

PHILCO

REG. U.S. PAT. OFF

Service Bulletin—No. 203

Model 28

Philco Model 28 is a six-tube receiver operating on 115 volts, either alternating current (A.C.) or direct current (D.C.). It is capable of receiving either standard and police broadcasts between 540 and 1720 kilocycles, or short-wave stations between 4.2 and 13 megacycles. The left-hand side of the dial is calibrated in kilocycles for standard reception and the right in megacycles for short-wave stations. A two-position switch changes reception from standard to short waves.

Model 28 uses a type 6-A-7 detector-oscillator, two type 39-44 I. F. Tubes, type 75 2d detector, type 43 output tube, and type 25-Z-5 rectifier. The power consumption is 50 watts. The intermediate frequency is 460 K.C.

TYPE TUBE	TUBE SOCKET VOLTAGES						On Line Voltage 120 D.C.					
	6-A-7	39-44	39-44	75	43	25-Z-5	6-A-7	39-44	39-44	75	43	25-Z-5
Plate (P to K)	100	100	98	45	95	120	95	95	85	40	90	..
Screen Grid (SG to K)	G1=-8 G2=80 G3&5=60	100	100	..	100	..	G1=-10 G2=80 G3&5=60	95	95	..	95	..

Total Filament Voltage—75

Total Filament Voltage—83

High resistance D.C. voltmeter used for above tests. Volume control at maximum; dial at 55; wave band switch at left. Refer to Fig. 2 (Socket View).

Philco Model 025 Circuit Tester is recommended for making the above voltage tests.

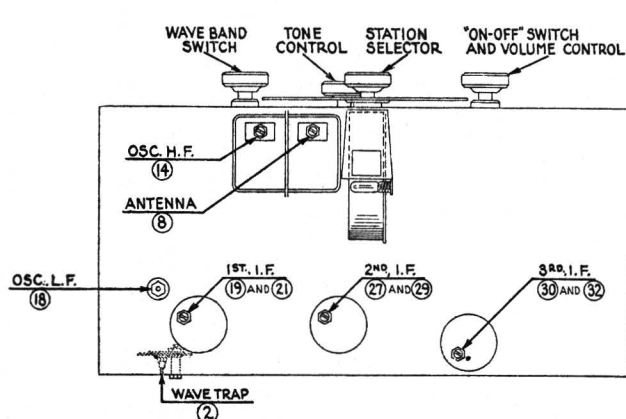


Fig. 1—Top View Showing Location of Compensating Condensers.

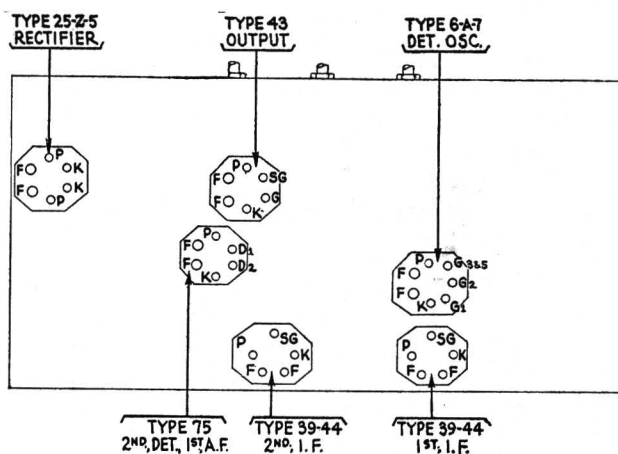


Fig. 2—Bottom View of Sockets for Testing Voltages.

Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in Model 28, an accurately calibrated signal generator, an output meter, and a special insulated padding wrench and screwdriver are needed. We suggest the Philco Model 024 Signal Generator, which is accurately calibrated and easy to handle. Philco No. 3164 fibre wrench and No. 27-1159 fibre-handled screwdriver are also recommended. For the output meter either Philco Model 025 complete tester or Philco Model 012 shadow output meter is suggested.

The chassis must be removed from cabinet in order to make all adjustments.

Adjustments are made in the following order—

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6-A-7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter adapter leads to the plate and cathode prongs of the type 43 tube. Set the signal generator at 460 K.C. (the intermediate frequency of Model 28) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600 K.C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compen-

sators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

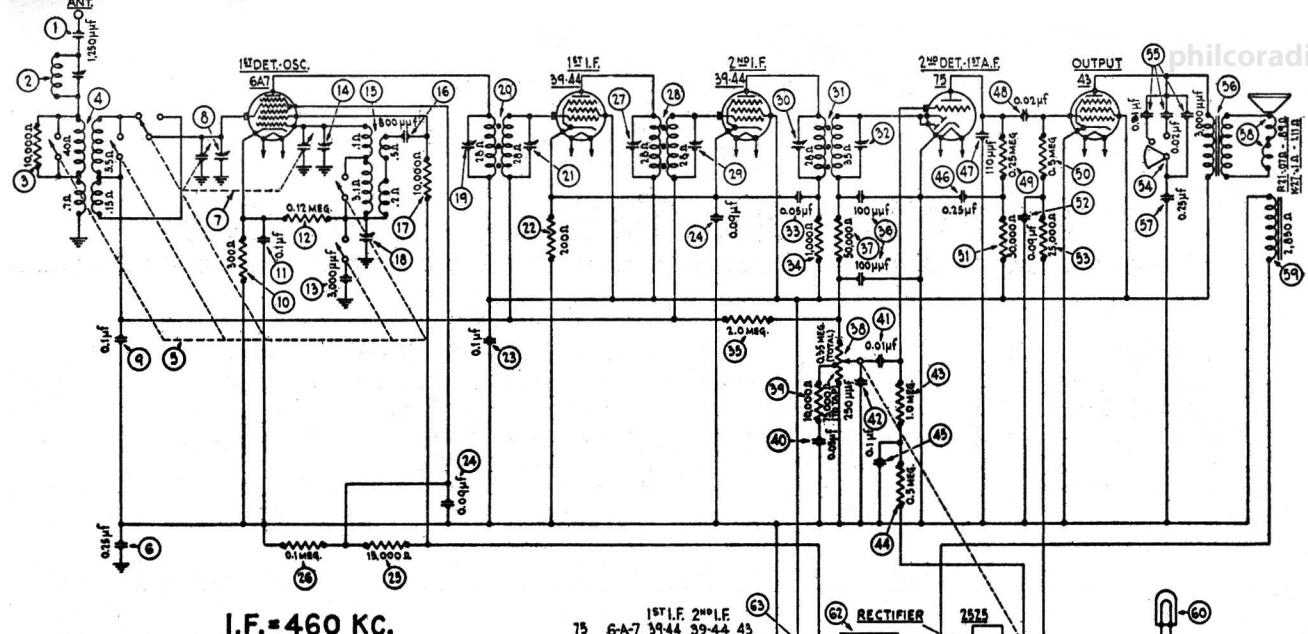
ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6-A-7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (left-hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap (2) is located at rear and underneath the chassis, and is shown in Figure 1. It is reached from the rear of the chassis by inserting the fibre wrench through the hole near left-hand rear corner of chassis.

ANTENNA AND OSCILLATOR "HIGH" AND "LOW" FREQUENCY ADJUSTMENTS—The "antenna" and "oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set and adjust the antenna compensator (8) (nearest tuning control) to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser (14) (located on the other section of tuning condenser) to maximum reading.

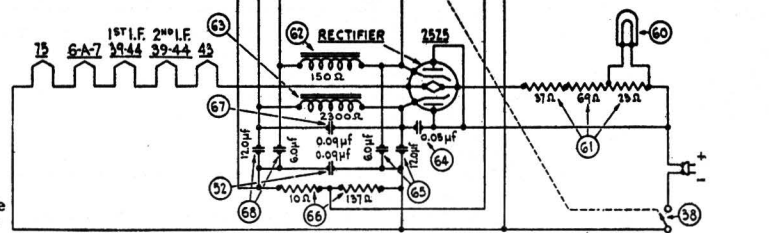
Finally, set the signal generator at 600, tune in this signal and adjust the "oscillator L. F." condenser, located underneath chassis (18) in Fig. 1) to maximum reading. This adjustment is reached through the hole in top of chassis, between the two electrolytic condensers (left-hand end of chassis when facing rear).



I.F. = 460 KC.

Fig. 3—Schematic Wiring Diagram
**REPLACEMENT PARTS—
MODEL 28**

No. on Figs.	Description	Part No.	List Price Each
1	Condenser (.00125 mfd.—Mica)	5896	\$0.35
2	Wave Trap	38-6050	.50
3	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
4	Antenna Transformer	32-1360	.60
5	Wave Band Switch	42-1062	1.10
6	Condenser (.25 mfd.—Tubular)	30-4146	.40
7	Tuning Condenser Assembly	31-1366	5.70
8	Compensating Condenser (Antenna)	Part of 7	...
9	Condenser (.1 mfd.—Tubular)	30-4122	.35
10	Resistor (400 ohms—Flex.) (Yellow-Black-Brown)	33-3016	.20
11	Condenser (.1 mfd.—Tubular)	30-4122	.35
12	Resistor (120,000 ohms) (Brown-Red-Yellow)	33-1128	...
13	Condenser (.003 mfd.—Mica)	30-1028	.60
14	Compensating Condenser (Osc. H. F.)	Part of 7	.65
15	Oscillator Transformer	32-1361	.65
16	Condenser (.0008 mfd.—Mica)	5878	.35
17	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.25
18	Compensating Condenser (Osc. L. F.)	04000S	.35
19	Compensating Condenser (1st I. F. Primary)	Part of 20	...
20	First I. F. Transformer	32-1362	1.50
21	Compensating Condenser (1st I. F. Secondary)	Part of 20	...
22	Resistor (200 ohms—Flex.) (Red-Black-Black)	7217	.20
23	Condenser (.1 mfd.—Tubular)	30-4122	.35
24	Condenser (.09 mfd.—Twin-Bakelite Block)	4989M	.40
25	Resistor (15,000 ohms) (Brown-Green-Orange)	6208	.25
26	Resistor (.1 meg.) (White-White-Orange)	4411	.25
27	Compensating Condenser (2d I. F. Primary)	Part of 28	...
28	2d I. F. Transformer	32-1363	1.50
29	Compensating Condenser (2d I. F. Secondary)	Part of 28	...
30	Compensating Condenser (3d I. F. Primary)	Part of 31	...
31	3d I. F. Transformer	32-1364	1.55
32	Compensating Condenser (3d I. F. Secondary)	Part of 31	...
33	Condenser (.05 mfd.—Tubular)	30-4020	.35
34	Resistor (1000 ohms) (Brown-Black-Red)	5837	.25
35	Resistor (2 megs.) (Red-Black-Green)	5872	.25
36	Condenser (.0001 mfd.—Twin-Bakelite Block)	8035E	.25
37	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
38	Volume Control and On-Off Switch (350,000 ohms, tapped at 75,000)	33-5066	1.45
39	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
40	Condenser (.05 mfd.—Bakelite Block)	3615-BU	.35
41	Condenser (.01 mfd.—Tubular)	30-4124	.25
42	Condenser (.00025 mfd.—Mica)	5858	.35
43	Resistor (1 meg.) (Brown-Black-Green)	4409	.25
44	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
45	Condenser (.1 mfd.—Tubular)	30-4122	.35
46	Condenser (.25 mfd.—Tubular)	30-4146	.40
47	Condenser (.00011 mfd.—Mica)	30-1031	.35
48	Condenser (.02 mfd.—Mica)	30-4113	.30
49	Resistor (.25 meg.) (Red-Yellow-Yellow)	4410	.25
50	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25



51	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	\$0.25
52	Condenser (.09 mfd.—Twin-Bakelite Block)	4989M	.40
53	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
54	Tone Control (3-point)	30-4211	.75
55	Condensers (In tone control)	Inside 54	...
56	Output Transformer (28C)	32-7243	1.10
57	Condenser (.25 mfd.—Tubular)	30-4146	.40
58	Voice Coil and Cone Assembly	P-21.....02861 K-27.....36-3159	.65 .80
59	Field Coil and Pot Assembly	P-21.....36-3357 K-27.....36-3352	3.50 4.00
60	Pilot Lamp	4567	...
61	Resistor (Wire Wound, New Type) (37, 63, 29 ohms)	33-3159	.35
62	Filter Choke	6658	1.50
63	Filter Choke	32-7018	1.50
64	Condenser (.05 mfd.—Tubular)	30-4123	.35
65	Condenser (Electrolytic 6 and 12 mfd., 150 volts)	30-2083	1.70
66	Resistor (Wire Wound, New Type) (10, 137 ohms)	33-3158	.45
67	Condenser (.09 mfd.—Tubular)	30-4122	.35
68	Condenser (Electrolytic 6 and 12 mfd., 150 volts)	30-2083	1.70
	Five-prong Socket	7546	.11
	Six-prong Socket	7547	.11
	Seven-prong Socket	27-6005	.11
	Knob (large)	27-4051	.10
	Knob (small)	27-4052	.10
	Dial Assembly	31-1208	.45
	Speaker Socket (Except 28C)	4957	.10
	A.C. Cord and Plug Assembly	L-943A	.60
	Chassis Mounting Screw	W-1345	2.75C
	Chassis Mounting Washer	29-2089	.35C
	Chassis Mounting Foot	27-4116	.05
	Chassis Mounting Foot Plate	27-7497	.35C
	Back Cover (28-C only)	29-2006	.50
	Bottom Shield Plate	29-2005	.30

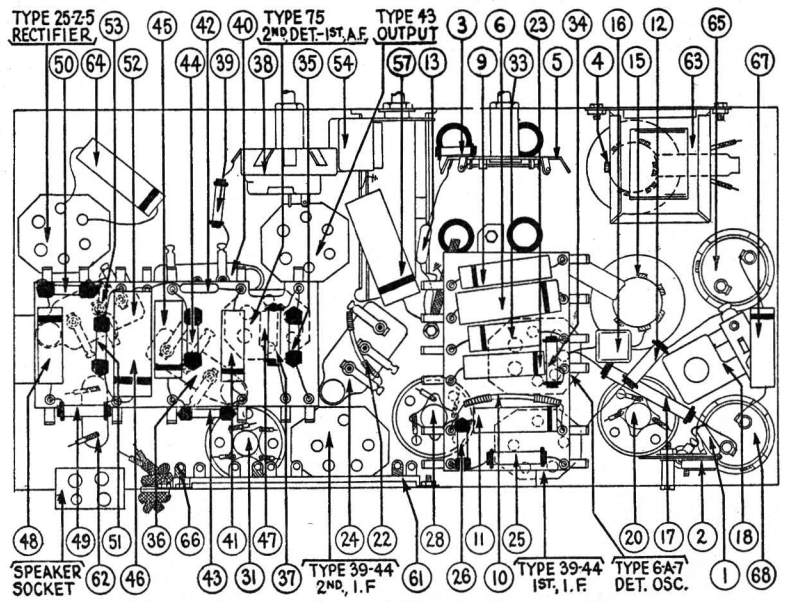


Fig. 4—Bottom View of Chassis Showing Parts.