ALIGNMENT DATA

INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6AV) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection of the antenna; or, if the oscillator is not available, connect it to the instrument panel, set the volume control at maximum, adjust the broadcast antenna condenser for maximum signal (as indicated on the output meter). Slowly increase or decrease the broadcast antenna condenser while tuning back and forth across the broadcast band. When the maximum reading is obtained at 600 KC, note the position of the broadcast oscillator trimmer. Then, adjust the broadcast oscillator trimmer to the original 1400 KC setting.
PACKARD BELL CO.

MODEL 5AC
Schematic
MODELS 5AE, 5AEP
Schematic, Socket

NOTE - CONNECTIONS MARKED "F" FOR SAE ONLY
"S" FOR SREP
AC 120V 50-60Hz
PACKARD BELL CO.

MODELS 48E, 48EP
MODEL 48F
Schematics, Socket

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RADIO
To record radio programs set "Phono-Radio Switch" so that number "5" is opposite brass marker above the knob. Set volume control for loud and clear reception. Then set switch so that number "3" is opposite the marker and record the program. Do not allow needle to cut disc when it reaches the inner label. Do not allow the fine threads which form to collect under the needle, brush lightly with a soft cloth or brush towards the center of the disc.

MICROPHONE
For microphone recording set switch so that number 1 is opposite marker and test for operation. Then turn switch so that number "2" is opposite the marker. Turn volume control fully to the right. In speaking use normal voice with microphone at least six inches from the mouth.

NOTE: Be sure needle is firmly in place and that the flat side points towards the rear of the cabinet. Check that the small pin projects through one of the three holes on the blank to prevent the disc from slipping.
IF PEAK 455 KC

MODEL
114 C

The receiver is designed for operation from 115 volt alternating current, 25-60 cycle (AC) supply lines. The proper frequency (cycles) is specified on the label at the rear of the chassis.
AUTOMATIC TUNING: There are four push buttons on the front panel which can be set so that by simply pushing the button marked with a station's call letters, any of four different stations may be received. Allow the receiver to warm up for 20 minutes before making the station adjustments. Decide on the station you wish to receive. Tune to this station as accurately as possible with the selector knob. Next, push in this button as far as possible, being careful not to disturb the station setting on the dial. Turn this push button knob about one turn to the left, or until it starts to unscrew easily. Holding the button at the "IN" position, screw the push button knob to the right until it is tight. Cut out name of station from list supplied and insert in face of button. Insert celluloid disk.

This completes the adjustments for one station. The three other buttons may be set in a similar manner.
PHILCO Model "L" RECORD CHANGER

OPERATING INSTRUCTIONS

The Model "L" Record Changer plays seven 12" or eight 10" Records automatically. The last record remains on the turntable and repeats as long as the Record Changer is in operation.

Records may be repeated as often as desired by raising the record selecting arm at A Fig. 1 to the upright position. To stop and start the record selecting arm, pull the latch lever at E Fig. 1 forward.

To adjust the record selecting arm to handle 10" records set the record selecting arm lever at D Fig. 1 opposite the number 10 stamped on the base plate. For 12" records set the lever opposite the number 1E.

To adjust the pickup to play 10" records, pull the pickup stop at B Fig. 1 back. (Away from the pickup needle). For 12" records pull the stop forward (toward the needle) as far as it will go.

Some units are equipped with two speed motors, and others with three 78 RPM motors. When the two speed motor is used change from one speed to the other by simply moving lever at Y Fig. 1 to position desired.

To start motor, throw switch at N Fig. 1 on the "off" position.

TRIP MECHANISM

The trip mechanism is the trigger that sets the Record Changer in motion. This is done by allowing the latch bar at O Fig. 1 to drop into position, and be actuated by the arm at P Fig. 1. This is caused by driving the motor and the motor is in motion as long as the motor is running. If this mechanism does not operate smoothly, the precautions outlined in succeeding paragraphs should be observed.

First of all, make sure that the square pin in the latch lever at O Fig. 1 latches properly in the notch in the latch lever at J Fig. 1. When latched, the notch should be engaged approximately one-half of its depth. If the depth of engagement is adjusted by means of the eccentric washer and locking screw at N Fig. 1. Now run the Record Changer through its cycle. If the square pin fails to engage the notch in the latch lever, first check the tension of the latch spring at H Fig. 1 to assure that the motor can engage the pin. Next check the depth of engagement at O Fig. 1. This may be because the motor is not properly mounted, and is too slack.

IMPORTANT—Before attempting to change the tension of any spring, be sure that the parts involved work freely without any tendency to bind, for at any binding condition would preclude proper operation.

The Record Changer is adjusted at the factory to trip on a 0" trip groove record when the phonograph needle is 1" from the end of the hole in the center of the record.

MOTOR SPEED

The motor speed is adjusted by means of a lever at C Fig. 1 which is mounted under the turntable. The direction of swing of a dial to slow is indicated by the legends F and S on the base plate.

33-1/3 RPM—78 RPM SHIFT

Two-speed motors only

More the speed change lever at P Fig. 1 as far as it will go to the position indicated by the legends 33-1/3 and 78 on the base plate.

If adjustment of speed change lever is required for any reason, proceed as follows: First loosen the screw which clamps the lever to the motor shaft. This shaft is provided with a screwdriver slot at the end, using a screw driver, turn this shaft in a clockwise direction until you feel it strike the stop. The motor is now in the 33-1/3 RPM position. Now set the lever against the lug provided in the base plate and opposite the legends 33-1/3 and tighten the clamp screw. This places the lever in the correct position on the motor shaft. The final step is the adjustment of the eccentric bushing at G Fig. 1 which limits the throw of the lever. First loosen the screw which holds the eccentric bushing. Next, throw the speed change lever to its farthest 78 RPM position, using care that the lever does not slip on the motor shaft. Then turn the eccentric bushing around until it touches the side of the lever, and tighten it in place with the screw provided.

MOTOR LUBRICATION

The motor installed in the Record Changer is governor controlled, and all gearing enclosed, and leaves the factory lubricated for operation. For maximum satisfaction, lubricate the motor at regular intervals with SAE No. 10 oil. Do not use any other grade of oil.

The governor arm engages with a ring of hard felt. This felt is impregnated with a lubricating solution sufficient for protection in both cases for a year under normal conditions. It may be necessary, however, if the motor shows a tendency to chatter or waiver, to apply a drop or two of oil to this felt ring.

When eccentric or oscillating trip groove records are used, tripping is effected by means of the hardened steel pin in the end of tone arm lift crank at S Fig. 2 engaging the serrated block on the trip lever at T Fig. 2. These must be a minimum of 1/16" play between the end of the pin and the block, when, with a short needle, (1/8" Minimum Length) the pin is resting on one record on the turntable. If the pressure of the pin on the block is not sufficient to insure operation, then check the pressure spring which is located up under the pin.

The oval head pivot screw at R Fig. 1 serves as a pivot for the lift lever at T Fig. 1. This screw should allow the lift lever to be raised by the latch bar to its maximum height without binding but also without any additional play.

If the Record Changer fails to trip, see if the phonograph needle is jumping out of a worn record trip groove. Next make certain that all parts of the mechanism work freely and smoothly. If it is found that the latch bar at O Fig. 1 is not dropping in far enough to engage the cam at P Fig. 1, then check the tension of the trip spring at H Fig. 1.

RECORD REMOVING MECHANISM

The Record Changer is adjusted so that it will always leave one record on the turntable. This is done to prevent the phonograph needle from damaging the covering on the turntable. In case the Record Removing Mechanism fails to operate smoothly, proceed as follows: The motor is in motion and that the latch bar at O Fig. 1 can swing freely and clear the cam at P Fig. 1. Place one record on the turntable and measure from the top of this record down to the base plate. This clearance should be one inch. Now by pulling the lever on Fig. 1, it will be possible to swing the record removing lever at Y Fig. 3 over to where it just touches the edge of the record. If the adjustment is correct, the record removing lever should just barely rise over the edge of the first record. If adjustment is required it can be made by means of the stop screw at Q Fig. 3. In the event the record removing record raises the record from the turntable and drops it back in place without removing it, check the lift adjustment at V Fig. 1. This adjustment consists of an eccentric stud which is loosened and is made by loosening the lock nut and turning the eccentric stud. The lift adjustment should be set so that the hole in the center of the record just clears turntable spindle when the Record Changer is in operation.

PICKUP LOWERING MECHANISM

The pickup lowering mechanism has two functions. First, it lowers the phonograph needle gently to the surface of the record. Second, it feeds the needle toward the center of the record so that it will enter the playing groove.
MODEL TH-1
Schematic
Alignment

ALIGNMENT OF THE COMPENSATORS

In order to align the R.F. circuit of the receiver, an output meter, and signal generator will be required. With these instruments, the compensators should be adjusted as given below.

1. Connect an output meter to the plate and cathode terminals of the 43 tube.

2. The signal generator output lead is now connected to the aerial wire of the receiver through a 100 μfd. condenser and the generator ground to a good ground connection. Then, turn the volume control to a full volume position.

3. Adjust the dial pointer as follows: Turn the tuning condenser to maximum capacity position. With the condenser in this position, the dial pointer should be 4 inch below the 650 K.C. mark of the dial and horizontal with the chassis.

4. Set the signal generator and receiver dial for 1500 K.C. and adjust paddles 3A and 3B for maximum reading on the output meter.

MODEL TH-1 is a 5 tube receiver designed for operation on alternating current (A.C.) or direct current (D.C.) 115 volts and covers a frequency range of 540 to 1720 kilocycles.

An indoor aerial 30 feet in length is attached to the receiver for average receiving conditions. In remote localities where signal strength is weak, a regular outdoor aerial is recommended, such as Philco aerial Part No. 40-638. For hotels and apartment house installations, Philco Utility Aerial Part No. 40-638 should be used.

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MODEL TH-3 is a Stube superheterodyne receiver covering a frequency range from 540 to 1720 kilocycles and designed for operation on 115 volts alternating current (A.C.). The tubes used in this model are indicated on the schematic diagram shown below.

REPLACEMENT PARTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Philco Part No.</th>
<th>No.</th>
<th>Description</th>
<th>Philco Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antenna Transformer</td>
<td>32-2563</td>
<td>23</td>
<td>Condenser (.006 mf. molded)</td>
<td>30-4423</td>
</tr>
<tr>
<td>2</td>
<td>Condenser (.05 mf. tubular)</td>
<td>30-4419</td>
<td>24</td>
<td>Power Transformer</td>
<td>32-7879</td>
</tr>
<tr>
<td>3</td>
<td>Tuning Condenser</td>
<td>31-2335</td>
<td>25</td>
<td>Electrolytic Condenser (12 mf.)</td>
<td>30-2327</td>
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<tr>
<td>4</td>
<td>Resistor (70,000 ohms, 1/2 watt)</td>
<td>33-370339</td>
<td>26</td>
<td>Electrolytic Condenser (4 mf.)</td>
<td>30-2328</td>
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<tr>
<td>5</td>
<td>Condenser (110 mmf. mica)</td>
<td>30-1031</td>
<td>27</td>
<td>Field Coil Part of Speaker</td>
<td>36-1461</td>
</tr>
<tr>
<td>6</td>
<td>Oscillator Transformer</td>
<td>32-3021</td>
<td>28</td>
<td>Resistor (250 ohms, 1/2 watt)</td>
<td>33-125339</td>
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<tr>
<td>7</td>
<td>1st I.F. Transformer</td>
<td>32-3120</td>
<td>29</td>
<td>Resistor (70 ohms, 1/2 watt)</td>
<td>33-070339</td>
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<tr>
<td>8</td>
<td>Resistor (3.0 meg., 1/2 watt)</td>
<td>33-530339</td>
<td>30</td>
<td>Pilot Lamp</td>
<td>34-2064</td>
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<tr>
<td>9</td>
<td>Resistor (25,000 ohms, 1/2 watt)</td>
<td>33-325339</td>
<td>31</td>
<td>Bezel &amp; Silk Assembly</td>
<td>40-6430</td>
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<tr>
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<td>Condenser (.05 mf. tubular)</td>
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<td>32</td>
<td>Bezel Throat</td>
<td>28-5474</td>
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<td>11</td>
<td>2nd I.F. Transformer</td>
<td>32-2274</td>
<td>33</td>
<td>Bezel Window</td>
<td>27-5409</td>
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<tr>
<td>12</td>
<td>Resistor (81,000 ohms, 1/2 watt)</td>
<td>33-351339</td>
<td>34</td>
<td>Cone Assembly For Speaker 36-1461-1</td>
<td>36-4114</td>
</tr>
<tr>
<td>13</td>
<td>Volume Control</td>
<td>33-5254</td>
<td>35</td>
<td>Cone Assembly For Speaker 36-1461-2</td>
<td>36-4065</td>
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<tr>
<td>14</td>
<td>Condenser (.01 mf. tubular)</td>
<td>30-4479</td>
<td>36</td>
<td>Dial &amp; Scale Assembly</td>
<td>31-2351</td>
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<tr>
<td>15</td>
<td>Resistor (4.0 meg., 1/2 watt)</td>
<td>33-540339</td>
<td>37</td>
<td>Drive Cord 10 9/16&quot;</td>
<td>27-8411</td>
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<tr>
<td>16</td>
<td>Resistor (160,000 ohms, 1/2 watt)</td>
<td>33-416338</td>
<td>38</td>
<td>Drive Drum</td>
<td>20-6626</td>
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<tr>
<td>17</td>
<td>Condenser (.01 mf. tubular)</td>
<td>30-4169</td>
<td>39</td>
<td>Drive Shaft</td>
<td>50-5018</td>
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<td>18</td>
<td>Condenser (250 mmf. mica)</td>
<td>30-1032</td>
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<td>Knob Assembly</td>
<td>27-4032</td>
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<tr>
<td>19</td>
<td>Resistor (1.0 meg., 1/2 watt)</td>
<td>33-510339</td>
<td>41</td>
<td>Pointer</td>
<td>28-5408</td>
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<tr>
<td>20</td>
<td>Condenser (.006 mf. tubular)</td>
<td>30-4467</td>
<td>42</td>
<td>Power Cord</td>
<td>1-2776</td>
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<tr>
<td>21</td>
<td>Output Transformer</td>
<td></td>
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<td>Socket (5 prong)</td>
<td>27-6035</td>
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<td></td>
<td>For Speaker 36-1461-1</td>
<td>32-6046</td>
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<td>Socket (6 prong)</td>
<td>27-6036</td>
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<td></td>
<td>For Speaker 36-1461-2</td>
<td>32-6040</td>
<td></td>
<td>Socket (7 prong)</td>
<td>27-6037</td>
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<tr>
<td>22</td>
<td>Speaker Cone and Voice Coil Assembly</td>
<td></td>
<td></td>
<td>Speaker</td>
<td>38-1461</td>
</tr>
</tbody>
</table>

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GENERAL ALIGNING INSTRUCTIONS

Models TH-3, TH-4, TP-4, TH-5, TP-5, TP-10, TP-11, TP-12

The same general procedure is followed in aligning the compensating condensers in any of the above listed models.

EQUIPMENT REQUIRED

Signal Generator Philco Model 077 or 177 should be used.
Aligning Indicator Philco Model 027 and Model 028 circuit testers which contain an audio output meter and vacuum tube voltmeter. Either of the vacuum tube voltmeter or the audio output meters may be used as an aligning indicator and are connected as given under “Connecting Aligning Instruments”.
Tools: Fibre handle aligning screwdriver, Philco Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Audio Output Meter: If an aligning indicator of this type is used, connect it to the plate and screen terminals of the output tube.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections:
Attach the negative terminal of the voltmeter to any point in the circuit where the A.V.C. voltage can be obtained. Connect the positive terminal to the ground connection of the receiver. In AC-DC sets the positive (+) terminal of the vacuum tube voltmeter should be connected to (B—) of the receiver. (Cathode 7C6.)

For aligning receivers with loktal type tubes, an aligning adaptor, Philco Part No. 45-2767 may be used with the vacuum tube voltmeter. To use the adaptor, remove the second detector tube from its socket and insert the aligning adaptor in the socket, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the light colored wire which protrudes from the side of the adaptor.

Attach the positive terminal of the vacuum tube voltmeter to the black wire of the adaptor.

Signal Generator: When adjusting the I.F. paddlers, the high side of the signal generator is connected through a .004 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis. It may be necessary when adjusting AC-DC models to reverse the power plug to eliminate hum.

The R.F. and oscillator paddlers are aligned with the high side of the signal generator connected to the antenna of the receiver through a 100 mradil condenser.

After connecting the aligning instruments, adjust the compensators on all models in the order as shown in the tabulation below. The first and second I.F. transformers in all models are located on the top and bottom sections of the chassis respectively. The antenna and oscillator paddlers are located on the tuning condenser.

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>SPECIAL INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Connections to Receiver</td>
<td>Dial Setting</td>
<td>Dial Setting</td>
<td>Control Setting</td>
</tr>
<tr>
<td>1</td>
<td>Ant. Section of Tuning Cond.</td>
<td>1700 K.C.</td>
<td>140 K.C</td>
</tr>
</tbody>
</table>

NOTE A—DIAL CALIBRATION: With the exception of Models TP-10 and TP-11 the dial pointers are adjusted by closing the tuning condenser (plates fully meshed) and setting the pointers on the dot below 55 on the dial.

NOTE B—The alignment procedure for the I.F. paddlers in Models TP-10 and TP-11 is the same as that given above. The antenna and oscillator paddlers of these models, however, are adjusted as follows:
1. Turn the tuning condenser to the extreme high frequency position (all plates out of mesh).
2. Insert a .004" gauge between the stationary and rotor plates of the oscillator condenser. If the gauge is not handy, a piece of bond writing paper can be used. After inserting gauge, turn rotor toward the low frequency end so that the gauge will be held in position.
4. Remove gauge and set signal generator to 1500 K.C. and tune tuning condenser for maximum reading on this signal, then adjust the antenna paddler for maximum output.
5. Place set in cabinet so that the tuning arm on the tuning condenser engages the dial on the cabinet. After placing receiver in the cabinet and it is found that the dial does not track properly with station signals, the dial can be calibrated as follows: Set the signal generator to a low frequency signal (600 K.C.) and tune receiver until signal shows maximum reading on the output meter. The dial is then set to this signal by inserting a 6-32 Phillips screwdriver to the adjustment screw on the tuning condenser pulley. Loosen screw and slightly turn dial so that it reads 600 K.C. and then tighten screw. When doing this, however, precaution should be taken so that the tuning condenser is not disturbed while dial is being adjusted and screw is being tightened or loosened.
WIRELESS RECORD PLAYER

MODEL RP-3

Model RP-3 is a wireless record player, designed to operate through the entire R.F. and audio system of a Radio Receiver. No connections are required between the wireless record player and the radio. The sound from the record is converted into a radio signal (540 K.C.) and broadcast to the aerial of the radio set.

This model is equipped with a semi-automatic crystal pickup mechanism which will play either ten inch or twelve inch records. The pickup mechanism automatically places the pickup on the record when the lid of the cabinet is closed. Records can also be repeated by simply opening and closing the lid.

The player is operated from a 115 Volt, 60 cycle A.C. power supply. A volume control is also provided for adjusting the output of the player.

CHANGING OPERATING FREQUENCY

When the record player leaves the factory it is adjusted to operate at approximately 540 K.C. If interference from broadcasting stations is encountered, the frequency of the unit can be changed to any other frequency between 530 K.C. and 550 K.C. by removing snap button and adjusting small screw indicated in diagram. Turning screw clockwise lowers the frequency, counter-clockwise raises the frequency. This adjustment is best made while the unit is in operation.

No definite rule can be established for the relative location of the record player to a radio. Individual trial will establish the best location. However, in general, satisfactory operation may be obtained up to a distance of fifty (50) feet, provided local noise conditions are not too severe.

If hum is experienced it may be necessary to reverse the power plug of the record player, the radio, or both. In some cases it may be advisable to use the same receptacle for record player and radio.

MODEL RP-3 WIRELESS RECORD PLAYER

<table>
<thead>
<tr>
<th>Schem. No.</th>
<th>Description</th>
<th>Philco Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motor Switch</td>
<td>42-1903</td>
</tr>
<tr>
<td>2</td>
<td>Master Switch</td>
<td>42-3406-2</td>
</tr>
<tr>
<td>3</td>
<td>Power Transformer</td>
<td>32-8043</td>
</tr>
<tr>
<td>4</td>
<td>Line Condenser (.01 mf.,.01 mf., 600 v.)</td>
<td>3903-DG</td>
</tr>
<tr>
<td>5</td>
<td>Motor</td>
<td>35-2021</td>
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<tr>
<td>6</td>
<td>Crystal Pickup</td>
<td>35-2028</td>
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<tr>
<td>7</td>
<td>Crystal Cartridge</td>
<td>35-1027</td>
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<tr>
<td>8</td>
<td>Filter Resistor (10,000 ohms., .5 watt)</td>
<td>33-310344</td>
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<tr>
<td>9</td>
<td>Oscillator Grid Cond. (110 mfd.)</td>
<td>30-1031</td>
</tr>
<tr>
<td>10</td>
<td>Oscillator Grid Resistor (99,000 ohms., .5 watt)</td>
<td>33-390344</td>
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<tr>
<td>11</td>
<td>Comp. Resistor (51,000 ohms., .5 watt)</td>
<td>33-35344</td>
</tr>
<tr>
<td>12</td>
<td>Comp. Condenser (.006 mf., 200 v.)</td>
<td>30-4447</td>
</tr>
<tr>
<td>13</td>
<td>Electrolytic Condenser (8 mf., 150 v.)</td>
<td>30-2388</td>
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<tr>
<td>14</td>
<td>Volume Control</td>
<td>33-3322</td>
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<tr>
<td>15</td>
<td>Cathode Bias Resistor (1,000 ohms., .5 watt)</td>
<td>33-210344</td>
</tr>
<tr>
<td>16</td>
<td>Screen By-Pass (.1 mf., 200 v.)</td>
<td>30-4499-S</td>
</tr>
<tr>
<td>17</td>
<td>Pilot Light (6-V, .250 amp.)</td>
<td>34-2210</td>
</tr>
<tr>
<td>18</td>
<td>Oscillator Coil</td>
<td>32-3232</td>
</tr>
<tr>
<td>19</td>
<td>Oscillator Condenser (400 mfd.)</td>
<td>30-1116</td>
</tr>
</tbody>
</table>
MODEL TH-4 is a 5 tube superheterodyne receiver covering a frequency range of 540 to 1720 kilocycles and designed for operation on either alternating current (A.C.) or direct current (D.C.) 115 volts.

An indoor aerial 20 feet in length is attached to the receiver for average receiving conditions; however in apartment houses, hotels, or steel reinforced buildings, the Philco Utility Aerial Part No. 40-6364 is recommended.

NOTE: If no sound is heard after connecting the receiver to the power supply and sufficient time has been allowed for the tubes to heat, reverse the electric plug in the outlet. The same procedure should be observed on A.C. power supplies when a slight hum is heard with the volume turned low.

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# PHILCO RADIO & TELEV. CORP.

**MODELS TP-4, TP4-I**

**Schematic, Notes**

![Schematic Diagram](image)

**IF PEAK 470 KC**

**FOR OTHER DATA SEE INDEX**

## REPLACEMENT PARTS

**TRANSITONE HOME RADIO MODEL**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Philco Part No.</th>
<th>Description</th>
<th>Philco Part No.</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>Antenna Transformer</td>
<td>32-3184</td>
<td>For Speaker</td>
<td>36-1469-9</td>
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<tr>
<td>2</td>
<td>Tubular Condenser (.0015 mf., 200V)</td>
<td>30-45668</td>
<td>Cone Assembly</td>
<td>36-4115</td>
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<tr>
<td>3</td>
<td>Tuning Condenser</td>
<td>31-2354</td>
<td>For Speaker</td>
<td>36-1469-1</td>
</tr>
<tr>
<td>4</td>
<td>Switch</td>
<td>42-1406</td>
<td>For Speaker</td>
<td>36-1469-9</td>
</tr>
<tr>
<td>5</td>
<td>Tubular Condenser (.05 mf., 200V)</td>
<td>30-45198</td>
<td>Tubular Condenser (.03 mf., 400V.)</td>
<td>30-44498</td>
</tr>
<tr>
<td>6</td>
<td>Tubular Condenser (.15 mf., 400V.)</td>
<td>30-46055</td>
<td>Electrolytic Condenser</td>
<td>30-2362</td>
</tr>
<tr>
<td>7</td>
<td>Resistor (50,000 ohms, 1/3 watt)</td>
<td>32-306244</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Mica Condenser</td>
<td>30-1031</td>
<td>Field Coil</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Oscillator Transformer</td>
<td>32-3152</td>
<td>Part of Speaker, Part No</td>
<td>36-1469</td>
</tr>
<tr>
<td>10</td>
<td>Tubular Condenser (.06 mf., 200V)</td>
<td>30-45198</td>
<td>Pilot Lamp</td>
<td>34-2068</td>
</tr>
<tr>
<td>11</td>
<td>1st I.F. Transformer</td>
<td>32-3148</td>
<td>Line Resistor</td>
<td>33-3367</td>
</tr>
<tr>
<td>12</td>
<td>2nd I.F. Transformer</td>
<td>32-3150</td>
<td>Cardboard Back</td>
<td>27-9511</td>
</tr>
<tr>
<td>13</td>
<td>Resistor (2 meg., 1/3 watt)</td>
<td>33-520244</td>
<td>Dial Window</td>
<td>27-5472</td>
</tr>
<tr>
<td>14</td>
<td>Mica Condenser (250 mmf.)</td>
<td>30-1032</td>
<td>Drive Cord Assembly</td>
<td>31-2356</td>
</tr>
<tr>
<td>15</td>
<td>Resistor (20,000 ohms, 1/3 watt)</td>
<td>33-320244</td>
<td>Drive Shaft Assembly</td>
<td>31-2356</td>
</tr>
<tr>
<td>16</td>
<td>Volume Control (500,000 ohms)</td>
<td>32-62006</td>
<td>Drive Drum</td>
<td>28-6622</td>
</tr>
<tr>
<td>17</td>
<td>Tubular Condenser (.01 mf. 200V.)</td>
<td>30-44795</td>
<td>Grille Cloth</td>
<td>44-1287</td>
</tr>
<tr>
<td>18</td>
<td>Resistor (4 meg., 1/3 watt)</td>
<td>33-540244</td>
<td>Knob Assembly</td>
<td>27-4809</td>
</tr>
<tr>
<td>19</td>
<td>Resistor (250,000 ohms, 1/3 watt).</td>
<td>33-452244</td>
<td>Pointer</td>
<td>27-4809</td>
</tr>
<tr>
<td>20</td>
<td>Tubular Condenser (.01 mf., 400V.)</td>
<td>30-45725</td>
<td>Scale</td>
<td>27-5472</td>
</tr>
<tr>
<td>21</td>
<td>Resistor (500,000 ohms, 1/3 watt)</td>
<td>33-450244</td>
<td>Speaker</td>
<td>33-450244</td>
</tr>
<tr>
<td>22</td>
<td>Resistor (130 ohms, 1/2 watt)</td>
<td>33-113336</td>
<td>Cardboard Back</td>
<td>27-9511</td>
</tr>
<tr>
<td>23</td>
<td>Tubular Condenser (.02 mf., 400V.)</td>
<td>30-46165</td>
<td>Drive Shaft</td>
<td>32-8047</td>
</tr>
<tr>
<td>24</td>
<td>Output Transformer</td>
<td>30-46165</td>
<td>Drive Drum</td>
<td>28-8654</td>
</tr>
</tbody>
</table>

**TP-4 IVORY**

- Cardboard Back: 27-9546
- Knob Assembly: 27-4810

**MODELS TP-4 and TP-4-I** are 5 tube superheterodyne receivers having 2 tuning ranges covering from 540 to 1720 kilocycles on the broadcast band and a frequency range from 2.3 to 2.5 megacycles (M.C.) on the police band. This model is designed to operate on either alternating (A.C.) or direct current (D.C.) 115 volts. These models are identical with the exception of cabinets.

An indoor aerial 20 feet in length is attached to the receiver for average receiving conditions; however in apartment houses, hotels or steel-reinforced buildings, the Philco Utility Aerial Part No. 40-6384 is recommended.

**NOTE:** If no sound is heard after connecting the receiver to the power supply and sufficient time has been allowed for the tubes to heat, reverse the electric plug in the outlet. The same procedure should be observed on A.C. power supplies when a slight hum is heard with the volume turned low.

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MODEL TH-5T IVORY

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**REPLACEMENT PARTS**

<table>
<thead>
<tr>
<th>Schem. No.</th>
<th>Description</th>
<th>Philco Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antenna Transformer</td>
<td>32-5156</td>
</tr>
<tr>
<td>2</td>
<td>Tubular Condenser (.0015 mfd., 200v)</td>
<td>30-46668</td>
</tr>
<tr>
<td>3</td>
<td>Tuning Condenser</td>
<td>31-1265</td>
</tr>
<tr>
<td>4</td>
<td>Tubular Condenser (.05 mfd., 200v)</td>
<td>30-4618</td>
</tr>
<tr>
<td>5</td>
<td>Tubular Condenser (.15 mfd., 400v)</td>
<td>30-4608</td>
</tr>
<tr>
<td>6</td>
<td>Resistor (60,000 ohms, 1/3 watt)</td>
<td>33-260244</td>
</tr>
<tr>
<td>7</td>
<td>Mica Condenser (110 mmf.)</td>
<td>30-1051</td>
</tr>
<tr>
<td>8</td>
<td>Oscillator Transformer</td>
<td>32-3167</td>
</tr>
<tr>
<td>9</td>
<td>Tubular Condenser (.05 mfd., 400v)</td>
<td>30-46189</td>
</tr>
<tr>
<td>10</td>
<td>1st I.F. Transformer</td>
<td>30-46189</td>
</tr>
<tr>
<td>11</td>
<td>2nd I.F. Transformer</td>
<td>32-5160</td>
</tr>
<tr>
<td>12</td>
<td>Resistor (2 meg., 1/3 watt)</td>
<td>33-520244</td>
</tr>
<tr>
<td>13</td>
<td>Mica Condenser (250 mmf.)</td>
<td>30-1052</td>
</tr>
<tr>
<td>14</td>
<td>Resistor (20,000 ohms, 1/3 watt)</td>
<td>33-520244</td>
</tr>
<tr>
<td>15</td>
<td>Volume Control (500,000 ohms)</td>
<td>33-5304</td>
</tr>
<tr>
<td>16</td>
<td>Tubular Condenser (.01 mfd., 200v)</td>
<td>30-44799</td>
</tr>
<tr>
<td>17</td>
<td>Resistor (4 meg. 1/3 watt)</td>
<td>33-540244</td>
</tr>
<tr>
<td>18</td>
<td>Resistor (250,000 ohms, 1/3 watt)</td>
<td>33-420244</td>
</tr>
<tr>
<td>19</td>
<td>Tubular Condenser (.01 mfd., 400v)</td>
<td>30-4572S</td>
</tr>
<tr>
<td>20</td>
<td>Resistor (500,000 ohms, 1/3 watt)</td>
<td>33-450244</td>
</tr>
<tr>
<td>21</td>
<td>Resistor (130 ohms, 1/2 watt)</td>
<td>33-113356</td>
</tr>
</tbody>
</table>

**MODEL TH-5 is a 5 tube superheterodyne receiver covering a frequency range of 540 to 1720 kilocycles and designed for operation on either alternating current (A.C.) or direct current (D.C.) 115 volts.**

This model is equipped with 8 electric push-buttons for automatically selecting stations in addition to dial tuning. Five push-buttons are used for the stations and one push button for selecting dial tuning. The push-buttons cover a frequency range as follows:

<table>
<thead>
<tr>
<th>Padders (right to left from rear)</th>
<th>Circuit</th>
<th>Frequency Range</th>
<th>Padders (right to left from front)</th>
<th>Buttons (right to left from front)</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ant.</td>
<td>540 to 1030 kilocycles</td>
<td>7</td>
<td>Ant.</td>
<td>900 to 1470 kilocycles</td>
</tr>
<tr>
<td>2</td>
<td>Osc.</td>
<td>650 to 1110 kilocycles</td>
<td>8</td>
<td>Osc.</td>
<td>1160 to 1600 kilocycles</td>
</tr>
<tr>
<td>3</td>
<td>Osc.</td>
<td>740 to 1240 kilocycles</td>
<td>9</td>
<td>Ant.</td>
<td>Manual</td>
</tr>
<tr>
<td>4</td>
<td>Osc.</td>
<td></td>
<td>10</td>
<td>Osc.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Osc.</td>
<td></td>
<td>6</td>
<td>Manual</td>
<td></td>
</tr>
</tbody>
</table>

An indoor aerial 20 feet in length is attached to the receiver for average receiving conditions; however in apartment houses, hotels or steel-reinforced buildings, the Philco Utility Aerial Part No. 40-265 is recommended.

NOTE: If no sound is heard after connecting the receiver to the power supply and sufficient time has been allowed for the tubes to heat, reverse the electric plug in the outlet. The same procedure should be observed on A.C. power supplies when a slight hum is heard with the volume turned low.

©John F. Rider, Publisher
This model...

These models...

540 to 1030 kilocycles. Tuning...

An indoor aerial 20 feet in length is attached to the receiver for average receiving conditions; however in apartment houses, hotels or steel re-inforced buildings, the Philco Utility Aerial Part No. 40-364 is recommended.

NOTE: If no sound is heard after connecting the receiver to the power supply and sufficient time has been allowed for the tubes to heat, reverse the electric plug in the outlet. The same procedure should be observed on A.C. power supplies when a slight hum is heard with the volume turned low.

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SETTING AND OPERATING ELECTRIC PUSH BUTTON TUNING

Models TP-5, TP-11, TH-5

Select five of your favorite nearby broadcast stations and remove their call letters from the station call letter tab sheets supplied. Place the call letters in the windows above the buttons, making sure that each respective button covers the frequency of the station for which it is to be used. The frequency of the popular stations in your vicinity may be found by consulting any station list. The frequency range of the buttons is as follows:

<table>
<thead>
<tr>
<th>Padders (right to left from rear)</th>
<th>Buttons (left to right from front)</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ant</td>
<td>1 Circle</td>
<td>540 to 1030 kHz</td>
</tr>
<tr>
<td>2 Ant</td>
<td>2 Circle</td>
<td>650 to 1190 kHz</td>
</tr>
<tr>
<td>3 Ant</td>
<td>3 Circle</td>
<td>740 to 1240 kHz</td>
</tr>
<tr>
<td>4 Ant</td>
<td>4 Circle</td>
<td>900 to 1470 kHz</td>
</tr>
<tr>
<td>5 Ant</td>
<td>5 Circle</td>
<td>1160 to 1600 kHz</td>
</tr>
<tr>
<td>6 Ant</td>
<td>6 Dial</td>
<td></td>
</tr>
</tbody>
</table>

The left-hand button looking at the front of the cabinet corresponds to the two right-hand screws looking at the rear and covers the lowest frequency range.

With the "Manual" button depressed, tune in the station whose call letters appear above the left-hand button. Then depress the left-hand button, tune in the station by rotating the "OSC" screw of No. 1 pair (at the right end of the unit looking at the rear of the chassis). Turn the screw slowly and listen carefully or the station may be missed without noticing it. After the "OSC" screw has been adjusted for maximum volume, the corresponding "ANT" screw should be adjusted for maximum. For some stations, it may be necessary to re-adjust the "OSC" screw after the "ANT" screw has been set. Switching from the "Manual" to the automatic push button will enable you to make sure you have the correct station tuned in. When the first station has been set, the same procedure should be followed for the remaining buttons, first tuning in the desired station by means of the "Manual" control.

To tune the receiver with the "Push-Buttons," simply press in the button which is under the call letters of the desired station. Your station will be received instantly. The volume of the program may be controlled with the manual volume control.

While the above procedure is satisfactory in setting up push buttons for stations, a very accurate adjustment can be obtained with a vacuum tube voltmeter.

Model 39-8
ALIGNMENT OF COMPENSATORS

EQUIPMENT REQUIRED:

(1) Signal Generator: Philco Model 077 Signal Generator which has a fundamental frequency range from 116 to 38,000 K.C. is the correct instrument for this purpose.
(2) Output Meter, Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended.
(3) Philco Fiber Handle Screw Driver, Part No. 45-2610 and Fiber Wrench, Part No. 3164.

Signal Generator

<table>
<thead>
<tr>
<th>Operation In Order</th>
<th>Output Connections to Receiver</th>
<th>Dummy Antenna (Note A)</th>
<th>Dial Setting</th>
<th>Dial Setting</th>
<th>Control Setting</th>
<th>Adjust Compensators in order</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6A7 Grid Cap</td>
<td>.1 mF</td>
<td>470 K.C.</td>
<td>580 K.C.</td>
<td>Vol. Cont. Max.</td>
<td>15A, 10B, 10A</td>
<td>Adjust for max. output</td>
</tr>
</tbody>
</table>

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B—DIAL CALIBRATION: With the tuning condenser in "maximum capacity" position (plates fully meshed), set the dial pointer between the two horizontal lines at the low frequency end of the scale (580 K.C.).
MODEL TP-10 is a 5 tube superheterodyne receiver having 2 tuning ranges covering from 540 to 1720 kilocycles (K.C.) on the broadcast band and 2.3 to 2.5 megacycles (M.C.) on the police band. This model is designed for operation on either alternating current (A.C.) or direct current (D.C.) 115 volts. The receiver is assembled in a streamlined, 2 toned plastic cabinet.

An indoor aerial 20 feet in length is attached to the receiver for average receiving conditions; however in apartment houses, hotels or steel re-inforced buildings, the Philco Utility Aerial Part No. 40-6384 is recommended.

NOTE: If no sound is heard after connecting the receiver to the power supply and sufficient time has been allowed for the tubes to heat, reverse the electric plug in the outlet. The same procedure should be observed on A.C. power supplies when a slight hum is heard with the volume turned low.

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MODEL TP-11
Schematic, Tuner

PHILCO RADIO & TELEV. CORP.

IF PEAK 470 KC

FOR OTHER DATA
SEE INDEX

REPLACEMENT PARTS

<table>
<thead>
<tr>
<th>Schem. No.</th>
<th>Description</th>
<th>Philco Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antenna Transformer</td>
<td>32-3168</td>
</tr>
<tr>
<td>2</td>
<td>Tubular Condenser (.0015 mf., 200V)</td>
<td>30-4555S</td>
</tr>
<tr>
<td>3</td>
<td>Switch</td>
<td>42-1405</td>
</tr>
<tr>
<td>4</td>
<td>Tubular Condenser (.05 mf., 200V)</td>
<td>30-4519S</td>
</tr>
<tr>
<td>5</td>
<td>Tubular Condenser (.15 mf., 400V)</td>
<td>30-4505S</td>
</tr>
<tr>
<td>6</td>
<td>Resistor (50,000 ohms, 1/3 watt)</td>
<td>33-360244</td>
</tr>
<tr>
<td>7</td>
<td>Mica Condenser (110 mmf.)</td>
<td>30-1031</td>
</tr>
<tr>
<td>8</td>
<td>Oscillator Transformer</td>
<td>32-3167</td>
</tr>
<tr>
<td>9</td>
<td>Tubular Condenser (.05 mf., 200V)</td>
<td>30-4519S</td>
</tr>
<tr>
<td>10</td>
<td>1st I.F. Transformer</td>
<td>32-3149</td>
</tr>
<tr>
<td>11</td>
<td>2nd I.F. Transformer</td>
<td>32-3150</td>
</tr>
<tr>
<td>12</td>
<td>Resistor (2 meg., 1/3 watt)</td>
<td>33-350244</td>
</tr>
<tr>
<td>13</td>
<td>Mica Condenser (250 mmf.)</td>
<td>30-1032</td>
</tr>
<tr>
<td>14</td>
<td>Resistor (20,000 ohms, 1/3 watt)</td>
<td>33-320244</td>
</tr>
<tr>
<td>15</td>
<td>Distortion Control (500,000 ohms)</td>
<td>33-5306</td>
</tr>
</tbody>
</table>

MODEL TP-11 is a 5 tube superheterodyne receiver having 2 tuning ranges covering from 540 to 1720 kilocycles (K.C.) on the broadcast band and from 2.3 to 2.6 megacycles (M.C.) on the police band. This model is assembled in a 210 sliding, streamlined plastic cabinet.

This model is equipped with 8 electric push-buttons for automatically selecting stations in addition to dial tuning. Five push-buttons are used for the stations and one push-button for selecting dial tuning. The push-buttons cover a frequency range as follows:

<table>
<thead>
<tr>
<th>Holders (left to right)</th>
<th>Buttons (left to front)</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ant.</td>
<td>1</td>
<td>310 to 1030 kilocycles</td>
</tr>
<tr>
<td>Ant.</td>
<td>2</td>
<td>650 to 1100 kilocycles</td>
</tr>
<tr>
<td>Ant.</td>
<td>3</td>
<td>740 to 1240 kilocycles</td>
</tr>
</tbody>
</table>

An indoor aerial 20 feet in length is attached to the receiver for average receiving conditions; however in apartment houses, hotels or steel reinforced buildings, the Philco Utility Aerial Part No. 40-6384 is recommended.

NOTE: If no sound is heard after connecting the receiver to the power supply and sufficient time has been allowed for the tubes to heat, reverse the electric plug in the outlet. The same procedure should be observed on A.C. power supplies when a slight hum is heard with the volume turned low.

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**MODEL TP-12**

**Schematic & Notes**

**FOR ALIGNMENT**

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---

**REPLACEMENT PARTS**

**TRANSITONE HOME RADIO MODEL TP-12**

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<th>Schem. No.</th>
<th>Description</th>
<th>Philco Schem. Part No.</th>
<th>Description</th>
<th>Philco Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antenna Transformer</td>
<td>32-3164</td>
<td>For Speaker 36-1469-9</td>
<td>32-8044</td>
</tr>
<tr>
<td>2</td>
<td>Tubular Condenser (.0015 mF, 200V)</td>
<td>30-45558</td>
<td>Cone Assembly</td>
<td>36-1415</td>
</tr>
<tr>
<td>3</td>
<td>Tuning Condenser</td>
<td>31-2354</td>
<td>For Speaker 36-1469-1</td>
<td>36-14115</td>
</tr>
<tr>
<td>4</td>
<td>Switch</td>
<td>42-1406</td>
<td>For Speaker 36-1469-9</td>
<td>36-14113</td>
</tr>
<tr>
<td>5</td>
<td>Tubular Condenser (.05 mF, 200V)</td>
<td>30-45198</td>
<td>Electrolytic Condenser</td>
<td>30-8252</td>
</tr>
<tr>
<td>6</td>
<td>Tubular Condenser (.15 mF, 400V)</td>
<td>30-45055</td>
<td>(20-20 mF, 150V)</td>
<td>36-1382</td>
</tr>
<tr>
<td>7</td>
<td>Resistor (50,000 ohms, 1/3 watt)</td>
<td>33-350244</td>
<td>Field Coil...Part of Speaker No 36-1469</td>
<td>34-8086</td>
</tr>
<tr>
<td>8</td>
<td>Mica Condenser (110 mF.)</td>
<td>30-1031</td>
<td>Pilot Lamp...</td>
<td>33-3367</td>
</tr>
<tr>
<td>9</td>
<td>Oscillator Transformer</td>
<td>32-3452</td>
<td>Line Resistor...</td>
<td>33-3367</td>
</tr>
<tr>
<td>10</td>
<td>Tubular Condenser (.05 mF, 200V)</td>
<td>30-45198</td>
<td>Tubular Condenser</td>
<td>30-84444</td>
</tr>
<tr>
<td>11</td>
<td>1st I.F. Transformer</td>
<td>32-3414</td>
<td>Cardboard...</td>
<td>27-9299</td>
</tr>
<tr>
<td>12</td>
<td>2nd I.F. Transformer</td>
<td>32-3450</td>
<td>Cabinet...</td>
<td>10374</td>
</tr>
<tr>
<td>13</td>
<td>Resistor (2 mF, 1/3 watt)</td>
<td>33-32044</td>
<td>Cable (Power)...</td>
<td>L-3183</td>
</tr>
<tr>
<td>14</td>
<td>Mica Condenser (250 mF.)</td>
<td>30-1032</td>
<td>Dial Scale...</td>
<td>27-8498</td>
</tr>
<tr>
<td>15</td>
<td>Resistor (20,000 ohms, 1/3 watt)</td>
<td>33-332444</td>
<td>Drive Drum...</td>
<td>28-8682</td>
</tr>
<tr>
<td>16</td>
<td>Volume Control (500,000 ohms)</td>
<td>33-34606</td>
<td>Drive Shaft Assembly...</td>
<td>31-2356</td>
</tr>
<tr>
<td>17</td>
<td>Tubular Condenser (.01 mF, 200V)</td>
<td>30-4479S</td>
<td>Drive Cord Assembly...</td>
<td>31-2356</td>
</tr>
<tr>
<td>18</td>
<td>Resistor (4 mF, 1/3 watt)</td>
<td>33-346044</td>
<td>Knob Assembly...</td>
<td>27-4820</td>
</tr>
<tr>
<td>19</td>
<td>Resistor (250,000 ohms, 1/3 watt)</td>
<td>33-425244</td>
<td>Pointer Dial...</td>
<td>56-1326</td>
</tr>
<tr>
<td>20</td>
<td>Tubular Condenser (.01 mF, 400V)</td>
<td>30-45028</td>
<td>Spring (Drive Cord)...</td>
<td>26-8751</td>
</tr>
<tr>
<td>21</td>
<td>Resistor (500,000 ohms, 1/3 watt)</td>
<td>33-450244</td>
<td>Speaker...</td>
<td>36-1469</td>
</tr>
<tr>
<td>22</td>
<td>Resistor (130 ohms, 1/2 watt)</td>
<td>33-1133366</td>
<td>Socket Assembly (Pilot Lamp)...</td>
<td>38-9285</td>
</tr>
<tr>
<td>23</td>
<td>Tubular Condenser (.02 mF, 400V)</td>
<td>30-45165</td>
<td>Sockets...</td>
<td>27-5128</td>
</tr>
<tr>
<td>24</td>
<td>Outputs Transformer</td>
<td>For Speaker 36-1469-1</td>
<td>32-8047</td>
<td></td>
</tr>
</tbody>
</table>

**MODEL TP-12** is a 6 tube superheterodyne receiver having 2 tuning ranges covering from 540 to 1720 kilocycles (K.C.) on the broadcast band and from 2.3 to 2.5 megacycles (M.C.) on the police band. This model is designed to operate on either alternating (A.C.) or direct current (D.C.) 110 volts. This model is assembled in a walnut cabinet with contrasting maple inlays.

An indoor aerial 20 feet in length is attached to the receiver for average receiving conditions; however in apartment houses, hotels or steel re-inforced buildings, the Philco Utility Aerial Part No. 40-63E4 is recommended.

**NOTE:** If no sound is heard after connecting the receiver to the power supply and sufficient time has been allowed for the tubes to heat, reverse the electric plug in the outlet. The same procedure should be observed on A.C. power supplies when a slight hum is heard with the volume turned low.

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The wiring of the earlier and later production models 12-TP were different. The complete circuit diagram of the early production receiver is shown above. The later production receivers used a Model 39-6 chassis.

The phonograph connections as used with Model 39-6 is shown below. Refer to index for Model 39-6.

**MODEL 39-12TP**

**"EARLY TYPE"**

<table>
<thead>
<tr>
<th>Schem. No.</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>Motor (115 Volts)</td>
<td>35-1174</td>
</tr>
<tr>
<td>32</td>
<td>Condenser (.06 mfd., 200 V.)</td>
<td>30-4619</td>
</tr>
<tr>
<td>33</td>
<td>Cable</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Resistor (32,000 ohms)</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Condenser (.006 mfd., 400 V.)</td>
<td>30-4691</td>
</tr>
<tr>
<td>36</td>
<td>Crystal Cartridge</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Resistor (32,000 ohms)</td>
<td>415-1027</td>
</tr>
<tr>
<td>38</td>
<td>Switch (Radio-Phono)</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Motor (Power Switch)</td>
<td>42-1498</td>
</tr>
<tr>
<td>40</td>
<td>Condenser (.006 mfd., 400 V.)</td>
<td>30-4691</td>
</tr>
<tr>
<td>41</td>
<td>Tone Control</td>
<td>33-5330</td>
</tr>
<tr>
<td>42</td>
<td>Pickup Complete</td>
<td>33-8267</td>
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</table>

**MODEL 39-12TP**

**"LATER PRODUCTION MODELS"**

<table>
<thead>
<tr>
<th>Schem. No.</th>
<th>Description</th>
<th>Part No.</th>
</tr>
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<tr>
<td>34</td>
<td>Condenser (.006 mfd., 400 V.)</td>
<td>30-4691</td>
</tr>
<tr>
<td>35</td>
<td>Tone Control</td>
<td>33-5330</td>
</tr>
<tr>
<td>36</td>
<td>Crystal Cartridge (Pickup)</td>
<td>415-1027</td>
</tr>
<tr>
<td>37</td>
<td>Resistor (32,000 ohms)</td>
<td>33-5330</td>
</tr>
<tr>
<td>38</td>
<td>Switch (Radio-Phono)</td>
<td>42-1498</td>
</tr>
<tr>
<td>39</td>
<td>Cable</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Condenser (.06 mfd., 200 V.)</td>
<td>30-4619</td>
</tr>
<tr>
<td>41</td>
<td>Motor (115 Volt A.C. 60 cycle)</td>
<td>35-1174</td>
</tr>
<tr>
<td>42</td>
<td>Power Switch (Motor)</td>
<td>42-1498</td>
</tr>
</tbody>
</table>

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TYPES OF CIRCUIT: Model 39-12 TP is a table model combination semi-automatic phonograph and superheterodyne radio receiver. The phonograph mechanism automatically places the pickup on the record when the lid is closed and will play 10 or 12 inch records.

A.C. operated, superheterodyne with automatic volume control, pentode audio output, and covers the standard broadcast and police frequencies.


PHILCO TUBES USED: Five: One 6A7, Det. Osc., One 78, I.F., One 78, 2nd Det., 1st Audio; One 41, Output, and One 84, Rectifier.

TUNING MECHANISM: 8 to 1 Ratio using Pulley and Cord.

EQUIPMENT REQUIRED:
(1) Signal Generator
(2) Output Meter
(3) Philco Handle Screw Driver, Part No. 46-5410 and 54-10511, and Flute Wrench, Part No. 3164.

OUTPUT METER:
The 6A7 Output meter is connected to the plate and cathode terminals of the 41 tube. Adjust the meter to use the (0-20) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION:
1. Turn the tuning condenser to maximum capacity position (plates fully meshed).
2. Hold the tuning condenser in this position, turn the pointer until it is 1/16 of an inch below the three lines of the scale at the 550 K.C. end. This is the correct position of pointer at maximum capacity of tuning condenser.

OPERATIONS IN ORDER

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
</tr>
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<tbody>
<tr>
<td>OUTPUT connections to Receiver</td>
<td></td>
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<tr>
<td>Dial Setting</td>
<td>&amp; C. Setting</td>
</tr>
<tr>
<td>Grid</td>
<td>470 K.C.</td>
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</tbody>
</table>

REPLACEMENT PARTS

MODEL 39-12 TP

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MODEL 35-1169

PHILCO RADIO & TELEV. CORP.

Automatic record changer Part No. 35-1169 plays eight 10" records automatically or eight 12" records manually. The record changer is in operation either in the manual or automatic position.

OPERATION

MANUAL POSITION:

To lift the mechanism to the record removing arm at (A) Fig. 1 to the upright position. To adjust the pickup to play 10" records manually, push the pickup stop at (K) Fig. 1 back away from the pickup position manually, pull the stop forward toward the needle as far as it will go. Place records on turntable. Throw switch at (N) Fig. 1 to the "manual position." Mechanism will now operate and reject each record after it has been played through. To reject a record and play the next record, lower it, pull the latch lever at (L) Fig. 1 forward.

MOTOR LUBRICATION

The motor installed in this Record Changer is governor controlled, with all gearing enclosed and leaves the factory lubricated for proper operation. For best results, lubricate the motor at regular intervals with SAE 10 or any oil containing mixtures of animal or vegetable oils.

The governor disc engages with a felt brake. This felt is impregnated with a lubricating solution sufficient for proper operation for approximately six months' operation. An oil hole is provided in the top of the governor housing for lubricating the brake felt.

MOTOR SPEED

The motor speed is adjusted by means of a slotted post (C) 3 Fig. 1 which is located under the turntable. To change motor speed rotate this post slightly by means of a screw driver.

TRIP MECHANISM

The trip mechanism is the trigger that sets the Record Changer in motion. This is done by allowing the latch bar at (O) Fig. 1 to drop in front of, and be actuated by, the cam at (P) Fig. 1. This cam is driven by the motor and is in motion as long as the motor is running. If this mechanism does not operate smoothly, the precautions outlined in succeeding paragraphs should be observed.

First of all, make sure that the square pin in the latch lever at (U) Fig. 1 latches properly in the notch in the lift lever at (J) Fig. 1. When latched, the notch should be engaged approximately one-half of its depth. The depth of engagement is adjusted by means of the eccentric washer and locking screw at (J) Fig. 1. Now run the record changer through its cycle. If the square pin fails to engage the notch in the lift lever, the eccentric should be adjusted to pull the square pin to a position where it will engage the notch at (H) Fig. 1 to insure that the notch can engage the pin. Next check the tension of the reset spring at (K) Fig. 1. This reset spring must be under tension when the latch bar is latched but should have enough tension when the latch bar drops back off of the cam to cause the square pin to travel over the cam.

IMPORTANT --- Before attempting to change the tension of any spring, be sure that the parts involved are free from any tendency to bind, as any binding condition would preclude proper operation.

The Record Changer is adjusted at the factory to trip on a spiral trip groove record when the phonograph is played. The minor adjustment is made from the edge of the hole in the center of the record.

When eccentric or oscillating trip groove records are used, tripping is effected by means of the hardened steel pin in the end of tone arm lift crank at (5) Fig. 2 engaging the serrated block on the trip lever at (T) Fig. 2. The minor adjustment is made from the end of pin and the block, when, with a short needle, (6/8" Minimum Length), the pickup is resting on one record on the turntable. If the pressure of the pin on the block is not sufficient to insure operation, then check the pressure spring which is located up under the pickup.

The oval head pivot screw at (R) Fig. 1 serves as a pivot for the lift lever at (I) Fig. 1. This screw should allow the lift lever to be raised by the latch bar to its maximum position without binding but also with any additional play.

If the Record Changer fails to trip, see if the phonograph needle is jumping out of a worn record trip groove. Next make certain that all parts of the mechanism work freely and smoothly. If it is found that the latch bar at (O) Fig. 1 is not dropping in far enough to engage the cam at (P) Fig. 1 then check the tension of the trip spring at (B) Fig. 1.

RECORD REMOVING MECHANISM

The Record Changer is adjusted so that it will always leave one record on the turntable. This is done to prevent the phonograph needle from damaging the covering on the turntable.

In case the Record Removing Mechanism fails to operate smoothly, proceed as follows:

1. Check the trigger (K) Fig. 3 to ensure that all parts work freely with no binding in pivots or bearings, and that the record removing arm assembly rests on the stop screw (0) Fig. 3. Next stop the motor in such a position that the latch bar at (O) Fig. 1 can swing by and clear the cam at (P) Fig. 1. Place just one record on the turntable and measure from the top of this record down to the base plate. This distance should be one inch. Now by pulling the reject lever at (L) Fig. 1 the lift bar will be found possible to swing the record removing finger at (Y) Fig. 3 over to where it just touches the edge of the record. If the adjustment is correct, the record removing finger should just barely rise over the edge of the first record. If adjustment is required it can be made by means of the stop screw at (Q) Fig. 3. If record removing arm raises the record from the turntable and drops it back in place without removing it, check the lift adjustment at (Y) Fig. 1. This adjustment consists of an eccentric stud which is provided with a lock nut, and is made by loosening the lock nut and turning the eccentric stud. The lift adjustment should be set so that the hole in the center of the record just clears turntable spindle when the Record Changer is in operation.

PICKUP LOWERING MECHANISM

The pickup lowering mechanism has two functions. First, it lowers the phonograph needle gently to the surface of the record. Second, it ENGAGES the needle toward the center of the record so that it will enter the playing groove.

If the pickup descends too fast or too slow, adjust the speed of descent by turning the knurled thumb nut on the dashpot sleeve at (W) Fig. 2.

The unit is adjusted at the factory so that the needle will be set down approximately 3/32" in from the edge of the record. An adjusting screw is provided on the side of the pickup at (M) Fig. 2. If the needle is being lowered onto the playing surface of the record, and the pickup fails to correct the condition proceed as follows:

First stop the record changer, with the pickup in the maximum raised position and check the clearance between the underside of the pickup shelf at (Z) Fig. 2 and the tip of the dashpot. This clearance should be very small as otherwise the pickup will tend to bounce as it is lowered. There must be sufficient clearance however to prevent the pickup shelf from rubbing on the tip of the dash pot, or the pickup will not swing out far enough to the adjustable stop at (K) Fig. 2 to come to rest against the dashpot. Check this clearance in both 10" and 12" record positions. If adjustment is required, the height of the dashpot may be regulated by loosening the nuts on the underside of the lift lever stud at (L) Fig. 2 and turning the shelf from where it is located up under the stud. To raise the dashpot turn the nuts counter-clockwise, to lower the dashpot turn the nuts clockwise. Be sure to lock the nuts tightly together after the adjustment is made.

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FIGURE 1

FIGURE 3
A. Record Removing Mechanism Assy. Complete
Parts of Above Assembly
Record Removing Arm Assembly
Record Removing Sleeve & Link Assy.
Record Removing Sleeve & Link Assy.
Record Removing Sleeve Screw
Record Removing Link Screw
Record Removing Link Spring
Record Removing Finger Pin
Record Removing Finger Spring
Record Removing Arm Adjusting Nut
Record Removing Arm Adjusting Screw
Record Removing Arm Pin
(Arm to Sleeve & Link Assy.)

B. Trip Spring
C. Motor Speed Adjusting Post
E. Record Removing Link Spring
H. Latch Spring
I. Lift Lever Assembly
   Lift Spring
   Lift Crank Washer
   Lift Lever Screw
J. Eccentric Washer & Locking Screw
K. Adjustable Stop

FIGURE 4
L. Reject Lever
M. Pickup Positioning Adjusting Screw
N. Power Switch
O. Latch Bar Assembly Complete
   Screw (Latch Bar Hts.)
   Stud Nut (Latch Bar & Bumper)
   Mounting Screw (Latch Bar Stop)
   Stop (Latch Bar)
   Cam (Latch Bar Stop)
   Record Removing Arm Adjusting Screw
   Nut (Record Removing Arm)
   Dash Pot
   Nut (Dash Pot)
   Adjusting Cap (Dash Pot)
   Gland (Dash Pot)
   Plunger Assembly (Dash Pot)
   Lever Spring (Dash Pot)
   Weight (Dash Pot)
   Lever Spacer (Dash Pot)
   Felt Washer (Dash Pot)
   Leather (Dash Pot)
   Washer Large (Dash Pot)
   Washer Small (Dash Pot)

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REMOVING MOTOR TRANSMISSION

In removing the motor transmission, the following parts should be disassembled first:
1. Remove turntable shaft. (See paragraph — Removing Turntable Shaft Assembly.)
2. Unsolder pick-up wires.
3. Loosen the two set screws which hold the tone arm lever and the tone arm shaft and remove tone arm and shaft.
4. Remove the mounting screws which hold the tone arm post to the panel. Unsolder electric tone arm reject switch wire from the terminal strip and remove tone arm post.
5. Remove "C" washer from the drive link pin — this will allow the drive link to be removed from the transmission and then remove the six mounting screws holding the transmission to the panel and take out the transmission.

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PHILCO INTER-MIX RECORD CHANGER, Part No. 35-1176 plays and automatically changes with one loading—14-inch or twelve-inch records mixed together in any order. This record changer will also separately play 15-inch records or 13-twelve-inch records. In addition, the mechanism is designed to operate with slight warps recorded.

Service information contained in this bulletin covers operation, care, and adjustments that might be necessary if the mechanism ceases to function properly.

When ordering parts, refer to the number of the entire mechanism in addition to the number and name of parts shown in the figures of this bulletin.

PHILCO RECORD PLAYER NEEDLES

To obtain brilliant life-like tone quality, PHILCO Record Player Needles of the shown types are recommended. These needles are especially designed to give high fidelity tone reproduction—less record wear and less surface noise. One needle plays 15 to 20 records. The use of inferior needles in the pick-up of this mechanism will greatly affect the tone reproduction performance.

AUTOMATIC AND MANUAL POSITIONS

A control knob (1) Fig. 2 is provided for placing the mechanism in the automatic or manual operating position. When changing from manual to automatic or automatic to manual positions, the mechanism should be turned off and allowed to complete its cycle. The knob can then be set for the position desired as follows:

1. To operate the mechanism manually, press knob (1) Fig. 2 marked "Press-Down" up and turn to the right (clockwise) until record support arm assembly (16) Fig. 1 is in the clock position.

For the automatic operating position, control knob (1) Fig. 2 is turned to the left (counter-clockwise) until knob snaps up.

PICK-UP DOES NOT INDEX PROPERLY ON OUTER EDGE OF 10" AND 12" RECORDS

The pick-up is set for 12" records by the trip cam (15) Fig. 1 that is pivotally mounted under the selector blade on main record support post (12) Fig. 1. This trip cam is operated by the edge of a 12" record compressing the cam when the record is placed on the turntable. When the cam moves the trip lever blade (14) Fig. 1 and toggle bar and spring (38) Fig. 13 which pushes set lever blade (5) Fig. 3 into position to hold the tone arm locator (56) Fig. 3 in the 12" position.

After playing a record or the mechanism has been re-located, the set lever (5) Fig. 3 is reset for the 10" position by the control cam bracket lever (35) Fig. 3 mounted on the set lever arm. The control cam bracket (35) Fig. 3 engages the control cam shaft pin (131) Fig. 3 at the start of rotation.

Adjustment of the tone arm when placing the tone arms in the first groove of 10" and 12" records is controlled by tone arm (25) Fig. 3 positions (5). When 10" or 12" adjustments are made, the 12" adjustment alone is necessary, the 12" adjustment should be re-checked.

Adjustment of the locator lever is as follows:

12-inch Record Adjustment

1. Turn control knob (1) Fig. 2 to "manual" position.
2. Place a 12" record on the turntable.
3. Start mechanism and if pick-up does not come to position itself on the outer edge of the record. If the needle has not been placed in the center of the smooth outer rim of the record, adjust stop (2) Fig. 3 by loosening set screw. Move the stop in the direction necessary to center the needle on the smooth outer rim of the record.

10-inch Record Adjustment

1. Set control knob (1) Fig. 2 to "automatic" position.
2. Load the mechanism with several 10" records.
3. Allow mechanism to set a pickup to position itself on the outer edge of the record. If the needle has been placed in the center of the smooth outer rim of the record, adjust stop (2) Fig. 3 by loosening set screw. Move the stop in the direction necessary to center the needle on the smooth outer rim of the record.
4. If the pick-up does not come down in the center of the smooth outer edge of the record, adjust the following:
   1. Loosen 10-inch record stop (1) Fig. 3.
5. Move the record slightly toward or away from the stop pin as the case may be to center the needle on the outer edge of the record, examine the following parts:
   1. Spring (2) Fig. 3 on 12" adjustment stop may be weak.
   2. Tone arm lever or swivel shaft may be binding, examine and lubricate.

TONE ARM ELECTRIC REJECT SWITCH WILL NOT OPERATE

(When no record is on turntable)

The tone arm electric reject switch operates when the mechanism is first loaded and no record or any records are on the record support arms. This switch closes when the pick-up needle drops into a groove provided on the turntable; allowing operation of the tone arm and causing switch contact to close. Adjustment of this switch is as follows:

1. Adjust screw (9) Fig. 1 located in the tone arm directly above the end of the tone arm shaft. Turn this screw in the direction necessary to obtain a clearance of 3/8" between the bottom of the groove in the turntable and the bottom end of the needle.
2. With a record on the turntable and the needle resting on the record, a clearance of 3/8" between the top and bottom edge of the tone arm will be obtained. Bend the moving contacts spring upward or downward to obtain the necessary clearance.
3. Adjust the electric magnet (19) Fig. 3 and associated wiring for proper operation.

MECHANISM WILL NOT REJECT AT THE END OF RECORDS

The tone arm is designed to reject records with an oscillating or spiral reject groove. To make the adjustments for either type of records, proceed as follows:

1. See that the screw (10) Fig. 1 which clamps the tone arm swivel bracket is tight. Make sure that the set screws holding the tone arm lever (12) Fig. 3 to the tone arm shaft are tight.
2. Oscillating Groove Records
   - Records with an oscillating reject groove are rejected by the trip dog located on the end of the tone arm lever (12) Fig. 3 engaging the saw teeth of the trip trigger (13) Fig. 3. When the mechanism will not reject an oscillating groove record, either the screws mentioned in paragraph 1 are loose or the trip dog trip trigger (13) Fig. 3 or springs (15) Fig. 3 are not in place. When it is found that these parts have become worn or weak, they should be replaced.
3. Spiral Groove Records
   - Records with spiral groove records are rejected by the trip shoe (14) Fig. 3 located on the end of the tone arm lever (12) Fig. 3. This trip shoe (14) Fig. 3 hits the pin on the trip trigger (13) Fig. 3 releasing the clutch throwout bracket (29) Fig. 3. This should occur when the pick-up needle has traveled to within a distance of 1 3/4" from the center of the turntable. Adjust the mechanism so that the trip shoe hits the arm lever (12) Fig. 3. Move trip shoe toward or away from the pin on the trip trigger (13) Fig. 3 until the trip shoe operates the mechanism properly. When this point is found, the knurled nut should be well tightened.

TEN AND TWELVE INCH RECORDS DO NOT SEPARATE PROPERLY IN A MIXED LOADING

Ten and twelve inch records in a mixed loading are separated by lifter cams (20) Fig. 1 located on the record support arms (6) (16) Fig. 1. These cams operate when the next record to be selected by the mechanism is 10" and are designed to lift 12" record when one is located directly above the 10" record. This allows the selector blades (5) Fig. 1 and guide arms (4) Fig. 1 to slide under the 12" record so that a 10" record can be placed on the turntable. The lifter cams (20) Fig. 1 are caused to operate by the 10" record hitting the end of the cam. Check the following parts when mechanism does not separate records properly:

1. The lifter cam link (20) Fig. 1 should be approximately 3/8" above the surface of the record support arms (6) (16) Fig. 1 when no records are on support arms (6) (16) Fig. 1. This link is held in this position by the small return spring found under (20) Fig. 1 underneath the support arms (6) (16) Fig. 1. If link is not above the surface of support arms (6) (16) Fig. 1, check for loose return spring or faulty spring.
2. The selector blades (5) Fig. 1 should have a slight downward pressure on the top surface of the guide arms (4) Fig. 1. Check in their return position when in their return position by the small return spring found under (20) Fig. 1. The selector blades (5) Fig. 1 should move in their return position.
MODEL 35-1176
PHILCO RADIO & TELEV. CORP.

TOP RECORD SLIPS WHEN PICK-UP IS IN THE PLAYING POSITION

If the top record slips in the playing position, check the following parts:
1. Check for excessively warped records. Records warped too badly to place the pick-up near should be replaced or disassembled and reassembled.
2. Check for worn grooves in record, particularly old records. After the grooves of the record lose their gloss, the pick-up does not glide through the groove. This condition has a tendency to cause pick-up needle to drag resulting in the top record slipping.
3. Check record friction spring (16) Fig. 2 for tension. This spring should protrude far enough from the shaft to hold the record from slipping when in the playing position. This spring when adjusted properly to hold a record, should also allow a 10" record to fall freely onto the turntable.

If the spring is in need of adjustment, see heading “Removing Turntable Shaft Assembly”, Paragraph 4.

OILING AND GREASING MOTOR AND MECHANISM

The motor and mechanism should be oiled and greased every six months with a good grade of S. A. E. 10 oil.

Parts to Lubricate:
1. All bearings of the mechanism.
2. All sliding surfaces such as, cams, etc., should be lubricated with a very light grease.
3. Motor bearings and governor felt.

TURNTABLE SPEED ADJUSTMENT

If motor runs too fast or slow, the governor adjustment screw (27) Fig. 2 on the side of the governor should be screwed in or out slightly as required. To do this, loosen the lock nut and turn screw, then retighten lock nut.

REMOVING TURNTABLE SHAFT ASSEMBLY

To remove the turntable shaft assembly, proceed as follows:
1. Loosen the two set screws holding the motor coupling (21) Fig. 2 to the turntable shaft.
2. Loosen the two screws holding the turntable drive worm (28) Fig. 2 to the turntable shaft. Then lift out turntable and shaft.
3. To remove the turntable from the shaft, remove the three screws and nuts which hold it to the hub.
4. The record friction spring (16) Fig. 2 on the turntable shaft can be removed by pushing the hub downward toward the heavy end of the shaft—the spring can then be removed. If it is desired to increase the record friction on spring, bend upward the lower section of the spring which contacts with the bottom surface of the hub. To decrease the record friction adjust, the spring, bend the lower downward.

The motor is removed as follows:
1. Remove the three \\
2. There are two motor bracket locating pins on the underside of the changer base panel which pass through grommets located in the motor mounting bracket. These are provided to keep the mounting panel and motor bracket in proper alignment.

MECHANISM AND CHASSIS MOUNTING

The mechanism is mounted in the cabinet as follows: 4 mounting studs are located in the bottom surface of the panel each threaded to take \\

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NO REPRODUCTION WHEN NEEDLE IS OPERATING ON RECORD

A muting switch (177 Fig. 3), the purpose of which is to shut off the pick-up during the change cycle. This switch is mounted on the transmission frame, and is operated from the clutch throw-out (29) Fig. 3. When a record is on the turntable and the needle is in playing position, the contact of this switch should be in the open position.

AUTOMATIC CLUTCH DOES NOT COMPLETELY DISENGAGE AT THE END OF THE CYCLE

This trouble is identified by a steady thumping or clicking sound when the pick-up is in the playing position and is caused by the clutch not properly disengaging at the end of the automatic cycle. In most cases, this trouble is due to the clutch clearance adjusting plate not being in the proper position on the tone arm brake (8) Fig. 3. To eliminate this trouble, make the following adjustments:

1. Loosen the two screws that hold the clutch clearance adjusting plate to the tone arm brake lever (8) Fig. 3. Advance the adjusting plate until the clutch pawl [found in clutch housing (30) Fig. 3] clears the clutch sprocket.

2. If the clutch disengages before the pin on the drive drum (10) Fig. 3 reaches the inclined surface of the adjusting plate, the plate should then be retarded until the drive drum pin passes over the humps and slides down inclined surface.

FAILURE OF UNIVERSAL DRIVE COUPLING

The Universal drive coupling consists of four strips of rubber held together by a frame having ears projecting into slots in the rubber.

If excessive strain is placed on the coupling, the projecting ears may slip out of the slots in the rubber, thus disconnecting the drive. In order to hold the coupling together more firmly, the outer end of these ears projecting through the rubber may be bent outward at right angles to form a hook which will hold the rubber firmly in place. Do not make bend any more than 1/4" from end of ear. See Fig. 4.

Automatic Record Changer

Part No. 35-1180

PHILCO AUTOMATIC RECORD CHANGER Part No. 35-1180 automatically changes either twelve 10" or ten 12" records. The service information contained in this bulletin covers the operation, care, and adjustments that may be necessary if the mechanism ceases to function properly.

When ordering parts for this mechanism, refer to the part number of the entire mechanism in addition to the number and names of the parts shown in the figures of this bulletin.

CHANGER OPERATION

Setting for Record Size

This changer plays up to twelve 10-inch records or ten 12-inch records at one loading.

On each post you will see two plates. The lower one, on which the record is rest, is the shelf plate. The upper one is the selector blade which selects the next record to be played from the bottom of the stack.

To set for record size. (1) Clasp one of the posts just underneath the shelf plate, with thumb and finger of left hand. With right hand, lift knob and turn selector plate until the figure 10 or 12 (whichever size you want to play) is opposite the pointer. Do the same with the other post. Both selector plates must be in 10 or 12 position. (2) Push button marked 10 or 12, as required (see Figure 1).

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TONE ARM SLIDES INWARD ACROSS RECORD

This is caused by the guils arm stud (12) not releasing from the grooves in the upper side of the large cam gear (11). This may be due to friction at the shoulder screw (26) or the coil spring lifting the arm may be weak.

If the coil spring appears to be weak, it may be strengthened by shortening. If there is binding at the bearing, a little oil will help; also, a few movements by hand under considerable pressure will relieve the binding. If the binding is caused by the being twisted out of line, the trouble can be cured by straightening up the parts.

ADJUSTING THE RISING HEIGHT OF PICK-UP ARM

The pick-up arm should rise high enough during the change cycle so that the top of the tone arm clears the record resting on the support arms by 1/8". When the maximum load of records are on the turntable, the needle should clear the top record, if not adjust as follows:

Loosen the lock nut in pick-up sleeve (22). Turn the sleeve in the direction necessary to lengthen or shorten the pick-up plunger (21). After correct adjustment is found, tighten lock nut.

ADJUSTING DISTANCE FROM TURNTABLE SPINDLE AT WHICH REJECT Will OPERATE AND CYCLE WILL BEGIN

The mechanism is designed to reject records of all types whether they are provided with special grooves or not. The mechanism is adjusted to operate 1/8" from the center of the record spindle; this distance has been found to be the most satisfactory point for all modern records so that they will be rejected after they have been played through. To adjust the reject mechanism for this distance or any distance that may be desired, a trip adjusting screw (18) is provided. By turning this screw toward the trip trigger (16), the mechanism is caused to operate at a closer distance from the spindle. Turning the adjusting screw (18) away from the trip trigger, operates the reject closer to the turntable spindle. It may be found on some records of very early manufacture that it will not be possible to obtain a satisfactory adjustment that will always operate the changer mechanism.

REJECT BUTTON "R" WILL NOT OPERATE MECHANISM

If the "R" button does not cause the mechanism to go through a change cycle check the following parts:

a. Examine key control unit (75) for parts that have become out of shape or any obstruction that will prevent the "R" button from moving to its maximum length of travel.

b. Inspect reject roll (78). If this roll does not trip the mechanism even when properly revolved by complete depressing of "R" button, the roll has probably been bent out of shape. Replace the roll or reshape it to its former position.

c. If trigger (16) is properly actuated but without starting a change cycle see instructions as given under "Mechanism Will Not Reject at End of Records" paragraph 3.

PRESSING "M" BUTTON DOES NOT CHANGE MECHANISM FROM AUTOMATIC TO MANUAL POSITIONS

Observe action of "M" button. Button should travel far enough down when depressed to cause the manual roll (77) to actuate the key control unit. The key control unit (75) should also be checked for parts which have become out of shape or any foreign obstruction.

MOTOR STOPS IMMEDIATELY WHEN CHANGER SWITCH IS TURNED OFF DURING A CHANGE CYCLE

The normal action of the mechanism when the changer switch is turned off during a change cycle is to continue to operate until the needle is again on the record. The mechanism should then stop. This action is caused by the cycling switch (85) short circuiting the manual changer switch during a change cycle. The switch should be changed when the above mentioned trouble develops.

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MECHANISM DOES NOT REPEAT THE LAST RECORD

If the mechanism does not repeat the last record, any one of the parts listed under “Mechanism Will Not Reject at End of Records” may be causing the trouble.

RECORDS FALL UNEVENLY ON THE TURNTABLE

Records falling unevenly on the turntable is generally due to the turntable spindle not being correctly centered between the record loading posts. To correct this trouble, see “Replacing Motor.”

LAST RECORD DROPS ON ONE SIDE

This trouble is due in most cases to the loading posts being bent out of perpendicular to the main plate. To check for this trouble, test the posts with a steel square as directed under “Replacing Motor.” Replace or adjust post so that it will be perpendicular to the main plate.

CHANGER CONTINUES CYCLING

If the mechanism continues to change records constantly, it indicates trouble in the lift (37). Failure of this lift to disengage with the cam gear (11), Fig. 2, will cause the trouble. Check the various rivets at which motion occurs to find a point where friction or binding is interfering with freedom of motion. The cam lever (39), Fig. 2, should also be checked for too much friction. Oil this part if necessary.

SELECTOR BLADE FAILS TO SEPARATE BOTTOM RECORD FROM STACK

This is due either to a badly warped record or to its being of a thickness considerably different from records now in standard use. The selector blade and shelf blades are designed to accommodate a maximum variation in thickness and flatness of records now in standard use. There are certain records, however, that may be found which vary in thickness so much as to be impracticable for use in the automatic changers.

SELECTOR BLADES JAM INTO EDGE OF RECORD

This is generally caused by too small a spacing between the selector plate and the spacing between the selector plate and the shelf plate. This space should never be less than .050 inch when selector plate is in 10" position. Another cause of jamming is too sharp an edge on the selector plate.

To eliminate this trouble, check spacing of plates. Bend the selector plate slightly, if necessary. Smooth up the edge of the selector plate by means of a piece of fine emery cloth.

MECHANISM SLOW IN STARTING OR STALLS DURING A CHANGE OF CYCLE

Trouble is probably due to:

a. Motor mechanism is not thoroughly lubricated. See heading “Lubrication”.

b. Check for loose set screws.

c. Line voltage may be abnormally low or motor windings damaged. If the windings of the motor are damaged, replace motor. To remove motor, see heading “Replacing Motor”.

REPLACING MOTOR

Replacing the motor necessitates extreme care in aligning and correctly mounting the new motor; a procedure listed below should be followed closely. When replacing a new motor or ordering a new one from your distributor, specify the power supply from which the motor is to be operated. The motor electrical wiring is shown in Fig. 4.

When mounting replacement motor, it is most important to see that record pin is centered between the two posts of the changer, that it stands perpendicular to main plate (55), and that it has not become bent so as to wobble. Even though the posts are stout and not easy to bend, it is well to check them also, with a 12" combination square laid across the concave upper surface of main plate. When the new motor has been attached, with three screws through grommet sleeves (51) (spacers) into its frame, and record pin is seen to revolve without appreciable wobble, the correct position of the record pin between the record-mounting posts can be accurately checked as follows: Place a single 12" record on the shelf plates, press “R” button, and turn turntable forward by hand. Immediately after the shelf plates open and allows the record to fall, turn turntable slightly backward, and with other hand support the record between the shelf plates; it can then be readily seen whether record pin is off center. If the record pin is found to be off center, remove the record and turntable, and loosen slightly the motor mounting screw or screws nearest the shelf plate to which record appeared closest. This should improve evenness of operation. However, unless the unevenness was very slight, it will be necessary for a permanent repair to insert a shim or two on one or more of the three screws (or change shims from one screw to another). The shims used are shaped like an ordinary washer, cut out at one side (see cut-away view at 52 on photo, showing a shim in place upon one of the grommet sleeves). Shims can readily be cut out with shears and punch from thin metal or cardboard—or an assortment of shims of different thicknesses can be had from your distributor. (Order “Assortment of Part No. 45-2785”). They should be inserted; around proper screws (when screws have been sufficiently loosened) between motor frame and metal grommet sleeve. Do not insert shims next to rubber grommet.

TURNING CHANGER SWITCH OFF FAILS TO STOP MECHANISM

If after turning the changer switch off the mechanism continues to operate it indicates trouble in the cycling switch (85). Replace the switch when this trouble develops.

FIG. 4. MOTOR ELECTRICAL CONNECTIONS

DISASSEMBLING THE CHANGER

Before attempting to remove sub-plate assembly (83) disconnect key control unit (75) from main plate. To do this, start with control unit truss bar (80). Then take out the screw which holds left end of adjusting rod lever (94). Next remove adjusting rod (92) and adjusting rod extension (79). Take out the screw holding spring (73); then the screws holding key control unit (75) to main plate. Rods (77) and (78) can then, with due care, be extracted without bending. Free the cam connecting rod (58) by loosening setscrew holding spacer and hub assembly (59). Sub-plate assembly can then be detached without bending parts. In reassembling, reverse the procedure.
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MECHANISM WILL NOT REJECT AT THE END OF RECORDS

There are several parts that will cause the mechanism to fail in the operation of rejecting records. These items are listed as follows:

1. Examine swivel spring (95) for stretching. This spring is attached to the arm, and the spring and spreaders (90) (91). The purpose of this spring is to keep the spreader in position where it will not interfere with the normal operation of the mechanism.

2. If the trip trigger (16) is operating properly, trouble may be found due to the cam lever (93) binding against sub-plate (4). In this case, look for some obstruction or foreign material on these two parts. Also see that the rivets are operating freely. If lever (92) engages cam lever (91) so that its rollers up into the groove on cam gear (92) and the set screws are tight, the change cycle should go into motion as the cam gear (92) turns.

3. Sometimes friction between the trigger (16) and trigger catch (17) due to burrs or rough surfaces may also prevent the release of the record. Look for burrs or rough surfaces in the trigger catch (17) and lengthen the trigger catch (17) with a file.

4. To eliminate this condition, locate the position where there is excessive friction. If it is found that the parts are out of shape due to being bent, new parts should be added or the old ones straightened. When it is found that trouble is due to a burr on the edge of the metal parts, burrs should be removed with a very fine file or scraper. After eliminating this trouble, a small amount of oil should be applied to the sliding surfaces.
**PHILCO Model 39-3-31 PA**

Model 39-31 PA is a combination automatic record changer, phonograph and electric push-button tuning superheterodyne radio. This model is identical to the Model 39-31 Code 121 with the exception of the automatic record changer.

The automatic record changer plays seven 12" or eight 10" records automatically. The last record remains on the turntable and repeats as long as the record changer is in operation. The electric pick-up is a crystal type.

The specifications for the radio receiver, alignment of compensators and adjustments of push-buttons for reception of stations is covered under the Model 39-31 Code 121. Connections for the phonograph pick-up as connected to the Model 39-31 Code 121 receiver are shown below. The circle numbers of this diagram correspond to the circle numbers of the Model 39-31 Schematic.

For automatic record changer Model "L" used with this set, see index.

**Replacement Parts — Model 39-3-31 PA**

<table>
<thead>
<tr>
<th>SCHE. No.</th>
<th>DESCRIPTION</th>
<th>PART No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>Condenser (.05 mfd., 200 V.)</td>
<td>30-4510</td>
</tr>
<tr>
<td>53</td>
<td>Resistor (100,000 ohms)</td>
<td>33-410339</td>
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<tr>
<td>54</td>
<td>Crystal Cartridge</td>
<td>35-2030</td>
</tr>
<tr>
<td>55</td>
<td>Resistor (50,000 ohms)</td>
<td>33-350339</td>
</tr>
<tr>
<td>56</td>
<td>Switch (Radio-Phono)</td>
<td>42-1053</td>
</tr>
<tr>
<td>57</td>
<td>Cable</td>
<td>35-3041</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS PARTS**

Motor (115 V., 60 cycle A. C.) | 35-1055
Motor Switch | 35-1056
Tone Arm Complete | 35-1057
Turntable | 35-1058

**NOTE:**

Models 39-39 and 39-36 code 121 are similar with the exception of the type of cabinets, speakers and power transformers. These differences are shown on the Replacement Parts list and circuit diagram.

**PHILCO Models 39-40 PCX and 2-40 PC**

Models 39-40 PCX and 2-40 PC are combination automatic record changer phonograph and electric push-button tuning superheterodyne radio receivers. These models are identical to the Model 39-40 Code 121 with the exception of the phonograph mechanism. The phonograph contains an automatic record changer which plays ten records either 10 or 12 inches repeating the last selection until the records are re-stacked or the set is turned off.

The radio receiver specifications, aligning instructions and adjustments for electric push-button tuning are covered under Model 39-40 Code 121. The cabinet size and power consumption, however, differ on the Models 39-40 PCX and 2-40 PC and are listed below.

The phonograph connections diagram shown below indicates the connections to the radio receiver of the Model 39-40 Code 121. The circle numbers of the diagram correspond to the circle numbers of the Model 39-40 Code 121 diagram.

**CABINET DIMENSIONS:**

Height, 37 7/8". Width, 39 1/2". Depth, 17 7/8".

**Replacement Parts — Models 39-40 PCX and 2-40 PC**

<table>
<thead>
<tr>
<th>SCHE. No.</th>
<th>DESCRIPTION</th>
<th>PART No.</th>
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<tr>
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<td>Condenser (.05 mfd., 200 V.)</td>
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<td>83</td>
<td>Switch (Radio-Phono)</td>
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<tr>
<td>84</td>
<td>Cable</td>
<td>35-3041</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS PARTS**

Motor 110 volt, 60 cycle | 35-1187
Motor 110 volt, 50 cycle | 35-1188
Automatic Record Chgr. (Com.) | 35-1178
Governor (motor) | 35-1165

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PHILCO MODELS 39-8, 39-ST
Schematic
Voltage

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SPECIFICATIONS

TYPE OF CIRCUIT: Model 39-8T is a 6 tube superheterodyne receiver designed for operation on AC or DC current in a frequency range from 25 to 100 cycles. In addition, other features of design are: Automatic Volume Control and Pentode Audio Output.


POWER SUPPLY: 100 to 125 volts AC
25 to 60 cycles or D.C.

POWER CONSUMPTION: 30 watts.

AUDIO OUTPUT: One (1) watt.

FREQUENCY RANGE: 530 to 1720 K.C.

INTERMEDIATE FREQUENCY: 470 K.C.

REPLACEMENT PARTS

MODEL 39-8

<table>
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<td>32-4444</td>
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<td>12B</td>
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<td>12C</td>
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<td>22</td>
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</table>

MISCELLANEOUS PARTS

Bezel & Glass Assembly...... 13105
Bezel Clamp................... 20162
Dial Scale..................... 16104P
Drive Drum & Set Screw....... 31-1283
Drive Shaft Assembly........ 31-2140
Drive Cord Assembly........ 90325
Output Transformer........... 32-7874
Pointer (Dial)................ 28-5468
Spring Drive Cord............. 28-8761
Speaker....................... 36-1362-1
Socket (7 prong).............. 27-6037
Socket (6 prong)............. 27-6036
Socket (8 prong)............. 27-6058

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Alignment of Compensators

EQUIPMENT REQUIRED:
(1) Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 30,000 KC is the correct instrument for this purpose.
(2) Output Meter. Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Signal Generator</th>
<th>Receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output Connections to Receiver</td>
<td>Dummy Antenna (Note A)</td>
</tr>
<tr>
<td>1</td>
<td>IA7G Grid</td>
<td>.1 mf</td>
</tr>
<tr>
<td>2</td>
<td>Ant. Lead (white)</td>
<td>400 ohms</td>
</tr>
<tr>
<td>3</td>
<td>Ant. Lead (white)</td>
<td>225 mmf</td>
</tr>
<tr>
<td>4</td>
<td>Ant. Lead (white)</td>
<td>225 mmf</td>
</tr>
<tr>
<td>5</td>
<td>Ant. Lead (white)</td>
<td>225 mmf</td>
</tr>
</tbody>
</table>

NOTE A—The "Dummy Antenna" consists of a condenser or resistor connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

Specifications

TYPE OF CIRCUIT: Four tube, battery operated superheterodyne circuit, with tuning ranges, Automatic Volume Control, and Pentode Output.

TUNING RANGES: Range 1, 540 to 1720 KC.; Range 2, 5.6 to 1800 MC.

INTERMEDIATE FREQUENCY: 470 KC.

PHILCO TUBES USED: 1-IA7G, 1st Detector and Oscillator: 1-INSG, 1 F. Amplifier; 1-1HSG, 2nd Detector, 1st Audio, and Automatic Volume Control; and 1-IA5G, Output.

AERIAL AND GROUND: Philco "Farm Radio Aerial," part No. 40-6383, is required for maximum performance. A good ground is very essential.

CABINETS: Types "B" and "XF."


TUNING MECHANISM: Pulley and cable drive for Manual tuning.

Electric Push-Button for Automatic Tuning.

SETTING AND OPERATING AUTOMATIC TUNING


For best results follow these instructions carefully.

Select six of your favorite nearby broadcast stations and remove their call letters from the station call letter tab sheets supplied. Insert these call letters in the escutcheon directly in front of the buttons at the top of the cabinet.

Hold the "Station Selector" knob to prevent it from rotating while you insert a large coin in the screw head at the center of the knob, (see figure) and loosen by turning counter-clockwise about one turn. Press down any one of the six buttons. Holding it down, tune in with the "Station Selector" the station corresponding to the call letters in front of the button. With the volume low, turn the "Station Selector" knob slowly back and forth until the signal is clearest. The station is then tuned in correctly.

Release the button and press another button all the way down. Follow the above instructions, tuning in the station accurately with the button held down. In the same way continue to set all the buttons.

After all buttons are set, and the last one is released, hold the "Station Selector" knob to prevent it from turning while you tighten the screw at the center of the knob. When the screw is tightened the unit is ready to operate.

If it is ever desired to substitute a station received well in your locality for a station already set, follow the same procedure, setting up only the desired station.

To tune your receiver automatically simply press down the button in the rear of the desired station call letters. Be sure that you press the button all the way down until a distinct step is noted.

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Model 39-19 PA is a combination automatic record changer phonograph and automatic tuning superheterodyne radio receiver. The radio receiver of this model is identical to the Model 39-19 Code 122 with the exception of the automatic phonograph connections. The automatic record changer plays eight 12-inch records automatically or 12-inch records manually. The specifications of this model with the exception of the cabinet dimensions and power consumption and automatic record changer are the same as Model 39-19 Code 122. The connections for the phonograph pick-up as connected in the Model 39-19 Code 122 are shown below. The circle numbers of this diagram correspond to the circle numbers of the Model 39-19 Code 122.

The alignment of the compensators will also be found under Model 39-19 Code 121 (see index).

For record changer 35-1169 see index.

Models 39-19 PF, 39-19 PCS and 39-19 PT, are combination phonograph and automatic tuning superheterodyne radio receivers. The radio receivers of Models 39-19 PF and PCS are identical to Model 39-19 Code 122 with the exception of the phonograph connections. The radio receiver of Model 39-19 PT is identical to Model 39-19 Code 121 with the addition of phonograph connections. The phonograph section of these models consists of a semi-automatic pick-up that is automatically on the turntable when the lid is closed and plays either 10- or 12-inch records.

The specifications of this model with the exception of cabinet dimensions, power consumption and semi-automatic pick-up are the same as Model 39-19 Codes 121, 122. The connections for the phonograph pick-up as connected to Model 39-19 Code 121 and 122 are shown below. The circle numbers of this diagram correspond to the circle numbers of the Model 39-19 Codes 121, 122.

The alignment of the compensators will also be found under Model 39-19 Code 121, 122 (see index).

Models 39-30 PCX

Model 39-30 PCX is a combination automatic record changer phonograph and electric push-button tuning superheterodyne radio receiver. This model is identical to the Model 39-30 Code 121, with the exception of the automatic record changer. The automatic record changer plays ten records either 10 or 12 inches repeating the last selection until the records are retracted or the set is turned off. The electric pick-up is a crystal type.

The specifications for the radio receiver, alignment of compensators and adjustment of push-buttons for reception of stations are covered under Model 39-30 Code 121. The connections for the phonograph pick-up as connected in the Model 39-30 Code 121 receiver are shown below. The circle numbers of this diagram correspond to the circle numbers of the Model 39-30 Code 121 schematic.

**Replacement Parts — Model 39-19 PA**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>SCHE. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>44</td>
<td>Condenser (.05 mfd., 400 V.)</td>
<td>44</td>
<td>Cable (Radio-Phone Switch)</td>
</tr>
<tr>
<td>45</td>
<td>Tone Control</td>
<td>45</td>
<td>20-0510</td>
</tr>
<tr>
<td>46</td>
<td>Crystal Cartridge</td>
<td>46</td>
<td>33-6109</td>
</tr>
<tr>
<td>47</td>
<td>Condenser (.006 mfd., 400 V.)</td>
<td>47</td>
<td>33-3059</td>
</tr>
<tr>
<td>48</td>
<td>Resistor</td>
<td>48</td>
<td>33-3063</td>
</tr>
<tr>
<td>49</td>
<td>Balance (200,000 ohms)</td>
<td>49</td>
<td>33-3062</td>
</tr>
<tr>
<td>50</td>
<td>Switch (Radio-Phone)</td>
<td>50</td>
<td>33-3061</td>
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<tr>
<td>51</td>
<td>Switch (150,000 ohms)</td>
<td>51</td>
<td>33-3060</td>
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</tbody>
</table>

**Replacement Parts — Model 39-19 PF, 39-19 PCS, 39-19 PT**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>SCHE. No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>44</td>
<td>Condenser (.05 mfd., 400 V.)</td>
<td>44</td>
<td>20-0510</td>
</tr>
<tr>
<td>45</td>
<td>Tone Control</td>
<td>45</td>
<td>20-0510</td>
</tr>
<tr>
<td>46</td>
<td>Crystal Cartridge</td>
<td>46</td>
<td>33-6109</td>
</tr>
<tr>
<td>47</td>
<td>Condenser (.006 mfd., 400 V.)</td>
<td>47</td>
<td>33-3059</td>
</tr>
<tr>
<td>48</td>
<td>Resistor</td>
<td>48</td>
<td>33-3063</td>
</tr>
<tr>
<td>49</td>
<td>Balance (200,000 ohms)</td>
<td>49</td>
<td>33-3062</td>
</tr>
<tr>
<td>50</td>
<td>Switch (Radio-Phone)</td>
<td>50</td>
<td>33-3061</td>
</tr>
<tr>
<td>51</td>
<td>Switch (150,000 ohms)</td>
<td>51</td>
<td>33-3060</td>
</tr>
</tbody>
</table>

**PHILCO Model 39-30 PCX**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>SCHE. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>Condenser (.05 mfd., 200 V.)</td>
<td>52</td>
<td>30-4589</td>
</tr>
<tr>
<td>26</td>
<td>Condenser (.006 mfd., 200 V.)</td>
<td>53</td>
<td>30-4583</td>
</tr>
<tr>
<td>27</td>
<td>Resistor (20,000 ohms)</td>
<td>54</td>
<td>33-30033</td>
</tr>
<tr>
<td>28</td>
<td>Resistor (100,000 ohms)</td>
<td>55</td>
<td>33-41039</td>
</tr>
<tr>
<td>29</td>
<td>Crystal Cartridge</td>
<td>56</td>
<td>33-20030</td>
</tr>
<tr>
<td>30</td>
<td>Condenser (.006 mfd., 500 V.)</td>
<td>57</td>
<td>33-41039</td>
</tr>
<tr>
<td>31</td>
<td>Resistor (100,000 ohms)</td>
<td>58</td>
<td>33-41039</td>
</tr>
<tr>
<td>32</td>
<td>Switch (Radio-Phone)</td>
<td>59</td>
<td>42-1522</td>
</tr>
</tbody>
</table>

**Miscellaneous Parts**

- Tone Arm and Pick-up (Less Base) | 35-2059

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MODEL 39-85, Code 121

Schematic, Chassis Voltage

Replacement Parts
Model 39-85, Code 121

Fig. 2. Schematic Diagram

Fig. 3. Part locations, underside of chassis

Replacement Parts CONTINUED

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PHILCO Model 39-116 PCX

Model 39-116 PCX is a combination phonograph and 14 tube radio receiver employing a superheterodyne circuit with three tuning ranges for reception of standard and short-wave broadcast stations. Incorporated in this receiver is Philco mystery control for electric automatic tuning of eight standard broadcast stations from a remote point. The phonograph section contains an automatic record changer which plays ten records either 10- or 12-inch size automatically repeating the last record until the records are restacked or the switch turned off.

This model with the exception of the phonograph mechanism is identical to the Model 39-116 RX. The same specifications for the Model 39-116 RX apply to this model except the cabinet size and power consumption which are listed below.

CABINET DIMENSIONS:
- Height, 37¼".
- Width, 44½".
- Depth, 17½".

The adjustment of the mystery control circuit for reception of stations and alignment of compensators is also covered under Model 39-116 RX. The phonograph connections are shown below as connected in the Model 39-116 RX circuit diagram. The circle numbers of this phonograph diagram correspond to the circle numbers of the Model 39-116 RX diagram.

**DOTTED LINES INDICATE CONNECTIONS BEFORE ADDITION OF PHONOGRAPH.**
**REFER TO SERVICE BULLETIN No. 310.**

PHONOGRAPH CONNECTIONS FOR MODEL 39-116 PCX

---

### Replacement Parts — Model 39-116 PCX

<table>
<thead>
<tr>
<th>PART No.</th>
<th>DESCRIPTION</th>
<th>Schematic No.</th>
<th>DESCRIPTION</th>
<th>Schematic No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>131</td>
<td>Condenser (.05 mfd., 200 V.)</td>
<td>30-4610</td>
<td>MISCELLANEOUS PARTS</td>
<td></td>
</tr>
<tr>
<td>132</td>
<td>Crystal Cartridge (Pick-up)</td>
<td>35-2030</td>
<td>Automatic Record Changer (Complete)</td>
<td>35-1178</td>
</tr>
<tr>
<td>133</td>
<td>Resistor (51,000 ohms)</td>
<td>33-381239</td>
<td>Motor 110 volts, 60 cycles</td>
<td>35-1187</td>
</tr>
<tr>
<td>134</td>
<td>Resistor (51,000 ohms)</td>
<td>33-381239</td>
<td>Motor 110 volts, 60 cycles</td>
<td>35-1187</td>
</tr>
<tr>
<td>135</td>
<td>Switch (Radio-Phono)</td>
<td>42-1053</td>
<td>Governor (motor)</td>
<td>35-1186</td>
</tr>
<tr>
<td>136</td>
<td>Cable</td>
<td></td>
<td></td>
<td>35-1185</td>
</tr>
</tbody>
</table>

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Alignment of Compensators

**EQUIPMENT REQUIRED:**

1. Signal Generator: Philco Model 077 Signal Generator, which has a fundamental frequency range from 110 to 45,000 K.C., is the correct instrument for this purpose.

2. Output Meter: Philco Model 027 Vacuum Tube Voltmeter and Circuit Tester incorporates a sensitive output meter and is recommended.

3. Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3164.

4. Philco Set Transformer, Part No. 32-2763

**OUTPUT METER:**

Two indicating devices for aligning the receiver can be used: either an audio output meter or a vacuum tube voltmeter. The method of connecting either the output meter is given in the next paragraph. The procedure for connecting the vacuum tube voltmeter as an aligning indicator will be found on Page 5. Where greater accuracy of the various tuned circuits is desired, the vacuum tube voltmeter is recommended as an aligning device.

The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 4 tube in Model 39-117 and 119 and type 49 tube in Model 39-118. Set the meter to use the 0-30 volt scale.

**Procedure—Model 39-117**

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>Adjust Compensators in Order</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output Connections to Receiver</td>
<td>Dummy Antenna (Note A)</td>
<td>Dial Setting (Max.)</td>
<td>Control Settings (Max.)</td>
</tr>
<tr>
<td>1</td>
<td>6A7 Grid</td>
<td>.1 mfd.</td>
<td>470 K.C.</td>
<td>580 K.C.</td>
</tr>
</tbody>
</table>

**Procedure—Model 39-118**

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>Adjust Compensators in Order</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output Connections to Receiver</td>
<td>Dummy Antenna (Note A)</td>
<td>Dial Setting (Max.)</td>
<td>Control Settings (Max.)</td>
</tr>
<tr>
<td>1</td>
<td>6A7 Grid</td>
<td>.1 mfd.</td>
<td>470 K.C.</td>
<td>580 K.C.</td>
</tr>
<tr>
<td>2</td>
<td>Ant. and Gnd.</td>
<td>200 mfd.</td>
<td>1550 K.C.</td>
<td>1550 K.C.</td>
</tr>
</tbody>
</table>

**Procedure—Model 39-119**

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>Adjust Compensators in Order</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output Connections to Receiver</td>
<td>Dummy Antenna (Note A)</td>
<td>Dial Setting (Max.)</td>
<td>Control Settings (Max.)</td>
</tr>
<tr>
<td>1</td>
<td>6A7 Grid</td>
<td>.1 mfd.</td>
<td>470 K.C.</td>
<td>580 K.C.</td>
</tr>
<tr>
<td>2</td>
<td>Ant. and Gnd.</td>
<td>200 mfd.</td>
<td>18 M.C.</td>
<td>1550 K.C.</td>
</tr>
<tr>
<td>3</td>
<td>Ant. and Gnd.</td>
<td>200 mfd.</td>
<td>18 M.C.</td>
<td>1550 K.C.</td>
</tr>
<tr>
<td>4</td>
<td>Ant. and Gnd.</td>
<td>200 mfd.</td>
<td>580 K.C.</td>
<td>1550 K.C.</td>
</tr>
<tr>
<td>5</td>
<td>Ant. and Gnd.</td>
<td>200 mfd.</td>
<td>580 K.C.</td>
<td>1550 K.C.</td>
</tr>
</tbody>
</table>

A—The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

B—Dial Calibration: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, the tuning pointer is set on the first index line at the low frequency end of the scale (540 K.C.).

Several speakers on the above models have the same part number with the exception of a .1-.2, etc., following the part number. These speakers are interchangeable. The cone assembly, however, cannot be interchanged. When ordering cones, be sure to order correct cone part number as indicated in each part list.

[Diagram of Part Locations, Model 39-119]
**Philco Utility Aerial.** Part No. 45-2450. This aerial should be used to obtain maximum performance from your receiver.

- **Power Supply:** Voltagé—115 volts, Fre.-quency—50-60 cycles, Power Consumption—40 watts.

- **Intermediate Frequency:** 470 K.C.

- **Tuning Range:** 540 to 1720 K.C.

- **Audio Output:** 2 watts.

**Philco Tubes Used:** Five tubes: 1A6-1, 7A1 detector and oscillator; 1A6-2, 7A7-2, 2A7 detector. Automatic Volume Control; and pentode audio output.

**Tuning Mechanism:** Pulley and cable drive for manual tuning. Six Electric Push-Buttons for Automatic Tuning. Five push-buttons are used for stations and one for manual tuning. This unit is used for adjusting and operating the Electric Push-Buttons will be found in the instructions supplied with each set.

**Cabinets:** Code 121 chassis in type "T" cabinet Code 122 chassis in type "F" cabinet.

---

**Philco Page 11-31**

**Model 39-117, Codes 121-122**

**Type of Circuit:** A.C. operated; superheterodyne circuit, covering standard broadcast and police stations (540 K.C. to 1720 K.C.). In addition other features of design are: Electric Push-Button Tuning; Automatic Volume Control; and pentode audio output.

- **Power Supply:** Voltage—115 volts. AC. or D.C. Power Consumption—55 watts.

- **Intermediate Frequency:** 470 K.C.

- **Tuning Range:** 540 to 1720 K.C.

**Philco Tubes Used:** 1A6-1, 7A1 detector and oscillator; 1A6-2, 7A7-2, 2A7 detector. Automatic Volume Control; and pentode audio output.

**Tuning Mechanism:** Pulley and cable drive for manual tuning. Six Electric Push-Buttons for Automatic Tuning. Five push-buttons are used for stations and one for manual tuning. The procedure for adjusting and operating the Electric Push-Buttons will be found in the instructions supplied with each set.

**Cabinets:** Code 121 chassis in type "T" cabinet. Code 122 chassis in type "F" cabinet.

---

**Model 39-117, Codes 121-122**

**Type of Circuit:** A.C. D.C. operated; superheterodyne circuit, covering standard broadcast and police stations (540 K.C. to 1720 K.C.). In addition other features of design are: Electric Push-Button Tuning; Automatic Volume Control; and pentode audio output.

- **Power Supply:** Voltage—115 volts. AC. or D.C. Power Consumption—55 watts.

- **Intermediate Frequency:** 470 K.C.

- **Tuning Range:** 540 to 1720 K.C.

**Philco Tubes Used:** 1A6-1, 7A1 detector and oscillator; 1A6-2, 7A7-2, 2A7 detector. Automatic Volume Control; and pentode audio output.

**Tuning Mechanism:** Pulley and cable drive for manual tuning. Six Electric Push-Buttons for Automatic Tuning. Five push-buttons are used for stations and one for manual tuning. The procedure for adjusting and operating the Electric Push-Buttons will be found in the instructions supplied with each set.

**Cabinets:** Code 121 chassis in type "T" cabinet.

---

**Contact Information:**

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MODEL 39-119(121,122)
PHILCO RADIO & TELEV. CORP.

Schematic, Voltage

Notes

GND ANT.  DET-OSC  21/2V

1 3 4 6 7 8 9 10 11 12 13 14 15 16 17

SCHMATIC DIAGRAM MODEL 39-119
VOLTAGES MEASURED FROM SOCKET CONTACTS TO CHASSIS

INTERMEDIATE FREQUENCY: 470 K.C.
TUNING RANGES: 540 K.C. to 1720 K.C.; 6.5 M.C. to 18.0 M.C.
AUDIO OUTPUT: 2 watts.
PHILCO TUBES USED: Five tubes: 1-6A7, 1st detector and oscillator; 1-78, I.F.; 1-75, 2nd detector, Automatic Volume Control, and 1st audio; 1-41, Output, and 1-84, Rectifier.
TUNING MECHANISM: Pulley and cable drive for Manual Tuning. Six push-buttons for Automatic Tuning. Five push-buttons are used for stations and one for manual tuning. The procedure for adjusting and operating the Electric Tuning Push-Buttons will be found in the instructions supplied with each set.

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PAGE 11-34 PHILCO
SPECIFICATIONS

INTERMEDIATE FREQUENCY: 470 K.C.

PHILCO TUBES: One 147G, First Detector and Oscillator; one 185G, I.F. Amplifier; one 185G, Second Detector; First Audio and Automatic Volume Control, and one 155G Pentode Output.


BATTERY DRAIN: "A"—(250 W.A.) *"B"—(85 W.A.)

AERIAL AND GROUND: In order to obtain the highest amount of sensitivity from these receivers the Philco Para Radio Aerial, Part No. 40-5933, should be used. This aerial is accurately designed to match the tuned antenna circuit in the receiver so that maximum performance will be obtained.

A good ground connection to the nearest water pipe or any other good ground source is also required.

Spring (On-Off Indicator)................. 28-3027
Snap Fastener (On-Off Indicator).......... 29-4342
Speaker (F Cabinet)....................... 30-1442
(F Cabinet)............................. 30-1447
Socket (6 prong)......................... 27-6086
Socket (7 prong)........................ 27-6099
Socket (Speaker)......................... 27-8015
Wire Link (On-Off Indicator)............. 28-8922
Tab (Manual)............................. 27-5487
Tab Clip................................. 40-6408
Shaft Extension (Tuning, Volume)........ 38-9640
Bezel (Push button)...................... 56-1364
Bezel Assembly (Dial).................... 40-0364
Bezel Gasket (Dial)....................... 29-9174
Bezel Gasket (Push Button).............. 27-9174
Cable Battery............................ 41-3429
Dial................................... 27-5420
Drive Drum Assembly...................... 31-2281
Drive Pulley............................. 28-6862
Drive Cord (Point)........................ 31-2275
Drive Cord (Cord drive)................... 31-2343
Knob (Push Button)....................... 27-4814
Knob (Tuning, Volume).................... 27-4753
Shaft (Tuning)............................ 56-6032
Spring (Drive Cord Tuning Condenser).... 28-8751
Spring (Drive Cord Pointer).............. 28-8946

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MODEL 39-711, code 121, is a six (6) tube A.C. or D.C. operated receiver employing a superheterodyne circuit with three tuning ranges for reception of Standard, Police and Shortwave Broadcast Stations. Connections are also provided for attaching a high impedance Electric Phonograph pick-up. In addition other features of design are: Automatic Volume Control; Three Point Tone Control; Bias Compensation; and special compensation for reducing frequency drift to a minimum.

POWER SUPPLY: 100-150 or 200-260 volts A.C. or D.C. The voltage ranges are selected by inserting the changeover plug as indicated on top of the chassis.

SCHEMATIC DIAGRAM MODEL 39-711

I.F. = 470 KC.

PRODUCTION CHANGES
Condenser Part No. 30-1116: 250 mfd. added from suppressor grid of the 6J5EG tube to ground to prevent regeneration at 15 to 22 M.C.

AERIAL AND GROUND: To obtain maximum performance from this receiver, the Philco Safety Aerial, Part No. 40-4370 should be used and a good ground connection to the nearest water pipe or any other good source.

CABINET DIMENSIONS: Height 12½" Width 18½" Depth 9½"
POWER CONSUMPTION: 50 watts at 120 volts.
100 watts at 240 volts.

TUNING RANGES: 530 to 1700 K.C.: 2.3 to 7.4 M.C.: 7.3 to 22 M.C.

COMPENSATION: Push-Pull Pentode Audio Output: and special non-CABINET DIMENSIONS:
Height Width Depth
IX 14% 28% 11%

AERIAL AND GROUND: Same as Model 39-711.
Alignment of Compensators

EQUIPMENT REQUIRED:
(1) Signal Generator; Philco Model 077.
(2) Output Meter, Philco Model 027 Circuit Tester.
(3) Philco Fiber Handle Screw Driver, Part No. 27-7058

OUTPUT METER:
Two indicating devices for aligning of the receiver can be used; either an audio output meter or a vacuum tube voltmeter. The method of connecting the audio output meter is given in the next paragraph. The procedure for connecting the vacuum tube voltmeter as an aligning indicator will be found on page 5. Where greater accuracy of the various tuned circuits is desired, the vacuum tube voltmeter is recommended as an aligning device.

The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 25L6G tube (use one tube in Model 39-701) and adjusted for the 0 to 30 V.A.C. scale. After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in Fig. 3, Model 39-711, and Fig. 4, Model 39-751. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

### MODEL 39-711

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>Adjust Compensators</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Connections to Receiver</td>
<td>Dummy Antenna Note A</td>
<td>Dia. Setting</td>
<td>Dial Setting</td>
<td>Control Settings</td>
</tr>
<tr>
<td>1</td>
<td>6J8EG</td>
<td>.1 mfd.</td>
<td>470 K.C.</td>
<td>580 K.C.</td>
</tr>
<tr>
<td>2</td>
<td>Ant. &amp; Grd.</td>
<td>200 mfd</td>
<td>1600 K.C.</td>
<td>1500 K.C.</td>
</tr>
<tr>
<td>3</td>
<td>Ant. &amp; Grd.</td>
<td>200 mfd</td>
<td>580 K.C.</td>
<td>580 K.C.</td>
</tr>
<tr>
<td>4</td>
<td>Ant. &amp; Grd.</td>
<td>400 ohms</td>
<td>7.0 M.C.</td>
<td>Range Sw. Police</td>
</tr>
<tr>
<td>5</td>
<td>Ant. &amp; Grd.</td>
<td>400 ohms</td>
<td>20 M.C.</td>
<td>Range Sw. S. W.</td>
</tr>
</tbody>
</table>

### MODEL 39-751

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>Adjust Compensators</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Connections to Receiver</td>
<td>Dummy Antenna Note A</td>
<td>Dia. Setting</td>
<td>Dial Setting</td>
<td>Control Settings</td>
</tr>
<tr>
<td>1</td>
<td>6J8G Grid and Ground</td>
<td>.1 mfd.</td>
<td>470 K.C.</td>
<td>580 K.C.</td>
</tr>
<tr>
<td>2</td>
<td>Ant. and Grd.</td>
<td>200 mfd</td>
<td>1600 K.C.</td>
<td>1500 K.C.</td>
</tr>
<tr>
<td>3</td>
<td>Ant. and Grd.</td>
<td>200 mfd</td>
<td>580 K.C.</td>
<td>580 K.C.</td>
</tr>
<tr>
<td>4</td>
<td>Ant. and Grd.</td>
<td>400 ohms</td>
<td>6.0 M.C.</td>
<td>Range Sw. Police</td>
</tr>
<tr>
<td>5</td>
<td>Ant. and Grd.</td>
<td>400 ohms</td>
<td>20 M.C.</td>
<td>Range Sw. S. W.</td>
</tr>
</tbody>
</table>

NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — Dial Calibration: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (33) model 39-751 and (6A) — model 39-711 be sure to tune in the fundamental signal (20 M.C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning dial 940 K.C. below the fundamental signal, which will be 19,060 M.C.

The Philco-Tropic radio is particularly recommended for locations where super reception of short wave is necessary and where the radio and the cabinet are exposed to extreme conditions. The receiver is especially constructed to withstand decay, spoilage and deterioration caused by extreme conditions of humidity, heat, salt air and cold; and to stand up under the most severe tropic weather conditions.

The chassis is heavily plated, making it impervious to salt air, rust and corrosion.

The various parts, such as coils, condensers, chokes and transformers, are treated with special wax that will withstand very high temperatures. In addition the wax is treated with chemicals which repel rodents and insects.

The cabinet is treated with a special sealing compound which protects it against moisture and heat.

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SCHEMATIC DIAGRAM MODEL 40-81 CODES 121 & 122.

PART LOCATIONS, UNDERSIDE OF CHASSIS, MODEL 40-81

AUGUST, 1939.

Replacement Parts — Models 40-81, Codes 121, 122

<table>
<thead>
<tr>
<th>SCHE. NO.</th>
<th>DESCRIPTION PART NO.</th>
<th>PART NO.</th>
<th>DESCRIPTION PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loop Assembly (Part of Cabinet)</td>
<td>10432A</td>
<td>Output Transformer</td>
</tr>
<tr>
<td>2</td>
<td>Mica Condenser (15 mmfd.)</td>
<td>61-0038</td>
<td>Cone and Voice Coil Assembly</td>
</tr>
<tr>
<td>3</td>
<td>Mica Condenser (510 mmfd.)</td>
<td>30-1891</td>
<td>Electrolytic Condenser (10,000 mfd., 150 V.)</td>
</tr>
<tr>
<td>4</td>
<td>Resistor (320,000 ohms, 1/4 watt)</td>
<td>33-88339</td>
<td>Resistor (8500 ohms, 1/4 watt)</td>
</tr>
<tr>
<td>5</td>
<td>Oscillator Transformer</td>
<td>38-3577</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Resistor (39,000 ohms, 1/4 watt)</td>
<td>33-333339</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Tubular Condenser (.01 mfd.)</td>
<td>30-6471</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Tuning Condenser Assembly</td>
<td>31-2432</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1st I. F. Transformer Assembly</td>
<td>32-3338</td>
<td></td>
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<tr>
<td>10</td>
<td>Tubular Condenser (.02 mfd.)</td>
<td>30-4510</td>
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<tr>
<td>11</td>
<td>Resistor (15.0 meg., 1/4 watt)</td>
<td>33-610339</td>
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</tr>
<tr>
<td>12</td>
<td>Resistor (4.7 meg., 1/4 watt)</td>
<td>33-847339</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Volume Control and On-Off Switch</td>
<td>30-5555</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Tubular Condenser (.004 mfd.)</td>
<td>30-4878</td>
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<tr>
<td>15</td>
<td>Resistor (4.7 meg., 1/4 watt)</td>
<td>33-847339</td>
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</tr>
<tr>
<td>16</td>
<td>Mica Condenser (220 mfd.)</td>
<td>61-0033</td>
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<td>17</td>
<td>2nd I. F. Transformer Assembly</td>
<td>38-3804</td>
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<td>18</td>
<td>Resistor (6.6 meg., 1/4 watt)</td>
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<td>19</td>
<td>Tubular Condenser (.004 mfd.)</td>
<td>30-4888</td>
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<td>20</td>
<td>Resistor (4.7 meg., 1/4 watt)</td>
<td>33-847339</td>
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<tr>
<td>21</td>
<td>Resistor (850 ohms, 1/4 watt)</td>
<td>33-88339</td>
<td></td>
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<tr>
<td>22</td>
<td>Mica Condenser (500 mmfd.)</td>
<td>30-1313</td>
<td></td>
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</table>

MISCELLANEOUS PARTS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Acetate Window</td>
<td>37-8241</td>
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<tr>
<td>Cabinet</td>
<td>10431A</td>
</tr>
<tr>
<td>Clip (Coil Mounting)</td>
<td>28-8002</td>
</tr>
<tr>
<td>Drive Cord Assembly</td>
<td>31-9411</td>
</tr>
<tr>
<td>Dial</td>
<td>37-8661</td>
</tr>
<tr>
<td>Grille Screen</td>
<td>38-1539</td>
</tr>
<tr>
<td>Knob (Volume and Tuning)</td>
<td>37-4866</td>
</tr>
<tr>
<td>Speaker</td>
<td>38-1481</td>
</tr>
<tr>
<td>Shield (Tube, Code 122)</td>
<td>38-1388</td>
</tr>
<tr>
<td>Sockets (Loktal, Code 131)</td>
<td>85-0078</td>
</tr>
<tr>
<td>Sockets (Octal, Code 19)</td>
<td>38-8133</td>
</tr>
<tr>
<td>Spring (Drive Cord)</td>
<td>38-8761</td>
</tr>
<tr>
<td>Tuning Shaft Assembly</td>
<td>38-9978</td>
</tr>
</tbody>
</table>

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Model 39-744 (121)
Runs 1, 2, 3
Schematic
Voltage Changes

TYPE CIRCUIT: Model 39-744, code 121, is a seven (7) tube battery operated receiver employing a superheterodyne circuit with three tuning ranges for reception of standard, police and shortwave broadcast signals. Each tuning range is provided for adding additional resonant elements to the variable tuned circuit, for the purpose of tuning to the desired station. Each tuning range is provided with a detachable volume control and a variable for reducing frequency drift to a minimum.

AERIAL AND GROUND: To obtain maximum performance from this receiver, the Philco Safety Aerial, Part No. 40-6570 should be used, a good ground connection to the nearest water pipe of any other good ground source.

POWER SUPPLY: 6 volt storage battery.

TUNING RANGES:

- 520 to 1220 K.C.: 23 to 7.4 M.C.
- 74 to 22 M.C.

PRODUCTION CHANGES:

- Run 1, beginning with B-3, a 350R5V2000000 ohm resistor was added across the A.F. transformer primary.
- Run 2, beginning with B-3, a resistor R-3 was added across the A.F. transformer primary.
- Run 3, beginning with B-3, a resistor R-3 was added across the A.F. transformer primary.

TO STABILIZE TUNING OF BROADCAST BAND AND PREVENT FREQUENCY DRIFT, CIRCUITRY WAS ADDED ACROSS THE OUTPUT TRANSISTOR TERMINAL OF THE 6G7 Tube.

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www.americanradiohistory.com
**Alignment of Compensators**

**EQUIPMENT REQUIRED:**
1. Signal Generator: Philco Model 077 A.C. operated or Model 177 Battery operated.
2. Output Meter, Philco Model 027 Circuit Tester.
3. Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3164.

**OUTPUT METER:** The Philco 027 Output Meter is connected to the plate and cathode terminals of one of the type 49 tubes and adjusted for the 0 to 30 V.A.C. scale. After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in Fig. 1. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

---

### Signal Generator

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>1</td>
<td>6D8EG Grid and Ground</td>
<td>.1 mfd.</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Note C</td>
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<td>2</td>
<td>Ant. and Grd.</td>
<td>200 mmfd.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>Ant. and Grd.</td>
<td>200 mmfd.</td>
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<tr>
<td>4</td>
<td>Ant. and Grd.</td>
<td>400 ohms</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>Ant. and Grd.</td>
<td>400 ohms</td>
<td></td>
<td></td>
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### Tabulation of Compensations

<table>
<thead>
<tr>
<th>Compensator</th>
<th>Description</th>
<th>Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ant. Trans. (Brast.)</td>
<td>33-2586</td>
</tr>
<tr>
<td>2</td>
<td>Ant. Trans. (S.W. 1)</td>
<td>30-2993</td>
</tr>
<tr>
<td>3</td>
<td>Ant. Trans. (S.W. 2)</td>
<td>33-2855</td>
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<tr>
<td>4</td>
<td>Compensator</td>
<td>31-6168</td>
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<tr>
<td>5</td>
<td>Tubular Cond.</td>
<td>20-6518</td>
</tr>
<tr>
<td>6</td>
<td>Resistor (50,000 ohms, 1 watt)</td>
<td>33-251435</td>
</tr>
<tr>
<td>7</td>
<td>Tuning Cond.</td>
<td>31-5315</td>
</tr>
<tr>
<td>8</td>
<td>R.F. Trans. (Brast.)</td>
<td>32-2379</td>
</tr>
<tr>
<td>9</td>
<td>R.F. Trans. (S.W. 1)</td>
<td>33-2935</td>
</tr>
<tr>
<td>10</td>
<td>R.F. Trans. (S.W. 2)</td>
<td>32-2615</td>
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<tr>
<td>11</td>
<td>Mica Cond. (5 mmfd.)</td>
<td>30-1126</td>
</tr>
<tr>
<td>12</td>
<td>Compensator</td>
<td>31-6396</td>
</tr>
<tr>
<td>13</td>
<td>Tubular Cond. (.05 mmfd.)</td>
<td>30-6518</td>
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<td>14</td>
<td>Tubular Cond. (.1 mmfd.)</td>
<td>30-6596</td>
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<td>15</td>
<td>Resistor (50,000 ohms, 1 watt)</td>
<td>33-251439</td>
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<td>16</td>
<td>Out. Trans. (Brast.)</td>
<td>32-2110</td>
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<td>Out. Trans. (S.W. 1)</td>
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<td>18</td>
<td>Out. Trans. (S.W. 2)</td>
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<td>Resistor 24-6509</td>
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<td>Compensator</td>
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<td>21</td>
<td>Semi-Bad Cond. (600 mmfd.)</td>
<td>31-6243</td>
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<td>22</td>
<td>Compensator</td>
<td>31-6243</td>
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<td>23</td>
<td>Mica Cond. (250 mmfd.)</td>
<td>30-1119</td>
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<td>24</td>
<td>Resistor (10,000 ohms, 1 watt)</td>
<td>33-210499</td>
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<tr>
<td>25</td>
<td>Resistor (10,000 ohms, 1 watt)</td>
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<td>26</td>
<td>Electrolytic Cond. (5.0 mfd.)</td>
<td>30-3374</td>
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<tr>
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<td>Electrolytic Cond. (5.0 mfd.)</td>
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<td>1st F. Trans. Assy.</td>
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<td>2nd F. Trans. Assy.</td>
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<td>32</td>
<td>Resistor (33,000 ohms, 1 watt)</td>
<td>33-253439</td>
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<td>Volume Control (2.0 mfd.)</td>
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<td>Resistor (70,000 ohms, 1 watt)</td>
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<td>35</td>
<td>Tubular Cond. (.006 mmfd.)</td>
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<td>36</td>
<td>Tubular Cond. (.006 mmfd.)</td>
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<td>37</td>
<td>Tone Control (.06 mfd.)</td>
<td>33-253439</td>
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<td>38</td>
<td>Tone Control (.06 mfd.)</td>
<td>33-253439</td>
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<td>39</td>
<td>Tubular Cond. (.01 mmfd.)</td>
<td>30-2993</td>
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<td>Resistor (170,000 ohms, 1 watt)</td>
<td>33-220439</td>
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<td>41</td>
<td>Resistor (490,000 ohms, 1 watt)</td>
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<td>Tubular Cond. (.006 mmfd.)</td>
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<td>43</td>
<td>Tubular Cond. (.006 mmfd.)</td>
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<td>Resistor (60,000 ohms, 1 watt)</td>
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<td>45</td>
<td>Resistor (60,000 ohms, 1 watt)</td>
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<td>46</td>
<td>Tubular Cond. (.01 mmfd.)</td>
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<td>47</td>
<td>Tubular Cond. (.01 mmfd.)</td>
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<td>48</td>
<td>Mica Cond. (.15 mmfd.)</td>
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<td>49</td>
<td>Resistor (60,000 ohms, 1 watt)</td>
<td>33-210439</td>
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<tr>
<td>50</td>
<td>Resistor (60,000 ohms, 1 watt)</td>
<td>33-210439</td>
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Voltagess Measured from Socket Contacts to Ground; Line Voltage 115 V.A.C.; Dial at No-Signal and using a 1000 ohm per Voltmeter (Philco Model 027).
**TYPE CIRCUIT:** Model 39-770 is an eleven (11) tube A.C. operated superheterodyne circuit with four (4) tuning ranges covering the frequencies listed below. Provisions are also provided for connecting a high impedance phonograph pickup. In addition, other features of design are: Tuning Light Indicator; Continuously Variable Tone Control with Variable Bass Compensation; Amplified Automatic Volume Control; Push-Pull Pentode Audio Output; and Special Compensation in all circuits to prevent frequency drift.

**POWER SUPPLY:** 115 or 220 V. 50 to 60 Cycle A.C. 115 Watts.

To operate the receiver on either of the above voltages, insert the plug on top of power transformer as indicated on the transformer. Special Power Transformers for operation on 220 cycle current are available.

**TUNING RANGES:** 530 to 1720 K.C.; 1.7 M.C. to 5.6 M.C.; 5.5 M.C. to 11.6 M.C.; 11.6 M.C. to 22.0 M.C.

**AUDIO OUTPUT:** 7.5 Watts.

**AERIAL AND GROUND:** To obtain maximum performance from this receiver, the Philco Safety Aerial, Part No. 40-6370, should be used together with a good ground connection to the nearest water pipe or any other good ground source.

**CABINET DIMENSIONS:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
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<tr>
<td>T</td>
<td>18¼</td>
<td>23¾</td>
<td>12¾</td>
</tr>
<tr>
<td>XX</td>
<td>30½</td>
<td>34¾</td>
<td>14¾</td>
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</table>
Alignment of Compensators

<table>
<thead>
<tr>
<th>Operations</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>Control Setting</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dummy Connections to Receiver</td>
<td>Dummy Antenna Note A</td>
<td>Dial Setting</td>
<td>Adjacent Compensators</td>
</tr>
<tr>
<td>1</td>
<td>6JRG Grid</td>
<td>1 mfd.</td>
<td>470 K.C.</td>
<td>580 K.C.</td>
</tr>
<tr>
<td>2</td>
<td>6JRG Grid</td>
<td>1 mfd.</td>
<td>470 K.C.</td>
<td>580 K.C.</td>
</tr>
<tr>
<td>3</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>200 mfd.</td>
<td>1500 K.C.</td>
<td>1500 K.C.</td>
</tr>
<tr>
<td>4</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>200 mfd.</td>
<td>580 K.C.</td>
<td>580 K.C.</td>
</tr>
<tr>
<td>5</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>200 mfd.</td>
<td>5.0 M.C.</td>
<td>5.0 M.C.</td>
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<tr>
<td>6</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>400 ohms</td>
<td>11 M.C.</td>
<td>11 M.C.</td>
</tr>
<tr>
<td>7</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>400 ohms</td>
<td>6.0 M.C.</td>
<td>6.0 M.C.</td>
</tr>
<tr>
<td>8</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>400 ohms</td>
<td>20.0 M.C.</td>
<td>20.0 M.C.</td>
</tr>
<tr>
<td>9</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>400 ohms</td>
<td>12.0 M.C.</td>
<td>12.0 M.C.</td>
</tr>
</tbody>
</table>

**NOTE A**—The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance specified in each step of the above procedure.

**NOTE B**—Dial Calibration: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast area. The arrangement of the drive cable with condenser and pointer in this position is shown.

**NOTE C**—Compensators should be peaked to the fundamental signal which is the second (3) signal from the tight (maximum capacity) position. If the compensator is correctly peaked, the "Image" signal will be found by turning the receiver dial 940 K.C. below 5.0 M.C.

### Schematic Diagram

1. **Ant. Trans.**
2. **Mica Cond.**
3. **Compensator**
4. **Tubular Cond.**
5. **Resistor**
6. **Tuning Cond.**
7. **Dial Pointer**
8. **Dial**
9. **Disc**
10. **Drive**
11. **Coupling**
12. **Spring**
13. **Lamp**
14. **Caution**
15. **Key**
16. **Switch**
17. **Selector**
18. **Volume Control**
19. **Power Trans.**
20. **Cabinet and Field Panel**
21. **Speaker**
22. **Speaker Cabinet**
23. **Speaker Shield**
24. **Station Card Shield**

### Control Settings

- **Tone Treble Vol.**
- **Max. Range Switch**
- **Brackets**
- **TO MAX. OUTPUT**
- **Roll Gang**
- **Tune 14B IN** full

### Special Instructions

- **TO MAX. OUTPUT**
- **Roll Gang**
- **Tune 14B IN** full

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SPECIFICATIONS

Model 39-2770 is an eleven (11) tube A. C. operated superheterodyne circuit with four tuning ranges covering — long wave, 140 to 390 K. C.; standard broad casts, 540 to 1720 K. C.; short wave (A) 8.7 to 11.8 M. C.; short wave (B) 11.8 to 22 M. C. Other than the tuning range coverage Model 39-2770 is similar in design to the Model 39-770.

Service information for Model 39-2770 is the same as that given for Model 39-770 with the exception of “Alignment of Compensator” procedure and some parts in the R. F. section.

These differences are listed below:

<table>
<thead>
<tr>
<th>SCHEMATIC NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
</tr>
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<tbody>
<tr>
<td>(2)</td>
<td>Ant. Trans.</td>
<td>32-3136</td>
</tr>
<tr>
<td>(8)</td>
<td>R. F. Trans.</td>
<td></td>
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<tr>
<td>(24)</td>
<td>Osc. Trans.</td>
<td>32-3137</td>
</tr>
</tbody>
</table>

1. Add a 2200 mmfd. condenser, Part No. 30-1125, from contact C1 on Range Switch to ground.

2. Add a 5 mmfd. condenser, Part No. 30-1120, from contact C2 on Range Switch to ground.

3. Add a 110 mmfd. condenser, Part No. 30-1118 in place of the 51,000 ohm resistor, Part No. 33-351439, now used in the Model 39-770.

4. Add a 5 mmfd. condenser, Part No. 30-1120 from contact B2 on Range Switch to ground.

5. Add a compensator, Part No. 31-6297, from contact A1 on Wave Switch to ground. (The 1330 mmfd. semi-fixed condenser, Part No. 31-6286, used in Model 39-770 is removed from Model 39-2770.)

ALIGNMENT OF COMPENSATORS

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>Adjust Compensators</th>
<th>Special Instructions</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Output Cond. to Receiver</th>
<th>Dummy Antenna Note A</th>
<th>Dial Setting</th>
<th>Dial Setting</th>
<th>Control Setting</th>
<th>Adj. Compensators</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>200 mmfd.</td>
<td>350 K. C.</td>
<td>350 K. C.</td>
<td>Tone-Treble Vol.</td>
<td>27A</td>
<td>Note B</td>
</tr>
<tr>
<td>7</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>400 ohms</td>
<td>11 M. C.</td>
<td>11 M. C.</td>
<td>Tone-Treble Vol.</td>
<td>30, 14, 6</td>
<td>Note D Roll gang on 14 and 6 image above 11.0 M. C.</td>
</tr>
<tr>
<td>8</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>400 ohms</td>
<td>6.0 M. C.</td>
<td>6.0 M. C.</td>
<td>Tone-Treble Vol.</td>
<td>30A, 14A, 9A</td>
<td>Note D Roll gang on 14A and 6A image above 8.0 M. C. Repeat operation 9</td>
</tr>
<tr>
<td>9</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>400 ohms</td>
<td>20.0 M. C.</td>
<td>20.0 M. C.</td>
<td>Tone-Treble Vol.</td>
<td>30B, 14C, 6C</td>
<td>Note D Roll gang on 14C and 6C image above 20.0 M. C.</td>
</tr>
<tr>
<td>10</td>
<td>Ant. &amp; Gnd. Panel</td>
<td>400 ohms</td>
<td>12.0 M. C.</td>
<td>12.0 M. C.</td>
<td>Tone-Treble Vol.</td>
<td>30C, 14B, 6B</td>
<td>Note D Roll gang on 14C and 6B image above 12.0 M. C. Repeat operation 7</td>
</tr>
</tbody>
</table>

COILS SHOWN BELOW

The numbers on coil connections shown, correspond to same numbers on coil connections for Model 39-770.
PHILCO RADIO & TELEV. CORP.

MODEL 40-110
Schematics, Voltage, Chassis, Trimmers

SCHEMATIC DIAGRAM MODEL 40-110

Replacement Parts — Model 40-110

MISCELLANEOUS PARTS

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MODEL 40-110
Alignment Notes

PHILCO RADIO & TELEV. CORP.

SPECIFICATIONS

TYPE OF CIRCUIT: Model 40-110 is a four tube battery operated superheterodyne receiver with electric push-button tuning. In addition other features of design are: Low current drain tubes, new high sound output speaker, specially designed tone chamber, two tuning ranges, automatic volume control, and pentode audio output.

The receiver is equipped with six electric tuning push-buttons for automatically selecting stations. Five of the push-buttons are used for broadcast stations and one for selecting dial tuning. The procedure for adjusting the push-buttons will be found in the instructions supplied with each set.

TUNING RANGES: 540 to 1630 K. C. 5.4 to 18.0 M. C.

INTERMEDIATE FREQUENCY: 455 K. C.

PHILCO TUBES USED: One 1A7G, Converter; one 1NSG, I. F. Amplifier; one 1H5G, 2nd Detector, A. V. C. 1st Audio; one 1A5G, Audio Output.

PHILCO BATTERIES: One Type P-60D-11L.

BATTERY DRAIN: "A" 200 M. A. "B" 7.2 M. A.

CABINET DIMENSIONS: Height Width Depth
40-110K ................. 37 1/2 26 3/4 11 1/2
40-110B ................ 17 1/2 17 1/2 9 1/2

AERIAL AND GROUND: To obtain maximum operating performance with this model, Philco Farm Radio Aerial Part No. 40-6383 is recommended and a good ground source such as a water pipe.

ALIGNMENT OF COMPENSATORS

EQUIPMENT REQUIRED

Signal Generator covering a frequency range of 116 K. C. to 36 M. C. such as Philco Model 077.

Aligning Indicator: A vacuum tube voltmeter or audio output meter such as contained in Philco Models 027 and 028 circuit testers. Either of these meters can be used to align the receiver and are connected as given below.

Tools: Aligning screw driver Part No. 45-2610.

CONNECTING ALIGNING METERS

Audio Output Meter: The audio output meter is connected to the plate and screen terminals of the 1A5G tube. Adjust the meter for the 0 to 30 volt A. C. scale.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows: Connect the negative (—) terminal of the voltmeter through a 2 meg. resistor to any point in the A. V. C. circuit where voltage can be obtained. The positive (+) terminal is connected to the receiver chassis.

After connecting the aligning meter, adjust the compensators in the order as shown in the tabulation below.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Output Connections to Receiver</th>
<th>Dummy Antenna</th>
<th>Dial Setting</th>
<th>Dial Setting</th>
<th>Control Setting</th>
<th>Adjust Padders</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Aerial</td>
<td>400 ohms</td>
<td>18 M. C.</td>
<td>18 M. C.</td>
<td>Val. Max. Range Switch &quot;S. W.&quot;</td>
<td>4A</td>
<td>Note B</td>
</tr>
<tr>
<td>3</td>
<td>Aerial</td>
<td>225 mmfd.</td>
<td>1500 K. C.</td>
<td>1800 K. C.</td>
<td>Range Switch &quot;Brdcat&quot;</td>
<td>7 screw, 4B</td>
<td>Note E</td>
</tr>
<tr>
<td>4</td>
<td>Aerial</td>
<td>225 mmfd.</td>
<td>580 K. C.</td>
<td>580 K. C.</td>
<td>Range Switch &quot;Brdcat&quot;</td>
<td>7A (nut)</td>
<td>Roll Tuning Condenser</td>
</tr>
<tr>
<td>5</td>
<td>Aerial</td>
<td>400 ohms</td>
<td>1500 K. C.</td>
<td>1500 K. C.</td>
<td>Range Switch &quot;Brdcat&quot;</td>
<td>7 screw</td>
<td></td>
</tr>
</tbody>
</table>

NOTE A — The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (High side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, the tuning pointer is set horizontal at the low frequency end of the scale (530 K. C.).

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Models 40-140, 40-145, 40-507

ALIGNMENT OF COMPENSATORS

EQUIPMENT REQUIRED

1. Signal Generator with a frequency range from 115 to 20,000 K. C. such as Philco Model 877.

2. Aligning Indicator, Philco Model 027 or 028, vacuum tube voltmeter and circuit tester incorporates sensitive audio output meters and vacuum tube voltmeters. Either of these instruments can be used as an aligning indicator.

3. Fibre Handle Screw Driver, Philco Part No. 45-2618. When using the vacuum tube voltmeter for aligning the receiver, an aligning adaptor Part No. 45-2767 is required.

CONNECTING ALIGNING METERS

Adjusting R. F. Circuits: To adjust the R. F. circuit, the aligning adaptor is inserted in the 7CN second detector tube socket. The vacuum tube voltmeter remains connected to the adaptor as given in the paragraph above. With the voltmeter connected in this manner, a very sensitive indication of the A. V. C. voltage is obtained when the padders are adjusted.

After connecting the aligning adaptors, adjust the compensators as shown in the tabulation below. Locations of the compensators are shown in Schematic Diagram. If the aligning meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>SPECIAL INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output Connections</td>
<td>Dial Setting</td>
<td>Dial Setting</td>
</tr>
<tr>
<td>2 Use Loop, Note C</td>
<td>18.0 M. C.</td>
<td>18.0 M. C.</td>
<td>Vol. Cont. Max. Range Switch &quot;S.W.&quot;</td>
</tr>
<tr>
<td>3 Use Loop, Note C</td>
<td>1500 K. C.</td>
<td>1500 K. C.</td>
<td>Range Switch &quot;Brdcst&quot;</td>
</tr>
<tr>
<td>4 Use Loop, Note C</td>
<td>580 K. C.</td>
<td>580 K. C.</td>
<td>Range Switch &quot;Brdcst&quot;</td>
</tr>
<tr>
<td>5 Use Loop, Note C</td>
<td>1500 K. C.</td>
<td>1500 K. C.</td>
<td>Range Switch &quot;Brdcst&quot;</td>
</tr>
<tr>
<td>6 Use Loop, Note C</td>
<td>18.0 M. C.</td>
<td>18.0 M. C.</td>
<td>Range Switch &quot;S.W.&quot;</td>
</tr>
</tbody>
</table>

NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left side of the index line at the low frequency end of the broadcast area.

NOTE B — When adjusting the L. F. padders the high side of the signal generator output is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the generator is connected to the chassis of the receiver.

NOTE C — When aligning the R. F. Circuits a loop is made from a few turns of wire and connected to the generator output terminals; the signal generator is then placed two or three feet from the loop in the cabinet.

NOTE D — S. W. Oscillator compensator (27A) is located on top of the tuning condenser. Antenna compensators (1A) and (2A) are located on the loop. When adjusting the "Ant" compensators, the receiver loop should be held in place against the back of the cabinet.

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Models 40-81, Codes 121, 122

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>SPECIAL INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output Connections</td>
<td>Dial Setting</td>
<td>Dial Setting</td>
</tr>
<tr>
<td>2 Use Loop on Generator</td>
<td>1500 K. C.</td>
<td>1500 K. C.</td>
<td>Vol. Max.</td>
</tr>
</tbody>
</table>

BATTERY CURRENT: "A" Battery, 200 M. A. Model 40-81 Battery, 5.6 M. A.

Model 40-88, Code 121

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>SPECIAL INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output Connections</td>
<td>Dial Setting</td>
<td>Dial Setting</td>
</tr>
<tr>
<td>2 Use Loop on Generator</td>
<td>18 M. C.</td>
<td>18 M. C.</td>
<td>Vol. Max. Range Switch &quot;S. W.&quot;</td>
</tr>
<tr>
<td>3 Use Loop</td>
<td>1400 K. C.</td>
<td>1400 K. C.</td>
<td>Range Switch &quot;Brdcst&quot;</td>
</tr>
<tr>
<td>4 Use Loop</td>
<td>580 K. C.</td>
<td>580 K. C.</td>
<td>Range Switch &quot;Brdcst&quot;</td>
</tr>
<tr>
<td>5 Use Loop</td>
<td>1400 K. C.</td>
<td>1400 K. C.</td>
<td>Range Switch &quot;Brdcst&quot;</td>
</tr>
<tr>
<td>6 Use Loop</td>
<td>18 M. C.</td>
<td>18 M. C.</td>
<td>Range Switch &quot;S. W.&quot;</td>
</tr>
</tbody>
</table>

BATTERY CURRENT: "A" Battery, 250 M. A. Model 40-88 Battery, 8 M. A.
Replacement Parts — Models 40-130 and 40-135

Model 40-130 is dial tuned and assembled in cabinet type "T"

* Model 40-135 is equipped with six electric push buttons for automatically selecting stations in addition to dial tuning. Five push buttons are used for stations one of which can be used in combination with Special type PHILCO TELEVISION receivers for reception of television sound programs. The sixth push button selects dial tuning. The push buttons in this model cover frequency ranges as follows:

- 540 to 1550 K.C. (1.5 to 3.3 Mc. DIAL TUNING)
- 455 to 850 K.C. (0.85 to 1.1 Mc. DIAL TUNING)
- 710 to 1550 K.C. (1.15 to 2.3 Mc. DIAL TUNING)
- 455 to 1550 K.C. (0.85 to 2.3 Mc. DIAL TUNING)

These range settings apply to Models 40-130, 40-135, 40-503, 40-506, and 40-525.

Fig. 1. PART LOCATIONS, UNDERSIDE OF CHASSIS.

The procedure for adjusting the push buttons for reception of stations is similar to the method described in the only difference being that the frequency range of each button is different.

Philo television sets and record players contain instructions for setting up and adjusting the push button in model 40-135.

TUNING RANGE: 540 to 1550 K.C. 1.5 to 3.3 M. C.
INTERMEDIATE FREQUENCY: 455 K.C.
POWER SUPPLY: 115 volts A. C. 60 cycles.
POWER CONSUMPTION: 35 watts.

NOTE: Push button data and tuning ranges apply for Models 40-503, 40-506 and 40-525 also.

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Connecting Aligning Meters

Audio Output Meter: Philco Model 027 or 028 Audio Output Meters is connected to the volley terminal of the speaker or the plate and screen of the "VB" tube and adjusted for the 0 to 0.1 volt A.C. scale.

Vacuum Tube Voltmeter: To use the Vacuum Tube Voltmeter as an alignment indicator make the following connections:

(1) Adjusting L.F. Circuits: Remove the 7CC or R.F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the light colored wire which protrudes from the side of the adaptor. Attach the positive terminal of the vacuum tube voltmeter to the black wire of the adaptor.

(2) Adjusting R.F. Circuits: To adjust the R.F. circuit, the aligning adaptor is inserted in the 7CC or R.F. detector tube socket. The vacuum tube voltmeter remains connected to the adaptor as given in the paragraph above. With the voltmeter connected in this manner a very sensitive indication of the A.V.C. voltage is obtained when the padders are adjusted. After connecting the aligning adaptors, adjust the compensators as shown in the tabulation below. Locations of the compensators are shown in Fig. 1. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Alignment

EQUIPMENT REQUIRED

Voltmeters and Circuit Testers incorporate sensitive vacuum tube voltmeters and audio output meters and are recommended.

(3) Philco Fiber Handle Screw Driver. Part No. 15-2610. Aligning adaptor Part No. 45-2767, when using the vacuum tube voltmeter for alignment.

Alignment

Model 40-165

Signal Generator: When adjusting the 1.F padders, the high side of the signal generator is connected to the loop terminal No. 1 of the loop terminal panel at the rear of the chassis. When adjusting the L.F padders a loop antenna is made from a few turns of wire and connected to the signal generator output terminals; the generator is then placed two or three feet from the loop in the cabinet. The ground or low side of the signal generator is connected to the chassis of the receiver.

Model 40-125

Alignment

Signal Generator: When adjusting the 1.F padders, the high side of the signal generator is connected to the loop terminal No. 1 of the loop terminal panel at the rear of the chassis. When adjusting the L.F padders a loop antenna is made from a few turns of wire and connected to the signal generator output terminals; the generator is then placed two or three feet from the loop in the cabinet. The ground or low side of the signal generator is connected to the chassis of the receiver.

Signal Generator: When adjusting the 1.F padders, the high side of the signal generator is connected to the loop terminal No. 1 of the loop terminal panel at the rear of the chassis. When adjusting the L.F padders a loop antenna is made from a few turns of wire and connected to the signal generator output terminals; the generator is then placed two or three feet from the loop in the cabinet. The ground or low side of the signal generator is connected to the chassis of the receiver.

Note A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale.

Note B — When adjusting the 1.F padders the high side of the signal generator output is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis.

Model 40-165

Signal Generator: When adjusting the 1.F padders, the high side of the signal generator is connected to the loop terminal No. 1 of the loop terminal panel at the rear of the chassis. When adjusting the L.F padders a loop antenna is made from a few turns of wire and connected to the signal generator output terminals; the generator is then placed two or three feet from the loop in the cabinet. The ground or low side of the signal generator is connected to the chassis of the receiver.

Note A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Schematic A.D.C

Note B — Turn loop paddler to closed position (maximum capacity), then adjust to the first signal peak from this position; at the same time roll the tuning condenser. See Note C.

Model 40-165

Signal Generator: When adjusting the 1.F padders, the high side of the signal generator is connected to the loop terminal No. 1 of the loop terminal panel at the rear of the chassis. When adjusting the L.F padders a loop antenna is made from a few turns of wire and connected to the signal generator output terminals; the generator is then placed two or three feet from the loop in the cabinet. The ground or low side of the signal generator is connected to the chassis of the receiver.

Note A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Schematic A.D.C.

Note B — Turn loop paddler to closed position (maximum capacity), then adjust to the first signal peak from this position; at the same time roll the tuning condenser. See Note C.

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PHILCO BUILT-IN SUPER AERIAL SYSTEM:

Included in the built-in super aerial system is a statically shielded loop for broadcast band reception and a short wave receiving loop. A feature of the built-in broadcast band statically shielded loop is the receiver may be turned to the position in which it picks up a minimum amount of interference. It is not present the receiver may be set in the position where best reception is obtained.

In addition, other features of design are: Three tuning ranges, especially high gain R. F. stage; Philco high-efficiency Loxit tube; automatic volume control; tone control; and a similar but different in their tuning mechanisms and cabinets.

Model 40-115 is equipped with six push buttons for automatically selecting stations in addition to dial tuning. Five push buttons are used for stations one of which can be un-used in combination with special type PHILCO TELEVISION receiver for reception of television sound programs. The sixth push button selects dial tuning.

The procedure for adjusting the push buttons to broadcast stations is the same as that contained in Volume 197.

The frequency coverage of each push button is as follows:

- **459 to 1030 K.C.**
- **749 to 1130 K.C.**
- **990 to 1470 K.C.**
- **1169 to 1400 K.C.**

Philco television sets and record players contain information for adjusting the push button on the 40-115.

**TUNING RANGES:**

- **1.5 to 3.3 M.C.**
- **5.7 to 18.9 M.C.**

**INTERMEDIATE FREQUENCY:** **455 K.C.**

**POWER SUPPLY:** 115 volts A. C., 60 cycle.

**POWER CONSUMPTION:** 38 watts.

**AUDIO OUTPUT:** 2 watts.

**PHILCO TUBES USED:** 1232, R. F.; 777, converter; 787, I. F.; 705, second detector, AVC and i-f audio; 7BR, audio output and TV6, rectifier.

*APPLIES TO MODEL 40-507 ALSO*

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PHILCO BUILT-IN SUPER AERIAL SYSTEM:

Included in the built-in super aerial system is a statically shielded loop for broadcast band reception and a short wave receiving loop. The feature of the built-in broadcast band statically shielded loop is that it may be turned to the position in which it picks up a minimum amount of interference, or if interference is not present the loop may be set in the position where best reception is obtained.

POWER SUPPLY: 115 Volts, 25 and 60 Cycle A. C.

POWER CONSUMPTION: 45 watts.

FREQUENCY TUNING RANGES: (Three)
- 400 to 1550 K. C.
- 1.5 to 3.5 M. C.
- 6.0 to 18.0 M. C.

INTERMEDIATE FREQUENCY: 455 K. C.

AUDIO OUTPUT: 2 watts.

PHILCO TUBES USED: 12AT7, R. F.; 6JS6, Converter; 7T7, I. F.; 7C6, Second Detector A. V. C. and First Audio; 411, Audio Power Output; 84, Rectifier.

CABINET DIMENSIONS: Type F: Height, 37"; Width, 23½"; Depth, 9½".

ADJUSTING ELECTRIC PUSH-BUTTON TUNING:

The procedure for adjusting the electric tuning push-buttons in this model is covered in Vol. X, Philco page 10-16.
**ADJUSTMENT OF WIRELESS REMOTE CONTROL CIRCUITS**

Models 40-205, 40-216 and 40-510, 40-516.

**ADJUSTING CONTROL FREQUENCY AMPLIFIER**

The wireless remote control models are shipped with 5 different control frequencies which range from 350 to 400 K. C. These frequencies are identified by code numbers appearing on the serial number plate and on the rear of the chassis. The code numbers and frequencies are as follows:

- Code 5 . . . . . 355 K. C.
- Code 6 . . . . . 367 K. C.
- Code 7 . . . . . 375 K. C.
- Code 8 . . . . . 383 K. C.
- Code 9 . . . . . 395 K. C.

The purpose of the different control frequencies is to prevent interaction between two or more wireless remote control models which are on the same floor or exceptionally close together. When several wireless remote control models are to be located close together, it will be necessary to use different control frequencies. These frequencies should be 20 K. C. apart. For example, if three models are to be operated at the same time and are closely situated, it will be advisable to adjust the control frequency of the first set to 355 K. C., the second set to 375 K. C., and the third set to 395 K. C.

In order to realign or change the control frequency of these models, the following equipment is required:

1. Philco Model 077 signal generator with a loop attached to the output terminal. (A few turns of wire 12 inch in diameter.)
2. Philco wireless remote control aligning adapter. Part No. 45-2769.
3. Philco aligning screw driver, Part No. 45-2610.

With this apparatus the control frequency is adjusted as follows:

1. Remove the 2A4G control tube from its socket and replace with the aligning adapter. Connect the red lead of the aligning adapter to the positive terminal of the control voltage tube. The black lead of the adapter is connected to the negative terminal of the control high voltage tube. 
2. Remove the 78 control amplifier tube, its shield and the shield of the 637G tube. Apply power to the set and turn the range selector to “remote.”
3. Attach the “high” side of the signal generator output to the grid of the 637G tube. Set the generator modulation control to “mod on” and turn the attenuator control about one-fourth up.

4. The control frequency to which the amplifier can be tuned can now be determined by tuning the signal generator between 350 and 400 K. C. When the signal generator is tuned to the control frequency, the vacuum tube voltmeter will show maximum deflection. If this frequency is to be used, leave the signal generator at this point until you turn the indicator to any other frequency desired between 350 and 400 K. C.

5. After the control frequency has been found or changed, the trimmer capacitors (103A), (103B) Model 40-216; and (74A), (74B) Model 40-516 are adjusted for maximum indication on the vacuum tube voltmeter.

6. After adjusting this circuit, replace the 78 tube and shield in their sockets and replace the signal generator lead from the grid of the 637G tube.

7. Place the small loop mentioned above into the “high” and “ground” of the signal generator output terminals and place the signal generator near the secondary inductor loop in the bottom of the cabinet. When doing this, do not disturb the setting of the signal generator indicator. 

8. Next adjust the secondary inductor loop trimmer (121) in the Model 216 and (92) Model 205 located in the bottom of the cabinet. This capacitor is located in a cardboard container that is attached to one corner of the vacuum tube voltmeter.

9. If the vacuum tube voltmeter pointer goes off scale when adjusting the trimmers, turn the attenuator control of the signal generator toward the ‘off’ position. After these compensators are adjusted to maximum, the control amplifier is tuned to the frequency selected.
ALIGNING OF COMPENSATING CONDENSERS

EQUIPMENT REQUIRED

(1) Signal Generator. In order to properly adjust this receiver a calibrated signal generator such as Philco Model 677 is required. This signal generator covers a frequency range of 540 to 7,000 K. C.

(2) Indicating Device. To obtain maximum signal strength and accurate adjustment of the padders a vacuum tube voltmeter and circuit tester such as Philco Models 027 and 028 is recommended. These testers also contain an audio output meter which may be used as an indicating device.

CONNECTING ALIGNING INSTRUMENTS

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (-) terminal of the voltmeter through a 2 meg. resistor to the converter grid (6J8G) Model 280. (6AG6) Model 216. The resistor must be connected directly to the grid of the tube and the voltmeter wire attached to the resistor.

2. Connect the positive (+) terminal to the chassis ground terminal.

AUDIO OUTPUT METER: If this type of meter is used as an aligning indicator, it should be connected to the plate terminals of the 6L6 tube. Adjust the meter for the 6 to 30 volt A. C. scale. After connecting the aligning meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in Fig. 6 and 7, page No. 6. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a 1 mid condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the L. F. padders a loop antenna is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiver loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

Receiver Circuit Adjustments — Model 40-216 and MODEL 40-516.

Receiver Circuit Adjustments — Model 40-205 and MODEL 40-510.

<table>
<thead>
<tr>
<th>Operation</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>SPECIAL INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Vol. Max. Range Switch &quot;Brackets&quot;</td>
<td>Turn Out 32B Full</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Val. Max. Range Switch &quot;Brackets&quot;</td>
<td>32B, 33A, 33B</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Val. Max. Range Switch &quot;Short Wave&quot;</td>
<td>Note A</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Val. Max. Range Switch &quot;Brackets&quot;</td>
<td>22B, 12A, 2A</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Val. Max. Range Switch &quot;Brackets&quot;</td>
<td>3X, 1X, 2X</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Val. Max. Range Switch &quot;Brackets&quot;</td>
<td>23</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Val. Max. Range Switch &quot;Police&quot;</td>
<td>22A</td>
</tr>
</tbody>
</table>

NOTE A — Dial calibration: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable and dial pointer is shown in Fig. 5.

NOTE C — If two peaks (signals) are observed on the aligning meter when adjusting the oscillator padders, No. 22A tune the padders to the second peak from the maximum capacity position (screw all the way in).

ADJUSTING WIRELESS REMOTE CONTROL UNIT

The wireless remote control unit is now adjusted to the control frequency of the amplifier as follows:

1. Turn off the signal generator, then dial any one of the stations indicated on the remote control unit by pulling the selector to the stop position, release the selector and at the same time press the stop down and hold it in this position.

2. Now bring the wireless remote control unit close to the receiver. Using a padding wrench, Philco Part No. 9164, tune the compensator (127) Fig. 3, located on the bottom of the remote control unit until a maximum voltage reading is indicated on the vacuum tube voltmeter. When tuning this compensator, it should be done very slowly so as not to pass over the frequency to which the control amplifier is tuned.

3. After adjusting the compensator with the sensitivity control in the "extreme" position, the remote control unit is adjusted for maximum sensitivity by setting the sensitivity control in the "near" position and placing the remote control unit a few feet away from the receiver. The compensator (127) Fig. 3, is then adjusted again for maximum voltage reading of the vacuum tube voltmeter.

4. After making these adjustments, remove the aligning adapter from the socket and replace the 6AG6 tube. The wireless remote control unit should now be adjusted to the same frequency as the control frequency in the receiver.
**Adjusting Wireless Remote Control for Reception of Stations**

**NOTE:** In Model 40-510 No. 8 position is used for phonograph. This position is already connected and will not need adjustment.

1. Select and remove the desired eight station call letters from the large station tab card supplied with the receiver. Insert the station tabs in the apertures (windows) of the bezel. The lowest frequency station is placed in the first window on the left and the remaining station tabs in the order of increasing frequency. Turn on power switch.

2. Remove from the small call letter card the tab of the first low frequency station. Insert the tab in the third aperture on the right side of the bezel to the remote control unit dial. Transparent tabs are also supplied to be placed over each call letter. The remaining call letter tabs are then placed in the order of increasing frequency around the bezel from right to left (counter clockwise).

3. Insert the loud and soft tabs in the first and second windows respectively on the right hand side of the bezel.

4. Connect the negative terminal of the vacuum tube voltmeter through a 2 meg. resistor to the grid of the 78 L. E. tube. The resistor must be connected directly to the grid of the tube and the voltmeter attached to the resistor at this point. Connect the positive terminal to the chassis ground terminal.

5. Attach a loop consisting of a few turns of wire to the output terminals of the Model 077 signal generator. Turn the signal generator modulation control to "mod on". The receiver range selector switch to "Broadcast" and manually tune in the lowest frequency station desired. This station should be between 540 and 1050 K.C. The signal generator is then tuned to the frequency of the station being received. A beat note should then be heard when the volume control is turned on.

6. Turn the range selector disc of the receiver to "remote" dial first low frequency station on the right side of the bezel of the remote control unit.

7. Using a padding screw driver, adjust the first 540 to 1050 K.C. "Loc" paddler (bottom row of holes) at the left rear of the chassis, until the station is identified by the modulated signal of the generator is tuned in to maximum on the vacuum tube voltmeter. Next adjust the first 540 to 1050 K.C. "Ant" paddler (top row of holes) for maximum indication on the voltmeter.

8. Turn the signal generator off the station frequency and readjust the "Ant" and "Loc" paddlers with the station signal for maximum reading on the voltmeter. This should be done with the volume control of the receiver adjusted for low volume. This procedure is repeated for each of the remaining stations to be set up. The next station to be set up should be within the frequency range of 540 to 1050 K.C. of the second set of paddlers. The second station is tuned in by the third set of paddlers and should be within a frequency range of 670 to 1150 K.C. The remaining stations are then set up in the order of increasing frequency.
Replacement Parts — Model 40-510

### Model 40-510

<table>
<thead>
<tr>
<th>PART No.</th>
<th>DESCRIPTION</th>
<th>PART No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>60F</td>
<td>Compensator No. 4 300-1760 A.C. Part of 60</td>
<td>60E</td>
<td>Compensator No. 5 300-1802 K.C. Part of 60</td>
</tr>
<tr>
<td>60D</td>
<td>Compensator No. 3 300-1700 A.C. Part of 60</td>
<td>60C</td>
<td>Compensator No. 2 300-1680 A.C. Part of 60</td>
</tr>
<tr>
<td>60B</td>
<td>Compensator No. 1 300-1750 A.C. Part of 60</td>
<td>60A</td>
<td>Compensator (150 V.) Part of 60</td>
</tr>
<tr>
<td>62</td>
<td>Oscillator (2.0 mfd.) 33.4273</td>
<td>61</td>
<td>Oscillator (1.0 mfd.) 32-4303</td>
</tr>
<tr>
<td>63</td>
<td>Resistor (2.0 mfd.) 32-4303</td>
<td>60</td>
<td>Oscillator (500 ohms, 1/2 watt) Part of 60</td>
</tr>
<tr>
<td>64</td>
<td>Resistor (900 ohms, 1/2 watt) Part of 60</td>
<td>65</td>
<td>Oscillator (1000 ohms, 1/2 watt) Part of 60</td>
</tr>
<tr>
<td>66</td>
<td>Resistor (1500 ohms, 1/2 watt) Part of 60</td>
<td>67</td>
<td>Oscillator (2000 ohms, 1/2 watt) Part of 60</td>
</tr>
<tr>
<td>68</td>
<td>Resistor (5000 ohms, 1/2 watt) Part of 60</td>
<td>69</td>
<td>Oscillator (10,000 ohms, 1/2 watt) Part of 60</td>
</tr>
<tr>
<td>610</td>
<td>Oscillator Coil 7 32-7041</td>
<td>611</td>
<td>Oscillator Coil 6 32-7042</td>
</tr>
<tr>
<td>612</td>
<td>Oscillator Coil 5 32-7043</td>
<td>613</td>
<td>Oscillator Coil 4 32-7044</td>
</tr>
<tr>
<td>614</td>
<td>Oscillator Coil 3 32-7045</td>
<td>615</td>
<td>Oscillator Coil 2 32-7046</td>
</tr>
<tr>
<td>616</td>
<td>Oscillator Coil 1 32-7047</td>
<td>617</td>
<td>Oscillator 32-7048</td>
</tr>
</tbody>
</table>

**Miscellaneous Parts**

- Model 40-515: Transformer 32.3227
- Model 40-516: Transformer 32.3226
- Model 40-517: Transformer 32.3228

**Stepper Unit, Parts**

- Component No. 1: Part of 60
- Component No. 2: Part of 60
- Component No. 3: Part of 60
- Component No. 4: Part of 60
- Component No. 5: Part of 60

**Wiring Diagram**

- FIG. 2: INTERNAL WIRING OF STEPPER UNIT NUMBERS CORRESPOND TO SCHEMATIC.

©John F. Rider, Publisher
The Deluxe Inter-Mix Record Changer plays fourteen 10" and 12" records intermixed, fifteen 10" or thirteen 12" records at one loading. The record changer can be operated manually or from the wireless remote control circuit of the radio receiver. When using the wireless remote control to operate the phonograph, the Inter-Mix Record Changer can be started and stopped, records rejected and volume adjusted, from the remote control unit. The automatic record changer is selected by dialing "PHONO" position. This operates relay (142) which pulls the "Radio-Phono" switch (138) to the "PHONO" position. Records are also rejected by dialing the "PHONO" position on the wireless remote control unit. Phono relay (142) is connected to No. 8 contact of the pilot lamp section of rotary switch (81X).
MODEL 40 - 710 CONNECTING ALIGNING INSTRUMENTS

**Vacuum Tube Voltmeters:** To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit with the Philco aligning adaptor, Part No. 45-2747, as follows:

1. Remove the 7C6 tube from its socket and insert the aligning adaptor in the socket, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the light colored wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the black wire.

2. **Audio Output Meters:** If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of the 3A5 tube. Adjust the meter for the 0 to 30 volt A. C. scale.

After connecting the aligning meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in Fig. 1. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

---

**MODEL 40 - 715 CONNECTING ALIGNING INSTRUMENTS**

**Vacuum Tube Voltmeters:** To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (-) terminal of the voltmeter through a 2 meg. resistor to the converter grid (6J8G). The resistor must be connected directly to the grid of the tube and the voltmeter wire attached to the resistor.

2. Connect the positive (+) terminal to the chassis ground terminal.

**Audio Output Meters:** If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of the 11 tube. Adjust the meter for the 0 to 30 volt A. C. scale.

After connecting the aligning meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in Fig. 1. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

---

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MODEL 40-715 (121)

Schematic, Voltage, Chassis Trimmers

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SPECIFICATIONS

TYPE CIRCUIT: Model 40-715, code-121, is a five (5) tube A.C. operated radio employing a superheterodyne circuit with three tuning ranges for reception of Standard, Police and Shortwave Broadcast Stations. Connections are also provided for attaching a high impedance Electric Phonograph pick-up. In addition other features of design are: Automatic Volume Control; Tube Point Tone Control; Base Compensation; and special temperature and humidity-proof compensators for reducing frequency drift to a minimum.

FOR ALIGNMENT SEE INDEX

POWER SUPPLY: 100-130 or 200-240 volts A.C. The voltage ranges are selected by inserting the changeover plug as indicated on top of the power transformer.

POWER CONSUMPTION: 40 watts.

TUNING RANGES:

620 to 1700 K.C. 2.3 to 7.4 M.C.
7.3 to 22 M.C.

I. F. FREQUENCY: 455 K.C.

PHILCO TUBES: 635B/2, Converter-Oscillator; 78E, I. F. Amplifier; 75, Second Detector; First Audio and A. V. C.; 11IE, Audio Output: 84, Rectifier.
Philco-Irroc Models

40-725, code 121
40-755, code 121

MODEL 40-725
MODEL 40-755

SPECIFICATIONS

Model 40-725

TYPE CIRCUIT: Model 40-725, code 121, is a six (6) tube A.C. operated receiver employing a superheterodyne circuit with three tuning ranges for reception of Standard, Police and Shortwave Broadcast Stations. Connections are also provided for attaching a high impedance Electric Phonograph pick-up. In addition other features of design are: Automatic Tube Control; Continuously Variable Tone Control; Bass Compensation, and special compensation for reducing frequency drift to a minimum.

POWER SUPPLY: 180-190 or 200-265 volt, 50-60 cycle, 60 watts. The voltage ranges are selected by inserting the plug as indicated on top of the power transformer.

TUNING RANGES:
530 to 1720 K. C. 2.3 to 7.4 M. C. 7.3 to 22 M. C.

1. F. FREQUENCY: 455 K. C.

PHILCO TUBES: 7AF; R. F. Amplifier; 6J5FQ, Converter-Oscillator; 78C; I. F. Amplifier; 75; Second Detector, First Audio, and A. V. C.; 41E, Pentode Audio Output; 41, Rectifier.

AUDIO OUTPUT: 2.5 watts.

AERIAL AND GROUND: To obtain maximum performance from this receiver, the Philco Safety Aerial. Part No. 10-0310 should be used and a good ground connection to the nearest water pipe or any other good ground.

CABINET DIMENSIONS:
Height, 14 1/4". Width, 13 1/4". Depth, 10 1/4".

ALIGNING COMPENSATING CONDENSERS

EQUIPMENT REQUIRED

(1) Signal Generator. In order to properly adjust this receiver, a calibrated signal generator such as Philco Model 971 A or Model 1015 G must be connected operating points are required. These signal generators cover a frequency range of 540 to 35,000 K. C.

(2) Inductive Coupler. To obtain maximum signal strength and accurate adjustment of the paddles a vacuum tube voltmeter and circuit test such as Philco Models 027 and 028 is recommended. These testers also contain an audio output meter which may be used as an indicator source.

(3) Aligning Tools. Fiber handle screw driver, Philco Part No. 15-2610.

CONNECTING ALIGNING INSTRUMENTS

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows:
1. Connect the negative (—) terminal of the voltmeter through a 2 meg. resistor to the converter grid (6J5Q). The resistor must be connected directly to the grid of the tube and the voltmeter wire attached to the resistor.
2. Connect the positive (+) terminal to the chassis ground terminal.

NOTE: The "Dummy Antennas" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B - DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C - When adjusting condenser (29) be sure to tune in the fundamental signal (20 M. C.) instead of the image signal. If the condenser is correctly adjusted, the image signal will be 910 K. C. below the fundamental signal, which will be 10,060 M. C.
**MODEL 40-746(121)**

- **Chassis, Trimmers**
- **Alignment**
- **MODEL S-1722**

**Tuner Data**

**PHILCO RADIO & TELEV. CORP.**

**PHILCO - TROPIC MODEL 40-748, CODE 121**

**SPECIFICATIONS**

**INTERMEDIATE FREQUENCY:** 455 K.C.

**PHILCO TUNER 6ESG:** 6ST15: R. F. Amplifier; 6AQ5: Converter; 6SH6, I. F. Amplifier; 677G: Second Detector; A. V. C. and Pilot Audio; 6DEG, Second Audio output, two 19, Output.

**AUDIO OUTPUT:** 2.5 watts.

**AERIAL & GROUND:** To obtain maximum performance from this receiver, the Philco Safety aerial, Part No. 10-6370 should be used. A good ground source to the nearest water pipe or any other grounding connection should be used.

**CABINET DIMENSIONS:** Height, 14½"; Width, 26"; Depth, 10½".

---

**MISCELLANEOUS PARTS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
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<td>26-145S</td>
</tr>
<tr>
<td>SPEAKER (I, Cabinet)</td>
<td>26-145S</td>
</tr>
<tr>
<td>Spring Clip (Cable Mounting)</td>
<td>28-807G</td>
</tr>
<tr>
<td>Rubber Washer</td>
<td>27-415G</td>
</tr>
<tr>
<td>Rubber Washer (top 49)</td>
<td>27-415G</td>
</tr>
<tr>
<td>Rubber Washer (bottom 49)</td>
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</tr>
<tr>
<td>Rubber Washer, Hats</td>
<td>26-107G</td>
</tr>
<tr>
<td>Rubber Washer, Under-Unit Mounting</td>
<td>27-426G</td>
</tr>
<tr>
<td>Rubber Washer, Mounting</td>
<td>27-426G</td>
</tr>
<tr>
<td>Rubber Washer, Dial and Assembly</td>
<td>27-427G</td>
</tr>
<tr>
<td>Rubber Washer, Drive (Tuning)</td>
<td>27-429G</td>
</tr>
<tr>
<td>INSTALLATION OF DRIVE CORD</td>
<td>27-428G</td>
</tr>
<tr>
<td>INSTALLATION OF DRIVE CORD</td>
<td>27-428G</td>
</tr>
<tr>
<td>INSTALLATION OF DRIVE CORD</td>
<td>27-428G</td>
</tr>
<tr>
<td>INSTALLATION OF DRIVE CORD</td>
<td>27-428G</td>
</tr>
</tbody>
</table>

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**ALIGNMENT OF COMPENSATORS**

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>Dial Setting</th>
<th>Control Settings</th>
<th>Adjust Compensators</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6.0 M.C.</td>
<td>Vol. Max. Range Switch &quot;S. W. 1&quot;</td>
<td>23A, Roll Gang</td>
</tr>
<tr>
<td>6</td>
<td>21 M.C.</td>
<td>Vol. Max. Range Switch &quot;S. W. 2&quot;</td>
<td>26, 15, 4, Note C</td>
</tr>
</tbody>
</table>

**NOTE A** — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

**NOTE B** — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the mark at the left edge (low frequency end) of the broadcast scale.

**NOTE C** — When adjusting compensator (26) be sure to tune in the fundamental signal (21 M.C. — second signal from light position of pointer) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning the receiver dial 910 K.C. below the fundamental signal.

---

**MODEL S-1722**

**SETTING UP THE RECEIVER FOR AUTOMATIC TUNING**

1. Turn the Receiver on and allow it to operate for TWENTY minutes. Remove the cover plate over the automatic tuning adjusting screws. This plate is on the front of the Receiver and is removed by removing two screws.

2. Push the Automatic Station Selector button until the word "DIAL" appears in the indicator window. Tune in the station whose call letters are in the first position on the dial (the highest frequency station) and note the program. Push the Automatic Selector button once and this station's call letters will appear at the indicator window.

3. With a small screwdriver, turn the No. 1 adjusting screw (see Fig. 3) in the lower column, to the right or left until this station is tuned in. Now adjust the corresponding screw in the upper column until maximum volume is obtained. Make these adjustments carefully, as it may be easy to over by the loudest point on some stations.

When adjusting for Automatic Tuning on strong local stations the antenna rod should be in about the way down and the adjustments made with the car in a shielded area, such as in a steel constructed building or under a viaduct. This is necessary in order to obtain a weak signal so the adjustments can be accurately made.

1. Press the Automatic Station Selector button until "DIAL" appears again in the indicator window and tune in the station whose call letters are in the second position on the automatic dial (the next lower frequency). Press the automatic button two times and adjust the number 2 set of adjusting screws.

Repeat this procedure until each of the five pairs of adjusting screws has been tuned to its respective station.

IT IS NECESSARY THAT THE SETTING OF THE ADJUSTING SCREWS BE REPEATED TO BE SURE THEY ARE PROPERLY SET SO THAT MAXIMUM PERFORMANCE MAY BE HAD.

Make all adjustments for maximum reading on the output meter.© John F. Rider, Publisher
PHILCO RADIO & TELEV. CORP

MODEL 107(121) Runs 1,2
Schematic, Voltage Notes

FOR OTHER DATA SEE INDEX

SCHEMATIC DIAGRAM MODEL 107

SPECIFICATIONS

CHANGING to manual tuning. The procedure for adjusting the push-buttons for reception of stations will be found in the instructions supplied with each set.

INTERMEDIATE FREQUENCY: 470 K.C.

PHILCO TUBES USED:

6A7 First Detector Oscillator; 78, I.F. Amplifier; 75, Second Detector, A.V.C., First Audio; 41 Audio Output and B4, Rectifier.

POWER SUPPLY: 115 V, 50 to 60 cycle A.C.

POWER Transformers are available for operation on 115 V, 25 to 40 cycles A.C.

POWER CONSUMPTION: 57 watts

AUDIO OUTPUT: One (1) watt

Compensating condensers will be found under the

Schem. Description Part No.

(See Philco page 10-2

1 Antenna Transformer........... 32-3039
2 Tubular Condenser (.05 mfd.)... 32-3189
3 Tuning Condenser.............. 31-2238
4 R3istor (70,000 ohms, 1/2 watt) 33-370339
4A R3istor (70 ohms, 1/2 watt).... 33-070339
5 Mica Condenser (.10 mfd.)..... 30-1031
6 Oscillator Transformer........ 32-2122
8A Mica Condenser (20 mfd.)..... 30-1123
7 1st I.F. Transformer Assy..... 32-3121
9 Resistor (3.0 meg., 1/2 watt).... 33-350339
10 Resistor (32,000 ohms, 1/2 watt) 33-222339
10 Tubular Cond. (.05 mfd.)...... 30-4444
11 2nd I.F. Transformer Assy..... 32-2874
12 Resistor (61,000 ohms, 1/2 watt) 33-361339
13 Volume Control (.5 meg.)...... 33-55264
14 Tubular Condenser (.01 mfd.)... 30-4572
15 Tuning Capacitor.............. 32-4972
16 Resistor (4.0 meg., 1/2 watt).... 33-540339
17 Resistor (160,000 ohms, 1/2 watt) 33-416339
18 Tubular Condenser (250 mfd.)... 30-1032
19 Resistor (1.0 meg., 1/2 watt).... 33-510339
20 Tubular Condenser (.03 mfd.)... 30-4582
21 Output Transformer............ 32-7980
22 Cone & Voice Assembly Speaker No. 36-1473-5.... 36-4120
Speaker No. 36-1440-3.... 36-4068
23 Resistor (50 ohms, 1/2 watt).... 33-050339
24 Resistor (250 ohms, 1/2 watt).... 33-126339
25 Electrolytic Cond. (Run 1-6 mfd., 450 V)..... 30-2265

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MODEL 933
ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 077 or 177 Philco Signal Generator, 027 Philco vacuum tube voltmeter and circuit tester and a 27-7139 Padding screw driver.

General — The vacuum tube voltmeter can be used as a "wireless" output meter as a convenient method for obtaining maximum output reading. Solder one end of a piece of wire to a strip of phosphor bronze approximately 1" wide, 6" long and .02" thick. Coil this strip so that it can be slipped over the top of the type 7B5 output tube, and make a fairly tight contact. Connect the other end of the wire to the "high" terminal of the vacuum tube voltmeter. Then connect a wire from the radio chassis to the "plus" terminal of the vacuum tube voltmeter.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>SIGNAL GENERATOR</th>
<th>DUMMY CAPACITY</th>
<th>SPECIAL INSTRUCTIONS</th>
<th>ADJUST PADDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Press</td>
<td>Automatic Station Selector button until &quot;DIAL&quot; appears in the window and stations can be tuned in by Manual Tuning.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 470 K.C. To Antenna Receptacle on Radio</td>
<td>30 Mmfd. See Note 1</td>
<td>Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 1580 K.C. To Antenna Receptacle on Radio</td>
<td>30 Mmfd. See Note 1</td>
<td>Set Tuning Condenser at 1580 K.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 1500 K.C. To Antenna Receptacle on Radio</td>
<td>30 Mmfd. See Note 1</td>
<td>Set Tuning Condenser at 1500 K.C.</td>
<td>Note 2</td>
<td></td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

NOTE 1 Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 30 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it. Also adjust the antenna compensator for maximum on a weak signal at approximately 1400 K.C.
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Place the receiver in the holder.</td>
</tr>
<tr>
<td>2.</td>
<td>Insert the proper wire into the hole.</td>
</tr>
<tr>
<td>3.</td>
<td>Place the end of the cord through the hole in the holder.</td>
</tr>
<tr>
<td>4.</td>
<td>Pull the cord.</td>
</tr>
<tr>
<td>5.</td>
<td>Turn the tuning condenser clockwise until the desired frequency is obtained.</td>
</tr>
<tr>
<td>6.</td>
<td>Replace the top cover.</td>
</tr>
</tbody>
</table>

**Chrysler Models C1708**

- Place the receiver in the holder. 
- Insert the proper wire into the hole. 
- Place the end of the cord through the hole in the holder. 
- Pull the cord. 
- Turn the tuning condenser clockwise until the desired frequency is obtained. 
- Replace the top cover.

**Ford Model F-1740**

- Place the receiver in the holder. 
- Insert the proper wire into the hole. 
- Place the end of the cord through the hole in the holder. 
- Pull the cord. 
- Turn the tuning condenser clockwise until the desired frequency is obtained. 
- Replace the top cover.

**Lincoln Models L1760 and L1761**

- Place the receiver in the holder. 
- Insert the proper wire into the hole. 
- Place the end of the cord through the hole in the holder. 
- Pull the cord. 
- Turn the tuning condenser clockwise until the desired frequency is obtained. 
- Replace the top cover.

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PHILCO RADIO & TELEV. CORP.

MODEL C-1708 Chrysler
Schematic, Chassis

I.F. = 455 KC.

FOR ALIGNMENT SEE INDEX

September, 1939

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### Model C - 1708 Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

**Equipment** — Fully charged heavy duty storage battery or 6-volt power pack, 077 or 177 Philco Signal Generator, 027 Philco vacuum tube voltmeter and circuit tester and a 27-7159 Paddling screw driver.

**General** — The vacuum tube voltmeter can be used as a "wireless" output meter as a convenient method for obtaining maximum output reading. Solder one end of a piece of wire to a strip of phosphor bronze approximately 1" wide, 6" long and .02" thick. Coat this strip so that it can be slipped over the top of the type 7B5 output tube, and make a fairly tight contact. Connect the other end of the wire to the "high" terminal of the vacuum tube voltmeter. Then connect a wire from the radio chassis to the "plus" terminal of the vacuum tube voltmeter.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud. The shielding on the generator output lead must be connected to the Radio housing.

<table>
<thead>
<tr>
<th>OPERATIONS</th>
<th>SIGNAL GENERATOR</th>
<th>DUMMY CAPACITY</th>
<th>SPECIAL INSTRUCTIONS</th>
<th>ADJUST PADDERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FREQUENCY</td>
<td>CONNECTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press the &quot;DIAL&quot; button and stations can be tuned in by &quot;DIAL&quot; tuning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 -</td>
<td>455 K. C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>.1 mfd.</td>
<td>Note 1</td>
</tr>
<tr>
<td>2</td>
<td>455 K. C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>.1 mfd.</td>
<td>Note 1</td>
</tr>
<tr>
<td>3</td>
<td>1400 K. C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>20 mmfd. Note 2</td>
<td>Set tuning condenser at 1400 K. C.</td>
</tr>
<tr>
<td>4</td>
<td>580 K. C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>20 mmfd. Note 2</td>
<td>Set tuning condenser at 580 K. C.</td>
</tr>
<tr>
<td>5</td>
<td>1400 K. C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>20 mmfd. Note 2</td>
<td>Set tuning condenser at 1400 K. C.</td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter unless otherwise specified.

**NOTE 1** — Turn the tuning control knob clockwise as far as it will go.

**NOTE 2** — Connect the Chrysler Antenna lead, Part No. 95-9016, to the antenna receptacle on the radio. Connect a 20 mmfd. Condenser in series between the signal generator and the antenna lead.

**NOTE 3** — Rotate the tuning control when adjusting the Low Frequency screw ¾. Tune to the signal and adjust the screw for maximum output. Turn the tuning control knob slightly, first one way then the other, for maximum output. Repeat this procedure until no further improvement is noticed.

**NOTE 4** — Adjust the Cowl Antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna lead but not connected to it and adjust pad spray ¾ for maximum signal at 1400 K. C.

### Alignment for Model S-1722

<table>
<thead>
<tr>
<th>OPERATIONS</th>
<th>SIGNAL GENERATOR</th>
<th>DUMMY CAPACITY</th>
<th>SPECIAL INSTRUCTIONS</th>
<th>ADJUST PADDERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FREQUENCY</td>
<td>CONNECTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Press the Automatic Station Selector button until &quot;DIAL&quot; appears in the window and stations can be tuned in by Manual Tuning.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>470 K. C.</td>
<td>To Grid of 78 L. F. Tube</td>
<td>.5 mfd.</td>
<td>Note 2</td>
</tr>
<tr>
<td>3</td>
<td>1550 K. C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>35 mmfd. See Note 1</td>
<td>Note 2</td>
</tr>
<tr>
<td>4</td>
<td>1360 K. C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>35 mmfd. See Note 1</td>
<td>Set tuning condenser at 1360 K. C.</td>
</tr>
</tbody>
</table>

**NOTE 1** — Connect the antenna lead, Part No. L. 2765, to the antenna receptacle in the radio. Connect a 35 mmfd. Condenser in series between the signal generator and the antenna lead.

**NOTE 2** — Turn the condenser rotor plates completely out of mesh as far as they will go.

**NOTE 3** — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.
**Model F-1740 ADJUSTMENTS**

All padding adjustments are carefully made at the factory and ordinarily no real adjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

**Equipment** — Fully charged heavy duty storage battery or 6-volt power pack, 077 or 177 Philco Signal Generator, 067 Philco vacuum tube voltmeter and circuit tester and a 27-7009 Padding screwdriver.

**General** — The vacuum tube voltmeter can be used as an output meter, as a convenient method for obtaining an output reading. Connect one end of the test lead to the "high" terminal of the vacuum tube voltmeter and the other end to the jumper on the bottom of the radio. Then connect one end of the other test lead, from the "plus" terminal of the vacuum tube voltmeter to the radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, the Radio voltage control will full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be bright but not loud.

All cover plates must be in place on the radio and screwed to the housing before attempting to adjust the radio.

<table>
<thead>
<tr>
<th>OPERATIONS</th>
<th>SIGNAL GENERATOR</th>
<th>DUMMY CAPACITY</th>
<th>SPECIAL INSTRUCTIONS</th>
<th>ADJUST PADDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREQUENCY</td>
<td>CONNECTION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>455 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>.1 mfd.</td>
<td>Note 2</td>
<td>@ @ @ @ @ @ @ @ @ (0)</td>
</tr>
<tr>
<td>455 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>.1 mfd.</td>
<td>Note 2</td>
<td>Minimum</td>
</tr>
<tr>
<td>1580 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Set Tuning Condenser at 1400 C.C.</td>
<td>@</td>
</tr>
<tr>
<td>1400 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Set Tuning Condenser at 580 C.C.</td>
<td>@</td>
</tr>
<tr>
<td>580 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Set Tuning Condenser at 1400 C.C.</td>
<td>@</td>
</tr>
<tr>
<td>1580 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Set Tuning Condenser at 580 C.C.</td>
<td>@</td>
</tr>
<tr>
<td>1400 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

**NOTE 1** — Connect the antenna lead part number 95-0120 to the antenna receptacle on the radio, in series with a 20 mfd. condenser between the antenna lead and the signal generator. Ground the shield pigtail on the antenna lead to the generator.

**NOTE 2** — Turn the condenser rotor plate completely out of mesh as far as they will go.

**NOTE 3** — Rock the tuning condenser while adjusting the low frequency paddler. Tune the condenser to the signal and adjust the paddler for maximum output. Rotate the tuning condenser back and forth slightly. Then readjust the paddler for maximum output. Repeat this procedure until no further improvement is noticed.

**NOTE 4** — When the antenna step adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

**SETTING UP THE RADIO FOR AUTOMATIC TUNING**

The Antenna and Rotomatic adjustments are easily accessible by removing the plastic bezel on the top of the radio. This bezel is held by two screws.

1. Turn the radio on and allow it to operate for at least twenty minutes before making any adjustments. All adjustments must be made with the antenna fully extended.

2. Press the Rotomatic button until the word "Dial" appears on the Rotomatic indicator. Tune in a weak station on the manual dial between 1300 and 1400 kilocycles. Adjust the antenna paddler (Fig. 3) until maximum volume is obtained. This adjustment must be made first before any Rotomatic adjustments are made; otherwise, mis-tuning will result.

3. Select five stations within the frequency range shown under each set of adjustment screws in Fig. 3.

4. With "Dial" showing on the Rotomatic indicator, manually tune in the station to be set up on position No. 1 and identify the program.

5. Press the Rotomatic button until No. 1 appears on the Rotomatic indicator. Now adjust the two screw at position No. 1 to the highest volume. Lower frequency stations are tuned by turning the screws to the left or counter-clockwise. Lower frequency stations are tuned by turning the right or clockwise.

6. Proceed with setting up the remaining four stations in the same manner as described above for position No. 1 and 2.

7. Because there is some detuning of the coils due to the movements of the core in adjacent coils, it is necessary to re-check the adjustments from No. 1 to No. 4. This is important to secure reception while driving a distance from the broadcasting stations.

8. This final re-checking of adjustments should be made in an area of low signal strength in your service area or in some known "dead" spot where signals can just barely be heard.
1939 FORD ADJUSTABLE ANTENNA
(FOR CLOSED CARS — MODELS 91A AND 99A)

ANTENNA ROD
91A-28-5536
99A-57-0537
91B-57-0582
998-28-5535

CUT HEADLINING EACH WAY OVER CENTER

AERIAL STOP
91A-27-4506
91B-27-4710
99A-55-0240
998-55-0240

99A ESC.
57-0278

91A-27-4678
99A-27-4679

WASHER 28-2606
91A & 99A ONLY

NUT W-1907
91B & 99A ONLY

CONTROL KNOB
55-0182 ALL MODELS

ESCUTCHEON

LOCK WASHER W-533
91A & 99A ONLY

LEAD-IN 95-0075

DRILL 1 INCH HOLE
USE TEMPLATE TO LOCATE HOLE
ADJUSTING SCREW
ROD LOCKING SCREW

THIS GASKET USED ON
91A COUPE ONLY
27-4678

1939 FORD Adjustable Antenna

FORD ANTENNA PARTS LIST
(FORD 91A CLOSED CAR)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price Each</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-58</td>
<td>Nut</td>
<td>per 100 0.50</td>
<td>W-58</td>
</tr>
<tr>
<td>W-495F1</td>
<td>Lockwasher</td>
<td>per 100 0.50</td>
<td>W-495F1</td>
</tr>
<tr>
<td>W-1907</td>
<td>Nut</td>
<td>per 100 0.50</td>
<td>W-1907</td>
</tr>
<tr>
<td>W-1907F1</td>
<td>Screw</td>
<td>per 100 0.50</td>
<td>W-1907F1</td>
</tr>
<tr>
<td>91-4071</td>
<td>Antenna Stop</td>
<td></td>
<td>91-4071</td>
</tr>
<tr>
<td>91-4078</td>
<td>Gasket</td>
<td>0.80</td>
<td>91-4078</td>
</tr>
</tbody>
</table>

*Used on No. 166 car also.

FORD ANTENNA PARTS LIST
(FORD 91B OPEN CAR)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price Each</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-58</td>
<td>Nut</td>
<td>0.50</td>
<td>W-58</td>
</tr>
<tr>
<td>W-495F1</td>
<td>Lockwasher</td>
<td>0.50</td>
<td>W-495F1</td>
</tr>
<tr>
<td>W-1907</td>
<td>Nut</td>
<td>0.50</td>
<td>W-1907</td>
</tr>
<tr>
<td>W-1907F1</td>
<td>Screw</td>
<td>0.50</td>
<td>W-1907F1</td>
</tr>
<tr>
<td>91-4071</td>
<td>Antenna Stop</td>
<td>0.80</td>
<td>91-4071</td>
</tr>
<tr>
<td>91-4078</td>
<td>Gasket</td>
<td>0.80</td>
<td>91-4078</td>
</tr>
</tbody>
</table>

*Used on 91B car also.

FORD ANTENNA PARTS LIST
POR 116 CLOSED CAR (MERCURY) (99A)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price Each</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-58</td>
<td>Nut</td>
<td>0.50</td>
<td>W-58</td>
</tr>
<tr>
<td>W-495F1</td>
<td>Lockwasher</td>
<td>0.50</td>
<td>W-495F1</td>
</tr>
<tr>
<td>W-1907</td>
<td>Nut</td>
<td>0.50</td>
<td>W-1907</td>
</tr>
<tr>
<td>W-1907F1</td>
<td>Screw</td>
<td>0.50</td>
<td>W-1907F1</td>
</tr>
<tr>
<td>91-4071</td>
<td>Bushing</td>
<td>0.50</td>
<td>91-4071</td>
</tr>
<tr>
<td>91-4078</td>
<td>Gasket</td>
<td>0.50</td>
<td>91-4078</td>
</tr>
</tbody>
</table>

*Used on 99A car also.

FORD ANTENNA PARTS LIST
POR 116 OPEN CAR (MERCURY) (99B)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price Each</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-58</td>
<td>Nut</td>
<td>0.50</td>
<td>W-58</td>
</tr>
<tr>
<td>W-495F1</td>
<td>Lockwasher</td>
<td>0.50</td>
<td>W-495F1</td>
</tr>
<tr>
<td>W-1907</td>
<td>Nut</td>
<td>0.50</td>
<td>W-1907</td>
</tr>
<tr>
<td>W-1907F1</td>
<td>Screw</td>
<td>0.50</td>
<td>W-1907F1</td>
</tr>
<tr>
<td>91-4071</td>
<td>Bushing</td>
<td>0.50</td>
<td>91-4071</td>
</tr>
<tr>
<td>91-4078</td>
<td>Gasket</td>
<td>0.50</td>
<td>91-4078</td>
</tr>
</tbody>
</table>

*Used on 99B car also.

Prices subject to change without notice.
PILOT RADIO CORP.

MODEL T-101
Schematic, Socket Trimmers, Alignment

TUNING RANGE

Broadcast Band 535 to 1720 kc.; or 561 to 174 meters
Short Wave Band 5.6 to 19.8 kc.; or 53.6 to 15.2 meters

ANTENNA

While this receiver is equipped with the new "Pilo-tenna" for the reception of local stations with good tone quality, it is recommended that a good outside antenna of the doublet type be installed for short wave or distant broadcast band reception and for the reduction of interfering noises due to other electrical devices.

When using a doublet antenna, connect one lead-in wire to terminal "A" at the rear of the chassis, and the other lead-in wire to terminal "D". Remove the connecting link from terminals "D" and "E" and connect terminal "G" to a ground such as a cold water pipe or radiator. If an ordinary single wire antenna is used, connect the lead-in wire to Terminal "A" on the rear of the chassis. Leave the link between "D" and "G" terminals and connect a ground wire under terminal "G".

SERVICE NOTES

The location of all adjustments used in re-aligning this receiver, and the frequencies at which these adjustments should be made, are shown in the accompanying diagram.

When aligning the I. F. amplifier, the generator must be connected to the grid of the 12SA7 tube through a .1 mfd condenser. When aligning the receiver on the Broadcast Band, connect the generator to the Antenna wire through a .0002 mfd condenser, and on the short wave band use a 400 ohm carbon resistor.

©John F. Rider, Publisher
MODEL T-102
Schematic, Socket
Alignment, Trimmers

PILOT RADIO CORP.

Broadcast Band 535 to 1720 kc.; or 561 to 1740 meters
Short Wave Band 5.6 to 19.8 mc.; or 53.6 to 15.2 meters

SERVICE NOTES

The location of all adjustments used in re-aligning this receiver, and the frequencies at which these adjustments should be made, are shown in the accompanying diagram.

When aligning the I. F. amplifier, the generator must be connected to the grid of the 6SA7 tube through a .1 mfd condenser. When aligning the receiver on the Broadcast Band, connect the generator to the Antenna wire through a .0002 mfd condenser, and on the short wave band use a 400 ohm carbon resistor.

ANTENNA

While this receiver is equipped with the new "Pilot-tenna" for the reception of local stations with good tone quality, it is recommended that a good outside antenna of the doublet type be installed for short wave or distant broadcast band reception and for the reduction of interfering noises due to other electrical devices.

When using a doublet antenna, connect one lead-in wire to terminal "A" at the rear of the cabinet, and the other lead-in wire to terminal "D". Remove the connecting link from terminals "D" and "G" and connect terminal "G" to a ground such as a cold water pipe or radiator. If an ordinary single wire antenna is used, connect the lead-in wire to Terminal "A" on the rear of the cabinet. Leave the link between "D" and "G" terminals and connect a ground wire under terminal "G".

©John F. Rider, Publisher
Broadcast Band:  535 to 1720 kc.
Short Wave Band:  5.6 to 19.8 mc.

When using a doublet antenna, connect one lead-in wire to terminal "A" at the rear of the chassis, and the other lead-in wire to terminal "D". Remove the connecting link from terminals "D" and "G" and connect terminal "G" to a ground such as a cold water pipe or radiator. If an ordinary single wire antenna is used, connect the lead-in wire to Terminal "A" on the rear of the chassis. Leave the link between "D" and "G" terminals and connect a ground wire under terminal "G".

SERVICE NOTES

The location of all adjustments used in re-aligning this receiver, and the frequencies at which these adjustments should be made, are shown in the accompanying diagram.

When aligning the I. F. amplifier, the generator must be connected to the grid of the 12SA7 tube through a .1 mfd condenser. When aligning the receiver on the Broadcast Band, connect the generator to the Antenna wire through a .002 mfd condenser, and on the short wave band use a 400 ohm carbon resistor.

©John F. Rider, Publisher
PUSH BUTTON CONTROLS:
The purpose of the topmost button (No. 1) is to shut off the power of the receiver. The following 6 push buttons are available for any 6 stations on the broadcast band in the tuning ranges designated below. The lowest button (No. 8) is to be pressed when you wish to operate the manual tuning control.

To set the 6 station buttons (No. 2 to 7) to various stations of the broadcast band, the operations noted below should be followed:

1. Remove the two screws above and below the push buttons in the wooden cover plate and lift off the plate. This will disclose the adjusting screws.

2. With a screw driver inserted in the larger of the two screws opposite the buttons, turn either right or left until the desired station is tuned in. Then make the final adjustment with the small screw.

The limiting wave lengths between which the various buttons can be adjusted are as follows: (buttons numbered from top to bottom).

- Button No. 1—"OFF" power switch
- Button No. 2—from 1620 kc. to 890 kc. and "ON" power switch
- Button No. 3—from 1335 kc. to 620 kc. and "ON" power switch
- Button No. 4—from 1335 kc. to 620 kc. and "ON" power switch
- Button No. 5—from 1335 kc. to 620 kc. and "ON" power switch

- Button No. 6—from 840 kc. to 527 kc. and "ON" power switch
- Button No. 7—from 840 kc. to 527 kc. and "ON" power switch
- Button No. 8—Manual Tuning and "ON" power switch

3. In the instruction envelope you will find a card with perforated call letters for most of the broadcasting stations.

Remove the desired one and insert it in the head of the push button whose shaft is next to the screw which has been adjusted to that station.

4. After all push buttons have been set, replace the front wooden plate.
MODEL 4QB
Alignment, Socket
Trimmers, Voltage
Chassis Wiring

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of the test osc. to—</th>
<th>Tune test osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for maximum peak output—</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1N5-G I-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; band, quiet point at high frequency end</td>
<td>L16 and L15 (2nd I-F Trans.) L10 and L11† (1st I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>1A7-G 1st Det. grid cap, in series with .01 mfd.</td>
<td>1,500 kc</td>
<td>1,500 kc (155°) &quot;A&quot; band</td>
<td>Preset L6 (osc.) core</td>
</tr>
<tr>
<td>3</td>
<td>Antenna lead, in series with 200 mmfd.</td>
<td>800 kc</td>
<td>600 kc (35°) &quot;A&quot; band</td>
<td>L6 (osc.)**</td>
</tr>
<tr>
<td>4</td>
<td>Repeat steps 3 and 4</td>
<td>2.5</td>
<td>2.5 mc (29.5°) &quot;B&quot; band</td>
<td>L6 (osc.)**</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 6 and 7</td>
<td>6.1 mc</td>
<td>6.1 mc (151°) &quot;B&quot; band</td>
<td>Preset L8 (osc.) core</td>
</tr>
<tr>
<td>6</td>
<td>Antenna lead, in series with 300 ohms</td>
<td>15.2 mc</td>
<td>15.2 mc (128°) &quot;C&quot; band</td>
<td>L10 (osc.)</td>
</tr>
<tr>
<td>7</td>
<td>20 mc</td>
<td>20 mc (105.5°) &quot;C&quot; band</td>
<td>L25 (ant.)†† Rock gang</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Repeat steps 6 and 7</td>
<td>1,500 kc</td>
<td>1,500 kc (105.6°) &quot;A&quot; band</td>
<td>C23 (osc.)</td>
</tr>
<tr>
<td>9</td>
<td>Antenna lead, in series with 200 mmfd.</td>
<td>15.2 mc</td>
<td>15.2 mc (128°) &quot;C&quot; band</td>
<td>L10 (osc.)</td>
</tr>
<tr>
<td>10</td>
<td>20 mc</td>
<td>20 mc (105.5°) &quot;C&quot; band</td>
<td>L25 (ant.)†† Rock gang</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Antenna lead, in series with 200 mmfd.</td>
<td>1,500 kc</td>
<td>1,500 kc (105.6°) &quot;A&quot; band</td>
<td>C23 (osc.)</td>
</tr>
</tbody>
</table>

*Use minimum capacity if two peaks can be obtained.
**Rock gang slightly for peak output.
†Do not readjust L13 or L14 when test-osc. is applied to 1A7-G grid.
††Use maximum capacity peak if two peaks can be obtained.

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Model 4QB Top View

Model 4QB R-F Wiring Diagram and Socket Voltages
Voltages shown above are for battery operation.

www.americanradiohistory.com
General Alignment Data for Models 4QB and 4QB4
(Refer to specific "Alignment Procedure" for each model)

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the recorder volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the ground terminal, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 45 degree mark on drum scale should be in an approximately horizontal position when the plates are fully meshed. The distance from the edge of the chassis to the drum must not exceed 1-inch. The drum is held to the shaft by means of a set screw, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improve a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, (last mark at end of "A" scale) and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

CV-111 A-C POWER SUPPLY UNIT

<table>
<thead>
<tr>
<th>Power Rating</th>
<th>105-125/200-250 volts, 50-60 cycle, 65 watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectifier Tube</td>
<td>RCA 5T4</td>
</tr>
<tr>
<td>Ballast Resistor Tube</td>
<td>Type 6692-3</td>
</tr>
<tr>
<td>Dial Lamp</td>
<td>Mazda 44, 63 volts, 0.25 amp.</td>
</tr>
<tr>
<td>Dimensions (inches)</td>
<td>5 x 31 x 61</td>
</tr>
<tr>
<td>Net Weight</td>
<td>5 lbs</td>
</tr>
</tbody>
</table>

Miscellaneous Data:

A four-wire cable with a plug at each end is provided for making connection from the 8-prong connector on chassis to a plug-in 14-90 volt "A-B" battery pack.

When separate "A" and "B" batteries are used, it is necessary to use an adapter cable with a socket on one end and three plugs on the other end, as shown in the accompanying sketch. With separate "A" and "B" batteries that have terminals instead of plug-in connectors, remove the three plugs on the adapter cable and connect the leads to the battery terminals, following the color code shown in the schematic diagram.

Victrola Attachment:

A jack is provided on the rear of chassis for connecting a Victrola Attachment into the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Models 4QB and 4QB4 may be operated on 105-125/200-250 volts, 50-60 cycle a-c power supply, by installing a CV-111 power supply unit on the chassis, as follows:

1. Remove the battery cable plug from the power plug on chassis.
2. Set the line power switch (on side of CV-111) to the correct position for the a-c voltage that is to be used.
3. Place the CV-111 on top of the radio chassis as shown in dotted lines in the top view. Press the dial light clip on the projection at low-frequency end of dial assembly. Insert the phono jack socket (on cable from CV-111) into the power plug on chassis.
4. Fasten the power unit to the chassis. The front of the unit has two projections which fit into slots on the front of the chassis. Two projections on the rear of the unit have holes for fastening to the rear of the chassis with self-tapping screws.
5. Caution: Before connecting the a-c supply, make certain that all tubes are firmly seated in their sockets. Always disconnect the a-c supply before removing or replacing tubes.
6. Reverse the a-c power plug for minimum hum.

Socket Voltages, with CV-111 Power Supply Unit
(Line Supply Voltage, 117, or 234 volts)

<table>
<thead>
<tr>
<th>Tube</th>
<th>1A7-G</th>
<th>1N5-G</th>
<th>1H5-G</th>
<th>1C5-G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>1st Det.</td>
<td>Osc.</td>
<td>I. F.</td>
<td>2nd Det., A. F.</td>
</tr>
<tr>
<td>Filament Voltage</td>
<td>1A7-G</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Plate Voltage</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>40**</td>
</tr>
<tr>
<td>Screen Voltage</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>95</td>
</tr>
<tr>
<td>Plate Mills</td>
<td>0.4</td>
<td>1.5</td>
<td>1.5</td>
<td>.03</td>
</tr>
<tr>
<td>Screen Mills</td>
<td>.7</td>
<td>.35</td>
<td>.35</td>
<td>1.75</td>
</tr>
<tr>
<td>Bias</td>
<td>6.1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total "B" current, 15 mils. Total filament current, 146 mils. **With 750,000 ohm voltmeter.
RCA MFG. CO. INC.

MODEL 4QB4, Ch. RC440A
Schematic, Lead Dress

Precautionary Lead Dress:
1. Dress C8 (100 mm) diaphragm to chassis.
2. Dress the 1A7-G grid cap lead clear of chassis.
3. Dress the 1R5-G ground lead, and green lead to the green lead to the 1H5-G grid cap.
4. Dress the blue lead from the terminal of the 1H5-G socket to the 1A7-G socket.
5. Dress the red wire from the power plug to the power switch on the volume control away from the chassis.
6. Blue lead from the 1C4-G band capacitor past 1A7-G No. 6 contact.
7. A all tube shields must be tight.

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### RCA MFG. CO., INC.

**Model 4QB4 Alignment Procedure**

1. **Steps**
   - Connect the high side of the test-osc. to...
   - Tune test-osc. to...
   - Adjust the following for maximum peak output

2. **Power Switch**
   - Voltage
   - Model
   - Chassis

3. **Power Plug**
   - Steps Connect
   - Output
   - 11-6

4. **VOLUME CONTROL**
   - POWER PLUG
   - CV-111 MOUNTING SCREWS
   - 4QB4 VICTROLA JACK

---

### Table: Model 4QB4 Alignment

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of the test-osc. to-</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for maximum peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1N5-G L-F grid cap, in series with 0.1 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; Band, Quiet Point at high-frequency end</td>
<td>L14 and L13 (2nd L-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>1A7-G 1st-Det. grid cap, in series with 0.1 mfd.</td>
<td>1,500 kc (200 m)</td>
<td>1,500 kc (152.5°)</td>
<td>&quot;A&quot; Band, Quiet Point at high-frequency end</td>
</tr>
<tr>
<td>3</td>
<td>600 kc (500 m)</td>
<td>1,500 kc (200 m)</td>
<td>1,500 kc (152.5°)</td>
<td>&quot;A&quot; Band, Quiet Point at high-frequency end</td>
</tr>
<tr>
<td>4</td>
<td>Antenna lead, in series with 200 mfd.</td>
<td>150 kc (500 m)</td>
<td>150 kc (500 m)</td>
<td>&quot;A&quot; Band, Quiet Point at high-frequency end</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 3 and 4.</td>
<td>150 kc (500 m)</td>
<td>150 kc (500 m)</td>
<td>&quot;A&quot; Band, Quiet Point at high-frequency end</td>
</tr>
<tr>
<td>6</td>
<td>Antenna lead, in series with 300 ohms</td>
<td>15 mc</td>
<td>15 mc</td>
<td>&quot;A&quot; Band, Quiet Point at high-frequency end</td>
</tr>
<tr>
<td>7</td>
<td>Repeat steps 6 and 7.</td>
<td>15 mc</td>
<td>15 mc</td>
<td>&quot;A&quot; Band, Quiet Point at high-frequency end</td>
</tr>
<tr>
<td>8</td>
<td>Antenna lead, in series with 200 mfd.</td>
<td>1,500 kc (200 m)</td>
<td>1,500 kc (200 m)</td>
<td>&quot;A&quot; Band, Quiet Point at high-frequency end</td>
</tr>
</tbody>
</table>

---

*Use minimum capacity peak if two peaks can be obtained.

**Notes:**
- **Rock gang slightly for peak output.**
- Do not readjust L13 or L14 when test-osc. is applied to 1A7-G grid.
- **Use maximum capacity peak if two peaks can be obtained.**

---

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Schematic
Chassis Wiring

RCA MFG. CO., INC.
MODEL 5Q1
(Formerly 95FT)

Power Output
Undistorted...2.2 watts
Maximum...4.5 watts

Power Supply Ratings
Rating A......105-125 volts, 50-60 cycles, 75 watts.
Rating B......105-125 volts, 25-60 cycles, 75 watts.
Rating C......105-125/200-250 volts, 30-60 cycles, 75 watts.

Loudspeaker......6-inch electrodynamic
Type.........84001-3 2.6 ohms at 400 cycles
V. C. Impedance 84091-2 4.7 ohms at 400 cycles IF PEAK 455 KC

Schematic and primary lead connections for 110-220 volt power transformer (Stock No. 30097). Resistance of each primary winding, 10 ohms; High-voltage secondary winding, 886 ohms total.

Pilot Lamps (2) Mazda No. 46, 6.3 volts, 0.25 amp. 6Q7 & G

First Edition
©John F. Rider, Publisher
### RCA MFG. CO., INC.

#### General Description and Service Data

Precautionary Lead Dress.—(1) Keep leads from C1 as short as possible. (2) Dress yellow and green leads from range selector to oscillator coil between front apron and range selector. (3) Dress blue lead from oscillator coil to oscillator plate away from other parts. Maintain original length and size of the following: (4) bus lead from antenna coil L1 to range selector and (5) lead from oscillator coil to chassis.

**Phonograph Attachment.—** A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-B, R-93-C, R-93-2, or R-94 Record Players should be connected as follows: Open link between terminals 1 and 2 on terminal board. Connect yellow wire in Radio-Record switch cable to terminal 1, green to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

---

### Alignment Procedure

With the gang tuning-condenser plates in full-mesh position, adjust the pointer to the low-frequency (end) calibration mark on the dial scale. The pointer is soldered in place on the drive cable.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4. Cathode-ray alignment is preferable, the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the “low” output terminal of the test oscillator to the receiver “G” (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-c action.

The term “Dummy antenna” means the device which must be connected between the “high” test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. “No signal,” 350-750 kc means that the receiver should be tuned to a point between 350 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

---

#### Test Oscillator

<table>
<thead>
<tr>
<th>Order of Alignment</th>
<th>Connection to Receiver</th>
<th>Dummy Antenna</th>
<th>Frequency Setting</th>
<th>Range Selector</th>
<th>Receiver Dial Setting</th>
<th>Circuit to Adjust</th>
<th>Adjustment Symbols</th>
<th>Adjust to Obtain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 IF Grid Cap</td>
<td>.001 Mfd.</td>
<td>455 kc</td>
<td>“A” Left</td>
<td>0 Signal</td>
<td>1000 kHz</td>
<td>L12 and L13</td>
<td>Max. (peak)</td>
</tr>
<tr>
<td>2</td>
<td>6A8 Det. Grid Cap</td>
<td>.001 Mfd.</td>
<td>455 kc</td>
<td>“A” Right</td>
<td>No Signal</td>
<td>1500 kHz</td>
<td>L10 and L11</td>
<td>Max. (peak)</td>
</tr>
<tr>
<td>3</td>
<td>Ant. Term. 300 Ohms</td>
<td>5000 kc</td>
<td>“B” Center</td>
<td>6000 kc</td>
<td>“B” Osc.</td>
<td>C10</td>
<td>Max. (peak)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ant. Term. 300 Ohms</td>
<td>5000 kc</td>
<td>“B” Left</td>
<td>6000 kc</td>
<td>“B” Ant.</td>
<td>C20</td>
<td>Max. (peak)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ant. Term. 300 Ohms</td>
<td>5000 kc</td>
<td>“C” Left</td>
<td>6000 kc</td>
<td>“C” Osc.</td>
<td>1000 Hz</td>
<td>Max. (peak)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Ant. Term. 200 Mfd.</td>
<td>6000 kc</td>
<td>“A” Left</td>
<td>5000 kc</td>
<td>“A” F-L Osc.</td>
<td>L8</td>
<td>Max. (peak)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ant. Term. 200 Mfd.</td>
<td>6000 kc</td>
<td>“A” Left</td>
<td>6000 kc</td>
<td>“A” H-F Osc.</td>
<td>L8</td>
<td>Max. (peak)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ant. Term. 200 Mfd.</td>
<td>1500 kc</td>
<td>“A”</td>
<td>6000 kc</td>
<td>“A” L-F Osc.</td>
<td>L8</td>
<td>Max. (peak)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Ant. Term. 200 Mfd.</td>
<td>1500 kc</td>
<td>“A”</td>
<td>6000 kc</td>
<td>“A” H-F Osc.</td>
<td>L8</td>
<td>Max. (peak)</td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained.
† After this adjustment, check for image signal by shifting receiver dial to 5.00 mc.
‡ Use maximum capacity peak if two peaks can be obtained. After this adjustment, check for image signal by shifting receiver dial to 20.91 mc.

Note that the heterodyne oscillator tracking above the signal frequency on bands “A” and “B,” and below the signal frequency on band “C.”

---

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Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 115-volt a-c supply.

**NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.
Alignment Procedure

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Pre-setting Dial.—With the gang condenser in full mesh, the dial pointer should be in line with the left-hand end of the dial scales. The pointer is soldered to the drive cable.

Miscellaneous Service Data

Victrola. The connections for this switch are as follows:

- Connect the yellow lead in the switch cable to terminal No. 1.
- Connect the green lead in the switch cable to terminal No. 2.
- Connect the shielding of the cable to terminal No. 3.
- Tape the ends of the blue and the red leads separately.

Connect the Victrola Attachment to the two clip-type connectors on the switch.

Connections of Universal Power Transformer

Primary for 220 and 110 Volts

Connections and Colors of Speaker and Cable
Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 110 volt ac supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.
MODEL 5Q2X
Alignment, Socket, Trimmers
Lead Dress

Precautionary Lead Dress.—
1. Leads on C20 ("C" band tracking condenser) must be as short as possible.
2. Dress blue lead from oscillator plate away from all parts.
3. Dress speaker cable away from ballast tube.

CAUTION: The chassis is connected to one side of the power supply. Avoid contact of chassis or parts to external ground when servicing.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to:</th>
<th>Tune test-osc. to:</th>
<th>Turn radio dial to:</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 1-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; band, Quiet Point between 550-750 kc</td>
<td>L8 and L9 (2nd I-P Trans.),</td>
</tr>
<tr>
<td>2</td>
<td>6K8 det grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;B&quot; band</td>
<td>L6 and L7 (1st I-P Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna Terminal in series with 300 ohms</td>
<td>6 mc</td>
<td>&quot;C&quot; band</td>
<td>C12 (osc.)*</td>
</tr>
<tr>
<td>4</td>
<td>Antenna Terminal in series with 300 ohms</td>
<td>20 mc</td>
<td>&quot;C&quot; band</td>
<td>C11 (osc.)** (Rock In)</td>
</tr>
<tr>
<td>5</td>
<td>Antenna Terminal in series with 200 mnf.</td>
<td>600 kc</td>
<td>&quot;A&quot; band</td>
<td>L14 (osc.)</td>
</tr>
<tr>
<td>6</td>
<td>Antenna Terminal in series with 200 mnf.</td>
<td>1,500 kc</td>
<td>&quot;A&quot; band</td>
<td>C14 (osc.) (Rock In)</td>
</tr>
<tr>
<td>7</td>
<td>Repeat steps 5 and 6.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained.
† After adjusting C3, check to determine that C12 has been adjusted to the correct peak by tuning the receiver to approximately 3.99 mc, where a weaker signal should be received.
‡ Use maximum capacity peak if two peaks can be obtained. Check to determine that C11 has been adjusted to the correct peak by tuning the receiver to approximately 20.91 mc, where a weaker signal should be received.

NOTE: The oscillator tracks 455 kc above the signal on "A" and "B" bands, and 455 kc below the signal on "C" band.

Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the spider screws, insert three narrow feelers at equal distances in the gap, and tighten the spider screws. Remove the feelers, and fasten a dust cover in place with loudspeaker cement.

At Right—Connections and Colors of Speaker and Cable

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RCA MFG. CO., INC.

4. Dress C22 (1st A.F. coupling condenser) against rear apron.

Power Supply Polarity.—
For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, a similar reversal of the plug may reduce hum.

Power Output Rating
(A-C Operation)
Undistorted: 1.7 watts
Maximum: 2.7 watts
(D-C Operation)
Undistorted: 1.4 watts
Maximum: 2.3 watts

LOUDSPEAKER
Type: 1-inch Electrodynamic V.C. Impedance: 2.2 ohms at 400 cycles

Power Supply Ratings
A-C Rating: 200-250 volts 60/60 cycles, 115 watts
D-C Rating: 200-250 volts direct current, 105 watts
Alignment Procedure

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis and keep the output as low as possible to avoid a.c. action.

Pre-setting Dial.—With the gang condenser in full mesh, the dial pointer should be in line with the left end of the dial scales. The pointer is soldered to the drive cable.

Connections of Loudspeaker and Cable

Connections of Universal Power Transformer

Victrola Attachment (Record Player).—Terminals are provided on the rear of the chassis for convenient connection to a Victrola Attachment (record player) such as the RCA R-93 and R-94 series. A stock No. 9824 switch may be used to change from radio to record player as shown at right.
Precautionary Lead Dress

1. Lead from 2nd I.F. (E) to volume control should be kept close to chassis.
2. R.F. coil leads should be kept short and away from coil.
3. Leads to 6,000 mml. (C10) should be as short as possible and condenser dressed away from chassis, bearing against 10 ohm (R12) resistor.

All Heaters 6.3 VAC., EXCEPT 5Y3G, 5V0AC.

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.
Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the ground terminal, and keep the output as low as possible to avoid a-v c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is often used in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 45 degree mark on the drum scale (see "Drum Drive and Indicator Cord Assembly") must be in a horizontal position when the plates are fully meshed. The distance from the chassis to the drum must not exceed 8 inch. The drum is held to the shaft by means of a set screw, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0 degree" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 900 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Steps

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to—</th>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 I-F grid cap. in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; Band quiet point between 500-750 kc</td>
<td>L10 and L11 (60 sec.)</td>
</tr>
<tr>
<td>2</td>
<td>Tuning condenser stator (osc.) in series with .01 mfd. **</td>
<td>455 kc</td>
<td>&quot;A&quot; Band quiet point between 500-750 kc</td>
<td>L1 and L2 (1st. F. trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna lead (blue) in series with 200 mfd.</td>
<td>600 kc</td>
<td>1,500 kc</td>
<td>C3 (ant.) C8 (osc.)</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>600 kc</td>
<td>(152.4°) &quot;A&quot; Band</td>
<td>C3 (ant.) C8 (osc.)</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 3 and 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna lead (blue) in series with 400 ohms</td>
<td>20 mc</td>
<td>20 mc</td>
<td>C5 (osc.) C26 (ant.)</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>6 mc</td>
<td>6 mc</td>
<td>C6 (osc.) C27 (ant.)</td>
</tr>
<tr>
<td>8</td>
<td>Antenna lead (blue) in series with 200 mfd.</td>
<td>1,500 kc</td>
<td>1,500 kc</td>
<td>C8 (osc.)</td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained.
** Make test-oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.

Speaker

Type (5Q5, 5Q55, 5Q56) RL-78-2 5-inch Electrodynamic (6Q7) 6-inch Electrodynamic
Voice-Coil Impedance: 4 ohms at 100 cycles

Power Supply Ratings

Rating A 110-125 volts, 50-60 cycles, 70 watts
Rating B 105-125 volts, 25-60 cycles, 70 watts
Rating C 105-125/200-250 volts, 50-60 cycles, 70 watts

Connections and Colors of Speaker and Cable

Connections of Universal Power Transformer Primary for 220 and 110 Volts

D C Resistance

Primary No. 1 13 ohms
Primary No. 2 13 ohms
H. V. Secondary (Total) 500 ohms

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RCA PAGE 11-17

General Description

Model SQ6 is a three-band, table-type superheterodyne receiver housed in a plastic cabinet. It is designed for operation on 210-250 volts, 50-60 cycles AC, or 210-250 volts DC.

Features of design include: New type single-ended tubes (6SA7 and 6SQ7); magnetite core I-F transformers; magnetite core oscillator adjustment for "A" band; automatic volume control; bass compensation; electrodynamic loudspeaker; high-frequency tone control; straight-line dial; tropic-proof construction; streamline moulded cabinet.

Power Supply Polarity:
For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, a similar reversal of the plug may reduce hum.

Tube Complement

1. RCA-6SA7
2. RCA-6X7
3. RCA-6SQ7
4. RCA-28L6-G
5. RCA-28Z6-G
6. Pilot Lamp
7. Mazda No. 47, 6.3 volts, 0.15 amp.
8. Ballast Tube
9. RCA Stock No. 32849 for 210-250 volt operation

Power Output Rating
(210-250 Volt Operation)
Undistorted ............................................ 1.5 watts
Maximum .................................................. 2.7 watts

 Loudspeaker (84552-2) .......................... 5-inch
Type ..................................................... V. C. Impedance
..................................................... 2.2 ohms at 400 cycles

Power Supply Ratings
210-250 volts, 50-60 cycles ..................... 125 watts
210-150 volts, direct current .................... 125 watts

First Edition
1939

Frequency Range
Standard Broadcast ("A" Band) .................. 540-1,720 kc (554-174 m)
Medium Wave ("B" Band) .......................... 2,370 kc (1304.2 m)
Short Wave ("C" Band) ............................ 7.0-22 mc (42.8-136.0 m)

Intermediate Frequency ....................... 455 kc

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MODEL SQ6-Omnia RC-477A
Schematic Diagram

RC A MFG. CO., INC.
Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver ground (black), and keep the output as low as possible to avoid a V.C. action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 135° mark on the drum scale must be vertical, and directly under the center of the gang condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of a set screw, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improve a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

 Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cord with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

### Alignment Procedure

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 I-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; Band quiet point between 550-750 kc</td>
<td>L10 and L11 (2nd I.F. trans.)</td>
</tr>
<tr>
<td>2</td>
<td>Tuning condenser stator (osc.) in series with .01 mfd. **</td>
<td>455 kc</td>
<td></td>
<td>L8 and L9 (1st I.F. trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna lead in series with 200 mmfd.</td>
<td>600 kc</td>
<td>&quot;A&quot; Band</td>
<td>L7†</td>
</tr>
<tr>
<td>4</td>
<td>Antenna lead in series with 200 mmfd.</td>
<td>1,500 kc</td>
<td>&quot;A&quot; Band</td>
<td>C2 (ant.) C8 (osc.)</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 3 and 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna lead in series with 400 ohms</td>
<td>20 mc</td>
<td>&quot;A&quot; Band</td>
<td>C6 (osc.)† C56 (ant.)</td>
</tr>
<tr>
<td>7</td>
<td>Antenna lead in series with 400 ohms</td>
<td>6 mc</td>
<td>&quot;B&quot; Band</td>
<td>C6 (osc.)† C27 (ant.)</td>
</tr>
<tr>
<td>8</td>
<td>Antenna lead in series with 200 mmfd.</td>
<td>1,500 kc</td>
<td>&quot;A&quot; Band</td>
<td>C8 (osc.)</td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained.
† Rock gang condenser slightly while adjusting L7.
** Make test-oscillator connection to bag on tuning condenser stator (oscillator sections) in series with .01 mfd. condenser.

Note.—Oscillator tracks 455 kc above signal on all bands.

### Calibration Scale

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 33° on the calibration scale corresponds to approximately 7.9 mc on "C" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

©John F. Rider, Publisher
Pilot Lamp: Mazda No. 47, 6.3 volts, 0.15 amp.

Power Output Rating:
- 210-250 Volt Operation
  - Undistorted: 1.5 watts
  - Maximum: 2.7 watts
- 105-125 Volt Operation
  - Undistorted: 1.7 watts
  - Maximum: 2.9 watts

Precautionary Lead Dress:
1. Lead from 2nd I-F transformer to volume control should be kept close to the chassis and dressed against front apron.

Frequency Ranges:
- Long Wave (X)........ 145-405 kc (2069-740 m)
- Medium Wave (A)..... 540-1720 kc (555-174 m)
- Short Wave (C)....... 5.8-18 mc (51.7-16.6 m)

Intermediate Frequency........ 455 kc

Rectifier Ballast Tubes: RCA Stock No. 32544 for 105-125 volt operation; RCA Stock No. 32850 for 210-250 volt operation.

Type:.............. 5-inch V. C. Impedance........... 3.0 ohms at 400 cycles

Power Supply Ratings:
- 105-125 volts, AC-DC................... 65 watts
- 210-250 volts, AC-DC................... 125 watts

C-10 should be dressed away from the antenna section of the variable condenser (C-1).

NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.
Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output as low as possible to avoid A-V-C action.

Calibration Scale on Indicator-Drive-Cord Drum. —The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees.

The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 133° mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of one set screw, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of the test-osc. to—</th>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 I-F grid cap in series with .01 mfd.</td>
<td>456 kc</td>
<td>“A” Band Quiet Point between 550-750 kc</td>
<td>L12 and L13 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6SA7 det. grid in series with .01 mfd.</td>
<td>456 kc</td>
<td>1,500 kc (152.4°)</td>
<td>L10 and L11 (1st I-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Ant. terminal in series with 200 mnf.</td>
<td>1,500 kc</td>
<td>“A” Band</td>
<td>C6 (osc.)</td>
</tr>
<tr>
<td>4</td>
<td>Ant. terminal in series with 200 mnf.</td>
<td>600 kc</td>
<td>“A” Band</td>
<td>C2 (ant.)</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 3 and 4</td>
<td></td>
<td></td>
<td>C8 (osc.)</td>
</tr>
<tr>
<td>6</td>
<td>Ant. terminal in series with 200 mnf.</td>
<td>360 kc</td>
<td>“X” Band</td>
<td>C26 (ant.)</td>
</tr>
<tr>
<td>7</td>
<td>Ant. terminal in series with 200 mnf.</td>
<td>175 kc</td>
<td>175 kc (553°) “X” Band</td>
<td>C8 (osc.)</td>
</tr>
<tr>
<td>8</td>
<td>Repeat steps 6 and 7</td>
<td></td>
<td></td>
<td>L9 (osc.)</td>
</tr>
<tr>
<td>9</td>
<td>Ant. terminal in series with 300 ohms</td>
<td>16.2 mc</td>
<td>15.2 mc (147.2°) “C” Band</td>
<td>C5 (osc.)</td>
</tr>
<tr>
<td>10</td>
<td>Ant. terminal in series with 200 mnf.</td>
<td>360 kc</td>
<td>“X” Band</td>
<td>C6 (osc.)</td>
</tr>
<tr>
<td>11</td>
<td>Ant. terminal in series with 200 mnf.</td>
<td>1,500 kc</td>
<td>“A” Band</td>
<td>C6 (osc.)</td>
</tr>
</tbody>
</table>

*Use minimum capacity peak if two can be obtained. Check to determine that C5 is adjusted to correct peak by tuning receiver to approximately 14.29 mc where a weaker signal should be received.

NOTE: Oscillator tracks above signal on all bands.
Precautionary Lead Dress:

1. Dress yellow lead from antenna coil to first section of range switch away from adjoining wires.
2. Dress green lead from middle section of gang and green lead from 6SA7 to the rear section of the range switch away from chassis, ground leads, other wires and capacitors.
3. Dress brown lead from detector coil to rear section of the range switch away from the detector coil; loop brown lead toward rear apron.
4. Dress black lead from 2nd I.F. transformer "B" to 6SQ7 socket against chassis.
5. Twist power leads together, and dress away from 6SQ7 socket.
6. Dress blue lead from 6SK7 (R-F) socket to detector coil away from chassis, ground shields and other wires.
7. Dress black lead from antenna trimmer (C1) to antenna coil away from range switch link action.
8. Dress black speaker lead around output socket toward power transformer, against base.
9. Keep green lead of 6SK7 R-F grid circuit away from blue antenna lead.
Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 180° mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of the test-osc to—</th>
<th>Tune test-osc to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for maximum peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6SK7 1-F grid in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; Band</td>
<td>L14 and L15 (2nd I-F trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6SA7 grid in series with .01 mfd.</td>
<td></td>
<td>Quiet point</td>
<td>L12 and L13 (1st I-F trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Ant. terminal in series with 200 nufmfd.</td>
<td>600 kc</td>
<td>between 550-750 kc</td>
<td>L11 (osc.) Rock gang</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>1,500 kc</td>
<td>&quot;A&quot; Band</td>
<td>C15 (osc.)</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 3 and 4.</td>
<td></td>
<td></td>
<td>C9 (det.) C3 (ant.)</td>
</tr>
<tr>
<td>6</td>
<td>Ant. terminal in series with 300 ohms</td>
<td>6 mc</td>
<td>&quot;B&quot; Band</td>
<td>C13 (osc.)*</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>20 mc</td>
<td>&quot;C&quot; Band</td>
<td>C8 (det.) C2 (ant.)</td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two can be obtained. Check to determine that C13 has been adjusted to the correct peak by tuning receiver to approximately 5.09 mc where a weaker signal should be received.

** Use minimum capacity peak if two can be obtained. Check to determine that C11 has been adjusted to the correct peak by tuning the receiver to approximately 19.09 mc where a weaker signal should be received.

Note.—Oscillator tracks above signal on all bands.

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Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 180° mark on the calibration scale when the plates are fully meshed.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to—</th>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for maximum peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turn tone control to 3rd position (sharp) from maximum counter-clockwise.</td>
<td>6SK7 I-F grid in series with .01 mfd.</td>
<td>455 kc</td>
<td>L18 and L19 (2nd I-F trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6SK7 I-F grid in series with .01 mfd.</td>
<td>“A” Band Quiet point between 500-750 kc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6SA7 grid in series with .01 mfd.</td>
<td>360 kc (31.5°)</td>
<td>C15 (osc.)†</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ant. terminal in series with 200 mmdf.</td>
<td>600 kc (148°)</td>
<td>C9 (osc.)**</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Turn tone control to 4th position (broad) from maximum counter-clockwise and check I-F response which should be a slightly double-peaked curve. Leave tone control in 3rd position (sharp) for the following steps.</td>
<td>360 kc (31.5°)</td>
<td>C10 (det.)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>“X” Band</td>
<td>175 kc</td>
<td>L16 and L17 (1st I-F trans.)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ant. terminal in series with 200 mmdf.</td>
<td>1,500 kc</td>
<td>C18 (det.)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>“A” Band</td>
<td>1,500 kc (28°)</td>
<td>C3 (ant.)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>L9 (osc.) Rock gang</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Repeat steps 5, 6, 7, and 8.</td>
<td>6 mc</td>
<td>6 mc (30°)</td>
<td>C11 (osc.)*</td>
</tr>
<tr>
<td>11</td>
<td>“B” Band</td>
<td>20 mc</td>
<td>20 mc (23°)</td>
<td>C9 (osc.)**</td>
</tr>
<tr>
<td></td>
<td>Ant. terminal in series with 300 ohms</td>
<td></td>
<td></td>
<td>C10 (det.)</td>
</tr>
<tr>
<td></td>
<td>“C” Band</td>
<td></td>
<td></td>
<td>C1 (ant.)</td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two can be obtained. Check to determine that C11 has been adjusted to the correct peak by tuning receiver to approximately 5.09 mc where a weaker signal should be received.

** Use minimum capacity peak if two can be obtained. Check to determine that C9 has been adjusted to the correct peak by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

† Preset L10 core approximately 1/2-inch out before adjusting C15.

‡ Preset L9 core screw flush with apron before adjusting C12.

Note.—Oscillator tracks above signal on all bands.
Diagram of a radio schematic with various components labeled. The text is not legible due to the nature of the diagram.
MODEL 6Q4X, Chassis RC-423
Alignment, Trimmers

Socket

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the black lead and keep the output as low as possible to avoid a-c action.

Calibration Scale on Indicator-Drive Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 180° mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to—</th>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for maximum peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turn tone control to 3rd position (sharp) from maximum counter-clockwise.</td>
<td></td>
<td></td>
<td>L18 and L18 (2nd I-F trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6SK7 I-F grid in series with .01 mfd.</td>
<td>455 kc</td>
<td>“A” Band</td>
<td>L16 and L17 (1st I-F trans.)</td>
</tr>
<tr>
<td>3</td>
<td>6SA7 grid in series with .01 mfd.</td>
<td></td>
<td>550-750 kc</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Turn tone control to 4th position (broad) from maximum counter-clockwise and check I-F response which should be a slightly double-peaked curve. Leave tone control in 3rd position (sharp) for the following steps.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>360 kc</td>
<td>360 kc</td>
<td>“X” Band</td>
<td>C15 (osc.)†</td>
</tr>
<tr>
<td>6</td>
<td>Ant. terminal in series with 200 mmfd.</td>
<td>175 kc</td>
<td>“X” Band</td>
<td>C21 (det.)</td>
</tr>
<tr>
<td>7</td>
<td>L10 (osc.) Rock gang</td>
<td>1,500 kc</td>
<td>“A” Band</td>
<td>C44 (ant.)</td>
</tr>
<tr>
<td>8</td>
<td>600 kc</td>
<td>600 kc</td>
<td>“A” Band</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Repeat steps 5, 6, 7, and 8.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Ant. terminal in series with 300 ohms</td>
<td>6 mc</td>
<td>6 mc</td>
<td>C11 (osc.)*</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>20 mc</td>
<td>20 mc</td>
<td>C19 (det.)</td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two can be obtained. Check to determine that C11 has been adjusted to the correct peak by tuning receiver to approximately 5.09 mc where a weaker signal should be received.

** Use minimum capacity peak if two can be obtained. Check to determine that C9 has been adjusted to the correct peak by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

† Preset L10 core approximately 1/2-inch out before adjusting C15.

‡ Preset L9 core screw flush with apron before adjusting C12.

Note.—Oscillator tracks above signal on all bands.
Precautionary Lead Dress:

1. Dress black lead from L1 to C20 against terminals 6 and 7 of 6SQ7 socket.
2. Dress green lead from the middle section of the green wire to be black against the chassis.
3. Dress the black diode lead running between the 6SQ7 and terminal G on the 2nd IF transformer, directly against the chassis.
4. Dress the brown lead from terminal E on the 1st IF transformer, directly against the chassis.
5. Test the pink power lead from terminal A on the 1st IF transformer, directly against the chassis.
6. Dress the black lead from the red diode section, directly against the chassis.
PAGE 11-30 RCA

MODEL 8QL, Chassis RC-337
Chassis Wiring, Voltage
Lead Dress

RCA MFG. CO., INC.

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter lead impedance. Measurements made to chassis unless otherwise indicated. Supply should be within 1/2 volt of 117 v a.c. Precautionary Lead Dress:
1. Dress the leads from the transformer to the chassis with star (*) to the range switch to the chassis.
2. Dress the blue lead from the transformer to the switch to the chassis.
3. Dress the blue lead from the transformer to the switch to the chassis.
Alignment Procedure

FOR VICTROLA ATTACHMENT
SEE PAGE 11-40

At Right — Location of Controls

To turn on the set, turn the power-tone control fully clockwise, past the snap of the switch. This is the full-range tone position. To switch off the set, turn this knob fully counter-clockwise.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 I-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>“C” band, Quiet Point.</td>
<td>L14 and L15 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6L7 1st-Det. grid cap, in series with .01 mfd.</td>
<td>6.1 mc (29°)</td>
<td>“B” band</td>
<td>C8 (osc.)*</td>
</tr>
<tr>
<td>3</td>
<td>Antenna Terminal, in series with 300 ohms</td>
<td>1,500 kc (31°)</td>
<td>“A” band</td>
<td>C40 (osc.)</td>
</tr>
<tr>
<td>3A</td>
<td>Check to determine that C8 has been adjusted to the correct peak by turning radio to 6.19 mc (50°) where a weaker signal should be received.</td>
<td>1,500 kc (31°)</td>
<td>“A” band</td>
<td>C40 (osc.)</td>
</tr>
<tr>
<td>4</td>
<td>Antenna Terminal, in series with 300 ohms</td>
<td>600 kc (144.5°)</td>
<td>“A” band</td>
<td>L7 (osc.)†</td>
</tr>
<tr>
<td>4A</td>
<td>Check to determine that C6 has been adjusted to the correct peak by turning radio to 19.09 mc (29°) where a weaker signal should be received.</td>
<td>600 kc (144.5°)</td>
<td>“A” band</td>
<td>L7 (osc.)†</td>
</tr>
<tr>
<td>5</td>
<td>Antenna Terminal, in series with 200 mfd.</td>
<td>1,500 kc (31°)</td>
<td>“A” band</td>
<td>C40 (osc.)</td>
</tr>
<tr>
<td>6</td>
<td>Antenna Terminal, in series with 200 mfd.</td>
<td>600 kc (144.5°)</td>
<td>“A” band</td>
<td>L7 (osc.)†</td>
</tr>
</tbody>
</table>

* Use minimum capacity peak (plunger out) if two peaks can be obtained.
** Rock gang condenser slightly while peaking C14, and use maximum capacity peak if two peaks can be obtained.
† Rock gang condenser slightly while peaking L7 for maximum output.

NOTE: The oscillator tracks 455 kc above the signal on all bands.

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RCA MFG. CO., INC.

MODEL 6Q8, Chassis 414B
Schematic, Voltage
Chassis Wiring

Pilot Lamp .......... Mazda No. 44, 6.3 volts, 0.25 amp.
Power Output Rating
(105-125 Volt Operation)
Undistorted ............ 1.5 watts
Maximum ................ 3.3 watts
Precautionary Lead Dress:
1. Lead from 2nd I.F. transformer to volume control should be kept close to the chassis and dressed against front apron.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.
Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment. — If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator. — For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-c action.

Calibration Scale on Indicator-Drive-Cord Drum. — The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees.

Alignment Procedure

The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 135° mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of one set screw, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale. — Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

### Alignment Procedure Table

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of the test-osc. to—</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 I-F grid cap in series with .01 mfd.</td>
<td>456 kc</td>
<td>&quot;A&quot; Band Quiet Point between 550-750 kc</td>
<td>L12 and L13 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6SA7 det. grid in series with .01 mfd.</td>
<td>456 kc</td>
<td>&quot;A&quot; Band</td>
<td>L10 and L11 (1st I-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Ant. terminal in series with 200 mmyf.</td>
<td>1,500 kc</td>
<td>&quot;A&quot; Band</td>
<td>C6 (osc.)</td>
</tr>
<tr>
<td>4</td>
<td>Ant. terminal in series with 200 mmyf.</td>
<td>600 kc</td>
<td>&quot;A&quot; Band</td>
<td>C2 (ant.)</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 3 and 4</td>
<td></td>
<td></td>
<td>Rock Gang</td>
</tr>
<tr>
<td>6</td>
<td>Ant. terminal in series with 200 mmyf.</td>
<td>360 kc</td>
<td>&quot;X&quot; Band</td>
<td>C8 (osc.)</td>
</tr>
<tr>
<td>7</td>
<td>Ant. terminal in series with 200 mmyf.</td>
<td>175 kc</td>
<td>&quot;X&quot; Band</td>
<td>C9 (ant.)</td>
</tr>
<tr>
<td>8</td>
<td>Repeat steps 6 and 7</td>
<td></td>
<td></td>
<td>Rock Gang</td>
</tr>
<tr>
<td>9</td>
<td>Ant. terminal in series with 300 ohms</td>
<td>15.2 mc</td>
<td>&quot;C&quot; Band</td>
<td>C6 (osc.)</td>
</tr>
<tr>
<td>10</td>
<td>Ant. terminal in series with 200 mmyf.</td>
<td>360 kc</td>
<td>&quot;X&quot; Band</td>
<td>C8 (osc.)</td>
</tr>
<tr>
<td>11</td>
<td>Ant. terminal in series with 200 mmyf.</td>
<td>1,500 kc</td>
<td>&quot;A&quot; Band</td>
<td>C8 (osc.)</td>
</tr>
</tbody>
</table>

*Use minimum capacity peak if two can be obtained. Check to determine that C5 is adjusted to correct peak by tuning receiver to approximately 14.29 mc where a weaker signal should be received.

NOTE: Oscillator tracks above signal on all bands.

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PSU 8E and 10E D-C Power Supply Units

Each d-c unit is equipped with an 18-inch 7-wire cable, with a 7-contact female receptacle which plugs into a 7-prong male connector on the receiver chassis. The d-c power cord (double conductor) is 6-feet long and is provided with a 7-prong plug. The units are approximately 12¼ inches long, 4½ inches wide, and 8½ inches high.

GOOD GROUND IS ESSENTIAL—It is necessary to provide a good ground connection to the receiver chassis. The ground lead should be heavy wire, as short as possible, connected to a water pipe by means of an approved ground clamp. If a water pipe ground is not available, a buried metal plate or screen may be used. This should have an area of approximately 20 square feet and should be buried one or two feet in moist ground. The connection to the plate should be electrically good, mechanically solid, and permanent.

Grounding Power Supply Units—A flexible metal braid is connected from the PSU chassis to the case of the unit, and another length of braid extends from the case for connection to the receiver chassis. Loosen one of the self-tapping screws on the rear of the chassis, and attach the braid under this screw. It is important to see that these connections are made correctly at the time of installation.

Magic Wave Antenna Recommended.—In cases where the line or vibrator interference is found to be objectionable, the use of an RCA Magic Wave Antenna (Stock No. 98132) is recommended in conjunction with a good ground as specified above.

Link Board for Changing from 117 to 234 Volts—A link board is mounted under the chassis of the PSU for making connections to permit operation on 105-125 volts d.c., or on 210-250 volts d.c. The correct position of the links for each voltage range is shown in the schematic diagram. The links must be arranged correctly in the link board for the particular voltage range on which the unit is to be operated, otherwise damage to the receiver may result.

Vibrator Plug.—The heater windings on the power transformer are tapped and connected to a six-contact socket on the rear of the PSU chassis. A plug fits into this socket in two positions only. An arrow on the plug points to markings "NEW" or "OLD" on the case of the unit. When the vibrator is new, the plug is inserted with the arrow pointing to "NEW." In the course of time, when the vibrator is worn to an extent where the dial lights burn dull or red instead of bright with their usual brilliancy, the plug should be removed and re-inserted with the arrow pointing to "OLD." (In this position, all the turns of the heater windings are connected, thus bringing the heater voltage up to normal.)

The number of operating hours to the time when it is necessary to turn the plug to "OLD" is not an indication of the ultimate life of the vibrator. For example, with high line voltage, the plug may usually be left at "NEW" for practically the entire useful life of the vibrator; but with low line voltage, it may be necessary to turn the plug to "OLD" after a time corresponding to a small fraction of the total life of the vibrator.

Testing.—The simplest way to check PSU 8E or 10E is to plug it into a receiver for which it is designed. (First check the position of the links for the particular line voltage.) Note whether the dial lamps in the receiver light with normal brilliancy, and measure the rectified "B" voltage at the receiver to determine whether it is normal.

If a receiver is not available, dummy loads may be connected to the unit as specified in the table below.

The supply current must be measured with a d-c ammeter, not a meter of the a-c-d-c type, inasmuch as the r.m.s. value of the current is considerably higher than the d-c current. The heater voltage must be measured with an r.m.s. meter (thermo-coupled), not with an average meter (rectifier type), on a pure of the square wave shape. If an accurate thermo-coupled meter is not available, the heater voltage may be checked by observing the brilliancy of the dial lamps in the receiver. They will glow dull or red if the heater voltage is low.

Precautionary Lead Dress.—(1) Dress all leads on the power transformer primary and the buffer capacitors away from the line chokes. (2) Leads to C19 must be as short as possible. (3) The rectifier filament leads should be run close to each other, and dressed away from the filter chokes. (4) D-C power cord must not touch power transformer. (5) Keep antenna and ground leads away from PSU and PSU cables.

Replacement Parts

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32054</td>
<td>Transformer—Power transformer (PSU-8E only)</td>
<td>11.90</td>
</tr>
<tr>
<td>32062</td>
<td>Transformer—Power transformer (PSU-10E only)</td>
<td>18.50</td>
</tr>
<tr>
<td>32065</td>
<td>Vibration</td>
<td>10.40</td>
</tr>
</tbody>
</table>

NOTE: The heater and rectifier dummy load resistors should be capable of handling 50 watts. Connect the heater lead across terminals 1 and 7 on the 7-contact plug. Connect the rectifier lead resistor across terminals 2 and 6 on the 7-contact plug. Connect a jumper from terminal 2 to 3, and from 4 to 5 on this plug. Check position of links before turning power on.

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Precautionary Lead Dress:
1. Green and blue leads from 1st I.F. transformer must be kept separated.
2. Dress yellow lead from loudspeaker under green lead from hum bucking coil to prevent it from touching the 50L6GT.

POWER SUPPLY RATINGS
A.C. Rating: 105-125 volts, 50-60 cycles, 30 watts D.C. Rating: 105-125 volts, direct current, 30 watts

POWER OUTPUT (125 volt, 60 cycle supply)
Undistorted: 6 watts
Maximum: 2.0 watts

LOUDSPEAKER Type: 5-inch Electrodynamic

XX Price upon application to your RCA Victor Parts Distributor.

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Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver ground terminal (G), and keep the output as low as possible to avoid action.

Calibration Scale on Indicator-Drive-Cord drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of

the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The surface of the drum must be flush with the end of the gang-condenser shaft. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointers for Calibration Scale.—Impromise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the “180°” mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the left-hand end marked on the dial scales, and gang-condenser fully meshed. The indicator has a spring clip for attachment to the cable.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to-</th>
<th>Tune test-osc. to-</th>
<th>Turn radio dial to-</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6B8 2nd I-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>“C” band Quiet Point.</td>
<td>L16 and L17 (3rd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6K7 1st I-F grid cap, in series with .01 mfd.</td>
<td>6.1 mc (29°) “B” band</td>
<td>C8 (osc.)* C14 (det.)† C3 (ant.)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6L7 1st Det. grid cap, in series with .01 mfd.</td>
<td>20 mc (29.5°) “C” band</td>
<td>C5 (osc.)‡</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Antenna Terminal, in series with 300 ohms</td>
<td>1,500 kc (31°) “A” band</td>
<td>C9 (osc.)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Antenna Terminal, in series with 300 ohms</td>
<td>600 kc (144.5°) “A” band</td>
<td>L7 (osc.)‡</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna Terminal, in series with 300 mfd.</td>
<td>600 kc (144.5°) “A” band</td>
<td>L7 (osc.)‡</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Antenna Terminal, in series with 300 mfd.</td>
<td>600 kc (144.5°) “A” band</td>
<td>L7 (osc.)‡</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Repeat Step No. 6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained.
† Rock the gang condenser slightly, and use the maximum capacity peak if two peaks can be obtained with trimmer C14. Check to determine that C8 has been adjusted to the correct peak by turning the receiver to 5.19 mc (50°), where a weaker signal should be received.
‡ Use minimum capacity peak if two peaks can be obtained. Check to determine that C5 has been adjusted to the correct peak by turning the receiver dial to 19.09 mc (29.5°), where a weaker signal should be received.
‡ Rock gang condenser slightly while peaking L7 for maximum output.

NOTE: Oscillator tracks 455 kc above the signal on all bands.

USED ALSO WITH MODEL 8Q1

Victrola Attachment (Record Player).—Terminals are provided on the rear of the chassis for convenient connection to a Victrola Attachment (record player) such as the RCA R93 and R94 series. A stock No. 9824 switch may be used to change from radio to record player. The connections of this switch are shown. In the event that a No. 9824 switch is not available, a double-pole double-throw toggle switch may be used.
PRECAUTIONARY LEAD DRESS
1. Power cord leads must be dressed up away from 6SQ7 socket, and toward end of chassis.
2. Green lead 2nd I.F. to 6SQ7 must be dressed against base.
3. Blue lead 2nd I.F. to 6SK7 must be dressed close to base.
4. Green and blue leads from 1st I.F. transformer must be dressed close to base.
5. Red lead from "L" terminal on antenna board to 6Y3G socket must be dressed against base.
6. Green lead from gang to 6SA7 socket must be dressed toward side apron away from other parts.

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Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver ground terminal (G), and keep the output as low as possible to avoid a-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 0° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The surface of the drum must be flush with the end of the gang-condenser shaft. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following to obtain maximum output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turn fidelity control counter-clockwise (sharp), and sensitivity switch at minimum (open).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>6K7 2nd I-F grid cap in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; band, Quiet Point between 550-750 kc</td>
<td>L22 and L23 (3rd I-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>6K7 1st I-F grid cap in series with .01 mfd.</td>
<td></td>
<td></td>
<td>L19 and L20 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>4</td>
<td>6L7 1st-det. grid cap in series with .01 mfd.</td>
<td></td>
<td></td>
<td>L16 and L17 (1st I-F Trans.)</td>
</tr>
<tr>
<td>5</td>
<td>Turn fidelity switch clockwise (broad) and check I-F response which should be a double-peaked curve. Leave fidelity counter-clockwise (sharp) for all of the following steps.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna Terminal in series with 300 ohms</td>
<td>2.5 mc</td>
<td>2.5 mc (&quot;B&quot;) 24 1/2</td>
<td>L8 (osc.)</td>
</tr>
<tr>
<td>7</td>
<td>6.0 mc</td>
<td>6.0 mc (&quot;B&quot;) 147°</td>
<td>C14 (osc.) Use minimum capacity peak</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>9.5 mc</td>
<td>9.5 mc (&quot;C&quot;) 55°</td>
<td>C4 (ant.) Use maximum capacity peak*</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>20 mc</td>
<td>20 mc (&quot;C&quot;) 153°</td>
<td>C7 (osc.) Use minimum capacity peak*</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Antenna Terminal in series with 200 mmd.</td>
<td>600 kc</td>
<td>600 kc (&quot;A&quot;) 24 1/2</td>
<td>L9 (osc.) Rock gang</td>
</tr>
<tr>
<td>11</td>
<td>1,500 kc</td>
<td>1,500 kc (&quot;A&quot;) 151 1/2</td>
<td>C18 (osc.)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Repeat steps 10 and 11.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>13</td>
<td>Antenna Terminal in series with 200 mmd.</td>
<td>175 kc</td>
<td>175 kc (&quot;X&quot;) 53 1/2</td>
<td>L10 (osc.)</td>
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<td>14</td>
<td>350 kc</td>
<td>350 kc (&quot;X&quot;) 145 1/2</td>
<td>C17 (osc.) C23 (det.)</td>
<td></td>
</tr>
</tbody>
</table>

* Check to determine that the oscillator trimmer has been adjusted to the correct peak by tuning the receiver approximately 910 kc lower, where a weaker signal should be received.

NOTE: The oscillator tracks 455 kc above the signal on all bands.

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The circuit of the electric tuning mechanism is shown in the schematic diagram, and the mechanical details are illustrated below.

The circuit can be understood by following a cycle of operation:

1. When a station button is pushed in, it completes the 24-volt circuit through the corresponding station-setting contact and one-half of the brass selector disc, which is connected to one side of the motor field coil. This energizes the motor, and the rotor is pulled forward, engaging with the gear train that drives the tuning condenser and selector disc. The condenser and disc rotate until the insulation line comes under the particular station-setting contact, and the motor circuit is broken. Simultaneously, the insulation line is released from the outer half of the disc. This completes the circuit to the other side of the motor field coil, causing the motor to reverse. The rotating flywheel is still turning in the original direction and therefore supplies the return movement of the selector disc. As a result, the selector disc is moved slowly back until the insulation line is under the station-setting contact, when the circuit is broken and the mechanism stops.

Oscillation of Tuning Mechanism

The principal element in the mechanism is the flywheel. Oscillation occurs when the flywheel is allowed to come to rest and then is started again in reverse direction. This process is repeated until the mechanism reaches its final position.

Oscillation on Certain Buttons Only

1. Check contact tip of selector assembly for looseness or damage. Use a light touch to see if it has not changed shape due to bending or warping. Replace if necessary.

Oscillation on All Buttons

1. Slow oscillation indicates friction adjustment of flywheel is too tight. Loosen screw and move flywheel slightly.
2. Rapid oscillation indicates friction adjustment is too loose. Tighten screw to move flywheel slightly.
3. If definite adjustment cannot be reached, remove springs from behind flywheel and set screw and screw in length by stretching, and replace and make necessary adjustments.
4. If leather friction pad is not binding in its hole, and that it is saturated with lubricant, "Nato-Pee" oil should be used for this purpose.

Lubrication

Motor bearings and gear housing: use light machine oil. Gear faces: use "Pure Oil No. 611" or petroleum jelly. Dial indicator pulleys and rails: use "Casting" or petroleum jelly.

Selector disc: apply thin film of petroleum jelly.

Fiction bushing on flywheel: applies "ozone-floe" oil. When replacing, soak for at least 24 hours in motor oil, and insert in flywheel while warming.

Muting Circuit

When the electric tuning mechanism is in action, the motor-sympathy voltage is fed into a diode rectifier circuit which applies a high bias to the input amplifier. This greatly reduces the audio amplification and makes the set quiet or "mute" while the mechanism is operating.

Armchair Control Unit

When a Model RCA Armchair Control is connected to the receiver it duplicates the action of the push-buttons on the front panel when No. 1 button is pressed down. The black lead from push-button No. 1 is unfiltered from No. 1 station-setting contact and connected to a terminal board which is to be mounted on the frame of the selector mechanism. If desired one of the other seven station buttons on the set may be used in place of No. 1 button.

This arrangement allows the use of only seven of the eight buttons when tuning in stations at the set, but allows the use of the entire eight buttons on the Armchair Control. In operating the GBA Armchair Control the push-button must be held down until the station has been tuned in. Care must be taken not to hold two of the station buttons down at one time as both windings of the motor may be engaged simultaneously causing the motor to be inoperative and overheated.

Component Parts of Station Setting Contact

ADJUSTMENTS FOR ELECTRIC TUNING

1. Make a list of the desired eight stations, arranged in order from low to high frequencies.
2. Turn range selector to "A" band, turn power on, and allow a few minutes for warming up.
3. Press down the "dial-tuning" (right-hand) button.
4. Manually tune in the first station on the list, using the "Magic Eye" for accurate tuning.
5. Hold down the "dial-tuning" button, and press down station button No. 1 (see chart). Both buttons will stay down. Move adjusting pin No. 1 to the insulated line on the disc at rear of disc. When pin is correctly centered on the insulated line, the central dial lamp will go completely out.
6. Press down any other button in order to release the dial-tuning button. Push down station button No. 1. Then press down station button No. 1 again. The electric tuning mechanism will function to tune in the station, and the central dial lamp will stay on.
7. Repeat this process for the remaining stations.
Specifications

<table>
<thead>
<tr>
<th>Frequency Ranges</th>
<th>Long Wave (&quot;X&quot; Band)</th>
<th>150-400 kc (2,000-750 m)</th>
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<tr>
<td></td>
<td>Medium Wave (&quot;A&quot; Band)</td>
<td>330-1,625 kc (366-184.6 m)</td>
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<td>Short Wave 1 (&quot;B&quot; Band)</td>
<td>2.3-7.0 mc (130-42.8 m)</td>
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<tr>
<td></td>
<td>Short Wave 2 (&quot;C&quot; Band)</td>
<td>7.0-22 mc (42.8-13.6 m)</td>
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</tbody>
</table>

INTERMEDIATE FREQUENCY

Phonograph (Model 12QU only)

Type

Power Output Rating

Undistorted Maximum

10 watts 12 watts

Power Supply Ratings

A.C. Ratings

With PSU 10A Power Supply Unit. 105-125 volts, 50-60 cycles
With PSU 10B Power Supply Unit. 105-125 volts, 50-60 cycles
With PSU 10C Power Supply Unit. 105-130, 140-160, 200-250 volts, 50-60 cycles

D.C. Ratings

With PSU 10E Power Supply Unit. 105-125, 210-250 volts D.C. (See text for current consumption ratings)

12QU

12Q4, 12QK

Radio Total

125 watts 125 watts 150 watts

12Q4, 12QK have seven-prong connectors for connection to a separate power supply unit. Units are available in different ratings for a.c. and d.c. operation, as listed under "Power Supply Ratings" in the electrical specifications. It should be noted, however, that Model 12Q4 may be used with a.c. units PSU 10A or 10C only. When Model 12Q4 or Model 12QK is used with a d.c. Power Supply Unit, the measured current drain is 0.7 amperes from a 234 volt supply, and 1.4 amperes from a 117 volt supply. These current values may vary as much as 30% when measured by various types of ammeters, due to the rectangular wave-shape of the vibrator current.

Service data, diagrams, and replacement parts lists for the power supply units are printed in separate service data sheets which should be referred to for further information.

Power Supply Units

Models 12Q4, 12QK, and 12QU have seven-prong connectors for connection to a separate power supply unit. Units are available in different ratings for a.c. and d.c. operation, as listed under "Power Supply Ratings" in the electrical specifications. It should be noted, however, that Model 12Q4 may be used with a.c. units PSU 10A or 10C only. When Model 12Q4 or Model 12QK is used with a d.c. Power Supply Unit, the measured current drain is 0.7 amperes from a 234 volt supply, and 1.4 amperes from a 117 volt supply. These current values may vary as much as 30% when measured by various types of ammeters, due to the rectangular wave-shape of the vibrator current.

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Models 12Q4, 12QK, and 12QU have seven-prong connectors for connection to a separate power supply unit. Units are available in different ratings for a.c. and d.c. operation, as listed under "Power Supply Ratings" in the electrical specifications. It should be noted, however, that Model 12Q4 may be used with a.c. units PSU 10A or 10C only. When Model 12Q4 or Model 12QK is used with a d.c. Power Supply Unit, the measured current drain is 0.7 amperes from a 234 volt supply, and 1.4 amperes from a 117 volt supply. These current values may vary as much as 30% when measured by various types of ammeters, due to the rectangular wave-shape of the vibrator current.

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Models 12Q4, 12QK, and 12QU have seven-prong connectors for connection to a separate power supply unit. Units are available in different ratings for a.c. and d.c. operation, as listed under "Power Supply Ratings" in the electrical specifications. It should be noted, however, that Model 12Q4 may be used with a.c. units PSU 10A or 10C only. When Model 12Q4 or Model 12QK is used with a d.c. Power Supply Unit, the measured current drain is 0.7 amperes from a 234 volt supply, and 1.4 amperes from a 117 volt supply. These current values may vary as much as 30% when measured by various types of ammeters, due to the rectangular wave-shape of the vibrator current.

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Power Supply Units

Models 12Q4, 12QK, and 12QU have seven-prong connectors for connection to a separate power supply unit. Units are available in different ratings for a.c. and d.c. operation, as listed under "Power Supply Ratings" in the electrical specifications. It should be noted, however, that Model 12Q4 may be used with a.c. units PSU 10A or 10C only. When Model 12Q4 or Model 12QK is used with a d.c. Power Supply Unit, the measured current drain is 0.7 amperes from a 234 volt supply, and 1.4 amperes from a 117 volt supply. These current values may vary as much as 30% when measured by various types of ammeters, due to the rectangular wave-shape of the vibrator current.

Service data, diagrams, and replacement parts lists for the power supply units are printed in separate service data sheets which should be referred to for further information.
Purpose and Function of Fidelity Control

Models 12Q4 and 12QK - 11-50

RCA

Models 12Q4, 12QK, 12QU

RCA Victor Receiver

Alignment Table

Step | Connect high side of test-osc. to | Tune test osc. to | Turn radio dial to | Adjust following for maximum peak output | Check Selectivity Curve No.
--- | --- | --- | --- | --- | ---
1 | Turn fidelity control to 3rd position from maximum clockwise, sensitivity switch minimum (open) | | | | |
2 | 6K7 2nd I.F. grid cap in series with 60 mfd. | | | | | 1
3 | 4K7 1st I.F. grid cap in series with 60 mfd. | | | | | 2
4 | 4L2 2nd detector grid cap in series with 60 mfd. | | | | | 3
5 | Turn fidelity control one position back from full clockwise | | | | | 4
6 | Turn fidelity control to position from maximum clockwise for the following operations | | | | | 5
7 | Antenna Terminal in series with 300 mohms | 2.44 kohm | 2.44 kohm (16) | L13 (osc.) | |
8 | Antenna Terminal in series with 300 ohms | 6,100 kohm | 6,100 kohm (16) | C18 (osc.) C19 (det.) C6 (osc.) | |
9 | Antenna Terminal in series with 1000 mohms | 600 kohm | 600 kohm (16) | L13 (osc.) Rock Gang | |
10 | Antenna Terminal in series with 300 mohms | 175 kohm | 175 kohm (16) | L13 (osc.) Rock Gang | |
11 | Antenna Terminal in series with 300 mohms | 500 kohm | 500 kohm (16) | L13 (osc.) Rock Gang | |
12 | Antenna Terminal in series with 300 mohms | 150 kohm | 150 kohm (16) | L13 (osc.) Rock Gang | |
13 | Antenna Terminal in series with 300 mohms | 150 kohm | 150 kohm (16) | L13 (osc.) Rock Gang | |
14 | Antenna Terminal in series with 300 mohms | 350 kohm | 350 kohm (16) | C19 (osc.) | |
15 | Antenna Terminal in series with 300 mohms | 175 kohm | 175 kohm (16) | L13 (osc.) Rock Gang | |
16 | Antenna Terminal in series with 300 mohms | 500 kohm | 500 kohm (16) | L13 (osc.) Rock Gang | |
17 | Antenna Terminal in series with 300 mohms | 200 kohm | 200 kohm (16) | C19 (osc.) | |
18 | Antenna Terminal in series with 300 mohms | 150 kohm | 150 kohm (16) | L13 (osc.) Rock Gang | |
19 | Antenna Terminal in series with 300 mohms | 150 kohm | 150 kohm (16) | L13 (osc.) Rock Gang | |
20 | Antenna Terminal in series with 300 mohms | 350 kohm | 350 kohm (16) | C19 (osc.) | |
21 | Antenna Terminal in series with 300 mohms | 175 kohm | 175 kohm (16) | L13 (osc.) Rock Gang | |
22 | Antenna Terminal in series with 300 mohms | 500 kohm | 500 kohm (16) | L13 (osc.) Rock Gang | |
23 | Antenna Terminal in series with 300 mohms | 200 kohm | 200 kohm (16) | C19 (osc.) | |
24 | Antenna Terminal in series with 300 mohms | 150 kohm | 150 kohm (16) | L13 (osc.) Rock Gang | |
25 | Antenna Terminal in series with 300 mohms | 350 kohm | 350 kohm (16) | C19 (osc.) | |
26 | Antenna Terminal in series with 300 mohms | 175 kohm | 175 kohm (16) | L13 (osc.) Rock Gang | |
27 | Antenna Terminal in series with 300 mohms | 500 kohm | 500 kohm (16) | L13 (osc.) Rock Gang | |
28 | Antenna Terminal in series with 300 mohms | 200 kohm | 200 kohm (16) | C19 (osc.) | |
29 | Antenna Terminal in series with 300 mohms | 150 kohm | 150 kohm (16) | L13 (osc.) Rock Gang | |
30 | Antenna Terminal in series with 300 mohms | 350 kohm | 350 kohm (16) | C19 (osc.) | |
31 | Antenna Terminal in series with 300 mohms | 175 kohm | 175 kohm (16) | L13 (osc.) Rock Gang | |
32 | Antenna Terminal in series with 300 mohms | 500 kohm | 500 kohm (16) | L13 (osc.) Rock Gang | |
33 | Antenna Terminal in series with 300 mohms | 200 kohm | 200 kohm (16) | C19 (osc.) | |
34 | Antenna Terminal in series with 300 mohms | 150 kohm | 150 kohm (16) | L13 (osc.) Rock Gang | |
35 | Antenna Terminal in series with 300 mohms | 350 kohm | 350 kohm (16) | C19 (osc.) | |
36 | Antenna Terminal in series with 300 mohms | 175 kohm | 175 kohm (16) | L13 (osc.) Rock Gang | |
37 | Antenna Terminal in series with 300 mohms | 500 kohm | 500 kohm (16) | L13 (osc.) Rock Gang | |
38 | Antenna Terminal in series with 300 mohms | 200 kohm | 200 kohm (16) | C19 (osc.) | |
39 | Antenna Terminal in series with 300 mohms | 150 kohm | 150 kohm (16) | L13 (osc.) Rock Gang | |
40 | Antenna Terminal in series with 300 mohms | 350 kohm | 350 kohm (16) | C19 (osc.) | |
41 | Antenna Terminal in series with 300 mohms | 175 kohm | 175 kohm (16) | L13 (osc.) Rock Gang | |
42 | Antenna Terminal in series with 300 mohms | 500 kohm | 500 kohm (16) | L13 (osc.) Rock Gang | |
43 | Antenna Terminal in series with 300 mohms | 200 kohm | 200 kohm (16) | C19 (osc.) | |
44 | Antenna Terminal in series with 300 mohms | 150 kohm | 150 kohm (16) | L13 (osc.) Rock Gang | |
45 | Antenna Terminal in series with 300 mohms | 350 kohm | 350 kohm (16) | C19 (osc.) | |
46 | Antenna Terminal in series with 300 mohms | 175 kohm | 175 kohm (16) | L13 (osc.) Rock Gang | |
47 | Antenna Terminal in series with 300 mohms | 500 kohm | 500 kohm (16) | L13 (osc.) Rock Gang | |
48 | Antenna Terminal in series with 300 mohms | 200 kohm | 200 kohm (16) | C19 (osc.) | |
49 | Antenna Terminal in series with 300 mohms | 150 kohm | 150 kohm (16) | L13 (osc.) Rock Gang | |
50 | Antenna Terminal in series with 300 mohms | 350 kohm | 350 kohm (16) | C19 (osc.) | |
RCA MFG. CO., INC.

MODEL 11QU
MODEL 12QU

Record Changer Assembly

Top View of Automatic Record Changer

Motor Data and Coupling

Bottom View of Automatic Record Changer

NOTE: Numbers refer to parts—letters refer to adjustments.

See Model RP-139-A for MISCELLANEOUS SERVICE HINTS ADJUSTMENTS

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The phonograph motor is self-starting and operates the turntable through friction drive between the motor spindle and the rubber tire on the underside of the turntable.

The rubber driving tire on the turntable should never be removed since it is ground into the spindle. If replacement is required, the entire turntable should be replaced.

The speed regulator raises and lowers the motor. This changes the driving ratio between the motor and the turntable due to the motor-spindle being conical in shape. It is important to adjust this regulator for a turntable speed of 78 rpm. While playing a 10-inch record with the needle approximately one inch from the outer edge of the record, lubrication should be lubricated as follows: Place a few drops of S.A.E. 20 (or equivalent) on the turntable spindle and saturate the oil returning feel pads on the motor shaft with S.A.E. 10 oil. This oiling process should be repeated once or twice a year. Caution - the motor drive spindle and rubber driving tire on the turntable must be kept clean and entirely free of oil and grease at all times.

The phonograph mechanism includes the phonograph motor which raises and lowers the turntable through friction drive. Lubrication of the motor-spindle is necessary to ensure smooth operation. The speed regulator adjusts the driving ratio between the motor and turntable.

Alignment Procedure:

- Output Meter Alignment: Connect the meter across the voice coil and turn the receiver volume control to maximum.
- Test Oscillator: Connect the low side of the test oscillator to the receiver chassis through a 0.01 mfd capacitor, and keep the output as low as possible.
- Pre-Setting Dial: With gang condenser in full mesh, the pointer should coincide with the left hand mark stamped in the dial backplate.

Antenna:

This set is equipped with a built-in loop antenna. It may be connected to the green antenna lead, stapled to the base of the cabinet. The antenna should not be longer than 100 feet including the lead-in. If it is longer, connect a 100 mfd capacitor in series with the lead-in.

Steps:

1. Connect the high side of the test oscillator to the tuning condenser in series with 0.01 mfd.
   - Tune test osc. to — Quiet point at 1,600 kc end of dial
   - Turn radio dial to — Adjust the following output:
     - C24, C25, C28 (1st and 2nd i-f transformers)
2. Antenna lead (green) in series with 100 mfd.
   - Antenna lead (green) in series with 100 mfd.
   - 1,720 kc Full clockwise (out of mesh)
   - 1,500 kc Resonance on 1,500 kc signal
   - C22 (osc.)
3. Lubricate with light machine oil.

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MODEL U12, Chassis RC425A

**Schematic, Socket, Trimmers**

**Lead Dress, Voltage**

---

**Phonograph**

Crystal Pickup. 100,000 ohms Impedance at 1,000 c.p.s.

Average Output of Pickup. 1 1/2 volts at 1,000 c.p.s. across 250,000 ohms load.


**Power Supply Ratings**

Rating A-6. . . . . . . 105-125 volts, 60 cycles, 110 watts

Rating A-5. . . . . . . 105-125 volts, 50 cycles, 110 watts

Rating C-6. . . . . . . 105-125, 210-250 volts, 60 cycles, 110 watts

Rating C-5. . . . . . . 105-125, 210-250 volts, 50 cycles, 110 watts

---

**Frequency Ranges**

Standard Broadcast. 540-1,720 kc.

Short Wave. . . . . . . 5.6-20 mc.

Intermediate Frequency. 455 kc.

**V.C. Impedance**. 3.4 ohms at 400 cycles.

**Power Output Rating**

Undistorted. . . . . . . 5.0 watts

Maximum. . . . . . . 6.0 watts

---

**Power Line Antenna**

This instrument is equipped with a built-in power line antenna. To use this antenna the link on the antenna terminal board should be connected between "A" and "L," thus connecting the antenna input of the receiver through a capacitor to the power line. If an external antenna is used, it should be connected to "A," a ground connection made to "G," and the link removed.

**Precautionary Lead Dress**

1. Dress the Power Line Antenna lead close to the chassis Fuse and near to the back flange.
2. Heater lead from 6P6-G to the 6SQ7-G must be dressed away from the 10 mfg. grid leak (R8).
3. AC leads to the power switch must be dressed away from KM and CS.
4. C17 should be kept as far away from the power switch as possible.
### Replacement Parts

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<th>Stock No.</th>
<th>Description</th>
<th>Unit Price</th>
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<td>24599</td>
<td>Acme Style wire support clips (2)</td>
<td>...</td>
</tr>
<tr>
<td>24600</td>
<td>Acme Style wire support clips (2)</td>
<td>...</td>
</tr>
</tbody>
</table>

### Alignment Procedure

Before proceeding with alignment, the following lead dress should be carefully checked:

1. Drive AC switch leads away from AXP1 tube socket.
2. Do not use lead tubes together or around each other. Spacing between leads for 5°C hard loop to chassis is important, use alignment step "T" below.
3. "High side" leads from loop anchors, range switch, oscillator coil, and trimmer must be driven away from chassis and loop anchor and into the "high side" of the loop (loop +). Drive C6 and C31 away from each other.
4. Drive O1 away from power switch leads.

**Cellphone Alignment**

If the following cell phone is in the chassis as shown in the cell phone schematic on page 24, use the following alignment steps:

1. Connect the lead dress according to the cell phone schematic.
2. Adjust the following for maximum output power:

<table>
<thead>
<tr>
<th>Step</th>
<th>Component to check</th>
<th>Time required</th>
<th>Recommended settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3,9 grid through 9,15 grid cap and ground</td>
<td>15 minutes</td>
<td>C-1 oscillator*</td>
</tr>
<tr>
<td>2</td>
<td>grid through 9,15 grid cap and ground</td>
<td>15 minutes</td>
<td>C-1 oscillator*</td>
</tr>
<tr>
<td>3</td>
<td>3,9 grid through 9,15 grid cap and ground</td>
<td>15 minutes</td>
<td>C-1 oscillator*</td>
</tr>
<tr>
<td>4</td>
<td>3,9 grid through 9,15 grid cap and ground</td>
<td>15 minutes</td>
<td>C-1 oscillator*</td>
</tr>
<tr>
<td>5</td>
<td>3,9 grid through 9,15 grid cap and ground</td>
<td>15 minutes</td>
<td>C-1 oscillator*</td>
</tr>
</tbody>
</table>

*Oscillator output should be tested at high frequency, if no peak is obtained use low frequency (minimum capacity) peak.

**Phonograph Information**

- The U-10 phonograph must be set up and aligned as shown in the phonograph schematic or if alignment marks are not present on the dial plate do not set up with dial scale reversed on cabinet because there is no way to do so.
- If two peaks can be obtained, use low frequency (minimum capacity) peak.

**Centering Loudspeaker Cone**

- The loudspeaker cone is centered by being set up in the field frame by two screws accessible to the rear of the speaker. The cone can also be centered by using a meter to read the voltage supplied to the speaker and moving the speaker until the voltage supplied to the speaker is equal to the voltage supplied to the speaker.
- Antennas

- Each of these antennas is equipped with an own pair of antennas of "H"-shaped helical and "X"-shaped vertical and horizontal.
- Antennas are set up to receive broadcasting signals and are connected to the terminals provided and when this is done, a dial between these terminals may be needed. However for loop operation this task must be done.
<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis RC386B</td>
<td>31319</td>
</tr>
<tr>
<td>Alignment, Parts</td>
<td>31320</td>
</tr>
<tr>
<td>RCA MFG. CO., INC.</td>
<td></td>
</tr>
</tbody>
</table>
RCA MFG. CO., INC.

MODELS U25, U26  
Chassis RC386B  
Schematic, Socket, Trimmers, Tuner, Lead Dress

Adjustments for Electric Tuning  

Three models have each push button. The left-hand button is for tuning from 1180 kHz to 1650 kHz. The right-hand button is for tuning from 1650 kHz to 1180 kHz. The center push button is for tuning from 1180 kHz to 1650 kHz.

1. Push in the tuning button No. 1 (left) and adjust No. 2 and No. 3 trims for the desired station.
2. Push in the tuning button No. 3 (right) and adjust No. 2 and No. 1 trims for the desired station.
3. Push in the tuning button No. 2 (center) and adjust No. 1 and No. 3 trims for the desired station.
4. Set the trimmer (C3) for maximum output.

Chassis RC386B

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www.americanradiohistory.com
MODELS U25, U26
Chassis RC386B
Chassis Wiring
Voltage, Dial Drive

FOR PHONOGRAPH DATA SEE
RCA PAGES 10-51 AND
10-52 in VOLUME X

©John F. Rider, Publisher
The RCA Victor Wireless Oscillator is an adapter unit used to convert your Victrola Attachment, such as the RCA Victor Model VA-22, into a wireless record player. This permits you to play phonograph records through your radio receiver without any connecting wires from the Victrola Attachment to the Radio Receiver.

**INSTALLATION**

Certain RCA Victrola Attachments such as the VA-22 are provided with a side shelf inside the cabinet for mounting the Wireless Oscillator. Three holes are drilled in the shelf correctly spaced for the oscillator mounting bolts to go through and screw into the holes in the OSC-22 chassis base. To install the OSC-22 first detach the VA-22 power cord from the electric outlet, then:

1. Look at the side of the cabinet and locate the connection from the pickup to the volume control on the side of the cabinet. This is a length of wire with a connector plug on one end. Disconnect the plug from the bayonet socket and turn the volume control to about 1/3 full and the record reproduction, if you are reproducing records, to the loudest volume you can obtain.

2. Mount the OSC-22 on the cabinet shelf with the three mounting screws and washers provided.

3. Mount the OSC-22 Power Switch and Volume Control unit in the location from which the VA-22 volume control was removed, using the washer and nut taken from the VA-22 volume control. Be sure that the locking pin of the new control is in the correct position. Attach knob on shaft of Power Switch and Volume Control unit and tighten the lock nut.

4. Insert the pickup plug into the connector on the cable of the newly installed Volume Control unit.

5. Insert the plug on the end of the VA-22 power cord into the power receptacle on the OSC-22 cabinet base.

6. Insert the plug on the end of the OSC-22 power cord into the electric outlet.

**OPERATION**

**CONTROLS AND MOVING MECHANISM**

In order to obtain best reproduction, the newly installed Volume Control should first be turned on about 2/3 full and the Volume Control on your radio receiver turned to the point that gives the greatest volume you are likely to require. Then all control of volume may be made with the knob on the Wireless Victrola Attachment. If in particular noisy locations it may be preferable to set the Volume Control of the Wireless Victrola Attachment at about 2/3 full and regulate with the volume control knob on the receiver.

The Victor Attachment—On the back of the OSC-22 chassis is a small adjusting rod to give reproduction at the most convenient point on your radio receiver. With your radio receiver in operation, set the Tuning Control to bring the pointer on the Standard Broadcast Scale to a point at the low frequency end between 530 and about 630 kilocycles. This is preferable, at which no station can be obtained. Then set your Wireless Victrola Attachment in operation and turn the adjusting rod on the OSC-22 slowly and carefully until the record reproduction is heard at its best.

**Antenna Modification**—If, due to your particular special conditions, insufficient volume or excessive noise interference affects record reproduction, a simple remedy is to connect a wire from the Wireless Victrola Attachment to your radio antenna lead. This is easily accomplished by means of a length of wire to cover the distance between the Victrola Attachment and Radio Receiver. One end of this should be wound 3 or 4 turns around the outside of the receiver antenna lead. When an RCA Master Antenna is used, the wire should be wound around the counterpoise lead where it is attached to the A3 terminal of your radio receiver antenna terminal board.

**Radio Receiver Controls**—Your radio receiver picks up the record selection as it does a broadcast program. So afterward the Victrola Adjustment is made, you must tune your radio receiver to the signal from the Wireless Victrola Attachment between 530 and about 630 kilocycles. This is the radio frequency for operating your particular receiver and turn the Tuning Control to bring the pointer to the dial scale to the low frequency end of the Standard Broadcast band, about 530 to 630 kilocycles, and tune in accurately with the Wireless Victrola Attachment playing a selection. This is your "Victrola" station. If you have a radio with Push Button Tuning you can set a push button and label it "Victrola," the push button or switch labeled "Victrola," "Record Player" or "Phono" on RCA Victor Radio Receivers previous to 1939 is of no use with the Wireless Victrola Attachment.

**PLAYING**

Plug the power cord from the OSC-22 into a convenient house outlet, then to play records proceed as follows:

1. Turn on the power to your radio receiver.

2. Turn the Volume Control of your radio receiver up slowly at first to a convenient point, then turn it up to a point at which your radio receiver antenna terminal board.

3. Turn on the wireless to the Wireless Victrola Attachment.

4. Make the setup for playing records in accordance with the original instructions accompanying the Victrola Attachment.

5. Turn the Wireless Victrola Attachment Volume Control about 2/3 full clockwise.

6. Play the radio receiver Tuning knob to accurately tune in the phonograph selection.

7. Turn Radio Receiver Volume Control to give the least reproduction you are likely to require.

8. Adjust the Wireless Victrola Attachment Volume Control to suit.

9. Adjust radio receiver Tone Control if desirable.
MODEL 40X-30, Ch. RC405C
40X-31, Chassis 405D
Schematic, Voltage

RCA MFG. CO., INC.

Alignment, Trimmers
Socket, Lead Dress

Features of design include: New Type single-ended tubes (12SA7, 12SK7, and 12SQ7); edge-lighted dial; dust proof electrodynamic loudspeaker; "Magic Loop"; Television-Victrola Jack; and Beam Power Output.

Electrical and Mechanical Specifications

Frequency Range
Intermediate Frequency
Tube Complement
- 1939 No. 34 -

Output Meter Alignment—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Pre-setting Dial—With gang condenser in full mesh, the pointer should be horizontal.

Antenna—The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the "ANT." terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mfd. capacitor in series with the lead-in.

Power-Supply Polarity—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Victrola Attachment—A jack is provided on the rear of cabinet for connecting a Victrola Attachment into the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Alignment Procedure

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-oscillator to—</th>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for max. peak output—</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tuning condenser stat. (osc.) in series with .01 mfd.</td>
<td>455 kc</td>
<td>Quiet point at 1,800 kc end of dial</td>
<td>C1, C2, C3, C4 (1st and 2nd 1-F transformers)</td>
</tr>
<tr>
<td>2</td>
<td>Antenna term. of ant. loop in series with 100 mfd.</td>
<td>1,800 kc</td>
<td>Full clockwise (out of mesh)</td>
<td>C5 (oscillator)</td>
</tr>
<tr>
<td>3</td>
<td>1,500 kc</td>
<td>Resonance on 1,500 kc signal</td>
<td>C6 (antenna)</td>
<td></td>
</tr>
</tbody>
</table>

Precautionary Lead Dress
1. Dress 2nd I-F green lead close to chassis and under other parts.
2. Dress lead from gang condenser to grid of 12SA7 close to chassis and away from 12SQ7 socket.
3. Dress blue 1st I-F lead under volume control close to chassis.
4. Dress blue 2nd I-F lead close to chassis and behind 12SK7 socket.

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Alignment, Trimmers
Socket, Lead Dress

RCA MFG. CO., INC.

MODELS 40X-50 to 40X-57
Chassis RC-436
Schematic, Voltage

NOTE: Output cathode resistor is 120 ohm when 50L6GT tube is used.

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Antenna.—The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the "ANT" terminal on rear of cabinet. It should not be longer than 100 feet including lead-in. If it is longer, connect a 100 to 200 mmfd. capacitor in series with the lead-in.

STOCK No. DESCRIPTION Unit List Price
32745 Cable—Phono. cable .................................................. .30
13007 Capacitor—40 mmfd. .................................................. .35
12488 Capacitor—250 mmfd. .................................................. .35
12967 Capacitor—300 mmfd. .................................................. .35
4838 Capacitor—600 mmfd. .................................................. .20
4870 Capacitor—1,000 mmfd. .................................................. .20
12767 Capacitor—25 mmfd. .................................................. .30
12464 Capacitor—25 mmfd. .................................................. .30
32767 Capacitor—Electrolytic, 20-12 mfd. .................................. .60
32968 Capacitor—Variable tuning ........................................... 2.25
32962 Coil—Oscillator coil .................................................. 1.00
32664 Cord—Drive cord .................................................. 1.00
32743 Drum—Drive drum .................................................. 1.00
31460 Lamp—Pilot lamp .................................................. 1.00
33663 Loop—Complete antenna loop ..................................... 1.00
33550 Resistor—66 ohms .................................................. 1.00
12071 Resistor—120 ohms, 1 watt ........................................... 1.00
13428 Resistor—150 ohms, 1 watt ........................................... 1.00
12457 Resistor—220 ohms, 1 watt ........................................... 1.00
12998 Resistor—2200 ohms, 1 watt ........................................... 1.00
12342 Resistor—47,000 ohms, 1 watt ...................................... 1.00
12284 Resistor—47,000 ohms, 2 watt ...................................... 1.00
12879 Resistor—22 megs, 1 watt ........................................... 1.00
13601 Resistor—10 megs, 1 watt ........................................... 1.00
33601 Shaft—Drive shaft .................................................. 1.00
30585 Spring—Drive cord spring ........................................... 1.00
33557 Socket—Dial light socket ........................................... 1.00
32837 Socket—Tube socket .................................................. 1.00
32976 Transformer—1-F input transformer ................................ 1.25

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

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Precautionary Lead Dress

1. Red lead from second i-f transformer to screen terminal of 1N5-G must be dressed close to and along edge of chassis.
2. Twisted green wire from antenna coil to gang must be 9 turns and kept clear of rotor.
3. Blue and green leads to volume control must be dressed close to chassis and between gang and front apron.
4. The opening in the shield of the 1N5-G should be turned away from the chassis and the i-f transformers.
5. Antenna and ground wires should be twisted together.

CV-40
Rectifier.......................... RCA-5U4-G
Plug-in Resistor.................. WW48, Stock No. 34565
Power Output (Battery Operation) Undistorted .................. 0.125 watt
Maximum .................. 0.300 watt
Load Speaker
Type............................ Permanent Magnet Dynamic Diameter .................. BK41, 8 inches; BT41, 5 inches
Voice Coil Impedance BK41, 2.2 ohms; BT41, 5.0 ohms at 400 cycles

Battery Required
Combination 11 volt-90 volt A-B Pack

Current Consumption
"A" at 1.4 volts, 0.25 amp.
"B" at 90 volts, 9.4 ma.
A-C Operation

Use of power unit CV-40 with either Model BK41 or BT41 adapts that receiver for A-C operation.

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General Description

The RCA Victor Model BT-42 is a table type battery operated radio receiver.

Features of design include: On and off "Economy" Blinker; 4 RCA 1.4 volt low drain tubes; large horizontal dial; magnetic core transformers; automatic volume control; 18 to 1 tuning ratio; 5" permanent magnet speaker, and an available converter unit (CV40) to convert the receiver to 110 volt AC operation.

Electrical and Mechanical Specifications

- **Frequency Range**: 540-1,780 kc
- **Intermediate Frequency**: 455 kc

RCA TUBE COMPLEMENT

1. **1A7G**: 1st Det. & Osc.
2. **1N5G**: I.F.
3. **1H5G**: 2nd Det. & A.V.C.

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, keep the output as low as possible to avoid a-c action.

Pre-setting Dial.—With the gong condenser fully out of mesh, the indicator should point to the extreme right (high frequency) mark on the dial scale.

CAUTION.—When ready to install or replace batteries or tubes or to make any repairs or changes, be sure to turn off power switch.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test oscillator to:</th>
<th>Tune test oscillator to:</th>
<th>Turn Radio Dial to:</th>
<th>Adjust the following for maximum peak output:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1A7G 1st Det. grid cap. in series with 0.01 mfd.</td>
<td>655 kc *</td>
<td>Quiet point at 655 kc</td>
<td>CR, C9, C10, C11 (1st and 2nd I.F. transformers)</td>
</tr>
<tr>
<td>2</td>
<td>1A7G 1st Det. cap. in series with 0.01 mfd.</td>
<td>1,500 kc</td>
<td>1,500 kc</td>
<td>C8 (oscillator)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna lead (blue) in series with 0.001 mfd.</td>
<td>800 kc</td>
<td>800 kc</td>
<td>L1 (antenna) *</td>
</tr>
<tr>
<td>4</td>
<td>Antenna lead (black) in series with 0.001 mfd.</td>
<td>1,800 kc</td>
<td>1,800 kc</td>
<td>C8 (oscillator)</td>
</tr>
</tbody>
</table>

*When adjusting L1 (antenna), trimmer C3 should be in a minimum capacity position (unscrewed).
**General Description**

The crystal pickup in Model VA-20 is connected through a volume control to grid No. 1 in an RCA 6A8 tube which functions as a modulated r-f oscillator. The oscillator frequency can be adjusted from 530 to 625 kc, by means of a magnetic core in the oscillator transformer, L1 L2. (This is a screwdriver adjustment at the rear of the cabinet.) An output wire is connected to the grid circuit of the oscillator, and is run parallel with the power cable. The output is sufficient to permit operation within approximately 20 feet of a radio receiver.

**Electrical and Mechanical Specifications**

- **Frequency Range**: 530-625 kc
- **Tube Complement**
  - Modulator Oscillator: RCA-6A8
  - Hall Wave Rectifier: 6L2
- **Power Supply Ratings**
  - A6: 105-125 volts, 50 cycles, 50 watts
  - A5: 105-125 volts, 50 cycles, 50 watts
- **Motor**
  - Type: Synchronous (Manual Starting)
  - Turntable Speed: 78 r.p.m.
- **Pickup**
  - Type: Crystal
  - Pickup Impedance: 100,000 ohms at 1000 cycles
  - Average Output Voltage: 15 volts at 1000 cycles with 250,000 ohm load.

**Cabinet Dimensions**

- **Height**: 38 inches
- **Width**: 24 inches
- **Depth**: 15 inches
- **Overall Height**: 5 inches
- **Turntable Diameter**: 7 inches
- **Weight**: 71 lbs. (net), 91 lbs. (shipping)

**Set-Up Procedure**

1. Insert plug in power supply socket, and turn the power switch—volume control knob on top of VA-20 to full clockwise position. Start a record on the VA-20. The motor is a synchronous manual-starting type, and requires a clockwise spin to start.
2. Tune the radio receiving set to a quiet point between 530-625 kc.
3. Tune the oscillator in the VA-20 to this frequency by adjusting the button on the rear of the VA-20 cabinet to obtain peak output on the receiver. Clockwise rotation increases the frequency. Counter-clockwise rotation decreases the frequency.
4. Adjust the radio volume control for the highest volume that is likely to be required, and then use the VA-20 volume control for further adjustment.
5. In noisy locations, it may be desirable to leave the VA-20 volume control turned full clockwise, and regulate the radio volume control for the desired level.
6. If there is insufficient volume, or excessive noise, the remedy is to couple the VA-20 to the radio receiver, by running a piece of insulated wire between the two units: Wrap one end (three or four turns) around the antenna lead-in on the radio, and wrap the other end (three or four turns) around the hole wire that projects from the plug on the power cord of the VA-20. With an RCA Master Antenna, wrap the wire around the counter-postile lead where it attaches to the receiver (terminal A3) or to the coupling unit (terminal B).
7. If the radio receiver has push-button tuning, one of the buttons may be set up to tune in the VA-20 oscillator frequency. This button should be marked "Record Player."

**Motor Data**

Smooth starting and running will be insured by keeping the bearings well greased and oiled.

**Hum and Vibration**—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is the correct one.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.

The damper spring must fit without binding or chattering in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. The damper spring must exert approximately equal force in restoring the stator to its mid-position when the stator is deflected manually in each direction.

**Removal of Rotor**—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting upward.

**Rotor Adjustment**—Remove motor from cabinet. Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

**Note**: Voltages with star (*) are operating voltages in circuits with high series resistance. The actual measured voltage will be lower, depending on the voltmeter loading. Voltages are measured to chassis, unless otherwise indicated. Values should hold within approximately ±20% with 117-volt a.c. supply.

**Precautionary Lead Dress**

1. The power supply cord must be dressed between chassis and top of cabinet, away from grid of 6A8, and entirely away from 2526-G.
2. All leads to oscillator coil must be as short as possible.
3. All motor leads must be dressed away from rotor.
4. Pickup leads must be dressed away from the top grid of 6A8, and keep away from the 2526-G.

**Caution**: Do not remove turntable from motor while power is turned on, as damage to the tubes will result.

**50-Cycle Motor Coil Assembly and Connections**

<table>
<thead>
<tr>
<th>D-C resistance of each coil:</th>
<th>36 ohms</th>
<th>40 ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>105-125 volts, 60 cycles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>105-125 volts, 50 cycles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Specifications

Power Output

Undistorted ........................................... 5 watts
Maximum ................................................... 6 watts

Pilot Lamps (2) ... Mazda No. 44 6.3 volts, A5 ... 105-125 volts, 60 cycles, 110 watts C6 ... 105-130/140-160/200-250 volts, 60 cycles, 110 watts
0.25 amperes, R2 ... 105-125 volts, 60 cycles, 110 watts C5 ... 105-130/140-160/200-250 volts, 60 cycles, 110 watts

Adjustments for Push-Button Tuning

1. Pull off the push-buttons and loosen the push-button rods with a small screwdriver.
2. Set the radio-phono switch to "radio" position and accurately tune in the station for which the first button is to be set.
3. Press in push-button rod No. 1 (left) with the screwdriver, as far as it will go without undue pressure, hold in, rotate station with manual control if necessary for best reception, and then carefully tighten the rod. Do not tighten more than 1/4 turn after the rod begins to grip or damage to the mechanism may result.
4. Replace the push-button on its shaft.
5. Proceed in a similar manner for the remainder of the push-buttons.
6. Insert the station marker tabs in the recesses above the push-buttons.

Frequency Ranges

Standard Broadcast .................................. 550 to 1,550 kc
Short Wave ........................................... 6 to 18 mic
1F Frequency ......................................... 455 kc

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Alignment Procedure

Output Meter Alignment.—If this method is used, connect the output meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Marks.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment. Therefore, calibration marks have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the extreme left (low frequency) mark on the dial scale.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect test-osc. output to—</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for maximum peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I-F grid through 0.1 mfd capacitor and ground</td>
<td>455 kc</td>
<td>Quiet point between 1,720-1,500 kc</td>
<td>L5 and L6 (2nd I-F trans.)</td>
</tr>
<tr>
<td>2</td>
<td>1st det. grid through 0.1 mfd capacitor and ground</td>
<td>15.2 mc</td>
<td>15.2 mc</td>
<td>L3 and L4 (1st I-F trans.)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>15.2 mc</td>
<td>Rock at 15.2 mc</td>
<td>C-4 oscillator*</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>6.1 mc</td>
<td>6.1 mc</td>
<td>C-2 antenna† while rocking</td>
</tr>
<tr>
<td>5</td>
<td>Radiation loop consisting of two turns of wire 15 inches in diameter located 6 to 6 feet from receiver</td>
<td>15.2 mc</td>
<td>Rock at 15.2 mc</td>
<td>C-2 antenna† while rocking</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>1,500 kc</td>
<td>1,500 kc</td>
<td>C-34 antenna</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>600 kc</td>
<td>Rock at 600 kc</td>
<td>C-28 oscillator</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>1,500 kc</td>
<td>1,500 kc</td>
<td>C-34 antenna</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td>C-28 oscillator</td>
</tr>
</tbody>
</table>

When making adjustments 4 to 9 inclusive, the chassis must be in the cabinet, both loops connected, and all leads in their normal positions. When mounting chassis in cabinet if calibration marks on dial plate do not line up with dial scale mounted on cabinet move pointer to agree with dial scale on cabinet.

* Oscillator should track on high frequency side of signal. If two peaks are obtained use high frequency (minimum capacity) peak.

† If two peaks can be obtained use low frequency (maximum capacity) peak.
Antennas

This receiver is equipped with two loop antennas (''C'' band horizontal and fixed, and ''A'' and ''B'' band vertical, shielded, and rotatable). During installation the ''A'' and ''B'' band loop should be rotated to the position giving maximum signal strength and freedom from noise. If desired, an outside antenna and ground can be connected to the terminals provided and when this is done the link between these terminals must be opened. However, for loop operation this link must be closed. If such an antenna is used it should be approximately 100 feet long.

Alignment Procedure

Before proceeding with alignment the following lead dress should be carefully checked:

1. A.C. leads at volume control dressed away from audio leads.
2. C-29 dressed close to chassis.
3. C-48 dressed under volume control.
4. Dress C-44 and 6F6 plate leads away from antenna leads.
5. Leads to phono and television jacks dressed close to end of chassis.
6. Red lead from R.F. coil to range switch short and direct as possible.
7. Leads to loop sockets dressed away from chassis and other leads.
8. Green lead from volume control arm to A.F. grid close to chassis.

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis wiring drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, keep the six steps in alignment the low side of the test-oscillator should output as low as possible to avoid A.C. action. For the first step be connected to the receiver chassis. Following step 6, the signal must be radiated (see alignment table).

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the tuning drum. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r.f. alignment, check the position of the drum. The 240° mark on the drum scale must be vertical and directly above the center of the shaft of the tuning drum when the plates are fully meshed. The drum is held to the shaft by means of two setscrews, which must be tightened securely when the drum is in the correct position.

On the inner side of the tuning drum are two projections which serve as stops to prevent extreme rotation of the gang condenser. The tuning drum should be set so that the stop limiting clockwise movement of the drum takes effect just as the gang condenser plates are becoming fully meshed, thus preventing stress on the gang due to extreme rotation.

Pointers for Calibration Scale.—Improve a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 240° mark on the calibration scale when the plates are fully meshed.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of the test-osc to—</th>
<th>Tune test-osc to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for maximum peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6SK7 L-F grid in series with .0 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; band Quiet point near 600 kc</td>
<td>L10 and L11 (2nd L-F trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6SA7 det. grid in series with .0 mfd.</td>
<td>15.2 mc</td>
<td>&quot;C&quot; band</td>
<td>C14 (osc.)* ** C11 (det.)***</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>3.44 mc</td>
<td>&quot;B&quot; band</td>
<td>C18 (osc.)** C7 (det.)</td>
</tr>
<tr>
<td>4</td>
<td>6SK7 R-F grid in series with .0 mfd.</td>
<td>600 mc</td>
<td>&quot;A&quot; band</td>
<td>C7 (osc.) Rock gang</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>1,500 mc</td>
<td>&quot;A&quot; band</td>
<td>C18 (osc.) C8 (det.)</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>15.2 mc</td>
<td>&quot;C&quot; band</td>
<td>C4 (ant.)</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>6.1 mc</td>
<td>Inductance of &quot;C&quot; band loop</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Repeat step 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Radiation loop consisting of two turns of wire 38 inches in diameter located 4 to 8 feet from receiver</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>3.44 mc</td>
<td>&quot;B&quot; band</td>
<td>C2 (ant.)</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>1,500 mc</td>
<td>&quot;A&quot; band</td>
<td>C3 (ant.)</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>600 mc</td>
<td>&quot;A&quot; band</td>
<td>L7 (osc.) Rock gang</td>
</tr>
<tr>
<td></td>
<td>Repeat step 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note.—For steps 7 to 13 inclusive the chassis must be in the cabinet, all loop leads connected and in their normal positions. The dial indicator pointer must be fastened to the drive cord in such a position that it is at the 530 kc mark on "A" scale when the gang condenser plates are fully meshed.

* Use minimum capacity peak if two can be obtained. Check to determine that C14 has been adjusted to the correct peak by tuning the receiver to approximately 14.29 kc where a weaker signal should be received.

** Use minimum capacity peak if two can be obtained. Check to determine that C16 has been adjusted to the correct peak by tuning the receiver to approximately 2.53 kc where a weaker signal should be received.

*** Use maximum capacity peak if two peaks can be obtained and rock gang condenser while adjusting.

† Adjust the inductance of "C" band loop by varying the spacing between the leads of the loop. Moving the leads closer together decreases the inductance and tunes the loop to a higher frequency; moving the leads farther apart increases the inductance and tunes the loop to a lower frequency.

Important.—The oscillator tracks above the signal on all bands.

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Alignment, Lead Dress
Stimulators, Socket

POWER SUPPLY RATINGS
A-C Rating .................................................... 105-125 volts, 50-60 cycles, 30 watts
D-C Rating .................................................... 105-125 volts, direct current, 30 watts

POWER OUTPUT (125 volt, 60 cycle supply)
Undistorted .................................................... .6 watts
Maximum .................................................... 2.0 watts

LOUDSPEAKER
Type ............................................................. 5-inch permanent magnet dynamic

Pre-Setting Dial — With gang condenser in full mesh, the pointer should be adjusted so that top edge of pointer just touches rivet in dial plate.

Antennas — The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the “ANT” terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mfd. capacitor in series with the lead-in.

STOCK No. DESCRIPTION Unit List Price
33296 Spring — Retaining spring for drum .................. .08
33296 Transformer — First 1-F transformer ............. 1.25
33297 Transformer — Second 1-F transformer ............ 1.05
33291 Volume control and switch ......................... 1.50

SPEAKER ASSEMBLIES (39213-I)
33853 Cone — Speaker cone and voice coil ............. 1.75
33851 Speaker complete .................................. 4.50
33854 Transformer — Output transformer ............... 1.20

CHASSIS ASSEMBLIES
13057 Capacitor — 30 mfd. ............................... .35
12957 Capacitor — 250 mfd. ............................. .35
12952 Capacitor — 300 mfd. ............................ .35
4398 Capacitor — .05 mfd. ............................... .25
32787 Capacitor — .01 mfd. ............................... .20
4839 Capacitor — .005 mfd. .............................. .30
12948 Capacitor — .055 mfd. ............................ .30
33952 Capacitor — Electrolytic, 8 mfd. ................. .30
3360 Capacitor — Electrolytic, 2 sections 30 mfd. each .10
34229 Coil — Oscillator coil ............................. .60
33688 Condenser — Variable tuning condenser .......... 2.55
33934 Cord — Drive cord ................................. .10
33662 Drum — Drive drum ............................... .25
33295 Indicator — Dial pointer ........................... .25

STOCK No. DESCRIPTION Unit List Price
11765 Lamp — Dial lamp .................................. .15
33663 Loop — Antenna loop complete ................... 1.20
33924 Pull — Drive cord pulley .......................... .02
13428 Resistor — 150 ohms, 1 watt ....................... .20
14561 Resistor — 220 ohms, 1 watt ...................... .20
3153 Resistor — 1,500 ohms, 1 watt .................... .20
13998 Resistor — 22,000 ohms, 1 watt ................. .20
15412 Resistor — 47,000 ohms, 1 watt .................. .20
14580 Resistor — 100,000 ohms, 1 watt ............... .20
13264 Resistor — 200,000 ohms, 1 watt ............... .20
12299 Resistor — 270,000 ohms, 1 watt ............... .20
12679 Resistor — 2.2 mfd. ............................... .20
33923 Shaft — Tuning knob shaft and bushing .......... .30
33557 Socket — Dial lamp socket ....................... .30
33537 Socket — Tube socket ............................. .20
31615 Spring — Drive cord spring ..................... .20

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

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Adjustments for Push-Button Tuning

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in order of frequency, from low to high. Proceed as follows:

1. Remove station marker tabs; reach through tab holes in escutcheon with small screwdriver and loosen push-button rods.
2. Press in push-button rod No. 1 with the screwdriver as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the rod. Do not tighten more than 1/4 turn after the rod begins to grip or damage to the mechanism may result.
3. Proceed in a similar manner for the remainder of the push-buttons.
4. Insert the station marker tabs in the recesses adjacent to the push-buttons.
### Alignment Procedure

As the first step in r-f alignment, check the position of the drum. The 240° mark on the drum scale must be vertical and directly above the center of the shaft of the tuning drum when the plates are fully meshed. The drum is held to the shaft by means of two set-screws, which must be tightened securely when the drum is in the correct position.

On the inner side of the tuning drum are two projections which serve as stops to prevent extreme rotation of the gang condenser. The tuning drum should be set so that the stop limiting clockwise movement of the drum takes effect just as the gang condenser plates are becoming fully meshed, thus preventing stress on the gang due to extreme rotation.

**Pointer for Calibration Scale.**—Improvises a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 240° mark on the calibration scale when the plates are fully meshed.

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#### Controls

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis wiring drawing.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, keep the output as low as possible to avoid a-c action. For the first six steps in alignment the low side of the test-oscillator should be connected to the receiver chassis. Following step 6, the signal must be radiated (see alignment table).

**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore, a calibration scale is attached to the tuning drum. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of the test-osc. to</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for maximum peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8SK7 I-F grid in series with .01 mfd.</td>
<td>400 kc</td>
<td>&quot;A&quot; band quiet point near 600 kc</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8SA7 det. grid in series with .01 mfd.</td>
<td></td>
<td>15.2 mc (22&quot;) &quot;C&quot; band</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>8SK7 R-F grid in series with .01 mfd.</td>
<td></td>
<td>3.44 mc (57&quot;) &quot;B&quot; band</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>600 kc</td>
<td>1,000 kc (22&quot;) &quot;A&quot; band</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>15.2 mc (22&quot;) &quot;C&quot; band</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>6.1 mc (22&quot;) &quot;C&quot; band Inductance of &quot;C&quot; band loop</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Radiation loop consisting of two turns of wire 3/8 inches in diameter located 4 to 6 feet from receiver</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Repeat step 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
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<td>10</td>
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<tr>
<td>11</td>
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<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Use minimum capacity peak if two can be obtained. Check to determine that C14 has been adjusted to the correct peak by tuning the receiver to approximately 14.29 mc where a weaker signal should be received.

**Use minimum capacity peak if two can be obtained. Check to determine that C16 has been adjusted to the correct peak by tuning the receiver to approximately 2.33 mc where a weaker signal should be received.

***Use maximum capacity peak if two peaks can be obtained and rock gang condenser while adjusting.

+ Adjust the inductance of "C" band loop by varying the spacing between the leads of the loop. Moving the leads closer together decreases the inductance and tunes the loop to a higher frequency; moving the leads farther apart increases the inductance and tunes the loop to a lower frequency.

**Important.**—The oscillator tracks above the signal on all bands.

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www.americanradiohistory.com
Alignment, Trimmers
Socket, Lead Dress

RCA MFG. CO. INC.

MODEL 45X5, 45X6
Chassis RC457D
Schematic, Voltage

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For I-F alignment, connect the low side of the test-oscillator to the receiver chassis through a .01 mfd. capacitor, and keep the output as low as possible.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be adjusted so that it is vertical.

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 150 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Features of design include: New Type single-ended tubes (12SA7, 12SK7, and 12SQ7); edge-lighted dial; dust proof electrolytic loudspeaker; and Beam Power Output.

Electrical and Mechanical Specifications

**FREQUENCY RANGE**
- 640-1,680 kHz
- Intermediate Frequency: 455 kHz

**TUBE COMPLEMENT**
1. RCA-12SA7 — 1st Detector-Oscillator
2. RCA-12SK7 — I-F Amplifier
3. RCA-12SQ7 — 2nd Detector, 1st A-F, and A-V.C.
4. RCA-60L6GT — Power Amplifier
5. RCA-6525GT — Half-Wave Rectifier

**Alignment Procedure**

<table>
<thead>
<tr>
<th>Step</th>
<th>Connect the high side of test-oscillator to—</th>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for max. peak output—</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12SK7 I-F grid in series with .01 mfd.</td>
<td>456 kc</td>
<td>Quiet point at 1,800 kc end of dial</td>
<td>C18 (2nd I-F trans.)</td>
</tr>
<tr>
<td>2</td>
<td>Tuning condenser stat. (osc.) in series with .01 mfd.</td>
<td>1,720 kc</td>
<td>Full clockwise (out of mesh)</td>
<td>C13 (oscillator)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna term. in series with 100 mmfd.</td>
<td>1,400 kc</td>
<td>Resonance on 1,400 kc signal</td>
<td>C12 (antenna)</td>
</tr>
</tbody>
</table>

Precautionary Lead Dress
1. Green and blue leads from 1st I.F. transformer should be dressed apart and against chassis.
2. Blue lead of the 2nd I.F. transformer must be dressed against the shield and down between the tube socket and chassis.
3. Dress green diode lead away from 12SQ7 grid resistor and condenser.
### Chassis Schematic and Voltage

#### Steps for Setting Dial:

1. Connect the high side of test oscillator to C8, C9 (2nd I.F. trans.).
2. Turn radio dial to C6, C7 (1st I.F. trans.).
3. Connect condenser in full mesh. The pointer should be adjusted so that the pointer is vertical.
4. If an outdoor antenna is used, it may be connected to the "ANT" terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. Oscillator coil, connect a 100 to 500 mfd. capacitor in series with the lead-in.

#### Power Supply Polarity:
- For operation on d.c., the power plug should be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a.c., reversal of the plug may reduce hum.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test oscillator to</th>
<th>Tune test osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12SK7 (1F) grid in series with .01 mfd.</td>
<td>Quiet point at 600 kc end of dial</td>
<td>C8, C9 (2nd I.F. trans.)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tuning condenser or (ant.) in series with .01 mfd.</td>
<td>455 kc</td>
<td>Full clockwise (out of mesh)</td>
<td>C5 (oscillator)</td>
</tr>
<tr>
<td>3</td>
<td>Radiation loop consisting of two turns of wire 18 inches in diameter</td>
<td>1,600 kc</td>
<td>Resonance on 1,400 kc signal</td>
<td>C1 (antenna)</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>1,400 kc</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Precautionary Lead Dress

1. Audio coupling capacitor to volume control must be dressed under the terminal board and down against the corner of the chassis.
2. The voice coil leads from the output transformer to the speaker must be dressed away from the terminal on the terminal-board to which the above audio coupling capacitor is connected.
3. The output tube bypass condenser must be dressed away from the 12SQ7 tube.

### Speaker Assemblies

#### Stock Description

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>13057</td>
<td>Capacitor—68 mfd. (C5)</td>
<td>.35</td>
<td></td>
</tr>
<tr>
<td>12694</td>
<td>Capacitor—220 mfd. (C13, C13)</td>
<td>.35</td>
<td></td>
</tr>
<tr>
<td>35584</td>
<td>Capacitor—.005 mfd. (C14)</td>
<td>.25</td>
<td></td>
</tr>
<tr>
<td>4937</td>
<td>Capacitor—.01 mfd. (C15, C16)</td>
<td>.25</td>
<td></td>
</tr>
<tr>
<td>13314</td>
<td>Capacitor—.015 mfd. (C17) (RC-459A)</td>
<td>.20</td>
<td></td>
</tr>
<tr>
<td>35593</td>
<td>Capacitor—.025 mfd. (C18)</td>
<td>.20</td>
<td></td>
</tr>
<tr>
<td>32677</td>
<td>Capacitor—.05 mfd. (C18)</td>
<td>.20</td>
<td></td>
</tr>
<tr>
<td>32676</td>
<td>Capacitor—Electrolytic comprising 1 section of 20 mfd. and 1 section of 12 mfd.</td>
<td>.90</td>
<td></td>
</tr>
<tr>
<td>34443</td>
<td>Condenser—Variable tuning condenser less drive drum</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>35053</td>
<td>Condenser—Voice coil</td>
<td>2.00</td>
<td></td>
</tr>
</tbody>
</table>

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**MODELS 146, 9-130**

**Two-Oscillators**—For all alignment operations, keep the output as low as possible to avoid x-y action. For the first eight steps in alignment the low side of the intercalation should be connected to the receiver side. Following step 9, the signal must be reduced.

**Calibration Scale on Indicator-Drive Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during the first eight steps of alignment; therefore, a calibration scale is attached to the tuning drum. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in 4 alignment, check the position of the drum. The 180° mark on the drum scale must be vertical and directly under the center of the dial of the tuning drum when the plates are fully meshed. The drum is held to the shaft by means of two set-screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—In case a pointer for the calibration scale be fastened by means of wire to the cabinet, and the plate is that it points to the 0° mark on the calibration scale when the plates are fully meshed.

**Diode-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the diode to the drive cable with indicator at the 510 kC mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

**Turns of the Output Transformer.**—At the point 0°, 90°, 180°, and 270°, the turns of the output transformer are counted as shown in the transformer schematic. When the transformer is in the correct position, the point 0° will be exactly on the 180° mark of the transformer scale when the plates are fully meshed.

**Frontal Section of Gang in steps with 51 ffd.**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Tune test osc. out to-</th>
<th>Tune test osc. out to-</th>
<th>Turn radio dial to-</th>
<th>Turn radio dial to-</th>
<th>Adjust the following for maximum peak out-</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>450 kc</td>
<td>15.2 mc</td>
<td>45.2 mc (144°)</td>
<td>45.2 mc (144°)</td>
<td>C2 (Mc)*</td>
</tr>
<tr>
<td>2A</td>
<td>With input to 657, do not re-adjust 1 F-Trans after last 1 F-Trans has been adjusted</td>
<td>3.44 mc</td>
<td>600 kc</td>
<td>600 kc</td>
<td>L5 (Mc)</td>
</tr>
<tr>
<td>3</td>
<td>600 kc</td>
<td>1.50 kc</td>
<td>1.50 kc (105°)</td>
<td>1.50 kc (105°)</td>
<td>C6 (Mc)*</td>
</tr>
<tr>
<td>4</td>
<td>600 kc</td>
<td>600 kc (260°)</td>
<td>600 kc</td>
<td>600 kc</td>
<td>L3 (Mc)</td>
</tr>
<tr>
<td>5</td>
<td>Repeat step 6</td>
<td>15.0 mc</td>
<td>15.0 mc (153°)</td>
<td>15.0 mc (153°)</td>
<td>C1 (Mc)</td>
</tr>
<tr>
<td>6</td>
<td>Repeat step 8</td>
<td>6.11 mc</td>
<td>6.11 mc</td>
<td>6.11 mc</td>
<td>Inductance of &quot;C&quot; bandloop</td>
</tr>
<tr>
<td>7</td>
<td>Repeat step 8</td>
<td>3.44 mc</td>
<td>3.44 mc (105°)</td>
<td>3.44 mc (105°)</td>
<td>C3 (Mc)</td>
</tr>
<tr>
<td>8</td>
<td>1.50 kc</td>
<td>1.50 kc</td>
<td>1.50 kc (105°)</td>
<td>1.50 kc (105°)</td>
<td>C6 (Mc)*</td>
</tr>
<tr>
<td>9</td>
<td>500 kc</td>
<td>600 kc (260°)</td>
<td>600 kc</td>
<td>600 kc</td>
<td>L3 (Mc)</td>
</tr>
<tr>
<td>10</td>
<td>1.50 kc</td>
<td>1.50 kc</td>
<td>1.50 kc (105°)</td>
<td>1.50 kc (105°)</td>
<td>C6 (Mc)*</td>
</tr>
</tbody>
</table>

**MODEL K-50, 2nd Production**

**Precalibrating Lead Dress.**—Before proceeding to alignment, dress power leads from audio lead to chassis ground and select center between input and output, leaving audio and grid lead from phone switch to volume control as far away from power leads as possible.

**Cathode-Ray Alignment** is the preferred method. Constructions for the oscilloscope are shown on the chassis schematics.

**Output Meter Alignment.**—If the method is used, connect the output meter in the place of the grid lead, and turn the receiver volume control to maximum.

**Wiring and Lead-Dress Parts**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect test osc. out to-</th>
<th>Tune test osc. out to-</th>
<th>Turn radio dial to-</th>
<th>Adjust the following for maximum peak out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-F grid through 51 ffd.</td>
<td>450 kc</td>
<td>Quiet point</td>
<td>L1 and L5</td>
</tr>
<tr>
<td>2</td>
<td>1st det. grid through 51 ffd.</td>
<td>L10 and L11 (2nd 1-F Trans)</td>
<td>600 kc between 600-700 kc</td>
<td>L2 and L3</td>
</tr>
<tr>
<td>4</td>
<td>Radiation loop consisting of two turns of wire 18 inches in diameter located 4 feet from receiver</td>
<td>1,500 kc</td>
<td>500 kc</td>
<td>C3 antenna</td>
</tr>
<tr>
<td>5</td>
<td>1,500 kc</td>
<td>1,500 kc</td>
<td>500 kc</td>
<td>C1 antenna while rocking</td>
</tr>
</tbody>
</table>

When making adjustments 3 to 5 in the chassis must be in the cabinet, the loop connected, and all leads in their normal positions. When mounting chassis in cabinet, if the alignment marks are on, do not line up with scale plate mounted to chassis move pointer to agree with dial scale on chassis.

* Oscillator should track on high frequency side of signal.

---

**MISCELLANEOUS ASSEMBLIES**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>3373</td>
<td>Push button</td>
<td>1/100 turn screw</td>
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<tr>
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<tr>
<td>3365</td>
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<td>.10</td>
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<tr>
<td>3364</td>
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<td>.10</td>
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<tr>
<td>3363</td>
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</tr>
<tr>
<td>3311</td>
<td>Push button</td>
<td>1/100 turn screw</td>
<td>.10</td>
</tr>
</tbody>
</table>

**All prices are subject to change or withdrawal without notice.**
FOR ADJUSTMENTS, NOTES AND SERVICE DATA, SEE MODEL RP-139-A

Top View of Automatic Record Changer

Details of Record Shelf Posts and Lever Assemblies

Motor Data and Coupling

Bottom View of Automatic Record Changer

NOTE: Numbers refer to parts—letters refer to adjustments.
-1940 No. 2-

Features of design include: New type single-ended tubes (12SA7, 12SK7, and 12SQ7), clock-type dial; dust-proofed electrodynamic loudspeaker; "Magic Loop", and Beam Power Output.

**Electrical and Mechanical Specifications**

**Power Supply Ratings**

- **A.C. Rating**: 105-125 volts, 60-60 cycles, 30 watts
- **D.C. Rating**: 105-125 volts, direct current, 30 watts

**Output Power (125 volt, 60 cycle supply)**

- **Undistorted Maximum**: 8 watts
- **1.3 watts**

**Loudspeaker**

- **Type**: 5-inch electrodynamic

**Description**

- **Cabinet Dimensions (inches)**: 19/32 x 9 35/32 x 34
- **Mahogany plastic finish**: 6 19/32 x 25/32 x 54
- **Walnut finish**: 5 1/32

**Alignment Procedure**

1. **Output Meter Alignment.**—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

2. **Test-Oscillator.**—For I.F. alignment, connect the low side of the test-oscillator to the receiver chassis through a .01 mfd. capacitor, and keep the output as low as possible.

3. **Pre-Setting Dial.**—With gang condenser in full mesh, the pointer should be adjusted so that it is vertical.

4. **Antenna.**—The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the "ANT." terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 m.m.f. capacitor in series with the lead-in.

5. **Power-Supply Polarity.**—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

**Precautionary Lead Dress**

1. Dress grid lead of 12SK7 close to chassis under condenser (C12).
2. Dress green and blue leads from i-f transformers close to chassis and away from each other.
3. Dress leads from terminal board on loop support away from loop.
Lead 46X3, Chassis RC459C

POWER OUTPUT (125 volt, 60 cycle supply)

Undistorted: 6 watts
Maximum: 2.0 watts

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be adjusted so that it is vertical.

Antenna.—The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the "ANT" terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mfd. capacitor in series with the lead-in.

---

**STOCK No.** | **DESCRIPTION** | **Unit List Price**
---|---|---
35065 | Cone—Cone complete with voice coil Transformer—Output transformer | 1.20
34174 | | 1.25
29297 | Cap—Dust cap | 0.02
35066 | Cone—Cone complete with voice coil | 1.30
35450 | Speaker 5" dynamic speaker complete with cone and voice coil less output transformer | 3.25
35660 | Ballast—Ballast tube resistor | 0.02
12667 | Capacitor—48 mfd. (C5) | 0.02
12664 | Capacitor—20 mfd. (C11, C13) | 0.02
33584 | Capacitor—005 mfd. (C14) | 0.02
4937 | Capacitor—001 mfd. (C15, C16) | 0.02
11315 | Capacitor—015 mfd. (C17) | 0.02
29938 | Ballast—Ballast transformer | 2.20
32787 | Capacitor—05 mfd. (C12, C18) | 0.20
13495 | Capacitor—2 mfd. (C21) | 0.30
12494 | Capacitor—0.25 mfd. (C6) | 0.30
35064 | Capacitor—Electrolytic comprising 1 section of 20 mfd. and 1 section of 12 mfd. | 0.75
34443 | Coil—Oscillator coil | 0.60
35053 | Condenser—Variable tuning condenser less drive drum | 2.00
35057 | Control—Volume control and power switch | 1.50
35063 | Drum—Tuning condenser drive cord | 0.30
35062 | Indicator—Station selector indicator | 0.20

---

Steps | Connect the high side of test-oscillator to | Tune test-osc. to | Turn radio dial to | Adjust the following for max. peak output—
---|---|---|---|---
1 | 12SK71-F grid in series with .01 mfd. | 465 kc | Quiet point at 1,600 kc end of dial | C9 and C10 (2nd I-F trans.)
2 | Tuning condenser stator (osc.) in series with .01 mfd. | 1,600 kc | Full clockwise (out of mesh) | C7 and C8 (1st I-F trans.)
3 | Radiation loop consisting of two turns of wire | 1,400 kc | Resonance on 1,400 kc signal | C1 (antenna)
4 | 18 inches in diameter | | | |

Precautionary Lead Dress
1. Dress grid lead of 12SK7 close to chassis under condenser (C12).
2. Dress green and blue leads from i-f transformers close to chassis and away from each other.
3. Lead dress from terminal board on loop support away from loop.

---

**STOCK No.** | **DESCRIPTION** | **Unit List Price**
---|---|---
31480 | Lamp—Dial lamp | 0.20
35061 | Loop—Antenna loop complete | 1.05
12073 | Resistor—120 ohms, 1 watt (R13) | 0.20
35255 | Resistor—120 ohms, 1 watt (R9) | 0.20
13998 | Resistor—22,000 ohms, 1 watt (R1) | 0.20
13412 | Resistor—47,000 ohms, 1 watt (R3) | 0.20
11081 | Resistor—100,000 ohms, 1/10 watt (R15) | 0.15
12264 | Resistor—220,000 ohms, 1 watt (R2) | 0.20
12826 | Resistor—170,000 ohms, 1 watt (R8) | 0.20
12679 | Resistor—2.5 megohms, 1 watt (R4) | 0.20
12601 | Resistor—10 megohms, 1 watt (R5) | 0.20
35000 | Resistor—Ballast tube resistor | 0.80
35600 | Scale—Dial scale | 0.65
35058 | Shaft—Tuning condenser drive shaft | 0.20
34449 | Socket—Dial lamp socket | 0.30
31729 | Socket—Tube socket | 0.25
35055 | Transformer—Output transformer | 1.30
35094 | Transformer—1st I-F transformer | 1.75
35055 | Transformer—2nd I-F transformer | 1.75
35000 | Tube—Ballast tube resistor | 0.80

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**Schematic, Voltage Socket, Trimmers Alignment**

**RCA MFG. CO. INC.**

**MODELS 46X11, 46X12**

**Chassis RC-456**

**46X13, Ch. RC456A**

---

**Loop Connections**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test oscillator to:</th>
<th>Tune to:</th>
<th>Adjust the following for max. peak output:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12S7 grid in series with .01 mfd.</td>
<td>455 kc</td>
<td>L9 and L10 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>12S7 grid in series with .01 mfd.</td>
<td>600 kc</td>
<td>L7 and L8 (1st I-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Ant. terminal in series with 200 mmfd. Link closed</td>
<td>1,560 kc</td>
<td>L6 (osc.)</td>
</tr>
<tr>
<td>4</td>
<td>Ant. terminal in series with 200 mmfd. Link closed</td>
<td>1,600 kc</td>
<td>L5 (osc.)</td>
</tr>
<tr>
<td>5</td>
<td>Ant. terminal in series with 200 mmfd. Link closed</td>
<td>600 kc</td>
<td>L4 (osc.)</td>
</tr>
<tr>
<td>6</td>
<td>Ant. terminal in series with 200 mmfd. Link closed</td>
<td>1,600 kc</td>
<td>L3 (osc.)</td>
</tr>
<tr>
<td>7</td>
<td>Ant. terminal in series with 200 mmfd. Link closed</td>
<td>600 kc</td>
<td>L2 (osc.)</td>
</tr>
<tr>
<td>8</td>
<td>Ant. terminal in series with 200 mmfd. Link closed</td>
<td>6.1 mc</td>
<td>L1 (osc.)</td>
</tr>
<tr>
<td>9</td>
<td>Ant. terminal in series with 200 mmfd. Link closed</td>
<td>2.44 mc</td>
<td>L0 (osc.)</td>
</tr>
<tr>
<td>10</td>
<td>Repeat steps 8 and 9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**VOLTAGE SUPPLIES**

**MODELS 46X11, 46X12**

- **Chassis RC-456**
- **46X13, Ch. RC456A**

---

**Pre-Setting Pointer**

- With gang condenser in full mesh, the pointer should be adjusted to a horizontal position.

---

**Antenna**

- The set is equipped with a built-in loop antenna. If the loop antenna is used, the antenna terminal board link should be closed. This link should be open when an external antenna is used. Connect the external antenna to terminal 1. If an antenna longer than 100 feet excluding lead-in is used, connect a 100 to 200 mmfd. capacitor in series with the lead-in.

---

**LOUDSPEAKER**

- **Type**: 5 inch electrodynamic
- **V.C. Impedance**: 4 ohms at 400 cycles

---

**POWER SUPPLY RATINGS**

- **A.C. Rating**: 105-125 volts, 50-60 cycles, 50 watts
- **D.C. Rating**: 105-125 volts, direct current, 50 watts

---

**POWER OUTPUT RATING**

- **Undistorted**: 1 watt
- **Maximum**: 2 watts

---

<table>
<thead>
<tr>
<th>Model</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>32830</td>
<td>.40</td>
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<tr>
<td>13209</td>
<td>.35</td>
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<td>12724</td>
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<td>31879</td>
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<td>.30</td>
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<td>35104</td>
<td>.30</td>
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<td>35105</td>
<td>.30</td>
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<tr>
<td>35106</td>
<td>.30</td>
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<td>35107</td>
<td>.30</td>
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<td>35108</td>
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<td>35114</td>
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<td>35116</td>
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<tr>
<td>35117</td>
<td>.30</td>
</tr>
<tr>
<td>35118</td>
<td>.30</td>
</tr>
</tbody>
</table>

---

**Schematic, Voltage Socket, Trimmers Alignment**

---

**Notes:**

- These calibration marks are concealed when chassis is in cabinet.
- Use minimum capacity peak if two can be obtained.
- Check for selection of correct peak by tuning receiver to approximately 5.19 mc where a weaker signal should be received.

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RCA MFG. CO., INC.

-1940 No. 6-

Specifications

Frequency Ranges 550-1,550 kc and 6-18 mc

Push Button Ranges (Model 46X24 only)

(1) Approximately 540-945 kc
(2) Approximately 650-1,320 kc
(3) Approximately 760-1,440 kc
(4) Approximately 990-1,560 kc

Intermediate Frequency - 455 kc

Power Output Ratings

Undistorted .................. 1.1 watts
Distorted .................... 1.4 watts

Dial and Controls

Type ........................................ 5-inch permanent magnet dynamic

Voice Coil Impedance at 400 Cycles .................. 4.5 ohms

Power Supply Ratings

A.C. Rating ..................... 105-125 volts, 60 cycle, 50 watts
D.C. Rating ..................... 105-125 volts, direct current, 50 watts

Adjustments for Electric Tuning:

The push buttons and corresponding frequency ranges are given in the schematic diagram. Allow the set to warm up for about 15 minutes and proceed as follows:

(1) List five desired stations in order of the push button ranges.
(2) Push in the dial tuning (right hand) button and manually tune in the first station on the list.
(3) Press button No. 1. Turn S-F screw half way in; next turn the oscillator screw entirely in and then gradually back out until the station is heard.
(4) Adjust the R-F trimmer for maximum output.
(Clockwise adjustment of oscillator and R-F trimmers tunes the circuits to lower frequencies.)
(5) By turning the set to a position in which reception is weak a final more accurate adjustment may be made.
(6) Adjust for each of the remaining stations in a similar manner and place corresponding station tabs in recesses above buttons. A "Dial Tuning" tab should be above button No. 6.

Precautionary Lead Dress:

(1) Dress all leads away from oscillator and antenna coils.
(2) Dress cathode resistor (R4) and B+ lead across 12SK7 socket between plate and grid terminals.
(3) (46X24 only) Dress leads to push button switch straight up and parallel so that they do not touch each other.
(4) Dress black lead from 1st-I.F. transformer over green lead.
(5) Keep plate-cathode bypass (C4) of rectifier tube away from volume control.

Alignment Procedure

Output Meter Alignment — Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator — Connect the low side of the test-oscillator to the receiver chassis through a .01 mfd. capacitor, and keep the output as low as possible.

Pre-Setting Pointer — With gang condenser in full mesh, the pointer should be adjusted to a horizontal position.

Antenna — The set is equipped with a built-in loop antenna. If the loop antenna is used, the antenna terminal board link should be closed. This link should be open when an external antenna is used. Connect the external antenna to terminal 1. If an antenna longer than 100 feet (excluding lead-in) is used, connect a 100 to 200 mmdl. capacitor in series with the lead-in.

Power-Supply Polarity — For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not operate, reverse the plug. On a-c, reversal of the plug may reduce hum.

<table>
<thead>
<tr>
<th>Step</th>
<th>Connect high side of test oscillator to</th>
<th>Tune test oscillator to</th>
<th>Turn radio dial to</th>
<th>Adjust following for max. output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grid 12SK7 in series with 0.01 mfd.</td>
<td>455 kc</td>
<td>C19 and C20 (2nd 1-F Trans.)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grid 12SA7 in series with 0.01 mfd.</td>
<td></td>
<td>C13 and C14 (1st 1-F Trans.)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Antenna in series with 200 mmdl.</td>
<td>600 kc</td>
<td>C15 (osc.)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Antenna in series with 1,500 mmdl.</td>
<td>1,500 kc</td>
<td>C8 (osc.)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Antenna in series with 1,400 mmdl.</td>
<td>1,400 kc</td>
<td>C6 (ant.)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Repeat steps 3 (rock in), 4 and 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Antenna in series with 300 ohms</td>
<td>18.5 kc</td>
<td>C17 (osc.)*</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Antenna in series with 300 ohms</td>
<td>17.8 kc</td>
<td>C3 (ant.)</td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two can be obtained.

Note: Oscillator tracks above signal on all bands.

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MODELS K50, Ch. RC418A
T55, T56, Ch. RC418

Schematic, Voltage
Chassis Wiring

Note.—In some sets a 12 mmfd. capacitor is connected across C5.

LOUDSPEAKER
Type ................................ 5 inch electrodynamic
V. C. impedance at 400 cycles .......... 12 inch electrodynamic
........................................ 3.4 ohms
........................................ 7.2 ohms

POWER OUTPUT Rating
Undistorted .................................. 2 watts
Maximum ................................... 4 watts

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**Alignment Procedure**

Output Meter Alignment—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-oscillator to—</th>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for max. peak output—</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1A7ST 1st Det. grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>Quiet point at 1,600 kc end of dial</td>
<td>L2, L3, L4, L7 (1st and 2nd I.F. transformers)</td>
</tr>
<tr>
<td>2</td>
<td>1,600 kc</td>
<td>1,600 kc</td>
<td></td>
<td>C4 osc.</td>
</tr>
<tr>
<td>3</td>
<td>Radiated signal near 600 kc</td>
<td>Signal frequency</td>
<td></td>
<td>L1</td>
</tr>
<tr>
<td>4</td>
<td>Radiated signal near 1,400 kc</td>
<td>Signal frequency</td>
<td></td>
<td>C5</td>
</tr>
<tr>
<td>5</td>
<td>Radiated signal near 2,800 kc</td>
<td>Signal frequency</td>
<td></td>
<td>L1</td>
</tr>
</tbody>
</table>

For steps 3, 4, and 5 the chassis must be in the cabinet and the batteries in place and connected. L1 is then reached through the small hole in the cabinet which is normally covered with a small plug located farthest away from C3 and C-3. If the broadcast signal is used it should be weak to avoid a-v-c action. Turning loop to minimum pickup position will sometimes be helpful. If no broadcast signal is available connect test oscillator output to a suitable radiation loop located several feet away from receiver.

**Schematic Circuit Diagram**

Measurements are made to chassis unless otherwise indicated, with set tuned to quiet point. Values should hold within approximately 20% with rated battery voltage.

**Line Current Supply**

110 to 125 volts, AC 60 or 60 cycles, or DC

**Batteries Required**

"A" one 6 volt dry type (Eveready No. 747 or equivalent)

"B" two 4 volt dry type (Eveready No. 852 or equivalent)

**Frequency Range**

Intermediate Frequency

540, 1,000 kc

600, 1,250 kc

**Current Consumption**

A. "A" 0.05 ampere—"B" 10.5 milliamperes full power;

6.5 milliamperes save power.

**Power Output**

Undistorted 0.122 watt

Maximum 0.17 watt

**LOUDSPEAKER**

Type: 5-inch permanent-magnet dynamic

Voice-coil Impedance: 4.5 ohms at 400 cycles

First Edition

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1. R11 is 4,700 ohms, and C18 is .05 mfd.
2. C1 is 470 mfd.
3. There are three types of 2nd I.F. transformers in use.
   a. The first type (Stock No. 14308) has C23 and R5 mounted inside the case, and is connected exactly as shown above.
   b. In the second type R5 is omitted and the lead from S4 connects to C instead of E. E is not used.

Note: On some receivers the following circuit modifications are in effect:

POWER OUTPUT RATING
Undistorted: 2.5 watts
Maximum: 4.5 watts

LOUDSPEAKER (RL-70H-6)
Type: 12-inch electrodynamic
V.C. Impedance: 2.2 ohms at 400 cycles

In the third type R5 is omitted and C23 is connected externally from C to ground. E is not used. The lead from the diode plate connects to A instead of B. When replacing this transformer with Stock No. 14308, remove the external C23 and connect the replacement transformer as shown in the above diagram.

Important: Stock No. 14308 is used as replacement for all three of the above types, and should be connected as shown in the diagram.
**Alignment Procedure**

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord-Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the tuning drum. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in alignment, check the position of the drum. The 180° mark on the drum scale must be vertical and directly under the center of the shaft of the tuning drum when the plates are fully meshed. The drum is held to the shaft by means of two set-screws, which must be tightened securely when the drum is in the correct position.

On the inner side of the tuning drum are two projections which serve as stops to prevent extreme rotation of the gang condenser. The tuning drum should be set so that the stop limiting clockwise movement of the drum takes effect just as the gang condenser plates are becoming fully meshed, thus preventing stress on the gang due to extreme rotation.

Pointer for Calibration Scale.—Improve a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

---

**Calibration Scale**

```
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240

INTERNATIONAL

7 8 9 10 12 14 16 18 20 22

DOMESTIC

550 600 700 800 1000 1200 1400 1700

SPECIAL SERVICE

2.3 2.5 2.7 3.0 3.5 4.0 5.0 6.0 7.0 7.5

RECEIVER DIAL SCALES, AND CORRESPONDING 0-240° CALIBRATION SCALES
```

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example 39.75° on the calibration scale corresponds to 600 kc on “A” band. Read instructions under “Alignment Procedure.”

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MODEL K105
Drive Cord Data

- CONDENSER DRIVE CORD ARRANGEMENT

Note: In the Dial Indicator Drive Cord assembly drawing at the right the mechanism is shown with the range switch in the "A" band position. In this position the trip arm on the range switch shaft must be adjusted so that when push-buttons are operated, the drive cord drum will turn freely without rubbing or binding against the driver.

---

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33640</td>
<td>Arm - Push arm and cam assembly on tuning unit - less lock screw</td>
<td>.25</td>
</tr>
<tr>
<td>33432</td>
<td>Arm - Trip arm and set screw located on range switch shaft</td>
<td>.15</td>
</tr>
<tr>
<td>33430</td>
<td>Board - Antenna and ground terminal board</td>
<td>.50</td>
</tr>
<tr>
<td>30766</td>
<td>Cap - Rubber cap for Magic Eye - Model K80</td>
<td>.80</td>
</tr>
<tr>
<td>19749</td>
<td>Capacitor - Air-trimmer, 2-12 mfd. (C10)</td>
<td>.50</td>
</tr>
<tr>
<td>33429</td>
<td>Capacitor - Trimmer capacitor bank, 2 sections 4-50 mfd., and 3 sections 2-20 mfd. (C3, C5, C6, C9, C11)</td>
<td>.80</td>
</tr>
<tr>
<td>31871</td>
<td>Capacitor - 20 mfd. (C5)</td>
<td>.40</td>
</tr>
<tr>
<td>12733</td>
<td>Capacitor - 56 mfd. (C10)</td>
<td>.25</td>
</tr>
<tr>
<td>30964</td>
<td>Capacitor - 160 mfd. (C19, C20)</td>
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<tr>
<td>12404</td>
<td>Capacitor - 120 mfd. (C21, C22)</td>
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<tr>
<td>14713</td>
<td>Capacitor - 180 mfd. (C23)</td>
<td>.30</td>
</tr>
<tr>
<td>30332</td>
<td>Capacitor - 220 mfd. (C14)</td>
<td>.35</td>
</tr>
<tr>
<td>33418</td>
<td>Capacitor - 600 mfd. (C11)</td>
<td>.50</td>
</tr>
<tr>
<td>31433</td>
<td>Capacitor - 500 mfd. (C7)</td>
<td>.25</td>
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<td>31383</td>
<td>Capacitor - 330 mfd. (C8)</td>
<td>.60</td>
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<tr>
<td>31466</td>
<td>Capacitor - 6,000 mfd. (C23)</td>
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<td>31207</td>
<td>Capacitor - 0.0025 mfd. (C25)</td>
<td>.25</td>
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<td>Capacitor - 0.0005 mfd. (C24, C26, C29, C35, C57)</td>
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<tr>
<td>4997</td>
<td>Capacitor - .02 mfd. (C18)</td>
<td>.25</td>
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<td>32875</td>
<td>Capacitor - .005 mfd. (C19, C34, C35)</td>
<td>.25</td>
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<tr>
<td>32786</td>
<td>Capacitor - .01 mfd. (C18)</td>
<td>.25</td>
</tr>
<tr>
<td>38360</td>
<td>Capacitor - Electrolytic, .3 sections 10 mfd., one section 20 mfd. (C16, C27, C30, C31)</td>
<td>1.90</td>
</tr>
<tr>
<td>32821</td>
<td>Coil - Antenna coil (L1, L2, L3, L4)</td>
<td>1.00</td>
</tr>
<tr>
<td>32824</td>
<td>Coil - Oscillator coil (L5, L6, L7)</td>
<td>1.00</td>
</tr>
<tr>
<td>33424</td>
<td>Control - Transformer (SS, S4)</td>
<td>1.10</td>
</tr>
<tr>
<td>33425</td>
<td>Control - Volume control and power switch (R6, R5)</td>
<td>2.50</td>
</tr>
<tr>
<td>32635</td>
<td>Cord - Condenser drive cord</td>
<td>.25</td>
</tr>
<tr>
<td>32634</td>
<td>Cord - Drive cord</td>
<td>.10</td>
</tr>
<tr>
<td>32713</td>
<td>Cord - Adjustable core and stud for oscillator coil</td>
<td>.25</td>
</tr>
<tr>
<td>33627</td>
<td>Drum - Condenser drive drum</td>
<td>.10</td>
</tr>
</tbody>
</table>

**NOTE:** Above Parts List applies to both Model K-50 and K-80 except for items noted. Items on the right apply only to Model K-80.

---

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>13370</td>
<td>Resistor - 1 meg., 1 watt (R1)</td>
<td>.10</td>
</tr>
<tr>
<td>12287</td>
<td>Resistor - 2.2 meg., 1 watt (R4)</td>
<td>.10</td>
</tr>
<tr>
<td>13691</td>
<td>Resistor - 5 meg., 1 watt (R7, R15)</td>
<td>.20</td>
</tr>
<tr>
<td>33240</td>
<td>Resistor - 10 meg., 1 watt (R6, R9)</td>
<td>.20</td>
</tr>
<tr>
<td>33659</td>
<td>Resistor - 50 meg., 1 watt (R11)</td>
<td>.10</td>
</tr>
<tr>
<td>33660</td>
<td>Resistor - 100 meg., 1 watt (R13)</td>
<td>.30</td>
</tr>
<tr>
<td>33661</td>
<td>Resistor - 1,000 meg., 1 watt (R12)</td>
<td>.60</td>
</tr>
<tr>
<td>33662</td>
<td>Resistor - 10,000 meg., 1 watt (R12)</td>
<td>.60</td>
</tr>
<tr>
<td>33663</td>
<td>Resistor - 22,000 ohms, 1/10 watt (R5)</td>
<td>.15</td>
</tr>
<tr>
<td>33664</td>
<td>Resistor - 50,000 ohms, 1/10 watt (R6)</td>
<td>.15</td>
</tr>
<tr>
<td>12013</td>
<td>Resistor - 1 meg., 1/10 watt (R13)*</td>
<td>.15</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4839</td>
<td>Capacitor - 0.1 mfd. (C16)</td>
<td>.30</td>
</tr>
<tr>
<td>32240</td>
<td>Capacitor - Electrolytic, 9 sections 10 mfd., one section 20 mfd. (C7, C20, C33)</td>
<td>.45</td>
</tr>
<tr>
<td>5119</td>
<td>Plus - 3-contact female for speaker cable</td>
<td>.25</td>
</tr>
<tr>
<td>31898</td>
<td>Resistor - 390 ohms, 1 watt (R8)</td>
<td>.40</td>
</tr>
<tr>
<td>33180</td>
<td>Resistor - 1,700 ohms, 1 watt (R11)</td>
<td>.20</td>
</tr>
<tr>
<td>33430</td>
<td>Resistor - 10,000 ohms, 1 watt (R11)</td>
<td>.20</td>
</tr>
<tr>
<td>33431</td>
<td>Resistor - 100,000 ohms, 1 watt (R11)</td>
<td>.20</td>
</tr>
<tr>
<td>33432</td>
<td>Resistor - 1 meg., 1 watt (R12)</td>
<td>.10</td>
</tr>
<tr>
<td>33433</td>
<td>Resistor - 5 meg., 1 watt (R12)</td>
<td>.10</td>
</tr>
<tr>
<td>11409</td>
<td>Resistor - 100,000 ohms, 1 watt (R12)</td>
<td>.20</td>
</tr>
<tr>
<td>33434</td>
<td>Resistor - 100,000 ohms, 1 watt (R12)</td>
<td>.20</td>
</tr>
<tr>
<td>33435</td>
<td>Resistor - 100,000 ohms, 1 watt (R12)</td>
<td>.20</td>
</tr>
<tr>
<td>33436</td>
<td>Resistor - 1 meg., 1 watt (R13)</td>
<td>.15</td>
</tr>
<tr>
<td>33437</td>
<td>Resistor - 5 meg., 1 watt (R13)</td>
<td>.15</td>
</tr>
<tr>
<td>33438</td>
<td>Resistor - 10 meg., 1 watt (R13)</td>
<td>.15</td>
</tr>
</tbody>
</table>

---

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MODEL K50, Chassis RC415

MODEL K60, Chassis RC415A

**DIAGRAM:**

- **TOP VIEW**
- **SIDE VIEW**

- **PULLEY**
- **INTEGRATOR**
- **TUNING SHAFT**
- **DRIVE CORD DRUM**
- **FLAT SPRING**
- **CAM RANGE SW. SHAFT**

**SPEAKER ASSEMBLIES (RC-70I)**

- **Cone - Center dust cap** | .05
- **Coil - Hum neutralizing coil (L13)** | .30
- **Speaker - Speaker field coil (L12)** | .25
- **Speaker - Speaker cone, voice coil, and dust cap (L14)** | .75
- **Plug - Plug for speaker** | .30
- **Transformer - Output transformer (T2)** | .20

**MICROPHONE ASSEMBLIES (RL-70H)**

- **Speaker - Microphone speaker** | .05
- **Transformer - Microphone transformer** | .10

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MODELS T60, Ch. RC425
T62, Chassis RC425D
Sohematic, Voltage
Lead Dress

Power Line Antenna

Each of these models is equipped
with a built-in power line antenna.
To use this antenna, the link on the
antenna terminal board should be
connected between "A" and "L", thus
connecting the antenna input of the
receiver through a capacitor to the
powerline. If an outside antenna is
used, it should be connected to "A",
a ground connection made to "G",
and the link removed.

LOUDSPEAKER (T-60, RL-78-6; T-62, RL-79A-4)
Type ............ T-60, 5-inch electrodynamic; T-62, 6-inch
electrodynamic
V. C. Impedance ............ 3.4 ohms at 400 cycles

Power Supply Ratings
Rating A ............ 105-125 volts, 50-60 cycles, 80 watts
Rating B ............ 105-125 volts, 50-60 cycles, 80 watts
Rating C ............ 100-130, 140-160, 195-250 volts,
40-60 cycles, 80 watts

PILOT LAMP (1) .......... Mazda No. 51, 6.3 volts, 0.20 amp.

Frequency Ranges
Standard Broadcast .......... 540-1,720 kc
Short Wave ............ 5.6-20 mc
Intermediate Frequency .......... 455 kc

Power Output Rating
Undistorted .......... 2.2 watts
Maximum .......... 4.2 watts

Precautionary Lead Dress—
1. Dress the Power Line Antenna lead close to the chassis base
   and near the back range.
2. Power switch leads should be dressed around the 6SQ7 socket.
MODELS T60, T62
Alignment, Trimmers
Socket, Tuner, Dial Data

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid A.V.C. action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the mark at the extreme left (low frequency) end of the dial scale.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of the test osc. to</th>
<th>Tune radio dial to</th>
<th>Adjust the following for maximum peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antenna terminal</td>
<td>455 kc</td>
<td>C14 and C15 (2nd I-F trans.)</td>
</tr>
<tr>
<td>2</td>
<td>Antenna terminal in series with 500 ohms</td>
<td>20 mc</td>
<td>C4 (osc.)*</td>
</tr>
<tr>
<td>3</td>
<td>Antenna terminal in series with 200 mmf.</td>
<td>1,500 kc</td>
<td>C9 (osc.)</td>
</tr>
<tr>
<td>4</td>
<td>Antenna terminal in series with 200 mmf.</td>
<td>600 kc</td>
<td>C10 (osc.) Rock gang</td>
</tr>
<tr>
<td>6</td>
<td>Repeat step 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum peak if two can be obtained. Check to determine that C4 has been adjusted properly by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

Note: Oscillator tracks above signal on both bands.

Adjustments for Push-Button Tuning

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Pull off the push-buttons and loosen the push-button rods with a small screwdriver.
2. Turn the accessory switch on the back apron of the chassis to "Radio" position and accurately tune in the station for which the first button is to be set.
3. Press in the first push-button rod (left) with the screwdriver, as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the rod. Do not tighten more than 1/4 turn after the rod begins to grip or damage to the mechanism may result.
4. Replace the push-button on its shaft.
5. Proceed in a similar manner for the remainder of the push-buttons.
6. Insert the station marker tabs in the recesses above the push-buttons.
Precautionary Lead Dress:

1. Dress AC switch leads away from 6SF5 tube socket.
2. Do not twist loop leads together or around each other. Spacing between leads from "C" band loop to chassis is important—see alignment step "11".
3. "High side" leads from loop sockets, range switch, oscillator coil, and trimmers must be dressed away from chassis and each other.
4. Dress C-6 and C-33 away from each other.
5. Dress C-17 away from power switch leads.

Intermediate Frequency
455 kc

Frequency Ranges
Standard Broadcast .... 540 to 1,560 kc
Short-Wave .......... 5.8 to 18 mc
Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the chassis schematic.

Output Meter Alignment.—If this method is used, connect the output meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the extreme left (low frequency) mark on the dial scale.

When making adjustments 4 to 9 inclusive the chassis must be in the cabinet, both loops connected, and all leads in their normal positions. When mounting chassis in cabinet if calibration marks on dial plate do not line up with dial scale mounted on cabinet move pointer to agree with dial scale on cabinet.

* Oscillator should track on high frequency side of signal. If two peaks are obtained use high frequency (minimum capacity) peak.

† If two peaks can be obtained use low frequency (maximum capacity) peak.

Antennas

This receiver is equipped with two loop antennas ("C" band horizontal and fixed, and "A" band vertical and rotatable). During operation the "A" band loop should be rotated to the position giving maximum signal strength and freedom from noise. If desired, an outside antenna and ground can be connected to the terminals provided and when this is done the link between these terminals must be opened. However, for loop operation this link must be closed.

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Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic drawing.

Output Meter Alignment—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, keep the output as low as possible to avoid a.v.c. action. The low side of the test-oscillator should be connected to the receiver chassis.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the tuning drum. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

Pointer for Calibration Scale.—Improvisate a pointer for the calibration scale by fastening a piece of tape to the chassis, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, adjust the dial indicator along the drive cable to the 540 kc mark, gang condenser fully meshed. The indicator has a clip for attachment to the cable.

Precautionary Lead Dress:
1. Dress C8 (Oscillator coil to range switch) and its leads away from surrounding wires and chassis.
2. Dress R2 (Screen to B+) away from surrounding wires and parts.
3. Dress power switch leads away from 6ST7 and 6F6G tube sockets.

Adjustments for Push-Button Tuning

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up for any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Pull off the push-buttons and loosen the push-button rods with a small screwdriver.
2. Set the receiver for “Radio” operation, range selector on “Broadcast”, and accurately tune in the station for which the first button is to be set.

3. Press in the first push-button rod (left) with the screwdriver as far as it will go without undue pressure, hold in, return station with manual control if necessary for best reception, and then carefully tighten up the rod. Do not tighten more than ¼ turn after the rod begins to grip or damage to the mechanism may result.
4. Replace the push-button on its shaft.
5. Proceed in a similar manner for the remainder of the push-buttons.
6. Insert the station marker tabs in the recesses above the push-buttons.
The Victrola Model R-60 consists of a crystal pickup, a two-stage audio amplifier, a six-inch electrodynamic speaker, and a rim-drive motor turntable mechanism with automatic mercury switch for starting and stopping—all housed in a wood cabinet of modern design and appearance.

The phonograph motor is a self-starting, constant-speed induction type. It should be lubricated every six months by applying a few drops of light machine oil to the top and bottom motor spindle bearings, to the turntable spindle, and to the turntable drive wheel bearing.

CAUTION: Keep oil away from drive bushing on top of motor spindle and from rubber driving tire on turntable drive wheel.

The motor switch is automatic for both starting and stopping, and when properly adjusted, will turn the motor on as the pickup is moved from the pickup rest toward the turntable. The switch should be adjusted so that it will snap into the "off" position when the pickup needle is 1 3/4 inches from the center line of the spindle. The motor may be shut off at any time by placing the pickup on the pickup rest.

### Specifications

**Power Supply Ratings**
- A-6... 105-125 volts, 60 cycles, 90 watts
- A-5... 105-125 volts, 50 cycles, 90 watts

**Loudspeaker (RL-79-2)**
- Type: 6-inch electrodynamic
- V.C. Impedance at 400 cycles: 3.4 ohms

**Tube Complement**
1. RCA-6SF5... A.F. Amplifier
2. RCA-6F6-G... Output
3. RCA-5Y3-G... Rectifier

**Pickup**
- Type: Crystal
- Impedance: 100,000 ohms at 400 cycles
- Average Output: 1/2 volt at 1,000 cycles with 250,000 ohms load

**Cabinet Dimensions (inches)**
- Height: 8 3/4
- Width: 14
- Depth: 9 3/4

**Chassis Base Dimensions (inches)**
- Height: 2 1/4
- Width: 7 3/4
- Depth: 4 3/4

**Overall Chassis Height**: 6 1/2 inches
**Weight**: 20 lbs. (shipping)

*NOTE: Values with star (*) are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated. Values should hold within approximately ±20% with 117-volt a.c. supply.
The push-buttons should be adjusted for six favorite stations after the receiver is operating, and has had a brief warm-up period.

Any standard broadcast stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push-button screws in back of the station-marker recesses.
2. Set Accessory-Tone Knob to “Radio” and turn the range selector to “A,” so that the “A” band indicator lights up.
3. Press in the tuning knob and accurately tune in the first station.
4. With station accurately tuned in, press in the first push-button and tighten the screw.
5. Place the station marker tab in the recess.
6. Proceed in a similar manner to adjust the remainder of the push-buttons.

### STOCK No. DESCRIPTION

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>33620</td>
<td>Arm—Push arm and cam assembly on tuning unbalance lock screw.</td>
</tr>
<tr>
<td>33430</td>
<td>Board—Antenna and ground terminal board.</td>
</tr>
<tr>
<td>31228</td>
<td>CAPACITOR—66uf., mmfd. (C10)</td>
</tr>
<tr>
<td>33249</td>
<td>Capacitor—Tungsten, two 6-60 mmfd., two 2-20 mmfd., sections (C5, C6, C9, C11).</td>
</tr>
<tr>
<td>33792</td>
<td>Capacitor—25 mf., (C2)</td>
</tr>
<tr>
<td>31232</td>
<td>Capacitor—66uf., (C12)</td>
</tr>
<tr>
<td>30904</td>
<td>Capacitor—100 mf., (C19, C20).</td>
</tr>
<tr>
<td>30404</td>
<td>Capacitor—100 mf., (C21, C22).</td>
</tr>
<tr>
<td>14712</td>
<td>Capacitor—180 mf., (C25).</td>
</tr>
<tr>
<td>12894</td>
<td>Capacitor—220 mf., (C14).</td>
</tr>
<tr>
<td>30433</td>
<td>Capacitor—470 mf., (C1).</td>
</tr>
<tr>
<td>12957</td>
<td>Capacitor—500 mf., (C32).</td>
</tr>
<tr>
<td>31431</td>
<td>Capacitor—5,000 mf., (C8).</td>
</tr>
<tr>
<td>31403</td>
<td>Capacitor—5,000 mf., (C13).</td>
</tr>
<tr>
<td>5107</td>
<td>Capacitor—0.005 mf., (C26).</td>
</tr>
<tr>
<td>4683</td>
<td>Capacitor—0.005 mf., (C74, C24, C29, C36).</td>
</tr>
<tr>
<td>4987</td>
<td>Capacitor—0.001 mf., (C29).</td>
</tr>
<tr>
<td>4870</td>
<td>Capacitor—0.001 mf., (C19).</td>
</tr>
<tr>
<td>32787</td>
<td>Capacitor—0.002 mf., (C17, C18, C19, C20).</td>
</tr>
<tr>
<td>33504</td>
<td>Capacitor—Electrolytic, 10 mfd., and one 20 mfd. sections (C16, C17, C59, C31).</td>
</tr>
<tr>
<td>33508</td>
<td>Capacitor—Magic Eye mounting clip and bracket.</td>
</tr>
<tr>
<td>32091</td>
<td>Capacitor—Antenna coil. (L1, L2, L3, L4).</td>
</tr>
<tr>
<td>32696</td>
<td>Capacitor—Oscillator coil. (L5, L6, L7).</td>
</tr>
<tr>
<td>32695</td>
<td>Capacitor—Condenser drive cord.</td>
</tr>
<tr>
<td>32694</td>
<td>Capacitor—Drive cord.</td>
</tr>
<tr>
<td>32713</td>
<td>Capacitor—Adjustable core and stud for oscillator coil.</td>
</tr>
<tr>
<td>33697</td>
<td>Drum—Condenser drive drum.</td>
</tr>
<tr>
<td>34221</td>
<td>Drum—Drive cord drum.</td>
</tr>
<tr>
<td>31388</td>
<td>DRUM—Volume control knob shaft and gears.</td>
</tr>
<tr>
<td>33313</td>
<td>Gear—Volume control knob shaft and gears, with set screws.</td>
</tr>
<tr>
<td>32222</td>
<td>Lamp—Dial lamp.</td>
</tr>
<tr>
<td>33431</td>
<td>Lamp—Antenna and ground terminal board.</td>
</tr>
<tr>
<td>33414</td>
<td>Link—Antenna and condenser drive cord.</td>
</tr>
<tr>
<td>33628</td>
<td>Plate—Front plate for tuning arm.</td>
</tr>
<tr>
<td>33671</td>
<td>Plug—Eye cable plug.</td>
</tr>
<tr>
<td>5040</td>
<td>Plugs—Speaker cable plug.</td>
</tr>
<tr>
<td>33910</td>
<td>Pulleys—Drive pulleys and brackets (1 pulley).</td>
</tr>
<tr>
<td>33510</td>
<td>Pulley—Drive pulley.</td>
</tr>
<tr>
<td>13705</td>
<td>Resistor—220 ohms, 1 watt (R10).</td>
</tr>
<tr>
<td>32735</td>
<td>Resistor—680 ohms, 1 watt (R9).</td>
</tr>
<tr>
<td>12285</td>
<td>Resistor—6,000 ohms, 1 watt (R17).</td>
</tr>
<tr>
<td>14559</td>
<td>Resistor—10,000 ohms, 1 watt (R11).</td>
</tr>
<tr>
<td>33489</td>
<td>Resistor—22,000 ohms, 1 watt (R6).</td>
</tr>
<tr>
<td>12454</td>
<td>Resistor—470,000 ohms, 1 watt (R3).</td>
</tr>
<tr>
<td>12259</td>
<td>Resistor—470,000 ohms, 1 watt (R3, R10, R14).</td>
</tr>
<tr>
<td>13419</td>
<td>Resistor—1 meg., 1/10 watt (R13).</td>
</tr>
<tr>
<td>13730</td>
<td>Resistor—1 meg., 1 watt (R1).</td>
</tr>
<tr>
<td>12265</td>
<td>Resistor—2.2 meg., 1 watt (R4).</td>
</tr>
<tr>
<td>13601</td>
<td>Resistor—10 meg., 1 watt (R7, R15).</td>
</tr>
<tr>
<td>13434</td>
<td>Resistor—10 meg., 1 watt (R6).</td>
</tr>
</tbody>
</table>

### ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

* Model T-80 only

**NOTE:** Above Parts List applies to both Models T-64 and T-80, except for the items noted. Items on the right apply only to Model T-64.
Note: On some receivers the following circuit changes are in effect:
1. C1 is 470 mmfd.
2. There are three types of 2nd, I-F transformers in use.
   a. The first type (Stock No. 14308) has C28 and R5 mounted inside the case, and is connected exactly as shown below.
   b. In the second type R5 is omitted and the lead from S4 connects to C instead of E. E is not used.
   c. In the third type R5 is omitted and C23 is connected externally from C to ground. E is not used. The lead from the diode plate connects to A instead of B. When replacing this transformer with Stock No. 14308, remove the external C23 and connect the replacement transformer as shown in the schematic diagram.

Important: Stock No. 14308 is used as replacement for all three of the above types, and should be connected as shown in the schematic diagram.
**Power Supply Ratings**

**Rating A** .... 105-125 volts, 50-60 cycles, 75 watts

**Rating B** .... 105-125 volts, 25-60 cycles, 75 watts

**Rating C** .... 100-130, 140-160, 195-250 volts, 40-60 cycles, 75 watts

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid over-excitation.

Calibration Scale on Indicator-Drive-Cord-Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the tuning drum. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 240° mark on the drum scale must be vertical and directly above the center of the shaft of the tuning drum when the plates are fully meshed. The drum is held to the shaft by means of two set-screws, which must be tightened securely when the drum is in the correct position.

On the inner side of the tuning drum are two projections which serve as stops to prevent extreme rotation of the gang condenser. The tuning drum should be set so that the stop limiting clockwise movement of the drum takes effect just as the gang condenser plates are becoming fully meshed, thus preventing stress on the gang due to extreme rotation.

**Pilot Lamps (2)** . Mazda No. 44, 6-3 volts, 0.25 amp.

**Power Output Rating**

Undistorted ........... 2.5 watts

Maximum .............. 4.5 watts

**Loudspeaker (RL-79-4)**

Type .................. 6-inch Electrodynamic

V.C. Impedance ...... 3.4 ohms at 400 cycles

**Pointer for Calibration Scale**—Improve a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 240° mark on the calibration scale when the plates are fully meshed.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of the test-osc. to</th>
<th>Tune test osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for maximum peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6S57 grid in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; Band Quiet Point between 500-700 kc</td>
<td>L11 and L12 (2nd 1-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6S7 grid in series with .04 mfd.</td>
<td>20 kc</td>
<td>20 kc (40°) &quot;C&quot; Band</td>
<td>C6 (osc.)* C9 (ant.)</td>
</tr>
<tr>
<td>3</td>
<td>Ant. terminal in series with 300 ohms</td>
<td>20 mc</td>
<td>6 mc (55°) &quot;B&quot; Band</td>
<td>C9 (osc.** C11 (ant.)</td>
</tr>
<tr>
<td>4</td>
<td>Ant. terminal in series with 300 mfd.</td>
<td>1,500 kc</td>
<td>1,500 kc (41.75°) &quot;A&quot; Band</td>
<td>C10 (osc.) C3 (ant.)</td>
</tr>
<tr>
<td>5</td>
<td>Ant. terminal in series with 200 mfd.</td>
<td>600 kc</td>
<td>800 kc (200.25°) &quot;A&quot; Band</td>
<td>L7 (osc.) Rock Gang</td>
</tr>
<tr>
<td>6</td>
<td>Repeat step 5.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two can be obtained. Check to determine that C6 has been adjusted to correct peak by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

** Use minimum capacity peak if two can be obtained. Check to determine that C9 has been adjusted to correct peak by tuning receiver to approximately 5.69 mc where a weaker signal should be received.

Note: Oscillator tracks above signal on all bands.
MODEL 580, Ch. RC415A
Schematic, Voltage
Chassis Wiring, Changes

Power Output Rating
Undistorted... 5.0 watts
Maximum.... 5.5 watts

LOUDSPEAKER (RL-70)-1)
Type......... 12-inch electrodynamic
V.C. Impedance... 2.2 ohms at 400 cycles

Note: On some receivers the following circuit modifications are in effect:
1. R11 is 5,600 ohms, and C18 is 0.1 mfd.
2. C3 is 470 micro, R15 is 2,700 ohms and is connected from
cathode of 6SF5 Inverter to ground; R17 is 15,000 ohms; and C33 is
omitted.
3. There are three types of 2nd I.F transformers in use.
a. The first type (Stock No. 14308) has C23 and R5 mounted
inside the case, and is connected exactly as shown above.
b. In the second type R5 is omitted and the lead from S4 con-
nects to C instead of E. E is not used.
c. In the third type R5 is omitted and C3 is connected externally
from C to ground. E is not used. The lead from the diode plate
connects to A instead of B. When replacing this transformer with
Stock No. 14308, remove the external C23 and connect the replace-
ment transformer as shown in the above diagram.

Important: Stock No. 14308 is used as replacement for all three
of the above types, and should be connected as shown in the diagram.

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Note: On some receivers the following circuit modifications are in effect:
1. R11 is 5,600 ohms, and C18 is 0.1 mfd.
2. C1 is 470 mfd; R15 is 2,700 ohms and is connected from cathode of 6SF5 Inverter to ground; R17 is 15,000 ohms; and C33 is omitted.
3. There are three types of 2nd I-F transformers in use:
   a. The first type (Stock No. 14308) has C23 and R5 mounted inside the case, and is connected exactly as shown below.
   b. In the second type R5 is omitted and the lead from S4 connects to C instead of E. E is not used.
   c. In the third type R5 is omitted and C23 is connected externally from C to ground. E is not used. The lead from the diode plate connects to A instead of B. When replacing this transformer with Stock No. 14308, remove the external C23 and connect the replacement transformer as shown in the schematic diagram.
Important: Stock No. 14308 is used as replacement for all three of the above types, and should be connected as shown in the schematic diagram.

Power Output Rating
Undistorted .................................. 5.0 watts
Maximum .................................... 5.5 watts

Loudspeaker (RL-79-5)
Type ............... 6-inch electrodynamic
V.C. Impedance: .... 3.4 ohms at 400 cycles
Alignment Procedure

To align "A" band, turn range switch to "A" band (clockwise) position, turn receiver dial to 1,500 kc, tune test-oscillator to 1,500 kc, connect an output meter across the voice coil, and turn volume control to maximum. Adjust the trimmers (C3 and C6) on side of gang condenser for maximum output, using lowest possible output from test-oscillator.

To align "X" band, turn range switch to "X" band (counterclockwise) position, tune test-oscillator to 360 kc, and adjust C19 for maximum output. The gang should be rocked during "X" band alignment.

**Precautionary Lead Dress**

1. Dress power cord away from yellow lead to volume control.
2. Dress all leads away from antenna coil.
3. Green lead from gang to detector coil must be dressed under switch shaft and over detector coil (looking from bottom of chassis).
4. Yellow lead from volume control to 6K7 cathode must be dressed down against rear apron of chassis.
5. Green lead from switch to volume control must be dressed away from all other wires.
6. All leads to detector coil, except green lead in No. 3 (above) must be dressed down against the chassis base.

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Adjustments for Electric Tuning

Push Button Ranges:

- Two stations between approximately 150–300 kc
- One station between approximately 350–980 kc
- One station between approximately 650–1,080 kc
- One station between approximately 850–1,500 kc

This model has six push buttons. The right-hand button connects the gang condenser for dial tuning. The other five buttons are for electric tuning of five different stations. The station buttons connect to separate magnetite-core coils and trimmers to separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31091. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for preliminary adjustments.

The procedure is as follows:

1. Make a list of the desired stations, arranged in the order of the push button ranges shown on the schematic diagram.
2. To adjust buttons Nos. 1 and 2, best results are obtained by using a test-oscillator. Using a separate receiver, tune in the desired station for button No. 1 and zero-beat the test-oscillator against the carrier of this station. Then, keeping the same setting on the test-oscillator, connect its output to the antenna of the 9TS5LW. Adjust the antenna and oscillator trimmers of button No. 1 for maximum output. Proceed in a similar fashion for button No. 2.
3. To adjust buttons Nos. 3, 4 and 5, proceed as follows:
   a. Push in the dial-tuning (right-hand) button, and manually tune in the third station on the list.
   b. Push in station-button No. 3 and adjust No. 3 oscillator core (L14) to receive the station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.
   c. Adjust No. 3 antenna trimmer (C22) for maximum output on the station.
   d. Adjust each of the remaining stations in a similar manner.

   (Clockwise adjustment of oscillator and antenna trimmers tunes the circuits to lower frequencies.)
   e. Make a final careful adjustment of the oscillator and antenna trimmers, using one or two feet of wire as an antenna to insure sharp peaking.

### Power Supply Ratings

| Rating A | 105-125 volts, 50-60 cycles, 50 watts |
| Rating C | 100-120, 200-240 volts, 50-60 cycles, 80 watts |

### Power Output

| Undistorted | 1.0 watt |
| Maximum     | 1.5 watts |

### Loudspeaker

| Type | 5-inch Electrodynamic |
| V.C. Impedance | 3.1 ohms at 400 cycles |

### Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing. Turn the receiver volume control to maximum.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid audio action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc and 1,500 kc have been stamped in the plate on the front of the chassis, as shown in the accompanying drawing. These marks are used for reference during alignment.

Drum and Dial Indicator Adjustment.—As the first step in alignment, check the position of the drum on the front shaft of the gang condenser. With the gang at maximum (full mesh) the drum set-screw should be pointed directly down as shown in the drawing. With the drum in this position, and the gang at maximum, move the dial indicator along the drive cord to coincide with the left-hand line as shown. The indicator is held to the drive cord by means of spring clips.

After completion of alignment, and after the chassis has been fastened in the cabinet, turn the gang to maximum and note whether the dial indicator is at the left-hand end mark on the dial; if it is not, loosen the drum set-screw (which is accessible through a slot in the bottom of the cabinet), turn the drum slightly so that the indicator is at this mark, and then tighten the set-screw.

After completion of alignment, seal the if core-adjustment screws with household cement.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc to—</th>
<th>Tune test-osc to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 I-F grid cap, in series with .01 mfd.</td>
<td>456 kc</td>
<td>Quiet point between 550-750 kc</td>
<td>L7 and L9 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6A8-G grid cap, in series with .01 mfd.</td>
<td>456 kc</td>
<td>L5 and L6 (1st I-F Trans.)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Antenna lead (blue) in series with 300 mfd.</td>
<td>1,500 kc</td>
<td>C6 (osc.)* C3 (ant.)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Follow “Adjustments for Electric Tuning.”</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The oscillator section of the gang condenser has two trimmers, one on top, accessible through a hole in the chassis, and the other on bottom. It may be necessary to adjust both of these trimmers to secure a peak on 1,500 kc.

### Drum Shown With Gang RT Maximum Capacity

Dial-Indicator and Drive Mechanism

Refer to “Alignment Procedure” for explanation of the “calibration marks” shown in this drawing.

At Left—Tube and Trimmer Locations
Alignment Procedure

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver ground terminal (G), and keep the output as low as possible to avoid a-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 2 inches. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improve a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the “180°” mark on the calibration scale when the plates are fully meshed.

Adjustments for Electric Tuning

These models have eight push buttons. The left-hand button is a Vactrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31021. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:
1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.
5. Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.
6. Adjust for each of the remaining five stations in the same manner.
7. Make a final careful adjustment of the oscillator cores and antenna trimmers.

Power Supply Rating
A-C Rating 105-125 volts, 25-60 cycles, 55 watts
D-C Rating 105-125 volts, 55 watts

Speaker (Permanent-Magnet Dynamic)
Diameter 6 inches
V. C. Impedance at 400 cycles 3 ohms

Steps Connect the high side of test-osc to— Tune test-osc to— Turn radio dial to— Adjust the following for max. peak output
1 6K7 1-F grid cap, in series with .01 mfd. 455 kc \"A\" band, Quick Point between 550-750 kc L12 and L13 (2nd I-F Transformer)
2 6K8 det. grid cap, in series with .01 mfd. 455 kc \"A\" band L10 and L11 (1st I-F Transformer)
3 Antenna Terminal, in series with 200 mfs. 600 kc \"A\" band L9
4 1,500 kc \"A\" band C35 (ant.)
5 Repeat steps 3 and 4.
6 Antenna Terminal, in series with 400 ohms. 300 kc \"B\" band C26 (ant.)
7 20 mc 26 mc (26.5 mc) \"C\" band C21 (ant.)
8 Follow "Adjustments for Electric Tuning."

* Use minimum capacity peak if two peaks can be obtained, and rock gang condenser slightly while adjusting C23 and C21.

Note.—Oscillator tracks 455 kc above signal on all bands.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, move the dial indicator on the drive cable to the left-hand end mark on dial, with gang condenser fully meshed.
**REPLACEMENT PARTS**

**Parts List**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31373</td>
<td>Pulley—Drive cord pulley</td>
<td>.08</td>
</tr>
<tr>
<td>5006</td>
<td>Reactor (L1)</td>
<td>.10</td>
</tr>
<tr>
<td>31577</td>
<td>Resistor—Ballast resistor (R22, R23, R24)</td>
<td>.08</td>
</tr>
<tr>
<td>30083</td>
<td>Resistor—12-volt elect. (R24)</td>
<td>.10</td>
</tr>
<tr>
<td>30084</td>
<td>Resistor—1,000 ohms (R12)</td>
<td>.06</td>
</tr>
<tr>
<td>14284</td>
<td>Resistor—3,900 ohms, 1 watt (R11)</td>
<td>.20</td>
</tr>
<tr>
<td>14245</td>
<td>Resistor—33,000 ohms, 1 watt (R2, R5)</td>
<td>.20</td>
</tr>
<tr>
<td>14560</td>
<td>Resistor—100,000 ohms, 1/4 watt (R9, R14)</td>
<td>.20</td>
</tr>
<tr>
<td>13045</td>
<td>Resistor—220,000 ohms, 1/4 watt (R10)</td>
<td>.08</td>
</tr>
<tr>
<td>12199</td>
<td>Resistor—270,000 ohms, 1 watt (R19)</td>
<td>.20</td>
</tr>
<tr>
<td>14983</td>
<td>Resistor—330,000 ohms, 1 watt (R6)</td>
<td>.20</td>
</tr>
<tr>
<td>31345</td>
<td>Resistor—470,000 ohms, 1 watt (R51)</td>
<td>.20</td>
</tr>
<tr>
<td>12370</td>
<td>Resistor—1 mfd. (R1)</td>
<td>.20</td>
</tr>
<tr>
<td>12283</td>
<td>Resistor—1 mfd. 1/2 watt (R16)</td>
<td>.15</td>
</tr>
<tr>
<td>12679</td>
<td>Resistor—2.2 mfd. 1 watt (R3)</td>
<td>.35</td>
</tr>
<tr>
<td>14343</td>
<td>Transmitter</td>
<td>.10</td>
</tr>
<tr>
<td>14887</td>
<td>Transmitter</td>
<td>.01</td>
</tr>
<tr>
<td>4669</td>
<td>Screw—No. 8-32 square head set screw for drum, Stock No. 31722</td>
<td>.60</td>
</tr>
<tr>
<td>32671</td>
<td>Shaft—Stator selector knob shaft and pulley</td>
<td>.35</td>
</tr>
<tr>
<td>12110</td>
<td>Shield—Radiator shield cap</td>
<td>.30</td>
</tr>
<tr>
<td>31362</td>
<td>Socket—Dial lamp socket</td>
<td>.20</td>
</tr>
<tr>
<td>13730</td>
<td>Socket—Magic Eye socket</td>
<td>.45</td>
</tr>
<tr>
<td>31251</td>
<td>Socket—Tub socket</td>
<td>.05</td>
</tr>
<tr>
<td>31970</td>
<td>Spring—Tension spring for stator push button switch latch bar</td>
<td>.05</td>
</tr>
<tr>
<td>31148</td>
<td>Spring—Indicator or drum drive cord tension spring</td>
<td>.05</td>
</tr>
<tr>
<td>31370</td>
<td>Switch—Push button selector switch (S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S15, S16, S17, S18, S19, S20)</td>
<td>.20</td>
</tr>
<tr>
<td>31384</td>
<td>Switch—Selector switch (S13, S14)</td>
<td>.05</td>
</tr>
<tr>
<td>31377</td>
<td>Tube—Ballast transformer (R22, R23, R24)</td>
<td>.80</td>
</tr>
</tbody>
</table>

**SPEAKER ASSEMBLIES**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31665</td>
<td>Cone—Speaker cone and voice coil (L14)</td>
<td>.20</td>
</tr>
<tr>
<td>3118</td>
<td>Plug—3-contact male plug for speaker</td>
<td>.20</td>
</tr>
<tr>
<td>31664</td>
<td>Speaker complete</td>
<td>.50</td>
</tr>
<tr>
<td>31666</td>
<td>Transformer—Output transformer (T1)</td>
<td>1.30</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS ASSEMBLIES**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31397</td>
<td>Button—Stator selector push button</td>
<td>.15</td>
</tr>
<tr>
<td>31456</td>
<td>Cover—8-protective covers for push button markers</td>
<td>.08</td>
</tr>
<tr>
<td>32673</td>
<td>Dial—Stator selector dial scale (glass)</td>
<td>.60</td>
</tr>
<tr>
<td>32674</td>
<td>Escutcheon—Stator selector escutcheon less dial scale and push button</td>
<td>.85</td>
</tr>
<tr>
<td>31355</td>
<td>Knob—Range switch knob</td>
<td>.12</td>
</tr>
<tr>
<td>14359</td>
<td>Knob—Stator selector knob</td>
<td>.20</td>
</tr>
<tr>
<td>31362</td>
<td>Knob—Tone control knob</td>
<td>.10</td>
</tr>
<tr>
<td>30773</td>
<td>Knob—Volume control knob</td>
<td>.15</td>
</tr>
<tr>
<td>31455</td>
<td>Marker—Mark on push button marker</td>
<td>.03</td>
</tr>
<tr>
<td>31457</td>
<td>Marker—&quot;Record Player&quot; push button marker</td>
<td>.01</td>
</tr>
<tr>
<td>31589</td>
<td>Marker—Stator call letters push button markers</td>
<td>.15</td>
</tr>
<tr>
<td>31838</td>
<td>Plate—Spring retaining spring for knob, Stock No. 31399</td>
<td>.05</td>
</tr>
</tbody>
</table>

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Lubrication and Adjustment

To assure normal and satisfactory operation, every motor requiring service should be lubricated and adjusted as follows:

1. Remove motor end brackets, bottom cover containing lower spindle bearing, and governor. Slide vertical spindle downward, remove C-washer; then push upward to disengage worm gear. Slide rotor and shaft from motor.

2. Clean rotor bearings and rotor shaft thoroughly with "Carbona" or "benzine." Crush oil reservoirs I and II with the same solvent, preferably after removing oil wicks.

3. Remove governor felt friction pad V. Replace this pad with revised type Stock No. 34058, being certain to saturate thoroughly with oil.

4. Put slight amount of oil in each rotor bearing, and reinsert rotor shaft. See that shaft revolves freely when in position.

5. Oil bearing IV, grease gear VI, and re-install bottom cover: checking to assure that vertical spindle revolves freely and worm is properly meshed after cover is in place and screws tightened. Do not misplace small disc of bottom thrust bearing.

6. Inspect governor to see that springs move freely under retaining washers, and that governor is otherwise in good condition. Install on rotor shaft, checking for possible bind of sleeve on the shaft.

7. Replace end brackets containing thrust screws "A" and "B".

8. Adjust thrust screw "A" so that one steel lamination of rotor shows beyond the stator laminations as illustrated. This positions rotor at the electrical center of the stator, for maximum torque.

9. Adjust thrust screw "B" to provide 1/16 inch clearance from end of rotor shaft.

10. Fill both wells I and II with oil. At least 30-50 drops are required. Also oil bearing III.

11. Position governor so that when it is fully contracted (closed), the friction disc is aligned with outer edge of oil guard. Tighten set screw "D".

12. Connect motor to source of power, and adjust screw "C" to give 78 R.P.M. After allowing motor to run a short time, to compress felt pad. It may be necessary to re-check position of governor to give sufficient range of speed adjustment.

13. Test motor, after allowing it to reach operating temperature, by grasping spindle and noting relative amount of force required to cause governor to contract. Also stall motor, and release, to see that governor has "snappy" response.

Special Notes

1. Do not interchange parts of different motors, especially bearings, shafts, or gears.

2. Where a new rotor or turntable spindle is installed, allow motor to run-in for eight hours; preferably under load.

3. The motor should not be tested or used at temperatures below 65 degrees Fahrenheit.

4. Where thrust bearing screw "A" is badly worn or does not have a fibre insert, replace with RCA Stock No. 31616.

5. Governor motors should be thoroughly lubricated after approximately 300-500 hours of operation. This is equivalent to 1-2 years usage in the average home.

Lubricant Specifications

Only mineral base oils and greases should be used.

1. For points requiring oil, use a type having a high viscosity index (with a viscosity rating of SAE 20-30), such as "Esso Motor Oil, Unifo No. 3.

2. For points requiring grease, a light gear grease having good clinging properties, such as "Cities Service No. 7035-A1" or "Koilmotor Universal Trojan No. 1", should be used.

Governor Waver — Causes

Drifting of motor speed at a slow rate, or erratic shift to other than normal speed, is generally caused by (1) binding of rotor or spindle bearings due to lack of lubrication, (2) scored shafts or bearings, (3) binding due to tight adjustment of thrust bearing "B", (4) binding of turntable spindle bearing on motor board (where used), (5) improper centering of motor with respect to turntable spindle.

Governor Chatter — Causes

When the governor rattles or flutters rapidly, accompanied by excessive mechanical noise, the likely source of trouble is (1) glazed felt friction pad due to lack of lubrication, (2) rotor not centrally positioned in stator, (3) thrust bearing "A" worn, (4) mis-aligned or rough governor disc.

Heavy Duty Motor

A heavy duty motor Stock No. 31163 is available for replacement of the Stock No. 31157 type used in Models U125, U126, U128, U132, U134, etc., at a nominal exchange price. The larger motor has a higher torque specification, will operate normally over greater ranges of voltage and frequency, and gives increased life before relubrication is required.
Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the class drawings. Output Meter Alignment—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator—For all alignment operations, keep the output as low as possible to avoid a-c action. For the first six steps in alignment the low side of the test oscillator should be connected to the receiver chassis. Following step 6, the signal must be reduced (see note under alignment table).

Calibration Scale on Indicator Drive-Cord Drum—The tuning dial is fastened in the cabinet and cannot be used for reference during the first six steps of alignment; therefore, a calibration scale is attached to the tuning dial. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 0° mark on the drum scale must be vertical and directly under the center of the shaft of the tuning drum when the plates are fully meshed. The drum is held in the shift by means of two set-screws, which must be tightened securely when the drum is in the correct position.

On the inner side of the tuning Drum are two projections which serve as stops to prevent extreme rotation of the gang condenser. The tuning drum should be set so that the stop limiting clockwise movement of the drum takes effect just as the gang condenser plates are becoming fully meshed, thus preventing stress on the gang due to extreme rotation.

Pointer for Calibration Scale—Improper pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

REPLACEMENT PARTS

*LIST ON GENUINE FACTORY-TESTED PARTS, WHICH ARE REA DILY IDENTIFIED AND MAY BE PURCHASED FROM AUTHORIZED DEALERS.

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>QTY Last Unit</th>
<th>PRICE Last Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>35419</td>
<td>Roller—Traction roller for track and car carriage</td>
<td>.95</td>
<td>.95</td>
</tr>
<tr>
<td>35422</td>
<td>Screw—5/16” socket head set screw for drum</td>
<td>.10</td>
<td>.10</td>
</tr>
<tr>
<td>35424</td>
<td>Screw—6-32 oval head set screw for rear wheel</td>
<td>.10</td>
<td>.10</td>
</tr>
<tr>
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</table>

**All Parts are Subject to Change or Withdrawal Without Notice.**

* Use minimum capacity peak if two can be obtained. Check to determine that C16 has been adjusted to the correct peak by turning the receiver to approximately 14:39 mHz where a weaker signal should be received.
RCA MFG. CO., INC.

General Description

The PSU 8A, 8B, 8C, 10A, 10B, and 10C Power Supply Units are designed for use in a variety of receivers. Each unit is equipped with a 4-inch square with a 5/16-inch hexagonal hole in the center. The units are compatible with most receivers and can be used in replacement of similar units. Each unit is marked with the manufacturer's name and model number. The PSU 8A is designed for use in receivers with a 100-volt supply, while the PSU 10A and PSU 10B are designed for use in receivers with a 120-volt supply.

Testing

To test the PSU, connect a 120-volt power supply to the PSU and connect the input terminals to the receiver. Check the output voltage of the PSU with a voltmeter. The output voltage should be approximately 125 volts.
ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlocks the various individual mechanisms which control needle landing, tuning, record separation, etc. Rotate the turntable in a clockwise direction to lower lever to "R" and re-engage the turntable with the main gear; and the charging cycle is started. Proper adjustment of the friction clutch "C" causes movement of the turntable to advance the advancing mechanism of the next record to "J" and "K". This lever should be adjusted so that the recording mechanism is completely stopped when the turntable revolutions are interrupted, etc.

B. Needle Landing.—On the right hand side of the record changer or cabinet are two pins, ""A"" or ""B", which control the operation of the recording mechanism. The rotation of ""A"" or ""B"" causes the recording mechanism to be engaged or disengaged from the record changer as required.

2. Record Selector.—The record selector is used to select the record to be recorded. The selector is rotated by the main gear, and the rotation of the selector is controlled by the lever mechanism. The selector is engaged or disengaged from the record changer by the lever mechanism. The selector is controlled by the main gear, and the rotation of the selector is controlled by the lever mechanism. The selector is engaged or disengaged from the record changer by the lever mechanism.

C. Pickup and Cable Switch.—During the record changing cycle, the pickup and cable switch is used to select the pickup and cable to be used for recording. The pickup and cable switch is controlled by the lever mechanism, and the rotation of the pickup and cable switch is controlled by the lever mechanism.

D. Friction Clutch.—The friction clutch is used to control the speed of the turntable. The friction clutch is controlled by the lever mechanism, and the rotation of the friction clutch is controlled by the lever mechanism.

E. Needle Holder.—The needle holder is used to hold the needle during the recording process. The needle holder is controlled by the lever mechanism, and the rotation of the needle holder is controlled by the lever mechanism.

F. G. Record Setting Knob.—The plate (upper) plate is used to adjust the record to be recorded. The plate (upper) plate is controlled by the lever mechanism, and the rotation of the plate (upper) plate is controlled by the lever mechanism.

G. Record Setting Knob.—The plate (lower) plate is used to adjust the record to be recorded. The plate (lower) plate is controlled by the lever mechanism, and the rotation of the plate (lower) plate is controlled by the lever mechanism.

H. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

I. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

J. Needle Landing.—The needle landing is used to control the landing of the needle on the record. The needle landing is controlled by the lever mechanism, and the rotation of the needle landing is controlled by the lever mechanism.

K. Needle Landing.—The needle landing is used to control the landing of the needle on the record. The needle landing is controlled by the lever mechanism, and the rotation of the needle landing is controlled by the lever mechanism.

L. Needle Landing.—The needle landing is used to control the landing of the needle on the record. The needle landing is controlled by the lever mechanism, and the rotation of the needle landing is controlled by the lever mechanism.

M. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

N. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

O. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

P. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

Q. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

R. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

S. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

T. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

U. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

V. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

W. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

X. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

Y. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

Z. Record Selector.—The record selector is used to select the record to be recorded. The record selector is controlled by the lever mechanism, and the rotation of the record selector is controlled by the lever mechanism.

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MODEL RP139A
MODEL RP145
Adjustments, Notes
Parts

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RCA MFG. CO., INC.

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These record changers are available for operation on voltages and frequencies as follows:

- **RP-139-A**
  - 105-125 volts, 60 cycles, 21 watts
  - 105-125 volts, 50 cycles, 21 watts
  - 105-125 volts, 25 cycles, 22 watts

- **RP-145**
  - 105-125 volts, 60 cycles, 15 watts
  - 105-125 volts, 50 cycles, 15 watts

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MODEL 5Q66
Ch. RC-477C

Schematic, Voltage

Power Supply Ratings

- Undecked: 3.0 watts
- Maximum: 45 watts
- Undecked: 45 watts
- Maximum: 60 watts
- Undecked: 60 watts
- Maximum: 90 watts

Frequency Ranges

- Standard Broadcast (A Band): 540-1,710 kc (555-1,745 m)
- Medium Wave (B Band): 530-1,510 kc (535-1,515 m)
- Short Wave (C Band): 2,050-2,550 mc (6,050-6,150 m)

Intermediate Frequency

455 kc Type Impedance

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Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the schematic.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver ground lead (black), and keep the output as low as possible to avoid AVC action.

Calibration Scale on Indicator-Drive Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting is that which is indicated in the alignment table.

As the first step in f-t alignment, check the position of the drum. The 135° mark on the drum scale must be vertical, and directly under the center of the gang condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of a set screw; which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 0° mark on the scale when the plates are fully meshed.

Diode Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 0° mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test osc. to-</th>
<th>Tune the osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12SK7 1-p grid in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; Band quiet point between 550-750 kc</td>
<td>L10 and L11 * (2nd I.F. trans.)</td>
</tr>
<tr>
<td>2</td>
<td>Tuning condenser stator (osc.) in series with .01 mfd. **</td>
<td>455 kc</td>
<td></td>
<td>L8 and L9 (1st I.F. trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna lead in series with 200 m. mfd.</td>
<td>600 kc</td>
<td>600 kc (33°) &quot;A&quot; Band</td>
<td>L7†</td>
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<tr>
<td>4</td>
<td>Antenna lead in series with 200 m. mfd.</td>
<td>1,500 kc</td>
<td>1,500 kc (152.4°) &quot;A&quot; Band</td>
<td>L2 (ant.)</td>
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<tr>
<td>5</td>
<td>Repeat steps 3 and 4</td>
<td></td>
<td></td>
<td>C8 (osc.)</td>
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<tr>
<td>6</td>
<td>Antenna lead in series with 400 ohms</td>
<td>20 mc</td>
<td>20 mc (155.4°) &quot;C&quot; Band</td>
<td>C5 (osc.) * C26 (ant.)</td>
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<td>7</td>
<td></td>
<td>6 mc</td>
<td>6 mc (148°) &quot;B&quot; Band</td>
<td>C6 (osc.) * C27 (ant.)</td>
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<tr>
<td>8</td>
<td>Antenna lead in series with 200 m. mfd.</td>
<td>1,500 kc</td>
<td>1,500 kc (152.4°) &quot;A&quot; Band</td>
<td>C8 (osc.)</td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained.
† Rock gang condenser slightly while adjusting L7.

Note.—Oscillator tracks 455 kc above signal on all bands.

Above—Top View
At Right—Dial Mechanism

Calibration Scale

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180

550 m 500 m 450 m 400 m 350 m 300 m 250 m 200 m 150 m

Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 33° on the calibration scale corresponds to approximately 1.9 mc on "C" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

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Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the black lead and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 0° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Steps** | **Connect the high side of test-osc. to** | **Tune test-osc. to** | **Turn radio dial to** | **Adjust the following for maximum peak output**
---|---|---|---|---
1 | Turn tone control to 3rd position (sharp) from maximum counter-clockwise. | | | 
2 | 12SK7 I-F grid in series with .01 mfd. | 455 kc | "A" band Quiet point between 560-790 kc | L18 and L19 (2nd I-F trans.) L16 and L17 (1st I-F trans.)
3 | 12SA7 grid in series with .01 mfd. | | | 
4 | Turn tone control to 4th position (broad) from maximum counter-clockwise and check I-F response which should be a slightly double-peaked curve. Leave tone control in 3rd position (sharp) for the following steps. | | | 
5 | Ant. lead in series with 200 mmfd. | 360 kc (149°) "X" band | | C15 (osc.)** C19 (det.)
6 | | 175 kc (53°) "X" band | | C20 (ant.)
7 | | 1,500 kc (152°) "A" band | | C12 (osc.)++ C18 (det.) C9 (ant.)
8 | | 600 kc (32°) "A" band | | L9 (osc.) Rock gang
9 | Repeat steps 5, 6, 7, and 8. | | | 
10 | Ant. lead in series with 300 ohms | 6 mc (149°) "B" band | | C11 (osc.)++ C19 (det.) C20 (ant.)
11 | | 20 mc (157°) "C" band | | C9 (osc.)++ C20 (det.) C1 (ant.)

* Use minimum capacity peak if two can be obtained. Check to determine that C11 has been adjusted to the correct peak by tuning receiver to approximately 5.09 mc where a weaker signal should be received.

++ Use minimum capacity peak if two can be obtained. Check to determine that C9 has been adjusted to the correct peak by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

† Preset L10 core approximately 1/2-inch out before adjusting C15.

++ Preset L9 core screw flush with apron before adjusting C12.

Note.—Oscillator tracks above signal on all bands.

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Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver ground terminal (G), and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table. As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The surface of the drum must be flush with the end of the gang-condenser shaft. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improve a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the left-hand end mark on the dial scale and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6S7-G 2nd-I-F. grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;B&quot; band, Quiet point.</td>
<td>L13 and L14 (3rd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6S7-G 1st-I-F. grid cap, in series with .01 mfd.</td>
<td></td>
<td></td>
<td>L11 and L12 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>6D8-G 1st-det. grid cap, in series with .01 mfd.</td>
<td></td>
<td></td>
<td>L9 and L10 (1st I-F Trans.)</td>
</tr>
<tr>
<td>4</td>
<td>Antenna Terminal, in series with 300 ohms</td>
<td>6.1 mc (29°) &quot;B&quot; band</td>
<td>C33 (osc.)* C8 (det.)† C30 (ant.)</td>
<td></td>
</tr>
<tr>
<td>4A</td>
<td>Check to determine that C33 has been adjusted to correct peak by turning radio to 5.19 mc (50°), where a weaker signal should be received.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Antenna Terminal, in series with 300 ohms</td>
<td>20 mc (20.5°) &quot;C&quot; band</td>
<td>C31 (osc.)*</td>
<td></td>
</tr>
<tr>
<td>5A</td>
<td>Check to determine that C31 has been adjusted to correct peak by turning radio to 19.09 mc (20.5°), where a weaker signal should be received.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna Terminal, in series with 200 mfd.</td>
<td>1,500 kc</td>
<td>1,500 kc (31°) &quot;A&quot; band</td>
<td>C34 (osc.)*</td>
</tr>
<tr>
<td>7</td>
<td>Antenna Terminal in series with 200 mfd.</td>
<td>600 kc</td>
<td>600 kc (144.5°) &quot;A&quot; band</td>
<td>L17 (osc.)††</td>
</tr>
<tr>
<td>8</td>
<td>Repeat Step No. 6.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak (plunger out) if two peaks can be obtained.
† Rock the gang condenser slightly while adjusting C8, and use maximum capacity peak if two peaks can be obtained.
‡ Rock the gang condenser slightly while adjusting L17 for maximum output.

NOTE: The oscillator tracks 455 kc above the signal on all bands.

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MODELS 8QB, 8QBK
Chassis Wiring, Voltage
SPU Schematics

RCA MFG. CO., INC.

Bottom View of Chassis, with
RTF Wiring Diagram and
Sticker Voltages

Measurements made to chassis
unless otherwise indicated, with
set tuned to quiet point and
volume control at minimum.
Values should hold within ±20%.

*NOTE: Values with star (*)
are operating voltages in chassis
with high series resistance. The
actual measured on the meter
load will be lower, depending on the
load.

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**RCA MFG. CO., INC.**

**INTERMEDIATE FREQUENCY**

**Specifications**

**Magnetic Pickup**

Impedance ............. 96 ohms at 1,000 c.p.s.
Average Output ........ 0.14 volts at 400 c.p.s. across open circuit

**Power Supply Ratings**

8Q2:
Rating A .............. 105-125 volts, 50-60 cycles, 75 watts
Rating B .............. 105-125 volts, 25-60 cycles, 75 watts
Rating C .............. 100-130, 140-160, 195-250 volts, 40-60 cycles, 75 watts

8QU5C and 8QU5M
Rating A5 .............. 105-125 volts, 50 cycles, 105 watts
Rating A6 .............. 105-125 volts, 60 cycles, 105 watts
Rating C5 .............. 105-125; 200-250 volts, 50 cycles, 105 watts
Rating C6 .............. 105-125; 200-250 volts, 60 cycles, 105 watts

**Alignment Strategy**

1. Connect the high side of test osc. to L14 and L15 (2nd I-F Trans.)
2. Stator of middle section of gang (C17) in series with .01 mfd.
3. Ant. terminal in series with 600 ohms.
4. Ant. terminal in series with 1,500 ohms.
5. Ant. terminal in series with 6.1 mc.
6. Ant. terminal in series with 20 mc.

**Calibration Scale**

**Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales**

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example, 32° on the calibration scale corresponds to approximately 7.9 mc on "A" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."
The 8QUSM is equipped with a magnetic pickup, and the 8QUSC with a crystal pickup. The output of the crystal pickup is fed directly into the Victrola jack at the rear of the chassis. On instruments using a magnetic pickup, a transformer and a compensating circuit are used between the pickup and the Victrola jack (see schematic diagram). The transformer has two jacks, the larger one (primary) for input from the pickup and the smaller one (secondary) for output to the compensating circuit. The components of the compensating circuit are mounted externally to the chassis on a terminal board in the rear of the cabinet.

The phonograph motor is a self-starting, constant-speed induction type. It should be lubricated every six months by applying a few drops of light machine oil to the spindle bearing and oil hole.

The motor spindle is tapered, and a conical rubber piece fits snugly on the spindle. The hole in the turntable bushing is tapered to fit the rubber. This provides an excellent self-centering floating mounting.

A metal washer is placed on the spindle under the rubber piece. The washer has ears on the under side which fit over a pin that protrudes through the spindle.

The motor switch is automatic for both starting and stopping, and when properly adjusted, will turn the motor on as the pickup is moved from the pickup rest toward the turntable. The switch should be adjusted so that it will snap into the "off" position when the pickup needle is 14 inches from the center line of the spindle shaft. The motor may be shut off at any time by placing the pickup on the pickup rest.

Crystal Pickup:
The crystal pickup is sealed in a metal case; if failure occurs, do not attempt to repair the unit, but install a new crystal unit.

Magnetic Pickup:
The magnetic pickup used is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. Service operations which may be necessary on the pickup are as follows:

Centering Armature.—Refer to the figure showing the pickup inner structure. The armature is shown in its proper relation to the pole pieces, i.e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm for re-adjustment. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup.

Insert a small rod or nail into the armature needle hole and tighten the needle holding screw to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is brought to the mid position between the pole pieces. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. Check to make sure that the armature is not touching the coil. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.

Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pickup leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing.—Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to re-magnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9548 Pickup Magnetizer and charge the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves to reduce undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. Special-tip soldering iron, constructed as shown, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

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Alignment, Trimmers

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The surface of the drum must be flush with the end of the gang-condenser shaft. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 180° mark on the calibration scale when the plates are fully meshed.

Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output
---|---|---|---|---
1 | 6K7 I-F grid cap, with 300 ohm resistor from cap to chassis | 455 kc | | L17 and L18* (3rd I-F Trans.)
2 | 6L7 1st-Det. grid cap, with 300 ohm resistor from cap to chassis, regular grid lead removed from cap | 455 kc | | L23 and L22 (2nd I-F Trans.) and L16 and L15** (1st I-F Trans.)
3 | Antenna terminal (A), in series with 300 ohms | 6.1 mc | 6.1 mc (28.2°) | C37 (osc.)*** C10 (det.)† C3 (ant.)
4 | Antenna terminal, in series with 300 ohms | 20 mc | 20 mc (22.5°) | C35 (osc.)‡
5 | Antenna terminal, in series with 200 mmf. | 1,500 kc | 1,500 kc (32°) | C38 (osc.)
6 | Antenna terminal, in series with 200 mmf. | 600 kc | 600 kc (143.8°) | L13 (osc.)
7 | Repeat steps 5 and 6. | | | |
8 | Adjust C39 so that it projects approximately 15/16-inch above top of chassis. | | | |
9 | Antenna terminal, in series with 200 mmf. | 175 kc | 175 kc (121.3°) | L14 (osc.)
10 | Antenna terminal, in series with 200 mmfd. | 360 kc | 360 kc (30.2°) | C39 (osc.) C11 (det.) C1 (ant.)
11 | Repeat oscillator adjustments in steps 9 and 10. | | | |

* Adjust for coincident response curves when using oscillograph.
** Readjust L23, L22, L16, and L15 several times to secure coincident curves. Turn fidelity control full clockwise (broad) and check response, which should be symmetrical, and with greater gain than on sharp.
*** Use minimum capacity peak if two peaks can be obtained with C37.
† Rock the gang condenser slightly and use maximum capacity peak if two peaks can be obtained with C10. Check to determine that C37 has been adjusted to the correct peak by turning the receiver to 5.19 mc (50°) where a weaker signal should be received.
‡‡ Use minimum capacity peak if two peaks can be obtained, and check to determine that C35 has been adjusted to the correct peak by turning the receiver to 19.09 mc (27.5°) where a weaker signal should be received.

NOTE: The oscillator tracks 455 kc above the signal on all bands.

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First Edition

Pilot Lamps (2) .......... Mazda No. 44, 6.3 volts, .25 amp.

FREQUENCY RANGES
Long Wave ("X" Band) ........ 150-400 kc (2,000-750 m)
Standard Broadcast ("A" Band) 530-1,720 kc (566-174 m)
Medium Wave ("B" Band) ...... 2.3-7.0 mc (130-42.8 m)
Short Wave ("C" Band) ...... 7.0-22 mc (42.8-13.6 m)

Precautionary Lead Dress.—
1. Dress all leads and wiring parts away from 6J7 oscillator grid.
2. Twist together the two leads from the 1st i-f transformer to the fidelity switch. Also the two leads from the 2nd i-f transformer.
3. Dress all leads away from the detector coil.
4. Dress leads from the detector coil to the range switch (contacts 7 and 8 on detector section of switch) away from the detector trimmer C10.

In the event that a Stock No. 9824 switch is not available, a double-pole—double-throw toggle switch may be used, connecting it as shown above.

The radio volume control may be used to regulate the volume of the record player.

VICTROLA ATTACHMENT (Record Player)—Terminals are provided on the rear of the chassis for convenient connection to a Victrola Attachment (record player) such as the RCA R-93 and R-94 series. A stock No. 9824 switch may be used to change from radio to record player, as shown above.
MODELS 9Q1, 9QK  
Chassis RC-444  
Schematic, Socket Trimmers, Lead Dress  

Precautionary Lead Dress—

1. C9 must be pushed downward as close to the chassis and from Model Type.
2. Electrolytic Capacitors should be pushed in as far as possible toward the V.C. Impedance.
3. Power Output Ratings:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Frequency (CPS)</th>
<th>Power Output (Watts)</th>
<th>Power Supply Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>9Q1</td>
<td>100-150</td>
<td>75, 125</td>
<td>A: 100, 50, 25, 12, 6, 3, 1.5</td>
</tr>
<tr>
<td>9QK</td>
<td>250-500</td>
<td>100</td>
<td>B: 100, 50, 25, 12, 6, 3, 1.5</td>
</tr>
<tr>
<td>1939</td>
<td>500-1000</td>
<td>30</td>
<td>C: 50, 25, 12, 6, 3, 1.5</td>
</tr>
</tbody>
</table>

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## Cathode-Ray Alignment

The preferable method. Connections for the oscillograph are shown in the chassis drawing.

### Output Meter Alignment

- If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

### Test-Oscillator

- For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-c action.

### Calibration Scale on Indicator-Drive-Cord Drum

The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "0" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

### Pointer for Calibration Scale

Improvis a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

### Dial-Indicator Adjustment

After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

### Spread-Band Alignment

The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magentite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator for frequencies at or close to the specified alignment frequencies by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

### Alignment Table

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to</th>
<th>Tune test-osc. to</th>
<th>Range switch</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6B8 I-F Grid in series with .01 mfd.</td>
<td>455 kc</td>
<td>A</td>
<td>Quiet Point</td>
<td>L29 and L28 (2nd I.F. Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6SA7 1st Detector Grid in series with .01 mfd.</td>
<td>9.5 mc</td>
<td>31M</td>
<td>20°</td>
<td>L27 and L26 (1st I.F. Trans.)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>11.7 mc</td>
<td></td>
<td>171°</td>
<td></td>
</tr>
<tr>
<td>4A</td>
<td>Antenna Terminal in series with 300 ohms</td>
<td>Check to determine that C16 has been adjusted to the correct peak by turning radio to 10.8 mc (141°) where a weaker signal should be received.</td>
<td>9.5 mc</td>
<td>B</td>
<td>180°</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5A</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>7</td>
<td>Antenna Terminal in series with 200 mmfd.</td>
<td>1,500 kc</td>
<td>A</td>
<td>149°</td>
<td>L12 (osc.)* (Rock Gang)</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8A</td>
<td>Repeat steps 7 and 8.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Antenna Terminal in series with 300 ohms</td>
<td>11.8 mc</td>
<td>25M</td>
<td>33°</td>
<td>L14 (osc.)*</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C1 (ant.)</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L15 (osc.)**</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L17 (osc.)**</td>
</tr>
</tbody>
</table>

* Use peak with plunger out if two peaks can be obtained. ** Use peak with plunger in if two peaks can be obtained.

† Rock gang condenser slightly while peaking. Use maximum capacity peak if two peaks can be obtained.

PAGE

RCA

9Q4RCA

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MODELS 9Q1,9QK
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MODEL 9Q4
Chassis Wiring, Voltage

RCA MFG. CO., INC.

Lead Dress, Dial Data

FREQUENCY RANGES
Long Wave (X: Band)
Standard Broadcast (C: Band)
Medium Wave (B: Band)

Precautions for Dressing Interchangeable Leads:
1. Disconnect lead from the middle section of the ground.
2. Dress the green lead lead running from the grid to the ground, if any, away from the other leads.
3. Connect the blue lead lead running from the plate to the ground, if any, away from the other leads.
4. Twist the power leads together and dress them away from the other leads.
5. Keep green lead of 6SK7 R.F. grid circuit away from blue antenna lead.

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Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 0° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to—</th>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for maximum peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turn tone control to 2nd position (sharp) from maximum counter-clockwise.</td>
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<tr>
<td>2</td>
<td>6SK7 I-F grid in series with .01 mfd.</td>
<td>456 kc</td>
<td>“A” Band Quiet point between 550-750 kc</td>
<td>L18 and L19 (2nd I-F trans.)</td>
</tr>
<tr>
<td>3</td>
<td>6SA7 grid in series with .01 mfd.</td>
<td></td>
<td></td>
<td>L16 and L17 (1st I-F trans.)</td>
</tr>
<tr>
<td>4</td>
<td>Turn tone control to maximum counter-clockwise (broad) position and check I-F response which should be a slightly double-peaked curve. Return tone control to 2nd position (sharp) for the following steps.</td>
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<tr>
<td>5</td>
<td>175 kc (52.5°) “X” Band</td>
<td>175 kc</td>
<td>L10 (osc.) Rock gang</td>
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<tr>
<td>6</td>
<td>Ant. terminal in series with 200 mfd.</td>
<td>360 kc (148.5°) “X” Band</td>
<td>L15 (osc.) C15 (det.) C44 (ant.)</td>
<td></td>
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<tr>
<td>7</td>
<td>600 kc (32°) “A” Band</td>
<td>600 kc</td>
<td>L9 (osc.) Rock gang</td>
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<tr>
<td>8</td>
<td>1,500 kc (150°) “A” Band</td>
<td>1,500 kc</td>
<td>C12 (osc.) C18 (det.) C3 (ant.)</td>
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<tr>
<td>9</td>
<td>Repeat steps 5, 6, 7, and 8.</td>
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<td></td>
<td></td>
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<tr>
<td>10</td>
<td>Ant. terminal in series with 300 ohms</td>
<td>6.1 mc (151°) “B” Band</td>
<td>C11 (osc.)* C19 (det.) C2 (ant.)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>20 mc</td>
<td>20 mc (157°) “C” Band</td>
<td>C9 (osc.)** C20 (det.) C1 (ant.)</td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two can be obtained. Check to determine that C11 has been adjusted to the correct peak by tuning receiver to approximately 5.19 mc where a weaker signal should be received.
** Use minimum capacity peak if two can be obtained. Check to determine that C9 has been adjusted to the correct peak by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

Note.—Oscillator tracks above signal on all bands.
MODEL VA-21
Wireless Record Player
Schematic Voltage
Adjustments Notes

6A8 MODULATED OSC.

OUTPUT WIRE IN POWER CABLE

General Description
The crystal pickup in Model VA-21 is connected through a volume control to grid No. 1 in an RCA 6A8 tube which functions as a modulated r-f oscillator. The oscillator frequency can be adjusted from 530 to 625 kc by means of a magnetic core in the oscillator transformer, L1-L2. (This is a screwdriver adjustment at the rear of the cabinet.) An output wire is connected to the grid circuit of the oscillator, and is run parallel with the power cable. The output is sufficient to permit operation within approximately 20 feet of a radio receiver.

Set-Up Procedure
1. Insert plug in power supply outlet, and turn the powerswitch—volume control knob on top of VA-21 to full clockwise position. Start a record on the VA-21. The motor is a synchronous manual starting type, and requires a clockwise spin to start.
2. Tune the radio receiving set to a quiet point between 530-625 kc.
3. Tune the oscillator in the VA-21 to this frequency by adjusting the button on the rear of the VA-21 cabinet to obtain peak output on the receiver. Clockwise rotation decreases the frequency; counter-clockwise rotation increases the frequency.
4. Adjust the radio volume control for the highest volume that is likely to be required, and then use the VA-21 volume control for further adjustment.
5. In noisy locations, it may be desirable to leave the VA-21 volume control turned full clockwise, and regulate the volume control for the desired level.
6. If there is insufficient volume, or excessive noise, the remedy is to couple the VA-21 to the radio receiver, by running a piece of insulated wire between the two units. Wrap one end (three or four turns) around the antenna lead-in on the radio, and wrap the other end (three or four turns) around the short wire that projects from the plug on the power cord of the VA-21. With an RCA Master Antenna, wrap the wire around the counter-poise lead where it attaches to the receiver (terminal A3) or to the coupling unit (terminal B). With a loop receiver, place the end of the wire close to the loop.
7. If the radio receiver has push-button tuning, one of the buttons may be set up to tune in the VA-21 oscillator frequency. This button should be marked “Record Player.”

Precautionary Lead Dress
1. The power supply cord must be dressed between chassis and top of cabinet, away from grid of 6A8, and entirely away from 2SK6-G.
2. All leads to oscillator coil must be as short as possible.
3. All motor leads must be dressed away from rotor.
4. Pickup leads must be dressed away from the top grid of 6A8, and kept away from the 2SK6-G.

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Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—Connect the low side of the test oscillator to the receiver chassis through a 0.01 mfd capacitor, and keep the output as low as possible.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should coincide with the left hand mark stamped in the dial backplate.

Antenna.—This set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the green antenna lead, stapled to the base of the cabinet. The antenna should not be longer than 100 feet including the lead-in. If it is longer, connect a 100 mfd. capacitor in series with the lead-in.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test oscillator to</th>
<th>Tune test osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tuning Cond. stator (det.) in series with 0.01 mfd.</td>
<td>455 kc</td>
<td>Quiet Point 1,600 kc</td>
<td>C24, C25, C26 (1st and 2nd I-F transformers)</td>
</tr>
<tr>
<td>2</td>
<td>Antenna lead (green) in series with 100 mfd.</td>
<td>1,720 kc</td>
<td>Full Clockwise (out of mesh)</td>
<td>C22 (osc.)</td>
</tr>
<tr>
<td>3</td>
<td>1,500 kc</td>
<td>Resonance on 1,500 kc signal</td>
<td>C21 (ant.)</td>
<td></td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
PHONOGRAPH MECHANISM.—The phonograph motor is self-starting and operates the turntable through friction drive between the motor spindle and the rubber drive tire on the underside of the turntable.

The rubber drive tire on the turntable should never be removed since it is ground in to be concentric with the spindle. If replacement is required, the entire turntable should be replaced.

The speed regulator varies and lowers the motor. This changes the driving ratio between the motor and the turntable due to the motor spindle being concentric with the spindle. It is important to adjust this regulator for a turntable speed of 78 r.p.m. WHILE PLAYING A 10-INCH RECORD WITH THE NEEDLE APPROXIMATELY ONE INCH FROM THE OUTER EDGE OF THE RECORD.

Lubrication.—The motor should be lubricated as follows; Place a few drops of S.A.E. 20 (or equivalent) on the turntable spindle and saturate the oil retaining felt pads on the motor shaft with S.A.E. 10 oil. This oiling process should be repeated once or twice a year. CAUTION—THE MOTOR DRIVE SPINDLE AND RUBBER DRIVING TIRE ON THE TURNTABLE MUST BE KEPT CLEAN AND ENTIRELY FREE FROM OIL AND GREASE AT ALL TIMES.

Electrical and Mechanical Specifications

**PHONO MECHANISM**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32864</td>
<td>Ball—Ball for turntable bearing</td>
<td>.06</td>
</tr>
<tr>
<td>33607</td>
<td>Base—Motor base and ball assembled</td>
<td>.80</td>
</tr>
<tr>
<td>33902</td>
<td>Motor—Complete motor 105-125 volts, 60 cycle (M1)</td>
<td>3.70</td>
</tr>
<tr>
<td>34496</td>
<td>Motor—Complete motor 105-125 volts, 50 cycle (M1)</td>
<td>4.60</td>
</tr>
<tr>
<td>33896</td>
<td>Mounting—Motor cradle mounting hardware and retainer</td>
<td>.10</td>
</tr>
</tbody>
</table>

**MOTOR ASSEMBLY**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32865</td>
<td>Cap—Dust cap</td>
<td>.02</td>
</tr>
<tr>
<td>35570</td>
<td>Cone—Cone complete with voice coil</td>
<td>1.35</td>
</tr>
<tr>
<td>5118</td>
<td>Plug—Strong male plug for speaker</td>
<td>.25</td>
</tr>
<tr>
<td>33904</td>
<td>Transformer—Output transformer</td>
<td>1.45</td>
</tr>
</tbody>
</table>

**LINEAR ASSEMBLY**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33680</td>
<td>Cup—Needle cup</td>
<td>.15</td>
</tr>
<tr>
<td>34819</td>
<td>Dial—Glass dial scale</td>
<td>1.50</td>
</tr>
<tr>
<td>34850</td>
<td>Hinge—Lid hinge</td>
<td>.25</td>
</tr>
<tr>
<td>33942</td>
<td>Knob—“Radio-Phono” switch knob</td>
<td>.25</td>
</tr>
<tr>
<td>30862</td>
<td>Knob—Tuning or volume control and power switch knob</td>
<td>.15</td>
</tr>
<tr>
<td>32870</td>
<td>Plug—2-contact male plug for motor leads</td>
<td>.30</td>
</tr>
<tr>
<td>33261</td>
<td>Rest—Rubber pickup rest</td>
<td>.30</td>
</tr>
<tr>
<td>33900</td>
<td>Spring—Retaining spring for knobs Stock No. 33942 and 30863</td>
<td>.60</td>
</tr>
<tr>
<td>32667</td>
<td>Switch—Combination “Radio-Phono” switch tone control</td>
<td>.50</td>
</tr>
<tr>
<td>33899</td>
<td>Turntable—Turntable complete with spindle and rubber drive tire</td>
<td>3.70</td>
</tr>
</tbody>
</table>

**CAPACITORS ASSEMBLY**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33400</td>
<td>Motorboard—Motor board and base</td>
<td>1.00</td>
</tr>
<tr>
<td>34433</td>
<td>Condenser—Condenser</td>
<td>.20</td>
</tr>
<tr>
<td>34345</td>
<td>Control—Volume control and switch switch</td>
<td>.50</td>
</tr>
<tr>
<td>33605</td>
<td>Drum—Drive cord</td>
<td>.50</td>
</tr>
<tr>
<td>33441</td>
<td>Frame—Drive frame complete—less indicator drive cord, tuning shaft and drive drum</td>
<td>1.40</td>
</tr>
<tr>
<td>33442</td>
<td>Indicator—Station selector indicator</td>
<td>.30</td>
</tr>
<tr>
<td>33444</td>
<td>Lamp—Dial lamp</td>
<td>.15</td>
</tr>
<tr>
<td>33445</td>
<td>Loop—Antenna loop</td>
<td>.14</td>
</tr>
<tr>
<td>33446</td>
<td>Plug—2-contact female plug for motor cable</td>
<td>.35</td>
</tr>
<tr>
<td>33447</td>
<td>Plug—2-contact female plug for speaker cable</td>
<td>.25</td>
</tr>
<tr>
<td>33448</td>
<td>Resistor—120 ohms, 1 watt (R9)</td>
<td>.20</td>
</tr>
<tr>
<td>33449</td>
<td>Resistor—200 ohms, 1 watt (R10)</td>
<td>.20</td>
</tr>
<tr>
<td>33450</td>
<td>Resistor—470 ohms, 1 watt (M1)</td>
<td>.20</td>
</tr>
<tr>
<td>33451</td>
<td>Resistor—870 ohms, 1 watt (R11)</td>
<td>.20</td>
</tr>
<tr>
<td>33452</td>
<td>Resistor—970 ohms, 1 watt (R7)</td>
<td>.20</td>
</tr>
<tr>
<td>33453</td>
<td>Resistor—100,000 ohms, 1 watt (R8)</td>
<td>.20</td>
</tr>
<tr>
<td>33454</td>
<td>Resistor—220,000 ohms, 1 watt (R12)</td>
<td>.20</td>
</tr>
<tr>
<td>33455</td>
<td>Resistor—220,000 ohms, 1 watt (R13)</td>
<td>.20</td>
</tr>
<tr>
<td>33456</td>
<td>Resistor—470,000 ohms, 1 watt (R10)</td>
<td>.20</td>
</tr>
<tr>
<td>33457</td>
<td>Resistor—2,200 ohms, 1 watt (R1)</td>
<td>.20</td>
</tr>
<tr>
<td>33458</td>
<td>Resistor—2,200 ohms, 1 watt (R4)</td>
<td>.20</td>
</tr>
<tr>
<td>33459</td>
<td>Resistor—2,200 ohms, 1 watt (R6)</td>
<td>.20</td>
</tr>
<tr>
<td>33460</td>
<td>Shaft—Tuning shaft</td>
<td>.30</td>
</tr>
<tr>
<td>33461</td>
<td>Socket—Dial lamp socket</td>
<td>.30</td>
</tr>
<tr>
<td>33462</td>
<td>Socket—Tubular socket</td>
<td>.20</td>
</tr>
<tr>
<td>33266</td>
<td>Spring—Retaining spring for Stock No. 33942</td>
<td>.60</td>
</tr>
<tr>
<td>33443</td>
<td>Transformer—First I.F. transformer</td>
<td>1.25</td>
</tr>
<tr>
<td>33444</td>
<td>Transformer—Second I.F. transformer</td>
<td>1.50</td>
</tr>
<tr>
<td>33445</td>
<td>Washer—“C” washer for holding shaft Stock No. 34893</td>
<td>.03</td>
</tr>
</tbody>
</table>

**Miscellaneous**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33680</td>
<td>Cup—Needle cup</td>
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</tr>
<tr>
<td>33899</td>
<td>Turntable—Turntable complete with spindle and rubber drive tire</td>
<td>3.70</td>
</tr>
</tbody>
</table>
**Alignment Procedure**

**Output Meter Alignment**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-oscillator**.—For all alignment operations, keep the output as low as possible to avoid a v-c action.

**Precautionary Lead Dress**

1. The phono input leads should be dressed away from 3Q5GT output leads.
2. C21 should be dressed away from the 3Q5GT output leads.
3. The lead from the 3Q5GT plate to output transformer should be dressed under clip and away from audio input plate leads.

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**MODELS 14BT1, 14BT2 and 14BK**

Chassis Nos. RC-525, 525A, 525B

Replacement Parts

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit Price</th>
</tr>
</thead>
</table>

**MODELS 16K, 16T2 and 16T3**

Chassis No. RC-509C, RC-509B, RC-509A

Replacement Parts

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit Price</th>
</tr>
</thead>
</table>

**MODEL 16T4**

Chassis No. RC-509

Replacement Parts

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit Price</th>
</tr>
</thead>
</table>

All prices are subject to change or withdrawal without notice.

©John F. Rider, Publisher
Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer’s home, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

Each method is described below.

Using Tuning Dial.—
1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.
2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.
3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.
4. After completion of alignment, replace the glass dial in cabinet, taking care that the fibre light shields are in correct position at ends of dial.

Using Calibration Scale.—
1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.
2. Place a flat 12-inch ruler on the dial backing plate so that the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.
3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale. For example, 1,500 kc is approximately 4 inches from the reference mark.

Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

<table>
<thead>
<tr>
<th>INCHES</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>55</td>
<td>60</td>
<td>70</td>
<td>90</td>
</tr>
</tbody>
</table>

Calibration Dial

Steps

<table>
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<th>Steps</th>
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<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

Connect the high side of the test-osc. to—

<table>
<thead>
<tr>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for maximum peak output—</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-F grid, in series with .01 mfd.</td>
<td>455 kc</td>
<td>“A” band, Quiet Point at 1,500 kc end of dial</td>
</tr>
<tr>
<td>1st det. grid, in series with .01 mfd.</td>
<td>15.2 mc</td>
<td>L7 and L8 (2nd I.F. Trans.)</td>
</tr>
<tr>
<td>Antenna terminal, in series with 300 ohms (link open)</td>
<td>1,500 kc</td>
<td>L5 and L6 (1st I.F. Trans.)</td>
</tr>
<tr>
<td>Antenna terminal, in series with 250 mmfd. (link open)</td>
<td>600 kc</td>
<td>C11 (osc.)*</td>
</tr>
</tbody>
</table>

Repeat steps 4 and 5.

In case of instability during R-F alignment, connect a 27,000 ohm 1/4 watt resistor across “D” and “F” of 2nd I-F transformer.

* Use minimum capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used, by tuning receiver to 14.29 mc, where a weaker signal should be received.

Note: Oscillator tracks above signal on both bands.

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The push buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use a insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

The procedure is as follows:
1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast (BC) position and manually tune in the first station on the list.
3. Turn range switch to push-button (PB) position and press in the left-hand button.
4. Unscrew the push-button loop trimmers to minimum capacity.
5. Adjust L9 to receive the first station. To secure the best adjustment, rotate the set for least pickup, and adjust L9 for peak output.

6. Adjust C44 for peak output on the first station.
7. Proceed in the same manner to adjust for the remaining four stations.

Owing to the relatively high R-F gain, it may be found that there are several settings of each push-button magnetite core that will bring in any particular station. The procedure outlined above (backing the push-button loop trimmers to minimum capacity before adjusting the cores) will reduce this effect.

On the 880 to 1,560 kc push-button, the higher frequency stations may be received with L5 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

**NOTE:** Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.
Tone Control

The tone control has four positions for radio, and four positions for television. (All positions are 610-1,250 kc. Vcr or television sound)

No. 1 — Radio, maximum low — minimum high
No. 2 — Radio, maximum low — reduced high
No. 3 — Radio, maximum low — maximum high
No. 4 — Radio, minimum low — maximum high
No. 5 — Phono, maximum low — minimum high
No. 6 — Phono, maximum low — reduced high
No. 7 — Phono, maximum low — maximum high
No. 8 — Phono, minimum low — maximum high

(No. 1 is full counter-clockwise, and No. 8 is full clockwise.)

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Alignment Procedure

1. Connect the high side of the test-osc. to C28.
2. Tune test-osc. to 455 kc. "A" band, 
3. Antenna terminal, in series with 300 ohms (link open).
4. 4.44 mc. "B'' band
5. Antenna terminal, in series with 200 mmfd. (link open)
6. 1,500 kc.
7. 600 kc.

Push Button Adjustment

The push buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or Allen tool such as RCA Stock No. 31031. Allow at least five minutes warm up period before making adjustments.

In the event that the receiver is to be used with an external antenna use one or two feet of wire (or an antenna) to ensure sharp peaking during the final adjustment procedure. For loop operation, the link should be strapped across "A" and "C'' terminals on back of set. In either case the procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range selector to "A'' band, and manually tune in the first station on the list.
3. Turn range selector to "PB'' position, push in station button No. 1 (extreme left). Then adjust No. 1 oscillator core (LO) to receive the station.
4. After oscillator core is adjusted properly, adjust C-44 for maximum output.
5. Antenna trimmers tune the circuits to lower frequencies.
6. Adjust for each of the remaining stations in the same manner.
7. Make a final careful adjustment of the oscillator cores and antenna trimmers.

C. John F. Rider, Publisher
Alignment Procedure

1. The dial may be removed from the cabinet by sliding out the two spring pieces which clamp it in its mounting position. The condenser plates should then be turned into full mesh, the pointer adjusted to the scratch at the left end of the dial backing plate, and the dial slipped under the pointer so that its extreme left calibration mark coincides with the pointer. The dial may be held in place with Scotch tape. In this manner the actual receiver dial is used for alignment. When alignment is finished, the scale should be replaced including the fibre light shields which are folded under the ends of the glass scale.

2. A calibration scale is attached to the tuning drum. The correct setting of the gang, in degrees, for each alignment frequency is given in the alignment table. Check the position of the drum, making sure that the 0 degree scale mark is horizontal with the gang in full mesh.

3. Pointer for Calibration Scale— If method (2) is used, improvise a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 0 degree mark on the calibration scale when the plates are fully meshed.

4. Steps: Connect high side of test oscillator to— Tune test oscillator to— Turn radio dial to— Adjust the follow- ing for maximum peak output—

5. Connect high side of test oscillator to— Tune test oscillator to— Turn radio dial to— Adjust the following for maximum peak output—

6. Connect high side of test oscillator to— Tune test oscillator to— Turn radio dial to— Adjust the following for maximum peak output—

7. Connect high side of test oscillator to— Tune test oscillator to— Turn radio dial to— Adjust the following for maximum peak output—

* Use minimum capacity peak if two can be obtained. Check to determine that C 24 has been adjusted to correct peak by tuning receiver to approximately 1420 mc where a weaker signal should be received.

Note.—Oscillator tracks above signal on all bands.

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RCA MFG. CO., INC.

Push Button Adjustment

The station push buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031, follow at least five minutes warm-up period before making adjustments.

In the event that the receiver is to be used with an external antenna use one or two pieces of wire (or an antenna) to ensure sharp peaking during the final adjustment procedure. For loop operation, the link should be strapped across terminals on back of set. In either case the procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range selector to "A" band, and manually tune in the first station on the list.
3. After turning range selector to "PB" position, push in station button No. 1 (extreme left). Then adjust the No. 1 oscillator core (L-14) to receive the station.
4. If oscillator core is set correctly, adjust C-8 for maximum output.
5. Adjust for each of the remaining stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and an
tenna trimmers.

Owing to the relatively high r-f gain, it may be found that a
given station can be tuned in at several different settings of the

Replacement Parts

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>35825</td>
<td>Moth--Antenna Ground board</td>
<td></td>
</tr>
<tr>
<td>35792</td>
<td>Capacitor--Trimmer comprising 2 sections of 25-50 mmfd. each</td>
<td></td>
</tr>
<tr>
<td>35971</td>
<td>Capacitor--Mica trimmer comprising 3 sections of 80 mmfd. each</td>
<td></td>
</tr>
<tr>
<td>35940</td>
<td>Capacitor--10 mmfd.</td>
<td></td>
</tr>
<tr>
<td>35804</td>
<td>Capacitor--Mica trimmer comprising 1 section of 10-160 mmfd., 2 sections of 20-250 mmfd., 2 sections of 50-400 mmfd., and 1 section of 100-560 mmfd.</td>
<td></td>
</tr>
<tr>
<td>35757</td>
<td>Capacitor--48 mmfd.</td>
<td></td>
</tr>
<tr>
<td>35972</td>
<td>Capacitor--100 mmfd.</td>
<td></td>
</tr>
<tr>
<td>35973</td>
<td>Capacitor--200 mmfd.</td>
<td></td>
</tr>
<tr>
<td>35877</td>
<td>Capacitor--720 mmfd.</td>
<td></td>
</tr>
<tr>
<td>35985</td>
<td>Capacitor--5,000 mmfd.</td>
<td></td>
</tr>
<tr>
<td>34056</td>
<td>Capacitor--20,000 mmfd.</td>
<td></td>
</tr>
<tr>
<td>35854</td>
<td>Capacitor--200 mfd.</td>
<td></td>
</tr>
<tr>
<td>35979</td>
<td>Capacitor--1 mfd.</td>
<td></td>
</tr>
<tr>
<td>35858</td>
<td>Capacitor--Electrolytic comprising 2 sections of 10 mfd., 40 volts each, and 1 section of 20 mfd., 25 volts</td>
<td></td>
</tr>
<tr>
<td>35985</td>
<td>Coil--Antenna coil--C&quot; band</td>
<td></td>
</tr>
<tr>
<td>35857</td>
<td>Coil--Coil and resistor assembly</td>
<td></td>
</tr>
<tr>
<td>35823</td>
<td>Cap--Loop loading coil</td>
<td></td>
</tr>
<tr>
<td>35788</td>
<td>Coil--Antenna coil</td>
<td></td>
</tr>
<tr>
<td>35803</td>
<td>Capacitor--Push button switch oscillator coil</td>
<td></td>
</tr>
<tr>
<td>35960</td>
<td>Capacitor--Variable tuning condenser</td>
<td></td>
</tr>
<tr>
<td>35249</td>
<td>Control--Tone control</td>
<td></td>
</tr>
<tr>
<td>35250</td>
<td>Control--Volume control and power switch</td>
<td></td>
</tr>
<tr>
<td>35462</td>
<td>Cord--Drive cord</td>
<td></td>
</tr>
<tr>
<td>35784</td>
<td>Core--Resistor and switch potentiometer</td>
<td></td>
</tr>
<tr>
<td>35871</td>
<td>Core--Resistor and switch potentiometer</td>
<td></td>
</tr>
<tr>
<td>35794</td>
<td>Drum--Tuning condenser drive drum--less calibrator</td>
<td></td>
</tr>
<tr>
<td>35799</td>
<td>Frame--Dial frame complete with lamp bracket and pulleys--less dial</td>
<td></td>
</tr>
<tr>
<td>35798</td>
<td>Indicator--Station selector indicator and carriage</td>
<td></td>
</tr>
<tr>
<td>35629</td>
<td>Loop--Antenna loop complete</td>
<td></td>
</tr>
<tr>
<td>35630</td>
<td>Loop--Loop winding only</td>
<td></td>
</tr>
<tr>
<td>35809</td>
<td>Plug--2-contact male plug for loop cable</td>
<td></td>
</tr>
<tr>
<td>5119</td>
<td>Plug--2-contact female plug for speaker cable</td>
<td></td>
</tr>
<tr>
<td>5013</td>
<td>Plug--4-contact male plug for speaker cable</td>
<td></td>
</tr>
<tr>
<td>35787</td>
<td>Plug--Phono input plug</td>
<td></td>
</tr>
<tr>
<td>35785</td>
<td>Pulley--Drive cord pulley</td>
<td></td>
</tr>
<tr>
<td>35498</td>
<td>Resistor--390 ohms, 1 watt</td>
<td></td>
</tr>
<tr>
<td>14720</td>
<td>Resistor--1,000 ohms, 1 watt</td>
<td></td>
</tr>
<tr>
<td>35858</td>
<td>Resistor--1,000 ohms</td>
<td></td>
</tr>
<tr>
<td>35875</td>
<td>Resistor--10,000 ohms</td>
<td></td>
</tr>
<tr>
<td>13045</td>
<td>Resistor--11,000 ohms, 3 watts</td>
<td></td>
</tr>
<tr>
<td>13046</td>
<td>Resistor--11,000 ohms, 3 watts</td>
<td></td>
</tr>
<tr>
<td>13046</td>
<td>Resistor--11,000 ohms, 3 watts</td>
<td></td>
</tr>
<tr>
<td>13047</td>
<td>Resistor--11,000 ohms, 3 watts</td>
<td></td>
</tr>
<tr>
<td>13048</td>
<td>Resistor--11,000 ohms, 3 watts</td>
<td></td>
</tr>
<tr>
<td>13049</td>
<td>Resistor--11,000 ohms, 3 watts</td>
<td></td>
</tr>
</tbody>
</table>

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Push Button Adjustment

Six station push buttons connect to separate magnetite-core oscillators and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 21033. Allow at least five minutes warm up period before making adjustments.

In the event the receiver is found to be using with an external antenna use one or two feet of wire (as an antenna) to ensure sharp peaking during the final adjustment procedure. Loop operation, the link should be strapped across "A" and "C" terminals on back set.

In either case the procedure is as follows:

1. Make a list of the desired six stations, in order from low to high frequencies.

2. Turn the range selector to "A" band (slightly toward the left) and manually tune in each station. Rinse with adjustment button (L-14) to receive the station. It may be necessary to maintain approximate tracking between antenna and oscillator to receive weak station. Approximate tracking will be indicated by noise, when tuned off a station, which will disappear when the station is tuned in, this will become more apparent as the receiving core becomes worn.

3. Tune each oscillator core, turn the range selector to "A" band (slightly toward the left) and manually tune in each station. Rinse with adjustment button (L-14) to receive the station. It may be necessary to maintain approximate tracking between antenna and oscillator to receive weak station. Approximate tracking will be indicated by noise, when tuned off a station, which will disappear when the station is tuned in, this will become more apparent as the receiving core becomes worn.

4. After oscillator core is adjusted properly, adjust C 8 for maximum output.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

5. Adjust for each of the five remaining stations in the same manner.

Replacement Parts

Insist on genuine factory-tested parts, which are readily identifiable and may be purchased from authorized dealers.

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>34785</td>
<td>Board—&quot;Antenna-Ground&quot; board</td>
<td>20</td>
<td>13716</td>
<td>Resistor—2,200 ohm, watt</td>
<td>.20</td>
</tr>
<tr>
<td>31292</td>
<td>Capacitor—Mica trimmer for loop—comprising 2 sections of 10-180 mfd.</td>
<td>40</td>
<td>14024</td>
<td>Resistor—2,700 ohm, watt</td>
<td>.20</td>
</tr>
<tr>
<td>35792</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 10 mfd.</td>
<td>40</td>
<td>14159</td>
<td>Resistor—10,000 ohm, watt</td>
<td>.20</td>
</tr>
<tr>
<td>35791</td>
<td>Capacitor—Mica trimmer—comprising 3 sections of 8-80 mfd.</td>
<td>60</td>
<td>12595</td>
<td>Resistor—15,000 ohm, watt</td>
<td>.20</td>
</tr>
<tr>
<td>35801</td>
<td>Capacitor—Mica trimmer—comprising 1 section of 10-180 mfd.</td>
<td>35</td>
<td>13998</td>
<td>Resistor—22,000 ohm, watt</td>
<td>.20</td>
</tr>
<tr>
<td>35804</td>
<td>Capacitor—Mica trimmer—comprising 1 section of 10-180 mfd.</td>
<td>35</td>
<td>12641</td>
<td>Resistor—33,000 ohm, watt</td>
<td>.20</td>
</tr>
<tr>
<td>35875</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 25-250 mfd.</td>
<td>20</td>
<td>12264</td>
<td>Resistor—200,000 ohm, watt</td>
<td>.20</td>
</tr>
<tr>
<td>35877</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>35</td>
<td>12285</td>
<td>Resistor—470,000 ohm, watt</td>
<td>.20</td>
</tr>
<tr>
<td>31418</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 25-250 mfd.</td>
<td>20</td>
<td>12679</td>
<td>Resistor—220,000 ohm, watt</td>
<td>.20</td>
</tr>
<tr>
<td>31459</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>35</td>
<td>13601</td>
<td>Resistor—10 meqohm, watt</td>
<td>.20</td>
</tr>
<tr>
<td>33584</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 25-250 mfd.</td>
<td>20</td>
<td>14350</td>
<td>Screw—No. 8-32 square-head set-screw for drum</td>
<td>.03</td>
</tr>
<tr>
<td>32787</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>35</td>
<td>35797</td>
<td>Shaft—Tuning shaft and pulley</td>
<td>.30</td>
</tr>
<tr>
<td>31564</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>20</td>
<td>35787</td>
<td>Socket—Dia. lamp socket</td>
<td>.20</td>
</tr>
<tr>
<td>34459</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>20</td>
<td>35781</td>
<td>Socket—Dia. lamp socket</td>
<td>.15</td>
</tr>
<tr>
<td>35848</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>20</td>
<td>35818</td>
<td>Socket—Dia. lamp socket</td>
<td>.25</td>
</tr>
<tr>
<td>35822</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>20</td>
<td>35802</td>
<td>Switch—Push button switch—less coils and trimmer</td>
<td>.27</td>
</tr>
<tr>
<td>33014</td>
<td>Capacitor—Electrolytic—comprising 3 sections of 10-180 mfd.</td>
<td>65</td>
<td>35793</td>
<td>Switch—Range switch</td>
<td>2.20</td>
</tr>
<tr>
<td>35795</td>
<td>Coil—Loop primary (L1)</td>
<td>50</td>
<td>35836</td>
<td>Transformer—First L.F. transformer</td>
<td>1.70</td>
</tr>
<tr>
<td>35790</td>
<td>Coil—Push button oscillator coil</td>
<td>30</td>
<td>35790</td>
<td>Transformer—Second L.F. transformer</td>
<td>1.60</td>
</tr>
<tr>
<td>35792</td>
<td>Coil—Oscillator coil</td>
<td>35</td>
<td>35885</td>
<td>Transformer—Power transformer, 110 volt, 25 cycle</td>
<td>6.00</td>
</tr>
<tr>
<td>35798</td>
<td>Coil—R.F. coil</td>
<td>50</td>
<td>35800</td>
<td>Transformer—Power transformer, 110 volt, 60 cycle</td>
<td>4.75</td>
</tr>
<tr>
<td>35799</td>
<td>Condenser—Variable tuning condenser</td>
<td>10</td>
<td>35728</td>
<td>Washer—C&quot; washer for tuning shaft</td>
<td>.02</td>
</tr>
<tr>
<td>33584</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>20</td>
<td>35819</td>
<td>Cap—Speaker cone dust cap</td>
<td>.03</td>
</tr>
<tr>
<td>32787</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>20</td>
<td>35810</td>
<td>Coil—Field coil, 1,000 ohm</td>
<td>1.70</td>
</tr>
<tr>
<td>33048</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>20</td>
<td>35820</td>
<td>Core—Cone complete with voice coil</td>
<td>1.25</td>
</tr>
<tr>
<td>33048</td>
<td>Capacitor—Mica trimmer—comprising 2 sections of 8-80 mfd.</td>
<td>20</td>
<td>35809</td>
<td>Transformer—Output transformer</td>
<td>1.50</td>
</tr>
</tbody>
</table>

XX—Price upon application to your RCA Distributor.

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.
## Electrical Specifications

### Frequency Ranges

- **Broadcast**: 540.1-1560 kc
- **Medium Wave**: 1560-4000 kc
- **Short Wave**: 5.8-18.0 mc
- **Intermediate Frequency**: 455 kc

### Push-Button Ranges

- One station between approximately 540-1,030 kc
- Two stations between approximately 610-1,250 kc
- One station between approximately 880-1,560 kc

### Pilot Lamps

- (2) 115-volt, 1-watt bulbs
- (3) 115-volt, 3-watt bulbs
- (1) 115-volt, 4-watt bulb

### Power Output Ratings

- **Undistorted**: 5.5 watts
- **Maximum**: 5.5 watts

### Loudspeaker (RL-79-A5)

- **Type**: 6-inch Electrodynamic
- **V.C. Impedance**: 3.4 ohms at 400 cycles

### Power Supply Ratings

- **105-125 volts, 50-60 cycles, 90 watts**
- **105-125 volts, 25-60 cycles, 90 watts**  
  - First Edition
Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-c action.

Calibration for Alignment.—The proper dial calibration for alignment purposes can be set up in two ways.

1. The dial may be removed from the cabinet by sliding out the two spring pieces which clamp it in its mounting position. The condenser plates should then be turned into full mesh, the pointer adjusted to the scratch at the left end of the dial backing plate, and the dial slipped under the pointer so that its extreme left calibration mark coincides with the pointer. The dial may be held in place with Scotch tape. In this manner the actual receiver dial is used for alignment. When alignment is finished, the scale should be replaced including the fibre light shields which are folded under the ends of the glass scale.

2. A calibration scale is attached to the tuning drum. The correct setting of the gang, in degrees, for each alignment frequency is given in the alignment table. Check the position of the drum, making sure that the 0 degree scale mark is horizontal with the gang in full mesh.

Pointer for Calibration Scale.—If method (2) is used, improvise a pointer for the calibration scale by fastening a piece of wire to the chassis and bend the wire so that it points to the 0 degree mark on the calibration scale when the plates are fully meshed.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect high side of test oscillator to—</th>
<th>Tune test osc. to</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for maximum peak output—</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6SK7 1-F grid in series with 0.01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; band Quiet Point between 550 and 750 kc</td>
<td>L-91 and L-22 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6SA7 grid in series with 0.01 mfd.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Antenna terminal in series with 300 ohms (&quot;A&quot; antenna trimmer C-11 should be</td>
<td>15.2 mc</td>
<td>15.2 mc (149°)</td>
<td>C-24 (Osc.) Rock gang</td>
</tr>
<tr>
<td></td>
<td>(preset &quot;A&quot; osc. trimmer C-28)</td>
<td></td>
<td></td>
<td>C-15 (Det.) Rock gang</td>
</tr>
<tr>
<td></td>
<td>Rock gang</td>
<td></td>
<td></td>
<td>C-1 (R-F) Rock gang</td>
</tr>
<tr>
<td>3</td>
<td>Antenna terminal in series with 200 mfd.</td>
<td>15.2 mc</td>
<td>15.2 mc (149°)</td>
<td>C-24 (Osc.) Rock gang</td>
</tr>
<tr>
<td></td>
<td>(&quot;A&quot; antenna trimmer C-11 should be</td>
<td></td>
<td></td>
<td>C-15 (Det.) Rock gang</td>
</tr>
<tr>
<td></td>
<td>(turn out)</td>
<td></td>
<td></td>
<td>C-11 (R-F) Rock gang</td>
</tr>
<tr>
<td>4</td>
<td>Antenna terminal in series with 200 mfd.</td>
<td>2.44 mc</td>
<td>2.44 mc (81.5°)</td>
<td>C-27 (Osc.) Rock gang</td>
</tr>
<tr>
<td></td>
<td>(&quot;A&quot; antenna trimmer C-11 should be</td>
<td></td>
<td></td>
<td>C-19 (Det.) Rock gang</td>
</tr>
<tr>
<td></td>
<td>(turn out)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Antenna terminal in series with 200 mfd.</td>
<td>600 kc</td>
<td>600 kc (33.2°)</td>
<td>L-28 Rock gang</td>
</tr>
<tr>
<td></td>
<td>(&quot;A&quot; antenna trimmer C-11 should be</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(turn out)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna terminal in series with 200 mfd.</td>
<td>1,500 kc</td>
<td>1,500 kc (183.4°)</td>
<td>C-28 (Osc.) Rock gang</td>
</tr>
<tr>
<td></td>
<td>(&quot;A&quot; antenna trimmer C-11 should be</td>
<td></td>
<td></td>
<td>C-20 (Det.) Rock gang</td>
</tr>
<tr>
<td></td>
<td>(turn out)</td>
<td></td>
<td></td>
<td>C-11 (R-F) Rock gang</td>
</tr>
<tr>
<td>7</td>
<td>Repeat steps 5, then 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Antenna terminal in series with 200 ohms</td>
<td>15.2 mc</td>
<td>15.2 mc (149°)</td>
<td>C-1 (R-F) Rock gang</td>
</tr>
<tr>
<td></td>
<td>(&quot;A&quot; antenna trimmer C-11 should be</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(turn out)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two can be obtained. Check to determine that C-24 has been adjusted to correct peak by tuning receiver to approximately 142.9 kc where a weaker signal should be received.

Note.—Oscillator tracks above signal on all bands.

To reduce sensitivity during RF Alignment connect a 15,000 ohm, 1 watt resistor across secondary of 1st I-F transformer.

Tone Control

The tone control has four positions for radio, and four positions for Victrola or Television sound.

No. 1—Radio—maximum low—minimum high
No. 2—Radio—maximum low—reduced high
No. 3—Radio—maximum low—maximum high
No. 4—Radio—minimum low—maximum high
No. 5—Phono—maximum low—minimum high
No. 6—Phono—maximum low—reduced high
No. 7—Phono—maximum low—maximum high
No. 8—Phono—minimum low—maximum high

(No. 1 is full counter-clockwise, and No. 8 is full clockwise.)

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**RCA MFG. CO., INC.**

### Adjustment for Electric Tuning

This model has six push buttons for electric tuning. The buttons connect to separate magnet core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31951. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the six desired stations, arranged in order from low to high frequency.
2. Turn Range Control knob to "A" position, and manually tune in the first station on the list.

**Push Button Adjustments**

Turn the Loop Antenna to give minimum pickup of signal, no outside antennas should be used and limit on antenna board should be closed.

3. Turn Range Control knob to "PB" and press push button No. 1 and adjust No. 1 oscillator core received. Secure the core all the way in, to lowest frequency, and then unscrew slowly until station is received.

4. Adjust No. 1 antenna trimmer for maximum output on this station.

Owing to the relatively high R.F. gain, it may be found that there are several settings of each push button magnetoreg that will bring in any particular station. In such cases it is advisable to unscrew the push button antenna trimmers to minimum capacity before adjusting the oscillator cores.

Clockwise adjustment of cores and trimmers tunes the circuit to lower frequencies.

5. Adjust for each of the remaining five stations in the same manner.

6. After all six stations are tuned in on the buttons, turn the Loop Antenna to a low frequency and make a final careful adjustment of all core rods until best reception is obtained for each. Outdoor antenna should now be reconnected if used.

### Replacement Parts

Inst stock genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>35968</td>
<td>Board—&quot;Antenna-Ground&quot; board</td>
<td>.20</td>
</tr>
<tr>
<td>35795</td>
<td>Calibrator—Drive drum calibrator</td>
<td>.25</td>
</tr>
<tr>
<td>35961</td>
<td>Capacitor—Mica trimmer (C1)</td>
<td>.25</td>
</tr>
<tr>
<td>14079</td>
<td>Capacitor—Mica, 6 mmfd.</td>
<td>.35</td>
</tr>
<tr>
<td>35979</td>
<td>Capacitor—Mica trimmer comprising 3 sections (C2, C4, C6)</td>
<td>.50</td>
</tr>
<tr>
<td>35804</td>
<td>Capacitor—Mica trimmer comprising 6 sections for push buttons 1, 2, 3, 4, 5, 6</td>
<td>1.15</td>
</tr>
<tr>
<td>13057</td>
<td>Capacitor—8 mmfd.</td>
<td>.20</td>
</tr>
<tr>
<td>12730</td>
<td>Capacitor—100 mmfd., moulded</td>
<td>.35</td>
</tr>
<tr>
<td>34699</td>
<td>Capacitor—.005 mmfd., mica</td>
<td>.25</td>
</tr>
<tr>
<td>34700</td>
<td>Capacitor—120 mmfd.</td>
<td>.30</td>
</tr>
<tr>
<td>13003</td>
<td>Capacitor—180 mmfd.</td>
<td>.36</td>
</tr>
<tr>
<td>13902</td>
<td>Capacitor—500 mmfd.</td>
<td>.45</td>
</tr>
<tr>
<td>35877</td>
<td>Capacitor—720 mmfd.</td>
<td>.45</td>
</tr>
<tr>
<td>13905</td>
<td>Capacitor—5,000 mmfd.</td>
<td>.35</td>
</tr>
<tr>
<td>34506</td>
<td>Cap—.001 mmfd.</td>
<td>.25</td>
</tr>
<tr>
<td>35854</td>
<td>Cap—.005 mmfd.</td>
<td>.25</td>
</tr>
<tr>
<td>14393</td>
<td>Cap—.01 mmfd.</td>
<td>.35</td>
</tr>
<tr>
<td>14839</td>
<td>Cap—.02 mmfd.</td>
<td>.35</td>
</tr>
<tr>
<td>35958</td>
<td>Cap—.05 mmfd.</td>
<td>.35</td>
</tr>
<tr>
<td>35858</td>
<td>Cap—.1 mmfd.</td>
<td>.35</td>
</tr>
<tr>
<td>35855</td>
<td>Cap—Antenna coil—C&quot; band</td>
<td>.40</td>
</tr>
<tr>
<td>35876</td>
<td>Cap—Coil and resistor assembly L6</td>
<td>.30</td>
</tr>
<tr>
<td>35789</td>
<td>Cap—Oscillator coil (A, B, C)</td>
<td>1.15</td>
</tr>
<tr>
<td>35803</td>
<td>Cap—Push button switch oscillator coil</td>
<td>.30</td>
</tr>
<tr>
<td>35980</td>
<td>Condenser—Variable tuning condenser</td>
<td>.30</td>
</tr>
<tr>
<td>35892</td>
<td>Control—Volume control and power switch</td>
<td>2.00</td>
</tr>
<tr>
<td>34662</td>
<td>Cord—Drive cord</td>
<td>.20</td>
</tr>
<tr>
<td>35878</td>
<td>Core—Adjusting core and stud for oscillator coil (L5)</td>
<td>.15</td>
</tr>
<tr>
<td>35871</td>
<td>Core—Adjusting core and stud for push button oscillator coils 1, 2, 3, 4, 5, 6</td>
<td>.55</td>
</tr>
<tr>
<td>35794</td>
<td>Dial—Tuning condenser drive drum—less calibrator</td>
<td>.70</td>
</tr>
<tr>
<td>35970</td>
<td>Indicator—Station selector indicator and carriage</td>
<td>.30</td>
</tr>
<tr>
<td>35972</td>
<td>Plate—Dial plate complete with drive cord pulley</td>
<td>1.10</td>
</tr>
<tr>
<td>36009</td>
<td>Plug—2-contact male plug for loop cable</td>
<td>.25</td>
</tr>
<tr>
<td>5010</td>
<td>Plug—4-prong female plug for speaker cable</td>
<td>.30</td>
</tr>
<tr>
<td>32165</td>
<td>Resistor—470 ohms, 2 watts</td>
<td>.25</td>
</tr>
<tr>
<td>14700</td>
<td>Resistor—1,000 ohms, 5 watts</td>
<td>.20</td>
</tr>
<tr>
<td>14024</td>
<td>Resistor—720 ohms, 1 watt</td>
<td>.25</td>
</tr>
<tr>
<td>30645</td>
<td>Resistor—3,900 ohms, 1 watt</td>
<td>.20</td>
</tr>
<tr>
<td>31875</td>
<td>Resistor—12,000 ohms, 1 watt</td>
<td>.25</td>
</tr>
<tr>
<td>12695</td>
<td>Resistor—15,000 ohms, 1 watt</td>
<td>.20</td>
</tr>
</tbody>
</table>

**SPEAKER ASSEMBLIES**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31825</td>
<td>Cap—Cone center dust cap</td>
<td>.30</td>
</tr>
<tr>
<td>31400</td>
<td>Coil—Hum neutralizing coil</td>
<td>1.50</td>
</tr>
<tr>
<td>33116</td>
<td>Coil—Speaker field coil</td>
<td>2.10</td>
</tr>
<tr>
<td>31275</td>
<td>Cone—Speaker cone, voice coil, and dust cap</td>
<td>1.50</td>
</tr>
<tr>
<td>5039</td>
<td>Plug—4-prong male, for speaker</td>
<td>.30</td>
</tr>
<tr>
<td>33444</td>
<td>Transformer—Output transformer</td>
<td>2.00</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS ASSEMBLIES**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>36005</td>
<td>Button—Push button (CS) for loop</td>
<td>.15</td>
</tr>
<tr>
<td>36098</td>
<td>Capacitor—Mica trimmer (C5) for loop</td>
<td>.20</td>
</tr>
<tr>
<td>36002</td>
<td>Cap—Loop primary coil</td>
<td>.25</td>
</tr>
<tr>
<td>35914</td>
<td>Decalcomania—Control panel decal</td>
<td>10.00</td>
</tr>
<tr>
<td>38019</td>
<td>Dial—Glass dial scale</td>
<td>1.65</td>
</tr>
<tr>
<td>38008</td>
<td>Escutcheon—Dial scale escutcheon—less dial</td>
<td>2.75</td>
</tr>
<tr>
<td>36095</td>
<td>Knob—Tone or range switch knob</td>
<td>2.50</td>
</tr>
<tr>
<td>36004</td>
<td>Knob—Tuning or volume control knob</td>
<td>2.25</td>
</tr>
<tr>
<td>11765</td>
<td>Lamp—Dial lamp</td>
<td>15.00</td>
</tr>
<tr>
<td>35997</td>
<td>Loop—Antenna loop</td>
<td>3.00</td>
</tr>
<tr>
<td>36149</td>
<td>Marker—Station selector push button markers</td>
<td>3.50</td>
</tr>
<tr>
<td>36009</td>
<td>Mounting—Antenna loop mounting hardware</td>
<td>10.00</td>
</tr>
<tr>
<td>35029</td>
<td>Mounting—Speaker mounting hardware</td>
<td>3.50</td>
</tr>
<tr>
<td>35999</td>
<td>Socket—Two contact socket for antenna loop</td>
<td>2.25</td>
</tr>
<tr>
<td>34603</td>
<td>Spring—Push button spring</td>
<td>3.50</td>
</tr>
<tr>
<td>34697</td>
<td>Spring—Retaining spring for knobs</td>
<td>3.00</td>
</tr>
</tbody>
</table>

**Arrangement of Drive Cords for Tuning Condenser and Dial Indicator**

![Diagram of drive cords](image)

**STOCK No.**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>12738</td>
<td>Resistor—27,000 ohms, 1/2 watt</td>
</tr>
<tr>
<td>12454</td>
<td>Resistor—35,000 ohms, 1/2 watt</td>
</tr>
<tr>
<td>12412</td>
<td>Resistor—47,000 ohms, 1/2 watt</td>
</tr>
<tr>
<td>12139</td>
<td>Resistor—270,000 ohms, 1 watt</td>
</tr>
<tr>
<td>12285</td>
<td>Resistor—470,000 ohms, 1 watt</td>
</tr>
<tr>
<td>12079</td>
<td>Resistor—2.2 meg., 1 watt</td>
</tr>
<tr>
<td>13863</td>
<td>Resistor—10 meg., 1 watt</td>
</tr>
<tr>
<td>35968</td>
<td>Shaft—Tuning shaft and pulley</td>
</tr>
<tr>
<td>35772</td>
<td>Shield—Bottom shield for power transformer</td>
</tr>
<tr>
<td>35790</td>
<td>Shield—Top shield for power transformer</td>
</tr>
<tr>
<td>31384</td>
<td>Socket—Dial lamp socket</td>
</tr>
<tr>
<td>31418</td>
<td>Socket—Tube socket</td>
</tr>
<tr>
<td>35787</td>
<td>Socket—Dial lamp socket</td>
</tr>
<tr>
<td>35974</td>
<td>Support—Dial plate support</td>
</tr>
<tr>
<td>33595</td>
<td>Switch—Push button</td>
</tr>
<tr>
<td>33596</td>
<td>Switch—Range switch (S1, S2, S3, S4)</td>
</tr>
<tr>
<td>35953</td>
<td>Switch—Tone switch (S5, S6)</td>
</tr>
<tr>
<td>35436</td>
<td>Transformer—P-T 1-1 F transformer</td>
</tr>
<tr>
<td>35790</td>
<td>Transformer—Second 1-1 F transformer</td>
</tr>
<tr>
<td>35588</td>
<td>Transformer—Power transformer—110 volts, 25 cycle</td>
</tr>
<tr>
<td>35959</td>
<td>Transformer—Power transformer—110 volts, 60 cycle—less end shields</td>
</tr>
<tr>
<td>35989</td>
<td>Washer—&quot;C&quot; washer for tuning shaft</td>
</tr>
</tbody>
</table>

**ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.**

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Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic drawing.

Output Meter Alignment—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "00°" mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540° mark and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Precautionary Lead Dress.—
1. Dress 2nd I.F. leads close to chassis.
2. Dress leads from volume control and tone switch away from filaments, diode and power leads.
3. Dress .005 mfd. volume control condenser away from electrolytic.

Tube and Trimmer Locations

Back of Chassis

Location of Controls

Tone Control and Phono-Radio Switch
General Description

Models Q20 and Q21 are two-band table type superhetodyne receivers. They are designed to cover the broadcast range of 540 to 1,800 kilocycles, and the short-wave range from 4.5 to 18 megacycles.

Features of design include: Magnetite-core I.F. transformers; magnetite-core "A" band oscillator coil; automatic volume control; tone control; illuminated dial; jack for phonograph attachment; 25 to 1 ratio vernier tuning; and dust-proofed permanent-magnet dynamic loudspeaker.

Phonograph Attachment—A jack is provided on the rear of chassis for connection to a phonograph attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Electrical Specifications

<table>
<thead>
<tr>
<th>Pilot Lamp</th>
<th>Mazda 51, 7.5 volts, 0.2 amp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply Ratings</td>
<td></td>
</tr>
<tr>
<td>Rating A</td>
<td>105-125 volts, 50-60 cycles, 50 watts</td>
</tr>
<tr>
<td>Rating B</td>
<td>105-125 volts, 25-60 cycles, 50 watts</td>
</tr>
<tr>
<td>Rating C</td>
<td>105-125, 200-250 volts, 50-60 cycles, 50 watts</td>
</tr>
</tbody>
</table>

Power Output Rating

Undistorted ..................................... 1.5 watts
Maximum ......................................... 2.3 watts

Loudspeaker

Type (RL-81-A2) .................................. 5-inch permanent-magnet dynamic voice-coil Impedance ............... 4.5 ohms at 400 cycles

Frequency Ranges

Standard Broadcast (A) .............. 540-1,800 kc (555-166 m)
Short Wave (C) ......................... 4.5-18 mc (66.7-16.6 m)
Intermediate Frequency .............. 455 kc
Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For I-F alignment, connect the low side of the test-oscillator to the receiver chassis through a 0.01 mfd, capacitor, and keep the output as low as possible.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be adjusted so that it is vertical.

Antenna.—The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the “ANT” terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 m.m. capacitor in series with the lead-in.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.
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RCA MFG. CO., INC.

Gain Data Instructions

Notes

Introduction

Gain Chart

Preliminary Set-Up

Quick-Over All Gain Checks on RF, IF, and AF Sections

Miscellaneous Data

Electronic Volume May Be Used in Connection With the Above Earphone.

RCA MFG. CO., INC.

Gain Data Instructions

Notes

Introduction

Gain Chart

Preliminary Set-Up

Quick-Over All Gain Checks on RF, IF, and AF Sections

Miscellaneous Data

Electronic Volume May Be Used in Connection With the Above Earphone.
The power drawn from the batteries is very small--being .675 watts from the 90 volt battery, represented by a current of 7.5 milliamperes, and a current from a 1.4 volt filament battery of 300 milliamperes.

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The intermediate frequency used in the MF-14 receiver is 525 kilocycles. Alignment can be achieved by inserting a signal of 525 kilocycles. By connecting a test oscillator generating 525 kilocycles (modulated) to the grid of the first detector tube, the intermediate frequency transformers labeled No. 1, No. 2, and No. 3 I.F. (See Figure 3) can be adjusted to match the signal. This is done by adjusting the trimmers for the maximum audio output. In Figure 3, the trimmers for the intermediate frequency transformers are shown. The trimmer on the bottom of the chassis is adjusted for the maximum audio output. The trimmer on the top of the chassis is adjusted for the maximum audio output. The trimmer on the right of the chassis is adjusted for the maximum audio output. The trimmer on the left of the chassis is adjusted for the maximum audio output. The trimmer on the middle of the chassis is adjusted for the maximum audio output. The trimmer on the front of the chassis is adjusted for the maximum audio output. The trimmer on the back of the chassis is adjusted for the maximum audio output. The trimmer on the side of the chassis is adjusted for the maximum audio output.

Distorted signals having a very broken and rough characteristic are usually due to the fact that the filament battery is below its required voltage and needs recharging. The sensitivity of the instrument may be increased by raising the filament voltage. Under these conditions, the sensitivity of the instrument may be decreased by lowering the filament voltage. The sensitivity of the instrument may be increased by increasing the filament voltage. The sensitivity of the instrument may be decreased by decreasing the filament voltage.
MODEL DB-20
MODEL DB-20 Batt.
Alignment, Trimmers

The adjustment of the RUE-69 receiver incurs no mismatch range covered by the maximum tuning indicator background noise or signal strength may be used as an indication of optimum setting of the preselector and this will provide signals which are bound to occur in the calibration of the instrument.

One side of the output circuit of the DB-20 is grounded and this is used for the proper operation of the combination. The high side of the grounded output cable may be connected to the antenna post of the receiver with which it is to be operated for the two-terminal input. The output circuit is normally connected to the antenna terminal which would be used in the normal operation of the receiver against ground in normal receiver operation without the DB-20. On the DB-69 receiver this is the outside terminal of the three-terminal input and it is to be connected on the terminal strip. In the case of a receiver being used with another antenna while one is connected on the terminal strip, the antenna is connected to the output circuit only and the DB-20 is used directly to the receiver and the DB-20 circuits are interconnected in conjunction with the DB-69 or any other receiver having a tuning indicator. In the absence of the tuning background noise signals can be found 1000%...
RADIO MFG. ENGINEERS, INC.

MODEL DB-20, Late MODEL DB-20 Batt.
Trimmers, Chassis

Parts List

BATTERY OPERATED DB-20 PARTS LIST

**RESISTORS**

<table>
<thead>
<tr>
<th>Value</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>0.1 ohm</td>
</tr>
<tr>
<td>2.2</td>
<td>0.1 ohm</td>
</tr>
<tr>
<td>2.3</td>
<td>0.1 ohm</td>
</tr>
<tr>
<td>2.4</td>
<td>0.1 ohm</td>
</tr>
<tr>
<td>2.5</td>
<td>0.1 ohm</td>
</tr>
<tr>
<td>2.6</td>
<td>0.1 ohm</td>
</tr>
<tr>
<td>2.7</td>
<td>0.1 ohm</td>
</tr>
</tbody>
</table>

**CAPACITORS**

<table>
<thead>
<tr>
<th>Value</th>
<th>Capacitance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>0.1 µfd</td>
</tr>
<tr>
<td>2.2</td>
<td>0.1 µfd</td>
</tr>
<tr>
<td>2.3</td>
<td>0.1 µfd</td>
</tr>
<tr>
<td>2.4</td>
<td>0.1 µfd</td>
</tr>
<tr>
<td>2.5</td>
<td>0.1 µfd</td>
</tr>
<tr>
<td>2.6</td>
<td>0.1 µfd</td>
</tr>
<tr>
<td>2.7</td>
<td>0.1 µfd</td>
</tr>
</tbody>
</table>

**SWITCHES**

1. Line switch
2. Antenna changeover switch
3. Band switch section
4. Band switch section
5. Band switch section

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www.americanradiohistory.com
This unit is in effect a frequency converter and therefore acts as a radio frequency amplifier and mixer tube with its oscillator in an over-all superheterodyne type of circuit. It must be used in connection with a regular receiver capable of tuning to a frequency of 1550 KC. The associated receiver therefore acts as an intermediate frequency amplifier unit and a demodulator and audio amplifier in order to reproduce the output of the expander.

R.F. Amplifier, cathode to ground...... 1 v. - 1.5 v.
R.F. Amplifier, plate to ground........... 210 v. - 240 v.
R.F. Amplifier, screen to ground......... 110 v. - 125 v.

Detector, cathode to ground........... 5 v. - 6 v.
Detector, plate to ground.............. 210 v. - 240 v.
Detector, screen to ground............. 110 v. - 125 v.

Oscillator, plate to ground (oscillating) 125 v. - 140 v.
Osc., plate to ground (not oscillating). 110 v. - 120 v.

Note* This voltage must be measured at "B" plus end of plate coil to prevent application of voltmeter leads from affecting oscillator circuit.
RADIO MFG. ENGINEERS, INC.

Schematic Diagram of RME 69-B for Battery Operation

Schematic Diagram of RME 69-A for AC or Battery Operation

©John F. Rider, Publisher
Legend of Resistors, Condensers, Chokes, and Transformers of RM-09 U-Cast Schematic Diagram.

### Specification

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>c, o</td>
<td>8 mfd 450 volt electrolytic.</td>
</tr>
<tr>
<td>c, y</td>
<td>5 mfd 450 volt electrolytic.</td>
</tr>
<tr>
<td>c</td>
<td>10 mfd mica condenser.</td>
</tr>
<tr>
<td>c</td>
<td>20 mfd 25 volt.</td>
</tr>
<tr>
<td>c</td>
<td>400 mfd, molded mica.</td>
</tr>
<tr>
<td>c</td>
<td>0.0005 mfd.</td>
</tr>
<tr>
<td>c</td>
<td>0.001 mfd.</td>
</tr>
<tr>
<td>c</td>
<td>0.002 mfd.</td>
</tr>
<tr>
<td>c</td>
<td>0.005 mfd.</td>
</tr>
<tr>
<td>c</td>
<td>0.01 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.02 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.03 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.04 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.05 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.06 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.08 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.1 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.12 mfd 450 volt electrolytic.</td>
</tr>
<tr>
<td>c</td>
<td>0.14 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.16 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.18 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.2 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.22 mfd 400 volts.</td>
</tr>
<tr>
<td>c</td>
<td>0.24 mfd 400 volts.</td>
</tr>
</tbody>
</table>

### Notes

- 17 my-1 WC4 59 my-1 W58
- 0004 mica condenser mounted by 70 mfd. mica adjustable trimmer.
- The antenna input impedance to an RM-09 Receiver varies in the vicinity of 250 to 350 ohms. The antenna supply should therefore be of the Marconi type which is fed at current maximum to the receiver or of the tuned feed type where impedances of lines involved are in the vicinity of the 250 ohms previously mentioned. For maximum selectivity insofar as the input circuit is concerned, the value of this impedance should be taken into account. Antennas which are supplying signal to the receiver at a high potential point should not be used in conjunction with the RM-09 Receiver because of the great loss in voltage transfer encountered in such a combination. The half-wave double type of antenna providing a tuned antenna system for a certain range of frequencies has certain marked directional characteristics. These directions characteristics are evident in the fact that the greatest pick-up occurs in a direction at right angles to the axis of the antenna, forming in effect a Figure 8 pattern in which the lobes are located off the sides of the antenna instead of off the ends.
- C-optimum tuning condition when $A < \frac{\pi}{2}$.
- B-optimum signal input to receiver when $B = \frac{\pi}{2}$.
- A general Marconi connection. Optimum condition exists when $A + B = \frac{\pi}{2}$.
RADIO MFG. ENGINEERS, INC.

TEST VOLTAGES OBTAINED AT VARIOUS POINTS IN THE RECEIVER CIRCUIT (Measurements made with voltmeter having internal resistance of 1,000 ohms per volt. Instruments with other internal resistances give entirely different readings) Note: Line voltage should be 115 v.

<table>
<thead>
<tr>
<th>Place Test Prods Between</th>
<th>Correct Voltage (Switch &quot;H&quot; in toward panel)</th>
<th>Correct Voltage (Switch &quot;H&quot; pulled outward from panel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio frequency amplifier plate and ground</td>
<td>240 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Radio frequency amplifier screen and ground</td>
<td>100 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>Radio frequency amplifier cathode and ground</td>
<td>3.2 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>First detector plates</td>
<td>240 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>First detector screen and ground</td>
<td>75 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>First detector cathode and ground</td>
<td>3.5 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>First intermediate frequency amplifier plate and ground</td>
<td>250 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>First intermediate frequency amplifier screen and ground</td>
<td>100 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>Intermediate frequency amplifier cathode and ground</td>
<td>3.2 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>(The same voltages apply to the second intermediate frequency amplifier tube elements)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6B7 plate and ground</td>
<td>115 &quot;</td>
<td>145 &quot;</td>
</tr>
<tr>
<td>6B7 screen and ground</td>
<td>25 &quot;</td>
<td>35 &quot;</td>
</tr>
<tr>
<td>42 plate and ground</td>
<td>244 &quot;</td>
<td>280 &quot;</td>
</tr>
<tr>
<td>42 screen and ground</td>
<td>248 &quot;</td>
<td>290 &quot;</td>
</tr>
<tr>
<td>42 cathode and ground</td>
<td>16 &quot;</td>
<td>18 &quot;</td>
</tr>
<tr>
<td>80 rectifier filament and ground</td>
<td>256 &quot;</td>
<td>335 &quot;</td>
</tr>
<tr>
<td>Oscillator plate and ground</td>
<td>248 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>Oscillator screen and ground</td>
<td>115 &quot;</td>
<td>0 &quot;</td>
</tr>
<tr>
<td>Beat oscillator plate and ground</td>
<td>160 &quot;</td>
<td>210 &quot;</td>
</tr>
<tr>
<td>Beat oscillator screen and ground</td>
<td>100 &quot;</td>
<td>130 &quot;</td>
</tr>
<tr>
<td>The voltage across R-31</td>
<td>14 &quot;</td>
<td>0 &quot;</td>
</tr>
</tbody>
</table>

These voltages are subject to a fluctuation of plus or minus 15% without indication of material difficulties.
**Test Voltages Obtained at Various Points in the A.C. 220 Volt Circuit**

(Measurements made with voltmeter having internal resistance of 1,000 ohms per volt. Instruments with other internal resistances give entirely different readings) Note: Line voltage should be 115v.

<table>
<thead>
<tr>
<th>Place Test Probes Between</th>
<th>Correct Voltage (Switch marked Audio level and Standby in toward panel)</th>
<th>Correct Voltage (Switch marked Audio level and Standby out ward from panel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio frequency amplifier plate and ground</td>
<td>240 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Radio frequency amplifier screen and ground</td>
<td>100 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Radio frequency amplifier cathode and ground</td>
<td>3.2 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>First detector plate</td>
<td>240 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>First detector screen and ground</td>
<td>75 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>First detector cathode and ground</td>
<td>3.5 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>First intermediate frequency amplifier screen and ground</td>
<td>100 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>First intermediate frequency amplifier plate and ground</td>
<td>250 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>6k7 audio amp. plate and ground</td>
<td>115 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>6k7 screen and ground</td>
<td>25 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>6p6 plate and ground</td>
<td>244 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>6p6 screen and ground</td>
<td>248 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>6p6 cathode and ground</td>
<td>16 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>B0 rectifier filament and ground</td>
<td>258 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Oscillator plate and ground</td>
<td>243 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Oscillator screen and ground</td>
<td>115 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Best oscillator plate and ground</td>
<td>180 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Best oscillator screen and ground</td>
<td>100 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>The voltage across 1.32</td>
<td>14 volts</td>
<td>0 volts</td>
</tr>
</tbody>
</table>

These voltages are subject to a fluctuation of plus or minus 10% without indication of material difficulties.

<table>
<thead>
<tr>
<th>Resistor</th>
<th>Parts List</th>
<th>Condenser cont.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30,000 ohm variable</td>
<td>150 ohm 1/2 watt</td>
<td>2.17 .01 400 volt</td>
</tr>
<tr>
<td>20,000 ohm 1 watt</td>
<td></td>
<td>2.18 1 mF trimmer</td>
</tr>
<tr>
<td>5,000 ohm 1/2 watt</td>
<td></td>
<td>2.21 25 pf cond.</td>
</tr>
<tr>
<td>5,000 ohm 1/2 watt</td>
<td></td>
<td>2.22 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>1 mF 1/2 watt</td>
<td></td>
<td>2.23 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>250,000 ohm 1/2 watt</td>
<td></td>
<td>2.24 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>10,000 ohm 1/2 watt</td>
<td></td>
<td>2.25 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>35 ohm 1/2 watt</td>
<td></td>
<td>2.26 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>1 mF 1/2 watt</td>
<td></td>
<td>2.27 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>5,000 ohm 1/2 watt</td>
<td></td>
<td>2.28 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>1 mF 1/2 watt</td>
<td></td>
<td>2.29 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>100,000 ohm 1/2 watt</td>
<td></td>
<td>2.30 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>250,000 ohm 1/2 watt</td>
<td></td>
<td>2.31 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>100,000 ohm 1/2 watt</td>
<td></td>
<td>2.32 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>1 mF 1/2 watt</td>
<td></td>
<td>2.33 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>100,000 ohm 1/2 watt</td>
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<td>2.34 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>250,000 ohm 1/2 watt</td>
<td></td>
<td>2.35 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>1 mF 1/2 watt</td>
<td></td>
<td>2.36 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>250,000 ohm 1/2 watt</td>
<td></td>
<td>2.37 150 ohm 1/2 watt</td>
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<td></td>
<td>2.38 150 ohm 1/2 watt</td>
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<td>2.41 150 ohm 1/2 watt</td>
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<tr>
<td>1 mF 1/2 watt</td>
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<td>2.42 150 ohm 1/2 watt</td>
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<td>250,000 ohm 1/2 watt</td>
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<td>2.43 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>1 mF 1/2 watt</td>
<td></td>
<td>2.44 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>6,600 ohm bleeder</td>
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<td>2.45 150 ohm 1/2 watt</td>
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<td>2.46 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>1,000 ohm 1/2 watt</td>
<td></td>
<td>2.47 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>1,000 ohm 1/2 watt</td>
<td></td>
<td>2.48 150 ohm 1/2 watt</td>
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<tr>
<td>10,000 ohm 1/2 watt</td>
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<td>2.49 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>10,000 ohm 1/2 watt</td>
<td></td>
<td>2.50 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>10,000 ohm 1/2 watt</td>
<td></td>
<td>2.51 150 ohm 1/2 watt</td>
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<td>7,200 ohm bleeder</td>
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</tr>
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<td>2,000 ohm 1/2 watt</td>
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<td>2.53 150 ohm 1/2 watt</td>
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<td>2,000 ohm 1/2 watt</td>
<td></td>
<td>2.54 150 ohm 1/2 watt</td>
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<tr>
<td>1,000 ohm 1/2 watt</td>
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<td>2.55 150 ohm 1/2 watt</td>
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<td>2,000 ohm 1/2 watt</td>
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<td>2.56 150 ohm 1/2 watt</td>
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<tr>
<td>1,000 ohm 1/2 watt</td>
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<td>2.57 150 ohm 1/2 watt</td>
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<td>1,000 ohm 1/2 watt</td>
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<td>2.58 150 ohm 1/2 watt</td>
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<td>2.59 150 ohm 1/2 watt</td>
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<tr>
<td>1,000 ohm 1/2 watt</td>
<td></td>
<td>2.60 150 ohm 1/2 watt</td>
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<td>1,000 ohm 1/2 watt</td>
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<td>2.61 150 ohm 1/2 watt</td>
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<td>1,000 ohm 1/2 watt</td>
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<td>2.62 150 ohm 1/2 watt</td>
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<td>2.64 150 ohm 1/2 watt</td>
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<td>2.68 150 ohm 1/2 watt</td>
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<td>1,000 ohm 1/2 watt</td>
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<td>2.69 150 ohm 1/2 watt</td>
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<tr>
<td>1,000 ohm 1/2 watt</td>
<td></td>
<td>2.70 150 ohm 1/2 watt</td>
</tr>
<tr>
<td>1,000 ohm 1/2 watt</td>
<td></td>
<td>2.71 150 ohm 1/2 watt</td>
</tr>
</tbody>
</table>

- **Model 70 Parts List**
- **RADIO MFG. ENGINEERS, INC.**
- **Rider, W. O. & Co.**
This is a six tube superheterodyne receiver, operating on 110 - 120 volts, 60 or 60 cycles current.

**INSTALLATION**

This receiver may be used with the built-in antennas where receiving conditions are favorable. When greater distance is required, or where receiving conditions are not satisfactory with the built-in antennas, an outside antenna may be used. This outside aerial should be from 50 to 100 feet in length and should be connected to the terminal on the back of the cabinet marked A. The outside aerial should be run in a straight line as possible and be kept clear of wires or other metal objects. A good ground connection to a water pipe is essential for clearest reception. The ground lead should be connected to the terminal marked G and should be as short as possible.

**CONTROLS**

The control on the left of the cabinet is the volume control and ON and OFF switch where the extreme left position. On the right side of the cabinet is located the station selector or tuning control. On Models 463, 464, 465 and 470 the center knob controls the high frequency response. When turned to the left the full tone range of the program is reproduced. Turning the control to the right diminishes the higher frequency tones. A position approximately one quarter turn from the left position is satisfactory for most programs. On Model 463, this control is on the back of the receiver. The antenna switch on the back of the cabinet changes the connections to either the built-in or outside aerial when used is used.

**OPERATION**

With the line cord connected turn the volume control about one half turn to the right and allow about one half minute for the tubes to properly heat. Select the desired station with the tuning control, varying the control until the tuning indicator produces the narrowest shadow. Adjust the volume control to the desired level and the tone control for the most pleasing response. For best quality be certain the station is properly tuned as indicated by the tuning indicator.

**AUTOMATIC PUSH BUTTON TUNING-MODELS 464 and 470**

The push buttons are adjusted for selecting five stations as indicated by the call letters over the buttons. To receive any one of these stations, push on the receiver as described above and depress the button corresponding to the desired station. Adjust the volume to the intensity required. To use the tone control for selecting the station depress the button.

**PHONOGRAPH MODEL 465**

This model is provided with a record player which reproduces up to 12 inch recordings with the cabinet top closed. To change over to photograph, turn the volume control to the right about half a turn and throw the record switch.