VOLUME XII
PERPETUAL
TROUBLESHOOTER'S
MANUAL
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JOHN F. RIDER
PERPETUAL TROUBLE SHOOTER'S MANUAL

VOLUME XII

by

JOHN F. RIDER

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SERVICING RECEIVERS BY MEANS OF RESISTANCE MEASUREMENT
PERPETUAL TROUBLE SHOOTER'S MANUAL
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VOLUMES I TO V ABRIDGED
ALIGNING PHILCO RECEIVERS, VOLUMES I AND II

AUTOMATIC FREQUENCY CONTROL SYSTEMS
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THE OSCILLATOR AT WORK
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VACUUM TUBE VOLT METERS
RESONANCE AND ALIGNMENT
AUTOMATIC VOLUME CONTROL

ALTERNATING CURRENTS IN RADIO RECEIVERS
D-C. VOLTAGE DISTRIBUTION IN RADIO RECEIVERS

AUTOMATIC RECORD CHANGERS AND RECORDERS
THE CATHODE-RAY TUBE AT WORK

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Printed in U.S.A.
IF ALIGNMENT - Wave change Sw. in BC position. Gang condenser at minimum, generator at 456 KC, output to LA6 CG thru .05 MFD condenser. Generator grounded to receiver, align four trimmers of IF transformers.

BROADCAST - Generator connected to antenna lead thru 200 uMFD condenser, and set at 1400 KC. Gang condenser at minimum. Trim oscillator then Antenna trimmers. Pad the oscillator circuit at 600 KC while rocking gang condenser.

SHORT WAVE - Generator at 6000 KC, start rotating gang condenser from HF end, when signal is heard, adjust antenna trimmer (Sw.) for maximum peak. Repeat all adjustments for maximum performance.
I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a 0.001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak.

R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

NOTE: COLOR OF WIRES TO CORRESPOND WITH COLOR OF PAINT SPOTS ON SPKR.
ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes; such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 455 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .02 Mfd selenium condenser. DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 455 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-140 KILOCYCLE BAND:

(a) Remove test oscillator lead from grid of the 6A7 tube and attach it to the receiver antenna lead through a .00025 Mfd series condenser.
(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.
(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.
(h) While rocking the tuning condenser back and forth adjust 600 KC oscillator paddle condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

(a) Replace .00025 Mfd. Test oscillator antenna lead series condenser with a 400 ohm resistor.
(b) Adjust band selector switch for 2.3-6.3 megacycles band operation, tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.
(c) Bring in 6.3 megacycle test oscillator signal to maximum output by adjusting 6.3 M.C. oscillator trimmer on top of coil located underneath chassis.
(d) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles and adjust 6 M.C. antenna trimmer which is mounted on coil located on top of chassis for maximum sensitivity.
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.
USE THE FOLLOWING DUMMY ANTENNAS——
I.F.——.02 MFD CONDENSER
540-1720 KC——.00025 MFD CONDENSER
(CONNECT DUMMIES IN SERIES WITH SIGNAL LEAD)

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

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CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

ELIMINATION OF INTERFERENCE CAUSED BY A 32-VOLT LIGHT PLANT

General

Two kinds of static-like noise may be heard when you operate your 32 volt radio at the same time the generating plant is charging the plant batteries. Static-like noise, due to the motion of the brushes on the commutator, may reach the set through the supply lines. Such noise can generally be eliminated by the use of 3 Mfd. 300 volt condensers, as shown in Figs. 1 and 3. Static-like noise, due to the operation of the high tension circuit may radiate through the air to the antenna of the set. Radiation has been found to extend a half mile in extreme cases. Proper placement of the antenna, along with the use of a spark plug suppressor and correct shielding will entirely eliminate this type of noise. When eliminating these electrical disturbances always apply the remedies given in the order in which they appear.

Usual Installations

Install spark plug suppressor on the spark plug and connect the high tension lead to the suppressor, as shown in Figure 3.

For four cylinder plants use four spark plug suppressors, one attached to each spark plug.

CAUTION: Disconnect batteries from generator before attaching suppressor equipment.

Connect one 3 Mfd. 300 volt condenser between one positive brush and the generator frame and one condenser between one negative brush and the generator frame as shown in Figure 1.

FOUR CYLINDER PLANTS: For four cylinder plants attach a condenser to the positive and negative brushes as shown in Figure 2.

Extreme Cases

To determine if the high tension wiring is radiating into the antenna disconnect the antenna and ground from the receiver and if the noise is eliminated or materially reduced, the noise is being picked up by the antenna. In such a case, obtain a piece of electronics's loom which will just slip over the high tension wire and a piece of copper braid shielding which will just slip over the loom. Cut a piece of loom just long enough to cover the high tension wire from the coil to the spark plug suppressor. Cut a piece of shielding that will be one inch shorter than the loom when the shielding is extended over the loom.

Ignition Noise on Battery Leads

Sometimes the ignition interference will travel up the battery leads. This condition can be corrected as follows: Attach a 3 Mfd. condenser between the positive terminal of the top of the control box and the frame of the box. Be sure the frame of the box is well grounded to the generator frame. Attach a 3 Mfd. condenser between the negative terminal of the top of the control box and the control box frame.

Ignition Interference on Supply Leads

In extreme cases the ignition interference will travel up the supply leads to the radio receiver. This condition can be corrected by connecting a 3 Mfd. condenser between the ungrounded side of the line (on the main switch box) and ground (or the grounded side of the line if one side of the line is grounded).

Grounding

Some cases may require a thorough grounding of the system. This may be accomplished by running a No. 12 B. & S. gage wire from the generator frame to a good ground. Conduct and metal switch bosses should also be grounded.

It is necessary to ground one side of the supply lines, first ground them temporarily, one at a time, through a 32 volt lamp. One side of the line will light the light, the other will not. The side which will not light the light should be grounded.

DO NOT apply any of the remedies listed under “Extreme Cases,” before trying the one listed under “Usual Cases.”

Slip the loom over the high tension lead. Slip the shielding over the loom so that it is one half inch from each end of the loom. Wrap some fine copper wire around the shielding near the end of the shielding to hold the shielding in place. Solder the wire to the shielding so it will not also be due to plant vibration. The shield may be taped in place if the tape is very adhesive. DO NOT USE FRICITION TAPE.

Solder a short braided wire to the shielding and ground it under the nearest screw on the generator frame.

This receiver is designed for operation on 32 volt battery plants only and must not be used on battery plants of a higher rated voltage than 32 volts without a voltage regulator.

The power plug attached to the end of the power cord must be inserted correctly in the 32 VOLT POWER SUPPLY OUTLET OR RECEPTACLE. OTHERWISE THE SET WILL NOT OPERATE. If after inserting the plug and turning the receiver on, the set does not operate after approximately two minutes, remove this plug and turn it half-way around and reinsert it in the power receptacle.

A 4 AMPERE FUSE is located on the back of the chassis underneath the receptacle marked ”Fuse” and protects the receiver from damage should a short occur in the set or if it is connected to an improper power supply. Continued burning of fuses on the proper power supply is indicative of some defect. THE WARRANTY IS VOID IF THE RECEIVER IS OPERATED WITH THE FUSE SHORTED OUT OR WITH A FUSE LARGER THAN 4 AMPERES.
ALIGNMENT

2. B.C.BAND. Osc. and dial at 1400 KC, .0002 mfd.
to max. Similarly B.C. Pad at 600 KC. Then recheck at 1400 KC.
4. INT. BAND. Dial and osc. at 5100 KC .0002 mfd. with 400 ohm
5. in series as dummy. Adj. ANT. and OSC trimmers to max. Adj.
6. Pad at 1800 KC. Recheck 5100 KC.
7. S.W. BAND. 400 ohm dummy. Osc.
8. and dial at 15 MC. Adjust S.W.
9. ANT. and OSC trimmers to max.
Sensitivity Check at 6000 KC
10. for proper alignment. If rece-
11. eiver lacks sensitivity check
12. the .0035 mica condenser
13. for short circuit.

IF PEAK 465 KC
THREE BAND — ELEVEN TUBE

A.C. Operated Superheterodyne Receiver
PUSH-BUTTON ADJUSTMENT

Nine stations operating in the 1500-540 kilocycle band may be automatically push button tuned by properly setting each station selector push button.

As the push buttons are not preset at the factory for any definite stations be sure to set each one.

Before Attempting to Set Push Buttons Be Sure to:

(a) Have aerial which will be used with the radio attached to the receiver when setting push buttons.
(b) Operate radio at least 15 minutes before adjusting push buttons.
(c) Obtain transmitter frequency—number of kilocycles—such call letters of the nine stations you wish to push button tune from radio log or newspaper radio station list.

Adjust Push Buttons for Selected Stations by:

(a) Rotate band switch knob to its NEXT TO MAXIMUM RIGHT HAND POSITION—540-1730 KILOCYCLE BAND MANUAL TUNING POSITION.
(b) Using regular manual tuning knob carefully tune in one of the selected stations whose transmitter frequency is somewhere between 1533-880 kilocycles. Make a mental note of the kind of program on this station, so that when push button is adjusted for this particular station (as instructed in paragraphs (c), (d)) it will be easy to recognize the station by the type of program being transmitted.
(c) Raise band switch knob to maximum right hand position.
(d) Press in one of the three push buttons marked 353-880 kilocycles on diagram.

NOTE: STATION MAY DISAPPEAR, BE DISTORTED OR IN SOME INSTANCES ANOTHER STATION MAY BE HEARD.

(e) GRASP END OF PUSH BUTTON JUST PRESSED IN AND BY SLOWLY TURNING THIS BUTTON CAREFULLY TUNE IN THE SELECTED 353-880 KILOCYCLE STATION THAT WAS PREVIOUSLY TUNED IN WITH MANUAL CONTROL.

Slowly—turn first in one direction, then in the opposite direction. Watch tuning eye and adjust so that the two open ends of the green inverted "V" on the tuning eye are closest together—at which point the signal will be heard with greatest volume and clearest tone.

(f) Press station call letter of the station just tuned in out of call letter sheet supplied and insert into depression adjacent to push button just adjusted.

(g) After the first 353-880 kilocycle push button has been properly set, the other eight push buttons should be adjusted in the same manner, preferably in the following order:

1. Set remaining two push buttons marked 555-880 kilocycles on diagram for any two stations operating between 533-880 kilocycles.
2. The three push buttons marked 880-1170 kilocycles on diagram should be adjusted for any three selected stations operating between 880 and 1170 kilocycles.
3. Adjust the three push buttons marked 1170-1520 kilocycles on diagram for any three selected stations operating between 1170 and 1520 kilocycles.

IMPORTANT

For Manual Tuning the Band Switch must be in next to maximum right hand position. When adjusting Push Buttons or when Push Button tuning after Push Buttons have been set. Band Switch must be in maximum right hand position.

MODEL E1082A

For maximum right hand position. When adjusting Push Buttons or when Push Button tuning after Push Buttons have been set. Band Switch must be in maximum right hand position.

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I.F. Adjust at 456 KC, connect oscillator to grid of 6A8 through .05 mfd. condenser, align all three trimmers to peak.

B.C. Adjust at 1730 KC through a .0001 mfd. condenser for oscillator trimmer. Peak antenna trimmer at 1400 KC.

Adjust antenna and R.F. trimmers at 1400 KC, use a 100 muf. 6C6 'Condenser.'
Note: In aligning IF, align all six Trimmers.
This receiver is designed to operate over three tuning ranges with a Horizontal Pointer movement; the broadcast band which extends from 535 to 1730 Kilocycles (K0 to 560 Meters), Police and Aviation Band which extends from 1.7 to 5.6 Megacycles (MC) to 176 Meters and the International Short Wave Band which extends from 5.6 to 18.1 Megacycles (MC) (0.6 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands. This receiver is designed to operate from a power supply mains of 110-120 volts, 60 cycle alternating current (AC). Never plug into a DC outlet.

**FLOATING CHASSIS (IMPORTANT)**

Loosen the four (4) mounting screws and two (2) lock bolts that secure the chassis to the cabinet and remove the two (2) wooden strips that are underneath the chassis. This allows the chassis to float and rest on the rubber pads used for this purpose. After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not tighten the mounting screws. **NOTE:** Save the mounting screws and wooden strips to use in case the set is reshipped or moved, otherwise damage may be done to the instrument cabinet or tubes.

**GROUND**

Wherever possible, a good ground should be employed. Water pipes and steam or hot water radiators make a very desirable ground connection. The ground wire should be connected to the ground lead (black). Where the above mentioned ground facilities are not available, a good outside ground may be had by sinking a metal pipe or ground rod about six feet into moist earth. An excellent bad can be prepared by digging a hole and filling with charcoal, in which the ground rod is placed. The charcoal bed surrounding the ground rod will maintain a mett condition throughout the year.

**REPLACEMENT PARTS LIST**

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<th>PARTS LIST</th>
<th>MODEL 210880</th>
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<tbody>
<tr>
<td>AMERICAN</td>
<td>ALLIED RADIO CORP.</td>
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ALLIED RADIO CORP

ELECTRIC TUNER

SETTING UP STATIONS

The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excessive fading. Turn on the receiver (broadcast band) and press in the dial tuning button; tune in the station of the lowest frequency, using the station selector knob. Now hold the dial tuning button in and press in button number one (1). (See Figure 1). Both buttons are now locked into place: a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidentally happens to be correct set. Loosen the thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station, call disc and insert into the recess of button number one. Push one of the clear celluloid discs into the recess also, over the station call disc. Now release button number one by pressing the dial tuning button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two. Both buttons are now locked into place. Loosen thumb screw number two (See Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call disc and celluloid disc into the window of button number two.

Follow this same procedure for the remaining stations, always choosing the station with the next highest frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. Note: In the window above the white button, Insert the word "OFF" found in the call letter sheet.

NOTE:

In the recesses of the white push buttons insert the words found in the call letter sheet as shown in Figure 1.

HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the dial tuning button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. Note: Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above.

To change from electric tuning to manual selecting, simply press in the dial tuning button. When the dial tuning button is in, the set may be tuned as a conventional receiver.
SERVICE NOTES for "AUTOMATIC-TUNE" WHEEL DIAL

DIAL MECHANISM

INSERT CELLULOID ENVELOPE BETWEEN EDGE OF DIAL AND METAL FACE PLATE THEN LIGHTLY PRESS NUT INTO SLOTTED DIAL TAB RAIL FIG. 3

REPLACING No. 4000 DIAL GLASS SCALE ASSEMBLY
As it requires special tools to properly set part No. 4005 shaft assembly on part No. 4000 glass scale—we will ship all orders for No. 4000 glass scales with the No. 4005 shaft assembled on the glass scale.

WHEN INSTALLING PART No. 4000 GLASS ASSEMBLY WITH No. 4005 SHAFT ATTACHED carefully follow procedure in order given.
(a) Insert No. 4005 shaft into main bushing attached to the cadmium plated bracket on back of dial face.
(b) Place steel spacer washer and brass tension spring in order named over end of No. 4005 shaft.
(c) Place the small die cast primary pulley No. 4009 on shaft—do not tighten No. 2754 set screws.
(d) Loosen the two set screws in brass spacer collar on the No. 4005 shaft.
(e) Adjust brass spacer collar—by sliding collar on shaft—so that there will be approximately 1/8" clearance between the bottom of metal tab holder and the face plate. Firmly retime brass collar and No. 2754 die cast pulley set screws. Failure to provide proper clearance will result in scratches on dial face and the dial mechanism will not operate freely.

TO INSTALL No. 3814 PRIMARY DRIVE CORD:
(a) Looking at back of dial, wrap dial cord twice around No. 4355 drive shaft in CLOCKWISE direction.
(b) Hook No. 3452 tension spring into loops at end of dial cord.

NEVER LOOSEN THE FOUR SCREWS THAT HOLD THE CADMIUM PLATED BRACKET TO DIAL FACE—OTHERWISE THE MAIN BUSHING WILL BE THROWN OUT OF CENTER.
TO INSTALL No. 4013 SECONDARY DRIVE CORD:

The dial mechanism picture shows and refers to eye terminals on drive cord—these were used in early production. Loops made by knots in the cords are now used to attach cord to lugs in the No. 4009 die cast pulley and to the No. 4382 & 4320 tension springs.

(a) Looking at the front of the dial rotate dial scale COUNTER-CLOCKWISE until dial stop is reached.
(b) Loosen the two No. 2754 set screws in small die cast pulley No. 4009.
(c) Looking at front of dial turn the small die cast pulley so that the cut out in pulley will be towards the left and approximately in line with the upper edge of the dial light bracket. This bracket which is only used in six volt battery and 110 volt AC models is shown mounted on the cadmium plated dial face plate bracket in dial mechanism picture.
(d) Hook No. 4352 tension spring in dial cord loop.
(e) Turn No. 4011 drum so that the hole in the No. 4012 large die cast pulley—through which the secondary drive cord is pulled—is towards the top of face plate. This will bring the hole approximately in line with the left hand edge (looking at back of dial) of face plate.

(a) Take long end of No. 4013 secondary drive cord—measured from knot at spring to end of cord—then looking at front of dial, wrap cord one complete turn CLOCK WISE around the No. 4009 small die cast pulley. The other end of the cord (short end) is placed on bottom half of secondary and primary die cast pulleys.
(b) Firmly tighten No. 2754 set screws in small die cast pulley.

NOTE: For #1, MODEL NUMBERS ARE B10600, -1, -2, -3, -4, -5
    For #2, " " " " B10572, -36, -38
    For #3, " " " " B10565, -6, -7, -8
    For #4, " " " " B10590, -1, -2, -3, -5, -6

COMPLETE WHEEL DIAL ASSEMBLY LESS ESCUTCHEON

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<td>Station Call Letter Cover</td>
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Prices are subject to change without notice.
SERVICE NOTES for PUSH BUTTON DIAL

FROM ONE TO TEN STATIONS OPERATING ON FREQUENCIES SEPARATED BY FORTY Kilocycles or MORE MAY BE AUTOMATICALLY TUNED BY PROPERLY SITTING PUSH BUTTONS.

SET STATION PUSH BUTTON BY:
- Gently press desired round paper station call letter tag out of station tab set.
- Always set the first push button for the desired station broadcast on the lowest frequency—the least number of kilocycles—and then set the next push button for the next highest station, and so on, continuing on in the manner until a Push Button has been set for all of the desired stations.
- Loosen Push Button locking screw and remove caps on all Push Buttons by grasping cap between fingers and gently pulling outward—then remove cap and discs.
- Carefully tune in the stations which broadcast on the lowest frequency—least number of kilocycles.
- Slide the Push Button nearest to the low frequency end of dial scale without moving dial—until metal indicator attached to Push Button is exactly even with the indicator line on the face of the dial; then with a small screwdriver firmly lock Push Button in place by tightening Push Button locking screw.
- Place printed paper station call letter tag, having call letters of station tuned in, against top of Push Button cup; then place polished protective disc on top of this and gently press Push Button cap firmly down over Push Button cup.
- Next set a Push Button for the desired station operating on the next lowest frequency in the same manner as above and continue on in this way until all the Push Buttons have been properly set.

AFTER THE TEN PUSH BUTTONS HAVE BEEN PROPERLY SET THEY WILL NOT REQUIRE FURTHER ATTENTION—EXCEPT WHEN MOVED FROM THEIR POSITION OR WHEN AN ADDITIONAL TAB IS INCLUDED WHICH WOULD DISTURB THE POSITION OF THE OTHER TABS.

PARTS LIST

COMPLETE PUSH BUTTON DIAL ASSEMBLY LESS ESCUTCHEON

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<th>Part No.</th>
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<td>Dial Assembly</td>
<td>Used With Model 1</td>
<td>$12.75</td>
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<tr>
<td>212</td>
<td>Dial Assembly</td>
<td>Used With Model 2</td>
<td>$12.75</td>
</tr>
<tr>
<td>228</td>
<td>Dial Assembly</td>
<td>Used With Model 2</td>
<td>$12.75</td>
</tr>
<tr>
<td>209</td>
<td>Dial Assembly</td>
<td>Used With Model 2 &amp; 3</td>
<td>$12.75</td>
</tr>
<tr>
<td>210</td>
<td>Dial Assembly</td>
<td>Used With Model 4</td>
<td>$12.35</td>
</tr>
</tbody>
</table>

MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4017</td>
<td>Cap</td>
<td>Push Button</td>
<td>$.15</td>
</tr>
<tr>
<td>4046</td>
<td>Celluloid Disc</td>
<td>Station Call Letter Cover</td>
<td>$.55</td>
</tr>
<tr>
<td>4214</td>
<td>Cord</td>
<td>Primary Drive Cord</td>
<td>$.15</td>
</tr>
<tr>
<td>4013</td>
<td>Cord</td>
<td>Secondary Drive Cord</td>
<td>$.15</td>
</tr>
<tr>
<td>4041</td>
<td>Cup Assembly</td>
<td>Push Button-Wire Clip and Compression Spring</td>
<td>$.15</td>
</tr>
<tr>
<td>3980</td>
<td>Band Indicator Assm.</td>
<td>For Model 1 &amp; 4</td>
<td>SEE NOTE</td>
</tr>
<tr>
<td>3992</td>
<td>Band Indicator Assm.</td>
<td>For Model 2 &amp; 3</td>
<td>SEE NOTE</td>
</tr>
<tr>
<td>4011</td>
<td>Drive Drum Assembly</td>
<td>With 4012 Secondary Pulley and Rubber Disc Coupler</td>
<td>$1.25</td>
</tr>
<tr>
<td>4021</td>
<td>Drive Shaft</td>
<td>Hub Cap</td>
<td>$1.50</td>
</tr>
<tr>
<td>3984</td>
<td>Dial Scale Drive (Die Cast)</td>
<td>Plate</td>
<td>$.10</td>
</tr>
<tr>
<td>4029</td>
<td>Dial Scale Drive (Die Cast)</td>
<td>Pulley</td>
<td>$.10</td>
</tr>
<tr>
<td>4030</td>
<td>Dial Scale Drive (Die Cast)</td>
<td>Screw</td>
<td>$.10</td>
</tr>
<tr>
<td>4000</td>
<td>Dial Scale Drive (Die Cast)</td>
<td>Spline Lock</td>
<td>$.10</td>
</tr>
<tr>
<td>4001</td>
<td>Dial Scale Drive (Die Cast)</td>
<td>Slide Stop</td>
<td>$.10</td>
</tr>
<tr>
<td>4002</td>
<td>Dial Scale Drive (Die Cast)</td>
<td>Spigot Lock</td>
<td>$.10</td>
</tr>
<tr>
<td>4003</td>
<td>Dial Scale Drive (Die Cast)</td>
<td>Spigot Lock</td>
<td>$.10</td>
</tr>
</tbody>
</table>

Prices are subject to change without notice.

When ordering parts be sure to mention part number and order all parts from:

For##1, Model numbers are B10500,-1,-2,-3,-4,-5
- #2, " " B10572,-86,-85
- #3, " " B10565,-6,-7,-8
- #4, " " B10590,-1,-2,-3,-5,-6

Note: Read Instructions.
ALIGNMENT NOTE: Use 0.1 uf condenser as dummy antenna when aligning the 1-f transformers; use a 400-ohm resistor for the S and I bands and a 0.00025-mf condenser for the M band.
Directions for Alignment of the FM Tuner

Remove the grid lead from the 6K8 converter tube. Connect the live side of the signal generator to the grid of the 6K8 through a small mica condenser 200 to 500 mmf. Connect the ground side of the signal generator through a similar condenser to the lead that was removed from the cap of the tube. Connect a resistor of 200 to 500 ohms between the grid of the tube and the grid lead. Connect the ground or shield of the signal generator to B-. Be sure that there is no direct connection between the signal generator and an external ground or directly to the power supply line.

Using a 5,000 ohm per volt D.C. meter with a voltage range of 20 volts as a resonance indicator, connect it across the 50,000 ohm limiting resistor. Set the signal generator at 4.3 M.C. and set the attenuator for about a 5-volt reading on the voltmeter. Align the three I.F. coils for a maximum reading, the same as an amplitude set.

Check the shape of the resonance curve by changing the signal generator to 4.2 M.C. and 4.4 M.C. The output reading either side of resonance should be about the same.

To align the discriminator, connect the signal generator, the same as for the I.F. alignment. Set the generator at 4.3 M.C. Connect the voltmeter across the two diode load resistors. Using an insulated screw driver adjust the secondary trimmer to zero voltage. Shift the signal generator to 4.2 M.C. and 4.4 M.C. Adjust the primary trimmer so that the D.C. readings are equal and opposite in polarity.

To align the R.F. and oscillator, connect the signal generator to the two leads at the back of the chassis. With the generator set at 40 M.C. adjust the oscillator, R.F. and antenna trimmers for maximum signal with the set tuned to the low frequency end of the dial, 50 M.C. and check the frequency and the alignment.
ANSLEY RADIO CORP.

AC.-D.C.

Power Unit

Part 1.21

CIRCUIT DIAGRAMS
OF PWR. UNITS. FOR
D-17A TUNER
ANSLEY RADIO CORP
4377 BROADWAY, N.Y.C.

DATE 5-10-40
TOLERANCE
BY A.M.S.
CHECKED

REVISED

©John F. Rider, Publisher
CIRCUIT DIAGRAMS
FOR MODELS D-21A
ANSLEY RADIO CORP.

PART 232
TUNER

PART No. 1.22
A.C. AUDIO AMPLIFIER AND POWER SUPPLY

PART No. 1.23
A.C.-D.C. AUDIO AMPLIFIER AND POWER SUPPLY

©John F. Rider, Publisher
Models P40, P41, P50, P51

AUTOMATIC RADIO MFG. CO.

1. IF Peak 456 KC
   2. Oec. (left trimmer on gang)
      3. Trimmer is on minimum capacity (right trimmer)
      4. Pad Loop 600 kc.

©John F. Rider, Publisher
AUTOMATIC RADIO MFG. CO. Models 120, 125, 130

©John F. Rider, Publisher
**BELMONT RADIO CORP.**

**MODELS 151, 536**

**BOTTOM VIEW OF CHASSIS**

**BOTTOM VIEW OF CHASSIS**

**RESISTORS**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Resistor Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>13012</td>
</tr>
<tr>
<td>R2</td>
<td>13010</td>
</tr>
<tr>
<td>R3</td>
<td>13017</td>
</tr>
<tr>
<td>R4</td>
<td>1304</td>
</tr>
<tr>
<td>R5</td>
<td>13070</td>
</tr>
<tr>
<td>R6</td>
<td>13023</td>
</tr>
<tr>
<td>R7</td>
<td>13030</td>
</tr>
<tr>
<td>R8</td>
<td>13052</td>
</tr>
<tr>
<td>R9</td>
<td>13003</td>
</tr>
<tr>
<td>R10</td>
<td>13051</td>
</tr>
<tr>
<td>R11</td>
<td>13056</td>
</tr>
<tr>
<td>R12</td>
<td>13023</td>
</tr>
</tbody>
</table>

**CONDENSERS**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Capacitor Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>13126</td>
</tr>
<tr>
<td>C2</td>
<td>12414</td>
</tr>
<tr>
<td>C3</td>
<td>12411</td>
</tr>
<tr>
<td>C4</td>
<td>12411</td>
</tr>
<tr>
<td>C5</td>
<td>13091</td>
</tr>
<tr>
<td>C6</td>
<td>13141</td>
</tr>
<tr>
<td>C7</td>
<td>11992</td>
</tr>
<tr>
<td>C8</td>
<td>11992</td>
</tr>
<tr>
<td>C9</td>
<td>12002</td>
</tr>
<tr>
<td>C10</td>
<td>12002</td>
</tr>
<tr>
<td>C11</td>
<td>13001</td>
</tr>
</tbody>
</table>

**REAR OF CHASSIS**

**VIEW LOOKING AT BOTTOM OF CHASSIS**

**Setting the Automatic Pushbuttons**

Make a list of your favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the front of each pushbutton.

Press one of the buttons all the way down and hold it FIRMLY. Now tune in the station you want with the tuning knob. Tune back and forth until the station is clear, then release the button.

**For Alignment data see Index**

October 1940

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ALIGNMENT PROCEDURE

IMPORTANT—See alignment instructions

- Volume control—Maximum all adjustments.
- Connect B+ of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>455 Kc.</td>
<td>.1 MFD.</td>
<td>Grid of 12SA7</td>
<td>Rotor full open (Plates out of mesh) Four Trimmers on Top (See Fig. 1)</td>
<td>Output and Input L. F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>BROADCAST</td>
<td>1600 Kc.</td>
<td>.1 MFD.</td>
<td>Grid of 12SA7</td>
<td>Rotor full open (Plates out of mesh) Trimmer rear section of gang</td>
<td>Broadcast Oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>BAND</td>
<td>1400 Kc.</td>
<td>See Note “A”</td>
<td>Set dial at 1400 Kc.</td>
<td>Trimmer front section of gang</td>
<td>Broadcast Antenna</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

FREQUENCY RANGE
535 to 1600 K.C.

Power Consumption ............................................. 35 Watts
Power Output ...................................................... 1 Watt Undistorted, 1.5 Watts Maximum
Intermediate Frequency ........................................... 455 K.C.

Selectivity - 85 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range .......................................... 535 to 1720 KC
INTERMEDIATE FREQUENCY ....................................... 455 KC
SPEAKER .................................................................. 5 IN. P. M. DYNAMIC

Sensitivity (for .05 Watts Output) - 30 Microvolts Average

- Volume control—Maximum all adjustments.
- Connect B+ of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Iron Core (Diagonal Setting)</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>455 Kc.</td>
<td>.1 MFD.</td>
<td>Connect to Metal Antenna Backplate</td>
<td>Iron Core</td>
<td>Two trimmers on top of input I. F. ca</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>455 Kc.</td>
<td>.1 MFD.</td>
<td>Connect to Metal Antenna Backplate</td>
<td>Iron Core</td>
<td>Two trimmers on top of input I. F. ca</td>
<td>Input I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROADCAST</td>
<td>1720 Kc.</td>
<td>.1 MFD.</td>
<td>Connect to Outside Antenna Clip</td>
<td>Iron Core</td>
<td>Trimmer (C) (See chassis view)</td>
<td>Oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BAND</td>
<td>1720 Kc.</td>
<td>200 MFF.</td>
<td>Connect to Outside Antenna Clip</td>
<td>Iron Core</td>
<td>Trimmer (C) (See chassis view)</td>
<td>Antenna</td>
<td>Adjust to maximum output (See Note “A”)</td>
</tr>
<tr>
<td></td>
<td>1400 Kc.</td>
<td>200 MFF.</td>
<td>Connect to Outside Antenna Clip</td>
<td>Turn Dial to 1400 Kc.</td>
<td>Antenna Coil</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1720 Kc.</td>
<td>200 MFF.</td>
<td>Connect to Outside Antenna Clip</td>
<td>Turn Dial to 1720 Kc.</td>
<td>Antenna</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

NOTE “A”—The antenna coil assembly is made so that it is moveable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE “B”—After the antenna coil has been tricked at 1400 Kc. it is necessary to check the antenna trimmer (C) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track. If the trimmers requires considerable change it will be necessary to adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

Reduce to 9%
### Model 518

**Model 518**

<table>
<thead>
<tr>
<th>BAND</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Iron Core (Dial Setting)</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>465 Kc.</td>
<td>1 MFD.</td>
<td>Connect to Terminal &quot;B&quot; (See Fig 4)</td>
<td>Iron Core All the way out</td>
<td>Two trimmers on top (See Fig 1)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>465 Kc.</td>
<td>1 MFD.</td>
<td>Connect to Terminal &quot;B&quot; (See Fig 4)</td>
<td>Iron Core All the way out</td>
<td>Two trimmers on top (See Fig 1)</td>
<td>Input I. F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

**BROADCAST**

<table>
<thead>
<tr>
<th>BAND</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Iron Core (Dial Setting)</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>1270 Kc.</td>
<td>1 MFD.</td>
<td>Connect to Terminal &quot;B&quot; (See Fig 4)</td>
<td>Iron Core All the way out</td>
<td>Two trimmers on top (See Fig 1)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>1270 Kc.</td>
<td>1 MFD.</td>
<td>Connect to Terminal &quot;B&quot; (See Fig 4)</td>
<td>Iron Core All the way out</td>
<td>Two trimmers on top (See Fig 1)</td>
<td>Input I. F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

**NOTE "A"**—The antenna coil assembly is made so that it is movable up or down. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

**NOTE "B"**—After the antenna coil has been tracked at 1400 Kc, it is necessary to check the antenna trimmers (C3) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

### Model 794

**Model 794**

**Series A**

<table>
<thead>
<tr>
<th>BAND</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmerers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>465 Kc.</td>
<td>1 MFD.</td>
<td>Grid of 7SK7 MGT</td>
<td>Broadcast</td>
<td>Rotorm full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig 2)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>465 Kc.</td>
<td>1 MFD.</td>
<td>Grid of SP9 MGT</td>
<td>Broadcast</td>
<td>Rotorm full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig 2)</td>
<td>Input I. F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

**SHORT WAVE**

<table>
<thead>
<tr>
<th>BAND</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmerers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>17 Mc.</td>
<td>600 Ohms</td>
<td>External</td>
<td>Short Wave</td>
<td>Set Dial at 10 Mc.</td>
<td>Trimmer C3 (See Fig 5)</td>
<td>Short Wave oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>17 Mc.</td>
<td>600 Ohms</td>
<td>External</td>
<td>Short Wave</td>
<td>Set Dial at 17 Mc.</td>
<td>Trimmer C2 (See Fig 4)</td>
<td>Short Wave antenna</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>6 Mc.</td>
<td>600 Ohms</td>
<td>External</td>
<td>Short Wave</td>
<td>Set Dial at 6 Mc.</td>
<td>Trimmer C5 (See Fig 4)</td>
<td>Short Wave oscillator series pad</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

**BROADCAST**

<table>
<thead>
<tr>
<th>BAND</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmerers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>1500 Kc.</td>
<td>200 mmf.</td>
<td>Grid of 12ARGT</td>
<td>Broadcast</td>
<td>Rotorm full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig 4)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>540 Kc.</td>
<td>200 mmf.</td>
<td>Grid of 12ARGT</td>
<td>Broadcast</td>
<td>Set Dial at 540 Kc.</td>
<td>Trimmer C8 (See Fig 4)</td>
<td>Broadcast oscillator series pad</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

**LOOP ALIGNMENT**

<table>
<thead>
<tr>
<th>BAND</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmerers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>1400 Kc.</td>
<td>200 mmf.</td>
<td>External</td>
<td>Broadcast</td>
<td>Set Dial at 1400 Kc.</td>
<td>Trimmer C1 (See Fig 5)</td>
<td>Broadcast antenna</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>600 Kc.</td>
<td>200 mmf.</td>
<td>External</td>
<td>Broadcast</td>
<td>Set Dial at 60 Kc.</td>
<td>Trimmer T2 (See Fig 5)</td>
<td>Iron Core Tracking Coil</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

**NOTE "A"**—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the Short Wave Band and to the grid of the 7SK7 MGT tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1550 and 1640 Kc.).

The loop antenna need not be connected to the radio when making these adjustments.

**NOTE "B"**—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected to the terminal board. The signal generator is connected to the "ANT." and "GND." terminals and the jumper on the terminal board connected to "EXT." terminals (See Fig 1).

**NOTE "C"**—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Alternate the signal from the signal generator to prevent the leveling-off action of the AVC.

**FREQUENCY RANGE**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 to 178 K.C.</td>
<td>Power Consumption: 3 Watts</td>
</tr>
<tr>
<td>465 Kc.</td>
<td>Power Output: 300 Milliwatts Undistorted, 1.2 Watts Maximum</td>
</tr>
</tbody>
</table>

**Intermediate Frequency**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>465 Kc.</td>
<td>Power Output: 300 Milliwatts Undistorted, 1.2 Watts Maximum</td>
</tr>
</tbody>
</table>

**FREQUENCY RANGE**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>540 to 1550 Kc.</td>
<td>Power Output: 300 Milliwatts Undistorted, 1.2 Watts Maximum</td>
</tr>
</tbody>
</table>

**After each band is completed, repeat the procedure as a final check.**

It is important during loop alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.
BELMONT RADIO CORP

MODEL 533, Series A
Ser. OC3710100 up

MODEL 533, Series B
Ser. OC3716058 up

Detector-oscillator
I. F. Amplifier
Second Det A.V.C. First Audio
Output

12SA7

Power Consumption
Radio Only 30 Watts
Power Output
900 Milliwatts Undistorted, 1.7 Watts Maximum

FREQUENCY RANGE
550 to 1650 K.C.

FIG. 1—TOP VIEW

BOTTOM VIEW OF CHASSIS

Note: Switch should be in radio position and motor switched on.

NO SIGNAL AND VOLUME CONTROL

PARTS

Series A Only

Series B Only

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www.americanradiohistory.com
### ALIGNMENT PROCEDURE

- **Volume control**—Maximum all adjustments.
- **Connect** —B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- **Connect** dummy antenna value in series with generator output lead.
- **Connect** output meter across primary of output transformer.
- **Allow** chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- **An all wave signal generator** which will provide an accurately calibrated signal at the test frequencies as listed.
- **Output indicating meter.**
- **Non-metallic screwdriver.**
- **Dummy antennas**—.1 Mfd., and 200 Mmf.

#### SIGNAL GENERATOR

<table>
<thead>
<tr>
<th>BAND</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Iron Cores (Dial Setting)</th>
<th>Trimmers Adjusted (In Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>465 Kc.</td>
<td>.1 MFD</td>
<td>Connect to Terminal &quot;A&quot; (See Fig. /)</td>
<td>Iron Cores All the way out</td>
<td>Two trimmers on top (See Fig. 1)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>465 Kc.</td>
<td>.1 MFD</td>
<td>Connect to Terminal &quot;A&quot; (See Fig. /)</td>
<td>Iron Cores All the way out</td>
<td>Two trimmers on top (See Fig. 1)</td>
<td>Input I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROAD-CAST BAND</td>
<td>1600 Kc.</td>
<td>.1 MFD</td>
<td>Connect to Terminal &quot;A&quot; (See Fig. /)</td>
<td>Iron Cores All the way out</td>
<td>Trimmer (C4) (See Fig. 1)</td>
<td>Oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>1600 Kc.</td>
<td>200 Mfd.</td>
<td>Connect to Terminal &quot;B&quot; (See Fig. /)</td>
<td>Iron Cores All the way out</td>
<td>Trimmer (C3) (See Fig. 1)</td>
<td>Antenna</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>1400 Kc.</td>
<td>200 Mfd.</td>
<td>Connect to Terminal &quot;B&quot; (See Fig. /)</td>
<td>Turn Dial to 1400 Kc.</td>
<td>Adjust position of antenna coil right or left. (See Fig. 3)</td>
<td>Antenna Coil Adjustment</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>1690 Kc.</td>
<td>200 Mfd.</td>
<td>Connect to Terminal &quot;B&quot; (See Fig. /)</td>
<td>Turn Dial to 1690 Kc.</td>
<td>Adjust trimmer (C3) (See Fig. 1)</td>
<td>Antenna</td>
<td>Check for tracking (See Note &quot;B&quot;)</td>
</tr>
</tbody>
</table>

**NOTE "A"**—The antenna coil assembly is made so that it is moveable right or left. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

**NOTE "B"**—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1690 Kc. If no appreciable change in trimmer adjustment is made the coil is in track. If the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1690 Kc.

---

**SERVICE NOTES:**

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

**ALIGNING INSTRUCTIONS:**

**CAUTION**—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, defective tubes, condensers and resistors. In order to properly align this radio, the chassis should be removed from the cabinet.
### MODEL 534

**Power Consumption** - 35 Watts
**Power Output** - 800 Milliwatts Undistorted
**Sensitivity for 50 Milliwick Output** - 20 Microvolts Average

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>Frequency Setting</td>
<td>I F. Tube</td>
<td>Grid of 12SK7 I. F.</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Top View)</td>
<td>Output I. F., Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>455 Kc.</td>
<td>1 MFD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BROAD-CAST</td>
<td>Frequency Setting</td>
<td>I. F. Mixer</td>
<td>Grid of 12SA7</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Top View)</td>
<td>Output I. F., Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>1650 Kc.</td>
<td>1 MFD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Loop aerial should be connected when aligning receiver. 

**NOTE** "A"—Mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust the antenna trimmer through hole in bottom of cabinet.

**NOTE** "B"—Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

### MODEL 695

**Power Consumption** - 35 Watts
**Power Output** - 900 Milliwatts Undistorted
**Sensitivity for 50 Milliwatts Output** - 15 Microvolts Average
**Selectivity** - 46 KC Broad at 1000 Times Signal at 1000 KC

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>Frequency Setting</td>
<td>I F. Tube</td>
<td>Grid of 12SK7 I. F.</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Top View)</td>
<td>Output I. F., Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>455 Kc.</td>
<td>1 MFD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHORT WAVE</td>
<td>Frequency Setting</td>
<td>B—</td>
<td>Grid of 12SA7</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Top View)</td>
<td>Output I. F., Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>17 Me.</td>
<td>200 Ohms</td>
<td>External Antenna and B—</td>
<td>Short Wave</td>
<td>Set Dial at 17 Me.</td>
<td>Trimmer C12</td>
<td>Short Wave oscillator, Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>17 Me.</td>
<td>200 Ohms</td>
<td>External Antenna and B—</td>
<td>Short Wave</td>
<td>Set Dial at 17 Me.</td>
<td>Trimmer C12</td>
<td>Short Wave oscillator, Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>6 Me.</td>
<td>200 Ohms</td>
<td>External Antenna and B—</td>
<td>Short Wave</td>
<td>Set Dial at 6 Me.</td>
<td>Trimmer C12</td>
<td>Short Wave oscillator, Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>BROAD-CAST</td>
<td>Frequency Setting</td>
<td>B—</td>
<td>Grid of 12SA7</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Top View)</td>
<td>Output I. F., Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>1600 Kc.</td>
<td>1 mmf.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1400 Kc.</td>
<td>200 mmf.</td>
<td>External Antenna and B—</td>
<td>Broadcast</td>
<td>Set Dial at 1400 K. C.</td>
<td>Trimmer C7</td>
<td>Broadcast oscillator, Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>600 Kc.</td>
<td>200 mmf.</td>
<td>External Antenna and B—</td>
<td>Broadcast</td>
<td>Set Dial at 600 K. C.</td>
<td>Trimmer C7</td>
<td>Broadcast oscillator, Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

The loop antenna should be connected to the radio when making all adjustments—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected.

**NOTE** "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

**NOTE** "B"—Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

The output should be adjusted to give maximum output. After each band is completed, repeat the procedure as a final check.

**Tuning Frequency Range**
- Broadcast: 540 to 1600 KC
- Shortwave: 5.6 to 18.3 MC
**Intermediate Frequency** - 455 KC
**Speaker** - 5 in. P.M. Dynamic
Power Supply

This radio is equipped with a universal transformer, 40 to 60 cycles which has the following taps: 90-110-130-150-230 volts.

A rotary switch mounted on top of the transformer selects the proper voltage tap.

Set the switch for various line voltages to conform with the following table:

- 90 mark for current of 85 to 105 volts
- 110 mark for current of 105 to 125 volts
- 130 mark for current of 125 to 145 volts
- 150 mark for current of 145 to 165 volts
- 230 mark for current of 210 to 250 volts

Turn the switch, unscrew the set screw on the side of the switch and rotate the knob so that the mark desired shows up in the small framed window on the top of the switch. Tighten the set screw.

MODEL 542 SERIES A

Power Consumption - 55 Watts
Power Output - 1½ Watts Undistorted
Tuning Frequency Range

Broadcast Band - 540 to 1735 KC
Medium Band - - 2.2 to 7 MC
Short Wave Band - - - 6.8 to 23 MC
## ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>455 Kc. 1 MFD.</td>
<td>Grid of 6SK7 L.F. Tube</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Chassis View)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short Wave</td>
<td>21 Mc. 400 ohms</td>
<td>Antenna lead</td>
<td>Short Wave</td>
<td>Set Dial at 21 Mc</td>
<td>Trimmer (C7) (See Trimmer View)</td>
<td>Short wave oscillator</td>
<td>Adjustment to maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Band</td>
<td>6 Mc. 400 ohms</td>
<td>Antenna lead</td>
<td>Medium Wave</td>
<td>Set Dial at 6 Mc</td>
<td>Trimmers (C8, C9) (See Trimmer View)</td>
<td>Medium wave oscillator and antenna</td>
<td>Adjustment to maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short Wave</td>
<td>1700 Kc. 200 mmf.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer (C10) (See Chassis View)</td>
<td>Broadcast oscillator</td>
<td>Adjustment to maximum output in series pad (See note “B&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Band</td>
<td>600 Kc. 200 ohms</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Set Dial at 600 Kc</td>
<td>Trimmer (C11) (See Chassis View)</td>
<td>Broadcast oscillator series pad</td>
<td>Adjustment to maximum output</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE "A"**—It is extremely necessary when making this adjustment that the fundamental oscillator signal be tuned in and out at the frequency which will fall below the fundamental.

**NOTE "B"**—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

ATTENUATE THE SIGNAL FROM THE SIGNAL GENERATOR TO PREVENT THE LEVELING-OFF ACTION OF THE AVC.

After each range is completed, repeat the procedure as a final check.

---

### MODEL 542—SERIES A

The loop antenna should be connected to the radio when making all R. F. adjustments.

**NOTE "A"**—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

ATTENUATE THE SIGNAL FROM THE SIGNAL GENERATOR TO PREVENT THE LEVELING-OFF ACTION OF THE AVC.

After each range is completed, repeat the procedure as a final check.

---

### Model 681—SERIES A

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 Mf, 200 Mm, 400 Ohms.
MODEL 679C

PROCEDURE FOR SETTING THE AUTOMATIC PUSHBUTTONS:

There are six pushbuttons on the Remote Tuner Unit by means of which six stations may be set up for automatic tuning (see F, Fig. 2).

1. Make a list of local stations you tune in regularly; any number up to six and including six.

2. Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

3. On the top of each pushbutton a slot is provided for inserting the call letter tabs. (See A, Fig. 2).

4. Insert the call letter tabs.

5. NOW PROCEED AS FOLLOWS-
   1. Push the dial tuning knob in hard enough to make it latch in.
   2. Rotate the dial tuning knob to the left (counter-clockwise) until the knob cannot be turned any further without forcing.
   3. Push in on the pushbutton which is latched in. Holding it firmly, turn it in by means of the dial tuning knob the station indicated on the station call letter tab on this pushbutton. Turn the dial tuning knob very slowly back and forth (while still pressing firmly on the pushbutton), until the station is clearest. The station will then be accurately tuned in.
   4. Push in on the pushbutton which is latched in. Holding it firmly, turn in by means of the dial tuning knob the station indicated on the station call letter tab on this pushbutton. Turn the dial tuning knob very slowly back and forth (while still pressing firmly on the pushbutton), until the station is clearest. The station will then be accurately tuned in.

6. Release the pushbutton and the dial tuning knob are latched together. Holding the pushbutton firmly, tune in the station indicated on the call letter tab on this pushbutton.

7. When the last pushbutton has been properly set up, it is necessary to release it from the latch position before the tuning mechanism can be locked. To release this pushbutton, press the pushbutton release pin on the bottom of the tuner unit. This will trip the latch mechanism and all the pushbuttons will be released to out position. (See B, Fig. 2.)

8. Now, press on the dial tuning knob hard enough to make it latch in. Rotate the dial tuning knob to the right (clockwise) until the knob cannot be turned any further without forcing.

9. Press in on any of the pushbuttons and--YOUR FAVORITE STATION IS SELECTED.

The important steps to remember when setting up stations on the pushbuttons for automatic tuning are:

1. To unlock the tuning mechanism press on the dial tuning knob hard enough to make it stay latched in. Rotate the dial tuning knob to the left (counter-clockwise) until the knob cannot be turned any further without forcing.

2. To set a pushbutton, Push in all the way and hold in firmly both the pushbutton and the dial tuning knob so that both latch in. Hold in firmly the pushbutton and tune in the station by means of the dial tuning knob. Set all the pushbuttons in the same manner.

3. To release the last pushbutton press the pushbutton release pin on the bottom of the tuner unit.

4. To lock the tuning mechanism push on the dial tuning knob hard enough to make it stay latched in. Rotate the dial tuning knob to the right (clockwise) until the knob can not be turned any further without forcing. [NOTE: All the pushbuttons must be in out position when locking the tuning mechanism.]

5. Press down another automatic tuner push button. Hold it down Firmly and carefully tune in next station desired. Release this push button.

6. Follow this procedure until you have selected all of your favorite stations.

7. Now, rotate the tuning knobs to the left (clockwise) as far as it will turn, and with a screwdriver loosen the special locking screw (C.)

8. Models 679C, 679A.

Fig. 2A-
Bottom View of Remote Tuner Unit Showing Push Button Release Pin

CHANGING STATIONS:

If you should desire to change any station you have selected to another, loosen the locking screw (C) one or two turns. Hold in push button on which the station is to be changed and turn to new station desired. Release the push button. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner buttons, it is due to the locking screw being too tight. Loosen the locking screw "C" until the dial mechanism works freely with the tuner push button pressed in.

Be sure to re-tighten the locking screw, otherwise the station you have previously selected will not stay adjusted to the push buttons.

The set is now set up for automatic tuning.
Volume control—Maximum all adjustments.
Connect radio ground to ground post of signal generator with a short heavy lead.
Connect dummy antenna value in series with generator output lead.
Connect output meter across primary of output transformer.
Allow chassis and signal generator to “heat up” for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 mH, 200 mH, 400 ohms.

---

MODEL 671

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (In Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>455 Kc.</td>
<td>1 MFD</td>
<td>Grid of 6SA7 Mixer</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmers on top (See Top View)</td>
<td>Input and Output I.F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>SHORT WAVE BAND (See Note A)</td>
<td>17 Mc.</td>
<td>400 Ohms</td>
<td>External Antenna and Ground</td>
<td>Short Wave</td>
<td>Set Dial at 17 Mc.</td>
<td>Trimmer C4</td>
<td>Short Wave oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>17 Mc.</td>
<td>400 Ohms</td>
<td>External Antenna and Ground</td>
<td>Short Wave</td>
<td>Set Dial at 17 Mc.</td>
<td>Trimmer C1</td>
<td>Short Wave antenna</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>6 Mc.</td>
<td>400 Ohms</td>
<td>External Antenna and Ground</td>
<td>Short Wave</td>
<td>Set Dial at 6 Mc.</td>
<td>Trimmer C7</td>
<td>Short Wave oscillator series pad</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROADCAST BAND (See Note A)</td>
<td>1600 Kc.</td>
<td>200 mH</td>
<td>Grid of 6SA7</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer C5</td>
<td>Broadcast oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>LOOP ALIGNMENT (See Note B)</td>
<td>530 Kc.</td>
<td>200 mH</td>
<td>Grid of 6SA7</td>
<td>Broadcast</td>
<td>Rotor full closed</td>
<td>Trimmer C6</td>
<td>Broadcast oscillator series pad</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

---

MODEL 616

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (In Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>455 Kc.</td>
<td>.1 MFD</td>
<td>Grid of 6SJ7</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Chassis View)</td>
<td>Input I.F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>455 Kc.</td>
<td>.1 MFD</td>
<td>Grid of 6SA7 Mixer</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Chassis View)</td>
<td>Input I.F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>SHORT WAVE BAND (See Note A)</td>
<td>17 Mc.</td>
<td>400 Ohms</td>
<td>External Antenna and Ground</td>
<td>Short Wave</td>
<td>Set Dial at 17 Mc.</td>
<td>Trimmer C4</td>
<td>Short Wave oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>17 Mc.</td>
<td>400 Ohms</td>
<td>External Antenna and Ground</td>
<td>Short Wave</td>
<td>Set Dial at 17 Mc.</td>
<td>Trimmer C1</td>
<td>Short Wave antenna</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>6 Mc.</td>
<td>400 Ohms</td>
<td>External Antenna and Ground</td>
<td>Short Wave</td>
<td>Set Dial at 6 Mc.</td>
<td>Trimmer C7</td>
<td>Short Wave oscillator series pad</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROADCAST BAND (See Note A)</td>
<td>1600 Kc.</td>
<td>200 mH</td>
<td>Grid of 6SA7</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer C6</td>
<td>Broadcast oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>LOOP ALIGNMENT (See Note B)</td>
<td>530 Kc.</td>
<td>200 mH</td>
<td>Grid of 6SA7</td>
<td>Broadcast</td>
<td>Rotor full closed</td>
<td>Trimmer C7</td>
<td>Broadcast oscillator series pad</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

---

NOTE "A"—The signal generator is connected to the "ANT." and "GND" leads when aligning the Short Wave Band and to the grid of the 6SA7 tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1600 and 530 K.C.) Mc. The loop antennas should be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." terminals.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained. Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC. After each band is completed, repeat the procedure as a final check.

MODEL 671
©John F. Rider, Publisher
Six-Tube A.C.-D.C. Superheterodyne Receiver with Automatic Tuning and Self-Contained Loop Antenna

JUNE 1940

Frequency Range—535 - 1600 Kilocycles
I. F. Frequency 455 Kc.

Alignments and tuning data are used for this receiver.

Volts

Receivers of this model which are to be used on voltages other than 105-125 volts A.C. (50/60 cycle), or 105-125 volts D.C. are so marked. The power consumption of this receiver is 35 watts.

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BELMONT RADIO CORP.

MODEL 671
Series A

6SA7 CONVERTER
6SK7 I.F. AMP.
6SK7 I.F. AMP.
6SQ7 2ND DET. A.U.C.
6V6GT OUTPUT

REMOTE CONTROL DATA, SEE INDEX

TRIMMER VIEW

Code Part Description
No. No.

RESISTORS
R1 13071 4000 ohm—56 w.
R2 13012 20 ohm—56 w.
R3 13019 1 megohm—56 w.
R4 13023 30M ohm—56 w.
R5 13025 750 ohm—56 w.
R6 13029 1M ohm—1 watt
R7 13018 5M ohm—56 w.
R8 13020 100M ohm—56 w.
R9 13017 3 megohm—56 w.
R10 13022 350 ohm—56 w.
R11 1303 50M ohm—56 w.
R12 101232 1 megohm volume control
R13 101219 10 megohm—56 w.
R14 1303 500M ohm—56 w.
R15 101231 1 megohm tone control
R16 130212 250M ohm—56 w.
R17 13023 270 ohm—1 watt

CONDENSERS
C C10137 Two gang variable cond
C1 12410 S. W. Antenna trimmer
C2 12419 B. C. Antenna trimmer
C3 1272 .005 mica
C4 124122 S. W. Oscillator trimmer
C5 124142 B. C. Oscillator trimmer
C6 124146 B. C. Padder Condenser
C7 124146 S. W. Padder Condenser
C8 12960 150 mmfd. mica
C9 1003 .01 400 v.
C10 1002 .05 200 v.
C11 1009 .01 200 v.
C12 1292 .005 mica
C13 129161 .001 mica

Power Consumption
Radio Only — — — 70 Watts
Motor Only — — — 20 Watts

Power Output — — — 2.1 Watts Undistorted

Sensitivity for 500 Milliwatt Output: 15 Microvolts Average

Selectivity - 51 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast Band - 530 to 1600 KC
Shortwave Band - 5.46 to 18.3 MC

Intermediate Frequency — — — 455 KC

Speaker — — — 8 in. Electro Dynamic

PARTS
T1 11100 Loop antenna assembly
T2 11118 S. W. Antenna Coil
T3 108154 B. C. and S. W. Oscillator Coil
T4 108169E Input I. F. Coil—455 kc.
T5 108169U Output I. F. Coil—455 kc.
T6 105118 Output Transformer
T7 114210 8" Electro Dynamic Speaker
T8 104225B 60 cycle power transformer
and 104238B 25 cycle power transformer
T9 10022 60 cycle Seeburg Record Changer
and 100229 25 cycle Seeburg Record Changer
and 100229 Phono Assembly

S1 125132 Phono-band switch
S2 10513 Switch on volume control
S3 12312 Switch on record changer
P1 10794 Pilot light bulb No. T-44
Fig. 3 - Top View of Chassis

VIBRATOR

FOR TUNER DATA, SEE INDEX

RESISTORS

FREQUENCY RANGE
550 to 1565 Kc.

MARCH 1940
MODEL 678, Issue C
(Serial No. 14302 and up)

IMPORTANT: Keep all battery connecting wires and cables such as cables 107313 and 107315 as far away from the R.F. connector cable (107231) as possible. This will reduce any interference which may be present in these battery wires from being radiated back into the R.F. connector cable 107231.
**ALIGNMENT PROCEDURE**

- The following equipment is required for aligning:
  - An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
  - Output indicating meter.
  - Non-metallic screwdriver.
  - Dummy antennas—1 mL, 125 mm.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Remote Tuner Dial Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>465 Kc. <code>.1 MFD</code></td>
<td>Grid of 6SK7 1 F. Tube</td>
<td>Set dial at 1400 Kc.</td>
<td>Trimmers C9, C10 (See Fig. 3)</td>
<td>Output I.F.</td>
<td>See note &quot;A&quot;</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>I.F.</td>
<td>465 Kc. <code>.1 MFD</code></td>
<td>Grid of 6SK7</td>
<td>Set dial at 1400 Kc.</td>
<td>Trimmer C1 (See Fig. 3)</td>
<td>Output I.F.</td>
<td>See note &quot;B&quot;</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>I.F.</td>
<td>465 Kc. <code>.1 MFD</code></td>
<td>Grid of 6AG7</td>
<td>Set dial at 1400 Kc.</td>
<td>Trimmer C4, C5 (See Fig. 3)</td>
<td>Input I.F.</td>
<td>See note &quot;B&quot;</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROADCAST</td>
<td>1565 Kc. 125 mml.</td>
<td>Antenna lead</td>
<td>Set dial at 1565 Kc.</td>
<td>Trimmer C3 (See Fig. 4)</td>
<td>Oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>BAND</td>
<td>1400 Kc. 125 mml.</td>
<td>Antenna lead</td>
<td>Set dial at 1400 Kc.</td>
<td>Trimmer C3 (See Fig. 4)</td>
<td>Antenna and k. P.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>BAND</td>
<td>600 Kc. 125 mml.</td>
<td>Antenna lead</td>
<td>Set dial at 600 Kc.</td>
<td>Trimmer C2 (See Fig. 4)</td>
<td>Antenna series adj.</td>
<td>See note &quot;C&quot;</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE "A" IMPORTANT:** To align the output I.F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the diode tuned circuit. Connect the resistor as indicated by points "X" and "Y" on the circuit diagram. If an oscillograph is not available, disconnect the output I.F. transformer from the circuit and connect a 10M ohm resistor between points "X" and "Y". After the alignment is completed, reconnect the output I.F. transformer and remove the 10M ohm resistor.

**NOTE "B"** Adjust trimmers C19 or C20 after the 10M ohm resistor has been removed.

**ALIGNMENT OF THE IRON CORES**

The iron cores for the antenna, R, P. and oscillator permeability coils have been very carefully adjusted at the factory and require no further adjustments, unless it becomes necessary to replace a coil, or if the adjustments have been tampered with.

The procedure for aligning the iron cores will be supplied with replacement coils when ordered.

---

**IMPORTANT—ADJUSTING ANTENNA TRIMMER:**

Tune in any weak station between 600 and 800 kc. Make sure that the antenna shunt trimmer on the Bottom of the Remote Tuner is turned all the way out (counter clockwise), (see adjustment "C1", Fig. 4).

Adjust antenna series trimmer on the side of the remote Tuner Unit. For maximum output. (See adjustment "C2", Fig. 4).

**NOTE:** If resonance (maximum output) cannot be obtained within the range of the antenna trimmer series trimmer "C2", turn the adjustment screw all the way out (counter clockwise) and then adjust the antenna shunt trimmer "C1" on the bottom of the remote tuner unit for a peak of maximum output.

The above arrangement will cover any antenna capacity that is now in use.
Model 681

Series A

**Resistors**

- **13071**: 4M ohm—55 w.
- **13019**: 20 ohm—55 w.
- **13026**: 1 megohm—55 w.
- **13023**: 710 ohm—55 w.
- **13074**: 19.4 ohm—55 w.
- **13018**: 5M ohm—55 w.
- **13020**: 10M ohm—55 w.
- **13042**: 5 megohm—15 w.
- **13022**: 310 ohm—55 w.
- **13012**: 50M ohm—55 w.
- **1304**: 1 megohm volume control
- **13023**: 10 megohm—55 w.
- **1305**: 500M ohm—55 w.
- **13024**: 1 megohm tone control
- **13011**: 250M ohm—55 w.
- **13025**: 50 ohm—1 w.

**Code Part No. No. CONDENSERS**

C1 13028 2 gang variable condenser:
C2 12416 S.W. antenna trimmer
C3 12416 B.C. antenna trimmer
C4 1392 1000 micros
C5 12412 S.W. Oscillator trimmer
C6 12412 B.C. Oscillator trimmer
C7 12416 B.C. padding condenser
C8 1392 100 micros
C9 12416 S.W. padding condenser
C10 1392 100 micros
C11 1392 100 micros
C12 1359 1000 micros
C13 1392 100 micros
C14 1392 100 micros
C15 1392 100 micros
C16 1392 100 micros
C17 1392 100 micros
C18 1392 100 micros
C19 1392 100 micros
C20 1392 100 micros
C21 1392 100 micros

**Setting the Pushbuttons**

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the front of each pushbutton.

Next push one of the pushbuttons all the way in as far as it will go and hold it there. Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct, then release the button. Continue setting each pushbutton in the same way. Now rotate the tuning knob to the right (clockwise) as far as it will turn.

Looking at the back of the cabinet note the reset lock screw on the left hand side of the chassis, (see chassis view).

Rotate the reset lock screw to the right (clockwise) by means of the pin thru the shaft.

It is very important that this locking screw is turned until it is absolutely tight.

This screw will lock in place all the stations you have selected on the automatic tuner pushbuttons. Pressing the proper button will now tune the station you want. (NOTE: Locking screw is loose when radio is shipped from factory).

To change stations simply loosen the reset lock screw and repeat the procedure above.

**Power Consumption**

- 55 Watts

**Power Output**

- 2.2 Watts Undistorted

**Sensitivity for 500 Milliwatt Output**: 15 Microvolts Average

**Selectivity**: 47 KC Broad at 1000 Times Signal at 1000 KC

**Tuning Frequency Range**: Broadcast Band - 535 to 1600 KC

**Shortwave Band**: 5.43 to 18.3 MC

**Intermediate Frequency**

- 455 KC

**Bottom View of Chassis**

- Voltages measured with high resistance voltmeter between socket terminals and chassis. Volume control at minimum, first line switch off.

- Cannot be measured with voltmeter.

- Amperage as measured across 2 amp. meter at 120 vac across fuse turn.

**Parts**

- T1 11228 Loop antenna assembly
- T1 11114 S.W. antenna coil
- T1 15014 B.C. & S.W. Oscillator coil
- T1 186696 Input 1.5 F coil—455 kc
- T5 186696 Output 0.5 F coil—415 kc
- T6 108483 Input Transformer
- T8 112375 0.5 cycle power transformer
- T8 193501 Cycle power transformer
- L4 12514 Band switch
- L4 12512 R.F. choke coil
- L1 10024 Pilot light bulb T-44
Setting the Pushbuttons

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheet included with the radio. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place, (push directly on front of button). Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure.
### MODEL 705

#### SIGNAL GENERATOR

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Dial Pointer Setting</th>
<th>Trimmers Adjusted in Order Shown</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>315 Hz</td>
<td>1 MFD</td>
<td>Grid of 6522 (L.F.)</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>45 Hz</td>
<td>1 MFD</td>
<td>Grid of 6527</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>30 Hz</td>
<td>1 MFD</td>
<td>Grid of 6529</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

#### 31 METER BAND

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Dial Pointer Setting</th>
<th>Trimmers Adjusted in Order Shown</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>315 Hz</td>
<td>1 MFD</td>
<td>Grid of 6522 (L.F.)</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

#### 25 METER BAND

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Dial Pointer Setting</th>
<th>Trimmers Adjusted in Order Shown</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 Hz</td>
<td>1 MFD</td>
<td>Grid of 6527</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

#### 19 METER BAND

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Dial Pointer Setting</th>
<th>Trimmers Adjusted in Order Shown</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>315 Hz</td>
<td>1 MFD</td>
<td>Grid of 6522 (L.F.)</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

#### BROADCAST BAND

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Dial Pointer Setting</th>
<th>Trimmers Adjusted in Order Shown</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>315 Hz</td>
<td>1 MFD</td>
<td>Grid of 6522 (L.F.)</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

#### TRIMMER VIEW

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Dial Pointer Setting</th>
<th>Trimmers Adjusted in Order Shown</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 METER</td>
<td>315 Hz</td>
<td>1 MFD</td>
<td>Grid of 6522 (L.F.)</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>25 METER</td>
<td>45 Hz</td>
<td>1 MFD</td>
<td>Grid of 6527</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>19 METER</td>
<td>315 Hz</td>
<td>1 MFD</td>
<td>Grid of 6522 (L.F.)</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROADCAST</td>
<td>315 Hz</td>
<td>1 MFD</td>
<td>Grid of 6522 (L.F.)</td>
<td>Broadcast</td>
<td>Set Dial at 100 Hz.</td>
<td>Two Trimmers on Top</td>
<td>Output F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

### Setting the Pushbuttons

#### 902

- Make a list of your 6 favorite stations.
- Push the button hard all the way in to lock the station in place (push directly on front of button).
- Time setting each pushbutton in the same way. Pressing the proper button will now tune the station. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.
- To change stations: Simply repeat the procedure.

### Pushbutton Tone Control

This button has three tone positions:
- Bass
- Medium
- Treble

### Radio-Phono Pushbutton Switch

This pushbutton switches from the radio to the phone position. It should be level with the other buttons for radio operation—or pulled out to use a phonograph. A phone jack is provided on the chassis should you wish to connect an external phonograph to your Radio. (Phone jack is shown in the chassis view.)
BELMONT RADIO CORP.

MODEL 729
Series A

BELMONT PAGE 12-25

Schematic Diagram

Ref. No. No. Description

RESISTORS
R1 1001 350 ohm-1/4 w.
R2 1002 10 ohm—1/4 w.
R3 1003 3 megohm—1/4 w.
R4 1004 30M ohm—1/4 w.
R5 1005 15M ohm—1/4 w.
R6 1006 300 ohm—1/4 w.
R7 1007 50M ohm—1/4 w.
R8 1008 2 megohm—1/4 w.
R9 1009 250 ohm—1/4 w.
R10 1010 15M ohm—1/4 w.
R11 1011 Tone control—1/4 megohm
R12 1012 Volume Control—1/4 megohm
R13 1013 5 megohm—1/4 w.
R14 1014 100M ohm—1/4 w.
R15 1015 8M ohm—1/4 w.
R16 1016 100M ohm—1/4 w.
R17 1017 100M ohm—1/4 w.
R18 1018 500 ohm—1/4 w.
R19 1019 500 ohm—1/4 w.
R20 1020 320 ohm—1 watt

CONDENSERS
C1 101113 2 gang variable condenser
C2 124116 Short wave antenna trimmer
C3 124117 B.C. antenna trimmer
C4 12412 Dual adj. trimmer—S.W. osc. trimmer
C5 12412 Dual adj. trimmer—B.C. osc. trimmer
C6 124140 Dual adj. condenser—B.C. pad
C7 124140 Dual adj. condenser—B.C. pad
C8 12560 0.0015 mica
C9 10013 0.0 x 400 v.
C10 1009 0.05 x 200 v.
C11 1009 0.5 x 300 v.
C12 1001 .1 x 400 v.
C13 129161 Dual—0.001 mica
C14 129161 Dual—0.001 mica
C15 119108 16 mfd. x 450 w.v. lytic condenser
C16 119108 16 mfd. x 450 w.v. lytic condenser
C17 12925 0.001 mica
C18 100120 0.05 x 200 v.
C19 10015 0.05 x 600 v.
C20 1006 0.2 x 400 v.
C21 10019 0.05 x 600 v.
C22 10013 0.05 x 400 v.
C23 10013 0.05 x 400 v.
C24 10061 0.02 x 600 v.
C25 10061 0.02 x 600 v.
C26 10019 0.0 x 600 v.
C27 129169 0.0025 mica

C4 and C5, C8 and C7, and C13 and C14 are in the same units

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### Phonograph-Television or FM Jack

Should you wish to use an external phonograph it should be plugged into the phono-jack shown in the top view. The on-off radio-phono knob on the front panel will then switch from radio to phonograph operation.

- **Power Consumption:** - - 75 Watts
- **Power Output:** - - 3 Watts Undistorted
- **Sensitivity for 500 Milliwatt Output:** 20 Microvolts Average

If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-television-FM in the top view will accommodate either the Phon or a television or FM converter.

- **Selectivity:** 45 KC Broad at 1000 Times Signal at 1000 KC
- **Tuning Frequency Range**
  - **Broadcast:** - - 535 to 1600 KC
  - **Shortwave:** - - 5.4 to 18.4 MC
- **Intermediate Frequency:** - - - - 455 KC
- **Speaker:** - - - - 6 in. Electro Dynamic

### ALIGNMENT PROCEDURE

- **Volume control:** Maximum all adjustments.
- **Connect radio ground to ground post of signal generator with a short heavy lead.**
- **Connect dummy antenna value in series with generator output lead.**
- **Connect output meter across primary of output transformer.**
- **Allow chassis and signal generator to "heat up" for several minutes.**

The following equipment is required for aligning:

- **An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.**
- **Output indicating meter.**
- **Non-metallic screwdriver.**
- **Dummy antennas—1 mil., 200 mmf., 400 ohms.**

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmers adjusted (as shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>455 Kc. 1 MFD. Grid of 6SK7 I.F.</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Top View)</td>
<td>Output I.F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>455 Kc. 1 MFD. Grid of 6SK7 Mixer</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Top View)</td>
<td>Input I.F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>SHORT WAVE BAND (See Note A)</td>
<td>17 Mc. 400 Ohms External Antenna and Ground</td>
<td>Short Wave</td>
<td>Set Dial at 17 Mc.</td>
<td>Trimmer C4</td>
<td>Short Wave oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17 Mc. 400 Ohms External Antenna and Ground</td>
<td>Short Wave</td>
<td>Set Dial at 17 Mc.</td>
<td>Trimmer C1</td>
<td>Short Wave antenna</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Mc. 400 Ohms External Antenna and Ground</td>
<td>Short Wave</td>
<td>Set Dial at 6 Mc.</td>
<td>Trimmer C7</td>
<td>Short Wave oscillator series pad</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>BROAD CAST BAND (See Note A)</td>
<td>1600 Kc. 200 mmf. Grid of 6SK7</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer C5</td>
<td>Broadcast oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>535 Kc. 200 mmf. Grid of 6SK7</td>
<td>Broadcast</td>
<td>Set Dial at 535 Kc.</td>
<td>Trimmer C5</td>
<td>Broadcast oscillator series pad</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>LOOP ALIGNMENT (See Note B)</td>
<td>1400 Kc. 200 mmf. External Antenna and Ground</td>
<td>Broadcast</td>
<td>Set Dial at 1400 Kc.</td>
<td>Trimmer C2</td>
<td>Broadcast oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>600 Kc. 200 mmf. External Antenna and Ground</td>
<td>Broadcast</td>
<td>Set Dial at 600 Kc.</td>
<td>Trimmer T3</td>
<td>Iron Core Tracking Coil</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE A**—The signal generator is connected to the "ANT" and "GND." terminals on the rear of the chassis when aligning the Short Wave Band and to the grid of the 6SK7 tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1600 and 355 K. C.).

The loop antenna should be connected to the radio when making these adjustments.

**NOTE B**—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT" and "GND." terminals.

**NOTE C**—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

After each band is completed, repeat the procedure as a final check.
First I.F. Amp  Second Detector  A.V.C. First Audio  Inverter Output Amplifier
Detector-oscillator  I.F. 465 K.C.  Phase

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6SA7</td>
<td>2 gang variable condenser</td>
</tr>
<tr>
<td>6SK7</td>
<td>S.W. Antenna Trimmer</td>
</tr>
<tr>
<td>6SQ7</td>
<td>C1 and C2 are in same unit</td>
</tr>
<tr>
<td>6J5GT</td>
<td>C3 and C4 are in same unit</td>
</tr>
<tr>
<td>6K6G</td>
<td>C5 and C6 are in same unit</td>
</tr>
</tbody>
</table>

**POWER CONSUMPTION**
Radio Chassis only, less Phono Motor... 100 Watts

**POWER OUTPUT**
4.5 Watts Distorted, 6 Watts Maximum

---

**FREQUENCY RANGE**
5.4 to 16.3 MHz
532 to 1570 K.C.

**Model 796**

**PARTS**

- Loop Antenna Assembly
- Loop Adjustable Coil
- Short Wave Antenna Coil
- B.C. S.W. Oscillator Coil
- Input L.F. Coil-465 kc.
- Output L.F. Coil-465 kc.
- Output Transformer
- Electrodynamic speaker
- Power Transformer
- Band Switch
- On-off Switch on Volume Control
- Phone Motor: Phone Pickup Arm
- Record Changer Complete
- Phone Turntable

---

**BELMONT RADIO CORP.**

**MODEL 796 SERIES A**

**SERIAL NO. OC362500 and up**

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**JOHN F. RIDER, PUBLISHER**

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**www.americanradiohistory.com**
IMPORTANT: See Aligning Instructions.

ALIGNMENT PROCEDURE

The following equipment is required for aligning:

- An all-wave signal generator which will provide an accurately calibrated signal at the test frequency listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antenna—1 mL, 200 mmL, 400 ohms.

**NOTE A—**The signal generator is connected to the "ANT" and "GND" terminals on the rear of the chassis when aligning the Short Wave Band and to the grid of the 6SA7 tube and ground terminal when setting the Broadcast Band oscillator and frequencies, (1570 and 532 K.C.).

The loop antenna need not be connected to the radio when making these adjustments.

**NOTE B—**Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT" and "GND" terminals and the jumper on the terminal board connected to "EXT" terminal.

**SERVICE NOTES:**

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 115 volts A.C. on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, short each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

**ALIGNING INSTRUCTIONS:**

**CAUTION—**No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers, and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

It is important during loop alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.

To remove the chassis from the cabinet, pull off the knobs and take out the 4 bolts holding the chassis flange to the control panel.
Model 797
Series A
(Serial No. OD428100 and up)

FOR TUNER DATA
SEE INDEX

PARTS

BELMONT RADIO CORP.
Model 797 Series A
Set No. OD428100 up
THE RECORDER AND PHONOGRAPH

Model 797 Series A

Unpack the microphone and plug it into the chassis; microphone socket is shown in Fig. 3. Insert a special cutting stylus (needle) in the cutter arm as shown in Fig. 2. Handle this needle with care.

Be sure the needle is tight after each recording. Should it loosen during the recording, it will chatter and ruin your record.

The cutting stylus is razor sharp and must not be dropped on the record or allowed to rest on the turntable. For best operation, the instrument should be level in all directions. To check this, place a small level, if you have one, on the turntable. If you do not have a level, a marble will do. If the marble rolls off the turntable, it is low in the direction in which it rolls. Place something under the console until the machine is reasonably level.

HOWLING:

If the microphone is held too close to the loud speaker, it will feed back and start a loud "howl!". Keep the microphone well away from the recording cabinet with its back toward the cabinet.

If the recording switch is in radio position and the microphone volume control is turned on, feedback will occur and a very loud "howl" will start. Be sure to turn the microphone volume control to zero when playing radio.

SHAVINGS:

The cutting stylus cuts out a fine shaving that is just a little thicker than a human hair. These shavings should not be allowed to gather under the cutting stylus.

Just before lowering the cutting arm on the record, hold one finger on the center of the record for a moment. This will create a static charge that will pull the shavings toward the center pin.

While cutting, gently brush the shavings from the left side of the record, toward the center pin, allowing them to collect there until the recording is completed.

CUTTING ARM ADJUSTMENTS:

The cutting arm is adjusted at the factory for proper operation, however, with various types of blanks this adjustment may sometimes have to be altered. With a blank record on the table, the height adjustment shown in Fig. 2, should be adjusted so that the bottom of the cutting arm is 1/4" from the top of the record blank. Make this measurement carefully at the front end beside the stylus screw.

The screw adjustment can be turned to raise or lower the arm.

Several blank grooves should now be cut to see if the groove is the proper depth. The depth adjustment screw shown in Fig. 2 will increase the depth of the groove if turned to the right and will decrease the groove if turned to the left.

If the groove is too shallow, the playback needle will not stay in the groove. If it is too deep, not enough wall will be left between grooves and the playback needle will break through from one track to the next a few playings.

The proper depth of groove will leave about the same space between the groove as the groove is wide. Hold a finished record toward the light and you can usually see if the grooves are spaced correctly.

A properly cut groove will leave a shaving just a little heavier than a human hair.

RECORDING RADIO PROGRAMS:

Turn the radio on and tune in the program you wish to record. Turn microphone volume control to zero (left). Put recording switch in record position. The volume will drop. Start motor and then gently lower cutting needle onto blank record, about 1/4" from outer edge.

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Setting the Pushbuttons

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton. (Except the two end ones).

Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place, (push directly on front of button). Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure above.

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### SIGNAL GENERATOR

<table>
<thead>
<tr>
<th>BAND</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Dial Pointer Setting</th>
<th>Trimmers Adjusted In Order Shown</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>455 Kc.</td>
<td>1 MFD.</td>
<td>Grid of 6SK7 (L.F.)</td>
<td>Broadcast</td>
<td>Set Dial at 600 Kc.</td>
<td>Two Trimmers on Top</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>31 METER BAND</td>
<td>5.6 Mz.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>31M</td>
<td>Set Dial at 5.6 Mz.</td>
<td>(See Trimmer View) C20</td>
<td>Osc. R. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>49 METER BAND</td>
<td>6.1 Mz.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>49M</td>
<td>Set Dial at 6.1 Mz.</td>
<td>(See Trimmer View) T8</td>
<td>Osc. R. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>25 METER BAND</td>
<td>11.8 Mz.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>25M</td>
<td>Set Dial at 11.8 Mz.</td>
<td>(See Trimmer View) T9</td>
<td>Osc. R. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>19 METER BAND</td>
<td>15.2 Mz.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>19M</td>
<td>Set Dial at 15.2 Mz.</td>
<td>(See Trimmer View) T6</td>
<td>Osc. R. F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

### FRONT VIEW CHASSIS

- Power Consumption: 100 Watts
- Power Output: 5 Watts Distorted
- Sensitivity for 500 Milliwatt Output: 10 Microvolts Average
- Selectivity: 35 KC Broad at 1000 Times Signal at 1000 KC

**Intermediate Frequency 455 KC**  
Speaker 12 in. Electro Dynamic  
**Phonegraph-Television and Fm. Jack**

Should you wish to use an external phonograph it should be plugged into the phono jack shown in the chassis view. The radio-phono button on the front panel will then switch from radio to phono operation.

If television or frequency modulation (FM) programs are available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-television-FM in the top view will accommodate either the Phono or a television or FM converter.

---

**Tuning Frequency Range**  
- Broadcast Band - 540 to 1600 KC
- 49M Band - 5.9 to 6.1 MC
- 31M Band - 9.1 to 10 MC
- 25M Band - 11.4 to 12.1 MC
- 19M Band - 14.3 to 15.4 MC

For adjustment of the coil forms:

- Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.
- First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a gauze). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.
- Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

You are now ready to continue with the trimmer adjustments as shown on the alignment chart.
Television and FM Jack

If television or frequency modulation (FM) programs ever become available in your community, this radio may still be used in conjunction with the necessary converters.

The jack marked phono-pickup jack in the chassis view will accommodate either the Phono or a television or FM converter.
How to Make Perfect Recordings

The microphone must be connected to the chassis all times.

Insert a playback needle in the playback arm.
Insert a special cutting stylus (needle) in the cutter arm. Handle this needle with care.

Shave the needle is tight after each recording. If it is loose during the recording, it will chatter and ruin your record.

Cutting Needle

The cutting stylus is razor sharp and should not be dropped on the record or allowed to rest on the turntable.

For best operation, the instrument should be level in all directions. To check this, place a small level, if you have one, on the turntable. If you do not have a level, a marble will do. If the marble rolls off the turntable, it is low in the direction in which it rolls. Place something under the cabinet until the machine is reasonably level.

Shavings

The cutting stylus cuts out a fine shaving which is just a little thicker than a human hair. These shavings should not be allowed to gather under the cutting stylus.

While cutting, gently break the shavings from the left side of the record in toward the center pin, allowing them to collect there until the recording is completed.

Do Not Use Too Much Volume

The most frequent cause of poor recordings is too much volume or overloading. If some passages of your recording are smooth and clear while others are husky, rough and distorted, you are probably using too much volume. Overloading occurs most often on strong passages. The remedy is to reduce the volume slightly and watch the volume indicator lights to study the different effects of microphone technique.

Too little volume will show up when you play the record back. The volume control on your equipment will have to be turned up quite high and needle scratch will be excessive.

Cutting Arm Adjustments

The cutting arm is adjusted at the factory for proper operation, however, with various types of blanks this adjustment may sometimes have to be altered.

ON MODEL 801

With a blank record on the table, the height adjustment on the cutter arm should be adjusted so that the needle is centered in the slot when the needle rests on a blank record.

ON MODEL 616

With a blank record on the table, the height adjustment under the cutter arm should be adjusted so that the bottom of the cutting arm is "L" from the top of the record blank. Make this measurement carefully at the front end beside the stylus screw.

The screw adjustment can be turned to raise or lower the arm.

Several blank grooves should now be cut to see if the groove is the proper depth.

ON MODEL 616

The depth adjustment screw on the cutter arm will increase or decrease the depth of the groove if turned to the right or left.

ON MODEL 801

The depth adjustment screw on the cutter arm will increase or decrease the depth of the groove if turned to the letter "L" and will decrease the groove if turned to the letter "M". For a medium groove turn to "M".

If the groove is too shallow, the playback needle will not stay in the groove. If it is too deep, not enough wall will be left between grooves and the playback needle will break through from one track to the next after a few plays.

A properly cut groove will leave a shaving just a little heavier than a human hair.

The proper depth of groove will leave about the same space between the groove as the groove is wide. Hold a finished record toward the light and you can usually see if the grooves are spaced correctly.

Recording Radio Programs

Turn the radio on and tune in the program you wish to record. Put recording switch in "Record" position. The volume will drop. Start motor and then gently lower cutting needle onto blank record about 1/8" from outer edge. Volume indicator lights will come on.

Recording Radio Programs

Turn the radio on and tune in the program you wish to record. Put recording switch in "Playback" position. The volume will drop. Adjust volume control to the desired level. Start motor and then gently lower cutting needle onto blank record about 1/8" from outer edge. Record indicator light is on and white indicator light continues to flicker.

Model 801

NOTE—Some radios of this model are equipped with a recording control which you can make your own recordings. If your radio has the recording control follow the instructions below for making records.

The Mike volume control must be turned off (all the way left) except when recording with the microphone.

The two volume indicator lights on the right side of the radio volume control are used for setting the proper recording level. When recording radio programs the radio volume control should be adjusted so that the red indicator light remains off while the white indicator flickers. When recording with the microphone the white light should be adjusted in the same manner but using the microphone volume control.

Model 616

Reverse the procedures and operate the radio volume control to "Record" position and the mike volume control to "Playback" position.
Setting for Size of Record

The Changer plays up to fourteen 10" or ten 12" records at one time. All records must be the same size for each loading.

On each post you will see selecting arms. The position of these arms determines the setting for different size records. To set for 10 or 12 inch records, it is merely necessary to grasp the posts by the knobs at the top, lift, and turn until the 10" or 12" arms are pointing toward the center of the turntable. When in either the 10" or 12" position, the posts will snap into place except when they are lifted by hand. Be sure to set both posts for the same size record.

Loading

See that the selecting arms of both posts are turned toward the center of the turntable as indicated by the engraved arrows and that both sets of arms are set for the same size (10" or 12") records as described in the preceding paragraph.

Place the stack of records (up to fourteen 10" or ten 12") over the center pin so that they will rest on the selecting arms.

Starting the Changer

1. Turn on the radio (allowing approximately 30 seconds for the tubes to warm up) and turn the phonograph knob to the phonograph position.
2. Turn the switch knob on the Record Changer panel to "ON." The motor will then start and the record changer will go into automatic operation of its own accord.

How to Reject a Record

Mere pressing of the switch knob on the Changer panel. You can do it any time after the needle has come into contact with the record.

Playing Individual Records

Should it be desired to play an individual record merely set up the machine as described above for the proper size (10" or 12" as indicated on the selecting arms), place the record on top of the arms as described under "Loading," and set the machine in operation by means of the switch knob described above. In other words, play an individual record in the same manner as you would play a stack of that size.

Automatic Record Changer

NOTE: TO REMOVE SELECTOR ARMS SPRING CLAMP ONLY

Unloading

First switch off the motor. Grasp each post by its knob at the top and turn them out of the way.

Lift the played records from the turntable. Then return the posts to the proper playing position as indicated by the arrows on the selecting arms.

The Changer may then be loaded with a new stack of records according to the size shown on the selecting arms.

Turning Off Changer

Throw Changer switch knob to "OFF" position. Lift tone arm and place it in the rest position. If you happen to turn off the Changer switch while the mechanism is going through a "change cycle," you will notice that it does not stop until the cycle has been completed, and the tone arm is again in playing position, at which point it is ready to be lifted to the rest position. If you prefer to turn off your Changer with the radio switch, be sure to turn it off while needle is resting upon a record; otherwise, the selecting arms cannot be correctly reset.

To avoid warping of records, never leave records resting on posts.

If Changer is Left Running

No damage will be done if you forget to turn off Changer after it has played its entire load of records. It will simply repeat the last record until stopped or unloaded.

Phonograph Needles

Various types and kinds of needles are available for use in phonograph tone arms. All have their virtues, as well as their faults, for use in ordinary phonographs, where needles can be changed after each record. For playing ten or more records at one set up, as with this Changer, no attempt should be made to use ordinary steel or fibre points, since continued use of worn points will be likely to ruin both quality of reproduction and the records as well. Any kind of needle can be used which has a point durable enough to play ten records or more without damaging them.

It should be remembered that, no matter what the quality of the tone arm, amplifier, and speaker, all of the recorded music must pass through the needle. For this reason, it is absolutely essential that particular care be taken to use good needles, and to see that they are changed often enough so that the records are not damaged and the quality of the music is not impaired.

In general there are two types of needles which can be satisfactorily used on an Automatic Record Changer: those which require changing after approximately 12 records, and the so-called permanent type needles which are rated in terms of "hours of service." In no case should the manufacturers' claims for these needles be exceeded, since in all probability the needles are rated in terms of their maximum life. If at any time short of the rated life, particularly in the case of the semi-permanent type needles, there is any reason to suspect that the needle has become unduly worn, it would probably be advisable to replace it with a new one. Under any conditions should a needle be removed from the tone arm head and then replaced—needle manufacturers' claims notwithstanding.

For convenience, the tone arm on your changer may be raised to a nearly vertical position, so that the needle may be easily inserted; the needle screw should be tightened firmly.

Radio-Phono Pushbutton Switch

This pushbutton switches from the radio to the phonograph position. It should be level with the other buttons for radio operation—or pulled out to use the phonograph. The volume and tone controls also operate when playing records.

Pushbutton Tone Control

This button has three positions: Bass—Medium—Treble. Each time you push the button it will change the tone of one of these positions—Change it any time to the tone you like best.
I. F.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Dial Pointer Setting</th>
<th>Trimmers Adjusted in Order Shown</th>
<th>Triimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>455 Kc.</td>
<td>1 MFD.</td>
<td>Grid of 6S57</td>
<td>I.F.</td>
<td>Broadcast</td>
<td>Set Dial at 1600 Kc.</td>
<td>Two Trimmers on Top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>31 METER BAND</td>
<td>9.6 Mc.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>31M</td>
<td>Broadcast</td>
<td>Set Dial at 96 Mc.</td>
<td>(See Triimmer View) C20</td>
<td>R. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>49 METER BAND</td>
<td>6.1 Mc.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>49M</td>
<td>Broadcast</td>
<td>Set Dial at 61 Mc.</td>
<td>(See Triimmer View) C8</td>
<td>R. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>25 METER BAND</td>
<td>11.8 Mc.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>25M</td>
<td>Broadcast</td>
<td>Set Dial at 11.8 Mc.</td>
<td>(See Triimmer View) T11</td>
<td>R. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>19 METER BAND</td>
<td>15.2 Mc.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>19M</td>
<td>Broadcast</td>
<td>Set Dial at 15.2 Mc.</td>
<td>(See Triimmer View) T6</td>
<td>R. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROAD-CAST BAND</td>
<td>1000 Kc.</td>
<td>200 mmf.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Broadcast</td>
<td>Set Dial at 1600 Kc.</td>
<td>(See Iron Core Adjustment View)</td>
<td>R. F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

Phonograph-Television and
Fm. Jack

Should you wish to use an external phonograph it should be plugged into the phono jack shown in the chassis view—The radio-phono switch on the chassis will then switch from radio to phono operation.

If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-television-FM in the chassis view will accommodate either the Phono or a television or FM converter. **Service Notes**

Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a gauge). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.

Next rotate each iron core until the fine score marks are even with the edge of the coil forms. You are now ready to continue with the trimmer adjustments as shown on the alignment chart.
Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a gauge). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.

Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

1. Tone control—Treb
2. Volume control—Maximum all adjustments.
3. Connect radio chassis to ground post of signal generator with a short heavy lead.
4. Connect dummy antenna value in series with generator output lead.
5. Connect output meter across primary of output transformer.
6. Allow chassis and signal generator to "rest up" for several minutes.

Power Consumption

<table>
<thead>
<tr>
<th>Band</th>
<th>A Battery</th>
<th>B Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>300 MA</td>
<td>13.5 MA</td>
</tr>
</tbody>
</table>

Power Output - 210 MW Undistorted

Sensitivity for 50 Milliwatt output: 10 Microvolts Average

Selectivity - 38 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range Broadcast Band - 535 to 1730 KC

49M Band - 5.9 to 6.1 MC
31M Band - 9.1 to 10 MC
25M Band - 11.4 to 12.1 MC
19M Band - 14.9 to 15.4 MC

Intermediate Frequency - 455 KC

Speaker - 6 in. PM Dynamic

TRIMMER VIEW

The following equipment is required for aligning:

1. An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
2. Output indicating meter.
3. Non-metallic scredriver.
4. Dummy antennas—1 mil. 200 mmf., and 400 ohms.

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Dial Pointer Setting</th>
<th>Trimmers Adjusted In Order Shown</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>455 Kc</td>
<td>.1 MFD</td>
<td>Grid of 1N5 (I.F.)</td>
<td>Broadcast</td>
<td>Set Dial at 120 Kc</td>
<td>Two Trimmers on Top</td>
<td>Output</td>
<td>I.F.</td>
</tr>
<tr>
<td></td>
<td>455 Kc</td>
<td>.1 MFD</td>
<td>Grid of 1A7</td>
<td>Broadcast</td>
<td>Set Dial at 120 Kc</td>
<td>Two Trimmers on Top</td>
<td>Input</td>
<td>I.F.</td>
</tr>
<tr>
<td>31 METER BAND</td>
<td>9.6 Mc</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>31M</td>
<td>Set Dial at 9.6 Mc</td>
<td>(See Trimmer View) C15</td>
<td>Osc.</td>
<td>Ant.</td>
</tr>
<tr>
<td>49 METER BAND</td>
<td>6.1 Mc</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>49M</td>
<td>Set Dial at 6.1 Mc</td>
<td>(See Trimmer View) T8</td>
<td>Osc.</td>
<td>Ant.</td>
</tr>
<tr>
<td>25 METER BAND</td>
<td>11.8 Mc</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>25M</td>
<td>Set Dial at 11.8 Mc</td>
<td>(See Trimmer View) T3</td>
<td>Osc.</td>
<td>Ant.</td>
</tr>
<tr>
<td>19 METER BAND</td>
<td>15.2 Mc</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>19M</td>
<td>Set Dial at 15.2 Mc</td>
<td>(See Trimmer View) T10</td>
<td>Osc.</td>
<td>Ant.</td>
</tr>
<tr>
<td>BROADCAST BAND</td>
<td>1750 Kc</td>
<td>200 mmf</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Set Dial at 180 Kc</td>
<td>(See Trimmer View) C23</td>
<td>Osc.</td>
<td>Ant.</td>
</tr>
<tr>
<td></td>
<td>1400 Kc</td>
<td>200 mmf</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Tune to Generator Sig.</td>
<td>Rotate Core Ti</td>
<td>(See Iron Core Adjustment View)</td>
<td>Ant.</td>
</tr>
</tbody>
</table>
TUNING CONTROLS: Tuning is accomplished by means of the conventional manual tuning control, or by means of the five push buttons which mechanically rotate the variable condenser gang to preselected frequencies. An electric clutch is provided which automatically disconnects the manual tuning mechanism when a button is pressed.

NOTE: Do not attempt to operate the push button tuning unless the set is connected to a 6 volt battery and the switch turned "on". Setting up the push buttons for any desired station may be done as follows:

1. Remove the button by depressing the spring located on the bottom of each button, and pulling straight out.
2. Loosen the screw with a coin or a screw driver.
3. Carefully tune in the desired station by means of the manual control.
4. Push the loosened screw in as far as possible and tighten.
Due to the fact that the iron cores have been sealed in place at the factory, only the trimmer adjustments as outlined under capacity alignment should be made unless the coils of the iron cored tuning unit are changed.

**CAPACITY ALIGNMENT**

1. I.F. Alignment at 260 K.C.
   (a) Connect an output meter across the test terminals on the left side of speaker cover, leaving the speaker connected.
   (b) Connect the ground lead of the signal generator to the chassis frame.
   (c) Connect the signal lead of the signal generator to the grid of the 7BB tube through the 0.1 mfdf condenser.
   (d) Turn set volume control on full and tone control to the extreme treble end. Set the signal generator at 260 K.C. Tune the receiver to a frequency where no signals or beat notes may be heard and so that when the tuning control is moved in narrow limits no appreciable change in output may be noted.
   (e) Adjust the I.F. trimmers A, B, C, & D for maximum output, beginning with trimmer A.

2. Alignment at 1560 K.C.
   (a) Connect the signal lead of the signal generator to the receiver antenna connection through a 70mf condenser or 7041315 alignment dummy.
   (b) Turn the manual tuning control of the receiver to the stop at the extreme high frequency end of the dial.
   (c) Set the signal generator to 1560 K.C.
   (d) Adjust the oscillator trimmer E for maximum output.

3. Alignment at 1400 K.C.
   (a) Set the signal generator to 1400 K.C. and tune set to this signal.
   (b) Adjust the R.F. core J for maximum output.
   (c) Adjust the antenna core H for maximum output.

4. Realignment at 1560 and 1400 K.C.
   (a) Repeat alignment of trimmer E and trimmers F and G at 1560 K.C.
   (b) Repeat alignment of cores H and J at 1400 K.C. Apply shellac to the core screws to seal the adjustment.

5. Alignment with car antenna
   Antenna trimmer G must be adjusted to match car antenna when receiver is installed; use a weak station signal between 1000 and 1500 K.C. The antenna should be fully extended when making this adjustment.

**AUTOMATIC FERROELECTRIC TUNING**

The automatic push button tuning unit has been made compact by combining the manual and automatic tuning units so that they both use the same three iron cores which are "ganged" together in one reciprocating unit actuated by a small mechanical motor. This highly efficient three-circuit tuning system pushes the iron cores back and forth like pistons in the tuning coils, which varies the inductance of the coils by changing the permeability of the magnetic circuit.

For manual tuning, this is accomplished by first depressing and then rotating the manual station selector knob. For automatic tuning, pressing an automatic tuning button causes the cores to be moved to a pre-set position and locked in place by the button latch mechanism, which prevents the cores from shifting position until released by the use of another of the automatic push buttons or by use of the manual control.

Changing the stations selected by the buttons is a simple operation. The button to be set to a new station is depressed until it locks in. Then the button is rotated exactly like a manual tuning knob until the desired station is tuned in. Pressing any tuning button will release the depressed button.

The call letters of the stations to which the automatic tuner is pre-set are inserted above the chrome plated selector buttons. Whenever the instrument panel lights are turned on, the call letters are illuminated. Identification of the station to which the radio is tuned is facilitated by three indications: the selector button is latched into its depressed position, the corresponding call letters are more brightly illuminated than the call letters of the other four stations, and, finally, the dial pointer indicates the station frequency.

**Note:** Do not turn any button at any time unless a new station setting is desired, as the tuning position of a button is changed whenever it is turned regardless of whether it is depressed or not.

**CADILLAC 1941 AUTOMATIC RADIO (Front Comp.) PART NO. 7240371**

- Power Output: 5 watts undistorted at 6.0 volts.
- Power Consumption: 7.0 amperes at 6.0 volts.
- Sensitivity: 2.5 microvolts at 1 watt output.
- Selectivity at 1000 times signal: 355 K.C.
- Tuning Range: 45 to 1500 K.C.
- Automatic Tuning (All buttons): 545 to 1500 K.C.
- Speaker: 8" permanent magnet dynamic.
- Intermediate Frequency Peak: 580 K.C.
- Antenna Trimmer Range: 45 to 90 mfd.
To the left of the volume control rod is the knob which controls the vacuum aerial. Pulling this button upward will raise the aerial and pushing it downward will lower the aerial. The vacuum aerial has two rods, one sliding within the other. For maximum reception both rods should be extended to their full height, the inner rod being extended manually.
TO CHANGE STATION SETTING OF PUSH BUTTONS

The five push buttons should be set up for five stations which are received favorably in your vicinity. The procedure for setting up the push buttons is as follows:

1. Turn on the radio and allow it to warm up from ten to fifteen minutes.
2. Depress button to be set up until it latches and remains depressed.
3. Without pressing or holding the button down, turn it, as in manual tuning, until the desired station is tuned in. This should be done very carefully until the station comes in sharp and clear, free from background noise.
4. Repeat this process for any other buttons which you wish to change.

The setting of any button may be changed at any time by following this procedure.

CAUTION: TUNING ANY OF THE PUSH BUTTONS CHANGES ITS STATION SETTING. DO NOT TUNE ANY BUTTON UNLESS YOU WISH TO CHANGE THE SETTING.

CAPACITY ALIGNMENT

1. Aligning I.F. stages at 455 K.C.
   (a) Connect the grid lead of the signal generator to the chassis frame.
   (b) Connect the signal lead of the signal generator to the grid of the 7866 (grid side of condenser 18) through a 0.1 mfd. condenser.
   (c) Connect an output meter across the speaker voice coil. (If speaker is disconnected a 4 ohm load may be used instead).
   (d) Set signal generator to 455 K.C.
   (e) Turn the volume control on full and tune the set to a position where no squeals or howls may be heard, and then when the tuning control knob is rotated within narrow limits there is no appreciable change in output. The tone control should be rotated to its extreme high position (clockwise).
   (f) Adjust the I.F. trimmers A, B, C, and D, and the I.F. core adjustment E until maximum output is obtained.
   (g) Repeat these adjustments with as low an output from the signal generator as possible for more accurate alignment.
   (h) Connect the signal generator to the antenna connection of the set through a 70 mfd. condenser.
   (i) Adjust the I.F. trap adjustment M for minimum output.

2. Alignment at 1560 K.C.
   (a) Leave signal generator connected the same as for the I.F. trap ad-justrment.
   (b) Tune the set to the extreme high frequency position against the stop.
   (c) Set the signal generator to 1560 K.C.
   (d) Adjust the oscillator trimmer F for maximum output.

3. Alignment at 600 K.C.
   (a) Set the signal generator to 600 K.C and tune the set to this signal.
   (b) Adjust the R.F. trimmer G and the antenna trimmer H for maximum output.
This auto radio is an eight-tube self contained receiver, built expressly for installation in 1941 Chevrolet automobiles. Special features incorporated are: Automatic station selection; permeability tuning; sensitivity control; automatic noise control; temperature control condenser; four-position tone control; A.V.C. applied to R.F., I.F., and A.F. circuits; a dimmer control for dial lights; automatic bass compensation; push-pull beam power output; elliptical low resonance speaker; OZ4 rectifier; and a special full-wave primary type vibrator.

ANTENNA SYSTEM:

There are two antenna systems available for use with this receiver; the telescopic cowl antenna, and the telescopic reel-type antenna. Either of these antennas will operate very efficiently when used with this Chevrolet radio. A motor noise filter is built into the set end of the antenna system.
CIRCUIT DESCRIPTION

The circuit used in this receiver is the conventional superheterodyne type and does not use any regeneration. The eight tubes employed are an R.F. amplifier, combination oscillator-modulator tube, 262.5 k.c. I.F. amplifier, the first transformer of which is triple tuned; push-pull output, and power supply. The 6R7GT tube supplies A.V.C. voltage to the grids of the 6K7GT R.F. amplifier; the 6A8GT and the 6K7GT 1st A.F. tube. Bias for the 6K7GT R.F. amplifier and the 6A8GT is developed across a 750 ohm variable resistor (sensitivity control, item 69) which has a fixed minimum of approximately 140 ohms. The bias for the 6K7GT I.F. amplifier is developed across a 450 ohm resistor (item 63). The bias for the 6K7GT 1st audio tube is developed across a 1500 ohm resistor (item 84). The bias for the 6R7GT is developed across two resistors, one of 300 ohms (item 73), the other of 2400 ohms (item 74). These two resistors form a voltage divider, feeding a portion of the bias voltage through the 300,000 ohm R.F.-A.V.C. load resistor (item 60) to the grid of the 6R7GT providing approximately one volt (q). Bias for the 6V6GT output tubes is developed across a 220 ohm resistor (item 82), between the 6K7GT 1st audio plate and the 6R7GT (driver) grid for the resistor capacity network comprising the tone color control. The 6R7GT plate is coupled through a .1 mfd. condenser to one side of the center tapped audio input choke.

TONE COLOR CONTROL

The numbers 1 to 6 which appear in the small window to the right of the dial, will indicate the station.

NOTE: The accuracy of the automatic station selector depends upon how accurately the station is tuned in manually when setting it up. Always tune to a point where the clearest reception is obtained.

TUBE COMPLEMENT

The following table shows the tube complement for this receiver:

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7GT</td>
<td>R.F. Amplifier</td>
<td>6K7GT</td>
<td>1st Audio (A.V.C. Control)</td>
</tr>
<tr>
<td>6A8GT</td>
<td>Osc.-Modl.</td>
<td>6V6GT</td>
<td>Output (Push-pull)</td>
</tr>
<tr>
<td>6R7GT</td>
<td>I.F. Amplifier</td>
<td>OZ4</td>
<td>Rectifier</td>
</tr>
<tr>
<td>6R7GT</td>
<td>2nd Det. A.V.C. Driver</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FIG. 5. TONE CONTROL WIRING

1-VOICE (BLUE)

2-MUSIC (YELLOW)

3-SOFT (GREEN)

4-BASS (RED)

FIG. 4. FILTER CIRCUIT

FIG. 3. VOLTAGE CHART

FIG. 2. TONE COLOR CONTROL WIRING

Model 985694

©John F. Rider, Publisher
Circuit Alignment

The adjustable condensers in this receiver have been very carefully adjusted at the factory and will require no further adjustment (excepting antenna trimmers) unless tampered with or a defective I.F. coil has been replaced. If realignment is found necessary the circuits can be adjusted only with the use of a signal generator and an output meter.

1. Aligning I.F. Stages at 362.5 Kilocycles

The I.F. amplifier may be aligned first by using a modulated signal generator and an output meter in the conventional manner, and then checking the final adjustment with a radio-frequency signal generator and oscillograph. The accuracy of the automatic tuning system partially depends upon the symmetry of the I.F. wave form. In most cases the symmetry is only approximately maintained without slight adjustments in the aid of the oscillograph equipment.

(a) Connect one terminal of the output meter to the plate of one of the 6G27/C output tubes, and connect the other terminal through a 1 mfd condenser (not electrolytic) to the plate of the other 6G27/C output tube.

(b) Connect the ground lead from the signal generator to the frame of the receiver chassis. Connect the output of the signal generator through a 0.01 mfd condenser to the grid of the 6A4/C I.F. amplifier tube leaving the tube's grid clip in place.

(c) Tune the volume control on full. Adjust station selector to low frequency (20) end of dial and press the tune control buttons in the "mute" position.

(d) Adjust the trimmer condensers located on the 2nd I.F. transformer for maximum reading on the output meter. NOTE: Use the lowest signal generator output that will give a reasonable reading on your oscillograph.

(e) Connect the output of the signal generator to the grid of the 6A4/C tube leaving the tube's grid clip in place.

(f) Open the middle trimmer (front on the 1st I.F. transformer) two or three turns of the adjusting screw. Core should then be adjusted and trimmer screw should be loosened and turned from the unit.

(g) Adjust the other two trimmers (front on the 1st I.F. transformer) for maximum reading on the output meter.

(h) Adjust the middle trimmer (front on the 2nd I.F. transformer for maximum reading on the output meter. NOTE: Do not adjust the trimmers on the 2nd I.F. transformer.

2. Oscillograph Alignment

For a more accurate adjustment of the I.F. amplifier a careful oscillograph alignment, in conjunction with a radio-frequency modulated signal generator, may be used to obtain visual alignment. It will also allow adjusting for a more non-symmetrical wave form.

(a) Disconnect the conventional signal generator from the receiver.

(b) Connect the vertical plates of the oscillograph to the receiver connecting the (15) terminal through a 0.01 mfd condenser to the grid of the 6G27/C radio-amplifier tube, leaving the tube's grid clip in place. Connect the ground terminal to the frame of the receiver chassis.

(c) Connect the output of the radio-frequency signal generator also through a 0.01 mfd condenser to the grid clip of the 6A4/C tube, leaving the tube's grid clip in place. Connect the ground lead to the frame of the receiver chassis.

(d) Adjust the signal generator to 260 cycles.

(e) With the modulator switch of the signal generator turned on horizontal line will appear on the window of the oscillograph. Move the amplitudes control on the oscillograph to adjust the length of the line so that it is equal to the width of the cathode ray screen with 40 volts on the oscillograph.

(f) Turn the frequency modulator switch of the signal generator on.

(g) Adjust the vertical control of the oscillograph so that the image is just in the top and bottom limits of the cathode ray tube. NOTE: Use the lowest signal generator output that will give a stable image on the oscillograph window. If too much signal input is used the hump desired on the wave form will not be visible even at perfect alignment.

(h) Readjust the middle trimmer condensers on the last I.F. transformer for maximum symmetry above the vertical null line in the center of the cathode ray tube. The hump or shoulder developing to right side of the wave will be equal distance from the numbers of the curve when maximum symmetry is reached.

3. Aligning the R.F. Amplifier

NOTE: The tuning of this receiver is not accomplished in the conventional manner. Tuning is accomplished by specially designed iron cores which are wound in and out of the coils to vary the inductance. There are three matched cores mounted in a cartridge and which move as a single unit. The adjustment (marking alignment) of the iron cores is very critical, therefore they should not be tampered with. The permeability tuning is precision tuned and aligned, then sealed at the factory, and should need no further adjustment.

NOTE: Do not make iron core adjustments. See instructions under permeability tuning and replacement procedure.

TO ALIGN THE R.F. AMPLIFIER

(a) Connect the output of the signal generator through a 40 mfd condenser and use the regular Chevrolet无视 lead-in to the antenna connection of the receiver chassis.

(b) Connect the ground lead from the frame of the receiver chassis.

(c) Adjust the signal generator to 1800 kilocycles.

(d) Adjust the station selector knob until the high frequency (1800) step is reached. The dial pointer should be at the outer marking on dial below 1800.

(e) Adjust the iron core trimmers for maximum output. The adjustment should be made in the following order: Capacitor—Antenna—R.F. NOTE: After the radio is installed in the car antenna trimmer should again be adjusted. Using a very weak signal around 1800 kilocycles, which is just audible with volume control on full, the antenna trimmer should be set for maximum output.

4. Permeability Unit Replacement Procedure

Each unit is made of a matched pair. The two cores in any one unit must be of the same group. There are four groups or classifications graded according to permeability and coded with a digit of points on the view end of the core. The code and value is as follows:

<table>
<thead>
<tr>
<th>Digit</th>
<th>Permeability Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Moderate permeability</td>
</tr>
<tr>
<td>2</td>
<td>High permeability</td>
</tr>
<tr>
<td>3</td>
<td>Very high permeability</td>
</tr>
<tr>
<td>4</td>
<td>Very, very high permeability</td>
</tr>
</tbody>
</table>

A. To Replace Core Only

(1) Remove speaker from case. This will give access to permeability tuning unit mounted to key assembly.

(2) Remove the two screws holding the bakelite core support strip to the carriage. Carefully remove assembly from carriage.

(3) Note the physical location of core to be replaced, then carefully remove defective core.

(4) Clean the recess from core and then insert the new core (be sure new core is in exact same position as the one removed. Replace core assembly on carriage being very careful to insert cores in correct form so as not to damage either.

(5) If either of the antenas or R.F. cores have been changed, align them as follows:

  1. Set the signal generator to 1610 kilocycles.
  2. Tune control until carriage is all the way out. Pointer on dial should be at index mark (below 165).
  3. Adjust the antenna and R.F. cores for maximum output.
  4. Adjust the signal generator to 1610 kilocycles.
  5. Readjust the antenna and R.F. cores to peak at 1600 kilocycles.
  6. Adjust the signal generator to 1610 kilocycles.
  7. Adjust the short trimmer condensers for maximum output.

B. Replacing Complete Permeability Units:

To facilitate this work, remove chassis from case.

(1) Remove the top and bottom covers from the case, then remove the speaker.

(2) Pull the "A" connection and motor noise from base by lifting on spark plug plate (mounted to rear of motor)

(3) Remove p.k.s screws holding chassis in case and remove the chassis and front panel from case.

(4) To remove tuning unit (key assembly, etc.):

   1. Remove the dial pointer from那儿 sets.
   2. Unscrew the two ground screws, antenna connection, its shield, the blue, black, and green leads of the tuning unit, and also the V.C. resonator attached to the junction block.
   3. Unclasp the choral and the enclosed leads from the push bar switch.
   4. Loosen the set screw in the indexing shaft and remove long flexible shaft.
   5. Loosen the unit on the volume control.
   6. Remove the four screws which attach the whole tuning unit to the chassis.
   7. Unscrew the 1010 mili grid meshing condenser from antenna trimmer unit, unhook the spring and connecting link connecting the antenna and tuning carriage.
   8. Remove permeability assembly by moving three screws accessible through keys on tuning unit and replace with new assembly.
   9. The adjustments necessary on new units are the same as outlined under paragraph headed "Aligning the R.F. Amplifier".

IMPORTANT. The permeability unit must not present any load or drag to the rest of the tuning unit. The method of determining whether or not there is too much friction is to hold the unit (permeability unit) so that the tuning unit will move in and out of the case at their own weight. If they do not, too much friction is present. The total linear motion of the inner core must be 1.375 inches. Always real iron core sections after an adjustment.

Automatic Tuning Unit

When the push-button bar is depressed, the following actions take place. The lower rear side of the bar pushes in on the switch. When the signal switch makes contact it closes the "A" circuit to both the magnetic clutch solenoid and the key operating bar switch. The clutch solenoid disconnects the manual drive mechanism. While this is occurring the large solenoid is pulling down the key operating bar. This bar has an arm on the right side which is a cam shunt on the end which moves from an indexing shaft secter. This movement causes the indexing shaft to pull on key bar far enough to permit the key operating bar to engage lower bank of key. The movement of the key rocker bar is transmitted through a link which moves the permeability tuning rack (core assembly) through indexing in series that position the shaft. The indexing shaft has five steps so that when one seal is pulled a key back the key operating bar will engage the lower hook on the key, the next seal on the shaft is indexed right up to the key back key. This follows in sequence. In the rest of the indexing shaft is in a flexible drive cable which operates the relay indicator drum. This entire action takes place instantaneously when the push button is depressed.

Adjustments

The second clutch fork gear should be approximately 190 inches. This is adjusted by bending the left hand gear just above the pivot. The backlash gears on both the clutch and the rocker bars are adjusted on both.

Key Adjustment

To adjust a key the two fingers should be parallel (strait up and down). Turn the rocker bar until it is exactly vertical. Push key in until both fingers are against the key. With the key in this position the key setting clutch-shaft (175-18103) should have its "C" washer bearing against the back end of the key and the clutch shaft needle bearing should also be bearing against key. The shaft must turn freely and not bound or be rough. With the key in the above position adjust the gap in the key setting clutch by means of adjusting screw on the bearings. With the setting screw at zero, the correct distance between the edges of the key (which engages the key operating rack (adjacent) at the outside edge of the case) at the rear key guide bar should be 0.110 inches. Adjust and tighten screw to key clutch shaft locking collar.

IMPORTANT: Don't put oil on shorted armature or on the clutch armature.
PORTABLE RADIO-985775

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT, ALL VOLTAGES EXCEPT THE HEATER VOLTAGES MEASURED ON THE 0-250 VOLTS SCALE.

'A' BATTERY 1.4 VOLTS. CURRENT DRAIN 250 M.A.

'B' SUPPLY DRAIN APPROXIMATELY 10 M.A.

* READINGS MUCH LOWER THAN ACTUAL VOLTAGE BECAUSE OF HIGH SERIES RESISTANCE.

IMPORTANT: Batteries must be in their proper positions before making any adjustments.

ALIGNING 1-F STAGES AT 455 KILOCYCLES
Connect the signal lead of the test oscillator through a .1 mfd condenser, to terminal "X" on variable condenser 16A (see Parts Layout), which is the grid lead of the IFS tube.

Connect the ground lead of the test oscillator to the chassis frame.

Connect the output meter through a .5 mfd condenser from the plate prong of the IFS output tube to ground. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D.C. voltages, and to prevent short circuiting the output circuits.

Turn volume control to maximum.

Adjust the trimmers 3B, 3C and 4A on the 1-F Transformers for maximum output. (See Parts Layout) These adjustments should be made several times and during alignment the test oscillator output should be kept as low as possible to obtain a readable indication on the output meter.

ALIGNING AT 1600 KILOCYCLES
Leave the test oscillator leads connected the same as for aligning the 1-F circuit.

Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

Adjust the condenser 16D (see Parts Layout) for maximum output. (It is very important that this frequency be set accurately as a slight misalignment will cause the receiver to be out of track over the entire high frequency end of the dial.)

ALIGNING THE ANTENNA STAGE 1400 K.C.
Remove the signal lead of the test oscillator from the grid of the IFS tube and run a wire from the output terminal of the test oscillator, having it come near the receiver. NOTE: No metallic connection is made between the test oscillator and the receiver.

Turn the condenser rotor plates until this frequency is tuned in with maximum output.

Adjust the Antenna Trimmer "16B" (see Parts Layout) for maximum output.

ALIGNING AT 600 KILOCYCLES
Turn the condenser rotor plates until the radiated signal from the test oscillator is tuned in with maximum output.

Maintain a low output signal from the test oscillator and adjust the oscillator padding adjustment on item 6 (see Parts Layout) while rocking the variable condenser gang tuning shaft back and forth through the signal.

This operation should be continued until no further increase in output can be obtained.

After the above operation turn the condenser rotor plates to the high frequency stop position. Check the 1600 K.C. setting and if necessary readjust trimer "16B". Then return to 1400 K.C. for final antenna trimmer adjustment.

If the entire alignment procedure has been accomplished correctly, the receiver should be uniformly sensitive over the entire frequency range.
Circuit Description

The circuit used in this receiver is the conventional superheterodyne type and does not use any regenerative feedback. A tuned circuit control circuit is employed to give the desired tone without distortion. The tuning circuits are tuned by varying the inductance of the antenna, R.F. and oscillator coil so that the signals slide in and out of the coils like a sawtooth. The alignment of the cores has been set at the factory and they should not require realignment unless the coils have been changed.

Circuit Alignment

The trimmer condensers in this receiver have been carefully adjusted at the factory and should require no further adjustment (except the antenna trimmer) unless tampered with or a coil has been replaced. It is advisable not to attempt any adjustment unless it is definitely known that alignment is necessary. Due to the fact that the iron cores are sealed in place at the factory, only the trimmer adjustment as outlined under "Capacity Alignment" should be made, unless the coils of the iron core tuning unit are changed. A signal generator and an output meter must be used to align the receiver correctly. To make all alignment adjustments the front and back covers must be removed. All trimmer condensers are readily accessible.

Capacity Alignment

1. I.F. Alignment at 260 Kilocycles

(a) Connect a 30 ohm condenser between the plate and the 850GT output lead and one terminal of the output meter. Connect the second terminal of the output meter in ground. This will prevent the meter from DC voltages.
(b) Connect the ground lead of the signal generator to the chassis frame.
(c) Connect the signal lead of the signal generator to the grid of the 850GT tube through a 30 ohm condenser. Leave the grid connection on the tube in place.
(d) Tune the set volume control on full and put tone control on "victor" position. Adjust the signal generator to 260 Kilocycles. Tune the receiver for a frequency. To the receiver in a frequency where no squeak or lost notes may be heard so that when the tuning control is turned through narrow limits no appreciable change in output may be noted.
(e) Adjust the I.F. trimmers (a), (b), (c), and (d) for maximum output.

2. Aligning at 1560 Kilocycles

Set the signal generator to 1560 kilocycles.
(a) Connect the signal lead of the signal generator to the receiver antenna connection through a 30 ohm condenser.
(b) Tune the manual tuning control of the receiver to the stop at the extreme high frequency end of the dial.
(c) Adjust the signal generator to 1560 kilocycles.
(d) Adjust the oscillator trimmer (a) for maximum output.
(e) Adjust the R.F. trimmer (b) for maximum output.
(f) Adjust the antenna trimmer (c) for maximum output.

3. Aligning at 1400 Kilocycles

(a) Adjust the signal generator to 1400 kilocycles.
(b) Tune the receiver to the signal and adjust the trimmers (f) and (g) for maximum output. The signal generator output should be as low as possible and will give a satisfactory tone reading. NOTE: This type of tuning does not require alignment at 600 Kc.

4. Alignment with Car Antenna

Antenna trimmer (g) must be adjusted to match car antenna when receiver is installed. Use a weak station signal near 1400 Kilocycles. When a weak signal has been tuned in, turn antenna control on full and adjust antenna trimmer for maximum output. NOTE: When making this adjustment the antenna system should be fully extended.

Capacity and Inductance Alignment

This should be used only when there is definite evidence of the tone being out of adjustment.

1. I.F. Alignment at 260 Kilocycles

The same procedure as previously outlined should be followed.

2. Aligning at 1560 Kilocycles

(a) Connect the signal lead of the signal generator to the antenna connection of the set through a 30 ohm condenser.
(b) Adjust the signal generator to 1560 kilocycles.
(c) Secure the manual tuning mechanism until the high frequency end of the dial is reached. Mechanically align the core rings (b), (c), and (d) by setting the oscillator coils (b) so that its front edge sticks out 1½" from the end of the core, and the antenna and R.F. cores (c) and (d) with their 1½"F from the end of the respective coil windings.
(d) Adjust the oscillator trimmer (a), the R.F. trimmer (b) and the antenna trimmer (g) for maximum output.

3. Aligning at 1400 Kilocycles

(a) Adjust the signal generator to 1400 kilocycles and tune the set to this signal.
(b) Adjust the R.F. trimmer (f) for maximum output.
(c) Adjust the antenna trimmer (g) for maximum output. NOTE: When checking maximum output receiver hand from vicinity of core as fully capacity will offer readings.

4. Realignment at 1600 and 1000 Kilocycles

(a) Repeat alignment of trimmer (g) and trimmers (f) and (g) at 1560 kilocycles.
(b) Repeat alignment of core (b) and (c) at 1400 kilocycles. When this alignment has been made the core is readjusted to zero.

5. Alignment with Car Antenna

Antenna trimmer (g) must be adjusted to match car antenna when receiver is installed. Use a weak station signal near 1000 kilocycles that is audible with volume control on full. Adjust antenna trimmer for maximum output. NOTE: The antenna should be fully extended when making this adjustment.

ANTENNA CIRCUIT

The antenna circuit is directly coupled to the antenna. The antenna coil is tuned by means of an iron core and the circuit is adjusted for slight variations in antenna capacity by means of an iron core trimmer which is located on the bottom of the receiver case.

ANTENNA SYSTEM

There are two antenna systems available for use with this receiver: the telescopic cowl antenna, and the telescopic real-type antenna. Either of these antennas may be used very efficiently when used with this Chevrolet radio.
1. Aligning I.F. Stages at 455 Kilocycles
   (a) Connect the signal lead of the test oscillator to terminal "X" on variable condenser 25A (see parts layout) which is the grid lead of the 6SA7GT tube through a .1 mfd. condenser.
   (b) Connect the ground lead of the test oscillator to the chassis frame.
   (c) Connect a .1 mfd. condenser between the plate prong of the 6V6GT output tube and one terminal of the output meter. Connect the second terminal of the output meter to ground. This will protect the meter from d.c. voltages.
   (d) Set the signal generator at 455 kilocycles.
   (e) Turn volume control on full.
   (f) Adjust the trimmer condensers (a), (b), (c), and (d), on the I.F. transformers for maximum output.

These adjustments should be repeated several times, and during alignment the signal generator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1560 Kilocycles
   (a) Leave the signal generator leads connected the same as for aligning the I.F. circuit.
   (b) Turn the rotor plates of the gang condenser all the way out and against the high frequency stop (h).
   (c) Set the signal generator at 1560 kilocycles.
   (d) Adjust condenser (e), (see parts layout) for maximum output.

NOTE: It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning the Antenna Stage
   (a) Remove the signal lead of the signal generator from the grid of the 6SA7GT tube and connect to the antenna terminal of the receiver through a .000075 mfd. mica condenser connected in place of the .1 mfd. condenser previously used. NOTE: It is very important that a .000075 mfd. mica condenser be used when aligning the antenna stage of the receiver in order that this circuit can be made to track properly.
   (b) Adjust the signal generator to 1400 kilocycles.
   (c) Turn the condenser rotor plates until the 1400 k.c. signal is tuned in with maximum output.
   (d) Adjust antenna trimmer (g), (see parts layout) for maximum output.

4. Aligning at 600 Kilocycles
   (a) Adjust the signal generator to 600 kilocycles.
   (b) Turn the condenser rotor plates until the signal from the generator is tuned in with maximum output.
   (c) Maintain a low output signal from the signal generator and adjust the oscillator padding condenser (f), (see parts layout) while rocking the variable condenser gang tuning shaft back and forth through the signal.
   (d) This operation should be continued until no further increase in output can be obtained.
   (e) After the above operation, turn the condenser rotor plates to the high frequency stop position. Check the 1560 k.c. setting and if necessary readjust trimmer (e) then return to 1400 k.c. for final antenna trimmer adjustment.

NOTE: If the entire alignment procedure has been accomplished correctly the receiver should be uniformly sensitive over the entire frequency range.
ANTENNA SYSTEM: There are two antenna systems available for use with this receiver: the telescopic cowl antenna and the telescopic reel-type antenna. Either of these antennas will operate very efficiently when used with this Chevrolet radio.

A motor noise filter is built into the set end of the antenna system.

I.F. = 455 K.C.
FIG. 10.
TUNER UNIT
(FRONT AND TOP VIEW)

FIG. 11.
TUNER UNIT (BOTTOM VIEW)
Alignment Instructions

1. Adjust the magneto core screws (104 and 110) for maximum signal output.
2. Connect the signal generator frequency to 9.0 megacycles and move the pointer to 9.0 megacycles on the dial scale.
3. Tune the core screw (118) in a clockwise direction until the peak is obtained, and then adjust for maximum reading on the output meter at the same time reducing the signal generator output to an 0.1 value as a constant with a reliable indication on the output meter.
4. Turn the core screw (118) a clockwise direction until 2nd peak is obtained, and adjust for maximum reading on the output meter.
5. Turn the core screw (112) and (105) in a clockwise direction, until 3rd peak is obtained, and adjust for maximum reading on the output meter.
6. Change the signal generator frequency to 16.6 megacycles, the band indicator to 19.0 megacycles, and move the pointer to 19.0 megacycles on the dial scale.
7. Tune the core screw (120) for blocking a clockwise direction until 2nd peak is obtained and adjust for maximum reading on the output meter.
8. Change the signal generator frequency to 17.8 megacycles, the band indicator to 19.0 megacycles, and move the pointer to 17.8 megacycles on the dial scale.
9. Adjust core screw (114 and 186) for maximum signal output.
10. Change the signal generator frequency to 18.0 megacycles and move the pointer to 18.0 megacycles on the dial scale.
11. Adjust the alignment on the R.F. core (105, 119, 120, and 121) for maximum output.
12. Complete Short Wave Alignment

Because of the extensive range of this receiver, it is necessary that the short wave bands be completely aligned in accordance with the following procedure. The same is made all adjustments in the order specified:

(a) Check broadcast band antenna trimmer (item 26) for maximum peaking. This is very important.
(b) Tune the receiver so that the dial pointer is at the extreme high frequency end of the 27-meter band and adjust the magnetite core screws (109, 113, and 117) so that such core end is flush with the coil form items No. 7, 8, and 10 which extend beyond the shield.
(c) Change the trimmer core screws (105, 107, 110, 111, 113, 114, 118, 119, and 121) in a counterclockwise direction, as far as they will go. NOTE: Do not force the cores against their stops as too much force may fracture the core.
(d) Check the signal generator through a 100 milliammeter and the Chevrolet shielded antenna lead-in, to the antenna connection of the receiver. Connect the ground lead from the signal generator to the shield of the leads.
(e) Turn the band indicator to 20 meters and turn the volume control to the maximum position.
(f) Change the signal generator frequency to 9.5 megacycles and move the pointer to 9.5 megacycles on the dial scale.
(g) Change the core screw (118) in a clockwise direction, until the peak is obtained, and then adjust for maximum reading on the output meter at the same time reducing the signal generator output to an 0.1 value as a constant with a reliable indication on the output meter.
(h) Turn the core screw (115) in a clockwise direction until the peak is obtained, and adjust for maximum reading on the output meter.
(i) Change the signal generator frequency to 14.1 megacycles, the band indicator to 19.0 megacycles, and move the pointer to 19.0 megacycles on the dial scale.
(j) Tune the core screw (120) in a clockwise direction until the peak is obtained, and adjust for maximum reading on the output meter.
(k) Change the signal generator frequency to 16.6 megacycles, the band indicator to 19.0 megacycles, and move the pointer to 19.0 megacycles on the dial scale.
(l) Change the core screw (114 and 186) by turning in a clockwise direction until 2nd peak is obtained and adjust for maximum reading on output meter.
(m) Repeat all operations starting with (k) until no further improvement can be obtained.

General Alignment Information

Alignment of the short wave bands should never be attempted without first peaking trimmer condenser No. 26 in accordance with the procedure outlined under "Broadcast Band Alignments." A slight misalignment at this receiver condenser will result in instantaneous short wave operation, the result being that trimmer condenser No. 26, is in the circuit on all bands but it should be peaked on the broadcast band only. The most satisfactory method of aligning or checking the short wave bands is on actual reception of short wave stations of known frequency by adjusting the magnetite core oscillator coil for each band, so that the short wave stations come in at the correct points on the dial. In exceptional cases, when the set is being received in a location where the noise level is high enough to prevent reception of short wave stations, a signal generator should be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the signal generator on a slight error will produce considerable inaccuracy in the coverage of the receiver.

When adjusting the magnetite core trimmer in the auxiliary short wave coils, if more than one peak is found, peak the set according to the alignment procedure for each band.

Instructions for Removal of Coil Unit

(a) Remove the top, rear bottom, and speaker cover from the receiver.
(b) Remove the row of tubes immediately behind coil unit assembly.
(c) Remove the two No. 8, 10-inch screws that hold the antenna cover on the side of the case, take the antenna cable shielding from the two grounding brackets which will leave this part free entirely. Pry up the top which holds the leads from the R.F. coils to the chassis. Free these leads. Unfasten the leads from the antenna, R.F. and coil unit assembly which is to be removed.
(d) Remove the two No. 8 screws which hold the wireon diagonal mounting brackets to the main case frame. Pull the wireon out of the way, taking care that the armature does not get damaged.
(e) Unfasten the small condenser (item 20) from 104 to 106 to 100 megacycles and turn the magnetite core screw (118) clockwise until maximum output is obtained.
(f) Change the frequency of the signal generator to 9.0 megacycles and tune the receiver for maximum signal output.
To Disassemble Coil Units

(a) Turn all trimmer screws until they are within the coil unit cover.

(b) Remove the small spring steel clip, part No. 12313A, which anchors the coil unit bracket to the end of the cover. Two fingers of this clip fit into the alinement of the cover and care must be taken when removing it so that no damage is done to the pre-existing coil tubes.

(c) Remove the two 9/32" nuts holding the shield can in place and slide the cover off.

9. Reassembling Coil Units

(a) Replace the coil clamp which holds the coil leads between the 6SK7 and the 6DR7.

(b) In replacing the trimmers into the coil tubes, grasp the threaded unit end, raise the coil and work it onto the coil tube.

(c) When the coil unit is reinstalled be sure that the two diester balls at the switch shaft do not get lost.

(d) The two nuts which hold the short arm to the band indicator shaft must be taken up tight.

(e) While replacing the coil unit mounting bracket be sure that the three runner clips move their slots in the shield tubes properly.

10. Staff Manual Tuning

Excessive stress on the warm hearing caused by tension or compression in the flexible manual tuning shaft (item 133) may cause staff manual tuning. Such stress can readily be eliminated by removing and straightening the unit before its use in the warm (item 136).

11. Tone Control

(a) The four positions of the tone control are: Soft, Voice, Music and Bass. The tone control and its tone compensating network in the circuit is between the audio amplifier and the output stage. When the switch is in the "Soft" position, the 100,000 ohm resistor (item 96) and the 80 mfd. condenser (item 137) are shunted out, resulting in maximum loud. Some of the high audio frequencies are bypassed to ground through the 81 condenser (item 80). In the "Voice" position, the high audio frequency response remains the same as in the "Soft" position but the 100,000 ohm resistor and the 81 condenser are in series with the primary of the driver coil transformer (item 122a) resulting in a reduced low frequency response. With the tone control switch in the "Music" position, some of the high frequencies are bypassed, and maximum low is available because the 100,000 ohm resistor (item 96) and the 80 mfd. condenser (item 137) are shunted out. When the switch is in the "Bass" position the high frequencies are bypassed to ground through the 85 condenser (item 86). The low frequency response remains the same as when the switch is in the music position.

12. Band Switching Circuits

The two switch sections shown in the schematic diagram in the antenna stage and in the R.F. stage are basically one switch relay in each case. The key section on the diagram is that set of contacts toward the right as viewed from the coils. The lower set of contacts is that set of contacts away from the coils. The switch sections are all shown in the 16-meter band position. Refer to the top switch sections when the upper meter gamma is on the 80 meter band. The lower meter gamma is on the 16-meter band. The switch sections are shown on the terminals Nos. 3 and 18 the 16-meter band contacts. Terminals Nos. 4 and 2 are the 20-meter band contacts. Terminals Nos. 5 and 6 are the "A" band or broadband band contacts.

The "A" band coil circuit shown in the actual simplified circuit diagram for the "A" band without the switch contacts being shown. The same applies to the 31-meter band circuit. Coils C2, T3, 15, 15 and 16 remain in the circuit at all times for short wave operation. When switching in the 20-meter band, coil C-3 is replaced by coil No. 4. Coil No. 9 is replaced by coil No. 18. Coil No. 17 is excited across coil Nos. 19, 10, and 18. On that of the 29, 19, and 16-meter bands there is shown the same. The sensitivity control is removed from the circuit for short wave operation thereby giving full sensitivity on short waves.

In order to provide good tracking sensitivity only perfectly matched main tuning condensers are used in the receivers on the "A" band (Nos. 104, 105 and 106). The same are used in the 31-meter band circuit. The output of the 20-meter band is furnished to the A.V.C. (item 20) also acts as a delayed bias on the main gain of the A.V.C. system.

The two 6V6GT tubes are used in the push-pull output circuit and both get their bias from the 380 volt resistor (item 91). The 6J6 tube is used as the coil cathode rectifier with a conventional no-oscillation type vibrator.
ALIGNMENT DATA

I.F. ALIGNMENT

Adjust the signal generator to 455 K.C. and connect the output to the grid of the first detector tube (6SA7) through a .05 or .1 mfd. condenser. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the signal generator to 1530 K.C. and connect the output to a shielded loop radiator and place this loop about two feet from the rotary loop antenna. If no loop radiator is available the output of the signal generator should be connected to the antenna clip of the rotary loop antenna thru a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the B.C. oscillator trimmer (upper left, front of chassis) to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 K.C. and after tuning in the signal adjust the B.C. antenna trimmer (on rotary loop antenna) to peak. Set the signal generator to 600 K.C., tune the signal and then slowly increase or decrease the B.C. oscillator pacing condenser (top of chassis, center) and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

Return to 1400 K.C. and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C. * or to A.T.V. lead on models without loopantenna.

SHORT WAVE BAND ALIGNMENT

Adjust the signal generator to 18,100 K.C. and connect the output to the antenna clip, through a 200 ohm resistor. Set the gang condenser to minimum capacity and adjust the S.W. oscillator trimmer (lower left, front of chassis) to receive this signal. Set the signal generator to 16,000 K.C., tune signal and adjust the S.W. antenna trimmer (upper right, front of chassis) to peak. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 K.C. to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 K.C., the antenna and oscillator coils, as well as the padding condenser should be tested.

I.F. ALIGNMENT

MODELS A5, A7, B7, 62-67

BROADCast BAND ALIGNMENT

Adjust the signal generator to 1630 K.C. and connect the output to the antenna lead, through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 K.C. and after tuning in the signal adjust the B.C. antenna trimmer to peak. In case of bent plates, set the signal generator and the receiver to 600 K.C. and bend the plates into the position for maximum output.

SHORT WAVE BAND ALIGNMENT

Set the signal generator to 6000 K.C. and adjust the short wave antenna trimmer to give maximum output. Set the signal generator to 3000 K.C., tune the signal and then slowly increase or decrease the short wave antenna padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

MODELS J6, XJ6, A7, B7, 62-67

PROCEDURE FOR SETTING UP PUSH BUTTONS

Loosen one of the push buttons by inserting a screw driver thru the center hole in the push button to the locking screw and turn the locking screw counter-clockwise one full turn and push in, while holding this screw in the desired station by means of the station selector. Turn the selector very slowly back and forth until the signal is clearest. Now while still holding the above screw in, tighten it by turning clockwise. Release and turn the station selector to one end of the dial, then check the button by pushing it down and if the station is tuned to the center of the area on the dial covered by the station the adjustment is correct.

Release the push button and repeat the above procedure for the remaining buttons.

If it is desired to change a button to a different station simply re-set by repeating the above procedure.

Punch the correct station call letter tabs from the set of sheets supplied and insert them from the side into the grooves in the front of the push buttons. Punch celluloid squares from the sheet supplied and insert them in the above mentioned grooves over the station call letter tabs.

The dial is now set up for quick tuning and all that is necessary is to push the button of the desired station down and then release.
POWER SUPPLY

This receiver is designed to operate on a single unit General 60B-6L or Burgess 6TA-60. The battery will fit inside the cabinet in back of the chassis.

A large single unit battery may also be used with this model such as the Burgess 17G-60, Eveready 748, Ray-O-Vac No. AB-82, Bond 0528 or General 60DL-11L and will provide the most economical operation.

Speaker (Part No. P4311) 5” PM Type

D.C. voice coil resistance ........................................ 3.1 ohms
Voice coil impedance at 400 cycles ............................. 3.5 ohms

Antenna Coil (Part No. G-6274)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting bracket.

Primary—No. 3 and No. 4—Resistance 24.6 ohms.
Secondary—No. 1 and No. 2—Resistance 2.2 ohms.
A gimmik coil of 5.5 mmfd. connects to terminals No. 2 and No. 3.

Oscillator Coil (Part No. P4308) (Red & Brown Dots)

Looking at the connection end (with dots) starting at the chassis in clockwise direction the terminals are: No. 1, grid; No. 2, plate; No. 3, B+; No. 4, ground.

Primary—No. 2 and No. 3—Resistance 2.2 ohms.
Secondary—No. 4 and No. 1—Resistance 5.7 ohms.

First I.F. Transformer (Part No. P4323)

Primary—Blue white, plate; red white, B+ — Resistance 12.1 ohms
Secondary—White, grid; black white, AVC — Resistance 24.9 ohms

Second I.F. Transformer (Part No. P3980)

Primary—Blue white, plate; red white, B+ — Resistance 15.1 ohms
Secondary—White, grid; black white, AVC — Resistance 11.8 ohms

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On XD5 only connect ground of signal generator to common ground thru a 1 mfd. condenser.

**Speaker (Part No. P3553) 5" PM Type**
- D.C. voice coil resistance: 3.4 ohms
- Voice coil impedance at 400 cycles: 3.8 ohms

**Oscillator Coil (Part No. P3748) (D5 only)**
- Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, end of winding; No. 2, start of winding; No. 3, tap.
  - No. 2 and No. 1—Resistance 4.9 ohms.
  - No. 3 and No. 1—Resistance 4.3 ohms.

**Oscillator Coil (Part No. P3917) (XD5 only)**
- Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, tap; No. 2, start of winding; No. 3, end of winding.
  - No. 3 and No. 1—Resistance 4.9 ohms.
  - No. 2 and No. 1—Resistance 4.3 ohms.

**First I.F. Transformer (Part No. P3923)**
- Primary—Blue, plate; red, B+—Resistance 21.8 ohms.
- Secondary—White, grid; black, AVC—Resistance 20.9 ohms.

**Secondary I.F. Transformer (Part No. P3924)**
- Primary—Blue, plate; red B+—Resistance 23.8 ohms.
- Secondary—White, grid; black, AVC—Resistance 23.7 ohms.

**Electrolytic Condenser (Part No. P3355)**
- Red, 30 mfd., 150 volt; green, 20 mfd., 150 volt; black, negative for both sections.

**D5 & XD5**

C2, C12 and R1 are used in Model XD5 only.

In D5 Model only, all common grounds are connected to chassis ground.

**Models D5 and XD5**

Models D5 and XD5 are the same except for a few parts and that the XD5 is approved by the Underwriters Laboratories. A condenser is used in the XD5 model to provide a floating ground.

**Voltages**
- Volume Control maximum. Meter 1000 ohms per volt, 150 volt scale.
- Plate (3) of 12SA7 tube to common ground 80 volts
- Screen (4) of 12SA7 tube to common ground 82 volts
- Plate (8) of 12SK7 tube to common ground 80 volts
- Screen (3) of 12SK7 tube to common ground 82 volts
- Plate (3) of 50L6 tube to common ground 97 volts
- Screen (4) of 50L6 tube to common ground 52 volts
- Cathode (2) of 50L6 tube to common ground 5.5 volts
- Cathode (9) of 3SG5 tube to common ground 102 volts
**Continental Radio & Telev. Corp.**

**Model H5**

**Vol. VIII**

**L. W. Antenna Coil** (Part No. P4019)
Looking at the connection end (with dot) in a clockwise direction starting at the mounting lug the terminals are: No. 1, grid; No. 2, plate; No. 3, B+; No. 4, grid.
Primary—No. 2 and No. 4—Resistance .................................. 139.7 ohms
Secondary—No. 3 and No. 1—Resistance .................................. 29.4 ohms

**B. C. Oscillator Coil** (Part No. P4018)
Looking at the connection end (with dot) in a clockwise direction starting at the chassis the terminals are: No. 1, grid; No. 2, plate; No. 3, B+; No. 4, grid.
Primary—No. 2 and No. 3—Resistance .................................. 2.9 ohms
Secondary—No. 4 and No. 1—Resistance .................................. 9.1 ohms

**L. W. Oscillator Coil** (Part No. P4017)
Looking at the connection end (with dot) in a clockwise direction starting at the chassis the terminals are: No. 1, grid; No. 2, plate; No. 3, plate; No. 4, grid.
Primary—No. 3 and No. 2—Resistance .................................. 4.8 ohms
Secondary—No. 1 and No. 4—Resistance .................................. 11.9 ohms

**First I.F. Transformer** (Part No. P3962)
Primary—Red white, B+; blue white, plate—Resistance.......... 11.8 ohms
Secondary—White, grid; black white, A/C—Resistance .......... 23.9 ohms

**Second I.F. Transformer** (Part No. P3980)
Primary—Blue white, plate; red white B+—Resistance .......... 15.1 ohms
Secondary—White, grid; black white, A/C—Resistance .......... 11.8 ohms

**Power Change Switch**
The power change switch connects the tube filaments in series (7½ volt) on A/C-D/C operation and parallel (1½ volt) on battery operation.

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**Aligning Frequencies**

IF trims—455KC; BC-OSC—1550KC; BC-PAD (nearest tuning shaft on front of chassis)—540KC; Re-check BC-OSC.

**Conventional Alignment**

See Special Section — Vol. VIII
AC 105 to 125 volts, 60 cycles
or DC 105-125 volts

For CONVENTIONAL ALIGNMENT see Spec. Section Vol. VIII.

In model J5 all common grounds become chassis grounds. C1, C3, C5, R2, and R6 are omitted.

Point "A" is connected to point "B" and point "C" to point "D."

Voltage—(tube to common ground) Line 117 Volts AC—

Volume Control maximum. Meter 1000 ohms per volt. 150 volt scale.

Models J5 and XJ5 are the same except for a few parts and that the XJ5 is approved by the Underwriters Laboratories. A condenser is used in the XJ5 model to provide a floating ground.

Oscillator and Short Wave Antenna Coil (Part No. G5167) J5 & XJ5

Looking at the five terminal connection end in a clockwise direction starting at the mounting bracket, the connections are: No. 1, ground; No. 2, grid; No. 3, B.C. osc. tap; No. 4, open; No. 5, open. Looking at the other end in a clockwise direction starting at the mounting bracket, the connections are: No. 8, pad; No. 7, open; No. 8, switch; No. 9, ant.

No. 3 and No. 2—Resistance..6.9 ohms
No. 1 and No. 3—Resistance... .4 ohm

First I.F. Transformer (Part No. P3923)

Primary—Blue, plate; red B+—Resistance 20.4 ohms.
Secondary—White, grid; Black, AVC—Resistance 20.3 ohms.

Second I.F. Transformer (Part No. P3924)

Primary—Blue, plate; red B+—Resistance 22.2 ohms.
Secondary—White, diode; black, AVC—Resistance 22.1 ohms.
This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (A.C.) Never plug in a D.C. outlet.

### RESISTORS

<table>
<thead>
<tr>
<th>No.</th>
<th>Ohms</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>10,000,000</td>
<td>1/2</td>
</tr>
<tr>
<td>R2</td>
<td>20,000</td>
<td>1/2</td>
</tr>
<tr>
<td>R3</td>
<td>100-100%</td>
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<td>R4</td>
<td>2,000,000</td>
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<td>R5</td>
<td>15,000-10%</td>
<td>2</td>
</tr>
<tr>
<td>M6</td>
<td>50,000</td>
<td>1/2</td>
</tr>
<tr>
<td>R7</td>
<td>5,000,000</td>
<td>1/2</td>
</tr>
</tbody>
</table>

### CONDENSERS

<table>
<thead>
<tr>
<th>No.</th>
<th>Capacity (Mfd.)</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>.05</td>
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<td>C3</td>
<td>.000005</td>
<td>Mica</td>
</tr>
<tr>
<td>C4</td>
<td>.05</td>
<td>400</td>
</tr>
<tr>
<td>C5</td>
<td>.001</td>
<td>Mica</td>
</tr>
<tr>
<td>C6</td>
<td>.001</td>
<td>Mica</td>
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<tr>
<td>C7</td>
<td>.01</td>
<td>400</td>
</tr>
<tr>
<td>C8</td>
<td>.000025</td>
<td>Mica</td>
</tr>
</tbody>
</table>

ALIGNMENT: IF - 455kc thru .05 or .1mF cond. BC - With 1630kc thru shielded loop radiator, 2 ft. from loop antenna; OR to blue lead of loop antenna thru .0002mF cond., gang at minimum, adjust osc. trim.

With 1400kc adj. Ant. trim. - If gang plates are bent adj. with 600kc.
**AUTOMATIC RECORD CHANGER**

This Record Changer will automatically play a series of eight 10" or seven 12" records of the standard 78 R.P.M. type. Records of the last few years with the standard eccentric or spiral stopping groove on the inside and an eccentric on the outside will operate the automatic mechanism. However, records of any size up to 12" may be played manually.

**OPERATION**

Before operating the phonograph, either automatically or manually, be sure that the pickup is down and can be moved by hand. If not a "click" must be completed to bring it down. To do this, throw Turntable Switch "On." The turntable will begin to revolve and the cycle of motion on the pickup arm will be reversed. When the pickup arm comes down, turn off the Turntable Switch.

**CAUTIONS**

1. Never use force to start or stop the motor or any part of the record-changing mechanism or pickup arm.
2. The use of records which have become warped or damaged through improper care, may cause the mechanism to jam and damage the instrument. Records which have become warped, will slide on one another when played, resulting in unsatisfactory reproduction.
3. This instrument is not recommended for playing 7" 12" records in mixed sequences. If this service is desired, an adapter must be used that is perfectly parallel and free from warps. The index and record Reflect lever will begin to revolve and the cycle of motion on the pickup arm will be reversed. When the pickup arm comes down, turn off the Turntable Switch.

**INDEX AND RECORD REJECT LEVER**

This lever is located near the front center of the motorboard with its index plate marked for four positions—"Manual," "12," "10" and "Reject". When it is desired to change record selections manually, this lever should be set in the "Manual" position. With the lever in the "12" position, the mechanism is set to play a series of 12" records automatically. To play either a series of 12" records or 10" and 12" records mixed, the lever should be set on the "10" position. To reject a record being played or to start, the record changing cycle is in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "Reject" position and let go. The pickup will rise and swing outwards and the next record will be played. When releasing the lever it will automatically return to the "10" position. It is recommended that the lever be set on the "12" position. To switch between 10" and 12" records, the lever should be returned to the "12" position and the cycle of motion on the pickup arm will be reversed. When the pickup arm comes down, turn off the Turntable Switch.

**TURNTABLE SWITCH**

The Switch is located just in front of the Index and Record Rejection Lever controls. This switch controls the turntable motor. To start the turntable, push the switch to the "On" position. To stop the turntable, push the switch to the "Off" position.

**NEEDLE**

The use of thin-gauge long-playing needles is absolutely essential for the proper operation of this instrument, as the needle groove on the records is very narrow and thin. If a needle is used too long, distortion and poor quality will be obtained and the needle will be damaged.

**NEEDLE SECTOR**

The extending tab on the needle groove plate of the needle box operates the needle ejector. To change a needle, place pickup in rest position, loosen needle screw and press the extending tab on the needle groove plate to drop the used needle into the box below. Release tab allowing the needle groove plate to swing back, and then insert a new needle in the pickup as described above.

**RECORD HOLDER SHELVES**

To place a record on the turntable or to remove it from the rack, raise the record holder shelves by lifting with the fingers under the shell, and swing clear of the outer edge of record. Also push back vertical lever adjacent to the rear record holder post. The turntable is now accessible. Before taking the magazine for automatic operation, swing the record holder shelves back into position.

**AUTOMATIC OPERATION**

1. See that the pickup is over the needle groove plate with the needle properly in place. If not, complete a "cycle" as explained in the first paragraph under "Operation."

2. With the Index and Record Reject Lever at "Manual," place the first of the series of records on the turntable and the remainder of the series up to seven (10" or 12") records on the record holder post as shown in Fig. 2. The records should be arranged in the desired order with the desired selection lever in the "Off" position.

3. Set the Index and Record Reject Lever to the proper position. (See Index and Record Reject Lever.

4. Push the turntable switch to the left—"On"—turntable should commence to revolve.

5. When the turntable has attained speed, lift pickup and lower gently on the record so that the needle point enters the outside groove.

6. Adjust volume control to the desired intensity and tone control to the preferred setting.

7. Close the lid of the cabinet to eliminate mechanical reproduction of sound by the needle.

The whole series of records will now play without further attention, and the last record will repeat until the Turntable Switch is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped. When the pickup is swung to the right beyond the edge of the record and lower onto the pickup rest with the pickup over the needle groove plate. The record player is then ready for reloading, or for manual operation.

**TO PLAY RECORDS MANUALLY**

**MANUAL OPERATION**

1. Proceed as in step 1, under "Automatic Operation."

2. Place a record on the turntable with the desired selection upwards.

3. Set the Index and Record Reject Lever to "Manual" position.

4. Proceed as in steps 5, 6, 7 and 7, under "Automatic Operation."

When the playing is finished, be sure that the turntable has stopped and the pickup is returned to the rest position over the needle groove plate. Never leave the pickup with the needle resting on a record or the turntable.

**VOLTAGE CHART**

All voltages measured with a 1.000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 75 watts.
Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

ALIGNING FREQUENCIES: IF trim - 455kc thru .65 or .lmf.
SW-OSC. - 18,100kc thru 400 ohm res., gang cond. at minimum.
SW-ANT. - 16,000kc thru 400 ohm res.
BC-OSC. - 1730kc thru .0002m, gang cond. at minimum.
BC-ANT. - 1400kc.
BC-OSC. PAD - 600 kc - Recheck BC at 1400kc.

POWER SUPPLY
This receiver is designed to operate on either a 6 volt storage battery or a power supply main of 110-120 volts, 60 cycle alternating current (A.C.) Never plug in to a D.C. outlet.
MODELS J6, XJ6

Band Switch
right (535 to 1630 kilocycles)
left (2.8 to 6.58 megacycles)

**MODEL J6 & XJ6**

**Speaker** (Part No. P4169) 5" Dynamic.
Field Resistance.......................... 400 ohms
D.C. voice coil resistance................ 3.6 ohms
Voice coil impedance at 400 cycles. 4.0 ohms

**RESISTORS**

<table>
<thead>
<tr>
<th>No.</th>
<th>Ohms</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>250,000</td>
<td>1/4</td>
</tr>
<tr>
<td>R2</td>
<td>150,000</td>
<td>1/4</td>
</tr>
<tr>
<td>R3</td>
<td>250,000</td>
<td>1/4</td>
</tr>
<tr>
<td>R4</td>
<td>10,000,000</td>
<td>1/4</td>
</tr>
<tr>
<td>R5</td>
<td>25,000</td>
<td>1/4</td>
</tr>
<tr>
<td>R6</td>
<td>150,000</td>
<td>1/4</td>
</tr>
</tbody>
</table>

**CONDENSERS**

<table>
<thead>
<tr>
<th>No.</th>
<th>Capacity (Mfd.)</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>.05</td>
<td>600</td>
</tr>
<tr>
<td>C2</td>
<td>.0001</td>
<td>Mica</td>
</tr>
<tr>
<td>C3</td>
<td>.05</td>
<td>200</td>
</tr>
<tr>
<td>C4</td>
<td>.0025</td>
<td>Mica</td>
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<tr>
<td>C5</td>
<td>.005</td>
<td>400</td>
</tr>
<tr>
<td>C6</td>
<td>.0005</td>
<td>Mica</td>
</tr>
<tr>
<td>C7</td>
<td>.01</td>
<td>400</td>
</tr>
</tbody>
</table>

**Oscillator and Short Wave Antenna Coil** (Part No. G6187)
Looking at the five terminal connection end in a clockwise direction starting at the mounting bracket, the connections are: No. 1, ground; No. 2, grid; No. 3, B.C. osc. tap; No. 4, open; No. 5, open. Looking at the other end in a clockwise direction starting at the mounting bracket, the connections are: No. 6, pad; No. 7, open; No. 8, switch; No. 9, ant.

No. 1 and No. 2—Resistance...69 ohms
No. 3 and No. 2—6.5 ohms
No. 1 and No. 3—Resistance... .4 ohm
No. 8 and No. 2—.3 ohm

**First I.F. Transformer** (Part No. P3794)
Primary—Blue, plate; red, B+—Resistance.......................... 19.9 ohms
Secondary—White, grid; black, A.V.C.—Resistance. 19.8 ohms

**Second I.F. Transformer** (Part No. P3324)
Primary—Blue, plate; red B+—Resistance 22.2 ohms.
Secondary—White, diode; black, A.V.C.—Resistance 22.1 ohms.

**Electrolytic Condenser** (Part No. P3531)
Red, 20 mfd., 150 volt; green, 20 mfd., 150 volt; yellow, 20 mfd., 25 volt; black, negative for all three sections.

For PUSH BUTTON DATA see INDEX. For CONVENTIONAL ALIGNMENT see Spec. Section Vol. VIII.
All voltages to ground with a 1,000 ohm per volt meter on the 250 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 45 watts.

**Short Wave Antenna Coil (Part No. P3378)**
Looking at the connection end in a clockwise direction starting at the mounting lug side the connections are: No. 1, AVC; No. 2, Ant; No. 3, Grid; No. 4, Ground.
Primary—No. 2 and No. 4—Resistance 3 ohm
Secondary—No. 1 and No. 3—Resistance .07 ohm

**Broadcast Antenna Coil (Part No. G6031)**
Looking at the connection end in a clockwise direction starting at the mounting strip the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant; No. 4, ground. No. 4 is grounded to the mounting strip.
Primary—No. 3 and No. 4—Resistance 27.1 ohms
Secondary—No. 1 and No. 2—Resistance 1.9 ohms

**Oscillator Coil (Part No. P4155)**
Looking at the mounting bracket end in a clockwise direction starting at the chassis the connections are: No. 1, pad; No. 2, B.C. grid; looking at the other end in a clockwise direction starting at the chassis the connections are: No. 3, ground; No. 4, sec. tap; No. 5, open; No. 6, S.W. grid; No. 7, tickler.
Tickler—No. 3 and No. 7—Resistance .8 ohm
S.W. Secondary—No. 6 and No. 7—Resistance .07 ohm
B.C. Secondary—No. 2 and No. 1—Resistance .51 ohms

Band switch shown in broadcast position in schematic and in short wave position in pictorial view.
Speaker (Part No. P4206) 6¾" PM. Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

D. C. voice coil resistance........................................ 3.6 ohms
Voice coil impedance at 400 cycles................................ 4.0 ohms

S. W. Antenna Coil (Part No. P3198)
Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, ground; No. 2, antenna; No. 3, switch; No. 4, ground.

Primary—No. 1 and No. 2—Resistance.............................. .37 ohm
Secondary—No. 3 and No. 4—Resistance............................ .08 ohm

Oscillator Coil (Part No. P4194)
Looking at the mounting strip end in a clockwise direction starting at the chassis, the terminals are: No. 1, ground; No. 2, cathode; No. 3, open; No. 4, pad; No. 5, switch; No. 6, grid; No. 7, grid; No. 8, open.
B.C. Primary—No. 1 and No. 5—Resistance....................... .29 ohm
S.W. Primary—No. 5 and No. 2—Resistance........................ .06 ohm
B.C. Secondary—No. 4 and No. 6—Resistance..................... .57 ohms
S.W. Secondary—No. 2 and No. 7—Resistance..................... .08 ohm

First I.F. Transformer (Part No. P4108)
Primary—Blue, plate; red, B+—Resistance.......................... 18.2 ohms
Secondary—White, grid; black, AVC—Resistance.................. 15.1 ohms

Second I.F. Transformer (Part No. P4109)
Primary—Blue, plate; red B+—Resistance........................... 20.8 ohms
Secondary—White, diode; black, AVC—Resistance................ 17.4 ohms

6SK7 (RF) TUBE
Plate (8) to ground............................................. 208
Screen (6) to ground............................................. 93

6SA7 TUBE
Plate (3) to ground............................................. 255
Screen (4) to ground............................................. 93

6SK7 (IF) TUBE
Plate (8) to ground............................................. 255
Screen (6) to ground............................................. 93

6SK7 (AF) TUBE
Plate (8) to ground............................................. 20
Screen (6) to ground............................................. 10

6KG TUBE
Plate (3) to ground............................................. 240
Screen (4) to ground............................................. 250
Cathode (8) to ground.......................................... 18

5Y3G TUBE
Filament (8) to ground......................................... 266

All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 60 watts.

RESISTORS

<table>
<thead>
<tr>
<th>No.</th>
<th>Ohms</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Ohms</th>
<th>Watts</th>
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<tbody>
<tr>
<td>R1</td>
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<tr>
<td>R3</td>
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<td>1/4</td>
</tr>
<tr>
<td>R4</td>
<td>25,000</td>
<td>1/4</td>
</tr>
<tr>
<td>R5</td>
<td>5,000,000</td>
<td>1/4</td>
</tr>
<tr>
<td>R6</td>
<td>1,000</td>
<td>1/4</td>
</tr>
<tr>
<td>R7</td>
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<td>1/4</td>
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CONDENSERS

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<thead>
<tr>
<th>No.</th>
<th>Capacity (Mfd.)</th>
<th>Volts</th>
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</thead>
<tbody>
<tr>
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<tr>
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<td>1000</td>
</tr>
<tr>
<td>C3</td>
<td>0.0005—5%</td>
<td>500</td>
</tr>
<tr>
<td>C4</td>
<td>0.0005—5%</td>
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<tr>
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<tr>
<td>C6</td>
<td>0.0002</td>
<td>500</td>
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</table>

For Alignment & Push-Button Tuner Data, see Index

POWER SUPPLY
This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (A.C.). Never plug in a D.C.
Fig. 2—Top View of Chassis

Resistors

<table>
<thead>
<tr>
<th>No.</th>
<th>Ohms</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>10,000,000</td>
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</tr>
<tr>
<td>R2</td>
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<td>R3</td>
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<tr>
<td>R4</td>
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<td>R8</td>
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<td>1/2</td>
</tr>
<tr>
<td>R9</td>
<td>55,000</td>
<td>1/2</td>
</tr>
</tbody>
</table>

Speaker (Part No. P-4490) 6 1/2" P.M. Type
D.C. voice coil resistance.......................... 2.8 ohms
Voice coil impedance at 400 cycles.............. 3.1 ohms

Oscillator Coil (Part No. P-4495)
Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, end of winding; No. 2, start of winding; No. 3, tap. No. 1 and No. 2—Resistance........ 4.5 ohms
No. 1 and No. 3—Resistance..................... 4.05 ohms
No. 2 and No. 3—Resistance..................... 4.5 ohms

First I.F. Transformer (Part No. P-4108)
Primary—Blue, plate; red, B+
Resistance......................................... 18.2 ohms
Secondary—White, grid; black, AVC
Resistance......................................... 15.1 ohms

Second I.F. Transformer (Part No. P-4109)
Primary—Blue, plate; red, B+
Resistance......................................... 20.8 ohms
Secondary—White, diode; black, AVC
Resistance......................................... 17.4 ohms

VOLTAGE CHART
Never plug in a D.C. outlet.
All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 90 watts.

6SA7 TUBE
Plate (3) to ground.................................. 255
Screen (4) to ground................................. 93

6SK7 TUBE
Plate (8) to ground.................................. 255
Screen (6) to ground................................. 93

6KG TUBE
Plate (3) to ground.................................. 240
Screen (4) to ground................................. 258
Cathode (8) to ground............................... 18

5Y3G TUBE
Filament (8) to ground............................. 266

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### PHONOGRAPH CONNECTIONS MODEL A11

Connection may be made directly from the phonograph to this jack by means of phone tips, if the phonograph pickup is of the high impedance type. If the pickup is of the low impedance type, a coupling transformer must be used.

### TELEVISION CONNECTIONS

A high impedance, high output microphone may be plugged directly into the phone jack, thus using the speaker and audio system of the receiver.

© John F. Rider, Publisher
This Record Changer will automatically play a series of up to twelve 10", 11" or ten mixed 10" and 12" records of the standard 78 R. P. M. type. Records of the last few years with the standard eccentric or sapphire stylus groove on the inside and an eccentric on the outside will operate the automatic mechanism. However, records of any size up to 12" may be played manually.

**SHEPPING BOLTS**

The automatic record changer is held solid for shipping by four bolts and before placing unit in operation the four channel shaped nuts must be loosened. The aforementioned four channel shaped nuts are located underneath the record changer and should be turned counterclockwise until they are free from the wood roll of the cabinet.

**DO NOT REMOVE THE BOLTS**

If it is necessary to later ship this radio the four channel shaped nuts must be tightened to the shipping position.

**CAUTIONS**

1. Never use force to start or stop the motor or any part of the record changing mechanism or pickup arm.
2. The use of records which have become warped or damaged thru improper care may cause the mechanism to jam and damage the instrument. Records which have become warped will slide on an uneven path when playing, resulting in unsatisfactory reproduction.
3. Do not leave records on the selector arms, as they are liable to warp particularly so in warm climates. Keep your records in a record file (or cabinet) when not in use. This will protect them from dust and dirt.
4. The Changing Cycle consists of the time interval beginning when the pickup arm automatically lifts at the end of each section of the record and moves out to its extreme position; the new record drops and the pickup arm rests itself on the outer edge of this new record. During this cycle, the pickup arm should not be handled. WHEN IT IS DESIRED TO STOP THE MECHANISM CARE SHOULD BE TAKEN TO SEE THAT THIS CHANGING CYCLE IS COMPLETE.
5. No damage will be done if you forget to turn off changer after it has played its entire load of records. It will simply report the last record until stopped.
6. **LEVELING**...For proper operation of the record changer the unit must be level.

**PHONOGRAPH NEEDLES**

Various types and kinds of needles are available for use in phonograph pickup arms. All have their virtues as well as their faults, for use in ordinary phonographs, where needles can be changed after each record. For records up to twelve records at one setting, as with this Changer, no attempt should be made to use ordinary steel or tungsten points, since continued use of worn points will be likely to ruin both quality of reproduction and the records as well. Any kind of needle can be used which has a point durable enough to play ten records or more without damaging these.

It should be remembered that, no matter what the quality of the pickup arm, amplifying system and speaker, all of the recorded music must pass through the needle. For this reason, it is absolutely essential that phonograph needles be used and that they are changed often enough so the records are not damaged and the quality of the music is not impaired.

It is recommended that a sapphire point needle be used as it is the only needle that can be satisfactorily used on both commercial records and home recordings. If any other type of needle is used it is suggested that the needle be changed every time a record is played to home recordings after playing commercial records. If the same needle is used on both types of phonograph, type "A", the recordings will be quickly damaged. A sapphire needle will play several thousand records before requiring replacement. Never under any condition should a needle be removed from the pickup arm and then reinstalled.

To install a needle raise the pickup arm to a nearly vertical position. loosen needle screw and meet needle. The needle screw should now be firmly tightened.

**LOADING**

Turn the record selector assemblies until they snap into place and then place the selected record up to twelve 10", 11" or mixed stack of 10" and 12" records, not exceeding ten over the center spindle so they will rest on the record platforms of the record selector assemblies. The Record Feeder Assemblies consist of a top plate or Selector Blade which is tapered at the edge for the purpose of selecting the bottom record on the stack and to drop it during the changing cycle. The lower plate is called the Record Platform and it is upon this plate that the records are placed. Place the record desired last on top.

**STARTING THE CHANGER**

1. Turn on the radio and set the "Phono-Bond Switch" to the "Phono" position.
2. Push the control button (see Fig. 11) to the "Reg." (Record) position and release. The motor will start and the record changer will go into automatic operation.
3. Adjust volume control to the desired intensity and tone control to the preferred setting.
4. Close cabinet to eliminate mechanical reproduction of sound by the needle.
5. When the playing is finished, be sure turntable is stopped and tone arm is in the rest position. Never leave the tone arm with the needle resting on a record or the turntable.

**REJECTING A RECORD**

To reject a record it is only necessary to push the control button on the record changer panel to the "Reg." (Record) position for a few seconds and then release. A record can be rejected any time the needle is in contact with the record.

**UNLOADING**

1. Switch all the motor while the needle is in contact with a record.
2. Return the pickup arm to the rest position.
3. Lift the record leader assemblies upward and turn them out of the way.
4. Lift the played records from the turntable.
5. Turn the record leader assemblies until they snap back into position.

The changer may now be loaded with a new stack of records.

**MANUAL OPERATION**

Manual operation is used for all home recordings and records without spiral grooves.

1. Lift the record leader assemblies upward and turn them out of the way.
2. Place record on turntable with the desired selection upward.
3. Push the control button to the first or "Man." (Manual) position.
4. When the turntable has attained speed, lift pickup arm and lower gently to the record so the needle point enters the outside groove.
5. Adjust volume control to the desired intensity and tone control to the preferred setting.
6. Close cabinet to eliminate mechanical reproduction of sound by the needle.
7. When the playing is finished, be sure turntable is stopped and pickup arm is in the rest position. Never leave the pickup arm with the needle resting on a record or the turntable.

**REPLACE**

This record changer is provided with two trip mechanisms so that automatic changing can be secured from records with conventional Eccentric Centre Groove or with records lacking the Eccentric Centre Groove, but which are recorded sufficiently close to the center so that the Positive Trip comes into operation.

**THE RATCHET TRIP**

The Ratchet Trip requires no adjustment as its range of operation is greater than that of any standard records.

**THE POSITIVE TRIP**

The Positive Trip can be adjusted to operate at a definite point from the center spindle in the following manner: Remove the button covering the hole on the left side of the pickup arm. Using a small screwdriver remove the screw-head appearing thru this hole.

**PICKUP ARM DROP POINT**

This Record Changer is provided with an adjustment controlling the position of which the Pickup Arm is dropped on the outer edge of the record. This adjustment has a constant relationship for 10" or 12" inch records. Therefore, one adjustment on either diameter of record is sufficient. To make this adjustment, remove the button on the right side of the pickup arm and with a small screwdriver, rotate the exposed screw-head slightly. This screw-head can be rotated only one half turn or 180 degrees. Therefore, slight adjustments are all that should be required. Turning this screw slightly to the right or in a clockwise direction causes the positive trip to set later in the playing cycle or nearer to the center of the record. The exact adjustment can be determined only by playing a record with its last move located at the desired distance from its center.

**PICKUP ARM LIFT POINT**

This Record Changer is designed so that the pickup will start at the proper position on the top record of 12 inch records or the turntable. This is based upon the use of a needle which is inserted with an approximately 5/16" protruding from the underside of the pickup arm. Adjustment for this is readily available by lifting pickup arm to its maximum position. Turning the hexagon headed screw which is located on the underside of the Pickup Arm makes the adjustment. Turning the screw to the left or counter-clockwise raises the operating position of the Pickup Arm and turning the screw to the right or clockwise, lowers its position.
PROCEDURE FOR SETTING UP PUSH BUTTONS

The push buttons under the dial will provide instant tuning to any one of six stations. Make a list of the desired stations, two between 540 and 1380 kilocycles, the second two between 670 and 1270 kilocycles, and the last two between 1000 and 1630 kilocycles. The push buttons are reached from the rear and are located above the chassis in the center of the top of the panel. Each of the push buttons is numbered from 1 to 6 inclusive and there are two adjustments under each number. Number 1, 2, 7, and 8 cover the two stations between 1000 and 1630 kilocycles, numbers 3 and 4 cover the two stations between 670 and 1270 kilocycles, and numbers 5 and 6 cover the two stations between 540 and 1380 kilocycles. To set the aforementioned adjustments proceed as follows:

1. Turn band switch to band indicator located in lower center of dial.
2. Tune in, by means of the station selector knob, the station selected above for number 1.
3. Turn band switch to P.B. position.
4. Loosen wing nut and remove the tuning eye located directly above the permeability tuner.
5. Turn the adjustment screw directly under number 1 until the station tuned in step number 3 is again received and then carefully ad
6. Just the adjustment directly below the aforementioned adjustment until the tuning eye is observed the clearest.
7. The above procedure is repeated for each of the five tuning eyes. The tuning eye should then be carefully reset.

MODEL 111

Voltages—Line 117 volts A.C. Power consumption 165 watts. Volume control maximum. Loop antenna not connected and set off. Meter 20,000 volts per volt. Meter scales used are as follows: Scale "A", 10 volts; Scale "B", 50 volts; Scale "C", 250 volts; Scale "D", 1000 volts.

6A8B R.F. Tube Meter Scale Voltage
Plates (8) to ground "A" 225 volts
Screen (8) to ground "C" 180 volts
Cathode (8) to ground "A" 2.6 volts

6SA7 1st Det. C.C. Tube Plate (3) to ground "D" 260 volts
Screen (4) to ground "A" 130 volts
Cathode (6) to ground "A" 0.0 volts

687A Ample Tube Plate (8) to ground "D" 230 volts
Screen (6) to ground "D" 125 volts
Cathode (5) to ground "A" 1.7 volts

6S7Q 2nd Det. C.C. Tube Plate (6) to ground "D" 260 volts

655 Tuning Eye and Volume Level Indicator Tube Target Plate (4) to ground "D" 260 volts

657Q Microphone Amp Tube Plate (8) to ground "D" 25 volts
Grid (2) to ground "A" 0.0 volts

6ST7 1st Audio Tube Plate (8) to ground "C" 70 volts
Screen (8) to ground "B" 30 volts

6SQT Driver Tube Plate (8) to ground "C" 85 volts
Cathode (8) to ground "A" 0.0 volts

6S7T Inverter Tube Plate (6) to ground "C" 75 volts
Diode Plate (4) to ground "A" 3 volts
Diode Plate (5) to ground "A" -3 volts

6SFQ Output Tubes Plate (3) to ground "D" 260 volts
Screen (4) to ground "D" 260 volts
Cathode (8) to ground "B" 15 volts

5U4G Rectifier Tube Plate (8) to ground "D" 340 volts

MODELS A111-A111-F11

General—A111-A111-F11
All adjustments should be made with the volume control in the maximum position, to prevent the A.V.C. from opening and giving false readings.

1. F. ALIGNMENT
Remove the chassis from the cabinet, disconnect the leads from the grid of the amplifier, and connect the output to the grid of the first detector in the line. Do not touch the tuning condenser while the circuit is energized. Adjust all 1.f. trimmers to peak or maximum reading on the output meter.

2. BROADCAST BAND ALIGNMENT

BAND No. 1 (First) Adjust the signal generator to 1630 KC and connect the output to the grid antenna loop. Turn the volume with the receiver until the maximum reading is obtained on the output meter. Return to 1630 KC and again go over the adjustments of this frequency to be sure that they were not just slightly out of adjustment when alignment was made at 600 KC.

Speaker (Part No. P436) 12" Dynamic
Feedback resistance 600 ohms
D.C. bias coil resistance 600 ohms
Voice coil impedance at 400 cycles 6.0 ohms

Short Wave Antenna Coil (Part No. G23B)
Looking at the live bus connection and starting at the chasis in a clockwise direction the terminating are No. 1, switch, No. 2, sec. top, No. 3, sec. top, No. 4, ground, No. 5, antenna, other end, No. 6, trimmer.

Primary—No. 4 and No. 5—Resistance 3 ohms
Secondary (180 ohms) No. 1 and No. 6—Resistance 3 ohms
Secondary (SW) No. 4 and No. 6—Resistance 3 ohms
Secondary—No. 1 and No. 3—Resistance 4.1 ohms

First L.F. Transformer (Part No. P4360)
Primary—Blue, plate, red B—Resistance 19.6 ohms
Secondary—White, grid, black, AVC—Resistance 16.9 ohms

Second L.F. Transformer (Part No. P4361)
Primary—Blue, plate, red B—Resistance 19.3 ohms
Secondary—White, diode, black, AVC—Resistance 16.6 ohms

Power Transformer (Part No. P3474)
Primary—115 volt, 60 cycle, black leads, Resistance 2.5 ohms
Secondary—6.3 volt filament, green leads, Resistance 12 ohms
Secondary—5 volt rectifier filament, yellow leads, Resistance 11 ohms
Secondary—High voltage, red leads, Resistance 123.7 ohms
High voltage center tap, red and white lead, Resistance to one side 59.8 ohms
Resistance to other side 64.3 ohms

6ST7 1st Audio Tube Plate (8) to ground "C" 70 volts
Screen (8) to ground "B" 30 volts

6SQT Driver Tube Plate (8) to ground "C" 85 volts
Cathode (8) to ground "A" 0.0 volts

6S7T Inverter Tube Plate (6) to ground "C" 75 volts
Diode Plate (4) to ground "A" 3 volts
Diode Plate (5) to ground "A" -3 volts

6SFQ Output Tubes Plate (3) to ground "D" 260 volts
Screen (4) to ground "D" 260 volts
Cathode (8) to ground "B" 15 volts

5U4G Rectifier Tube Plate (8) to ground "D" 340 volts

Models A111-A111-F11

CONTINENTAL RADIO & TELEVISION CORP.

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AUTOMATIC RECORD CHANGER

This Record Changer will automatically play a series of fourteen 10" or ten 12" records of the standard and 78 R.P.M. type. The records must all be one size when loading and may consist of less records than listed above. Records of the last few years with the standard eccentric or spiral stopping groove on the inside and an eccentric on the outside will operate the automatic mechanism. However, records of any size up to 12" may be played manually.

CAUTIONS

1. Never use force to start or stop the motor or any part of the record changing mechanism or pickup arm. The turntable is weighted for recording and will require about one minute to come to rest after the motor is turned off.

2. The use of records which have become warped or damaged thru improper care may cause the mechanism to jam and damage the instrument. Records which have become warped will slide on one another when playing, resulting in unsatisfactory reproduction.

3. Do not leave records on the selector arms, as they are liable to warp, particularly so in warm climates. Keep your records in a record file (album or cabinet) when not in use. This will protect them from warping and dust.

4. If the automatic record changer is turned off by the motor switch knob while the mechanism is going thru a "change cycle" the motor will not stop until the cycle is completed and the tone arm is raised in playing position. The tone arm may now be lifted to the rest position. If it is desired to turn the record changer off by the use of any other switch then the one on the changer itself, be sure to turn the off while needle is resting upon record, otherwise the selecting arms cannot be correctly reset.

5. No damage will be done if you forget to turn off changer after it has played its entire load of records. It will simply repeat the last record until stopped.

6. LEVELING. For proper operation of the record changer and recorders the unit must be level.

PHONOGRAPH NEEDLES

Various types and kinds of needles are available for use in phonograph tone arms. All have their virtues, as well as their faults, for use in ordinary phonographs, where needles can be changed after each record. For playing ten or more records at one setting, as with this Changer, no attempt should be made to use ordinary steel or ferrite points, since continued use of worn points will be likely to ruin both quality of reproduction and the records as well. Any kind of needle can be used which has a point durable enough to play ten records or more without damaging them.

It should be remembered that, no matter what the quality of the tone arm, amplifying system and speaker, all of the recorded music must pass through the needle. For this reason, it is absolutely essential that particular care be taken to use good needles, and to see that they are changed often enough so that the records are not damaged and the quality of the music is not impaired.

It is recommended that a sapphire point needle be used as it is the only needle that can be satisfactorily used on both commercial records and home recordings. If any other type of needle is used it is necessary to change the needle every time it is desired to play home recordings of playing commercial records. If the same needle is used on both kinds of records (except sapphire types) the home recordings will be quickly damaged. A sapphire needle will play several thousand records before requiring replacement. Never under any condition should a needle be removed from the tone-arm head and then re-installed. To install a needle raise the tone arm to a nearly vertical position, loosen needle screw and insert needle. The needle screw should now be firmly tightened.

SETTING FOR SIZE OF RECORD

On each set there are selecting arms (See Fig. 2 and Fig. 3) and their position determines the setting for different size records. To set for 10 or 12 inch records it is merely necessary to grasp the posts by the knobs at the top, lift, and turn until the 10" or 12" arrows are pointing toward the center of the turntable. When in either the 10" or 12" position, the posts will snap into place when they are lifted by hand. Figure 2 shows the Record changer with the selecting arms set for 10" records and ready to be loaded; the tone arm in the rest position. Figure 3 shows the setting for 12" records.

LOADING

After both selecting arms are adjusted so the arrows match with the desired record size points to the center, the selected records (up to fourteen 10" or ten 12") are placed over the center pin so they will rest on the selecting arms. Place the record desired last on top.

STARTING THE CHANGER

1. Move the manual control button as far as possible toward the needle screw and then move the tone arm to its extreme outside position. The combination of movements will result in the manual control button snapping into position at the end of the eccentric arm plate and will completely free the tone arm from all locked or automatic positions.

2. Place record on turntable with the desired selection upward.

3. Turn the switch knob on the record changer panel to "ON."

4. When the turntable has obtained speed, lift tone arm and lower gently on to the record so the needle point enters the outside groove.

5. Adjust volume control to the desired intensity and tone control to the preferred setting.

6. Close lid of the cabinet to eliminate mechanical reproduction of sound by the needle.

7. When the playing is finished, be sure turntable is stopped and tone arm is in the rest position. Never leave the tone arm with the needle resting on a record or the turntable.

REJECTING A RECORD

To reject a record, it is only necessary to press the switch knob on the record changer panel for a few seconds and then release. A record can be relabeled any time the needle is in contact with the record.

UNLOADING

First switch off the motor. Gasp each post by its knob at the top and turn them out of the way. Remove the tone arm to the rest position.

Lift the played records from the turntable. Then remove the posts to the proper playing position as indicated by the arrows on the selecting arms. (See Fig. 2 and 3.) The Changer may then be loaded with a new stack of records according to the size shown on the selecting arms.

MANUAL OPERATION

Manual operation is used for all home recordings and records without spiral grooves.

1. Move the manual control button as far as possible toward the needle screw and then move the tone arm to its extreme outside position.

2. Place record on turntable with the desired selection upward.

3. Turn the switch knob on the record changer panel to "ON."

4. When the turntable has obtained speed, lift tone arm and lower gently on to the record so the needle point enters the outside groove.

5. Adjust volume control to the desired intensity and tone control to the preferred setting.

6. Close lid of the cabinet to eliminate mechanical reproduction of sound by the needle.

7. When the playing is finished, be sure turntable is stopped and tone arm is in the rest position. Never leave the tone arm with the needle resting on a record or the turntable.

ANTENNA CONTROL

The antenna control knob is located above the dial scale and controls the position of the rotary loop antenna. On weekmason this knob should be turned right or left to the position of maximum output. In extremely noisy locations the knob should be turned to the point of minimum noise.

TELEVISION CONNECTIONS

The sound channel output from the second detector of a Television Receiver may be plugged directly into the Phonograph, thus using the speaker and audio system of the receiver. The above connections will greatly reduce the cost of Television Receiving Equipment, because it eliminates the need for a speaker and audio system in the above equipment.
**RECORDERS**

This recorder will make up to 12 inch recordings. The recordings may be made from the microphone or radio; also the microphone and radio may be blended together in one recording.

**CAUTIONS**

1. Never try to record on a blank that is warped even though it be just slightly.

2. When recording the recording needle will cut a fine thread, just a little thicker than a human hair, from the record blank, and this thread should pull up toward the center of the blank. After the recording is completed, this thread may be gathered up and removed. Although it is possible to remove this thread continually with a soft brush while the record is being cut, considerable care must be taken so that the thread is not tangled around the recording needle or the turntable slowed up by touching it, since either will cause poor recordings.

3. If the showings cut from the record gather under the recording needle the needle screw should be loosened and then tightened, being sure to keep the needle all the way in. The resulting minute change in the angular position of the needle will probably correct the trouble.

4. The recorder arm must be in the rest position when playing back recordings or using the automatic record changer.

5. Never try to remove or replace a recorded or plain blank with the motor running.

6. Be sure the recording needle is tight after each recording. Should it loosen during a recording, it will chatter and ruin the record.

7. The recording needle is razor sharp and must not be dropped or allowed to rest on the turntable. The recording needle should only be in contact with the record while actually recording or adjusting the Recorder Arm Height.

8. If the microphone is held too close to the speaker it will feed back and start to a loud "howl." When recording from the microphone it should be held away from the cabinet and with the back toward the cabinet. When not recording the microphone volume control should be turned to the all position to prevent feedback or "howl."

9. Never record nearer than one and one-half inches from the center of the record. With some recording discs it is not possible to record this close to the center because of a large label; do not record closer than one-fourth inch from label.

**TO RECORD A RADIO PROGRAM**

1. Place a blank recording disc on the turntable with the driving pin, located in the top of the turntable about one inch from the center, in one of the three holes provided.

2. Set "Phono-Radio-Micro" switch to Radio Position. (Model K7)

3. Move the manual control button as far as possible toward the needle screw and then move the tone arm to extreme outside position.

4. The combination of movements will result in the manual control button snapping into position on the end of the rocketchron plate and will completely free the tone arm from all locked or automatic positions. (Model B11)

5. Tum radio on and tune desired station.

6. Lift recorder arm about three inches and move it to the edge of the blank. This will switch from playback to record and decreases the volume. While holding the recorder arm adjust the volume control until the volume level indicator hitting area almost closes and lower the recorder arm gently on to the record so the recording needle starts about one-fourth inch from the edge of the blank disc. On loud music passages the volume level indicator should completely close.

7. After the recording is complete (never record closer than one and one-half inches from the center) the recorder arm should be returned to its rest position. Never leave the recorder arm resting on record or turntable.

**TO RECORD FROM THE MICROPHONE**

The procedure is the same as recording a radio program except for the volume control switch to minimum and the microphone volume control is used (Mod. B11) (Mod. K7, Radio-Radio-Micro switch turned to Mike Position)

**TO RECORD MICROPHONE AND RADIO PROGRAM AT THE SAME TIME**

The procedure is the same as recording a radio program except the microphone volume control is also used. The two may be blended as desired or only one used part of the time and by changing the volume controls slowly, fading from one to the other is obtained. Model B11 only.

**PLAYBACK**

As soon as a recording is completed it may be instantly played back after the recorder arm is returned to its rest position and the "Phono" button is pushed in. (See Manual Playback)

**RECORDING NEEDLE PRESSURE ADJUSTMENT**

The pressure on the recording needle which determines the groove depth is controlled by the chrome- plated knob on the top of the recorder arm. The knob has engraved upon it the letters "L, M, and H" indicating Light, Medium and Heavy pressure and provides an easy means of compensating for different types of recording needles, blanks or for the wear of the recording needle after it is used. In general, the machine is properly set at the factory so that it will cut the average record correctly when this knob is in the "M" position. No "M" Pos. for KOD. K7.

If the groove is too shallow, the playback needle will not stay in the groove. If it is too deep, not enough will be left between grooves and the playback needle will break through from one track to the next after a few playings.

The proper depth of groove will leave about the same space between the groove as the groove is wide. Hold a finished record toward the light and you can usually see if the grooves are spaced correctly.

A properly cut groove will leave a shaving just a little heavier than a human hair.

**RECORDING ARM HEIGHT ADJUSTMENT**

The height of the recording arm can be varied by means of the slotted screw head which is on the top of the arm and toward the back, approximately flush with the surface. In order to make this adjustment, it is necessary to insert a recording needle and, with the motor turned OFF and a record blank on the turntable, place the recording arm in a position on the blank, so that the recording needle will be approximately centered in the slot at the front end of the recorder arm.

**RECORDING NEEDLE**

The recording needle is provided with a flat on one side and should be inserted in the needle hole so that it is toward the needle screw, now with the needle off the way in which it is pointed outside of the needle screw. The recording arm adjustments must now be checked. See "Recorder Arm Height Adjustment" and "Recorder Arm Pressure Adjustment."

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This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (A.C.). **Never plug in a D.C. outlet.**

For ALIGN. & COIL DATA - SEE INDEX.

**CONVENTIONAL ALIGNMENT**

**MODEL J55, XJ55, XJ55-PH**

**ISSUE A**

**JUNE 1940**

**MODEL J55 & XJ55**

**BOTTOM VIEW OF SOCKET**

For SPEAKER & COIL DATA - SEE INDEX.

(Band Switch)

(right 535 to 1630 kilocycles)

(left 2.8 to 6.58 megacycles)

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All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 60 watts.

Speaker (Part No. P4263) 10" PM.
D. C. voice coil resistance .37 ohms
Voice coil impedance at 400 cycles .41 ohms

S. W. Antenna Coil (Part No. P3198)
Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, plate; No. 2, B+; No. 3, grid; No. 4, pad.
Primary—No. 3 and No. 4—Resistance .08 ohm
Secondary—No. 1 and No. 2—Resistance .37 ohm

Oscillator Coil (Part No. P4194)
Looking at the mounting strip end in a clockwise direction starting at the chassis, the terminals are: No. 1, ground; No. 2, cathode; No. 3, open; No. 4, pad; No. 5, switch; No. 6, grid; No. 7, grid; No. 8, open.
B.C. Primary—No. 1 and No. 5—Resistance .29 ohm
S.W. Primary—No. 5 and No. 2—Resistance .06 ohm
B.C. Secondary—No. 4 and No. 6—Resistance .57 ohms
S.W. Secondary—No. 2 and No. 7—Resistance .08 ohm

First I.F. Transformer (Part No. P4108)
Primary—Blue, plate; red, B+—Resistance 18.2 ohms
Secondary—White, grid; black, A.V.C.—Resistance 15.1 ohms

Second I.F. Transformer (Part No. P4109)
Primary—Blue, plate; red, B+—Resistance 20.8 ohms
Secondary—White, diode; black, A.V.C.—Resistance 17.4 ohms
MODEL --- #10
TUBES MAY BE METAL OR GT TYPE

1940

SOCKET VOLTAGES TAKEN @ 117.5 VOLT LINE (A. C.)

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>No. 1</th>
<th>No. 2</th>
<th>No. 3</th>
<th>No. 4</th>
<th>No. 5</th>
<th>No. 6</th>
<th>No. 7</th>
<th>No. 8</th>
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<tr>
<td>6SK7</td>
<td>R. F. Amplifier</td>
<td>GND.</td>
<td>H</td>
<td>3</td>
<td>0</td>
<td>GRID</td>
<td>3</td>
<td>0</td>
<td>91</td>
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<tr>
<td>6J7</td>
<td>Detector</td>
<td>GND.</td>
<td>H</td>
<td>20</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>H</td>
<td>91</td>
</tr>
<tr>
<td>25L6</td>
<td>Output</td>
<td>GND.</td>
<td>H</td>
<td>120</td>
<td>A.C.</td>
<td>120</td>
<td>A.C.</td>
<td>H</td>
<td>5.8</td>
</tr>
<tr>
<td>W-46416</td>
<td>Ballast Resistor</td>
<td>165 Ohms (Cold) Between No. 3 and No. 7 Pins with No. 6 and No. 8 Pins Tied Together.</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Alignment

(a) Connect the output lead of the signal generator through a .0001 mf. condenser to the antenna lead on the receiver.
(b) Open the gang condenser all the way.
(c) Set the generator to 1712 kilocycles.
(d) Adjust the trimmer condensers on the gang until the 1712 kc. signal is heard. The gang should just tune through this signal.
(e) Set the generator to 1400 kc.
(f) Tune the set to the 1400 kc. signal, then alternately adjust the trimmers on the gang until no further improvement can be noticed on the output meter.
ALIGNMENT PROCEDURE

The chassis of this receiver is mounted to one side of the power supply and for this reason all test equipment should be thoroughly insulated in order that the power supply will not become short circuited while aligning the receiver.

This does not apply to the models J11 as the power supply is isolated from the chassis by a 25 mfd. condenser.

CONNECTIONS OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the grid of the 50AG7 output tube. Be certain that the meter is protected from DC by connecting a condenser (1 mfd or larger—non-electrolytic) in series with one of the leads.

Tuning the I-F Amplifier To 155 Kilocycles.

(a) Connect the output of the signal generator through a 100 mfd condenser to the antenna connection (Blue or Red lead extending from rear of chassis on the receiver). Do not connect ground return from the signal generator unless it is found to be absolutely necessary. If it is absolutely necessary to connect a small condenser (approximately .001 mfd) should be connected in series with the ground terminal of the signal generator and the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the 2nd I-F trimmer condenser, item 7, located in top of 2nd I-F any (Fig. 2) for maximum reading on the output meter.

(e) Adjust the 1st I-F trimmer condenser, item 6, located on top of 1st I-F any (Fig. 2) for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

ALIGNING THE R-F AMPLIFIER.

(a) Set the signal generator to 1550 kilocycles.

(b) With the condenser gang turned to the minimum capacity position, adjust the trimmer condenser (Fig. 3) B.C. "TNC" so that the 1550 kilocycle signal is heard. It is not necessary that the receiver tunes through this signal.

(c) Set the signal generator to 1400 kilocycles.

(d) Tune-in the 1400 kilocycle signal in the region of 140 on the dial for maximum output.

(e) Adjust the trimmer condensers B.C. "ANT" for maximum output (Fig. 3).

NOTE: Do not readjust the "OSC" trimmer. (1) Repeat operations (d) and (e) for more accurate adjustments.

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from side stations which operate on a frequency of approximately 255 kilocycles. This assembly is located on the loop mounting bracket (Fig. 2) and consists of a coil, and a trimmer condenser as illustrated by the dotted lines in the wiring diagram (item 45).

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a 50 mfd condenser into the antenna terminal of the receiver. With the gang condenser set at approximately 60 on the dial and the volume control full on, adjust the trimmer condenser on the wave trap for minimum output.

Should the interfering station be operating on a frequency of slightly more than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.
MODELS 13, J13, 14, J14

THE CROSLEY CORP.

FIG. 2—Top View Model 13

SHUNT TRIMMERS
B.C. OSC.
S.W. ANT.
B.C. ANT.
12SA7
12SK7

FIG. 3—Top View Model 14

VOLUME CONTROL OFF-ON SWITCH
BAND CHANGE SWITCH
STATION SELECTOR
FRONT KNOB—BAND CHANGE SWITCH
REAR KNOB—TONE CONTROL

1.—Aligning I-F To 455 Kc.
(a) Connect the output lead of the signal generator through a .0001 mf. condenser to the antenna lead extending from the rear of the chassis. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If necessary a small condenser (.001 mf.) should be connected in series with the ground lead of the signal generator and the chassis.
(b) Open tuning gang condenser all the way (plates completely out of mesh). Turn volume control to maximum. On models 14 and J14 turn tone control switch to right (treble). Turn band switch to the B. C. (left) position.
(c) Set the signal generator to 455 kilocycles.
(d) Adjust the two trimmer condensers on top of 2nd I-F assembly (Fig. 3) for maximum output.
(e) Adjust the two trimmer condensers on top of the 1st I-F assembly (Fig. 3) for maximum output.
(f) Repeat (d) and (e) for more accurate adjustments.

2.—Aligning R-F Amplifier.
The short wave band 6-15 mc. must be aligned before the Broadcast Band 540-1600 kc.
(a) Connect the signal generator output lead through a dummy antenna (400 ohm carbon resistor) to lead (Blue or Red) extending from rear of chassis. Turn the band switch to S. W. (right) and open tuning condenser all the way.
(b) Set signal generator to 15.0 megacycles.
(c) Adjust the S. W. “OSC” trimmer condenser (Fig. 2) (on rear section of gang) for maximum output. The gang should just tune through this signal.

For voltage and wave trap data, see Model 11

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MODELS 15, J15, 16, J16

1.-Aligning I-F To 455 Kc.
(a) Connect the output lead of the signal generator through a .0001 mf condenser to the antenna lead extending from the rear of the chassis. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If necessary a small condenser (.001 mf.) should be connected in series with the ground lead of the signal generator and the chassis.

(b) Open tuning gang condenser all the way (plates completely out of mesh). Turn volume control to maximum, turn tone control switch to right (treble). Turn band switch to the B. C. (left) position.

(c) Set the signal generator to 455 kilocycles.

(d) Adjust two 2nd I-F trimmer condensers located through front chassis flange, below speaker (Fig. 3) for maximum output.

(e) Adjust the two trimmer condensers on top of the first I-F assembly (Fig. 2) for maximum output.

(f) Repeat (d) and (e) for more accurate adjustments.

2.-Aligning R-F Amplifier.

The short wave band 6-15 mc., MUST be aligned before the Broadcast Band 540-1600 kc.

(a) Connect the signal generator output lead through a dummy antenna (400 ohm carbon resistor) to lead (Blue or Red) extending from rear of chassis. Turn the band switch to S. W. (right) and open tuning condenser all the way.

(b) Set signal generator to 15.0 megacycles.

(c) Adjust the S. W. "OSC" trimmer condenser (Fig. 2) (on rear section of gang) for maximum output. The gang should just tune through this signal.

(d) Tune in 15.0 mc. signal with gang and while slowly rocking gang through signal adjust the S. W. "ANT" trimmer condenser for maximum output. (Center trimmer on right end of chassis)

NOTE: When aligning the Short Wave band care should be exercised so that the circuits are aligned on the fundamental rather than on the image frequency which is approximately 910 kilocycles more than the fundamental. To check this increase the output of the signal generator approximately 10 times and try to tune in both, the fundamental, at the signal generator frequency as indicated on the dial and the image which should be approximately 910 kilocycles lower (approximately 14) on the dial.

(e) Repeat (c) and (d) for more accurate adjustments.

(f) Replace 400 ohm carbon antenna dummy with a .0001 mf. condenser. Turn band switch to the Broadcast band, open gang condenser all the way, etc.

(g) Set the signal generator to 1650 kilocycles.

(h) Adjust B. C. "OSC" trimmer (rear trimmer right end of chassis) Fig. 3, for maximum output.

(i) Set signal generator to 1400 kilocycles.

(j) Tune-in generator signal for maximum output then adjust B. C. "ANT" trimmer (front trimmer right end of chassis) Fig. 3, for maximum output.

(k) Repeat (h) and (j) for more accurate adjustments.

---

Fig. 2—Top View Model 18, J-18

Fig. 3—Bottom View Models 18, J-18

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Setting The Push Buttons (Models 21 and 23 Only)

If any of the circuits of the receiver have been realigned it may be necessary to reset the push buttons. Lift up buttons to be reset and loosen the set screws two or three turns. Tune in securely the station to which the first button is to be set, with a small screw driver inserted in the adjusting screw, push the adjusting screw all the way in and while holding in that position, securely tighten the screw. It is essential that you apply a steady pressure while tightening the setting screw in order to keep the mechanism lined up with the station tuned in.
THE CROSLEY CORP.

MODEL 22AS

Broadcast Band — 550 to 1600 Kilocycles
Short Wave Band — 6.0 to 15.0 Megacycles
Special Police Band — 2.3 to 2.5 Megacycles

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PAGE 124

MODEL 22A4

THE CROSHEY CORP.

All the circuits in this receiver are very accurately adjusted at the factories and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the plate and screen of the 6K6C output tube. Be certain that the meter is protected from D.C. by connecting a condenser (1 mf. or larger—non-electrolytic in series with one of the leads.

Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mf. condenser to the antenna lead (Blue). Connect the ground lead from the signal generator to the ground lead (Black) of the receiver.
(b) Set the station selector to the lowest tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON).
(c) Turn the band selector switch to the Broadcast band (Left). Push switch on loop ant. to B.C. position.
(d) Set the signal generator to 455 kilocycles.
(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output.
(f) Adjust both trimmers located on top of the 1st I-F transformer for maximum output.
(g) Check operation of (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The E-F Circuits.

(a) Connect the signal generator output through a 405 ohm carbon resistor to the input lead (Blue) of the receiver and the generator return to the ground lead (Black).
(b) Set signal generator to 15.4 megacycles.
(c) Open tuning condenser of the way (tor the receiver completely out of mesh) turn band switch to the right (short wave) and volume control on full. On models 21 and 23 turn volume control to treble position.
(d) Adjust S.W. "OSC" trimmer located on gang condenser for maximum output.
(e) Set signal generator to 15.0 megacycles.
(f) Tune signal generator frequency with the station selector switch (approximately 15 on the dial) and while slowly rocking the station selector knob adjust the S.W. "ANT" trimmer condenser, center trimmer on right end of chassis, for maximum output.

NOTE: Check the image frequency by increasing the signal generator output. Tune in 15 mc. signal and then the image which should come in at equal 15 on the dial. If image is not heard the oscillator is aligned on the wrong peak and S.W. "OSC" trimmer should be further opened until correct peak is found.

CHASSIS NO. 29, 21 AND 23

Preliminary

Output Meter Connections

To chassis or Ground Lead

Dummy Antenna to be in series with generator output.

Position of Volume Control

Position of Tone Control

ALIGNMENT PROCEDURE CHART

Alignment Procedure Chart

<table>
<thead>
<tr>
<th>Alignment Method</th>
<th>Frequency</th>
<th>Input to Base</th>
<th>Band Cond.</th>
<th>Tapping Cond.</th>
<th>Trimmer Cond.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. D.C. 9000 mc.</td>
<td>455 Mc.</td>
<td>Ant. Lead (Blue)</td>
<td>B.C.</td>
<td>Full</td>
<td>Open</td>
<td>2nd I-F (1/2)</td>
</tr>
<tr>
<td>2. 450 ohm (15k)</td>
<td>15.4 Mc.</td>
<td>Ant. Lead (Blue)</td>
<td>B.C.</td>
<td>Full</td>
<td>Open</td>
<td>2nd I-F (1/2)</td>
</tr>
<tr>
<td>4. 0000 M. F.</td>
<td>15.4 Mc.</td>
<td>Ant. Lead (Blue)</td>
<td>B.C.</td>
<td>Full</td>
<td>Open</td>
<td>A.C. - G.S.C.</td>
</tr>
<tr>
<td>5. 1500 M.F.</td>
<td>15.4 Mc.</td>
<td>Ant. Lead (Blue)</td>
<td>B.C.</td>
<td>Approx.</td>
<td>1000 ohms</td>
<td>A.C. - G.S.C.</td>
</tr>
<tr>
<td>6. 3000 M.F.</td>
<td>15.4 Mc.</td>
<td>Ant. Lead (Blue)</td>
<td>B.C.</td>
<td>Approx.</td>
<td>1000 ohms</td>
<td>A.C. - G.S.C.</td>
</tr>
</tbody>
</table>

IMPORTANT ALIGNMENT NOTES

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency which is approximately 910 kilocycles less as indicated on the dial. To check, increase generator output, turn in the generator frequency and then tune in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position. Repeat the original alignment procedure for more accurate adjustments.

Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on frequencies of approximately 455 kilocycles. This assembly consists of a coil and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram. The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal into the signal generator through a .0002 mf. condenser into the antenna lead of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser set to approximately 60 on the dial, and the volume control full on, adjust the wave trap trimmer condenser for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal an antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

VOLTAGE CHART

All voltages measured from socket pin to chassis @ 115 VOLT LINE

<table>
<thead>
<tr>
<th>SOCKET PIN NUMBER</th>
<th>TUBE SECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

| 634T - Oct. Mod. | 0 | 0 | 225 | 74 | 0 | 0 | 63 A.C. | 0 |
| 60KT - 1 P. Mod. | 0 | 0 | 0 | 0 | 9 | 74 | 63 A.C. | 725 |
| 685Q - Det. A.V.C. Int. A. F. | 0 | 0 | 0 | 0 | 0 | 100 | 63 A.C. | 0 |
| 6V5G - Output | 0 | 0 | 0 | 0 | 0 | 0 | 63 A.C. | 0 |
| 5V5G - Rectifier | 0 | 0 | 5.0 A.C. | 316 A.C. | 0 | 316 A.C. | 283 |

All voltages measured with 1000 OHM/Volt Voltmeter except heater voltages. Voltages may vary 10% of values given.

Dropping across speaker field: 58 Volts.

Maximum power output of 130 VAC. 6.5 Watts.

Maximum power consumption of 115 VAC. 66 Watts.

Phone Motor 49 Watts additional.
MODEL -- 24
455 K.C. I.F.

TUNING RANGE:  APPROXIMATE COVERAGE:
Standard Broadcast Band — 550 to 1600 Kilocycles
International Short Wave (Foreign) 6.0 to 18.0 Megacycles
Special Service (Police, Amateurs, etc.) 1.6 to 5.0 Megacycles
### Signal Generator

<table>
<thead>
<tr>
<th>Alignment Sequence</th>
<th>Dummy Antenna</th>
<th>Frequency Setting</th>
<th>Input Connection to Receiver</th>
<th>Band Switch</th>
<th>Tuning Cond. Setting</th>
<th>Trimmer Adjusted</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.02 MF</td>
<td>455 Kc.</td>
<td>Grid of 6A8GT</td>
<td>B. C.</td>
<td>Fully open</td>
<td>2nd I-F (2)</td>
<td>Adjust for Maximum.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st I-F (2)</td>
<td>Adjust for Maximum.</td>
</tr>
<tr>
<td>2</td>
<td>.0062 MF</td>
<td>1600 Kc.</td>
<td>Ant. Lead (Blue)</td>
<td>B. C.</td>
<td>Fully open</td>
<td>B. C. &quot;OSC&quot;</td>
<td>Adjust for peak; gang does not have to tune thru signal.</td>
</tr>
<tr>
<td>3</td>
<td>.0062 MF</td>
<td>600 Kc.</td>
<td>Ant. Lead (Blue)</td>
<td>B. C.</td>
<td>Approx. 60 on dial</td>
<td>B. C. &quot;OSC&quot;</td>
<td>Adjust for maximum output while rocking gang thru signal.</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>.0062 MF</td>
<td>1400 Kc.</td>
<td>Ant. Lead (Blue)</td>
<td>B. C.</td>
<td>Approx. 140 on dial</td>
<td>B. C. &quot;ANT&quot; Trimmer</td>
<td>Adjust for maximum output to not touch B. C. Osc. Trimmer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B. C. &quot;PRE&quot; Trimmer</td>
<td>Adjust for maximum output.</td>
</tr>
<tr>
<td>6</td>
<td>100 ohm (carbon)</td>
<td>5.5 Mc.</td>
<td>Ant. Lead (Blue)</td>
<td>Police</td>
<td>Fully open</td>
<td>Pol. &quot;OSC&quot;</td>
<td>Adjust for peak gang; does not have to tune thru signal.</td>
</tr>
<tr>
<td>7</td>
<td>400 ohm (carbon)</td>
<td>5.0 Mc.</td>
<td>Ant. Lead (Blue)</td>
<td>Police</td>
<td>Approx. 5.0</td>
<td>Pol. &quot;ANT&quot;</td>
<td>Adjust for maximum output while rocking gang thru signal.</td>
</tr>
<tr>
<td>8</td>
<td>400 ohm (carbon)</td>
<td>18.3 Mc.</td>
<td>Ant. Lead (Blue)</td>
<td>S. W.</td>
<td>Fully open</td>
<td>S. W. &quot;OSC&quot;</td>
<td>Adjust for peak. Gang does not have to tune thru signal.</td>
</tr>
<tr>
<td>9</td>
<td>400 ohm (carbon)</td>
<td>18.0 Mc.</td>
<td>Ant. Lead (Blue)</td>
<td>S. W.</td>
<td>Approx. 18</td>
<td>S. W. &quot;ANT&quot;</td>
<td>Adjust for maximum output while rocking gang thru signal.</td>
</tr>
</tbody>
</table>

### TRIMMER LOCATIONS

For Phonograph connections  
See Model 20

For Voltage data  
See Index
Standard Broadcast Band — 550 to 1600 Kilocycles
International Short Wave (Foreign) — 6.0 to 18.0 Megacycles
Special Service (Police, Amateurs, etc.) — 1.6 to 5.0 Megacycles

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SOCKET VOLTAGE CHART
Models 24, 25

- **6K6**
  - Grid: J.B.
  - Output: 14.5, 14.5
- **6K6**
  - Grid: J.B.
  - Output: 220
- **6J5**
  - Inverter: J.B.
- **6SK7**
  - I.F.: J.B.
- **5Y3**
  - Rectifier: J.B.
- **J.B.**
  - Grid: 119

**J.B.** = Junction Block
**H** = Heater
**N.C.** = No Connection

Power Consumption at 117.5 Volts: 65 Watts
Max. Power Output at 117.5 Volts: 5 Watts
Drop across speaker field approx. 75 Volts
Voltages measured between socket pin 6 and ground
With a 250 Volt, 1000 Ohms per volt voltmeter
Readings may vary 10%

PHONO CONNECTIONS
Model 25

Connect to tone arm or television sound terminals
Switch as shown is set for normal radio reception

Model 25
Bottom view of chassis

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SET UP PROCEDURE

Remove push button escutcheon. Turn the set on and leave operate a sufficient length of time to permit the tubes to reach their normal operating conditions.

NOTE: To simplify the set up and insure accurate adjustments the following pre-adjustments should be made.

Tighten all the “ANT” Trimmer screws just moderately tight. See Fig. 1.

Turn the “OSC” screws to the left (counter-clockwise) until the end of the screw is about flush (even) with the top of the “ANT” padded condenser. Note: Care should be exercised when adjusting the “OSC” screws so that the selected station is not passed over, turn screws slowly.

It is essential that the frequency (kilocycles) of the station selected is within the range of the push button to be set for that station, see Fig. 1.

1. Turn the band switch to “B” position, first notch from left end. Using the station selector knob (upper right) carefully tune in the station to which the No. 1 push button is to be set. Note program.

2. Turn the band switch to the left (“A”) and using a small screw driver, carefully turn the “OSC” screw to the right (clockwise) for the No. 1 push button (first screw on left in the upper row) until the station you tuned in (Manually) is heard again. Adjust for maximum output in speaker.

3. Adjust the No. 1 push button “ANT” adjusting screw for maximum volume in speaker. NOTE: If this adjustment does not seem to have much effect adjust loop antenna for minimum signal from that station, then adjust the “ANT” screw for maximum signal.

4. Turn band switch one notch to right “B” then back to “A” to check if push button is correctly adjusted. There should be no change in tone quality when switched from one to the other.

5. The set-up for No. 1 push button is now complete. Set up remaining buttons to be set, following the same procedure, adjusting the “OSC” screw first, then the “ANT” padder screw.

6. After all the buttons have been set, they should be rechecked, turning the loop antenna for minimum pickup on each station to insure accurate adjustments.

To tune the receiver with the push buttons the Band Switch must be turned all the way to the left “A” then completely depress the button which represents the station you wish to hear.
Preliminary Output Meter Connections
Generator Ground Connection
Dummy Antenna to be in series with generator output
Position of Volume Control
Position of Tone Control

**ALIGNMENT PROCEDURE CHART**

<table>
<thead>
<tr>
<th>Alignment Sequence</th>
<th>Dummy Antenna Frequency Setting</th>
<th>Input Connection to Receiver</th>
<th>Hand Switch</th>
<th>Tuning Cond. Setting</th>
<th>Trimmer Adjusted</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>02 MF. 455 Kc. Grid of 6AQ7</td>
<td>B. C. Fully open</td>
<td>2nd L-F (2) 1st L-F (2)</td>
<td>Adjust for Maximum. Adjust for Maximum.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>0002 MF. 1650 Kc. Ant. Lead (Blue)</td>
<td>B. C. Fully open</td>
<td>B.C. &quot;OSC&quot; Trimmer</td>
<td>Adjust for peak; gang does not have to tune thru signal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>0002 MF. 600 Kc. Ant. Lead (Blue)</td>
<td>B. C. Approx. 60 on dial</td>
<td>B.C. &quot;OSC&quot; Series Trimmer</td>
<td>Adjust for maximum output while rocking gang thru signal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Repeat Step No. 2 to check possible shift due to series adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>400 ohm (carbon) 5.3 Mc. Ant. Lead (Blue)</td>
<td>Police Fully open Pol &quot;OSC&quot;</td>
<td>Adjust for peak; gang does not have to tune thru signal.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>400 ohm (carbon) 5.0 Mc. Ant. Lead (Blue)</td>
<td>Police Approx. 5.0 Pol &quot;ANT&quot; and &quot;R-F&quot; Trimmers</td>
<td>Adjust for maximum output while rocking gang thru signal.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>400 ohm (carbon) 18.3 Mc. Ant. Lead (Blue)</td>
<td>S. W. Fully open S. W. &quot;OSC&quot;</td>
<td>Adjust for peak. Gang does not have to tune thru signal.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>400 ohm (carbon) 18.0 Mc. Ant. Lead (Blue)</td>
<td>S. W. Approx. 18 S. W. &quot;ANT&quot; and &quot;R-F&quot; Trimmers</td>
<td>Adjust for maximum output while rocking gang thru signal.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS)**
WITH 1000 OHM PER VOLT, 500 VOLT RANGE VOLTOMETER (D.C.)

**PIN NUMBER**

<table>
<thead>
<tr>
<th>TUBE FUNCTION</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7GT—R. F. Amp.</td>
<td>0</td>
<td>0</td>
<td>187</td>
<td>75</td>
<td>0</td>
<td>J.B.</td>
<td>*6.3</td>
<td>2</td>
</tr>
<tr>
<td>6A8GT—Osc.—Mod.</td>
<td>0</td>
<td>0</td>
<td>187</td>
<td>75</td>
<td>0</td>
<td>130</td>
<td>*6.3</td>
<td>1</td>
</tr>
<tr>
<td>6SK7—I. F. Amp.</td>
<td>0</td>
<td>2.3</td>
<td>0</td>
<td>2.3</td>
<td>78</td>
<td>6.3</td>
<td>228</td>
<td></td>
</tr>
<tr>
<td>6SQ7—Det. A. V. C-A. F.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>110</td>
<td>*6.3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>6J5GT—Phase Invert.</td>
<td>0</td>
<td>0</td>
<td>120</td>
<td>0</td>
<td>0</td>
<td>J.B.</td>
<td>*6.3</td>
<td>5.5</td>
</tr>
<tr>
<td>6F6G—Output</td>
<td>0</td>
<td>0</td>
<td>220</td>
<td>230</td>
<td>0</td>
<td>J.B.</td>
<td>*6.3</td>
<td>14.5</td>
</tr>
<tr>
<td>6F6G—Output</td>
<td>0</td>
<td>0</td>
<td>220</td>
<td>230</td>
<td>0</td>
<td>J.B.</td>
<td>*6.3</td>
<td>14.5</td>
</tr>
<tr>
<td>5Y3G—Rectifier</td>
<td>NC</td>
<td>329.0</td>
<td>J.B.</td>
<td>*358.0</td>
<td>J.B.</td>
<td>*358</td>
<td>J.B.</td>
<td>329.0</td>
</tr>
</tbody>
</table>

*Measure with A. C. Voltmeter.

Max. POWER OUTPUT @ 117.5 V. LINE 8.0 Watts
POWER CONSUMPTION @ 117.5 V. LINE 85 Watts
DROP ACROSS SPEAKER FIELD 96.0 Volts

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ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR</th>
<th>DUMMY ANTENNA</th>
<th>TUNING COND SETTING</th>
<th>TRIMMERS TO ADJUST</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>455 Kc</td>
<td>Grid 1A7GT</td>
<td>.02 MF</td>
<td>Fully open</td>
<td>2nd I-F (1) located on front, Adjust for maximum signal</td>
</tr>
<tr>
<td>455 Kc</td>
<td>Grid 1A7GT</td>
<td>.02 MF</td>
<td>Fully open</td>
<td>chassis flange 1st I-F (2), Adjust for maximum signal, Located top of 1st I-F ass'y.</td>
</tr>
<tr>
<td>1650 Ant. Lead</td>
<td>.0001 MF</td>
<td>Approx. 149</td>
<td>&quot;OSC&quot; Shunt on gang</td>
<td>Adjust for maximum output, Gang does not have to tune through signal</td>
</tr>
<tr>
<td>1400 Ant. Lead</td>
<td>.0001 MF</td>
<td>on dial</td>
<td>&quot;ANT&quot; Shunt on loop ant. through hole in right side of</td>
<td>Adjust for maximum output, cabinet</td>
</tr>
</tbody>
</table>

Repeat above for more accurate adjustments

- A Battery drain ¼ 8 volts, 05 Amp. "B" Battery drain ¼ 75 V., 9 M.A., ½ 90 V., 12 M.A.
- Maximum power output ¼ 90 V., "B" - approx. 340 M.W.
- Maximum power output ¼ 90 V., "B" - approx. 200 M.W.
- Maximum power output undistorted

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THE CROSLEY CORP.

MODEL 28

APPROX. TUNING RANGE
550 to 1600 Kilocycles
6.0 to 15.0 Megacycles
1.6 to 5.0 Megacycles

BAND
American Broadcast Band
Short Wave (International) Band
Police Band (Special Service)

MODEL -- 28

455 KC. I.F.

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### ALIGNMENT PROCEDURE CHART

#### Models 29, 30

<table>
<thead>
<tr>
<th>Signal Generator</th>
<th>Alignment</th>
<th>Hummer Antenna</th>
<th>Frequency Setting</th>
<th>Input Connection</th>
<th>Head Switch</th>
<th>Testing Cond. Setting</th>
<th>Trimmer Adjusted</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 455 kHz, 755 kHz</td>
<td>10 MHz, 8 MHz</td>
<td>0 B.C.</td>
<td>Fully open</td>
<td>B.C.</td>
<td>Fully open</td>
<td>Adjust for peak. Gains does not have to tune this signal.</td>
<td>B.C. OSC</td>
<td>All the way to left. (OFF)</td>
</tr>
<tr>
<td>2. 455 kHz, 755 kHz</td>
<td>10 MHz, 8 MHz</td>
<td>0 B.C.</td>
<td>Fully open</td>
<td>B.C.</td>
<td>Fully open</td>
<td>Adjust for peak. Gains does not have to tune this signal.</td>
<td>B.C. OSC</td>
<td>All the way to left. (OFF)</td>
</tr>
<tr>
<td>3. 455 kHz, 755 kHz</td>
<td>10 MHz, 8 MHz</td>
<td>0 B.C.</td>
<td>Fully open</td>
<td>B.C.</td>
<td>Fully open</td>
<td>Adjust for peak. Gains does not have to tune this signal.</td>
<td>B.C. OSC</td>
<td>All the way to left. (OFF)</td>
</tr>
</tbody>
</table>

#### IMPORTANT ALIGNMENT NOTES

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles lower than indicated on the dial. To check, increase generator output, tune the generator frequency, and then tune the image frequency which should be weaker than the fundamental and cut in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned-in the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

Repet the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

#### Models 29, 30, 30J, 31BF, 34BH

<table>
<thead>
<tr>
<th>TUBE FUNCTION</th>
<th>PIN NUMBER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>6AK7: Dec. Mod.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6AK7: T. F. Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6AK7: OSC-A F.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6AK7: Phasor Invert.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5Y3G: Rectifier</td>
<td>NC</td>
<td>350</td>
<td>J.B.</td>
<td>+200</td>
<td>+500</td>
<td>J.B.</td>
<td>350</td>
<td>J.B.</td>
<td>350</td>
</tr>
</tbody>
</table>

*Measure with A.C. Voltmeter.

#### Models 28, 30

<table>
<thead>
<tr>
<th>SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 VOLTS RANGE VOLTOMETER (D.C.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUBE FUNCTION</td>
</tr>
<tr>
<td>6AK7: Dec. Mod.</td>
</tr>
<tr>
<td>6AK7: T. F. Amp.</td>
</tr>
<tr>
<td>6AK7: OSC-A F.</td>
</tr>
<tr>
<td>6AK7: Phasor Invert.</td>
</tr>
<tr>
<td>5Y3G: Rectifier</td>
</tr>
</tbody>
</table>

*Measure with A.C. Voltmeter.

**ADJUSTMENT PROCEDURE**

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles lower than indicated on the dial. To check, increase generator output, tune the generator frequency, and then tune the image frequency which should be weaker than the fundamental and cut in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned-in the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

Repet the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

#### Models 28, 30, 30J, 31BF, 34BH

<table>
<thead>
<tr>
<th>SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 VOLTS RANGE VOLTOMETER (D.C.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUBE FUNCTION</td>
</tr>
<tr>
<td>6AK7: Dec. Mod.</td>
</tr>
<tr>
<td>6AK7: T. F. Amp.</td>
</tr>
<tr>
<td>6AK7: OSC-A F.</td>
</tr>
<tr>
<td>6AK7: Phasor Invert.</td>
</tr>
<tr>
<td>5Y3G: Rectifier</td>
</tr>
</tbody>
</table>

*Measure with A.C. Voltmeter.

**ADJUSTMENT PROCEDURE**

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles lower than indicated on the dial. To check, increase generator output, tune the generator frequency, and then tune the image frequency which should be weaker than the fundamental and cut in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned-in the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

Repet the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

#### Models 28, 30, 30J, 31BF, 34BH

<table>
<thead>
<tr>
<th>SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 VOLTS RANGE VOLTOMETER (D.C.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUBE FUNCTION</td>
</tr>
<tr>
<td>6AK7: Dec. Mod.</td>
</tr>
<tr>
<td>6AK7: T. F. Amp.</td>
</tr>
<tr>
<td>6AK7: OSC-A F.</td>
</tr>
<tr>
<td>6AK7: Phasor Invert.</td>
</tr>
<tr>
<td>5Y3G: Rectifier</td>
</tr>
</tbody>
</table>

*Measure with A.C. Voltmeter.

**ADJUSTMENT PROCEDURE**

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles lower than indicated on the dial. To check, increase generator output, tune the generator frequency, and then tune the image frequency which should be weaker than the fundamental and cut in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned-in the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

Repet the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.
For tuner, alignment voltage, See INDEX

Model 34EH

American Broadcast—550 to 1600 Kc. (545-187 Meters)
Police, Amateur, etc.—1600 to 5000 Kc. (187-60 Meters)
Short Wave (Foreign)—6.0 to 18.0 Mc. (50-16.6 Meters)

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American Broadcast—550 to 1600 Kc. (545-187 Meters)
Police, Amateur, etc.—1600 to 5000 Kc. (187-60 Meters)
Short Wave (Foreign)—6.0 to 18.0 Mc. (50-16.6 Meters)

For alignment and voltage
See INDEX

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SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT. 500 VOLT RANGE VOLTMETER (D.C.) VOLTAGES MAY VARY 10% OF VALUES GIVEN

Model J30BC

ALIGNMENT PROCEDURE CHART

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency which is approximately 910 kilocycles less as indicated on the dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)
**Model 33BG**

**VOLTAGE CHART**

All voltages measured from socket pin to chassis @ 117.5 volt line.

<table>
<thead>
<tr>
<th>TUBE SECTION</th>
<th>SOCKET PIN NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>6SA7—Osc.—Mod.</td>
<td>0 0 225 74 0 0 6.3 0</td>
</tr>
<tr>
<td>6SK7—I F. Amp.</td>
<td>0 0 0 0 74 6.3 225</td>
</tr>
<tr>
<td>6SQ7—Det. A.V.C.—1st A.F.</td>
<td>0 0 0 0 100 6.3 0</td>
</tr>
<tr>
<td>6V6GT—Output</td>
<td>0 0 200 225 0 0 6.3 10.5</td>
</tr>
<tr>
<td>6SK7—Mike Amp.</td>
<td>0 0 0 316 A.C. 0 316 A.C. 0 283</td>
</tr>
<tr>
<td>5Y3G—Rectifier</td>
<td>0 5.0 0 0 0 0 0</td>
</tr>
</tbody>
</table>

All voltages measured with 1000 Ohm/Volt Voltmeter except heaters. Voltages may vary 10% of values given.

**DROP ACROSS SPEAKER FIELD**

58 Volts

**MAXIMUM POWER OUTPUT @ 130 V. LINE**

6.5 Watts

**MAXIMUM POWER CONSUMPTION @ 130 V. LINE**

*60 Watts

*Phono Motor 40 Watts additional.

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ALIGNMENT:

I.F. -- Set signal generator to 455 kHz and connect to Red or Blue antenna lead through a 100 mmf dummy. Adjust 2nd i-f trimmers located through front chassis flange below speaker. Adjust 1st i-f trimmers for maximum output. See layout at left.

R.F. -- Set signal generator to 1650 kHz. Condenser gang to minimum. Adjust B.C. OSC. trimmer so that signal is heard. Set signal generator to 1400 kHz. Adjust tuning dial to 140 and adjust BC ANL trimmer for maximum output.

NOTE: Do not readjust the OSC trimmer.
The circuit diagram for the CROSLEY 36 AM radio receiver is shown with various components labeled. The circuit is designed to handle signals from a signal generator through an amplifier and oscillator-modulator to the tuning circuits and detector, with adjustments for proper alignment.

### TUBE SOCKET VOLTAGE READINGS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1A7-GT</td>
<td>Oscillator-Modulator</td>
<td>1.5</td>
<td>66</td>
<td>46</td>
<td>Neg.</td>
<td>86</td>
</tr>
<tr>
<td>1N5-GT</td>
<td>1-F Amplifier</td>
<td>1.5</td>
<td>66</td>
<td>86</td>
<td>J.B.</td>
<td>-</td>
</tr>
<tr>
<td>1H5-GT</td>
<td>Detector &amp; 1st A-F Amp.</td>
<td>1.5</td>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1A5-GT</td>
<td>Output</td>
<td>1.5</td>
<td>84</td>
<td>86</td>
<td>4.3*</td>
<td>J.B.</td>
</tr>
</tbody>
</table>

Power Output approximately 200 milliwatts.

**Alignment Procedure**

1. **Tuning 1-F Amplifier to 455 Kilocycles**
   - Adjust the output of the signal generator through a 0.02 mfd. condenser to the top cap of the 1A5GT tube, leaving the tube's grid clip in place.
   - Connect the input lead from the signal generator to the 'GRID' lead of the 1A5GT tube. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.
   - Set the station selector so that the tuning condenser plates are completely in mesh and turn the volume control knob on the right (G.R.).
   - Set the signal generator to 455 kilocycles.
   - Adjust both 1st 1-F trimmers for maximum output.

2. **Aligning R-F Amplifier**
   - When the signal generator is connected, tune the signal generator to 1500 kilocycles.
   - Open the condenser gang all the way.
   - Adjust the OSC trimmer condenser on the first output for maximum output.

3. **Check Operations**
   - Set the signal generator to 1400 kilocycles.
   - Tune the receiver to the generator signal for maximum output (approximately 140 on the dial).
   - Adjust the ANT trimmer condenser on gang for maximum output. DO NOT READJUST THE OSC TRIMMER AT 1400 Kilocycles.

4. **Repeatability**
   - Repeat operations (3) and (4) alternately until no further improvement in output can be obtained.
The vibrator is a 150 cycle full wave primary type. Bias for the 6A8GT and the 6SK7 is obtained from the voltage drop across item 27, a 100 ohm resistor. The 6SQ7 is operated at zero bias. Bias for the 6K6GT is obtained from the voltage drop across item 37, a 600 ohm resistor. A resistive “B” filter is used and consists of item 35, a 1400 ohm resistor and sections B and C of item 22, a three section electrolytic condenser (section A used as by-pass for output cathode).

Models A-150 and A-450 are manually tuned receivers while model A-350 has a five station mechanical push button tuning system.
THE CROSLEY CORP.

Fig. 2—Top View Model A-160

Fig. 3—Bottom View Model A-160

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOMETER FROM CHASSIS TO TUBE PRONG AND MAY VARY PLUS OR MINUS 10% OF VALUES GIVEN.

CURRENT DRAIN = 8.0 AMP.

J.B. = JUNCTION BLOCK
G = GROUND

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www.americanradiohistory.com
1. Aligning The I-F Amplifier (455 Kc.)
(a) Connect the output of the signal generator through a 0.02 mfd. or larger, condenser to the top cap of the 6AG7 oscillating modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the chassis.
(b) Set the signal generator to 455 kilocycles.
(c) Open the tuning condenser all the way, turn the volume control on full.
(d) Adjust both trimmers on the 2nd. I-F transformer for maximum output. (See figure 3).
(e) Adjust both trimmers on the 1st. I-F transformer for maximum output. (See figure 3).
(f) Repeat (d) and (e) for more accurate adjustments. ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING TO PREVENT A V.C. ACTION.

2. Aligning R-F Amplifier
To obtain the greatest gain from the R-F amplifier, the capacity of the dummy antenna should be equal to the capacity of the antenna with which the receiver is to be used. The capacities of auto radio antennas range from 65 mfd. (0.0065 mfd.) to 250 mfd. (0.0025 mfd.), depending upon the size and type. If the receiver is adjusted for maximum efficiency when used with an antenna having a high capacity, it will not operate at its maximum efficiency on an antenna having a much lower capacity and vice versa.
(a) If the receiver is to be used with a whip or streamlined antenna, the output lead from the signal generator should be connected through a 0.001 mfd. condenser to the "A.T." connection of the receiver. If a large antenna such as a running board type or built-in top antenna is to be used, a 0.002 mfd. condenser should be used in place of the 0.001 mfd. condenser.
(b) Set the signal generator to 1400 kilocycles.

SOCKET VOLTAGES MEASURED @ 117.5 VOLS LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 VOLT RANGE VOLTOMETER (D.C.)

<table>
<thead>
<tr>
<th>TUBE</th>
<th>FUNCTION</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7GT</td>
<td>R-F Amp</td>
<td>195</td>
<td>78.6</td>
<td>2.0</td>
<td>*63</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6AG7</td>
<td>Osc-Mod</td>
<td>195</td>
<td>78.6</td>
<td>2.0</td>
<td>*63</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6S7</td>
<td>I-F Amp</td>
<td>5.5 B.C.</td>
<td>78.6</td>
<td>2.0</td>
<td>*63</td>
<td>234</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6S87</td>
<td>Det. A.V.C., 1st A-F</td>
<td>110</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6K7T</td>
<td>Phase Invert</td>
<td>110</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6BX1</td>
<td>Output</td>
<td>220</td>
<td>220</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6SK7</td>
<td>Output</td>
<td>220</td>
<td>220</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6K7</td>
<td>Milli Amp</td>
<td>220</td>
<td>220</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75G</td>
<td>Rectifier</td>
<td>300 D.C.</td>
<td>225</td>
<td>300 D.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Measured with A.C. volt meter

VOLTAGE DROP ACROSS SPEAKER FIELD = 77 VOLTS MAXIMUM POWER OUTPUT @ 130 V Line = 7.5 Watts

POWER CONSUMPTION @ 117.5 V. Line = Radio 80 Watts, Phonograph 35 Watts TOTAL = 115 WATTS

Voltages may vary 10% of values given.

(c) Check the pointer on the dial to see that it makes a complete trip, reset if necessary. Adjust the station selector to 140 on the dial.
(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.
(e) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.
(f) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.
(g) Repeat operation (e) for more accurate adjustment.

3. Adjusting Antenna Compensating Condenser
(a) Set the signal generator to 600 kilocycles.
(b) Tune in the 600 kilocycle signal with the station selector for maximum output.
(c) Adjust the antenna compensating condenser, located to the right of antenna receptacle, for maximum output.
(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.
(e) Set the signal generator to 1400 kilocycles again.
(f) Tune in the 1400 kilocycle signal with the station selector for maximum output.
(g) Readjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.
(a) After the installation is complete, tune in a WEAK station between 55 and 65 on the dial.
(b) Adjust the antenna compensating condenser for maximum volume in the speaker.
SETTING PUSH BUTTONS FOR A-160 AND A-250

The push buttons are easily set if necessary. Remove the push button by pulling straight out. Loosen the set screw two or three turns. With the manual control knob in the position to which key is to be set, with a small screwdriver inserted in set screw push the key all the way down, then securely tighten set screw.
I—RECORDERS

The quality and life of instantaneous home recordings is largely dependent upon the operators working knowledge of his equipment and the type blank disc and cutting needles used. For the operation and adjustment of the various controls read the operating instructions supplied with the recorder.

The type recorders used in Crocey equipment employ low inductive magnets for cutting heads and have crystal tone arm for playback. The turntable is run driven. The deluxe recorder also has the automatic record changer capable of playing 14 ten inch or 16 twelve inch records at one loading.

A—CUTTING NEEDLES

The cutting needle or stylus as furnished with the Crocey recorders will cut approximately 30, 60, 120 records one side or 15, 60, 120 records both sides (30 hour life cutting time).

These needles are of the hardened steel type and the cutting point and edges are extremely sharp and quite easily damaged should they be bumped or wrapped against a metal surface. The point of these needles is cutting it should be lowered GENTLY on the blank with turntable RUNNING.

NOTE: Most cutting needles have a flat ground on the shank. The needle screw must be tightened against this flat. Always firmly tighten the needle screws before a recording.

B—PLAY BACK NEEDLES. (Use Rejection needles as furnished by Crocey for best results)

Instantaneous recordings (home recordings) require special playback needles if the quality and life of the record is to be retained. Needles purchased as "100% shadow-graphed" steel needles should be used at all times. This type needle is individually inspected to see that it has a perfectly rounded point of proper radius with no sharp edges or flat sides so that it will have no tendency to harm the record.

Several home recordings may be played with one needle, PROVIDED the needle does not touch a commercial record. Never play an instantaneous recording with a needle that has been used on a commercial record.

A rule of the thumb method for judging the amount of wear on a home recording when it is being played back is to watch the change in the color of that portion of the record which the needle has played in comparison with the rest of the record. The first time the record is played back after it has been recorded the grooves may turn slightly darker or the playback needle passes over them, but the change should not be great. Further playback should have little or no change in color, provided the playback is in good condition and that the record is free from dust and dirt. Wherever any great change in color does occur, it is advisable to immediately stop the record and put in a new needle.

C—CUTTING ARM ADJUSTMENTS

"Recorders with Automatic Record Changer." "Selburg" Type used on Model 28AZ, 318L, 318F, and 418F.

The height of the cutting arm can be varied by means of the slotted screw head which is on top of the arm and near the back, approximately 1/4 inch under the top surface of the arm. In order to make this adjustment, it is necessary to insert a cutting needle and, with the motor turned OFF and a record blank on the turntable, place the recording arm in the cutting position. Now turn the cutting arm height adjusting screw UNTIL THE NEEDLE SCREW IS CENTERED IN THE

SLOT THROUGH WHICH IT PROTRUDES (AT FRONT END OF RECORDER ARM).

Any change in the cutting arm height adjustment will change the vertical angle of the cutting needle therefore it is absolutely essential that the depth of cut be rechecked.

"Recorders as used in Model 338G." (General Industries Type)

The height adjustment of the cutting arm on this recorder is accomplished by raising the cutting arm and loosening the backnut of the cutting arm Height Adjusting Screw, see fig. 4. Place needle in cutting arm and place a record blank on turntable. Carefully lower cutting arm on record, with the motor turned OFF.

Set the Arm Height Adjusting Screw so that there is exactly 1/2 space between the surface of the record and the bottom edge of the cutting arm (Front) see fig. 4.

NOTE: A change in cutting arm height adjustment may affect the depth of cut or vice-versa.

C—ADJUSTING DEPTH OF CUT

The correct depth of cut is important to insure maximum record life and sound reproduction quality.

The depth of cut which is determined by the cutting needle pressure on the blank disc should be such THAT THE WIDTH OF THE GROOVE IS APPROXIMATELY THE WIDTH OF THE SPACE (LAND) BETWEEN THE GROOVES. With no sound applied the ratio of 60 percent groove and 40 percent land is the ideal cutting depth for most conditions. The importance of the depth of cut CANNOT BE OVER EMPhASIZED, where too light a cut or too heavy a cut will tend to give distortion and generally poor results.

Illustrations A, B, C, and D in fig. 5, are typical results obtained. A shows a groove which is too light, "C" a groove of approximately 60-40 or which is generally preferred depth, "D" illustrates an appearance of a groove of "C" depth after recording while "B" illustrates a too heavy a cut (over 60-40) with an excessive amount of too high a cutting level) signal applied to cutting head causing an overrun of the groove.

The adjustment of the depth of cut is accomplished by rotating the chrome knob on the cutting arm of the recorder with automatic record changer, see fig. 3. This knob has the letters "L", "M", and "H" engraved on it indicating Light, Medium and Heavy pressures. In general, the machine is properly adjusted and set at the factory so that it will cut the average record correctly when this knob is in the "M" position.

On the recorder as employed in Model 338G the
depth of cut is adjusted by rotating the screw approximately in the middle of the cutting arm and flush with the rear face of it. To increase the depth of cut, the adjusting screw should be turned to the right (clockwise). Conversely, to decrease the depth of cut the screw should be turned to the left (counterclockwise). This adjustment in either direction will move the blade upward or downward. The nearest possible diameter is critical and should be moved only one-eighth turn.

When the cutting head is in proper adjustment, and the cutter arm is raised to the point (approximately 45°) where it can be freely moved over the record, the cutting head screw should just rest on the bottom of the slot in the nose of the arm, that is, in the equilibrium spring position should be such that the cutting head almost floats freely.

Always try a test cut with a new cutting needle before making any adjustments, since often times when casual observation indicates faulty adjustment, the whole trouble may be due to a cutting needle that has been dulled either through accident or natural wear.

Note: Changing the arm height usually necessitates a change in cutting depth adjustment and changing the depth of cut may call for a slight variation in the arm height to adjust to prevent cutting needle chatter or reduce surface noise.

E.—CUTTING LEVEL.

The cutting level as required for instantaneous recordings as made on the two type recorders as used in Crosley equipment will vary with the type cutting needle used and the type of record being used. Provided the cutting arm height is correct and the depth of cut is correct the following cutting levels should give good results.

For those models having the cathode ray type indicator, the volume level should be adjusted until the shadow on the indicator tube forms a narrow vertical line approximately 1/32" wide for lead or peak signal. During recording this shadow will vary in width in accordance with the lead and soft passages of the record. For the models equipped with a Neon Tube as a Cutting Level Indicator the volume level should be raised to a point where the neon tube elements give an even pinkish glow during loud or peak signals. The correct cutting level can only be found by experimentation as the volume level is dependent upon the condition of cutting needle and blank disc used.

F.—RECORDS (BLANK & CUT).

The record blanks for instantaneous home recordings differ from commercial records in many respects. Commercial discs are normally made of shellac compounded pressings formed under hydraulic pressure, resulting in recordings which are extremely resistant to wear but which are quite brittle and easily broken. Record blanks for instantaneous recordings are quite soft in comparison with commercial records but their durability is about as good as that of the cheaper grade phonograph record provided they are given the proper care.

Never use reproducing needle on instantaneous record that has been used to play commercial phonograph record.

The Crosley home recording disc is of the non-famable or slow burning type. Always exercise care in the storage of home recordings. Keep them clean, free from dust and dirt and will add many hours to the life of the record.

Never attempt to playback an instantaneous recording on a mechanical phonograph.

Note: Excessive rumble which may sometimes be encountered during the playback of home recordings usually can be eliminated entirely (as Models 33B, 36A, and 34B) by just turning the microphone head to a low level control in a clockwise direction until the switch clicks.

II.—SERVICE NOTES.

Recorders with Automatic Record Changer. (Models 2BZA, 34BH, 31BF, and 48BF)

When Manual Control Button (Item 84, Fig. 6) is moved to the Manual Play Back position, record head moves the Manual Control Slide (Item 102, Fig. 7) which in turn moves Clutch Lock Slide (Item 108, Fig. 7) into position which prevents Engagement Clutch Arm Assembly (Item 79, Fig. 8) from rotating. When Engagement Clutch Arm Assembly is in the above mentioned position and is not free to rotate, the Changer will not go into its changing cycle.

Also when the Manual Control Button is in the above mentioned position, the Manual Control Slide has moved the Locator Lock Slide (Item 106, Fig. 7) into a position to engage the Tone Arm Locator & Raising Assembly (Item 12, Fig. 7) and prevents same from leaving against Tone Arm Lever Assembly (Item 19, Fig. 1) allowing the Tone Arm to swing freely without hindrance and without setting Changer into its changing cycle. When the Manual Control button is in the automatic position the Changer will function normally as an automatic record changer.

2.—POSSIBLE MECHANICAL CAUSES OF POOR RECORDINGS.

(A) Threads from record cuttings getting down onto Rubber Drive Wheel (Item 4, Fig. 1) and give an even driving wheel and motor pulley. This will cause very bad sound variation of the turntable and, of course, will result in very inferior recording. Cuttings may also wrap around motor shaft and cause motor to slow down or stop.

To remove the record cuttings, the turntable should be lifted by applying an even lifting force at opposite edges of the turntable while the turntable spindle is gently tapped downward on its top end, and the record cuttings then removed. The Rubber Idler Drive Wheel should be taken off this can be accomplished by un-snappiing it from its mount. The Rubber Idler Drive Wheel off its shaft, after which all record cuttings can be removed.

Note: It is very important that no grease or oil be gotten on the surface of the Rubber Idler Drive Wheel.

(B) Tight pivot bearings. Check cartridge pivot screws (Item 106, Fig. 6) for binding. Also recording arm pivot screws (Item 107, Fig. 6) and Turntable arm pivot screws (Item 101, Fig. 4). These bearings should all be free, but have no looseness or play.

If the pivot screws, (Item 106, Fig. 6) of the Cartridge Idler is tight, the Cartridge Idler cannot follow a slight up and down variation of turntable. A record cut in this manner will, when played back, have a high scratch level, rough cutting and a tendency for the needle to jump from one groove to another.

(C) Damaged Rubber Idler Drive Wheel (Item 83, Fig. 6). Rubber Idler Drive Wheel may have become damaged by:

1. Allowing oil or grease to come in contact with same.

2. By allowing turntable to drop and cut into the outside surface of the Rubber Idler Drive Wheel.

3. Stopping the turntable by hand while the motor is running will cause a flat spot on the surface of the Rubber Idler Drive Wheel.

Note: If the Rubber Idler Drive Wheel has been damaged in any of the above mentioned ways, it should be replaced with a new one.

(D) Vibration Reaching the Recorder While A Blank Is Being Cut.

It is very important that the surface or the floor upon which the Recorder rests remain quiet as any vibration such as people walking across the floor or shaking of the instrument to which the recorder is mounted will seriously affect the quality of the finished recording.

(E) Recorder Not Level.

It is very important that the Recorder be level. This can be checked by placing a small level on the turntable and checking same in two positions at right angles to each other and then leveling instrument in which Recorder is mounted.

(F) Best or Damaged Turntable Spindle: If the Turntable Spindle (Item 59, Fig. 6) has been bent in shipment, or by someone carrying a heavy pressure on one side, it should be replaced with a new one. A bent Turntable Spindle will cause the surface of the Turntable to move up and down while it is turning, and, of course, will seriously effect the quality of both record and playback.

Note: When removing the Turntable an even upward lifting force should be applied at opposite edges of the Turntable while Turntable Spindle is gently tapped downward on its top end.

(G) Record Cutting Causing A Bend Between Turntable Spindle (Item 59, Fig. 6) and its Damaged Spindle Bushing (Item 60, Fig. 6).

It is very important that all record cuttings are removed from Turntable Spindle and its bearing.
III—AUTOMATIC RECORD CHANGER

General Instructions

1.—FUNCTION OF RECORD CHANGER WHEN IT IS GOING THROU A CHANGE CYCLE—The Record Changer plays and automatically changes 14 or less ten-inch records or 10 or less 12-inch records.

The Record Changer is started by turning the switch control knob, (Item 29, Fig. 11) to "ON" this starts the motor and moves the record (Item 22, Fig. 12), which rotates the lever assembly (Item 20, Fig. 12), causing it to disengage from the Engagement Clutch Cam, (Item 79, Fig. 12). The Engagement Clutch Cam will then rotate due to friction from the spring, (Item 27, Fig. 12). This causes it to return the pin on the top edge of the Drive Gear Assembly, (Item 4, Fig. 12), as it returns, and in turn, moves the Drive Link Assembly, (Item 14, Fig. 12), and the Selector Shaft Clutch Assembly No. 11 and No. 12 in the position shown in Fig. 12. Also the tone arm pivot link, (Item 30, Fig. 12), has moved to where it has released the latch, (Item 18, Fig. 12), and carried the tone arm to its extreme outward position. The Tone Arm Lifter Link, (Item 81, Fig. 12), has raised the tone arm to its extreme height, by means of the Lifter Plate Assembly, (Item 17, Fig. 12). The tone arm is kept from "fainting" free by the friction of the Tone Arm Brake Spring which also compresses the tone arm booster spring, (Item 13, Fig. 12) due to its very light tension.

The Drive Gear Assembly (Item 4, Fig. 12) continues to rotate which causes the top pin to disengage from the Automatic Engagement Clutch Cam which is moved back to its initial position, and the lower pin to engage the drive link assembly, moving it back to its initial position. This swings the tone arm to either the 10 inch or 12 inch record playing position and lowers it in the record. At the same time, it releases the Tone Arm Brake Spring allowing the Tone Arm Booster Spring to set.

2.—PHONOGRAPH NEEDLES

Various types and kinds of needles are available for use in phonograph tone arms.

For playing ten or more records at one setup with this Record Changer, no attempt should be made to use ordinary needles with steel or fiber points since continued use of worn needle points will damage the records being played.

Any needle can be used that is designed to play 10 or more records. It is well to keep in mind that even if the amplifying system, speaker, and tone arm are of the best quality, a poor needle will result in poor reproduction of music.

There are a number of good non-permanent types of needles on the market which are used in number of players. It is usually more economical to use one or two of these needles which is rated 10,000 plays or more.

It is very important to remember not to remove and replace any needle that has been used.

3.—CHASSIS MOUNTING

The bottom surface of the panel are four mounting

kinds, each threaded to take a 4—20 machine screw. The mounting panel nuts on four tapered coil springs, the small end of each spring is pressed over a mounting stud and the large end of each spring fits into a socket in the top surface of the mounting shell in cabinet.

Four spring block 1/8" thick and with a 5/6" hole are fastened to the lower side of the mounting shell. The 5/6 hole in each is centered with the center of the 7/16" screw clearance hole. These are to be provided and located on the outer side of the mounting shell into which each of the four mounting springs are to be inserted.

The 4—20 machine screws are turned through the four wing nuts until the head of each screw is against the bottom side of each wing nut.

The four lower springs which are of smaller diameter than the upper springs are slipped over the ends of each of the 4—20 machine screws with the tapered end toward the head and resting on the wing nuts.

OPERATING INSTRUCTIONS

1.—TO PREPARE CHANGER FOR OPERATION

(A) Setting Record Changer in Play Ten-Inch Records:

Turn both knobs until the arrows are pointing toward the center of the turntable. When in this position any number up to and including fourteen 10-inch records can be played.

(B) Setting Record Changer in Play Twelve-Inch Records:

Turn both knobs until the arrows marked "12" are pointing toward the center of the turntable. When in this position any number up to and including ten 12-inch records can be played.

2.—LOADING

(A) If 10-inch records are to be played, set knobs as described in (A) above and place any number up to and including 10 records (ten inch only) over center pin so that they will rest on the selecting arms.

(B) If 12-inch records are to be played, set knobs as described in (B) above and place only number up to and including 10 records (twelve inch only) over center pin so that they will rest on the arms.

3.—STARTING THE RECORD CHANGER

1. Turn on the radio (allowing approximately 30 seconds for the tubes to warm up) and throw the phonograph switch to on position.

2. Turn the switch knob on the Record Changer panel to "ON". The motor will then start and the record changer will go into automatic operation of its own accord.

4.—PLAYING AN INDIVIDUAL RECORD

An individual record can be played in the same manner as a stack of records would be played; i.e., if it is a 10-inch record, follow the instructions pertaining to 10-inch records. If it is a 12-inch record, follow the instructions pertaining to 12-inch records.

A 10-inch record may be played manually by turning the selecting arm knobs to the unloading position and leaving them in this position. Records may then be put on or taken off the turntable by merely moving the tone arm outward until it catches, and placing the 10-inch records over the spindle and down onto the turntable. The "OFF" and "OFF" switch knob is then pushed down and the 10-inch record will be played and removed if left on the turntable. To remove the record it is necessary to move the tone arm outward until it catches, and lift the record off of the turntable.

5.—TURNING OFF RECORD CHANGER

Turn switch knob to "OFF" position while the tone arm is still on the record. If the switch knob should be turned off while Record Changer is going through a change cycle, it will be difficult to adjust the selector arms correctly for the automatic playing of 10-inch or 12-inch records.

6.—UNLOADING RECORDS

1. Turn switch knob to "OFF" position.

2. Remove any records remaining on the selector arms.

3. Move tone arm outward until it catches in outward position.

4. Turn selector arms so that records will clear them.

5. Remove records from turntable.

7.—LUBRICATION

(A) Motor: The motor is equipped with oilless bearing and requires no lubrication.

(B) Turntable Spindle Bearings: Are lubricated at the factory and do not require any lubrication for one year. After one year they should be oiled with two drops of light grade oil. The top bearing can be oiled by lifting off turntable. Make sure when replacing turntable in to see that pin in Turntable spindle slips into slot on bottom surface of Turntable hub and also care should be taken not to injure Rubber Idle Drive Wheel.

Never under any circumstances allow oil to come in contact with Rubber Idle Drive Wheel.

(C) Spindle Due To Records Balancing On Turntable Spindle. This can be eliminated by gently lining up the stack of records.

Figure 11
IV-SERVICE NOTES

1. Trip Rod (Item 32, Fig. 12), may be bent so that it is in top short, making Trip Lever Assembly from containing Engagement Clutch Cam Assembly.

2. Springs (Items 24 or 38, Fig. 12) may be discontected.

3. NO SOUND WHEN NEEDLE IS ON MOVING RECORD

(a) Making switch (Item 20, Fig. 12), may be out of adjustment. The contacts of this switch should be open whenever its long blade is not resting on the arm of the Engagement Clutch Cam Assembly (Item 70, Fig. 12). If the contacts remain closed after the long blade has left the slot, they should be adjusted by bending until there is a separation of approximately 0.020.

(b) Switch should be checked to make sure contacts are closed when long blade is resting on the arm of the Engagement Clutch Cam Assembly.

(c) The legs on the Start Switch may have been bent together.

3. Pickup cartridge in Tone Arm may have been damaged or may be defective.

6. TONE ARM ADJUSTMENTS FOR 17 RECORDS

(a) Turn both Control Knobs until the arrows marked "17" are pointing toward the center of the turntable.

(b) Place a twelve inch record on the turntable.

(c) Start Record Changer and note where needle contacts record. Correct positioning is about 1/32" from the outside edge of record.

(d) Set Dial (Item 56, Fig. 13), is operated by Selector Arm (Item 60, Fig. 11). The 17 Set Link (Item 10, Fig. 11), operates as a stop when Record Changer is set for 12 records. When Tone Arm Locating Assembly (Item 32, Fig. 13) contacts 12" Selector Link the Tone Arm should be in the correct position to play a 12" record.

(e) At this point, the position of Tone Arm is incorrect. Return the screw where Tone Arm Locating Shoe 12" (Item 14, Fig. 11) and more in either direction as required and tighten screws.

7. TONE ARM ADJUSTMENTS FOR 16 RECORDS

(a) Turn both Control Knobs until the arrows marked "16" are pointing toward the center of the turntable.

(b) Place a 10" record on the turntable and start Record Changer.

(c) Note where needle contacts record. Correct positioning is about 1/32" from the outside edge of record.

(d) If contact of needle is not correct as mentioned, loosen the screw which holds Tone Arm Locating Shoe "10" (Item 18, Fig. 13) and white line in or out as required, then tighten screw.

8. TONE ARM HEIGHT ADJUSTMENTS

Set the Record Changer for ten-inch records, turn Switch to "ON" and allow Record Changer to go thru a changing cycle with no record on the turntable. The clearance between Turntable and the bottom surface of the Tone Arm should be approximately 1/32. Finally, this clearance can be obtained by adjusting the Tone Arm Adjustment Screw (Item 70, Fig. 13). It is well to check the following points before making any adjustment.

Check clearance between Rotor (Item 51, Fig. 13) and Selector Crank Shaft Assembly (Item 7, Fig. 12). There should be approximately 1/32 clearance at this point. If the clearance is greater, it would be due to the pressure on the Spring Washer (Item 50, Fig. 13) being too great. This will prevent the Tone Arm Lift Lever Spring (Item 52, Fig. 13) from returning the Tone Arm Lift Lever Assembly (Item 81, Fig. 12) sufficiently. To relieve the pressure on the Spring Washer, lever the Selector Shaft Collar (Item 6, Fig. 12) slightly.