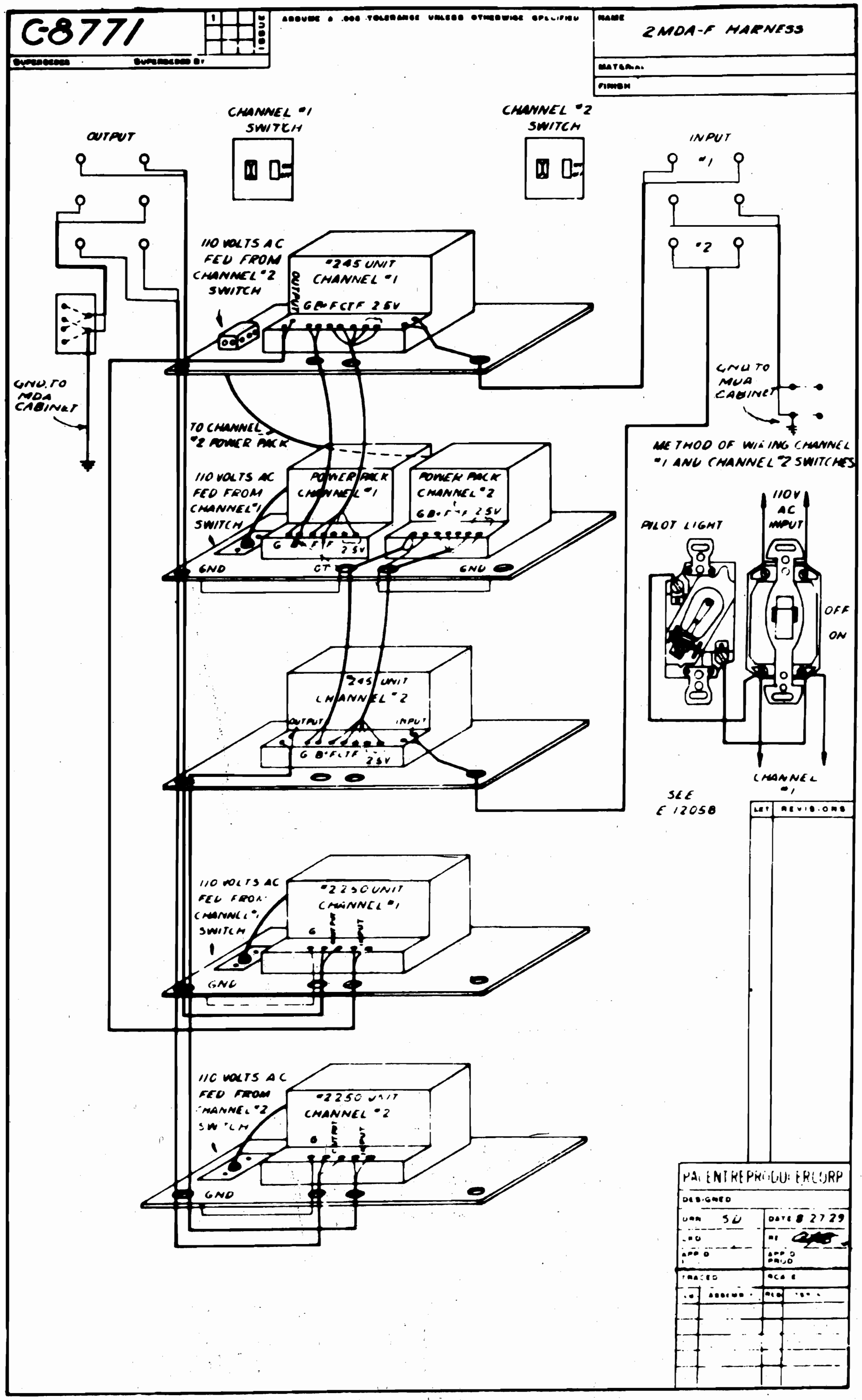
MODEL 4-MDA-F
Piping Layout

PACENT REPRODUCER CORP.



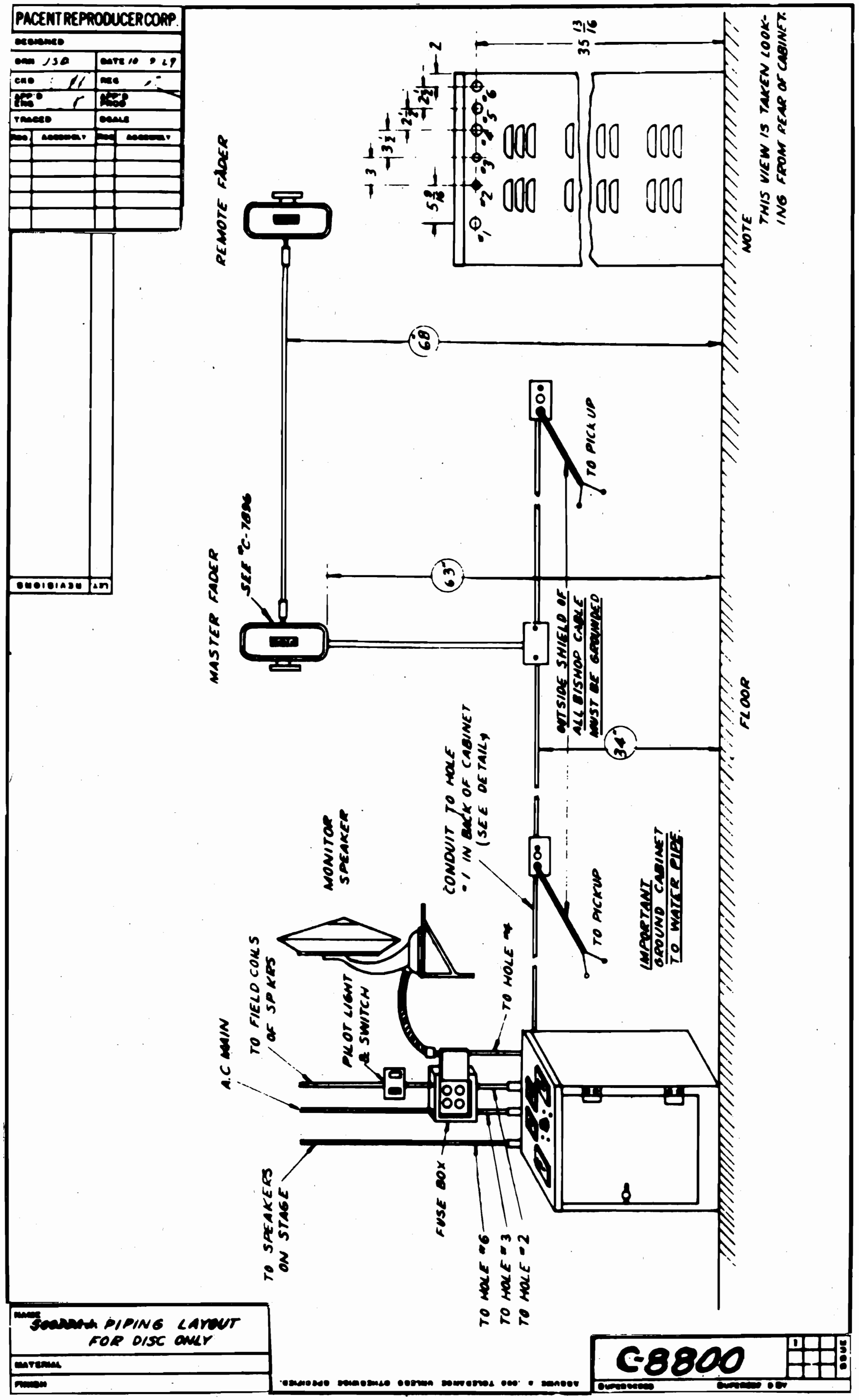
MODEL 2-MDA-F
Harness

PACENT REPRODUCER CORP.



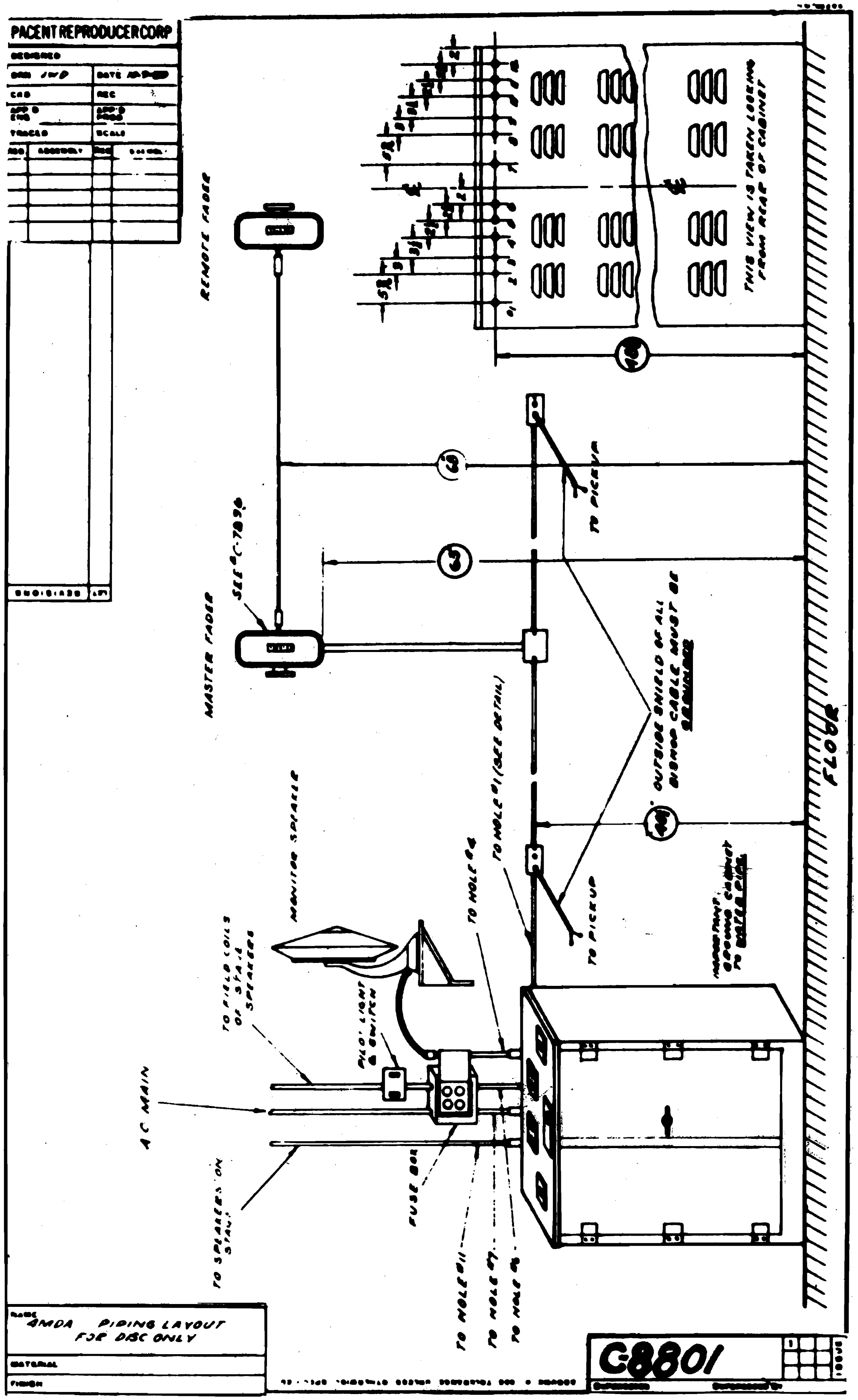
PACENT REPRODUCER CORP.

MODEL 500 DDA-Jr
Piping Layout
for Disc.



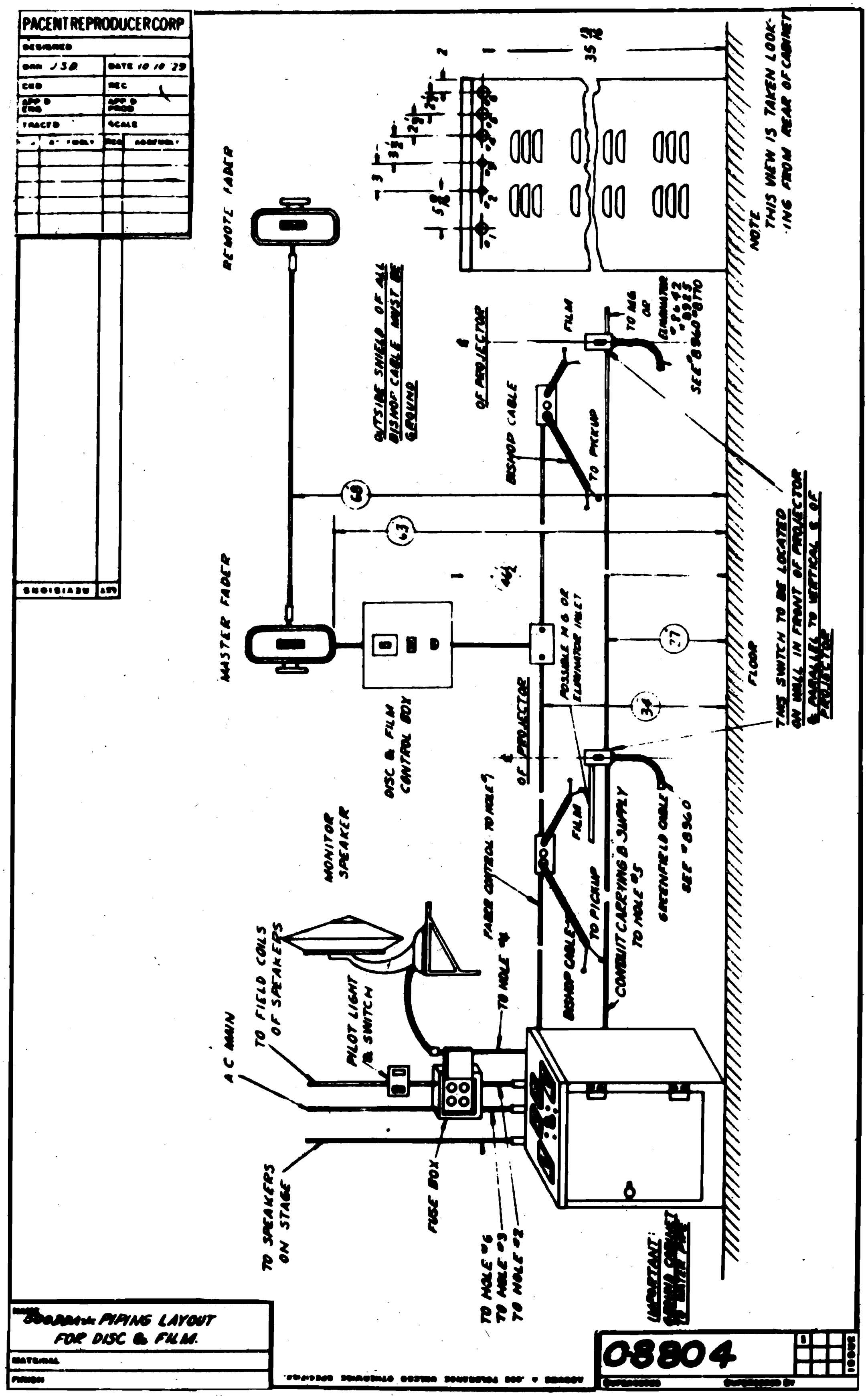
MODEL 4-MDA
Piping Layout
for Disc.

PACENT REPRODUCER CORP.



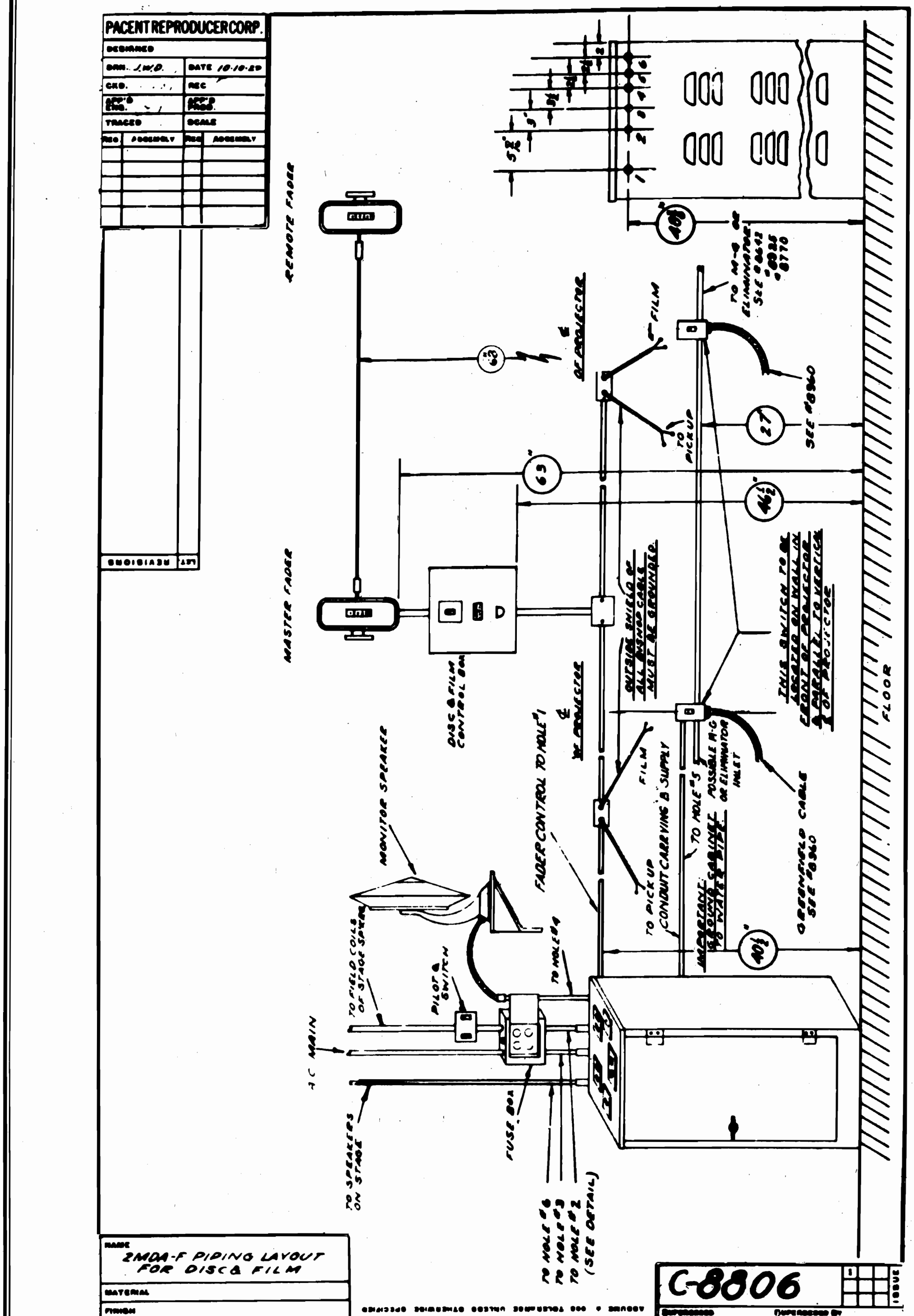
PACENT REPRODUCER CORP.

MODEL 500 DDA-Jr.
Piping Layout
for Disc-Film



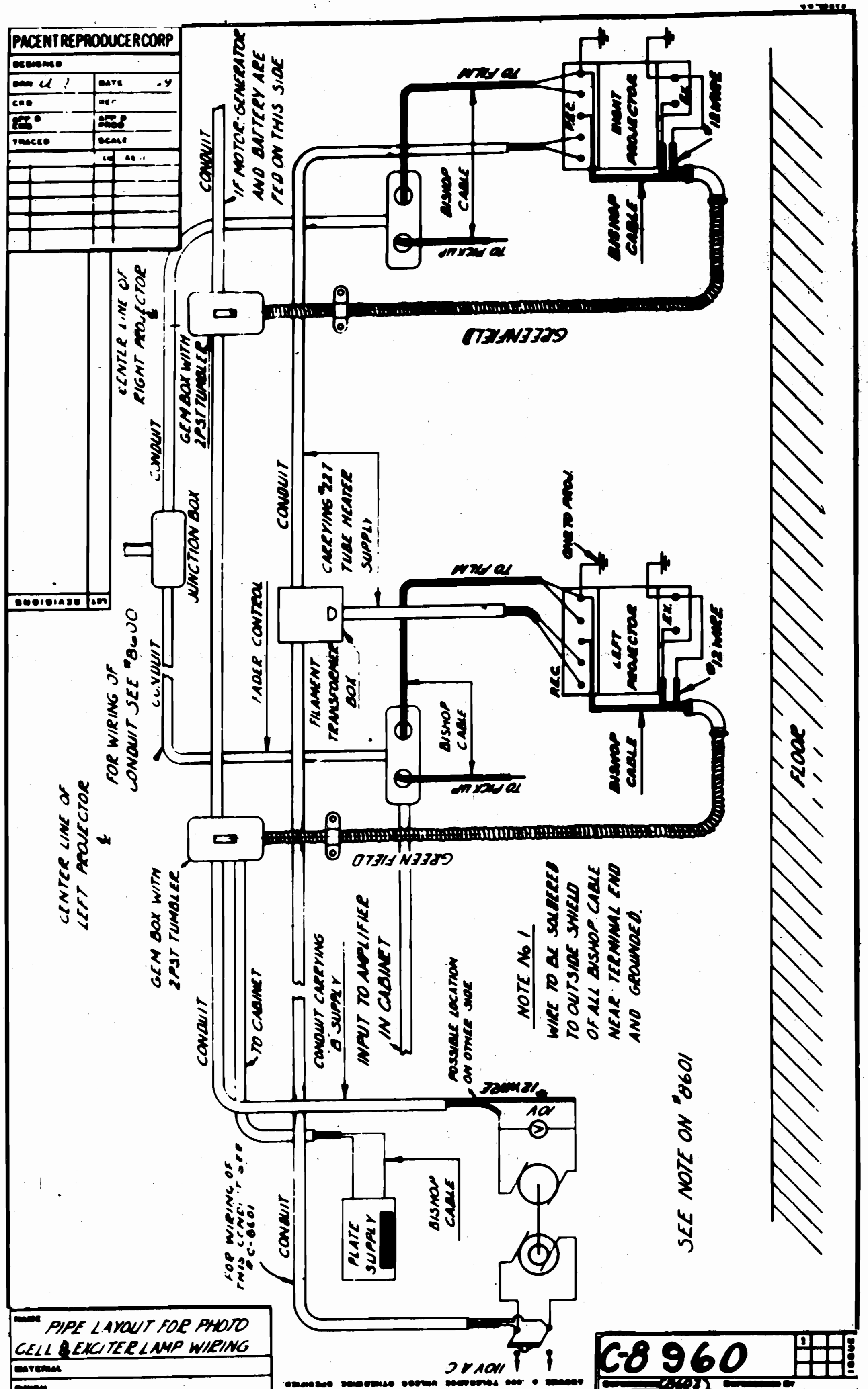
MODEL 2-MDA-F
Piping Layout
for Disc-Film

PACENT REPRODUCER CORP.



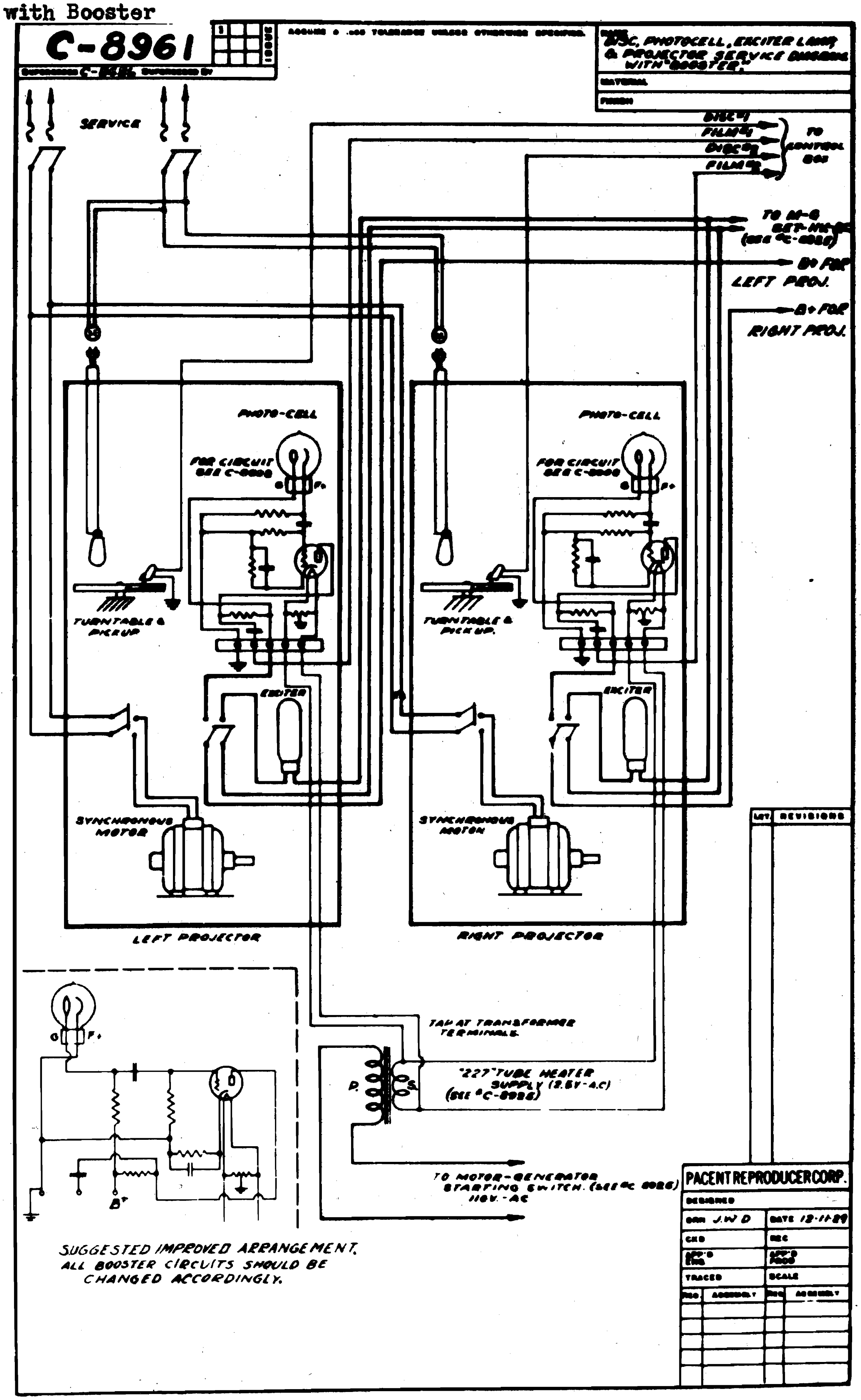
PACENT REPRODUCER CORP.

MODEL PEC-XITER
Piping Layout



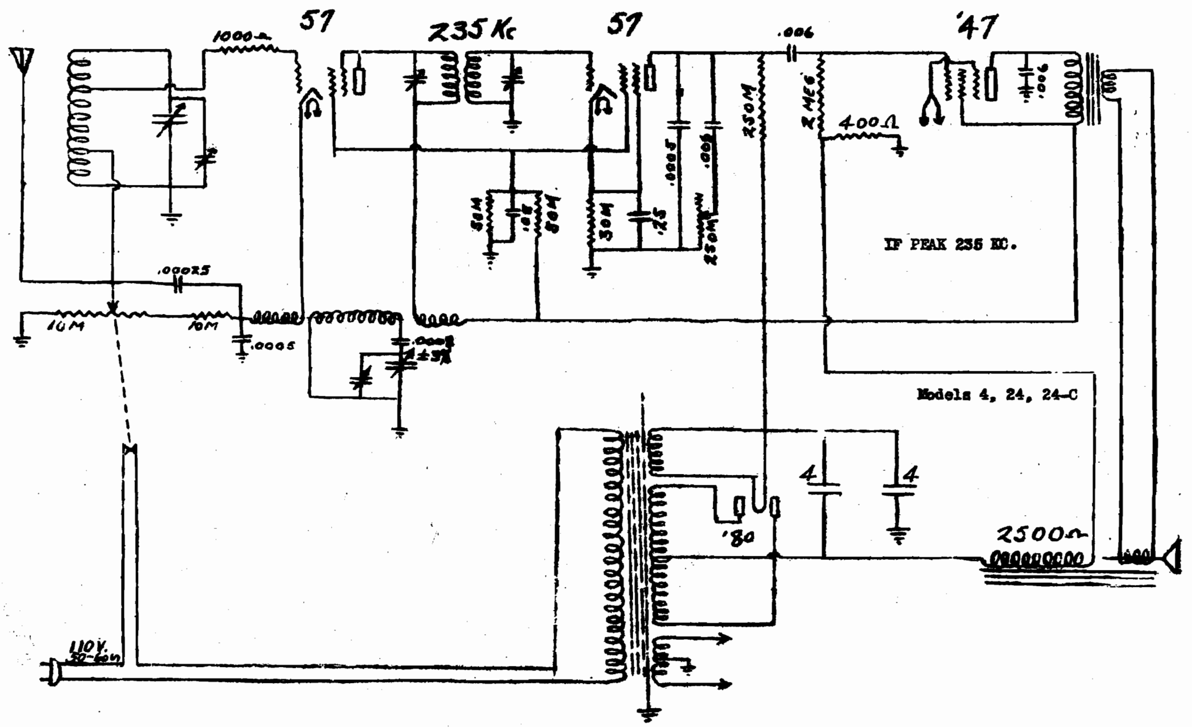
MODEL PEC, XITER and Projector Service Diagrams with Booster

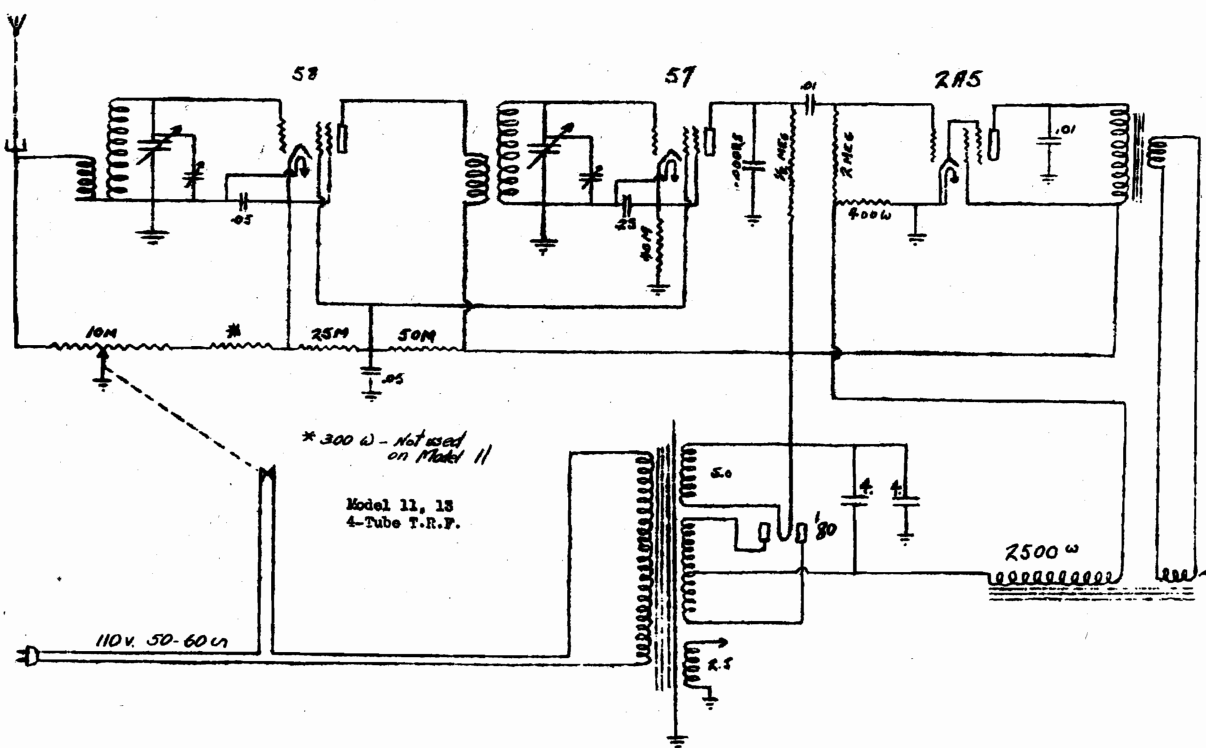
PACENT REPRODUCER CORP.



PACKARD RADIO CO.

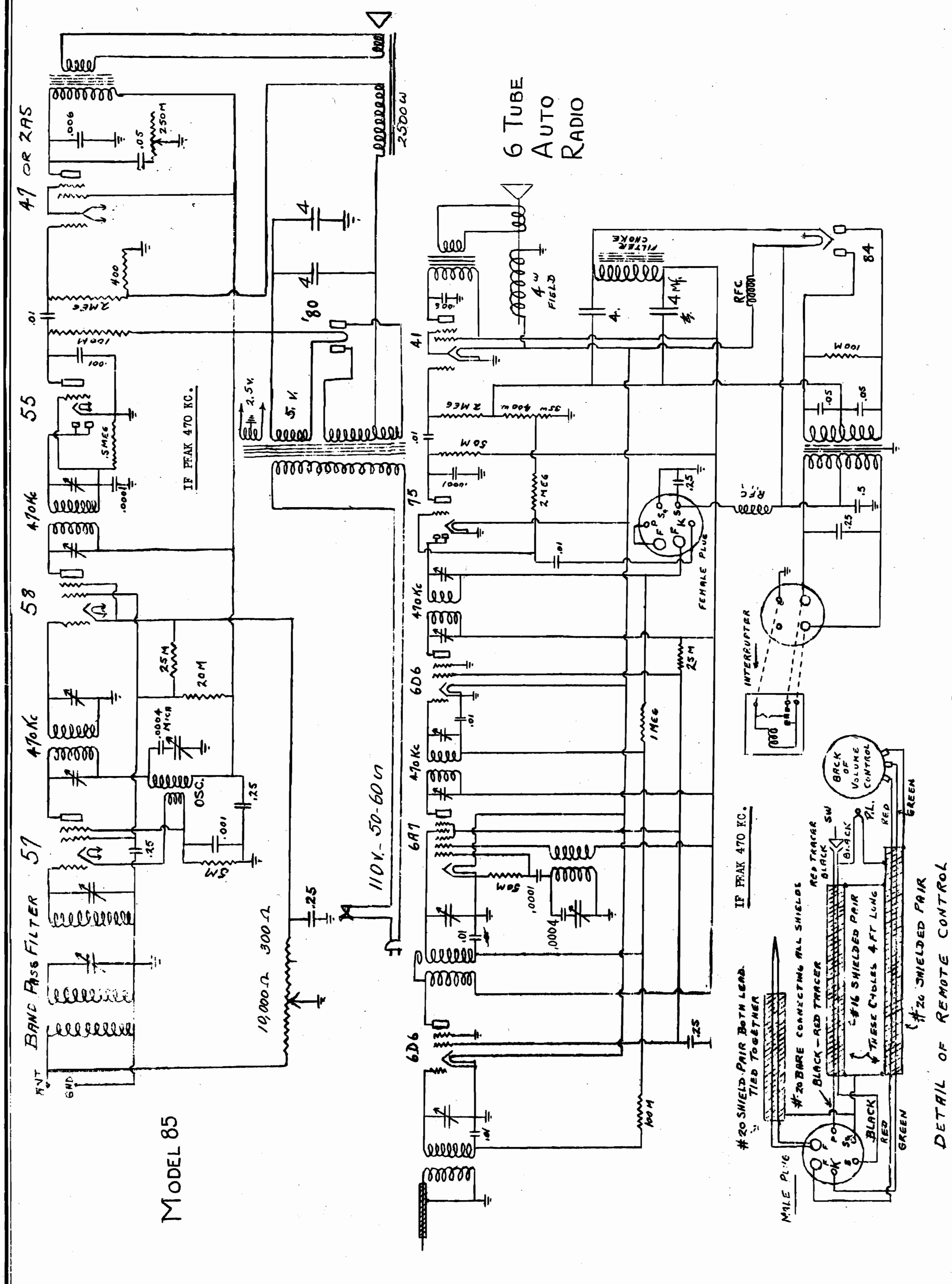
MODEL 4,24,24-C
MODEL 11,13





MODEL 85
MODEL 6 Tube Auto
Schematic

PACKARD RADIO CO.



PATTERSON RADIO CO.

MODEL 70-AW, 74-AW, 507-AW Schematic, Alignment, Test data

INTERMEDIATES

Connect a 262 K. C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

REBALANCING

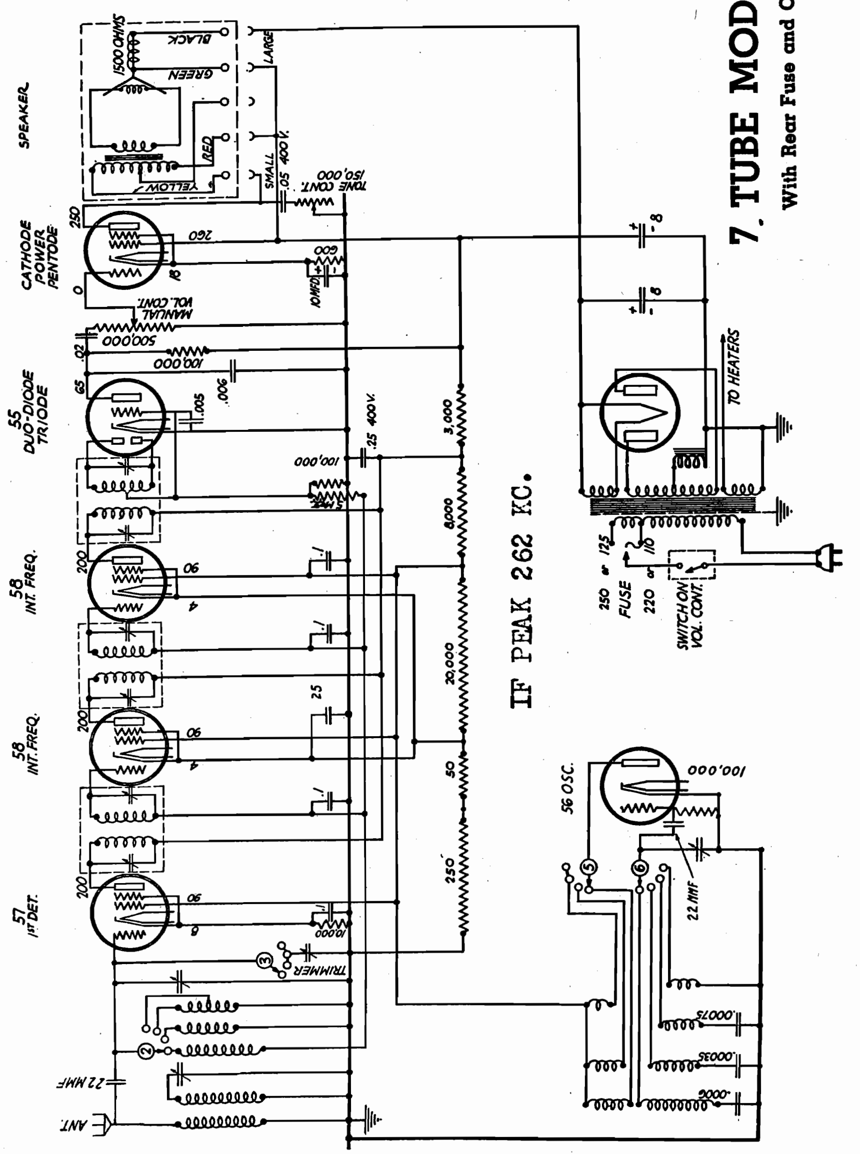
Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

SERVICE DATA

This model has the diode type AVC controlling the first detector and the intermediate frequency stages. The AVC makes it impossible to service and rebalance the set without the proper type of equipment. We advise building a VTVM as shown in the diagram. This meter can be used on any set that uses automatic volume control by connecting the hot lead to the Grid return of the tubes controlled by the AVC. Connect the ground lead to the cathodes of the same tubes. On this model connect the hot lead to the 5 meg. resistor and the ground lead to the chassis.

7 TUBE MODELS

With Rear Fuse and Cover



CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section rear of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 5 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear. Check tubes for leakage from grid to ground.

NOISY OPERATION (Not Static)

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter over the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

There is no freak or trick antenna that will eliminate natural static.

GENERAL

All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.

MODEL 80-AW, 84-AW, 508-AW
Schematic, Alignment
Test data

PATTERSON RADIO CO.

SERVICE DATA 8-TUBE MODEL

This model has the diode type AVC controlling the first detector and the intermediate frequency stages. The AVC makes it impossible to service and rebalance the set without the proper type of equipment. We advise building a VTVM as shown in the diagram. This meter can be used on any set that uses automatic volume control by connecting the hot lead to the Grid return of the tubes controlled by the AVC. Connect the ground lead to the cathodes of the same tubes. On this 8-tube model connect the hot lead to the 5 meg. resistor and the ground lead to the chassis.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—0 to 1 or 0 to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 5 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear. Check tubes for leakage from grid to ground.

NOISY OPERATION (Not Static)

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter over the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

There is no freak or trick antenna that will eliminate natural static.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262 K. C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

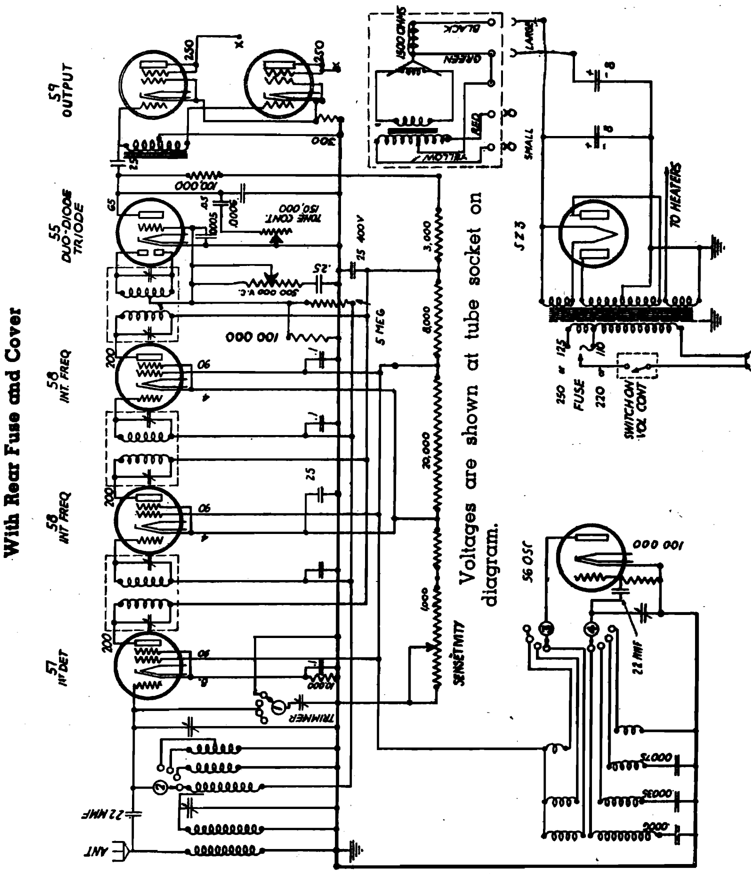
Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section rear of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

EIGHT TUBE MODELS (Compact and Consoles)

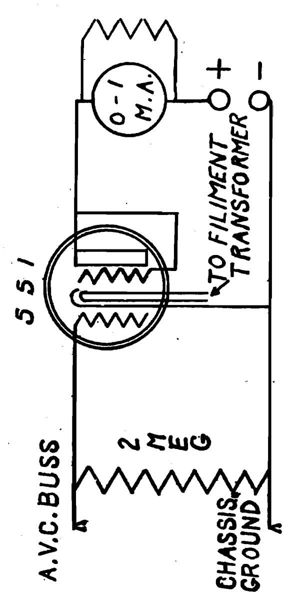
With Rear Fuse and Cover



Voltages are shown at tube socket on diagram.

IF PEAK 262 KC

Diagram for Vacuum Tube Volt Meter



PATTERSON RADIO CO.

MODEL 104-AW, 510-AW with #46 power tubes

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

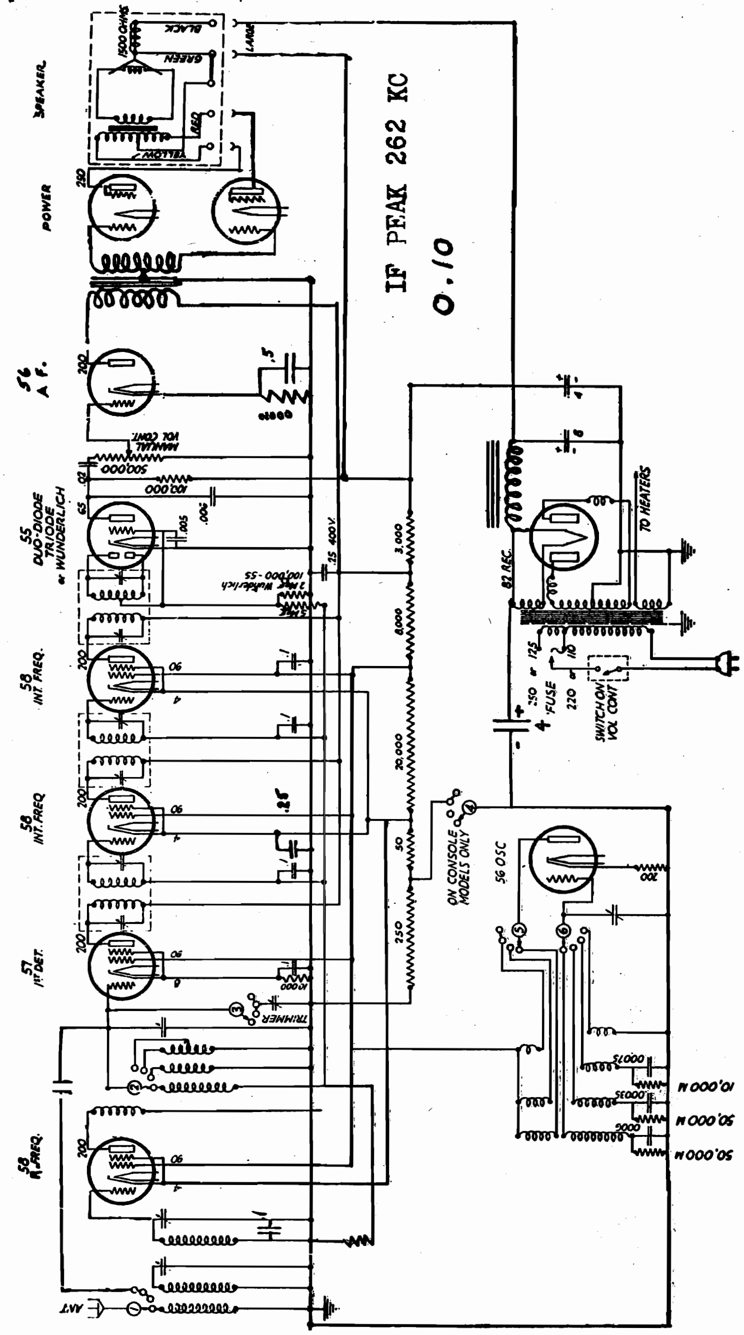
Connect a 262 K. C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

SERVICE DATA

This model has the diode type AVC controlling the first detector and the intermediate frequency stages. The AVC makes it impossible to service and rebalance the set without the proper type of equipment. We advise building a VTVM as shown in the diagram. This meter can be used on any set that uses automatic volume control by connecting the hot lead to the Grid return of the tubes controlled by the AVC. Connect the ground lead to the cathodes of the same tubes. On this model connect the hot lead to the 5 meg. resistor and the ground lead to the chassis.

Patterson
ALL-WAVE
SUPER-HETERODYNE
LOS ANGELES U. S. A.

10 TUBE MODEL
Without Rear Fuse and Cover
No. 46 Power Tubes



TUBE TROUBLE

The tubes in this set have been carefully checked and re-heated four times before shipment. Occasionally a tube has a small air leak that will allow gas to enter and cause it to become inoperative within the first thirty days. After this time they should give from 1500 to 2000 hours of satisfactory service.

CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section rear of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 5 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear. Check tubes for leakage from grid to ground.

NOISY OPERATION (Not Static)

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter over the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

There is no freak or trick antenna that will eliminate natural static.

GENERAL

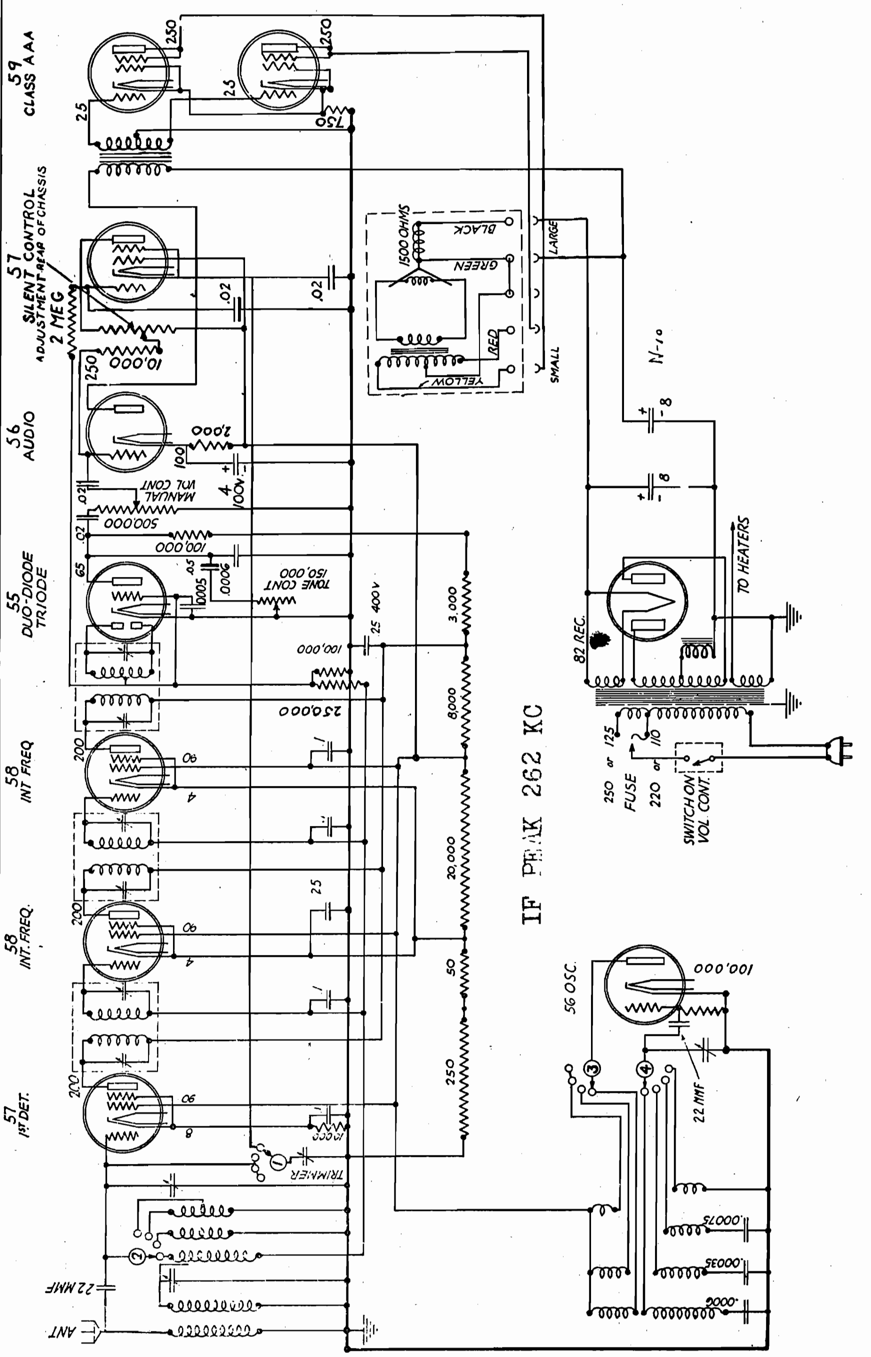
All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.

MODEL 104-AW, 510 AW
with #59 Power tubes
Schematic, Data

PATTERSON RADIO CO.



10 TUBE MODEL

With Rear Fuse and Cover
No. 59 Power Tubes

SERVICE DATA

This model has the diode type AVC controlling the first detector and the intermediate frequency stages. The AVC makes it impossible to service and rebalance the set without the proper type of equipment. We advise building a VTVM as shown in the diagram. This meter can be used on any set that uses automatic volume control by connecting the hot lead to the Grid return of the tubes controlled by the AVC. Connect the ground lead to the cathodes of the same tubes. On this model connect the hot lead to the ¼ meg. resistor and the ground lead to the chassis.

SENSITIVITY CONTROL

Models that have this control in rear of chassis. Adjust to required sensitivity by disconnecting antennae and turning control toward maximum until a strong local broadcasting station is heard with a slight fringe howl on each side of the carrier.

SILENT AUTOMATIC VOLUME CONTROL
(10 tube models only)

Adjust tuning dial to greatest noise level between stations with right hand trimmer switch turned to extreme left. Then close switch by turning trimmer to extreme right; adjust screw driver control just below point that eliminates all noise.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262 K. C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section rear of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

GENERAL

All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.

MODEL 14
Voltage,
Chassis view
Socket, Data

PHILCO RADIO & TELEVISION CORP.

PHILCO RADIO MODEL 14 is a nine-tube superheterodyne receiver, designed for operation upon alternating current. The intermediate frequency of the superheterodyne circuit is 175 kilocycles. The frequency range of the receiver is 520-4000 kilocycles, which includes standard broadcast, police, aircraft, and amateur radiophone reception. The tube sequence is: Type 78 tube for radio frequency amplifier, Type 6A7 tube as combination first detector and oscillator, Type 78 for intermediate frequency, Type 37 for automatic volume control—second detector, Type 77 as first audio frequency, Type 42 as Driver—2nd A. F.; two Type 42's as triodes form the class "A" amplifier, and a Type 80 is the rectifier. The power consumption of the Model 14 is 110 watts. The Receiver incorporates automatic volume control, four-point bass-compensating tone control, shadow-tuning, and a waveband switch which permits reception over a wide frequency band with the same superheterodyne circuit.

Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts.

CIRCUIT	R. F.	Det. Osc.	I. F.	A.V.C.-2nd, Det.	1st, A. F.	Driver (2nd A. F.)	Output (Class "A")		Rectifier
TYPE TUBE	78	6A7	78	37	77	42	42	42	80
Filament Volts—F to F..	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K.....	210	210	220	..	80	205	275	275	340
Screen Grid Volts—SG to K (Type 6A7—G3-5 to K)................	90	90	90	..	40	205	280	280	..
Control Grid Volts—CG to K (Type 6A7—G4 to K)................	.4	.1	3.2	.4	.5	.4	28	28	..
Cathode Volts—K to F...	2.7	2.7	3.2	..	..	..	..	..	..
Type 6A7—G1 to K.....	..	30	..	..	..	..	..	..	..
Type 6A7—G2 to K.....	..	170	..	..	..	..	..	..	..

*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other readings. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER IS RECOMMENDED FOR THIS. Volume Control at maximum; station selector at 520 K. C. Readings which are obtained with a plug-in adaptor will NOT be satisfactory.

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1-2	105-125	Primary	White
3-5	6.3	Filament	Black
6-7	5.0	Filament of 80	Blue
8-10	760	Plates of 80	Yellow
4	...	Center Tap of 3-5	Black—Yellow Tracer
9	...	Center Tap of 8-10	Yellow—Green Tracer

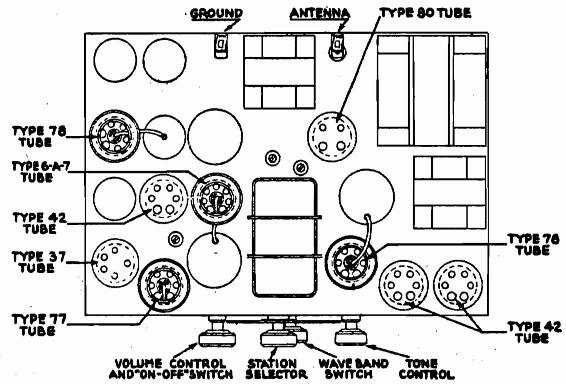


Fig. 1—Top View of Chassis

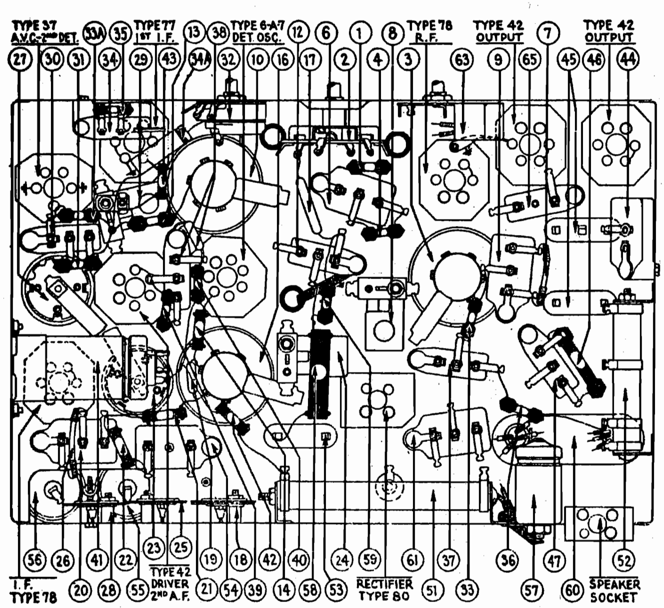


Fig. 2—Bottom View of Chassis Showing Parts

Adjustment of Model 14

The accurate adjustment of receivers is completed before shipment from the factory. Subsequent adjustments should not be undertaken unless complete instruction has been obtained in the adjustment of the compensating condensers. An accurately calibrated signal generator is necessary, and the PHILCO MODEL 048 ALL-PURPOSE SET TESTER, which contains a precision signal generator, is thoroughly recommended. Philco Service Bulletin No. 120-C, "Adjusting Philco Superheterodynes", outlines the general procedure. The following specifically supplements for Model 14:

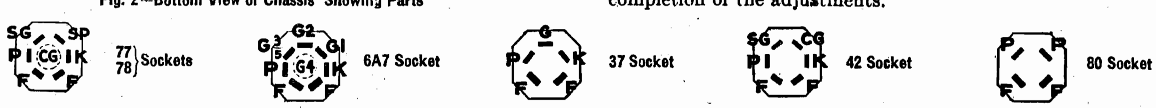
Figure 3 of the present Bulletin shows the electrical position of the several compensating condensers; Figure 2, the physical location of those compensating condensers which are mounted upon the underside of the chassis, and at the rear of the chassis sub-base.

The intermediate frequency compensating condensers should be adjusted first. The intermediate frequency is 175 kilocycles. The location of these compensating condensers is: (a) 1st, I. F. PRIMARY—(24),—underneath the chassis. May be reached through hole in chassis sub-base, to rear, *left*, of Tuning Condenser Assembly (5). See Figure 1. (b) 1st, I. F. SECONDARY—(25),—at rear of chassis, and accessible therefrom. Mounted near (55) and (56) electrolytic condensers. (c) 2nd, I. F. PRIMARY—(28),—at rear of chassis. Accessible from rear. Mounted next to (25). (d) 2nd, I. F. SECONDARY—(29),—underneath the chassis. Accessible through hole in sub-base, located between Type 42 (Driver) and Type 77 (1st, A. F.). See Figure 1.

Next, the "OSC.; H. F." (15), "DETECTOR" (11), and "ANT.; H. F." (8) compensating condensers should be adjusted in the order given. (15) and (11) are mounted upon the Tuning Condenser Assembly (5). (8) is located *underneath* the chassis, accessible through hole in sub-base at rear of Tuning Condenser Assembly (5),—between Tuning Condenser and Type 80 (Rectifier). See Figure 1. The signal generator is adjusted to a frequency of 1500 K. C. for (15), to 1400 K. C. for (11) and (8).

The "OSC.; L. F." (18) compensating condenser is next adjusted. It is located at rear of chassis, beside (25), and toward "GND" terminal of Receiver. The signal generator is set at 600 K. C. for this adjustment. The Tuning Condenser should be "rocked" during this adjustment.

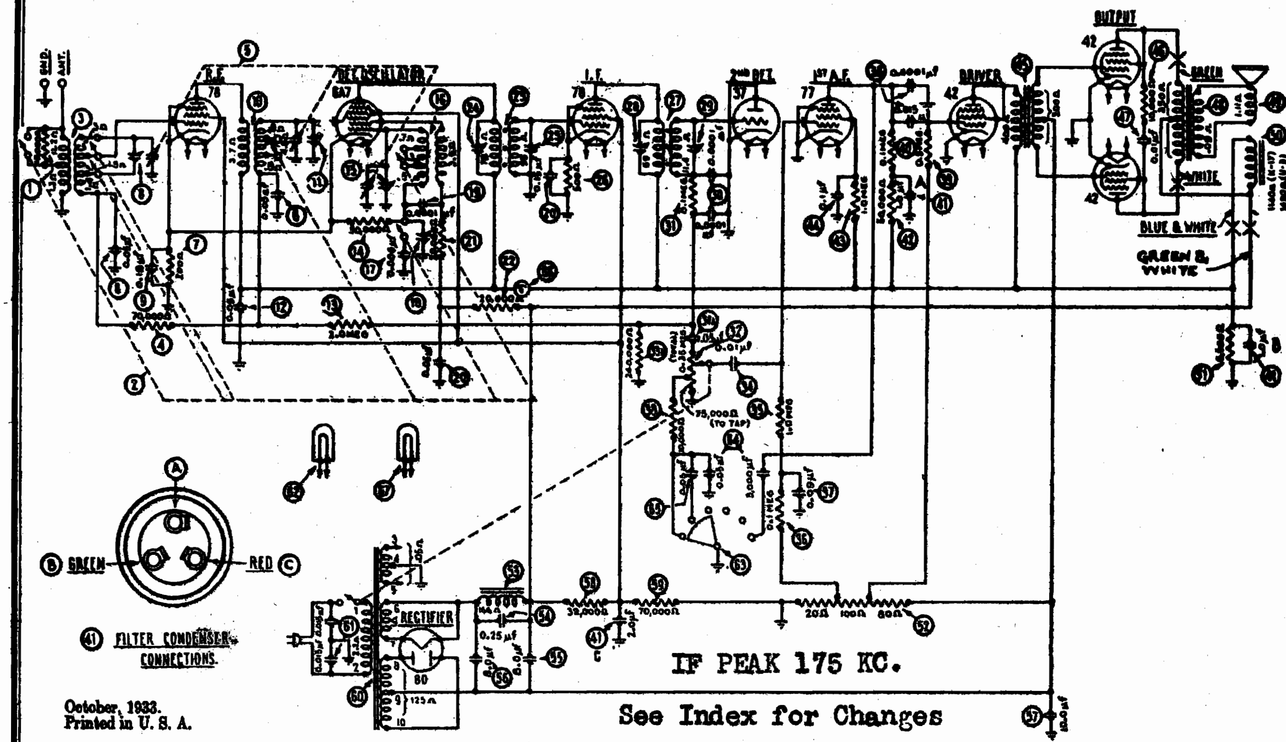
The "Push-on Button" shields covering the holes through which these adjustments are made, must be replaced upon completion of the adjustments.



Terminal Arrangement of Tube Sockets Viewed from Under Side of Chassis.

MODEL 14
Schematic
Parts List

PHILCO RADIO & TELEVISION CORP.



October, 1933.
Printed in U. S. A.

Fig 3—Schematic Wiring Diagram

No. on Figs.	Description	Part No.	List Price
1	Resistor (10,000) (Brown-Black-Orange)	4412	$0.24
2	Wave Band Switch	42-1035	.78
3	Antenna Transformer	32-1261	.60
4	Resistor (70,000) (Violet-Black-Orange)	5385	.24
5	Tuning Condenser Assembly (Code 122)	31-1099	4.35
	Tuning Condenser Assembly (Code 123)	31-1100	4.35
6	Condenser (Double) (.05-.05)	3615-AM	.24
7	Resistor (Flexible Wire Wound); (200) (Red-Black-Brown)	7217	.18
8	Compensating Condenser (Ant.; H. F.)	04000-A	.14
9	Condenser (.18)	4989-AC	.24
10	Detector Transformer	32-1256	.45
11	Compensating Condenser (Det.; Part of 5)	....	....
12	Condenser (.05)	3615-AA	.24
13	Resistor (2.0 meg.) (Red-Black-Green)	5872	.24
14	Resistor (50,000) (Green-Brown-Orange)	4518	.24
15	Compensating Condenser (Osc.; H. F.; Part of 5)	....	....
16	Oscillator Transformer	32-1262	.55
17	Condenser (.006)	6359	.48
18	Compensating Condenser (Osc.; L. F.)	04000-R	.42
19	Condenser (.0001)	4519	.22
20	Condenser (Double); (.05-.15)	6287-M	.25
21	Resistor (20,000) (Red-Black-Orange)	6650	.30
22	Resistor (20,000) (Red-Black-Orange)	6650	.30
23	1st, I. F. Transformer	32-1263	.55
24	Compensating Condenser (1st, I. F. Pri.)	04000-J	.24
25	Compensating Condenser (1st, I. F. Sec.)	04000-H	.22
26	Resistor (Flexible Wire Wound) (500) (Green-Black-Brown)	6977	.24
27	2nd, I. F. Transformer	32-1264	.55
28	Compensating Condenser (2nd, I. F. Pri.)	04000-J	.24
29	Compensating Condenser (2nd, I. F. Sec.)	04000-T	.19
30	Condenser (Double); (.0001-.0001)	8035-K	.25
31	Resistor (.1 meg.) (White-White-Orange)	4411	.24
32	Volume Control & "On-Off" Switch	33-5024	1.00
33	Resistor (10,000) (Brown-Black-Orange)	4412	.24
33a	Resistor (240,000) (Red-Yellow-Yellow)	4410	.24
34	Condenser (.01)	3903-Z	.17
34a	Condenser (.05)	30-4020	.14
35	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24
36	Resistor (.1 meg.) (White-White-Orange)	4411	.24
37	Condenser (.09)	4989-N	.24
38	Condenser (.00011)	4519	.22
	Condenser (.015)	3793-AB	.20
39	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.24
40	Resistor (.1 meg.) (White-White-Orange)	4411	.24
41	Electrolytic Condenser ("A"=1.0 mfd.; "B"=1.0 mfd.; "C"=2.0 mfd.)	30-2029	1.00

No. on Figs.	Description	Part No.	List Price
42	Resistor (50,000) (Green-Brown-Orange)	4518	.24
43	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24
44	Condenser (.1)	3615-BM	.25
45	Input Transformer	32-7057	2.70
46	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.24
47	Condenser (.01)	3903-P	.24
48	Output Transformer	32-7078	1.25
49	Voice Coil and Cone Assembly	36-3061	.90
50	Speaker Field Coil and Pot Assembly (U-3)	36-3162	6.75
51	Resistor (Wire Wound); (6,500)	33-3033	.25
52	Voltage Divider Resistor (Wire Wound)	33-3032	.30
53	Filter Choke	32-7115	1.50
54	Condenser (.25 mfd.)	6287-N	.20
55	Condenser (Electrolytic), (8.0 mfd.) (Code122)	30-2022	1.00
	Condenser (Electrolytic), (8.0 mfd.) (Code123)	7464	1.50
56	Condenser (Electrolytic), (8.0 mfd.) (Code122)	30-2025	1.15
	Condenser (Electrolytic), (8.0 mfd.) (Code123)	7464	1.50
57	Condenser (Electrolytic), (10.0 mfd.)	30-2003	.84
58	Resistor (32,000) (Orange-Red-Orange)	33-1026	.30
59	Resistor (70,000) (Violet-Black-Orange)	5385	.24
60	Power Transformer (50-60 cycles)	32-7111	5.75
61	Condenser (Double); (.015-.015)	3793-R	.30
62	Pilot Lamp (Station Selector)	6608	.14
63	Tone Control	30-4073	.55
64	Condensers, (Internal to 63)	....	....
65	Condenser, (External to 63)	3615-G	.19
66	Shadow Tuning Meter	6497	2.70
67	Pilot Lamp; (Part of 66 Shadow Tuning Meter)	....	....
	Shield ("Push-on" Button)	W-775	per C 1.50
	Tube Shield	28-1107	.12
	Four-Prong Tube Socket	7544	.07
	Five-Prong Tube Socket	7546	.12
	Six-Prong Tube Socket	7547	.12
	Seven-Prong Tube Socket	27-6005	.12
	Speaker Socket	4957	.10
	Dial Scale (Station Selector)	27-5013	.20
	Mounting Bolt (Chassis)	W-567	per C 2.88
	Mounting Washer (Chassis)	5189	.04
	Mounting Washer (Chassis)	5058	per C .82
	Knob (large)	03063	.10
	Knob (small)	03064	.07
	Knob Spring	5262	per C .42
	Bezel	6418	.24
	Bezel Mounting Screw	W-452	per M 4.20
	Bezel Felt	6732	per C .25
	Speaker (K-17) (Baby Grand Only) Output Transformer	32-7078	1.25
	Speaker (K-17) (Baby Grand Only) Voice Coil & Cone Assembly	36-3020	.48
	Speaker (K-17) (Baby Grand Only) Speaker Field & Pot Assembly	36-3104	2.25
	Speaker Socket *Hole Cover*	7084	per C .90
	Speaker Cable	L-1632	.24

MODEL 16
Schematic, Voltage Data

PHILCO RADIO & TELEVISION CORP.

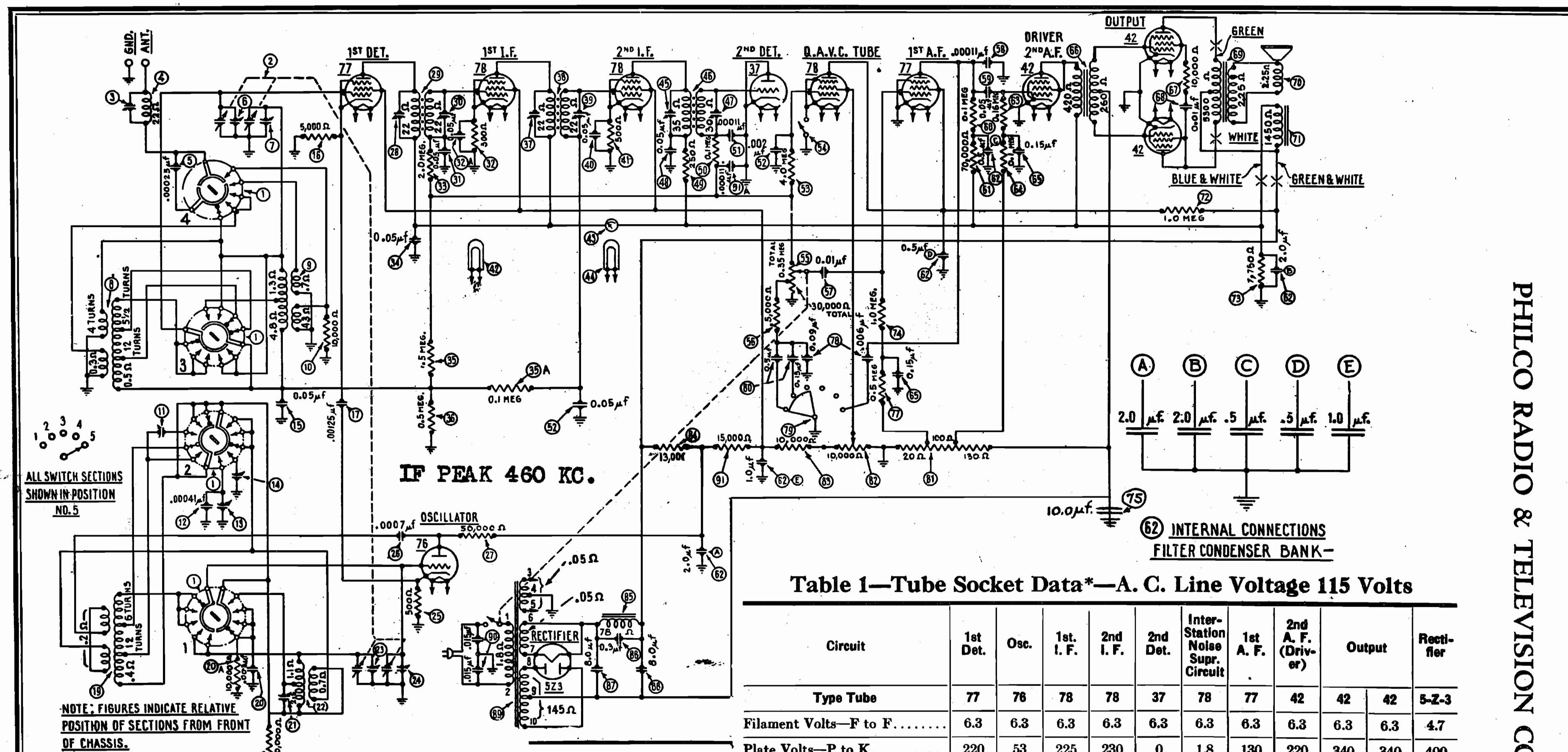


Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	1st Det.	Osc.	1st. I. F.	2nd I. F.	2nd Det.	Inter-Station Noise Supr. Circuit	1st A. F.	2nd A. F. (Driver)	Output		Rectifier
Type Tube	77	76	78	78	37	78	77	42	42	42	5-Z-3
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	4.7
Plate Volts—P to K	220	53	225	230	0	1.8	130	220	340	340	400
Screen Grid Volts—SG to K	80	—	80	80	—	1.8	1.8	220	340	340	—
Control Grid Volts—CG to K	1.6	6.4	0	0	.2	1.6	.4	.6	34	34	—
Cathode Volts—K to F	4.2	1.9	2.2	2.5	0	0	0	0	0	0	—

* All of the above readings were taken from the underside of the chassis, using test prods and leads, with a suitable A. C. voltmeter for filament voltages, and a high-resistance multi-range D. C. voltmeter for other readings. The *Philco Model 048 All-Purpose Set Tester* is highly recommended for this use. Volume control set at maximum and station selector turned to low frequency end; interstation noise suppression circuit potentiometer turned all the way to the right; and toggle switch (interstation noise suppression circuit) in "ON" ("S") position. Readings taken with a plug-in adapter will NOT be satisfactory.

Terminal Arrangement of Tube Sockets Viewed from Underside of Chassis

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1—2	105—125	Primary	White
3—5	6.3	Filament	Black
6—7	5.0	Filament of 5-Z-3	Blue
8—10	800	Plates of 5-Z-3	Yellow
4	—	Center Tap of 3—5	Black—Yellow Tracer
9	—	Center Tap of 8—10	Yellow—Green Tracer

NOTE—These values are for Model 16-122. Model 16-121 uses a Type 80 Rectifier Tube. See Note at end of Replacement Parts List.

MODEL 16
Chassis view
Sockey layout

PHILCO RADIO & TELEVISION CORP.

The Philco Radio Model 16 is an eleven-tube superheterodyne broadcast and short-wave receiver, operating upon alternating current and employing the high-efficiency 6.3 volt tubes, automatic inter-station noise suppression, and a frequency (wave-band) coverage that permits reception of the short-wave (high-frequency) broadcast programs. The same superheterodyne circuit is used for all reception. The Receiver is equipped with a five-point wave-band switch. The ranges are—

(1) 520 K. C. to 1500 K. C. (3) 3.2 M. C. to 6.0 M. C.
(2) 1.5 M. C. to 4.0 M. C. (4) 5.8 M. C. to 12.0 M. C.
(5) 11.0 M. C. to 23.0 M. C.

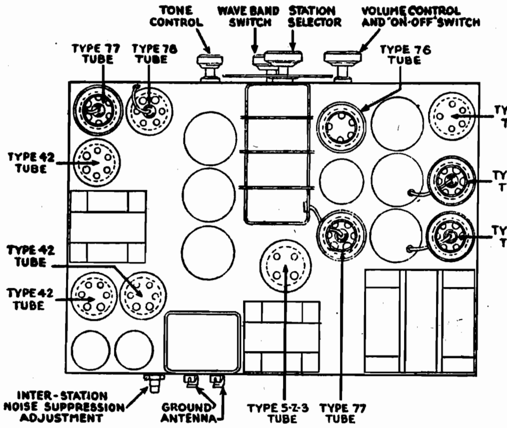


Fig. 1—Top View of Chassis, Showing Tube Locations and Major Parts

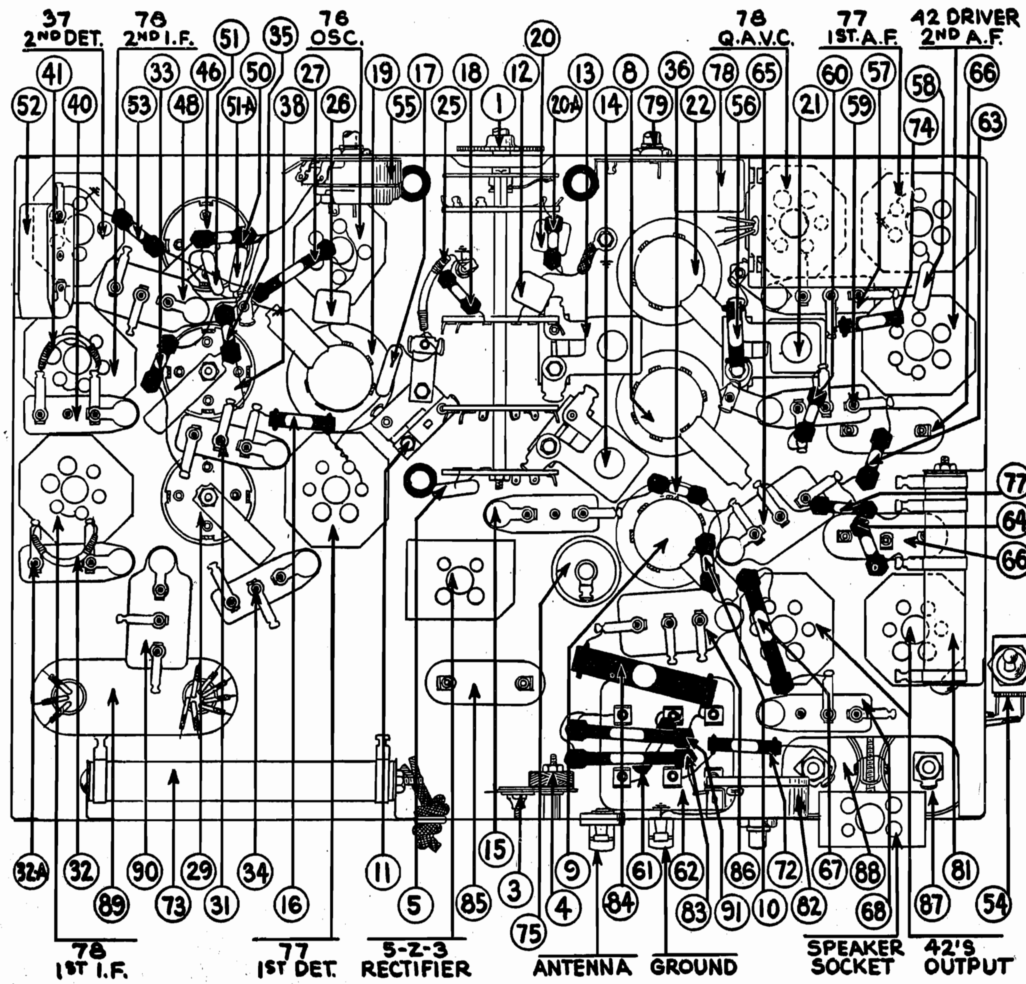


Fig. 3—Bottom View of Chassis, Showing Parts

The Receiver employs a Philco Type 77 tube for first detector, a Type 76 for oscillator, a Type 78 for first I. F., a Type 78 for second I. F., and a Type 37 for second detector. The automatic interstation noise suppression circuit uses a Type 78, the first A. F., a Type 77. The driver (second A. F.) is a Type 42; the class "A" amplification is accomplished with two Type 42 tubes as triodes; the rectifier is a Type 5-Z-3. The intermediate frequency is 460 kilocycles. The power consumption of Model 16-122 is 130 watts; of Model 16-121, 120 watts.

MODEL 16
Parts List

PHILCO RADIO & TELEVISION CORP.

No. on Figs.	Description	Part No.	List Price
1	Wave Band Switch	42-1037	....
2	Tuning Condenser Assembly	31-1039	....
3	Compensating Condenser (Wave-trap) { Wave-trap Assembly }	38-5199	....
4	Inductance (Wave-trap)		
5	Condenser	5858	.16
6	Compensating Condenser (Ant.; H. F.; Part of 2)	......	....
7	Compensating Condenser (Ant.; Broadcast and Police; Part of 2)	......	....
8	Antenna Transformer (H. F. Bands)	32-1183	....
9	Antenna Transformer (B'dc't & Police B'ds)	32-1182	....
10	Resistor (Brown-Black-Orange)	4412	.20
11	Compensating Condenser (Range 3)	04000-V	.16
12	Condenser	30-1000	.20
13	Compensating Condenser (Range 2; series)	04000-R	.35
14	Compensating Condenser (Range 1; series)	04000-R	.35
15	Condenser	3615-L	.16
16	Resistor (Green-Black-Red)	5310	.20
17	Condenser	5886	.25
18	Resistor (Brown-Black-Orange)	4412	.20
19	Oscillator Coil (H. F.)	32-1185	....
20	Condenser	7301	.35
20a	Resistor (Brown-Black-Orange)	4412	.20
21	Compensating Condenser (Range 1; Shunt)	0-4000-A	.12
22	Oscillator Coil (Broadcast and Police)	32-1184	....
23	Compensating Condenser (Osc.; H. F.; Part of 2)	......	....
24	Compensating Condenser (Osc.; Police; Part of 2)	......	....
25	Resistor (Flexible Wire-wound; Green-Black-Brown)	6977	.20
26	Condenser	5863	.18
27	Resistor (Green-Brown-Orange)	4237	.25
28	Compensating Cond'ser (1st, I. F. Primary)	31-6002	....
29	1st, I. F. Transformer	32-1186	....
30	Compensating Cond'r (1st, I. F. Secondary)	Common with 28	....
31	Condenser	3615-AB	.20
32	Resistor (Flexible Wire-wound; Orange-Black-Brown)	33-3010	.15
32a	Condenser	3615-AT	.20
33	Resistor (Red-Black-Green)	5872	.20
34	Condenser	3615-D	.18
35	Resistor (Brown-Green-Green)	7009	.20
35a	Resistor (White-White-Orange)	4411	.20
36	Resistor (Yellow-White-Yellow)	4517	.20
37	Compensating Cond'ser (2d, I. F. Primary)	31-6002	....
38	2d, I. F. Transformer	32-1186	....
39	Compensating Cond'r (2d, I. F. Secondary)	Common with 37	....
40	Condenser	3615-AT	.20
41	Resistor (Flexible Wire-wound; Green-Black-Brown)	6977	.20
42	Pilot Lamp (Station Selector)	6608	.12
43	Shadow Tuning Meter	6497	2.25
44	Pilot Lamp (Shadow Tuning Meter; Part of 43)	......	....

No. on Figs.	Description	Part No.	List Price
45	Compensating Cond'ser (3d, I. F. Primary)	31-6003	....
46	3d, I. F. Transformer	32-1188	....
47	Compensating Cond'r (3d, I. F. Secondary)	Common with 45	....
48	Condenser	3615-AS	.25
49	Resistor (Part of 48)	......	....
50	Resistor (White-White-Orange)	4411	.20
51	Condenser	4519	.18
51a	Condenser	4519	.18
52	Condenser (Double)	7296-G	....
53	Resistor (Yellow-Black-Green)	6010	.20
54	Switch (Toggle); Interstation Noise Suppression Circuit	42-1036	.40
55	Volume Control and "On-Off" Switch	33-5013	1.00
56	Resistor (Green-Black-Red)	5310	.20
57	Condenser	3903-J	.20
58	Condenser	4519	.18
59	Condenser	3615-AD	.20
60	Resistor (White-White-Orange)	4411	.20
61	Resistor (Violet-Black-Orange)	5385	.20
62	Filter Condenser Bank	30-4026	3.00
63	Resistor (Brown-Blue-Yellow)	5331	.20
64	Resistor (White-White-Orange)	4411	.20
65	Condenser (Double)	6287-J	....
66	Input Transformer	32-7057	2.25
67	Resistor (Brown-Black-Orange)	3524	.20
68	Condenser	3903-F	.15
69	Output Transformer	32-7052	....
70	Voice Coil and Cone Assembly	36-3061	.75
71	Speaker Field, Assembled with Pot (U-2)	36-3088	....
72	Resistor (Brown-Black-Green)	4409	.20
73	Resistor (Wire-wound)	33-3020	.30
74	Resistor (Brown-Black-Green)	4409	.20
75	Condenser (Electrolytic)	30-2003	.70
77	Resistor (Yellow-White-Yellow)	4517	.20
78	Condenser (Internal to 79)	......	....
79	Tone Control	30-4033	....
80	Condensers (External to 79)	06713	.45
81	Voltage Divider Resistor (Wire-wound)	33-3021	.16
82	Potentiometer (Interstation Noise Suppression Circuit)	33-5015	.80
83	Resistor (Brown-Black-Orange)	3524	.20
84	Resistor (Brown-Orange-Orange)	6450	.35
85	Filter Choke	32-7056	1.85
86	Condenser	6287-F	.12
87	Condenser (Electrolytic)	30-2011	1.25
88	Condenser (Electrolytic)	30-2011	1.25
89	Power Transformer (50-60~)	32-7058	5.00
90	Condenser (Double)	3793-E	.20
91	Resistor (Brown-Green-Orange)	5718	.40
	Tube Shield	28-1107	.10
	Four-prong Socket	7545	.08
	Five-prong Socket	7546	.10
	Six-prong Socket	7547	.10
	Knob (Large)	03063	.08
	Knob (Small)	03064	.06

NOTE.—Model 16-121 uses a Type 80 tube in lieu of 5-Z-3. Parts used in the 16-121 chassis that differ from the 16-122 parts above listed are:

July, 1933

No. on Figs.	Description	Part No.	List Price
89	Power Transformer (50-60~)	32-7080	....
87	Condenser (Electrolytic) (8.0 Mfd.)	6706	1.50
88	Condenser (Electrolytic) (8.0 Mfd.)	7464	1.25
	Speaker	K-17	....
	Speaker Socket	7084	....
	Speaker Cable	L1632	....

Effective December 20th, the shadowmeter used on Model 16 will be part No. 45-2028 instead of the No. 6497 previously used. The new shadowmeter gives a somewhat better deflection when tuning.

A change which eliminates a long lead, separates two capacities, and gives improved results, is effective with Run Number 8, in which By-pass Condenser 52 (.05-.002), Part No. 7296-G is superseded by By-pass Condenser, (.002), Part No. 7296-F; connection between Condenser 52 and 2nd, I. F. Transformer 38 is removed, and Condenser (Tubular) (.05) Part No. 30-4020 inserted between the secondary of 38 and ground at Condenser 31. A 1-inch length of Part No. L-1228 Spaghetti is used to protect one end of Condenser Part No. 30-4020 from grounding.

Better results,—mechanically,—are gotten when, in the Run, Condenser 12 (.00041) (Yellow-Orange), Part No. 30-1000, is superseded by Condenser (.00041) (Yellow-Orange-Green). Part No. 30-1027.

November 15, 1933

PHILCO RADIO & TELEVISION CORP.

ADJUSTING MODEL 16

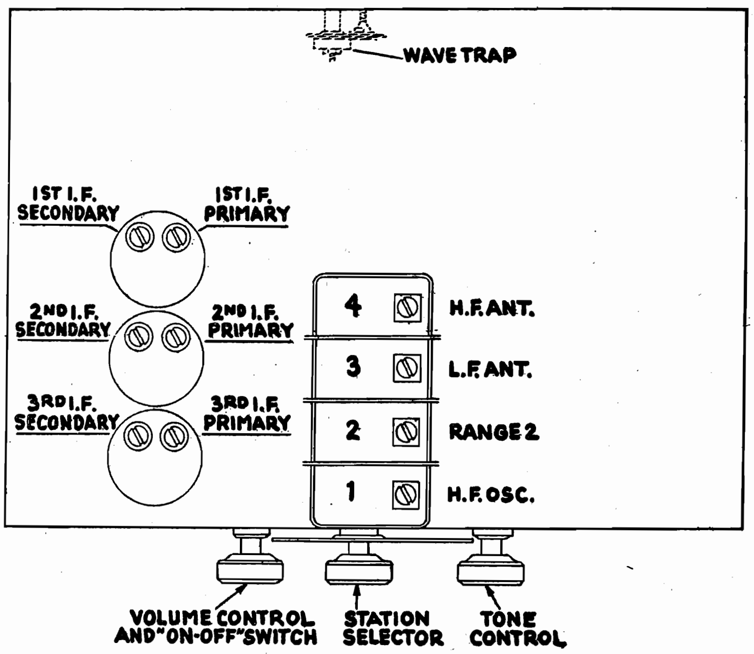


Fig. 1—Position of Compensating Condensers

NOTE: DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections 3 and 4 of the tuning condenser of Model 16. These compensating condensers are carefully adjusted, and sealed at the factory.

The compensating condensers of the Model 16 All-Wave Receiver are adjusted in essentially the same manner as detailed in Service Bulletin No. 120-C. The ability of the Model 16 to cover the higher frequencies up to 23 megacycles requires the use of a signal generator which will supply a suitable frequency, with its harmonics, to cover the adjustment throughout the short wave bands.

The Philco Model 091 signal generator is recommended for the higher frequencies. It supplies an accurate and constant 3600 kilocycle (3.6 megacycle) signal, whose harmonics include the necessary high frequencies.

The Philco Model 048 All-Purpose Set Tester is recommended for the adjustment of the I. F. compensating condensers, and for *any* adjustments requiring the use of a signal generator supplying frequencies between the limits of 105 kilocycles and 2000 kilocycles.

The Model 16 is adjusted as follows:

ADJUSTMENT OF THE I. F.

Connect the signal generator and receiver in the manner described in Philco Service Bulletin No. 120-C. (NOTE: The output terminals of the signal generator are connected to the grid cap of the first detector tube,—after removing the grid clip,—and to the "GND." terminal of the receiver. The output meter is connected to the primary terminals of the output transformer). The intermediate frequency of Model 16 is 460 K. C. Adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I. F. compensating condensers is shown in Fig. 1. They are reached from the top of the receiver chassis.

WAVE TRAP ADJUSTMENT

Replace the grid clip on the first detector tube. Connect the output of the signal generator to the antenna and ground terminals of the receiver. Adjust the wave-band switch of the receiver to the broadcast band (520-1500 K. C.) (Range 1) and the station selector to the low frequency (520 K. C.) end. Adjust the wave-trap condenser to give *minimum* response to a 460 K. C. signal from the signal generator. This adjustment is made from rear of chassis.

PHILCO RADIO & TELEVISION CORP.

ADJUSTMENT OF DIAL FREQUENCIES

In the procedure given herewith, the frequency ranges are referred to as follows:

Range 1	520 K. C.—1500 K. C.
Range 2	1.5 M. C.— 4.0 M. C.
Range 3	3.2 M. C.— 6.0 M. C.
Range 4	5.8 M. C.—12.0 M. C.
Range 5	11.0 M. C.—23.0 M. C.

The tuning condenser (four-gang) sections and their individual compensating condensers are shown in Figure 1. They are additionally referred to as numbered sections 1 to 4 inclusive, with 1 as the front section.

Do not attempt to adjust compensating condensers on sections 3 and 4.

The compensating condensers of "H. F. Osc." circuit and of "Range 2 (Police & Aircraft)", are located upon sections 1 and 2, respectively.

Connect the output terminals of the signal generator (Model 091) to the antenna and ground terminals of the receiver. Adjust the wave-band switch of the receiver to Range 4 and adjust the station selector to 10.8 megacycles. At this point the third harmonic of the 3.6 M. C. generator can be picked up. Adjust the "H. F. Osc." compensating condenser (located on section 1 of tuning condenser) to give maximum response in the output meter.

Next, the wave band switch is set upon Range 5, and the station selector placed at 21.6 megacycles.

If the signal from the signal generator is not picked up within a reasonable distance (approximately 100 K. C. either side) of the 21.6 M. C. position on the receiver station selector dial, it will be necessary to re-adjust the 10.8 M. C. compensating condenser to care for the 21.6 M. C. signal. Such adjustment causes a slight error in the 10.8 M. C. setting. The error at the two points (10.8 and 21.6 M. C.) must be split in proportion to the frequencies. Care should be taken not to mistake the image of 21.6 M. C., which also can be heard at approximately 20.7 M. C.

Next, the adjustment should be made at 5.2 M. C. on Range 3. At this point the second harmonic of the oscillator circuit in the receiver beats with the third harmonic of the 3.6 megacycle crystal in the 091 signal generator. This adjustment is accomplished by means of the "Range 3" compensating condenser (11 in Service Bulletin No. 165), mounted under the chassis, and reached from beneath.

Following this, adjustment at 3.6 M. C. on Range 2 should be made. The "Antenna" connection between the signal generator and the receiver must be removed for this adjustment, as the output of the signal generator is too great otherwise.

This adjustment is made with the compensating condenser ("Range 2: Police & Aircraft") mounted on section 2 of the tuning condenser.

Next in sequence, the station selector is set at 1.57 megacycles (Range 2), by approximating the correct position on the dial. The second harmonic of the receiver oscillator beats with the fundamental frequency of the 3.6 megacycle crystal in the signal generator. Normally, it is necessary to replace the "antenna" connection between the signal generator and the receiver, for this test. Adjustment is accomplished by means of "Range 2, series", compensating condenser (13 in Service Bulletin No. 165), reached from the underside of the chassis.

Next, adjustment of the "Range 1, Shunt," compensating condenser (21 in Service Bulletin No. 165) is made at 1400 kilocycles (Range 1), by means of the signal generator in the Model 048 All-Purpose Set Tester, or by using the eighth harmonic of a signal generator producing a 175 kilocycle frequency. This compensating condenser is reached from underside of chassis.

The next step is the adjustment of the "Range 1, Series," compensating condenser (14 in Service Bulletin No. 165), by placing the wave band switch on Range 1, and the station selector at 520 kilocycles. Use the signal generator in Model 048 Set Tester, with setting of 520 K. C., or the second harmonic of a signal generator giving a frequency of 260 kilocycles.

For proper adjustment of the Model 16 receiver, the procedure must be followed in the sequence given.

The adjustment should *not* be undertaken without full information and proper equipment. Your distributor can supply both.

August, 1933
Printed in U. S. A.

PHILCO RADIO & TELEVISION CORP.

Model 16

Effective with current production, Toggle Switch (Interstation Noise Suppression Circuit) (54), Part No. 42-1036, is superseded by Toggle Switch Part No. 3253, and two Part No. 9618 leads, in Model 16-123; by Toggle Switch Part No. 3253, one Part No. 9616 lead and one Part No. 9617 lead, in Model 16-121 and 16-122. The joint at the switch is protected by two pieces of sleeving. The *list* price of Switch, Part No. 3253, is 40 cents.

Effective with current production, Knob Part No. 03063 will be used upon Wave-Band Switch (1), in lieu of knob Part No. 03064, upon Models 16-121, 16-122 and 16-123. Tuning Condenser Assembly (2) will use Knob Part No. 42-4025, Volume Control and "On-Off" Switch (55) will use Knob Part No. 03064, and Tone Control (79) will use Knob Part No. 03064.

Model 16

Refer to Service Bulletin No. 165

Effective with Run Number 3, the following substitutions were made in the by-pass condensers:

(32)-A Part No. 3615-AT superseded by Part No. 3615-BK, *list* price, $0.16
(34) Part No. 3615-D superseded by Part No. 3615-BL, *list* price, 0.16
(40) Part No. 3615-AT superseded by Part No. 3615-BK, *list* price, 0.16

NOTE: The electrical values of these condensers remain the same.

Effective with Run Number 2, Resistor (41) Part No. 6977 (500 ohms) (Green-Black-Brown) is superseded by Resistor Part No. 33-3010 (300 ohms) (Orange-Black-Brown). Both are flexible wire-wound. The *list* price of Part No. 33-3010 is $0.15.

The large knob now used upon Tuning Condenser Assembly (2) bears Part No. 27-4025, instead o 42-4025. Make this correction to Service Bulletin No. 170; Page 2, line 5.

The following additional *list* prices should be included in the Replacement Parts list:

No. on Figures	Description	Part No.	List Price
(3) (4)	Wave Trap Assembly	38-5199	$0.30
(9)	Antenna Transformer (B'dc'st & Police Bands)	32-1182	.60
(65)	Condenser (Double)	6287-J	.30
(71)	Speaker Field, Assembled with Pot, (U-2)	36-3088	6.75

(NOTE: The above four list prices are effective September 15, 1933).

This additional *list* price should be included in the Replacement Parts list:

No. on Figs.	Description	Part No.	List Price
(52)	Condenser (Double)	7296-G	$0.19

Note: The above list price is effective September 15, 1933.

Models 16A-122 *and* 16A-123

(25 cycle sets)

Effective December 14, 1933, all production on these models will have the first electrolytic condenser (67), part No. 30-2014 superseded by part No. 30-2067, no change in connections. (No. 30-2014 is 8 mfd. 500 volt, and 30-2067 is 10 mfd. 15 volt.)

The following additional *list* prices should be included in the Replacement Parts list:

No. ON FIGURES	DESCRIPTION	PART No.	LIST PRICE
(1)	Wave Band Switch	42-1037	$2.75
(2)	Tuning Condenser Assembly	31-1039	.40
(37)	Compensating Condenser (2nd. I. F. Pri.)	31-6002	.35
(45)	Compensating Condenser (3rd. I. F. Pri.)	31-6003	.35
(69)	Output Transformer	32-7052	1.50

PHILCO RADIO & TELEVISION CORP.

MODEL 16
MODEL 17
Changes

Models 16 and 17

Change in Volume Control Circuit

The change in the volume control circuits of Models 16 and 17, outlined in this bulletin, is recommended in EVERY case where rotation of the volume control is accompanied by noise—traceable to the control.

PRODUCTION BEGINNING WITH RUN No. 4 FOR MODEL 16 SERIES, AND RUN No. 4 FOR MODEL 17 SERIES, INCLUDE THESE CHANGES.

Model 16

1. The Volume Control and "On-Off" Switch (55) is replaced by Volume Control and "On-Off" Switch, Part No. 33-5022, having an overall value of 2 megohms. The movable element of the Volume Control goes to (57) as heretofore; the tap to the resistor (56) mentioned under (2) below; the end nearest tap, to ground; and the opposite end to the .01 mfd. condenser mentioned in (3).

2. Resistor (56) (Green-Black-Red) is replaced by Resistor (Orange-Red-Orange), (32,000 ohms), Part No. 5279.

3. A resistor (Orange-Orange-Yellow) (330,000 ohms), Part No. 6046, is *added,* with one side grounded to frame; the other joining the original circuit at (60) and (58); this same point (high side of 330,000 ohm resistor) connected through a .01 mfd. condenser, Part No. 3903-J, (*added*), to the high side of the Volume Control.

4. Tone Control (70) is replaced by Tone Control, Part No. 30-4069, inclosing a .09 mfd. and a .003 mfd. condenser, with two .025 mfd. condensers in a single external housing, Part No. 7653-C, which replaces the two external condensers (80) in metal container. The .09 mfd. condenser is on the first tap of the tone control; one of the .025's is on the second tap, while the third tap is permanently connected to ground through the other .025 mfd. The "fourth" tap of the tone control (previously connected through the .006 mfd. condenser) is connected to the .003 mfd. condenser, connecting to the original circuit at the plate of the first A. F. tube (type 77) and to (58).

5. It is essential that A. C. shielded cable (Part No. L-1655) be used to connect the "On-Off" switch. The cable is a special two-conductor shielded and braided conductor. The shield of this cable is brought out at one end and tied to ground. This cable should be kept as close as possible to the chassis frame. At the power transformer (86) one lead of the shielded cable is connected to the external A. C. cable. In order that the other lead may be connected to the primary lead of the power transformer, it is necessary to use a stand-off insulator (Part No. 03103). This insulator may be mounted at any convenient place.

Model 17

1. The Volume Control and "On-Off" Switch (60) is replaced by Volume Control and "On-Off" Switch (Part No. 33-5023), having an overall value of 2 megohms. The movable element goes to (61) as heretofore; the tap to the resistor (62) mentioned under (2) below; the end nearest tap, to ground; and the opposite end to the .01 mfd. condenser mentioned in (3)

2. Resistor (62) (Green-Black-Red) is replaced by resistor (Red-Green-Orange) (25,000 ohms), Part No. 4516.

Continued on next page

MODEL 16
Changes
MODEL 17
Changes

PHILCO RADIO & TELEVISION CORP.

3. A resistor (Violet-Black-Orange) (70,000 ohms), Part No. 5385 is *added,* with one side grounded to frame; the other joining the original circuit at (30) and (33); this same point (high side of 70,000-ohm resistor) connected through a .01 mfd. condenser (Part No. 3903-J) (*added*) to the high side of the volume control.

4. Tone Control (65) is replaced by Tone Control, Part No. 30-4070, inclosing a .09 mfd. and a .003 mfd. condenser, with two .025 mfd. condensers in a single external housing, Part No. 7653-C, which replaces the two external condensers (64) in metal container. The .09 mfd. condenser is on the first tap of the tone control; one of the .025 mfd. condensers is on the second tap, while the third tap is permanently grounded through the other .025 mfd. condenser. The "fourth" tap of the tone control (previously connected through the .006 mfd. condenser) is connected to the .003 condenser, connecting to the original circuit at the plate of the first A. F. tube (type 77), and to (40).

5. It is essential that A. C. shielded cable (Part No. L-1655) be used to connect the "On-Off" switch. This cable is a special two-conductor shielded and braided conductor. The shield of this cable is brought out at one end and tied to ground. This cable should be kept as close as possible to the chassis frame. At the power transformer (68) one lead is connected to the external A. C. cable. In order that the other lead may be connected to the primary lead of the power transformer, it is necessary to use a stand-off insulator (Part No. 03103). This insulator may be mounted at any convenient place.

Production to *include* the change will be Run No. 5 for both models, instead of Run No. 4.

Model 16 — Model 17

An error occurs in the designation of Part No. 7084, as Speaker Socket of Code 121 (Models 16 and 17). Part No. 7084 is Speaker Socket *Hole Cover* and has a *list* price of 75 cents per hundred, as shown in Bulletin 170, under Model 16-121-122. The Code 121 of Models 16 and 17 does not have a Speaker Socket. Part No. 7084 covers (in Code 121) the opening which accommodates Speaker Socket Part No. 4957 in Code 122.

This correction should be made to Bulletin No. 161, bottom of second page, under NOTE; to Bulletin No. 165, bottom of fourth page, under NOTE; and to Bulletin No. 170, as noted above.

PHILCO RADIO & TELEVISION CORP.

MODEL 17
Voltage, Data
Chassis view
Socket layout

MODEL 17

The Philco Radio Model 17 is an eleven tube superheterodyne, designed for operation on alternating current. The same superheterodyne circuit is used for standard broadcast, police broadcast and airport and aircraft reception. The frequency coverage upon the two bands is,—

520–1500 K. C.
1500–4000 K. C. (4.0 megacycles).

The receiver employs a Philco Type 78 tube in the pre-selection circuit, a Type 6A7 as a combination first detector and oscillator, a Type 78 for the intermediate frequency, a Type 37 for second detector, a Type 37 for automatic volume control, and a Type 78 for automatic interstation noise suppression. The first audio frequency stage is a Type 77 tube, the driver (2nd A.F.) is a Type 42; the class "A" amplification is accomplished with two Type 42's as triodes, and the rectifier is a Type 5Z3. The intermediate frequency used in adjusting the superheterodyne circuit is 175 kilocycles. The power consumption is 130 watts.

Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	R.F.	Det. Osc.	I.F.	2nd Det.	A. V. C.	Inter-Station Noise Supr. Crt.	1st A.F.	Driver	Output		Rectifier
Type Tube	78	6A7	78	37	37	78	77	42	42	42	5Z3
Filament Volts—F to F..	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	4.7
Plate Volts—P to K.....	220	220	225	0	0	45	45	230	340	340	400
Screen Grid Volts—Sg to K... (6A7-G3-5 to K)	75	58	75	—	—	50	50	230	340	340	...
Control Grid Volts—CG to K.. (6A7-G4 to K)	Negligible	Negligible	3.7	.25	.25	.24	.24	.24	34.	34.	...
Cathode Volts—K to F..	0	0	3.7	0	11.	0	0	0	0	0	...

6A7-G1 to K = 22.0 Volts
6A7-G2 to K = 140.0 Volts

*All of the above readings were taken from the underside of the chassis, using test prods and leads, with a suitable A. C. voltmeter for filament voltages, and a high-resistance multi-range D. C. voltmeter for all other readings. Volume control at maximum and station selector turned to low frequency end; interstation noise suppression circuit potentiometer turned all the way to right; and toggle switch (interstation noise suppression circuit) in "ON" position. Readings taken with a radio set tester and plug-in adapter will NOT be satisfactory.

NOTE: These values are for Model 17-122. Model 17-121 uses a Type 80 Rectifier. See note at end of Parts List.

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1– 2	105–125	Primary	White
3– 5	6.3	Filament	Black
6– 7	5.0	Filament of 5Z3	Blue
8–10	800	Plates of 5Z3	Yellow
4	...	Center Tap of 3-5	Black—Yellow Tracer
9	...	Center Tap of 8-10	Yellow—Green Tracer

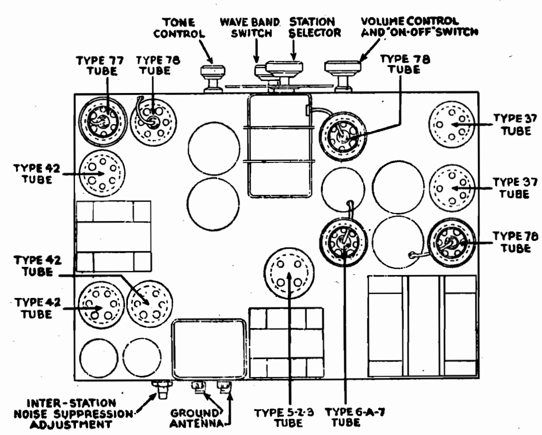


Fig. 1—Top View of Chassis, showing Tube Locations, and Major Parts

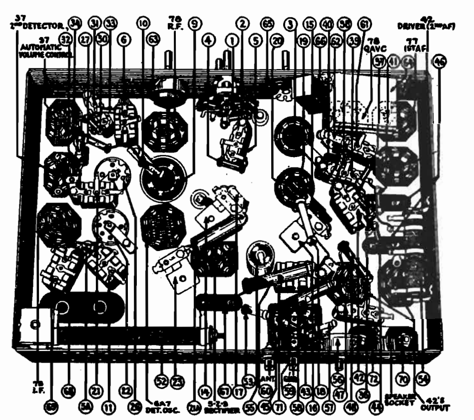
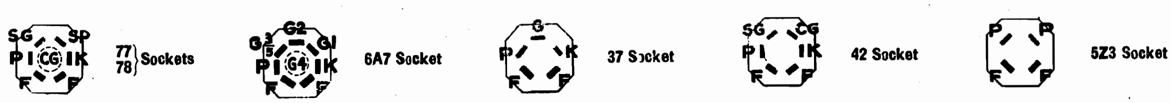


Fig. 2—Bottom View of Chassis, showing Parts



June, 1933

Terminal Arrangement of Tube Sockets Viewed from Under Side of Chassis.

Effective December 20th, the shadowmeter used on Model 17 will be No. 45-2028 instead of the No. 6497 previously used. The new shadowmeter gives a somewhat better deflection when tuning.

MODEL 17
Schematic
Trimmer data

PHILCO RADIO & TELEVISION CORP.

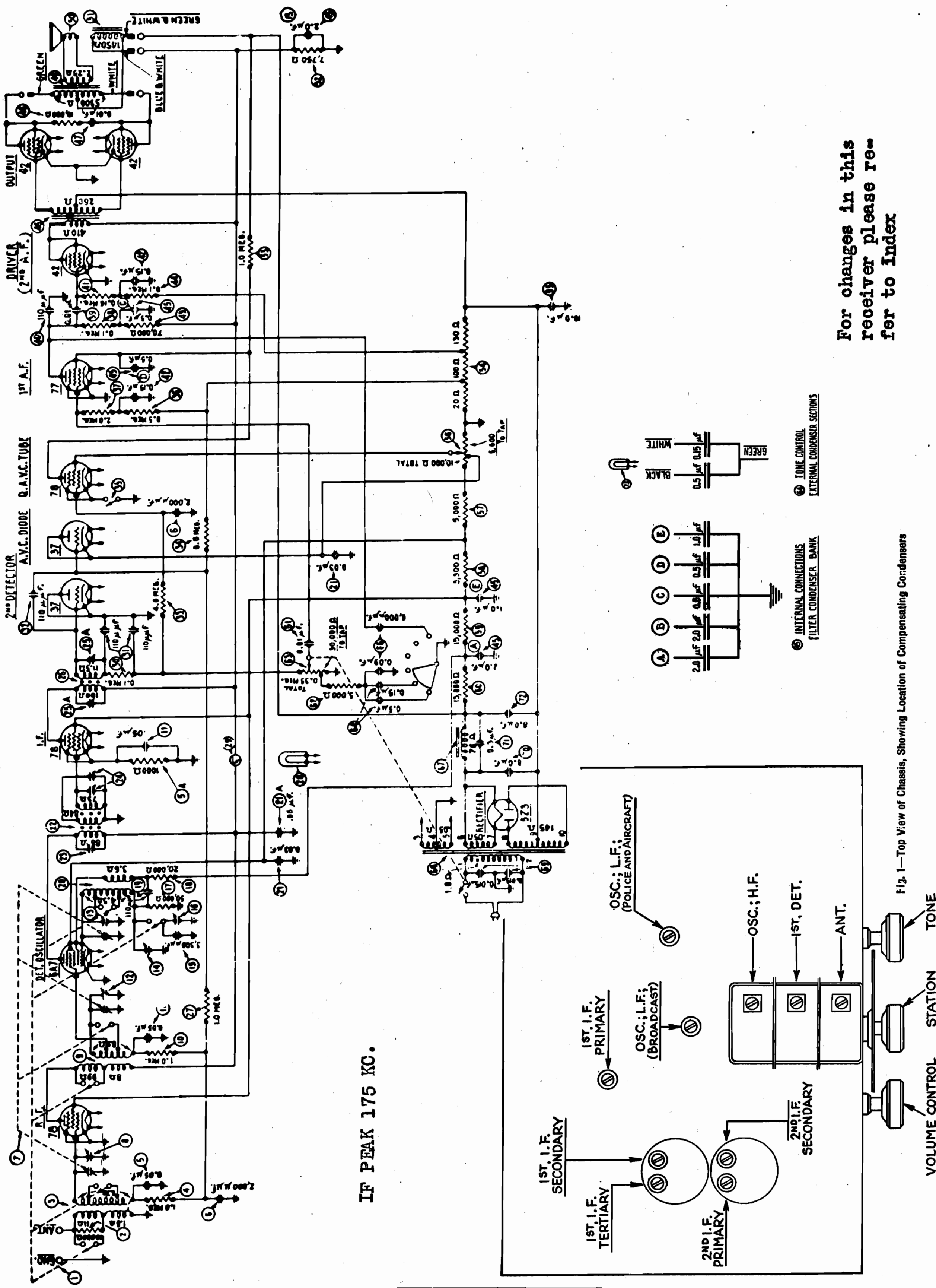


Fig. 1—Top View of Chassis, Showing Location of Compensating Condensers

For changes in this receiver please refer to Index

PHILCO RADIO & TELEVISION CORP.

MODEL 17
Alignment
Parts List

The adjustment of the I. F. compensating condensers is first completed. The intermediate frequency is 175 K. C. An accurately calibrated signal generator is necessary for these adjustments. The *Philco All-Purpose Set Tester Model 048* is recommended.

Next, the high frequency, detector, and antenna compensating condensers (located upon the tuning condenser) are adjusted, followed by the adjustment of the low frequency compensating condensers.

Care should be exercised in *each* individual adjustment.

It is advisable to give a final re-trimming to the intermediate frequency compensating condensers.

All adjustments of the Model 17 Series compensating condensers can be accomplished from the top of the chassis.

REPLACEMENT PARTS FOR MODEL 17

No. on Figs.	Description	Part Number	List Price
1	Wave Band Switch	42-1035	....
2	Resistor (Brown-Black-Orange)	4412	.25
3	Antenna Transformer	32-1170	....
4	Resistor (Brown-Black-Green)	4409	.20
5	Condenser	3615-BC	....
5a	Resistor (Brown-Black-Red)	5837	.20
6	Condenser (Double)	7296-E	....
7	Tuning Condenser Assembly	31-1041	....
8	Compensating Condenser (Ant.; Part of 7)	....	....
9	1st Detector Transformer	32-1171	....
10	Resistor (Brown-Black-Green)	4409	.20
11	Condenser (Double)	3615-AP	....
12	Compensating Condenser (Det.; Part of 7)	....	....
13	Compensating Cond. (Osc.; Part of 7)	....	....
14	Compensating Condenser (Oscillator)	04000-R	....
15	Condenser	7301	.35
16	Compensating Cond. (High Freq.)	04000-R	....
17	Resistor (Green-Brown-Orange)	4518	.20
18	Resistor (Red-Black-Orange)	6649	.20
19	Condenser	4519	.18
20	Oscillator Transformer	32-1172	....
21	Condenser (Double)	8318-C	....
21a	Condenser	30-4012	.15
22	1st I. F. Transformer	32-1173	....
23	Compensating Cond. (1st. I. F. Pri.)	04000-M	.16
24	Compensating Cond. (1st. I. F. Sec.) Compensating Cond. (1st. I. F. Tert.)	31-6001	....
25 25a	Compensating Cond. (2nd, I. F. Pri.) Compensating Cond. (2nd, I. F. Sec.)	31-6000	....
26	2nd. I. F. Transformer	32-1174	....
27	Resistor (Brown-Black-Green)	4409	.20
28	Pilot Lamp (Shadow Tuning Meter); (Part of 29)	....	....
29	Shadow Tuning Meter	6497	2.25
30	Resistor (White-White-Orange)	4411	.20
31	Condenser (Double)	8035-C	....
32	Condenser	4519	.18
33	Resistor (Yellow-Black-Green)	6010	.20
34	Resistor (Yellow-White-Yellow)	3769	.20
35	Switch (Toggle); (Interstation Noise Supp. Ckt.)	42-1036	....
36	Resistor (Yellow-White-Yellow)	4517	.20
37	Resistor (Red-Black-Green)	5872	.20
38	Resistor (White-White-Orange)	4411	.20
39	Condenser	3903-L	.16
40	Condenser	4519	.18
41	Resistor (Brown-Blue-Yellow)	5331	.20
42	Condenser	6287-H	.20
43	Resistor (Violet-Black-Orange)	5385	.20
44	Resistor (White-White-Orange)	4411	.20
45	Filter Condenser Bank	30-4026	....
46	Input Transformer	32-7057	....
47	Condenser	3903-F	.15
48	Resistor (Brown-Black-Orange)	3524	.20
49	Output Transformer	32-7052	....
50	Voice Coil & Cone Assembly	36-3061	....
51	Speaker Field, Assembled with Pot, (U-2)	36-3088	....
52	Resistor (Wire-Wound)	33-3020	....
53	Resistor (Brown-Black-Green)	4409	.20
54	Voltage Divider Resistor (Wire-Wound)	33-3021	....
55	Condenser (Electrolytic)	30-2003	....
56	Potentiometer (Interstation Noise Supp. Ckt.)	33-5015	....
57	Resistor (Green-Black-Red)	5310	.20
58	Resistor (Orange-Orange-Red)	7238	.20
59	Resistor (Brown-Green-Orange)	5718	.40
60	Resistor (Brown-Orange-Orange)	6450	.35
61	Condenser	3903-L	.16
62	Resistor (Green-Black-Red)	5310	.20
63	Volume Control & "On-Off" Switch	33-5013	....
64	Condenser (External to 66)	06713	.45
65	Tone Control	30-4028	....
66	Condensers (Internal to 66)	....	....
67	Filter Choke	32-7056	....
68	Power Transformer (50-60 ~)	32-7058	....
69	Condenser (Double)	3793-R	.25
70	Condenser (Electrolytic)	30-2011	....
71	Condenser	6287-F	.12
72	Condenser (Electrolytic)	30-2011	....
73	Pilot Lamp (Station Selector)	6608	.12
	Tube Shield	28-1107	.10
	Four Prong Socket	7545	.08
	Five Prong Socket	7546	.10
	Six Prong Socket	7547	.10
	Seven Prong Socket	27-6005	.10
	Knob (large)	03063	.08
	Knob (small)	03064	.06

NOTE: Model 17-121 uses a Type 80 tube in lieu of 5Z3; Power Transformer (50-60 ~) 68 No. 32-7080; Resistors (Brown-Black-Orange) No. 33-1024 in both 59 and 60; Electrolytic Condensers 70 No. 6707 and 72 No. 7464; Speaker "K-17"; Speaker Socket No. 7084; Speaker Cable L-1632

MODEL 17
MODEL 17A-122, 17A-123
Changes
Parts List

PHILCO RADIO & TELEVISION CORP.

Model 17

1. The Volume Control and "On-Off" Switch ⑥③ is replaced by Volume Control and "On-Off" Switch (Part No. 33-5023), having an overall value of 2 megohms. The movable element goes to ⑥① as heretofore; the tap to the resistor ⑥② mentioned under (2) below; the end nearest tap, to ground; and the opposite end to the .01 mfd. condenser mentioned in (3).

The 2nd I. F. Transformer ㉖ has been superseded by a transformer which is identified by an orange dot on the metal bracket. This new coil possesses less turns on the primary, and the spacing is decreased between the secondary lugs.

The part number of the transformer remains the same.

Effective with current production, Toggle Switch (Interstation Noise Suppression Circuit) ㉟, Part No. 42-1036, is superseded by Toggle Switch Part No. 3253, and two Part No. 9618 leads, in Model 17-123; by Toggle Switch Part No. 3253, one Part No. 9616 lead and one Part No. 9617 lead, in Model 17-121 and 17-122. The joint at the switch is protected by two pieces of sleeving. The *list* price of Switch, Part No. 3253, is 40 cents.

The following additional *list* prices should be included in the Replacement Parts list:

No. on Figs.	Description	Part No.	List Price
①	Wave Band Switch	42–1035	$0.65
③	Antenna Transformer	32–1170	.70
⑤	Condenser	3615-BC	.16
⑥	Condenser (Double)	7296-E	.16
⑦	Tuning Condenser Assembly	31–1041	3.75
⑨	1st Detector Transformer	32–1171	.70
⑪	Condenser (Double)	3615-AP	.18
⑭	Compensating Condenser (Oscillator)	04000-R	.35
⑯	Compensating Condenser (High Freq.)	04000–R	.35
⑳	Oscillator Transformer	32–1172	.75
㉑	Condenser (Double)	8318-C	.18
㉒	1st I. F. Transformer	32–1173	.75
㉖	2nd I. F. Transformer	32–1174	.60
㉛	Condenser (Double)	8035-C	.16
㉟	Switch (Toggle); (Inter-station Noise Suppressor Circuit)	42–1036	.40
㊺	Filter Condenser Bank	30–4026	3.00
㊻	Input Transformer	32–7057	2.25
㊿	Voice Coil and Cone Assembly	36–3061	.75
⑥②	Resistor (Wire-Wound)	33–3020	.30
⑥④	Voltage Divider Resistor (Wire-Wound)	33–3021	.16
⑥⑤	Condenser (Electrolytic)	30–2003	.70
⑥⑥	Potentiometer (Inter-station Noise Suppressor Circuit)	33–5015	.80
⑥③	Volume Control and "On-Off" Switch	33–5013	1.00
⑥⑤	Tone Control	30–4028	.45
⑥⑦	Filter Choke	32–7056	1.85
⑥⑧	Power Transformer (50-60 ∿)	32–7058	5.00
⑦⓪	Condenser (Electrolytic)	30–2011	1.25
⑦②	Condenser (Electrolytic)	30–2011	1.25

No. on Figures	Description	Part No.	List Price
⑥①	**Speaker Field, Assembled with Pot, (U-2)**	**36-3088**	**$6.75**

The following additional *list* prices should be included in the Replacement Parts list:

No. ON FIGURES	DESCRIPTION	PART No.	LIST PRICE
㉔	Compensating Condenser	31-6001	$0.35
㉕	Compensating Condenser	31-6000	.40
㊾	Output Transformer	32-7052	1.50

On page 2 of the Bulletin, at end of the Replacement Parts list, make Electrolytic Condenser ⑦⓪ read "No. 6706" instead of No. 6707.

Models 17A-122 *and* 17A-123

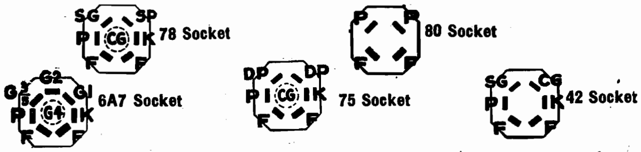
(25 cycle sets)

Effective December 14, 1933, all production on these models will have the first electrolytic condenser ⑦⓪, part No. 30-2014 superseded by part No. 30-2067, no change in connections. (No. 30-2014 is 8 mfd. 500 volt, and No. 30-2067 is 10 mfd. 15 volt.)

PHILCO RADIO & TELEVISION CORP.

MODEL 18
Schematic, Data
Voltage, Socket

Philco Radio Model 18 is an eight-tube superheterodyne receiver. It is designed for operation upon alternating current. The frequency range is 520-4000 kilocycles, and the same superheterodyne circuit is used for the reception of standard broadcast, police broadcast, airport and aircraft, and amateur radiophone signals. A Type 78 tube is employed in the R. F. amplifier circuit, a Type 6A7 tube as a combination first detector and oscillator, a Type 78 tube for the intermediate frequency, and a Type 75 as second detector and first audio stage. A Type 42 acts as a driver (2nd A. F.), two Type 42's as triodes form the class "A" output, and a Type 80 acts as rectifier. The intermediate frequency is 260 kilocycles. The power consumption is 110 watts.



Terminal Arrangement of Tube Sockets Viewed From Under Side of Chassis

*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The **Philco Model 048 All-Purpose Set Tester** is highly recommended for this use. Volume control at maximum and station selector at 520 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

See Index for Changes

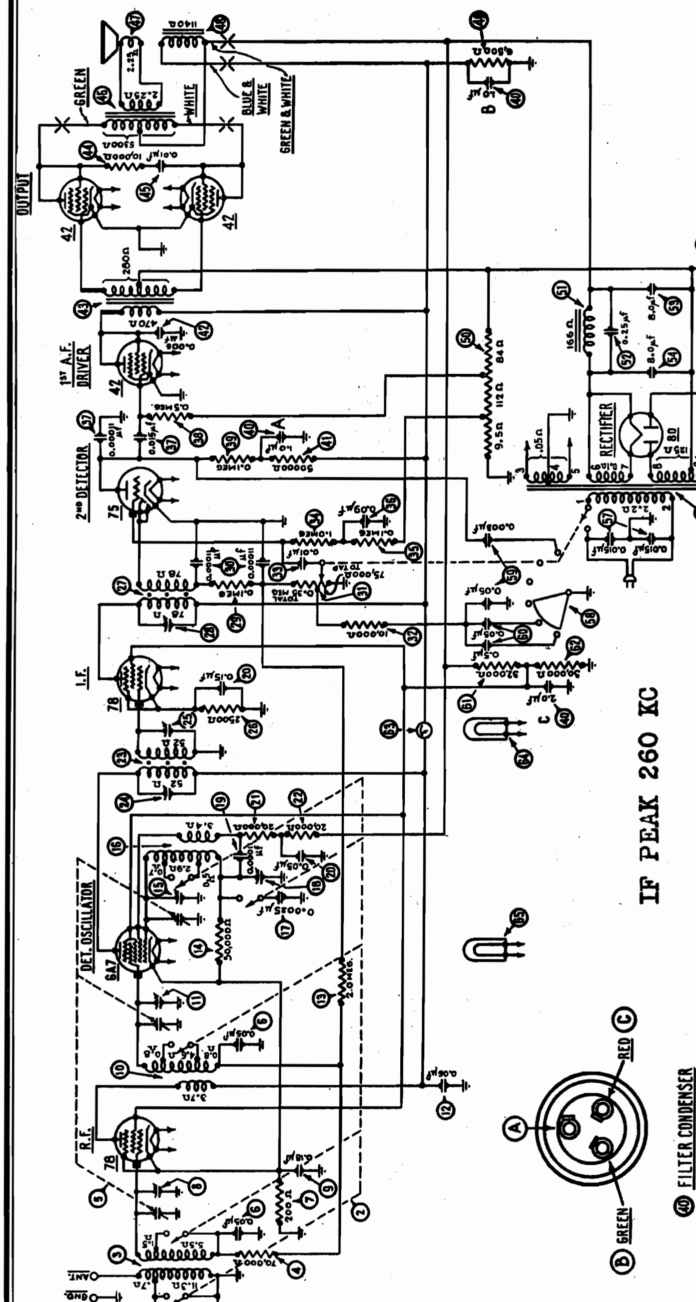


Fig. 3—Schematic Wiring Diagram

September, 1933

NOTE: In current production—㉜-a Resistor (240,000) (Red-Yellow-Yellow), Part No. 4410—(*not* shown in Schematic), is connected *between* line running from ⑬ to junction of ㉙, ㉚; and ground. ㉝-a Condenser (.05), Part No. 30-4020—(*not* shown in Schematic), is connected *between* high side of Volume Control ㉛ and junction of ㉙, ㉚. ㊿ External Condenser in Tone Control circuit has but one section (in current production),—the .05 mfd. on point two. Point one goes directly to ㉜.

NOTE: Values of primary and secondary of ㊻ Output Transformer, and value of ㊼ Voice Coil, are given in impedance at 200 cycles, 30 volts. The D. C. resistance of the primary is 350 ohms; of the secondary, .09 ohm, D. C. resistance of ㊼ is 1.11 ohm.

Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	R. F.	Det. Osc.	I. F.	2nd Det. & 1st A. F.	Driver (2nd A. F.)	Output (Class "A")		Recti- fier
Type Tube	78	6A7	78	75	42	42	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	210	210	210	120	205	280	280	350
Screen Grid Volts—SG to K (Type 6A7—G3-5 to K)	80	80	80	..	200	300	300	..
Control Grid Volts—CG to K (Type 6A7—G4 to K)	.3	.15	5.3	.3	.35	28.	28.	..
Cathode Volts—K to F	2.8	2.8	5.3	0	0	0	0	..
Type 6A7—G1 to K	..	35	..	..	..	..	..	..
Type 6A7—G2 to K	..	130	..	..	..	..	..	..

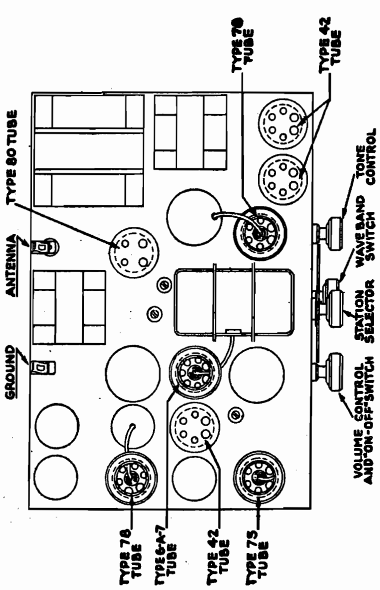


Fig. 1—Top View of Chassis

MODEL 18
Chassis view
Alignment
Parts List

PHILCO RADIO & TELEVISION CORP.

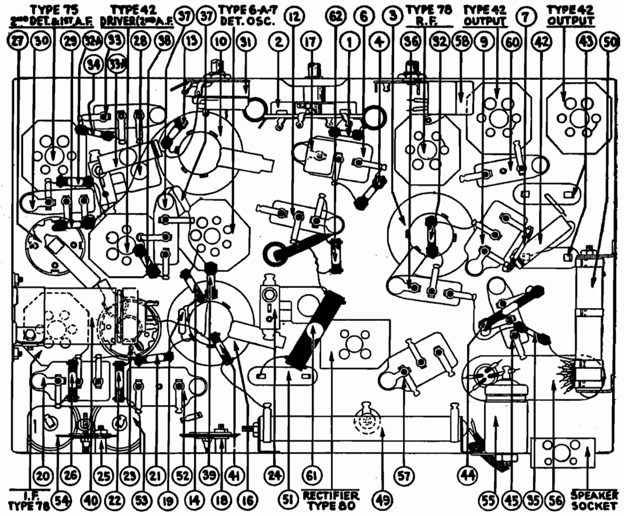


Fig.—2 Bottom View of Chassis, Showing Parts

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1-2	105-125	Primary	White
3-5	6.3	Filament	Black
6-7	5.0	Filament of 80	Blue
8-10	760	Plates of 80	Yellow
4	....	Center Tap of 3-5	Black-Yellow Tracer
9	....	Center Tap of 8-10	Yellow-Green Tracer

ADJUSTMENT OF MODEL 18

Receivers are adjusted accurately before shipment from the factory. Complete instructions and suitable equipment should be available when *any* adjustments are undertaken. Your distributor is in a position to supply both. The **Philco Model 048 All-Purpose Set Tester** is thoroughly recommended for these adjustments. It includes an accurately calibrated signal generator. Adjustment of the compensating condensers essentially is the same as that outlined in Service Bulletin No. 120-C, "Adjusting Philco Superheterodynes."

Reference to Figure 3 of the present Bulletin will give the electrical location of the several compensating condensers in the Model 18 Receiver. Figure 2 will show the physical location of the compensating condensers underneath and at the rear of the chassis.

The intermediate frequency compensating condensers should be adjusted first. The intermediate frequency is 260 kilocycles. These compensating condensers are situated:

(a) 1st I. F. PRIMARY—(24), underneath chassis. Access from above through hole in sub-base, back of the Tuning Condenser Assembly (5). Shield covers the hole and may be removed by prying with a screw driver.

(b) 1st I. F. SECONDARY—(25), at rear of chassis, beneath the two vertically mounted electrolytic condensers (53) and (54). Accessible from rear of chassis.

(c) 2nd I. F. PRIMARY—(28), underneath chassis. Accessible from above through hole in chassis sub-base, in *front* of Type 42 (Driver; 2nd A. F.), and to right of Type 75 tube. The shield can be removed as under (a). The "OSC.; H. F." (15), the "DETECTOR" (11), and the "ANT.; H. F." (8) compensating condensers are then adjusted, in this sequence. The signal generator is set at 1500 K. C. for (15); at 1400 K. C. for (11) and (8). These are mounted upon the Tuning Condenser Assembly (5). (8) is mounted upon the condenser section nearest front.

The "OSC.; L. F." (18) compensating condenser, located at rear of chassis is adjusted next; with the signal generator set at 600 K. C. It is accessible from rear of chassis. The Tuning Condenser (5) should be "rocked" while the "OSC.; L. F." adjustment is made.

The "Push-on Button" shields should be replaced over (24) and (28) after the adjustments are finished.

No. on Fig.	Description	Part No.	List Price
1	Resistor (10,000) (Brown-Black-Orange)	4412	$0.24
2	Wave Band Switch	42-1046	.70
3	Antenna Transformer	32-1255	.65
4	Resistor (70,000) (Violet-Black-Orange)	5385	.24
5	Tuning Condenser Assembly	31-1110	3.75
6	Condenser (Double) (.05-.05)	3615-AM	.24
7	Resistor (Flexible Wire-Wound) (200) (Red-Black-Brown)	7217	.18
8	Compensating Condenser (Ant.; H. F.; Part of (5))	....	....
9	Condenser (.18)	4989-AC	.24
10	Detector Transformer	32-1256	.45
11	Compensating Condenser (Det.; Part of (5))	....	....
12	Condenser (.05)	3615-AA	.24
13	Resistor (2.0 meg.) (Red-Black-Green)	5872	.24
14	Resistor (50,000) (Green-Brown-Orange)	4518	.24
15	Compensating Condenser (Osc.; H. F.; Part of (5))	....	....
16	Oscillator Transformer	32-1257	.50
17	Condenser (.0025)	7006	.36
18	Compensating Condenser (Osc.; L. F.)	04000-R	.42
19	Condenser (.00011)	4519	.22
20	Condenser (Double) (.5-.15)	6287-M	.25
21	Resistor (20,000) (Red-Black-Orange)	6650	.30
22	Resistor (20,000) (Red-Black-Orange)	6650	.30
23	1st I. F. Transformer	32-1288	.45
24	Compensating Condenser (1st I. F. Primary)	04000-M	.19
25	Compensating Condenser (1st I. F. Secondary)	04000-X	.19
26	Resistor (2,500) (Red-Green-Red)	7775	.24
27	2nd I. F. Transformer	32-1258	.45
28	Compensating Condenser (2nd, I. F. Primary)	04000-A	.14
29	Resistor (.1 meg.) (White-White-Orange)	4411	.24
30	Condenser (Double) (.00011-.00011)	8035-K	.25
31	Volume Control and "On-Off" Switch	33-5024	1.00
32	Resistor (10,000) (Brown-Black-Orange)	4412	.24
32-a	Resistor (240,000) (Red-Yellow-Yellow)	4410	.24
33	Condenser (.01)	3903-Z	.17
33-a	Condenser (.05)	30-4020	.14
34	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24
35	Resistor (.1 meg.) (White-White-Orange)	4411	.24
36	Condenser (.09)	4989-N	.24
37	Condenser (.00011)	4519	.22
	Condenser (.015)	3793-AB	.20
38	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.24
39	Resistor (.1 meg.) (White-White-Orange)	4411	.24
40	Filter Condenser (Electrolytic) (A=1.0 mfd.; B=1.0 mfd.; C=2.0 mfd.	30-2029	1.00
41	Resistor (50,000) (Green-Brown-Orange)	4518	.24
42	Condenser (.006)	30-4024	.36
43	Input Transformer	32-7114	1.75
44	Resistor (10,000) (Brown-Black-Orange)	3524	.24
45	Condenser (.01)	3903-P	.24
46	Output Transformer	32-7078	1.25
47	Voice Coil and Cone Assembly	02625	.66
48	Speaker Field Coil and Pot Assembly (H-13)	36-3104	
49	Resistor (Wire-Wound) (6,500)	33-3033	.25
50	Voltage Divider Resistor (Wire-Wound)	33-3034	.20
51	Filter Choke	32-7115	1.50
52	Condenser (.25)	6287-N	.20
53	Condenser (Electrolytic) (8.0)	6706	1.80
54	Condenser (Electrolytic) (8.0)	30-2025	1.15
55	Condenser (Electrolytic) (10.0)	30-2003	.84
56	Power Transformer (50-60 ~)	32-7111	5.75
57	Condenser (Double) (.015-.015)	3793-R	.30
58	Tone Control	30-4073	.55
59	Condensers (Internal to (58))	....	....
60	Condenser (External to (58))	3615-G	.19
61	Resistor (32,000) (Orange-Red-Orange)	33-1026	.30
62	Resistor (50,000) (Green-Brown-Orange)	4518	.24
63	Shadow Tuning Meter	6497	2.70
64	Pilot Lamp (Part of (63) Shadow Tuning Meter)	....	....
65	Pilot Lamp (Station Selector)	6608	.14
	Shield ("Push-on Button") for sub-base holes; over (24) and (28) Compensating Condensers	W-775 per C	1.50
	Tube Shield	28-1107	.12
	Four-prong Tube Socket	7544	.07
	Six-prong Tube Socket	7547	.12
	Seven-prong Tube Socket	27-6005	.12
	Speaker Socket	4957	.10
	Dial Scale (Station Selector)	27-5013	.20
	Mounting Bolt (Chassis)	W-567 per C	2.88
	Mounting Washer (Chassis)	5189	.04
	Mounting Washer (Chassis)	5058 per C	.82
	Knob (large)	03063	.10
	Knob (small)	03064	.07
	Bezel	6418	.24
	Model 18— Code 121 only		
	Speaker (K-17) Output transformer	32-7078	1.25
	Speaker (K-17) Voice Coil and Cone Assembly	36-3020	.48
	Speaker (K-17) Speaker Field and Pot Assembly	36-3104	
	Speaker Socket Hole Cover	7084 per C	.90
	Speaker Cable	L-1632	.24

PHILCO RADIO & TELEVISION CORP.

MODEL 14, 14-121
Changes
MODEL 18
Changes

Model 14

Part Numbers of knobs and bezel used on 14-MX cabinet are as follows:

Knob (large-black)	27–4051
Knob (small-black)	27–4052
Bezel	27–4092

Effective with Run Number 2, Condenser (24), Part No. 3903-Z, (.01 Mfd.) is superseded by Condenser, Part No. 4989-AJ, (.09 Mfd.); also, Resistor (36), Part No. 4411 (.1 Meg.; White-White-Orange) is superseded by Resistor, Part No. 4517 (.5 Meg.; Yellow-White-Yellow).

In Run No. 2, Model 14-121, Tone-Control (44) Part No. 06698 is superseded by Part No. 30-4041; Resistor Part No. 4411 by Part No. 4517 in both (32) and (51)a positions; Resistor Part No. 6984 (28) by Part No. 5310; By-pass Condenser Part No. 4989-T (56) by 4989-K; and By-pass Condenser Part No. 3903-P (42) by Part No. 3615-BJ. The leads from the Volume Control are NOT twisted.

Model 14-121

Twin speakers (H-7 and K-12) in this model were superseded by speaker "U". This speaker ("U" type), Part No. 36-1017, has a field coil D.C. resistance of 6500 ohms and a D.C. resistance of 2 ohms in the voice coil. The Speaker Field assembled with Pot ("U") is Part No. 36-3074. The Voice Coil and Cone Assembly is Part No. 36-3061. The Output Transformer is Part No. 32-7051, and has a D.C. resistance in primary of 680 ohms; in secondary, .2 ohm.

With Run number 1-X, Tuning Condenser Assembly (4) will be changed to Part No. 31-1048, superseding Part No. 31-1011. In this substitution, three of Part No. 29-6060 spacers and three of Part No. W-729 mounting bolts are used.

Model 18

Effective with Run Number 4, Condenser (17), Part No. 7006, (.0025 Mfd.) is superseded by Condenser, Part No. 30-1026,—same capacity.

This additional *list* price should be included in the Replacement Parts list:

No. on Figs.	Description	Part No.	List Price
(48)	Speaker Field Coil and Pot Assembly (H-13)	36-3104	$2.25
	[Code 121] Speaker Field and Pot Assembly (K-17)	36-3104	2.25

NOTE: The above list price is effective September 15, 1933.

ALL PRICES CONTAINED IN SERVICE BULLETIN NO. 172 (MODEL 18) WERE THOSE EFFECTIVE SEPTEMBER 15, 1933.

Compensating Condenser Identifications

Cellulose paint spots on the bottom of compensating condensers will identify them as follows:

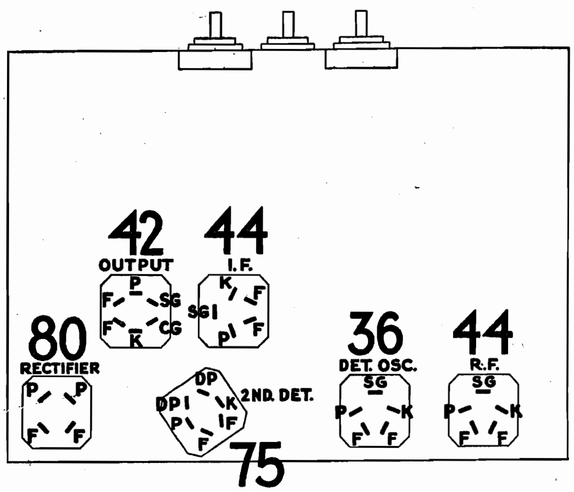
Part No. 31-6000	Capacity 350-600 Mmf.	No Spot
Part No. 31-6001	Capacity 100-145 Mmf.	Red Spot
Part No. 31-6002	Capacity 145-190 Mmf.	Green Spot
Part No. 31-6003	Capacity 50-125 Mmf.	Yellow Spot

MODEL 19 - 128
Socket layout
Voltage, Data

PHILCO RADIO & TELEVISION CORP.

Model 19 (code 128)

PHILCO RADIO MODEL 19 is a superheterodyne designed for operation upon alternating current. It uses the high-efficiency, multiple-function 6.3 volt tubes which give the performance of a set using several more than the six tubes the Model 19 actually employs. Model 19 has Automatic Volume Control, Shadow Tuning, Four-point Bass-Compensating Tone Control, and Pentode Output. The Receiver covers a frequency range from 550 to 3260 kilocycles,—which includes all standard broadcast stations, police stations, airport and aircraft, and amateur stations. The tubes, and their uses in the several circuits, are: R. F. Stage, Philco Type 44; First Detector and Oscillator, Type 36; Intermediate Frequency Stage, Type 44; Second Detector, Type 75; Output Stage, Type 42; and Rectifier, Type 80. The intermediate frequency used in adjusting the superheterodyne circuit is 260 kilocycles. The power consumption of Model 19 (Code 128) is 70 watts. The receiver has an undistorted output of 5 watts.



F FILAMENT
P PLATE
SG SCREEN GRID
CG CONTROL GRID
K CATHODE
DP DIODE PLATE

Fig. 1—Tube Socket Locations, from Underside of Chassis.

Table 1—Tube Socket Data*
A. C. Line Voltage, 115

Circuit	RF	Det. Osc.	IF	2nd Det.	Out-put	Rectifier
Type Tube	44	36	44	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	215	215	215	175	235	350/Plate
Screen Grid Volts—SG to K	95	90	95	.....	245	....
Control Grid Volts—CG to K	.3	9.0	.3	.3	2.2	....
Cathode Volts—K to F	4.4	9.5	4.4	.....	.....	....
Diode Plate Volts—K to DP	.....	.....	.....	.2	.....	....

*The filament voltage values in Table 1 were obtained with an A.C. voltmeter; all the other values were obtained with a high-resistance, multi-range D.C. voltmeter. The readings were taken from the underside of the chassis,—with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER is especially useful in taking these readings, and is highly recommended for this and many other tests of Model 19. When the above values were obtained, the Station Selector was set at the low frequency (550 K.C.) end of the scale; the Volume Control was at maximum (all the way to the right).
Readings will NOT be reliable if taken with a plug-in adaptor.

CAUTION: DO NOT CONNECT THE CHASSIS TO THE POWER SUPPLY UNLESS THE SPEAKER IS CONNECTED TO THE CHASSIS AND ALL THE TUBES ARE IN PLACE.

Table 2—Power Transformer Data

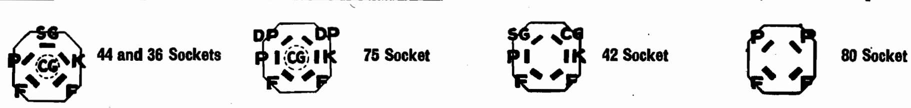
Terminal	A.C. Volts	Circuit	Color
1-2	120	Primary	White
3-4	6.3	Filaments	Black
6-7	5.0	Filament of 80	Blue
9-10	746	Plates of 80	Yellow
5	...	Center Tap of 3-4	Black-Yellow Tracer
8	...	Center Tap of 9-10	Yellow-Green Tracer

PHILCO MODEL 048 ALL-PURPOSE SET TESTER IS HIGHLY RECOMMENDED FOR ALL TESTS OF MODEL 19.

Table 3—Resistor Data

Numbers on Figures 2 and 3	Resistance (Ohms)	Power Rating (Watts)	COLOR		
			Body	Tip	Dot
1	10,000	1/3	Brown	Black	Orange
7*	300	1/3	Violet	Black	Brown
10	15,000	1/2	Brown	Green	Orange
19	2 meg.	1/2	Red	Black	Green
23	50,000	1/2	Green	Brown	Orange
27	70,000	1/2	Violet	Black	Orange
28	70,000	1/2	Violet	Black	Orange
30	250,000	1/2	Red	Yellow	Yellow
36	2,900	1/3	Red	White	Red
39	10,000	1/2	Brown	Black	Orange
43	1 meg.	1/2	Brown	Black	Green
45	100,000	1/2	White	White	Orange
46	2,000	1	Red	Black	Red
49	1,000	1	Brown	Black	Red
50	15,000	2	Brown	Green	Orange
51	13,000	1	Brown	Orange	Orange
52‡	263, 21 (tapped)	1.7,.14	—	—	—

*Wire wound flexible ‡Wire wound porc. tube

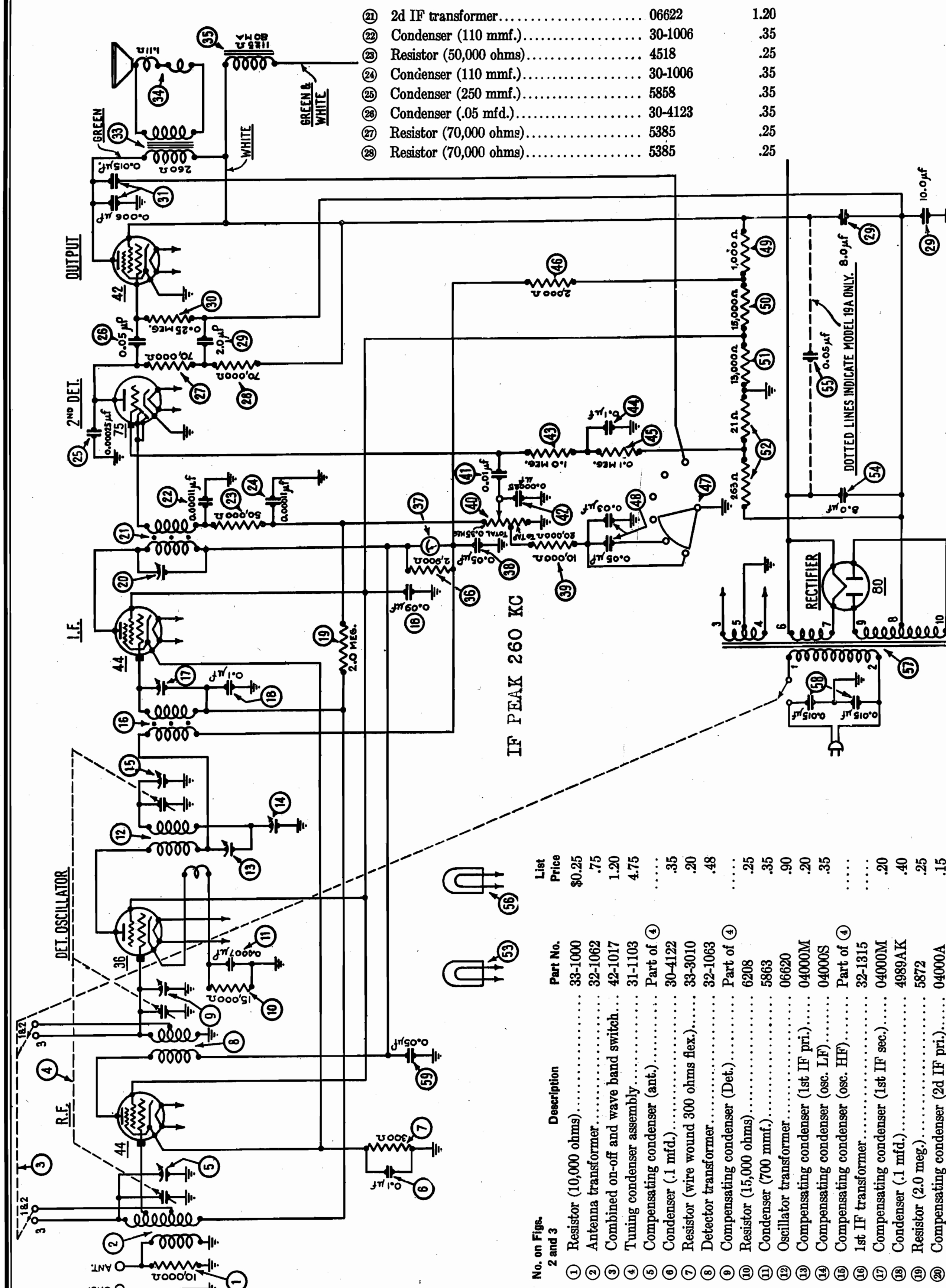


Terminal Arrangement of Tube Sockets Viewed From Under Side of Chassis

PHILCO RADIO & TELEVISION CORP.

MODEL 19- 128
Schematic
Parts List

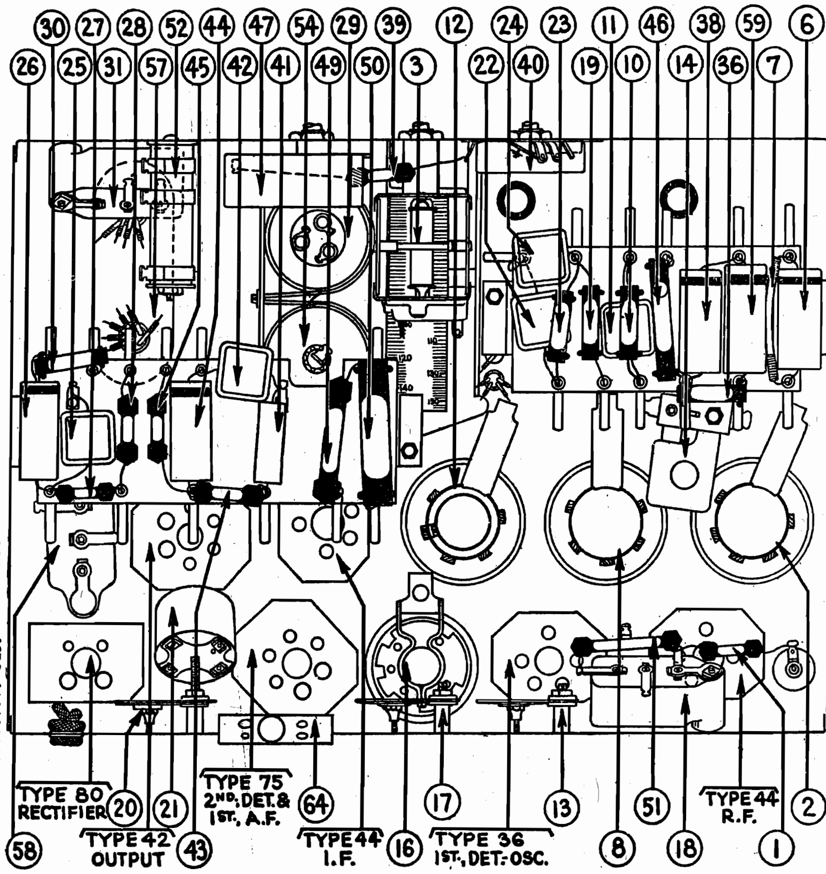
21	2d IF transformer	06622	1.20
22	Condenser (110 mmf.)	30-1006	.35
23	Resistor (50,000 ohms)	4518	.25
24	Condenser (110 mmf.)	30-1006	.35
25	Condenser (250 mmf.)	5858	.35
26	Condenser (.05 mfd.)	30-4123	.35
27	Resistor (70,000 ohms)	5385	.25
28	Resistor (70,000 ohms)	5385	.25



No. on Figs. 2 and 3	Description	Part No.	List Price
1	Resistor (10,000 ohms)	33-1000	$0.25
2	Antenna transformer	32-1062	.75
3	Combined on-off and wave band switch	42-1017	1.20
4	Tuning condenser assembly	31-1103	4.75
5	Compensating condenser (ant.)	Part of 4	.....
6	Condenser (.1 mfd.)	30-4122	.35
7	Resistor (wire wound 300 ohms flex.)	33-3010	.20
8	Detector transformer	32-1063	.48
9	Compensating condenser (Det.)	Part of 4	.....
10	Resistor (15,000 ohms)	6208	.25
11	Condenser (700 mmf.)	5863	.35
12	Oscillator transformer	06620	.90
13	Compensating condenser (1st IF pri.)	04000M	.20
14	Compensating condenser (osc. LF)	04000S	.35
15	Compensating condenser (osc. HF)	Part of 4	.....
16	1st IF transformer	32-1315	.....
17	Compensating condenser (1st IF sec.)	04000M	.20
18	Condenser (.1 mfd.)	4989AK	.40
19	Resistor (2.0 meg.)	5872	.25
20	Compensating condenser (2d IF pri.)	04000A	.15

MODEL 19- 128
Chassis view
Trimmer notes
Adjustment

PHILCO RADIO & TELEVISION CORP.



(29)	Condenser (elec.—2.0, 8.0, 10.0 mfd.)	30-2062X	.....
(30)	Resistor (.25 meg.)	4410	.25
(31)	Condenser (.006-.015 mfd.)	7625D	.30
(33)	Output transformer (H-16)	32-7178	.....
(34)	Speaker voice coil and cone (H-16)	02625	.65
(35)	Speaker field coil and pot assembly (H-16)	36-3218	.....
(36)	Resistor (2900 ohms)	5309	$0.25
(37)	Shadow meter	6497	2.70

(43)	Resistor (1.0 meg.)	4409	
(44)	Condenser (.1 mfd.)	30-4122	
(45)	Resistor (.1 meg.)	4411	
(46)	Resistor (2000 ohms)	4515	
(47)	Tone control	38-5519	
(48)	Condensers (inside (47))	.....	
(49)	Resistor (1000 ohms)	4590	
(50)	Resistor (15,000 ohms)	5718	
(51)	Resistor (13,000 ohms)	3766	
(52)	Resistor (wire wound tapped, 263,21 ohms)	33-3069	
(53)	Pilot lamp (station selector)	6608	
(54)	Condenser (elec. filter 8 mfd.)	30-2026	
(55)	Condenser .05 mfd. (used on 19A only)	30-4020	
(56)	Pilot lamp	Part of (37)	
(57)	Power transformer	32-7170	
(58)	Condenser (double .015-.015 mfd.)	3793E	
(59)	Condenser (.05 mfd.)	30-4123	
(60)	Tube shield	8005	

Fig. 3—Bottom View of Chassis, Showing Parts.

(38)	Condenser (.05 mfd.)	30-4123	.35
(39)	Resistor (10,000 ohms)	4412	.25
(40)	Volume control	33-5000	1.45
(41)	Condenser (.01 mfd.)	30-4124	.25
(42)	Condenser (250 mmf.)	5858	.35

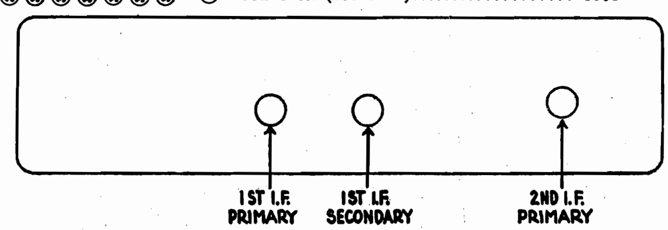


Fig. 4—Rear of Model 19 Chassis, showing location of Compensating Condensers

NOTE:—I. F. Frequency of Model 19 is 260 K.C.

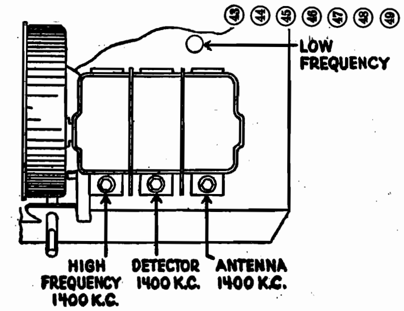


Fig. 5—Top View of Chassis showing Comp. Cond. mtd. on Tuning Condenser, Model 19, also Low Freq. Compensating Condenser.

ADJUSTMENT OF MODEL 19

COMPENSATING CONDENSERS

The compensating condensers of Philco Model 19 are adjusted in essentially the same manner described in Service Bulletin No. 120-C, "Adjusting Philco Superheterodynes." The method should be understood thoroughly before any adjustments are attempted.

These receivers are adjusted accurately before they are shipped from the Factory. If re-adjustment is required, it is necessary usually only to re-align the intermediate frequency compensating condensers. Figures 3 and 4 show the location of these compensating condensers. The intermediate frequency is 260 kilocycles.

An accurately calibrated signal generator is required for these adjustments. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER includes a precision signal generator supplying frequencies from 105 kilocycles to 2000 kilocycles. It is recommended. Your Distributor can supply the Model 048 Set Tester, and can give you complete instruction in the adjustment of Model 19.

If re-adjustment of the intermediate frequency circuits is not sufficient to restore sensitivity, the high frequency and low frequency compensating condensers are re-aligned as described in the following paragraphs. Figure 5 shows the location of these compensating condensers.

The OSC; High Frequency compensating condenser is adjusted at 1400 kilocycles,—with the signal generator of the Model 048 Set Tester set at that frequency. Next the Detector and Antenna Condensers, located on the tuning condenser assembly, should now be adjusted, with the signal generator still operating at 1400.

The last adjustment is that of the low frequency (LF) compensating condenser which is accessible from above through the hole in chassis alongside the tuning condenser assembly. This adjustment is made with the signal generator set to give a 700 K.C signal.

A final re-setting may be made of the H.F. condenser (signal generator at 1400) the maximum peak of compensation is desired.

PHILCO RADIO & TELEVISION CORP.

MODEL 38, 38-A
Chassis view, Data
Socket layout
Alignment

Models 38 and 38-A

The Philco Models 38 and 38-A are battery-operated five-tube superheterodyne receivers. Model 38 is designed for use with a two-volt storage battery for filament ("A") supply; Model 38-A for use with dry "A" battery,—in conjunction with a Type 6 ballast tube. The frequency range is 520 to 2470 kilocycles, and a wave-band switch permits the selection of either the standard broadcast or police and amateur radiophone signals. Models 38 and 38-A possess receiver chasses that are identical. When shipped, Model 38 has a shorting jumper across the filament contacts of the Type 6 Ballast Tube socket. This should **not** be disturbed as long as the receiver is operated upon the storage battery. Removal of it will open the filament circuit. The Model 38-A,—in addition to its complement of five tubes,—is equipped with a Type 6 ballast tube which **must** be used with the receiver operating on dry "A" battery. A 30-ohm resistor is used across the filament of the Type 6 ballast tube.

The Models 38 and 38-A employ a Philco Type 15 tube as detector-oscillator, a Type 32 tube for the intermediate frequency amplifier, a Type 32 as second detector, a Type 30 tube for the first audio frequency stage, and a Type 19 tube as output (class "B" amplifier). These are the Philco low-current drain two-volt tubes.

The Model 38 is designed to be used with the Philco Type 172-R two-volt storage battery and Philco Type "P-962" "B"/"C" battery; the Model 38-A with the Philco Type "P-166" dry "A" battery and Philco Type "P-962" "B"/"C" battery.

The filament ("A") supply should **never** exceed two volts at the tube socket terminals of either Model. The Type 6 tube acts as a voltage-regulator, and maintains a constant "A" potential to the filaments of the Model 38-A. The filament current drain upon the "A" battery is 720 milliamperes. The "B" battery current drain varies between 8 and 12 milliamperes,—at 135 volts. The intermediate frequency of the superheterodyne circuit is 460 kilocycles.

Table 1—Tube Socket Data*

CIRCUIT	Det.-Osc.	I. F.	2nd. Det.	1st. A. F.	Output
TYPE TUBES	**15**	**32**	**32**	**30**	**19**
Filament Volts—F to F......	1.9	1.9	1.9	1.9	1.9
Plate Volts—P to F.........	135 (P to K)	135	40	135	135
Screen Grid Volts—SG to F..	67 (SG to K)	67	25	..	..
Control Grid Volts—CG to F	4. (CG to K)	.15	.15	.15	3 (To Gnd.)
Cathode Volts—K to F......	5	..	..	..	..

*The above values were obtained from the underside of the chassis, using test prods and leads, with a high-resistance multi-range D. C. voltmeter. The Philco Model 048 All Purpose Set Tester is highly recommended for all tests of this character. Receiver volume control at maximum; station selector at 520 kilocycles. Readings taken with a plug-in adapter will not be satisfactory.

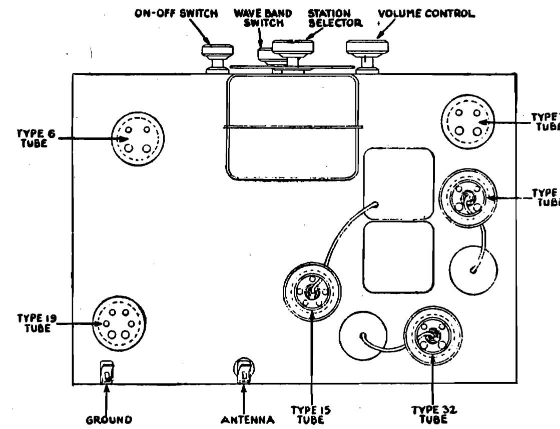


Fig. 1—Top View of Chassis, Showing Tube Locations.
NOTE: Model 38 does not use Type 6 tube.

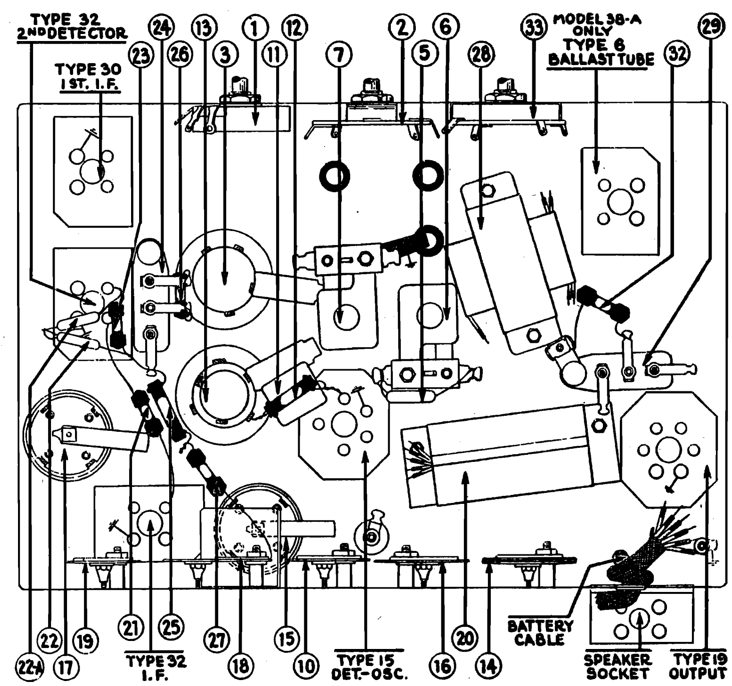


Fig. 2—Bottom View of Chassis, Showing Parts.

Adjustment of Models 38, 38-A

These receivers are adjusted accurately before shipment from the factory. Adjustments of the compensating condensers with which the receivers are equipped should be undertaken **only** when proper equipment is available, and full instructions are at hand. Your distributor can supply both. The **Philco Model 048 All-Purpose Set Tester** is recommended. It contains an accurately calibrated signal generator.

The adjustment of the compensating condensers is similar to the method described in Service Bulletin No. 120-C.

The location of the compensating condensers may be learned by referring to Fig. 3 of the present bulletin for their electrical location in the circuit; to Fig. 2 of this bulletin for the physical location of the compensating condensers underneath and at the rear of the chassis.

The intermediate frequency compensating condensers first should be adjusted. These condensers are identified as ⑩, ⑯, ⑱, and ⑲; they are situated at the rear of the chassis, and are shown in Fig. 2. They are accessible from the rear of the chassis. The intermediate frequency is 460 K.C.

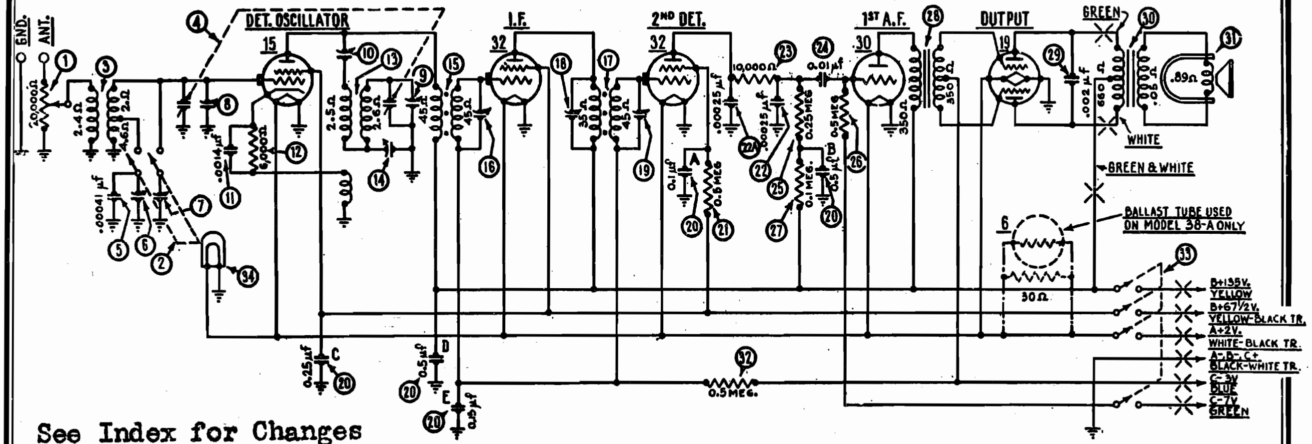
The H.F.; Ant. (Broadcast) ⑧ and H.F.; Osc. ⑨ compensating condensers are situated upon the tuning condenser assembly, and these should next be adjusted. ⑧ is mounted upon the section nearest the front. Both are accessible from top of chassis, as is the H.F.; Ant.; (Police) ⑦, which also should be adjusted at this time. ⑦ is reached through an opening in the chassis sub-base, to the rear and left of the tuning condenser, facing front of chassis.

Next, the L.F.; Ant.; (Police) ⑥ and L.F.; Osc. ⑭ are adjusted. ⑥ is accessible through an opening in the chassis sub-base, to the right of ⑦ and behind the tuning condenser. ⑭ is situated along the rear underside of the chassis, and is accessible from chassis' rear.

Following the adjustments outlined above, the I.F. compensating condensers should finally be re-trimmed.

MODEL 38, 38-A
Schematic, Changes
Parts List

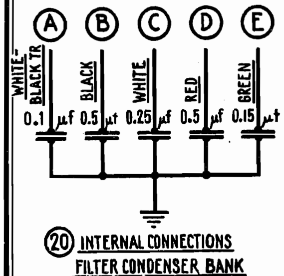
PHILCO RADIO & TELEVISION CORP.

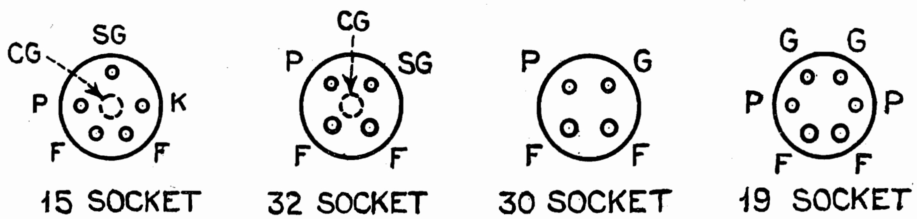


See Index for Changes

Fig. 3—Schematic Wiring Diagram

IF PEAK 460 KC.





August, 1933.

REPLACEMENT PARTS FOR MODELS 38 AND 38-A

No. on Figs.	Description	Part No.	List Price
(1)	Volume Control	33-5017	....
(2)	Wave-Band Switch	42-1039	....
(3)	Antenna Transformer	32-1208	....
(4)	Tuning Condenser Assembly	31-1076	....
(5)	Condenser (.00041)	30-1000	$0.20
(6)	Compensating Condenser (Ant.; L.F.; Police)	04000-S	.25
(7)	Compensating Condenser (Ant.; H.F.; Police)	04000-X	.16
(8)	Compensating Condenser (Ant.; H.F.; Part of (4))	....	....
(9)	Compensating Condenser (Osc.; H.F.; Part of (4))	....	....
(10)	Compensating Condenser (1st. I.F. Primary)	04000-A	.12
(11)	Condenser (.0014)	7007	.25
(12)	Resistor (6,000) (Blue-Black-Red)	7352	.20
(13)	Oscillator Transformer	32-1209	....
(14)	Compensating Condenser (Osc.; L.F.)	04000-S	.25
(15)	1st. I.F. Transformer	32-1251	....
(16)	Compensating Condenser (1st. I.F. Secondary)	04000-A	.12
(17)	2nd. I.F. Transformer	32-1252	....
(18)	Compensating Condenser (2nd. I.F. Primary)	04000-A	.12
(19)	Compensating Condenser (2nd. I.F. Secondary)	04000-A	.12
(20)	Filter Condenser Bank	03915	1.10
(21)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.20
(22)	Condenser (.00025)	3082	.20
(22)A	Condenser (.00025)	3082	.20
(23)	Resistor (10,000) (Brown-Black-Orange)	4412	.20
(24)	Condenser (.01)	3903-Z	$0.14
(25)	Resistor (.25 meg.) (Red-Yellow-Yellow)	4410	.20
(26)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.20
(27)	Resistor (.1 meg.) (White-White-Orange)	4411	.20
(28)	Input Transformer	7233	1.50
(29)	Condenser (.002)	7296-C	.12
(30)	Output Transformer	2565	1.40
(31)	Voice Coil and Cone Assembly (KR-2)	36-3014	....
(32)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.20
(33)	Switch ("On-Off"; Battery)	42-1040	....
(34)	Pilot Lamp (Station Selector)	5316	.30
	Resistor (30 ohm) [(Used across Type 6 ballast tube filament; Model 38-A, only)]	7155	.20
	Shorting Jumper (Model 38; across filament terminals; Type 6 tube socket)	28-8061	....
	Tube Shield	28-1107	.10
	Four-prong Tube Socket	7545	.08
	Five-prong Tube Socket	7546	.10
	Six-prong Tube Socket	7547	.10
	Speaker Socket	4957	.08
	Battery Cable Assembly (including multi-plug)	38-5265	....
	Station Selector Dial-scale	27-5019	....
	Knob (large)	03063	.08
	Knob (small)	03064	.06

Effective with Run Number 3, 1st I. F. Transformer (15), Part No. 32-1251, is superseded by Part No. 32-1290; 2nd I. F. Transformer (17), Part No. 32-1252, is superseded by Part No. 32-1291; Resistor (23), Part No. 4112 (10,000 ohms; Brown-Black-Orange) is superseded by Resistor, Part No. 4516 (25,000 ohms; Red-Green-Orange); Compensating Condenser (2nd I. F. Primary) (18), Part No. 04000-A, is superseded by Compensating Condenser, Part No. 04000-J.

Compensating Condensers (10) and (16) are reversed, with respect to wiring into the circuit. They are of the same capacity and the change is therefore physical only. (Run Number 3). Wave-Band Switch (2) is rotated 180 degrees away from former position. The new position brings lug end nearest to sub-base. (Run Number 3).

In Run Number 4, Volume Control (1) is rotated 90 degrees in a clockwise direction, looking from front of chassis.

PHILCO RADIO & TELEVISION CORP.

MODEL 44
Voltage, Trimmers
Socket layout

Model 44

PHILCO MODEL 44 is a six-tube superheterodyne broadcast and short wave receiver. It operates on alternating current. The intermediate frequency is 460 kilocycles. The receiver has automatic volume control. A four-point wave-band switch covers the following ranges:

(1) 520 K.C. to 1500 K.C.
(2) 1.5 M.C. to 4.0 M.C.
(3) 4.0 M.C. to 11.0 M.C.
(4) 11.0 M.C. to 23.0 M.C.

The radio receiver uses the high-efficiency 6.3 volt tubes. A Philco Type 6A7 dual-purpose tube is used as Detector-Oscillator; a Type 78 is used for the 1st I.F. stage, a Type 78 for 2nd I.F., a Type 75 as 2nd Detector and 1st A.F., and a Type 42 as output. The Rectifier is a Type 80 tube. The power consumption of Model 44 is 65 watts.

Table 1—Tube Socket Data*—A. C. Line Volts, 115.

CIRCUIT	Det.-Osc.	1st I.F.	2nd I.F.	2nd Det. and 1st A.F.	Out-put	Recti-fier
TUBE TYPE	6A7	78	78	75	42	80
Filament Volts—F to F..........	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K.............	260	260	255	165	250	350
Screen Grid Volts—SG to K (Type 6A7—G-3-5 to K).............	50	85	85	...	260	...
Control Grid Volts—CG to K (Type 6A7—G-4 to K)........	.4	.4	.35	.2	.5	...
Cathode Volts—K to F..........	2.2	2.1	1.9	0	0	...
Type 6A7—G-1 to K............	20	...	...	...	...	...
Type 6A7—G-2 to K............	168	...	...	...	...	...

*The values in Table 1 were gotten with an A.C. voltmeter for filament voltages and a high-resistance D.C. voltmeter for all others. The values were gotten from the underside of the chassis with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER IS RECOMMENDED FOR THIS USE. The Volume Control was at maximum (all the way to right) and the Station Selector was adjusted to 520 K.C.,—(with Wave Band Switch all the way to left),—when these readings were taken. NOTE: Values obtained with a plug-in adaptor will NOT be reliable.

DO NOT ATTEMPT TO ADJUST COMPENSATING CONDENSERS MOUNTED ON SECTIONS 3 AND 4 OF TUNING CONDENSER. (FIG. 2).

Table 2—Power Transformer Data

Terminal	A.C. Volts	Circuit	Color
1–2	105–125	Primary	White
3–5	6.3	Filaments	Black
6–7	5.0	Filament of 80	Blue
8–10	680	Plates of 80	Yellow
4	.....	Center Tap of 3-5	Black—Yellow Tracer
9	.....	Center Tap of 8-10	Yellow—Green Tracer

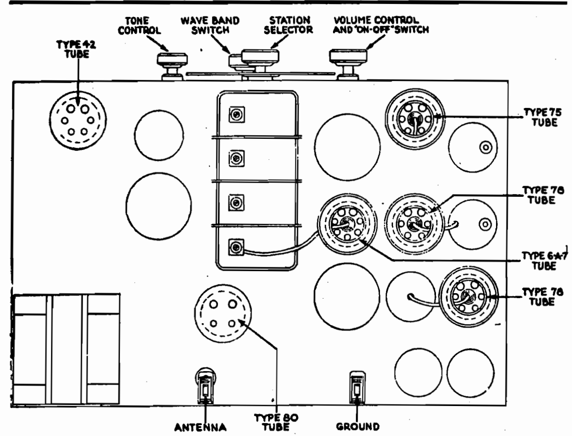


FIG. 1—Top View of Chassis

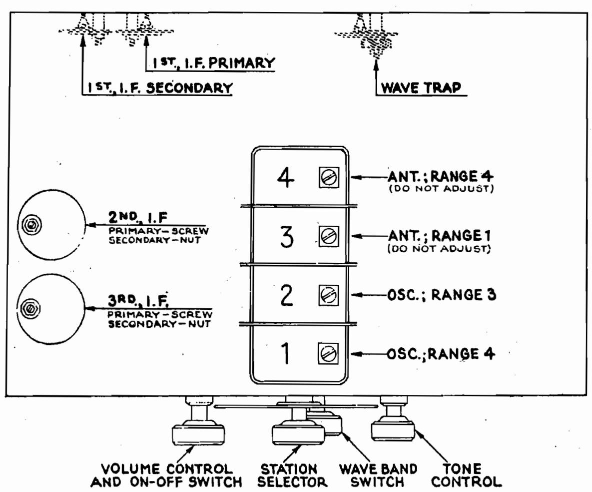
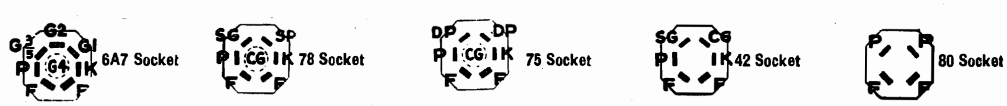


FIG. 2—Position of Compensating Condensers Reached from *Above* Chassis



Terminal Arrangement of Tube Sockets Viewed From Under Side of Chassis

MODEL 44
Schematic
Condensers

PHILCO RADIO & TELEVISION CORP.

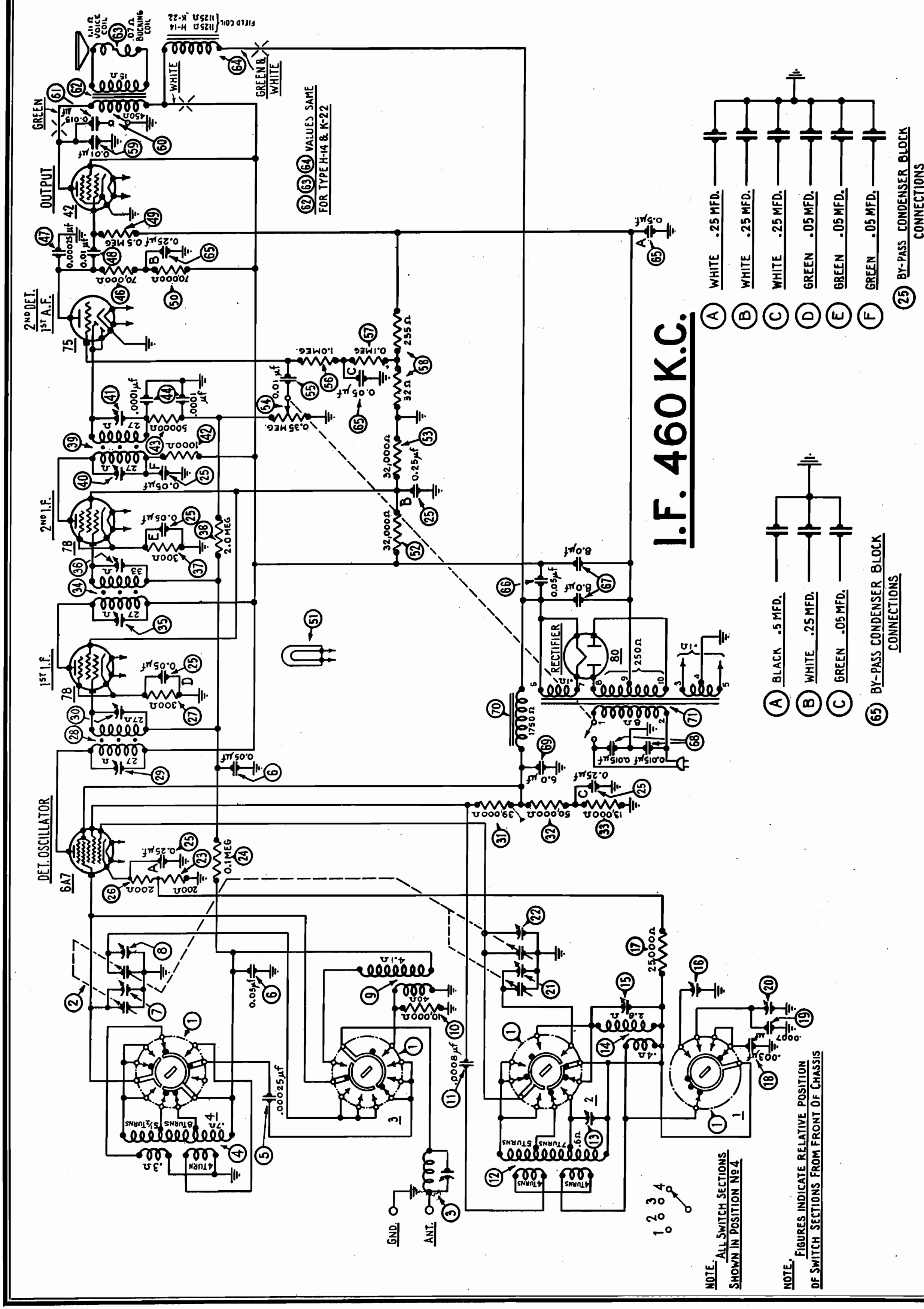


FIG. 3—Schematic Wiring Diagram

MODEL 44
Chassis view
Adjustment data

PHILCO RADIO & TELEVISION CORP.

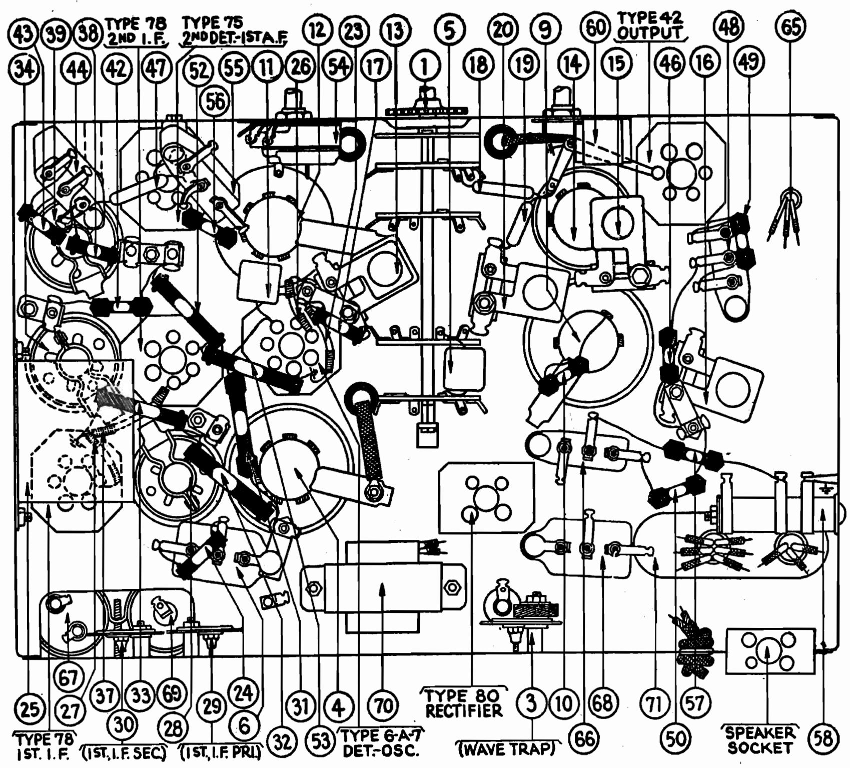


FIG. 4—Bottom View of Chassis, Showing Parts, and Position of Compensating Condensers Located,—and Reached,—from Below Chassis.

ADJUSTING MODEL 44

DO NOT ATTEMPT TO ADJUST the compensating condensers of Model 44 unless full instruction has been received in the actual adjustment.

Each of the compensating condensers of Model 44 has been adjusted accurately before shipment. If later adjustment is required, in most cases only the intermediate frequency and low frequency compensating condensers should be done. Extreme care must be given the adjustment of the high frequency circuits, and the adjustment should not be undertaken unless the receiver is seriously out of alignment.

The adjustment of Model 44 is the same generally as that described in Service Bulletin No. 120-C, "Adjusting Philco Superheterodynes".

DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections numbered 3 and 4 of the Tuning Condenser Assembly ②. These have been adjusted, and sealed, at the Factory.

Philco Model 048 All-Purpose Set Tester is recommended for the adjustment of the intermediate frequency and low frequency compensating condensers, and for any adjustments requiring the use of an accurately calibrated signal generator supplying a signal between the frequency limits of 105 kilocycles and 2000 kilocycles. The Model 048 Set Tester is extremely useful in many other tests.

Philco Model 091 crystal-controlled Signal Generator is recommended for the high frequency adjustments. It gives an accurate and constant 3600 kilocycle (3.6 megacycle) signal, the harmonics of which include the necessary high frequencies.

PHILCO MODEL 44 is adjusted:

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—

The "ANT" output terminal of the signal generator (Model 048 Set Tester) is connected to the grid cap of the Detector-Oscillator tube (Type 6A7),—after removing the grid clip. The "GND" output terminal (of the Model 048) is connected to the "GND" terminal of the receiver chassis.

The output meter is connected to the primary terminals of the Output Transformer. Set the signal generator of the Model 048 at 460 K.C.,—the intermediate frequency of Model 44,—and adjust each of the I.F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I.F. compensating condensers is shown in Figure 2 and Figure 4. Figure 2 shows the position of the compensating condensers of the 2nd, I.F. Transformer ㉞ and of the 3rd, I.F. Transformer ㊴. Each of these transformers has its dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by the SCREW; the Secondary circuit is adjusted by the hex-head nut. The adjustment of the primary and secondary circuits of the 1st, I.F. Transformer ㉘ is made by means of two single compensating condensers ㉙ and ㉚ mounted underneath, and at the rear of the chassis and accessible from the rear. They are shown in Figures 2 and 4.

ADJUSTMENT OF THE WAVE TRAP—

Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output of the signal generator (Model 048) to the antenna and ground terminals of the receiver. Set the Wave-Band Switch ① of the Model 44 to the standard broadcast band (520-1500 K.C.) (Range 1), and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap ③ condenser to give minimum response to a 460 K.C. signal from the Model 048's signal generator. The Wave Trap ③ is located at rear and underneath the chassis, and is shown in Figures 2 and 4. It is reached from the rear of the chassis.

ADJUSTMENT OF THE DIAL FREQUENCIES—

In the following procedure, the frequency ranges are:

Range 1	520 K.C.—1500 K.C.
Range 2	1.5 M.C.—4.0 M.C.
Range 3	4.0 M.C.—11.0 M.C.
Range 4	11.0 M.C.—23.0 M.C.

The Tuning Condenser ② has four sections. The individual compensating condensers are shown in Figure 2. They also are identified as numbered sections 1 to 4 inclusive, with 1 as the front section.

Do not attempt to adjust Compensating Condensers on Sections 3 and 4.

Connect the output terminals of the Model 091 Signal Generator to the "ANT" and "GND" terminals of the receiver chassis. Connect an output meter to the primary terminals of the Output Transformer of the receiver. The meter of Model 048 may be used as Output Meter. Set the Wave-Band Switch ① to Range 4, and the Station Selector at 21.6 M.C. The sixth harmonic of the 3.6 M.C. crystal in the Model 091 Signal Generator is picked up at this point. Adjust the compensating condenser ㉑ on Section 1 of Tuning Condenser to give maximum response in the output of the receiver, measured with the output meter.

Turn the Wave-Band Switch to Range 3, and the Station Selector to 10.8 M.C. Here, the third harmonic of the 3.6 M.C. crystal will be gotten. Adjust the compensating condenser ㉒ on Section 2 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 2, and adjust the Station Selector to 3.6 M.C. The "Antenna" connection between the Signal Generator and the receiver chassis must be removed for this adjustment. The output of the Signal Generator will be too great, otherwise. Adjust the compensating condenser ⑬ to give maximum response in the output circuit. This compensating condenser is located underneath the chassis and is not accessible from above. See Figure 4

The Model 048 Set Tester is used again. Turn the Wave-Band Switch to Range 2, Station Selector to 1.5 M.C. Set the Signal Generator (Model 048) at 1500 K.C. (1.5 M.C.). The "Antenna" connection between the Signal Generator and the chassis should be restored. Adjust compensating condenser ⑳, located underneath the chassis, (Figure 4). Adjustment is possible from the underside of the chassis.

Place the Wave-Band Switch at Range 1, and the Station Selector to 1400 K.C. Set the Signal Generator (Model 048) at 1400 K.C. Adjust the compensating condenser ⑮, which is located underneath the chassis. See Figure 4. This adjustment is possible from the underside of chassis.

With Wave-Band Switch at Range 1, and Station Selector at 520 K.C., set the Signal Generator of the Model 048 at 520 K.C., and adjust the compensating condenser ⑯, (Figure 4). This compensating condenser is mounted underneath the chassis, and is reached from below.

For proper and accurate adjustment of Model 44, the procedure must be followed exactly in the order given. The adjustment shoult not be undertaken without full information and proper equipment. Your Distributor can supply both.

MODEL 44
Parts List

PHILCO RADIO & TELEVISION CORP.

REPLACEMENT PARTS FOR MODEL 44

(THESE PRICES ARE EFFECTIVE SEPTEMBER 15, 1933)

No. on Figs.	Description	Part No.	List Price
1	Wave-Band Switch	42-1045	....
2	Tuning Condenser Assembly	31-1106	....
3	Wave Trap	38-5199	$ .30
4	Antenna Transformer (H. F. Bands)	32-1271	...
5	Condenser (.00025)	5858	.19
6	Condenser (Double) (.05-.05)	3615-AM	.24
7	Compensating Condenser (Ant.; H. F.) (Part of 2)	....	....
8	Compensating Condenser (Ant.; B'dc'st.) (Part of 2)	....	....
9	Antenna Transformer (B'dc'st. Bands)	32-1270	....
10	Resistor (10,000) (Brown-Black-Orange)	4412	.24
11	Condenser (.0008)	5878	.24
12	Oscillator Transformer (H. F. Bands)	32-1273	....
13	Compensating Condenser (Range 2)	04000-C	.10
14	Oscillator Transformer (B'dc'st. Bands)	32-1272	....
15	Compensating Condenser (Osc.; Range 1)	04000-A	.14
16	Compensating Condenser (B'dc'st.; Series)	04000-S	.30
17	Resistor (25,000) (Red-Green-Orange)	4516	.24
18	Condenser (.003)	6009	.36
19	Condenser (.0007)	5863	.22
20	Compensating Condenser (Range 2; Series)	04000-R	.42
21	Compensating Condenser (Osc.; Range 4) (Part of 2)	....	....
22	Compensating Condenser (Osc.; Range 3) (Part of 2)	....	....
23	Resistor (200) (Flexible Wire-Wound) (Red-Black-Brown)	7217	.18
24	Resistor (.1 meg.) (White-White-Orange)	4411	.24
25	By-pass Condenser Block (6-section)	30-4077	....
26	Resistor (200) (Flexible Wire-Wound) (Red-Black-Brown)	7217	.18
27	Resistor (300) (Flexible Wire-Wound) (Orange-Black-Brown)	33-3010	.18
28	1st, I. F. Transformer	32-1274	....
29	Compensating Condenser (1st, I. F. Pri.)	04000-J	.24
30	Compensating Condenser (1st, I. F. Sec.)	04000-J	.24
31	Resistor (39,000) (Orange-White-Orange)	33-1027	.24
32	Resistor (50,000) (Green-Brown-Orange)	5868	.42
33	Resistor (13,000) (Brown-Orange-Orange)	3766	.24
34	2nd, I. F. Transformer	32-1306	....
35	Compensating Condenser (2nd, I. F. Pri.)	31-6007, (included as part of 34)	....
36	Compensating Condenser (2nd, I. F. Sec.)		....
37	Resistor (300) (Flexible Wire-Wound) (Orange-Black-Brown)	33-3010	.18
38	Resistor (2.0 meg.) (Red-Black-Green)	5872	.24
39	3rd, I. F. Transformer	32-1307	....
40	Compensating Condenser (3rd, I. F. Pri.)	31-6007, (included as part of 39)	
41	Compensating Condenser (3rd, I. F. Sec.)		....
42	Resistor (1,000) (Brown-Black-Red)	5837	.24
43	Resistor (50,000) (Green-Brown-Orange)	4518	.24
44	Condenser (Double) (.0001-.0001)	8035-K	.25

No. on Figs.	Description	Part No.	List Price
46	Resistor (70,000) (Violet-Black-Orange)	5385	$.24
47	Condenser (.00025)	5858	.19
48	Condenser (.01)	3903-AN	.24
49	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.24
50	Resistor (70,000) (Violet-Black-Orange)	5385	.24
51	Pilot Lamp (Station Selector)	6608	.14
52	Resistor (32,000) (Orange-Red-Orange)	3525	.24
53	Resistor (32,000) (Orange-Red-Orange)	3525	.24
54	Volume Control and "On-Off" Switch	33-5025	....
55	Condenser (.01)	3903-J	.24
56	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24
57	Resistor (.1 meg.) (White-White-Orange)	4411	.24
58	Voltage Divider Resistor	33-3037	....
59	Condenser (.01) (Part of 60)	....	....
60	Tone Control	30-4080	....
61	Condenser (.015) (Part of 60)	....	....
62	Output Transformer (H-14)	2580	1.50
63	Voice Coil and Cone Assembly (H-14)	02625	.66
64	Speaker Field Coil and Pot Assembly (H-14)	02767	2.70
65	By-pass Condenser Block (3-section)	30-4087	....
66	Condenser (.05)	3615-H	.24
67	Condenser (Electrolytic) (Double) (8.0-8.0)	30-2028	....
68	Condenser (Double) (.015-.015)	3793-H	.24
69	Condenser (Electrolytic) (6.0)	30-2020	1.00
70	Filter Choke	5930	1.68
71	Power Transformer (50-60 cycle)	32-7137	....
	Tube Shield	28-1107	.12
	Four-Prong Tube Socket	7544	.07
	Six-Prong Tube Socket	7547	.12
	Seven-Prong Tube Socket	27-6005	.12
	Speaker Socket	4957	.10
	Dial Scale (Station Selector)	27-5028	....
	Drum Assembly (Tuning Condenser)	31-1055	....
	Idler Shaft Assembly (Tuning Condenser)	31-1056	....
	Tuning Shaft Assembly (Tuning Condenser)	31-1057	....
	Gear (Wave-Band Switch)	28-7012	....
	Knob (large)	27-4025	....
	Knob (medium)	03063	.10
	Knob (small)	03064	.07
	Knob Spring	5262	.42 per C
	Knob Screw (Brass) (Secures large knob to shaft)	W-267	.53 per C
	Bezel	27-4039	....
	Bezel Mounting Screw	W-841	....
	Bezel Felt	6732	.25 per C.
	Mounting Bolt (Chassis)	W-567	2.88 per C.
	Mounting Washer (Chassis) (Rubber)	5189	.04
	Mounting Washer (Chassis) (Steel)	5058	.82 per C.
	Speaker (K-22) **(Baby Grand Only)**:		
	Output Transformer	2580	1.50
	Voice Coil and Cone Assembly	36-3174	....
	Speaker Field Coil and Pot Assembly	02767	2.70

The lead from the screen-grid of the type 6A7 detector-oscillator tube should connect to the junction point between resistors 32 and 33 instead of as shown on the diagram, which is incorrect.

PHILCO RADIO & TELEVISION CORP.

MODEL 57
Voltage
Parts view

The Philco Radio Model 57 is a four-tube superheterodyne receiver, combining standard broadcast and police reception and employs the new Philco high efficiency tubes with pentode output and electro dynamic speaker. The same superheterodyne circuit is used for standard broadcast and police reception. The intermediate frequency for tuning the I. F. transformer is 460 kilocycles. The power consumption of the Model 57 is 46 watts.

Table 1—Tube Socket Data*—Power Line Voltage 115 Volts

Circuit	Det. Osc.	2nd Det.	Out-put	Recti-fier
Type Tube	77	77	42	80
Filament Volts—F to F...........	6.3	6.3	6.3	4.8
Plate Volts—P to K..............	235	45	235	300
Screen Grid Volts—SG to K.......	110	35	250	....
Control Grid Volts—CG to K......	10.5	.25	.25	....
Cathode Volts—K to F...........	25	15	15	....

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1–2	105–125	Primary	White
3–5	6.3	Filament	Black
6–7	5.0	Filament of 80	Blue
8–10	580	Plates of 80	Yellow
4	...	Center Tap of 3-5	Black-Yellow Tracer
9	...	Center Tap of 8-10	Yellow-Green Tracer

* All of the above readings were taken from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high resistance multirange D. C. voltmeter for all other readings. Volume control at maximum and station selector turned to low frequency end. Readings taken with a radio set tester and plug-in adapter will NOT be satisfactory.

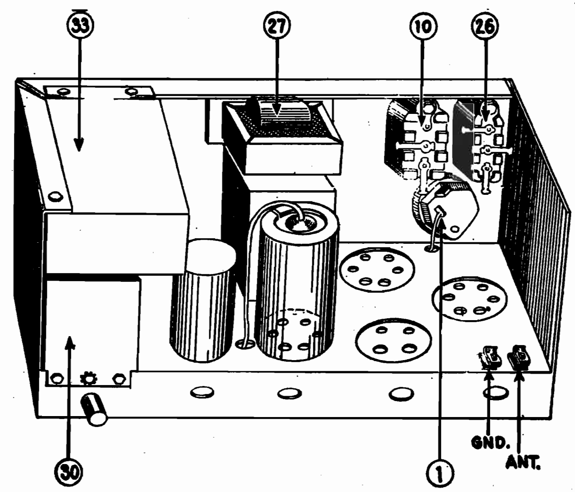


Fig. 1—Top View of Chassis, Showing Parts

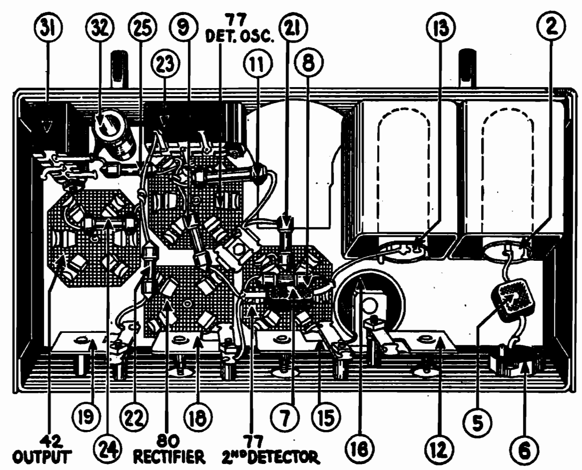


Fig. 2—Bottom View of Chassis, Showing Parts

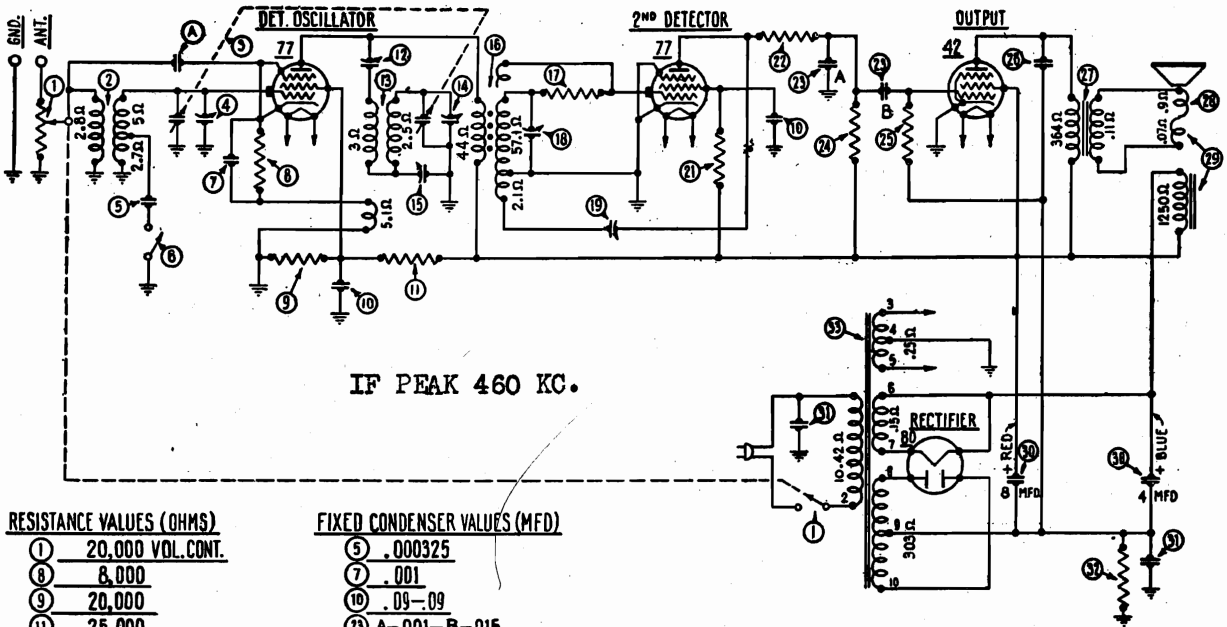
Terminal Arrangement of Tube Sockets Viewed From Under Side of Chassis.

Instruction sheet (Part No. 39-3185) packed with previous shipments of this Model contains an error in the designation of the "Antenna" and "Ground" connections in Figure 1. The "Antenna" connection of the Model 57 is at the extreme right, facing rear of chassis; therefore the words "Ground" and "Antenna" should be transposed on the Instructions.

This change also should be made on the "Tube Location" label pasted on bottom of Model 57 cabinet.

MODEL 57
Schematic
Parts List

PHILCO RADIO & TELEVISION CORP.



RESISTANCE VALUES (OHMS)

①	20,000 VOL.CONT.
⑧	8,000
⑨	20,000
⑪	25,000
⑰	4,000,000
㉑	1,000,000
㉒	10,000
㉔	240,000
㉕	490,000
㉜	325 (WIRE WOUND)

FIXED CONDENSER VALUES (MFD)

⑤	.000325
⑦	.001
⑩	.09–.09
㉓	A–.001–B–.015
㉖	.006
㉛	.015–.015

June, 1933

Fig. 3—Schematic Wiring Diagram

Note (A)—This capacity obtained by pair twisted wires

REPLACEMENT PARTS MODEL 57

No. on Figs.	Description	Part No.	List Price
①	Volume Control and "On-Off" Switch	33-5011	.80
②	Antenna Transformer	32-1153	.50
③	Tuning Condenser Assembly	31-1035	1.75
④	Compensating Condenser (Antenna; Part of ③)	....	....
⑤	Condenser	30-1004	.18
⑥	Wave Band Switch	42-1027	.50
⑦	Condenser	5215	.20
⑧	Resistor (Gray-Black-Red)	5838	.20
⑨	Resistor (Red-Black-Orange)	6650	.20
⑩	Condenser (Double)	4989-C	.25
⑪	Resistor (Red-Green-Orange)	3656	.20
⑫	Compensating Condenser (I. F. Primary)	04000-A	.12
⑬	Oscillator Coil	32-1023	.85
⑭	Compensating Cond. (High Frequency—1400 kilocycles) (Part of ③)	....	....
⑮	Compensating Cond. (Low Frequency)	04000-S	.25
⑯	I. F. Transformer	32-1155	1.00
⑰	Resistor (Yellow-Black-Green)	6010	.20
⑱	Compensating Cond. (I. F. Secondary)	04000-D	.10
⑲	Compensating Condenser	04000	.16
㉑	Resistor (Brown-Black-Green)	4409	.20
㉒	Resistor (Brown-Black-Orange)	4412	.20
㉓	Condenser (Double)	7762-B	.20
㉔	Resistor (Red-Yellow-Yellow)	4410	.20
㉕	Resistor (Yellow-White-Yellow)	3769	.20
㉖	Condenser	7625-E	.12
㉗	Output Transformer	32-7041	.80
㉘	Voice Coil and Cone Assembly	36-3029	.60
㉙	Field Coil and Pot Assembly	36-3081	1.50
㉚	Electrolytic Condenser (Double)	30-2004	1.60
㉛	Condenser (Double)	3793-R	.25
㉜	Resistor (Wire Wound)	7465	.12
㉝	Power Transformer	32-7046	3.25
	Tube Shield	28-1107	.10
	Four Prong Socket	7544	.06
	Six Prong Socket	7547	.10

With Run number 4, Power Transformer (50-60 ∿) ㉝ is changed to Part No. 32-7064. This transformer possesses electrical characteristics identical with Part No. 32-7046, but its physical mounting differs. In instances where the chassis is of a run prior to Run number 4, Part No. 32-7046 should be used.

A change which gives greater accessibility to Electrolytic Condenser ㉚, (4.0 Mfd.-8.0 Mfd.), was obtained when Part No. 30-2004, originally used, was superseded by Electrolytic Condenser (4.0 Mfd.-8.0 Mfd.), Part No. 30-2013. 4.0 Mfd. section has GREEN terminal; 8.0 Mfd. section has RED terminal; the "Negative" point is BLACK.

Effective with Run No. 6, Wave-Band Switch ⑥, Part No. 42-1027, is superseded by Wave-Band Switch, Part No. 42-1043, employing a Part No. W-467 washer on the switch side of shaft.

MODEL 57
Trimmers
Data

PHILCO RADIO & TELEVISION CORP.

Model 58 is a four tube superheterodyne receiver, very similar to Model 57 (see Bulletin No. 159A). It uses the same tubes, circuit and most of the same electrical parts as the Model 57, however, the cabinet is somewhat different, and a pilot light (part No. 6608) has been added. The illuminated dial and volume indicator are similar to those used in Model 54C. A friction drive tuning condenser is used, and a few other parts carry different part numbers.

Note that the center tap of filament winding goes to —B instead of to ground (as shown on diagram of 57 in Bulletin 159A). This connection (to —B) is also used on all Model 57 except the earliest production.

Note also that the connections on the oscillator pick-up coil have been changed from Model 57. In the Model 58 one end of this coil goes directly to the cathode of the detector-oscillator tube, and the other end to the 8000 ohm resistor and .001 condenser, the other ends of these two units being grounded.

The following parts used in Model 58 are different, otherwise replacement parts are the same as Model 57.

Item	*Part No. (Model 58)*	*List Price*
Tuning Condenser	31-1089	....
Electrolytic filter condenser	30-2013	$1.95
Wave-band switch	42-1043	.30
Volume Control	33-5057	1.45
Dial scale	27-5023	.15
Pilot light shield	29-1126	....

Also part No. 3569 (1-watt resistor—490,000 ohms) used in Model 57, is replaced by part No. 4517 (½ watt, 490,000 ohms) in Model 58.

January, 1934

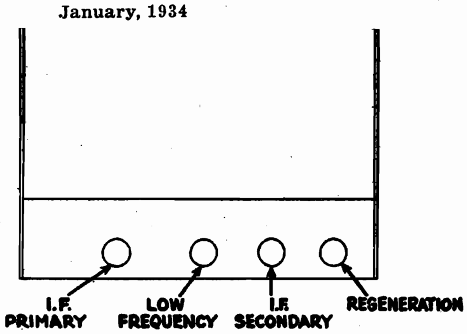


Fig. 3—Back of Model 57 Chassis, showing location of Compensating Condensers and Regeneration Control.

Model 57

Refer to Figures 3 and 4

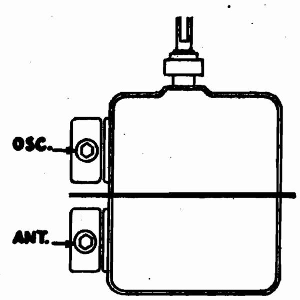


Fig. 4—Tuning Condenser, Model 57 Chassis, showing location of additional Compensating Condensers ("H.F. Oscillator" and "Antenna").

The I. F. (460 K.C.) compensating condensers are adjusted first, after which the Antenna and High Frequency compensating condensers are adjusted at 1400 K.C.; then the Low Frequency at 600 K.C. (Note: The Antenna and High Frequency compensators can be reached with a screw driver through side of cabinet).

The Regeneration Control is adjusted with the Philco All Purpose Set Tester Model 048, or by tuning to a station operating on approximately 1300 kilocycles, and turning the fibre screw at back of chassis (right end when facing back of set) in a clockwise direction, with a screw driver, until the receiver goes into oscillation, giving a squeal when various carriers are passed with the station selector. Then turn the screw counter-clockwise until the "swishing" sound just ceases. Continue to turn in the same direction about one quarter of a revolution beyond this point. Tune to different stations over the dial, noting that the squeal is not present on any stations received. If such a noise is present at any section of the dial, the adjusting screw should be turned farther in a counter-clockwise direction until the noise stops. For best average operation, the screw should be turned back from one-half to one turn except where extreme selectivity is required. Should the type 77 tube (2nd Det.) under the metal shield ever be replaced, this adjustment should be repeated.

Following the adjustment of the Regeneration Control, the I. F. compensating condensers should be finally re-trimmed, inasmuch as the two circuits are closely interrelated.

MODEL 60
Changes

PHILCO RADIO & TELEVISION CORP.

Model 60

Run No. 2 will include an individual filter condenser section in the form of Part No. 6287-B (.2 mfd.) in addition to Part No. 30-4013 ⑳ already used. This additional unit will be connected between the *end* terminal of ⑧ and grounded terminal of ⑧.

Run No. 3 will use a five-section filter condenser bank ⑳, Part No. 30-4063, in place of Part No. 30-4013. The additional section included will be of .2 mfd. capacity (red and yellow lead) and will be connected to the *end* terminal of ⑧.

Effective with Run Number 4, Compensating Condenser ⑪, Part No. 04000-S, and Condenser (.0008 Mfd.) (Green-Orange), Part No. 5878, which was connected across it, have been removed, and a Condenser (.0014 Mfd.) (Red-Red), Part No. 7007, added—between the third terminal (counting clockwise from underside of chassis—Resistor ① is across first and second) of Wave-Band Switch ② and *grounded* terminal of Condenser ⑦.

The following substitutions of electrolytic condensers are effective with current production:

Position	
㊻	30–2025, or 7558
㊺	30–2024, or 7464, or 7557

(These are all of 8.0 Mfd. capacity)

The following additional *list* prices should be included in the Replacement Parts list:

No. on Figs.	Description	Part No.	List Price
②	Wave Band Switch	42-1001	$0.60
③	Tuning Condenser Assembly	31-1006	2.70
④	Antenna Transformer	32-1047	.78
⑧	Condenser (.18)	4989-Z	.24
⑮	Oscillator Transformer	32-1048	.78
⑯	1st I. F. Transformer	32-1049	.60
㉕	2nd I. F. Transformer	32-1050	.60
㉙	Volume Control and "On-Off" Switch	33-5006	1.20
㉝	Condenser (Double) (.00011-.015)	8035-D	.24
㊲	Tone Control	30-4008	.54
㊵	Output Transformer	32-7019	1.50
㊶	Voice Coil and Cone Assembly	36-3014	.60
㊷	Speaker Field, assembled with Pot (S-7)	36-3037	1.80

The following additional *list* price should be included in the Replacement Parts list:

No. on Figures	Description	Part No.	List Price
㉚	Condenser (.01)	3903-AP	$0.24

(NOTE: The above list price is effective September 15, 1933).

To give greater selectivity to Model 60, the following changes have been made, effective with Run Number 6:

No. on Figs.	DESCRIPTION	REMOVED (Part Number)	ADDED (Part Number)
⑯	1st, I. F. TRANSFORMER	32-1049	32-1304 (Orange Paint)
㉕	2nd, I. F. TRANSFORMER	32-1050	32-1305 (Orange Paint)
	COMPENSATING CONDENSER (2nd, I. F. Secondary)	....	04000-S*
⑫	COMPENSATING CONDENSER (Osc., L. F.; Broadcast Band)	04000-S	04000-M
⑰	COMPENSATING CONDENSER (1st, I. F. Primary)	04000-M	04000-A
⑱	COMPENSATING CONDENSER (1st, I. F. Secondary)	04000-A	04000-M
㉖	COMPENSATING CONDENSER (2nd, I. F. Primary)	04000-M	04000-A

***1 each of Part No. 3098 Sleeve, W-614 Screw, W-291 Washer, and W-95 Nut, are required for this additional Compensating Condenser.**

The Padder Shield, Part No. 29-1131, at ㉖ Compensating Condenser is superseded by Padder Shield, Part No. 29-1416, *which is now placed at* ⑱ Compensating Condenser.

MODEL 60
Voltage
Parts view
Adjustment

PHILCO RADIO & TELEVISION CORP.

Model 60

THE PHILCO RADIO MODEL 60 is a five-tube superheterodyne receiver, operating upon alternating current and designed for the reception of standard broadcast, and police, airport and aircraft, and amateur radiophone signals. The frequency range is 530–4000 kilocycles. The intermediate frequency is 460 kilocycles. The power consumption is 60 watts. A Type 6A7 tube is used as a combination first detector and oscillator, a Type 78 for intermediate frequency; a Type 75 as second detector and first A. F.; a Type 42 as second A. F. (output), and a Type 80 as rectifier.

Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	Det. Osc.	I. F.	2nd Det. and 1st A. F.	2nd A.F. (Output)	Rectifier
Type Tube	6A7	78	75	42	80
Filament Volts—F to F...	6.3	6.3	6.3	6.3	4.8
Plate Volts—P to K......	250	250	170	240	350
Screen Grid Volts—SG to K (6A7-G3-5 to K).....	85	120	......	245	......
Control Grid Volts—CG to K (6A7-G4 to K)......	.18	.18	.15	.18	......
Cathode Volts—K to F...	3.	3.	0	0	......

6A7-G1 to K=1.4 volts.
6A7-G2 to K=180 volts.
*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The Philco Model 048 All-Purpose Set Tester is highly recommended for this use. Volume control at maximum and station selector at 530 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1–2	105–125	Primary	White
3–5	6.3	Filament	Black
6–7	5.0	Filament of 80	Blue
8–10	680	Plates of 80	Yellow
4	....	Center Tap of 3–5	Black-Yellow Tracer
9	....	Center Tap of 8-10	Yellow-Green Tracer

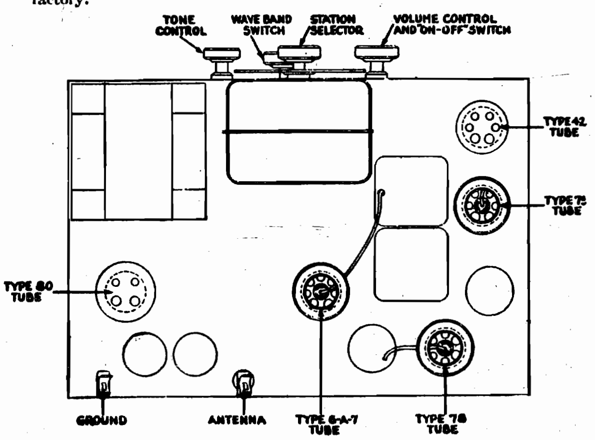


Fig. 1—Top View of Chassis

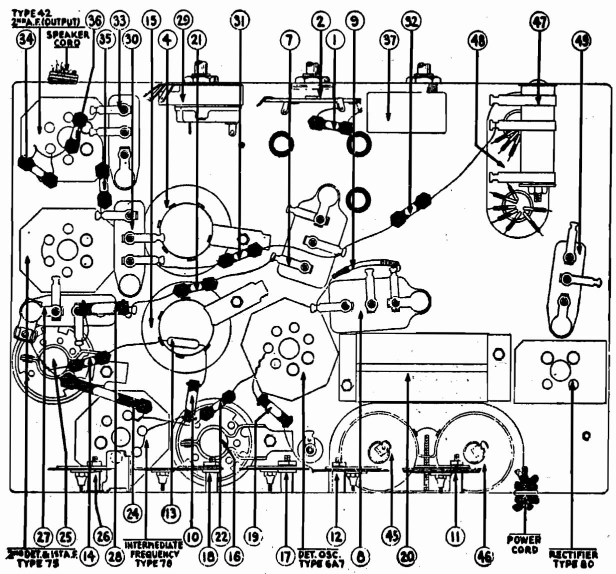


Fig. 2—Bottom View of Chassis Showing Parts

ADJUSTMENT OF MODEL 60

The receivers are accurately adjusted prior to shipment from the factory. Adjustments of the compensating condensers should *only* be undertaken with proper instructions and equipment available. Your distributor can supply both. The *Philco Model 048 All-Purpose Set Tester* is highly recommended. It contains an accurately calibrated signal generator.

The adjustment of the compensating condensers is similar to that outlined in Service Bulletin No. 120-C.

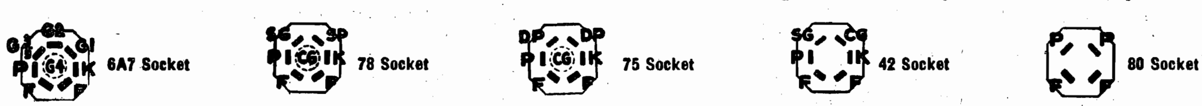
Location of the several compensating condensers can be learned through reference to Fig. 3 for their electrical location in the receiver, and to Fig. 2 for the physical location of the compensating condensers at the rear of the chassis.

The intermediate frequency compensating condensers first should be adjusted. The intermediate frequency is 460 K. C. These condensers are (17), (18) and (28), accessible from rear of chassis.

Next, the high frequency (6) and antenna (5) compensating condensers are adjusted. These are mounted upon the tuning condenser assembly (3); (5) is nearest front of chassis.

The low frequency compensating condensers are adjusted last. These are (11) for Police Band, (12) for Broadcast Band, and are at rear of chassis.

The I. F. compensating condensers should be given a final retrimming after these adjustments are completed.



Terminal Arrangement of Tube Sockets, Viewed From Under Side of Chassis

MODEL 60
Schematic
Parts List

PHILCO RADIO & TELEVISION CORP.

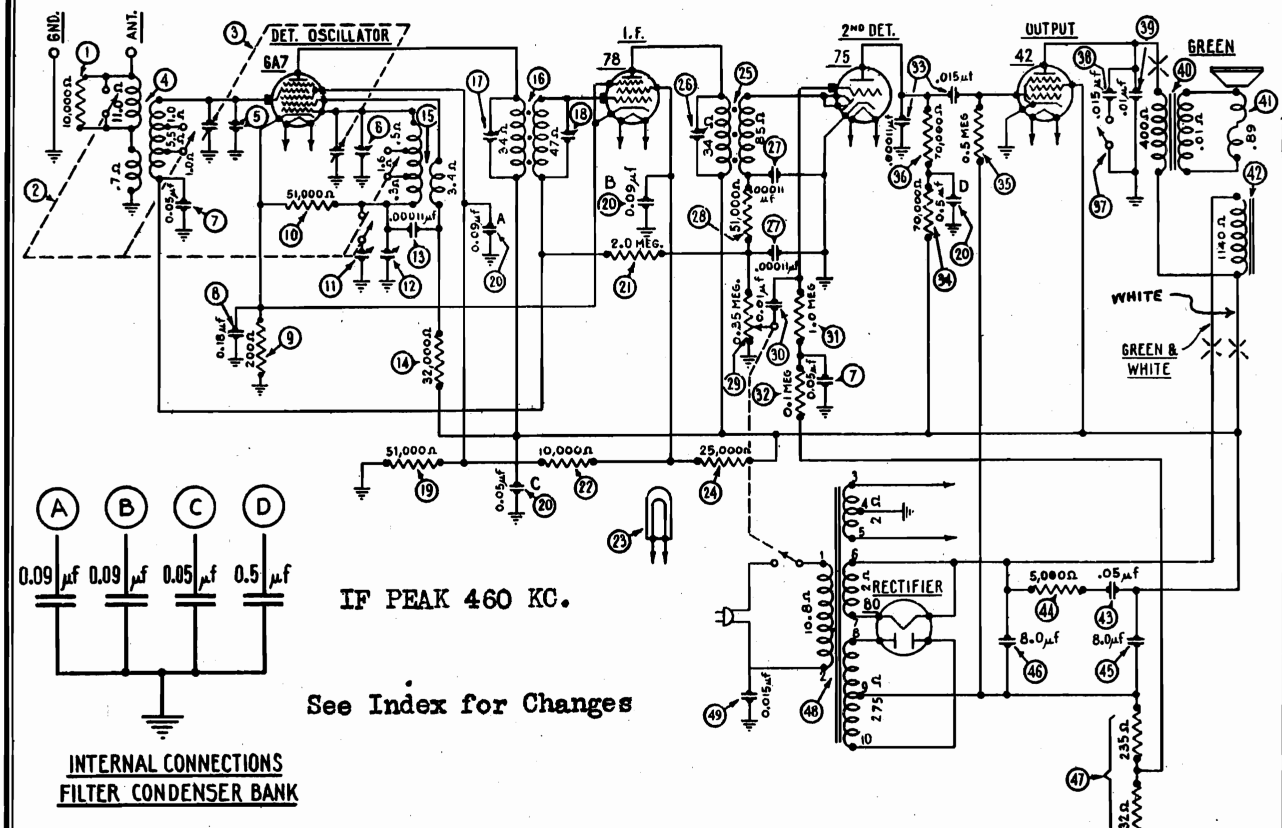


Fig. 3—Schematic Wiring Diagram

NOTE—20 External connections, Filter Condenser Bank, are:
(A) 0.09 mfd. section—White-Black Tracer.
(B) 0.09 mfd. section—White-Black Tracer.
(C) 0.05 mfd. section—Green.
(D) 0.5 mfd. section—Black.

NOTE—48 Condenser, and 44 Resistor, are NOT included in current production.
NOTE—A Fixed Condenser (Green-Orange); Part No. 5878; (.0008 mfd.) is connected across 11 in current production.

REPLACEMENT PARTS FOR MODEL 60

No. on Figs.	Description	Part No.	List Price
1	Resistor (10,000) (Brown-Black-Orange)	4412	.20
2	Wave-Band Switch	42-1001	....
3	Tuning Condenser Assembly	31-1006	....
4	Antenna Transformer	32-1047	....
5	Compensating Condenser (Ant.; H. F.; Part of 3)		....
6	Compensating Condenser (Osc.; H. F.; Part of 3)		....
7	Condenser (Double) (.05-.05)	3615-AJ	.25
8	Condenser (.18)	4989-Z	....
9	Resistor (Flexible Wire-Wound) (200) (Red-Black-Brown)	7217	.15
10	Resistor (51,000) (Green-Brown-Orange)	4518	.20
11	Compensating Condenser (Osc.; L. F.; Police Band)	04000-S	.25
12	Compensating Condenser (Osc.; L. F.; Broadcast Band)	04000-S	.25
13	Condenser (.00011)	4519	.18
14	Resistor (32,000) (Orange-Red-Orange)	5279	.20
15	Oscillator Transformer	32-1048	....
16	First I. F. Transformer	32-1049	....
17	Compensating Cond. (1st I. F. Primary)	04000-M	.16
18	Compensating Cond. (1st I. F. Secondary)	04000-A	.12
19	Resistor (51,000) (Green-Brown-Orange)	4518	.20
20	Filter Condenser Bank	30-4013	.65
21	Resistor (2. meg.) (Red-Black-Green)	5872	.20
22	Resistor (10,000) (Brown-Black-Orange)	4412	.20
23	Pilot Lamp (Station Selector)	6608	.12
24	Resistor (25,000) (Red-Green-Orange)	3656	.20
25	Second I. F. Transformer	32-1050	....
26	Compensating Cond. (2nd, I. F. Primary)	04000-M	.16
27	Condenser (Double) (.00011-.00011)	8035-B	.16
28	Resistor (51,000) (Green-Brown-Orange)	4518	.20
29	Volume Control and "On-Off" Switch	33-5006	....
30	Condenser (.01)	3903-AP	....
31	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.20
32	Resistor (.1 meg.) (White-White-Orange)	4411	.20
33	Condenser (Double) (.00011-.015)	8035-D	...
34	Resistor (70,000) (Violet-Black-Orange)	5385	.20
35	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.20
36	Resistor (70,000) (Violet-Black-Orange)	5385	.20
37	Tone Control	30-4008	....
38	Condenser (Part of 37)—(.015)		....
39	Condenser (Part of 37)—(.01)		....
40	Output Transformer	32-7019	....
41	Voice Coil and Cone Assembly	36-3014	....
42	Speaker Field, assembled with Pot (S-7)	36-3037	....
45	Condenser (Electrolytic) (8.0)	7558	1.25
46	Condenser (Electrolytic) (8.0)	7558	1.25
47	Resistor (Wire-Wound)	7998	.15
48	Power Transformer (50-60 ∼)	8046	3.00
49	Condenser (.015)	3793-W	.16
	Tube Shield	28-1107	.10
	Four-Prong Tube Socket	7544	.06
	Six-Prong Tube Socket	7547	.10
	Seven-Prong Tube Socket	27-6005	.10

August, 1933

PHILCO RADIO & TELEVISION CORP.

MODEL 84
Adjustment
Voltage
Parts view

Model 84

THE PHILCO RADIO MODEL 84 is a four-tube superheterodyne receiver, operating upon alternating current and designed for the reception of standard broadcast, and police stations in the two lower police bands. The frequency range is 540-1740 kilocycles. The intermediate frequency is 460 kilocycles. The power consumption is 43 watts. A Type 77 tube is used as a combination first detector and oscillator, a Type 77 as I.F. and second detector, a Type 42 as second A.F. (output), and a Type 80 as rectifier.

Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	Det. Osc.	2nd Det.	2nd A.F. (Output)	Rectifier
Type Tube	77	77	42	80
Filament Volts—F to F........	6 3	6.3	6 3	5 0
Plate Volts—P to K...........	240	70	225	340
Screen Grid Volts—SG to K.....	95	23	225	...

*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The Philco Model 048 All-Purpose Set Tester is highly recommended for this use. Volume control at maximum and station selector at 540 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1-2	120	Primary	White
3-4	6.3	Filament	Black
6-7	5 0	Filament of 80	Blue
9-10	630	Plates of 80	Yellow
5	....	Center Tap of 3-4	Black-Yellow Tracer
8	....	Center Tap of 9-10	Yellow-Green Tracer

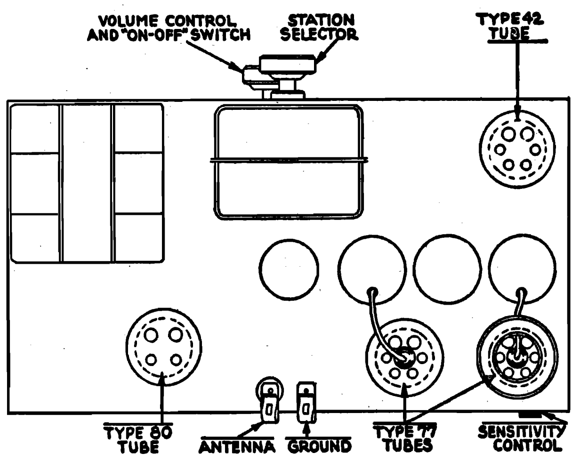


Fig. 1—Top View of Chassis

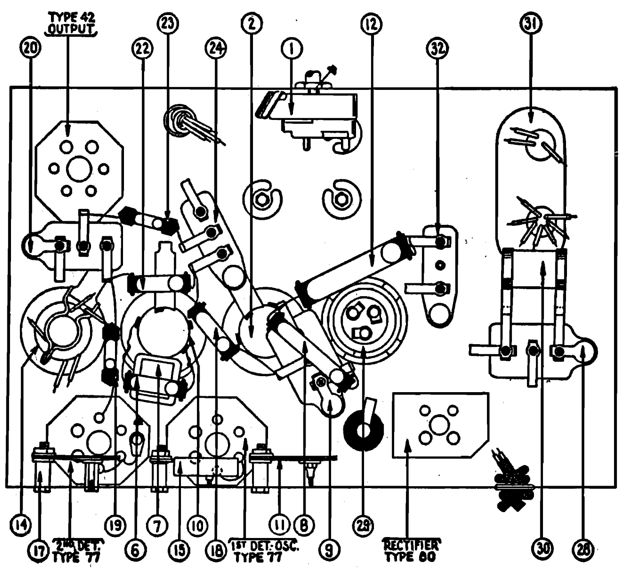


Fig. 2—Bottom View of Chassis Showing Parts

ADJUSTMENT OF MODEL 84

The receivers are accurately adjusted prior to shipment from the factory. Adjustments of the compensating condensers should *only* be undertaken with proper instructions and equipment available. Your distributor can supply both. The *Philco Model 048 All-Purpose Set Tester* is highly recommended. It contains an accurately calibrated signal generator.

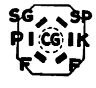
The adjustment of the compensating condensers is similar to that outlined in Service Bulletin No. 120-C.

Location of the several compensating condensers can be learned through reference to Fig. 3 for their electrical location in the receiver, and to Fig. 2 for the physical location of the compensating condensers at the rear of the chassis

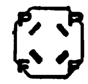
The I.F. primary and I.F. secondary condensers should be adjusted first. Set the signal generator at 460 KC (the I.F of Model 84) and the dial pointer at 600. Adjust I.F. condensers (11) and (15) so that maximum signal is obtained. These condensers are at rear of chassis, accessible from rear.

Next, adjust the "regeneration" condenser. This is (17) located at the right hand rear of chassis (facing rear). Adjustment is made by turning the fibre hex nut with either a screw driver or the special fibre wrench. The procedure is: tune in a signal at the high frequency (1500) end of the dial and turn the fibre nut clockwise until oscillation or squealing is heard. Then turn the nut half a turn back (to left). Now tune in a low frequency station, and if squealing is still heard, turn the adjusting nut half a turn back from the squealing point.

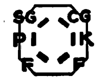
The OSC HF (13) and ANT compensating condensers (5) are adjusted last in the order mentioned. These are located on the tuning condenser gang, the ANT (5) being nearest the front of set. In early production sets use the fibre handle screw driver for adjustment, later production, the fibre hex wrench. In making these adjustments, set the signal generator at 1400 and the station selector at 140.



77 Sockets



80 Socket



42 Socket

Terminal Arrangement of Tube Sockets, Viewed From Under Side of Chassis

MODEL 84
Schematic
Parts List

PHILCO RADIO & TELEVISION CORP.

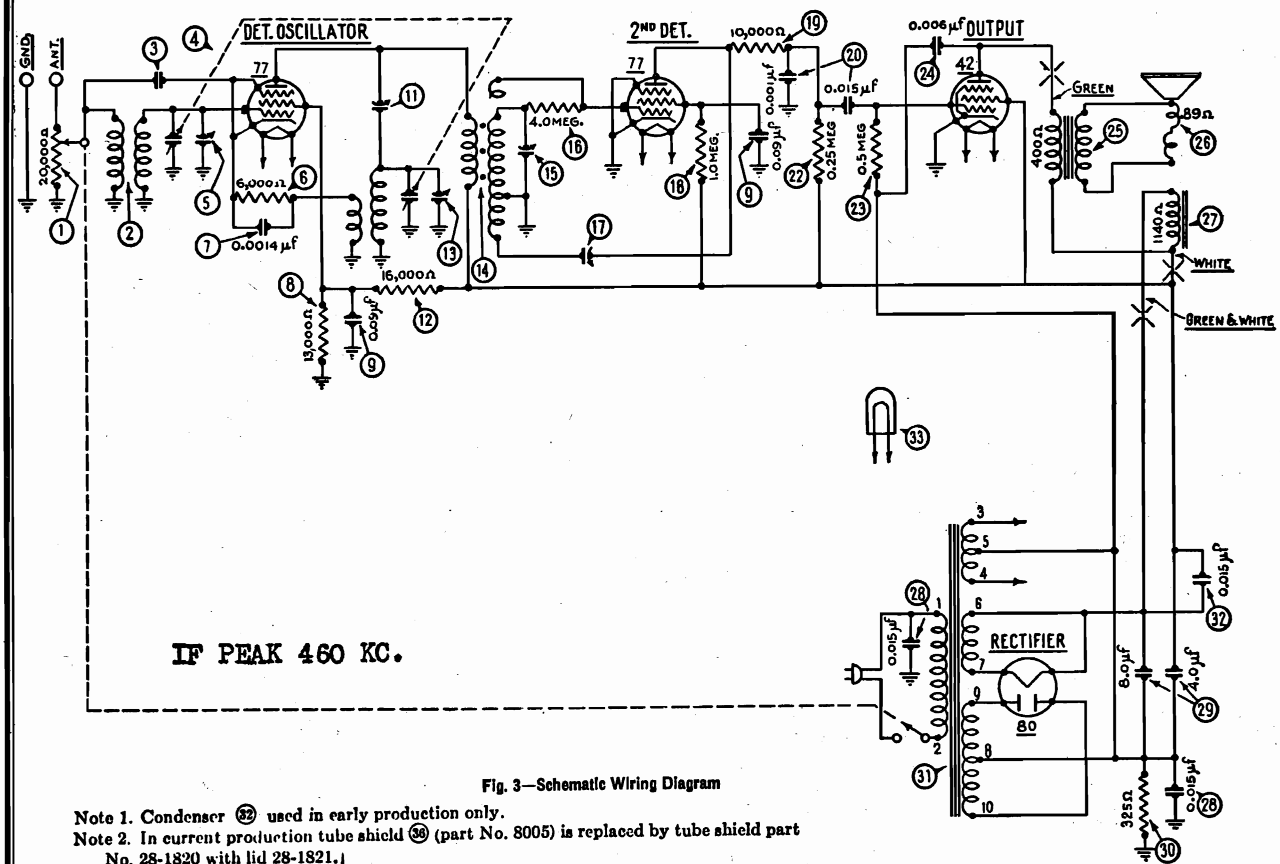


Fig. 3—Schematic Wiring Diagram

Note 1. Condenser (32) used in early production only.
Note 2. In current production tube shield (36) (part No. 8005) is replaced by tube shield part No. 28-1820 with lid 28-1821.

REPLACEMENT PARTS FOR MODEL 84

No. on Figs.	Description	Part No.	List Price
1	Volume control and on-off switch	33-5055	1.45
2	Antenna transformer	32-1310	.40
3	Condenser—capacity obtained by twisting ends of two leads together	....	
4	Tuning condenser assembly	31-1122	
5	Compensator (antenna)	Part of (4)	
6	Resistor (6000 ohms: Blue, Black, Red)	7352	.25
7	Condenser (.0014 mfd.)	7007	.35
8	Resistor (13000 ohms: Brown, orange, orange)	3766	.25
9	Condenser (double .09 .09 mfd.)	4989 AK	.40
10	Oscillator transformer	32-1311	.40
11	Compensator (I.F. primary)	04000A	.15
12	Resistor (16000 ohms: Brown, blue, orange)	7500	.25
13	Compensator (OSC HF)	Part of (4)	
14	I F. transformer	32-1313	1.05
15	Compensator (I.F. sec.)	0-4000Y	15
16	Resistor (4 meg.: Yellow, black, green) inside (14)	6010	.25
17	Compensator (regeneration)	0-4000	.20
18	Resistor (1 meg.: Brown, black, green)	4409	.25
19	Resistor (10000 ohms: Brown, black, orange)	4412	.25
20	Condenser (.015-.001)	7762-B	.30

No. on Figs.	Description	Part No.	List Price
22	Resistor (240000 ohms: Red, yellow, yellow)	4410	.25
23	Resistor (490000 ohms: Yellow, white, yellow)	4517	.25
24	Condenser .006 mfd.	7625H	.25
25	Output transformer	32-7019	1.25
26	Voice coil and cone assembly	36-3014	.60
27	Field coil and pot assembly	36-3243	1.60
28	Condenser (.015—.015)	3793AD	.40
29	Condenser (electrolytic—4.0—8.0 mfd.)	30-2013	1.95
30	Resistor (wire wound 325 ohms)	7465	.15
31	Power transformer	32-7180	3.60
32	Condenser (.015)	3793 C	.35
33	Pilot lamp	6608	.11
34	Four prong socket	7544	.10
35	Six prong socket	7547	.11
36	Tube shield	8005	.06
37	Knob	27-4038	.10
38	Pointer	27-5007	.30 Per C
39	AC cord and plug	L-943A	.60
40	Speaker cord	L 1474	.15
41	Base shield plate	29-1724	.13
42	Chassis mounting screw	W-490	3.60 per C
43	Chassis mounting washer	W 315	.50 per C
44	Output transformer shield	36 3025	.08
45	Dial scale	27-5031	.15

MODEL 71
Shadow tuning data

PHILCO RADIO & TELEVISION CORP.

INSTRUCTIONS FOR INSTALLING SHADOW TUNING METER

IN PHILCO MODEL 71

The mechanical part of the installation of the shadow tuning meter is accomplished by means of the two brackets supplied with the kit which are to be fastened to the tuning dial bracket with the two small screws provided for this purpose. The dial bezel on the set is to be replaced with the new bezel which will require the enlarging of the hole in the control panel to accommodate the opening for the shadow screen.

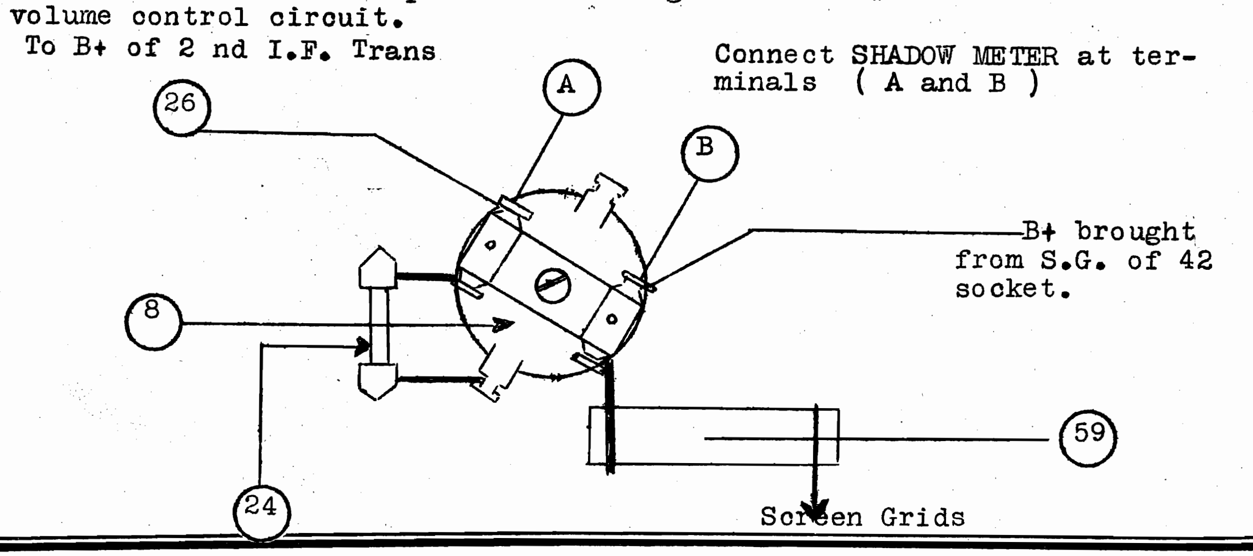
In some of the later 71 chasses the wiring at the terminal board of choke #8, Service Bulletin #128, will be arranged as shown in the accompanying figure and with a short piece of wire connecting terminals A and B. In these sets it is only necessary to remove the link and to connect the tuning meter leads to these terminals.

The earlier chasses which are not already wired for the tuning meter in the above manner will require the following changes.

If the terminal strip at the top of choke #8 has only a single terminal, remove the strip and replace with the double terminal strip furnished with the kit. In other chasses equipped with the double terminal strip, a common lead from resistors #27, 28 and 17 and condensers #31 and 32 will be found connected to terminal A. In this case the common lead should be removed and connected to this corresponding terminal of by-pass condenser #32. After making either of these changes, the wiring at the terminal strip should be re-arranged as illustrated.

The B+ lead coming from the screen grid contact of the 42 socket must be broken at this point and connected at terminal B as shown. When the changes have been properly made, the B+ lead will be connected to the screen grids of the R.F., I.F., and detector oscillator tubes through resistor #59 and to the plates of these three tubes through the shadow tuning meter.

To complete the changes remove resistor #23 and wire the terminal on the first I.F. transformer from which the resistor was removed to the terminal on by-pass condenser #5 to which resistor #17 is connected. This change will connect the grid returns of the R.F. and I.F. tubes to a common point and through resistor #17 to the automatic volume control circuit.



MODEL 37
MODEL 43-121
MODEL 54
Changes

PHILCO RADIO & TELEVISION CORP.

Model 37

In Run No. 4, the cathode resistor (11) is changed from Part No. 7352 (6,000 ohm) to Part No. 5838 (8,000 ohm).

Model 43-121

The following substitutions of electrolytic condensers are effective with current production:

Position	Code 121
(47)	7556 (6 Mfd.) (remains)
(75)	7556 (6 Mfd.)
(72)	6453 (6 Mfd.)

Model 54

Effective with Run No. 9, fixed condenser (36), 3793-Y is replaced by 3793-S, same capacity, .015 mfd. 3793-S is mounted in a new hole and is parallel to chassis.

Present production of this Model carries condenser (28) Part number 3903AR instead of 3903AM. There is no difference in the electrical characteristics of these condensers.

In run number 4, two of Part number 31-6004 double compensating condensers supersede Parts number 04000A in locations (18), (20), and (22) one of Part number 31-6004 covers (18) and (20), the other (22), and the additional compensating condenser is used to tune the secondary of the 2nd I. F. transformer (28)

The correct resistance value of the Speaker Field Coil (30) is 2600 ohms.

The extruded washers at top and bottom of voltage divider resistors (43) and (36) are Part No. 27-7168. These washers are used in some of the later production of this Model.

Second I. F. Transformer (28) Part No. 32-1116 is superseded by Part No. 32-1195.

Refer to Figures 1 and 2

The adjustment of the I. F. compensating condensers is first completed. This is followed by the adjustment of the High Frequency and Antenna compensating condensers, and then the Low Frequency compensating condenser. The intermediate frequency is 460 kilocycles, and it is necessary to have an accurately calibrated signal generator for the adjustment. The Philco All Purpose Set Tester Model 048 is ideal.

The adjustment of the High Frequency and Antenna compensating condensers can be accomplished by means of a screw driver through the top grille of the cabinet. The Low Frequency condenser is accessible from rear of cabinet.

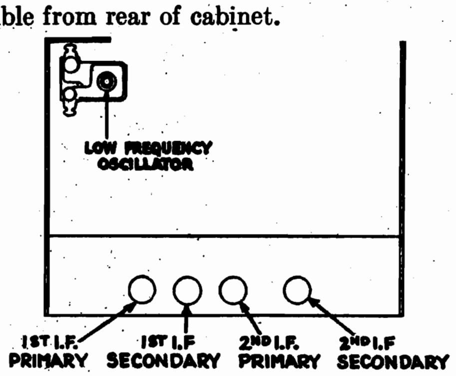


Fig. 1—Back of Model 54 Chassis, showing location of Compensating Condensers.

Model 54

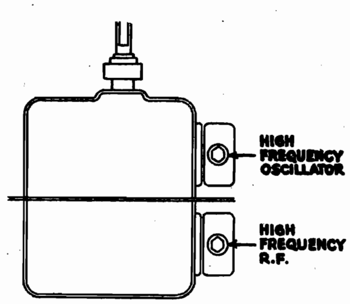


Fig. 2—Tuning Condenser, Model 54 Chassis, showing location of additional Compensating Condensers.

FOR FURTHER INFORMATION ON THESE RECEIVERS, SEE INDEX

MODEL 503
Schematic
Data

PHILCO RADIO & TELEVISION CORP.

Radio-Phonograph Model 503

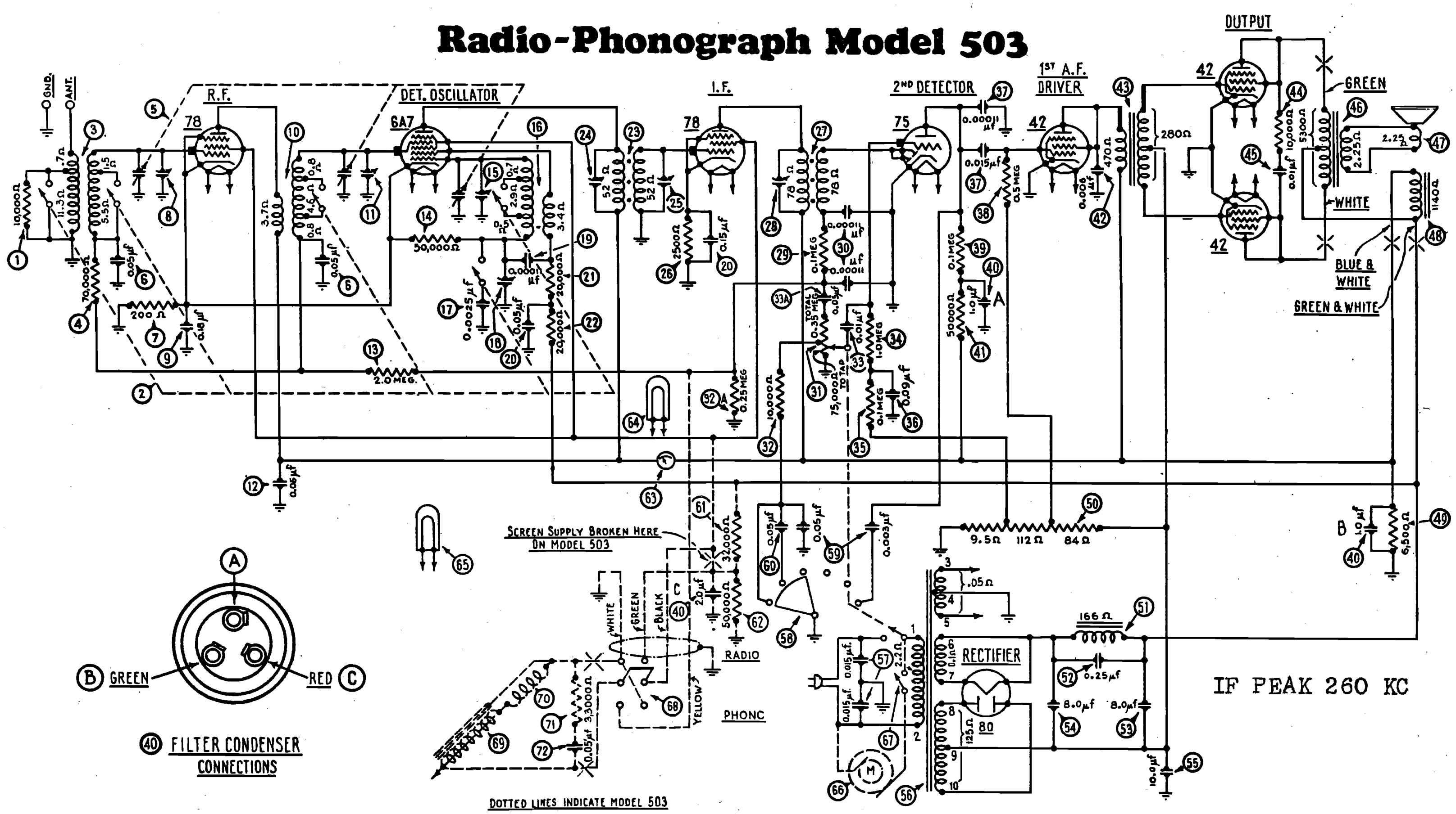


Fig. 1—Schematic Wiring Diagram. Numbers on this figure from ① to ⑥⑤, inclusive, are the same as in Fig. 3, Service Bulletin No. 172.

④⓪ FILTER CONDENSER CONNECTIONS

Ⓐ Ⓑ GREEN ⒸRED

NOTE: Primary and secondary winding values of ④⑥ Output Transformer, and value of ④⑦ Voice Coil are given in impedance at 200 cycles, 80 volts. The D. C. resistance of the primary winding is 850 ohms; of the secondary, .09 ohm. The D. C. resistance of ④⑦ is 1.11 ohms.

NOTE: ⑦① and ⑦② form the Scratch Filter, Part No. 85-5001.

The electric motor of Model 503 is of the self-starting, synchronous type, depending on the power line frequency (cycles) for its correct speed. If the motor should develop trouble, do not attempt to repair it. Replace it, and communicate with your Distributor with regard to the faulty one. The motor should be lubricated at least once every six months. To do this, take off the turntable and put a few drops of a good grade of light machine oil in the oil-hole in the motor top-plate.

The pick-up is of the high impedance type. The impedance of the pick-up is approximately 2500 ohms, measured at 1000 cycles. The D.C. resistance is 600 ohms. Adjustment of the pick-up is described in Service Bulletin No. 89, "Adjusting the Electric Pick-up." The D.C. resistance of the pick-up bucking coil is 230 ohms. If the bucking coil is disconnected, be sure it is re-connected correctly. The direction of current flow is very important.

The tone arm must be free to rotate upon its axis at all times. Damage to the records will result if it is not.

The speaker unit is Type H-13.

MODEL 503
Parts List

PHILCO RADIO & TELEVISION CORP.

Radio-Phonograph Model 503

PHILCO MODEL 503 is a radio-phonograph using the same radio receiver chassis as the Model 18 superheterodyne.

Except for the additional wiring of the phonograph, the circuits are the same as those of Model 18. The audio system of the radio chassis takes care of the amplification of the pick-up currents.

The power consumption of Model 503, with motor running, is 140 watts.

Complete schematic wiring diagram of Model 503 is given in Fig. 1 of this Bulletin.

Refer to Service Bulletin No. 172 (Model 18) for data on the radio chassis, including the adjustment of the compensating condensers. Replacement parts for the radio receiver and for the speaker unit are included in Bulletin No. 172. The additional *phonograph* parts are:

These Prices are Effective September 15, 1933

No. on Fig. 1	Description	Part No.	List Price
66	Phonograph Motor (115-volt, 60-cycle)	6336	$27.00
	Phonograph Motor (115-volt, 50-cycle)	6338	27.00
	Phonograph Motor (115-volt, 40-cycle)	6339	31.80
67	Automatic-Stop Switch (Motor)	6345	3.30
68	Phonograph-Radio Switch	42-1053	
69	Pick-up Unit (only)	35-2004	
70	Pick-up Bucking Coil	32-1293	
	Tone Arm and Bucking Coil Assembly	35-2003	
71	Resistor (3,300 ohms) (Orange-Orange-Red)	7238	.24
72	By-pass Condenser (.05 Mfd.)	3615-AX	.24
	Phonograph-Radio Switch Indicator	4277	.02
	Phonograph-Radio Switch Cover	27-7285	
	Phonograph-Radio Switch Plate	6444	.10
	Motor Board	32516	
	Motor Board Mounting Screw	W-461	.01
	Motor Board Mounting Washer	W-464	1.44 per C.
	Motor Board Mounting Washer	W-410	.48 per C.
	Motor Board Mounting Nut	W-149	.48 per C.
	Motor Board *Rubber* Washer	4074	.06
	Motor Mounting Screw	W-694	1.20 per C.
	Motor Mounting Washer	W-410	.48 per C.
	Motor Mounting Nut	W-139	.48 per C.
	Turntable	6344	3.00
	Pick-up Mounting Screw	W-695	.24 per C.
	Pick-up Mounting Washer	W-410	.48 per C.
	Pick-up Mounting Nut	W-696	.30 per C.
	Pick-up Needle Screw	4108	.17
	Speed Change Plate	6347	.10
	Speed Change Plate Pin	W-976	.06 per C.
	Cord-Connector Plug	4091	.30
	Needle Cup	4101	.19
	Needle Box	4102	.36

MODEL 504
Schematic

PHILCO RADIO & TELEVISION CORP.

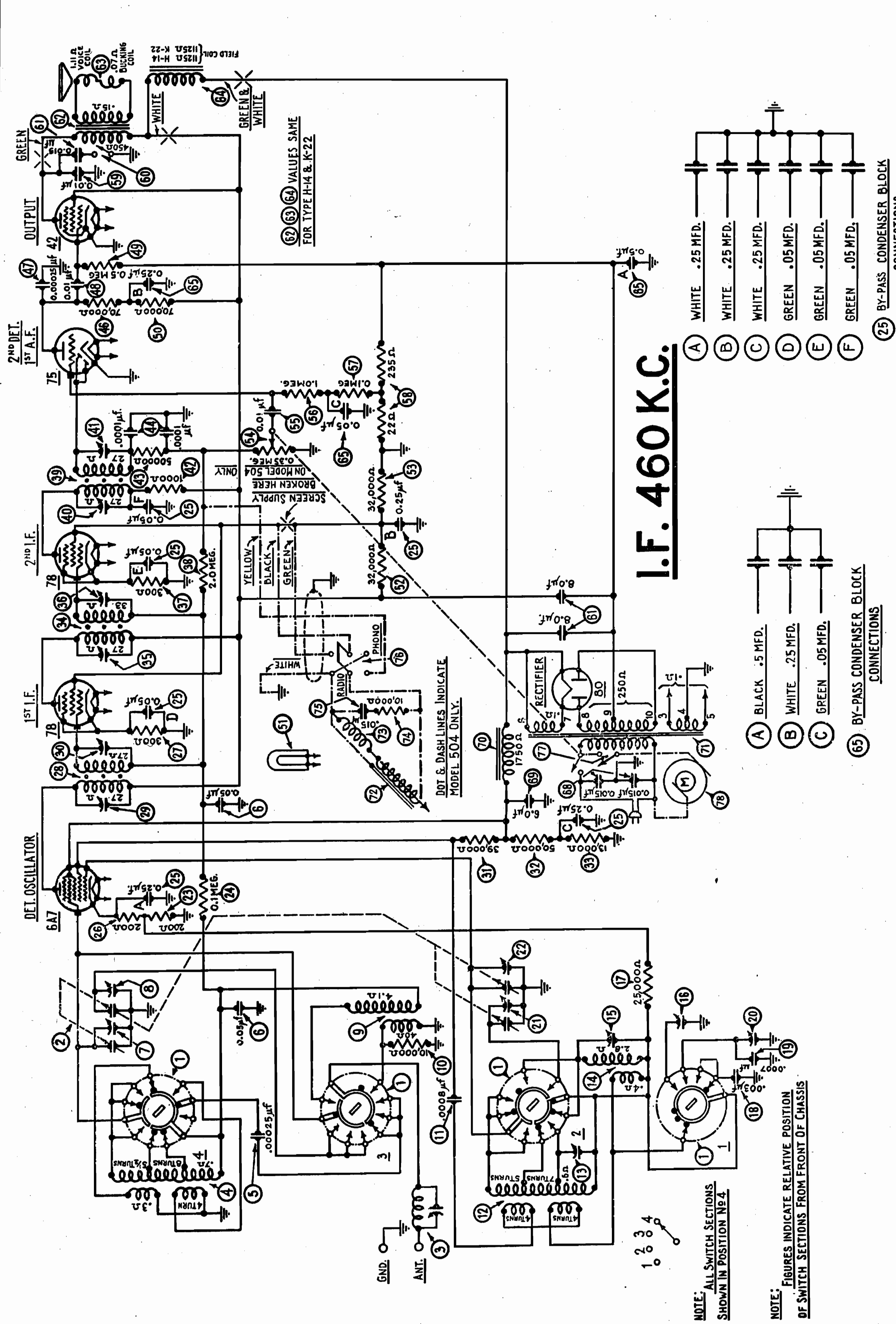


Fig. 1 - Schematic Wiring Diagram.

November, 1933

MODEL 504
Parts List

PHILCO RADIO & TELEVISION CORP.

Radio-Phonograph Model 504

PHILCO MODEL 504 has the same superheterodyne broadcast and short-wave receiver chassis as Model 44, and must be operated upon the exact frequency (cycles) of alternating current given upon the name-label of the radio receiver chassis,—for correct speed of the phonograph motor.

Service Bulletin No. 176 upon Model 44 gives the data necessary to test and adjust the radio receiver of Model 504, and includes a full description of the adjustment of its compensating condensers.

The radio circuits are the same as those of Model 44,—with the additional phonograph reproducing circuits. Complete schematic wiring diagram of Model 504 is given in Figure 1 of this Bulletin. The audio frequency system of the radio chassis amplifies the impulses generated in the pick-up.

Replacement Parts for the radio chassis and speaker are given in Service Bulletin No. 176 (Model 44); the additional *phonograph* parts are:

These Prices Are Effective September 15, 1933

No. on Fig. 1	Description	Part No.	List Price
72	Pick-up Unit (only)	6823	$11.40
73	Pick-up Bucking Coil	32-1293	
	Tone Arm and Bucking Coil Assembly	35-2006	
74	Resistor (10,000 ohm) (Brown-Black-Orange)	4412	.24
75	Condenser (.015 Mfd.)	3793-N	.18
76	Phonograph-Radio Switch	42-1053	
	Phonograph-Radio Switch Indicator	4277	.02
	Phonograph-Radio Switch Cover	27-7285	
	Phonograph-Radio Switch Plate	6444	.10
77	Automatic-Stop Switch (Motor)	6345	3.30
	Turntable	35-3001	
	Speed-Change Lever (Turntable)	28-1648	
	Speed-Change Lever Spacer (Turntable)	28-6103	
	Speed-Change Lever Spring (Turntable)	28-1649	
78	Phonograph Motor (115 volt, 60 cycle)	35-1002	
	Phonograph Motor (115 volt, 50 cycle)	35-1007	
	Phonograph Motor (115 volt, 40 cycle)	35-1003	

No. on Fig. 1	Description	Part No.	List Price
	Motor Board	32516	
	Motor Board Mounting Screw	W-461	.01
	Motor Board Mounting Washer (Finishing)	W-464	1.44 per C
	Motor Board Mounting Washer	W-410	.48 per C
	Motor Board Mounting Nut	W-139	.48 per C
	Mounting Board *Rubber* Washer	4074	.06
	Motor Mounting Screw	W-694	1.20 per C.
	Motor Mounting Washer	W-410	.48 per C.
	Motor Mounting Nut	W-139	.48 per C.
	Pick-up Mounting Screw	W-695	.24 per C.
	Pick-up Mounting Washer	W-410	.48 per C.
	Pick-up Mounting Nut	W-696	.30 per C.
	Pick-up Needle Screw	4108	.17
	Cord-Connector Plug	4091	.30
	Needle Cup	4101	.19
	Needle Box	4102	.36

The electric pick-up is of the high-impedance type. Its impedance, at 1000 cycles, is 10,000 ohms. Its D. C. resistance is 700 ohms. A description of the adjustment of the pick-up is given in Service Bulletin No. 89, "Adjusting the Electric Pick-up". The D. C. resistance of the pick-up bucking coil is 230 ohms. The direction of current-flow in the bucking coil is very important for proper reproduction; if the bucking coil is temporarily disconnected, be sure it is re-connected correctly.

The electric motor depends upon the frequency (cycles) of the power supply for its correct speed. The power line frequency must be the same as that given in the name-label upon the radio chassis and upon the motor frame. Only a motor of the correct frequency will give the proper turntable speed.

The motor is of the self-starting, synchronous type. The motor should be lubricated at least once every six months. To do this, lift off the turntable and place a few drops of a good grade of light machine oil in the oil-hole in the top-plate of the motor.

If the electric motor should develop a fault, it should be replaced. Do not attempt to repair it; get in touch with your Distributor regarding the faulty motor.

The tone arm must be free to rotate upon its axis at all times. Damage to records will result if it is not.

The speaker unit of Model 504 is Type H-14.

The power consumption of Model 504,—with motor running,—is 95 watts.

MODEL 505
Schematic

PHILCO RADIO & TELEVISION CORP.

Radio-Phonograph Model 505

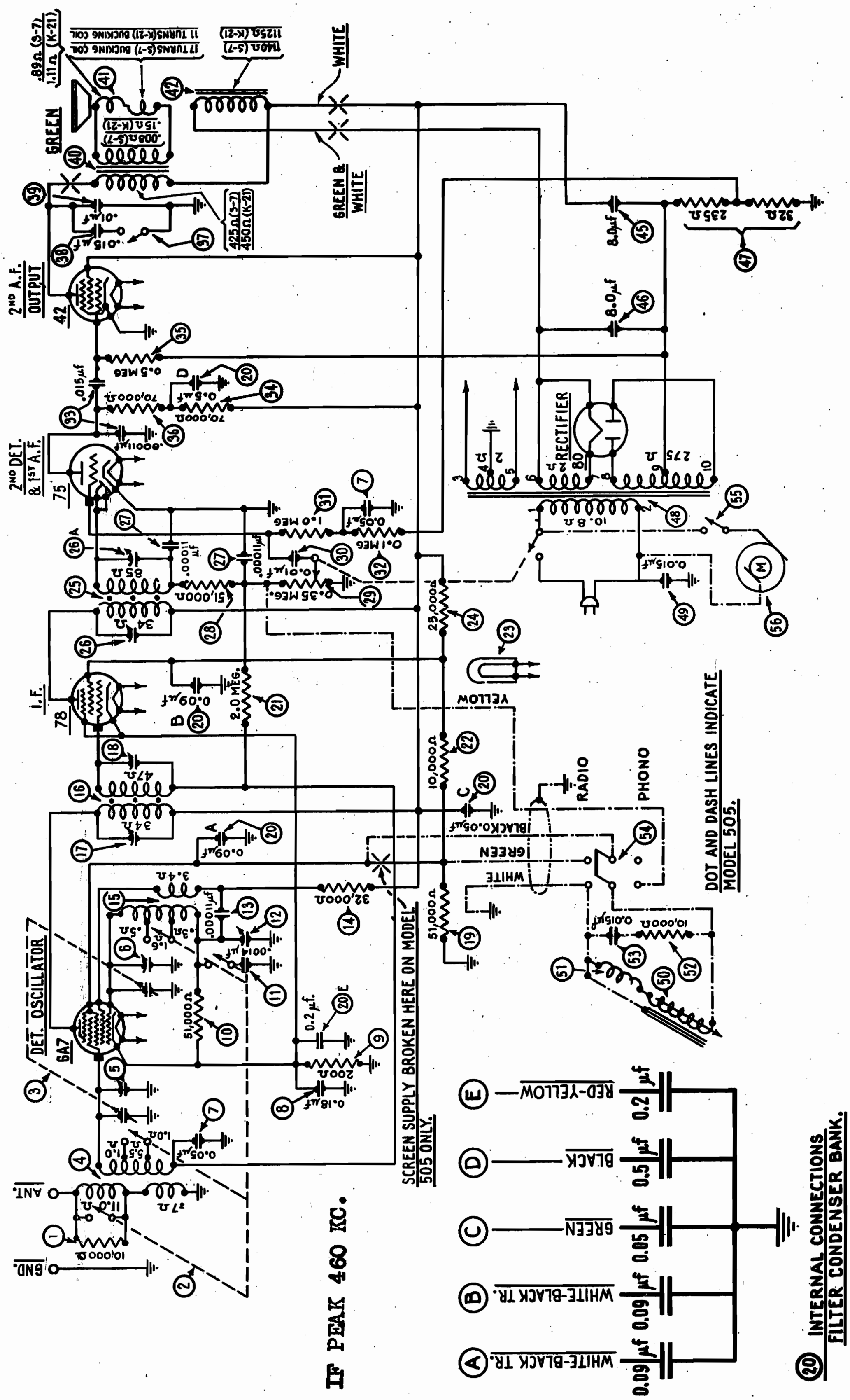


Fig. 1 - Schematic Wiring Diagram

November, 1933

MODEL 505
Parts List
Data

PHILCO RADIO & TELEVISION CORP.

Radio-Phonograph Model 505

PHILCO RADIO-PHONOGRAPH MODEL 505 uses the same radio receiver chassis as the Model 60 Superheterodyne.

Model 505 is designed to operate upon alternating current; the frequency (cycles) of the power line must be that given upon the name-label of the radio chassis.

The radio circuits are the same as those of Model 60,—with the additional wiring of the phonograph. The audio system of the radio chassis amplifies the voltages generated by the pick-up.

Complete schematic wiring diagram of Model 505 is given in Figure 1 of this Bulletin.

Service Bulletin No. 164-A (Model 60) gives the information necessary for tests, and adjustments of the radio receiver, including the adjustment of the compensating condensers.

Replacement Parts for the radio chassis and speaker are included in Service Bulletin No. 164-A. The additional *phonograph* parts are:

These Prices Are Effective September 15, 1933

No. on Fig. 1	Description	Part No.	List Price
50	Pick-up Unit (only)	6823	$11.40
51	Pick-up Bucking Coil	32-1293	
	Tone Arm and Bucking Coil Assembly	35-2006	
52	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.24
53	Condenser (.015 Mfd.)	3793-N	.18
54	Phonograph-Radio Switch	42-1053	
55	Automatic-stop Switch (Motor)	6345	3.30
56	Phonograph Motor (115 volt, 60 cycle)	35-1002	
	Phonograph Motor (115 volt, 50 cycle)	35-1007	
	Phonograph Motor (115 volt, 40 cycle)	35-1003	
	Motor Board	32516	
	Motor Board Mounting Screw	W-461	.01
	Motor Board Mounting (Finishing) Washer	W-464	1.44 per C.
	Motor Board Mounting Washer	W-410	.48 per C.
	Motor Board Mounting Nut	W-149	.48 per C.
	Motor Board *Rubber* Washer	4074	.06
	Motor Mounting Screw	W-694	1.20 per C.
	Motor Mounting Washer	W-410	.48 per C.
	Motor Mounting Nut	W-139	.48 per C.
	Turntable	35-3001	
	Pick-up Mounting Screw	W-695	.24 per C.
	Pick-up Mounting Washer	W-410	.48 per C.
	Pick-up Mounting Nut	W-696	.30 per C.
	Pick-up Needle Screw	4108	.17
	Phonograph-Radio Switch Indicator	4277	.02
	Phonograph-Radio Switch Cover	27-7285	
	Phonograph-Radio Switch Plate	6444	.10
	Speed-Change Lever (Turntable)	28-1648	
	Speed-Change Lever Spacer (Turntable)	28-6103	
	Speed-Change Lever Spring (Turntable)	28-1649	
	Cord-Connector Plug	4091	.30
	Needle Cup	4101	.19
	Needle Box	4102	.36

The electric motor of Model 505 is of the self-starting, synchronous type, depending upon the frequency (cycles) of the power line for its correct speed. The power line frequency must be the same as that given on name-label of Model 505. The motor should be lubricated at least once every six months. Lift off the turntable, and place a few drops of a good grade of light machine oil in the oil-hole in the top-plate of the motor. Only a motor of the correct frequency will give the proper turntable speed.

If the electric motor should develop a fault, it should be replaced. Do not attempt to repair it. Communicate with your Distributor regarding the faulty motor.

The electric pick-up is of the high-impedance type. Its impedance is 10,000 ohms, measured at 1000 cycles. The D. C. resistance is 700 ohms. Adjustment of the pick-up is described in Service Bulletin No. 89, "Adjusting the Electric Pick-up." The D. C. resistance of the pick-up bucking coil is 230 ohms. If the bucking coil is disconnected, be sure it is re-connected correctly, as the direction of current-flow is very important.

The tone arm must be free at all times to rotate upon its axis. Damage to records will result if it is not.

The speaker unit of Model 505 is Type K-21.

The power consumption of Model 505,—with the motor running,—is 90 watts.

PHILCO RADIO & TELEVISION CORP.

MODEL 38,38-A
MODEL 71
MODEL 89-126-126-B
MODEL 19-122-126-126B
MODEL 91,14,91-122
MODEL 91-A,121
Changes

SEE INDEX FOR FURTHER INFORMATION ON THESE RECEIVERS,

Models 38 and 38-A

The following additional *list* prices should be included in the Replacement Parts list:

No. on Figs.	Description	Part No.	List Price
1	Volume Control	33-5017	$0.72
2	Wave Band Switch	42-1039	.48
3	Antenna Transformer	32-1208	.48
4	Tuning Condenser Assembly	31-1076	2.70
13	Oscillator Transformer	32-1209	.78
16	1st I. F. Transformer	32-1251	.60
17	2nd I. F. Transformer	32-1252	.60
31	Voice Coil and Cone Assembly	36-3014	.60
33	Switch ("On-Off"; Battery)	42-1040	.54
	Battery Cable Assembly (including Multi-Plug)	38-5265	.96
	Station Selector Dial Scale	27-5019	.14

Note: The above list prices are effective September 15, 1933.

Model 71 Series

To correct typographical error;—

Change Part No. 02761 (40), Speaker Field and Bucking Coil assembled with Pot (K-7)—(single speaker Models), to Part No. 02741.

Change Part No. 02762 (47) Speaker Field and Bucking Coil assembled with Pot—(K-9)—(twin speaker Models)—to Part No. 02761.

Model 89-126-126B

Model 19-122-126-126B

The following substitutions of electrolytic condensers are effective with current production:

Position	Code 122 (Model 19 only)	Code 126 and 126B (Models 89 and 19)
46	8095 (6 Mfd.), or 7464 (8 Mfd.)	30–2020, or 8166, or 4916, or 8095
44	8095 (6 Mfd.), or 7464 (8 Mfd.)	30–2021, or 8165, or 8095
		(These are all of 6.0 Mfd. capacity)

Effective with Run Number 5, Tuning Condenser (3) is superseded by Tuning Condenser, Part No. 31-1053. The *complete* Tuning Condenser Assembly (3) Part No. 06577, is superseded by Assembly, Part No. 31-1059.

The sub-base has been modified to accommodate the new condenser by change in location of mounting holes.

Effective with Run Number 6 for Model 89, and with Run Number 5 for Model 19, the red and black wires connecting Oscillator Transformer (14) and Compensating Condenser—(1st. I. F. Primary) (15) are reversed at the Compensating Condenser.

Part No. 3615BF Condenser is substituted for Part No. 3615E in (45).

Change Part No. 02761 (50), Speaker Field and Bucking Coil assembled with Pot (K-7), to Part No. 02741.

Effective with Run Number 6 for Model 89, and with Run Number 5 for Model 19, the red and black wires connecting Oscillator Transformer (14) and Compensating Condenser—(1st. I. F. Primary) (15) are reversed at the Compensating Condenser.

Models 91 and 14 Series

Make (19) Oscillator Coil read Part No. 05983. This part has a list price of 65 cents.

Model 91-122

With Run number 2, Tuning Condenser Assembly (4) will be changed to Part No. 31-1051, immediately superseding Part No. 31-1015. In the substitution, it is necessary to remove three of Part No. W-453 mounting bolts and add three of Part No. W-729 mounting bolts; to add three Part No. 29-6060 spacers, six Part No. 3914 rubber washers, and three Part No. W-410 washers.

Model 91-A; Code 121

Effective with current production, this Model will have two Part No. 8022 (10 microfarad) Electrolytic Condensers.

PHILCO SPEAKERS

PHILCO RADIO & TELEVISION CORP.

DATA ON ALL PHILCO SPEAKERS

All speakers are equipped with output transformer, except as mentioned in notes

Speaker Model No.	Speaker Part No.	Used in Receiver Model:	For Receiver Output, Using:	Speaker Field Coil and Pot Assembly (Part No.)	Speaker Field Coil (Part No.)	Speaker Voice Coil and Cone Assembly (Part No.)	Speaker Field Coil Resistance D.C. (Ohms)	Speaker Voice Coil Resistance (Ohms)	Speaker Bucking Coil (Part No.)	Output Transformer (Part No.)	Rated Field Current	Output Transformer Primary Resistance; D.C. (Ohms)	Replacement Speaker
A‡		3 (Transitone)	1-71A	Not furnished	2707	2769-B	4.05	.62	....	2706	1.50 A.	375	A-17
A-2‡	02971	3 (Transitone)	1-71A	Not furnished	2707	02996	4.05	.62	....	2706	1.50 A.	375	A-17
A-3‡	02832	7 (Transitone)	1-38 as Pentode	Not furnished	2707	02996	4.05	.62	....	2589	1.50 A.	700	A-18
A-4	02822	6 (Transitone); 7 (Transitone)	1-41 as Pentode	02795	2593	36-3020	4.2	1.11	....	2598	1.25 A.	680	....
A-5	02756	8 (Transitone)	Push-Pull 41's as Pentodes	02795	2593	36-3020	4.2	1.11	....	2565	1.25 A.	680	....
A-6	02712	12 (Transitone) (Code 121)	Push-Pull 41's as Pentodes	02688	2535	36-3020	16.0	1.11	....	2565	.75 A.	680	....
A-7	02674	9 (Transitone) (6 Volt)	1-79asClass "B"	02795	2593	36-3020	4.2	1.11	....	32-7039	1.25 A.	725	....
A-8	02665	B-6 (Transitone)	1-41	02795	2593	36-3020	4.2	1.11	....	2598	1.25 A.	680	....
A-9	36-1001	12 (Transitone) (Code 122)	1-79asClass "B"	02688	2535	36-3020	16.0	1.11	....	32-7039	.75 A.	725	....
A-10	36-1003	B-9-F (Transitone)	1-79asClass "B"	02795	2593	36-3020	4.2	1.11	....	32-7039	1.25 A.	725	....
A-11	36-1032	PB (Transitone)	1-41	02795	2593	36-3020	4.2	1.11	....	2598	1.25 A.	680	....
A-12	36-1040	PA (Transitone)	1-79asClass "B"	02795	2593	36-3020	4.2	1.11	....	32-7039	1.25 A.	725	....
A-13	36-1045	9 (Transitone)	1-79asClass "B"	02795	2593	36-3020	4.2	1.11	....	32-7039	1.25 A.	725	....
A-17	36-1062	Replacement for A and A-2	1-71A	02795	2593	36-3020	4.2	1.11	....	32-7014	1.25 A.	170	....
A-18	36-1063	Replacement for A-3	1-38 Pentode	02795	2593	36-3020	4.2	1.11	....	32-7005	1.25 A.	680	....
B	36-1007	54	1-43 as Pentode	36-3040	32-9007	36-3029	2600	.89	36-3021	32-7020	40 M.A.	200	....
B-2	36-1016	57; 58	1-42 as Pentode	36-3081	32-9019	36-3029	1140	.89	36-3057	32-7041	50 M.A.	400	....
E‡		86	Push-Pull 71A's	Not furnished	2850	02996	3100	.62	....	2897	40 M.A.	550	K-24
F-10‡		65, 76	Push-Pull 45's	Not furnished	2850	....	3200	.62	....	2848	....	550	K-24
G‡		65; 76; 87; 95	Push-Pull 45's	Not furnished	Not furnished	36-3170	3200	.62	....	2848	40 M.A.	550	H-17
H‡		77; 96	Push-Pull 45's	Not furnished	Not furnished	36-3170	3200	.62	....	2848	40 M.A.	550	H-17
H-2‡	02999	90-H; 90-L; 112-L; 111-L	Push-Pull 45's	Not furnished	2850	36-3170	3200	.62	....	2848	40 M.A.	550	H-17
H-3‡	02951	90-H, (Series "B"); 90-L, (Series "B")	1-47 as Pentode	Not furnished	2850	36-3170	3200	.62	....	2673	40 M.A.	450	H-18
H-4‡	02901	112, (Series "B")	Push-Pull 47's as Pentodes	Not furnished	2850	36-3170	3200	.62	....	2635	40 M.A.	800	H-12
H-5‡	02876	90-H, (Series "B"); 90-L, (Series "B")	1-47 as Pentode	Not furnished	2850	36-3170	3200	.62	....	2673	40 M.A.	450	H-18
H-6‡	02873	90-X, (Series "B"); 112-X, (Series "B")	Push-Pull 47's as Pentodes	Not furnished	2850	36-3170	3200	.62	....	2635	40 M.A.	800	H-12
H-7	02813	14-LZX; 15-X; 23-X; 91-X (See Note 1)	Push-Pull 42's as Pentodes	02803	2588	02625	3275	1.11	....	2565	40 M.A.	680	....
H-9	02648	19-H; 19-LZX; 71-X; 25-L; 27-L; 43-L; 71-H; 44	1-42 as Pentode	02807	2562	02625	1125	1.11	02775	2580	65 M.A.	450	....
H-10	02641	47-H (Code 125); 47-X (Code 125)	Push-Pull 43's as Pentodes	02745	2546	02625	70	1.11	....	2550	300 M.A.	170	....
H-11	36-1005	Central Control System	(4,000 Ohm Impedance on line)	02803	2588	02625	3275	1.11	....	32-7014	40 M.A.	170	....
H-12	36-1006	91-D; 91-L; 91-X; 23-L	Push-Pull 42's as Pentodes	02803	2588	02625	3275	1.11	....	2585	40 M.A.	680	....
H-13	36-1036	18-D; 18-H; 18-L; 18-X; 503-L	Push-Pull 42's as Triodes	36-3104	2562	02625	1125	1.11	....	32-7078	65 M.A.	310	....
H-14	36-1037	44-H; 504-L; 260-L; 261-L	1-42 as Pentode	02767	2562	02625	1125	1.11	02775	2580	65 M.A.	450	....
H-15	36-1057	19-H (Code 126)	1-42 as Pentode	36-3201	2562	02625	1125	1.11	02780	2580	65 M.A.	450	....
H-16	36-1059	19-X (Code 128)	1-42 as Pentode	36-3218	32-9087	02625	660	1.11	36-3204	32-7178	80 M.A.	260	....

PHILCO RADIO & TELEVISION CORP.

H-17	36-1064	Replacement for H, H-2, G	Push-Pull 45's	02803	2588	02625	3275	1.11	....	32-7078	40 M.A.	310	....
H-18	36-1065	Replacement for H-3 and H-5	1-47 as Pentode	02803	2588	02625	3275	1.11	....	2580	40 M.A.	450	....
H-19	36-1066	Replacement for J	Push-Pull 71A's	02795	2593	02625	4.2	1.11	....	32-7078	1.25 A.	310	....
H-20	36-1080	Central Control System	(1000 Ohm Impedance on line)	02803	2588	02625	3275	1.11	....	32-7198	40 M.A.	32	....
HR	02652	Central Control System	(12000 Ohm Impedance on line)	....	....	02625	Permanent Magnet	1.11	....	2598	....	680	....
J‡		40; 41	Push-Pull 71A's	Not furnished	2799	36-3170	3	.62	....	2848	1.75 A.	550	H-19
K‡		20; 21	Push-Pull 71A's	Not furnished	2768	02996	3100	.62	....	2766	40 M.A.	500	K-24
K-2‡	02998	90-B	Push-Pull 45's	Not furnished	2768	02996	3100	.62	....	2766	40 M.A.	500	K-24
K-3‡	02981	70-B; 70-H; 90-H, (Series "B")	1-47 as Pentode	Not furnished	2768	02996	3100	.62	....	2673	40 M.A.	450	K-25
K-4‡	02865	470; 490	1-47 as Pentode	Not furnished	2768	02996	3100	.62	....	2673	40 M.A.	450	K-25
K-5‡	02834	90, (Series "B")	Push-Pull 47's as Pentodes	Not furnished	2768	02996	3100	.62	....	2590	40 M.A.	700	K-6
K-6	02821	91-B (Also replacement for K-5)	Push-Pull 42's as Pentodes	02803	2588	36-3174	3275	1.11	....	2585	40 M.A.	680	....
K-7	02819	19-B; 19-LZ; 89-B; 89-H; 71-B; 71-L; 43-B	1-42 as Pentode	02741	2562	36-3174	1125	1.11	02780	2580	65 M.A.	450	....
K-8	02806	470, 490	....	Not furnished	2768	02996	3100	.62	....	2590	40 M.A.	700	....
K-9	02874	22-L; 43-H; 71-D; 71-H (See Note 2)	1-42 as Pentode	02761	2588	36-3174	3275	1.11	02775	2564	40 M.A.	530	....
K-10	02872	22-L; 43-H; 71-D; 71-H (See Note 3)	....	02767	2562	36-3174	1125	1.11	02780	....	65 M.A.	....	....
K-12	02765	14-LZX; 15-X; 23-X; 91-X (See Note 4)	....	02803	2588	36-3020	3275	1.11	....	....	40 M.A.	....	....
K-13	02763	47-B and Replacement for N and N-2	Push-Pull 43's as Pentodes	02745	2546	36-3020	70	1.11	....	2550	300 M.A.	170	....
K-14	02758	47-H (See Note 5)	Push-Pull 43's as Pentodes	02745	2546	36-3020	70	1.11	....	2544	300 M.A.	170	....
K-15	02757	47-H (See Note 6)	....	02744	2545	36-3020	2200	1.11	....	....	50 M.A.	....	....
K-16	02706	247-E	Push-Pull 43's as Pentodes	02745	2546	36-3020	70	1.11	....	2585	300 M.A.	680	....
K-17	36-1025	16-B; 17-B; 14-B (Code 122); 18-B	Push-Pull 42's as Triodes	36-3104	2562	36-3020	1125	1.11	....	32-7078	65 M.A.	310	....
K-18	36-1031	10 (Transitone) (6 Volt) (See Note 7)	....	02795	2593	36-3020	4.2	1.11	....	....	1.25 A.	....	....
K-19	36-1035	261-B	1-42 as Pentode	02741	2562	36-3174	1125	1.11	02780	2580	65 M.A.	450	....
K-20	36-1043	10 (Transitone) (12 Volt) (See Note 7)	....	36-3172	2535	36-3020	16	1.11	....	....	.75 A.	....	....
K-21	36-1055	505-L; 19-B; 89-L; 89-B; 19-LZ	1-42 as Pentode	36-3245	2562	36-3174	1125	1.11	36-3177	2580	65 M.A.	450	....
K-22	36-1058	44-B	1-42 as Pentode	02767	2562	36-3174	1125	1.11	02775	2580	65 M.A.	450	....
K-23	36-1060	19 (Code 128)	1-42 as Pentode	32-3239	32-9087	36-3174	660	1.11	36-3177	32-7178	80 M.A.	260	....
K-24	36-1067	Replacement for E, F-10, M, K, K-2	Push-Pull 71A's or 45's	02803	2588	36-3174	3275	1.11	....	32-7078	40 M.A.	310	....
K-25	36-1068	Replacement for K-3 and K-4	1-47 as Pentode	02803	2588	36-3174	3275	1.11	....	2580	40 M.A.	450	....
KR	36-1002	Central Control System	(10000 Ohm Impedance on line)	....	....	36-3014	Permanent Magnet	.89	....	32-7005	....	680	....
KR-2	36-1004	38-B; 38-L	1-19 as Class "B"	....	....	36-3014	Permanent Magnet	.89	....	2565	....	680	....
KR-3	36-1022	Model 12, (Coast Guard)	Push-Pull 41's	....	....	36-3014	Permanent Magnet	.89	....	2585	....	680	....
KR-4	36-1085	Central Control System	(4000 Ohm Impedance on line)	....	....	36-3014	Permanent Magnet	.89	....	32-7014	....	170	....
L		30	Push-Pull 31's	....	....	36-3223	MAGNETIC	....	....	....	....	....	....
M‡		Separate Speaker	Push-Pull 71A's	....	2768	02996	3100	.62	....	2766	40 M.A.	500	K-24
N‡		46-B; 46-H	Push-Pull 71A's	Not furnished	2694	02996	80	.62	....	2766	330 M.A.	500	K-13
N-2‡	02977	46-B; 46-H	Push-Pull 71A's	Not furnished	2694	02996	80	.62	....	2766	330 M.A.	500	K-13

PHILCO SPEAKERS

PHILCO RADIO & TELEVISION CORP.

Speaker Model No.	Speaker Part No.	Used in Receiver Model:	For Receiver Output, Using:	Speaker Field Coil and Pot Assembly (Part No.)	Speaker Field Coil (Part No.)	Speaker Voice Coil and Cone Assembly (Part No.)	Speaker Field Coil Resistance D.C. (Ohms)	Speaker Voice Coil Resistance (Ohms)	Speaker Bucking Coil (Part No.)	Output Transformer (Part No.)	Rated Field Current	Output Transformer Primary Resistance; D.C. (Ohms)	Replacement Speaker
P‡	02947	50; 51	1-47 as Pentode	Not furnished	2674	02970	1140	.89	....	2660	65 M.A.	360	P-16
P-2‡	02860	52-B; 52-C; 52-L	1-47 as Pentode	Not furnished	2674	02861	1140	.89	....	2660	65 M.A.	360	P-16
P-3‡	02705	48-E	1-18 as Pentode	Not furnished	2527	02861	50	.89	....	2651	330 M.A.	360	P-13
P-4‡	02680	48-B; 48-C	1-43 as Pentode	Not furnished	2527	02861	50	.89		2520	330 M.A.	175	P-17
P-5‡	02679	80-C; 80-P	1-42 as Pentode	Not furnished	2674	02861	1140	.89	02678	2660	65 M.A.	360	P-8
P-6‡	02666	80-C; 80-P	1-42 as Pentode	Not furnished	2674	02861	1140	.89	02664	2660	65 M.A.	360	P-8
P-8	36-1012	81 (Also Replacement for P-5 and P-6)	1-42 as Pentode	36-3058	32-9008	36-3027	1140	.89	36-3101	32-7019	65 M.A.	400	......
P-10	36-1014	5 (Transitone) (6 Volt)	1-41 as Pentode	36-3046	32-9013	36-3027	6	.89	....	32-7042	1.0 A.	450	......
P-11	36-1018	5 (Transitone) (6 Volt)	1-41 as Pentode	36-3097	32-9013	36-3027	6	.89	....	32-7065	1.0 A.	450	......
P-12	36-1023	5 (Transitone) (12 Volt)	1-41 as Pentode	36-3098	32-9035	36-3027	24	.89	....	32-7065	.5 A.	450	......
P-13	36-1024	48-E (Also Replacement for P-3)	1-18 as Pentode	36-3120	32-9038	36-3027	50	.89	....	32-7076	330 M.A.	400	......
P-16	36-1069	Replacement for P and P-2	1-47 as Pentode	36-3242	32-9008	36-3027	1140	.89	....	32-7076	65 M.A.	400	......
P-17	36-1070	Replacement for P-4	1-43 as Pentode	36-3120	32-9038	36-3027	50	.89	....	32-7191	330 M.A.	175	......
PR	36-1000	53	1-43 as Pentode	....	....	36-3000	Permanent Magnet	1.22	....	32-7000	....	200	......
R‡	02941	35-B; 35-H	1-33 as Pentode	....	....	02949	Permanent Magnet	.89	....	2646	....	450	KR-5
R-2‡	02888	35-B; 35-H	1-33 as Pentode	....	....	02887	Permanent Magnet	.89	....	2646	....	450	KR-5
R-3‡	02753	Separate Speaker	(15000 Ohm Impedance on line)	....	....	02887	Permanent Magnet	.89	....	2551	....	680	KR-2
R-4‡	02748	36-B; 36-H; 36-L	1-33 as Pentode	....	....	02887	Permanent Magnet	.89	....	2646	....	450	KR-5
R-5‡	02709	36-B; 36-H; 36-L	1-33 as Pentode	....	....	02887	Permanent Magnet	.89	....	2646	....	450	KR-5
R-6‡	02708	37-C; 37-L	1-19 as Class "B"	....	....	02887	Permanent Magnet	.89	....	2528	....	680	KR-2
R-7‡	02619	Central Control System	(10000 Ohm Impedance on line)	....	....	02887	Permanent Magnet	.89	....	2585	....	680	KR
S‡	02912	52-L; 50; 51	1-47 as Pentode	Not furnished	2674	02887	1140	.89	....	2660	65 M.A.	360	S-9
S-2‡	02858	24-L; 52-L; 50; 51	1-47 as Pentode	Not furnished	2674	02887	1140	.89	....	2660	65 M.A.	360	S-9
S-4‡	02672	48-L	1-43 as Pentode	Not furnished	2527	02887	50	.89	....	2520	330 M.A.	175	S-10
S-7	36-1009	60-B; 60-L; 260-B	1-42 as Pentode	36-3037	32-9008	36-3014	1140	.89	36-3129	32-7019	65 M.A.	400	......
S-9	36-1071	Replacement for S and S-2	1-47 as Pentode	36-3264	32-9008	36-3014	1140	.89	....	32-7076	65 M.A.	400	......
S-10	36-1072	Replacement for S-4	1-43 as Pentode	36-3120	32-9038	36-3014	50	.89	....	32-7191	330 M.A.	175	......
SB	36-1073	84	1-42 as Pentode	36-3243	32-9019	36-3014	1140	.89	36-3240	32-7019	50 M.A.	400	......
U	36-1017	14 (Code 121)	Push-Pull 42's as Pentodes	36-3074	32-9026	36-3061	6500	2.0	....	32-7051	40 M.A.	680	......
U-2	36-1019	16-L; 16-X; 16-RX; 16-PX; 17-L; 17-D; 17-X; 17-RX	Push-Pull 42's as Triodes	36-3088	32-9024	36-3061	1450	2.0	....	32-7052	80 M.A.	350	......
U-3	36-1039	14-L (Code 122); 14-X (Code 122); 14-R (Code 122)	Push-Pull 42's as Triodes	36-3162	32-9055	36-3061	1140	2.0	....	32-7052	70 M.A.	350	......
KR-5	36-1097	Replacement for R, R-2, R-4, R-5	1-33 as Pentode	....	....	36-3014	Permanent Magnet	.89	....	2580	....	450	......

NOTE 1: Output Transformer designed to carry two speaker voice coils in parallel; —with K-12.
NOTE 2: Output Transformer designed to carry two speaker voice coils in series; —with K-10.
NOTE 3: NO output transformer on speaker; this speaker paired with K-9.
NOTE 4: NO output transformer on speaker; this speaker paired with H-7.
NOTE 5: Output Transformer designed to carry two speaker voice coils in parallel; —with K-15.
NOTE 6: NO output transformer on speaker; this speaker paired with K-14.
NOTE 7: NO output transformer on speaker; Output Transformer is on chassis.
‡NOT available; use replacement.

January, 1934

MODEL Transitone
Vibrator data
Steering Column

PHILCO RADIO & TELEVISION CORP.

HOW OLD IS A VIBRATOR?

THIS question often comes up. Nobody can afford to give Vibrators away free indefinitely. There must come a time when the customer is no longer entitled to a free Vibrator replacement.

The Vibrator, like all other radio parts, is covered by our Standard Warranty, which, interpreted liberally, means that the warranty is in force for a period of ninety days from the date of the original sale and installation.

Installation records should furnish this information, but in the absence of these records, the code date of manufacture stamped on the top of the Vibrator can be used. Under average conditions the warranty period expires four months after the date of manufacture. This allows thirty days for distribution and consummation of the retail sale, and then ninety days from the sale date.

The code number is built up by using the last number of the year as the first digit—(3 for 1933, 4 for 1934). The remainder of the code number is the number of the day in the year. For example, January 28, 1933, is 328. The following list shows the code numbers for the first of each month in 1933:

Date	*Code Number*
January 1, 1933	31
February 1, 1933	332
March 1, 1933	360
April 1, 1933	391
May 1, 1933	3121
June 1, 1933	3152
July 1, 1933	3182
August 1, 1933	3213
September 1, 1933	3244
October 1, 1933	3274
November 1, 1933	3305
December 1, 1933	3335

CAR BATTERY CONNECTIONS

THE following list shows the polarity of the ground connection in American automobiles and will prove useful in service work:

(A—) GROUNDED

Buick	Durant	Pontiac
Chevrolet	Essex	Reo
DeVaux	Hudson	Stutz
Dusenburg	Nash	Willys
	Oldsmobile	

(A+) GROUNDED

Auburn	Franklin	Packard
Cadillac	Graham	Peerless
Chrysler	Hupmobile	Pierce Arrow
Cord	LaSalle	Plymouth
DeSoto	Lincoln	Rockne
Dodge	Marmon	Studebaker
Ford	*Nash	

*(Twin Ignition)

STEERING COLUMN CONTROL HOUSINGS

THERE are 50 or more control assemblies for Philco automobile radio, many of which you probably will never be called upon to service. It is important, however, that you have a complete record of the controls—what they are used for and the important parts that enter into the construction of the various controls.

Since there is little wear to the parts that go to make up the control, your replacement parts stock for servicing controls can be limited chiefly to dials, knobs, keys, locks, pilot lamps and the hardware necessary for mounting a control on a steering column. A spare control unit for the current model Receivers should also be stocked for quick replacement.

There are two basic type controls. The type used the most has direct drive and is shown in Fig. 3. The control knobs fasten on to the control ends of the flexible shafts. The control shown in Fig. 4 uses a gear type drive for the volume control shaft. In this type control, the knobs fasten on to short shafts or stubs in the control head and the shafts are coupled to these stubs. The volume control is connected through a gear train, while the tuning control shaft is coupled direct.

The early controls of this type had smaller openings in the rear for coupling the shaft casings, since the casings were straight ended (without the usual swelled or bell end.) These holes were enlarged later on to take the large bell end casing, as shown in Fig. 4., but the same part number was retained for the control housing. When ordering a control housing of the gear type and the one with the small casing holes is required, be sure to note this on the order.

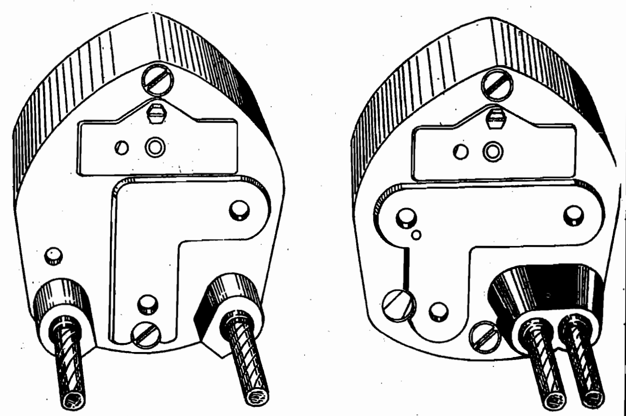


FIG. 3 FIG. 4

DIRECT DRIVE CONTROLS—(See Fig. 3)

Control Assembly No. 42-5006 Consists of

Control Housing Only	6029	
Lock Retainer	6031	Lock Retainer Assembly No. 42-5009
Lock Plate	6039	
Lock Spring (coil)	6111	
Washer	W-442	
Screw	W-145	
Screw (shaft end retaining)	6042	
Set Screw (shaft casing)	W-481	
Screw (lock assembly mounting)	W-523	

Continued on next page

MODEL Transitone Drive controls

PHILCO RADIO & TELEVISION CORP.

This assembly has no shafts, lock, dial, pilot lamp, front plate, etc. It is the basic control assembly that can be used for Models 5, 6, 7, 8, 9, 10 and 12 controls and can be used with P, R, W, X and Y type shafts.

GEAR DRIVE CONTROLS—(See Fig. 4)

Control Housing Assembly No. 42-5027 Consists of

Part	Part No.	Sub-assembly
Control Housing Only	28-7011	No. 42-5026
Shaft Retaining Screws	6042	No. 42-5026
Set Screws	W-481	No. 42-5026
Lock Retainer	29-7006	No. 42-5024
Lock Plate	29-1442	No. 42-5024
Lock Spring	28-1403	No. 42-5024
Stud	28-6048	No. 42-5024
Tuning Control Shaft (with set screw)	42-5016	
Volume Control Shaft Driven (with set screws)	42-5017	
Volume Control Shaft Driver	28-7009	
Intermediate Gear	28-7010	
Intermediate Gear Sleeve	28-6075	
Intermediate Gear Spring Washer	28-1456	
Intermediate Gear Mounting Screw	W-849	
Lock Retaining Mounting Screw	W-833	

This assembly has no external shafts, lock, dial, pilot lamp, front plate, etc. It is the basic control assembly that is used for Models 5, 6, 9 and 12 gear type controls and can be used with T, U and V type shafts.

The pilot lamp bracket assembly 38-5091 is fastened to the above control assemblies with a W-745 mounting screw.

The standard cover plate, which is used alike on both the direct and gear drive controls, is part No. 6030. The screws for fastening the cover plate to the controls are W-611B.

Special cover plates used with the various car manufacturer special Receivers can only be purchased through the car manufacturer organizations.

The standard knobs are 03334 for the tuning control shaft and 06886 for the volume control shaft.

The dials used in the various steering column controls are:

Model	*Part No.*
7 and 8	6043
6 and 9	8255
B6 and B9	8257
5	27-5006
10	27-5022
12 (121)	6043
12 (122)	8255

The lock used in the direct drive control is 6036. The lock in the gear drive control is 28-8014. These are not interchangeable.

The dial which fits over the dial hub is firmly held in place by means of a spring spider, 6644. The same spider is used in both type controls.

The various types of flexible shafts are shown in the October issue of "Service Broadcast."

The controls for the various models are assembled by using the basic control and adding the following parts:

- Pilot Lamp Bracket and Mounting Screw
- Dial with Spider
- Lock
- Cover Plate with Screws
- Flexible Shafts
- Knobs

A partial list of the direct drive controls in common use is given below:

Receiver Model	Control Part No.	Flex. Shaft Part No.	Shaft Type	Special Note
7-8-12	04343	6128 6129	Z Z	Also early 6-9.
B6-B9	06262	7739 7740	Z Z	Early B6-B9.
B6-9	06918	7739 7740	Z Z	
6-9	06941	6128 6129	Z Z	
B6	42-5003	7739 7740	Z Z	Without cover or knobs. These furnished by car manufacturer.
S6-S9	42-5004	6351 6352	Z Z	With special 7887 cover plate.
5	42-5008	28-8006 28-8007	R R	
P5	42-5010	28-8006 28-8007	R R	
5 Chrysler	42-5011	28-8006 28-8007	R R	Without cover or knobs. These furnished by car manufacturer.
B6	42-5052	28-8064 28-8065	W W	Without cover or knobs. These furnished by car manufacturer.
5 Studebaker	42-5057	28-8113 28-8114	Y Y	With special 7887 cover plate.
Auburn 5	42-5058	28-8113 28-8114	Y Y	With special 28-7013 cover plate.
Nash 5	42-5059	28-8113 28-8114	Y Y	With special 28-7015 cover plate.
Hupp 5	42-5060	28-8113 28-8114	Y Y	With special 28-7014 cover plate.
6-9-12 Chrysler	42-5063	28-8099 28-8102	X X	Without cover or knobs. These furnished by car manufacturer.
6-9-12 Studebaker	42-5064	28-8100 28-8103	X X	With special 7887 cover plate.
6-9-12 Hupp	42-5065	28-8133 28-8134	Y Y	With special 28-7014 cover plate.
6-9-12 Auburn	42-5066	28-8129 28-8130	Y Y	With special 28-7013 cover plate.
6-9-12 Nash	42-5067	28-8129 28-8130	Y Y	With special 28-7015 cover plate.
B6-9	42-5068	28-8098 28-8101	Y Y	Without cover or knobs. These furnished by car manufacturer.
5 Chrysler	42-5069	28-8113 28-8114	Y Y	Without cover or knobs. These furnished by car manufacturer.
5 Packard	42-5070	28-8137 28-8138	Y Y	
9F Studebaker	42-5075	28-8129 28-8130	Y Y	With special 7887 cover plate.
B6-B9	42-5076	28-8135 28-8136	Y Y	Without cover or knobs. These furnished by car manufacturer.
10	42-5077	28-8139 28-8141	P P	
6-9-12	42-5079	28-8099 28-8102	X X	
B6	42-5080	28-8098 28-8101	X X	Furnished with couplings on end of shafts for connecting to Receiver volume and tuning control shafts.
6-9	42-5081	28-8099 28-8102	X X	Furnished with couplings on end of shafts for connecting to Receiver volume and tuning control shafts.
5 Hupp	42-5083	28-8155 28-8156	Y Y	With special 28-7014 cover plate.
PAS-PBS	42-5084	28-8099 28-8102	X X	With special 7765 cover plate.
5	42-5085	28-8113 28-8114	Y Y	
6-9	42-5086	28-8129 28-8130	Y Y	
SCS-SDS	42-5087	28-8139 28-8141	P P	With special 7887 cover plate.
9 Studebaker	42-5089	28-8099 28-8102	X X	With special 7887 cover plate.
CDS	42-5090	28-8139 28-8141	P P	Without cover or knobs. These furnished by car manufacturer.
9 Hupp	42-5091	28-8109 28-8110	X X	With special 28-7014 cover plate.
HDS	42-5094	28-8157 28-5158	P P	With special 28-7014 cover plate.
NCS-NDS	42-5096	28-8139 28-8141	P P	With special 28-7015 cover plate.
10X	42-5103	28-8186 28-8187	P P	No lock.

Gear Drive Controls (using basic control 42-5027)

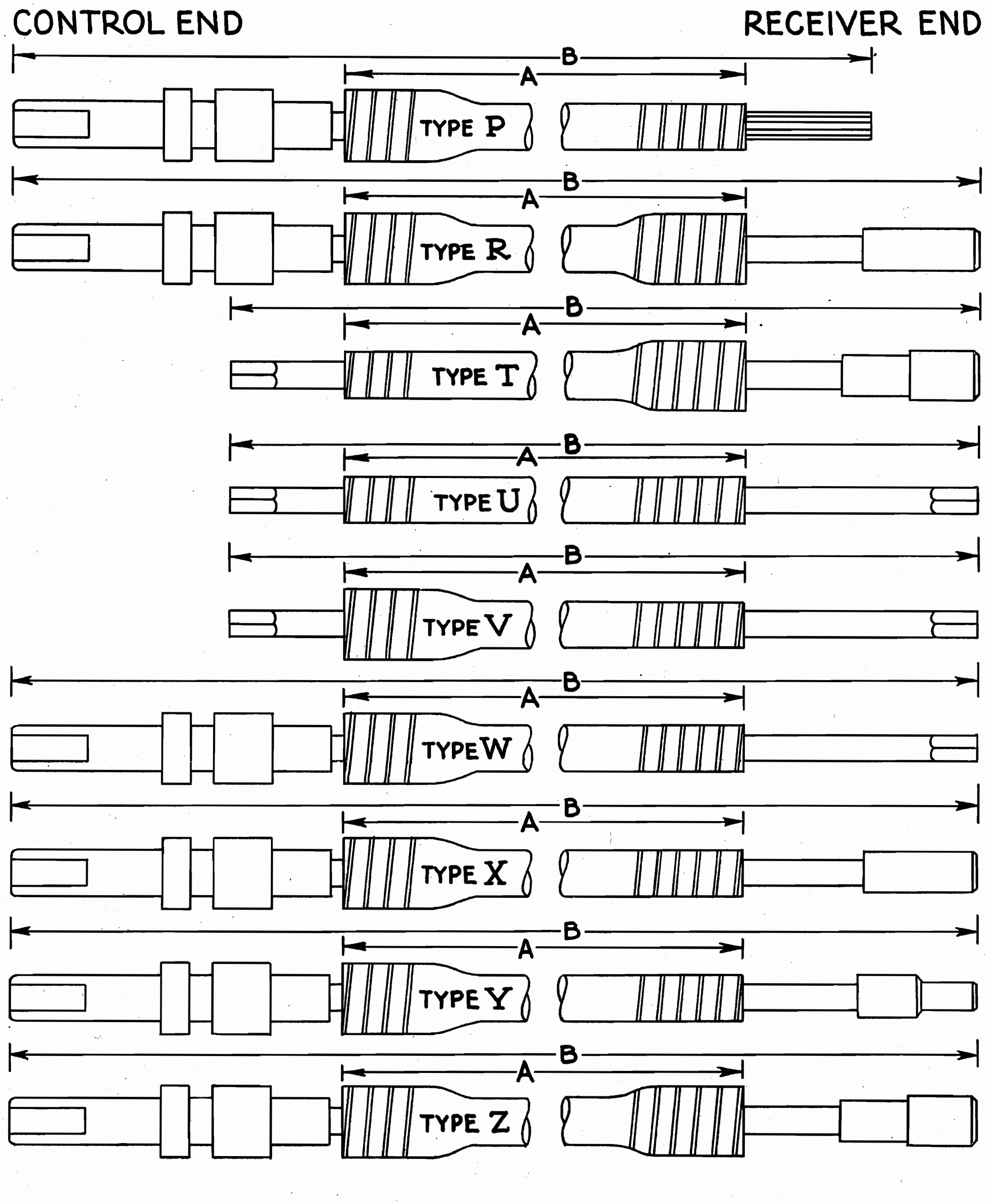
Receiver Model	Control Part No.	
5	42-5012	Without cover or knobs. These furnished by car manufacturer.
B6	42-5014	
6-9-12	42-5015	With special 7765 cover plate.
P5	42-5021	

NOTE—Shafts are shipped separately.

PHILCO RADIO & TELEVISION CORP.

MODEL Transitone
Drive controls

FLEXIBLE CONTROL SHAFTS—MODELS 5, 6, 7, 8, 9, 10, 12



MODEL Transitone
Control shafts

PHILCO RADIO & TELEVISION CORP.

FLEXIBLE CONTROL SHAFT GUIDE LIST

Type	Tuning Control Dimension A	Tuning Control Dimension B	Tuning Control Part No.	Volume Control Dimension A	Volume Control Dimension B	Volume Control Part No.	Used With Model
P	12"	14 3/8"	28-8161	12"	14 3/8"	28-8162	10
	18"	20 3/8"	28-6163	18"	20 3/8"	28-8164	10
	19"	21 3/8"	28-8157	19"	21 3/8"	28-8158	10
	28"	30 3/8"	28-8139	28"	30 3/8"	28-8141	10
R	12"	14 5/8"	28-8010	12"	17 1/8"	28-8011	5
	18"	20 5/8"	28-8012	18"	23 1/8"	28-8013	5
	24"	26 5/8"	28-8022	24"	29 1/8"	28-8023	5
	32"	34 5/8"	28-8006	32"	37 1/8"	28-8007	5
	84"	86 5/8"	28-8020	84"	89 1/8"	28-8021	5
T	18"	—	28-8054	18"	—	28-8054	6-9
	—	20 1/8"	38-5218	—	20 1/8"	38-5218	
	24"	—	28-8052	24"	—	28-8052	5
	—	25 3/8"	38-5210	—	27 7/8"	38-5211	
	28"	—	28-8036	28"	—	28-8036	5
	—	29 3/8"	38-5159	—	31 7/8"	38-5160	
	32"	—	28-8038	32"	—	28-8038	6-9
	—	34 1/8"	38-5170	—	34 1/8"	38-5170	
	120"	—	28-8043	120"	—	28-8043	B6-9
	—	121 5/8"	38-5184	—	121 5/8"	38-5184	
U	18"	—	28-8055	18"	—	28-8055	6-9
	—	20 13/16"	28-8081	—	20 13/16"	28-8081	
	24"	—	28-8053	24"	—	28-8053	P5
	—	25 7/16"	28-8077	—	27 3/4"	28-8079	
	28"	—	28-8037	28"	—	28-8037	5
	—	29 7/16"	28-8073	—	31 3/4"	28-8075	
	32"	—	28-8039	32"	—	28-8039	6-9
	—	34 13/16"	28-8083	—	34 13/16"	28-8083	
	120"	—	28-8045	120"	—	28-8045	B6-9
	—	121 9/16"	28-8085	—	121 9/16"	28-8085	
V	10"	—	28-8072	10"	—	28-8072	P9
	—	12 13/16"	28-8087	—	12 13/16"	28-8087	
	18"	—	28-8054	18"	—	28-8054	S6
	—	20 13/16"	28-8081	—	20 13/16"	28-8081	
	24"	—	28-8052	24"	—	28-8052	P5
	—	25 7/16"	28-8077	—	27 3/4"	28-8079	
	28"	—	28-8036	28"	—	28-8036	5
	—	29 7/16"	28-8073	—	31 3/4"	28-8075	
	32"	—	28-8038	32"	—	28-8038	6-9
	—	39 13/16"	28-8083	—	34 13/16"	28-8083	
	120"	—	28-8043	120"	—	28-8043	B6-9
	—	121 9/16"	28-8085	—	121 9/16"	28-8085	

Type	Tuning Control Dimension A	Tuning Control Dimension B	Tuning Control Part No.	Volume Control Dimension A	Volume Control Dimension B	Volume Control Part No.	Used With Model
W	10"	14"	28-8091	10"	14"	28-8094	PA
	18"	22"	28-8090	18"	22"	28-8093	S6
	24"	26 5/8"	28-8089	24"	28 15/16"	28-8092	P5
	28"	30 5/8"	28-8062	28"	32 15/16"	28-8063	5
	32"	36"	28-8068	32"	36"	28-8069	6-9
	120"	122 3/4"	28-8064	120"	122 3/4"	28-8065	B6-9
X	10"	14"	28-8100	10"	14"	28-8103	PA
	28"	30 5/8"	28-8106	28"	32 15/16"	28-8107	5
	32"	36"	28-8099	32"	36"	28-8102	6-9
	120"	122 3/4"	28-8098	120"	122 3/4"	28-8101	B6-9
Y	10"	14"	28-8131	10"	14"	28-8132	PA
	18"	22"	28-8133	18"	22"	28-8134	S6-9
	19"	21 5/8"	28-8155	19"	23 15/16"	28-8156	H5
	24"	26 5/8"	28-8137	24"	28 15/16"	28-8138	P5
	28"	30 5/8"	28-8113	28"	32 15/16"	28-8114	C5
	32"	34 5/8"	28-8127	32"	36 15/16"	28-8128	5
	32"	36"	28-8129	32"	36"	28-8130	6-9
	120"	122 3/4"	28-8135	120"	122 3/4"	28-8136	B6-9
Z	8"	11 3/8"	6617	8"	11 3/8"	6616	6-7-8-9-12
	11"	14 3/8"	28-8003	11"	14 3/8"	28-8004	6-7-8-9-12
	18"	21 3/8"	6352	18"	21 3/8"	6351	6-7-8-9-12
	32"	35 3/8"	6128	32"	35 3/8"	6129	6-7-8-9-12
	48"	51 3/8"	6298	48"	51 3/8"	6299	6-7-8-9-12
	—	—	—	48"	50 3/8"	8289	3PX
	72"	75 3/8"	7289	72"	75 3/8"	7290	6-7-8-9-12
	84"	87 3/8"	7443	84"	87 3/8"	7444	6-7-8-9-12
	120"	123 3/8"	6356	120"	123 3/8"	6355	6-7-8-9-12
	—	—	—	120"	122 3/8"	8293	3PX
	120"	122 7/8"	7739	120"	122 7/8"	7740	B6-9
	132"	135 3/8"	7071	132"	135 3/8"	7072	6-7-8-9-12
	144"	147 3/8"	8291	144"	147 3/8"	8292	6-7-8-9-12
	186"	189 3/8"	28-8024	186"	189 3/8"	28-8025	6-7-8-9-12

C—Chrysler   H—Hupmobile   P—Packard   S—Studebaker
B6—B9—Special Chrysler   PA—Special Packard

FLEXIBLE CONTROL SHAFTS

The different types of flexible control shafts are pictured on the front page. They all differ in construction from each other, although some are interchangeable. Consulting the front page to identify the type of shaft and then using the guide list will enable anyone to pick the proper part number for the shafts, and *vice versa.*

Types P, R, W, X, Y and Z are used only with the so-termed "old style" control heads where the knobs fasten onto the ends of the shafts which protrude through the control head. Types T, U and V are used with the so-termed "new style" control head, in which both shafts are terminated side by side and the volume control shaft is actuated through a gear train.

Types T, U, V and W have one or more square swedged ends. Type P has an octagon swedging on the Receiver end.

The part numbers given for the T, U and V type shafts are the "A" or casing numbers and the "B" or shaft numbers. All other numbers given are for the completely assembled parts.

The A dimensions are the casing lengths, the B dimensions are the overall lengths. When referring to a particular length shaft as given in our parts lists, the casing dimension is always used. For instance, the standard 28-inch shaft for the Model 10 is actually 30⅜ inches long overall, but the casing which really represents the distance from the control to the Receiver is only 28 inches long.

Tuning control and volume control shafts can easily be identified in all but the T, U and V types by the difference in the stubs at the control end of the shaft. All Model 5 volume control shafts are longer than the tuning control shafts.

There are three different brass tips in use on the shafts. They can be identified by referring to the cuts on the front page.

OCTOBER, 1933

REPLACING SPEAKER CONES—MODEL 5, 6 AND 9 RECEIVERS

THE Model 5 Receiver uses the P-11 Speaker. Normally, the cone, Part No. 36-3027, is cemented to the frame of the speaker (see Fig. 1). A cardboard spacer, No. 27-7098, not shown in the sketch, is placed between the speaker and the receiver panel to which it is fastened to prevent the frame from being warped by the speaker mounting screws.

To replace the cone of the P-11 speaker, disconnect the voice coil leads, remove the centering screw and remove the cone from the frame.

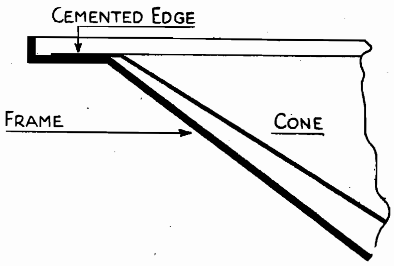


FIG. 1

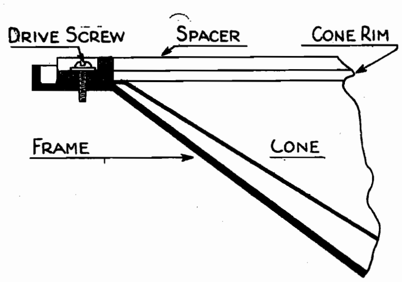


FIG. 2

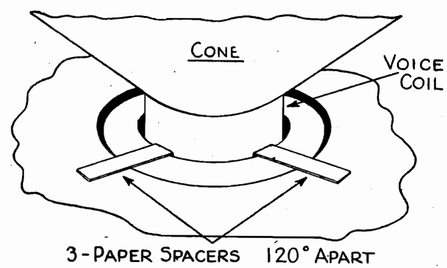


FIG. 3

The proper replacement cone is the No. 02861 cone, which has a cardboard rim. This must be fastened to the speaker frame by means of six W-451 washer head-drive screws. The holes for the drive screws are provided in the speaker frame. After tightening the drive screws and the centering screw, a cardboard spacer, No. 27-7178, must be placed between the speaker and the receiver panel to which it fastens (see Fig. 2). There are cutouts in the 27-7178 spacer for the washer head screws.

The cones in the Models 6 and 9 speakers were formerly held in place by a rim and clamp. This has been discontinued and the cone is now cemented to the speaker frame (Fig. 1). The replacement cone is No. 36-3020. It will be necessary to remove the cone and scrape the cement and cone edge from the speaker frame.

Make three spacers from regular bond letterhead paper. The spacers should be ten inches long and one-eighth inch wide. Fold each one sharply in the middle. This will then make spacers approximately .008 inch thick and 5 inches long. Place the paper spacers in the armature at right angles to prevent falling in (see Fig. 3).

Spread an even coat of Duco household cement over the face of the speaker frame. Set the cone in place with the voice coil in the armature gap. The paper spacers will insure proper clearance for the voice coil on all sides. Tighten the centering screw and firmly press down the edges of the cone, so that they will be cemented securely. Allow the cement to dry thoroughly and remove the paper spacers.

Part No.		*List Price*
02861	Cone (Model 5)	$0.60
27-7178	Cardboard spacer	.03
36-3020	Cone (Models 6 and 9)	.40
W-451	Washer head drive screws	1.20/C

MODEL 5 ADJUSTMENTS

Become thoroughly familiar with the adjustment procedure and the location of the padding condensers before starting to adjust a Model 5 Receiver.

Furthermore, don't attempt to make the adjustments using a make-shift oscillator. The modern radio depends on critically tuned circuits for its exceptional performance. It is nothing short of gross carelessness to try to adjust these delicately tuned circuits using unstable oscillators which are incapable of being calibrated accurately.

Use a Philco 095 oscillator, or if your service department is fortunate enough to have one, the new Philco Signal Generator 048.

NOTE.—United Motors Service Stations, see U. M. S. Service Manual.

The intermediate frequency used is 460 K. C. Set up the oscillator or signal generator for this frequency.

Disconnect the grid lead from the 6A7 tube. Then connect the test lead to the grid of this tube and ground the shield on the Receiver housing. Use the fibre adjusting wrench 3164 for all adjustments.

Padder 10. Turn the adjusting nut in until tight. Then back off one full turn. Leave this condenser in this position until the last step.

Padder 11. This is the first I. F. primary condenser. With the Receiver and oscillator turned on and the oscillator set for 460 K. C., turn the Receiver volume control on full and adjust the oscillator attenuator. Then adjust the padder for maximum signal in the loud speaker.

Padder 13. This is the first I. F. secondary condenser. Adjust the attenuator so that the signal is barely audible. This should be repeated with each adjustment if necessary. Adjust the padder for maximum signal in the loud speaker. Repeat this procedure in the next two adjustments.

Padder 17. This is the second I. F. primary condenser.

Padder 20. This is the second I. F. secondary condenser.

Remove the oscillator connections from the 6A7 tube and reconnect the Receiver grid lead to this tube. The oscillator setting must now be changed to 1500 K. C.

The Receiver volume control must be turned on full, the oscillator lead connected to the antenna lead-in and the shield to the Receiver housing. To obtain the correct setting of the tuning condenser, open the plates as wide as possible. Place a piece of paper on the stator plates and then turn the rotor in until it strikes the paper.

Oscillator padder. This is the padder on the second section of the tuning condenser (section nearest drive mechanism). Adjust for maximum signal.

Antenna Padder. This is the remaining padder on the tuning condenser. Remove the paper from the tuning condenser and set the condenser and oscillator for 1400 K. C. Adjust the padder for maximum signal.

Low Frequency Padder 10. Set the oscillator for 600 K. C. and tune the Receiver to this frequency. Adjust the padder for maximum signal. After completing these operations, repad the antenna padder at 1400 K. C.

MODEL EA,EG
MODEL 9
Data

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Be Sure You Know How To Do This

The intermediate frequency of the Model 6 is 260 K.C. This is a departure from the frequency used in the Model 7 and 8 Receivers. All dealers and installation stations must be equipped with a suitable oscillator capable of producing accurately a 175 K.C. signal for the Models 7 and 8 and 260 K.C. for the Model 6.

Philco's oscillator, Model 095, priced at $28.50 net to the dealers and service stations, is the ideal oscillator for such work and can be ordered direct from your distributor.

I. F. Stages

Remove the grid clip from the detector oscillator tube and connect the output of the oscillator to the control grid. The detector oscillator is the second tube from the right.

With the Receiver and oscillator turned "on," set the oscillator for 260 K.C. and adjust the oscillator attenuator so that the signal is barely audible with the Receiver volume control turned on full. If the oscillator is equipped with an output meter, connect the meter and adjust the attenuator so that a half scale reading is obtained.

Using a Philco 3164 fibre wrench, adjust the second I. F. condenser. This is numbered (23).

The correct adjustment is obtained when the strongest signal is heard in the speaker or the maximum reading is secured on the meter.

Next adjust the secondary and primary I. F. condensers. These are (20) and (13), respectively.

Disconnect the oscillator and reconnect the clip to the control grid.

High Frequency Compensators

Connect the output of the oscillator to the antenna lead and the housing of the Receiver. With the Receiver turned on and the oscillator set for 175 K.C., tune the Receiver to 1400 K.C., the eighth harmonic of 175 K.C., and adjust the third padder on the tuning condenser for maximum signal. This is the one on the extreme left of the housing. The purpose of this adjustment is to line up the condenser so that 1400 K.C. is tuned in at 140 on the scale when the scale is set properly.

It may be necessary to adjust the first two compensators on the tuning condensers at 1400 K.C., in order to get a strong enough signal through.

R. F. Compensators

After the detector oscillator has been padded at 1400 K.C., adjust the first and second R. F. Condensers on tuning condenser at 1400 K.C.

Low Frequency Compensator

Now tune the Receiver to 700 K.C. and adjust the condenser (16) During this operation the tuning condenser must be shifted and the compensator must be adjusted to bring in the maximum signal.

After this has been done, check the adjustment of the high frequency condenser at 1400 K C. again.

IMPORTANT.—MODEL 9 CHANGES.

Description	New Part No. replacing Old Part No.		Schematic and Base View No.
Dial	8255	6043	
Padder	04000-X	04000-D	(20)
Padder	04000-J	04000-A	(13)
Resistor (13,000 ohm)	8267	7352	(12)
Antenna Coil	16914	06574	(2)
R. F. Transformer	06915	05902	(9)
Oscillator Coil	06916	05975	(14)
I. F. Transformer	06932	05901	(26)
Resistor (8,000 ohm)	8255	(Connected between terminal panel near (19) and B+ terminal of (9).	

USING THE EA DYNAMOTOR

Many Dealers and Service Stations have built up a profitable business selling and installing the EA Dynamotor for replacing "B" batteries and other power devices. A bit skeptical at first, they soon realized the market for this dynamotor and since then, repeat orders have come in, in nice volume. Intended primarily for use with the Model 3 and Model 7 as a battery replacement, service men have been quick to adapt it to all other makes of battery operated car radio.

The installation instruction label is pasted to the inside bottom of the dynamotor housing, where it can be seen by anyone making the installation. It is vitally important that these instructions be carried out in detail.

Since the EA was first placed on the market, an additional filter condenser has been placed on the "B+" lead. This condenser, 3615-AZ, is mounted on the base at the rear of the dynamotor. When one of the EA dynamotors equipped with this condenser is installed with the Model 3 Philco Transitone or any radio in which "B—" is not grounded, this additional change must be made:

> Remove the mounting screw from the 3516-AZ condenser. Bend up the ground terminal which normally is grounded by the mounting screw. Replace the mounting screw and be sure that the old ground terminal does not make contact with the screw. This is important.
>
> The "B—" lead, the black lead coming from the rear of the dynamotor, which is connected to the ground terminal on the base, must be disconnected from the ground terminal and connected to the new terminal on the 3615-AZ.
>
> The "B—" terminal on the condenser must then be connected to the "B—" terminal on the terminal panel. This was formerly the "B+" screen-terminal.

This additional change must be made on all Model EA dynamotors having the 3615-AZ condenser connected to "B+" when using the dynamotor with a Model 3 or any other Receiver with a non-grounded "B—", otherwise it will be impossible to clear up the dynamotor hum.

MODEL EG VIBRATOR

The Model EF Vibrator is a part of the Model 6F Receiver. Its counterpart for "B" battery replacement service is the Model EG Vibrator. Instead of being connected with a cable and plug, it is equipped with a terminal panel for easy installation.

When used as a replacement unit for "B" batteries, simply install in the old "B" battery box or in any place that is convenient and where the Vibrator will not be exposed to water and dirt. The installation is easy, but at the same time permanent.

Simplicity in construction insures freedom from trouble and efficient operation. Cut disc tungsten points eliminate any possibility of troubles from contacts. Full wave rectification with the 84 rectifier tube developed especially for this type of service is used to give a smooth flow of power. Complete filtering eliminates all hum.

The terminal panel provides for the following connections:

A ± terminal for control, connecting to the control relay.

+B terminal, 180 volts to 200 volts for the "B" lead to the Receiver.

INT+B terminal, an intermediate voltage for Receivers requiring a tap voltage.

—B terminal, for Receivers requiring this lead. Normally it is not grounded. This, however, can be accomplished by strapping to the GND terminal.

GND terminal for grounding the chassis.

Complete instructions for installing are packed with each Vibrator.

PHILCO RADIO & TELEVISION CORP.

Adjusting the Philco Superheterodyne Auto Radio Receivers

MODEL 5

The intermediate frequency used is 460 K. C. Set up the signal generator for this frequency.

Disconnect the grid lead from the 6A7 tube. Then connect the test lead to the grid of this tube and ground the shield on the Receiver housing. Use the fibre adjusting wrench for all adjustments.

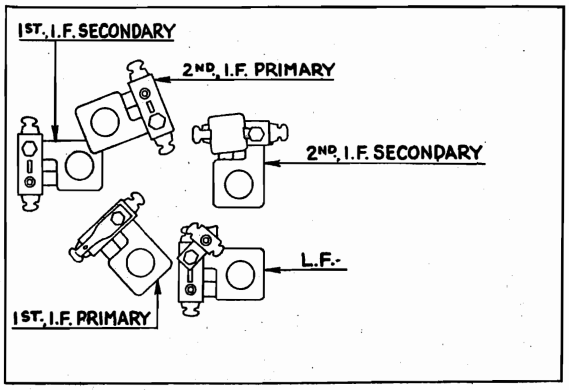

FIG. 1. MODEL 5—I. F. 460 K. C.

Padder "LF." Turn the adjusting nut in until tight. Then back off one full turn. Leave this condenser in this position until the last step.

Now adjust the first I. F. primary condenser. With the Receiver and signal generator turned on and the signal generator set for 460 K. C., turn the Receiver volume control on full and adjust the attenuator. Then adjust the padder for maximum reading on the output meter.

Next adjust the first I. F. secondary condenser. Adjust the attenuator so that a half-scale reading is obtained. This should be repeated with each adjustment if necessary. Adjust the padder for maximum reading. Repeat this procedure in the next two adjustments.

The next adjustment in order is the second I. F. primary condenser. This is then followed by the second I. F. secondary condenser. These are indicated on the illustration. (Fig. 1.)

Remove the signal generator connections from the 6A7 tube and reconnect the Receiver grid lead to this tube. The signal generator setting must now be changed to 1500 K. C.

The Receiver volume control must be turned on full, the oscillator lead connected to the antenna lead-in and the shield to the Receiver housing. To obtain the correct setting of the tuning condenser, open the plates as wide as possible. Place a piece of paper on the stator plates and then turn the rotor out until it strikes the paper.

Oscillator Adjustment. This is the padder on the second section of the tuning condenser (section nearest drive mechanism). Adjust for maximum reading.

Antenna Adjustment. This is the remaining padder on the tuning condenser. Remove the paper from the tuning condenser and set the condenser and signal generator for 1400 K. C. Adjust the padder for maximum reading.

Low Frequency Adjustment. Set the signal generator for 600 K. C. and tune the Receiver to this frequency. Adjust the padder for maximum reading. After completing these operations, readjust the antenna padder at 1400 K. C.

MODELS 6, 9 AND 12 (CODE 122)

I. F. Stages. Remove the grid clip from the detector-oscillator tube and connect the output of the signal generator to the control grid. The detector-oscillator is the second tube from the right.

With the Receiver and signal generator turned "on," set the signal generator for 260 K. C. and adjust the attenuator so that a half-scale reading is obtained on the output meter, with the Receiver volume control turned on full.

Using a Philco fibre wrench, adjust the second I. F. condenser. The correct adjustment is obtained when the maximum reading is secured on the meter.

Next adjust the secondary and primary I. F. condensers. These are the right-hand ones on Fig. 2.

Disconnect the signal generator and reconnect the clip to the control grid.

High Frequency Adjustments. Connect the output of the signal generator to the antenna lead and the housing of the Receiver. With the Receiver turned on and the signal generator set for 1400 K. C., tune the Receiver to 1400 K. C. and adjust the third padder on the tuning condenser for maximum signal. This is the one on the extreme left of the housing. The purpose of this adjustment is to line up the condenser so that 1400 K. C. is tuned in at 140 on the scale when the scale is set properly.

It may be necessary to adjust the first two compensators on the tuning condenser at 1400 K. C. in order to get a strong enough signal through.

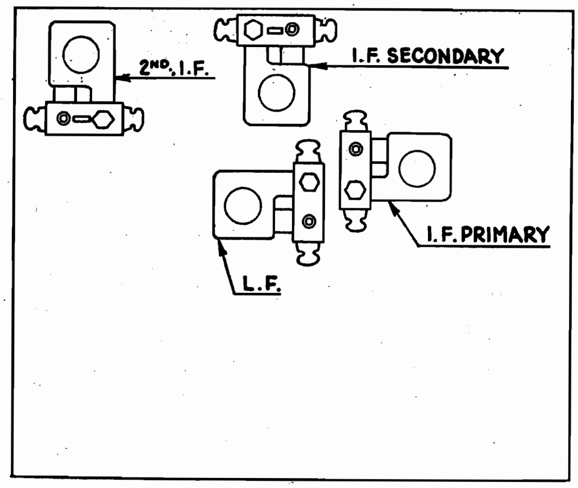

FIG. 2. MODELS 6, 9 AND 12.—(CODE 122) I. F. 260 K. C.

R. F. Adjustments. After the detector-oscillator has been padded at 1400 K. C. adjust the first and second R. F. Condensers on tuning condensers at 1400 K. C.

Low Frequency Adjustment. Now tune the Receiver and signal generator to 700 K. C., and adjust the condenser (LF) on Fig. 2. During this operation the tuning condenser must be shifted and the compensator must be adjusted to bring in the maximum signal.

After this has been done, check the adjustment of the high-frequency condenser at 1400 K. C. again.

MODELS 7, 8 AND 12 (CODE 121)

Intermediate Frequency or I. F. Stages. Remove the grid clip from the detector-oscillator tube and connect the output of the signal generator to the control grid. The detector-oscillator is the second tube from the right.

With the Receiver and signal generator turned "on," set the signal generator for 175 K. C. Adjust the attenuator so that a half-scale reading on the output meter is obtained with the Receiver volume control turned on full.

Using a Philco fibre wrench, adjust the second I. F. condenser. This is the one in the upper left-hand corner of Fig. 3.

The correct adjustment is obtained when the maximum reading is secured on the meter.

Next adjust the secondary and primary I. F. condensers. These are the two shown at right on Figs. 3 and 4.

MODEL 7,10
Adjustments

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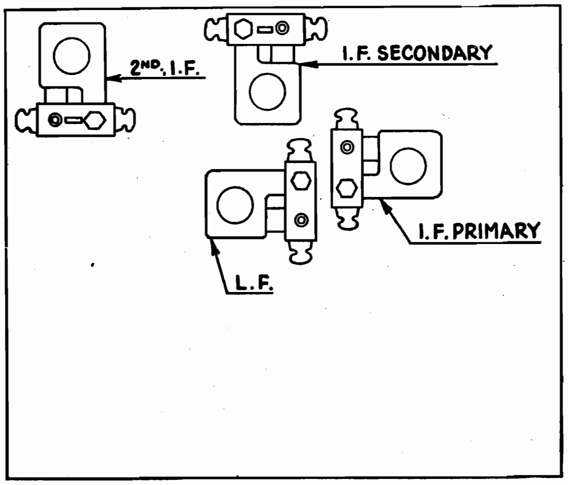

FIG. 3. MODEL 7.—I. F. 175 K. C.

Disconnect the signal generator lead and reconnect the clip to the control grid.

High Frequency Compensator. Connect the output of the signal generator to the antenna lead and the housing of the Receiver. With the Receiver turned on and the signal generator set for 1400 K. C., tune the Receiver to 1400 K. C. and adjust the third padder on the tuning condenser for maximum signal. This is the one on the extreme left of the housing. The purpose of this adjustment is to line up the condenser so that 1400 K. C. is tuned in at 140 on the scale when the scale is set properly.

It may be necessary to adjust the first two compensators on the tuning condensers at 1400 K. C. in order to get a strong enough signal through.

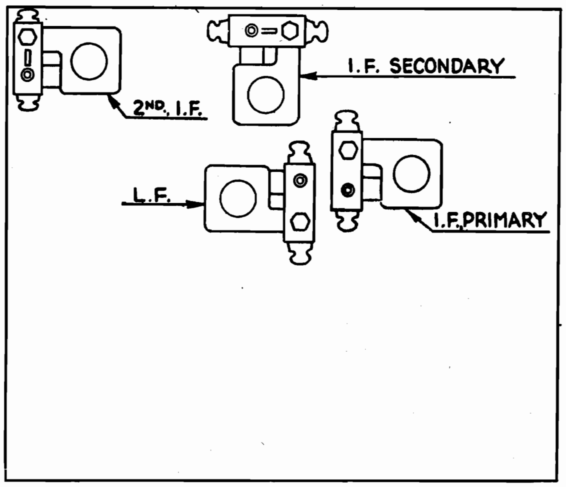

FIG. 4. MODELS 8 AND 12 (Code 121) I. F. 175 K. C.

R. F. Compensators. After the detector-oscillator has been padded at 1400 K. C., adjust the first and second R. F. Condensers on tuning condenser at 1400 K. C.

Low Frequency Condenser. Set the signal generator to 700 K. C. Now tune the Receiver sharply. Adjust the L. F. condenser shown near the center of Figs. 3 and 4. During this operation the tuning condenser must be shifted and the compensators must be adjusted to bring in the maximum signal.

After this has been done, check the adjustment of the high-frequency condenser at 1400 K. C. again.

MODEL 10

I. F. A new style I. F. transformer complete with adjusting condensers is used in the Model 10.

The condensers are placed in the top of the shield can, one above the other.

The primary I. F. condenser is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube. (For location see Fig. 5.)

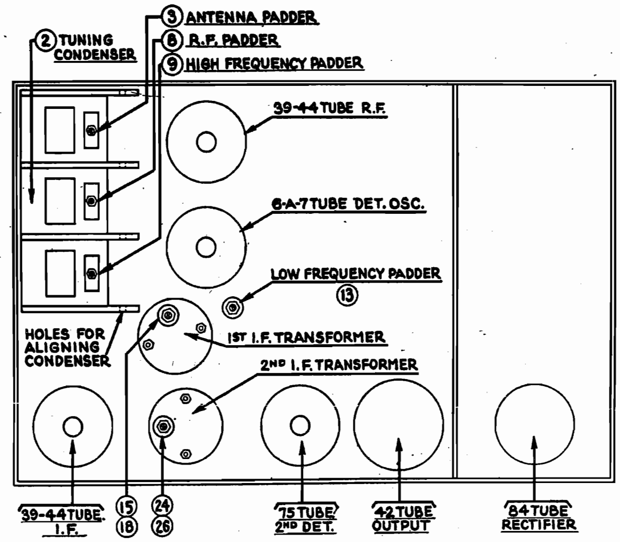

FIG. 5. MODEL 10—I. F. 260 K. C.

Set up the signal generator and adjust it to exactly 260 K. C. Connect signal generator lead to the grid cap of the 6A7 tube. (See Fig. 5.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The condensers 24 and 26 are adjusted first (Fig. 5). Turn the adjusting screw all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtained and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers 15 and 18.

After adjusting the first I. F. stage, remove signal generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set signal generator to 1500 K. C. and then connect signal generator lead to the antenna lead.

H. F. There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 5.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency condenser until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

R. F. and Ant. Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. Adjust R. F. condenser and the antenna condenser for maximum reading on the output meter.

L. F. Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency condenser for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

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MODEL 5 CHANGES

THE schematic—Fig. 4 shows a portion of the Model 5 circuit with the latest changes.

The 78-tube cathode resistor has been changed from 1000 ohms to 500 ohms, a 1,500,000-ohm resistor has been added in the A. V. C. return lead to the control grids of the first and second tubes. The network and volume control circuits in the combined second detector and audio stages have been changed about.

Two other resistors, not shown, have also been changed. Resistor ⑥ in the Model 5 schematic (April "Service Broadcast") has been changed from 13,000 ohms to 25,000 ohms and resistor ⑯ has been changed from 10,000 ohms to 15,000 ohms.

The I. F. transformer ⑱ retains the same part number, but due to certain construction changes, is now marked on the bracket with yellow paint.

Fig. 5 shows the changes made in the vibrator section of the Model 5. The 200-ohm resistor ㊶ in the old schematic has been removed from across the vibrator contacts. An .05 mfd. condenser will be added to the driver contact spring to remove vibrator interference which may be picked up due to the increased sensitivity of the receiver. The thirty-turn choke, while not shown in the schematic as a part, is still used in wiring the receiver. Fig. 5 also shows a correction to the schematic in the April "Service Broadcast." The "A" lead to the "A" circuit of the receiver should be connected at the switch ahead of the "A" choke instead of being connected as shown in the earlier schematic.

The speaker in the Model 5 is now enclosed in a fabric bag, which completely covers the rear of the speaker. This prevents iron cuttings and filings from lodging in the armature gap and causing rattles and buzzes.

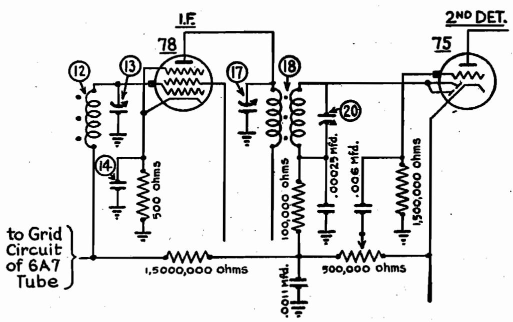

FIG. 4

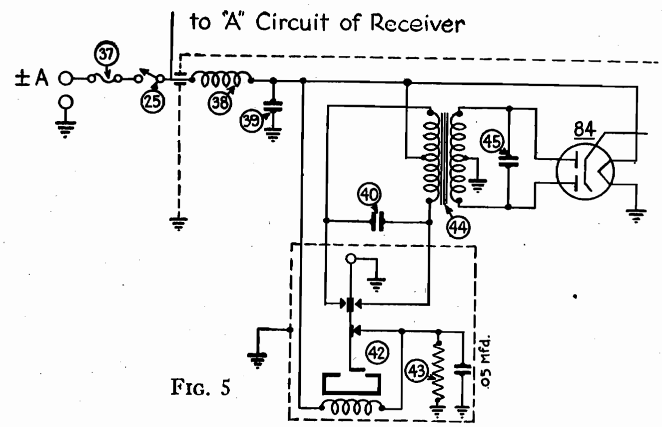

FIG. 5

MODEL 5 IMPROVEMENTS

ON some of the early Model 5 Receivers a frying or crackling noise may have been experienced. In some cases it has been blamed on the vibrators and in others on the 6A7 tube. If there are any Model 5 Receivers held up in the service shop on account of a complaint of this nature, they can easily and quickly be corrected and put back into service.

Remove the grid clip from the grid cap of the 6A7 tube and remove the grid lead from the clip. Using a stranded wire (same size as the grid lead), connect it to the grid clip and wind five turns of wire around the clip. Then splice and solder to the grid lead. Reconnect the clip to the cap on the tube. This makes an R. F. choke of just the proper size, which will eliminate practically all such complaints if they occur.

For the more obstinate cases, wind thirty turns of No. 16 solid, cotton-covered copper wire around a lead pencil. Withdrawing the pencil leaves an air-core choke, which must be installed in the "A" lead between the low-voltage R. F. choke and the heater terminal of the 84 tube. Keep the choke in the vibrator section of the base.

Solder and tape the splices to prevent further trouble.

The factory is installing these chokes in all Model 5 Receivers.

A visual examination of one of the latest Model 5 Receivers will give a better idea of these changes.

INSTALLING THE MODEL 5

1. Use the best antenna that it is possible to install in the car.
2. Use as little shielded antenna lead as possible.
3. After installing the Model 5 in the car and making all connections, the antenna stage should be padded to the car antenna.

Tune in a weak broadcast signal between 120 and 150 on the dial and adjust the padder on the condenser section that is adjacent to the side of the housing. Adjust the padder until the maximum signal is heard in the speaker. If no broadcast signal of the proper frequency is available, set up an oscillator or signal generator inside the car and adjust it to 1400 K. C. A six-foot lead should be connected to the oscillator to radiate the test signal. Then adjust the padder, using the standard Philco padding wrench No. 3164.

The factory is now putting a special hole in the lid of the Model 5, just to make it easier to pad this stage.

Insist on the best top antenna possible in each car. With a good antenna and the antenna stage properly padded, you will notice a big improvement in the Model 5 performance.

A SERVICE PRECAUTION

The speaker cable should be dressed toward the vibrator end of the housing. The condenser plates should be fully meshed, so that they cannot be bent out of alignment by the speaker field or cable.

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high-frequency padder ⑨ until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder ⑧ and the antenna padder ③ are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder ⑬ for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

MODEL 10 PARTS LIST

No.	Part	Part No.	No.	Part	Part No.
1	Antenna Transformer	32-1220	41	Field Coil Assembly	36-3120
2	Tuning Condenser	30-1083	42	Tone Control	30-4056
3	1st Padder (in tuning cond.)		43	Pilot Lamp	6608
4	Resistor (100,000 ohms)	6099	44	Condenser (.25 mfd.)	04360
5	Condenser (.05 mfd.)	30-4020	45	Resistor (20,000 ohms)	6649
6	R. F. Transformer	32-1221	46	Condenser (.05 mfd.)	30-4020
7	Condenser (.05 mfd.)	30-4020	47	Resistor (32,000 ohms)	3525
8	2nd Padder (in tuning cond.)		48	Condenser (.5 mfd.)	30-4048
9	3rd Padder (in tuning cond.)		49	Resistor (200 ohms)	7217
10	Resistor (50,000 ohms)	6098	50	Resistor (100 ohms)	7838
11	Oscillator Transformer	32-1222	51	A Choke	32-7109
12	Condenser (.00025 mfd.)	3082	52	15 Amp. Fuse	7227
13	Padder	04000S	53	Condenser (.5 mfd.)	30-4061
14	Resistor (15,000 ohms)	6208	54	Vibrator Choke	32-1235
15	Padder (prim. 1st I. F.)	31-6007	55	Condenser (.5 mfd.)	30-4061
16	I. F. Transformer (1st)	38-5274	56	Vibrator	38-5036
17	Resistor (500,000 ohms)	6097	57	Condenser (.05 mfd.)	30-4039
18	Padder (secondary 1st I. F.)	31-6007	58	Resistor (200 ohms)	7217
19	Condenser (.05 mfd.)	30-4020	59	Resistor (200 ohms)	7217
20	Condenser (.5 mfd.)	30-4058	60	Condenser (.00125 mfd.)	5886
21	Resistor (500 ohms)	6977	61	Power Transformer	32-7098
22	Resistor (500,000 ohms)	6097	62	Condenser (.01 mfd.)	30-4051
23	Condenser (.00011 mfd.)	4519	63	Filter Condenser	30-2015
24	Padder (prim. 2nd I. F.)	31-6008	64	B Chokes	32-7038
25	I. F. Transformer (2nd)	38-5275	65	R. F. Chokes	32-1078
26	Padder (secondary 2nd I. F.)	31-6008	66	Resistor (50,000 ohms)	4237
27	Resistor (100,000 ohms)	6099	67	Resistor (7 ohms)	5110
28	Condenser (.00025 mfd.)	3082		Spark Plug Resistors	4531
29	Condenser (.01 mfd.)	30-4051		Distributor Resistor	4546
30	Vol. Control Assembly	38-5280		Screw Type Resistor	4851
31	Resistor (2,000,000 ohms)	33-1025		Interference Condenser	30-4007
32	Condenser (.00025 mfd.)	5828		Dial	27-5022
33	Resistor (250,000 ohms)	3768		Studs	28-6036
34	Condenser (.006 mfd.)	30-4024		Nuts (mounting)	W55
35	Resistor (500,000 ohms)	6097		Knobs	03334
36	Condenser (20 mfd.; 25mfd.)	30-2027		Battery Cable	38-5296
37	Resistor (550 ohms)	6977		Antenna Lead	38-5161
38	Condenser (.006 mfd.)	30-4024		Control Unit Assembly	42-5056
39	Output Transformer	32-7106		Acorn Nut	W821
40	Cone and Coil	36-3020		Key	6091

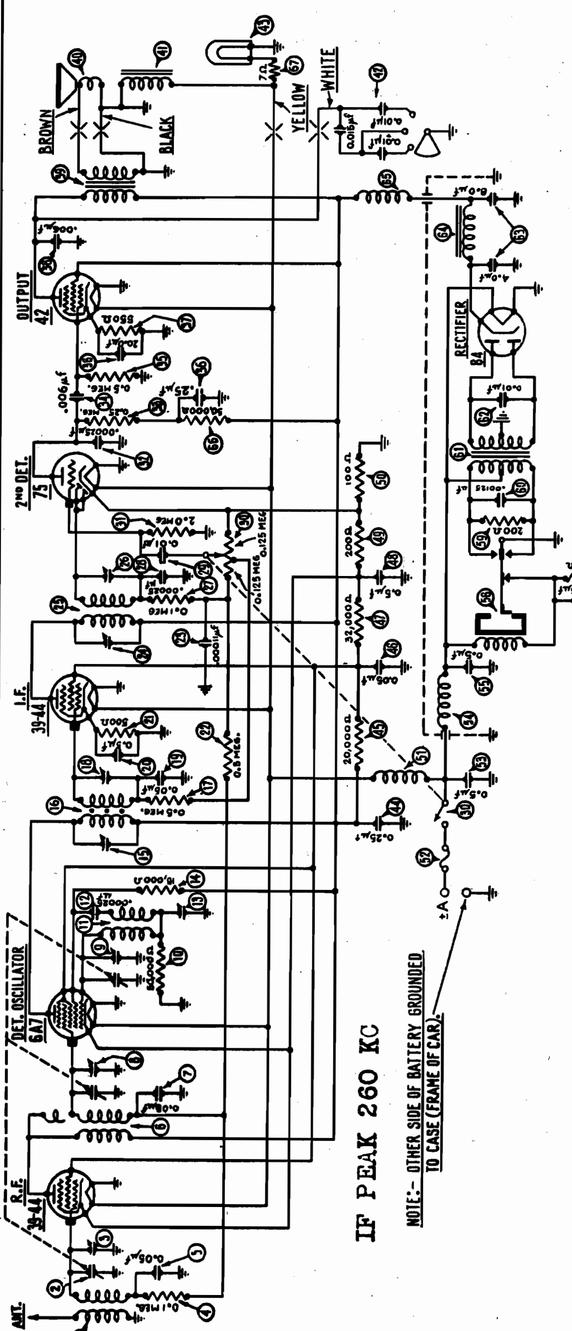


FIG. 3

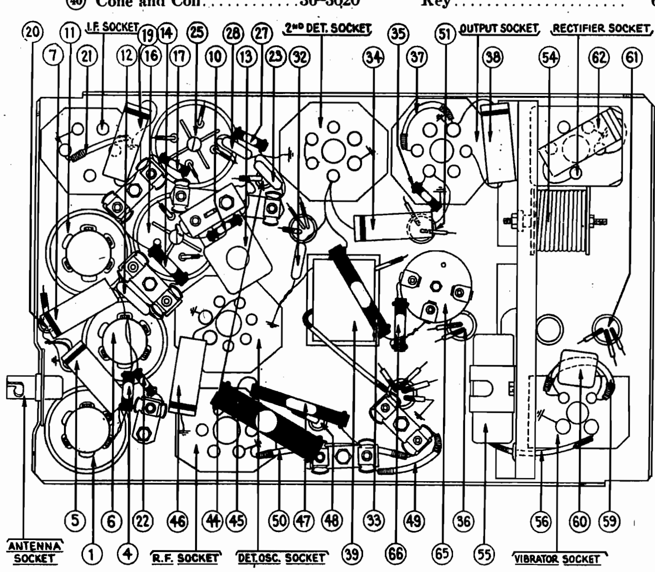


FIG. 4

PHILCO RADIO & TELEVISION CORP.

MODEL 10 RECEIVER

The Model 10 represents the latest developments in single-unit automobile radio. Compact and easy to install, its performance is amazing.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a tremendous power output and is equipped with a full-size electro dynamic speaker, the same type as used in high-priced home radio Receivers.

Four-point tone control is provided to satisfy the individual preference. Greater sensitivity, a three-section tuning condenser giving improved selectivity and fidelity, inherently quiet circuits and all the other improvements, make this model the outstanding automobile radio.

Added to this, the ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) makes it the most desirable one to sell, install or own.

I. F. TRANSFORMER AND PADDERS

A new style I. F. transformer complete with padders is used in the Model 10.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 38-5274 for the first I. F. stage and 38-5275 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

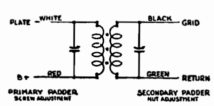


Fig. 1

MODEL 10 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (24) and (26) are adjusted first (Figs. 2 and 3.) Turn the adjusting screw (24) all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (26) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (24) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

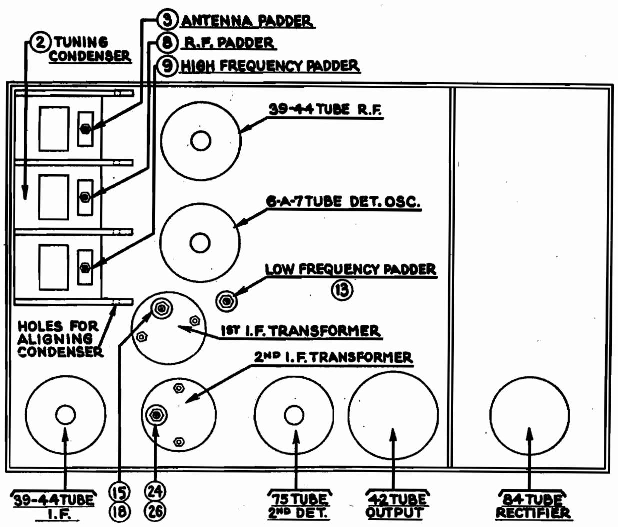


Fig. 2

Repeat the above procedure with the condensers (15) and (18).

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the

PHILCO RADIO & TELEVISION CORP.

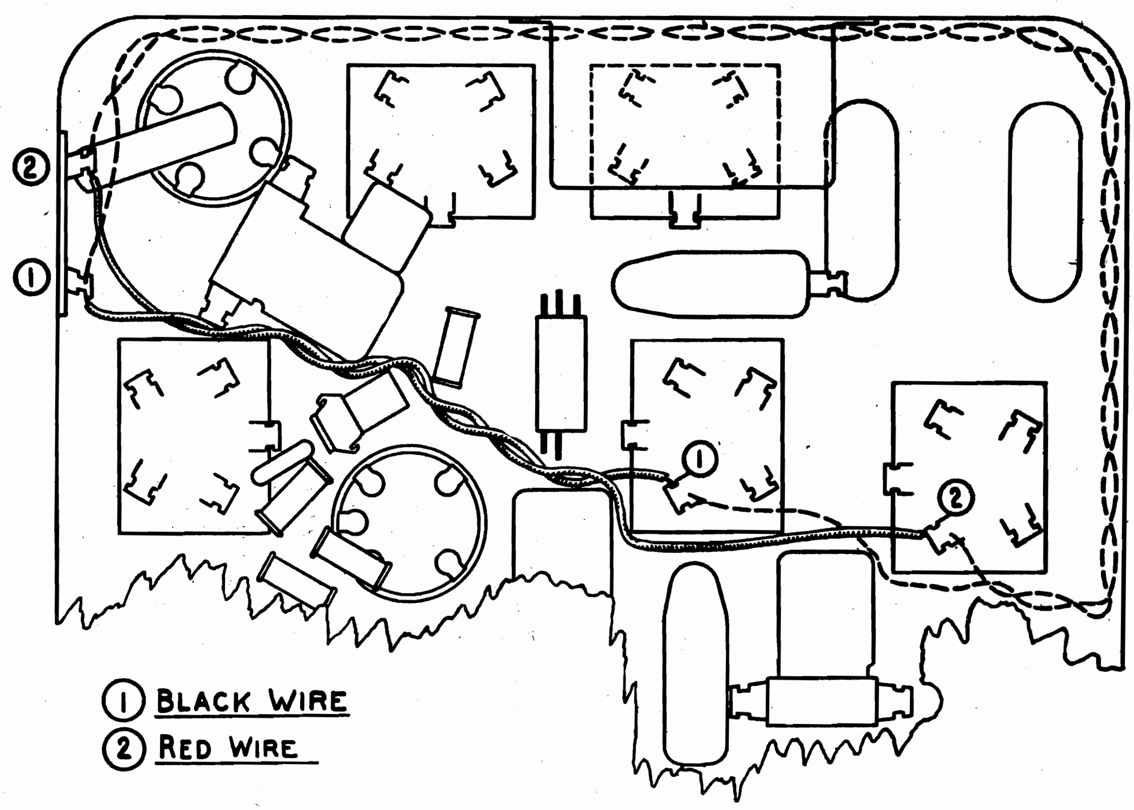
Wiring Changes in Model 112-X

A few of the early production of the model 112-X had an input transformer with a letter "A" after the part number on the terminal board. These transformers should have an .0008 Mfd. condenser, part 5878, connected across the entire secondary.

Later production have the input transformer without the letter "A". They should be equipped with a 490,000 ohm resistor, part 4517 across the secondary.

On some of the first 112-X production the wires from the plates of the pentodes to the two lower terminals of the speaker socket in the chassis were wired as shown by the dotted lines in the illustration. This "dressing" of the wires tends to produce a high pitched whistle if the tubes are slightly unbalanced. The condition is readily eliminated, however, by changing the dressing of the wires as shown by the full lines in the illustration. All production is now wired in this manner. If it is found necessary to make this change, be sure that the polarity of the wires after reconnection is the same as it was before. In production, a red wire and a black wire are now used, but the early production had two red wires.

In some few cases with present production, a slight whistle is present. This can be eliminated by moving the two plate wires away from the compensating condenser (28) in circuit diagram, Service Bulletin No. 101.



Adjusting the Electric Pickup

Distortion of electric phonograph reproduction is usually caused by a badly worn needle (ordinary steel needles should never be used on automatic record changer instruments), a loose needle, or by improper centering of the electric pickup armature. The adjustment for centering the pick-up is extremely simple, and can be accomplished in the following manner:

Low Impedance Type Part 5251 Used on Model 270

1. Remove the pickup from the tone arm, and remove the cover from the pickup, taking care not to loose the phosphor bronze spring, which serves as a pressure clamp between the top of the magnet and the cover.

2. Slide the magnet out from the pole pieces slightly so that a keeper (heavy flat piece of steel) can be placed across the poles of the magnet before the latter is removed from the assembly. *Great care must be exercised to see that the magnet does not become disconnected from the pole pieces (or the keeper) even for an instant.* A noticeable loss in pickup efficiency and volume will result if this point is not carefully observed.

3. Lift the magnet and keeper from the assembly, taking extreme care that the keeper does not come off the magnet.

4. Loosen the two round head screws in the small brass plate, and move the plate slightly to the right or left as required until the armature is exactly centered between the pole pieces.

5. Tighten the screws while holding the plate in this centered position.

6. After making certain that the armature has not shifted while the screws were being tightened, replace the magnet over the pole pieces, taking care that the magnet is in contact with both pole pieces before removing the keeper.

7. Re-assemble the pickup cover, and replace the pickup on the tone arm.

High Impedance Type Part 4584 Used on Models 296, 220, 211 and 212

1. Remove the pickup from the tone arm, and remove the cover from the pickup as described above. It will be unnecessary to remove the magnet when making this adjustment.

2. Loosen the nuts which clamp the pole pieces to the pickup housing so as to free the adjusting arms.

3. Push the right or the left adjusting arm, as required, until the armature is properly centered.

4. Tighten the nuts while holding the armature in this centered position.

5. Re-assemble the cover, and replace the pickup on the tone arm.

MODEL 77,77-A
Voltage
Values

PHILCO RADIO & TELEVISION CORP.

Table 1—Tube Socket Readings Taken with AC Set Tester AC Line—115 volts

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milli-amperes
24	1st R. F.	2.3	145	90	3	13	3.5
24	2d R. F.	2.3	145	90	3	13	3.5
24	Detector	2.3	36*	30†	1.4	12	0
27	1st A. F.	2.3	140		1	10	3
45	2d A. F.	2.2	230		46		30
45	2d A. F.	2.2	230		46		30
80	Rectifier	4.5					50/Plate

All readings taken with antenna disconnected and ground on. Volume control on full.
*Read with a 250,000-ohm voltmeter. †Read with a 100,000-ohm voltmeter.

Table 2—Power Transformer Voltages

Terminals	A.C. Volts	
1—2		Primary
3		Center Tap for 80 Plate
4		Center Tap for 45 Tubes
5—6	2.67	Heaters of 24 and 27 Tubes
7—8	2.68	Filaments of 45 Tubes
10—11	5.00	Filament of 80 Tube
9—12	750	Plate of 80 Tube
Rubber Covered Lead		Center Tap for 24 and 27 Tubes

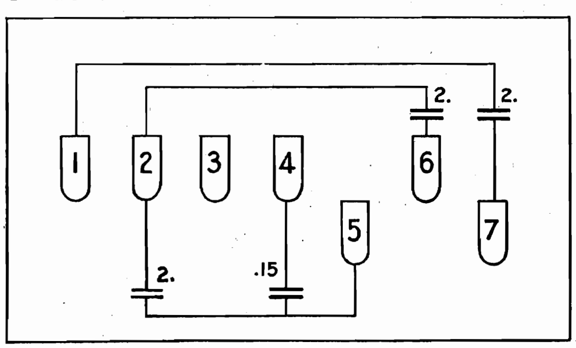
Table 3—RESISTOR DATA

No. on Figs. 3 and 4	Terminal	Resistance	Color
30	1-2	1,400	Long Tubular
	2-3	1,500	
	3-4	2,000	
26	1-2	250	Short Tubular
	3-4	800	
12 18		100,000	Silver Gray
15		250,000	White
17 20		500,000	Battleship Gray
29		85	Flatwire wound

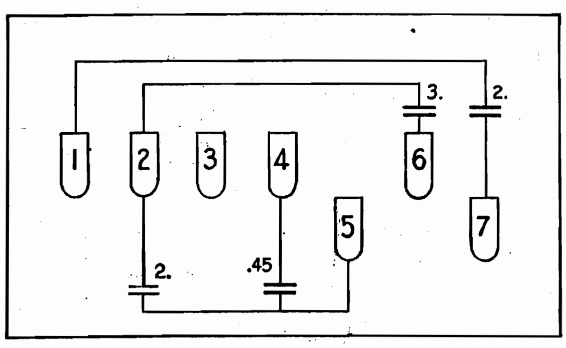
Table 4—CONDENSER DATA
(Other Than Filter Block)

No. on Figs. 3 and 4	Capacity MFD	Volts D.C. With Receiver Turned On
7	.25	95 on Screen Grid Cond.; 15 on Cathode Cond.
11	.05	150
13	.5	12
14	.25	95 Plate Resistor Cond.; 40 Screen Grid Cond.
16	.00025	40
19	.01	25

Model 77 Condenser Block Part No. 3870



Model 77A Condenser Block Part No. 3871



MODEL 800
Schematic
Parts List
Chassis Layout

PHILCO RADIO & TELEVISION CORP.

MODEL 800 PARTS LIST

No.	Part	Part No.
1	Antenna Transformer	32-1220
2	Tuning Condenser	31-1083
3	1st Padder (in tuning cond.)	
4	Resistor (100,000 ohms)	6099
5	Condenser (.03 mfd.)	30-4025
6	Condenser (.05 mfd.)	30-4020
7	R. F. Transformer	32-1221
8	Condenser (.03 mfd.)	30-4025
9	2nd Padder (in tuning cond.)	
10	3rd Padder (in tuning cond.)	
11	Resistor (50,000 ohms)	6098
12	Oscillator Transformer	32-1222
13	Condenser (.00025 mfd.)	3082
14	Padder	31-6012
15	Resistor (15,000 ohms)	6208
16	Padder (prim. 1st I. F.)	
17	First I. F. Transformer	32-1236
18	Resistor (1,000,000 ohms)	33-1090
19	Padder (secondary 1st I. F.)	
20	Condenser (.03 mfd.)	30-4025
21	Condenser (.5 mfd.)	30-4058
22	Resistor (500 ohms)	6977
23	Resistor (500,000 ohms)	6097
24	Condenser (.00011-.00025)	30-1020
25	Padder (prim. 2nd I. F.)	
26	Second I. F. Transformer	32-1237
27	Padder (secondary 2nd I. F.)	
28	Resistor (25,000 ohms)	33-1013
29	Condenser (.006 mfd.)	30-4125
30	Volume Control Assembly	33-5058
31	Resistor (2,000,000 ohms)	33-1025
32	Resistor (250,000 ohms)	33-1097
33	Resistor (250,000 ohms)	33-1097
34	Condenser (.00025 mfd.)	5858
35	Resistor (250,000 ohms)	33-1097
36	Resistor (25,000 ohms)	33-1013
37	Condenser (.01 mfd.)	30-4145
38	Condenser (.25-8-10mfd.)	30-4135
39	Resistor (500,000 ohms)	6097
40	Resistor (2500 ohms)	33-1100
41	Input Transformer	32-7206
42	Pilot Lamp	34-2031
43	Resistor (7 ohms)	33-3130
44	Condenser (.006 mfd.)	30-4024
45	Output Transformer	32-7205
46	Cone and Voice Coil	36-3159
47	Field Coil Assembly	36-3130
48	Tone Control	30-4142
49	Condenser (.25 mfd.)	30-4134
50	Resistor (5,000 ohms)	33-1070
51	Resistor (20,000 ohms)	6649
52	Resistor (37,000 ohms)	33-1098
53	Condenser (.5 mfd.)	30-4018
54	Resistor (200 ohms)	7217
55	Resistor (100 ohms)	33-3023
56	Resistor (100 ohms)	33-3023
57	Condenser (.5 mfd.)	30-4015
58	Vibrator Choke	32-1335
59	Condenser (.5 mfd.)	30-4115
60	Vibrator Unit	38-5036
61	Condenser (.05 mfd.)	30-4039
62	Resistor (200 ohms)	7217
63	Resistor (200 ohms)	7217
64	Condenser (.00125 mfd.)	5886
65	Power Transformer	32-7098
66	Condenser (.01 mfd.)	30-4051
67	Filter Condenser (4-8 mfd.)	30-2015
68	"B" Choke	32-7104
	Spark Plug Resistors	33-1015
	Distributor Resistor	4546
	Interference Condenser	30-4007
	Dial	27-5022
	Studs	28-6036
	Nuts (mounting)	W55
	Knobs	03334
	Battery Cable	38-5296
	Antenna Lead	38-5131
	Control Unit Assembly	42-5077
	Acorn Nut	W821
	Key	6091
	Flex. Shaft (28") Vol. Con.	28-8141
	Flex. Shaft (28") Tun. Con.	28-8139

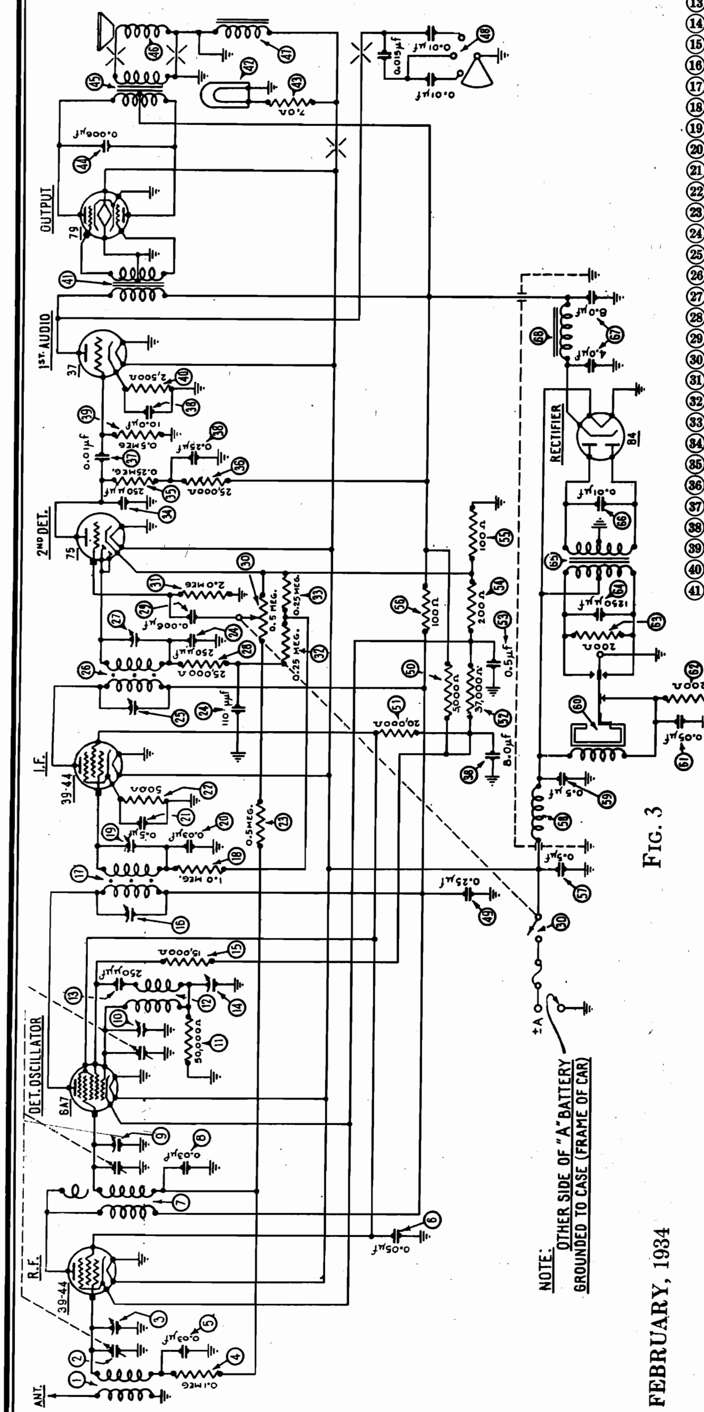


FIG. 3

FEBRUARY, 1934

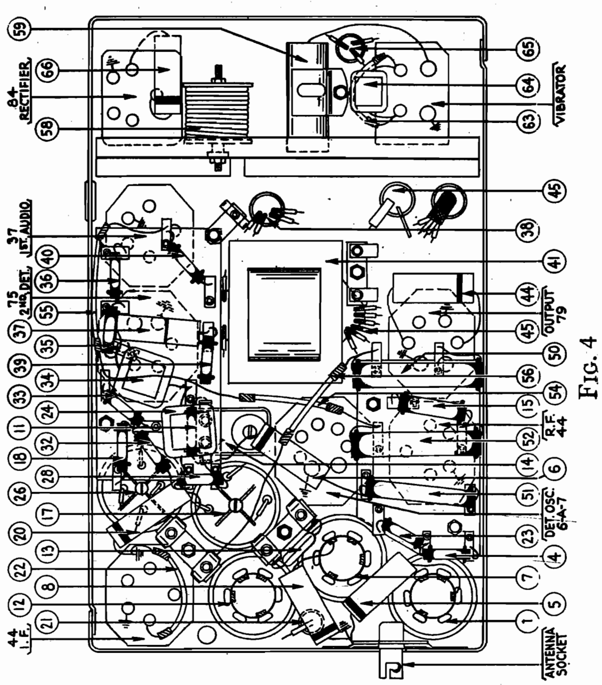


FIG. 4

MODEL 800
Layout
Notes

PHILCO RADIO & TELEVISION CORP.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 800.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

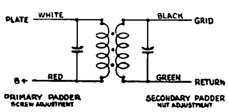


FIG. 1

MODEL 800 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (25) and (27) are adjusted first (Figs. 2 and 3.) Turn the adjusting screw (25) all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (27) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (25) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers (16) and (19).

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

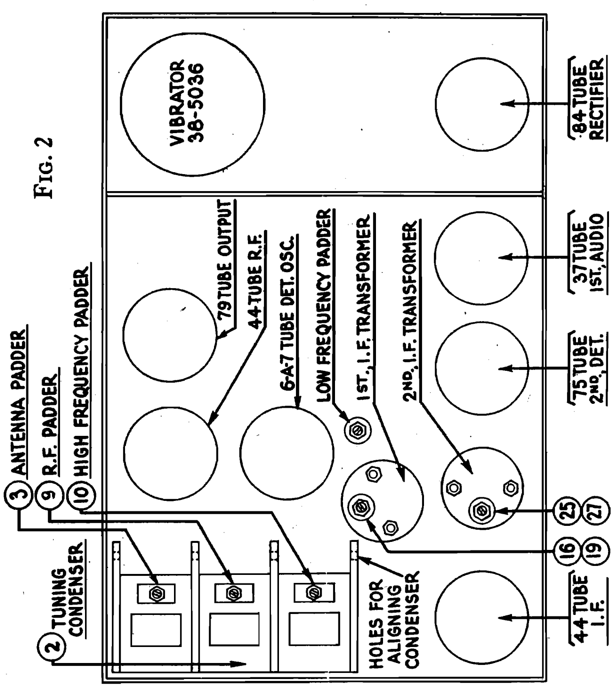
With the tuning condenser in this position adjust the high-frequency padder (10) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (9) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder (14) for the maximum meter reading.

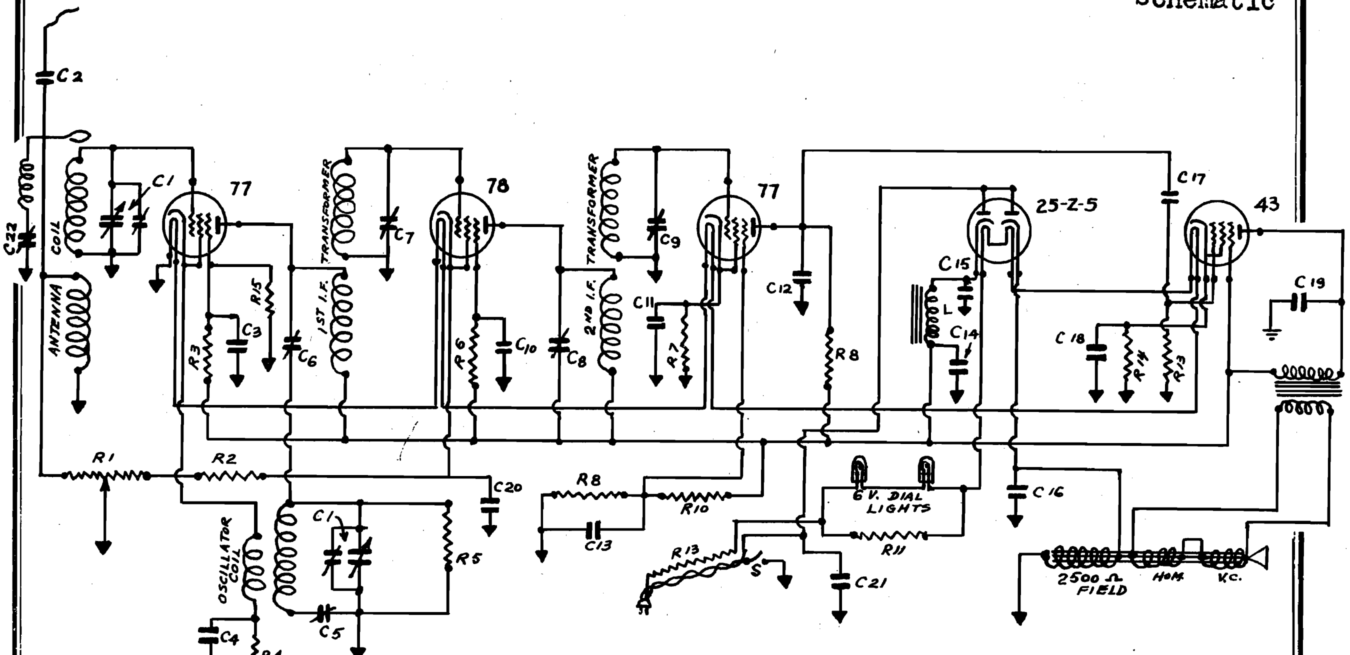
Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

FIG. 2



PILOT RADIO & TUBE CORP.

MODEL 2
Schematic
MODEL D-3
Schematic



CAPACITORS

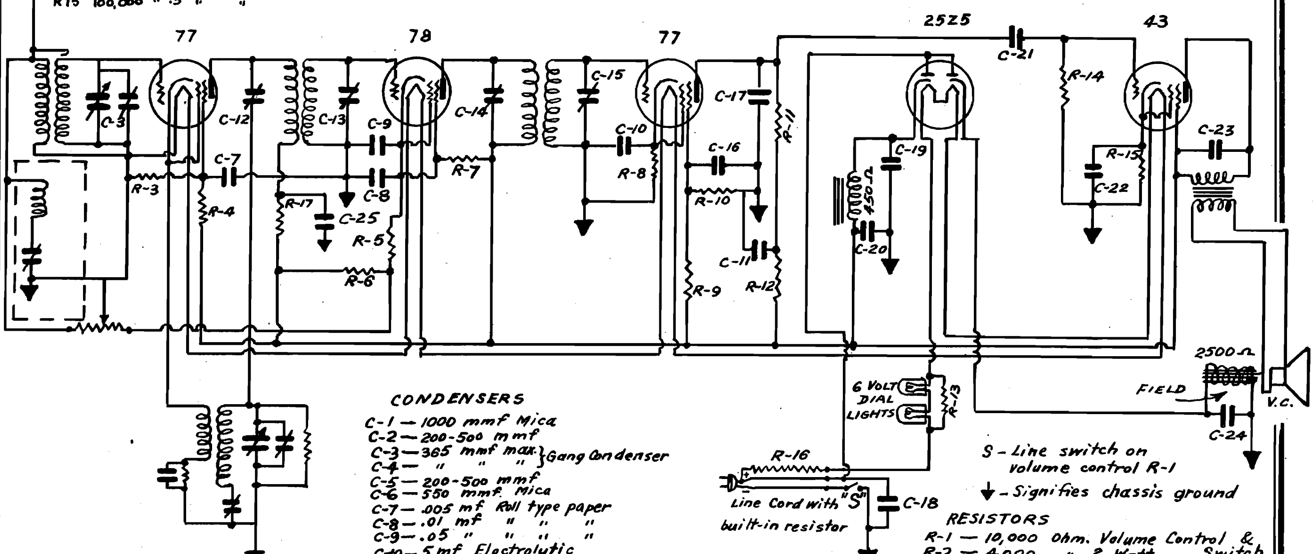
C1	360 mmf	max. Gang Cond.
C2	500 "	mica
C3	5,000 "	paper
C4	1450 "	mica
C5	500 "	max. 200 mmf min.
C6	225 "	" 90 " "
C7	" "	" " " "
C8	" "	" " " "
C9	" "	" " " "
C10	0.01 mfd	paper
C11	6 "	Electrolytic
C12	500 mmf	mica
C13	0.1 mfd	paper
C14	12. "	Electrolytic
C15	8. "	"
C16	4. "	"
C17	0.01 "	Paper
C18	5 "	Electrolytic
C19	0.01 "	Paper
C20	0.05 "	"
C21	0.05 "	"
C22	500 mmf	Max 200 mmf min.

S Line Switch- Same knob as R1
L Filter choke
↓ Signifies connections to chassis
DO NOT CONNECT TO GROUND

RESISTORS

R1	20,000 Ω	Volume Control
R2	250 "	.2 Watt Carbon
R3	59000 "	" "
R4	4,000 "	" "
R5	100,000 "	" "
R6	50,000 "	" "
R7	20,000 "	" "
R8	500,000 "	" "
R9	40,000 "	" "
R10	49,000 "	" "
R11	50 "	Wire wound 1.25 watt
R12	112 "	10 Watt incl. in Ext'n Cord
R13	500,000 "	.2 " Carbon
R14	500 "	.5 " "
R15	100,000 "	.5 " "

Model 2



S - Line switch on volume control R-1
↓ - Signifies chassis ground

CONDENSERS

C-1 — 1000 mmf Mica
C-2 — 200-500 mmf
C-3 — 365 mmf max. } Gang Condenser
C-4 — " " "
C-5 — 200-500 mmf
C-6 — 550 mmf Mica
C-7 — .005 mf Roll type paper
C-8 — .01 mf " " "
C-9 — .05 " " " "
C-10 — 5 mf Electrolytic
C-11 — .25 mf Roll type paper
C-12 — 90-225 mmf
C-13 — " " "
C-14 — " " "
C-15 — " " "
C-16 — .25 mf Roll Type paper
C-17 — 250 mmf Mica
C-18 — .05 mf Roll type paper
C-19 — 8.0 " Electrolytic
C-20 — 120 " "
C-21 — .01 " Roll type paper
C-22 — 5 " Electrolytic
C-23 — .005 " Roll type paper
C-24 — 4 " Electrolytic
C-25 — .25 " Roll type paper

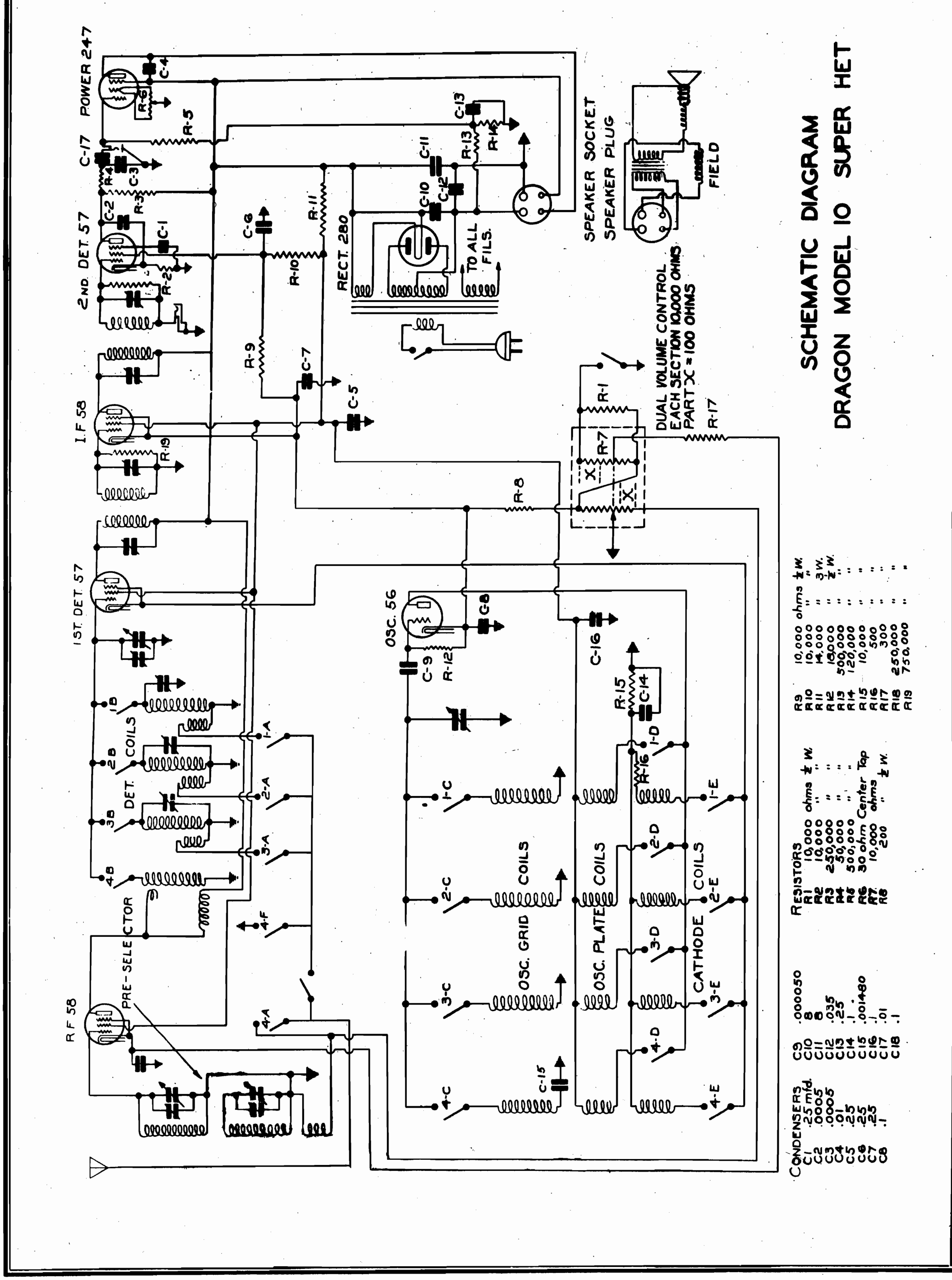
RESISTORS

R-1 — 10,000 Ohm. Volume Control & Switch
R-2 — 4,000 " .2 Watt
R-3 — 100,000 " .5 "
R-4 — 50,000 " .2 "
R-5 — 250 " .2 "
R-6 — 40,000 " .5 "
R-7 — 50,000 " .2 "
R-8 — 20,000 " .2 "
R-9 — 40,000 " .2 "
R-10 — 40,000 " .5 "
R-11 — 500,000 " .2 "
R-12 — 100,000 " .2 "
R-13 — 50,000 " Moulded resistance
R-14 — 500,000 " .2 Watt
R-15 — 500 " .1 "
R-16 — 112 " Resistance in line cord
R-17 — 10,000 " .5 watt

Model D-3

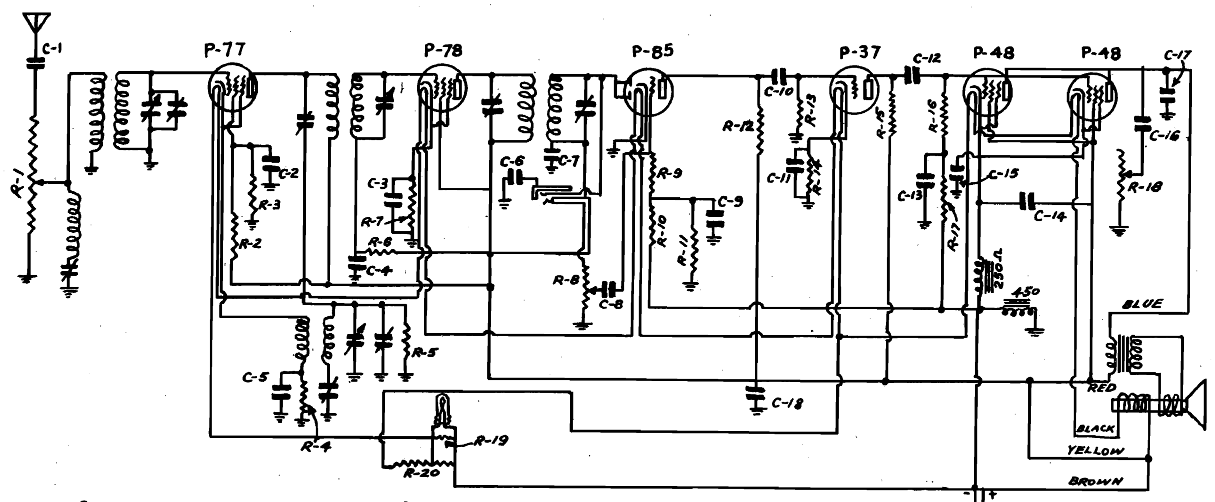
MODEL 10 AC
Dragon Superhet
Schematic

PILOT RADIO & TUBE CORP.



PILOT RADIO & TUBE CORP.

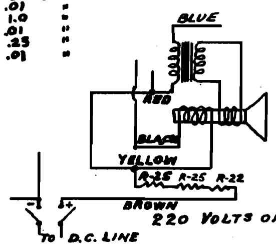
MODEL F-14 DC
Superhet
MODEL 4 Tube DC
Superhet

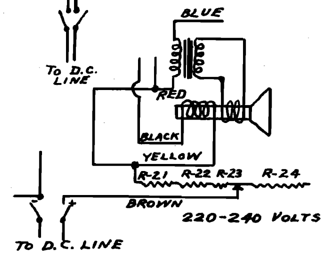


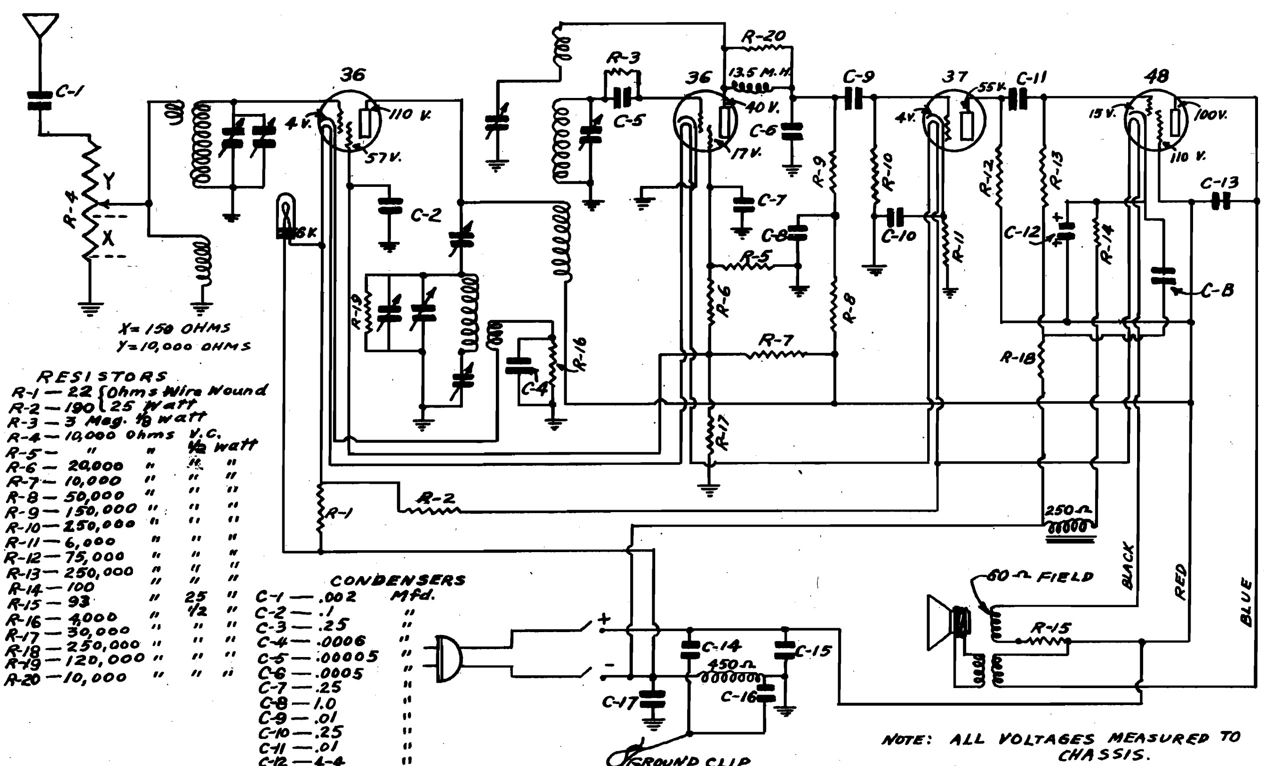
CONDENSERS	
C1	.002 MFD
C2	.05 "
C3	.25 "
C4	.05 "
C5	.0005 "
C6	.01 "
C7	.0005 "
C8	.01 "
C9	1.0 "
C10	.01 "
C11	.25 "
C12	.01 "
C13	.25 MFD
C14	4-4 " Elect.
C15	.1 "
C16	.25 "
C17	.01 "
C18	2.0 "

RESISTORS	
R1	10,000 Ω Sensitivity Cont.
R2	" " .5 Watt
R3	" " " "
R4	6,000 " " "
R5	250,000 " " "
R6	500,000 " " "
R7	150 " " "
R8	750,000 " Volume Control
R9	500,000 " .5 Watt
R10	250,000 " " "
R11	20,000 " " "
R12	100,000 " " "
R13	500,000 Ω .5 Watt
R14	6,000 " " "
R15	75,000 " " "
R16	250,000 " " "
R17	250,000 " " "
R18	10,000 " Tone Control
R19	50 " 1 Watt
R20	274 Ω [22-252 Ω] Wire Wound Watt
R21	65 Ω Wire Wound 25 Watt
R22	" " " " " "
R23	" " " " " "
R24	" " [13.5 Ω - 15.4 Ω - 19.3 Ω - 16.8 Ω] (Taps) Wire Wound
R-25	75 Ω Wire Wound 25 Watt

Model F-14







X = 150 OHMS
Y = 10,000 OHMS

RESISTORS			
R-1 — 22	Ohms Wire Wound 25 Watt		
R-2 — 190	Ohms Wire Wound 25 Watt		
R-3 — 3 Meg.	1/8 watt		
R-4 — 10,000	ohms	V.C.	
R-5 — "	"	1/2	watt
R-6 — 20,000	"	"	"
R-7 — 10,000	"	"	"
R-8 — 50,000	"	"	"
R-9 — 150,000	"	"	"
R-10 — 250,000	"	"	"
R-11 — 6,000	"	"	"
R-12 — 75,000	"	"	"
R-13 — 250,000	"	"	"
R-14 — 100	"	"	"
R-15 — 93	"	25	"
R-16 — 4,000	"	1/2	"
R-17 — 30,000	"	"	"
R-18 — 250,000	"	"	"
R-19 — 120,000	"	"	"
R-20 — 10,000	"	"	"

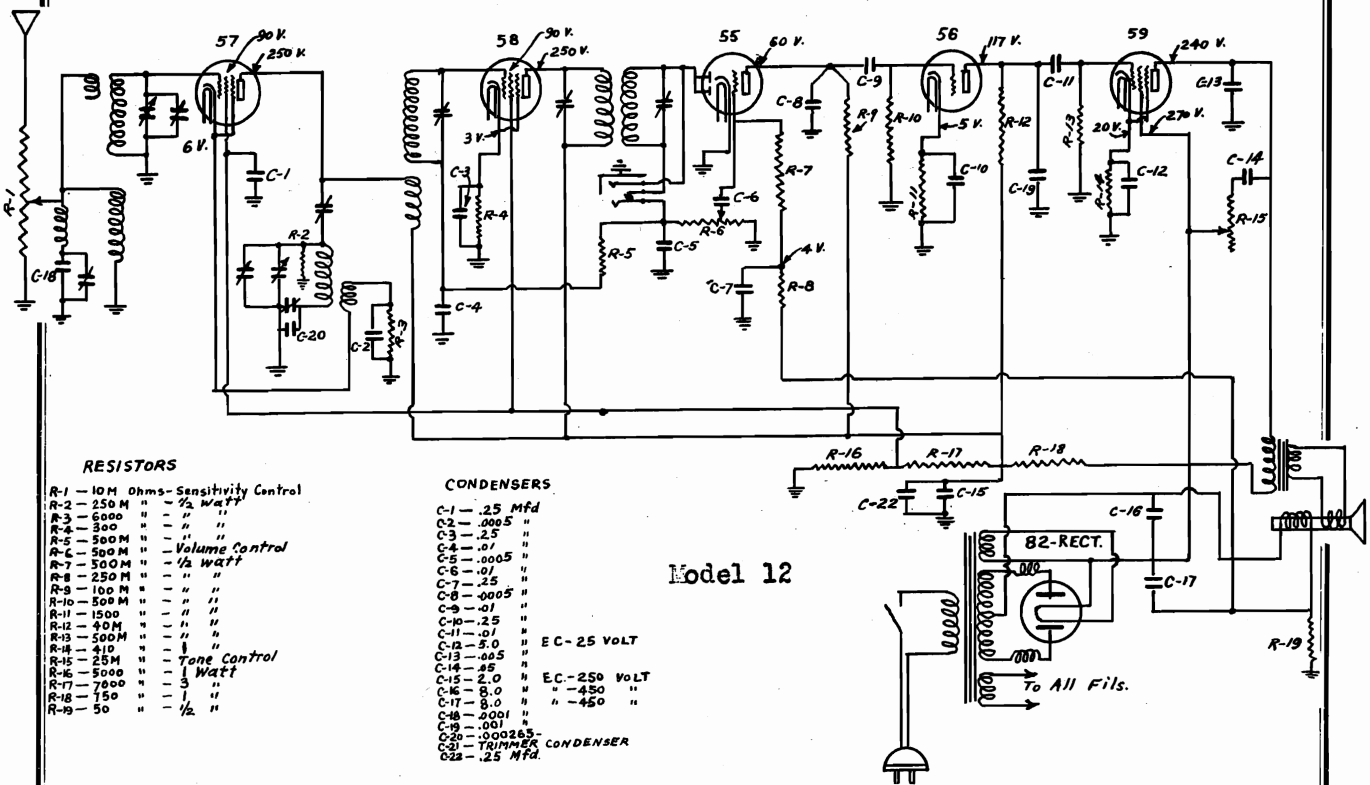
CONDENSERS	
C-1 — .002	Mfd.
C-2 — .1	"
C-3 — .25	"
C-4 — .0006	"
C-5 — .00005	"
C-6 — .0005	"
C-7 — .25	"
C-8 — 1.0	"
C-9 — .01	"
C-10 — .25	"
C-11 — .01	"
C-12 — 4-4	"
C-13 — .035	"
C-14 — .1	"
C-15 — 2.	"
C-16 — .1	"
C-17 — .01	"

NOTE: ALL VOLTAGES MEASURED TO CHASSIS.
⏚ DENOTES CHASSIS GROUND

4-Tube D-C. Superhet

MODEL 12 AC
Superhet
MODEL 20
Schematic

PILOT RADIO & TUBE CORP.

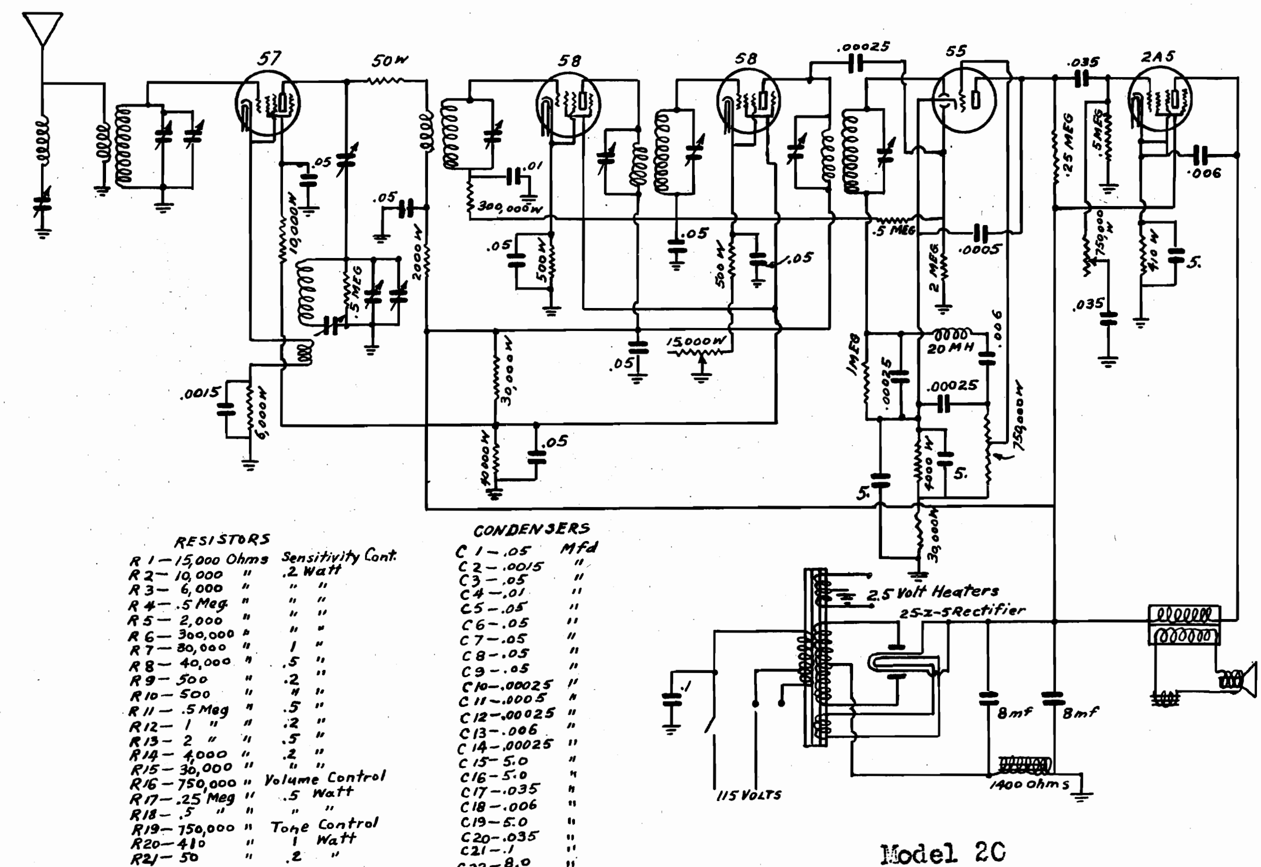


RESISTORS

R-1 — 10M Ohms - Sensitivity Control
R-2 — 250M " - ½ watt
R-3 — 6000 " - " "
R-4 — 300 " - " "
R-5 — 500M " - " "
R-6 — 500M " - Volume Control
R-7 — 500M " - ½ watt
R-8 — 250M " - " "
R-9 — 100M " - " "
R-10 — 500M " - " "
R-11 — 1500 " - " "
R-12 — 40M " - " "
R-13 — 500M " - " "
R-14 — 410 " - 1 "
R-15 — 25M " - Tone Control
R-16 — 5000 " - 1 Watt
R-17 — 7000 " - 3 "
R-18 — 750 " - 1 "
R-19 — 50 " - ½ "

CONDENSERS

C-1 — .25 Mfd
C-2 — .0005 "
C-3 — .25 "
C-4 — .01 "
C-5 — .0005 "
C-6 — .01 "
C-7 — .25 "
C-8 — .0005 "
C-9 — .01 "
C-10 — .25 "
C-11 — .01 "
C-12 — 5.0 " EC - 25 VOLT
C-13 — .005 "
C-14 — .05 "
C-15 — 2.0 " EC. - 250 VOLT
C-16 — 8.0 " " - 450 "
C-17 — 8.0 " " - 450 "
C-18 — .0001 "
C-19 — .001 "
C-20 — .000265 -
C-21 — TRIMMER CONDENSER
C-22 — .25 Mfd.



RESISTORS

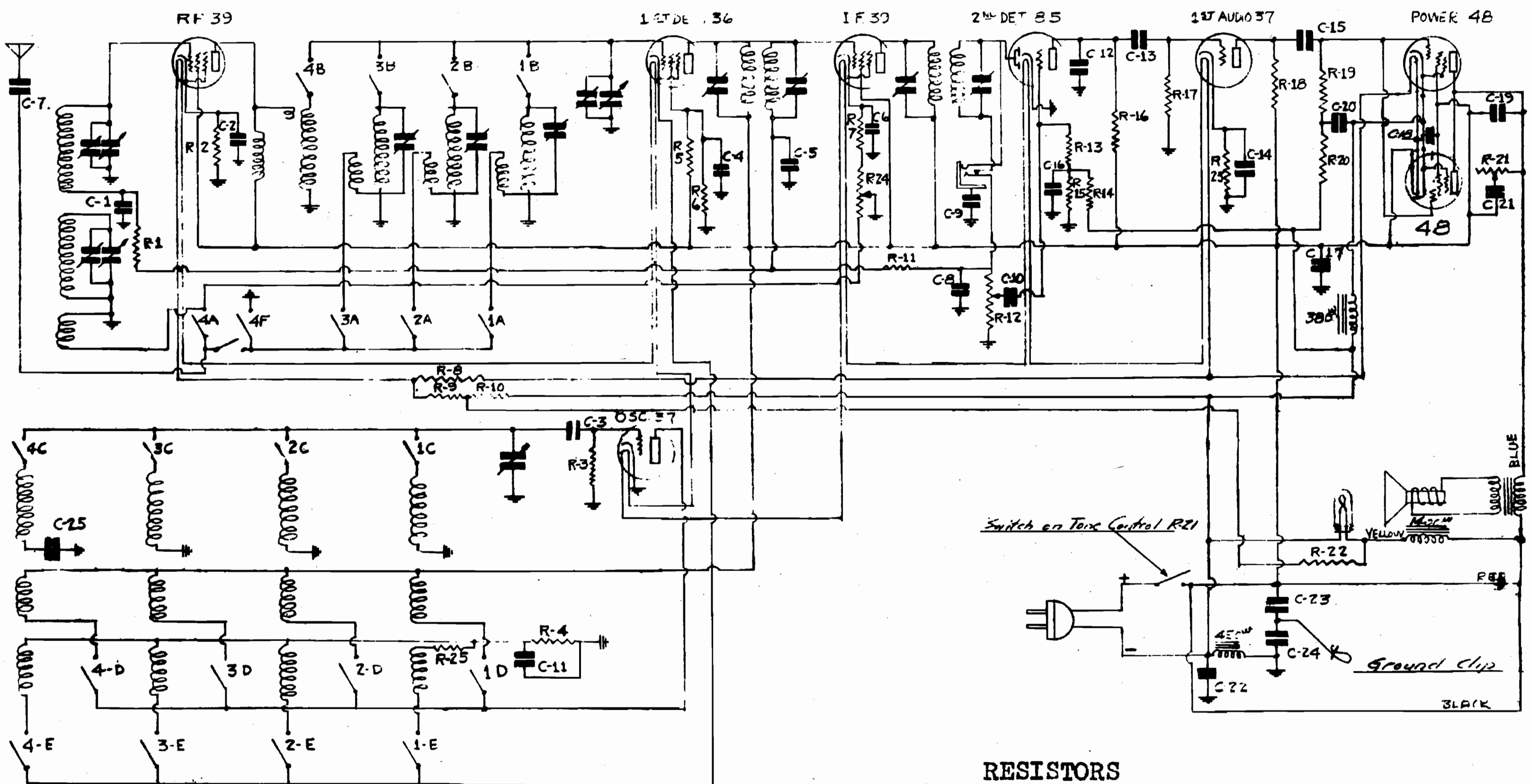
R 1 — 15,000 Ohms Sensitivity Cont.
R 2 — 10,000 " .2 Watt
R 3 — 6,000 " " "
R 4 — .5 Meg. " " "
R 5 — 2,000 " " "
R 6 — 300,000 " " "
R 7 — 80,000 " 1 "
R 8 — 40,000 " .5 "
R 9 — 500 " .2 "
R 10 — 500 " " "
R 11 — .5 Meg " .5 "
R 12 — 1 " " .2 "
R 13 — 2 " " .5 "
R 14 — 4,000 " .2 "
R 15 — 30,000 " " "
R 16 — 750,000 " Volume Control
R 17 — .25 Meg " .5 Watt
R 18 — .5 " " " "
R 19 — 750,000 " Tone Control
R 20 — 410 " 1 Watt
R 21 — 50 " .2 "

CONDENSERS

C 1 — .05 Mfd
C 2 — .0015 "
C 3 — .05 "
C 4 — .01 "
C 5 — .05 "
C 6 — .05 "
C 7 — .05 "
C 8 — .05 "
C 9 — .05 "
C 10 — .00025 "
C 11 — .0005 "
C 12 — .00025 "
C 13 — .006 "
C 14 — .00025 "
C 15 — 5.0 "
C 16 — 5.0 "
C 17 — .035 "
C 18 — .006 "
C 19 — 5.0 "
C 20 — .035 "
C 21 — .1 "
C 22 — 8.0 "
C 23 — 8.0 "

PILOT RADIO & TUBE CORP.

MODEL 28 Schematic



CONDENSERS

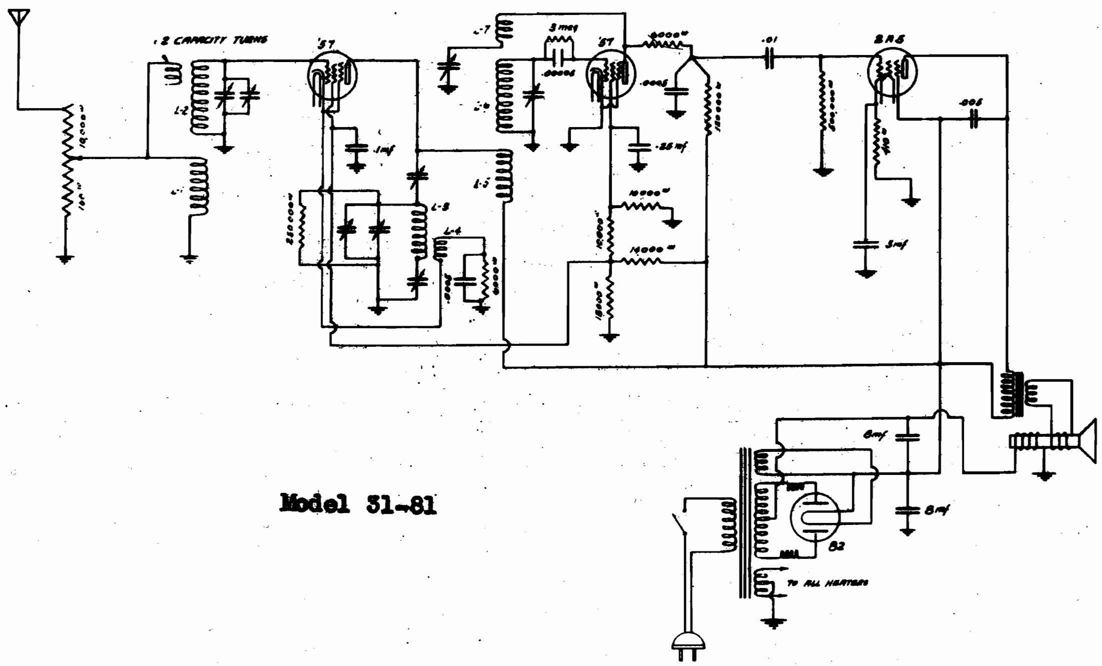
C1	.1 mf.	C13	.01 mf.	C25	.00148 mf.
C2	.1 mf.	C14	.25 mf.		
C3	.0001 mf.	C15	.01 mf.		
C4	.05 mf.	C16	1.0 mf.		
C5	.1 mf.	C17	2.0 mf.		
C6	.25 mf.	C18	2.0 mf.		
C7	.0015 mf.	C19	.005 mf.		
C8	.0001 mf.	C20	.25 mf.		
C9	.1 mf.	C21	.25 mf.		
C10	.01 mf.	C22	.01 mf.		
C11	.1 mf.	C23	.1 mf.		
C12	.0005 mf.	C24	.1 mf.		

RESISTORS

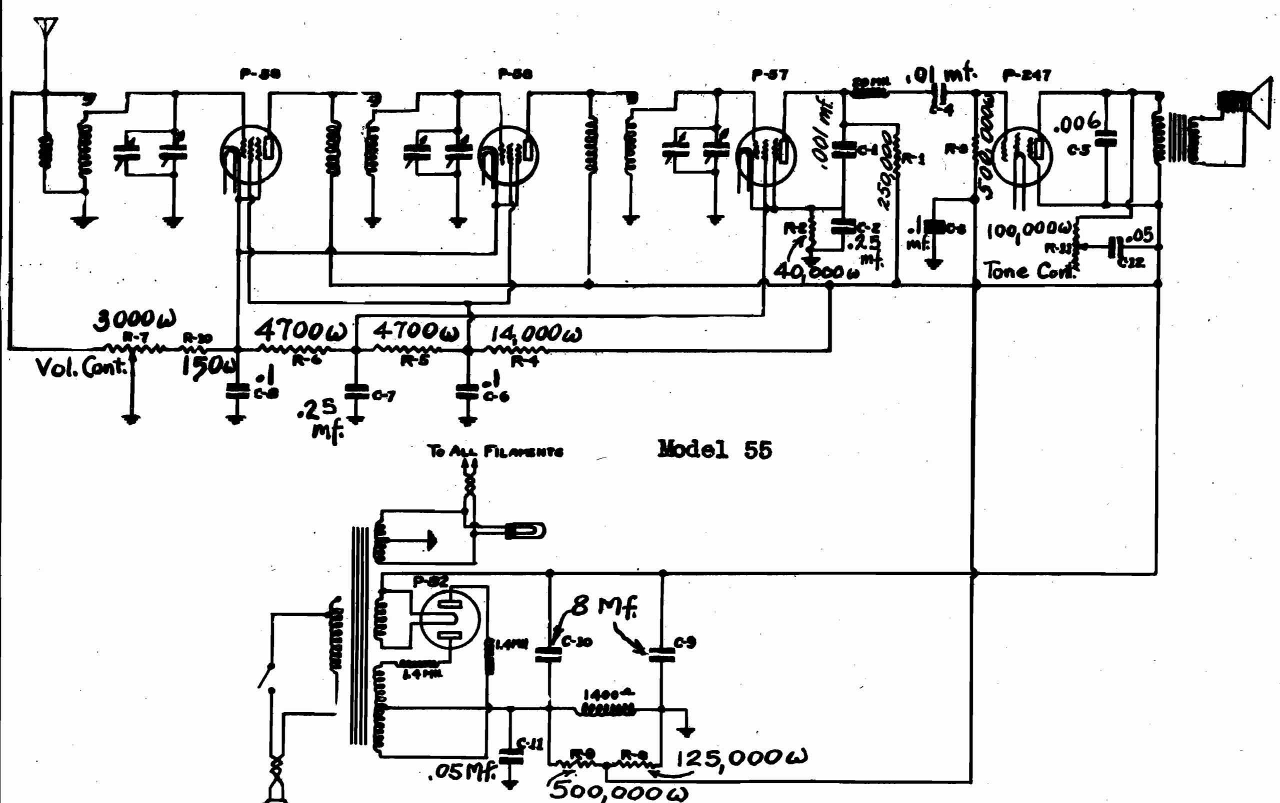
R1	500,000 ohms	R13	500,000 ohms
R2	500 "	R14	100,000 "
R3	30,000 "	R15	250,000 "
R4	10,000 "	R16	100,000 "
R5	10,000 "	R17	500,000 "
R6	10,000 "	R18	75,000 "
R7	500 "	R19	250,000 "
R8	378 "	R20	250,000 "
R9	25 "	R21	10,000 " Tone Cont.
R10	22 "	R22	100 "
R11	500,000 "	R23	6,000 "
R12	750,000 " Vol.Cont.	R24	15,000 "
		R25	500 "

MODEL 31-81
Rainbow Super
MODEL 55
Schematic

PILOT RADIO & TUBE CORP.



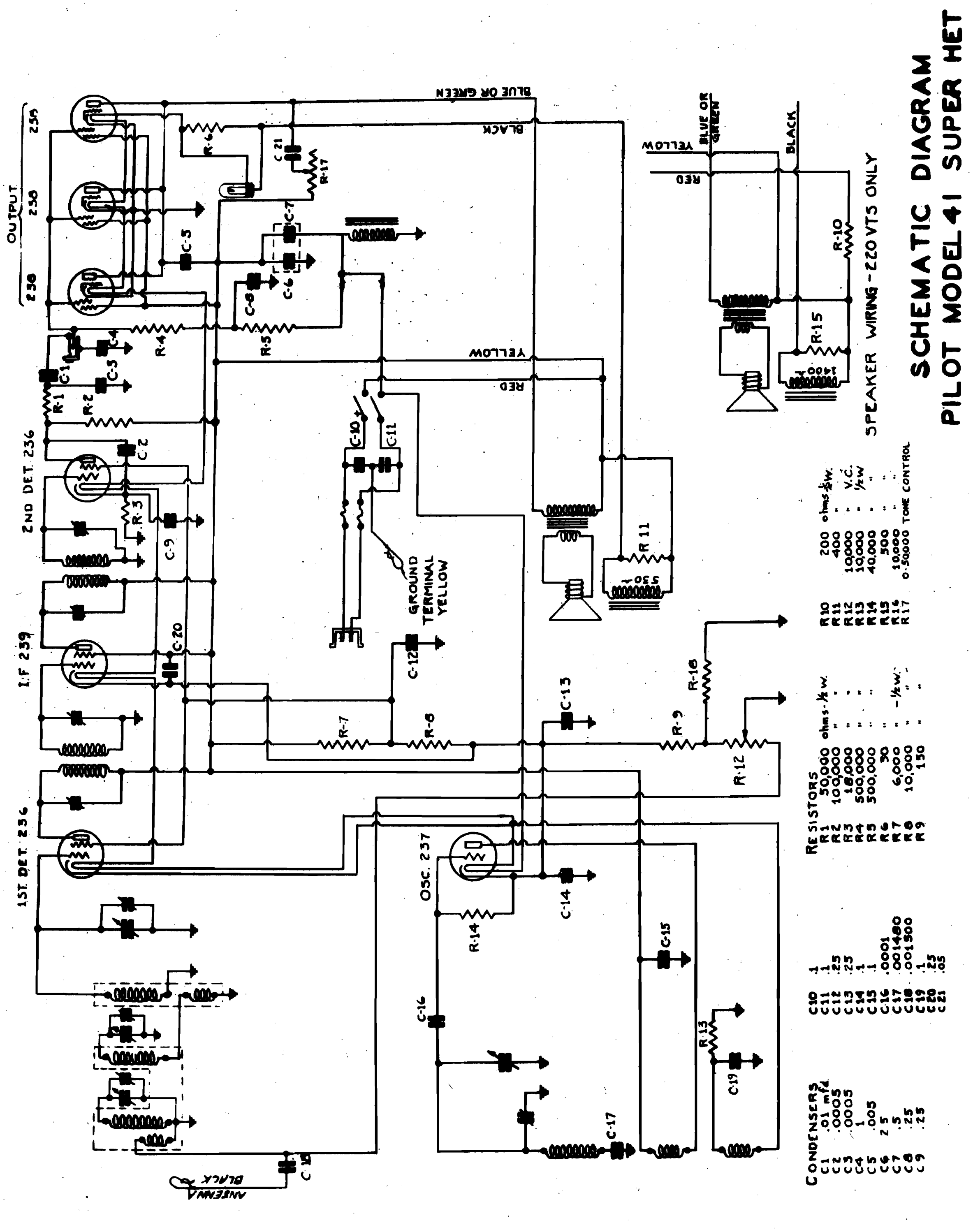
Model 31-81



Model 55

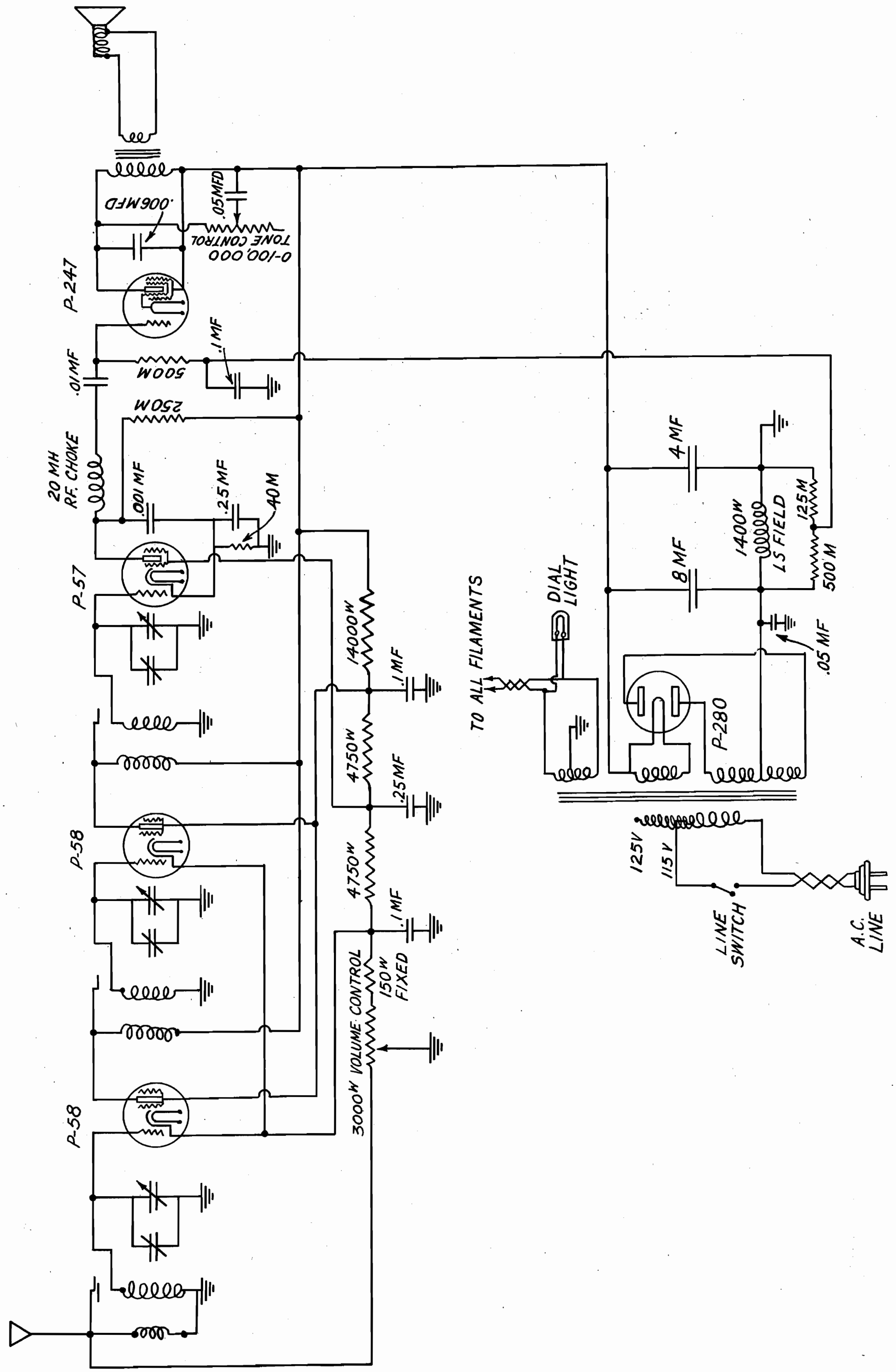
PILOT RADIO & TUBE CORP.

MODEL 41 DC
Superhet
Schematic



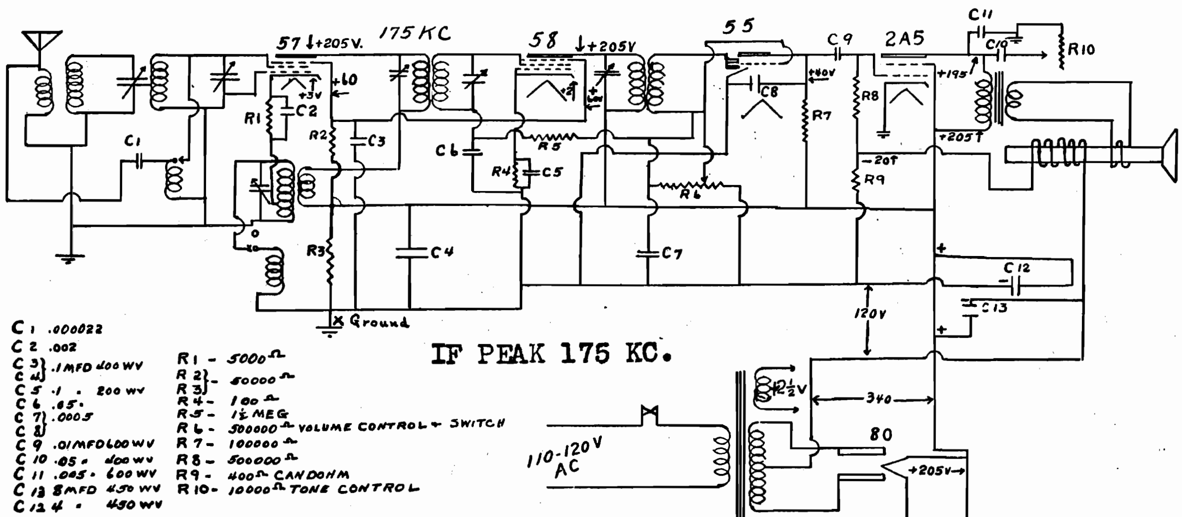
MODEL 43
Schematic

PILOT RADIO & TUBE CORP.



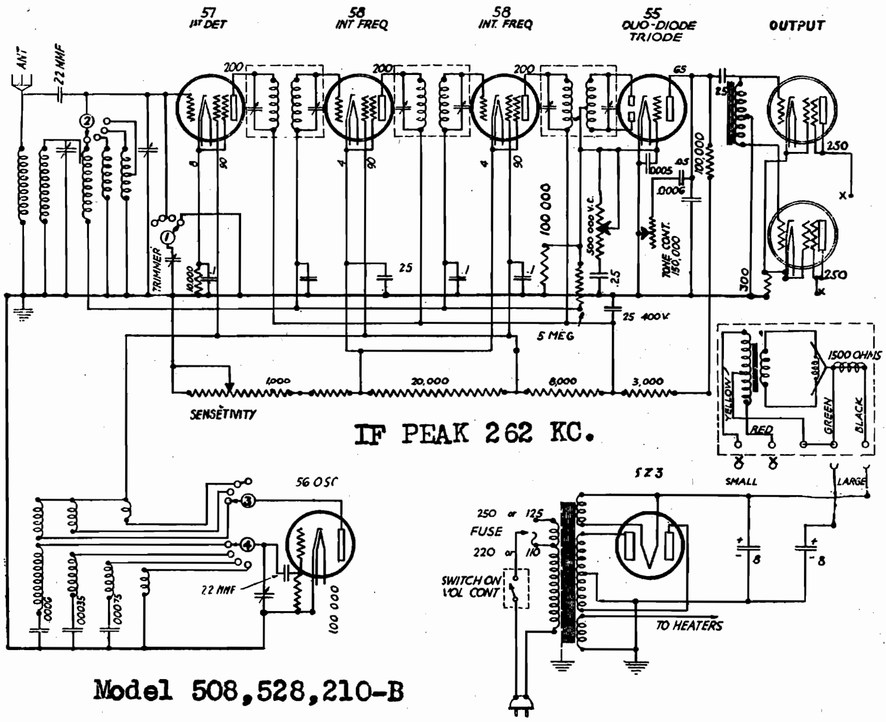
RADIOBAR COMPANY OF AMERICA

MODEL 505
MODEL 508,526,210-B
Schematic



IF PEAK 175 KC.

Model 505



IF PEAK 262 KC.

Model 508,528,210-B

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262 K. C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section rear of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

SERVICE DATA

This model has the diode type AVC controlling the first detector and the intermediate frequency stages. The AVC makes it impossible to service and rebalance the set without the proper type of equipment. We advise building a VTVM as shown in the diagram. This meter can be used on any set that uses automatic volume control by connecting the hot lead to the Grid return of the tubes controlled by the AVC. Connect the ground lead to the cathodes of the same tubes. On this 8-tube model connect the hot lead to the 5 meg. resistor and the ground lead to the chassis.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 5 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

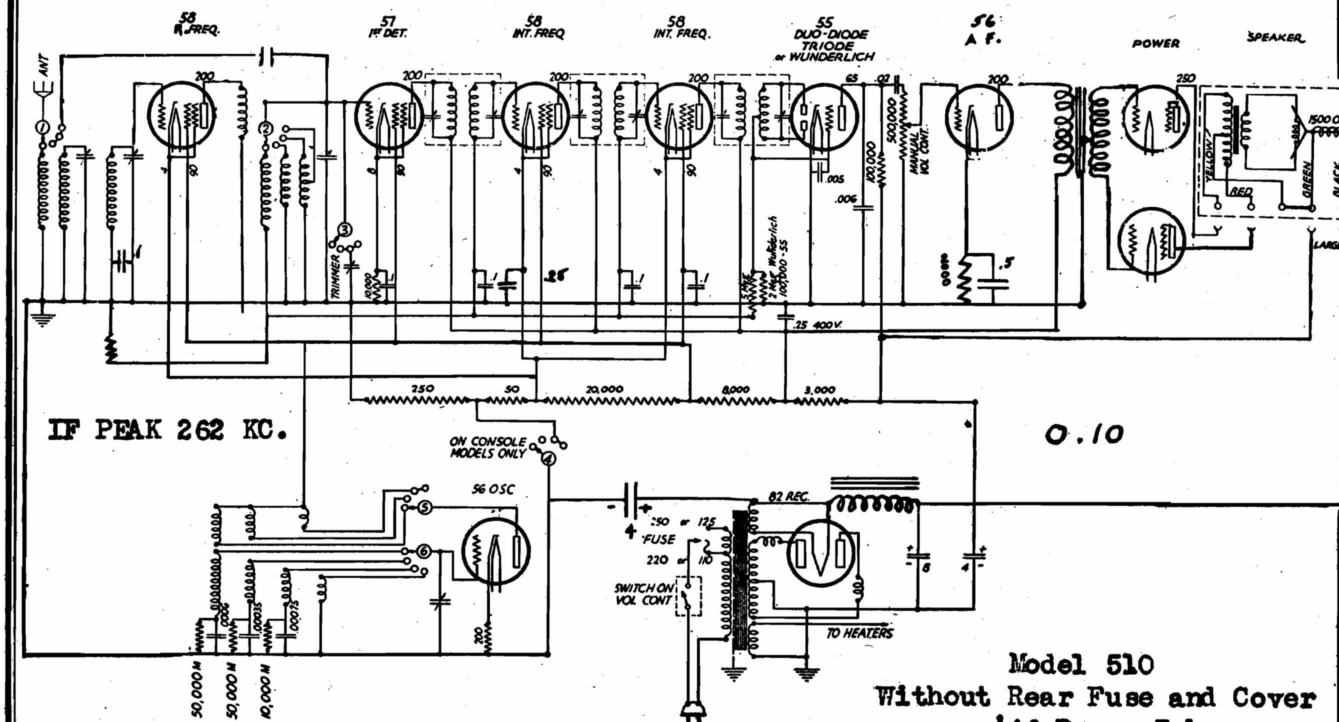
If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear. Check tubes for leakage from grid to ground.

NOISY OPERATION (Not Static)

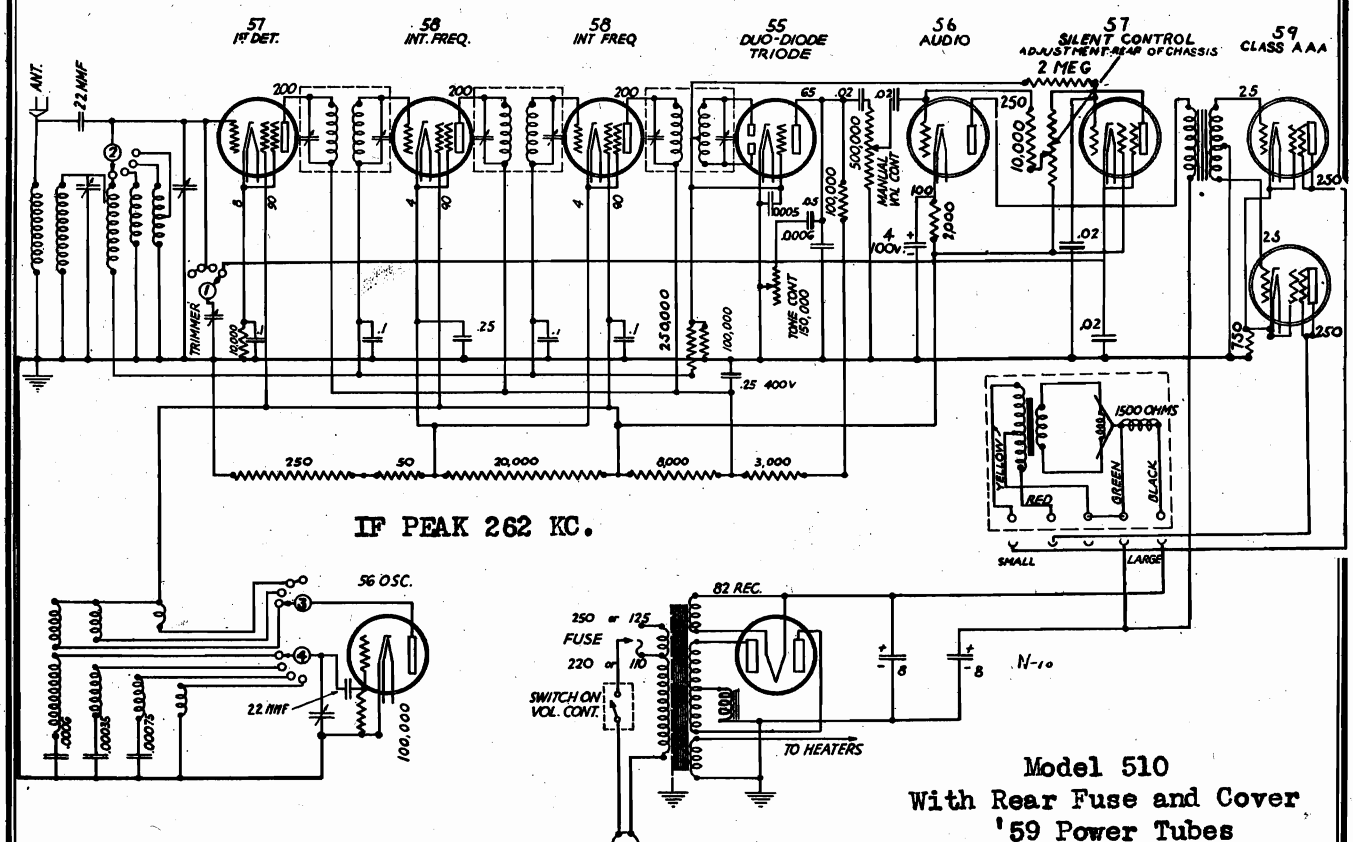
In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter over the light lines or via the antenna. The only way to check the source is to turn off one after another, all electrical apparatus in the vicinity of the set.

MODEL 510 w/'46s
MODEL 510 w/'59s
Schematic

RADIOBAR COMPANY OF AMERICA



Model 510
Without Rear Fuse and Cover
'46 Power Tubes



Model 510
With Rear Fuse and Cover
'59 Power Tubes

MODEL 510
Service notes

RADIOBAR COMPANY OF AMERICA

SERVICE DATA (All Models)

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—0 to 1 or 0 to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262 K.C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 5 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

NOISY OPERATION (Not Static)

A defective 82 tube will cause a sharp 60 cycle R.F. pickup. This is most prominent on low frequency. Replace with a good tube.

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter over the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

There is no freak or trick antenna that will eliminate natural static.

GENERAL

All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

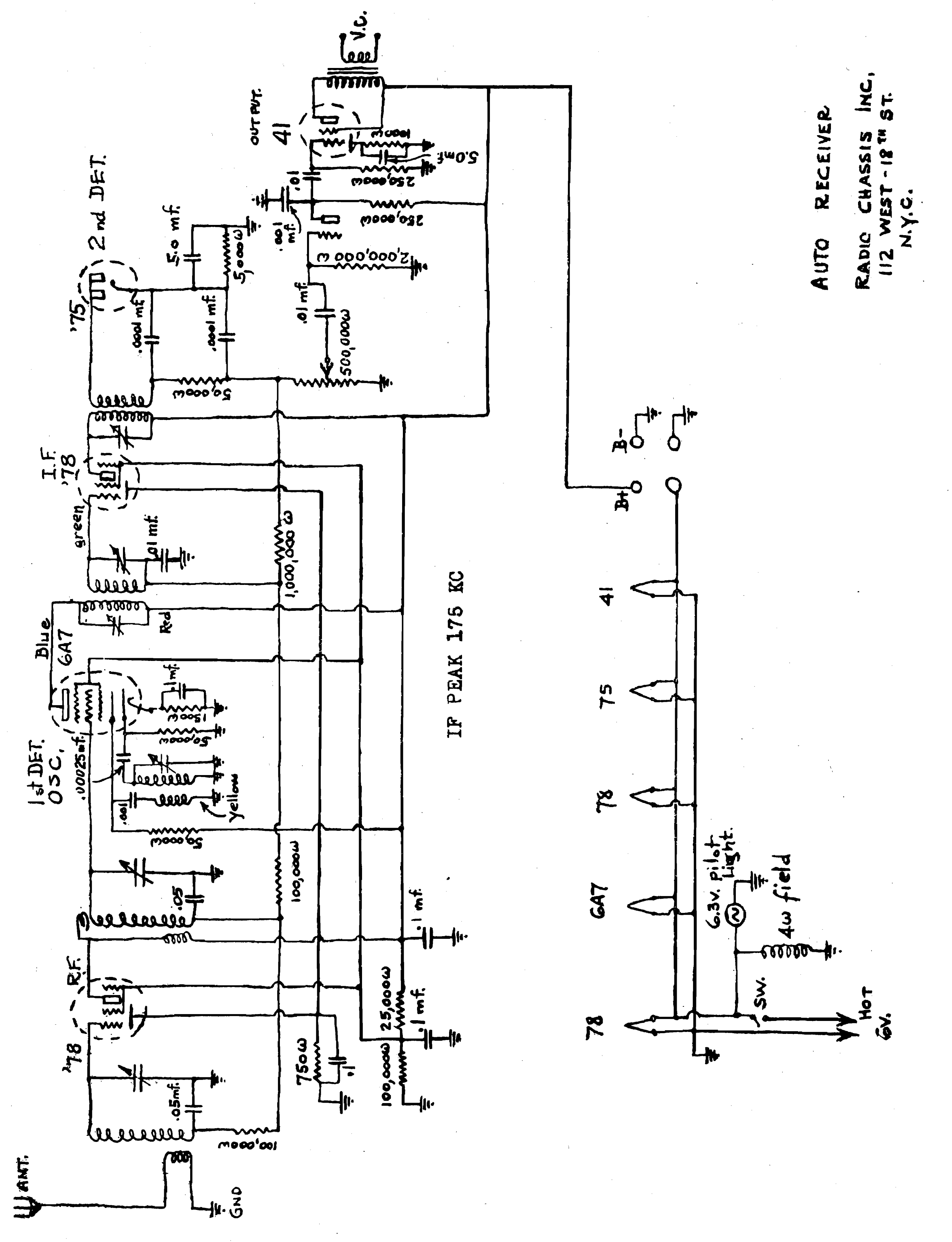
99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.

SILENT AUTOMATIC VOLUME CONTROL ***(10 tube models only)***

Adjust tuning dial to greatest noise level between stations with right hand trimmer switch turned to extreme left. Then close switch by turning trimmer to extreme right; adjust screw driver control just below point that eliminates all noise.

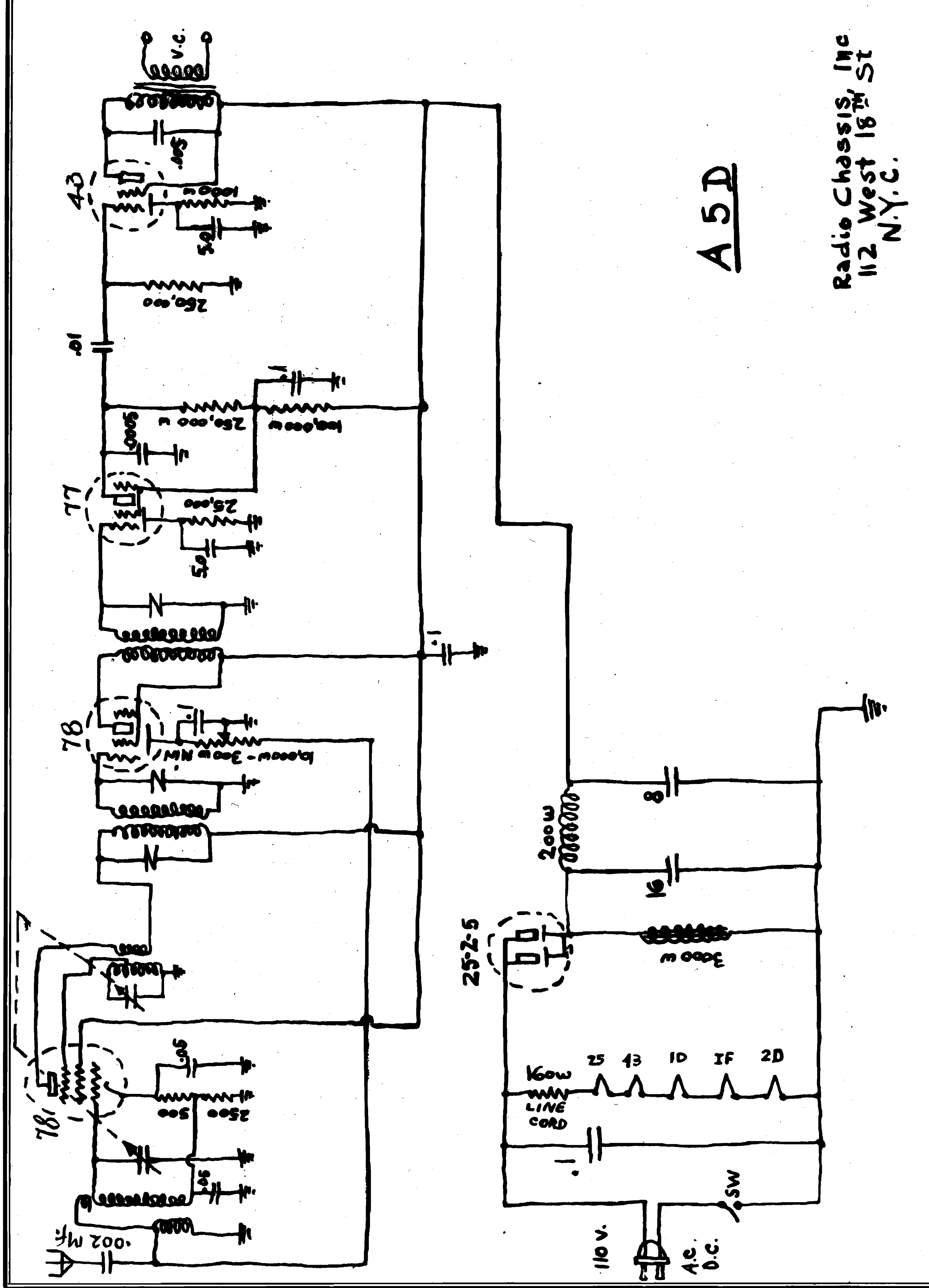
RADIO CHASSIS, INC.

MODEL Auto Receiver
Schematic



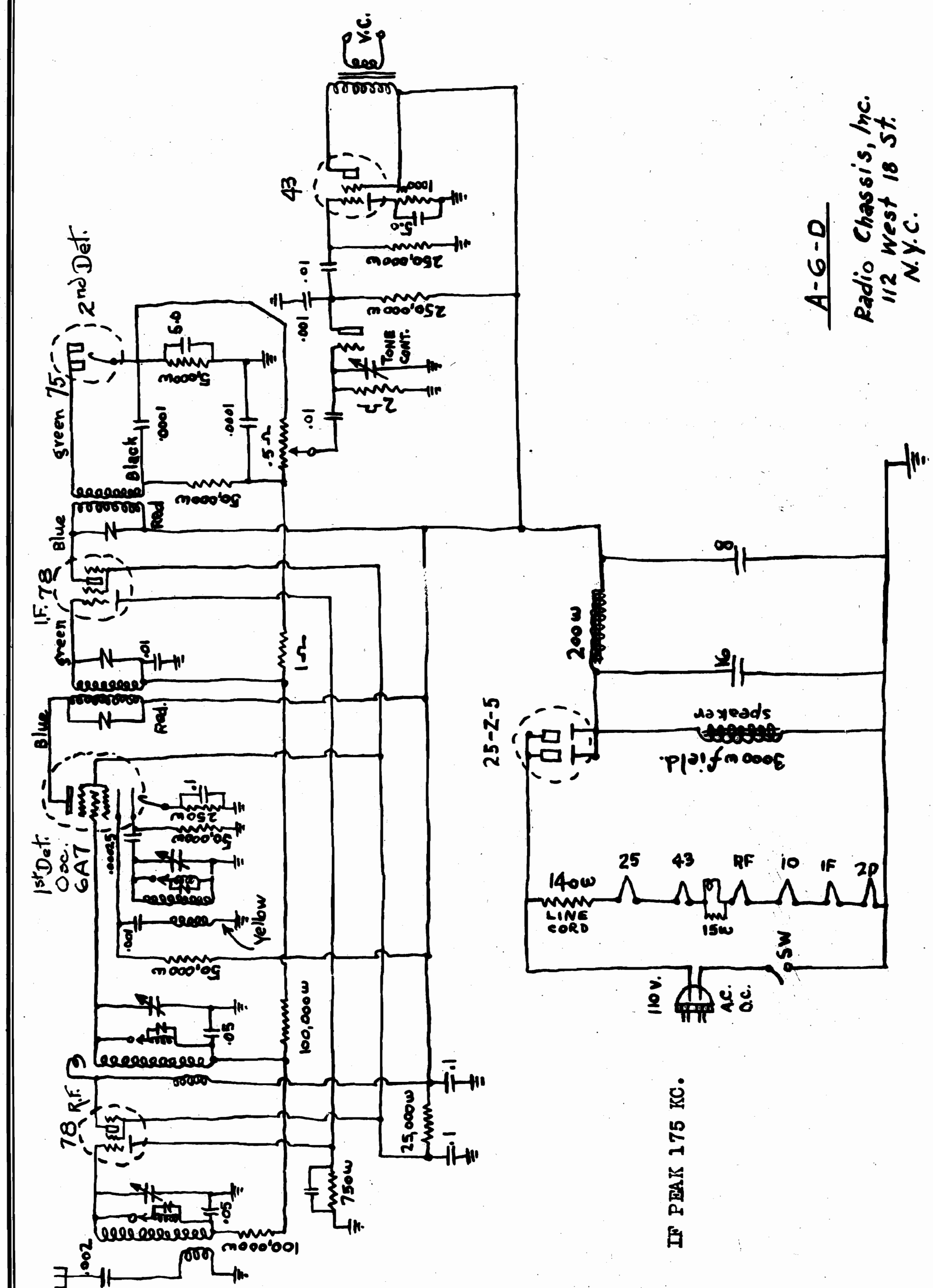
MODEL A-5-D
Schematic

RADIO CHASSIS, INC.



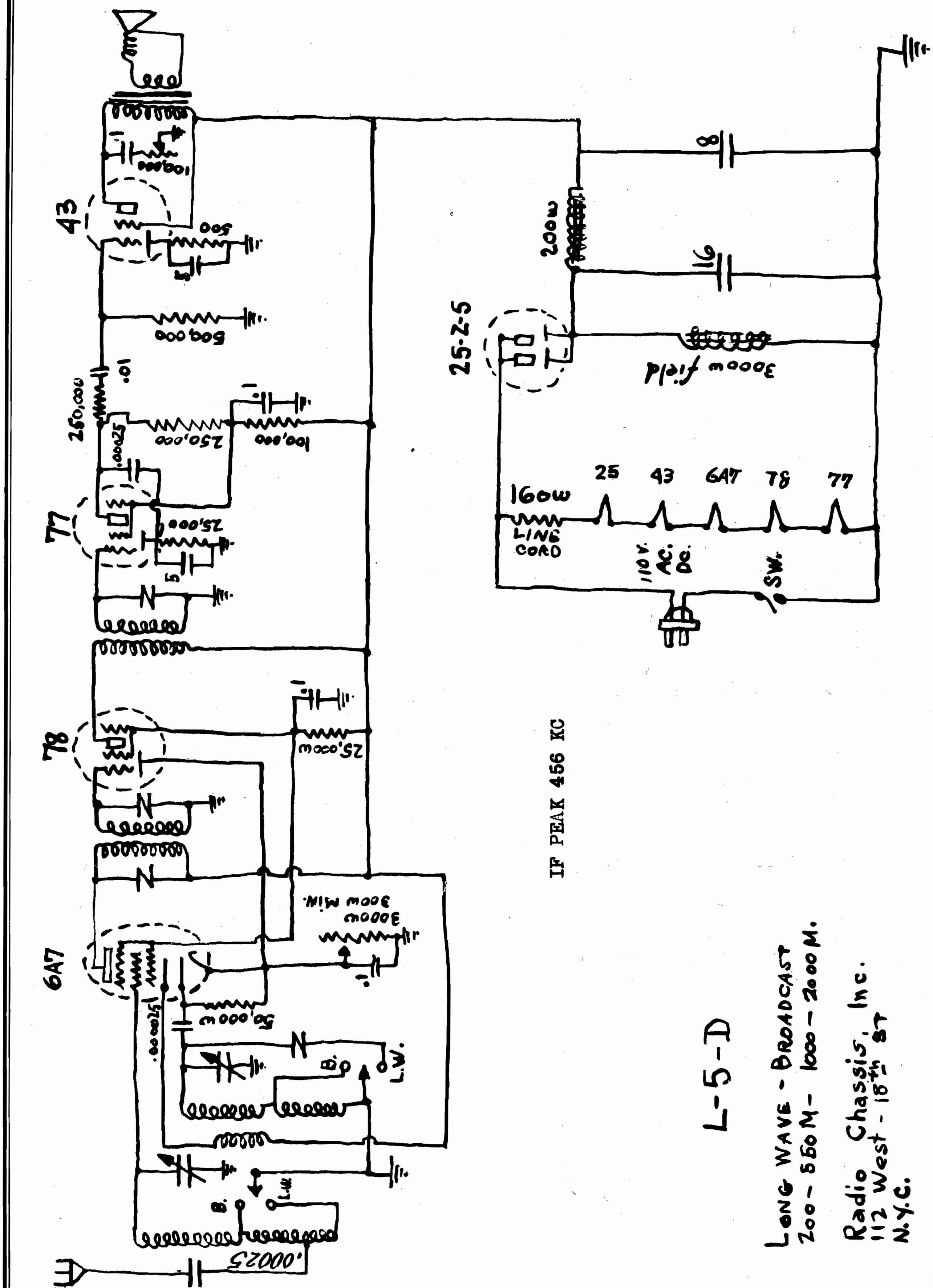
RADIO CHASSIS, INC.

MODEL A-6-D
Schematic



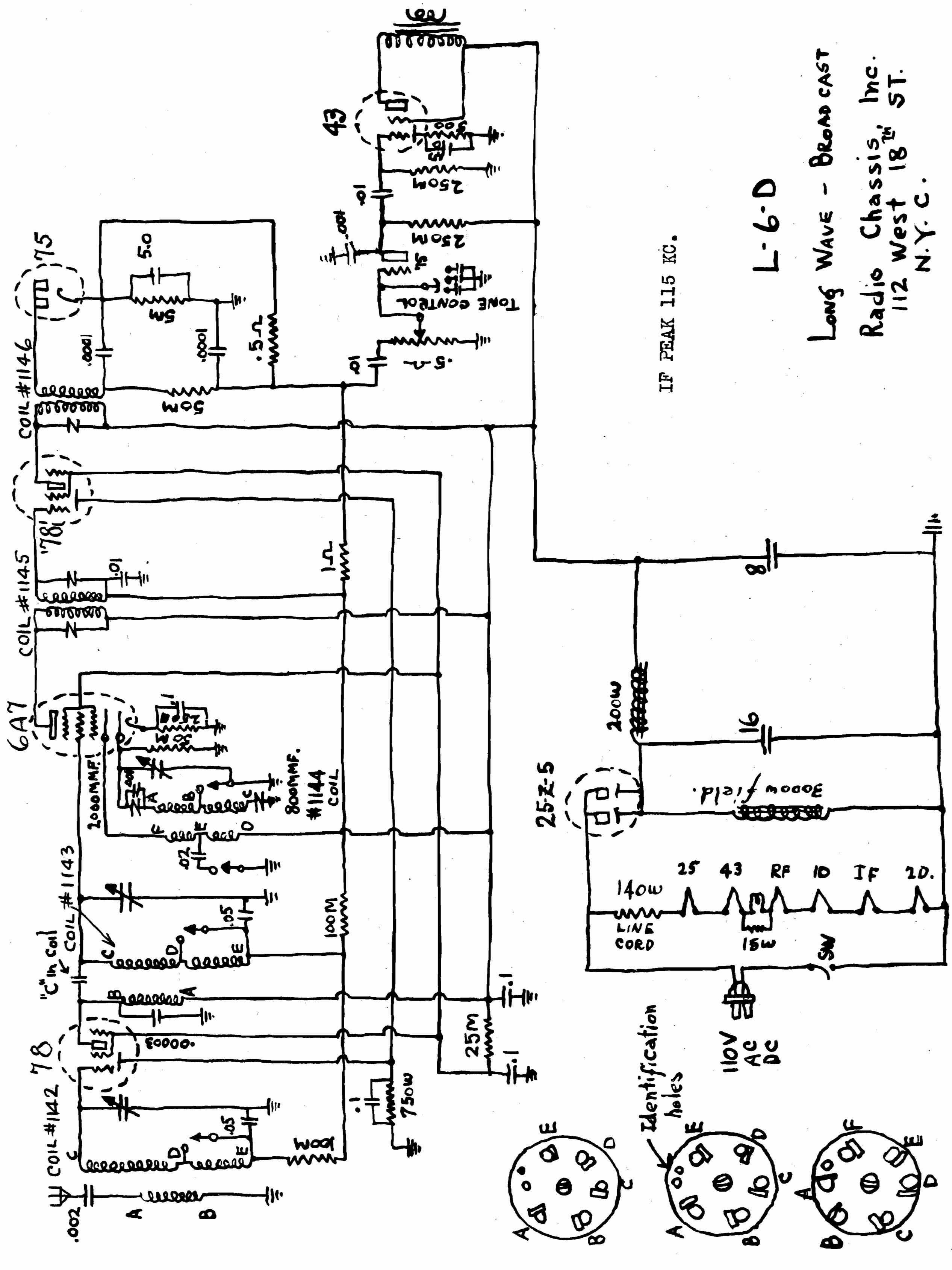
MODEL L-5-D
Schematic

RADIO CHASSIS, INC.



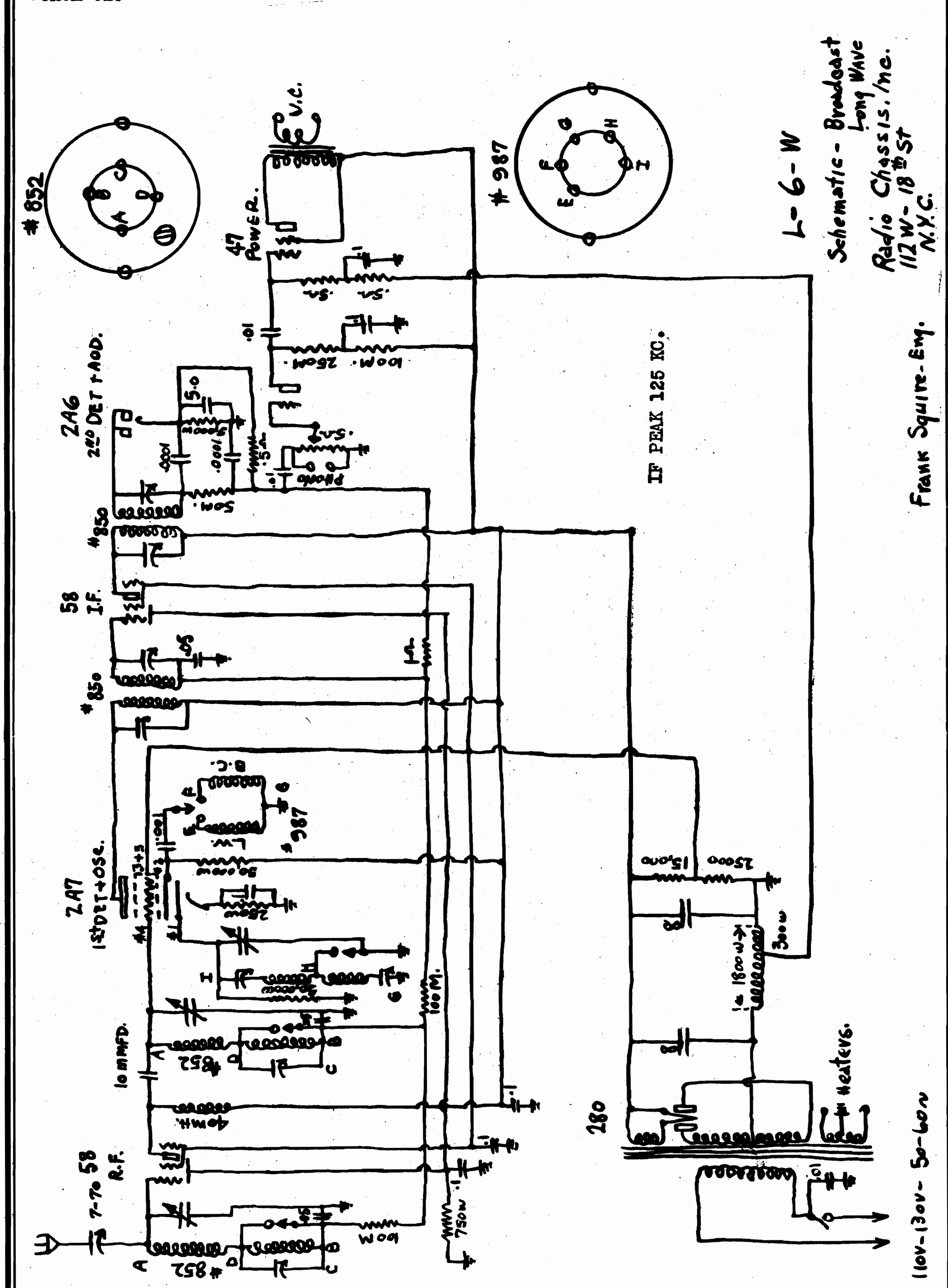
MODEL L-6-D
Schematic

RADIO CHASSIS, INC.



MODEL L-6-W
Schematic

RADIO CHASSIS, INC.



MODEL Premax P-1
Data

RCA-VICTOR CO., INC.

PREMAX

Model P-1

115 Volt AC/DC Universal Receiver

INTRODUCTION

This four-tube radio receiver is an extremely compact and readily portable instrument which is operable from any 100 to 125 volt power mains, either A. C. (alternating current—any frequency from 25 to 133 cycles per second) or D. C. (direct current). Equivalent performance will be obtained with either type of power supply.

An additional feature of this instrument is found in the use of a tuning range extended beyond the limits of the standardized broadcast band. The actual range is from 540 to 1710 kilocycles, permitting the reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment.

INSTALLATION

Important—After unpacking the instrument, uncoil the antenna lead and the power cord. Then take off the rear cover (held by two screws through the flange) and *remove the interior packing material used to protect the Radiotrons during shipment.* Before replacing the cover, make certain that all tubes are firmly in the sockets and that the three grid leads are securely connected (by means of the spring contact clips) to the dome terminals of the proper Radiotrons, as shown by the tube location diagram on the bottom of the receiver.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

External Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window since such structures form an effective shield which greatly impedes the passage of radio waves.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by inserting the plug connector at the end of the power cord in the intended electrical outlet and by then turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow approximately 30 seconds for the Radiotron filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard.

   Important—When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loud-speaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the foregoing procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position mid-way between the points where the signal disappears.

   Note—When tuned to a strong local station with the volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of the control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the volume control below the readily-apparent critical point.

4. When through operating turn off the power by rotating the volume control counter-clockwise until the "snap" of the power switch is heard.

CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES OR METAL PARTS INSIDE CABINET.

RCA-VICTOR CO., INC.

MODEL Premax P-1
Schematic, Voltage
Chassis, Data

SERVICE DATA

Electrical Specifications

Voltage Rating. . 105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption . . . . 40 Watts
Frequency Range . . . . 540 K. C.–1700 K. C.
Type and Number of Radiotrons—
1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

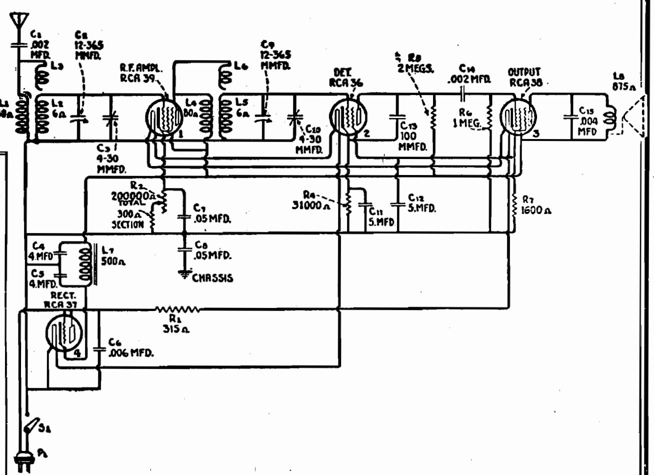


Figure A—Schematic Circuit

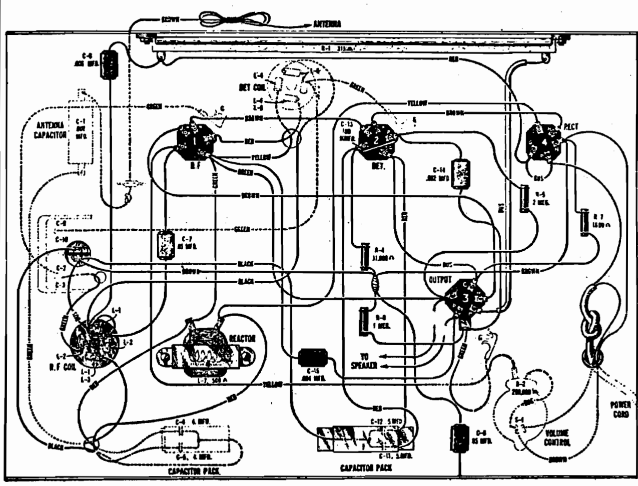


Figure B—Wiring Diagram

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume 115 Volt A. C. Line

All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39R. F.	3.0	105.0	105	7.0	6.0
2. RCA-36 Detector	*0.75	11.0	*60	0.025	6.0
3. RCA-38 Output	11.0	100.0	95	5.0	6.0
4. RCA-37 Rectifier	——	——	115	15.0	6.0

*Impossible to measure on ordinary voltmeter.

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers only)

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES		3714	Coil—Detector coil	$0.98
3076	Resistor—1 megohm—Carbon type—Package of 5	$1.00	3715	Coil—R. F. coil complete	1.08
3456	Capacitor—.05 mfd.	.44	3716	Escutcheon—Volume control escutcheon—Package of 2	.25
3536	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors	1.10	3717	Escutcheon—Station selector escutcheon—Package of 2	.25
3537	Reactor—Filter reactor	1.10	6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	1.00
3538	Capacitor—Filter capacitor—Two 4.0 mfd.	1.18			
3542	Volume control—Complete with mounting nut	1.18	6451	Condenser—Two gang variable tuning condenser	2.04
3557	Capacitor—0.002 mfd.	.30	7484	Socket—Radiotron socket—5 contact	.35
3559	Resistor—31,000 ohms—Carbon type—½ watt—Package of 5	1.00	10405	Capacitor—Antenna series capacitor—.002 mfd.	.40
			10820	Capacitor—100 mmfd.	.40
3560	Resistor—1,600 ohms—Carbon type—½ watt—Package of 5	1.00		LOUDSPEAKER ASSEMBLIES—MAGNETIC TYPE	
3561	Capacitor—0.004 mfd.	.42			
3562	Capacitor—0.006 mfd.	.42	7594	Cone—Speaker cone—Package of 5	5.00
3569	Knob—Station selector or volume control knob—Package of 5	.65	7595	Support—Cone support	.60
			7596	Mechanism—Speaker mechanism complete with magnet	3.00
3635	Resistor—Filament resistor—315 ohms	1.00	9426	Loudspeaker complete	4.38

MODEL SW-3 Converter Data

RCA-VICTOR CO., INC.

RCA Victor
Short Wave Converter SW-3

SERVICE NOTES

SPECIFICATIONS

Type of Circuit ....Super-Heterodyne Converter for use with standard broadcast receiver

Type and Number of Radiotrons—A. C...........................1 RCA-58, 1 RCA-56—Total, 2

Type and Number of Radiotrons—Battery.....................1 RCA-230, 1 RCA-232—Total, 2

Type of Tuning....All tuning is done by means of the I. F. Amplifier which is the broadcast receiver

Broadcasting Ranges................................
- 6000 K. C. to 6150 K. C.—49 Meters
- 9500 K. C. to 9600 K. C.—31 Meters
- 11700 K. C. to 11900 K. C.—25 Meters
- 15100 K. C. to 15350 K. C.—19 Meters

Requirements of Receiver for use with Converter......................High impedance antenna transformer primary insulated from the chassis or other circuits; a source of 2.5 volt current capable of supplying 2 amperes additional and a source of 180-260 volt plate current supplying an additional 5 M. A. The cabinet must also be acoustically correct as the tendency to howl is increased by the addition of the converter.

The RCA Victor Short Wave Converter SW-3 is a two-tube Super-Heterodyne Converter that may be used with standard broadcast band receivers. By means of the Converter, short wave broadcasting stations may be received merely by tuning with the broadcast receiver. A selector switch allows choice of the short wave band that it is desired to receive.

A number of RCA Victor receivers include this Converter. The assembly wiring diagrams, together with any schematic changes for the models are contained in this booklet. The regular Service Notes should be consulted for service information pertinent to the broadcast receivers.

SERVICE DATA

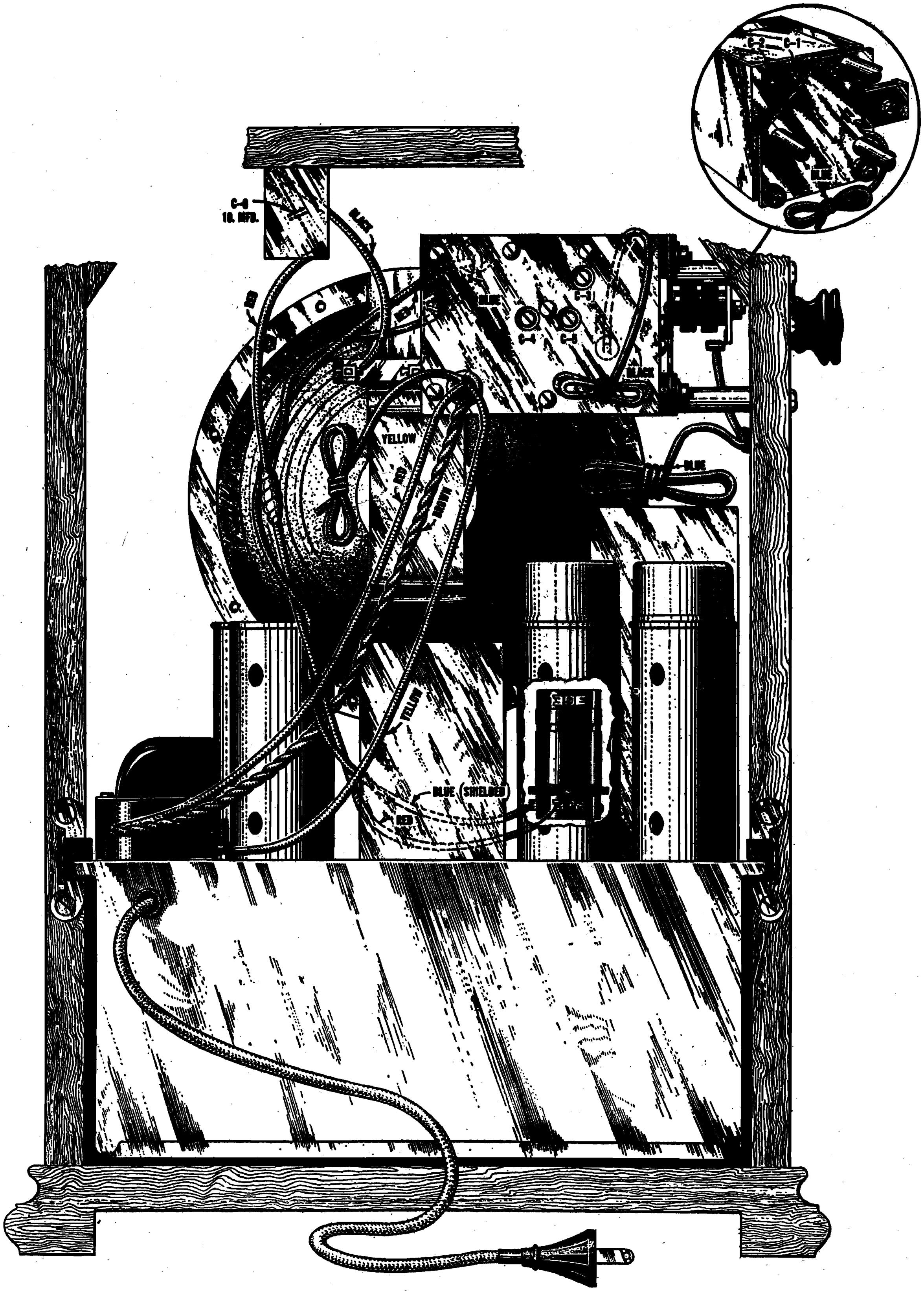
A three-section, five position switch, located on the side or front of the cabinet provides for readily changing the detector fixed tuning inductance and the oscillator fixed tuning capacitance (both in the short wave converter) for operation in any desired short wave broadcasting band. Such changes are effected by shifting the tap switch contact arm through its first four positions, the fifth, or remaining position being employed for standard (long wave) broadcast reception. In the latter case, the short wave circuits are isolated and grounded and the incoming signals are transferred to the input of the standard broadcast receiver.

The following tabulation shows the frequency range of the instrument for each position of the switch and, in addition, the width of the important short wave bands included in those ranges:

Switch Position	*Range (K. C.)*	*Broadcast Band Included (Meters)*	*Band Width (K. C.)*
1	15600–14650	19	15340–15100
2	12350–11400	25	11900–11700
3	9950– 9000	31	9600–9500
4	6700– 5750	49	6150–6000
5	1500– 550	Standard	1500–550

MODEL SW-3 w/R-24
Assembly wiring

RCA-VICTOR CO., INC.



(Some Models have Converter Unit on the opposite side from that shown)

Figure 1—Assembly Wiring of Model R-24

RCA-VICTOR CO., INC.

MODEL SW-3 AC
Schematic
MODEL SW-3 Battery
Schematic

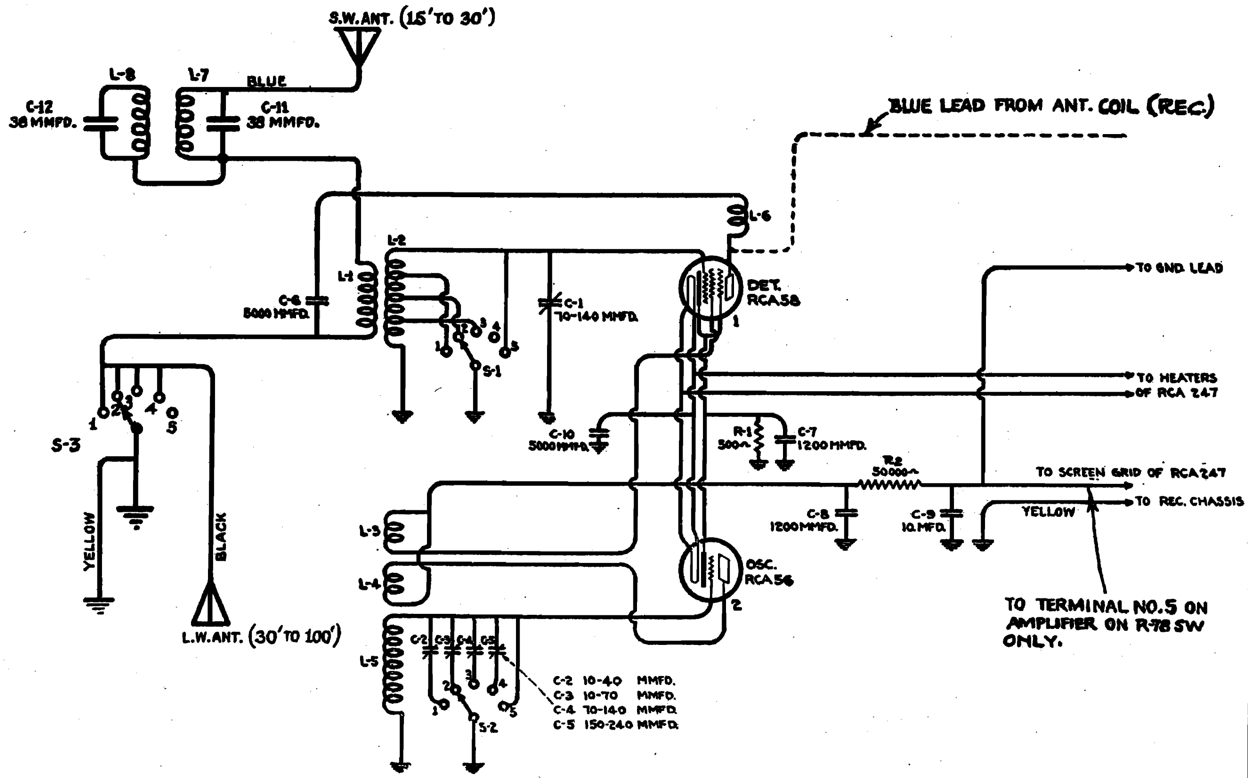


Figure 2—Schematic Diagram of A. C. SW-3

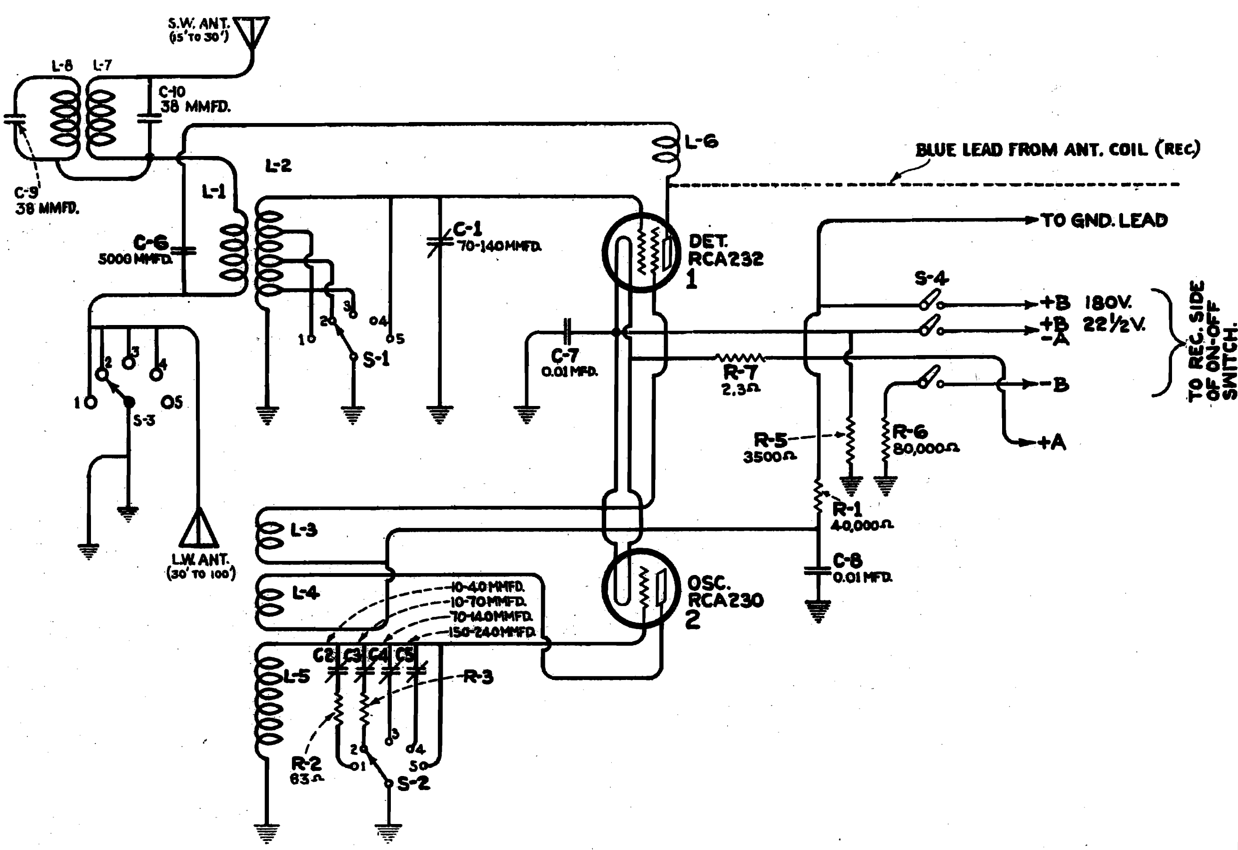


Figure 3—Schematic Diagram of Battery SW-3

RCA-VICTOR CO., INC.

By examination of the above table, it will be seen that considerable latitude is provided on either side of the actual extremities of each standardized short wave band. This provision further increases the usefulness of the receiver since several stations are now operating on frequencies slightly outside of the actual band range limits.

Since all tuning adjustments are effected from the single dial, it will be appreciated that considerable interference with short wave reception may be caused by nearby, powerful, long wave (200 to 546 meter) broadcasting stations. Since when correctly adjusted, all short wave broadcasting bands fall within 950–1300 K. C., the possibility of interference is limited to that caused by local stations operating within these frequencies. Such interference may be eliminated in each range by a slight shift of the oscillator frequency. This result is accomplished by adjustment of one of the four, spring-plate, tuning capacitors on the short wave converter chassis, one of which is effective for each position of the tap switch. Any adjustment of these capacitors, of course, will change the dial positions of all stations in that particular range an equal number of dial divisions (10 K. C. per dial division) to an extent corresponding to the frequency shift from the original position at which interference was encountered. If local stations are present within 950–1300 K. C. range, adjust the oscillator tuning capacitors so that no short wave signals are received at the same dial setting.

(1) OSCILLATOR ADJUSTMENTS

The oscillator frequencies should be the following values for the taps indicated:

Band	*Oscillator Frequency*	*Trimming Capacitor*
19 Meter	14100 K. C.	C-2
25 Meter	12900 K. C.	C-3
31 Meter	8450 K. C.	C-4
49 Meter	7250 K. C.	C-5

If a frequency meter or a calibrated receiver is available, either will be suitable for checking or adjusting these capacitors. If such equipment is not available then the following method may be used:

The frequency of the oscillator may be checked by adding or subtracting the dial reading in kilocycles from the operating frequency of the station being received. The instruction book lists a number of stations with their correct operating frequency. The dial reading should be added or subtracted as follows:

19 Meter Tap..........Subtract dial reading.
25 Meter Tap..........Add dial reading.
31 Meter Tap..........Subtract dial reading.
49 Meter Tap..........Add dial reading.

It will be noted that when the oscillator trimmer capacitors are properly adjusted, all stations operating in the assigned bands will fall between 950 and 1300 K. C. on the receiver dial. The purpose of the oscillator capacitors is to adjust this range and is *not* a sensitivity adjustment.

In the event that they are so badly out of adjustment that one or more of the bands falls entirely out of the receiver tuning range and no short wave broadcasting stations are heard, the following procedure may be used for realigning them:

1. By means of a set using the SW-3 Converter and working properly, determine that a station can be heard on the band to be adjusted.

2. Tune in a signal, on the receiver working properly, in the band it is desired to adjust the defective receiver. Then set the band switch and dial at the same position on the defective receiver as that of the receiver tuned to the signal.

3. For the 49 and 25 meter bands, turn C-3 or C-5 as the case may be, Figure 1, to the extreme minimum capacity position, counter-clockwise. Then turn slowly clockwise until the station being received on the first receiver is heard. For the 19 and 31 meter positions, the capacitors C-2 and C-4, as the case may be, should be first tuned to their maximum capacity position clockwise and then turned counter-clockwise until the signal is heard. This order should be carefully followed. The first point, after starting from the maximum or minimum position at which the signal is heard, is the correct adjustment. On some settings, two positions may be found but any one other than the first will result in improper tuning.

(2) DETECTOR ADJUSTMENT

The detector trimmer capacitor, if not properly adjusted, will cause insensitivity or excessive background noise on all bands.

This adjustment can only be made at the time of day when 49 meter stations can be received unless equipment for generating an artificial high-frequency (6075 K. C.) test signal of accurate frequency is available.

The adjustment should be made as follows:

1. Remove screws holding converter in cabinet and place converter at the rear of the chassis on a wooden box or other rest made of non-conductive material, leaving all connections intact so that proper operation is maintained. In models not having a hole in mounting plate to enable adjustment of C-1, the mounting plate must also be removed and so placed that it is not in the field of the coils of the converter.

2. Then tune in a station operating near the center of the 49 meter band (6075 K. C.) and adjust detector trimmer (C-1) for maximum volume. Rock the main tuning capacitor back and forth while making this adjustment.

   If no station operating close to 6075 K. C. can be heard, adjust for maximum volume on two stations successively, one on either side of 6075 K. C., noting position of trimmer and then placing the trimmer at the mean of the two positions.

3. Use of Station Finding Chart.

By thorough understanding and use of the Station Finder, the customer can obtain much greater satisfaction by enabling the rapid identification and dial setting of short wave stations.

In effect the Station Finder provides a calibration of the receiver tuning dial, converting the long wave markings 540 to 1500 K. C. to higher frequency calibrations, depending on the position of the range switch.

This is made possible by the fact that no matter what frequency is being received one dial division always represents 10 K. C.

The following example explains the operation:

With Range Switch in 49 meter position, assume that W8XK is tuned in at 1080 dial position. By reference to the Station Finder, it will be seen that in the section bracketed 49 M., W8XK is marked opposite 6140 K. C. the operating frequency of W8XK. This then means that 1080 corresponds to 6140 K. C. Rotate the inner circle so that 1080 is exactly opposite 6140, the point at which

RCA-VICTOR CO., INC.

W8XK is marked. Then by reference to chart it will be seen that with the receiver tuned to 1180 it will be tuned to 6040 K. C. or the operating frequency of W4XB. Now, by outlining the index hole we can record, permanently, the point to set the Station Finder in order to find the dial setting for any 49 meter station. By looking on the Short Wave Broadcast Station List and Program Schedule we find that W3XAL operates on 6100 K. C.; then for the example given above we can immediately find that W3XAL will be received at 1120 K. C. and when received, the call letters may be marked in the margin opposite 6100 K. C.

Thus it is only necessary to log one station in a band to obtain the dial position for all stations in that band. The same procedure should be repeated for all bands.

In case it is found that any stations operating within the bands fall outside of the region from 950–1300 K. C., the oscillator trimmer condenser for that band should be readjusted so as to bring all stations within the region of 950–1300 K. C. in order to obtain maximum efficiency.

It is recommended that each receiver be checked and the Station Finder be logged for the particular set, marking the serial number on the Station Finder before sending to customer's house. Then when installed the operation of the Station Finder should be demonstrated, stressing the ease of tuning and separation of stations obtained.

(3) GENERAL NOTES

The following general notes will help in the performance of service work in conjunction with receivers using the SW-3.

1. Keep the antenna lead of the converter as far as possible from the broadcast receiver chassis

2. If modulation hum is encountered, connect a 5000 mmfd. capacitor from either heater lead to ground. Later production instruments include this capacitor.

3. The shielding on the grid of the R. F. tube should be kept as loose as possible. If it is drawn tight it will affect the adjustment of the R. F. Trimmer Capacitor on the broadcast receiver

4. Keep all other shielding tight, especially the shield over the lead from the converter to the shielded antenna coil, pushing it tight against the coil shield and thus covering the wire entirely.

5. If it is desired to use only one antenna, connect the antenna permanently to the blue lead from the Converter. If sufficient signal strength is not obtained on long wave reception, provide a single pole, single throw switch for connecting the black lead to the blue when long wave reception is desired. A clip on the black lead can be used if a switch is not available.

6. In buildings of metal framework or even with a metal roof, an indoor antenna or an outdoor antenna that does not extend beyond the shielding effect of the building will not be satisfactory. For such installations, an outdoor antenna must be used and the lead-in placed away from any metal parts of the building.

RCA-VICTOR CO., INC.

MODEL SW-3 AC
Chassis wiring
MODEL SW-3 Battery
Chassis wiring

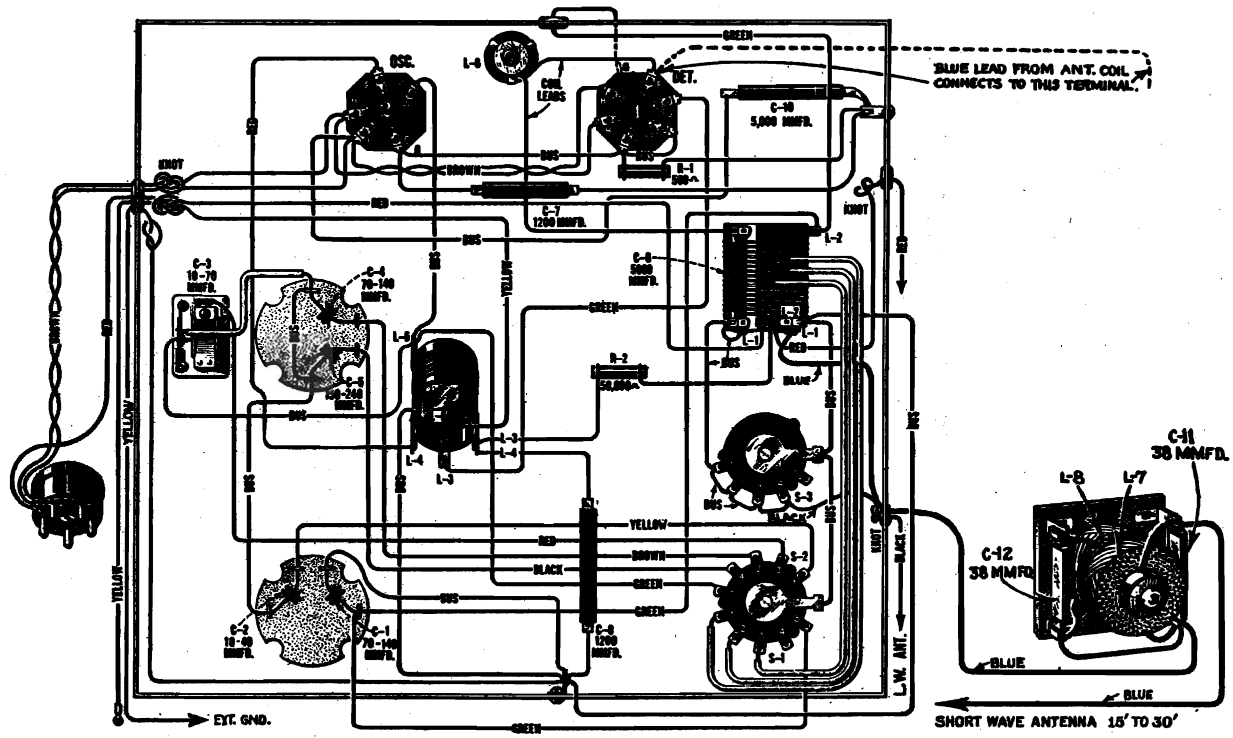


Figure 4—Wiring Diagram of A. C. SW-3

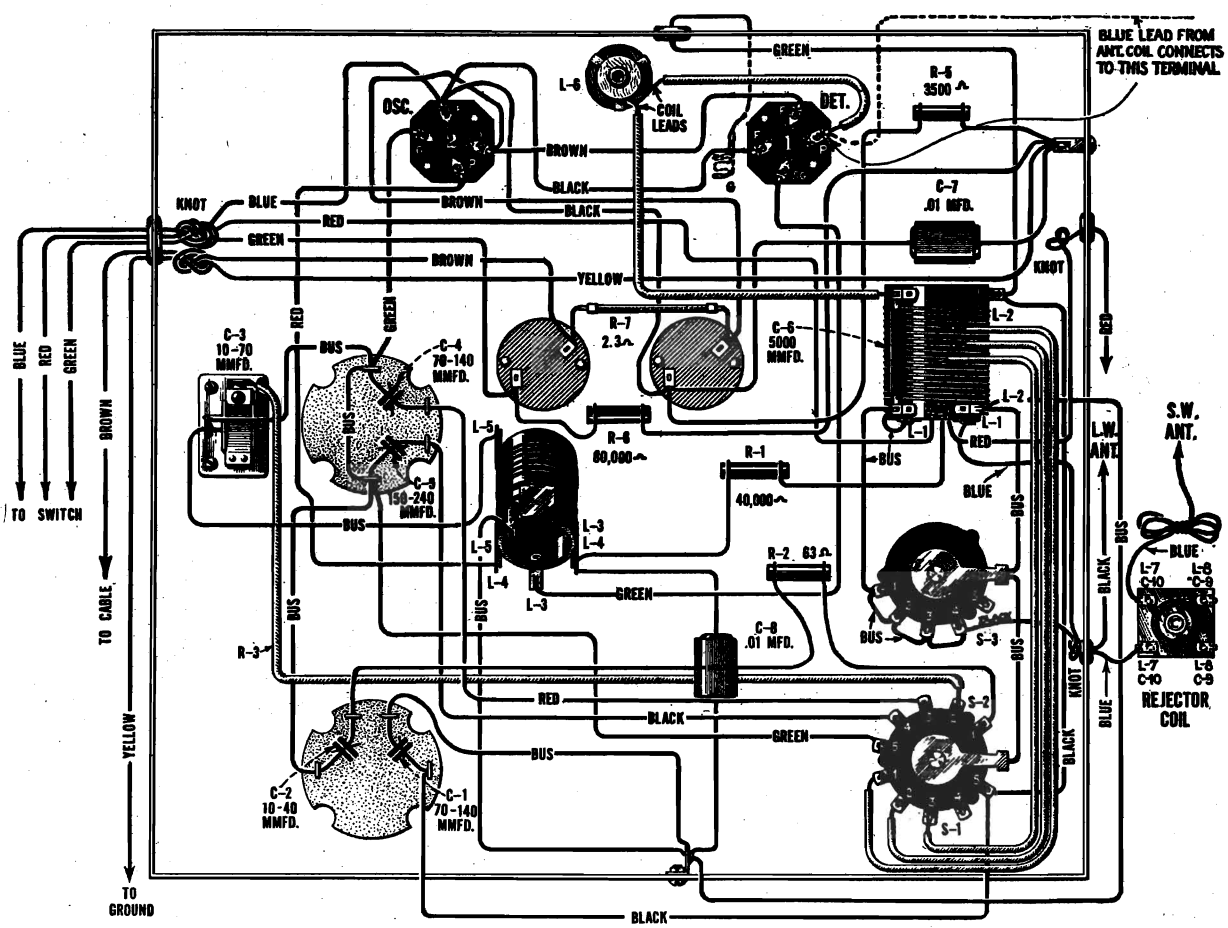


Figure 5—Wiring Diagram of Battery SW-3

MODEL SW-3 w/R-24-A
Assembly wiring

RCA-VICTOR CO., INC.

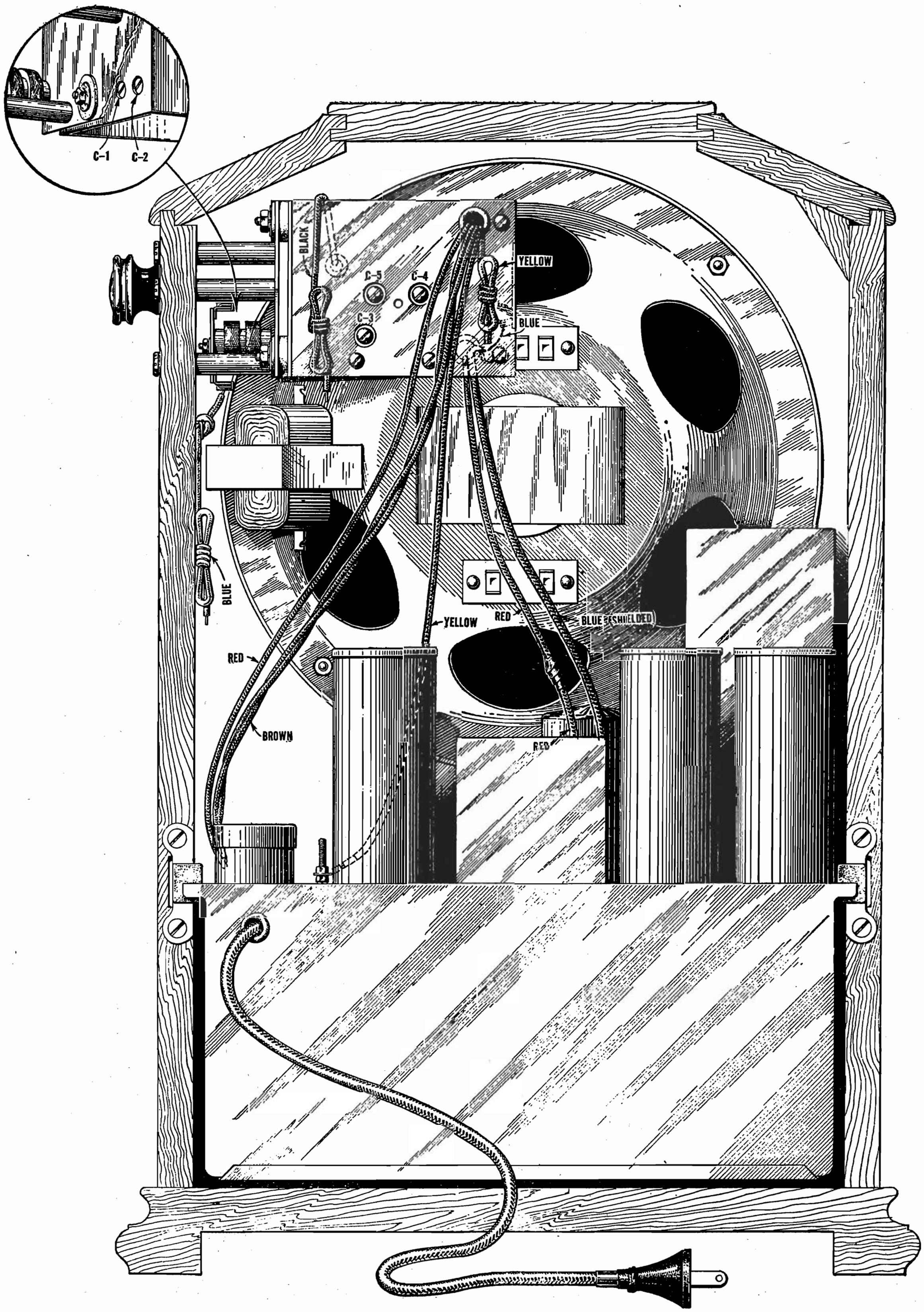


Figure 6—R-24-A Assembly Wiring

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MODEL SW-3 w/ R-24-B
Assembly wiring

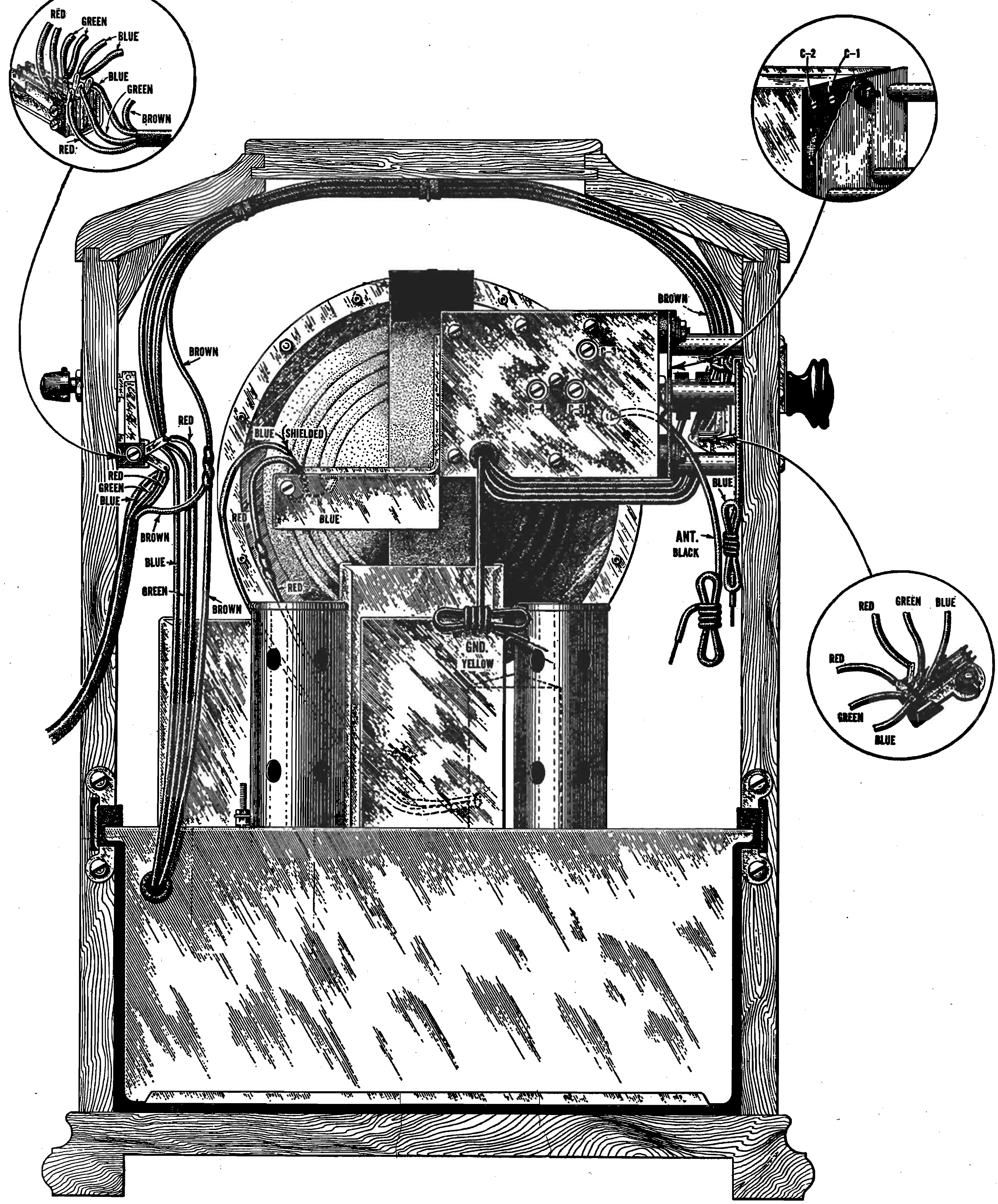

Figure 7—R-24-B Assembly Wiring

MODEL SW-3 w/R-78 SW
Assembly wiring

RCA-VICTOR CO., INC.

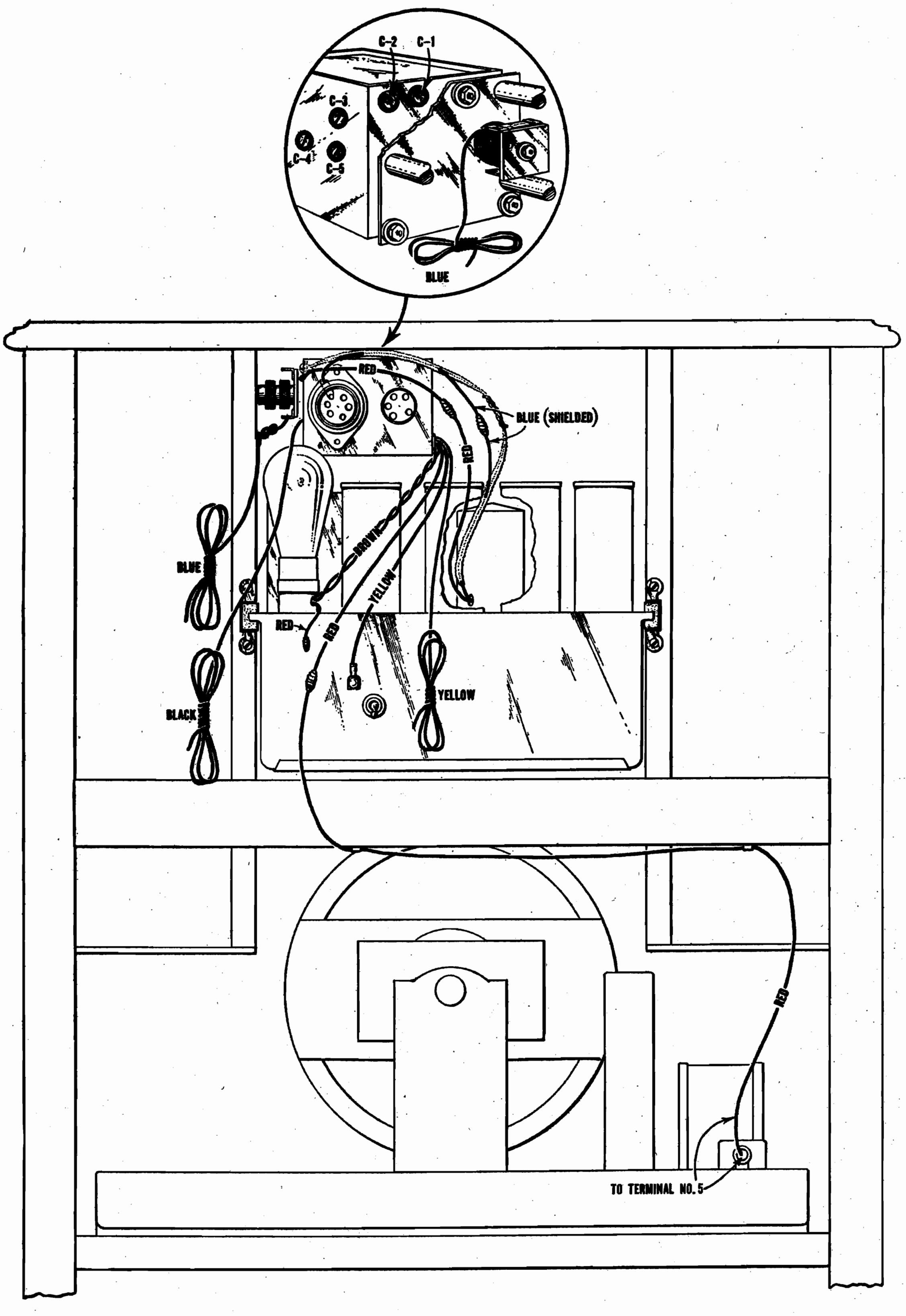

Figure 8—R-78-S. W. Assembly Wiring

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MODEL SW-3 w/ RE-81
Assembly wiring
MODEL SW-3 w/ RAE-84
Assembly wiring

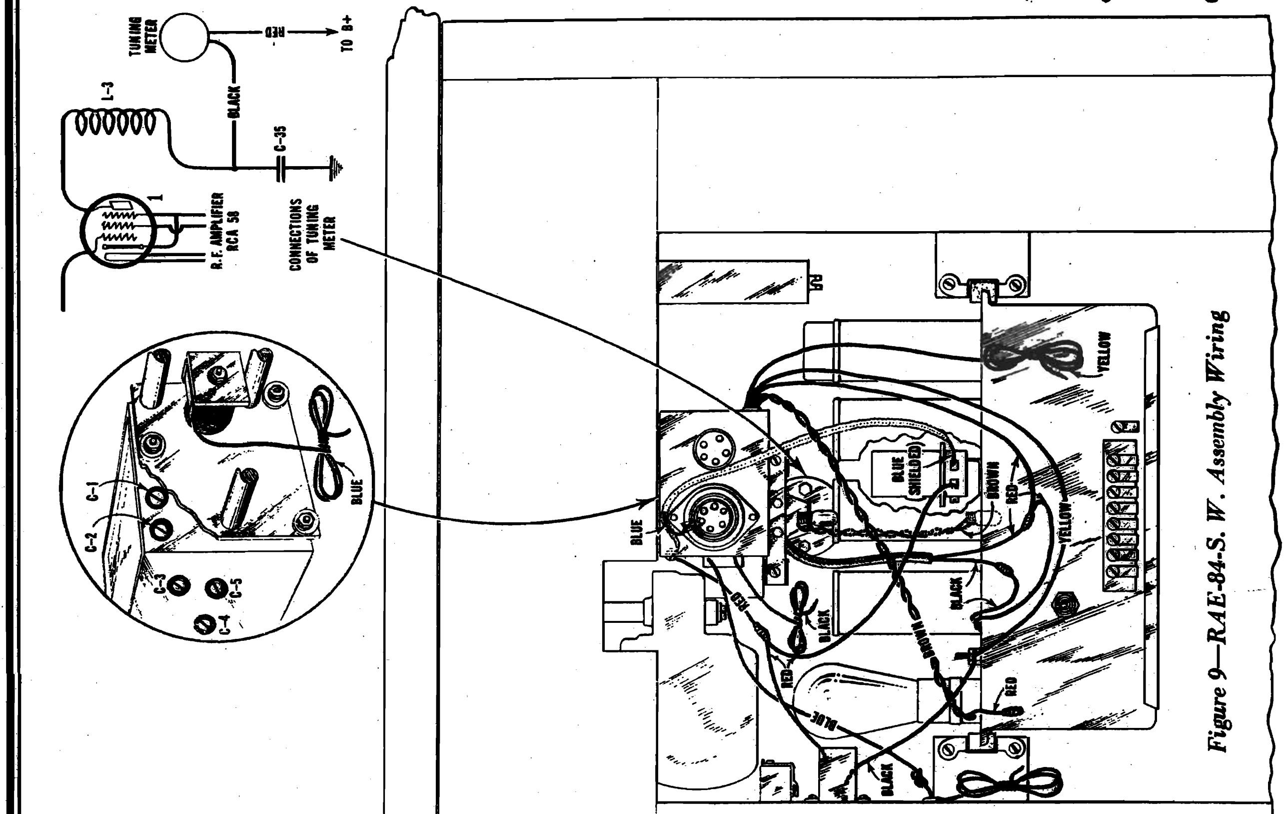


Figure 9—RAE-84-S. W. Assembly Wiring

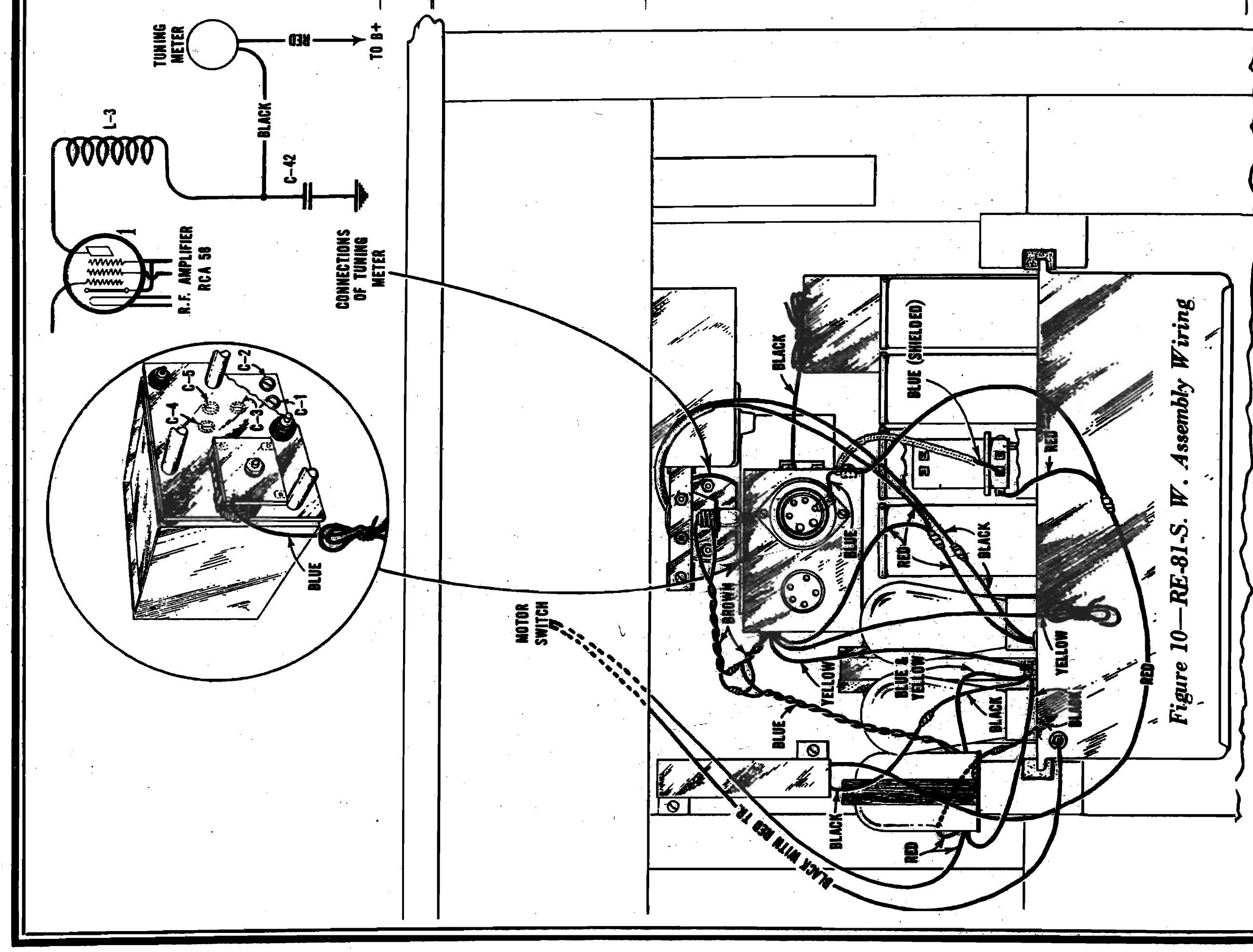


Figure 10—RE-81-S. W. Assembly Wiring

MODEL SW-3 Converter
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

Stock No.	DESCRIPTION	List Price
	SW-3 A. C.	
2012	Capacitor—1200 mmfd.	$0.55
2747	Contact cap—Package of 5	.50
2969	Resistor—50,000 ohms—Carbon type—1 watt—Package of 5	2.50
2932	Capacitor—5000 mmfd.	1.00
3383	Resistor—500 ohms—Carbon type—½ watt—Package of 5	2.50
3420	Switch—Range selector switch	2.00
3421	Coil—Oscillator coil	1.10
3422	Capacitor — Adjustable capacitor — 10 mmfd. to 40 mmfd. and 70 mmfd. to 140 mmfd.	1.10
3423	Capacitor — Adjustable capacitor — 70 mmfd. to 140 mmfd. and 150 mmfd. to 240 mmfd.	1.10
3424	Coil—Detector coil	1.60
3425	Capacitor — Adjustable capacitor — 10 mmfd. to 70 mmfd.	.75
3426	Escutcheon — Range selector switch escutcheon	.50
3427	Capacitor—10 mfd. capacitor	2.15
3428	Plate—Converter mounting plate assembly	.85
3429	Screw—Converter mounting screw—Package of 3	.50
3500	Coil—Rejector coil—Located on mounting plate	1.46
3501	Capacitor — 38 mmfd. — Located on resistor board	.44
3504	Shield—Detector shield	.34
6100	Coil—Choke coil	.75
6109	Knob—Range selector switch knob—Package of 5	1.75
6350	Adaptor—Five prong adaptor plug complete with leads	1.25
7484	Socket—UY type Radiotron socket	.65
7485	Socket—Radiotron 6 contact socket	.70
	SW-3 (Battery)	
2747	Contact cap—Package of 5	.50
2932	Capacitor—5000 mmfd.	1.00
3045	Resistor—40,000 ohms—1 watt—Carbon type—Package of 5	2.50
3297	Resistor—80,000 ohms—½ watt—Carbon type—Package of 5	2.50
3420	Switch—Range selector switch	2.00
3422	Capacitor — Adjustable capacitor — 10 mmfd. to 40 mmfd. and 70 mmfd. to 140 mmfd.	1.10
3423	Capacitor — Adjustable capacitor — 70 mmfd. to 140 mmfd. and 150 mmfd. to 240 mmfd.	1.10
3425	Capacitor — Adjustable capacitor — 10 mmfd. to 70 mmfd.	.75
3426	Escutcheon — Range selector switch escutcheon	.50
3428	Plate—Converter mounting plate assembly	.85
3429	Screw—Converter mounting screw—Package of 3	.50
3500	Coil—Rejector coil	1.46
3501	Capacitor — 38 mmfd. — Located on rejector coil	$0.44
3504	Shield—Detector shield	.34
3576	Resistor—2.3 ohms—Flexible type—Package of 5	1.20
3577	Resistor—3,500 ohms—½ watt—Carbon type—Package of 5	1.00
3578	Capacitor—0.01 mfd.	.38
3579	Resistor—63 ohms—½ watt—Carbon type—Package of 5	1.00
6100	Coil—Choke coil	.75
6109	Knob—Range switch selector knob—Package of 5	1.75
6300	Socket—4 contact Radiotron socket	.55
6379	Coil—Detector coil	1.52
6380	Coil—Oscillator coil	1.08
7488	Shield—Detector tube shield top	.50
	SPECIAL PARTS FOR R-24-A, R-24-B, RE-81 and RAE-84 RECEIVER ASSEMBLIES	
3502	Base and mounting bracket for R. F. coil	.32
3503	Shield—R. F. coil shield	.36
6411	Coil—R. F. coil complete with mounting bracket	1.54
	SPECIAL PARTS FOR R-24-A RECEIVER ASSEMBLIES	
3522	Resistor—17,000 ohms—Carbon type—½ watt—Package of 5	1.00
	REPRODUCER ASSEMBLIES	
6390	Transformer—Output transformer	2.12
8976	Coil assembly—Comprising field coil magnet and cone support	4.30
	SPECIAL PARTS FOR R-24-B RECEIVER ASSEMBLIES	
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3079	Resistor—40,000 ohms—Carbon type—½ watt—Package of 5	2.50
6312	Capacitor—650 mmfd.—Package of 5	2.50
	SPECIAL PARTS FOR RE-81	
7587	Transformer—Filament transformer	4.25
	SPECIAL PARTS FOR RAE-84	
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3505	Capacitor—0.1 mfd.	.36
3506	Knob—Range switch selector knob	.50
3523	Capacitor pack—Comprising two 0.05 mfd. capacitors in metal container	.72
	SPECIAL PARTS FOR RE-81 and RAE-84	
6412	Capacitor—10 mfd.	1.62
6413	Meter—Tuning meter	2.38

RCA-VICTOR CO., INC.

RCA Model R-7-LW

ELECTRICAL SPECIFICATIONS

Voltage Rating	100-230 Volts
Frequency Rating	40-60 Cycles
Power Consumption	100 Watts
Antenna Length	25-75 Feet
Circuit	A.C. Screen Grid Super-Heterodyne
Radiotrons	2 RCA-235, 1 UY-224, 2 UY-227, 2 UX-245, 1 UX-280 Total of 8
Radio Frequency Stages	One
First Detector	Tuned Input Grid Bias
Intermediate Stages	One
Second Detector	Power Grid Bias
Audio Stages	One (Push-Pull)
Rectifier	Full Wave UX-280
Loudspeaker	Dynamic
Undistorted Output	3.0 Watts
Frequency Range	550-1500 K.C. and 150-300 K.C.

PHYSICAL SPECIFICATIONS

Height	19 inches
Depth	10 inches
Width	14 inches
Weight alone	37 pounds
Weight (Packed for Shipment)	44 pounds
Packing Case Dimensions	16¾″ x 12⅞″ x 23¼″

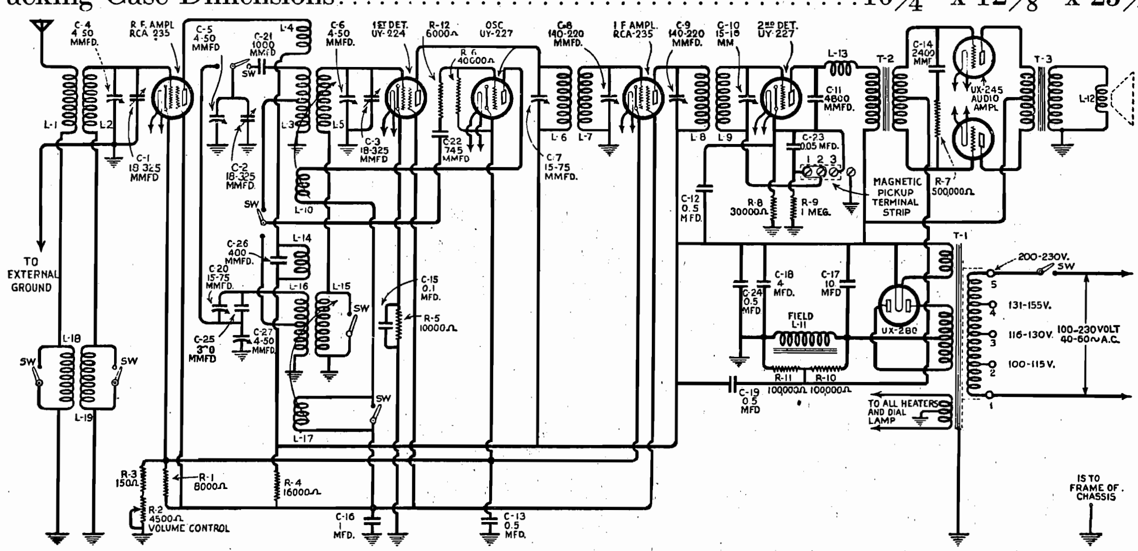


Figure 1—Schematic circuit diagram of R-7-LW

MODEL R-7-LW
Chassis wiring

RCA-VICTOR CO., INC.

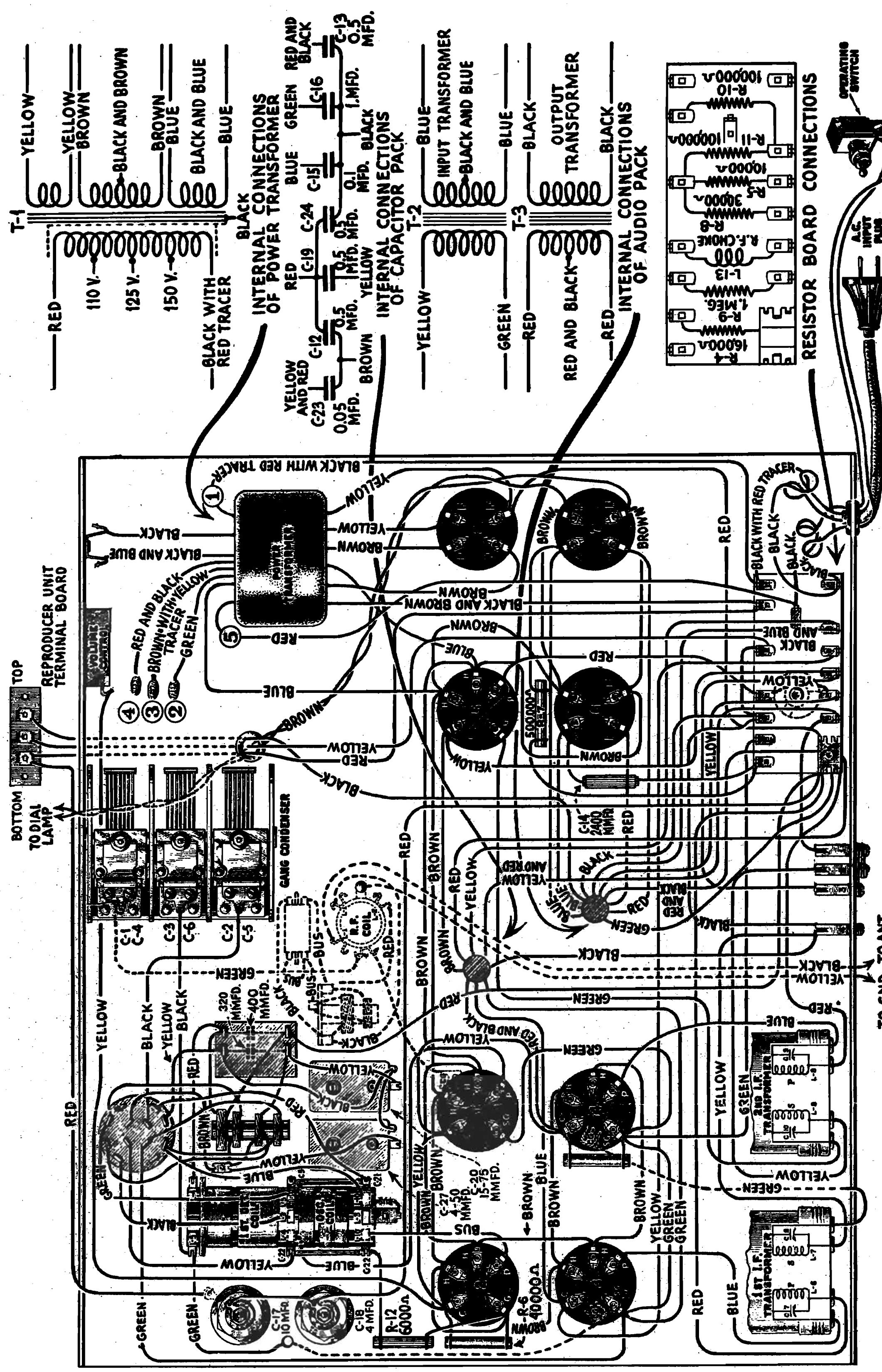


Figure 4—Wiring diagram of R-7-LW

RCA-VICTOR CO., INC.

INTRODUCTION

The RCA Model R-7-LW is an eight tube screen grid Super-Heterodyne Receiver incorporating all the features inherent in this circuit and with the additional feature of covering two frequency bands. By means of a Selector Switch the tuning range may be changed from the broadcast range—550 to 1500 K.C.—to the intermediate range of 150 to 300 K.C. The entire mechanism is of compact construction and mounted on a table model cabinet of pleasing design.

SERVICE DATA

A reference to the RCA Superette Model R-7 Service Notes will give the details of the usual service work necessary with this type of receiver.

Figure 1 shows the schematic circuit diagram. Figure 2 shows the location of the various line-up capacitors. Figure 3 gives the correct connections for attaching a magnetic pickup to the R-7-L.W. and Figure 4 shows the wiring diagram. The voltage readings obtained at the Radiotron sockets with one of the usual set analyzers are given on page 3.

I. F. TRANSFORMER ALIGNMENT

A single intermediate frequency amplifier stage is used in this receiver. Two transformers are used and all circuits are tuned to 110 K.C. The circuits are peaked and when alignment adjustments are made, the condensers are adjusted for maximum output.

A detailed procedure for making these adjustments follows:

(a) Procure a modulated R. F. oscil lator giving a signal at 110 K.C. A non-metallic screw driver is also necessary. A suitable screw driver is listed in the Replacement Part List (Stock No. 7065).

(b) Connect an output meter in the circuit. This may be a current square thermo-galvanometer connected to the secondary of the output transformer instead of the reproducer unit cone coil, a 0-5 milliameter connected in series with the plate supply to the second detector or a low range A.C. voltmeter connected across the cone coil of the reproducer.

(c) Remove the oscillator tube, socket No. 2, and make a good ground connection to the chassis. Place the oscillator in operation and connect its output to the control grid cap of the first detector, socket No. 3. Adjust the oscillator output or the receiver volume control until a deflection is obtained in the output meter.

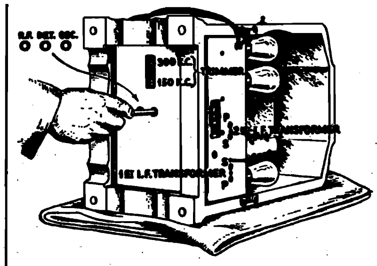


Figure 2—Location of various line-up capacitors

(d) Now adjust the secondary and primary of the second and first I.F. transformers until a maximum reading is obtained in the output meter. See Figure 2. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made, the set should perform at maximum efficiency. However, due to the interlocking of the adjustments, it is a good plan to follow the I.F. adjustments with R.F. and oscillator line-up condenser adjustments. The correct method of doing this is given in the following section.

OSCILLATOR ADJUSTMENTS

Five adjustable condensers are provided for aligning the R.F. circuits and adjusting the oscillator frequency so that it will be at a 110 K.C. difference from the incoming R.F. signal throughout the tuning range of the set. Poor quality, insensitivity, and possible inoperation of the receiver may be caused by these condensers being out of adjustment.

If the other adjustments have not been tampered with and are correctly aligned—the intermediate tuning condensers—the following procedure may be used for adjusting these condensers.

(a) Procure an R.F. oscillator giving a modulated signal at exactly 1400 K.C., 300 K.C. and 150 K.C. Also procure a non-metallic screw driver, such as Stock No. 7065 and a small socket wrench.

(b) An output indicator is necessary. This may be a current squared thermo-galvanometer connected to the secondary of the output transformer instead of the cone coil of the reproducer unit, a 0-5 milliameter connected in series with the plate supply to the second detector or a low range A.C. voltmeter connected across the reproducer unit cone coil.

(c) Turn the station selector until the dial reads exactly 100. Then remove the chassis from the cabinet, being careful not to disturb the setting of the dial. The gang condenser rotor plates should be fully meshed with the stator plates. If not, then the dial drum must be adjusted until such a condition exists. Be sure and tighten the set screws that hold the drum to the condenser shaft.

(d) Place the oscillator in operation at exactly 1400 K.C. and couple it to the antenna. Set the dial scale at 11 and turn the cabinet on its side. Place a soft pad under the instrument to prevent damage to the cabinet finish. Adjust the coupling between the oscillator and the antenna lead of the set or the volume control until a deflection is obtained in the output meter.

(e) With the socket wrench adjust the oscillator, first detector and R.F. line-up condensers until a maximum deflection is obtained in the output meter. (See Figure 2).

(f) Set the oscillator at 300 K.C. Set the Selector Switch to the right for the low frequency band and tune in this signal with the receiver. Adjust the Volume control for a deflection in the output meter. Now adjust the 300 K.C. condenser Figure 2 until maximum output has been obtained. Rock the gang condenser back and forth while making this adjustment.

(g) Set the oscillator at 150 K.C. and repeat as in (f) only adjust the 150 K.C. trimming condenser shown in Figure 2.

Change the frequency of the oscillator to 1400 K.C. and set the Dial at 11. Shift to the high frequency band. Again make the adjustment given under (d) and (e).

So adjusted, the R.F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R.F. signal.

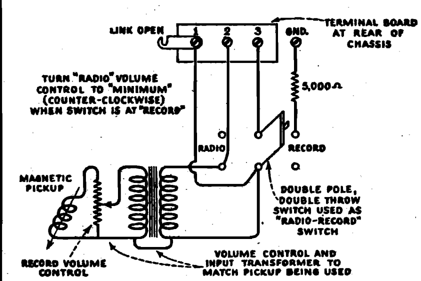


Figure 3—Magnetic Pickup Connections

MODEL R-7-LW
Voltage, Parts List

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES

Line Voltage correct for the transformer tap being used

These voltages are taken with the usual Set Analyzers and are not the true voltages at which the Radiotrons operate

Tube No.	Cathode to Heater Volts, D. C.	Cathode or Filament to Control Grid Volts, D. C.	Cathode to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current M. A.	Screen Grid Current M. A.	Heater or Filament Volts, A. C.
VOLUME CONTROL AT MINIMUM							
1	40	40	55	200	0	0	2.4
2	40	0	—	50	4.0	—	2.4
3	8.0	7.0	90	240	0.5	0.25	2.4
4	40	40	55	200	0	0	2.4
5	25	*5.0	—	220	0.5	—	2.4
6	—	*30.0	—	245	30.0	—	2 4
7	—	*30.0	—	245	30.0	—	2.4
VOLUME CONTROL AT MAXIMUM							
1	3.5	3.5	70	240	5.0	**0.7	2.4
2	2.5	0	—	65	5.5	—	2.4
3	5.0	5.0	70	235	0.5	0.25	2.4
4	3.5	3.5	70	240	5.0	**0.7	2.4
5	25	*5.0	—	220	0.5	—	2.4
6	—	*30	—	245	25.0	—	2.4
7	—	*30	—	245	25.0	—	2.4

*Not true reading due to resistance in circuit.
**This reading may be + or — depending on age of tube.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLY	
2240	Resistor—30,000 Ohms—Carbon type—Package of 1	$0.70
2546	Resistor—1,000,000 Ohms—Carbon type—Package of 5	3.00
2563	Resistor—6,000 Ohms—Carbon type—Package of 5	3.00
2731	Resistor—10,000 Ohms—Carbon type—Package of 5	2.00
2746	Socket—Dial lamp socket	.50
2747	Caps—Grid contactor caps—Package of 5	.50
2749	Capacitor—2400 MMFD	1.50
2875	Knobs—Station selector, band selector or volume control knob—Package of 5	1.50
2881	Bracket—Dial lamp bracket—Package of 5	.50
2882	Socket—UY Radiotron socket complete with insulator—5 used	.50
2957	Condenser—10 MFD Electrolytic condenser with mounting nut and washers	3.00
2963	Resistor—8.000 Ohms—Carbon type—Package of 5	2.50
2968	Socket—UX Radiotron socket complete with insulator—3 used	.50
2970	Resistor—500,000 Ohms—Carbon type—Package of 5	2.50
2973	Board—Magnetic pickup terminal board—Package of 2	.50
2994	Coil—2d detector R.F. choke coil	.60
2997	Coil—R.F. coil	1.90
2999	Shaft assembly—Dial scale drive shaft	.50
3000	Dial—Dial drum and scale complete	.60
3003	Cushions—Receiver chassis mounting cushions—Package of 4	.50
3006	Capacitor—1000 MMFD	.50
3056	Shield—Radiotron shield—3 used—Package of 2	.50
3057	Condenser—4 MFD. Electrolytic condenser with mounting nuts and washers	2.50
3058	Resistor—100,000 Ohms—Carbon type—Package of 5	2.50
3060	Resistor—40,000 Ohms—Carbon type—Package of 5	3.50
3061	Switch—Toggle type—Operating switch with mounting nut	.70
3081	Resistor—16,000 Ohms—Carbon type—Package of 1	.60
3085	Capacitor—400 MMFD	.60
3225	Lever—Switch lever—Package of 2	1.00
3226	Coil—Oscillator and 1st detector loading coil	1.25
3227	Coil—Antenna loading coal	$1.10
3228	Switch—Toggle switch for band changing	1.50
3230	Coil—1st detector and oscillator coil	3.00
3231	Control—Volume control—Complete with mounting nut	1.55
3232	Capacitor—280 MMFD—Package of 5	2.50
7054	Cord—Power cord	1.00
7062	Capacitor—Adjustable oscillator trimmer capacitor—15-70	1.00
7063	Capacitor—Adjustable trimmer capacitor 5-40	1.00
7065	Screwdriver—Non-metallic screwdriver for line-up adjustments	1.10
7238	Capacitor—Comprising four 0.5 MFD., one 0.05 MFD., one 0.1 MFD. and one 1.0 MFD. capacitors in metal container	3.50
7239	Transformer—Audio transformer assembly	6.00
7241	Capacitor—3 gang tuning condenser	8.00
7299	Capacitor—745 MMFD	.70
7336	Transformer—1st intermediate transformer	3.00
7337	Transformer—2d intermediate transformer	3.00
7338	Board—Resistor board complete less resistors and coil	1.00
7339	Switch—Rotary Band Selector switch—Complete with mounting nut and washers	1.90
8680	Transformer—Power transformer—105-125 volts—25-40 cycles	12.00
8768	Coil capacitor and switch—Complete with mounting nuts and escutcheon	9.00
8769	Transformer—Power transformer—100-230—40-60 cycles	12.50
	REPRODUCER	
8559	Ring—Cone retaining ring	.80
8601	Cone—Reproducer paper cone—Package of 5	15.00
8639	Coil—Reproducer field coil assembly—Comprising field coil, magnet and cone housing	5.00
	CABINET	
3005	Screw assembly—Reproducing mounting screws, nut and washers—Package of 1 set of 4 each	.50
3229	Escutcheon—Station selector escutcheon—Complete with mounting screws	.70
7242	Baffle board and grill cloth	1.00
9391	Cabinet—Cabinet complete less equipment	15.00

RCA-VICTOR CO., INC.

SERVICE NOTES
for
RCA Victor Model RE-16A

The RCA Victor Model RE-16A is a radio phonograph combination instrument that utilizes the standard RCA Victor R-7A chassis and loudspeaker together with the phonograph equipment used in RCA Victor combination instruments. This consists of the low impedance magnetic pickup and inertia type tone arm, induction disc motor, radio-record switch and record volume control. A manually operated automatic switch, similar to that used in the T-5 Electrola is included in the motor and turntable assembly.

Service information, other than that pertaining to replacement parts, may be obtained from Service Notes already issued on the RCA Victor R-7A and the RCA Radiola 86.

The schematic wiring diagram is shown in Figure 1 and the assembly wiring in Figure 2. The chassis wiring, with the exception of the power leads added for the phonograph motor, is the same as that shown in the RCA Victor R-7A Service Notes.

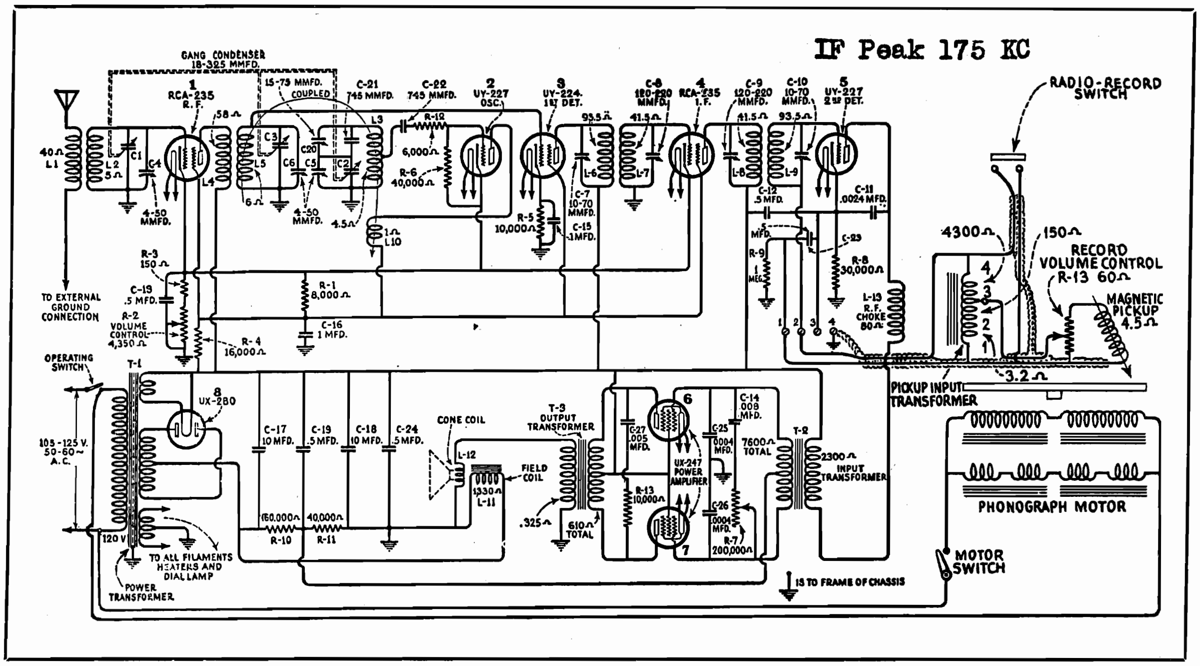


Figure 1—Schematic Wiring Diagram of Model RE-16A

MODEL RE-16-A
Assembly wiring

RCA-VICTOR CO., INC.

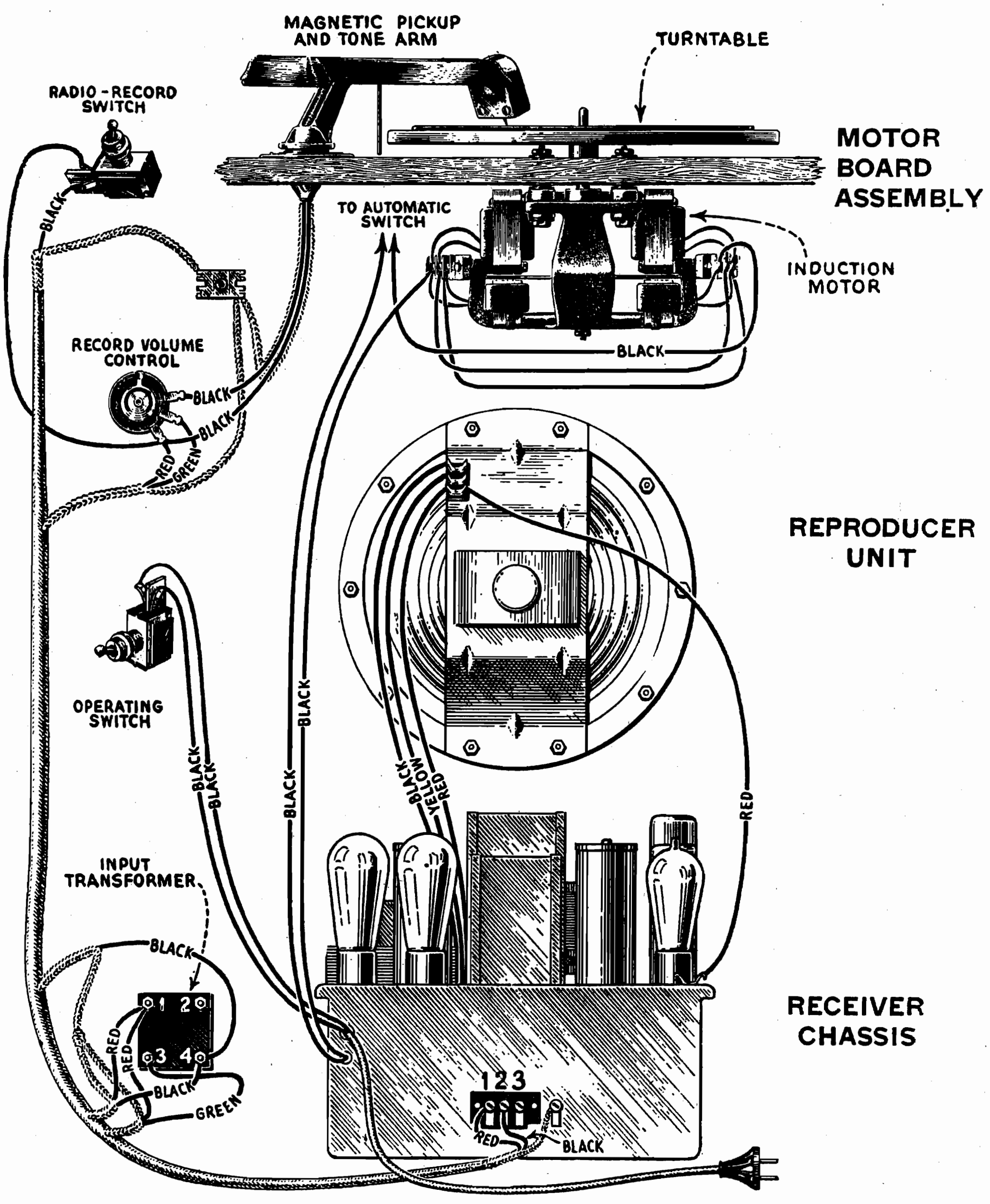


Figure 2—Assembly Wiring Diagram of Model RE-16A

RCA-VICTOR CO., INC.

MODEL R-17-M
Notes

RCA Victor R-17-M

115 Volt AC/DC Universal Receiver

INTRODUCTION

This four-tube radio receiver is an extremely compact and readily portable instrument which is operable from any 100 to 125 volt power mains, either A. C. (alternating current—any frequency from 25 to 133 cycles per second) or D. C. (direct current). Equivalent performance will be obtained with either type of power supply.

An additional feature of this instrument is found in the use of a tuning range extended beyond the limits of the standardized broadcast band. The actual range is from 540 to 1710 kilocycles, permitting the reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment.

INSTALLATION

Important—After unpacking the instrument, uncoil the antenna lead and the power cord. Then take off the rear cover (held by two screws through the flange) and *remove the interior packing material used to protect the Radiotrons during shipment.* Before replacing the cover, make certain that all tubes are firmly in the sockets and that the three grid leads are securely connected (by means of the spring contact clips) to the dome terminals of the proper Radiotrons, as shown by the tube location diagram on the bottom of the receiver.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

External Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window since such structures form an effective shield which greatly impedes the passage of radio waves.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by inserting the plug connector at the end of the power cord in the intended electrical outlet and by then turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow approximately 30 seconds for the Radiotron filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard.

> **Important**—When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loudspeaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the foregoing procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position mid-way between the points where the signal disappears.

> **Note**—When tuned to a strong local station with the volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of the control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the volume control below the readily-apparent critical point.

4. When through operating turn off the power by rotating the volume control counter-clockwise until the "snap" of the power switch is heard.

CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES OR METAL PARTS INSIDE CABINET.

MODEL R-17-M
Schematic, Chassis
Voltage, Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating..105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption............................40 Watts
Frequency Range...................540 K. C.–1700 K. C.
Type and Number of Radiotrons—
1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39 R. F.	3.0	105.0	105	7.0	6.0
2. RCA-36 Detector	*0.75	11.0	*60	0.025	6.0
3. RCA-38 Output	11.0	100.0	95	5.0	6.0
4. RCA-37 Rectifier	—	—	115	15.0	6.0

*Impossible to measure on ordinary voltmeter.

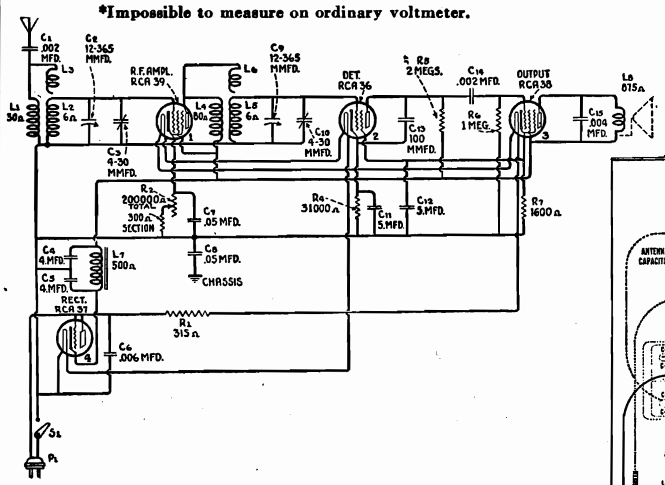


Figure A—Schematic Circuit

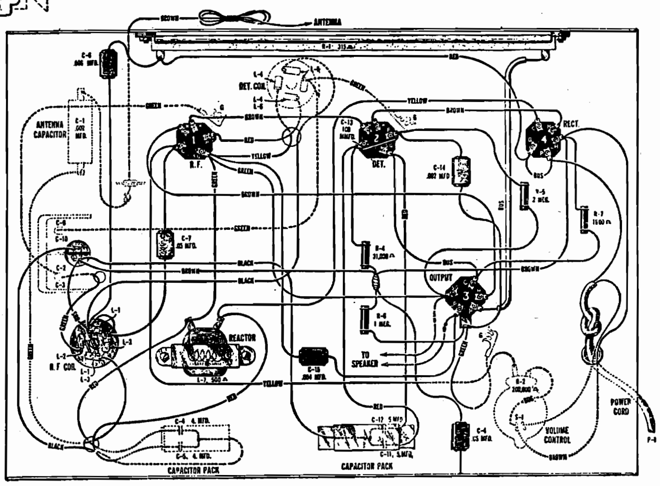


Figure B—Wiring Diagram

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap	
3076	Resistor—1 megohm—Carbon type—½ watt	
3456	Capacitor—.05 mfd.	
3536	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors	
3537	Reactor—Filter reactor	
3538	Capacitor—Filter capacitor—Two 4.0 mfd.	
3542	Volume control—Complete with mounting nut	
3557	Capacitor—0.002 mfd.	
3559	Resistor—31,000 ohms—Carbon type—½ watt	
3560	Resistor—1,600 ohms—Carbon type—½ watt	
3561	Capacitor—0.004 mfd.	
3562	Capacitor—0.006 mfd.	
3635	Resistor—Filament resistor—315 ohms	
3686	Escutcheon—Volume control escutcheon	

Stock No.	DESCRIPTION	
3687	Escutcheon—Station selector escutcheon	
3709	Knob—Station selector or volume control knob	
3714	Coil—Detector coil	
3715	Coil—R. F. coil complete	
6188	Resistor—2 megohm—Carbon type—½ watt	
6451	Condenser—Two gang variable tuning condenser	
7484	Socket—Radiotron socket—5 contact	
10405	Capacitor—Antenna series capacitor—.002 mfd.	
10820	Capacitor—100 mmfd.	
	LOUDSPEAKER ASSEMBLIES—MAGNETIC TYPE	
7594	Cone—Speaker cone	
7595	Support—Cone support	
7596	Mechanism—Speaker mechanism complete with magnet	
9426	Loudspeaker complete	

RCA-VICTOR CO., INC.

MODEL R-18-W
Notes

Instructions for

RCA Victor R-18-W

115 Volt AC/DC Universal Receiver

INTRODUCTION

This four-tube radio receiver is an extremely compact and readily portable instrument which is operable from any 100 to 125 volt power mains, either A. C. (alternating current—any frequency from 25 to 133 cycles per second) or D. C. (direct current).

An additional feature of this instrument is found in the use of a tuning range extended beyond the limits of the standardized broadcast band. The actual range is from 540 to 1710 kilocycles, permitting the reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment.

INSTALLATION

Preliminary—After unpacking the instrument, remove the antenna lead and the power cord from the rear compartment formed at the top of the cabinet. Then remove the interior packing material (used to protect the Radiotrons during shipment). Refer to the tube location diagram on the license label (located on inside of rear cover), and make certain that all tubes are in position and that the three grid clips are firmly connected to the dome terminals of the proper Radiotrons.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

Antenna Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window since such structures form an effective shield which greatly impedes the passage of radio waves.

Power Supply—Before connecting the power cord to the electrical outlet, make certain (1) that the supply voltage does not exceed 125 volts and (2) that the A. C.–D. C. line switch at the rear of the chassis is correctly set (as indicated on the tube location diagram on the inside of the rear cover)—to the right (facing rear of set) for A. C. and to the left for D. C. supply.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by inserting the plug connector at the end of the power cord in the intended electrical outlet and by then turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow a minute or two for the Radiotron filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard.

Important: When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loudspeaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the above procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position mid-way between the points where the signal disappears.

Note 1—When tuned to a strong local station with the volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of the control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the volume control below the readily-apparent critical point.

Note 2—If the antenna lead is bunched or coiled too near the set, oscillation (indicated by "whistling" on stations) may occur. This condition also may be corrected by reducing the volume control setting. When operated at or near the point of oscillation, however, the sensitivity of the set will be greatly increased—ordinarily to a point in excess of that required for normal reception.

4. When through operating turn off the power by rotating the volume control counter-clockwise until the "snap" of the power switch is heard.

CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES, OR METAL PARTS INSIDE CABINET.

MODEL R-18-W
Schematic, Chassis
Voltage, Parts List

RCA-VICTOR CO., INC.

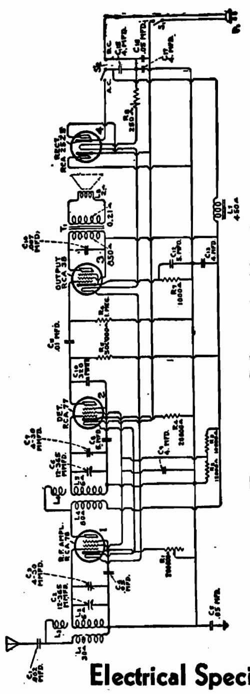


Figure A—Schematic Circuit

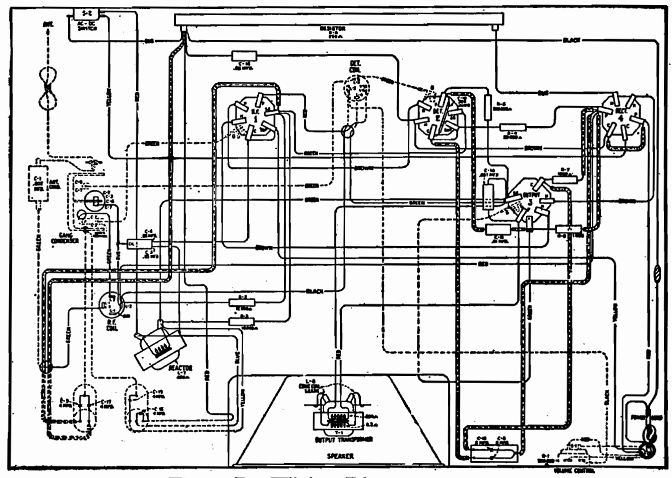


Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating . . 105–125 Volts, 25–133 Cycles, A. C. or D. C.
Power Consumption . . . . 50 Watts at 115 Volts, 60 Cycles
Frequency Range . . . . 540–1710 K. C.
Type and Number of Radiotrons—
1 RCA-78, 1 RCA-77, 1 RCA-38, 1 RCA-25Z5—Total 4
Undistorted Output . . . . A. C. 0.55 Watts
D. C. 0.15 Watts

This receiver is a four tube A. C.–D. C. table model R. F. type broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, dynamic loudspeaker, excellent performance and compact construction characterize this instrument. Due to the use of a voltage doubling circuit in the rectifier, the receiver has considerably greater output when operated on alternating current than when operated on direct current.

Figures A and B show the schematic and wiring diagrams respectively while the voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volts, 60 Cycles and 115 Volts D. C.

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Filament or Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78, R. F.	2.5	1.5	100	50	200	100	8.0	5.0	6.0
RCA-77, Detector	*5.0	*3.0	95	45	*100	*50	0.2	0.1	6.0
RCA-38, Output	18.0	9.0	180	95	170	90	14.0	7.0	6.0
RCA-25Z5, Rectifier	—	—	—	—	115	—	30.0	20.0	25.0

* Impossible to measure on ordinary voltmeter.

NOTE: 25 cycle voltages will be less than those obtained on 60 cycles.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2731	Resistor—10,000 ohms—Carbon type—1 watt—Package of 5	$1.10
2981	Capacitor—320 mmfd.	.30
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	1.00
3066	Resistor—12,000 ohms—Carbon type—1 watt—Package of 5	1.10
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3472	Capacitor—0.0024 mfd.	.32
3536	Capacitor—Filter capacitor—Comprising two 5.0 mfd. capacitors	1.10
3538	Capacitor—Filter capacitor—Comprising two 4.0 mfd. capacitors	1.18
3542	Volume control—Complete with mounting nut	1.18
3567	Escutcheon—Station selector escutcheon—Package of 2	.42
3568	Escutcheon—Volume control escutcheon—Package of 2	.42
3569	Knob—Station selector or volume control knob—Package of 5	.65
3684	Switch—Single pole double throw—Toggle switch	.94
3701	Capacitor—0.01 mfd.	.30
3713	Capacitor—0.05 mfd.	.32
3714	Coil—Detector coil	$0.98
3715	Coil—R. F. coil	1.08
3720	Resistor—250 ohms—Filament resistor	1.00
3721	Resistor—1,000 ohms—Carbon type—½ watt—Package of 5	1.00
3722	Capacitor—Comprising two 0.05 mfd. capacitors	.70
3723	Capacitor—0.007 mfd.	.45
3724	Reactor—Filter reactor	1.10
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6451	Condenser—Two gang variable tuning condenser	2.04
6535	Capacitor—Comprising two 4.0 mfd. capacitors—High voltage	1.25
7484	Socket—Radiotron socket—5 contact	.35
7485	Socket—Radiotron socket—4 contact	.40
10405	Capacitor—Antenna series capacitor—0.002 mfd.	.40
	REPRODUCER ASSEMBLIES—DYNAMIC TYPE	
3610	Magnet	1.04
6477	Transformer—Output transformer	1.32
7598	Cone—Reproducer cone complete—Package of 5	4.35
7599	Housing—Cone housing and cone assembly	1.16
9429	Reproducer—Complete	4.85

MODEL R-22
Schematic, Voltage
Parts List

RCA-VICTOR CO., INC.

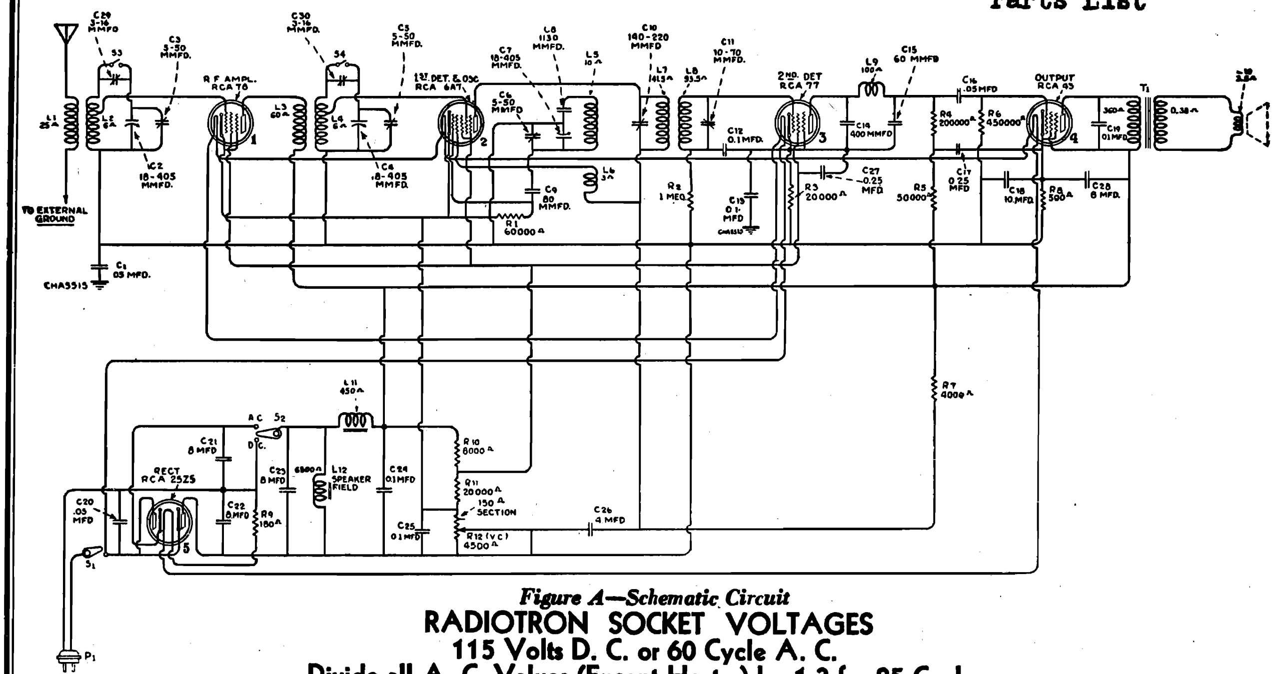


Figure A—Schematic Circuit

RADIOTRON SOCKET VOLTAGES

115 Volts D. C. or 60 Cycle A. C.

Divide all A. C. Values (Except Heater) by 1.3 for 25 Cycles

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78 R. F.	2.6	1.5	90	50	157	88.5	5.5	3.0	6.0
RCA-6A7 Oscillator	—	—	—	—	157	88.5	1.7	1.0	6.0
1st Detector	2.6	1.5	90	50	157	88.5	2.5	1.5	—
RCA-77 2nd Detector	Plate and Bias Supply 160 Volts						—	—	6.0
RCA-43 Power	21.0	12.0	135	80	125	72.0	35.0	20.0	25.0
RCA-2525 Rectifier	115 R. M. S.						89.0 Total	35.0 Total	25.0

Voltage Across Loudspeaker Field (115 Volts, 60 Cycles—185; 115 Volts, 25 Cycles—140; 115 Volts, D. C.—105)

REPLACMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2963	Resistor—8,000 ohms—Carbon type—1 watt—Package of 5	1.10
3033	Resistor—1 megohm—Carbon type—¼ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.—Connected across loudspeaker field	.36
3569	Knob—Station selector and volume control knob—Package of 5	.65
3572	Socket—7 contact Radiotron socket	.38
3584	Ring—Antenna coil shield retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3640	Capacitor—0.05 mfd	.25
3641	Capacitor—0.1 mfd	.35
3682	Shield—Radiotron shield body	.22
3683	Shield—Radiotron shield cap	.20
3684	Switch—Toggle type—AC-DC operation	.94
3685	Coil—Choke coil—Second detector plate	.54
3697	Escutcheon—Station selector escutcheon—Package of 2	.28
3698	Escutcheon—Volume control escutcheon—Package of 2	.28
3700	Resistor—450,000 ohms—Carbon type—½ watt—Package of 5	1.00
3701	Capacitor—0.01 mfd	.30
3702	Capacitor—0.25 mfd	.42
3710	Capacitor—60 mmfd	.36
3711	Capacitor—80 mmfd	.40
3712	Capacitor—400 mmfd	$0.40
3713	Capacitor—0.05 mfd	.32
3725	Capacitor—1,130 mmfd	.50
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6250	Resistor—4,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6464	Transformer—Intermediate frequency transformer	1.88
6505	Reactor—Filter reactor	1.06
6506	Condenser—Three gang variable condenser assembly	3.24
6507	Resistor—180 ohms—Porcelain type	.60
6508	Volume control—Complete with mounting nut	1.36
6510	Capacitor—8.0 mfd	1.00
6511	Capacitor—Comprising one 8.0 mfd. one 10 mfd. and 4.0 mfd.	1.49
6518	Capacitor—Comprising two 8.0 mfd. capacitors	1.58
6519	Coil—Antenna coil	.88
6520	Coil—R. F. coil assembly	.94
6521	Coil—Oscillator coil assembly	.60
7485	Socket—6 contact Radiotron socket	.40
	REPRODUCER ASSEMBLIES	
6509	Transformer—Output transformer	1.34
7606	Coil assembly—Comprising field coil, magnet and cone support	2.06
8937	Cone—Reproducer cone complete with voice coil—Package of 5	5.00

MODEL R-22
Chassis Wiring
Alignment

RCA-VICTOR CO., INC.

SERVICE DATA

ELECTRICAL SPECIFICATIONS

Voltage Rating....................100–125 A. C. or D. C.
Frequency Rating (A. C.)..................25–133 Cycles
Power Consumption: A. C. 60 Cycles, 115 Volts—60 Watts; D. C. 115 Volts—40 Watts
Number and Types of Radiotrons...............1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-25Z5—Total, 5
Undistorted Output (A. C.)....................1.5 Watts
Undistorted Output (D. C.)....................0.5 Watts
Frequency Range......540–1710 K. C. and 2400–2500 K. C.

This receiver is a five tube Super-Heterodyne designed to operate on A. C. or D. C. over a wide voltage and frequency range. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-25Z5 which is used in a voltage doubling circuit. This results in considerable more output when the receiver is used on A. C. than that obtained from D. C. operation.

LINE-UP CAPACITOR ADJUSTMENTS

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., 1710 K. C. and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C. coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1710 K. C. This is done with the Range Switch at the broadcast position (counter-clockwise). A similar manner is used as that of the I. F. except that the oscillator is set at 1710 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 8 (minimum dial position). The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) After making the 1710 K. C. adjustment, set the dial at 18 and the oscillator at 1400. Then adjust the first detector and R. F. line-up capacitors only. This adjustment is made so that the R. F. and 1st detector will be aligned over the broadcast band but the receiver will still tune to 1710 K. C. due to the oscillator line-up capacitor not being readjusted.

(e) Then set the Range Switch at its clockwise position. The oscillator should now be set at 2440 K. C. and the signal tuned in. Two points on the dial will be noted where the signal is heard, one of which may be louder than the other. Set the dial at either point. Note—the 2440 K. C. signal will still be heard at two points since these R. F. stages act as fixed tuned circuits. Adjust the two high frequency trimmers, located on the lower side of the gang capacitor until maximum output is obtained.

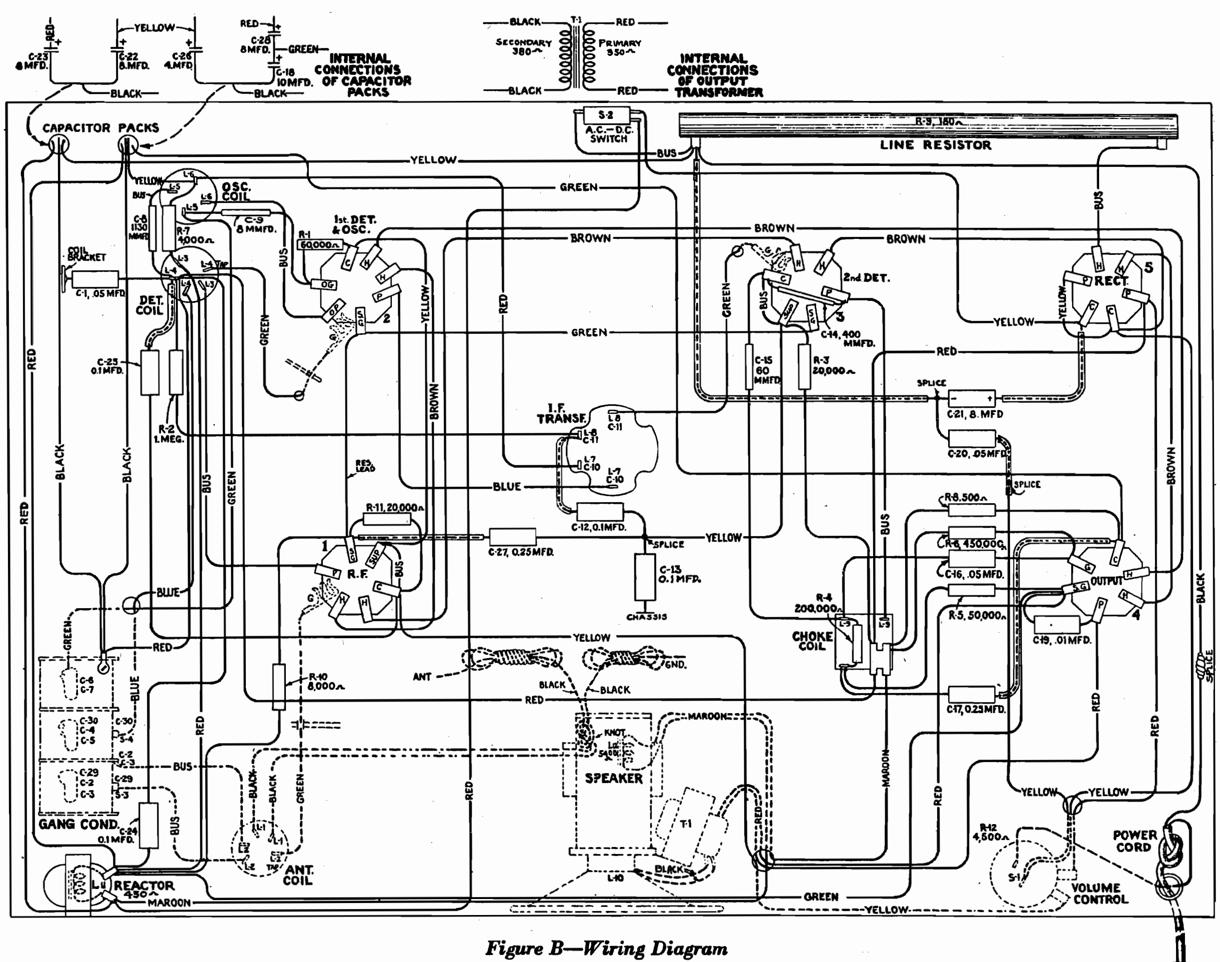


Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL R-27
Voltage, Parts List

SERVICE DATA

Electrical Specifications

Voltage Rating . . 105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption . . . . 40 Watts
Frequency Range . . . . 540 K. C.–1710 K. C.
Type and Number of Radiotrons—
1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Meximum Volume—115 Volt A. C. Line
All Voltages on D C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39 R. F.	3.0	105	105	7.0	6.0
2. RCA-36 Det.	*0.75	11.0	*60	.025	6.0
3. RCA-38 Output	11.0	100	95	5	6.0
4. RCA-37 Rect.	——	——	115	15	6.0

*Impossible to measure on ordinary voltmeter

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3076	Resistor—1 megohm—Carbon type—Package of 5	$2.50
3456	Capacitor—.05 mfd.	.44
3536	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors	1.10
3537	Reactor—Filter reactor	1.10
3538	Capacitor—Filter capacitor—Two 4.0 mfd.	1.18
3539	Coil—R. F. coil complete	1.08
3540	Coil—Detector coil	.98
3542	Volume control—Complete with mounting nut	1.18
3557	Capacitor—0.002 mfd.	.30
3559	Resistor—31,000 ohms—Carbon type—½ watt—Package of 5	1.00
3560	Resistor — 1,600 ohms — Carbon type — ½ watt—Package of 5	1.00
3561	Capacitor—0.004 mfd.	.42
3562	Capacitor—0.006 mfd.	.42
3567	Escutcheon — Station selector escutcheon Package of 2	.42
3568	Escutcheon — Volume control escutcheon Package of 2	$0.42
3569	Knob—Station selector or volume control knob—Package of 5	.65
3635	Resistor—Filament resistor—315 ohms	1.00
6188	Resistor—2 megohm—Carbon type—½ watt Package of 5	2.00
6451	Condenser—Two gang variable tuning condenser	2.04
7484	Socket—Radiotron socket—5 contact	.65
10405	Capacitor—Antenna series capacitor—.002 mfd.	.50
10820	Capacitor—100 mmfd.	.50
	REPRODUCER ASSEMBLIES DYNAMIC TYPE	
3610	Magnet	1.04
6477	Transformer—Output transformer	1.32
7598	Cone—Reproducer cone complete—Package of 5	4.35
7599	Housing—Cone housing and core assembly	1.16
9429	Reproducer—Complete	4.85

MODEL R-27
Schematic
Chassis wiring

RCA-VICTOR CO., INC.

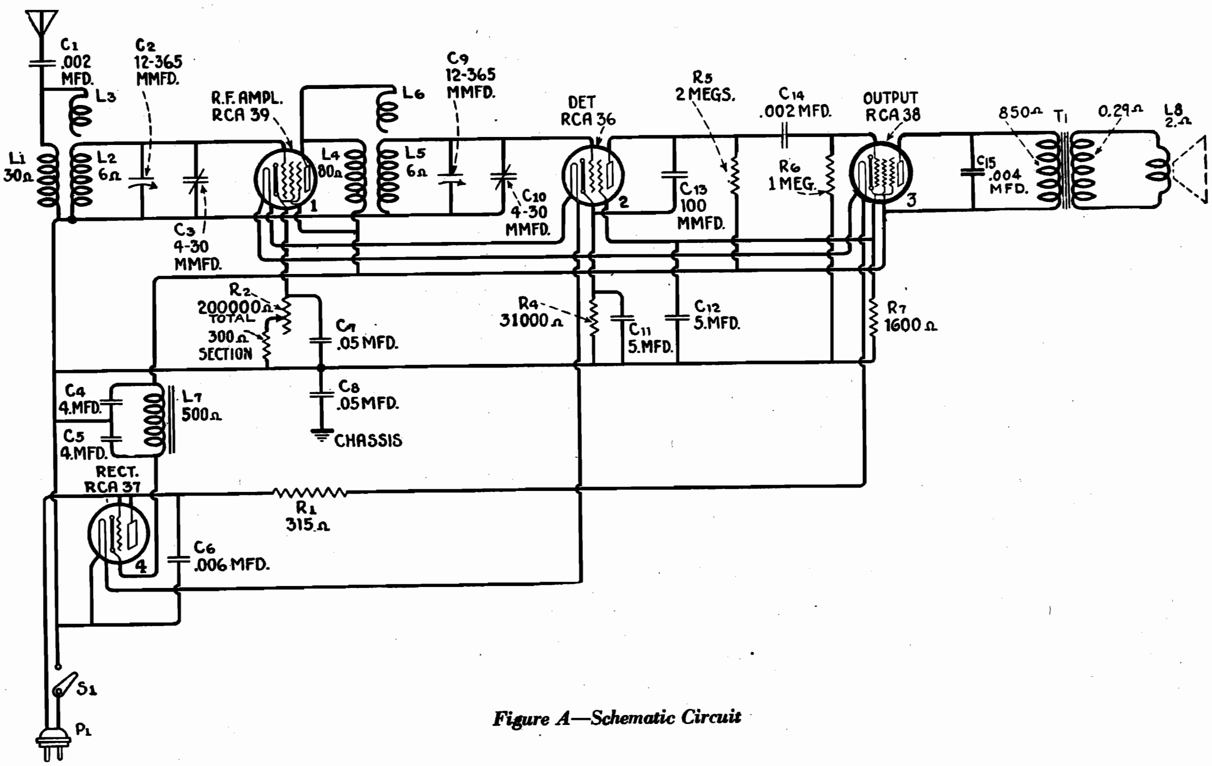


Figure A—Schematic Circuit

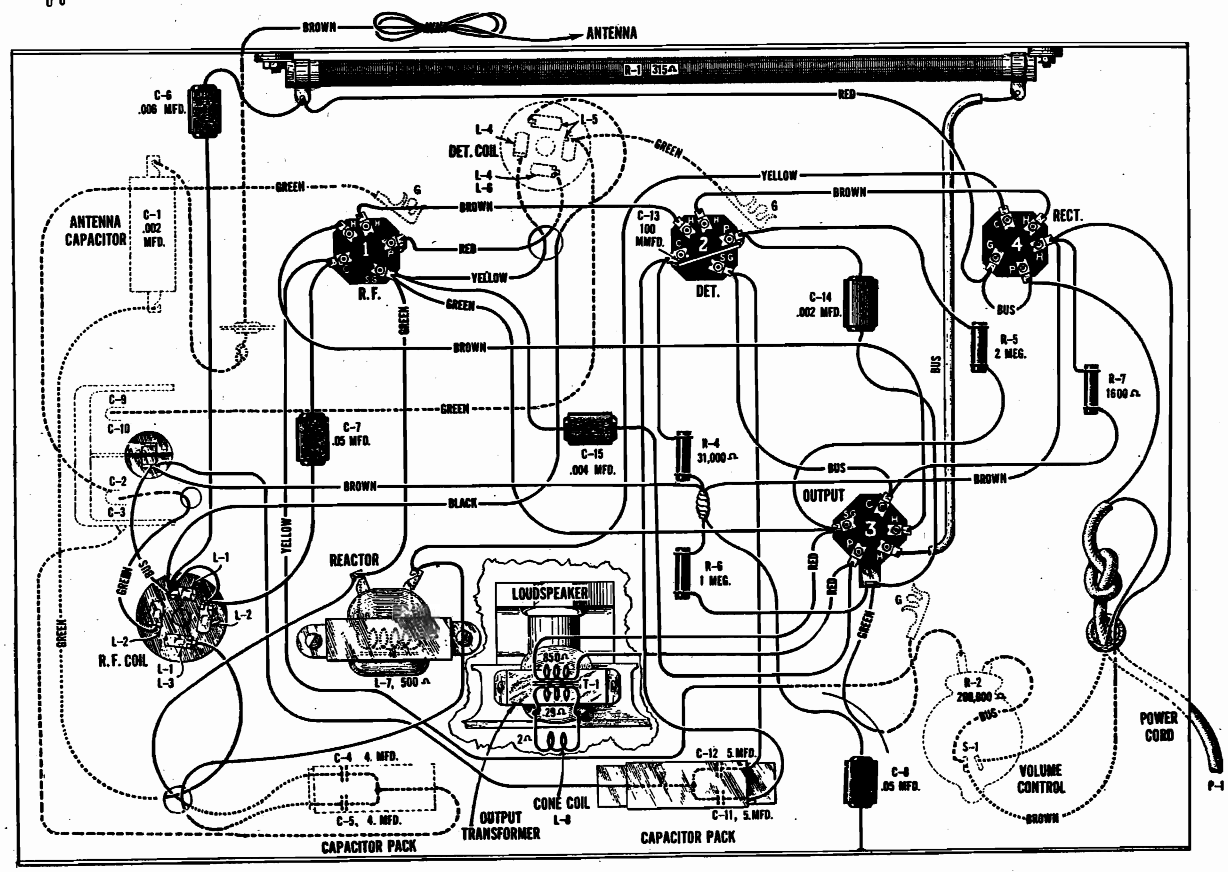


Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL R-28-P
Schematic
Chassis wiring

IF Peak 175 KC

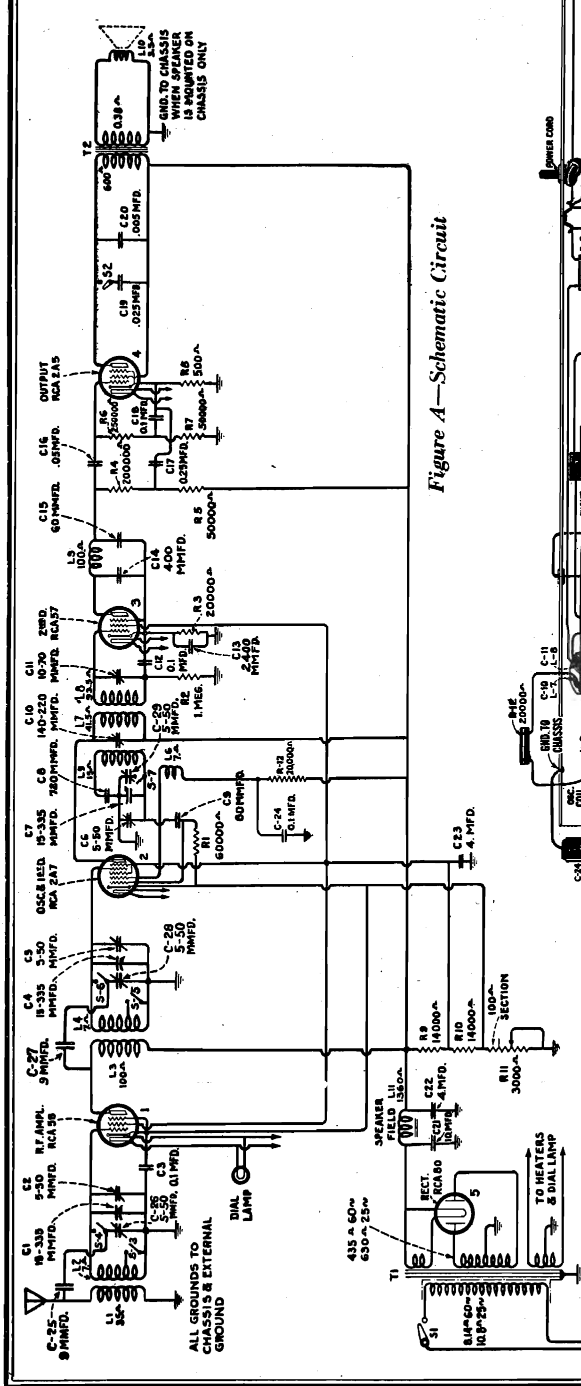


Figure A—Schematic Circuit

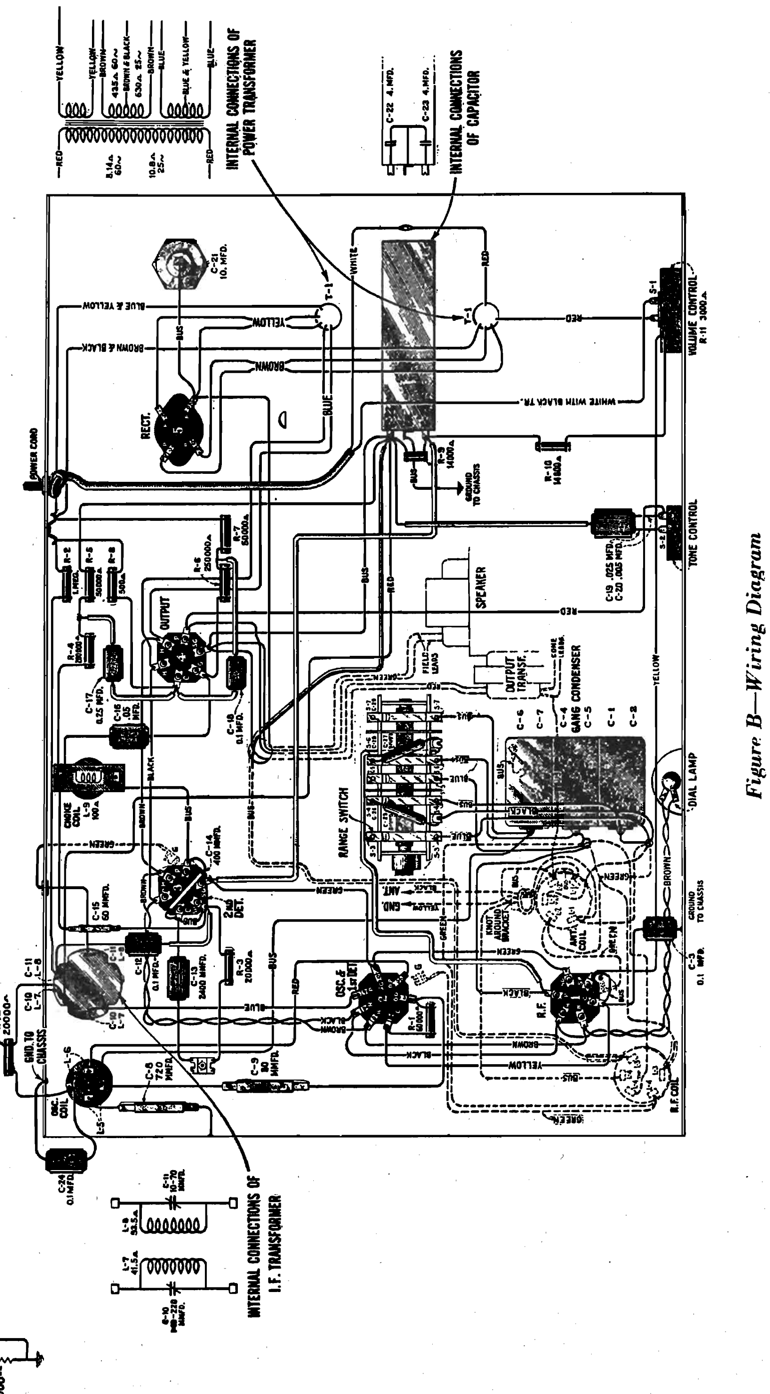


Figure B—Wiring Diagram

Voltage Rating	115 Volts
Frequency Rating	25-40 Cycles and 50-60 Cycles
Power Consumption	70 Watts
Number and Types of Radiotrons	1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output	1.75 Watts
Frequency Range	540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

MODEL R-28-P
Voltage, Parts List
Alignment

RCA-VICTOR CO., INC.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker as a part of the chassis; two-point tone control; single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic and Figure B the wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2747	Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd.	.35
3024	Capacitor—9 mmfd.—Package of 2	.50
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.—Oscillator filter	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3574	Coil—Choke coil	.68
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3590	Escutcheon—Station selector escutcheon—Package of 5	1.40
3591	Escutcheon—Name plate escutcheon—Package of 5	1.40
3592	Knob—Station selector or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3604	Capacitor—400 mmfd.	.30
3606	Capacitor—Comprising one 0.005 mfd. and one 0.025 mfd. capacitors	.40
3615	Knob—Tone control or range switch knob—Package of 5	$0.60
3623	Shield—Antenna or R. F. Coil shield	.30
3705	Scale—Dial scale assembly	.50
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6465	Volume control—Complete with mounting nut	1.22
6466	Switch—Tone control switch	.45
6471	Coil—Oscillator coil assembly	.74
6527	Coil—Antenna coil	1.08
6528	Coil—R. F. coil assembly	.94
6529	Switch—Range switch—Short shaft	1.25
6530	Switch—Range switch—Long shaft	1.25
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7588	Condenser—Three gang variable tuning condenser	2.85
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container	1.64
7590	Capacitor—10.0 mfd.	1.40
8985	Transformer—Power transformer—105-125 volts—50-60 cycles	4.26
8986	Transformer — Power transformer — 200-250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105-125 volts—25-50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
8988	Coil assembly—Comprising field coil, magnet and cone support	2.35

RCA-VICTOR CO., INC.

MODEL R-37-P,R-38-P
Alignment,Voltage

SERVICE DATA

Electrical Specifications

Voltage Rating.................................115 Volts
Frequency Rating.................25–60 and 50–60 Cycles
Power Consumption...60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons...............2 RCA-58,
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output...........................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C.
and 1400 to 2800 K. C.

This receiver is a six tube Superheterodyne incorporating features such as Dynamic Loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit and Figure B the wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

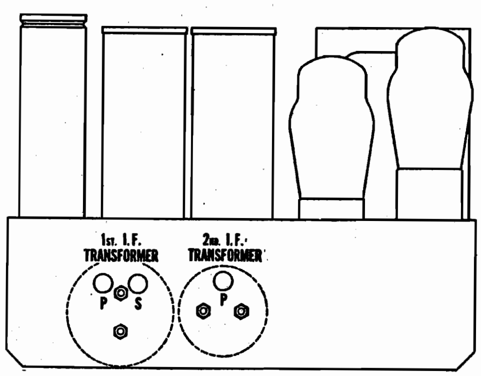


Figure C—Location of I. F. Line-up Adjustment Screws

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

LINE-UP ADJUSTMENTS

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the top of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F.	3.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	3.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	3.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.31
6. RCA-80 Rectifier	700/350 Volts—75 M. A. Total Current				4.82

*The Voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

MODEL R-37-P,R-38-P
Schematic,Chassis

RCA-VICTOR CO., INC.

IF Peak 175 KC

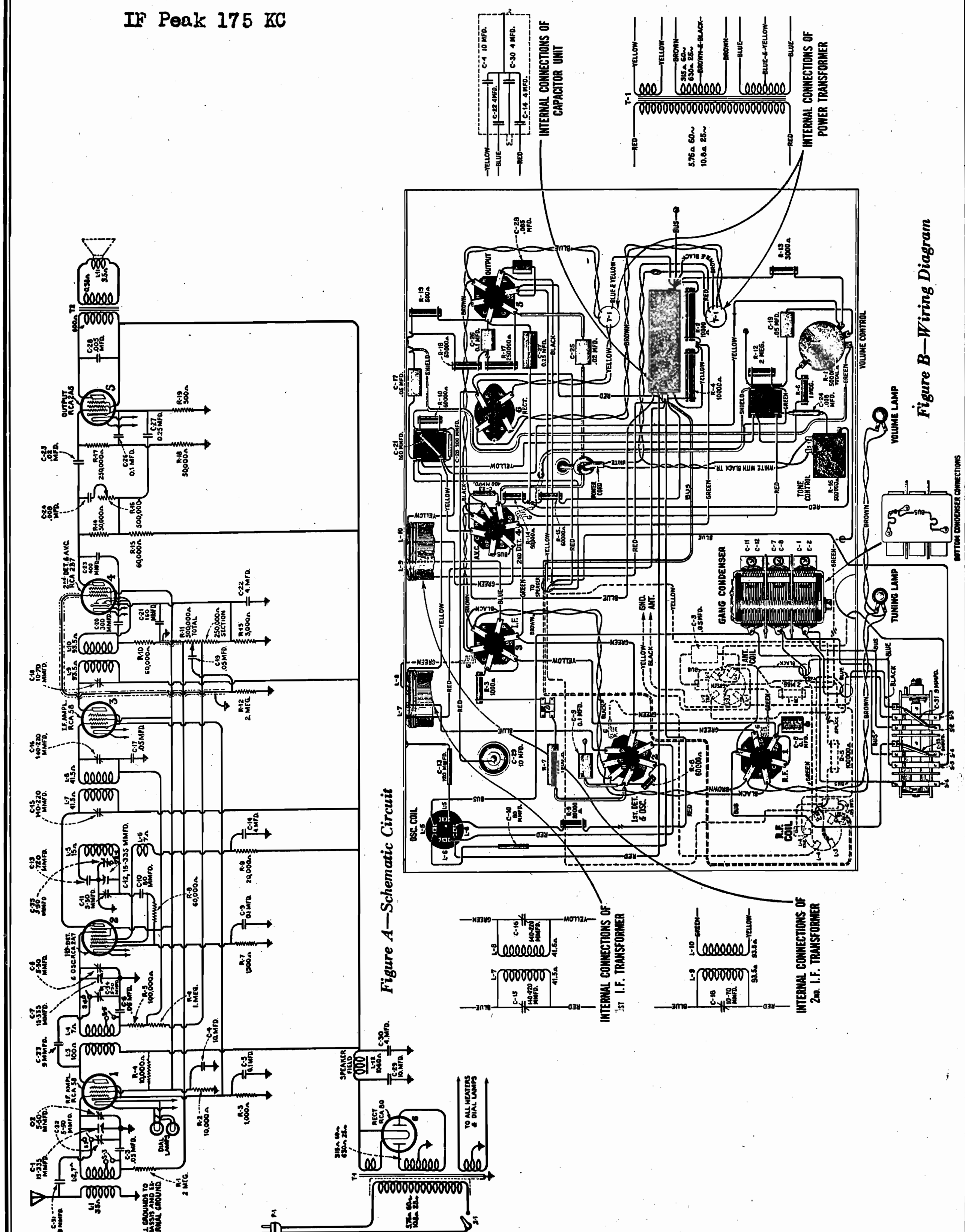


Figure A—Schematic Circuit

Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL RE-40-P
Schematic, Chassis

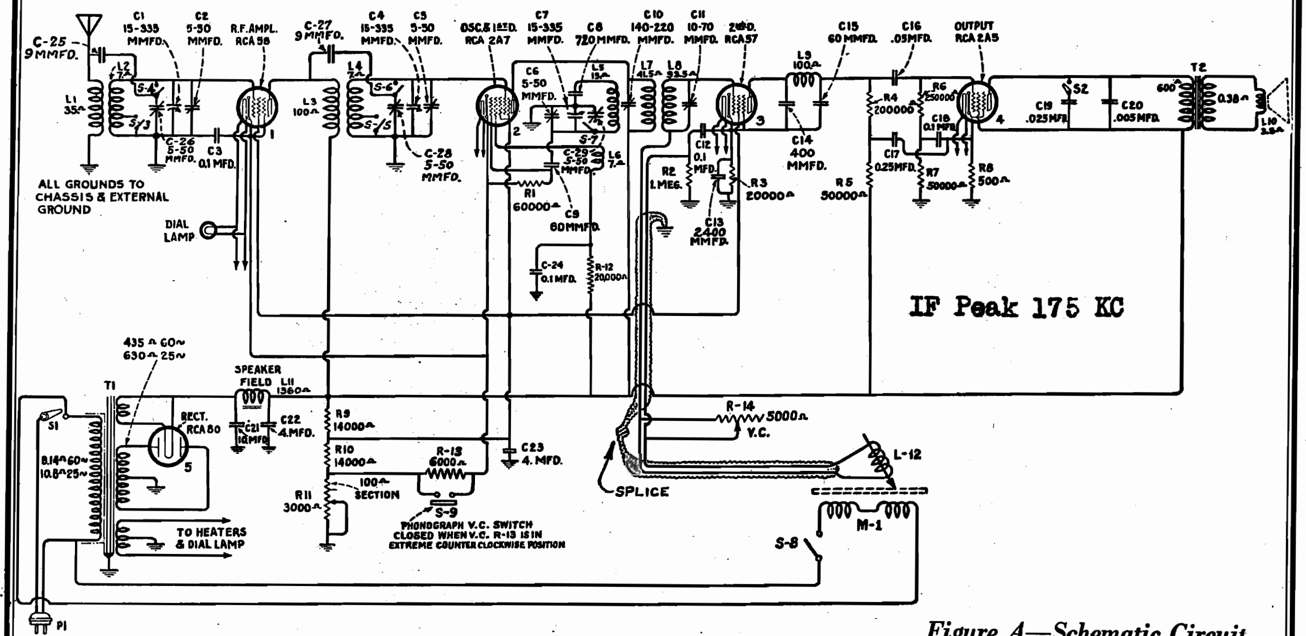


Figure A—Schematic Circuit

Voltage Rating .... 115 Volts
Frequency Rating .... 25–40 Cycles and 50–60 Cycles
Power Consumption .... 60 Cycles, 95 Watts
Number and Types of Radiotrons 1 UX-280,
1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output .... 1.75 Watts
Frequency Range .... 540 K. C. to 1500 K. C.
and 1400 K. C. to 2800 K. C.

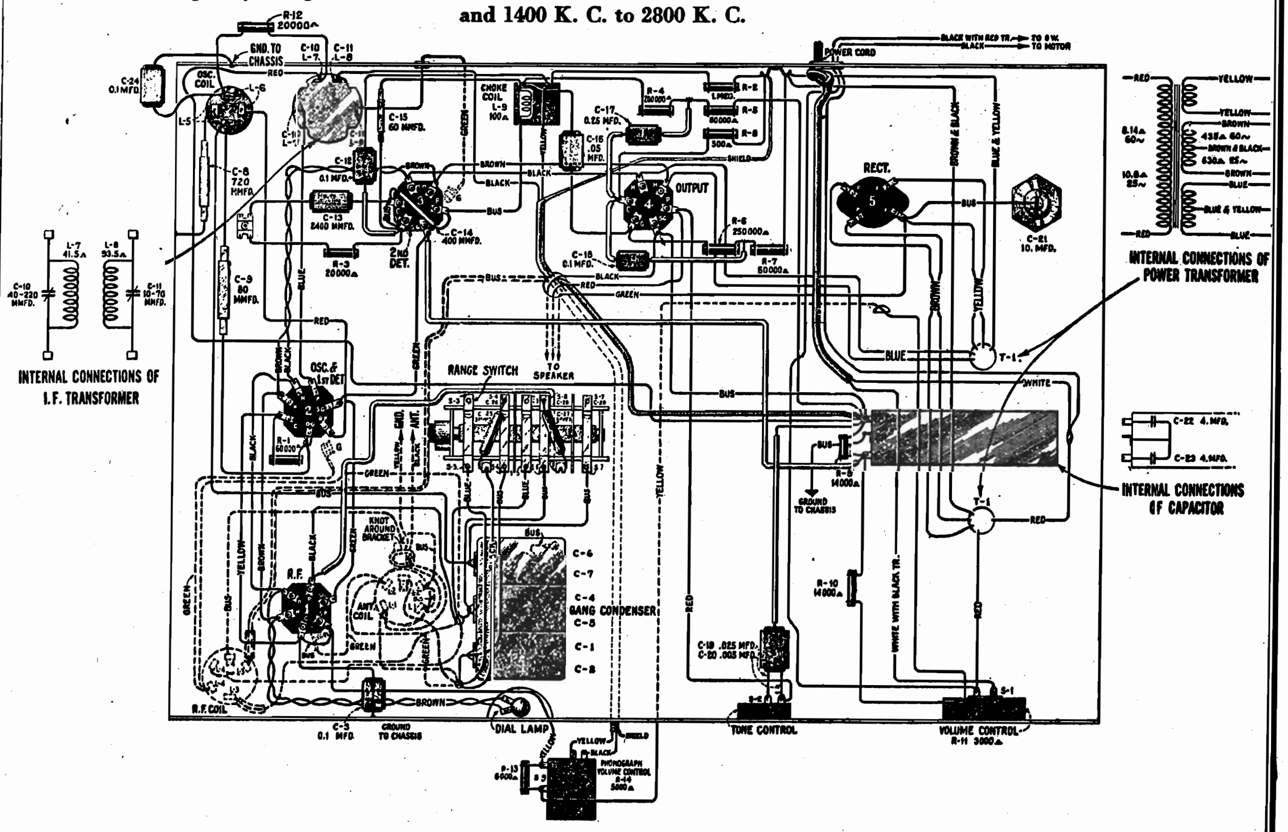


Figure B—Wiring Diagram

MODEL RE-40-P
Alignment, Voltage
Pickup data

RCA-VICTOR CO., INC.

This combination radio-phonograph instrument uses a five-tube Super-Heterodyne receiver incorporating a dynamic loudspeaker, two-point tone control, single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The standard RCA Victor two speed motor board equipment is used and the entire assembly enclosed in a table type cabinet.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure B shows the assembly wiring, Figure C the schematic diagram and Figure D the chassis wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

Service data for the magnetic pickup is included below.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

SERVICE DATA ON MAGNETIC PICKUP

This magnetic pickup is of a new design that results in excellent reproduction. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature.

REPLACING MAGNET COIL, PIVOT RUBBERS, OR ARMATURE

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered.

(f) The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position.

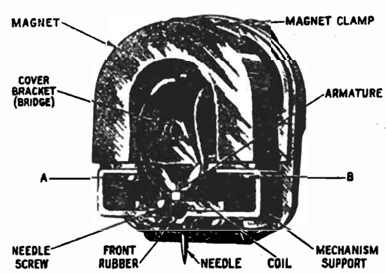


Figure A—View of Pickup showing parts

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure A), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

Only rosin core solder should be used for any soldering in conjunction with the pickup. However, if great care to wipe clean and use as small amount as possible is exercised, paste or liquid flux may be used for soldering the end of the spring.

MODEL RE-40-P
Assembly wiring

RCA-VICTOR CO., INC.

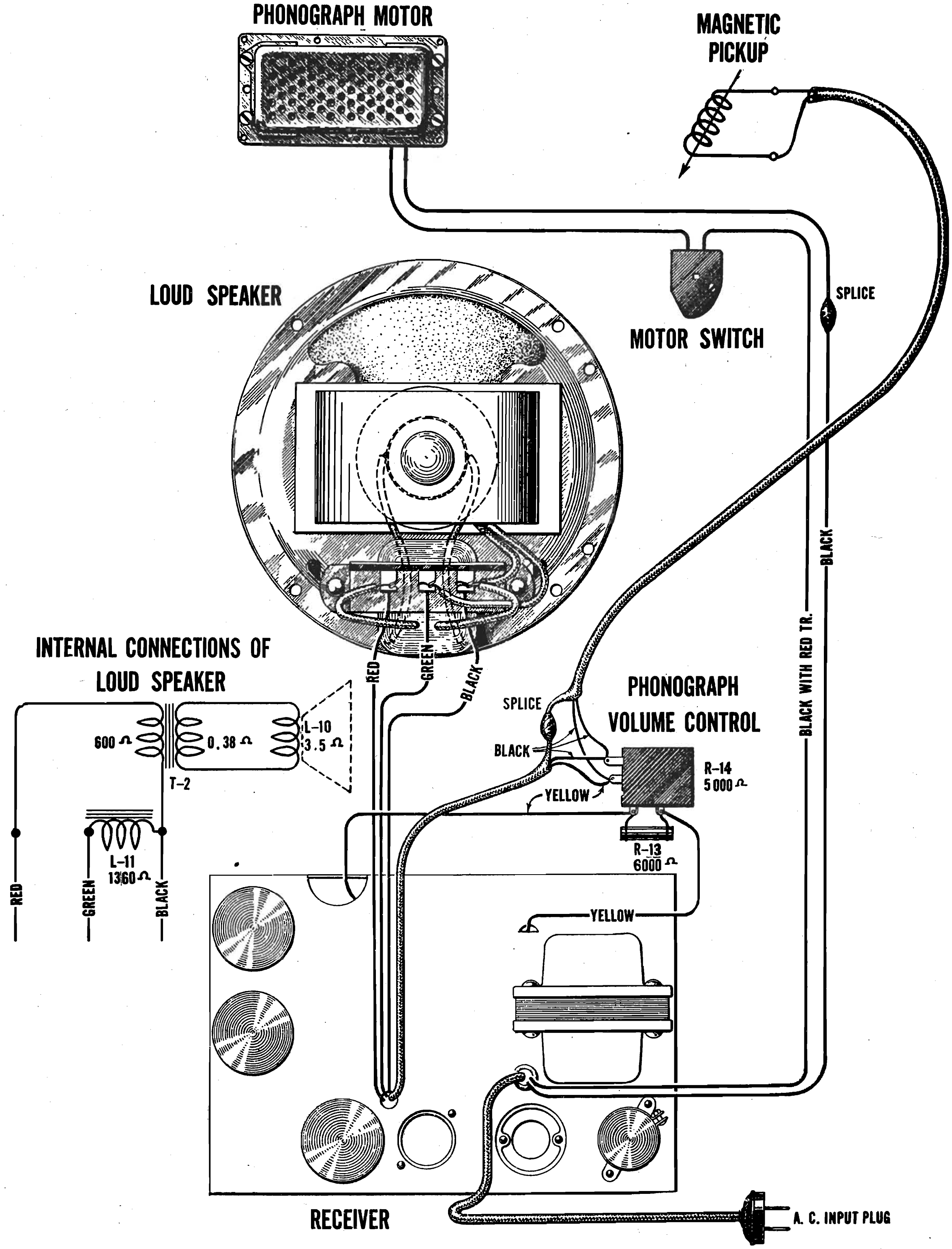


Figure B—Assembly Wiring

MODEL RE-40-P
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd	$0.75
2563	Resistor—6,000 ohms—Carbon type—1 watt—Located on volume control—Package of 5	1.10
2747	Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd	.35
2994	Coil—R. F. choke coil	.45
3024	Capacitor—9 mmfd.—Package of 2	.50
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3456	Capacitor—0.05 mfd	.44
3459	Capacitor—80 mmfd	.44
3472	Capacitor—0.0024 mfd	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.—Oscillator filter	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3592	Knob—Station selector or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd	.36
3597	Capacitor—0.25 mfd	.40
3598	Capacitor—0.1 mfd	.36
3601	Coil—Choke coil	.68
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3604	Capacitor—400 mmfd	.30
3606	Capacitor—Comprising one 0.005 mfd. and one 0.025 mfd. capacitors	.40
3623	Shield—R. F. or oscillator coil shield	.30
3705	Scale—Dial scale assembly	.50
G5027	Escutcheon—Station selector escutcheon—Package of 2	.70
G5028	Escutcheon—Name plate escutcheon—Package of 2	.70
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6465	Volume control—Complete with mounting nut	1.22
6466	Switch—Tone control switch	.45
6471	Coil—Oscillator coil assembly	.74
6527	Coil—Antenna coil	1.08
6528	Coil—R. F. coil assembly	.94
6529	Switch—Range switch	1.25
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7588	Condenser—3 gang variable tuning condenser	2.85
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container	1.64
7590	Capacitor—10 mfd	1.40
8985	Transformer—Power transformer—105-125 volts—50-60 cycles	4.26
8986	Transformer — Power transformer — 200-250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105-125 volts—25-50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
9003	Coil assembly—Comprising field coil, magnet and cone support	2.35
	MOTOR ASSEMBLIES	
3599	Motor mounting washer assembly—Comprising one screw, one washer and one lock washer—Package of 3 sets	$0.30
8989	Motor—Motor complete 105-125 volts—60 cycles	18.52
8990	Motor—Motor complete 105-125 volts—50 cycles	18.52
8991	Motor—105-125 volts—40 cycles	23.36
8992	Motor—Motor complete 105-125 volts—25 cycles	23.36
8993	Rotor and shaft for 105-125 volts, 60 cycles motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycles motor	4.75
8995	Rotor and shaft for 105-125 volts, 50 cycles motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycles motor	4.75
8997	Rotor and shaft for 105-125 volts, 40 cycles motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycles motor	5.50
8999	Rotor and shaft for 105-125 volts, 25 cycles motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycles motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3600	Coil—Pickup coil	.50
G5026	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.65
6346	Back—Pickup housing back	.45
6474	Pickup—Pickup unit complete	4.00
7593	Arm—Pickup arm complete, less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3430	Box—Needle box with lid—Package of 2	.90
3615	Knob—Tone control, band selector or operating switch knob—Package of 5	.60
6475	Volume control—Phonograph volume control	1.25
10174	Springs—Automatic brake springs—One set of 4 springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40

RCA-VICTOR CO., INC.

MODEL R-51-B, R-53-B
Schematic, Chassis

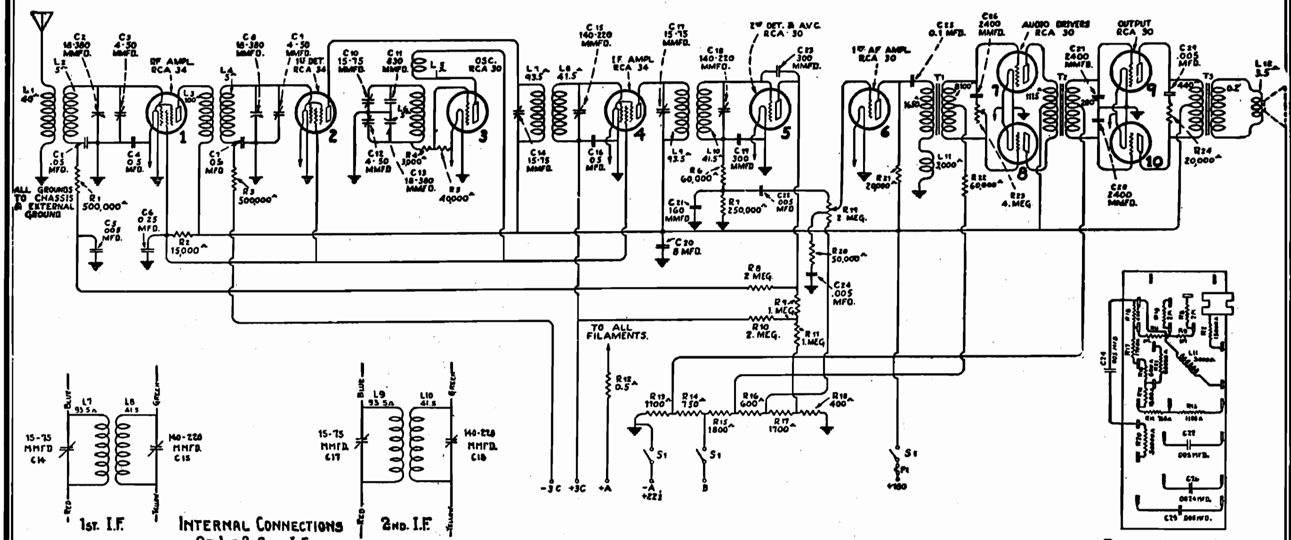


Figure A—Schematic Circuit

Total "A" Battery Current.................................0.6 Ampere
Average "B" Battery Current...............................18 M. A.
Type and Number of Radiotrons......7 RCA-230, 3 RCA-234—Total, 10
Undistorted Output.......................................1.6 Watts

This receiver is a ten-tube battery operated Super-Heterodyne giving excellent performance. Features such as automatic volume control, continuously variable tone control, double class "B" audio amplifier, low "A" and "B" battery current drain, permanent magnet dynamic loudspeaker, exceptional fidelity, large undistorted output, compensated volume control, and the inherent sensitivity, selectivity, and tone quality of the Super-Heterodyne characterize this instrument. The performance of this receiver is comparable in all respects to a modern A. C. receiver of similar design.

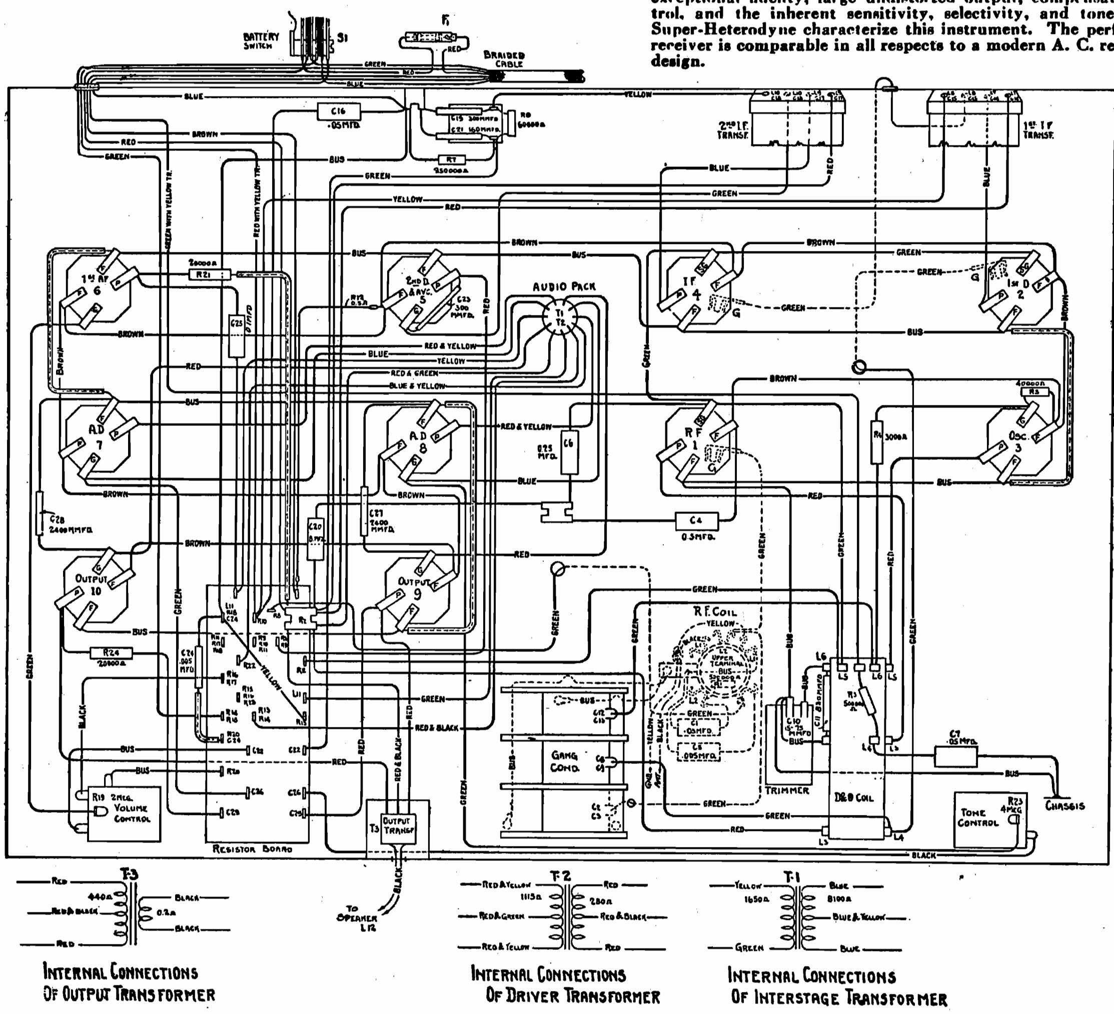


Figure B—Wiring Diagram

MODEL R-51-B,R-53-B
Voltage,Alignment
Parts List

RCA-VICTOR CO., INC.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis. A tube base with a 16000 ohms resistor connected between one filament prong and the plate prong must be substituted for the oscillator tube.

(c) Connect the oscillator output between the first detector control grid and the negative terminal on the 4.5 volt bias battery. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter. Also a socket wrench is necessary for the main tuning capacitor trimmers.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the first line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

New "A" and "B" Batteries—No Signal Received

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M. A.	Filament Volts
R. F.—RCA-234	2.0	65.0	157.5	3.0	2.15
Oscillator—RCA-230	—	—	65.0	4.0	2.15
First Detector—RCA-234	5.0	65.0	157.5	1.0	2.15
I. F.—RCA-234	2.0	65.0	157.5	3.0	2.15
Second Detector—RCA-230	0	—	—2.0	0	2.15
First A. F.—RCA-230	10.5	—	130.0	1.25	2.15
Driver A. F.—RCA-230	13.5	—	150.0	1.5	2.15
Driver A. F.—RCA-230	13.5	—	150.0	1.5	2.15
Power—RCA-230	13.5	—	150.0	1.5	2.15
Power—RCA-230	13.5	—	150.0	1.5	2.15

REPLACEMENT PARTS

Insist on genuine factory tested parts which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3003	Cushion—Sponge rubber chassis support cushion—Package of 4	.30
3033	Resistor—1 megohm—Carbon type—¼ watt—Package of 5	1.00
3088	Knob—Operating switch knob—Package of 5	.50
3114	Resistor—50,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3238	Screw—Set screw for switch knob No. 3088—Package of 10	.25
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3382	Resistor—750 ohms—Carbon type—½ watt—Package of 5	1.00
3449	Coil—Choke coil located on resistor board	1.12
3472	Capacitor—0.0024 mfd	.32
3556	Capacitor—0.05 mfd.—Located on antenna coil	.34
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3616	Capacitor—300 mmfd	.34
3634	Capacitor—160 mmfd	.34
3640	Capacitor—0.05 mfd	.25
3643	Capacitor—0.005 mfd	.25
3703	Resistor—1,700 ohms—Carbon type—¼ watt—Package of 5	1.00
3704	Resistor—400 ohms—Carbon type—¼ watt—Package of 5	1.00
3706	Resistor—1,800 ohms—Carbon type—¼ watt—Package of 5	1.00
3707	Volume control—Complete with mounting nut	1.40
3708	Resistor—600 ohms—Carbon type—¼ watt—Package of 5	1.00
3743	Resistor—0.5 ohm—Flexible type—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3748	Fuse—½ ampere—Package of 5	.40
3749	Capacitor—0.1 mfd	.30
3750	Capacitor—0.25 mfd	.36
3751	Capacitor—0.5 mfd	.40
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6143	Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5	1.00
6176	Escutcheon—Operating switch escutcheon—Package of 5	$0.50
6186	Resistor—500,000 ohms—Carbon type—¼ watt—Package of 5	1.00
6192	Spring—3 gang tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—¼ watt—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6281	Resistor—1,100 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.00
6298	Cord—3 gang tuning condenser drive cord—Package of 5	.60
6300	Socket—UX Radiotron socket	.35
6320	Capacitor—670 mmfd.—Located on detector oscillator coil—Package of 5	1.50
6323	Shaft—Tuning condenser drive shaft with one flat washer and two "C" washers—Package of 2	.20
6332	Switch—Operating switch	1.60
6449	Tone control complete with mounting nut	1.06
6512	Capacitor—0.005 mfd	.28
6516	Connector—Fuse connector	.16
6522	Shield—Radiotron shield	.30
6523	Transformer—Audio transformer assembly comprising driver transformer and interstage transformer	5.24
6524	Transformer—First intermediate frequency transformer	2.28
6525	Transformer—Second intermediate frequency transformer	2.25
6526	Transformer—Output transformer	1.80
6533	Condenser—3 gang variable tuning condenser	5.55
6544	Coil—Antenna coil assembly	.85
6545	Coil—Detector oscillator coil	2.44
6546	Scale—Dial and dial scale	.75
6548	Capacitor—8.0 mfd. capacitor	.95
6549	Cable—Battery connecting cable	1.25
7062	Capacitor—Adjustable trimming capacitor 15 to 70 mmfd	.50
7439	Drum—Dial drum with set screws and 3 dial mounting nuts	.35
7523	Escutcheon—Station selector escutcheon	.50
	REPRODUCER ASSEMBLIES	
8920	Ring—Cone retaining ring	.35
9431	Bracket—Cone bracket and magnet assembly	8.10
9432	Cone—Reproducer cone complete with voice coil	1.89

RCA-VICTOR CO., INC.

MODEL R-70
Data, Parts List

SERVICE DATA

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption............................85 Watts
Radiotrons Required
3 RCA-58, 2 RCA-56, 1 RCA-247, 1 UX-280—Total 7
Undistorted Output...........................2.25 Watts
Intermediate Frequency........................175 K. C.
R. F. and Oscillator Line-up Frequency.....1400 K. C. Only

This receiver is a seven tube Super-Heterodyne receiver incorporating such features as new high efficiency Radiotrons. Pentode Output Stage, continuously variable tone control and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers. Line-up adjustments are made with a modulated oscillator and output meter. The I. F. amplifier consists of an untuned transformer and one tuned transformer. The I. F. frequency is 175 K. C. and the line-up capacitors should be adjusted for maximum output at this frequency. The three gang capacitor trimmers are adjusted for maximum output when the dial and oscillator are both set at 1400 K. C.

Figure A shows the loudspeaker wiring, Figure B the schematic wiring and Figure C, the chassis wiring. The voltage readings are given on the next page and the replacement parts below.

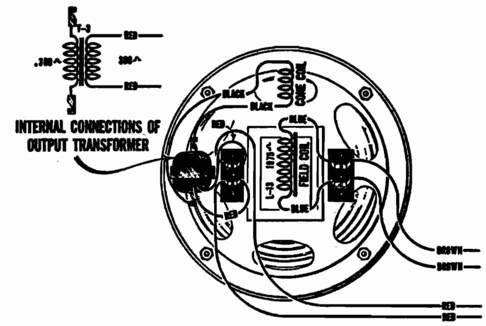


Figure A—Loudspeaker Wiring

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2532	Capacitor—230 mmfd.—Package of 5	$3.15
2746	Socket—Dial lamp socket	.50
2747	Cap—Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd.	1.50
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
3077	Resistor—30,000 ohms—Carbon type—½ watt—Package of 5	2.50
3078	Resistor—10,000 ohms—Carbon type—½ watt—Package of 5	2.50
3461	Coil—Second detector plate choke coil	.88
3462	Resistor—2,500 ohms—Carbon type—1 watt—Package of 5	1.10
3463	Resistor—6,500 ohms—Carbon type—1 watt—Package of 5	1.10
3464	Resistor—70,000 ohms—Carbon type—½ watt—Package of 5	1.00
3469	Resistor—2,500 ohms—Carbon type—1 watt—Package of 5	1.10
3470	Resistor—6,500 ohms—Carbon type—1 watt—Package of 5	1.10
3471	Capacitor—0.025 mfd.	.32
3472	Capacitor—0.0024 mfd.	.32
3490	Screw assembly—Chassis mounting screw assembly comprising 4 screws, 4 washers and 4 spacers—1 set	
3495	Capacitor—320 mmfd.	.50
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	2.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.50
6288	Knob—Station selector—Volume control or tone control knob—Package of 5	1.50
6298	Cord—3 gang variable tuning capacitor drive cord—Package of 5	1.00
6300	Socket—4 prong Radiotron socket	.55
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	2.50
6312	Capacitor—650 mmfd.—Oscillator series—Package of 5	2.50
6318	Resistor—10,000 ohms—Porcelain type—20 watts	1.00
6372	Volume control	1.34
6373	Coil—R. F. coil complete	1.06
6374	Coil—Detector and oscillator coil	2.14

Stock No.	DESCRIPTION	List Price
6375	Transformer—Second Intermediate frequency transformer	$1.88
6376	Transformer—First intermediate transformer	2.12
6377	Shaft—Tuning capacitor drive shaft with one flat washer and two "C" washers	.32
7484	Socket—UY type Radiotron socket	.65
7485	Socket—Radiotron 6 contact socket	.70
7501	Capacitor—3 gang variable tuning capacitor complete with mounting screws	5.20
7510	Shield—Radiotron tube shield—Maroon finish	.50
7522	Tone control	1.90
7557	Scale—Dial and dial scale	.80
7558	Transformer—Interstage audio transformer in metal container	2.48
7559	Capacitor pack—Comprising one 0.05 mfd., one 0.5 mfd., one 10.0 mfd., one 8.0 mfd., one 0.3 mfd., one 1.0 mfd. and three 0.1 mfd. capacitors in metal container	6.70
7560	Transformer—Power transformer—105–125 volts—50–60 cycles	6.14
7570	Transformers—Power transformer—105–125 volts—25–40 cycles	7.40
7571	Transformer—200–250 volts—50–60 cycles	6.28
	REPRODUCER ASSEMBLIES	
3005	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set	.50
6184	Board—Terminal board with 3 terminals—Package of 5	.50
6378	Transformer—Output transformer	1.94
8920	Ring—Cone retaining ring	.50
8935	Cone—Reproducer cone complete with voice coil—Package of 5	12.50
9422	Coil assembly—Comprising field coil, magnet and cone support	4.32
	CABINET ASSEMBLIES	
6113	Foot—Felt foot—Package of 15	
7437	Escutcheon—Tuning selector escutcheon	
X190	Cabinet—Complete less all equipment	
X191	Baffle board and cloth grille	
	PARTS SPECIAL FOR NURSERY MODEL	
3492	Knob—Blue knob	.30
3493	Knob—Red knob	.30
3494	Knob—Orange knob	.30
X194	Escutcheon—Station selector escutcheon—Red finish	
X195	Baffle board and grille cloth	
X196	Cabinet—Cabinet complete less all equipment	

MODEL R-70
Schematic, Voltage
Chassis wiring

RCA-VICTOR CO., INC.

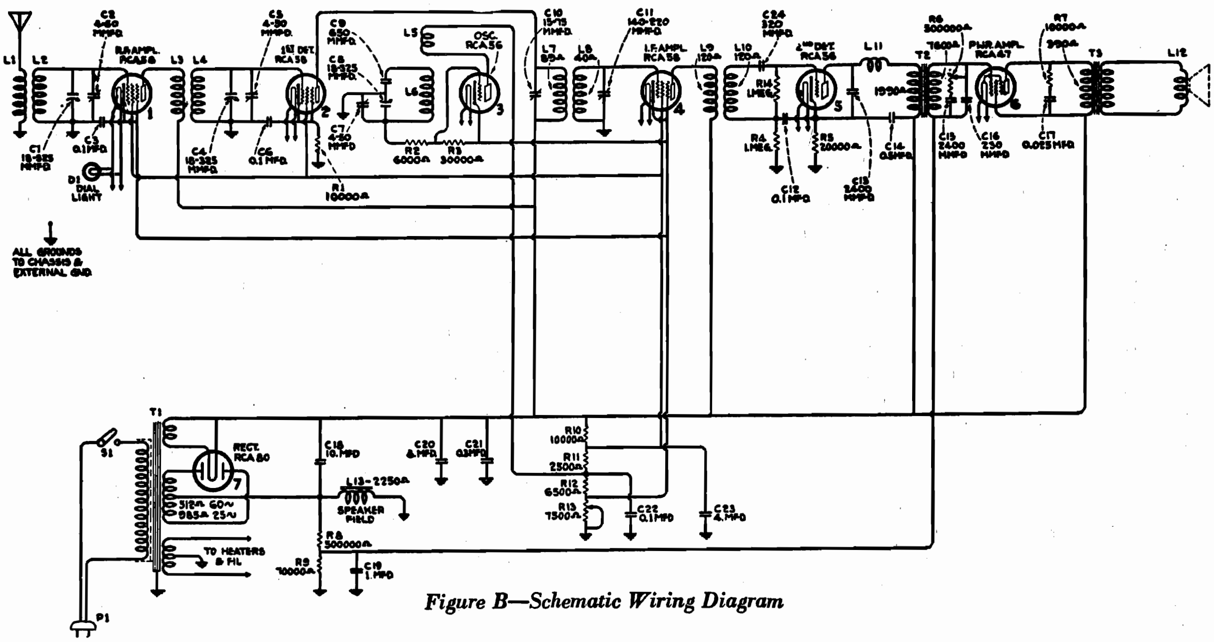


Figure B—Schematic Wiring Diagram

RADIOTRON SOCKET VOLTAGES

All Voltages Measured at Maximum Volume with no Signal Impressed on Input. 120 Volt 60 Cycle A. C. Source Used

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	245	6.0	2.37
2. Oscillator RCA-56	—	—	60	4.5	2.37
3. First Detector RCA-58	13.0	90	235	1.3	2.37
4. I. F. RCA-58	4.5	100	245	6.0	2.37
5. Second Detector RCA-56	18.0	—	230	1.0	2.37
6. Power RCA-247	16.5	250	240	30.0	2.37
7. Rectifier UX-280	370 Volts R. M. S. each plate			70.0	5.0

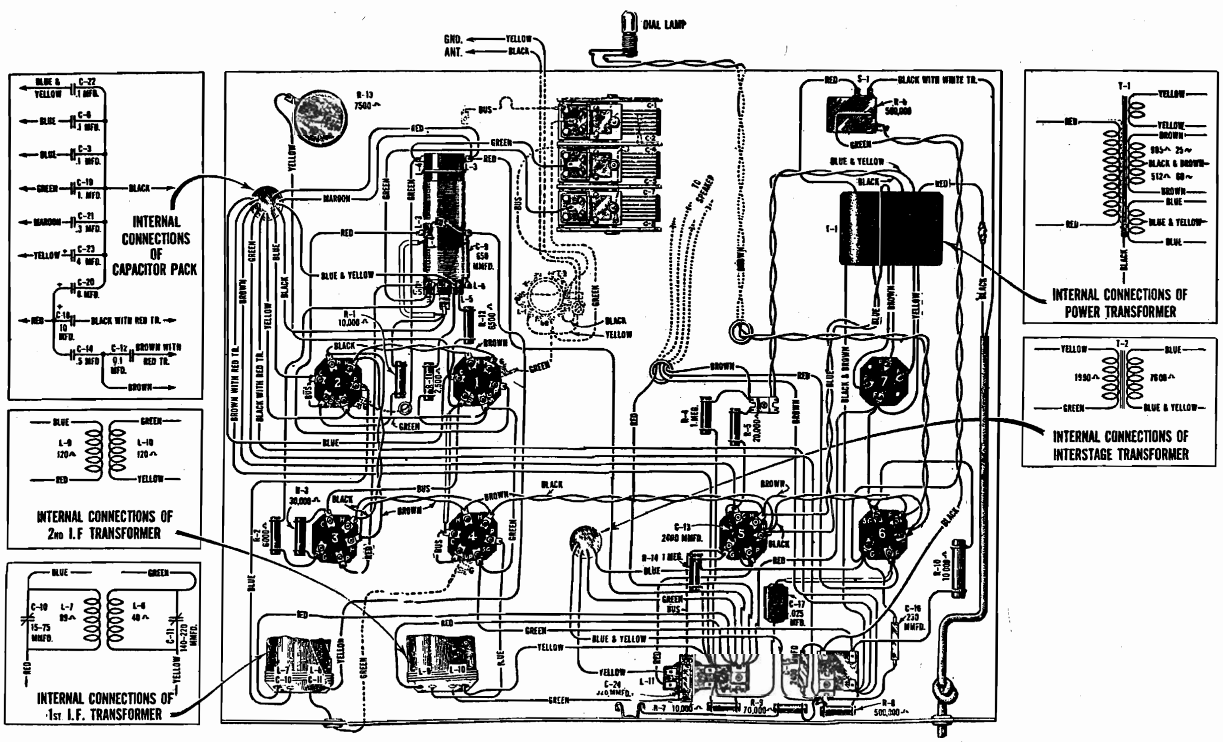


Figure C—Chassis Wiring Diagram

MODEL R-73-A
Alignment, Voltage
Speaker data

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption..........................100 Watts
Type and Number of Radiotrons..3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-2A5, 1 UX-280—Total, 8
Type of Circuit..Super-Heterodyne with A.V.C., tone control and push-pull Universal Output Tubes
Undistorted Output.............................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C., and 1400 K. C.
Intermediate Frequency.......................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Universal Output tubes operated as a push-pull pentode stage. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

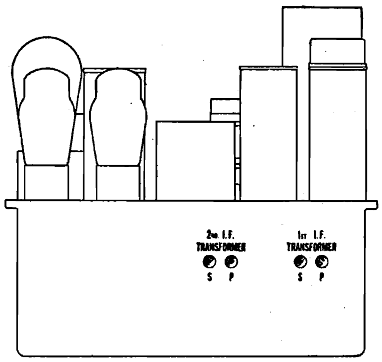


Figure C—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C., and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.
(b) Remove the oscillator tube and connect a ground to the chassis.
(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.
(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

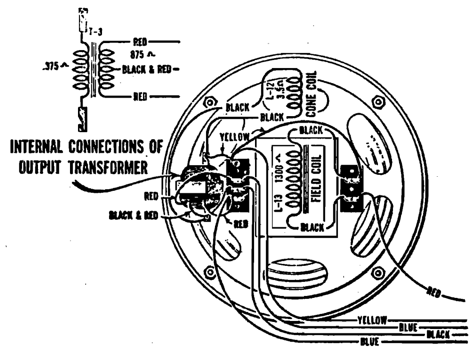


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.
(c) Adjust the three line-up capacitors, accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.
(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.
(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. at Maximum and No Signal

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Filament or Cathode, Volts	Plate to Filament or Cathode, Volts	Plate Current, M. A.	Heater or Filament, Volts
1. R. F. RCA-58	4.0	100	240	6.0	2.4
2. 1st Det. RCA-58	10.0	90	230	2.0	2.4
3. Osc. RCA-56	—	—	75	4.5	2.4
4. I. F. RCA-58	4.0	100	240	6.0	2.4
5. 2nd Det. RCA-55 and A.V.C.	5.8	—	100	4.0	2.4
6. PWR. RCA-2A5	19.0	230	220	20.0	2.4
7. PWR. RCA-2A5	19.0	230	220	20.0	2.4

Rectifier—370 Volts R.M.S. Each Plate

MODEL R-73-A
Schematic
Chassis wiring

RCA-VICTOR CO., INC.

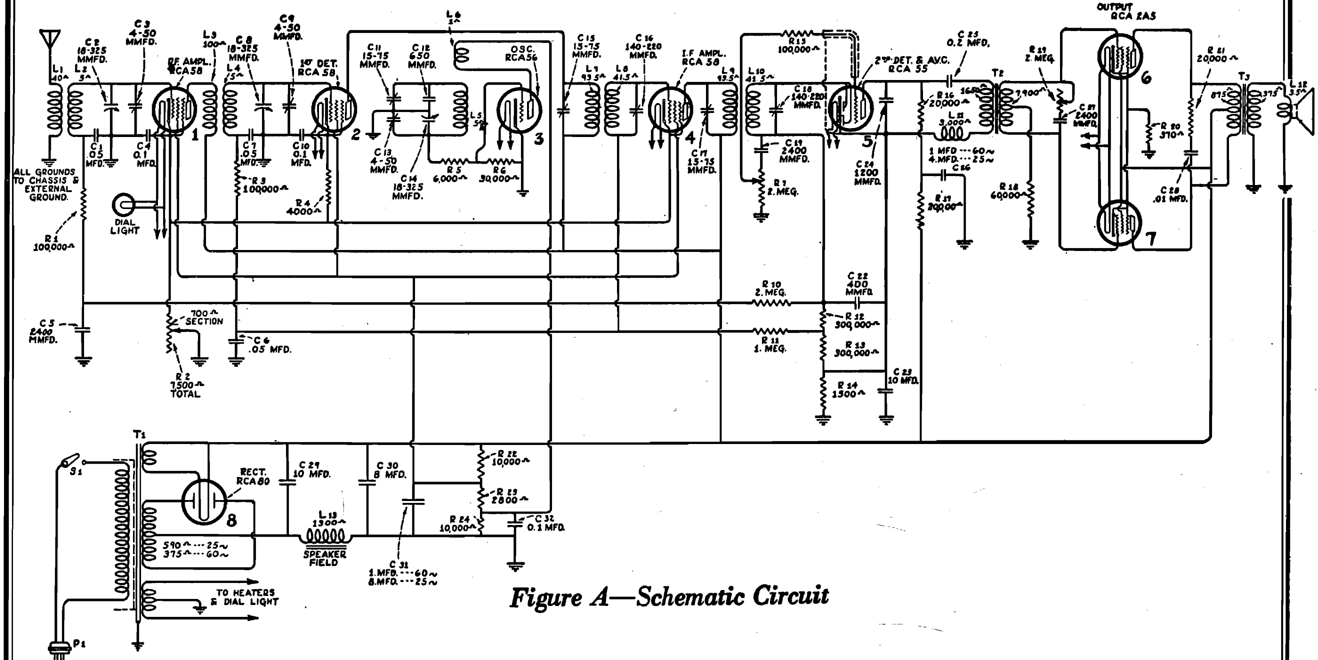


Figure A—Schematic Circuit

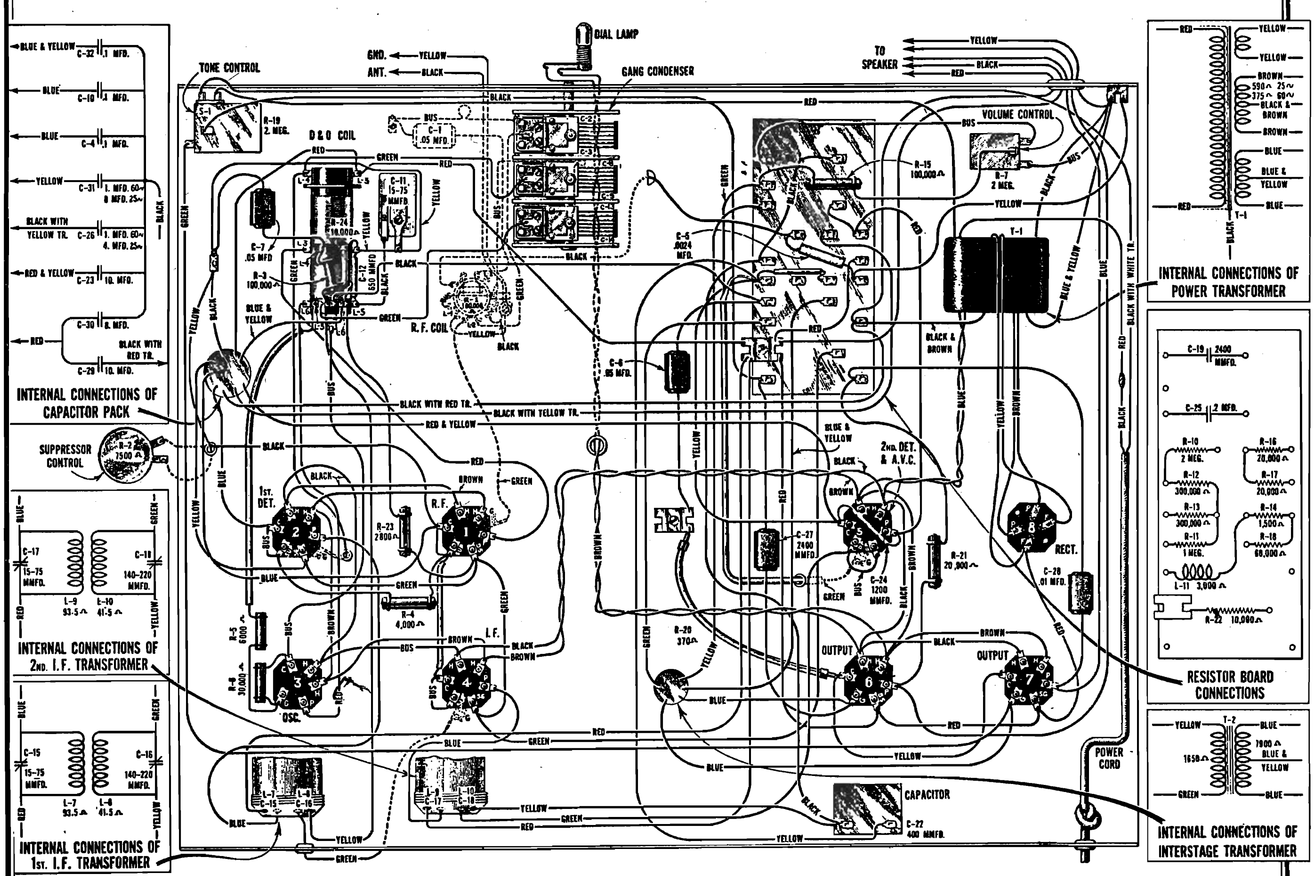


Figure B—Chassis Wiring Diagram

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.30
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	1.00
3078	Resistor—10,000 ohms—½ watt—Carbon type—Package of 5	1.00
3241	Resistor—300,000 ohms—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	1.00
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd	.46
3451	Bracket—Dial lamp bracket and indicator...Package of 2	.38
3455	Capacitor—0.01 mfd	.44
3458	Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5	1.00
3460	Capacitor—1200 mmfd	.30
3472	Capacitor—0.0024 mfd	.32
3548	Knob—Noise suppressor knob	.24
3549	Capacitor—400 mmfd	.34
3550	Resistor—370 ohms—Flexible type—Package of 5	.80
3556	Capacitor—0.05 mfd	.34
3565	Socket—Dial lamp socket	.50
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	1.00
6188	Resistor — 2 megohm — Carbon type — ½ watt—Package of 5	1.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.30
6250	Resistor — 4,000 ohms — Carbon type — ½ watt—Package of 5	1.00
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.00
6298	Cord—3 gang variabe tuning capacitor drive cord—Package of 5	.60
6300	Socket—4 contact Radiotron socket	.35
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	1.00
6312	Capacitor—650 mmfd.—Located on detector oscillator coil—Package of 5	1.50
6318	Resistor—10,000 ohms—Porcelain type—20 watt	.80
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	$0.20
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer—Second intermediate frequency transformer	2.14
6370	Tone control—Complete with mounting nut	1.34
6452	Volume control—Complete with mounting nut	1.40
6453	Rheostat—Noise suppressor rheostat	1.10
6454	Coil—R. F. coil complete with mounting bracket	.90
7054	Cord—Power cord	.60
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd	.50
7065	Screw driver—Micarta screw driver for I. F., R. F., and oscillator condensers	.80
7439	Drum—Dial drum with 3 dial mounting nuts	.35
7440	Scale—Dial and dial scale	.50
7481	Coil—Detector and oscillator coil complete with mounting bracket	2.20
7484	Socket—UY type Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7501	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	4.20
7549	Transformer—Interstage audio transformer	2.48
7582	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., two 1.0 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	8.06
7583	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 4.0 mfd., capacitors in metal container—For 25 cycle operation	10.00
7584	Transformer—Power transformer 105-125 volts—50-60 cycles	5.72
7585	Transformer—Power transformer—105-125 volts—25-50 cycles	9.86
7586	Transformer—Power transformer 200-250 volts—50-60 cycles	5.88
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets	.50
6184	Board—Terminal board complete with 3 terminals	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone complete with voice coil	6.35
9421	Coil assembly—Comprising field coil, magnet, and cone support	4.32

MODEL RE-80
Alignment, Voltage
Speaker data, Notes

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating .... 105-125 Volts
Power Consumption .... 120 Watts
Type and Number of Radiotrons ...... 3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit .... Super-Heterodyne with A. V. C., tone control and push pull Pentode Output
Undistorted Output .... 3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C. and 1400 K. C.
Intermediate Frequency .... 175 K. C.
Type of Magnetic Pickup Low Impedance with Inertia Type Tone Arm
Type of Turntable ...... Two Speed with Ball Race Reducer

This combination instrument uses an eight tube chassis incorporating automatic volume control, tone control, noise suppressor and push-pull Pentode output stage. Due to the excellent high frequency response of this receiver, a switch is provided for reducing the high frequency response when playing records having a high value of needle scratch. The radio-record switch and record volume control are one unit, accessible from the front. High and low frequency compensation is incorporated in the record audio system.

Service work will be found to be similar to that of other Super-Heterodyne receivers incorporating automatic volume control.

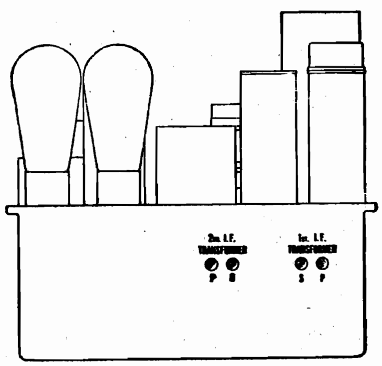


Figure C—I. F. Alignment Location

Line-Up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.
(b) Remove the oscillator tube and connect a ground to the chassis.
(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.
(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

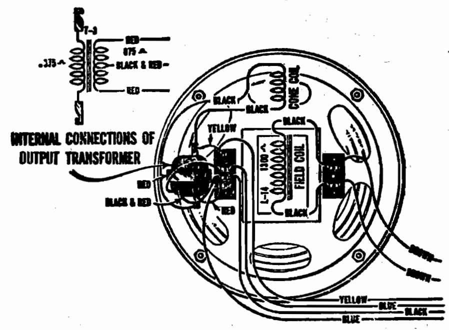


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.
(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.
(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.
(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. At Maximum and No Signal.

Radiotron No.	Control Grid to Filament or Cathode Volts	Screen Grid to Filament or Cathode Volts	Plate to Filament or Cathode Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	165	6.0	2.37
2. 1st Det. RCA-58	11.0	95	155	1.5	2.37
3. Oscillator RCA-56	—	—	70	4.5	2.37
4. I. F. RCA-58	4.5	100	165	6.0	2.37
5. 2nd Det. RCA-55 and A.V.C.	—	—	55	4.7	2.37
6. Power RCA-247	19.0	235	225	20.0	2.37
7. Power RCA-247	19.0	235	225	20.0	2.37

OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field . 105 Volts
Chassis to Low Side of Field .... 90 Volts
Voltage Across Field .... 120 Volts
Rectifier . . 370 Volts R.M.S. Each Plate—80 M.A. Each Plate

RCA-VICTOR CO., INC.

MODEL RE-80
Schematic
Chassis wiring

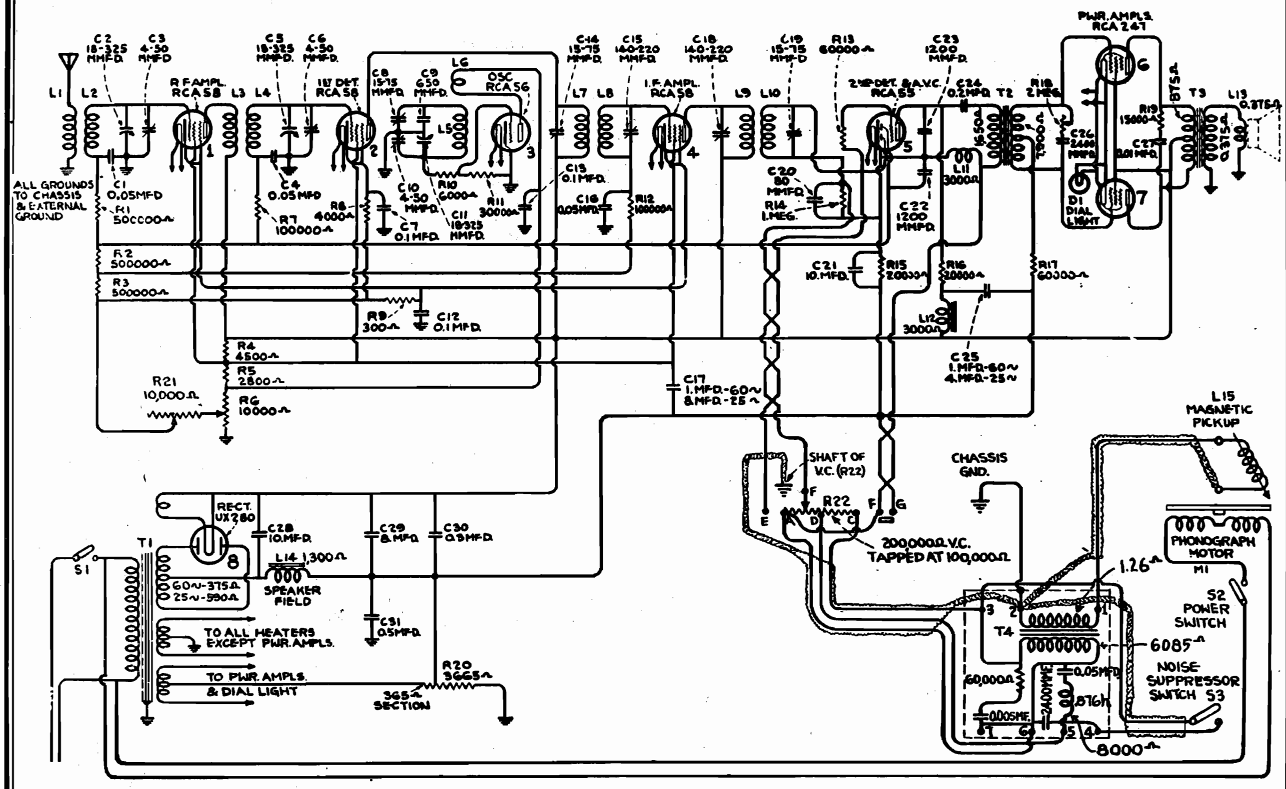


Figure A—Schematic Wiring Diagram

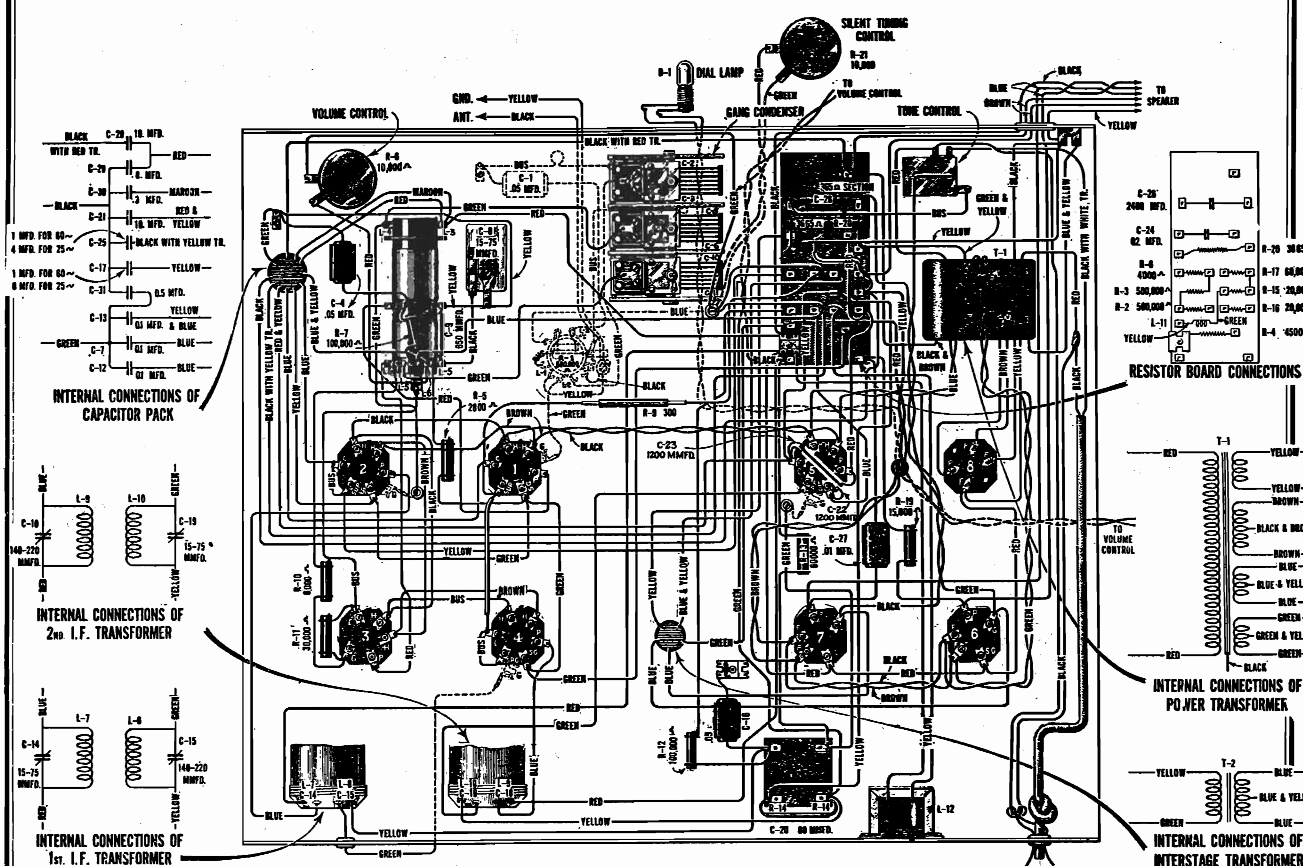


Figure B—Chassis Wiring Diagram

MODEL RE-80
Assembly wiring

RCA-VICTOR CO., INC.

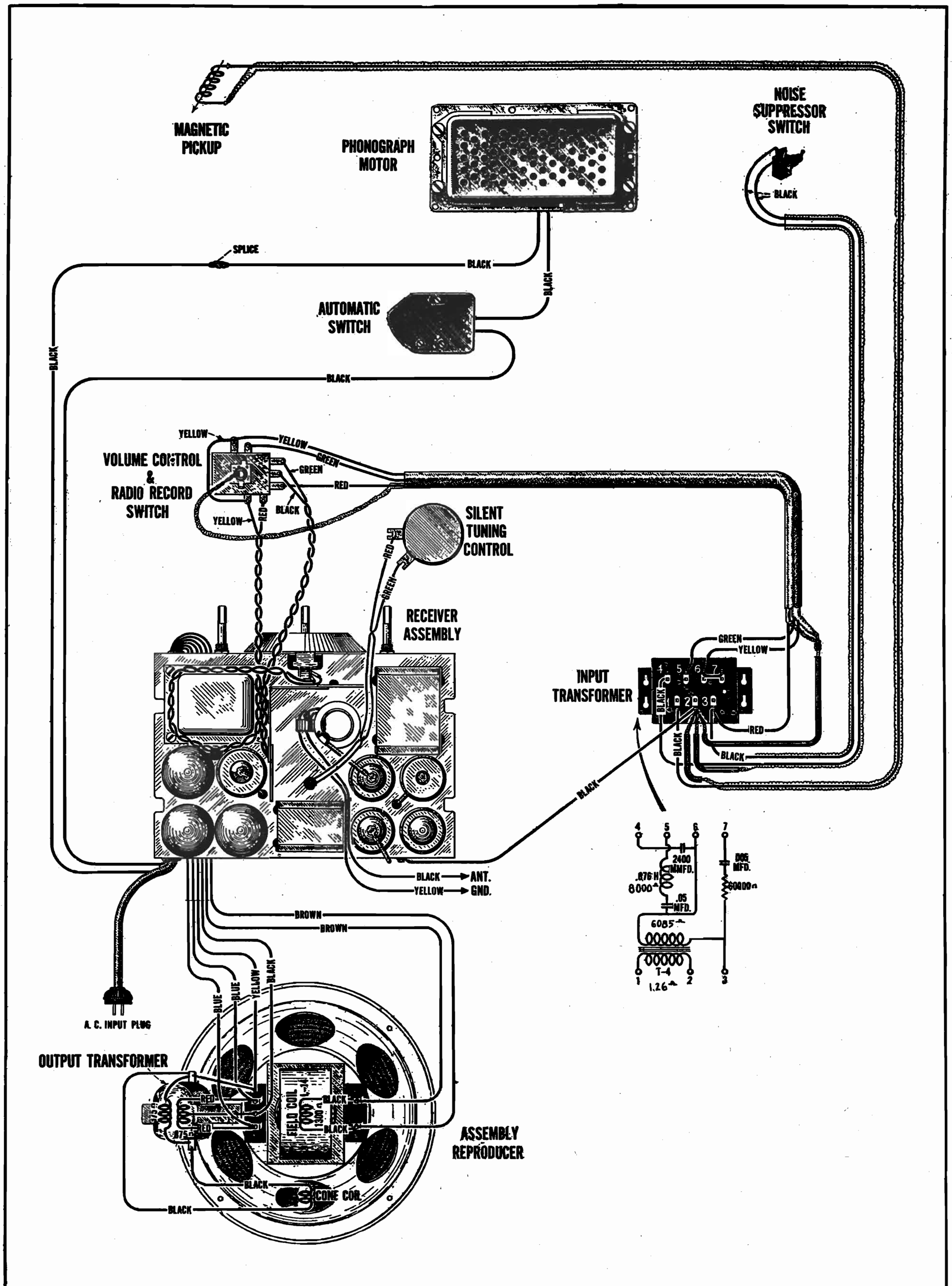


Figure E—Assembly Wiring Diagram

MODEL RE-80
Pickup data

RCA-VICTOR CO., INC.

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of the viscoloid damping block.

The use of the viscoloid damping block, which vibrates as a whole on the low frequencies, yet absorbs the armature vibration at the higher frequencies, eliminates any bad peaks in the frequency range. This pickup output is substantially flat from 50 to 5000 cycles.

REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

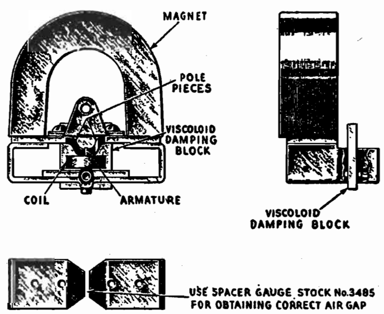


Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered, being careful not to use too much heat as damage to the viscoloid damping block may result.

(f) Before reassembling the pole pieces the air gap should be correctly set by use of a Spacer Gauge—Stock No. 3485. The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position, making sure that the viscoloid damping block is entirely free from touching any parts, including the cover.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

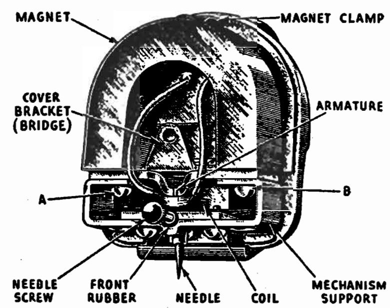


Figure G

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered. If the air gap is previously checked by means of Space Gauge, Stock No. 3485, no difficulty will be had in properly centering the armature.

REPLACING THE VISCOLOID DAMPING BLOCK

If it is desired to replace the viscoloid damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism frame.

(c) Remove the damping block from the armature.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the viscoloid in place. The iron should be applied long enough to slightly melt the viscoloid and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling of the viscoloid. The pickup should then be reassembled as described in the preceding section.

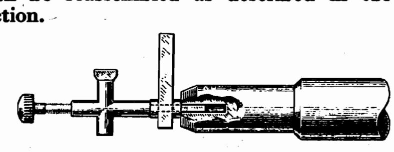


Figure H

Only rosin core solder should be used for any soldering in conjunction with the pickup. However if great care to wipe clean and use as small amount as possible is exercised paste or liquid flux may be used for soldering the end of the spring.

MODEL RE-80
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

Stock No.	DESCRIPTION
	RECEIVER ASSEMBLIES
2746	Socket—Dial lamp socket
2747	Cap—Contact cap
2749	Capacitor—2,400 mmfd. capacitor
3003	Cushion—Sponge rubber chassis support cushions
3048	Resistor—500,000 ohms—Carbon type—½ watt
3076	Resistor—1 megohm—Carbon type—½ watt
3077	Resistor—30,000 ohms—½ watt—Carbon type
3252	Resistor—100,000 ohms—½ watt—Carbon type
3369	Resistor—4,500 ohms—Porcelain type—20 watt
3449	Coil—Choke coil mounted on resistor board
3450	Capacitor—0.2 mfd. mounted on resistor board
3451	Bracket—Dial lamp bracket and indicator
3455	Capacitor—0.01 mfd.
3456	Capacitor—0.05 mfd.
3457	Resistor—Porcelain type—3,665 ohms—Tapped at 365 ohms
3458	Resistor—2,800 ohms—Carbon type—½ watt
3459	Capacitor—80 mmfd. capacitor
3460	Capacitor—1,200 mmfd. capacitor
3468	Resistor—300 ohms—Flexible type
3485	Guage—Pole piece spacing guage
6142	Resistor—6,000 ohms—½ watt—Carbon type
6192	Spring—3 gang tuning capacitor drive cord tension spring
6279	Resistor—15,000 ohms—½ watt—Carbon type
6282	Resistor—60,000 ohms—Carbon type—½ watt
6288	Knob—Station selector, tone control or volume control knob
6298	Cord—3 gang variable tuning capacitor drive cord
6300	Socket—4 contact Radiotron socket
6301	Reactor—Filter reactor
6303	Resistor—20,000 ohms—½ watt—Carbon type
6308	Coil—R. F. coil complete with mounting bracket
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers
6367	Transformer—First intermediate frequency transformer
6368	Transformer—Second intermediate frequency transformer
6369	Volume control—Complete with mounting nut
6370	Tone control—Complete with mounting nut
7054	Cord—Power cord
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.
7065	Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers
7439	Drum—Dial drum with 3 dial mounting nuts
7440	Scale—Dial and dial scale
7481	Coil—Detector and oscillator coil complete with mounting bracket
7484	Socket—UY type Radiotron socket
7485	Socket—6 contact Radiotron socket
7510	Shield—Radiotron tube shield—Maroon finish
7511	Shield—Radiotron tube shield top—Maroon finish
7549	Transformer—Interstage audio transformer
7550	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0.3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation
7551	Transformer—Power transformer—105–125 volts—50–60 cycles
7552	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers
7556	Transformer—Power transformer—105–125 volts—25–50 cycles
7564	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation
	MOTOR BOARD ASSEMBLIES
2947	Leather—Friction leather
3322	Switch—Automatic brake switch with mounting screws
3391	Suspension spring and washer assembly for motor board—Comprising 1 bolt, 1 top spring, 1 bottom spring, 1 "C" washer, 2 cup washers and 1 nut
3430	Box—Needle box with lid
3396	Receptacle—Needle receptacle with mounting screws
10174	Springs—Automatic brake springs—One set of 4 springs—Package of 2 sets
10184	Plate—Automatic brake latch trip plate with mounting screws
10635	Switch—Scratch filter switch—Toggle type
	PICKUP AND PICKUP ARM ASSEMBLIES
3385	Coil—Pickup coil
3386	Cover—Pickup cover
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer
3388	Screw—Pickup needle holding screw
3389	Rod—Automatic brake trip rod with lock nut
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets
3417	Armature—Pickup armature
3418	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing.
3419	Screw—Pickup cover mounting screw
6335	Pickup—Pickup unit complete
6346	Back—Pickup housing back
7538	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer
	TURNTABLE ASSEMBLIES
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud
3340	Washer—Thrust washer
3341	Pin—Groov-Pin
3342	Spring—Latch spring—Located on clamping ring
3343	Sleeve—Sleeve complete with ball race
3344	Cover—Grease retainer cover
3346	Bushing—Speed shifter lever bushing
3347	Spring—Speed shifter lever spring
3399	Lever—Speed shifter lever with mounting screws
8948	Turntable—Complete
	MOTOR ASSEMBLIES
3398	Motor mounting washer assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer
7389	Rotor and shaft for 105–125 volts, 60 cycle motor
7443	Rotor and shaft for 105–125 volts, 25 cycle motor
8939	Motor—Motor complete 105–125 volts—60 cycle
8940	Motor—Motor complete 105–125 volts—50 cycle
8941	Motor—Motor complete 105–125 volts—25 cycle
8943	Rotor and shaft for 105–125 volts, 50 cycle motor
8945	Spindle—Turntable spindle with fibre gear for 60 cycle motor
8947	Spindle—Turntable spindle with fibre gear for 25 cycle motor
	REPRODUCER ASSEMBLIES
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets
6184	Board—Terminal board complete with 3 terminals
6371	Transformer—Output transformer
8920	Ring—Cone retaining ring
8969	Cone—Reproducer cone complete with voice coil
9121	Coil assembly—Comprising field coil, magnet and cone support
	MISCELLANEOUS PARTS
3437	Knob—Selector switch and volume control knob
6385	Volume control—Phonograph volume control and selector switch
6386	Cable—3 conductor shielded cable—From phonograph to volume control and input transformer pack
7572	Transformer pack—Comprising input transformer, reactor, capacitors and resistor in metal container
	CABINET ASSEMBLIES
2776	Catch assembly—Door catch and strike with nails
8938	Board—Motor board—Less equipment
X168	Escutcheon—Station selector escutcheon
X173	Hinge—Lid hinge
X184	Panel—Control panel
X185	Leg—Cabinet end leg
X186	Foot—Cabinet foot
X187	Stretcher assembly—Comprising front, back and end rails.
X188	Lid—Cabinet lid
X189	Baffle board and grille cloth
6341	Support—Lid support with mounting screws

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating........105–125 Volts
Power Consumption........120 Watts
Type and Number of Radiotrons........3 RCA-56, 4 RCA-58, 1 UX-280, 2 RCA-2A5—Total, 10
Frequency Range........540 K. C.–1500 K. C. 1400 K. C.–2800 K. C.
Undistorted Output........4.0 Watts

This receiver is a ten tube Super-Heterodyne radio receiver. Features such as illuminated controls, improved automatic volume control, noise suppressor, compensated volume control, heater pentode output tubes operated as a push-pull stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the location of the adjustable capacitors and Figure D, the loudspeaker wiring. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. And Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with–the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C., 1400 K. C. and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor. Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g) and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed precedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

6. Adjust the two Tone Controls to obtain the tone shading preferred. The full range of musical reproduction is obtained with the right-hand knob all the way clockwise and the left-hand knob fully counter-clockwise, and is represented by full illumination of the tone color indicator which extends between the two knobs. Modifications of the tone range may be obtained as follows:

(a) To reduce the high-frequency (treble) response, or to decrease the background noise (static) interference *on station settings*, turn the right-hand tone control knob counter-clockwise. The extent of high-frequency cut-off thus obtained is indicated by shading of the *yellow* illumination at the right-hand side of the tone color indicator.

(b) To reduce the low-frequency (bass) response, or to decrease low pitched hum present on the signals of some stations, turn the left-hand tone control knob clockwise. The extent of low-frequency cut-off thus obtained is indicated by shading of the *blue* illumination at the left-hand side of the tone color indicator.

(c) The *red* illumination at the center of the tone color indicator represents the middle range of musical response. This illumination is not cut off by rotation of either of the tone control knobs as described in the preceding paragraphs (a) and (b).

MODEL R-90-P
Schematic, Speaker Voltage, Trimmers

RCA-VICTOR CO., INC.

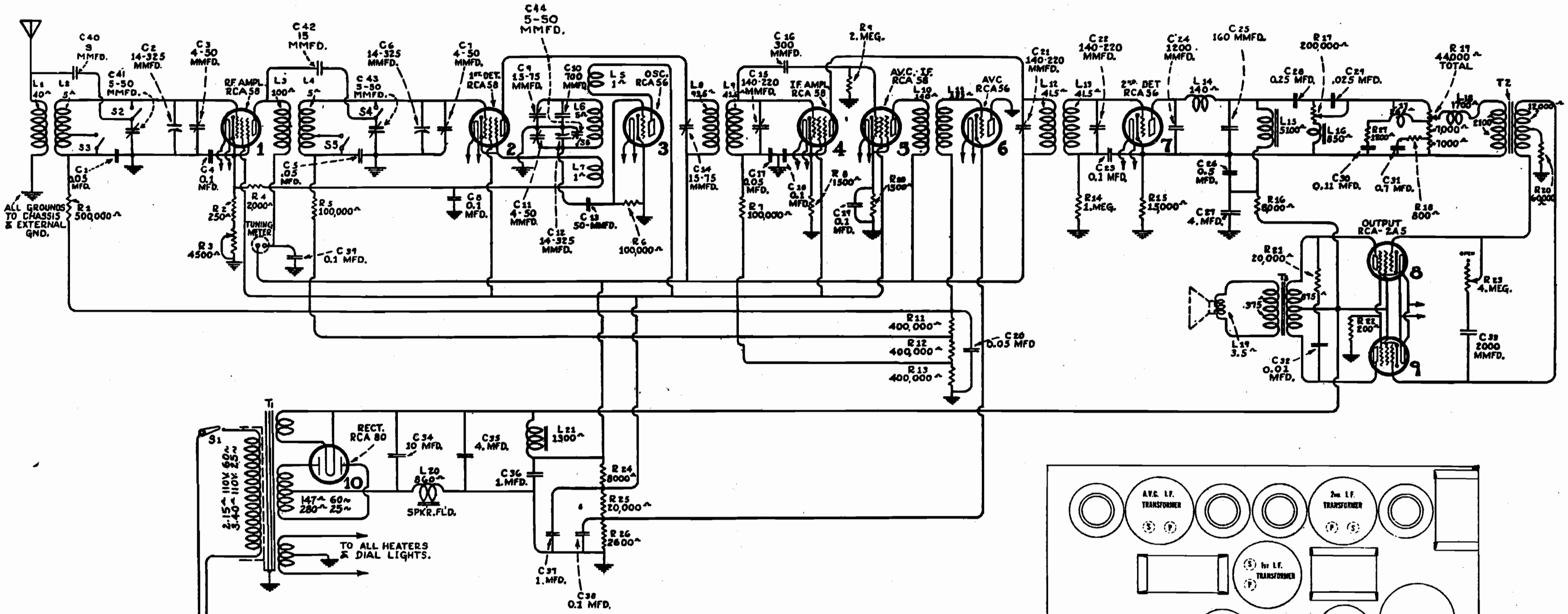


Figure A—Schematic Circuit Diagram

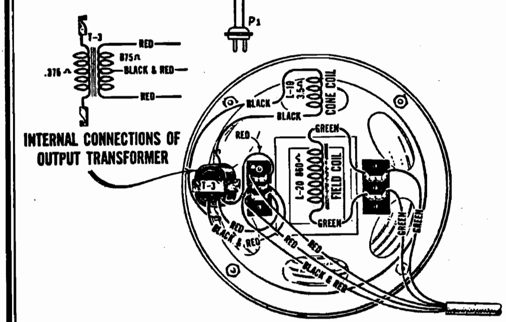


Figure D—Loudspeaker Wiring

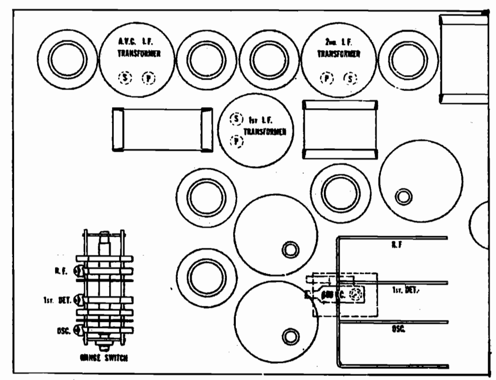


Figure C—Location of Adjustable Capacitors

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

RCA-VICTOR CO., INC.

MODEL R-90-P
Chassis wiring

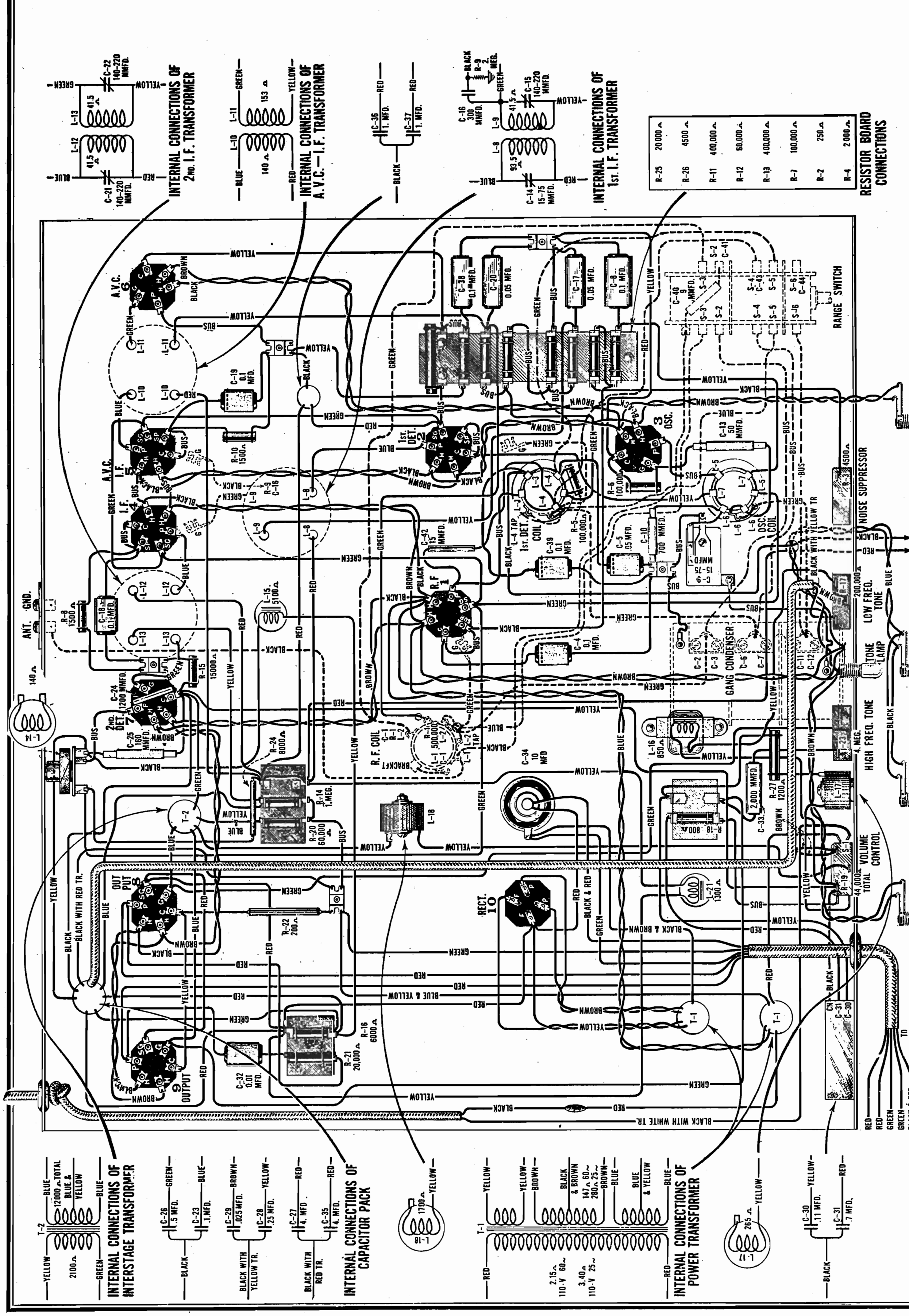


Figure B—Wiring Diagram

MODEL R-90-P
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3024	Capacitor—9 mmfd—Package of 2	$0.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt—Package of 5	1.00
3440	Resistor—4,500 ohms—Carbon type—½ watt—Package of 5	1.00
3455	Capacitor—0.01 mfd. capacitor	.44
3460	Capacitor—1,200 mmfd	.30
3513	Capacitor—700 mmfd	.48
3526	Resistor—2,000 ohms—Carbon type—½ watt—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt—Package of 5	1.00
3528	Bracket—Volume control or noise suppressor indicator lamp bracket	.18
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3530	Coil—Second detector plate choke coil	.72
3531	Shutter—Volume control shutter	.50
3532	Shutter—Noise suppressor shutter	.50
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lock washers, 4 washers, 8 cushions and 4 spacers—One set	.68
3552	Resistor—200 ohms—Porcelain type—20 watts	.80
3553	Resistor—8,000 ohms—Porcelain type—20 watts	.80
3554	Resistor—1,200 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd. capacitor	.36
3556	Capacitor—0.05 mfd. capacitor	.34
3557	Capacitor—0.002 mfd. capacitor	.30
3558	Capacitor—50 mmfd. capacitor	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp mounting bracket	.25
3565	Socket—Dial lamp socket	.50
3615	Knob—Range switch knob—Package of 5	.60
3638	Scale—Tuning Meter scale—Package of 5	.60
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft bushing and nut	.30
3747	Capacitor—15 mmfd	.36
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—¼ watt—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	$0.60
6314	Capacitor—160 mmfd. —Package of 5	2.00
6323	Shaft—Three gang variable tuning condenser drive shaft —Comprising 1 shaft, 2 "C" washers and 2 flat washers —Package of 2	.20
6429	Capacitor pack—Comprising one 0.11 mfd. and one 0.7 mfd. capacitor in metal container	.98
6430	Ccpacitor pack—Comprising two 4.0 mfd., one 0.25 mfd., one 0.025 mfd., one 0.1 mfd. and one 0.5 mfd. capacitors in metal container	3.78
6431	Reactor—Filter reactor	1.92
6432	Transformer—Interstage audio transformer	3.69
6434	Reactor—Second detector plate coupling reactor	1.96
6435	Transformer—First intermediate frequency transformer	2.54
6436	Reactor—High frequency tone control compensating reactor	.70
6437	Coil—Oscillator coil assembly	1.24
6439	Reactor—High frequency tone control reactor	1.14
6440	Transformer—Second intermediate frequency transformer	1.94
6441	Transformer—Third intermediate frequency transformer	1.76
6442	Reactor—Volume control series reactor	.88
6443	Capacitor—10 mfd	1.50
6444	Socket—Five contact Radiotron socket	.36
6445	Socket—Six contact Radiotron socket	.38
6446	Socket—Four contact Radiotron socket	.32
6447	Volume control—Complete with mounting nut	1.92
6448	Tone control—Low frequency tone control complete with mounting nut	1.04
6449	Tone control—High frequency tone control complete with mounting nut	1.06
6450	Rheostat—Noise suppressor rheostat	1.24
6456	Escutcheon—Volume control escutcheon and color screen	.50
6457	Escutcheon—Noise suppressor escutcheon and color screen	.50
6458	Escutcheon—High and low frequency excutcheon and color screen	.92
6459	Cable—Braid covered—Five conductor reproducer cable	.54
6461	Meter—Tuning meter	2.14
6536	Condenser—3 gang variable tuning condenser assembly	5.00
6537	Switch—Range switch	1.30
6538	Coil—Antenna coil assembly	1.80
6539	Coil—Detector Coil	1.44
6541	Scale—Dial and dial scale	.75
6547	Bezel—Tuning Meter bezel	.45
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screws and three dial mounting nuts	.35
7487	Shield—Radiotron tube shield	.25
7488	Shield—Tube shield top	.20
8978	Transformer—Power transformer—105–120 volts—50–60 cycles	8.50
8979	Transformer—Power transformer—105–120 volts—25–40 cycles	12.88
8980	Transformer—Power transformer—210–240 volts—50–60 cycles	9.36
8982	Capacitor pack—Comprising two 1.0 mfd. capacitors in metal container	1.44
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone—Package of 5	6.35
9425	Coil assembly—Comprising field coil, magnet and cone support	4.94

RCA-VICTOR CO., INC.

MODEL RCA-100,101
Alignment, Speaker
Schematic,Voltage

SERVICE DATA

Voltage Rating............................105–125 Volts
Frequency Rating...................25–60 or 50–60 Cycles
Power Consumption..............................40 Watts
Number and Types of Radiotrons—
1 RCA-6A7, 1 RCA-6F7, 1 RCA-38, 1 RCA-1-V
Undistorted Output...............................1.6 Watts
Frequency Range......540–1500 K. C. and 1600–3500 K. C.

This receiver is a four-tube superheterodyne incorporating features such as wide tuning range, electro-dynamic loud-speaker, two-point tone control, illuminated dial and the inherent sensitivity, selectivity and tone quality of the super-heterodyne.

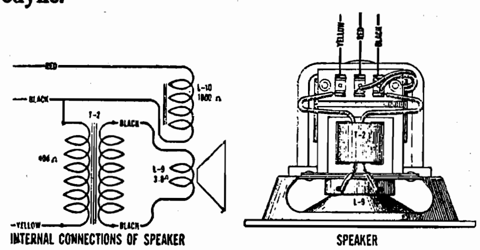


Figure C—Loudspeaker Wiring

The following description of the circuit describes several new design features which are incorporated in this receiver.

The first tube is a combined first detector and oscillator using Radiotron RCA-6A7. Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended merely by shorting out a portion of the coil. The oscillator circuit is not tapped, the high frequency range being obtained by use of its second harmonic instead of the fundamental for obtaining the I. F. frequency.

The next tube is a combined I. F. stage and second detector using Radiotron RCA-6F7. It has two sets of elements, one being used as a screen grid I. F. amplifier and one as a triode detector. The I. F. frequency in this receiver is 460 K. C. The output stage is a single Pentode RCA-38.

The rectifier is an RCA-1-V used in a half-wave rectifying circuit. A feature of this circuit is that only one transformer secondary is used. This is accomplished by having a cathode type rectifier, a series arrangement of filaments and a tapped secondary winding.

Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

Line-Up Adjustments

The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the sub-mounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

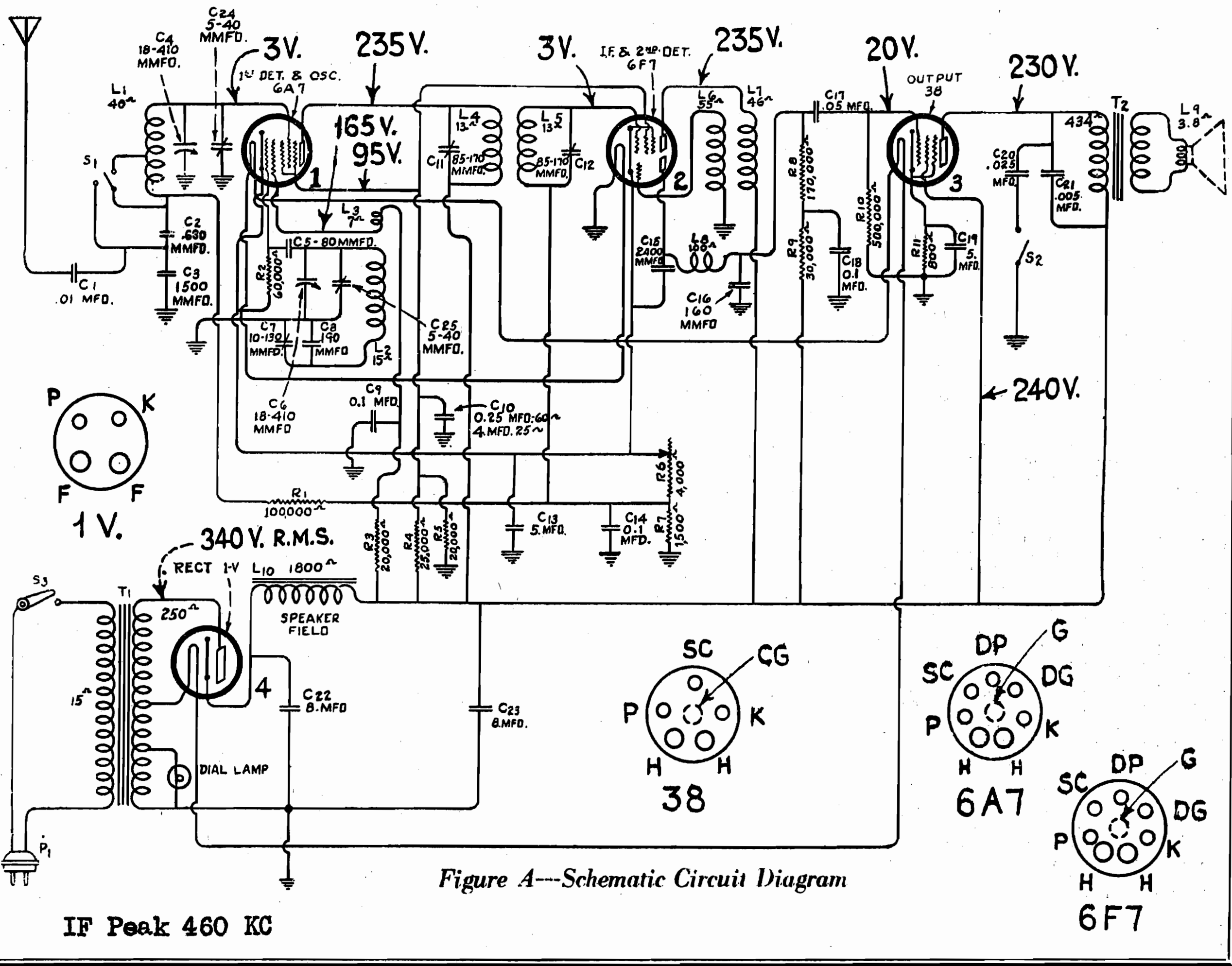


Figure A—Schematic Circuit Diagram

IF Peak 460 KC

MODEL RCA-100,101
Chassis wiring
Parts List

RCA-VICTOR CO., INC.

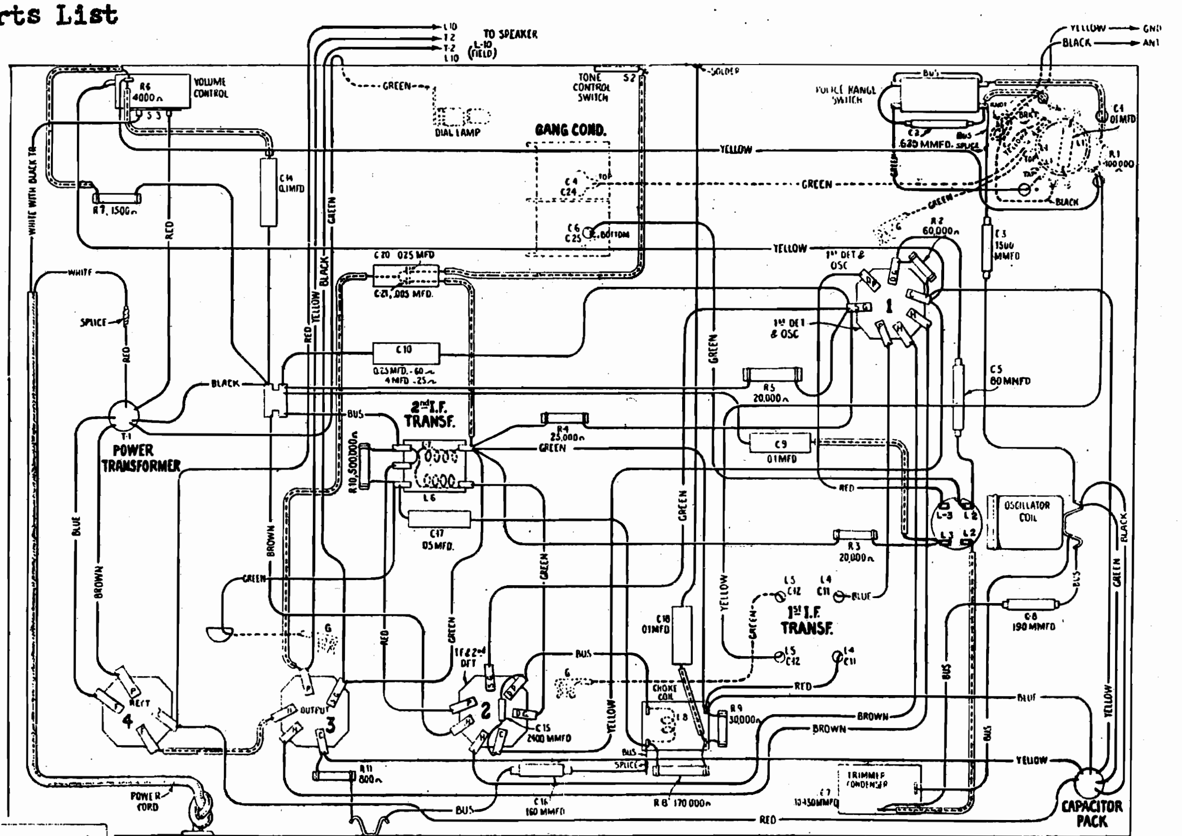
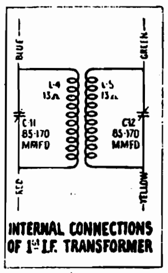
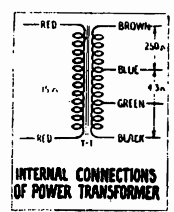
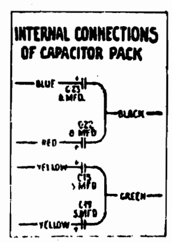


Figure B—Wiring Diagram







REPLACEMENT PARTS

Stock No	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
3047	Resistor—1,500 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3048	Resistor—500,000 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
3077	Resistor—30,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3459	Capacitor—80 mmfd. (C5)	.44
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
3592	Knob—Tone control switch knob—Package of 5	.80
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3606	Capacitor—Comprising one 0.005 and one 0.025 mfd. capacitors (C20, C21)	.40
3615	Knob—Volume control or range switch knob—Package of 5	.60
3641	Capacitor—0.1 mfd. (C9)	.35
3682	Shield—Radiotron shield	.22
3701	Capacitor—0.01 mfd. (C1)	.30
3702	Capacitor—0.25 mfd. (C10) (60 cycle)	.42
3713	Capacitor—0.05 mfd. (C17)	.32
3749	Capacitor—0.1 mfd. (C18)	.30
3857	Coil—Detector choke coil (L8)	.90
3858	Socket—Dial lamp socket and bracket	.26
3859	Socket—4-contact Radiotron socket	.30
3860	Socket—5-contact Radiotron socket	.32
3861	Capacitor—Adjustable capacitor (C7)	.78
3862	Screw—Chassis mounting screw and washer—Package of 4	.24
3865	Capacitor—160 mmfd. (C16)	.30
3868	Resistor—800 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3869	Resistor—170,000 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3873	Capacitor—1,500 mmfd. (C3)	.30

Stock No.	DESCRIPTION	List Price
3877	Capacitor—0.1 mfd. (C14)	$0.32
3885	Knob—Station selector knob—Package of 5	1.00
3886	Reflector—Dial light reflector	.30
3887	Dial—Station selector dial—Package of 5	.60
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4)	.25
3890	Capacitor—190 mmfd. (C8)	.30
3932	Capacitor—2,400 mmfd. (C15)	.30
3933	Capacitor—630 mmfd. (C2)	.32
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5	1.10
6660	Condenser—2-gang variable condenser	2.78
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23)	2.70
6662	Transformer—First intermediate frequency transformer (L4, L5, C11, C12)	2.34
6663	Transformer—Second intermediate frequency transformer (L6, L7)	1.06
6664	Coil—Oscillator coil (L2, L3)	.94
6665	Shield—Oscillator coil shield and mounting bracket	.34
6666	Coil—Antenna coil (L1, C1, R1)	1.08
6667	Volume control (R6, S3)	1.58
6668	Switch—Range switch (S1)	.58
6669	Switch—Tone control switch (S2)	.50
7641	Capacitor—4.0 mfd. (C10) (25 cycle)	.86
9045	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	4.84
9047	Transformer—Power transformer—105-125 volts—25-40 cycles	5.25
9048	Transformer—Power transformer—200-250 volts—50-60 cycles	5.50
	REPRODUCER ASSEMBLIES	
6659	Transformer—Output transformer (T2)	1.60
8987	Cone—Reproducer cone (L9)—Package of 5	5.00
9436	Reproducer complete	5.30
9437	Coil assembly—Comprising field coil, magnet and cone support (L10)	2.72

RCA-VICTOR CO., INC.

MODEL RCA 110,111,115
Alignment, Voltage
Parts List

SERVICE DATA

This receiver is a five-tube Super-Heterodyne incorporating a dynamic loudspeaker as a part of the chassis; continuously variable tone control; single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic and Figure B the wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd. (C8)	$0.75
3050	Resistor—14,000 ohms—Carbon type—3 watts (R9)	.25
3076	Resistor—1 megohm—Carbon type—½ watt (R2)—Pkg. of 5	1.00
3459	Capacitor—80 mmfd. (C9)	.44
3472	Capacitor—0.0024 mfd. (C13)	.32
3555	Capacitor—0.1 mfd. (C24)	.36
3572	Socket—Seven contact Radiotron socket	.38
3573	Socket—Four contact Radiotron socket	.32
3574	Coil—Choke coil (L9)	.68
3584	Ring—R. F. or oscillator coil retaining ring—Pkg. of 5	.40
3590	Escutcheon—Station selector escutcheon—Pkg. of 5	1.40
3591	Escutcheon—Name plate escutcheon—Pkg. of 5	1.40
3592	Knob—Station selector, volume control or tone control knob—Pkg. of 5	.80
3594	Resistor—50,000 ohms—carbon type—½ watt (R5, R7)—Pkg. of 5	1.00
3596	Capacitor—60 Mmfd. (C15)	.36
3597	Capacitor—0.25 Mfd. (C17)	.40
3602	Resistor—60,000 ohms—carbon type—¼ watt (R1)—Pkg. of 5	1.00
3604	Capacitor—400 Mmfd. (C14)	.30
3615	Knob—Range switch knob—Pkg. of 5	.60
3623	Shield—Antenna or R. F. coil shield	.30
3632	Resistor—500 ohms—carbon type—1 watt (R8)—Pkg. of 5	1.10
3641	Capacitor—0.1 mfd. (C3, C12, C18)	.35
3682	Shield—Radiotron shield—oscillator	.22
3713	Capacitor—.05 mfd. (C16)	.32
3783	Capacitor—9 mmfd. (C25, C27)—Pkg. of 2	.50
3789	Shield—Radiotron shield—R. F. or 2nd Detector	.25
3842	Screw—Chassis mounting screw assembly—Package of 4	.26
6228	Resistor—200,000 ohms—carbon type—½ watt (R4)—Pkg. of 5	$1.00
6303	Resistor—20,000 ohms—carbon type—½ watt (R12, R3)—Pkg. of 5	1.00
6306	Resistor—14,000 ohms—carbon type—1 watt (R10)—Pkg. of 5	1.10
6464	Transformer—I. F. transformer (C10, C11, L7, L8)	1.88
6465	Volume control (R11)	1.22
6471	Coil—Oscillator coil (L5, L6)	.74
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil (L3, L4)	.94
6620	Capacitor—Comprising one .005 and one .035 mfd. (C20, C30)	.50
6622	Dial—Condenser dial and drive assembly	.95
6623	Tone control (R13)	1.25
6624	Condenser—3-gang variable tuning condenser	3.50
6625	Switch—Range switch	1.60
6676	Socket—6-contact Radiotron socket—Output tube	
7485	Socket—6-contact Radiotron socket	.40
7589	Capacitor—Comprising two 4.0 mfd. capacitors (C22, C23)	1.64
7590	Capacitor—10 mfd. (C21)	1.40
8985	Transformer—Power transformer 105–125 volts, 50–60 cycles (T1)	4.26
8986	Transformer—Power transformer 220–250 volts, 50–60 cycles (T1)	4.38
9002	Transformer—Power transformer 105–125 volts, 25–40 cycles (T1)	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer (T2)	1.44
8987	Cone—Reproducer cone (L10)—Pkg. of 5	5.00
8988	Coil assembly—Comprising field coil, magnet and cone support (L11)	2.35
9435	Reproducer complete	4.75

MODEL RCA 110,111,115
Schematic, Data
Chassis wiring

RCA-VICTOR CO., INC.

IF Peak 175 KC

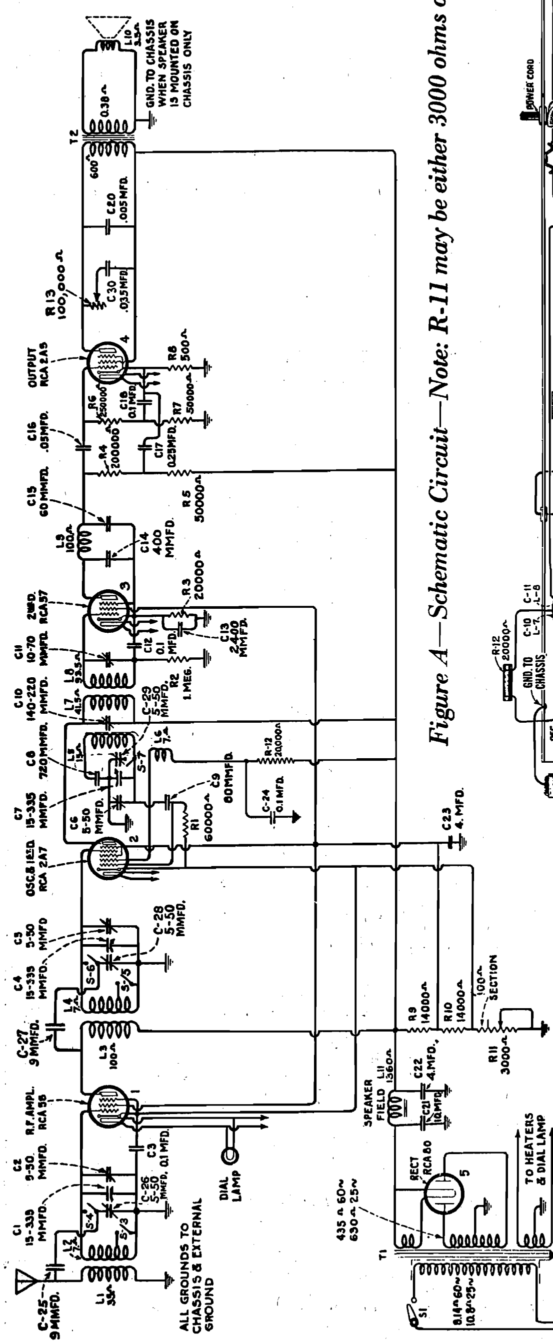


Figure A—Schematic Circuit—Note: R-11 may be either 3000 ohms or 4500 ohms

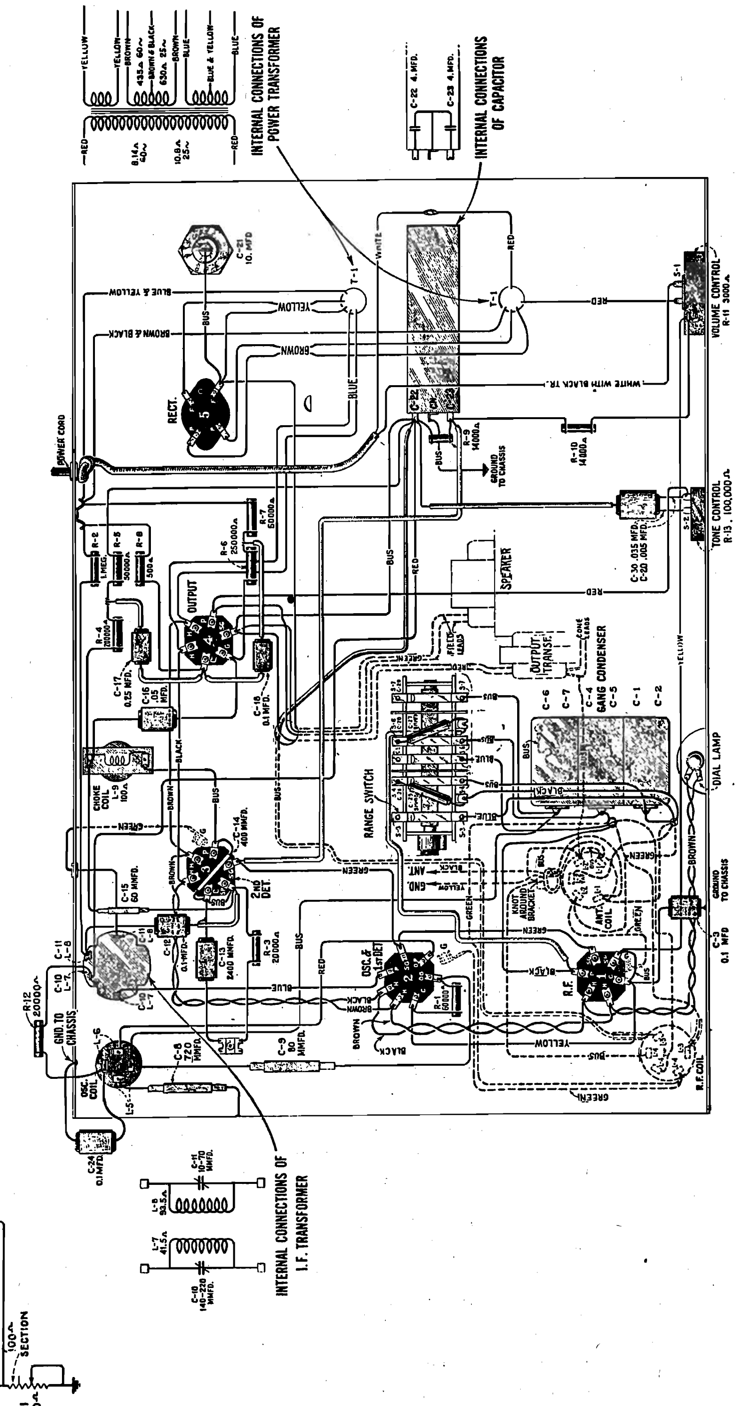


Figure B—Wiring Diagram

Voltage Rating .... 115 Volts
Frequency Rating .... 25–60 Cycles and 50–60 Cycles
Power Consumption .... 60 Cycles—70 Watts
Number and Types of Radiotrons .... 1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output .... 1.75 Watts
Frequency Range .... 540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

RCA-VICTOR CO., INC.

MODEL 112 AC-DC 220V
Alignment, Parts List

220 Volt AC/DC Universal Receiver

Five-Tube Superheterodyne Table Model

SERVICE DATA

Electrical Specifications

Voltage Rating .... 200–230 AC or DC
Frequency Rating (AC) .... 50–60 Cycles
Power Consumption .... AC 60 Cycles—105 Watts—DC—85 Watts
Number and Types of Radiotrons .... 1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-12Z3—Total 5
Undistorted Output .... 1.5 Watts
Frequency Range .... 540 KC–1500 KC

This receiver is a five tube Super-Heterodyne designed to operate on AC or DC over the voltage and frequency range indicated. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-12Z3 which is used in a half-wave circuit.

Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and for the R. F. circuits should be made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 KC and 1400 KC. An output meter and non-metallic screw driver are also necessary. The Stock No. 9050 test oscillator and Stock No. 7065 screw driver are suitable for this purpose. Figure C shows the location of the I. F. capacitors.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 KC, coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the R. F. and oscillator circuits are adjusted at 1400 K. C. Prior to making the adjustment however, the dial should be checked. This is done by making sure the dial indicator reads 530 when the tuning capacitor rotor plates are fully meshed with the stator plates. The adjustments are then made in similar manner as that of the I. F. except that the oscillator is set at 1400 KC., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
2875	Knob—Volume control or station selector knob—Package of 5	1.50
2963	Resistor—8,000 ohms—Carbon type—1 watt (R10)—Package of 5	1.10
3033	Resistor—1 megohm—Carbon type—¼ watt (R2)—Package of 5	1.00
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Antenna, RF or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3623	Shield—Antenna, RF or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R8)—Package of 5	1.10
3700	Resistor—450,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3701	Capacitor—.01 mfd. (C19)	.30
3710	Capacitor—60 mmfd. (C15)	.36
3711	Capacitor—80 mmfd. (C9)	.40
3712	Capacitor—400 mmfd. (C14)	.40
3754	Capacitor—1,150 mmfd. (C8)	.50
3755	Capacitor—Comprising two .1 mfd. and one .25 mfd. (C12, C13, C27)	.60
3859	Socket—4-contact Radiotron socket	.30
3888	Capacitor—.05 mfd. (C16)	.25
3914	Resistor—30 ohms—Flexible type (R13)	.28
3915	Resistor—Porcelain type—320 ohms (R14, R15)	.88
3916	Capacitor—.05 mfd. (C20)	.32
3917	Capacitor—.25 mfd. (C17)	.40
3919	Socket—Dial lamp socket	.28
3950	Shield—Radiotron shield	.26
3993	Screw—No. 6-32 square head set screw for condenser dial and drive assembly—Package of 10	$0.25
4005	Escutcheon—Volume control escutcheon	.42
6114	Resistor—20,000 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
6228	Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
6250	Resistor—4,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
6519	Coil—Antenna coil (L1, L2)	.88
6520	Coil—RF coil (L3, L4)	.94
6521	Coil—Oscillator coil (L5, L6)	.60
6621	Capacitor—Comprising one .05 and one .1 mfd. (C1, C25)	.46
6676	Socket—6-contact Radiotron socket	.40
6723	Condenser—3-gang variable tuning condenser (C2, C3, C4, C5, C6, C7)	4.15
6724	Volume control (R12, S1)	1.20
6725	Dial—Tuning condenser dial and drive assembly	.88
6726	Coil—Choke coil (L9)	.62
6727	Transformer—Intermediate frequency transformer (L7, L8, C10, C11)	1.68
6728	Capacitor—Comprising one 4.0 mfd., one 10.0 mfd. and two 8.0 mfd. (C18, C26, C28, C31)	2.94
7065	Screwdriver—For IF, RF and oscillator condenser adjustment	.80
7485	Socket—6-contact Radiotron socket—Second detector	.40
7822	Escutcheon—Station selector escutcheon	.42
9050	Oscillator—Test oscillator 15–20,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6730	Transformer—Output transformer (T1)	1.52
9428	Cone—Reproducer cone (L10)—Package of 5	5.00
9447	Reproducer complete	5.25
9448	Coil—Field coil magnet and cone support (L11)	2.74

MODEL 112 AC-DC 220V
Schematic, Voltage
Trimmer locations

RCA-VICTOR CO., INC.

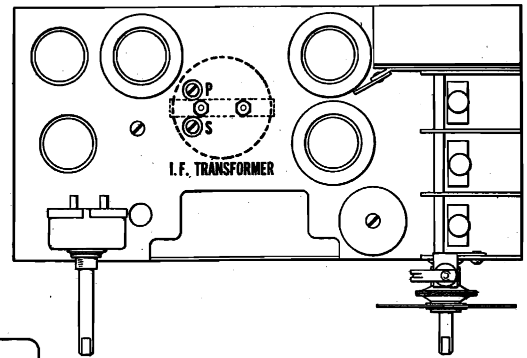


Figure C—Location of Line-up Capacitors

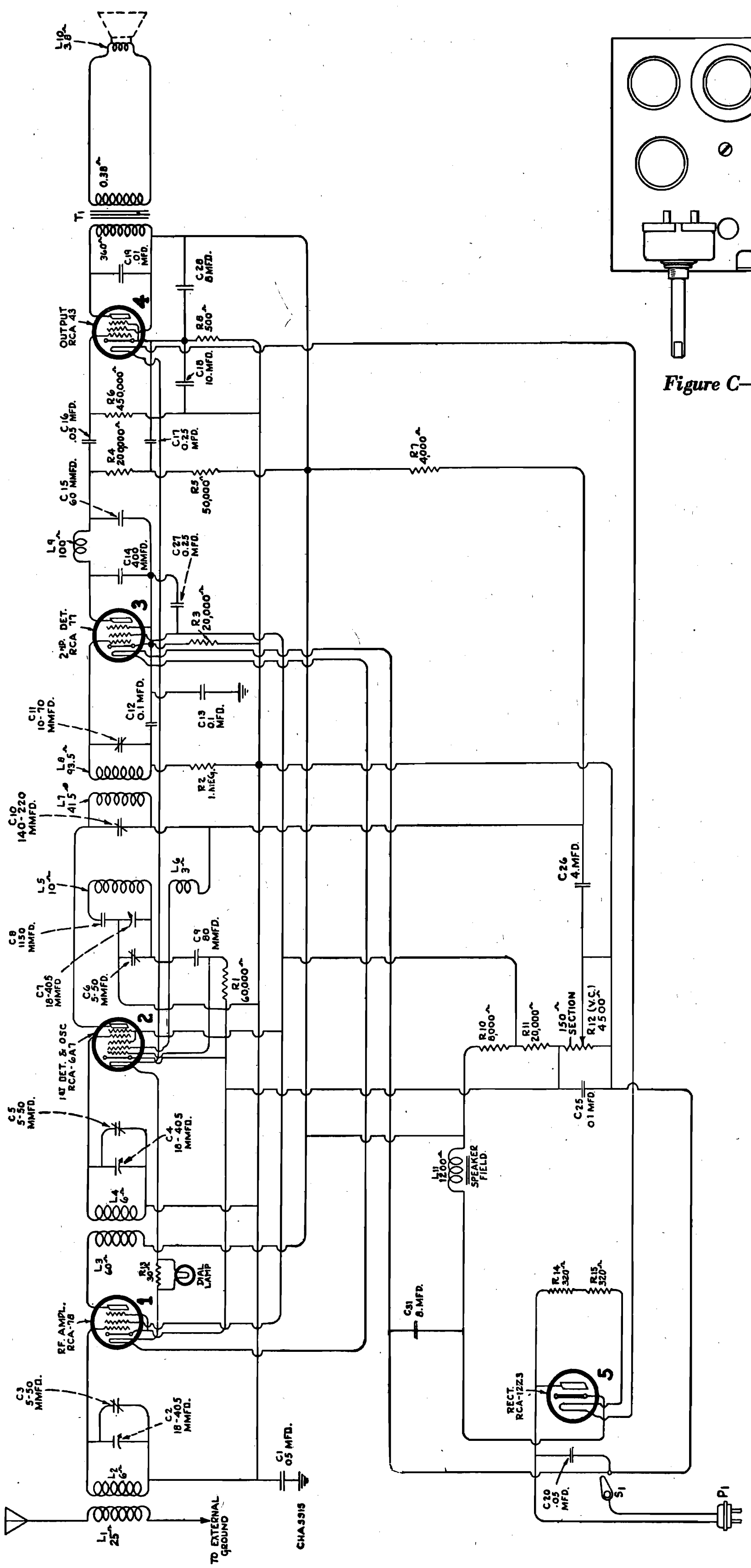


Figure A—Schematic Diagram

RADIOTRON SOCKET VOLTAGES

***Measured at 220 Volts A. C., 60 cycles (Maximum Volume Control)**

Radiotron No.	Cathode to Control Grid, Volts DC	Cathode to Screen Grid, Volts DC	Cathode to Plate, Volts DC	Plate Current M. A.	Heater Volts
RCA-78 R. F.	3.0	100	165	5.5	6.0
RCA-6A7 Oscillator 1st Detector	—	—	145	1.7	6.0
	3.0	100	145	2.5	—
RCA-77 2nd Detector	Plate and Bias Supply 165 Volts			—	6.0
RCA-43 Power	21.0	140	130	35.0	25.0
RCA-12Z3 Rectifier	220 RMS			—	12.0

***Voltages with 220 Volts D. C. supply will be approximately 10 per cent less than tabulated values**

RCA-VICTOR CO., INC.

MODEL 112 AC-DC 220V
Chassis wiring

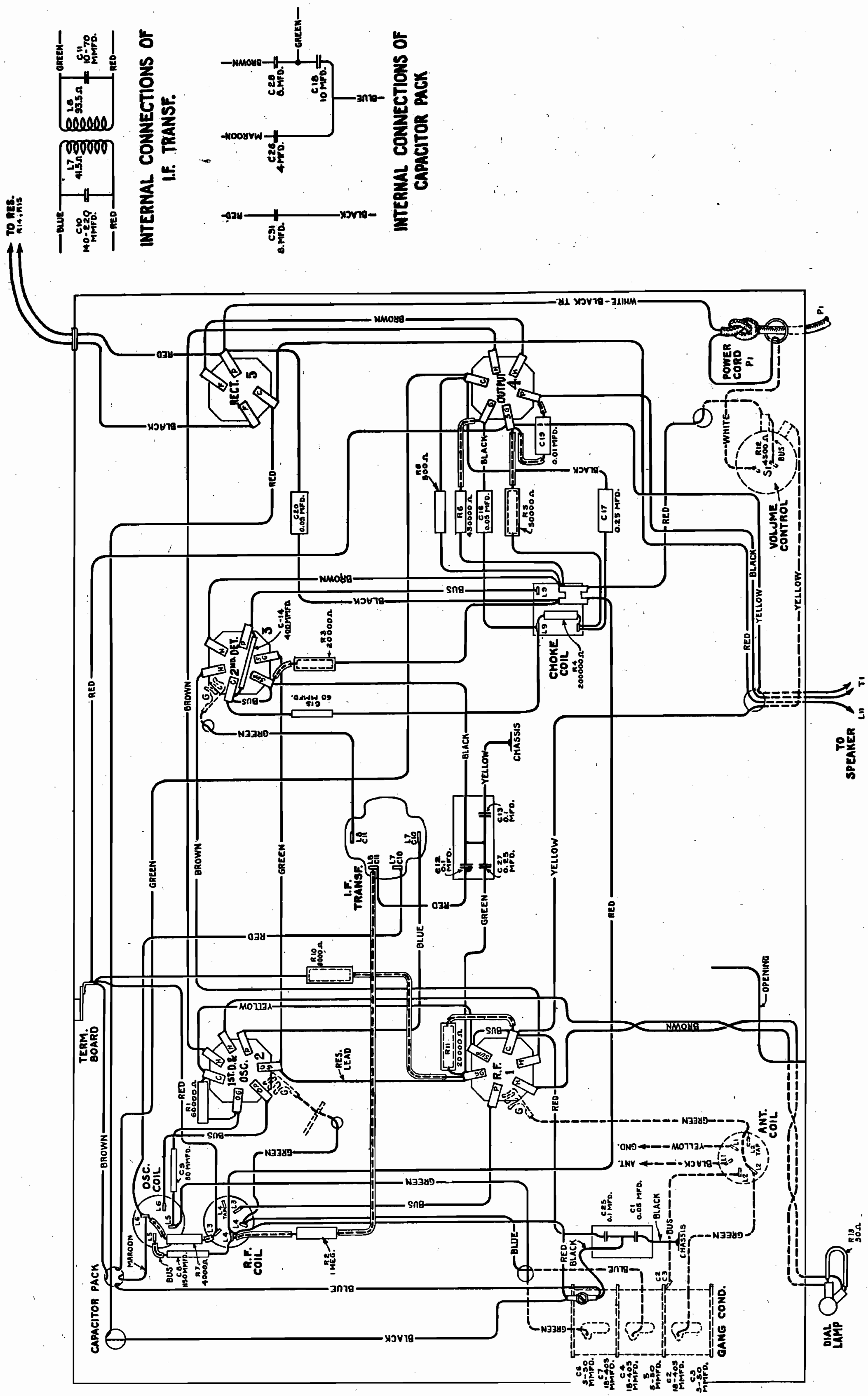


Figure B—Wiring Diagram

MODEL 114
Voltage, Alignment

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating....................100–125 A. C. or D. C.
Frequency Rating (A. C.)...................25–133 Cycles
Power Consumption: {A. C. 60 Cycles, 115 Volts—60 Watts; D. C. 115 Volts—40 Watts
Number and Types of Radiotrons...............1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-25Z5—Total, 5

Undistorted Output (A. C.)......................1.5 Watts
Undistorted Output (D. C.).....................0.5 Watt
Frequency Range......540–1710 K. C. and 2400–2500 K. C.

This receiver is a five-tube Superheterodyne designed to operate on A. C. or D. C. over a wide voltage and frequency range. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-25Z5, which is used in a voltage doubling circuit. This results in considerable more output when the receiver is used on A. C. than that obtained from D. C. operation.

Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator such as Stock No. 9050, giving a signal at 175 K. C., 1400 K. C., 1710 K. C. and 2440 K. C. An output meter and non-metallic screw driver (Stock No. 7065) are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F., line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1710 K. C. This is done with the Range Switch at the broadcast position (counter-clockwise). A similar manner is used as that of the I. F. except that the oscillator is set at 1710 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 8 (minimum dial position). The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) After making the 1710 K. C. adjustment, set the dial at 18 and the oscillator at 1400. Then adjust the first detector and R. F. line-up capacitors only. This adjustment is made so that the R. F. and 1st detector will be aligned over the broadcast band, but the receiver will still tune to 1710 K. C. due to the oscillator line-up capacitor not being readjusted.

(e) Then set the Range Switch at its clockwise position. The oscillator should now be set at 2440 K. C. and the signal tuned in. Two points on the dial will be noted where the signal is heard, one of which may be louder than the other. Set the dial at either point. Note—the 2440 K. C. signal will still be heard at two points, since the R. F. stage acts as a fixed tuned circuit. Adjust the two high-frequency trimmers, located on the lower side of the gang capacitor, until maximum output is obtained.

RADIOTRON SOCKET VOLTAGES

115 Volts D. C. or 60 Cycles A. C.

Divide all A. C. Values (Except Heater) by 1.3 for 25 Cycles

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78 R. F.	2.6	1.5	90	50	157	88.5	5.5	3.0	6.0
RCA-6A7 Oscillator	—	—	—	—	157	88.5	1.7	1.0	6.0
1st Detector	2.6	1.5	90	50	157	88.5	2.5	1.5	—
RCA-77 2nd Detector	Plate and Bias Supply160 Volts						—	—	6.0
RCA-43 Power	21.0	12.0	135	80	125	72.0	35.0	20.0	25.0
RCA-25Z5 Rectifier	115 R. M. S.						89.0 Total	35.0 Total	25.0

Voltage Across Loudspeaker Field {115 Volts, 60 Cycles—185; 115 Volts, 25 Cycles—140; 115 Volts, D. C.—105}

RCA-VICTOR CO., INC.

MODEL 114
Schematic
Chassis wiring

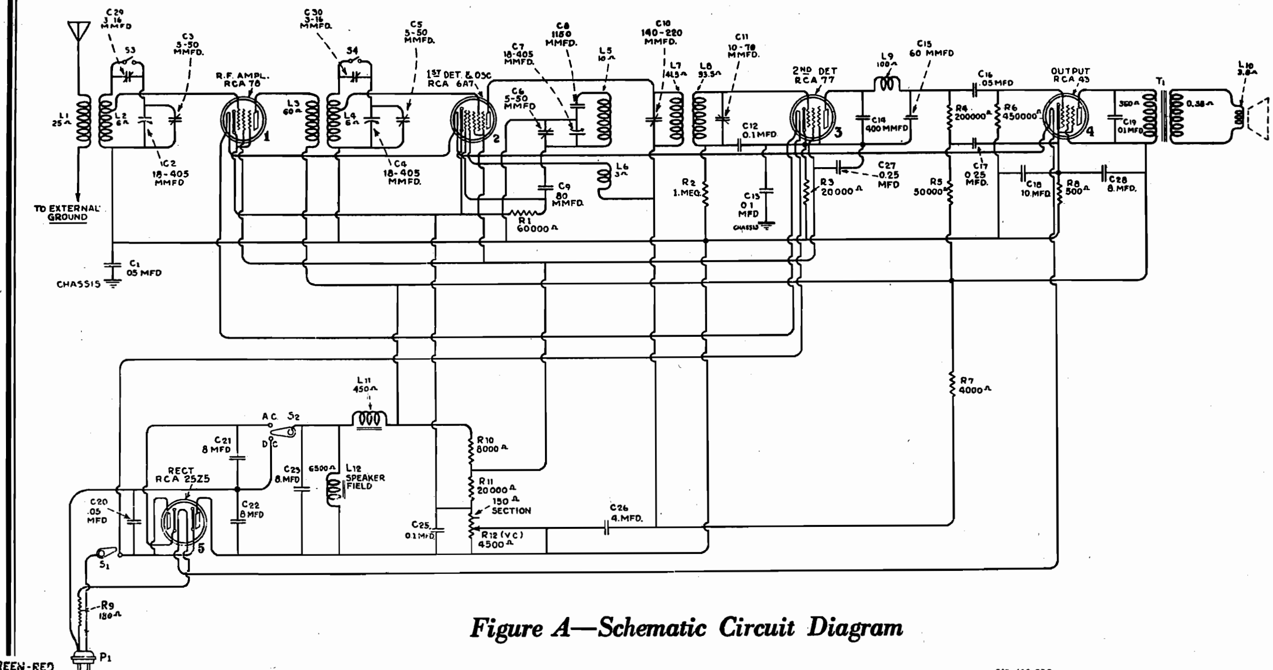


Figure A—Schematic Circuit Diagram

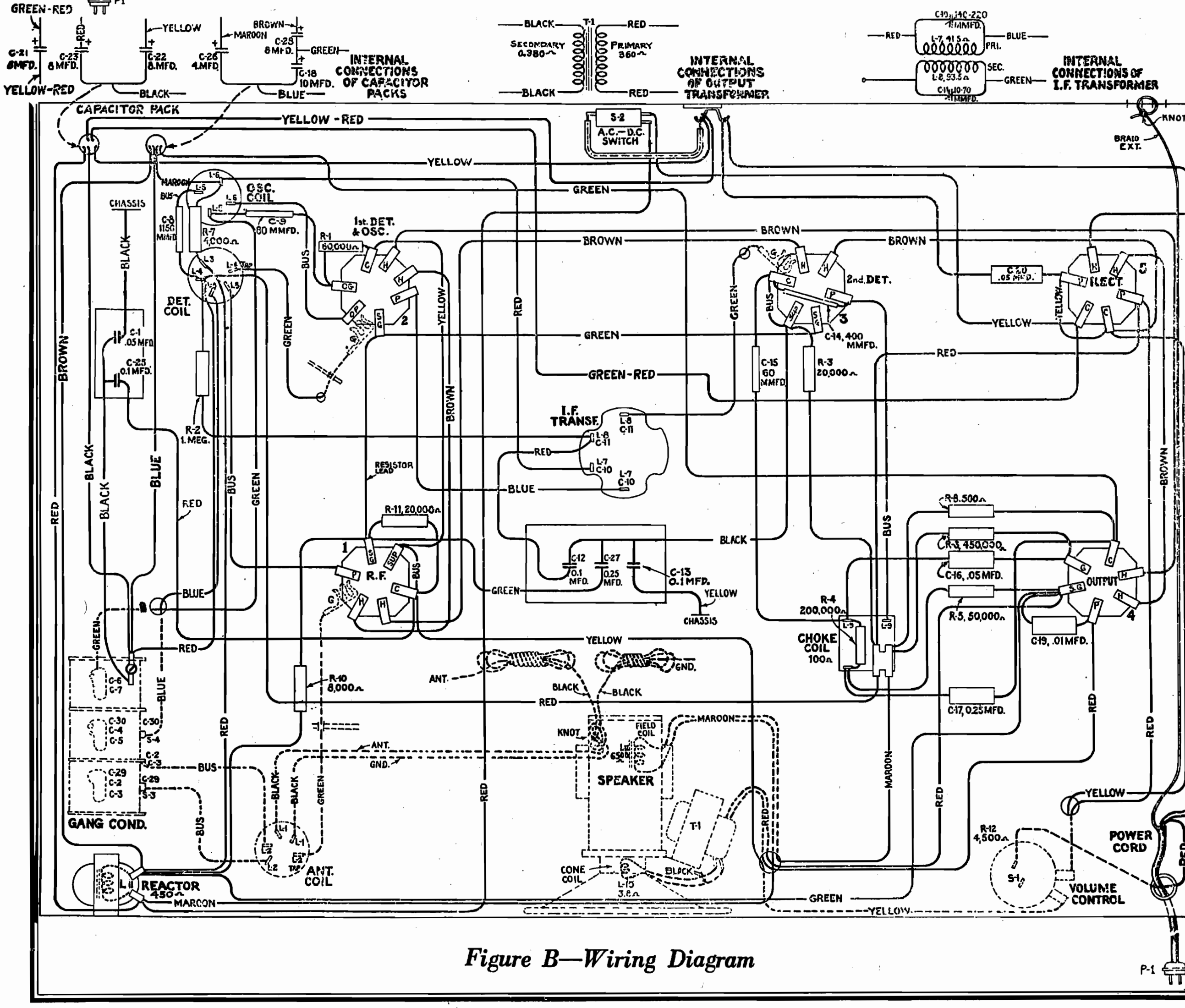


Figure B—Wiring Diagram

MODEL 114
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2963	Resistor — 8,000 ohms — Carbon type — 1 watt (R10)—Package of 5	1.10
3033	Resistor — 1 megohm — Carbon type — ¼ watt (R2)—Package of 5	1.00
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Antenna coil shield retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt —Package of 5	1.10
3640	Capacitor—0.05 mfd.	.25
3641	Capacitor—0.1 mfd.	.35
3682	Shield—Radiotron shield body	.22
3684	Switch—Toggle type—AC-DC operation (S2)	.94
3685	Coil—Choke coil—Second detector plate (L9)	.54
3697	Escutcheon—Station selector escutcheon—Package of 2	.28
3698	Escutcheon—Volume control escutcheon—Package of 2	.28
3700	Resistor—450,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3701	Capacitor—0.01 mfd. (C19)	.30
3710	Capacitor—60 mmfd. (C15)	.36
3711	Capacitor—80 mmfd. (C9)	.40
3712	Capacitor—400 mmfd. (C14)	.40
3713	Capacitor—0.05 mfd. (C20)	.32
3752	Shaft—Range switch shaft	.50
3753	Contact—Ranges witch contact—Pkg. of 2	.40
3754	Capacitor—1,150 mmfd. (C8)	.50
3755	Capacitor—Comprising two .1 mfd. and one .25 mfd. capacitors (C12, C13, C27)	.60
3901	Capacitor—.05 mfd. (C16)	$0.36
3917	Capacitor—.25 mfd. (C17)	.40
4014	Cord—Power cord—180 ohms (R9)	1.15
4015	Knob—Station selector or volume control knob	.85
4016	Foot—Cabinet foot—Package of 4	.22
6114	Resistor — 20,000 ohms — Carbon type — 1 watt (R11)—Package of 5	1.10
6228	Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
6250	Resistor — 4,000 ohms — Carbon type — ½ watt (R7)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ Watt (R3)—Package of 5	1.00
6464	Transformer—Intermediate frequency transformer (L7, L8, C10, C11)	1.88
6505	Reactor—Filter reactor	1.06
6506	Condenser—Three-gang variable condenser assembly (C2, C3, C4, C5, C6, C7)	3.24
6508	Volume control—Complete with mounting nut (R12, S1)	1.36
6519	Coil—Antenna coil (L1, L2)	.88
6520	Coil—R. F. coil assembly (L3, L4)	.94
6521	Coil—Oscillator coil assembly (L5, L6)	.60
6621	Capacitor—Comprising one .05 and one .1 mfd. capacitors (C1, C25)	.46
6783	Capacitor—Comprising four 8. mfd., one 4. mfd. and one 10. mfd. capacitors (C18, C21, C22, C23, C26, C28)	4.38
7485	Socket—6-contact Radiotron socket	.40
	REPRODUCER ASSEMBLIES	
6509	Transformer—Output transformer (T1)	1.34
7606	Coil assembly—Comprising field coil, magnet and cone support (L12)	2.06
8987	Cone—Reproducer cone complete with voice coil (L10)—Package of 5	5.00
9462	Reproducer complete	5.14

MODEL 120
Alignment, Voltage
Speaker data

RCA-VICTOR CO., INC.

SERVICE DATA

ELECTRICAL SPECIFICATIONS

Voltage Rating............................105–125 Volts
Frequency Rating..................25–60 and 50–60 Cycles
Power Consumption...60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons...............2 RCA-58,
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output............................1.75 Watts
Frequency Range..................540 K. C. to 1500 K. C.
and 1400 to 2800 K. C.

This receiver is a six tube Superheterodyne incorporating features such as Dynamic Loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

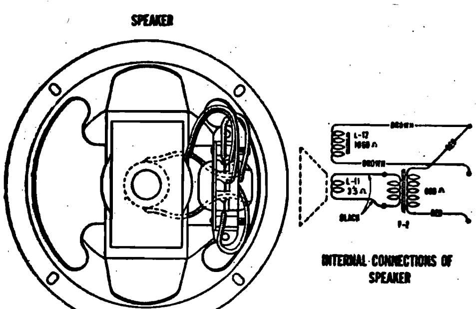


Figure C—Loudspeaker Wiring

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

LINE-UP ADJUSTMENTS

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

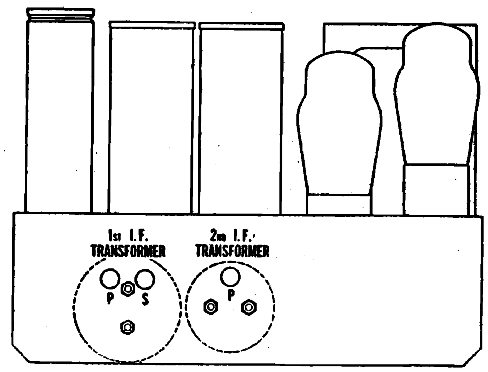


Figure D—Location of I. F. Line-up Adjustment Screws

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	4.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	5.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	4.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.31
6. RCA-80 Rectifier	700/350 Volts—75 M. A. Total Current				4.82

*The voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

MODEL 120
Schematic, Chassis

RCA-VICTOR CO., INC.

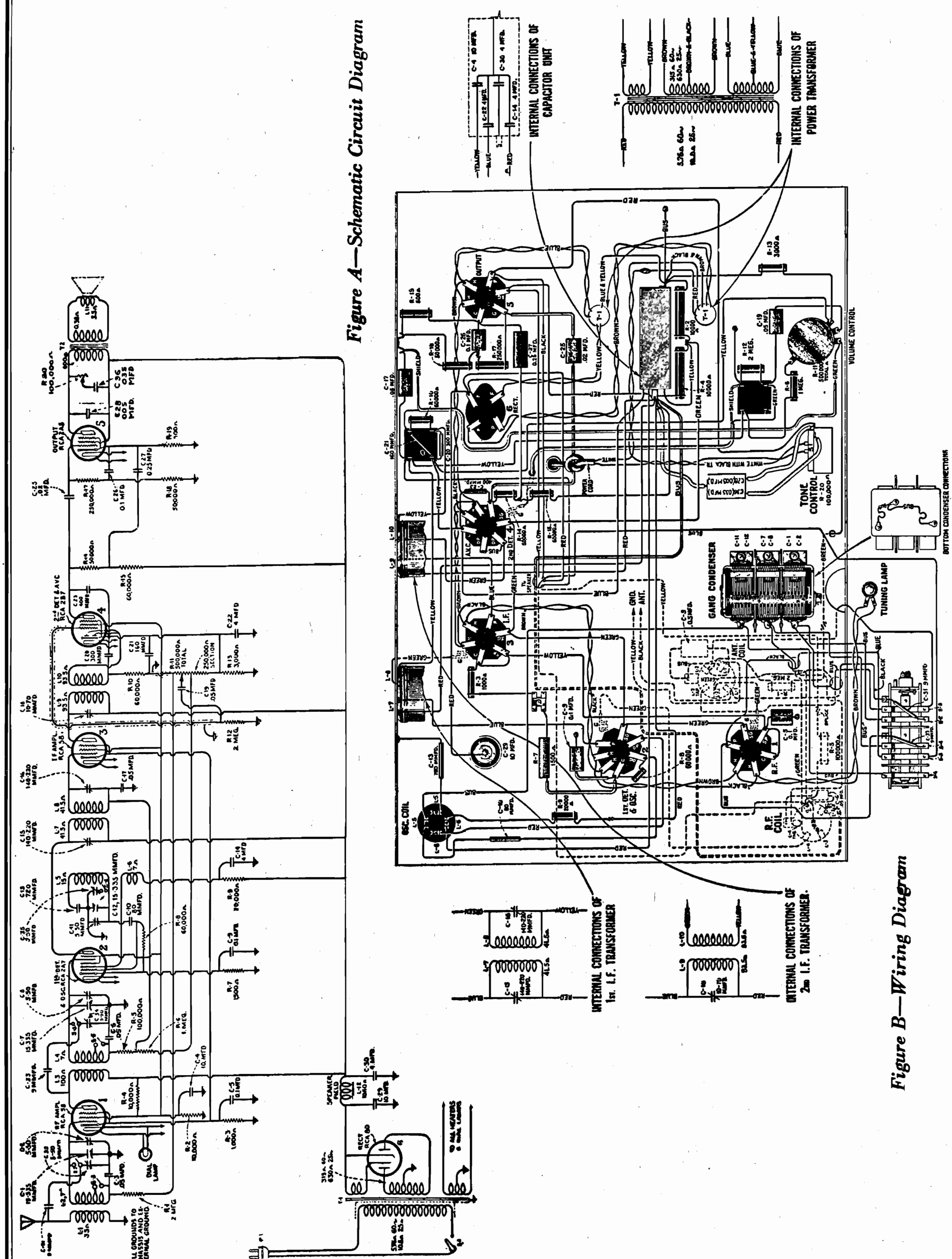


Figure A—Schematic Circuit Diagram

Figure B—Wiring Diagram

MODEL 120
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.—(C13)	$0.75
2747	Cap—Contact cap—Package of 5	.50
3047	Resistor — 1500 ohms — Carbon type — ½ watt—(R7)—Package of 5	1.00
3076	Resistor — 1 megohm — Carbon type — ½ watt—(R6)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—(R5)—Package of 5	1.00
3358	Resistor — 3,000 ohms — Carbon type — ½ watt—(R13)—Package of 5	1.00
3459	Capacitor—80 mmfd.—(C10)	.44
3514	Resistor—250,000 ohms—Carbon type—½ watt—(R17)—Package of 5	1.00
3572	Socket—Radiotron 7 contact socket	.38
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt—(R14, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd.—(C27)	.40
3598	Capacitor—0.1 mfd.—R. F. and I. F. by-pass—(C5)	.36
3615	Knob—Tone control or range switch knob—Package of 5	.60
3616	Capacitor—300 mmfd.—(C20)	.34
3622	Shield—Radiotron shield—2nd detector	.36
3623	Shield—Antenna or R. F. coil shield	.30
3624	Socket—Dial lamp socket and bracket	.40
3626	Shield—Oscillator coil shield	.22
3627	Knob—Station selector or volume control knob—Package of 5	.75
3630	Resistor — 10,000 ohms — Carbon type — 3 watt—(R2, R4)	.25
3632	Resistor — 500 ohms — Carbon type—1 watt—(R19)—Package of 5	1.10
3633	Capacitor—400 mmfd.—(C23)	.38
3634	Capacitor—160 mmfd.—(C21)	.34
3639	Capacitor—0.02 mfd.—(C25)	.25
3640	Capacitor—0.05 mfd.—(C3, C6, C17, C19)	.25
3641	Capacitor—0.1 mfd.—(C9, C26)	.35
3642	Capacitor—0.008 mfd.—(C24)	.25
3682	Shield—Radiotron shield—1st detector	.22
3721	Resistor — 1,000 ohms — Carbon type — ½ watt—(R3)—Package of 5	1.00
3783	Capacitor—9 mmfd.—(C31, C33)—Package of 2	$0.50
3789	Shield—Radiotron shield—I. F. or R. F.	.25
3881	Escutcheon—Station selector escutcheon	.42
3882	Escutcheon—Volume control escutcheon	.42
6188	Resistor — 2 megohm — Carbon type — ½ watt—(R1, R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—(R8, R10, R15)—Package of 5	1.00
6300	Socket—Radiotron 4 contact socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt—(R9)—Package of 5	1.00
6471	Coil—Oscillator coil—(L5, L6)	.74
6483	Transformer—1st intermediate frequency transformer—(L7, L8, C15, C16)	1.84
6484	Transformer—2nd intermediate frequency transformer—(L9, L10, C18)	1.70
6485	Volume control—With mounting nut—(R11)	1.20
6487	Capacitor assembly—Comprising three 4.0 mfd. and one 10.0 mfd. capacitors—(C4, C14, C22, C30)	2.90
6527	Coil—Antenna coil—(L1, L2)	1.08
6528	Coil—R. F. coil—(L3, L4)	.94
6534	Switch—Range switch	1.25
6598	Condenser—3 gang variable tuning condenser	3.00
6619	Tone control with mounting nut—(R20)	1.44
6620	Capacitor—Comprising one .005 and one .035 mfd.—(C28, C36)	.50
6622	Scale—Dial scale and drive assembly	.95
7485	Socket—Radiotron 6 contact socket	.40
7590	Capacitor—10.0 mfd.—(C29)	1.40
9005	Transformer—Power transformer—105-125 volts, 50-60 cycles—(T1)	4.80
9006	Transformer—Power transformer—200-250 volts, 50-60 cycles	5.05
9024	Transformer—Power transformer—105-125 volts, 25-40 cycles	5.85
	REPRODUCER ASSEMBLIES	
6476	Transformer—Output transformer—(T2)	1.44
9032	Coil assembly—Comprising coil, magnet and cone support—(L12)	2.35
9428	Cone — Reproducer cone — (L11) — Package of 5	5.00
9440	Reproducer complete	4.75

MODEL 121,122
Alignment, Voltage
Trimmer location

RCA-VICTOR CO., INC.

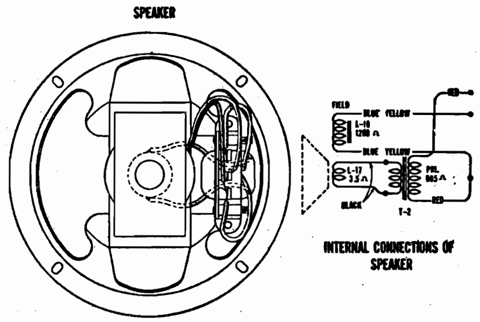


Figure C—Loudspeaker Wiring

This receiver is a six tube two band A. C. operated Superheterodyne Receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two position switch. Other features include a double reduction vernier drive using two concentric knobs giving a 10–1 and a 55–1 ratio of speed reduction, a continuously variable tone control, six-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact constuction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

Line-Up Capacitor Adjustments

In order to properly align this receiver, it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground leads of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as SW in Figure D for maximum output, beginning with the oscillator trimmer. It will be noted that the trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator. The position that uses a maximum capacitance is correct for the detector and R. F. In conjunction with the detector adjustment, it is advisable to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator adjustment.

Power Transformer Connections

The power transformer used in this Model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts, the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

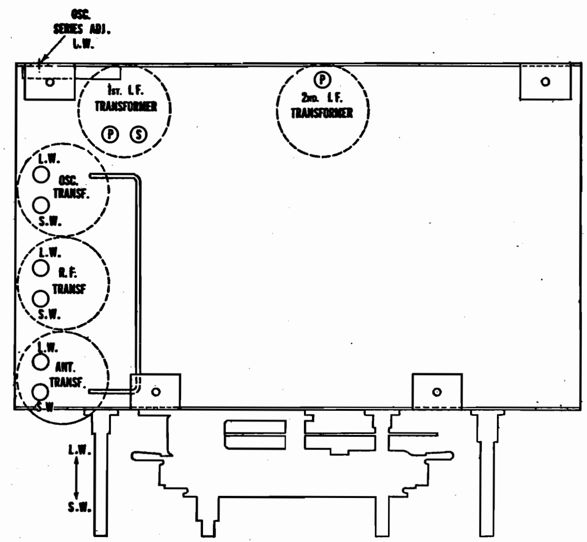


Figure D—Location of Line-Up Capacitors

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.32
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.32
3. RCA-58 I. F.	3.0	100	265	6.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.32
5. RCA-2A5 Power	16.0	255	240	35.0	2.32
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

*The voltages and current refer to the detector part of the tube.

RCA-VICTOR CO., INC.

MODEL 121,122
Schematic

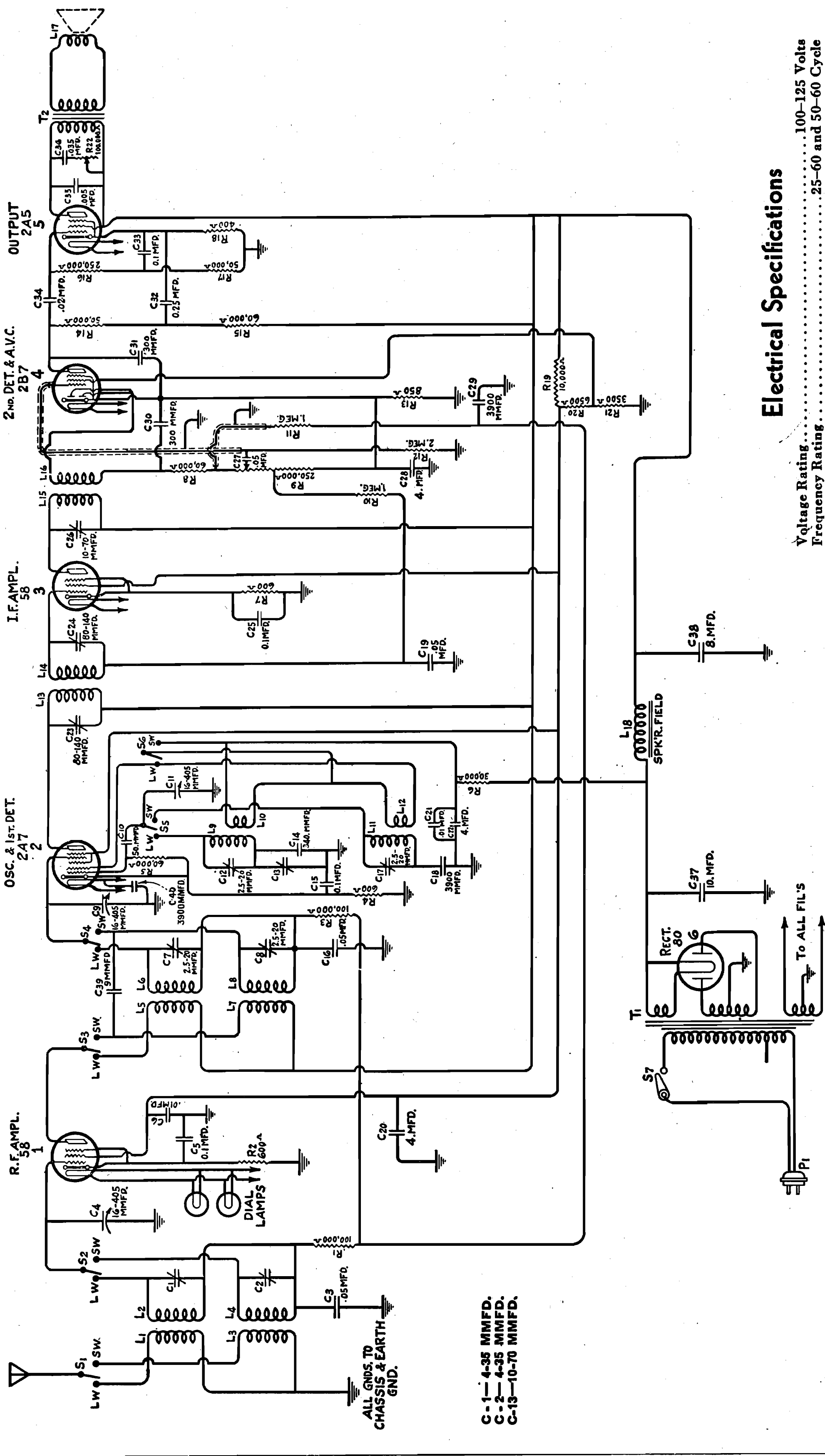


Figure A—Schematic Diagram

Electrical Specifications

Voltage Rating.......................100-125 Volts
Frequency Rating.......................25-60 and 50-60 Cycle
Power Consumption..............60 Cycle, 75 Watts; 25 Cycle, 80 Watts
Number and Type of Radiotrons.......................2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Tuning Ranges..........540 K. C.-1500 K. C.—5400 K. C.-15,350 K. C.
Undistorted Output.......................1.75 Watts

MODEL 121,122
Chassis wiring

RCA-VICTOR CO., INC.

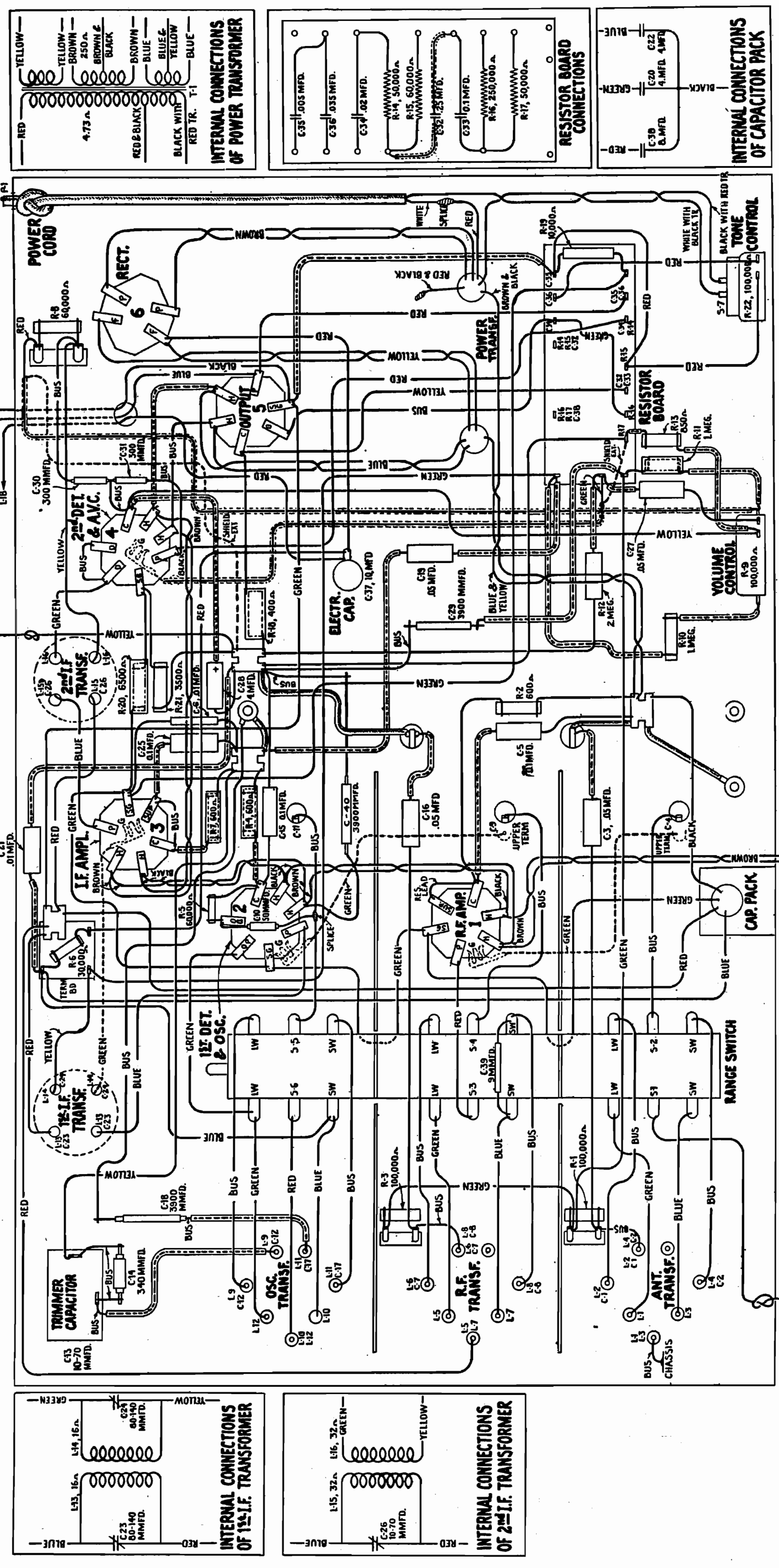


Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 121,122
Parts List

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R6)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3056	Shield—2nd detector Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R10, R11)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R1, R3)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R20)—Package of 5	1.10
3514	Resistor—250,000 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3572	Socket—7-contact Radiotron socket	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)—Package of 5	1.00
3615	Knob—Range switch or tone control knob (Model 121)—Package of 5	.60
3631	Resistor—850 ohms—Carbon type—½ watt (R13)—Package of 5	1.00
3639	Capacitor—.02 mfd. (C34)	.25
3683	Shield—Radiotron shield top	.20
3701	Capacitor—.01 mfd. (C6, C21)	.30
3702	Capacitor—.25 mfd. (C32)	.42
3768	Screw—Square head No. 6-32-¼" set screw for condenser drive—Package of 10	.35
3796	Capacitor—4. mfd. (C28)	.60
3849	Capacitor—50 mmfd. (C10)	.30
3859	Socket—4-contact Radiotron socket	.30
3861	Capacitor—Adjustable capacitor (C13)	.78
3877	Capacitor—.1 mfd. (C5, C15, C25, C33)	.32
3878	Screw—No. 4-40-3/16" screw for fastening station selector pointer—Package of 20	.25
3888	Capacitor—.05 mfd. (C19, C27)	.25
3892	Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)—Package of 5	1.00
3897	Resistor—400 ohms—Carbon type—1 watt (R18)—Package of 5	1.10
3901	Capacitor—.05 mfd. (C3, C16)	.36
3902	Knob — Station selector knob complete (Model 121)	.44
3903	Screw—No. 8-32-3/16" headless cup point set screw for station selector knob—Package of 20	.36
3904	Knob—Volume control knob (Model 121)—Package of 5	.88
3905	Screw—Chassis mounting screw assembly comprising 4 screws, 4 washers, and 4 cushions	.46
3906	Mounting assembly — Variable condenser mounting assembly comprising 3 bushings, 3 lockwashers, 3 nuts, and 3 washers	.28
3935	Capacitor—340 mmfd. (C14)	.34
3936	Capacitor—3,900 mmfd. (C18, C29, C40)	.68
3937	Capacitor—300 mmfd. (C30, C31)	.34
3938	Capacitor—9 mmfd. (C39)	.25
3939	Resistor — 3,500 ohms — Carbon type — ½ watt (R21)—Package of 5	1.00
3940	Pointer—Station selector pointer—Package of 5	.50
3941	Dial—Station selector dial—Package of 5	1.75
3942	Shield—1st detector Radiotron shield	.18

Stock No.	DESCRIPTION	List Price
3943	Screen—Translucent screen for dial light—Package of 2	$0.18
3944	Shield—Antenna, R. F. or oscillator coil shield	.28
3991	Resistor—10,000 ohms—Porcelain type (R19)	.60
6188	Resistor—2 megohm—Carbon type—½ watt (R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)—Package of 5	1.00
6571	Capacitor—10 mfd. (C37)	1.20
6620	Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36)	.50
6676	Socket—6-contact Radiotron socket—Output	.40
6694	Condenser—3-gang variable tuning condenser (C4, C9, C11)	3.75
6695	Volume control (R9)	1.20
6696	Switch—Range switch (S1, S2, S3, S4)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C23, C24)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C26)	1.78
6699	Coil—R. F. coil (L5, L6, L7, L8, C7, C8)	2.44
6700	Coil—Oscillator coil (L9, L10, L11, L12, C12, C17)	2.30
6701	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	2.64
6702	Drive—Variable tuning condenser drive assembly complete	1.86
6703	Capacitor pack—Comprising one 8. mfd. and two 4. mfd. capacitors (C20, C22, C38)	2.46
6704	Shaft—Tuning condenser drive assembly shaft	.64
6705	Tone control complete (R22)	1.20
6706	Bezel—Metal bezel for station selector dial glass (Model 121)	.42
6707	Glass—Station selector dial glass	.20
6708	Ring—Retaining ring for dial glass—Package of 5	.44
6752	Knob—Station selector knob (Model 122)—Package of 5	.60
6753	Knob—Volume control knob (Model 122)—Package of 5	.60
6754	Knob—Range switch or tone control knob (Model 122)—Package of 5	.60
6755	Bezel—Metal bezel for station selector dial glass (Model 122)	.50
7485	Socket—6-contact Radiotron socket	.40
7487	Shield—I. F. and R. F. amplifier Radiotron shield	.25
9446	Transformer—Power transformer—105-125 volts 50-60 cycles (T1)	5.40
9451	Transformer—Power transformer—105-125 volts 25-40 cycles	5.40
9452	Transformer—Power transformer—200-250 volts 50-60 cycles	5.52
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	REPRODUCER ASSEMBLIES (Models 121 and 122)	
6476	Transformer—Output transformer (T2)	1.44
9428	Cone—Reproducer cone complete (L17)—Package of 5	5.00
9449	Reproducer complete	5.20
9450	Coil—Field coil magnet and cone support (L18)	2.80

MODEL 140,141,141-E,
240,AVR-1
Alignment,Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating............100–125 Volts and 200–250 Volts
Frequency Rating
25–60 (100–125 Volt Only) and 50–60 Cycles
Power Consumption..........................110 Watts
Type and Number of Radiotrons
3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 8
Type of Circuit
Straight Super-Heterodyne for all frequencies with Class "B" Output Stage.
Undistorted Output..............................6 Watts

This all wave super-heterodyne receiver is of the continuous tuning type utilizing a straight super-heterodyne circuit in all bands. The bands are as follows:

Selector Switch Position	*Frequency Range (Kilocycles)*	*Wave Length Range (Meters)*
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–30
D	8000–18000	37.5–16.7

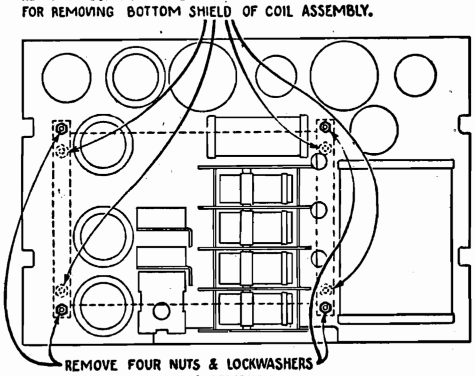


Figure D—Location of nuts and lockwashers holding coil assembly

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing Radiotrons and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss and 445 K. C. signals or static.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and makes easier alignment of the oscillator at the higher frequency bands.

Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly with the selector switch is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure D and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure D.

Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode Volts	Screen Grid to Cathode Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

MODEL 140,141,141-E, 240,AVR-1
Alignment,Switch data

RCA-VICTOR CO., INC.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screw-driver such as Stock No. 7065, and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position.

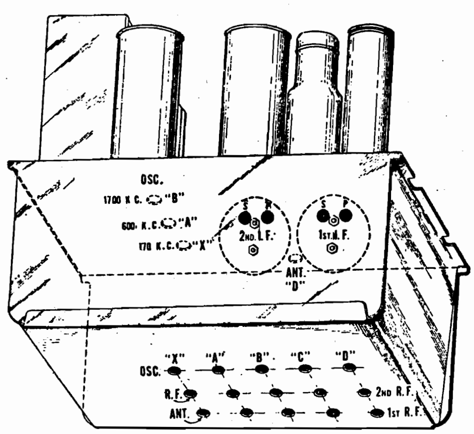


Figure E—Location of line-up capacitors.

The external oscillator output should be connected between antenna and ground for the R. F. and oscillator adjustments and between the first detector grid and ground for the I. F. adjustments. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure E for the location of the line-up capacitors.

Pickup Connections

A terminal board is provided at the rear of the chassis for attaching a magnetic pickup to this instrument. Such connections are shown in Figures F, G and H.

Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure J shows the proper manner of making the various connections possible for this transformer.

The 25–60 cycle transformer uses only one 100–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115-125 volt lines but the connection shown in Figure I may be used for 100-115 volt lines.

External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments To Be Made
445 K. C.	Any setting that does not bring in station.	At rear of chassis	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output.	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. Adjust oscillator trimmer until two points are noted where signal is heard. Use for adjustment the higher frequency of these two points. This will be the point lying counter-clockwise from the other point.	4

**MODEL 140,141,141-E,
240,AVR-1
Schematic,Voltage**

RCA-VICTOR CO., INC.

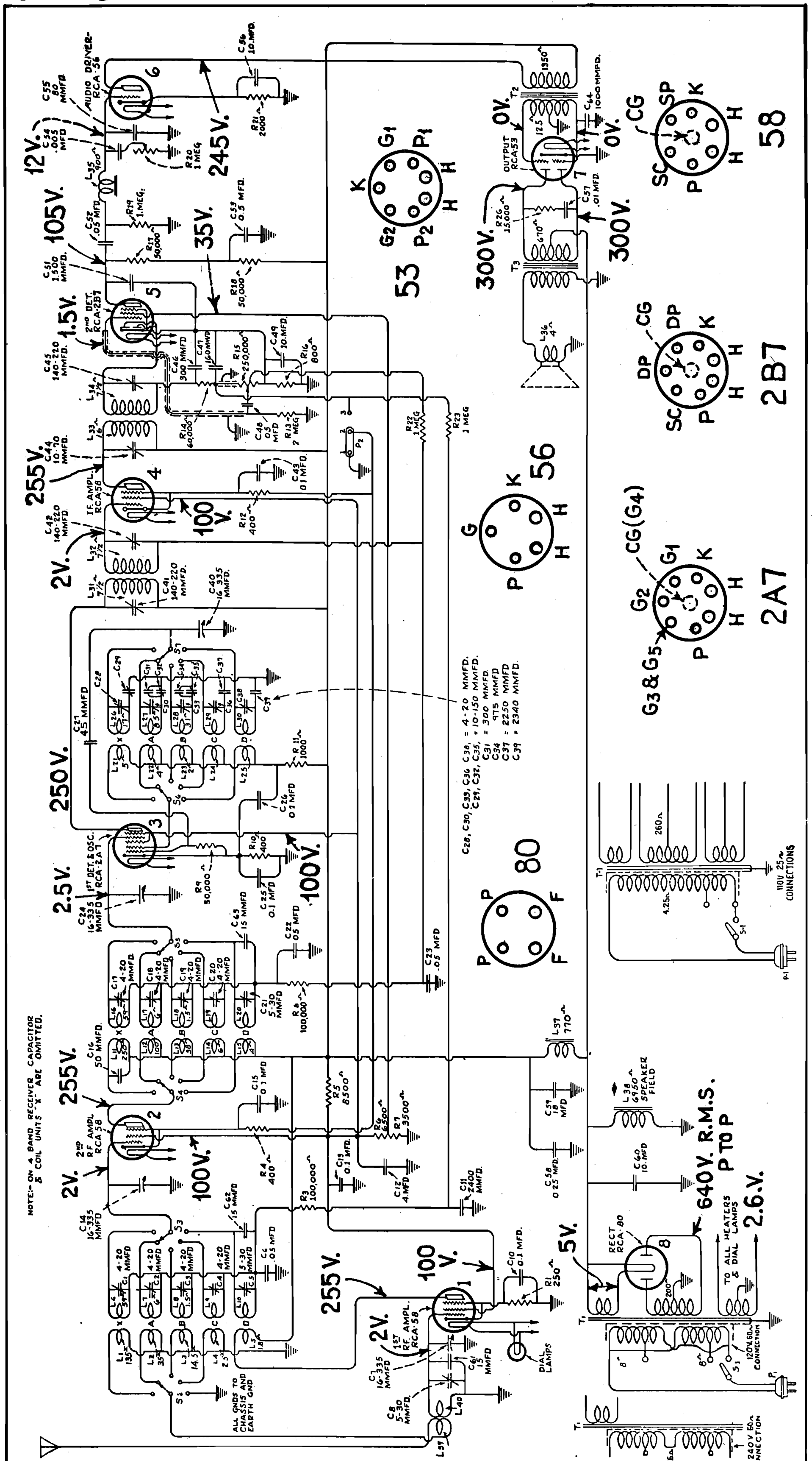


Figure A—Schematic Circuit Diagram

RCA-VICTOR CO., INC.

MODEL 140, 141, 141-E, 240, AVR-1

Chassis wiring

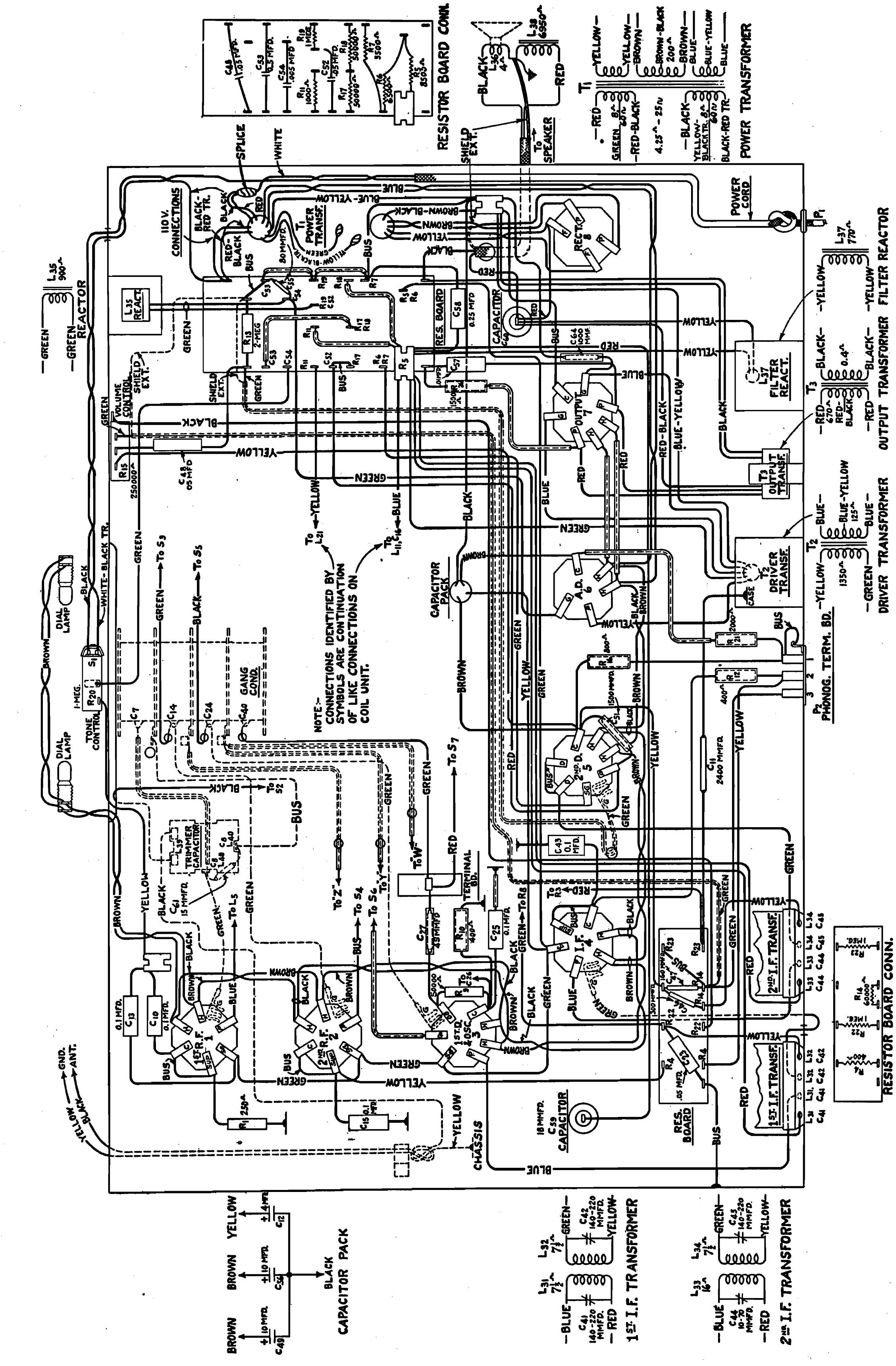


Figure B—Wiring Diagram of Chassis Assembly

MODEL 140,141,141-E, 240,AVR-1
Coil assembly wiring

RCA-VICTOR CO., INC.

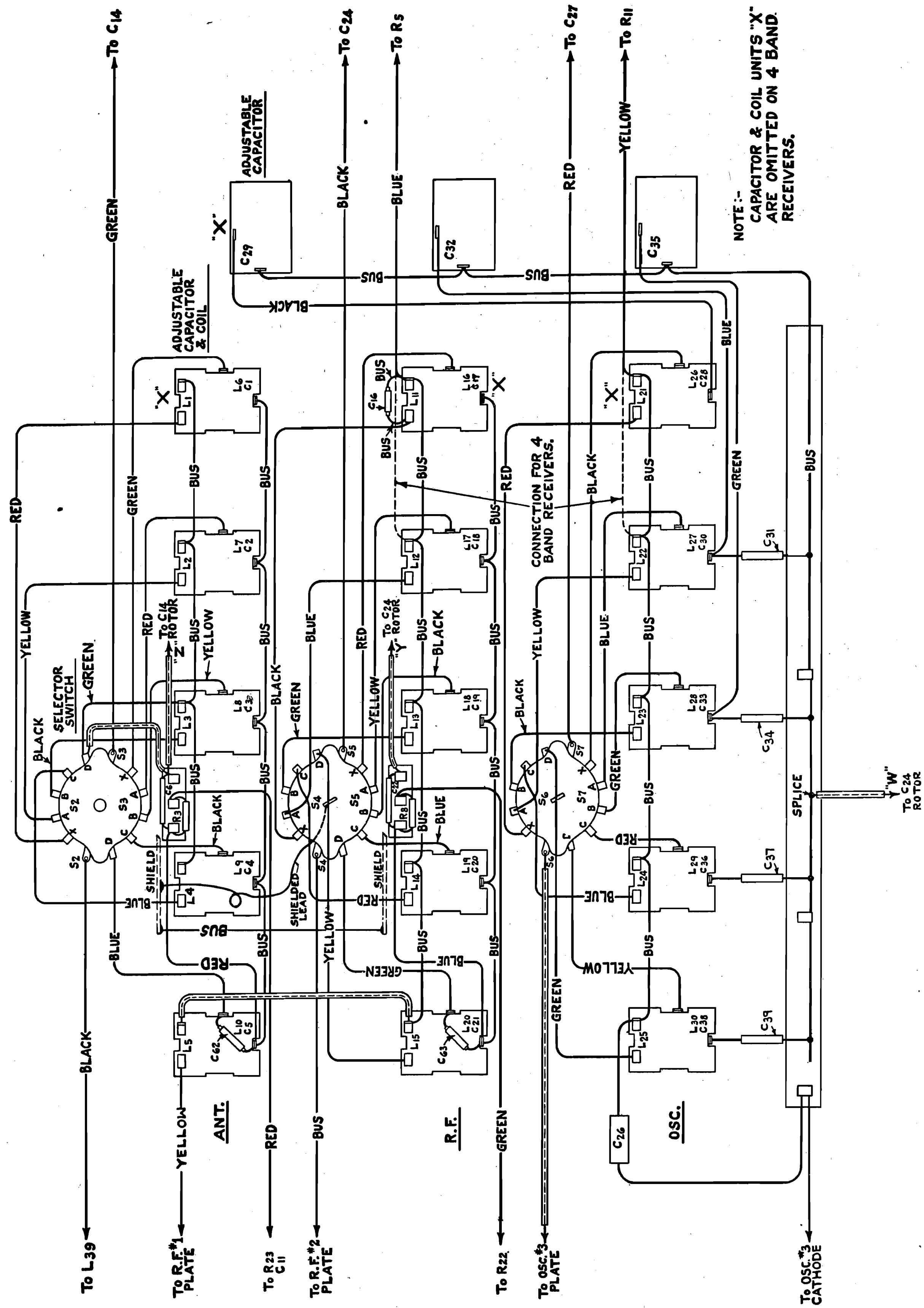


Figure C—Wiring Diagram of Coil Assembly

RCA-VICTOR CO., INC.

MODEL 140,141,141-E, 240,AVR-1
Power transformer wiring.

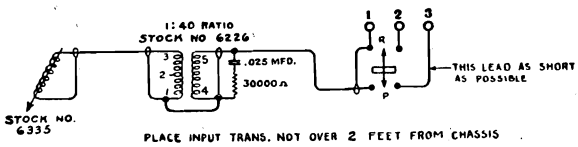


Figure F—Typical Pickup Connections

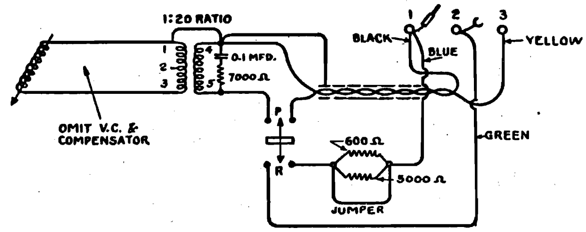


Figure G—Table Phonograph Connections

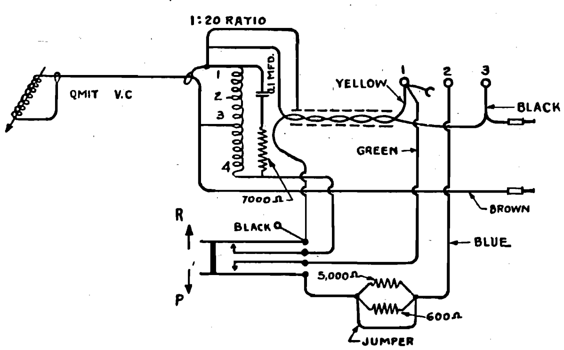


Figure H—End Table Connections

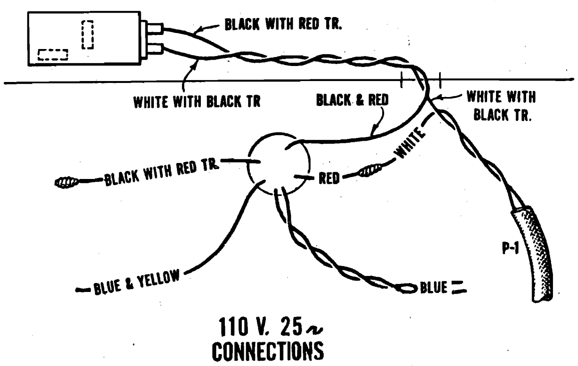


Figure I—100-115 Volt Connection of 25–60 Cycles Transformer

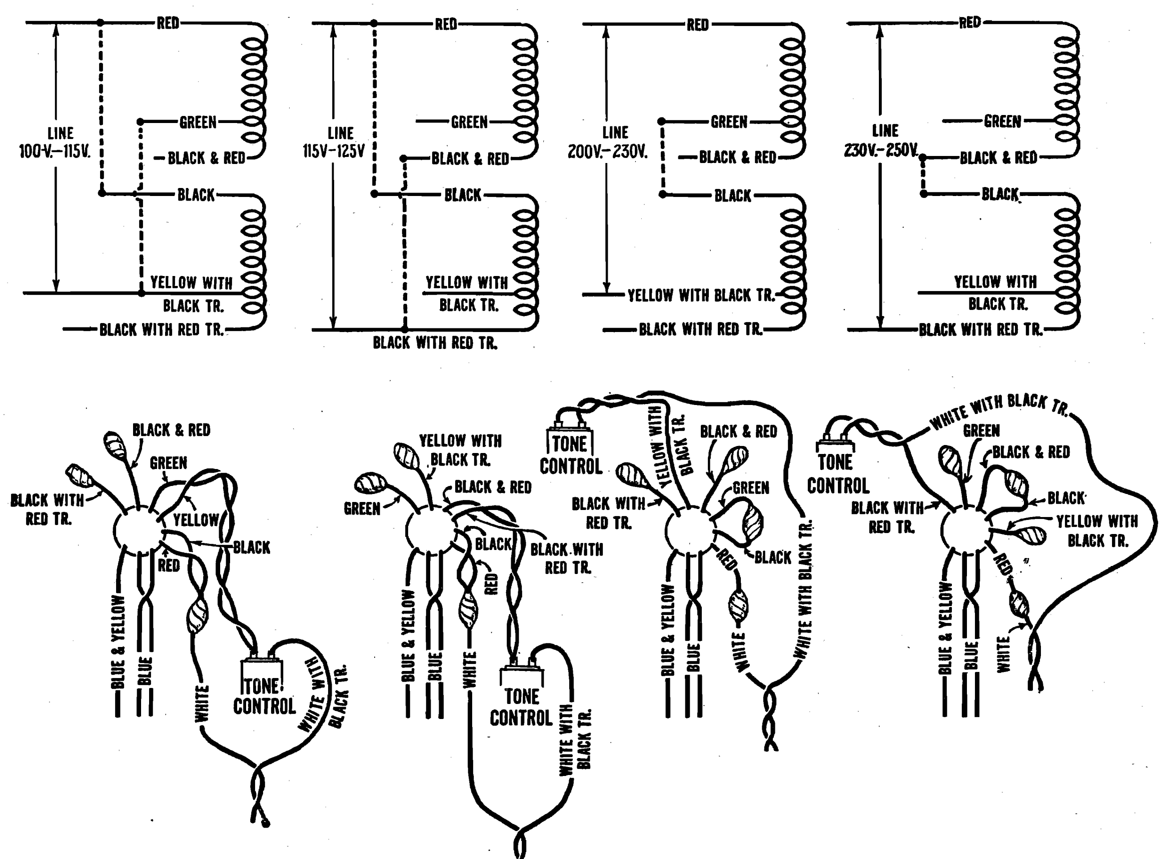


Figure J—Power Transformer Connections (50–60 cycles)

MODEL 140,141,141-E,
240,AVR-1
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3472	Capacitor—.0024 mfd. (C11)	.32
3526	Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R17, R18), —Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor—0.1 mfd. (C10, C15, C25)	.35
3683	Shield—Radiotron shield top	.20
3711	Capacitor—80 mmfd. (C55)	.40
3719	Socket—7-contact Radiotron socket	.30
3771	Resistor—8,500 ohms—Carbon type—3 watt (R5)	.25
3787	Capacitor—.01 mfd. (C57)	.30
3844	Capacitor—15 mmfd. (C61, C62, C63)	.30
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5	1.00
3864	Capacitor—300 mmfd. (C46)	.30
3865	Capacitor—160 mmfd. (C47)	.30
3866	Capacitor—1,500 mmfd. (C51)	.34
3867	Capacitor—0.1 mfd. (C13, C43)	.32
3888	Capacitor—.05 mfd. (C6, C22, C23, C48, C52)	.25
3931	Capacitor—45 mmfd. (C27)	.30
3942	Shield—I. F. Radiotron shield	.18
3973	Capacitor—1,000 mmfd. (C64)	.34
3974	Capacitor—975 mmfd. (C34)	.34
6112	Cushion—Rubber cushions for chassis—Package of 4	.25
6136	Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5	1.10
6188	Resistor—2 megohm—Carbon type—½ watt (R13)—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6512	Capacitor—.005 mfd. (C54)	.28
6571	Capacitor—10 mfd. (C60)	1.20
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48
6606	Reactor—Filter reactor (L37)	1.66
6607	Reactor—Tone control reactor (L35)	1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18. mfd. (C59)	1.10
6610	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	1.55
6611	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	1.62
6612	Volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	$1.00
6626	Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56)	1.86
6627	Tone control (R20)	1.44
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48
6631	Coil and capacitor assembly—Antenna coil and capacitor —150–410 kilocycles—5-band (L1, L6, C1)	2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17)	2.10
6633	Coil and capacitor—Oscillator coil and capacitor assembly —150–410 kilocycles—5-band (L21, L26, C28)	1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly —540–1,500 kilocycles—4 or 5 band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly —540–1,500 kilocycles—4 or 5 band (L22, L27, C30)	1 40
6637	Coil and capacitor—Antenna coil and capacitor assembly 1,500–4,000 kilocycles—4 or 5 band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L13, L18, C19)	1.66
6639	Coil and capacitor—Oscillator coil and capacitor assembly —1,500–4,000 kilocycles—4 or 5 band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly —4,000–10,000 kilocycles—4 or 5 band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly 8,000–18,000 kilocycles—4 or 5 band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments	
7065	Screwdriver—For R. F. or I. F. adjustment	.80
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
7487	Shield—First detector and R. F. Radiotron shield	.25
8837	Support—Metal supports for chassis—Package of 4	.48
9042	Transformer—Power transformer—105–250 volt—50–60 cycles (T1)	6.84
9046	Transformer—Power transformer—105–125 volts—25–40 cycles	9.22
9050	Oscillator—Test oscillator—15 to 20,000 K.C.	33.50
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	MISCELLANEOUS	
3829	Knob—Volume control or tone control knob—Package of 5	1.10
3830	Knob—Station selector knob—Package of 5	1.08
3831	Knob—Range switch knob—Package of 5	1.08
3876	Cable—3-conductor for loudspeaker—4-band	.60
3878	Screws—No. 4–40–$\frac{3}{16}$ fillister head screw and washer for fastening station selector pointer—Package of 20	.25
3952	Escutcheon—Volume control escutcheon	.10
3953	Escutcheon—Range switch escutcheon—5-band	.10
3992	Escutcheon—Range switch escutcheon—4-band	.10
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial	.50
6671	Cable—2-conductor shielded for loudspeaker—5-band	.36
6672	Screen—Translucent celluloid screen—For dial lamps—Package of 5	.30
6673	Pointer—Station selector pointer—Package of 5	.64
6677	Dial—Station selector dial—5-band—Package of 5	1.42
6678	Dial—Station selector dial—4-band—Package of 5	1.42
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.22

MODEL 142-B,241-B
Alignment, Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

Total "A" Battery Current....................0.48 Ampere
Average "B" Battery Current....................15 M. A.
Type and Number of Radiotrons:
2 RCA-34, 1 RCA-32, 5 RCA-30—Total, 8
Tuning Range............................540–1500 K. C.
Maximum Undistorted Output...................1.0 Watt

This receiver is an eight tube battery operated Superheterodyne giving excellent performance. Features such as Class "B" output stage, two point tone control, permanent magnet dynamic loudspeaker, local-distant switch, adaptability for either Air Cell or storage battery operation and the inherent sensitivity, selectivity and tone quality of the Superheterodyne are incorporated in this instrument.

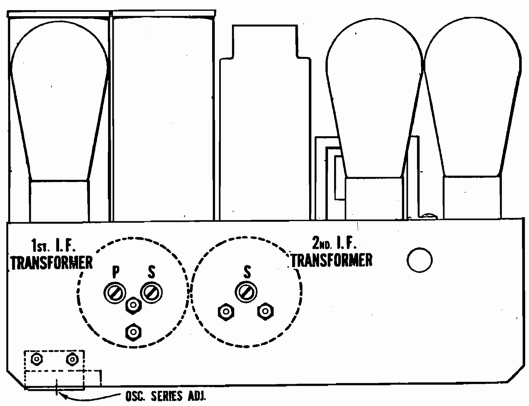


Figure C—Location of Line-up Capacitor

The circuit consists of an R. F. stage using Radiotron RCA-34, a Radiotron RCA-32 as a first detector, an oscillator using Radiotron RCA-30, an I. F. using Radiotron RCA-34, and a second detector utilizing Radiotron RCA-30. Two audio stages are used, the first using an RCA-30 and the second using two RCA-30 as a Class "B" output stage. The local distance switch is in the antenna circuit so that the antenna may be disconnected when receiving strong local stations. The volume control varies the control grid bias on the R. F. and I. F. Radiotrons. The tone control consists of a capacitor that is connected across one half of the secondary of the input audio transformer at the maximum low position. At the maximum high position this capacitor is disconnected.

Line-up Adjustments

I. F. Adjustments: Two transformers comprising three tuned circuits and one untuned circuit are used in the intermediate amplifier. These circuits are all tuned to 175 K. C. The screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that a slight deflection is obtained in the output meter

(d) Adjust the secondary of the second and then the primary and secondary of the first I. F. transformers until a maximum deflection is obtained. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments: The three gang capacitor screws and 600 K. C. oscillator trimmer are accessible from beneath the receiver chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should point toward the small arrow at the edge of the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained.

(c) With a non-metallic screwdriver, adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

RADIOTRON SOCKET VOLTAGES

New "A" and "B" Batteries—No Signal Received—Volume Control at Maximum

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M. A.	Filament Volts
1. R. F.—RCA-34	*3.0	65	155	2.5	2.0
2. Oscillator—RCA-30	—	—	55	4.0	2.0
3. 1st Detector—RCA-32	*4.0	65	155	0.5	2.0
4. I. F.—RCA-34	*3.0	65	155	2.5	2.0
5. 2nd Detector—RCA-30	*10.0	—	*130	0.25	2.0
6. A. F.—RCA-30	*7.0	—	150	2.5	2.0
7. Power—RCA-30	*14.0	—	155	2.0 Total	2.0
8. Power—RCA-30	*14.0	—	155		2.0

*Voltages are obtained by means of high resistance dividers and it is not possible to accurately measure them with ordinary equipment.

MODEL 142-B,241-B
Schematic

RCA-VICTOR CO., INC.

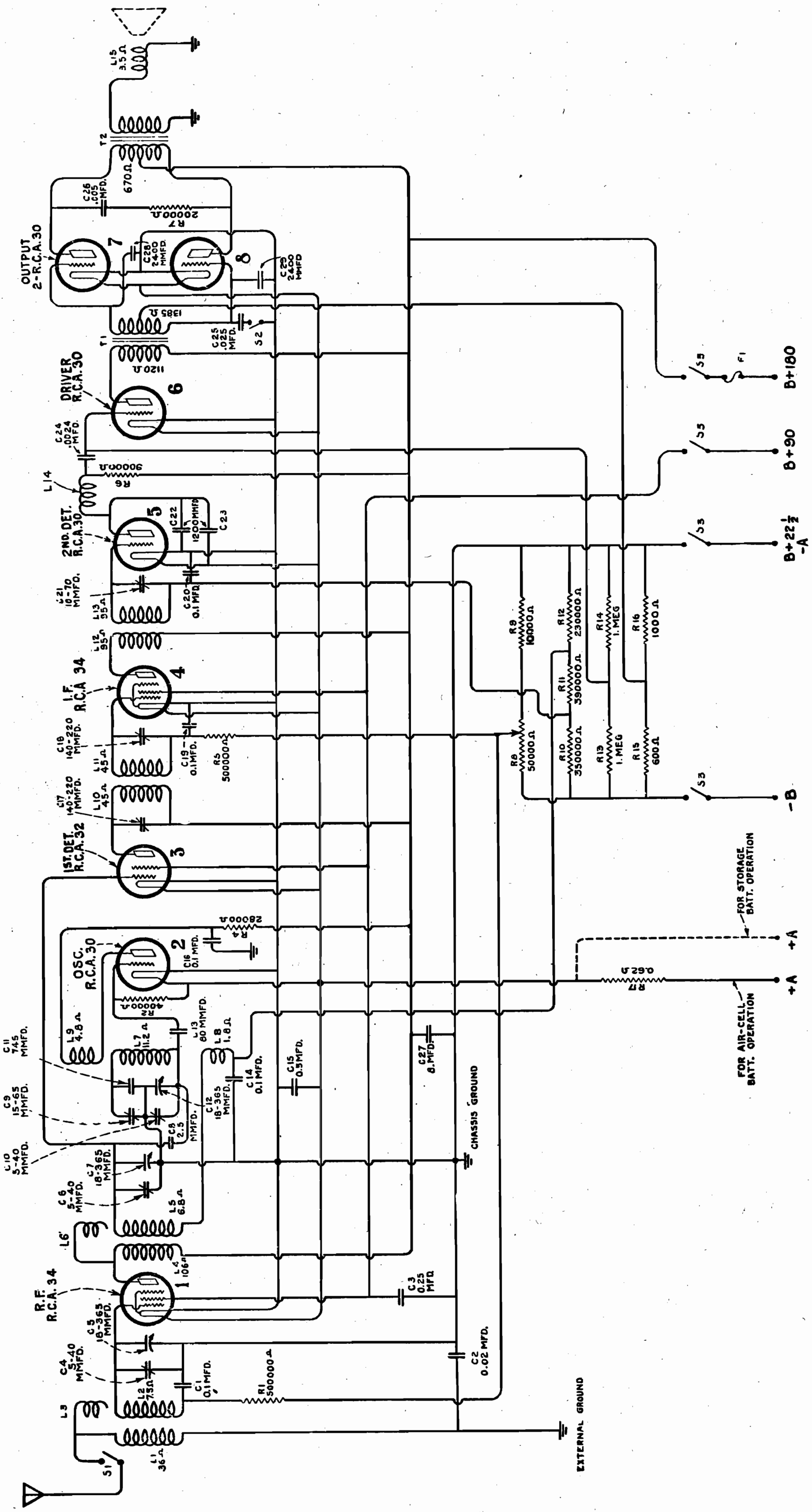


Figure A—Schematic Diagram

RCA-VICTOR CO., INC.

MODEL 142-B, 241-B
Chassis wiring

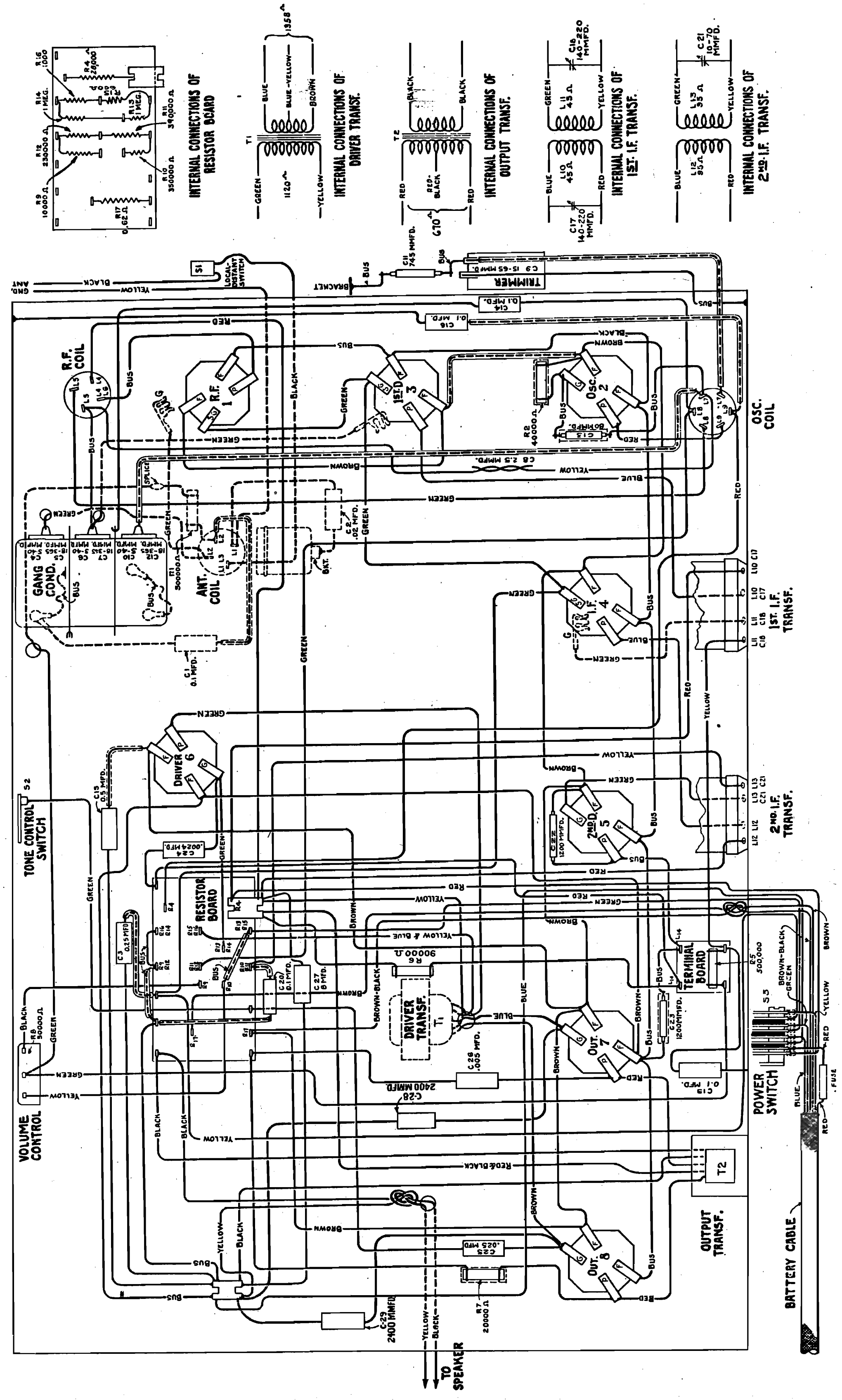


Figure B—Wiring Diagram

MODEL 142-B,241-B
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	
	RECEIVER ASSEMBLIES	
2734	Capacitor—745 mmfd. (C11)	
2737	Escutcheon—Local-Distant switch escutcheon	
2747	Cap—Contact cap	
2816	Resistor — 1,000 ohms — Carbon type — ½ watt (R16)	
2966	Resistor — 28,000 ohms — Carbon type — 1 watt (R4)	
3048	Resistor—500,000 ohms—Carbon type—½ watt (R1, R5)	
3056	Shield—Radiotron shield—R. F. or oscillator	
3076	Resistor—1 megohm—Carbon type—½ watt (R13, R14)	
3088	Knob—Operating switch knob	
3238	Screw—Set screw for switch knob	
3472	Capacitor—2,400 mmfd. (C24)	
3584	Ring—R. F., oscillator or antenna coil retaining ring	
3592	Knob—Station selector, tone or volume control knob	
3623	Shield—R. F., oscillator or antenna coil shield	
3639	Capacitor—0.02 mfd. (C2)	
3702	Capacitor—0.25 mfd. (C3)	
3711	Capacitor—80 mmfd. (C13)	
3748	Fuse—½ ampere fuse (F1)	
3765	Capacitor—0.025 mfd. (C25)	
3768	Screw—Volume indicator or station selector dial scale set screw	
3859	Socket—4-contact Radiotron socket—Audio driver and output Radiotrons	
3877	Capacitor—0.1 mfd. (C1, C14, C16, C19, C20)	
3892	Resistor—600 ohms—Carbon type—½ watt (R15)	
3908	Switch—Local-Distant switch—For table models	
3909	Switch—Local-Distant switch—For console models	
3910	Screw assembly—Chassis mounting screw assembly—Comprising 4 screws, 4 washers and 4 spacers	
3911	Resistor—40,000 ohms—Carbon type—½ watt (R2)	
3912	Resistor—90,000 ohms—Carbon type—½ watt (R6)	
3913	Switch—Operating switch—4-pole, single throw	
3932	Capacitor—2,400 mmfd. (C28, C29)	
3945	Resistor — 7,500 ohms — Carbon type — ½ watt (R9)	
3946	Resistor—230,000 ohms—Carbon type—½ watt (R12)	
3947	Resistor—390,000 ohms—Carbon type—½ watt (R11)	
3948	Resistor—350,000 ohms—Carbon type—½ watt (R10)	
3950	Shield—Radiotron shield	
6176	Escutcheon—Operating switch escutcheon	
6251	Capacitor—1,200 mmfd. (C22, C23)	
6300	Socket—4-contact Radiotron socket	
6303	Resistor—20,000 ohms—Carbon type—½ watt (R7)	
6489	Coil—Antenna coil (L1, L2, L3)	
6512	Capacitor—0.005 mfd. (C26)	
6516	Connector—Fuse connector	
6548	Capacitor—8.0 mfd. (C27)	
6604	Capacitor—0.5 mfd. (C15)	
6709	Transformer—Output transformer (T2)	
6710	Transformer—Audio driver transformer (T1)	
6711	Coil—Choke coil (L14)	
6712	Transformer—First intermediate frequency transformer (L10, L11, C17, C18)	
6713	Transformer—Second intermediate frequency transformer (L12, L13, C21)	
6714	Volume control (R8)	
6715	Dial—Volume indicator dial assembly	
6716	Switch—Tone control switch	
6717	Condenser—3-gang variable tuning condenser (C4, C5, C6, C7, C10, C12)	
6718	Scale—Station selector dial scale assembly	
6719	Coil—R. F. coil (L4, L5, L6)	
6720	Coil—Oscillator coil (L7, L8, L9)	
6721	Cable—Main cable—For table models	
6737	Resistor—0.62 ohms—Wire wound (R17)	
7062	Capacitor—Adjustable capacitor—15 to 70 mmfd. (C9)	
	REPRODUCER ASSEMBLIES	
8920	Ring—Cone retaining ring	
9431	Bracket—Cone bracket and magnet assembly	
9432	Cone—Reproducer cone complete (L15)	
9455	Reproducer complete	
	REPRODUCER ASSEMBLIES	
3949	Magnet	
9428	Cone—Reproducer cone	
9453	Reproducer complete	
9454	Housing—Cone housing and core assembly	

MODEL 210
Alignment, Voltage
Speaker wiring

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating............................105–125 Volts
Frequency Rating...........25–60 Cycles and 50–60 Cycles
Power Consumption.................60 Cycles—70 Watts
Number and Types of Radiotrons..............1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7, 1 RCA-80—Total 5
Maximum Undistorted Output.................1.75 Watts
Tuning Frequency Range..........540 K. C. to 1500 K. C. 1400 K. C. to 2800 K. C.

This five tube Super-Heterodyne Receiver is of compact design and excellent construction. Features such as a large electrodynamic loudspeaker, vernier dial, continuously variable tone control, single heater-type Pentode output tube,

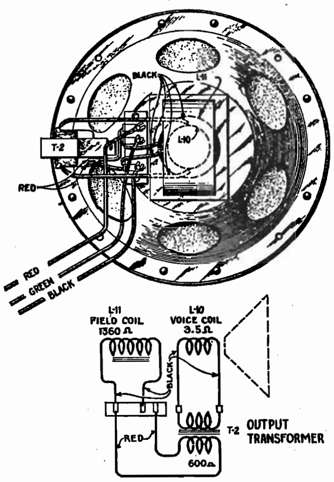


Figure C—Loudspeaker Wiring

wide tuning frequency range, and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne characterize this instrument.

Figure "A" shows the schematic diagram, Figure "B" the wiring and Figure "C" the loudspeaker wiring. The circuit consists of an R. F. stage, a combined oscillator and first detector, two intermediate tuned circuits, a high gain second detector and a single Pentode output stage. A full wave rectifier circuit is used together with a filter circuit in which the loudspeaker field functions as the filter reactor. The volume control varies the control grid bias on the R. F. and first detector tubes, while the tone control consists of a capacitor and variable resistor connected in series from the plate to the screen grid of the output tube.

Line-Up Capacitor Adjustments

The line-up capacitor adjustments of the I. F. stage, gang capacitor and high frequency circuit are made in the following manner:

(a) Procure a modulated oscillator such as stock No. 9050, giving a signal at 175 K. C., 600 K. C., 1400 K. C. and 2440 K. C., a non-metallic screwdriver (Stock No. 7065), and an output meter.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. alignment, the broadcast band R. F. circuits are adjusted at 1400 and 600 K. C. For these adjustments the Range Switch must be set in the broadcast position and the oscillator output connected to the antenna and ground leads of the receiver. First set the oscillator at 1400 K. C. and the receiver dial at 140 and adjust the three trimmer capacitors located on top of the gang capacitor for maximum output. Shift the oscillator to 600 K. C., tune in the signal and adjust the oscillator series capacitor (accessible at the right-hand side of the chassis) for maximum output while rocking the variable condenser back and forth. Then repeat the 1400 K. C. adjustments, as there is a tendency toward interaction.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the broadcast band R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector—Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

MODEL 210
Schematic
Chassis wiring

RCA-VICTOR CO., INC.

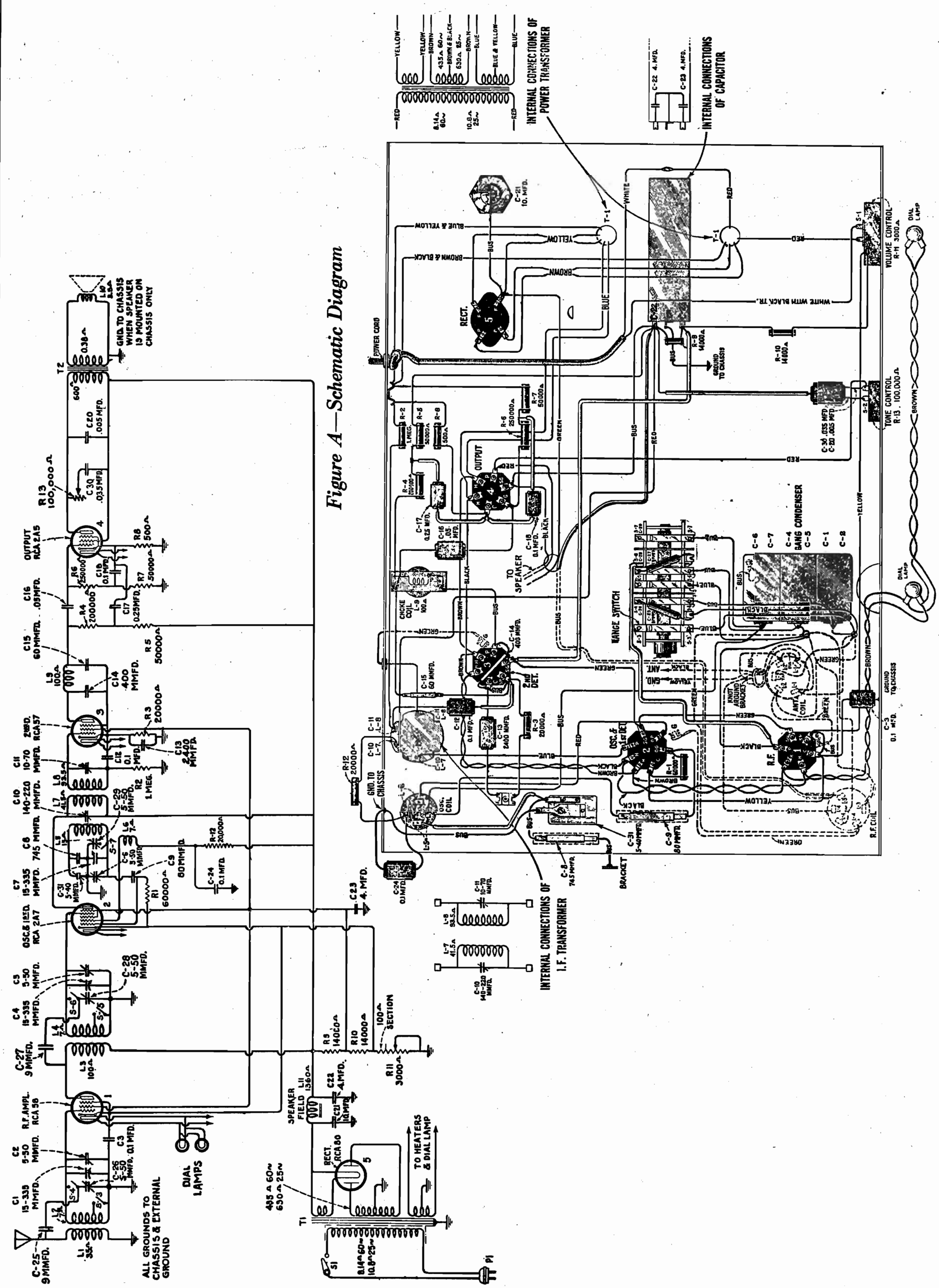


Figure A—Schematic Diagram

Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	Price List
	RECEIVER ASSEMBLIES	
2734	Capacitor—745 mmfd. (C8)—Package of 5	$1.50
3050	Resistor — 14,000 ohms — Carbon type — 3 watt (R9)	.25
3076	Resistor—1 megohm—Carbon type—½ watt (R2)—Package of 5	1.00
3459	Capacitor—80 mmfd. (C9)	.44
3514	Resistor—250,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3555	Capacitor—.1 mfd. (C24)	.36
3572	Socket—7-contact Radiotron socket	.38
3574	Coil—Choke coil assembly (L9)	.68
3584	Ring—R. F., antenna or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R5, R7)—Package of 5	1.00
3596	Capacitor—60 mmfd. (C15)	.36
3597	Capacitor—.25 mfd. (C17)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt (R8)—Package of 5	1.10
3604	Capacitor—400 mmfd. (C14)	.30
3623	Shield—Antenna or R. F. coil shield	.30
3624	Socket—Dial lamp socket	.40
3625	Dial—Volume indicator dial assembly	.40
3628	Escutcheon—Volume control escutcheon	.42
3629	Escutcheon—Station selector escutcheon	.42
3641	Capacitor—.1 mfd. (C3, C12, C18)	.35
3713	Capacitor—.05 mfd. (C16)	.32
3783	Capacitor—9 mmfd. (C25, C27)—Package of 2	.50
3932	Capacitor—2,400 mmfd. (C13)	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R3, R12)—Package of 5	1.00
6306	Resistor — 14,000 ohms — Carbon type — 1 watt (R10)—Package of 5	1.10
6464	Transformer—Intermediate frequency transformer (L7, L8, C10, C11)	1.88

Stock No.	DESCRIPTION	List Price
6471	Coil—Oscillator coil (L5, L6)	$0.74
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil (L3, L4)	.94
6573	Switch—Range switch (S3, S4, S5, S6, S7, C26, C28, C29)	1.25
6598	Condenser—3-gang variable tuning condenser (C1, C2, C4, C5, C6, C7)	3.00
6599	Volume control (R11, S1)	1.25
6620	Capacitor—Comprising .005 and one .035 mfd. capacitors (C20, C30)	.50
6622	Dial—Condenser dial and drive assembly	.95
6645	Tone control (R13)	1.20
6676	Socket—6-contact Radiotron socket—Output	.40
6754	Knob—Range switch knob—Package of 5	.50
6769	Socket—4-contact Radiotron socket	.35
6771	Knob—Station selector, tone or volume control knob—Package of 5	.85
7062	Capacitor—Adjustable capacitor—15 to 70 mmfd. (C31)	.50
7065	Screwdriver—For R. F., fixed oscillator condenser	.80
7485	Socket—6-contact Radiotron socket	.40
7589	Capacitor—Comprising two 4. mfd. capacitors (C22, C23)	1.64
7590	Capacitor—10 mfd. (C21)	1.40
8985	Transformer—Power transformer 105–125 volts 50–60 cycles (T1)	4.26
8986	Transformer—Power transformer 200–250 volts 50–60 cycles	4.38
9002	Transformer—Power transformer 105–125 volts 25–40 cycles	6.00
9050	Oscillator—Test oscillator—15 to 20,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6770	Transformer—Output transformer (T2)	2.00
8935	Cone—Reproducer cone (L10)—Package of 5	5.25
9460	Coil—Field coil, magnet and cone support (L11)	6.00
9461	Reproducer complete	8.50

MODEL 220,222
Voltage, Alignment
Trimmer location

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating............................105-125 Volts
Frequency Rating.................25–60 and 50–60 Cycles
Power Consumption...60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons..............2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output..........................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C. and 1600 K. C. to 3500 K. C.

This receiver is a six tube Superheterodyne incorporating features such as electro-dynamic loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control, "airplane" dial and the inherent sensitivity, selectivity and tone quality of the superheterodyne.

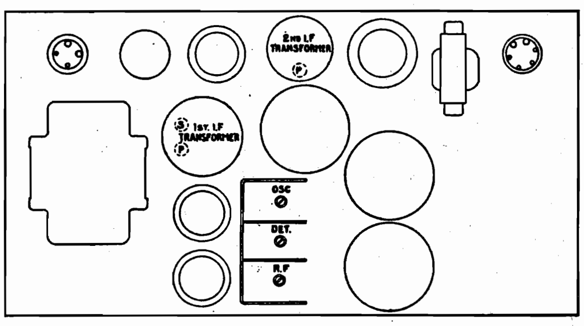


Figure C—Location of Line-up Capacitors

A feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1600 to 3500 K. C. band. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the location of the line-up capacitors.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning as a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are located on the main tuning capacitor, accessible at the top of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator pointer should be set on the white inner radial line located at approximately 530 K. C. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the top of the chassis, for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

(d) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 244. The three line-up capacitors located on the Range Switch and accessible from the bottom of the chassis should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.5	100	260	5.0	2.32
2. RCA-2A7 1st Det. Osc.	5.5*	100*	260*	2.0*	2.32
3. RCA-58 I. F.	3.5	100	260	5.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	4.5	50	90	0.7	2.32
5. RCA-2A5 Power	16.5	255	245	34.0	2.32
6. RCA-80 Rectifier		725 RMS		73.0 Total	4.82

*The voltages and current refer to the detector part of the tube.

RCA-VICTOR CO., INC.

MODEL 220,222
Schematic
Chassis wiring

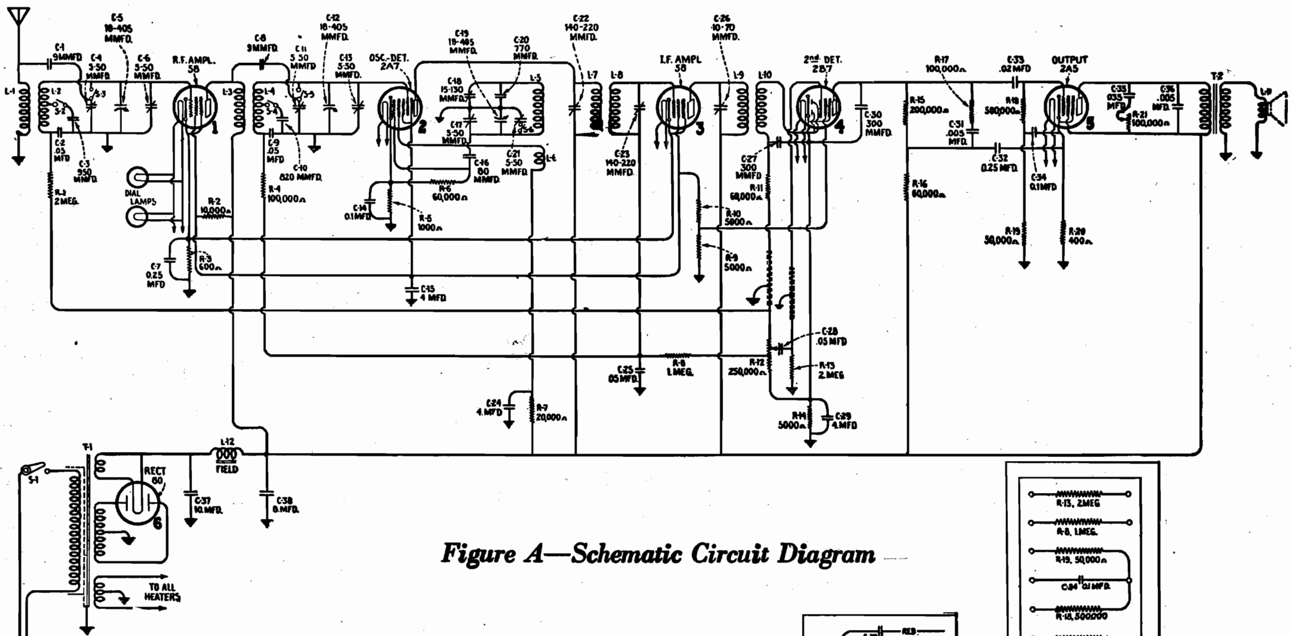


Figure A—Schematic Circuit Diagram

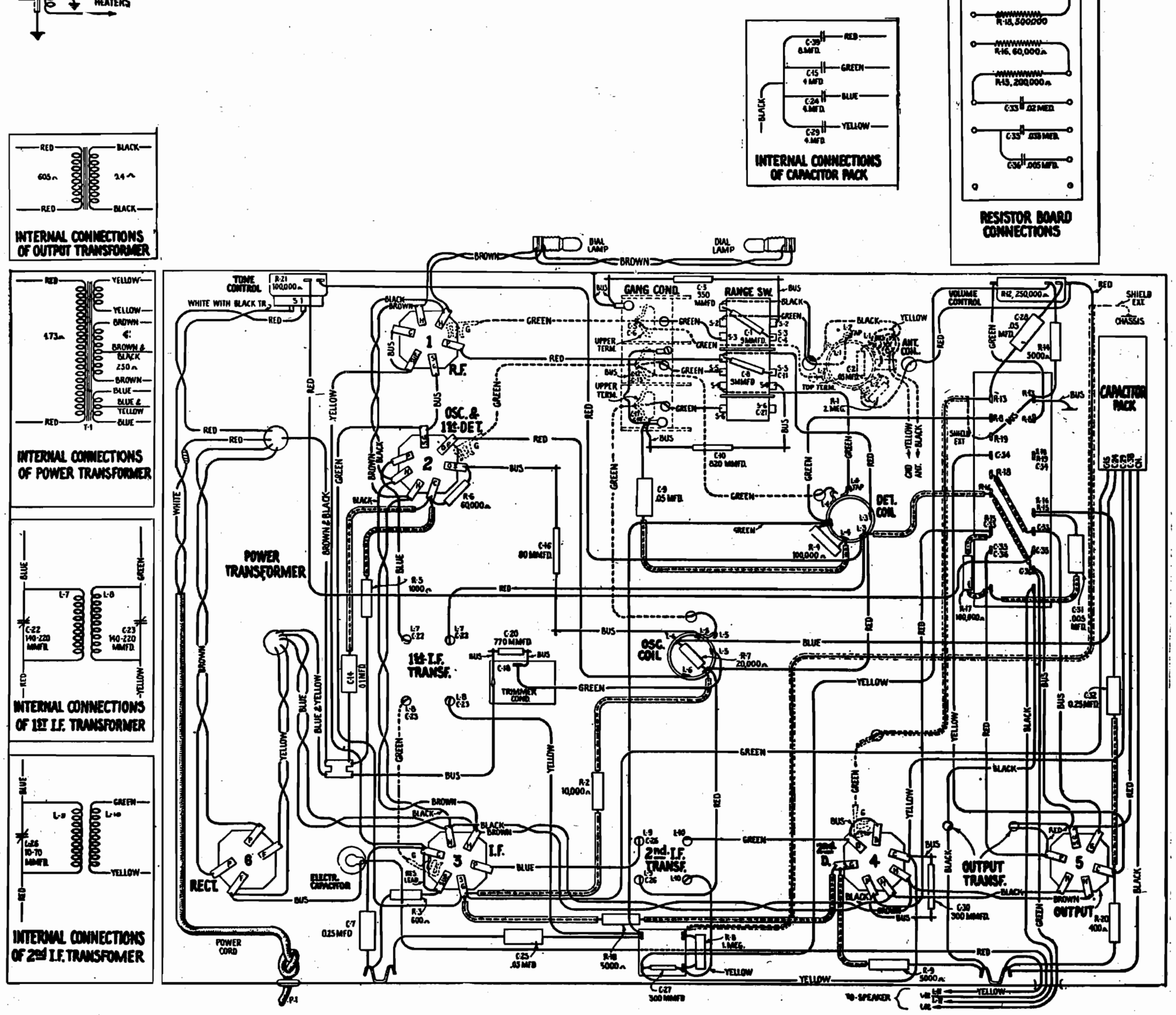


Figure B—Wiring Diagram

MODEL 220,222
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3048	Resistor—500,000 ohms—Carbon type—½ watt (R18)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R8)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R4, R17)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3556	Capacitor—0.05 mfd.—Located on antenna coil (C2)	.34
3572	Socket—7-contact Radiotron socket	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R19)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C27, C30)	.34
3620	Capacitor—770 mmfd. (C20)	.40
3622	Shield—Radiotron shield—Second detector and output	.36
3630	Resistor—10,000 ohms—Carbon type—3 watt (R2)	.25
3639	Capacitor—0.02 mfd. (C33)	.25
3682	Shield—Radiotron shield—Oscillator and first detector	.22
3702	Capacitor—0.25 mfd. (C7, C32)	.42
3711	Capacitor—80 mmfd. (C16)	.40
3768	Screw—Square head—No. 6-32-¼" set screw for condenser drive—Package of 10	.35
3783	Capacitor—9 mmfd. (C1, C8)—Package of 2	.50
3789	Shield—Radiotron shield—R. F. and I. F.	.25
3859	Socket—4-contact Radiotron socket	.30
3861	Capacitor—Adjustable capacitor	.78
3877	Capacitor—0.1 mfd. (C14, C34)	.32
3878	Screw—No. 4-40 screw and washer assembly for fastening station selector indicator—Package of 20	.25
3891	Resistor—5,000 ohms—Carbon type—1 watt (R9, R10)—Package of 5	1.10
3892	Resistor—600 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
3893	Resistor—5,000 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
3894	Capacitor—820 mmfd. (C10)	.36
3895	Capacitor—950 mmfd. (C3)	.40
3896	Capacitor—0.05 mfd. (C9, C25, C28)	.36
3897	Resistor—400 ohms—Carbon type—1 watt (R20)—Package of 5	1.10
3898	Knob—Station selector, volume control, tone control or range switch knob—Package of 5	.90
6188	Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5	1.00
6228	Resistor—200,000 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt—Located on antenna coil (R1)—Package of 5	$1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R6, R11, R16)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6512	Capacitor—0.005 mfd. (C31)	.28
6571	Capacitor—10.0 mfd. (C37)	1.20
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial	.50
6620	Capacitor—Comprising one 0.005 and one 0.035 mfd. capacitors (C35, C36)	.50
6672	Screen—Translucent screen for dial light—Package of 5	.30
6673	Pointer—Station selector indicator—Package of 5	.64
6676	Socket—6-contact output Radiotron socket	.40
6680	Condenser—3-gang variable tuning condenser	3.80
6681	Tone control (R21, S1)	1.25
6682	Volume control (R12)	1.25
6683	Coil—Antenna coil(L1, L2, C2, R1)	1.38
6684	Coil—Detector coil (L3, L4)	1.10
6685	Coil—Oscillator coil (L5, L6)	1.05
6686	Transformer—First intermediate frequency transformer (L7, L8, C22, C23)	1.80
6687	Transformer—Second intermediate frequency transformer (L9, L10, C26)	1.78
6688	Shield—Antenna, detector or oscillator coil shield	.60
6689	Switch—Range switch	1.48
6690	Transformer—Output transformer (T2)	1.46
6691	Capacitor pack—Comprising one 8.0 mfd. and three 4.0 mfd. capacitors (C15, C24, C29, C38)	2.16
6693	Drive—Variable tuning condenser drive assembly complete	1.40
6722	Dial—Station selector dial—Package of 5	1.20
7485	Socket—6-contact Radiotron socket	.40
9441	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	4.92
9442	Transformer—Power transformer—105-125 volts—25-40 cycles	6.80
9443	Transformer—Power transformer—200-250 volts—50-60 cycles	5.04
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone (L11)—Package of 5	6.35
9444	Coil—Field coil, magnet and cone support (L12)	5.00
9445	Reproducer complete	7.14

RCA-VICTOR CO., INC.

MODEL 260
Alignment, Voltage

SERVICE DATA

Electrical Specifications

Voltage Rating....................................105-125 Volts
Power Consumption....................................120 Watts
Type and Number of Radiotrons....................3 RCA-56, 4 RCA-58, 1 UX-280, 2 RCA-2A5—Total, 10
Frequency Range.............................540 K. C.-1500 K. C. 1400 K. C.-2800 K. C.
Undistorted Output....................................4.0 Watts

This receiver is a ten tube Super-Heterodyne radio receiver. Features such as illuminated controls, improved automatic volume control, noise suppressor, compensated volume control, heater pentode output tubes operated as a push-pull stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the location of the adjustable capacitors and Figure D, the loudspeaker wiring. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. And Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C., 1400 K. C. and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g) and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed precedure for making this adjustment follows:

(a) Procure a modulated R. F Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

MODEL 260
Schematic, Trimmers
Speaker data

RCA-VICTOR CO., INC.

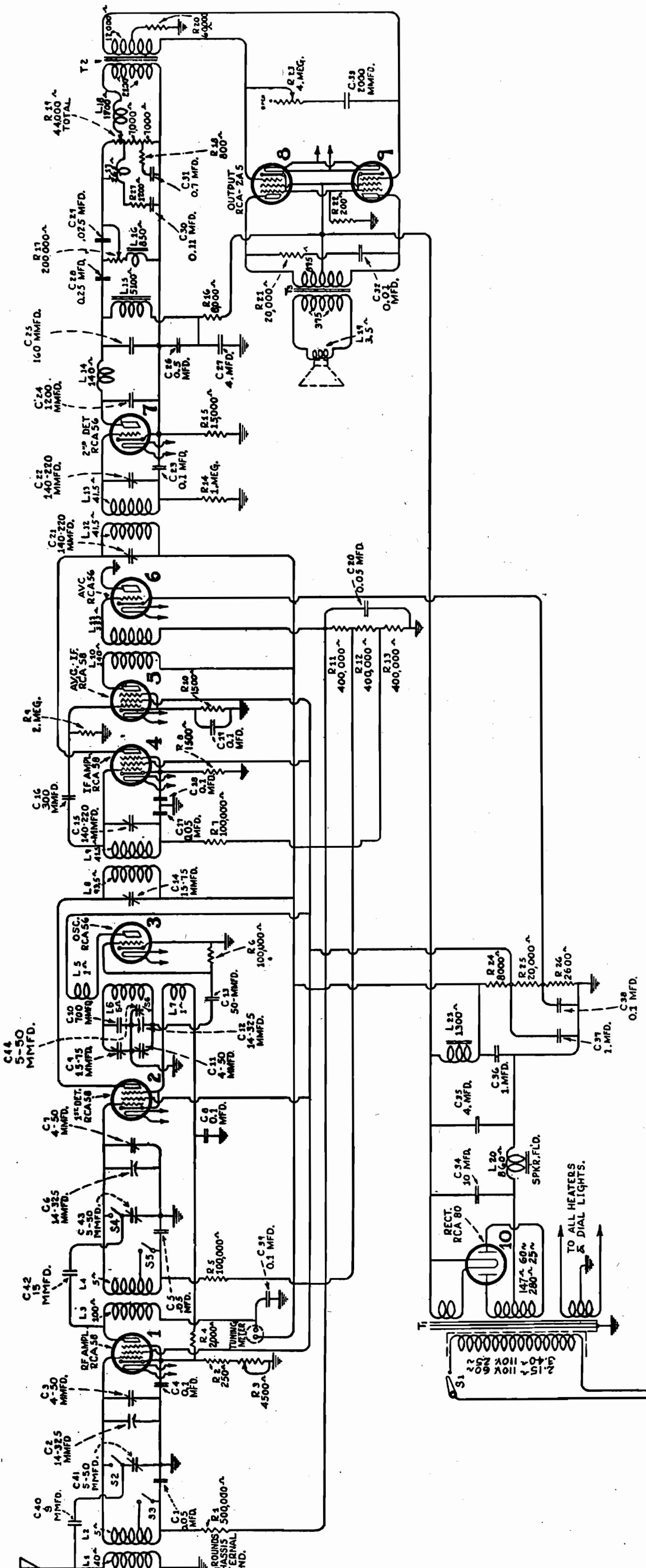


Figure A—Schematic Circuit Diagram

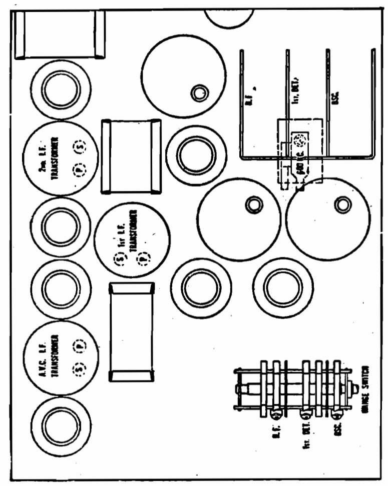


Figure C—Location of Adjustable Capacitors

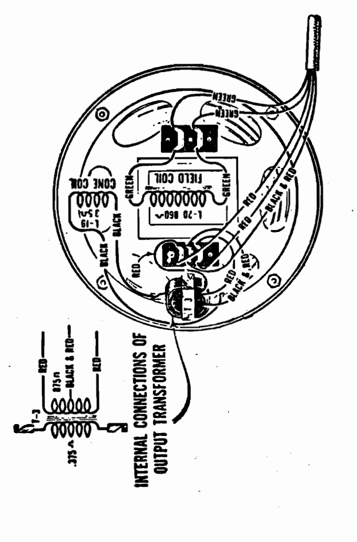


Figure D—Loudspeaker Wiring

RCA-VICTOR CO., INC.

MODEL 260
Chassis wiring

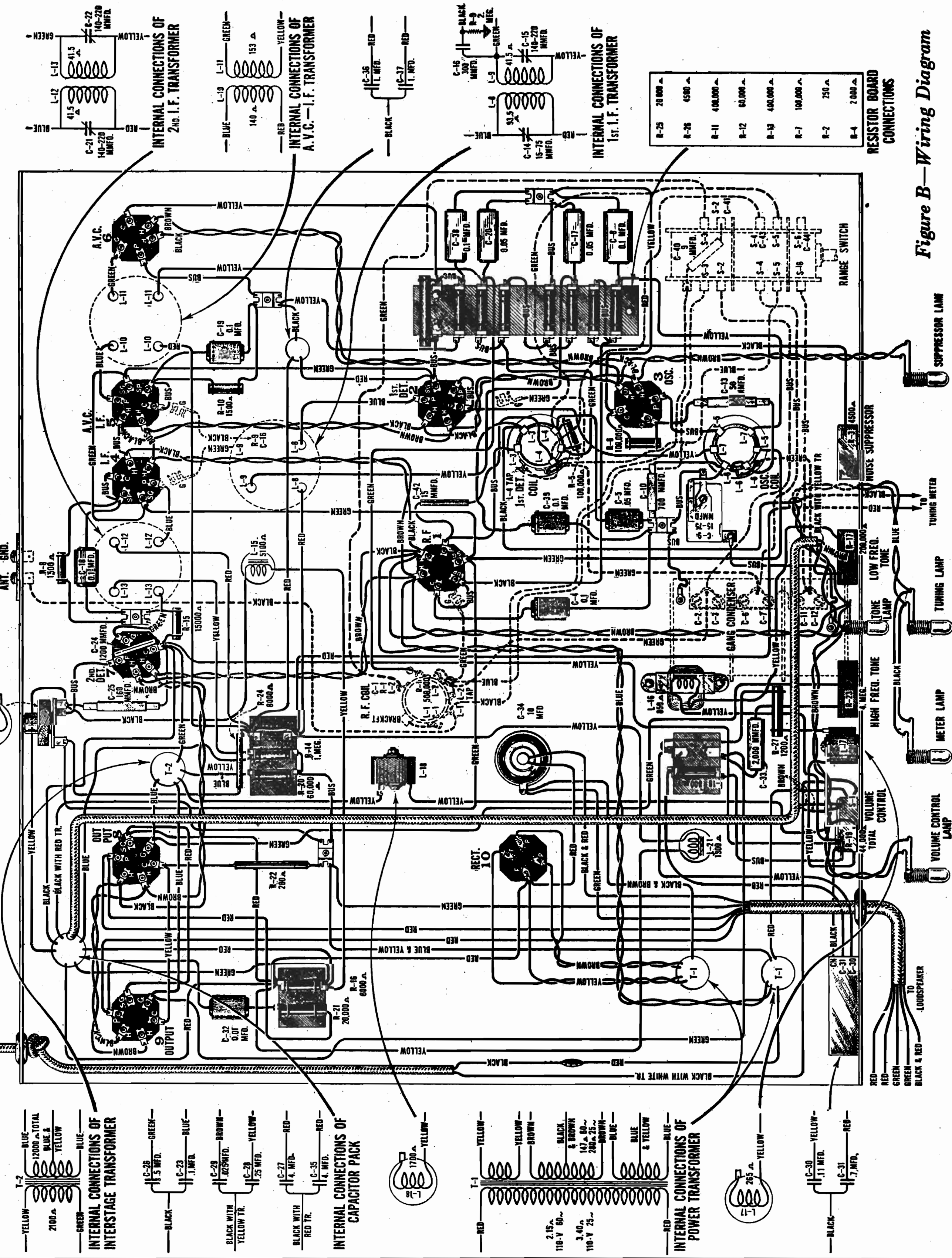


Figure B—Wiring Diagram

MODEL 260
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3024	Capacitor—9 mmfd—Package of 2	$0.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt—Package of 5	1.00
3440	Resistor—4,500 ohms—Carbon type—½ watt—Package of 5	1.00
3455	Capacitor—0.01 mfd capacitor	.44
3460	Capacitor—1,200 mmfd	.30
3513	Capacitor—700 mmfd	.48
3526	Resistor—2,000 ohms—Carbon type—½ watt—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt—Package of 5	1.00
3528	Bracket—Volume control or noise suppressor indicator lamp bracket	.18
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3530	Coil—Second detector plate choke coil	.72
3531	Shutter—Volume control shutter	.50
3532	Shutter—Noise suppressor shutter	.50
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3546	Capacitor—150 mmfd	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lock washers, 4 washers, 8 cushions and 4 spacers—One set	.68
3552	Resistor—200 ohms—Porcelain type—20 watts	.80
3553	Resistor—8,000 ohms—Porcelain type—20 watts	.80
3554	Resistor—1,200 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd. capacitor—Tuning meter	.36
3556	Capacitor—0.05 mfd. capacitor	.34
3557	Capacitor—0.002 mfd. capacitor	.30
3558	Capacitor—50 mmfd. capacitor	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp mounting bracket	.25
3565	Socket—Dial lamp socket	.50
3598	Capacitor—0.1 mfd	.36
3615	Knob—Range switch knob—Package of 5	.60
3638	Scale—Tuning Meter scale—Package of 5	.60
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft bushing and nut	.30
3747	Capacitor—15 mmfd	.36
3900	Resistor—2 600 ohms—Carbon type—½ watt—Package of 5	1.00
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	$0.60
6314	Capacitor—160 mmfd. —Package of 5	2.00
6316	Resistor—2.500 ohms—Carbon type—½ watt—Package of 5	1.00
6323	Shaft—Three gang variable tuning condenser drive shaft —Comprising 1 shaft, 2 "C" washers and 2 flat washers —Package of 2	.20
6429	Capacitor pack—Comprising one 0.11 mfd. and one 0.7 mfd. capacitor in metal container	.98
6430	Capacitor pack—Comprising two 4.0 mfd., one 0.25 mfd., one 0.025 mfd., one 0.1 mfd. and one 0.5 mfd. capacitors in metal container	3.78
6431	Reactor—Filter reactor	1.92
6432	Transformer—Interstage audio transformer	3.69
6434	Reactor—Second detector plate coupling reactor	1.96
6435	Transformer—First intermediate frequency transformer	2.54
6436	Reactor—High frequency tone control compensating reactor	.70
6437	Coil—Oscillator coil assembly	1.24
6439	Reactor—High frequency tone control reactor	1.14
6440	Transformer—Second intermediate frequency transformer	1.94
6441	Transformer—Third intermediate frequency transformer	1.76
6442	Reactor—Volume control series reactor	.88
6443	Capacitor—10 mfd	1.50
6444	Socket—Five contact Radiotron socket	.36
6445	Socket—Six contact Radiotron socket	.38
6446	Socket—Four contact Radiotron socket	.32
6447	Volume control—Complete with mounting nut	1.92
6448	Tone control—Low frequency tone control complete with mounting nut	1.04
6449	Tone control—High frequency tone control complete with mounting nut	1.06
6450	Rheostat—Noise suppressor rheostat	1.24
6456	Escutcheon—Volume control escutcheon and color screen	.50
6457	Escutcheon—Noise suppressor escutcheon and color screen	.50
6458	Escutcheon—High and low frequency excutcheon and color screen	.92
6459	Cable—Braid covered—Five conductor reproducer cable	.54
6461	Meter—Tuning meter	2.14
6536	Condenser—3 gang variable tuning condenser assembly	5.00
6537	Switch—Range switch	1.30
6538	Coil—Antenna coil assembly	1.80
6539	Coil—Detector Coil	1.44
6541	Scale—Dial and dial scale	.75
6547	Bezel—Tuning Meter bezel	.45
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screws and three dial mounting nuts	.35
7487	Shield—Radiotron tube shield	.25
7488	Shield—Tube shield top	.20
8978	Transformer—Power transformer—105-120 volts—50-60 cycles	8.50
8979	Transformer—Power transformer—105-120 volts—25-40 cycles	12.88
8980	Transformer—Power transformer—210-240 volts—50-60 cycles	9.36
8982	Capacitor pack—Comprising two 1.0 mfd. capacitors in metal container	1.44
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone—Package of 5	6.35
9425	Coil assembly—Comprising field coil, magnet and cone support	4.94

RCA-VICTOR CO., INC.

MODEL 261
Alignment, Voltage
Speaker wiring

SERVICE DATA

Electrical Specifications

Voltage Rating..105–125 Volts
Power Consumption..120 Watts
Type and Number of Radiotrons..............................3 RCA-56, 4 RCA-58, 1 RCA-80, 2 RCA-2A5—Total, 10
Frequency Range..............................540 K. C.—1500 K. C. 1400 K. C.—2800 K. C.
Undistorted Output..4.0 Watts

This receiver is a ten-tube Superheterodyne radio receiver. Features such as improved automatic volume control, noise suppressor, compensated volume control, heater pentode output tubes operated as a push-pull stage and the inherent sensitivity, selectivity and tone quality of the Superheterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the location of the adjustable capacitors and Figure D, the loudspeaker wiring. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. And Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors:

(a) Procure an R. F. Oscillator such as Stock No. 9050 giving a modulated signal at 600 K. C., 1400 K. C. and 2440 K. C. Also procure a non-metallic screwdriver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment, as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g) and then (h).

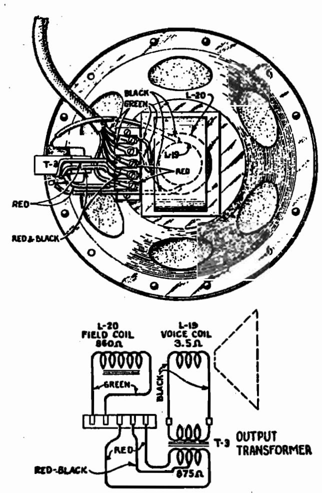


Figure D—Loudspeaker Wiring

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

MODEL 261
Schematic, Notes
Trimmer location

RCA-VICTOR CO., INC.

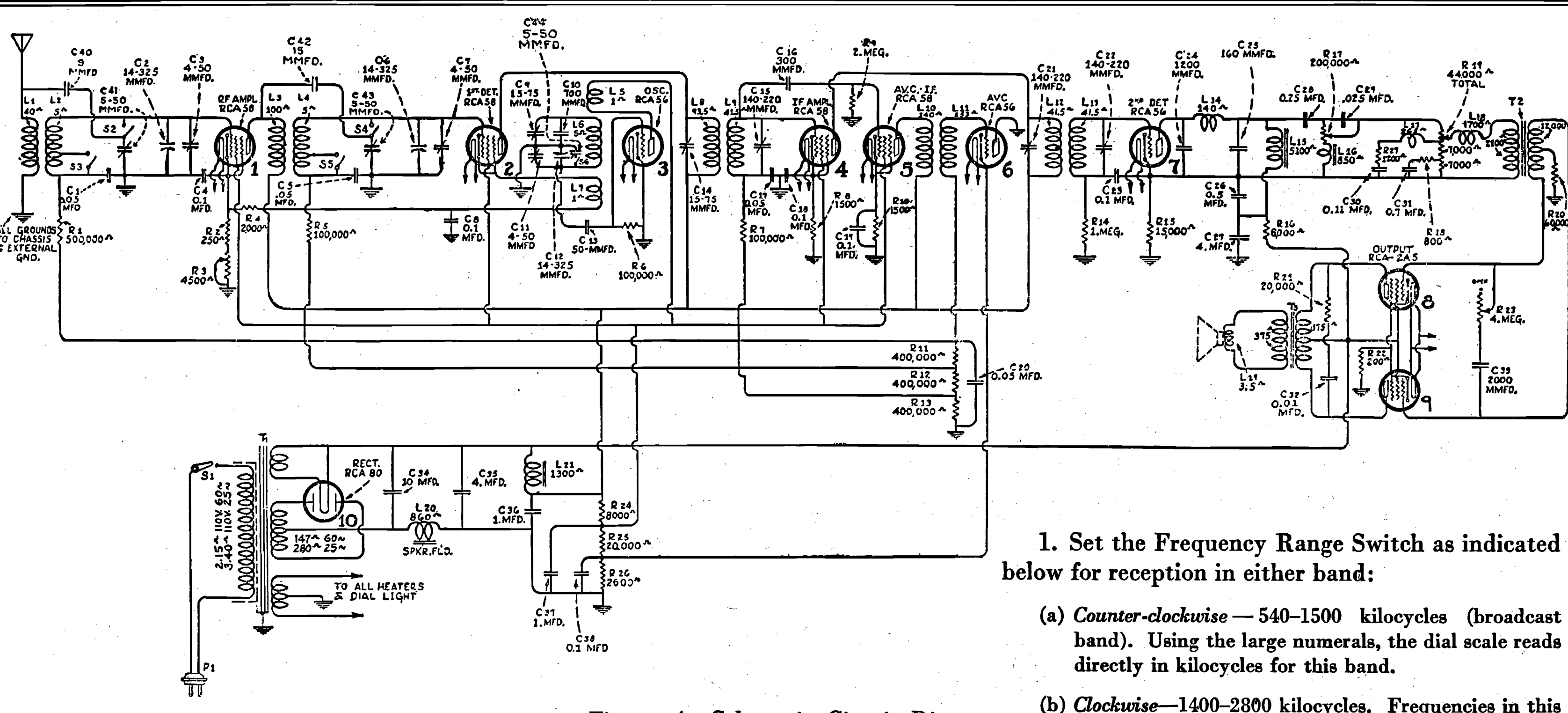


Figure A—Schematic Circuit Diagram

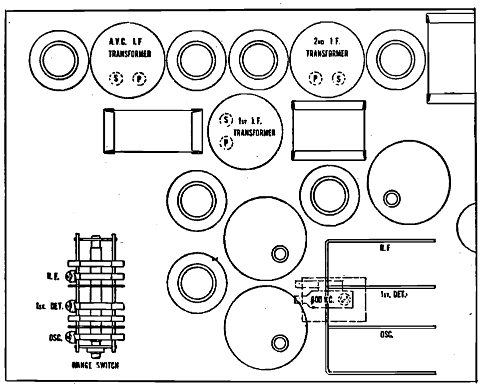


Figure C—Location of Adjustable Capacitors

1. Set the Frequency Range Switch as indicated below for reception in either band:

(a) *Counter-clockwise* — 540–1500 kilocycles (broadcast band). Using the large numerals, the dial scale reads directly in kilocycles for this band.

(b) *Clockwise*—1400–2800 kilocycles. Frequencies in this band are indicated approximately by the positions of the small numerals at the bottom of the dial (add two ciphers to obtain kilocycles). Available services therein include the following:

(1) **Police Calls**—Stations operating at 1574 and 1712 kilocycles and between 2400 and 2500 kilocycles.

(2) **Amateur Radio "Phone"**—Assigned band 1800–2000 kilocycles.

(3) **Aviation Communications "Phone"**—Between 2500 and 2800 kilocycles.

NOTE—The majority of stations in this range do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400–2800 kilocycles.

RCA-VICTOR CO., INC.

MODEL 261
Chassis wiring

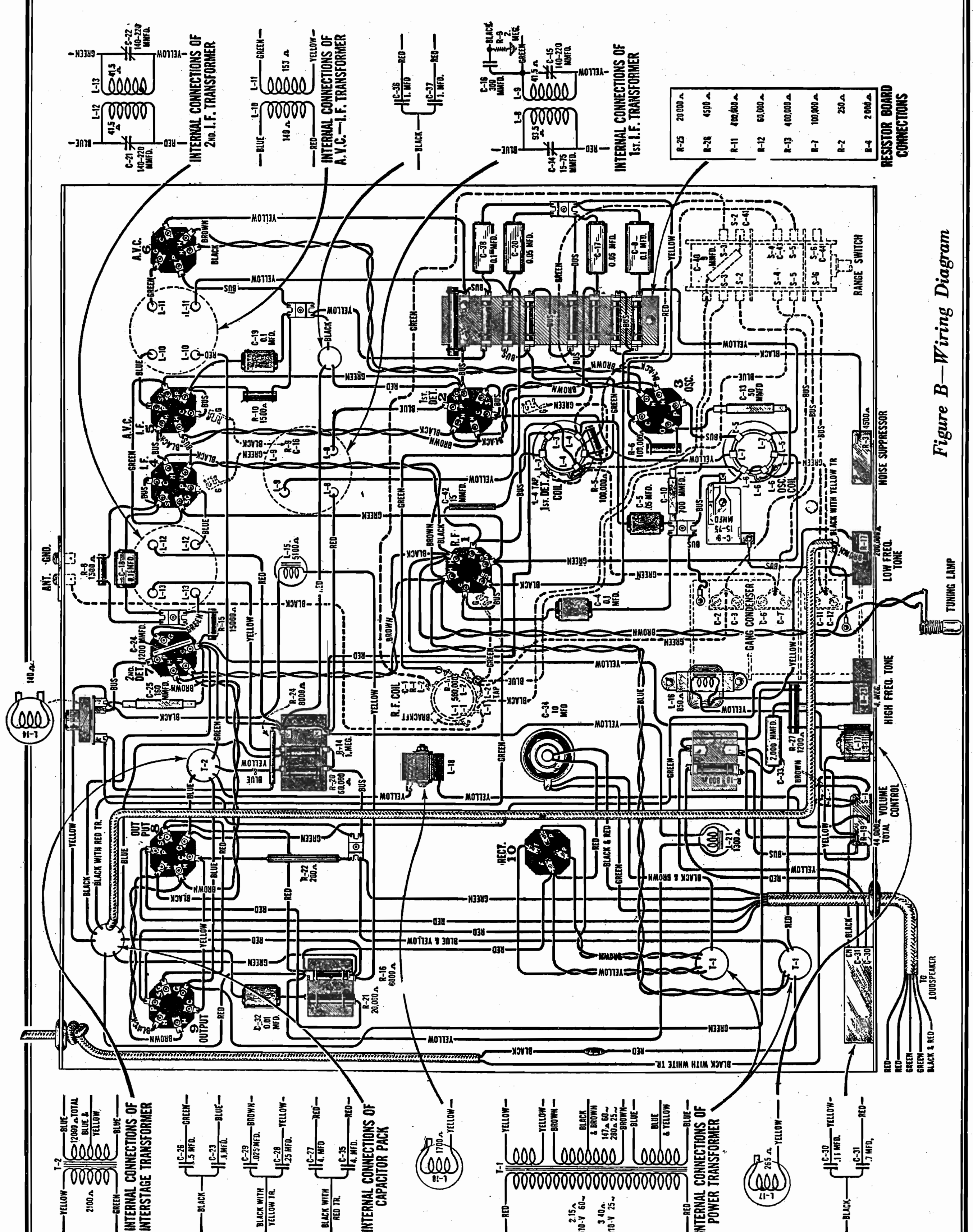


Figure B—Wiring Diagram

MODEL 261
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3024	Capacitor—9 mmfd. (C40)—Package of 2	$0.50
3047	Resistor — 1,500 ohms — Carbon type — ½ watt (R8, R10)—Package of 5	1.00
3076	Resistor — 1 megohm — Carbon type — ½ watt (R14)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R5, R6, R7)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
3455	Capacitor—0.01 mfd. capacitor (C32)	.44
3460	Capacitor—1,200 mmfd. (C24)	.30
3513	Capacitor—700 mmfd. (C10)	.48
3526	Resistor — 2,000 ohms — Carbon type — ½ watt (R4)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R18)—Package of 5	1.00
3530	Coil—Second detector plate choke coil (L14)	.72
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lock washers, 4 washers, 8 cushions and 4 spacers	.68
3552	Resistor—200 ohms—Porcelain type—20 watts (R22)	.80
3553	Resistor—8,000 ohms—Porcelain type—20 watts (R24)	.80
3554	Resistor — 1,200 ohms — Carbon type — ½ watt (R27)—Package of 5	1.00
3556	Capacitor—0.05 mfd. capacitor (C1, C5, C17, C20)	.34
3557	Capacitor—0.002 mfd. capacitor (C33)	.30
3558	Capacitor—50 mmfd. capacitor (C13)	.36
3564	Bracket—Station selector dial lamp mounting bracket	.25
3565	Socket—Dial lamp socket	.50
3598	Capacitor—0.1 mmfd. (C4, C8, C18, C19, C38)	.36
3726	Arm—Range switch operating arm assembly —Comprising arm, link, studs and set screws	.45
3747	Capacitor—15 mmfd. (C42)	.36
3900	Resistor — 2,600 ohms — Carbon type — ½ watt (R26)—Package of 5	1.00
4022	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut	.54
4023	Escutcheon—Station selector escutcheon	.42
4080	Knob—Range switch knob—Package of 5	.75
4081	Knob—Volume control or noise suppressor knob—Package of 5	1.08
4082	Knob—High or low frequency tone control knob—Package of 5	1.08
6114	Resistor — 20,000 ohms — Carbon type — 1 watt (R21, R25)—Package of 5	1.10
6142	Resistor — 6,000 ohms — Carbon type — ½ watt (R16)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—¼ watt (R9)—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt (R11, R12, R13)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R20)—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	.60
6300	Socket—Four contact Radiotron socket—Package of 5	.35
6314	Capacitor—160 mmfd. (C25)—Package of 5	2.00
6323	Shaft—Three gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	$0.20
6429	Capacitor pack—Comprising one 0.11 mfd. and one 0.7 mfd. capacitor in metal container (C30, C31)	.98
6430	Capacitor pack—Comprising two 4.0 mmfd., one 0.25, one 0.025, one 0.1, and one 0.5 mfd. capacitors in metal container (C23, C26, C27, C28, C29, C35)	3.78
6431	Reactor—Filter reactor (L21)	1.92
6432	Transformer—Interstage audio transformer (T2)	3.69
6434	Reactor—Second detector plate coupling reactor (L15)	1.96
6435	Transformer—First intermediate frequency transformer (L8, L9, C14, C15, C16, R9)	2.54
6436	Reactor—High frequency tone control compensating reactor (L17)	.70
6437	Coil—Oscillator coil assembly (L5, L6, L7)	1.24
6439	Reactor—High frequency tone control reactor (L16)	1.14
6440	Transformer—Second intermediate frequency transformer (L2, L3, C21, C22)	1.94
6441	Transformer—Third intermediate frequency transformer (L10, L11)	1.76
6442	Reactor—Volume control series reactor (L18)	.88
6443	Capacitor—10 mmfd. (C34)	1.50
6447	Volume control—Complete with mounting nut (R19)	1.92
6448	Tone control—Low frequency tone control complete with mounting nut (R17)	1.04
6449	Tone control—High frequency tone control complete with mounting nut (R23)	1.06
6450	Rheostat—Noise suppressor rheostat (R3)	1.24
6537	Switch—Range switch (S2, S3, S4, S5, S6, C41, C43, C44)	1.30
6538	Coil—Antenna coil (L1, L2, R1, C1)	1.80
6539	Coil—Detector coil (L3, L4)	1.44
6541	Scale—Dial and dial scale	.75
6785	Cable—Braid covered—Five conductor reproducer cable	.80
6786	Condenser—3-gang variable tuning condenser assembly (C2, C3, C6, C7, C11, C12)	7.12
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd. (C9)	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screws and three dial mounting nuts	.35
7484	Socket—Five contact Radiotron socket	.35
7485	Socket—Six contact Radiotron socket	.40
7487	Shield—Radiotron tube shield	.25
7488	Shield—Tube shield top	.20
8978	Transformer—Power transformer—105-120 volts—50-60 cycles (T1)	8.50
8979	Transformer—Power transformer—105-120 volts—25-40 cycles	12.88
8980	Transformer—Power transformer—210-240 volts—50-60 cycles	9.36
8982	Capacitor pack—Comprising two 1.0 mfd. capacitors in metal container	1.44
9050	Oscillator—Test oscillator—150-25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6455	Transformer—Output transformer (T3)	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone (L19)—Package of 5	6.35
9425	Coil assembly—Comprising field coil, magnet and cone support (L20)	4.94
9463	Reproducer complete	9.42

RCA-VICTOR CO., INC.

MODEL 280
Alignment
Trimmer location

SERVICE DATA

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption............................120 Watts
Type and Number of Radiotrons......4 RCA-56, 4 RCA-58, 1 RCA-55, 2 RCA-59, 1 RCA-5Z3—Total 12
Frequency Range. 540 K. C.-1500 K. C.—1400 K. C.-2800K. C.
Undistorted Output............................10.0 Watts

This receiver is a twelve tube Super-Heterodyne radio receiver. Features such as illuminated controls, improved automatic volume control, noise suppressor, compensated volume control, class B output stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

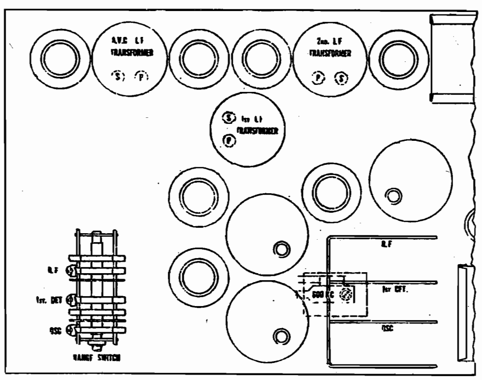


Figure C

Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the location of the adjustable capacitors. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. and Oscillator Line-up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C. —difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C., 1400 K. C., and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects, but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that only a slight reduction in current is obtained in the output meter.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a minimum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the Range Switch are adjusted for minimum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a slight deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a minimum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g), and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

Antenna Connections

It will be noted that three antenna terminals are provided at the rear of the receiver chassis. Two of these will normally be used for the usual antenna and ground connections while the third one is for use in connection with a shielded antenna system. The tap eliminates the need of the transformer usually used for coupling the shielded line to the radio receiver.

RF-5203 shield kit which comprises a combination antenna insulator, lightning arrester, transformer assembly, and 75 feet of shielded wire is recommended. When such an antenna system is used, it is necessary to connect a 200 mmfd. capacitor between terminals 1 and 2. This prevents the first R. F. circuit from being detuned and results in maximum gain from the antenna. This capacitor is included with the RF-5203 Kit. However, in event an assembly of parts from other type kits are used, it must be added.

MODEL 280
Schematic, Voltage

RCA-VICTOR CO., INC.

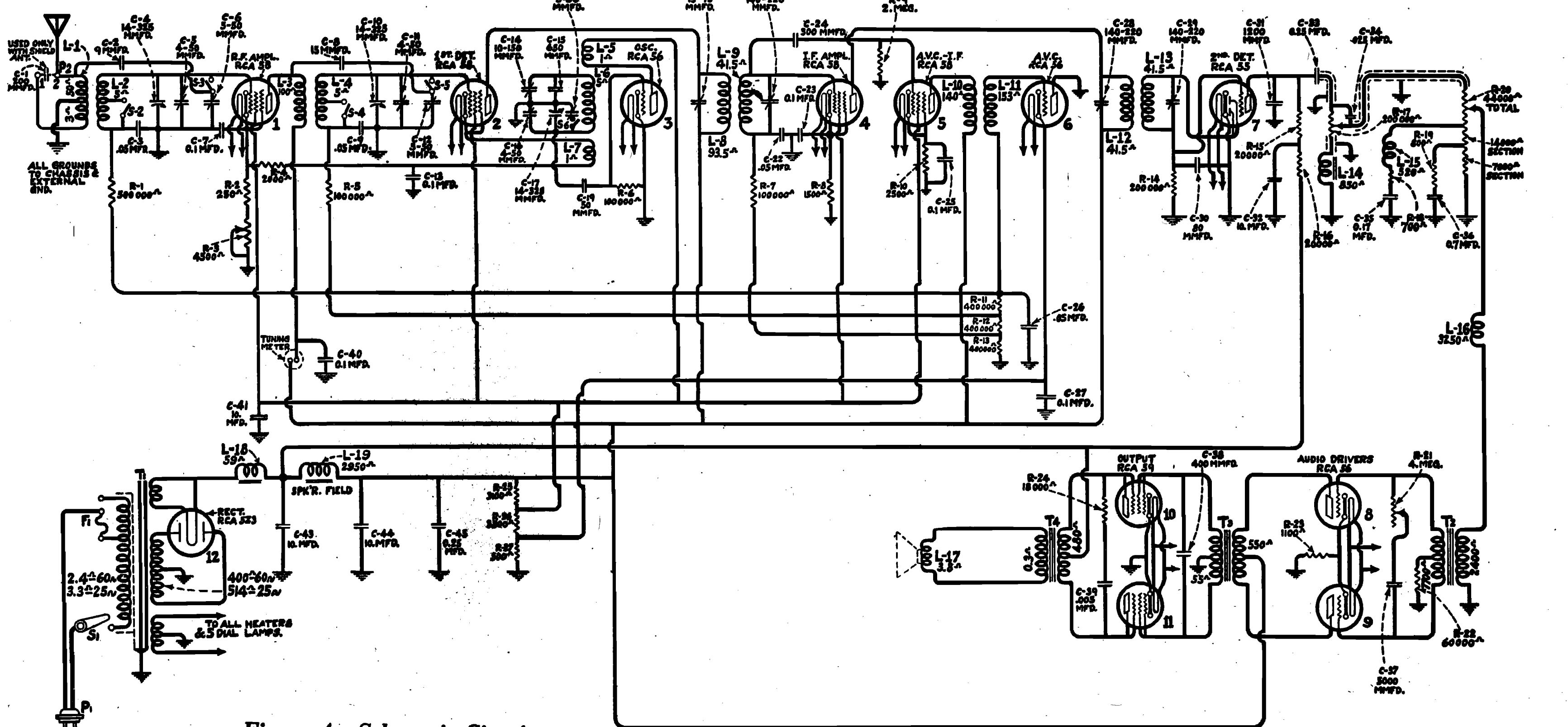


Figure A—Schematic Circuit

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—No signal being received

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.–I. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-5Z3 Rect.	990–495 R. M. S.			92 Total	5.0

RCA-VICTOR CO., INC.

MODEL 280
Chassis wiring

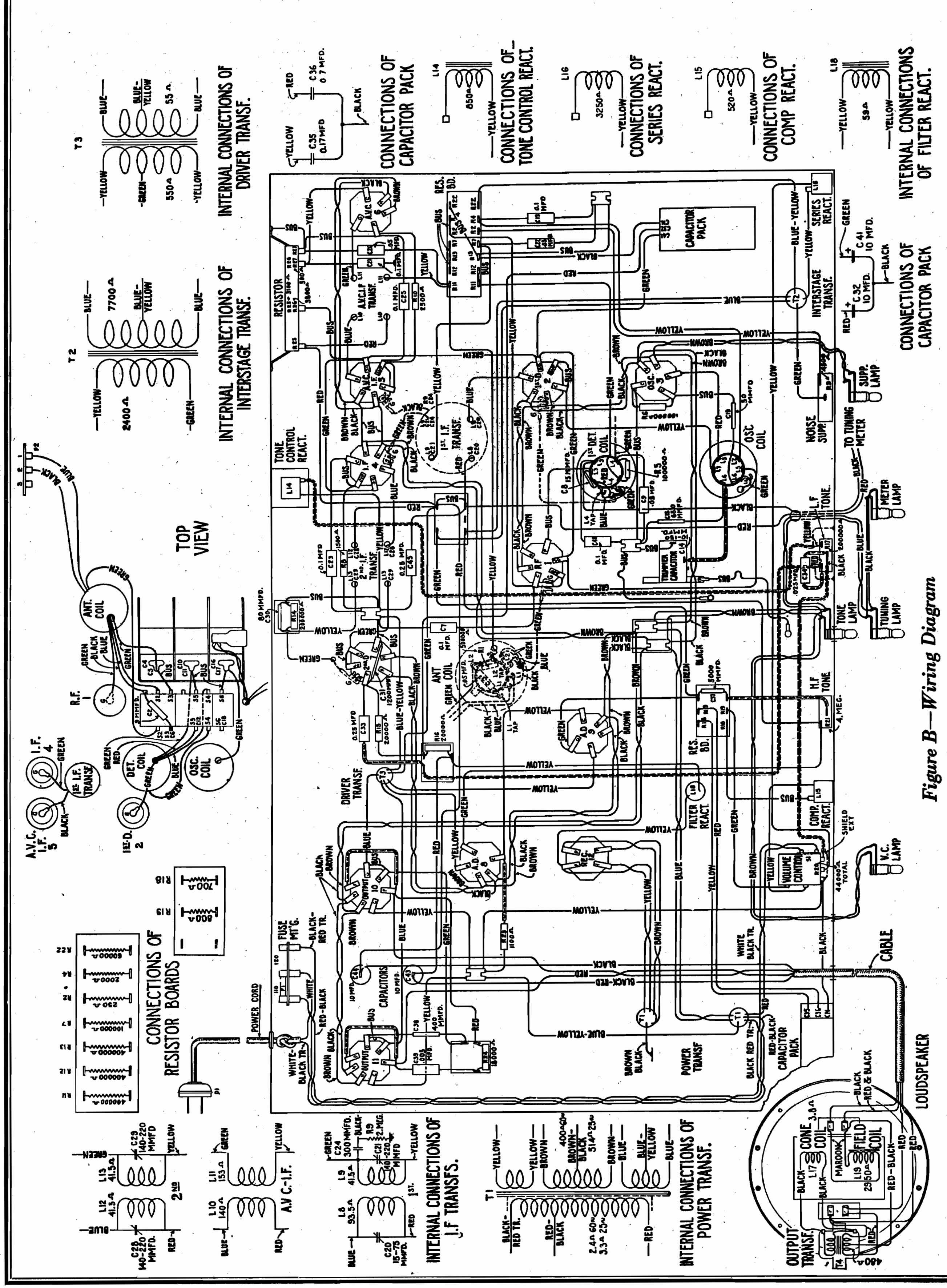


Figure B—Wiring Diagram

MODEL 280
Parts List

RCA-VICTOR CO., INC.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2725	Fuse—1.5 ampere—Package of 5	$0.40
2730	Resistor — 18,000 ohms — Carbon type — 1 watt—R24—Package of 5	1.10
3024	Capacitor—9 mmfd.—C2—Package of 2	.50
3047	Resistor — 1,500 ohms — Carbon type — ½ watt—R8—Package of 5	1.00
3085	Capacitor—400 mmfd.—C38	.30
3118	Resistor—100,000 ohms—Carbon type—¼ watt—R5—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—R6, R7—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt —R2—Package of 5	1.00
3460	Capacitor—1,200 mmfd.—C31	.30
3526	Resistor — 2,000 ohms — Carbon type — ½ watt—R4—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt —R19—Package of 5	1.00
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3533	Shutter — High frequency tone control shutter	.50
3534	Shutter — Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lockwashers, 4 washers, 8 cushions and 4 spacers—One set	.68
3556	Capacitor—0.05 mfd.—Located on antenna coil—C3	.34
3558	Capacitor—50 mmfd.—C19	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp bracket	.25
3565	Socket—Dial lamp socket	.50
3597	Capacitor—0.25 mfd.—C33, C45	.40
3615	Knob—Range switch knob—Package of 5	.60
3638	Scale—Tuning meter scale—Package of 5	.60
3640	Capacitor—0.05 mfd.—C9, C22, C26	.25
3641	Capacitor—0.1 mfd.—C7, C13, C23, C25, C27	.35
3643	Capacitor—0.005 mfd.—Output stage—In series with 18,000 ohm resistor—C39	.25
3719	Socket—7 contact Radiotron socket	.30
3726	Arm—Range switch operating arm assembly —Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut	.30
3747	Capacitor—15 mmfd.—C8	.36
3749	Capacitor—0.1 mfd.—Tuning meter filter—C40	.30
3765	Capacitor—0.025 mfd.—C34	.34
3774	Resistor—7,400 ohms—Tapped at 3,800 and 500 ohms—R25, R26, R27	.80
3780	Shutter—Noise suppressor shutter	.30
3781	Shutter—Volume control shutter	.30
3782	Shield—Radiotron shield—Second detector	.26
3797	Reactor — Volume control compensating reactor—L15	.64
3798	Resistor—700 ohms—Carbon type—½ watt —R18—Package of 5	1.00
3799	Capacitor—80 mmfd.—C30	.70
5817	Resistor — 20,000 ohms — Carbon type — 3 watts—R15, R16—Package of 5	.25
6186	Resistor — 500,000 ohms — Carbon type — Located on antenna coil—R1—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt—R14—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—R11, R12, R13—Package of 5	$1.00
6281	Resistor — 1,100 ohms — Carbon type — ½ watt—R23—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—R22—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	.60
6300	Socket—4 contact Radiotron socket	.35
6312	Capacitor—650 mmfd.—C15—Package of 5	1.50
6316	Resistor — 2,500 ohms — Carbon type — ½ watt—R10—Package of 5	1.00
6323	Shaft—Three gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	.20
6437	Coil—Oscillator coil—L5, L6, L7	1.24
6447	Volume control complete with mounting nut —R20	1.92
6448	Tone control—Low frequency tone control complete with mounting nut—R17	1.04
6449	Tone control—High frequency tone control complete with mounting nut—R21	1.06
6450	Rheostat—Noise suppressor rheostat—R3	1.24
6461	Meter—Tuning meter	2.14
6512	Capacitor — 0.005 mfd. — High frequency tone control—C37	.28
6536	Capacitor—3 gang variable tuning condenser assembly	5.00
6537	Switch—Range switch—L3, L4	1.30
6539	Coil—Detector coil—L3, L4	1.44
6541	Scale—Dial and dial scale	.75
6547	Bezel—Tuning meter bezel	.45
6561	Coil—Antenna coil—L1, L2, R1	1.65
6562	Transformer—Driver transformer—T3	3.04
6563	Reactor—Volume control series reactor—L16	1.06
6564	Transformer—First intermediate frequency transformer—C20, C21, C24, L8, L9, R9	2.30
6565	Transformer—Second intermediate frequency transformer—L10, L11	2.10
6566	Transformer—Third intermediate frequency transformer—C28, C29, L12, L13	1.72
6567	Capacitor pack—Comprising one 0.17 mfd. and one 0.7 mfd. capacitors—C35, C36	.95
6568	Transformer—Interstage audio transformer —T2	3.10
6571	Capacitor—10.0 mfd.—C43, C44	1.20
6572	Reactor—Tone control reactor—L14	.90
6574	Capacitor pack—Comprising two 10.0 mfd. capacitors—C32, C41	1.80
6578	Reactor—Filter reactor—L18	3.22
6618	Cable—Braid covered—4 conductor—reproducer cable	.54
7062	Capacitor—Adjustable trimming capacitor —15 to 70 mmfd.	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screw and three dial mounting nuts	.35
7484	Socket—5 contact Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7487	Shield—Radiotron shield	.25
7488	Shield—Radiotron shield top	.20
9028	Transformer—Power transformer—105-125 volts—50-60 cycles—T1	7.75
9029	Transformer—Power transformer—105-125 volts—25-50 cycles	12.25
9030	Transformer—Power transformer—200-250 volts—50-60 cycles	8.00
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6569	Transformer—Output transformer—T4	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone—L17—Package of 5	6.35
9031	Coil assembly—Comprising field coil, magnet and cone support—L19	4.90

RCA-VICTOR CO., INC.

MODEL 300
Voltage, Pickup data

Electrical Specifications

Voltage Rating............................105–115 Volts
Frequency Rating...................25, 50, and 60 Cycles
Power Consumption............................55 Watts
Tuning Range............................540–1710 K. C.
Type and number of Radiotrons
1 RCA-78, 1 RCA-77, 1 RCA-38, 1 RCA-25Z5—Total, 4
Undistorted Output................0.3 Watts at 60 Cycles

This table type combination instrument consists of a four tube tuned R. F. receiver and a new compactly constructed motor board assembly. It is designed for A. C. operation only. Features such as wide tuning range, electro-dynamic loudspeaker, ability to play both 10 and 12 inch records and excellent quality of reproduction characterize this instrument. Figures C and D show the schematic and wiring diagrams respectively while the voltage readings and replacement parts are given below:

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volts, 60 Cycles

Radiotron No.	Cathode to Control Grid, Volts D.C.	Cathode to Screen Grid, Volts D.C	Cathode to Plate, Volts D.C.	Plate Current M. A	Filament or Heater Volts
RCA-78, R. F.	2.5	100	200	8.0	6.0
RCA-77, Detector	*5.0	95	*100	0.2	6.0
RCA-38, Output	18.0	180	170	14.0	6.0
RCA-25Z5, Rectifier	—	—	115	30.0	25.0

* Impossible to measure on ordinary voltmeter
NOTE: 25 cycle voltages will be less than those obtained on 60 cycles.

Pickup Service Data

The magnetic pick-up and tone-arm assembly of this instrument is of new design and unique construction. Service work will consist of centering the armature, replacing the rubber pivots and replacing the magnet coil.

Disassembling the Pickup

The pick-up may be disassembled in the following manner:

(a) Unsolder the two cable connections to the terminal strip.

(b) Remove the needle screw and screws "A" and "B."

(c) Remove the pick-up assembly from the arm and housing.

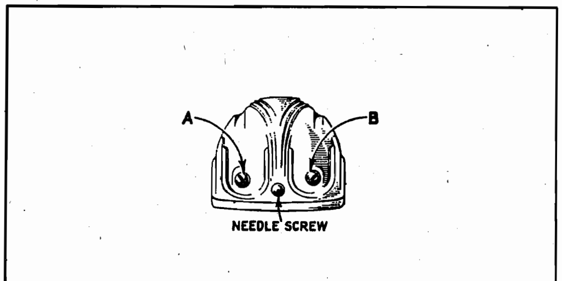
(d) Unsolder the two magnet coil leads attached to the terminals and then remove screw E. This will allow the removal of the fibre terminal board.

(e) If centering of the armature is the only adjustment required, such centering can be done without further disassembly. The armature is centered by loosening screw F and holding the armature with the finger in proper position while screw F is tightened. A visual inspection is sufficiently accurate for centering. When centering after any work has been done or the magnet removed, it is important that the magnet be re-magnetized while in place.

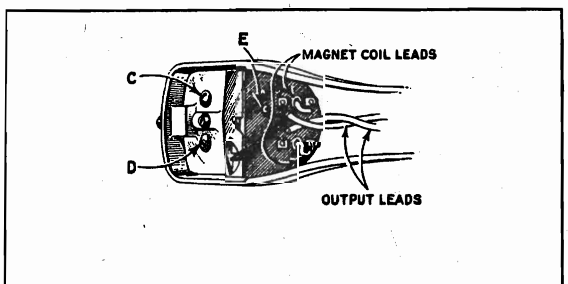
(f) If the coil or pivot rubbers are to be replaced, the pick-up must be further disassembled. This is done by first removing the magnet and then removing screws C and D. The pole piece is now removed, paper sleeve pushed out and the magnet coil slipped from between the pole pieces. Be careful to replace the paper sleeve that centers the coil and to replace it in the new coil assembly.

(g) The pivot rubbers are replaced by loosening the armature adjusting screw F and removing the armature from its bracket. The rubbers can then be removed by slipping them from each end of the pivot shaft.

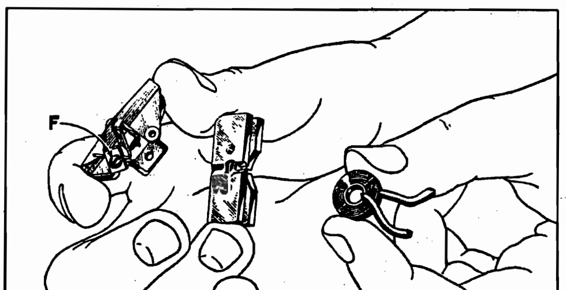
It is important to remember that in all operations after reassembling but before placing in the tone arm, the pickup should be magnetized and the armature centered after remagnetizing. Magnetizing should be done by placing the pickup magnet on the magnetizer and sliding it onto the pole pieces, after magnetizing being careful not to break the magnetic circuit.



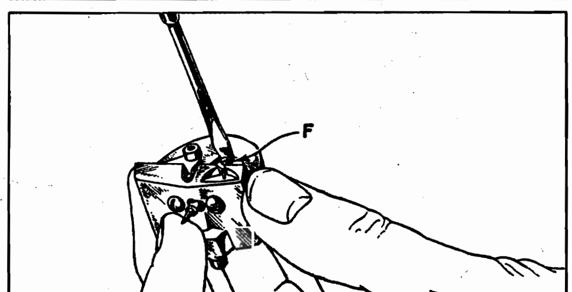
FRONT VIEW SHOWING LOCATION OF SCREWS



BOTTOM VIEW SHOWING DETAILS



DISASSEMBLY OF PICKUP



METHOD OF CENTERING ARMATURE

Figure A—Pickup Details

MODEL 300
Schematic, Voltage
Chassis wiring

RCA-VICTOR CO., INC.

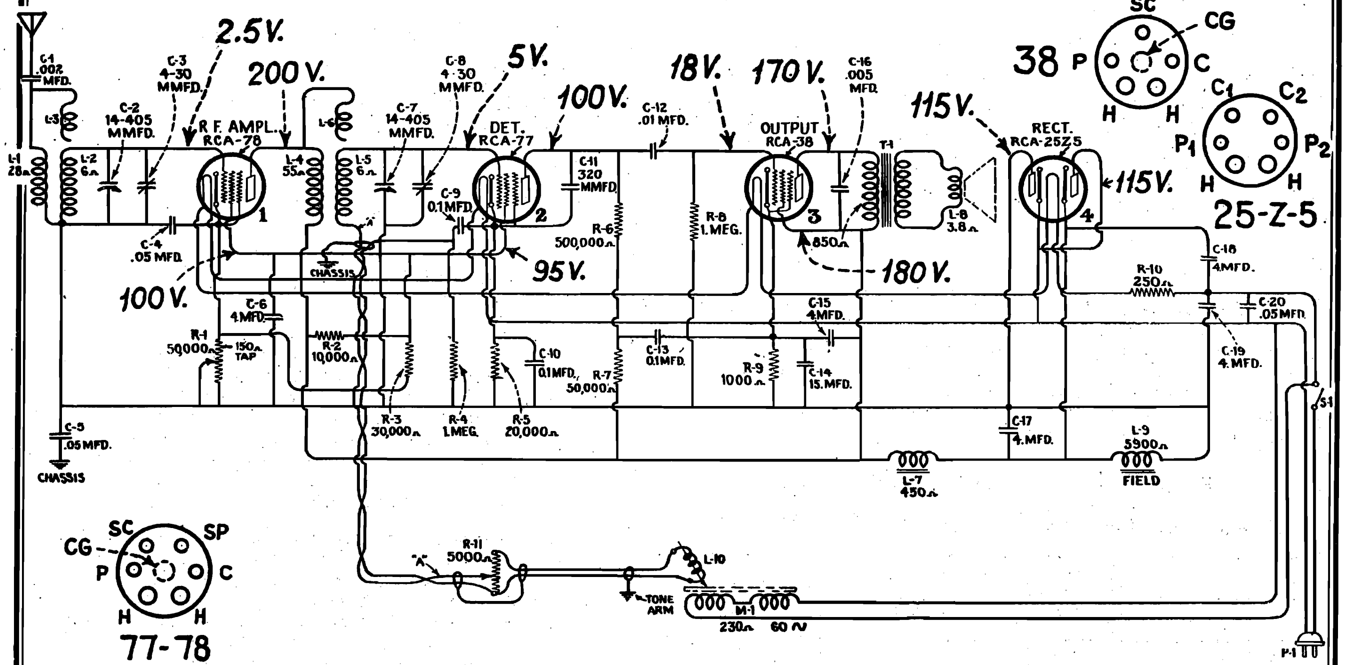


Figure C—Schematic Wiring Diagram

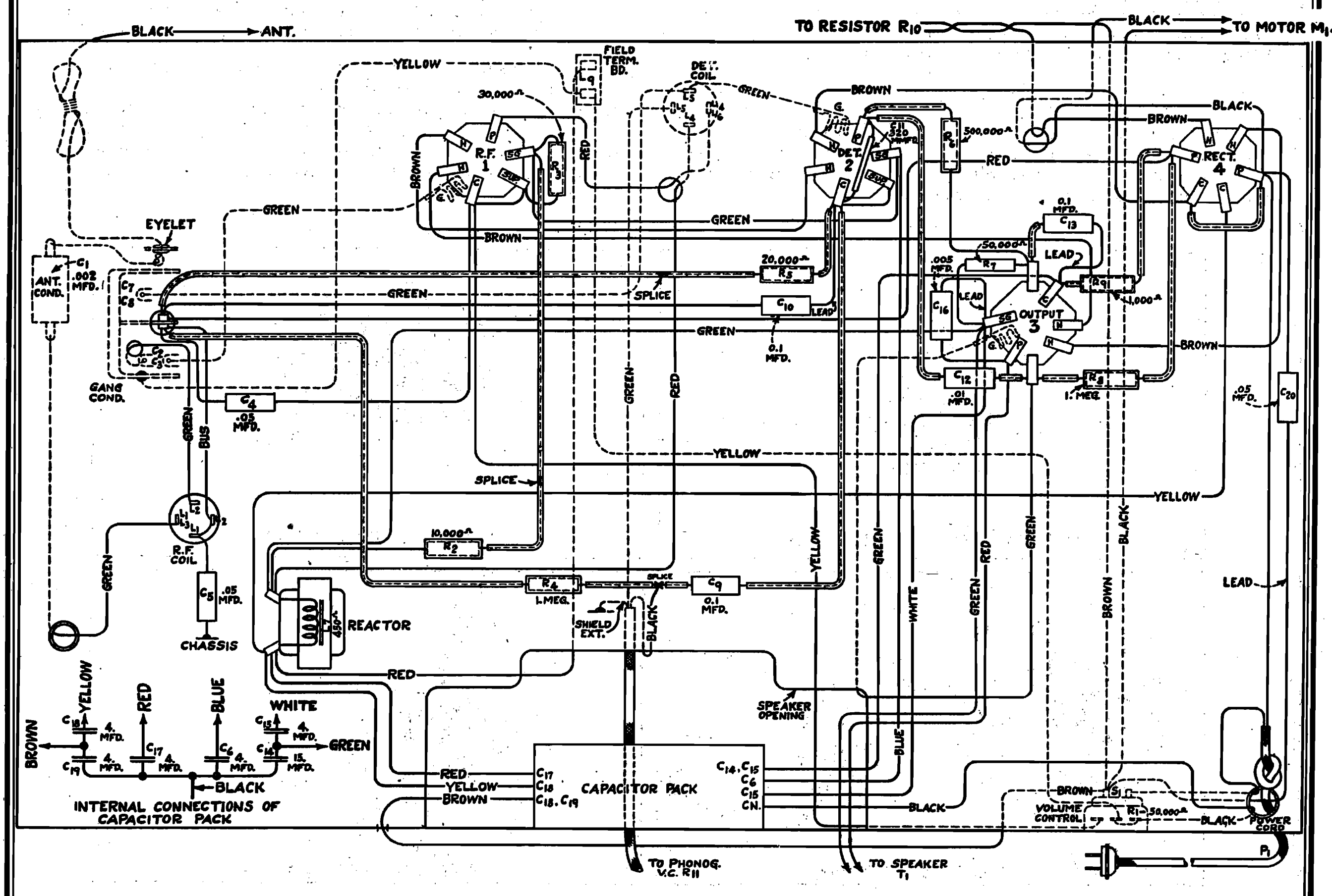


Figure D—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 300
Assembly wiring

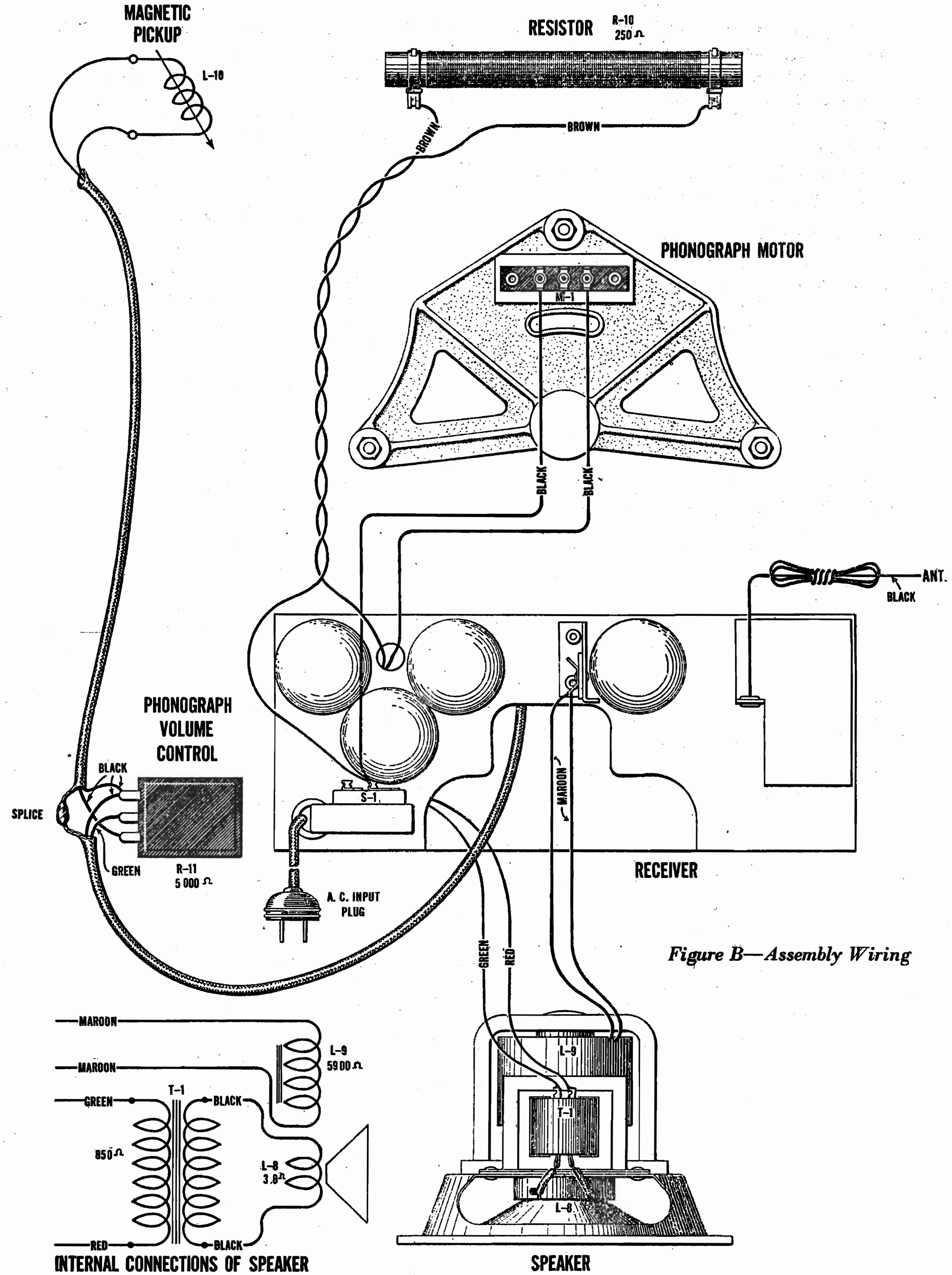


Figure B—Assembly Wiring

MODEL 300
Phono Motor data

RCA-VICTOR CO., INC.

PHONOGRAPH MOTOR SERVICE DATA

The synchronous motor used in this instrument is of simple design and foolproof construction. Among its many features are low power consumption, single moving part, ease of starting, oilless main bearing, resilient bumper, and long life with freedom from service repairs.

Figure E shows the main parts of the motor and the points that may require attention.

Operation—The two stator coils are connected in series and the motor is started by giving it a clockwise spin with the hand. If it is found to be difficult of starting, or if it runs at a sub-synchronous speed such as at 70 R. P. M., such action may result from one of the following causes:

Difficult to Start—This may be due to the stator failing to rotate on the outer bearing. This can be caused by the spaghetti sleeve being jammed in the slot, or sticking to the resilient bumper. The outer bearing not being properly lubricated may also cause this condition. It is important that the ball bearing be at the bottom of the main bearing assembly.

Slow Speed—If the turntable is jarred or slowed down, the motor may run at a sub-synchronous speed, such as 70 R. P. M. This is remedied by merely lifting the tone arm from the turntable, thereby removing the load. The turntable speed will then immediately increase to normal. This is due to the decreased load that occurs with the pickup removed.

Excessive Vibration and Hum — A small amount of hum when starting decreasing to a negligible amount while running is normal. If excessive vibration occurs either at starting or running, it may be due to one of the following:

(1) Insufficient lubricant in outer bearing or any other failure that will cause the stator to bind.

(2) The metal washer should be above the leather washer at the bottom of the main bearing.

(3) Motor not properly supported from motor board. Unless the motor is properly supported from the motor board, normal vibration will be excessive.

Removing Rotor from Stator—The rotor which includes the turntable may be removed by loosening the screw shown in Figure E until it clears the rotor and then lifting the turntable. Be careful not to lose the ball end-bearing when this is removed. After replacing the rotor, tighten the restraining screw securely to eliminate the possibility of rattle in operation.

Power Consumption—The motor consumes 3.3 watts while not running, 3.5 watts while running, but with no load, and 4 watts while running with full load. The motor should never be turned on when the rotor is removed, as in this condition excessive current will be drawn with consequent increase in temperature.

NOTE: The above values of power consumption are average for a 60 cycle motor at 125 volts. At lower voltages the power consumption will be less.

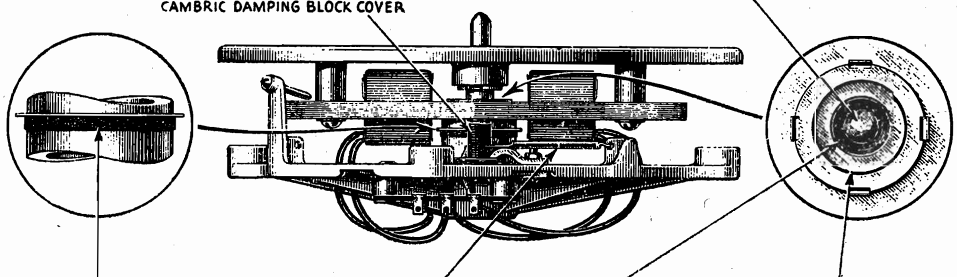


Figure E—Details of Motor

RCA-VICTOR CO., INC.

MODEL 310
Alignment
Pickup data

SERVICE DATA

Voltage Rating................................115 Volts
Frequency Rating....................25, 50 and 60 Cycles
Power Consumption...................60 Cycles, 95 Watts
Number and Types of Radiotrons...............1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output............................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This combination radio-phonograph instrument uses a five-tube Super-Heterodyne receiver incorporating a dynamic loudspeaker, continuously variable tone control, single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The standard two speed motor board equipment is used and the entire assembly enclosed in a table type cabinet.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure B shows the assembly wiring, Figure C the schematic diagram and Figure D the chassis wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

Service data for the magnetic pickup is included below.

SERVICE DATA ON MAGNETIC PICKUP

This magnetic pickup is of a new design that results in excellent reproduction. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature.

REPLACING MAGNET COIL, PIVOT RUBBERS, OR ARMATURE

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered.

(f) The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position.

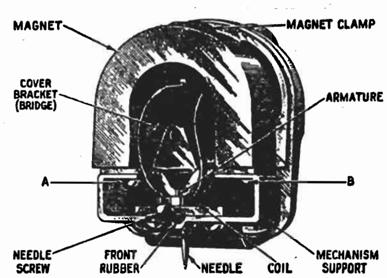


Figure A—View of Pickup showing parts

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure A), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

Only rosin core solder should be used for any soldering in conjunction with the pickup. However, if great care to wipe clean and use as small amount as possible is exercised, paste or liquid flux may be used for soldering the end of the spring.

MODEL 310
Schematic
Chassis wiring

RCA-VICTOR CO., INC.

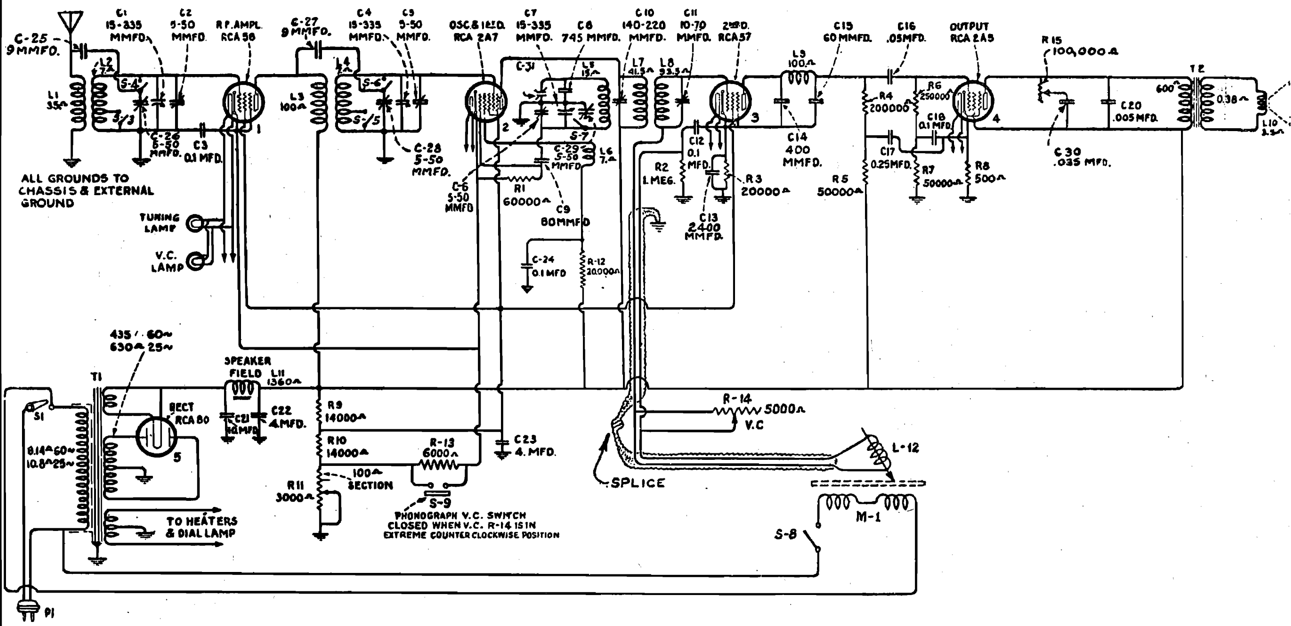


Figure C—Schematic Circuit Diagram—Note: R-11 may be either 3000 ohms or 4500 ohms

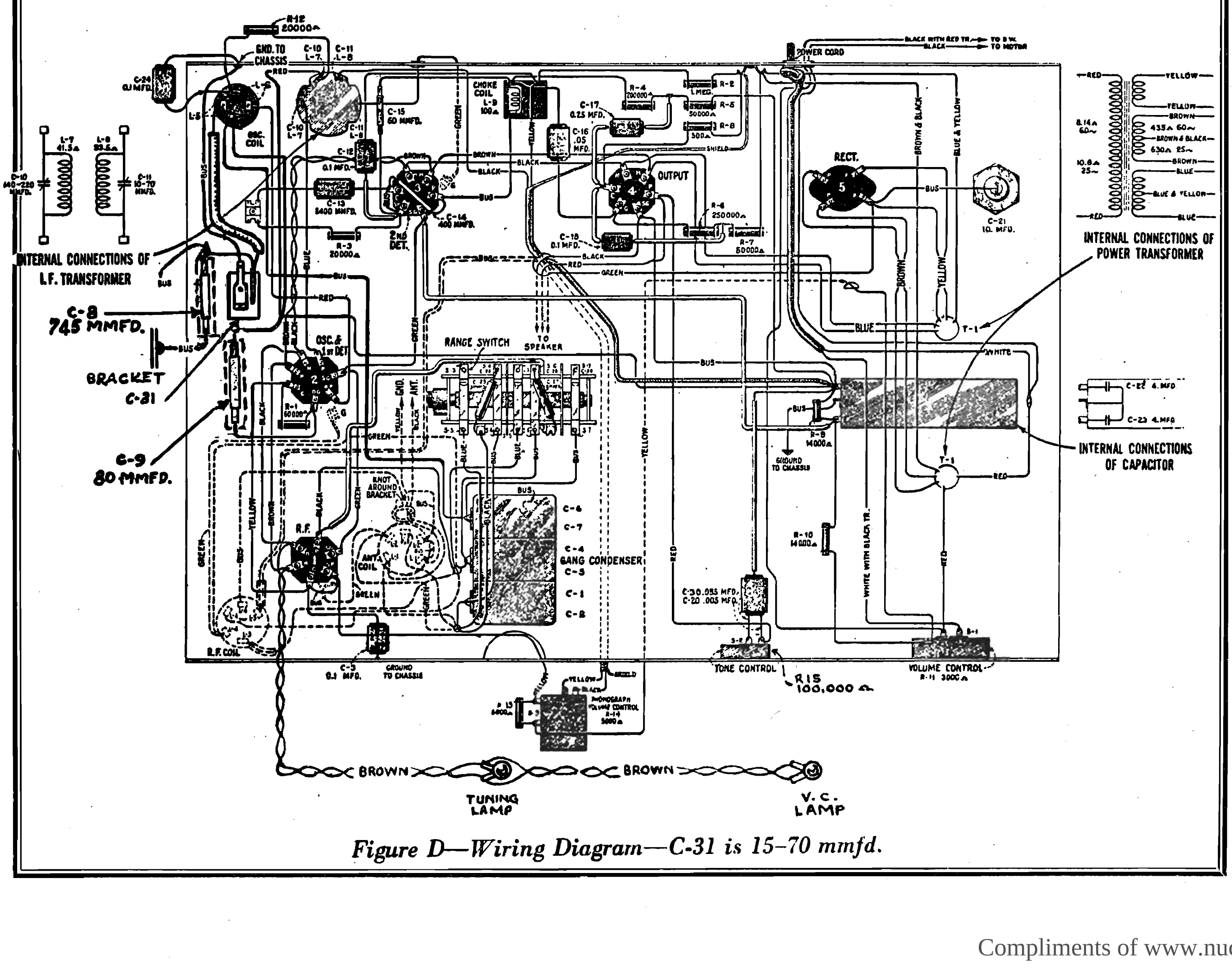


Figure D—Wiring Diagram—C-31 is 15–70 mmfd.

RCA-VICTOR CO., INC.

MODEL 310
Assembly wiring

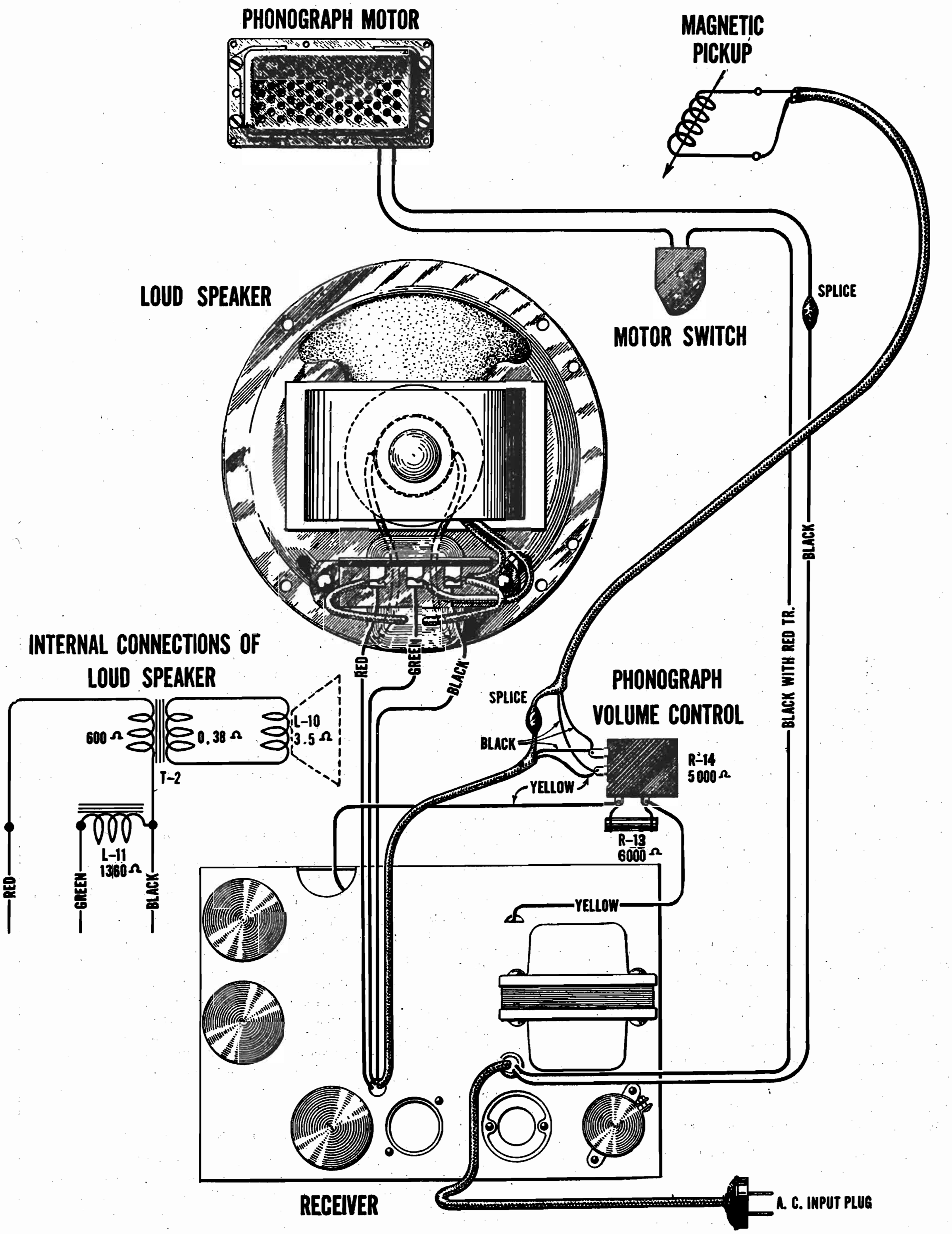


Figure B—Assembly Wiring

MODEL 310
Voltage, Parts List

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2563	Resistor—6,000 ohms—Carbon type—1 watt—Pkg. of 5 (R13)	$1.10
2734	Capacitor—745 mmfd. (C8)—Package of 5	1.50
2747	Contact cap—Package of 5	.50
2994	Coil—R. F. choke coil (L9)	.45
3050	Resistor—14,000 ohms—Carbon type—3 watts (R9)	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Pkg. of 5 (R2)	1.00
3459	Capacitor—80 mmfd. (C9)	.44
3472	Capacitor—0.0024 mfd. (C13)	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Pkg. of 5 (R6)	1.00
3555	Capacitor—0.1 mfd. (C24)	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3584	Ring—R. F. or oscillator coil retaining ring—Pkg. of 5	.40
3592	Knob—Station selector, volume or tone control knob—Package of 5	.80
3594	Resistor—50,000 ohms—Carbon type—½ watt—Pkg. of 5 (R5, R7)	1.00
3596	Capacitor—60 mmfd. (C15)	.36
3597	Capacitor—0.25 mfd. (C17)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Pkg. of 5 (R1)	1.00
3604	Capacitor—400 mmfd. (C14)	.30
3623	Shield—R. F. or oscillator coil shield	.30
3624	Socket—Dial lamp socket and bracket	.40
3625	Indicator—Volume control indicator	.40
3632	Resistor—500 ohms—Carbon type—1 watt—Pkg. of 5 (R8)	1.10
3641	Capacitor—0.1 mfd. (C3, C12, C18)	.35
3713	Capacitor—0.05 mfd. (C16)	.32
3783	Capacitor—9 mmfd.—Package of 2 (C25, C27)	.50
3785	Screw—Chassis mounting screw—Package of 10	.40
6228	Resistor—200,000 ohms—Carbon type—½ watt—Pkg. of 5 (R4)	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Pkg. of 5 (R3, R12)	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Pkg. of 5 (R10)	1.10
6464	Transformer—I. F. transformer (C10, C11, L7, L8)	1.88
6471	Coil—Oscillator coil assembly (L5, L6)	.74
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil assembly (L3, L4)	.94
6573	Switch—Range switch	1.25
6598	Capacitor—Three gang variable tuning capacitor	3.00
6599	Volume control—Complete with mounting nut (R11)	1.25
6620	Capacitor—Comprising one 0.005 and one 0.035 mfd. capacitors (C20, C30)	.50
6622	Dial—Station selector dial assembly	.95
6645	Tone control (R15)	1.20
7063	Capacitor—Adjustable—5-40 mmfd. (C31)	.50
7485	Socket—Radiotron 6-contact socket	.40
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container (C22, C23)	1.64
7590	Capacitor—10.0 mfd. (C21)	1.40
8985	Transformer—Power transformer—105-125 volts—50-60 cycles	1.26
9002	Transformer—Power transformer—105-125 volts—25-50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer (T2)	1.44
9041	Coil assembly—Comprising field coil, magnet and cone support (L11)	2.92
9043	Reproducer complete	5.50
9428	Cone—Reproducer cone (L10)—Package of 5	5.00
	MOTOR ASSEMBLIES	
3731	Motor mounting assembly—Comprising three felt washers, three cushions, six metal washers and three studs	$0.46
8989	Motor—Motor complete—105-125 volts—60 cycle	18.52
8990	Motor—Motor complete—105-125 volts—50 cycle	18.52
8991	Motor—105-125 volts—40 cycle	23.36
8992	Motor—Motor complete—105-125 volts—25 cycle	23.36
8993	Rotor and shaft for 105-125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105-125 volts, 50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105-125 volts, 40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105-125 volts, 25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Pkg. of 5	.40
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3600	Coil—Pickup coil	.50
6346	Back—Pickup housing back	.45
6474	Pickup—Pickup unit complete	4.00
7593	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Pkg. of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3430	Box—Needle box with lid—Package of 2	.90
3615	Knob—Phonograph volume control or range switch knob—Package of 5	.60
6475	Volume control—Phonograph volume control (R14)	1.25
10174	Springs—Automatic brake springs—One set of 4 springs	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40

MODEL 330
Alignment, Voltage
Trimmer location

RCA-VICTOR CO., INC.

SERVICE DATA

Voltage Rating............................105–125 Volts
Frequency Rating............25, 30, 40, 50, and 60 Cycles
Power Consumption.................25 Cycle–115 Watts; 30 Cycle–115 Watts; 40 Cycle–125 Watts; 50 Cycle–115 Watts; 60 Cycle–120 Watts
Number and Types of Radiotrons ...2 RCA-58, 1 RCA-2A7, 1 RCA-55, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 7
Undistorted Output.............................5 Watts
Frequency Range................540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This combination instrument utilizes the standard two-speed motorboard and a new seven tube superheterodyne radio receiver. Excellent fidelity on both radio and record is obtained due to properly designed circuits and a Class "B" output stage. Other features of the receiver are automatic volume control, eight inch dynamic loudspeaker, continuously variable tone control, and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

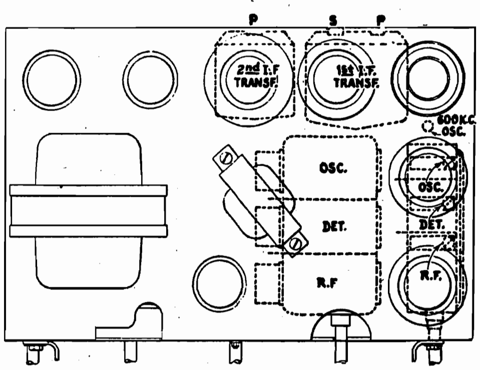


Figure C—Location of Line-Up Capacitor Screws

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure B the wiring diagram, and Figure D the assembly wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, and RCA-55 functioning a combined second detector and automatic volume control, an audio stage using an RCA-56, an output stage using RCA-53 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang variable capacitor and 600 K. C. trimmer screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 600, 1400 and 2400 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Connect the output meter across the cone coil. Then set the dial at 140, the oscillator at 1400 K. C. and adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum. Align all three trimmer capacitors on the variable capacitor to maximum output keeping the oscillator output as low as possible.

(c) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(d) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (a) and (b).

(e) Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

Fidelity—A link is provided in the filter circuit connected across the plates of the Radiotron RCA-53. Opening this link increases the high frequency range of the phonograph approximately 2000 cycles. The link is accessible by removing the filter unit from the cabinet.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line—Volume Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	4.0	100	245	6.0	2.4
*RCA-2A7 Osc. Det.	4.0	100	245	5.0	2.4
RCA-58 I. F.	4.0	100	245	6.0	2.4
RCA-55 2nd Det. A V. C.	6.0	—	100	4.0	2.4
RCA-56 Driver A. F.	13.0	—	235	6.3	2.4
RCA-53 Output	4.5	—	290	12.0	2.4
RCA-80 Rectifier	600 R. M. S. Plate to Plate			88.0	5.0

* Voltages and current apply to detector portion of tube.

MODEL 330
Schematic, Voltage

RCA-VICTOR CO., INC.

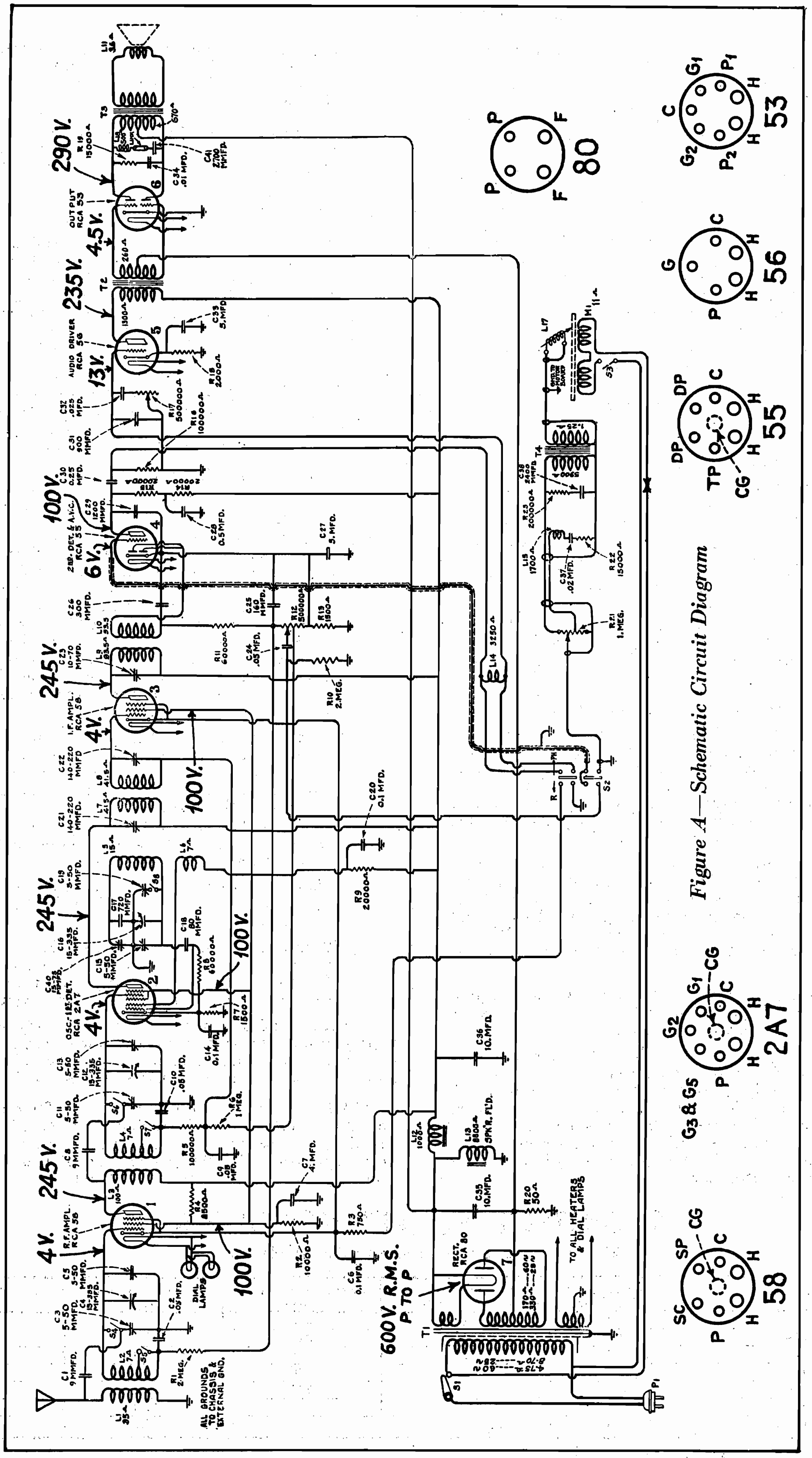


Figure A—Schematic Circuit Diagram

RCA-VICTOR CO., INC.

MODEL 330
Chassis wiring

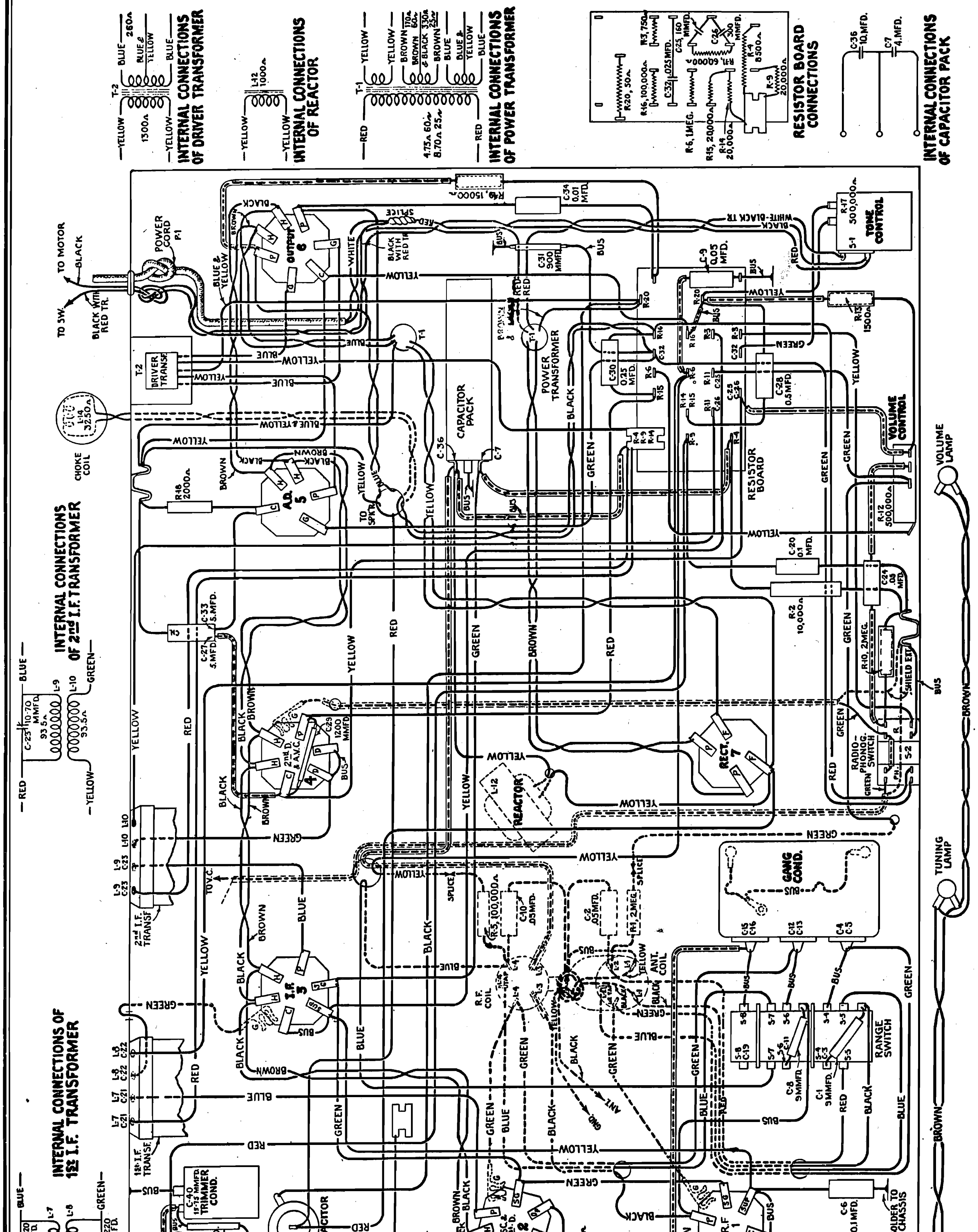


Figure B—Receiver Wiring Diagram

MODEL 330
Assembly wiring

RCA-VICTOR CO., INC.

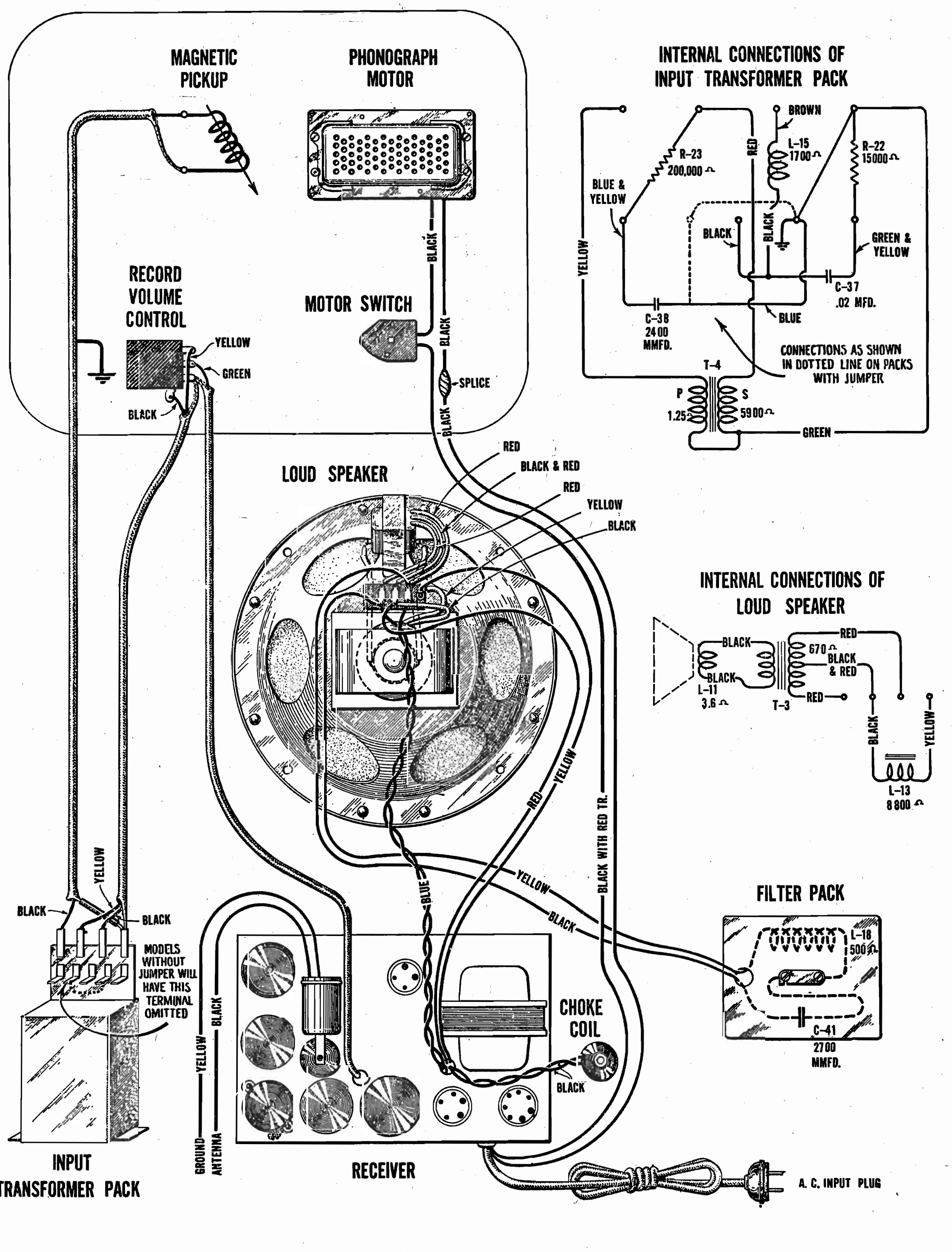


Figure D—Assembly Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 330
Pickup data

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by meaes of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. This pickup output is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pick-up cover by removing the center holding screw and needle screw.

(b) Remove the pick-up magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

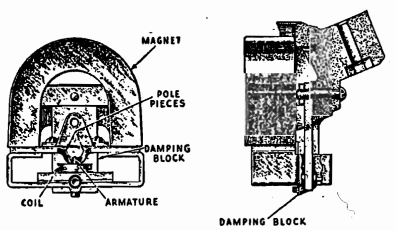


Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered, being careful not to use too much heat as damage to the damping block may result.

The damping block must be removed and then the rear pivot rubber may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pick-up returned to the tone arm.

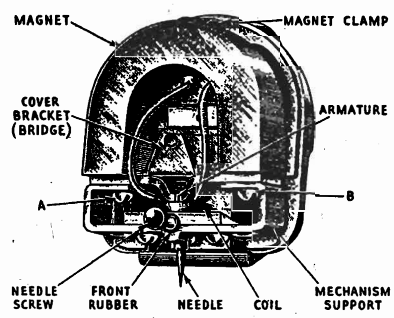


Figure G

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pick-up as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pick-up should then be reassembled as described in the preceding section.

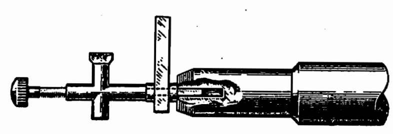


Figure H

Only rosin core solder should be used for any soldering in conjunction with the pick-up. However, if great care to wipe clean and use as small amount as possible is exercised, paste or liquid flux may be used for soldering the end of the spring.

MODEL 330
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.—C17	$0.75
3047	Resistor—1500 ohms—Carbon type—½ watt—Pkg. of 5—R-7, R-13	1.00
3076	Resistor—1 megohm—carbon type—½ watt—Pkge of 5—R6	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Pkge of 5—R5, R16	1.00
3459	Capacitor—80 mmfd.—C18	.44
3460	Capacitor—1200 mmfd.—C29	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt—Pkge of 5—R-18	1.00
3536	Capacitor—Comprising two 5.0 mfd.—C27, C33	1.10
3555	Capacitor—0.1 mfd. C6	.36
3572	Socket—7 contact radiotron socket	.38
3584	Ring—Antenna, R.F. or oscillator coil retaining ring—Pkge of 5	.40
3592	Knob—Station selector, radio-phonograph switch or volume control knob—Pkge of 5	.80
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Pkge of 5—R-8	1.00
3616	Capacitor—300 mmfd.—C26	.34
3623	Shield—Antenna or R.F. coil shield	.30
3627	Knob—Range switch or tone control knob—Pkge of 5	.75
3630	Resistor—10,000 ohms—Carbon type—3 watt—R2	.25
3634	Capacitor—160 mmfd.—C25	.34
3640	Capacitor—.05 mfd.—C2, C9, C10, C24	.25
3641	Capacitor—0.1 mfd. C14, C20	.35
3719	Socket—7 contact radiotron socket—Output	.30
3761	Scale—Volume control dial scale	.60
3765	Capacitor—.025 mfd.—C32	.34
3769	Resistor—750 ohms—Carbon type—½ watt—Pkge of 5—R3	1.00
3770	Resistor—50 ohms—Wire wound—Porcelain type—R20	.34
3771	Resistor—8500 ohms—Carbon type—3 watt—R4	.25
3772	Capacitor—0.5 mfd.—C28	.32
3773	Capacitor—0.25 mfd.—C30	.36
3783	Capacitor—9 mmfd.—Pkge of 2—C1, C8	.50
3784	Capacitor—900 mmfd. C31	.30
3787	Capacitor—.01 mfd.—C34	.30
3788	Coil—High frequency compensator choke coil—L14	1.00
3814	Socket—Station selector or volume control lamp socket	.32
6188	Resistor—2 megohm—Carbon type—½ watt—Pkge of 5—R1	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Pkge of 5—R19	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Pkge of 5—R11	1.00
6300	Socket—4 contact radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt—Pkge of 5—R9, R14, R15	1.00
6471	Coil—Oscillator coil—L5, L6	.74
6527	Coil—Antenna coil—L1, L2	1.08
6528	Coil—R. F. coil assembly—L3, L4	.94
6551	Transformer—Audio driver transformer—T2	1.48
6552	Reactor—Filter reactor—L12	1.04
6553	Transformer—First intermediate frequency transformer—L7, L8, C21, C22	1.56
6554	Transformer—Second intermediate frequency transformer L9, L10, C23	1.64
6555	Capacitor Assembly—Comprising one 10 mfd. and one 4 mfd. capacitor—C7, C36	1.64
6557	Scale—Station selector dial scale	.78
6593	Condenser—3 gang variable tuning condenser	3.25
6594	Volume Control—R12	1.40
6595	Tone Control—R17	1.46
6596	Switch—Range switch	1.25
6597	Switch—Radio phonograph switch	1.10
6674	Output Filter—Comprising reactors and capacitor—L18, C41	1.60
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.—C40	.50
7484	Socket—5 contact radiotron socket	.35
7485	Socket—6 contact radiotron socket	.40
7590	Capacitor—10 mfd.—C35	1.40
9026	Transformer—Power transformer—105-125 volt—50-60 Cycles—T1	4.80
9035	Transformer—Power transformer—105-125 volts—25-40 cycles	6.00

Stock No.	DESCRIPTION	List Price
	MISCELLANEOUS	
3322	Switch—Automatic brake switch with mounting screws	$0.75
3391	Motor board suspension spring assembly—Comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 "C" washer and 1 nut	.50
3430	Box—Needle box with lid—Pkge of 2	.90
3824	Nut—Cap nut—Pkge of 4	.82
6288	Knob—Phonograph volume control knob—Pkge of 5	1.00
6560	Volume Control—Phonograph volume control—R21	1.60
6657	Cable—Two conductor shielded cable—From transformer pack to volume control	.20
7632	Transformer Pack—Comprising input transformer, two reactors, one 2400 mmfd., one 300 mmfd., one .02 mfd. capacitors, one 200,000 ohm, one 15000 ohm resistor—In metal container—T4, L5, L16, C37, C38, C39, R22, R23	5.45
10174	Springs—Automatic brake springs—Pkge of 4	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Pkge of 5	.40
	MOTOR ASSEMBLIES	
3398	Motor Mounting Assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	.48
3817	Stud—Motor mounting stud—Package of 3	.18
8989	Motor—105-125 volts—60 cycles	18.52
8990	Motor—105-125 volts—50 cycles	18.52
8991	Motor—105-125 volts—40 cycles	23.36
8992	Motor—105-125 volts—25 cycles	23.36
	PICKUP AND PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw Assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10	.40
3388	Screw—Pickup needle holding screw—Pkge of 10	.60
3389	Rod—Automatic brake trip rod—Pkge of 5	.40
3417	Armature—Pickup armature	.72
3419	Screw—Cover mounting screw—Pkge of 10	.40
3516	Damper Assembly—Comprising 1 upper and 1 lower drawer, 1 upper and 1 lower bearing—For pickup base	.14
3521	Cover—Pickup back cover	.18
3737	Damper—Viscoloid damping block—Pkge of 5	.65
6346	Back—Pickup housing back	.45
6601	Pickup—Magnetic pickup complete	4.54
6602	Coil—Pickup coil—L17	.65
7659	Arm—Pickup arm complete less pickup and escutcheon	4.60
	TURNTABLE ASSEMBLIES	
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Pkge of 2	.56
3341	Pin—Groove pin—Pkge of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Pkge of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Pkge of 2	.70
3346	Bushing—Speed shifter lever brushing—Pkge of 4	.66
3347	Spring—Speed shifter lever spring—Pkge of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable Complete	5.50
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Pkge of 5	.50
6556	Transformer—Output transformer—T3	1.50
8969	Cone—Reproducer cone—L11—Pkge of 5	6.35
9434	Coil Assembly—Comprising field coil magnet and cone support—L13	4.66

MODEL 331
Voltage, Alignment
Trimmer location

RCA-VICTOR CO., INC.

Voltage Rating............................105–125 Volts
Frequency Rating............25, 30, 40, 50, and 60 Cycles.
Power Consumption..................25 Cycle–115 Watts; 30 Cycle–115 Watts; 40 Cycle–125 Watts; 50 Cycle–115 Watts; 60 Cycle–120 Watts
Number and Types of Radiotrons...2 RCA-58, 1 RCA-2A7, 1 RCA-55, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 7
Undistorted Output.............................5 Watts
Frequency Range..................540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This combination instrument utilizes the new perfected automatic record changing mechanism and a new seven tube superheterodyne radio receiver. Excellent fidelity on both radio and record is obtained due to properly designed circuits and a Class "B" output stage. Other features of the receiver are automatic volume control, eight inch dynamic loudspeaker, continuously variable tone control, and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

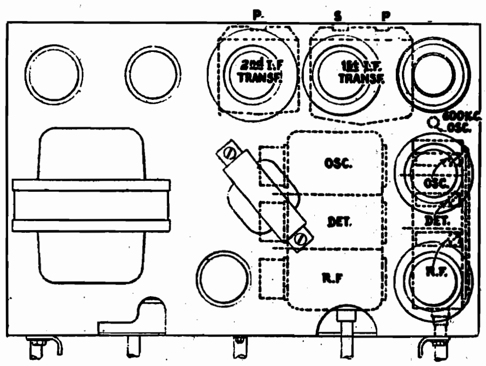


Figure B—Location of Line-Up Capacitor Screws

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure C the wiring diagram, and Figure D the assembly wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-55 functioning a combined second detector and automatic volume control, an audio stage using an RCA-56, an output stage using RCA-53 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang variable capacitor and 600 K. C. trimmer screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 600, 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Connect the output meter across the cone coil. Then set the dial at 140, the oscillator at 1400 K. C. and adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum. Align all three trimmer capacitors on the variable capacitor to maximum output keeping the oscillator output as low as possible.

(c) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure B, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(d) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under A and B.

(e) Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

Automatic Record Changer—The automatic record changer used in this instrument is of simple design and excellent construction. The various adjustments that may be required are shown in Figure E. A point to remember with this instrument is that it must always be level, otherwise proper operation will not be obtained.

Fidelity—A link is provided in the filter circuit connected across the plates of Radiotron RCA-53. Opening this link increases the high frequency output of the phonograph approximately 2000 cycles. The link is accessible by removing the filter unit from the cabinet.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line—Volume Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	4.0	100	245	6.0	2.4
*RCA-2A7 Osc. Det.	4.0	100	245	5.0	2.4
RCA-58 I. F.	4.0	100	245	6.0	2.4
RCA-55 2nd Det. A. V. C.	6.0	—	100	4.0	2.4
RCA-56 Driver A. F.	13.0	—	235	6.3	2.4
RCA-53 Output	4.5	—	290	12.0	2.4
RCA-80 Rectifier	600 R. M. S. Plate to Plate			88.0	5.0

* Voltages and current apply to detector portion of tube.

MODEL 331
Schematic

RCA-VICTOR CO., INC.

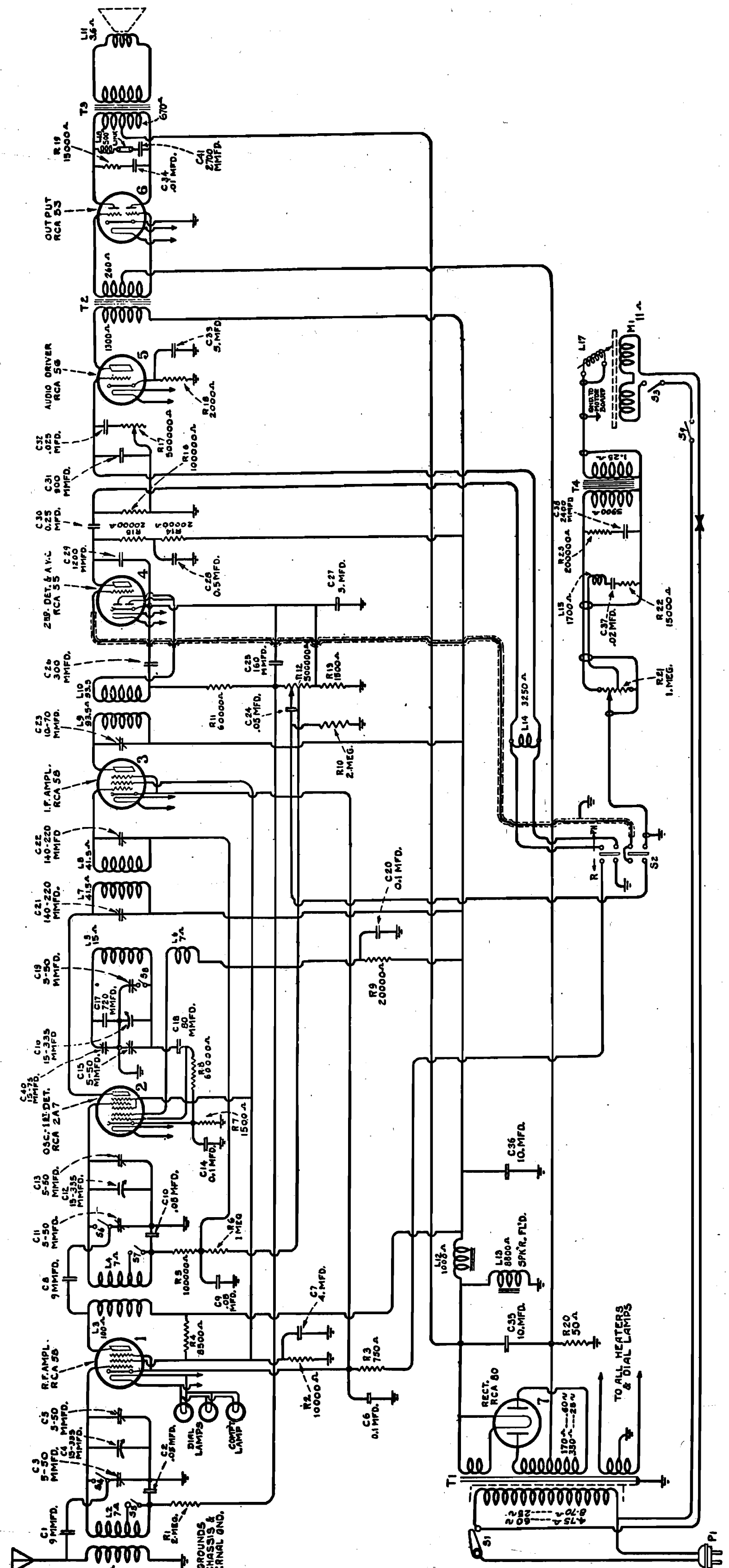


Figure A—Schematic Circuit Diagram

RCA-VICTOR CO., INC.

MODEL 331
Chassis wiring

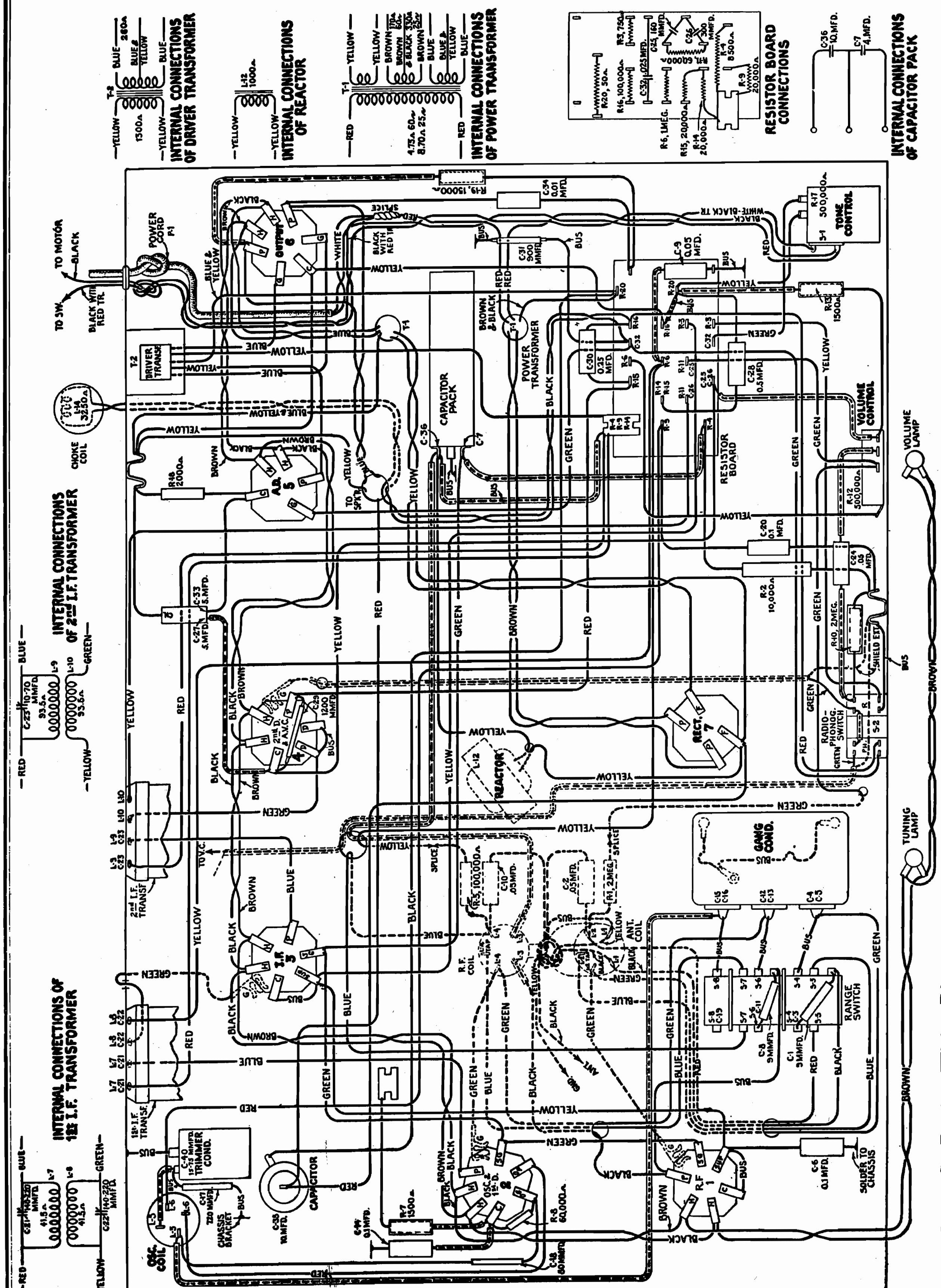


Figure C—Receiver Wiring Diagram

MODEL 331
Assembly wiring

RCA-VICTOR CO., INC.

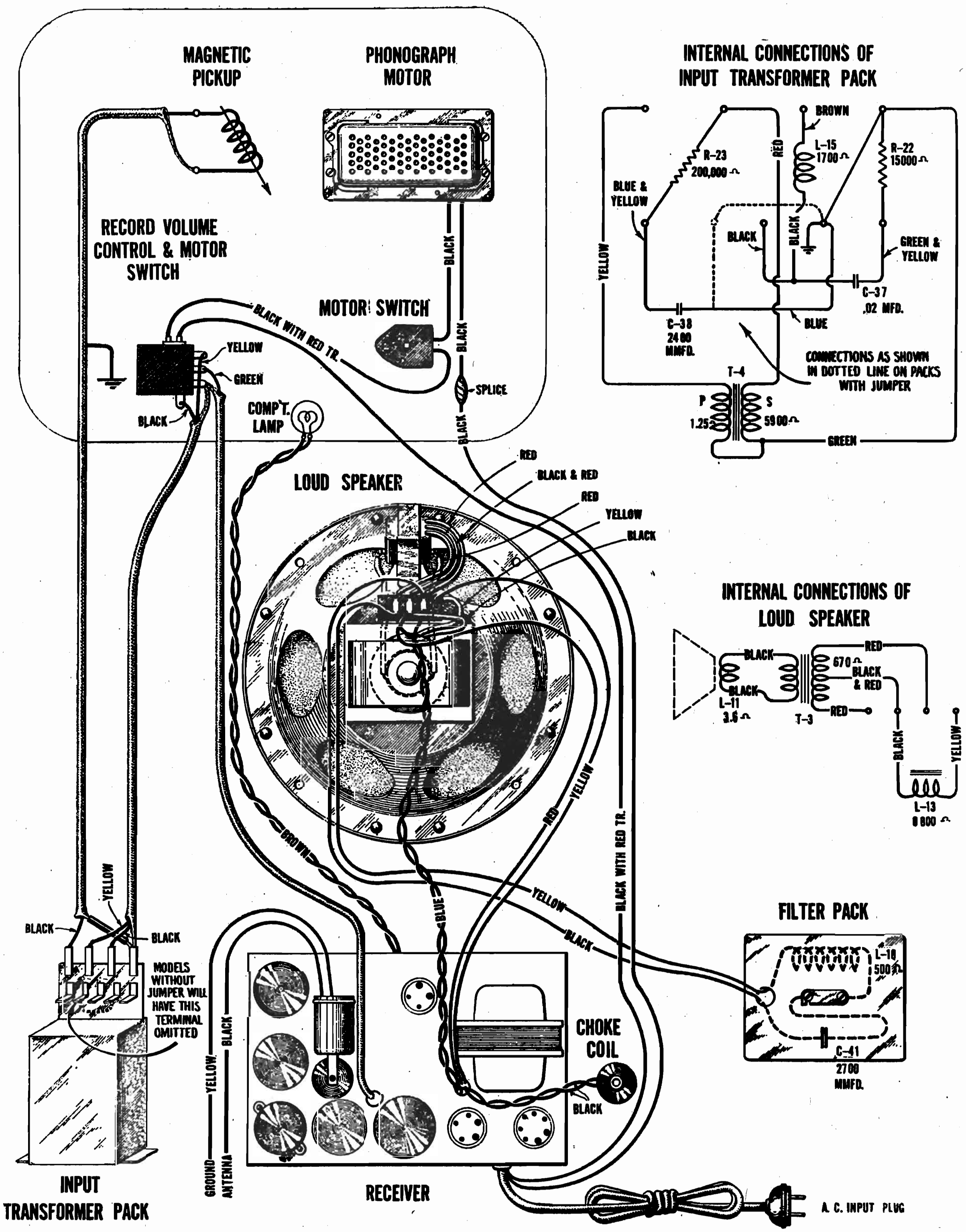


Figure D—Assembly Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 331
Record changer data

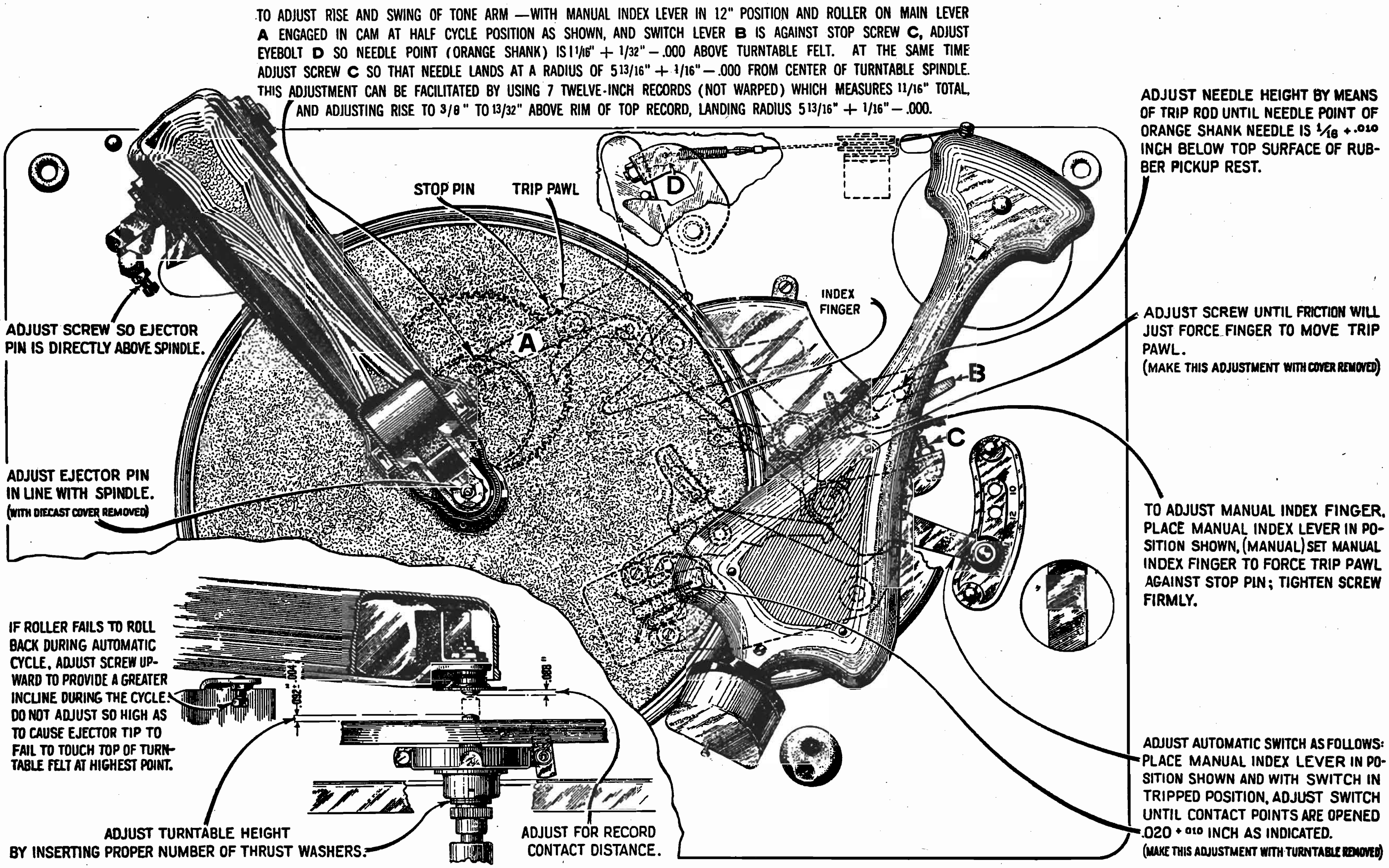


Figure E—Automatic Record Changer Adjustments

MODEL 331
Parts List

RCA-VICTOR CO., INC.

RECEIVER ASSEMBLIES

Stock No.	DESCRIPTION	List Price
2269	Capacitor—720 mmfd.	$0.75
2747	Cap—Contact cap—Package of 5	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Pkg. of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Pkg. of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd.	.44
3460	Capacitor—1,200 mmfd.	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt—Pkg. of 5	1.00
3536	Capacitor—Filter capacitor—Two 5.0 mfd.	1.10
3555	Capacitor—0.1 mfd.—R. F. and I. F. Bias	.36
3572	Socket—7 contact Radiotron socket—Oscillator	.38
3584	Ring—Antenna, R. F. and oscillator coil retaining ring—Package of 5	.40
3592	Knob—Station selector, volume control, or radio-phonograph knob—Package of 5	.80
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3615	Knob—Range switch or tone control knob—Package of 5	.60
3616	Capacitor—300 mmfd.	.34
3622	Shield—Radiotron shield—Second detector	.36
3624	Socket—Station selector or volume control lamp socket and bracket assembly	.40
3630	Resistor—10,000 ohms—Carbon type—3 watt	.25
3634	Capacitor—160 mmfd.	.35
3640	Capacitor—0.05 mfd.	.34
3641	Capacitor—0.1 mfd.	.25
3682	Shield—Radiotron shield—Oscillator and 1st detector	.22
3719	Socket—7 contact Radiotron socket	.30
3760	Switch—Radio-phonograph—Rotary type—Double pole—Double throw	.98
3761	Scale—Volume control dial and scale assembly	.60
3762	Screw—Chassis mounting screw and washer	.32
3765	Capacitor—0.025 mfd.	.34
3766	Extension—Tone control, rotary switch, volume control, or range switch shaft extension	.36
3767	Extension—Station selector shaft extension	.36
3768	Screw—Set screw for shaft extension coupling—Pkg. of 10	.35
3769	Resistor—750 ohms—Carbon type—½ watt—Package of 5	1.00
3770	Resistor—50 ohms—Wire wound—Porcelain type	.34
3771	Resistor—8,500 ohms—Carbon type—3 watt	.25
3772	Capacitor—0.5 mfd.	.32
3783	Capacitor—9 mmfd.—Package of 2	.50
3784	Capacitor—900 mmfd.	.30
3787	Capacitor—0.01 mfd.	.30
3788	Coil—High frequency compensator choke coil	1.00
3789	Shield—Radiotron shield—R. F. and I. F.	.25
6188	Resistor—2 megohm—Carbon type—½ watt—Pkg. of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Pkg. of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Pkg. of 5	1.00
6300	Socket—4 contact Radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt—Pkg. of 5	1.00
6471	Coil—Oscillator coil	.74
6485	Volume control with mounting nut	1.20
6527	Coil—Antenna coil	1.08
6528	Coil—R. F. coil	.94
6534	Switch—Range switch	1.25
6551	Transformer—Driver transformer	1.48
6552	Reactor—Filter reactor	1.04
6553	Transformer—First intermediate frequency transformer	1.56
6554	Transformer—Second intermediate frequency transformer	1.64
6555	Capacitor assembly—Comprising one 10.0 mfd. and one 4.0 mfd. capacitors	1.64
6557	Scale—Dial and dial scale—Tuning capacitor	.78
6559	Tone control complete with mounting nut	1.60
6648	Capacitor—0.25 mfd.	.42
6674	Output Filter—Comprising reactor and capacitor	1.60
7062	Capacitor—Adjustable trimming capacitor	.50
7484	Socket—5 contact Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7588	Condenser—3 gang variable tuning condenser	2.85
7590	Capacitor—10.0 mfd.	1.40
9026	Transformer—Power transformer 105–125 volt 50–60 cycle	4.80
9035	Transformer—Power transformer 105–125 volt 25–40 cycle	6.00

MISCELLANEOUS

Stock No.	DESCRIPTION	List Price
3759	Receptacle—Needle receptacle with mounting screws	.50
3763	Suspension spring, washer and bolt assembly for motor board—Comprising one bolt, two cup washers, 2 springs, one "C" washer, and one cap nut	.42
3764	Nut—Cap nut for motor board suspension assembly Package of 4	.40
6288	Knob—Phonograph volume control knob—Package of 5	1.00
6560	Volume control—Phonograph volume control	1.60
6576	Cable—Shielded two conductor cable from phonograph volume control to transformer pack	.32
6646	Socket and base assembly—For compartment lamp	.60
6647	Shade—Compartment lamp shade	.30
6649	Escutcheon—Station selector—Package of 2	.44
6650	Escutcheon—Volume control—Package of 2	.44
7632	Transformer pack—Comprising input transformer, two reactors, one 2,400 mmfd., one 300 mmfd., one 0.02 mfd. capacitors, one 200,000 ohm and one 15,000 ohm resistor—In metal container	5.45
10241	Box—Needle box with lid—Package of 2	.60

REPRODUCER ASSEMBLIES

Stock No.	DESCRIPTION	List Price
6184	Board—Terminal board complete with three terminals—Package of 5	$0.50
6556	Transformer—Output transformer	1.50
8969	Cone—Reproducer cone—Package of 5	6.35
9434	Coil assembly—Comprising field coil, magnet and cone support	4.66

AUTOMATIC RECORD CHANGER
EJECT ARM ASSEMBLIES

Stock No.	DESCRIPTION	List Price
2917	Washer—Spring washer—Package of 10	.25
3655	Retainer—Ball retainer with three ball bearings	.45
3656	Bearing—Ejector tip bearing	.48
3657	Tip—Ejector tip	.30
3658	Ball—Ball bearing—Package of 20	.30
3660	Shaft—Eject arm shaft	.40
3661	Yoke—Eject arm yoke assembly	.80
3662	Plate—Ejector plate and felt pad—Package of 5	.95
3663	Spring—Eject arm horizontal action tension spring—Package of 10	.50
3665	Screw—Eject arm adjustment screw and nut—Package of 5	.25
3729	Roller—Counter balance roller—Located inside of eject arm	.45
3930	Cushion—Counter balance roller stop Cushion and bracket Located inside of eject arm	.18
6575	Cover—Eject arm cover	.90
7605	Arm—Eject arm assembly complete	4.30

MOTOR ASSEMBLIES

Stock No.	DESCRIPTION	List Price
9011	Motor—Motor complete 105–125 volts—60 cycles	19.72
9012	Motor—Motor complete 105–125 volts—25 cycles	24.16
9013	Motor—Motor complete 105–125 volts—40 cycles	24.16
9014	Motor—Motor complete 105–125 volts—50 cycles	19.72
9015	Rotor and shaft for 60 cycle motor	7.00
9017	Rotor and shaft for 25 cycle motor	9.00
9019	Rotor and shaft for 40 cycle motor	9.00
9021	Rotor and shaft for 50 cycle motor	7.00

MOTOR BOARD ASSEMBLIES

Stock No.	DESCRIPTION	List Price
2893	Spring—Trip lever tension spring—Package of 10	.30
2897	Screw—Cable lever tension spring adjustment screw and nut—Package of 5	.50
3322	Switch—Motor switch complete	.75
3653	Spring—Phosphor bronze—Trip pawl spring—Package of 5	.30
3654	Roller—Guide roller assembly—Comprising bracket, roller, and guide pin	.34
3666	Spring—Cable lever tension spring—Package of 10	.44
3667	Plate—Actuating plate assembly	.42
3669	Screw—Special screw for holding main lever to actuating plate—Package of 5	.25
3670	Finger—Friction finger assembly	.32
3671	Lever—Manual index lever	.45
3672	Pin—Manual index lever pin	.42
3673	Screw—Manual index lever adjustment screw and nut—Package of 5	.20
3674	Escutcheon—Engraved MANUAL 12-10	.32
3675	Lever—Trip lever assembly	.90
3676	Spring—Cam and gear tension spring—Package of 10	.52
3677	Lever—Cable lever assembly	.40
3777	Motor mounting spring, washer, and stud assembly—Comprising three upper and three lower springs, six cup washers, three spring washers, and three studs—Package of 1 set	.62
3778	Spring—Main lever and link assembly tension spring—Package of 10	.55
6502	Cam and gear assembly	1.18
6503	Pawl—Trip pawl assembly	.40
6504	Lever—Main lever and link assembly	.80
10174	Springs—Automatic brake springs—One set of four springs—Package of 2 sets of 4	.50
10184	Plate—Automatic brake latch plate—Package of 5	.40

PICKUP AND PICKUP ARM ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3388	Screw—Pickup needle holding screw—Package of 10	.60
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3516	Damper and bushing assembly—Located at bottom of pickup arm base—Package of 1 set	.14
3680	Rest—Pickup rest	.18
3728	Coil—Pickup coil	.50
3732	Cover—Pickup cover	.50
3733	Back—Pickup housing back	.60
3734	Cover—Pickup back cover	.30
3735	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut, and one washer—Package of 10	.60
3736	Rod—Automatic brake trip rod with lock nut—Pkg. of 5	.30
3737	Damper	.20
3779	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
6542	Pickup—Pickup unit complete	4.15
6543	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut, and washer	4.00

TURNTABLE ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3338	Ring—Clamp ring assembly—Comprising spring, latch lever, and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groove-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3678	Sleeve—Sleeve complete with ball race	2.24
3679	Lever—Speed shifter lever with mounting screws	.50
9010	Turntable—Complete	5.50

AMPLIFIER RACK

The amplifier rack assembly consists of the voltage amplifier, power amplifier, field supply and their various controls, mounted on a rack one above the other. Each unit consists of a vertical panel, on the rear of which are mounted the capacitors, transformers, disc rectifiers, etc., that make up the individual assemblies. The panels are in turn bolted to the rear of the iron channel frame in such a manner that each panel may be installed or removed through the front of the rack.

The Radiotron sockets in both the voltage and power amplifiers are mounted on shelves placed at right angles to the respective panels so that vertical operation of the Radiotrons is secured.

INSTALLATION

CHECKING INSTALLATION

After completion of the installation of an amplifier rack by the contractor, check all external and internal connections to the main terminal boards at the top and bottom of the rack to ascertain that the electrical work has been accurately and neatly done. Examine each carbon type resistor for breakage or open terminal connections. The volume control should operate smoothly throughout its entire range.

SETTING POWER SUPPLY SWITCHES

The voltage amplifier, power amplifier, and loudspeaker field supply panels are equipped with switches marked 110/120. These switches are used to allow for small variations in line voltage and the "ageing" characteristics of disc rectifier units. If the average line voltage at the main power supply switch is in excess of 115 volts *during operating hours*, set the switches on both the power and voltage amplifiers in the 120 volt position, while if the average line voltage under the same conditions is less than 115 volts set the switches in the 110 volt position.

In the model PB45A1 power amplifier a tumbler switch, with no marking is provided. With the operating lever in the right hand position this switch is set for 110 volts, while in the opposite direction the switch is set in the 120 volt position.

At the time of installation set the 110/120 volt switches on the loudspeaker field supply panel in the 120 volt position regardless of the line voltage. After about six months of operation the "ageing" of the rectifier units will necessitate resetting these switches in the 110 volt position. No further adjustment will be necessary.

Access to these various switches may be had by removing the cover panels on the front of the rack.

RADIOTRONS

In the case of the push-pull stages, it is good practice to match the tubes of the various stages with respect to plate current as accurately as possible. For example, if four Radiotrons UX-245 and UX-250 are available, the two of each type that match most closely with respect to plate current should be used in each stage.

The Radiotron socket voltages given in the following pages are the actual values at which each Radiotron should operate. In circuits containing high resistance, voltages read on a Set Analyzer will not agree with the values in the table, due to the relatively low resistance of the meter employed. Therefore a correction must be applied to the meter reading to obtain the correct voltage at each socket. Usually, an application of Ohms Law will give an approximate value of the voltages at which each Radiotron is operating, assuming that the resistance of the test meter is known.

HUM ADJUSTMENT

The voltage amplifier should be adjusted to the point of minimum hum by means of the two hum adjusting potentiometers with which the voltage amplifier is equipped. The arm of the potentiometer located between the Radiotron UX-245 and the Radiotron UX-280 selects the point of cathode return of the Radiotrons UY-224-A and RCA-56 to the heater circuit and thereby regulates the hum component contributed by these Radiotrons.

The arm of the potentiometer located between the Radiotrons UX-245 selects the point of grid return of the UX-245 Radiotrons to the filament circuit and thereby regulates their hum component.

LOUDSPEAKERS

The stage loudspeakers used with the public address equipments are of the electro-dynamic type. The loudspeaker unit is mounted in a wooden directional baffle which may be suspended in a rack placed on the stage.

The speaker unit consists of a six-inch corrugated paper cone with an aluminum voice coil, a cone support, and an aluminum casting, with a four-inch square hole, which holds the cone in position on the cone support. The square opening in the aluminum casting matches a similar opening in the throat of the directional baffle.

MOUNTING LOUDSPEAKER UNIT IN DIRECTIONAL BAFFLE

To install the speaker unit in the housing at the rear of the directional baffle, proceed as follows:

(a) Place the baffle on the floor so that the widest dimension across the mouth of the baffle is parallel with the floor.

(b) Place the speaker unit in the housing so that the plug and terminal posts are toward the right and the square opening of the aluminum throat on the speaker lines up with the square opening in the throat of the baffle.

(c) Secure the speaker unit in position by means of the four bolts and nuts provided with the baffle.

LOUDSPEAKER COUPLING TRANSFORMER

The special coupling device designated as XT-736 is an impedance matching transformer having eight terminals. Each terminal is marked with an index number.

The XT-736 speaker coupling transformer in addition to allowing all loudspeakers to be connected in parallel, also will permit the speakers to be operated at different power levels. Differences in power level between speakers may be required in auditoriums having a large balcony, where it would be necessary to raise the volume level of all the speakers in order to obtain the proper level in the balcony. This would naturally result in excessive volume level in the orchestra, a condition that would be undesirable.

The taps of this transformer are so arranged that a difference in power output of 3 decibels may be obtained between the full winding and the tap marked 0.5. Also a difference of 3 decibels may be obtained between tap 0.5 and tap 0.25 and so on. Of course in working the speakers at different power levels from the same transformer some mismatching of impedance will be present.

To secure as close an impedance match as possible between loudspeakers and the coupling transformer and still get the the required difference in power level between speakers, use the following procedure for connecting the speakers to the transformer.

Connect the speakers between terminal S and certain taps such that the sum of all the index numbers used will be as close as possible to 1. The allowable limits between which the sum of these index numbers may fall is from 0.7 to 1.3.

As an example, assume that four loudspeakers are to be connected for the same power level. Connect all four in parallel between terminals S and 0.25.

Public Address Notes
Part #2

RCA-VICTOR CO., INC.

Thus the total of the index numbers used would be 4 x 0.25 or 1.0 which shows that the speakers and transformer are matched correctly for impedance. Now assume that two speakers are to operate at 3 decibels above two other speakers. Connect two in parallel between terminals S and 0.25 and connect the remaining speakers between terminals S and 0.13. The sum of the index numbers will then be 2 x 0.25 + 2 x 0.13 or 0.76. As this number falls within the allowable limits the speakers will operate satisfactorily.

PHASING LOUDSPEAKERS

When more than one loudspeaker is used it is necessary that all the speakers be in phase. That is, the motion of all cones must be in the same direction at a given instant when a signal is impressed on them. To phase the stage loudspeakers proceed as follows:

Set the volume control on the amplifier so that it is operating at high gain and producing an appreciable hum in the loudspeakers.

If the outputs of two power amplifiers are worked in parallel, the phase relation of both amplifiers must be checked before the phasing of the speakers is done. If the power amplifiers are not in phase very little sound will be obtained from any of the stage speakers as the output transformers will be working at a phase difference of 180°.

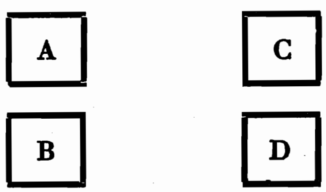


Figure A

TWO LOUDSPEAKERS

Two Speakers Mounted Side By Side—Walk across the stage in front of the two baffles from the outer edge of one to the outer edge of the other. If the sound level of the hum is approximately uniform, the loudspeakers are in phase. If the sound level is appreciably lower in the vertical plane between the two baffles than at either of their outer edges, the speakers are out of phase.

If the speakers are out of phase, reverse the voice coil connections to one of the cones.

Two Speakers Mounted One Above the Other—The procedure is similar to that for two loudspeakers mounted side by side except that the ear is moved in a vertical direction between the baffles.

FOUR LOUDSPEAKERS

Assume that the arrangement of the four loudspeakers are as shown in Figure A. The procedure for phasing the loudspeakers is as follows:

(a) Make speakers A and C inoperative by open circuiting the voice coils of both speakers.

(b) Walk across the stage in front of the two baffles, B and D, from the outer edge of one to the outer edge of the other. If the sound level of the hum is approximately uniform, the loudspeakers are in phase. If the sound level is appreciably lower in the vertical plane between the two baffles than at either of their outer edges, the speakers are out of phase. If the speakers are out of phase, reverse the voice coil connections to one of the cones.

(c) Complete the circuit to A and open circuit the voice coil in D. Phase speakers A and B by moving the ear in a vertical direction between the baffles. If the speakers are out of phase reverse the voice coil connections to A only.

(d) Complete the circuit to C and D and open circuit A and B. Phase C and D in a manner similar to that used in phasing A and B.

REPLACING THE STAGE LOUDSPEAKER CONE

To remove the old cone proceed as follows:

(a) Remove the voice coil leads from the terminal posts.
(b) Remove the center clamping screw and washer.
(c) Remove the nine bolts which hold the aluminum casting and cone to the cone support ring.
(d) Remove the aluminum casting.
(e) Remove the cone.
(f) Remove the heavy paper spacers.

To install the new cone, use the following procedure:

(a) Place the new cone on the cone support with the cone leads toward the terminal posts. See Figure B.

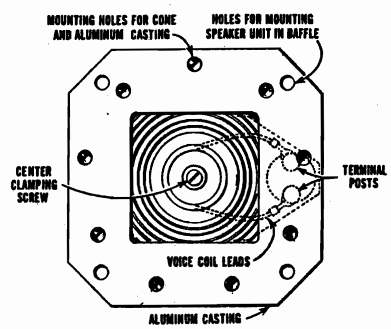


Figure B—Position of Cone in Mounting

Due to manufacturing tolerances, the dimensions of the cones and cone supports will vary. To compensate for these small variations, paper spacers are provided which can be placed either between the cone and cone support to secure proper position of the voice coil in the air gap, or between the cone and aluminum casting to obtain proper clearance (1/8 inch) between the casting and the cone, or possibly for both reasons.

If sufficient spacers are not available, additional spacers may be cut from heavy paper using one of the spacers as a template.

The number of spacers required between the cone and cone support should be such that the cone center will just touch the boss on the center field pole.

The number of spacers required between the cone and the aluminum casting should be such that the cone is 1/8 inch from the conical surface of the casting. To measure this distance, place a rule against the side of the square opening in the aluminum casting and push the rule down until it just touches the cone. The clearance between the cone and casting should be checked at all four surfaces of the casting.

(b) With the center clamping screw out, bolt the casting, spacers and cone loosely to the cone support. Then adjust the relative positions of the cone, aluminum casting and the cone support until the cone is held centered by the aluminum casting. In this position you should be able to move the voice coil freely in all directions perpendicular to the axis of the field pole piece. Also the hole in the center should line up with the hole in the field pole piece. Screw down the nine bolts which hold the aluminum casting and cone in position. *Care should be taken not to shift the position of the cone while the bolts are being tightened.*

(c) Place the center clamping screw and washer in place and screw down. Be sure that the cone center is not twisted or shifted when the screw is tightened down.

IMPORTANT NOTE—The center clamping screw is not a centering screw, but is merely a holding screw to hold the cone center to the pole piece. Centering of the voice coil should be done as outlined under (a) and (b). Under no circumstances should the voice coil be centered by means of the clamping screw. To do this will distort the flexible cone center and increase the possibility of cone rattle.

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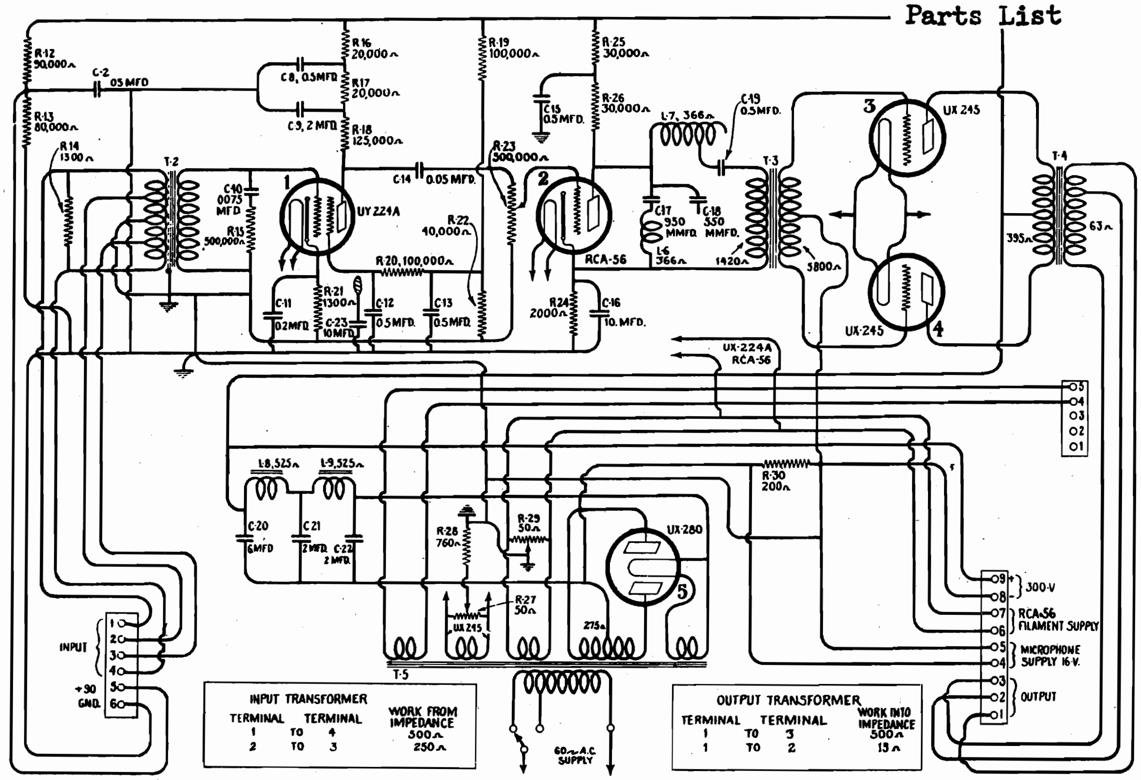
MODEL PB 23 H1 Amp.
Schematic, Voltage
Parts List



Schematic Wiring Diagram

REPLACEMENT OF INPUT TRANSFORMER

Should it become necessary to replace the input transformer in the first stage of the voltage amplifier, care must be used to replace it in such a position that maximum shielding is obtained. The position of the transformer with respect to the amplifier panel which gives minimum hum is the correct position for maximum shielding.

RADIOTRON SOCKET VOLTAGES
120 Volt A. C. Line

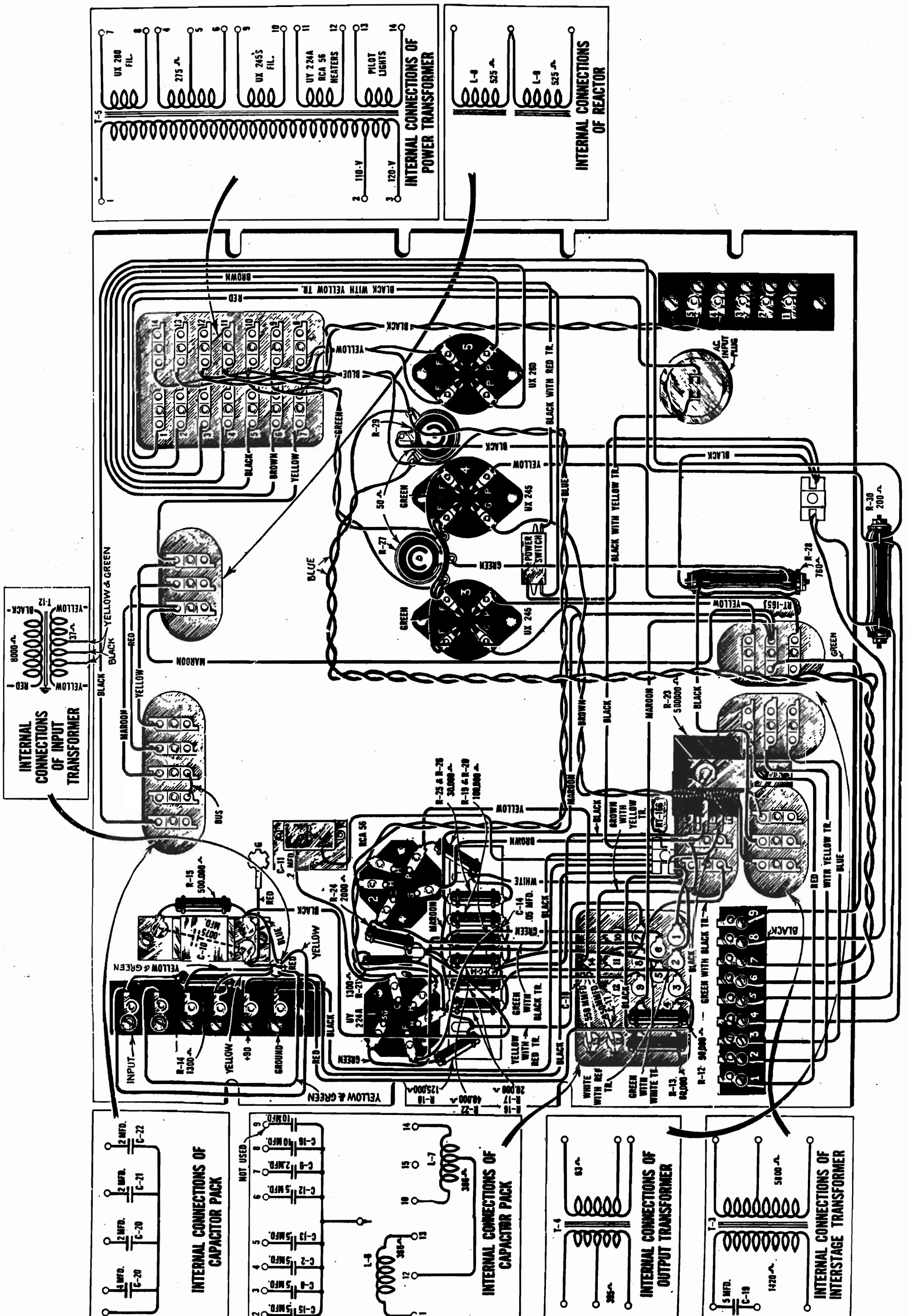
Radio-tron	Control Grid Volts	Screen Grid Volts	Plate Volts	Plate Current M. A.	Filament or Heater Volts
UY-224A	1.3	45	185	.7	2.5
RCA-56	6.0	—	130	2.3	2.5
UX-245	48.0	—	250	30.0	2.5
UX-245	48.0	—	250	30.0	2.5

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
20058	Screws—One set of two special thumb screws for securing perforated panel	$0.60
20096	Screws—One set of two thumb screws for fastening input shields	1.00
21630	Switch—Single pole, double throw toggle type switch—Mounted on tube shelf	2.00
21632	Cap—First stage Radiotron control grid cap	.75
22178	Connector—Two contact male connector	.26
22186	Resistor—760 ohm porcelain type resistor	.90
22195	Resistor—500,000 ohm carbon type resistor—½ watt	.50
22868	Resistor—80,000 ohm carbon type resistor—½ watt	.50
22932	Socket—UX type socket complete with two mounting screws, two lockwashers and two nuts	.60
23000	Capacitor—550 mmfd. fixed capacitor	1.20
23001	Resistor—90,000 ohm carbon type resistor—½ watt	.50
23002	Capacitor—950 mmfd. fixed capacitor	1.20
23003	Resistor—30,000 ohm carbon type resistor—½ watt	.50
23004	Resistor—40,000 ohm carbon type resistor—½ watt	.50
23005	Resistor—20,000 ohm carbon type resistor—½ watt	.50
23006	Resistor—100,000 ohm carbon type resistor—½ watt	.50
23007	Resistor—120,000 ohm carbon type resistor—½ watt	.50
23008	Resistor—3,000 ohm carbon type resistor—½ watt	.50
23009	Resistor—1,300 ohm carbon type resistor—½ watt	.50
23012	Potentiometer—Volume control potentiometer complete with mounting nut	6.25
23014	Potentiometer—50 ohm hum control potentiometer complete with mounting nut	2.50
23015	Capacitor—0.0075 mfd. fixed capacitor complete with two mounting screws (CX-43)	2.50
23016	Capacitor—0.05 mfd. fixed capacitor (CX-45)	2.00
23017	Socket—UX type socket complete with insulator, two mounting screws, two lockwashers and two nuts	.65
23018	Knob—Volume control potentiometer push on type knob	1.10
23019	Cable—Remote volume control contact switch cable	3.00
25065	Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers and four nuts (RT-77)	25.00
25376	Transformer—Output transformer in metal container complete with four mounting screws, four lockwashers and four nuts (RT-165)	$35.00
25377	Transformer—Interstage transformer in metal container complete with four mounting screws, four lockwashers and four nuts (RT-166)	25.00
25381	Cushion—One set of two sponge rubber cushions for input transformer (¼" x 1" x 3⅛")	2.25
25382	Cushions—One set of three rubber cushions for input transformers (located in metal container)	5.00
25383	Board—Terminal board engraved "1, 2, 3, 4, 5" complete with five terminals, two mounting screws, two lockwashers, two washers, and two spacers (located under power transformer)	4.50
25553	Resistor—200 ohm porcelain type resistor	1.40
25587	Transformer—Voltage amplifier input transformer—Less container (RT-188)	12.95
27328	Capacitor pack—Capacitor pack comprising three 2.0 mfd. condensers and one 4.0 mfd. condenser in metal container complete with four mounting screws, four lockwashers and four nuts (CP-31)	24.00
27459	Transformer—Power transformer (50–60 cycle) complete with four mounting screws, four lockwashers and four nuts (RT-168)	50.00
27505	Capacitor pack—Comprising two reactors, two 10.0 mfd. electrolytic condensers, one 2.0 mfd. capacitor and five 0.5 mfd. capacitors in metal container complete with four mounting screws, four lockwashers and four nuts (CX-67)	43.10
27514	Board—Terminal board complete with nine terminals, two mounting screws, two lockwashers, two washers and two spacers (located under capacitor pack)	3.95
27515	Board—Terminal board complete with six terminals, two mounting screws, two lockwashers, two washers and two spacers	3.65

MODEL PB 23 H1 Amp
Chassis wiring

RCA-VICTOR CO., INC.

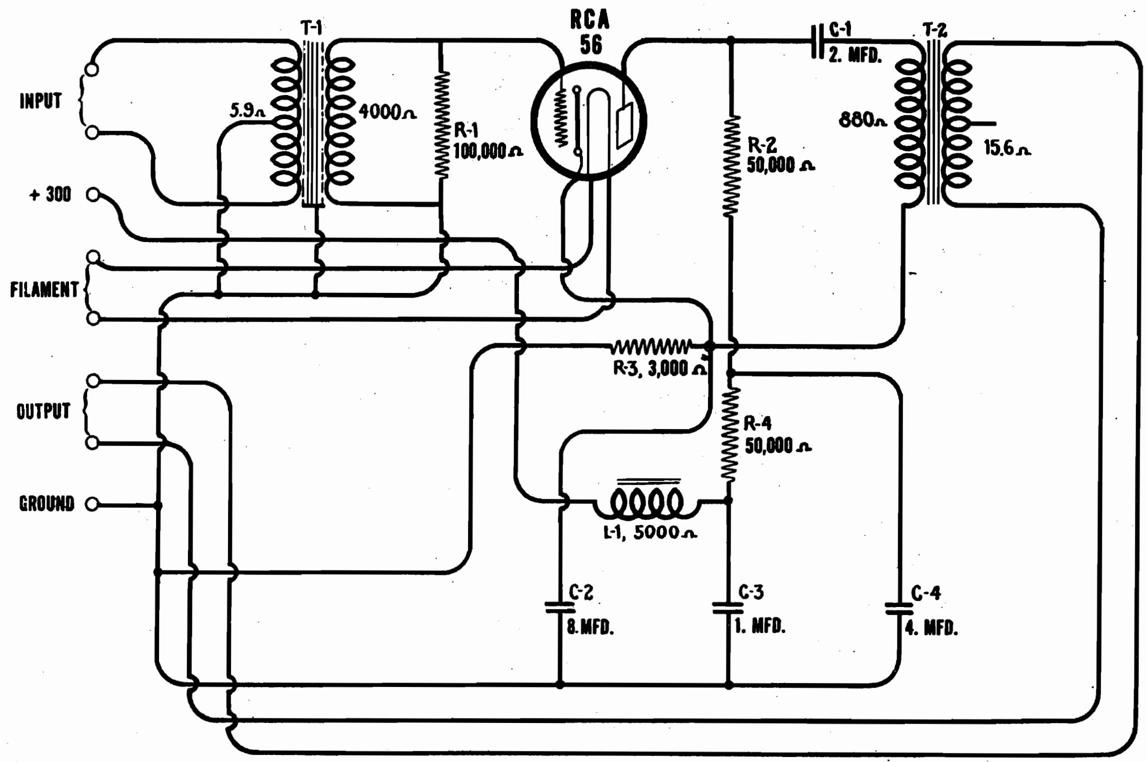


Voltage Amplifier Panel Wiring (PB23 H1)

RCA-VICTOR CO., INC.

MODEL PA 90 A1 Amp
Schematic, Voltage
Parts List

PRE-AMPLIFIER PA90A1



Schematic Wiring Diagram

PRE-AMPLIFIER

For program pick-up, or where the velocity microphone is used for any purpose except close talking, a pre-amplifier is required for each microphone. The supply voltages for one PA90 pre-amplifier may be obtained from the PB23H1 voltage amplifier. Where a larger number of pre-amplifiers is used the supply voltages are obtained from a PK24A1 power supply unit.

The pre-amplifier is designed to work from a 250 ohm source and into a 250 ohm line.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line

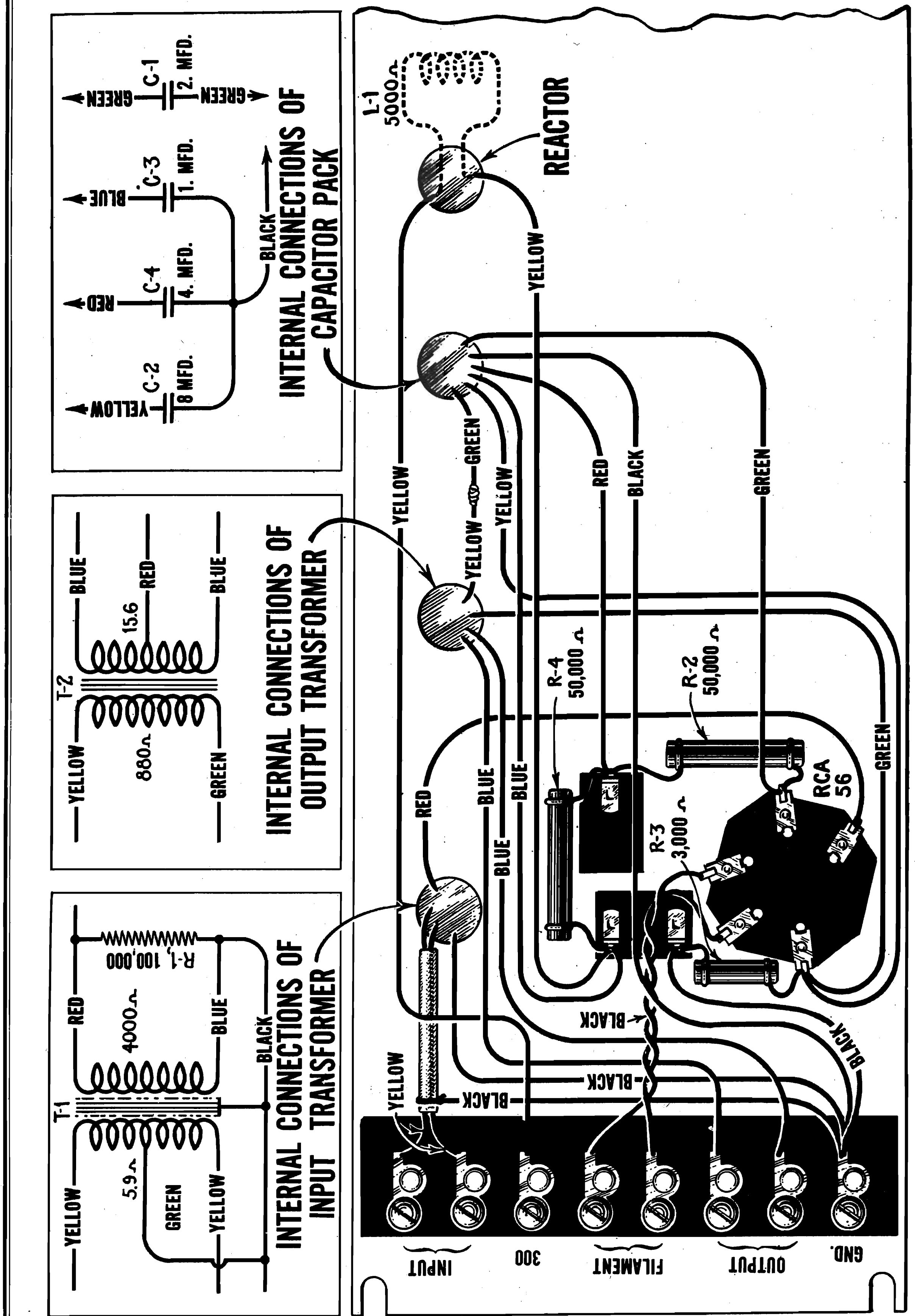
Radiotron	Control Grid Volts	Plate Volts	Plate Current M. A.	Heater Volts
RCA-56	6.0	130	2.3	2.5

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
20141	Screws—Thumb screw for fastening Radiotron cover	$1.05
23006	Resistor—100,000 ohm input transformer loading resistor—Carbon type	.50
23008	Resistor—3,000 ohm carbon type resistor—Bias resistor	.50
23011	Resistor—50,000 ohm carbon type resistor—Plate resistor	.50
23017	Socket—UY type Radiotron socket complete with two mounting screws, two lockwashers and two nuts	.65
25382	Cushions—One set of three rubber cushions for input and output transformers	5.00
25592	Reactor—Filter reactor complete with four mounting screws, four lockwashers and four nuts (XT-552-C)	5.00
25593	Board—Terminal board complete with eight terminals, two spacers, two mounting screws, two lockwashers and two nuts	$5.20
25594	Cushion—One set of two rubber cushions for suspending tube socket shelf	.65
27516	Capacitor pack—Comprising one 8.0 mfd., one 1.0 mfd. and one 4.0 mfd. capacitors in metal container complete with four mounting screws, four lockwashers and four nuts	12.50
27517	Transformer—Input transformer complete with leads	8.70
27518	Transformer—Output transformer complete with leads	7.90

MODEL PA 90 A1 Amp
Chassis wiring

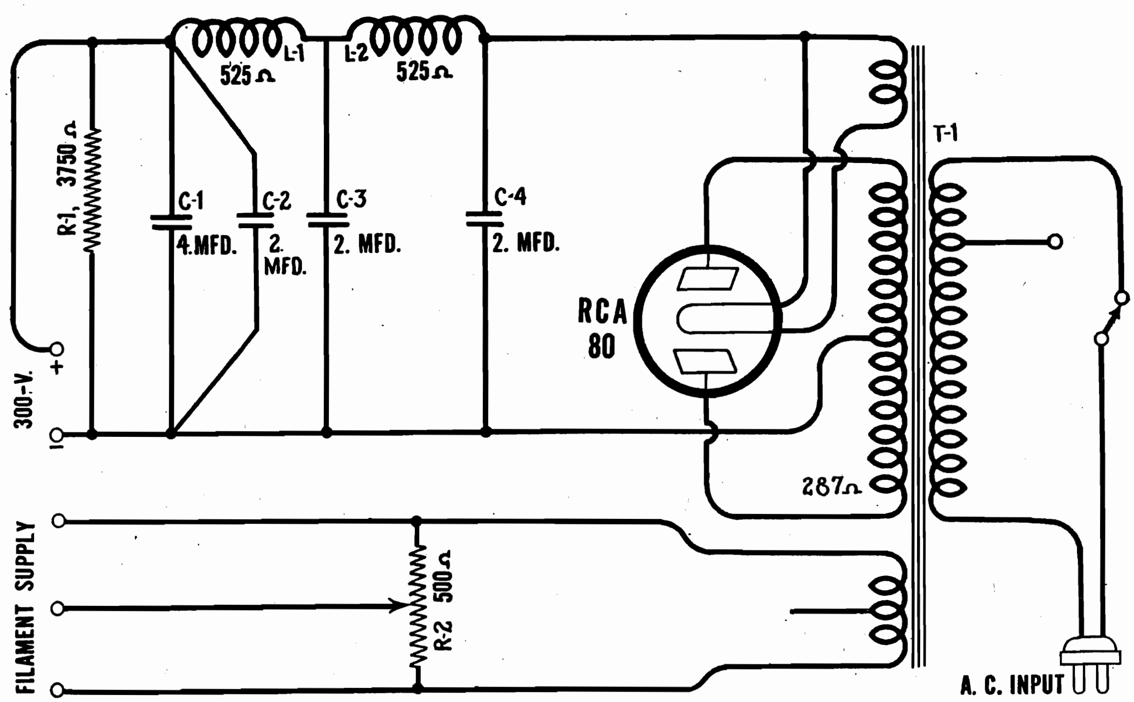
RCA-VICTOR CO., INC.



Pre-Amplifier Panel Wiring (PA90A1)

RCA-VICTOR CO., INC.

POWER SUPPLY PANEL PK24A1



Schematic Wiring Diagram

POWER SUPPLY PANEL

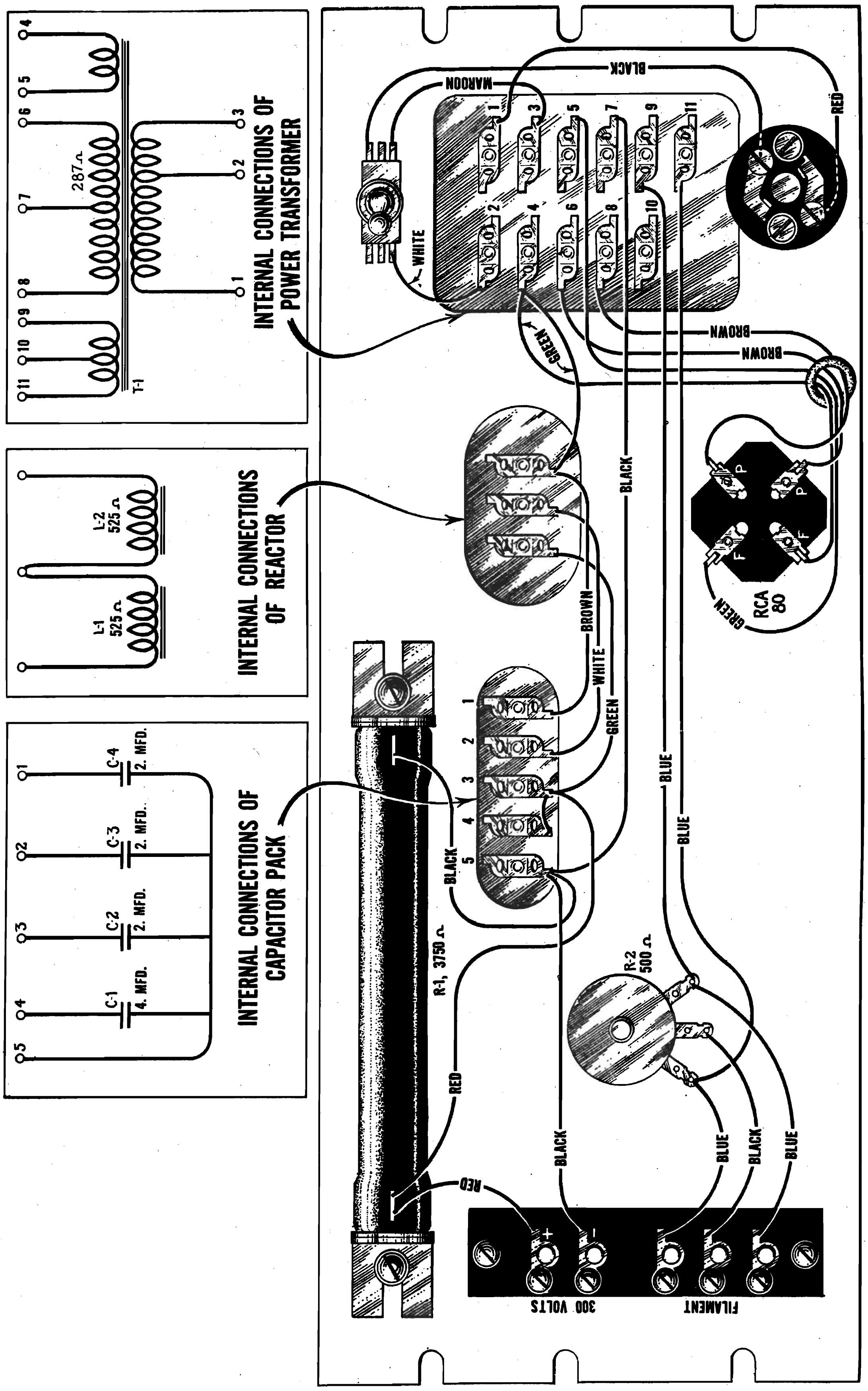
The power supply panel PK24A1 is employed as a power source for the filament and plate voltage required in the PA90A1 pre-amplifier unit, when more than one pre-amplifier is used in connection with the voltage amplifier PB23H1. This power supply panel will furnish sufficient power to operate eight pre-amplifiers.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
21630	Switch—Single pole, double throw toggle type switch—Line voltage selector switch	$2.00	27328	Capacitor pack—Comprising three 2.0 mfd. and one 4.0 mfd. capacitors in metal container complete with four mounting screws, four lockwashers and four nuts (CP-31)	$24.00
22178	Connector—Two contact male connector	.26	27519	Board—Terminal board complete with five terminals, two spacers, two screws, two lockwashers and two nuts	4.35
25065	Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers and four nuts (RT-77)	25.00	27520	Shield—Perforated metal shield complete with two mounting screws and two lockwashers	3.55
25536	Socket—UX type Radiotron socket complete with insulator	.35	27521	Transformer—110 volt, 60 cycle power transformer complete with four mounting screws, four lockwashers and four nuts (XT-1071)	37.50
25603	Resistor—3,750 ohm porcelain type bleeder resistor	4.25			
25604	Potentiometer—500 ohm potentiometer complete with nut, centering and insulating washers	1.80			

MODEL PK 23 A1 Amp
Chassis wiring

RCA-VICTOR CO., INC.



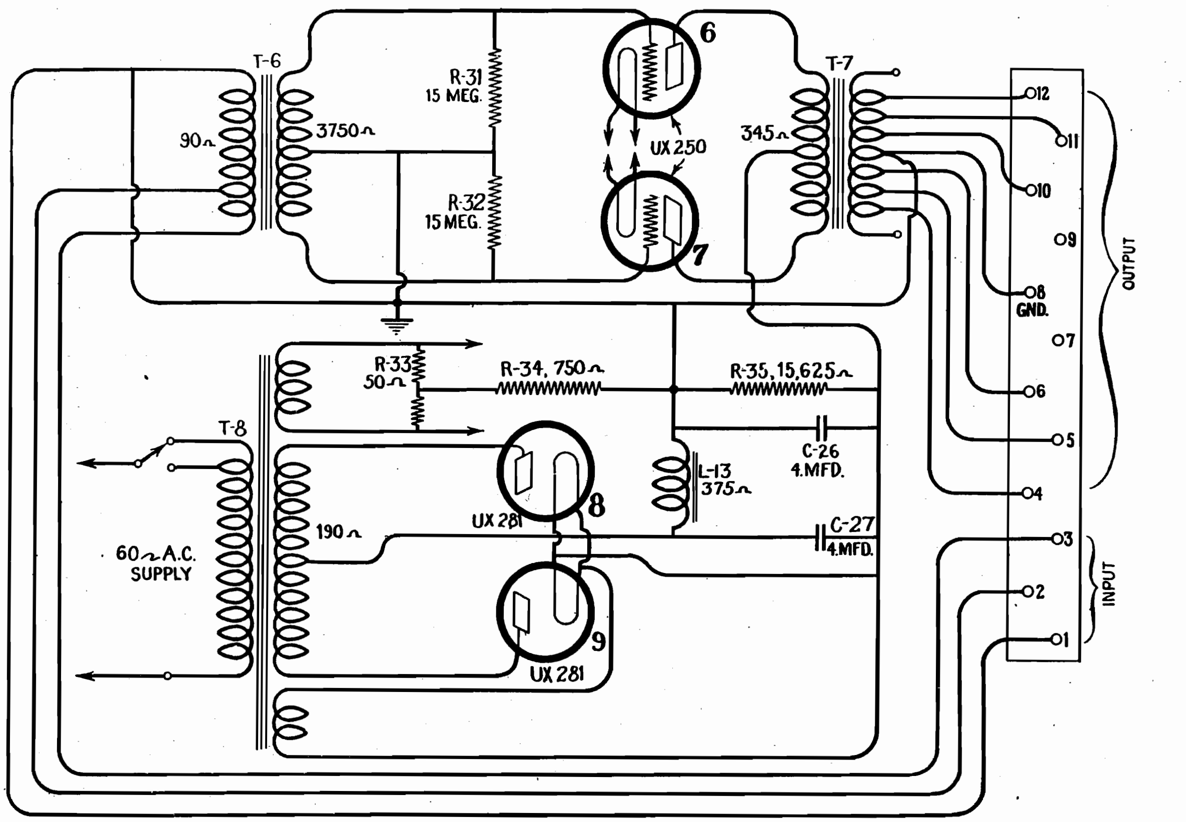
Power Supply Panel Wiring Diagram (PK24A1)

RCA-VICTOR CO., INC.

MODEL PB 24 C2 Amp
Schematic,Voltage
Parts List

POWER AMPLIFIER PB24C2

(10 Watt)



Schematic Wiring Diagram

TRANSFORMER IMPEDANCES

INPUT TRANSFORMER

From Terminal No.	To Terminal No.	Work from Impedance in Ohms
1	2	500 Ohms
1	3	1000 Ohms

OUTPUT TRANSFORMER

From Terminal No.	To Terminal No.	Work into Impedance in Ohms
6	10	10 Ohms
6	11	23 Ohms
5	11	40 Ohms
4	12	120 Ohms

IMPEDANCES

If an output impedance to work into 480 ohms is desired, connect terminals No. 4 and No. 12 on the output transformer to terminals No. 9 and No. 7 on the terminal board respectively

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line

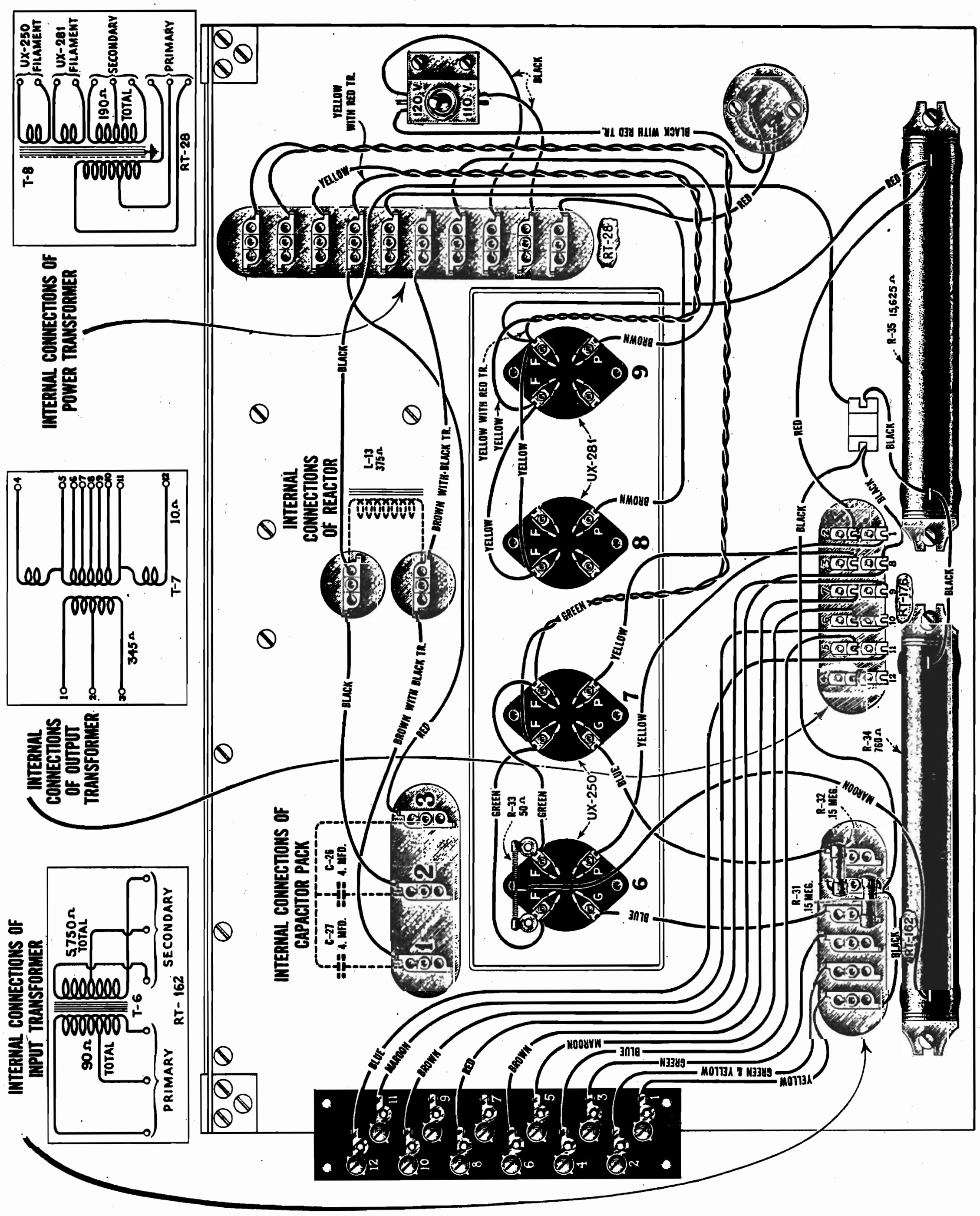
Radiotron	Control Grid Volts	Plate Volts	Plate Current M. A.	Filament Volts
UX-250	80	450	55	7.5
UX-250	80	450	55	7.5

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
21289	Resistor—750 ohm porcelain type resistor—Grid bias resistor	$2.80
21290	Resistor—15,625 ohm porcelain type resistor—Bleeder resistor	2.80
21630	Switch—Single pole, double throw toggle type switch—Line voltage regulator switch	2.00
22178	Connector—Two contact male connector	.26
22194	Resistor—50 ohm wire wound center tapped resistor	.30
22198	Resistor—150,000 ohm carbon type resistor	.50
22932	Socket—UX type Radiotron socket complete with two mounting screws, two lockwashers and two nuts	.60
24279	Reactor—Filter reactor complete with four mounting screws; four lockwashers, and four nuts (RT-20)	23.55
25379	Transformer—Input transformer complete with four mounting screws, four lockwashers and four nuts (RT-162)	$35.00
27302	Transformer—Power transformer (110 volt, 50–60 cycle) complete with six mounting screws, six lockwashers and six nuts (RT-28)	35.00
27303	Capacitor pack—Comprising two 4.0 mfd. capacitors in metal container complete with six mounting screws, six lockwashers and six nuts (CP-32)	35.00
27501	Transformer—Output transformer complete with four mounting screws, four lockwashers and four nuts (RT-176)	34.45

MODEL PB 24 C2 Amp
Chassis wiring

RCA-VICTOR CO., INC.



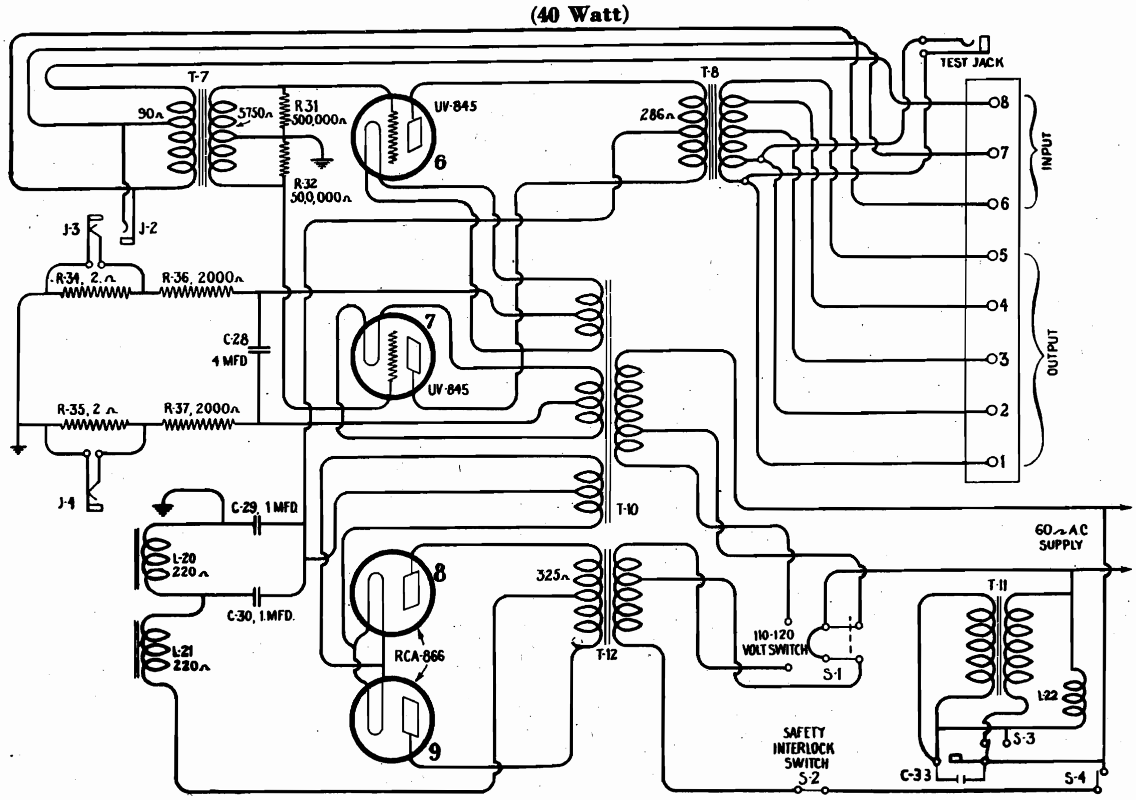
Power Amplifier Panel Wiring Diagram (PB24C2)

MODEL PB 45 A1 Amp
Parts List, Data

RCA-VICTOR CO., INC.

POWER AMPLIFIER PB45A1

(40 Watt)



Schematic Wiring Diagram

TRANSFORMER IMPEDANCES

INPUT TRANSFORMER

From Terminal No.	To Terminal No.	Work from Impedance in Ohms
6	7	500
6	8	1000

OUTPUT TRANSFORMER

From Terminal No.	To Terminal No.	Work into Impedance in Ohms
1	5	30
1	4	15
1	3	10
1	2	3

RADIOTRONS UV-845

To measure the plate current of the Radiotrons UV-845 a low range voltmeter or a millivoltmeter is required. The meter should be connected to a Yaxley No. 75 phone plug or a similar plug and the plug inserted into the plate current metering jacks on the base of the power amplifier. The normal plate current is between 60 and 75 milliamperes. Filament voltage is 10 volts.

Two millivolts read on the test meter equals one milliampere of plate current.

RADIOTRONS UX-866

During shipment the mercury in the Radiotrons RCA-866 may spatter on the filament and plate, and therefore, when this type of tube is first placed in operation, the filament should be heated for fifteen minutes with no plate voltage applied to the tube in order to properly distribute the mercury. Heating the filament may be accomplished by removing the perforated cover from the power amplifier, which automatically opens the plate circuit of the rectifier tubes.

TIME DELAY RELAY

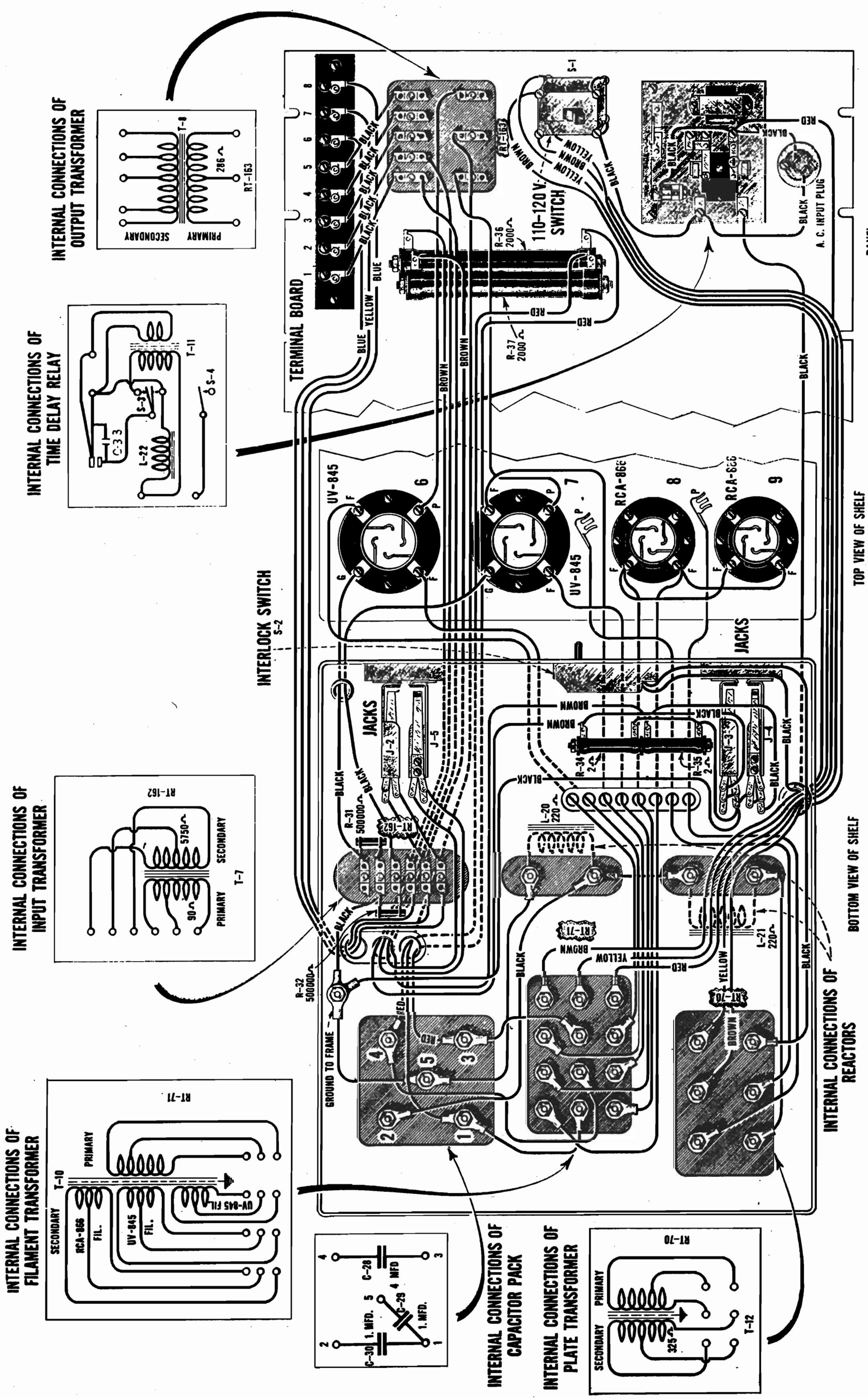
The time delay relay in the power amplifier panel should be adjusted to close in approximately 25 to 30 seconds. To increase the time delay action, the distance should be increased between the time delay contacts. To reduce the time delay action this distance should be decreased.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
20058	Screws—One set of two special thumb screws for fastening perforated covers	$0.60
22178	Connector—Two contact male connector	.26
22195	Resistor—0.5 megohm carbon type resistor—½ watt—Connected across secondaries of input transformer	.50
22613	Jack—Plate current metering jack	1.65
22616	Jack—Power amplifier input or output monitoring jack	1.50
22620	Switch—Interlock switch for power amplifier	5.00
24475	Socket—Porcelain base socket for UV-845 Radiotrons	7.00
25075	Socket—Porcelain base socket for UX-866 Radiotrons	6.00
25379	Transformer—Input transformer in metal container complete with four mounting screws, four lockwashers and four nuts (RT-162)	35.00
25380	Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers and four nuts (RT-164)	35.00
25390	Resistor—Double porcelain resistor assembly—Each resistor 2,000 ohms	7.50
25391	Resistor—2 ohm porcelain type resistor	1.95
25392	Switch—Double pole, double throw, tumbler switch—110–120 volt line switch	$3.00
25393	Board—Terminal board engraved "Output, Input" complete with eight terminals, two mounting screws, two lockwashers, two washers and two spacers	4.25
27397	Transformer—Filament transformer in metal container complete with four mounting screws, four lockwashers and four nuts (RT-71)	85.00
27398	Transformer—Plate transformer in metal container complete with six mounting screws, six lockwashers and six nuts (RT-70)	85.00
27460	Transformer—Output transformer in metal container complete with four mounting screws, four lockwashers and four nuts (RT-163)	35.00
27461	Relay—Time delay relay	23.00
27462	Capacitor pack—Capacitor pack comprising two 1.0 mfd. and one 4.0 mfd. capacitors in metal container complete with six mounting screws, six lockwashers and six nuts (CX-29)	24.75

MODEL PB 45 A1 Amp
Chassis wiring

RCA-VICTOR CO., INC.

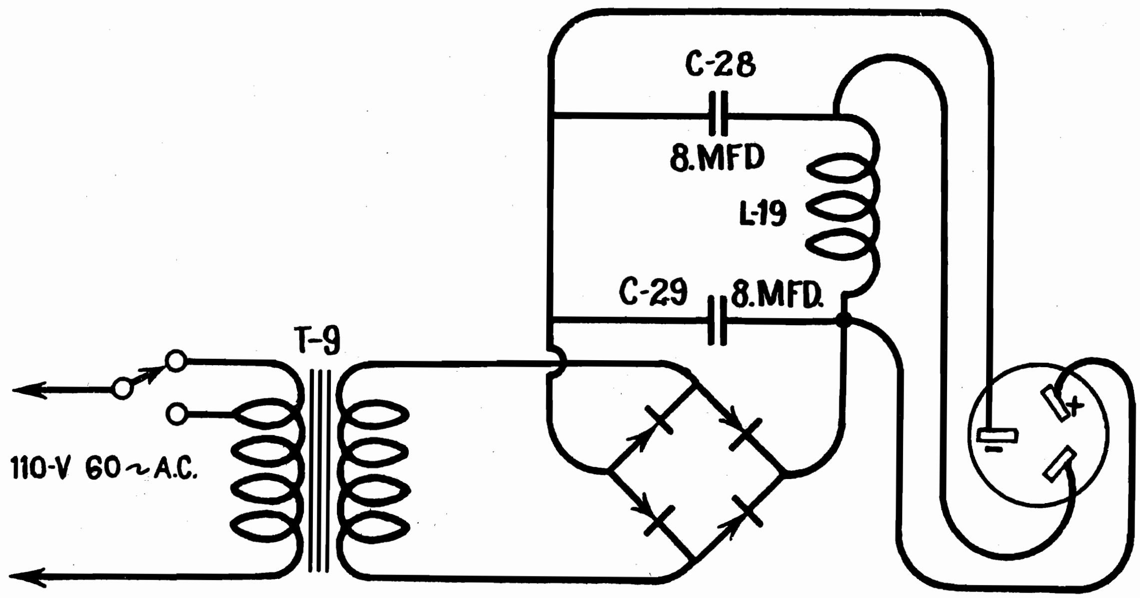


Power Amplifier Panel Wiring Diagram (PB45A1)

RCA-VICTOR CO., INC.

MODEL PK 15 B1
Speaker Field Supply
Schematic, Part List

LOUDSPEAKER FIELD SUPPLY PANEL PK15B1



Schematic Wiring Diagram

LOUDSPEAKER FIELD SUPPLY

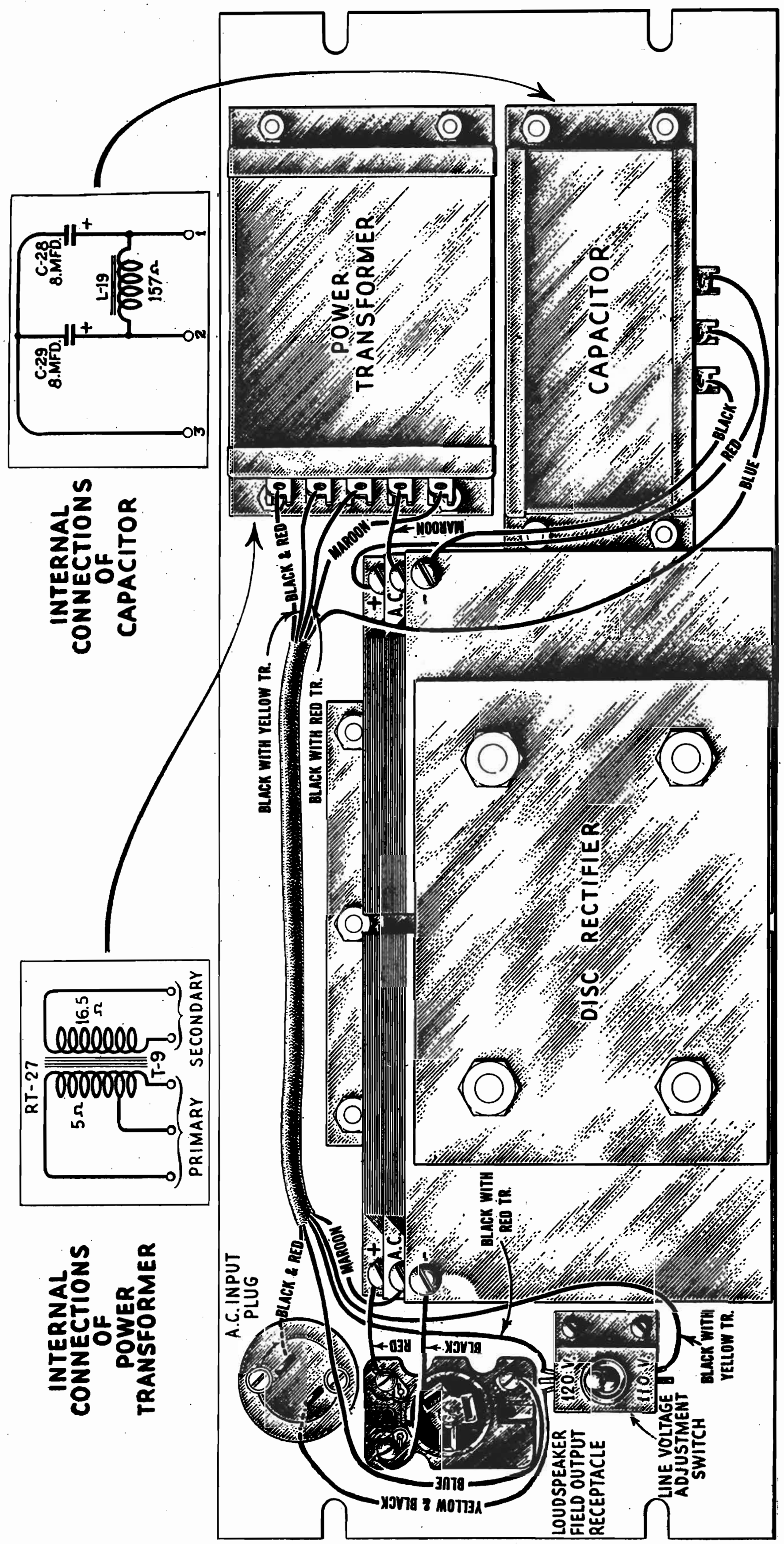
The Model PK15B1 loudspeaker field supply panel will furnish field current for five dynamic loudspeakers, each consuming 100 M. A. This unit consists of a power transformer and a dry disc rectifier for converting the A. C. to D. C. Plug type connectors are provided on the panel for making connections to the A. C. supply source and to the speaker lines.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
21630	Switch—Single pole, double throw toggle type switch—Line voltage regulator switch	$2.00	27304	Rectifier—Rectifier stack complete—Comprising four rectox units, mounting bracket, six mounting screws, six lockwashers and six nuts	$50.00
22178	Connector—Two contact male connector	.26			
24559	Receptacle—Three contact female receptacle	1.70			
24735	Transformer—Power transformer complete with four mounting screws, four lockwashers and four nuts (RT-27)	21.00	27507	Capacitor pack—Comprising two 8.0 mfd. capacitors and one filter reactor in metal container (CX-68)	19.30

MODEL PK 15 B1
Speaker Field Supply
Assembly wiring

RCA-VICTOR CO., INC.

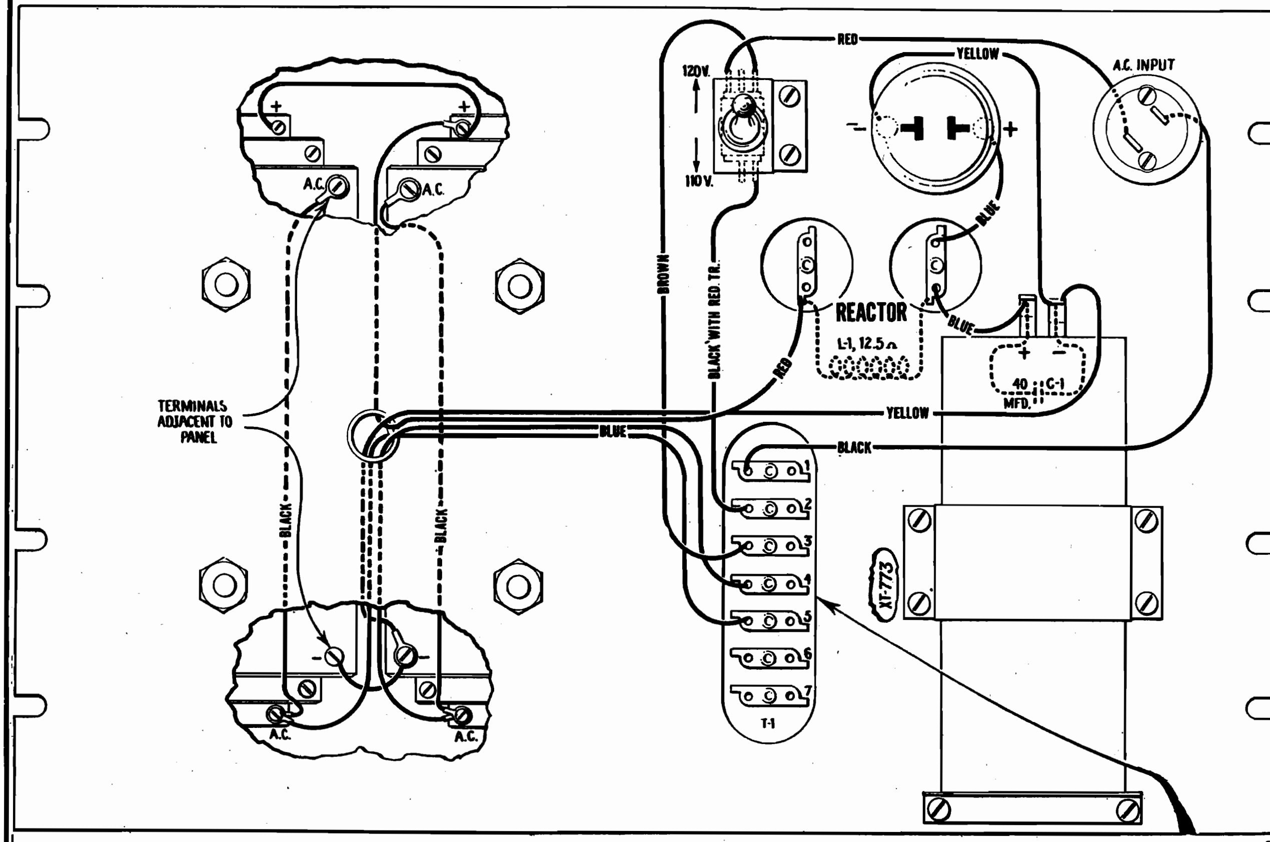


Loudspeaker Field Supply Panel Wiring Diagram (PK15B1)

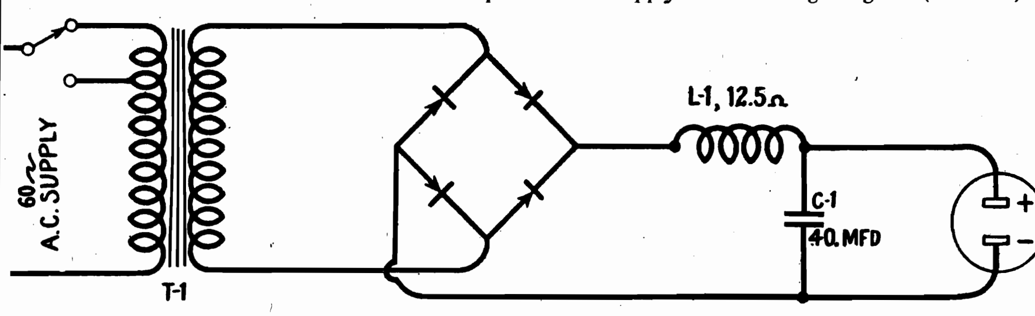
RCA-VICTOR CO., INC.

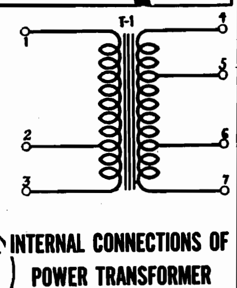
MODEL PK 21 A1
Speaker Field Supply
Panel wiring, Schematic

LOUDSPEAKER FIELD SUPPLY PANEL PK21A1



Loudspeaker Field Supply Panel Wiring Diagram (PK21A1)





Schematic Wiring Diagram

LOUDSPEAKER FIELD SUPPLY

The Model PK21A1 loudspeaker field supply panel will furnish field current for eight dynamic loudspeakers, each consuming 100 M. A. This unit consists of a power transformer and a dry disc rectifier for converting the A. C. to D. C. Plug type connectors are provided on the panel for making connections to the A. C. supply source and to the speaker lines.

REPLACEMENT PARTS

Stock No	DESCRIPTION	List Price	Stock No	DESCRIPTION	List Price
21630	Switch—Single pole, double throw, toggle type switch	$2.00	27523	Transformer—Power transformer complete with six mounting screws, six lockwashers and six nuts (XT-773)	$24.00
22178	Connector—Two contact male connector	.26	27524	Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers and four nuts (XT-774)	10.20
22206	Receptacle—Two contact female receptacle—Porcelain base	.60	27525	Capacitor—40 mfd filter capacitor complete with four mounting screws and four lockwashers (CX-53)	9.30
27522	Rectox—Copper oxide rectox unit	9.40			

MODEL PG 62
Assembly wiring

RCA-VICTOR CO., INC.

Voltage Rating..............105–125 Volts A. C.
Frequency Rating..............50–60 Cycles
Power Consumption..............110 Watts
Wattage Dissipation in Loudspeaker Fields . . 9 Watts
Overall Gain..............95 db.
Maximum Undistorted Audio Output.....20 Watts

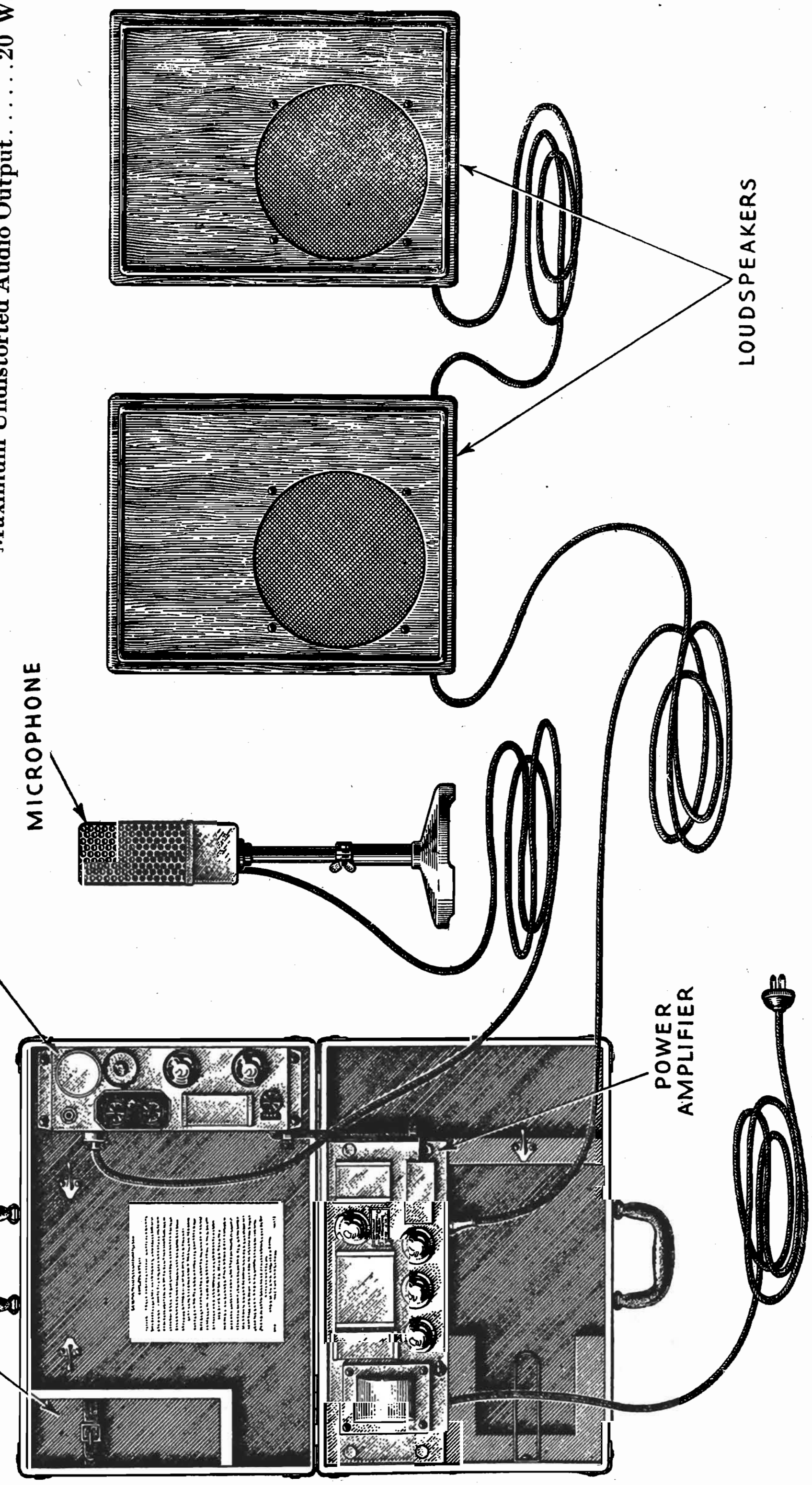


Figure 1—View of PG-62 Equipment set up for operation

RCA-VICTOR CO., INC.

MODEL PG 62
Chassis views

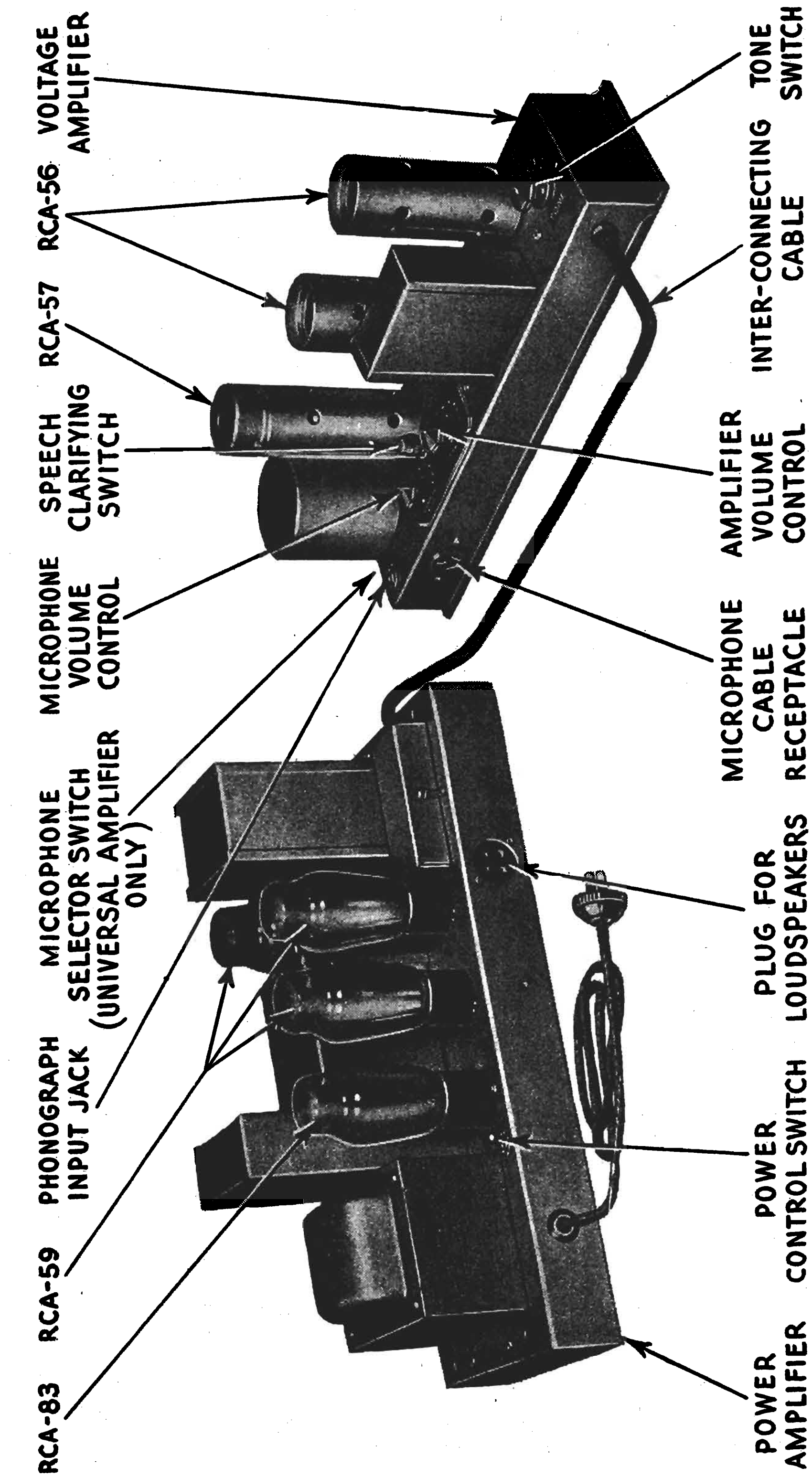


Figure 2—View of Voltage and Power Amplifiers Showing Parts

MODEL PG 62
Notes

RCA-VICTOR CO., INC.

The RCA Victor Portable Public Address System, Type PG-62 is a complete amplifying system consisting of an amplifier, a microphone, and two loudspeakers. It is designed for use as a sound reinforcing system in auditoriums, theatres and churches or for outdoor gatherings. The equipment is entirely A. C. operated, power for its operation being obtained from any 50 or 60 cycle, 110 volt house lighting receptacle. The maximum undistorted power output of this equipment is 20 watts which is sufficient to meet the average requirements of sound reinforcement in auditoriums with a capacity up to 2,500 seats.

The amplifier consists of two units; the voltage and power amplifier units both mounted in a carrying case. The loudspeakers, two of which are supplied with the equipment, are each mounted in a wooden housing. A special carrying case is provided for the loudspeakers when they are to be transported.

A velocity type microphone, the latest type developed by the RCA Victor engineers, is also furnished as a standard part of the equipment. Provision is made for placing microphone and stand together with the microphone interconnecting cables in the amplifier carrying case when the equipment is to be transported. Figure 1 shows the equipment set up for operation.

All the controls except the power control switch are mounted on the voltage amplifier base and are easily accessible to the operator. The controls consist of the power control switch mounted on the power amplifier base, the microphone volume control, amplifier volume control, the speech clarifying switch and the tone switch. Figure 2 shows the location of the various controls.

Facilities are provided for operating the equipment with a phonograph turntable. If it is desired, phonograph music may be played as a background for the microphone pick-up, the volume of each being controlled independently of each other. In the Universal Amplifier Assembly a microphone selector switch is mounted on the voltage amplifier to permit the use of a carbon type microphone with the equipment.

MODEL PG62B1 EQUIPMENT

Amplifier (Model PA97A1)

Model	*Amplifier*	*Number of Stages*
PB88A1	Voltage	3
PB89A1	Power	2

Loudspeakers

Model	*Field Resistance*
PL71A1	1,350 Ohms
PL71B1	1,950 Ohms

Microphone

Model	*Type*
PB90A1	Velocity

UNIVERSAL AMPLIFIER ASSEMBLY

Voltage Amplifier

Model	*Number of Stages*
PB88A2	3

Power Amplifier

Model	*Number of Stages*
PB89B1	2

PART I—SETTING UP THE EQUIPMENT

(1) TYPE PG-62 EQUIPMENT

The equipment is set up for operation in the following manner:

1. Open the amplifier carrying case and lay the two halves on the floor or a table so that the Radiotrons will be in an upright position. Remove the microphone and microphone stand and support.

2. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instrument unless all Radiotrons are in place. See Figure 2.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That all shields are rigidly in place over all the tubes in the voltage amplifier and the cap is on the shield over the Radiotron RCA-57.

3. Open the loudspeaker carrying case and remove the two loudspeakers. Place the loudspeakers in a position so that the loudspeaker grilles face in the direction in which the sound beams are desired. Interconnect the two loudspeakers with the cable and plug provided. Connect the loudspeakers to the amplifier by means of the four-pole plug provided on the other loudspeaker cord.

4. Assemble the microphone and the microphone stand and support. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the voltage amplifier.

5. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle. The equipment is now ready for operation.

FUSE: A small cartridge type fuse is located on the end of the power amplifier base. Should it open and the equipment fail to function, replace the Rectifier Tube, RCA-83, and replace the fuse. A deposit of mercury between the elements may have caused the short that burnt out the fuse.

(2) UNIVERSAL AMPLIFIER

Before the equipment may be set up for operation, certain accessories must be obtained. They are as follows:

1. Microphone, such as the Type PB-90.
2. Microphone stand, such as the table stand, Type PB-96 or the floor stand, Type AZ-4090.
3. One, two, or four loudspeakers having a voice coil impedance of 7½ ohms or 15 ohms each. Each loudspeaker should have its own source of supply for field current. The dry disc rectifier type or the vacuum tube rectifier type is suitable for this purpose.
4. A two conductor loudspeaker cable.

The equipment is set up for operation in the following manner:

1. Insert the Radiotrons in the sockets as shown in Figure 2.
2. Place both the voltage and power amplifiers on a table or on the floor so that the Radiotrons will be in an upright position. Check and make certain:
   - (a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instruments unless all Radiotrons are in place. Figure 2 shows the proper Radiotron locations.
   - (b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.
   - (c) That all shields are rigidly in place over all the tubes in the voltage amplifier and the cap is on the shield over the Radiotron RCA-57.
3. Connect the voltage and power amplifiers together by means of the interconnecting cable as shown in Figure 10.
4. Make connections between the loudspeakers and the four pole loudspeaker plug, furnished with the amplifier, as indicated in Figure 3. Insert the loudspeaker plug into the corresponding receptacle on the side of the power amplifier base.

NOTE: If a loudspeaker having a voice coil of 7½ ohms impedance is used, the link between the output transformer and the loudspeaker receptacle should remain connected between terminals 1 and 2, as indicated in Figure 10. If the voice coil impedance is 15 ohms, shift the link so that it connects terminals 2 and 3 on the link terminal board.

5. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the voltage amplifier.
6. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle. The equipment is now ready for operation.

FUSE: A small cartridge type fuse is located on the end of the power amplifier base. Should it open and the equipment fail to function, replace the rectifier tube, RCA-83, and replace the fuse. A deposit of mercury between the elements may have caused the short that burnt out the fuse.

PART II—OPERATION

After the equipment has been properly located and connected, it may be operated in the following manner. (Refer to Figure 2.) This operating procedure applies to both the PG-62 equipment and the Universal Amplifier.

1. Apply power by turning the power control switch "on," located on the base of the power amplifier.

MODEL PG 62
Loudspeaker wiring

RCA-VICTOR CO., INC.

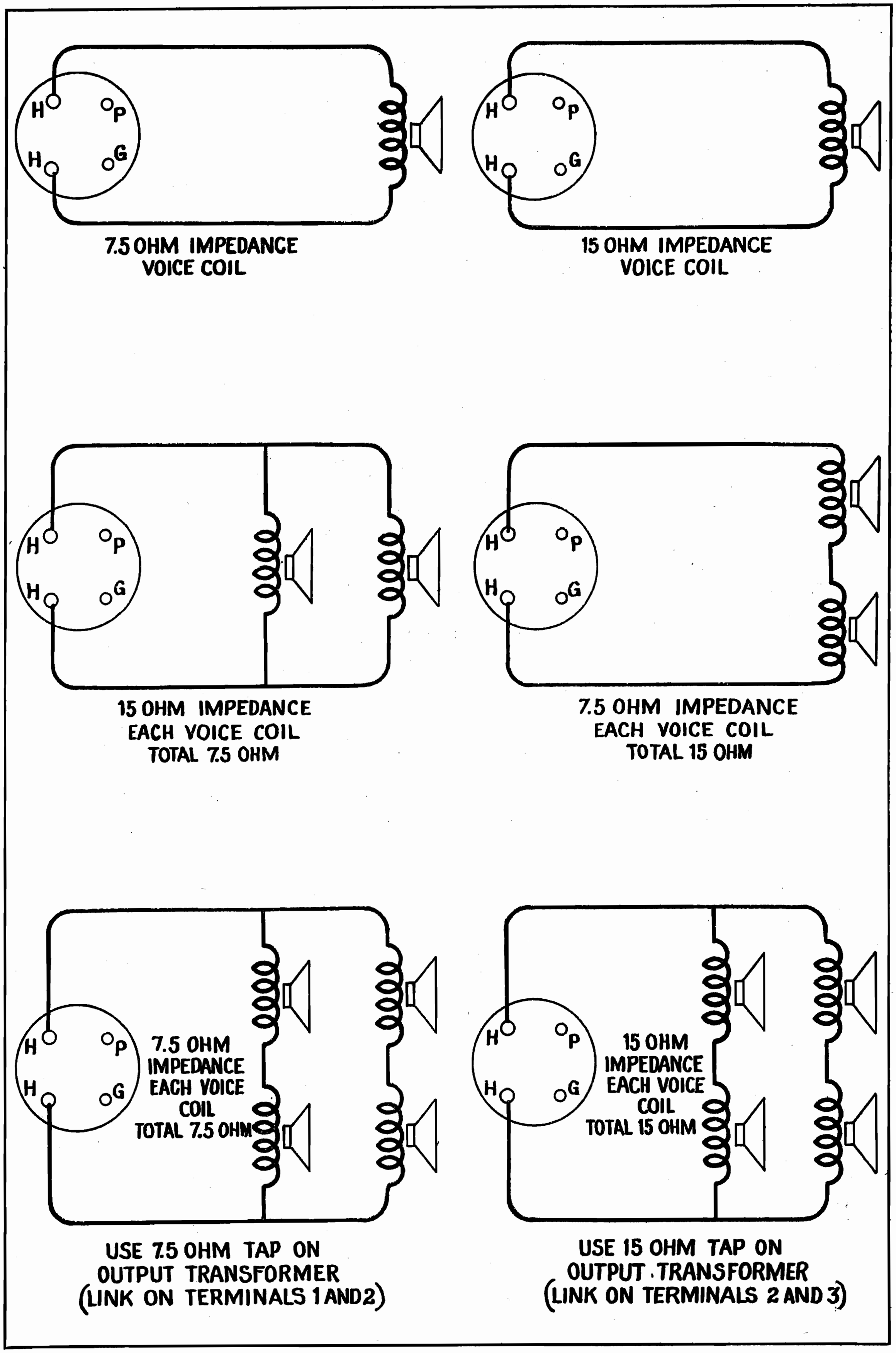


Figure 3—Loudspeaker Wiring

2. The microphone should be located adjacent to the person talking and to one side of the loudspeaker. It should preferably not be located either directly in front or at the rear of the loudspeaker as acoustic feedback will result. Turning the microphone, with both volume controls at maximum, until the position where the least sound is produced in the loudspeakers due to feedback, will allow best operation.

NOTE: The Universal Amplifier Assembly is equipped with a microphone selector switch located on one end of the voltage amplifier. Set this switch in the "Velocity" position when a Velocity Type Microphone is used. When a carbon type microphone is used, set the switch at the "Carbon" position.

Set the Microphone Volume Control, located on the voltage amplifier, at its mid-position. Talk into the microphone at a distance of ten to twenty inches and gradually rotate the Amplifier Volume Control until the desired volume is obtained from the loudspeakers.

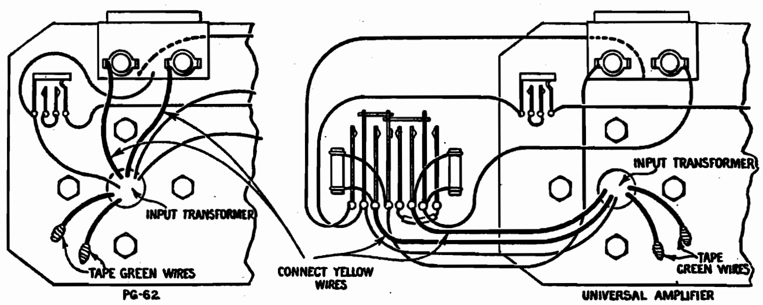


Figure 4—Wiring changes for two microphone operation

3. If voice only is to be picked up by the microphone, set the speech clarifying switch in the "speech" position. For musical pickup, the "music" position will give better reproduction. In either case, the "tone" dial, located on the base of the voltage amplifier, should be adjusted for most pleasing reproduction.

PART III—SPECIAL OPERATION

In some instances, it may be desirable or necessary to use two velocity microphones or more than one power amplifier operated from one voltage amplifier. The following sections cover these special uses of the equipment.

(1) TWO MICROPHONE OPERATION

In general, the use of more than one velocity microphone with either the PG-62 Equipment or Universal Amplifier is not recommended. This would presume a microphone mixer which is undesirable as the overall gain is insufficient to overcome the attenuation in the mixer.

If it is necessary to use two microphones (not more than two) and keep both in the circuit at the same time, using no fading or mixing arrangement, other than the volume controls on the voltage amplifier, the connections and changes in the amplifier wiring are as follows:

PG-62 Equipment

(a) Disconnect and tape the two green leads between the microphone receptacle on the voltage amplifier and input transformer.

(b) Connect the two yellow transformer leads (500 ohms) to the microphone receptacle. See Figure 4.

(c) Connect the two microphones in series to the microphone plug as shown in Figure 5.

Universal Amplifier

(a) Disconnect and tape the two green leads between the microphone selector switch on the voltage amplifier and the input transformer.

(b) Connect the two yellow transformer leads (500 ohms) to the microphone selector switch at the points from which the two green leads were removed. See Figure 4.

(c) Connect the two microphones in series to the microphone plug as shown in Figure 5.

(2) MULTIPLE OPERATION OF POWER AMPLIFIERS

The Type PB-88 Voltage Amplifier may be used to operate as many as three Type PB-89 Power Amplifiers. The requirements for such operation are as follows:

(a) In each power amplifier, remove the resistor R-18 (50,000 ohms) and replace with a 100,000 ohm, one-watt resistor, Catalog No. 3058.

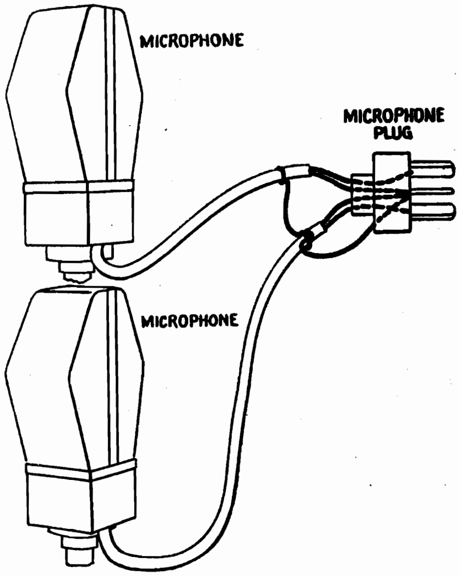


Figure 5—Two microphones wired to one plug

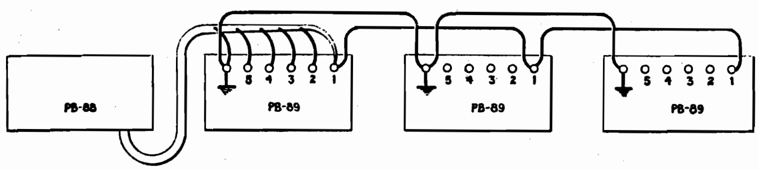


Figure 6—Multiple Operation of Power Amplifier

(b) Connect the power amplifiers to the voltage amplifier as shown in Figure 6.

(c) If the Model PB89A1 power amplifiers are used, connect a set of loudspeakers to each power amplifier as shown in Figure 8. If the Model PB89B1 power amplifiers are used, connect a set of loudspeakers to each power amplifier as shown in Figure 3.

(d) Each power amplifier must be connected to a source of A. C. 110 volt, 60 cycle power.

PART IV—SERVICE DATA ON AMPLIFIER EQUIPMENT

(1) ELECTRICAL DESCRIPTION OF CIRCUIT

The velocity microphone is coupled to the first stage of the voltage amplifier (RCA-57) by means of an input transformer located on the amplifier base. The link circuit between the microphone transformer and the input transformer is of 250 ohms impedance. A potentiometer is provided in the grid circuit of the RCA-57 to vary the input voltage applied to the grid.

The RCA-57 is resistance coupled to the RCA-56 in the second stage. Another potentiometer is provided in the grid circuit of this RCA-56 to control the output volume of the entire equipment. The RCA-56 is in turn resistance coupled to the RCA-56 in the third stage of the voltage amplifier. The last stage of the voltage amplifier is coupled to the single RCA-59 which is the driver for two Radiotrons RCA-59 in the Class "B" output stage. The output stage supplies power to two loudspeakers through a step-down transformer. This transformer has an output impedance of 15 ohms with a tap at 7½ ohms.

RCA-VICTOR CO., INC.

MODEL PG 62
Schematic

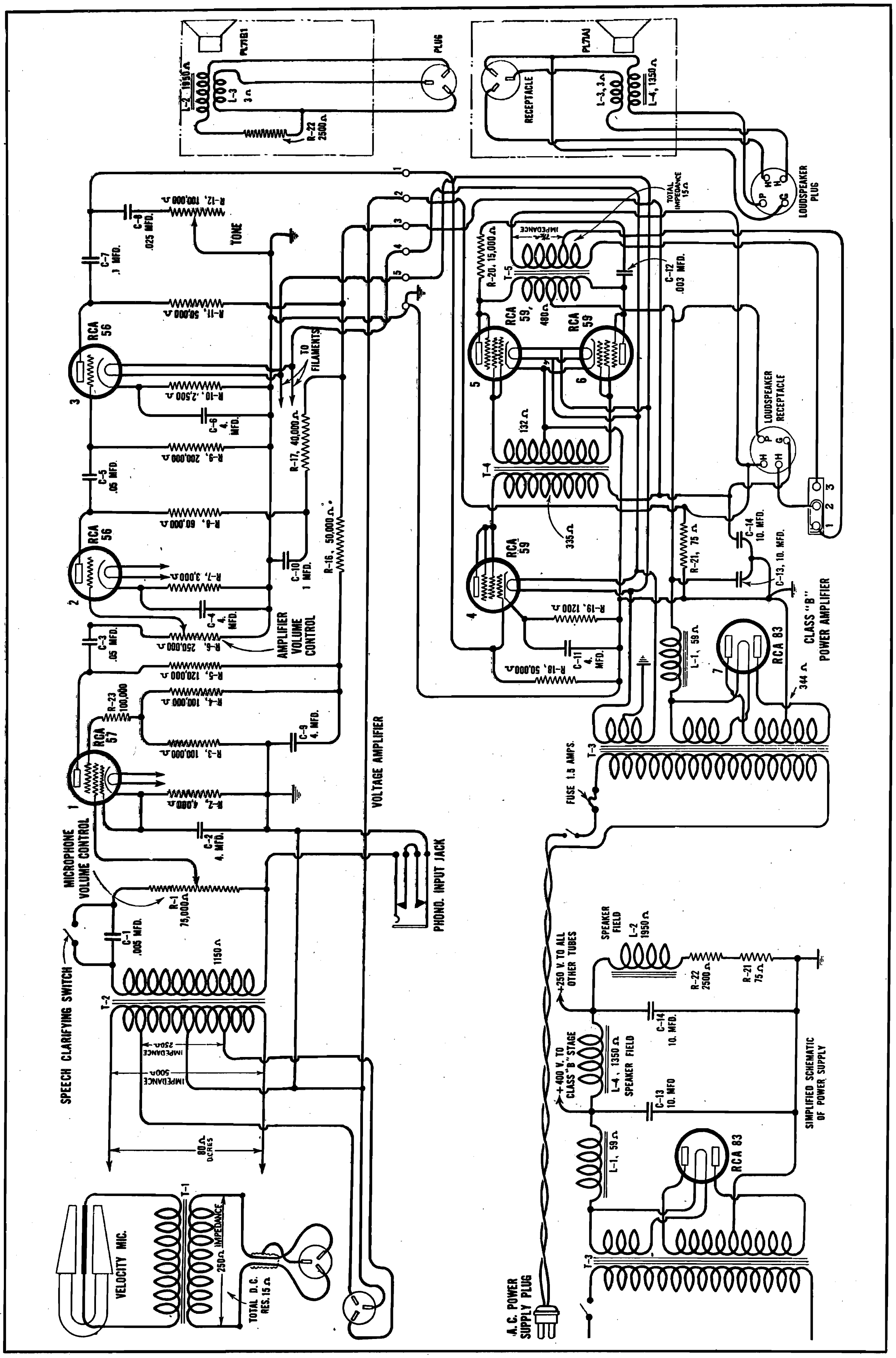


Figure 7—Schematic Circuit Diagram—PG-62 Equipment

MODEL PG 62
Chassis wiring

RCA-VICTOR CO., INC.

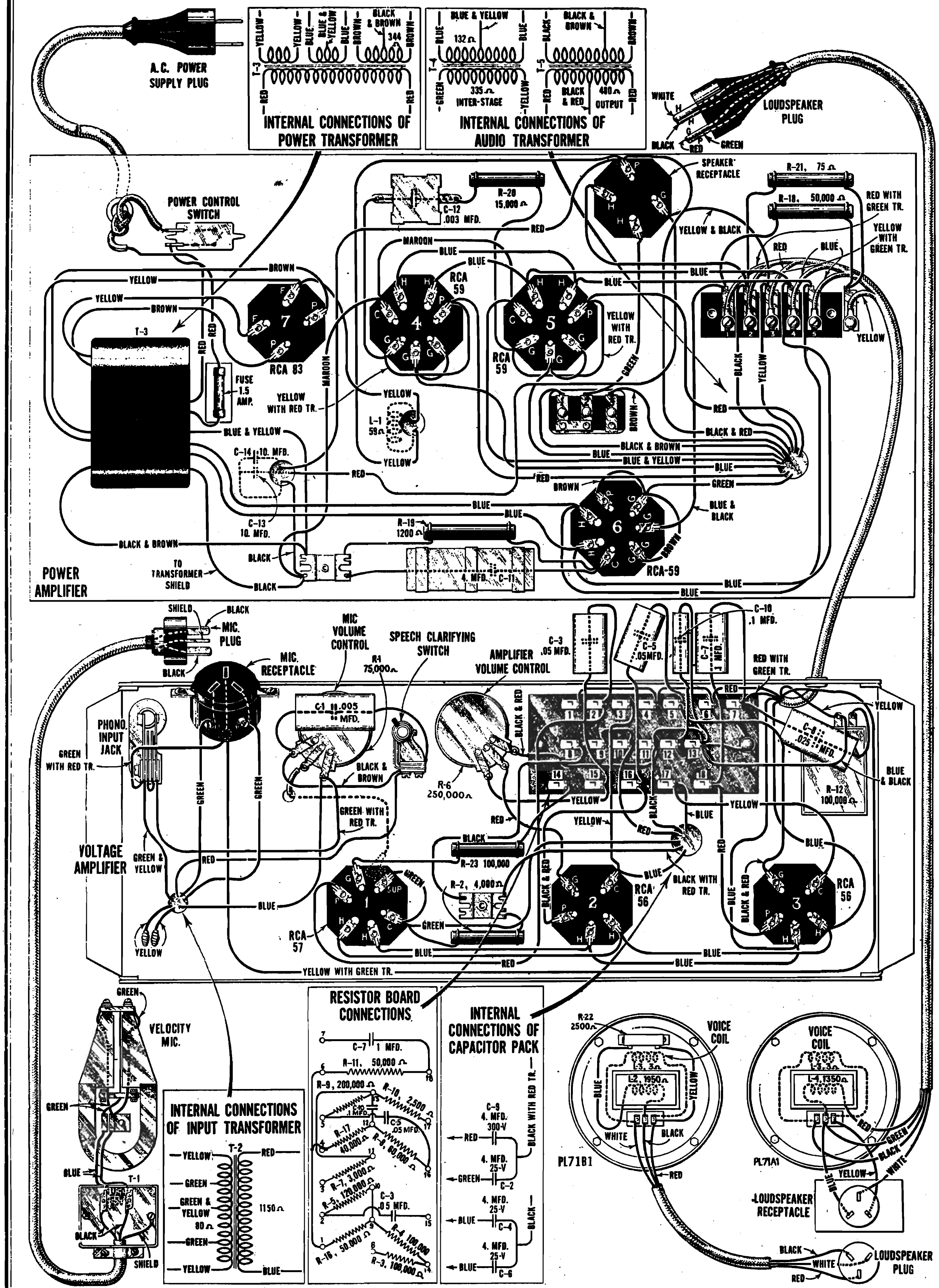


Figure 8—Wiring Diagram—PG-62 Equipment

RCA-VICTOR CO., INC.

MODEL PG 62
Universal Amplifier
Schematic

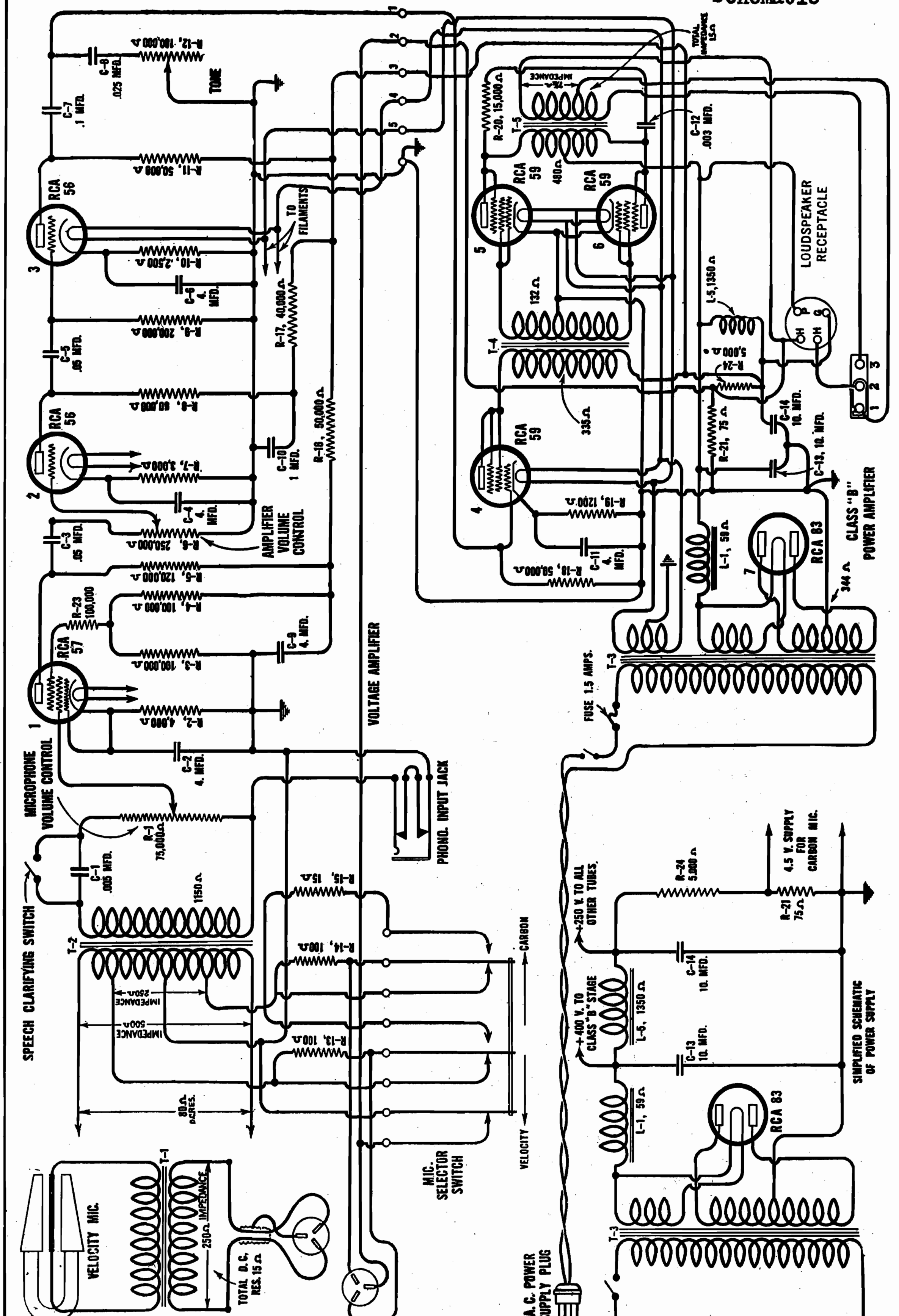


Figure 9—Schematic Circuit Diagram—Universal Amplifier

MODEL PG 62
Universal Amplifier
Chassis wiring

RCA-VICTOR CO., INC.

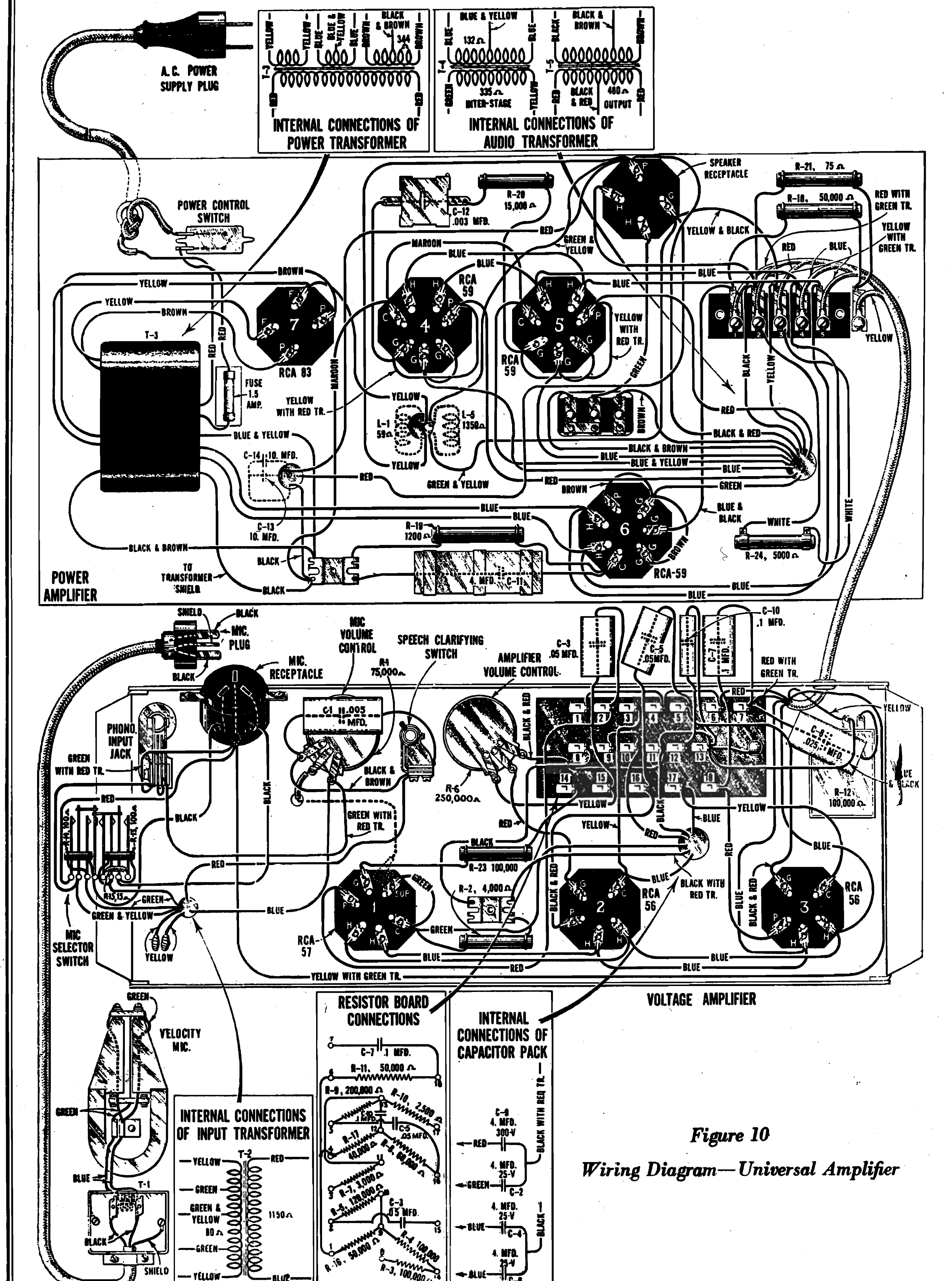


Figure 10

Wiring Diagram—Universal Amplifier

RCA-VICTOR CO., INC.

MODEL PG 62
Voltage, Notes
Phasing speakers

The power supply for both the voltage and power amplifiers is obtained from the RCA-83 and a filter system located on the power amplifier base. The field coil of one loudspeaker in the PG-62 Equipment is used as a filter reactor in the power supply system in the power amplifier. In the Universal Amplifier an additional reactor is used in the filter circuit in place of the loudspeaker field mentioned above.

(2) CARBON MICROPHONE CONNECTIONS (Universal Amplifier Only)

The Universal Amplifier Equipment is designed so that it will operate with a double button carbon microphone of 250 ohms impedance. A three-pole plug, similar to that employed with the velocity microphone, should be used. Each button on the microphone should be connected to each of the symmetrical poles on the plug. The remaining pole on the plug should be used to connect to the mid-point of the microphone. When using the carbon microphone, the microphone selector switch should be placed at the "Carbon" position.

(3) PHONOGRAPH CONNECTIONS

An input jack is provided in the grid circuit of the RCA-57 which permits the use of a phonograph turntable RCA Victor Type PT-14 or Type PT-15. The instructions for operation of the turntables are included with the phonograph equipment.

(4) WIRING

The schematic wiring diagram for the PG-62 Equipment is shown in Figure 7. The wiring diagram for the complete PG-62 Equipment is shown in Figure 8. Figures 9 and 10 show the schematic and wiring diagrams respectively for the Universal Amplifier.

(5) RADIOTRON SOCKET VOLTAGES

The Radiotron socket voltages given in the following tabulation are the actual values at which each Radiotron should operate. In circuits containing high resistance, voltages read on a set analyzer will not agree with the values in the table, due to the relatively low resistance of the meter employed. Therefore, a correction must be applied to the meter reading to obtain the correct voltage at each socket. Usually, an application of Ohms Law will give an approximate value of the voltages at which each Radiotron is operating, assuming that the resistance of the meter is known.

RADIOTRON SOCKET VOLTAGES

115 VOLT A. C. LINE—NO INPUT SIGNAL VOLTAGE

Radiotron No.	Control Grid to Cathode or Filament Volts	Screen Grid to Cathode or Filament Volts	Plate to Cathode or Filament Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-57	1.0	80	145	.25	2,5
2. RCA-56	3.5	—	120	1.2	2.5
3. RCA-56	4.0	—	165	1.6	2.5
4. RCA-59	2.8	—	242	23.0	2.5
5. RCA-59	0	—	390	13.0	2.5
6. RCA-59	0	—	390	13.0	2.5

CAUTION: Whenever the Radiotron RCA-83 rectifier is removed from or installed in its socket, the A. C. power control switch should be in the "off" position.

(6) PHASING LOUDSPEAKERS (PG-62 Equipment)

If either of the loudspeaker cones are replaced, the two loudspeakers must be properly phased after the replacement work is done. That is, the motion of both cones must be in the same direction at a given instant when a signal is impressed on them. The following procedure may be used to phase the loudspeakers.

1. Place the two loudspeakers side by side and connect them together by means of the cord and plug provided.

MODEL PG 62
Replacement parts

RCA-VICTOR CO., INC.

2. Turn the equipment on so that field coils are energized. Apply 6 volts D. C. intermittently to the voice coil terminals at one loudspeaker (black lead and yellow lead on PL71A1 or white lead and red lead on PL71B1). If both cones do not move in the same direction, reverse the voice coil leads to the terminal board of one loudspeaker only.

CAUTION: The loudspeaker fields are at approximately 400 volts above ground. Therefore care must be observed in making tests on the loudspeakers.

(7) DIRECTIONAL BAFFLE LOUDSPEAKER

It is sometimes desirable to use a directional baffle type of loudspeaker with this amplifying equipment. In this case it is necessary to compensate for the difference between the response frequency characteristic of the flat baffle and the directional baffle. The compensation should consist of a .0005 MFD capacitor (Catalog No. 21648) connected in series with the .005 MFD capacitor C-1, and a 250,000 ohm resistor (Catalog No. 23114) shunted across the speech clarifying switch.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	PORTABLE AMPLIFIER ASSEMBLY MODEL PA97A1	
	POWER AMPLIFIER MODELS PB89A1 AND PB89B1	
2725	Fuse—1½ ampere cartridge fuse—Package of 5	$0.40
21581	Resistor—50,000 ohms—Carbon type—1 watt	.50
21623	Resistor—15,000 ohms—Carbon type—1 watt	.50
22451	Switch—Single pole, single throw—Toggle type	.50
22853	Plug—Four contact male connector plug (for PB89B1)	.50
23113	Resistor—1,200 ohms—Carbon type—1 watt	.65
23119	Resistor—75 ohms—Carbon type—1 watt	.50
23120	Resistor—5,000 ohms porcelain resistor	2.00
25536	Socket—Four contact Radiotron socket	.35
25626	Socket—Seven contact Radiotron socket	.45
25627	Capacitor—4.0 mfd. filter capacitor	1.00
25628	Board—Terminal board complete with five terminals	1.50
25629	Capacitor—0.003 mfd. capacitor	1.30
25630	Capacitor pack—Comprising two 10.0 mfd. capacitors in container	9.30
25631	Reactor—Filter reactor (for PB89A1)	6.15
25633	Cord—Two conductor power cord and plug	6.70
25634	Reactor—Double filter reactor (RT-200) (for PB89B1)	8.00
27526	Transformer—Power transformer (RT-189)	12.30
27527	Transformer—Audio transformer pack—Interstage and output transformers (RT-190)	15.30
	VOLTAGE AMPLIFIER MODELS PB88AZ AND PB88A2	
3294	Resistor—15 ohms—Flexible type resistor (for PB88A2)	.20
3471	Capacitor—0.025 mfd. capacitor	.32
3555	Capacitor—0.1 mfd. capacitor	.36
7487	Shield—Metal shield for Radiotrons	.25
7488	Cap—Radiotron shield cap for RCA-57 Radiotron	.20
21581	Resistor—50,000 ohms—Carbon type—1 watt	.50
21632	Cap—Control grid cap	.75
22197	Resistor—2,500 ohms—Carbon type—1 watt	.50
22451	Switch—Single pole, single throw—Toggle switch	.50
22621	Resistor—200,000 ohms—Carbon type—½ watt	.50
23004	Resistor—40,000 ohms—Carbon type—½ watt	.50
23006	Resistor—100,000 ohms—Carbon type—½ watt	.50
23007	Resistor—120,000 ohms—Carbon type—½ watt	.50
23008	Resistor—3,000 ohms—Carbon type—½ watt	.50
23011	Resistor—50,000 ohms—Carbon type—½ watt	.50
23115	Resistor—60,000 ohms—Carbon type—½ watt	$0.50
23116	Resistor—4,000 ohms—Carbon type—½ watt	.50
23117	Resistor—100 ohms—Carbon type—¼ watt	.50
25531	Socket—Five contact Radiotron socket	.35
25532	Socket—Six contact Radiotron socket	.40
25615	Transformer—Core and coil for input transformer	10.60
25617	Capacitor—0.05 mfd. capacitor	1.25
25618	Capacitor—0.005 mfd. capacitor	1.40
25619	Rheostat—100,000 ohms—Tone control rheostat	3.70
25620	Switch—Triple pole, double throw—Key type switch	2.60
25621	Receptacle—Three contact female receptacle	3.60
25622	Jack—Phonograph input jack	1.05
25623	Knob—Moulded knob and pointer	.30
25624	Cushion—One set of four rubber cushions for input transformer	3.00
25625	Cable—Six conductor braid covered interconnecting cable	5.80
25778	Potentiometer—75,000 ohms—Microphone volume control potentiometer	1.35
25779	Potentiometer—150,000 ohms—Amplifier volume control potentiometer	1.75
27529	Capacitor pack—Comprising four 4.0 mfd. capacitors in container	8.35
	VELOCITY MICROPHONE MODEL PB90A1	
25782	Guard—Front and rear guard for microphone	11.00
25783	Transformer—Microphone transformer	18.00
25784	Cable—30 foot, two conductor, rubber covered, shielded cable	7.30
25785	Plug—Two conductor male connector plug	1.75
	LOUDSPEAKER—MODEL PL71A1	
6184	Board—Terminal board complete with three terminals	.10
8969	Cone—Loudspeaker cone with voice coil	1.27
9421	Coil—Field coil—Comprising coil, cone housing and magnet	4.32
25780	Cable—30 foot, 4-conductor, rubbered covered, cable—Complete with 4-contact plug	7.30
	LOUDSPEAKER—MODEL PL71B1	
6184	Board—Terminal board complete with three terminals	.10
8969	Cone—Loudspeaker cone with voice coil	1.27
9416	Coil—Field coil comprising coil, cone housing and magnet	4.00
25781	Cable—50 foot, 3-conductor, rubber covered, cable—Complete with 3-contact plug	11.00

RCA-VICTOR CO., INC.

RCA Victor
Portable Sound Amplifier Type PG-63 and Universal Amplifier Assembly

INSTRUCTIONS FOR OPERATION AND SERVICE

ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts
Frequency Rating	50–60 Cycles
Power Consumption	55 Watts
Number and Type of Radiotrons	1 RCA-57, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 4
Number of Amplifier Stages	Three
Overall Gain	75 DB.
Type of Loudspeaker	Electro-Dynamic
Number of Loudspeakers	One
Maximum Undistorted Audio Output	6 Watts

PHYSICAL SPECIFICATIONS

(Complete Amplifier in Carrying Case)

Height	11½ Inches
Width	16⅝ Inches
Depth	7 Inches
Weight of Entire Equipment	24½ Pounds

(Universal Amplifier Assembly)

Height	9¼ Inches
Width	16 Inches
Depth	3½ Inches
Weight	13¾ Pounds

The RCA Victor Portable Sound Amplifier System, Type PG-63 is a complete self contained amplifying system consisting of a microphone, a loudspeaker and a high gain amplifier. The entire equipment is enclosed in a small portable container. The equipment is designed for use as a sound reinforcing system in small auditoriums, theatres, churches or for outdoor gatherings. It is especially suitable for store window advertising use where the loudspeaker is placed outdoors while the person speaking remains in view through a window. The equipment is entirely A. C. operated, power for its operation being obtained from any 50 or 60 cycle, 110 volt house lighting receptacle. The maximum undistorted power output of this equipment is 6 watts which is sufficient to meet the average requirements of sound reinforcement in auditoriums with a capacity up to 600 seats.

The amplifier consists of two stages of voltage amplification and one class "B" power output stage, all mounted on a single chassis. The amplifier chassis is mounted in a small carrying case, and the dynamic speaker is mounted in the cover of the carrying case. A double button carbon microphone is supplied as a standard part of the equipment. Provision is made for placing the microphone together with all interconnecting cables in the carrying case when the equipment is to be transported. The weight of the complete equipment packed in the carrying case is 24½ pounds. Figure 1 shows the equipment set up for operation.

MODEL PG 63
View

RCA-VICTOR CO., INC.

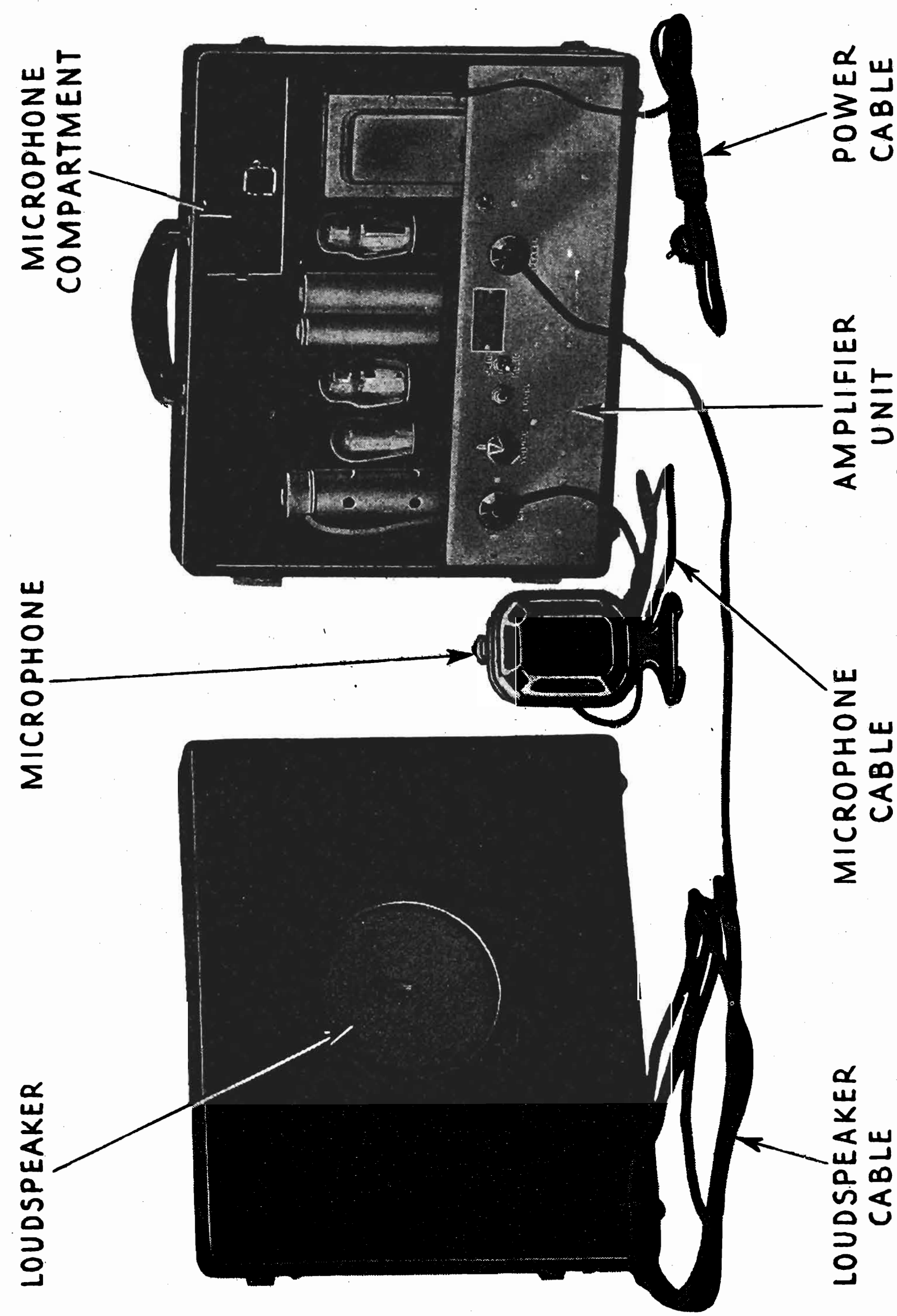


Figure 1—Type PG-63 Equipment Set Up for Operation

RCA-VICTOR CO., INC.

MODEL PG 63
Chassis view

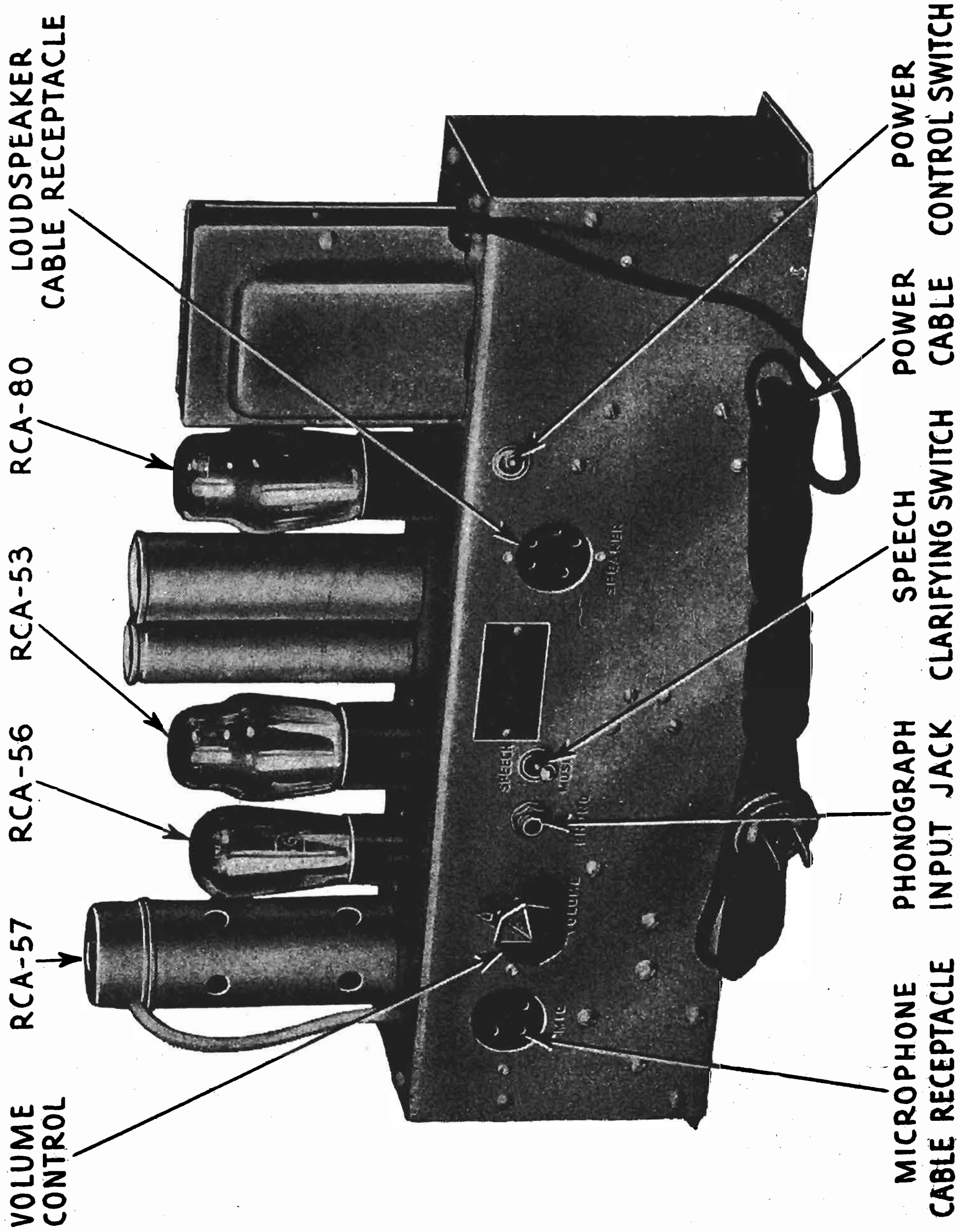


Figure 2—View of Amplifier Showing Parts

MODEL PG 63
Notes

RCA-VICTOR CO., INC.

All controls are mounted on the amplifier base and are easily accessible to the operator. The controls consist of the power control switch, speech clarifying switch and the volume control knob. Figure 2 shows the locations of these controls.

The six watt Universal Amplifier is similar to the amplifier in the PG-63 equipment with the exception that a 10,000 ohm resistor is employed as a bleeder in the power supply circuit in place of the 10,000 ohm field coil

The equipment is also adaptable for use with a phonograph turntable such as the RCA Victor Type PT-14 or PT-15. A phonograph input jack is provided on the side of the amplifier base for making suitable connections.

The following tabulation gives the model numbers of the various parts of the equipment covered in this booklet:

MICROPHONE

Model	*Type*
RP-91	Carbon

AMPLIFIER

Model	*Where Used*	*Number of Stages*
PB100A1	Type PG-63	3
PB100B1	Universal Amplifier	3

LOUDSPEAKER

Model	*Field Resistance*
RL-55	10,000 Ohms

Part I—Setting Up the Equipment

(1) TYPE PG–63

The equipment is set up for operation in the following manner:

1. Open the carrying case and separate its two sections by slipping them apart at the hinges. Place the loudspeaker in a position so that the loudspeaker grille faces in the direction in which the sound beam is desired. The loudspeaker may be hung on the wall of an auditorium or outside of a store window, a hook for this purpose being provided on the rear of the loudspeaker part of the carrying case. Unwind the speaker cord.

2. Place the other section of the carrying case on a table or on the floor so that the tubes will be in an upright position. Check and make certain:

   (a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instrument unless all Radiotrons are in place. Figure 2 shows the proper Radiotron locations.

   (b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

   (c) That the shield is rigidly in place and the cap is on the shield over the Radiotron RCA-57.

3. Insert the loudspeaker five-pole male plug in the corresponding receptacle on the side of the amplifier base.

4. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle.

5. Remove the microphone from the carrying case. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the amplifier. The microphone should be located adjacent to the person talking and to one side of the loudspeaker. It should preferably not be located directly in front or at the rear of the loudspeaker as acoustic feedback will result. Turning the microphone, with the volume control advanced, until the position where the least sound is produced in the loudspeakers due to feedback, will result in best operation.

The equipment is now ready for operation.

RCA-VICTOR CO., INC.

MODEL PG 63
Schematic

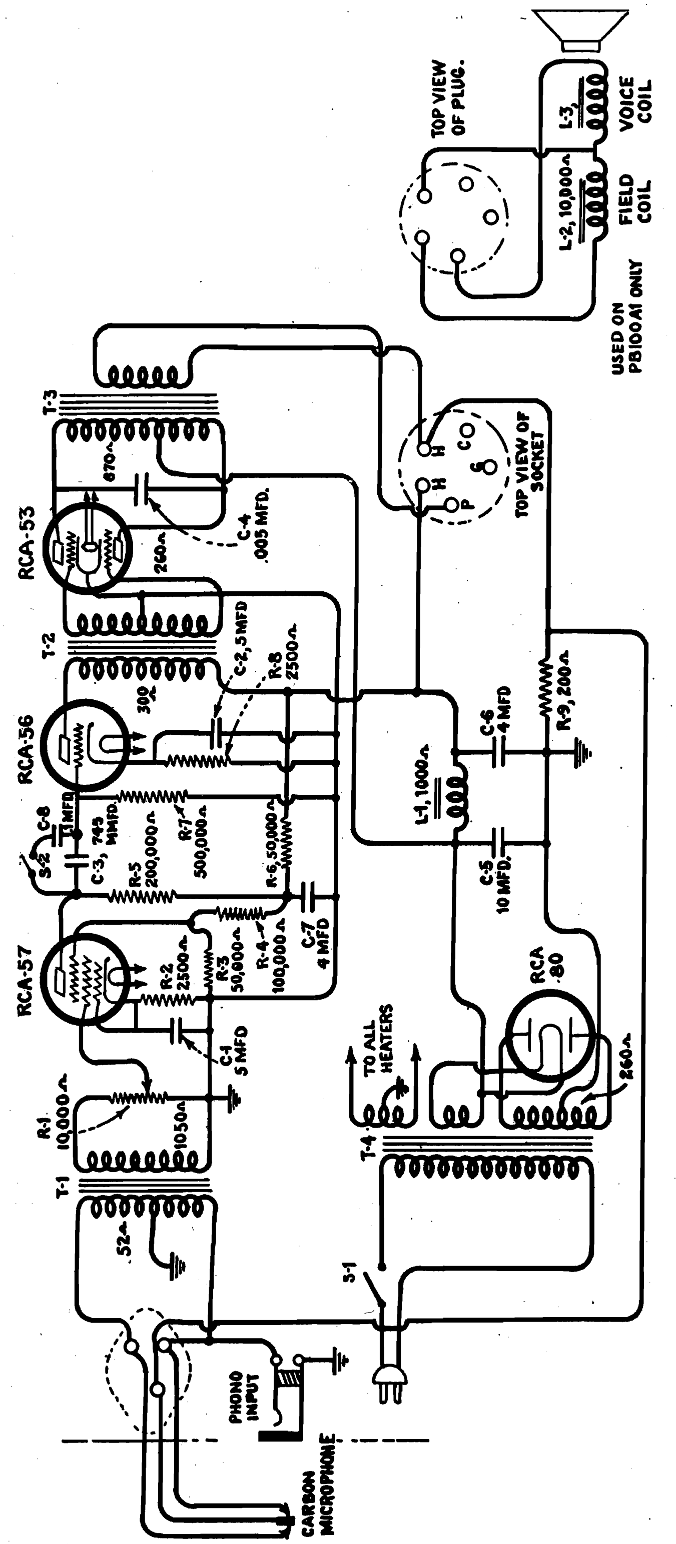


Figure 3—Schematic Circuit Diagram—PG-63

RCA-VICTOR CO., INC.

(2) UNIVERSAL AMPLIFIER

Before the Universal Amplifier may be set up for operation certain accessories must be obtained. They are as follows:

1. Microphone, cable, and plug such as the Model RP-91.

2. One loudspeaker having a voice coil impedance of either 4 ohms, 7½ ohms or 15 ohms. The loudspeaker should have its own source of supply for field current. The dry disc or the vacuum tube types of rectifier are suitable for this purpose.

3. A two conductor loudspeaker cable with a five-pole plug to fit the loudspeaker receptacle on the amplifier base.

The equipment is set up for operation in the following manner:

1. Insert the Radiotrons in the sockets as shown in Figure 2.

2. Place the amplifier on a table or on the floor so that the tubes will be in an upright position. Check and make certain:

   (a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instrument unless all Radiotrons are in place. Figure 2 shows the proper Radiotron locations.

   (b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

   (c) That the shield is rigidly in place and the cap is on the shield over the Radiotron RCA-57.

3. Make connections between the voice coil of the loudspeaker and two prongs of the five-pole plug so that the proper impedance match is obtained between the loudspeaker and the output transformer. See Figure 4. Insert the loudspeaker plug into the corresponding receptacle on the side of the amplifier base.

4. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle.

5. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the amplifier. The microphone should be located adjacent to the person talking and to one side of the loudspeaker. It should preferably not be located directly in front or at the rear of the loudspeaker as acoustic feedback will result. Turning the microphone, with the volume control at maximum, until the position where the least sound is produced in the loudspeakers due to feedback will result in best operation.

The equipment is now ready for operation.

Part II—Operation

After the equipment has been properly located and connected, it may be operated in the following manner: (Refer to Figure 2.)

1. Apply power by turning the power control switch "on." This switch is located on the front side of the amplifier base.

2. Talk into the microphone at a distance of ten to twenty inches and gradually rotate the volume control, located on the voltage amplifier, until the desired volume is obtained from the loudspeakers. Always talk into the microphone from the side which does not have the felt pad behind the screen.

3. If voice only is to be picked up by the microphone, set the speech clarifying switch in the "speech" position. For musical pickup and phonograph input, the "music" position will give better reproduction.

Part III Service Data on Amplifier Equipment

(1) ELECTRICAL DESCRIPTION OF CIRCUIT

The microphone is coupled to the first stage of the voltage amplifier (RCA-57) by means of an input transformer located on the amplifier base. The link circuit between the microphone and the input transformer is 400 ohms impedance. A potentiometer is provided in the grid circuit of the RCA-57 to vary the input voltage applied to the grid, thus controlling the output volume of the entire equipment.

RCA-VICTOR CO., INC.

MODEL PG 63 (PB100B1)
Universal Amplifier
Schematic

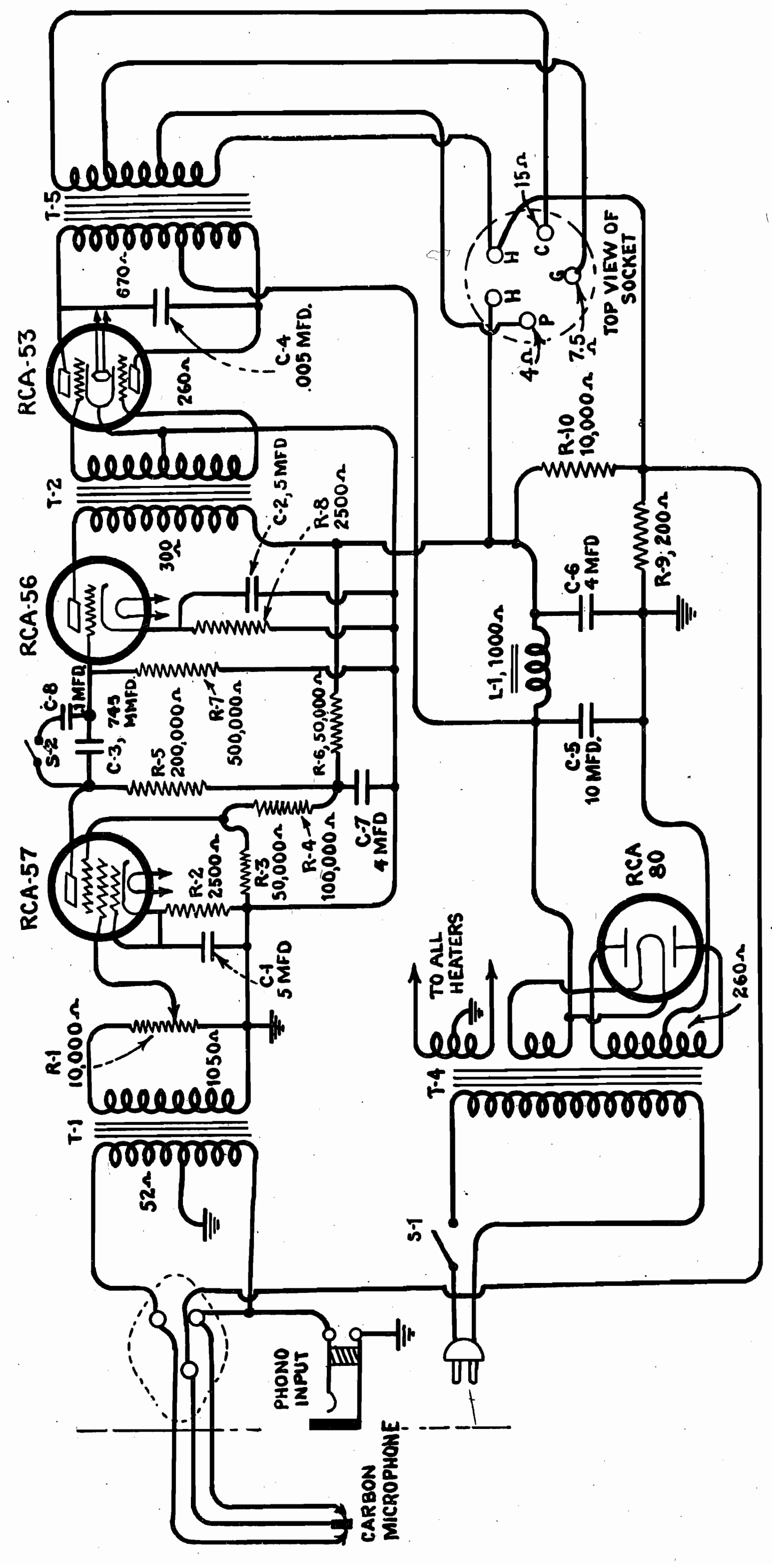


Figure 4—Schematic Circuit Diagram—PB-100B1

MODEL PG 63 Amp
Chassis wiring

RCA-VICTOR CO., INC.

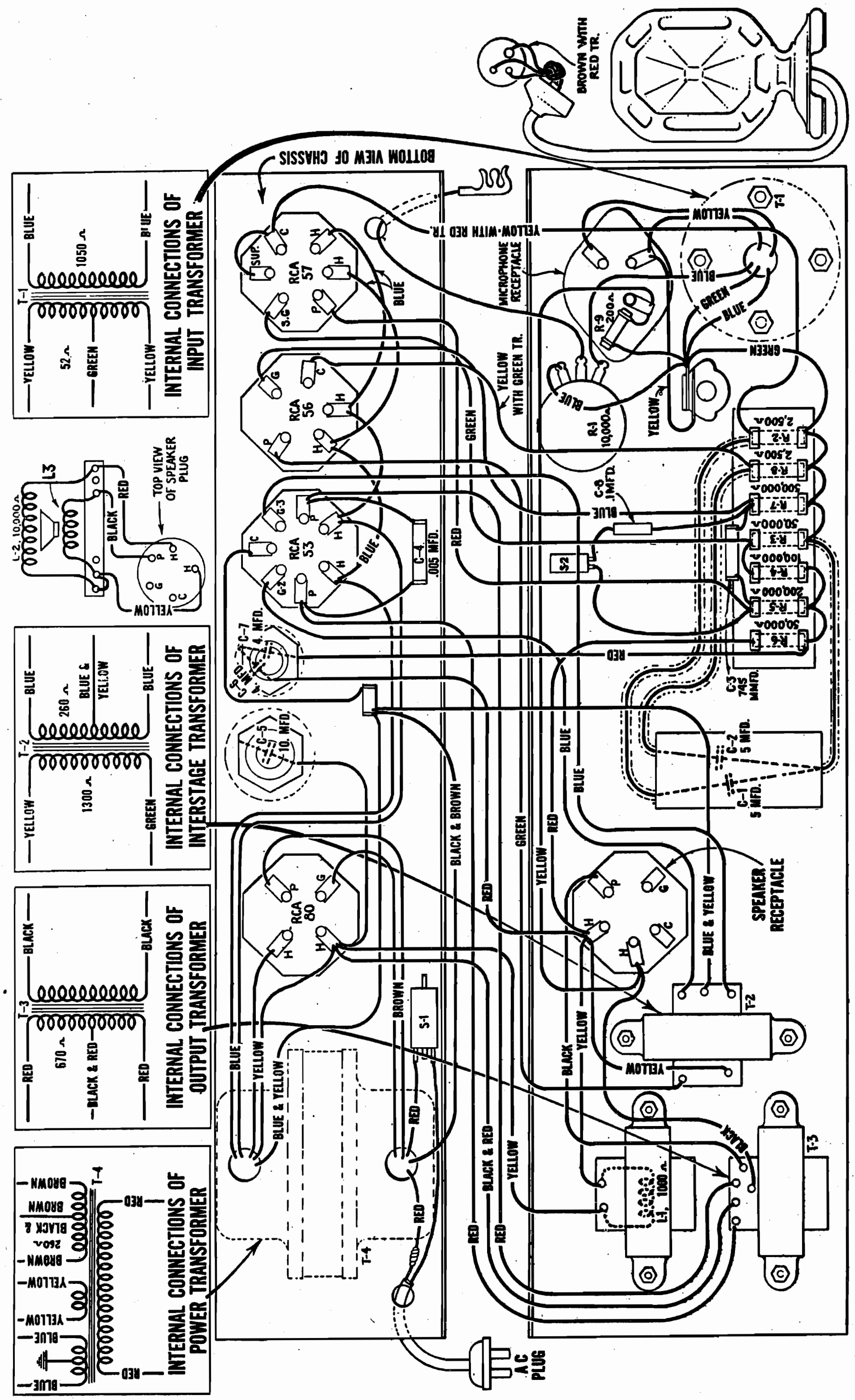


Figure 5 —Wiring Diagram—PG-63

RCA-VICTOR CO., INC.

MODEL PG 63 (PB100B1)
Universal amplifier
Chassis wiring

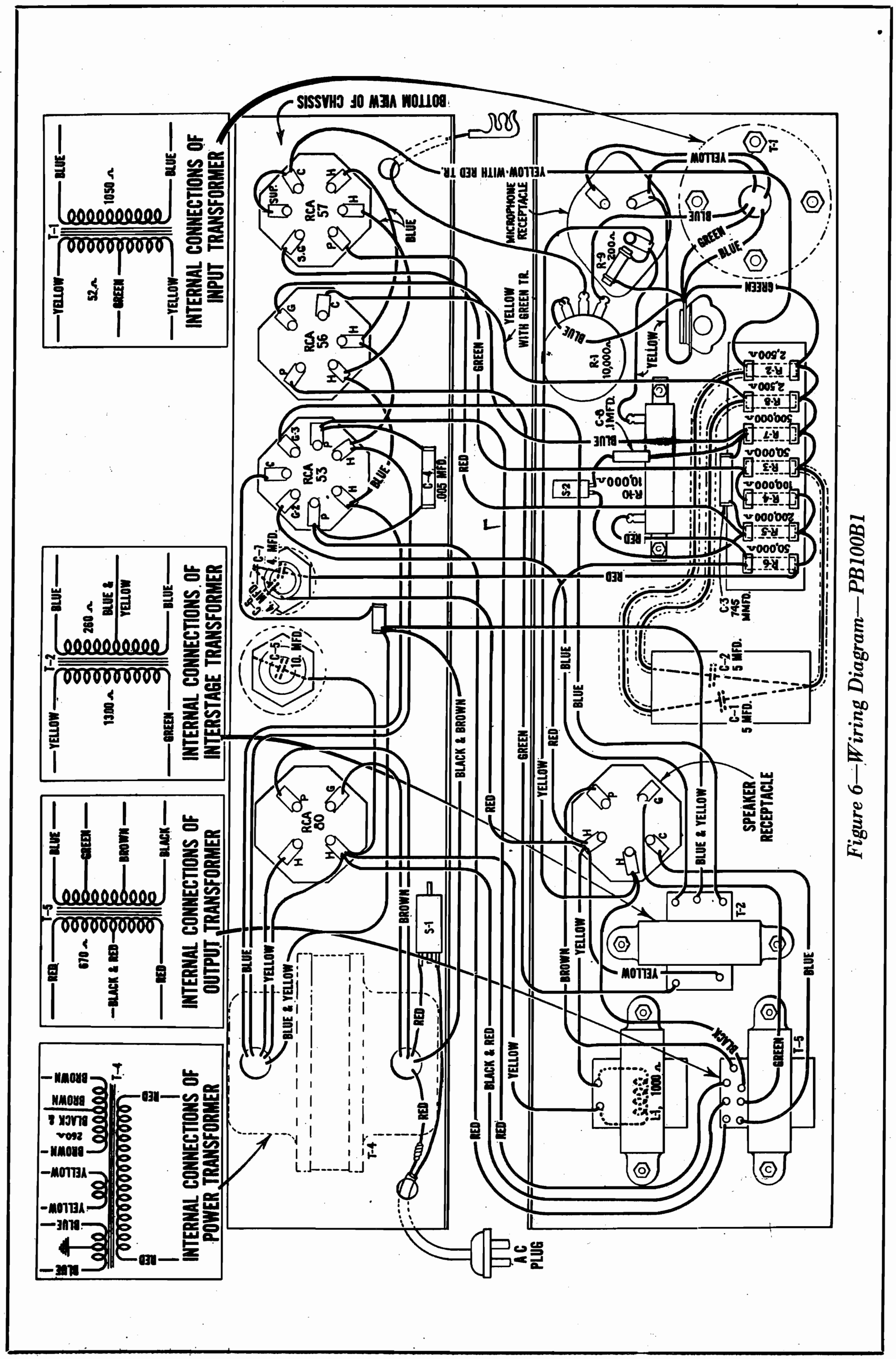


Figure 6—Wiring Diagram—PB100B1

MODEL PG 63
Voltage, Parts List

RCA-VICTOR CO., INC.

The RCA-57 is resistance coupled to the RCA-56 in the second stage which is the driver for the RCA-53 in the class "B" output stage. The output stage supplies power to one dynamic loudspeaker through a stepdown transformer. This transformer has an output impedance of 4 ohms.

The power supply for the amplifier is obtained from the RCA-80 and a filter system located on the amplifier base. The field coil of the loudspeaker in the PG-63 equipment is used as a "bleeder" across the output of the power supply system. In the Universal Amplifier (PB100B1) a 10,000 ohm resistor is used as the "bleeder."

(2) PHONOGRAPH CONNECTIONS

An input jack is provided in the primary circuit of the input transformer which permits the use of a phonograph turntable RCA Victor Type PT-14 or PT-15. The instructions for operation are included with the phonograph equipment.

(3) WIRING

The schematic wiring diagram for the PB100A1 amplifier equipment is shown in Figure 3 and that for the PB100B1 is shown in Figure 4. The wiring diagram for the complete PG-63 equipment is shown in Figure 5. Figure 6 shows the wiring diagram for the PB100B1 amplifier.

(4) RADIOTRON SOCKET VOLTAGES

The Radiotron socket voltages given in the following tabulation are the actual values at which each Radiotron should operate. In circuits containing high resistance, voltages read on a set analyzer will not agree with the values in the table, due to the relatively low resistance of the meter employed. Therefore, a correction must be applied to the meter reading to obtain the correct voltage at each socket. Usually, an application of Ohms Law will give an approximate value of the voltages at which each Radiotron is operating, assuming that the resistance of the meter is known.

RADIOTRON SOCKET VOLTAGES

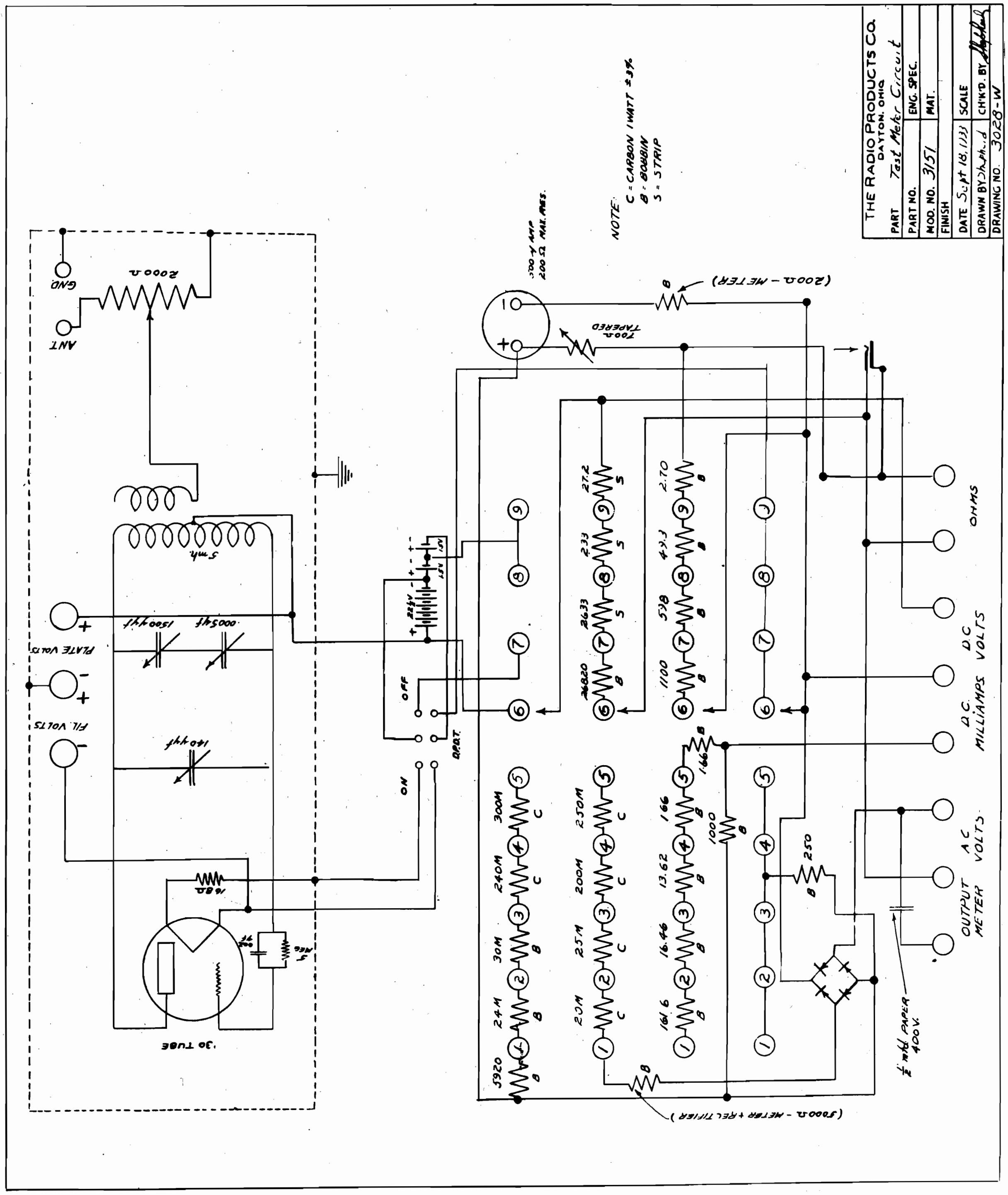
115 Volt A. C. Line—No Input Signal Voltage

Radiotron No.	Control Grid to Cathode or Filament Volts	Screen Grid to Cathode or Filament Volts	Plate to Cathode or Filament Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-57	1.4	53	65	0.6	2.5
2. RCA-56	13.5	—	240	5.0	2.5
3. RCA-53	0	—	275	15 per Plate	2.5

Stock No.	DESCRIPTION	List Price
	PB-100A1 AND PB-100B1 AMPLIFIER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	1.00
3183	Socket—3 contact socket—For microphone connection—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3581	Resistor—200 ohms—Carbon type—½ watt—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3643	Capacitor—0.005 mfd	.25
3699	Capacitor—720 mmfd	.40
3719	Socket—7 contact Radiotron socket	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6300	Socket—4 contact Radiotron socket	.35
6316	Resistor—2,500 ohms—Carbon type—½ watt—Package of 5	1.00
6513	Capacitor—Comprising two 5.0 mfd. capacitors	1.00
7054	Cord—Power cord	.60
7484	Socket—5 contact socket—For speaker connection	.35
7485	Socket—6 contact Radiotron socket	.40
7487	Shield—Radiotron shield	.25
7488	Shield—Radiotron shield cap	.20
7610	Transformer—Power transformer	5.92
7611	Capacitor—10.0 mfd	$1.72
7612	Capacitor—Comprising two 4.0 mfd. capacitors	1.60
7613	Volume control—100,000 ohms	1.55
7614	Transformer—Input transformer	12.80
7615	Jack—Long frame open circuit jack	1.28
7616	Transformer—Driver transformer	3.52
7617	Transformer — Output transformer—For use in PB100A1 amplifier only	4.48
7618	Switch—Single pole—Single throw—Toggle type	1.68
7619	Reactor—Filter reactor	2.80
7620	Resistor—10,000 ohms—Porcelain type—For use in PB-100B1 amplifier only	1.28
7623	Transformer—Tapped output transformer—For use in PB-100B1 amplifier only	5.20
25623	Knob—Volume control knob	.30
	MICROPHONE ASSEMBLIES	
3215	Plug—Microphone cord plug	.40
3216	Cushion—Microphone rubber cushion—Package of 6	.24
7533	Mechanism—Microphone mechanism, less housing	6.80
7534	Cord—Microphone cord	.70
	LOUDSPEAKER ASSEMBLIES	
9428	Cone—Loudspeaker cone—Package of 5	5.00
9433	Coil assembly—Comprising field coil, cone bracket and magnet assembly	4.75
27445	Cable—Loudspeaker cable and plug	3.80

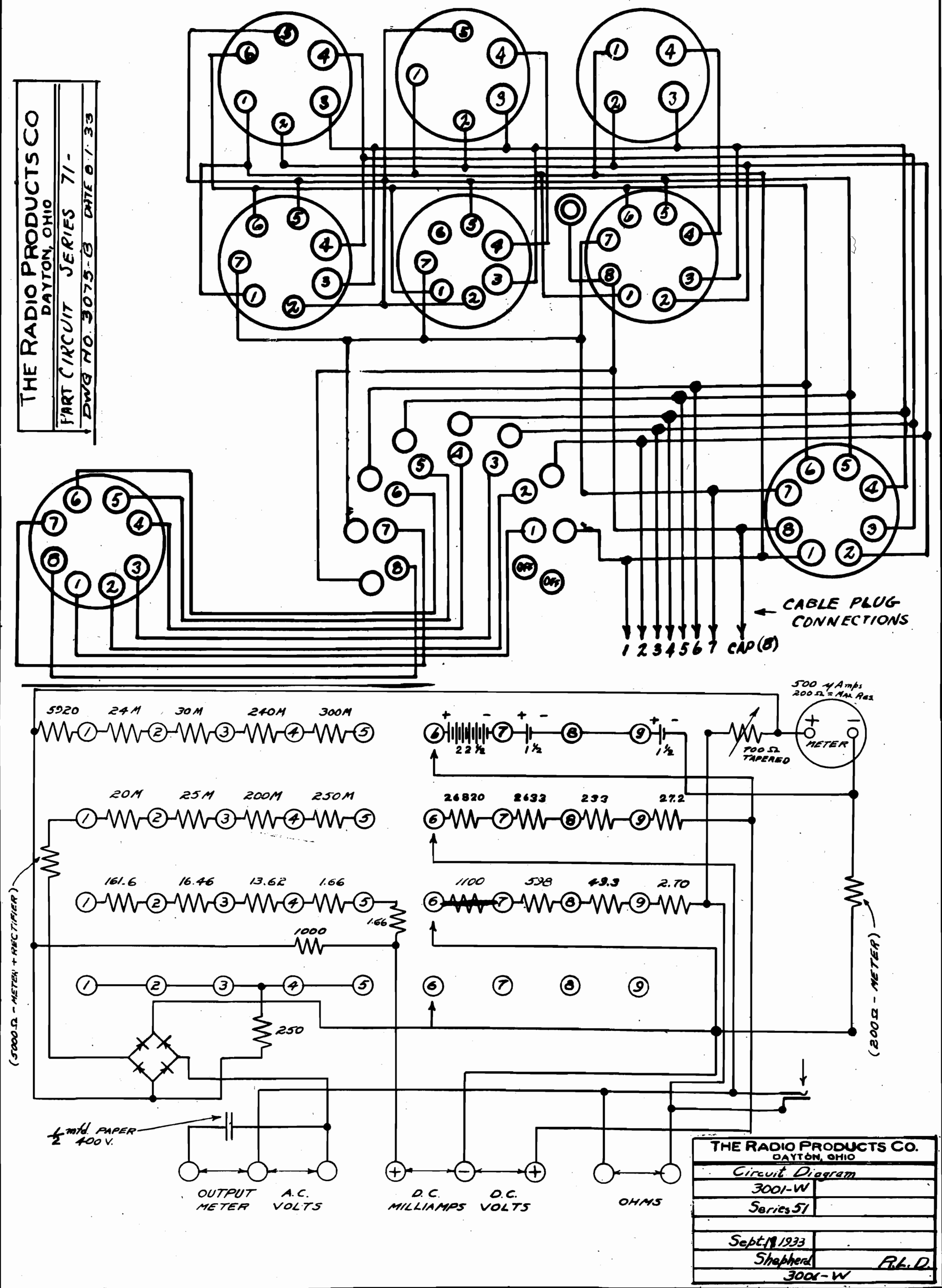
MODEL 3151
Tester Schematic

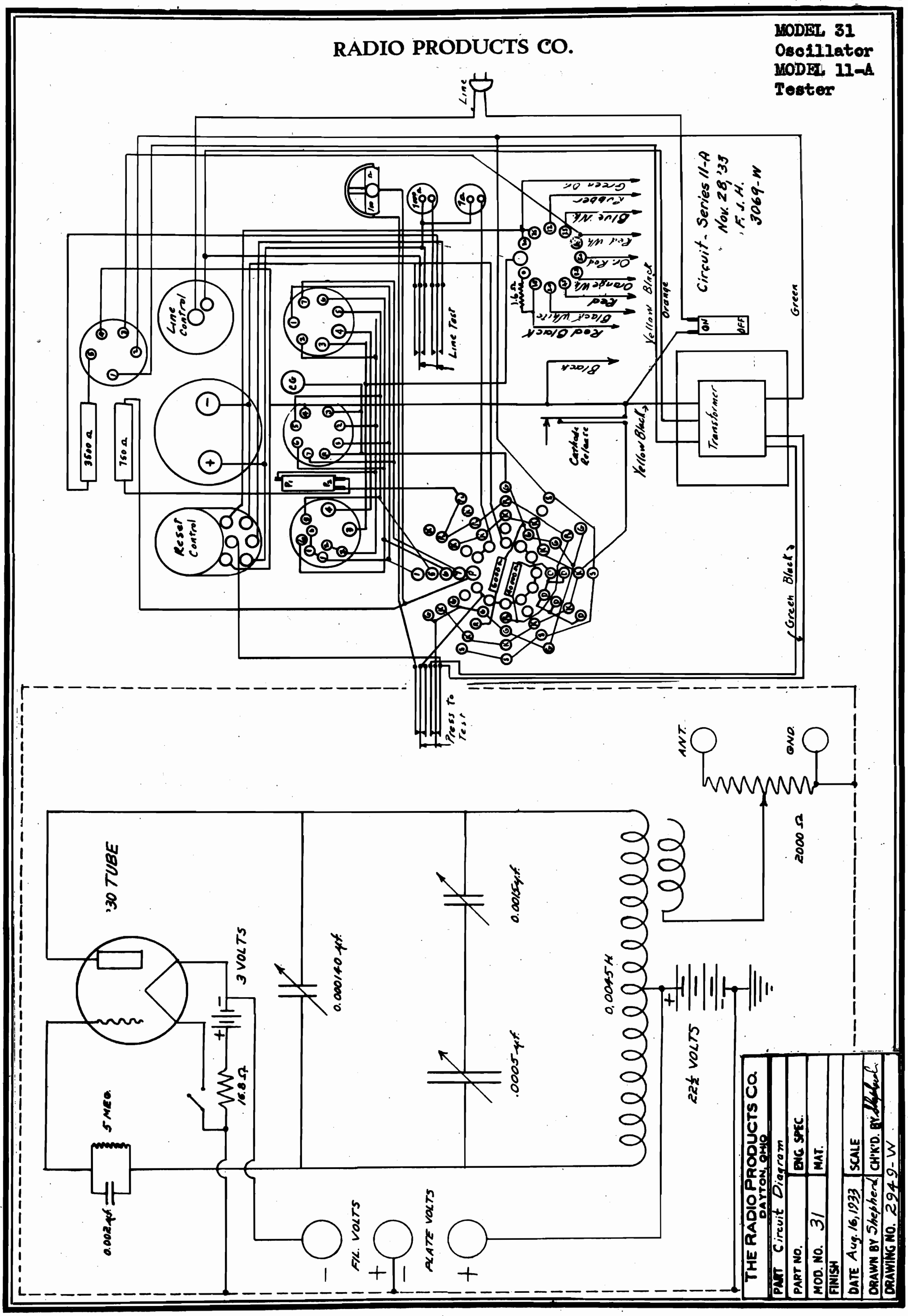
RADIO PRODUCTS CORP.



MODEL 51 (3001-W)
Tester Schematic

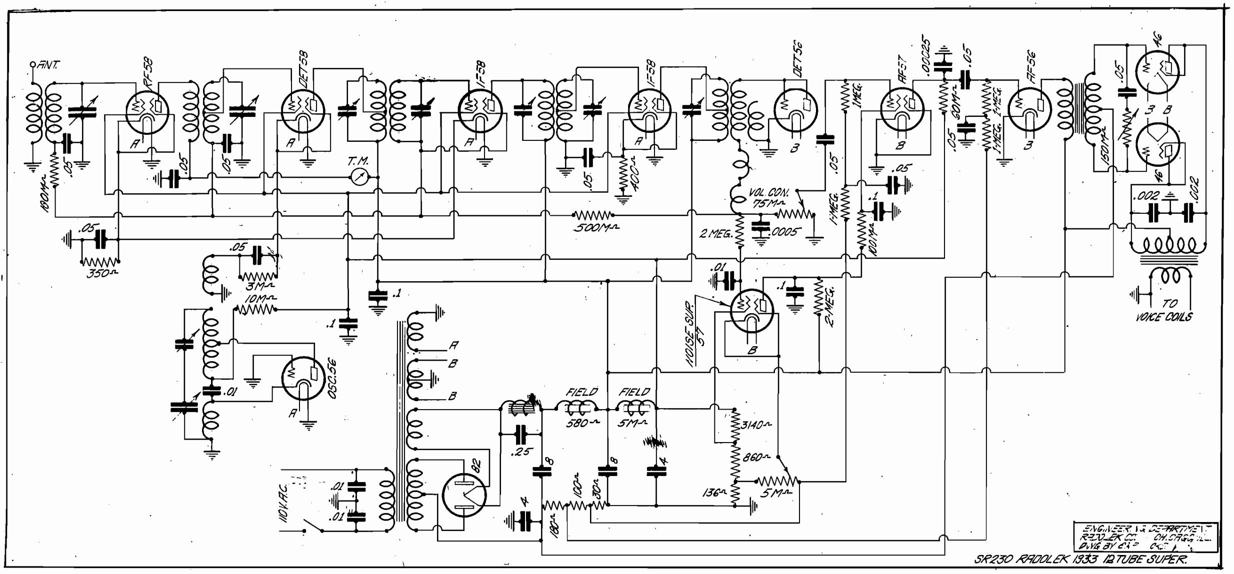
RADIO PRODUCTS CO.

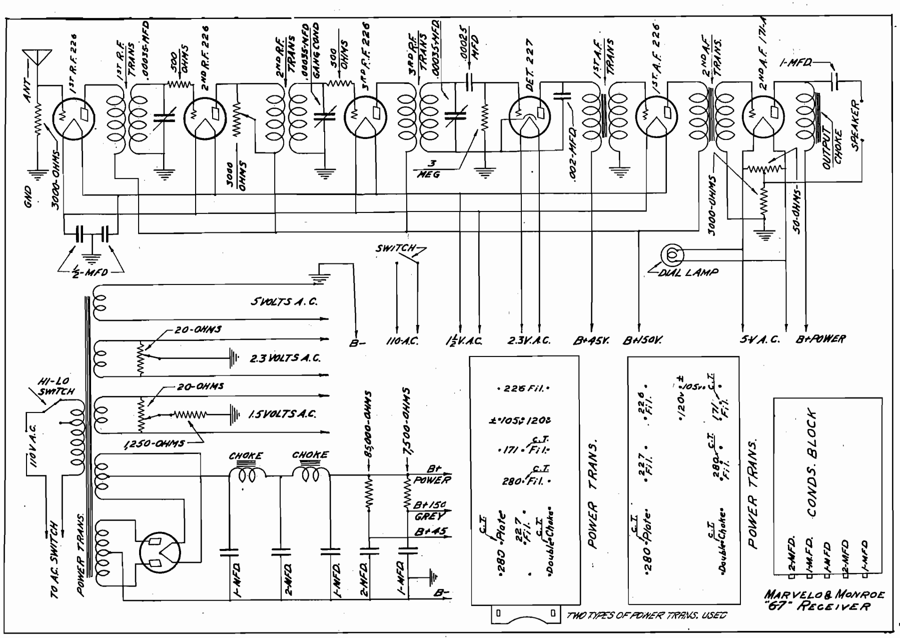



RADIO PRODUCTS CO.
MODEL 31
Oscillator
MODEL 11-A
Tester
Line
Circuit - Series 11-A
Nov. 28, '33
F. J. H.
3069-W
Green Dk
Rubber
Blue Wh.
Red Wh.
Or. Red
Orange Wh.
Red
Black White
Red Black
Black
Yellow Black
Orange
Green
ON
OFF
Transformer
Cathode Release
Yellow Black
Green Black
Line Control
Line Test
Reset Control
CG
3600 Ω
750 Ω
Press to Test
ANT.
GND.
2000 Ω
'30 TUBE
3 VOLTS
16.8 Ω
5 MEG.
0.002 μf.
0.000140 μf.
.0005 μf.
0.00154 μf.
0.0045 H
22½ VOLTS
FIL. VOLTS
PLATE VOLTS
THE RADIO PRODUCTS CO.
DAYTON, OHIO
PART Circuit Diagram
PART NO.
ENG. SPEC.
MOD. NO. 31
MAT.
FINISH
DATE Aug. 16, 1933
SCALE
DRAWN BY Shepherd
CH'K'D. BY
DRAWING NO. 2949-W

RAD OLEK

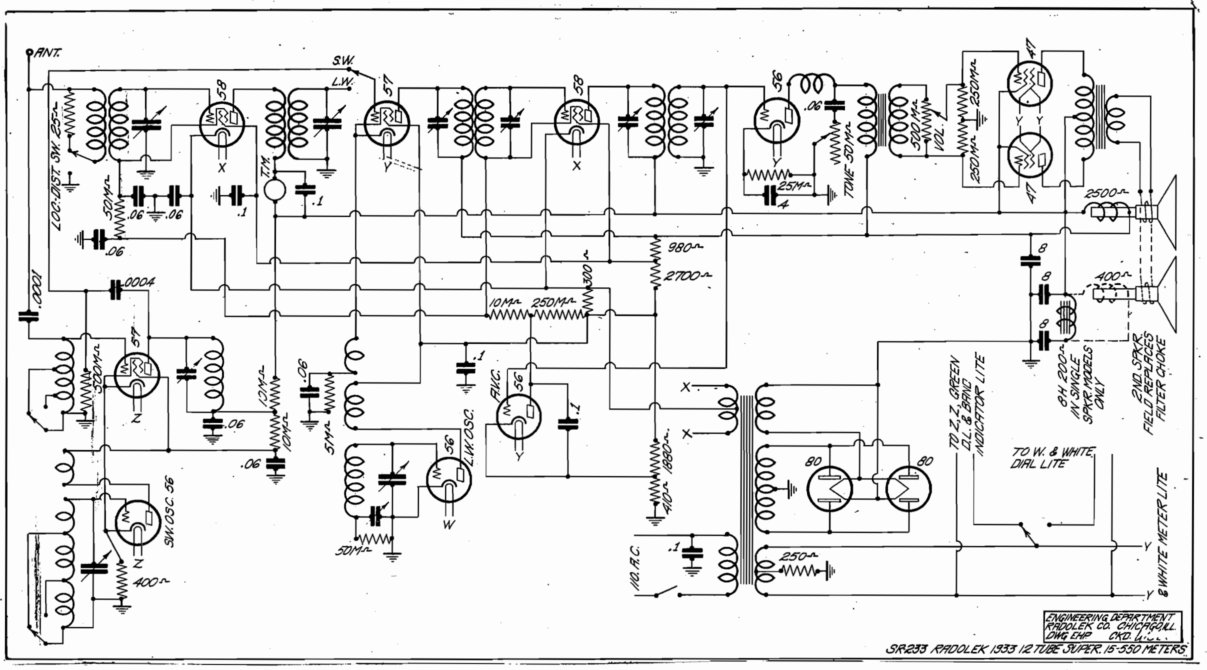
MODEL SR-230
MODEL Marvelo-Monroe 6-7

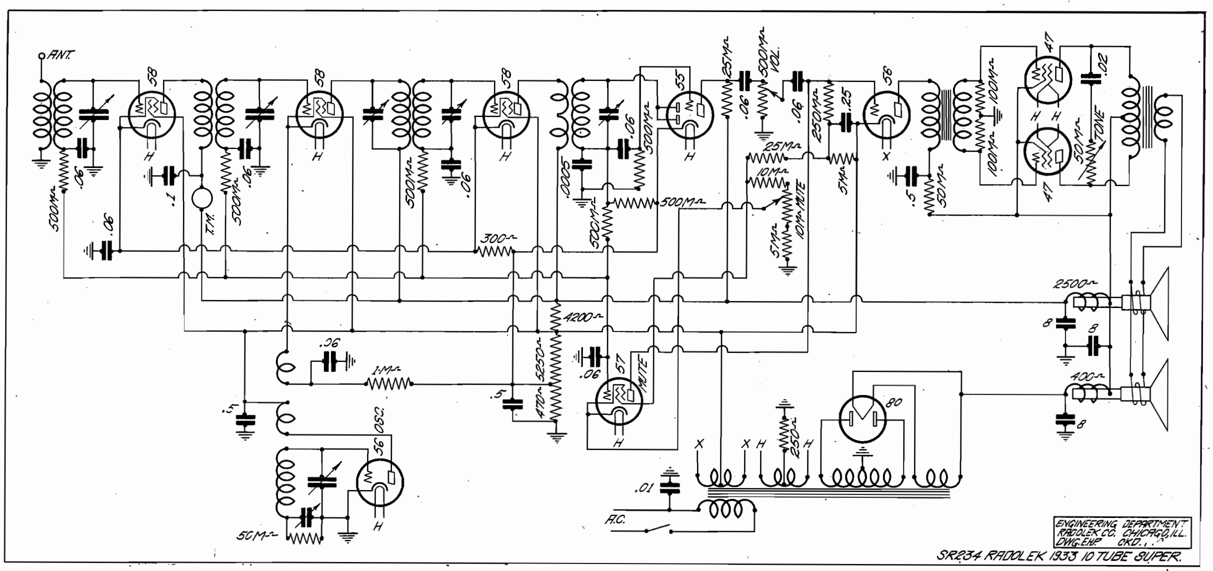


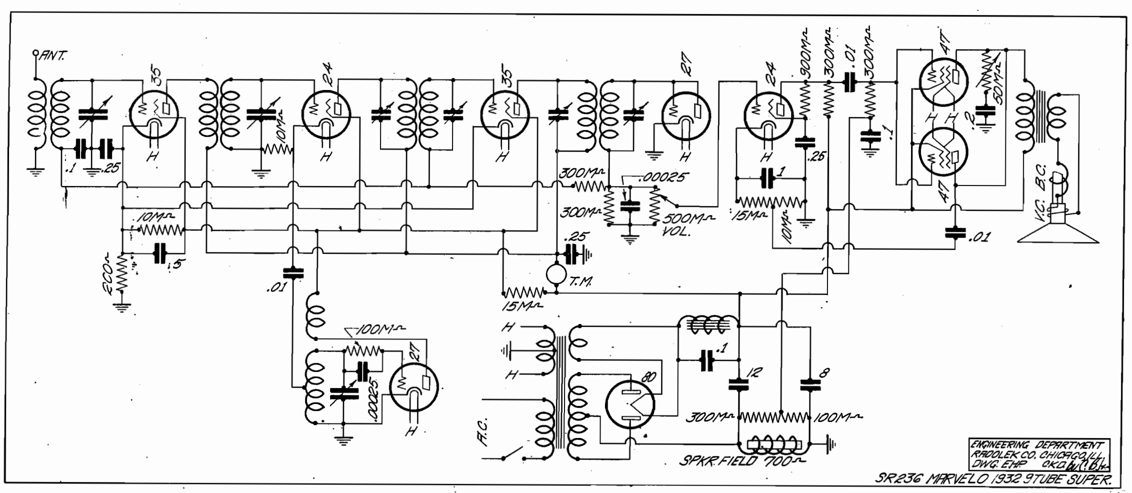


MODEL SR-233
MODEL SR-234
MODEL SR-236

RAD OLEK

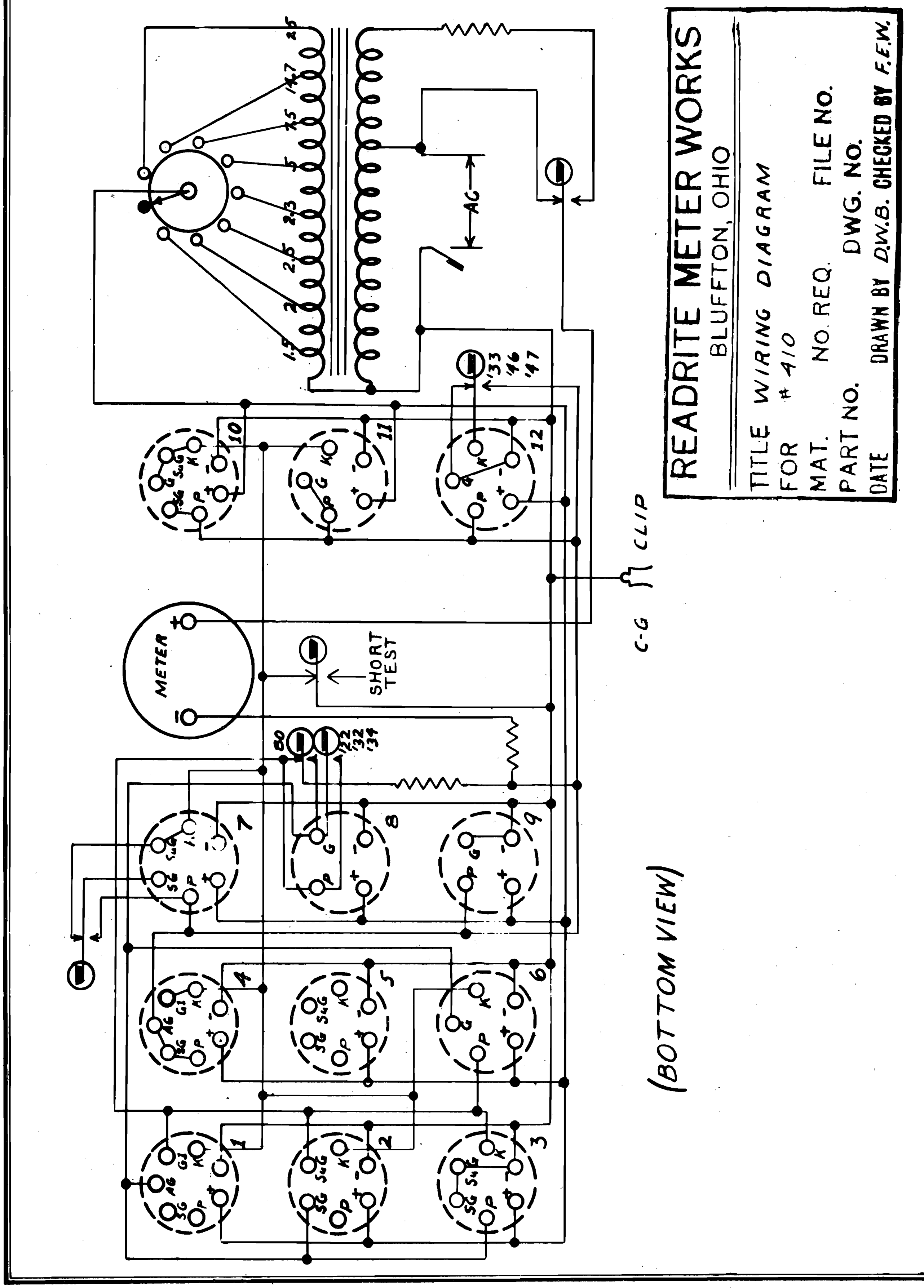






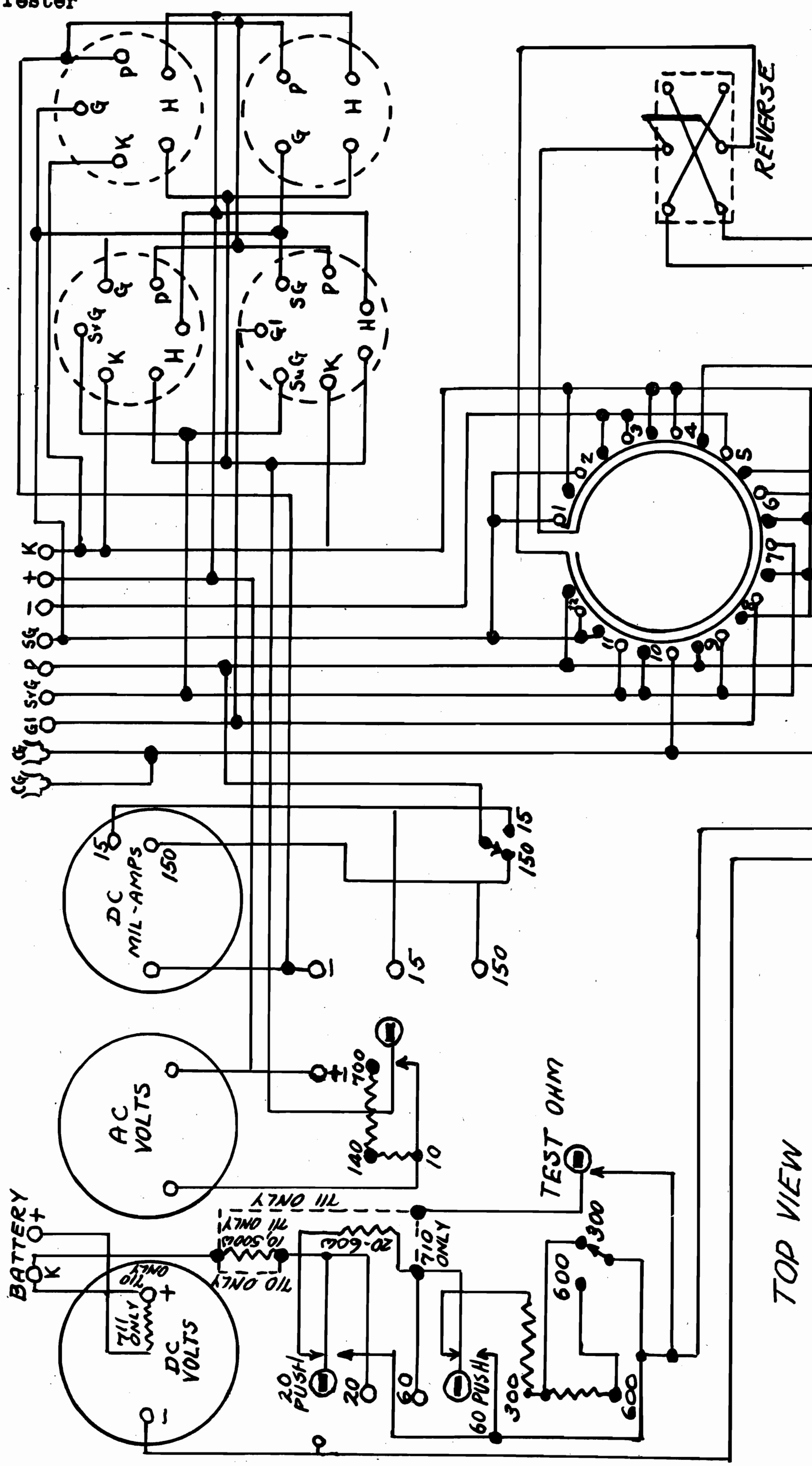
READRITE METER WORKS

MODEL 410
Tube Checker



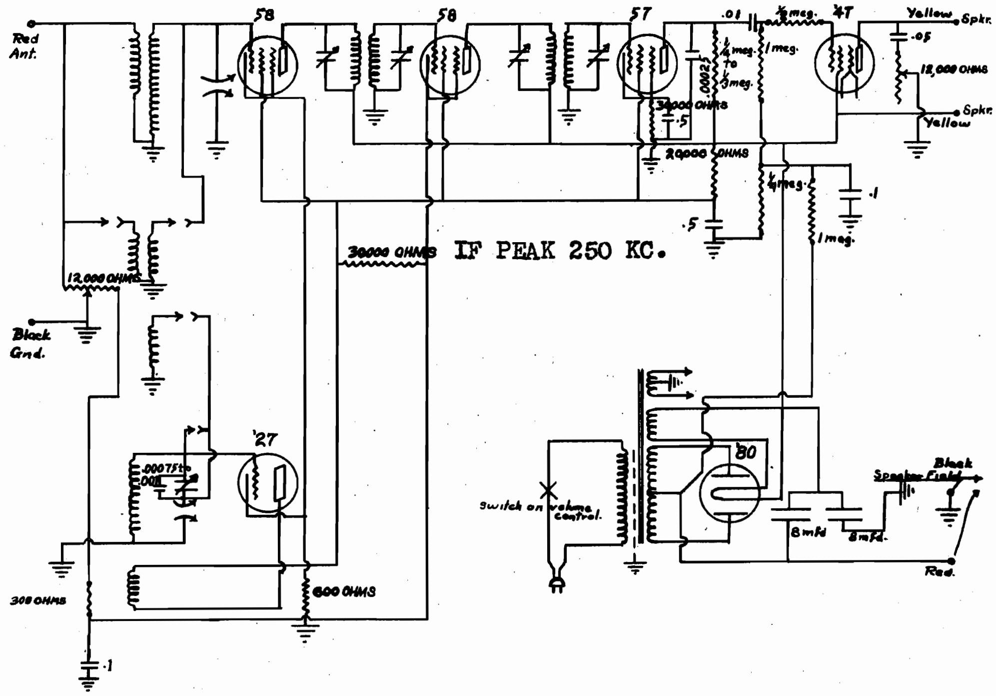
MODEL 710
Set Tester

READRITE METER WORKS



MODEL 10-3
Schematic, Voltage
Alignment

REMLER COMPANY, LTD.



MODEL #10-3

This Radio Receiver is of the Conventional Super-heterodyne type, employing the following tubes:

> #380 as rectifier; #58 as mixer; #58 as intermediate frequency amplifier; #57 as detector; #347 as audio power amplifier and #327 as oscillator. These tubes are noted in the order of their placement on the chassis, beginning with the #380 tube nearest the power transformer.

INSTALLATION:

This set is designed to operate from a standard power supply of 110 to 125 volts, 50 or 60 cycles, alternating current. Best results will be obtained when operated from a fifty foot antenna and a good ground - connected respectively to the Red and Black wires at the back of the chassis.

CONTROLS:

The knob at the left controls the volume increasing in a clockwise rotation. This knob also controls the line power switch. The center knob controls the station selector dial. The knob at the right operates the variable tone control. In the center and below the station selector knob is the wave changing switch, the two positions of which are designated as "Short Wave" and "Long Wave".

The dual wave operation allows signal reception covering 6500 kilo-cycles to 2000 when the wave changing switch is in the Short Wave position and from 2000 K.C. to 550 K.C. when the wave changing switch is in the Long Wave (standard broadcast) position.

SERVICE DATA:

The circuits and associated apparatus in their sequence are as follows:

On the under side of the chassis and directly behind the two gang variable condenser will be found the "resonated" antenna coil and the secondary or grid coil of the mixer tube. Inductively coupled to the secondary coil and wound upon the same coil form are the grid and plate coils of the Oscillator. The front section of the gang condenser, with its adjustable series padding condenser, tune the Oscillator grid coil while the second gang condenser simultaneously tunes the grid coil of the mixer tube.

The blue plate lead of the mixer tube goes to the primary of the 250 K.C. intermediate transformer located directly beneath the mixer tube. The secondary of this transformer connects by a flexible lead to the grid of the shielded intermediate amplifier tube. The blue plate lead of the intermediate tube goes to the primary of the 250 K.C. detector transformer (located on the top of the chassis near the detector tube) while the secondary or grid coil connects to the grid cap or the #57 detector. The plate of the detector tube is "capacity coupled" to the grid of the power tube. Inspection of the circuit diagram will show the method of wave changing - the three short wave coils being placed in shunt with the broadcast coils for short wave operation.

The grid bias for the power tube is obtained by a voltage divider system across the choke (dynamic speaker field) on the negative side of the high voltage circuit.

Voltage readings for servicing purposes follow:

A.C.Voltages:

Line	--	120 volts
Heater filaments	--	2.3 "
Power tube filament	--	2.3 "
Rectifier filament	--	5.0 "

D.C.Voltages:

From Ground to:

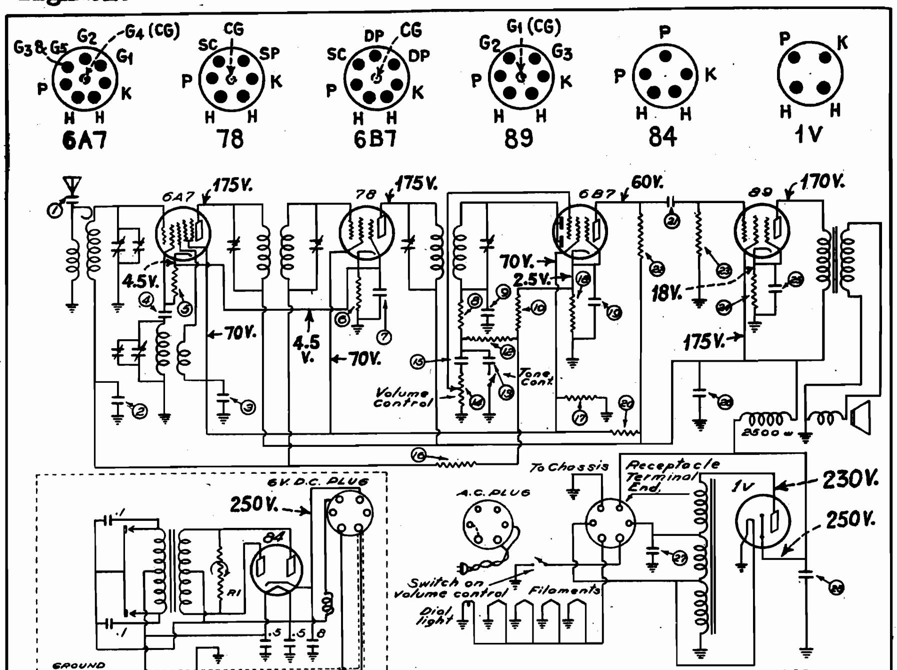
#380	Rectifier	tube	filament	--	235 volts
#347	Power	"	screen grid	--	235 "
#347	"	"	plate	--	230 "
#347	"	"	grid	--	17 "
#58	Mixer	"	plate	--	235 "
#58	"	"	screen grid	--	60 "
#58	"	"	kathode	--	4 "
#58	Intermediate	"	Plate	--	235 "
#58	"	"	screen grid	--	60 "
#58	"	"	kathode	--	2 to 20 volts
#57	Detector	Tube	plate	--	120 volts
#57	"	"	screen grid	--	60 "
#57	"	"	kathode	--	3½ "
#327	Oscillator	Tube	plate	--	60 "
#327	"	"	kathode	--	4 "

Due to small current, meter readings will be inaccurate on detector plate and power tube grid.

Speaker field (red lead) -- 105 volts negative.

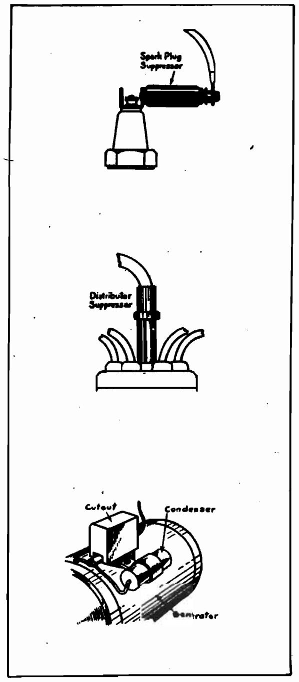
MODEL 27
Schematic, Voltage
Alignment

REMLER COMPANY, LTD.



RESISTORS		
5	60,000 w	½ watt
6	500 "	"
8	50,000 "	"
10	1,000,000 "	"
12	1,000,000 "	"
14	600,000 "	"
16	500,000 "	"
17	20,000 "	1 watt
18	1400 "	½ watt
20	20,000 "	1 watt
22	75,000 "	½ watt
23	500,000 "	"
24	1000 "	1 watt

CONDENSERS		
1	.001	mica
2	.1	200 V.
3	.25	200 V.
4	.0008	mica
7	.25	200 V.
9	.0003	mica
13	.002	mica
15	.02	600 V.
19	10 mf.	25 V.
21	.02	600 V.
25	10 mf.	25 V.
26	8 mf.	250 V.
27	.05	600 V.
28	8 mf.	350 V.



MODEL #27
SUPERHETERODYNE

This radio receiver is of the superheterodyne type with automatic volume control; and is intended for use on 110 to 125 volt, 50 - 60 cycles A.C. or from a 6 volt battery, using the power box.

INSTALLATION IN AUTOMOBILE:

Supplied with the radio receiver are the power box, eight spark plug type suppressors, one distributor suppressor and one generator condenser.

The power box may be mounted under the dash, high enough up to leave room for the feet on the toe board; or it may be placed under the front seat by those who do not care to permanently attach the box to the car. The metal shielded cable terminating in two connecting lugs is the battery cable. The lug connected to the metal shield should be connected to the car chassis, or the grounded side of the battery. The lug terminating the insulated wire may be connected to a terminal of the ammeter, or to the "hot," or ungrounded side of the battery.

After making the above connections, run the black thick cotton covered cable under the floor mat, or under the seat, and plug into radio receiver.

Later model automobiles have antennas built in the tops with a lead in wire usually brought down the right front door post. An extension may be made to this wire and connected to the antenna wire extending from the radio receiver. Older model cars may be equipped with either a top antenna or a running board type at slight cost.

In order to reduce the noise from the ignition system in the car, a spark plug suppressor should be connected in series with each spark plug wire at the plug, and the distributor suppressor should be plugged into the central distributor connection in series with the lead running to this point. The generator condenser should be mounted on the generator and the flexible lead connected to the terminal at the cutout where the wire from the generator is attached.

Some cars require special work to further reduce noises due to peculiarities of the wiring systems.

The on-and-off switch operated by the volume knob controls both the six volt battery supply and the 110 - 125 volt AC supply when used in the home with AC line cord supplied.

SERVICE DATA:

When operated from 110 - 125 volt A.C. source, an auto-transformer in the receiver is used to provide the high voltage for the plate and field supply, and the filament supply for the tubes. The chassis is directly connected to the power source, and contact between chassis and ground should be avoided.

On battery operation, the cable plug connects the six volt supply to the filaments of the tubes, and the plate and field supply from the power box to the filter in the set. Neither the auto transformer nor the 1v rectifier is in use when the set is battery operated.

To take the chassis out of the cabinet, first, remove the knobs then the back, and finally the hold down screw in the base of the cabinet. To replace tubes it is only necessary to remove the back.

The back may be plugged on the chassis after removal from the cabinet for testing and aligning.

The mixer coil is in the aluminum shield can in back of the variable condenser.

The oscillator coil is inside the chassis and is trimmed with the front section trimmer on the variable condenser.

Mounted with the oscillator coil is the first I.F. coil which is trimmed by the condensers accessible from the back of the chassis.

The second I.F. transformer is also located within the chassis and may be trimmed by the condensers located under the holes in the chassis bottom.

The power box contains a vibrator type interrupter and transformer, and a rectifier tube with necessary filter system. A 20 ampere auto type fuse is provided for protection to battery and wiring system. The cover of the power unit may be removed for servicing by taking out the four screws around the edge of the base. After several hundred hours' use, the vibrator contacts may require a slight adjustment due to wear. The necessity of this adjustment will be indicated by a marked reduction in the plate supply voltage.

On account of the action of the A.V.C., when aligning the set, use a weak signal or oscillator input; and an output meter to indicate resonance.

The following tubes are used:

6A7 as oscillator-mixer,
78 as I.F. amplifier,
6B7 as detector and amplifier,
89 as power amplifier,
1v as rectifier,
6.3 volt dial lamp.

An 84 rectifier is used in the power box.

A.C. VOLTAGE READINGS:

Line	120 volts
Filaments	6 "
Plate 1v rectifier to chassis	230 "

D. C. VOLTAGE READINGS:

From chassis to:

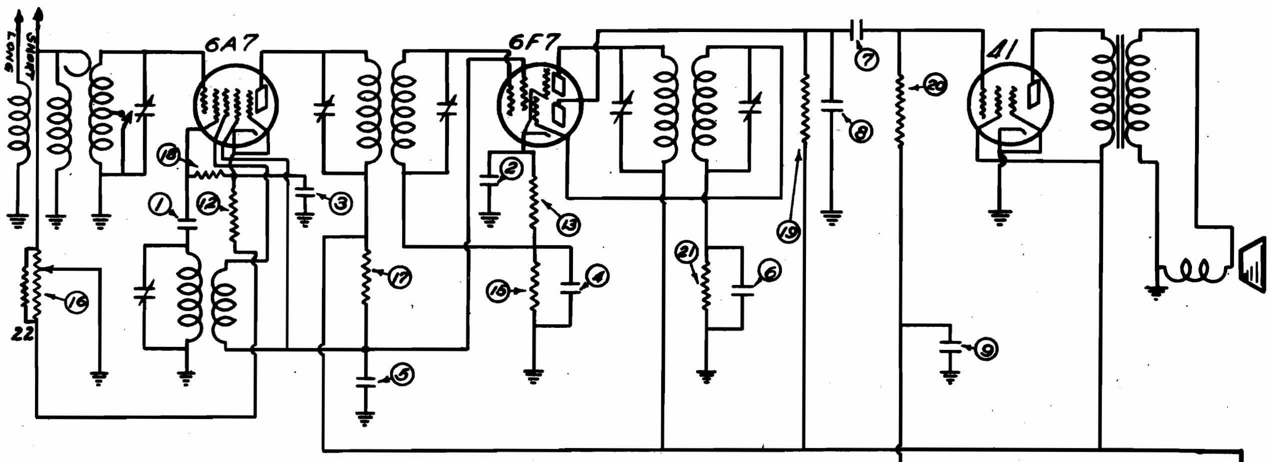
1v Rectifier	tube	cathode	250 volts
89 Power	"	plate	170 "
89 "	"	screen grid	175 "
89 "	"	cathode	18 "
6B7 Detector Amp.	"	plate	60 "
6B7 " "	"	screen grid	70 "
6B7 " "	"	cathode	2.5 "
78 I.F.	" "	plate	175 "
78 I.F.	" "	screen grid	70 "
78 I.F.	" "	cathode	4.5 "
6A7 Mixer Osc.	"	plate	175 "
6A7 " "	"	screen grid	70 "
6A7 " "	"	cathode	4.5 "
84 Rectifier	"	cathode	250 "

Voltage across field 75 volts.

Total current from battery 4.5 amperes.

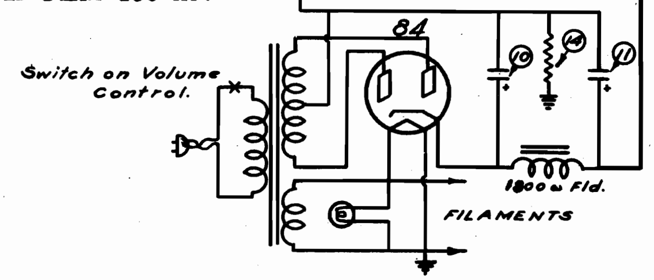
REMLER COMPANY, LTD.

MODEL 30,40
Schematic, Voltage
Alignment



CONDENSERS		RESISTORS	
1	.00008 MFD.	12	300 ohms
2	.05	13	300
3	.1	14	450
4	.002	15	600
5	.1	16	12,000
6	02	17	15,000
7	.02	18	60,000
8	002	19	500,000
9	1	20	500,000
10	4 MFD	21	1,000,000
11	4 MFD	22	5000

IF PEAK 450 KC.



REMLER SUPERHETERODYNES

Model #30 - Model #40

TUBES:

This is a four tube superheterodyne receiver employing the following tubes:

#84 as full wave rectifier; #6A7 as oscillator and mixer; #6F7 as I.F. amplifier and fixed bias detector; and #41 as pentode power amplifier.

INSTALLATION:

This set is designed to operate from a 110 to 125 volts, 50 or 60 cycle A.C. power supply. Two antenna leads are provided. The red wire should be connected when the antenna is less than 100 feet in length, and the green wire should be used when the antenna is longer. A good ground connection to the black lead is necessary for best results.

CONTROLS:

The knob at the left controls the volume and also operates the ON and OFF switch. The knob at the right is the station selector. The dial is calibrated in hundreds of kilocycles. The short wave switch allows the reception of the higher frequency police band when the switch is to the right, and the selector is turned to from 15 to 16 on the dial. The lower frequency police band is received at 17 on the dial with the switch to the left, or broadcast position.

SERVICE DATA:

The antenna and mixer coils are in the aluminum shield at the back of the variable condenser. The mixer coil is trimmed by the back section trimmer. The oscillator coil is within the chassis and is trimmed by the front section trimmer on the variable condenser. The first I.F. transformer is mounted with the oscillator coil and is trimmed by the condensers accessible from the back of the chassis. The second I.F. transformer is also located within the chassis and may be trimmed by the condensers mounted thereon. The intermediate frequency used is 450 kilocycles.

A. C. VOLTAGES:

Line	- 120 volts
Filaments	6.3 "

D. C. VOLTAGES:

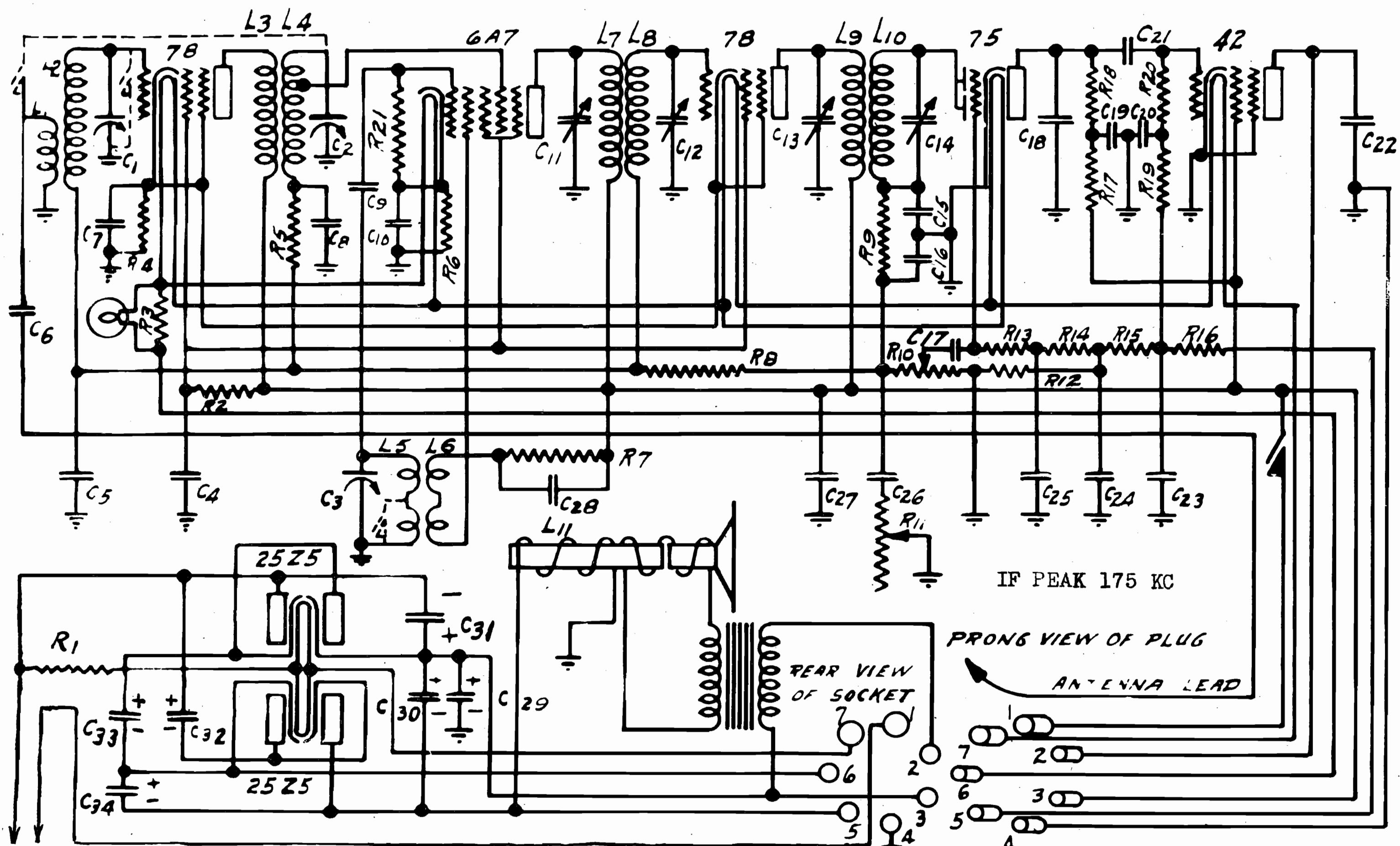
From ground to:

#84	Rectifier cathode	- 330 volts
#41	Plate	240 "
#41	Screen grid	250 "
#41	Grid	20 "
#6F7	Triode plate	100 "
#6F7	Pentode plate	250 "
#6F7	Screen grid	100 "
#6F7	Cathode	8 "
#6F7	Pentode grid	5 "
#6A7	Plate	250 "
#6A7	Screen grid	100 "
#6A7	Oscillator plate	100 "
#6A7	Cathode	3½ - 23 volts

Due to current taken by voltmeter used, readings of detector plate and grid voltages may be slightly less than values shown above.

REPUBLIC INDUSTRIES

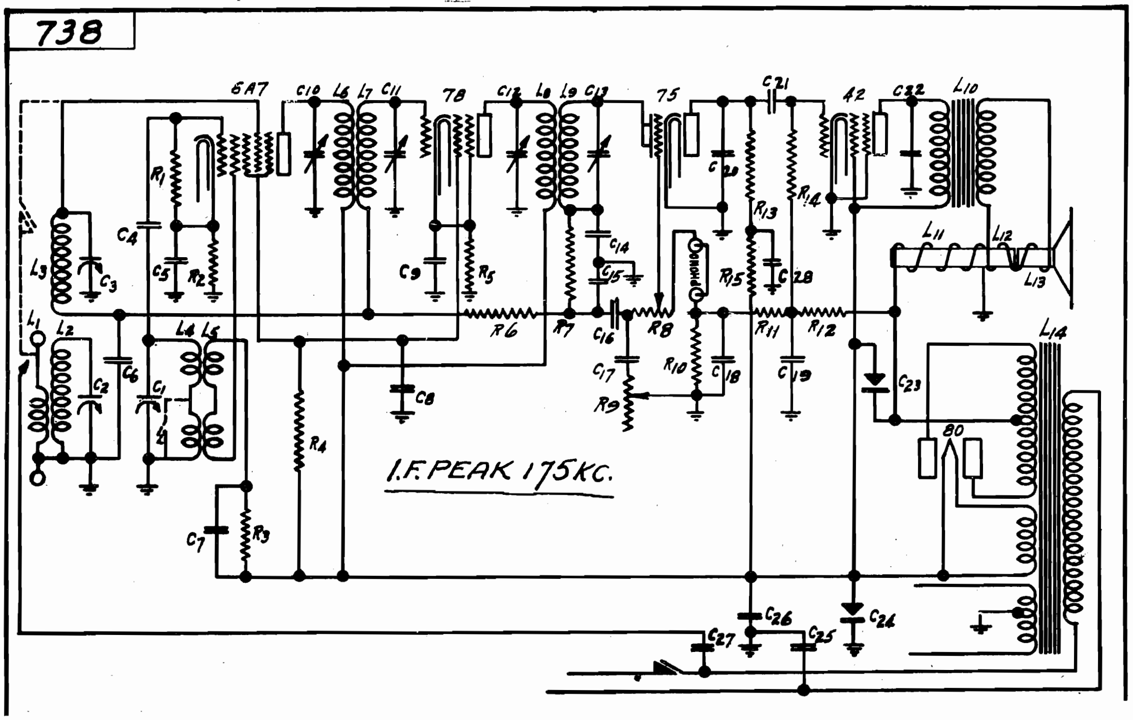
MODEL "Skyhawk" RC-5,RC-6
Schematic



R1	100 ohms	R12	5,000 ohms	C1	371 mmf.	C12	70-200 mmf.	C23	.1 mf.	C34	4 mf.
R2	75,000 "	R13	500,000 "	C2	371 mmf.	C13	75-150 mmf.	C24	.5 mf.		
R3	9 "	R14	500,000 "	C3	336 mmf.	C14	75-150 mmf.	C25	.5 mf.		L7,L8
R4	250 "	R15	75,000 "	C4	.1 mf.	C15	.0001 mf.	C26	.01 mf.		are 8000
R5	100,000 "	R16	500,000 "	C5	.1 mf.	C16	.0001 mf.	C27	1.0 mf.		microhenrys.
R6	250 "	R17	40,000 "	C6	.001 mf.	C17	.01 mf.	C28	.1 mf.		L9 and L10
R7	10,000 "	R18	100,000 "	C7	.5 mf.	C18	.002 mf.	C29	4.0 mf.		are 6000
R8	2,000,000 "	R19	40,000 "	C8	.1 mf.	C19	.1 mf.	C30	4.0 mf.		microhenrys.
R9	50,000 "	R20	500,000 "	C9	.00025 mf.	C20	.5 mf.	C31	4.0 mf.		L11 2500
R10	500,000 "	R21	40,000 "	C10	.1 mf.	C21	.01 mf.	C32	8.0 mf.		Speaker Fld.
R11	250,000 "			C11	70-200 mmf.	C22	.004 mf.	C33	8.0 mf.		

MODEL "Skyhawk" SL-5-D
Schematic

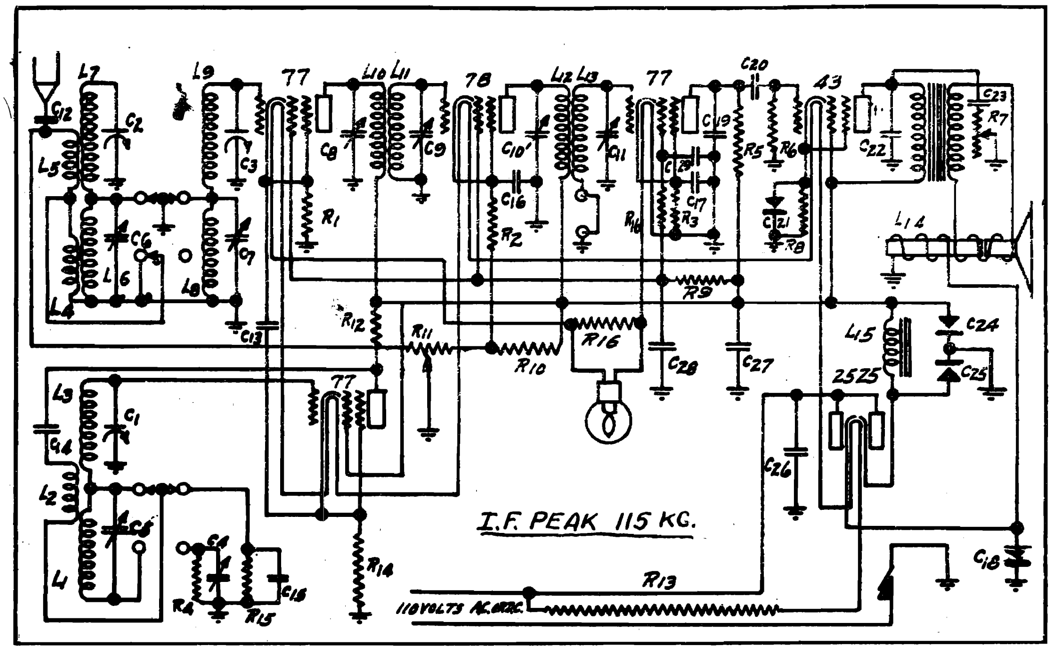
REPUBLIC INDUSTRIES



Code	Part No.	RESISTORS
R1	921	40,000 Ohm Oscillator Grid Leak
R2	1062	250 Ohm 6A7 Cathode Resistor
R3	920	10,000 Ohm Oscillator Feed Resistor
R4	898	50,000 Ohm 6A7 & 78 Screen Feed Resistor
R5	1063	500 Ohm 78 Cathode Resistor
R6	926	1 Megohm A.V.C. Network Resistor
R7	898	50,000 Ohm A.V.C. Network Filter Resistor
R8	535	500,000 Ohm Volume Control & A. C. Switch
R9	534	250,000 Ohm Tone Control
R10	919	5,000 Ohm Bias Network Resistor
R11	922	75,000 Ohm Bias Network Resistor
R12	926	1 Megohm Bias Network Resistor
R13	924	250,000 Ohm 75 Plate Resistor
R14	925	500,000 Ohm 42 Grid Resistor
R15	898	50,000 Ohm 75 Plate Resistor
		CONDENSERS
C1	833	336 MMFD. Oscillator Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	371 MMFD. Preselector Section of Tuning Condenser
C4	268	.00025 MFD. Oscillator Coupling Condenser
C5	272	.1 MFD. 6A7 Cathode By-pass Condenser
C6	272	.1 MFD. A.V.C. By-pass Condenser
C7	272	.1 MFD. Oscillator Feed By-pass Condenser
C8	272	.1 MFD. 6A7 & 78 Screen By-pass Condenser
C9	272	.1 MFD. 78 Cathode By-pass Condenser
C10	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C11	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C12	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C13	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C14	339	.0001 Diode Filter Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	269	.01 MFD. Second Detector Feed Condenser
C17	269	.01 MFD. Tone Control Condenser
C18	928	25 MFD. A.V.C. Network By-pass Condenser
C19	569	.2 MFD. 42 Bias By-pass Condenser
C20	516	.001 MFD. 75 Plate Filter Condenser
C21	269	.01 MFD. Audio Feed Condenser
C22	1132	.002 MFD. 42 Plate Filter Condenser 600 Volt
C23	496	4 MFD. B Filter Condenser
C24	496	4 MFD. B Filter Condenser
C25	269	.01 MFD. Line By-pass Condenser
C26	794	1 MFD. B Supply By-pass Condenser
C27	307	.0005 MFD. Sub. Antenna Condenser
C28	272	.1 MFD. 75 Plate Hum Filter Condenser
		INDUCTANCES
L1	1109	Antenna Coil Primary 178 Turns #36 S.S.E.
L2	1109	Antenna Coil Secondary 136 Turns #36 S.S.E.
L3	1109	Preselector Secondary 126 Turns #36 S.S.E.
L4	1111	Oscillator Secondary 72 and 50 Turns #36 D.D.C.
L5	1111	Oscillator Primary 35 Turns and 15 Turns #36 S.S.E.
L6	1101	8,000 Microhenries First I.F. Primary
L7	1101	8,000 Microhenries First I.F. Secondary
L8	1101	8,000 Microhenries Second I.F. Primary
L9	1101	8,000 Microhenries Second I.F. Secondary
L10		Single 42 Output Transformer
L11		3,000 Ohm Speaker Field
L12		Hum Bucking Coil
L13		Speaker Voice Coil
L14	1068	Power Transformer 115 Volts A. C. 60 Cycle

REPUBLIC INDUSTRIES

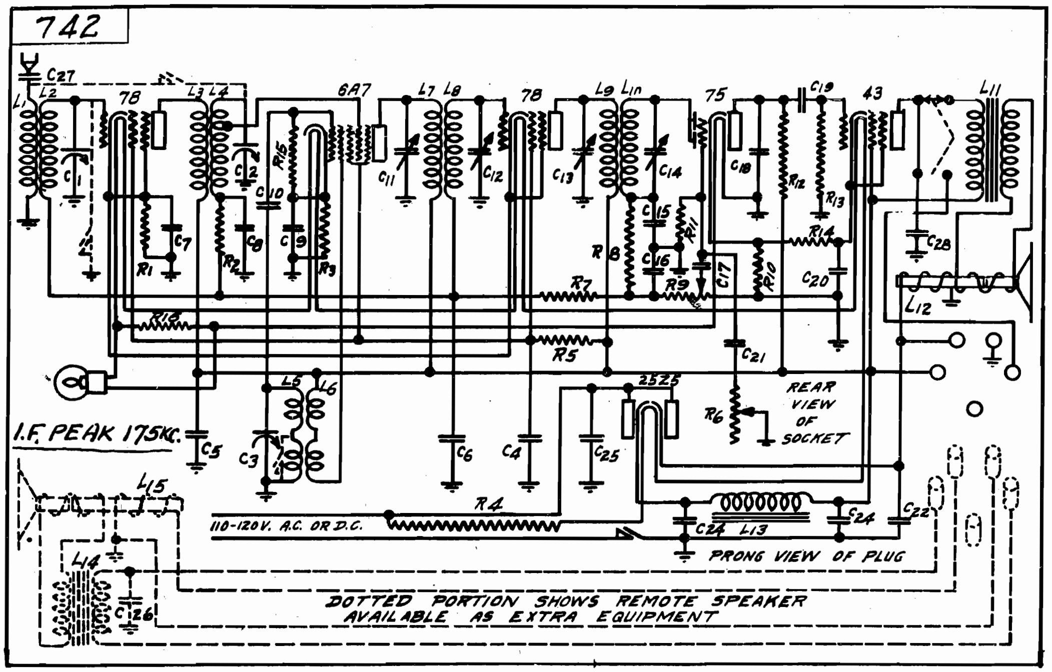
MODEL "Skyhawk" SL-6
Schematic



Code	Part No.	RESISTORS
R1	919	5,000 Ohm First Detector Cathode
R2	1062	250 Ohm I. F. Cathode
R3	1003	15,000 Ohm Second Detector Cathode
R4	1042	25,000 Ohm Long Wave Oscillator Grid
R5	924	250,000 Ohm Second Detector Plate
R6	925	500,000 Ohm 43 Grid
R7	534	250,000 Ohm Tone Control
R8	1063	500 Ohm 43 Cathode
R9	921	40,000 Ohm Screen Feed
R10	922	75,000 Ohm I. F. Cathode Feed
R11	512	10,000 Ohm Volume Control & Switch
R12	941	20,000 Ohm Oscillator Plate Feed
R13	1125	130 Ohm Resistance in Power Cord
R14	1064	600 Ohm Oscillator Cathode
R15	1042	25,000 Ohm Broadcast Oscillator Grid
R16	924	250,000 Ohm Second Detector Screen
R17	1119	36 Ohm Pilot Light Shunt Resistor
		CONDENSERS
C1	833	26 - 336 MMFD. Oscillator Section of 3 Gang
C2	833	26 - 371 MMFD. Preselector Section of 3 Gang
C3	833	26 - 371 MMFD. Preselector Section of 3 Gang
C4	784	4 Plate Long Wave Oscillator Trimmer
C5	972	2 Plate Long Wave Oscillator Trimmer
C6	971	2 Plate First Preselector Trimmer
C7	971	2 Plate Second Preselector Trimmer
C8	993	75 - 150 MMFD. First I.F. Primary Trimmer
C9	994	75 - 150 MMFD. First I.F. Secondary Trimmer
C10	995	75 - 150 MMFD. Second I.F. Primary Trimmer
C11	996	75 - 150 MMFD. Second I.F. Secondary Trimmer
C12	269	.01 Antenna Coupling Condenser
C13	269	.01 Oscillator Feed Condenser
C14	269	.01 Mfd. Oscillator Plate Condenser
C15	503	.004 Mfd. Broadcast Oscillator Condenser
C16	272	.1 Mfd. I.F. Cathode By-pass Condenser
C17	569	.2 Mfd. Second Detector Cathode By-pass Condenser
C18	1085	4. Mfd. Dry Electrolytic Filter Condenser
C19	544	.001 Mfd. Second Detector Plate Filter Condenser
C20	269	.01 Mfd. Audio Feed Condenser
C21	928	25 Mfd. Electrolytic 43 Cathode 30 Volt Tubular
C22	503	.004 Mfd. 43 Plate Filter Condenser
C23	272	.1 Mfd. Tone Control Condenser
C24	1085	4 Mfd. Dry Electrolytic Condenser
C25	1085	12 Mfd. Dry Electrolytic Condenser
C26	272	.1 Mfd. Power Line By-pass Condenser
C27	266	1. Mfd. B Supply By-pass Condenser
C28	267	.5 Mfd. Screen By-pass Condenser
C29	269	.01 Mfd. Second Detector Screen By-pass Condenser
		INDUCTANCES
L1	782	Long Wave Oscillator Secondary 1975 Microhenries
L2	782	Long Wave & Broadcast Oscillator Primary 10 Turns #36 P.E.
L3	782	Long Wave Oscillator Secondary 97 Turns #32 P.E.
L4	781	Long Wave First Preselector Primary U.W. 800 Turns #36 S.S.E.
L5	976	Broadcast First Preselector Primary U.W. 178 Turns #36 S.S.E.
L6	781	Long Wave First Preselector Secondary U.W. 3380 Microhenries
L7	976	Broadcast First Preselector Secondary 139 Turns #32 S.S.E.
L8	781	Long Wave Second Preselector Secondary 3380 Microhenries
L9	976	Broadcast Second Preselector Secondary 132 Turns #36 S.S.E.
L10	999	25,000 Microhenries First I.F. Primary U.W.
L11	999	25,000 Microhenries First I.F. Secondary U.W.
L12	1156	14,000 Microhenries Second I.F. Primary U.W.
L13	1156	14,000 Microhenries Second I.F. Secondary U.W.
L14	917	3,000 Ohm Speaker Field
L15	940	20 Henry Choke

MODEL "Skyhawk" SL-6-D
Schematic

REPUBLIC INDUSTRIES



RESISTORS

Code	Part No.	
R1	1062	250 Ohm R.F. & I.F. Cathode & Screen Resistor
R2	923	100,000 Ohm A.V.C. Network Resistor
R3	1062	250 Ohm 6A7 Cathode Resistor
R4	1125	130 Ohm Resistor In Power Cord
R5	941	20,000 Ohm 78 & 6A7 Screen Feed Resistor
R6	534	250,000 Ohm Tone Control
R7	926	1 Megohm A.V.C. Network Resistor
R8	898	50,000 Ohm A.V.C. Network Filter Resistor
R9	535	500,000 Ohm Volume Control & Power Switch
R10	1122	40 Ohm Bias Network Resistor
R11	925	500,000 Ohm 75 Grid Leak Resistor
R12	923	100,000 Ohm 75 Plate Resistor
R13	925	500,000 Ohm 43 Grid Resistor
R14	1063	500 Ohm Bias Resistor
R15	921	40,000 Ohm Oscillator Grid Leak Resistor
R16	1119	36 Ohm Pilot Light Shunt Resistor

CONDENSERS

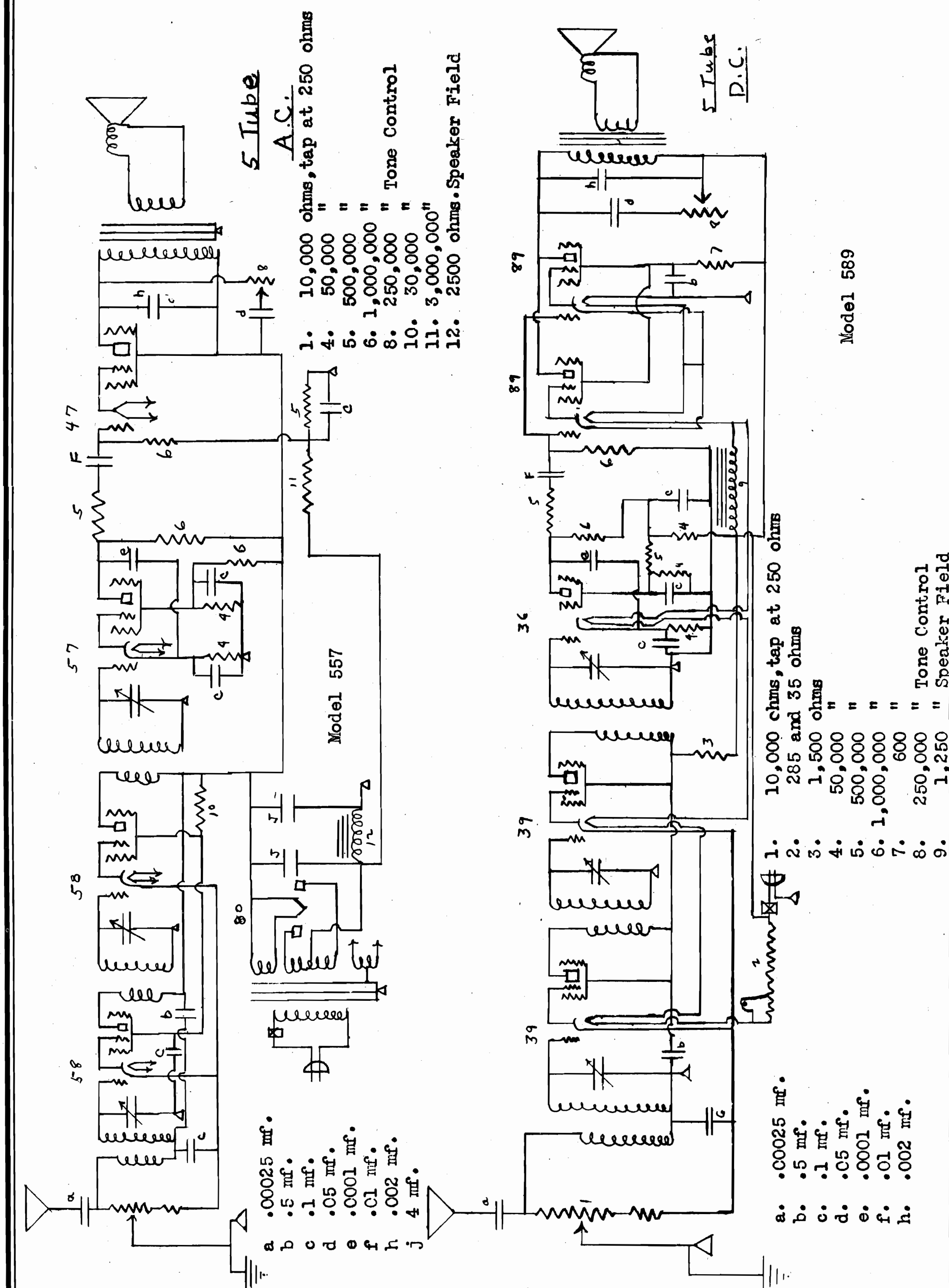
Code	Part No.	
C1	833	371 MMFD. Preselector Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	336 MMFD. Oscillator Section of Tuning Condenser
C4	272	.1 MFD. 78 & 6A7 Screen By-pass Condenser
C5	266	1. MFD. B By-pass Condenser
C6	272	.1 MFD. A.V.C. Network By-pass Condenser
C7	272	.1 MFD. R.F. & I.F. Cathode By-pass Condenser
C8	272	.1 MFD. First Detector R.F. By-pass Condenser
C9	272	.1 MFD. 6A7 Cathode By-pass Condenser
C10	268	.00025 MFD. Oscillator Coupling Condenser
C11	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C12	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C13	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C14	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C15	359	.0001 MFD. Diode Filter Condenser
C16	339	.0001 MFD. Diode Filter Condenser
C17	269	.01 MFD. First Detector Feed Condenser
C18	516	.001 MFD. 75 Plate Filter Condenser
C19	269	.01 MFD. Audio Feed Condenser
C20	928	25 MFD. 43 Cathode Electrolytic By-pass Condenser
C21	269	.01 MFD. Tone Control Condenser
C22	1085	4 MFD. Dry Electrolytic Condenser
C23	1085	4 MFD. Dry Electrolytic Condenser
C24	1085	11 MFD. Dry Electrolytic Condenser
C25	272	.1 MFD. Line By-pass Condenser
C26	1085	19 MFD. Dry Electrolytic Condenser
C27	269	.01 MFD. Antenna Series Condenser
C28	1132	.002 MFD. Output Plate Filter Condenser

INDUCTANCES

Code	Part No.	
L1	1138	Preselector Primary 450 Turns #36 S.S.E.
L2	1138	Preselector Secondary 144 Turns #36 D.D.C.
L3	1137	Detector Coil Primary 750 Turns #36 S.S.E.
L4	1137	Detector Coil Secondary 118 Turns & 77 Turns #36 D.D.C.
L5	1111	Oscillator Secondary 72 Turns & 50 Turns #36 D.D.C.
L6	1111	Oscillator Primary 35 Turns & 15 Turns #36 S.S.E.
L7	1101	8,000 Microhenries First I.F. Primary
L8	1101	8,000 Microhenries First I.F. Secondary
L9	1101	8,000 Microhenries Second I.F. Primary
L10	1101	8,000 Microhenries Second I.F. Secondary
L11		#43 Output Transformer
L12		3,000 Ohm Speaker Field
L13	940	20 Henry Choke
L14		#43 Output Transformer
L15		2,500 Ohm Speaker Field

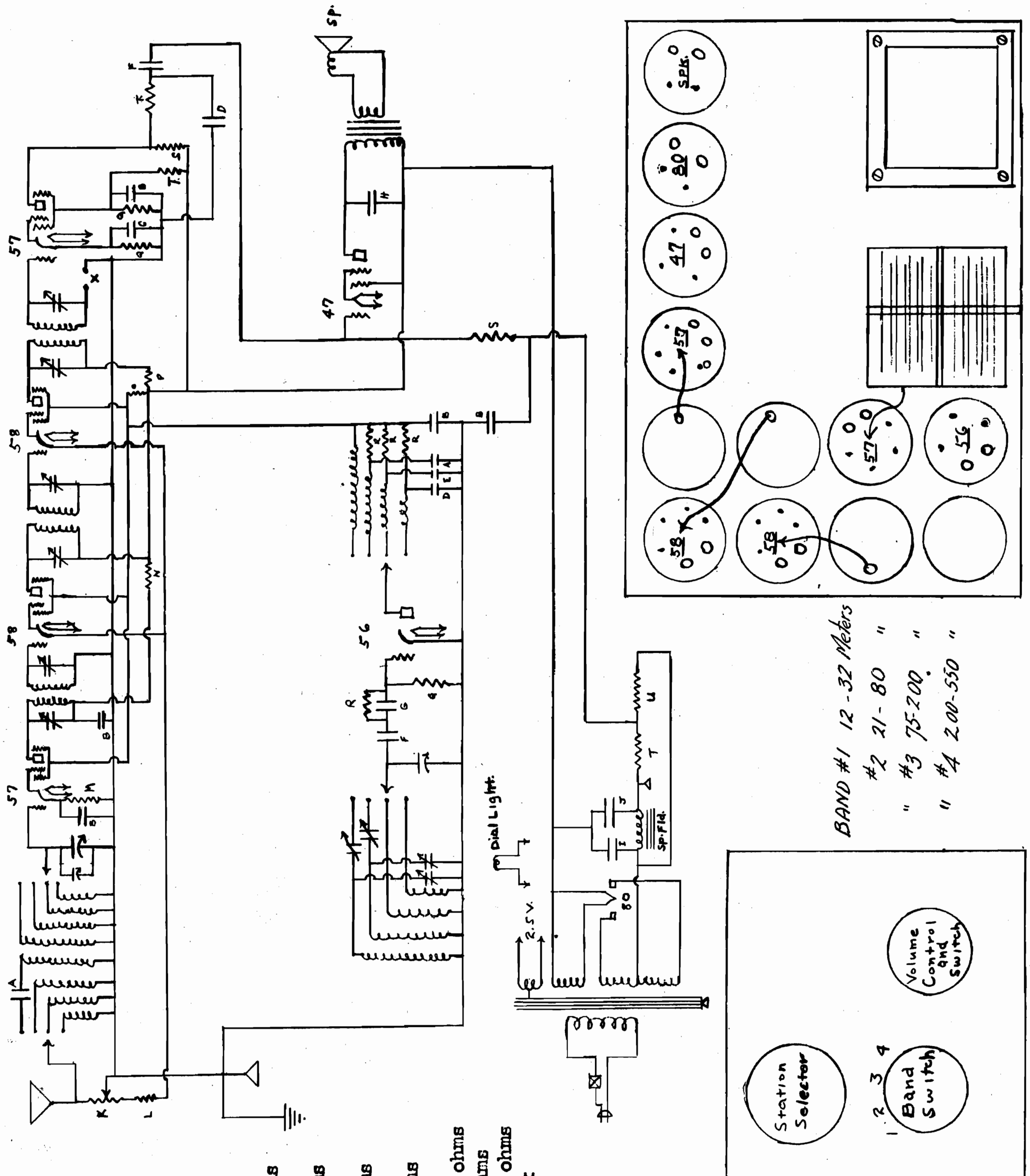
MODEL 557
Schematic
MODEL 589
Schematic

SAVIL RADIO ENGINEERING CORP.



MODEL 715
Schematic

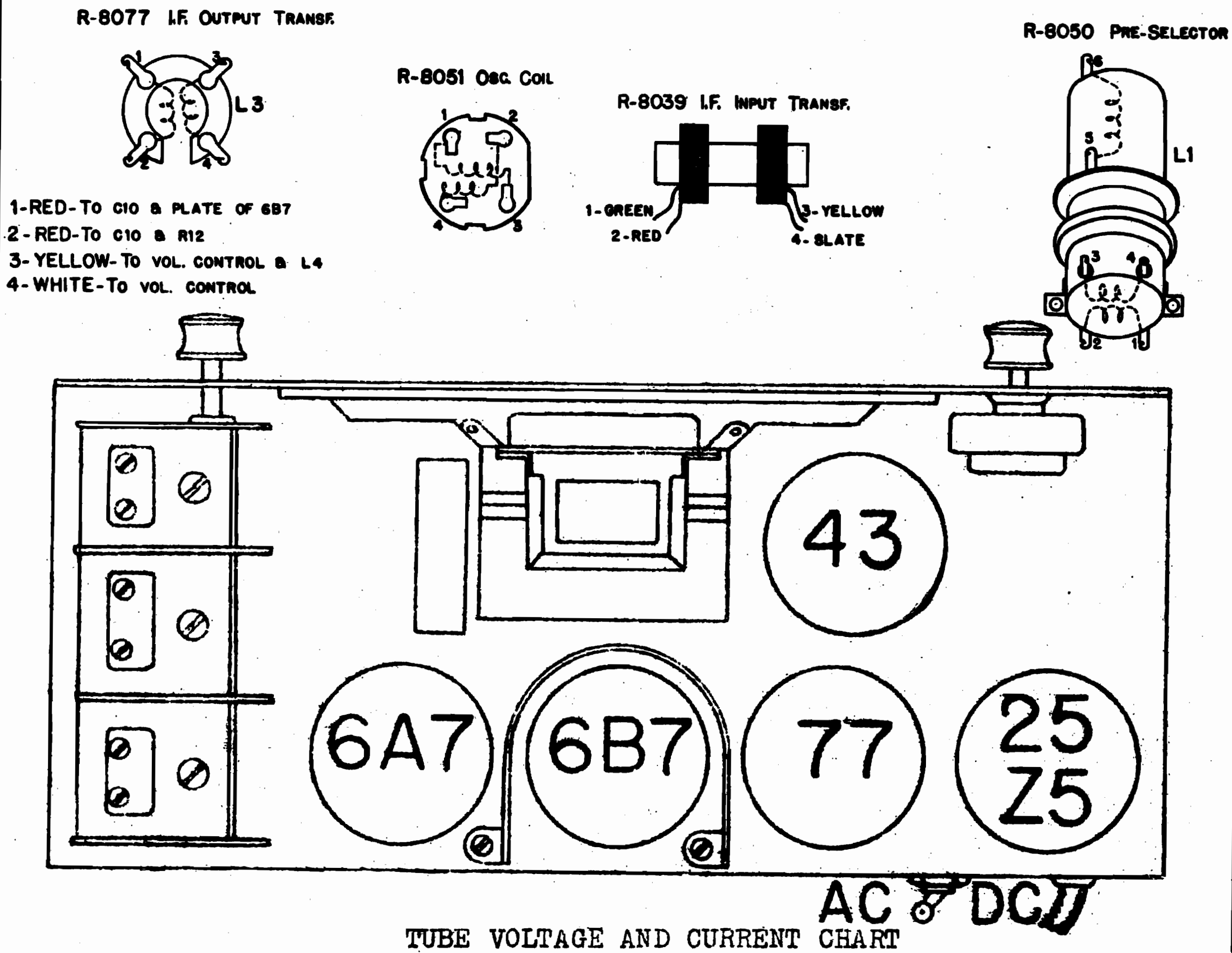
SAVIL RADIO ENGINEERING CORP.



A .00025 mf.
B .1 mf.
C .5 mf.
D .01 mf.
E .001 mf.
F .0001 mf.
G 10 mmf.
H .002 mf.
I 4 mf.
J 8 mf.
K 10,000 ohms
L 175 ohms
M 10,000 ohms
N 1800 ohms
O 30,000 ohms
P 400 ohms
Q 50,000 ohms
R 1000 ohms
S 1,000,000 ohms
T 500,000 ohms
U 3,000,000 ohms
X Phono Jack

MODEL 1700,7062
Voltage,Socket
Data

SEARS-ROEBUCK & CO.



TUBE VOLTAGE AND CURRENT CHART

MODELS 1700 - 7062

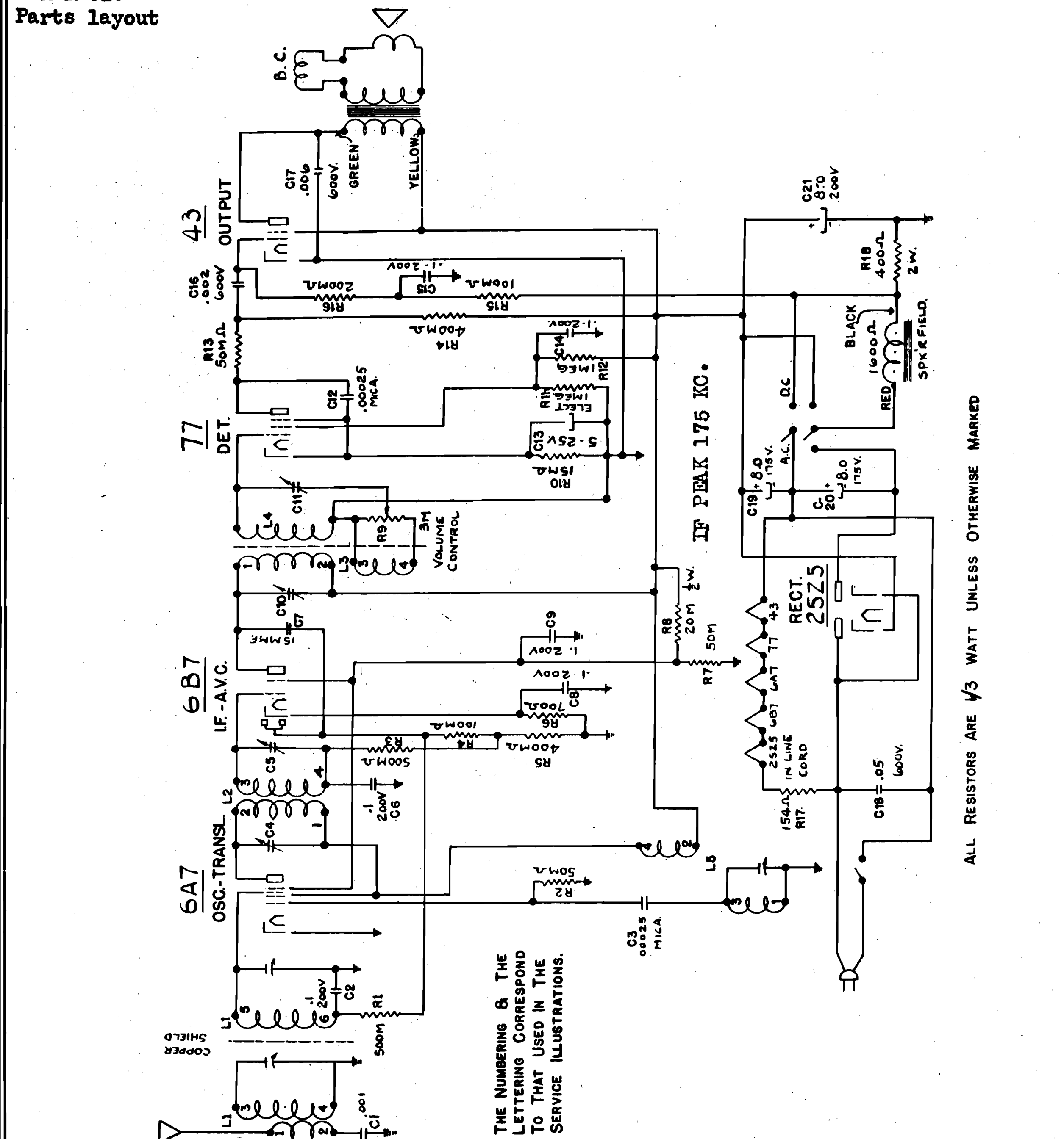
TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE MA	SCREEN M
6B7 - IF-AVC	110	55	-7*	.4	.2
77 - Detector	50	22	-1.5	.1	.04
43 - Output	100	120	-10*	26	5
6A7 - Osc-Transl	Ep=105v; Ip=2ma	EG#1=-5v; Ig#2=1.3ma;	EG#2=105v; EG#3&5=55v; EG#4=*; Ig-#3&5=1.2ma.		
25Z5- Rectifier	Plate Current - 40 M.A.per plate				

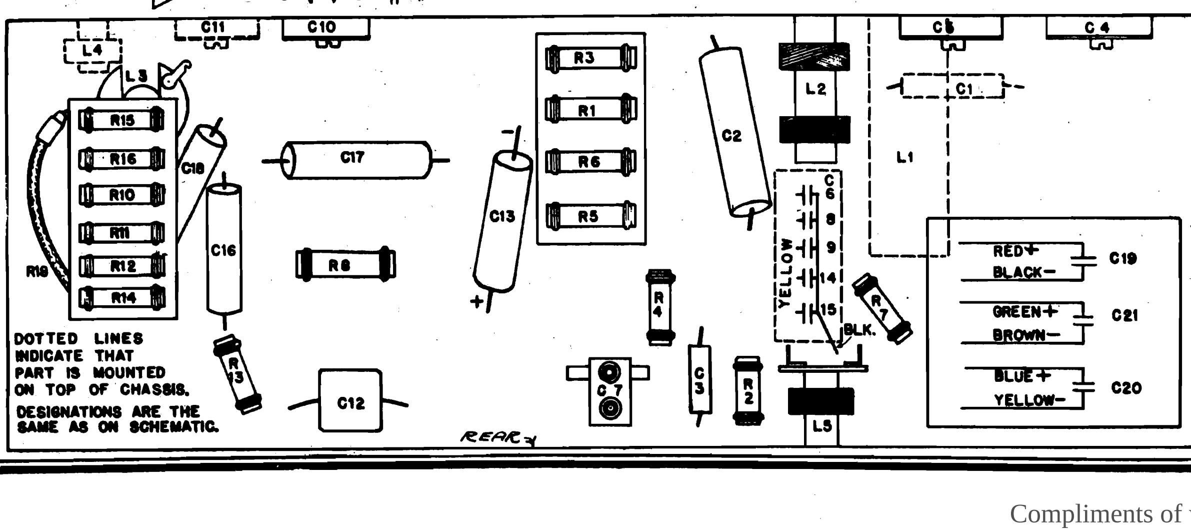
Eg=Grid Voltage Ip=Plate Current
Ep=Plate Voltage Ig=Grid Current

Speaker Field Voltage = 70 v.
*= Indicates high series resistor
Tube heaters are in series so that if one burns out, none will light.
These measurements were made with a 500 volt, 1000 ohms per volt meter.
Power supply 118 volts A.C. Measurements made with set detuned, and speaker field hot. Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation.

MODEL 1700, 7062
Schematic
Parts layout

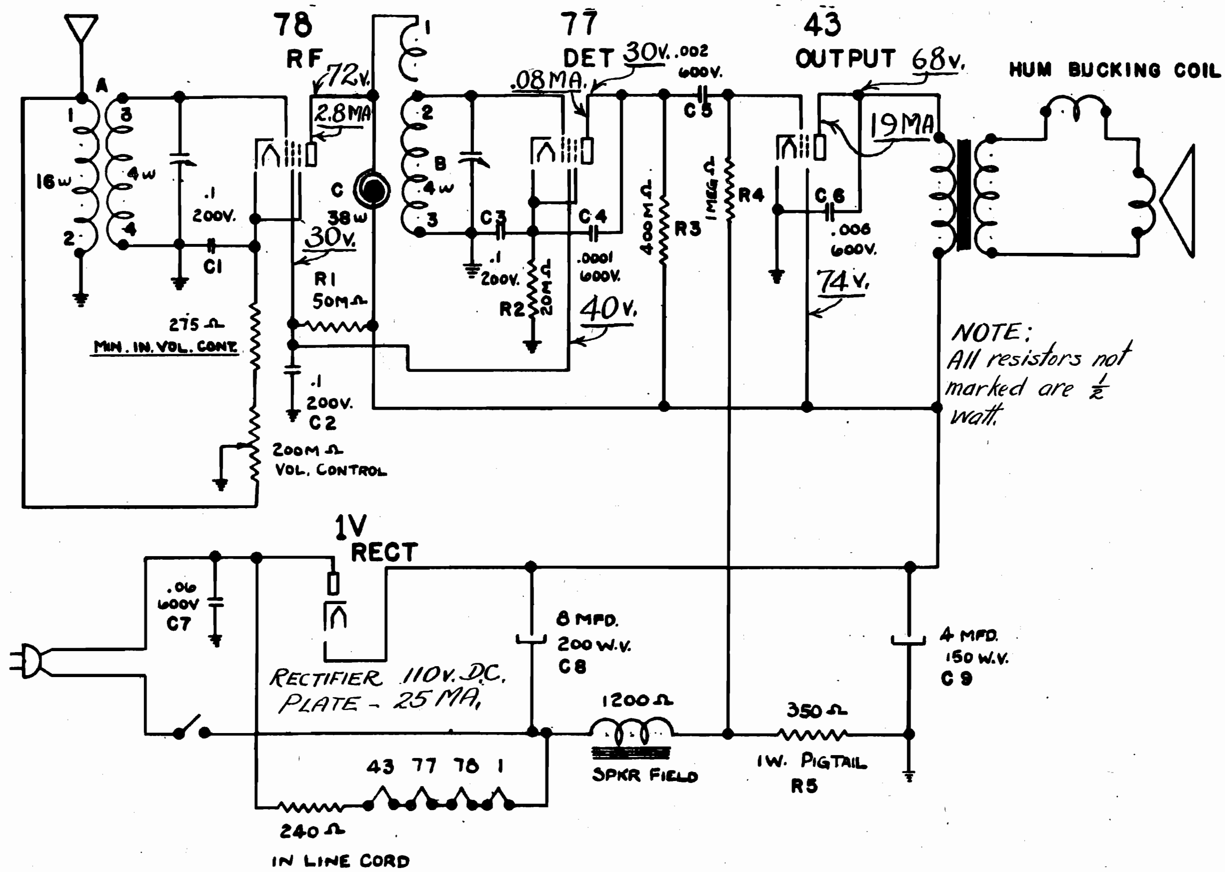
SEARS-ROEBUCK & CO.

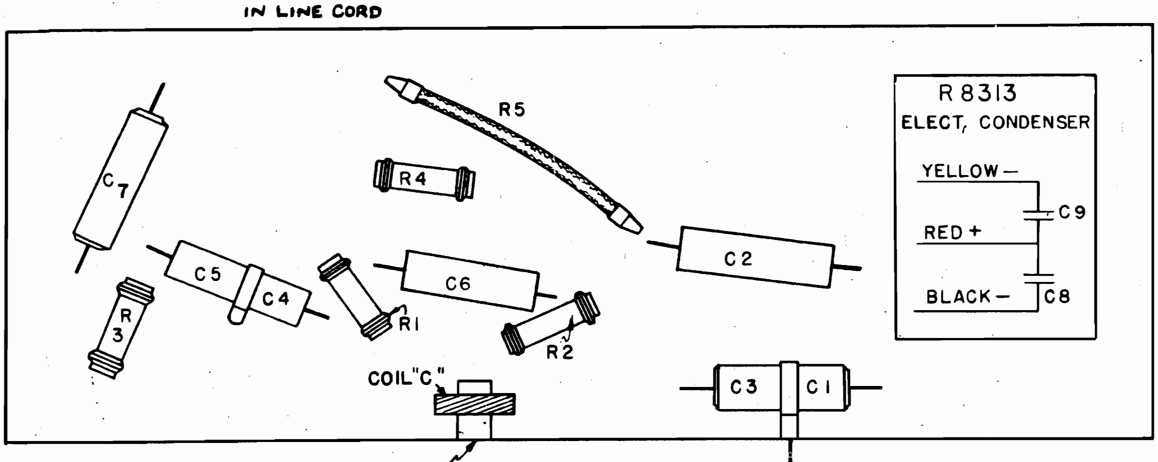




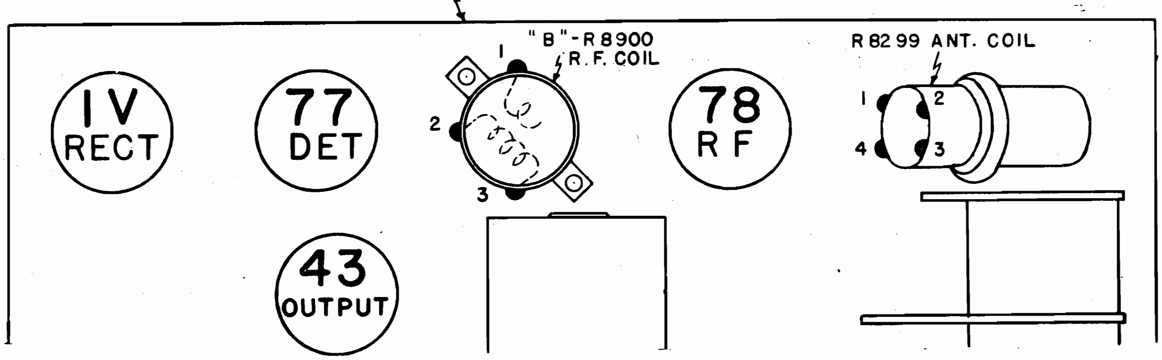
SEARS-ROEBUCK & CO.

MODEL 1703, 7064
Schematic, Socket
Parts layout



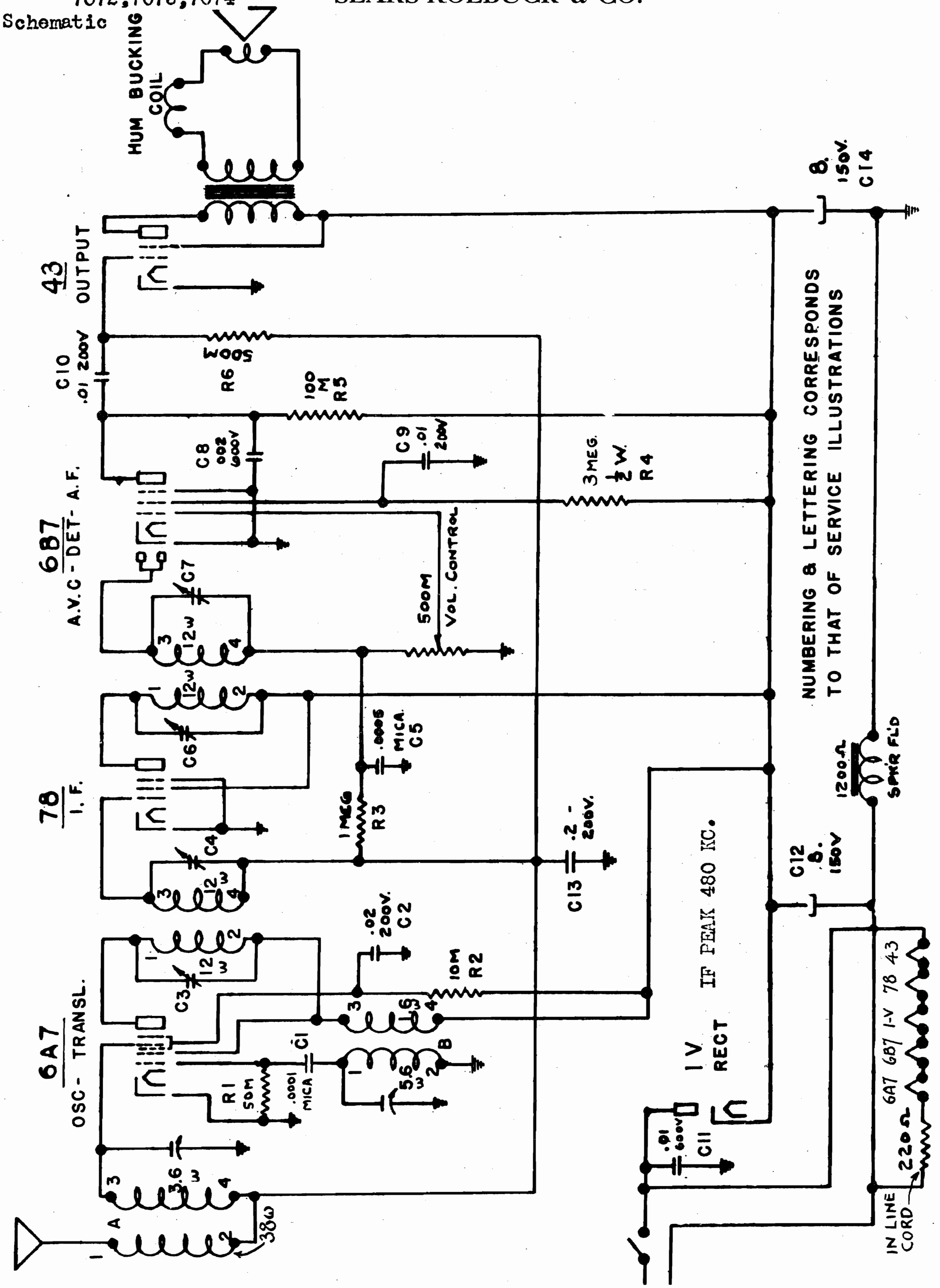


REAR



MODEL 1704,7070,7071,
7072,7073,7074
Schematic

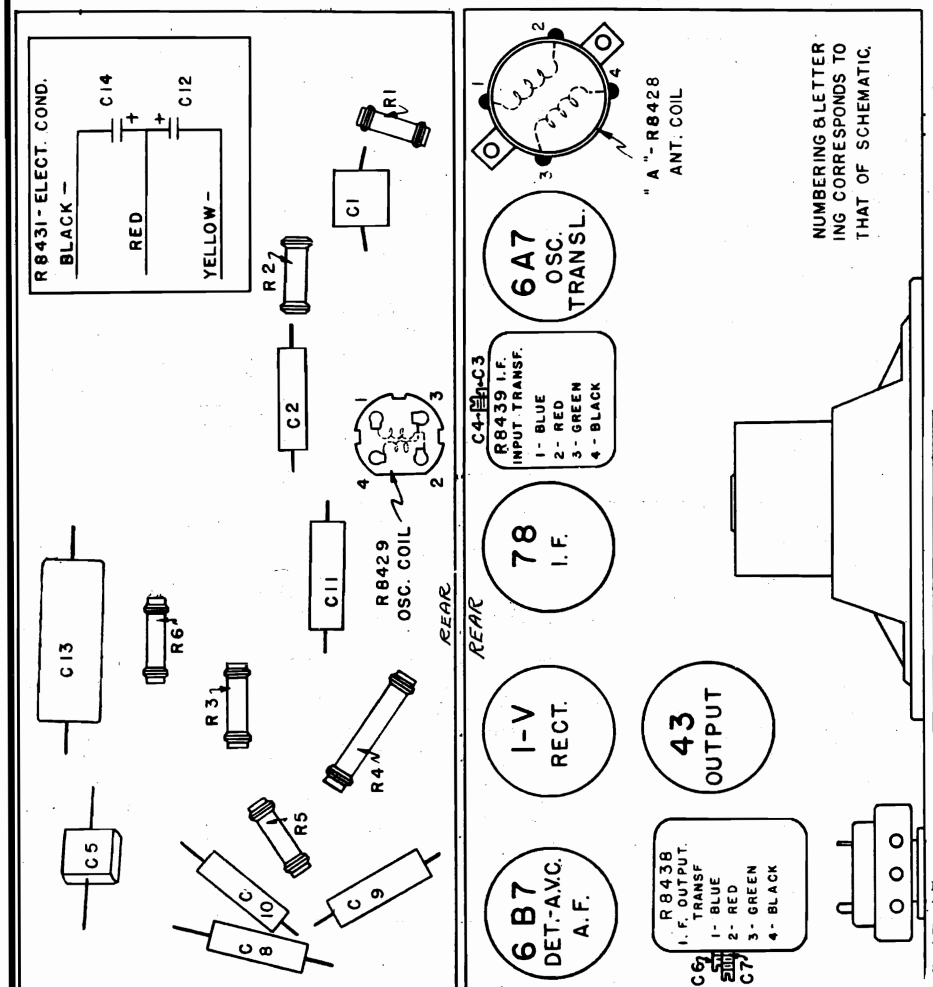
SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

MODEL 1704, 7070, 7071, 7072, 7073, 7074
Voltage, Socket Parts layout

R-8431	Condenser - Dry electrolytic
R-8430	Condenser - Variable tuning
R-6380	Condenser - .2 mfd. 200v.
R-6444	Condenser - .1 mfd. 200v.
R-6629	Condenser - .02 mfd. 200v.
R-8432	Condenser - .01 mfd. 200v.
R-7070	Condenser - .01 mfd. 600v.
R-6933	Condenser - .002 mfd. 600v.
R-6760	Condenser - .0005 mfd. mica
R-8433	Control - Volume 500 M ohm
R-8434	Cord - Power
R-8289	Escutcheon - Station Selector
R-8288	Escutcheon - Volume Control
R-8440	Instruction leaflet
R-8278	Knob
R-8319	Pin - Escutcheon
R-7585	Resistor - 1 megohm, 1/3 watt carbon
R-7228	Resistor - 500 M ohms, 1/3 watt carbon
R-6179	Resistor - 500 M ohms, 1/2 watt carbon
R-7586	Resistor - 100 M ohms, 1/3 watt carbon
R-6156	Resistor - 30 M ohms, 1/2 watt carbon
R-7587	Resistor - 10 M ohms, 1/3 watt carbon
R-8315	Socket - 4 prong
R-8092	Socket - 6 prong
R-8072	Socket - 7 prong
S-8309	Speaker - 1200 ohm, 5"
R-8437	Sticker - Tube layout & license
R-9182	Sticker - NRA
R-8439-A	Transformer - IF input
R-8438	Transformer - IF output



TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	50	50	1	1
6B7 - AVC-Det-AF	25*		.07	
43 - Output	45	50	20	3.75
6A7 - Osc-Transl	Ep=50v; Eg#2=50v; Eg#3&#5=35v; Ip=1m.a.; Ig#2=1.1m.a.; Ig#3&#5=1.5m.a.			
1-V - Rect.	Dc voltage=90v; Plate current = 32m.a.			

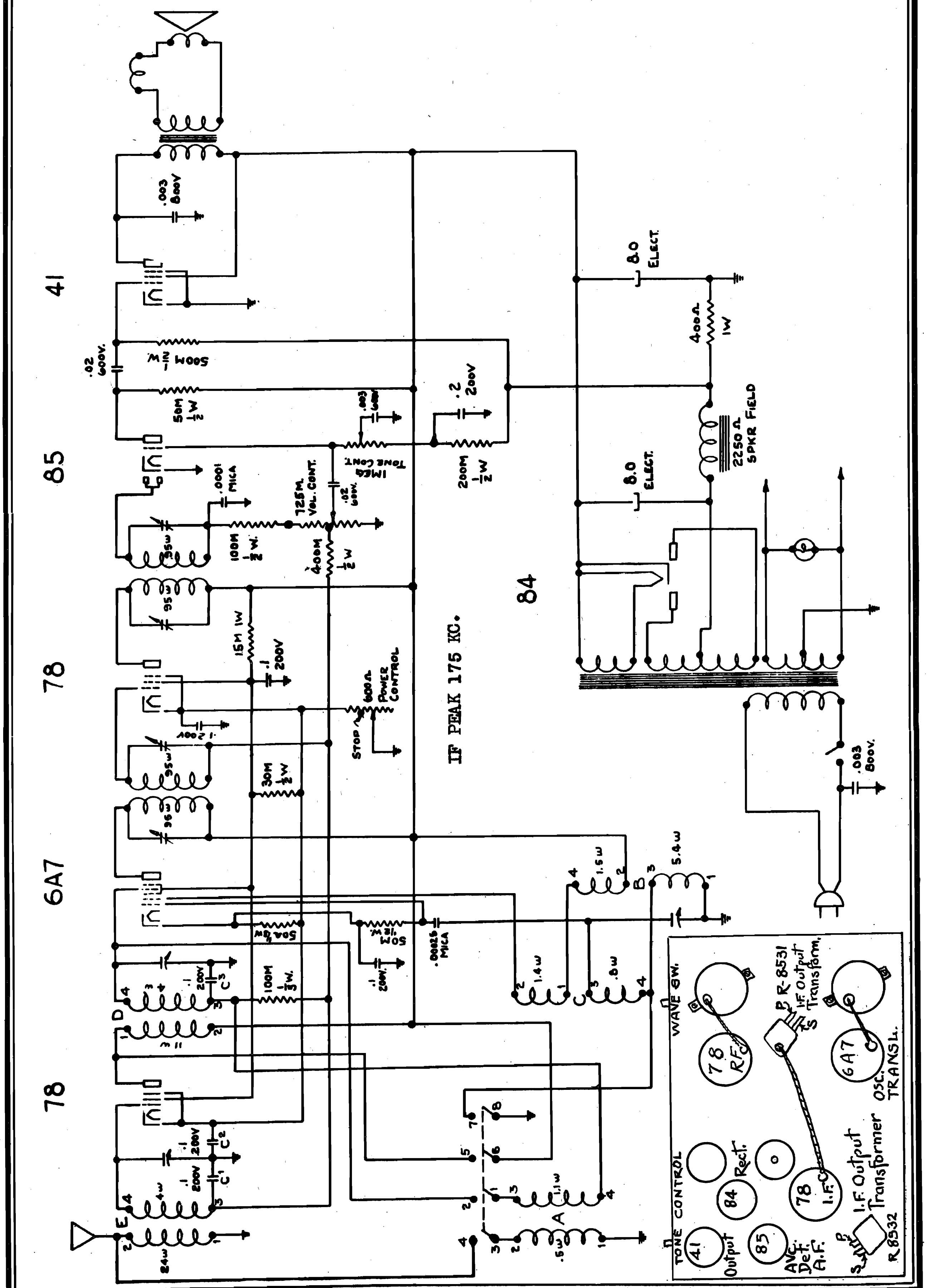
Speaker field voltage =40v.

* - Indicates high series resistor

Readings taken with 1000 ohms per volt meter. Care must be used if measurements are made with an analyzer since the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, voltage readings can be made from cathode to the respective elements of each tube.

MODEL 1705
Schematic

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

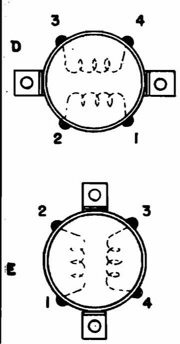
MODEL 1705
Voltage, Socket
Coil data

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M. A.	SCREEN M. A.
78 - RF	155	70	*	4.25	1
78 - IF	155	85	*	5	1.25
85 - AVC-Det-AF	120		*	.75	
41 - Output	155	160	*	12	1.75
6A7 - Osc-Transl	Ep=155v; Eg #2=155v; Eg#3&5=65v; Eg #4=*; Ip=2ma; Ig #2=3.5 ma; Ig #3&5=2.5 ma.				
84 - Rect	Plate current = 17m.a. per plate				

* - Indicates high series resistance.

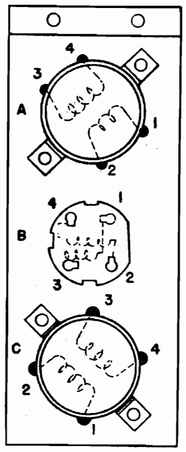
The 78 RF stage is not used in the short wave position. The signal is fed, by coil A, directly to the 6A7 tube control grid. The primary of the 78 RF output transformer, coil D is shorted by contacts 5 and 6 of the wave switch. Contacts 7 and 8 short out the broadcast range oscillator coil B, leaving only the short wave oscillator coil C in the circuit.

COILS MOUNTED ON TOP OF CHASSIS



D - R 8505 TRANSLATOR COIL - BROADCAS'
LUG 1 - TO SWITCH LUG 5 & PLATE OF 78 TUBE
LUG 2 TO SWITCH LUG 6
LUG 3 - TO 100 M OHM RESISTOR & .1 MFD. COND.
LUG 4 - TO #4 GRID OF 6A7

E - R 8504 ANTENNA COIL - BROADCAST
LUG 1 - TO GND.
LUG 2 - TO ANT & SWITCH LUG 4,
LUG 3 - TO 100 M OHM RESISTOR & .1 MFD. COND
LUG 4 - TO CONTROL GRID OF 78 & STATOR, REAR SECTION OF VARIABLE TUNING COND.

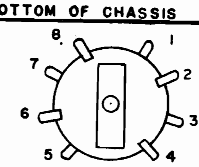


A-R 8507 ANTENNA COIL SHORT WAVE
LUG 1 - TO COIL B LUG 1
LUG 2 - TO SWITCH LUG 3
LUG 3 - TO SWITCH LUG 1
LUG 4 - TO 100 M RESISTOR & .1 MFD. COND.

B-R 8506 OSCILLATOR COIL BROADCAST
LUG 1 - TO SWITCH LUG 8 & GND.
LUG 2 - TO SWITCH LUG 6
LUG 3 - TO COIL C LUG 4
LUG 4 - TO COIL C LUG 1

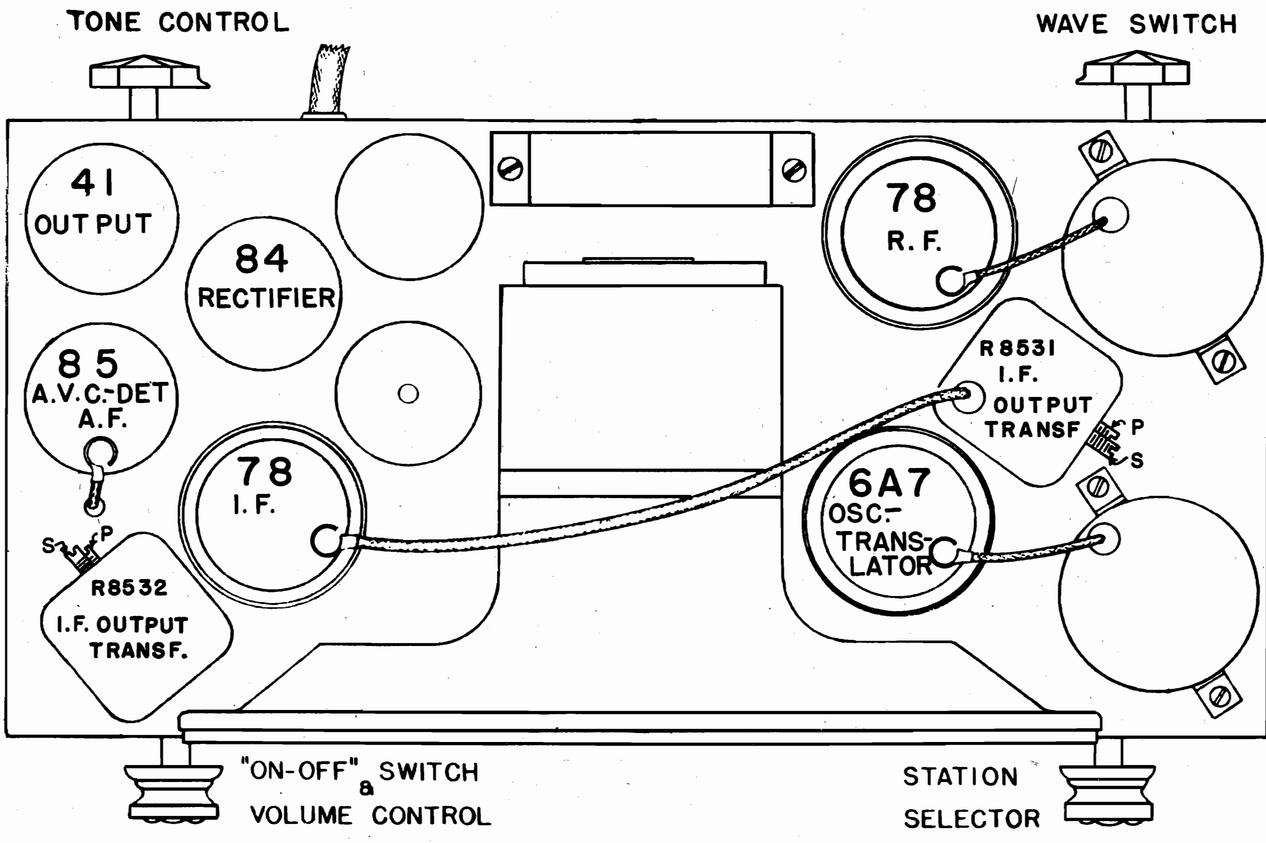
C-R 8508 OSCILLATOR COIL SHORT WAVE
LUG 1 - TO COIL B LUG 4
LUG 2 - TO 6A7 GRID 2
LUG 3 - TO .00025 COND. & STATOR OF FRONT SECTION OF VARIABLE TUNING CONDENSER
LUG 4 - TO COIL B LUG 3 & SWITCH LUG 7

BOTTOM OF CHASSIS



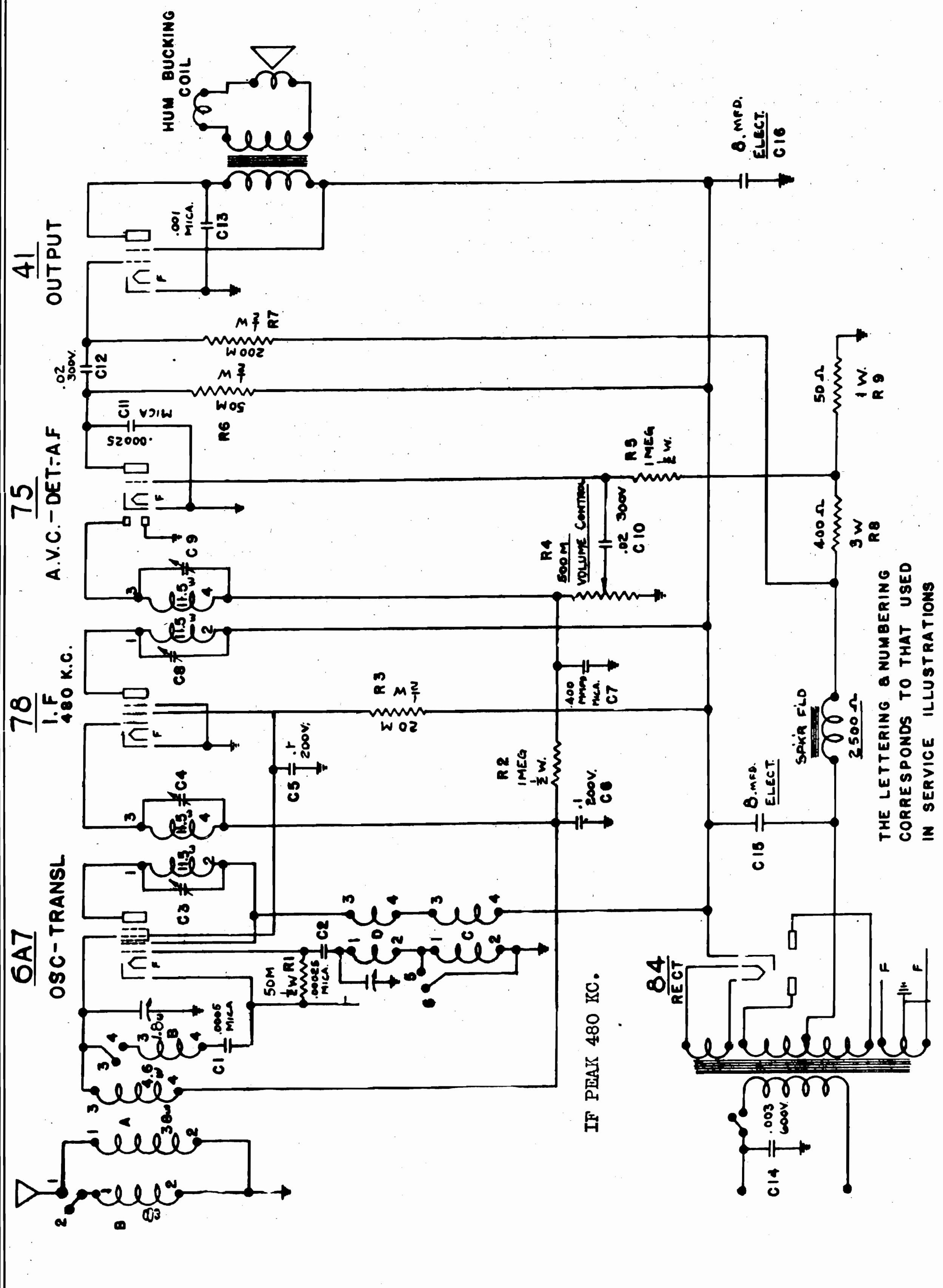
R 8529 - WAVE SWITCH

LUG 1 - TO COIL A LUG 3
LUG 2 - TO STATOR, MIDDLE SECTION OF VARIABLE COND.
LUG 3 - TO COIL A LUG 2
LUG 4 - TO ANT. & COIL E LUG 2.
LUG 5 - TO COIL D, LUG 1 & PLATE OF 78 TUBE.
LUG 6 - TO COIL D LUG 2, COIL B LUG 2 B+ OF I.F INPUT TRANSFORMER & B+
LUG 7 - TO COIL C LUG 4 & COIL B LUG 3
LUG 8 - TO GND. & COIL B LUG 1



MODEL 1706,170
Schematic

SEARS-ROEBUCK & CO.



MODEL 1706,1707
Socket,Trimmers
Parts layout
Voltage

SEARS-ROEBUCK & CO.

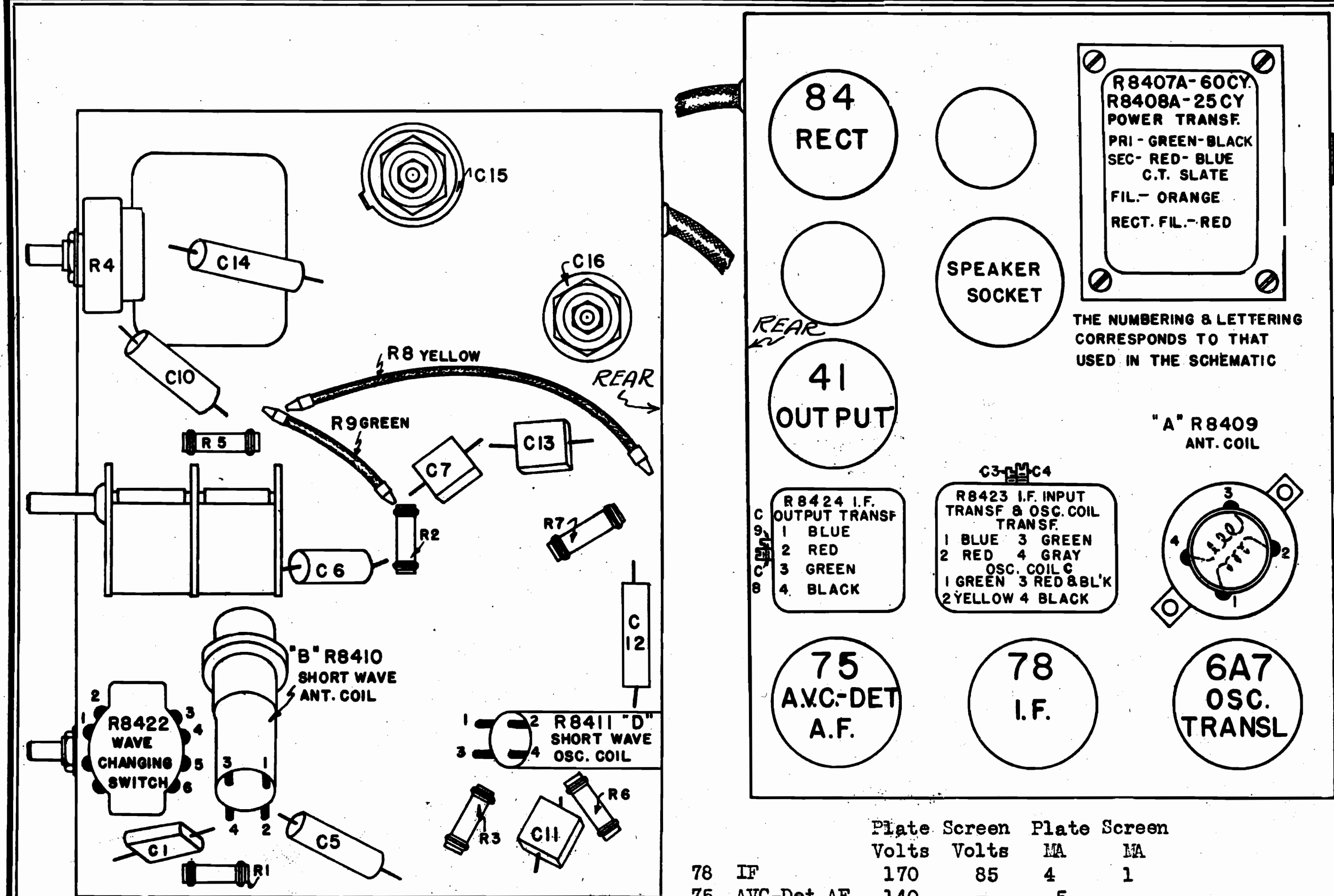
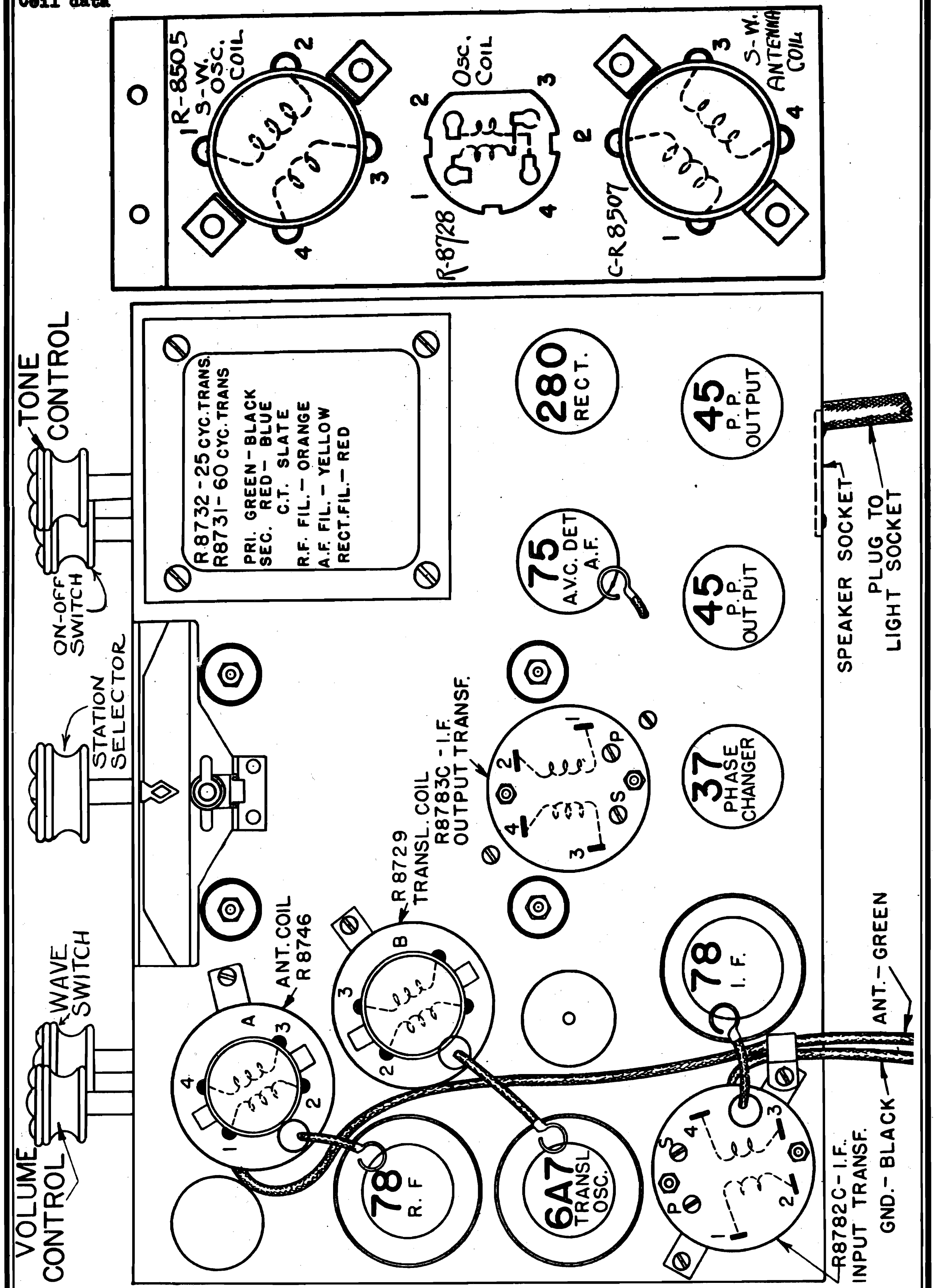


		Plate Volts	Screen Volts	Plate MA	Screen MA
78	IF	170	85	4	1
75	AVC-Det-AF	140	-	.5	-
41	Output	165	170	11.5	2.25

6A7 Osc-Transl. Ep=170v. Eg#2=170v. Eg#3=#5=85v.
Ip=3.4 ma. Ig#2=2.8 ma. Ig#3=#5=2.5 ma.
84 Rect.
84 Rect. Max. DC=270 v. Plate current=18 ma.per plate

MODEL 1708,1709
Socket,Trimmers
Coil data

SEARS-ROEBUCK & CO.



SEARS ROEBUCK & CO.

MODEL 1708, Schematic

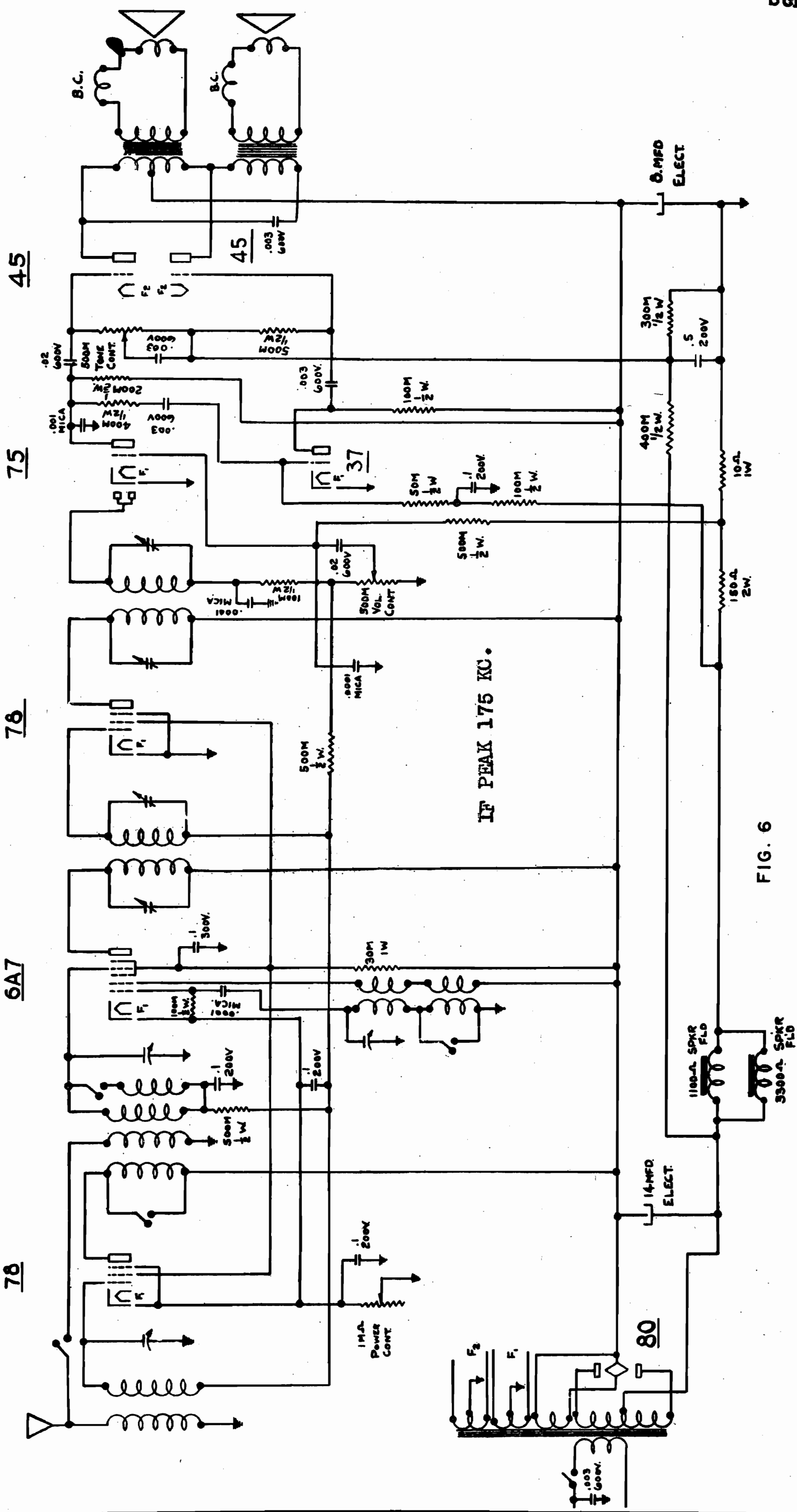


FIG. 6

MODEL 1709
Schematic

SEARS-ROEBUCK & CO.

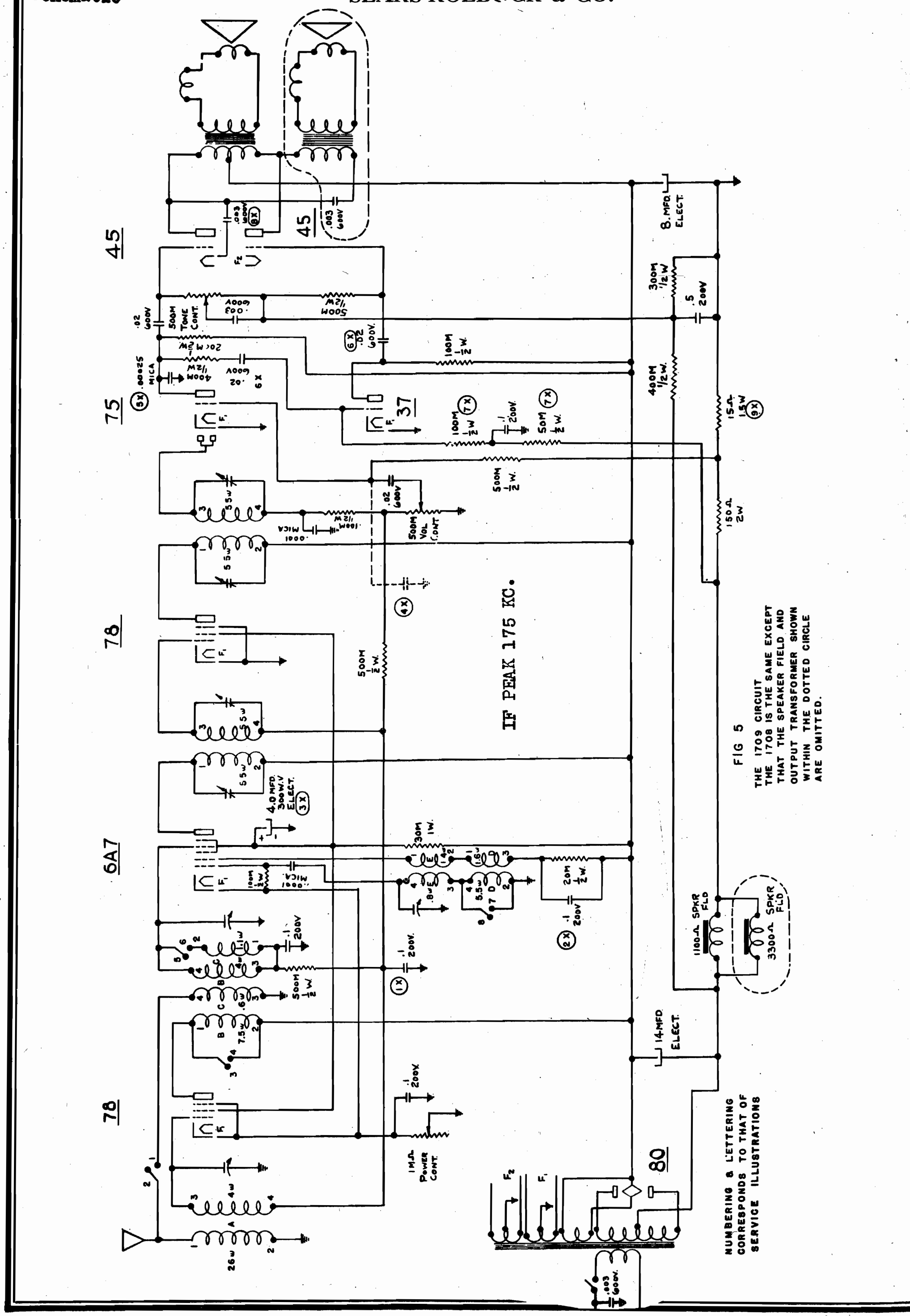


FIG 5
THE 1709 CIRCUIT
THE 1708 IS THE SAME EXCEPT
THAT THE SPEAKER FIELD AND
OUTPUT TRANSFORMER SHOWN
WITHIN THE DOTTED CIRCLE
ARE OMITTED.

SEARS-ROEBUCK & CO.

MODEL 1708,1709
Circuit notes
Voltage

The Models 1708 and 1709 have identical chassis. The 1708 uses a single 8 inch speaker; the 1709, an 8 inch and a 5 inch one.

The majority of this model have been built with the circuit shown in Fig. 5. Some have the circuit of Fig. 6. Any that may be found with this circuit should be changed to the circuit of Fig. 5. The changes are indicated in Fig. 5, with "X" marks. They are:

1. RF translator and IF grid returns were returned to cathode through the .1 Mfd. condenser instead of to ground.

2. A 20 M ohm resistor shunted by a .1 Mfd. 200 v condenser put in eries with the #2 grid of the 6A7. Lack of this resistor and condenser may cause the receiver to stop playing suddenly because of the oscillator's stopping. If the receiver is turned off and then turned on again it will play. This trouble is remedied when the 20 M ohm resistor is put in the 6A7 #2 grid lead. The #2 grid prong is the one directly opposite the heater prongs.

3. The .1 Mfd. condenser from ground to grids #3 and #5 of the 6A7 changed to 4 Mfd. electrolytic (R-9237).

4. The .0001 Mfd. mica condenser from the 75 grid to ground, removed.

5. The .001 Mfd. mica condenser from the 75 plate to ground has been replaced by a .00025 (R-4592).

6. The .003 Mfd. condenser in the 37 grid lead has been changed to .02 (R-6761).

7. The positions of the 100 M ohm and 50 M ohm resistors in the 37 grid lead have been interchanged.

8. A .003 Mfd. 600 volt condenser (R-7681) has been added from plate to filament of one of the 45 tubes.

9. The 10 ohm biasing resistor in the b - lead has been changed to a 15 ohm, 1.5 watt flexohm(R-9238).

The 78 RF tube is used only in the broadcast position. For the short wave range the antenna is coupled directly to the 6A7 tube through coil C.

In the short wave position, coil D is shorted out, leaving only the low inductance coil, E.

TUBE VOLTAGE AND CURRENT CHARTS

MODEL 1708

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - RF	235	80	*volume -10 con.off	1-vol.off 5-vol. on	.25-vol.off 1.5-vol. on
78 - IF	235	80	*	1.5	1
75 - AVC-Det-AF	110		*	.54	
'37 -Phase changer	135		*	5.5	
'45 - Output	235		*	30	
6A7 - Osc-transl	Ep=235v; Eg#2=180v; Eg#3&#5=80v; Ip=4.9m.a.; Ig#2=1.6m.a.; Ig#3&#5=1.7m.a.				
280 - Rectifier	Max. d.c. volts-355. Plate current-42m.a.perplate				

MODEL 1709

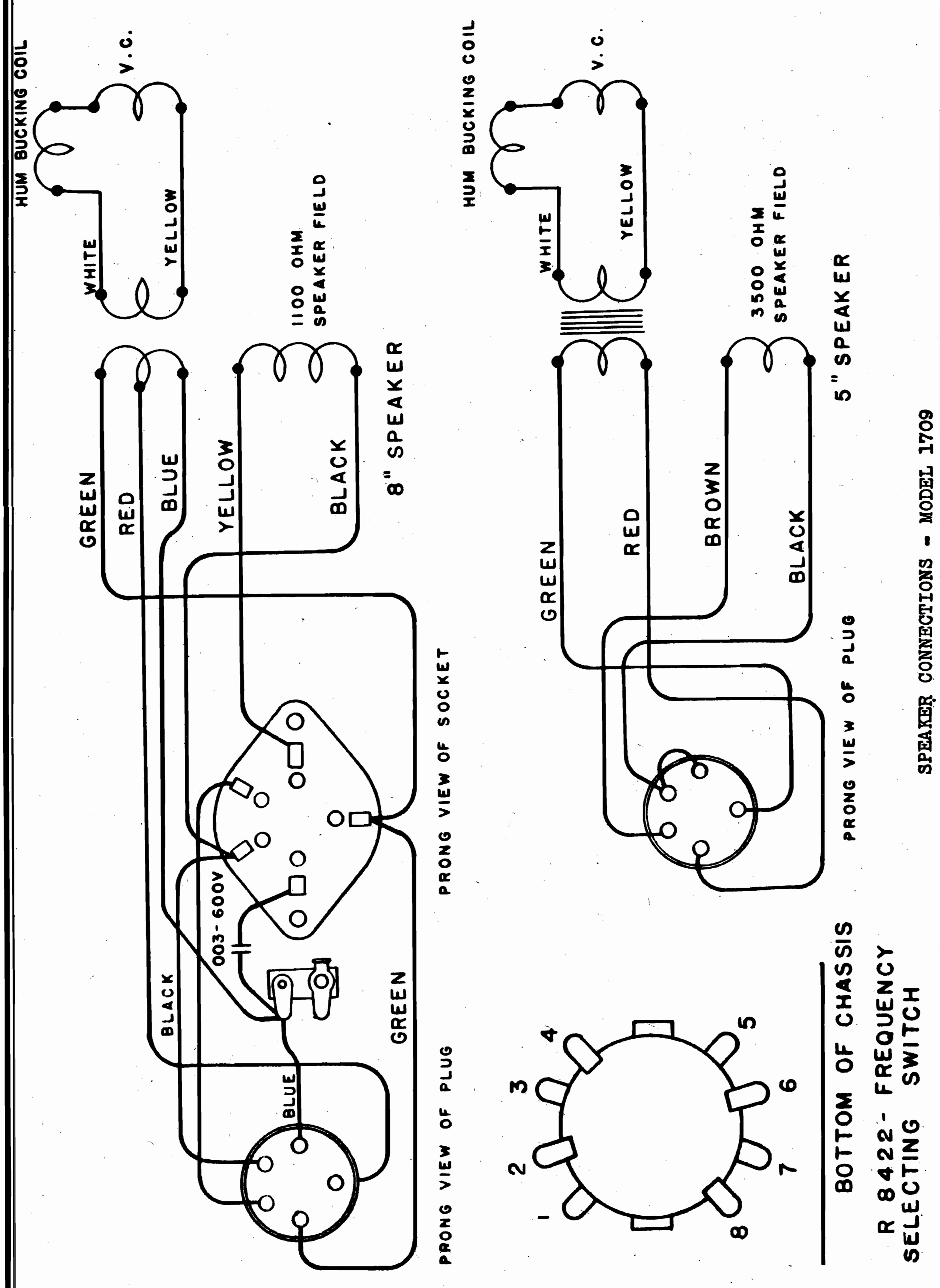
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - RF	235	80	*volume -10 con.off	1-vol.off 5-vol. on	.25-vol.off 1.5-vol. on
78 - IF	235	80	*	1.7	.85
75 - AVC-Det-AF	115		*	.45	
'37-Phase changer	145		*	.9	
'45 - Output	230		*	37	
6A7 - Osc-Transl	Ep=235v; Eg#2=180v; Eg#3&#5=80v; Ip=4.9m.a.; Ig#2=1.6m.a.; Ig#3&#5=1.7m.a.;				
280 - Rectifier	Max. d.c. volts=345. Plate current=50m.a. per plate				

* - Indicates high series resistance.

Readings taken with a 1000 ohms per volt meter. Care must be used if measurements are made with an analyzer since the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, voltage readings can be made with a 1000 ohms per volt meter connected from cathode to the respective element of each tube.

MODEL 1708,1709
Speaker data

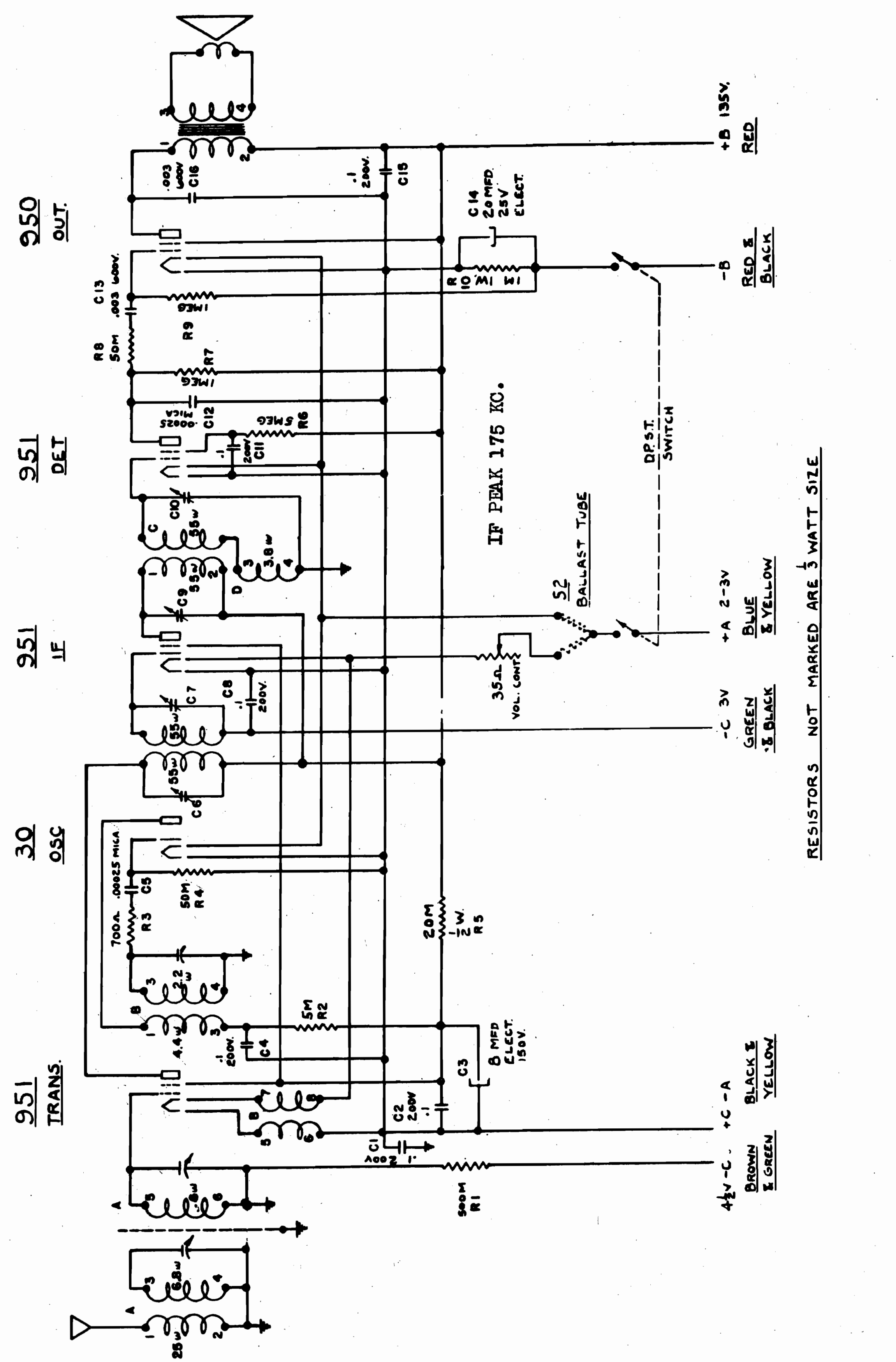
SEARS-ROEBUCK & CO.



SPEAKER CONNECTIONS - MODEL 1709

SEARS-ROEBUCK & CO.

MODEL 1710
Schematic



MODEL 1710

Notes, Socket Voltage, Parts

SEARS-ROEBUCK & CO.

A type 951 translator tube creates a 175 kc signal in its plate circuit by mixing the incoming broadcast signal with the signal created by the type 230 oscillator. This 175 kc signal is amplified by the 951 IF stage and coupled to the 951 detector. The audio output of the detector is fed to the 950 output tube and then to the permanent magnet dynamic loud-speaker.

Volume is controlled by a 35 ohm rheostat in the IF and translator filament circuit. A type 52 ballast tube automatically adjusts the filament voltage to the proper value (2 volts) even though the A supply has a value anywhere between two and three volts. Always turn the set off before removing or inserting tubes.

If the chassis is removed from the cabinet, this procedure should be followed, when replacing it, in order to maintain the dial calibration:

1. Turn the Volume Control shaft all the way to the right.

2. Tighten the Volume Control knob on its shaft, with the pointer of the knob facing the head of the arrow on the escutcheon. Do not let the shaft turn during the process.

3. Replace and tighten the Station Selector knob, paying no attention to the position of the pointer with respect to the Station Selector dial markings.

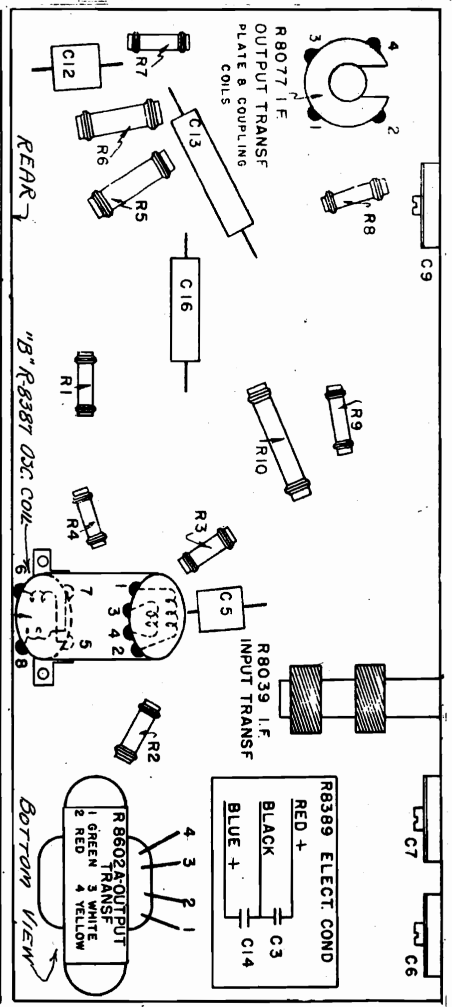
4. Turn the receiver on and tune in some station of known frequency of approximately 1000 kc. If none is known, tune in some station at about the middle of the tuning range (the middle can be located by turning the knob all the way in both directions and then turning it back half way) and wait for the station to announce its call letters. Its frequency can then be determined from the listing on the radio program page of your local newspaper or from a radio "log".

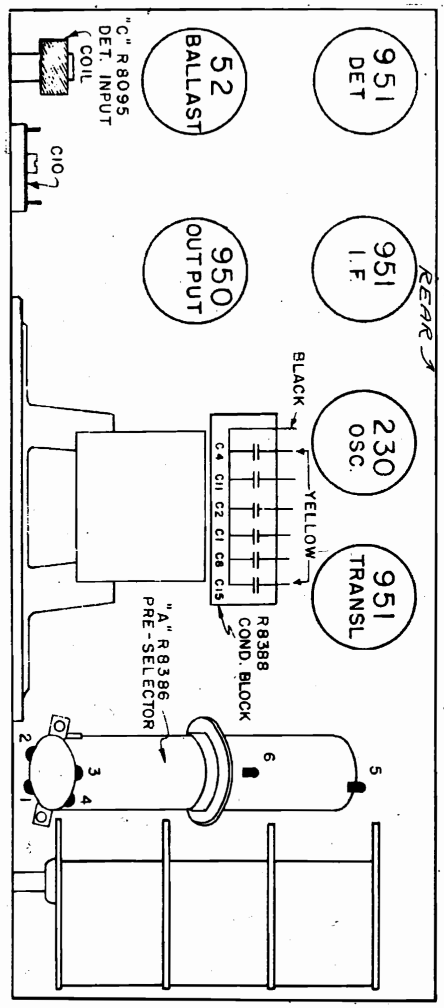
5. Then loosen the Station Selector knob set screw, being very careful not to move the Station Selector shaft. (Leave the station tuned in as a check of this.)

6. Turn the knob until the pointer is at a dial marking which is the same as the station's frequency.

7. Tighten the set screw.

As an example, suppose a 900 kc station has been tuned in. The knob setscrew would be loosened, the knob turned until the pointer was at 9 on the dial, and the setscrew then retightened. In this way the accuracy of the dial calibration is maintained.

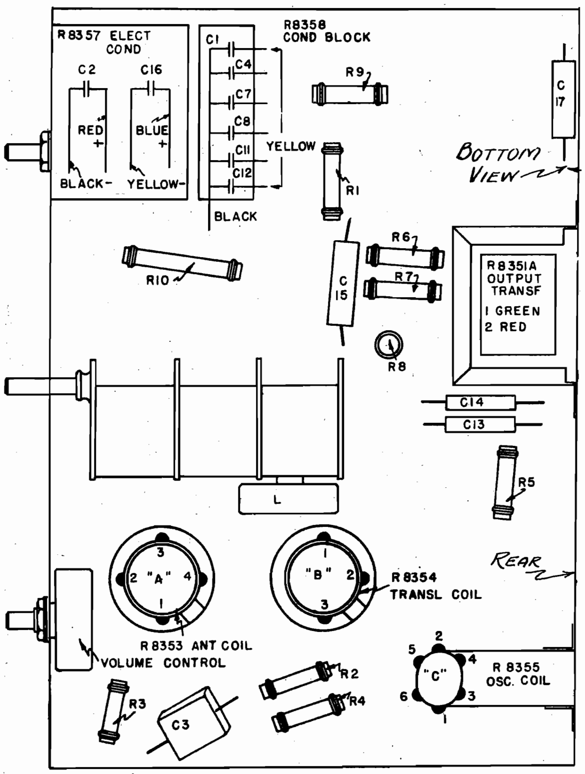


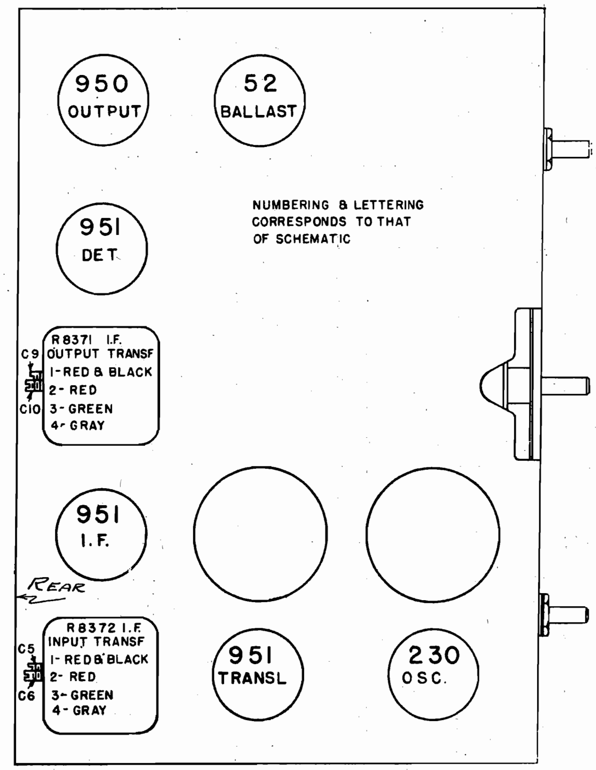


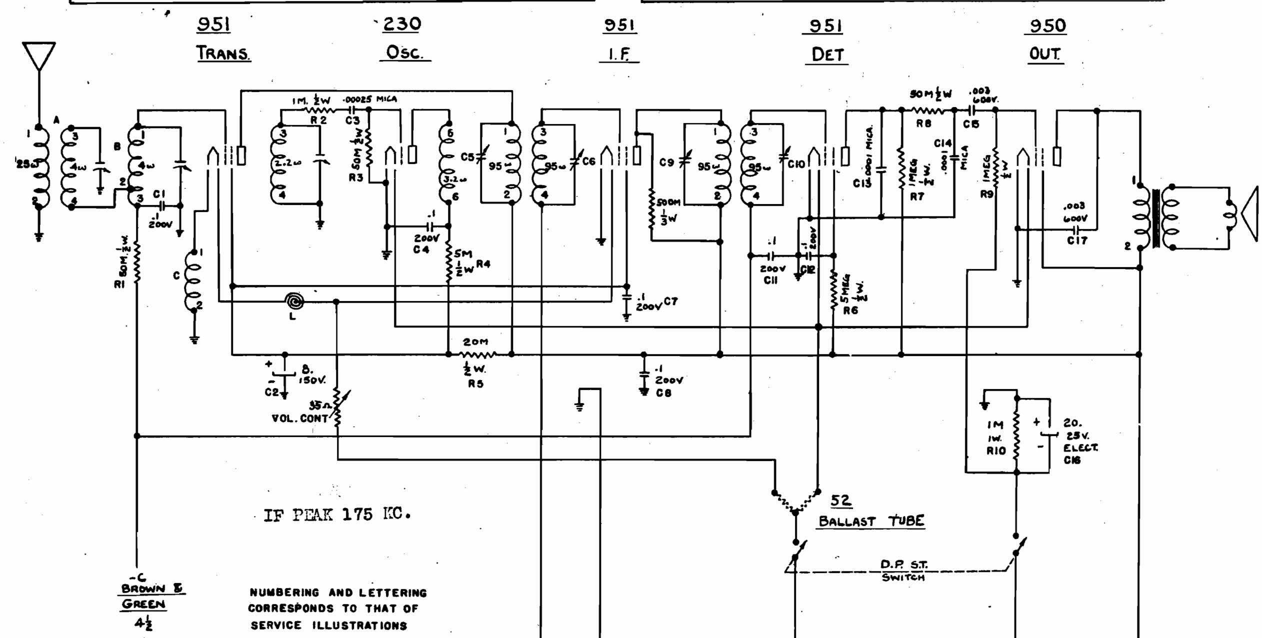
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
951 - Translator	135	65	.85	.2
230 - Oscillator	50		2.6	
951 - IF	135	65	1.5	1.7
951 - Detector	25*	10*	.03	.02
950 - Output	135	135	6	1.5

SEARS-ROEBUCK & CO.

MODEL 1711,7090
Schematic,Socket
Parts layout
Voltage





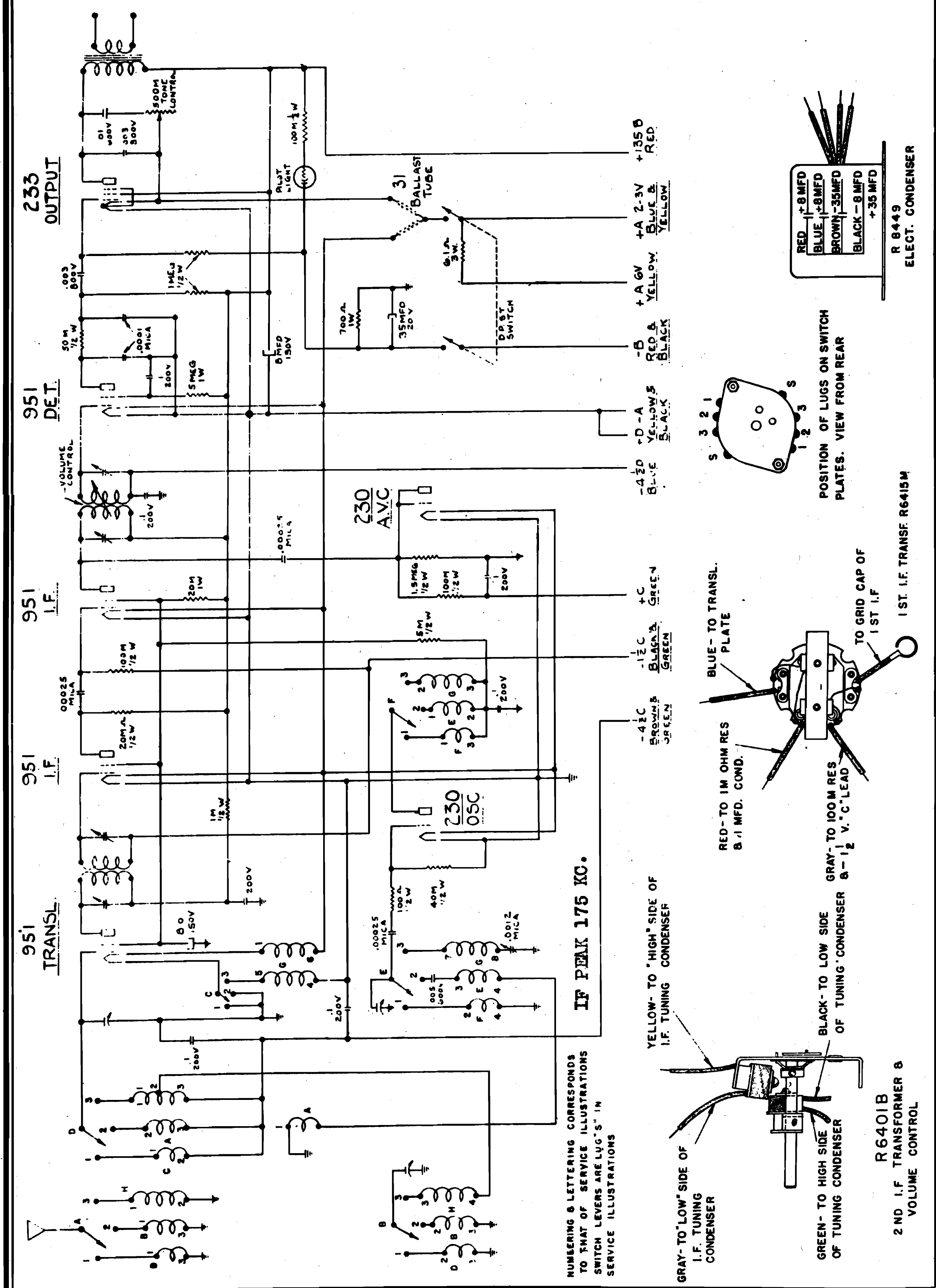


IF PEAK 175 KC.

		Plate Volts	Screen Volts	Plate MA	Screen MA
230	Osc.	50	-	2.8	-
951	Transl.	135	65	1.25	1.5
951	IF	135	65	1.5	2
951	Det.	25	5	.03	.01
950	Output	135	135	5.	1

MODEL 1712, 1713
Schematic
Coil data

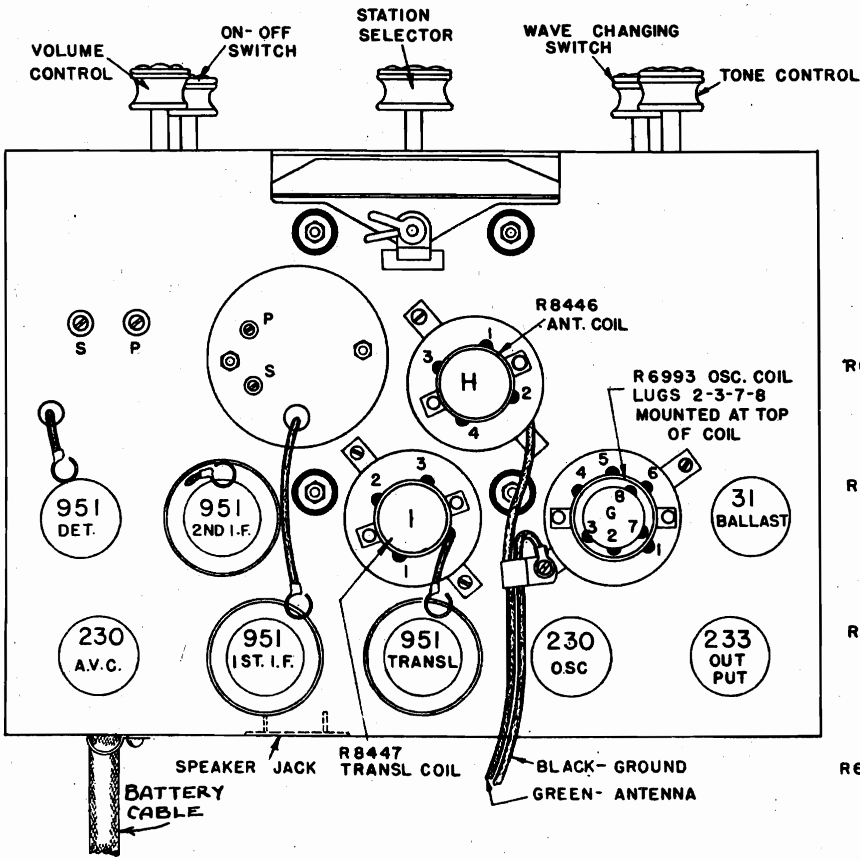
SEARS-ROEBUCK & CO.

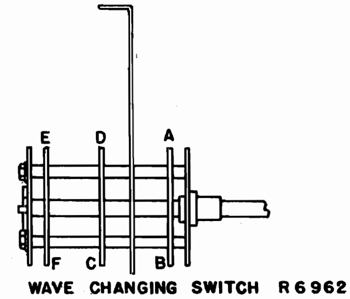


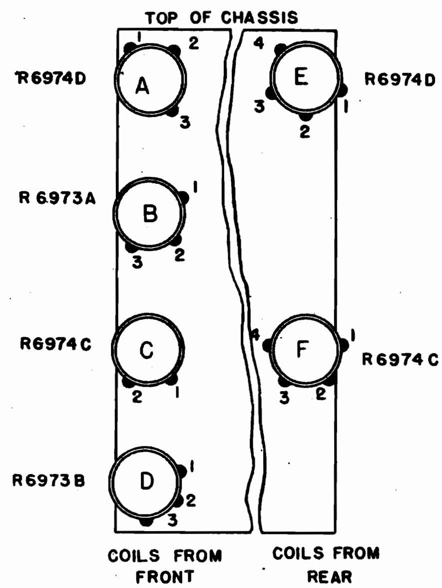
SEARS-ROEBUCK & CO.

MODEL 1712,1713
Voltage,Socket
Trimmers

In order to properly peak the i-f stages short out the AVC system by connecting C plus to the chassis







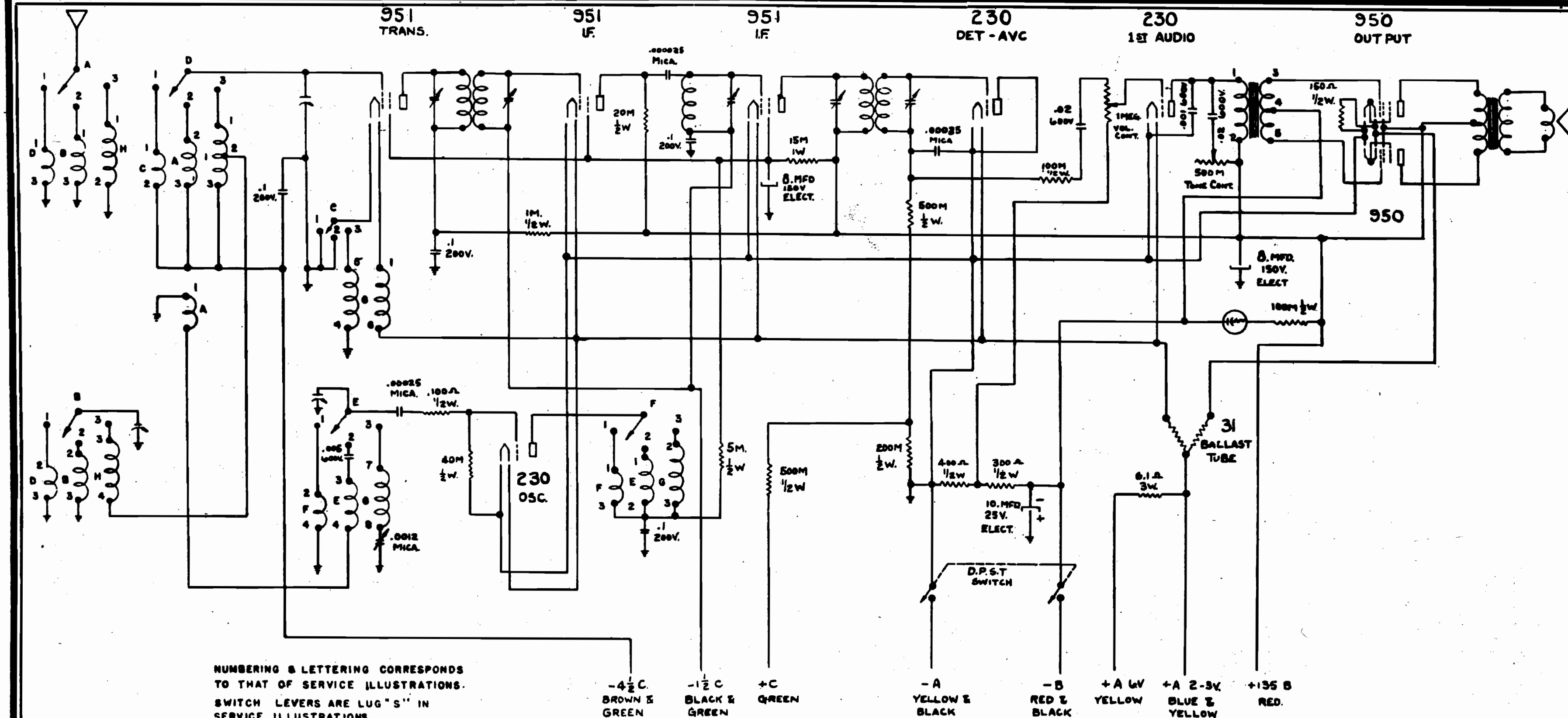
TUBE VOLTAGE AND CURRENT CHART

Models 1712 & 1713

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
230 - Oscillator	45		2.25	
951 - Translator	135	55	.65	.08
951 - 1st IF	85	55	2	.5
951 - 2nd IF	135	55	2.5	.6
951 - Detector	25*	10*	.06	.02
233 - Output	130	135	10	2.5
230 - AVC	Used as rectifier with no applied DC potential			

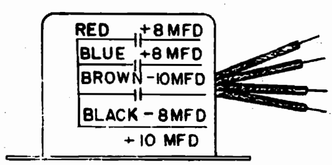
MODEL 1714
Schematic, Voltage

SEARS-ROEBUCK & CO.



NUMBERING & LETTERING CORRESPONDS TO THAT OF SERVICE ILLUSTRATIONS. SWITCH LEVERS ARE LUG "S" IN SERVICE ILLUSTRATIONS.

IF PEAK 175 KC.



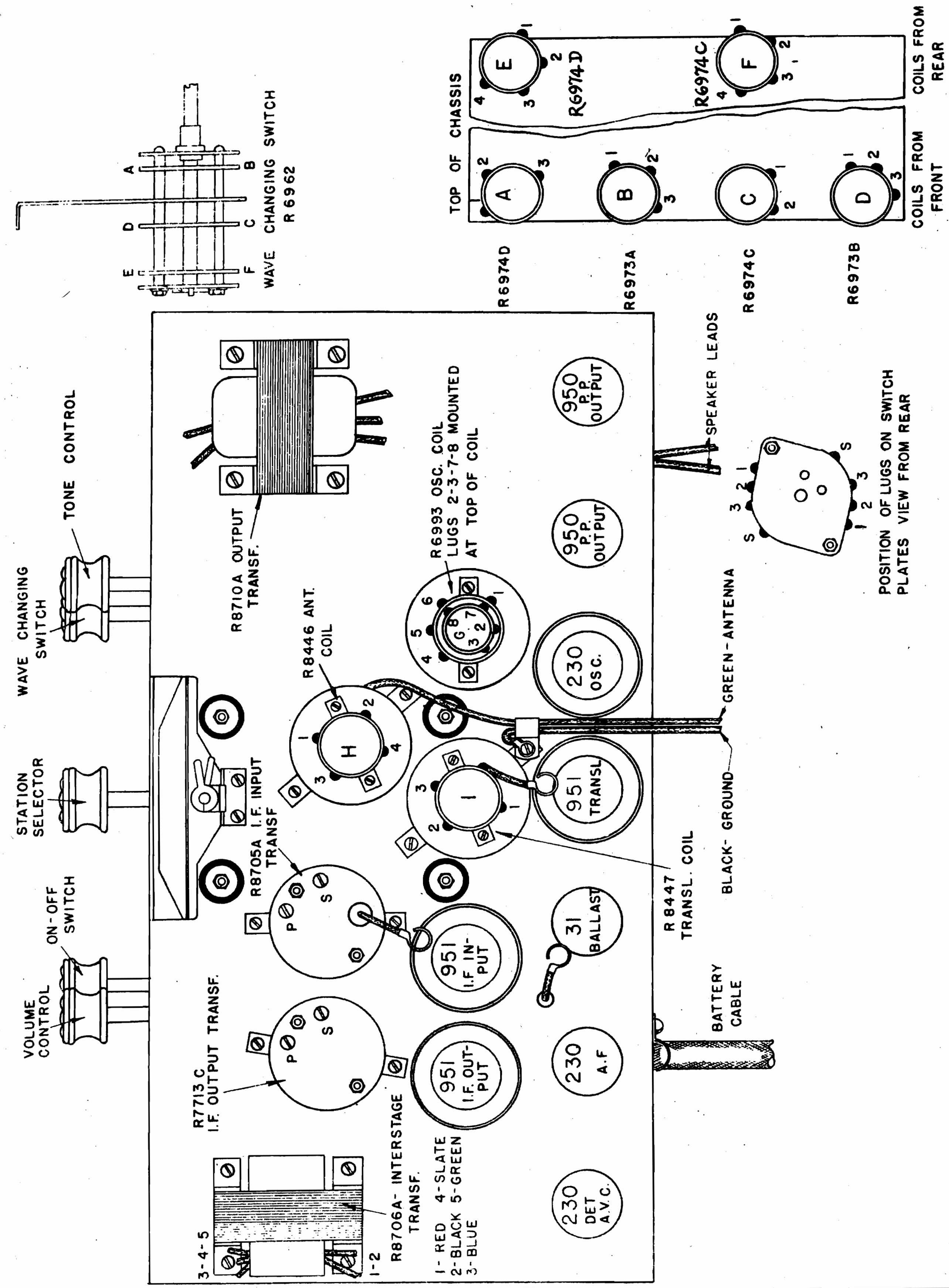
R8707
ELECT CONDENSER

NUMBERING & LETTERING CORRESPONDS TO THAT OF SCHEMATIC DIAGRAM

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
230 - Osc.	50		3.8	
951 - Transl.	135	65	1.25	.3
951 - 1st IF	90	65	1.7	.5
951 - 2nd IF	135	65	2.5	.7
230 - AF	130		1.75	
950 - P.P. Output	130	135	6	1.5

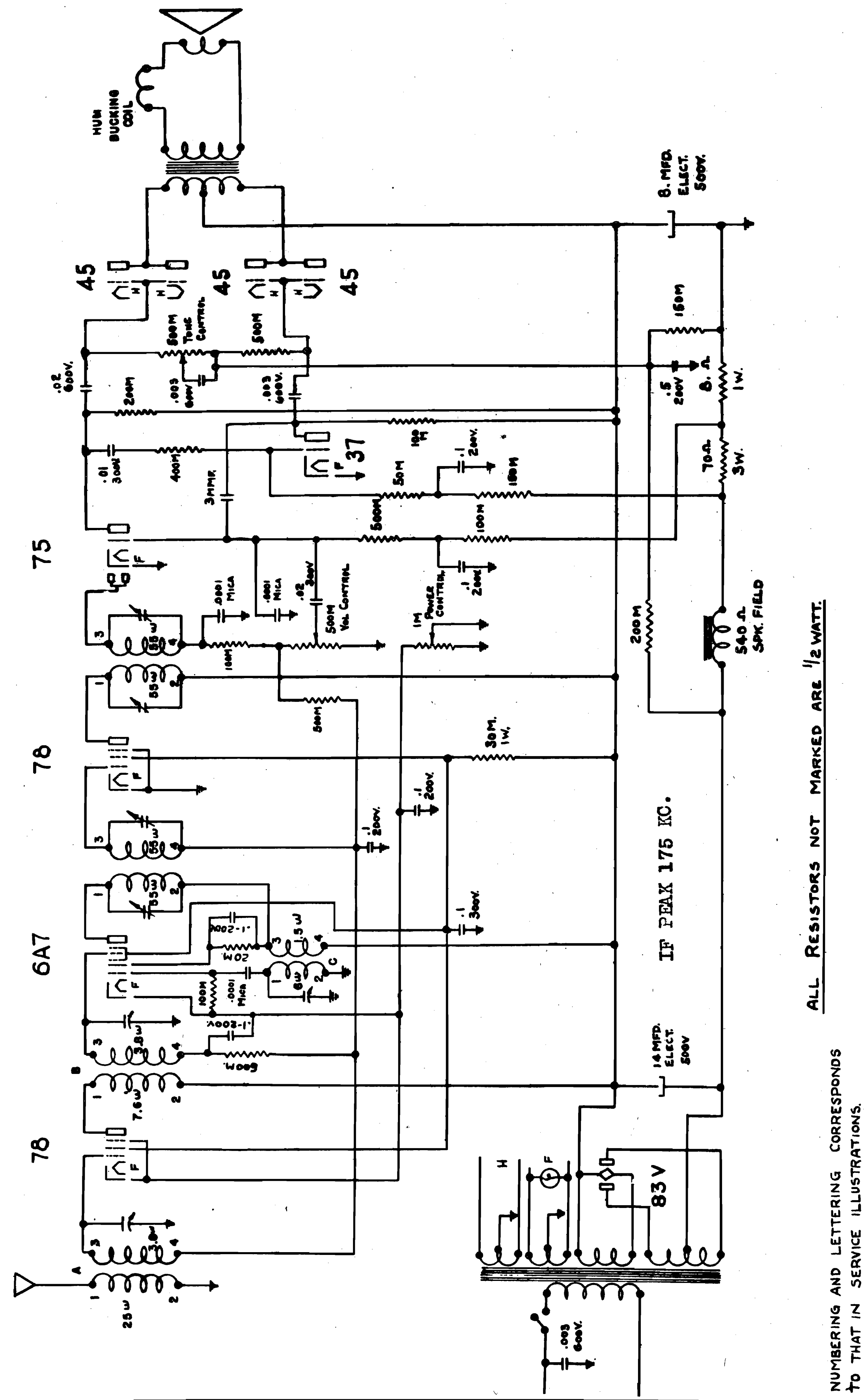
SEARS-ROEBUCK & CO.

MODEL 1714
Socket, Trimmers



MODEL 1720, 1725, 7065
Schematic

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

MODEL 1720,1725,7065
Socket,Trimmers
Voltage

REPLACEMENT PARTS LIST

MODEL 1720-7065

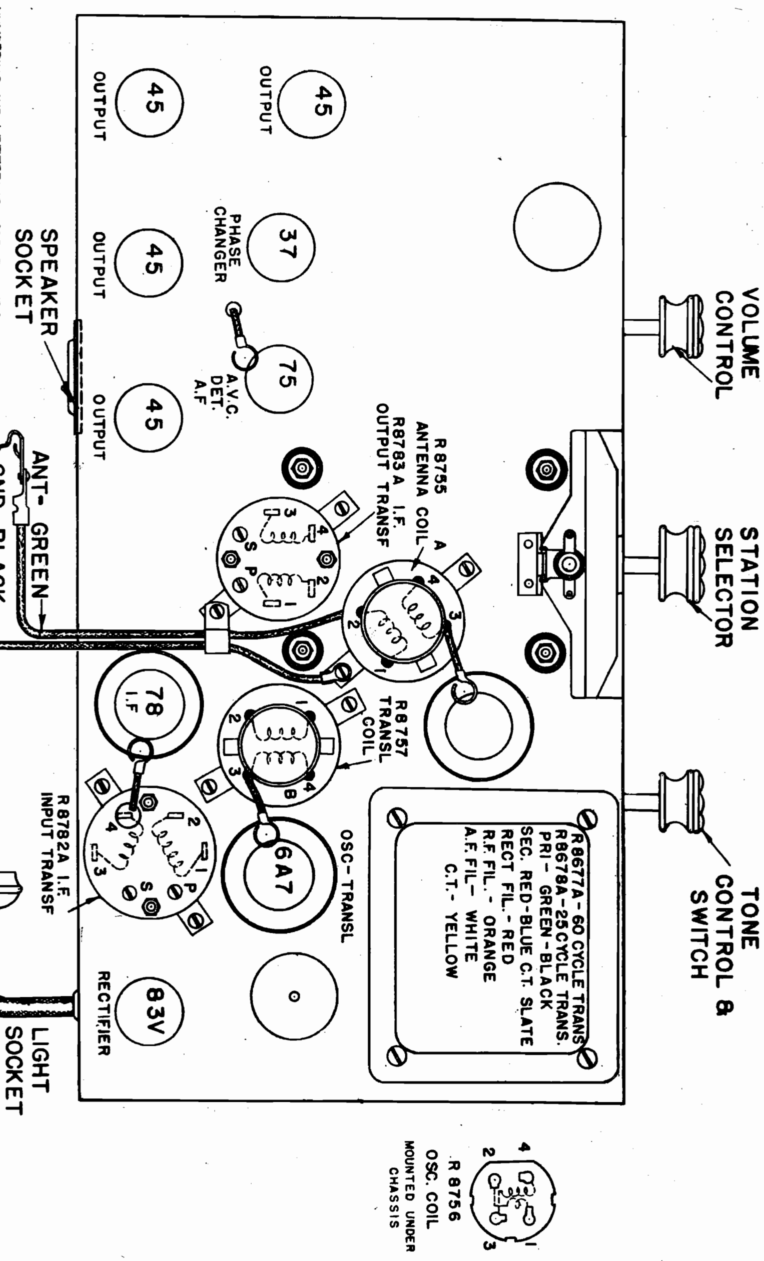
PART NO.	DESCRIPTION
R-6179	Resistor - 500M ohm, 1/2 watt carbon
R-5822	Resistor - 400M ohm, 1/2 watt carbon
R-5830	Resistor - 200M ohm, 1/2 watt carbon
R-8683	Resistor - 150M ohm, 1/2 watt carbon
R-5819	Resistor - 100M ohm, 1/2 watt carbon
R-6445	Resistor - 50M ohm, 1/2 watt carbon
R-6689	Resistor - 30M ohm, 1 watt carbon
R-8685	Resistor - 70 ohms, 3 watt flexohm
R-8684	Resistor - 8 ohms, 1 watt flexohm
R-7236	Condenser - 14 mfd. electrolytic
D-4758-P	Condenser - 8 mfd. electrolytic
R-6451	Condenser - .5 mfd. 200 volts
R-6444	Condenser - .1 mfd. 200 volts
R-6138	Condenser - .1 mfd. 300 volts
R-7680	Condenser - .02 mfd. 300 volts
R-6761	Condenser - .02 mfd. 600 volts
R-6462	Condenser - .01 mfd. 300 volts
R-7681	Condenser - .005 mfd. 600 volts
R-4303	Condenser - .0001 mica
R-8677-A	Transformer - Power, 60 cycle
R-8678-A	Transformer - Power, 25 cycle

TUBE VOLTAGE AND CURRENT CHART

MODELS 1720 - 7065 - 1725

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - R F	255	100	*	8	2
78 - I F	255	100	*	8	2
75 - AVC-DET-AF	125		*	.5	
'37 - Phase Changer	190		*	1.5	
'45 - Output	245		*	32	
6A7 - Osc-Transl	Ep=255v; Eg #1=-10v; Eg #2=200v; Eg #3&#5=82v; Ip=3.75m.a.; Ig #2=3.5m.a.; Ig #3&#5=2.25m.a.				
83-V - Rect.	Maximum d.c. volts=390v. Plate current=84m.a.per plate				

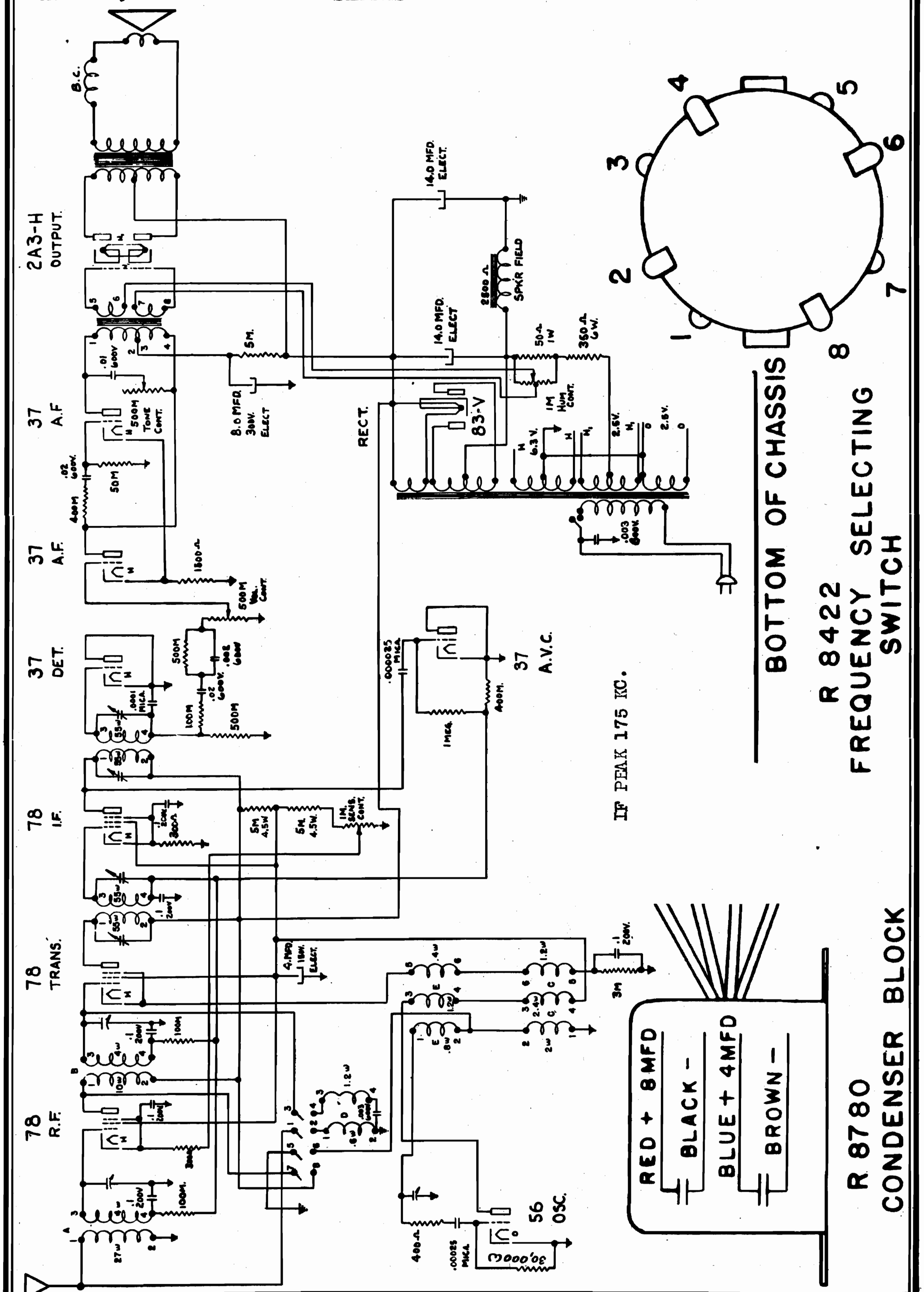
* - Indicates high series resistor



NUMBERING AND LETTERING CORRESPONDS TO THAT IN SCHEMATIC DIAGRAM

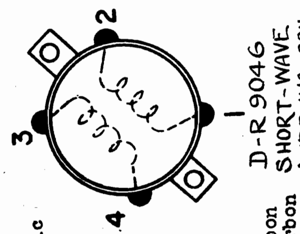
MODEL 1721
Schematic, Data

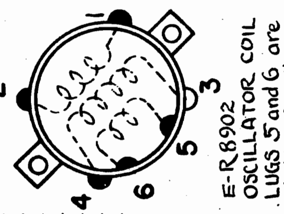
SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

MODEL 1721
Socket, Trimmers
Voltage, Coils



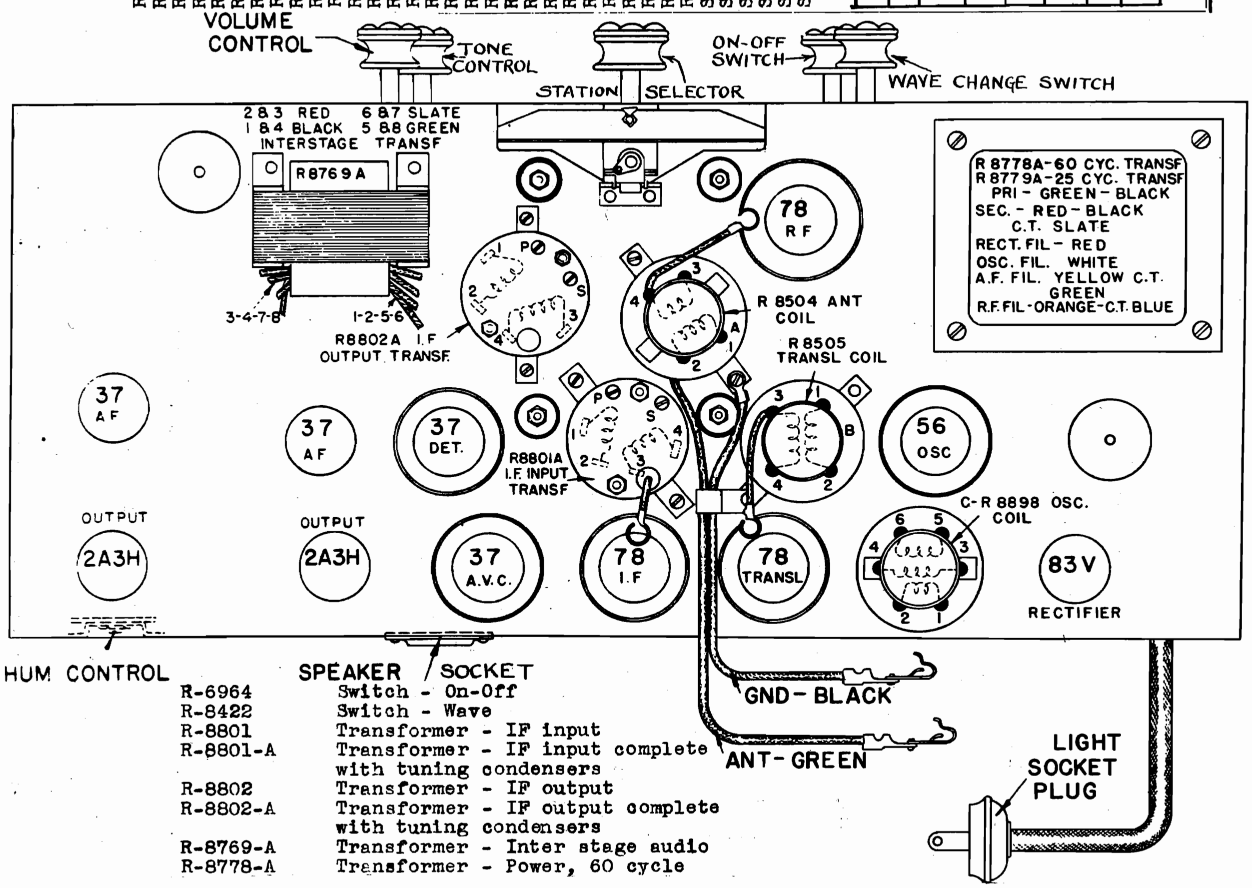


R-8734	Condenser	- Variable tuning
R-6565	Condenser	- IF tuning
R-7236	Condenser	- 14 mfd. electrolytic
R-8780	Condenser	- 4 x 8 mfd. electrolytic
R-6444	Condenser	- .1 mfd. 200 volt
R-6761	Condenser	- .02 mfd. 600 volt
R-7070	Condenser	- .01 mfd. 600 volt
R-6461	Condenser	- .003 mfd. 800 volt
R-7681	Condenser	- .003 mfd. 600 volt
R-6933	Condenser	- .002 mfd. 600 volt
R-4592	Condenser	- .00025 mfd. mica
R-4303	Condenser	- .0001 mfd. mica
R-8711	Condenser	- .000025 mfd. mica
R-6570	Control	- Tone
R-8934	Control	- Volume & Sensitivity
R-5823	Resistor	- 1 megohm, 1/2 watt carbon
R-6179	Resistor	- 500 M ohm, 1/2 watt carbon
R-5822	Resistor	- 400 M ohm, 1/2 watt carbon
R-5819	Resistor	- 100 M ohm, 1/2 watt carbon
R-6445	Resistor	- 50 M ohm, 1/2 watt carbon
R-6156	Resistor	- 30 M ohm, 1/2 watt carbon
R-6510	Resistor	- 5 M ohm, 1/2 watt carbon
R-6153	Resistor	- 3 M ohm, 1/2 watt carbon
R-8829	Resistor	- 1500 ohms, 1/2 watt carbon
R-6436	Resistor	- 400 ohms, 1/2 watt carbon
R-6447	Resistor	- 300 ohms, 1/2 watt carbon
R-9062	Resistor	- 600 ohm, hum adjuster
R-8886	Resistor	- Candohm, tapped
R-8901	Resistor	- Candohm
S-8766-S	Speaker	- 12", 2500 ohm
S-7606-A	Speaker	- Cone & Voice Coil Assembly
S-7175	Speaker	- field coil
S-8815	Speaker	- Hum bucking coil
S-8794-A	Speaker	- transformer
S-7415	Speaker	- plug, 5 prong

TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE V.	SCREEN V.	GRID V.	PLATE ma	SCREEN ma
56 - Osc.	95		-7	7	
78 - RF	200	85	*	.3 vol off	
78 - Transl.	210	82	*	2	.4
78 - IF	220	92	*	5	1
'37 - AF	165		-12	4.5	
2A3-H - Output	270		-44	60	
83 - Rect.	330 v. dc. Plate m.a. = 85 m.a. per plate				

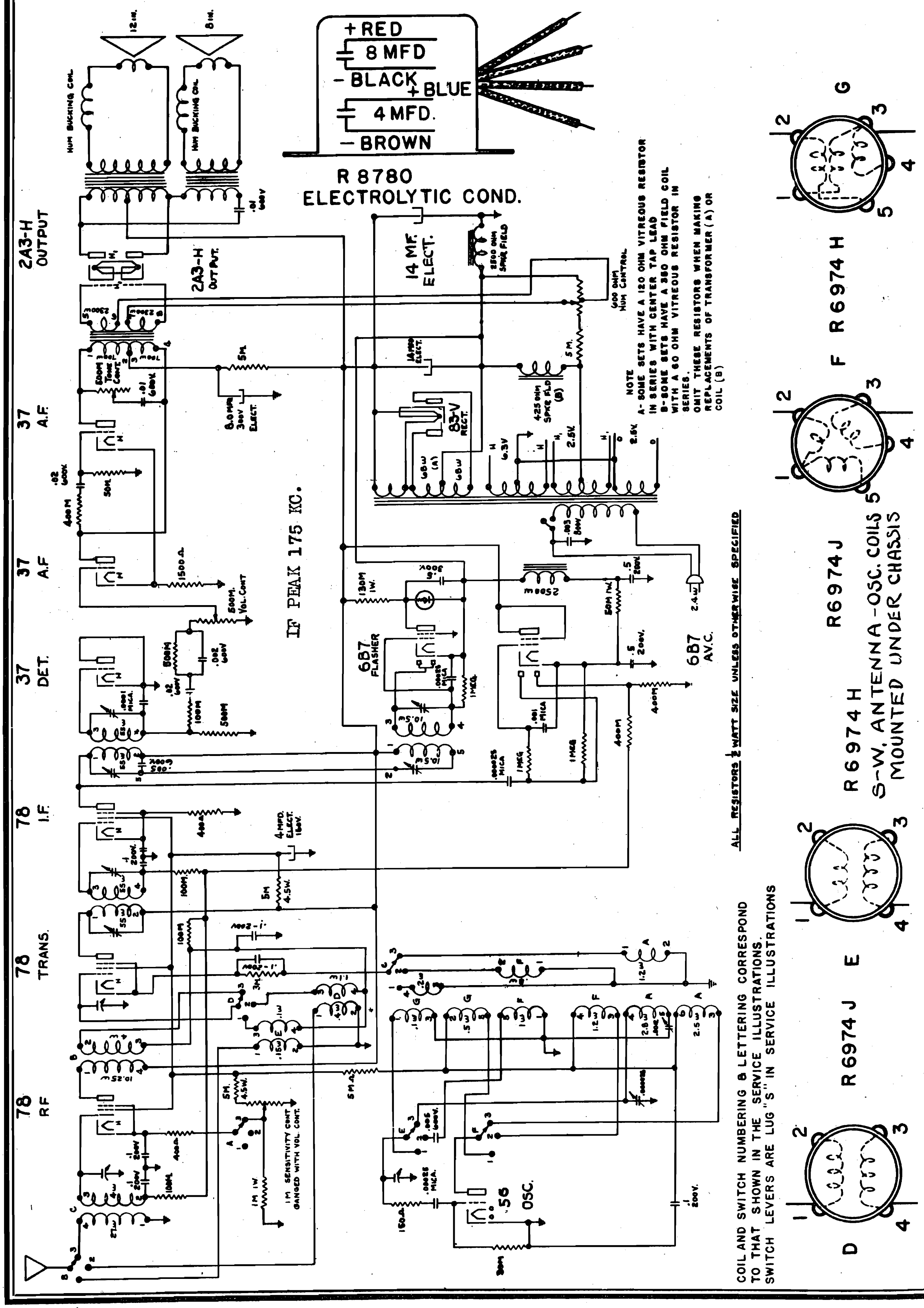
* - Indicates high series resistance.
Speaker field voltage = 110 volts.



R-6964	Switch	- On-Off
R-8422	Switch	- Wave
R-8801	Transformer	- IF input
R-8801-A	Transformer	- IF input complete with tuning condensers
R-8802	Transformer	- IF output
R-8802-A	Transformer	- IF output complete with tuning condensers
R-8769-A	Transformer	- Inter stage audio
R-8778-A	Transformer	- Power, 60 cycle

MODEL 1722,1732
Schematic, Coils

SEARS-ROEBUCK & CO.

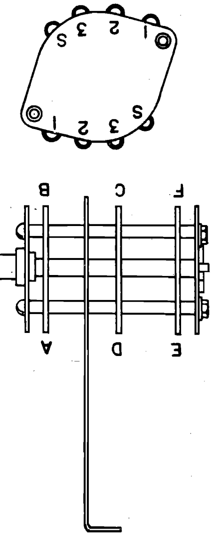


SEARS-ROEBUCK & CO.

MODEL 1722, 1732
Socket, Trimmers
Voltage, Parts

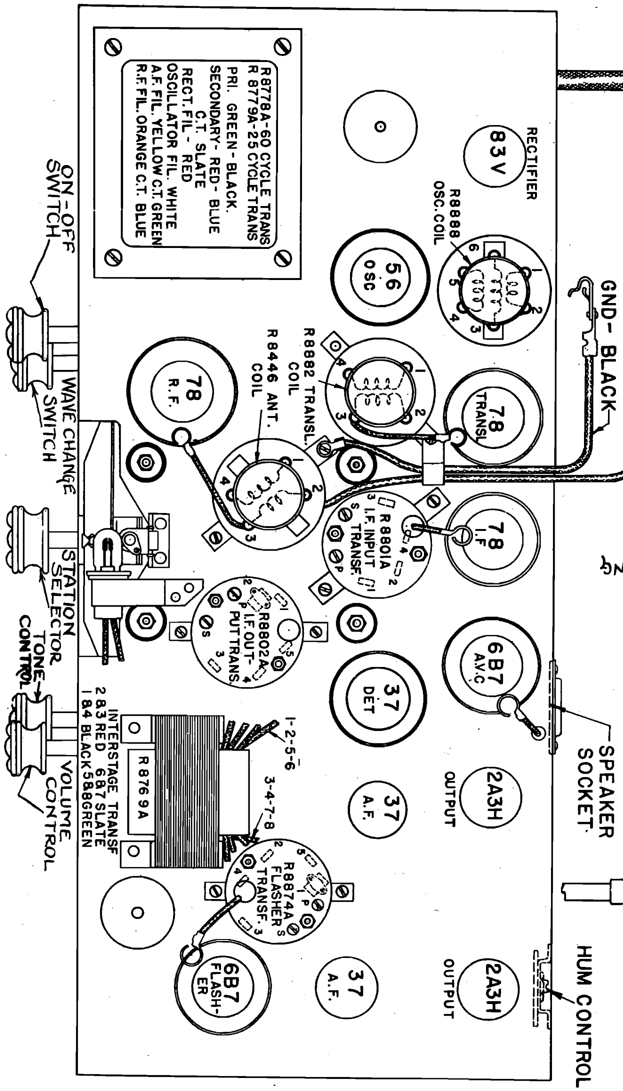
R-8817 Condenser - .000035 Trimmer
R-7137-A Condenser - .0012 padding
R-8448-B Condenser - Variable tuning
R-8711 Condenser - .000025 mfd. mica
R-4303 Condenser - .0001 mfd. mica
R-4592 Condenser - .00025 mfd. mica
R-6759 Condenser - .001 mfd. mica
R-6933 Condenser - .002 mfd. 600 volt
R-6461 Condenser - .003 mfd. 800 volt
R-6954 Condenser - .005 mfd. 600 volt
R-7079 Condenser - .01 mfd. 600 volt
R-6761 Condenser - .02 mfd. 600 volt
R-6444 Condenser - .1 mfd. 200 volt
R-8826 Condenser - .5 mfd. 300 volt
R-8780 Condenser - Dry electrolytic dual
R-8825 Condenser - Dual .5 mfd, 200 v.
R-7236 Condenser - Electrolytic 14 mfd.
R-6570 Control - Tone 500 M ohm
R-8934 Control - Volume & sensitivity
R-8801 Transformer - IF input
R-8801-A Transformer - IF input with tuning Condensers
R-8802 Transformer - IF output
R-8802-A Transformer - IF output with tuning Condensers
R-8887 Transformer - Tuning flasher
R-8887-A Transformer - Tuning flasher with Condensers
R-8769-A Transformer - AF interstage
R-8778-A Transformer - Power, 60 cycle
R-8779-A Transformer - Power, 25 cycle

R-6156 Resistor - 30 M Ohm 1/2 watt
R-6510 Resistor - 5 M ohm 1/2 watt
R-6153 Resistor - 3 M ohm 1/2 watt
R-8829 Resistor - 1500 ohm 1/2 wat
R-6436 Resistor - 400 ohm 1/2 watt
R-6155 Resistor - 150 ohm 1/2 watt
R-8886 Resistor - Candohm
R-9062 Resistor - Variable 600 ohm
R-7293 Resistor - 60 ohm vitreous
R-8835 Resistor - 120 ohm vitreous
R-5823 Resistor - 1 megohm 1/2 watt
R-6179 Resistor - 500 M ohm 1/2 watt
R-5822 Resistor - 400 M ohm 1/2 watt
R-8828 Resistor - 130 M ohm 1 watt
R-5819 Resistor - 100 M ohm 1/2 wa
R-6445 Resistor - 50 M ohm 1 watt
R-4354 Resistor - 50 M ohm 1/2 wa
R-7011-A Clip - Ant. & Gnd. lea
R-6381 Clip - Grid
R-6381-W Clip - Grid with 7½" 1
R-8446 Coil - Antenna
R-6974-J Coil - Ant. - Osc. Int
R-6974-H Coil - Ant. - Osc. Hi
R-8776-A Coil - Choke
R-8888 Coil - Oscillator
R-8882 Coil - Translator



Position of lugs as viewed from rear. Frequency selecting switch, R-6962

Tube	Plate Voltage	Screen Voltage	Grid Voltage	Plate MA	Screen MA
78 - R F	225	100	*	7	1.5
56 - Oscillator	70		-6	5	
78 - Translator	215	90	-6	2	.5
78 - I F	220	110	-3	8	1.5
37 - 1st A F	165		-12.5 (Volume control off)	4	
37 - 2nd A F	165		-9*	4	
2A3H - Output	265		-44	58	
6B7 - AVC	60	60		4	1
6B7 - Flasher	7-No signal 90-With signal	Cathode is approximately 100 volts below ground.			
83V - Rectifier	DC volts = 350 Plate Current = 87 m.a. per plate				

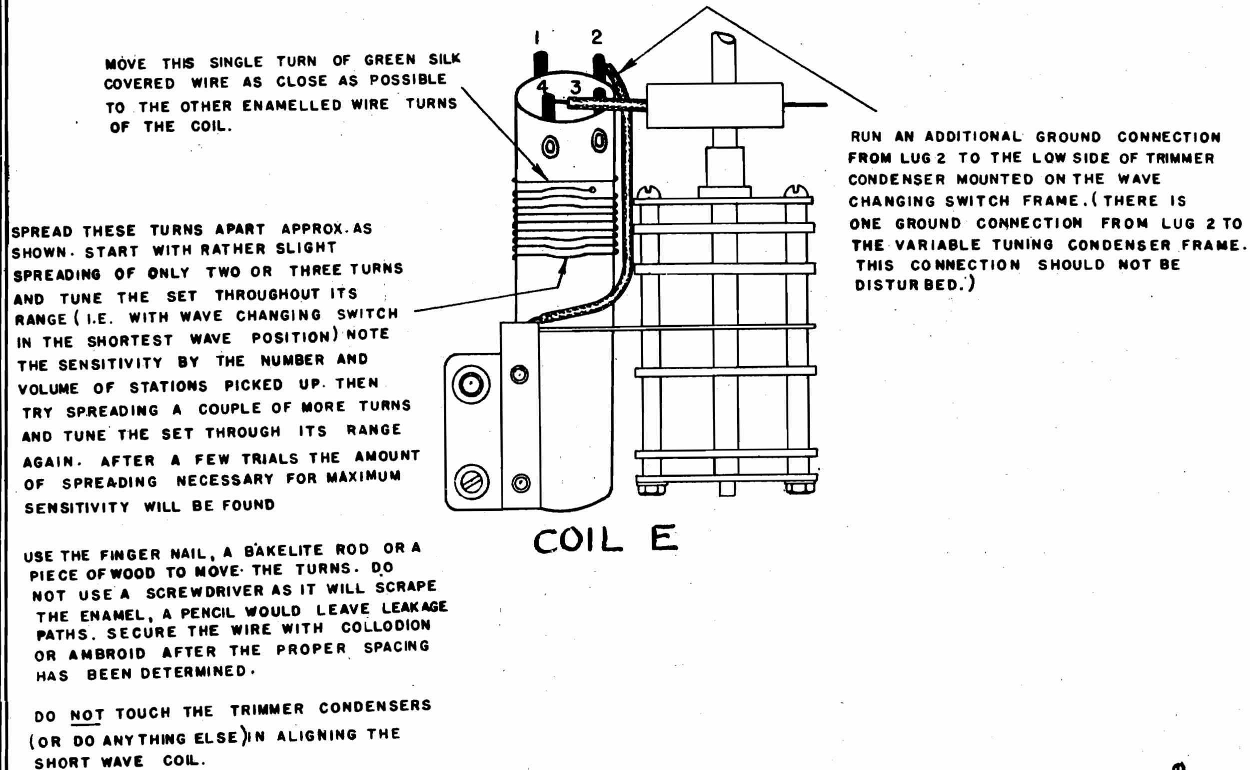


1410
175
1685

1080
175
1255

MODEL 1722,1732
Adjustment data

SEARS-ROEBUCK & CO.



COIL E

There has been complaint of insufficient short wave sensitivity in some instances. The following suggestions should prove helpful:

1. A GOOD outdoor antenna MUST be used for satisfactory short wave reception.

2. There is considerable variation in the efficiency of the type 56 tubes as short wave oscillators. Trial of a few will probably show one up as better than the rest.

3. Increase the coupling of the short wave antenna coil. This is Coil E (Part R-6974H in the service manual illustration. Winding 1-2, consisting of a single turn of green silk covered wire, should be moved as close as possible to the other winding on the coil (3-4), as referred to in attached diagram.

4. Run an ADDITIONAL ground connection from Coil E, lug 2, to the low side of the trimmer condenser mounted on the wave changing switch frame. (There is one ground connection from Coil E, lug 2, to the variable tuning condenser frame. This connection should not be disturbed.)

5. Try re-aligning by tuning in a station of about 6000 kc, on the short wave range, and spreading the turns of Coil E (3-4), the enamelled wire winding, apart until maximum volume is secured. Then fasten the turns in place with a touch of collodion, ambroid or similar substance.

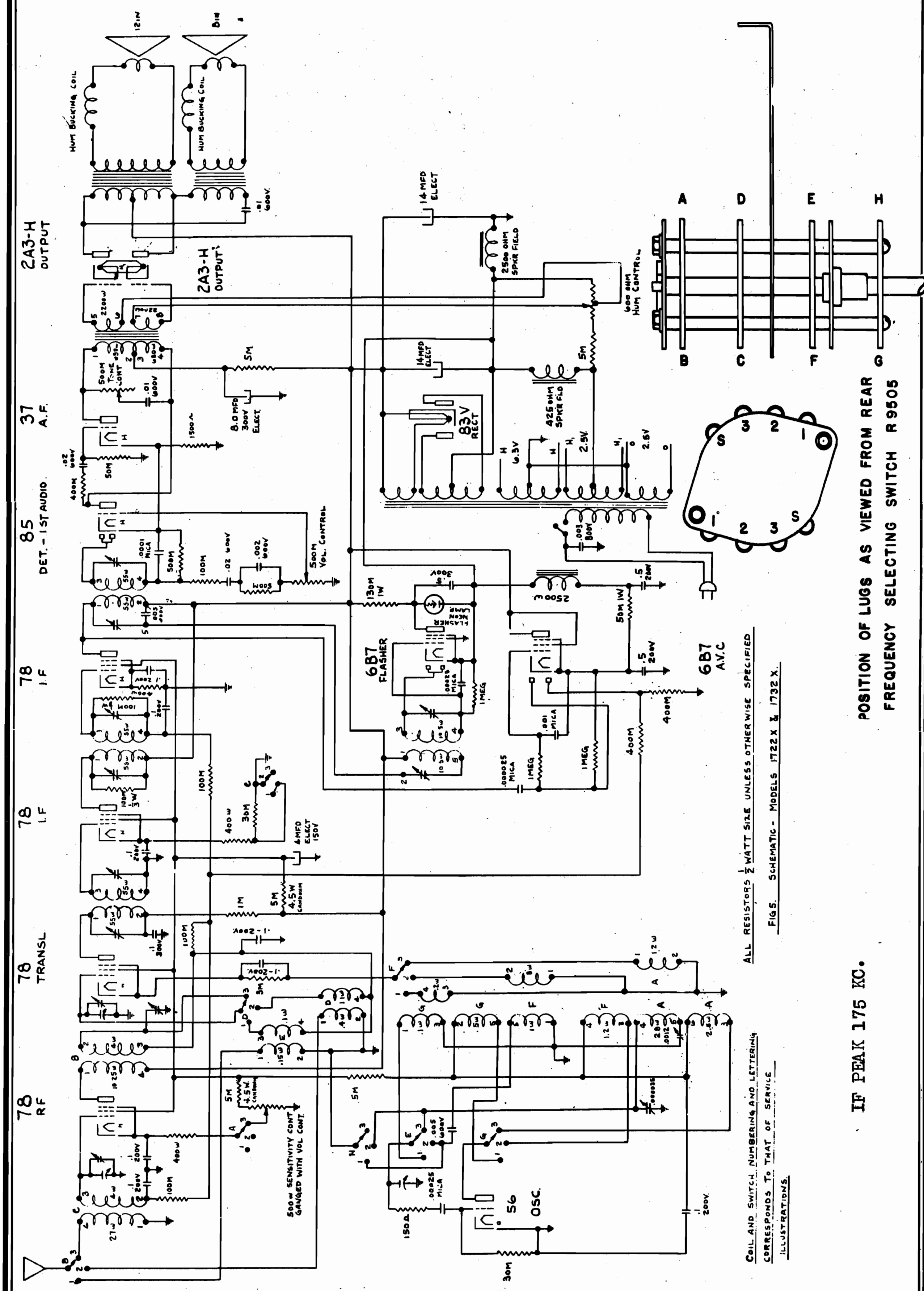
Hum which cannot be eliminated with the hum balancing adjustment is due to poorly matched 2A3H tubes. Try others until a combination is found which permits a hum balance. The platecurrents of the tubes must be very nearly equal in order to obtain this balance.

Examination of the output tubes sometimes discloses particles of white hot carbon on the grid or plate. Hum balance cannot be obtained with such tubes and they should be replaced.

Some trouble has been experienced with power transformers burning up. In almost all instances this is due to an inter-element short in the 2A3 or 2A3H tubes. These tubes are very much more prone to such trouble because of the very close spacing of their elements.

MODEL 1722X, 1732X
Schematic

SEARS-ROEBUCK & CO.



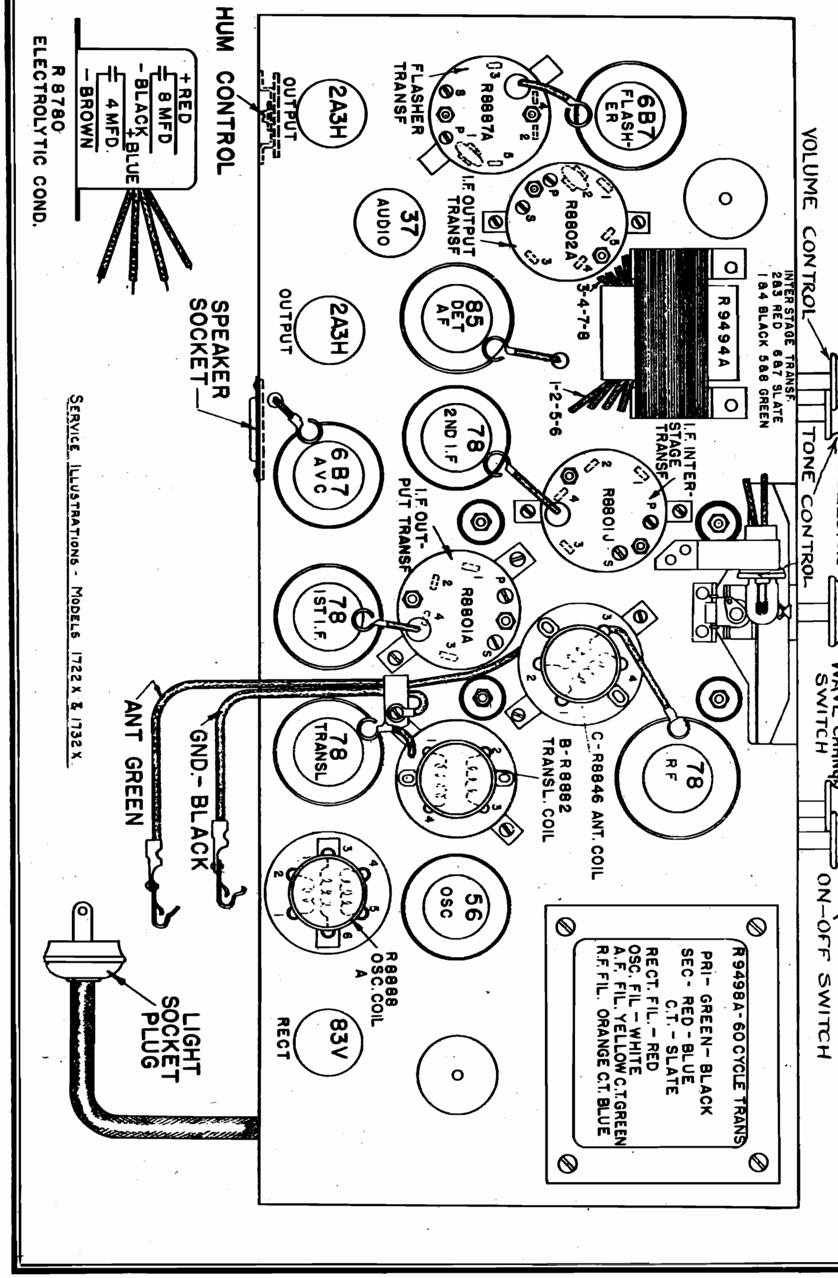
MODEL 1722X,1732X
Voltage,Socket
Trimmer data

SEARS-ROEBUCK & CO.

R-5509-A	Board - Terminal
R-8297-A	Board - Terminal
R-8791	Card - Operating
R-7243	Bushing - Fibre, Wave Switch
R-4715	Clamp - Ant. & Gnd. lead
R-7011-A	Clip - Ant. & Gnd. lead
R-6381	Clip - Grid
R-6381-W	Clip - Grid with 7-1/2" lead
R-8446	Coil - Antenna
R-6974-J	Coil - Ant. - Osc. Intermediate
R-6974-H	Coil - Ant. - Osc. Hi-range
R-8776-A	Coil - Choke
R-8888	Coil - Oscillator
R-8882	Coil - Translator
R-8817	Condenser - .000035 Trimmer
R-7137-A	Condenser - .0012 padding
R-8448-B	Condenser - Variable tuning
*R-8711	Condenser - .000025 mfd. mica
*R-4303	Condenser - .0001 mfd. mica
*R-4592	Condenser - .00025 mfd. mica
R-6759	Condenser - .001 mfd. mica
R-6933	Condenser - .002 mfd. 600 volt
*R-6461	Condenser - .003 mfd. 800 volt
R-6954	Condenser - .005 mfd. 600 volt
R-7070	Condenser - .01 mfd. 600 volt
*R-6761	Condenser - .02 mfd. 600 volt
R-6138	Condenser - .1 mfd. 300 volt
*R-6444	Condenser - .1 mfd. 200 volt
R-8826	Condenser - .5 mfd. 300 volt
*R-8780	Condenser - Dry electrolytic dual
R-8825	Condenser - Dual .5 mfd. 200 V.
*R-7236	Condenser - Electrolytic 14 mfd.
*R-6570	Control - Tone 500 M ohm
R-8934	Control - Volume and sensitivity
R-6989	Cord - Extension
*R-8959-A	Dial & Indicator
R-8855	Escutcheon - Silvertone
R-7173	Folder - Short Wave
*R-8893	Knob - Large
*R-8896	Knob - Medium
R-8914	Knob - Medium, with dot
R-2288	Lamp - Pilot
R-8830	Lamp - Neon tuning flasher
*R-5346-B	Lead - Antenna with clip
R-5346-D	Lead - Ground with clip
*R-5823	Resistor - 1 megohm 1/2 watt carbon
*R-6179	Resistor - 500 M ohm 1/2 watt carbon
*R-5822	Resistor - 400 M ohm 1/2 watt carbon
*R-8828	Resistor - 130 M ohm 1 watt carbon
*R-5819	Resistor - 100 M ohm 1/2 watt carbon
*R-6445	Resistor - 50 M ohm 1 watt carbon
*R-4354	Resistor - 50 M ohm 1/2 watt carbon
*R-6156	Resistor - 30 M ohm 1/2 watt carbon
*R-6510	Resistor - 5 M ohm 1/2 watt carbon
*R-6153	Resistor - 3 M ohm 1/2 watt carbon
R-8829	Resistor - 1500 ohm 1/2 watt carbon
*R-6154	Resistor - 1000 ohm 1/2 watt carbon
*R-6436	Resistor - 400 ohm 1/2 watt carbon
*R-6155	Resistor - 150 ohm 1/2 watt carbon
R-8886	Resistor - Candohm
*R-9062	Resistor - Variable 600 ohm
R-7293	Resistor - 60 ohm vitreous
R-8835	Resistor - 120 ohm vitreous
*R-6652-A	Shaft - Dial Drive
*R-6018-A	Shield - Ant. & Transl. coil
R-8803-A	Shield - IF & flasher transf.
R-8687-A	Shield - Oscillator coil
R-8947-A	Shield - Tuning flasher reflector
R-6748-A	Shield - Tube, bottom
R-6749	Shield - Tube, top
R-7235	Shield - Electrolytic condenser
*R-7320	Shield - Chassis bottom
R-8366	Socket - 4 Prong
R-8367	Socket - 5 prong
R-8368	Socket - 6 prong
*R-8369	Socket - 7 prong
R-8917	Socket - Flasher lamp
S-8763-S	Speaker - 8",2250 ohm field
S-7776-C	Speaker - 8",cone & voice coil
S-8569	Speaker - 8", field coil
S-8798-AS	Speaker - 8", transformer
*S-8762-S	Speaker - 12",410 ohm
S-7606-A	Speaker - 12", cone & voice coil
S-8792	Speaker - 12", field coil
S-8793-A	Speaker - 12", transformer
R-8788	Sticker - Tube & license, 60 cycle
R-8789	Sticker - Tube & license, 25 cycle
*R-6962	Switch - Frequency selecting
*R-6964	Switch - on-off
R-8801	Transformer - IF input
R-8801-A	Transformer - IF input with tuning
R-8801-J	Transformer - IF interstage
R-8802	Transformer - IF output
R-8802-A	Transformer - IF output with tuning
R-8887	Transformer - Tuning Flasher
R-8887-A	Transformer - Tuning Flasher with c
R-9494-A	Transformer - AF interstage
R-9498-A	Transformer - Power, 60 cycle

		Plate Volts	Screen Volts	Grid Volts	Plate MA	Screen MA
78	RF	225	100		7	1.5
56	Osc.	70	-	-6	5	--
78	Transl.	215	90	-6	2	.5
78	1st IF	220	110	-3	8	1.5
78	2nd IF	220a	110a	-3a	8a	1.5a
		209b	99b	-14b	.4b	.06b
37	1st AF	165	-	-12.5°	4	
37	2nd AF	165	-	-9	4	
2A3H	Output	265	-	-44	58	
6B7	AVC	60	60	—	4	1
6B7	Flasher	7*	Cathode is approximately			
		90**	100 volts below ground.			
83V	Rect.	D-C.volts=350	Plate MA=87 per plate			

a= Wave Selecting Switch in Broadcast position
b= Wave Selecting Switch in Short Wave position
c= Volume Control Off.
*= No Signal **= With Signal.

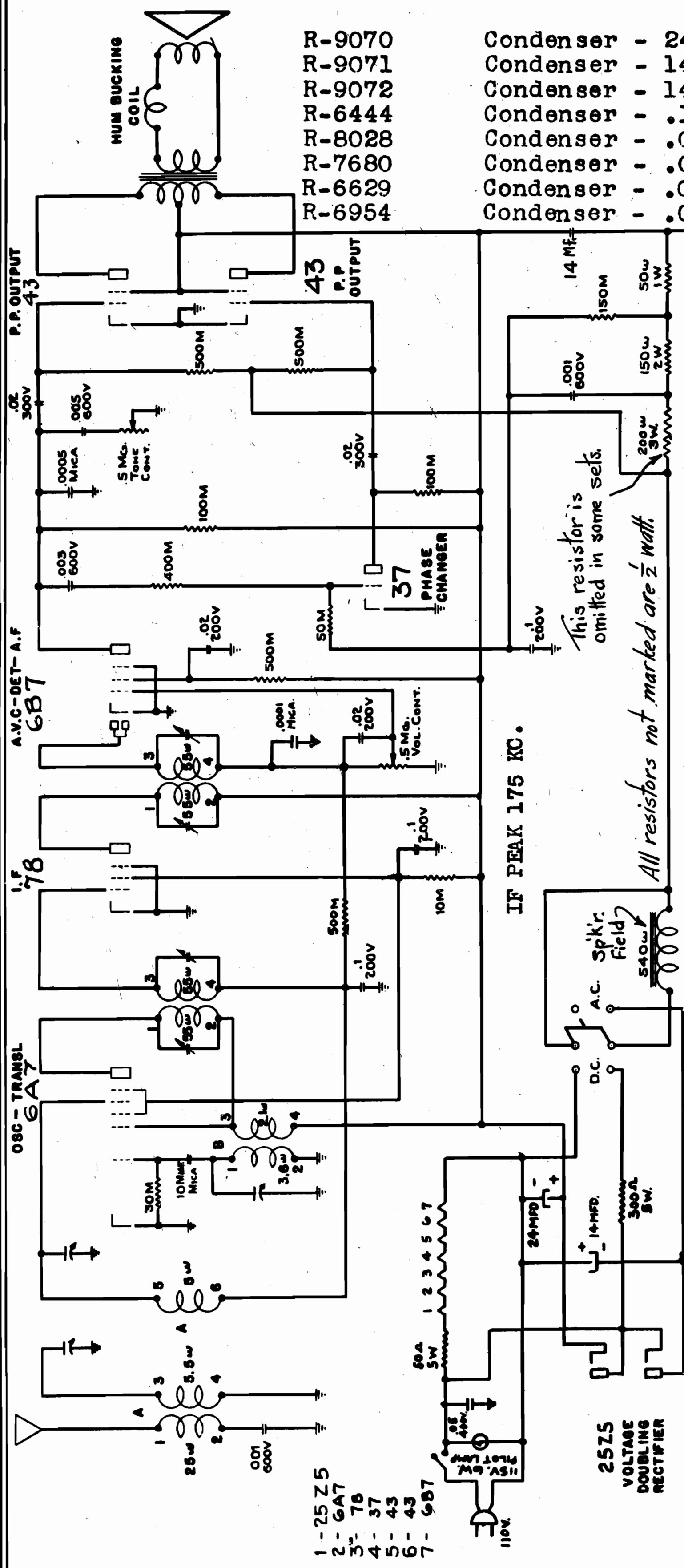


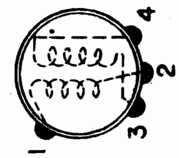
SERVICE ILLUSTRATIONS - MODELS 1722X & 1732X

SEARS-ROEBUCK & CO.

MODEL 1750
Schematic, Voltage

R-9070 Condenser - 24 mfd. electrolytic
R-9071 Condenser - 14 mfd. electrolytic
R-9072 Condenser - 14 mfd. electrolytic
R-6444 Condenser - .1 mfd, 200 volt
R-8028 Condenser - .05 mfd. 400 volt
R-7680 Condenser - .02 mfd. 300 volt
R-6629 Condenser - .02 mfd. 200 volt
R-6954 Condenser - .005 mfd. 600 volt





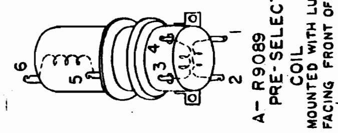
B-R9021-OSCILLATOR COIL-MOUNTED UNDER CHASSIS

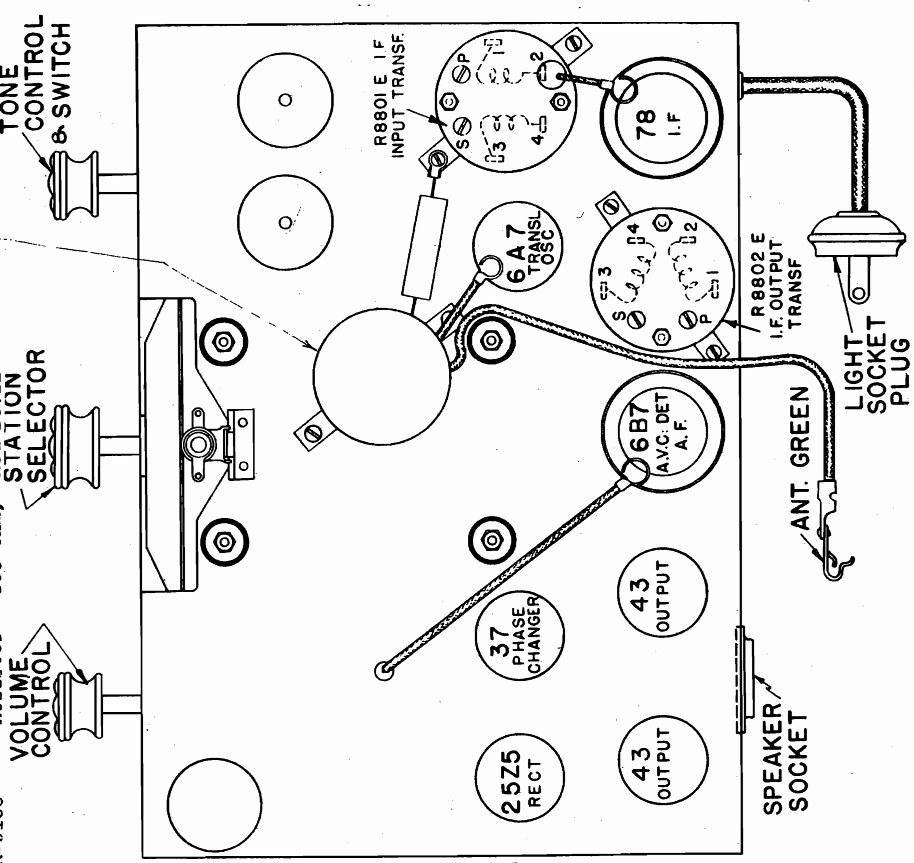
FOR CHANGES SEE INDEX

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	150	85	*	2	1.25
6B7 - Det-AVC-AF	40*		*	1	
'37 - Phase Changer	40*		*	1	
43 - Output	145	150	*	24	5
6A7 - Osc-Transl.	Ep=150v; Eg#2=150v; Eg#3&#5=85v; Ip=6m.a. Ig#2=5m.a.; Ig#3&#5=5m.a.				
25Z5 - Rectifier.	Max. d.c. volts=225. Plate current =80m.a.				

MODEL 1750
Socket, Trimmers
Chassis changes

SEARS-ROEBUCK & CO.





R-7681	Condenser - .003 mfd. 600 volt	
R-6952	Condenser - .001 mfd. 600 volt	
R-6760	Condenser - .0005 mfd. mica	
S-9017-S	Speaker - 6", 540 ohm	
R-5321	Pin - Escutcheon	
R-6179	Resistor - 500M ohm, 1/2 watt carbon	
R-5822	Resistor - 400M ohm, 1/2 watt carbon	
R-8683	Resistor - 150M ohm, 1/2 watt carbon	
R-5819	Resistor - 100M ohm, 1/2 watt carbon	
R-6445	Resistor - 50M ohm, 1/2 watt carbon	
R-6156	Resistor - 30M ohm, 1/2 watt carbon	
R-6152	Resistor - 10M ohm, 1/2 watt carbon	
R-9028	Resistor - 150 Ohm, 2 watt flexohm	
R-8565	Resistor - 50 ohm, 1 watt flexohm	
R-9258	Resistor - 200 ohm, 3 watt flexohm	
R-9018	Resistor - 50 ohm, vitreous	
R-9160	Resistor - 300 ohm, "Red Devil"	

SHORT OUT RESISTOR "A" FIG. I (THIS RESISTOR IS OMITTED IN SOME SETS)
OPEN LEADS #1, #2, #4 FIG 2
CONNECT THEM TOGETHER AT ONE END
OF THE ADDED R 9398 RESISTOR.
MOUNT THE RESISTOR AS SHOWN IN FIG.3

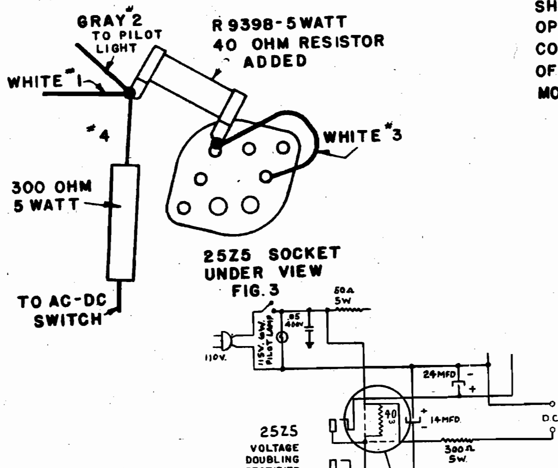
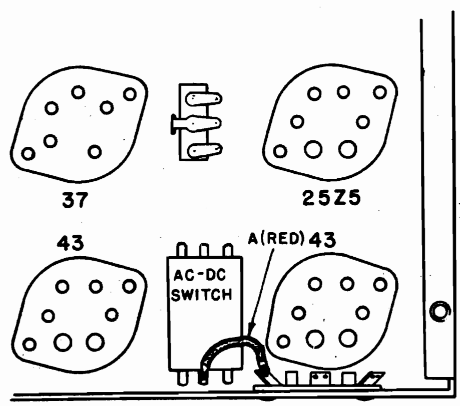


FIG. 3



UNDER VIEW
FIG I

ORIGINAL CONNECTIONS SHOWN IN DOTTED LINES. ADD R9398 - 40 OHM, 5 WATT RESISTOR & CHANGE CONNECTIONS AS SHOWN.

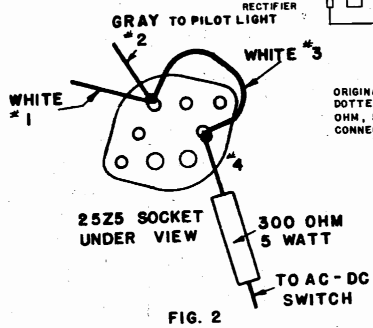
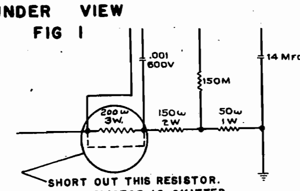


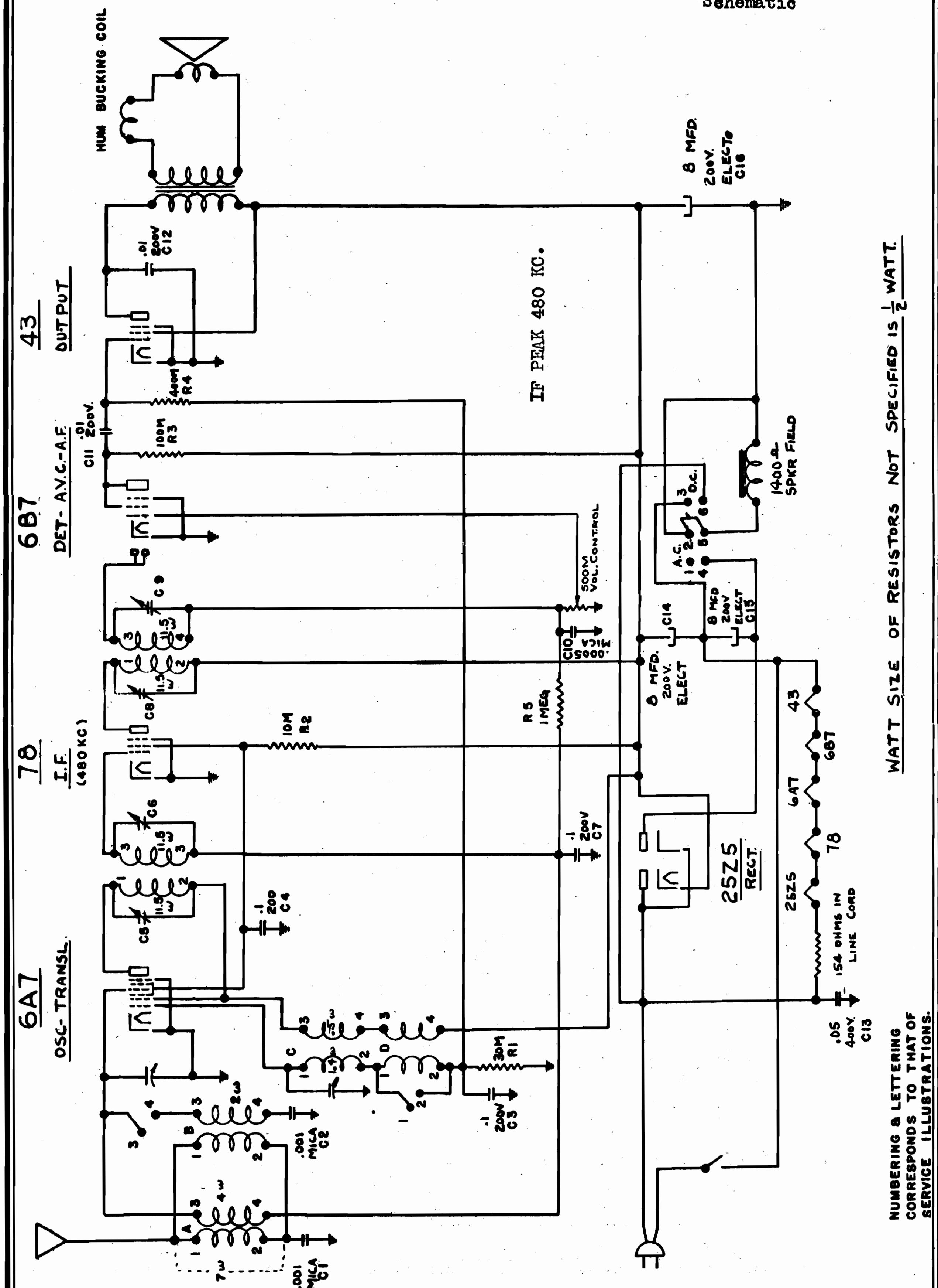
FIG. 2



SHORT OUT THIS RESISTOR.
THIS RESISTOR IS OMITTED
IN SOME SETS

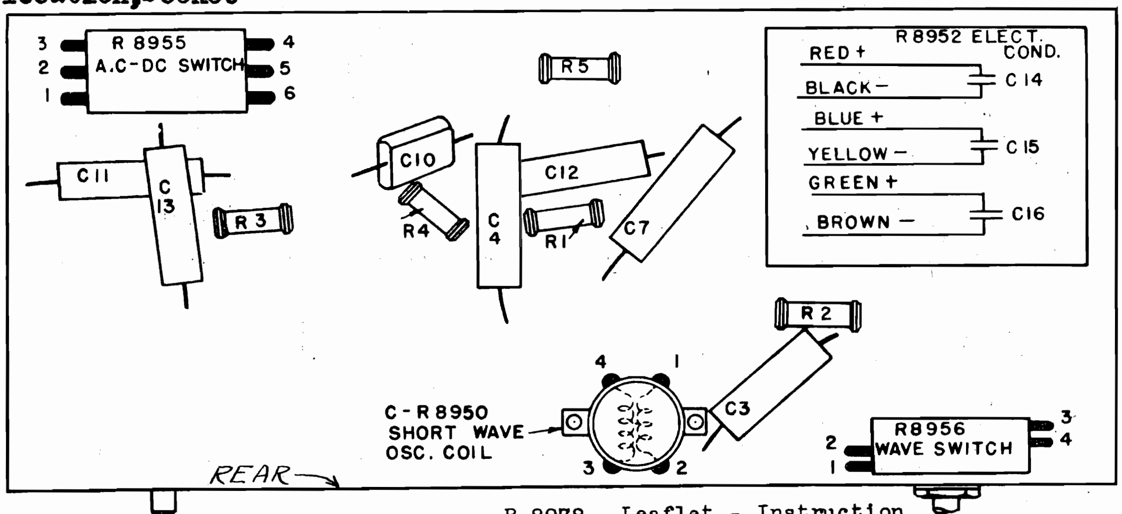
SEARS-ROEBUCK & CO.

MODEL 7075,7076,7077,
7078,7091,7092,
7093,7094
Schematic

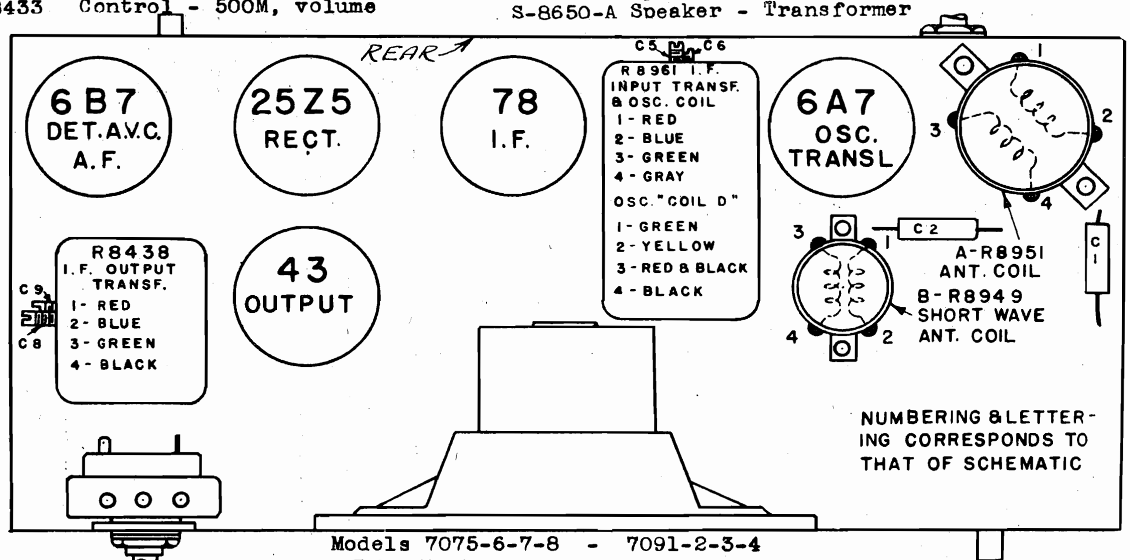


MODEL 7075,6,7 and 8
7091,2,3 and 4
Voltage,Trimmers
Parts location,Socket

SEARS-ROEBUCK & CO.



R-6381	Clip - Grid	R-8978	Leaflet - Instruction
R-6381-A	Clip - Grid with 6" lead	R-8319	Pin - Escutcheon
R-8951	Coil - Antenna	R-5823	Resistor - 1 Megohm - 1/2 watt
R-8949	Coil - Antenna, short wave	R-5822	Resistor - 400 M ohms,1/2 watt
R-8950	Coil - Oscillator, short wave	R-5819	Resistor - 100 M ohms,1/2 watt
R-8960	Condenser - Variable tuning	R-6156	Resistor - 30 M ohms,1/2 watt
R-8952	Condenser - Triple, dry electr	R-6152	Resistor - 10 M ohms,1/2 watt
R-6444	Condenser - .1 Mfd, 200 volt	R-8092	Socket - 6 prong
R-8028	Condenser - .05 Mfd, 400 volt	R-8072	Socket - 7 prong
R-8432	Condenser - .01 Mfd, 200 volt	S-8954	Speaker - 1400 ohm
R-6759	Condenser - .001 Mfd, mica	S-8643-A	Speaker - Cone & Voice Coil
R-6760	Condenser - .0005 Mfd, mica	S-8962	Speaker - Field Coil
R-8433	Control - 500M, volume	S-8674	Speaker - Hum Bucking Coil
		S-8650-A	Speaker - Transformer

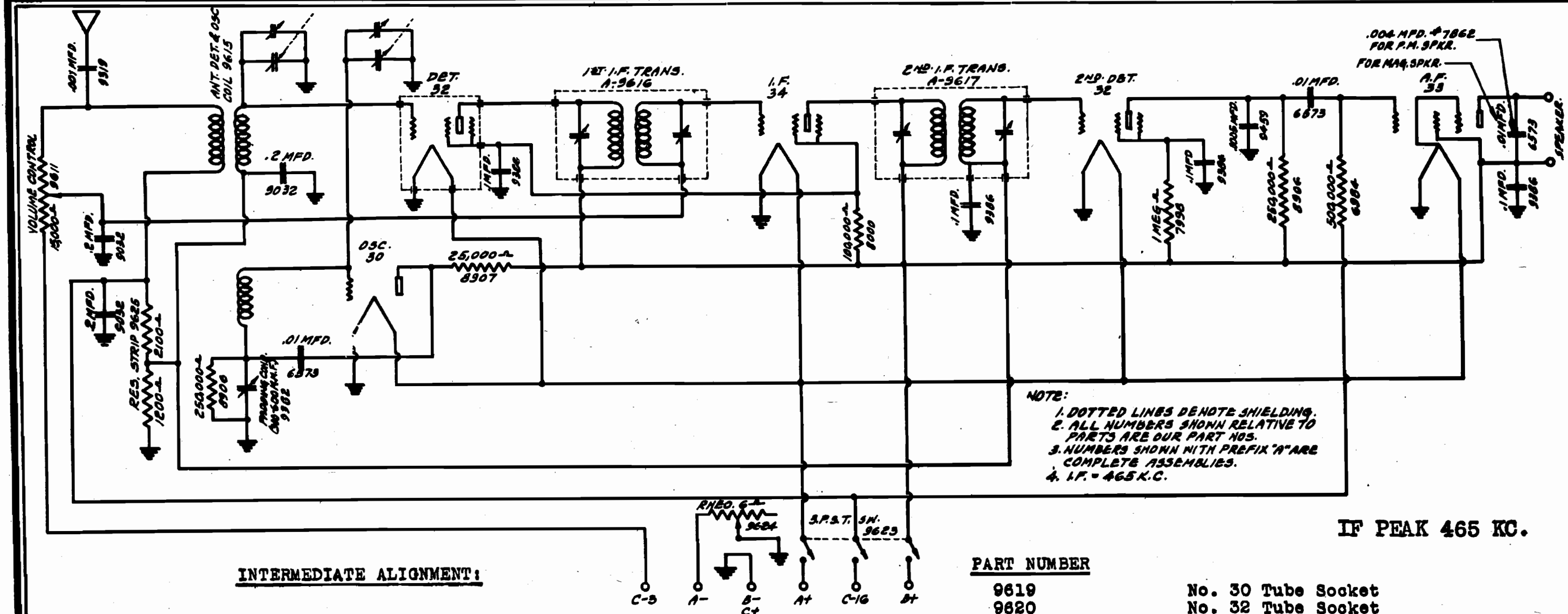


Models 7075-6-7-8 - 7091-2-3-4
Tube Voltage & Current Chart

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	115	80	3	1
6B7 - AVC-Det-AF	20	20	.6	.2
43 - Output	100	115	27	5.5
6A7 - Osc-Transl	Ep=84; EG#2 =84; EG #3 & #5=50; Ip=2; Ig#2 =2m.a. Ig#3 & #5=2m.a.			
25Z5 - Rect.	Max. d.c. volts=185. Plate current=46m.a.			

SENTINEL RADIO CORP.

MODEL 501, 502
Schematic
Alignment, Parts



IF PEAK 465 KC.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the #36 modulator tube. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output ofthe oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.

4. The second I.F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

To align the variable condenser,

1. Connect the high output side of the oscillator to the set antenna lead and the ground side of the oscillator to the chassis.

2. Tune the receiver to 1400 kilocycles on the dial and set the oscillator to this frequency.

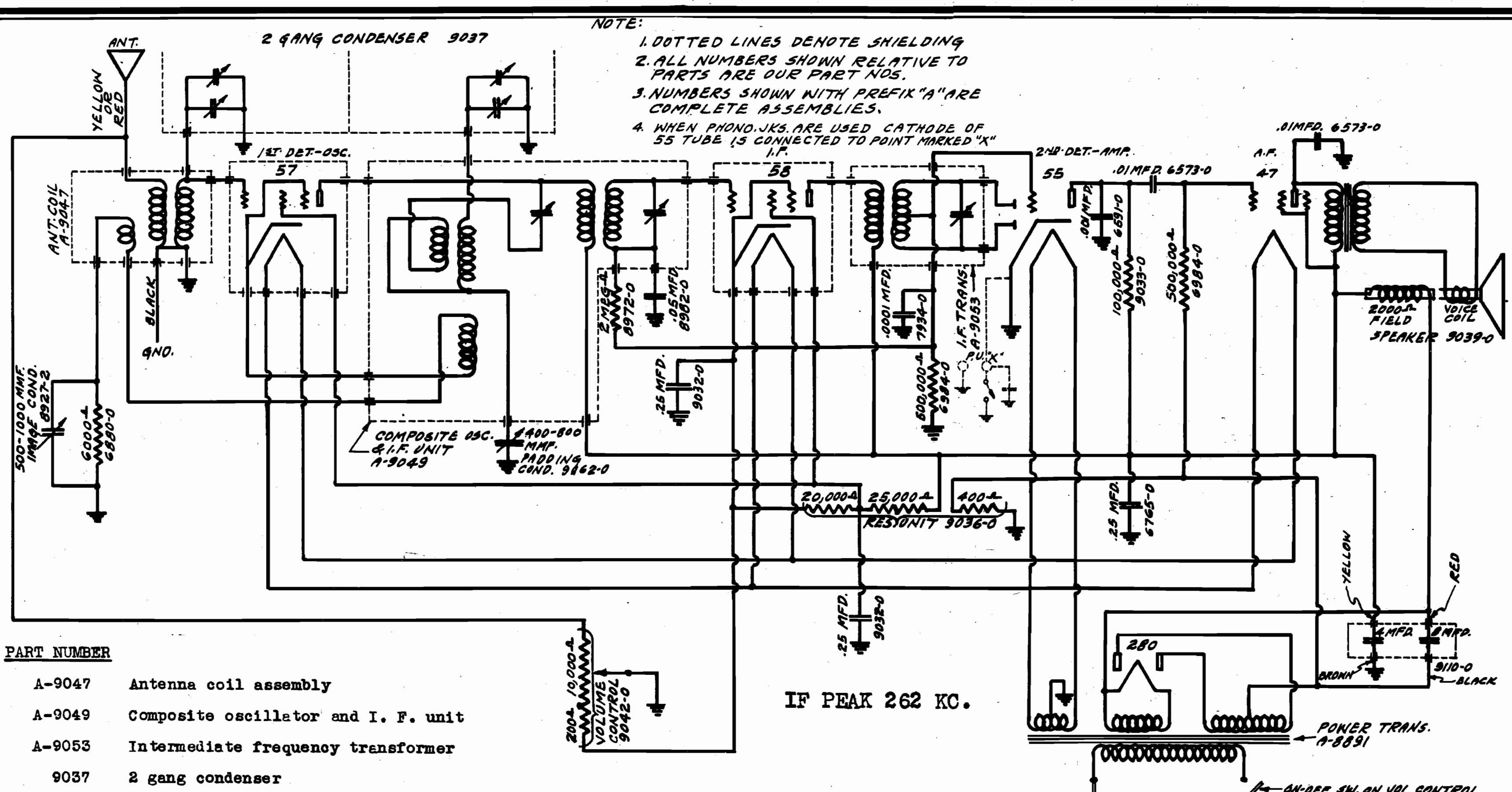
3. Adjust the variable condenser trimmer screws for maximum output reading.

4. Tune the set to approximately 600 kilocycles on the dial and adjust the oscillator frequency to 600 kilocycles. Adjust the padding condenser located on the rear of the chassis adjacent to the antenna and ground leads and accessible through the hole in the chassis for maximum output reading.

PART NUMBER	
9619	No. 30 Tube Socket
9620	No. 32 Tube Socket
9621	No. 34 Tube Socket
9622	No. 33 Tube Socket
9221	Tube Shield Base
9222	Tube Shield
9612	Two Gang Condenser
9615	Antenna, Detector & Oscillator Coil
9616	1st I. F. Transformer
9617	2nd I. F. Transformer
9382	Padding Condenser
9614	Tuning Dial
9611	Volume Control
9623	3 P. S. T. Switch
9624	6 Ohm Voltage Control Rheostat
9613	Battery Cable
9625	Wire Wound Resistor Strip
8906	250,000 ohm 1/3 Watt Resistor
8907	25,000 ohm 1/3 Watt Resistor
8000	100,000 ohm 1/3 Watt Resistor
7998	1 Meg ohm 1/3 Watt Resistor
6984	500,000 ohm 1/3 Watt Resistor
9319	.001 Mfd. Moulded Condenser
9459	.0005 Mfd. Moulded Condenser
9386	.1 Mfd. 200 Volt Condenser
6573	.01 Mfd. 200 Volt Condenser
9032	.2 Mfd. 200 Volt Condenser
7862	.004 Mfd. 400 Volt Condenser
9636	Knob with pointer for voltage control
9718	Knob
9717	Knob with arrow

MODEL 513
Schematic, Parts List

SENTINEL RADIO CORP.

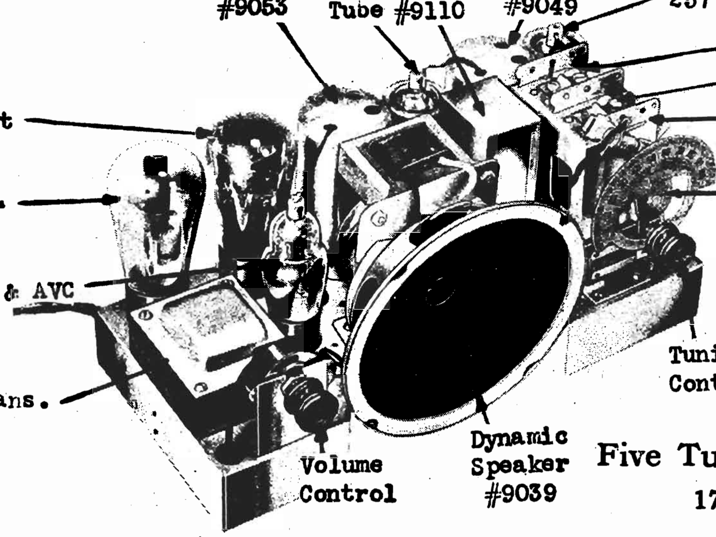


IF PEAK 262 KC.

PART NUMBER					
A-9047	Antenna coil assembly	9036	Load resistor	6925	110 volt line cord and plug
A-9049	Composite oscillator and I. F. unit	6984	500,000 ohm 247 grid and AVC resistor	8913	Knobs
A-9053	Intermediate frequency transformer	9033	100,000 ohm 55 plate resistor	8980	Tube shields
9037	2 gang condenser	8972	2 megohm resistor	9082	Tube shield cap
8927	Image condenser	6880	6000 ohm resistor	8979	Tube shield base
9062	Padding condenser	9042	Volume control		
9032	.25 M.F.D. 200 volt 58 cathode & screen by-pass condenser	9039	Dynamic speaker		
6573	.01 M.F.D. 400 volt 47 coupling & plate by-pass condenser	9054	Dial and drive		
6765	.25 M.F.D. 400 volt condenser	8918	Dial light, socket and bracket		
8982	.05 M.F.D. 200 volt condenser	6248	Pilot light 2.5 volt		
7934	.0001 M.F.D. mica condenser				
6591	.001 M.F.D. 400 volt condenser				
9110	8 M.F.D. & 4 M.F.D. electrolytic condensers				
8891	Power transformer				

MODEL 513
Socket, Voltage
Alignment

SENTINEL RADIO CORP.



Five Tube Superheterodyne
175 – 550 Meters

VOLTAGE TABLE:
Never check voltages until all tubes are fully warmed up to proper operating condition. The voltage table, given below, is taken at 115 volts line with volume control in the full on position. It must be remembered that the voltage readings vary directly as the line voltage and also with the accuracy of the meters used. A variation of 10 percent plus, or minus, is permissible.

TUBE VOLTAGES

Type of Tube	Position of tube	Filament volts	Plate volts	C volts	Normal Plate-M.A.	Screen volts
257	Composite oscillator and modulator	2.4	240	6	3.5	85
258	Intermediate frequency	2.4	240	3	7	85
255	Detector and audio	2.4	30*			
247	Output	2.4	220	5**	32.5	240
280	Rectifier	4.9	30 M.A. each plate			

* These readings are only comparative and are not true voltages applied. The voltmeter, when readings are taken at these points, is in series with a very high resistance.
** To read 247 bias, read between 247 control grid and ground.

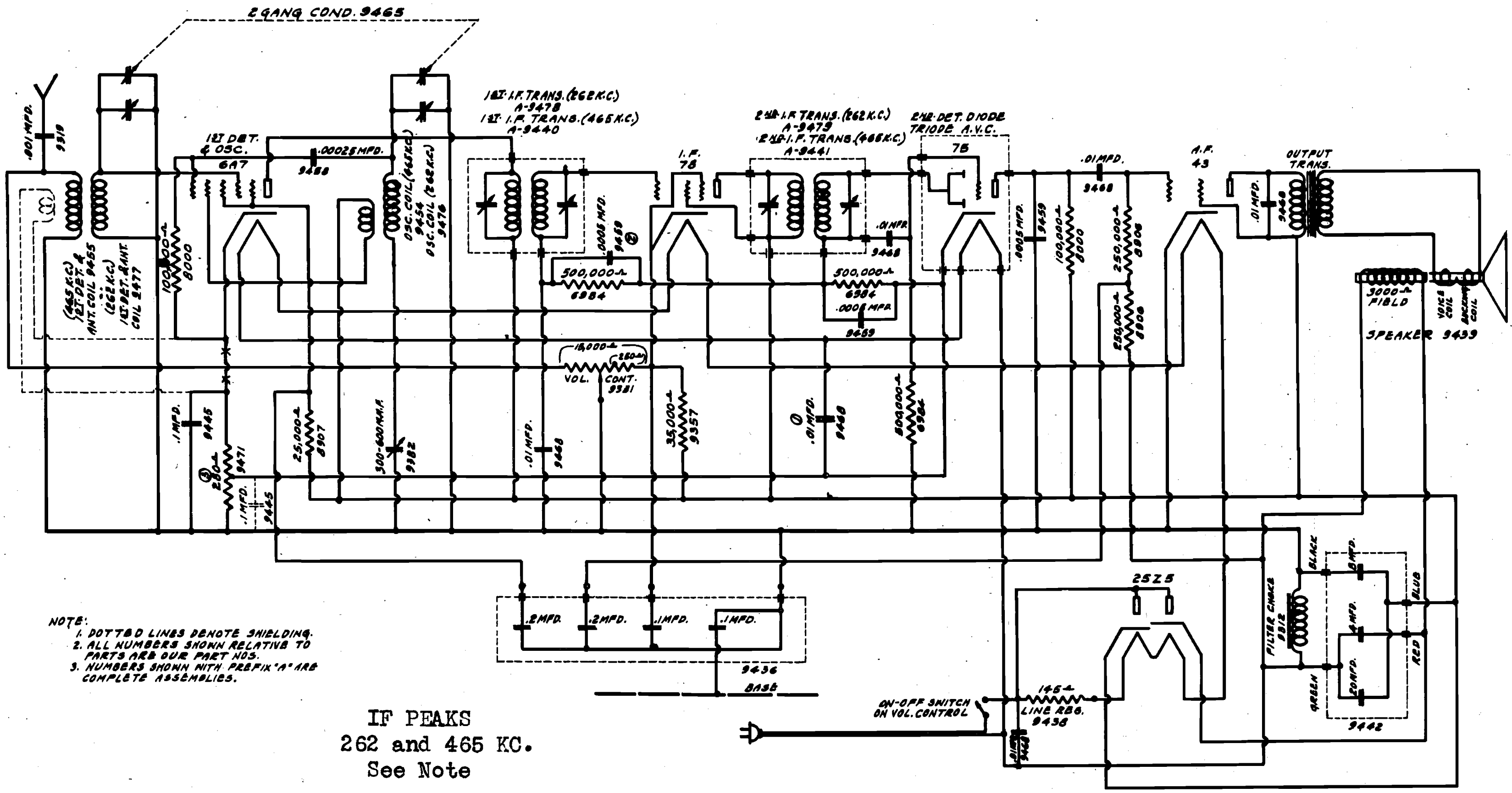
IMAGE ADJUSTMENT:
On the early models which used dials that were not calibrated in kilocycles, the location of the image and padding condensers were different than on the later models which have dials calibrated in kilocycles. On the first models the image condenser is located on the under side of the chassis (one end being connected to the terminal lug) and the padding condenser is on the back of, and accessible through the hole in the chassis. The image suppression condenser on the current models is located on the back of the chassis and the padding condenser on the right hand side of the chassis, both being accessible through the holes in the chassis. On either model the alignment procedure is the same. If an interfering station or whistle is noticed, tune the receiver to this interference and adjust the image suppression condenser until the interference disappears, or until the interference is at the minimum point.

INTERMEDIATE FREQUENCY ALIGNMENT:
Only when an intermediate coil has become defective, due to an open or burned out winding, should it be necessary to readjust the intermediate stages. Should this occur, it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate stage, connect the high side of the oscillator output to the control grid of the #57 oscillator modulator tube, leaving the grid cap disconnected from the tube. The ground side of the test oscillator should be connected to either the ground lead of the set or to the chassis. Set the oscillator at 262 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. If, during the alignment, the meter goes off scale, reduce the output of the oscillator or adjust the receiver volume control. It is always best to realign the set with tubes that are to be used with the receiver. Align the first intermediate transformer by turning the intermediate frequency trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by adjustment of the primary. The same procedure is followed in aligning the second intermediate transformer. After both intermediate transformers are adjusted the alignment of the intermediate stage is complete and they should not be further disturbed, and the grid cap should be connected to the grid of the #57 tube.

ANTENNA & OSCILLATOR ALIGNMENT:
If an antenna or oscillator coil requires replacement, it will be necessary to realign the variable condenser. The front section of the variable condenser (looking at the front of the receiver) is the oscillator section and the second section tunes the antenna stage. Tune the receiver to 1400 kilocycles and set the oscillator at this frequency and adjust the trimmer screws of the antenna and oscillator stages, which are mounted on top of the variable condenser, so as to obtain maximum output reading; then tune the receiver to approximately 600 kilocycles and set oscillator at this frequency; next, adjust the padding condenser, which is located at the right hand side of the chassis, and which is accessible through the hole in the chassis, to obtain maximum output reading. Note: It may be necessary to rock the condenser back and forth to peak correctly. After the above alignment is made, it is well to recheck the intermediate frequency trimmers with a weak signal tuned in.

MODEL 570
Schematic
Circuit notes

SENTINEL RADIO CORP.



IF PEAKS
262 and 465 KC.
See Note

These service notes are for two receivers which are practically identical but having different I.F. frequencies. Referring to the circuit diagram it will be noted that two part numbers are given for the first and second I.F. transformers, also for the first detector and antenna coil and oscillator coil. The receiver which uses an intermediate frequency of 265 K.C. can be readily identified by the red paint mark on top of each of the I.F. transformer shields. The additional parts used in the 265 K.C. I.F. receiver are the .1 MFD condenser, Part No. 9445, indicated by the dotted line in the drawing. The .1 MFD 9445 condenser shown by the unbroken lines, is replaced with a .05 MFD condenser, Part No. 9457, and the .0005 MFD condenser, Part No. 9459, by a .00025 MFD condenser, Part No. 9458. The only other circuit changes on the 265 K.C. I.F. receiver are indicated by the dotted line showing the image suppression coil, in which case the connections marked "X" are omitted in this type set. In the 465 K.C. I.F. receiver the image coil is not used, that is, the cathode of the 6A7 tube is connected directly to the 280 ohm resistor instead of to the image suppression winding as in the 465 K.C. receiver. The voltage table as given, and the alignment procedure, are the same for each receiver. When ordering parts be sure to specify the part number and the frequency of the I.F. transformer used in the receiver.

MODEL 570
Voltage, Alignment

SENTINEL RADIO CORP.

TUBE VOLTAGES

TYPE	POSITION	Filament Volts	Plate Volts	Screen Volts	Cathode Volts	Grid #1	Grid #2	Grid #3	Grid #4	Grid #5
6A7	Osc-Mod.	5.2	128		2.0	1.5	125	76	2	76
78	I.F.	5.1	128	128	2.25					
75	2nd Det.AVC	5.0	82.5*		2.0					
43	Output	25	115	128	20.0**					
25Z5	Rect.	25								

* These readings are only comparative and not true voltages applied. The Voltmeter, when readings are taken at these points, is in series with a very high resistance.

** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

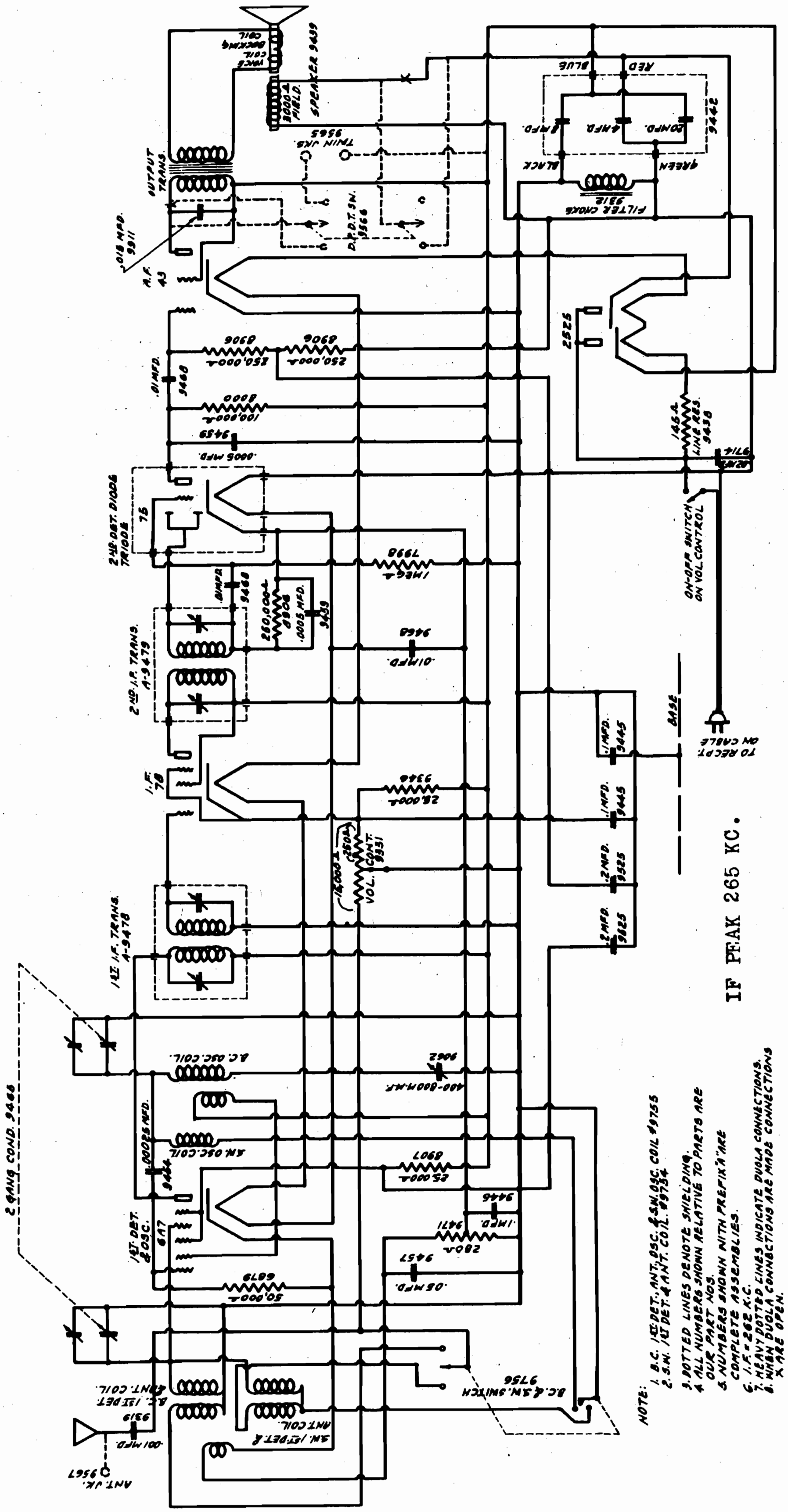
INTERMEDIATE FREQUENCY ALIGNMENT: Only when an intermediate transformer has become defective, due to an open or burned-out winding, should it be necessary to readjust the intermediate stages. Should this occur it is necessary that an oscillator be used with some type of output measuring device so as to tune the transformers correctly. To align the intermediate transformers connect the high side of the oscillator output to the control grid cap (Grid #4) of the 6A7 oscillator-modulator tube, leaving the grid cap disconnected from the control grid (Grid #4) of the 6A7 tube. CONNECT A 50,000-OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER AND PLACE A METAL SHIELD BETWEEN THE SECOND IF TRANSFORMERS AND THE 78 IF TUBE. FAILURE TO USE A SHIELD AND THE 50,000-OHM RESISTOR WILL CAUSE THE IF AMPLIFIER TO OSCILLATE AND THE ALIGNMENT WILL NOT BE CORRECT. The ground side of the test oscillator should be connected to the gang condenser frame and MUST NOT OTHERWISE BE GROUNDED. Set the oscillator for the proper IF signal frequency (265 or 465 KC., this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate frequency trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate transformer. After both intermediate transformers are adjusted, the alignment of the intermediate stage is complete. The trimmer should not be further disturbed. The grid cap should be connected to the grid of the 6A7 tube and the metal shield removed from between the IF. transformer and the 78 tube.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if an antenna or oscillator coil requires replacement, it will be necessary to realign the variable condenser. The front section of the variable condenser (looking at the front of the receiver) is the oscillator section, the other section tunes the antenna stage. Tune the receiver to 1720 kilocycles on the dial (minimum capacity) and set the oscillator at this frequency. Next adjust the trimmer screws of the oscillator and antenna sections, which are mounted on top of the variable condensers, so as to obtain maximum output reading. It will be found that the oscillator section trimmer condenser will in most cases have to be adjusted to minimum capacity and in some instances it may be necessary to remove the trimmer screw entirely.

After the trimmers have been correctly adjusted at this frequency, tune the receiver to 600 kilocycles and adjust the oscillator to 600 kilocycles. Next, adjust the oscillator padding condenser (which is located directly below the variable condenser and is accessible through the hole in the front of the chassis) to obtain maximum reading on the output meter. If the above is correctly followed, the receiver will now track correctly over the entire band from 1720 KC. to 550 KC. It is always advisable to align the receiver, whenever possible, with the tubes that are to be used in the set.

MODEL 599
Schematic

SENTINEL RADIO CORP.



MODEL 599
Voltage, Alignment

SENTINEL RADIO CORP.

SERVICE NOTES
for the
110 VOLT AC/DC 25-60 CYCLE
FIVE TUBE SUPERHETERODYNE RECEIVER.
(70-550 METERS)

These service notes pertain to two receivers which are identical with the exception that one model had Duola connections incorporated in it. These connections are shown in the schematic drawing by the dotted lines. Where Duola provisions are provided connections marked "X" on the diagram are open. Receivers with Duola connections may be identified by the Duola switch and two tip jacks located on the back of the chassis. Receivers which do not have the Duola connections do not have the switch (Part #9566) or the tip jacks (Part #9565).

ALIGNMENT: Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE TRANSFORMER ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the grid clip disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. The ground side of the test oscillator should be connected to the gang condenser frame and must not be otherwise grounded.

2. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer trimmer shields.

4. The second IF transformer should next be adjusted in the same manner as the first intermediate transformer.

TO ALIGN THE VARIABLE CONDENSER:

1. Place the band selector switch for operation on the 1500-540 kilocycle band (right hand position) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Next, adjust the trimmer screws of the oscillator and antenna section of the variable condenser to obtain maximum output reading. These trimmers are mounted on the top of the variable condenser.

2. Tune the receiver and set the oscillator frequency to approximately 600 kilocycles. Adjust the 600 kilocycle padding condenser which is located on the rear of and accessible through the small hole in the chassis for maximum output. Be sure to rock the variable condenser slightly to the right and left so as to obtain the position of greatest output.

NOTE: There is no short wave adjustment. After alignment has been properly made in accordance with the instructions given, the dial calibration will be correct and the receiver will properly track on short wave band.

VOLTAGE TABLE

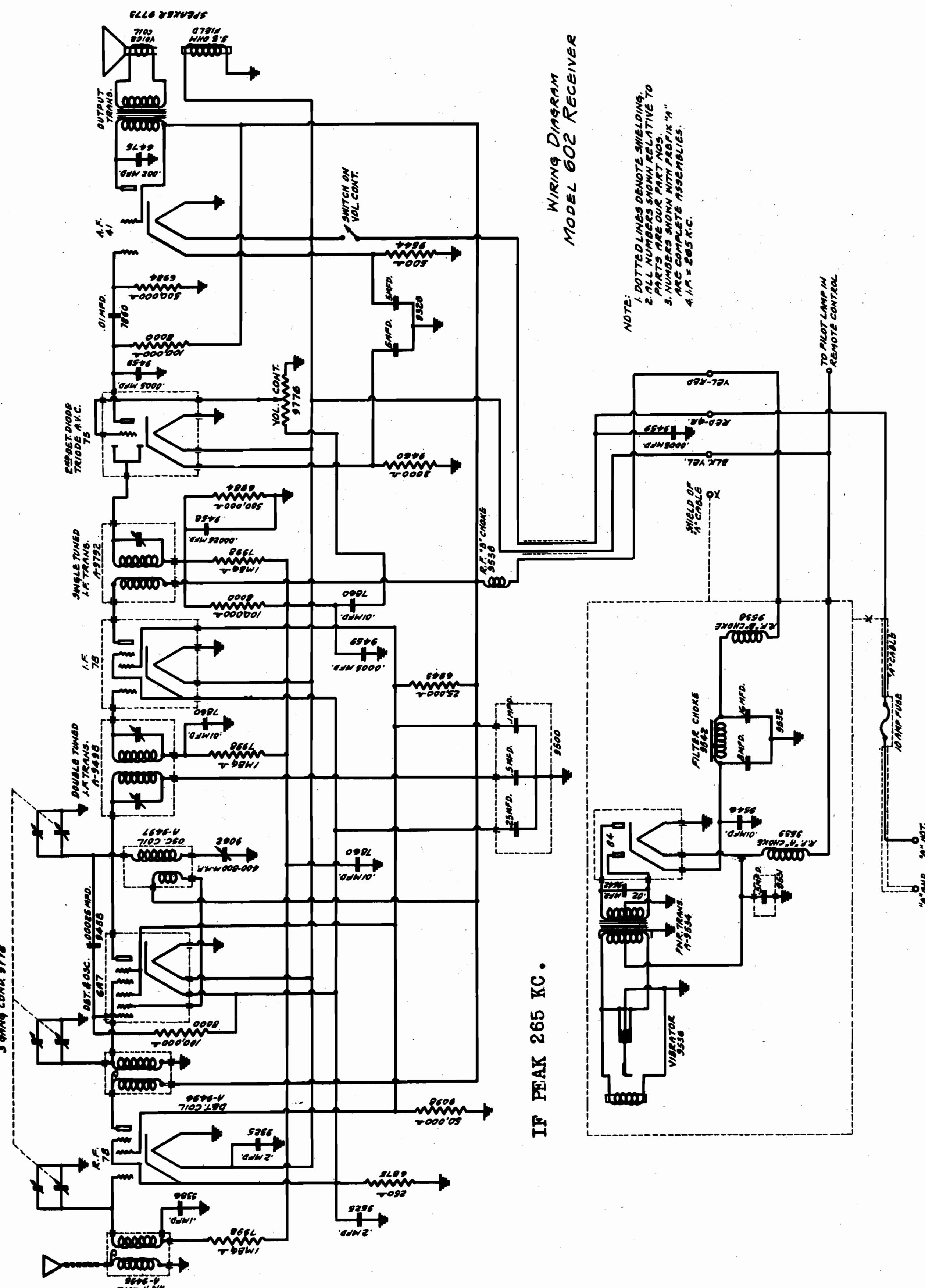
TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	CATHODE VOLTS	OSC. GRID NO.1	ANODE GRID NO.2	SCREEN GRID NO.3 & 5
6A7	Oscillator & Modulator	5.2	128		2.00	1.5	125	76
78	Intermediate Frequency	5.1	128	128	2.25			
75	2nd Detector Diode & AVC	5.0	82.5*		2.00			
43	Output	25	115	128	20**			
25Z5	Rectifier	25						

* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

MODEL 602
Schematic

SENTINEL RADIO CORP.



MODEL 602
Voltage
Alignment

SENTINEL RADIO CORP.

TUBE VOLTAGES

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO.2	GRID NO.3	GRID NO.5
78	Radio Frequency	6	225	4	92				
6A7	Oscillator & Modulator	6	225	4		6.2	225	92	92
78	Intermediate Frequency	6	225	4	92				
75	2nd Detector Diode & AVC	6	135	1.5					
41	Output	6	218	13	225				
84	Rectifier	6	260*	235					

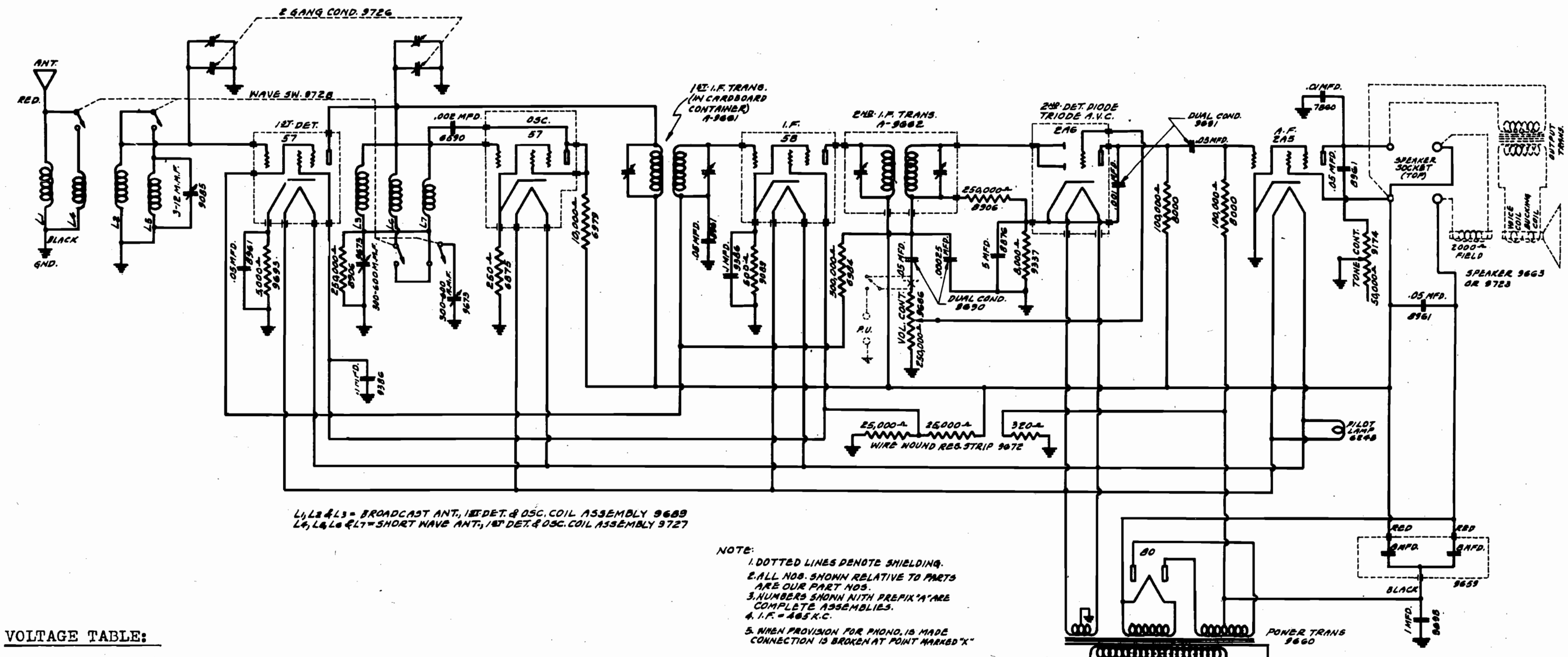
* A.C. each plate
Total "A" current - 6.2 amperes.

INTERMEDIATE FREQUENCY: Unless an intermediate transformer has become defective due to an open or burned out winding it should never be necessary to readjust the intermediate stage. Should this occur it is essential that an oscillator be used with some type of output measuring device to correctly tune the I.F. Transformers. Connect the high side of the oscillator output to the control grid cap (grid No. 4) of the 6A7 oscillator modulator tube leaving the grid cap disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. If the output of the oscillator is too great the value of this resistor may be reduced. The ground side of the tes oscillator should be connected to the chassis. Set the oscillator to 265 K.C. (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate frequency transformer trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary trimmer. The first I.F. transformer is double-tuned, the trimmers of which are accessible through the top of the I. F. can, one section of which is adjusted by turning the brass hex nut and the other section by screwing in and out the set screw that is accessible through the hole provided in the brass hex nut. The second intermediate transformer has but one trimmer which is likewise accessible from the top of the intermediate transformer shield can. After both intermediate transformers are correctly adjusted the alignment of the intermediate stage is complete and the trimmers should not be further disturbed. The grid cap should be connected to the grid of the 6A7 tube and 50,000 ohm resistor removed.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if the antenna, R.F. or oscillator coil have been replaced it will be necessary to realign the variable condensers. If the receiver is not mounted in the set housing it will be necessary to place a metal shield along side of the variable condenser and flush against the side of the set chassis nearest the variable condenser trimmers. It is necessary to do this otherwise when the receiver is placed in the set housing the metal housing will detune the receiver. Three holes should be made in the shield to correspond with the hole provided in the set housing which permits alignment of the receiver when the set is in the housing. Be sure the shield is properly grounded to the receiver chassis. NOTE: When the receiver and "B" unit is removed from the set housing be sure to set the receiver on top of the "B" unit, otherwise considerable R.F. and audio hash will be encountered. Regardless of whether the receiver is mounted in the set housing or not the alignment procedure is the same. Adjust the variable condenser to minimum capacity. Connect the high output side of the set oscillator to set antenna lead and the low side to antenna shield lead or chassis. Then adjust the test oscillator to 1500 K. C. Next, BRING THIS SIGNAL IN BY ADJUSTING THE VARIABLE CONDENSER OSCILLATOR SECTION TRIMMER. Looking at the front of the receiver, the variable condenser trimmers are mounted on the left side of the set on the variable condenser and reading from the bottom up the trimmers are, oscillator, R.F. and antenna. After the oscillator section has been properly peaked, adjust the antenna and R.F. trimmers in the order mentioned. After the variable condenser trimmers have been correctly adjusted at 1500 K.C. tune the receiver to 600 K.C. and adjust the oscillator to this frequency. Then adjust the oscillator padding condenser which is located on the lefthand side to the rear of the chassis, to obtain maximum reading on the output meter. If the set is mounted in the receiver housing the padding condenser is accessible through the small hole in the side of the set housing. It may be necessary to turn the variablecondenser slightly to the right and left to find the point where greatest output is obtained. If the alignment procedure is correctly followed the receiver will now track correctly over the entire tuning range. It is always advisable to align the receiver with the tubes to be used in the set whenever possible.

MODEL 622,623
Schematic,Voltage
Notes

SENTINEL RADIO CORP.



VOLTAGE TABLE:

Line Voltage : 115
Volume Control : Full on
Wave Band : Broadcast

TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I. F.	2.4	230	90	4
2A6 2nd Detector	2.45	160*		3
2A5 A. F.	2.4	218	230	7**
80 Rectifier	4.8	340 ea.plate		

IF PEAK 465 KC.

* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

BAND SELECTOR SWITCH: This receiver has a tuning range from 555 meters to 70 meters (540 kilocycles to 4500 kilocycles). Selection of either band is made with the band selector switch which is located on the right front of the cabinet below the tuning control knob. When the band selector switch is placed in the left hand position the set is operating on the 1500-4500 kilocycle band (200-70 meters). To operate the set on the 1500-540 kilocycle band (200-255 meters) place the band selector switch in the right hand position.

SENTINEL RADIO CORP.

MODEL 622,623
Alignment

SERVICE NOTES
for the
70-555 METER
SIX TUBE SUPERHETERODYNE RECEIVER.

Only when the antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the type 57 modulator tube (1st detector) leaving the grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

NOTE: Some of the IF intermediate transformers used do not have the brass hex nut and the trimmer screw inside of the brass hex nut, but have two parallel trimmers which are likewise accessible through two holes provided in the top of the I. F. shield can.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Tune the receiver to exactly 1400 kilocycles on the dial, adjust the band selector switch for operation on the broadcast band (1500-540 kilocycles) and set the oscillator to 1400 kilocycles. Then adjust the oscillator variable condenser section trimmer condenser TO BRING THIS SIGNAL IN (maximum output). The oscillator and antenna variable condenser trimmers are mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band, set the oscillator at 600 kilocycles and tune the receiver to approximately 600 kilocycles on the dial. Then adjust the 600 kilocycle padding condenser which is the one located towards the front on the right hand side of the chassis and accessible through the small hole in the chassis for maximum output. It is necessary to rock the condenser slightly to the right and left to obtain the correct position. After aligning the 600 kilocycle padding condenser be sure to recheck the 1400 kilocycle adjustment as the 600 kilocycle alignment may have changed the alignment at 1400 kilocycles.

4. Adjust the short wave switch for operation on 1500 kilocycle to 4500 kilocycle band. Set the oscillator at 4 megacycles and the receiver to 4 megacycles on the dial. Turn the receiver on end and BRING THE 4 MEGACYCLE SIGNAL IN (TO MAXIMUM OUTPUT) BY ADJUSTING THE 4 MEGACYCLE TRIMMER located underneath the chassis and adjacent to the band selector switch.

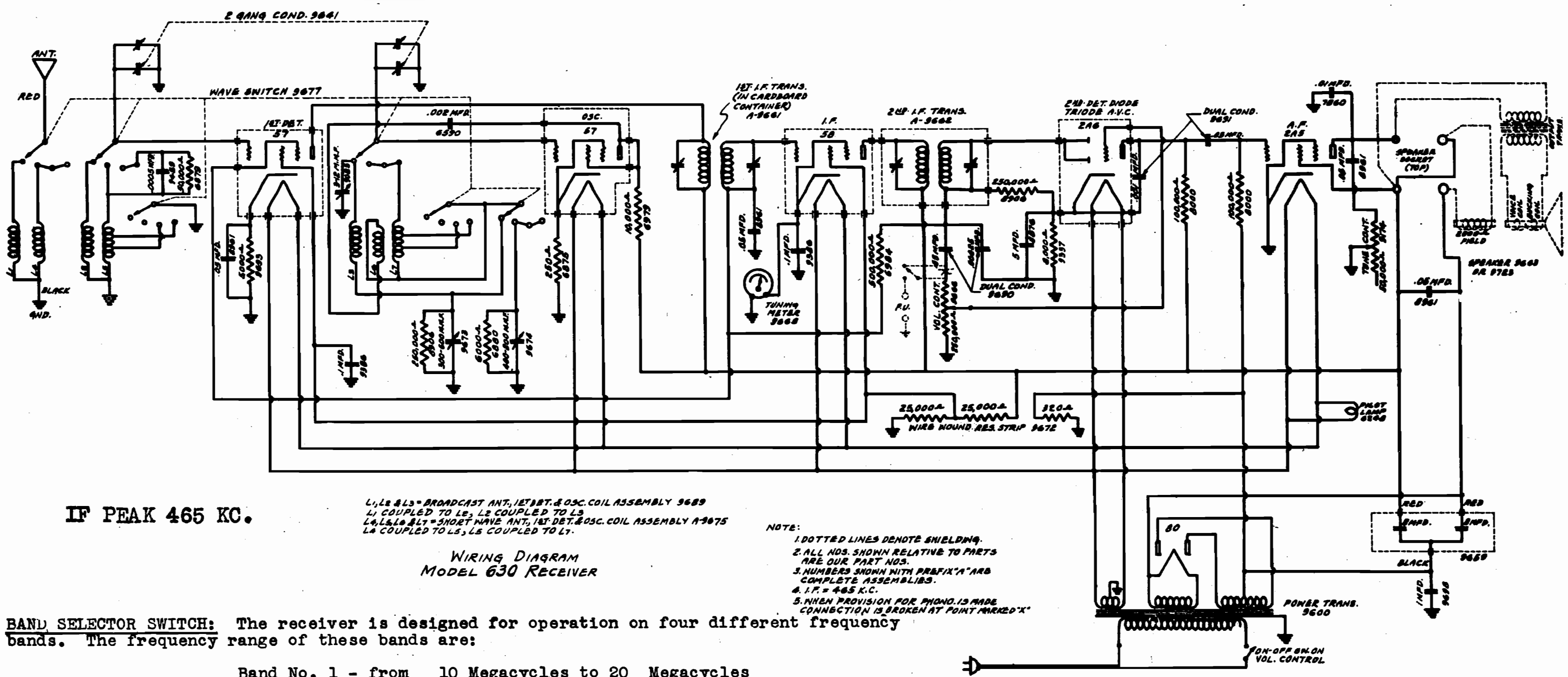
Next, tune the receiver to 1600 kilocycles on the dial and set the oscillator frequency to 1600 kilocycles after which adjust the 1600 kilocycle padding condenser which is located on the rear right hand side and accessible through the hole in the chassis for maximum output. It is imperative that after making this adjustment at 1600 kilocycles that the alignment at 4 megacycles be rechecked, as the 1600 kilocycle adjustment may throw the receiver out at 4 megacycles.

TUBES: The receiver uses the following tubes:

One (1) Type 57 Detector
One (1) Type 57 Oscillator
One (1) Type 58 I. F.
One (1) Type 2A6 Second Detector Diode, Triode AVC
One (1) Type 2A6 Output
One (1) Type 80 Rectifier

MODEL 634,635
Schematic,Trimmers

SENTINEL RADIO CORP.



IF PEAK 465 KC.

L_1, L_2 & L_3 = BROADCAST ANT., 1ST DET. & OSC. COIL ASSEMBLY 9689
L_1 COUPLED TO L_2, L_2 COUPLED TO L_3
L_4, L_5, L_6 & L_7 = SHORT WAVE ANT., 1ST DET. & OSC. COIL ASSEMBLY A-9675
L_4 COUPLED TO L_5, L_6 COUPLED TO L_7.

WIRING DIAGRAM
MODEL 630 RECEIVER

NOTE:
1. DOTTED LINES DENOTE SHIELDING.
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. I.F. = 465 K.C.
5. WHEN PROVISION FOR PHONO. IS MADE CONNECTION IS BROKEN AT POINT MARKED "X"

BAND SELECTOR SWITCH: The receiver is designed for operation on four different frequency bands. The frequency range of these bands are:

Band No. 1 - from 10 Megacycles to 20 Megacycles
Band No. 2 - from 4 Megacycles to 10 Megacycles
Band No. 3 - from 1.5 Megacycles to 4 Megacycles
Band No. 4 - from 1500 Kilocycles to 540 Kilocycles.

Selection of the desired frequency band is made with the band selector switch knob (large rear knob of double knob) which is located on the lower right front of the cabinet below the tuning control knob. When the band selector switch is placed in the maximum left hand position the receiver is operating on Band No. 1, 10 megacycles to 20 megacycles. Rotating the band selector knob in the clockwise direction the three other positions are in the order named Band No. 2, 4 megacycles to 10 megacycles, Band No. 3, 1.5 to 4 megacycles and Band No. 4, 1500 kilocycles to 540 kilocycles. All four frequency bands are calibrated on a single dial. The calibrated section of the dial for the band that the receiver is adjusted to operon is indicated by the dial indicator which is automatically adjusted by the band selector switch knob.

SHORT-WAVE TRIMMER: A short wave trimmer control is incorporated in the receiver and is used for a fine tuning adjustment when tuning for short-wave reception from 1.5 megacycles to 20 megacycles. The band selector switch knob consists of two sections. The small front section knob is used for adjusting the short-wave trimmer and the large rear section is the band selector switch knob. When tuning for short-wave reception always rotate the tuning control slowly until a station is heard with maximum volume. Don't hurriedly skim over the dial or pass up any weak signals. After adjusting the tuning control so as to bring the station in at its loudest point adjust the short wave trimmer control by turning the trimmer knob first in the clockwise and then in the counter-clockwise direction to the position of greatest volume. Occasionally after tuning in this manner still better results may be obtained by readjusting the tuning control and then further fine adjustment should be made with the short-wave trimmer for maximum volume.

SENTINEL RADIO CORP.

MODEL 634,635
Voltage,Alignment

VOLTAGE TABLE:

Line Voltage : 115
Volume Control : Full on
Wave Band : Broadcast

TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I.F.	2.4	230	90	4
2A6 Second Detector	2.45	160*		3
2A5 A.F.	2.4	218	230	7**
80 Rectifier	4.8	340 each plate		

* Comparative voltage only. The voltmeter when readings are taken at this point is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the #57 Modulator tube (1st detector), leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the 1st intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second I.F. transformer should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Tune the receiver to exactly 4 megacycles on the dial and adjust the band selector switch for operation on this band.

   Set the short wave trimmer about one-half the distance between maximum clockwise and counter-clockwise rotation.

   Next set the test oscillator to exactly four megacycles and tune the signal in by adjustingthe oscillator variable condenser trimmer mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band and tune the receiver to 1.6 megacycles on the dial.

   Set the oscillator to exactly 1.6 megacycles.

   Adjust the padding condenser accessible through the hole in the right hand side of the chassis and the closest to the rear of the chassis to obtain maximum output reading. After making this adjustment recheck the alignment at 4 megacycles. It is advisable to recheck the 1.6 and 4 megacycle adjustment several times.

MODEL 634, 635
Alignment
Parts List

SENTINEL RADIO CORP.

4. Adjust the band selector switch for operation on the broadcast band.

   Tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency.

   Turn the receiver on end and adjust the trimmer screw on the small trimmer located adjacent to the short-wave switch underneath the chassis for maximum signal after which adjust the antenna variable condenser trimmer mounted on top of the variable condenser for maximum signal strength.

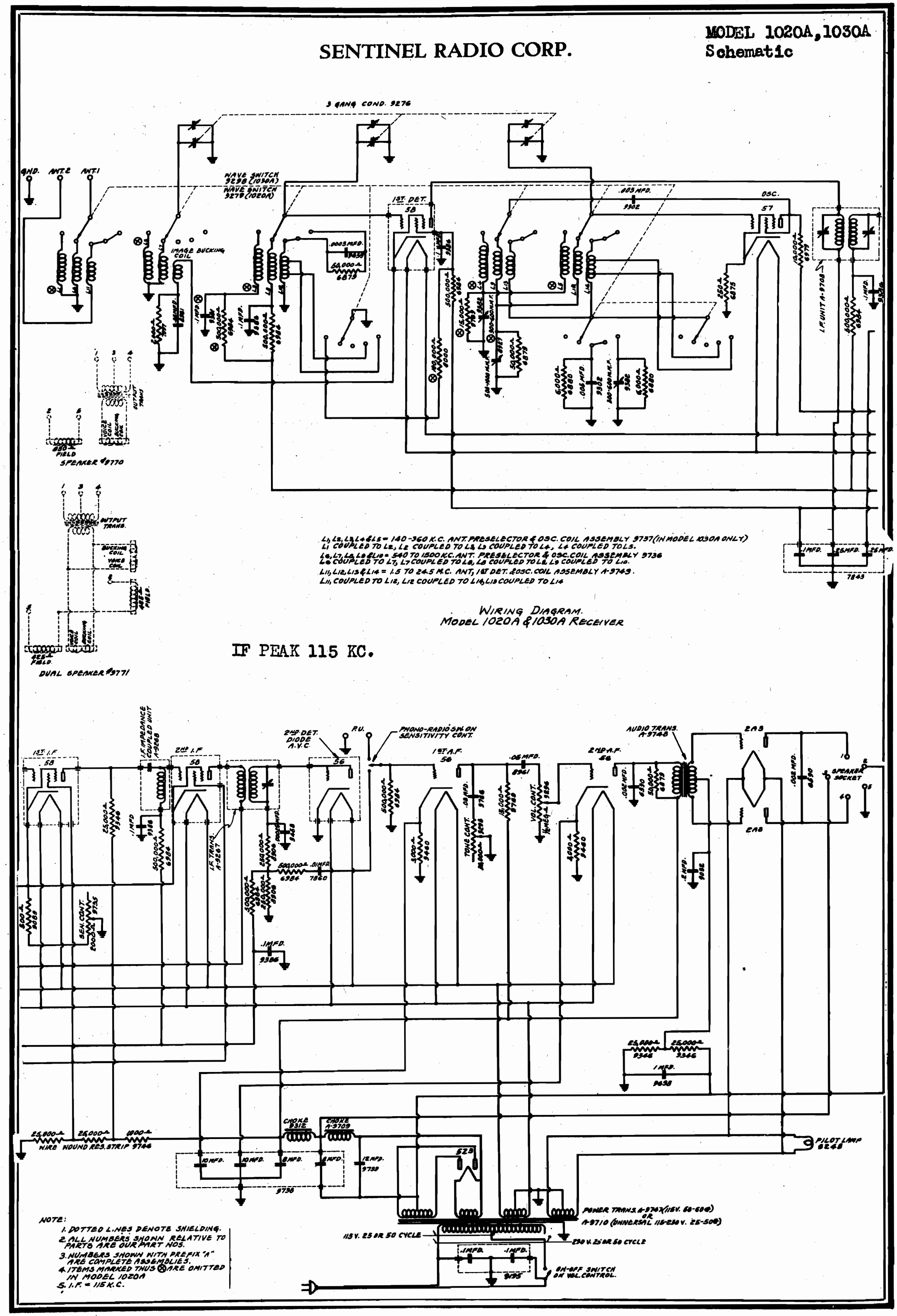
5. Leave the band selector switch for operation on the broadcast band and tune the receiver to approximately 600 kilocycles and adjust the oscillator to this frequency. Then adjust the 600 kilocycle padding condenser which is located on the righthand side next to the 1.6 megacycle padding condenser for maximum output reading. As this adjustment is quite critical it is necessary to rock the condenser slightly to obtain maximum sensitivity.

   NOTE: Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles and the 600 kilocycle adjustment after aligning at 1400 kilocycles. All short-wave bands are properly aligned after correctly aligning at 4 megacycles.

PARTS & PRICE LIST
for the
SIX TUBE SUPERHETERODYNE RECEIVER
20-550 Meters.

PART NUMBER		LIST PRICE
9689	Broadcast, Antenna, First Detector & Oscillator Coil	$1.40
9675	Short-Wave and First Detector Coil	4.07
9686	Short-Wave Oscillator Coil	1.32
9287	Short-Wave Trimmer Disc. Assembly	.39
9682	Short-Wave Trimmer Worm Tuning Rod	.88
9661	1st IF Transformer	2.20
9662	2nd IF transformer	2.15
9641	Two Gang Condenser	3.03
9699	Dial	.61
9673	Padding Condenser	.50
9674	Padding Condenser	.50
9666	Volume Control	1.27
9668	Tuning Meter	2.75
9174	Tone Control	.94
9660	Power Transformer	4.02
9659	2-8 Mfd. Electrolytic Condenser	2.80
8876	5 Mfd. Electrolytic Condenser	.72
9663	Dynamic Speaker	9.79
9672	Wire Wound Resistor Strip	1.00
9651	Wave Band Indicator Assembly	1.10
9677	Wave Switch	3.58
9671	Pilot Light Socket	.09
6248	Pilot light	.17
9386	.1 Mfd. 200 Volt Condenser	.19
8961	.05 Mfd. 400 Volt Condenser	.19
6590	.02 Mfd. 400 Volt Condenser	.19
7860	.01 Mfd. 400 Volt Condenser	.17
9690	.0025 Mfd. & 05 Mfd. 400 Volt Dual Condenser	.44
9691	.05 Mfd. & .001 Mfd. 400 Volt Dual Condenser	.39
9698	1 Mfd. 100 Volt Condenser	.56
9459	.0005 Moulded Condenser	.21
6976	10,000 Ohm 1 Watt Resistor	.22
6880	6,000 Ohm 1/3 Watt Resistor	.19
9693	5,000 Ohm 1/3 Watt Resistor	.19
8000	100,000 Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
6875	250 Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
6879	50,000 Ohm 1/3 Watt Resistor	.19
9337	8,000 Ohm 1/3 Watt Resistor	.19
9889	Tuning Control Knob	.22
9889	Tone Control Knob	.22
9887	Short Wave Switch Control Knob	.22
9886	Volume Control Knob	.22
9888	Short Wave Trimmer Knob	.22
9063	Tube Shield Base	.05
8980	Tube Shield	.11
9082	Tube Shield Cap	.04
6576	Phono Jacks	.14
6123	S.P.D.T. Phono Switch	.55

MODEL 1020A, 1030A
Schematic



MODEL 1020A, 1030A
Alignment

SENTINEL RADIO CORP.

BANDS: On those receivers which are designed for operation on the European band from 140 to 370 kilocycles, there are five different frequency bands. Receivers which are designed for operation only up to 550 kilocycles have four bands.

Band #1 - from 24 Megacycles to 9.8 Megacycles
Band #2 - from 9.8 Megacycles to 3.8 Megacycles
Band #3 - from 3.8 Megacycles to 1.5 Megacycles
Band #4 - from 1500 Kilocycles to 550 Kilocycles
Band #5 - from 370 Kilocycles to 140 Kilocycles

Model 1020A does not have Band #5, 370 to 140 K.C. The desired frequency band is selected by adjusting the selector switch knob. The first position of the band selector (turned all the way to the left) is for operation on the 24 to 9.8 megacycle band. Rotating the knob clockwise to the second position is Band #2, 9.8 to 3.8 megacycles. The third position is Band #3, 3.8 to 1.5 megacycles. The fourth position is Band #4, 1500 kilocycles to 550 kilocycles. Band #5 is the fifth position, 370 kilocycles to 140 kilocycles. The dial scale is calibrated and divided into four or five sections, depending upon the range of the receiver, one for each band. The 550 to 1500 kilocycle and 140 to 370 kilocycle is calibrated in kilocycles, the other three sections in megacycles.

INTERMEDIATE FREQUENCY ALIGNMENT: Referring to the circuit diagram, it will be noted that there are three intermediate frequency transformers. The first I. F. transformer is mounted in back of the short-wave coil assembly and has two trimmers. The second I.F. transformer is located between the #58 first I.F. tube and the #58 second I.F. tube. This is the impedance coupled I.F. transformer and has no alignment trimmers. The third I.F. transformer is located between the #58 second I.F. tube and the #56 2nd detector tube, and has one trimmer. All three of the I. F. trimmers are accessible from the top of the I. F. transformer shield can. Only when an intermediate transformer has become defective due to an open or burned out winding, should it be necessery to readjust the intermediate stages. Should this occur it is absolutely necessary that an oscillator be used with some type of output measuring device so as to correctly tune the transformer.

THE INTERMEDIATE FREQUENCY IS 115 K. C.

To align the intermediate transformer, connect the high side of the test oscillator output to the control grid of the #58 first detector tube. leaving the grid cap of this tube disconnected. The ground side of the test oscillator should be connected to the ground post of the chassis. Set the oscillator at 115 K.C., (this must be accurate) and adjust the oscillator so that a convenient reading is obtained on the output meter. If, during the alignment the output meter goes off scale, reduce the output of the oscillator or turn the volume control further in the minimum volume position. Align the first intermediate transformer by turning the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws of the first I. F. transformer should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the third I. F. transformer, excepting that this transformer has but one trimmer. After both the intermediate transformers are adjusted, the alignment of the intermediate stage is complete and the trimmers should not be further disturbed.

VARIABLE CONDENSER ALIGNMENT: If the antenna preselector or oscillator coil requires replacement it will be necessary to re-align the variable condensers and padding condensers. As a general rule this is the only time that this realignment should be necessary. An oscillator and output meter is, of course, necessary. If the test oscillator frequency range does not include a signal of 9.5 megacycles, it will be necessary to use a harmonic of the oscillator for alignment of the high frequency band as a signal of 9.5 megacycles is required. It must be remembered that the signal voltage of the oscillator decreases with increase of harmonics, that is, the harmonic will not give as large a reading on the output meter as the fundamental frequency. As some oscillators may not have sufficient harmonic output to permit aligning on 9.5 megacycles it would be advisable to check the output of the oscillator at this frequency by using a set that is known to be perfectly aligned and in good condition, noting whether or not the harmonic can be picked up by the receiver. The 140 K. C. signal may be obtained on the intermediate frequency band available on most oscillators. Reference will be made to bands #1, 2, 3, 4 and 5, the frequencies of which are given in the paragraph entitled "Bands". To align the variable condensers proceed as follows: Connect the high side of the test oscillator to the antenna post and the low side of the oscillator to the ground post. Tune the receiver to 1400 K. C. on the dial and set the test oscillator to this frequency. Then adjust the oscillator variable condenser trimmer condenser for maximum output reading, after which the antenna preselector and first detector variable condenser trimmers should be adjusted in the order named. The variable condenser sections are, reading from front of the receiver to the rear, the antenna preselector, first detector and oscillator.

After the alignment is correctly made at 1400 K. C. tune the receiver to 600 K.C. and set the test oscillator to this frequency and adjust the 600 K.C. padding condenser for maximum output. This padding condenser is located, looking at the front of the receiver, on the lefthand side of the chassis pan closest to the rear of the chassis. The one toward the front of the chassis immediately adjacent to the 600 K. C. padding condenser, is the 9.8 megacycle padding condenser. It may be necessary to rock the variable condenser by rotating the tuning control knob slightly to the right and left which adds and subtracts capacity) to correctly align the padding condenser at this frequency. Next adjust the band selector switch for operation on Band #1 and tune the receiver to a point midway between 10 megacycles and the end of the dial (approximately 9.5 megacycles). The oscillator should be adjusted for a signal of 9.5 megacycles. The 9.5 megacycles padding condenser located along side of the 600 K.C. padding condenser, should NOW BE ADJUSTED TO BRING THIS SIGNAL IN AT THIS DIAL SETTING. Failure to have the correct signal frequency or an improper setting of the dial will result in the calibration of the dial being inaccurate. After the 9.5 megacycle padding condenser has been correctly adjusted, the band selector switch should be changed for operation on Band #2 and the 9.5 megacycle signal should come in at approximately 9.5 megacycles on this band's dial calibrated section. If the signal is received too far from the correct dial position, it will be necessary to recheck the 9.5 megacycle padding condenser adjustment. Note the cause may be due to improper oscillator signal frequency. If the signal is tuned in correctly, the short wave alignment is complete and no further adjustments are necessary.

On Model 1030A it will be necessary to align the 140 K.C. to 370 K.C. band. To do so tuned the receiver to 140 K.C. on the dial and adjust the oscillator frequency to exactly 140 K. C. then place

MODEL 1020A, 1030A
Alignment, Voltage
Parts List

SENTINEL RADIO CORP.

the band selector switch for operation on Band #5 and adjust the 140 K. C. padding condenser for maximum output reading. THE SIGNAL MUST BE TUNED IN WITH THE 140 K. C. PADDING CONDENSER WITH THE DIAL SET AT 140 K. C. This padding condenser is located on the front of the chassis pan below the tuning dial and is accessible through the small hole in the chassis pan. It is absolutely essential when making the adjustment on the 140 K. C. to 370 K. C. band, that the dial be tuned to 140 K. C. and that the test oscillator frequency be exactly adjusted to this frequency and the SIGNAL TUNED IN BY ADJUSTING THE 140 K. C. PADDING CONDENSER TO BRING IN THIS 140 K. C. Failure to do this will result in inaccurate dial calibration.

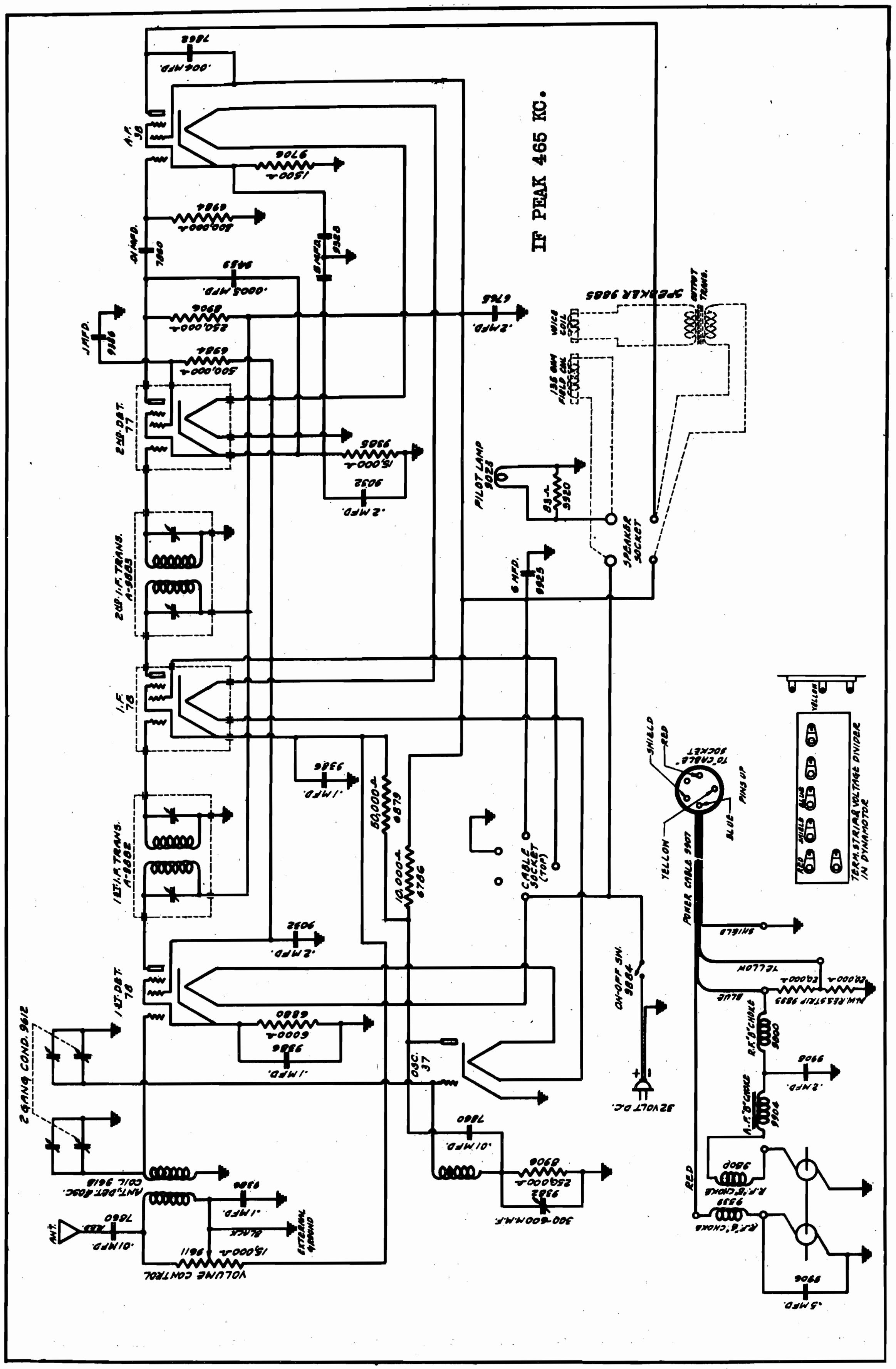
Line Voltage	- 115 Volts A.C.
Volume Control	- Full On
S. & N.S. Control	- Minimum Suppression
Wave Band	- Broadcast

TUBE	FIL.	PLATE	SCREEN	SUPPR.	CATHODE	GRID BIAS
#58 (1st Det.)	2.4	230	203	1.2	1.2	
#57 (Osc.)	2.4	130	130	2.8	2.8	
#58 (1st I.F.)	2.4	143	90	3.7	3.7	
#58 (2nd I.F.)	2.4	230	90	3.7	3.7	
#56 (2nd Det. AVC)	2.4					
#56 (1st Audio)	2.4	190			10	
#56 (2nd Audio)	2.4	240			12.5	
#2A3(Output)	2.4	270				44
#2A3(Output)	2.4	270				44
#80(Rectifier)	5.0	300				

9738	Electrolytic Condenser (2-8 Mfg. & 2-10 Mfd.)	3.85
9739	14 Mfd. Wet Electrolytic Condenser	1.98
9195	Condenser (2-.1 Mfd. 400 Volt)	.66
7843	Bypass Condenser (2-.25 & 1-.1 Mfd.)	1.27
9386	.1 Mfd. 200 Volt Condenser	.19
7860	.01 Mfd. 400 Volt Condenser	.17
9032	.2 Mfd. 200 Volt Condenser	.25
6590	.002 Mfd. 400 Volt Condenser	.17
8961	.05 Mfd. 400 Volt Condenser	.19
9766	.03 Mfd. 400 Volt Condenser	.19
9698	1. Mfd 100 Volt Condenser	.61
9302	.005 Moulded Condenser	.55
9459	.0005 Moulded Condenser	.21
9458	.00025 Moulded Condenser	.21
9346	25,000 Ohm 1/2 Watt Resistor	.22
9769	15,000 Ohm 1/2 Watt Resistor	.22
8906	250,000 Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
9098	500 Ohm 1/3 Watt Resistor	.19
6879	50,000 Ohm 1/3 Watt Resistor	.19
6875	250 Ohm 1/3 Watt Resistor	.19
7997	2,000 Ohm 1/3 Watt Resistor	.19
6786	10,000 Ohm 1/3 Watt Resistor	.19
9460	3,000 Ohm 1/3 Watt Resistor	.19
6880	6,000 Ohm 1/3 Watt Resistor	.19

SENTINEL RADIO CORP.

MODEL 5000, 5100
Schematic



MODEL 5000,5100
Voltage,Alignment
Parts List

SENTINEL RADIO CORP.

9925	6 Mfd. Elect. Condenser	8000	100,000 Ohm 1/3 Watt Resistor
9328	Duo 5 Electrolytic Condenser	6880	6,000 Ohm 1/3 Watt Resistor
9882	First I.F. Transformer	9385	15,000 Ohm 1/3 Watt Resistor
9883	Second I.F. Transformer	9901	32 Volt Dynamotor Complete
9617	Antenna, Detector & Oscillator Coil	9902	Dynamotor Filter Assembly Complete
6765	.2 Mfd. 400 Volt Condenser	9804	A.F. "B" Choke
9032	.2 Mfd. 200 Volt Condenser	9539	R.F. "A" Choke
9386	.1 Mfd. 200 Volt Condenser	9800	R.F. "B" Choke
7860	.01 Mfd. 400 Volt Condenser	9908	.2 Mfd. 200 Volt Condenser
7862	.004 Mfd. 400 Volt Condenser	9906	.5 Mfd. 200 Volt Condenser
9459	.0005 Mfd. Moulded Condenser	9893	Wire Wound Resistance Strip 40,000 Ohm
8106	250,000 Ohm 1/3 Watt Resistor	9907	Three Conductor Power Cable with Plug
		9611	Volume Control
6984	500,000 Ohm 1/3 Watt Resistor	9382	Padding Condenser
6786	10,000 Ohm 1/3 Watt Resistor	8980	Tube Shield
9706	15,000 Ohm 1/3 Watt Resistor	9082	Tube Shield Cap

INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the #36 modulator tube. The ground side of the oscillator should be connected to the chassis.
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.
3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.
4. The second I.F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

To align the variable condenser:

1. Connect the high output side of the oscillator to the set antenna lead and the ground side of the oscillator to the ground lead.
2. Tune the receiver to 1400 kilocycles on the dial and set the oscillator to this frequency.
3. Adjust the variable condenser trimmer screws for maximum output reading.
4. Tune the set to approximately 600 kilocycles on the dial and adjust the oscillator frequency to 600 kilocycles. Adjust the padding condenser located on the rear of the chassis adjacent to the antenna and ground leads and accessible through the hole in the chassis for maximum output reading.

When making this adjustment be sure to rock the variable condenser slightly to the right and left using the position where the greatest output reading is obtained.

VOLTAGE TABLE:

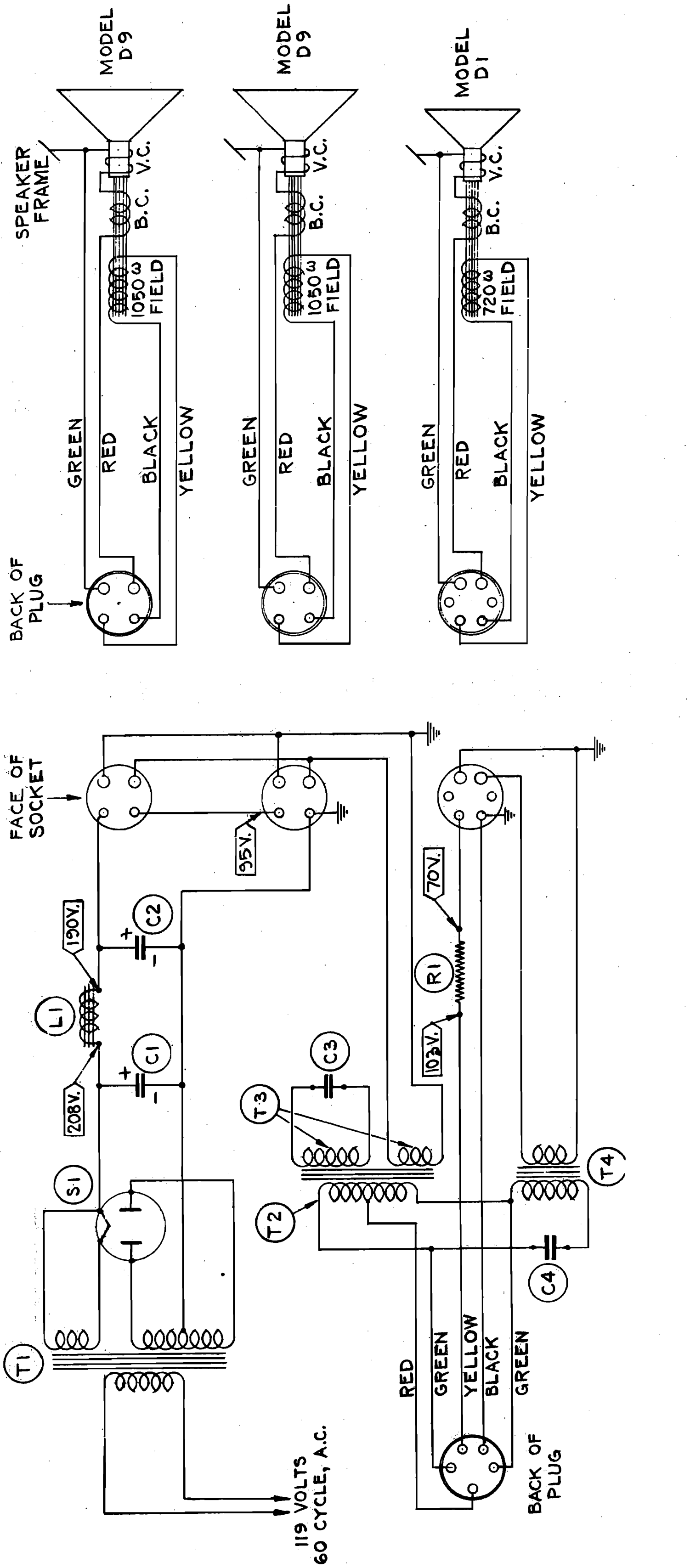
Line Voltage : 32 Volts
Volume Control : Full on

TUBE	FIL.	PLATE	SCREEN	CATHODE
78 1st Detector	6.5	215	100	10
37 Oscillator	6.5	140		25
78 I.F.	6.5	215	100	26
77 2nd Detector	6.5	90*	32.5*	4
38 Output	6.5	208	215	20

* Comparative Voltage only.
Read voltage from socket to chassis.

SILVER - MARSHALL MFG CO.

MODEL Triple Speaker
"V", "X", "Q"
Schematic



TRIPLE SPEAKER & POWER SUPPLY DIAGRAM

USED WITH MODELS 'V,' 'X,' & 'Q DE LUXE'

LEGEND

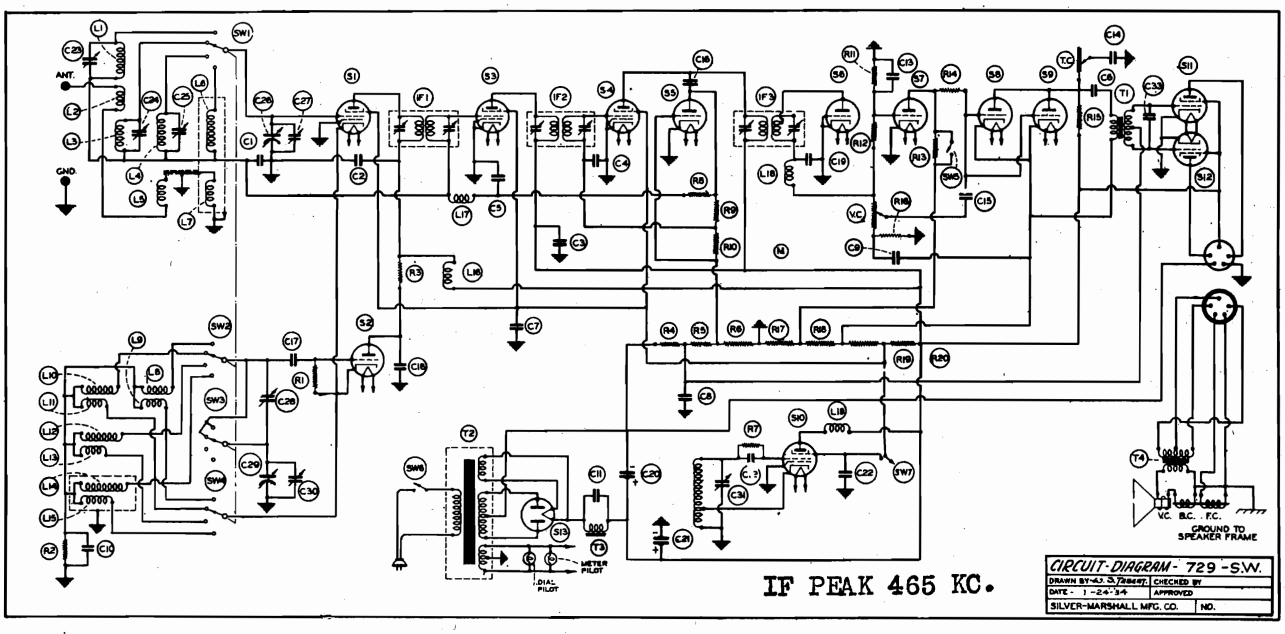
C1-C2	4 MFD. ELECTROLYTIC CONDENSER	13177
C3	.01 MFD. MICA CONDENSER	7047
C4	.007 MFD. TYPE M MICA CONDENSER	3305
L1	3395 CHOKE	
R1	330 OHM RED DEVIL RESISTOR	4757
S1	280 TUBE	
T1	10257 TRANSFORMER	
T2	10247 PRIMARY COIL	
T3	10248 SECONDARY COIL	
T4	10228 TRANSFORMER	

DRAWN BY M.K.
APPVD.
SILVER-MARSHALL, INC.
7-19-32

Dwg. No. 310-3

MODEL 729 SW
Schematic
Parts List

SILVER - MARSHALL MFG. CO.



Model 729-SW Superheterodyne

RESISTANCES
R1- 100,000 - 1/2 watt
R2- 150 - 1/2 "
R3- 3,000 - 2 "
R4- 230,000 - 1 "
R5- 60,000 - 1 "
R6- 11,000 - 1 "
R7- 100,000 - 1/2 "
R8- 500,000 - 1/2 "
R9- 1,000,000 - 1/2 "
R10- 1,000,000 - 1/2 "
R11- 1,000,000 - 1/2 "
R12- 2,000,000 - 1/2 "
R13- 300,000 - 1/2 "
R14- 1,000,000 - 1/2 "
R15- 8,000 - 1 "
R16- 100,000 - 1 "
R17- 2,600)-
R18- 340)- Wire Wound
R19- 1,840)
R20- 5,750)
V. C. with A. C. Switch, 500,000 ohms with log taper.
T. C. Tone Control 5,000 tapered.

TUBES
S1- 58 1st Detector
S2- 56 Oscillator
S3- 58 1st Int. Amp.
S4- 58 2nd Int. Amp.
S5- 56 A. V. C.
S6- 56 2nd Detector
S7- 56 Quiet A. V. C.
S8- 56 1st Audio Driver
S11, S12- 2A5 Push-Pull Output
S13- 523 Rectifier

TRANSFORMERS
T1- CB-1038 Audio Transformer
T2- CB-1008 Power Transformer
T3- CB-1007 Power Choke Coil
T4-(CB-1013 Output Trans. with 10" speaker
(CB-1037 Output Trans. with Auditorium speaker

COILS
L1, L2, L3- R.F. and antenna coil - purple and green SW ranges
L4, L5- R.F. and antenna coil - red SW range
L6, L7- R.F. and antenna coil - black BC range
L8, L9, L10, L11- Oscillator and cathode coils - purple and green SW ranges
L12, L13- Oscillator and cathode coils - red SW range
L14, L15- Oscillator and cathode coils - black BC range
L16, L17, L18, L19- 15 m.h. R. F. chokes

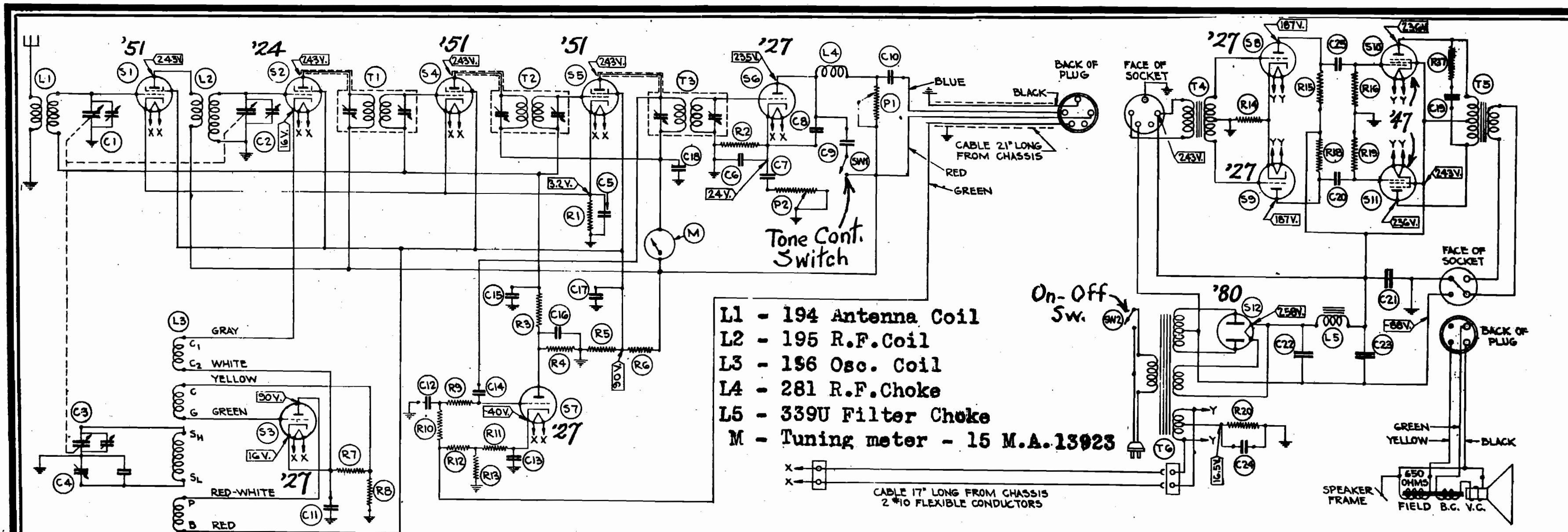
SWITCHES
SW1, SW2, SW3, SW4- Frequency Range Switch
SW5- Switch for Quiet AVC Circuit
SW6- Power Switch on Volume Control
SW7 - Switch for "Beat Note" Oscillator

CONDENSERS
C1- .01 mfd 200V Paper
C2- .25 " 400V "
C3- .5 " 400V "
C4- .01 " 200V "
C5- .01 " 200V "
C6- .1 " 400V "
C7- .5 " 400V "
C8- .5 mfd 400V Paper
C9- .5 " 400V "
C10- .1 " 200V "
C11- .15 " 400V "
C12- .0001 " Mica
C13- .025 " 200V "
C14- .25 " 400V "
C15- .01 " 200V "
C16- .00025 Mica
C17- .00005 "
C18- .002 "
C19- .0001 "
C20- 8 mfd 450V Dry Electrolytic
C21- 12 " 450V "
C22- .002 Mica
C23- 20-65 mmf Adjustable Mica
C24- 6-30 " " "
C25- 25-65 " " "
C26, C27, C29, C3- Adjustable Air Condenser 410 mmf
C28- Adjustable Mica Condenser 350-500 mmf
C31- " " " 70-125 "
C33- .002 Mica Condenser

SPEAKER - 8,000 ohm F.C., D-19 Type, or A DeLuxe

SILVER - MARSHALL MFG. CO.

MODEL C w/ AVC
Schematic
Parts List



L1 - 194 Antenna Coil
L2 - 195 R.F.Coil
L3 - 196 Osc. Coil
L4 - 281 R.F.Choke
L5 - 339U Filter Choke
M - Tuning meter - 15 M.A.13923

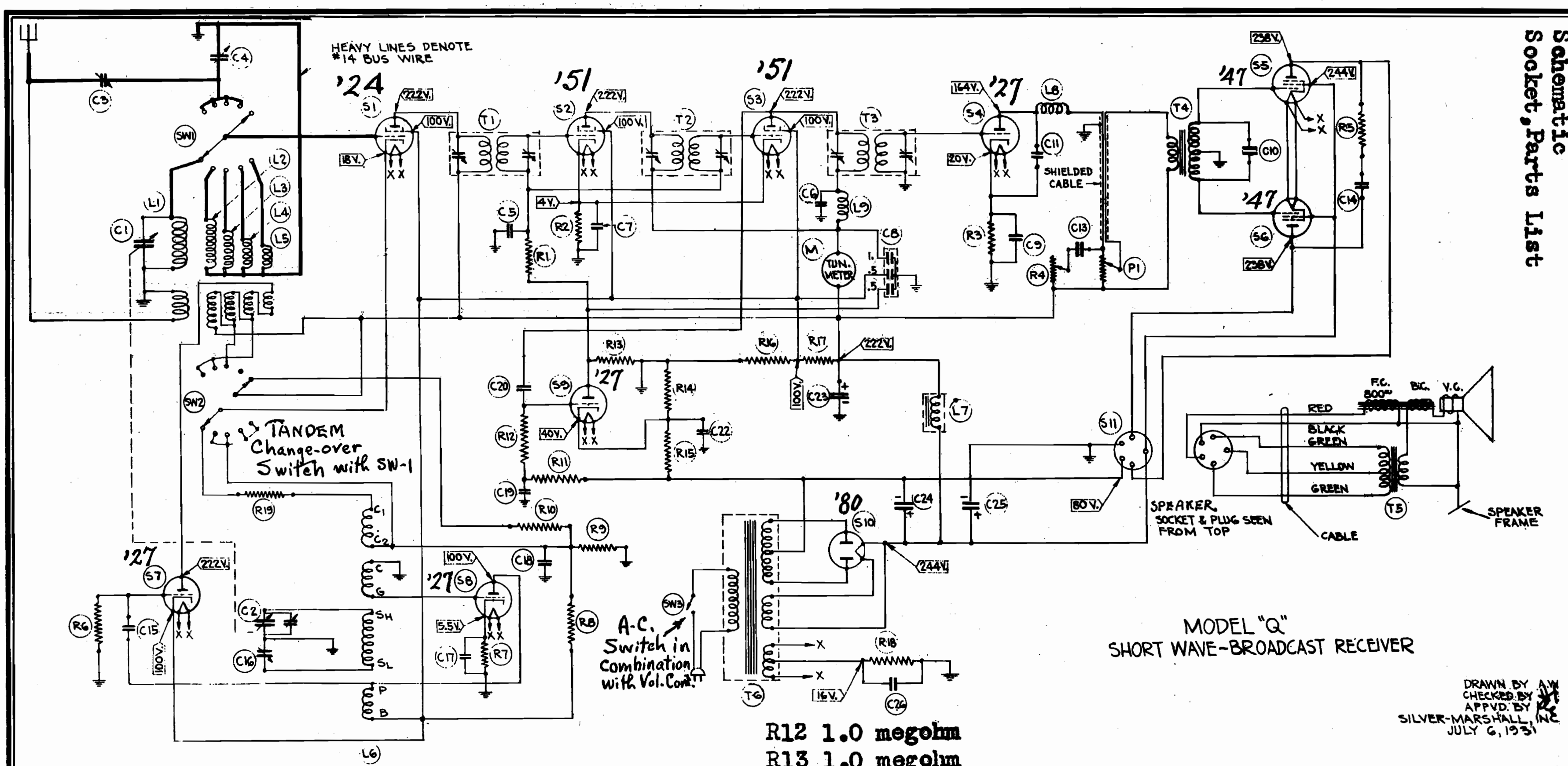
C1-C2-C3	365 Mmfd. Variable Cond. ± 5 mmfd.	13189
C4	Trimmer Cond. Assem.	16035
C5	.5 mfd. Cond. - Waxtite - 200 V.	13329
C6	.02 mfd. Cond. - Sprague - 500 V.	13195
C7	1 mfd. Cond - 300 V.	3254
C8	.0005 mfd. Cond (Mica)	7052
C9	.02 mfd. Cond. - Sprague - 500 V.	13195
C10	.06 mfd. Cond. - Sprague - 400 V.	7050
C11	.1 mfd . Cond. - Sprague - 200 V.	3220
C12	.1 mfd. Cond. - Sprague - 200 V.	3220
C13	.5 mfd. Cond. - Waxtite - 200 V.	13329
C14	.0005 mfd. Cond. (Mica)	7052
C15	.1 mfd. Cond. - Sprague - 200 V.	3220
C16	.5 mfd. Cond. - 200 V.)	
C17	.5 mfd. Cond. - 200 V.)	13140
C18	1.0 mfd. Cond. - 300 V.)	
C19	.006 mfd.Cond. -	3144
C20	.15 mfd. Cond. - Sprague	13145
C21	8 mfd. Cond. - 450 V. (Dry Electrolytic)	13181
C22	4 mfd. Cond. - 450 V. (Dry Electrolytic)	13177
C23	8 mfd. Cond. - 450 V. (Dry Electrolytic)	13181
C24	.1 mfd. Cond. - Sprague - 200 V.	3220
C25	.15 mfd. Cond. - Sprague	13145

P1	20,000 ohm Pot. (Volume control)	14427
P2	½ Megohm Pot. (Tone control)	4507
R1	150 ohm Resistor - wire wound	4720
R2	60,000 ohm Resistor - 1 watt carbon	4695
R3	100,000 ohm Resistor - 1 watt carbon	14691
R4	500,000 ohm Resistor - 1 watt carbon	4772
R5	8250) 14750 Ohm R.D.Ohmite - 3 watt	14781
R6	6500)	
R7	100) 1800 ohm Resistor - wire wound	14723
R8	1700)	
R9	1 Megohm Resistor - 1 watt carbon	4759
R10	1 Megohm Resistor - 1 watt carbon	4759
R11	60,000 ohm Resistor - 1 watt carbon	4695
R12	12,000 ohm Resistor - 1 watt carbon	4746
R13	9,000 ohm Resistor - 1 watt carbon	14746
R14	1350 ohm Resistor - 1 watt carbon	14767
R15	10,000 ohm Resistor - 1 watt carbon	14696
R16	300,000 ohm Resistor - 1 watt carbon	4685
R17	25,000 ohm Resistor - 1 watt carbon	4697
R18	10,000 ohm Resistor - 1 watt carbon	14696
R19	300,000 Ohm Resistor - 1 watt carbon	4685
R20	220 ohm R.D.Ohmite	14766

MODEL C RECEIVER(A.V.C.)	
SKETCH BY H.D.	APP'D. BY
DRAWN BY A.W.A.	DATE 3-22-32
CHECKED BY [signature]	[signature]
CHANGE	DATE / BY / APP'D.
SILVER-MARSHALL, INC.	156-1

MODEL "Q" Type 1
Schematic
Socket, Parts List

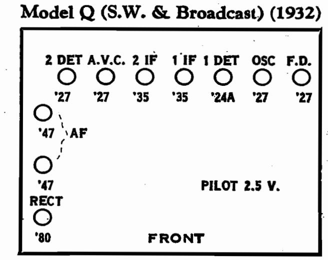
SILVER - MARSHALL MFG. CO.



DWG. No. 154-3

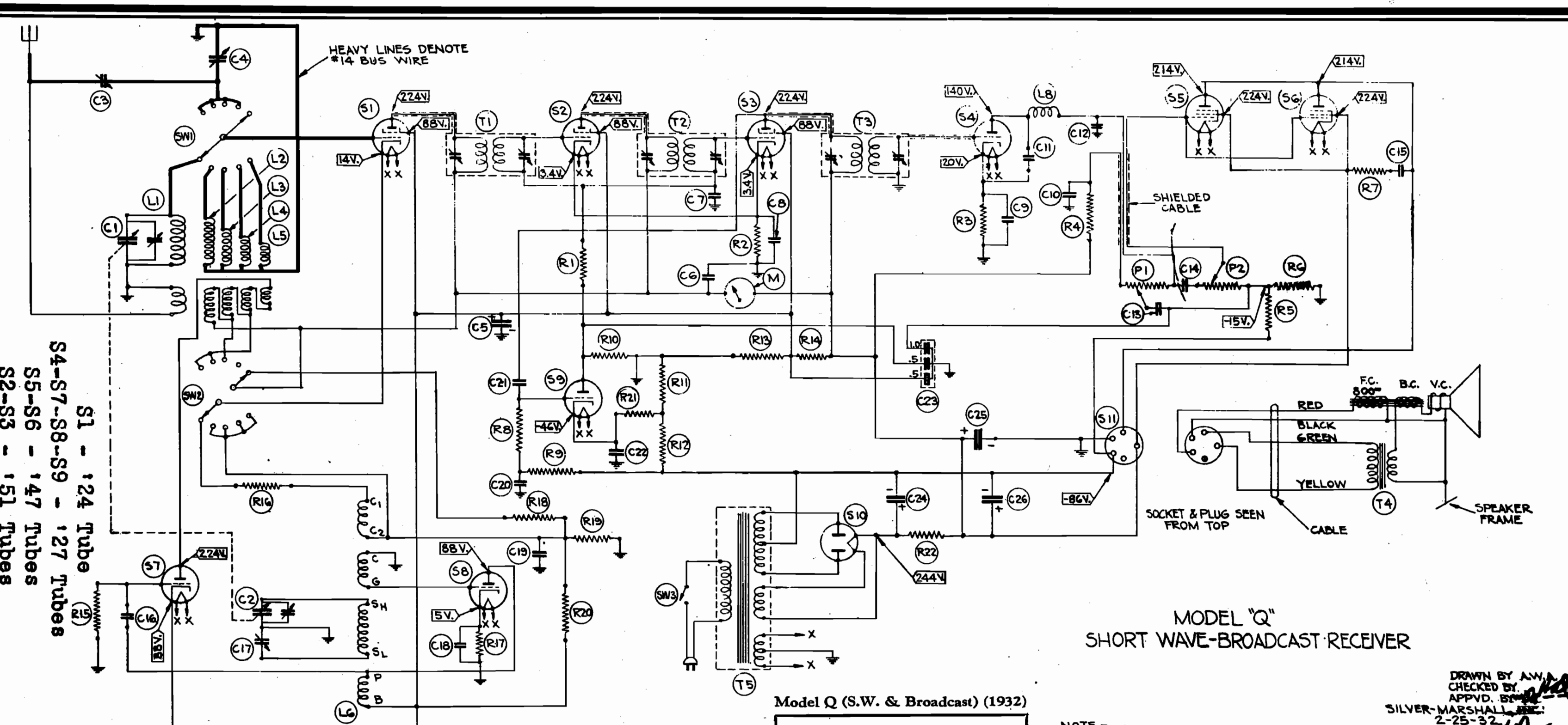
C1, C2	365 mfd	C15	.00015 mfd	P1	100000 ohms	R12	1.0 megohm
C3	25 mmfd	C16	Osc. Tr.	R1	100000 ohms	R13	1.0 megohm
C4	200 mfd	C17	0.1 mfd	R2	400 ohms	R14	10000 ohms
C5	0.1 mfd	C18	0.1 mfd	R3	100000 ohms	R15	9000 ohms
C6	0.1 mfd	C19	0.1 mfd	R4	500000 ohms	R16	10000 ohms
C7	0.1 mfd	C20	.0005 mfd	R5	25000 ohms	R17	6500 ohms
C8	see diagram	C21		R6	300000 ohms	R18	220 ohms
C9	1.0 mfd	C22	1.0 mfd	R7	400 ohms	R19	400 ohms
C10	.001 mfd	C23	4.0 mfd	R8	60000 ohms		
C11	.001 mfd	C24	8.0 mfd	R9	3500 ohms	L1	550-1500 kc
C12		C25	4.0 mfd	R10	300000 ohms	L2	1.56-3.46 megcyc
C13	.025 mfd	C26	0.1 mfd	R11	1.0 megohm	L3	3.51-5.36 megcyc
C14	.006 mfd					L4	5.54-10.29 megcyc
						L5	9.6-18.15 megcyc

Model Q (S.W. & Broadcast) (1932)



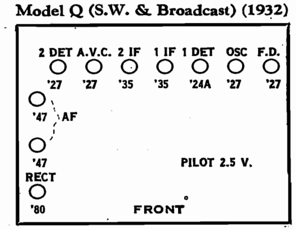
SILVER-MARSHALL MFG. CO.

MODEL "Q" Type 3
Schematic, Socket
Parts List



S1 - '24 Tube
S4-S7-S8-S9 - '27 Tubes
S5-S6 - '47 Tubes
S2-S3 - '51 Tubes
S10 - '80 Tube
S11 - Speaker Socket

Model Q (S.W. & Broadcast) (1932)



NOTE - ALL VOLTAGES TAKEN FROM GROUND.

DRAWN BY A.W.
CHECKED BY
APPVD. BY
SILVER-MARSHALL, INC.
2-25-32
3-18-32
4-12-32

DWG. No. 155-4

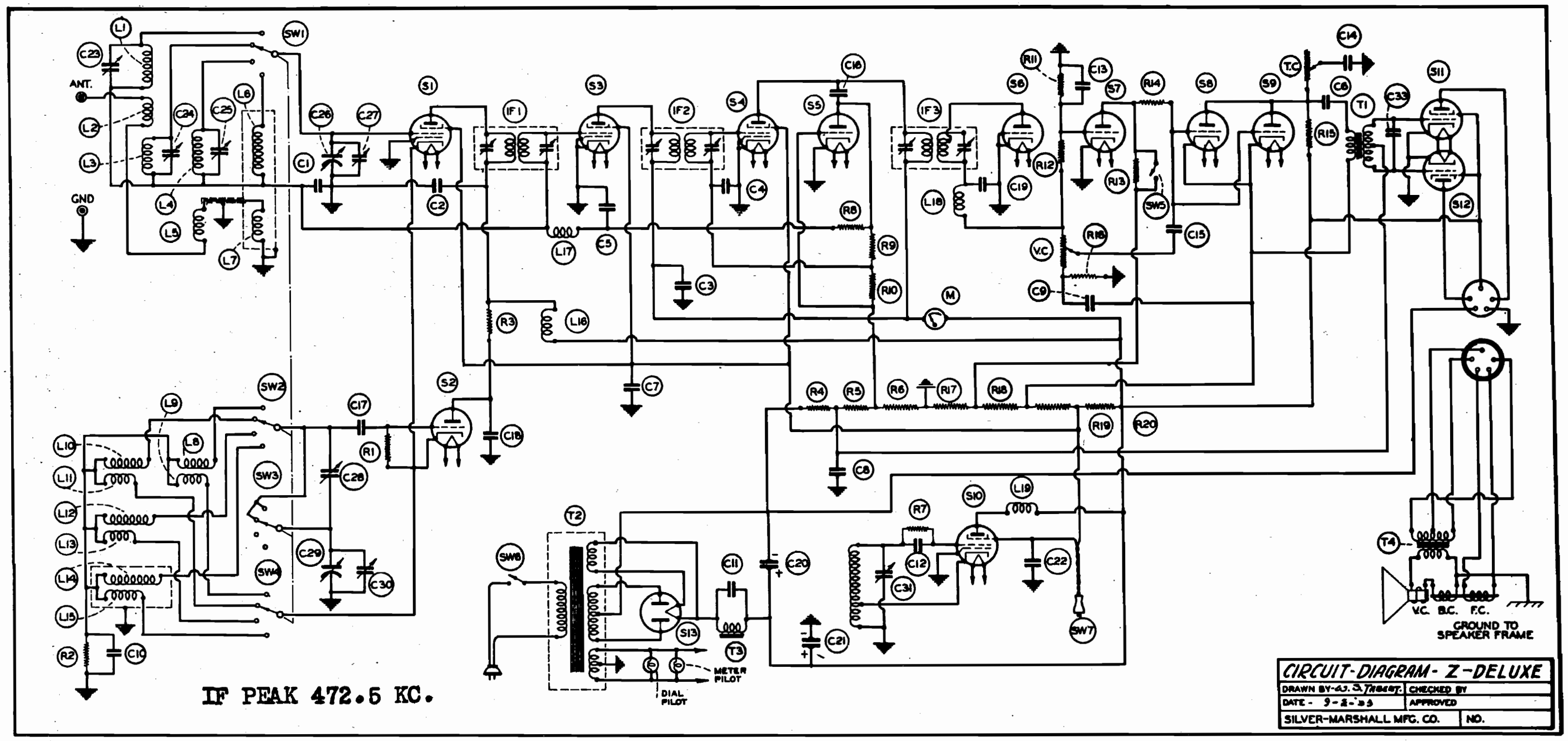
C1-C2	365 mmfd	C19	0.1 mfd	R9	1. meg
C3	25 mmfd	C20	0.15 mfd	R10	1. meg
C4	200 mmfd	C21	.0005 mfd	R11	12000 ohms
C5	4. mfd	C22	0.5 mfd	R12	9000 ohms
C6	0.1 mfd	C23	See diagram	R13	8250 ohms
C7	0.1 mfd	C24	12 mfd	R14	6500 ohms
C8	0.1 mfd	C25	8 mfd	R15	300000 ohms
C9	0.1 mfd	C26	4 mfd	R16	400 ohms
C10	0.5 mfd			R17	400 ohms
C11	.001 mfd	R1	100000 ohms	R18	300000 ohms
C12	.001 mfd	R2	250 ohms	R19	3500 ohms
C13	.025 mfd	R3	60000 ohms	R20	60000 ohms
C14	.025 mfd	R4	25000 ohms	R21	60000 ohms
C15	.03 mfd	R5	500000 ohms	R22	220 ohms
C16	.00015 mfd	R6	100000 ohms	P1	100000 ohms
C17	Osc Tr.	R7	5000 ohms	P2	250000 ohms
C18	0.1 mfd	R8	1. meg		

L1 - 197 Broadcast Antenna Coil (550-1500 kc.)
L2 - 202 Short Wave antenna Coil (1.56-3.46 megacycles)
L3 - 201 Short Wave Antenna Coil (3.51-5.36 megacycles)
L4 - 200 Short Wave Antenna Coil (5.54-10.29 megacycles)
L5 - 199 Short Wave Antenna Coil (9.6-18.15 megacycles)
L6 - 198 Oscillator Coil
L8 - 283 R.F.Choke

M - Tuning Meter - 15 m.a. 13923

MODEL "Z" DeLuxe
Schematic
Parts List

SILVER - MARSHALL MFG. CO.



Parts List
Z-DE LUXE Superheterodyne

RESISTANCES
R1- 100,000 - 1/2 watt
R2- 150 - 1/2 "
R3- 3,000 - 2 "
R4- 230,000 - 1 "
R5- 60,000 - 1 "
R6- 11,000 - 1 "
R7- 100,000 - 1/2 "
R8- 500,000 - 1/2 "
R9- 1,000,000 - 1/2 "
R10- 1,000,000 - 1/2 "
R11- 1,000,000 - 1/2 "
R12- 2,000,000 - 1/2 "
R13- 300,000 - 1/2 "
R14- 1,000,000 - 1/2 "
R15- 8,000 - 1 "
R16- 100,000 - 1 "
R17- 2,600)
R18- 340)- Wire Wound
R19- 1,840)
R20- 5,750)
V. C. with A. C. Switch,
500,000 ohms with log taper.
T. C. Tone Control 5,000 tapered.

TUBES
S1- 58 1st Detector
S2- 56 Oscillator
S3- 58 1st Int. Amp.
S4- 58 2nd Int. Amp.
S5- 56 A. V. C.
S6- 56 2nd Detector
S7- 56 Quiet A. V. C.
S8- 56 1st Audio Driver
S11, S12- 2A5 Push-Pull Output
S13- 523 Rectifier

COILS
L1, L2, L3- R.F. and antenna coil - purple and green SW ranges
L4, L5- R.F. and antenna coil - red SW range
L6, L7- R.F. and antenna coil - black BC range
L8, L9, L10, L11- Oscillator and cathode coils - purple and green SW ranges
L12, L13- Oscillator and cathode coils - red SW range
L14, L15- Oscillator and cathode coils - black BC range
L16, L17, L18, L19- 15 m.h. R. F. chokes

SPEAKER - 80,000 ohm F.C., D-9 Type, or A DeLuxe

TRANSFORMERS
T1- CB-1038 Audio Transformer
T2- CB-1008 Power Transformer
T3- CB-1007 Power Choke Coil
T4-(CB-1013 Output Trans. with 10" speaker
(CB-1037 Output Trans. with Auditorium speaker

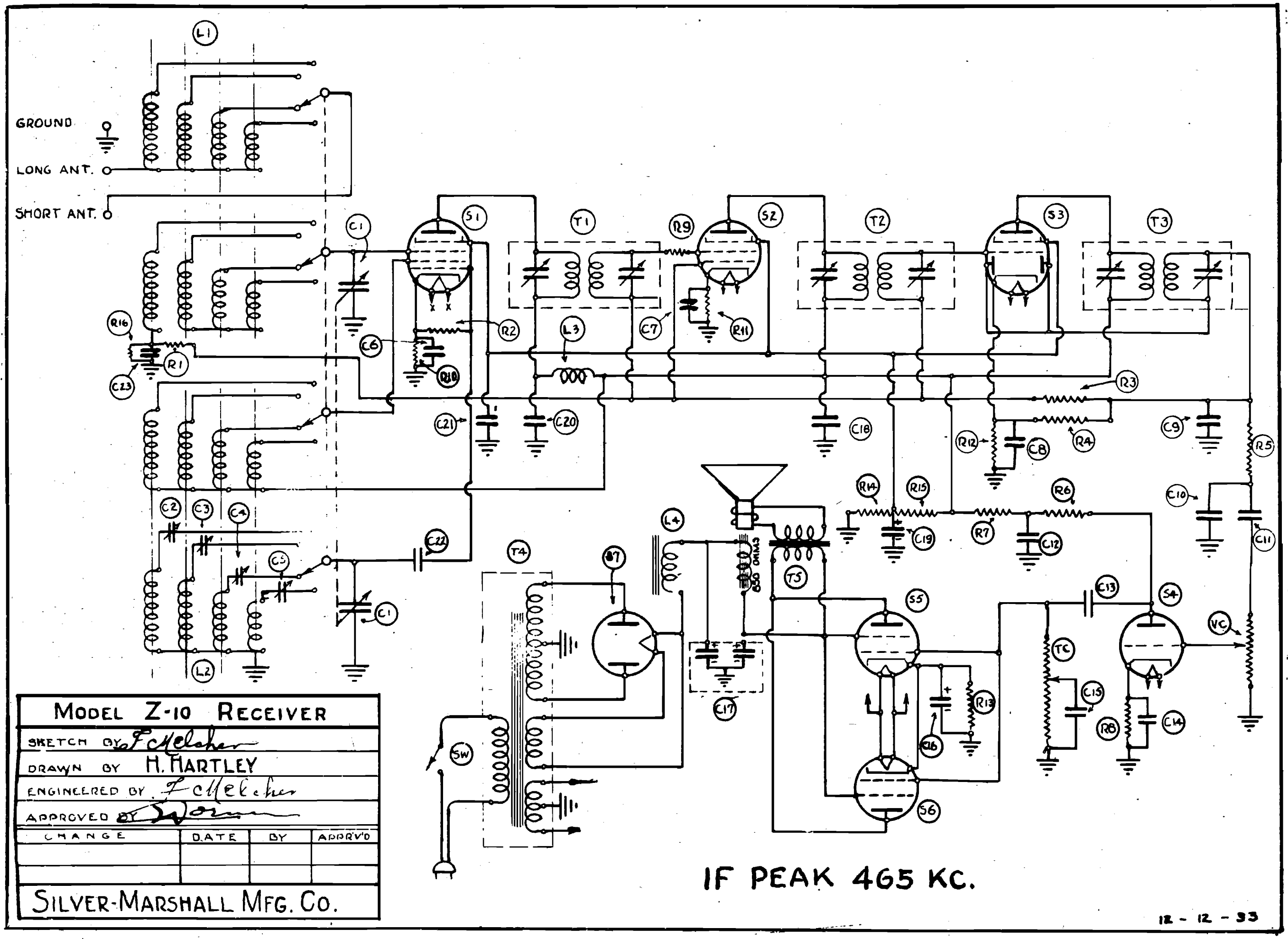
SWITCHES
SW1, SW2, SW3, SW4- Frequency Range Switch
SW5- Switch for Quiet AVC Circuit
SW6- Power Switch on Volume Control
SW7 - Pendant Switch for "Beat Note" Oscillator

CONDENSERS
C1- .01 mfd 200V Paper
C2- .25 " 400V "
C3- .5 " 400V "
C4- .01 " 200V "
C5- .01 " 200V "
C6- .1 " 400V "
C7- .5 " 400V "
C8- .5 mfd 400V Paper
C9- .5 " 400V "
C10- .1 " 200V "
C11- .15 " 400V "
C12- .0001 " Mica
C13- .025 " 200V "
C14- .25 " 400V "
C15- .01 " 200V "
C16- .00025 Mica
C17- .00005 "
C18- .002 "
C19- .0001 "
C20- 8 mfd 450V Dry Electrolytic
C21- 12 " 450V " "
C22- .002 Mica
C23- 20-65 mmf Adjustable Mica
C24- 6-30 " " "
C25- 25-65 " " "
C26, C27, C29, C3- Adjustable Air Condenser 410 mmf
C28- Adjustable Mica Condenser 350-500 mmf
C31- " " " 70-125 "
C33- .002 Mica Condenser

9-2-33

SILVER - MARSHALL MFG. CO.

MODEL Z-10 Schematic, Parts List List

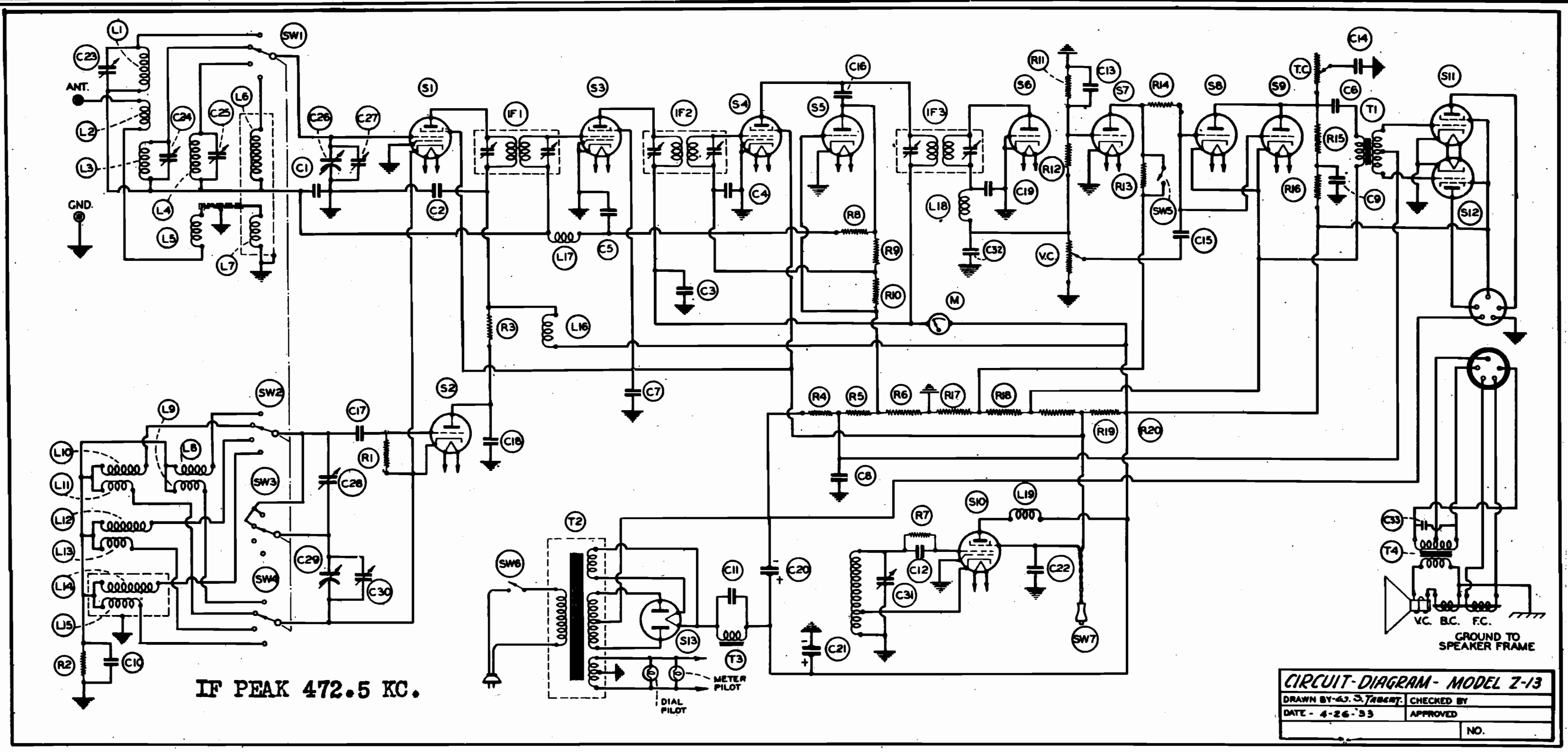


LEGEND MODEL Z-10

L1	R.F. coil assembly
L2	Oscillator coil assembly
L3	10 m.h. R. F. choke
L4	510 choke 15 henry
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	3rd I.F. transformer
T4	510 power transformer
T5	Output transformer
C1	410 mmf variable gang condenser
C2	Broadcast oscillator pad 550 mmf
C3	1st S.W. band osc. pad 2000 mmf
C4	2nd S.W. band osc. pad 2000 mmf
C5	3rd S.W. band osc. pad 2000 mmf
C6	.1 mf 25 volt paper cond.
C7	.1 mf 25 volt paper cond.
C8	.1 mf 25 volt paper cond.
C9	.00025 mf mica
C10	.001 mf mica
C11	.01 mf paper
C12	.1 mf 400 volt paper
C13	.01 mf 400 volt paper
C14	.5 mf 25 volt paper
C15	4 mf 25 volt dry electrolytic
C16	.025 mf 25 volt paper
C17	2-8 mf canned electrolytic
C18	1 mf 400 volt paper
C19	8 mf 150 volt dry electrolytic
C20	.1 mf 400 volt paper
C21	.5 mf 200 volt paper
C22	.00025 mf mica
C23	.1 mf 100 volt paper
R1	300,000 ohm 1/3 watt
R2	60,000 ohm 1/3 watt
R3	1 meg 1/3 watt
R4	500,000 ohm 1/3 watt
R5	300,000 ohm 1/3 watt
R6	12,000 ohm 1/2 watt
R7	60,000 ohm 1 watt
R8	2,750 ohm 1 watt
R9	60,000 ohm 1/3 watt
R10	500 ohm 1 watt
R11	300 ohm 1 watt
R12	500 ohm 1 watt
R13	250 ohm 2 watt
R14	Resistor 6,150 ohm 15 watt
R15	Resistor 7,500 ohm 15 watt
R16	300,000 ohm 1/3 watt
S1	2A7 tube
S2	58 tube
S3	2B7 tube
S4	56 tube
S5	2A5 tube
S6	2A5 tube
S7	5Z3 tube
TC	Tone control with switch 300,000 ohm tapered
VC	Volume control 500,000 ohm tapered

MODEL Z-13
Schematic
Parts List

SILVER - MARSHALL MFG. CO



Parts List
Model Z-13 Superheterodyne

RESISTANCES
R1- 100,000 - 1/2 watt
R2- 150 - 1/2 "
R3- 3,000 - 2 "
R4- 230,000 - 1 "
R5- 60,000 - 1 "
R6- 11,000 - 1 "
R7- 100,000 - 1/2 "
R8- 500,000 - 1/2 "
R9- 500,000 - 1/2 "
R10- 250,000 - 1/2 "
R11- 1,000,000 - 1/2 "
R12- 2,000,000 - 1/2 "
R13- 300,000 - 1/2 "
R14- 1,000,000 - 1/2 "
R15- 6,000 - 1 "
R16- 8,000 - 1 "
R17- 2,600)
R18- 340)
R19- 1,840)- Wire Wound
R20- 5,750)
V. C. with A. C. Switch,
500,000 ohms with log taper.
T. C. Tone Control 5,000 tapered.

TUBES
S1- 58 1st Detector
S2- 56 Oscillator
S3- 58 1st Int. Amp.
S4- 58 2nd Int. Amp.
S5- 56 A. V. C.
S6- 56 2nd. Detector
S7- 56 Quiet A. V. C.
S8, S9- 56 1st Audio Driver
S11, S12- 59 Push-Pull Output
S13- 523 Rectifier

COILS
L1, L2, L3- R.F. and antenna coil - purple and green SW ranges
L4, L5- R.F. and antenna coil - red SW range
L6, L7- R.F. and antenna coil - black BC range
L8, L9, L10, L11- Oscillator and cathode coils - purple and green SW ranges
L12, L13- Oscillator and cathode coils - red SW range
L14, L15- Oscillator and cathode coils - black BC range
L16, L17, L18, L19- 15 m.h. R.F. chokes

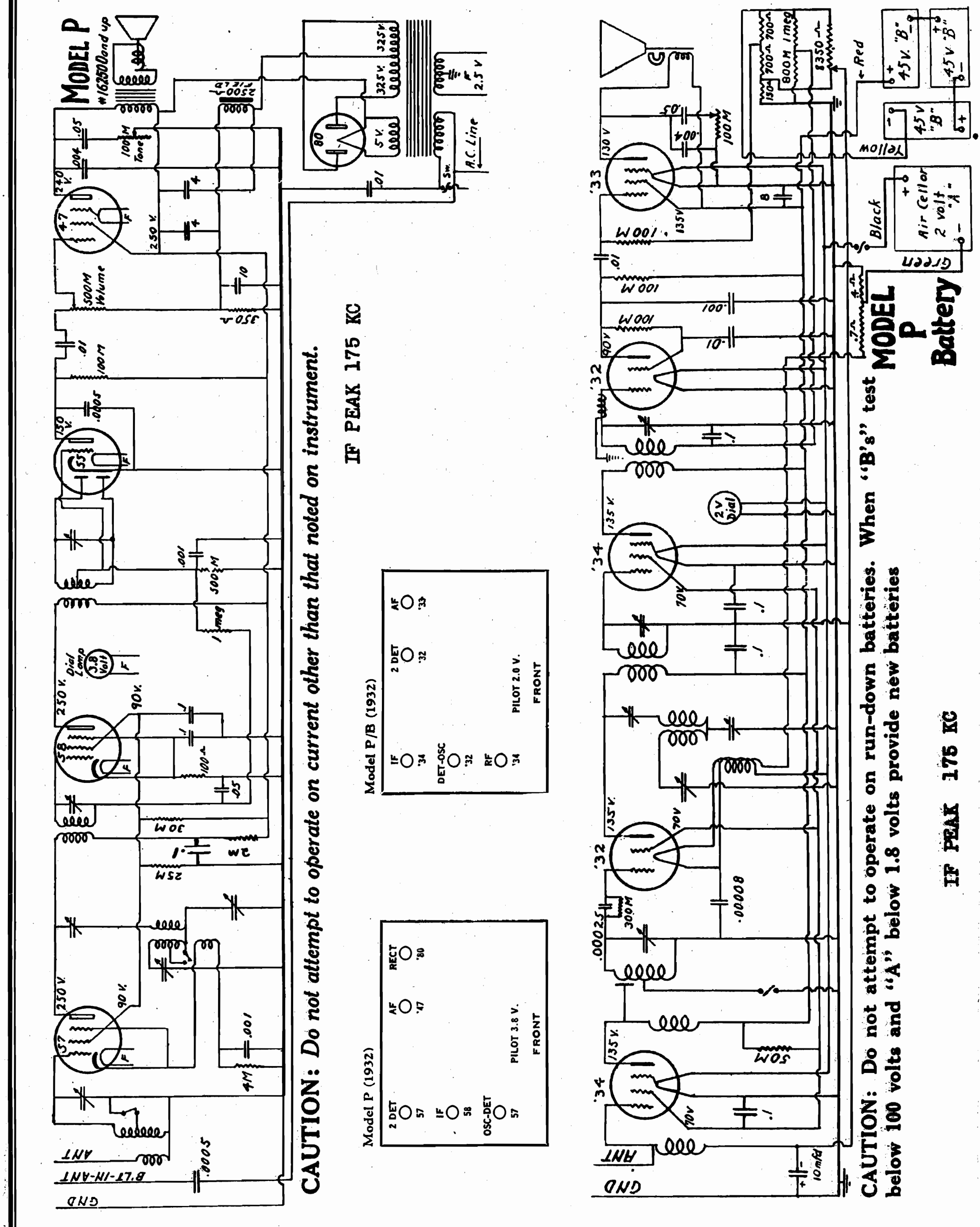
TRANSFORMERS
T1- CB-1038 Audio Transformer
T2- CB-1008 Power Transformer
T3- CB-1007 Power Choke Coil
T4-(CB-1013 Output Trans. with 10" Speaker
(CB-1037 Output Trans. with Auditorium Speaker

SWITCHES
SW1, SW2, SW3, SW4- Frequency Range Switch
SW5- Switch for Quiet AVC Circuit
SW6- Power Switch on Volume Control
SW7- Pendant Switch for "Beat Note" Oscillator

CONDENSERS
C1- .01 mfd 200V Paper
C2- .25 " 400V "
C3- .5 " 400V "
C4- .01 " 200V "
C5- .01 " 200V "
C6- .1 " 400V "
C7- .5 " 400V "
C8- .5 mfd 400V Paper
C9- .5 " 400V "
C10- .01 " Mica
C11- .15 " 400V "
C12- .0001 " Mica
C13- .025 " 200V "
C14- .1 " 400V "
C15- .01 " 200V "
C16- .00025 Mica
C17- .00005 "
C18- .002 "
C19- .0001 "
C20- 8 mfd 450V Dry Electrolytic
C21- 12 " 450V " "
C22- .002 Mica
C23- 20-65 mmf Adjustable Mica
C24- 6-30 " " "
C25- 25-65 " " "
C26, C27, C29, C3- Adjustable Air Condenser 410 mmf
C28- Adjustable Mica Condenser 350-500 mmf
C31- " " " 70-125 "
C32- .00025 Mica Condenser
C33- .002 " "

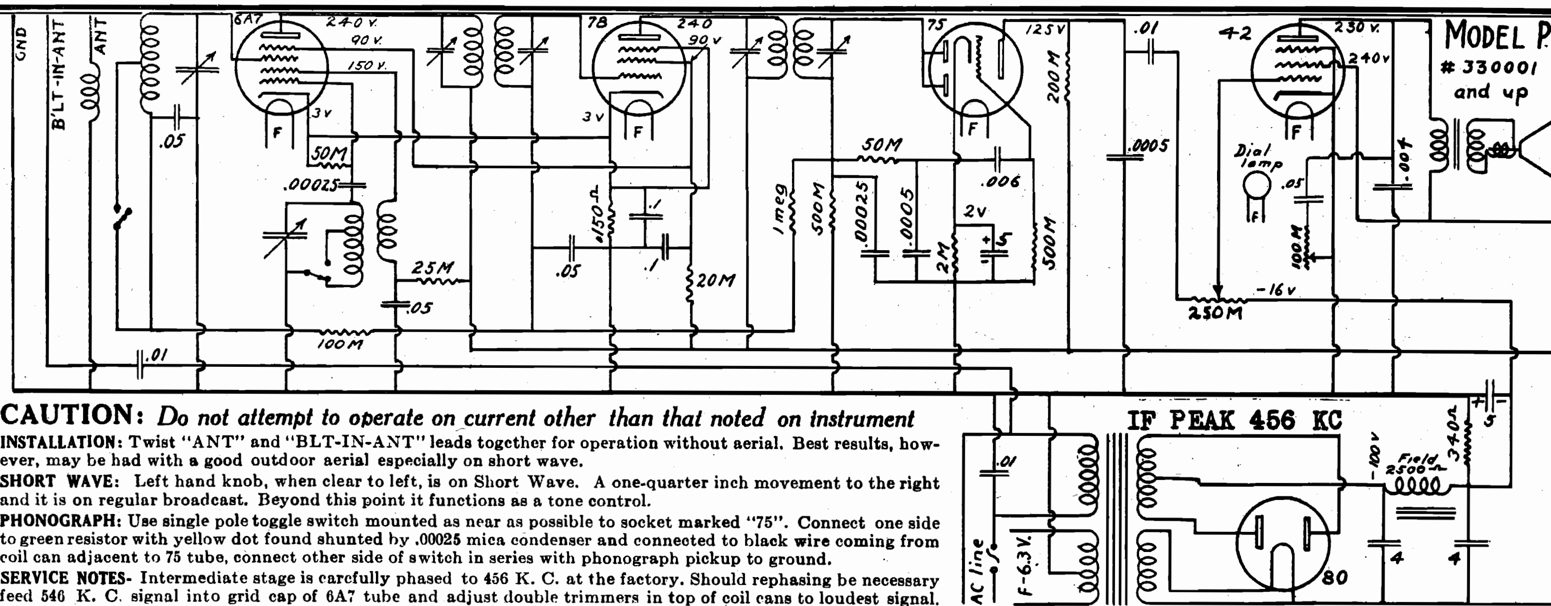
SIMPLEX RADIO CO.

MODEL P Battery
Schematic, Socket
MODEL B AC
Above serial
162500
Schematic



MODEL P AC
Above 330001
MODEL P 32 V
Above 350001

SIMPLEX RADIO CO.



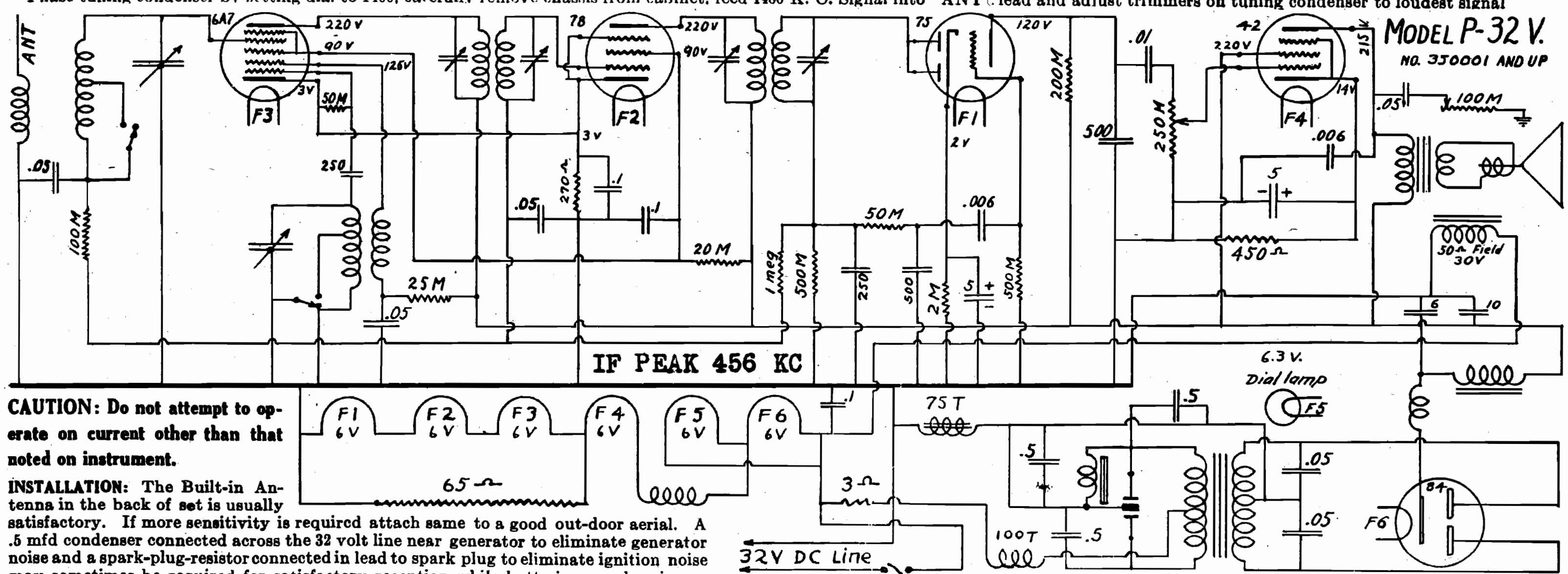
CAUTION: *Do not attempt to operate on current other than that noted on instrument*

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial especially on short wave.

SHORT WAVE: Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 546 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal



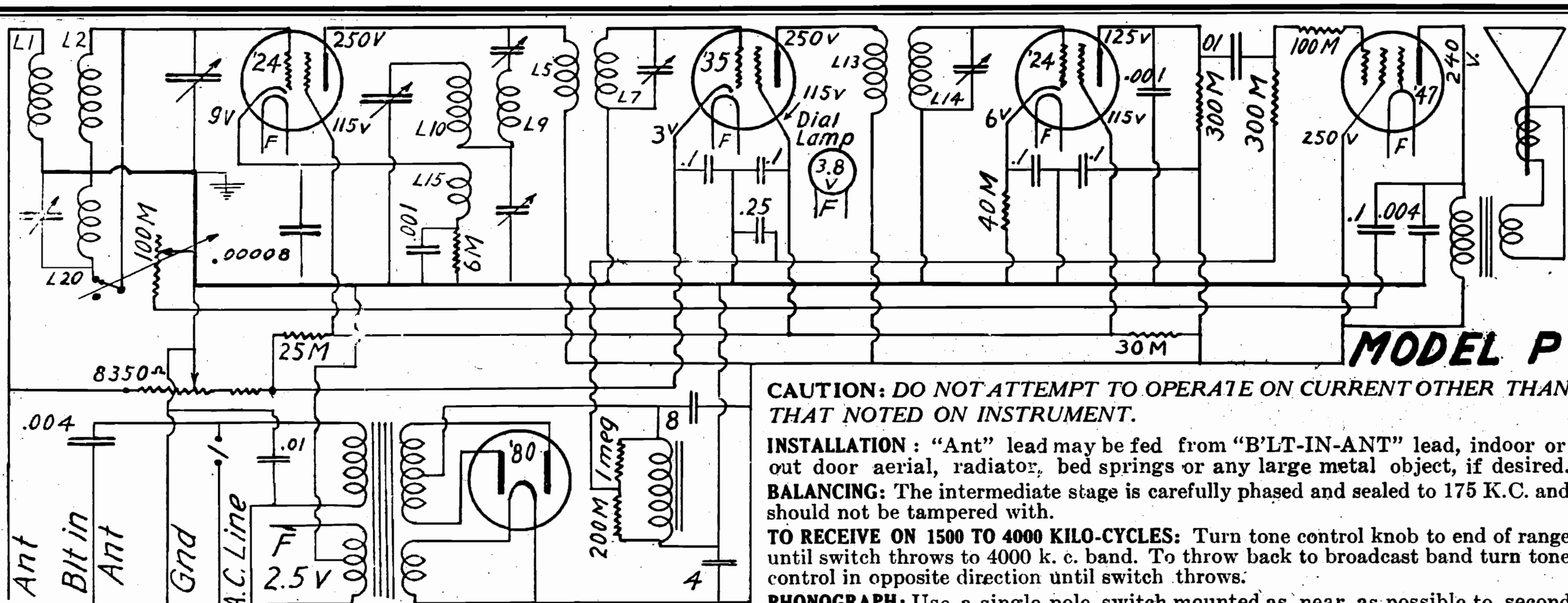
CAUTION: Do not attempt to operate on current other than that noted on instrument.

INSTALLATION: The Built-in Antenna in the back of set is usually satisfactory. If more sensitivity is required attach same to a good out-door aerial. A .5 mfd condenser connected across the 32 volt line near generator to eliminate generator noise and a spark-plug-resistor connected in lead to spark plug to eliminate ignition noise may sometimes be required for satisfactory reception while batteries are charging.

USE NO GROUND CONNECTION ON SET. **SHORT WAVE:** Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control **PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground. **SERVICE NOTES-** Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400. carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

MODEL P 1931
Schematic
MODEL Q 1931
Schematic

SIMPLEX RADIO CO.



MODEL P

CAUTION: *DO NOT ATTEMPT TO OPERATE ON CURRENT OTHER THAN THAT NOTED ON INSTRUMENT.*

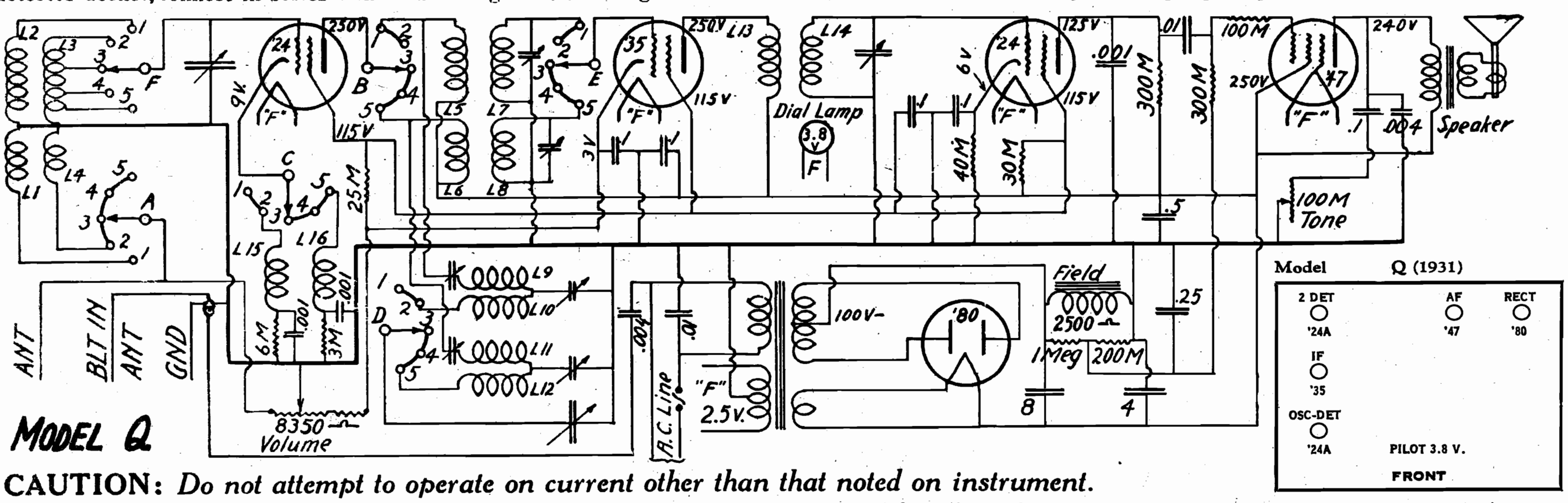
INSTALLATION : "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K.C. and should not be tampered with.

TO RECEIVE ON 1500 TO 4000 KILO-CYCLES: Turn tone control knob to end of range until switch throws to 4000 k. c. band. To throw back to broadcast band turn tone control in opposite direction until switch throws.

PHONOGRAPH: Use a single pole switch mounted as near as possible to second detector socket, connect in series with lead from ground end of grid coil of second detector tube. Solder phonograph pickup leads to switch terminals

MODEL Q



CAUTION: *Do not attempt to operate on current other than that noted on instrument.*

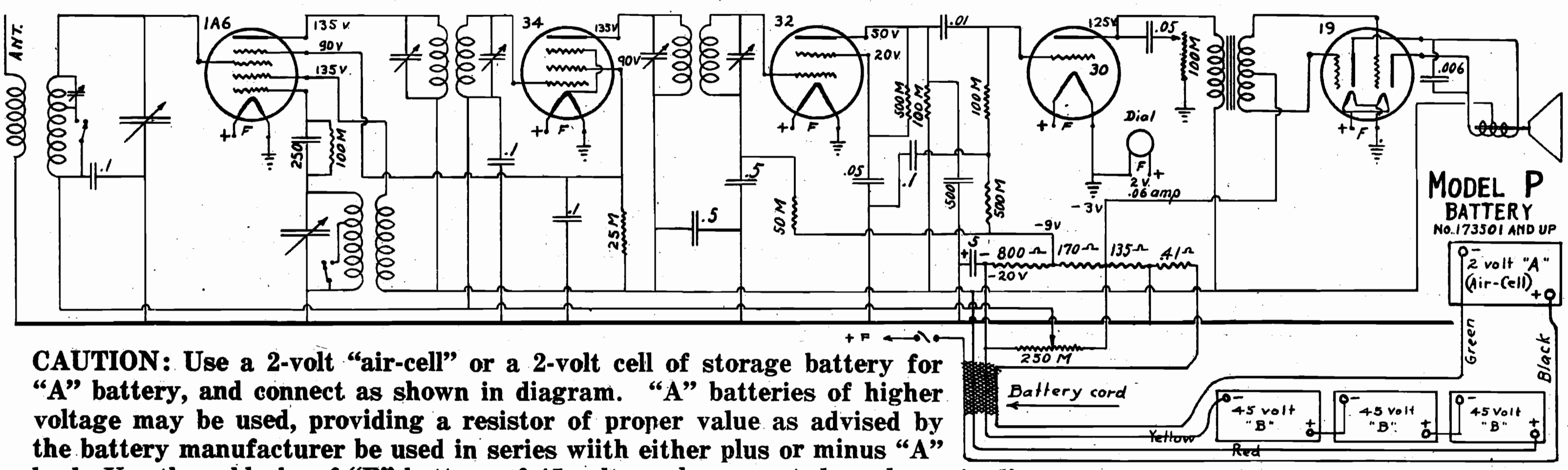
INSTALLATION: "ANT" may be fed from "B'LT-IN-ANT" lead, indoor or outdoor aerial, radiator, bed springs, or any large metal object, if desired

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

PHONOGRAPH: Use a single pole switch mounted as near as possible to the second detector socket, connect in series with lead from ground end of the grid coil of second detector tube. Solder phonograph pick-up leads to switch terminals.

MODEL P Battery
Above 173501
MODEL R AC
Above 320001

SIMPLEX RADIO CO.



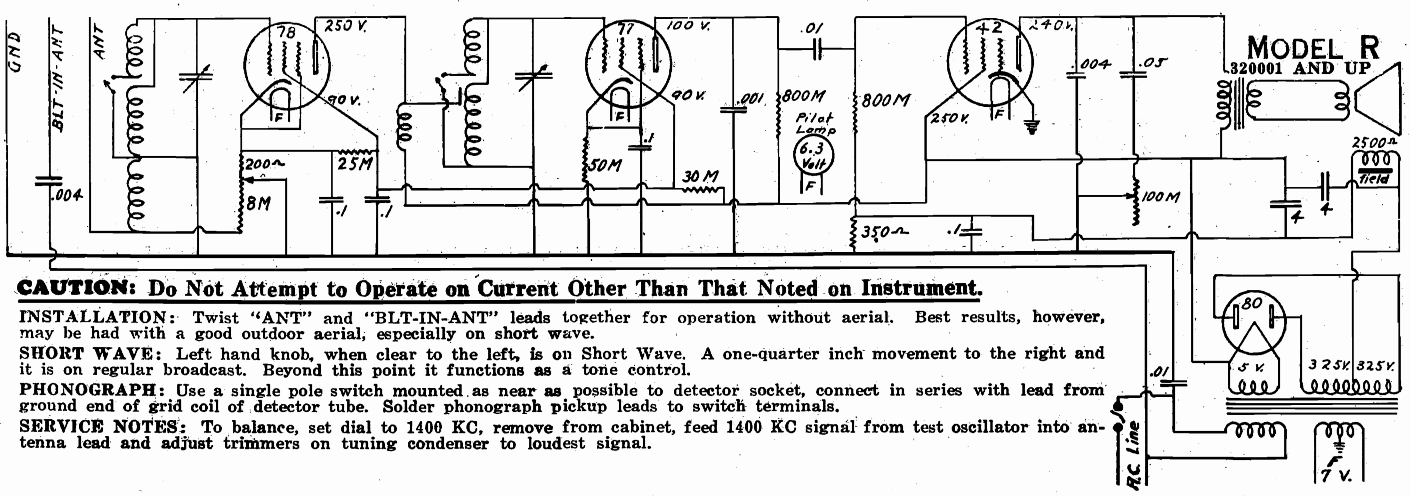
CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series wiith either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.

IF PEAK 456 KC

INSTALLATION: A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.

SERVICE NOTES: Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.



CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial, especially on short wave.

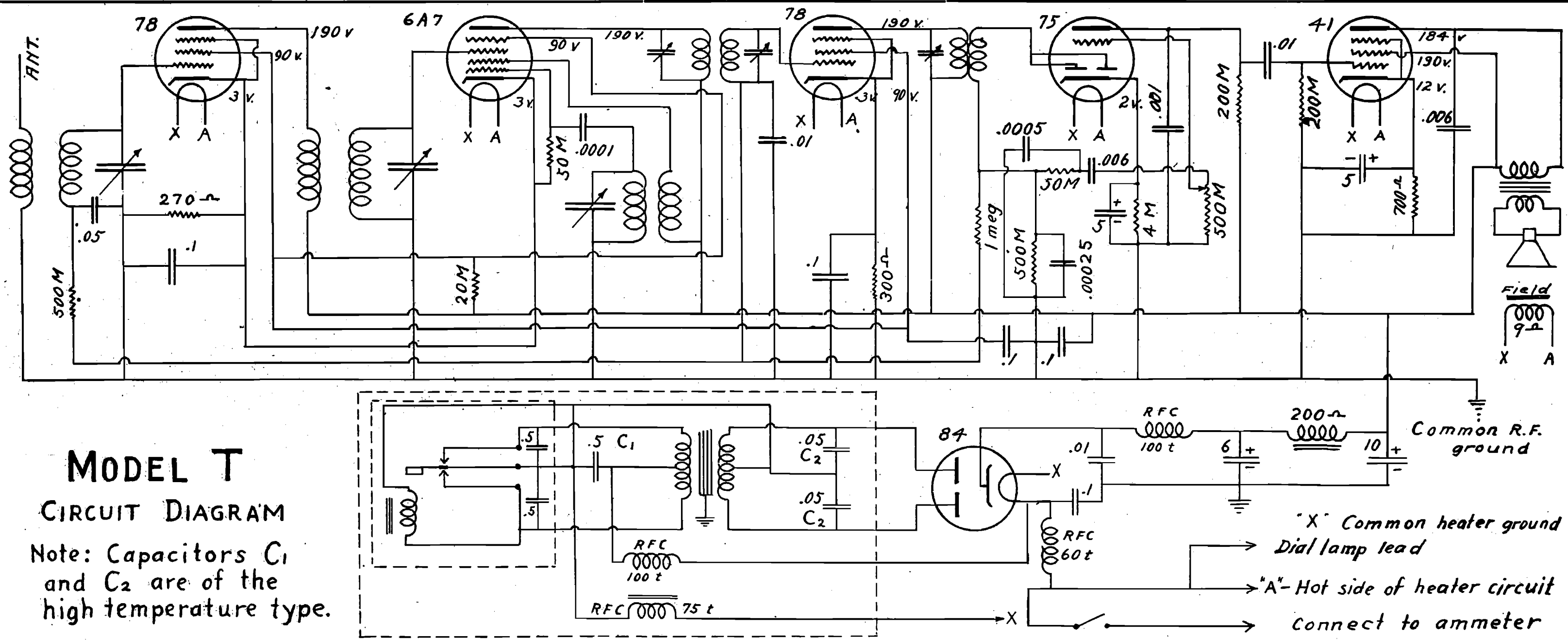
SHORT WAVE: Left hand knob, when clear to the left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

SERVICE NOTES: To balance, set dial to 1400 KC, remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.

SIMPLEX RADIO CO.

MODEL T
Schematic, Data



MODEL T

CIRCUIT DIAGRAM

Note: Capacitors C_1 and C_2 are of the high temperature type.

BALANCING I-F. COILS. These are trimmed through the tops of the tall cans by means of a small screwdriver and a 5-16" socket wrench. Remove chassis from cabinet and feed signal from test oscillator into grid cap of the 6A7.

BALANCING R-F. COILS. Tuning control must be attached to tuning condenser shaft with pointer set to 530 when condenser is turned to maximum. Tune in a weak signal at its proper dial marking near 1400 and adjust first and second trimmers on variable from front of chassis for loudest signal. If signal does not come at proper dial setting, carefully adjust rear trimmer on variable to shift signal to its proper location and then readjust first and second trimmers. After reinstalling set in car, slightly readjust the first trimmer through hole in top of cabinet.

Determine most satisfactory mounting position on bulkhead which should be at the left hand side or directly in front of steering column. Spot the mounting bolt location and drill ½" diameter hole. Insert bolt through hole and assemble washer and nut on engine side. Hang receiver over bolt head and tighten nut.

Attach flexible shafts to control unit by first inserting shaft as far in as possible and then tighten set screws of shaft housing, being careful it is not so tight as to cause shaft to bind in housing.

Mount control unit on steering column in approximately correct position, set pointer to 530 on dial, turn upper control of receiver to extreme clockwise position, carefully place right hand shaft in position on upper receiver control and left hand shaft on lower control and tighten set screws securely.

Adjust control unit position so that shafts leave set with least amount of bend possible and fasten securely in this position. Trial of controls will show best location for smooth operation.

Attach heavy rubber covered lead to ammeter terminal.

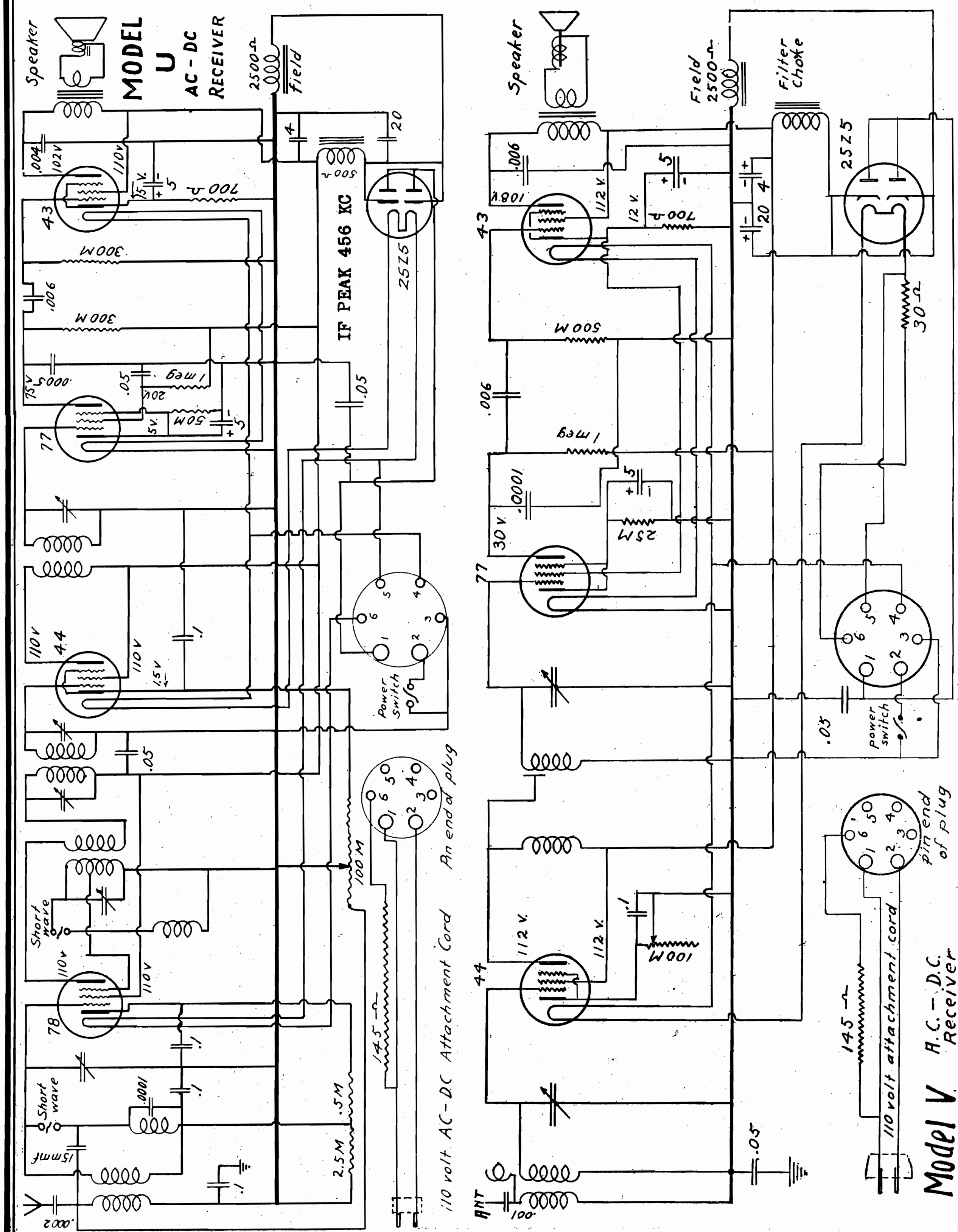
Connect pilot light wire from control head to short black wire on set, making connection close to set, and tape up joint. Ground shield by loosening screw under nearest corner of set and connecting wire therefrom to end of shield and tighten up screw.

Disconnect ignition leads from spark plugs, attach one suppressor to top of each plug and reattach the ignition lead to free end of suppressor. Disconnect center wire from distributor head, and substitute distributor suppressor, then plug center wire into free end of suppressor.

Attach generator bypass condenser to generator frame by means of screw holding cut-out. Connect wire from condenser to generator side of cut-out switch.

MODEL U
MODEL V

SIMPLEX RADIO CO.



MODEL 9X, 13, 14, 14A, 15X, 17, 18, 27, 27A, 28, 30A, 34, 41A, 42, 54, 620X, 750X, 870X. 111X Alignment

SPARKS WITHINGTON CO.

Tune in a weak distant station or oscillator signal between 1300 and 1400 kilocycles, (Model 41-A or 42 use station to which receiver will be tuned) turn the volume control on full, and rotate the inter-station noise suppressor control knob (none on Models 13, 30-A, 41-A or 42) clockwise as far as it will go. Next, with a hex-socket insulated wrench, turn the hex-nut on the condenser or the screw in the condenser with an insulated handle screw driver to the position where the volume from the station "tuned-in" or the oscillator signal is the loudest. Once made, this adjustment need not be changed unless the antenna system is altered, the receiver is moved from one location to another, or the other condensers are re-adjusted.

NOTE—When antenna equalizing condenser is adjusted on oscillator signal, adjustment will not hold true when receiver is connected to aerial, this condenser must be aligned to antenna system.

ALIGNING THE OSCILLATOR, PRE-SELECTOR EQUALIZING AND I. F. ADJUSTABLE CONDENSERS

Symptoms denoting that the condensers require alignment

1. Oscillator Equalizing Condenser
   (a) Dial calibration incorrect.
2. Pre-selector equalizing condensers
   (a) Weak reception.
   (b) Multiple peaks within a 40 kilocycle band from a loud local station.
   (c) Hiss.
3. I. F. Adjustable Condensers
   (a) When the condenser is replaced.
   (b) When the I. F. transformer is replaced.
   (c) When they have been purposely misaligned.

ALIGNING THE OSCILLATOR EQUALIZING CONDENSER (none on Model 41-A or 42)

The adjustment of this condenser determines the accuracy of the dial calibration. If alignment of this condenser is required to correct the dial calibration, it must be adjusted before either the antenna or pre-selector equalizing condensers are adjusted.

To cause the pointer to move towards 1500 kilocycles, or the high end of the scale, turn the condenser nut down. Conversely, to cause the pointer to move toward 530 kilocycles or toward the low end of the scale, turn the condenser nut up.

The procedure of adjusting this condenser is as follows:

1. Turn the volume control on full.
2. Rotate inter-station noise suppressor control knob clockwise as far as it will go.
3. Turn the tone and static control all the way to the left or to the position where low tone is obtained.
4. Adjust the condenser so that a station broadcasting on any frequency in the region of 1300 to 1400 kilocycles "comes in" at its assigned frequency.
5. If the calibration of the dial is correct on the high frequency end and off on the low frequency end, proceed as follows:

If the calibration is incorrect between 600 and 1200 kilocycles, tune in a station at about 900 kilocycles. If the calibration is incorrect between 600 and 530 kilocycles, tune in a station at about 600 kilocycles. Then bend slightly inward, if the pointer is lower than the required point, or outward, if it is higher than the required point, one or both of the end stator plates (not rotor plate) of the oscillator variable condenser. Make the bend on the portion of the plate indicated in Fig. 2, depending upon the frequency at which this operation is being performed.

CAUTION: THE BEND NEED ONLY BE SLIGHT!

To those unfamiliar with the adjustment of an oscillator condenser, it will be noted that when the adjusting wrench is placed over the condenser, that the volume of the station tuned in decreases—and that by giving the condenser about a quarter turn in either direction, the volume can be brought back to normal. When the wrench is removed, the volume of the station "dies away," or the station is not heard at all. This is a normal condition, and by turning the dial knob one way or the other, depending upon whether the condenser nut was moved up or down, the station is again "tuned in" at its normal amount of volume.

ALIGNING THE FIRST DETECTOR EQUALIZING CONDENSER

Two resonance peaks are obtained when this condenser is adjusted. One peak occurs when the condenser is turned down (capacity increased), and the other peak occurs when the condenser is turned up (capacity decreased). The correct peak to use is the one which occurs when the condenser is turned down. If this condenser is adjusted on the wrong peak, the effect will be "Dead Spots" around 1300 and 1450 kilocycles, and poor sensitivity at 900 and 600 kilocycles.

STEP BY STEP ALIGNMENT PROCEDURE, FOR ANTENNA, PRE-SELECTOR and OSCILLATOR EQUALIZING CONDENSERS

1. Tune in a weak distant station between 1300 and 1400 kilocycles or tune the modulated oscillator to this frequency.

2. Turn the volume control on full and the tone and static control all the way to the left or to the position where low tone is obtained.

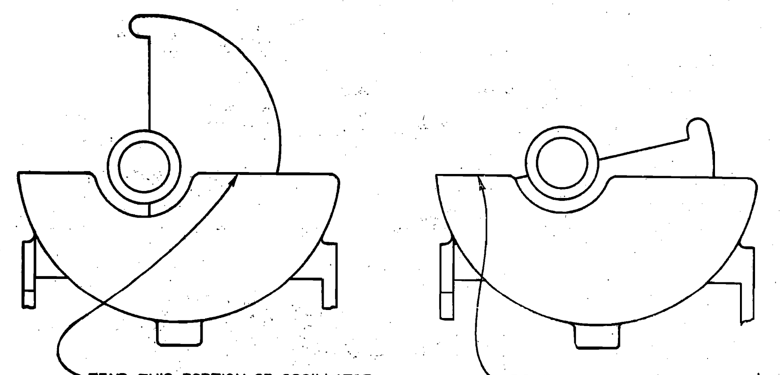


FIG. 2. ILLUSTRATING PORTION OF OSCILLATOR VARIABLE CONDENSER PLATE TO BEND WHEN CORRECTING DIAL CALIBRATION

3. Rotate the inter-station noise suppressor control knob clockwise as far as it will go.

4. Connect the output meter as illustrated in Fig. 1.

5. If necessary, adjust the oscillator equalizing condenser before proceeding further.

6. Adjust the antenna equalizing condenser.

7. Adjust the pre-selector equalizing condensers.

8. Repeat the entire adjustment for assurance that the first adjustment was executed properly.

ALIGNING THE INTERMEDIATE FREQUENCY ADJUSTABLE CONDENSERS

CAUTION: These condensers must not be adjusted except under the conditions, and with the equipment recommended, as follows:

A. Conditions when Adjustment is Required

1. When replacement of the condenser itself is made.

2. When replacement of the intermediate frequency transformer is made.

3. When they have been purposely misaligned.

B. Equipment Required

1. A 12-inch screw driver solidly constructed from insulating material.

2. A modulated oscillator from which a signal of exactly 172.5 kilocycles can be obtained.

3. A suitable output meter.

If the oscillator is crystal controlled, the exact frequency is assured. If not, the oscillator should be calibrated, in accordance with the manufacturer's instructions, each time it is used for this purpose.

Recalibration is necessary in an oscillator not crystal controlled, as a change in frequency will occur due to a very slight change in tube characteristics and applied voltages.

C. How the Condensers are Adjusted

1. Connect the aerial terminal of the oscillator to the control grid terminal (terminal on top of tube) of the first detector-oscillator tube, and the ground terminal to the ground binding post of the receiver.

2. Turn the tone and static control to the left, or to the position where low tone is obtained.

3. Turn the volume control on full.

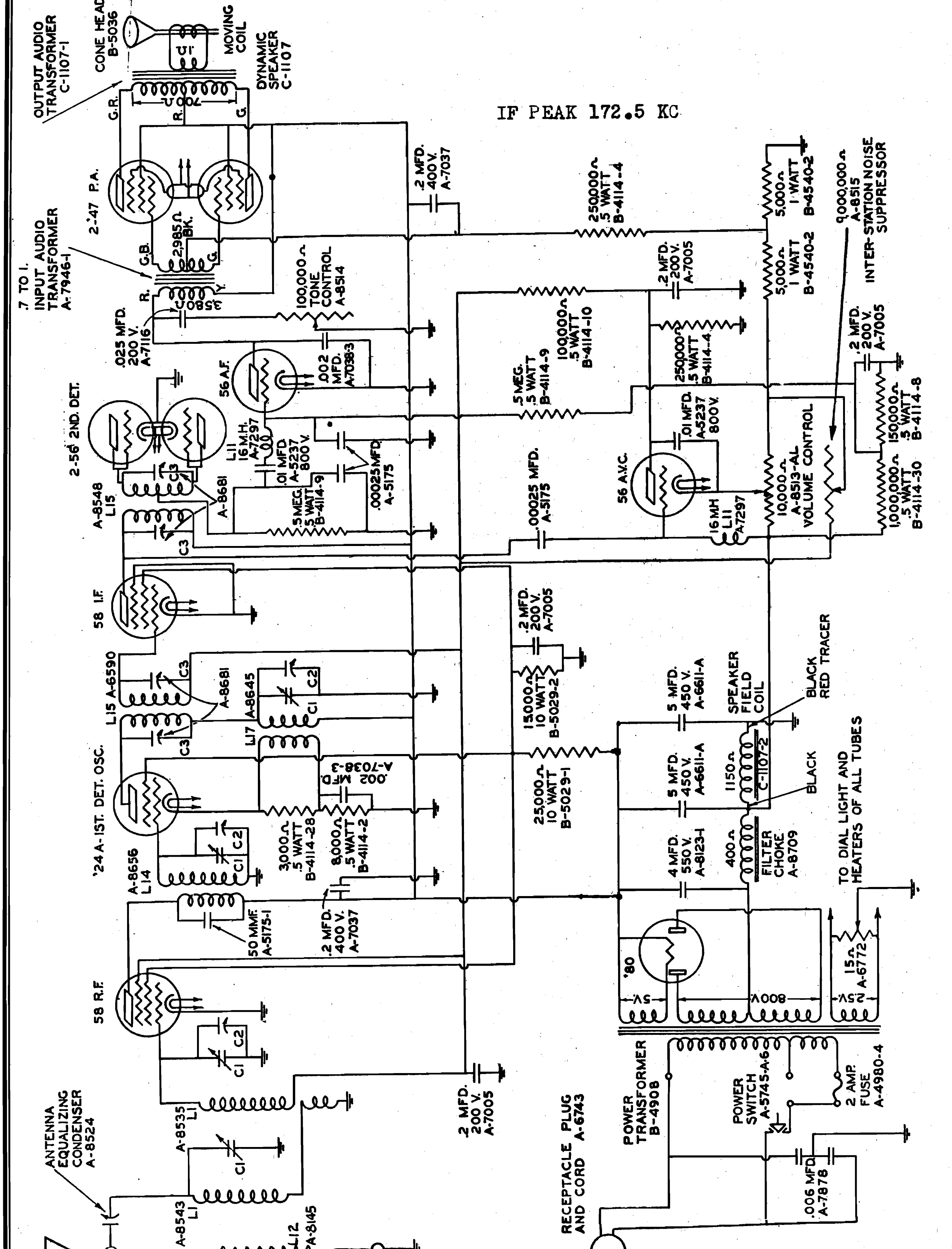
4. Rotate the inter-station noise suppressor control knob clockwise as far as it will go.

5. Turn the attenuator or volume control on the oscillator to the position where the oscillator is heard faintly. If the oscillator is not heard at all, even with the control full on, the condensers of the stage requiring adjustment should be manipulated until it is heard at the loudest. The control should then be reduced so that only a faint sound from the oscillator is audible.

7. All intermediate frequency adjustable condensers should be adjusted if the adjustment of one is necessary. When adjustment of the stage that requires such has been made, the other stages should be adjusted in rotation, from front to rear of chassis, or vice versa. Each pair of condensers should be adjusted before proceeding to the next.

MODEL 18
Schematic

SPARKS WITHINGTON CO.



SPARKS WITHINGTON CO.

MODEL 18
Voltage, Chassis
Trimmers

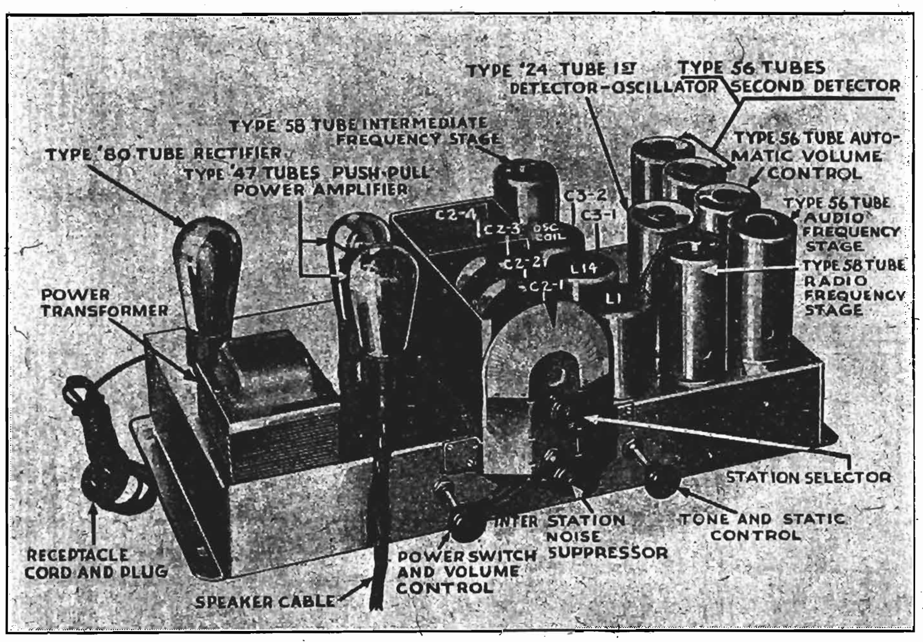
VOLTAGE ANALYSIS

Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
58	R. F. Stage	2.2—2.5	260—305	1.9—2.5	70—88	4.5—8.0
'24	1st Det.-Osc.	2.2—2.5	260—305	5—9	70—88	0.8—1.4
58	I. F. Stage	2.2—2.5	260—305	1.9—2.5	70—88	4.5—8.0
56	2nd Det.	2.2—2.5	*	*	——	*
56	2nd Det.	2.2—2.5	*	*	——	*
56	A. F. Stage	2.2—2.5	245—285	10—14	——	4.5—8.0
56	AVC	2.2—2.5	35—50	40—50	——	Zero
'47	Power Stage	2.2—2.5	250—295	19—25	260—305	18—25
'47	Power Stage	2.2—2.5	250—295	19—25	260—305	18—25
'80	Rectifier	4.2—5.0	360—440	——	——	33-45 per Plate

* Present only when signal is applied.

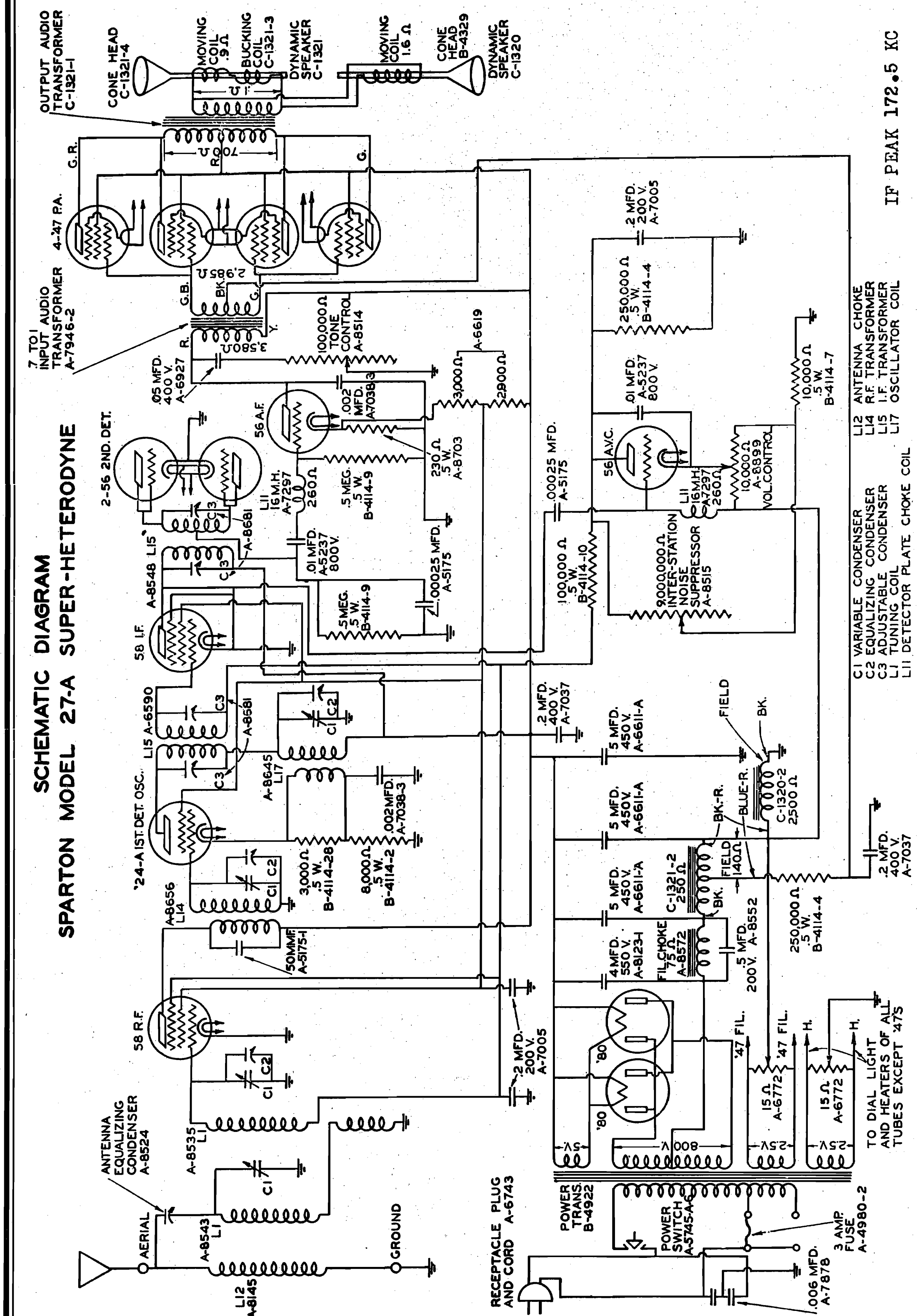
MODEL 18 CHASSIS



C2-1 Antenna Equalizing Condenser
C2-2 R. F. Stage Equalizing Condenser
C2-3 1st Detector Equalizing Condenser
C2-4 Oscillator Equalizing Condenser
C3-1 I. F. Input Stage Adjustable Condenser
C3-2 I. F. Output Stage Adjustable Condenser
L1 1st Tuning Coil
L14 R. F. Transformer

MODEL 27-A
Schematic

SPARKS WITHINGTON CO.



NOTE: : In 25 cycle Model 27-A the 4 Mfd. 550 V. filter condenser part A-8123-1 is paralleled with another identical condenser. The 5 Mfd. 450 V. filter condenser part A-6611-A, connected from rectifier tube filaments to end of filter choke coil part A-8572, is removed. The 5 Mfd. 200 V. condenser part A-8552 shunted across filter choke coil part A-8572 is replaced with a 2 Mfd. 200 V. condenser part A-8895. Power Transformer part B-4922 is replaced with both Power Transformer parts B-4922-25 and Filament Transformer part A-8702.

MODEL 27-A
Chassis
Voltage

SPARKS WITHINGTON CO.

Sparton Model 27-A Super-Heterodyne Schematic Diagram and Voltage Analysis

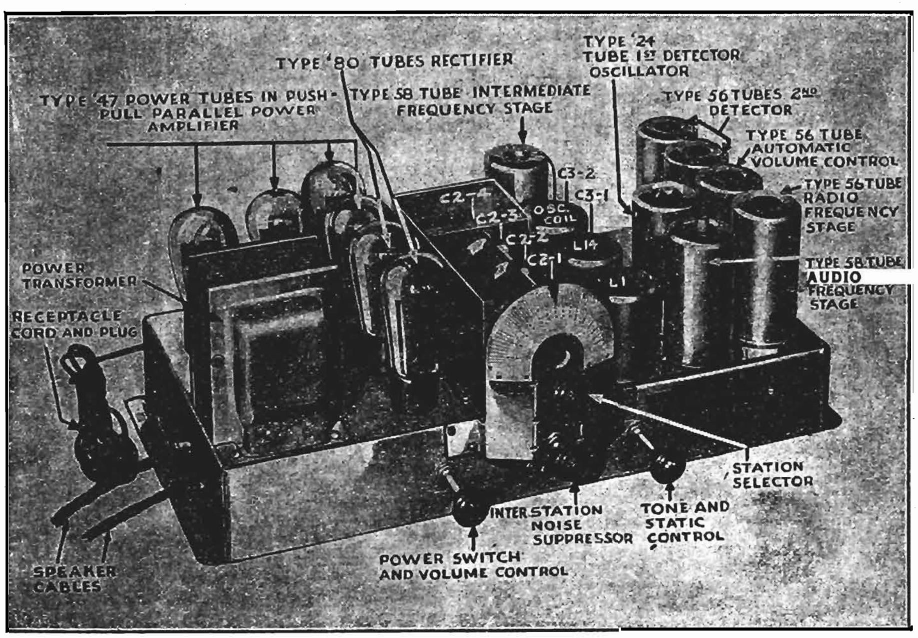
VOLTAGE ANALYSIS

Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
58	R. F. Stage	2.2—2.5	165—200	2.3—2.7	90—112	4.5—8.0
'24	1st Det.-Osc.	2.2—2.5	165—200	5.0—9.0	90—112	0.8—1.4
58	I. F. Stage	2.2—2.5	165—200	2.3—2.7	90—112	4.5—8.0
56	2nd Det.	2.2—2.5	*	*	——	*
56	2nd Det.	2.2—2.5	*	*	——	*
56	A. F. Stage	2.2—2.5	145—180	7—11	——	4—7
56	AVC	2.2—2.5	30— 50	50—80	——	0
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'80	Rectifier	4.2—5.0	320—375	——	——	33-45 per Plate
'80	Rectifier	4.2—5.0	320—375	——	——	33-45 per Plate

* Present only when signal is applied.

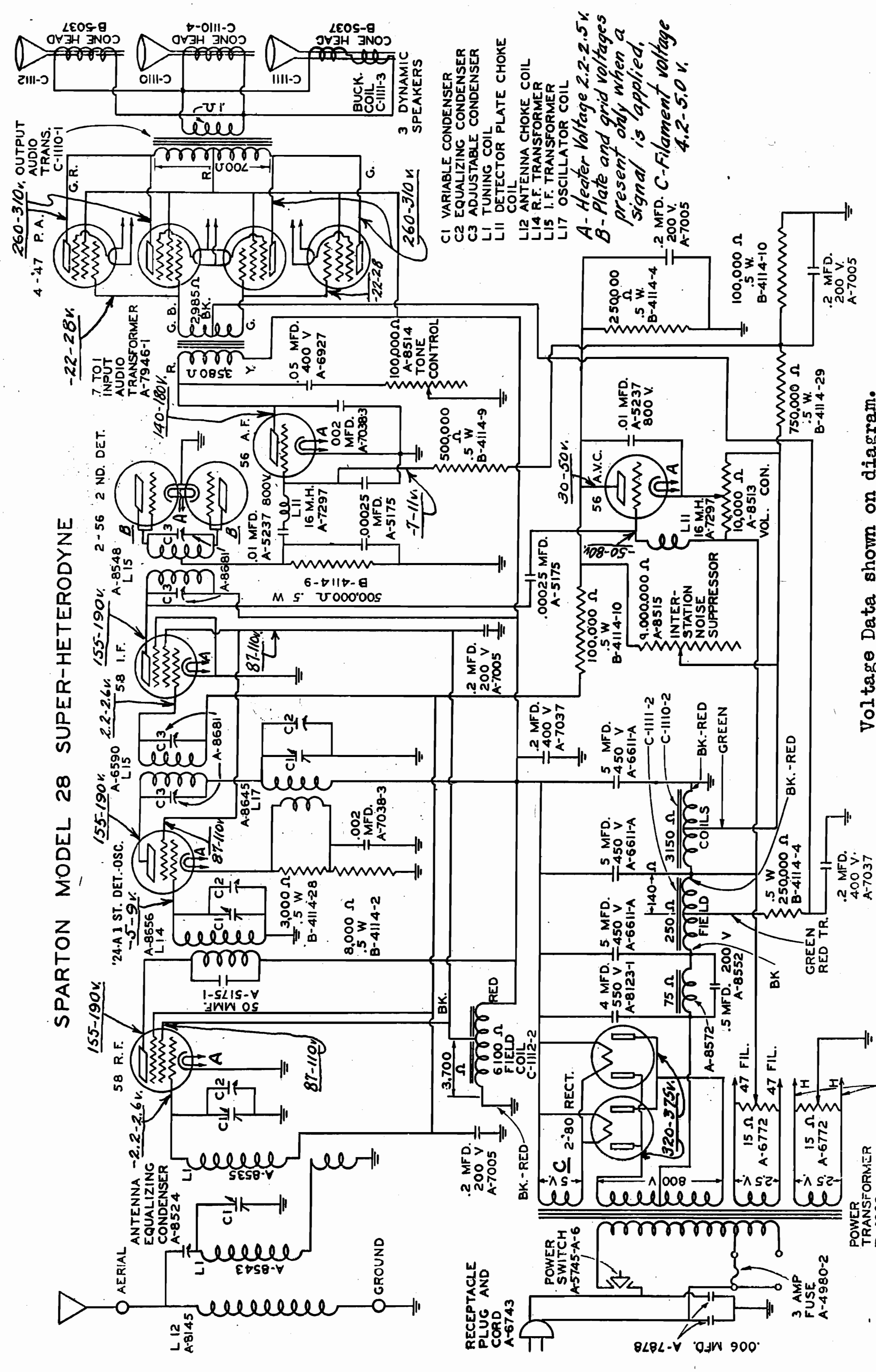
MODEL 27-A CHASSIS



C2-1 Antenna Equalizing Condenser
C2-2 R. F. Stage Equalizing Condenser
C2-3 1st Detector Equalizing Condenser
C2-4 Oscillator Equalizing Condenser
C3-1 I. F. Input Stage Adjustable Condenser
C3-2 I. F. Output Stage Adjustable Condenser
L1 1st Tuning Coil
L14 R. F. Transformer

MODEL 28
Schematic

SPARKS WITHINGTON CO.

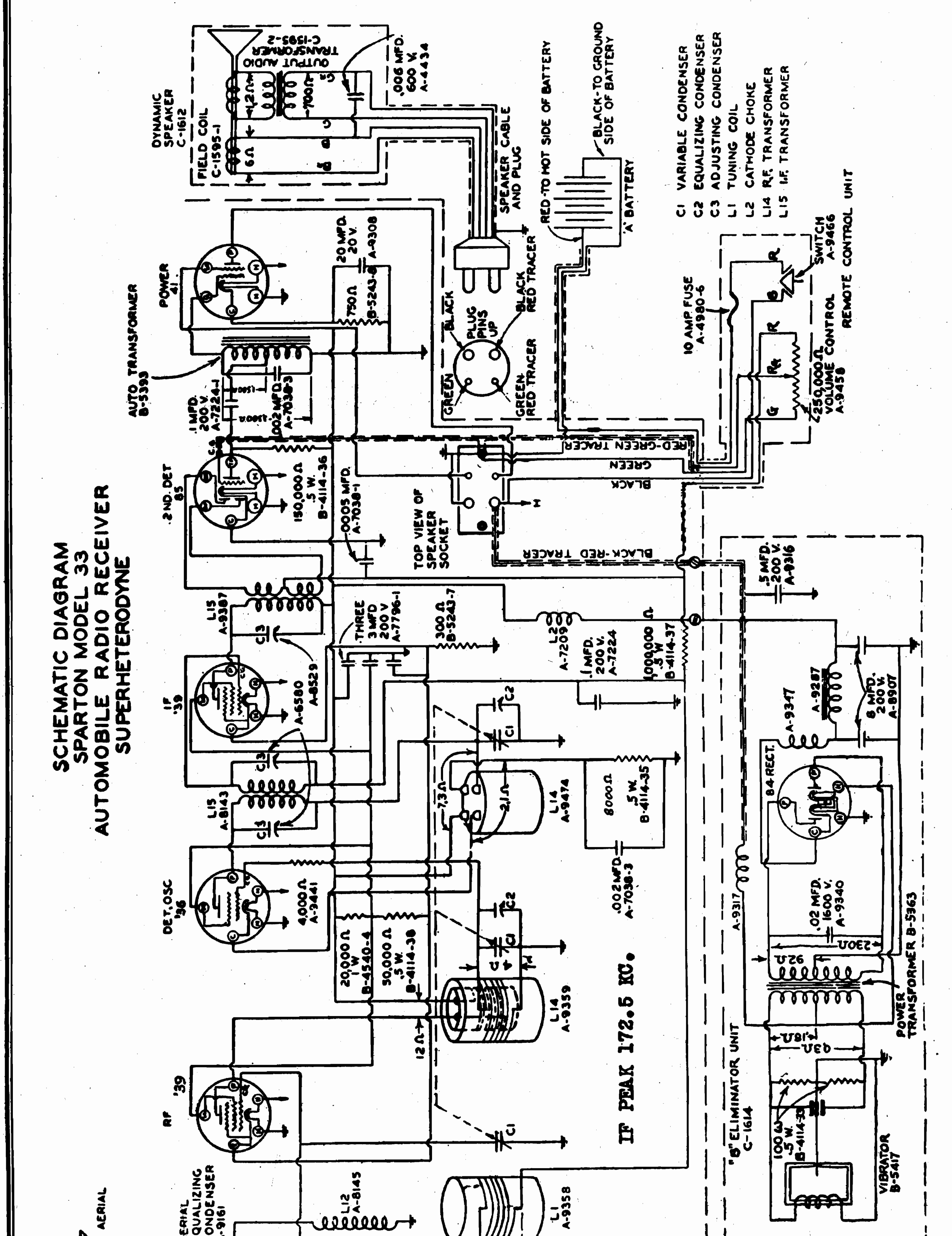


Voltage Data shown on diagram.

NOTE: : In 25 cycle Model 27-A the 4 Mfd. 550 V. filter condenser part A-8123-1 is paralleled with another identical condenser. The 5 Mfd. 450 V. filter condenser part A-6611-A, connected from rectifier tube filaments to end of filter choke coil part A-8572, is removed. The .5 Mfd. 200 V. condenser part A-8552 shunted across filter choke coil part A-8572 is replaced with a 2 Mfd. 200 V. condenser part A-8895. Power Transformer part B-4922 is replaced with both Power Transformer part B-4922-25 and Filament Transformer part A-8702.

MODEL 33
Schematic

SPARKS WITHINGTON CO.



MODEL 33
Voltage, Notes
Socket
MODEL 43
Voltage

SPARKS WITHINGTON CO.

The receiver is equipped with pin jack post. A low capacity shielded lead-in wire is furnished. The shield must be grounded as close to the antenna post as possible. A clamp is attached to the receiver for this purpose. Keep lead-in wire as short as possible. When under hood mounting is found necessary, the antenna post may pick up motor noise, in which case it will be necessary to shield it. The lead-in wire should be brought down the body post nearest the end of the receiver that has the antenna post so as to keep the lead-in wire as short as possible. The shielded portion of the lead-in should extend from the receiver to a point approximately eight inches from the aerial proper and the shielding must be grounded at this point to the metal framework of the car by soldering a piece of wire to the shield and fastening the wire under a convenient screw head.

There are various types af antennae, but the recommended type is the roof antenna. Many automobile manufacturers install antennas in the roof of the cars at the factory. The lead-in wire is usually coiled up under one side of the instrument panel.

Every antenna should be checked for ground in the following manner: Using a continuity tester consisting of a low range high resistance voltmeter (1.5 or 3.0 volt scale) in series with a dry cell, touch one lead from the continuity tester to the antenna and touch the other lead from the continuity tester to the body or other grounded portion of the car. If any reading is obtained, even though very small, the antenna is grounded and cannot be used for an aerial until the ground is removed.

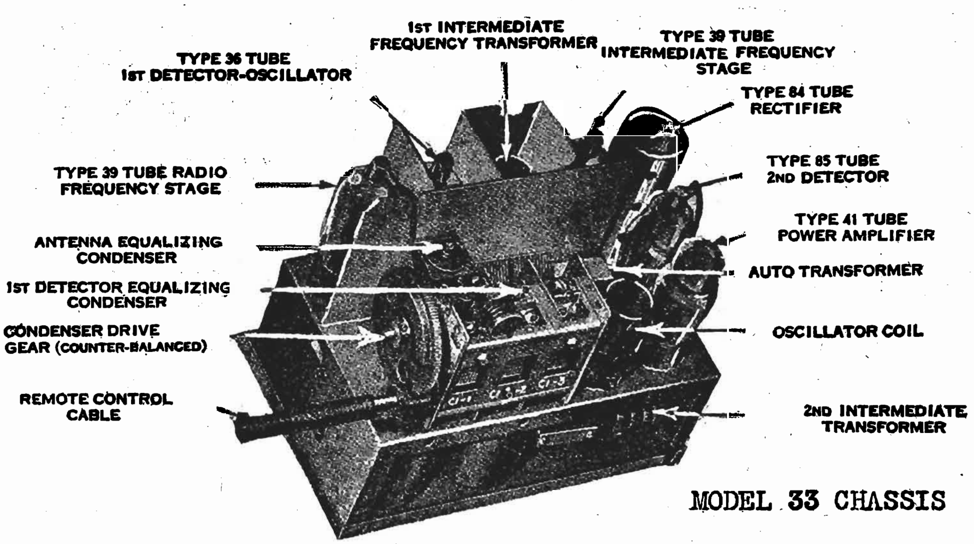
If a continuity tester is not available, connect 200 volts of "B" battery in series with a 200 volt, 1000 ohm per volt, sensitive meter. Touch one lead from the meter to the antenna and touch the other lead from the batteries to a grounded portion of the car. If the sensitive meter reads more than two volts, even when the roof of the car is damp, it indicates that antenna is grounded. *The ground must then be removed.*

Under car antennas are not recommended, but where it is impossible to install a roof antenna, we suggest an antenna formed by placing not less than four square feet of copper screen between two pieces of water-proof material, such as leatherette, and sewing it in. The water-proof insulating material is then fastened to the frame of the car. It may be necessary to make the antenna in two pieces in order to obtain four square feet of screen. Care must be taken to make sure that the screen is not or cannot become grounded to the frame of the car. Test for ground in the same manner as instructed for roof antenna.

ADJUSTING THE ANTENNA CIRCUIT

The antenna circuit must be adjusted to be in perfect resonance with the particular antenna to which the receiver is connected. Tune in the station the receiver will be operated on. A distant location, or a point of low signal strength, will permit the best adjustment, for a weak signal produces the sharpest resonance point. The adjusting screw is under the hole-cover nearest the dial drive adjustment hole. With a small insulated handle screw driver, turn the screw to the right or left slowly to the position of maximum volume. Once made, the adjustment need never be changed unless the antenna system is altered, or the receiver is operated on a different kilocycle frequency.

MODEL 43	Filament or Heater	Plate	Control Grid	Screen Grid	Plate Current M.A.
39 1st R.F.	6	135	- 3	85	4.5
39 2nd R.F.	6	135	- 3	85	4.5
39 3rd R.F.	6	135	- 3	85	4.5
36 Det.	6	132	-10	63	1
37 AVC	6	--	-18	--	0
38 Power	6	180	-18	180	9



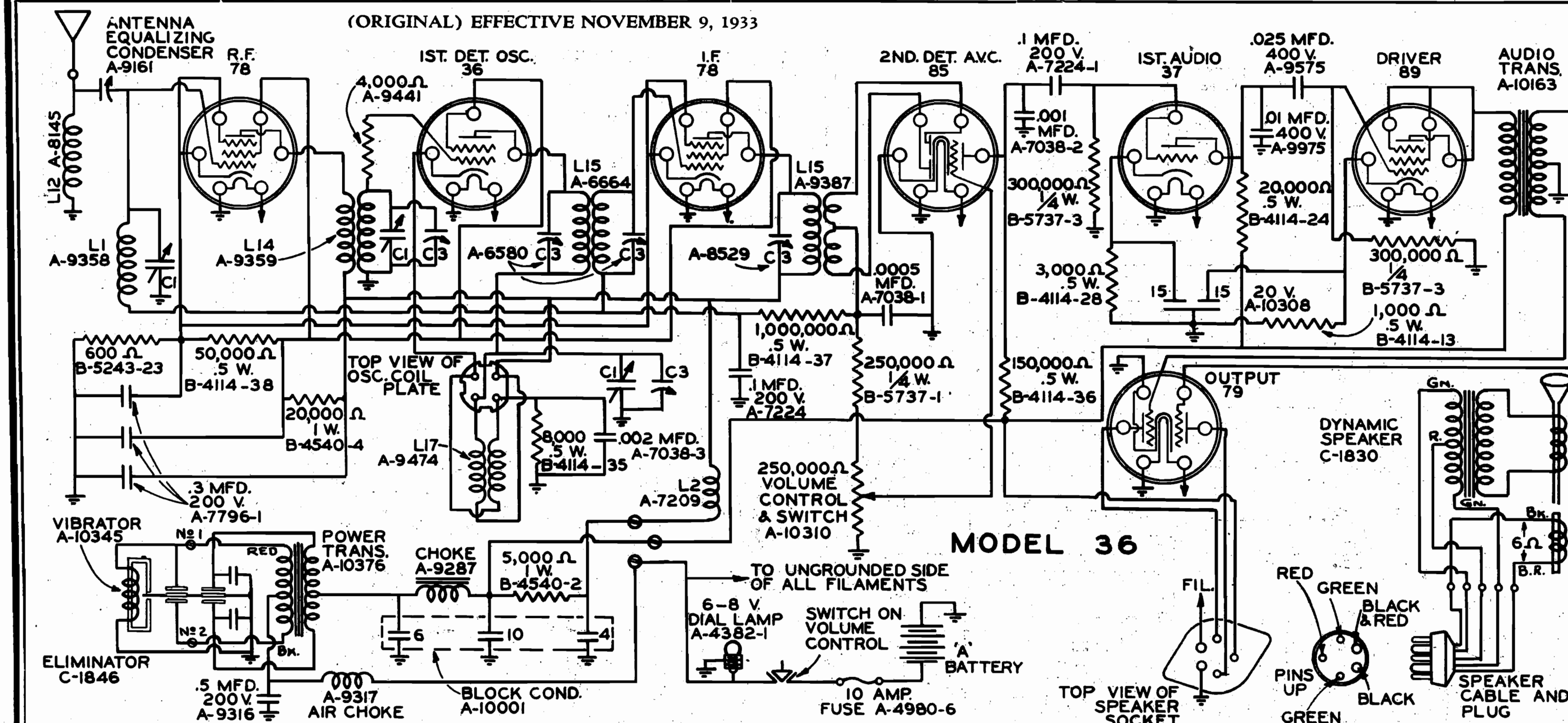
MODEL 33 CHASSIS

MODEL 33	Filament or Heater	Plate	Control Grid	Screen Grid	Plate Current M.A.
39 R.F.	6.3	195	- 3.5	100	4.2
36 1st Det-Osc.	6.3	195	-12.	100	1.5
39 I.F.	6.3	195	- 3.5	100	4.2
85 2nd Det.-AVC	6.3	30	--	--	1.5
41 Power	6.3	195	-15.	195	16.
84 Rect.	6.3	220	---	---	20 per plate

MODEL 36
Schematic, Voltage Resistance data

SPARKS WITHINGTON CO.

(ORIGINAL) EFFECTIVE NOVEMBER 9, 1933



NOTE: WHEN POSITIVE (+) 'A' BATTERY IS GROUNDED, CONNECTIONS TO ELIMINATOR TERMINALS ONE (1) AND TWO (2) ARE AS SHOWN. (MODEL 36 SHIPPED FROM FACTORY WITH THESE CONNECTIONS.)
WHEN NEGATIVE (−) 'A' BATTERY IS GROUNDED, REMOVE ELIMINATOR COVER AND REVERSE CONNECTIONS TO TERMINALS ONE (1) AND TWO (2).

C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L1 TUNING COIL
L2 CATHODE CHOKE

L12 ANTENNA CHOKE COIL
L14 R.F. TRANSFORMER
L15 I. F. TRANSFORMER 172.5 K.C.
L17 OSCILLATOR COIL

All heater voltages: 6.3.

Tube	Location	PLATE Volts	PLATE Ma.	Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS) Plate	Screen	C. Grid	Cathode
78	R-F Stage	200	4.2	100	—3.	—	70,000	50,000	1,250,000	600
36	1st Det.-Osc.	200	1.5	100	—12.	80,000	70,000	50,000	4,000	8,000
78	I-F Stage	200	4.2	100	—3.	1,500,000	70,000	50,000	1,250,000	600
85	2nd Det.-AVC	50	1.5	—	0	325,000	225,000	—	250,000	0
37	1st Audio	170	3.5	—	—10.	575,000	95,000	—	300,000	3,000
89	Driver Stage	240	20.0	240	—20.	495,000	75,000	75,000	300,000	1,000
79	Power Stage	240	*4.0	—	0	75,000	75,000	—	300	0

CHANGES IN MODEL 36 SCHEMATIC DIAGRAM

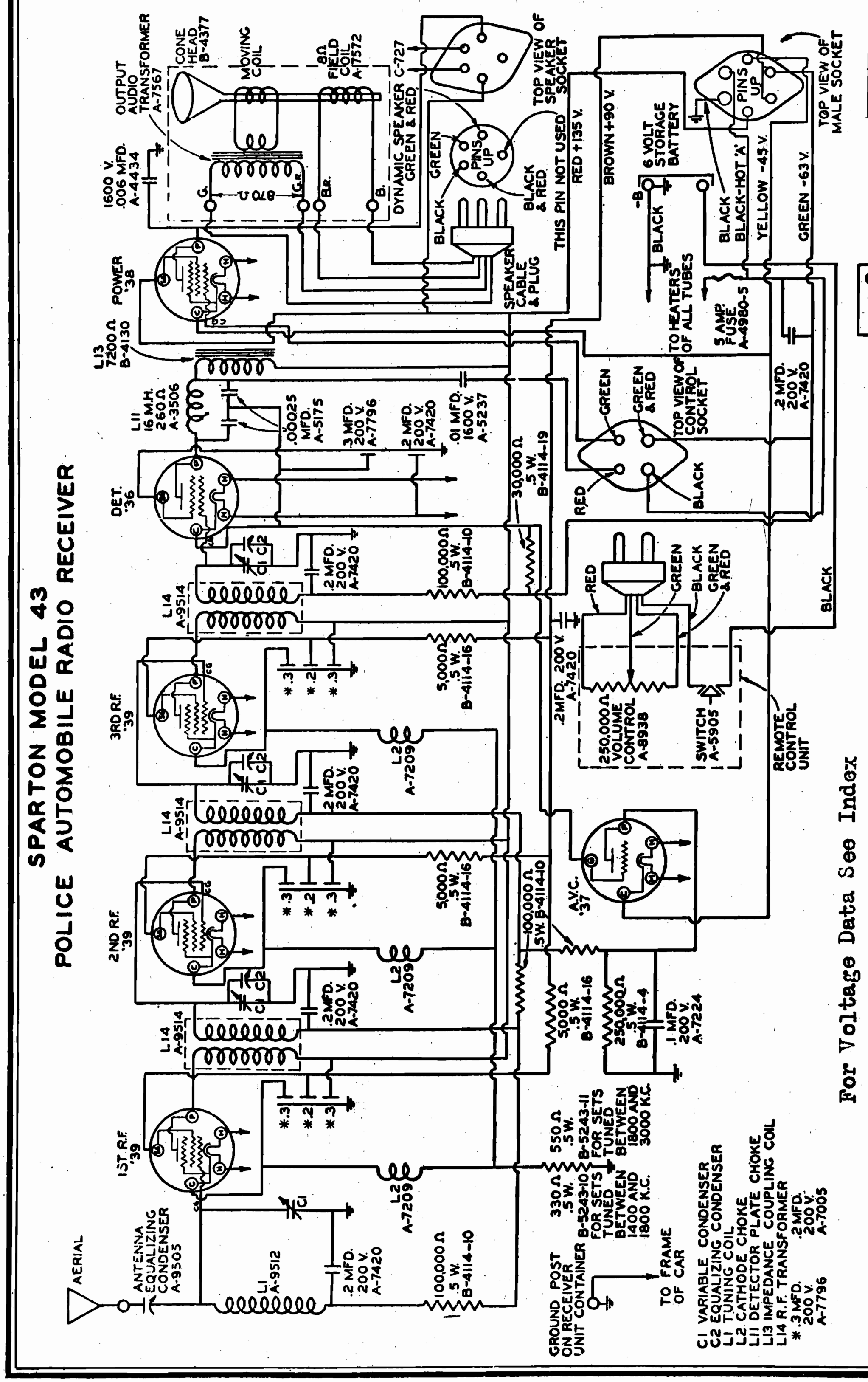
Effective November 16, 1933

Condenser part #A-4434 .006 mfd added across primary of output transformer between green and green lead.
Condenser part #A-5175-1, .00005 mfd added from ground to eliminator terminal connection which continues through Cathode Choke L-2

Volume Control—Full with Antenna Disconnected

MODEL 43
Schematic, Changes

SPARKS WITHINGTON CO.



For Voltage Data See Index

CHANGES IN MODEL 43 SCHEMATIC DIAGRAM

Effective July 14, 1933

Change .006 Mfd. Condenser A-4434 to .003 Mfd. Condenser A-9793
Change 330 Ohm Resistor B-5243-10 to 160 Ohm Resistor B-5243-17
Change 550 Ohm Resistor B-5243-11 to 230 Ohm Resistor B-5243-18

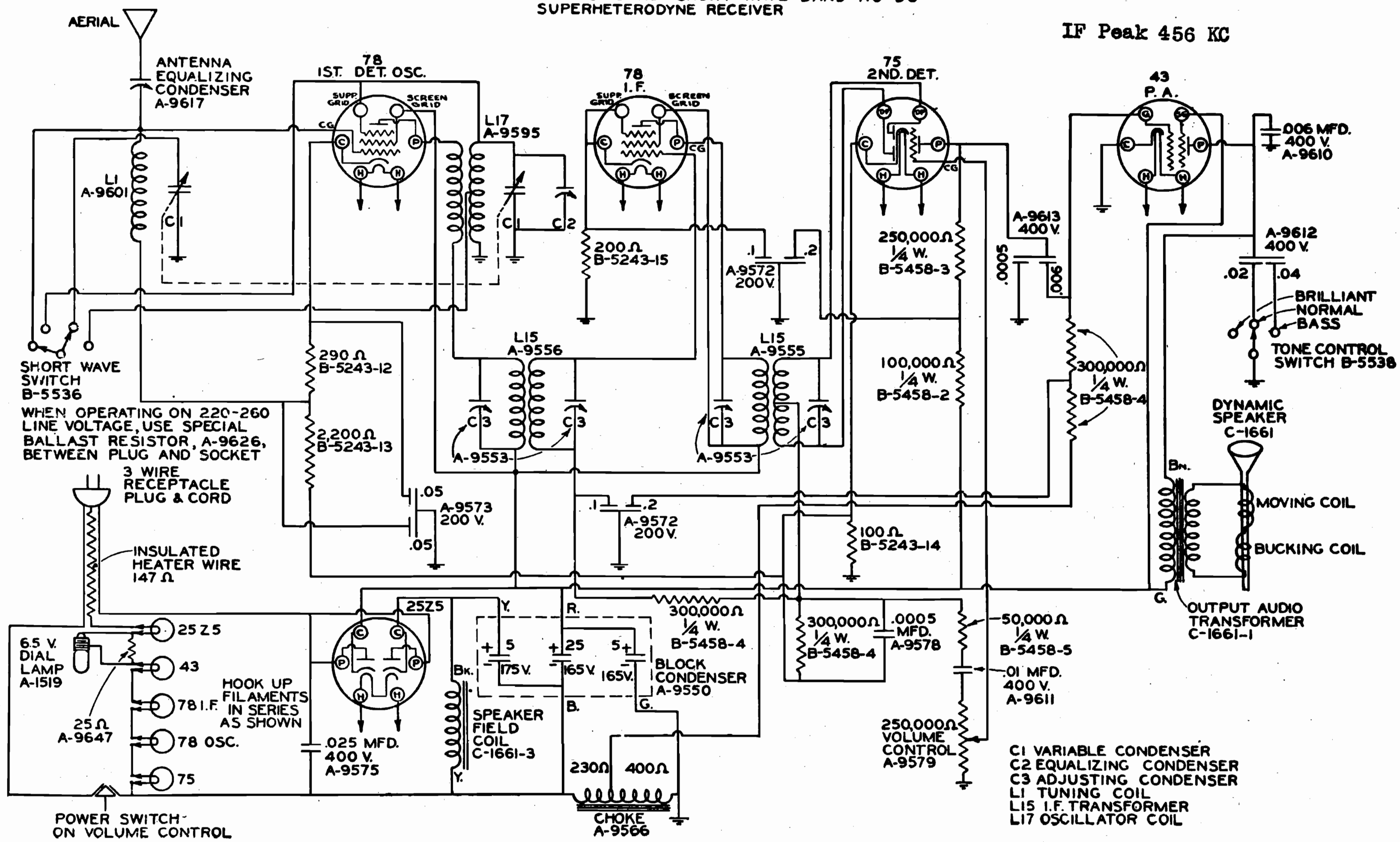
SPARKS WITHINGTON CO.

MODEL 61,62
Schematic,Voltage

SPARTON MODELS 61-62

COMBINATION BROADCAST BAND - SHORT WAVE BAND · AC-DC
SUPERHETERODYNE RECEIVER

IF Peak 456 KC



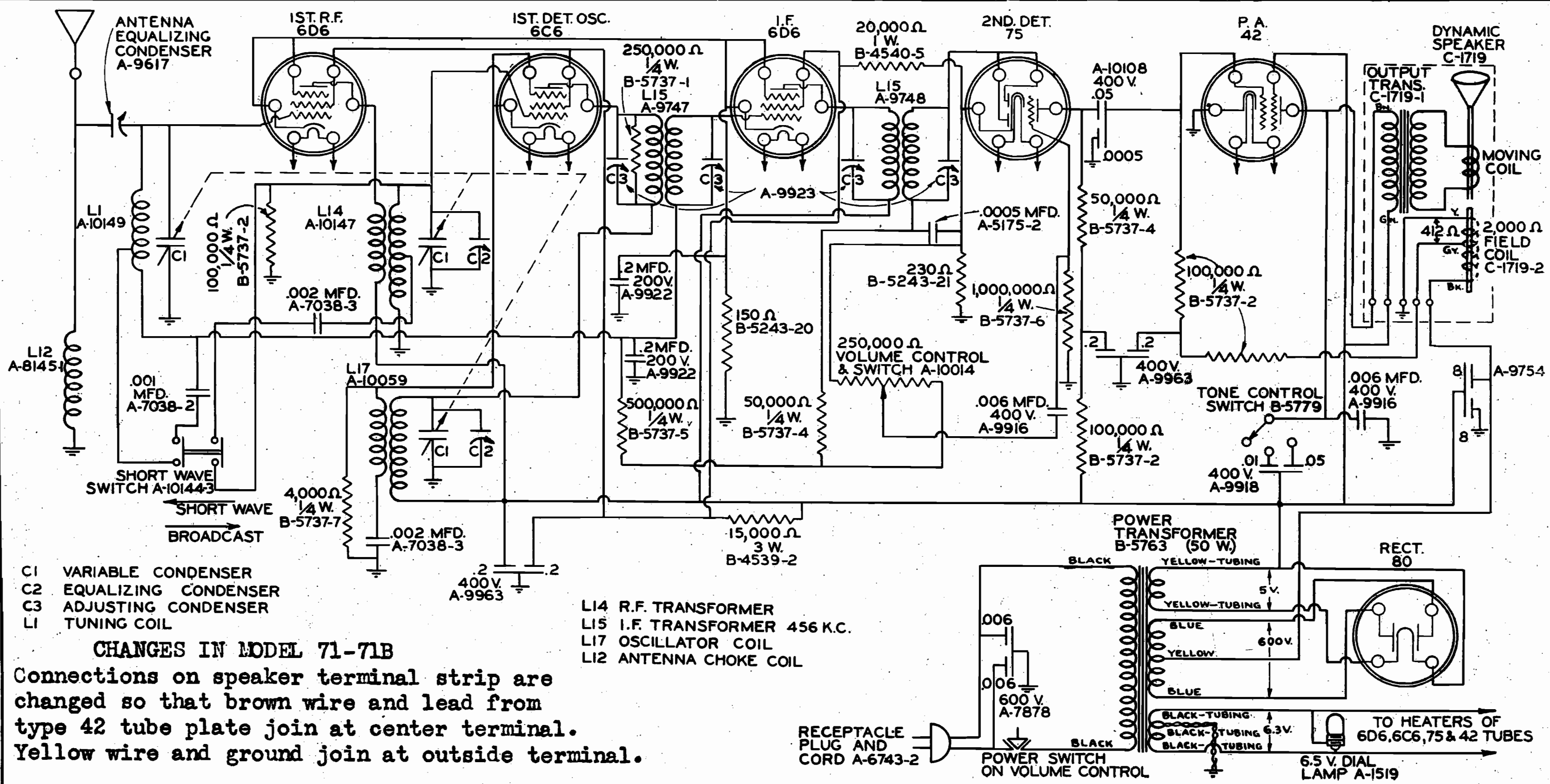
Line Voltage 120 VOLTAGE DATA Volume Control at FULL

Tube	Location	Heater	Plate	Control Grid	Screen Grid	Plate Current
25Z5	Rectifier	22-28	--------	----------	----------	----------
43	Power	22-28	92-98	14-18	98-108	18-25
75	Det-AVC	5.9-7	35-45	.4-.65	------	.19-.22
78	IF Amp	5.9-7	98-108	1.8-2.5	98-108	7-10
78	Det-Osc	5.9-7	98-108	14-18	98-108	4-6

Voltage across speaker field is 100-120

MODEL 71,71-B
Schematic,Voltage
Resistance data

SPARKS WITHINGTON CO.



CHANGES IN MODEL 71-71B

Connections on speaker terminal strip are changed so that brown wire and lead from type 42 tube plate join at center terminal. Yellow wire and ground join at outside terminal.

Line Voltage 115

Position of Volume Control—Full with Antenna Disconnect

Position of Band Selector Switch—Broadcast

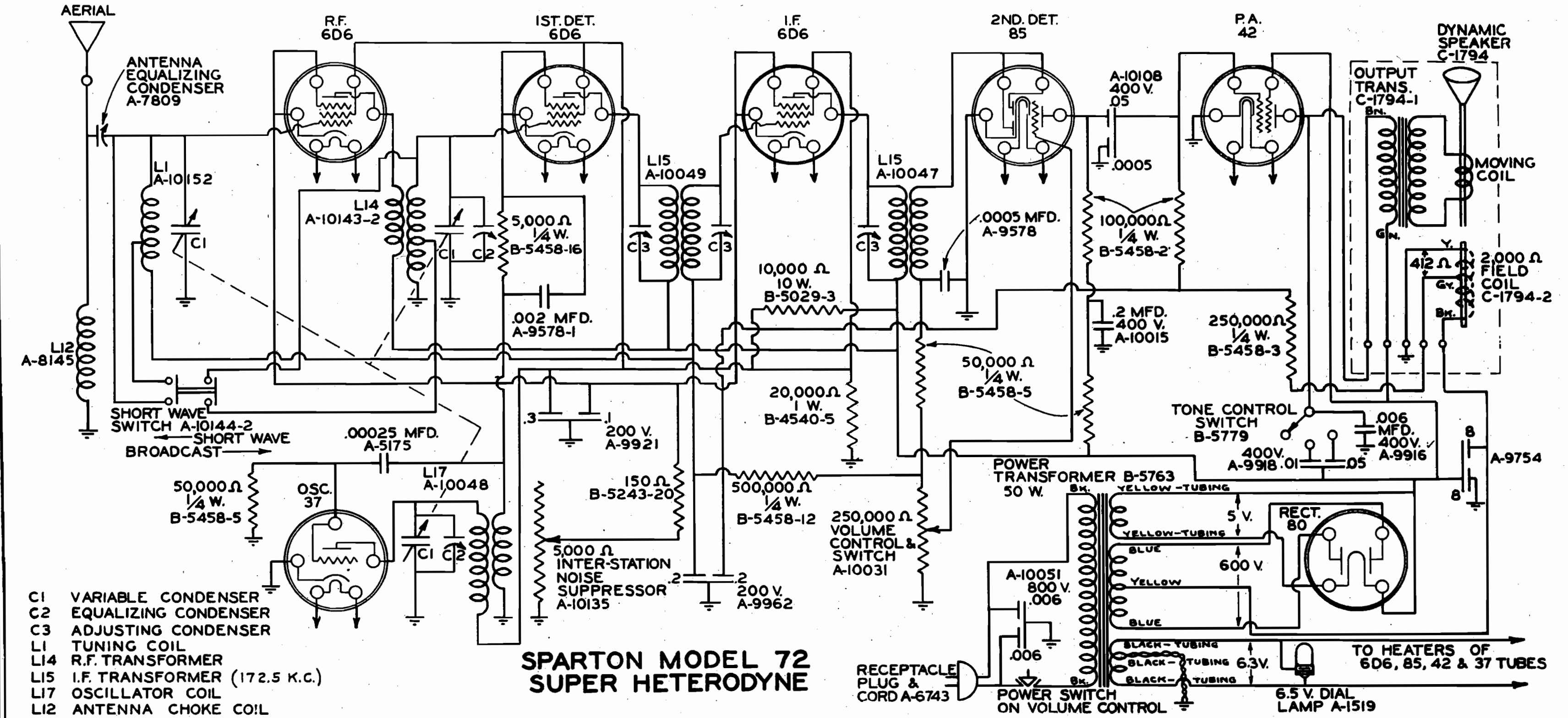
(ORIGINAL) EFFECTIVE SEPTEMBER 13, 1933

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
6D6	R-F Stage	250	8.	100	—3.	—	35,000	20,000	750,000	150
6C6	1st Det.—Osc.	250*	*	100*	*	35,000	35,000	20,000	0	4,000
6D6	I-F Stage	250	8.	100	—3.	785,000	35,000	20,000	750,000	150
75	Diode Det.	0	0	—	—	785,000‡	750,000	—	—	230
	Triode A-F	135	0.5	—	—1.5	1,000,000	185,000	—	1,000,000	
42	Power Stage	240	20.	250	—12.**	385,000	35,000	35,000	200,000	0
80	Rectifier	450†	28.5***	—	—	600[1]	2,300	—	—	30,000[2]

Allow 15% + or — on all measurements.
All heater voltages: 6.3, except 80 Rectifier filament: 5.0
* Cannot be measured with test kit and adapter without causing oscillator to cease functioning; thus the omitted readings are of no value.
** Using 300,000 ohm volt meter.
*** Per plate.
† As read on 800 volt scale of A-C meter in Jewell 444
‡ Diode plates to I-F plate.
[1] Plate to plate on 80 Rectifier.
[2] Filament on 80 Rectifier to ground.

MODEL 72
Schematic, Voltage Resistance data

SPARKS WITHINGTON CO.



Line Voltage 115

Position of Inter-Station Noise Suppressor—Full

Position of Volume Control—Full with Antenna Disconnected

Position of Band Selector Switch—Broadcast

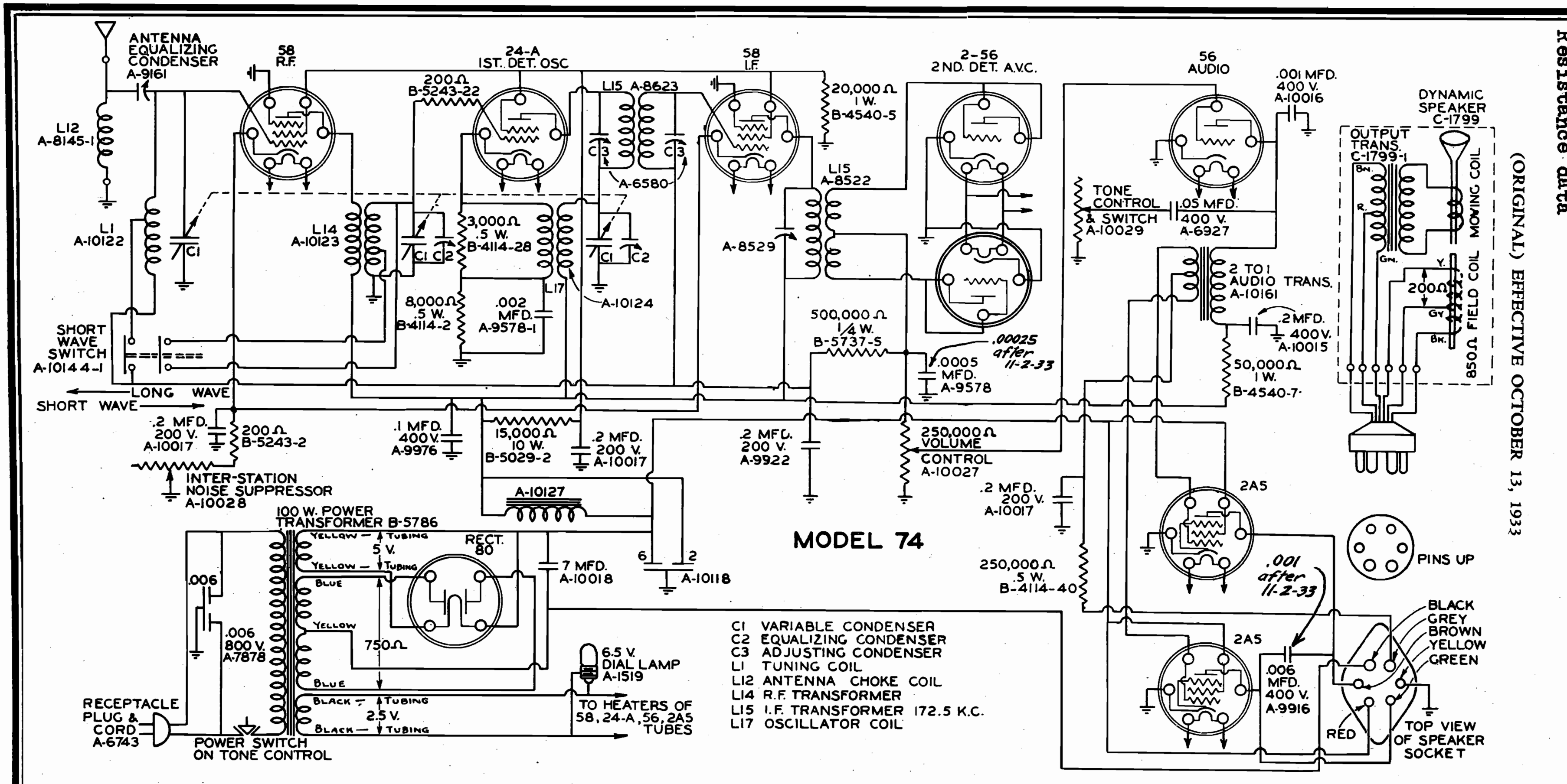
Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
6D6	R-F Stage	250	8.	100	—3.	—	30,000	20,000	750,000	150
6D6	1st Det.	250	*	100	*	30,000	30,000	20,000	0	5,400
37	Osc.	100*	*	—	*	80,000	20,000	0	50,000	0
6D6	I-F Stage	250	8.	100	—3.	780,000	30,000	20,000	750,000	150
85	Diode Det.	0	0	—	—	330,000‡	300,000	—	—	0
	Triode A-F	22	1.6	—	0	280,000	180,000	—	250,000	
42	Power Stage	240	20.	250	—11.**	530,000	30,000	30,000	350,000	0
80	Rectifier	450†	26.***	—	—	600[1]	2,300	—	—	30,000[2]

Allow 15% + or — on all measurements.
All heater voltages: 6.3, except 80 Rectifier: 5.0 volts
*Cannot be measured with test kit and adapter without causing oscillator to cease functioning; thus omitted readings are of no value.
** Using 300,000 ohm volt meter.
***Per plate.
† As read on 800 volt scale of A-C meter in Jewell 444
‡ Diode plates to I-F plate.
[1] Plate to plate on 80 Rectifier.
[2] Filament on 80 Rectifier to ground.

MODEL 74
Schematic, Voltage
Resistance data

SPARKS WITHINGTON CO.

(ORIGINAL) EFFECTIVE OCTOBER 13, 1933



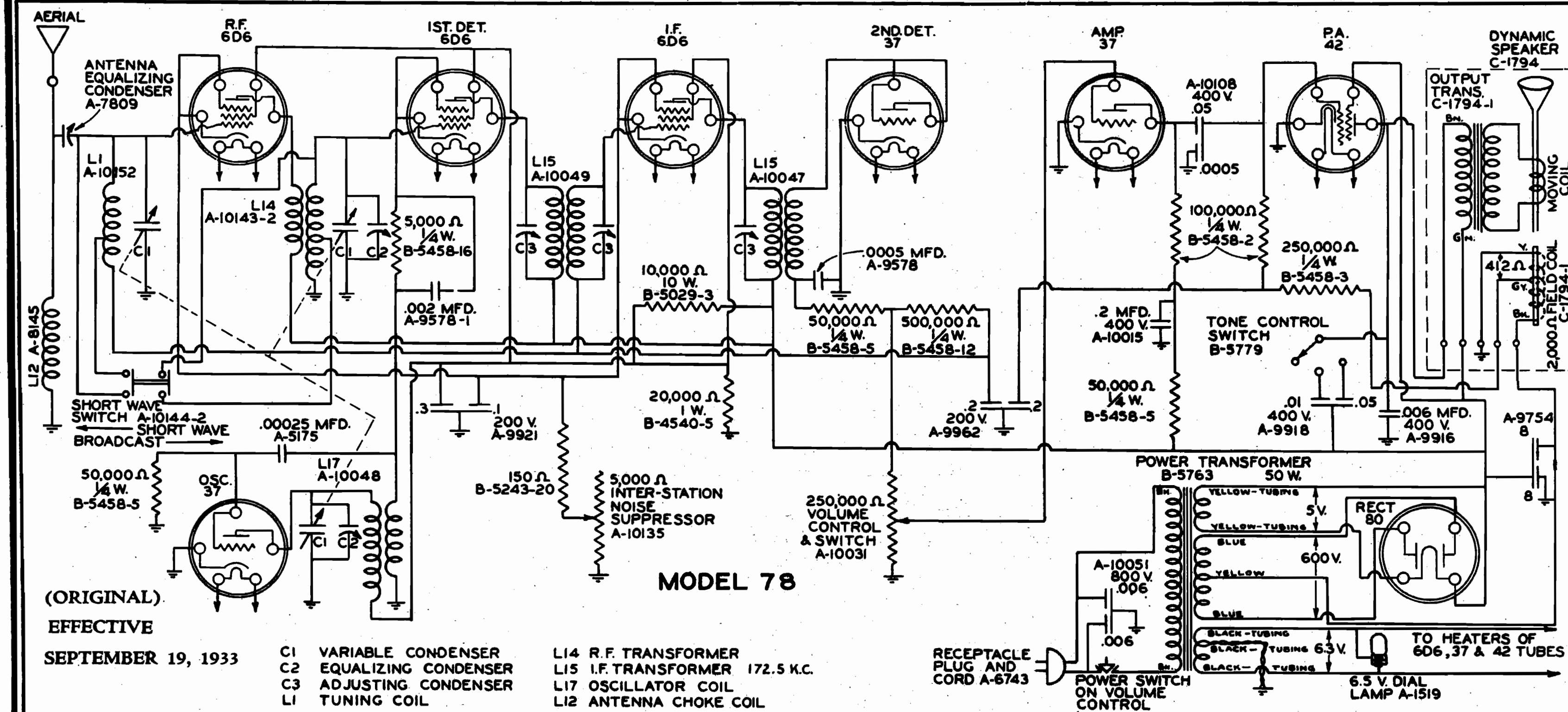
Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
58	R-F Stage	250	8.	110	—3.	—	35,000	20,000	750,000	200
24-A	1st Det.-Osc.	250	*	110	*	35,200	35,000	20,000	200	11,000
58	I-F Stage	250	8.	110	—3.	785,000	35,000	20,000	750,000	200
56	2nd Det.-A.V.C.	0	0	—	0	285,000	250,000	—	250,000	0
56	2nd Det.-A.V.C.	0	0	—	0	285,000	250,000	—	250,000	0
56	1st Audio	50	4.	—	0	0	85,000	—	250,000	0
2A5	Power Stage	260	28.	270	—11.**	335,000	35,000	35,000	250,000	0
2A5	Power Stage	260	28.	270	—11.**	335,000	35,000	35,000	250,000	0
80	Rectifier	490†	44.	—	—	2,200[1]	950	—	—	3,000[2]

Line Voltage 115
Inter-station Noise Suppressor—FULL
Volume Control— FULL with Antenna off
Band Selector Switch—Broadcast

Allow 15% + or — on all measurements.
All heater voltages: 2.5, except 80 Rectifier: 5.0 volts.
* Cannot be measured with test kit and adapter are of no value.
** Using a 300,000 ohm voltmeter.
† As read on 800 volt scale of A-C meter in Jewell 444
[1] Plate to plate on 80 Rectifier.
[2] Plate of 80 Rectifier to ground.

MODEL 78
Schematic, Voltage Resistance data

SPARKS WITHINGTON CO.



(ORIGINAL)
EFFECTIVE
SEPTEMBER 19, 1933

C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L1 TUNING COIL

L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER 172.5 K.C.
L17 OSCILLATOR COIL
L12 ANTENNA CHOKE COIL

Line Voltage 115

Position of Inter-Station Noise Suppressor—Full

Position of Volume Control—Full with Antenna Disconnected

Position of Band Selector Switch—Broadcast

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
6D6	R-F Stage	250	8.	100	—3.	—	30,000	20,000	750,000	150
6D6	1st Det.	250	*	100	*	30,000	30,000	20,000	0	5,400
37	Osc. Stage	100*	*	—	*	80,000	20,000	0	50,000	0
6D6	I-F Stage	250	8.	100	—3.	780,000	30,000	20,000	750,000	150
37	2nd Det.-A.V.C.	0	*	—	*	330,000	300,000	—	300,000	0
37	1st Audio	22	1.6	—	0	280,000	180,000	—	250,000	0
42	Power Stage	240	20.	250	—11.**	530,000	30,000	30,000	350 000	0
80	Rectifier	450†	26.‡	—	—	600[1]	2,300	—	—	30,000[2]

All heater voltages: 6.3 except 80 Rectifier: 5.0 volts.

Allow 15% + or — on all measurements.

* Cannot be measured with test kit and adapter without causing oscillator to cease functioning; thus the omitted readings are of no value.

** Using a 300,000 ohm volt meter.

‡ Per plate.

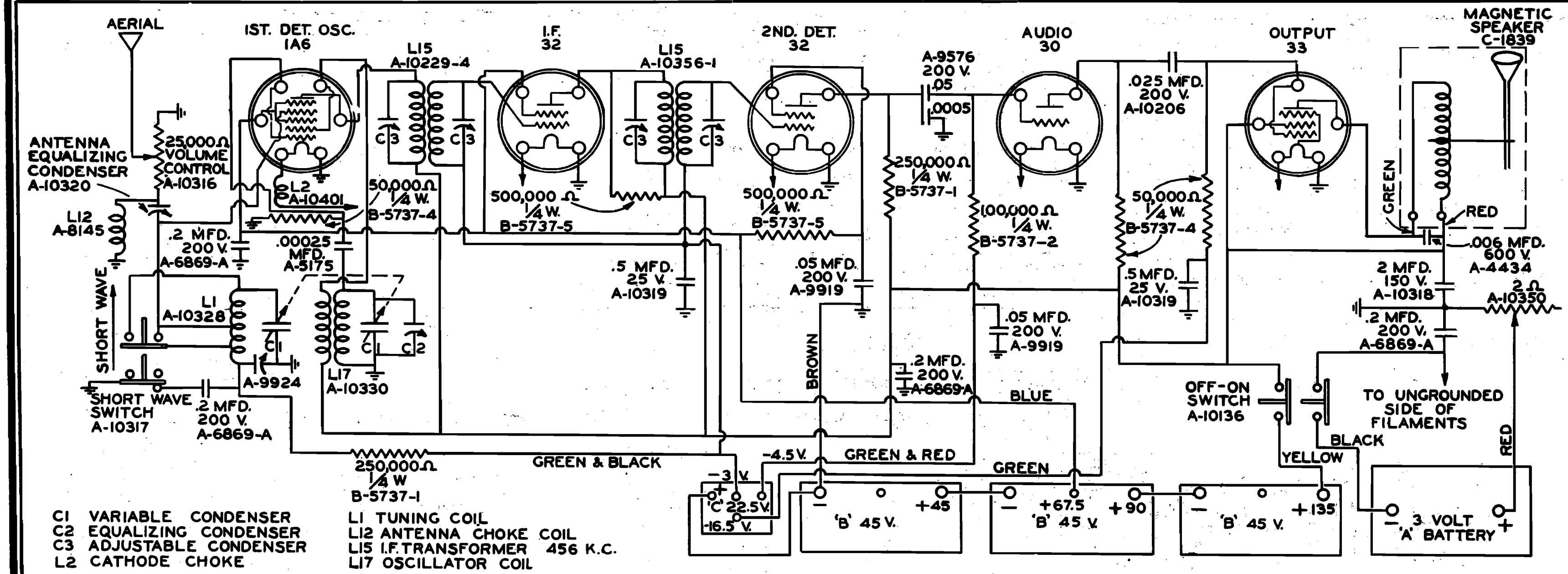
† As read on 800 volt scale of A-C meter in Jewell 444 Analyzer.

[1] Plate to plate on 80 Rectifier.

[2] Filament on 80 Rectifier to ground.

MODEL 81
Schematic, Voltage
Resistance data

SPARKS WITHINGTON CO.



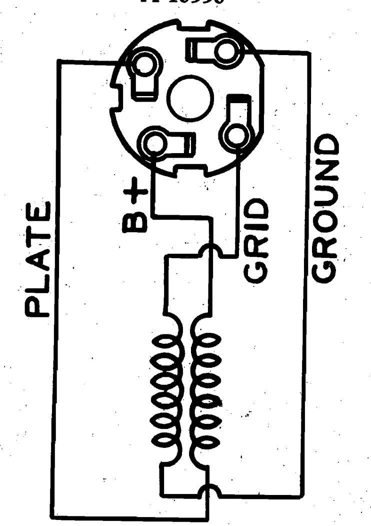
C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTABLE CONDENSER
L2 CATHODE CHOKE

L1 TUNING COIL
L12 ANTENNA CHOKE COIL
L15 I.F. TRANSFORMER 456 K.C.
L17 OSCILLATOR COIL

SPARTON MODEL 81 COUNTRY HOME RECEIVER SUPERHETERODYNE

(ORIGINAL) EFFECTIVE OCTOBER 25, 1933

HOOK UP OF TERMINALS ON OSCILLATOR COIL A-10330



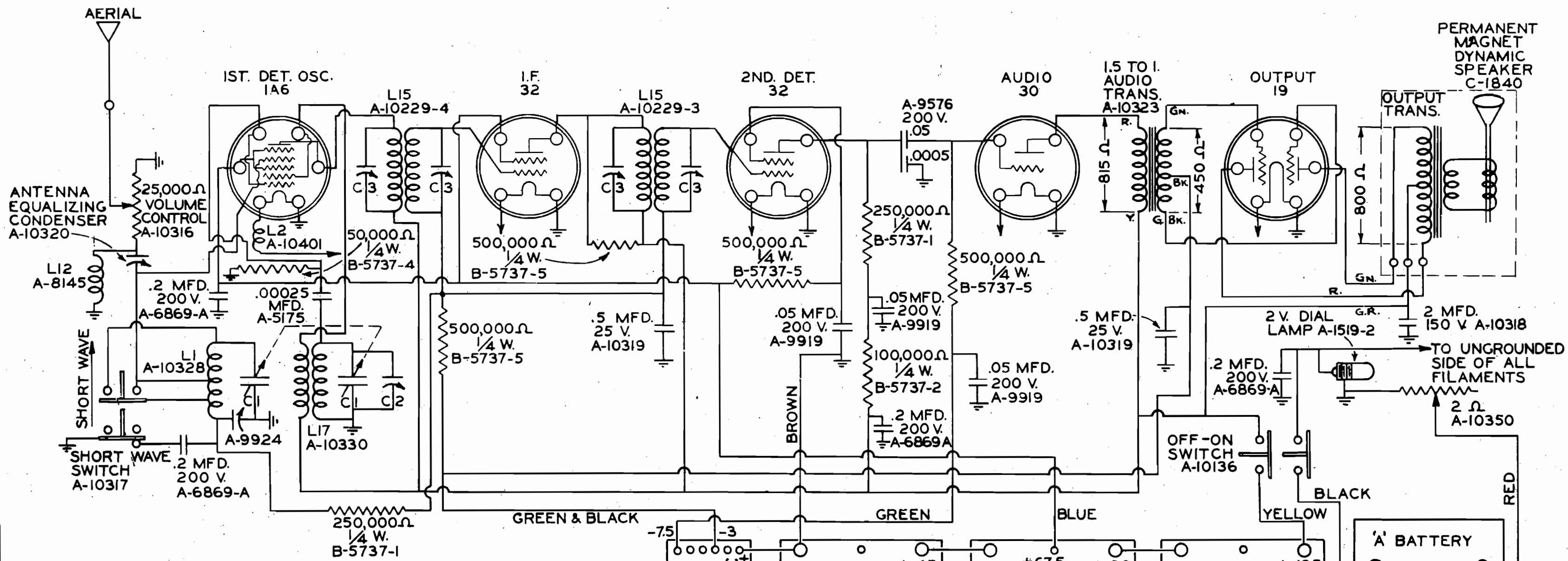
Condition of "A" Battery—Good
Condition of "B" Batteries—Good
Condition of "C" Battery—Good

Position of Volume Control—Full with Antenna Disconnected
Position of Band Selector Switch—Broadcast

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
1A6	1st Det.-Osc.	135	1.3	67.5	—3.	—	12.5	0	250,000	0
32	I-F Stage	135	1.7	67.5	—3.	25	10.0	0	12.5	0
32	2nd Det.	135	.6	50.	—3.	20	250,000	500,000	10.0	0
30	1st Audio	135	3.0	—	—4.5	300,000	100,000	—	50,000	0
33	Power Stage	135	14.5	135	—16.5	150,000	630	0	50,000	0

NOTES: Allow 15% + or — on all resistance measurements (all battery leads connected together).
All filament voltages: 2.4 volts.
"A" battery drain 0.5 ampere.
"B" battery drain 30. milliamperes.

SPARKS WITHINGTON CO.



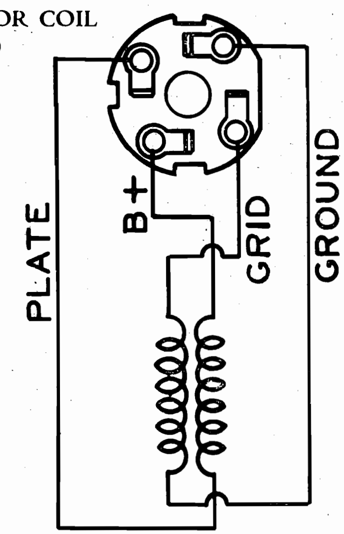
C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTABLE CONDENSER
L2 CATHODE CHOKE

L1 TUNING COIL
L12 ANTENNA CHOKE COIL
L15 I.F. TRANSFORMER 456 K.C.
L17 OSCILLATOR COIL

(ORIGINAL) EFFECTIVE OCTOBER 20, 1933

SPARTON MODEL 82
COUNTRY HOME RECEIVER
SUPERHETERODYNE

HOOK UP OF TERMINALS
ON OSCILLATOR COIL
A-10330



MODEL 82

Condition of "A" Battery—Good

Condition of "B" Batteries—Good

Condition of "C" Battery—Good

Position of Volume Control—Full with Antenna Disconnected

Position of Band Selector Switch—Broadcast

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
1A6	1st Det.-Osc.	135	1.3	67.5	—3.	—	12.5	0	750,000	0
32	I-F Stage	135	1.7	67.5	—3.	500,000	12.5	0	500,000	0
32	2nd Det.	135	.6	50.	—3.	500,000	350,000	500,000	500,000	0
30	1st Audio	135	3.0	—	—7.5	85,000	80	—	500,000	0
19	Power Stage	135	4.0	—	—3.	300	75	—	220	0

NOTES: Allow 15% + or — on all resistance measurements (all battery leads connected together).
All filament voltages: 2.0 volts.

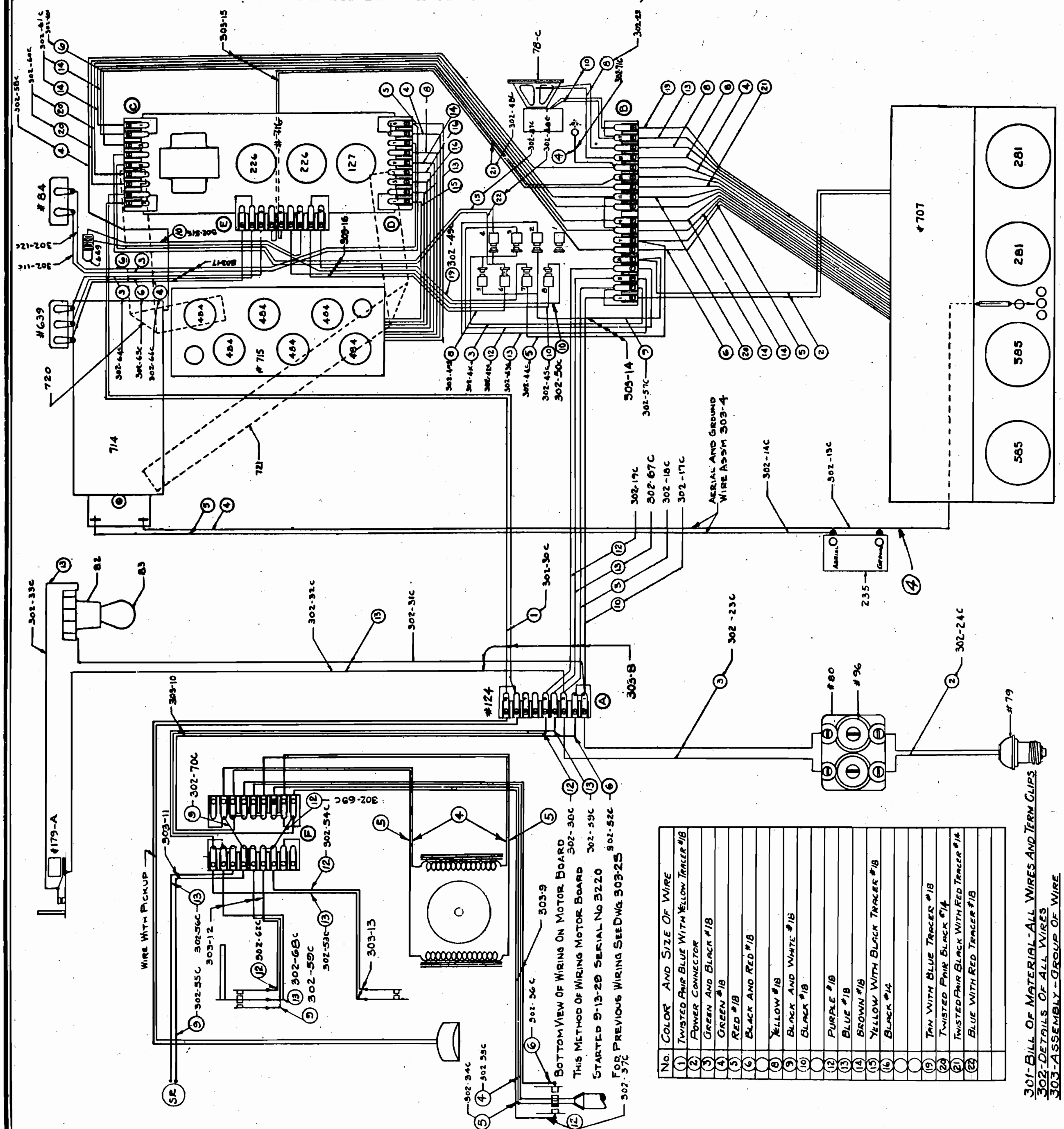
MODEL 101
Voltage
Assembly wiring

SPARKS WITHINGTON CO.

SPARTON—Model 101-103-109
Line Voltage 120—Volume Control Full

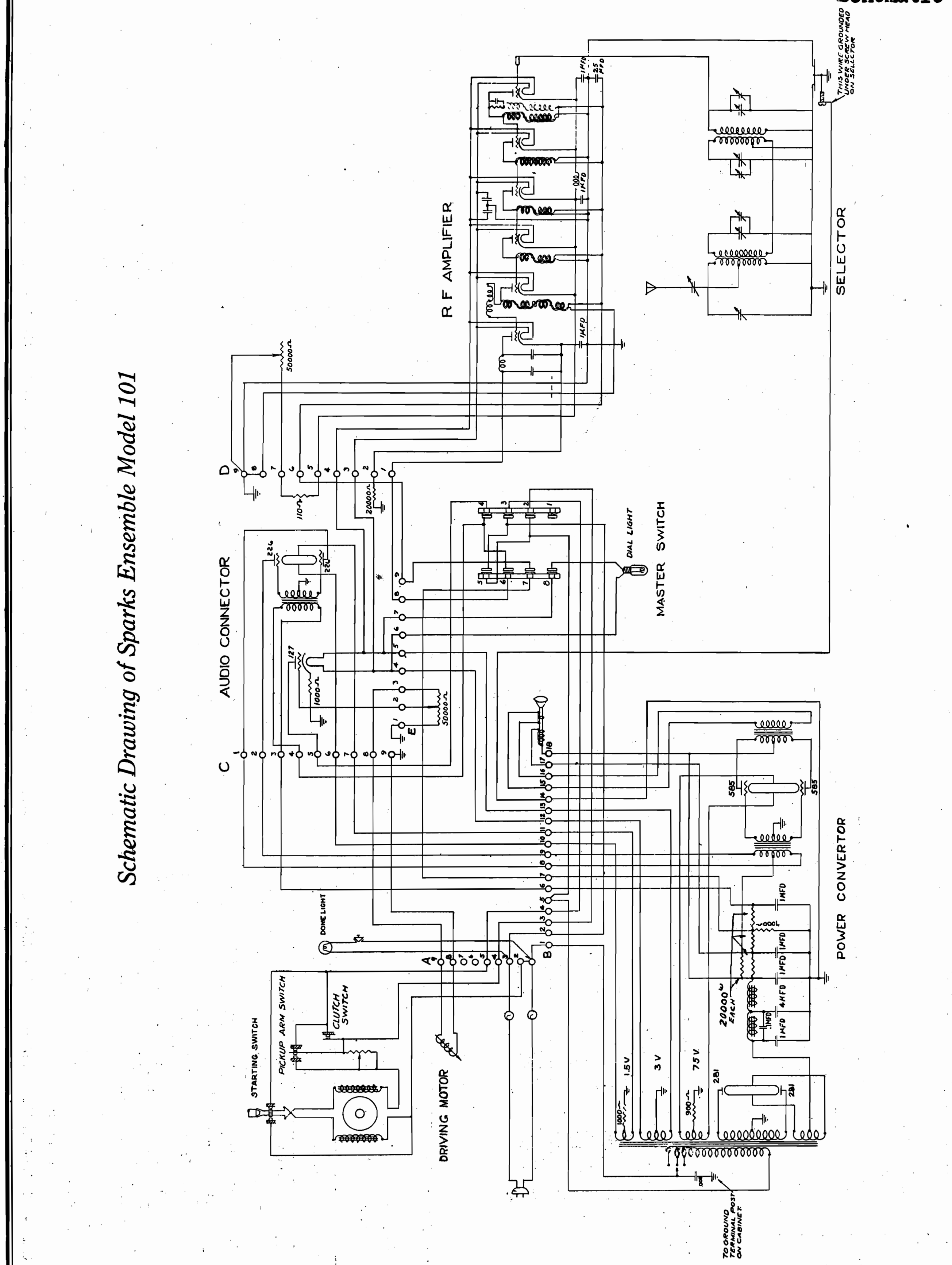
Tube No. in Order ①	Type of Tube ②	Position of Tube 1st. RF Det., Etc. ③	Readings, Plug in Socket of Set — Tube Out: A Volts ④	Tube Out: B Volts ⑤	Tube in Tester: A Volts ⑥	Tube in Tester: B Volts ⑦	Tube in Tester: C Volts (Control Grid) ⑧	Cathode-Heater Volts ⑨	Normal Plate M.A. ⑩	Plate M.A. Grid Test ⑪	Plate Change M.A. ⑫	Screen Grid Volts ⑬
1	C-484	1st PF	3.2	125	3	120	9		4.3	7.3	3.0	
2	C-484	2nd RF	3.2	126	3	122	8		6.5	11.4	4.9	
3	C-484	3rd RF	3.2	125	3	122	8		8	9.5	1.5	
4	D-484	4th RF	3.2	125	3	122	8		6.5	12.2	4.7	
5	C-484	5th RF	3.2	128	3	120	8		6.3	11.0	4.7	
6	C-484	Det.	3.2	240	3	185	32		3.8	6.	2.2	
7	585	Audio	7.9	345	7.7	340	65		55	60	5	
8	585	Audio	7.9	345	7.7	340	65		55	60	5	
9	281	Rect.	8	-	7.7	-	-		68	-	-	
10	281	Rect.	8	-	7.7	-	-		68	-	-	

***Model 101—2 Additional 226 Tubes, Also 1 484**



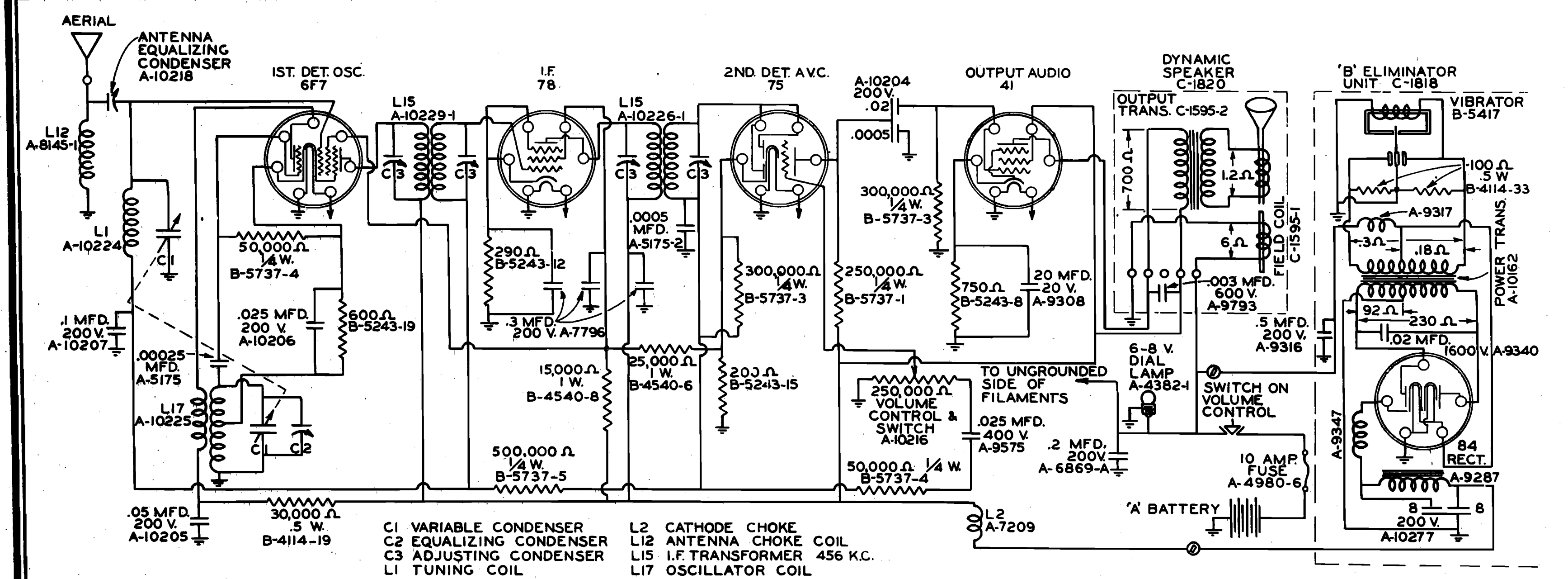
SPARKS WITHINGTON CO.

MODEL 101
Ensemble
Schematic



MODEL 333
Schematic, Voltage
Resistance data

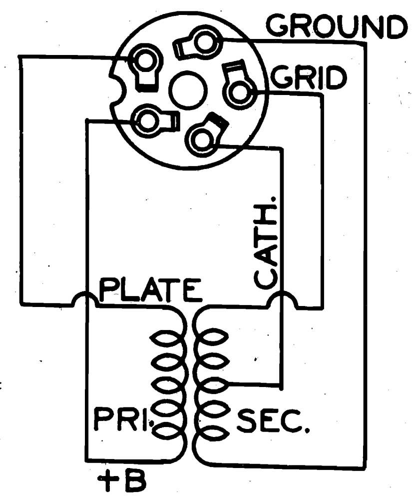
SPARKS WITHINGTON CO.



SPARTON MODEL 333
AUTOMOBILE RADIO RECEIVER
SUPERHETERODYNE

(ORIGINAL) EFFECTIVE OCTOBER 24, 1933

HOOK UP OF TERMINALS ON OSCILLATOR COIL A-10225



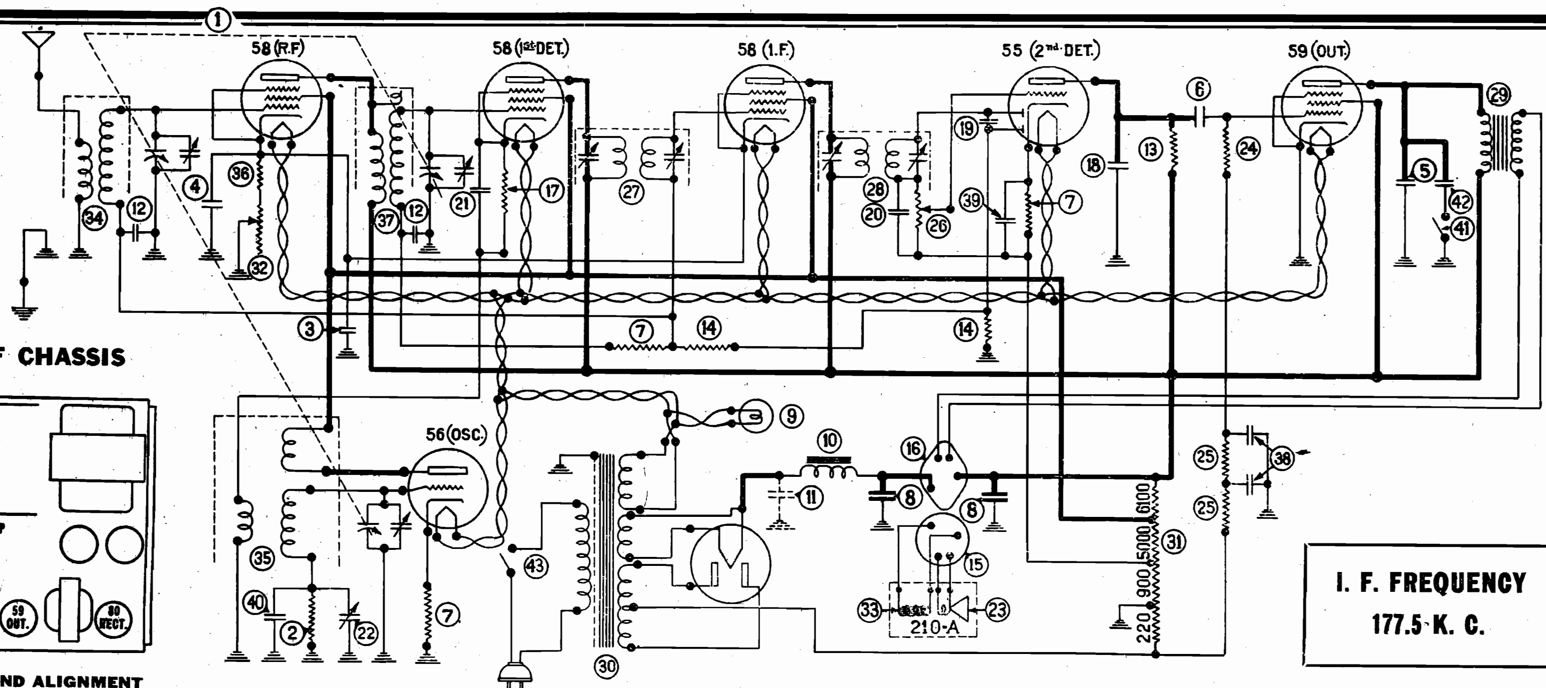
Condition of "A" Battery—Good   Position of Volume Control—Full with Antenna Disconnected

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
6F7	Triode Osc.	100	3.5	—	—3.0	—	70,000	—	50,000	600
	Pent. Mixer	200	6.	100	—2.5	850,000	40,000	25,000	800,000	
78	I-F Stage	200	6.	100	—2.5	840,000	40,000	25,000	800,000	290
75	Diode Det.-AVC	0	0	—	—	—	300,000	—	—	200
	A-F Triode	200	1.	—	—1.2	550,000	290,000	—	250,000	
41	Power Stage	185	18.	200	—16.0	590,000	40,000	40,000	300,000	750
84	Rectifier	250	25.	—	—	—	92	—	—	40,000

NOTES: Allow 15% + or — on all measurements.
All heater voltages: 6.3.
"A" battery drain: 5.7 amperes.

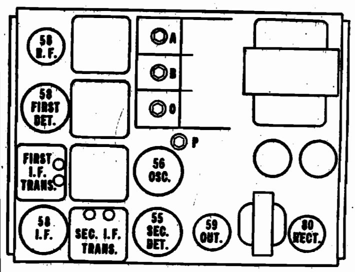
STEWART-WARNER CORP.

MODEL R-106
Schematic, Voltage
Parts List, Socket



FRONT OF CHASSIS

I. F. FREQUENCY 177.5 K. C.



TUBE LAYOUT AND ALIGNMENT TRIMMERS

LINE VOLTAGE 115 — VOLTAGE TABLE — VOLUME AND SENSITIVITY CONTROLS FULL ON

Tube Circuit	Type of Tube	Filament Voltage	Plate Voltage	Screen Grid Voltage	Bias Voltage
58	R. F.	2.29	245	97	3.1
56	Osc.	2.28	97	..	9.3
58	1st Det.	2.28	245	97	...
58	I. F.	2.26	245	97	3.1
55	2nd Det.	2.24	66	..	7.9
59	Output	2.24	229	245	17.4*
80	Rect.	4.78	...	...	....

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltages.

*This reading taken between negative end of voltage divider and chassis.

Diag. No.	Part No.	Description	List Price
1	67248	3 gang tuning condenser	$5.50
2	67259	45,000 ohm, 1/4 w. carbon res.	.25
3	67294	.1 mf., 200 v. tubular cond.	.30
4	67297	.25 mf., 200 v. tubular cond.	.40
5	67298	.01 mf., 600 v. tubular cond.	.30
6	67299	.02 mf., 400 v. tubular cond.	.30
7	67303	2,000 ohm, 1/4 w. carbon res.	.25
8	67328	8 mf., 440 v. electrolytic cond.	1.75
9	67551	2.5 volt pilot lamp	.25
10	67584	Filter choke coil	2.00
11	67588	8 mf., 500 v. electrolytic cond. (For 25 cycle sets only)	1.80
12	67762	.05 mf., 200 v. tubular cond.	.25
13	67938	100,000 ohm, 1 w. carbon res.	.25
14	67939	1 megohm, 1/2 w. carbon res.	.25
15	67971	Speaker cable only	.40
	67972	Speaker cable and plug	.60
	81092	Speaker plug only	.20
16	81042	Speaker socket	.20
17	81151	4,000 ohm, 1/2 w. carbon res.	.25
18	81155	.0005 mf. pigtail mica cond.	.25
19	81156	.001 mf. pigtail mica cond.	.30
20	81157	.00025 mf. pigtail mica cond.	.30
21	81190	.1 mf., 200 v. tubular cond. & bracket	.35
22	81231	Oscill. pad trimming cond.	.50
23	81274	Diaphragm (R210A and RL211A)	2.75
	81279	Diaphragm & shell (RH211A)	2.75
24	81381	150,000 ohm, 1/2 w. carbon res.	.25
25	81382	60,000 ohm, 1/2 w. carbon res.	.25
26	81484	500,000 ohm volume control	.95
27	81510	1st I. F. trans. assembly	2.00
	81200	Double I. F. trim. cond. only	.60
	81234	I. F. transformer coils only	1.00
28	81511	2nd I. F. trans. assembly	2.00
	81200	Double I. F. trim. cond. only	.60
	81234	I. F. transformer coils only	1.00
29	81513	Single speaker output trans.	2.75
	81596	Twin speaker output trans.	2.75
30	81525	115 v., 60 cy. power trans.	8.00
	81571	115 v., 25 cy. power trans.	10.00
	81574	110-250 v., 50-60 cy. power trans.	10.00
31	81530	Voltage divider vitreous res.	1.25
32	81534	8,000 ohm sensitivity control & switch	1.50
33	81532	R210A speaker field coil (1000 ohms)	3.50
	81265	211A speaker field coil (460 ohms)	3.50
34	81538	R. F. tuning coil	1.00
35	81539	Oscillator tuning coil	1.00
36	81548	200 ohm, 1/4 w. resistor	.25
37	81550	First detector tuning coil	1.00
38, 39	81580	.25 mf., 100 v. shlded. cond.; .25 mf., 100 v. shlded. cond.; 1 mf., 100 v. shlded. cond. — in one can	1.50
40	81593	.0075 mf. oscill. pad. cond.	.25
41	81616	Tone control switch only	.40
42	81618	.04 mf., 600 v. tubular cond.	.30
43	.....	Power switch (mtd. on 81534)	...

PARTS NOT SHOWN IN DIAGRAM

Part No.	Description	List Price
81568	R. F. tube shield shell	.20
81569	R. F. tube shield cover	.05
67964	1st det. & I. F. tube shield	.30
81213	R. F. coil shield (with hole)	.50
67326	R. F. coil shield (plain)	.50
81212	I. F. coil shield	.50
67712	Gang cond. rubber pad	.05
67711	Gang cond. rubber washer	.05
67236	Dial drive rubber bushing	.05
81592	Celluloid dial and frame	.35
67269	No. 14 x 1" chassis screw	.05
67667	1 1/8 diam. 1/4 hole washer	.01
81091	No. 8—32 x 1 1/8 speaker mtg. screw	.01
66735	No. 8—32 thin hex. nut	.01
67953	Escutcheon plate	.50
81326	Escutcheon wood screws per C	.50
81413	Large knob	.25
81412	Small knob	.25
66964	Felt washer for knobs	.01

MODEL R-106
Alignment

STEWART-WARNER CORP.

SERVICE DATA FOR MODEL 106 CHASSIS

CIRCUIT DESCRIPTION

The Model 106 Stewart-Warner Radio Chassis is a seven tube superheterodyne receiver embodying three important features: (1) Interstation Noise Suppression; (2) "Q" or "Squelch" Circuit; (3) Delayed Automatic Volume Control Action. These desirable features are obtained thru the use of a 55 detector tube which functions as three tubes in one—two diode rectifiers and a triode amplifier. One diode is used for detection, the detected signal obtained in this way being then passed on to the grid of the triode part of the same tube where it is amplified at audio frequencies and fed into the pentode output tube. A constant negative bias is provided on this diode by means of a cathode resistor which prevents detection of signal or noise unless the incoming signal is above a certain minimum value, thus providing the "squelcher" or "Q" circuit. This circuit, in combination with a manually operated sensitivity control (No. 32 on the diagram) makes it possible to eliminate objectionable noise when tuning between stations, resulting in interstation noise suppression.

Delayed A. V. C. is obtained thru the second diode section of the 55 tube, which is coupled to the first by a .001 mfd. condenser. However, this diode plate is about 15 volts negative with respect to the cathode, so that no rectification and consequently no A. V. C. action can take place in this circuit unless the incoming signal builds up to this value, which represents the minimum signal capable of giving full audio output. Consequently no fading will be noticed throughout the range where the A. V. C. has hold. Furthermore, any station not capable of producing full output in the speaker, is not further reduced in volume by the action of the A.V.C. circuit, as is the case in normal A.V.C., so that with delayed A.V.C. weak stations come in with much better volume and the effects of severe fading are greatly minimized.

ALIGNING THE 106 CHASSIS

Alignment can be carried out intelligently only if the service man knows the general layout of the set, and how each circuit is affected during the process of alignment. The simplified top view of the chassis appearing on the other side of this sheet gives the layout of the receiver and locations of the various aligning adjustments. The following brief discussion of what actually happens during alignment should be carefully read, using the sketch as a basis before commencing the actual work.

LOCATION AND FUNCTION OF ALIGNING ADJUSTMENTS

The incoming signal is tuned first by the radio-frequency stage and then fed into the first detector circuit, where it is tuned again to improve selectivity. These circuits are brought into exact alignment by the two trimmer condensers "A" and "B," pointed out in the attached sketch. The tuned oscillator circuit is so designed that it tunes to a frequency exactly 177.5 K.C. higher than the incoming signal. This circuit is kept in exact step by means of two adjustments, the oscillator condenser trimmer "O," and the padding condenser "P," which can be reached thru a small hole in the chassis base just in back of the "O" condenser.

THE "O" TRIMMER IS MAINLY EFFECTIVE AT THE HIGH FREQUENCY END OF THE DIAL, AND THE PADDING CONDENSER "P" AT THE LOW FREQUENCY END. The alignment routine which will be outlined takes this into consideration.

The two intermediate frequency (I.F.) transformers are of the tuned input,—tuned output type and each winding is tuned by a separate trimmer condenser, making a total of four additional adjustments. The first I.F. transformer is in the shield at the right side of the set, while the second I.F. transformer is at the rear of the chassis The I.F. trimmer adjusting screws can easily be reached thru two small holes at the top of each shield.

PRELIMINARY STEPS IN ALIGNING

In aligning the Model 106 it is essential to use a high grade oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. circuit to function, making correct alignment impossible. The output meter must be sufficiently sensitive to give a satisfactory reading with this low signal.

Before starting the alignment procedure see that the volume control and inter-station noise suppressor are full on, and the output meter connected either between the pentode plate and ground **thru a .25 mfd condenser** or across the voice coil, depending upon its sensitivity.

ALIGNING PROCEDURE

With this preliminary discussion clearly in mind, the actual alignment can be started. The following step-by-step routine should be followed for satisfactory results:

1. Set up the oscillator, and tune it to exactly 177.5 K.C. (This frequency can be accurately determined by tuning in a station at either 710 or 1420 K.C. and beating the 4th or 8th harmonic of the oscillator 177.5 K.C. signal against it. To be sure that you have the harmonic of the 177.5 K.C. signal, instead of some other frequency, tune in the other 177.5 harmonics on the broadcast dial. These should come in 177.5 K.C. on either side of the original setting. **Do not use the oscillator calibration curve to determine this intermediate frequency.**)

2. Connect the oscillator output across the grid clip of the first detector tube and ground.

3. Adjust the oscillator output to give about one-half full scale deflection of the output meter.

Adjusting the I. F. Circuits

1. Adjust all four I.F. trimmer condensers, in each case tuning carefully to make sure that maximum deflection is obtained on the output meter.

IT IS VERY IMPORTANT THAT ABSOLUTELY NO INWARD PRESSURE BE APPLIED TO THE ALIGNMENT TOOL, OR THE CONDENSER MAY SPRING BACK TO A DIFFERENT SETTING AS SOON AS THE TOOL IS REMOVED.

2. Go back and repeat all four adjustments since the adjustment of each I.F. trimmer affects the others to a certain extent, thus necessitating readjustment.

Adjusting R. F. and Oscillator Circuits

1. Twist the aerial and ground wires of the set together for their entire length to reduce noise pick-up. Connect the aerial wire to the output of the oscillator and **ground both set and oscillator.** Adjust the oscillator frequency to 1400 K.C. and carefully tune the receiver to give maximum output. Adjust the oscillator output to produce about one-half full scale deflection of the output meter.

2. Carefully tune the radio frequency stage "A" trimmer till the output meter reading reaches a maximum.

3. Retune the set and adjust the "B" first detector trimmer for maximum output. The oscillator, or "O" trimmer should not be touched unless the set is badly out of calibration at the high frequency end of the dial.

4. Set the oscillator at 600 K.C. and tune the set carefully to this frequency.

5. Adjust the oscillator padding condenser "P" for maximum output, **RETUNING THE SET AFTER EACH CHANGE IN ADJUSTMENT. This is important.**

6. Turn back the oscillator to 1400 K.C., tune the set to the same frequency, and very carefully readjust the "A" and "B" trimmer condensers to produce maximum output.

The receiver should now be perfectly aligned.

MODEL R-110 Series
Schematic, Voltage
Parts List, Socket

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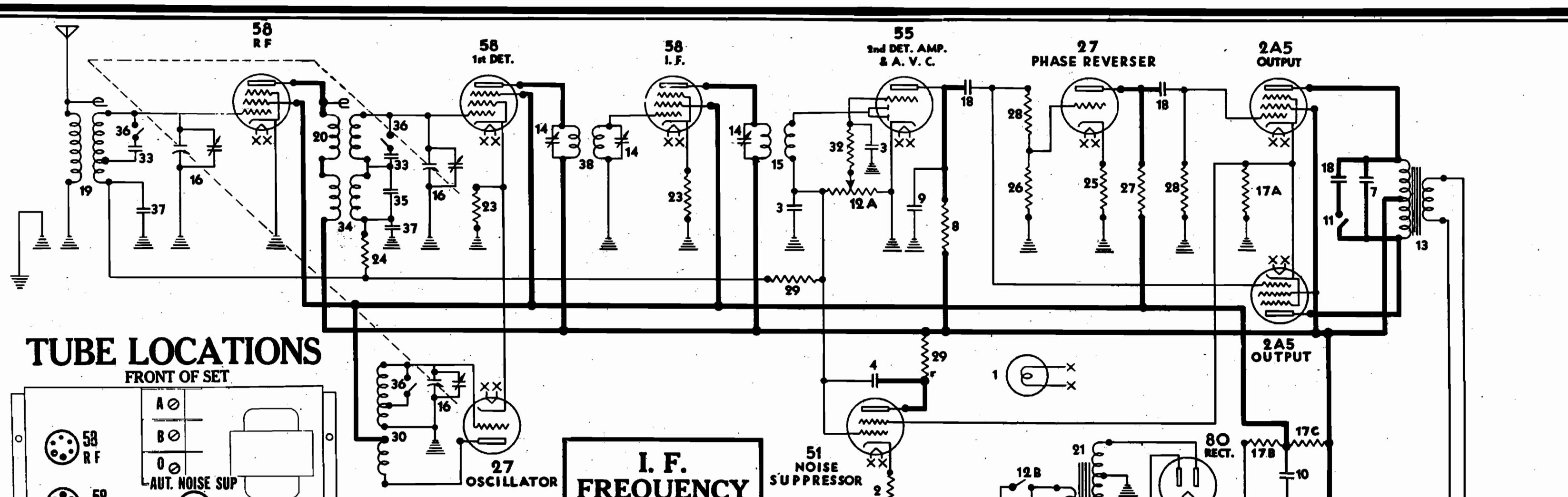
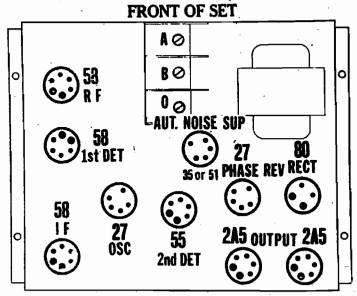


TUBE LOCATIONS

FRONT OF SET



NOTE. Model 110-B is 25 cycle receiver. Model 110-E is 230 volt, 60 cycle receiver. Suffix T identifies twin speaker model and F, phono.

VOLTAGE TABLE

LINE VOLTAGE 115 — VOLUME CONTROL FULL ON

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
58	R. F.	2.26	280	101	—0.1	0
58	1st. Det.	2.27	281	101	—0.1	5.7
58	I. F.	2.29	280	101	0	3.9
27	Osc.	2.32	101		0	5.7
55	2nd Det.	2.34	26.0		—0.1	0
51 or 35	Noise Suppressor	2.37	17.0	17	—0.1	1.1
27	Phase Reverser	2.36	35.0		0	2.8
2A5	Output	2.34	271	281	0	17.0
2A5	Output	2.33	272	281	0	17.0
80	Rectifier	4.95	353 Volts D. C. from Fil. to Ground			

—0.1 Volt from Diodes of 55 to Ground.

Speaker Field Voltage 72 Volts (Half of this across each field in twin speaker models.

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

R-110 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	67551	Pilot Light, 2½ volt, .5 amp.	$0.15
2	81151	4000 ohm ¼ watt resistor	.20
3	81157	.00025 mfd. condenser	.30
4	81158	.0001 mfd. condenser	.25
5	81274	Single speaker diaphragm assembly (Note: See 83045 for twin speaker)	2.75
6	81347	8 mfd. 475 volt Electrolytic condenser	1.75
7	81415	.002 mfd. 1000 volt condenser. (Used in twin speaker models only) (Note: See 83011 for single speaker sets)	.35
8	81810	110,000 ohm 1 watt resistor	.20
9	81812	.00051 mfd. condenser	.25
10	81901	8 mfd. 180 volt dry electrolytic cond.	1.20
11	81903	Tone control switch	.45
12A, 12B	81904	500,000 ohm volume control; Line switch — In one unit	1.25
13	81907	Single speaker output transformer (Note: See 83096 for twin speaker)	2.25
14	81940	I. F. trimmer condenser	.50
15	81947	2nd I. F. transformer coil	1.25
16	81988	Variable condenser	3.65
17A, 17B, 17C	83001	200 ohm 1.5 watt resistor; 10,000 ohm 1 watt resistor; 7500 ohm 5 watt resistor — In one unit	.75
18	83007	.02 mfd. 600 volt condenser. (For single speaker models) (Note: For twin speaker models see 83352)	.35
..	83011	.004 mfd. 600 volt condenser. (Used in single speaker models only.)	.30
19	83024	Antenna coil	1.00
20	83025	Detector coil	1.00
21	83028	115 volt 60 cycle power transformer (Note: See 83103 for 230 volt 50-60 cycle transformer.) (See 83416 for 115 volt 25 cycle transformer.)	6.00
..	83045	Twin speaker diaphragm and shell assem.	1.75
22	83071	Single speaker field coil (Note: See 83092 for twin speaker field coil)	2.25
23	83077	500 ohm 1 watt resistor	.25
24	83078	2000 ohm ¼ watt resistor	.20
25	83079	4000 ohm 1 watt resistor	.25
26	83080	51,000 ohm ¼ watt resistor	.20
27	83081	76,000 ohm ½ watt resistor	.25
28	83082	260,000 ohm ¼ watt resistor	.20
29	83083	1.1 meg. ½ watt resistor	.25
..	83092	Twin speaker field coil	2.25
30	83094	Oscillator tuning coil	1.00
..	83096	Twin speaker output transformer	2.25
..	83103	230 volt special tapped power transformer	7.00
31	83216	.02 mfd. 1000 volt condenser	.35
32	83286	21,000 ohm ¼ watt resistor	.20
33	83329	.0015 mfd. fixed condenser	.25
34	83339	Short wave detector coil	.75
35	83341	16 mmfd. special capacity	.15
36	83344	Short wave range switch	1.00
..	83352	.015 mfd. 600 volt condenser. (For twin speaker models only)	.35
37	83353	.05 mfd. 100 volt condenser	.30
38	83392	1st I.F. transformer coil	1.00
..	83416	115 volt 25 cycle power transformer	8.50

MISCELLANEOUS PARTS NOT ON DIAGRAM

Part No.	Description	List Price
67236	Rubber drive roller	$0.02
81413	Tuning knob	.25
81834	6-prong tube socket	.10
81837	4-prong tube socket	.15
81910	Tube shield	.15
81924	Pilot light socket and bracket	.15
81951	5-prong tube socket	.10
81974	Power cord and plug	.60
83049	Button for covering aligning condenser openings	.05
83064	Escutcheon plate	.30
83105	Dial and gear assembly	.50
83134	Speaker cable	.40
83248	Volume control knob	.20

STEWART - WARNER CORP.

SERVICE DATA FOR MODEL 110 CHASSIS

CIRCUIT DESCRIPTION

The Model 110 Stewart-Warner Radio Chassis is a ten tube Superheterodyne receiver embodying the following important features: (1) Push-pull Resistance Coupled Power Output Tubes; (2) Short Wave Band for the reception of 2500 and 1715 K. C. police calls; (3) Automatic Noise Suppression; and (4) Automatic Volume Control (A.V.C.).

The incoming signal is tuned and amplified by the R. F. amplifier tube to improve selectivity and sensitivity, and to reduce image frequency interference. It then goes to the tuned first detector stage where it beats with the output of the oscillator tube to produce a 177.5 K. C. intermediate frequency signal. This particular frequency is chosen to further improve the image frequency ratio.

The I. F. signal is amplified in a carefully-designed, high gain I. F. stage and is then rectified by the diodes of the 55 which are connected in parallel. This rectified signal appears across the 500,000 ohm potentiometer as an R.F. and A.F. D.C. voltage. Any desired portion of the audio voltage is selected by the moving arm of the potientiometer and impressed on the grid of the triode section which operates as an audio frequency amplifier. The potentiometer thus acts as a manual volume control.

The necessary A.V.C. operating potential is developed by virtue of the rectified radio frequency drop across the potentiometer resistance. This is smoothed out by a resistance-capacity filter and applied as a bias to the grids of the R.F. and first detector tubes. Thus as the incoming signal increases or decreases in strength the bias is raised or lowered proportionately and so the audio output is maintained at a constant value.

The automatic noise suppression is accomplished by the 51 tube which is connected to act as a variable capacity across the audio output of the detector. This lowers the high frequency audio response of the set as the signal strength decreases, and thus reduces the noise background which tends to increase as the incoming signal becomes weaker.

The 27 phase reversing tube makes it possible to use the output tubes in a resistance-coupled push-pull circuit which eliminates the distortion which would be produced by an input transformer, increases the low frequency response, and greatly improves the tone quality.

The phase reversal tube as used in the resistance-coupled push-pull circuit, functions as follows: By means of a voltage divider arrangement (resistances Nos. 26 and 28) a part of the audio output of the 55 is impressed on the grid of the 27, which then amplifies the signal, reverses the phase and applies it to the grid of one of the 2-A-5 output tubes. The other 2-A-5 receives its signal direct from the 55. Thus the two output tubes receive signals in opposite phase relation giving a true push-pull effect without the use of a transformer. By this method about 7 watts of undistorted power output are available with excellent tone quality.

Short wave reception is accomplished by shunting parts of the R.F. and detector coils by condensers, and by shorting out part of the oscillator coil.

ALIGNING THE 110 CHASSIS

Alignment can be carried out intelligently only if the service man knows the general layout of the set, and how each circuit is affected during the process of alignment. The simplified top view of the chassis appearing on the other side of this sheet gives the layout of the receiver. The following brief discussion of what actually happens during alignment should be carefully read, using the sketch as a basis before commencing the actual work.

LOCATION AND FUNCTION OF ALIGNING ADJUSTMENTS

R.F. alignment and calibration are accomplished by means of the three trimmer condensers located on the top of the variable condenser gang.

The first intermediate frequency (I.F.) transformer is a tuned-input, tuned-output type and each winding is tuned by a separate trimmer condenser. Looking at the chassis from the rear, these trimmer adjustment screws may be reached through holes in the left side of the chassis. In the second intermediate transformer, only the primary is tuned by a trimmer. This may be reached through a hole in the rear of the chassis. Each hole is covered by a flat metal button which may be pried out with a knife or small screwdriver.

PRELIMINARY STEPS IN ALIGNING

In aligning the Model 110 it is essential to use a high grade oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. circuit to function, making correct alignment impossible. The output meter must be sufficiently sensitive to give a satisfactory reading with this low signal.

Before starting the alignment procedure see that the volume control is full on, and the output meter connected either between the plates of the two 2-A-5 output tubes thru a .25 mfd. condenser or across the speaker voice coil, depending upon its sensitivity.

ALIGNING PROCEDURE

With this preliminary discussion clearly in mind, the actual alignment can be started. The following step-by-step routine should be followed for satisfactory results:

1. Set up the oscillator, and tune it to exactly 177.5 K.C. (This frequency can be accurately determined by tuning in a station at either 710 or 1420 K.C. and beating the 4th or 8th harmonic of the oscillator 177.5 K.C. signal against it. To be sure that you have the harmonic of the 177.5 K.C. signal, instead of some other frequency, tune in the other 177.5 harmonics on the broadcast dial. These should come in 177.5 K.C. on either side of the original setting. **Do not use the oscillator calibration curve to determine this intermediate frequency.)**
2. Connect the oscillator output across the grid cap of the first detector tube and ground.
3. Adjust the oscillator output to give about one-half full scale deflection of the output meter.

ADJUSTING THE I. F. CIRCUITS

1. Adjust all three I.F. trimmer condensers, in each case tuning carefully to make sure that maximum deflection is obtained on the output meter.

A Stewart-Warner phasing tool (No. T-79890, net price 75c) should be used for these adjustments. However a quarter inch (No. 4) Spintite socket wrench may be employed. It must be insulated by wrapping a piece of tape around it so that it will not short to the chassis because the plate trimmer adjusting nuts of the I.F. transformers are connected to B plus.

It is very important that absolutely no inward or sideward pressure be applied to the alignment tool, or the condenser may spring back to a different setting as soon as the tool is removed.

2. Go back and repeat all three adjustments since the adjustment of each I.F. trimmer affects the others to a certain extent, thus necessitating readjustment. Replace buttons covering trimmer holes to prevent tampering.

ADJUSTING THE R. F. AND OSCILLATOR CIRCUITS

1. Connect the aerial wire to the output of the oscillator and ground both set and oscillator. Adjust the oscillator frequency to 1400 K.C. and carefully tune the receiver to give maximum output. Adjust the oscillator output to produce about one-half full scale deflection of the output meter.
2. Carefully tune the radio frequency stage "A" trimmer till the output meter reading reaches a maximum.
3. **Retune the set** and adjust the "B" first detector trimmer for maximum output. The oscillator, or "O" trimmer should not be touched unless the set is badly out of calibration at the high frequency end of the dial.

Calibration can be checked by arranging a wire pointer above the condenser shaft center and then tuning in several stations of known frequency.

If the set is out of calibration, it can be re-calibrated as follows: Set the tuning dial at the frequency reading of some station between 1200 and 1500 kilocycles only, whose exact frequency is known and which can be picked up without any difficulty. Adjust the oscillator trimmer "O" until this station is brought in with maximum volume. Re-adjust the "A" and "B" trimmers again, since these are always affected by any change in the oscillator tuned circuit, taking care to retune the set between adjustments.

No adjustment is provided for aligning the set for the short wave band.

MODEL R-111, R-115
Schematic, Voltage Socket, Parts List

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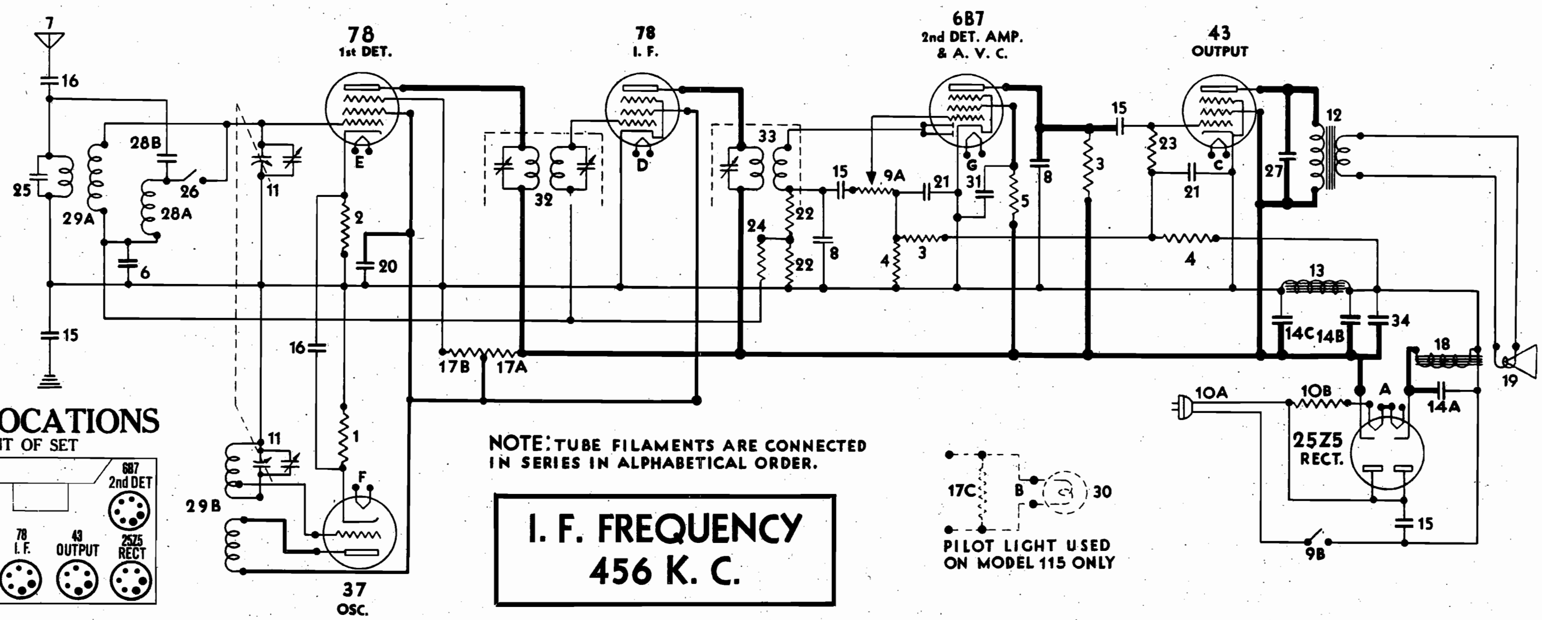


NOTE: TUBE FILAMENTS ARE CONNECTED IN SERIES IN ALPHABETICAL ORDER.

I. F. FREQUENCY
456 K. C.

TUBE LOCATIONS

FRONT OF SET

VOLTAGE TABLE

LINE VOLTAGE 115 A. C. — VOLUME CONTROL FULL ON

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
78	1st Det.	5.4	98	59	—0.4	5.8
37	Osc.	5.3	58		0	5.6
78	I. F.	5.7	98	59	—0.4	0
43	Output	20.	91	98	—2.9	0
25Z5	Rect.	22.	—21 —21			89 70 (Spkr.)
6B7	2nd Det.	5.4	21	37	—0.5	0

—0.4 Volt from Diode of 6B7 to Ground. Speaker field voltage 70. For a 115 Volts D.C. line the above voltages will be about 10 to 15% lower with the exception of the speaker field voltage which will be about 85 and the filament voltages which will be the same. The A.C. filament voltages will depend upon the meter range and resistance.

IMPORTANT

All D. C. voltages measured with respect to condenser frame, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltages.

R-111 AND R-115 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	67257	500 ohm 1/4 watt resistor	$0.25
2	81151	4000 ohm 1/2 watt resistor	.20
3	81161	250,000 ohm 1/2 watt resistor	.20
4	81381	150,000 ohm 1/2 watt resistor	.25
5	81509	500,000 ohm 1/4 watt resistor	.35
6	81630	.1 mfd. 100 volt paper condenser	.30
7	81671	Antenna wire ... per 100 ft.	.70
8	81812	.00051 mfd. mica fixed condenser	.25
9A 9B	81908	500,000 ohm volume control Line switch — In one unit	1.25
10A 10B	81942 83295	(Used in Model 111) (Used in Model 115) — Power cord and plug including filament series resistor	.85
11	81948	Two gang variable tuning condenser	2.50
12	81956	Output transformer on 217-A speaker	2.00
13	81958	Filter choke assembly	1.75
14A 14B 14C	81959	4 mfd. 13 mfd. 7 mfd. — 3 section 150 volt dry electrolytic condenser	2.80
15	83007	.02 mfd. 600 volt paper fixed condenser	.35
16	83011	.004 mfd. 600 volt paper fixed condenser	.30
17A 17B	83029	For Model 111 — 2500 ohm 1 watt res. 12500 ohm 1/2 watt res. — In one unit	.50
17A 17B 17C	83305	For Model 115 only — 2500 ohm 1 watt res. 12500 ohm 1/2 watt res. 20 ohm ballast res. — In one unit	.70
18	83042	Field coil and housing for 217-A speaker	2.75
19	83045	Diaphragm, voice coil, shell and spider assembly	1.75
20	83058	.25 mfd. 100 volt paper fixed condenser	.35
21	83063	.5 mfd. 100 volt paper fixed condenser	.45
22	83072	510,000 ohm 1/4 watt resistor	.20
23	83082	260,000 ohm 1/2 watt resistor	.20
24	83083	1.1 meg. 1/2 watt resistor	.25
25	83109	.0001 mfd. mica fixed condenser	.20
26	83179	Short wave switch	.30
27	83219	.01 mfd. 600 volt paper fixed condenser	.30
28A 28B	83254	Short wave coil Short wave coupling condenser — In one unit	.60
29A 29B	83255	Antenna coil Oscillator coil — In one unit	1.25
30	83278	Pilot bulb (6.3 volt). Used on Model 115 only	.15
..	83295	(For Model 115 only). Power cord and plug including filament series resistor. See part No. 81942 for Model 111	.85
..	83305	For Model 115 only — 2500 ohm 1 watt res. 12500 ohm 1/2 watt res. 20 ohm ballast res. (See Part No. 83029 for Model 111)	.70
31	83353	.05 mfd. 100 volt paper fixed condenser	.30
32	83385	1st I.F. transformer with trimmers	2.00
33	83386	2d I.F. transformer with trimmers	2.00
34	83394	12 mfd. 100 volt dry electrolytic condenser	1.30

MISCELLANEOUS PARTS NOT LISTED ON DIAGRAM

Part No.	Description	List Price
81824	Antenna reel	$0.25
81834	6-prong tube socket	.10
81841	Antenna reel clip	.02
81891	Knob (used on Models 1116-7-8)	.40
81909	Tube shield	.05
81949	7-prong tube socket	.10
81951	5-prong tube socket	.10
83245	Tuning escutcheon — Used on Models 1112-3-4	.10
83246	Volume control escutcheon — Used on Models 1112-3-4	.10
83280	Knob. (Used on Model 1111)	.20
83292	Knob. (Used on Model 1119)	.25
83296	Volume control escutcheon — Used on Model 115	.10
83297	Tuning escutcheon — Used on Model 115	.15
83299	Pilot light socket and bracket assembly. (Used on Model 115)	.15
83304	Knob. (Used on Model 115)	.25

STEWART - WARNER CORP.

SERVICE DATA FOR MODELS 111 AND 115 CHASSIS

CIRCUIT DESCRIPTION

The Models 111 and 115 Stewart-Warner Radio Chassis are identical except that the 115 has a pilot light inserted in the filament circuit. These models use a six-tube superheterodyne circuit employing automatic volume control (A.V.C.) through the action of the type 6-B-7 detector tube. They are designed for operation on 110-120 volt D.C. or 60 cycle A.C. power supplies. In addition to the regular broadcast band, these sets are designed to receive signals on the 175 and 120 meter police bands. In operation, the incoming signal is first passed to the tuned first detector circuit and then beats with the oscillator output to produce a 456 K. C. intermediate frequency signal.

The I.F. signal is amplified in an exceptionally high gain stage and then fed to the diodes of the 6-B-7 tube where it is rectified. The rectified current produces a modulated D.C. voltage drop across the two resistors No. 22. This audio modulation is impressed across the 500,000 ohm potentiometer. Any desired portion of the A.F. voltage is picked up by the moving arm of the potentiometer and applied to the grid of the 6-B-7 tube. The pentode section of the tube then acts as an A.F. amplifier. Good tone quality is made possible by the resistance-coupling and by the high power output of the 43 tube.

The necessary A.V.C. potential is taken from the mid-tap of the two resistors, No. 22, smoothed out by a resistance-capacity filter, and applied as a bias to the grids of the first detector and I. F. amplifier tubes. Thus as the incoming signal increases or decreases in strength, the bias is raised or lowered proportionally and the audio output of the set is maintained at a constant value.

ALIGNING THE 111 AND 115 CHASSIS

Alignment can be carried out intelligently only if the service man knows the general layout of the set, and how each circuit is affected during the process of alignment. The simplified top view of the chassis appearing on the other side of this sheet gives the layout of the receiver. The following brief discussion of what actually happens during alignment should be carefully read, using the sketch as a basis before commencing the actual work.

LOCATION AND FUNCTION OF ALIGNING ADJUSTMENTS

The first detector and oscillator circuits are aligned by the two trimmers, "A" and "O"; and are kept in exact step by the special shape of the rotor plates of the oscillator tuning condenser. This shaping of the plates makes it unnecessarv to use a padding condenser for low frequency alignment.

For the reception of police calls and other short wave signals, a switch, No. 26, shunts an additional coil (No. 28A) across the first detector tuned circuit, thus making it tune to higher frequencies. The constants are such that it tunes to exactly 456 K. C. ABOVE the oscillator frequency and thus a 456 K.C. I.F. signal is produced on the short waves with no change in the oscillator circuit.

The first intermediate frequency (I.F.) transformer is a tuned-input, tuned-output type and each winding is tuned by a separate trimmer condenser. In the second I.F. transformer only the primary is tuned by a trimmer.

The I.F. transformers are located under the chassis in the front and the trimmers may be reached through holes in the front of the chassis.

PRELIMINARY STEPS IN ALIGNING

In aligning the Models 111 and 115 it is essential to use a high grade oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. circuit to function, making correct alignment impossible. The output meter must be sufficiently sensitive to give a satisfactory reading with this low signal.

Before starting the alignment procedure see that the volume control is full on, and the output meter connected either between the 43 plate and **the frame of the tuning condenser** thru a .25 mfd condenser or across the voice coil, depending upon its sensitivity. **Do not hook the output meter to the chassis.**

ALIGNING PROCEDURE

With this preliminary discussion clearly in mind, the actual alignment can be started. The following step-by-step routine should be followed for satisfactory results:

1. A modulated oscillator having a fundamental frequency of 152, 228, or 456 K.C. is needed to align the 456 K.C. intermediate frequency trimmers. Do not use the oscillator calibration curve to determine the frequency but determine by checking against broadcast stations. With the oscillator set at 152 K.C., the third harmonic is used for aligning and the fifth harmonic is 760 K.C. Thus if a 760 K.C. station is tuned in, the oscillator can be accurately adjusted by beating its fifth harmonic with the station.

To be sure that you have the harmonic of the 152 K.C. signal, tune in the other harmonics on the broadcast dial. These should come in 152 K.C. on either side of the original setting. With a 228 or 456 K.C. oscillator a similar procedure can be followed using a 910 K.C. station. (The exact frequency to be used is 912 K.C. but 910 will be close enough).

2. Connect the oscillator output from the grid cap of the first detector tube to the **frame of the variable condenser.**
3. Adjust the oscillator output to give about one-half full scale deflection of the output meter.

ADJUSTING THE I. F. CIRCUITS

1. Adjust all three I.F. trimmer condensers, in each case tuning carefully to make sure that maximum deflection is obtained on the output meter. A screwdriver can be used for this operation on some sets but in others the first I.F. transformer has a double trimmer consisting of a slotted screw for one trimmer and a hex. nut around it for the other. If a suitable aligning tool is not available, we can furnish one, Part No. T-79800, priced at 50c net.

IT IS VERY IMPORTANT THAT ABSOLUTELY NO INWARD OR SIDEWARD PRESSURE BE APPLIED TO THE ALIGNMENT TOOL, OR THE CONDENSER MAY SPRING BACK TO A DIFFERENT SETTING AS SOON AS THE TOOL IS REMOVED.

2. Go back and repeat all three adjustments since the adjustment of each I.F. trimmer affects the others to a certain extent, thus necessitating readjustment.

ADJUSTING THE R. F. AND OSCILLATOR CIRCUITS

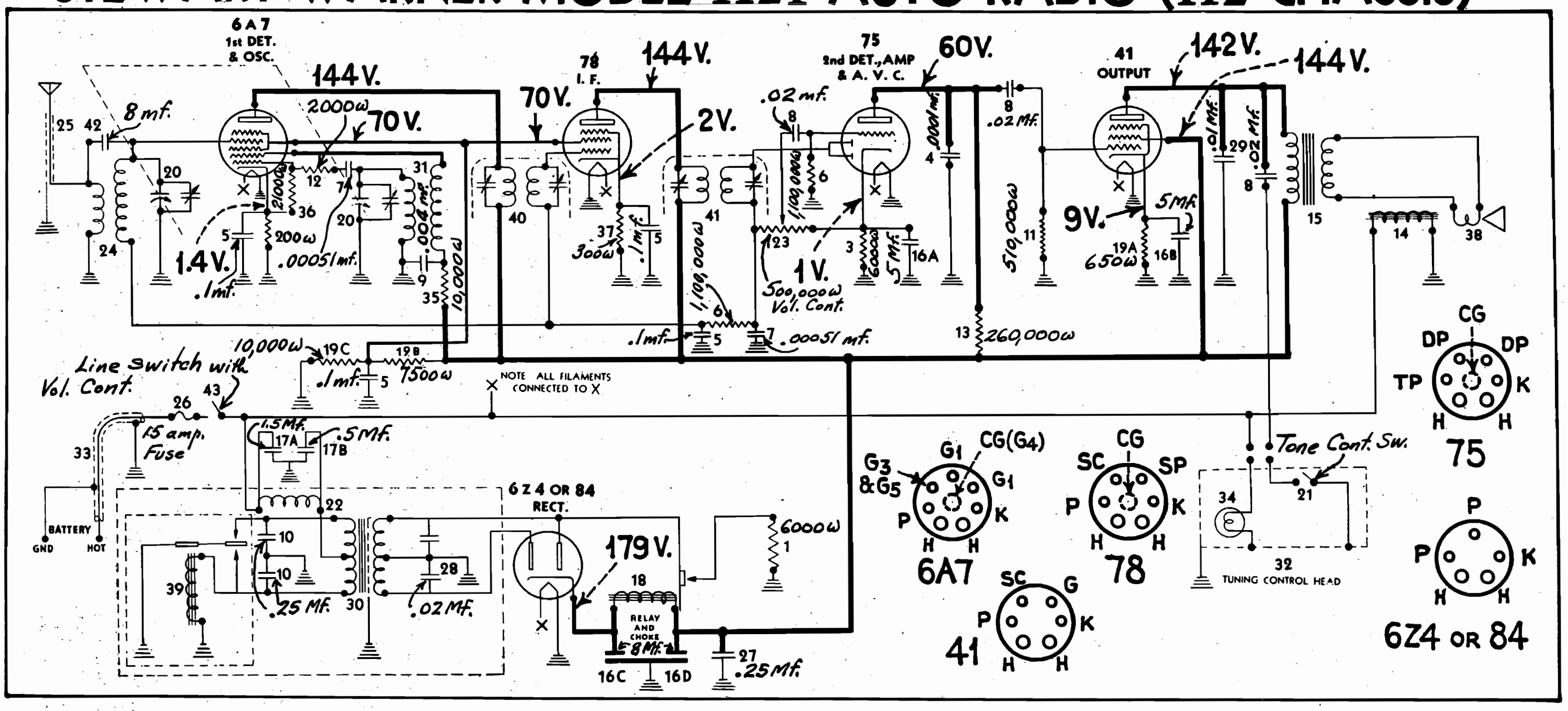
Connect the aerial wire to the output of the oscillator and connect both set and oscillator to ground through a condenser of .1 mfd. or more. **Do not omit this series condenser** because the set is directly connected to the 110 volt line. Adjust the oscillator frequency to 1400 K.C. and carefully tune the receiver to give maximum output. Adjust the oscillator output to produce about one-half full scale deflection of the output meter.

2. Adjust the "A" first detector trimmer for maximum output. The oscillator, or "O" trimmer should not be touched unless the set is out of calibration at the high frequency end of the dial.

MODEL 112 (1121)
Schematic, Voltage
Socket

STEWART - WARNER CORP.

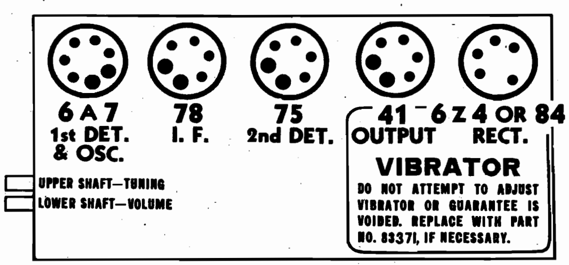
STEWART-WARNER MODEL 1121 AUTO RADIO (112 CHASSIS)



Battery Voltage 6.0	VOLTAGE TABLE			Volume Control Full On	
Tube Type	**Position in Circuit**	**Filament Voltage**	**Plate Voltage**	**Screen Grid Voltage**	**Cathode (Bias) Voltage**
6A7	1st Det. and Osc.	5.5	144	70	1.4
78	I. F.	5.5	144	70	2.0
75	2nd Det.	5.5	60	—	1.0
41	Output	5.5	142	144	9.0
84	Rect.	5.5	—	—	179

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltages.

TUBE LOCATIONS



FRONT OF SET

I. F. FREQUENCY 456 K. C.

MODEL 112,(1121)
Alignment
Notes

STEWART - WARNER CORP.

STEWART-WARNER SERVICE MANUAL
MODEL 1121 AUTO RADIO

CIRCUIT DESCRIPTION

The Model 1121 Stewart-Warner Auto Radio makes use of a five-tube superheterodyne circuit (chassis model R-112). The action of the set is as follows:

An incoming signal is fed to the 6 A 7 combination detector and oscillator, where it is amplified and its frequency is converted to 456 K. C. This 456 K. C. intermediate frequency signal is amplified by the 78 tube I. F. stage and fed to the diode section of the 75 tube where it is rectified. This rectified signal appears across the 500,000 ohm potentiometer (No. 23 in the diagram) as an audio voltage, any desired portion of which is picked up by the sliding arm of the potentiometer and fed to the triode section of the 75 tube, which functions purely as an A. F. amplifier. Thus the potentiometer is made to act as a volume control.

The necesary A.V.C. voltage is obtained by virtue of the rectified radio frequency drop across the potentiometer resistance. This potential is smoothed out by an appropriate resistance-capacity filter and applied as a bias to the grids of the first detector and I.F. tubes. Thus as the incoming signal increases or decreases in strength, the bias is raised or lowered proportionately and the audio output of the set maintained at a constant level.

The audio circuit is an extremely simple yet efficient one and needs no special explanation.

A unique and important feature of the Model R-112 Radio chassis is the protective relay (No. 12 in the diagram). When the set is first turned on, the relay is arranged to connect a load of 6000 ohms across one half of the high voltage winding of the transformer, thus holding down the voltage peaks to a safe value until the heater type tubes warm up and start drawing plate current. This plate current flows thru the relay, causing it to open the 6000 ohm load. Incidentally the field winding of the relay is used as a choke to filter the rectified B voltage.

ALIGNING THE R-112 CHASSIS

In aligning the Model R-112 Radio chassis it is essential to use a high grade oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. circuit to function, making correct alignment impossible. The output meter must be sufficiently sensitive to give a satisfactory reading with this low signal.

Before starting the alignment procedure see that the volume control is full on and the output meter connected either between the pentode plate and ground **thru a .25 mfd condenser** or across the voice coil, depending upon its sensitivity.

Now proceed with alignment as follows:

1. Set up the oscillator and tune it to 456 K. C. This frequency can be determined by tuning in a station at 910 K. C. and beating the second harmonic of the oscillator 456 K. C. signal against it. Altho this will give an I. F. of 455 instead of 456, the difference is negligible.

Do not use the oscillator calibration curve to determine this intermediate frequency.

If the oscillator cannot tune to 456 K. C., it may be set to 228 or 152 K. C. and either the second or third harmonic of this signal used.

2. Connect the oscillator output between the grid cap of the first detector tube and chassis.

3. Align the I. F. trimmer condensers located on the front of the chassis just below the speaker so as to produce the maximum output. In some chassis, instead of four separate trimmers, each I. F. transformer has a double trimmer adjustment, a slotted screw for one trimmer and a hex nut around it for the other. If a suitable aligning tool is not available, an aligning tool T-79800, priced at 50c net can be purchased from Stewart-Warner.

Calibrating and Aligning the R. F. Circuits

1. Turn the variable condensers of the chassis **all the way out of mesh.**
2. Connect the tuning dial drive and set the red arrow of the tuning control to the first mark below 15 on the dial (this represents 1550 K. C.).
3. Tune the set to 14 on the dial (this corresponds to 1400 K. C.).
4. Connect the test oscillator to the antenna lead of the set and adjust it accurately to 1400 K. C.
5. Carefully adjust the trimmer on the rear of the variable condenser until the 1400 K. C. signal is brought in with maximum output. This calibrates the set.
6. Adjust the front trimmer of the variable condenser for maximum output, taking care to retune the set several times during the adjusting process. The set is now in correct alignment and calibration.

Note: When installing the set in the car, it will be necessary to re-calibrate the tuning head, since any bending of the flexible control shafts changes the dial reading.

This is done after the installation is made in the car as follows:

1. Mount the tuning head with its shafts on the steering column or dash.
2. Turn the volume control shaft (the lower one on the set) all the way to the left until the switch clicks.
3. Lock the volume control knob by turning the key of the tuning head to the left and turning the left hand knob to the left until it locks in place.
4. Turn the variable condenser shaft (the upper one on the chassis) all the way out (to the right).
5. Set the arrow on the tuning head to the first mark below 15 on the dial (1550 K. C.).
6. Attach the flexible shafts to their respective controls, making sure that the small coupling is shoved as far onto the shaft as possible. Make sure the set screws are well tightened.
7. Mount the tuning dial bracket and tighten the set screws holding the shaft casings in place. The casings should be pulled out as far as possible, allowing just enough to project into the bushing on the mounting bracket, to be held by the set screw.

ELIMINATING VIBRATOR HASH

Occasionally an early production model 112 auto radio chassis may be found in which the vibrator creates electrical interference known as "vibrator hash". This type of interference is similar in character to that caused by the ignition system but can be readily distinguished from the latter since it is present **when the engine is not running.** Vibrator hash may be eliminated as follows:

1. Remove the chassis from the metal cabinet.
2. With a heavy soldering iron, solder the top of the transformer-vibrator housing to the sides, making sure that you run a complete ring of solder clear around all four sides. If the top cover is already soldered, the set is probably of later production.
3. Check to see that the bottom cover is soldered to the side at least at one point.

Special Instructions

Earlier production Model 1121 Auto Radio Receivers are somewhat more subject to motor interference than later sets. This condition can be rectified by:

(1) Shielding the pilot light and tone control lead running from the tuning control head to the set. Ordinary metal braiding may be used, altho our part 83382 shield, listing at 20c, will be found more satisfactory.

MODEL R-113, R-114
Schematic, Voltage

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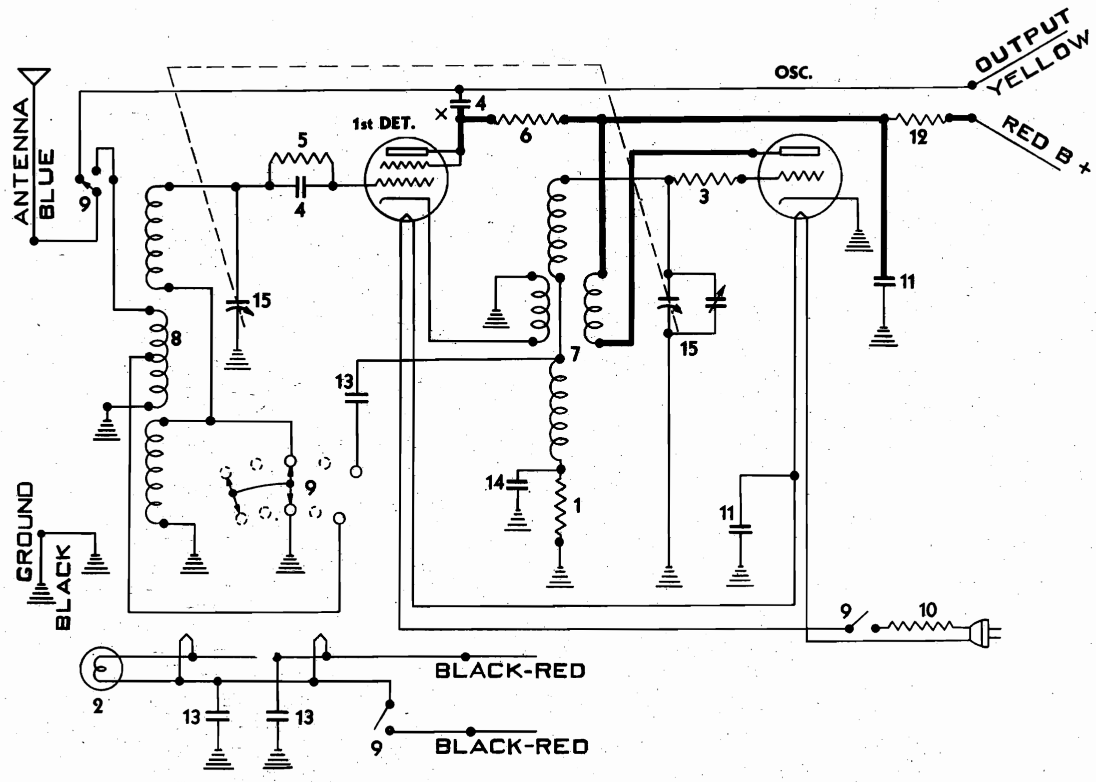


FILAMENT WIRING OF R-114

The Model R-113 Converter uses a 36 tube as first detector and a 37 oscillator. Model R-114 uses a 57 first detector and a 56 oscillator.

NOTE: The upper circuit diagram is that of the R-113. In the R-114, the filament circuit only is different, and is wired as shown in the lower diagram. In addition, a 6000 ohm carbon resistor, No. 67580 is inserted in series with the detector plate coupling condenser No. 4, at the point marked "X".

See Instruction Booklet for further information.

VOLTAGE TABLE

Plate Supply Voltage	1st Detector Plate Voltage	Oscillator Plate Voltage
170	14	59
210	16	70
250	19	83
270	20	89

The voltages are measured between the tube socket terminals and chassis, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for the detector voltage. The filament voltage readings of the 113 will also be dependent upon the type of meter used, but will be from 5.0 to 6.0 volts. The filament voltage of the Model 114 will be about 2.2 when used with a Model 110 Stewart-Warner broadcast set.

R-113-114 PARTS LISTS

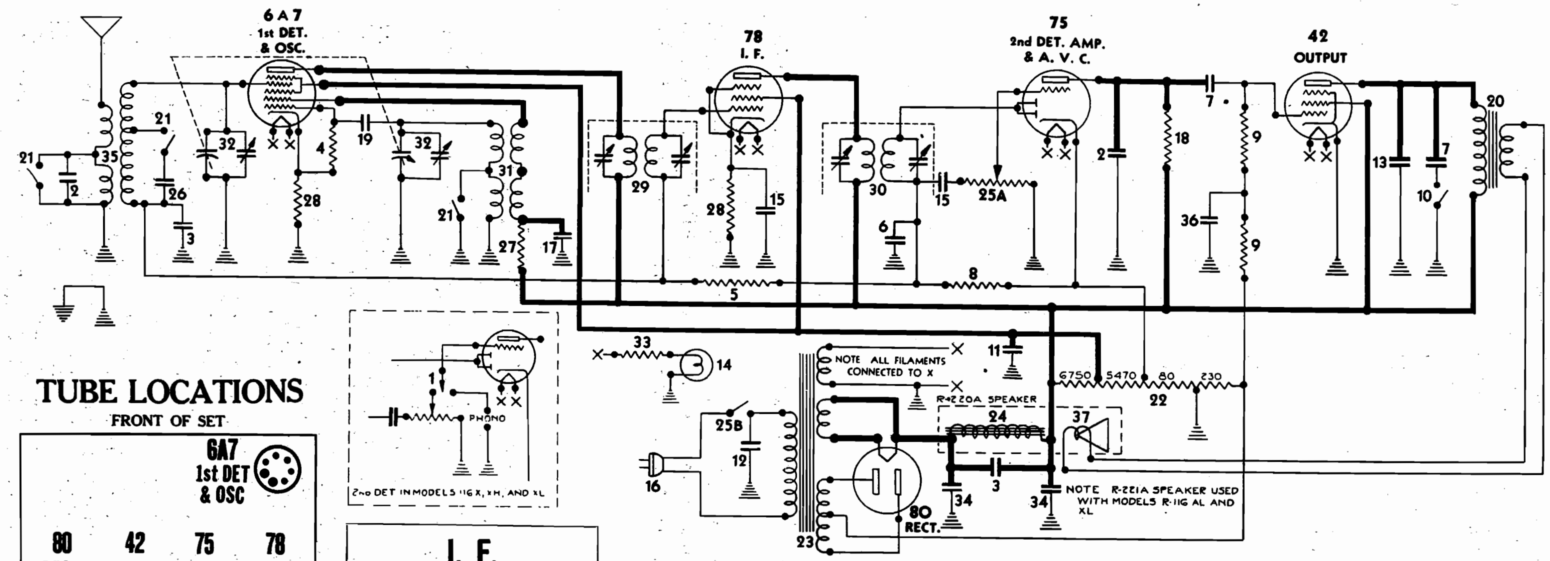
Dia. No.	Part No.	Description	Price
1	67259	45,000 ohm, 1/4 watt Carbon Resistor	$0.25
2	67551	2½ volt Pilot Bulb (Used in Model 114 only	.15
	67580	6000 ohm, 1/4 watt Carbon Resistor (Used in Model 114 only)	.25
3	67981	400 ohm, 1/4 watt Carbon Resistor	.25
4	81158	.0001 Mica Fixed Condenser	.25
5	81644	2.1 megohm, 1/4 watt Carbon Resistor	.20
6	81810	110,000 ohm, 1 watt Carbon Resistor	.20
7	81985	Oscillator Coil	1.00
8	81991	Antenna Coil	1.00
9	81994	Three Section Range and Filament Switch	1.50
10	83003	Power Cord and Plug including 315 ohm Filament Series Resistor (Used in Model 113 only)	.65
11	83007	.02 mfd. 600 volt Fixed Condenser	.35
12	83014	26,000 ohm, 2 watt Carbon Resistor	.35
13	83015	.01 mfd. 200 volt Mica Fixed Condenser	.65
14	83016	.00055 mfd Mica Fixed Condenser	.15
15	83017	Two gang Variable Condenser	2.50

MISCELLANEOUS PARTS NOT ON DIAGRAM

Part No.	Description	Price
67282	Escutcheon	.25
67532	Dial Drive Rubber Roller	.02
81413	Tuning Knob	.25
81834	6 prong Tube Socket (Model 114 only)	.10
81951	5 prong Tube Socket	.10
83019	Pilot Light Socket and Bracket	.20
83104	Range Switch Knob	.25

MODEL R-116
Schematic, Voltage
Socket, Parts List

STEWART - WARNER CORP.



TUBE LOCATIONS

FRONT OF SET

6A7 1st DET & OSC

80 RECT — 42 OUTPUT — 75 2nd DET — 78 I F

I. F. FREQUENCY 456 K. C.

VOLTAGE TABLE

Line Voltage 115 A. C. — Volume Control Full On

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
6A7*	1 Det & Osc.	6.15	240	90	0	2.7
78	I. F.	6.15	240	90	0	2.4
75	2nd Det.	6.15	110		0	1.3
42	Output	6.15	227	240	-1.5†	0
80	Rect.	5.0	320 Volts D. C. From Filament to Ground			

* Oscillator plate voltage, 130; Oscillator grid voltage, —7.5.

† Actual bias voltage on type 42 tube is 17.0 volts measured across 230 ohm section of voltage divider.

Speaker field voltage, 85.

All D. C. voltages are to be measured with respect to ground, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

Readings taken with set analyzers will be different because such instruments generally measure voltages with respect to cathode instead of ground.

R-116 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	73689	Phonograph Switch (Used in R-116X, XL, and XH)	$1.00
2	81158	.0001 Mfd. Mica Fixed Condenser	.25
3	81630	.1 Mfd. 100 volt Fixed Condenser	.30
4	81681	29,000 ohm, ¼ watt Carbon Resistor	.20
5	81682	1.1 megohm, ¼ watt Carbon Resistor	.20
6	81812	.00051 mfd. Mica Fixed Condenser	.25
7	83007	.02 Mfd. 600 volt Fixed Condenser	.35
8	83072	510,000 ohm, ¼ watt Carbon Resistor	.20
9	83082	260,000 ohm, ¼ watt Carbon Resistor	.20
10	83179	Tone Control Switch	.30
11	83214	.25 mfd. 250 volt Fixed Condenser	.30
12	83216	.02 mfd. 1000 volt Fixed Condenser	.35
13	83219	.01 mfd. 600 volt Fixed Condenser (Used in models R-116-AL and XL only. See No. 83352 for R-116-A, AH, X and XH)	.30
14	83278	6.3 volt Pilot Light Bulb	.15
	83352	.015 mfd. 600 volt Fixed Condenser (Used in Models 116A, AH, X, and XH only)	.35
15	83353	.05 mfd. 100 volt Fixed Condenser	.30
16	83406	Power Cord and Plug	.50
17	83440	.1 mfd. 400 volt Fixed Condenser	.35
	83455	Diaphragm and Shell Assembly (for R221A Speaker used in Models R-116AL and XL)	2.75
18	83538	260,000 ohm, 1 watt Carbon Resistor	.25
19	83539	.00026 mfd. Mica, Fixed Condenser	.25
20	83541	Output Transformer for R-220A Speaker (Used in Models R-116 A, AH, X and XH. See No. 83625 for R-116, AL and XL)	2.00
21	83542	Range Switch	1.00
22	83543	6750-5470-80-230 ohm Voltage Divider	1.00
23	83544	Power Transformer, 115 volts, 60 cycles. (Used in R-116A, AH, and AL only. See No. 83620 for 115-250 volt, 25-60 cycle)	4.25
24	83548	Field Coil and Housing for R-220A Speaker. (Used in R-116A, AH, X, and XH. See No. 83635 for R-221A Speaker Field Coil	2.50
25-A, 25-B	83551	500,000 ohm Volume Control, Line Switch — In one unit	1.25
26	83554	.0011 mfd. Mica Fixed Condenser	.25
27	83555	21,000 ohm, 1 watt Carbon Resistor	.25
28	83556	310 ohm, ¼ watt Carbon Resistor	.20
29	83557	1st I. F. Transformer Complete	1.75
30	83558	2nd I. F. Transformer Complete	1.75
31	83559	Oscillator Coil	1.25
32	83565	Variable Condenser	2.50
33	83566	10 ohm Wire Wound Resistor	.25
34	83613	8 mfd. 440 volt Dry Electrolytic Condenser	1.65
	83620	Power Transformer, 115-250 volts 60 cycles. (Used in Models R-116X, XH, XL)	6.00
	83625	Output Transformer for R-221A Speaker. (Used in Models R-116AL and XL only)	2.00
35	83631	Antenna Coil	1.50
36	83632	.5 mfd. 100 volt Fixed Condenser	.40
	83635	Field and Hum Bucking Coils (for R-221A Speaker used in R-116 AL and XL)	2.50
37	83662	Diaphragm and Shell Assembly for R-220A Speaker. (Used in R-119A, AH, X and XH only. See No. 83455 for R-221A Speaker)	2.50

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

Part No.	Description	List Price
83447	Range Switch Knob	.10
83470	Speaker Cable (Used in R-116 AL and XL)	.50
83560	Tube Shield	.15
83574	Pilot Light Socket and Bracket	.15
83577	Escutcheon (Used in R-1161 and R-1162)	.35
83579	Knob for R-1161-2-3-4	.25
83580	Dial & Bushing (Used in R-116A,AL,X,&XL	.45
83581	Volume Control Dial and Bracket (Used in R-116A, AL, X, and XL	.12
83590	Volume Control Dial and Bracket (Used in R-116AH and XH)	.12
83593	Escutcheon (Used in R-1163-A)	.35
83603	Dial and Bushing (Used in R-116AL & XL)	.45
83637	Escutcheon (Used in R-1165)	.35
83638	Knob for Model R-1165	.30
R-220A	Dynamic Speaker (6 inch used in Models R-116A, AH, X, and XH)	6.25
R-221A	Dynamic Speaker (8 inch used in Models R-116L and XL)	7.00

STEWART - WARNER CORP.

SERVICE DATA FOR MODEL R-116 CHASSIS

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-116 chassis uses a five-tube superheterodyne circuit. The incoming signal goes to the tuned first detector circuit and then beats with the oscillator output to produce a 456 K. C. intermediate frequency signal. This particular frequency is chosen to prevent image frequency interference.

The 456 K. C. signal is amplified by a high-gain I. F. stage and is then rectified by the diodes of the 75 tube which are connected in parallel. The audio component of the rectified signal is impressed across the 500,000 ohm potentiometer through condenser No. 15. The volume is controlled by selecting any desired portion of the A. F. voltage with the moving arm of the potentiometer which is connected to the grid of the 75 tube. The triode section of this tube acts as a high-mu audio amplifier, resistance-coupled to the type 42 output tube. This method of coupling produces excellent tone quality.

The necessary A. V. C. operating voltage is secured by smoothing out the modulated drop across resistor No. 8 by a resistance-capacity filter consisting of resistor No. 5 and condensers No. 3 and 6, and applying the voltage to the grids of the 6A7 and 78 tubes. Thus the bias of these tubes increases and drops in proportion to the strength of the received signal and tends to maintain the audio output at a practically constant value.

For the reception of short wave signals, portions of the antenna coil primary and the oscillator grid coil are shorted and a condenser is connected across part of the antenna coil secondary. This reduces the inductance of the coils and thus permits tuning to higher frequencies.

The R-116 A, H, and L are designed for operation on 115 volt 60 cycle power circuits while the R-116 X, XH, and XL are adaptable for use with voltages of 115, 125, 230, 240, or 250 at any frequency from 25 to 60 cycles. To permit this flexibility of operation, the power transformer has two separate tapped primaries. The connections for the various line voltages are shown on the tag attached to the transformer. All X models are also wired for operation with a high impedance phonograph pick-up. The R-116 AL and XL chassis are used in console cabinets with 8 inch speakers. The others are used in table models with 6 inch speakers.

ALIGNING THE R-116 CHASSIS

Before attempting to align a set, the service man should remove the chassis from the cabinet and become familiar with the general layout and with the function and location of the various alignment trimmers. The following discussion briefly explains how each circuit is affected during the various steps of alignment.

The first detector and oscillator circuits are aligned by the two trimmers located on the two-gang variable condenser and are kept in exact step by the special shape of the rotor plates of the oscillator section. This shaping of the plates makes it unnecessary to use a padding condenser for low frequency alignment.

The I. F. transformers, located on the top of the chassis in front of the 75 and 78 tubes, are the tuned-input, tuned-output type, with each winding tuned by a separate trimmer condenser. The four I. F. adjustments are reached through holes in the tops of the I. F. transformer shields.

PRELIMINARY STEPS

A high-grade modulated oscillator and a sensitive output meter are necessary for correct alignment of the Model R-116 receiver. It must be possible to reduce the oscillator output to a very low value or the signal will cause the A. V. C. circuit to function making it difficult to secure exact alignment. The output meter must be sufficiently sensitive to give a satisfactory reading with the low signal.

All aligning adjustments should be made with the **volume control full on but with no broadcast signal being received.** The output meter should be connected between the plate of the 42 and the chassis through a .25 mfd. condenser or across the speaker voice coil, depending upon the type used.

ALIGNING PROCEDURE

The step-by-step routine given below should be carefully followed after reading the preceding instructions.

1. The modulated oscillator should be tuned to a frequency of 152, 228, or 456 K. C. to align the 456 K. C. I. F. amplifier. **Do not use the oscillator calibration curve to determine this frequency but check the oscillator** harmonics against broadcast stations which are required to be on their assigned frequency. First check the accuracy of the broadcast dial by noting whether stations come in at the correct setting. With the oscillator set at 152 K. C., the third harmonic is used for aligning while the fifth harmonic can be tuned in on the broadcast dial. It should come in at exactly 760 K. C.

To be sure that you have the harmonic of the 152 K. C. signal, tune in the other harmonics on the broadcast dial. These should come in 152 K. C. on either side of the original setting. With a 228 or 456 K. C. oscillator signal a similar procedure can be followed using 910 K. C. (The exact frequency to be used is 912 K. C. but 910 will be satisfactory.)

2. Connect the oscillator output from the grid cap of the 6A7 to chassis. Turn the tuning condenser of the set to some point where it has no effect upon the signal strength.

3. Adjust the oscillator output to give about one-half full scale deflection of the output meter.

ADJUSTING THE I. F. CIRCUIT

1. Adjust all four I. F. trimmer condensers, in each case tuning carefully to make sure that maximum deflection is obtained on the output meter. It is desirable to use an all-bakelite screw driver for this purpose although one with a small metal point may be used.

No inward or sideward pressure should be applied to the alignment tool, or the condenser may spring back to a different setting as soon as the tool is removed.

2. Go back and repeat all four adjustments since the changing of each I. F. trimmer affects the others to a certain extent, thus necessitating readjustment.

ADJUSTING R. F. AND OSCILLATOR CIRCUITS

1. Connect a .0001 mfd. condenser from the blue aerial wire to the output of the oscillator, and ground both set and oscillator. Adjust the oscillator frequency to 1400 K. C. and carefully tune the receiver to give maximum output. Set the oscillator output to produce about half-scale deflection on the output meter.

2. Carefully adjust the 1st detector trimmer which is the front one on the gang, to give a maximum output meter reading. Retune the set and again adjust the trimmer. The rear section which tunes the oscillator, should not be touched unless the set is out of calibration at the high frequency end of the dial.

If the set is out of calibration it can be re-calibrated as follows: Disconnect the test oscillator, connect an aerial and set the tuning dial at the frequency reading of some broadcast station between 1000 and 1500 K. C., whose exact frequency is known and which can be picked up without any difficulty. Adjust the oscillator trimmer (rear) until this station is brought in with maximum volume. Re-connect the modulated oscillator and output meter and again adjust the front trimmer for maximum output meter reading. This is necessary because the first detector circuit is always affected by any change in the oscillator tuned circuit.

HUM AND NOISE ELIMINATION

Hum in early R-116 table model chassis may be reduced by reversing the two speaker field coil leads. This may be done underneath the chassis where these leads connect to the two electrolytic condensers. The green field coil lead should go to the front electrolytic condenser, and the white lead to the rear electrolytic. Later production chassis already have the connections made in this way. All console model chassis are already wired for least hum with the white lead connected to the front electrolytic and the green to the rear electrolytic.

Excessive hum may also be due to the fact that the A. C. line lead is too close to the .05 mfd. 100 volt condenser No. 15 which is hooked in series with the volume control. The remedy is to separate the two as far as possible.

Another cause of hum is poor contact at the grounding lug of the voltage divider. This may be caused by the grounding screw being loose or may be at the point where the resistance wire is soldered to the terminal strap on the resistor. To eliminate hum from this cause, first tighten the grounding screw and solder to the chassis. If the hum continues, the 230 ohm negative end of the voltage divider should be replaced by a **230 ohm wire wound** resistor. The two wires connected to the negative end of the voltage divider should be unsoldered and hooked to one end of the new resistor. The other end should be soldered to ground, preferably to the lug located just below the short wave switch.

Intermittent or noisy operation especially noticeable when the dial is turned or when the variable condenser is jarred, is frequently caused by metal particles shorting the variable condenser. This trouble can be eliminated by cleaning with a blast of air or by running a pipe cleaner between the plates.

MODEL R-119
Schematic, Voltage Socket, Parts List

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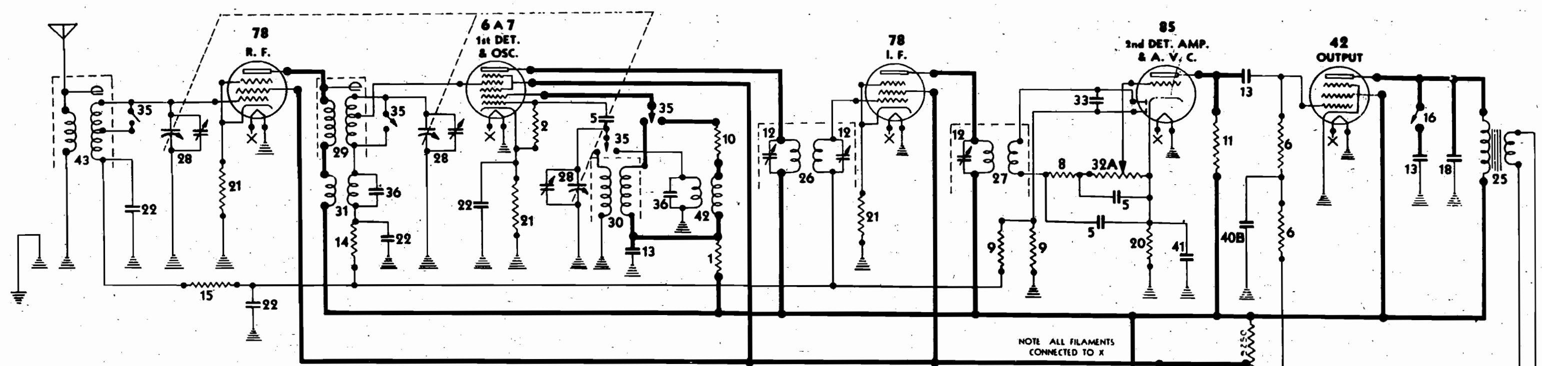
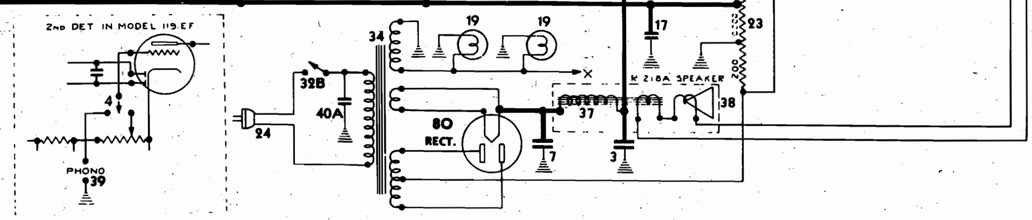
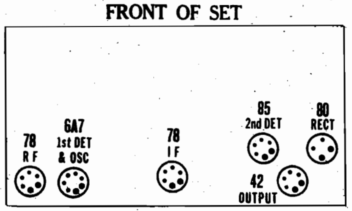



TUBE LOCATIONS
FRONT OF SET



I. F. FREQUENCY 177.5 K. C.

VOLTAGE TABLE

Line Voltage 115 A.C. — Volume Control Full On

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
78	R. F.	6.1	260	104		3.2
6A7*	1 Det. & Osc.	6.1	260	104		3.0
78	I. F.	6.1	260	104		3.0
85	2nd Det	6.1	50	—		17.5
42	Output	6.1	247	260	-1.8†	0
80	Rectifier	5.1	320 Volts D. C. From Filament to Ground			

* Oscillator plate voltage 175; Oscillator grid voltage -5.
† Actual bias on 42 tube is 17.3 volts measured across 200 ohm section of voltage divider.

Speaker Field Voltage, 60.

All D. C. voltages are to be measured with respect to ground, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variatic is most marked for the second detector plate voltage. Readings taken with set analyzers will be different because such instruments generally measure voltages with respect to cathode.

R-119 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	67100	20,000 ohm, 1 watt Carbon Resistor	$0.25
2	67301	75,000 ohm, 1/4 watt Carbon Resistor	.25
3	67328	8 Mfd. 440 volt, Wet Electrolytic Condenser	1.75
4	73689	Phonograph Switch (Note: Used in Models R-119 EF only)	1.00
5	81157	.00025 Mfd. Mica Fixed Condenser	.30
6	81161	250,000 ohm, 1/2 watt Carbon Resistor	.20
7	81347	8 Mfd. 485 volt Wet Electrolytic Condenser	1.75
8	81681	29,000 ohm, 1/4 watt Carbon Resistor	.20
9	81682	1.1 Megohm, 1/4 watt Carbon Resistor	.20
10	81727	1000 ohm, 1/4 watt Carbon Resistor	.20
11	81810	100,000 ohm, 1 watt Carbon Resistor	.20
12	81940	I. F. Trimmer Condenser	.50
13	83007	.02 Mfd. 600 volt Fixed Condenser	.35
14	83078	2000 ohm, 1/4 watt Carbon Resistor	.20
15	83081	76,000 ohm, 1/2 watt Carbon Resistor	.25
16	83179	Tone Control Switch	.30
17	83214	.25 Mfd. 250 volt Fixed Condenser	.30
18	83219	.01 Mfd. 600 volt Fixed Condenser	.30
19	83278	6.3 volt Pilot Light Bulb	.15
20	83285	10,000 ohm, 1/2 watt Carbon Resistor	.25
21	83293	300 ohm, 1/4 watt Carbon Resistor	.25
22	83353	.05 Mfd. 100 volt Fixed Condenser	.30
23	83398	9250-10,000-200 ohm Voltage Divider	1.00
24	83406	Power Cord and Plug	.50
25	83408	Output Transformer	2.75
26	83410	1st Intermediate Transformer Coil	1.25
27	83412	2nd Intermediate Transformer Coil	1.25
28	83413	3 gang Variable Condenser	3.75
29	83418	Broadcast 1st Detector Coil	1.25
30	83419	Broadcast Oscillator Coil	.75
31	83420	Short-Wave 1st Detector Coil	.75
32-A / 32-B	83424	500,000 ohm Volume Control / Line Switch (In one unit)	1.30
33	83436	.002 Mfd. 1000 volt, Fixed Condenser	.25
34	83442	Power Transformer, 115 volt, 60 cycle (Note: See No. 83469 for 25-60 cycle 115-250 volt Transformer used in Model R-119EF)	5.75
35	83444	Range Switch (4 sections)	1.00
36	83448	25 Mmfd. Fixed Condenser	.10
37	83454	Speaker Field and Humbucking Coil As'mbly	2.50
38	83455	Diaphragm, Voice Coil, Spider and Shell Assembly	2.75
39	83463	Terminal Strip (Used in Model R-119EF only)	.15
	83469	Power Transformer, 115-250 volts, 25-60 cycles (Note: Used on Model R-119-EF only)	9.00
40-A / 40-B	83476	.02 Mfd. 1000 volt Fixed Condenser / .5 Mfd. 100 volt Fixed Condenser (In one unit)	.75
41	83537	10 Mfd. 25 volt Electrolytic Condenser	.75
42	83599	Short Wave Oscillator Coil	.75
43	83602	Antenna Coil	1.00

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

Part No.	Description	List Price
67236	Rubber Drive Roller	.02
81834	6 prong Tube Socket	.10
81837	4 prong Tube Socket	.15
81941	Tube Shield	.20
81949	7 prong Tube Socket	.10
83049	Button for covering trimmer holes	.05
83405	Pilot Light Bracket and Socket	.20
83458	Pilot Light Socket and Volume Control Dial	.30
83460	Dial and Gear	.55
83461	Escutcheon for Models R-1191-2-3	.30
83497	Knob for Model R-1191-2	.20
83505	Knob for Model R-1193	.20
R-218A	Dynamic Speaker (8 inch)	6.75

STEWART - WARNER CORP.

SERVICE DATA FOR MODEL R-119 CHASSIS

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-119 Chassis is a six-tube super-heterodyne. It will cover the broadcast and short wave ranges from 530 to 3750 K. C. The tuning dial is calibrated from 530 to 1740 K. C. and a short wave range is provided through a switch on the back of the chassis, for reception up to 3750 K. C. (80 meters).

The R-119A Chassis is designed for operation on 115 volt, 60 cycle power circuits while the R-119EF is adaptable for use with voltages of 115, 125, 230, 240, or 250 at any frequency from 25 to 60 cycles. To accomplish this, the power transformer has two separate tapped primaries. The method of connecting these primaries is shown on a tag attached to the chassis. The R-119-EF chassis is wired for operation with a high impedance phonograph pick-up.

In the R-119A and EF chassis, the incoming signal is amplified by a stage of tuned radio frequency to improve selectivity and sensitivity, and to prevent image frequency interference. It then goes to the 6-A-7, first detector and oscillator, where its frequency is converted to 177.5 K. C.

The 177.5 K. C. intermediate frequency signal is amplified by the high gain I. F. stage, and is then rectified by the diodes of the 85 tube. Detection is accomplished by the diode connected directly to the I. F. transformer. A modulated D. C. voltage drop is produced across the 500,000 ohm potentiometer by the rectified current. The volume is controlled by selecting any desired portion of the A. F. voltage with the moving arm of the potentiometer which is connected to the grid of the 85 tubes. The triode section of this tube acts as an audio amplifier and is resistance-coupled to the 42 output tube.

Delayed A. V. C. is obtained by using the voltage drop produced by the rectified current of the second diode of the 85 tube, for bias on the 78 and 6A7 tubes. This diode, which is coupled to the I. F. transformer by a .002 mfd. condenser, is 17.5 volts negative with respect to the cathode since it is biased by the cathode bias resistor. Consequently, no rectification and no A. V. C. action can take place in this circuit until the incoming signal is strong enough to exceed this value. This represents the minimum signal capable of giving full audio output. Through the use of the delayed A. V. C. any signal which cannot be amplified to this minimum value is not reduced in volume by the action of the A. V. C. circuit.

Short wave reception is accomplished by shorting a portion of the antenna coil, shorting the secondary of the broadcast r. f. coil so that only the short-wave r. f. coil is active, and by switching in a short wave oscillator coil. These operations are performed by a single two-position switch located on the back of the chassis.

ALIGNING THE R-119 CHASSIS

Before attempting to align a set, the service man should become familiar with the general layout of the chassis and with the function and location of the various trimmer condensers. The following discussion briefly explains the action of each alignment step.

R. F. alignment and calibration are accomplished by the three trimmer condensers located on the top of the variable condenser gang. The oscillator is kept in exact step with the other R. F. circuits by the special shape of the stator plates in the oscillator tuning section.

Both windings of the first I. F. transformer are tuned but only the plate coil (primary) of the second I. F. transformer is tuned. The three I. F. tuning trimmers are mounted on the rear of the chassis and may be reached through holes which are covered with flat metal buttons. The buttons may be pried out with a knife or screw-driver.

EQUIPMENT AND PRELIMINARY STEPS

A good modulated oscillator and an output meter are essential for proper alignment. The attenuator on the oscillator must be capable of reducing the signal to a low value because the A. V. C. will function if the signal is too strong and thus make correct alignment impossible. The output meter must be sensitive enough to give a satisfactory reading with this low signal.

The output meter should be connected from the plate of the 42 tube to ground through a .25 mfd. condenser or across the speaker voice coil, depending upon the type used.

All alignment adjustments should be made with the volume control **full on** but with **no broadcast signal being received.**

ALIGNING THE I. F. CIRCUITS

An insulated, ¼ inch socket wrench is needed for I. F. alignment since two of the trimmers are connected to B plus. A Stewart-Warner phasing tool (No. T-79890, net price 75c) should be used although a Spintite wrench insulated with tape so that it will not short to the chassis, can be employed.

The step-by-step routine given below should be carefully followed after reading the preceding instructions:

1. The modulated oscillator must be tuned **exactly to 177.5 K. C.** This frequency can be acurately determined by checking the oscillator harmonics against broadcast stations. First check the accuracy of the broadcast dial, and then tune in either the fourth or eighth harmonic of the 177.5 K. C. signal. If they come in at exactly 710 or 1420 K. C. the oscillator frequency is correct. To be sure that you have the harmonic of a 177.5 K. C. signal instead of some other frequency, tune in the other 177.5 K. C. harmonics on the broadcast dial. These should come in 177.5 K. C. on either side of the original setting. **Do not use the oscillator calibration curve to determine this intermediate frequency.**

2. Connect the oscillator output across the 6-A-7 grid cap and ground.

3. Set the oscillator output to give about half scale deflection on the output meter.

4. Adjust all three I. F. trimmer condensers, in each case tuning carefully to get maximum deflection of the output meter. Reduce oscillator output if output meter goes off scale.

It is very important that no inward or sideward pressure be applied to the alignment tool or the condenser may spring back to a different setting as soon as the tool is removed.

5. Repeat all three adjustments since the adjustment of each I. F. trimmer may affect the others to a certain extent. Replace buttons covering trimmer holes to prevent tampering.

ADJUSTING R. F. AND OSCILLATOR CIRCUITS

1. Connect a .0001 mfd. condenser from the blue aerial wire to the output of the oscillator, and ground both set and oscillator. Adjust the oscillator frequency to 1400 K. C. and carefully tune the receiver to give maximum output. Set the oscillator output to produce about half scale deflection of the output meter.

2. Carefully tune the radio frequency, "A" trimmer, which is the back one on the condenser gang, until the output meter reading reaches a maximum.

3. **Retune the set** and adjust the first detector "B" trimmer, which is the middle one, for maximum output. The oscillator, or "O" trimmer should not be touched unless the set is badly out of calibration at the high frequency end of the dial.

CALIBRATION

Calibration can be checked by arranging a wire pointer **above the condenser shaft center** and then tuning in several stations of known frequency. With the condenser plates fully meshed, the lowest dial division (530 K. C.) should line up with the pointer.

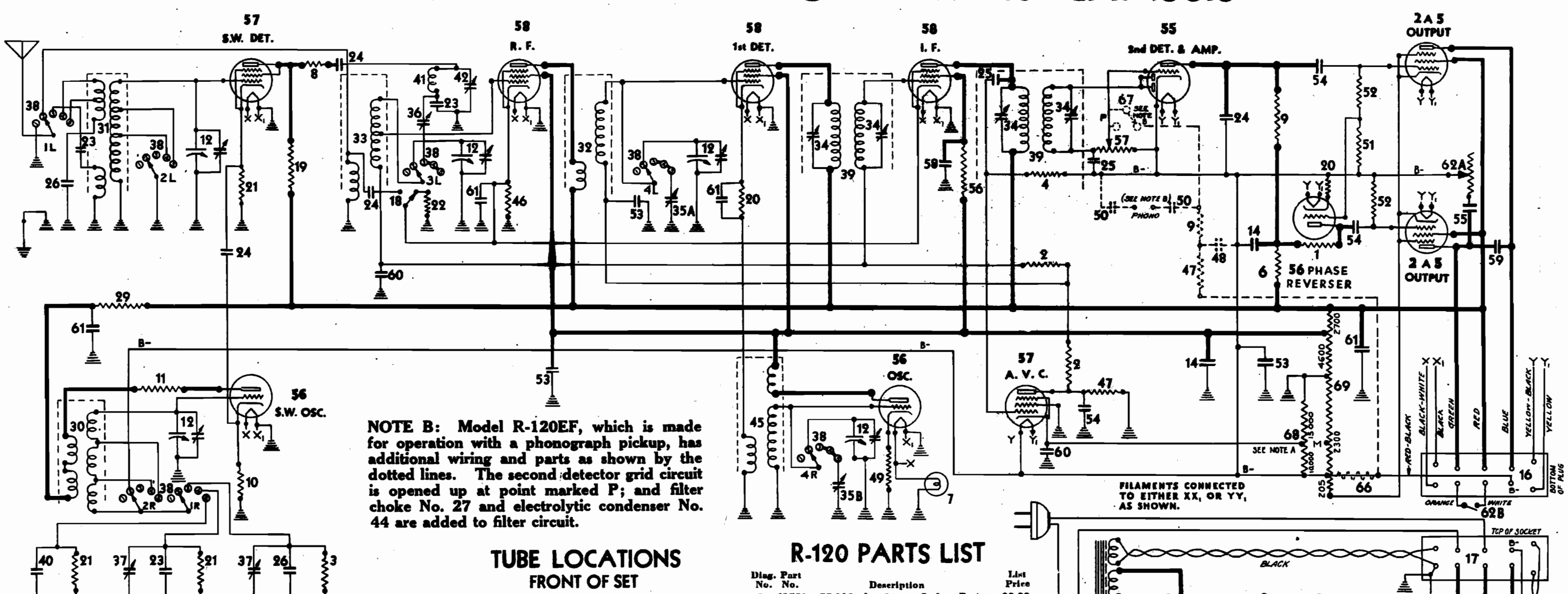
If the set is out of calibration, it can be re-calibrated as follows: Disconnect the test oscillator, connect an aerial to the blue wire, and set the tuning dial at the frequency reading of some station between 1200 and 1500 kilocycles, whose exact frequency is known and which can be picked up without any difficulty. Adjust the oscillator trimmer "O" until this station is brought in with maximum volume. Then use the modulated oscillator and output meter to re-adjust the "A" and "B" trimmers, since these are always affected by any change to the oscillator tuned circuit, taking care to retune the set between adjustments.

No adjustment is provided for aligning the set for the short wave band.

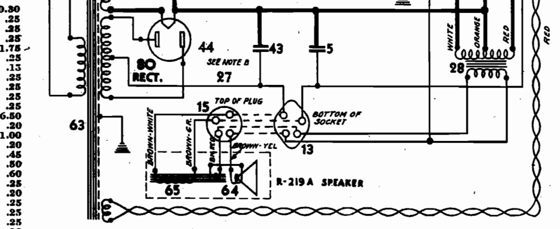
MODEL R-120(1201,1209)
Schematic,Voltage
Socket

STEWART-WARNER CORP.

STEWART-WARNER MODEL R-120 CHASSIS

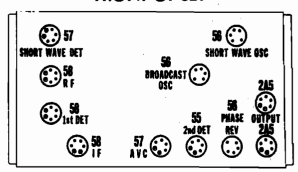


NOTE B: Model R-120EF, which is made for operation with a phonograph pickup, has additional wiring and parts as shown by the dotted lines. The second detector grid circuit is opened up at point marked P; and filter choke No. 27 and electrolytic condenser No. 44 are added to filter circuit.



TUBE LOCATIONS

FRONT OF SET



Use an 80 Tube in Power Unit

NOTE A: Resistor No. 68, mounted on the A. V. C. tube cathode terminal, is used in all chassis using voltage divider (Diag. No. 69) Part No. 83430. It is not used in chassis which have voltage divider No. 83628. In such sets, the A. V. C. tube cathode is connected directly to point M. The two voltage dividers differ only in the position of tap M. Use No. 83628 for all replacements.

I. F. FREQUENCY 177.5 K. C.

CAUTION

Voltage readings must be taken with the set switched to one of the short wave ranges, and the local-distance switch pulled out.

All D. C. voltages are measured between the tube socket terminals and chassis, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for all detector and oscillator D. C. voltages. Allowance must be made for line voltage variations.

Readings taken with set testers plugged into tube sockets may deviate considerably from the values given in this table, due to their internal circuit arrangements.

VOLTAGE TABLE

Line Voltage 115 A. C. — Distance Switch Pulled Out

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Cathode Voltage	Control Grid Voltage
57	Short Wave Detector	2.33	8*	8*		0
56	Short Wave Oscillator	2.33	75		5.0	0
58	R. F.	2.33	166	90	2.1	0
58	First Detector	2.33	166	90	8.5	0
56	Broadcast Oscillator	2.33	90		9.4	0
58	I. F.	2.33	166	77	2.1	0
57	A. V. C.	2.32	0	0	—56	—30
55	Second Detector	2.32	—68*		—95	—95
56	Phase Reverser	2.32	—1*		—89	—83
2A5	Output	2.28	156	166	—79	—66
80	Rectifier	4.9	164 Volts D C from Filament to Chassis			

* Approximate Reading. Drop across Speaker Field, 68 volts. B- to chassis, -95 volts; B plus to B-, 260 volts

R-120 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	61559	75,000 ohm 1 watt Carbon Resistor	$0.30
2	67256	75,000 ohm 1/3 watt Carbon Resistor	.25
3	67259	45,000 ohm 1/4 watt Carbon Resistor	.25
4	67302	2 meg. 1/3 watt Carbon Resistor	.25
5	67328	8 mfd. 440 volt Electrolytic Cond.	1.75
6	67425	25,000 ohm 1 watt Carbon Resistor	.25
7	67551	2.5 volt Pilot Light Bulb	.13
8	67580	6,000 ohm 1/4 watt Carbon Resistor	.25
9	67938	100,000 ohm 1 watt Carbon Resistor	.25
10	67986	2000 ohm 1 watt Carbon Resistor	.25
11	67987	100 ohm 1/2 watt Carbon Resistor	.25
12	81000	Five Section Variable Condenser	6.50
13	81042	Speaker Socket	.20
14	81082	1 mfd. 400 volt Shielded Condenser	1.00
15	81092	Speaker Plug	.20
16	81094	Terminal Plug Assembly	.45
17	81095	Terminal Receptacle Assembly	.50
18	81126	Local-Distance Switch	.60
19	81150	750,000 ohm 1/3 watt Carbon Resistor	.25
20	81151	4000 ohm 1/3 watt Carbon Resistor	.20
21	81152	10,000 ohm 1/4 watt Carbon Resistor	.25
22	81153	150 ohm 1 watt Carbon Resistor	.25
23	81155	.0005 mfd. Mica Fixed Condenser	.25
24	81156	.001 mfd. Mica Fixed Condenser	.30
25	81157	.00025 mfd. Mica Fixed Condenser	.30
26	81158	.0001 mfd. Mica Fixed Condenser	.25
27	81159	Filter Choke (Used in R-120EF only)	2.70
28	81160	Output Transformer	2.75
29	81162	40,000 ohm 1 watt Carbon Resistor	.25
30	81178	Short Wave Oscillator Coil	1.50
31	81179	Short Wave Detector Coil	1.70
32	81188	Broadcast First Detector Coil	1.00
33	81189	Broadcast Antenna Coil	1.00
34	81200	I.F. Trimmer Cond. (Double) (One unit used in each I. F. Transformer)	.60
35A, 35B	81201	Trimmer Condenser (Double)	.60
36	81202	Single Trimmer Condenser	.40
37	81231	Short Wave Padding Trimmer Cond.	.50
38	81232	Range Switch	4.00
39	81234	I. F. Transformer Coil	1.00
40	81282	.003 mfd. Mica Fixed Condenser	.50
41	81305	Trap Circuit Coil	.35
42	81306	Trap Circuit Trimmer	.50
43	81347	8 mfd. 485 volt Wet Electrolytic Condenser (Used in model R-120A only. Model R-120EF uses No. 67328)	1.75
44	81367	10 mfd. 485 volt Wet Electrolytic Cond. (Used in R-120EF only)	2.00
45	81406	Broadcast Oscillator Coil	1.00
46	81427	1200 ohm 1/4 watt Carbon Resistor	.25
47	81509	500,000 ohm 1/2 watt Carb. Resistor	.35
48	81630	.1 mfd. 100 volt Fixed Condenser (Used in Model R-120EF only)	.30
49	81829	1500 ohm 1/4 watt Carbon Resistor	.20
50	83058	.25 mfd. 100 volt Fixed Condenser (Used in Model R-120EF only)	.35
51	83080	51,000 ohm 1/4 watt Carbon Resistor	.20
32	83082	260,000 ohm 1/4 w. Carbon Resistor	.20
53	83214	.25 mfd. 250 volt Fixed Condenser	.30
54	83216	.02 mfd. 1000 volt Fixed Condenser	.35
55	83217	.04 mfd. 600 volt Fixed Condenser	.35
56	83285	10,000 ohm 1/3 watt Carbon Resistor	.25
57	83425	500,000 ohm Volume Control (Used in model R-120A only. See No. 83612 for Model R-120EF)	.95
58	83429	.5 mfd. 300 volt Fixed Condenser	.55
59	83436	.002 mfd. 1000 volt Fixed Condenser	.25
60	83437	.05 mfd. 200 volt Fixed Condenser	.30
61	83440	.1 mfd. 400 volt Fixed Condenser	.30
62A, 62B	83466	25,000 ohm Tone Control, Line Switch — In one unit	1.25
63	83489	Power Transformer, 115 volts, 60 cycles (Used in Model R-120A. See No. 83608 for Model R-120EF)	8.00
64	83525	Diaphragm and Shell Assembly	3.25
65	83528	Field & Hum Bucking Coils. Field Resistance, 460 ohms (Cold)	2.50
	83608	Power Transformer. 115-250 volts. 25-60 cyc. (Used in R-120EF only)	11.00
66	83610	35 ohm, 1 watt Resistor (Used in model R-120EF only)	.25
67	83612	500,000 ohm Volume Control and Phonograph Switch (Used in model R-120EF only)	1.23
68	83627	15,000 - 10,000 ohm Wire Wound Resistor (See Note A)	.60
69	83628	Voltage Divider Resistor (See Note A)	1.75

Miscellaneous Parts Not Shown on Diagram

Part No.	Description	List Price
61841	Felt Knob Washer	.01
67263	No. 6 x 1/4 Self Tapping Bottom Screw	.03
67826	R. F. Coil Shield, plain	.50
67964	I. F. (Short) Tube Shield	.30
81007	Tube Shield Cover	.06
81012	Tube Shield Shell	.15
81068	Dial Cord (17 1/8" long). Per foot	.05
81069	Dial Cord Tension Spring	.10
81098	Speaker Cable only	.45
81099	Terminal Plug Cover	.20
81100	Speaker Cable and Plug	.60
81104	Chassis Bottom Plate	.70
81109	Small Rubber Drive Bushing	.03
81111	Large Rubber Drive Bushing	.04
81209	S. W. Coil Shield (plain)	.25
81210	S. W. Coil Shield (hole)	.65
81212	I. F. Coil Shield	.50
81213	R. F. Coil Shield (hole)	.50
81214	Knob Set Screw	.02
81216	Dial Drive Shaft with Fibre Spool	.60
81220	Light Bracket and Dial Pointer	.90
81237	Dial Guide Spring	.14
81328	Fibre Dial Frame Guide Pad	.01
81340	Chassis Bottom Gasket	.12
81420	Rubber Mounting Cushion	.05
81421	No. 14x1 3/4" Self Tapping Screw	.03
81426	Mounting Cushion Cup	.03
81433	Range Switch Lever Set Screw	.02
83468	Celluloid Dial and Frame	1.00
83514	Escutcheon Plate	.75
83570	Tone or Volume Control Knob	.35
83571	Tuning Knob with Set Screw	.35
83572	Range Switch Lever with Set Screw	.35
83573	Escutcheon Wood Screw. Per 100	.50
R-219A	Loud Speaker (10 inch)	9.25

SERVICE DATA for STEWART-WARNER R-120 CHASSIS (RECEIVER MODELS 1201 to 1209)

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-120 radio chassis is a 12 tube all-wave receiver, using a double superheterodyne circuit. Thru the use of a multi-section range switch, any one of four tuning ranges extending from 15 to 565 meters may be used.

By means of this range switch, radio signals are made to follow one of two general circuit paths, depending on their wave length. If the signal is in the broadcast band, it is fed directly to the tuned input circuit of the R.F. tube, and from there on amplified in the usual way. During broadcast reception the short wave section is rendered inoperative by applying a very high negative bias on the short wave oscillator tube.

When the set is switched over to any one of the three short wave ranges, the received short wave signal passes thru the short wave detector, where it is converted to 1540 K. C. by the action of the short wave oscillator and it is then amplified at this frequency in the broadcast section of the receiver.

By the use of a separate A. V. C. tube, input to the second detector is kept practically constant regardless of variation in signal strength. Volume is controlled by a potentiometer in the diode circuit of the 55 second detector tube. This volume control feeds any desired portion of the audio signal to the triode section of the tube which acts as an audio amplifier.

This amplified audio signal is then fed into a resistance coupled push-pull stage. The resistance coupled push-pull stage with its necessary phase reversal tube, not only eliminates the distortion which would be produced by an input transformer but also increases the low frequency response, and greatly improves the tone quality.

The type 56 phase reversal tube as used in the resistance-coupled push-pull circuit, functions as follows: By means of a voltage divider arrangement (resistances No. 51 and 52) one-sixth of the audio output voltage of the 55 is impressed on the grid of the 56 which reverses the phase, amplifies the signal to its original value, and applies it to the grid of one of the 2A5 output tubes. The other 2A5 receives its signal direct from the 55. Thus the two output tubes receive signals of equal strength but in opposite phase relation, giving a true push-pull effect without the use of a transformer.

LOCAL-DISTANCE SWITCH

The local-distance or "quiet" switch, which is operated by an in-and-out motion of the tone control knob, makes the following circuit changes. In the "in" or local position, the primary of the R. F. coil is shunted by a fixed condenser, thus by-passing part of the signal to ground and reducing the signal input into this circuit. In this position the R. F. and I. F tubes are operated at a high negative bias to reduce their amplification. In the "out" or distance position, the by-pass condenser is cut out of the circuit and a fixed resistor is connected in parallel with the bias resistor of the R. F. and I. F. tubes, thus reducing the bias on these tubes to its normal value, permitting them to operate at maximum sensitivity.

EXPLANATION OF RANGE SWITCH:

The range switch consists of eight independent switch sections, each section being provided with five contacts. Only seven sections of the eight, and only four contacts of the five per section are used.

In the circuit diagram these different switch sections are labelled 1R, 1L, 2R, etc., and for the sake of simplicity are shown in different locations in the diagram, altho they are all parts of the master range switch assembly located in the center of the chassis. With the chassis **bottom-side up and controls pointing toward you,** 1R is the front right hand section, 1L is the front left hand section, 2R is the second right-hand section counting from the front of the chassis, and so on. (Note that the switch numbers are identical with those of the 105 circuit diagram but that the letters L and R are reversed.)

As the range switch is rotated in a clockwise direction the following circuit changes are effected.

POSITION 1: Switch 1L grounds the aerial, preventing any reception.

POSITION 2: Broadcast Band. In this position switch 2R biases the short wave oscillator to stop it from oscillating so that the short wave section cannot cause interference when receiving stations on the broadcast band. Switch 1L connects the aerial to the primary of the R. F. coil. Switch 3L connects the third section of the variable condenser gang across the secondary of the R. F. coil. Switch 4L connects the fifth section of the variable condenser gang across the secondary of the first detector coil. Switch 4R connects the fourth section of the variable condenser gang across the secondary of the broadcast oscillator coil. Switch 1R is open.

POSITION 3: 185 to 78 Meter Short Wave Band. In this position switch 1L connects the aerial to one of the two primaries of the short wave detector. Switch 3L connects the output of the short wave detector to the secondary of the R. F. coil, and also connects an adjustable trimmer condenser across the secondary of this coil to tune it to 1540 K. C. Switch 4L connects an adjustable trimmer across the secondary of the first detector coil to tune it to 1540 K. C. Switch 4R connects a variable trimmer across the secondary of the broadcast oscillator to tune it to 1717.5 K. C. thus giving an I. F. of 177.5 K. C. Switch 1R connects an adjustable padding circuit in series with the secondary of the short wave oscillator coil, thus permitting proper tracking of this circuit in this short wave band.

POSITION 4: 80 to 33 Meter Short Wave Band. In this position switch 1L connects the aerial to the second of the two primaries of the short wave detector coil. Switch 2L shorts out a portion of the secondary of the short wave detector coil, thus enabling it to tune to the 80 to 33 meter band. Connections to switches 3L, 4R, and 4L remain the same as in position 3, tuning the R. F. section to 1540 K. C. Switch 1R connects a different adjustable padding circuit in series with the secondary of the short wave oscillator coil, thus permitting proper tracking of this circuit in this short wave band. Switch 2R shorts out part of the secondary of the short wave oscillator coil so that it will tune to wavelengths between 80 and 33 meters.

POSITION 5: 33 to 14.5 Meter Short Wave Band. In this position switch 1L connects the aerial thru a tap to the second primary of the short wave detector coil. Switch 2L shorts out a larger section of the secondary of the short wave detector coil so that this circuit can be tuned from 33 to 14.5 meters.

Connections made by switches 3L, 4L and 4R remain as in positions 3 and 4 since three points on each switch are connected together. Switch 1R connects a non-adjustable padding circuit in series with the secondary of the short wave oscillator coil. Switch 2R shorts out another portion of the secondary of the short wave oscillator coil, thus permitting this tuned circuit to cover the 33 to 14.5 meter band.

ALIGNING THE R120 CHASSIS

EQUIPMENT AND PRELIMINARY STEPS

Before proceeding to align the R-120 the following important suggestions should be noted:

(A) This chassis absolutely cannot be aligned properly "on the air" or by ear. Only one of the best service oscillators should be used. Two frequency bands are needed, one including the 177.5 K. C. intermediate frequency and the other covering the broadcast band. A wide range of modulated signal output must be available; very weak for broadcast alignment so that the A. V. C. circuit will not be actuated, and very strong for short wave alignment since harmonics as high as the ninth are used if the oscillator has no short wave range. The output lead should be shielded.

(B) **Do not rely on calibration curves for test oscillator frequency determination. Check all frequencies used against broadcasting stations,** which are required to operate on their assigned frequencies.

(C) An output meter must be used, preferably of the copper oxide rectifier type with a 0 to 50 volt scale. It should be connected across the plates of the two 2A5 output tubes. During alignment, re-adjust the oscillator output whenever necessary to keep the output meter at about half-scale reading.

(D) A Stewart-Warner No. T-75470 aligning tool or an insulated screwdriver should be used for all adjustments.

(E) Choose, if possible, a location free from "man-made-static," as high frequency noise disturbance might make short wave alignment difficult. A good ground is helpful, a poor one worse than none at all.

(F) To reduce noise pick-up, the antenna and ground wires of the chassis should be twisted together.

(G) Noise effect can be reduced by turning the tone control to the right.

(H) The A. V. C. tube can be removed for short wave alignment to increase sensitivity. It must not be removed for any of the other adjustments or calibration will be incorrect.

MODEL R-120,(1201,1209)
Alignment

STEWART - WARNER CORP.

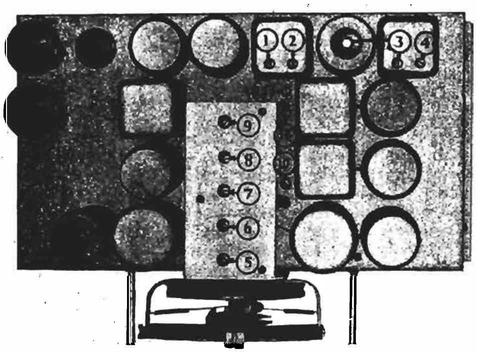
(I) During all aligning adjustments, the volume control should be turned full-on but no station should be tuned in. **The local-distance switch should be pulled out for all adjustments. The chassis bottom must be fastened in place and all tube shields must be in their proper positions during alignment.**

ALIGNING PROCEDURE:

The following aligning procedure for the R-120 can also be applied to the R-105 chassis if attention is paid to the difference in the position of the No. 11, 12, and 15 trimmers. This procedure is a development and improvement of the former (105) alignment procedure differing in the choice of the Short-Wave Intermediate Frequency and the sequence of the short-wave trimmer adjustments. For the R-105, follow the following procedure but use the diagrams given in the 105 Service Data Sheet.

There are six different groups of circuits to be aligned in the R-105 and R-120 chassis. These must be aligned in the order given below.

(1) **The Broadcast Band Intermediate Frequency Amplifier (177.5 K. C.)** This requires adjustment of trimmers No. 1, 2, 3, and 4, which tune the I. F. transformers. (See diagram on this page.)



(2) **The Broadcast Band Radio Frequency Circuits (530 to 1540 K. C.)** This group has three adjustments, trimmers No. 7, 8 and 9 calibrating and aligning the R. F., broadcast oscillator, and first detector circuits, respectively.

(3) **The Short Wave Intermediate Frequency Amplifier (1540 K. C.)** There are three adjustments, trimmers No. 10, 11 and 12 tuning the same circuits in order, as No. (2) but as a fixed 1540 K. C. short wave intermediate frequency amplifier; and a fourth adjustment, trimmer No. 15, tuning the short wave detector plate circuit to 1540 K. C.

(4) **The 33 to 14.5 Meter Short Wave Band.** This requires two adjustments, trimmers No. 5 and 6, calibrating and aligning the short wave oscillator and detector circuits for all three short wave bands.

(5) **The 80 to 33 Meter Short Wave Band.** This has one adjustment, trimmer No. 13, padding the short wave oscillator on this band.

(6) **The 185 to 78 Meter Short Wave Band.** Trimmer No. 14 is used to pad the short wave oscillator on this band.

(1) ALIGNING THE BROADCAST I. F. AMPLIFIER

The modulated oscillator must be tuned **exactly to 177.5 K. C.** This frequency can be accurately determined by checking the oscillator harmonics against broadcast stations. First check the accuracy of the broadcast dial, and then connect the oscillator to the aerial and ground wires of the chassis and tune in either the fourth or eighth harmonic of the 177.5 K. C. signal. If they come in at exactly 710 or 1420 K. C. the oscillator frequency is correct. To be sure that you have the harmonic of a 177.5 K. C. signal instead of some other frequency, tune in the other 177.5 K. C. harmonics on the broadcast dial. These should come in 177.5 K. C. on either side of the original setting. **Do not use the oscillator calibration curve to determine this intermediate frequency.**

Turn the receiver dial to some point where the oscillator signal cannot be heard to prevent the receiver oscillator from beating with the test oscillator. Then connect the test oscillator output from the grid cap of the 58 first detector tube to chassis. Carefully adjust trimmers No. 4, 3, 2 and 1, in order, for maximum output meter deflection. Repeat the four adjustments since the adjustment of each trimmer has some effect on the others.

(2) CALIBRATING AND ALIGNING THE BROADCAST R. F. CIRCUITS

Before proceeding further, it is necessary to check the calibration of the set on the broadcast band, since this band must be subsequently used as a reference point in aligning the three short wave bands. **This calibration check is very important.** It can easily be done by connecting the aerial and tuning in broadcast stations of known frequency between 550 and 700 K. C. for the low frequency check and between 1200 and 1400 K. C. for the high frequency end. If the calibration between 550 and 700 K. C. is incorrect, bend the brackets guiding the side of the dial frame until the stations come in at the correct setting.

For the high frequency correction, turn the dial to the frequency of a station between 1300 and 1400 K. C. whose frequency is definitely known. Using no aerial or a very short one carefully adjust trimmer No. 8 (broadcast oscillator) until the station is tuned in with maximum volume and then also adjust trimmers 7 and 9.

Unless the condenser plates are misaligned the rest of the dial should then be properly calibrated. About 10 K. C. variation is generally allowable. If the pointer is too far away from the dial, bend it in to avoid parallax or false reading.

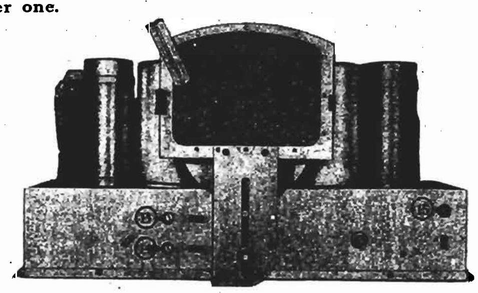
Connect the test oscillator to the aerial and ground leads of the receiver and set the oscillator to approximately 1400 K. C. Carefully tune the receiver to this signal. Adjust trimmers No. 7 and 9 for maximum output meter response. Retune the receiver and check adjustments. Do not touch trimmer No. 8 since this will alter the calibration.

(3) ALIGNING THE SHORT WAVE I. F. AMPLIFIER

The second harmonic of a 770 K. C. oscillator signal is used for aligning the 1540 K. C. short wave I. F. amplifier. Tune the receiver exactly to 770 K. C., allowing for any error in dial reading and connect the oscillator output to the receiver aerial and ground wires. Tune the test oscillator to give maximum output meter response.

Connect the test oscillator output from the 57 short wave detector grid cap to chassis.

Shift the range switch to the third short wave band (33 to 14.5 meters) and adjust trimmer No. 11 until the signal is tuned in with maximum output meter response. **Two peaks may be noted in some sets. The peak at the minimum trimmer capacity, that is, the one where the trimmer is turned nearly all-the-way-out is the correct one.** Then adjust trimmers No. 10, 12, and 15 for maximum output meter reading. When adjusting No. 15, two relatively broad peaks may be found, but the nearly-all-the-way-out position is again the proper one.



(4) ALIGNING THE THIRD SHORT WAVE BAND

Set the range switch to the broadcast position, tune the receiver to exactly 1390 K. C. allowing for calibration error. Connect the test oscillator to the aerial and ground wires of the receiver and adjust the frequency of the oscillator until the signal is at a peak. Shift the range switch to the third short wave band (33 to 14.5 meters) and turn the receiver dial pointer to exactly 24.0 meters (12500 K. C.) Adjust trimmer No. 5 until the oscillator signal (ninth harmonic of 1390 K. C.) is picked up with maximum output meter reading. Adjust trimmer No. 6 to an approximate peak. Connect a 400 ohm resistor or a .0001 mfd condenser in series with the oscillator output and the blue aerial wire as a short wave dummy antenna, and then carefully adjust trimmer No. 6 for maximum output. The resistor or condenser will reduce the signal strength so increased oscillator output will be needed.

(5) ALIGNING THE SECOND SHORT WAVE BAND

Shift to the second short wave band (33-80 meters) and set the dial pointer to 54 meters (5555 K. C.) With the oscillator still at 1390 K. C. adjust trimmer No. 13 until the signal (4th harmonic of 1390 K. C.) gives maximum output meter indication.

(6) ALIGNING THE FIRST SHORT WAVE BAND

Using the broadcast dial for reference, adjust the test oscillator to 910 K. C. Switch the receiver to the first short wave band (185 to 78 meters), turn the dial pointer to 165 meters and adjust trimmer No. 14 for maximum output meter reading.

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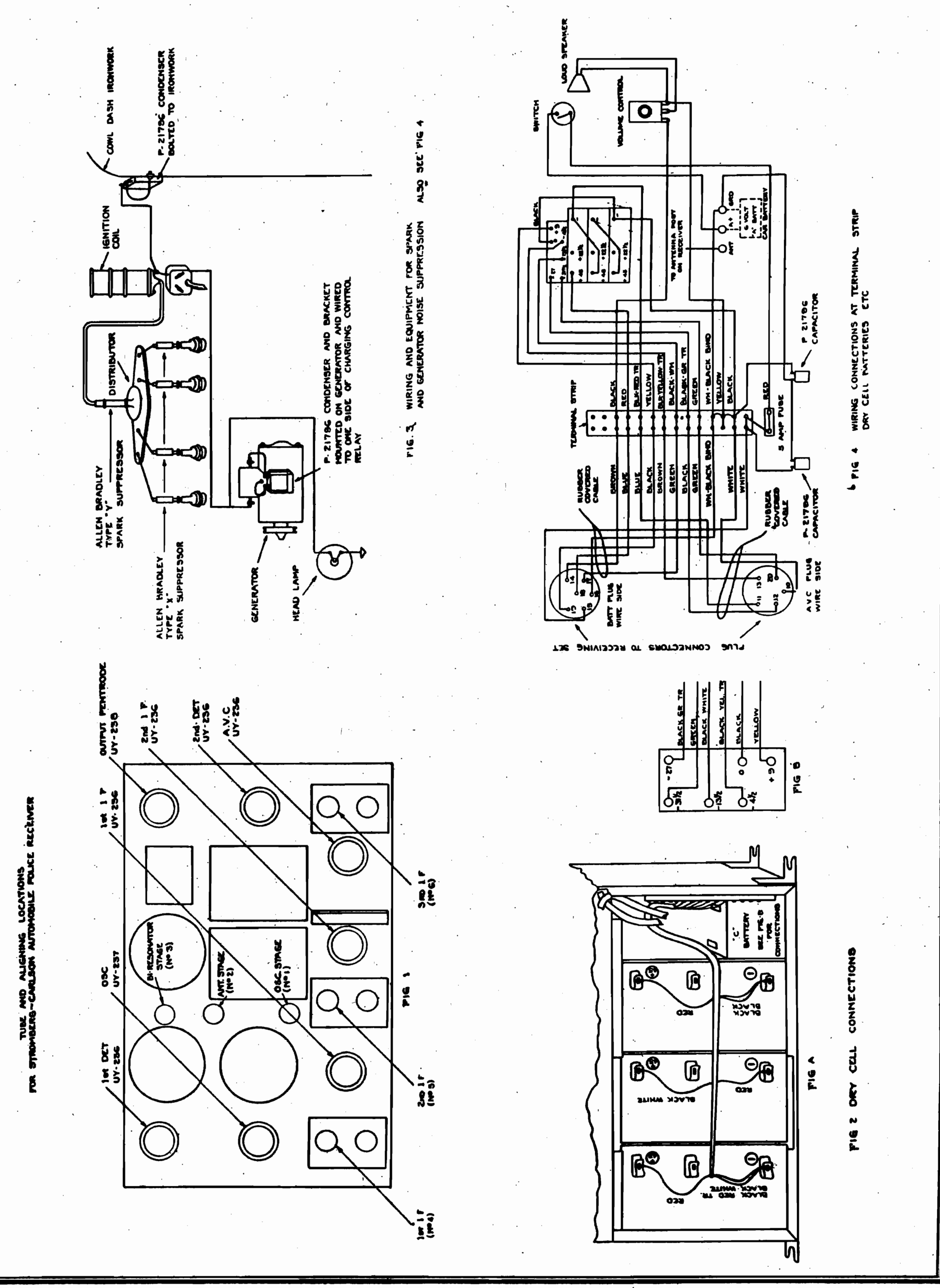
MODEL Compact Police Receiver Wiring, Socket



MODEL Compact
Police Receiver
Schematic

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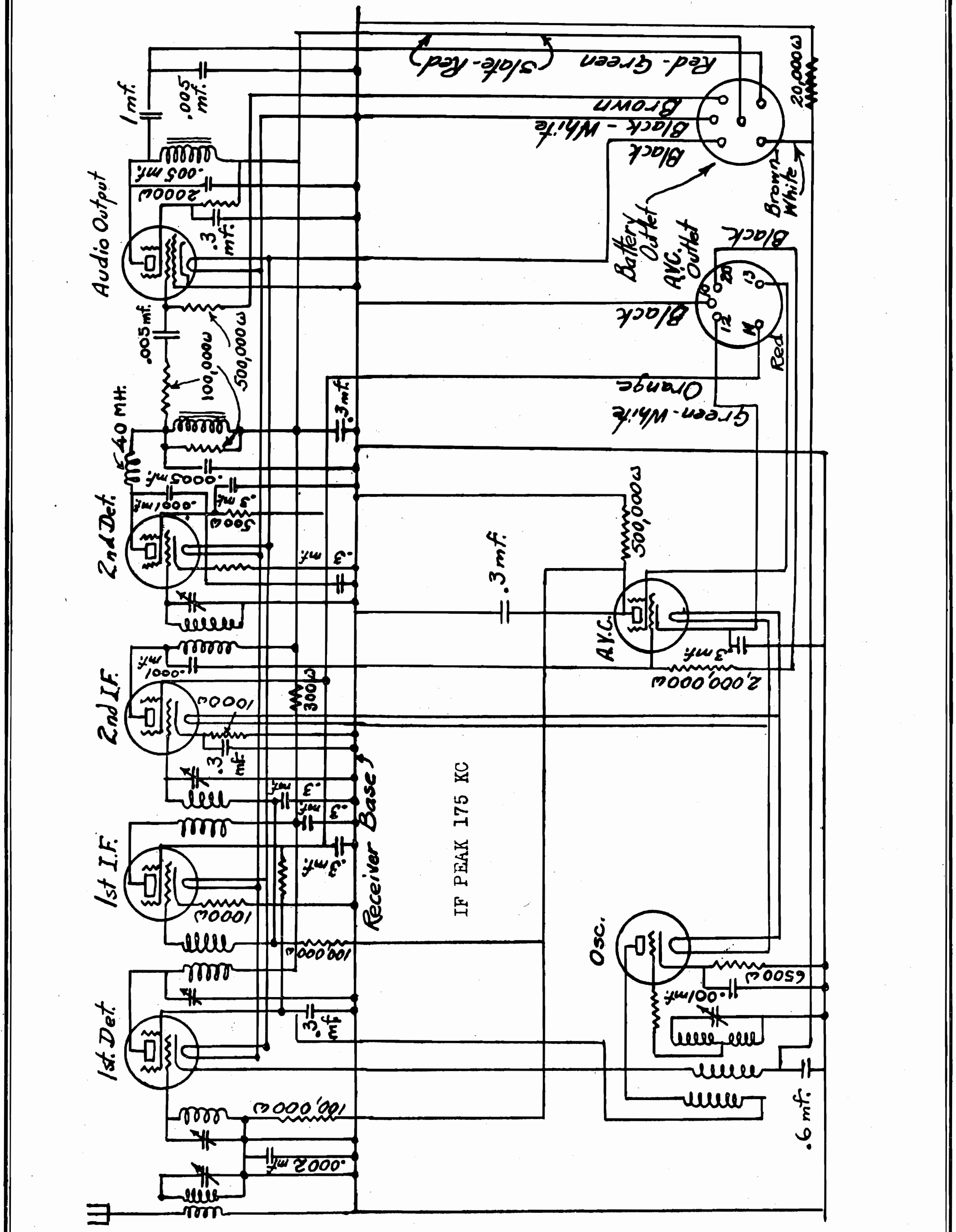

MODEL 33
Schematic,
Alignment

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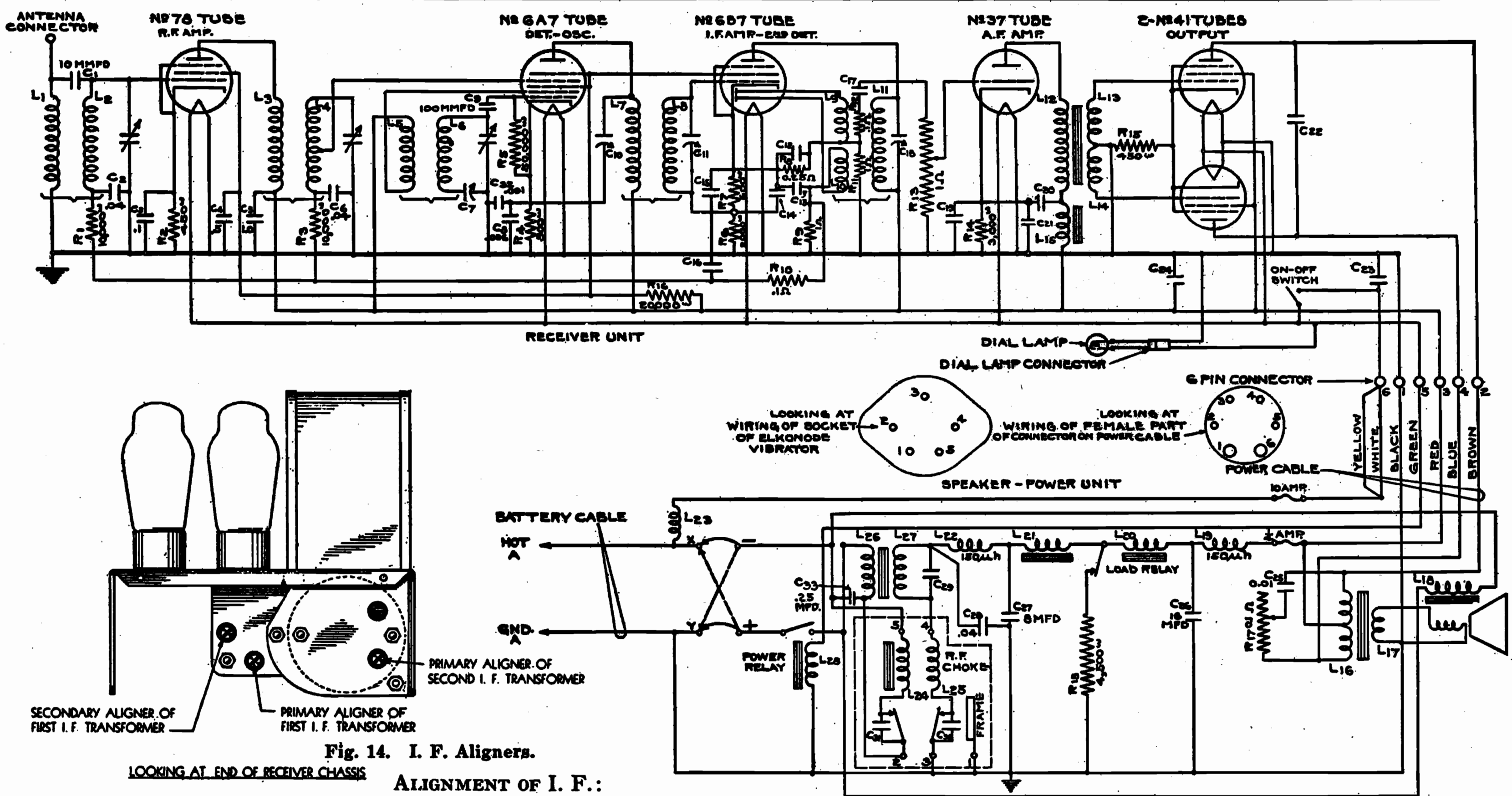

Fig. 14. I. F. Aligners.

LOOKING AT END OF RECEIVER CHASSIS

IF PEAK 260 KC

Alignment of I. F.:

Use a test oscillator having an output with a frequency of 260 kilocycles. Connect the leads from this oscillator between the grid (top cap) of the No. 6A7 tube and chassis base. A .5 mfd. capacitor should be connected in series with the lead going to the grid to insulate the 260 k. c. oscillator source from the voltages of the No. 6A7 tube.

Connect the output meter across terminal "M" of the fuse block (See Fig. 11) and the speaker-power supply frame. This puts the meter across the moving coil of the speaker (4 ohms impedance). The signal applied should be very weak, just sufficient to show a deflection on the output meter.

Now adjust the aligners of the primary and the secondary of the first I. F. transformer (See Fig. 14) for the peak swing on the output meter. It will be necessary to check over these adjustments as they are somewhat interdependent. Now, adjust the aligner of the primary of the second I. F. transformer in the same manner. For this aligning operation an insulated screwdriver should be used, a Formica rod with a small piece of metal inserted in the end will serve.

MODEL 33
Voltage
Resistance Data

STROMBERG-CARLSON TEL. MFG. CO.

Continuity Test—Receiver Unit

This test is made with all tubes removed from sockets and the power cord removed from the receiver unit. The On-Off switch should be turned "Off" The readings given are in ohms as measured on a Weston Volt-ohmmeter No. 663. See Fig. 13.

Measurements Made Between Points		Ohms	*If resistance differs greatly from value shown, Check the following*
3	1	Open	Capacitors C4, C5, C24 or grounds in wiring or apparatus.
6	1	Open	Defective Switch or Capacitor C23.
7	5	0	Wiring of heater circuits.
8	3	70	Primary of R. F. Transformer L3.
9	3	20,000	R16 or wiring.
10–11	1	450	Cathode Resistor of No. 78 Tube R2.
12	1	0	Ground Connection.
13	5	0	Wiring of heater circuits.
14	3	20	Primary of 1st I. F. Transformer L7.
15	3	20,000	R16 or wiring.
16	3	1	Plate winding of oscillator coil L5.
17	18	50,000	Grid Leak R5 or Grid Capacitor C9.
18	1	500	Cathode Resistor R4.
19	1	0	Ground Connection.
20	5	0	Wiring of heater circuits.
21	3	45	Primary of second I. F. Transformer L11.
22	3	20,000	R16 or wiring.
23	25	200,000	Secondary of Second I. F. Transformer L9 or R8, or R11.
24	1	1,000,000	Secondary of Second I. F. Transformer L10 or R9.
25	1	2,600	Resistors R6 and R7.
26	1	0	Ground Connection.
27	1	0	Ground Connection.
28	3	5,500	Primary of Audio Transformer L12 or Choke L15.
29	1	0–10 (Switch "off")	Volume Control Potentiometer.
30	1	3,000	Cathode Resistor R14.
31	5	0	Wiring of heater circuits.
32	1	0	Ground Connection.
33	2	0	Wiring of output tubes.
33	39	Open	Capacitors C22.
34	3	0	Wiring of output tubes.
35	1	2700–3700	Secondary of Audio Transformer L13 or L14.
36	1	450	Cathode Resistor R15 or wiring.
37	5	0	Wiring of heater circuits.
38	1	0	Ground Connection.
39	4	0	Wiring of output tubes.
40	3	0	Wiring of output tubes.
41	1	2700–3700	Secondary of audio transformer L13 or L14.
42	1	450	Cathode Resistor R15 or wiring.
43	5	0	Wiring of heater circuits.
44	1	2000	Secondary of first I. F. Transformer L8 and Resistor R6.
45	1	1,100,000	Secondary of R. F. Transformer L4; Resistors R3, R9, R10 or Capacitors C6, C13, C16.
46	1	1,100,000	Secondary of Antenna Transformer L2; Resistors R1, R9, R10 or Capacitors C2, C13, C16.
47	1	25	Primary of Ant. Transformer.
47	46	Open	Capacitor C1.

Note—Due to manufacturing tolerances on carbon resistors, the values in the above table may vary plus or minus 10 per cent.

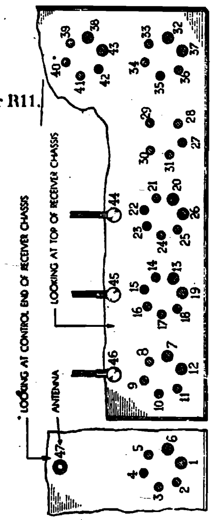

Fig. 13. Location of Points for Continuity Test.

Voltage Table.

These voltage readings are obtained by measuring between the various tube socket contacts and chassis base, with the tubes in place. Fig. 12 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater pin as 1 and proceeding clockwise around the pin circle to the other heater pin. This is done looking at the bottom of the socket.

Voltages are read on the meter scale (1000 ohms per volt) normally used for the magnitude of the particular voltage except as otherwise specified. The voltages given are those obtained when the battery voltage is 6.3 volts.

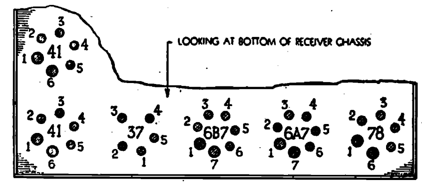

Fig. 12. Location of Socket Terminals for Measuring Voltages.

Tube	Circuit	Grid Clip	Terminals of Sockets 1	2	3	4	5	6	7
No. 78	R. F. Amp.	0	−6.1	+187	+81	+2.9	2.9	0	—
No. 6A7	Det. Osc.	0	−6.1	+187	+81	+187	−2 250 Scale	−3.6	0
No. 6B7	I. F. Det.	8.1	−6.1	+187	+81	+3 100 Scale	0	+12	0
No. 37	A. F. Amp.	—	0	+166	0	+11	−6.1	—	—
No. 41	Output	—	0	+184	+187	0	+14.5	−6.1	—

Note—These readings are made with the positive pole of the storage battery grounded. If the negative is grounded, the heater voltages will naturally be reversed. These voltages will vary slightly from the average given due to tolerances in resistors, variations in tubes, battery voltage differences, etc.

Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7
78	R. F. Amp.	Control Grid	"Hot" Heater	Plate	Screen	Sup-pressor	Cathode	Grounded Heater	—
6A7	Det. Osc.	Detector Control Grid	"Hot" Heater	Plate of Detector	Screen	Plate of Osc.	Control Grid of Osc.	Cathode	Grounded Heater
6B7	I. F. Det.	Control Grid	"Hot" Heater	Plate	Screen	Audio Diode	A. V. C. Diode	Cathode	Grounded Heater
37	A. F. Amp.	—	Grounded Heater	Plate	Control Grid	Cathode	"Hot" Heater	—	—
41's	Outputs	—	Grounded Heater	Plate	Screen	Control Grid	Cathode	"Hot" Heater	—

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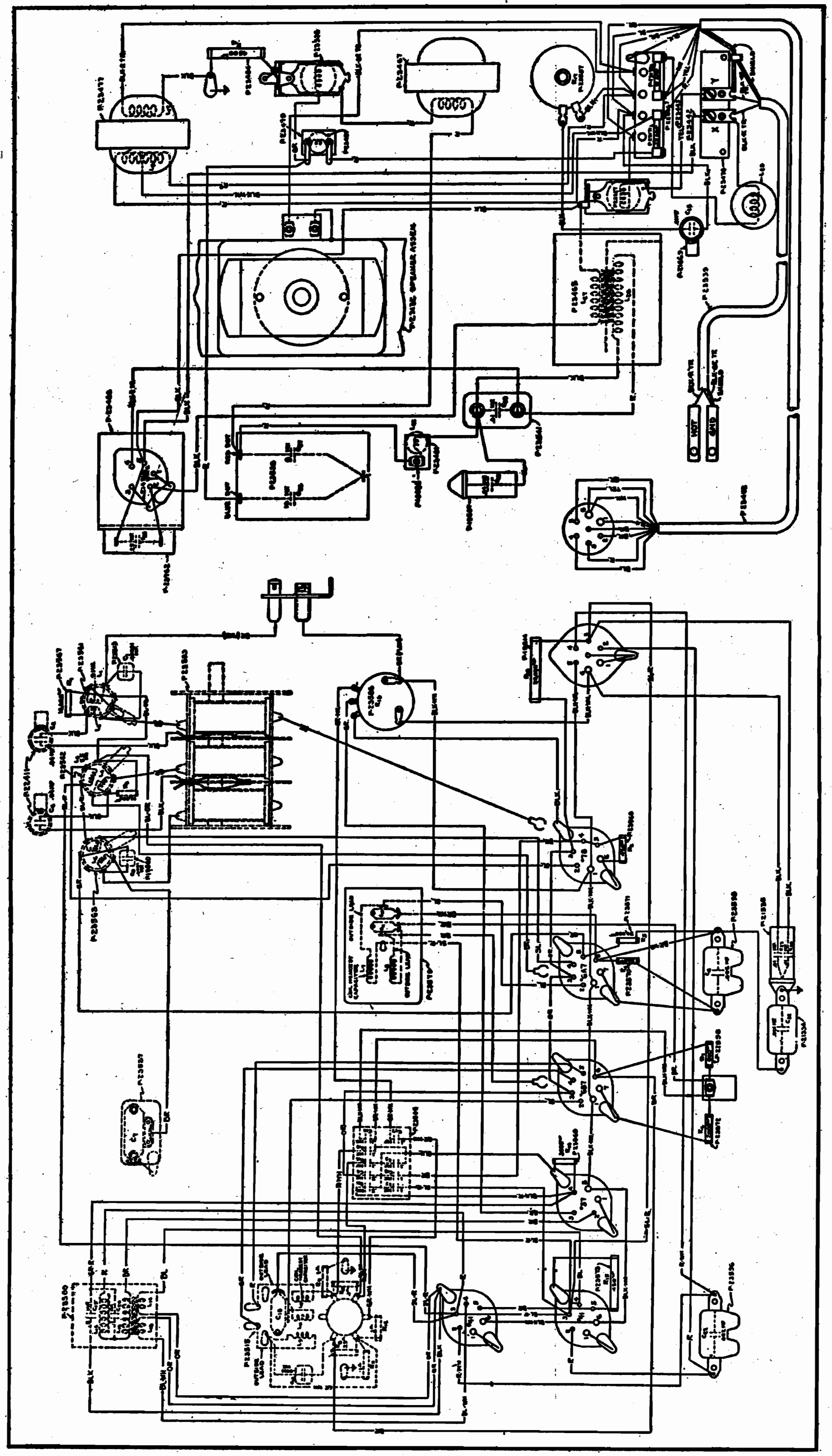
MODEL 33
Chassis Wiring
Socket Layout



MODEL 33
Parts List

STROMBERG - CARLSON TEL. MFG. CO.

Alignment of R. F. and Oscillator:

Now put the output of the oscillator on the antenna input terminal through a 200 mmfd. capacitor, the "low" side of the oscillator being connected to the chassis base.

Now tune the test oscillator to 1400 k. c. and set the dial of the remote control unit at 140. Make sure that the signal applied is only strong enough to give a deflection on the output meter. Now, adjust the oscillator shunt aligner (Fig. 15) for maximum meter deflection. Then, adjust the R. F and Antenna Aligners (Fig. 15) in the same manner.

Now, set the test oscillator frequency to 600 k. c. and adjust the oscillator series aligner for maximum meter deflection. If this adjustment was very far out, it is advisable to re-set to 1400 k. c. and check the oscillator shunt aligner.

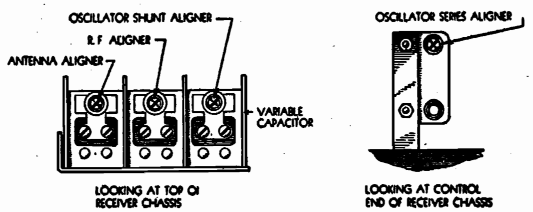


Fig. 15.
R. F. and Oscillator Aligners.

SECTION II—IDENTIFICATION OF CIRCUIT CONSTANTS

Resistors

R1	Bias Feed of R. F. Amplifier—10,000 Ohms, Type D; Brown, Black, Orange.
R2	Cathode Resistor of R. F. Amplifier—450 Ohms, Type D; Yellow, Green, Brown.
R3	Bias Feed of First Detector—10,000 Ohms, Type T; Brown, Black, Orange.
R4	Cathode Resistor of No. 6A7—500 Ohms, Type D; Green, Black, Brown.
R5	Grid Leak of Oscillator—50,000 Ohms, Type D; Green, Black, Orange.
R6	Delay Bias Resistor of Cathode of No. 6B7—2,000 Ohms, Type D; Red, Black, Red.
R7	Grid Bias Resistor of Cathode of No. 6B7—600 Ohms, Type D; Blue, Black, Brown.
R8	Audio Diode Load—.25 Megohm, Type D; Red, Green, Yellow.
R9	A. V. C. Diode Load—1.0 Megohm, Type D; Brown, Black, Green.
R10	Feeder of A. V. C. voltage—.1 Megohm, Type D; Brown, Black, Yellow.
R11	"Q" Resistor for Audio Diode—1.0 Megohm, Type D; Brown, Black, Green.
R12	Filter Resistor in Volume Control Circuit—.1 Megohm, Type D; Brown, Black, Yellow.
R13	Volume Control Potentiometer—1.0 Megohm.
R14	Bias Resistor of Audio Amplifier—3,000 Ohms, Type D; Orange, Black, Red.
R15	Bias Resistor of Output Tubes—450 Ohms, Type B; Yellow, Green, Brown.
R16	Screen Series Resistor—20,000 Ohms, Type B; Red, Black, Orange.
R17	Temporary Load Resistor—4,500 Ohms, Vitreous Enamel.

Inductances

L1	Primary of Antenna Transformer—.9 Mh. 25 Ohms.	(P-23561)
L2	Secondary of Antenna Transformer.	
L3	Primary of R. F. Transformer—5.5 Mh. 73 Ohms.	(P-23562)
L4	Secondary of R. F. Transformer.	
L5	Plate Winding of Oscillator Coupler.	(P-23563)
L6	Grid Winding of Oscillator Coupler.	
L7	Primary of First I. F. Transformer—5.5 Mh.; 20 Ohms.	(P-23579)
L8	Secondary of First I. F. Transformer—5.5 Mh.; 20 Ohms.	
L9	Secondary of Second I. F. Transformer—5.5 Mh.; 45 Ohms.	(P-23515)
L10	Secondary of Second I. F. Transformer—5.5 Mh.; 45 Ohms.	
L11	Primary of Second I. F. Transformer—5.5 Mh.; 45 Ohms.	

Inductances (Contd.)

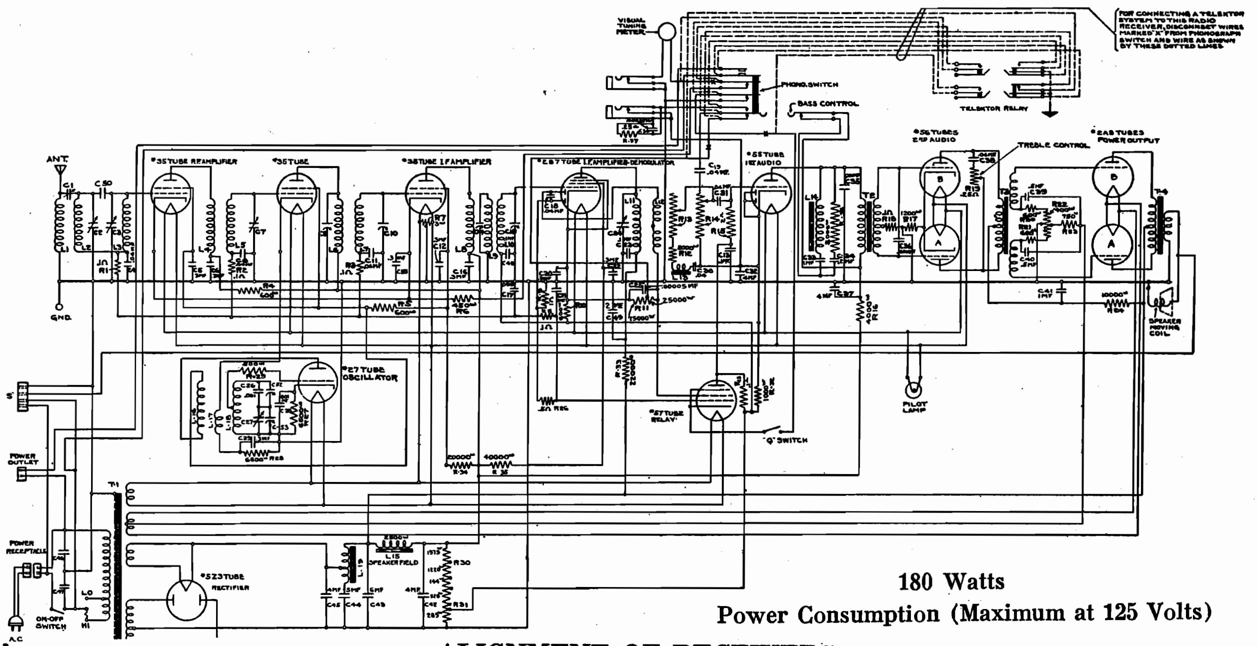
L12	Primary of Audio Input Transformer—2,400 Ohms.	(P-23500)
L13	Secondary of Audio Input Transformer. 7,000 Ohms	
L14	Secondary of Audio Input Transformer.	
L15	Plate Circuit Choke—2,800 Ohms.	
L16	Primary of Audio Output Transformer—530 Ohms.	(P-23417)
L17	Secondary of Audio Output Transformer.	
L18	Field of Electro-Dynamic Speaker—6 Ohms.	
L19	R. F. Choke—150 Microhenries (P-23481)	
L20	Load Relay Winding—48 Ohms. (In P-23537 Relay)	
L21	Filter Choke—210 Ohms (P-23467)	
L22	R. F. Choke—150 Microhenries. (P-23481)	
L23	R. F. Choke "A" Supply Circuit to Chassis. (P-23651)	
L24	Driving Coil of Elkonode. (In P-23466 Elkonode Assembly)	
L25	R. F. Choke. (In P-23466 Elkonode Assembly)	
L26	Primary of Power Transformer.	(P-23465)
L27	Secondary of Power Transformer—90 Ohms.	
L28	Winding of Power Relay—Ohms. (P-23537)	

Capacitors

C1	Antenna Series Capacitor—10 Mmfd. (P-23518)	
C2	A. V. C. By-Pass in R. F. Amplifier—.04 Mfd. (P-22411)	
C3	Cathode Resistor By-pass in R. F. Amplifier—.1 Mfd. (In P-23508)	
C4	Screen By-pass .5 Mfd. (In P-23508)	
C5	Plate Circuit By-pass—1.0 Mfd. (In P-23508)	
C6	A. V. C. By-pass in First Detector Circuit—.04 Mfd. (P-22411)	
C7	Oscillator Series Aligner. (P-23527)	
C8	Cathode By-pass No. 6A7 Tube—.006 Mfd. (P-23595)	
C9	Grid Capacitor of Oscillator—100 Mmfd. (P-19560)	
C10	Tuning Capacitor for Primary of First I. F. Transformer.	
C11	Tuning Capacitor for Secondary of First I. F. Transformer.	
C12	By-pass for Audio Diode Load—100 Mmfd. (P-19560)	
C13	By-pass for A. V. C. Diode Load—.1 Mfd. (In P-23508)	
C14	By-pass for Grid Bias Resistor of No. 6B7—.1 Mfd. (In P-23508)	
C15	By-pass for Grid and Delay Bias Resistors of No. 6B7—.1 Mfd. (In P-23508)	
C16	By-pass for A. V. C. Filter Circuit—.1 Mfd. (In P-23508)	
C17	Stopping Capacitor Audio Diode Circuit—.1 Mfd. (In P-23508)	
C18	Tuning Capacitor Primary of Second I. F. Transformer.	
C19	By-pass for Cathode Resistor No. 37 Tube—.5 Mfd. (In P-23500)	
C20	Plate Circuit Capacitor No. 37 Tube—.15 Mfd. (In P-23500)	
C21	By-pass for Cathode Resistor No. 37 Tube—.5 Mfd. (In P-23508)	
C22	By-pass for Plate Circuits Output Tubes—.002 Mfd. (P-23596)	
C23	By-pass for "Hot" A Circuit—.01 Mfd.	(P-21535)
C24	By-pass for "B—" Circuit—.01 Mfd.	
C25	Tone Control Capacitor .01 Mfd. (P-21669)	
C26	Filter Capacitor—16 Mfd.	(P-23538)
C27	Filter Capacitor—8 Mfd.	
C28	Filter Capacitor—.04 Mfd. (P-19597)	
C29	Secondary Capacitor (P-23541)	
C30	Vibrator Capacitor.	(In P-23466 Vibrator Assembly)
C31	Vibrator Capacitor.	
C32	Cathode By-pass No. 6A7—.001 Mfd. (P-19334)	
C33	Primary Capacitor, Vibrator Circuit—.25 Mfd. (P-23765)	

STROMBERG-CARLSON TEL. MFG. CO.

MODEL 52, 54
Schematic,
Alignment, Data



180 Watts
Power Consumption (Maximum at 125 Volts)

ALIGNMENT OF RECEIVERS

If a test oscillator and output meter are used, the signal strength applied to the receiver should be low enough so that the automatic volume control is not operated in order to avoid apparent broad adjustment. If broadcast signals are used, moderately strong signals which swing the meter pointer about half the distance back toward the "Off" position should be used.

With whichever method is used, the receiver should be tuned to a 1400 kc. signal first, and the Antenna, R. F. and Oscillator Shunt Aligners adjusted for best setting. Next the receiver should be set at 600 kc. on the dial, and the Oscillator Series Aligner ONLY adjusted for best position for maximum background noise. After this is done re-check the Oscillator Shunt Aligner at 1400 kc., using same dial setting as previously. The receiver should be left turned "On" for about fifteen minutes before aligning.

The Intermediate Amplifier circuits are aligned on oscillographs to obtain the proper shape of resonance curves having "steep" sides to get proper selectivity and fidelity. "Peak" methods of alignment (with oscillator and meter) do not give the desired curve, as it may be broad and unsymmetrical although a high peak is indicated. The adjustment of these circuits is very stable as shown by field experience and Proving Division tests. Therefore, as these adjustments cannot be duplicated exactly without the oscillograph equipment, it is recommended that the I. F. circuits never be adjusted by a service man.

Warning regarding changing position of cable wires in base of chassis—Re-arrangement may cause mis-alignment, tweets, hum, etc.

CONTINUITY TEST—No. 52 RECEIVER

Socket	Heater	Plate	Screen	Suppressor	Cathode	Control Grid
R. F.	0	4080	24,040	......	450	1,600,000
Mixer	0	4080	24,040	......	6500	1,600,000
Osc.	0	23,440	......	......	6500	600
1st I. F.	0	3480	23,440	......	450	1,600,000
2nd I. F.	0	18,480	33,440	1264	1264	664
Relay	0	100,520	101,164	See Note A	See Note A	1,500,000
Demod.	0	8,840	664	664	664	2,100,520
1st Audio No. 1	0	14,940	......	......	1200	5,500
1st Audio No. 2	0	14,315	......	......	1200	4,200
2nd Audio No. 1	750	3,670	......	......	......	830
2nd Audio No. 2	750	3,590	......	......	......	750
Rectifier	3510	30	......	......	......	28

NOTE A: No reading when either Q switch is open or when phono-switch is operated. Zero ohms when Q switch is closed and phono-switch is not in operated position.

MODEL 52, 54
Voltage,
Circuit notes

STROMBERG - CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

Voltage	Meter	Scale	Where Measured	Approx. Value in Volts
Heater Voltage Nos. 35, 27 2B7, 55, 56 and 57 Tubes	A. C.	0–4	Across Heater Terminals of Sockets	2.5
Filament Voltages Nos. 2A3 Tubes	A. C.	0–4	Across Filament Terminals of Sockets	2.5
Filament Voltage No. 5Z3 Tube	A. C.	0–8	Across Filament Terminals of Sockets	5.
Plate Voltage Radio Amplifier Tube	D. C.	0–250	Between Plate Terminal of R. F. Amplifier Socket (+) and Chassis Base (—)	184
Plate Voltage Mixer Tube	D. C.	0–250	Between Plate Terminal of Mixer Socket (+) and Chassis Base (—)	186
Plate Voltage Oscillator Tube	D. C.	0–250	Between Plate Terminal of Oscillator Socket (+) and Chassis Base (—)	83
Plate Voltage First I. F. Tube	D. C.	0–250	Between Plate Terminal of First I. F. Socket (+) and Chassis Base (—)	186
Plate Voltage I. F. Demodulator Tube	D. C.	0–750	Between Plate Terminal of I. F.—Demodulator Socket (+) and Chassis Base (—)	290
Plate Voltage First Audio Tube	D. C.	0–250	Between Plate Terminal of First Audio Socket (+) and Chassis Base (—)	182
Plate Voltage Second Audio Tubes	D. C.	0–250	Between Plate Terminals of Second Audio Sockets (+) and Chassis Base (—)	240
Plate Voltages Power Output Tubes	D. C.	0–750	Between Plate Terminals of Power Output Sockets (+) and Chassis Base (—)	358
Screen Voltages, R. F. and Mixer Tubes	D. C.	0–250	Between Screen Terminals of R. F., Mixer and First I. F. Sockets (+) and Chassis Base (—)	81
Screen Voltage First I. F. Tube	D. C.	0–250	Between Screen Terminal of First I. F. Socket (+) and Chassis Base (—)	83
Screen Voltage Second I. F. Tube	D. C.	0–250	Between Screen Terminal of Second I. F. Socket (+) and Chassis Base (—)	131
"C" Voltage R. F. Amplifier Tube	D. C.	0–10	Between Cathode Terminal of R. F. Amplifier Socket (+) and Chassis Base (—)	3.2
"C" Voltage Mixer Tube	D. C.	0–10	Between Cathode Terminal of Mixer Socket (+) and Chassis Base (—)	8.2
"C" Voltage First I. F. Tube	D. C.	0–10	Between Cathode Terminal of First I. F. Socket (+) and Chassis Base (—)	3.6
"C" Voltage I. F.,—Demodulator Tube	D. C.	0–10	Between Cathode Terminal of I. F., Demodulator Socket (+) and Chassis Base (—)	3.6
"C" Voltage First Audio Tube	D. C.	0–250	Between Cathode Terminal of First Audio Socket (+) and Chassis Base (—)	35
Grid Voltage Oscillator Tube	D. C.	0–250	Between Cathode Terminal of Oscillator Tube Socket (+) and Chassis Base (—)	26
Grid Voltage Second Audio Tubes	D. C.	0–250	Between Cathode Terminal of Second Audio Sockets (+) and Chassis (Base (—)	11
Grid Voltage Power Output Tubes	D. C.	0–250	Between Grid Terminals of Power Output Tubes (—) and Terminal No. 1 on Voltage Divider (+)	57
"B" Voltage R. F. Amplifier Tube	D. C.	0–250	Between Tube Side of 600 ohm Resistor R4 (+) and Chassis Base (—)	186
"B" Voltage Mixer, First I. F. and First Audio Tubes	D. C.	0–250	Between Hi Side of Voltage Divider (+) and Chassis Base (—)	184
"B" Voltage Oscillator Tube	D. C.	0–250	Between Tube Side of 20,000 ohm Resistor (+) and Chassis Base (—)	83
"B" Voltage Second Audio Tubes	D. C.	0–250	Between Low Side of 10,000 ohm Resistor R24 (+) and Chassis Base (—)	248
"B" Voltage Power Output Tubes	D. C.	0–750	Between Hi Side of 10,000 ohm Resistor R24 (+) and Chassis Base (—)	365
"C" Voltage Power Output Tubes	D. C.	0–250	Across 750 ohm Biasing Resistor R23 on Voltage Divider	57
Speaker Field Voltage	D. C.	0–250	Across Small Pins on Speaker Connector Socket	182
Plate Voltage A. C. per Anode No. 5Z3 Rectifier Tube	A. C.	See Remarks	Between Plate Terminals of No. 5Z3 Rectifier Socket and Chassis Base	380†

A Bi-resonator is used to couple the antenna to the R. F. amplifier to prevent cross modulation. The R. F. amplifier is coupled to the mixer by a regular tuned R. F. transformer. This gives three tuning circuits (four-gang tuning capacitor) for R. F. selectivity ahead of the mixer, thus the image response ratio is extremely high. The oscillator is coupled to the cathode circuit of the mixer tube in the regular manner. The I. F. output of the mixer tube is fed into the first I. F. amplifier through a transformer. From the first I. F. amplifier the signal is coupled to the pentode portion of the second I. F. amplifier-demodulator tube. This tube is the No. 2B7, and the diodes are fed from the output of the pentode amplifier through a single tuned R. F. transformer. One of the diodes is used for the audio signal rectification and the other for AVC voltage.

The resistor unit of the volume control potentiometer forms part of the load of the "audio" diode of the No. 2B7 tube, and the audio voltage is applied to the triode portion of the No. 55 first audio tube. (The diodes in this No. 55 tube are not used). The potentiometer is double, the rear unit being used in the low level tone compensation circuit, which increases the response to bass frequencies and high frequencies in proper proportion as the volume level is reduced. The output of the No. 55 triode is fed through a transformer to the push-pull first audio stage. "The Bass Control" circuit apparatus is connected across the primary of this transformer. The "Bass Control" switch is provided to remove the bass compensation by opening this circuit when it is desired to secure extremely high levels of sound output for dancing, etc. The AVC voltage secured from the other diode of the No. 2B7 tube is fed back to the first three tubes through a suitable filter.

The "Q" circuit for providing quiet operation for tuning between stations, consists of the No. 57 relay tube connected to the "AVC" diode of the No. 2B7 tube. When there is no carrier coming in, the action of this circuit is to put high negative potentials on the "audio" diode and the grid of the No. 55 triode, thus preventing reception of inter-carrier noise. When a carrier of suitable strength comes in, these negative potentials are removed and the signal is received. A switch on the side of the chassis (right side looking at rear) is provided, so that this "Q" circuit can be rendered inoperative if it is desired to use the maximum sensitivity of the receiver.

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MODEL 52, 54
Chassis wiring

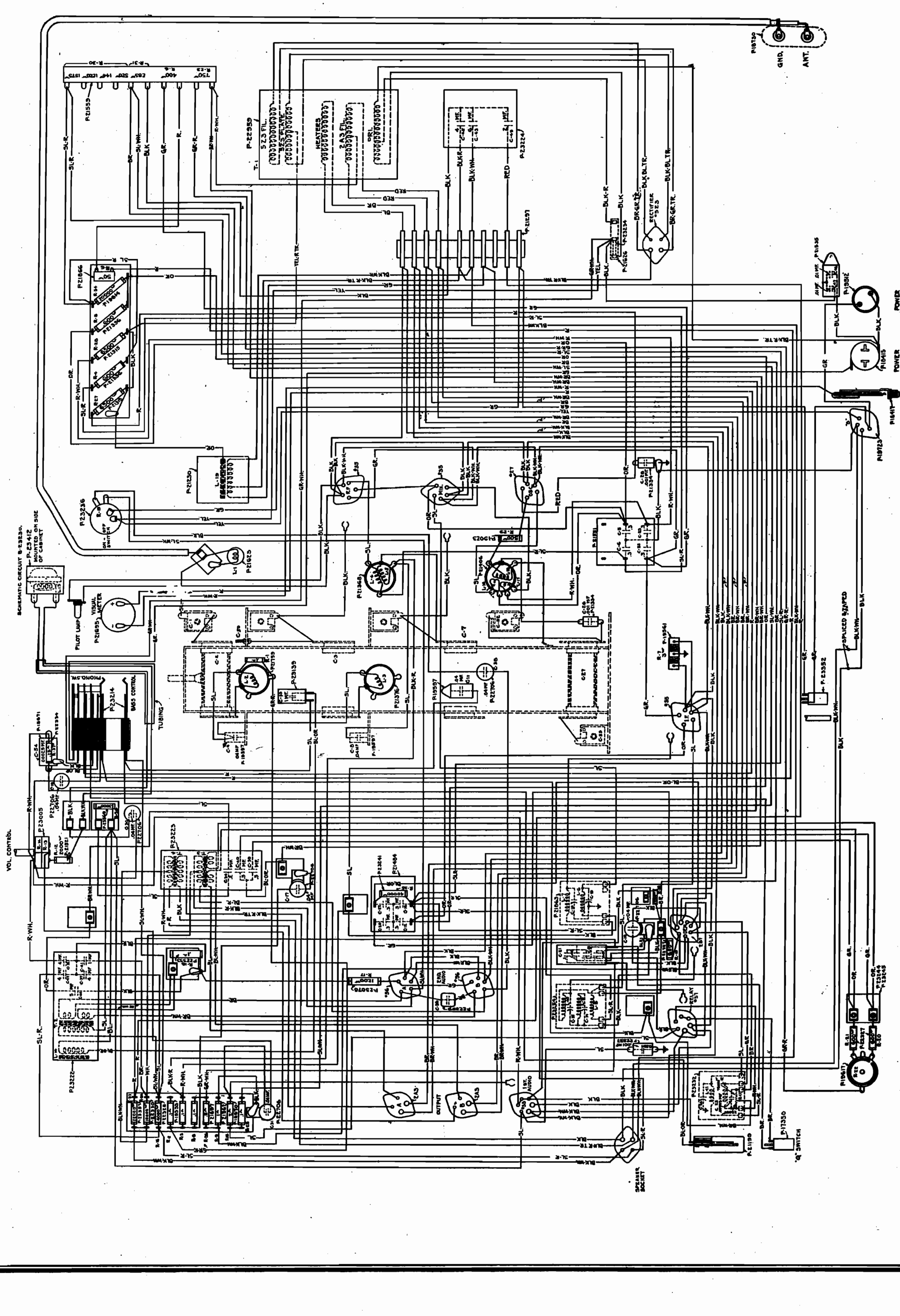
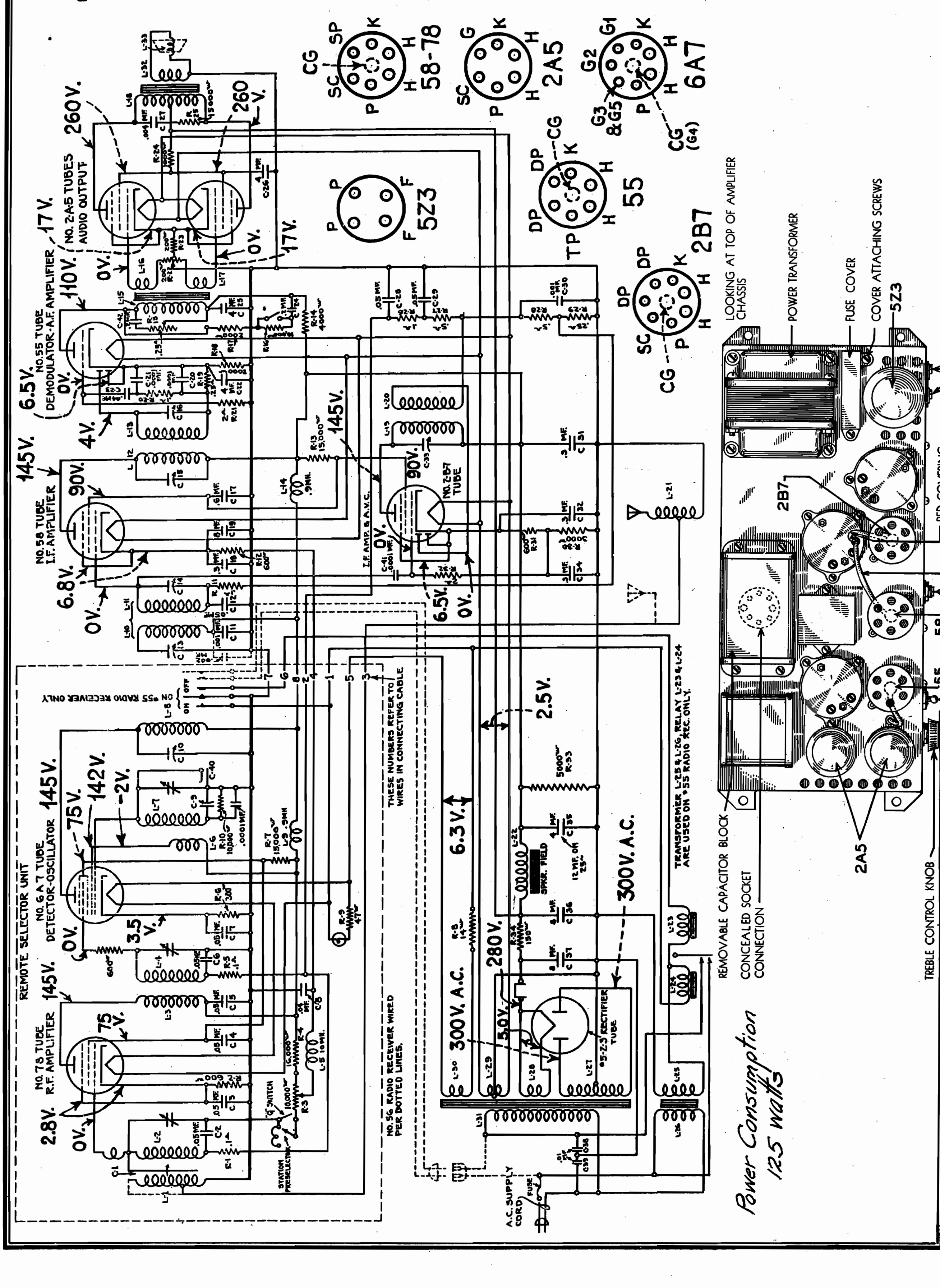


Fig. 3. Wiring Diagram.

MODEL 55,56
Schematic
Voltage

STROMBERG - CARLSON TEL. MFG. CO.



MODEL 55,56
Socket,Voltage

STROMBERG - CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes, speaker, and cable plug in place. The set is therefore in operation when the measurements are made. Fig. 1 and Fig. 2 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120

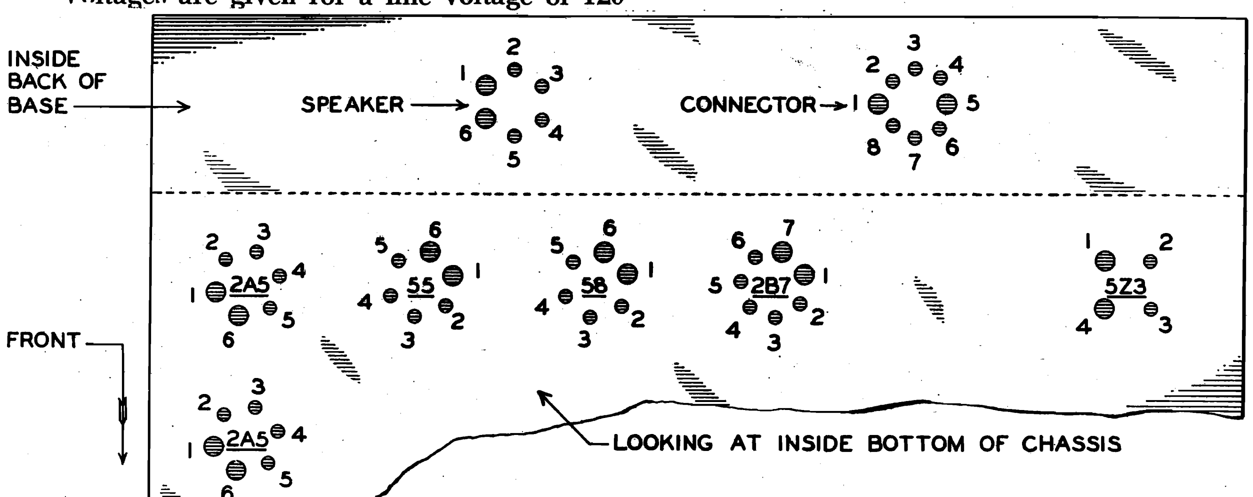


Fig. 1. Terminal Layout for Voltage Readings on Amplifier

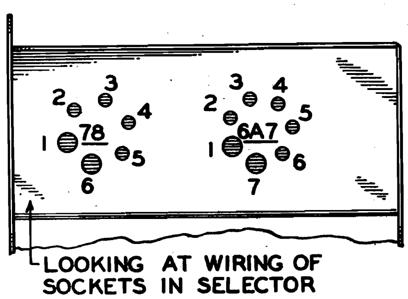


Fig. 2. Terminal Layout for Voltage Readings on Selector Unit

Tube	*Circuit*	*Grid Clip*	1	2	3	4	5	6	7	**Heater Voltages between Terminal Nos.*
78		0	*	+145	+ 75	+ 2.8	+ 2.8	*		1–6—*6.3* volts
6A7		0	*	+145	+ 75	+142	— 2	+ 3.5	*	1–7—*6.3* volts
58		0	*	+145	+ 90	+ 6.8	+ 6.8	*		1–6—*2.5* volts
2B7		0	*	+145	+ 90	0	+ 6.4	+ 6.4	*	1–7—*2.5* volts
55		0	*	+110	+ 4	+ 6.5	+ 6.5	*		1–6—*2.5* volts
2A5's		—	*	+260	+260	0	+ 17	*		1–6—*2.5* volts
5Z3 ~~80~~		—	* +280	*300*	*300*	* +280				1–4— *5* volts
Speaker Socket		—	0	+260	+270	+270	+130	0		

A. C. voltages are indicated by italics. Additional voltages may be measured directly across the proper terminals.

MODEL 55,56
Resistance data

STROMBERG - CARLSON TEL. MFG. CO.

CONTINUITY TESTS

This test is made with all tubes, the loud speaker plug, and the cable plug removed from the sockets. The power supply cord must be disconnected from the convenience outlet. The readings given are in ohms as measured on a Weston Volt-Ohmmeter No. 663.

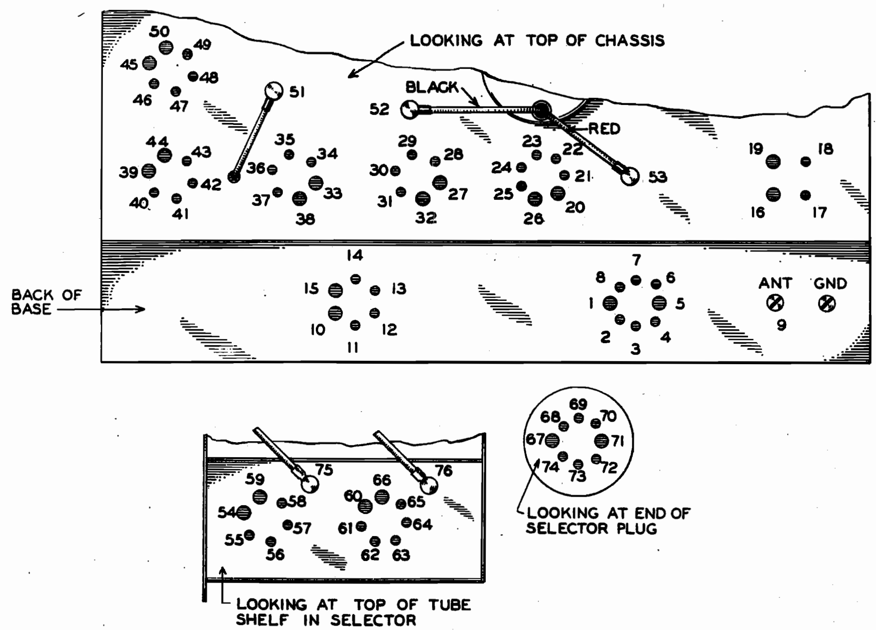


Fig. 3. Layout of Point for Continuity Test

Measurements Between Points		Resistors	If resistance differs greatly from value shown, check the following
1	5	14.5 ohms	L30, R35.
2	23	7.5 ohms	R26, R27, L20.
2	Ground	7.5 ohms	R26, R27, R28, R29.
3	9	600,000 ohms	L21.
3	Ground	1.5 megohms	L21.
4	31	600 ohms	R12.
5	6	35 ohms	L23, L24 (Relay Windings).
6	Ground	19 ohms	L24, L25.
7	Ground	0	Wiring.
8	22	16,000 ohms	L14, R13.
10	15	1 ohm	L32.
16	19	.1 ohm	L28.
17	18	90 ohms	L27.
21	Ground	5,000 ohms	L19, R33.
22	29	0	Wiring.
25	Ground	3,600 ohms	R30, R31.
26	34	5,000 ohms	L12, R14, L15.
35	Ground	300,000 ohms	L13, R19, R18.
40	46	475 ohms	L18.
40 or 46	41 or 47	1,100 ohms	L18, R24.
43 or 49	Ground	200 ohms	R22, R23.

CONTINUITY TESTS—Continued

42 or 48	Ground	5,500 ohms	L16 or L18, R22.
51	Ground	2 megohms	R21.
52	Ground	400,000 ohms	L11, R11, R29.
53	Ground	2 megohms	R30, R32.
54	71	0	Cable.
55	74	23 ohms	L3, L9, Cable.
56	74	17,500 ohms	R7, L9, Cable
58	Ground	600 ohms	R2.
61	74	60 ohms	L8, Cable.
62	74	17,500 ohms	R7, L9, Cable.
63	74	17,500 ohms	L6, R7, L9.
64	Ground	15,000 ohms	L7, R10.
65	Ground	300 ohms	R6.
66	67	0	Cable.
75	68	120,000 ohms	L2, R1, Cable.
76	68	120,000 ohms	L4, R5, Cable.

LOCATION AT POINTS USED IN CONTINUITY TEST

Point	Location	Point	Location
1	"Free" Filament lead.	39	Heater of No. 2A5 Socket.
2	A. V. C. lead.	40	Plate of No. 2A5 Socket.
3	Antenna transmission line.	41	Screen of No. 2A5 Socket.
4	Manual Volume Control lead.	42	Grid of No. 2A5 Socket.
5	Filament and Relay lead.	43	Cathode of No. 2A5 Socket.
6	Relay lead.	44	Heater of No. 2A5 Socket.
7	Shield terminal.	45	Heater of No. 2A5 Socket.
8	I. F. transmission line.	46	Plate of No. 2A5 Socket.
9	Antenna post.	47	Screen of No. 2A5 Socket.
10	Moving coil terminal for speaker.	48	Grid of No. 2A5 Socket.
11	Field coil terminal for speaker.	49	Cathode of No. 2A5 Socket.
12	Rectifier circuit rectifier side.	50	Heater of No. 2A5 Socket.
13	Rectifier circuit Filter side.	51	Grid clip for No. 55 Tube.
14	Field coil terminal for loud speaker.	52	Grid clip for No. 58 Tube.
15	Moving coil terminal for loud speaker.	53	Grid clip for No. 2B7 Tube.
16	Filament Rectifier Tube Socket.	54	Heater of No. 78 Socket.
17	Plate of Rectifier Tube Socket.	55	Plate of No. 78 Socket.
18	Plate of Rectifier Tube Socket.	56	Screen for No. 78 Socket.
19	Filament of Rectifier Tube Socket.	57	Suppressor of No. 78 Socket.
20	Heater of No. 2B7 Socket.	58	Cathode of No. 78 Socket.
21	Plate Terminal of No. 2B7 Socket.	59	Heater of No. 78 Socket.
22	Screen Terminal of No. 2B7 Socket.	60	Heater of No. 6A7 Socket.
23	Diode Terminal of No. 2B7 Socket.	61	Plate of No. 6A7 Socket.
24	Diode of No. 2B7 Socket.	62	Nos. 3 and 5 Grids of No. 6A7 Socket.
25	Cathode of No. 2B7 Socket.	63	No. 2 Grid of No. 6A7 Socket.
26	Heater of No. 2B7 Socket.	64	No. 1 Grid of No. 6A7 Socket.
27	Heater of No. 58 Socket.	65	Cathode of No. 6A7 Socket.
28	Plate of No. 58 Socket.	66	Heater of No. 6A7 Socket.
29	Screen of No. 58 Socket.	67	Same as 1 on Socket.
30	Suppressor of No. 58 Socket.	68	Same as 2 on Socket.
31	Cathode of No. 58 Socket.	69	Same as 3 on Socket.
32	Heater of No. 58 Socket.	70	Same as 4 on Socket.
33	Heater of No. 55 Socket.	71	Same as 5 on Socket.
34	Plate of No. 55 Socket.	72	Same as 6 on Socket.
35	Diode of No. 55 Socket.	73	Same as 7 on Socket.
36	Diode of No. 55 Socket.	74	Same as 8 on Socket.
37	Cathode of No. 55 Socket.	75	Grid clip of No. 78 Tube.
38	Heater of No. 55 Socket.	76	Grid clip of No. 6A7 Tube.

MODEL 55,56
Chassis wiring

STROMBERG - CARLSON TEL. MFG. CO.

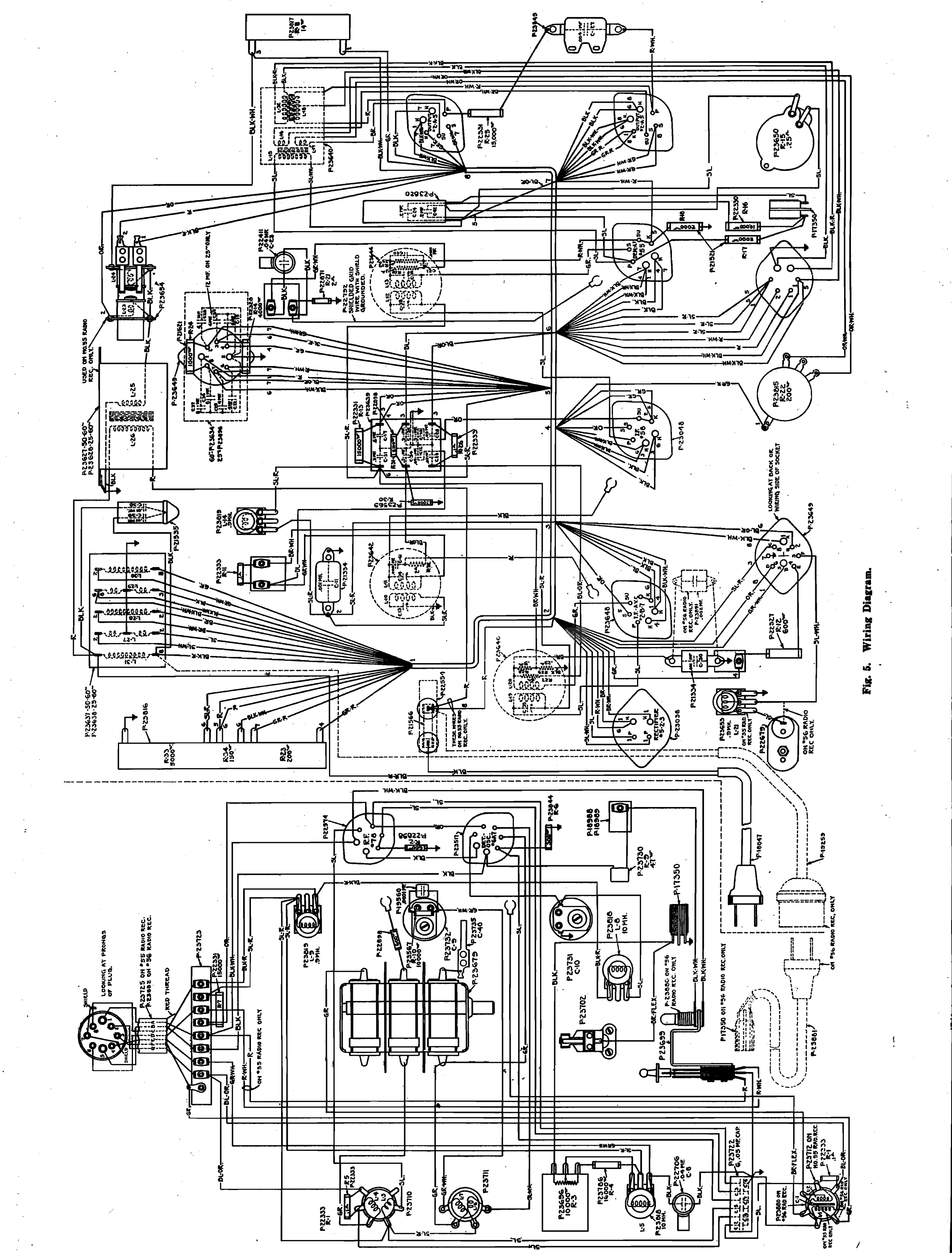


Fig. 5. Wiring Diagram.

MODEL 55,56
Selector notes

STROMBERG - CARLSON TEL. MFG. CO.

SECTION 5—PRE-SELECTOR INSTRUCTIONS

First—List the eight favorite stations which you wish to set up on the Pre-Selector Mechanism. Local and other stations that give best daytime and evening service should be selected. Arrange these eight stations in the order of their channel numbering. Channel numberings are obtained by omitting the right hand "0" from the kilocycle numbers, which you find in newspaper radio programs. For example, 700 kilocycles is channel "70".

Second—Release the lid stay on the Remote Selector Case by lowering the lid to the position where the stud "M", Fig. 3, on the upper end of the stay can be pushed out of the enlarged slot "N" of the slide plate. A slight side movement is sufficient to release this stay arm. This allows the control box lid to be completely opened as shown in the last view of Fig. 3.

Third—Remove the cover over the Selector Dial by unscrewing the four knurled headed thumbscrews "A", Fig. 2, (one located in each corner of the cover) and lifting this cover completely off. It is not necessary to remove control knobs; also the four knurled screws remain in the cover holes, to avoid misplacing these small parts.

Fourth—Take the first station nearest the "55" channel end of the dial, from the pre-selected list of "favorite" stations and tune this station by aid of the markings on the Station Selector dial. For example, WGR, which occupies channel "55" (550 kilocycles).

Fifth—With a small screwdriver, loosen Pre-Selector Contact Lug Screw "C", Fig. 7, of the first lug in the left hand end of the Contact Lug Slot, about one-half turn. This will allow the pointed end of stud of the first lug to be moved directly under and into the notch in the Contact Arm "E". Allow the Te-lek-tor-et Receiver to remain turned on for a period of at least 15 minutes before making a final setting of the contact points. This will insure correct temperature adjustment of the thermostatic control.

Sixth—Sharpen the tuning of pre-selected stations by turning down the volume (left hand knob turned counter-clockwise) and moving the right hand knob slightly until the setting is obtained where the audio quality is "full tone". Any movement in either direction from this correct setting will give a higher pitched tone or a distorted reproduction.

Seventh—Set Contact Lug Screws "C", Fig. 7, tight, taking care not to disturb the accurate setting previously obtained. Check sharpness of tuning, after setting screw "C" as described in the previous paragraph. When making this check, have the "Q" Switch Lever "G", Fig. 7, in the right hand position so as to be sure that the electrical circuit is completed through contact arm "E" and pointed stud on contact lug.

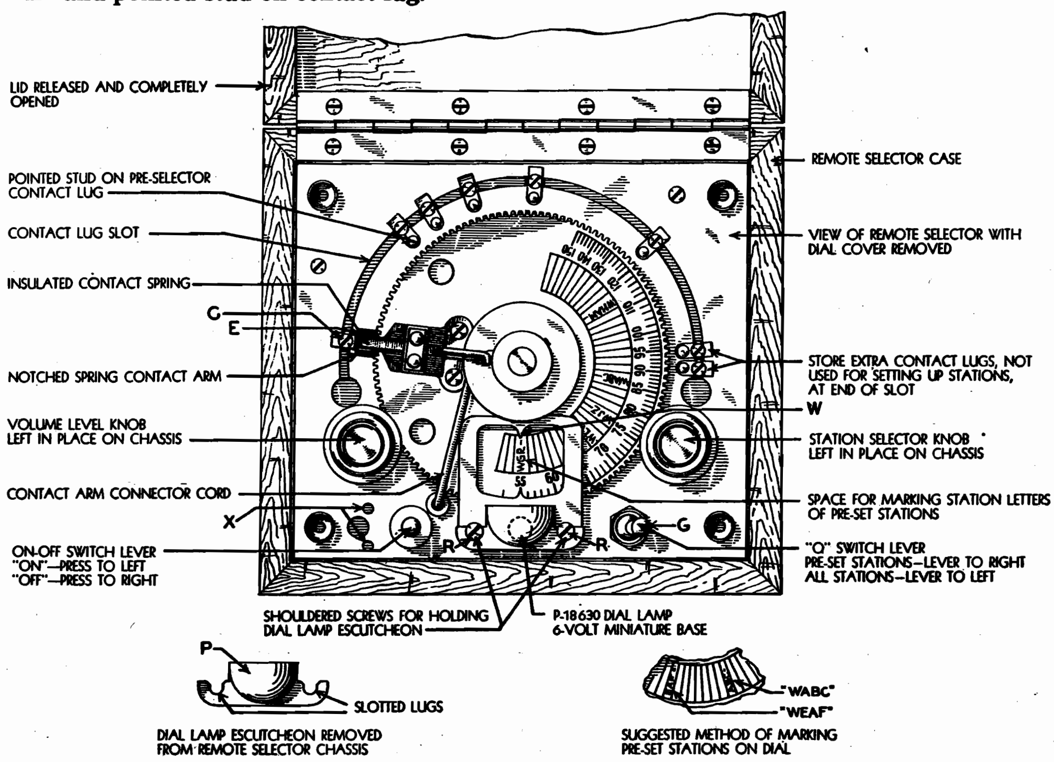


Fig. 7. Remote Selector Unit of No. 55 Te-lek-tor-et with Dial Cover removed for setting Pre-Selector Mechanism.

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Eighth—Proceed to set up remaining stations on your list in the order of the channel numbering, moving the contact lugs around the adjusting slot as the operation of setting proceeds. Store any Contact Lugs not used in setting-up favorite stations in the two ends of the adjusting slot, so as not to come into contact with the notched contact arm when operating the station selector over the used portion of the dial.

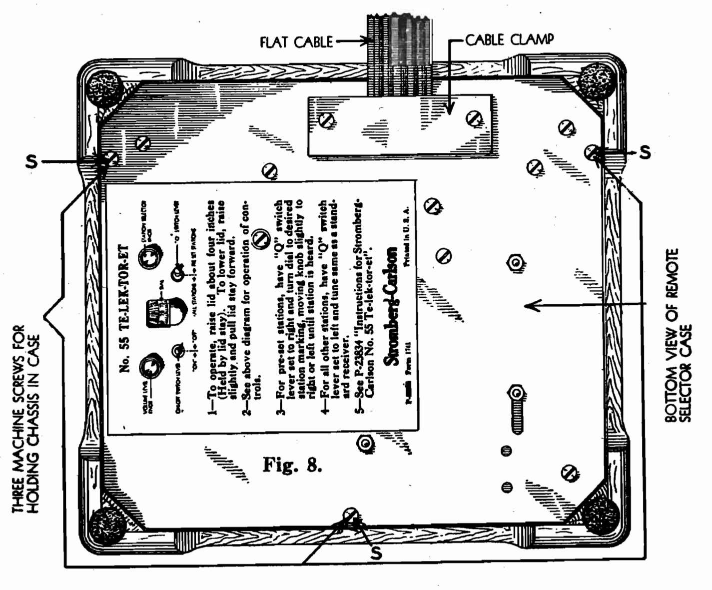
Ninth—Now, mark the station letters of the pre-selected stations only, in the white space provided on the Selector Dial, placing a dot on the dial directly in line with the upper pointer "W", Fig. 7, when the station is accurately tuned. Use a soft lead pencil and arrange letters as shown in lower view of Fig. 7. Leave off the first letter of four letter stations, for better legibility. Use a damp cloth for removing pencil markings on the dial.

Tenth—Return Selector Dial Cover, turning the four corner screws until tight.

Eleventh—Lower the lid of Remote Selector Case to a location where the end "M" of the lift stay will enter the enlarged slot "N", Fig. 3, in the lid slide plate, after which the lid can be completely lowered or raised to the limit of the stay arm.

Replacing Tubes in Remote Selector Unit

There are two radio tubes in the Te-lek-tor-et Remote Selector Case which require replacing when "worn out" in service. These tubes are easily accessible by removing the complete Remote Selector chassis as follows:



Bottom view of Remote Selector Unit of No. 55 Te-lek-tor-et showing location of Chassis Holding Screws.

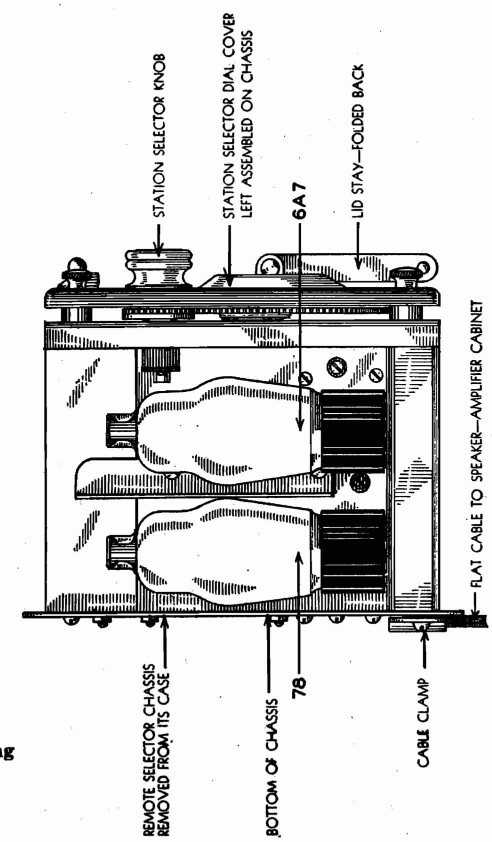


Fig. 9. Chassis of Remote Selector removed from its case for Tube Replacement.

First—Release the Remote Selector Case lid stay as shown in Fig. 3. Swing this stay back and close the lid.

Second—Turn Remote Selector Case over so as to rest on a newspaper or magazine and avoid marring the finish. Now, remove three copper colored machine screws "S", Fig. 8. This completely releases the chassis unit.

Third—Turn the Selector Case over so as to allow the chassis to come out with its own weight. Place the hand over the bottom of case when turning the Selector Unit over so as to avoid accidentally dropping the chassis and marring a table top. If the chassis sticks in the case, open the lid and press down on the top of chassis.

Fourth—Now, the two radio tubes, shown in Fig. 9, as well as all working parts of this chassis are completely accessible.

 STROMBERG - CARLSON TEL. MFG. CO.

Stromberg-Carlson No. 64 Radio Receiver

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Rochester, New York

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Type and Number of Tubes	1 No. 37, 3 No. 42, 1 No. 78, 1 No. 6A7, 1 No. 6B7, 1 No. 5Z3
Voltage Rating	105-125 Volts
Frequency Rating	50-60 Cycles
Power Consumption (Maximum at 125 volts)	160 Watts

CIRCUIT DESCRIPTION

The No. 78 tube is used as the R. F. Amplifier. The No. 6A7 tube is used for the oscillator-mixer. The No. 6B7 tube is used for the I. F. Amplifier, A. V. C., and demodulator. The No. 37 tube and one of the No. 42 tubes is used for the first and second (driver) audio stages respectively. The other two No. 42 tubes are used in the high power push-pull output stage.

This receiver is provided with two tuning ranges, 540 k. c. to 1,500 k. c. and 1,400 k. c. to 3,600 k. c. "Touch Tuning" is provided and includes means for "Free Wheeling" operation. See P-24185 "Installation and Operation Instructions" for directions for operating the controls of this receiver.

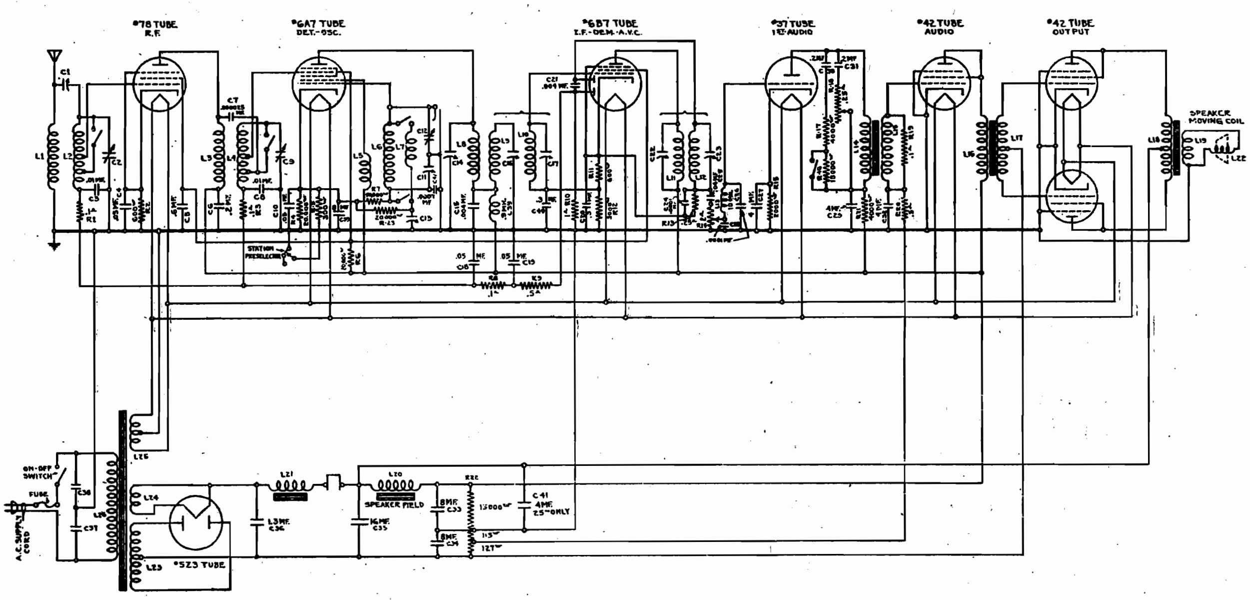
An antenna aligner, which may be adjusted with a screwdriver, if necessary, is located on the rear of the top of the chassis. Align only at high frequency end of dial with very weak station.

If the receiver does not respond over the dial when the "Q" switch is in the "All-Stations" position or if the pre-selector arms cause the grounding (outer) contact on the spring assembly to make when the brush rides up on the end of the arm (determined by listening with the "Q" switch in the "Pre-selected Stations" position), adjust the grounding spring on the contact assembly to the right, looking at the back of the receiver, so that it makes contact when the "Q" switch is in the "All-Stations" position only, and at no other time. See Fig. 2, P-24185 Instruction Book. When adjusting this outside contact spring, make bends only in the section near the contact end so as not to effect the initial tension of the spring against its mounting frame.

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes, speaker, and cable plug in place. The set is therefore in operation when the measurements are made. Fig. 1 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages. The Volume Control should be set all "On" (clockwise) before measuring voltages. See page 2.



MODEL 64
Voltage
Parts List

STROMBERG-CARLSON TEL. MFG. CO.

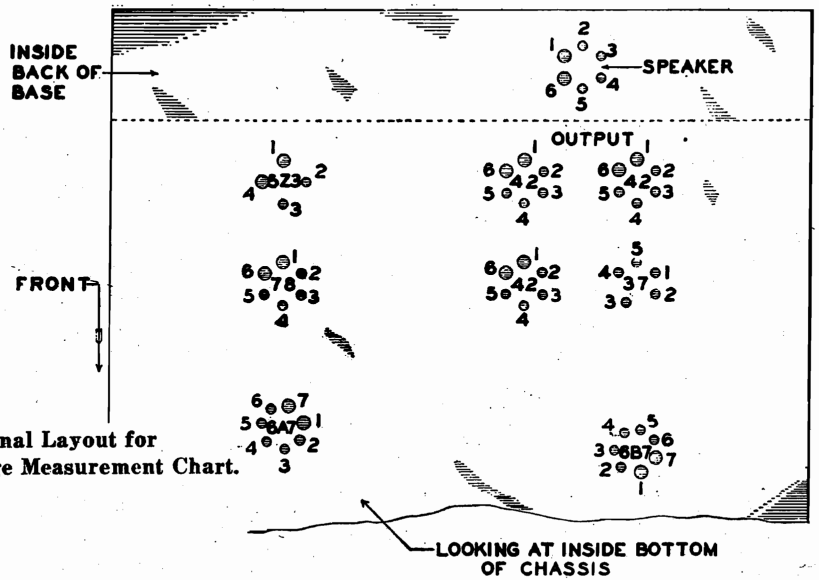


Fig. 2. Terminal Layout for Voltage Measurement Chart.

Terminals of Sockets

Tubes	*Circuit*	*Cap.*	1	2	3	4	5	6	7	*A. C. Meter for Heater Voltages Between Terminal Nos.*
78	R. F.			+210	+ 90	+2.5	+2.5			1–6—6.3 volts
6A7	Det. Osc.			+210	+ 90	+210	– 35	+2.5		1–7—6.3 volts
6B7	I. F. Dem. A. V. C.	+12		+210	+ 90		2.5	15		1–7—6.3 volts
37	1st Audio			+190		+ 10				1–5—6.3 volts
42	2nd Audio			+190		–3.5				1–6—6.3 volts
42	Output			+350		– 35				1–6—6.3 volts
5Z3	Rectifier	A. C. voltmeter between plate terminal and chassis base		480						1–4—5 volts
Speaker Socket				+210	+350	+350	+350			

A. C. voltages are indicated by italics. Additional voltages may be measured directly across the proper terminals.

REPLACEMENT PARTS

Piece Number		List Price Each
P-23965	Transformer Assembly Audio	$4.55
P-24025	Transformer Assembly Audio	2.40
P-23967	Transformer Assembly Output	2.20
P-23969	Capacitor Assembly, 60 cycles	7.20
P-24058	Capacitor Assembly, 25 cycles	7.20
P-23964	Capacitor Assembly	4.95
P-24030	Capacitor Assembly	2.30
P-21535	Capacitor Assembly	.80
P-24067	Capacitor Assembly	.30
P-22411	Capacitor Assembly	.80
P-24060	Condenser	.35
P-24061	Condenser	.35
P-24062	Condenser	.45
P-24072	Condenser	.60
P-22557	Capacitor	.70
P-24064	Potentiometer Volume Control	1.20
P-24065	Potentiometer Treble Control	1.20
P-23150	Fuse	.12
P-18047	Power Cord	.80
P-23819	Coil Assembly, 9 M H	.60
P-19630	Grid Clip	.12
P-23818	Coil Assembly, 10 M H	.70
P-22390	Knob—Large	.27
P-22391	Knob—Small	.22
P-24084	Knob—"Q" Circuit	.12

Piece Number		List Price Each
P-24013	Power Transformer, 60 cycle	8.55
P-24014	Power Transformer, 25 cycle	8.55
P-21521	Resistor, 2,000 Ohms	.37
P-21562	Resistor, 1 Megohm, Type "C"	.37
P-21593	Resistor, 20,000 Ohms, Type "C"	.37
P-22328	Resistor, 4,000 Ohms, Type "C"	.37
P-22331	Resistor, 15,000 Ohms, Type "C"	.37
P-22333	Resistor, 100,000 Ohms, Type "D"	.37
P-22335	Resistor, 500,000 Ohms, Type "D"	.37
P-22898	Resistor, 600 Ohms, Type "D"	.37
P-23569	Resistor, 3,000 Ohms, Type "D"	.37
P-23844	Resistor, 300 Ohms, Type "D"	.37
P-23567	Resistor, 10,000 Ohms, Type "D"	.37
P-23966	Resistor, Wire Wound	1.85
P-23038	Tube Socket, 4 Prong	.17
P-23039	Tube Socket, 5 Prong	.17
P-23218	Tube Socket, 6 Prong	.17
P-23648	Tube Socket, 7 Prong	.17
P-23649	Tube Socket, 8 Prong	.17
P-24046	Coil Assembly Antenna	2.50
P-24048	Coil Assembly, R. F.	2.50
P-24049	Coil Assembly Oscillator	.90
P-24042	Transformer Assembly, 1st I. F.	2.60
P-24043	Transformer Assembly, 2nd I. F.	4.05

MODEL 64
Chassis wiring

STROMBERG - CARLSON TEL. MFG. CO.

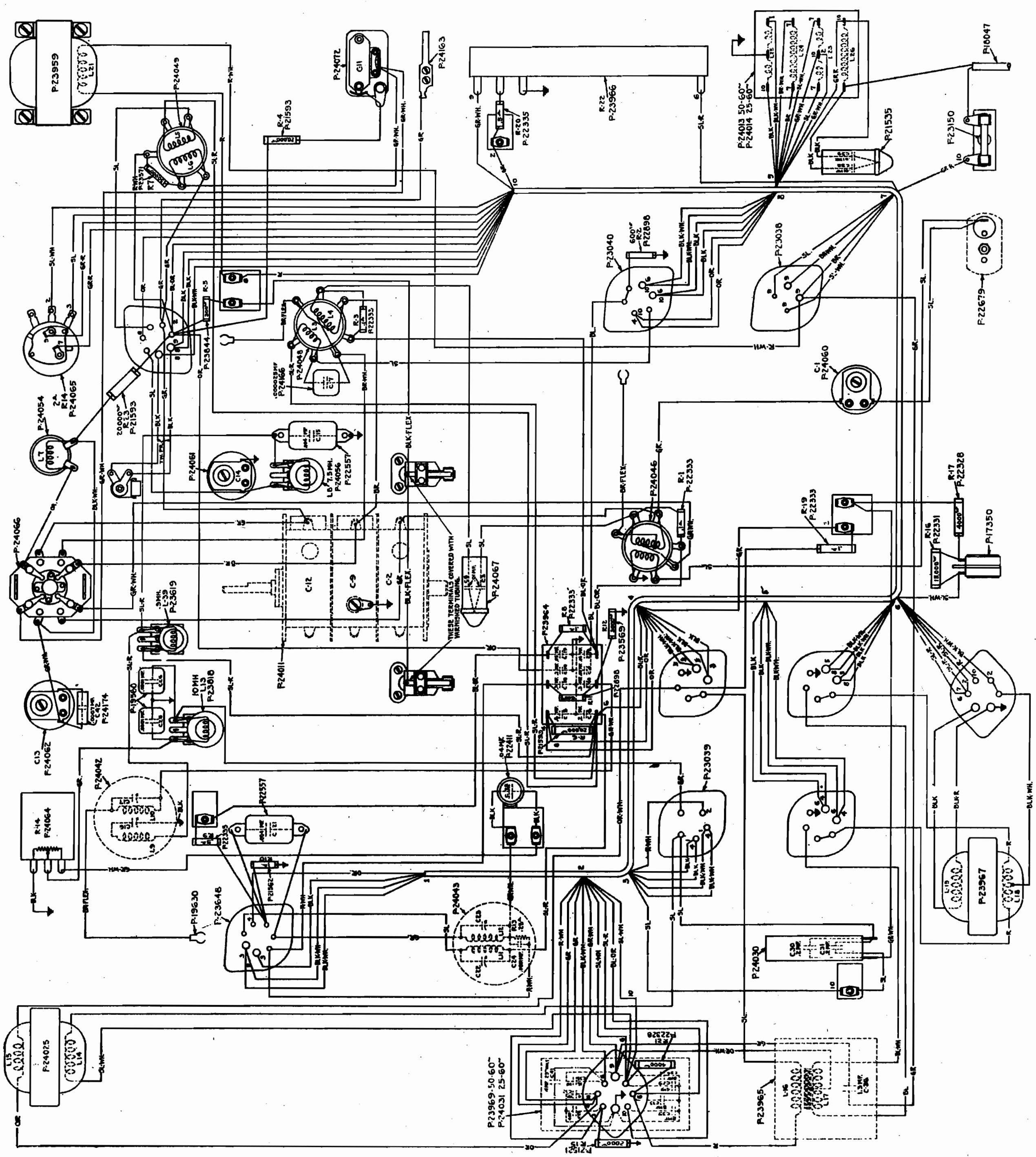


Fig. 3. Wiring Diagram of Chassis.

MODEL 64

Chassis assembly

STROMBERG - CARLSON TEL. MFG. CO.

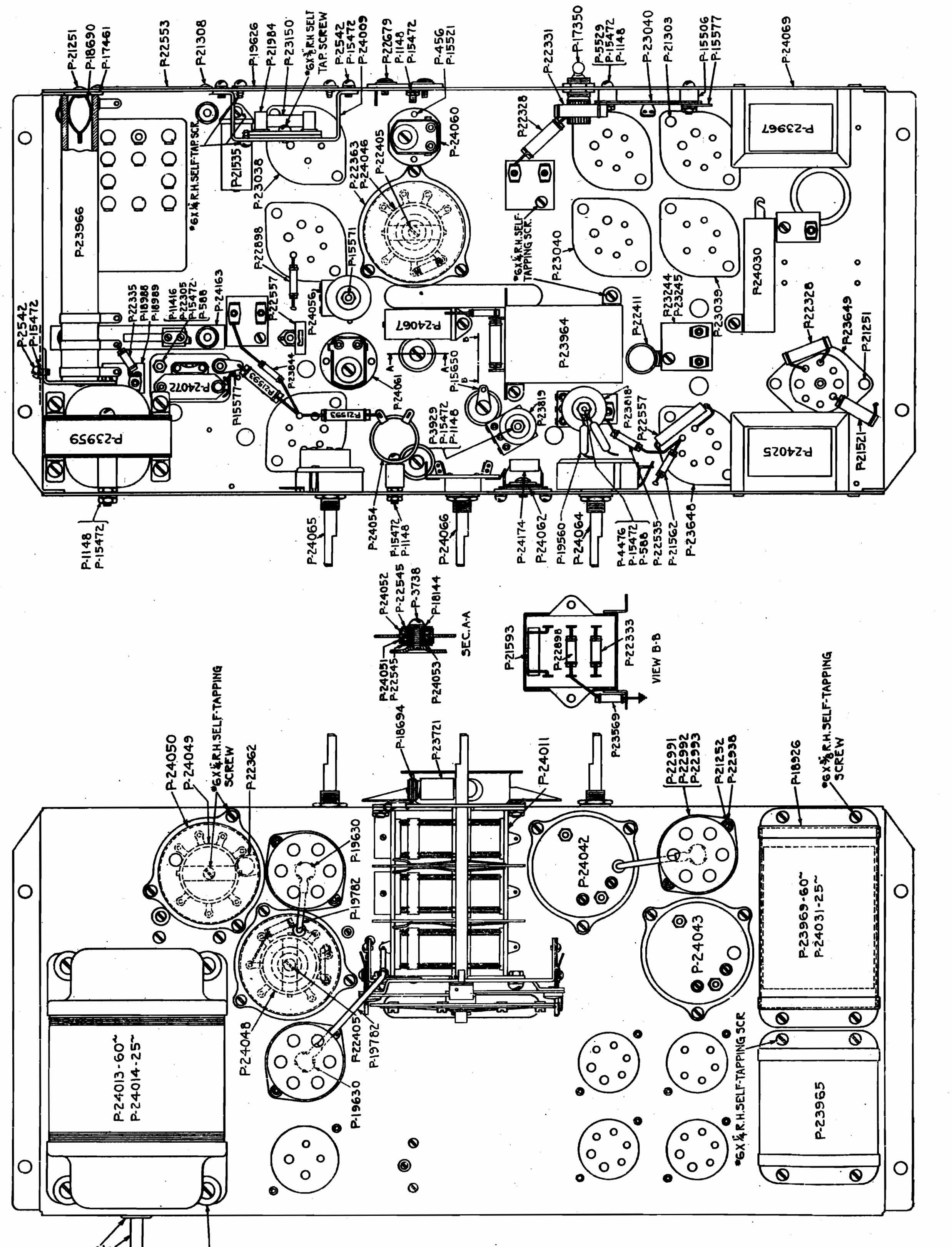


Fig. 4. Chassis Assembly.

MODEL 64
Selector notes

STROMBERG - CARLSON TEL. MFG. CO.

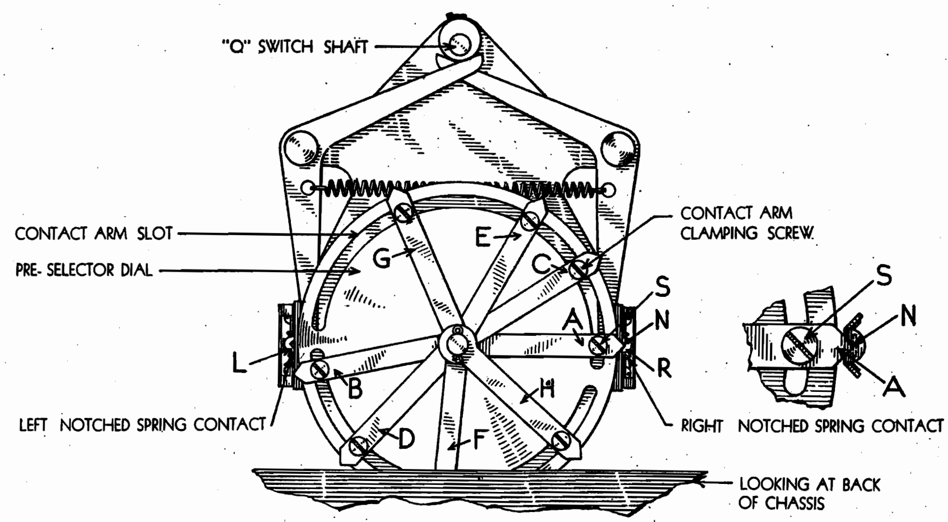


Fig. 2. Pre-selector Mechanism

SETTING UP "FAVORITE STATIONS" ON PRE-SELECTOR MECHANISM:

First—List the eight favorite stations which you wish to set up on the Pre-Selector Mechanism. Local and other stations that give best daytime and evening service should be selected. Arrange these eight stations in the order of their channel numbering. Channel numberings are obtained by omitting the right hand "0" from the kilocycle numbers, which you find in newspaper radio programs. For example, 700 kilocycles is channel "70"

Second—Take the first station nearest the "55" channel end of the dial, from the pre-selected list of "favorite" stations and tune this station by aid of the markings on the Station Selector Dial. For example, WGR, which occupies channel "55" (550 kilocycles).

Third—With a small screwdriver, loosen Pre-Selector Contact Arm Screw "S", Fig. 2, of the first arm in the right hand end of the upper Contact Arm Slot, about one-half turn. This will allow the pointed end of the first arm "A" to be moved directly under and into the notch "N" in the Contact Arm "R" Have the "Q" Switch Knob pointer in right hand position when "setting-up" stations,

Fourth—Sharpen the tuning of pre-selected stations by turning down the volume (left hand knob on front of cabinet turned counter-clockwise) and moving the large middle station selecting knob slightly until the setting is obtained where the audio quality is "full tone". Any movement in either direction from this correct setting will give a higher pitched tone or a distorted reproduction.

Fifth—Now, set Contact Lug Screws "S", Fig. 2, tight, taking care not to disturb the accurate setting previously obtained. Check sharpness of tuning, after setting screw "S" as described in the previous paragraph. When making this check, have the pointer of the "Q" Switch Knob, Fig. 1, in the right hand position so as to be sure that the electrical circuit is completed through contact arm "R" and "S" and pointed stud on contact arm. Allow the Receiver to remain turned on for a period of at least 15 minutes before making a final setting of the contact points. This will insure correct temperature adjustment of the thermostatic control.

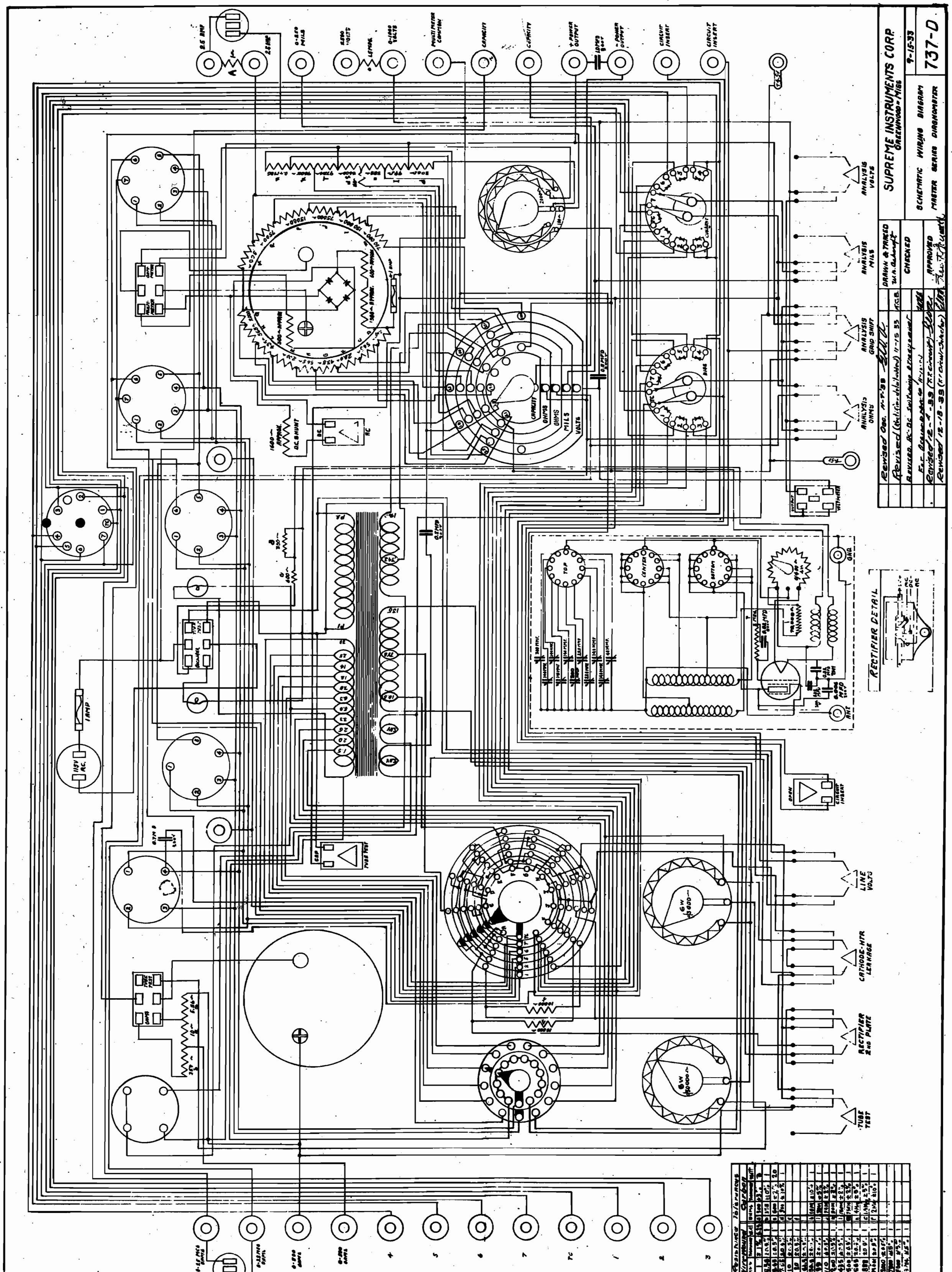
Sixth—Proceed to set up remaining stations on your list in the order of the channel numbering, using first contact arm "B" in the left hand end of lower slot (Fig. 2) and left hand notched Spring Contact "L" for the second station, in pre-selected list of "Favorite Stations". For the third station use contact arm "C" and right hand notched Spring Contact "R". For the fourth station use Arm "D" and left hand Contact "L". For the fifth station use Arm "E" and right hand Contact "R". For the sixth station use Arm "F" and left hand Contact "L". For the seventh station use Arm "G" and right hand Contact "R". For the eighth station use Arm "H" and left hand Contact "L". This use of contact arms from alternate slots allows close spacing of adjacent "Favorite Stations". If alternate arrangements are not used it may be found impossible to make use of all the contact arms. Store any Contact Lugs not used in setting up favorite stations in the two ends of the adjusting slots, so as not to come into contact with the notched contact arms when operating the station selector over the used portion of the dial.

Seventh—Now, mark the station letters of the pre-selected stations only, in the white space provided on the Selector Dial between the dial numberings, when the station is accurately tuned. Use a soft lead pencil. Leave off the first letter of four letter stations, for better legibility. Use a damp cloth for removing pencil markings on the dial.

Eighth—By setting the pointer of the "Q" Switch Knob to the left hand position (for "all stations") both of the contact springs "L" and "M" are raised so as to be clear of the pointed ends of the rotating contact arms, giving free action of the tuning dial (popularly termed "Free Wheeling").

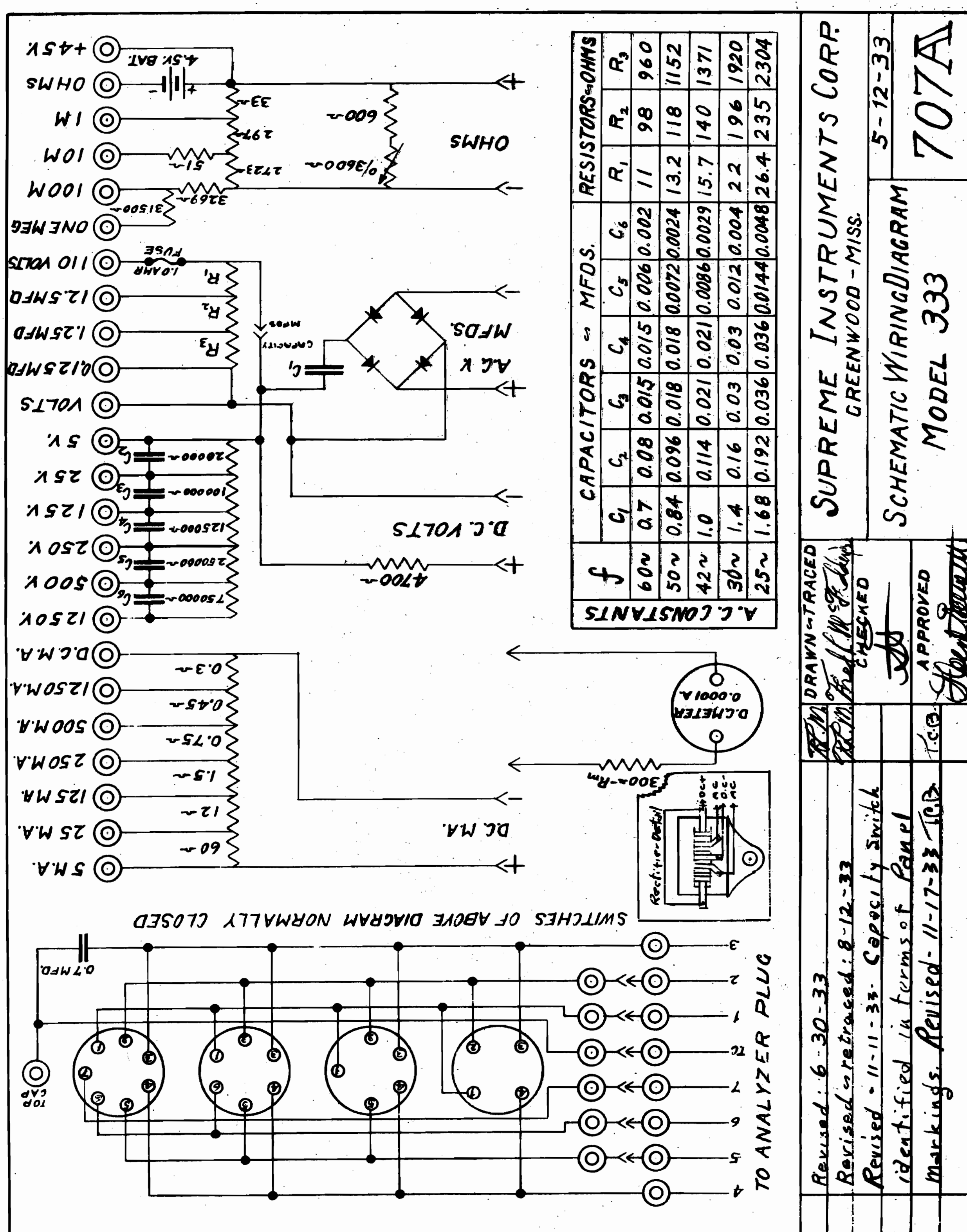
SUPREME INSTRUMENTS CORP.

MODEL "Master" Diagnometer Schematic



MODEL "333"
Free Reference Point Tester

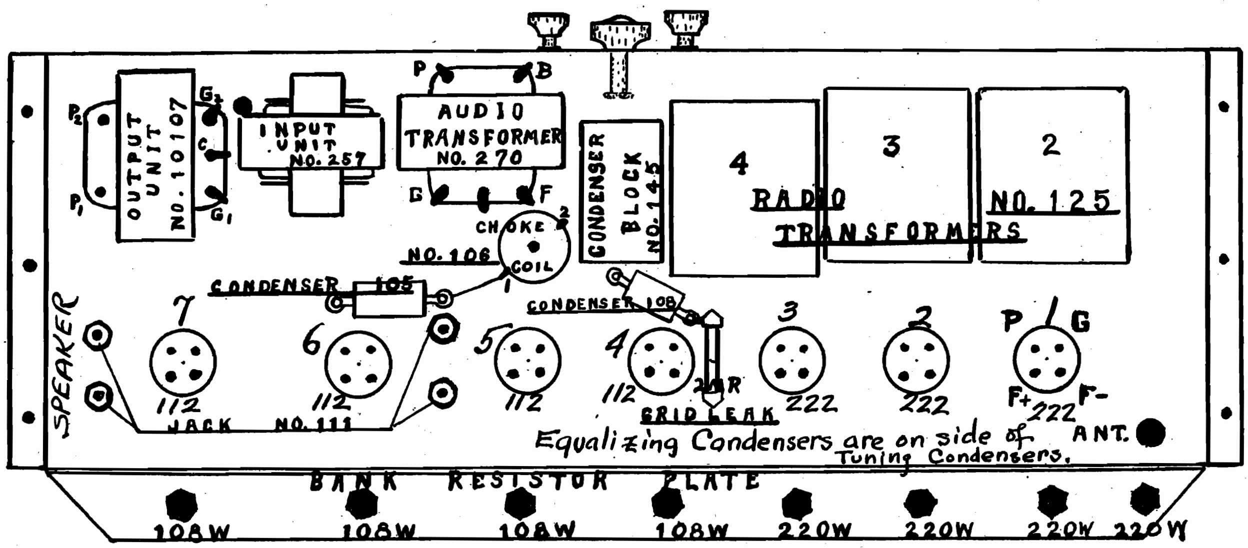
SUPREME INSTRUMENTS CORP.



A.C. CONSTANTS	CAPACITORS - MFDS.						RESISTORS - OHMS		
f	C_1	C_2	C_3	C_4	C_5	C_6	R_1	R_2	R_3
60~	0.7	0.08	0.015	0.015	0.006	0.002	11	98	960
50~	0.84	0.096	0.018	0.018	0.0072	0.0024	13.2	118	1152
42~	1.0	0.114	0.021	0.021	0.0086	0.0029	15.7	140	1371
30~	1.4	0.16	0.03	0.03	0.012	0.004	22	196	1920
25~	1.68	0.192	0.036	0.036	0.0144	0.0048	26.4	235	2304

MODEL A,B
Socket,Voltage
Resistance data

L. TATRO PRODUCTS CORP.



(Continuity Tests, Radio)

Place one Prod on	The other one	Voltmeter Reading should be approx.	Part tested
F2 of Coil 125	G of Coil 125	Full	Secondary of 125
F1 of Coil 125	P of Coil 125	Full	Primary of 125
G of Coil 125	P of Coil 125	None	For Short of 125
GND	G of Coil 125P	Full	Secondary of 125P
ANT	P of Coil 125P	Full	Special Coil of 125P

Unsolder and separate the two wires from below at ANT for next test.

Place one Prod on	The other one	Voltmeter Reading should be approx.	Part tested
GND	F1 of Coil 125P	None	For Short of 125
GND	G of Loading Coil 125	Full	Loading Coil

Unsolder the four wires from bottom of each condenser or gang number 3604B.

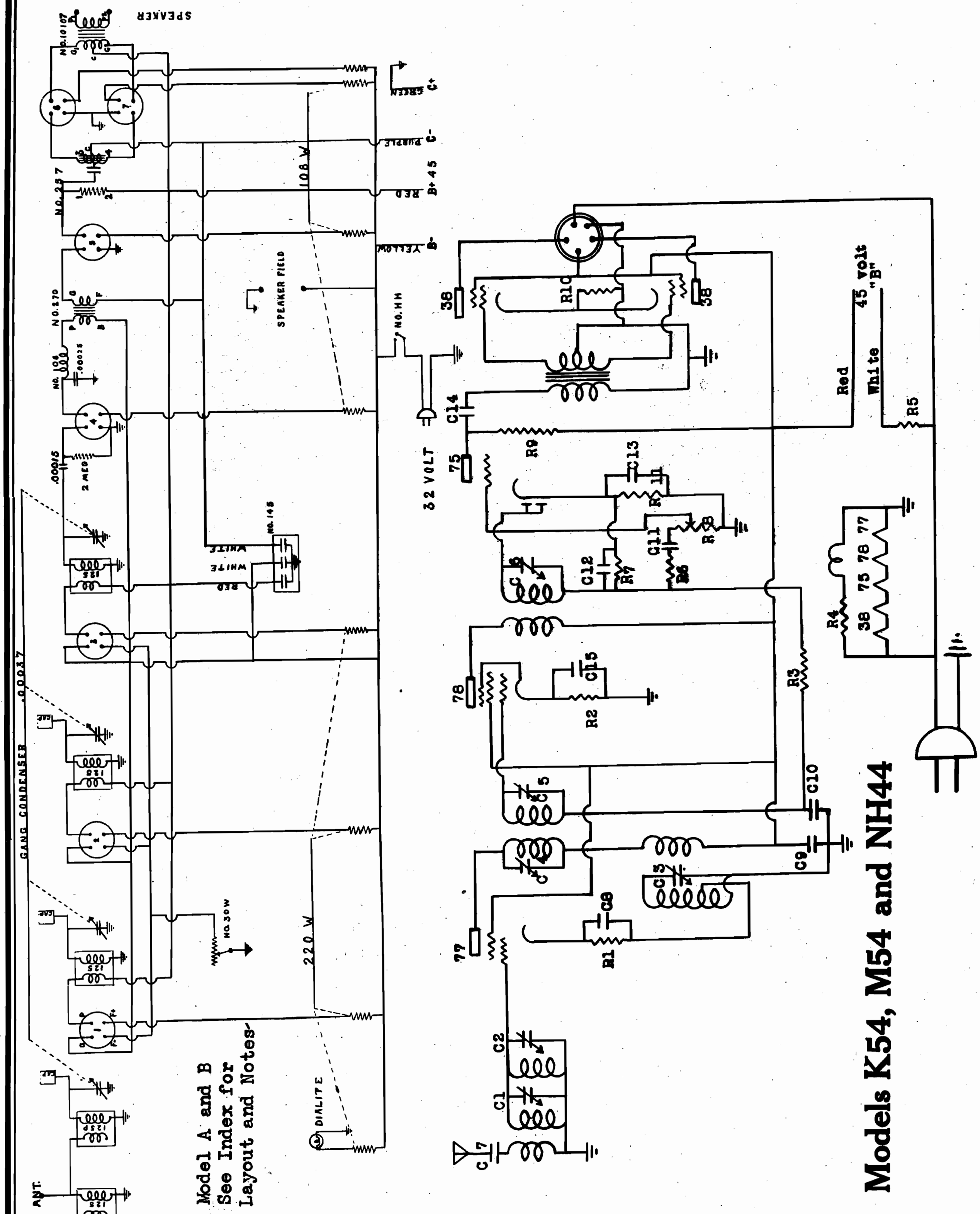
Place one Prod on	The other one	Voltmeter Reading should be approx.	Part tested
Screen Grid Cap	GND	None	Turn dial as you test each cond.

(Continuity Tests, Audio)

Place one Prod on	The other on	Ohms of resistance	Voltmeter Reading should be approx.	Part tested
P of Audio No. 270	B of Audio No. 270	2800	½ Full	Primary No. 270
G of Audio No. 270	F of Audio No. 270	7000	⅓ Full	Secondary No. 270
1 of Choke	2 of Choke	20	Full	Choke
3 of Input No. 257	4 of No. 257	10000	¼ Full	Secondary No. 257
1 of Input No. 257	2 of No. 257	27000	⅛ Full	Resistance No. 257
2 of Input No. 257	4 of No. 257		None	Condenser of No. 257
G of Output No. 10107	G2 of No. 10107	4300	⅓ Full	Primary of No. 10107
One Speaker Jack	Other Speaker Jack	6	Full	Secondary of No. 10107
F on No. 270	GND	None	None	Part of Unit No. 145
F1 on 125 No. 4	GND		None	Part of Unit No. 145
G1 Tube No. 3	GND		None	Part of Unit No. 145
One Side No. 105	Other Side No. 105		None	Condenser No. 105
One Side No. 108	Other Side No. 108		None	Condenser No. 108

MODEL A,B
Schematic
MODEL K-54,M-54,NH-44
Schematic

L. TATRO PRODUCTS CORP.

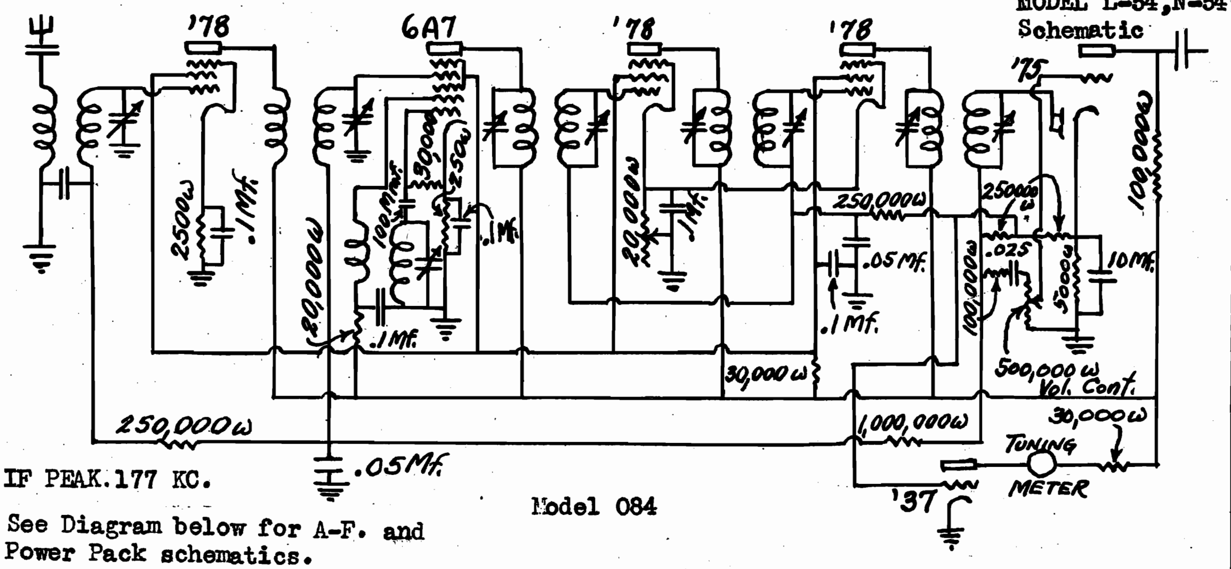


C1, C2, C3 tuning condensers; C4, C5, C6 I. F. trimmers; C7 .0025 Mfd; C8 .005 Mfd; C9, C14, C15 .1 Mfd; C10 .05 Mfd; C11 .025 Mfd; C12 .0005 Mfd; C13 .10 Mfd 6 volt electrolytic.

R1, R11 5000 ohms; R2 400 ohms; R3 1 meg; R4 200 ohms; R5 25 ohms; R6 30,000 ohms; R7 250,000 ohms; R8 ½ meg volume control; R9 100,000 ohms; R10 800 ohms; R12 (not shown on plate No. 2) ½ meg tone control connected in series to a .005 Mfd condenser between plates of output tubes.

MODEL 084
Schematic
MODEL L-54, N-54
Schematic

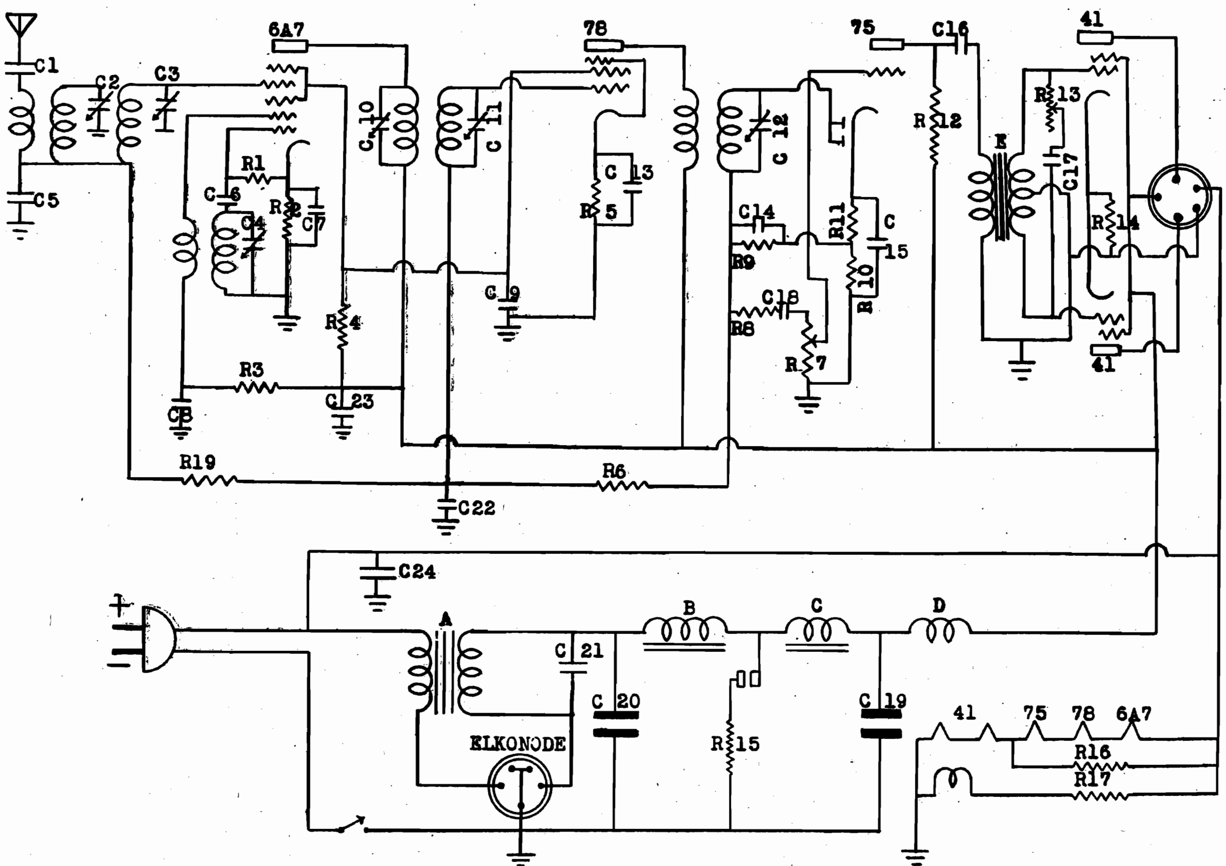
L. TATRO PRODUCTS CORP.



IF PEAK.177 KC.

Model 084

See Diagram below for A-F. and Power Pack schematics.



CIRCUIT DIAGRAM "L'TATRO" RADIO

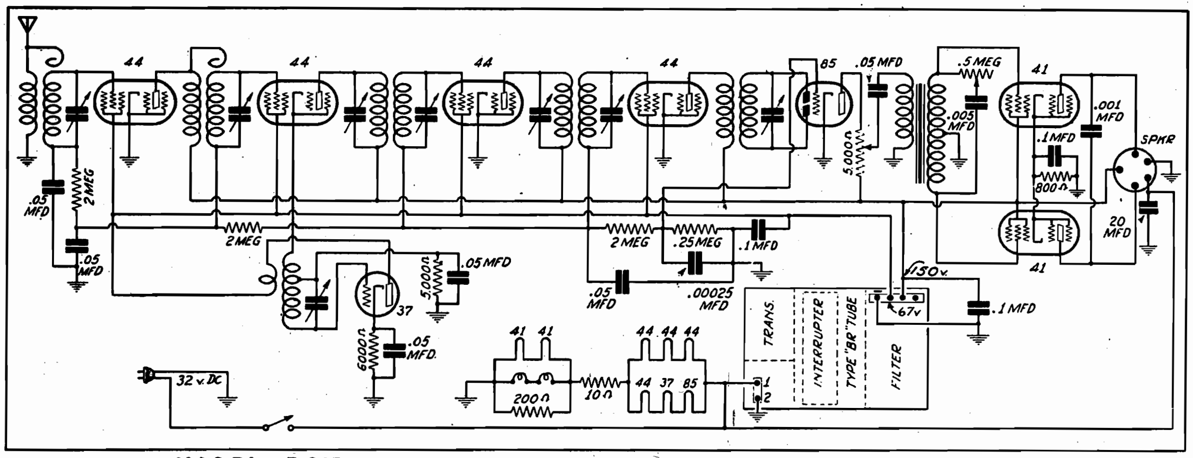
Models L54 - - N54

C2, C3, and C4 tuning condensers; C1 .0025 Mfd; C5, C7, C8, C9, C13, C16, C23 .1 Mfd; C6 100 mmfd; C10, C11, C12 I. F. trimmers; C14 .0005 Mfd; C15 10 Mfd 6 volt electrolytic; C17 .005 Mfd; C18 .025 Mfd; C19 16 Mfd 250 volt electrolytic; C20 8 Mfd 250 volt electrolytic; C21 .01 Mfd 1600 volts; C22 .05 Mfd; C24 20 Mfd 40 volt electrolytic.

R1 30,000 ohms; R2 250 ohms; R3 20,000 ohms; R4 38,000 ohms; R5 400 ohms; R6 1 meg ohm; R7 ½ meg volume control; R8 30,000 ohms; R10 3500 ohms; R11 1500 ohms; R12 100,000 ohms; R13 ½ meg tone control; R14 800 ohms; R15 7000 ohms; R16 and R17 200 ohms; R9 and R19 250,000 ohms.

MODEL F-913
Schematic, Notes

L. TATRO PRODUCTS CORP.



MODEL F 913

SERVICE NOTES

Model F913

In reference to the diagram the dial lights of the Model F913 are operated in series and are mounted as follows: one on station selector assembly and the other on the tuning meter assembly. It is very important that these dial lights are lighting when the receiver is being operated since they pass a portion of the filament current of the one bank of tubes.

The filaments of the type 41 tubes pass approximately 390 milliamperes and must not be replaced by type 41 tubes designed to pass 650 milliamperes.

The 20 mfd bipass condenser which is mounted to the speaker socket is of the electrolytic type and will be damaged if the receiver is connected to an alternating current source.

The secondary of the radio frequency and detector coils and the tuned coil of the oscillator are bank wound of "litz" wire. Should these coils become damaged through shipment of the receiver so that replacement is necessary, make sure that the single secondary turn of wire passing on the grid side of tuned section is not mutilated so as to cause a short-circuit.

In the two first intermediate amplifier coils both primary and secondary are tuned while in the third intermediate amplifier coil the secondary only is tuned. The latter being arranged with very close coupling and if damaged look for short between the primary and secondary. These coils are all wound with single strand enameled wire and are "flat-topped" at approximately 10 K. C.

The audio transformer has a ratio of approximately 2 to 1 per side. Do not substitute when replacing this unit.

The intermediate voltage of the power unit is approximately 67 volts and the high potential terminal will register approximately 150 volts at no signal when read with a voltmeter.

The visual tuning indicator as used on these receivers is placed directly in the plate lead of the radio frequency and intermediate amplifier tubes being bipassed by an .05 condenser.

If the antenna pick up coil has been damaged it will be necessary to replace the old antenna coil primary and secondary.

The antenna switch simply shunts the antenna to chassis panel and the mute tuning switch shunts the primary of the audio transformer.

In some instances an erratic noise may be noticed from the speaker of the receiver which is caused by interference from radiation of current in the 32-volt mains as a result of local conditions permitting the vibrator of the power unit to feed alternating current to these mains. When this condition exists a very noticeable hum may be heard from the receiver especially when tuned to a weak station during the daytime and can be eliminated entirely when the proper steps are taken. In the first place it is necessary that there be no leaks in the line between the 32-volt outlet socket and the battery. In order to check this it is sometimes advisable to run a separate line from the 32-volt battery to the receiver to note whether or not there will be any improvement.

If the radio is operated at some distance from the battery the line will have to be of sufficient size to carry the current with ample reserve. It is usually advisable that one side of the 32-volt line be grounded at the generator and then at several other points and if an installation is encountered where pick up of interference is excessive it is advisable to try the line grounded and also non-grounded. In any event if trouble is being experienced with interference from excessive hum it is always advisable to increase the length of the antenna since this receiver may be operated on an antenna up to 200 feet in length. Also bear in mind that if the radio is connected to the 32-volt battery in the proper manner and if the antenna is placed as far as possible from the external wiring of the 32-volt system you should not be able to notice any hum or hash even on the most distant stations.

If the receiver is operated at reversed polarity over any length of time, the contact points of the vibrator may become injured or the buffer condenser blocked. This is caused by the de-tuning affect of the primary system of the high voltage transformer being entirely out of synchronism and overloading these units. Make sure that the receiver is operated at proper polarity in accordance with instruction card inclosed with receiver.

Model F923

The Model F923 uses the same circuit as that of the F913 with the exception that it operates with two speakers. Should one of these speakers become damaged it is advisable that both be returned to distributor or factory for repairs since they are matched and if replacement is necessary the speakers will have to be operated simultaneously.

Model E83

Model E83 uses the same circuit throughout with the exception of the tube arrangement, visual tuning indicator and the one intermediate amplifier. Two type '38 output tubes are used in place of the type 41s so that 6 tubes are placed in series across the 32-volt line and one of the tubes is fed by a 100-ohm resistor. The dial light in this receiver is fed through a 200-ohm resistor placed directly across the line. The visual tuning indicator is not used in this model. Only one intermediate amplifier stage is used. The intermediate amplifier coils in this case being wound of "Litz" wire and coupled for "maximum" gain.

Models D73 and D76

Models D73 and D76 are identical to E83 with the exception that the power unit is not used in the latter models. The screen grid voltage is obtained from the positive side of the 32-volt line and the plate voltage on all of the tubes but the oscillator is obtained from the line plus a 45-volt battery, the negative terminal of which is connected to the positive of the 32-volt main.

TRANSFORMER CORP. OF AMERICA

MODEL AC-240
Voltage, Resistance
Trimmer data

VOLTAGE ANALYSIS

Model 240

No.	Stage	Tube	A	B	C	K	Sc.G	Ip.	Su.g
1	Autodyne. . . .	24	2.0	230	8.0	10	75	.6	....
2	Oscillator. . .	27	2.0	100	0	0	....	7.0	....
3	1st. I.F. . . .	51	2.0	250	.0	3.0	75	2.0	....
4	2nd. I.F. . . .	51	2.0	250	0	3.0	75	2.0	....
5	Audio	58	2.0	190	.4	0	25	1.0	.4
6	Dio Det	56	2.0	0	0	0	0	0	....
7	Output.	47	2.25	250	16.0	....	250	30.	....
8	Rectifier . . .	80	4.8	300	....	....	....	....	....

Vol. control "full on".
Band switch "broadcast".
Tested with Weston model 565 analyzer.
Line: 115 Volts.

CIRCUIT RESISTANCE ANALYSIS

Model 240 Socket to ground

Stage	Grid	Cath-ode	Heater	Plate	Screen G	Suppr G	Space G
Autodyne	4.0	10,300	0.15	20,400	8,400	.....	......
1st.I.F.	850,000	200	0.2	20,400	8,400	.....	......
2nd.I.F.	850,000	200	0.25	19,400	8,400	.....	......
Dio Det.	250,000	0.17	0.33	0.11	......	.....	......
Oscilla-tor . .	100,000	0.25	0.15	8,400	......	.....	......
Audio. .	Infini-ty	0.1	0.12	120,000	Infin-ity	0.1	......
Pentode.	500,000	......	0.25	20,000	......	.....	19,400
Recti-fier. .	....	......	19,900	1.320 1,360	......	.....	......

Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohm meter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

ADJUSTING TRIMMERS: The model 240 receiver has ten trimmer condensers. The setting is critical, due to the high intermediate frequency that is employed, namely 490 K. C. Rough handling in shipment will occasionally jar these condensers and cause the set to lose sensitivity.

Very few test oscillators of commercial design will supply a frequency of 490 K. C. We are giving, herewith, a sketch of an oscillator that might be made up with standard parts from the model 240. For this purpose you will require, one P-1595 type 80 socket at 20¢ ea. One P-1106, one meg resistor at 35¢, two P-1100 .001 condenser (in parallel) 25¢ ea. One G-1532 second I. F. coil and trimmer assembly at $2.50. In addition to this you will require a 230 type tube, three Fhanestock clips, 22½ volts of "B" battery and two volts of "A" battery. The mechanical layout is not important and can be adapted to suit your requirements. When completely assembled, the oscillator's condenser can be adjusted by connecting a wire from the B plus terminal to the grid cap of the first detector type 24 tube on the model 240, then vary the oscillator condenser until the signal comes thru the standard 240 set with peak volume. Two .001 condensers are used in parallel, to obtain a value of .002. This condenser's capacity and the value of the grid leak governs the tone of the signal. Slightly different values can be used if necessary.

To adjust the trimmers connect your 490 K. C. oscillator to the first detector type 24 grid cap and in the following order. Readjust trimmers three, four, five, six, seven and eight for maximum output, preferably using an output meter as an indicator. The above operations take care of all intermediate adjustments. These trimmers will be found numbered on the drawings of the chassis, top view, in this manual.

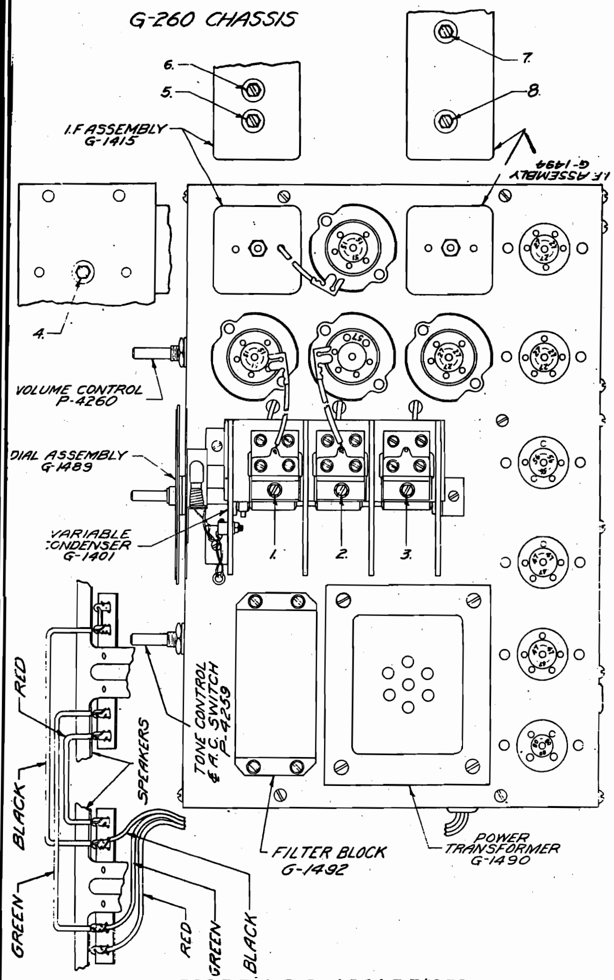
Next disconnect the 490 K. C. oscillator and tune in a broadcast signal, either from an oscillator or a known frequency, crystal controlled, broadcasting station at 1400 K. C. Adjust trimmer #1 for maximum output, then adjust trimmer #2 for proper calibration so that the dial reads exactly 1400 K. C. when the signal is tuned in at maximum volume. Next retune the receiver to 600 K. C. and adjust #10 trimmer on the rear of the chassis, slowly increasing and decreasing the capacity of #10 trimmer at the same time, and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swing closely and readjust #10 trimmer until the needle reaches the highest peak.

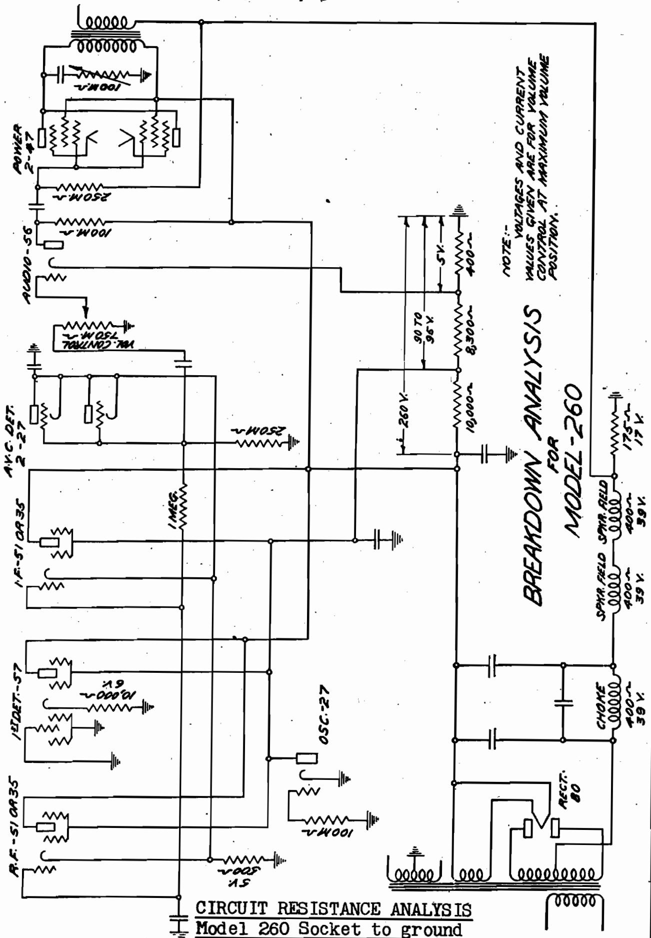
Next, throw the band switch to the center position and tune in a signal at about 1700 K. C., probably a police call station would be the handiest. Readjust #9 trimmer for maximum output. Switch back to the broadcast band and retune the receiver and test oscillator to 1400 K. C., then re-check trimmer #2 to make sure that the adjustment of #10 has not thrown the receiver out of calibration. If it has, then readjust #2 until the calibration is correct.

MODEL AC 260
Voltage
Resistance Data
Breakdown Chart
Chassis View

TRANSFORMER CORP. OF AMERICA

No. 1 is the antenna trimmer, No. 2 first detector trimmer, No. 3 oscillator gang trimmer, No. 4 oscillator padding trimmer, No. 5 second detector grid trimmer, No. 6 second detector plate trimmer, No. 7 intermediate frequency grid trimmer, No. 8 intermediate frequency plate trimmer.





VOLTAGE ANALYSIS

Taken with Weston 565 Analyzer

Stage	Type Tube	"A" Volts	"B" Volts	Cont. Grid Volts	Cath. Volts	Screen Volts	Ip Norm
R. F.	51 or 35	2.15	250	.4	4.	80	4.
1st Det.	57	2.25	137	4.5	5.	83	.5
Osc.	27	2.25	107	0	0	0	8.
I. F.	51 or 35	2.25	244	.4	4.	76	1.7
AVC Det	27	2.25	0	2.5	4.5	0	0
AVC Det	27	2.25	0	2.5	4.5	0	0
1st Audio	56	2.25	178	2.	4.	0	1.5
Pentode	47	2.25	235	16	0	0	25.
Pentode	47	2.25	235	16	0	0	25.
Rect.	80	4.9	140	0	0	0	98.

CIRCUIT RESISTANCE ANALYSIS
Model 260 Socket to ground

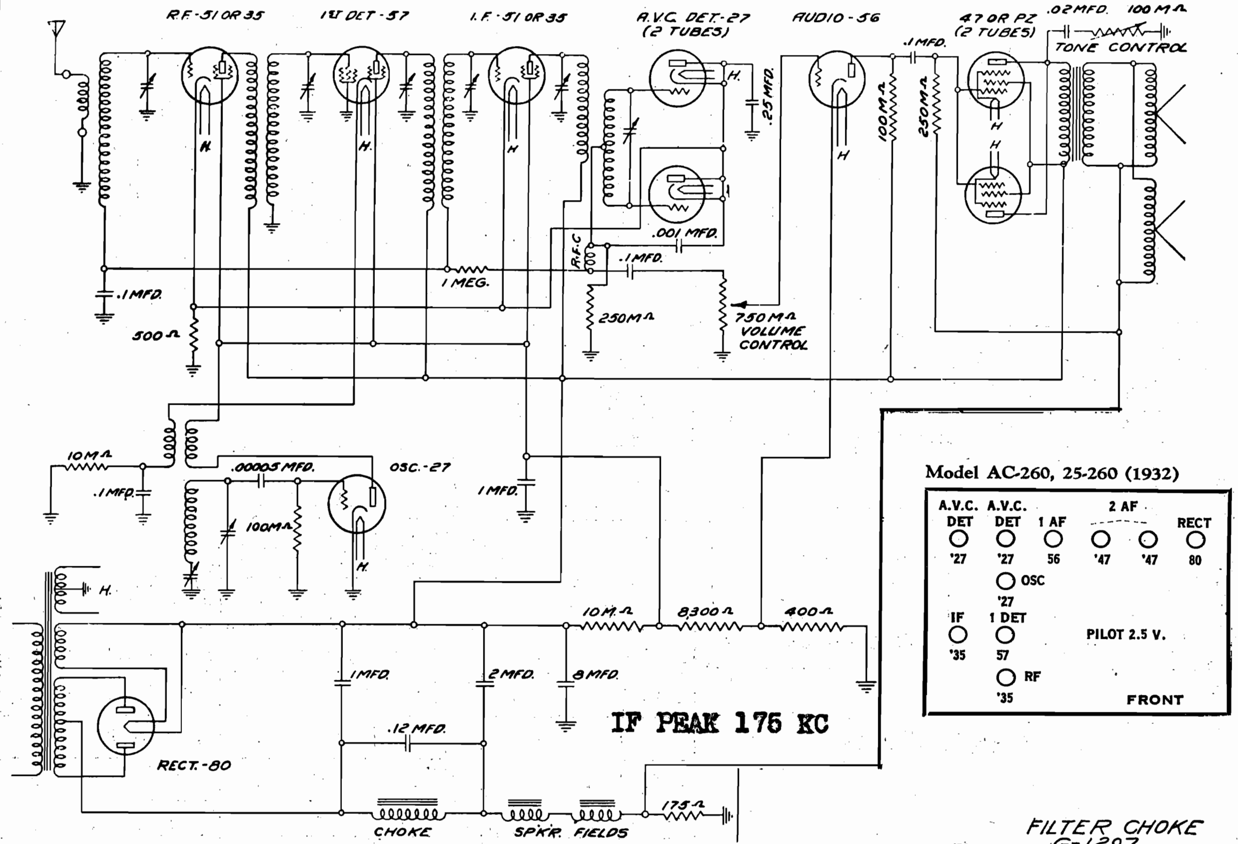
Stage	Grid	Cath-ode	Heater	Plate	Screen G	Suppr. G	Space G
R. F.	Infinity	500	.1	18,400	8,700	...	......
1st.Det.	4.0	10,000	.1	18,800	8,700	.08	......
Oscillator	100,000	.08	.1	8,700	.....	...	......
I. F.	Infinity	510	.1	18,600	.....	...	......
A.V.C. Det.	230,000	510	.1	510	.....	...	......
A.V.C. Det.	230,000	510	.1	510	.....	...	......
Audio	750,000	422	.1	110,000	.....	...	......
Output	275,000	......	.1	19,000	.....	...	18,800
Output	275,000	......	.1	19,000	.....	...	18,800
Rectifier	....	......	18,800	1,580	.....	...	......

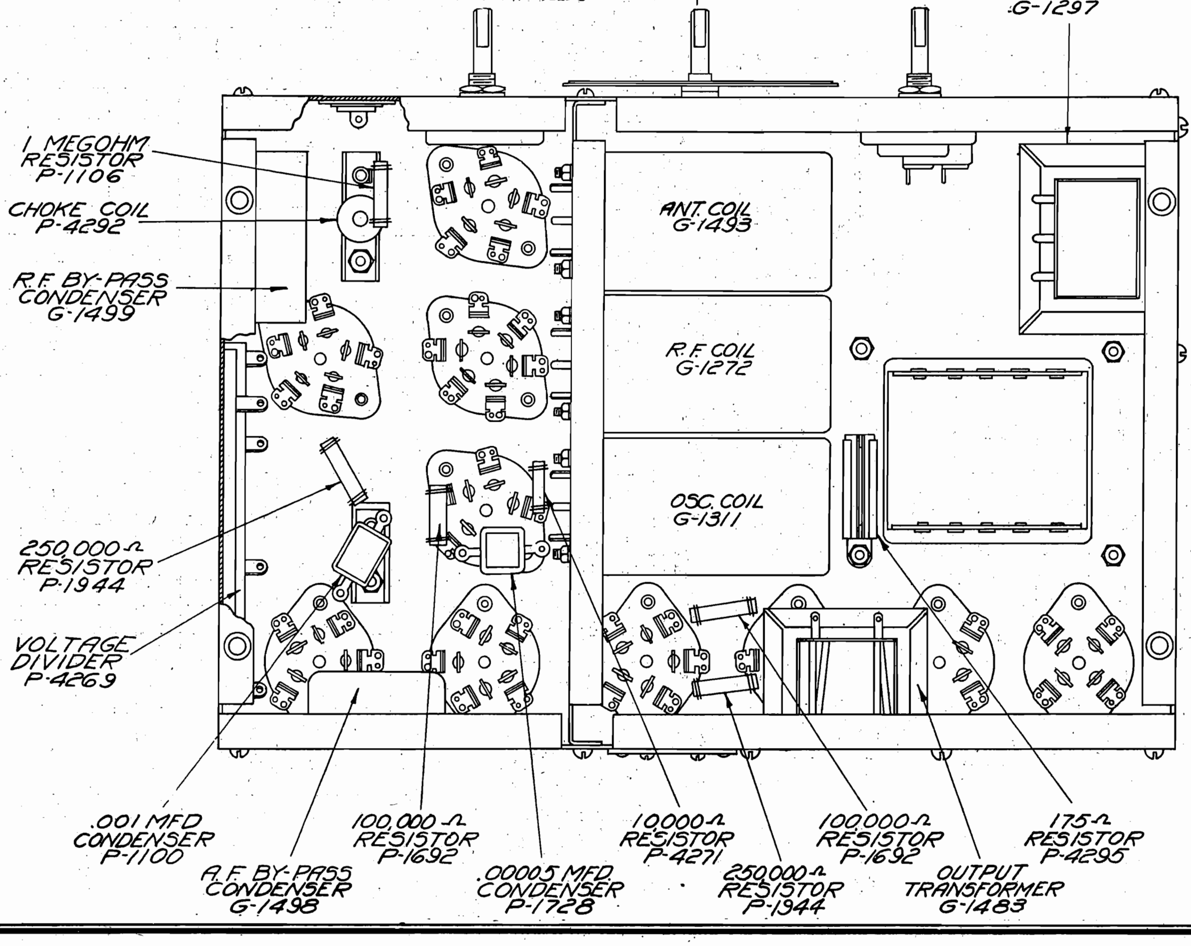
Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohm meter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

Note: Since resistance tolerances in the set are plus or minus 10 percent, and the tubes may vary over 20 percent, your readings may disagree with the above by plus or minus 30 percent.

TRANSFORMER CORP. OF AMERICA

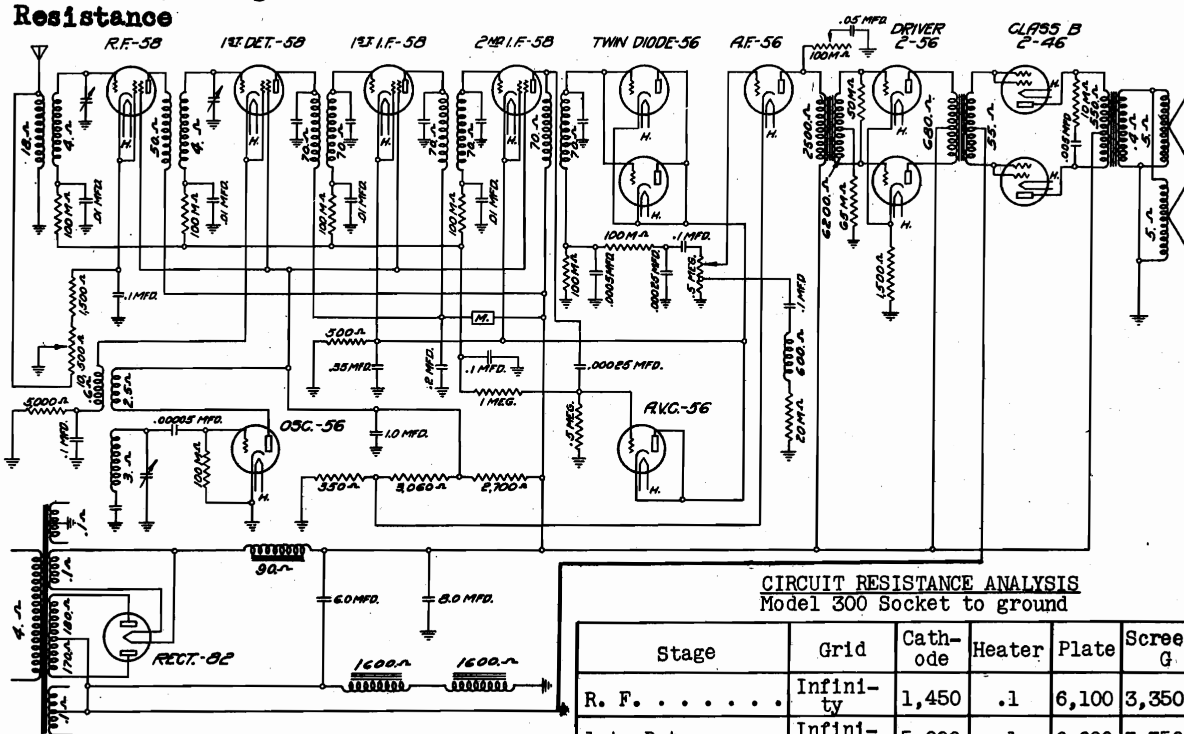
MODEL AC 260
Schematic
Chassis View



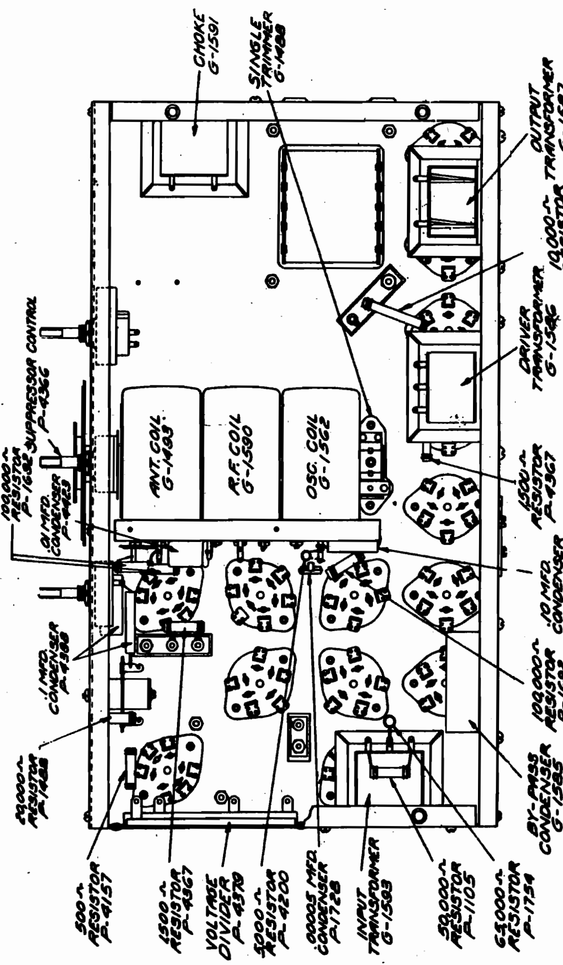


MODEL AC-300
Schematic, Voltage
Resistance

TRANSFORMER CORP. OF AMERICA



IF PEAK 175 KC



CIRCUIT RESISTANCE ANALYSIS
Model 300 Socket to ground

Stage	Grid	Cath-ode	Heater	Plate	Screen G	Suppr. G
R. F.	Infinity	1,450	.1	6,100	3,350	1,480
1st. Det.	Infinity	5,000	.1	6,600	3,350	5,000
1st. I. F. . . .	Infinity	500	.1	6,600	3,350	500
2nd. I. F. . . .	Infinity	500	.1	6,100	3,350	500
Oscillator. . . .	100,000	.07	.1	3,400	.....	.....
A.V.C.	500,000	500	.1	500	.....	.....
1st. diode. . . .	100,000	500	.1	500	.....	.....
2nd. diode. . . .	100,000	500	.1	500	.....	.....
A. F.	500,000	350	.1	8,600	.....	.....
Driver 1.	68,000	1,500	.1	6,400	.....	.....
Driver 2.	68,000	1,500	.1	6,400	.....	.....
1 Class "B" . . .	3,250	.....	3,250	6,300	.....	.....
2 Class "B" . . .	3,250	.....	3,250	6,300	.....	.....
Rectifier	....	.....	6,100	3,400	.....	.....

Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohm meter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

VOLTAGE OF ANALYSIS
Model 300

No.	Stage	Tube	A	B	C	K	Sc.G	Ip.	Su.G.
1	R.F.	58	2.2	180	.5	7.	85	.7	7.
2	1st. Det. . . .	58	2.2	180	1.	7.	85	1.2	7.
3	Oscillator . . .	56	2.2	100	0	0	0	10.	..
4	1st. i.f.	58	2.1	190	.4	4.	90	3.	4.
5	2nd. i.f.	58	2.0	190	.2	4.	90	2.	4.
6	A.V.C.	56	2.0	0	0	4.	..	0	..
7	Diode	56	2.1	0	0	4.	..	0	..
8	Diode	56	2.1	0	0	4.	..	0	..
9	A.F.	56	2.2	180	0	10.	..	2.	..
10	Driver 1	56	2.3	185	0	8.	..	3.	..
11	Driver 2	56	2.3	185	0	8.	..	3.5	..
12	Class "B" 1. . .	46	2.2	400	0	0	..	5.	..
13	Class "B" 2. . .	46	2.2	400	0	0	..	5.	..
14	Rectifier . . .	82	2.3	300	..	..	..	..	..

Vol. control "full on".
Noise Suppressor "full open".
Tested with Weston model 565 analyzer.
Line: 115 volts.

TRANSFORMER CORP. OF AMERICA

MODEL AC-320
Schematic, Voltage Resistance, Chassis

CIRCUIT RESISTANCE ANALYSIS

Model 320 Socket to Ground

Stage	Grid	Cath-ode	Heater	Plate	Screen G	Suppr. G	Space G
Auto-dyne	1,000	8,000	.1	50,000	20,000	.1	......
I.F.	70	270	.1	50,000	20,000	*270.	......
2nd.Det	110	15,000	.1	300,000	Infin-ity	15,000	......
Output	570,000	......	.1	50,000	......	......	50,000
Recti-fier	......	......	50,000	1,900	......	......	......

Readings of one megohm and over are given as "Infinity". The first three significant figures, only are interpreted from the ohmmeter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.
*NOTE: On first few thousand sets the i.f. Suppressor Grid Resistance read .1 ohm and was connected to ground.

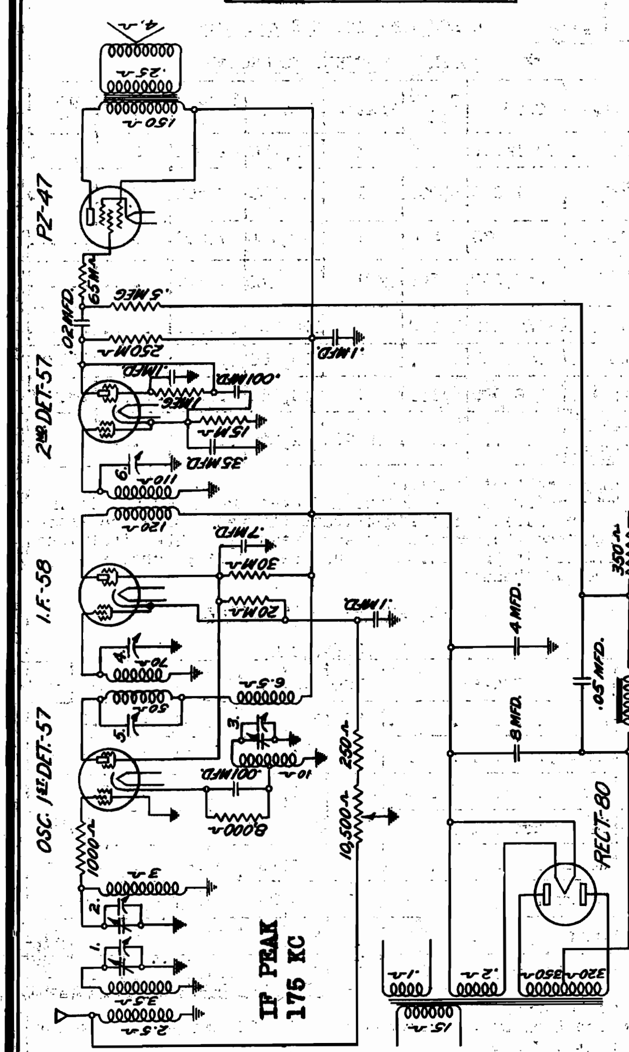
VOLTAGE ANALYSIS

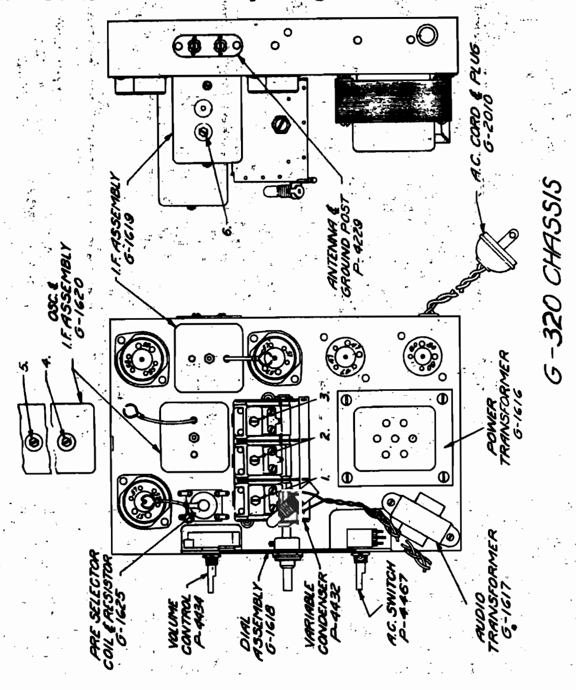
Model 320

No.	Stage	Tube	A	B	C	K	ScG	Ip	Su.G
1	Autodyne	57	2.0	230	3.0	3.0	75	3.5	....
2	I.F.	58	2.0	245	1.5	1.5	65	4.5	1.5
3	2nd. det.	57	2.0	125	1.0	2.0	45	.2	2.0
4	Output	47	2.0	260	14	...	270	27.	....
5	Rectifier	80	4.4	280	...	...	...	...	....

Vol. control "full on".
Line: 115 volts.

First connect the 175 K. C. Oscillator to the first detector grid and adjust trimmers Nos. 4, 5 and 6 for maximum output as indicated by the loud speaker, or preferably by a regular output meter; next hook up the broadcast oscillator to the antenna and ground binding posts of the set and adjust number 3 (oscillator gang trimmer) at 1500 K. C., for calibration. This is accomplished by using a broadcast oscillator at 1500 K. C. if the calibration of the broadcast oscillator is known to be accurate or by tuning in a broadcasting station, using "crystal control" at a known frequency between 1400 and 1500 K. C., then adjust number 3 trimmer until the receiver's dial reading is exactly the same as the frequency of the broadcasting station; next readjust trimmers number 2 and 1 for maximum output at a point between 1400 and 1500 K. C., since adjusting at these high frequencies is more accurate and critical. No oscillator padding trimmer is employed on this receiver. The special shape of the oscillator tuning condenser rotor makes such a padding trimmer unnecessary.

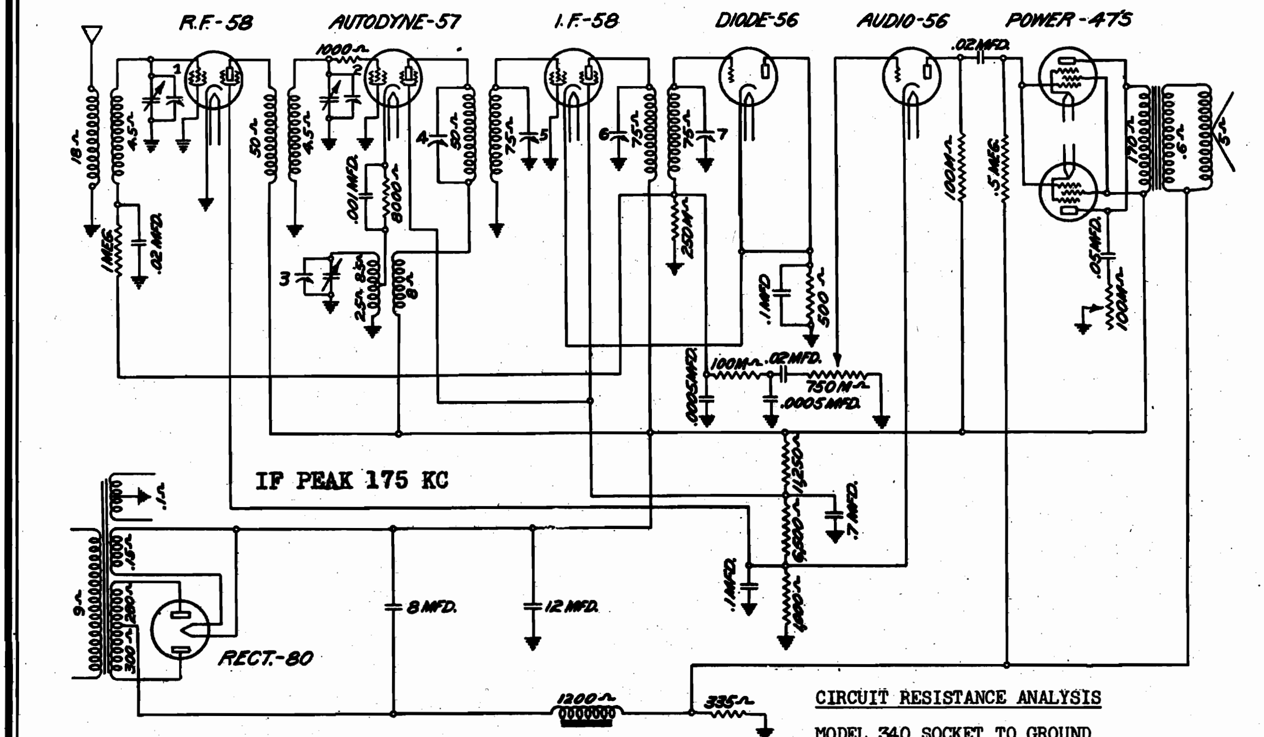


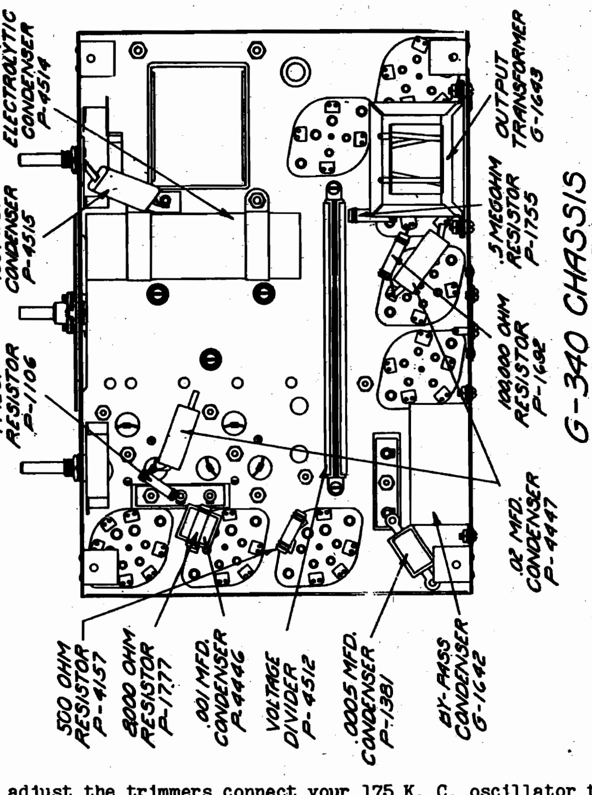


G-320 CHASSIS

MODEL AC-340
Schematic,Voltage
Chassis,Resistance

TRANSFORMER CORP. OF AMERICA





CIRCUIT RESISTANCE ANALYSIS

MODEL 340 SOCKET TO GROUND

Stage	Grid	Cath-ode	Heater	Plate	Screen G	Suppr. G	Space G
R.F. . .	Infinity	0	.1	18,750	1,000	0	.....
Auto-dyne. .	1,000	8,000	.1	18,750	7,500	0	.....
I.F. . .	75	500	.1	18,750	7,500	0	.....
Diode det . .	250,000	500	.1	500	......	......	.....
Audio. .	*750,000	1,000	.1	18,750	......	......	.....
Output .	500,000	.....	.1	18,750	......	......	18,750
Output .	500,000	.....	.1	18,750	......	......	18,750
Recti-fier. .	....	.....	18,700	1,800	......	......	.....

* Volume control "full on".
NOTE: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohmmeter in each reading: The individual resistance in the circuit can be readily checked upon removal of chassis.

VOLTAGE ANALYSIS *ACTUAL

MODEL 340

No.	Stage	Tube	A	B	C	K	Sc.G	Ip	Su.G
1	r.f	58	2.4	260	.4	0	12	.6	0
2	Autodyne.	57	2.4	260	0	7	90	.5	0
3	i.f	58	2.4	260	0	3	90	5.	0
4	Diode det	56	2.4	3	0	3	....	0	...
5	Audio	56	2.4	180	0	12	....	5	...
6	Output.	47	2.4	250	1	..	260	20	...
7	Output.	47	2.4	250	1	..	260	20	...
8	Rectifier	80	4.8	...	..	..	....	....	...

Volume control full on.
*Tested from socket to chassis with 1000 ohm per volt meter.
Line 115 volts.

To adjust the trimmers,connect your 175 K. C. oscillator to the autodyne type 57 grid cap, and in the following order: Readjust trimmers numbers four, five, six and seven for maximum output, next disconnect the 175 K. C. oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator or tune in a broadcast signal from a known frequency crystal controlled station at 1400 K. C.; then reset trimmers two and one respectively for maximum output. This adjustment will track the first detector (autodyne) and r. f. stage.

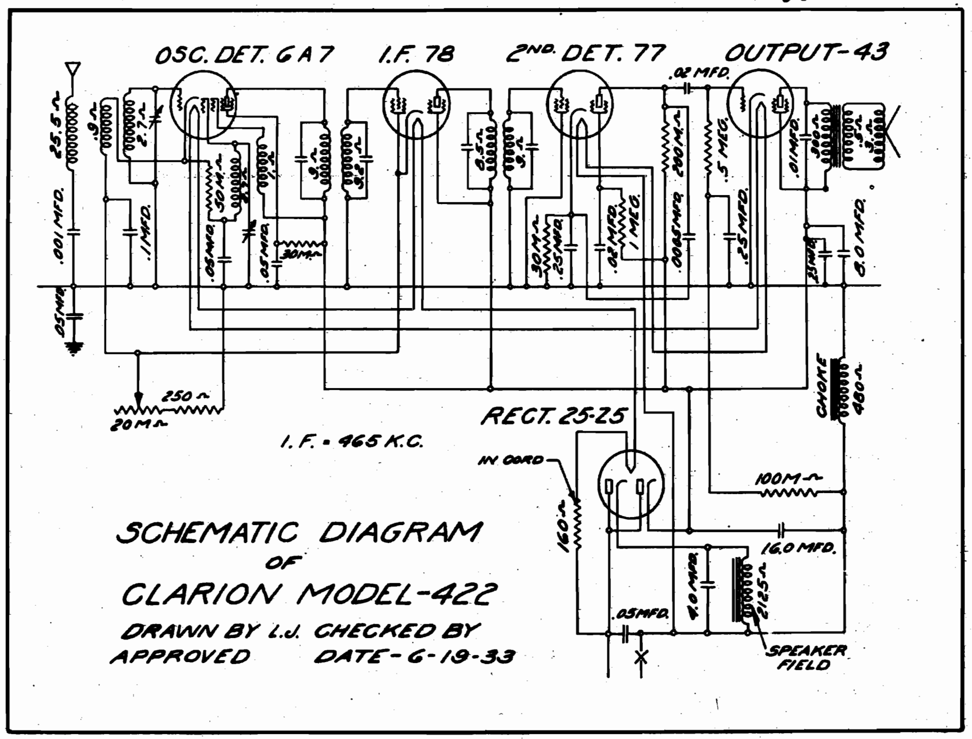
MODEL 422,423
Schematic,Voltage
Parts List

TRANSFORMER CORP. OF AMERICA

P-1381	.0005 Mfd. Condenser	$ .50
P-4361	Tube Shield.	.15
P-4400	Grid Clips	.05
P-4446	.001 Mfd. Condenser.	.25
P-4594	30,000 Ohm Resistor. .	.25
P-4595	1 Megohm Resistor. . .	.25
P-4597	2500 Ohm Resistor. . .	.25
P-4629	Tuning Gang Condenser.	2.65
P-4632	8 Mfd. Condenser . . .	1.60
P-4640	.25 Mfd. Condenser . .	.20
P-4644	.05 Mfd. Condenser . .	.20
P-4645	.01 Mfd. Condenser . .	.20
P-4647	A. C. Cordohm.	.85
P-4672	Field Coil	2.00
P-4685	Ant. Wire Only	.30
P-4701	.1 Mfd. Condenser. . . .	.30
P-4707	#77 Sockets.	.30
P-4715	1st I. F. Transformer	2.20
P-4716	2nd I. F. Transformer	2.20
P-4717	16 Mfd. Condenser. . . .	2.00
*P-4835	6 Volt Bulb.	.45
*P-4850	Bullseye	.30
*P-4851	Bullseye Light Socket. .	.15
*P-4852	50 Ohm Resistor.	.20

* Model 423 only.

P-4648	6A7 Socket	.20
P-4649	#78 Socket	.20
P-4651	#43 Socket	.20
P-4652	Tube Shield Base	.10
P-4653	Ant. and Osc. Coil	1.25
P-4659	50,000 Ohm Resistor. . . .	.25
P-4662	100 M Resistor.	.25
P-4663	1/2 Meg. Resistor.	.25
P-4664	200,000 Ohm Resistor . . .	.25
P-4667	.005 Mfd. Condenser. . . .	.20



SOCKET VOLTAGE ANALYSIS OF MODEL 422

USING A 1000 OHM PER VOLT METER

No.	STAGE	TUBE	Ef	Ep	Eg	Ek	Esg	Esug	Ip	Ep-O	Eg-O	Ip-O
1	Osc. Det. .	6A7	48	80	2.5	15	35		.6	77	.2	1.8
2	I. F. . . .	78	7	72	2.3	13	75	0	4.4			
3	2nd Det . .	77	6	28	.9	13	.3	.8	.1			
4	Output. . .	43	24	78	.3	13	82		13			
5	Rectifier .	25Z5	24	p 90		c 90			p 32			

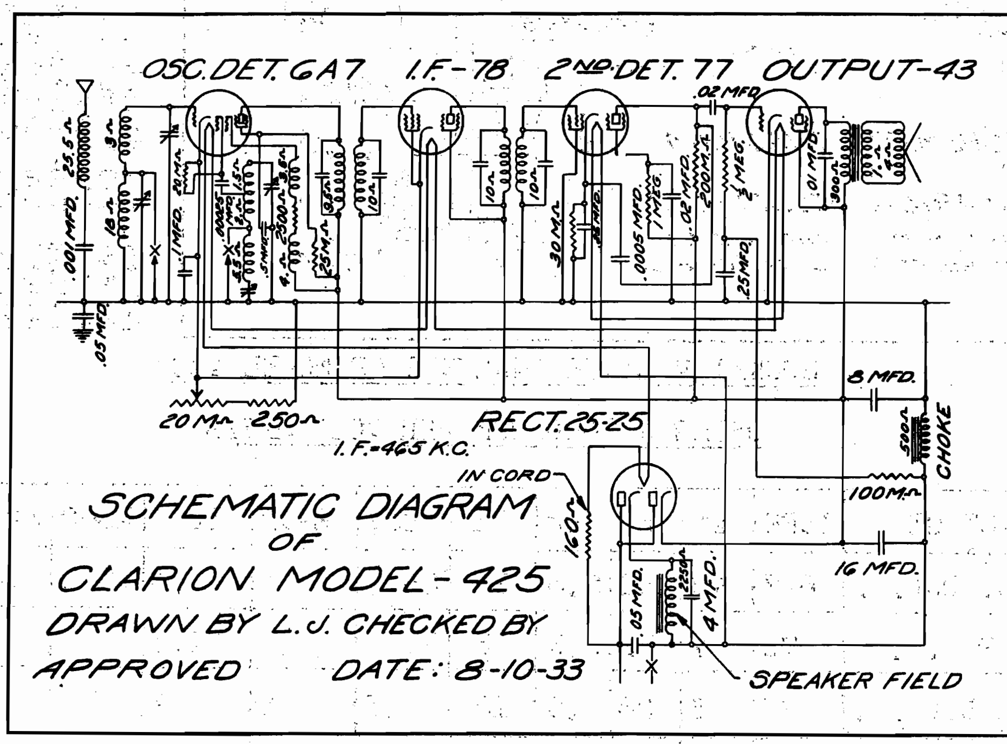
O - Oscillator
Volume Control - Full On
Line Voltage - 105

p - Per Plate
c - Per Cathode

MODEL 425
Schematic, Voltage
Parts List

TRANSFORMER CORP. OF AMERICA

P-1999	1,000 Ohm Resistor	.25	P-4654	I. F. Coil, 1st.	1.90
P-4117	30,000 Ohm Resistor	.25	P-4662	100,000 Ohm Resistor	.25
P-4361	Tube Shield	.15	P-4663	500,000 Ohm Resistor	.25
P-4374	.00025 Mfg. Condenser	.25	P-4664	200,000 Ohm Resistor	.25
P-4446	.001 Mfd. Condenser	.25	P-4685	Aerial Wire	.30
P-4582	Socket 25Z5	.20	P-4701	.1 Mfg. Condenser	.25
P-4586	Knobs	.20	P-4707	Socket 77	.20
P-4587	Vol Escutcheon	.20	P-4716	I. F. Coil, 2nd	1.90
P-4588	Stat. Escutcheon	.20	P-4717	Elec. Condenser	2.40
P-4595	1,000,000 Ohm Resistor	.25	P-4864	Broadcast Longwave Switch	1.60
P-4597	250 Ohm Resistor	.25	P-4865	Trimmer Condenser	.60
P-4640	.25 Mfd. Condenser	.20	P-4866	Preselector Coil	3.40
P-4629	Tuning Condenser	2.65	P-4868	2,500 Ohm Resistor	.25
P-4633	Elec. Condenser and Mfd.	1.60	P-4869	25,000 Ohm Resistor	.25
P-4644	.05 Mfd. Condenser	.20	P-4870	15,000 Ohm Resistor	.25
P-4645	.01 Mfd. Condenser	.20			
P-4646	.02 Mfd. Condenser	.25	G-1697	Output Transformer	1.25
P-4647	Cordohm	.85	G-1704	Spkr. Comp. 5" Reg	5.30
P-4648	Sockets 6A7	.20	G-1711	"B" Choke	1.25
P-4649	Sockets 78	.20	G-1740	Volt Cont.	1.40
P-4651	Sockets 43	.20	G-1751	Voice Coil and Cone	.75



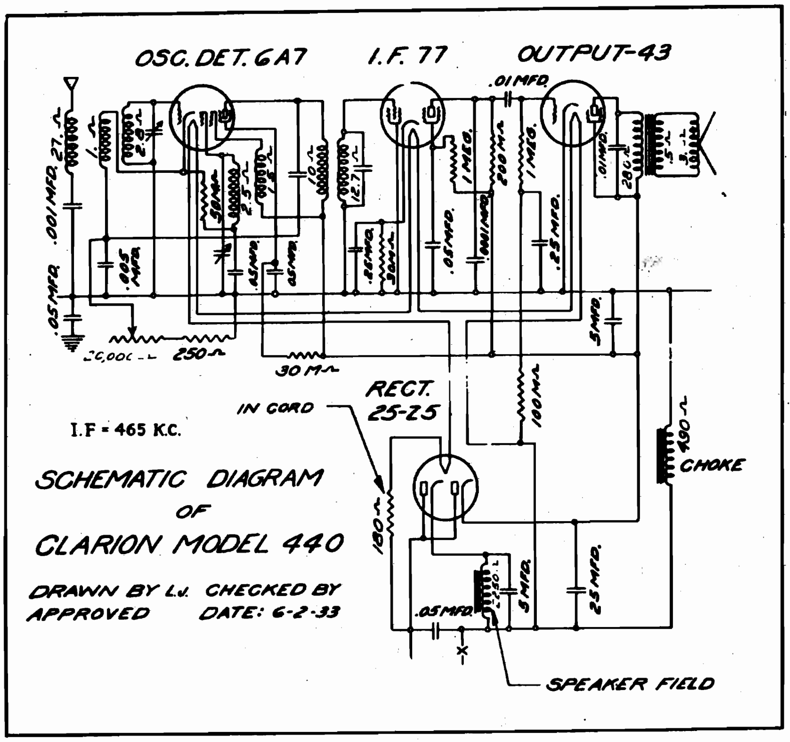
Stage	Tube	Ef	Ep	Eg	Ek	Esg	Esug	Ip	Ep-O	Eg-O	Ip-O
Osc-Det	6A7	5.5	105	2.4	20	38		1.	92	.1	3
IF Amp	78	6	105	2.1	20	105	0	6.5			
2nd Det	77	6	35	15.	18	.6	1.4	.1			
Output	43	24	100	.3	18	107		19.			
Rect	25Z5	24	p110		c110			p37			

O- Oscillator. Line voltage 110. Volume control-Full. "c"- per cathode.
"p"- Per plate

TRANSFORMER CORP. OF AMERICA

MODEL 440
Schematic, Voltage
Parts List

G-1697	Output Transformer. . . .	$1.90
G-1704	Speaker complete.	5.00
G-1727	Filter Choke.	1.60
G-1751	Voice Coil and Cone . . .	.75
P-4446	.001 Mfd. Condenser . . .	.30
P-4576	Volume Control.	1.60
P-4582	25Z5 Socket	.20
P-4586	Knobs	.20
P-4587	Volume Escutcheon	.20
P-4588	Station Escutcheon. . . .	.20
P-4590	.0001 Mfd. Cond	.25
P-4594	30,000 Ohm Resistor . . .	.25
P-4595	1,000,000 Ohm Resistor. .	.25
P-4597	250 Ohm Resistor.	.25
P-4640	.25 Mfd. Condenser. . . .	.40



I.F = 465 K.C.

SCHEMATIC DIAGRAM OF CLARION MODEL 440

DRAWN BY L.J. CHECKED BY
APPROVED DATE: 6-2-33

P-4644	.05 Mfd. Condenser.	.25
P-4645	.01 Mfd. Condenser.	.25
P-4648	6A7 Socket.	.20
P-4651	43 Socket	.20
P-4653	Preselector Coil.	1.65
P-4659	50,000 Ohm Resistor . . .	.25
P-4662	100,000 Ohm Resistor. . .	.25
P-4664	200,000 Ohm Resistor. . .	.25
P-4667	.005 Mfd. Condenser . . .	.25
P-4685	Aerial Wire	.40
P-4707	77 Socket	.20
P-4708	Cord Ohm.	.90
P-4709	Electrolytic Condenser. .	3.75
P-4711	I.F. Coil	2.50
P-4712	Tuning Condenser 2 Gang .	3.15

SOCKET VOLTAGE READINGS WITH 1000 Ohms/Volt METER

Stage	Tube	Ef	Ep	Ek	Esg	Esug	Ip	Ep-O	Eg-O	Ip-O	Eg
Osc-Det	6A7	6	110	20.	37.5		1.7	110	-1	2 ma	1.5
IF Amp	77	6	36	16.5	.6	1.5	.1				1.5
Output	43	25.	105	18.	112.5		26.				.1
Rect	25Z5	25.	110	110"			38.*				

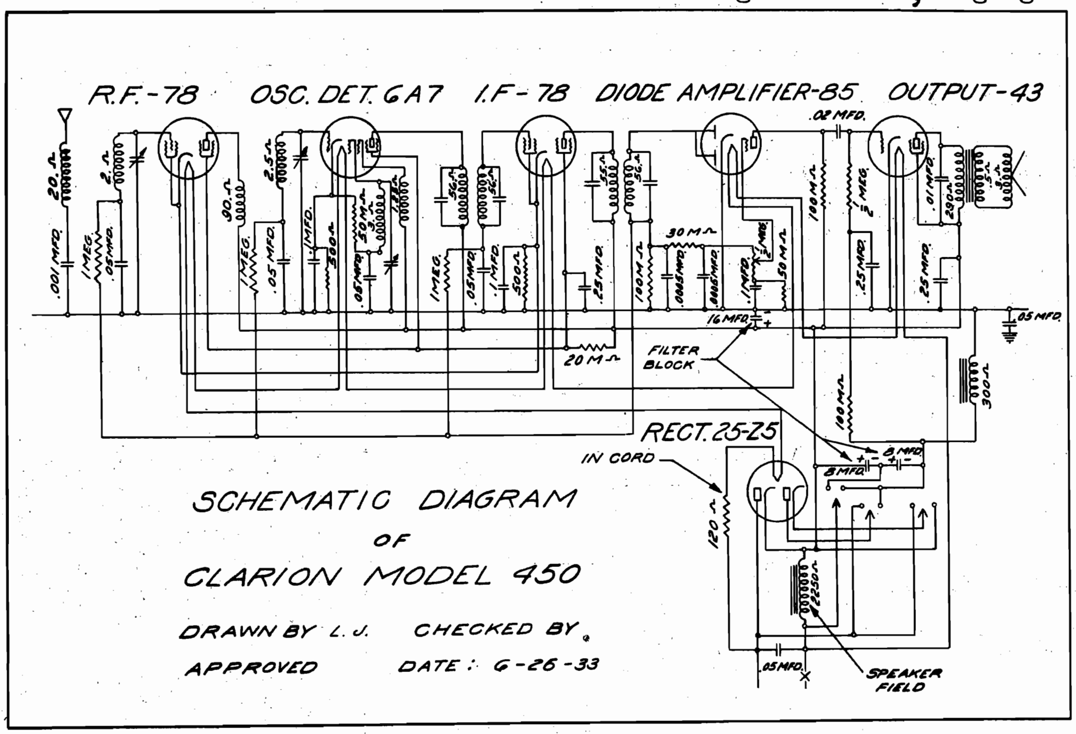
* Per plate " Per cathode O- Oscillator Line Voltage 112. Control On

MODEL 450
Schematic, Voltage
Parts List

TRANSFORMER CORP. OF AMERICA

G-1697	Output transformer . . .	$1.60
G-1698	Volume control	1.60
G-1704	Speaker, complete. . . .	4.40
G-1742	"B" choke.	1.25
G-1751	Voice coil and cone. . .	.95
P-1381	.0005 mfd. condenser . .	.25
P-1488	20,000 ohm resistor. . .	.30
P-4446	.001 mfd. condenser. . .	.25
P-4586	Knobs.	.20
P-4587	Vol. escutcheon.	.20
P-4594	30,000 ohm resistor. . .	.20
P-4595	1,000,000 ohm resistor .	.20
P-4640	.25 mfd. condenser . . .	.25
P-4644	.05 mfd. condenser . . .	.20
P-4645	.01 mfd. condenser . . .	.20
P-4646	.02 mfd. condenser . . .	.20
P-4659	50,000 ohm resistor. . .	.20
P-4662	100,000 ohm resistor . .	.20

P-4663	500,000 ohm resistor . .	.20
P-4685	Aerial wire.	.40
P-4701	.1 mfd. condenser. . . .	.20
P-4725	Station escutcheon . . .	.20
P-4728	Tube shield.	.25
P-4730	I.F. coil, 1st	2.50
P-4731	I.F. coil, 2nd	2.50
P-4732	Socket 6A7	.20
P-4733	Socket 78.	.20
P-4734	Socket 85.	.20
P-4735	Socket 43.	.20
P-4736	Socket 25Z5.	.20
P-4737	Electrolytic condenser .	3.75
P-4738	AC-DC switch	1.25
P-4739	Antenna coil	1.25
P-4740	Oscillator coil.	1.45
P-4741	R.F. coil.	1.25
P-4742	Cord ohm	.95
P-4743	500 ohm resistor	.20
P-4745	Tuning condenser, 3 gang	4.40



Stage	Tube	Ef	Ep	Eg	Ek	Esg	Esug	Ip	Ep-O	Eg-O	Ip-O
RF	78	6	140	51	72	80	0	1.8			
Osc-Det	6A7	6	144	1.5	65	77		5.	144	.1	24
IF Amp	78	6	150	61	70	83	0	1.9		.1	
Diode	85	6	60	100	60			0		d65	
Output	43	25	135	2	70	148		40			
Rect	25Z5	25	p85		c85			p85			

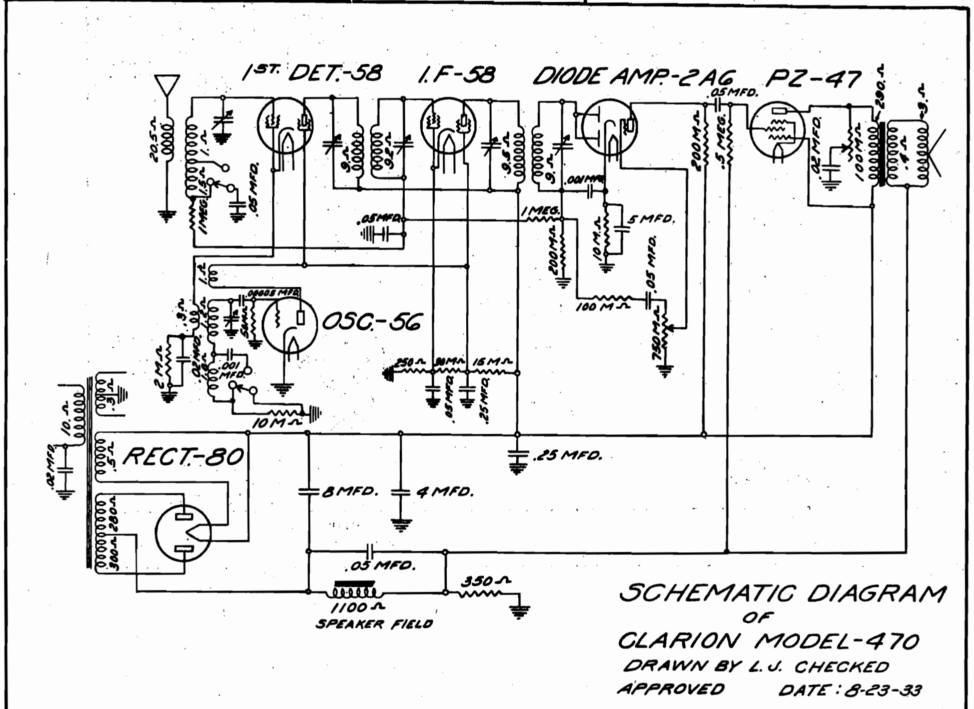
O - Oscillator Line voltage 109 p-Per plate. c-Per cathode. d-diode plates
Volume control on Full

TRANSFORMER CORP. OF AMERICA

MODEL 470,472
Schematic,Voltage
Parts List

P-4504	1,000 Ohm Resistor. . .	.25
P-4594	30,000 Ohm Resistor . .	.25
P-4595	1 Megohm Resistor . . .	.25
P-4640	.25 Mfd. Condenser. . .	.20
P-4644	.05 Mfd. Condenser. . .	.20
P-4646	.02 Mfd. Condenser. . .	.20
P-4659	50,000 Ohm Resistor . .	.25
P-4661	10,000 Ohm Resistor . .	.25
P-4662	100,000 Ohm Resistor. .	.25
P-4663	500,000 Ohm Resistor. .	.25
P-4664	200,000 Ohm Resistor. .	.25
P-4685	Antenna Wire.	.30
P-4724	5 Mfd. Elec. Condensers	.75
P-4885	1st I. F. Transformer.	2.20
P-4886	Ant. Coil	.90
P-4887	Oscillator Coil	1.00
P-4890	Small Knobs	.20
P-4891	Large Knobs	.20
*P-4913	Escutcheon Plates	.60
G-1484	Voice Coil and Spider	.50
G-1706	Speaker	4.50
G-1768	Power Transformer	3.00
G-1768A	Power Transformer 25 Cycle. . .	4.50
G-1768B	Power Transformer 220 Volt. . .	3.50
G-1770	Output Audio Assembly	1.50

* Model 472 only.



P-1685	2,000 Ohm Resistor.	.25
P-1688	15,000 Ohm Resistor	.25
P-1728	.00005 Mfd. Condenser	.40
P-1860	Pilot Light Bracket	.30
P-4262	56 Socket	.15
P-4264	58 Socket	.15
P-4400	Grid Clips.	.05
P-4435	250 Ohm Resistor.	.25
P-4443	8 Mfd. - 4 Mfd. Elec. Condenser	2.50
P-4445	350 Ohm Resistor.	.25
P-4485	Tube Shield	.15
P-4486	Tube Shield Cap	.10
P-4487	Tube Shield Bases	.10

SOCKET VOLTAGE ANALYSIS OF MODEL 470

USING A 1000 OHM PER VOLT METER

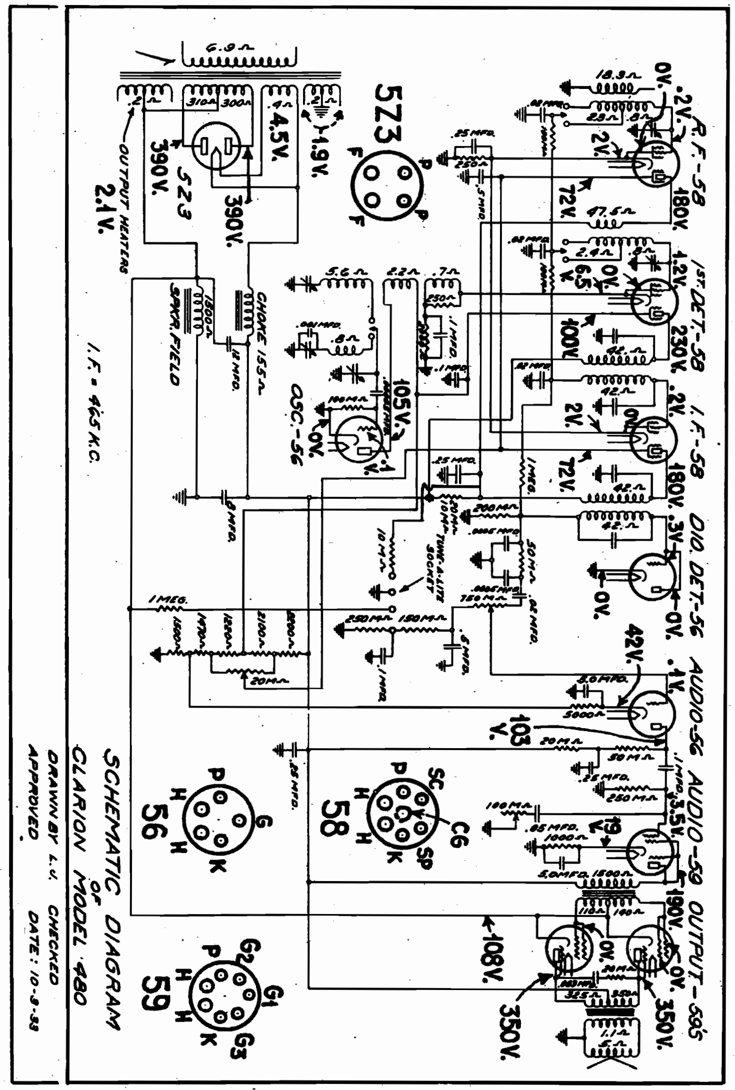
No.	STAGE	TUBE	Ef	Ep	Eg	Ek	Esg	Esug	Ip
1	1st Det. .	58	2.1	235	.4	7	80	0	2.7
2	Osc. . . .	56	2.1	95	.6	0			5
3	I. F . . .	58	2.1	243	.3	2.2	85	0	6
4	Diode Amp.	2A6	2.1	140	4	1.1	d .1		.2
5	Output . .	PZ 47	2.1	235	.5	240			24
6	Rectifier.	80	4.7	p 328					p 24

Volume Control - Full On
Line Voltage - 109

p - Per Plate
d - Diode Plate

MODEL 480
Schematic, Voltage
Parts List

TRANSFORMER CORP. OF AMERICA

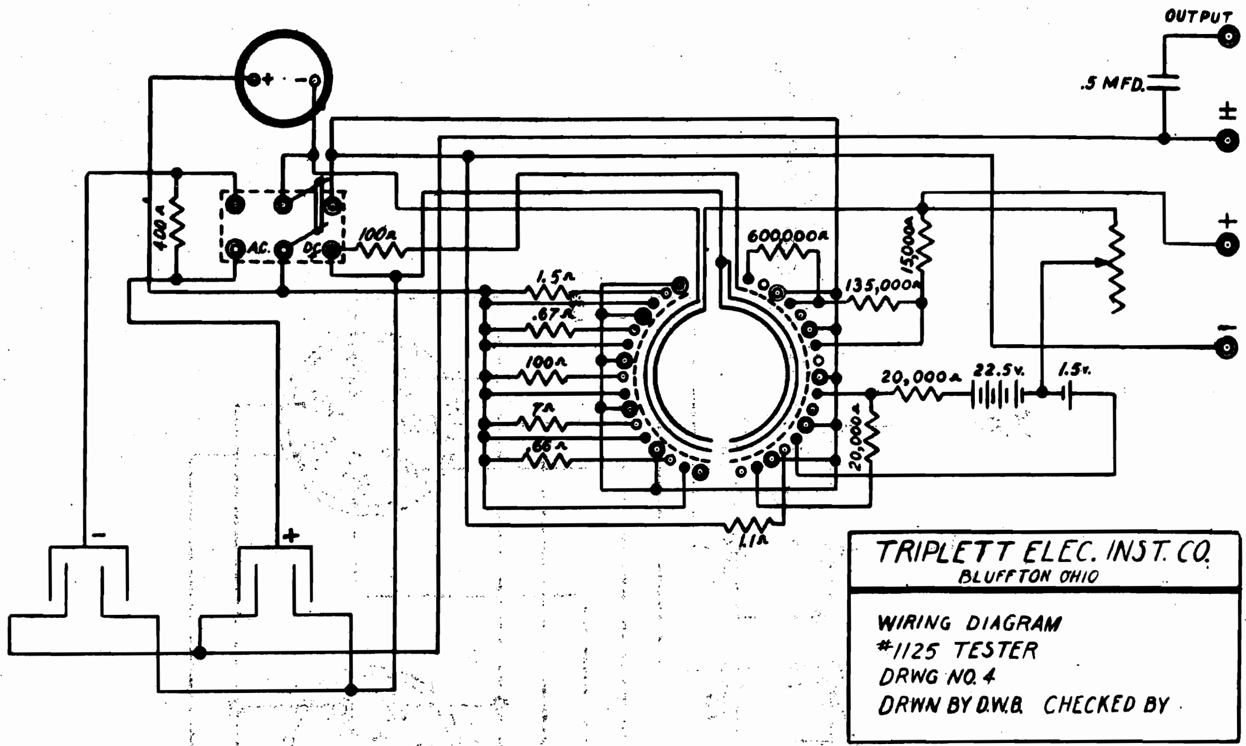


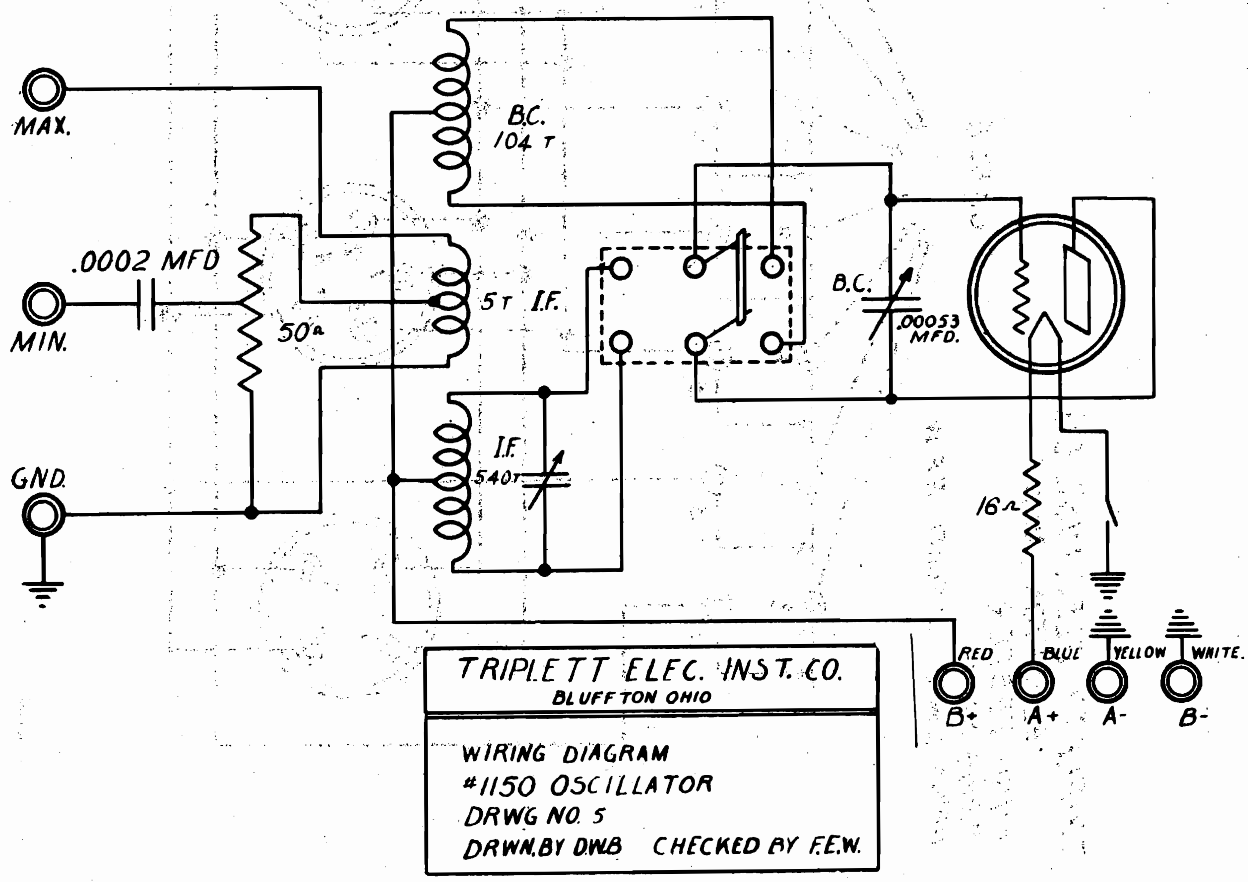
MODEL 480 PARTS PRICE LIST

PART NUMBER	DESCRIPTION	LIST PRICE
P-1038	Pilot Light	$ .45
P-1100-A	.001 Mfd. Condenser	.25
P-1108	10,000 Resistor, 1 Watt	.25
P-1381	.0005 Mfd. Condenser	.50
P-1685	2,000 Ohm Resistor	.25
P-1728	.00005 Mfd. Condenser	.40
P-1999	10,000 Ohm Resistor	.25
P-4168	Blinder	.10
P-4182	Felt Washer	.05
P-4200	5,000 Ohm Resistor	.30
P-4259	Tone Control and Switch	1.75
P-4260	Volume Control	1.25
P-4262	56 Sockets	.25
P-4264	58 Sockets	.25
P-4391	Field Coil	2.50
P-4485	Tube Shield	.15
P-4486	Tube Shield Caps	.10
P-4487	Tube Shield Case	.10
P-4514	12 Mfd. - 8 Mfd. Dual Electrolytic	2.85
P-4585	Dual 5 Mfd. Condenser	1.50
P-4595	1 Meg. Resistor	.25
P-4597	250 Ohm Resistor	.25
P-4640	.25 Mfd. Condenser	.20
P-4644	.05 Mfd. Condenser	.20
P-4646	.02 Mfd. Condenser	.25
P-4659	50,000 Ohm Resistor	.25
P-4662	100,000 Ohm Resistor	.25
P-4664	200,000 Ohm Resistor	.25
P-4701	.10 Mfd. Condenser	.30
P-4761	.5 Mfd. Condenser	.40
P-4890	Small Knobs	.25
P-4891	Large Knobs	.25
P-4894	Escutcheon Plate	.80
P-4905	59 Sockets	.15
P-4909	20,000 Ohm Resistors	.25
P-4911	.25 Mfd. Condensers	.35
P-4914	5Z3 Socket	.15
P-4915	Tune-A-Lite	3.00
P-4917	Tune-A-Lite Socket	.25
P-4919	Switch - Wave Change	1.00
P-4923	Noise Control	1.00
P-4924	Tune-A-Lite Bracket	.15
P-4925	Canopy Mtg. Studs	.10
P-4929	Tune-A-Lite Blinder	.15
P-4930	20,000 Ohm Resistor	.25
P-4931	250,000 Ohm Resistor	.25
P-4932	150,000 Ohm Resistor	.25
P-4933	1,000 Ohm Resistor	.25
P-4934	.003 Mfd. Condenser	.25
P-4937	Wing Bolts	.10
P-4952	Wing Nuts	.05
P-4957	Diaphragm	.50
G-1281	Primary Coil Assembly (R.F. Coil)	.75
G-1282	Primary Coil Assembly (Ant. Coil)	.40
G-1378	Single Insulated Trimmer	.75
G-1401	Gang Condenser	5.00
G-1403	Trimmer Assembly	.75
G-1488	Padding Condenser	.75
G-1600	Voice Coil and Spider	.65
G-1669	Filter Choke Assembly	1.75
G-1708	10" Speaker	6.00
G-1776	Power Transformer Assembly	4.50
G-1776-A	Power Transformer 25 Cycle	6.25
G-1776-B	Power Transformer 220 Volt	5.00
G-1777	Output Transformer Assembly	2.00
G-1778	Input Transformer	2.50
G-1779	R.F. Units	4.00
G-1792	1st I.F. Transformer	2.50
G-1793	I.F. Coil and Dowel Assembly (G-1792)	1.25
G-1794	2nd. I.F. Transformer	2.00
G-1795	Dial Assembly	.90
G-1797	Canopy	1.00
G-1803	R.F. Coil Assembly	.80
G-1804	Oscillator Coil Assembly	.90

TRIPLETT ELECTRICAL INSTRUMENT CO.

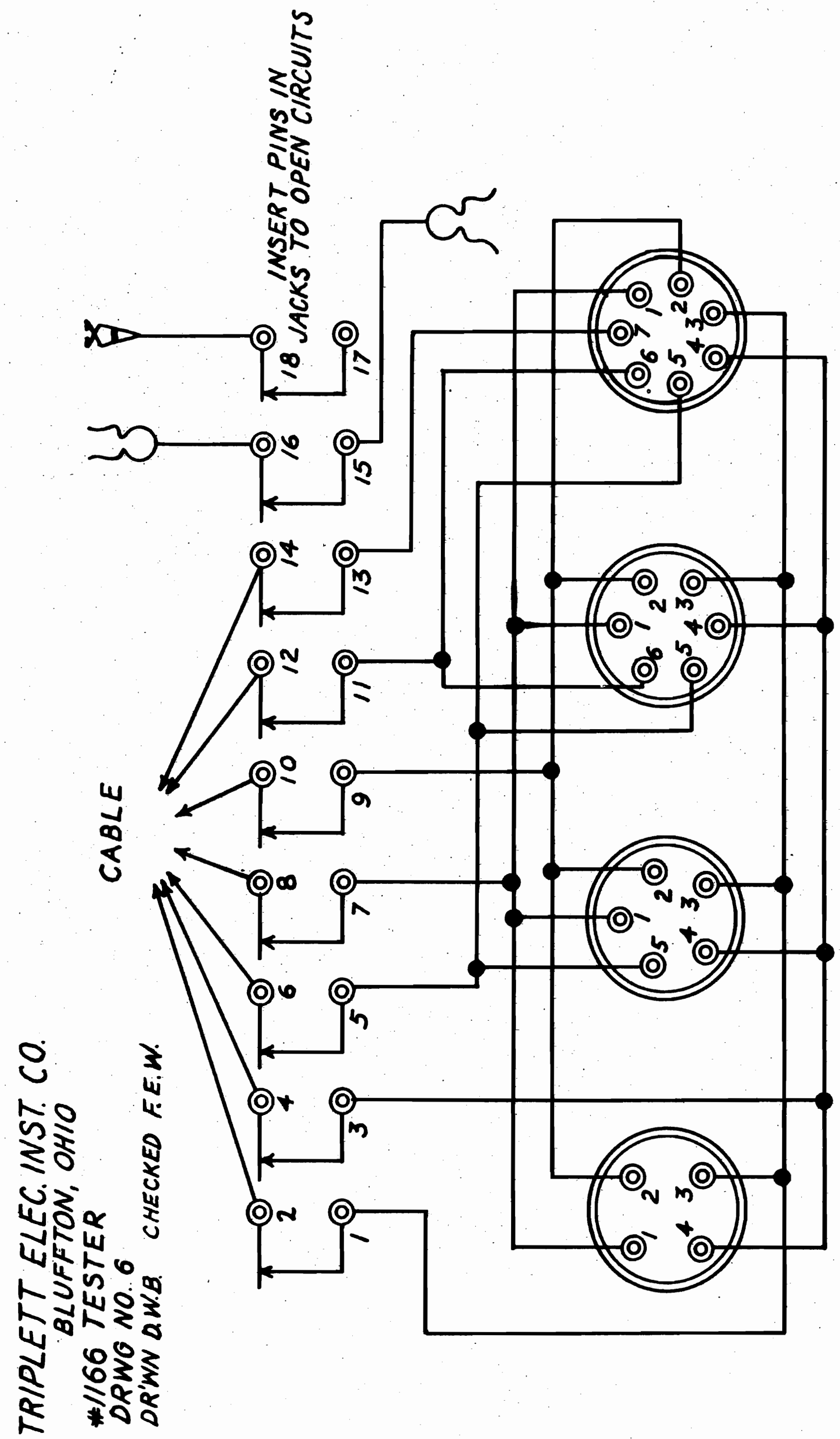
MODEL 1125 Schematic
MODEL 1150 Schematic





MODEL 1166
Schematic

TRIPLETT ELECTRICAL INSTRUMENT CO.



MODEL 40,41 AC
Schematic
Chassis

UNITED AMERICAN BOSCH CORP.

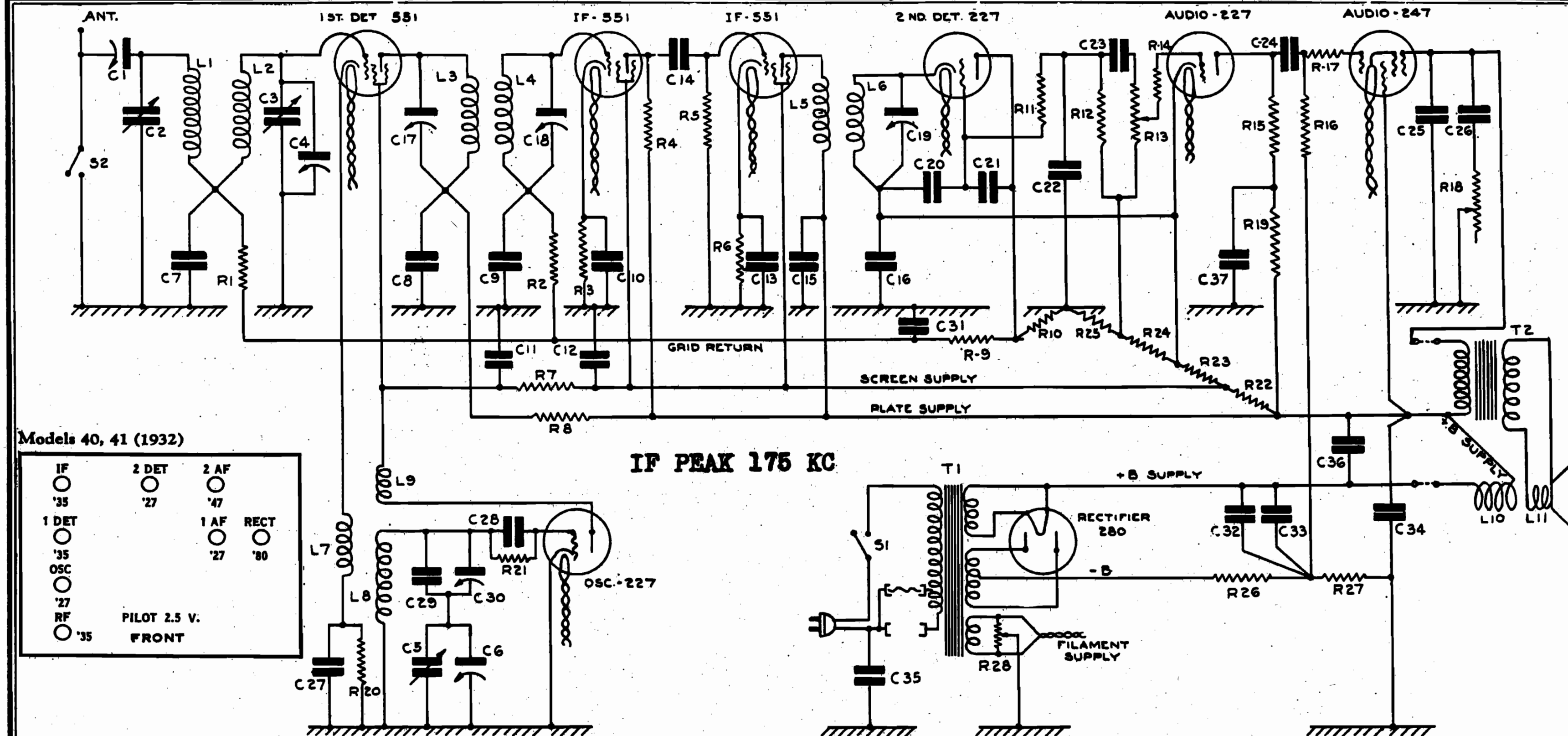
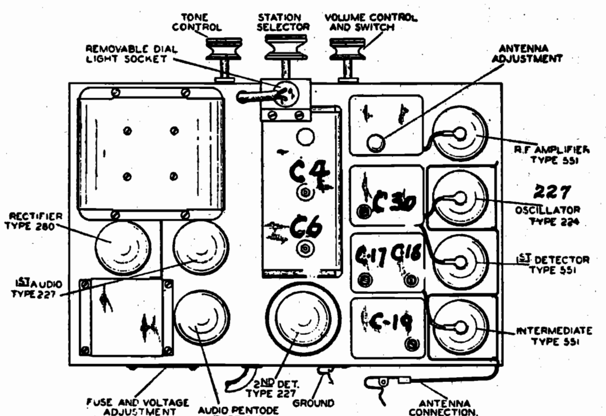


Fig. 1—Schematic Diagram — Model 40



DUO DIODE DETECTOR

The type 227 detector utilizes the elements (cathode, grid, and plate) for two very distinct functions, namely detection and automatic volume control. The grid to cathode circuit (L 6 and C 19 is the tuned IF circuit, C 20 imposes the signal on the grid, and R 11 and R 12 provide a voltage drop for the rectified audio voltage) acts as the detector and the AVC action is furnished by the plate to cathode circuit (R 10 controls the bias of the 1st detector and 1st IF tubes, and R 24 and R 25 furnish the delay action.) This type of control provides high output on weak signals and controls over a wide range of signal strengths.

MODEL 40,41 AC
Electrical Values
Voltage

UNITED AMERICAN BOSCH CORP.

NOMENCLATURE - MODEL 40

R 1 - Grid Resistor - 10,000 ohms
R 2 - Grid Resistor - 10,000 ohms
R 3 - Cathode Resistor - 750 ohms
R 4 - IF Plate Resistor - 25,000 ohms
R 5 - IF Grid Resistor - .1 megohm
R 6 - Cathode Resistor - 750 ohms
R 7 - Screen Resistor - 1.000 ohms
R 8 - Plate Resistor - 1,000 ohms
R 9 - Divider Resistor - .5 megohm
R 10 - Divider Resistor - .1 megohm
R 11 - 2nd Det. Screen Resistor - 10,000 ohm
R 12 - 2nd Det. Screen Resistor - .5 megohm
R 13 - Volume Control - .5 megohm
R 14 - Audio Grid Resistor - .1 megohm
R 15 - Audio Plate Resistor - 25,000 ohms
R 16 - Audio Grid Resistor - .5 megohm
R 17 - Audio Grid Resistor - .1 megohm
R 18 - Tone Control - .5 megohm
R 19 - Audio Plate Resistor - 5,000 ohms
R 20 - 1st Det. Cathode Resistor - 5,000 ohms
R 21 - Osc. Grid Resistor - .1 megohm
R 22 - Screen Supply Resistor - 5,000 ohms
R 23 - Divider Resistor - 1,830 ohms
R 24 - Divider Resistor - 235 ohms
R 25 - Divider Resistor - 850 ohms
R 26 - Bias Resistor - 300 ohms
R 27 - Bias Resistor - 200 ohms
R 28 - Mid Tap Resistor
C 1 - Antenna Trimmer
C 2 - Tuning)
C 3 - Tuning)
C 4 - Alignment) Condenser Gang
C 5 - Tuning)
C 6 - Alignment)
C 7 - RF Coupling - .05 mfd.
C 8 - Plate By-pass - .05 mfd.

C 9 - IF Grid - .05 mfd.
C 10 - IF Cathode By-pass - .05 mfd
C 11 - Screen By-pass - .05 mfd.
C 12 - Screen By-pass - .05 mfd.
C 13 - IF Cathode By-pass - .05 mfd
C 14 - IF Coupling - 1100 mmf.
C 15 - IF Plate By-pass - .05 mfd.
C 16 - 2nd Det. Cathode - .05 mfd.
C 17 - 1st Det. Alignment
C 18 - 1st IF Alignment
C 19 - 2nd Det. Alignment
C 20 - Blocking Condenser - 100 mmf.
C 21 - By-pass Condenser - .05 mfd.
C 22 - 2nd Det. Screen By-pass - 100 μf
C 23 - Audio Coupling - .05 mfd.
C 24 - Audio Coupling - .05 mfd.
C 25 - Audio Plate By-pass - .01 mfd
C 26 - Tone Control Condenser - .05 μf
C 27 - 1st Det. Cathode - .05 mfd.
C 28 - Osc. Grid Condenser - 100 mmf
C 29 - Oscillator Condenser - 1100 μf
C 30 - Oscillator Series Alignment
C 31 - By-pass Condenser - .05 mfd.
C 32 - Filter Condenser - 8 mfd.
C 33 - Filter Condenser - 8 mfd.
C 34 - Filter Condenser - 4 mfd.
C 35 - Buffer Condenser - .05 mfd.
C 36 - Field Tuning Condenser - .05 mfd.
C 37 - 1st Audio Plate By-pass - .25 mfd
L 1 - RF Coil
L 2 - RF Coil
L 3 - Primary) 1st IF coil
L 4 - Secondary)
L 5 - Primary) 2nd IF coil
L 6 - Secondary)
L 7 - Cathode Winding)
L 8 - Grid Winding) Osc. coil
L 9 - Plate Winding)
L 10 - Speaker Field
L 11 - Voice Coil

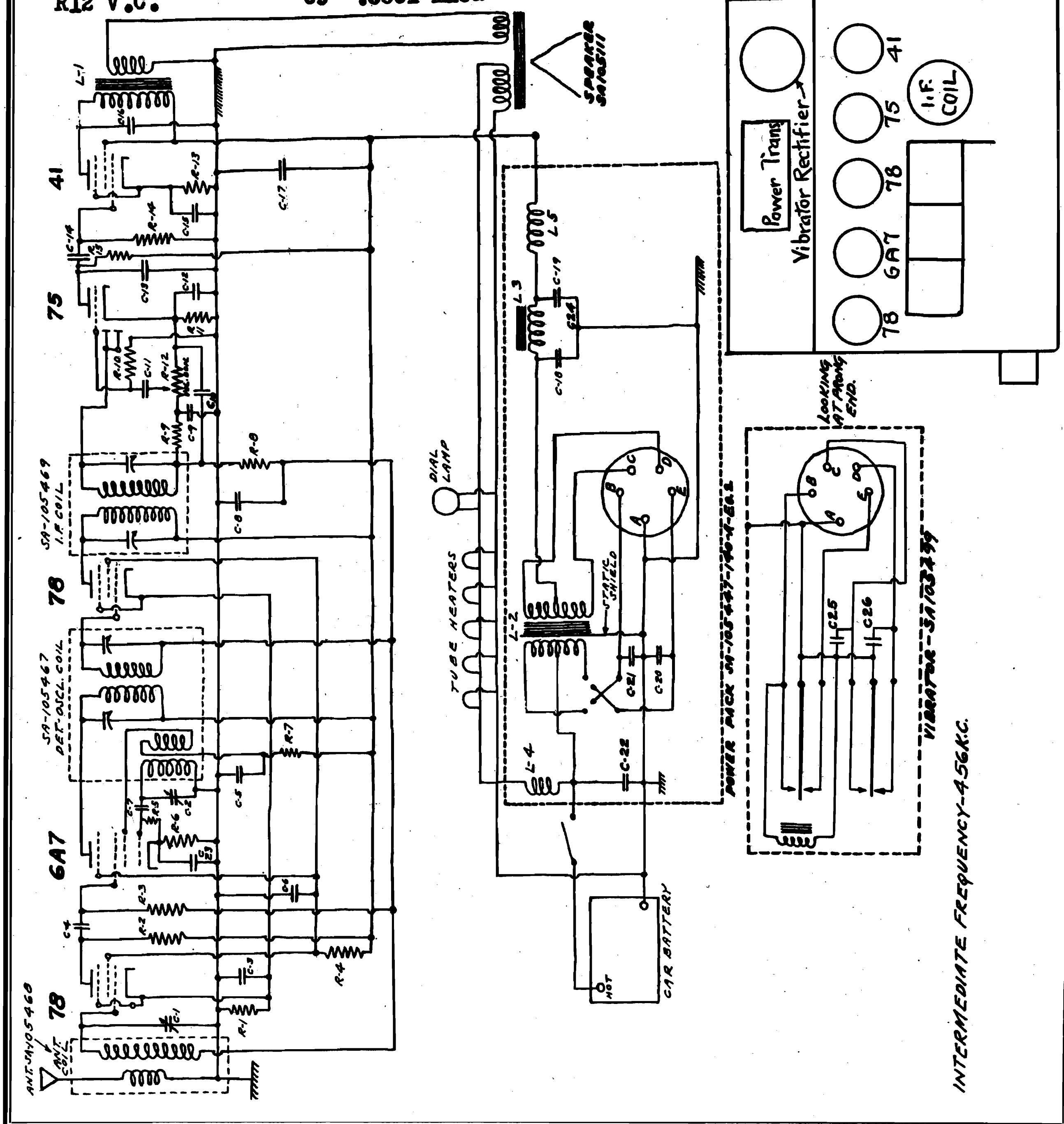
SOCKET VOLTAGES

STAGE	TUBE	PLATE	SCREEN	CATHODE	GRID	FIL.	PLATE MA
1st Det.	551	250	75	10	2	2.2	2
Osc.	227	75	....	0	0	2.2	7
1st IF	551	140	85	4	.2	2.2	4
2nd IF	551	260	85	5	.4	2.2	5
2nd Det.	227	--5	....	35	1	2.2	.1
1st Audio	227	110	....	35	1	2.2	4
2nd Audio	247	250	250	....	16	2.2	30
Rect.	280	....	....	....	....	5.0	30

MODEL 140A
Schematic,
Values

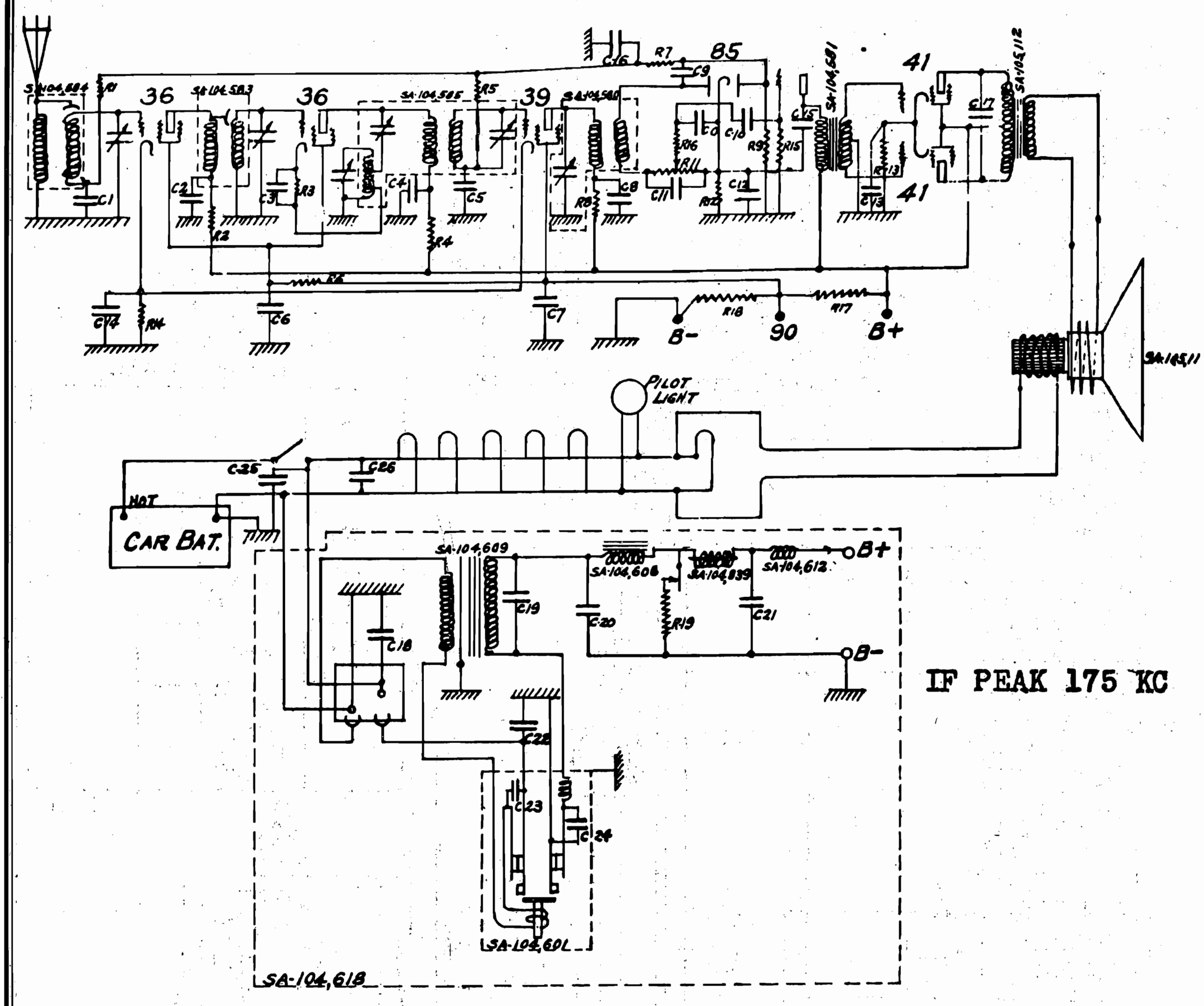
UNITED AMERICAN BOSCH CORP.

R1 250 ohms
R2 20000 ohms
R3 100000 ohms
R4 20000 ohms
R5 100000 ohms
R6 500 ohms
R7 20000 ohms
R8 500000 ohms
R9 50000 ohms
R10 1 megohm
R11 5000 ohms
R12 V.C.
R13 600 ohms
R14 500000 ohms
R15 250000 ohms
C1 Gang
C2 Gang
*C3 .5 mfd
C4 .0001 mica
*C5 .01 mfd
*C6 .05 mfd
C7 .0001 mica
C8 .05 mfd
C9 .0001 mica
C10 .0001 mica
C11 .005 mfd
*C12 .25 mfd
C13 .003 mfd
*C14 .005 mfd
C15 10. mfd
*C16 .005 mfd
C17 .05 mfd
C18 8. mfd
C19 8. mfd
C20 .5 mfd
C21 .5 mfd
C22 .5 mfd
*C23 .05 mfd
C25 .01 mfd
C26 .01 mfd
* In one housing



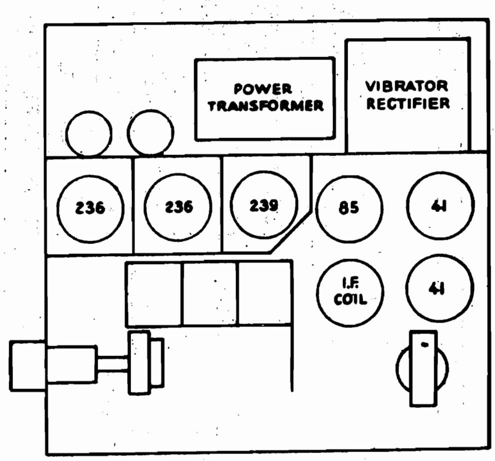
MODEL 150 Type 1
Schematic, Socket

UNITED AMERICAN BOSCH CORP.



IF PEAK 175 KC

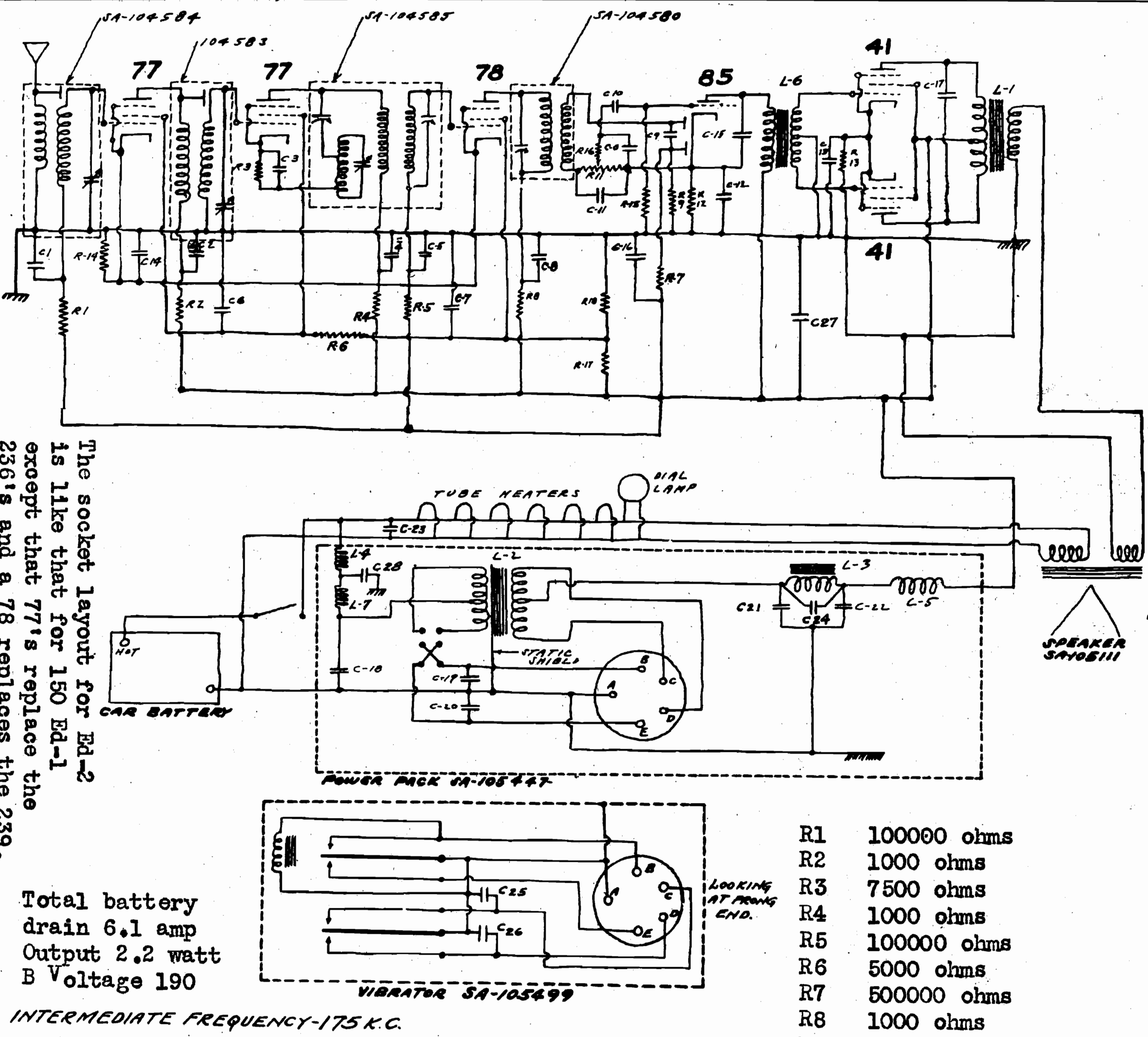
1	C-0	.0001 MFD.	SA-101,143
3	C-1	.05 - 2-PLY	SA-102,493
3	C2	.05 - 3-PLY	SA-102,492
1	C3	.002 - 4-PLY	SA-103,852
3	C4	.05 - 3-PLY	SA-102,492
3	C5	.05 - 2-PLY	SA-102,493
4	C6	.1 - 2-PLY	SA-102,495
4	C7	.05 - 2-PLY	SA-102,493
2	C8	.05 - 3-PLY	SA-102,492
2	C9	.0001 MFD.	SA-101,143
2	C10	.01 - 3-PLY	SA-102,500
2	C11	.0001 MFD.	SA-101,143
1	C12	.5 - 2-PLY	SA-102,499
1	C13	.5 - 2-PLY	SA-102,499
4	C14	.25 - 2-PLY	SA-102,497
1	C15	.002 - 4-PLY	SA-103,852
4	C16	.05 - 2-PLY	SA-102,493
1	C17	.002 - 4-PLY	SA-103,852
5	C18	.002 - 4-PLY	SA-103,852
5	C19	.01 MF - 1600 V	SA-104,837
5	C20	8 MFD	SA-104,614
5	C21	8 MFD	SA-104,614
5	C22	.002 - 4-PLY	SA-103,852
5	C23	.5 - —	SA-104,601
5	C24	.01 -	
5	C25	.5 - 2-PLY	SA-102,499
1	C26	.002 - 4-PLY	SA-103,852



3	R1	100 000 Ω ½ WATT	SA-100,727
3	R2	1,000 Ω "	SA-100,729
1	R3	7500 Ω "	SA-104 824
3	R4	1,000 Ω "	SA-100,729
3	R5	100,000 Ω "	SA-100,727
4	R6	5,000 Ω "	SA-100,824
4	R7	0.5 MEG. "	SA-100,194
2	R8	1,000 Ω "	SA-100,729
4	R9	0.5 MEG "	SA-100,194
	R10		
6	R11	0.5 MEG VOL. CONT.	SA-104,605
4	R12	1800 Ω ½ WATT	SA-102,961
1	R13	600 Ω 1-WATT	SA-105,004
4	R14	500 Ω ½ WATT	SA-99,583
2	R15	1 MEG. "	SA-100,815
2	R16	50,000 Ω "	SA-100,512
2	R17	40,000 Ω "	SA-103,410
2	R18	75,000 Ω "	SA-101,163
5	R19	5,000 Ω 10-WATT	SA-104,704

MODEL 150 Type 2
Schematic

UNITED AMERICAN BOSCH CORP.



The socket layout for Ed-2 is like that for 150 Ed-1 except that 77's replace the 236's and a 78 replaces the 239.

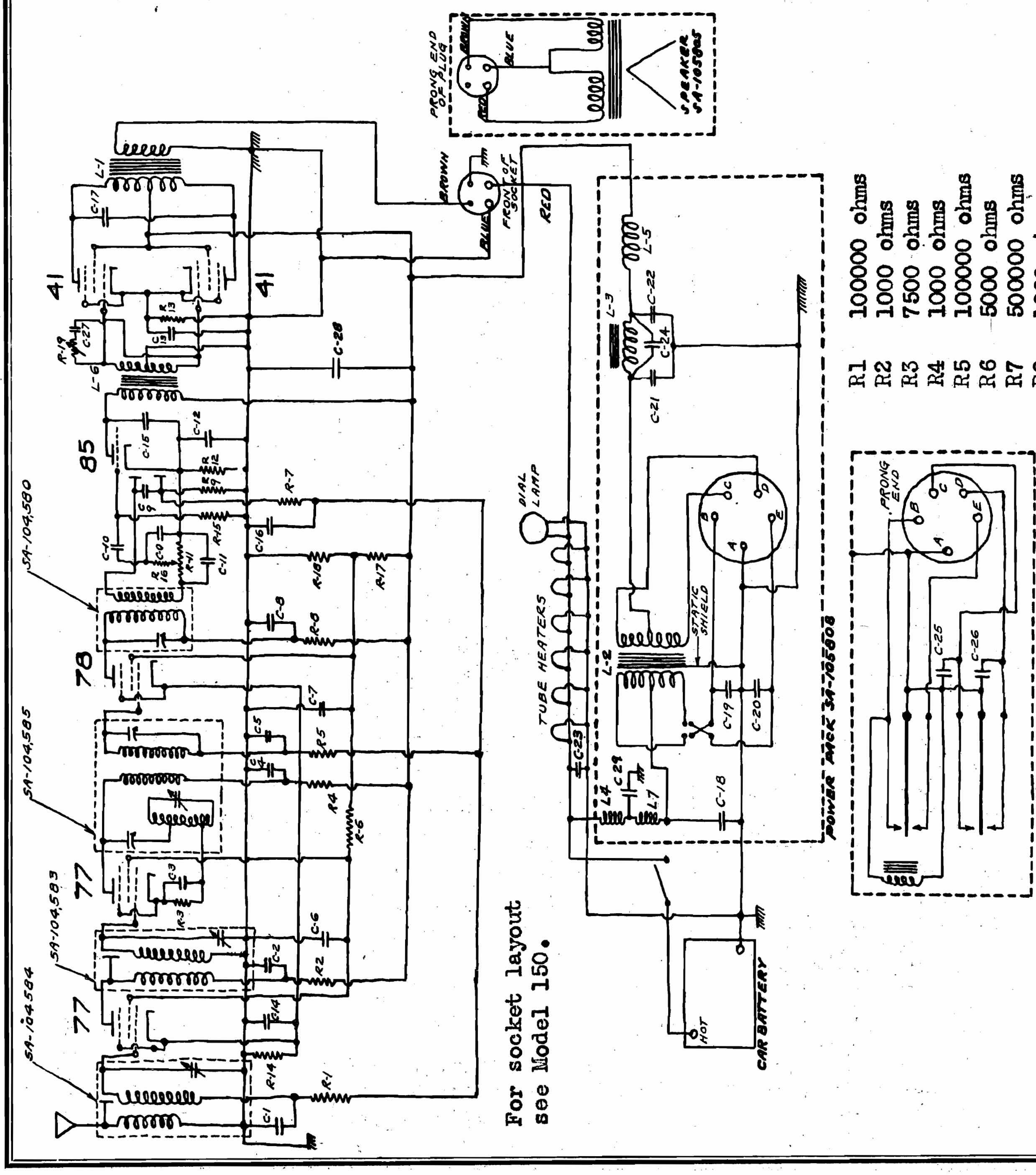
Total battery drain 6.1 amp
Output 2.2 watt
B Voltage 190

R1	100000 ohms
R2	1000 ohms
R3	7500 ohms
R4	1000 ohms
R5	100000 ohms
R6	5000 ohms
R7	500000 ohms
R8	1000 ohms
R9	500000 ohms
R11	500000 ohms
R12	1800 ohms
R13	600 ohms
R14	500 ohms
R15	1. megohm
R16	50000 ohms
R17	40000 ohms
R18	75000 ohms

C0	.0001 mfd
C1	.05 mfd
C2	.05 mfd
C3	.002 mfd
C4	.05 mfd
C5	.05 mfd
C6	.1 mfd
C7	.05 mfd
C8	.05 mfd
C9	.0001 mfd
C10	.01 mfd
C11	.0001 mfd
C12	.5 mfd
C13	.5 mfd
C14	.25 mfd
C15	.002 mfd
C16	.05 mfd
C17	.002 mfd
C18	.5 Comm. in can
C19	.5 Comm. in can
C20	.5 Comm. in can
C21	8.0 mfd
C22	8.0 mfd
C23	.002 mfd
C24	.1 mfd
C25	.01 mfd
C26	.01 mfd
C27	.25 mfd
C28	.5 mfd
C29	

MODEL 160
Schematic

UNITED AMERICAN BOSCH CORP.



R1	100000 ohms
R2	1000 ohms
R3	7500 ohms
R4	1000 ohms
R5	100000 ohms
R6	5000 ohms
R7	500000 ohms
R8	1000 ohms
R9	500000 ohms

R11	500000 ohms
R12	1800 ohms
R13	600 ohms
R14	500 ohms
R15	1. megohm
R16	50000 ohms
R17	40000 ohms
R18	75000 ohms
R19	Tone Control

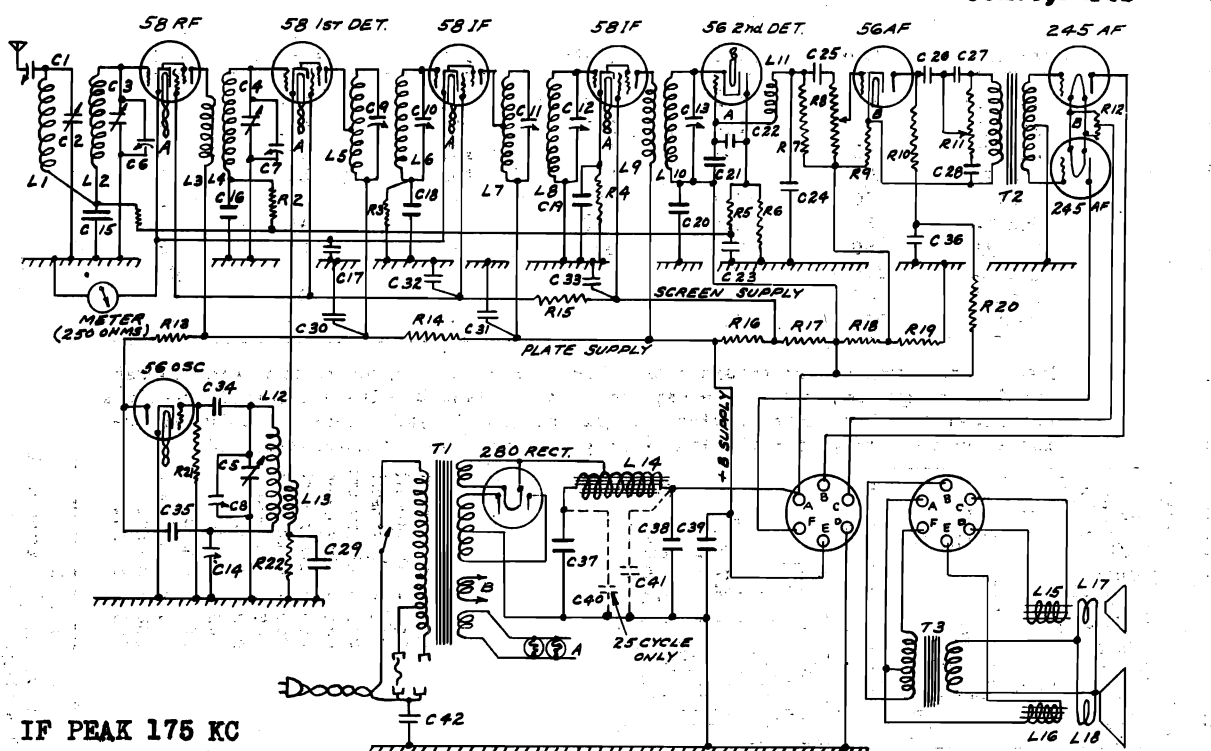
C0	.0001 mica
C1	.05 mfd
C2	.05 mfd
C3	.002 mfd
C4	.05 mfd
C5	.05 mfd
C6	.1 mfd
C7	.05 mfd
C8	.05 mfd
C9	.0001 mfd
C10	.01 mfd
C11	.0001 mica
C12	.5 mfd
C13	.5 mfd
C14	.25 mfd
C15	.002 mfd
C16	.05 mfd
C17	.002 mfd
C18	.5 mfd in can
C19	.5 mfd in can
C20	.5 mfd in can
C21	8.0 mfd
C22	8.0 mfd
C23	.002 mfd
C24	.1 mfd
C25	.01 mfd
C26	.01 mfd
C27	.005 mfd
C28	.25 mfd
C29	.5 mfd in can

For socket layout see Model 150.

INTERMEDIATE FREQUENCY-175 K.C.

UNITED AMERICAN BOSCH CORP.

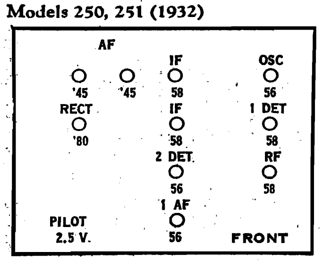
MODEL 250,251
Schematic, Voltage
Socket, Parts



IF PEAK 175 KC

R1 - 100,000 ohms	C1 - Trimmer	C23 - .05 mfd.	L2 - RF coil
R2 - 100,000 ohms	C2 - Tuning	C24 - 100 mmf.	L3 - RF coil
R3 - 100,000 ohms	C3 - Tuning	C25 - .05 mmf.	L4 - RF coil
R4 - 500 ohms	C4 - Tuning	C26 - .5 mfd.	L5 - IF coil
R5 - 500,000 ohms	C5 - Tuning	C27 - .05 mfd.	L6 - IF coil
R6 - 100,000 ohms	C6 - Alignment	C28 - .05 mfd.	L7 - IF coil
R7 - 100,000 ohms	C7 - Alignment	C29 - .05 mfd.	L8 - IF coil
R8 - 500,000 ohms	C8 - Alignment	C30 - .05 mfd.	L9 - IF coil
R9 - 1500 ohms	C9 - IF	C31 - .05 mfd.	L10 - IF coil
R10 - 25,000 ohms	C10 - IF	C32 - .05 mfd.	L11 - Choke
R11 - 100,000 ohms	C11 - IF	C33 - .05 mfd.	L12 - Osc.
R12 - Center Tap	C12 - IF	C34 - 100 mmf.	L13 - Osc.
R13 - 30,000 ohms	C13 - 2nd Det.	C35 - .05 mfd.	L14 - Choke
R14 - 1000 ohms	C14 - Alignment	C36 - 4	L15 - Field
R15 - 1000 ohms	C15 - .05 mfd.	C37 - 8 mfd.	L16 - Field
R16 - 3700	C16 - .05 mfd.	C38 - 8	L17 - Voice
R17 - 2270 ohms	C17 - .05 mfd.	C39 - 4	L18 - Voice
R18 - 230	C18 - .05 mfd.	C40 - 8 mfd.	
R19 - 1280	C19 - .05 mfd.	C41 - 8	
R20 - 10,000 ohms	C20 - .05 mfd.	C42 - .01 mfd.	T1 - Power
R21 - 100,000 ohms	C21 - 100 mmf.		T2 - Input
R22 - 5000 ohms	C22 - .05 mfd.	L1 - RF coil	T3 - Output

Models 250, 251 (1932)



Stage	Tube	Fil.	Plate	Screen	Cathode	Grid
RF	58	2.4	200	100	4.5	0
1st Det.	58	2.4	200	100	8.5	0
Osc.	56	2.4	85	-	0	7.8
1st IF	58	2.4	200	100	4.5	0
2nd IF	58	2.4	200	100	4.5	0
2nd Det.	56	2.4	0	-	47	0
1st AF	56	2.4	175	1	47	0
2nd AF	245	2.4	350	-	-	55
2nd AF	245	2.4	350	-	-	55
Rect.	280	4.8	SOCKET VOLTAGES			

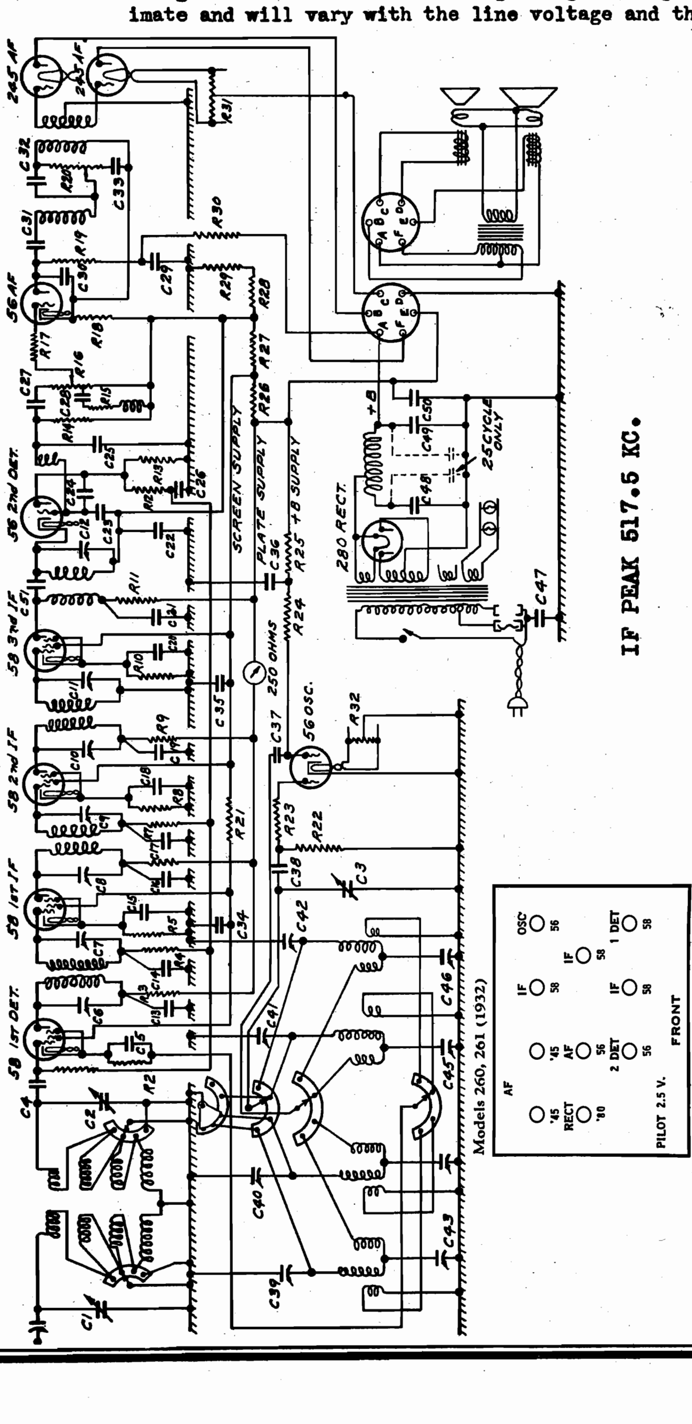
Note: These values are readings of a high resistance voltmeter to ground with the exception of the filament voltages. Cathode voltages are given for those tubes having the grid at ground.

MODEL 260,261
Schematic,Voltage
Socket,Parts

UNITED AMERICAN BOSCH CORP.

Stage	Tube	Fil.	Plate	Screen	Cathode	Grid
1st Det.	58	2.4	215	90	7.5	0
1st IF	58	2.4	215	90	5.0	0
2nd IF	58	2.4	215	105	48	0
3rd IF	58	2.4	215	105	32	0
Osc.	56	2.4	70	-	0	0
2nd Det.	56	2.4	0	-	45	-
1st AF	56	2.4	180	-	50	12
Output	245	2.4	350	-	60	0
Output	245	2.4	350	-	60	0
Rect.	280	4.8	-	-	-	-

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. Cathode readings are given for those tubes having the grid at ground. The values are only approximate and will vary with the line voltage and the type of meter employed.



IF PEAK 517.5 KC.

R 1 - 500,000 ohms
R 2 - 5,000 ohms
R 3 - 1,000 ohms
R 4 - 100,000 ohms
R 5 - 1,500 ohms
R 6 - 1,000 ohms
R 7 - 100,000 ohms
R 8 - 1,500 ohms
R 9 - 1,000 ohms
R10 - 350 ohms
R11 - 1,000 ohms
R12 - 500,000 ohms
R13 - 1 megohm
R14 - 100,000 ohms
R15 - 10,000 ohms
R16 - 500,000 ohms
R17 - 100,000 ohms
R18 - 1,500 ohms
R19 - 25,000 ohms

R20 - 100,000 ohms
R21 - 10,000 ohms
R22 - 50,000 ohms
R23 - 150 ohms
R24 - 10,000 ohms
R25 - 10,000 ohms
R26 - 3700)
R27 - 2270) ohms
R28 - 230)
R29 - 1280)
R30 - 10,000 ohms
R31 - Mid tap
R32 - Mid tap

C 1 - Tuning
C 2 - Tuning
C 3 - Tuning
C 4 - 100 mmf.
C 5 - .05 mfd.

C 6 - alignment
C 7 - alignment
C 8 - alignment
C 9 - alignment
C10 - alignment
C11 - alignment
C12 - alignment
C13 - .005 mfd.
C14 - .005 mfd.
C15 - .05 mfd.
C16 - .005 mfd.
C17 - .005 mfd.
C18 - .05 mfd.
C19 - .005 mfd.
C20 - .05 mfd.
C21 - .005 mfd.
C22 - .05 mfd.
C23 - 100 mmf. Note
C24 - .05 mfd.

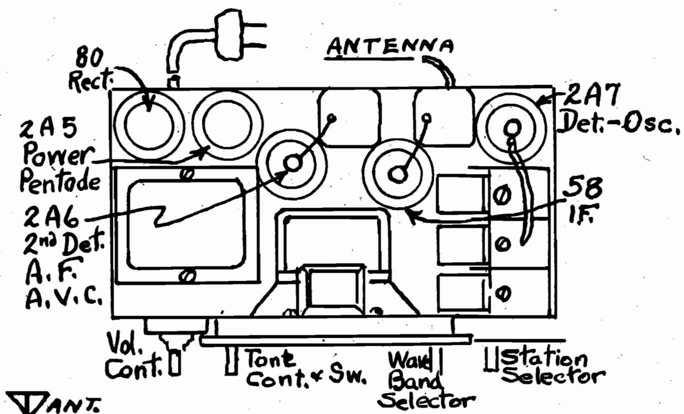
C25 - 100 mmf.
C26 - .25 mfd.
C27 - .05 mfd.
C28 - .025 mfd.
C29 - 4 mfd.
C30 - .001 mfd.
C31 - .5 mfd.
C32 - .05 mfd.
C33 - .05 mfd.
C34 - .05 mfd.
C35 - .05 mfd.
C36 - .25 mfd.
C37 - .05 mfd.
C38 - 100 mmf.
C39 - alignment

C40 - alignment
C41 - alignment
C42 - alignment
C43 - alignment
C44 - alignment
C45 - alignment
C46 - .01 mfd.
C47 - 8 mfd.
C48 - 8 mfd.
C49 - 8 mfd.
C50 - 4 mfd.
C51 - 1,000 mmf.
C52 - 8 mfd.
C53 - 4 mfd.

(R26, R27, R28, R29 - tapped unit
(C13, C14, C16, C17, C19, C21 - single unit
(C29, C48, C49, C50 - single unit

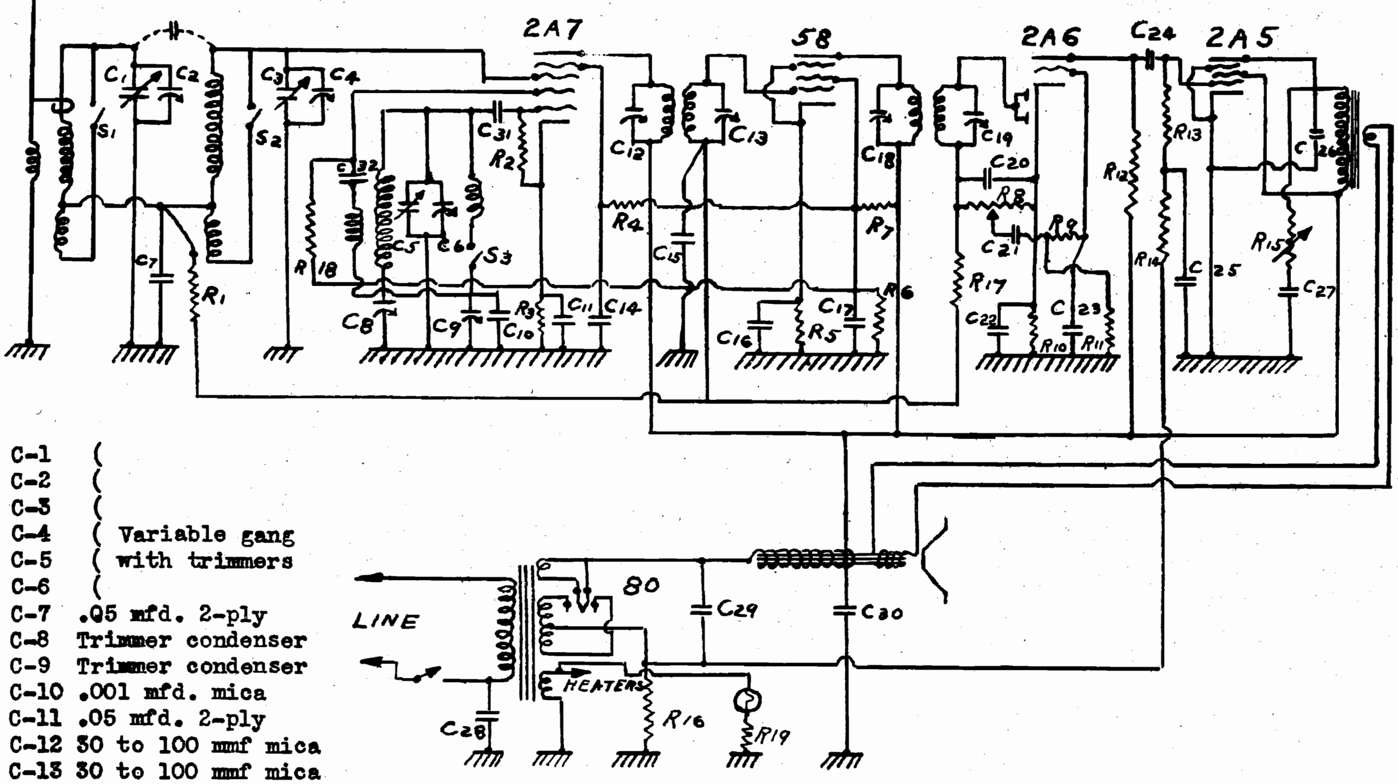
MODEL 350
Schematic, Voltage
Socket, Parts

UNITED AMERICAN BOSCH CORP.



Tube	Fil.	Plate	Screen	Cathode	Grid
2A7	2.4	75*	30	0.8	--
		60**			
58	2.4	250	75	2.0	--
2A5	2.4	95	--	1.5	--
2A6	2.5	235	250	0	7.0
80	4.7				

* Detector plate. ** Oscillator plate
Line voltage 115. Power consumption 50 w.
2A5 Bias resistor drop - 15 volts.

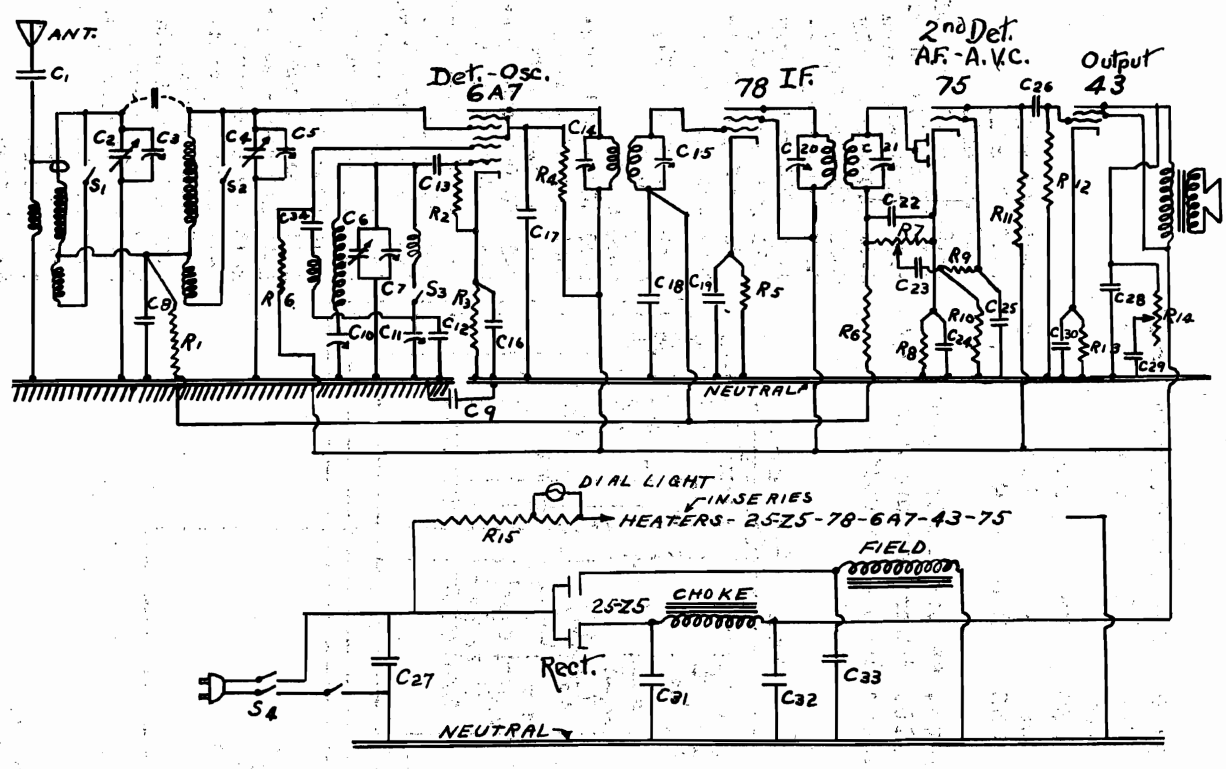


SCHEMATIC WIRING DIAGRAM OF THE MODEL 350

C-1 (
C-2 (
C-3 (
C-4 (Variable gang
C-5 (with trimmers
C-6 (
C-7 .05 mfd. 2-ply
C-8 Trimmer condenser
C-9 Trimmer condenser
C-10 .001 mfd. mica
C-11 .05 mfd. 2-ply
C-12 30 to 100 mmf mica
C-13 30 to 100 mmf mica
C-14 .05 mfd.
C-15 .05 mfd.
C-16 .05 mfd.
C-17 .05 mfd.
C-18 30 to 100 mmf mica
C-19 30 to 100 mmf mica
C-20 .0001 mfd. mica
C-21 .005 mfd. 3-ply
C-22 .25 mfd. 2-ply
C-23 .0001 mfd. mica
C-24 .005 mfd. 3-ply
C-25 .05 mfd. 2-ply
C-26 .005 mfd. 3-ply
C-27 .05 mfd. 2-ply
C-28 .01 mfd. 4-ply
C-29 8 mfd.
C-30 6 mfd.
C-31 .0001 mfd. mica
C-32 .01 mfd. 4-ply
R-1 .1 meg $\frac{1}{2}$ watt
R-2 50,000 ohms $\frac{1}{4}$ watt
R-3 300 ohms $\frac{1}{4}$ watt
R-4 50,000 ohms $\frac{1}{4}$ watt
R-5 300 ohms $\frac{1}{4}$ watt
R-6 40,000 ohms $\frac{1}{2}$ watt
R-8 Volume control
R-9 .1 meg. $\frac{1}{4}$ watt
R-10 5000 ohms $\frac{1}{4}$ watt
R-11 1 meg. $\frac{1}{4}$ watt
R-12 250,000 ohms $\frac{1}{4}$ watt
R-13 $\frac{1}{2}$ meg. $\frac{1}{4}$ watt
R-14 .1 meg. $\frac{1}{4}$ watt
R-15 Tone control
R-16 350 ohms 1 watt
R-17 $\frac{1}{4}$ meg. $\frac{1}{4}$ watt
R-18 10,000 ohms $\frac{1}{4}$ watt
R-19 .4 ohms
S-1 Switch
S-2 Switch
S-3 Switch

MODEL 355
Schematic, Voltage
Parts List

UNITED AMERICAN BOSCH CORP.



SCHEMATIC WIRING DIAGRAM MODEL 355

AC Volts across series resistor-44
DC Volts across series resistor-52
DC Dynamic field excitation 113 volts
AC Dynamic field excitation 115 volts

AC Power Consumption
45 watts

AC Voltage Table

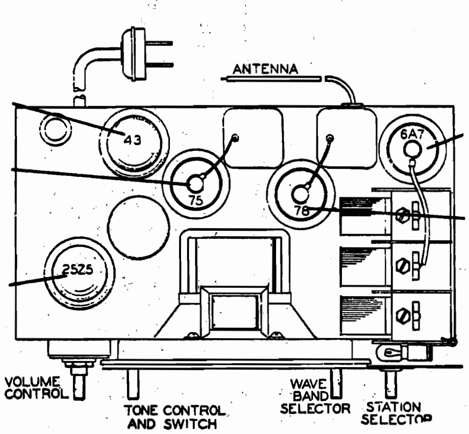
Tube	Fil	Plate	Screen	Cath.
6A7	5.1	118*	45*	1.4*
78	5.1	118	118	3.0
76	5.3	50	-	.7
43	22.3	108	118	18.
25Z5	24.	128	-	-

*Detector elements. Osc. Plate 97 V

DC Voltage Table

Tube	Fil	Plate	Screen	Cath.
6A7	5.6		40*	1.1*
78	5.5	105	105	2.4
76	5.8	47	-	0.6
43	28.	97	105	18.
25Z5	30.	113	-	-

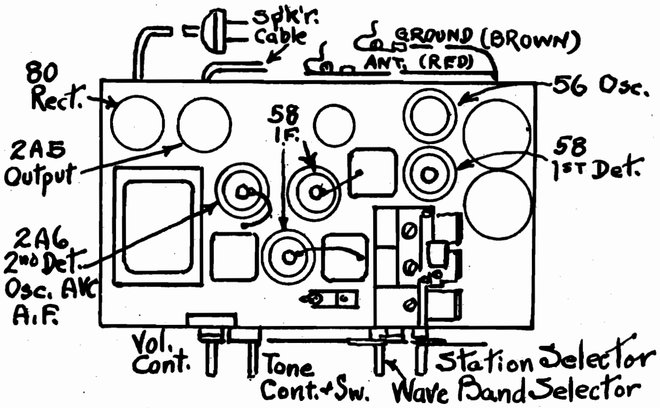
* Detector elements.



R1 100000 1/4 watt		
R2 50000 "	C1 .002 4-ply	C18 .05
R3 300 "	C2)	C19 .05
R4 50000 "	C3)	C22 .0001 mica
R5 300 "	C4) Var. gang with	C23 .005 - 3ply
R6 1/2 meg. "	C5) trimmers	C24 .25 - 2ply
R7 Volume control	C6)	C25 .0001 mica
R8 5000 1/4 watt	C7)	C26 .005 3ply
R9 100000 "	C8 .05 - 2ply	C27 .01 - 4ply
R10 1 meg. "	C9 .25 - 4ply	C28 .01 - 4ply
R11 250000 "	C10 Trim. cond.	C29 .05 - 2ply
R12 1/2 meg. "	C11 " "	C30 4 mfd.
R13 600 1/2 watt	C12 .001 mica	C31 12 "
R14 Tone control	C13 .0001 "	C32 8 "
R15 165	C16 .05	C33 4 "
R16 10000 1/4 watt	C17 .05	C34 .01 - 4ply

UNITED AMERICAN BOSCH CORP.

MODEL 360
Schematic, Voltage Socket, Parts



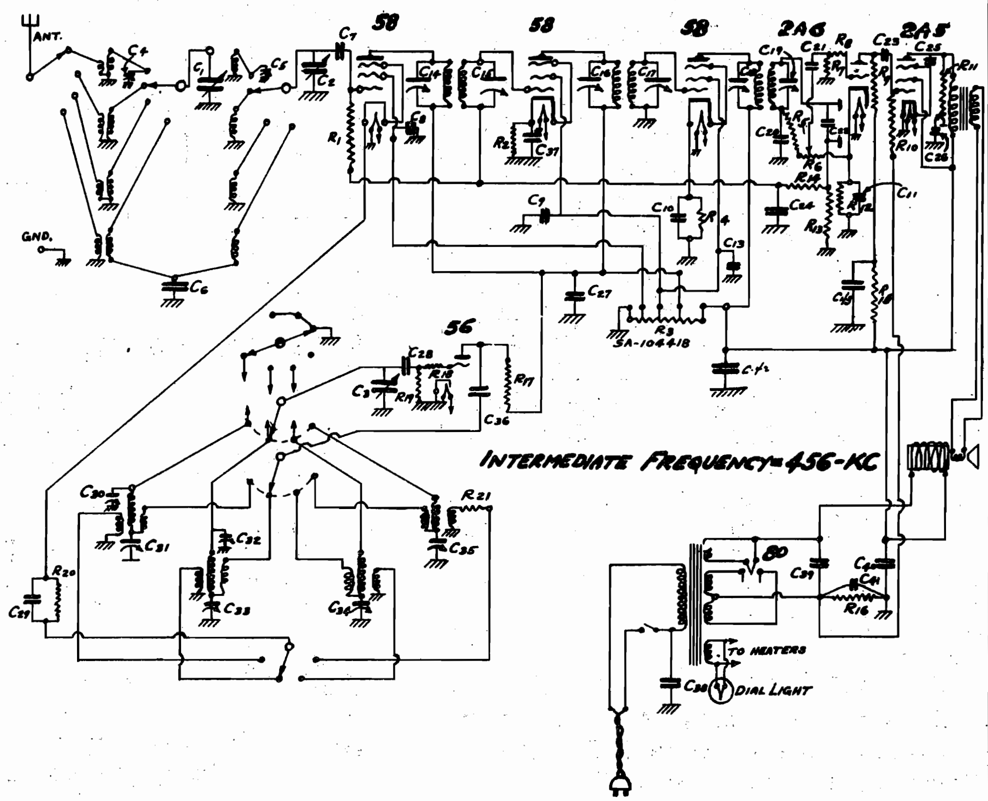
Voltage stated in table are measured between tube element and ground. Heater or filament excluded.

Tube	Fil.	Plate	Screen	Cathode	Grid
58	2.65	220	40	2.8	-
58	2.65	220	95	2.0	-
58	2.65	240	95	2.7	-
56	2.65	75	-	0	25
2A6	2.65	90	-	1.4	-
2A5	2.65	235	240	0	-
80	4.8	---	-	-	-

Across 400 ohm 2A5 bias resistor 22 volts
Output of rectifier 360 volts.
Line voltage 115 . Power consumption 60 watts

R-1 1/2 meg. 1/4 watt
R-2 300 ohms 1/4 watt
R-3 Multiple
R-4 300 ohms 1/4 watt
R-5 5000 ohms 1/4 watt
R-6 500,000 ohms vol.
R-7 2 meg. 1/4 watt
R-8 100,000 ohms 1/4 watt
R-9 250,000 ohms 1/4 watt
R-10 1/2 meg. 1/4 watt
R-11 Variable
R-12 5000 ohms 1/4 watt
R-13 1 meg. 1/4 watt
R-14 1/2 meg. 1/4 watt
R-15 ----
R-16 400 ohms 1 watt
R-17 2500 ohms 1/2 watt
R-18 50 ohms 1/2 watt
R-19 20,000 ohms 1/4 watt
R-20 2000 ohms 1/4 watt
R-21 200 ohms 1/4 watt

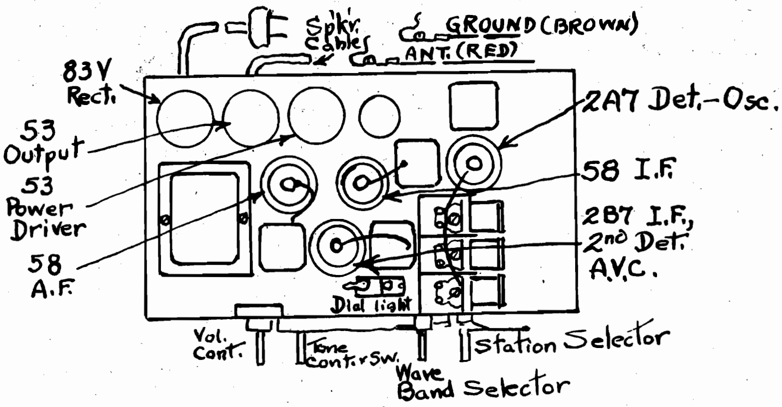
C-1 ----
C-2 Variable condenser
C-3 ----
C-4 Trim condenser
C-5 Trim condenser
C-6 .05 mfd. 2-ply
C-7 100 mmf mica
C-8 .05 mfd.
C-9 .05 mfd.
C-10 .05 mfd.
C-11 .25 mfd.
C-12 ----
C-13 .05 mfd.
C-14 30 - 100 mmf mica
C-15 " " " "
C-16 " " " "
C-17 " " " "
C-18 " " " "
C-19 " " " "
C-20 100 mmf mica
C-21 .005 mfd. 3-ply
C-22 100 mmf mica
C-23 .005 mfd. 3-ply
C-24 .05 mfd. 2-ply
C-25 .005 mfd. 3-ply
C-26 .05 2-ply
C-27 .05 mfd. 3-ply
C-28 100 mmf mica
C-29 .05 mfd. 2-ply
C-30 7 - 70 mmf
C-31 300 mmf variable
C-32 7 - 70 mmf
C-33 1200 mmf variable
C-34 1200 mmf variable
C-35 1500 mmf variable
C-36 .05 mfd. 2-ply
C-37 .05 mfd.
C-38 .01 mfd. 4-ply
C-39 8 mfd. electro
C-40 4 mfd. electro
C-41 20 mfd. electro

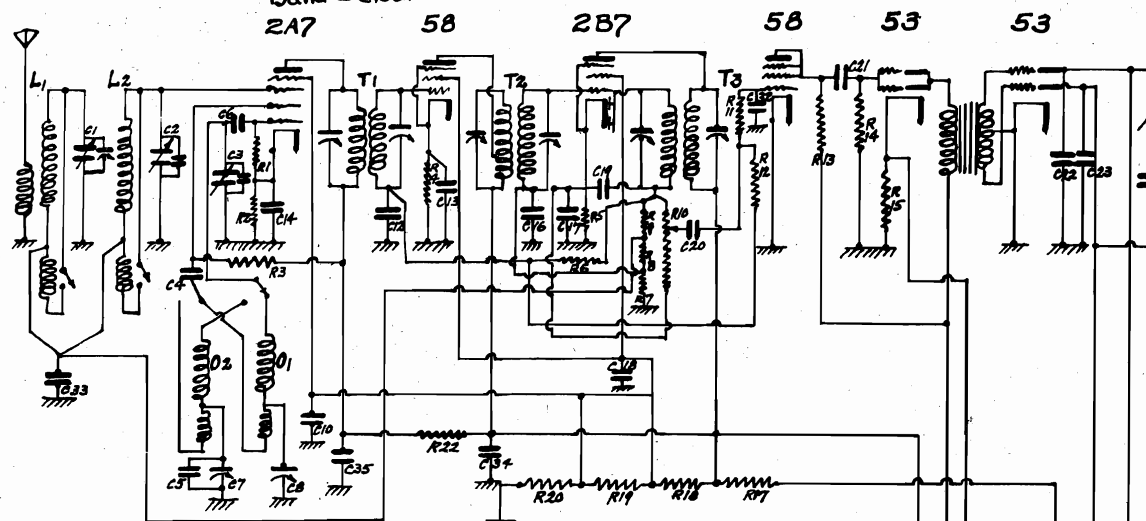


MODEL 370
Schematic, Voltage
Socket, Parts

UNITED AMERICAN BOSCH CORP.

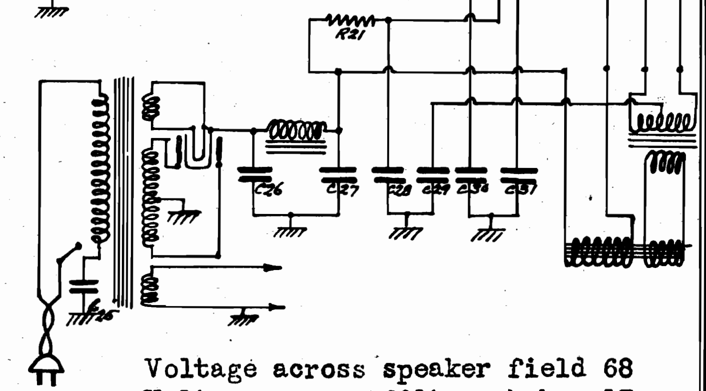
R-1	50,000 ohms	1/4 watt	
R-2	500 "	1/4 "	
R-3	20,000 "	1/2 "	
R-4	500 "	1/4 "	
R-5	125 "	1/4 "	
R-6	.5 meg.	1/4 "	
R-7	50,000 "	1/4 "	
R-8	.25 meg.	1/4 "	
R-9	.25 meg.	1/4 "	
R-10	.5 meg. variable		
R-11	.25 "	1/4 watt	
R-12	.5 meg.	1/4 "	
R-13	.1 "	1/4 "	
R-14	.5 "	1/4 "	
R-15	1000 ohms	1/4 "	
R-16	.5 meg. variable		
R-17	1000 ohms		
R-18	12,000 "		
R-19	8,000 "		
R-20	6,000 "		
R-21	10,000 "	1 watt	
R-22	1,000 "	1/4 "	
C-1)	Gang cond.		
C-2)	with trimmers		
C-3)	457 mmf		
C-4	.02 3-ply		
C-5	.0015 mfd. mica		
C-6	100 mmf. mica		
C-7)	500 to 1200 mmf.		
C-8)	dual condenser		
C-9	- - -		
C-10	.05 2-ply		
C-11	- - -		
C-12	.05 2-ply		
C-13	.05 2-ply		
C-14	.05 2-ply		
C-15	- - -		
C-16	.05 2-ply		
C-17	.05 2-ply		
C-18	.05 2-ply		
C-19	100 mmf mica		
C-20	.05 2-ply		
C-21	.005 3-ply		
C-22	.005 3-ply		
C-23	.005 3-ply		
C-24	.01 4-ply		
C-25	.01 4-ply		
C-26	8 mfd.	475 V	
C-27	8 "	"	
C-28	4 "	"	
C-29	4 "	"	
C-30	4 "	300 V	
C-31	25 "	10 V	
C-32	100 mmf. mica		
C-33	.05 2-ply		
C-34	.05 3-ply		
C-35	.05 3-ply		





Tube	Fil.	Plate	Screen	Cathode
2A7	2.4	250* 175**	45*	2.3*
58	2.4	240	110	4.0
2B7	2.4	240	110	1.5
58	2.4	30		0
53	2.4	280		3.2
53	2.4	260		0
83V	4.7	360		

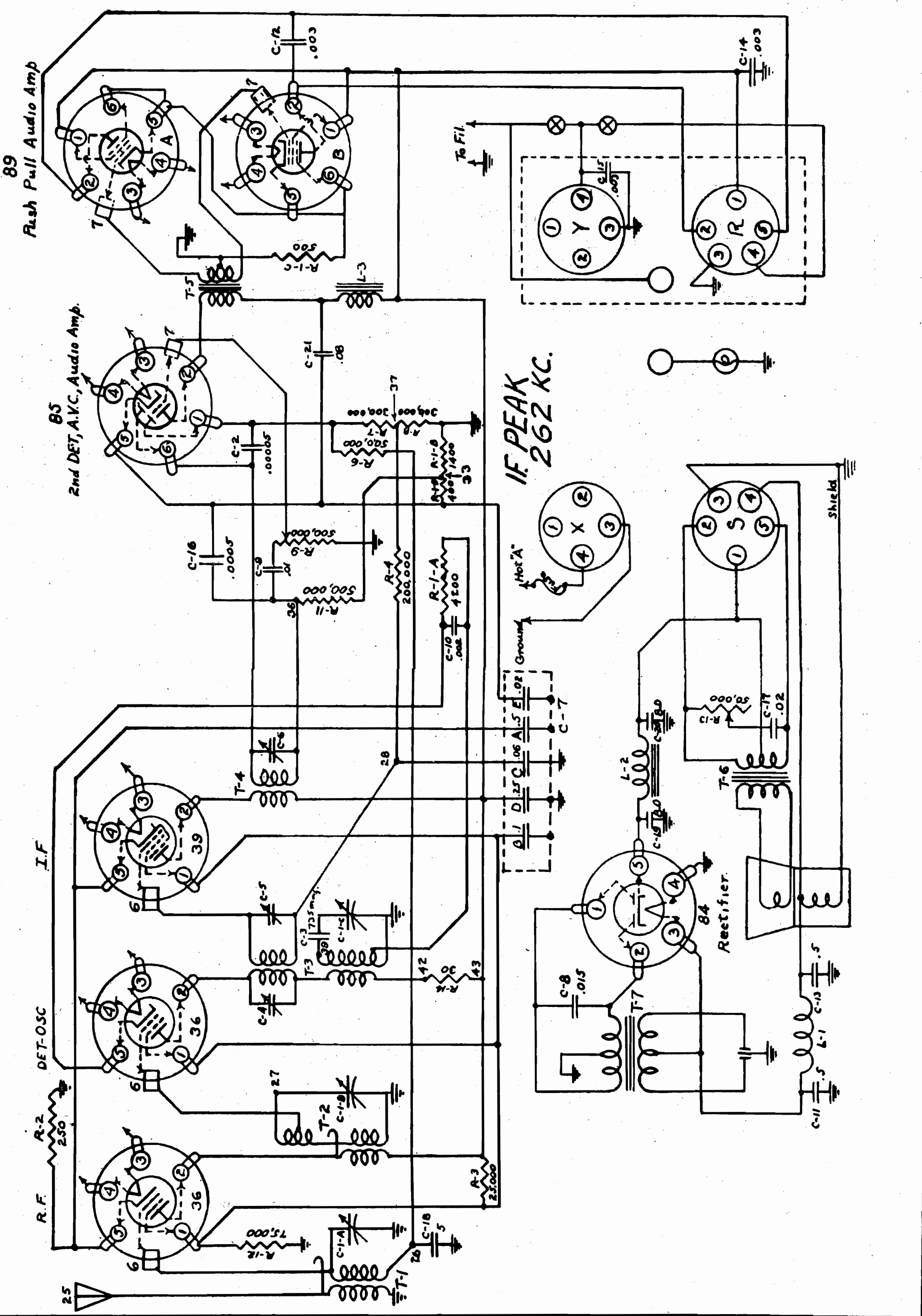
* Detector element. ** Oscillator element. Line voltage 115 volts. Power consumption 66 watts.



Voltage across speaker field 68
Voltage across filter choke 17

UNITED MOTORS SERVICE

MODEL 4036, B-O-P
Schematic



MODEL 4036, B-O-P
Voltage
Socket Layout
Chassis Layout

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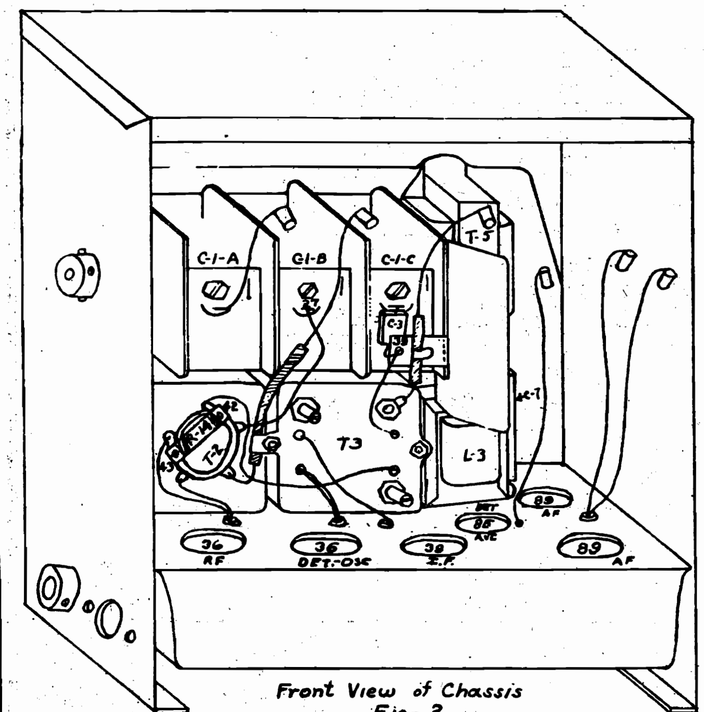
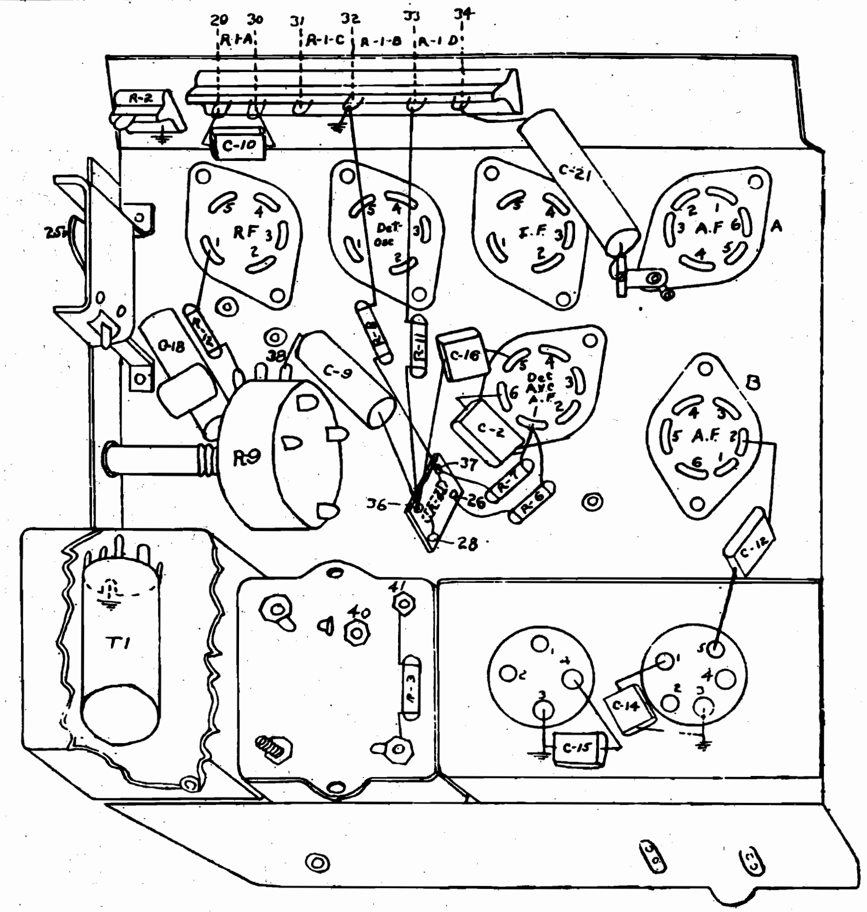


Front View of Chassis
Fig- 2

Parts Location



Tube	Screen Contact #1	Plate Contact #2	Heater Contact #3	Heater Contact #4	Cathode Contact #5	Gnd. Contact #6
236 RF	85	165	0	6.0	2.1	
236 Osc.	85	165	0	6.0	6.0	
239 IF	85	165	0	6.0	2.1	
85 Det.	O-A.V.C.	125	0	6.0	7.5	.2 Det.
A-89 AF	165	160	6.0	0	30.0	30.0
B-89 AF	165	160	0	6.0	30.0	30.0
84 Rect.	3.5	3.5	0	6.0	180	

UNITED MOTORS SERVICE

MODEL 4036,B-0-P
Alignment data

PEAKING ADJUSTABLE CONDENSERS

The complete Condenser Aligning Kit is now available under part No. 1207804. This kit contains all the small parts which are necessary for the proper aligning of the condensers on the U.M.S., 8-0-P. and Chevrolet Radio Receivers.

All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I. F. transformer is changed or the adjustments are tampered with in the field.

DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and an accurate test oscillator and a screw driver (with fibre handle) are available. Using a standard metal screw driver for this purpose will not give accurate adjustment

Proceed as follows:

A. Disconnect the antenna lead-in from the chassis.

B. Ground the antenna terminal on the chassis to the frame of the chassis.

C. Set "test oscillator" to 262 kilocycles. Some oscillators are not equipped with a frequency of 262 K.C. but do have a frequency of 130 K.C. In this case, the second harmonic of 130 K.C., namely 260 K.C., may be used.

D. Connect the output leads of the test oscillator to the grid of the 1st Detector tube and to ground (frame of the chassis) Leave grid cap in place.

E. Connect an output meter across the plates of the type 89 tubes. If the output meter is not protected, place a .1 mfd. condenser in series with the meter.

F. Turn the tuning condenser rotor to minimum capacity (rotor plates out of stator places).

G. Adjust I. F. Trimmers in the following order, in each case leaving the trimmer set for maximum output as shown by the output meter* * (See note

* C-4, Plate circuit of 1st Det.
C-5, Grid circuit of I. F. Amp.
C-6, Diode Input cirquit.

* See Fig 2. and 3 for location of condensers.

H. Remove connection grounding the antenna (reverse of instructions under B)

I. Insert the Calibration Block, Part No. 1206418, between the center (2nd R. F.) condenser and the rear of the chassis as follows: Lay the block on the bench with the largest flat side down and the cut-out edge toward the operator. Pick up the block between the first and second fingers of the hand so that the side having the beveled and cut-out edges faces the knuckles of the hand, and the fingers are as close to the beveled corners as is possible. Insert the hand in the case over the center tuning condenser (condenser plates fully closed) and place the Block between the condenser bracket and the chassis back, with the largest face of the Block flat against the back of the chassis. The Block will fit quite tightly and the left side must rest against the shield between the 1st and 2nd R.F. condensers in order to clear the condenser wiper spring.

J. Attach the test oscillator to antenna terminal and ground (frame) of the chassis. (Ant. on test oscillator to Ant. on chassis and ground on test oscillator to frame of chassis.)

K. Set test oscillator at 1400 K.C.

L. Open tuning condenser until it stops against the Calibration Block

M. Place Tube Shield in position around 236 Det.-Osc. tube. Adjust the trimmer condensers on the tuning condenser to maximum output, as measured by the output meter, in the following order:

C-1-C--Oscillator trimmer
C-1-B--2nd R. F. trimmer
C-1-A--1st R. F. trimmer

*NOTE: To insure sharp peaking of all trimmers, set the oscillator output below the point of start of A.V.C. action. Set the output of the oscillator so that it is less than half the maximum output available.

MODEL 4036,B-O-P
Resistance data

UNITED MOTORS SERVICE

LOCATING TROUBLES ISOLATED BY VOLTAGE TESTS

The voltmeter tests of the chassis merely serve to isolate the defect in some particular stage of the circuit. The actual fault must be located, in that stage, by means of a point-to-point check of the resistance values of the defective stage.

NOTE: All tubes should be removed from the chassis before making these tests, unless they are known to be good tubes.

Description of incorrect voltage	Test from	To	Correct reading (in OHMS)	Part or parts probably causing incorrect voltage
A. No filament voltage at any socket	1. Hot "A" lead	X4	Zero	Fuse or green lead
	2. Y4	RF #4	*Zero	Switch
	3. Y4	R #4	Zero	Switch
	4. Y4	Gnd.	#Open	C-15
	5. S4	"	6	Speaker field
B. No plate voltage at any socket	1. Rect. #5	Gnd.	Open	C-19; C-20
	2. " "	S-1	350	L-2
	3. R-1	Gnd.	100,000	C-14;C-7-D;C-7-B; R-3; R-12
C. 89 sockets (a) Plate volts	1. S-1	S-5	425	Output Trans.Pri.
	2. S-1	S-2	225	" " "
	3. R-2	R-5	Open	C-12
(b) Screen "	1. R-1	89 #1 (A)	Zero	Defective wiring
	2. R-2	89 #1 (B)	"	" "
(c) Cathode volts	1. Gnd.	89 #5 (B)	500	R-1-C
(d) Suppressor grid volts	1. Gnd.	89 #5 (B)	500	R-1-C
D. 85 Socket (a) Plate volts	1. R-1	85 #2	9,500	L-3;T-5
(b) A.V.C. and Det. plate V.	1. 34	Gnd.	1,800	R-1-B; R-1-D
	2. 34	85 #6	500,000	R-11;T-4;C-9
	3. 85 #6	85 #1	1,000,000	R-7; R-8;R-1-B; R-11;C-2;C-9
(c) Cathode volts	1. Gnd.	85 #5	1,800	R-1-B; R-1-D; C-7-E
E. 39 IF socket (a) Plate volts	1. IF #2	41	52	T-4 Pri.
	2. 41	Gnd.	100,000	C-1-D; R-3; R-12
(b) Screen volts	1. IF #1	41	25,000	R-3
	2. IF #1	Gnd.	100,000	R-3; R-12; C-1-D; C-7-B
(c) Cathode volts	IF #5	Gnd.	250	R-2; C-7-A

Description of incorrect voltage	Test from	To	Correct reading (in ohms)	Part or parts probably causing incorrect voltage
F. 36 Osc. socket (a) Plate volts	1. Osc. #2	42	36	T-3
	2. 42	43	30	R-14
(b) Screen volts	1. Osc. #1	41	25,000	R-3
	2. Osc. #1	Gnd.	100,000	R-3; R-12; C-7-D C-7-B
(c) Cathode	1. Osc. #5	Gnd.	4,200	R-1-A; C-10; T-3
G. 36 F. socket (a) Plate volts	1. RF #2	43	75	T-2
(b) Screen volts	1. RF #1	41	25,000	R-3
	2. RF #1	Gnd.	100,000	R-3; R-12; C-7-D; C-7-B
(c) Cathode	1. RF #5	Gnd.	250	R-2; C-7-A
H. Speaker (a) Weak	S-4	Gnd.	6	Speaker field
(b) Distorted	1. S-1	S-5	200	T-6 Trans.
	2. S-1	S-2	225	T-6 Trans.
	3. S-2	S-5	425	T-6; C-17; R-13
I. Inoperative power unit (a) Vibrator operates				
1. Check 84 tube				
2. Rect. #1	Rect. #2		350	T-7 Sec; C-8
3. Rect. #1	Gnd.		175	T-7 Sec; C-8
4. Rect. #5	Gnd.		Open	C-14; C-20
5. Rect. #5	S-1		350	L-2
(b) Vibrator inoperative				
1. S-4	Gnd.		6	C-11; C-13; Vibrator
2. S-4	Rect. #3		2	L-1

NOTE--It will be necessary to disconnect one lead of all condensers, which have one terminal grounded, in order to test them accurately.

* Switch on # Switch off

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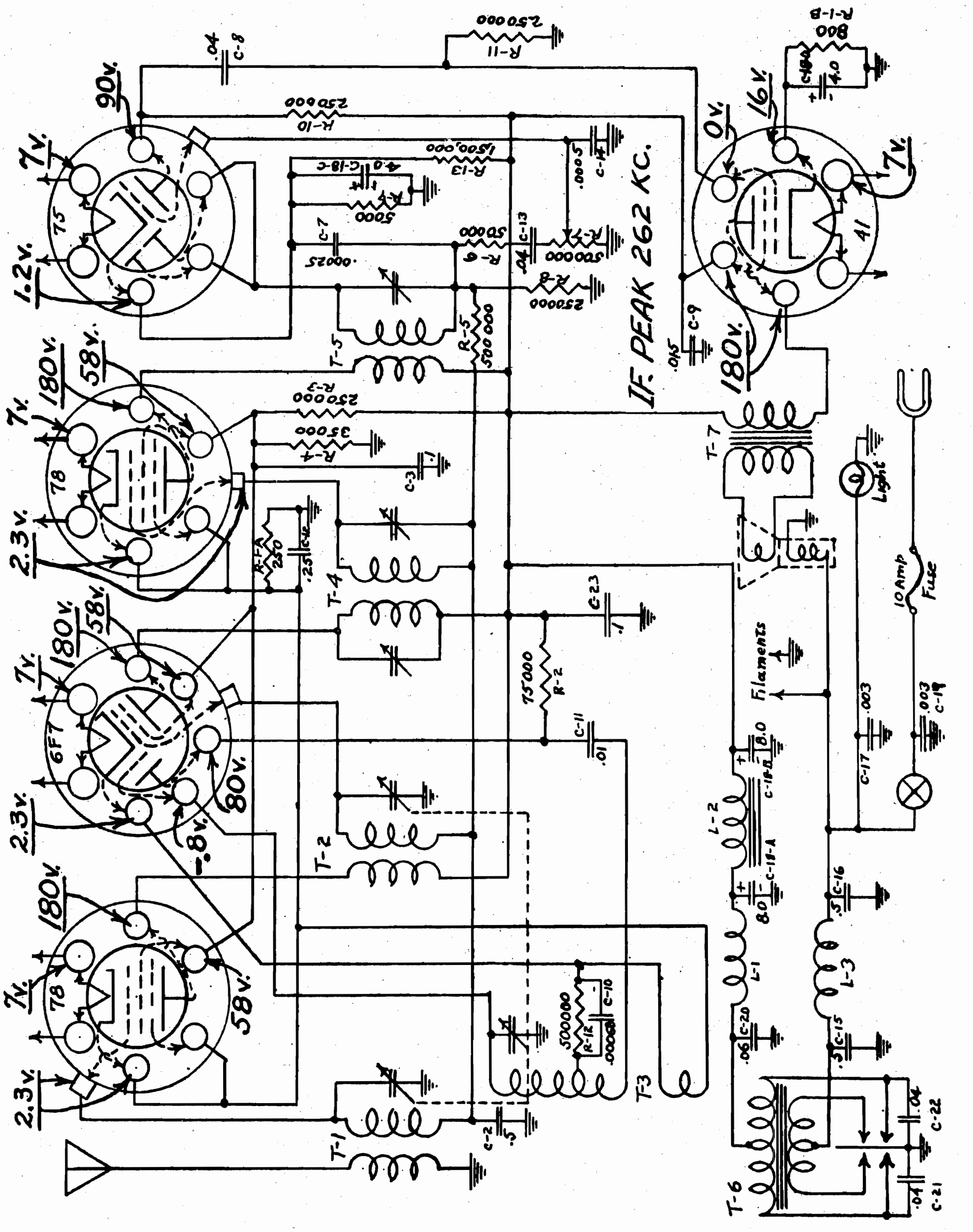
MODEL 4037
Schematic, Voltage

Speaker field 6 ohms



MODEL 4037
Service Hints
Alignment

UNITED MOTORS SERVICE

SERVICE HINTS

The Battery Cable consists of a single fused lead which should be fastened to the ammeter. Advances in filtering methods minimize chassis pick-up due to connecting the battery cable to the ammeter rather than to the battery.

The paint must be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R. F noise due to the vibrator will appear if good ground connections are not made at the dash.

A very slight amount of Chassis pick-up may appear in an installation on a car having the coil mounted behind the instrument panel. Take precautions to see that a good ground is made between the control unit and the instrument panel. The location of the Ammeter and dial light lead with respect to the coil is very important. Moving these leads as far away from the coil as possible and locating them against a brace or any metal support under the cowl will reduce the interference to a minimum.

The 6F7 tube is a two unit Tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function; operates weakly or not at all at the 550 end of the dial, remove the grid cap of the 78 I.F. tube and make and break the grid contact several times; if very loud pops occur in the speaker the 6F7 is probably defective and should be replaced.

All chassis having a Serial number below Serial #1349259 have a 500,000 ohm resistor connected between the screen (#2) of the 78 I.F. tube and the cathode (#5) of the 75 tube.

All chassis having a serial number above #1349259 have a 1,500,000 ohm resistor between the B plus terminal of the diode coil (2nd I.F.) and the cathode (#5) of the 75 tube.

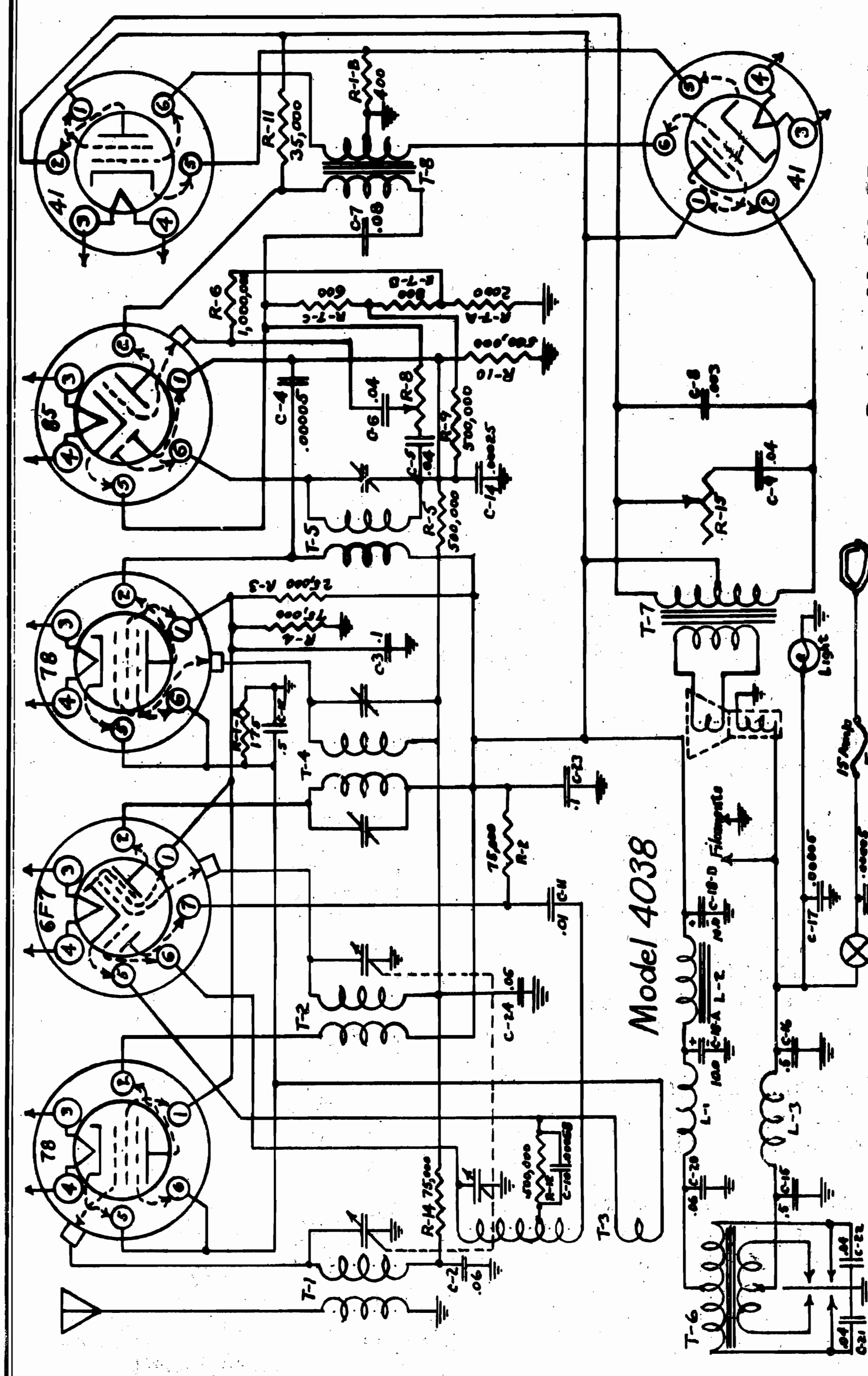
PEAKING: The peaking operation for this receiver is similar to that on the Model 4036. The I.F. stages should be peaked at 262 KC. Peak the I.F. trimmer, which is in the I.F. coil can having only one adjusting screw, first.

Peak the parallel trimmers, on the top of the tuning condenser, at 1400 KC., the oscillator section (beneath the volume control) first.

VIBRATORS. Sometimes a small amount of dirt will lodge between the contacts and result in such high contact resistance that the vibrator will not start. If such is apparently the case, remove the transformer-vibrator from the chassis. Disconnect ONLY the red B plus lead from the iron core choke. Turn the receiver "on" (there must be a connection between the vibrator case and the chassis) and start the vibrator by snapping the reed back and forth with a pencil. If the vibrator starts to function, allow it to run without stopping until the dirt has been burned out as indicated by the cessation of brilliant sparking. The vibrator should now start under its own power and should continue to function properly. If the vibrator still fails to start properly, replace the vibrator unit.

MODEL 4038
Schematic,Voltage

UNITED MOTORS SERVICE



Date 11-10-33

Tube	#1 Screen	#2 Plate	#3 Fil.	#4 Fil.	#5 Cathode	#6 Cond.	#7 Triode Plate
78	85	210	5.9	0	3.2	3.2	
6F7	85	210	0	5.9	3.2	0	90
78	85	210	5.9	0	3.2	3.2	
85	0	85	0	5.9	8.0	0	
41	210	205	5.9	0	16	0	
41	210	205	5.9	0	16	0	

I.F. PEAK 262 KC.

MODEL 4038
Alignment, Changes

UNITED MOTORS SERVICE

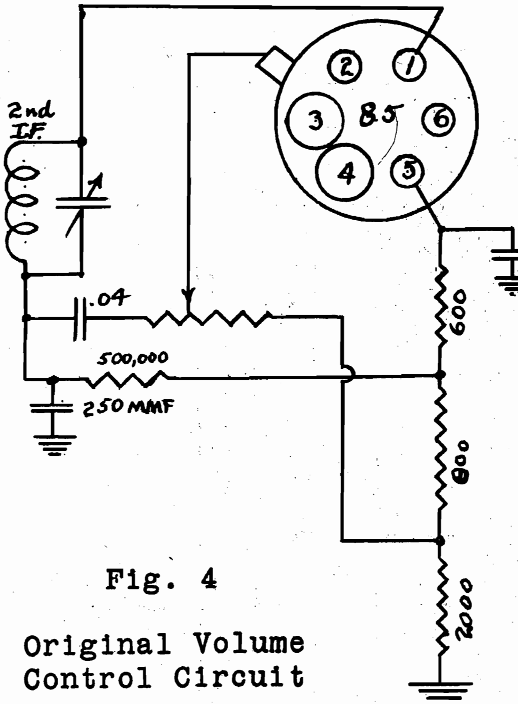


Fig. 4

Original Volume Control Circuit

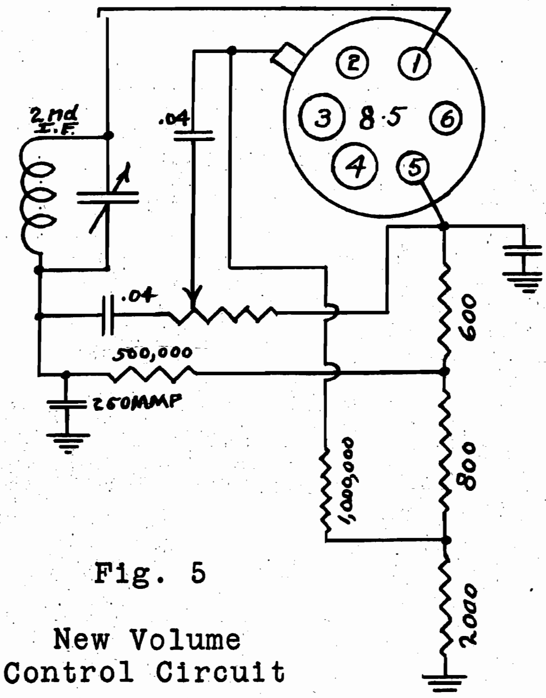


Fig. 5

New Volume Control Circuit

PEAKING: The peaking operation for this receiver is exactly the same as the peaking operation for the model 4037, as described below. The I.F. stages should be peaked at 262 K.C. Peak the I.F. trimmer, which is in the I.F. coil can having only one adjusting screw, first.

Obtain the 1400 K.C. Tuning Condenser setting by means of the red wood calibration block part #1208073, as follows:

1. Insert the block under the middle section of the tuning condenser so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket (See Figure A.)

2. Open the condenser blades until they stop solidly against the bevel edge of the block.

3. Peak the trimmers on the tuning condenser, adjusting the oscillator section (neares volume control) first.

4. Remove calibration block.

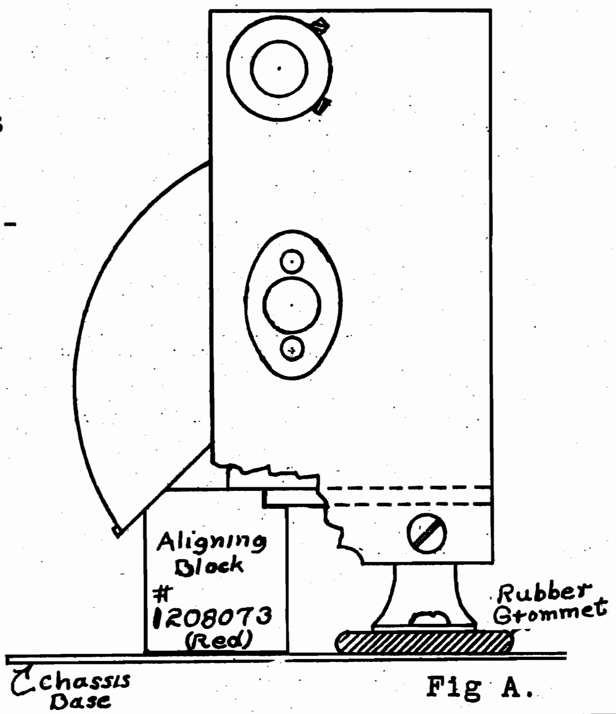
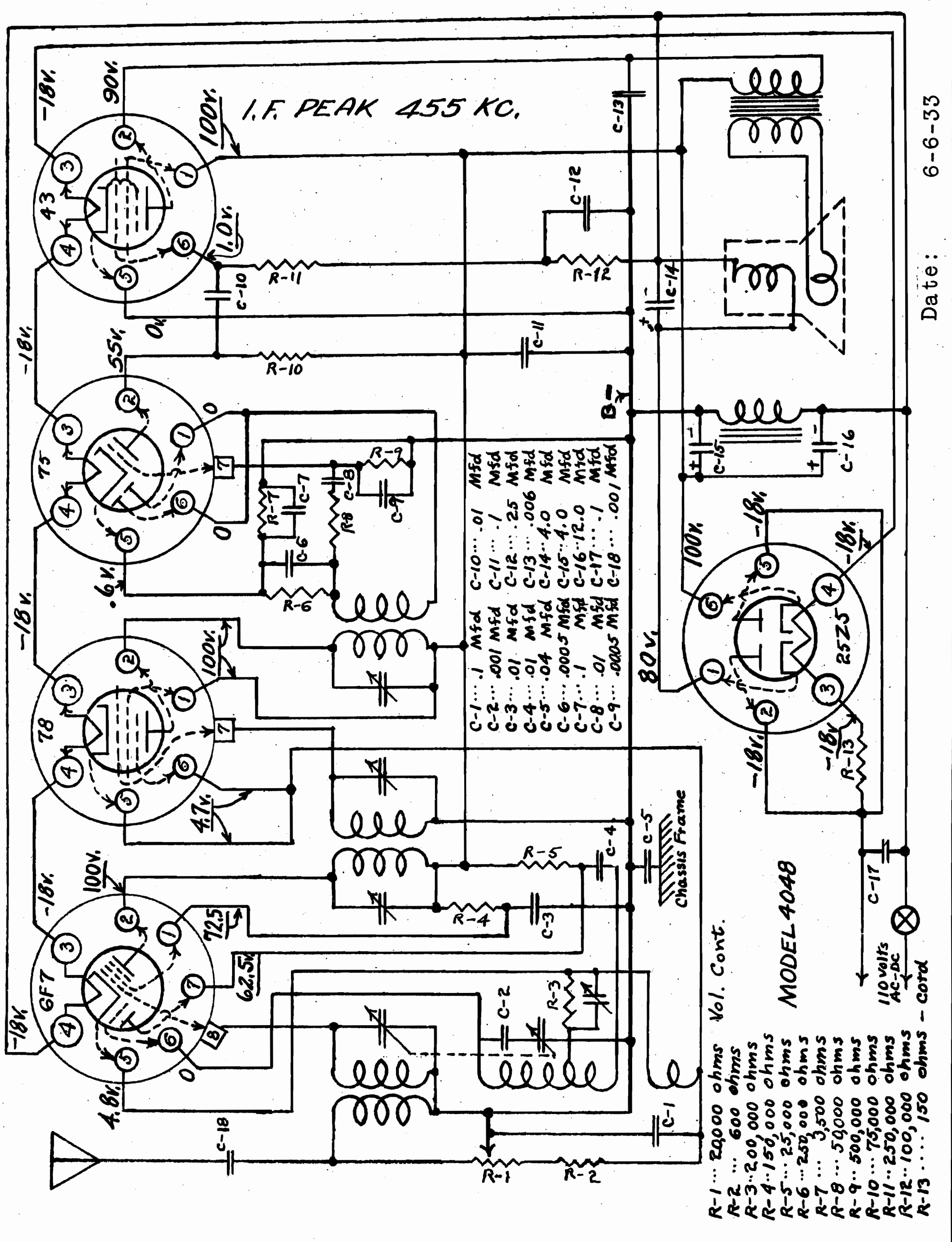


Fig A.

MODEL 4048
Schematic, Voltage

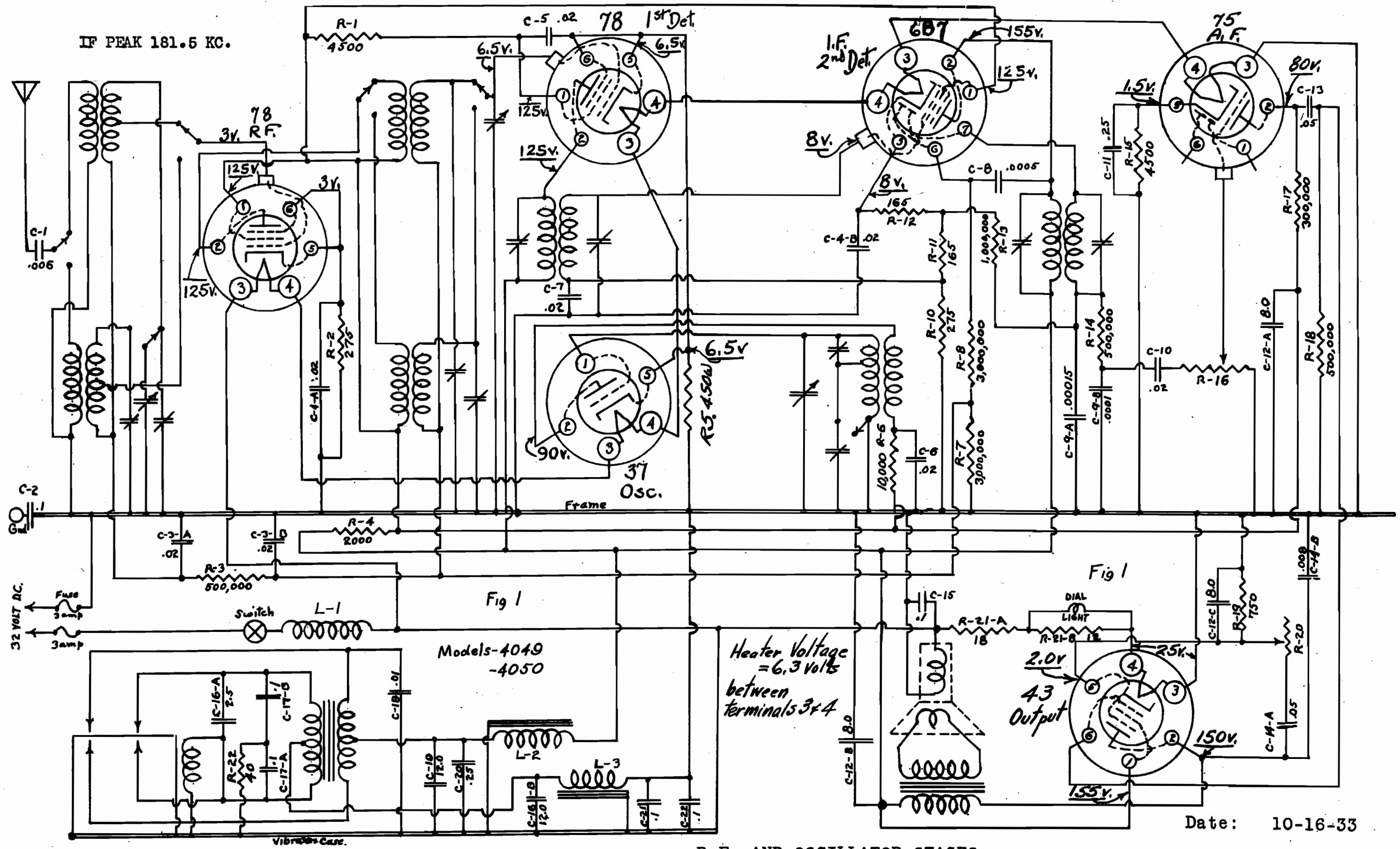
UNITED MOTORS SERVICE



MODEL 4049,4050
Schematic
Alignment

UNITED MOTORS SERVICE

IF PEAK 181.5 KC.



Date: 10-16-33

PEAKING:

The Intermediate frequency for the Model 4049 and 4050 is 181.5 K.C

I.F. STAGES

1. Connect the oscillator to the grid cap of the 1st Detetctor (78 tube).
2. Set the Oscillator for 181.5 K.C.
3. Peak the I.F. trimmer condensers, peaking the secondary of the second I.F. coil first and working forward to the primary of the first I.F. coil.

R.F. AND OSCILLATOR STAGES

1. Connect the oscillator to the antenna and ground posts of the receiver.
2. Tune the receiver to 1400 K.C.; operate the oscillator at 1400 K.C.
3. Peak the parallel trimmers on the tuning condenser; peak the oscillator section (small plates) first.

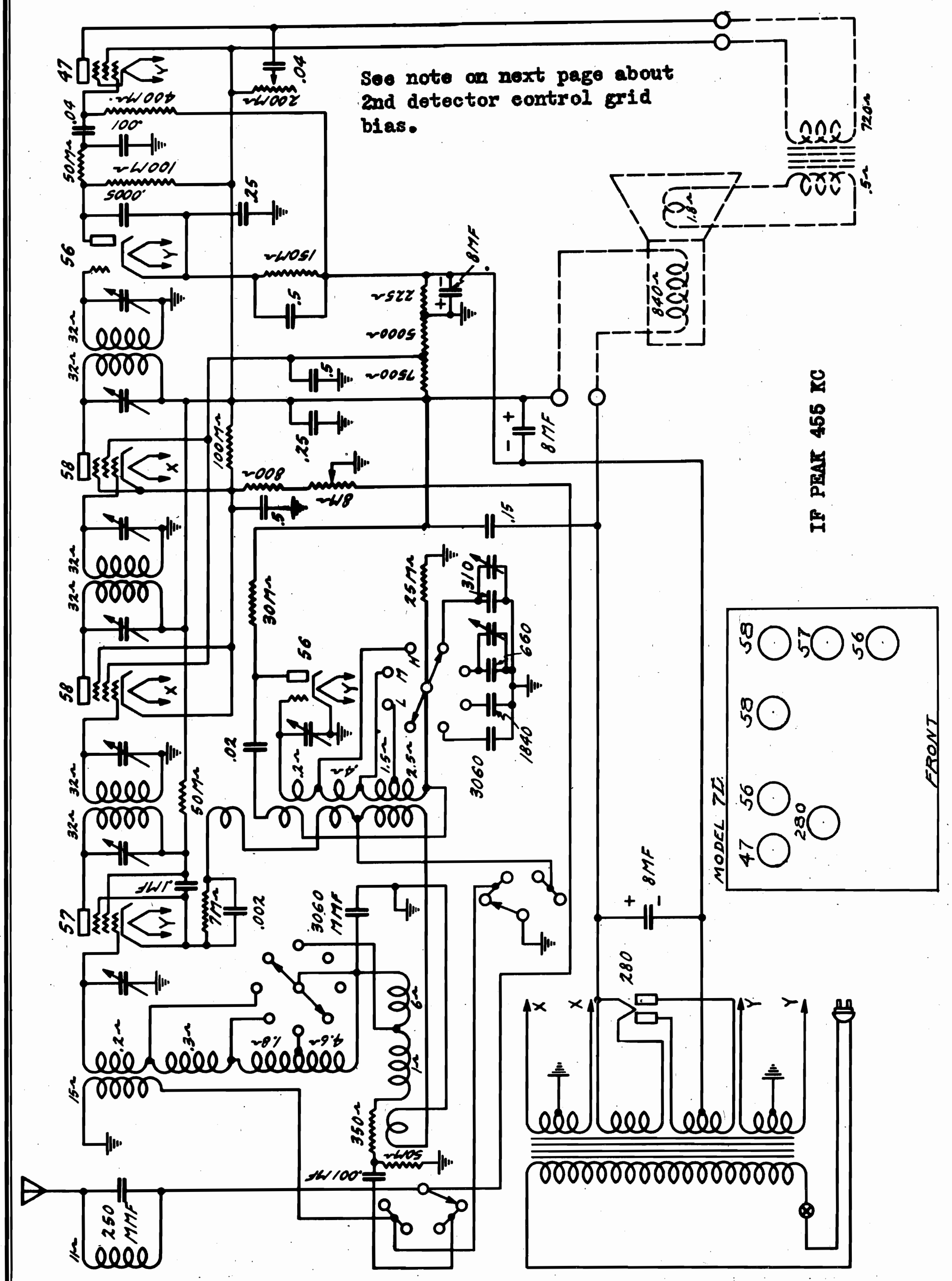
CAUTION:

Do NOT connect the chassis of the receiver to the chassis of the vibrator as they are 32 volts apart electrically. Connecting the two chassis together will cause the fuses to blow.

MODEL 7-D
Chassis 700
Schematic
Socket

U. S. RADIO & TELEVISION CORP.

See note on next page about 2nd detector control grid bias.



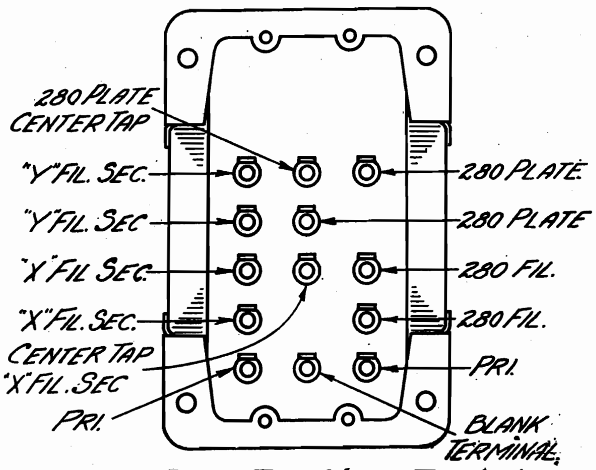
MODEL 7-D
Chassis 700
Voltage
Alignment

U. S. RADIO & TELEVISION CORP.

No. 700 CHASSIS—VOLTAGES AT SOCKETS
VOLUME CONTROL AT MAXIMUM—LINE VOLTAGE 115

Type of Tube	Position of Tube	Function	A Volts	B Volts	Control Grid C Volts	Screen Grid Volts	Screen Grid Current MA	Cathode Volts	Plate Current MA	Grid Test MA
56	1	Osc.	2.4	70	18 (1)			0	6.2	6.2
57	2	1st Det.	2.4	170	8.0	170	.3	8.0	1.2	1.6
58	3	1st I.F.	2.4	260	7.0	90 (2)	.6	7.0	2.5	4.0
58	4	2nd I.F.	2.4	260	7.0	90 (2)	.6	7.0	2.5	4.0
56	5	2nd Det.	2.4	200 (3)	17.0 (2)			17.0	.2	.3
247	6	Audio	2.4	240	1.6 (4)	265	6.8		33.0	38.0
280	7	Rect.	5.0						39 Per Plate	

(1) Varies with frequency. Actual voltage measured across 25,000 ohm bias resistor—39 Volts.
(2) Voltage measured with 120,000 ohm meter.
(3) Voltage measured with 600,000 ohm meter.
(4) Actual voltage measured across 225 ohm section of voltage divider resistor—17 Volts.



Power Transformer Terminals

CONDENSER ALIGNMENT

The R.F. trimmers, which are used to align the receiver at the high frequency end of the broadcast band are located on the variable tuning condenser assembly, one on each section.

There are also six I.F. trimmer condensers which are used to align the I.F. circuits accurately to 455 K.C. The adjusting screws of these trimmers are accessible from beneath the chassis and protrude from the porcelain bases of the I.F. transformers. The adjusting screws of the I.F. transformer trimmers as well as the R.F. trimmers should not be tampered with or changed unless it is apparent that they are out of adjustment. The necessity for readjustment of these circuits is usually indicated by low volume accompanied by broad tuning or a lack of selectivity but all other possible defects which might bring about these effects should be checked before attempting realignment.

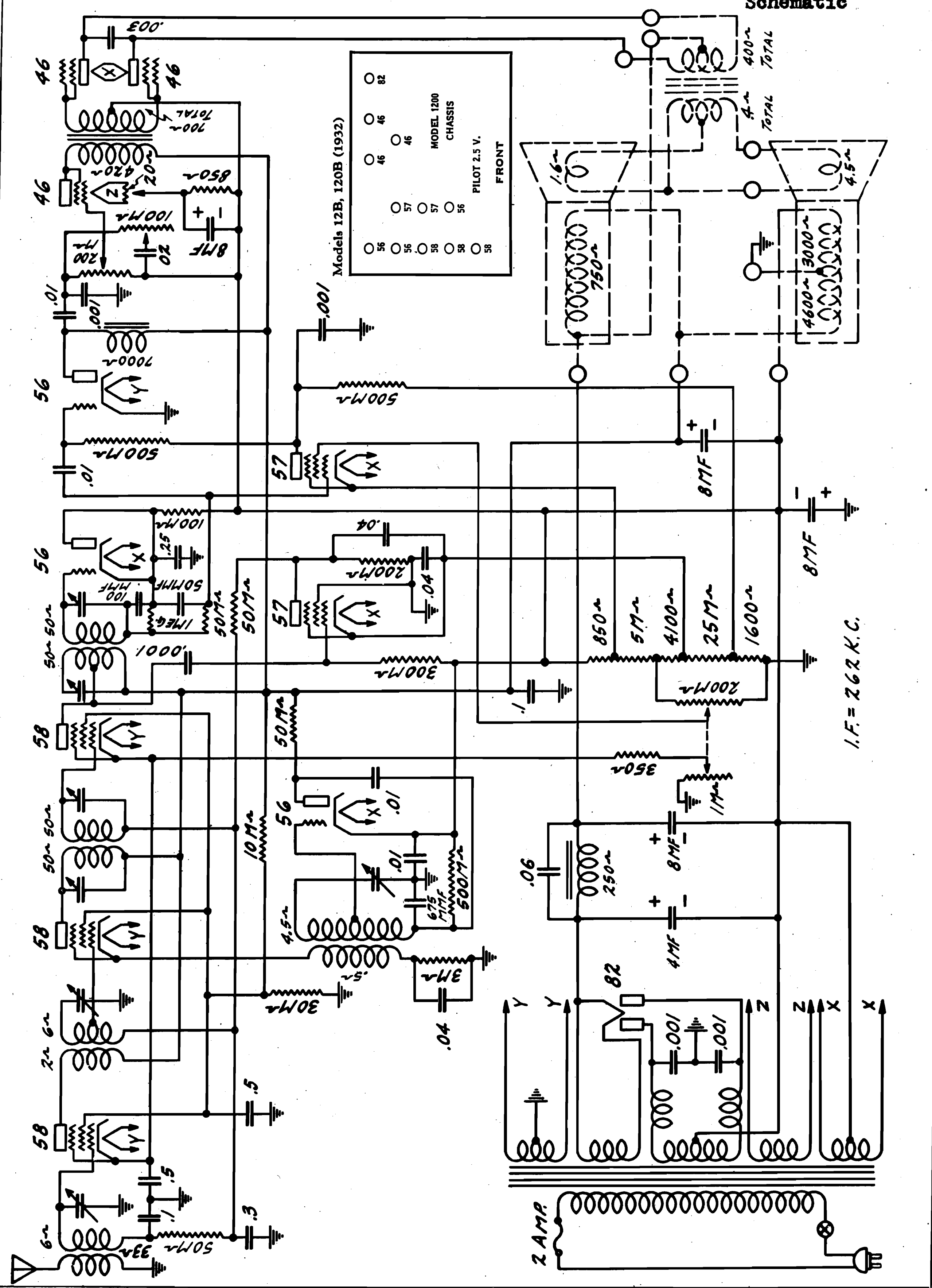
A special biasing system is used with the second detector to allow it to handle strong signals without overloading. A 150,000 ohm resistor is connected in the cathode circuit and at no signal has a voltage drop of 34 volts established across it due to the 2nd detector plate current flowing in this circuit. This voltage is in opposition to the 17 volt drop across the 225 ohm section of the voltage divider resistor and there is, consequently an initial grid bias of 17 volts applied to the grid of the 2nd detector when no signal is applied. When signal is applied to the 2nd detector, the plate current increases in proportion to the strength of the signal and the grid bias is increased accordingly. Much greater resistance to overload is obtained with this method of obtaining grid bias than would be had if a resistance of lower value were connected between cathode and ground without the bucking voltage.

Aligning Intermediate Condensers—The six I.F. trimmers must be aligned accurately before the 1st detector and oscillator circuits can be correctly aligned. Remove the 56 oscillator tube from the socket and connect the signal generator output to the grid contact of the 57 1st detector tube. Adjust the output of the signal generator to as low a value as will give a satisfactory deflection on the output meter with the receiver volume control set at maximum. Too strong a signal will cause overloading of the second detector and make it impossible to peak the I.F. transformers properly.

Then adjust the six I.F. Condenser screws until maximum output is indicated on the output meter. After all six have been adjusted the first time, go over them again and check the setting for maximum output.

U. S. RADIO & TELEVISION CORP.

MODEL 12 and 120
Class "B"
Chassis 1200
Schematic



MODEL 12 and 120
Class "B"
Chassis 1200
Changes - Voltage

U. S. RADIO & TELEVISION CORP.

SUPPLEMENTARY NOTES FOR No. 1200 CHASSIS ABOVE SERIAL No. 1189197

In No. 1200 chassis above serial No. 1189197 a new type volume control circuit and tone compensating system is used. The schematic circuit diagram of the audio section of the receiver in these chassis is shown in Fig. 7, the remainder of the circuit being the same as shown in the complete schematic diagram, Fig. 1. The volume control is a variable 600,000 ohm resistor with a tap at 100,000 ohms and is connected in the circuit as a potentiometer. One end connects to the .01 Mfd. coupling condenser and the other end to the source of grid bias voltage for the 46 driver tube. A tuned circuit consisting of a 1 henry choke, 4,000 ohm resistor and .02 Mfd. condenser is connected in series across the 100,000 ohm section of the volume control and is resonant to a frequency of approximately 900 cycles. The grid of the 46 driver tube is connected to the movable arm of the volume control and accordingly the A.F. voltage impressed upon this grid may be varied, thus controlling the volume.

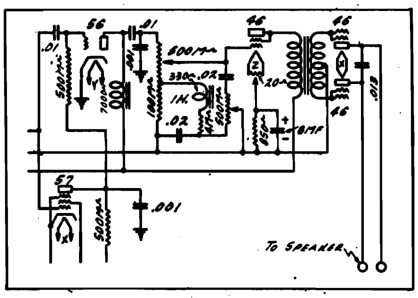


Fig. 7—Revised Audio Circuit in No. 1200 Chassis above Serial No. 1189197

The 900 cycle tuned circuit becomes effective when the volume is lowered by means of the manual volume control and then attenuates frequencies in the middle audio register. The 4,000 ohm resistor serves to make the circuit tune rather broadly and consequently, the attenuation is not confined sharply to the resonant frequency of 900 cycles but spreads over a band of frequencies in the middle register. It is desirable to attenuate these frequencies to a greater extent than the higher and lower audio frequencies due to the peculiarities of the human ear which is much more sensitive to the middle register frequencies than it is to low frequencies around 60 cycles or very high frequencies around 10,000 cycles or higher. If all frequencies are attenuated equally when reducing the volume as has been the practice in previous receivers, the effect on the ear is the same as if the higher and lower frequencies were eliminated or considerably more reduced than frequencies in the middle register.

By means of the tone blender circuit, consisting of the 500,000 ohm resistor and .02 Mfd. condenser which connect between the grid of the 46 driver tube and the 4,000 ohm resistor in the tone compensating circuit, the frequency response of the receiver may be varied to give prominence either to low frequencies or high frequencies. When the movable arm of the tone blender resistor is at the lower end the .02 Mfd. condenser in the tone compensating circuit is shorted and this circuit has no effect. At the same time, the total resistance of the tone blender resistor is thrown in series with the .02 Mfd. tone blender condenser. This double action serves to increase the response of the receiver in the middle and upper frequency registers and makes them predominate in the reproduction. With the movable arm of the tone blender resistor in the center position, the upper and middle frequency registers are attenuated to a certain extent and the receiver response is substantially equal for all frequencies. When the movable arm reaches its position nearest to the .02 Mfd. tone blender condenser, maximum attenuation of high frequencies is obtained and the low frequencies are predominant in the receiver reproduction.

FLUTTERING OR MOTORBOATING

The tube shields and cover must be on, otherwise motorboating may result. Still other causes are open or defective grid circuits or open bypass condensers. Fluttering is very often due to I.F. oscillation and the causes for such a condition should be investigated in line with the information given in the section on "Oscillation."

Oscillation may be due to feed-back in the I.F. stage between the 2nd I.F. plate circuit and the 1st I.F. grid circuit. Keep the 2nd I.F. plate lead close to the subpanel and away from the preceding grid lead.

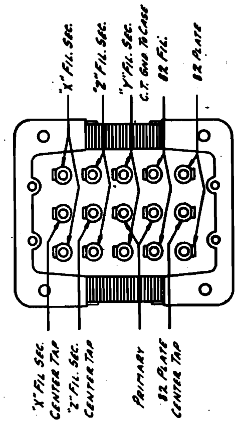


Fig. 3—Power Transformer Terminals

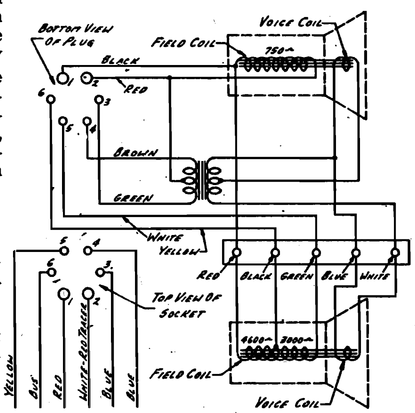


Fig. 4—Electrodynamic Speakers and Connections

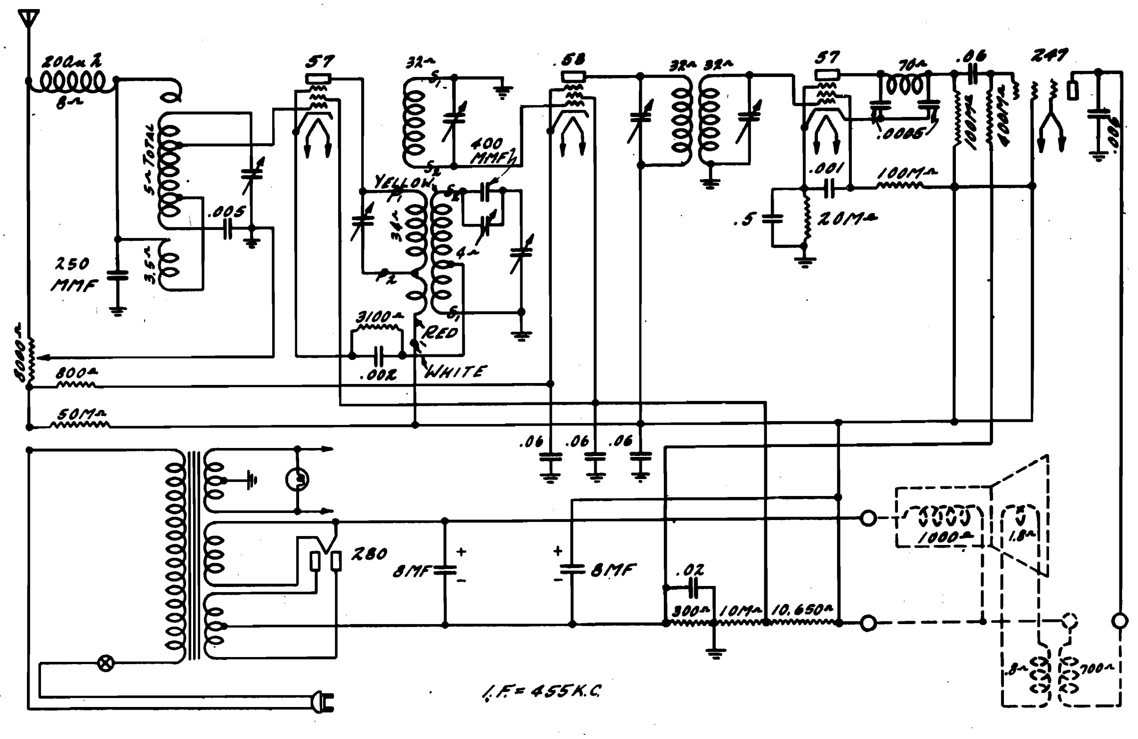
No. 1200 CHASSIS—VOLTAGES AT SOCKETS—LINE VOLTAGE 115
VOLUME CONTROL AT MAXIMUM —"Q" CONTROL AT MAXIMUM

Tube No.	Type of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Grid Volts	Screen Grid MA	Cathode Volts	Plate Current MA	Grid Test MA
1	58	R.F.	2.25	140	3.2(1)	80	.9	3.2	3.6	7.6
2	58	1st Det.	2.25	130	7.5	74	.5	7.5	2.0	2.3
3	58	I F.	2.25	140	3.2(1)	80	.9	3.2	3.6	7.6
4	56	2nd Det.	2.25							
5	56	1st Audio	2.25	110	5.5(2)			0	4.2	8.6
6	56	Osc.	2.25	110	10-23(3)			0	3.4	
7	57	AVC	2.25	65(4)	35(5)	85	0	35(5)	0	0
8	57	"Q"	2.25	120(6)	3.5(7)	20	0	3.5(7)	0	0
9	46	Driver	2.25	235	28(8)				26.0	28
10	46	Power	2.25	335	0				5.5(9)	13
11	46	Power	2.25	335	0				5.5(9)	13
12	82	Rect.	2.2						51 Per Plate	

(1) Measured across 350 Ohm Resistor.
(2) Measured across 1600 Ohm section of Voltage Divider Resistors.
(3) Varies as shown with frequency—measured across 500,000 Ohm Resistor.
(4) Measured with 600,000 Ohm Meter.
(5) Measured across 850—5,000—4100 Ohm sections of Voltage Divider Resistors.
(6) Measured across 5,000—4100—25,000 Ohm sections of Voltage Divider Resistors.
(7) Measured across 850 Ohm "Q" Tube Bias Resistor.
(8) Measured across 850 Ohm Driver Tube Bias Resistor.
(9) Plate Current at No Signal.

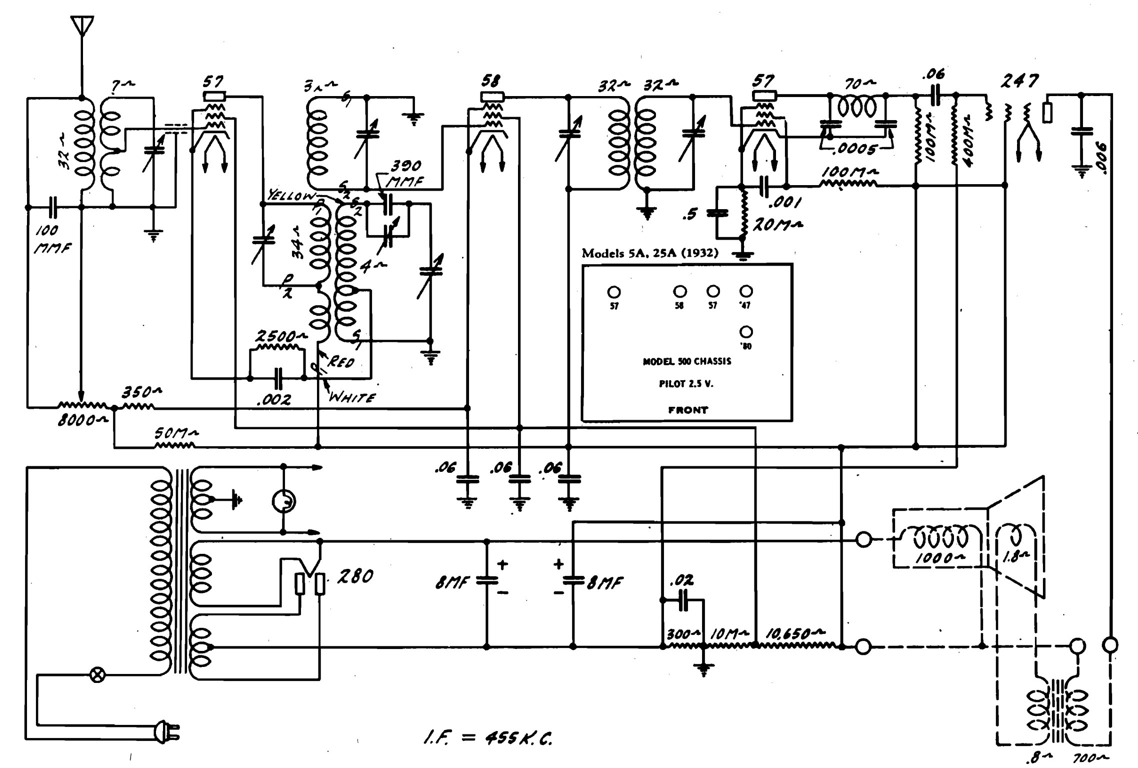
U. S. RADIO & TELEVISION CORP.

MODEL 25
Chassis 500
Schematics
Two Types



Schematic Circuit Diagram of No. 500 Chassis above Serial No. 1188825

2nd Type



Schematic Circuit Diagram of No. 500 Chassis

1st Type

MODEL 25
Chassis 500
Voltage
Oscillation

U. S. RADIO & TELEVISION CORP.

OSCILLATION

Should the No. 500 chassis oscillate on being connected up, it may be due to 57 or 58 tubes whose characteristics vary considerably from the standard. In case of oscillation, therefore, try out some new 57's and 58's. Try out a new ground and investigate the line voltage to see if it is excessively high.

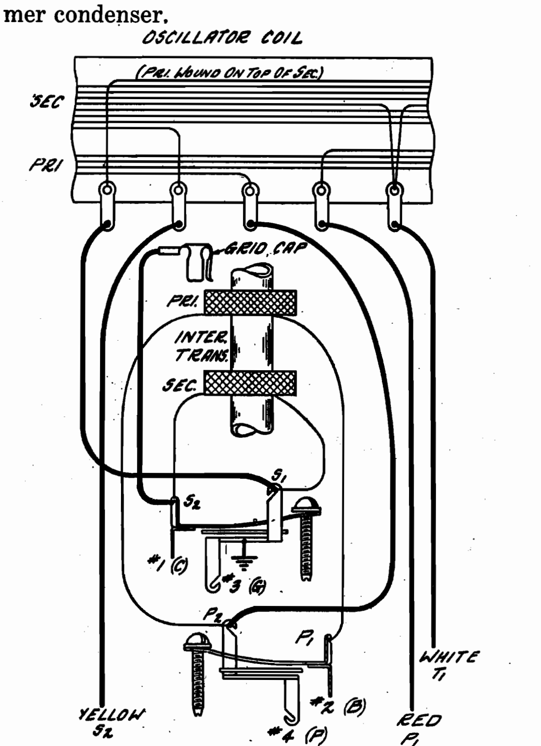
The tube shield and cover should be in place when the set is operating and the control grid leads to the 57 and 58 tubes should be in their proper positions. Otherwise, oscillation may result.

Oscillation may be caused by the plate lead to the 2nd I.F. transformer being too close to the preceding grid. The connecting point for the preceding grid is a blank lug on the base of the Oscillator-1st I.F. assembly marked "1". Keep the plate lead to the 2nd I.F. transformer as close to the I.F. shield can and as far away from the preceding grid as possible.

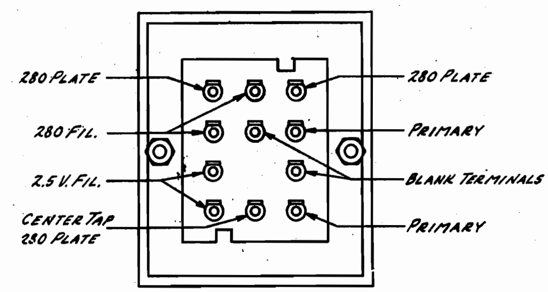
An open by-pass condenser or open leads to the by-pass condensers are a common cause of oscillation. Check the by-pass condensers for capacity and the leads to them for continuity of circuit. A quick way to check by-pass condensers for opens is to take a good condenser with test leads attached to the terminals and connect the new condenser across the condenser in the chassis.

The control grid lead to the 1st detector-oscillator tube passes through a length of copper braid which is grounded at the rear of the tuning condenser. If this braid is not grounded, "parasitic" oscillation may occur in the 1st detector circuit. The braid should extend to within 1/4 inch of the grid cap. Oscillation may occur if a greater length of the grid lead is exposed at the top. Model 25 receivers of the first production did not have this shield and may oscillate at a "parasitic" frequency. The presence of oscillation of this type may be determined by removing the antenna and tuning the receiver from 550 to 1500 K.C. If "parasitic" oscillation is present a "plop" or "cluck" will be heard at certain points on the dial.

Oscillation may also be caused by the antenna lead to the primary of the antenna transformer being misplaced. This lead should be pushed close to the chassis in the small space between the coil shield and the 600 K.C. trimmer condenser.



Wiring Diagram, Osc. and I.F. Assembly



Power Transformer Terminals

NO. 500 CHASSIS—VOLTAGES AT SOCKETS
LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM
ANALYZER PLUG IN SOCKET—TUBE IN ANALYZER SOCKET

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Grid Volts	Screen Grid Current MA	Cathode Volts	Plate MA	Grid Test MA
57	1	1st Det. & Osc.	2.15	245	4.3-5.9 (1)	100	.6	4.3-5.9 (1)	.95	2.0
58	2	I.F.	2.15	240	3.0	100	1.5	3.0	6.6	10.4
57	3	2nd Det.	2.15	166	9.0	115 (2)	.1	9.0	.35	.45
247	4	Audio	2.15	215	17.0 (3)	240	8.0		30.	48.
280	5	Rect.	4.6						30 Per Plate	

(1) Varies with frequency setting of dial approximately as shown.
(2) Voltage as measured with 120,000 ohm meter.
(3) Measured across 300 ohm section of voltage divider resistor.

MODEL 112-A SW Con.
Chassis 300
Used In Model 712
Schematic, Voltage

U. S. RADIO & TELEVISION CORP.

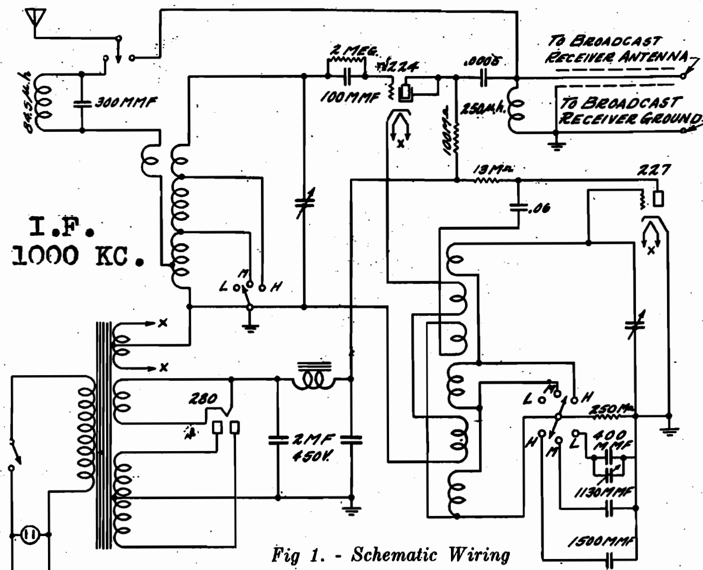


Fig 1. - Schematic Wiring Diagram No. 300 Chassis Short Wave Converter.

The No. 300 Chassis is an A. C. operated Short Wave Converter utilizing the Super-Heterodyne principle and when used in conjunction with any standard broadcast band receiver permits the reception of stations transmitting on frequencies ranging from 550 K.C. to 20,000 K.C. This chassis is used in U. S. Radio Table Models 12A and 12AX Short Wave Converters and Console Models 712A and 712AX Combination Short Wave and Broadcast Band Receivers.

The chassis is self-powered and is designed to operate satisfactorily on a power supply of from 105 to 125 volts and from 50 to 60 cycles alternating current. The No. 300X Chassis is designed for 25 cycle, 115 volt operation. The tube sequence (top view) is shown in Fig. 2.

The seven tube super-heterodyne chassis used with the converter in the combination Short Wave and Broadcast Receiver is identically the same as the chassis used in the seven tube Broadcast Super-Heterodyne receiver and in servicing the combination model the service notes for the No. 7 Super-Heterodyne chassis should be referred to for data concerning the broadcast unit of the receiver.

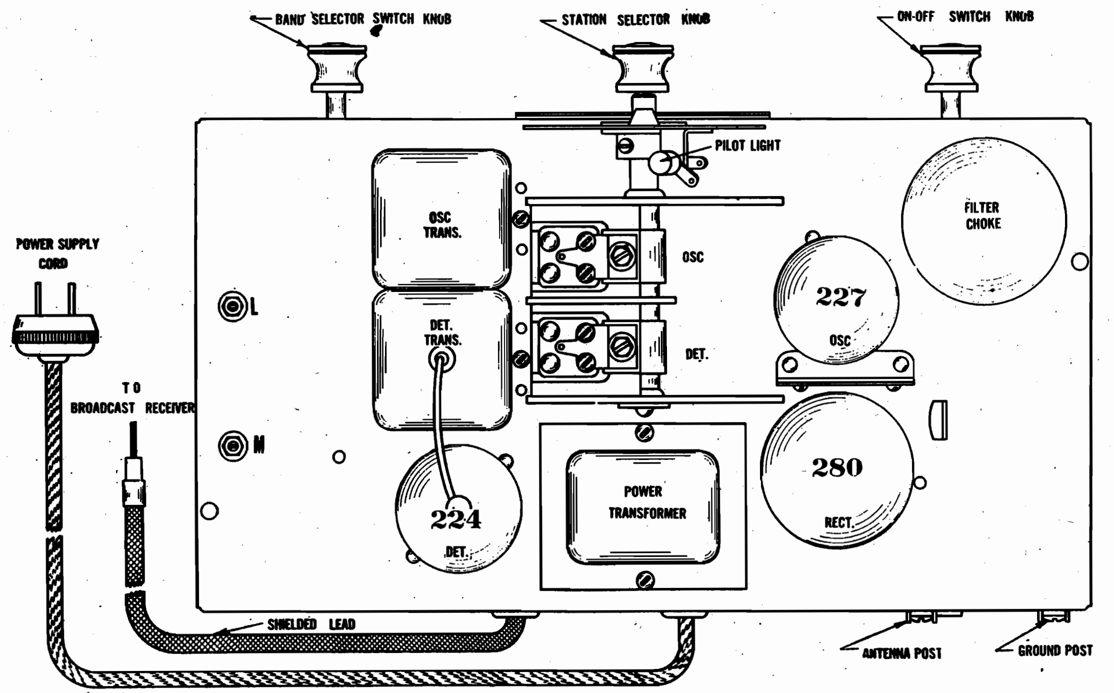


Fig. 2 - Top View of Chassis Showing Tube Location.

VOLTAGES

The voltage chart shows the voltages and current with all tubes in and the converter otherwise in operating condition.

The voltages shown in the chart were recorded with the band selector switch in the "L" position and the dial pointer of the tuning condenser rotor turned to "0" on the dial scale, with the condenser rotors in mesh with the stator plates, indicating maximum capacity. The bias voltage for the 227 oscillator tube was measured across the 250,000 ohm bias resistor as shown rather than at the socket. The voltages and currents will vary for other positions of the band selector switch and settings of the tuning condenser, or the frequency to which the receiver is tuned.

NO. 300 CHASSIS—VOLTAGES AT SOCKETS—LINE VOLTAGE 115
BAND SELECTOR SWITCH ON "L"—TUNING DIAL AT "0"

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Plate MA	Grid Test MA
224	1	1st Det.	2.45	50.	4.	1.	—
227	2	Osc.	2.45	135.	28. (*)	5.5	5.9
280	3	Rect.	5.			2.8 Per Plate	

*Measured across 250.000 ohm oscillator bias resistor.

**MODEL 112-A SW Con.
Chassis 300
Used in Model 712
Alignment Data**

U. S. RADIO & TELEVISION CORP.

DESCRIPTION

The broadcast receiver used in connection with the converter is tuned for the best performance to a frequency of 1000 K.C. Unless proper precaution were taken in the design of the converter troublesome interference would be introduced if it so happened a station broadcasting on 1000 K.C. was within the receiving range of the receiver. In the No. 300 Chassis this possibility is very effectively overcome by incorporating in the antenna circuit of the antenna transformer a parallel combination of inductance and capacity. The values of these parts are, as can be seen by referring to Fig. 1, 84.5 microhenries and 300 Mmf. respectively. This parallel impedance constitutes the frequency filter and offers maximum opposition to the undesirable 1000 K.C. frequency without, however, preventing the passage of currents of other frequencies and for which the tuning range of the converter is designed.

Referring to the schematic wiring diagram it will be noted the unused sections of the secondary of the antenna transformer are short circuited by the band selector switch as the frequency tuning range is increased. The effect of "dead ends" in a coil, especially at the higher frequencies, is to produce undesirable effects and to produce energy loss and considerably effect the frequency of resonance of the circuit, because the unused turns are in the magnetic field of the used portion of the coil and are closed by the inherent distributed capacity. Due to the close coupling, if the resonant frequency of this circuit is near that of the first it will greatly affect the resonant frequency of the first circuit. This undesirable effect is counteracted by short circuiting the unused portions of the coil, increasing the impedance of this circuit and causing very little current to flow, thus preventing the possibility of the circuit from responding to two frequencies.

The output from the plate of the 1st detector of the converter is fed through a .0005 coupling condenser to the antenna post of the broadcast receiver by means of a shielded cable with the shield grounded. The capacity reactance between the antenna lead and the grounded shield is of the order of a few hundred ohms and would, were not proper provisions taken in the design, seriously affect the sensitivity. This effect is satisfactorily overcome by choosing an inductance coil of suitable value and connecting it in parallel to the inherent capacity reactance of the shielded cable. This coil is the 250 microhenry choke shown in the schematic wiring diagram and it greatly increases the impedance between the antenna lead and the ground, thus preventing any loss in sensitivity.

The Band Selector Switch permits the selection of any of the three bands. The tuning knob has letters upon its face designating the three bands. The frequency band covered by the tuning condenser with the switch in the "L" position is 1.5 M.C. to 3.75 M.C; in the "M" position, 3.58 M.C. to 9.10 M.C; and from 8.40 M.C. to 20 M.C. with the switch at the "H" position. This switch is of excellent design and under normal conditions of service no inherent trouble should develop in its function.

The Antenna and A. C. Rotor Switch serves a dual purpose. It turns the power on to the converter and connects the antenna to the converter when turned clockwise. When turned counterclockwise the power supply to the converter is disconnected and the antenna connected to the broadcast receiver.

The volume and tone of the short wave signals are controlled by the volume and tone controls on the broadcast receiver.

OSCILLATOR

The oscillator is of the tuned grid type and has combined inductive and capacity coupling. The oscillator pick-up coil which is inductively coupled to the oscillator coil is connected in the cathode circuit of the 1st detector. The signal generated by the oscillator is 1000 K.C. in frequency above the frequency to which the 1st detector is tuned. The drop across the 250,000 ohm resistor in the oscillator brought about by the D.C. component of the oscillatory current establishes the bias voltage.

SERVICING

In the event the converter when connected to a broadcast receiver exhibits faulty operation or lack of sensitivity make certain the broadcast unit is performing correctly, which may be determined by giving it a thorough test throughout the broadcast band. The blades of the band selector switch should be inspected for good electrical contact. The contacts of this switch are lubricated with a very light lubricant to insure freedom from noise and under normal conditions of service no defects in this assembly should arise.

The band selector switch assembly is furnished with all bus wiring attached and equipped with the 250,000 ohm bias resistor. It is of extreme importance the soldered connections connecting the switch to the various circuits be carefully made as poorly soldered connections will seriously interfere with the performance and these switches are subjected to rigid tests at the factory after the various connections described above have been made in the complete assembly.

The tubes should be carefully tested and particular attention given to the 227 oscillator as some 227 type tubes may not oscillate over the entire frequency range. A good check is to read the voltage across the 250,000 ohm bias resistor, taking into consideration this voltage varies depending on the frequency to which the receiver is tuned.

The shielded lead should be carefully checked to make certain the antenna connection from the converter to the broadcast set is not grounded. The sensitivity will be impaired if the 250 microhenry plate choke is open or if the 100,000 ohm detector plate series resistor is shorted.

ALIGNMENT

The excellent performance of which the No. 300 Chassis is capable depends to a large degree on the correct alignment of the antenna and oscillator trimmer located on their respective sections of the two-gang tuning condenser and the oscillator padding condenser. The actual mechanics of the alignment procedure is, with the exception of the frequency range involved, identically the same as in those Super-Heterodyne chassis designed for the regular broadcast band.

The adjustable trimmers are accurately aligned at the factory with accurately calibrated signal generators and output meters and the receivers should not as a general rule require alignment unless mishandled or tampered with. If realignment is found necessary the chassis should be removed from the cabinet. The complete aligning procedure and location of the different condensers is as follows:

ALIGNING OSCILLATOR TRIMMER — The chassis must be connected to a broadcast receiver in the usual manner with the ground wire connected but the antenna lead disconnected. The signal generator placed in operation and coupled with a wire to the antenna post on the converter. The signal generator must be grounded and adjusted to 20,000 K.C.

Then turn the tuning condenser rotor until the dial pointer is at exactly 100 with the rotor plates completely out of mesh, indicating minimum capacity. If the dial does not correspond to a reading of 100 with the plates out of mesh the set screws that secure the drive to the tuning condenser shaft should be loosened and the dial shifted until the pointer is at exactly 100 on the dial scale.

The band selector switch should be turned to the "H" position and the oscillator trimmer screw turned up or down until maximum deflection on the output indicating meter is obtained. It will be noted two peaks can be obtained and the correct one is with the trimmer screw farthest out.

ALIGNING ANTENNA TRIMMER—The position of the band selector switch should be retained as in the case above with the signal generator adjusted to 20,000 K.C. and the tuning condenser rotor turned until the pointer is at 10 on the dial scale. The adjusting screw of this trimmer is then turned up or down until maximum deflection on the output meter is obtained.

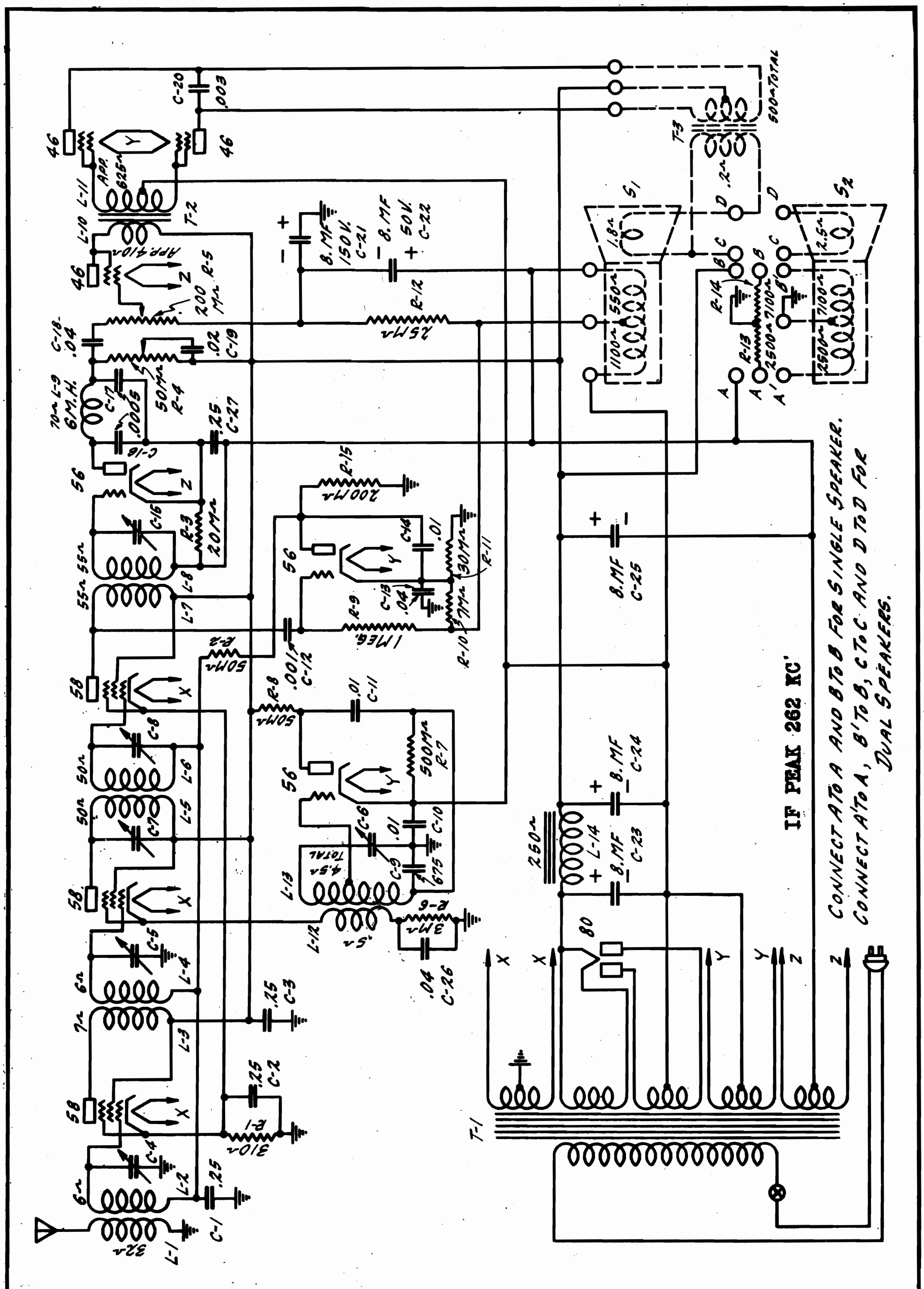
ALIGNING OSCILLATOR PADDING CONDENSER— The band selector switch must be turned to the "L" position and the signal generator adjusted to 1500 K.C. The adjusting screw for this condenser is located to the right outer edge of the subpanel as indicated by "L" in Fig. 2, and it should be turned up or down until maximum output is obtained.

NOTE: In No. 300 Chassis below Serial No. 1155363 there is incorporated in the circuit of the oscillator and the "M" range of the band selector switch a variable padding condenser in addition to a fixed condenser of 1100 Mmf. The fixed condenser was subsequently changed to one having a capacity of 1130 Mmf. as shown in the schematic wiring diagram, thus making the use of a variable padding condenser unnecessary. The location of this condenser is shown at the point "M" of Fig. 2, and aligning instructions are given in the alignment paragraph in this manual.

In chassis having also this condenser the signal generator is adjusted to 3580 K.C. and the tuning condenser rotor turned until the pointer is at "0" on the dial scale with the band selector switch position at "M." The adjustment is the same as for the low range padding condenser, however, it precedes the adjustment of the low range padding condenser in the sequence of alignment.

U. S. RADIO & TELEVISION CORP.

MODEL 1006,1007
Class "B"
Schematic



Schematic Circuit Diagram of No. 1006 and No. 1007 Chassis

MODEL 1006,1007
Class "B"
Voltage
Alignment

U. S. RADIO & TELEVISION CORP.

Remove the 56 oscillator tube during I.F. alignment.

Alignment of the R.F. and oscillator circuits is made at 1400 K.C. by means of the trimmer condensers mounted on the main tuning condenser. These should be adjusted to give maximum output on a 1400 K.C. oscillator signal with the receiver dial indicator set exactly at 1400. When maximum output has been obtained the oscillator is next set for a signal of 600 K.C. and the receiver tuned to this signal. The dial reading should then be 600 but, if it is not exact, may be corrected by loosening the set screws which hold the drive disc and turning the disc until correct reading is obtained. Alignment at 1400 K.C. will then have to be repeated.

OSCILLATION

A common cause of oscillation is open bypass condensers and these should be checked by simple trial replacement. Coupling between I.F. grid and plate leads may cause the trouble and these leads should be separated and pushed close to the chassis. Too great R.F. gain in the receiver may cause instability or oscillation and is corrected by removing four or five turns from the primary of the 1st detector transfomer. This should not be done, however, until all other causes of oscillation have been investigated.

DISTORTION

Distorted reproduction may be brought about by defective tubes and in any case of distortion these should be checked first. An inoperative 46 output tube will especially cause distortion due to harmonics in the output of the good tube not being balanced out by the other tube. Leaky or open bypass condensers may also cause distortion.

The connections to the voice coil of one speaker being reversed will cause a very noticeable distortion and these should be checked at the terminal strip. Open field windings in either speaker will allow the receiver to continue operation but at reduced volume and with some distortion.

At low volume, distortion may be caused by a tone control rheostat having a resistance higher than the normal value of 50,000 ohms. Other resistors which will bring about distortion if they are high in value are the 20,000 ohm 2nd detector bias resistor and the 7,000 ohm resistor in the voltage dividing circuit which provides grid bias for the AVC tube. In case of distortion at low volume, therefore, these resistors should be checked with an ohmmeter and replaced if not within normal 10% limits.

EXCESSIVE HUM

Excessive hum may be brought about by an open filter condenser or by an open circuit in one half of the 280 plate winding of the power transformer.

Heater-cathode shorts in the 56 or 58 tubes will cause the hum to be higher than normal and new tubes should be tried in any case of excessive hum. Certain 46 tubes, when used in the driver stage, will produce a hum much greater than normal and the tube in this socket should be inter-changed with the other two 46 tubes in the receiver.

Shorted turns in the filter choke or 1,650 ohm speaker field will cause the receiver to hum as will various shorts, opens or grounds at different points in the chassis.

CHASSIS No. 1006

Chassis No. 1006 is practically the same as chassis No. 1007 except that it is designed for single speaker operation. A speaker having a 1,650 ohm field is used with this chassis and a tapped wire wound resistor is substituted for the field of the second speaker.

No. 1007 CHASSIS—VOLTAGES AT SOCKETS—LINE VOLTAGE 115
VOLUME CONTROL AT MAXIMUM

Type of Tube	*Position of Tube*	*Function*	*"A" Volts*	*"B" Volts*	*Control Grid "C" Volts*	*Screen Volts*	*Screen Current MA*	*Cathode Volts*	*Plate Current MA*	*Grid Test MA*
58	1	R.F.	2.35	125	.3 (1)	125	1.3	5.0	5.6	9.6
58	2	1st Det	2.35	115	5.0 (2)	115	.6	10.0	2.9	3.5
58	3	I.F.	2.35	125	.3 (1)	125	1.3	5.0	5.6	9.6
56	4	2nd Det.	2.30	170	12.0			12.0	.6	.6
46	5	Driver	2.25	215	18.0 (3)				18.0	21.0
56	6	Osc.	2.30	130	7-15 (4)			0 (4)	3.7	3.8
56	7	AVC	2.25	60 (5)	2.0 (6)			85.0	0	0
46	8	Class B	2.25	310	0				6.0 (7)	13.0
46	9	Class B	2.25	310	0				6.0 (7)	13.0
280	10	Rect.	4.2						41 Per Plate	

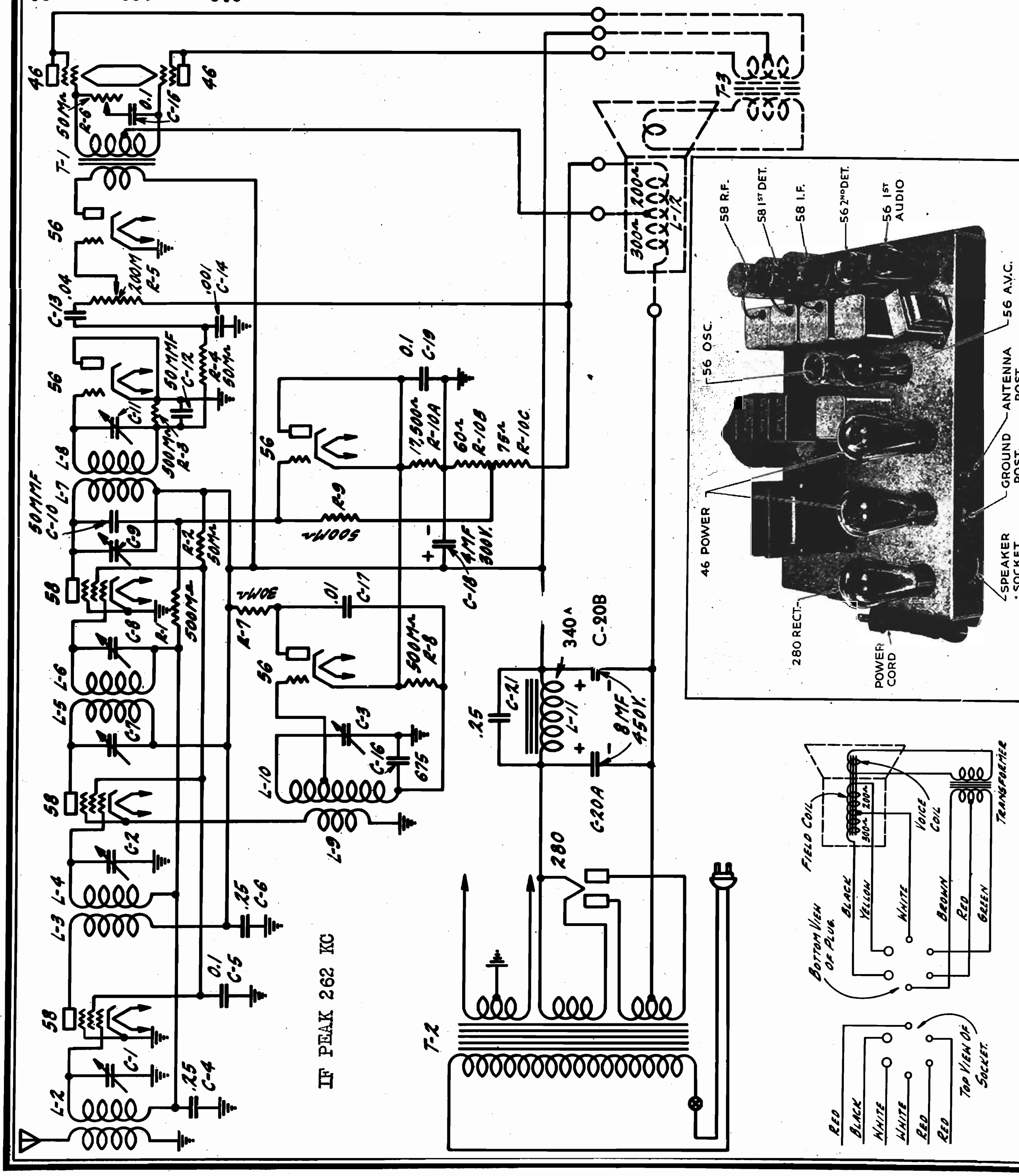
(1) Actual Voltage measured across 310 ohm biasing resistor—5.0 Volts.
(2) Actual Voltage measured across 3,000 ohm bias resistor—10 Volts.
(3) Read with Volume Control at minimum.
(4) Varies as shown with frequency. Actual voltage measured across 500,000 ohm bias resistor—15 to 35 Volts.
(5) Actual Voltage measured across 30,000 ohm voltage divider resistor—92 Volts.
(6) Actual Voltage measured across 7,000 ohm voltage divider resistor—22 Volts.
(7) Plate current at no signal.

MODEL 3070
Chassis 1009
Schematic
Voltage, Layout

U. S. RADIO & TELEVISION CORP.

Tube	Function	Fil.	Plate	Screen	Con.Grid	Cathode
58	RF	2.4	280	86	3.0*	0
58	1st Det	2.4	280	86	3.0*	0
58	IF Amp	2.4	280	86	3.0*	0
56	2nd Det	2.4	0		0	0
56	1st AF	2.4	245		4.0"	0
56	Osc	2.4	120		8-14'	58
56	AVC	2.4	0		18**	54***
46	Power	2.4	275		36	
46	Power	2.4	275		36	
80	Rect	5.0				

*Voltage across R10-B is 4.5V
"Voltage across R-10-B and R10-C is 10V
'Varies with frequency
**Voltage across R10-A and R10-B is 58.5 V.
***Voltage as measured with 300000 ohm meter.
Line voltage 115. Control at Maximum.



MODEL 3070
Chassis 1009
Resistance Test Data

U. S. RADIO & TELEVISION CORP.

CONTINUITY TEST CHART

All Tubes removed—Power Cord disconnected—Volume Control at maximum—Tone Control at maximum bass—Speaker connected.

REFERENCE POINT—CHASSIS

Measurement Point	Correct Reading (Ohms)	Incorrect Reading (Ohms)	Defect
Antenna	30	Open	Open L-1
R. F. Control Grid	1,000,065.5	0 5.5 Open	Shorted C-1 or Trimmer Shorted C-4 Open R-1, R-9, R-10B or L-2
1st Detector Cathode	.5	Open	Open L-9
R. F., 1st Detector, or I. F. Screen Grid	Open	0 50,635 50,855 50,000	Shorted C-5 Shorted C-20B Shorted C-20A Shorted C-6 or C-18
R. F. Plate	Open	2 637 977	Shorted C-6 or C-18 Shorted C-20B Shorted C-20A
1st Detector Control Grid	1,000,065.5	0 5.5 Open	Shorted C-2 or Trimmer Shorted C-4 Open R-1, R-9, R-10B or L-4
1st Detector Plate	Open	50 685 1,025	Shorted C-6 or C-18 Shorted C-20B Shorted C-20A
Oscillator Control Grid	517,500	2 2.5 Open	Shorted C-3 or Trimmer Shorted C-16 Open L-10, R-8 or R-10A
Oscillator Cathode	17,500	0 Open	Shorted C-19 Open R-10A
Oscillator Plate	Open	30,000 80,000 30,635 30,975	Shorted C-6 or C-18 Shorted C-5 Shorted C-20B Shorted C-20A
I. F. Control Grid	1,000,110	50 Open	Shorted C-4 Open R-1, R-9, R-10B or L-6
I. F. Plate	Open	500,060 24 659 999	Shorted C-10 Shorted C-6 or C-18 Shorted C-20B Shorted C-20A
2nd Detector Control Grid	500,026	26	Shorted C-12
2nd Detector Plate or Cathode	0	Open	Open Connection
AVC Control Grid	500,060	Open	Open R-9 or R-10B
AVC Plate or Cathode	17,500	0 Open	Shorted C-19 Open R-10A
1st Audio Control Grid	200,135	Open	Open R-10B, R-10C or R-5
1st Audio Plate	Open	1,350 51,350 1,985 2,325	Shorted C-6 or C-18 Shorted C-5 Shorted C-20B Shorted C-20A

CONTINUITY TEST CHART

Measurement Point	Correct Reading (Ohms)	Incorrect Reading (Ohms)	Defect
Power Stage Either Control Grid	985	Open	Open L-12, R-10C, R-10B or Sec. T-1
Power Stage Either Plate	Open	185 50,185	Shorted C-6 or C-18 Shorted C-5
Rectifier Filament	Open	635 975	Shorted C-20A Shorted C-20B
Rectifier Either Plate	750	Open	Open R-10B, R-10C, L-12 or R-7

REFERENCE POINT—+B (RED LEAD IN SPEAKER PLUG)

Measurement Point	Correct Reading (Ohms)	Incorrect Reading (Ohms)	Defect
R. F., 1st Detector, or I. F. Screen Grid	50,000	Open	Open R-2
R. F. Plate	1.5	Open	Open L-3
1st Detector Plate	50	Open 0	Open L-5 Shorted C-7
Oscillator Plate	30,000	Open	Open R-7
I. F. Plate	24	Open 0	Open L-7 Shorted C-9
1st Audio Plate	1,350	Open	Open Pri. T-1
Power Stage Either Plate	185	Open	Open Pri. T-3
Rectifier Filament	340	Open 0	Open L-11 Shorted C-21
Rectifier Plate	Open	115 455	Shorted C-20B Shorted C-20A

MISCELLANEOUS

Measurement Point	Correct Reading (Ohms)	Incorrect Reading (Ohms)	Defect
R. F. Control Grid to I. F. Control Grid	55.5	5.5	Shorted C-8
Power Stage Grid to Grid	1300	0	Shorted C-15
Oscillator Plate to Grid	Open	2.5	Shorted C-17
2nd Det. Grid to 1st Audio Grid	Open	50,026	Shorted C-13
Rectifier Plate to Plate	230	Open	Open Rect. Plate Winding T-2
Rectifier Filament to Filament	Very Low	Open	Open Rect. Fil. Winding T-2
Filament to Filament Any Other Socket	Very Low	Open	Open Heater Winding T-2

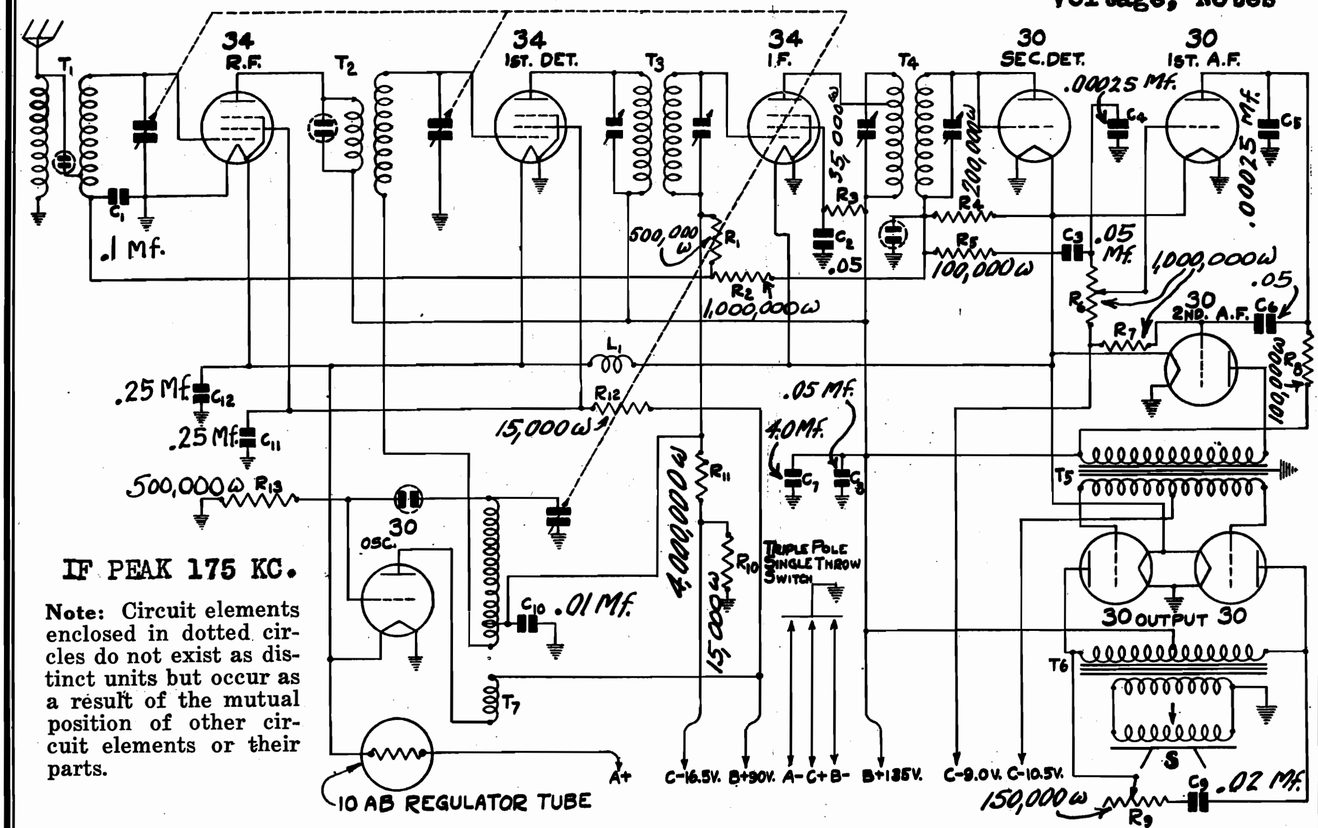
SPEAKER (REFER TO FIG. 4)

Remove retaining ring and fibre cover from speaker plug to observe lead connections.

Measurement Point	Correct Reading (Ohms)	Incorrect Reading (Ohms)	Defect
Black to White	300	Open	Open 300 Ohm Sec. L-12
Yellow to White	200	Open	Open 200 Ohm Sec. L-12
Brown to Red	185	Open	Open Primary T-3
Red to Green	185	Open	Open Primary T-3
Across Voice Coil (Unsolder Voice Coil Lead)	3.1	Open	Open Voice Coil
Across Sec. T-3 (Unsolder Voice Coil Lead)	.34	Open	Open Sec. T-3

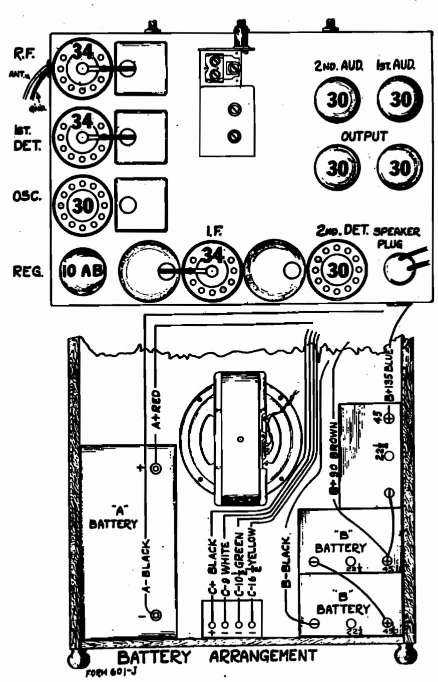
MODEL 00A
Schematic, Layout
Voltage, Notes

WELLS - GARDNER & CO.



IF PEAK 175 KC.

Note: Circuit elements enclosed in dotted circles do not exist as distinct units but occur as a result of the mutual position of other circuit elements or their parts.



Tube Arrangement and Battery Connections

Voltages at Sockets

Antenna Shorted to Ground
Batteries Up to Rated Voltages. See Fig. 1
Voltages Read From Negative Filament Terminal

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
34	R.F.	2.0	135	65	3.0 (1)	2.6
34	1st Det.	2.0	135	65	4.5 (1)	2.5
30	Osc.	2.0	90		2–4 (2)	3.3
34	I.F.	2.0	135	90	4.5 (1)	3.0
30	2nd Det.	2.0				
30	1st Audio	2.0	90		9.0 (3)	.45
30	2nd Audio	2.0	130		9.0 (4)	3.4
30	Output	2.0	135		10.5	2.5

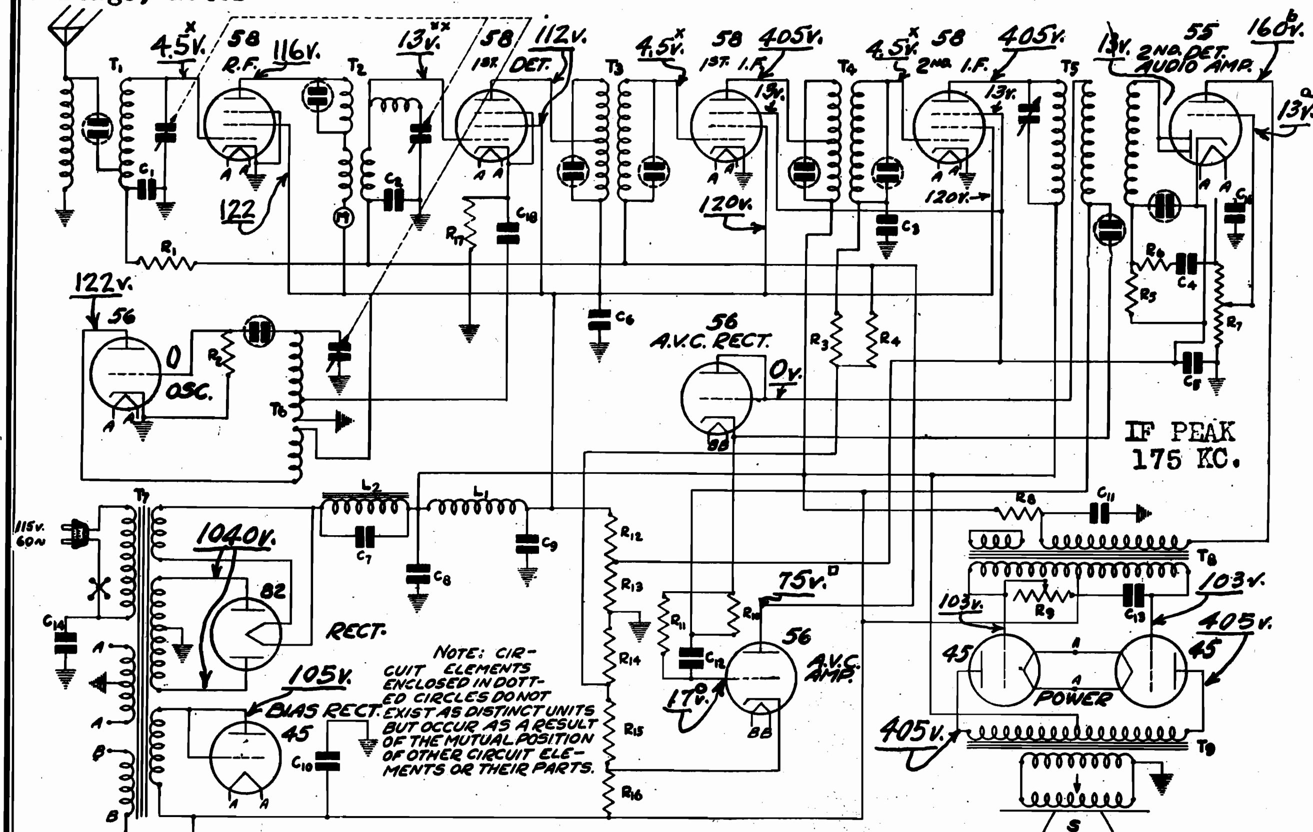
(1) Computed figure—cannot be read because of high resistance circuit.
(2) Varies with frequency setting.
(3) Volume Control at minimum.
(4) As read at battery.

Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

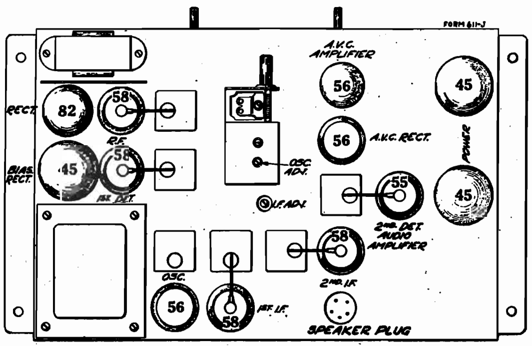
Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

MODEL 02A
Schematic, Layout
Voltage, Notes

WELLS - GARDNER & CO.



× As read across R-14. ×× As read across R-17 and R-14. ▫ As read across R-15 with 1,000,000 ohm meter.
o As read across R-16. a Vol. Cont. at Minimum.
b Triode plate to cathode



CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-80862	C1	.050 mfd.	200 V.	Tubular	$0.30
P-80987	C2	.150 mfd.	200 V.	Tubular	.25
P-80862	C3	.050 mfd.	200 V.	Tubular	.30
P-80862	C4	.050 mfd.	200 V.	Tubular	.30
P-80888	C5	.250 mfd.	200 V.	Tubular	.40
P-80888	C6	.250 mfd.	200 V.	Tubular	.40
P-80985	C7	.150 mfd.	200 V.AC	Tubular	.55
P-80984	C8	16. mfd.	450 V.	Electrolytic Block	4.00
	C9	6. mfd.	150 V.		
	C10	8. mfd.	100 V.		
	C11	4. mfd.	350 V.		
	16 mfd. Section—Term. 3+, Term. 1−				
	6 mfd. Section—Term. 5+, Term. 1−				
	4 mfd. Section—Term. 4+, Term. 1−				
	8 mfd. Section—Term. 6+, Term. 2−				
P-80862	C12	.050 mfd.	200 V.	Tubular	.30
P-80863	C13	.004 mfd.	600 V.	Tubular	.25
P-80997	C14	.010 mfd.	600 V.	Metal Can	.50
P-80919	C16	.00025 mfd.	600 V.	Moulded	.20
P-80914	C18	.002 mfd.	200 V.	Tubular	.20
P-80991	3 Gang Condenser				3.85
P-1922	3rd I. F. Trimmer Condenser				.50

RESISTORS

Part No.	Code	Resistance	Type	
P-A95204	R1	200,000 ohm	Carbon	$0.20
P-A95504	R2	.5 megohm	Carbon	.25
P-A95105	R3	1 megohm	Carbon	.25
P-A95504	R4	.5 megohm	Carbon	.25
P-B94803	R5	80,000 ohm	Carbon	.25
P-A95104	R6	100,000 ohm	Carbon	.25
P- 96008	R7	2 megohm	Vol. Con. & Switch	1.20
P-C94403	R8	40,000 ohm	Carbon	.25
P- 97006	R9	3 megohm	Tone Control	.90
P-A95204	R10	200,000 ohm	Carbon	.20
P-A95105	R11	1 megohm	Carbon	.25
P- 98003	R12 / R13	4000 ohm / 390 ohm	Armoured Wire Wound	.50
P-A94902	R14	9,000 ohm	Carbon	.25
P-A94154	R15	150,000 ohm	Carbon	.25
P-A94353	R16	35,000 ohm	Carbon	.25
P-A95352	R17	3,500 ohm	Carbon	.20

"A" preceding the number signifies .2 watt
"B" preceding the number signifies .5 watt
"C" preceding the number signifies 1.0 watt

Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the 3rd I. F. primary condenser for maximum output. The adjusting screw for this condenser is reached from the top of the sub-panel and will be seen in back of the tuning condenser.

Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

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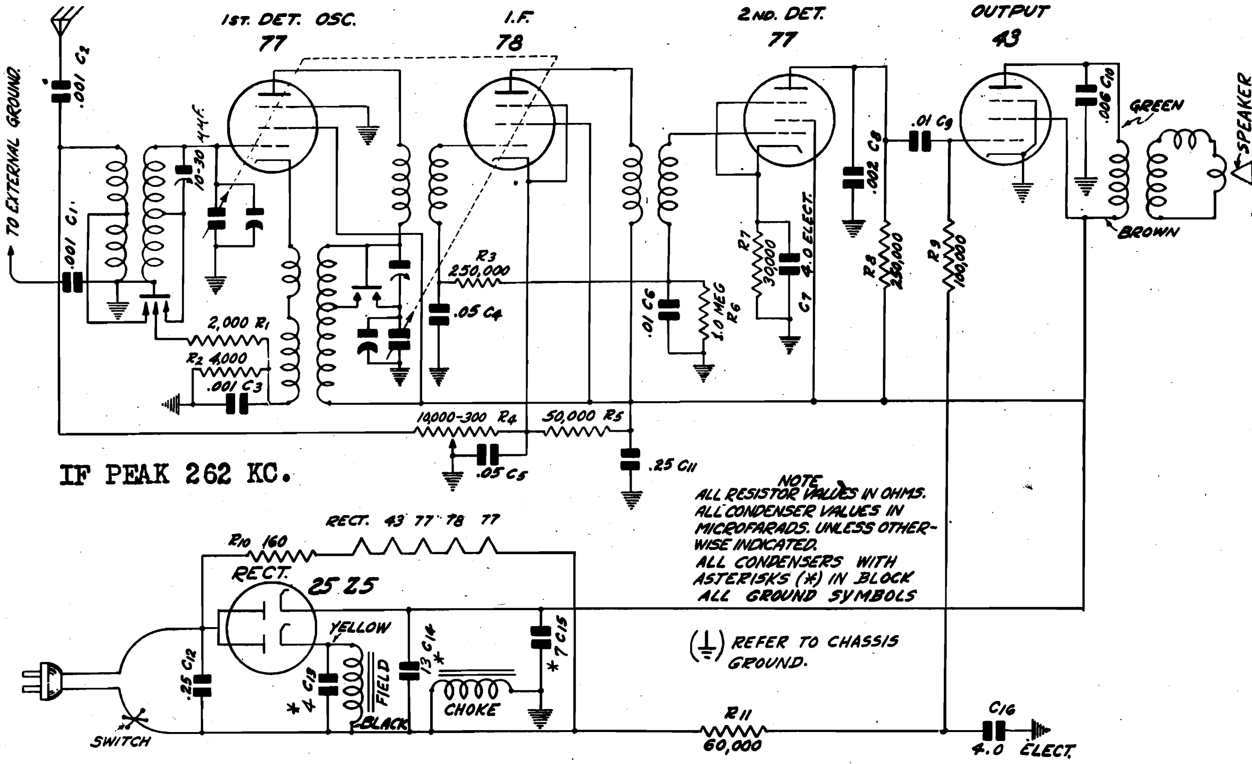
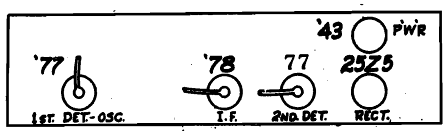
MODEL 05A
Schematic, Layout
Voltage





Voltages at Sockets

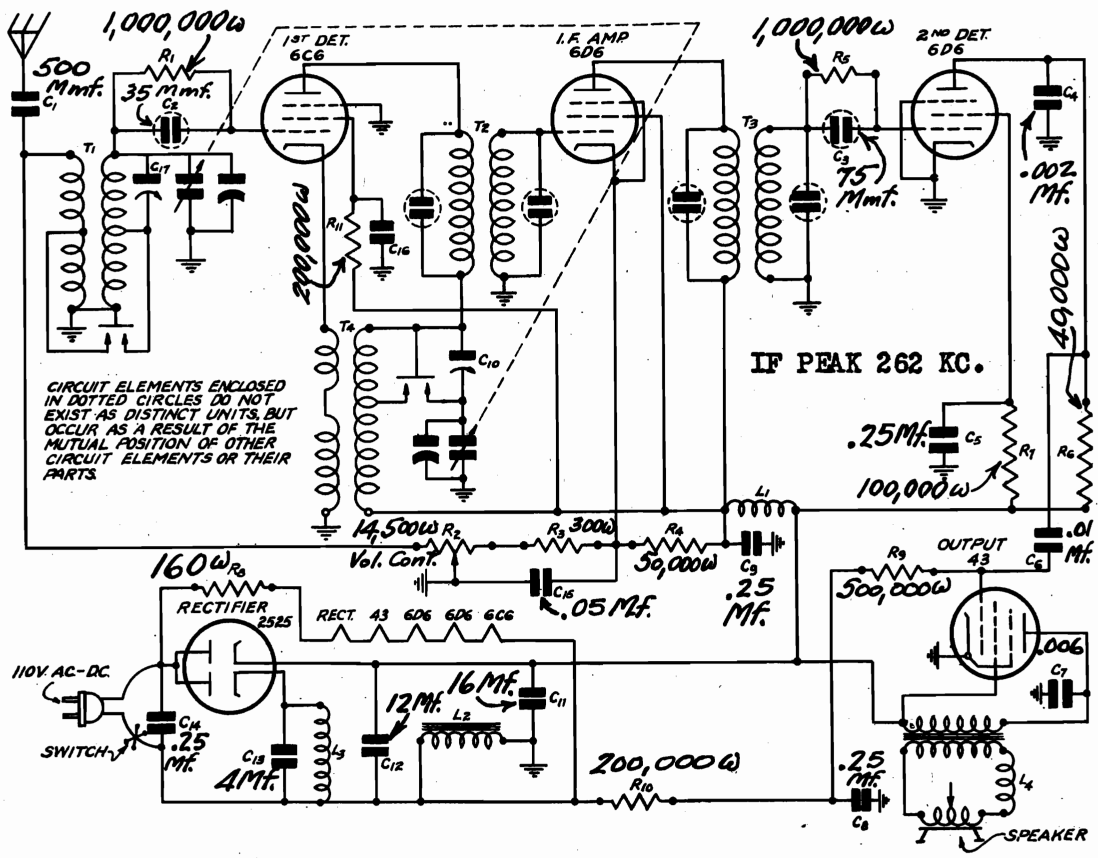
Antenna lead connected to ground lead (not external ground).—Volume Control at Maximum.
CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

		A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements					D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements				
Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
77	1st Det. Osc.	5.8	106	106	5.2	.8	5.6	87	87	4.3	.6
78	I.F.	5.8	108	108	3.0 (1)	7.4	5.6	88	88	2.4 (1)	6.0
77	2nd Det.	5.8	65 (2)	104	6.0 (3)	.14	5.6	58 (2)	82	5.0 (3)	.11
43	Output	24.	95	110	18.0 (4)	22.0	23.0	80	90	15.0 (4)	17.0
25Z5	Rect.	24.	110 / 155 (5)			84.0 Total	23.0	5.0 / 6.0 (5)			74.0 Total

(1) Cathode to Ground.
(2) With 1,000,000 ohm meter—reading will be lower with lower resistance meter.
(3) Cathode to ground—read with 100,000 ohm meter.
(4) Read across filter choke.
(5) Readings from plate to two cathodes with 250,000 ohm meter

MODEL 05AA.
Schematic
Voltage

WELLS - GARDNER & CO.



Voltages at Sockets

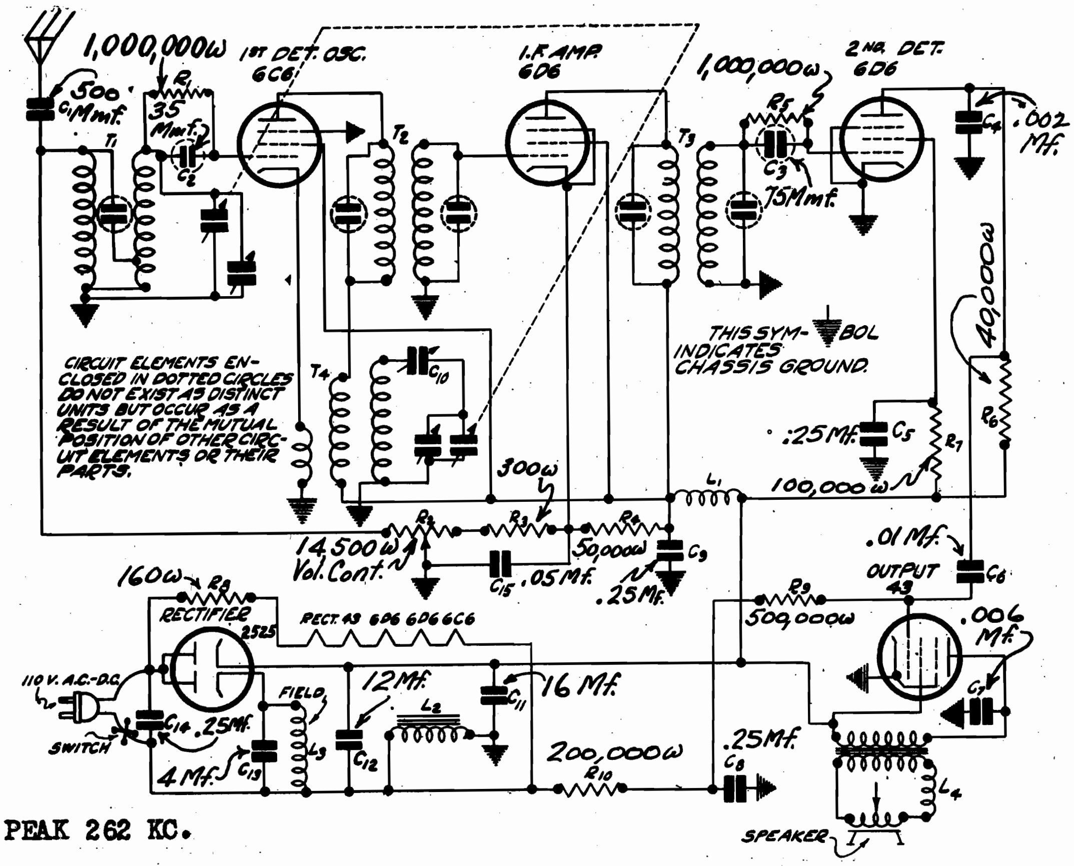
Antenna lead connected to subpanel.—Volume Control at Maximum.
CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

		A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements					D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements				
Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
6C6	1st Det.	5.8	108	50		1.0 (1)	5.6	90	47		.9 (1)
6D6	I.F.	5.8	105	105	3.0	7.5	5.6	86	86	2.4	6.0
6D6	2nd Det.	5.8	20 (2)	40 (2)	.3	2.3	5.6	17 (2)	34 (2)	.2	2.0
43	Output	24.0	95	108	17.0 (3)	20.0	23.0	80	90	14.0 (3)	17.0
25Z5	Rect.	24.0	105 / 125 (4)			84.0 Total	23.0	6 / 7 (4)			74.0 Total

(1) Subject to variation.
(2) As read with 1,000,000 ohm meter.
(3) Read across filter choke.
(4) Readings from plate to two cathodes.

WELLS - GARDNER & CO.

MODEL 05BA
Schematic
Layout
Voltage



IF PEAK 262 KC.

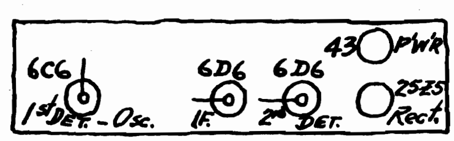
Voltages at Sockets

Antenna lead connected to subpanel.—Volume Control at Maximum.

CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

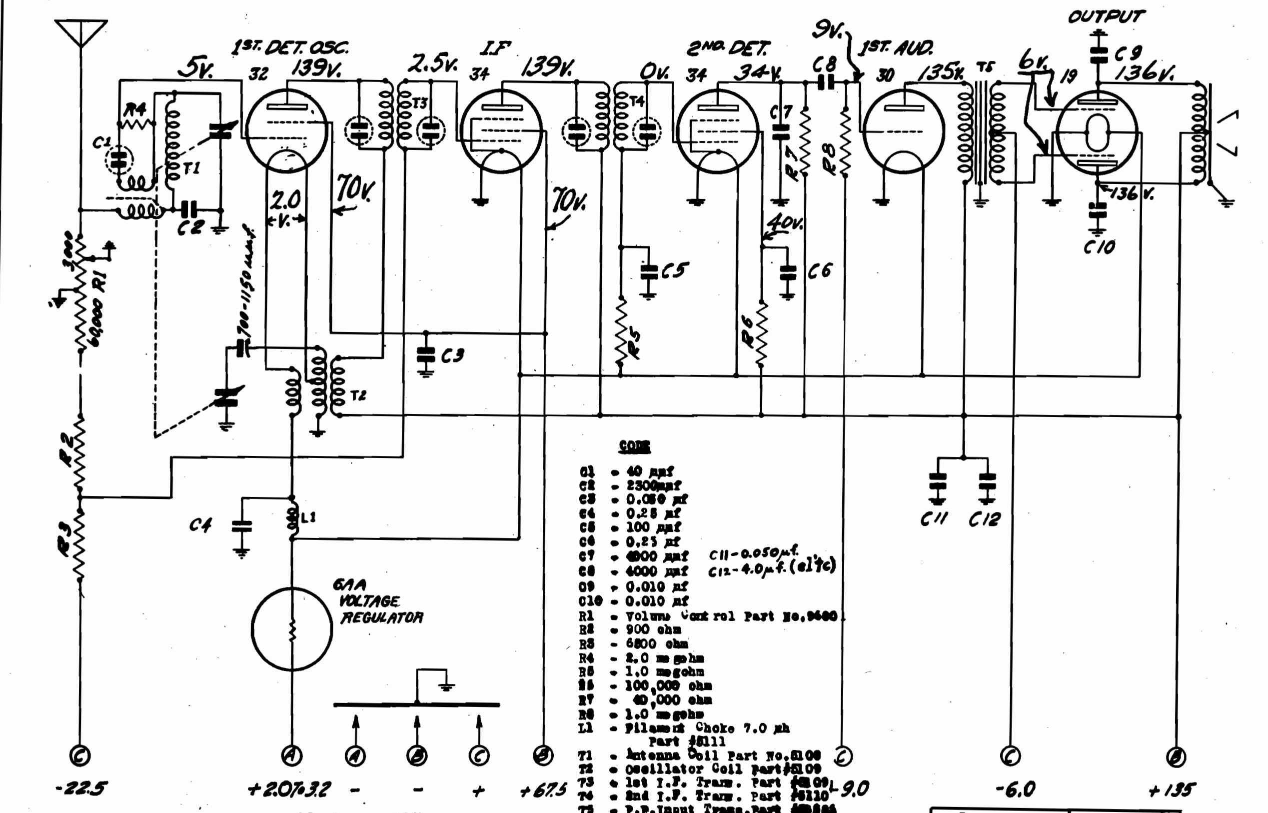
Type of Tube	Function	A.C. Line Voltage—115. Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements: Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	D.C. Line Voltage—110. Use High Resistance D.C. Meter for Heater Voltage Measurements: Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
6C6	1st Det.	5.8	108	108	12.0 (1)	6.0 (1)	5.6	90	90	10.0 (1)	4.0 (1)
6D6	I.F.	5.8	105	105	3.0	7.5	5.6	86	86	2.4	6.0
6D6	2nd Det.	5.8	20 (2)	40 (2)	.3	2.3	5.6	17 (2)	34 (2)	.2	2.0
43	Output	24.0	95	108	17.0 (3)	20.0	23.0	80	90	14.0 (3)	17.0
25Z5	Rect.	24.0	105 / 125 (4)			84.0 Total	23.0	6 / 7 (4)			74.0 Total

(1) Subject to variation.
(2) As read with 1,000,000 ohm meter.
(3) Read across filter choke.
(4) Readings from plate to two cathodes.

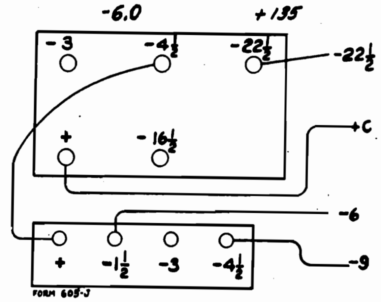


MODEL 06A
Schematic
Layout, Notes

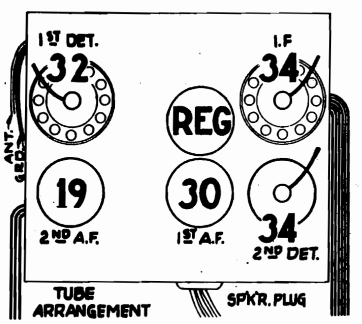
WELLS - GARDNER & CO.

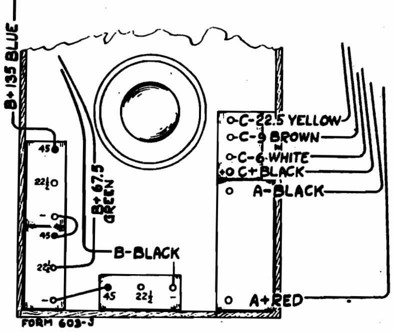


IF PEAK 175 KC.



Optional "C" Battery Connections





Tube Arrangement and Battery Connections

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself is broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and an output indicating meter are advisable. The procedure is as follows:

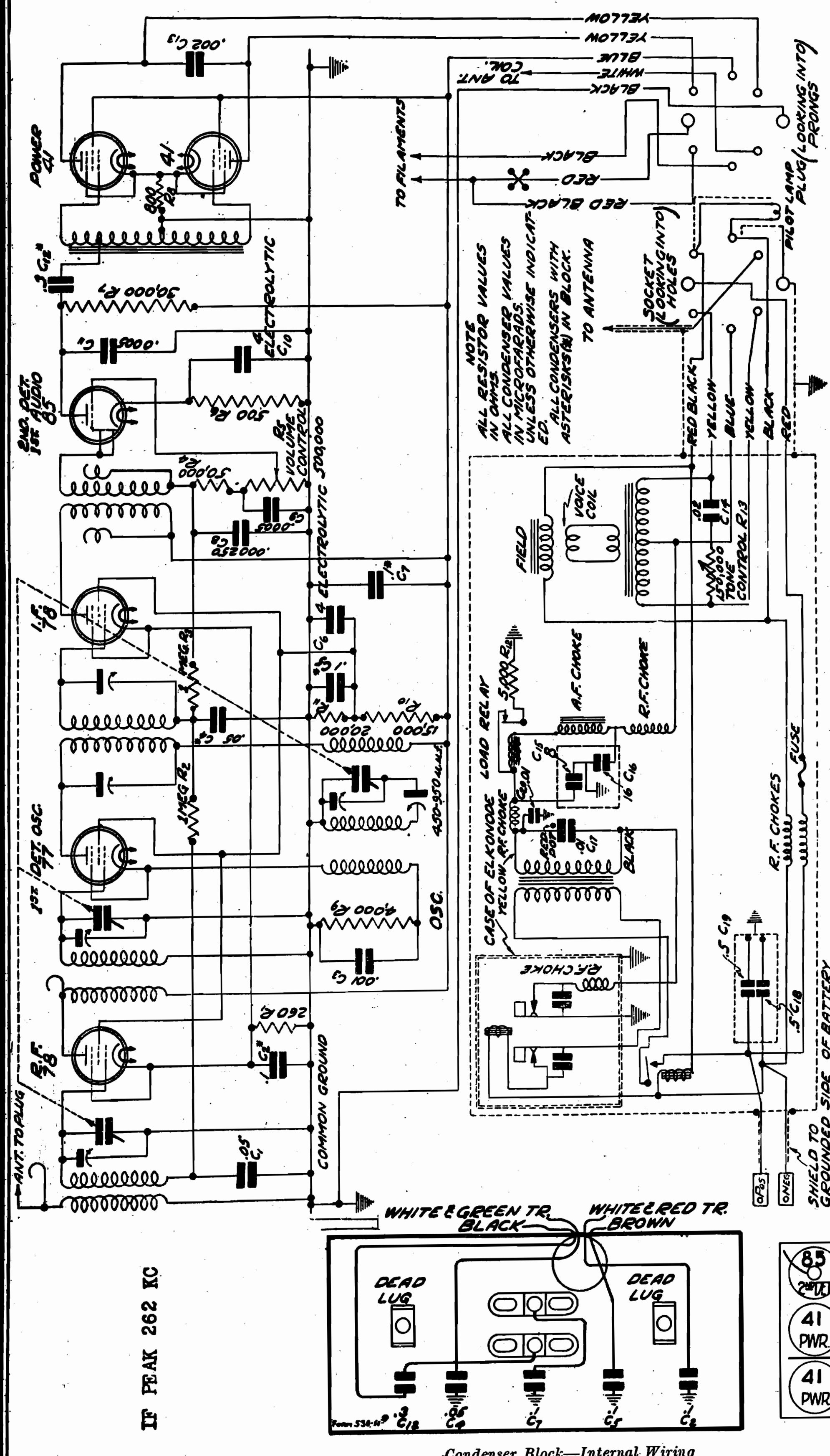
As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 175 K.C. is required.

First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw will be seen at the side of the tuning condenser and is reached from the top of the chassis. A non-metallic screw-driver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

MODEL 06W
Schematic
Layout, Voltage

WELLS - GARDNER & CO.

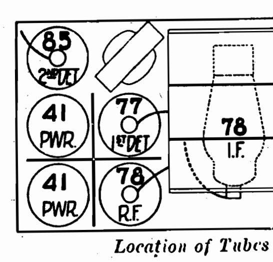


Condenser Block—Internal Wiring

IF PEAK 262 KC

	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78 R.F.	6.1	182	80	3**	7.0
77 1st Det.& Osc.	6.1	178	77	5 x	1.3 x
78 I.F.	6.1	182	80	3**	7.0
85 2nd Det.& 1st A.F.	6.1	70*		1.8**	3.5
41 Output	6.1	162	168.5	17	11.0

*-Triode Plate to Cathode. **-Cathode to Ground x-Subject to variation
NOTE:- All voltages are at 185 volts input from "B" Eliminator



Location of Tubes

MODEL 06-W
Alignment
Speaker Data

WELLS - GARDNER & CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

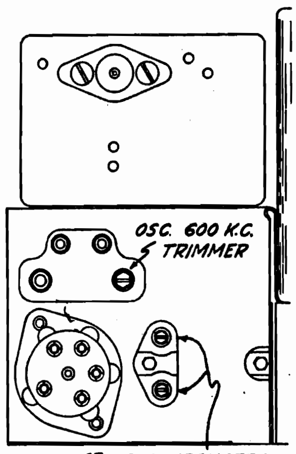


Fig. 12—Location of Trimmers

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. The location of the adjusting screws for these condensers is shown in Fig. 12.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first (section farthest from drive gear).

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The location of this condenser is shown in Fig. 12.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Mounting the Speaker-"B" Eliminator

The speaker-"B" eliminator is mounted on the back of the dash by means of two brackets, as shown in Fig. 5. Usually the space available will govern the location of the speaker and position of it on the mounting brackets. However, the matter of acoustics should be given careful consideration. One of the most desirable positions from the standpoint of acoustics is that shown by the solid lines in Fig. 5 (A). In this position the sound waves travel in the most direct lines toward the listener. After the speaker is mounted and regardless of the position of the brackets, loosen the bracket bolts and turn it to several positions in order to get the best one from the standpoint of tone quality.

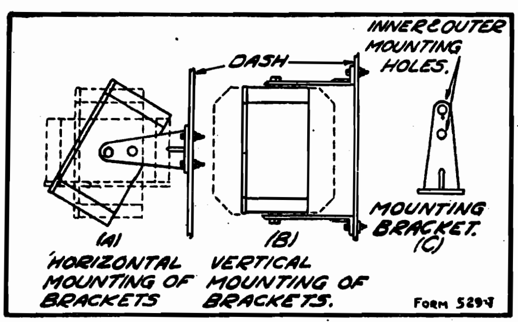


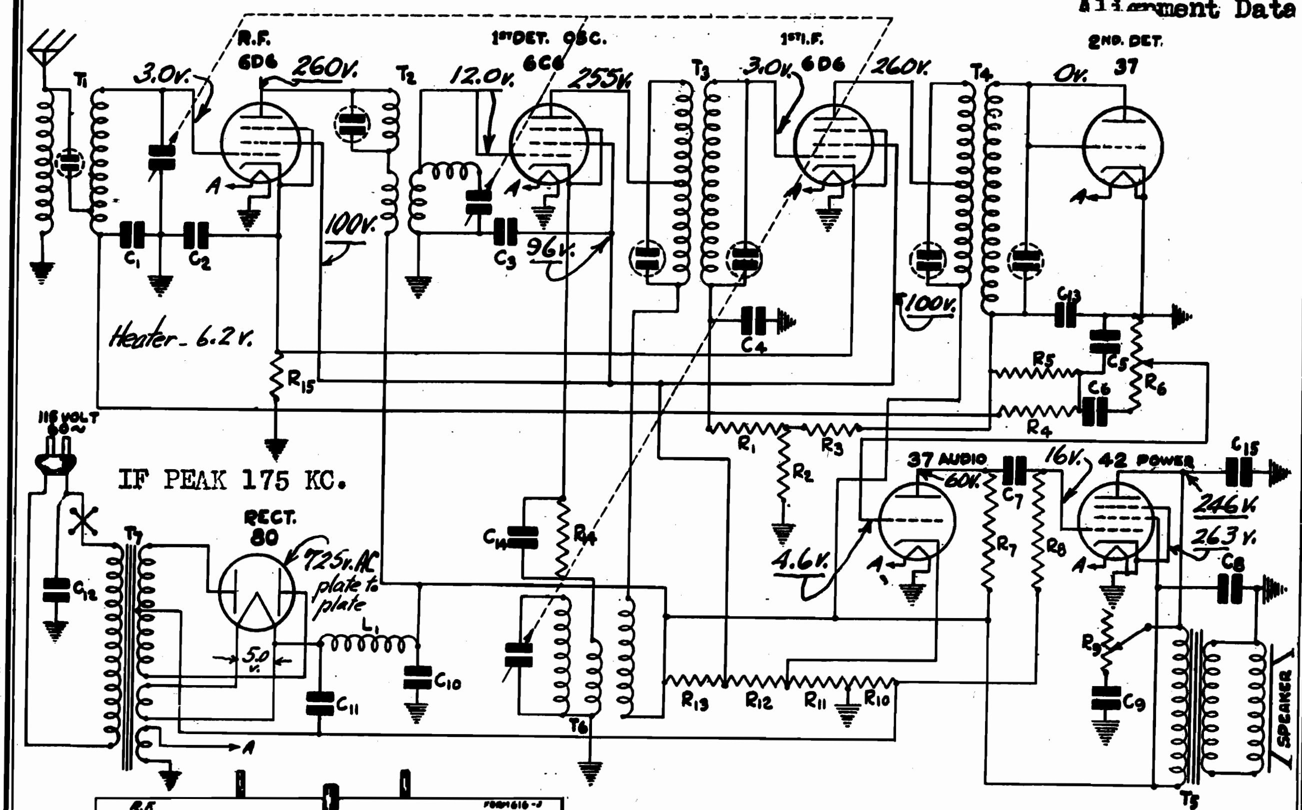
Fig. 5—Method of Mounting Speaker

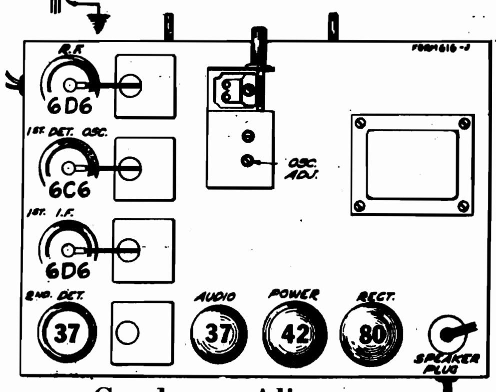
Other considerations governing the location of the speaker are the cables and the tone control. The speaker should be so mounted that the two shielded cables, one to the storage battery and one to the chassis, will be long enough and can be most conveniently brought over. The tone control knob on the speaker box should be preferably on the bottom, so that it can be reached easily.

After the position of the speaker is decided on, drill the four $\frac{5}{16}''$ holes required for the bracket mounting bolts. A template for these holes is supplied with the receiver. The holes are arranged in a rectangle. The centers of the holes, the small dimension are $2\frac{3}{8}''$ apart and the long dimension 10" apart. In Fig. 5 is shown how the brackets can be mounted horizontally (A) or vertically (B), and the different positions in which the speaker itself can be placed. There are two holes in each bracket as shown in Fig. 5 (C) which determine the distance of the speaker box from the dash. The grilled portion of the box at the front should face the listener.

MODEL 07A
Schematic
Voltage
Alignment Data

WELLS - GARDNER & CO.





Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

As the I. F. stages are fixed tuned, no I. F. alignment at the intermediate frequency of 175 K. C. is required.

First set the signal generator for a signal of exactly 1400 K. C. Connect the antenna lead from the signal generator to the antenna lead of the receiver, and the ground lead from the signal generator to the ground lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

RESISTORS

Part No.	Code	Resistance	Type	List Price
P-A95105	R1	1 megohm	Carbon	$0.25
P-A95503	R2	50,000 ohm	Carbon	.25
P-A95154	R3	150,000 ohm	Carbon	.25
P-A95205	R4	2 megohm	Carbon	.25
P-A95104	R5	100,000 ohm	Carbon	.25
*	R6	1 megohm	Vol. Control & Switch	1.25
P-A95204	R7	200,000 ohm	Carbon	.20
P-A95204	R8	200,000 ohm	Carbon	.20
*	R9	150,000 ohm	Tone Control	.80
P-A98002	R10	250 ohm	Armoured Wire Wound	1.00
	R11	800 ohm		
	R12	20,000 ohm		
	R13	18,000 ohm		
P-A93452	R14	4,500 ohm	Carbon	.25
P-A94201	R15	200 ohm	Carbon	.20

"A" preceding the number signifies .2 watt.
"B" preceding the number signifies .5 watt.
"C" preceding the number signifies 1.0 watt.
*When ordering these parts specify shaft length and series number of receiver.

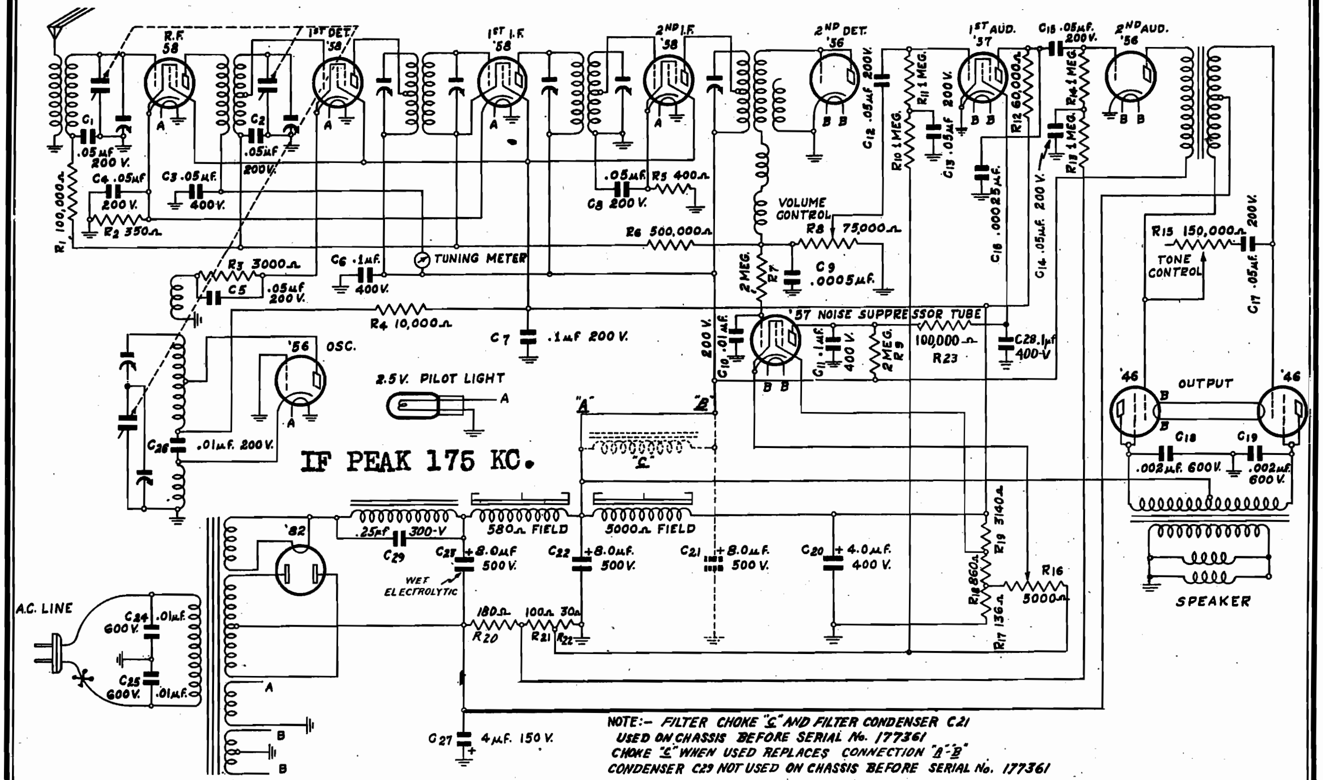
CONDENSERS

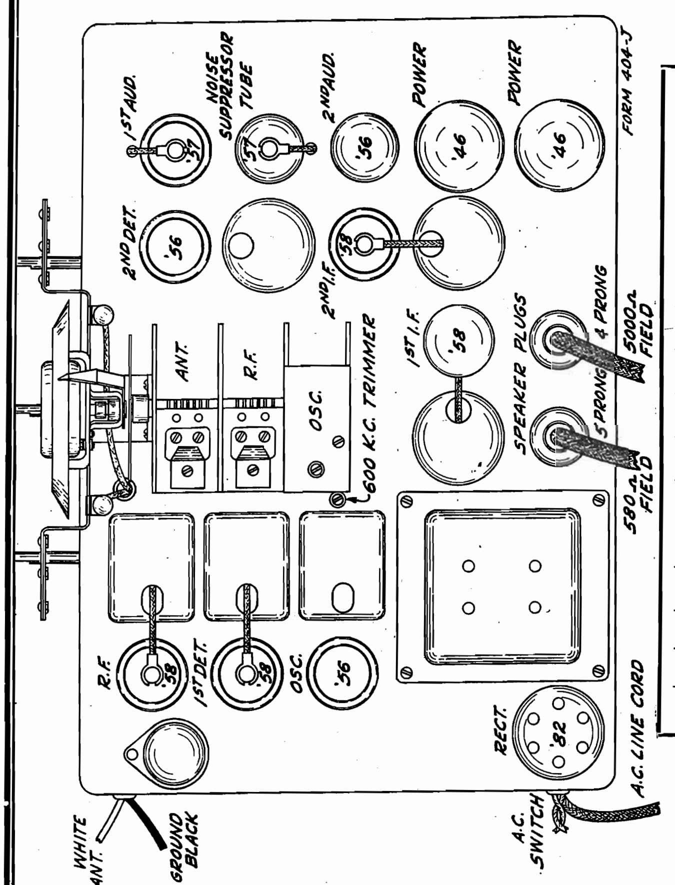
Part No.	Code	Capacity	Voltage	Type	List Price
P-80862	C1	.050 mfd.	200 V.	Tubular	$0.30
P-80864	C2	.10 mfd.	200 V.	Tubular	.30
P-80888	C3	.25 mfd.	200 V.	Tubular	.40
P-80862	C4	.050 mfd.	200 V.	Tubular	.30
P-80919	C5	250 mmfd.	600 V.	Moulded	.20
P-80862	C6	.050 mfd.	200 V.	Tubular	.30
P-80890	C7	.050 mfd.	400 V.	Tubular	.20
P-80930	C8	.25 mfd.	400 V.	Tubular	.30
P-80890	C9	.050 mfd.	400 V.	Tubular	.20
P-80916	C10	8.0 mfd.	450 V.	Electrolytic	1.50
P-80990	C11	16.0 mfd.	450 V.	Electrolytic	2.00
P-80997	C12	.010 mfd.	600 V.	Metal can	.50
P-80919	C13	250 mmfd.	600 V.	Moulded	.20
P-80914	C14	.002 mfd.	600 V.	Tubular	.20
P-80914	C15	.002 mfd.	600 V.	Tubular	.20
P-80991	Three Gang Condenser				3.85

The tuning condensers are all adjusted at the factory for the correct relative capacity between the oscillator section and the other two sections. As a rule no adjustment other than at 1400 K. C., as mentioned above, is required.

MODEL 022
Schematic
Layout
Voltage

WELLS-GARDNER & CO.





Voltages at Sockets

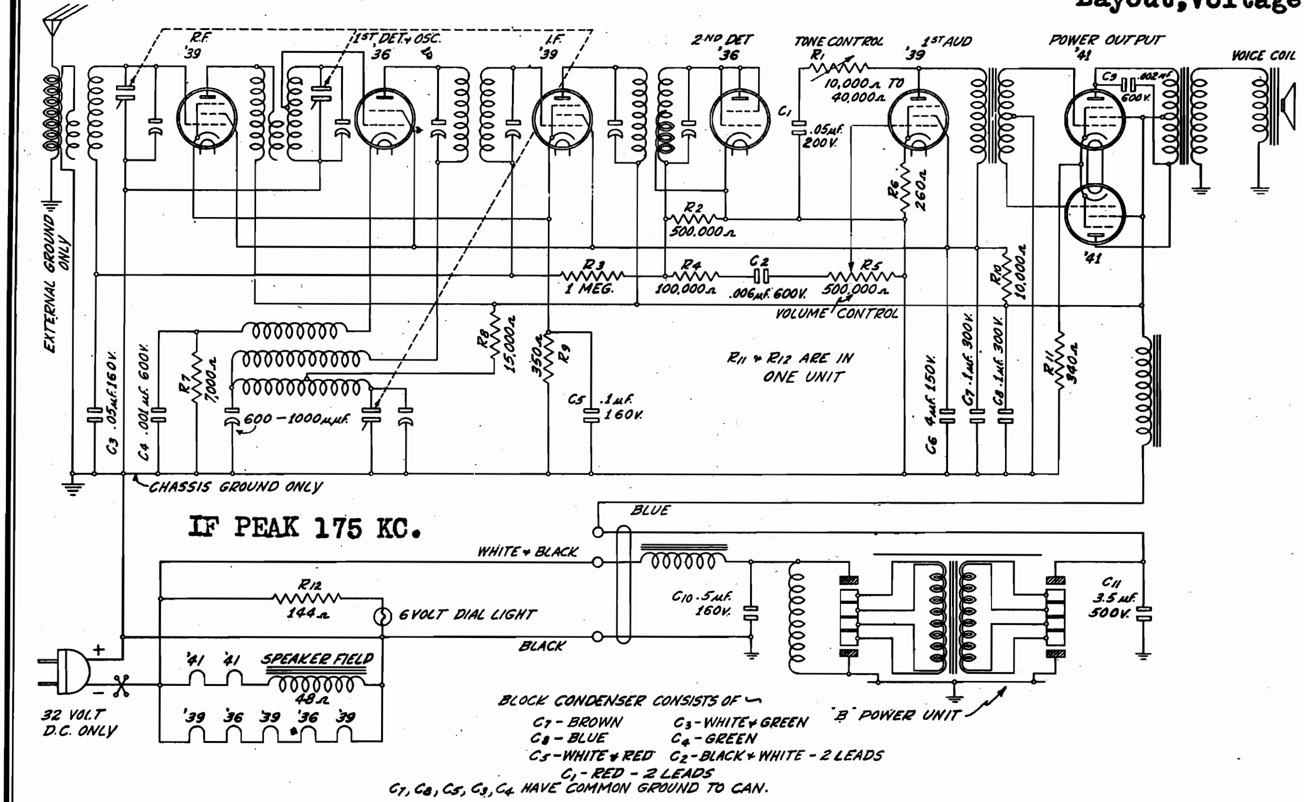
LINE VOLTAGE 115—ANTENNA SHORTED TO GROUND—NOISE SUPPRESSOR AT MAXIMUM CLOCKWISE POSITION

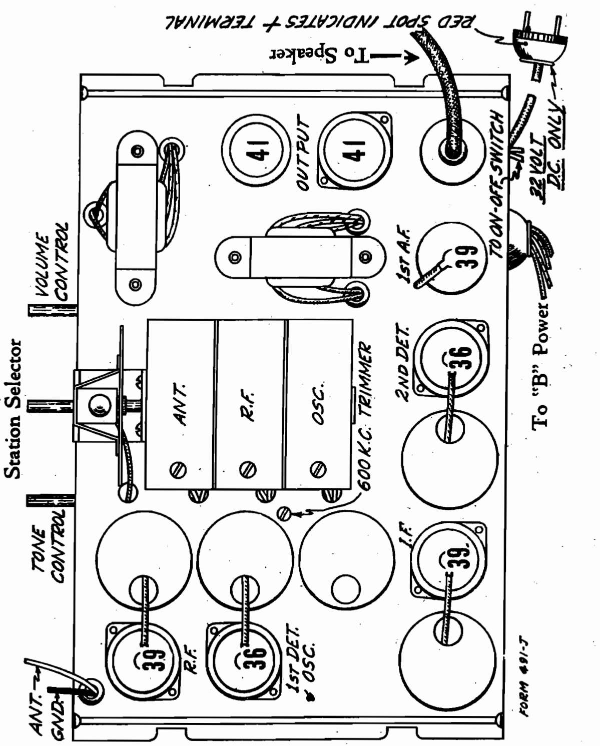
Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
58	R.F.	2.4	242	90	4 (1)	4
58	1st Det.	2.4	250	86	7 (1)	2
56	Osc.	2.4	24		0	8
58	1st I.F. (2)	2.4	252	90	4 (1)	4
58	2nd I.F. (2)	2.4	254	91	3	5.7
56	2nd Det.	2.4	0		0	0
57	1st Audio	2.4	65	55	4 (3)	.4
57	NoiseSup.	2.4	55	20	3 (1)	0
56	2nd Audio	2.4	255		14 (4)	3.3
46	Power	2.4	260	260	34	23
82	Rectifier	2.4	880 volts plate to plate			53 per plate

(1) Read from cathode to ground.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation and motor boating.
(3) Read across 30 ohm section of voltage divider.
(4) Read across 30 ohm and 100 ohm section of voltage divider.

MODEL 073
Schematic
Layout, Voltage

WELLS - GARDNER & CO.





Voltages at Sockets

INPUT 32 VOLTS—GROUND R.F. GRID

Type of Tube	Function	Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'39	R.F.	6.4	190	90	3.0(1)	5.0
'36	1st Det. & Osc.	6.4	170	86	6.5(2)	.6
'39	I.F.	6.4	190	90	3.0(1)	5.0
'36	2nd Det.	6.4	0	0	0	0
'39	1st A.F.	6.4	70	90	1.75(1)	6.0
'41	Output	6.4	180	185	14.0	18.0

(1) Cathode to Ground.

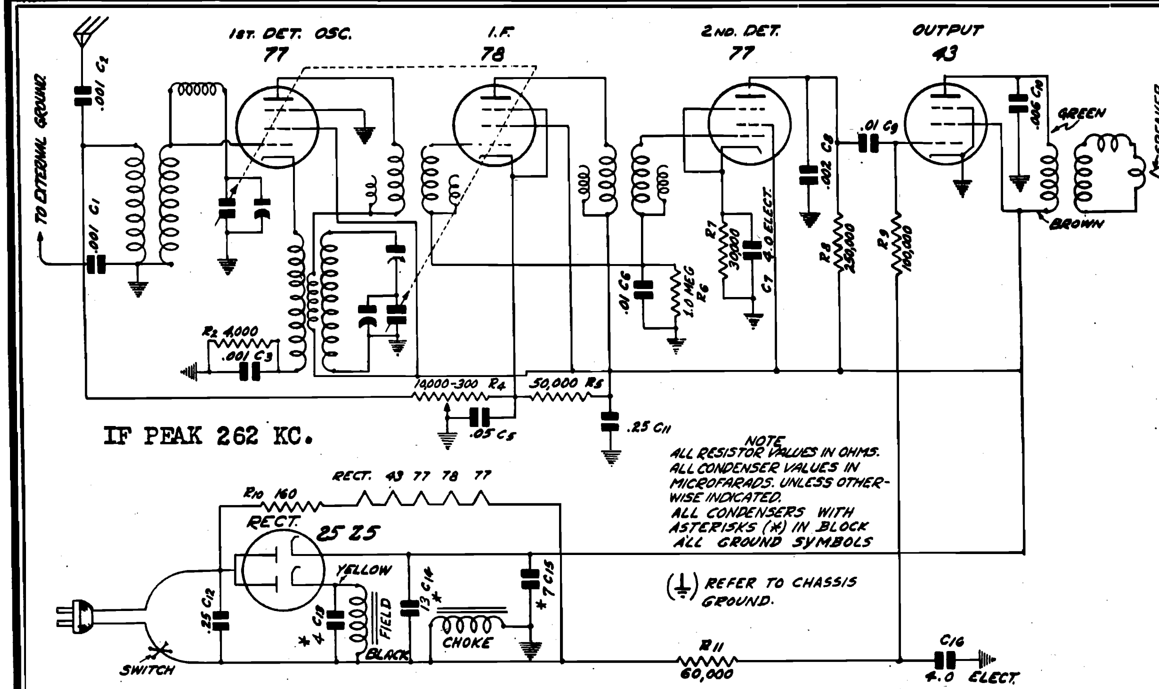
(2) Subject to Variation with dial setting.

Polarity of Power Supply

IMPORTANT—POLARITY OF THE POWER SUPPLY TO THE RECEIVER MUST BE OBSERVED. There is a red mark on the plug. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line. Use a receptacle on the 32 volt line from which the plug will not have to be removed after it has once been correctly inserted.

MODEL 5B
Schematic
Layout, Voltage

WELLS - GARDNER & CO.

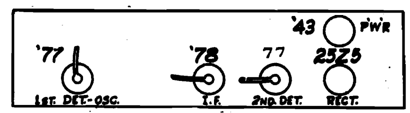


CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-80821.B	C-1	.001 mfd.	600 V.	Moulded	$0.25
P-80821.B	C-2	.001 "	600 V.	Moulded	.25
P-80005-A	C-3	.001 "	400 V.	Tubular	.15
P-80862-C	C-5	.05 "	200 V.	Tubular	.30
P-80872-B	C-6	.01 "	600 V.	Tubular	.25
P-80986-C	C-7	4.0 "	80 V.	Electrolytic	.65
P-80914	C-8	.002 "	600 V.	Tubular	.20
P-80872-B	C.9	.01 "	600 V.	Tubular	.25
P-80898	C-10	.006 "	600 V.	Tubular	.15
P-80888-A	C-11	.25 "	200 V.	Tubular	.35
P-80888-A	C-12	.25 "	200 V.	Tubular	.35
P.80044	C-13 C-14 C-15	4.0 " 13.0 " 7.0 "	150 150 150	Elec. Block	2.15
P-80878-C	C-16	4.0 "	150 V.	Electrolytic	.80
P-1539	600 K.C. Trimmer Cond.				.45
P-80982	2-gang Condenser—Gear Drive				2.25

RESISTORS

Part No.	Code	Resistance	Type	List Price
P-A-90947	R-2	4,000 ohm	Carbon	.20
P-91019C	R-4	300-10,000 ohm	Vol. Contr. & Switch	1.40
P-A-90941	R-5	50,000 ohm	Carbon	.20
P-A-90948	R-6	1 Megohm	Carbon	.25
P-A-90956	R-7	30,000 ohm	Carbon	.20
P-A-90954	R-8	250,000 ohm	Carbon	.20
P-A-90912	R-9	100,000 ohm	Carbon	.25
P-91064	R-10	160 ohm	Armored Wire Wound	.50
P-A-91036	R-11	60,000 ohm	Carbon	.20



As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 262 K.C. is required.

First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. In order to do this, it will be necessary to put the chassis back in the cabinet. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. This adjusting screw will be seen on the back panel of the chassis.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Voltages at Sockets

Antenna lead connected to ground lead (not external ground).—Volume Control at Maximum.
CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

		A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements					D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements				
Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
77	1st Det. Osc.	5.8	106	106	5.2	.8	5.6	87	87	4.3	.6
78	I.F.	5.8	108	108	3.0(1)	7.4	5.6	88	88	2.4(1)	6.0
77	2nd Det.	5.8	65(2)	104	6.0(3)	.14	5.6	58(2)	82	5.0(3)	.11
43	Output	24.	95	110	18.0(4)	22.0	23.0	80	90	15.0(4)	17.0
25Z5	Rect.	24.	110, 155 (5)			84.0 Total	23.0	5.0, 6.0 (5)			74.0 Total

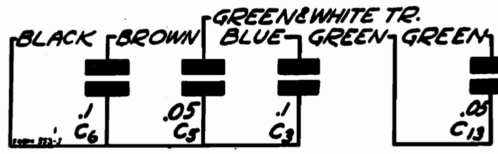
(1) Cathode to Ground.
(2) With 1,000,000 ohm meter—reading will be lower with lower resistance meter.
(3) Cathode to ground—read with 100,000 ohm meter.
(4) Read across filter choke.
(5) Readings from plate to two cathodes with 250,000 ohm meter

WELLS - GARDNER & CO.

MODEL V6Z2
Schematic
Voltage

Trying Out the Set and Adjusting

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer. The location of the tubes is shown in Fig. 7 To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 K.C. with the volume control about three-fourths on. On one end of the chassis box is a small metal plate. Remove this plate. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.



Condenser Block—Internal Wiring

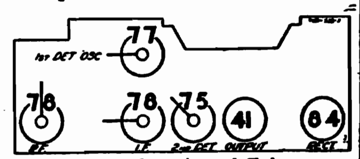
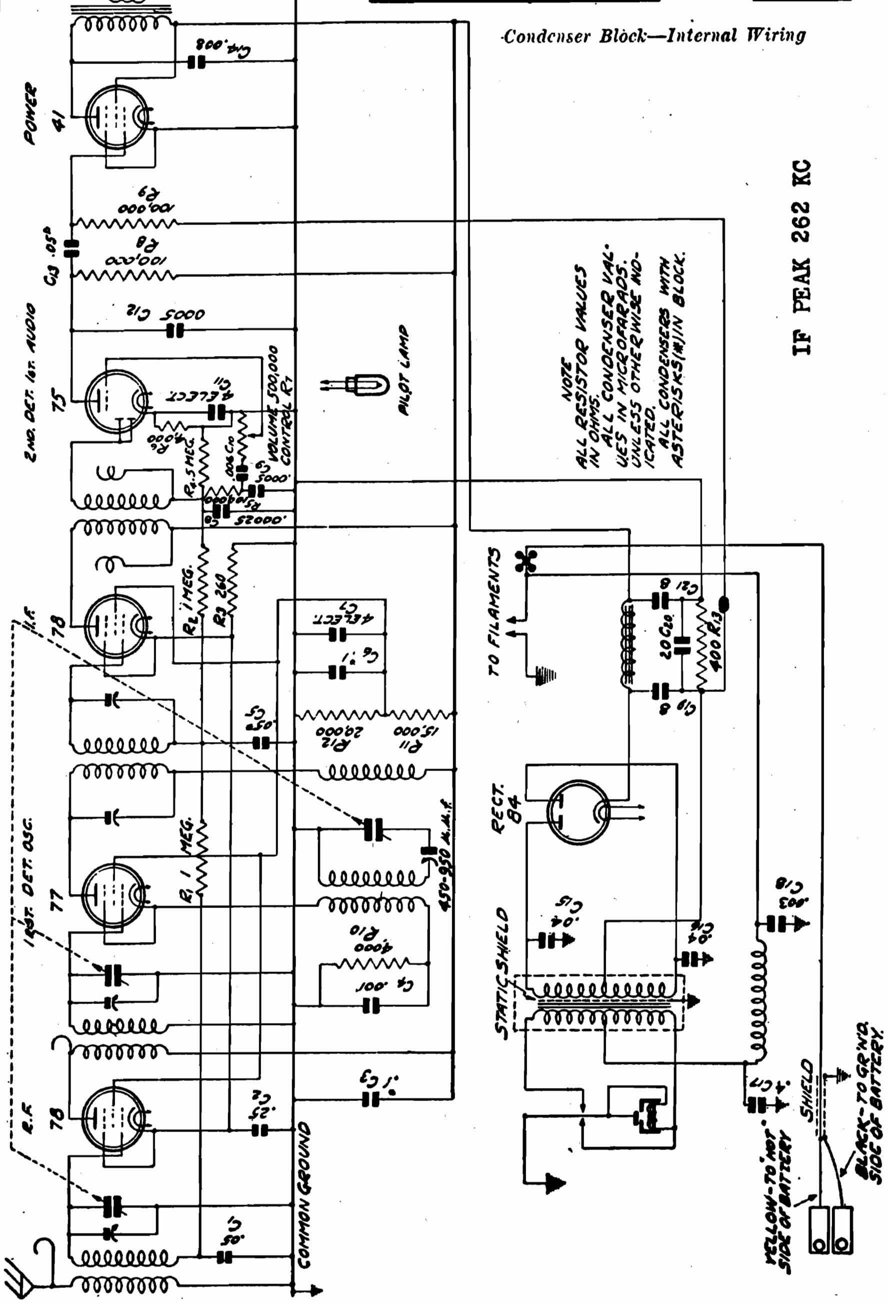


Fig. 7—Location of Tubes



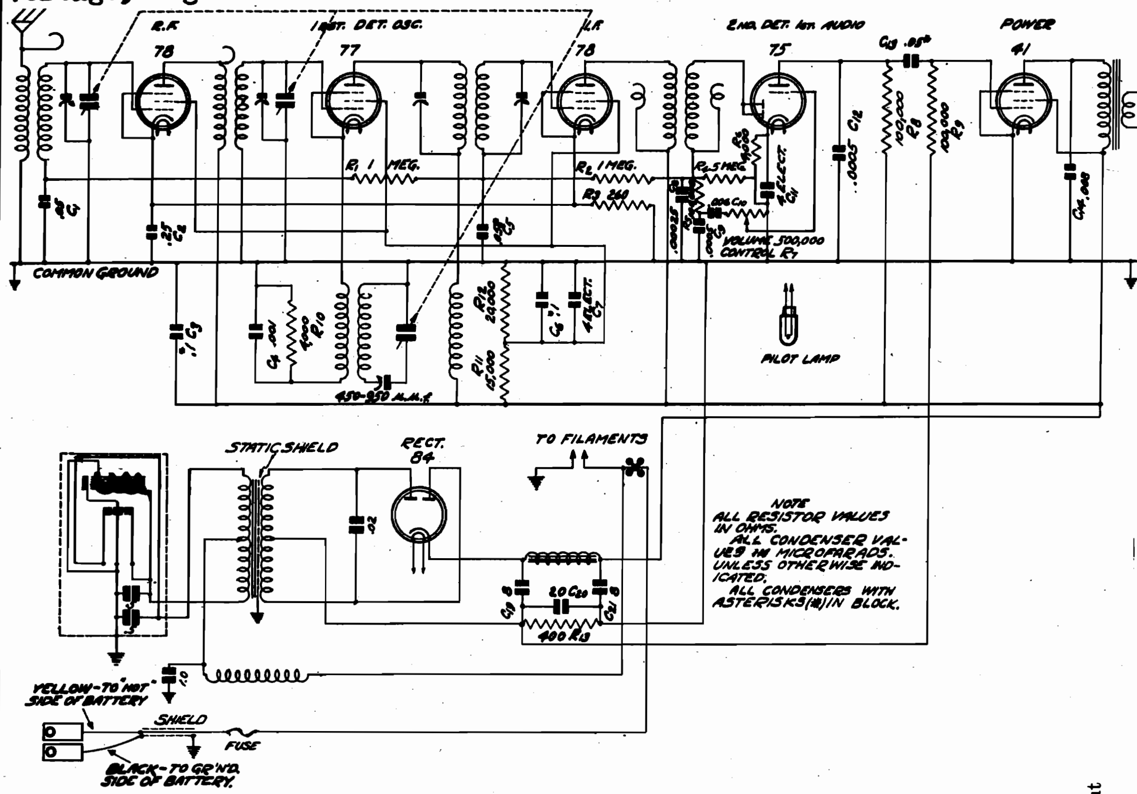
IF PEAK 262 KC

	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78 R.F.	6.1	182	80	3*	7.0
77 1st Det. & Osc.	6.1	178	77	5**	1.3**
78 I.F.	6.1	182	80	3.*	7.0
75 2nd Det. 1st Audio	6.1	70x		1.4*	.35
41 Output	6.1	172.5	176.5	12.5xx	16.0
84 Rect.	6.1	205			17.5 per plate

*-Cathode to Ground. **-Subject to Variation. x-Triode Plate to Cathode
xx-Read Across 400-Ohm Resistor, R13

MODEL Z6Z1
Schematic, Layout
Voltage, Alignment

WELLS - GARDNER & CO.



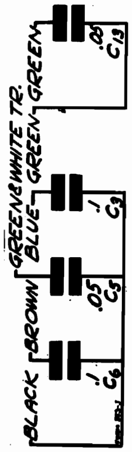


Fig. —Condenser Block—Internal Wiring

Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78	R. F.	6.1	182	80	3.[1]	7.0
77	1st Det. and Osc.	6.1	178	77	5.[2]	1.3[2]
78	I. F.	6.1	182	80	3.[1]	7.0
75	2nd Det. 1st Audio	6.1	70[3]		1.4[1]	.35
41	Output	6.1	172.5	176.5	12.5[4]	16.0
84	Rect.	6.1	205			17.5 per plate

(1) Cathode to Ground
(2) Subject to Variation
(3) Triode Plate to Cathode
(4) Read Across 400-Ohm Resistor, R13

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig.10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Trying Out the Set and Adjusting

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer. The location of the tubes is shown in Fig. 8. To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 K.C. with the volume control about three-fourths on. On one end of the chassis box are two small metal plates. Remove the smaller of these two plates. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

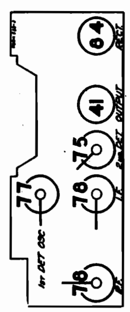
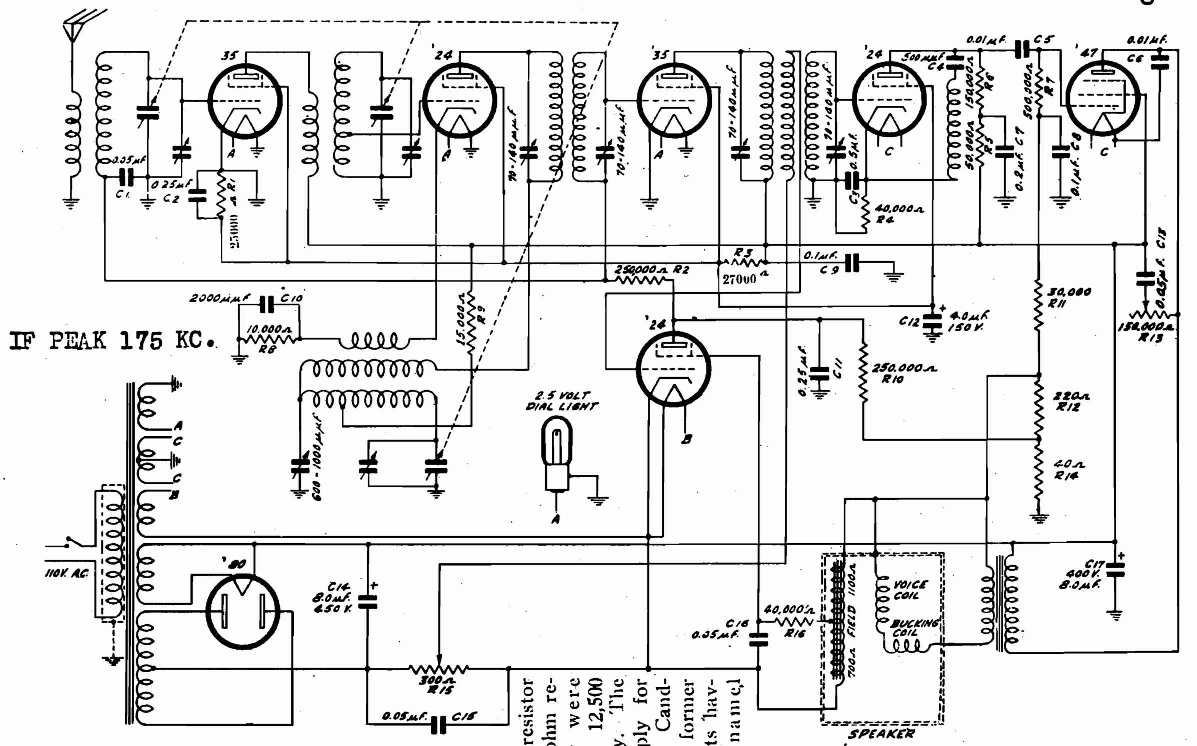


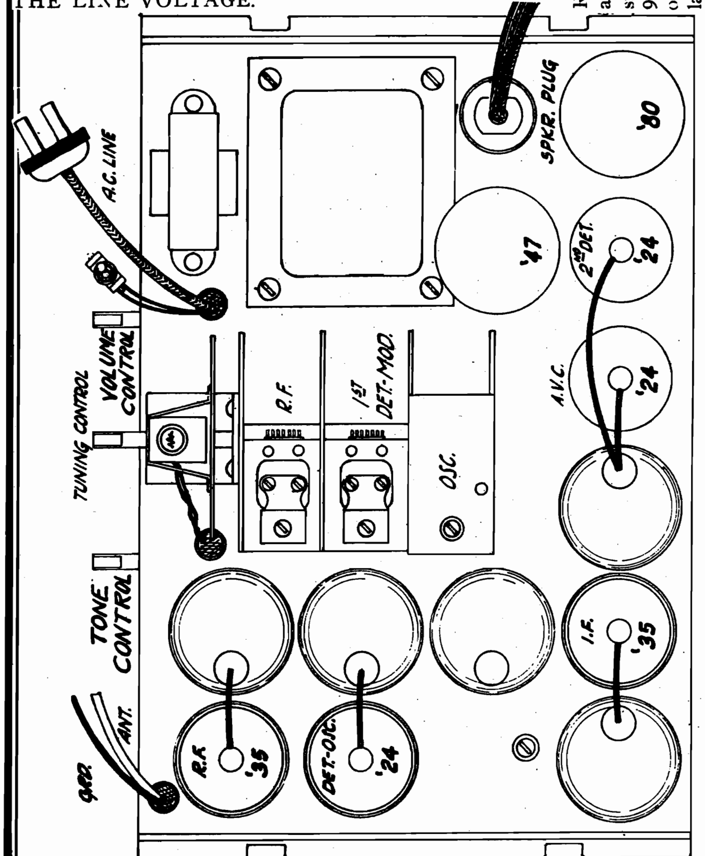
Fig. 8—Location of Tubes

MODEL 50
Schematic
Layout
Voltage

WELLS - GARDNER & CO.



TURN THE VOLUME CONTROL ALL THE WAY ON, CONNECT THE ANTENNA AND GROUND LEADS TOGETHER AND TURN THE GANG CONDENSER PLATES ALL THE WAY OUT. CHECK THE LINE VOLTAGE.



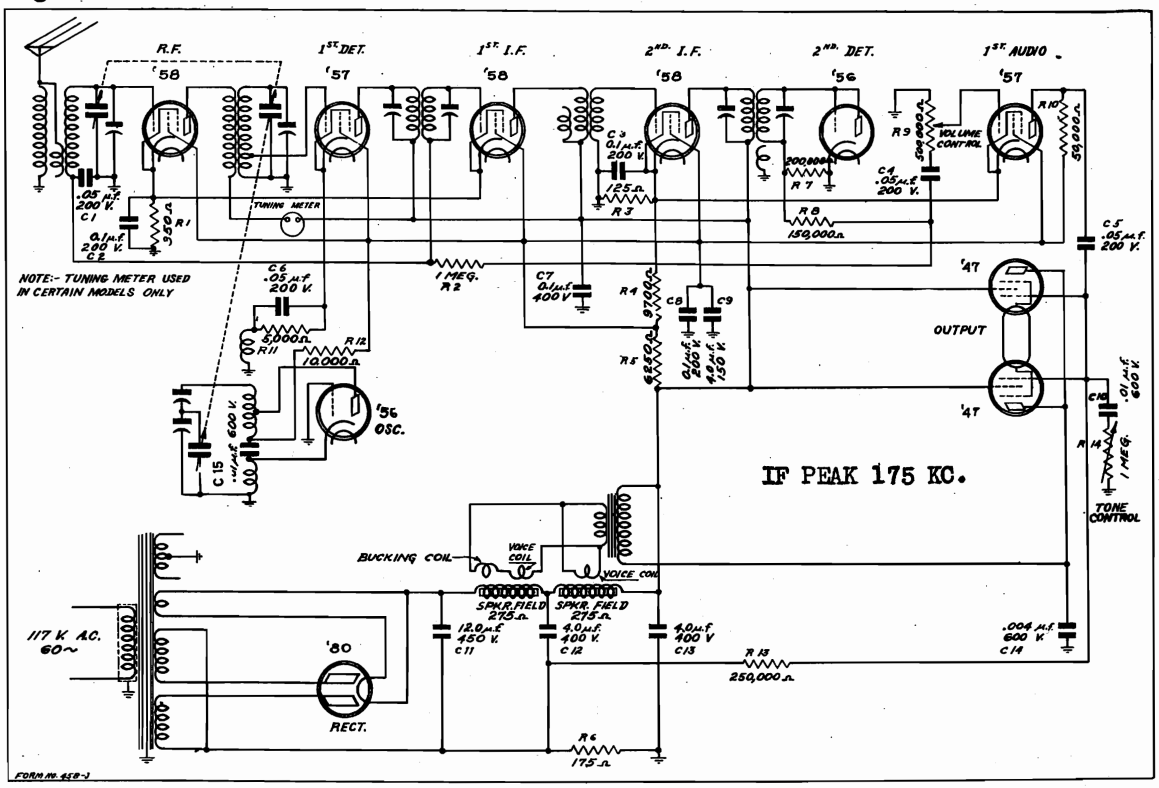
R1—25,000 ohm resistor and R3—27,000 ohm resistor formerly were 9,000 ohms and 12,500 ohms respectively. The latter values apply for all sets having Candohm units; the former values for all sets having vitreous enamel units.

The voltages shown are measured to the cathode of the heater type tubes and to filament of the '47 Pentode.

TUBE	CIRCUIT.	LINE VOLTAGE 90 V.	100 V.	110 V.	120 V.	130 V.
R.F. '35	Screen-Grid Plate	70 192	78 213	85 234	92 256	100 277
Det.-Modulator '24	Screen-Grid Plate	70 192	78 213	85 234	92 256	100 277
I.F '35	Screen-Grid Plate	70 192	78 213	85 234	92 256	100 277
2nd Detector '24	Screen-Grid Plate	70 154	78 171	85 187	92 204	100 221
Audio '47	Accelerating Grid Plate	199 181	221 200	244 220	267 240	289 260
A. V. C. '24	Grid Screen-Grid	12.3 34.5	13.7 38.5	15.1 42	16.5 46	17.8 50
Rectifier '80	Plate to Plate Current (both plates)	308 52.3 MA	342 58.1 MA	376 64 MA	410 69.7 MA	445 75.5 MA

MODEL 502
Schematic
Layout
Voltage

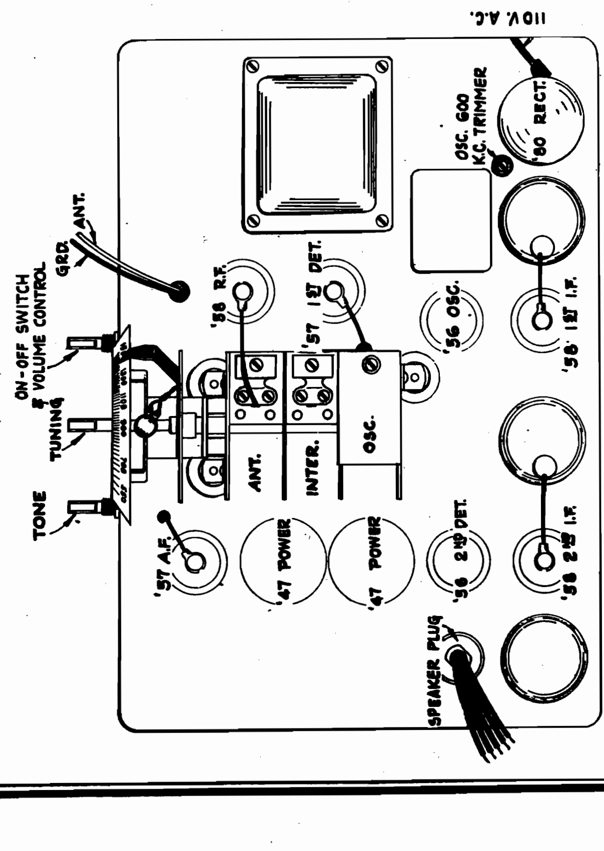
WELLS - GARDNER & CO.



Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.



Voltages at Sockets

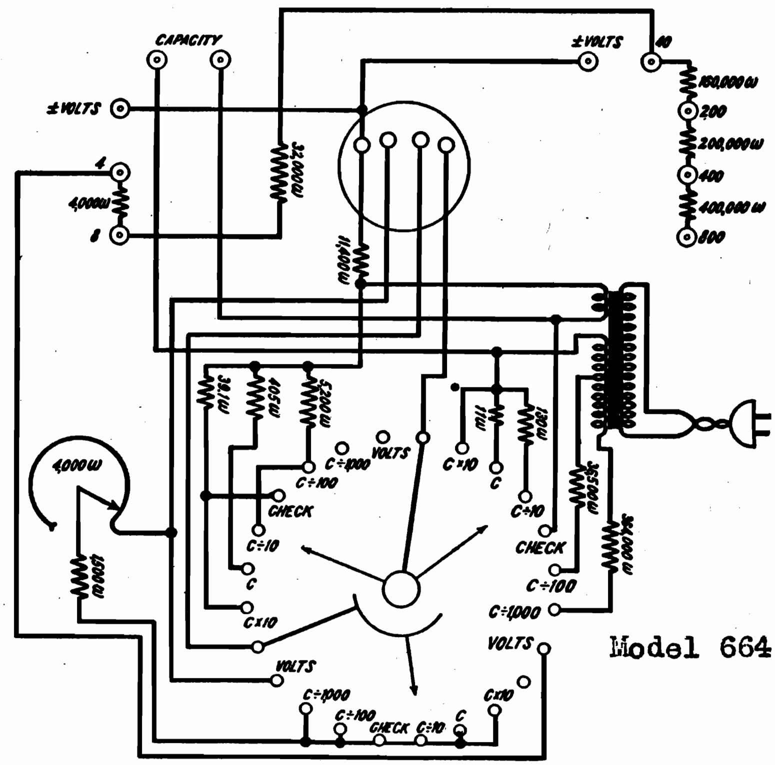
LINE VOLTAGE, 115 — ANTENNA LEAD SHORTED TO GROUND

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
58	R.F.	2.4	275	100	4.2(1)	5.2
57	1st Det.	2.4	265	99	5.4	.9
56	Osc.	2.4	28		0	8.6
58	1st I.F.	2.4	275	100	4.2(1)	5.2
58	2nd I.F.	2.4	275	102	3.0	8.5
56	2nd Det.	2.4	0		0	0
57	1st Audio	2.4	12	102	3.0(1)	1.8
47	Output	2.4	265	280	18.5(2)	30.0
80	Rect.	4.9				55.0 per plate

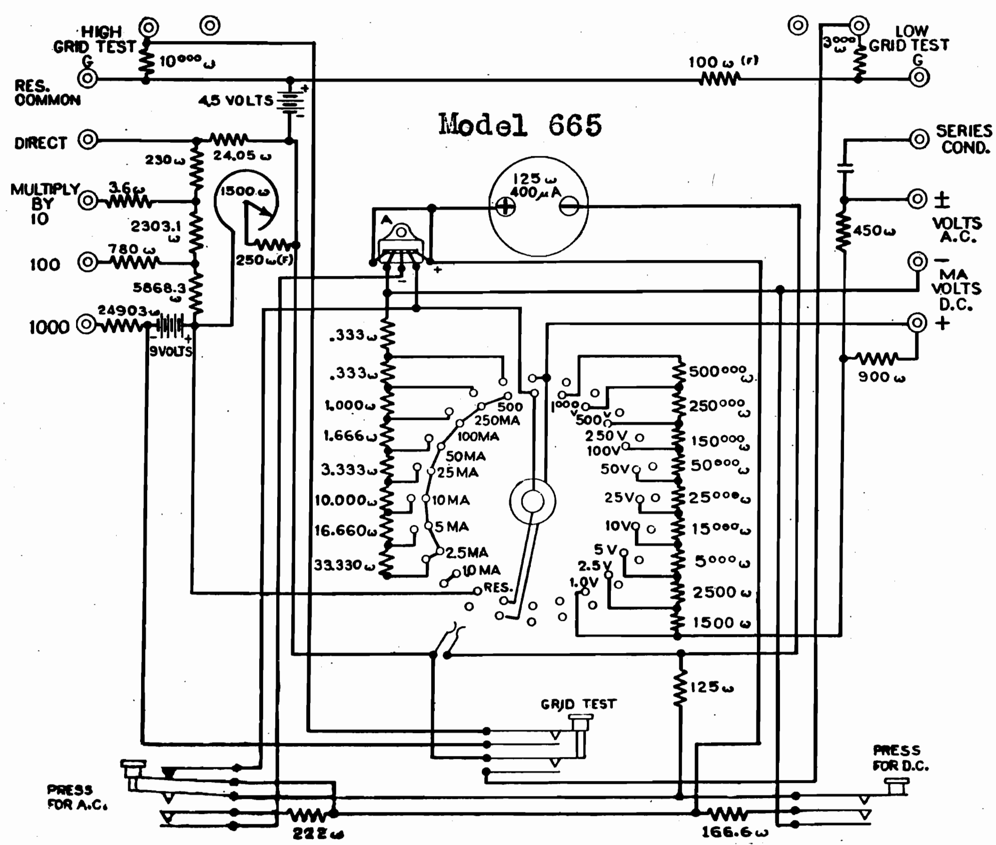
(1) Measured from cathode to ground.
(2) Measured across Resistor R6.

WESTON ELECTRICAL INSTRUMENT CORP.

MODEL 664
Capacity-Voltmeter
MODEL 665
Selective Analyzer



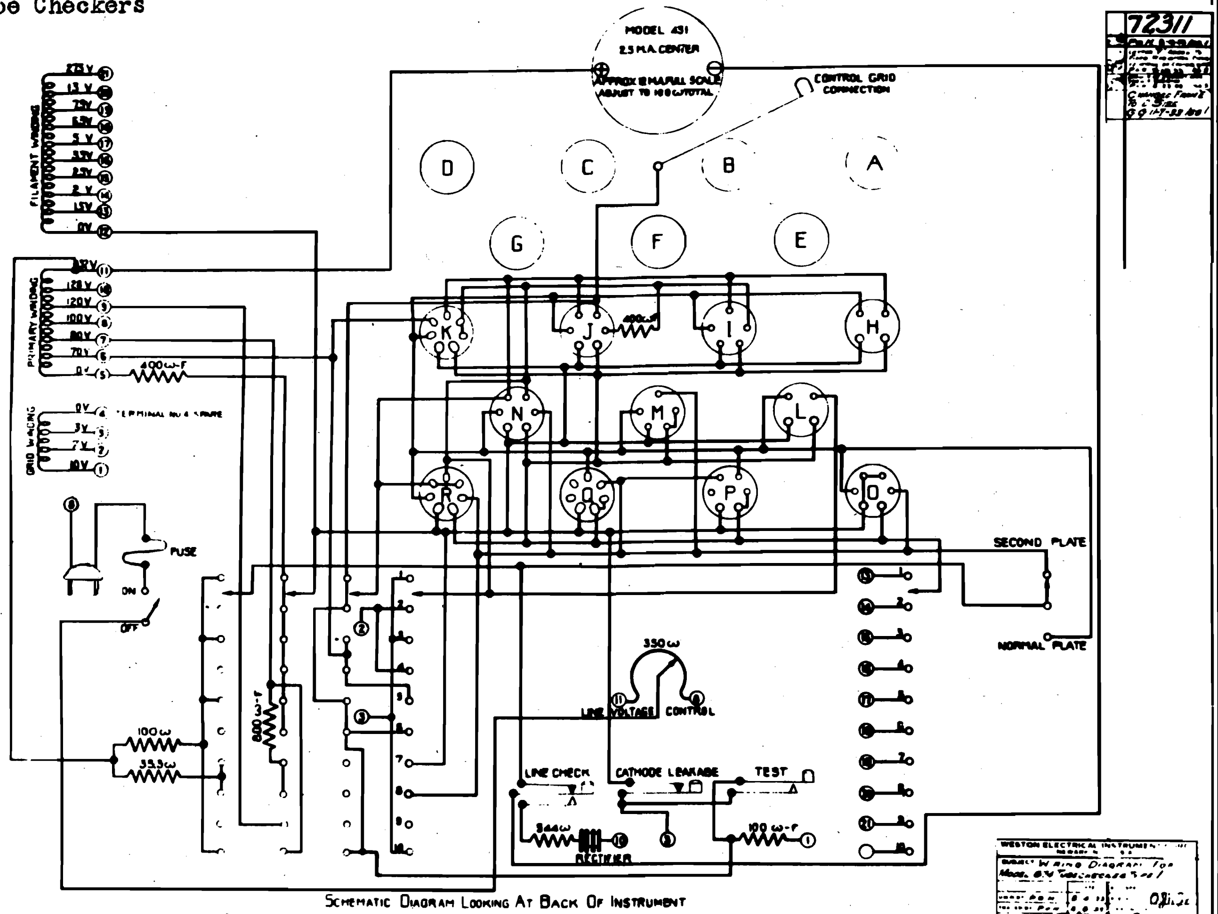
Model 664



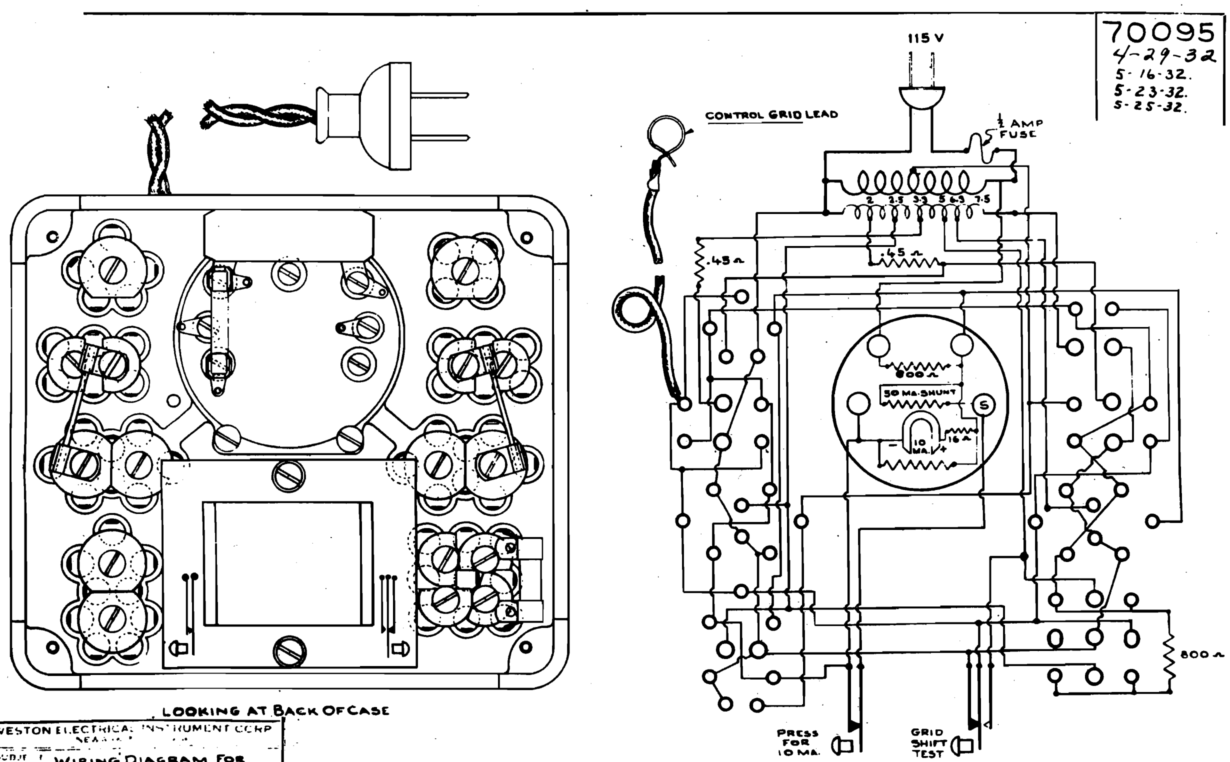
Model 665

MODEL 674
MODEL 675
Tube Checkers

WESTON ELECTRICAL INSTRUMENT CORP.



Schematic Diagram Looking At Back Of Instrument



LOOKING AT BACK OF CASE

SCHEMATIC LOOKING AT BACK OF CASE

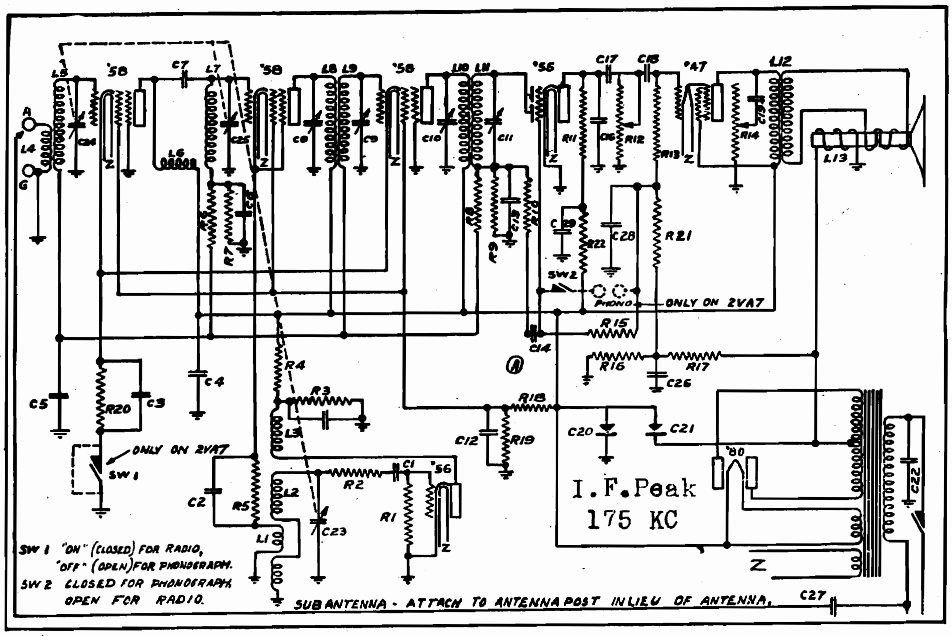
WESTON ELECTRICAL INSTRUMENT CORP.
WIRING DIAGRAM FOR PATTERN 675 TUBE CHECKER

NOTE ~
WIRE WITH #20 B.&S. GA (.0319) TINNED BARE Cu WIRE N.D.19443 & NUCOR COLORED WIRE, COLORS BLACK, RED AND GREEN.

MODEL 2-VA-7
Schematic

WILCOX-GAY CORP.

Automatic Volume Control



RESISTORS

Part No.		
200	R1	100,000 Ohm Oscillator Grid Resistor
475	R2	1,000 Ohm Oscillator Grid Suppressor Resistor
192	R3	40,000 Ohm Oscillator Plate Bleeder Resistor
278	R4	20,000 Ohm Oscillator Plate Resistor
282	R5	2,000 Ohm First Detector Cathode Resistor
198	R6	1 Megohm First Detector Grid Feed Resistor
91	R7	250,000 Ohm First Detector Grid Bleeder Resistor
201	R8	500,000 Ohm Diode Resistor
201	R9	500,000 Ohm Diode Resistor
200	R10	100,000 Ohm Diode Resistor
200	R11	100,000 Ohm Second Detector Plate Resistor
535	R12	500,000 Ohm Volume Control
201	R13	500,000 Ohm 47 Grid Bias Resistor
534	R14	¼ Meg. Tone Control
201	R15	500,000 Ohm Second Detector Grid Resistor
200	R16	100,000 Ohm 47 Grid Bias Network Resistor
198	R17	1 Meg. 47 Grid Bias Network Resistor
337	R18	20,000 Ohm Screen Grid Resistor (Type E)
192	R19	40,000 Ohm Screen Grid Bleeder Resistor
539	R20	150 Ohm First R.F. & First I.F. Cathode Resistor
201	R21	500,000 Ohm Grid Bias Resistor
200	R22	100,000 Ohm Second Detector Plate Resistor

CONDENSERS

339	C1	.0001 MFD. Oscillator Grid Feed Condenser
269	C2	.01 MFD. First Detector Cathode Condenser
272	C3	.1 MFD. First R.F. and First I.F. Cathode Condenser 200 Volt D.C.
266	C4	1 MFD. B+ Supply Condenser 300 Volt D. C., Paper
272	C5	.1 MFD. R.F. and I F. Grid Isolation Condenser 200 V. D.C. Paper
272	C6	.1 MFD. First Detector Grid Isolation Consender 200 V. D.C. Paper
347	C7	.00001 MFD. First R.F. Feed Condenser
	C8	75 - 150 MMFD. I.F. Tuning Condenser
	C9	75 - 150 MMFD. I.F. Tuning Condenser
	C10	75 - 150 MMFD I.F. Tuning Condenser
	C11	75 - 150 MMFD. I.F. Tuning Condenser
272	C12	.1 MFD. Screen Grid By-pass Condenser 200 Volt D.C.
307	C13	.0005 MFD. Diode Condenser
269	C14	.01 MFD. Audio Feed Condenser 400 Volt D.C. Paper
339	C15	.0001 MFD. R.F. By-pass Condenser
544	C16	.001 MFD. Plate Filter Condenser 350 Volt D.C. Mica
269	C17	.01 MFD. Audio Feed Condenser
269	C18	.01 MFD. Audio Feed Condenser
552	C19	.1 MFD. Tone Control Condenser (300 V.)
533	C20	4 MFD. Electrolytic Condenser 500 Volt
533	C21	4 MFD. Electrolytic Condenser 500 Volt
269	C22	.01 MFD. 110 Primary By-pass Condenser
547	C23	350 Oscillator Variable Condenser
547	C24	365 Preselector Variable Condenser
547	C25	365 First Detector Variable Condenser
267	C26	.5 MFD. 247 Grid Bias By-pass (200 Volt)
307	C27	.0005 MFD. Subantenna Condenser
272	C28	.1 MFD. 200 Volt Grid Bias By-pass Condenser
272	C29	.1 MFD. 200 Volt Second Detector Plate By-pass

INDUCTANCES

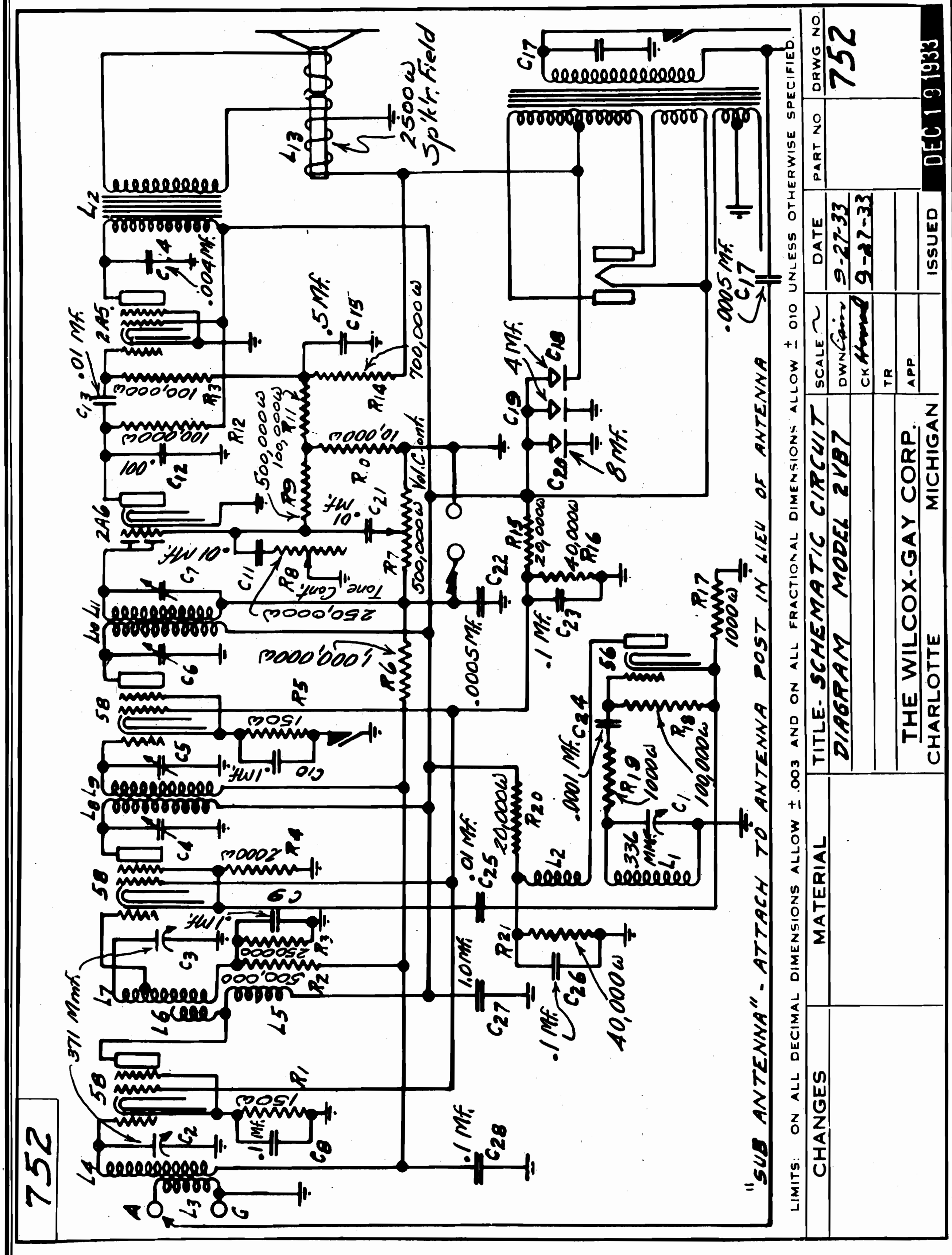
549	L1	30 Turns #36 Oscillator Coupling Winding
549	L2	83 Turns #32 Oscillator Secondary Tapped at 30 Turns
549	L3	20 Turns #36 Oscillator Plate Winding
582	L4	10 Turns #36 Ant. Coil Pri.
582	L5	115 Turns #32 Ant. Coil Sec.
179	L6	5.5 M.H. Choke Coil
588	L7	115 Turns First Detector Coil Secondary
260	L8	6,000 M.H. First I.F. Primary
260	L9	6,000 M.H. First I.F. Secondary
260	L10	6,000 M.H. Second I.F Primary
260	L11	6,000 M.H. Second I.F. Secondary
	L12	Output Transformer
	L13	2,500 Ohm Speaker Field

Connection to the speaker assembly is made through the means of four wires extending from the chassis to the speaker. These wires are color-coded and are attached to the speaker terminal board as follows:

Black - - - - - Field and ground terminal
Red - - - - - - Input Transformer Primary (B+)
White - - - - Input Transformer Primary (Pentode Plate)
Yellow - - - - Field

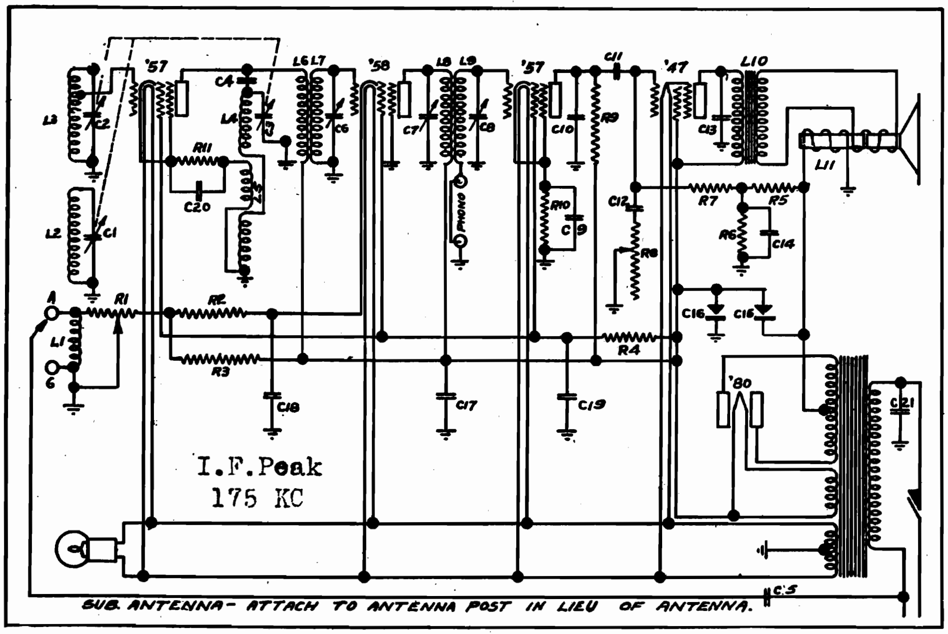
MODEL 2-VB-7
Schematic

WILCOX-GAY CORP.



MODEL 3-D-5
Schematic

WILCOX-GAY CORP.



RESISTORS

Part No.		
445	R1	10,000 Ohm Volume Control & Switch
279	R2	500 Ohm Type J Resistor First I. F. Cathode
494	R3	75,000 Ohm Type J Resistor First I. F. Cathode Feed
200	R4	100,000 Ohm Type J Resistor Screen Grid Feed
198	R5	1 Megohm Type J Resistor 247 Grid Bias Network
281	R6	330,000 Ohm Type J Resistor 247 Grid Bias Network
201	R7	500,000 Ohm Type J Resistor 247 Grid Bias
534	R8	250,000 Ohm Potentiometer Tone Control
91	R9	250,000 Ohm Type J Resistor Second Detector Plate Feed
192	R10	40,000 Ohm Type J Resistor Second Detector Cathode
280	R11	5,000 Ohm Type J Resistor First Detector Cathode
200	R12	100,000 Ohm Type J Resistor Audio Feed

CONDENSERS

547	C1	365 MMFD. Preselector Section of 3 Gang Condenser
547	C2	365 MMFD. Preselector Section of 3 Gang Condenser
547	C3	350 MMFD. Oscillator Section of 3 Gang Condenser
339	C4	.0001 MFD. R.F. Condenser
307	C5	.0005 MFD. Mica - Stamp Type S, Sub. Antenna
	C6	75 - 150 MMFD. I.F. Trimming Condenser
	C7	75 - 150 MMFD. I.F. Trimming Condenser
	C8	75 - 150 MMFD. I.F. Trimming Condenser
569	C9	.2 MFD. 300 Volt Second Dectector Cathode By-pass Condenser
516	C10	.001 MFD. 350 Volt Second Detector Plate Filter Mica
269	C11	.01 MFD. 400 Volt Audio Feed Condenser, Paper, Tubular
269	C12	.01 MFD. 400 Volt Tone Control Condenser, Paper, Tubular
516	C13	.001 MFD. 350 Volt, 247 Plate Filter, Mica
267	C14	.5 MFD. 200 Volt 247 Bias By-pass
496	C15	4 MFD. 400 Volt Working - 500 Volt Peak
496	C16	4 MFD. Micamold Type 441 W.P. Condenser
266	C17	1 MFD. 300 Volt B Supply By-pass Condenser
272	C18	.1 MFD. 200 Volt First I.F. Cathode By-pass Condenser
272	C19	.1 MFD. 200 Volt Screen By-pass Condenser
516	C20	.001 MFD. 350 Volt First Detector By-pass Mica Condenser
269	C21	.01 MFD. 400 Volt Line By-pass

INDUCTANCES

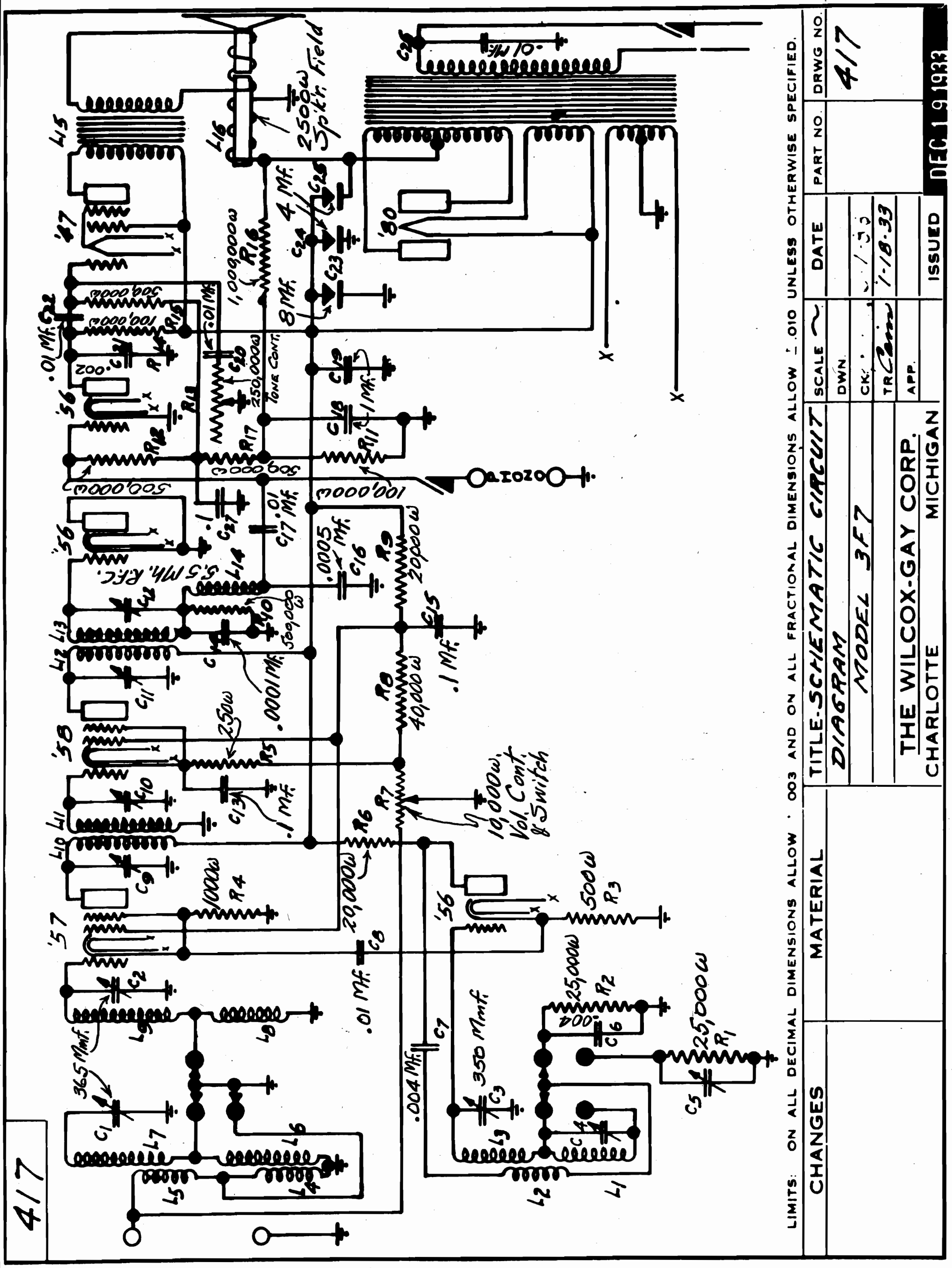
604	L1	Preselector Ant. Primary 30 Turns #36 P.E. Wire
604	L2	Preselector Ant. Secondary 90 Turns Tap at 30 T. Grid End #32 P.E.W.
514	L3	Preselector Secondary 91 Turns #32 P.E.W.
514	L4	Oscillator Secondary 87 T. Tapped at 30 Turns #32 P.E.W.
514	L5	Oscillator Coupling 5 Turns & 5 Turns #36 P. E. Wire
259	L6	First I.F. Primary 6,000 Microhenrys
259	L7	First I.F. Secondary 6,000 Microhenrys
260	L8	Second I.F. Primary 6,000 Microhenrys
260	L9	Second I.F. Secondary 6,000 Microhenrys
	L10	Output Transformer
	L11	1,000 Ohm Speaker Field

Connection to the speaker assembly is made through the means of four wires extending from the chassis to the speaker. These wires are color-coded and are attached to the speaker terminal panel as follows:

Black - - - - - Field and ground terminal
Red - - - - - - Input Transformer Primary (B+)
White - - - - Input Transformer Primary (Pentode Plate)
Yellow - - - - Field

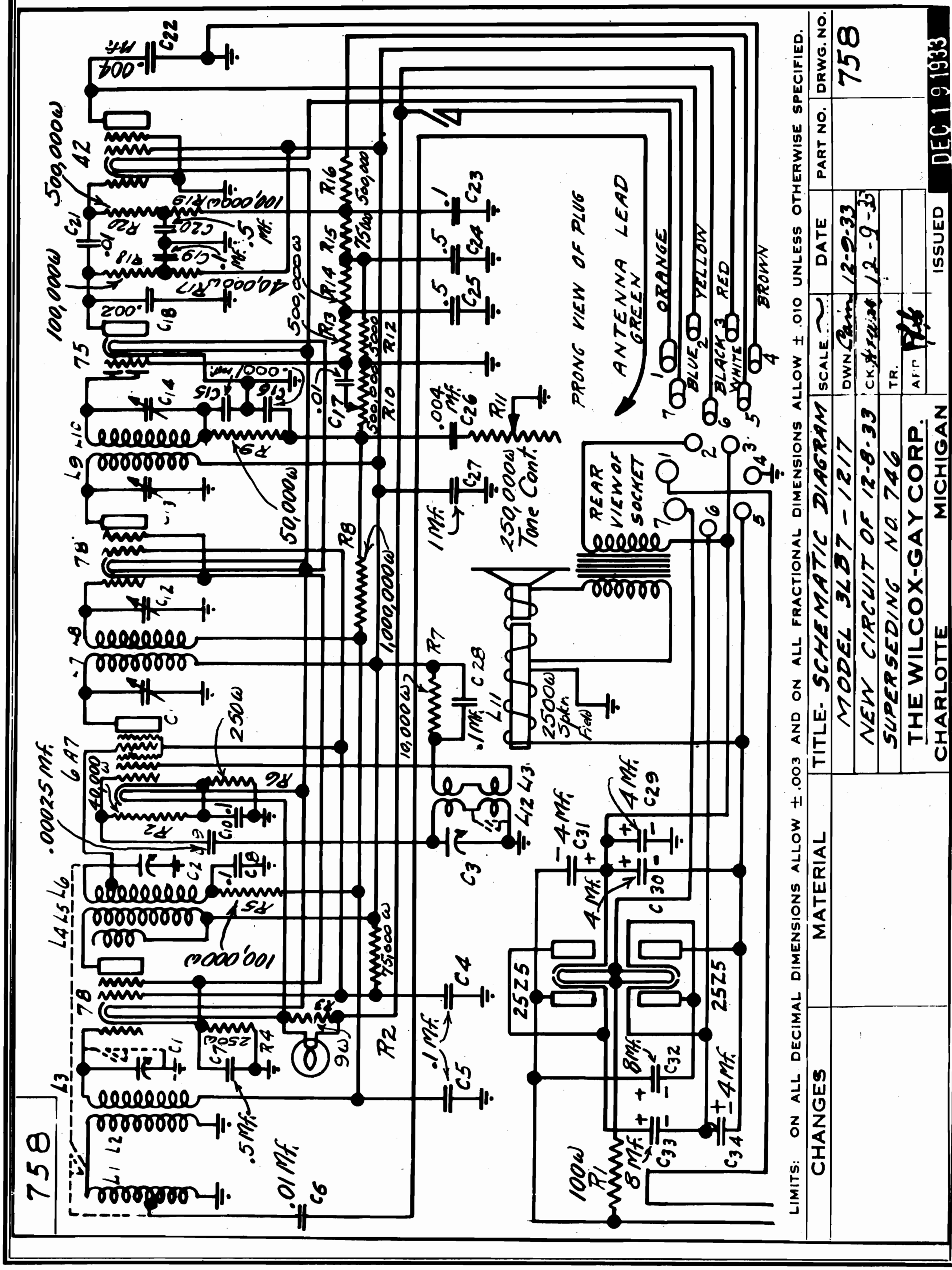
MODEL 3-F-7
Schematic

WILCOX-GAY CORP.



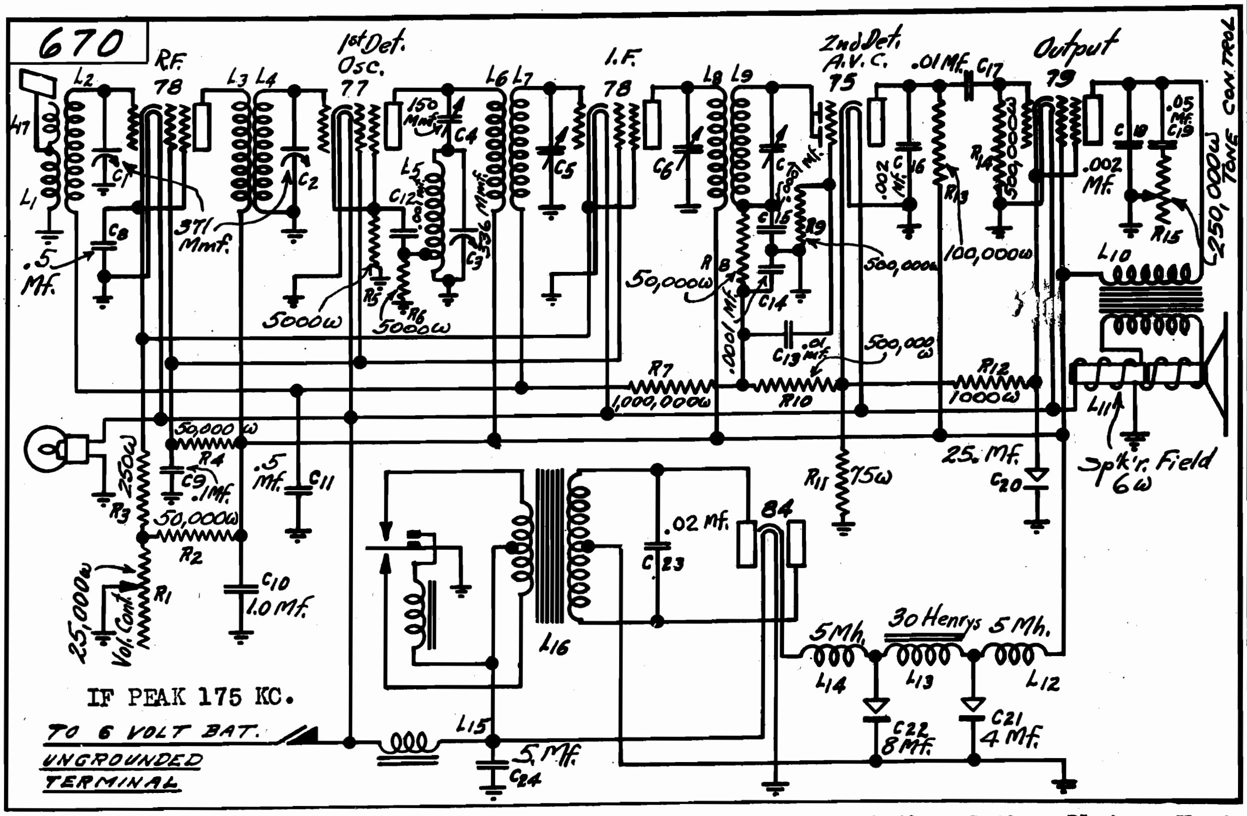
MODEL 3-LB-7
Schematic

WILCOX-GAY CORP.



MODEL 3-R-6
Schematic

WILCOX-GAY CORP.



	Cath. to Plate	Cath. to Screen	Cath. to Ground	Plate Current MA	Heater Volts
78	180	80	2	4	6.3
77	180	80	4	58	6.3
78	180	80	2	4	6.3
75	120	--	2	1	6.3
89	180	180	17	20	6.3

Volume Control full on.

R. F. Adjustment:

The three R. F. trimming condensers are adjusted at 1400 K. C. Proceed as follows:

Procure a modulated oscillator giving a signal at 1400 K. C.

Remove the cover of the case, couple the out-put of the oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 K.C.

Place the oscillator and receiver in operation and adjust the oscillator out-put so that a weak signal is heard in the loudspeaker when the volume control is at its maximum position.

Then adjust the trimming condensers starting with C 3, C 2 and then C 1 until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments.

A more accurate adjustment can be made with an out-put meter.

I. F. Adjustment:

The four I. F. trimming condensers are adjusted at 175 K. C. Proceed as follows:

Procure a modulated oscillator giving a signal at 175 K. C., a non-metalic screw driver and an out-put meter.

Remove the bottom, top, cap, drive pulley and the speaker leads and remove the chassis.

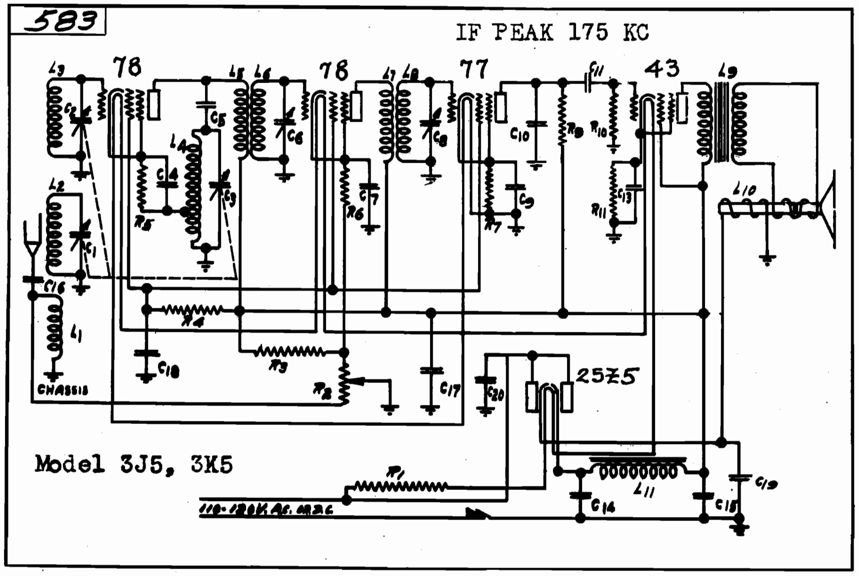
Reconnect the speaker. Connect the oscillator out-put between the first detector grid and ground. Connect out-put meter.

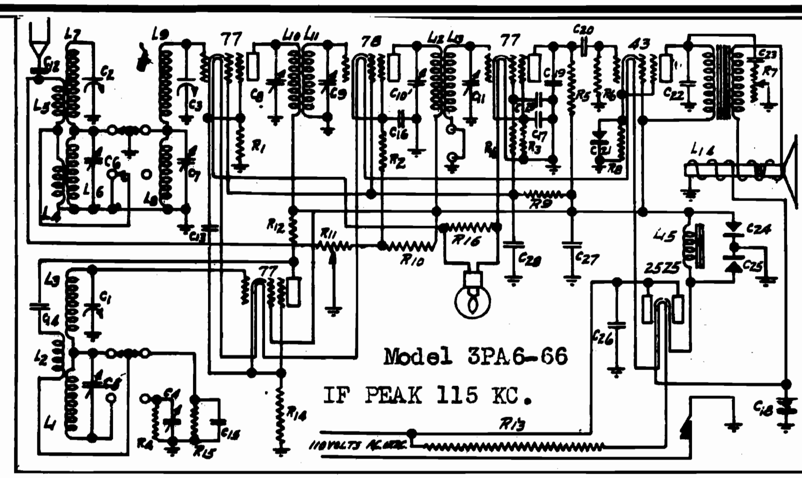
Adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the oscillator out-put until a small deflection is obtained. Unless this is done the action of the A.V.C. will make it impossible to obtain correct adjustments.

Trim in order C 4, C 5, C 6 and C 7, repeat adjustments and then follow with the R. F. adjustments.

WILCOX-GAY CORP.

MODEL 3-J-5,3-K-5 Schematic
MODEL 3-PA-6-66 Schematic





Model 3J5, 3K5

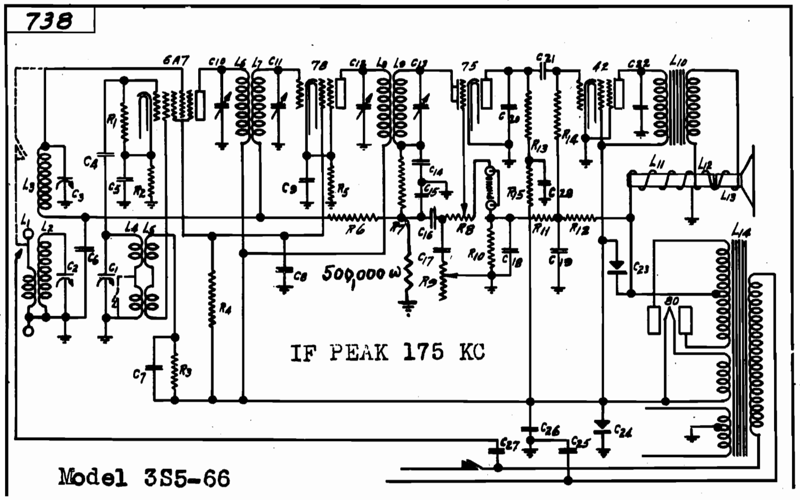
Code	Part No.	RESISTORS
R1	809	170 Ohm Filament Resistor In Power Cord
R2	853	10,000 Ohm Volume Control and Switch
R3	922	75,000 Ohm Resistor I.F. Cathode Feed
R4	921	40,000 Ohm Resistor Screen Feed
R5	919	5,000 Ohm Resistor First Detector & Oscillator Cathode
R6	1063	500 Ohm Resistor I.F. Cathode Feed
R7	941	20,000 Ohm Resistor Second Detector Cathode
R8		
R9	924	250,000 Ohm Resistor Second Detector Plate Load
R10	925	500,000 Ohm Resistor Output Grid Bias
R11	1063	500 Ohm Resistor 43 Bias
		CONDENSERS
C1	833	365 MMFD. Preselector Section of Variable Condenser
C2	833	365 MMFD. Preselector Section of Variable Condenser
C3	833	350 MMFD. Oscillator Section of Variable Condenser
C4	265	.001 MFD. First Detector & Oscillator Cathode Condenser
C5	264	.00005 MFD. Oscillator Coupling Condenser
C6	477	75-150 MMFD. First I.F. Trimmer Condenser
C7	272	.1 MFD. I.F. Cathode By-pass Condenser
C8	849	75-150 MMFD. Second I.F. Trimmer Condenser
C9	569	.2 MFD. Second Detector Cathode
C10	265	.001 MFD. Second Detector Plate R.F. Filter
C11	269	.01 MFD. Audio Feed Condenser
C12		
C13	928	25 MFD. C. Bias By-pass
C14	965	12 MFD. Voltage Filter Condenser
C15	965	4 MFD. Voltage Filter Condenser
C16	265	.001 MFD. Antenna Series Condenser
C17	267	.5 B Supply By-pass Condenser
C18	272	.1 200 Volt Screen By-pass Condenser
C19	965	4 MFD. Voltage Filter Condenser
C20	272	.1 MFD. 200 Volt Line By-pass Condenser
		INDUCTANCES
L1	847	Preselector Primary 178 Turns #36 S.S.E. U.W.
L2	847	Preselector First Secondary 128 Turns #36 S.S.E. U.W.
L3	847	Preselector Second Secondary 133 Turns #36 S.S.E. U.W.
L4	938	Oscillator Coil 98 Turns Tapped 15 Turns #36 S.S.E.
L5	938	First I.F. Primary 650 Turns #36 S.S.E. U.W.
L6	938	First I.F. Secondary 650 Turns #36 S.S.E. U.W.
L7	937	Second I.F. Primary 650 Turns #36 S.S.E. U.W.
L8	937	Second I.F. Secondary 650 Turns #36 S.S.E. U.W.
L9		Single #43 Output Transformer
L10	917	3,000 Ohm Speaker Field
L11	940	32 Henry Choke

Model 3PA6-66

Code	Part No.	RESISTORS
R1	919	5,000 Ohm First Detector Cathode
R2	1062	250 Ohm I. F. Cathode
R3	1003	15,000 Ohm Second Detector Cathode
R4	1042	25,000 Ohm Long Wave Oscillator Grid
R5	924	250,000 Ohm Second Detector Plate
R6	925	500,000 Ohm 43 Grid
R7	534	250,000 Ohm Tone Control
R8	1063	500 Ohm 43 Cathode
R9	921	40,000 Ohm Screen Feed
R10	922	75,000 Ohm I. F. Cathode Feed
R11	512	10,000 Ohm Volume Control & Switch
R12	941	20,000 Ohm Oscillator Plate Feed
R13	1125	130 Ohm Resistance in Power Cord
R14	1064	600 Ohm Oscillator Cathode
R15	1042	25,000 Ohm Broadcast Oscillator Grid
R16	924	250,000 Ohm Second Detector Screen
R17	1119	36 Ohm Pilot Light Shunt Resistor
		CONDENSERS
C1	833	26 - 336 MMFD. Oscillator Section of 3 Gang
C2	833	26 - 371 MMFD. Preselector Section of 3 Gang
C3	833	26 - 371 MMFD. Preselector Section of 3 Gang
C4	784	4 Plate Long Wave Oscillator Trimmer
C5	972	2 Plate Long Wave Oscillator Trimmer
C6	971	2 Plate First Preselector Trimmer
C7	971	2 Plate Second Preselector Trimmer
C8	993	75 - 150 MMFD. First I.F. Primary Trimmer
C9	994	75 - 150 MMFD. First I.F. Secondary Trimmer
C10	995	75 - 150 MMFD. Second I.F. Primary Trimmer
C11	996	75 - 150 MMFD. Second I.F. Secondary Trimmer
C12	269	.01 Antenna Coupling Condenser
C13	269	.01 Oscillator Feed Condenser
C14	269	.01 Mfd. Oscillator Plate Condenser
C15	503	.004 Mfd. Broadcast Oscillator Condenser
C16	272	.1 Mfd. I.F. Cathode By-pass Condenser
C17	569	.2 Mfd. Second Detector Cathode By-pass Condenser
C18	1085	4. Mfd. Dry Electrolytic Filter Condenser
C19	544	.001 Mfd. Second Detector Plate Filter Condenser
C20	269	.01 Mfd. Audio Feed Condenser
C21	928	25 Mfd. Electrolytic 43 Cathode 30 Volt Tubular
C22	503	.004 Mfd. 43 Plate Filter Condenser
C23	272	.1 Mfd. Tone Control Condenser
C24	1085	4 Mfd. Dry Electrolytic Condenser
C25	1085	12 Mfd. Dry Electrolytic Condenser
C26	272	.1 Mfd. Power Line By-pass Condenser
C27	266	1. Mfd. B Supply By-pass Condenser
C28	267	.5 Mfd. Screen By-pass Condenser
C29	269	.01 Mfd. Second Detector Screen By-pass Condenser
		INDUCTANCES
L1	782	Long Wave Oscillator Secondary 1975 Microhenries
L2	782	Long Wave & Broadcast Oscillator Primary 10 Turns #36 P.E.
L3	782	Long Wave Oscillator Secondary 97 Turns #32 P.E.
L4	781	Long Wave First Preselector Primary U.W. 800 Turns #36 S.S.E.
L5	976	Broadcast First Preselector Primary U.W. 178 Turns #36 S.S.E.
L6	781	Long Wave First Preselector Secondary U.W. 3380 Microhenries
L7	976	Broadcast First Preselector Secondary 139 Turns #32 S.S.E.
L8	781	Long Wave Second Preselector Secondary 3380 Microhenries
L9	976	Broadcast Second Preselector Secondary 132 Turns #36 S.S.E.
L10	999	25,000 Microhenries First I.F. Primary U.W.
L11	999	25,000 Microhenries First I.F. Secondary U.W.
L12	1156	14,000 Microhenries Second I.F. Primary U.W.
L13	1156	14,000 Microhenries Second I.F. Secondary U.W.
L14	917	3,000 Ohm Speaker Field
L15	940	20 Henry Choke

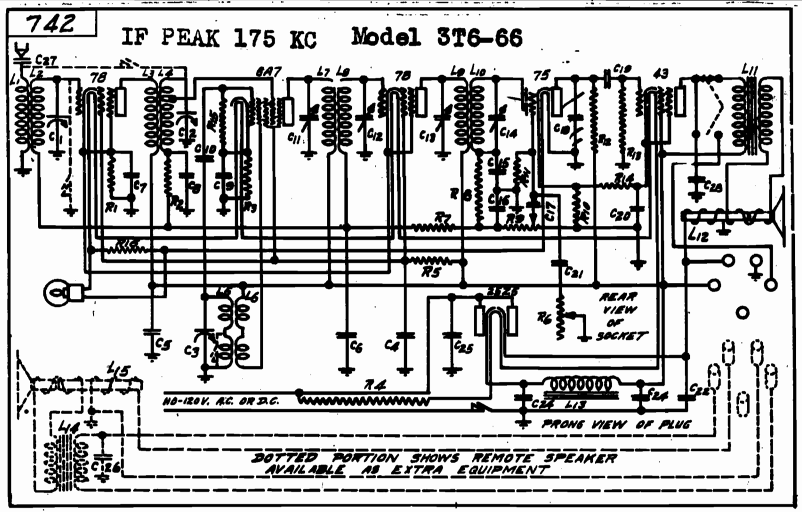
MODEL 3-S5-66
Schematic
MODEL 3T6-66
Schematic

WILCOX-GAY CORP.



Model 3S5-66

Code	Part No.	RESISTORS
R1	921	40,000 Ohm Oscillator Grid Leak
R2	1062	250 Ohm 6A7 Cathode Resistor
R3	920	10,000 Ohm Oscillator Feed Resistor
R4	898	50,000 Ohm 6A7 & 78 Screen Feed Resistor
R5	1063	500 Ohm 78 Cathode Resistor
R6	926	1 Megohm A.V.C. Network Resistor
R7	898	50,000 Ohm A.V.C. Network Filter Resistor
R8	535	500,000 Ohm Volume Control & A. C. Switch
R9	534	250,000 Ohm Tone Control
R10	919	5,000 Ohm Bias Network Resistor
R11	922	75,000 Ohm Bias Network Resistor
R12	926	1 Megohm Bias Network Resistor
R13	924	250,000 Ohm 75 Plate Resistor
R14	925	500,000 Ohm 42 Grid Resistor
R15	898	50,000 Ohm 75 Plate Resistor
		CONDENSERS
C1	833	336 MMFD. Oscillator Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	371 MMFD. Preselector Section of Tuning Condenser
C4	268	.00025 MFD. Oscillator Coupling Condenser
C5	272	.1 MFD. 6A7 Cathode By-pass Condenser
C6	272	.1 MFD. A.V.C. By-pass Condenser
C7	272	.1 MFD. Oscillator Feed By-pass Condenser
C8	272	.1 MFD. 6A7 & 78 Screen By-pass Condenser
C9	272	.1 MFD. 78 Cathode By-pass Condenser
C10	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C11	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C12	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C13	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C14	339	.0001 Diode Filter Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	269	.01 MFD. Second Detector Feed Condenser
C17	269	.01 MFD. Tone Control Condenser
C18	928	25 MFD. A.V.C. Network By-pass Condenser
C19	569	.2 MFD. 42 Bias By-pass Condenser
C20	516	.001 MFD. 75 Plate Filter Condenser
C21	269	.01 MFD. Audio Feed Condenser
C22	1132	.002 MFD. 42 Plate Filter Condenser 600 Volt
C23	496	4 MFD. B Filter Condenser
C24	496	4 MFD. B Filter Condenser
C25	269	.01 MFD. Line By-pass Condenser
C26	794	1 MFD. B Supply By-pass Condenser
C27	307	.0005 MFD. Sub. Antenna Condenser
C28	272	.1 MFD. 75 Plate Hum Filter Condenser
		INDUCTANCES
L1	1109	Antenna Coil Primary 178 Turns #36 S.S.E.
L2	1109	Antenna Coil Secondary 136 Turns #36 S.S.E.
L3	1109	Preselector Secondary 126 Turns #36 S.S.E.
L4	1111	Oscillator Secondary 72 and 50 Turns #36 D.D.C.
L5	1111	Oscillator Primary 35 Turns and 15 Turns #36 S.S.E.
L6	1101	8,000 Microhenries First I.F. Primary
L7	1101	8,000 Microhenries First I.F. Secondary
L8	1101	8,000 Microhenries Second I.F. Primary
L9	1101	8,000 Microhenries Second I.F. Secondary
L10		Single 42 Output Transformer
L11		3,000 Ohm Speaker Field
L12		Hum Bucking Coil
L13		Speaker Voice Coil
L14	1068	Power Transformer 115 Volts A. C. 60 Cycle

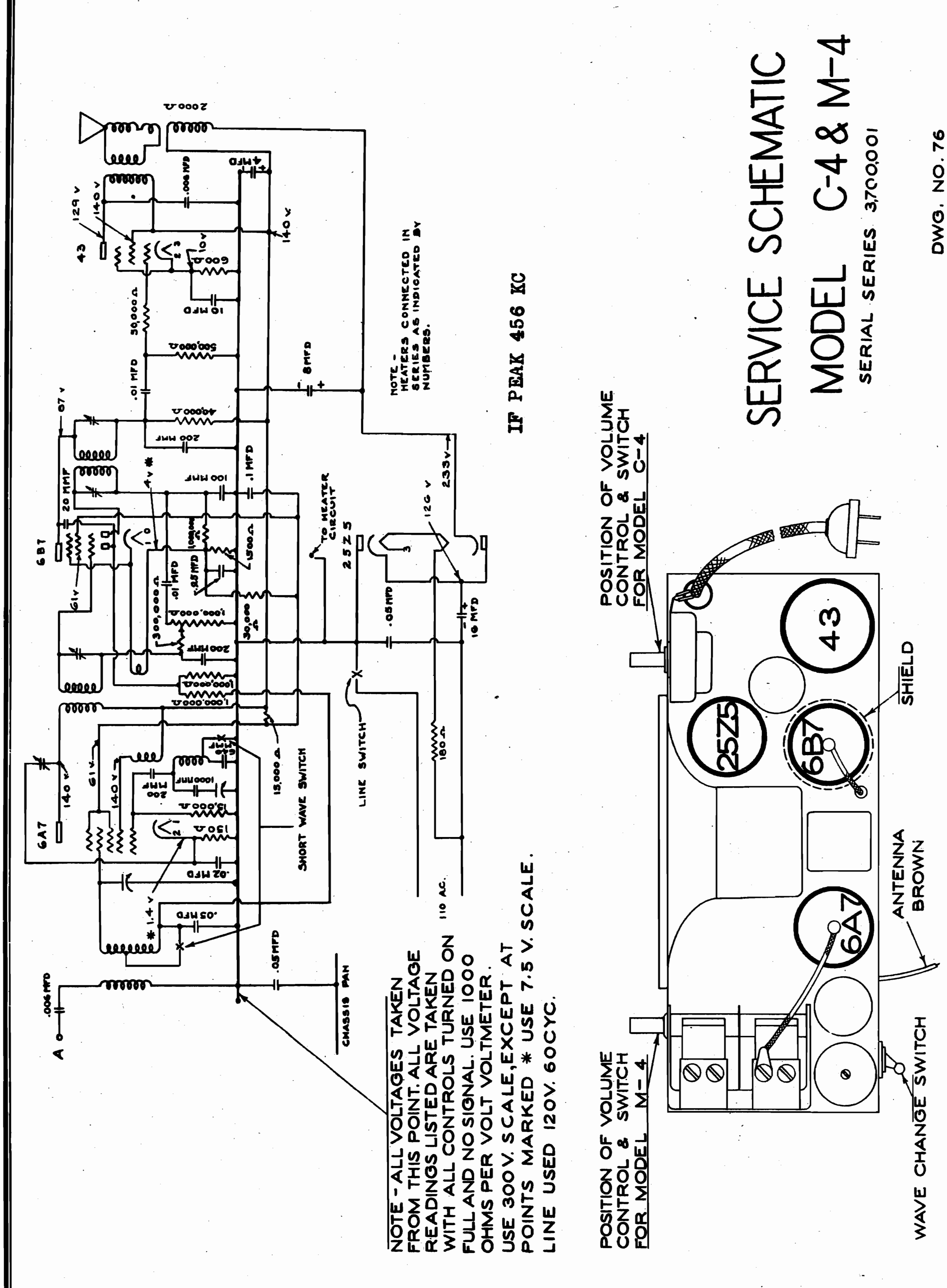


Model 3T6-66

Code	Part No.	RESISTORS
R1	1062	250 Ohm R.F. & I.F. Cathode & Screen Resistor
R2	923	100,000 Ohm A.V.C. Network Resistor
R3	1062	250 Ohm 6A7 Cathode Resistor
R4	1125	130 Ohm Resistor In Power Cord
R5	941	20,000 Ohm 78 & 6A7 Screen Feed Resistor
R6	534	250,000 Ohm Tone Control
R7	926	1 Megohm A.V.C. Network Resistor
R8	898	50,000 Ohm A.V.C. Network Filter Resistor
R9	535	500,000 Ohm Volume Control & Power Switch
R10	1122	40 Ohm Bias Network Resistor
R11	925	500,000 Ohm 75 Grid Leak Resistor
R12		,000 Ohm 75 Plate Resistor
R13	925	500,000 Ohm 43 Grid Resistor
R14	1063	500 Ohm Bias Resistor
R15	921	40,000 Ohm Oscillator Grid Leak Resistor
R16	1119	36 Ohm Pilot Light Shunt Resistor
		CONDENSERS
C1	833	371 MMFD. Preselector Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	336 MMFD. Oscillator Section of Tuning Condenser
C4	272	.1 MFD. 78 & 6A7 Screen By-pass Condenser
C5	266	1. MFD. B By-pass Condenser
C6	272	.1 MFD. A.V.C. Network By-pass Condenser
C7	272	.1 MFD. R.F. & I.F. Cathode By-pass Condenser
C8	272	.1 MFD. First Detector R.F. By-pass Condenser
C9	272	.1 MFD. 6A7 Cathode By-pass Condenser
C10	268	.00025 MFD. Oscillator Coupling Condenser
C11	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C12	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C13	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C14	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	339	.0001 MFD. Diode Filter Condenser
C17	269	.01 MFD. First Detector Feed Condenser
C19	269	.01 MFD. Audio Feed Condenser
C20	928	25 MFD. 43 Cathode Electrolytic By-pass Condenser
C21	269	.01 MFD. Tone Control Condenser
C22	1085	4 MFD. Dry Electrolytic Condenser
C23	1085	4 MFD. Dry Electrolytic Condenser
C24	1085	11 MFD. Dry Electrolytic Condenser
C25	272	.1 MFD. Line By-pass Condenser
C26	1085	19 MFD. Dry Electrolytic Condenser
C27	269	.01 MFD. Antenna Series Condenser
C28		MFD. Output Plate Filter Condenser
		INDUCTANCES
L1	1138	Preselector Primary 450 Turns #36 S.S.E.
L2	1138	Preselector Secondary 144 Turns #36 D.D.C.
L3	1137	Detector Coil Primary 750 Turns #36 S.S.E.
L4	1137	Detector Coil Secondary 118 Turns & 77 Turns #36 D.D.C.
L5	1111	Oscillator Secondary 72 Turns & 50 Turns #36 D.D.C.
L6	1111	Oscillator Primary 35 Turns & 15 Turns #36 S.S.E.
L7	1101	8,000 Microhenries First I.F. Primary
L8	1101	8,000 Microhenries First I.F. Secondary
L9	1101	8,000 Microhenries Second I.F. Primary
L10	1101	8,000 Microhenries Second I.F. Secondary
L11		#43 Output Transformer
L12		3,000 Ohm Speaker Field
L13	940	20 Henry Choke
L14		#43 Output Transformer
L15		2,500 Ohm Speaker Field

THE RUDOLPH WURLITZER CO.

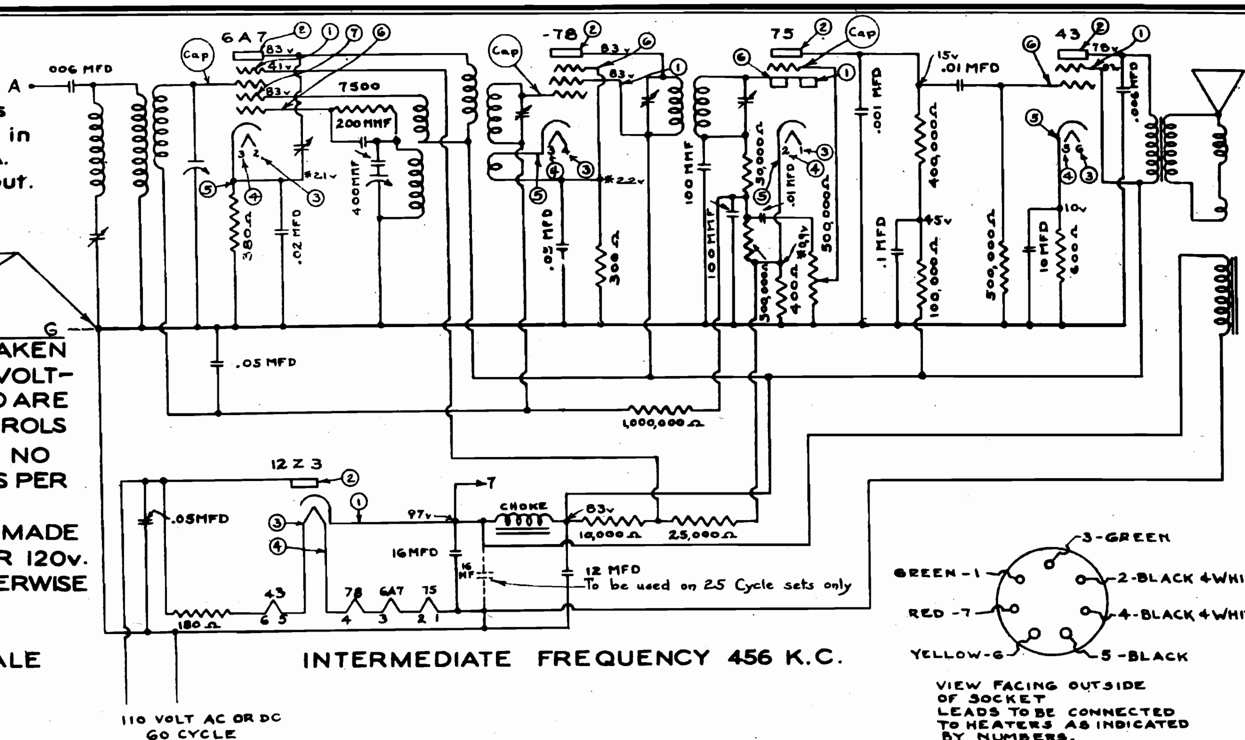
MODEL C-4, M-4
Schematic, Data



MODEL P-5
Schematic, Data

THE RUDOLPH WURLITZER CO.

Note—Numbers in circles indicate tube elements in accordance with R.C.A. Radiotron pinbase layout.

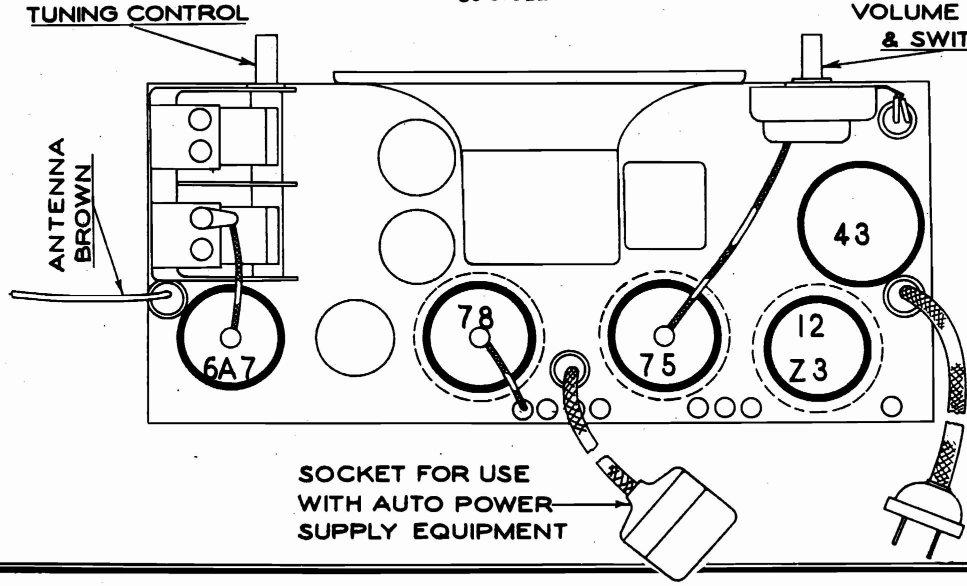


Chassis Pan

NOTE-ALL VOLTAGES TAKEN FROM THIS POINT. ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER.
ALL MEASUREMENTS MADE WITH 1000 ω/v. METER 120v. SCALE UNLESS OTHERWISE SPECIFIED.
LINE VOLTAGE = 115v.
* INDICATES 10v. SCALE

INTERMEDIATE FREQUENCY 456 K.C.

VIEW FACING OUTSIDE OF SOCKET
LEADS TO BE CONNECTED TO HEATERS AS INDICATED BY NUMBERS.



IMPORTANT

WHEN USING D.C. IF SET DOES NOT OPERATE AFTER TUBES ARE HEATED, REVERSE PLUG TO GET PROPER POLARITY.

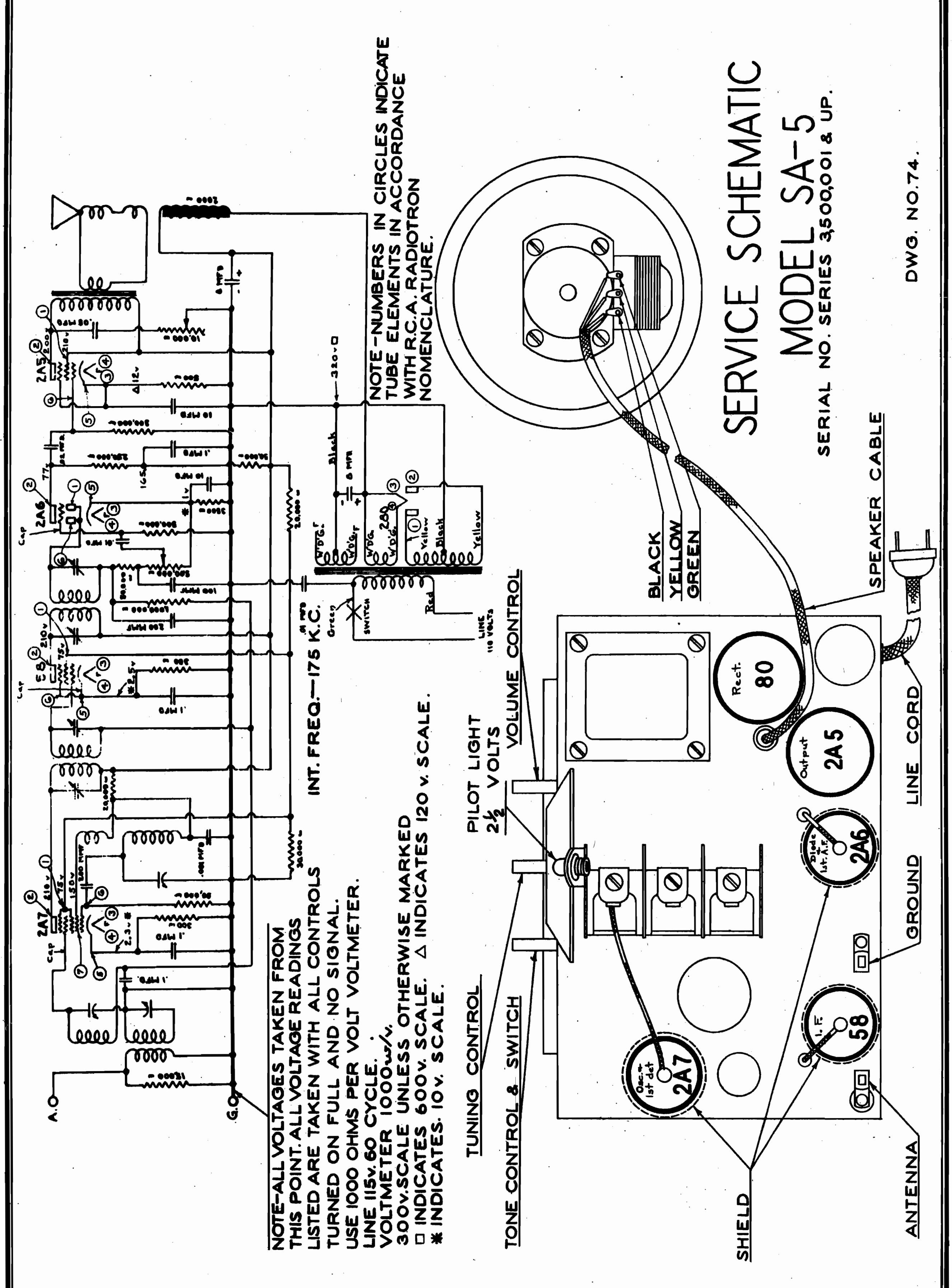
SERVICE SCHEMATIC MODEL P-5

SERIAL NO. SERIES 3,900,001 & UP

DWG. NO. 78

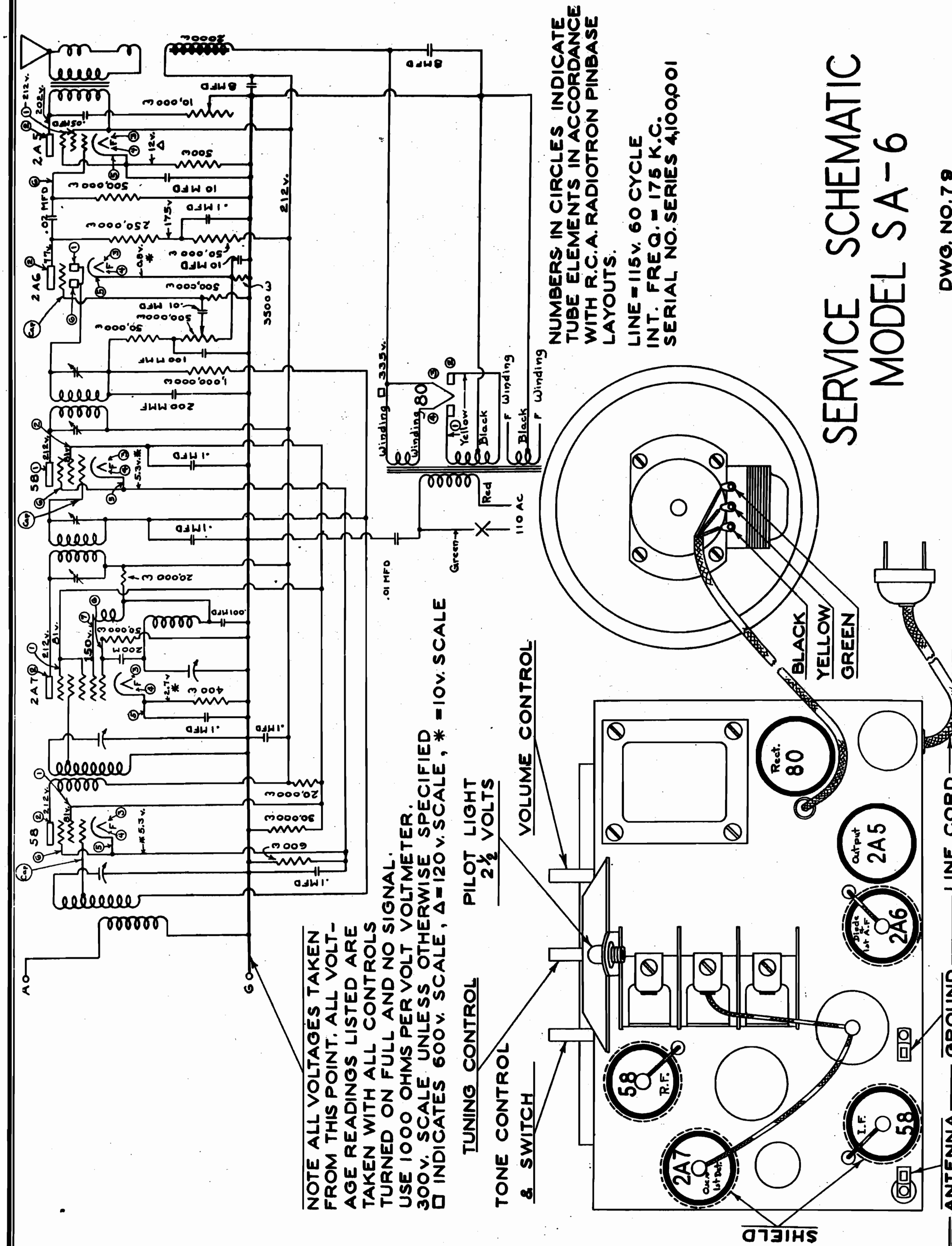
MODEL SA-5
Schematic, Data

THE RUDOLPH WURLITZER CO.



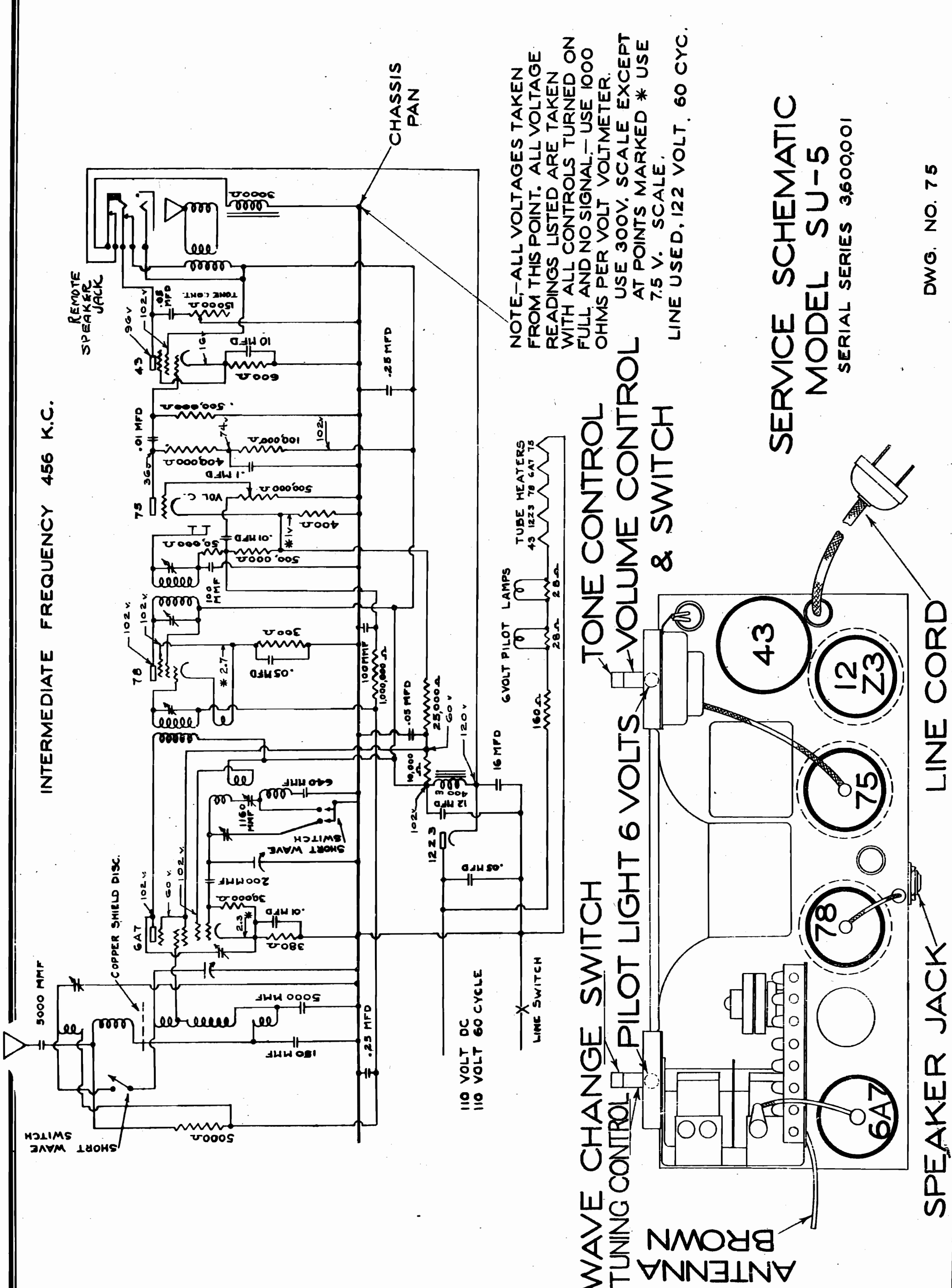
MODEL SA-6
Schematic, Data

THE RUDOLPH WURLITZER CO.



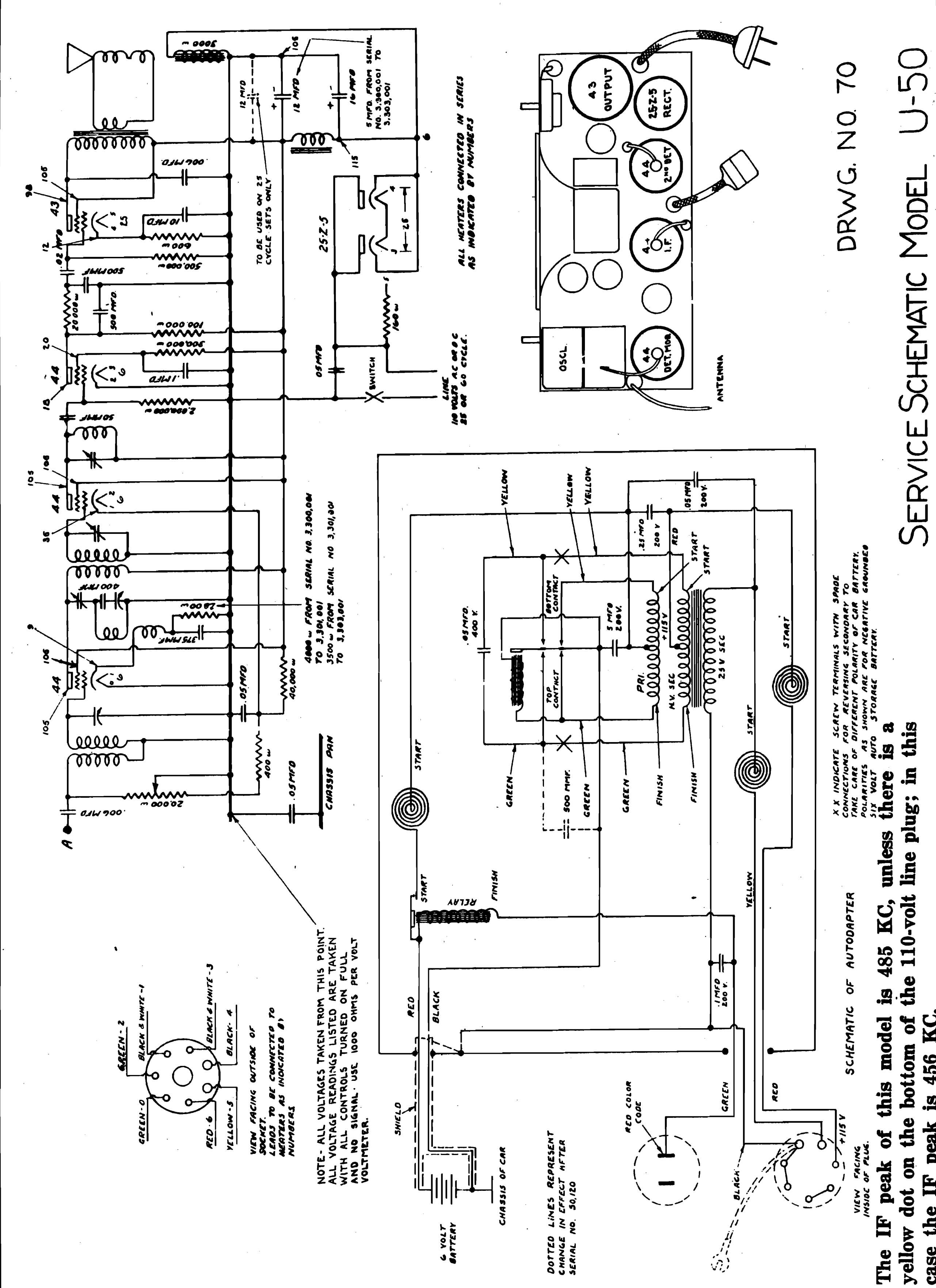
THE RUDOLPH WURLITZER CO.

MODEL SU-5
Schematic, Data



MODEL U-50
Schematic,Data

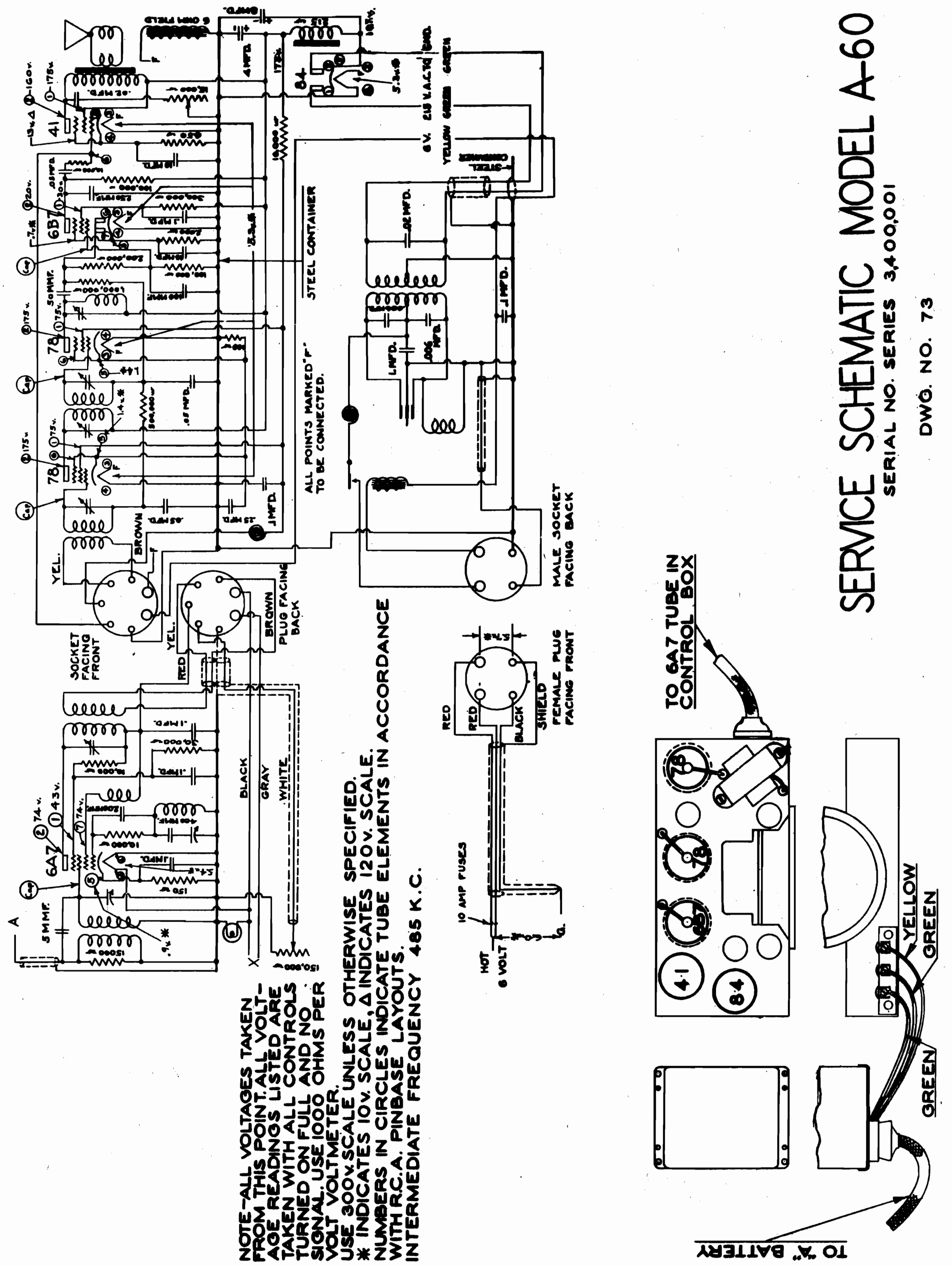
THE RUDOLPH WURLITZER CO.



The IF peak of this model is 485 KC, unless there is a yellow dot on the bottom of the 110-volt line plug; in this case the IF peak is 456 KC.

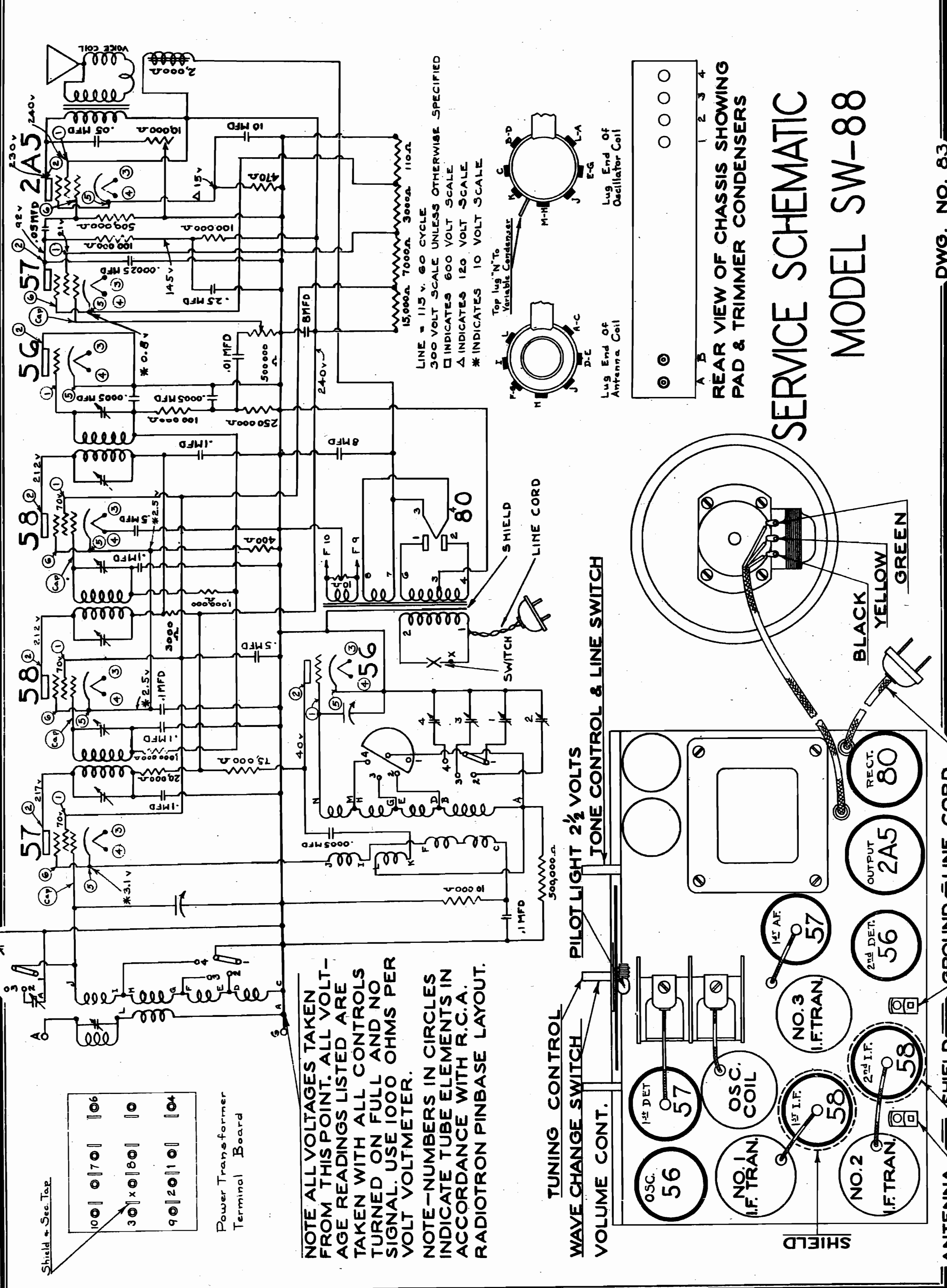
THE RUDOLPH WURLITZER CO.

MODEL A-60
Schematic, Data



MODEL SW-88
Schematic, Data

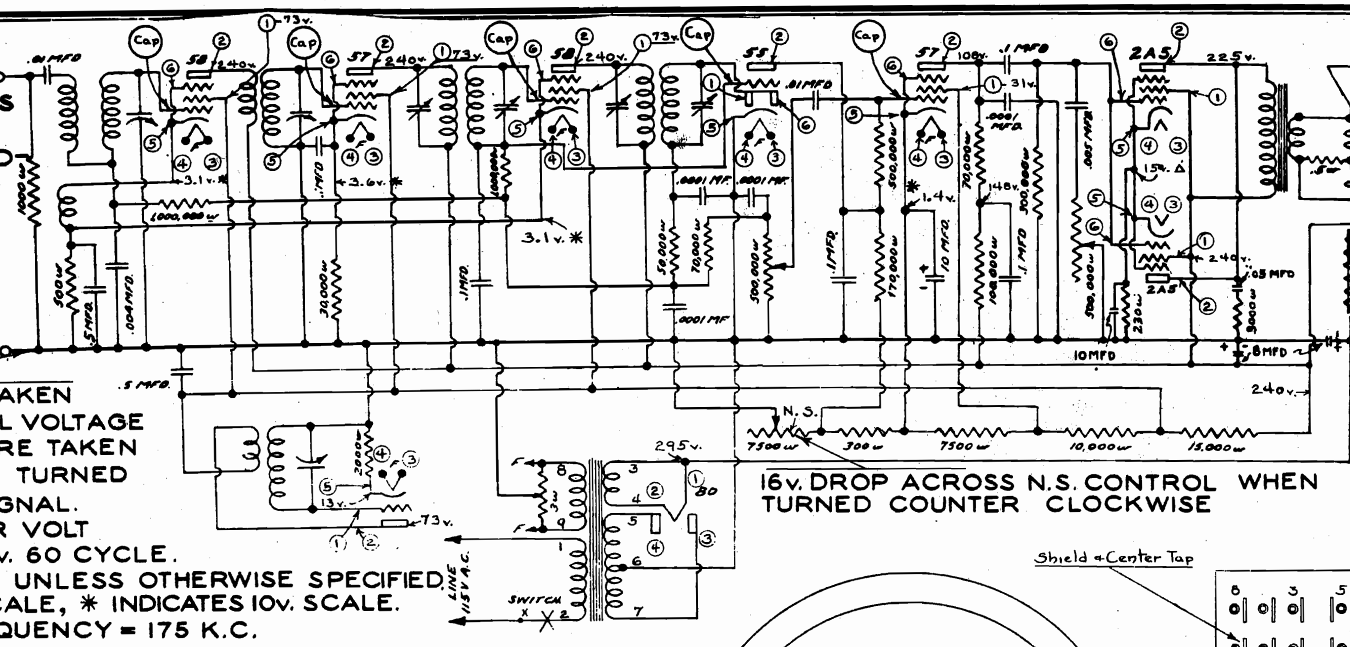
THE RUDOLPH WURLITZER CO.



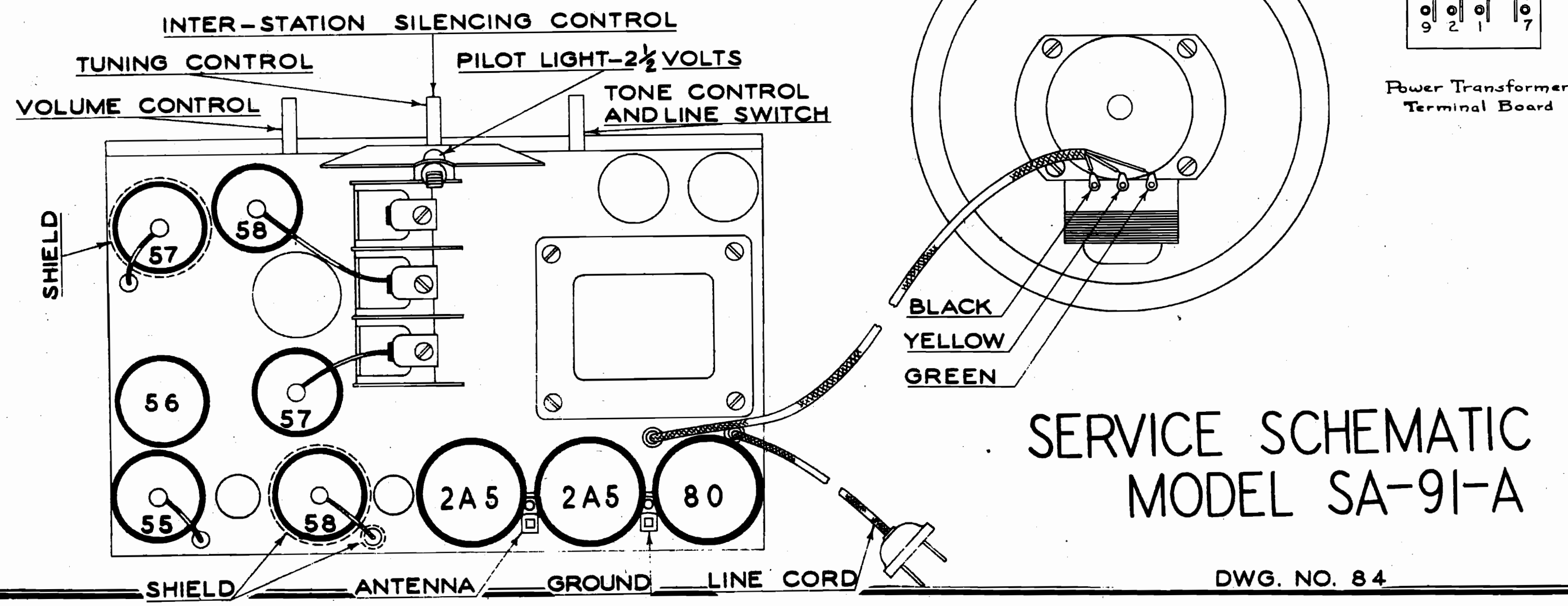
MODEL SA-91-A
Schematic, Data

THE RUDOLPH WURLITZER CO.

NUMBERS IN CIRCLES INDICATE TUBE ELEMENTS IN ACCORDANCE WITH R.C.A. RADIOTRON PINBASE LAYOUT.



NOTE–ALL VOLTAGES TAKEN FROM THIS POINT. ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL.
USE 1000 OHMS PER VOLT VOLTMETER. LINE 115v. 60 CYCLE.
USE 300 VOLT SCALE UNLESS OTHERWISE SPECIFIED.
Δ INDICATES 120v. SCALE, * INDICATES 10v. SCALE.
INTERMEDIATE FREQUENCY = 175 K.C.

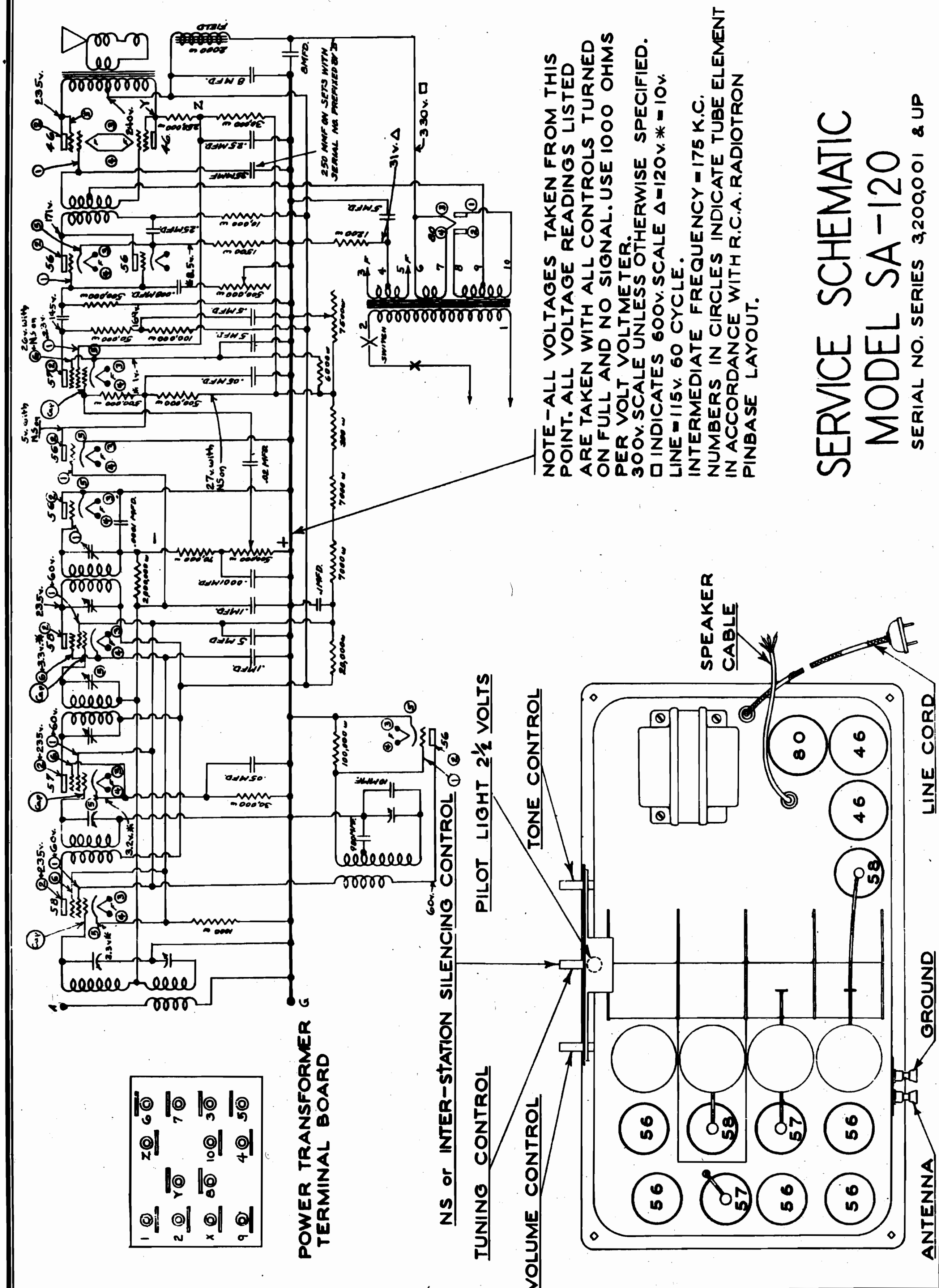


SERVICE SCHEMATIC MODEL SA-91-A

DWG. NO. 84

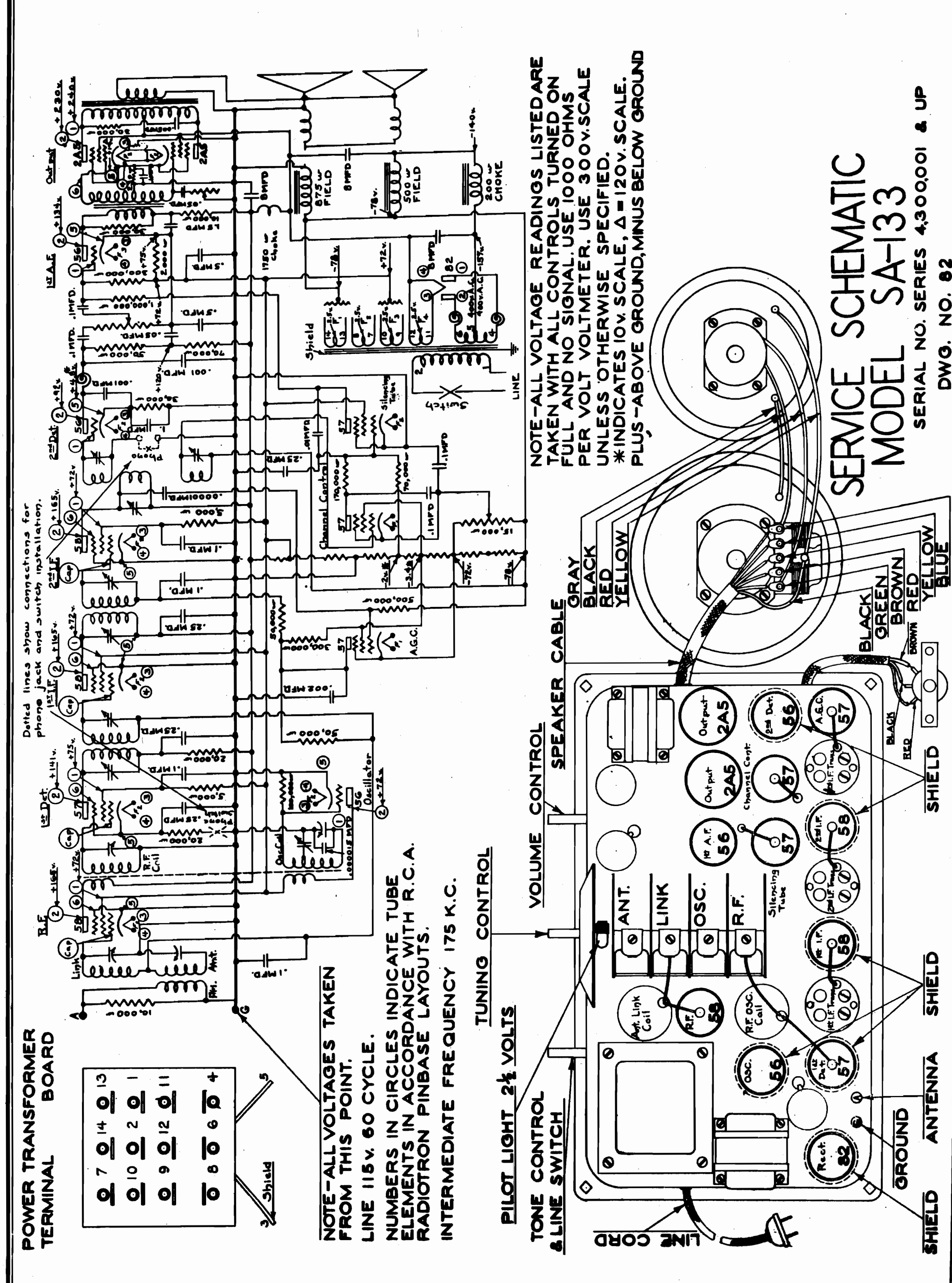
MODEL SA-120
Schematic, Data

THE RUDOLPH WURLITZER CO.



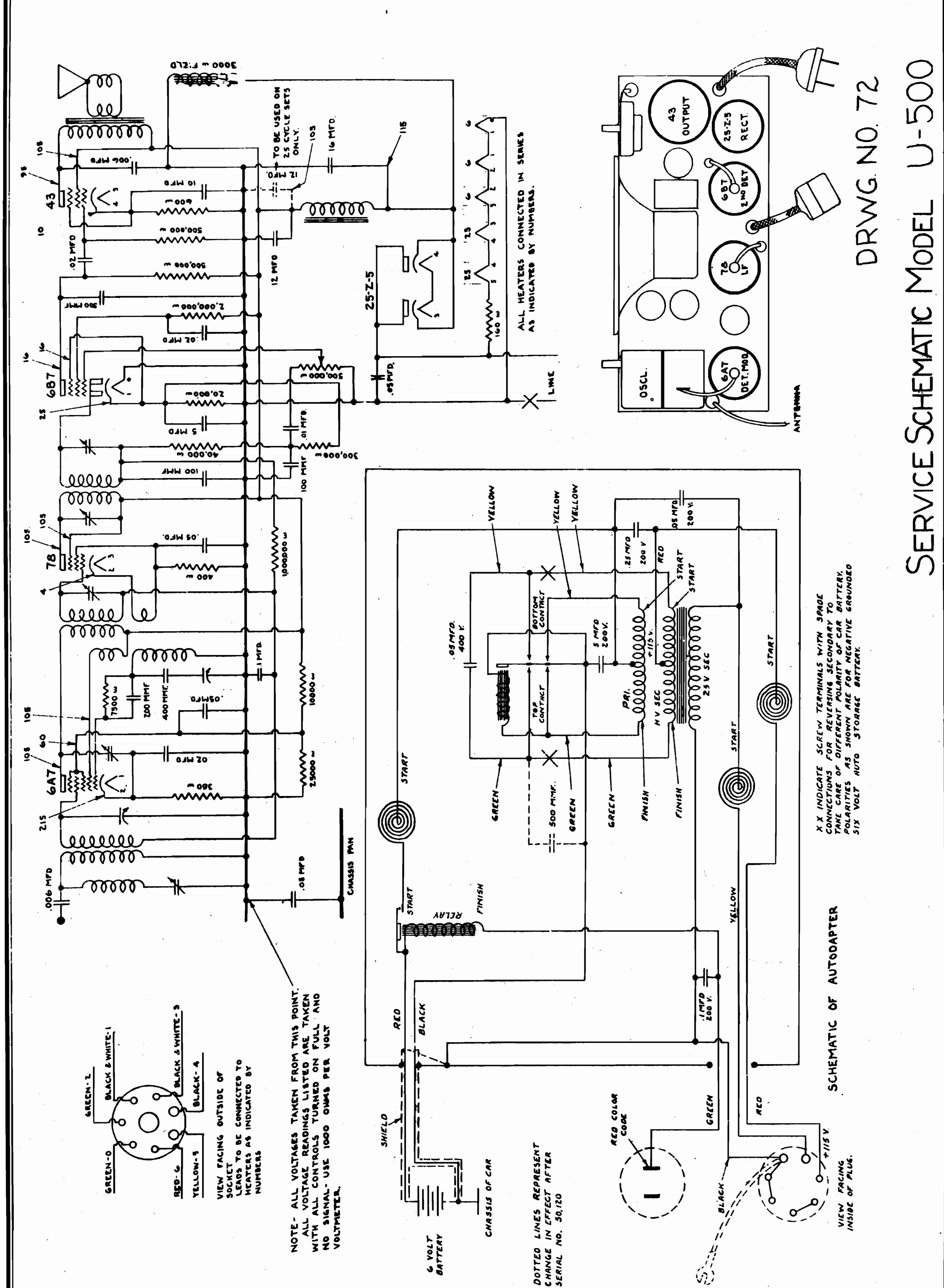
MODEL SA-133
Schematic, Data

THE RUDOLPH WURLITZER CO.



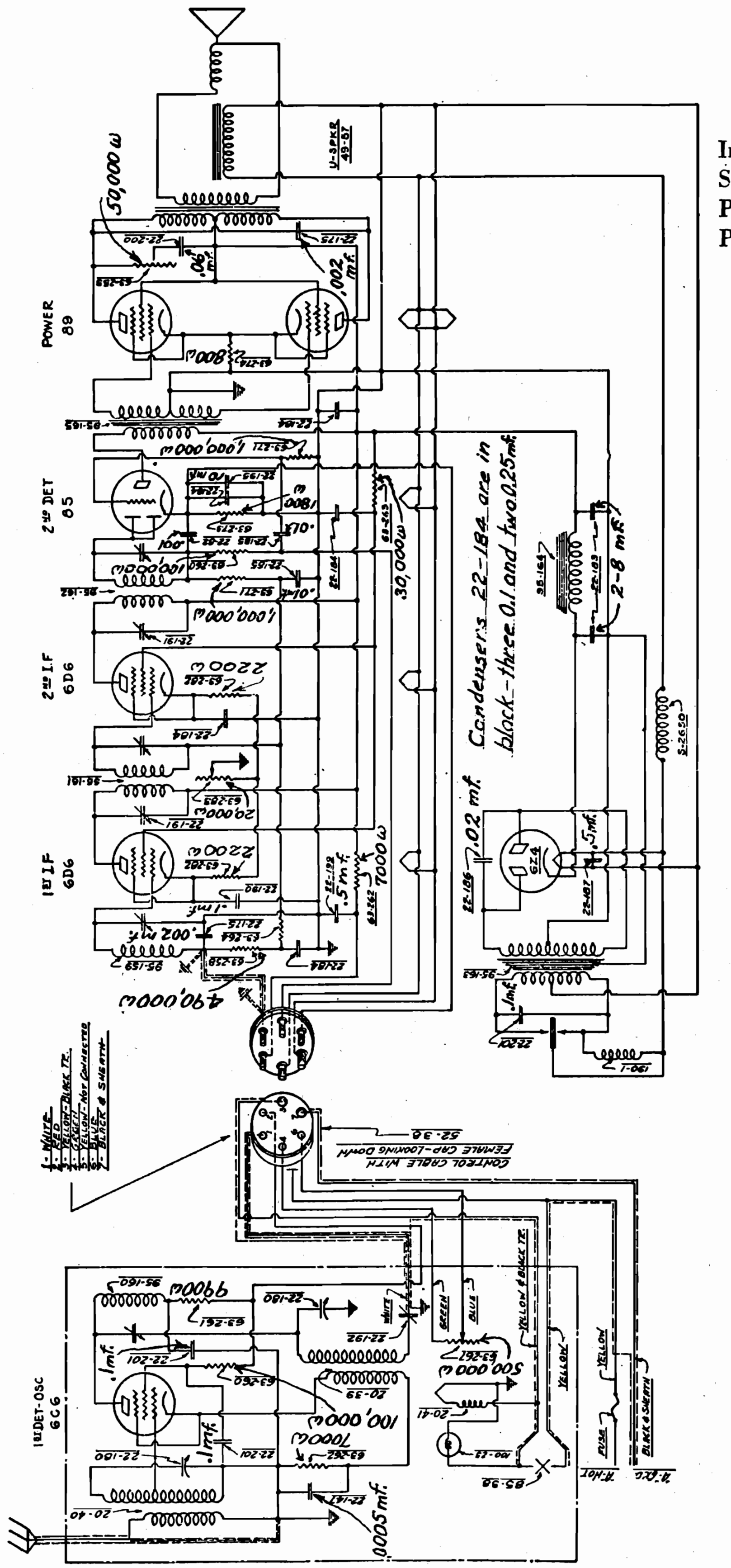
MODEL U-500
Schematic, Data

THE RUDOLPH WURLITZER CO.



ZENITH RADIO CORP.

MODEL 460
Schematic
Voltage



Intermediate Frequency	485 K.C.
Sensitivity in Microvolts	1.5
Power in Milliwatts	2200
Power Consumption in Watts	36

TUBE OPERATING VOLTAGES

Position	Tube	Ef	Ek	Eg^1	Eg^2	Eg^3	Ep
1st Detector	6C6	4.8	6.5	0	6.5	120	150
1st I.F. Amp.	6D6	5.3	10.5	*	10.5	103.5	165
2nd I.F. Amp.	6D6	5.3	10.5	*	10.5	103.5	165
2nd Detector	85	5.3	8.	0	—	—	156
P. P. Audio	89	5.3	17.	0	17.	165	165
	89	5.3	17.	0	17.	165	165

f—Filament. k—Cathode. g^1—Control grid. g^2—Suppressor grid. g^3—Screen grid. p—Plate.
*Depends on applied signal strength. All voltages measured from indicated points to ground.

MODEL 460
Socket, Trimmers
Alignment

ZENITH RADIO CORP.

If the receiver is entirely inoperative the fuse should be examined. It is contained in an insulated holder at the "Hot" battery terminal. Be sure to replace the spaghetti insulator over the fuse if necessary to change it. The next important step is to very carefully check the tubes both in the control head and speaker chassis. This has been found to be the most common cause of service in an auto receiver. The extreme vibration to which the tubes are subjected will occasionally develop a short in the elements in spite of the precautions that have been taken in their construction. A loud hum and lack of sensitivity can usually be attributed to a defective 6C6. Microphonic howl can be traced to the 89's. Replacement is recommended for such complaints, since the average tube checker will not show up this condition. An intermittent cutting out accompanied with rasping and other noises will usually be found in either of the 6D6's. The chassis may be taken out for inspection by simply removing the cable plug and three round-head hexagon nuts on the front of the case.

Alignment

Every Zenith Automobile receiver is balanced on an accurate, temperature controlled crystal oscillator before leaving the factory and unless a part is changed or the calibration has shifted, the adjustments should not be tampered with. Where it is absolutely necessary, however, a good test oscillator capable of delivering a modulated signal at 1500, 600 and 485 K.C. will be required.

To balance the I.F. circuit remove the cap and lead from the grid of the 6C6 tube in the control head and attach the test oscillator to the grid and to ground. Set to 485 K.C. and first adjust the primary I.F. trimmer shown (A) in Figure 1. Next trim the secondary (B). Now turn the plate trimmer (C) on the side of the chassis base to resonance, with a No. 4 Spintite wrench. Its (2nd I.F.) transformer is directly above the adjustment. Set the screw (D) in the top of the transformer shield to resonance also. The third I.F. transformer is adjusted through a hole in the rear of the chassis and also on top of the transformer indicated at E and F. This completes the I.F. circuit. Replace the grid lead on the 6C6 and screw the metal cap back in position.

Next attach the test oscillator to the antenna and ground lead of the control head and set it to 1500 K.C. Remove the control head cover and set the variable condenser trimmers (G and H) to a point where the 1500 K.C. signal is loudest at that frequency on the dial. Then set the test oscillator to 600 K.C. and rock the dial slowly at that frequency; at the same time turn the padder condenser adjusting screw. This trimmer is reached by removing the button plug on the bottom of the control head. The adjustments should be gone over twice to insure greater precision.

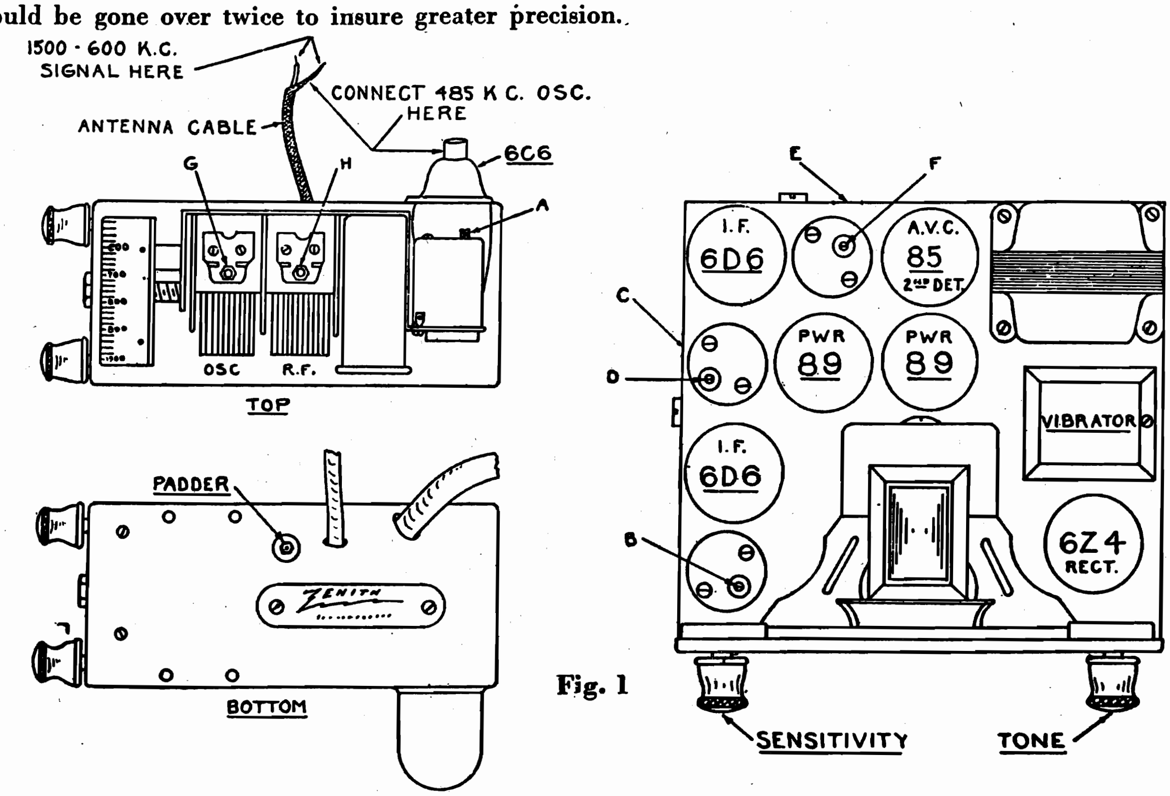
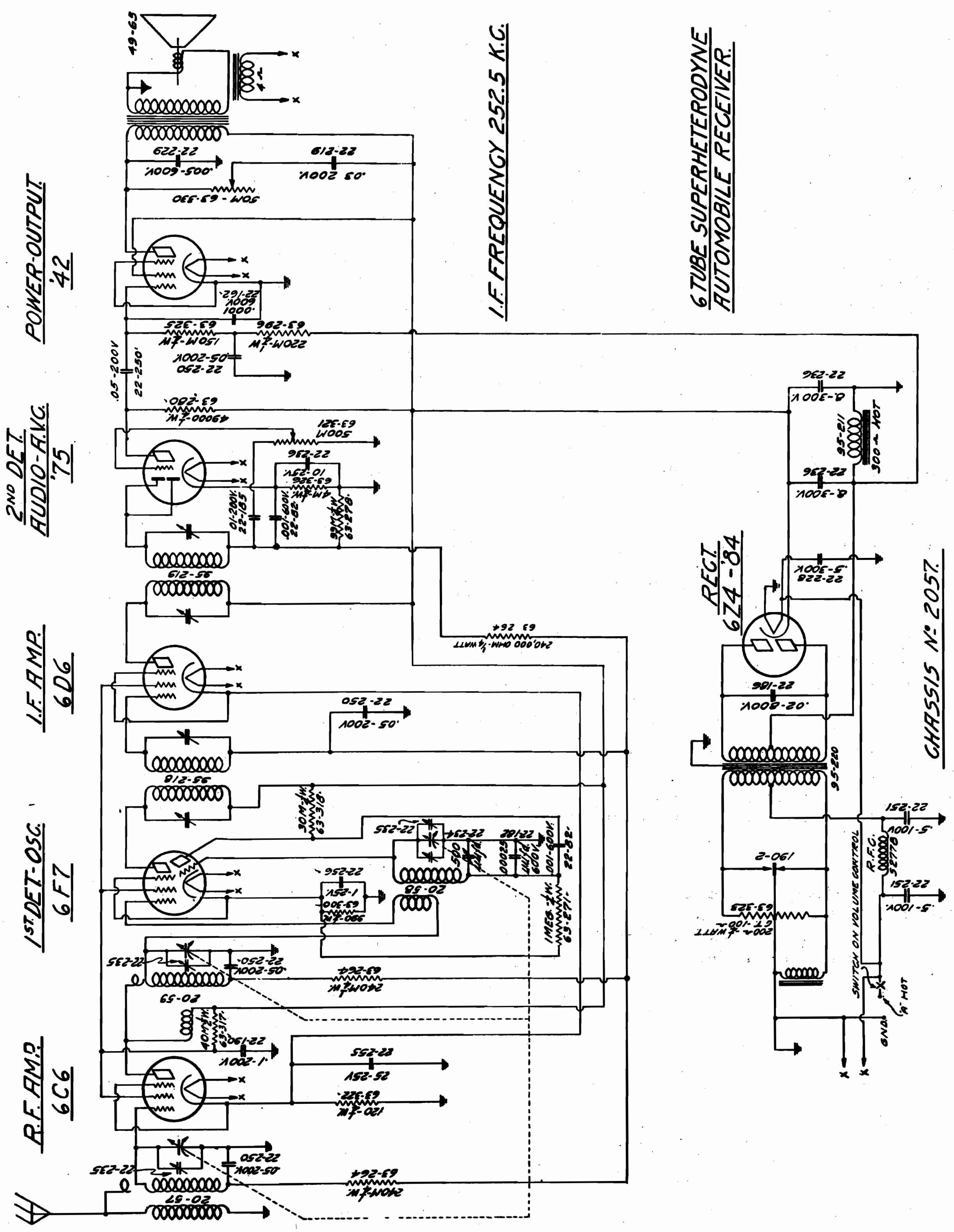


Fig. 1

MODEL 462
Chassis 2057
Schematic

ZENITH RADIO CORP.



Intermediate Frequency—252½ K.C.
Sensitivity in Microvolts—1
Power Output in Milliwatts—2500
Power consumption—40 watts at 6 volts.

February 8, 1934

MODEL 462
Chassis 2057
Voltage, Socket
Alignment Data

ZENITH RADIO CORP.

Position	Tube	Ef	Ek	Eg[1]	Eg[2]	Eg[3]	Ep
R. F. Amplifier	6C6	5.6	1.5	*	1.5	72	174
1st Det.-Osc.	6F7	5.6	3.5	0	3.5	72	Det. 174 Osc. 130
I. F. Amplifier	6D6	5.6	1.5	*	1.5	72	174
2nd Det. A. V. C.	75	5.6	1.2	0	0	—	156
Power Amp.	42	5.6	0	—11.5	0	174.6	165
Rectifier	6Z4	5.6	174.6	—	—	—	—

f—Filament; k—Cathode; g[1]—Control Grid; g[2]—Suppressor Grid; g[3]—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts.

Alignment

Every Zenith automobile receiver is balanced on an accurate crystal controlled oscillator before leaving the factory; and, unless a part is changed or the calibration has shifted, the adjustments should never be tampered with. Where it is absolutely necessary, however, a good test oscillator capable of delivering a modulated signal at 1500, 600 and 252½ K. C. will be essential.

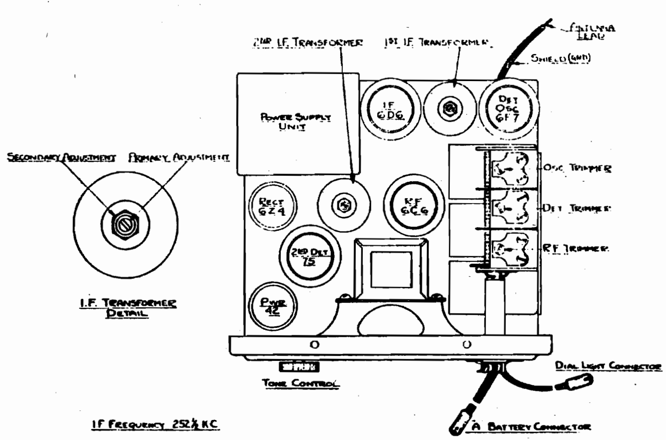
Before attempting to make any adjustments, the dial indicator must be set to 540 K. C. with the tuning condenser plates in full mesh. This is done as follows:

1. Turn control knob toward the left until the stop is reached.
2. Remove tuning knob.
3. Loosen two set screws in tuning shaft bushing (under knob).
4. Turn bushing until dial reads 540 K. C.
5. Tighten set screws and replace tuning knob.

The receiver may now be aligned and will dial accurately when the operation is completed.

To balance the I.F. circuit, remove the grid lead from the 6F7 and connect the 252½ K.C. test oscillator signal to the grid of the tube and to ground. Adjust the 1st I.F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I.F. transformer. This completes the I.F. circuit. Place the grid lead back on the 6F7 tube.

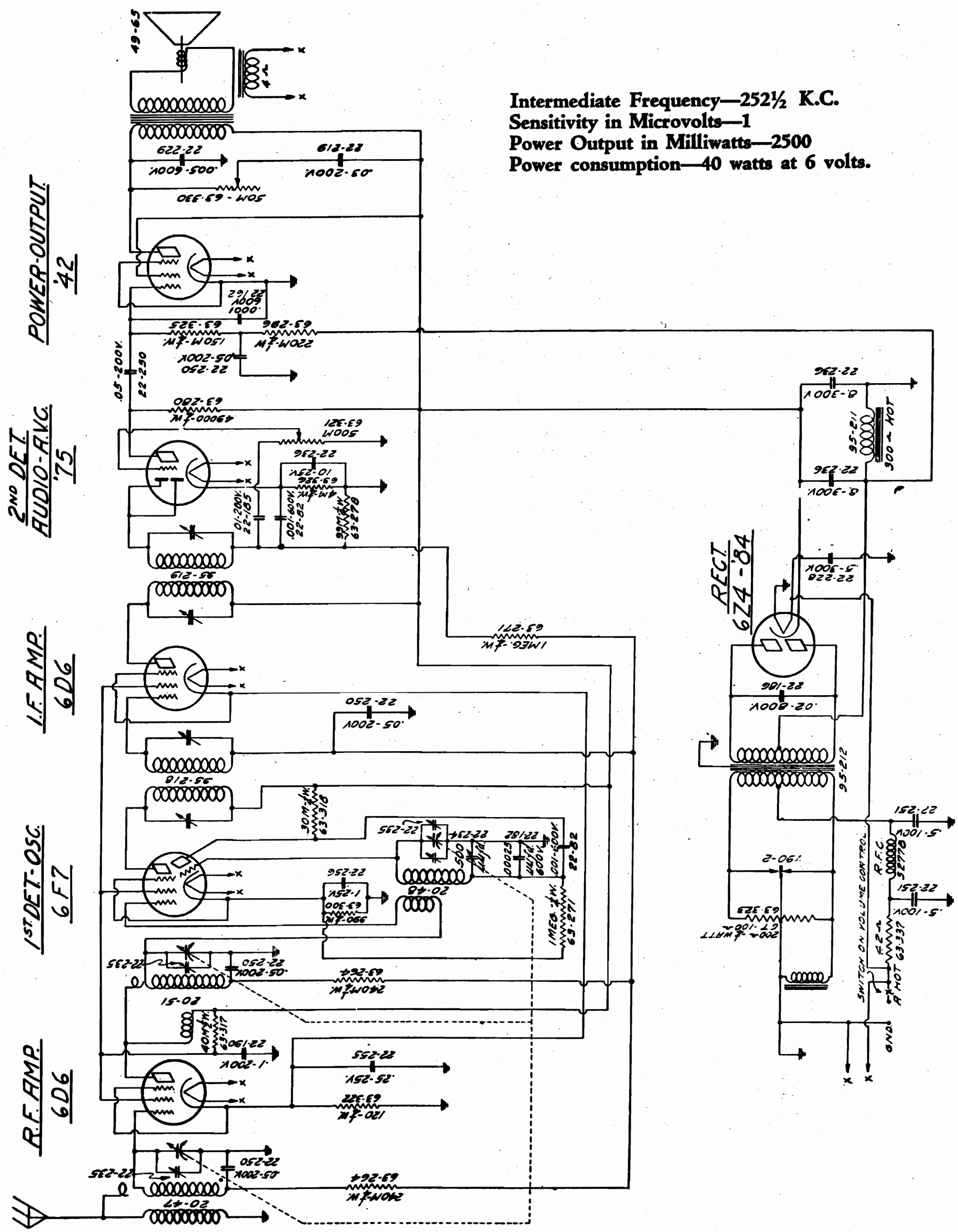
Next attach the test oscillator to the antenna and ground leads and set it to 1500 K.C. Turn the dial indicator to 1500 and adjust the oscillator, detector and R.F. trimmers, on the condenser gang, for maximum output. Set the test oscillator to 600 K.C. and rock the pointer slowly over the same frequency on the dial at the same time adjust the padder condenser for greatest signal strength. All adjustments should be gone over twice—at least twice—to insure greatest accuracy.



MODELS 650-HD, 651-HE, 660-TD, 661-TE
Terraplane Hudson
Schematic

ZENITH RADIO CORP.

Intermediate Frequency—252½ K.C.
Sensitivity in Microvolts—1
Power Output in Milliwatts—2500
Power consumption—40 watts at 6 volts.



January 2, 1934

MODELS 650-HD, 651-HE,
660-TD, 661-TE
Terraplane Hudson
Voltage, Socket, Alignment

ZENITH RADIO CORP.

Position	Tube	Ef	Ek	Eg[1]	Eg[2]	Eg[3]	Ep
R. F. Amplifier	6D6	5.6	1.5	*	1.5	72	174
1st Det.-Osc.	6F7	5.6	3.5	0	3.5	72	Det. 174 Osc. 130
I. F. Amplifier	6D6	5.6	1.5	*	1.5	72	174
2nd Det. A. V. C.	75	5.6	1.2	0	0	—	156
Power Amp.	42	5.6	0	—11.5	0	174.6	165
Rectifier	6Z4	5.6	174.6	—	—	—	—

f—Filament; k—Cathode; g[1]—Control Grid; g[2]—Suppressor Grid; g[3]—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts.

Alignment

Every Zenith automobile receiver is balanced on an accurate crystal controlled oscillator before leaving the factory; and, unless a part is changed or the calibration has shifted, the adjustments should never be tampered with. Where it is absolutely necessary, however, a good test oscillator capable of delivering a modulated signal at 1500, 600 and 252½ K. C. will be essential.

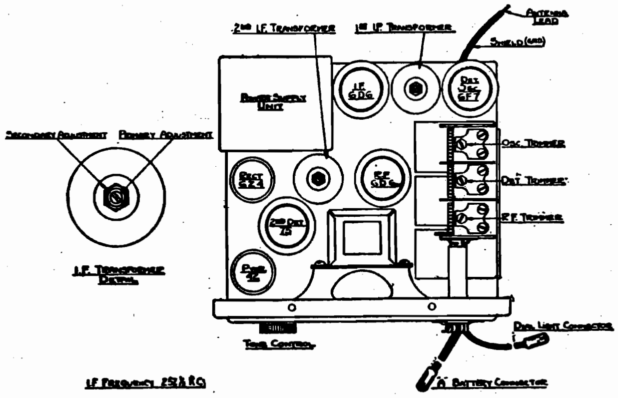
Before attempting to make any adjustments, the dial indicator must be set to 540 K. C. with the tuning condenser plates in full mesh. This is done as follows:

1. Turn control knob toward the right until the stop is reached.
2. Remove pilot lamp from rear of control head.
3. Reach through pilot lamp hole with a small screwdriver and turn indicator screw until indicator points to 540 K.C.

The receiver may now be aligned and will dial accurately when the operation is completed.

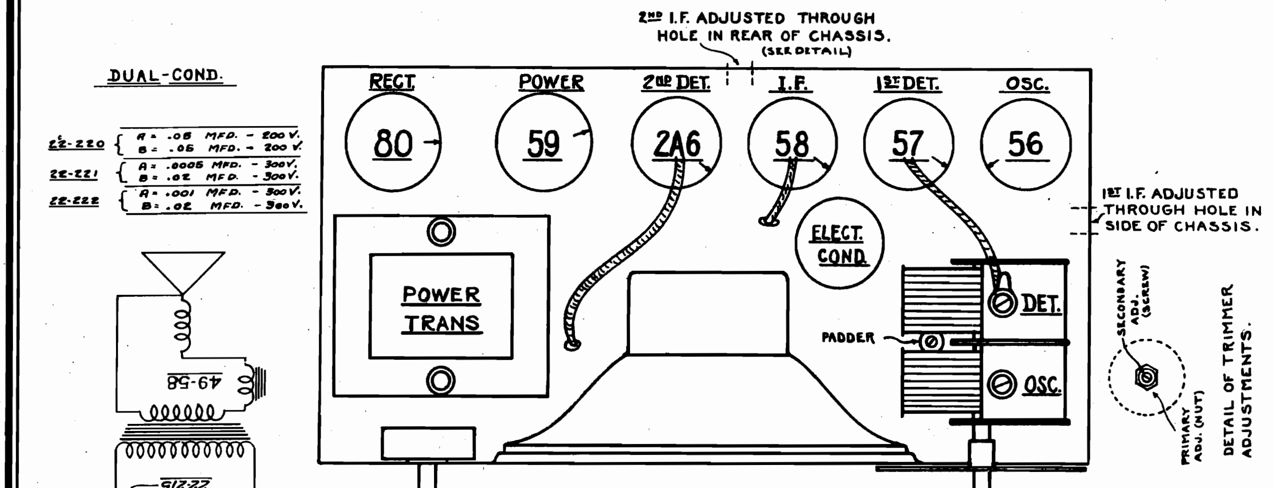
To balance the I.F. circuit, remove the grid lead from the 6F7 and connect the 252½ K.C. test oscillator signal to the grid of the tube and to ground. Adjust the 1st I.F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I.F. transformer. This completes the I.F. circuit. Place the grid lead back on the 6F7 tube.

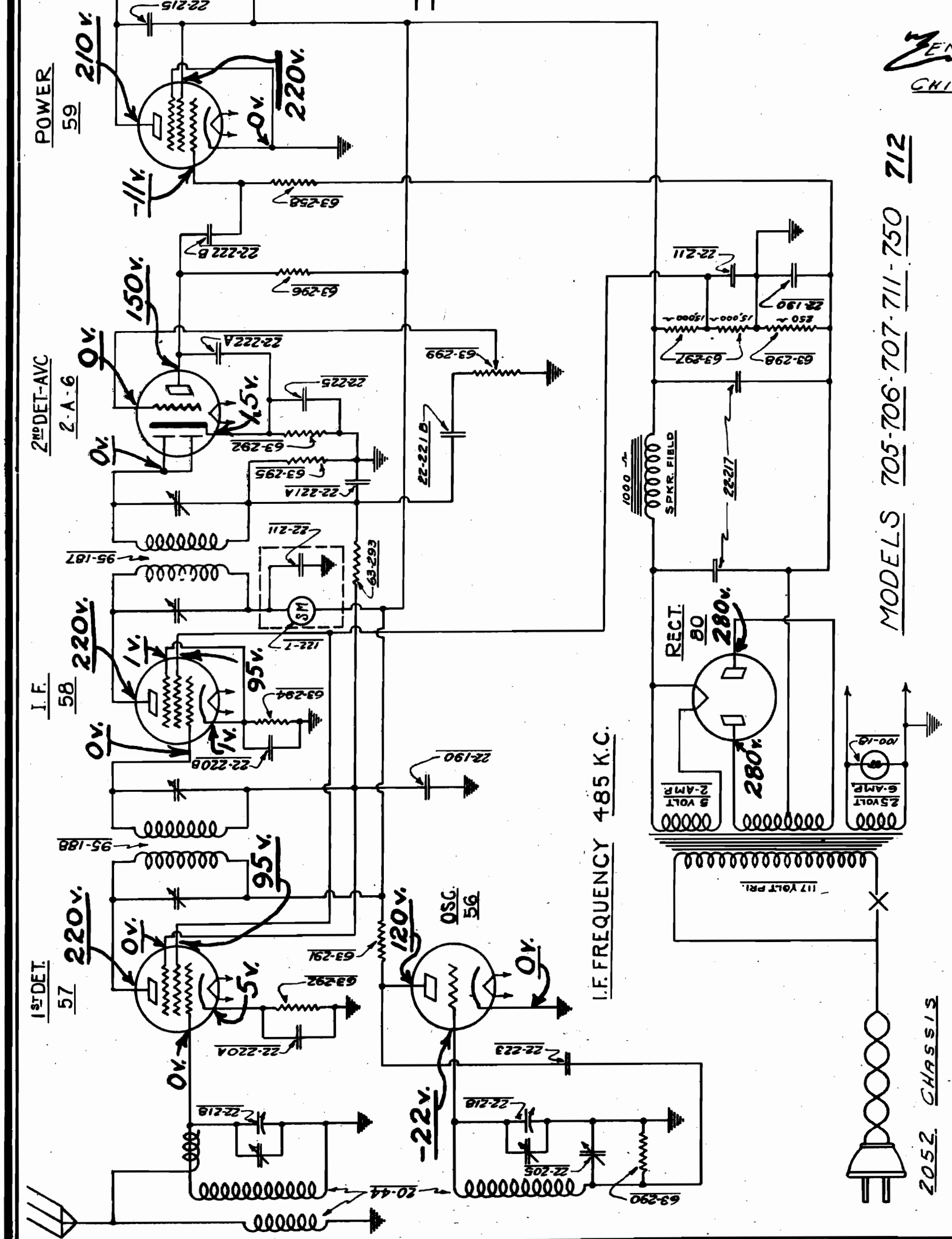
Next attach the test oscillator to the antenna and ground leads and set it to 1500 K.C. Turn the dial indicator to 1500 and adjust the oscillator, detector and R.F. trimmers, on the condenser gang, for maximum output. Set the test oscillator to 600 K.C. and rock the pointer slowly over the same frequency on the dial at the same time adjust the padder condenser for greatest signal strength. All adjustments should be gone over twice—at least twice—to insure greatest accuracy.



ZENITH RADIO CORP.

MODELS 705,706,707
711,712,750
Schematic, Socket





ZENITH RADIO CORP
CHICAGO. ILL. U.S.A.

MODELS 705-706-707-711-750 712

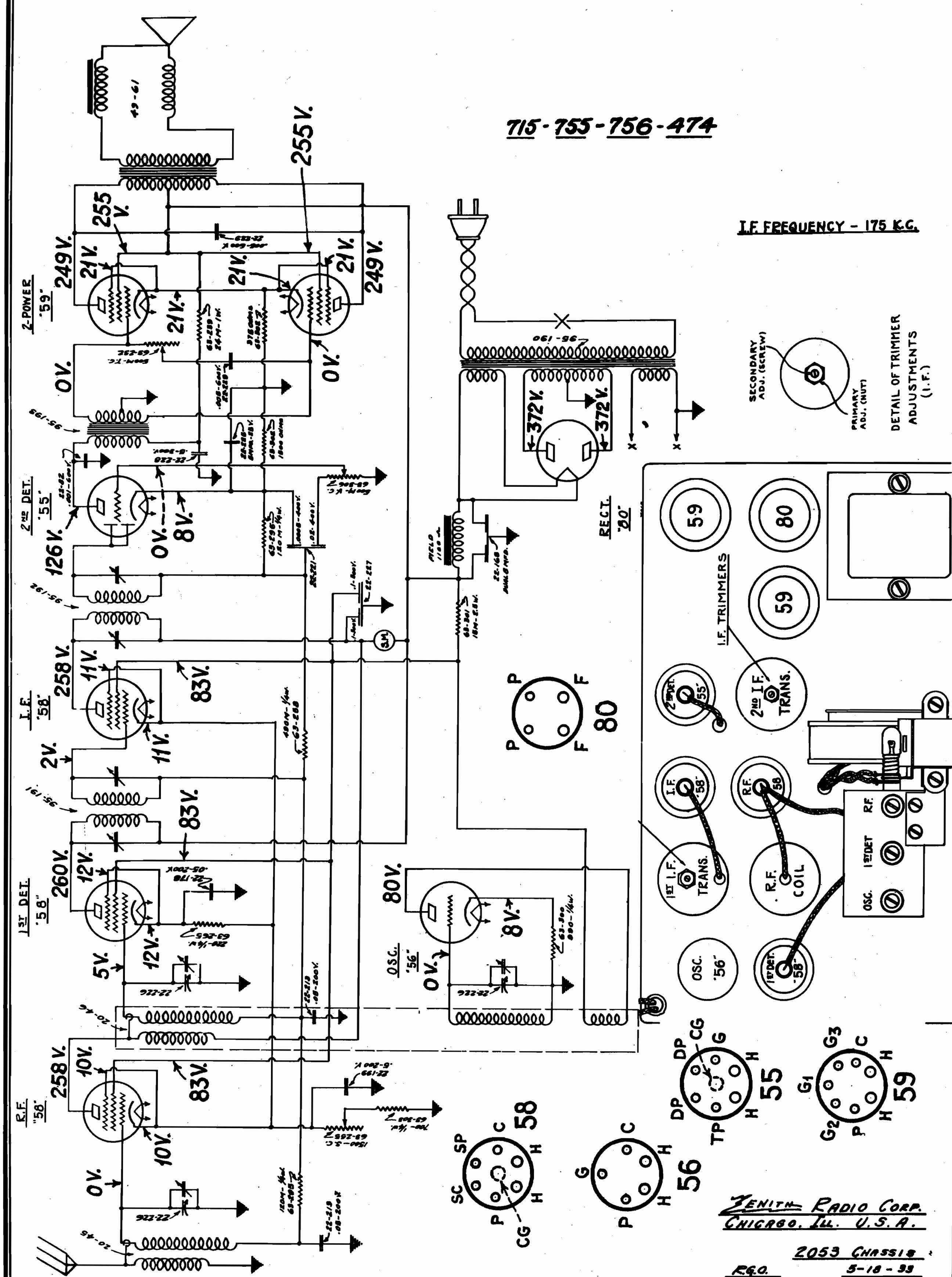
63-258	490M ohm	1/4 watt
63-290	260M ohm	1/2 watt
63-291	29M ohm	1/2 watt
63-292	5400 ohm	1/4 watt
63-293	990M ohm	1/4 watt
63-294	100 ohm	1/4 watt
63-295	120M ohm	1/4 watt
63-296	220M ohm	1/4 watt
63-297	30M ohm	3 watt
63-298	250 ohm	1 1/2 watt
63-299	Volume Control and Switch.	

2052 CHASSIS
4-21-33 RGO

22-190	Dual .1 mfd 200 volt
22-205	Padder
22-217	Dual 8 mfd. 500 volt (filters).
22-218	Two Gang Variable
22-220	Dual .05 mfd & .05 mfd 200 volt
22-221	Dual .02 mfd & .001 mfd 300 "
22-223	.01 mfd 300 volt
22-224	.1 mfd 300 volt
22-225	5. mfd 25 volt

MODELS 715,755,756,474
Schematic,Socket
Voltage

ZENITH RADIO CORP.



MODELS 730,735
Schematic, Socket Voltage Alignment Data

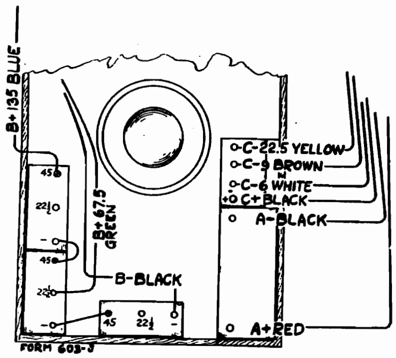
ZENITH RADIO CORP.

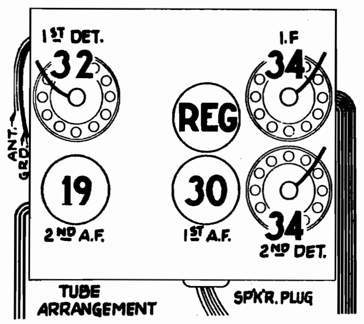
As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 175 K.C. is required.

First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw will be seen at the side of the tuning condenser and is reached from the top of the chassis. A non-metallic screw-driver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

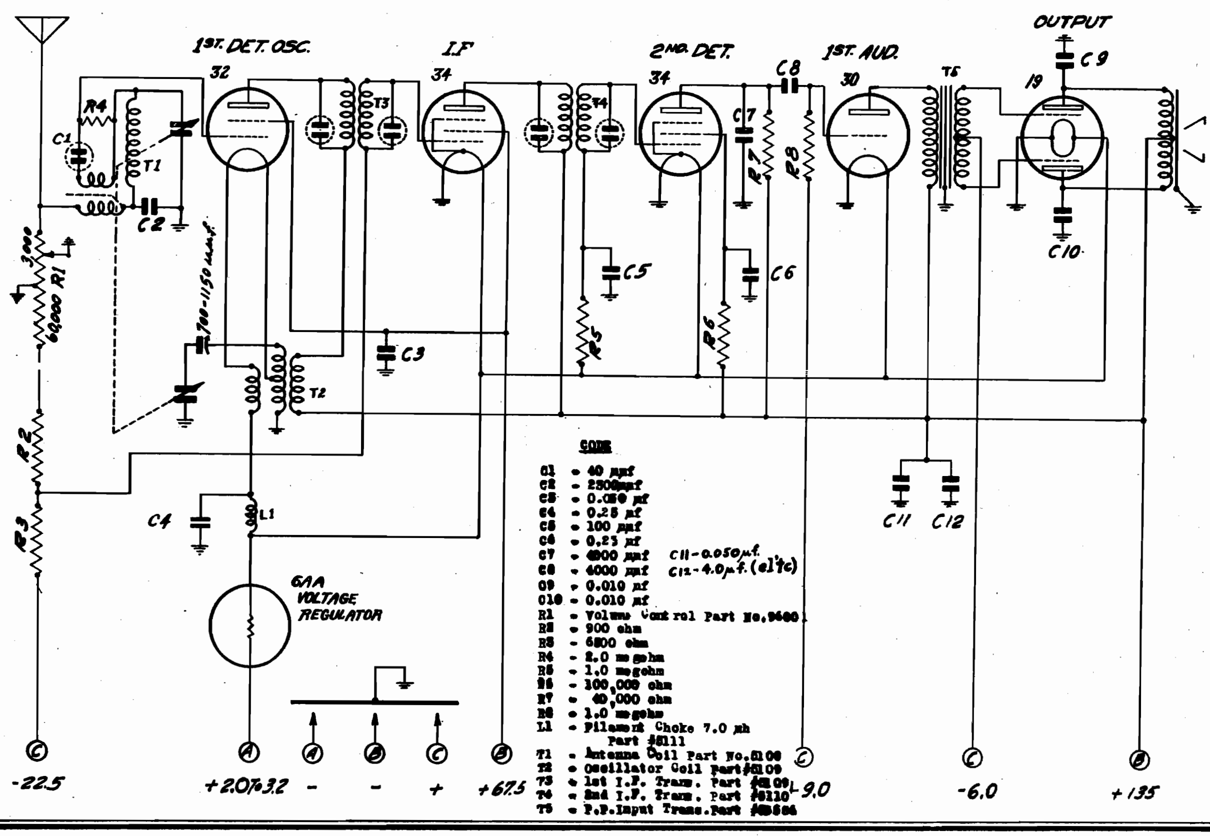
Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.





Tube	Function	Fil.	Plate	Screen	Grid
32	Det-Osc	2.0	139	70	5**
34	IF Amp	2.2	139	70	2.5
34	2nd Det	2.2	34*	40*	0
30	1st AF	2.2	135		9"
19	Output	2.2	136		6

Volume control at Mximum. Antenna grounded
* With 250000 ohm meter. **Varies with frequency. " As read at "C" battery.



MODEL 740
Schematic
Socket, Voltage
Alignment Data

ZENITH RADIO CORP.

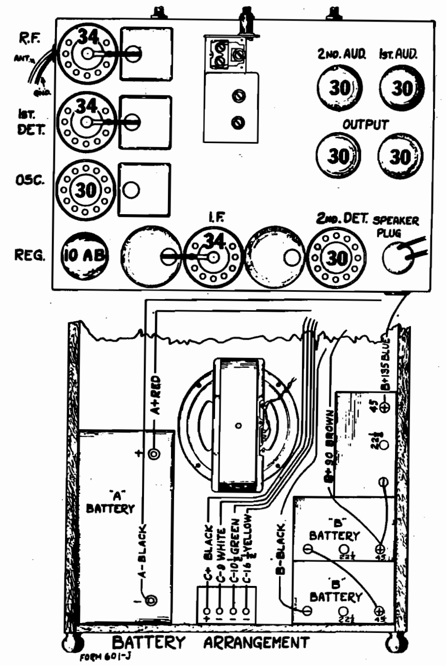
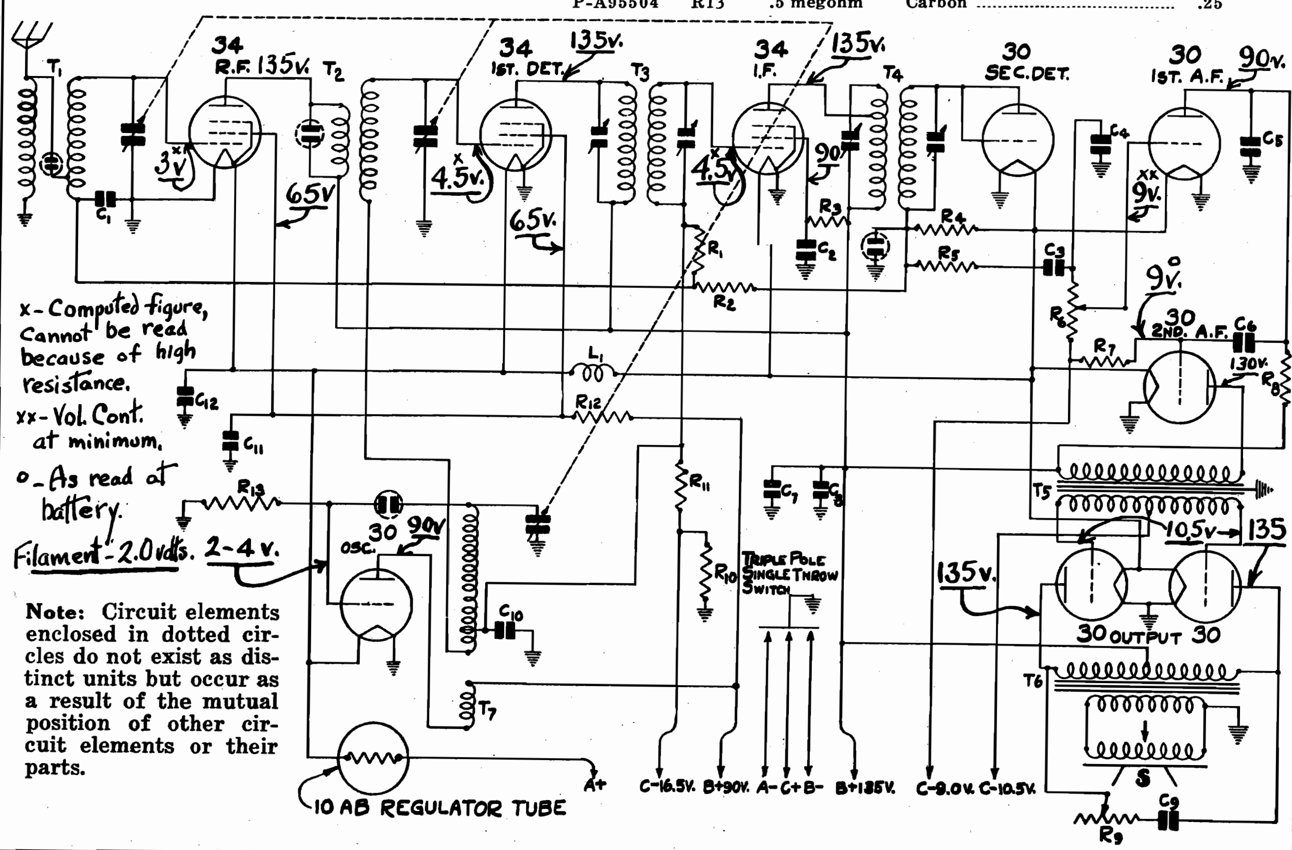


Fig. 2.—Tube Arrangement and Battery Connections

Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to

Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

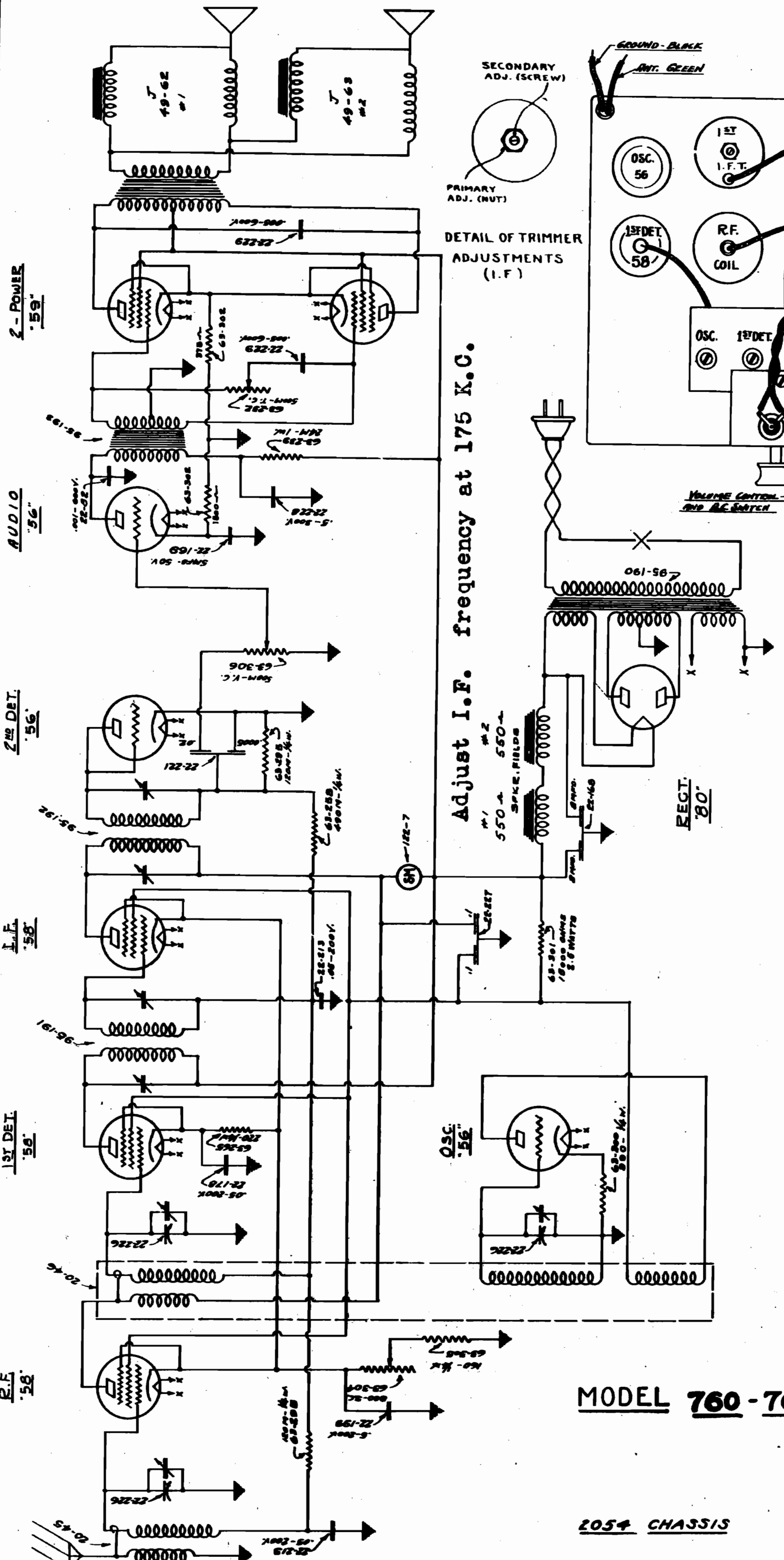
Part No.	Code	Capacity	Voltage	Type	List Price
P-80864	C1	.10 mfd.	200 V.	Tubular	$0.30
P-80862	C2	.050 mfd.	200 V.	Tubular	.30
P-80862	C3	.050 mfd.	200 V.	Tubular	.30
P-80919	C4	.00025 mfd.	600 V.	Moulded	.20
P-80919	C5	.00025 mfd.	600 V.	Moulded	.20
P-80862	C6	.050 mfd.	200 V.	Tubular	.30
P-80968	C7	4.00 mfd.	150 V.	Electrolytic	.70
P-80862	C8	.050 mfd.	200 V.	Tubular	.30
P-80940	C9	.02 mfd.	400 V.	Tubular	.15
P-80981	C10	.01 mfd.	400 V.	Tubular	.20
P-80888	C11	.25 mfd.	200 V.	Tubular	.40
P-80888	C12	.25 mfd.	200 V.	Tubular	.40
P-80980	Three Gang Variable Condenser				3.40
P-A95504	R1	.5 megohm		Carbon	$0.25
P-A94105	R2	1.0 megohm		Carbon	.25
P-A95353	R3	35,000 ohms		Carbon	.20
P-A94204	R4	200,000 ohms		Carbon	.20
P-A95104	R5	100,000 ohms		Carbon	.20
P- 96009	R6	1 megohm		Volume Control	.90
P-A94105	R7	1 megohm		Carbon	.25
P-A95104	R8	100,000 ohms		Carbon	.25
P- 97005	R9	150,000 ohms		Tone Control	.80
P-A94153	R10	15,000 ohms		Carbon	.25
P-A94405	R11	4 megohms		Carbon	.20
P-A94153	R12	15,000 ohms		Carbon	.25
P-A95504	R13	.5 megohm		Carbon	.25

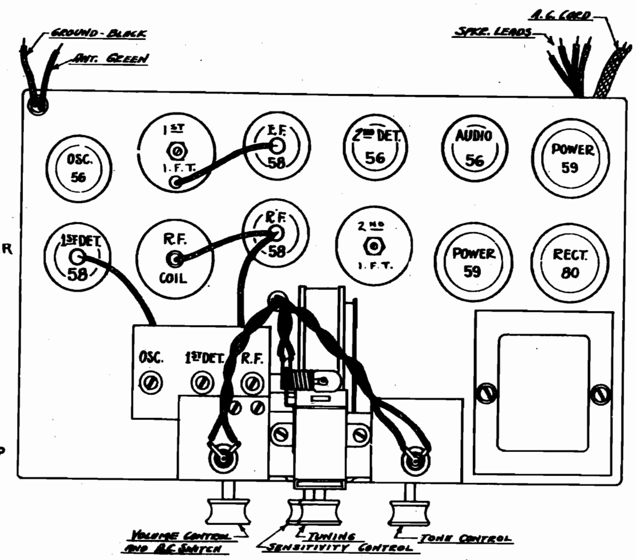


Note: Circuit elements enclosed in dotted circles do not exist as distinct units but occur as a result of the mutual position of other circuit elements or their parts.

ZENITH RADIO CORP.

MODELS 760,765,767,475
Schematic, Socket Voltage





Adjust I.F. frequency at 175 K.C.

Tube	Function	Fil	Cath.	Grid	Screen	Supp.	Plate
58	RF	2.5	3	0	100	3	260
58	1st Det	2.5	4	5	100	4	275
56	Osc	2.5	7	0	-	-	100
58	IF	2.5	3	2	100	3	255
56	2nd Det	2.5	0	0	-	-	0
56	1st AF	2.5	7	0	-	-	150
59	Power	2.5	20	0	270	20	260
59	Power	2.5	20	0	270	20	260
80	Rect	5.					364

Line voltage 117. All controls maximum. Antenna and Ground disconnected. Measured between ground and as stated.

MODEL 760-765-767-475

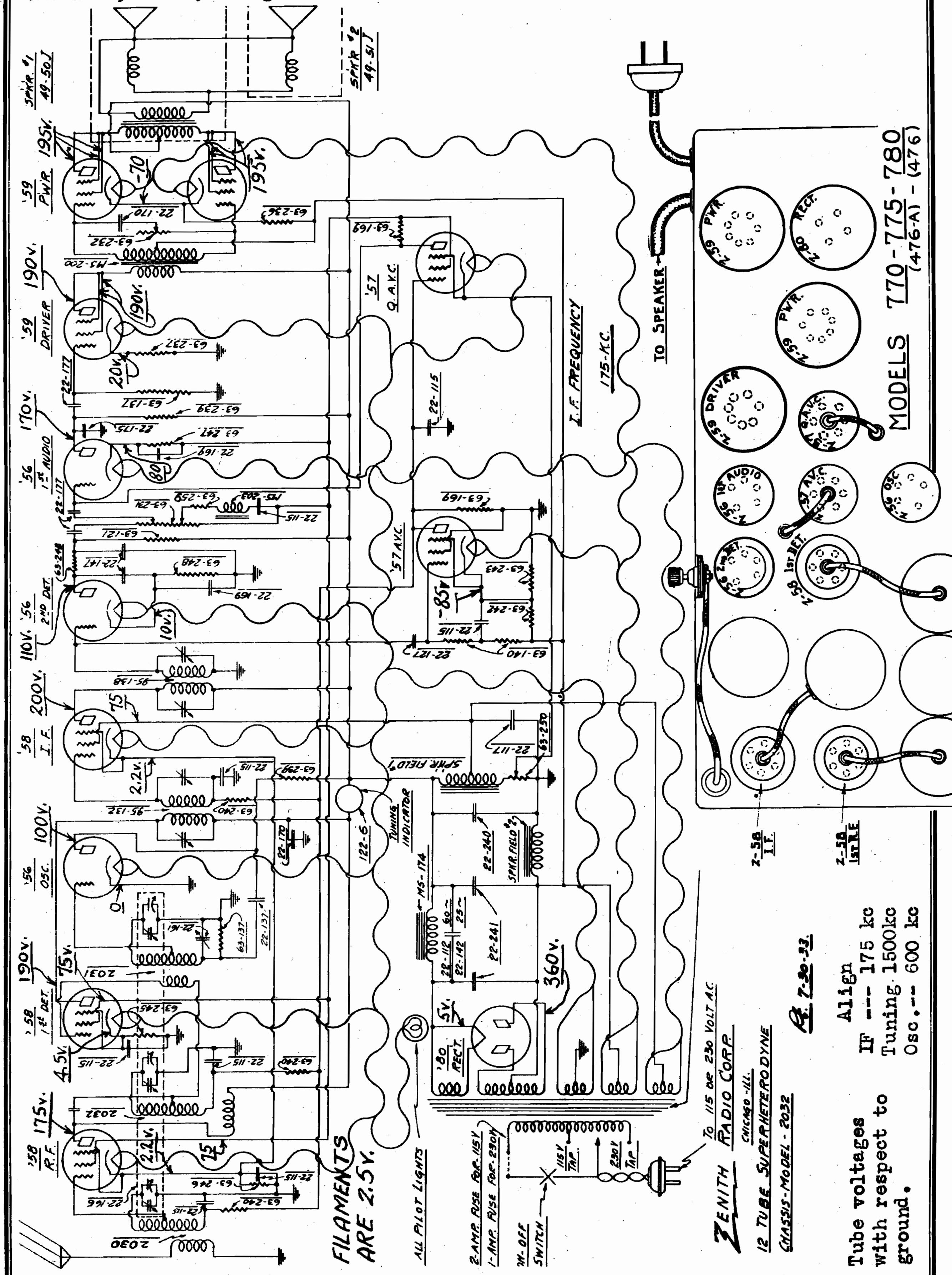
2054 CHASSIS

ZENITH RADIO CORP.
CHICAGO, ILL. U.S.A.

R.G.O. 5-15-33

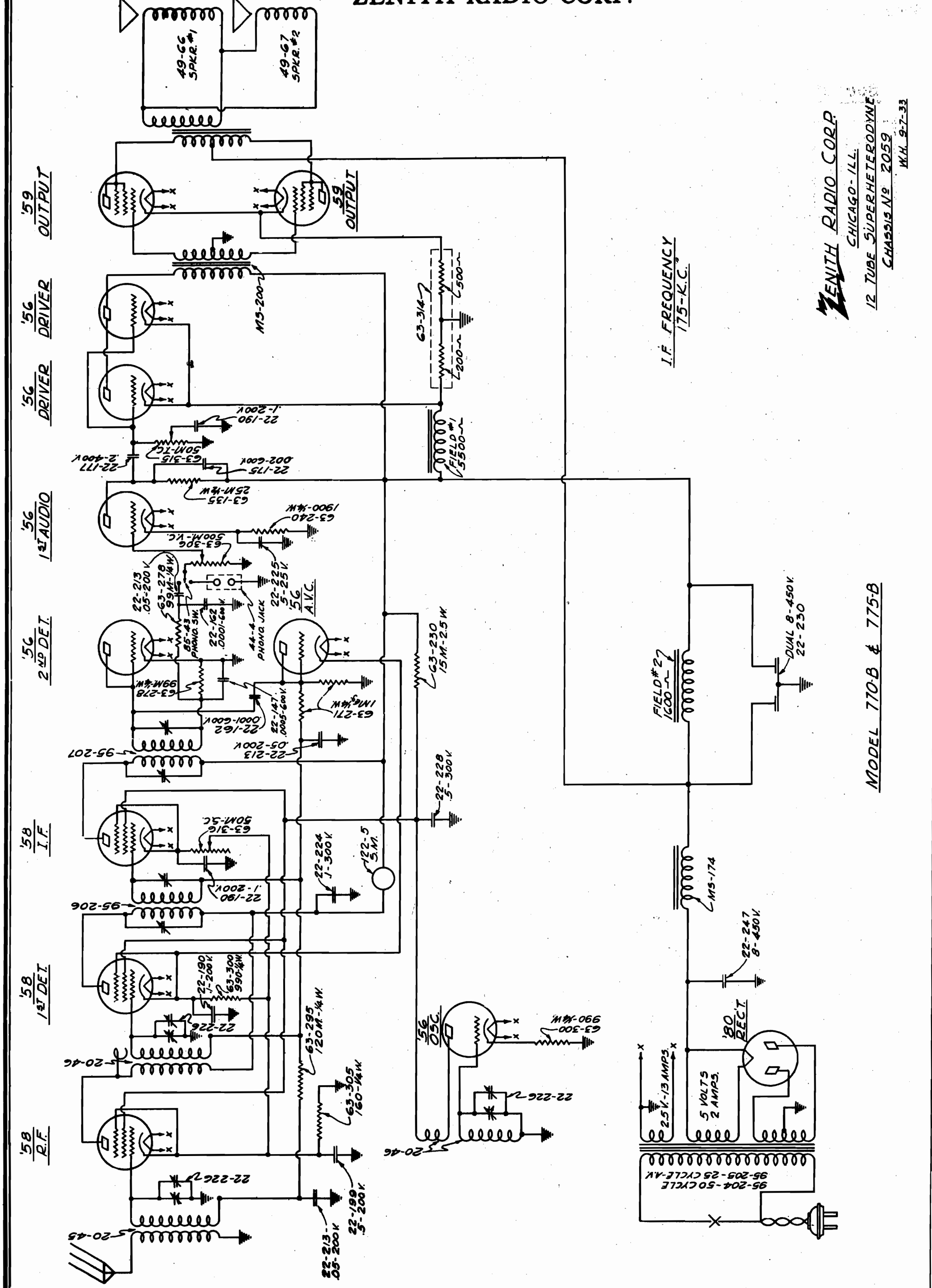
MODELS 770,775,780,476,476A
Schematic,Socket,Voltage

ZENITH RADIO CORP.



MODELS 770-B, 775-B, 476-B
Schematic

ZENITH RADIO CORP.



MODELS 770-B,775-B,476-B
Voltage
Socket

ZENITH RADIO CORP.

ZENITH AUTOMATIC RADIO

Socket Voltages

770B - 775B - 476B

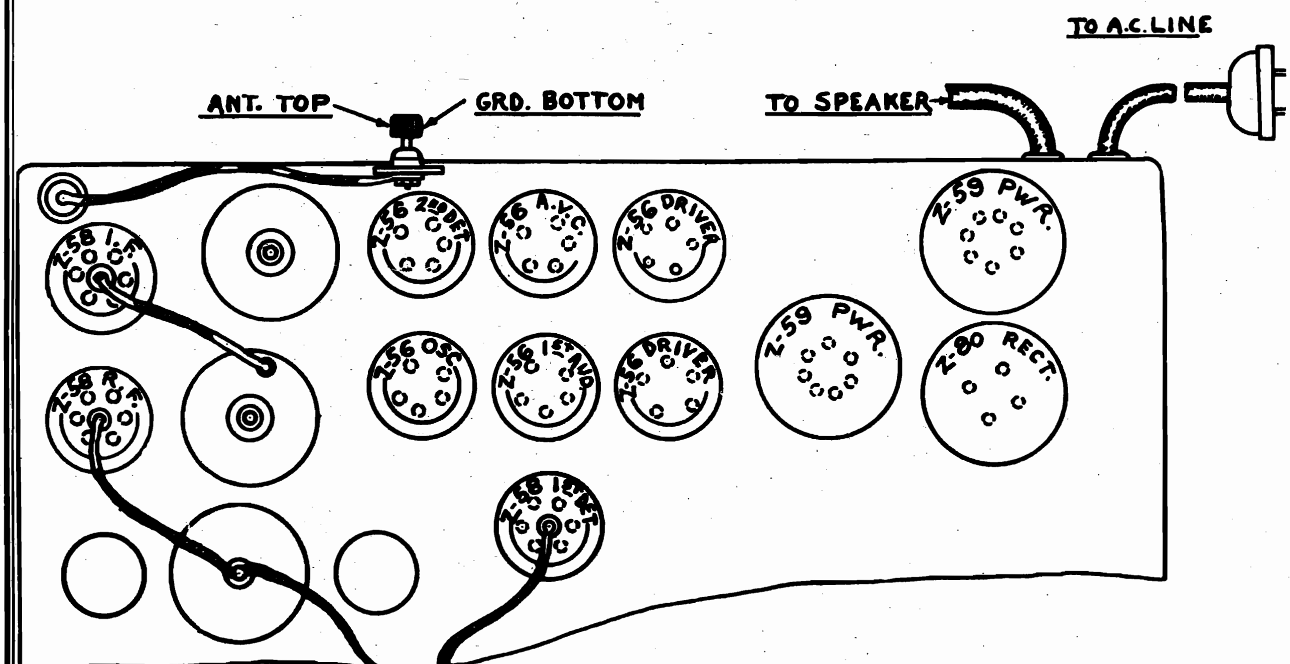
Tube Type	Position	Fil. Volt.	Plate Volt.	Cath. Volt.	Screen Volt.	Supp. Volt.	Plate Current
Z-58	1st R.F.	2.5	200	2.2	82	2.2	4.6
Z-58	1st Det.	2.5	200	5.0	82	5.0	2.4
Z-56	Osc.	2.5	80	6.0	--	---	5.4
Z-58	1st I.F.	2.5	210	2.2	82	2.2	5.2
Z-56	2nd Det.	2.5	0	0	--	---	0
Z-56	A.V.C.	2.5	0	5.0	--	---	0
Z-56	1st A.F.	2.5	120	5.0	--	---	3.0
Z-56	Driver	2.5	200	9.0	--	---	3.0
Z-56	Driver	2.5	200	9.0	--	---	3.0
Z-59	Power	2.5	310	30.0	310	310	24.0
Z-59	Power	2.5	310	30.0	310	310	24.0
Z-80	Rect.	5.0	360	----	---	---	62.5

Line 115 Volts

All Controls Maximum

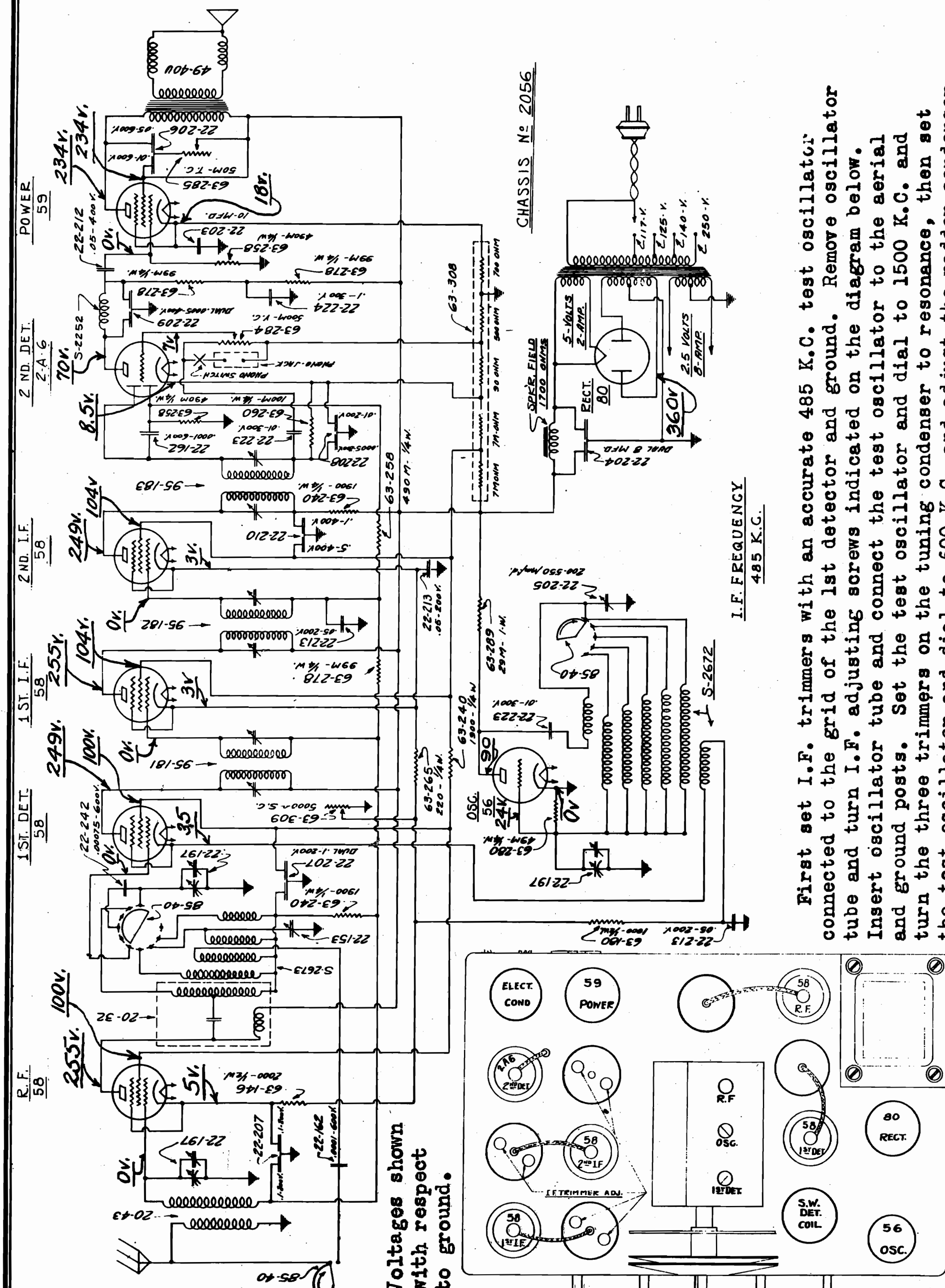
(All readings, with exception of heaters, taken from socket connections to ground. Use 1,000 ohm per volt D.C. meter.)

BALANCE I.F. frequency at 175 K.C. Condenser gang at 1500 K.C. No padder adjustment required.



ZENITH RADIO CORP.

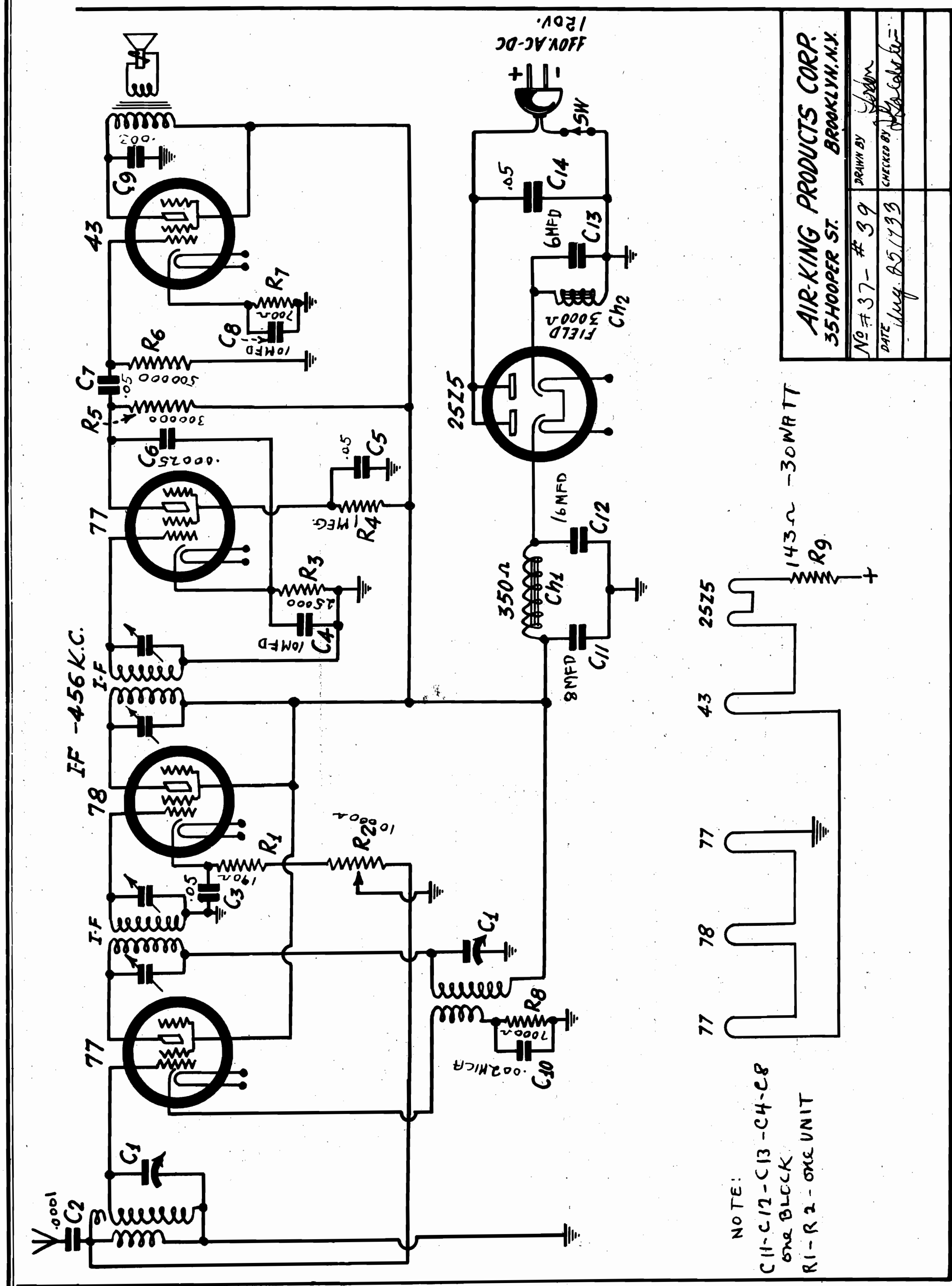
MODELS Chassis 2056, 2056-I
Schematic
Socket, Voltage
Alignment Data



First set I.F. trimmers with an accurate 485 K.C. test oscillator connected to the grid of the 1st detector and ground. Remove oscillator tube and turn I.F. adjusting screws indicated on the diagram below. Insert oscillator tube and connect the test oscillator to the aerial and ground posts. Set the test oscillator and dial to 1500 K.C. and turn the three trimmers on the tuning condenser to resonance, then set the test oscillator and dial to 600 K.C. and adjust the padder condenser for maximum output. Repeat the entire procedure for greater accuracy.

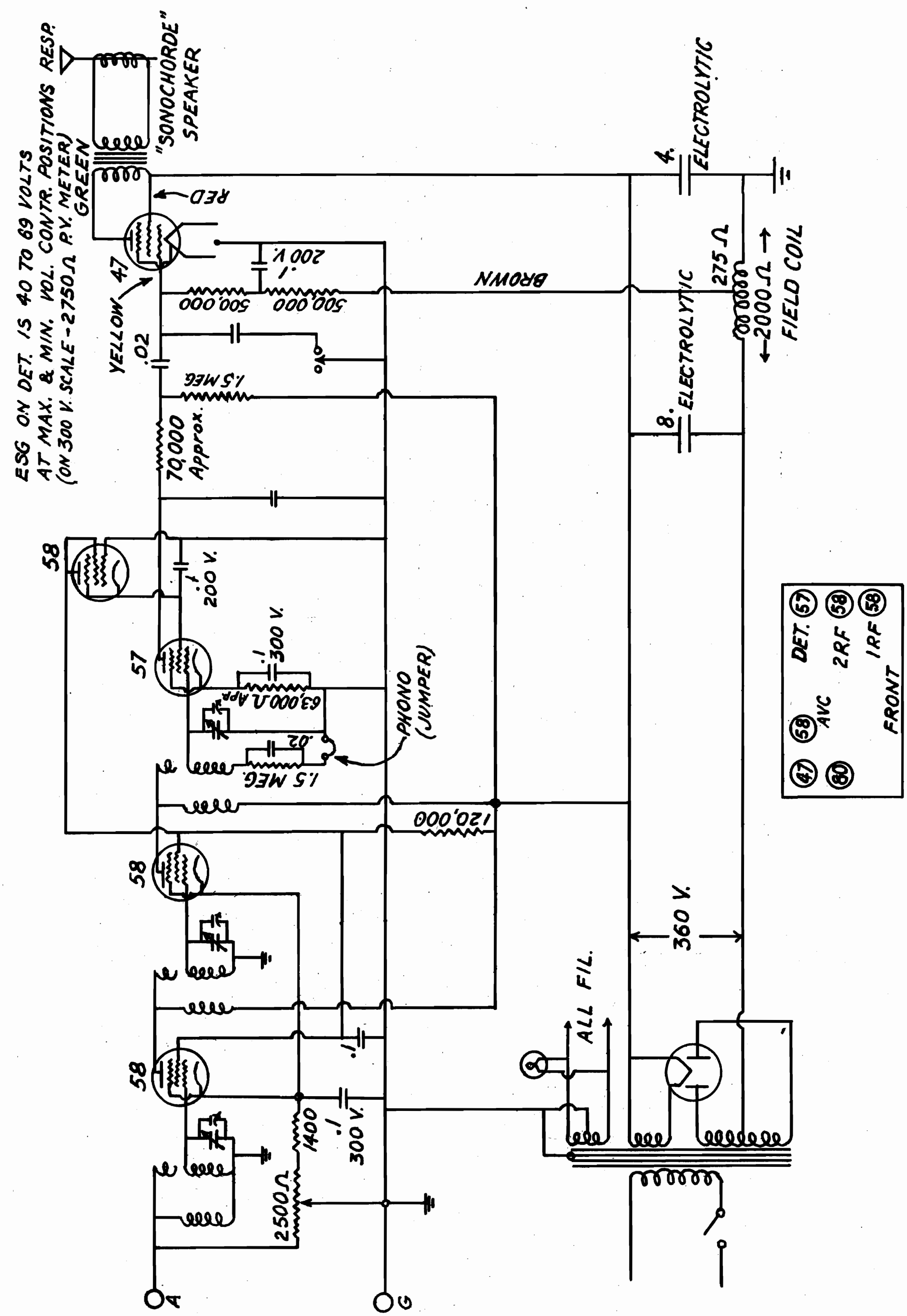
MODEL 37,39
Schematic

AIR KING PRODUCTS CORP.



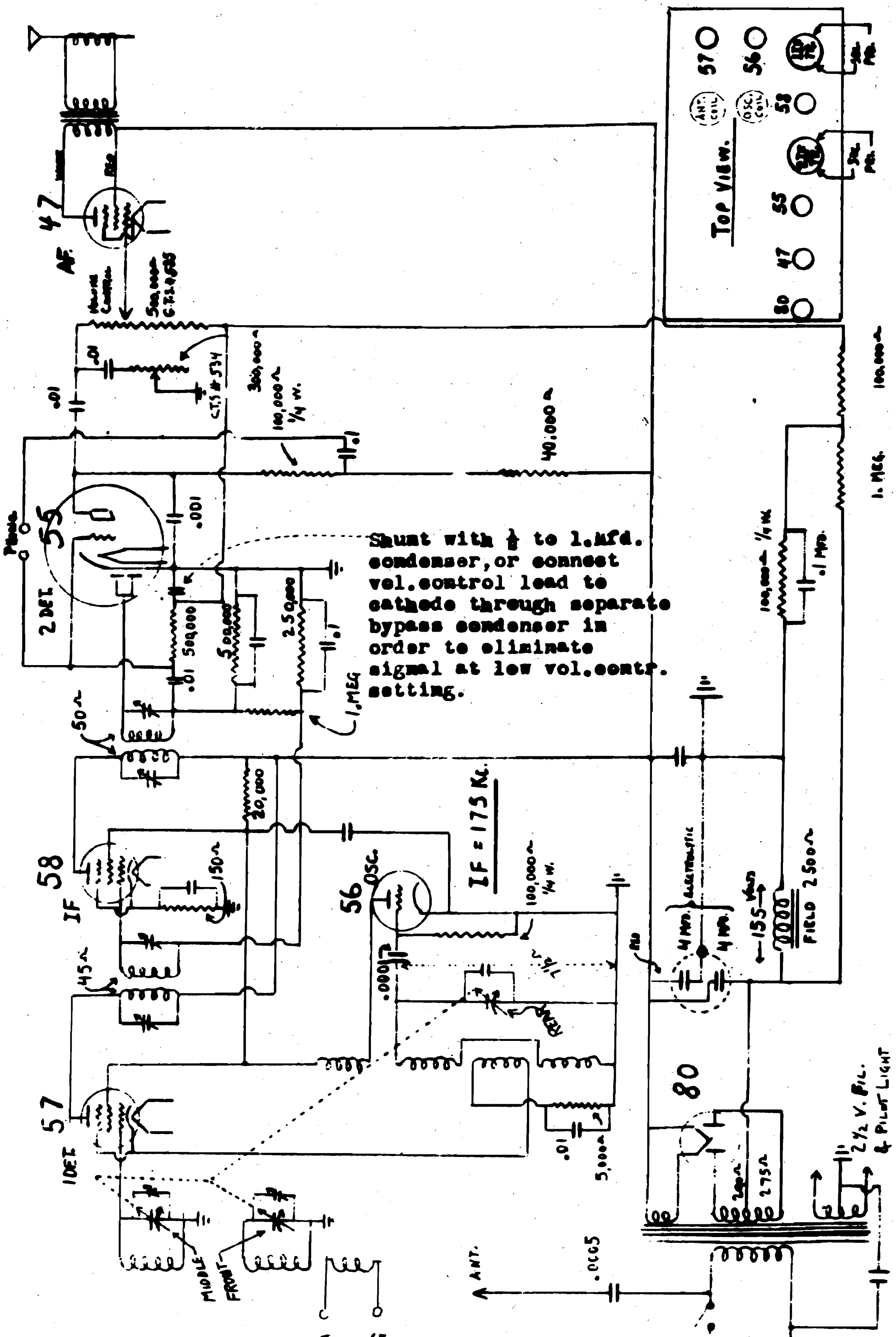
MODEL Bronswick
Schematic, Socket

BRONSWICK RADIO



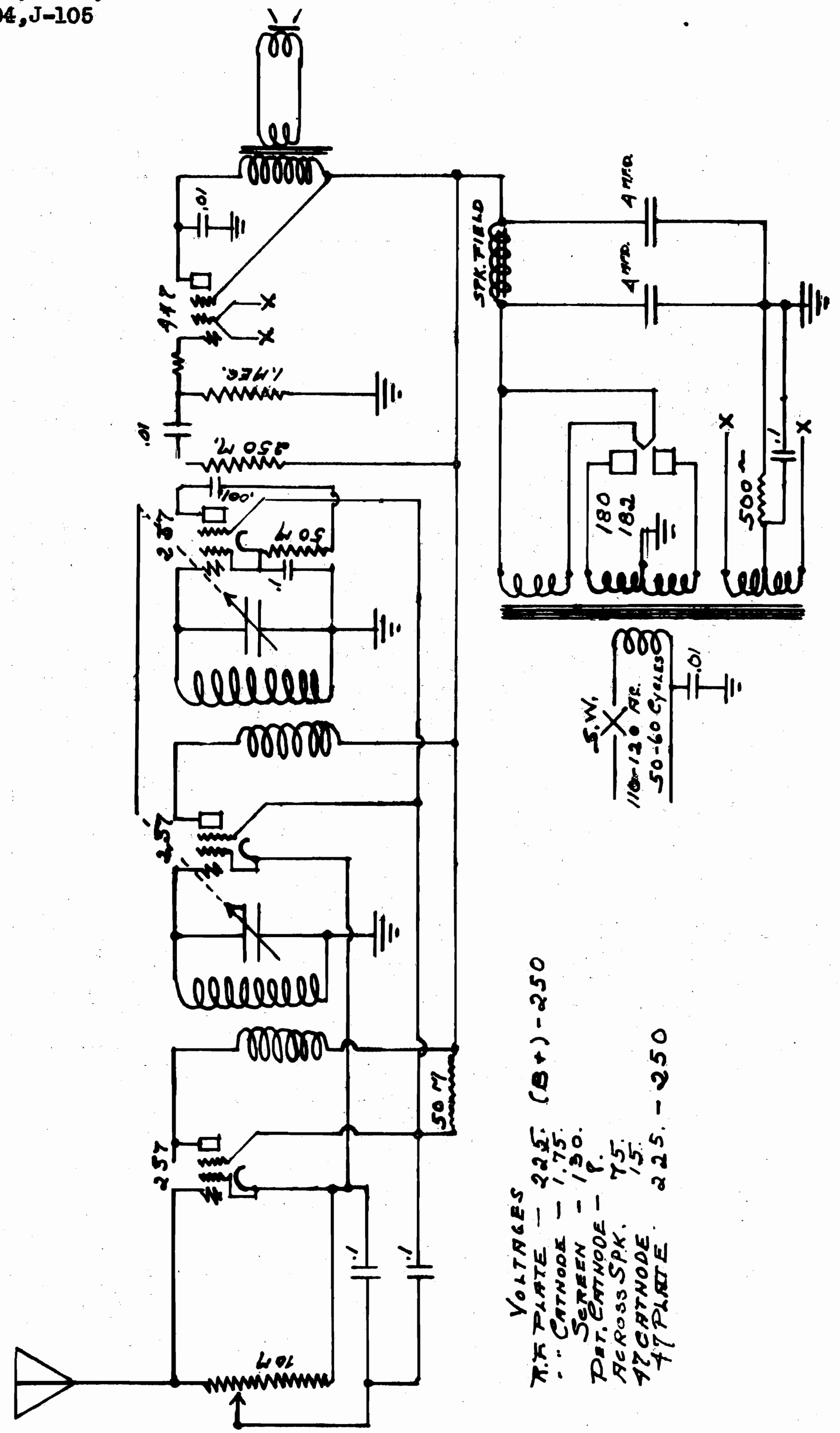
FEDERATED PURCHASER

MODEL Aoratone 17
Schematic



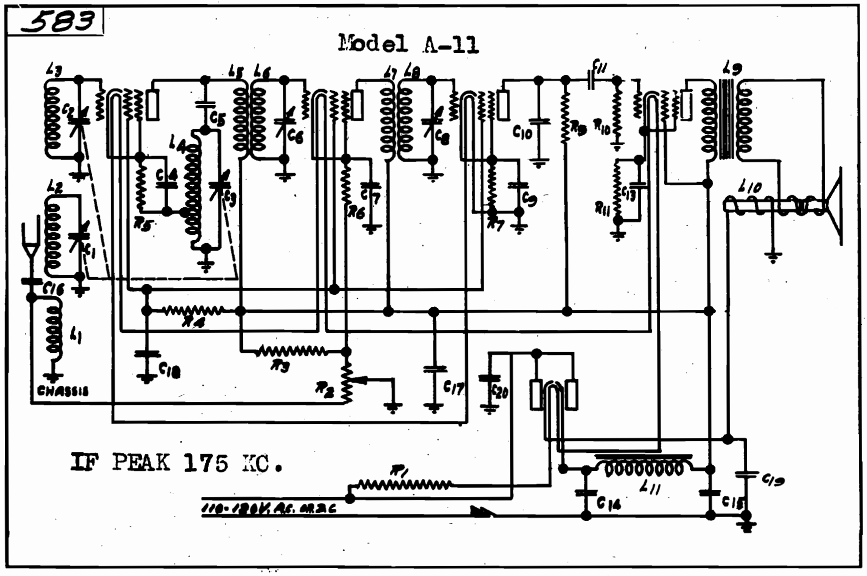
MODEL LK-447, SF-547, 401-A, 504-B, J-104, J-105

JACKSON RADIO & TELEVISION CO.

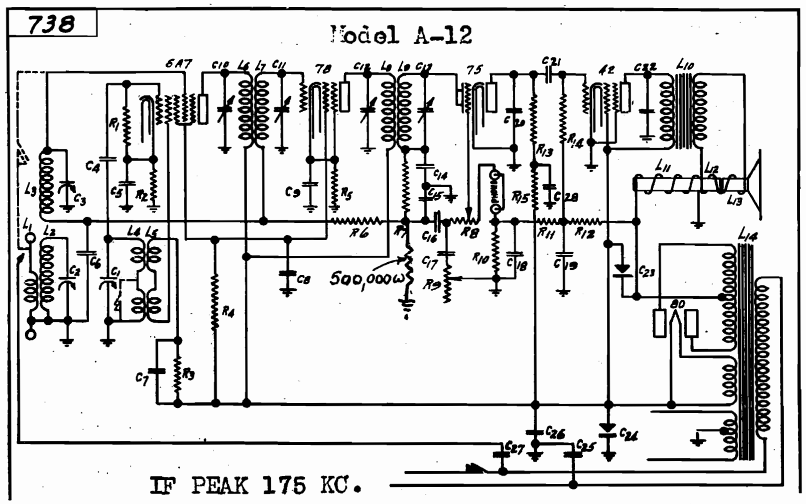


MODEL A-11
MODEL A-12
Schematics

LAFAYETTE RADIO & TELEVISION CORP.



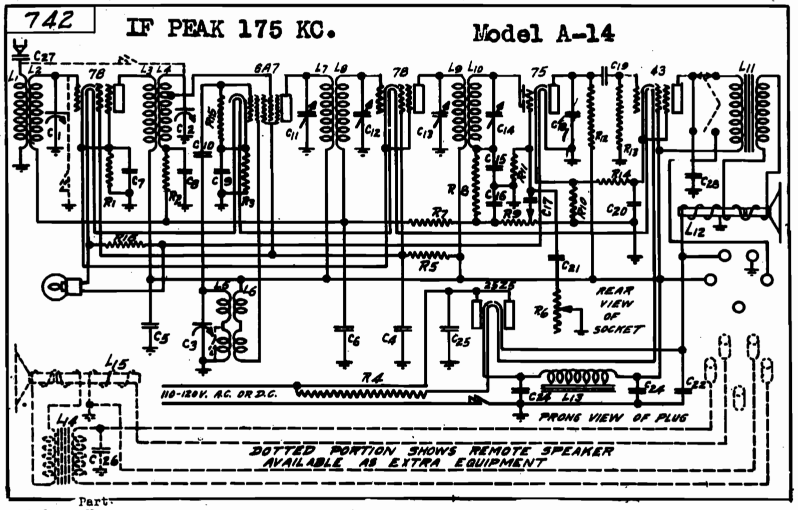
Code	Part No.	RESISTORS
R1	809	170 Ohm Filament Resistor In Power Cord
R2	855	10,000 Ohm Volume Control and Switch
R3	922	75,000 Ohm Resistor I.F. Cathode Feed
R4	921	40,000 Ohm Resistor Screen Feed
R5	919	5,000 Ohm Resistor First Detector & Oscillator Cathode
R6	1063	500 Ohm Resistor I.F. Cathode Feed
R7	941	20,000 Ohm Resistor Second Detector Cathode
R8		
R9	924	250,000 Ohm Resistor Second Detector Plate Load
R10	925	500,000 Ohm Resistor Output Grid Bias
R11	1063	500 Ohm Resistor 43 Bias
		CONDENSERS
C1	833	365 MMFD. Preselector Section of Variable Condenser
C2	833	365 MMFD. Preselector Section of Variable Condenser
C3	833	350 MMFD. Oscillator Section of Variable Condenser
C4	265	.001 MFD. First Detector & Oscillator Cathode Condenser
C5	264	.00005 MFD. Oscillator Coupling Condenser
C6	477	75-150 MMFD. First I.F. Trimmer Condenser
C7	272	.1 MFD. I.F. Cathode By-pass Condenser
C8	849	75-150 MMFD. Second I.F. Trimmer Condenser
C9	569	.2 MFD. Second Detector Cathode
C10	265	.001 MFD. Second Detector Plate R.F. Filter
C11	269	.01 MFD. Audio Feed Condenser
C12		
C13	928	25 MFD. C. Bias By-pass
C14	965	12 MFD. Voltage Filter Condenser
C15	965	4 MFD. Voltage Filter Condenser
C16	265	.001 MFD. Antenna Series Condenser
C17	267	.5 B Supply By-pass Condenser
C18	272	.1 200 Volt Screen By-pass Condenser
C19	965	4 MFD. Voltage Filter Condenser
C20	272	.1 MFD. 200 Volt Line By-pass Condenser
		INDUCTANCES
L1	847	Preselector Primary 178 Turns #36 S.S.E. U.W.
L2	847	Preselector First Secondary 128 Turns #36 S.S.E. U.W.
L3	847	Preselector Second Secondary 133 Turns #36 S.S.E. U.W.
L4	938	Oscillator Coil 98 Turns Tapped 15 Turns #36 S.S.E.
L5	938	First I.F. Primary 650 Turns #36 S.S.E. U.W.
L6	938	First I.F. Secondary 650 Turns #36 S.S.E. U.W.
L7	937	Second I.F. Primary 650 Turns #36 S.S.E. U.W.
L8	937	Second I.F. Secondary 650 Turns #36 S.S.E. U.W.
L9		Single #43 Output Transformer
L10	917	3,000 Ohm Speaker Field
L11	940	32 Henry Choke



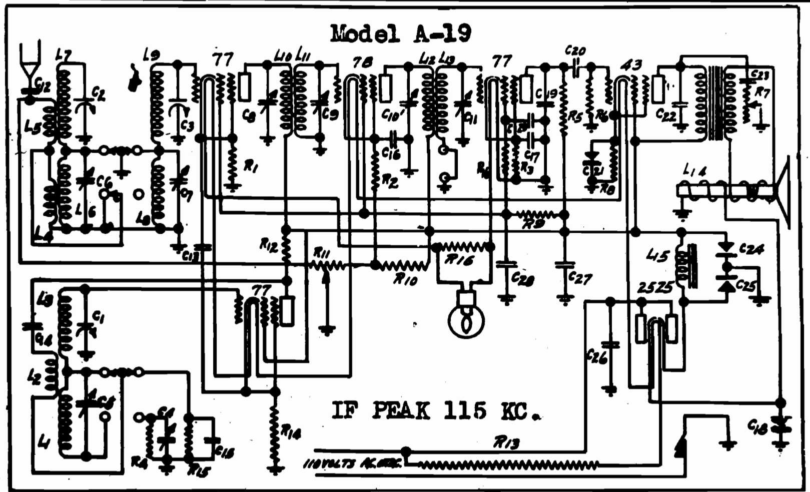
Code	Part No.	RESISTORS
R1	921	40,000 Ohm Oscillator Grid Leak
R2	1062	250 Ohm 6A7 Cathode Resistor
R3	920	10,000 Ohm Oscillator Feed Resistor
R4	898	50,000 Ohm 6A7 & 78 Screen Feed Resistor
R5	1063	500 Ohm 78 Cathode Resistor
R6	926	1 Megohm A.V.C. Network Resistor
R7	898	50,000 Ohm A.V.C. Network Filter Resistor
R8	535	500,000 Ohm Volume Control & A. C. Switch
R9	534	250,000 Ohm Tone Control
R10	919	5,000 Ohm Bias Network Resistor
R11	922	75,000 Ohm Bias Network Resistor
R12	926	1 Megohm Bias Network Resistor
R13	924	250,000 Ohm 75 Plate Resistor
R14	925	500,000 Ohm 42 Grid Resistor
R15	898	50,000 Ohm 75 Plate Resistor
		CONDENSERS
C1	833	336 MMFD. Oscillator Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	371 MMFD. Preselector Section of Tuning Condenser
C4	268	.00025 MFD. Oscillator Coupling Condenser
C5	272	.1 MFD. 6A7 Cathode By-pass Condenser
C6	272	.1 MFD. A.V.C. By-pass Condenser
C7	272	.1 MFD. Oscillator Feed By-pass Condenser
C8	272	.1 MFD. 6A7 & 78 Screen By-pass Condenser
C9	272	.1 MFD. 78 Cathode By-pass Condenser
C10	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C11	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C12	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C13	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C14	339	.0001 Diode Filter Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	269	.01 MFD. Second Detector Feed Condenser
C17	269	.01 MFD. Tone Control Condenser
C18	928	25 MFD. A.V.C. Network By-pass Condenser
C19	569	.2 MFD. 42 Bias By-pass Condenser
C20	516	.001 MFD. 75 Plate Filter Condenser
C21	269	.01 MFD. Audio Feed Condenser
C22	1132	.002 MFD. 42 Plate Filter Condenser 600 Volt
C23	496	4 MFD. B Filter Condenser
C24	496	4 MFD. B Filter Condenser
C25	269	.01 MFD. Line By-pass Condenser
C26	794	1 MFD. B Supply By-pass Condenser
C27	307	.0005 MFD. Sub. Antenna Condenser
C28	272	.1 MFD. 75 Plate Hum Filter Condenser
		INDUCTANCES
L1	1109	Antenna Coil Primary 178 Turns #36 S.S.E.
L2	1109	Antenna Coil Secondary 136 Turns #36 S.S.E.
L3	1109	Preselector Secondary 126 Turns #36 S.S.E.
L4	1111	Oscillator Secondary 72 and 50 Turns #36 D.D.C.
L5	1111	Oscillator Primary 35 Turns and 15 Turns #36 S.S.E.
L6	1101	8,000 Microhenries First I.F. Primary
L7	1101	8,000 Microhenries First I.F. Secondary
L8	1101	8,000 Microhenries Second I.F. Primary
L9	1101	8,000 Microhenries Second I.F. Secondary
L10		Single 42 Output Transformer
L11		3,000 Ohm Speaker Field
L12		Hum Bucking Coil
L13		Speaker Voice Coil
L14	1068	Power Transformer 115 Volts A. C. 60 Cycle

MODEL A-14
MODEL A-19
Schematics

LAFAYETTE RADIO & TELEVISION CORP.



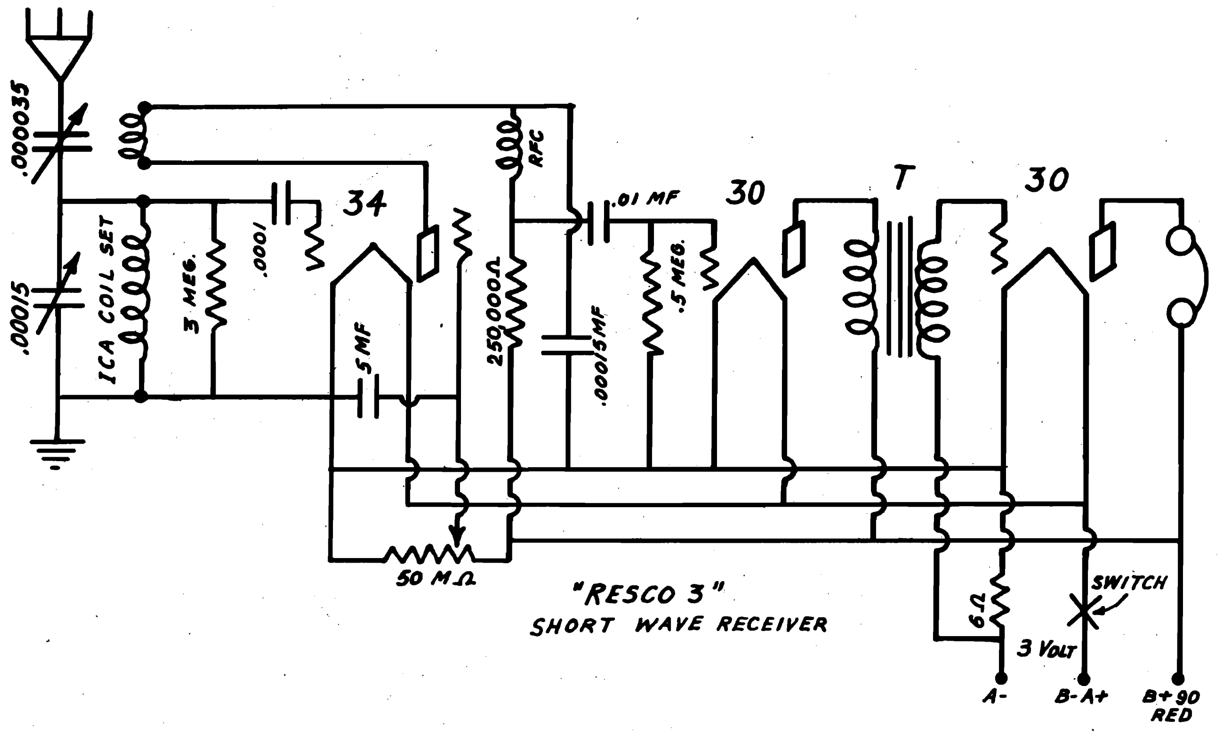
Code	Part No.	
R1	1062	250 Ohm R.F. & I.F. Cathode & Screen Resistor
R2	923	100,000 Ohm A.V.C. Network Resistor
R3	1062	250 Ohm 6A7 Cathode Resistor
R4	1125	130 Ohm Resistor In Power Cord
R5	941	20,000 Ohm 78 & 6A7 Screen Feed Resistor
R6	534	250,000 Ohm Tone Control
R7	926	1 Megohm A.V.C. Network Resistor
R8	898	50,000 Ohm A.V.C. Network Filter Resistor
R9	535	500,000 Ohm Volume Control & Power Switch
R10	1122	40 Ohm Bias Network Resistor
R11	925	500,000 Ohm 75 Grid Leak Resistor
R12	~~926~~	500,000 Ohm 75 Plate Resistor
R13	925	500,000 Ohm 43 Grid Resistor
R14	1063	500 Ohm Bias Resistor
R15	921	40,000 Ohm Oscillator Grid Leak Resistor
R16	1119	36 Ohm Pilot Light Shunt Resistor
		CONDENSERS
C1	833	371 MMFD. Preselector Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	336 MMFD. Oscillator Section of Tuning Condenser
C4	272	.1 MFD. 78 & 6A7 Screen By-pass Condenser
C5	266	1. MFD. B By-pass Condenser
C6	272	.1 MFD. A.V.C. Network By-pass Condenser
C7	272	.1 MFD. R.F. & I.F. Cathode By-pass Condenser
C8	272	.1 MFD. First Detector R.F. By-pass Condenser
C9	272	.1 MFD. 6A7 Cathode By-pass Condenser
C10	266	.00025 MFD. Oscillator Coupling Condenser
C11	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C12	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C13	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C14	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	339	.0001 MFD. Diode Filter Condenser
C17	269	.01 MFD. First Detector Feed Condenser
~~C18~~	~~516~~	~~.001 MFD. 75 Plate Filter Condenser~~
C19	269	.01 MFD. Audio Feed Condenser
C20	928	25 MFD. 43 Cathode Electrolytic By-pass Condenser
C21	269	.01 MFD. Tone Control Condenser
C22	1085	4 MFD. Dry Electrolytic Condenser
C23	1085	4 MFD. Dry Electrolytic Condenser
C24	1085	11 MFD. Dry Electrolytic Condenser
C25	272	.1 MFD. Line By-pass Condenser
C26	1085	19 MFD. Dry Electrolytic Condenser
C27	269	.01 MFD. Antenna Series Condenser
C28	~~1137~~	~~.002~~ .01 MFD. Output Plate Filter Condenser
		INDUCTANCES
L1	1138	Preselector Primary 450 Turns #36 S.S.E.
L2	1130	Preselector Secondary 144 Turns #36 D.D.C.
L3	1137	Detector Coil Primary 750 Turns #36 S.S.E.
L4	1137	Detector Coil Secondary 118 Turns & 77 Turns #36 D.D.C.
L5	1111	Oscillator Secondary 72 Turns & 50 Turns #36 D.D.C.
L6	1111	Oscillator Primary 35 Turns & 15 Turns #36 S.S.E.
L7	1101	8,000 Microhenries First I.F. Primary
L8	1101	8,000 Microhenries First I.F. Secondary
L9	1101	8,000 Microhenries Second I.F. Primary
L10	1101	8,000 Microhenries Second I.F. Secondary
L11		#43 Output Transformer
L12		3,000 Ohm Speaker Field
L13	940	20 Henry Choke
L14		#43 Output Transformer
L15		2,500 Ohm Speaker Field



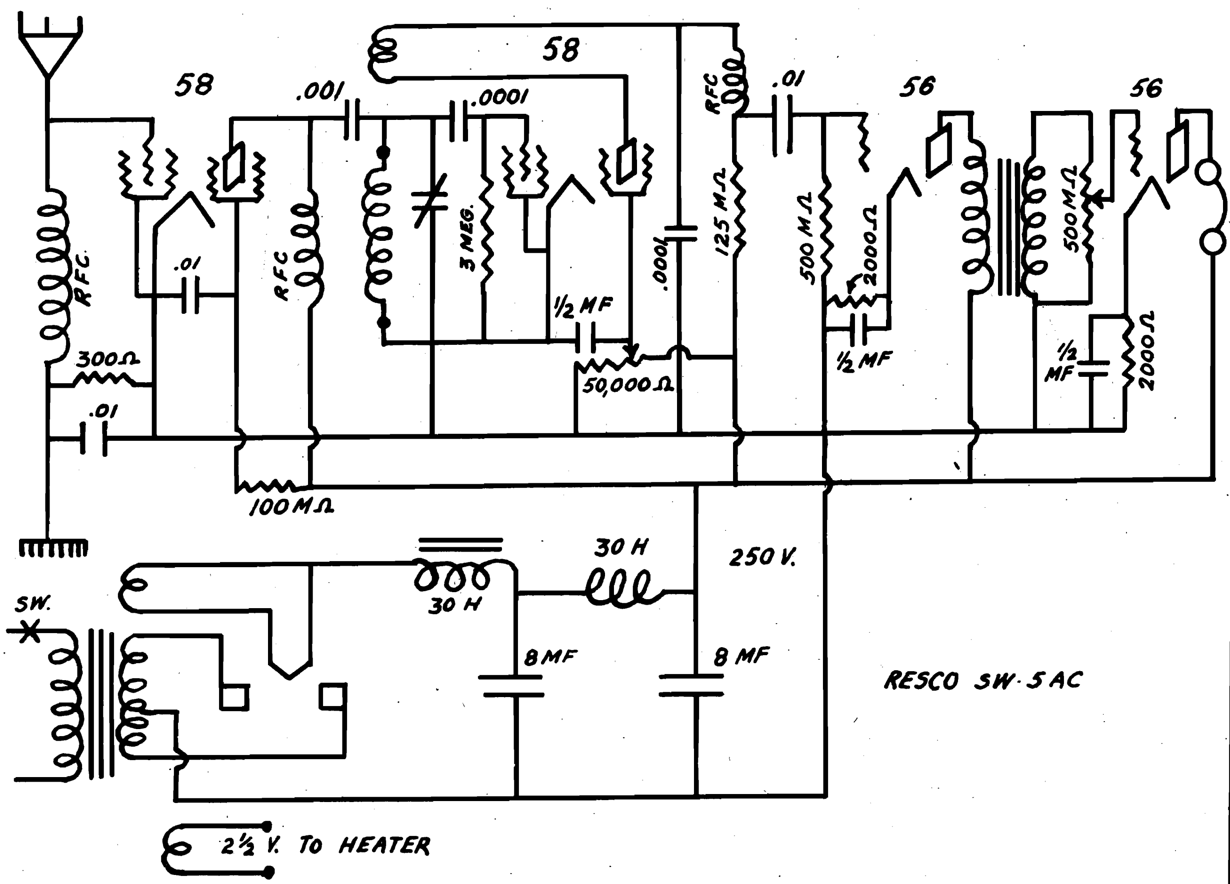
Code	Part No.	RESISTORS
R1	919	5,000 Ohm First Detector Cathode
R2	1062	250 Ohm I. F. Cathode
R3	1003	15,000 Ohm Second Detector Cathode
R4	1042	25,000 Ohm Long Wave Oscillator Grid
R5	924	250,000 Ohm Second Detector Plate
R6	925	500,000 Ohm 43 Grid
R7	534	250,000 Ohm Tone Control
R8	1065	500 Ohm 43 Cathode
R9	921	40,000 Ohm Screen Feed
R10	922	75,000 Ohm I. F. Cathode Feed
R11	512	10,000 Ohm Volume Control & Switch
R12	941	20,000 Ohm Oscillator Plate Feed
R13	1125	130 Ohm Resistance in Power Cord
R14	1064	600 Ohm Oscillator Cathode
R15	1042	25,000 Ohm Broadcast Oscillator Grid
R16	924	250,000 Ohm Second Detector Screen
R17	1119	36 Ohm Pilot Light Shunt Resistor
		CONDENSERS
C1	833	26 - 336 MMFD. Oscillator Section of 3 Gang
C2	833	26 - 371 MMFD. Preselector Section of 3 Gang
C3	833	26 - 371 MMFD. Preselector Section of 3 Gang
C4	784	4 Plate Long Wave Oscillator Trimmer
C5	972	2 Plate Long Wave Oscillator Trimmer
C6	971	2 Plate First Preselector Trimmer
C7	971	2 Plate Second Preselector Trimmer
C8	993	75 - 150 MMFD. First I.F. Primary Trimmer
C9	994	75 - 150 MMFD. First I.F. Secondary Trimmer
C10	995	75 - 150 MMFD. Second I.F. Primary Trimmer
C11	996	75 - 150 MMFD. Second I.F. Secondary Trimmer
C12	269	.01 Antenna Coupling Condenser
C13	269	.01 Oscillator Feed Condenser
C14	269	.01 Mfd. Oscillator Plate Condenser
C15	503	.004 Mfd. Broadcast Oscillator Condenser
C16	272	.1 Mfd. I.F. Cathode By-pass Condenser
C17	569	.2 Mfd. Second Detector Cathode By-pass Condenser
C18	1085	4. Mfd. Dry Electrolytic Filter Condenser
C19	544	.001 Mfd. Second Detector Plate Filter Condenser
C20	269	.01 Mfd. Audio Feed Condenser
C21	928	25 Mfd. Electrolytic 43 Cathode 30 Volt Tubular
C22	503	.004 Mfd. 43 Plate Filter Condenser
C23	272	.1 Mfd. Tone Control Condenser
C24	1085	4 Mfd. Dry Electrolytic Condenser
C25	1085	12 Mfd. Dry Electrolytic Condenser
C26	272	.1 Mfd. Power Line By-pass Condenser
C27	266	1. Mfd. B Supply By-pass Condenser
C28	267	.5 Mfd. Screen By-pass Condenser
C29	269	.01 Mfd. Second Detector Screen By-pass Condenser
		INDUCTANCES
L1	782	Long Wave Oscillator Secondary 1975 Microhenries
L2	782	Long Wave & Broadcast Oscillator Primary 10 Turns #36 P.E.
L3	782	Long Wave Oscillator Secondary 97 Turns #32 P.E.
L4	781	Long Wave First Preselector Primary U.W. 800 Turns #36 S.S.E.
L5	976	Broadcast First Preselector Primary U.W. 178 Turns #36 S.S.E.
L6	781	Long Wave First Preselector Secondary U.W. 3380 Microhenries
L7	976	Broadcast First Preselector Secondary 139 Turns #32 S.S.E.
L8	781	Long Wave Second Preselector Secondary 3380 Microhenries
L9	976	Broadcast Second Preselector Secondary 132 Turns #36 S.S.E.
L10	999	25,000 Microhenries First I.F. Primary U.W.
L11	999	25,000 Microhenries First I.F. Secondary U.W.
L12	1156	14,000 Microhenries Second I.F. Primary U.W.
L13	1156	11,000 Microhenries Second I.F. Secondary U.W.
L14	917	3,000 Ohm Speaker Field
L15	940	20 Henry Choke

MODEL Resco 3
MODEL Resco SW-5-AC
Schematic

RADIO ELECTRIC SERVICE CO.



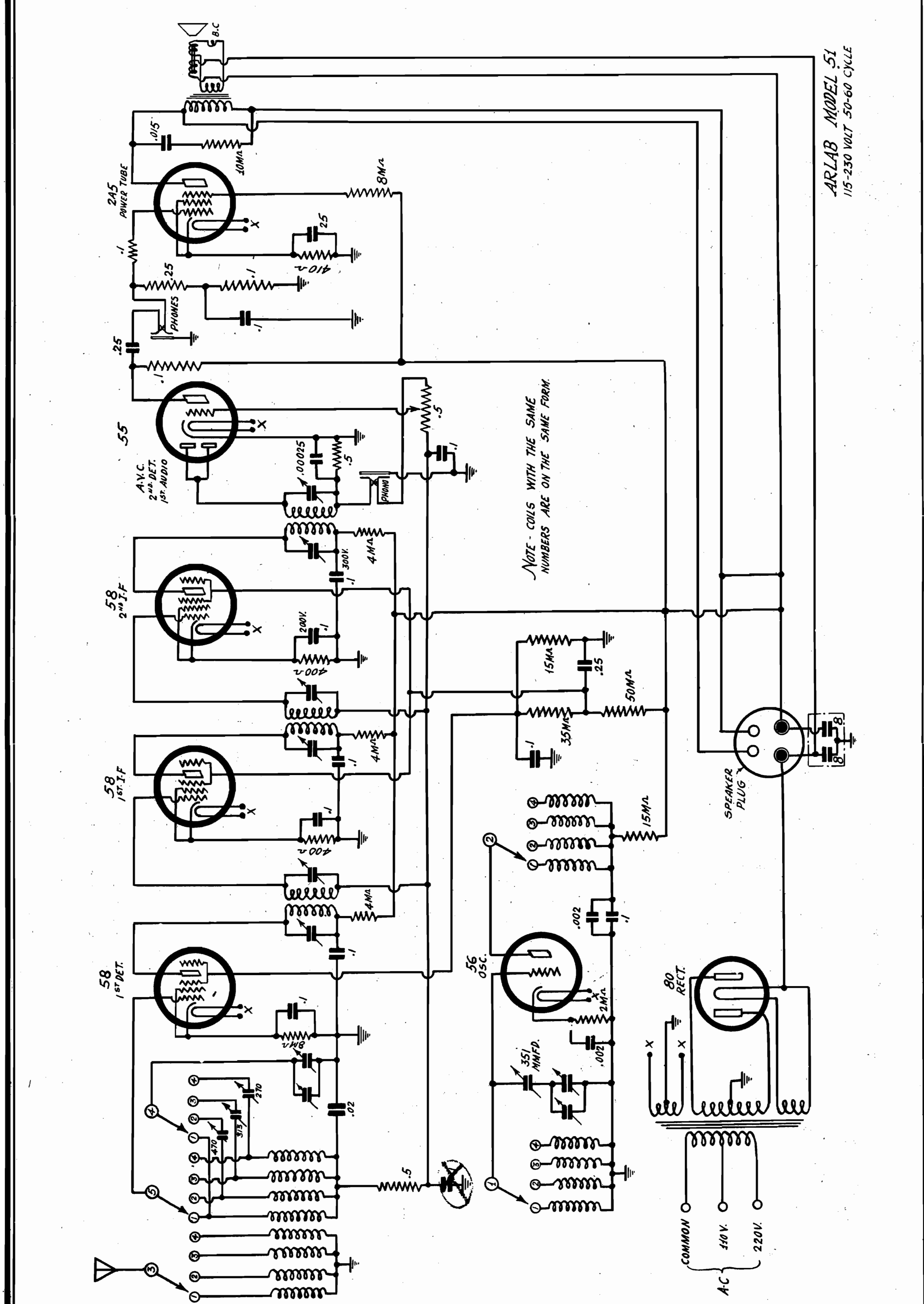
"RESCO 3"
SHORT WAVE RECEIVER



RESCO SW-5 AC

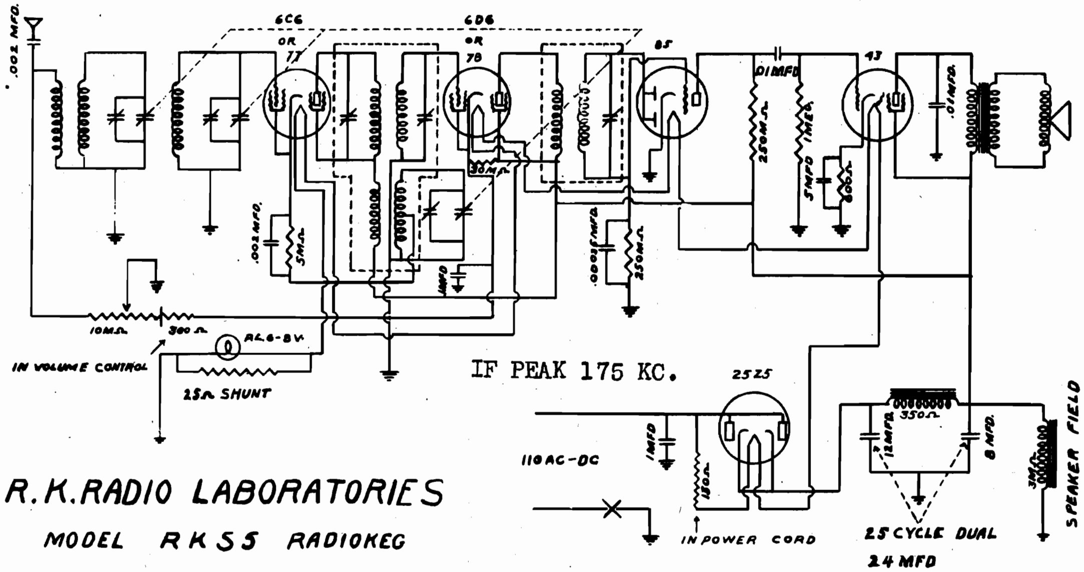
MODEL Arlab 51
Schematic

ROCKE INTERNATIONAL ELECTRIC CORP.



MODEL RK-S-5 Radiokeg
MODEL Radiochron "B"

CLAGO RADIO CORP.
RK RADIO LABORATORIES, INC.



R.K.RADIO LABORATORIES

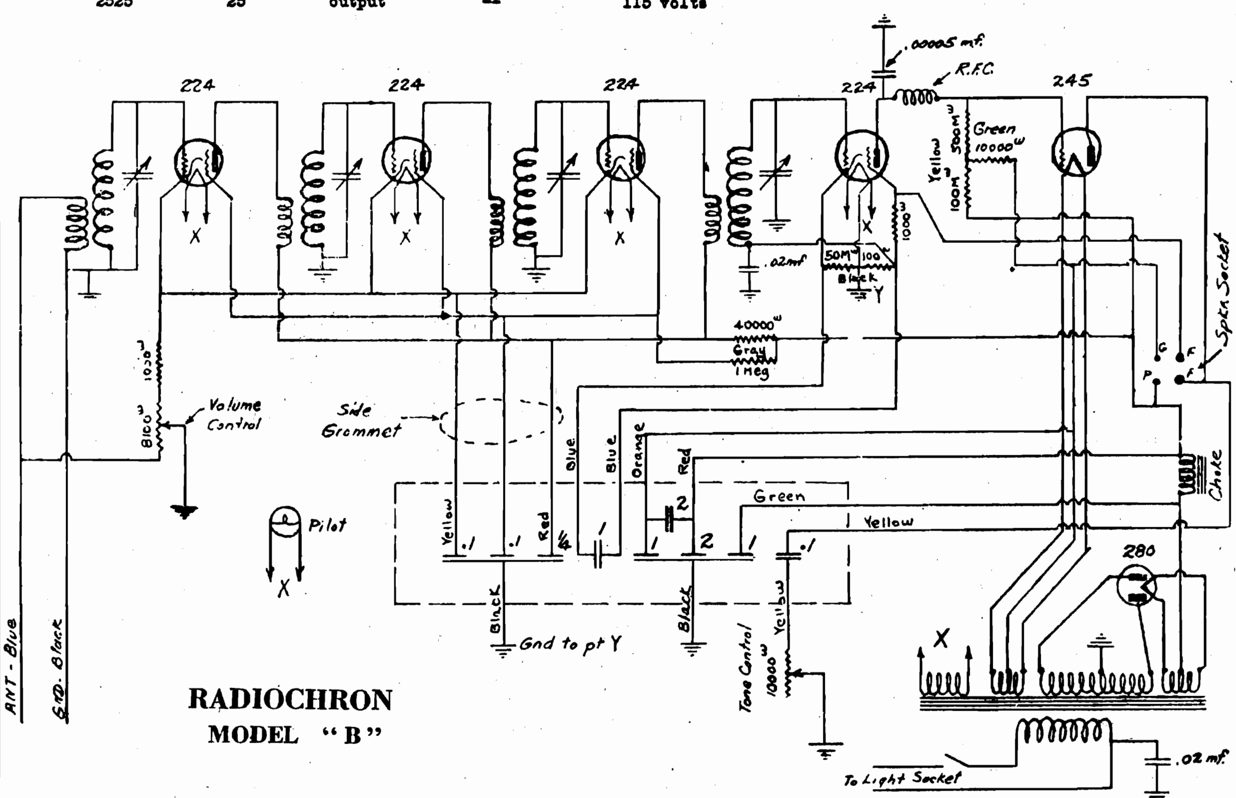
MODEL RKSS RADIOKEG

ENGINEER J.ZOLOYCHICK

DRAWN BY ASSISTANT ENG. S.R.MAKO

VOLTAGE ANALYSIS: The following voltage analysis was taken with a 1000 ohms per volt meter. Socket to ground on chassis. Volume control set at maximum and line potential 115.

	Filament volts	Screen Grid volts	Bias volts	Plate Voltage volts
77	6.3	105	5	105
78	6.3	105	3.5	105
85	6.3	--	--	15
43	25	106	15	98
2525	25	output	--	115 volts



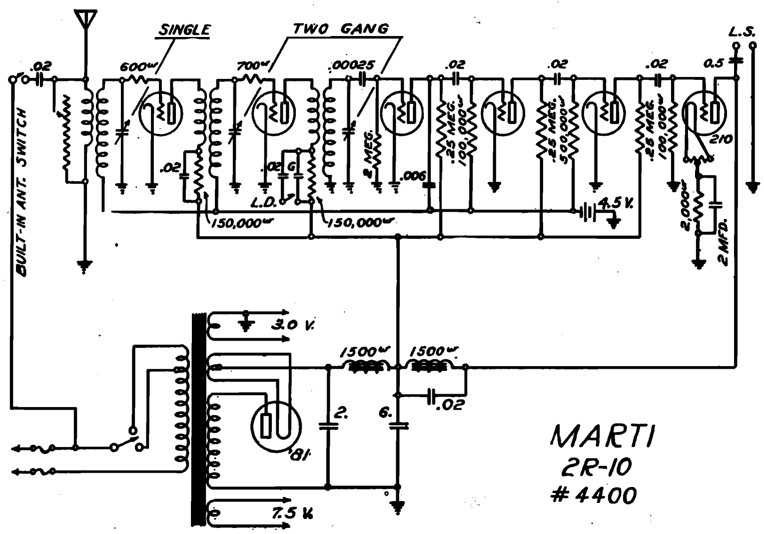
RADIOCHRON
MODEL "B"

MODEL Marti 2R-10
MODEL Marti "T"
MODEL Shamrock "28-29"

MARTI RADIO
SHAMROCK RADIO

Marti Model 2R-10

Numerous requests have been received for circuit diagrams of Marti receivers. In Figure 8 you will find the schematic wiring diagram of the Marti Model 2R-10. It has often been repeated by service men that many changes were made in these receivers and that no two of them are alike in every respect. The values and circuit shown in Figure 3 were obtained from receiver bearing the serial number 4400. Oscillation and low volume are the chief troubles encountered with this model. Excepting the terminals of the transformer, choke and volume control assembly there are few if any soldered connections, the leads being comprised of straps secured by bolts and nuts. It is imperative that all nuts and bolts are tightened securely to avoid oscillation. Low volume is usually attributed to defective coupling resistors. The model 2R-10 employs Kellogg type tubes in the r. f., detector, first and second audio stages.



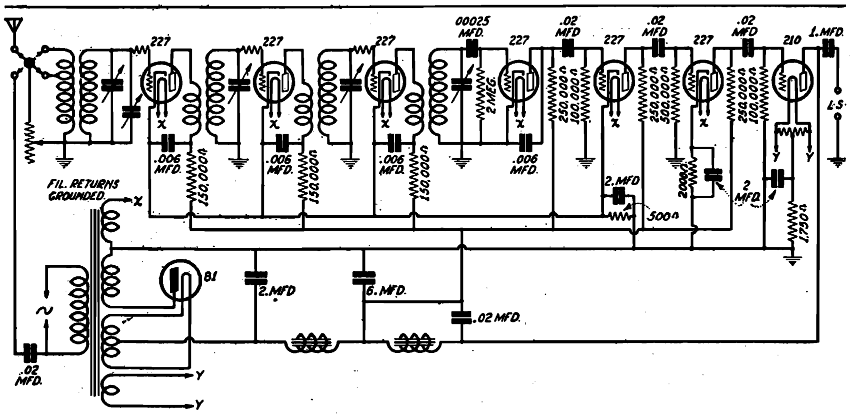
Model 2R-10 Marti and the Shamrock diagrams reproduced by courtesy of RADIO MERCHANT, November 1933.

Marti Model T

The schematic diagram of the Marti Model T is shown on this page. This, of course, is an early model receiver, but the diagram has not been easily obtainable.

It is seen to consist of three stages of tuned r-f, detector of the grid leak and condenser type, two stages of resistance coupled a-f and a single type 210 tube in the power stage. The power unit employs a type 81 half-wave rectifier and a double filter with the second section tuned to resonance in the vicinity of 60 cycles.

The volume control is seen to be in the antenna circuit. In the same circuit is a switch which permits changing from a regular antenna installation to the use of the light line as an antenna.



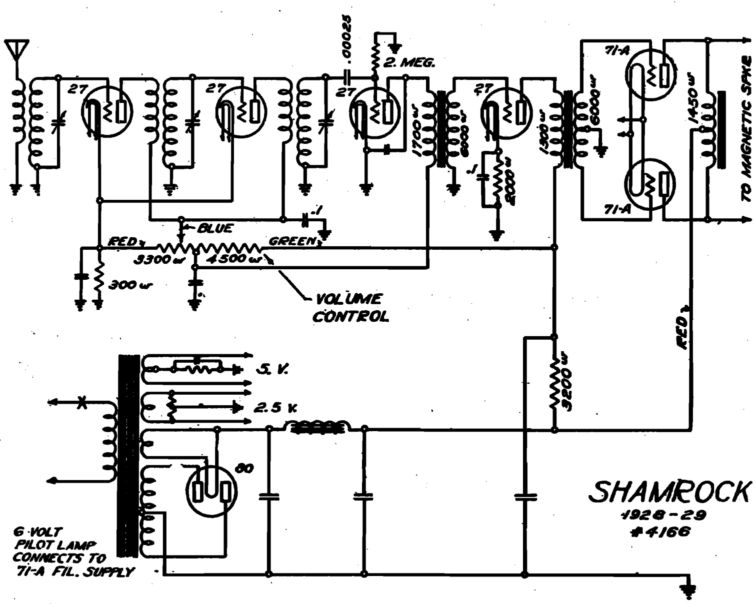
Shamrock Wiring Diagram

Two requests have been received for information regarding the connection of the volume control unit in the Shamrock receiver. The total resistance of the volume control assembly is approximately 7,800 ohms with a fixed tap at 4500 ohms to supply the detector plate voltage.

SOCKET VOLTAGES

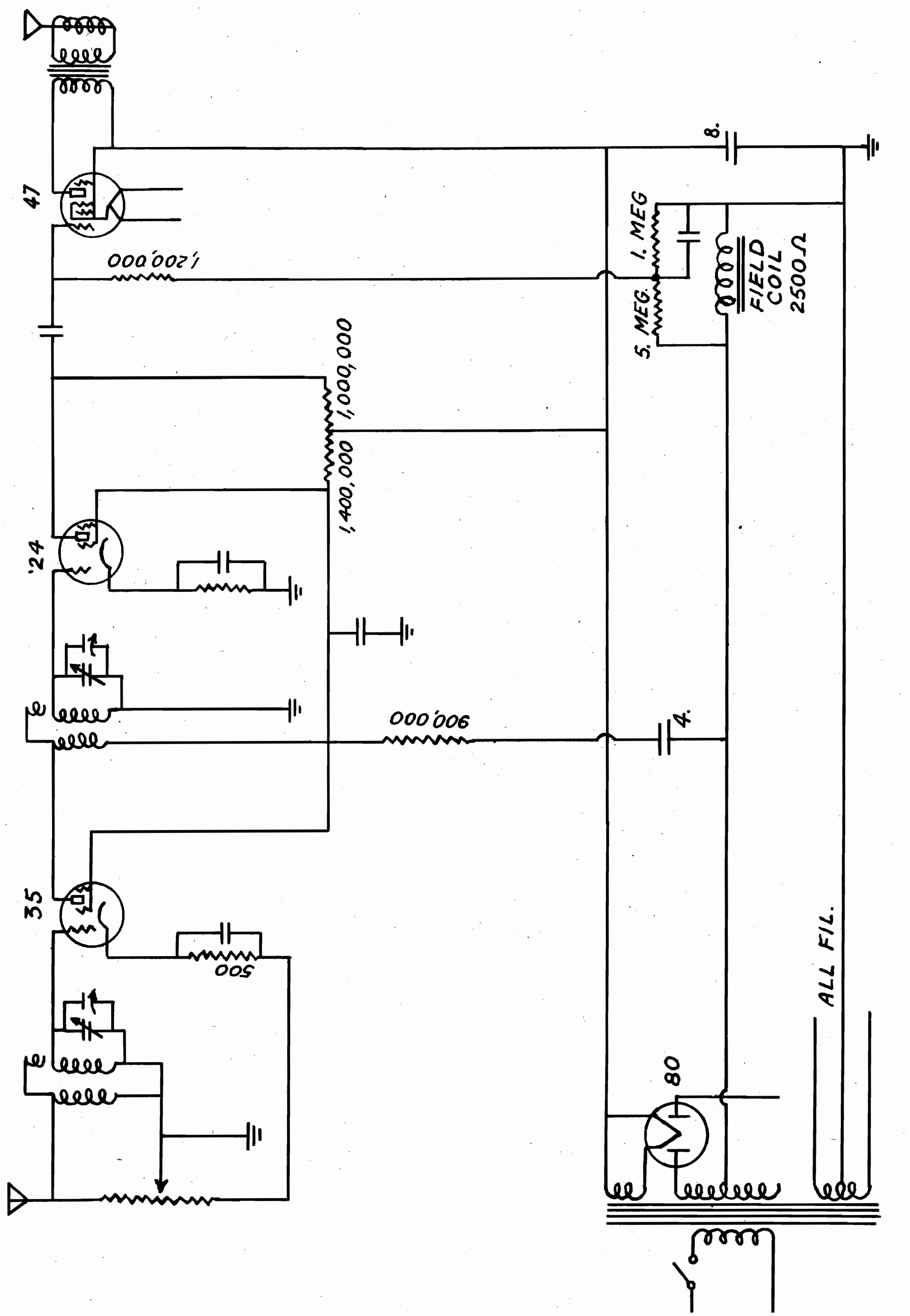
VOLUME CONTROL IN MAX. VOLUME POSITION

SOCKET	TYPE	E_f	E_k	E_p	E_{cg}	I_p
1st. R.F.	27	2.1	5	100	6	4
2nd. R.F.	27	2.1	5	100	6	4
DET.	27	2.1		40		2.5
1st. A.F.	27	1.9	4.5	100	4	4
P.P / P.P	71-A	5.0		150	32	150
RECT.	80	4.4				275/275



MODEL Sky-Rover
Schematic

SKY ROVER



MODEL Supreme 1931
Schematic

SUPREME RADIO