



# SERVICE BULLETIN No. 286A for members of RADIO MANUFACTURERS SERVICE

## A PHILCO Service Plan

## SPECIFICATIONS

**TYPE OF CIRCUIT:** Model 38-C116, code 125, employs a fifteen tube, A.C. operated superheterodyne circuit with the **Philco Automatic Tuning Dial**, having five tuning ranges, covering a frequency range from 530 K.C. to 18.2 M.C.

Incorporated in this model are design features such as Magnetic Tuning control on each tuning range; Automatic Volume Control; Fidelity and Selectivity controlled by variable I.F. Transformers; Bass Compensation; Acoustic Clarifiers to eliminate cabinet resonance; Split Stator Tuning Condensers for spreading short wave stations further apart, and Special Push-Pull Audio Output circuit using 6L6G Beam tubes.

POWER SUPPLY:	Voltage	Frequency Cycles	Power Consumption
	115	50 to 60	165 watts
	115	25 to 40	165 watts
	115/230	50 to 60	165 watts

Different transformers are required for operation on the voltages and frequencies listed above. The part numbers for these transformers are listed on page 4. A special transformer for operation on either 115 or 230 volt—50 to 60 cycle A.C. power circuit can be obtained. This transformer is provided with a plug and socket for selection of either voltage rating. Place the plug with arrow pointing toward voltage being used.

**INTERMEDIATE FREQUENCY: 470 K.C.**

**FREQUENCY RANGES:** Range One 530 to 1600 K.C.  
Two 1.58 to 4.75 M.C.  
Three 4.7 to 7.4 M.C.  
Four 7.35 to 11.6 M.C.  
Five 11.5 to 18.2 M.C.

**UNDISTORTED OUTPUT:** 15 watts.

**TUBES USED:** 6U7G R.F.; 6A8G Mixer; 6A8G Oscillator; 6N7G Oscillator control; two 6K7G I.F.; 6K7G 2nd Detector and Magnetic tuning amplifier; two 6J5G discriminator; 6J5G A.V.C.; 6R7G 1st audio; 6J5G audio driver; two 6L6G audio output, and one 5X4G rectifier.

**TONE CONTROLS:** Two — 1. High audio-frequency tone varied by Treble-Selectivity control.  
2. Low audio-frequency tone varied by "Bass Tone Control," in the volume control circuit.

**PHILCO SPEAKERS USED:** One type "W5" with three acoustic clarifiers.

**CABINET:** Type XX.

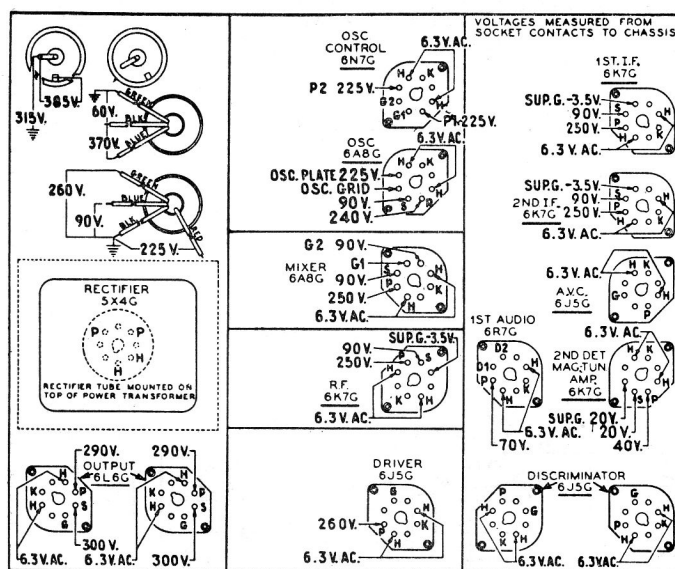
## SERVICE NOTES

For reference between illustrations, Parts List, and for replacement of parts, the various diagrams in this bulletin are marked with "circled numbers" indicating a particular part.

Physical views of the R.F. and I.F. transformers and the range switch sections are shown on pages 2 and 3. Each part is marked with the corresponding schematic diagram circled number.

The leads and lugs of the R.F. and I.F. transformers are either numbered or the color of the wire marked to indicate the connecting point in the circuit diagram, which is also correspondingly marked.

Rear views of the range switch sections are also shown in Fig. 5. The lugs on each are marked with a letter and number—example (A2)—indicating the connecting point of each lug in the circuit diagram.



**Fig. 1. Underside View of Chassis showing Socket Voltages**

The voltages indicated by the arrows were measured with a **Philco 025A Circuit Tester**, which contains a sensitive voltmeter. Line voltage 115 A.C.—Volume control minimum—Dial set at point where no signal is present—Range Switch in broadcast position.

Speaker wiring is shown in Fig. 3 and the power transformer wire colors are marked on the schematic diagram.

For band spread purposes, the stator plates of the tuning condensers in this receiver are designed in two sections; one section is of small capacity, and the other of large capacity. The sections are interconnected through the range switch.

The small capacity sections of the stators are used when tuning ranges 3, 4 and 5. When tuning ranges 1 and 2 both stator sections are connected in parallel.

For identifying the sections on the diagram Fig. 2, the dotted line of the tuning condenser is marked as follows: Small capacity sections are marked Ant. "A"; R.F. "A", and Osc. "A", and the large capacity sections—Ant. "B"; R.F. "B", and Osc. "B".

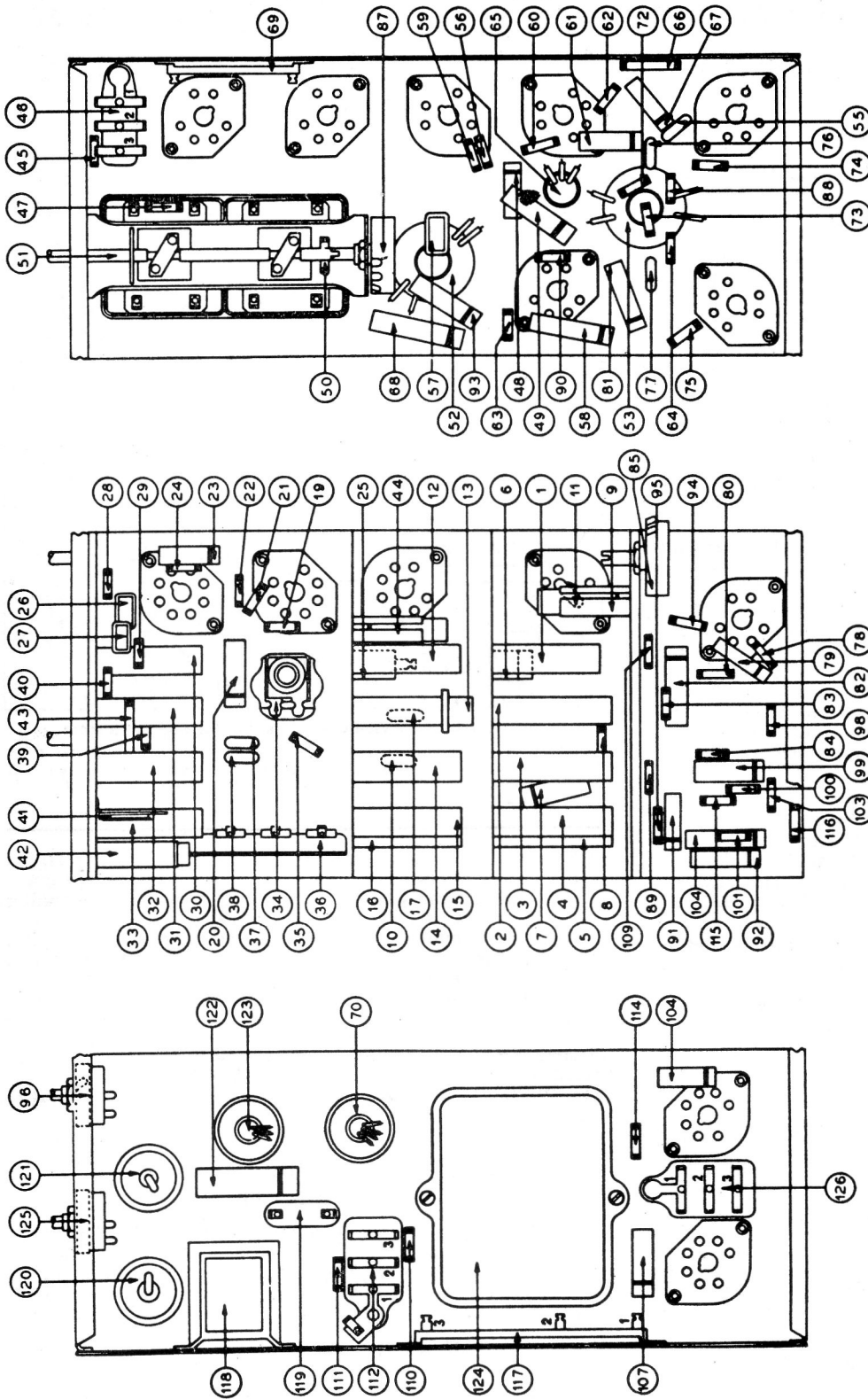
## Automatic Tuning Mechanism

Service data and a complete parts list for the Automatic Tuning Mechanism of this receiver will be found in Service Bulletin 273. There are four automatic dial parts, however, which differ from those shown in bulletin 273. These parts are marked with an asterisk on page 4 of this bulletin.

## Aerial Connections

To obtain the full advantage of the sensitivity of this receiver the **Philco High Efficiency Aerial Part No. 40-6112** should be used. Connect the aerial as follows:

The aerial terminal panel located on the rear of the chassis, contains three terminals marked "Red," "Blk" and "Gnd". Connect the red and black wires of the aerial lead in (Transmission Line) to the "Red" and "Blk" terminals respectively. Connect the "Gnd" terminal to a good ground source. If a temporary aerial is used, connect it to the "Red" terminal.



Part Locations  
Fig. 2. Underside View of Chassis

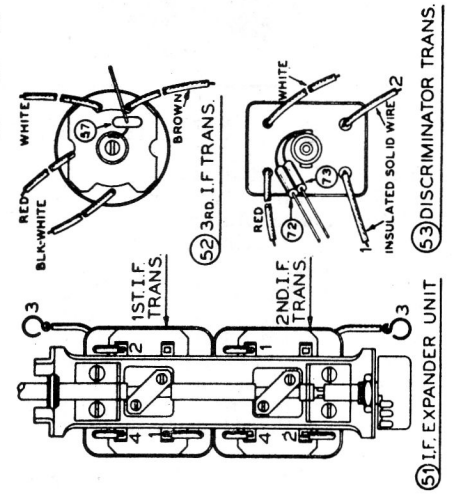


Fig. 4. I. F. Transformer Connections

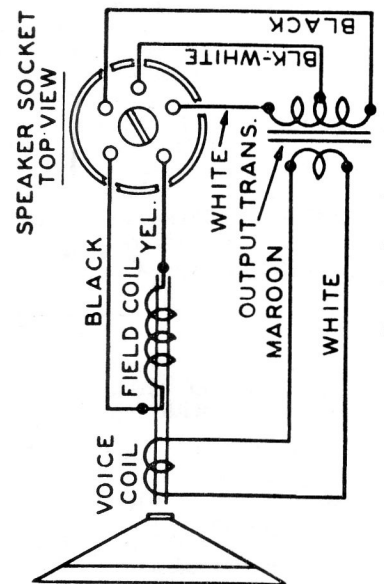
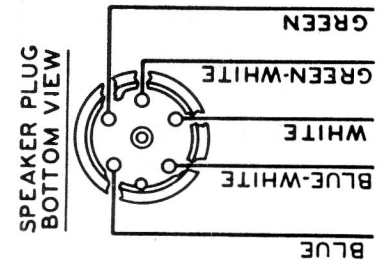


Fig. 3. Speaker Wiring



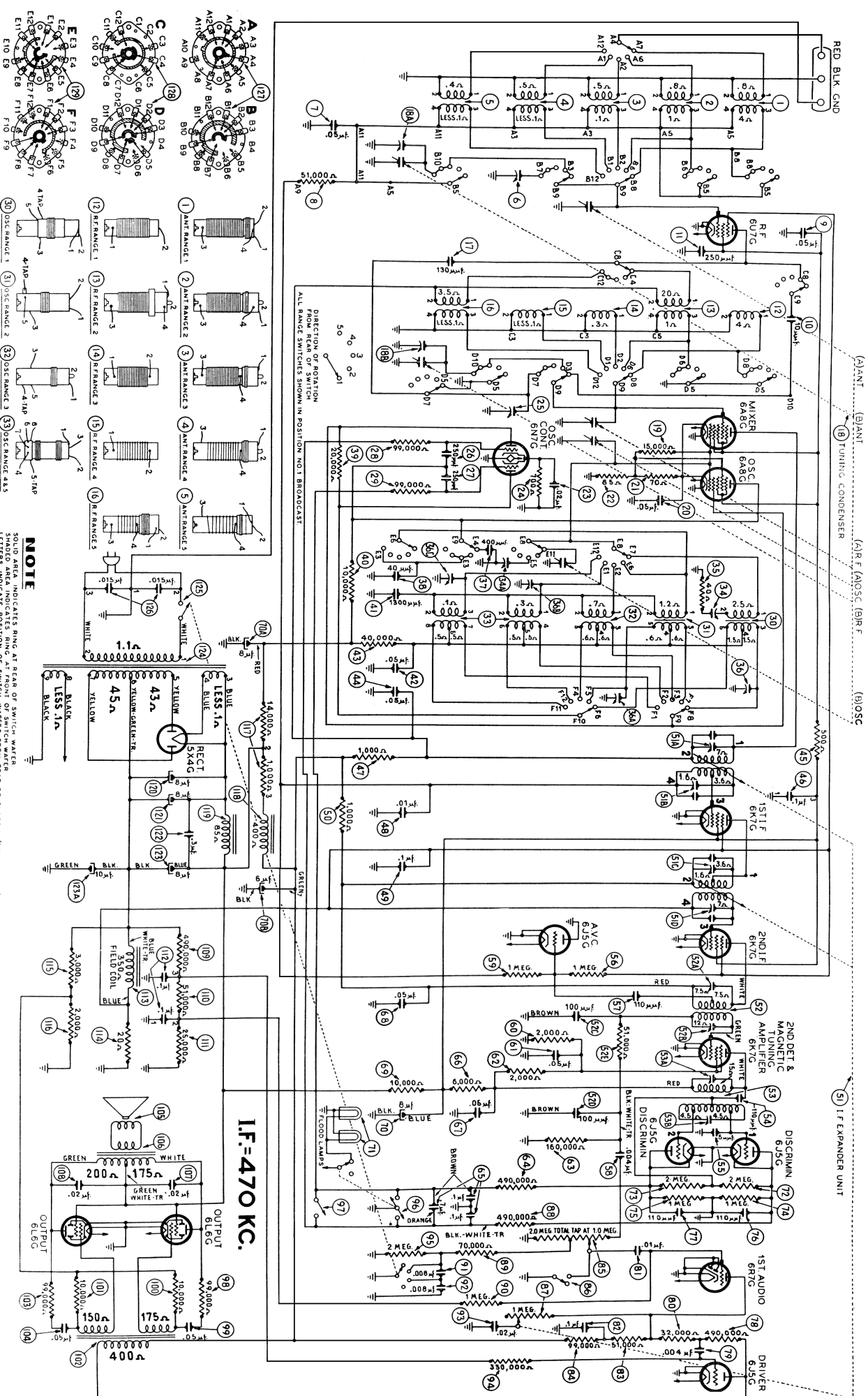


Fig. 5. Schematic Diagram Model 38-C116, Code 125

## REPLACEMENT PARTS—Model 38-C116, Code 125

Schem. No.	Description	Part No.	Schem. No.	Description	Part No.	Schem. No.	Description	Part No.
1	Ant. Transformer (Range 1).....	32-2615	102	Input Transformer.....	32-7865		Shaft and Index Plate (Range Switch).....	42-1208
2	Ant. Transformer (Range 2).....	32-2616	103	Resistor (99,000 ohms, 1/2 watt).....	33-399344		Shaft (I.F. Expander).....	28-6496
3	Ant. Transformer (Range 3).....	32-2617	104	Condenser (.05 mfd tubular).....	30-4518		Shaft (Volume Control).....	38-8061
4	Ant. Transformer (Range 4).....	32-2618	105	Cone & Voice Coil Assembly.....	36-3716		Shield (Tube, Square).....	28-2726
5	Ant. Transformer (Range 5).....	32-2619	106	Output Transformer.....	32-7897		Shield (Round 6N7G).....	8005
6	Compensator (R.F.).....	31-6084	107	Condenser (.02 mfd. tubular).....	30-4481		Shield 3rd (I.F.).....	38-1962
7	Condenser (.05 mfd tubular).....	30-4519	108	Condenser (.02 mfd tubular).....	30-4481		Shield (I.F. Expander).....	38-9025
8	Resistor (51,000 ohms, 1/2 watt).....	33-351344	109	Resistor (490,000 ohms, 1/2 watt).....	33-449344		Shield Base (Square).....	28-2725
9	Condenser (.05 mfd tubular).....	30-4123	110	Resistor (51,000 ohms, 1/2 watt).....	33-351344		Shield Base (Round 6N7G).....	8004
10	Condenser (10 mmfd mica).....	30-1065	111	Resistor (25,000 ohms, 1/2 watt).....	33-325344		Speaker (W5).....	36-1364
11	Condenser (250 mmfd mica).....	30-1032	112	Cond. (.1 mfd.—.1 mfd Bakelite).....	4989DG		Socket (7 prong, Power tubes).....	27-6057
12	R.F. Transformer (Range 1).....	32-2620	113	Field & Pot Assembly.....	36-3788		Socket (7 prong).....	27-6087
13	R.F. Transformer (Range 2).....	32-2621	114	Resistor (20 ohms, 1/2 watt).....	33-020344		Socket (6 prong).....	27-6086
14	R.F. Transformer (Range 3).....	32-2622	115	Resistor (3,000 ohms, 1/2 watt).....	33-230344		Socket (Power Transformer).....	27-6052
15	R.F. Transformer (Range 4).....	32-2623	116	Resistor (2,000 ohms, 1/2 watt).....	33-220344		Terminal Panel (Ant.).....	38-8746
16	R.F. Transformer (Range 5).....	32-2624	117	Resistor, wire-wound (4,000 ohms—1,000 ohms).....	33-3289-1	<b>MISCELLANEOUS MOUNTING PARTS</b>		
17	Condenser (130 mmfd mica).....	30-1036	118	Choke.....	32-7722		Bolt (Mtg. Speaker).....	W-862
18	Tuning Condenser Assembly.....	31-2035	119	Choke.....	32-7056		Bushing (Mtg. R.F. Unit).....	28-2257
19	Resistor (15,000 ohms, 1/2 watt).....	33-315344	120	Electrolytic Condenser.....	30-2026		Clip (Volume Shaft Front Sect.).....	28-4394
20	Condenser (.05 mfd tubular).....	30-4444	121	Electrolytic Condenser.....	30-2026		Cover (Back of Cabinet).....	27-8866
21	Resistor (70 ohms, 1/2 watt).....	33-070344	122	Cond. (.3 mfd. tubular) 60 cycle.....	30-4465		Felt (Mtg. Speaker).....	27-8498
22	Resistor (85 ohms, 1/2 watt).....	33-085344	122	Cond. (1 mfd. tub.) (25 cycle).....	30-4227		Rubber Grommet (Mtg. R.F. Unit).....	27-4317
23	Condenser (.02 mfd tubular).....	30-4215	123	Electrolytic Cond. (8—10 mfd).....	30-2201		Rubber Bushing (Mtg. Chassis).....	27-4202
24	Resistor (700 ohms, 1/2 watt).....	33-070344	124	Power Transformer.....			Rubber Bushing (Mtg. Chassis).....	27-4360
25	Compensator.....	31-6084		115 V.—50-60 cycles.....	32-7699		Rubber Cushion (Mtg. Chassis).....	3558
26	Condenser (250 mmfd mica).....	30-1032		115 V.—25-40 cycles.....	32-7700		Pin (I.F. Shaft).....	3014
27	Condenser (250 mmfd mica).....	30-1032		115-230 V.—50-60 cycles.....	32-7701		Screw (Mtg. R.F. Unit Rear Section).....	W-729
28	Resistor (99,000 ohms, 1/2 watt).....	33-399344	125	Power & Bass Tone Switch.....	42-1233		Screw (I.F. Cord Clamp).....	W-1324
29	Resistor (99,000 ohms, 1/2 watt).....	33-399344	126	Cond. (.015—.015 mfd Bakelite).....	3793DG		Snap Fastener (Range Switch Coupling).....	28-4279
30	Osc. Transformer (Range 1).....	32-2625	127	Wave Switch (Ant. Section).....	42-1354		Spacer (Mtg. R.F. Unit).....	27-7807
31	Osc. Transformer (Range 2).....	32-2626	128	Wave Switch (R.F. Section).....	42-1355		Spring (Retaining I.F. Shaft Front Section).....	28-8610
32	Osc. Transformer (Range 3).....	32-2627	129	Wave Switch (Osc. Section).....	42-1356		Spring Clip (I.F. Shaft, Rear Section).....	28-4117
33	Osc. Transformer (Ranges 4&5).....	32-2628		Acoustic Clarifier.....	36-1155		Washer—Flat—I.F. Shaft.....	W-174
34	Compensator (2 sections).....	31-6100		Automatic Tuning Mech. Comp. Bezel Assembly (Cabinet).....	31-6203		Washer (Mtg. R.F. Unit).....	28-3927
35	Resistor (40 ohms, 1/2 watt).....	33-040344		Brace (Dial Mechanism).....	28-4119		Washer-Spring (Mtg. I.F. Shaft).....	28-4186
36	Compensator (4 sections).....	31-6200		Cable (Power).....	L-1149A	*These Automatic Tuning Mechanism Parts differ from those shown in Service Bulletin 273.		
37	Condenser (400 mmfd mica).....	30-1089		Cable and Plug (Speaker).....	41-3339	‡1st I.F. Transformer Section.....		
38	Condenser (40 mmfd mica).....	30-1095		Clamp (R.F. Unit Rear Mtg.).....	28-3900	2nd I.F. Transformer Section.....		
39	Resistor (20,000 ohms, 1/2 watt).....	33-320344		Clamp Locking Plate (R.F. unit).....	28-3982			
40	Resistor (10,000 ohms, 1/2 watt).....	33-310344		Clamp (I.F. Cord).....	28-4147			
41	Condenser (1300 mmfd mica).....	31-6205		Cord (I.F. Expander Drive).....	27-8411			
42	Condenser (.05 mfd tubular).....	30-4123		Coupling (Range Switch & Mask).....	38-8693			
43	Resistor (40,000 ohms, 1 watt).....	33-340434		Coupling (Tuning Condenser and Dial Mechanism).....	31-1961			
44	Condenser (.05 mfd tubular).....	30-4123		*Cover (Handle of Auto. Mech.).....	28-5092			
45	Resistor (500 ohms, 1/2 watt).....	33-150344		*Dial.....	27-5340			
46	Condenser (.1 mfd Bakelite).....	4989SG		*Dial Screen & Lens Holder Assy.....	31-2053			
47	Resistor (1,000 ohms, 1/2 watt).....	33-210344		*Escutcheon Assem. (Station Tabs).....	45-2472			
48	Condenser (.01 mfd tubular).....	30-4515		Knob (Range Switch).....	27-4326			
49	Condenser (.1 mfd tubular).....	30-4499		Knob (Tuning).....	27-4330			
50	Resistor (1,000 ohms, 1/2 watt).....	33-210344		Knob (Vernier).....	27-4331			
51	I.F. Expander Unit Assembly (See Note for 1st and 2nd I.F. Trans.).....	38-8912		Knob (Bass, Volume, Expander Magnetic).....	27-4332			
52	3rd I.F. Transformer.....	32-2660		Mask Guide (Tuning Mechanism).....	28-4118			
53	Discrimin. Transformer.....	32-2661		Pilot Lamp Socket Assembly (3 Sockets).....	38-8487			
54	Condenser (110 mmfd mica) (Part of 53).....	30-1031						
55	Condenser (5 mmfd mica).....	30-1097						
56	Resistor (1.0 meg., 1/2 watt).....	33-510344						
57	Condenser (110 mmfd mica).....	30-1031						
58	Condenser (.004 mfd tubular).....	30-4456						
59	Resistor (1.0 meg., 1/2 watt).....	33-510344						
60	Resistor (2,000 ohms, 1/2 watt).....	33-220344						
61	Condenser (.05 mfd tubular).....	30-4444						
62	Resistor (2,000 ohms, 1/2 watt).....	33-220344						
63	Resistor (160,000 ohms, 1/2 watt).....	33-416344						
64	Resistor (490,000 ohms, 1/2 watt).....	33-449344						
65	Condenser (.1—.1—.7 mfd).....	30-4537						
66	Resistor (6,000 ohms, 1 watt).....	33-260444						
67	Condenser (.05 mfd tubular).....	30-4444						
68	Condenser (.05 mfd. tubular).....	30-4518						
69	Resistor (10,000 ohms).....	33-3925						
70	Electrolytic Cond. (8—8—6 mfd).....	30-2232						
71	Flood Lamp Bulb.....	34-2064						
72	Resistor (2.0 meg., 1/2 watt).....	33-520399						
73	Resistor (2.0 meg., 1/2 watt).....	33-520399						
74	Resistor (1.0 meg., 1/2 watt).....	33-510399						
75	Resistor (1.0 meg., 1/2 watt).....	33-510399						
76	Condenser (110 mmfd mica).....	30-1031						
77	Condenser (110 mmfd mica).....	30-1031						
78	Resistor (490,000 ohms, 1/2 watt).....	33-449344						
79	Condenser (.004 mfd tubular).....	30-4456						
80	Resistor (32,000 ohms, 1/2 watt).....	33-332344						
81	Condenser (.01 mfd tubular).....	30-4169						
82	Condenser (.1 mfd tubular).....	30-4455						
83	Resistor (51,000 ohms, 1/2 watt).....	33-351344						
84	Resistor (99,000 ohms, 1/2 watt).....	33-399344						
85	Volume Control.....	33-5158						
86	Audio Shorting Switch (Part of Auto. Tuner—See parts (6) and (16) Bulletin 273).....							
87	Potentiometer.....	33-5235						
88	Resistor (490,000 ohms, 1/2 watt).....	33-449344						
89	Resistor (70,000 ohms, 1/2 watt).....	33-370344						
90	Resistor (1.0 meg., 1/2 watt).....	33-510344						
91	Condenser (.008 mfd tubular).....	30-4112						
92	Condenser (.008 mfd tubular).....	30-4112						
93	Condenser (.02 mfd tubular).....	30-4481						
94	Resistor (330,000 ohms, 1/2 watt).....	33-433344						
95	Resistor (2 meg., 1/2 watt).....	33-520344						
96	A.F.C. Switch.....	42-1216						
97	A.F.C. Shorting Switch (Part of Auto. Tuner—Bulletin 273).....	45-2330						
98	Resistor (99,000 ohms, 1/2 watt).....	33-399344						
99	Condenser (.05 mfd tubular).....	30-4518						
100	Resistor (10,000 ohms, 1/2 watt).....	33-310344						
101	Resistor (10,000 ohms, 1/2 watt).....	33-310344						

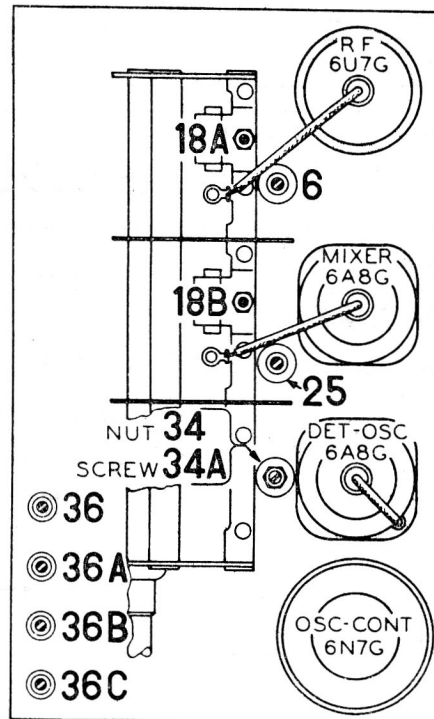


Fig. 6. Top View of R. F. Unit Showing Compensator Locations

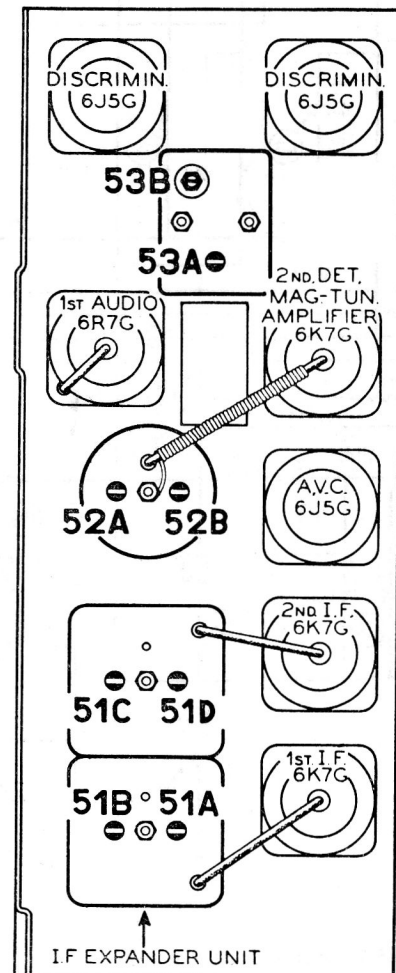


Fig. 7. Top View of I. F. Unit Showing Compensator Locations



## Alignment of Compensators

**EQUIPMENT REQUIRED:** (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. **Philco Model 088 Signal Generator** which has a fundamental frequency range from 110 to 20,000 K.C. is the correct instrument for this purpose; (2) Output Meter, **Philco Model 025A Circuit Tester** incorporates a sensitive output meter and is recommended; (3) **Philco Fibre Handle Screw Driver**, Part No. 27-7059 and **Fibre Wrench**, Part No. 3164.

**OUTPUT METER:** The 025A Output Meter is connected to the plate and cathode terminals of one of the 6L6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied to stage being adjusted.

**DIAL CALIBRATION:** In order to adjust the compensators of this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the set screws on the shaft coupling of the tuning condenser. Then turn the tuning condenser until the plates are in the maximum capacity position. Now turn the dial until the glowing beam indicator is on the Index Line at the low frequency end of range 3. (See Fig. 8). With the dial and tuning condenser in this position tighten set screws.
2. Turn the tuning condenser control until the indicator is on the 4.71 M.C. mark of range 3. (See Fig. 8.)
3. With the dial in this position, loosen the shaft coupling set screws. Then turn the dial until the indicator is again on the Index Line. Tighten the set screws in this position. Be careful when turning the dial that the position of the tuning condenser is not disturbed.

### INTERMEDIATE FREQUENCY CIRCUIT

1. Viewing each instrument from the front, set the receiver and Signal Generator controls as follows:

- a. Selectivity-fidelity control (clockwise)
- b. Volume Control at maximum (clockwise)
- c. Magnetic Tuning Switch (off)
- d. Bass Compensation Switch first position from "Off"
- e. Range Switch position one (broadcast)
- f. Receiver dial 580 K.C.
- g. Signal Generator indicator set at 470 K.C. and the "Attenuator" control for maximum output.

2. Connect the Signal Generator output cable through a .1 mfd. condenser to the grid of the second 6K7G I.F. tube. Then adjust the I.F. compensator as follows:

- a. Close compensator (52B) by turning to the extreme clockwise position, then pad compensator (52A) for maximum output. Now readjust compensator (52B) for maximum output.

b. Connect the Signal Generator output lead through the .1 mfd. condenser to the grid of the 6A8G Mixer tube, and adjust the following compensators for maximum output: (51D), (51C), (51B), (51A).

c. Repad (52A), See Note. A Check for two equal peaks. Treble-Selectivity control in expanded position (counter-clockwise).

### RADIO FREQUENCY CIRCUIT

1. Connect the Signal Generator output cable to the "Red" and "Blk" terminals on the aerial panel (rear of chassis). The ground connection of the cable should be connected to the "Blk" terminal. Set the controls as given under "Intermediate Frequency Circuit" (a-b-c-d) and set the Range Switch, Signal Generator and Receiver Dials as given in the following procedure.

2. Set the controls and adjust the compensators for maximum output as follows:

Range Switch Position	Signal Generator and Receiver Dials	Compensators in Order
1	1550 K.C.	(36), (18B), (18A)
1	580 K.C.	(34)
1	1550 K.C.	(36), (18B), (18A)
5	18 M.C.	(36C) See Note C
5	18 M.C.	(25), (6) Roll Tuning Condenser. See Note B
4	11 M.C.	(36B)
3	7 M.C.	(34A)
2	4.5 M.C.	(36A)
5	18 M.C.	(36C) See Note C
5	18 M.C.	(25), (6) Roll Tuning Condenser. See Note B

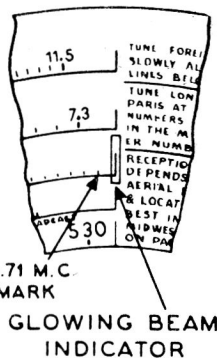


Fig. 8. Dial Calibration

**NOTE "A"**—Slowly shift signal generator indicator between 460 and 480 K.C. As the indicator is turned, two peaks will be noted on the Output Meter; one about 465 K.C. and the other about 475 K.C. These peaks should give the same deflection or reading on the output meter. If the peaks are unequal, Compensator (52A) must be slightly readjusted to the right or left (not more than  $\frac{1}{2}$  of a turn) until the peaks are equalized. Each time the compensator is set in another position, rotate the signal generator through the 460 or 480 K.C. range and note the reading of each peak. This adjustment is used to compensate for slight differences between peaks. If the compensator must be turned more than  $\frac{1}{2}$  of a turn in either direction to equalize the peaks, all padders should be carefully readjusted as given under "Intermediate Frequency Circuit" adjustment procedure.

**NOTE "B"**—When adjusting the low frequency compensator of Range 1 (Broadcast) or the antenna and R. F. compensators of the high frequency tuning range, the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output about the frequency dial mark being used. Now turn the compensator slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn the compensator 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.

**NOTE "C"**—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from the maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K.C. below the frequency being used on the high frequency range.

### MAGNETIC TUNING CIRCUIT ADJUSTMENT

- a. Set the Magnetic Tuning switch in the "out" position (counter-clockwise).
- b. Volume control maximum (extreme clockwise).
- c. Turn Treble-Selectivity control to the Selective position (extreme clockwise).
- d. Now turn the signal generator indicator to the 1000 K.C. mark and adjust the "Attenuator" control for a weak signal. Then adjust the receiver dial for maximum output at this frequency.

**NOTE:** The receiver dial **MUST** be tuned very accurately to the 1000 K.C. signal in order to make the following adjustments correctly.

- e. After adjusting the receiver dial, turn the Magnetic Tuning Switch "on".
- f. Now, turn compensator (53B) slightly to the right or left (about  $\frac{1}{4}$  turn) and proceed with adjustment "g."
- g. Adjust compensator (53A) primary of the discriminator transformer for **minimum** output; then readjust compensator (53B) secondary of discriminator transformer for **maximum** output.

The above adjustments are now checked for accuracy as follows:

#### Frequency Test:

With the 1000 K.C. signal tuned for maximum output turn the Magnetic Tuning control back and forth; that is, from the "out" to "in" position. The reading of the output meter should not change in either position. If the output meter reading changes, the above magnetic tuning circuit adjustments should be repeated.

A further check on the magnetic tuning adjustment is to very carefully tune in a broadcasting station and then turn the magnetic tuning switch from the "out" to the "in" position. With the switch in either position, the tone of the station should not change. If a change of tone or hiss develops repeat the above Magnetic Tuning Adjustments.

#### Sensitivity Test:

1. To check the magnetic tuning circuit for sensitivity, turn the magnetic tuning switch to the "off" position, and tune in the 1000 K.C. signal. Then adjust the "attenuator" control of the signal generator for a good audible signal,—approximately 20 volts on the output meter.

2. Now detune the signal (first above and then below the 1000 K.C. mark) to a point at which the signal is weakly heard. At each point turn the magnetic tuning control "ON". When the control is turned "ON" the signal should return to normal output strength. If the magnetic tuning circuit does not pull the signal into resonance, the primary compensator (53A) should be carefully readjusted.

PHILCO PRODUCTS LIMITED

TORONTO