



## FOR MEMBERS OF RADIO MANUFACTURERS SERVICE

SERVICE BULLETIN  
No. 260

### SERVICE DATA

Model 37-3670 is an 11 tube superheterodyne receiver designed for operation on alternating current. It has five tuning ranges, covering standard broadcast and short-wave frequencies. The chassis is constructed in four basic assembly unit, concentrating the R.F., I.F., Audio and Power circuits in individual units.

The circuit includes the PHILCO Foreign Tuning System—controlled by the range switch—providing maximum sensitivity and noise-reduction, when used with the Philco High-Efficiency Aerial; automatic bass compensation in the volume control circuit; shadow tuning; automatic volume control, and a push-pull class “A” output circuit.

#### AERIAL CONNECTIONS

The red and black leads of the High-Efficiency Aerial “transmission line” are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

#### REPLACING DIAL

To replace the dial, remove the clamp holding the dial to the hub, by turning clamp counter-clockwise, using the two holes provided on the clamp for this purpose.

#### REMOVING MASK ARM & LINK ASSEMBLY

First remove dial, then loosen set screw of dial hub and remove the hub and felt washer from the shaft. Now loosen screws holding indicator bracket and lens assembly, and move bracket forward about 1/2 inch. The assembly may now be removed by loosening set screw of range switch arm, then pulling arm off of range switch shaft.

#### REMOVING SWITCH & COIL ASSEMBLIES OF R.F. UNIT

To replace any part in the switch and coil assemblies of the R.F. Unit, each assembly can be removed separately as follows:

First remove the tuning dial, mask and arm assembly. Remove the center mounting screw on the rear of the R.F. Unit. Then lift the rear of the unit and push forward until the rubber mounting grommets, on each side of the unit, clear the mounting slots. The unit is then lifted far enough from the chassis for removal of the two screws holding the selector switch indexing plate and shaft (front of unit). Then pull shaft straight out from the unit. Also, remove the volume control shaft by releasing the retaining clip, inside the chassis, from the shaft.

**IMPORTANT**—When selector switch shaft is replaced, care should be taken to have all wafer rotors in the same position, so that the key on the switch shaft will slide freely into the notched hole in each wafer rotor. **NEVER** force shaft into rotors.

**Servicing Stages**—It is necessary to unsolder some connecting leads in order to release the stage for servicing. If all the following connections are unfastened the stage will be entirely released. Ordinarily only one or two leads need be loosened in order to change coils, replace coupling condensers, or replace switch sections.

#### ANTENNA ASSEMBLY—Rear Section

1. Unsolder the wires which connect the antenna panel and I.F. Unit to the range switch, also the assembly shield ground leads.

2. Unsolder the two leads from the gang condenser terminal panel which connect to the range switch. Also the lead of tubular condenser (40) at the ground lug on the R.F. Unit.

3. Remove the screw holding the shield plate to the unit base. This screw is located in the right hand corner of the shield plate, facing the rear underside of the chassis. The assembly can then be removed.

#### R.F. ASSEMBLY—Middle Section

1. Unsolder the wires from the I.F. Unit and the 6K7G plate contact in R.F. unit which connect to the range switch. Then remove ground leads of shield plate.

2. Unsolder the leads from the gang condenser terminal panels and the lead connecting D2 on the range switch to the 6K7G Plate Contact.

3. Remove the screw holding the shield plate to the unit base. This screw is located in the right hand corner of the shield plate facing the rear underside of the chassis. Then pull the assembly straight out.

#### OSCILLATOR ASSEMBLY—Front Section

1. Unscrew the two screws located on each side of the R.F. Unit.

2. Unsolder the wires connecting the range switch to resistors (81) and (78) in the power unit, electrolytic condenser (77) in the R.F. Unit and Osc. plate and grid contacts on the 6A8G socket.

3. Remove the leads from the gang condenser terminal panels and the lead of Mica condenser (30) at the ground lug on R.F. Unit base. With these leads disconnected lift oscillator section from unit.

### Electrical Specifications

#### POWER SUPPLY:

Voltage	Frequency	Power Consumption
115	50-60	130 watts
115	25-40	130 watts

Power transformers for the different voltage and frequency ratings are listed in the Parts List, page 3.

Intermediate Frequency: 470 K.C.

Audio Output: 10 watts

Tubes Used: 6K7G, R.F. Amplifier; 6A8G, Oscillator and First Detector; 6K7G, I.F. Amplifier; 6J5G, 2nd Detector, A.V.C.; 6J5G, First Audio; 6J5G, Phase Inverter; 2-6J5G, Push-Pull Drivers; 2-6F6G, Output; 5X4G, Rectifier.

Tuning Ranges: Five. Range 1—530-1600 K.C.; Range 2—1.58 to 4.75 M.C.; Range 3—4.7 to 7.4 M.C.; Range 4—7.35 to 11.6 M.C.; Range 5—11.5 to 18.2 M.C.

Speaker: “X” Cabinet, H-28.

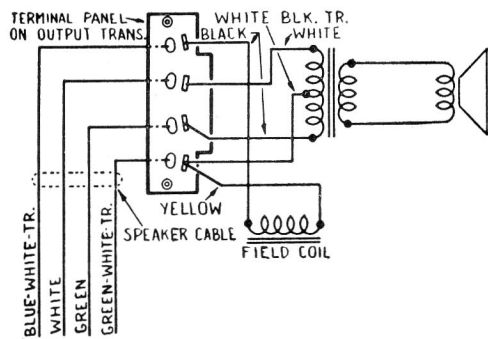


Fig. 1—Speaker Wiring for Type H-28

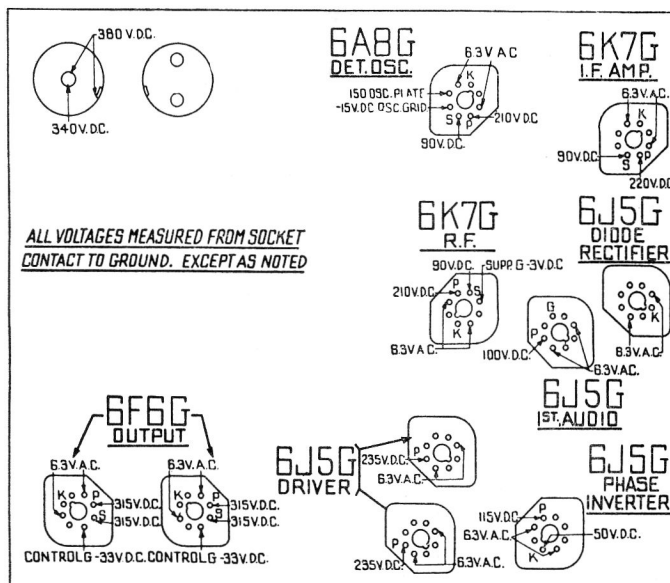
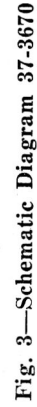


Fig. 2—Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.



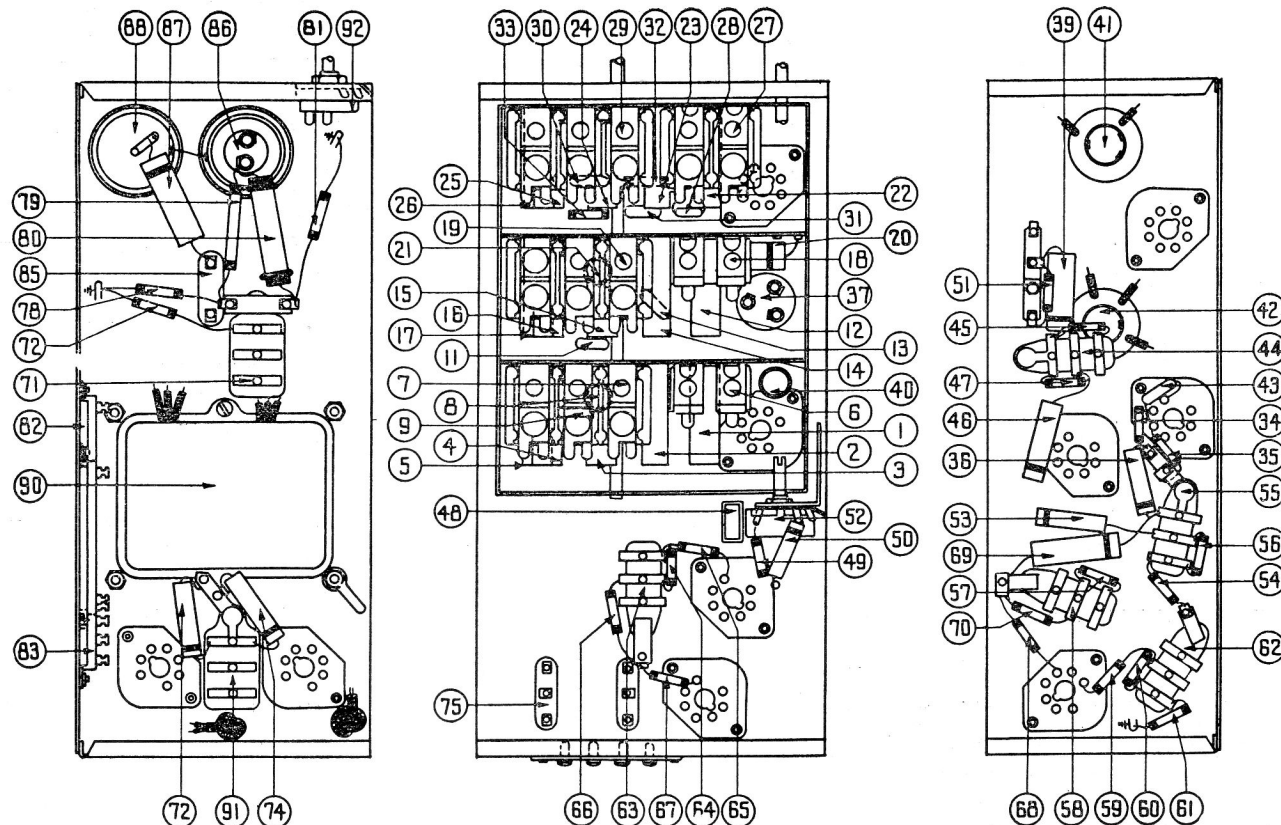


Fig. 4—Parts Location—Underside of Chassis

## Replacement Parts—Model 37-3670

Schem. No.	Description	Part No.
1	Antenna Trans. (530 to 1600 K.C.)	32-2108
2	Antenna Transformer (1.58 to 4.75 M.C.)	32-2146
3	Antenna Trans. (4.7 to 7.4 M.C.)	32-2183
4	Antenna Transformer (7.35 to 11.6 M.C.)	32-2185
5	Antenna Transformer (11.5 to 18.2 M.C.)	32-2175
6	Compensator (two section)	31-6093
7	Compensator (six section)	31-6112
8	Condenser (.05 mfd. tubular)	30-4020
9	Resistor (51000 ohms)	33-351339
10	Tuning Condenser	31-1855
11	Condenser (40 mmfd. mica)	30-1076
12	R.F. Trans. (530 to 1600 K.C.)	32-2105
13	Condenser (5mmfd. mica)	30-1077
14	R.F. Trans. (1.58 to 4.75 M.C.)	32-2147
15	R.F. Trans. (4.7 to 7.4 M.C.)	32-2177
16	R.F. Trans. (7.3 to 11.6 M.C.)	32-2178
17	R.F. Trans. (11.5 to 18.2 M.C.)	32-2176
18	Compensator (two section)	31-6093
19	Compensator (six section)	31-6113
20	Condenser (.05 mfd. tubular)	30-4123
21	Condenser (.05 mfd. tubular)	30-4020
22	Oscillator Transformer (530 to 1600 K.C.)	32-2120
23	Oscillator Transformer (1.58 to 4.75 M.C.)	32-2149
24	Oscillator Trans. (4.7 to 7.4 M.C.)	32-2184
25	Oscillator Trans. (7.3 to 11.6 M.C.)	32-2186
26	Oscillator Transformer (11.6 to 18.2 M.C.)	32-2182
27	Compensator (four section)	31-6108
28	Condenser (700 mmfd.)	5863
29	Compensator (six section)	31-6112
30	Condenser (3000 mmfd. mica)	30-1028
31	Condenser (250 mmfd. mica)	30-1038
32	Resistor (32000 ohms)	33-323239
33	Resistor (10000 ohms)	33-310339
34	Resistor (1.0 megohm)	33-510339
35	Resistor (1.0 megohm)	33-510339
36	Condenser (.05 mfd. tubular)	30-4444
37	Electrolytic Cond. (2, 1, 3 mfd.)	30-2122
38	Shadowmeter	45-2189C
39	Condenser (.05 mfd. tubular)	30-4012
40	Condenser (.05 mfd. tubular)	30-4123
41	1st I.F. Transformer	32-2170
42	2nd I.F. Transformer	32-2172
43	Condenser (110 mmfd. mica)	30-1031
44	Cond. (110 mmfd. dual bakelite)	8035DG
45	Resistor (99000 ohms)	33-399339

Figures in black type indicate circled figures in Base View.

Schem. No.	Description	Part No.
46	Condenser (.01 mfd. tubular)	30-4124
47	Resistor (490000 ohms)	33-449339
48	Condenser (75 mmfd. mica)	30-1053
49	Resistor (40000 ohms)	33-340339
50	Condenser (.006 mfd. tubular)	30-4125
51	Resistor (1000 ohms)	33-210339
52	Volume Control	33-5158
53	Condenser (.015 mfd. tubular)	30-4358
54	Resistor (490000 ohms)	33-449339
55	Condenser (.1 mfd. bakelite)	4989-SG
56	Resistor (1 megohm)	33-510339
57	Resistor (99000 ohms)	33-399339
58	Condenser (.03 mfd. bakelite)	8318-SU
59	Resistor (490000 ohms)	33-449339
60	Resistor (5000 ohms)	33-250339
61	Resistor (45000 ohms)	33-345339
62	Condenser (.03 mfd. bakelite)	8318-SU
63	Condenser (.03 mfd. bakelite)	8318-SU
64	Resistor (330000 ohms)	33-433339
65	Resistor (99000 ohms)	33-399339
66	Resistor (330000 ohms)	33-433339
67	Resistor (99000 ohms)	33-399339
68	Resistor (51000 ohms)	33-351339
69	Condenser (.1 mfd. tubular)	30-4455
70	Resistor (51000 ohms)	33-351339
71	Cond. (.015 mfd. dual bakelite)	3793-DU
72	Resistor (1 megohm)	33-510339
73	Condenser (.003 mfd. tubular)	30-4469
74	Condenser (.003 mfd. tubular)	30-4469
75	Audio Input Transformer	32-7671
76	Output Transformer (H-28)	32-7660
77	Cone and Voice Coil (H-28)	02625
78	Resistor (70000 ohms)	33-370439
79	Resistor (15000 ohms)	33-315339
80	Resistor (25000 ohms)	33-325639
81	Resistor (51000 ohms)	33-351339
82	Resistor (5600 ohms wirewound)	33-3232
83	Resistor (258 ohms wirewound)	33-3281
84	Field Coil Assembly (H-28)	36-3104
85	Filter Choke	32-7115
86	Electrolytic Cond. (8, 10 mfd.)	30-2045
87	Cond. (.25 mfd.) tubular (60 cy.)	30-4446
88	Condenser (1 mfd.) (25 cycle)	04357
89	Electrolytic Condenser (8 mfd.)	30-2025
90	Pilot Lamp	34-2039
91	Power Trans. 115 V., 50-60 cycles	32-7640
92	Power Trans. 115 V., 25-40 cycles	32-7641
93	Cond. (.015 mfd. dual bakelite)	3793-DG
94	Power and Tone Control Switch	42-1232
95	Range Switch (Ant.)	42-1211
96	Range Switch (R.F.)	42-1212
97	Range Switch (Osc.)	42-1213
98	Shadowmeter Lamp	34-2064
99	Switch Index Plate and Shaft	42-1187
100	Pilot Lamp Assembly	38-7706

Schem. No.	Description	Part No.
Dial		27-5213
Hub		28-7187
Clamp		28-2837
Set Screw		W-1641
Gear (Dial)		28-7185
Gear (Drive)		31-1884
Thrust Spring		28-8611
Thrust Washer		28-3976
"C" Washer		28-3904
Mask		27-5206
Mask Arm and Link Assembly		31-1887
Mask Washer		27-8318
Mask Guide and Bracket		38-7876
Screens & Lens Holder Assembly		31-1900
Volume Control Shaft		38-8060
Retaining Clip		28-4394
Spring		28-4117
Tube Shield		28-2726
Tube Shield Base		28-3898
Socket 7 prong		27-6057
Socket 8 prong		27-6058
Socket Rectifier		27-6057
Terminal Panel (Ant.)		38-7714
Grommet Mtg. R.F. Unit		27-4317
Sleeve Mtg. R.F. Unit		28-2257
Washer Mtg. R.F. Unit		27-7807
Screw Mtg. R.F. Unit		W-729
Rubber Mtg. (Gang Condenser)		27-4325
Spring Mtg. Shadowmeter		28-8623
Plate Mtg. R.F. Transformer		28-3808
Spacer Mtg. R.F. Transformer		27-8228
Screw Mtg. R.F. Transformer		W-1635
Screw Chassis Mtg.		W-1496
Washer Chassis Mtg.		28-2089
Snap Fasteners		28-4279
Rubber Cushion (X Cabinet)		3558
Rubber Bushing (two required)		27-4360
Rubber Washer		5189
Speaker Cable		41-3210
A.C. Cord		L-1149A
Knob Tuning		27-4330
Knob Tuning Vernier		27-4331
Knob Tone & Volume		27-4332
Knob Range Switch		27-4326

## X CABINET PARTS

Bezel Frame and Plate	40-5948
Glass	27-8300
Ring	28-3988
Gasket	27-8313
Speaker (H-28) "X" Cabinet	36-1253



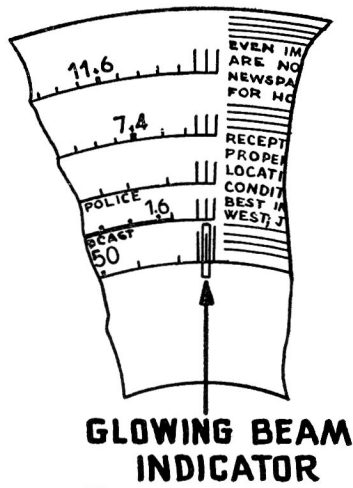
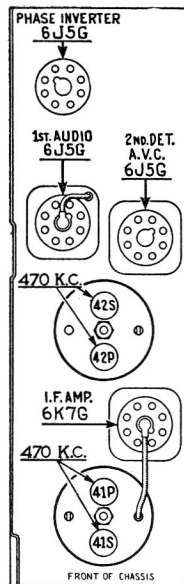
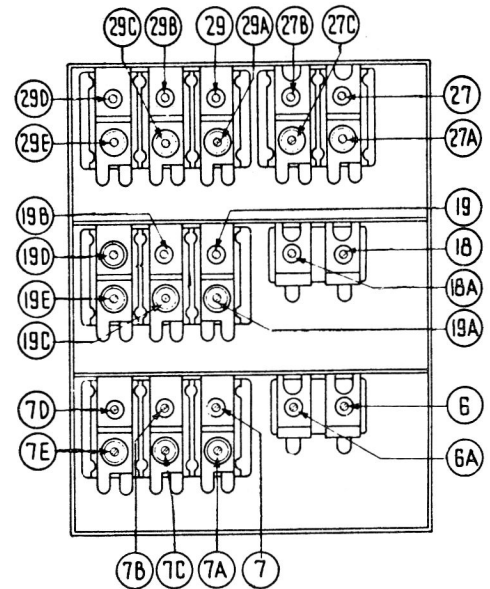


Fig. 5—Dial Calibration

Fig. 6—I.F. Compensators  
Top of ChassisFig. 7—R.F. Compensators  
Underside of Chassis

## Alignment of Compensators

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the PHILCO MODEL 088 Signal Generator, covering from 110 to 20,000 K.C. is recommended for use in adjusting the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators.

PHILCO MODEL 025 CIRCUIT TESTER contains a sensitive output meter and is recommended for these adjustments.

Philco Fibre Handle Screw-driver No. 27-7059 completes the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 6 and 7.

The following procedure must be observed in adjusting the compensators:

**DIAL CALIBRATION**—In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this rotate the tuning control to the extreme counter-clockwise position (maximum capacity). Loosen the sets screw of the dial hub, then turn dial until the glowing indicator is centered on second index line of dial scale (see Fig. 5). Now tighten the dial hub set screw in this position.

**SHADOW METER ADJUSTMENT**—Remove aerial and allow tubes to warm up. Then adjust the shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are  $\frac{1}{8}$  of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.
2. Remove the 5X4G rectifier tube from its socket and rotate coil until shadow reaches minimum width. This width must not exceed  $\frac{3}{32}$  of an inch.
3. Replace the 5X4G rectifier tube in its socket. The shadow should then widen until it is not more than  $\frac{3}{16}$  inch or less than  $\frac{1}{16}$  inch from each side of the screen, measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 until they are reached.

**OUTPUT METER**—The 025 Output Meter is connected between the plate and cathode prongs of one of the (6F6G) tubes. The meter is adjusted to use the (0-30) volt scale.

### INTERMEDIATE FREQUENCY CIRCUIT

#### Frequency 470 K.C.

1. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the control grid of the 6A8G tube, and the ground connection of the output lead to the chassis. Turn the Volume Control to maximum volume position.
2. Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to approximately 580 K.C. and adjust the signal generator for 470 K.C.
3. Adjust compensators (42S) 2nd I.F. Sec., (42P) 2nd I.F. Pri., (41S) 1st I.F. Sec., and (41P) 1st I.F. Pri. for maximum reading on the output meter.

### RADIO FREQUENCY CIRCUIT

#### Tuning Range (11.5) to (18.2) M.C.

1. Remove the signal generator output lead from the grid of the 6A8G tube and connect it through the .1 mfd. condenser to terminal No. 1 on aerial input panel and the generator ground lead to terminal No. 3, rear of chassis. Terminals 2 and 3 must be connected by the shorting link provided on the panel.
2. Set the range switch in position No. 5. Turn the receiver and signal generator dials to 18 M.C. Now adjust compensator (29D) by turning the screw (clockwise) to the maximum capacity position, then slowly turning it (counter-clockwise) until a second peak signal is reached on the output meter. The first peak from maximum capacity is the image signal and must not be used. NOTE—In adjusting some receivers only one peak will be observed, therefore, tune the compensator to maximum on this peak. If the above procedure is correctly performed, the image signal will be found at 17.06 M.C. by advancing the signal generator attenuator and turning the receiver dial to this frequency mark on the dial.
3. The antenna and R.F. compensators (7D) and (19D) are now adjusted by connecting a variable condenser of approximately 350 mmfd.—Philco Part No. 45-2325 across the oscillator compensator (29D) (First contact from left side of the receiver facing rear underside of chassis) and ground. Leaving the signal generator and receiver dials at 18 M.C., tune the added condenser from the maximum capacity point until the second harmonic of the receiver oscillator beats against the signal from the generator there-

by bringing in the signal. The antenna and R.F. compensators (7D) and (19D) are then adjusted for maximum output. Now remove the external condenser and readjust compensator (29D) as given in paragraph 2 above.

4. Turn signal generator and receiver dials to 12 M.C. and adjust compensator (29E) for maximum output. Then adjust compensators (19E) and (7E) for maximum output.

5. Now turn the signal generator and receiver dials to 18 M.C. and readjust compensators (29D) Osc., (7D) Ant., and (19D) R.F. as given in paragraphs 2 and 3 above.

#### Tuning Range (7.35) to (11.6) M.C.

1. Set range switch in position 4. Rotate signal generator and receiver dials to 11 M.C. Now adjust compensator (29B) by turning the screw (clockwise) to the maximum capacity position, then slowly turn it (counter-clockwise) until a second peak signal is reached on the output meter. The first peak from maximum capacity is the image signal and must not be used. NOTE—In adjusting some receivers only one peak will be observed, therefore, tune the compensator to maximum on this peak. If the above procedure is correctly performed, the image signal will be found at 10.06 M.C. by advancing the signal generator attenuator and turning receiver dial to this frequency mark on the dial.

2. Using the 11 M.C. signal, compensators (19B) R.F. and (7B) Ant. are adjusted by using the procedure given in paragraph 3, under tuning range (11.5) to (18.2) M.C. with the exception that the external condenser is connected across compensator (29B) (Third contact from left side of the receiver) and ground.

3. Remove the variable condenser and readjust compensator (29B) Osc. as given in paragraph 1 above.

4. Turn the signal generator and receiver dials to 7.5 M.C. and adjust compensators (29C) Osc. series, (19C) R.F. and (7C) Ant. for maximum output.

5. Due to the slight interaction of the high and low frequency compensators of this range, compensators (29B) Osc., (19B) R.F. and (7B) Ant. must be readjusted using the procedure in paragraphs 1 and 2 above.

#### Tuning Range (4.7) to (7.4) M.C.

1. Set range switch in Position 3. Turn signal generator and receiver dials to 7.0 M.C. Now adjust compensator (29) Osc., (19) R.F. and (7) Ant. for maximum output.

2. Turn the signal generator and receiver dials to 5.0 M.C. and adjust compensators (29A), (19A) and (7A) for maximum output.

3. Turn the signal generator and receiver dials to 7.0 M.C. and readjust compensators (29) Osc., (19) R.F. and (7) Ant. for maximum output.

#### Tuning Range (1.58) to (4.75) M.C.

1. Set the range switch in position 2. Turn the signal generator and receiver dials to 4.5 M.C.

2. Now adjust compensators (27B) Osc., (18A) R.F. and (6A) Ant. for maximum output.

3. Rotate the signal generator and receiver dials to 1.7 M.C. Compensator (27C) Osc. series is now adjusted for maximum output as follows:

First tune compensator (27C) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 1.7 M.C. dial mark. Now turn compensator (27C) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (27C) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

4. Turn signal generator and receiver dials to 4.5 M.C. and readjust compensators (27B), (18A) and (6A) as given in Paragraphs 1 and 2 above.

#### Tuning Range (530) to (1600) K.C.

1. Set range switch in position No. 1 (Broadcast). Rotate the signal generator and receiver dials to 1500 K.C. Now adjust compensators (27) Osc., (18) R.F. and (6) Ant. for maximum output.

2. Tune signal generator and receiver dials to 580 K.C. Compensator (27A) Osc. series is then adjusted for maximum output as given in paragraph 3 under tuning range (1.58) to (4.75) M.C., the only difference in the procedure being in the frequency used.

3. Readjust compensator (27) for maximum output, by turning the signal generator and receiver dials to 1500 K.C.

4. Turn the signal generator and receiver dials to 1400 K.C. and adjust compensators (18) R.F. and (6) Ant. for maximum output.