

PHILCO Service Manual . . . Model 643

SERVICE BULLETIN
No. 226



For Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

Model 643

General Specifications

TYPE CIRCUIT: Superheterodyne, with Class "B" output; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

POWER SUPPLY: Battery operated Model 643 uses a 2-volt storage battery (Philco 172-R). Model 643-A uses dry A battery (Philco 41-8006). Both sets use a dry combination "B" and "C" battery unit (41-8061). This has a socket into which the plug on the battery cable attached to chassis is to be inserted.

TUBES USED: 1 type 34, pre-selector; 1 type 1C6, Detector-Oscillator; 1 type 34, I. F.; 1 type 30, 2nd Detector and A. V. C.; 1 type 32, 1st A. F.; 1 type 30, driver; 1 type 19 output. Model 643-A has also a ballast tube, type 1C1, to maintain constant filament voltage on all tubes. The socket for this tube exists in both 643 and 643-A chassis, but in the former, the type 1C1 tube is not used, and the filament contacts of the socket are shorted by a metal jumper.

WAVE BANDS: Four—(1) Longwave (U. S. weather forecasts); (2) Standard; (3) Police; (4) Shortwave.

COVERAGE OF EACH BAND: Band 1, 150-390 K.C.; Band 2, 540-1750 K.C.; Band 3, 1.75 to 5.8 megacycles; Band 4, 5.8 to 18.0 megacycles.

TUNING DRIVE: Dual planetary, ball bearing, 80 to 1 ratio for slow speed tuning.

TONE CONTROL: 3-Position.

INTERMEDIATE FREQUENCY: 460 K.C.

CURRENT CONSUMPTION: "A" battery, .750 M.A.; "B" battery, 22 M.A.

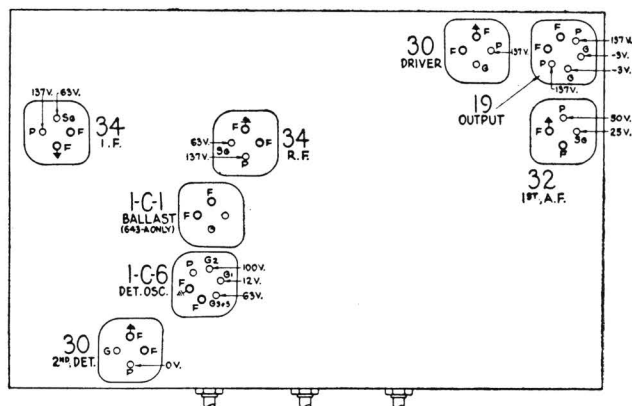


Fig. 1. Tube Sockets as viewed from bottom

Adjusting Compensating Condensers

Adjustment of compensating condensers in Model 643 requires an accurate signal generator covering long-wave, standard wave, police and short-wave frequencies. The **PHILCO Model 088 All-Wave Signal Generator**, having a continuous range of from 100 to 20000 K.C., is ideal for this purpose.

An output meter is also needed. **PHILCO Model 025 Circuit Tester** includes a high grade output meter.

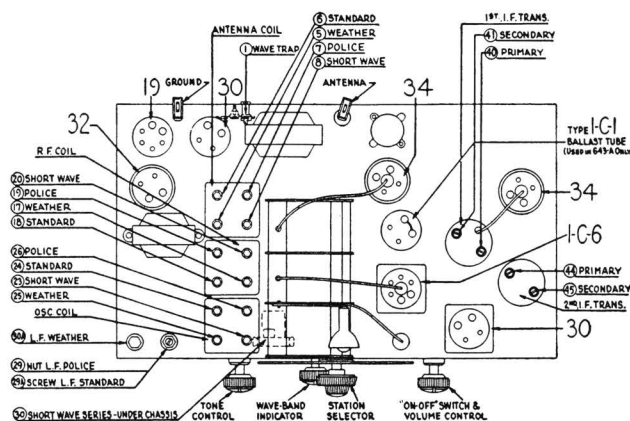


Fig. 2. Locations of Compensating Condensers

Philco No. 3164 fibre wrench and No. 27-7059 fibre-handled screwdriver complete the equipment needed for making these adjustments. The locations of the various compensating condensers are shown in Fig. 2. Connect the output meter to the plate and cathode contacts of the type 30 driver tube (using the adapters provided with the "025") and set it at the 0-30 volt range.

I.F.—Set the signal generator at 460 K.C. with attenuator set at minimum, and attach its antenna lead to the grid cap of the 34 I.F. amplifier tube (removing grid lead). Connect ground lead to ground terminal on set or some part of chassis. Set the dial at 55 and turn the waveband switch to position 2 (standard). Adjust the volume control of set to almost maximum (just before oscillator hiss becomes noticeable), and the 088 attenuator so that about one-fourth ($\frac{1}{4}$) scale reading is had on the output meter. With a fibre screwdriver adjust condensers (44) and (45) (2nd I.F.) for maximum reading on output meter. Turn attenuator of signal generator to minimum and remove its antenna lead from the grid of the 34 I.F. tube, placing it on the grid of the 1C6. Adjust 088 attenuator as before then proceed to adjust condensers (40) and (41) (1st I.F.) for maximum reading. Then remove the 088 oscillator lead and replace grid connection. Care should be taken to keep the output meter reading during adjustments at about one-fourth scale reading. This should be done by using the 088 attenuator control.

WAVE TRAP—Connect the Signal Generator antenna and ground leads to the antenna and ground posts of the set. With the signal generator operating at 460 K.C. and the set controls adjusted as before for I.F. alignment, adjust wavetrapp (1) until a minimum reading is obtained in the output meter.

SHORT WAVE—In adjusting the short wave or high frequency band, the R.F. compensator will have a tendency to "pull" or **change** the frequency of the oscillator. By shunting a padding or variable condenser across the oscillator section of the gang and tuning it so that the second harmonic,

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Replacement Parts for Model 643

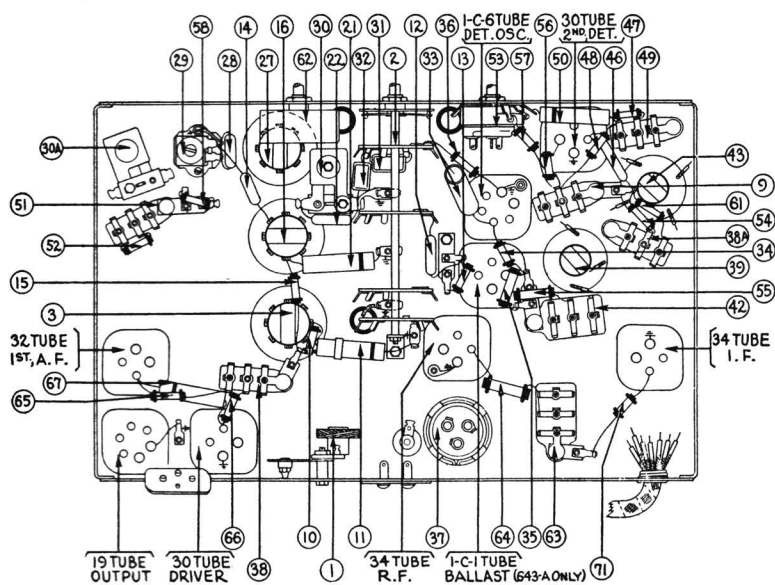


Fig. 4. Bottom View of Chassis

Description	Part No	List Price
1 Wave Trap Assembly	38-6850	\$1.10
2 Wave Band Switch	42-1128	2.50
3 Antenna Transformer	32-1806	3.25
4 Condenser Gang Assembly	31-1634	5.50
5 Padder	Part of 32-1806 ③	
6 Padder		
7 Padder		
8 Padder		
9 Condenser (.05 mfd.)	3615-SG	.35
10 Resistor (100,000 ohms)	6099	.20
11 Condenser (.05 mfd. tubular)	30-4020	.35
12 Condenser (Mica 1800 mmf.)	6018	.40
13 Resistor (500 ohms)	33-1207	.20
14 Condenser (Mica 110 mmf.)	30-1031	.35
15 Resistor (100,000 ohms)	6099	.20
16 R.F. Transformer	32-1807	3.00
17 Padder	Part of 32-1807 ⑩	
18 Padder		
19 Padder		
20 Padder		
21 Condenser (Tubular .05 mfd.)	30-4020	.35
22 Condenser (Mica 3250 mmf.)	30-1061	.45
23 Padder	Part of 32-1808 ⑲	
24 Padder		
25 Padder		
26 Padder		
27 Oscillator Transformer	32-1808	2.50
28 Condenser (Mica 600 mmf.)	30-1049	.35
29 Padding Condenser	31-6027	.70
30 Padding Condenser	01000-R	.45
30A Padding Condenser	04000-F	.25
31 Condenser (Mica 15 mmf.)	30-1030	.35
42 Condenser (Mica 15 mmf.)	30-1030	.35
33 Condenser (Tubular .01 mfd.)	30-1145	.25
34 Resistor (8000 ohms)	5838	.20
35 Resistor (2000 ohms)	6984	.20
36 Resistor (51,000 ohms)	6098	.20
37 Electrolytic Condenser	30-2127	1.50
38 Condenser (0.05 mf.)	3615-SG	.35
38A Condenser (.05 mfd.)	3615-SG	.35
39 1st I.F. Transformer	32-1809	1.50
40 Padder	Part of 39	
41 Padder		
42 Condenser (Twin 0.05 mf.)	3615-DU	.40
43 2nd I.F. Transformer	32-1810	2.00
44 Padder	Part of 43	
45 Padder		
46 Condenser (Mica 6000 mmf.)	6359	.60
47 Resistor (50,000 ohms)	6098	.20
48 Resistor (.5 meg.)	4410	.20
49 Condenser (Twin 110 mmf.)	30-1031	.35
50 Condenser (.05 mf.)	3615-SU	.35
51 Condenser (.01 mf.)	3903-SU	.25
52 Resistor (1 meg.)	33-1096	.20
53 Volume Control and Switch	33-5119	1.10
54 Resistor (2 meg.)	33-1025	.20
55 Resistor (1000 ohms)	33-1028	.20
56 Resistor (1000 ohms)	33-1028	.20
57 Resistor (1000 ohms)	33-1028	.20
58 Resistor (50,000 ohms)	6098	.20
59 Pilot Lamp	5316	.35
60 Condenser (.01 mf.)	3903-SG	.25
61 Resistor (2 meg.)	33-1025	.20
62 Tone Control	30-4352	.75
63 Condenser (0.3 mf.)	6287-DG	.40
64 Resistor (330,000 ohms)	6046	.20
65 Resistor (250,000 ohms)	4410	.20
66 Resistor (500,000 ohms)	6097	.20
67 Condenser (0.01 mf.)	3903-SU	.25
68 Input Transformer	32-7473	1.75
69 Output Transformer	32-7472	1.50
70 Voice Coil and Cone Assembly (K-7)	36-3159	.80
71 Resistor (1000 ohms)	5837	.20
Battery Cable Assembly	41-3144	1.50
Tube Shield Base (2)	28-2725	.03
Tube Shield Base (3)	8004	.01
Tube Shield Body (2)	28-2726	.10
Tube Shield Body (3)	8005	.10
4-prong Tube Socket (5)	27-6044	.10
5-prong Tube Socket (1)	27-6042	.10
6-prong Tube Socket (2)	27-6036	.11
Speaker Socket (1)	27-6043	.08
Dial Scale	27-5124	.25
Knobs (1)	27-4206	.12
Knobs (1)	27-4207	.10
Knobs (2)	27-4208	.10
Knobs (1)	27-4219	.10
Bezel	28-2933	.55
Bezel Glass	27-8009	.55
Bezel Frame Gasket	27-7972	
Chassis Mounting Screw	W-1496-H	1.60 per C.
Chassis Mounting Washer	27-4021	1.40 per C.
Chassis Mounting Cushion	27-4202	.03
"A" Battery	172R	
"B" and "C" Battery	P9068	

Adjusting Compensating Condensers

(Continued from first Page)

instead of the fundamental, beats with the incoming signal, this "pull" can be minimized. The procedure for tuning this band is as follows:

Set the dial of the receiver at 18 megacycles (top scale) and the 088 dial at the same frequency. Connect the shunt condenser to the oscillator section of the gang and tune it so that the second harmonic of the oscillator beats with the 18 M.C. signal from the 088. Next tune padders ⑳ and ㉑ (antenna and R.F.) for maximum reading of the output meter. Disconnect shunt condenser and tune padder ㉒ (osc.) for correct dial calibration. The oscillator frequency, when correctly set, will be higher than that of the incoming signal and the image frequency lower. In order to check this it should be possible to tune the image at approximately 17.1 M.C. by increasing the input from the 088 oscillator.

For the low frequency adjustment of this band, turn the dial to 6.0 M.C., set the signal generator at 6.0 M.C. and adjust condenser ㉓ for maximum reading. This compensator is underneath the chassis and reached from underneath.

POLICE BAND—Turn waveband switch to position 3

from left (police band); set dial at 5.5 and signal generator at 5500 K.C. Adjust condenser ㉔, ㉕ and ㉖ for maximum reading (osc., R.F. and Ant.). Turn dial to 1.8 and signal generator to 1800. Then adjust condenser ㉗ (nut) for maximum output reading.

STANDARD WAVE—Turn waveband switch to position 2 (standard broadcast), set signal generator at 1500 and dial of set at 150. Now adjust the oscillator, R.F., and antenna "Standard" condensers. These are ㉘, ㉙ and ㉚, respectively.

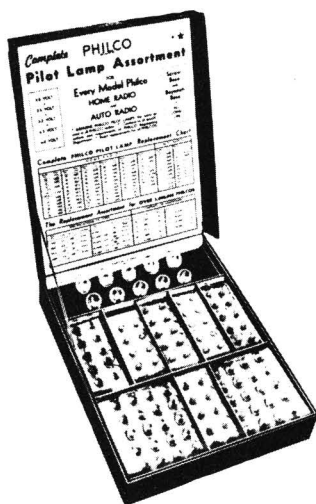
Now turn the dial to 60, set signal generator at 600 and adjust condenser ㉛A (oscillator standard-series) (screw) for maximum reading.

LONG WAVE (Weather) BAND—Turn waveband switch to position 1 (left) (Longwave). Set dial at 35 and signal generator at 350 K.C. Adjust condensers ㉜, ㉝ and ㉞ (oscillator, R.F., and Antenna Longwave) for maximum reading.

Turn dial to 17, signal generator to 170 and adjust condenser ㉞A (longwave series) for maximum reading.

In making these adjustments be sure that the signal level from the 088 is kept as low as possible. If the dial calibration is off, go over the low and high frequency padders in the oscillator circuit of each band until this is corrected.

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