PHILCO . . . . . Model 38-116, Code 125

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

A PHILCO Service Plan

SPECIFICATIONS

TYPE OF CIRCUIT: Model 38-116, 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.

PHILCO 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.

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

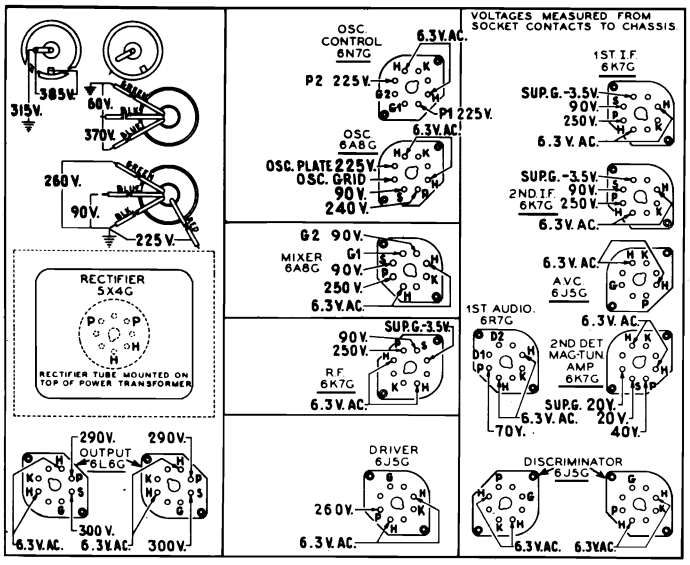


Fig. 1. Underside View of Chassis showing Socket Voltages

The voltages indicated by the arrows were measured with a **Philco 026 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.

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".

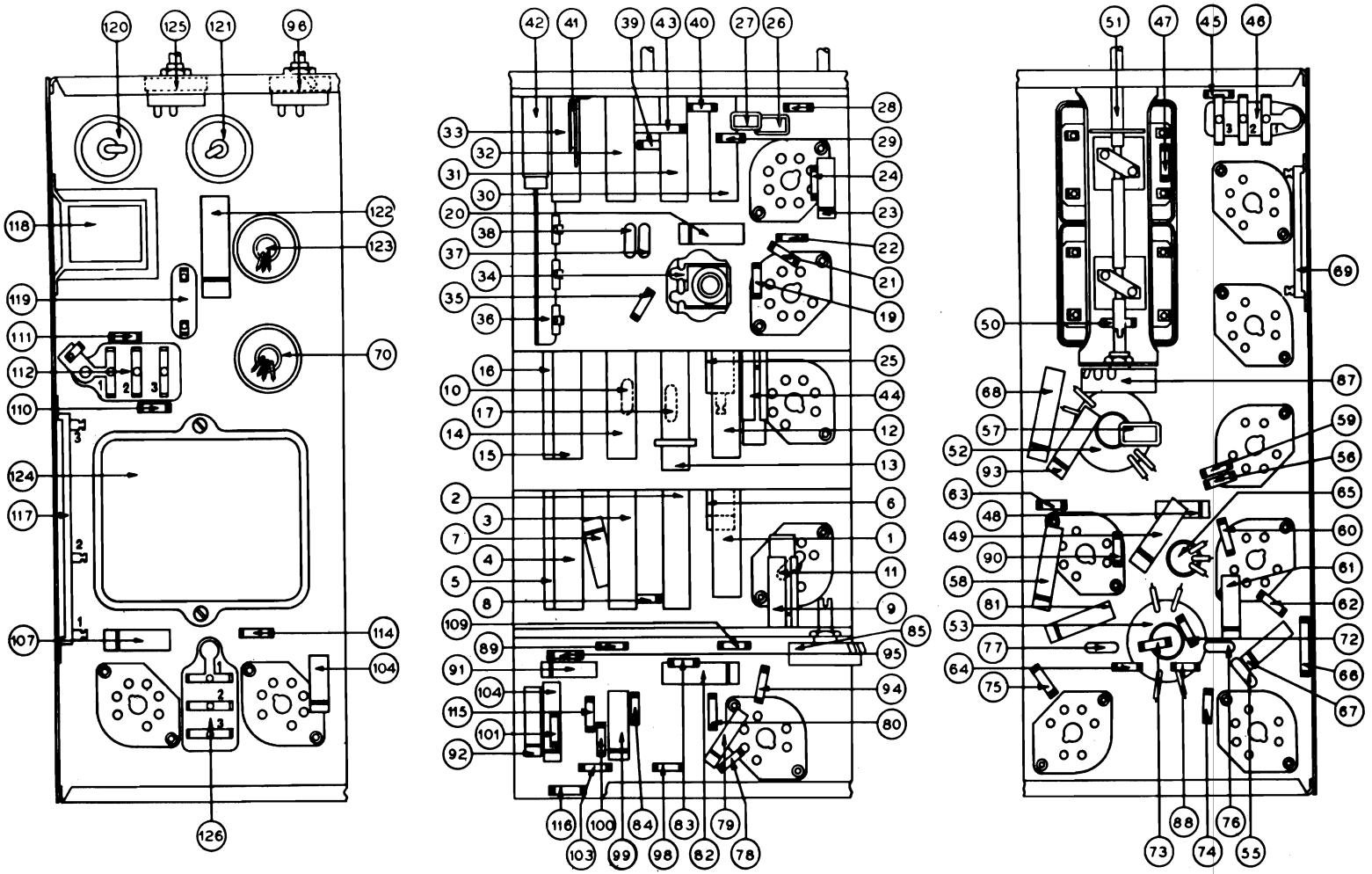
Automatic Tuning Mechanism Service Data

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

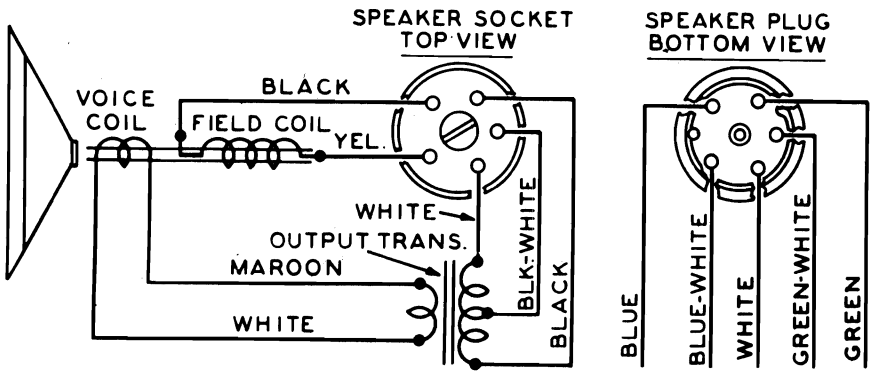


Fig. 3. Speaker Wiring

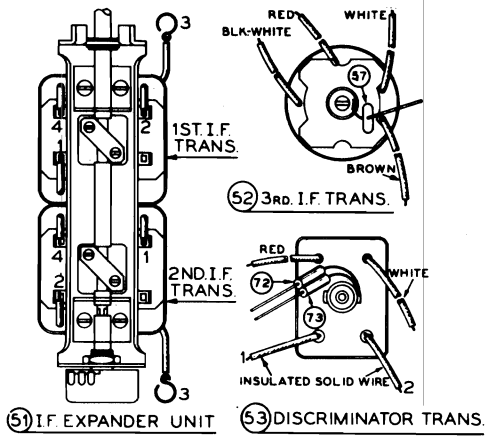
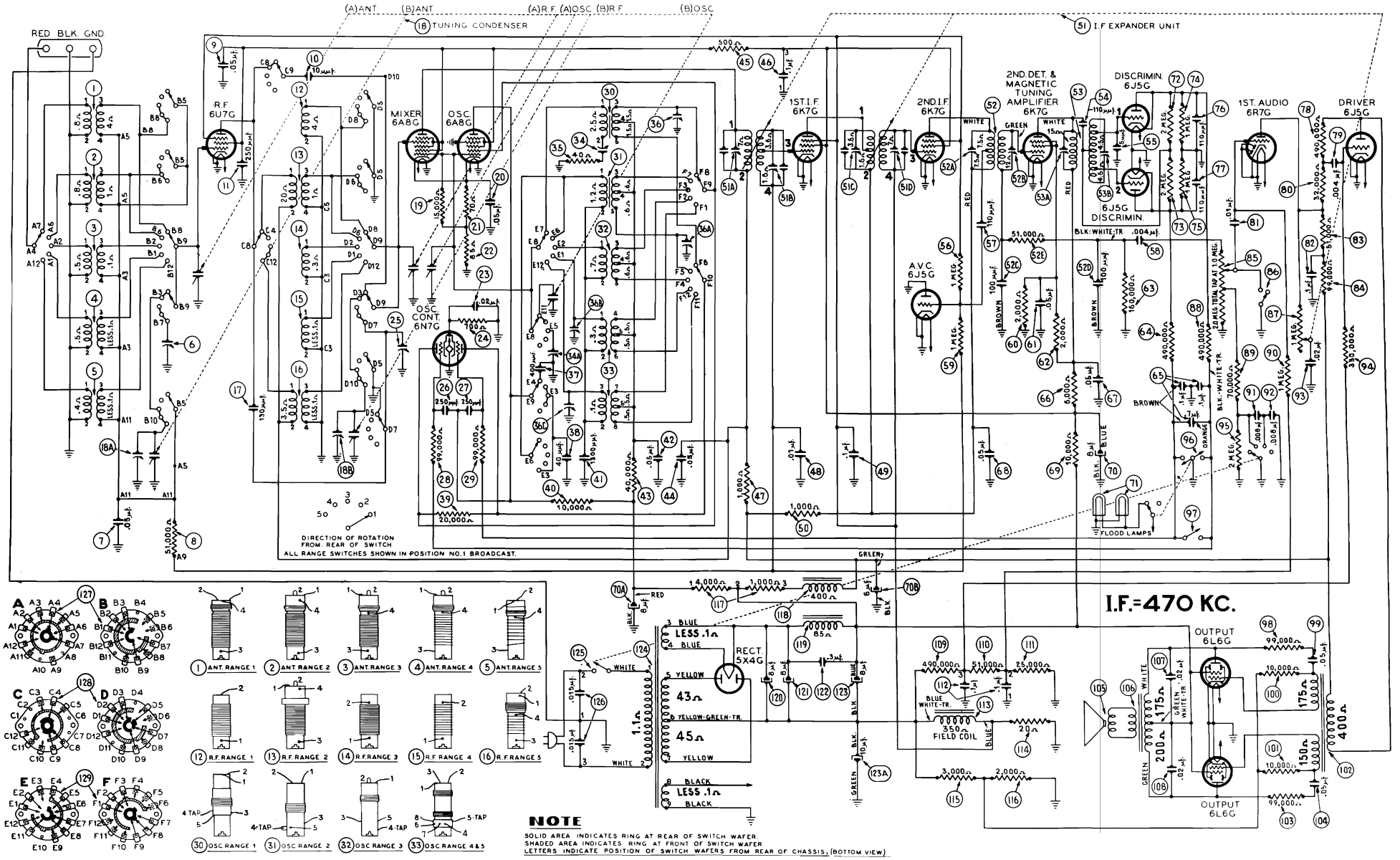


Fig. 4. I. F. Transformer Connections



NOTE

SOLID AREA INDICATES RING AT REAR OF SWITCH WAFER.
SHADED AREA INDICATES RING AT FRONT OF SWITCH WAFER.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS, (BOTTOM VIEW)

Fig. 5. Schematic Diagram Model 38-116, Code 125

REPLACEMENT PARTS—Model 38-116, Code 125

Schem. No.	Description	Part No.	List Price
1	Ant. Transformer (Range 1)	32-2615	$0.70
2	Ant. Transformer (Range 2)	32-2616	.70
3	Ant. Transformer (Range 3)	32-2617	.70
4	Ant. Transformer (Range 4)	32-2618	.70
5	Ant. Transformer (Range 5)	32-2619	.70
6	Compensator (R. F.)	31-6084	.15
7	Condenser (.05 μf tubular)	30-4519	.20
8	Resistor (51,000 Ω, ½ watt)	33-351339	.20
9	Condenser (.05 μf tubular)	30-4123	.20
10	Condenser (10 μμf mica)	30-1065	.20
11	Condenser (250 μμf mica)	30-1032	.25
12	R. F. Transformer (Range 1)	32-2620	.70
13	R. F. Transformer (Range 2)	32-2621	1.00
14	R. F. Transformer (Range 3)	32-2622	.50
15	R. F. Transformer (Range 4)	32-2623	.50
16	R. F. Transformer (Range 5)	32-2624	.70
17	Condenser (130 μμf mica)	30-1036	.20
18	Tuning Condenser Assembly	31-2036	
19	Resistor (15,000 Ω, ½ watt)	33-315339	.20
20	Condenser (.05 μf tubular)	30-4444	.20
21	Resistor (70 Ω, ½ watt)	33-070339	.20
22	Resistor (85 Ω, ½ watt)	33-085339	.20
23	Condenser (.02 μf tubular)	30-4215	.20
24	Resistor (700 Ω, ½ watt)	33-070339	.20
25	Compensator	31-6084	.15
26	Condenser (250 μμf mica)	30-1032	.25
27	Condenser (250 μμf mica)	30-1032	.25
28	Resistor (99,000 Ω, ½ watt)	33-399339	.20
29	Resistor (99,000 Ω, ½ watt)	33-399339	.20
30	Osc. Transformer (Range 1)	32-2625	1.60
31	Osc. Transformer (Range 2)	32-2626	1.60
32	Osc. Transformer (Range 3)	32-2627	1.60
33	Osc. Transformer (Ranges 4 & 5)	32-2628	1.60
34	Compensator (2 sections)	31-6100	.40
35	Resistor (40 Ω, ½ watt)	33-040339	.20
36	Compensator (4 sections)	31-0200	.80
37	Condenser (400 μμf mica)	30-1089	
38	Condenser (40 μμf mica)	30-1095	
39	Resistor (20,000 Ω, ½ watt)	33-320339	.20
40	Resistor (10,000 Ω, ½ watt)	33-310339	.20
41	Condenser (1300 μμf mica)	31-6205	.40
42	Condenser (.05 μf tubular)	30-4123	.20
43	Resistor (40,000 Ω, 1 watt)	33-340439	.20
44	Condenser (.05 μf tubular)	30-4123	.20
45	Resistor (500 Ω, ½ watt)	33-150339	.20
46	Condenser (.1 μf Bakelite)	4989SG	.35
47	Resistor (1,000 Ω, ½ watt)	33-210339	.20
48	Condenser (.01 μf tubular)	30-4515	.20
49	Condenser (.1 μf tubular)	30-4499	.20
50	Resistor (1,000 Ω, ½ watt)	33-210339	.20
‡51	I. F. Expander Unit Assembly (See Note for 1st and 2nd I. F. Transformers)	38-8912	10.00
52	3rd I. F. Transformer	32-2660	2.20
53	Discrimin. Transformer	32-2661	4.00
54	Condenser (110 μμf mica) (Part of 53)	30-1031	.20
55	Condenser (.5 μμf mica)	30-1097	.20
56	Resistor (1.0 meg., ½ watt)	33-510339	.20
57	Condenser (110 μμf mica)	30-1031	.20
58	Condenser (.004 μf tubular)	30-4456	.20
59	Resistor (1.0 meg., ½ watt)	33-510339	.20
60	Resistor (2,000 Ω, ½ watt)	33-220339	.20
61	Condenser (.05 μf tubular)	30-4444	.20
62	Resistor (2,000 Ω, ½ watt)	33-220339	.20
63	Resistor (160,000 Ω, ½ watt)	33-416339	.20
64	Resistor (490,000 Ω, ½ watt)	33-449339	.20
65	Condenser (.1—.1—.2 μf)	30-4537	
66	Resistor (6,000 Ω, 1 watt)	33-260439	.20
67	Condenser (.05 μf tubular)	30-4444	.20
68	Condenser (.05 μf tubular)	30-4518	.20
69	Resistor (10,000 Ω, ½ watt)	33-310339	.20
70	Electrolytic Condenser (8—8—6 μf)	30-2232	2.50
71	Flood Lamp Bulb	34-2064	.09
72	Resistor (2.0 meg., ½ watt)	33-520399	.20
73	Resistor (2.0 meg., ½ watt)	33-520339	.20
74	Resistor (1.0 meg., ½ watt)	33-510339	.20
75	Resistor (1.0 meg., ½ watt)	33-510339	.20
76	Condenser (110 μμf mica)	30-1031	.20
77	Condenser (110 μμf mica)	30-1031	.20
78	Resistor (490,000 Ω, ½ watt)	33-449339	.20
79	Condenser (.004 μf tubular)	30-4456	.20
80	Resistor (32,000 Ω, ½ watt)	33-332339	.20
81	Condenser (.01 μf tubular)	30-4169	.20
82	Condenser (.1 μf tubular)	30-4455	.25
83	Resistor (51,000 Ω, ½ watt)	33-351339	.20
84	Resistor (99,000 Ω, ½ watt)	33-399339	.20
85	Volume Control	33-5158	1.00
86	Audio Shorting Switch (Part of Auto. Tuner—See parts (6) and (16) Bulletin 273)		
87	Potentiometer	33-5235	1.00
88	Resistor (490,000 Ω, ½ watt)	33-449339	.20
89	Resistor (70,000 Ω, ½ watt)	33-370339	.20
90	Resistor (1.0 meg., ½ watt)	33-510339	.20
91	Condenser (.008 μf tubular)	30-4112	.20
92	Condenser (.008 μf tubular)	30-4112	.20
93	Condenser (.02 μf tubular)	30-4481	.20
94	Resistor (330,000 Ω, ½ watt)	33-433339	.20
95	Resistor (490,000 Ω, ½ watt)	33-449339	.20
96	A. F. C. Switch	42-1216	.75
97	A. F. C. Shorting Switch (Part of Auto. Tuner—Bulletin 273)	45-2330	1.20
98	Resistor (99,000 Ω, ½ watt)	33-399339	.20
99	Condenser (.05 μf tubular)	30-4518	.20
100	Resistor (10,000 Ω, ½ watt)	33-310339	.20
101	Resistor (10,000 Ω, ½ watt)	33-310339	.20
102	Input Transformer	32-7865	$2.50
103	Resistor (99,000 Ω, ½ watt)	33-399339	.20
104	Condenser (.05 μf tubular)	30-4518	.20
105	Cone & Voice Coil Assembly	36-3047	2.50
106	Output Transformer	32-7751	2.00
107	Condenser (.02 μf tubular)	30-4481	.20
108	Condenser (.02 μf tubular)	30-4481	.20
109	Resistor (490,000 Ω, ½ watt)	33-449339	.20
110	Resistor (51,000 Ω, ½ watt)	33-351339	.20
111	Resistor (25,000 Ω, ½ watt)	33-325339	.20
112	Condenser (.1 μf—.1 μf Bakelite)	4989DG	.40
113	Field & Pot Assembly	36-3788	15.00
114	Resistor (20 Ω, ½ watt)	33-020339	.20
115	Resistor (3,000 Ω, ½ watt)	33-230339	.20
116	Resistor (2,000 Ω, ½ watt)	33-220339	.20
117	Resistor, wire-wound (4,000Ω—1,000Ω)	33-3289	.50
118	Choke	32-7722	1.20
119	Choke	32-7056	2.20
120	Electrolytic Condenser	30-2026	1.05
121	Electrolytic Condenser	30-2026	1.05
122	Condenser (.3 μf tubular)	30-4465	.25
123	Electrolytic Condenser (8—10 μf)	30-2201	1.75
124	Power Transformer		
	115 V.—50-60 cycles	32-7699	7.50
	115 V.—25-40 cycles	32-7700	12.00
	115-230 V.—50-60 cycles	32-7701	10.00
125	Power & Bass Tone Switch	42-1196	.75
126	Condenser (.015—.015 μf Bakelite)	3793DG	.40
127	Wave Switch (Ant. Section)	42-1354	1.50
128	Wave Switch (R. F. Section)	42-1355	1.50
129	Wave Switch (Osc. Section)	42-1356	1.50
	Acoustic Clarifier	36-1155	1.25
	Automatic Tuning Mech. Complete	31-2063	
	Bezel Assembly (Cabinet)	38-8833	
	Brace (Dial Mechanism)	28-4119	.05
	Cable and Plug (Floodlights)	41-3253	.25
	Cable (Power)	L-2183	.40
	Cable and Plug (Speaker)	41-3338	
	Clamp (R. F. Unit Rear Mtg.)	28-3900	.03
	Clamp Locking Plate (R. F. Unit)	28-3982	.01
	Clamp (I. F. Cord)	28-4147	.01
	Cord (I. F. Expander Drive)	27-4311	.04
	Coupling (Range Switch and Mask)	38-8693	
	Coupling (Tuning Condenser and Dial Mechanism)	31-1061	
*	Cover (Handle of Automatic Mech.)	28-5092	
*	Dial	27-5340	.80
*	Dial Screen and Lens Holder Ass'y	31-2053	
*	Escutcheon Assembly (Station Tabs)	45-2472	
	Knob (Range Switch)	27-4326	.10
	Knob (Tuning)	27-4330	.10
	Knob (Vernier)	27-4331	.10
	Knob (Bass, Volume, Expander Magnetic)	27-4332	.10
	Mask Guide (Tuning Mechanism)	28-4118	.25
	Pilot Lamp Socket Assembly (3 Sockets)	38-8487	
	Shaft and Index Plate (Range Switch)	42-1208	.50
	Shaft (I. F. Expander)	28-6496	$0.30
	Shaft (Volume Control)	38-8061	.12
	Shield (Tube, Square)	28-2726	.10
	Shield (Round 6N7G)	8005	.10
	Shield 3rd (I. F.)	38-1962	
	Shield (I. F. Expander)	38-9025	
	Shield Base (Square)	28-2725	.20
	Shield Base (Round 6N7G)	8004	.03
	Speaker (WS)	36-1363	
	Socket (7 prong, Power tubes)	27-6057	.11
	Socket (7 prong)	27-6087	.11
	Socket (6 prong)	27-6086	.11
	Socket (Power Transformer)	27-6052	.11
	Terminal Panel (Ant.)	38-8746	
	MISCELLANEOUS MOUNTING PARTS		
	Bolt (Mtg. Speaker)	W-862	
	Bushing (Mtg. R. F. Unit)	28-2257	.01
	Clip (Volume Shaft Front Section)	28-4394	.01
	Cover (Back of Cabinet)	27-8866	
	Felt (Mtg. Speaker)	27-8498	.15
	Rubber (Grommet (Mtg. R. F. Unit)	27-4317	.04
	Rubber Bushing (Mtg. Chassis)	27-4202	.08
	Rubber Bushing (Mtg. Chassis)	27-4360	
	Rubber Cushion (Mtg. Chassis)	3558	
	Pin (I. F. Shaft)	3014	
	Screw (Mtg. R. F. Unit Rear Section)	W-729	
	Screw (I. F. Cord Clamp)	W-1324	
	Snap Fastener (Range Switch Coupling)	28-4279	
	Spacer (Mtg. R. F. Unit)	27-7807	
	Spring (Retaining I. F. Shaft Front Section)	28-8610	
	Spring Clip (I. F. Shaft, Rear Section)	28-4117	per C .40
	Washer—Flat (I. F. Shaft)	W-174	
	Washer (Mtg. R. F. Unit)	28-3927	.01
	Washer—Spring—(Mtg. I. F. Shaft)	28-4186	per C .75

*These Automatic Tuning Mechanism Parts differ from those shown in Service Bulletin 273.

‡1st I. F. Transformer Section 32-2727
2nd I. F. Transformer Section 32-2728

Prices Subject to Change without Notice

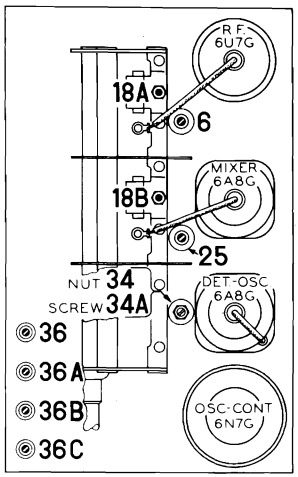


Fig. 6. Top View of R. F. Unit Showing Compensator Locations

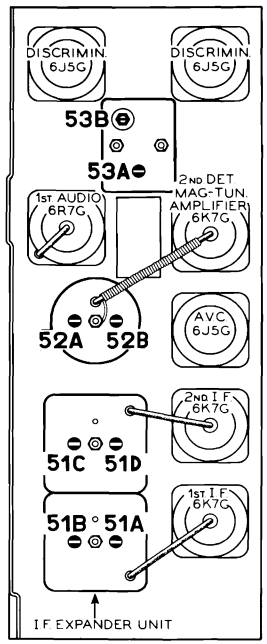


Fig. 7. Top View of I. F. Unit Showing Compensator Locations

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. **Philco Model 077 Signal Generator** which has a fundamental frequency range from 115 to 36000 K. C. is the correct instrument for this purpose; (2) Output Meter, **Philco Model 026 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 026 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. compensators as follows:

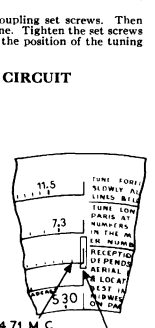


Fig. 8. Dial Calibration

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**

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 ¼ 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 ¼ 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 out 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 ¼ 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.

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