Radio Manufacturers Service

PHILCO

REG. U.S. PAT. OFF.

Essential Service Data on All Models

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
14 (Code 126 & 226) See Model 91			
14 (Code 122)	110	175	2–78, 1–6A7, 1–37, 1–77, 3–42, 1–80
15	115	175	4–37, 3–44, 2–42, 1–80
16 All-Wave (& 500–501 Phonos) 540 K.C.–23 M.C.	130 (Code 122) 120 (Code 121)	460	1–76, 2–77, 3–78, 3–42, 1–37, 1–5Z3 (1–80 replaces 1–5Z3 in Code 121, 16-B)
16 (Code 125) 540 K.C.–22.5 M.C.	120	460	3–78, 2–77, 1–76, 1–37, 3–42, 1–80
16 (Code 126) 540 K.C.–22.5 M.C.	130	460	3–78, 2–77, 1–76, 1–37, 3–42, 1–5Z3
17	130 (Code 122) 120 (Code 121)	175	1–6A7, 3–78, 2–37, 1–77, 3–42, 1–5Z3 (1–80 replaces 1–5Z3 in Code 121, 17B)

‡Tube Socket Voltages

Circuit	R.F.	Det. Osc.	I.F.	A.V.C. 2nd, Det.	1st, A.F.	Driver (2nd A.F.)	Output (Class "A")		Rectifier
Type Tube	78	6A7	78	37	77	42	42	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	210	210	220	...	80	205	275	275	340
Screen Grid Volts—SG to K (Type 6A7—G3-5 to K)	90	90	90	...	40	205	280	280	...
Control Grid Volts—CG to K (Type 6A7—G4 to K)	.4	1	3.2	.4	.5	.4	28	28	...
Cathode Volts—K to F	2.7	2.7	3.2	...	...	...	...	...	...
Type 6A7—G1 to K	...	30	...	...	...	...	...	...	...
Type 6A7—G2 to K	...	170	...	...	...	...	...	...	...

Tube Type	Tube Circuit	Filament Volts F to F	Plate Volts P to K	Screen Grid Volts SG to K	Control Grid Volts CG to K	Cathode Volts K to F
44	R. F.	6.3	165	55	15.	30
44	1st Det.	6.3	250	90	.85	10
37	Osc.	6.3	60	...	15.	10
44	1st I. F.	6.3	250	90	.85	10
44	2nd I. F.	6.3	275	90	3.3	10
37	Det.-Rect.	6.3	0	...	.2	10
37	1st Audio	6.3	75	...	.4	10
37	2nd Audio	6.3	100	...	.2	10
42	P. P. Output	6.3	255	270	15	15
42	P. P. Output	6.3	255	270	15	15
80	Rectifier	5.0	320/Plate			

CODE 122 ONLY

Circuit	1st Det.	Osc.	1st I.F.	2nd I.F.	2nd Det.	Inter-Station Noise Supr. Circuit	1st A.F.	2nd A.F. (Driver)	Output		Rectifier
Type Tube	77	76	78	78	37	78	77	42	42	42	5-Z-3
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	4.7
Plate Volts—P to K	220	53	225	230	0	1.8	130	220	340	340	400
Screen Grid Volts—SG to K	80	...	80	80	...	1.8	1.8	220	340	340	...
Control Grid Volts—CG to K	1.6	6.4	0	0	.2	1.6	.4	.6	34	34	...
Cathode Volts—K to F	4.2	1.9	2.2	2.5	0	0	0	0	0	0	...

Tube Function	78 R.F.	77 1st Det.	76 Osc.	78 1st I.F.	78 2d I.F.	37 2d Det.	77 1st Aud.	42 Driver	42 Output	80 Rect.
Circuit										
F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
P to K	175	185	70	180	180	0	60	190	275 ea.	...
SG to K	65	62	...	65	65	...	48	190	275 ea.	...
K to Gnd	2.4	4.8	5.4	2.3	2.5	0	0	0	0	...

Tube Function	78 R.F.	77 1st Det.	76 Osc.	78 1st I.F.	78 2d I.F.	37 2d Det.	77 1st Aud.	42 Driver	42 Output	80 Rect.
Circuit										
F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
P to K	210	220	75	215	215	0	70	215	330	...
SG to K	75	70	...	75	80	...	56	215	330	...
K to Gnd	2.8	5.8	6.1	2.8	3.3	0	0	0	0	...

CODE 122 ONLY

Circuit	R.F.	1st Det. Osc.	I.F.	2nd Det.	A.V.C.	Inter-Station Noise Supr. Crt.	1st A.F.	Driver (2nd A.F.)	Output (Class A)		Rectifier
Type Tube	78	6A7	78	37	37	78	77	42	42	42	5Z3
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	4.7
Plate Volts—P to K	220	220	225	0	0	45	45	230	340	340	400
Screen Grid Volts—SG to K (6A7-G3-5 to K)	75	58	75	—	—	50	50	230	340	340	...
Control Grid Volts—CG to K (6A7-G4 to K)	Negligible	Negligible	3.7	.25	.25	.24	.24	.24	34.	34.	...
Cathode Volts—K to F	0	0	3.7	0	11.	0	0	0	0	0	...
Type 6A7-G1 to K	22	...	...	...	...	...	...	...	...	...	...
Type 6A7-G2 to K	140	...	...	...	...	...	...	...	...	...	...

‡Line Voltage 120. Readings made direct from tube sockets on underside of chassis, using test prods, and high resistance D. C. voltmeter for D. C. voltages; A. C. voltmeter for A. C. voltages. Volume control of set at maximum.

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used	‡Tube Socket Voltages

18
(Codes 121–2–3–4) (& 503 Phono.)

110 | 260 | 1–6A7, 2–78, 1–75, 3–42, 1–80

Circuit	R.F.	Det. Osc.	I.F.	2nd Det. & 1st A.F.	Driver (2nd A.F.)	Output (Class "A")		Rectifier
Type Tube	78	6A7	78	75	42	42	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	210	210	210	120	205	280	280	350
Screen Grid Volts—SG to K (Type 6A7—G3-5 to K)	80	80	80	...	200	300	300	..
Control Grid Volts—CG to K (Type 6A7—G4 to K)	.3	.15	5.3	.3	.35	28.	28.	...
Cathode Volts—K to F	2.8	2.8	5.3	0	0	0	0	...
Type 6A7—G1 to K	...	35	...	...	...	...	...	...
Type 6A7—G2 to K	...	130	...	...	...	...	...	...

19
(Codes 121–126) (& 27 Phono.)

60 | 260 | 2–44, 1–36, 1–75, 1–42, 1–80

Circuit	R.F.	Det. Osc.	I.F.	2nd Det.	Output	Rectifier
Type Tube	44	36	44	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	235	230	240	175	235	350/Plate
Screen Grid Volts—SG to K	90	90	90	...	245	.....
Control Grid Volts—CG to K	.3	7.5	.3	.3	.15	.....
Cathode Volts—K to F	3.5	7.8	3.5	...	14	.....
Diode Plate Volts—K to DP	...	...	...	.2	...	.....

19
(Code 128)

70 | 260 | 2–44, 1–36, 1–75, 1–42, 1–80

Circuit	R.F.	Det. Osc.	I.F.	2nd Det.	Output	Rectifier
Type Tube	44	36	44	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	225	225	225	150	270	350/Plate
Screen Grid Volts—SG to K	100	100	100	...	290	.....
Control Grid Volts—CG to K	.3	9.0	.3	.3	2.2	.....
Cathode Volts—K to F	4.4	9.5	4.4	...	...	.....
Diode Plate Volts—K to DP	...	...	...	.2	...	.....

20

75 | 1400 (Adj. Freq.) | 3–24, 1–27, 2–71A, 1–80

Tube Type	Tube Circuit	Filament Voltage	Plate Voltage	Grid Voltage	Screen Grid Voltage	Cathode Voltage	Plate Milli-amperes
24	1st R. F.	2.2	225	2.8	82.0	10	3.0
24	2d R. F.	2.2	130	2.8	82.0	10	3.0
24	Detector	2.2	30	1.0	2.0	8	....
27	1st Audio	2.3	115	....	....	7	3.0
71-A	2d Audio	4.8	190	43.0	....		18.0
71-A	Push-Pull	4.8	190	43.0	....		18.0
80	Rectifier	4.8	...		....		36/Plate

28
A.C.–D.C. Two-band: 540–1720 K.C. 4.2–13. M.C.

50 | 460 | 1–6A7, 2–39/44, 1–75, 1–43, 1–25Z5

ON LINE VOLTAGE 120 A.C.

Type Tube	6A7	39-44	39-44	75	43	25Z5
Plate (P to K)	100	100	98	45	95	120
Screen Grid (SG to K)	(G1 = 8, G2 = 80, G3&5 = 60)	100	100	..	100	...

Total Filament Voltage—75.

ON LINE VOLTAGE 120 D.C.

Type Tube	6A7	39-44	39-44	75	43	25Z5
Plate (P to K)	95	95	85	40	90	..
Screen Grid (SG to K)	(G1 = 10, G2 = 80, G3&5 = 60)	95	95	..	95	..

¶Total Filament Voltage—83.

29
Two-band: 540–1720 K.C. 4.2–13. M.C.

70 | 460 | 1–6A7, 2–39/44, 1–75, 1–42, 1–80

Function	Det. Osc.	1st I.F.	2nd I.F.	2nd Det.	Output	Rectifier
Type	6A7	39/44	39/44	75	42	80
Filament (F to F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P to K)	210	200	200	200	300	310
Screen (SG to K)	80	80	80	...	315	...
Cathode (K to Gnd)	4.8	4.8	4.8	0	0	...
6A7 Grid G1 to K	35	...	...	...	...	...
6A7 Grid G2 to K	170	...	...	...	...	...

30
(Battery Operated)

See Table for Plate Current | Tuned R.F. 1200-1400 Adj. Freq. | 3–32, 3–30, 2–31

Tube	Circuit	Filament Volts	Plate Volts	Grid Volts	Plate Current Milliamperes	Screen Grid Volts
32	1st R.F.	2.0	150	..	.0015	60
32	2nd R.F.	2.0	150	..	.0015	58
32	3rd R.F.	2.0	150	..	.0015	58
30	Detector Rectifier	2.0	...	...	.....	...
30	Detector Amplifier	2.0	15	..	.....	..
30	1st Audio	2.0	90	*	.002	..
31	2d Audio	2.0	150	24	.008	..
31	Push-Pull	2.0	150	24	.008	..

32
(32-volt D.C.)

50–70 | 260 | 1–36, 2–44, 1–75, 1–42, 1–84

LINE VOLTAGE 34 VOLTS

Circuit	R.F.	Det.-Osc.	I.F.	A.F.	Output	Rect.
Type Tube	39/44	36	39/44	75	42	84
Filament Volts	6.8	6.8	6.8	6.8	6.8	6.8
Plate Volts	205	200	235	155	220	300
Screen Grid Volts (SG to K)	85	83	85	...	240	...
Cathode Volts (K to Gnd)	4	8.5	4	0	0	...

‡Line Voltage 120. Readings made direct from tube sockets on underside of chassis, using test prods, and high resistance D. C. voltmeter for D. C. voltages; A. C. voltmeter for A. C. voltages. Volume control of set at maximum. *4 Volts with Volume Control "off".

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
34 (Battery Operated) All-Wave 540 K.C.–23 M.C.	Filament Current 750 M.A. Total Plate Current is from 16-19 M.A.	460	2–34, 2–30, 1–1C6, 1–32, 1–19 (34A uses also 1–1C1)

‡Tube Socket Voltages

Circuit	Det.-Osc.	1st I.F.	2nd I.F.	2nd Det.	1st A.F.	Driver	Output
Type Tubes	1C6	34	34	30	32	30	19
Filament Volts	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Plate Volts	P-135 G2-120	135	135	...	40	135	135
Screen Grid Volts	67½	67½	67½	...	35	...	...

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
35 (Battery Operated)	Plate Current 23 M.A.	260	3–30, 3–32, 1–33

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Grid Volts	Plate Current Milliamperes	Screen Grid Volts
32	R.F.	1.9	133	...	3.0	60
32	1st Det.	1.9	133	...	3.0	63
30	Osc.	1.9	60	...	1.5	..
32	I.F.	1.9	133	...	3.5	60
30	2nd Det.	1.9	55	2.5	.05	..
30	1st Audio	1.9	65	...	.05	..
33	Output	1.9	125	7	12.	135

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
37 (Battery Operated)	Fil. Current 720 M.A. Plate Current 8–12 M.A.	175	1–15, 2–32, 1–30, 1–19, 1–No. 6 (ballast)

Tube Type	Tube Circuit	Filament Volts F to F	Plate Volts P to F	Screen Grid Volts SG to F	Control Grid Volts CG to F	Cathode Volts K to F
15	Det.-Osc.	1.9	120 (P to K)	60 (SG to K)	2.5 (CG to K)	5.5
32	I.F.	1.9	120	60	2.5	...
32	2nd Det.	1.9	2.0	45	2.5	...
30	1st Audio	1.9	110	..	.4	...
19	Output	2.0	120/Plate	..	.4/Grid	...

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
38 (Battery Operated)	Fil. Cur. 720 M.A. Plate Cur. 8–12 M.A.	460	1–15, 2–32, 1–30, 1–19 (38A uses also 1–No. 6, ballast)

Circuit	Det.-Osc.	I.F.	2nd Det.	1st A.F.	Output
Type Tubes	15	32	32	30	19
Filament Volts—F to F	1.9	1.9	1.9	1.9	1.9
Plate Volts—P to F	135 (P to K)	135	40	135	135
Screen Grid Volts—SG to F	67 (SG to K)	67	25	...	...
Control Grid Volts—CG to F	4. (CG to K)	.15	.15	.15	3 (To Gnd.)
Cathode Volts—K to F	5	...	...	...	...

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
38 (Code 123)	Fil. Cur. 720 M.A. Plate Cur. 8–12 M.A.	460	1–1A6, 2–32, 1–30, 1–19 (38A uses 1–1A1 ballast)

ALL VOLTAGES MEASURE TO GROUND OR –F

	1A6	32 (I.F.)	32 (2nd Det.)	30	19
Plate	127	127	50	126	126
Screen Grid	G2—82 G3&5—64	64	22	...	...
Grid	G1—10	...	..	...	G1—2.9 G2—2.9

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
40, 41 & 42 (D.C.)	210	Tuned R.F. Adj. Freq. 1200-1400	3–24, 1–27, 2-71A

Tube Type	Tube Circuit	Filament	Plate	Screen Grid	Control Grid
24	1 R.F.	2.1	100	75	.4
24	2 R.F.	2.1	100	75	.4
24	Detector	2.1	45	15	1.8
27	1 A.F.	2.4	87	..	.2
71-A	2 A.F.	5	85	..	13
71-A	2 A.F.	5	85	..	13

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
43 All-Wave (and 25) Phono.) 550 K.C.–20 M.C.	Code 121 65 Code 221 88	460	4–44, 2–37, 1–42, 1–80

Tube Type	Tube Circuit	Filament Volts F to F	Plate Volts P to K	Screen Grid Volts SG to K	Control Grid Volts CG to K	Cathode Volts K to F
37	Osc.	6.3	175	..	6.	...
36	1st Det.	6.3	235	80	3.0	12.0
44	1st I.F.	6.3	235	80	.2	3.0
44	2nd I.F.	6.3	235	80	3.5	3.5
37	2nd Det.	6.3	0	..	0	0
44	1st Audio	6.3	45	45	.2	2.0
42	Output	6.3	215	240	.4	15.0
80	Rectifier	5.0	350/Plate			

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
44 All-Wave (and 504 Phono.) 530 K.C.–23 M.C.	65	460	1–6A7, 2–78, 1–75, 1–42, 1–80

Circuit	Det.-Osc.	1st I.F.	2nd I.F.	2nd Det. and 1st A.F.	Output	Rectifier
Tube Type	6A7	78	78	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	260	260	255	165	250	350
Screen Grid Volts—SG to K (Type 6A7—G3-5 to K)	50	85	85	...	260	...
Control Grid Volts—CG to K (Type 6A7—G-4 to K)	G1-K = 20 G2-K = 168	.4	.35	.2	.5	...
Cathode Volts—K to F	2.2	2.1	1.9	0	0	...

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
45 Two-band: 540–1720 K.C. 4.2–13 M.C.	65	460	1–6A7, 2–39/44, 1–75, 1–42, 1–80

Circuit	Det.-Osc.	1st I.F.	2d I.F.	2d Det.	Output	Rect.
Type Tube	6A7	39/44	39/44	75	42	80
Filament (F to F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P to K)	260	255	255	175	250	335
Screen Grid (SG to K)	G1-35 G2-135 G3&5-85	75	75	...	260	...
Cathode (K to F)	4.2	3.8	3.8	0	0	...

‡Line Voltage 120. Readings made direct from tube sockets on underside of chassis, using test prods, and high resistance D. C. voltmeter for D. C. voltages; A. C. voltmeter for A. C. voltages Volume control of set at maximum.

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
46 D.C.	42	Tuned R.F. Adj. Freq. 1200-1400	3–14, 1–17, 2–71A, 1 No. 2 (ballast)
47 (D.C.)	45	260	1–36, 2–44, 3–37, 2–43
48 (D.C.)	40	175	1–44, 2–36, 1–43, 1–No. 9 (ballast)
49 (D.C.) Two-band: 540–1720 K.C. 4.2–12 M.C.	50	260	1–6A7, 2–78, 1–85, 1–76, 2–43
50	60	Tuned R.F. Adj. Freq. 1400	3–24, 1–47, 1–80
51 & 52 (& 24 Phono.)	60	175	2–24, 1–35, 1–47, 1–80
53 A.C.-D.C.	45	460	2–77, 1–43, 1–12Z3
54 A.C.-D.C.	50	460	1–6A7, 1–78, 1–75, 1–43, 1–25Z-5

‡Tube Socket Voltages

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Grid Volts	Screen Grid Volts	Cathode Volts
14	R.F.	13.5	100	1.5	60	2.5
14	Det.	13.5	30	1.0	25	2.5
17	1st A.F.	13.5	100	.25	..	4.5
71-A	Output	4.5	90	15.5	..	...
2	Ballast	8.0	...	...	...	...

Tube Type	Tube Circuit	Filament Volts F to F	Plate Volts P to K	Screen Grid Volts SG to K	Control Grid Volts CG to K	Cathode Volts K to F
44	R.F.	6.3	100	100	.4	40
36	Det.-Osc.	6.3	100	65	5.0	30
44	I.F.	6.3	100	100	.4	25
37	Det.-Rect.	6.3	0	...	.2	22
37	1st Audio	6.3	75	...	.4	2.
37	2nd Audio	6.3	90	...	.4	10
43	{Push-Pull	25.	110	112	10.	80
43	{Output	25.	110	112	10.	80
4	Ballast (121) 230 Volts	110	...	...	...	..
5	Ballast (221) 230 Volts	110	...	...	...	..

Tube Type	Tube Circuit	Filament Volts F to F	Plate Volts P to K	Screen Grid Volts SG to K	Control Grid Volts CG to K	Cathode Volts K to F
36	Det.-Osc.	6.3	100	55	3.0	.5
44	I.F.	6.3	70	70	4.5	10.
36	2nd Det.	6.3	37	35	3.0	.5
43	Output	25.0	100	105	.4	.4
9	Ballast	50	...	...	...	...

Tube Type	Tube Circuit	Filament F to F	Plate P to K	Screen Grid SG to K	Cathode K to F
78	R.F.	5.8	85	100	30
6A7	Det.-Osc.	5.7	90	{G3&5-K:65 G2 -K:80 G1 -K:12}	22
78	I.F.	6.3	90	100	15
85	2d Det.—1st A.F.	6.3	40	...	15
76	Driver	6.3	100	...	20
43	Output	2.6	100	105	60
43	Output	2.6	100	105	60

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
24	1st R.F.	2.4	245	90	2.5	3.0
24	2nd R.F.	2.4	250	90	2.5	3.0
24	Det.	2.4	100	42	8.0	8.0
47	Output	2.4	175	190	1.0	...
80	Rect.	5.0	...	...	...	...

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
24	Osc. & 1st Det.	2.2	220	85	9.0	9.0
35	I.F.	2.2	210	85	3.0	3.0
24	2nd Det.	2.2	75	54	5.2	5.2
47	Output	2.2	210	240	0.2	...
80	Rect.	5.0	240/Plate	...	...	...

115 VOLTS A.C.

Circuit	Det. Osc.	2nd Det.	Output	Rectifier
Type Tube	77	77	43	12Z3
Filament—Total 49.9 Volts A. C.				
Plate Volts—P to K	95	15	94	112
Screen Grid Volts—SG to K	94	34	102	...
Control Grid Volts—CG to K	7	4	4	...
Cathode Volts—K to F	18	12	10	112

120 VOLTS D.C.

Circuit	Det. Osc.	2nd Det.	Output	Rectifier
Type Tube	77	77	43	12Z3
Filament—Total 51 Volts D. C.				
Plate Volts—P to K	95	14	94	10
Screen Grid Volts—SG to K	93	34	100	..
Control Grid Volts—CG to K	8	3	4	...
Cathode Volts—K to F	7–14	6–12	3–26	58–73

115 VOLTS A.C.

Circuit	Det. Osc.	I.F.	2nd Det.	Output	Rectifier
Type Tube	6A7	78	75	43	25Z5
Filament—Total 68					
Plate Volts—P to K	84	84	38	84	146
	K to G 3/5				
Screen Grid Volts—SG to K	65	52	..	90	...
Control Grid Volts—CG to K	.15	.15	.25	5	...
Cathode Volts—K to F	12	12	10	10	...

120 VOLTS D.C.

Circuit	Det. Osc.	I.F.	2nd Det.	Output	Rectifier
Type Tube	6A7	78	75	43	25Z5
Filament—Total 70					
Plate Volts—P to K	90	90	40	90	..
Screen Grid Volts—SG to K	70	70	..	92	..
Control Grid Volts—CG to K	.15	.15	.25	.5	..
Cathode Volts—K to F	7.5	7.5	10	10	..

‡Line Voltage 120. Readings made direct from tube sockets on underside of chassis, using test prods, and high resistance D. C. voltmeter for D. C. voltages; A. C. voltmeter for A. C. voltages. Volume control of set at maximum.

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
57, 58 & 59	57 & 58: 46 59: 52	460	2–77, 1–42, 1–80
60 (and 505 Phono.)	60	460	1–6A7, 1–78, 1–75, 1–42, 1–80
65	95	Tuned R.F. Adj. Freq. 1400	2–24, 1–27, 2–45, 1–80
66 (Two-band) 540–1720 K.C. 5.5–15.5 M.C.	60	460	1–6A7, 1–78, 1–75, 1–42, 1–80
70	80	260	4–24, 1–27, 1–47, 1–80
70 (A.V.C.)	80	260	3–35, 1–24, 1–27, 1–47, 1–80
71 (and 22 Phono.)	Code 121: 63 Code 221: 80	260	3–44, 1–36, 1–37, 1–42, 1–80
76 **77**	105	Tuned R.F. Adj. Freq. 1400	3–24, 1–27, 2–45, 1–80
80	46	460	2–36, 1–42, 1–80

‡Tube Socket Voltages

Circuit	Det. Osc.	2nd Det.	Output	Rectifier
Type Tube	77	77	42	80
Filament Volts—F to F	6.3	6.3	6.3	4.8
Plate Volts—P to K	235	45	235	300
Screen Grid Volts—SG to K	110	35	250	...
Control Grid Volts—CG to K	10.5	.25	.25	...
Cathode Volts—K to F	25	15	15	...

Circuit	Det. Osc.	I.F.	2nd Det. and 1st A.F.	2nd A.F. (Output)	Rectifier
Type Tube	6A7	78	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	4.8
Plate Volts—P to K	250	250	170	240	350
Screen Grid Volts—SG to K (6A7-G3-5 to K)	85	120	...	245	...
Control Grid Volts—CG to K (6A7-G4 to K)	.18	.18	.15	.18	...
Cathode Volts—K to F	3.	3.	0	0	...

6A7-G1 to K=1.4 volts.
6A7-G2 to K=180 volts.

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Grid Volts	Cathode Volts
24	R.F.	2.5	150	1.5	1.5
27	Det.	2.5	250	28	28
45	Output	2.5	250	50	..
80	Rect.	5.0	350 A.C.	..	..

Tube	6A7	78	75	42	80
Circuit	Det. Osc.	I.F.	2d Det.	Output	Rect.
Filament (F-F)	6.3	6.3	6.3	6.3	5.0
Plate (P-K)	260	260	160	250	340
Screen (SG-K)	85	85	...	260	...
Cathode (K-F)	2.1	2.2	0	0	...

6A7-G1-K:20; 6A7-G2-K:130.

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
24	1st R.F.	2.25	250	85	3.	19.5
24	1st Det.	2.25	250	87	5.5	21.5
27	Osc.	2.25	85	..	2.	19.5
24	1st I.F.	2.25	250	87	3.	19.5
24	2nd Det.	2.25	105	75	6.	22.
47	Audio	2.25	245	255	1.	....
80	Rectifier	4.7	...	...	..	....

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Control Grid Volts	Screen Grid Volts	Cathode Volts
35	R.F.	2.25	250	5	70	6
24	Osc & 1st Det.	2.25	250	8	12	8
35	I.F.	2.25	250	20	70	0
27	Rectifier Detector	2.25	...	0	0	0
35	Audio Amplifier	2.25	50	0	60	0
47	Output	2.25	240	4	255	.
80	Rectifier	4.70	260/Plate	..	...	.

Tube Type	Tube Circuit	Filament Volts F to F	Plate Volts P to K	Screen Grid Volts SG to K	Control Grid Volts CG to K	Cathode Volts K to F
44	R.F.	6.3	245	90	4.	20
36	Det. Osc.	6.3	235	90	2.3	20
44	I.F.	6.3	255	90	.2	20
37	Det. Rect.	6.3	0	..	..	15
44	Audio	6.3	50	50	.3	20
42	Output	6.3	250	260	.2	15
80	Rectifier	5.0	365/Plate	...	..	..

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
24	1st R.F.	2.3	145	90	3	13
24	2d R.F.	2.3	145	90	3	13
24	Detector	2.3	36	30	1.4	12
27	1st A.F.	2.3	140	..	1	10
45	2d A.F.	2.2	230	..	46	..
45	2d A.F.	2.2	230	..	46	..
80	Rectifier	4.5	...	..	..	..

Tube Type	Tube Circuit	Filament Volts F to F	Plate Volts P to K	Screen Grid Volts SG to K	Control Grid Volts CG to K	Cathode Volts K to F
36	Det.-Osc.	6.3	245	165	6.4	8.4
36	2nd Det.	6.3	40	15	.4	0
42	Output	6.3	240	255	4	0
80	Rectifier	5.0	340/Plate	...	...	..

‡Line Voltage 120. Readings made direct from tube sockets on underside of chassis, using test prods, and high resistance D. C. voltmeter for D. C. voltages; A. C. voltmeter for A. C. voltages. Volume control of set at maximum.

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used
81	46	460	2–77, 1–42, 1–80
84	43	460	2–77, 1–42, 1–80
86	70	"Neutrodyne Plus" Adj. Freq. 1200-1400	4–26, 1–27, 2–71A, 1–80
87	95	"Neutrodyne Plus" Adj. Freq. 1200-1400	4–26, 1–27, 2–45, 1–80
89 (and 26 Phono.)	60	260	1–36, 2–44, 1–75, 1–42, 1–80
90 (1st type)	95	175	4–24, 2–27, 2–45, 1–80
90 Above Serial No. 237,001	95	175	3–24, 4–27, 1–47, 1–80
90 Serial B32001–B35000 and above B53100	95	260	2–35, 1–24, 3–27, 2–47, 1–80
91 (and 23 Phono.) Also 14 (Code 126 & 226)	Code 126 90 Code 226 95	260	2–44, 1–36, 3–37, 2–42, 1–80
95 and **96**	115	Tuned R.F. Adj. Freq. 1400	3–24, 3–27, 2–45, 1–80

‡Tube Socket Voltages

Circuit	Det. Osc.	2nd Det.	Output	Rectifier
Type Tube	77	77	42	80
Filament Volts—F to K	6.3	6.3	6.3	5.0
Plate Volts—P to K	240	75	240	425
Screen Grid Volts—SG to K	85	40	250	...
Control Grid Volts—CG to K	5.6	6	2.3	...
Cathode Volts—K to F	24.5	16	16.2	...

Circuit	Det. Osc.	2nd Det.	2nd A.F. (Output)	Rectifier
Type Tube	77	77	42	80
Filament Volts—F to F	6.3	6.3	6.3	5.0
Plate Volts—P to K	240	70	225	340
Screen Grid Volts—SG to K	95	23	225	...

Tube		Filament Volts	Plate Volts	Grid Volts
Type	Circuit			
26	R.F. & 1st A.F.	1.4	85	5.5
27	Det.	2.2	30	...
71-A	2d A.F.	4.6	172	41
80	Rect.	4.6	...	...

Tube		Filament Volts	Plate Volts	Grid Volts
Tube	Circuit			
26	R.F. & 1st A.F.	1.5	90	6.0
27	Det.	2.5	30	...
45	2d A.F.	2.5	245	45
80	Rect.	50	...	...

Same as Model 19 (First Type)

Tube		Filament Volts	Plate Volts	Grid Volts	Screen Grid Volts	Cathode Volts
Type	Circuit					
24	1st R.F.	2.1	250	3.3	83	15
27	Osc.	2.1	60	1	...	15
24	1st Det.	2.1	250	5.5	23	15
24	1st I.F.	2.1	250	3.8	80	15
24	2nd Det.	2.1	48	3.7	42	15
27	1st Audio	2.1	140	.25	..	10
45	Audio	2.2	243	46	..	..
45	Audio	2.2	243	46	..	..
80	Rect.	4.5	...	...	..	..

Tube		Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
Type	Circuit					
24	R.F.	2.0	255	60	.25	20
27	Osc.	2.0	65	...	.6	20
24	1st Det.	2.0	250	64	6.0	24
24	I.F.	2.0	270	76	.25	18
27	Det. Rect.	2.0	0	..	0	17
27	Det. Amp.	2.0	140	..	.4	18
27	1st A.F.	2.0	45	..	.4	20
47	Output	2.0	220	240	1.0	..
80	Rectifier	4.6	...	...	..	..

Tube		Filament Volts	Plate Volts	Control Grid Volts	Screen Grid Volts	Cathode Volts
Type	Circuit					
35	R.F.	2.5	225	0	38	6
24	Det.-Osc.	2.5	215	12	40	22
35	I.F.	2.5	235	10	38	10
27	Det. Rect.	2.5	...	..	..	10
27	Det. Amp.	2.5	50	0	..	1.
27	1st Audio	2.5	90	0	...	1.
47	Output	2.5	210	10	225	..
47		2.5	210	10	225	..
80	Rectifier	5.0	225/Plate	..	...	..

Tube		Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
Type	Circuit					
44	R.F.	6.3	200	50	.6	25
36	Det.-Osc.	6.3	250	80	10	10
44	I.F.	6.3	250	85	.2	5
37	Det. Rect.	6.3	0	..	.2	2
37	Det. Amp.	6.3	60	..	.2	2
37	Audio	6.3	100	...	0	2
42	Output	6.3	240	250	15	15
42	Output	6.3	240	250	15	15
80	Rectifier	5.0	310/Plate	...	..	..

Tube		Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
Type	Circuit					
24	R.F.	2.15	155	95	0	5.3
27	Det.	2.15	0	..	0.5	0.7
27	1st A.F.	2.15	27	..	0.5	5.5
27	2nd A.F.	2.15	85	..	2.0	5.5
45	Output	2.2	250	..	41	...
80	Rect.	4.5	...	..	..	...

‡Line Voltage 120. Readings made direct from tube sockets on underside of chassis, using test prods, and high resistance D. C. voltmeter for D. C. voltages; A. C. voltmeter for A. C. voltages. Volume control of set at maximum.

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used	‡Tube Socket Voltages

111 and **112** (Below Serial 174000)

105 | 175 | 4–24, 4–27, 2–45, 1–80

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
24	1st R.F.	2.1	190	60	.2	5
27	Osc.	2.1	45	..	.7	7
24	1st Det.	2.1	180	62	4.6	8
24	1st I.F.	2.1	185	65	...	5
24	2nd I.F.	2.1	190	82	2.2	5
27	Det Rect.	2.2	...	..	.4	.5
27	Det. Amp.	2.2	35	..	.4	5
27	1st A.F.	2.1	95	..	1.2	5
45	2nd A.F.	2.2	255	..	50	..
45	2nd A.F.	2.2	255	..	50	..
80	Rect.	4.9	..	..	..	..

112 (Above Serial 174001)

105 | 175 | 4–24, 4–27, 2–47, 1–80

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
24	1st R.F.	2.25	160	75	.2	5.0
27	Osc.	2.25	55	..	.6	7.5
24	1st Det.	2.25	160	75	2.5	8.0
24	1st I.F.	2.25	160	75	.2	5.0
24	2nd I.F.	2.25	160	75	6.	4.0
27	Det. Rect.	2.25	...	..	..	...
27	Det. Amp.	2.25	20	...	...	4.0
27	1st A.F.	2.30	150	...	...	4.0
47	2nd A.F.	2.30	245	255	16.5	...
47	2nd A.F.	2.30	245	255	16.5	...
80	Rect.	5.0	...	...	...	...

118 Two-band (and 507 Phono.) 540–1720 K.C. 4.2–12 M.C.

110 | 260 | 1–6A7, 2–78, 1–75, 3–42, 1–80

Function	R.F.	Det.-Osc.	I.F.	A.F.	Driver	Output		Rect.
Type	78	6A7	78	75	42	42	42	80
Filament (F-F)	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P-K)	180	180	200	125	195	280	280	315
Screen (SG-K)	80	175	80	...	195	290	290	...
Cathode (K to F)	2.5	2.6	3.2	0	0	0	0	...
6A7—G1 to K	26							
6A7—G2 to K	150							

144 All-Wave (and 506 Phono.) 540 K.C.–23 M.C.

70 | 460 | 1–6A7, 2–78, 1–75, 1–42, 1–80

Circuit	Det.-Osc.	1st I.F.	2nd I.F.	A.F.	Output	Rectifier
Tube	6A7	78	78	75	42	80
Filament Volts (F-F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts (P-K)	250	230	230	185	300	350
Screen Grid Volts (SG-K)	60	75	75	...	310	...
Cathode Volts (K-Gnd)	1.4	2	2	0	0	...
6A7—G2 to K	160	...	...	...	...	...
6A7—G1 to K	20	...	...	...	...	...

200 High Fidelity

130 | 175 | 1–6A7, 3–78, 1–76, 1–37, 3–42, 1–5Z3

Circuit	R.F.	Det. Osc.	1st I.F.	2d I.F.	Shadow-meter Control	A.F.	Driver	Out-put	Rect.
Type Tube	78	6A7	78	78	37	75	42	42 42	5Z3
Test Points									
F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
P to K	225	210 (G3&5-K)	210	220	63	110	225	335 335	350 toGnd.
SG to K	80	73	73	76	..	...	225	335	...
K to Gnd	3	8	8	4	0	0	0	0 0	...
CG to K	0.2	0	0.2	4	0	...	0.2	35 35	...
6A7—G1 to K	22.0								
6A7—G2 to K	90.0								

470 All-Wave 550 K.C. 19 M.C.

110 | 260 | 5–24, 2–27, 1–47, 1–80

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
	SHORT WAVE UNIT					
27	Osc.	2.2	110	..	3.3	0
24	Det.	2.2	24	24	5.	0
	BROADCAST UNIT					
24	R.F.	2.4	255	50	3.5	25
24	1st Det.	2.4	260	60	9	38
27	Osc.	2.4	60	..	3.5	25
24	I.F.	2.4	265	50	3	22
24	2nd Det.	2.4	116	40	7	25
47	Output	2.5	205	220	.7	..
80	Rectifier	4.5	260/Plate	...	..	..

490 All-Wave 550 K.C. 19 M.C.

125 | 260 | 4–24, 5–27, 1–47, 1–80

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts
	SHORT WAVE UNIT					
27	Osc.	2.2	110	..	3.3	0
24	1st Det.	2.2	24	24	5.	0
	BROADCAST UNIT					
24	R.F.	2.1	220	50	6.	15
27	Osc.	2.1	80	..	6	15
24	1st Det.	2.1	210	55	5	15
24	I.F.	2.1	220	60	8	15
27	Rect. Det.	2.1	...	..	..	14
27	Amp. Det.	2.1	150	..	0	15
27	1st Audio	2.1	150	..	2	15
47	Output	2.4	205	220	7	..
80	Rectifier	4.5	220/Plate	...	..	..

511

50 | Neutrodyne Adj. Freq. 1200-1400 | 4–26, 1–27, 1–71A, 1–80

Tube Type	Tube Circuit	Filament Volts	Plate Volts	Grid Volts
26	R.F. & 1st A.F.	1.62	98.0	6.0
27	Det.	2.65	38.0	.....
71	Output	5.26	148.0	29.0
80	Rect.	5.26	375 A.C.	30 each plate

‡Line Voltage 120. Readings made direct from tube sockets on underside of chassis, using test prods, and high resistance D. C. voltmeter for D. C. voltages; A. C. voltmeter for A. C. voltages. Volume control of set at maximum.

Transitone (Auto-Radio) Sets; Short Wave Converter

Model No.	Power Input (Watts)	I.F. (K.C.)	Tubes Used	‡Tube Socket Voltages
3 (Trans.)		Tuned R.F. 1000-1200 (Adj. Freq.)	3–24, 2–01A, 2–71A	*
4 (Short-wave Converter)	30	3600	1–27, 1–24, 1–80	Tube: Type 27, Circuit Osc., Filament Volts 2.4, Plate Volts 110, Screen Grid Volts .., Cathode Volts 0 Tube: Type 24, Circuit Det., Filament Volts 2.4, Plate Volts 25, Screen Grid Volts 25, Cathode Volts 0 Tube: Type 80, Circuit Rect., Filament Volts 5.0, Plate Volts 170, Screen Grid Volts .., Cathode Volts ..
5 (Trans.)		460	1–6A7, 1–78, 1–75, 1–41, 1–84	*
6 (Trans.) 6F		260	3–36, 1–85, 1–41 3–36, 1–85, 1–41, 1–84	*
7 (Trans.) 1st type 2d type		175	3–36, 2–38 3–36, 1–38, 1–41	*
8 (Trans.)		175	3–36, 1–38, 2–41	*
9 (Trans.) 9F		260	3–36, 1–85, 1–37, 1–79 3–36, 1–85, 1–37, 1–79, 1–84	*
10 (Trans.)		260	2–39/44, 1–6A7, 1–75, 1–42, 1–84	*
11 (Trans.) 1st type 2d type		260	2–44, 1–77, 1–75, 1–42, 1–84	*
12 (Trans.) Code 121 Code 122		175	3–36, 1–38, 1–41	*
700 (Trans.)		260	2–44, 1–77, 1–75, 1–42, 1–84	*
800 (Trans.)		260	2–39/44, 1–6A7, 1–75, 1–37, 1–79, 1–84	*
802		260	2–39/44, 1–6A7, 1–75, 1–37, 1–79 1–84	*

*Voltages not given for auto radio models due to voltage variations.
‡Line Voltage 120. Readings made direct from tube sockets on underside of chassis, using test prods, and high resistance D. C. voltmeter for D. C. voltages; A. C. voltmeter for A. C. voltages. Volume control of set at maximum.

November, 1934—10M

Printed in U. S. A.

WIRING DIAGRAMS
AND
PARTS LISTS

PHILCO
REG. U.S. PAT. OFF.

BALANCED UNIT RADIO RECEIVERS

Models are arranged numerically. The first is Model 3; the last is Model 511. Models that have similar chasses, as Models 89 and 19, are placed under a single number insofar as sequence is concerned.

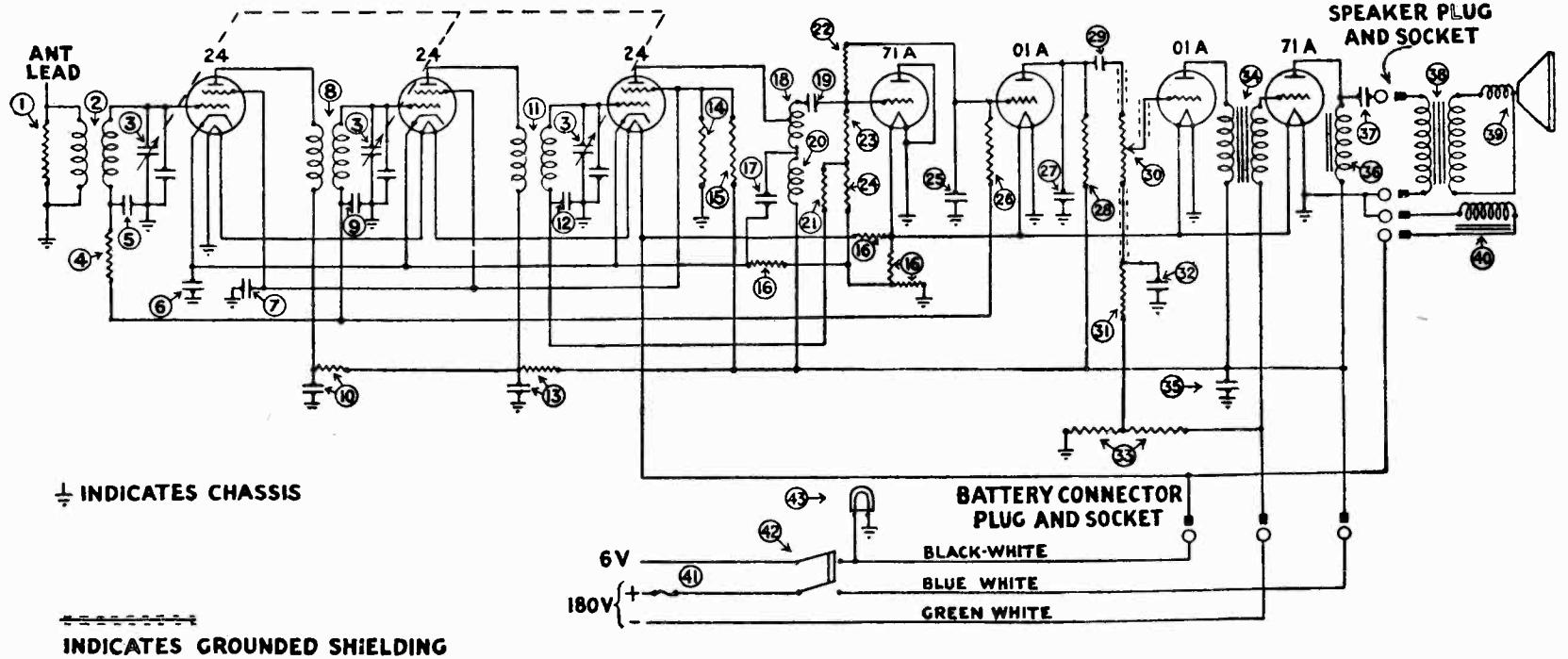
Thus arranged are:

Model 22, see Model 71
" 23, " " 14
" 25, " " 43
Model 89, see Model 19
" 91, " " 14

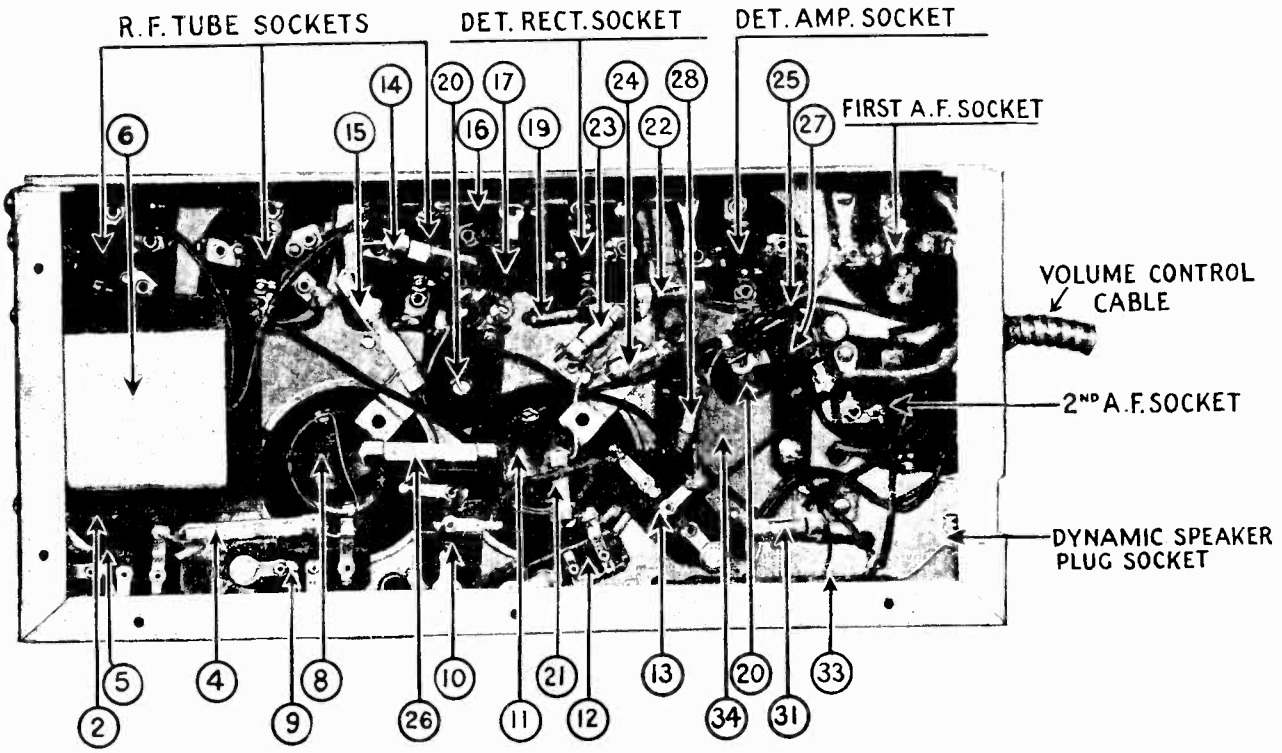
Form No. 2992-B-11-30-34

Litho. in U. S. A.

Model 3


ANT LEAD
24
24
24
71 A
01 A
01 A
71 A
SPEAKER PLUG AND SOCKET
INDICATES CHASSIS
INDICATES GROUNDED SHIELDING
BATTERY CONNECTOR PLUG AND SOCKET
6V
180V
+
-
BLACK-WHITE
BLUE WHITE
GREEN WHITE

Model 3

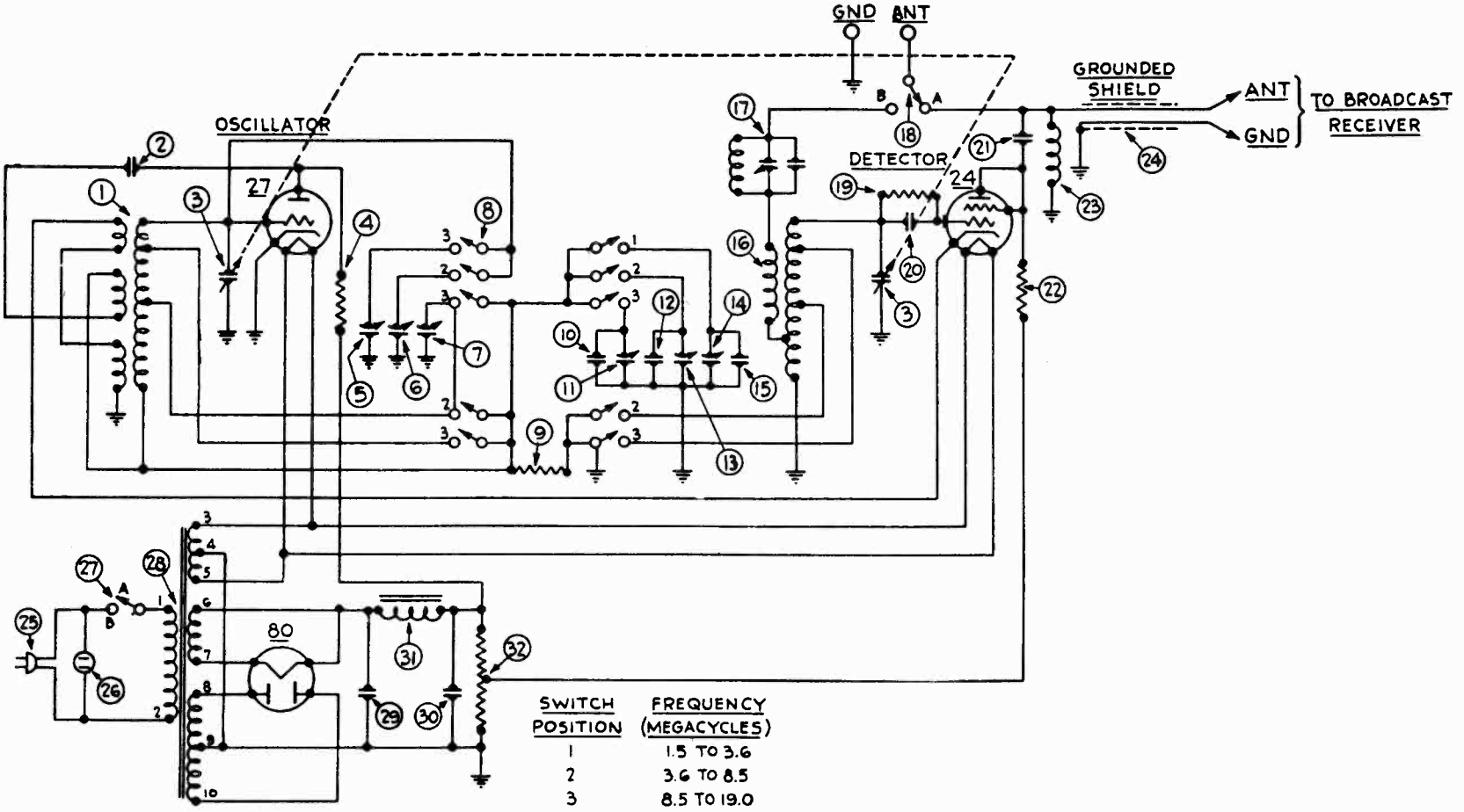


REPLACEMENT PARTS—MODEL 3 TRANSITONE RECEIVERS

No. on Figs. 1 and 2	Description	Part No.
①	Resistor (10,000 ohms—½ watt)	4412
③	First R. F. Transformer	4401-A
⑧	Tuning Condenser	4372-A
④	Resistor (100,000 ohms—1 watt)	3767
⑤	Condenser (.05 mfd)	3615-N
⑥	Condenser (1.0 mfd)	4419
⑦	Condenser (.25 mfd)	4487
⑧	Second R. F. Transformer	4401-B
⑨	Condenser (.05 mfd)	3615-N
⑩	Condenser and Resistor (.05 mfd with 250 ohms)	3615-P
⑪	Third R. F. Transformer	4401-B
⑫	Condenser (.05 mfd)	3615-N
⑬	Condenser and Resistor (.05 mfd with 250 ohms)	3615-C
⑭	Resistor (50,000 ohms—1 watt)	4237
⑮	Resistor (25,000 ohms—1 watt)	3656
⑯	Resistor (4-section)	4407
⑰	Condenser (.00025 mfd)	3082
⑱	Fourth R. F. Transformer	3775-B
⑲	Condenser (.00005 mfd)	3774
⑳	R. F. Choke	3256-A
㉑	Resistor (1,000,000 ohms—½ watt)	4409
㉒	Resistor (250,000 ohms — ½ watt)	4410
㉓	Resistor (100,000 ohms — ½ watt)	4411
㉔	Resistor (100,000 ohms — ½ watt)	4411
㉕	Condenser (.00025 mfd)	3082
㉖	Resistor (1,000,000 ohms — 1 watt)	4414
㉗	Condenser (.00025 mfd)	3082
㉘	Resistor (100,000 ohms — ½ watt)	4411
㉙	Condenser (.015 mfd)	3793-D
㉚	Volume Control	4463
㉛	Resistor (250,000 ohms — ½ watt)	4410
㉜	Condenser (.25 mfd)	4487
㉝	Resistor (2-section)	4408
㉞	Audio Transformer	3241
㉟	Condenser (2.0 mfd)	4418
㊱	Audio Choke	4485
㊲	Output Condenser (1.0 mfd)	4420
㊳	Output Transformer	2706
㊴	Voice Coil and Cone	2769-B
㊵	Field Coil	2707
㊶	Fuse	4540
㊷	Lock Switch (With Keys)	4462
㊸	Pilot Lamp	4567

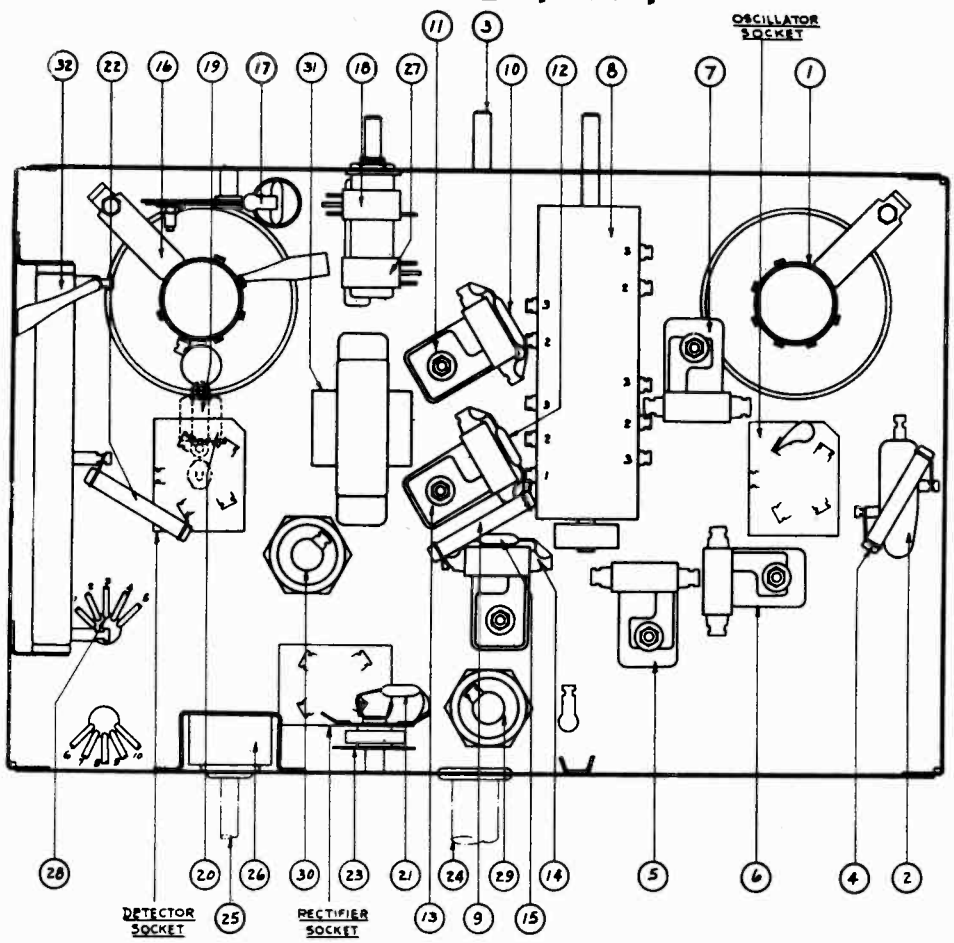
Description	Part No.
Speaker Plug and Cable	L-1163-A
Battery Connector Plug	2802
Battery Plug Receptacle	4406
224 Socket	4416
171-A Socket	4415
201-A Socket	4415
"B" Battery Compartment	4465
Battery Box Lid	4467
Screws (Housing)	W-274-A
Lock Washers	W-291
Knobs	4523
Flexible Condenser Drive Shaft	4505
Dial Insulator for Volume Control	4461
Distributor Resistor	4546
Spark Plug Resistor	4531
Volume Control Housing	4541
Bezel Plate	4443
Dial	4461
Fuse Holder	4593
Gear Wheel	4385
Set Screws	W-520
Drive Shaft Coupling	4434
Cover Plate (Comp. Cond.)	4427
Cover Plate (Front)	4374
Dial Pinion Shaft	4387
Dial Drive Pinion	4386
Worm	4370
Worm Shaft	4383
Ball (Worm Adj.)	4475
Side Gasket	4472
Bottom Gasket	4473
Side Gasket	4477
Condenser Shaft Gasket	4478
Sub-Base Gasket	4479
Top Gasket	4480
Parting Gasket	4481
Shield Gasket	4483
Cover Gasket	4484
Tube-Side Gasket	4488
Interference Condenser	4522
Nuts (Control Panel)	W-434
Front Cover	4470
B Cable	L-1160-A
A Cable	L-1169-A
Battery Box Coupling	4524
Battery Cable and Plug	L-1164-A
Volume Control Cable Housing	4541
Rubber Sleeving	4537
Pilot Lamp Assembly	4391-A
Fibre Wrench	3164

MODEL 4 AND 4 C



SWITCH POSITION	FREQUENCY (MEGACYCLES)
1	1.5 TO 3.6
2	3.6 TO 8.5
3	8.5 TO 19.0

MODEL 4 AND 4C

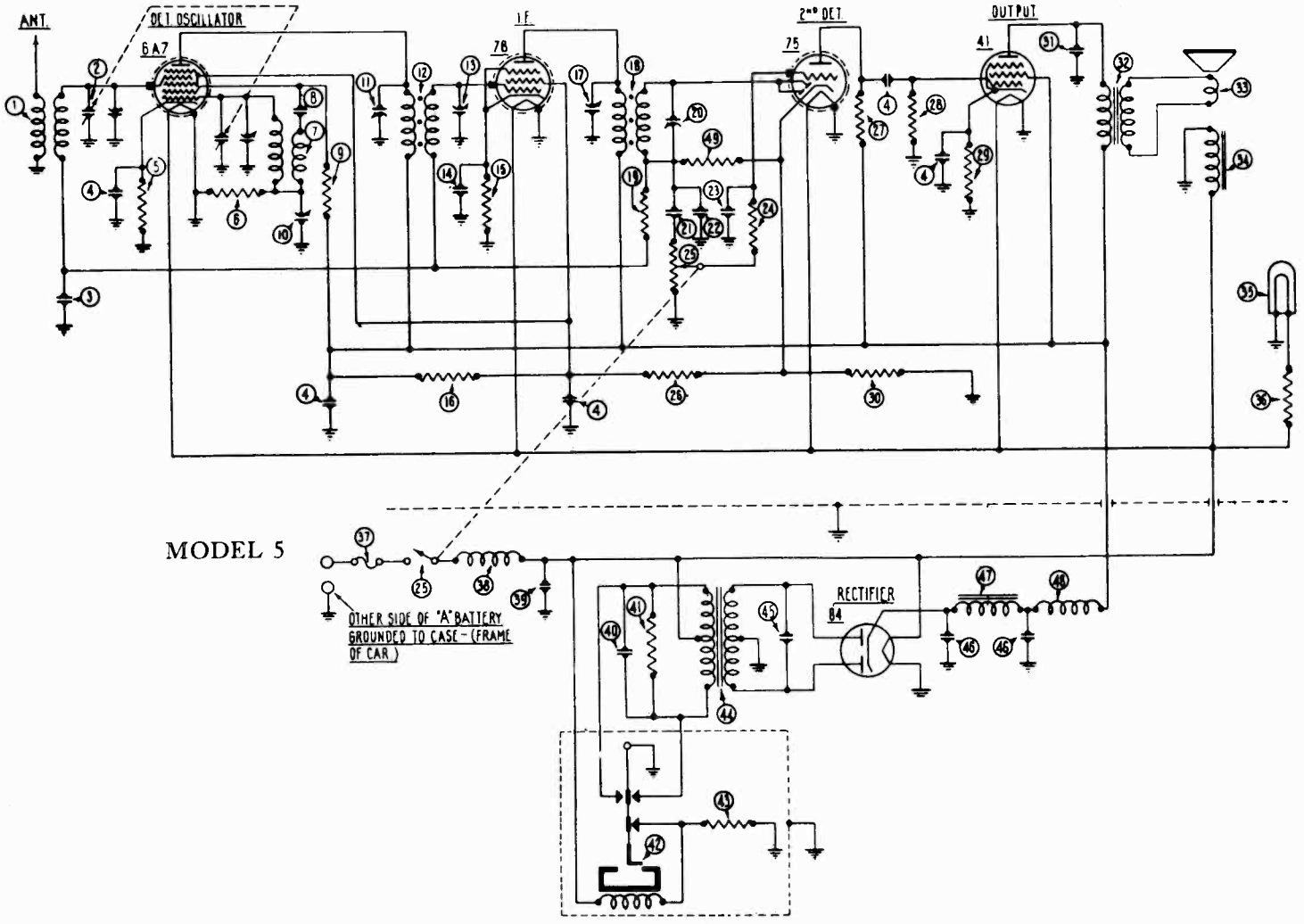


REPLACEMENT PARTS MODELS 4 AND 4C

No. on Figs. 1 and 2	Description	Part No.
①	Oscillator Coil	03734*
②	By-pass condenser (.05 mfd.)	3615-M
③	Gang condenser	03692
④	Resistor (13,000 ohms)	3766
⑤	Compensating condenser (19 MC end of top scale)	04000-E
⑥	Compensating condenser (8.5 MC end of center scale)	04000-E
⑦	Compensating condenser (3.6 MC end of bottom scale)	04000-E
⑧	Frequency control switch	03751
⑨	Resistor (240,000 ohms)	3768
⑪	Condenser (1800 mmf.)	6018
⑫	Condenser (800 mmf.)	5878
⑬	Compensating condenser (3.6 MC end of center scale)	04000-F
⑭	Compensating condenser (1.5 MC end of bottom scale)	04000-F
⑮	Condenser (250 mmf.)	3082
⑯	Detector transformer	03734*
⑰	Frequency filter	03662
⑱	Antenna switch (assembled with 27)	5796
⑲	Resistor (2 Megohms) assembled with (20)	03879
⑳	Condenser (110 mmf.) assembled with (19)	03879
㉑	Condenser (250 mmf.)	3082
㉒	Resistor (99,000 ohms)	3767
㉓	R. F. choke	03893
㉔	Shielded cable	L-1278
㉕	Power cord and plug	L-943-A
㉖	Outlet receptacle	5439
㉗	"On-Off" switch (assembled with 18)	5796
㉘	Power transformer—50-60 cycles 25-40 cycles	5785 5786
㉙	Electrolytic condenser (6 mfd.)	4916
㉚	Electrolytic condenser (6 mfd.)	4916
㉛	Filter choke (50-60 cycles)	4951
	Filter choke (25-40 cycles)	5930
㉜	B.C. resistor (4750 each side of center), 50-60 cycles	5783
	Resistor (two 32,000 ohms), 25-40 cycles	3525
	Bezel	5175
	Cabinet	40600

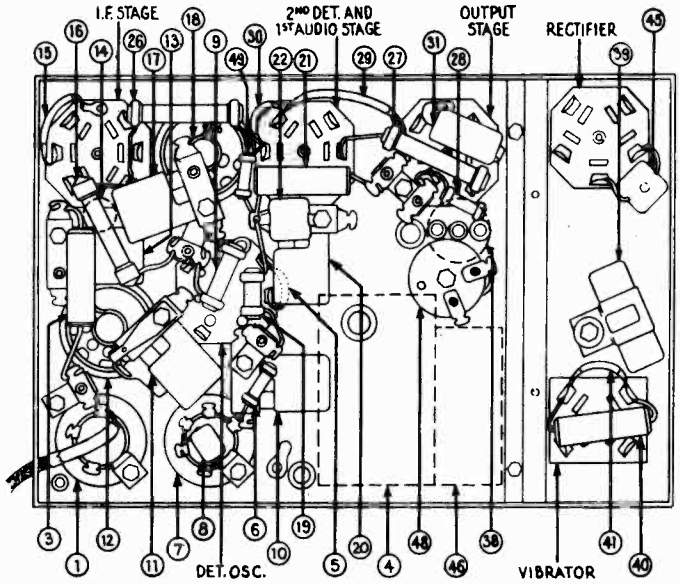
*Includes matched oscillator coil and detector transformer.

MODEL 5



MODEL 5

MODEL 5

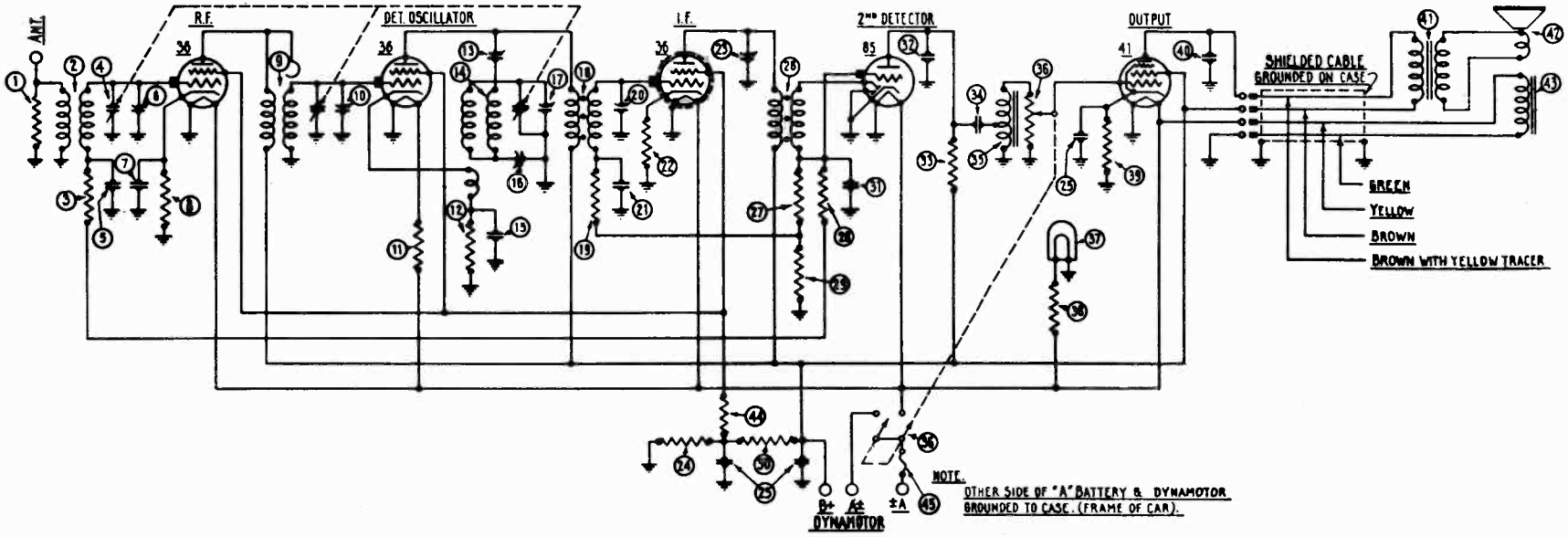


MODEL 5 PARTS LIST

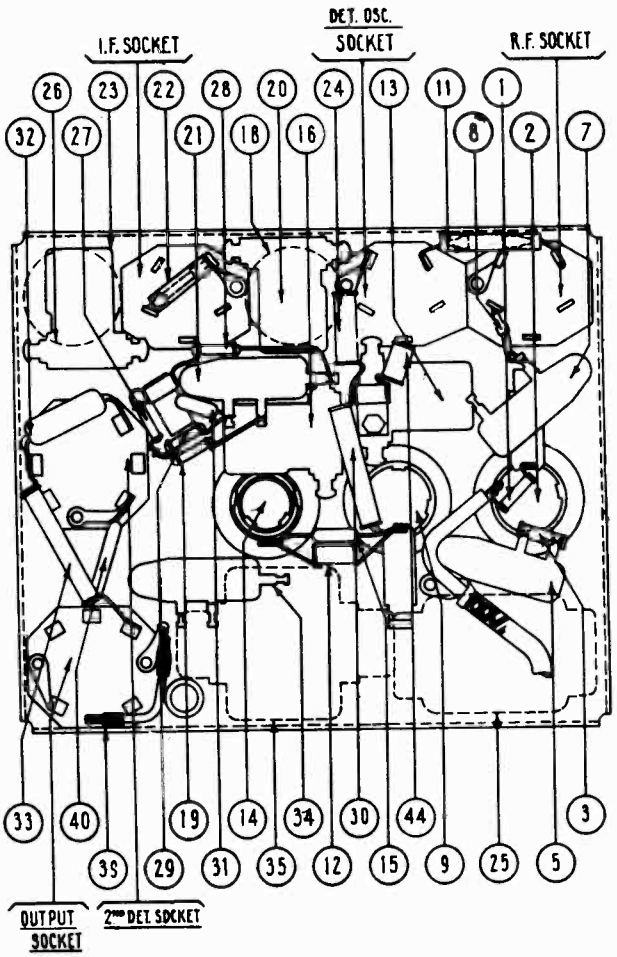
No. on Fig. 1 and 2	Description	Part No.
1	Antenna Transformer	32–1084
2	Tuning Condenser	31–1019
3	Condenser (.05 mfd.)	30–4020
4	Filter Condenser (.25; .25; .5; 20 mfd.)	30–4017
5	Resistor (200 ohms)	7217
6	Resistor (1300 ohms)	8267
7	Oscillator Coil	32–1085
8	Condenser (.00025 mfd.)	3082
9	Resistor (15,000 ohms)	6208
10	Padder	04000–S
11	Padder	04000–J
12	First I. F. Transformer	32–1086
13	Padder	04000–Y
14	Condenser (.5 mfd.)	30–4018
15	Resistor (1,000 ohms)	33–3017
16	Resistor (10,000 ohms)	4412
17	Padder	04000–D
18	Second I. F. Transformer	32–1087
19	Resistor (1,000,000 ohms)	4409
20	Padder	04000–M
21	Condenser (.05 mfd.)	30–4020
22	Condenser (.00025 mfd.)	3082
23	Condenser (.0005 mfd.)	3910
24	Resistor (100,000 ohms)	6099
25	Volume Control and Switch	33–5009
26	Resistor (32,000 ohms)	3525
27	Resistor (250,000 ohms)	3768
28	Resistor (500,000 ohms)	6097
29	Resistor (700 ohms)	6443
30	Resistor (400 ohms)	33–3016
31	Condenser (.006 mfd.)	30–1002
32	Output Transformer	32–7005
33	Cone	36–3027
34	Field Coil	9013
35	Pilot Lamp	6608
36	Resistor (7 ohms)	7155
37	Fuse, 15 A.	7227

No. on Fig. 1 and 2	Description	Part No.
38	R. F. Choke (Low voltage)	32–1083
39	Condenser (.5 mfd.)	30–4015
40	Condenser (.05 mfd.)	30–4020
41	Resistor (200 ohms)	7217
42	Vibrator	38–5036
43	Resistor (200 ohms)	7217
44	Transformer	32–7030
45	Condenser (.006 mfd.)	30–1002
46	Condenser (4 mfd.; 8 mfd.)	30–4010
47	Filter Choke	32–7026
48	R. F. Choke (High voltage)	32–1078
49	Resistor (250,000 ohms)	4410
	Control Shaft (Tuning)	28–8006
	Control Shaft (Volume)	28–8007
	Tube Kit	34–3006
	75 Tube	8002
	78 Tube	8315
	41 Tube	6446
	84 Tube	34–2001
	6A7 Tube	34–2002
	Dial	27–5006
	Antenna Lead	L–1594
	Battery Cable (Bat. end)	38–5124
	Battery Cable (Rec. end)	38–5123
	Fuse Housing	28–1269
	Male Cap (Fuse)	28–1270
	Contact (Fuse)	27–7133
	Washer	27–7132
	Spring	28–8009
	Fuse Insulator	27–7131
	Antenna Male Cap	28–1270
	Contact (Antenna)	28–7133
	Spark Plug Resistors	4531
	Dist. Resistors	4546
	Screw Type	4851
	Interference Condenser (1 mfd.)	4522
	Interference Condenser (½ mfd.)	30–4007

MODEL 6


ANT.
R.F.
DET. OSCILLATOR
I.F.
2ND DETECTOR
OUTPUT
SHIELDED CABLE GROUNDED ON CASE
GREEN
YELLOW
BROWN
BROWN WITH YELLOW TRACER
B+ DYNAMOTOR
A±
±A
NOTE.
OTHER SIDE OF "A" BATTERY & DYNAMOTOR GROUNDED TO CASE. (FRAME OF CAR).

MODEL 6

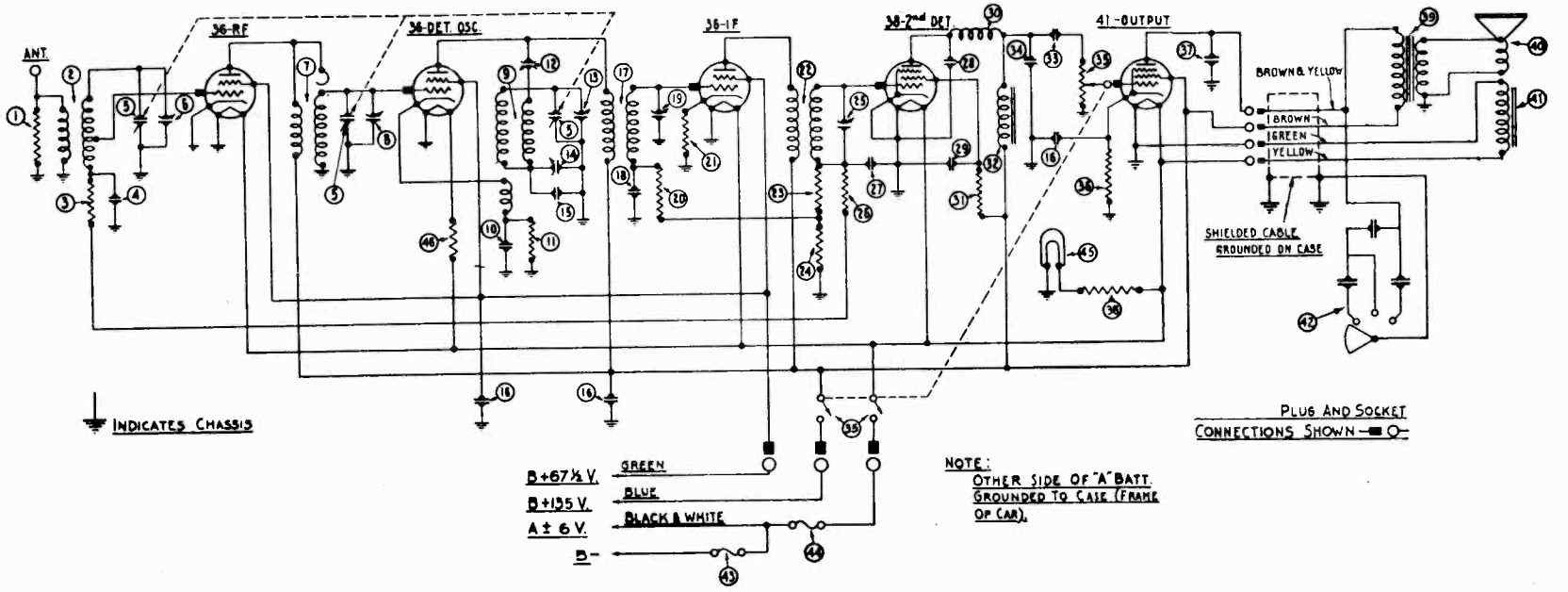


PARTS LIST

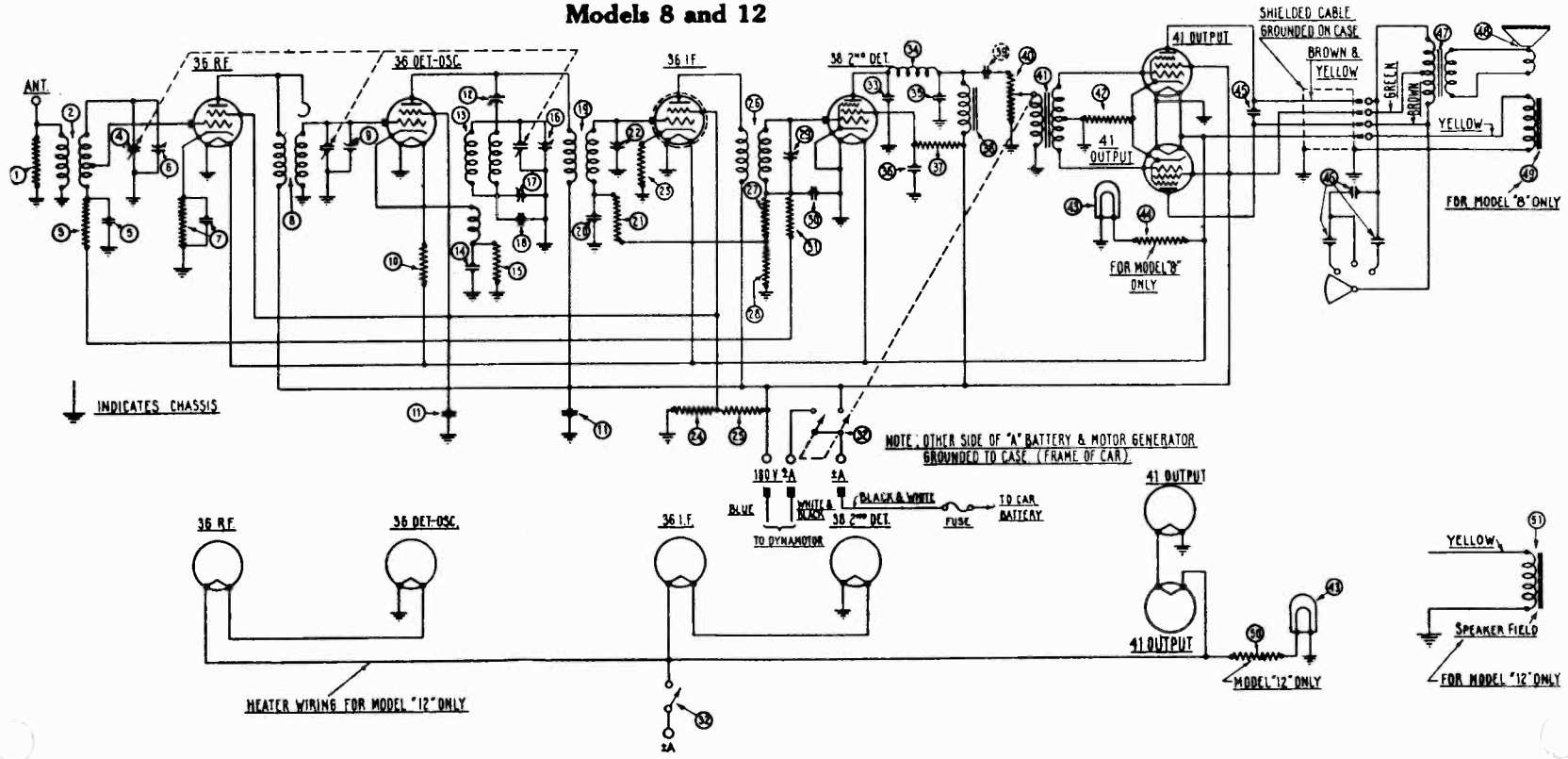
No. in Figs. 1 and 2	Description	Part No.
①	Resistor (5,000 ohm)	6096
②	Antenna Coil	05903
③	Resistor (100,000 ohm)	6099
④	Tuning Condenser	04308
⑤	By-pass Condenser (.05 mfd.)	3615-AN
⑥	Compensator section on tuning condenser	
⑦	By-pass Condenser (.05 mfd.)	3615-AT
⑧	Resistor (500 ohm)	6977
⑨	Detector Coil	05902
⑩	Compensator section on tuning condenser	
⑪	Resistor (2.7 ohm)	6511
⑫	Resistor (8,000 ohm)	5838
⑬	Compensating Cond.	04000A
⑭	Oscillator Coil	05975
⑮	Condenser (.007 mfd.)	4520
⑯	Compensating Cond.	04000S
⑰	Compensator section on tuning condenser	
⑱	First I. F. Transformer	05970
⑲	Resistor (500,000 ohm)	6097
⑳	Compensating Cond.	04000D
㉑	Condenser (.05 mfd.)	3615-AK
㉒	Resistor (500 ohm)	6977
㉓	Compensating Cond.	04000D
㉔	Resistor (20,000 ohm)	6650
㉕	Condenser (.25 mfd., .5 mfd., 8 mfd.)	04354
㉖	Second I. F. Transformer	05901
㉗	Resistor (100,000 ohm)	6099
㉘	Resistor (500,000 ohm)	6097
㉙	Resistor (100,000 ohm)	6099
㉚	Resistor (20,000 ohm)	6649
㉛	Condenser (.00025 mfd.)	3082
㉜	Condenser (.0002 mfd.)	4059
㉝	Resistor (50,000 ohm)	4237
㉞	Condenser (.09 mfd.)	4989-Y
㉟	Audio Transformer	7535

No. in Figs. 1 and 2	Description	Part No.
㊱	Volume Control (500,000 ohm) and switch	7525
㊲	Pilot Lamp	4567
㊳	Resistor (7 ohm)	5110
㊴	Resistor (700 ohm)	6443
㊵	Condenser (.002 mfd.)	6853
㊶	Output Transformer	2598
㊷	Cone and Coil	02823
㊸	Field Coil	02794
㊹	Resistor (25,000 ohm)	4516
	Interstage Shield	05910
	Dynamotor EB	05389
	Dynamotor EA (for battery replacements)	05388
	Receiver Studs	6122
	Shielded Loom (18" high tension shield)	L1387
	Shielded Loom (30" high tension shield)	L1386
	Spark Plug Resistor	4531
	Distributor Resistor	4546
	Screw Type Resistors	4851
	Interference Condensers	4522
	Knobs	5166
	Speaker Extension Cable	02984
	Dynamotor Filter Choke	6658
	Dynamotor Filter Condenser (large unit)	0538
	Dynamotor Filter Condenser (small unit)	05724
	Dynamotor RF Choke (small unit only)	05746
	18"Volume Control Shaft	6351
	18"Tuning Control Shaft	6352
	32"Volume Control Shaft	6128
	32"Tuning Control Shaft	6129
	48"Volume Control Shaft	6298
	48"Tuning Control Shaft	6299
	120"Volume Control Shaft	6355
	120"Tuning Control Shaft	6356
	Philco Oscillator (for adjusting Models 3, 7, 8, 6)	Model 095
	Fibre Wrench	3164

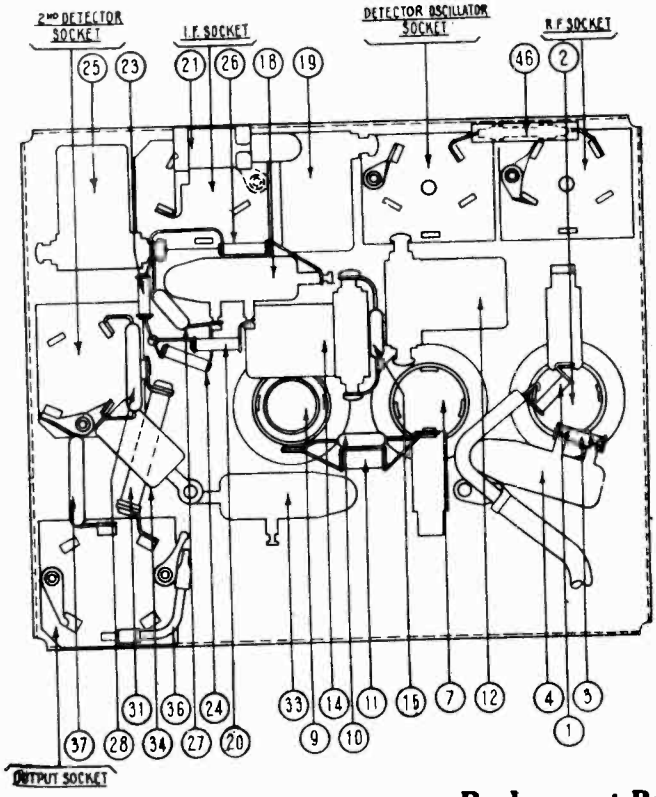
Model 7



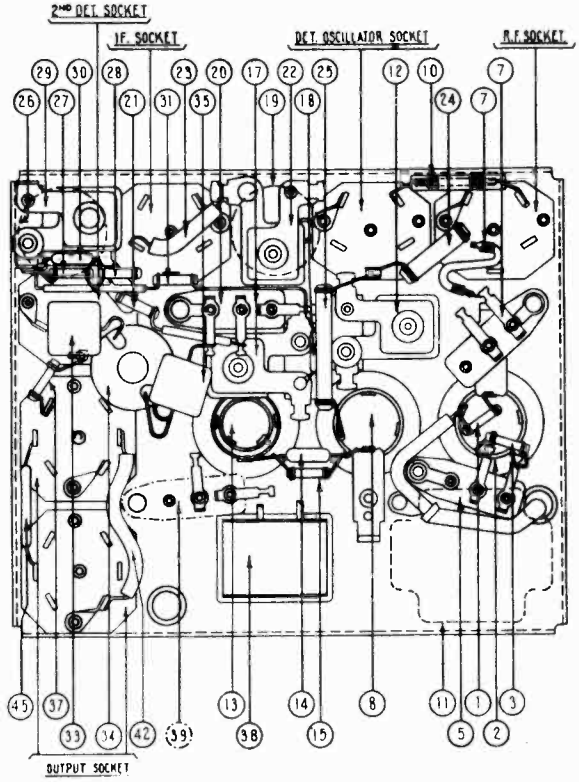
Models 8 and 12



Model 7



Models 8 and 12



Replacement Parts Models 7, 8 and 12

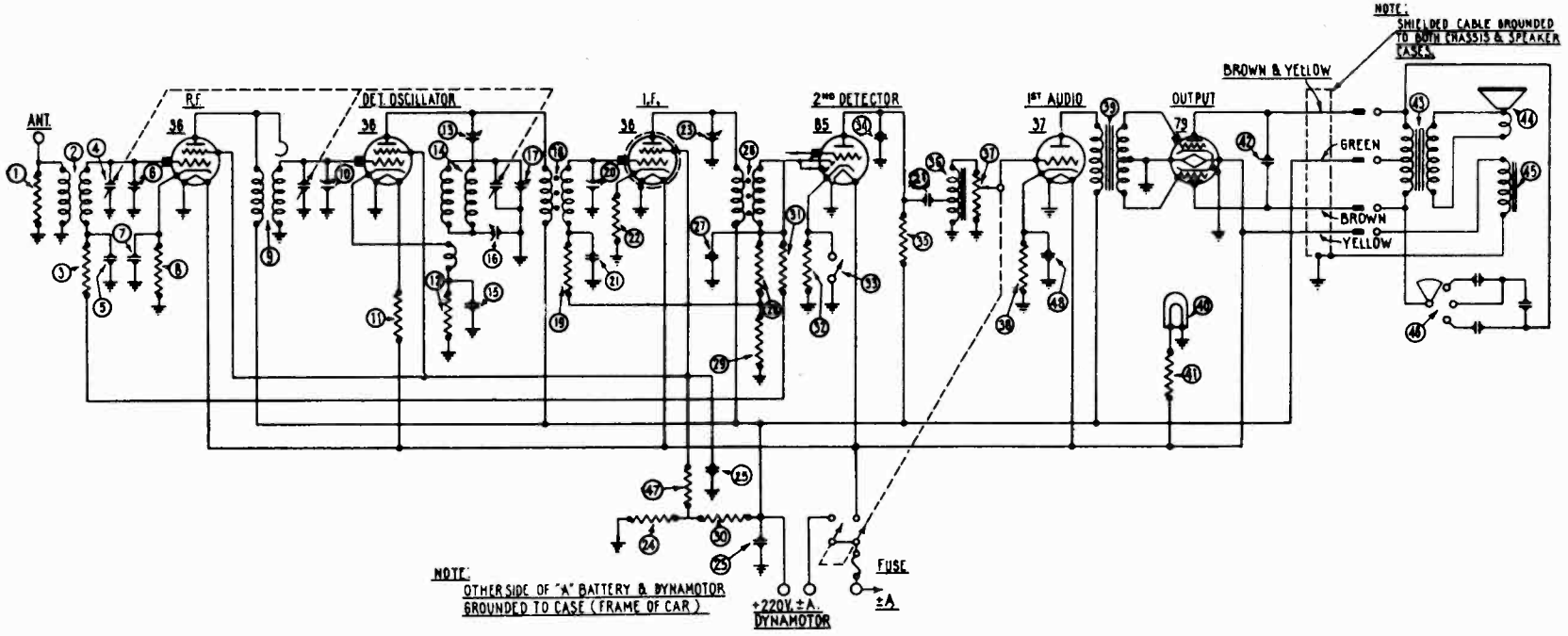
Models 8-12	Model 7	Description	Part No.
①	①	Resistor (5,000 Ohms)	6096
②	②	Antenna Coil	04348
③	③	Resistor (99,000 Ohms)	6099
④	④	Tuning Condenser Assembly	04308
	④	Condenser (.05 Mfd.)	3615-AG
⑤		Condenser (.05 Mfd.)	3615-AN
⑥	⑤	Compensating Cond. (Part of Tuning Condenser)	
		Condenser (.05 Mfd.)	3615-AE
⑦		Resistor (500 Ohms)	6977
⑧	⑦	Detector Transformer	04509
⑨	⑧	Compensating Cond. (Part of Tuning Condenser)	
⑩	⑨	Resistor (2.7 Ohms)	6511
⑪		Condenser (.25, .5 Mfd.)	04959
		See Note 1 (.25, .25, .5 Mfd.)	05622
	⑩	Condenser (.25, .5, 20. Mfd.)	04354
⑫	⑪	Compensating Condenser	04000-A
⑬	⑫	Oscillator Coil	04508
⑭	⑬	Condenser (.0007 Mfd.)	4520
⑮	⑭	Resistor (5,000 Ohms)	6096
⑯	⑮	Compensating Cond. (Part of Tuning Condenser)	
⑰	⑯	Compensating Condenser	04000-R
⑱	⑰	Condenser (.0007 Mfd.)	5863
⑲	⑱	First I.F. Transformer	04352
⑳	⑲	Condenser (.05 Mfd.)	3615-AK
㉑	⑳	Resistor (490,000 Ohms)	6097
㉒	㉑	Compensating Condenser	04000-D
㉓		Resistor (500 Ohms)	9042
	㉒	Resistor (225 Ohms)	6107
㉔		Resistor (20,000 Ohms)	6650
㉕		Resistor (20,000 Ohms)	6649
㉖	㉓	Second I.F. Transformer	04353
㉗	㉔	Resistor (99,000 Ohms)	6099
㉘	㉕	Resistor (99,000 Ohms)	6099
㉙	㉖	Compensating Condenser	04000-A
㉚	㉗	Condenser (.00025 Mfd.)	3082
㉛	㉘	Resistor (490,000 Ohms)	6097
㉜		Switch (See Note 2)	
㉝		Condenser (.00125 Mfd.)	5886
	㉙	Condenser (.001 Mfd.)	5215
㉞	㉚	R.F. Choke	04342
㉟		Condenser (.00125 Mfd.)	5886
	㉛	Condenser (.001 Mfd.)	5215
㊱	㉜	Condenser (.25 Mfd.) See Note 3	04360
㊲		Resistor (50,000 Ohms)	6098
	㉝	Resistor (50,000 Ohms)	4237
㊳		Audio Choke	6602
	㉞	Audio Choke	5930
㊴	㉟	Condenser (.01 Mfd.)	3903-Y
㊵		Volume Control (Note 2)	7322
	㊱	Volume Control	6109
㊶		Input Transformer	6582
㊷	㊲	Resistor (700 Ohms)	6443

Models 8-12	Model 7	Description	Part No.
㊸	㊳	Pilot Lamp	4567
㊹	㊴	Resistor (7 Ohms)	5110
㊺	㊵	Condenser (.002 Mfd.)	6583
㊻	㊶	Tone Control	05366
㊼		Output Transformer	2565
	㊷	Output Transformer	2598
㊽	㊸	Cone and Voice Coil	02823
㊾	㊹	Field Coil Assembly (6V)	02794
㊿		Resistor (30 Ohms)	7155
	㊺	1 Amp. Fuse	4540
	㊻	10 Amp. Fuse	5676
		15 Amp. Fuse	7227
㊿①		Field Coil Assembly (12V)	02688
		Battery Cable (Model 7)	04416
		Battery Cable (Model 8-12)	05419
		Plug (Model 7)	4539
		Cap (Model 7)	4885
		Plug (Model 8)	7122
		Cap (Model 8)	7123
		Fibre Wrench	3164
		Control Unit Assembly	04343
		Control Housing Cover	6030
		Key (Interchangeable)	6091
		Speaker Extension Cable	02984
		Spark Plug Resistor	4531
		Distributor Head Resistor	4546
		Special Resistor (Screw Type)	4581
		Interference Condenser	4522
		Philco I. F. Oscillator—Model 095	
		Type 36 Tube	5582
		Type 38 Tube	5584
		Type 41 Tube	6446
		Knobs	5166
		Receiver Housing	6058
		Speaker Housing	2710
		Dynamotor Complete—Model EA	05388
		Dynamotor Complete—Model EC	05424
		Dynamotor Only 6V	6651
		Dynamotor Only 12V	7165
		Dynamotor Filter Choke	6658
		Dynamotor Filter Condenser	05386
		Dynamotor Housing	6655
		Large Battery Box (Complete)	04585
		Small Battery Box (Complete)	04581
		Receiver Studs	6122
		Shielded Loom	L-1387

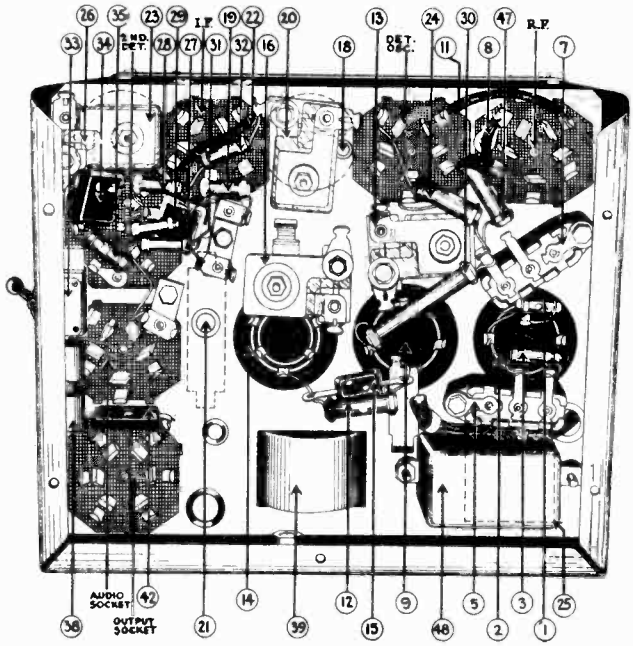
18" Volume Control Shaft	6351
18" Tuning Control Shaft	6352
32" Volume Control Shaft	6128
32" Tuning Control Shaft	6129
48" Volume Control Shaft	6298
48" Tuning Control Shaft	6299
120" Volume Control Shaft	6355
120" Tuning Control Shaft	6356

NOTE 1—In some Receivers, 04959 is replaced by 05622. ㉜ is omitted and a .25 Mfd. section of 05622 is used in its place.
NOTE 2—Switch ㉜, in fig. 4 is integral part of volume control ㊱, part No. 7322.

MODEL 9


ANT.
R.F.
DET. OSCILLATOR
I.F.
2ND DETECTOR
1ST AUDIO
OUTPUT
36
36
36
85
37
79
BROWN & YELLOW
NOTE:
SHIELDED CABLE GROUNDED TO BOTH CHASSIS & SPEAKER CASES.
GREEN
BROWN
YELLOW
NOTE:
OTHER SIDE OF "A" BATTERY & DYNAMOTOR GROUNDED TO CASE (FRAME OF CAR)
+220V. ±A.
DYNAMOTOR
FUSE
±A

MODEL 9

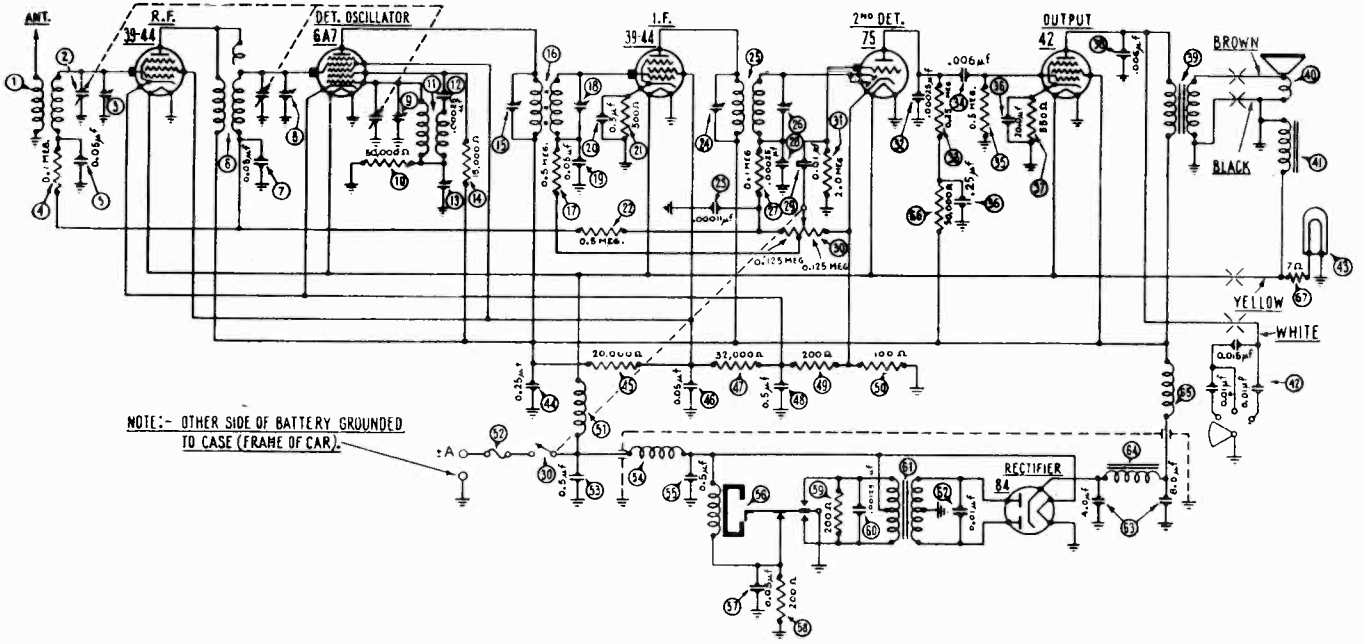


PARTS LIST

No. in Figs. 1 and 2	Description	Part No.
1	Resistor (5,000 ohm)	6096
2	Antenna Coil	06574
3	Resistor (100,000 ohm)	6099
4	Tuning Condenser	04308
5	By-pass Condenser (.05 mfd.)	3615-AN
6	Compensator section on tuning condenser	
7	By-pass Condenser	3615-AY
8	Resistor (500 ohm)	6977
9	R. F. Transformer	05902
10	Compensator section on tuning condenser	
11	Resistor (2.7 ohm)	6511
12	Resistor (6,000 ohm)	7352
13	Compensator	04000-A
14	Oscillator Coil	05975
15	Condenser (.0007 mfd.)	4520
16	Compensating Cond.	04000-S
17	Compensator section on tuning condenser	
18	First I. F. Transformer	05970
19	Resistor (500,000 ohm)	6097
20	Compensating Cond.	04000-D
21	Condenser (.05 mfd., .15 mfd.)	06091
22	Resistor (500 ohm)	6977
23	Compensating Cond.	04000-D
24	Resistor (20,000 ohm)	6650
25	Condenser (.5 mfd., .25 mfd.)	06088
26	Second I. F. Transformer	05901
27	Condenser (.00025 mfd.)	3082
28	Resistor (100,000 ohm)	6099
29	Resistor (100,000 ohm)	6099
30	Resistor (20,000 ohm)	6649
31	Resistor (500,000 ohm)	6097
32	Resistor (5,000 ohm)	6096
33	Switch	5462
34	Condenser (.00125 mfd.)	5886
35	Resistor (50,000 ohm)	4518
36	Audio Transformer	7552
37	Volume Control	7525
38	Resistor (2,500 ohm)	7775
39	Input Transformer	7652
40	Pilot Lamp	4567
41	Resistor (7 ohm)	5110
42	Condenser (.06 mfd.)	6359
43	Output Transformer	2515

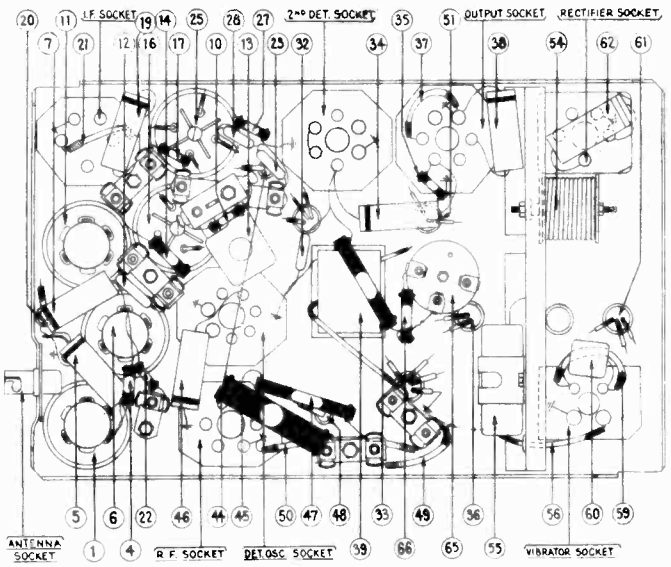
No. in Figs. 1 and 2	Description	Part No.
44	Speaker Coil and Cone	02823
45	Speaker Field Pot	02795
46	Tone Control	05366
47	Resistor (25,000 ohm)	4516
48	Condenser	7774
	Complete Speaker Assembly (Model 6)	A-4
	Complete Speaker Assembly (Model 7)	A-4
	Complete Speaker Assembly (Model 8)	A-5
	Complete Speaker Assembly (Model 9)	A-7
	Complete Speaker Assembly (Model 12)	A-6
	Complete Speaker Assembly (Model B-6)	A-8
	Interstage Shield	05910
	Dynamotor ED	06084
	Dynamotor EA (for battery replacements)	05388
	Receiver Studs	6122
	Shielded Loom (18" high tension shield)	L-1387
	Shielded Loom (30" high tension shield)	L-1386
	Spark Plug Resistor	4531
	Distributor Resistor	4546
	Screw Type Resistor	4851
	Interference Condensers	4522
	Knobs	5166
	Speaker Extension Cables	02984
	Dynamotor Filter Choke	6658
	Dynamotor Filter Condenser (large unit)	05386
	Dynamotor Filter Condenser (small unit)	05724
	Dynamotor RF Choke	05723
	Battery Cable	05419-D
	18" Volume Control Shaft	6351
	18" Tuning Control Shaft	6352
	32" Volume Control Shaft	6128
	32" Tuning Control Shaft	6129
	48" Volume Control Shaft	6298
	48" Tuning Control Shaft	6299
	120" Volume Control Shaft	6355
	120" Tuning Control Shaft	6356
	Philco Oscillator (for adjusting Models 3, 6, 7, 8, 9)	095
	Fibre Wrench	3164

MODEL 10



I. F. 260 K. C.

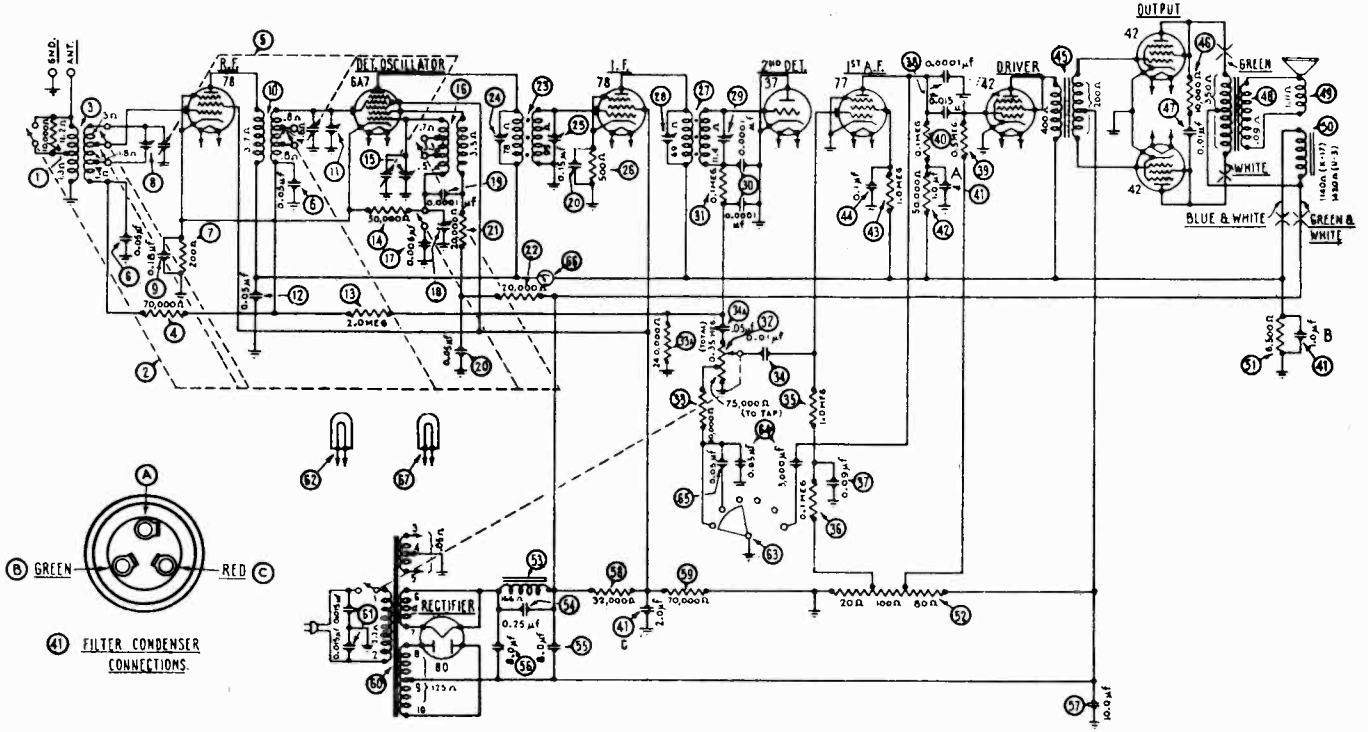
MODEL 10



MODEL 10 PARTS LIST

(1)	Antenna Transformer	32–1220
(2)	Tuning Condenser	30–1083
(3)	1st Padder (in tuning cond.)	
(4)	Resistor (100,000 ohms)	6099
(5)	Condenser (.05 mfd.)	30–4020
(6)	R. F. Transformer	32–1221
(7)	Condenser (.05 mfd.)	30–4020
(8)	2nd Padder (in tuning cond.)	
(9)	3rd Padder (in tuning cond.)	
(10)	Resistor (50,000 ohms)	6098
(11)	Oscillator Transformer	32–1222
(12)	Condenser (.00025 mfd.)	3082
(13)	Padder	040008
(14)	Resistor (15,000 ohms)	6208
(15)	Padder (prim. 1st I. F.)	31–6007
(16)	I. F. Transformer (1st)	38–5274
(17)	Resistor (500,000 ohms)	6097
(18)	Padder (secondary 1st I. F.)	31–6007
(19)	Condenser (.05 mfd.)	30–4020
(20)	Condenser (.5 mfd.)	30–4058
(21)	Resistor (500 ohms)	6977
(22)	Resistor (500,000 ohms)	6097
(23)	Condenser (.00011 mfd.)	4519
(24)	Padder (prim. 2nd I. F.)	31–6008
(25)	I. F. Transformer (2nd)	38-5275
(26)	Padder (secondary 2nd I. F.)	31–6008
(27)	Resistor (100,000 ohms)	6099
(28)	Condenser (.00025 mfd.)	3082
(29)	Condenser (.01 mfd.)	30–4051
(30)	Vol. Control Assembly	38–5280
(31)	Resistor (2,000,000 ohms)	33–1025
(32)	Condenser (.00025 mfd.)	5828
(33)	Resistor (250,000 ohms)	3768
(34)	Condenser (.006 mfd.)	30–4024
(35)	Resistor (500,000 ohms)	6097
(36)	Condenser (20 mfd.; 25mfd.)	30–2027
(37)	Resistor (550 ohms)	6977
(38)	Condenser (.006 mfd.)	30–4024
(39)	Output Transformer	32–7106
(40)	Cone and Coil	36–3020
(41)	Field Coil Assembly	36–3120
(42)	Tone Control	30–4056
(43)	Pilot Lamp	6608
(44)	Condenser (.25 mfd.)	04360
(45)	Resistor (20,000 ohms)	6649
(46)	Condenser (.05 mfd.)	30–4020
(47)	Resistor (32,000 ohms)	3525
(48)	Condenser (.5 mfd.)	30–4048
(49)	Resistor (200 ohms)	7217
(50)	Resistor (100 ohms)	7838
(51)	A Choke	32–7109
(52)	15 Amp. Fuse	7227
(53)	Condenser (.5 mfd.)	30–4061
(54)	Vibrator Choke	32–1235
(55)	Condenser (.5 mfd.)	30–4061
(56)	Vibrator	38–5036
(57)	Condenser (.05 mfd.)	30–4039
(58)	Resistor (200 ohms)	7217
(59)	Resistor (200 ohms)	7217
(60)	Condenser (.00125 mfd.)	5886
(61)	Power Transformer	32–7098
(62)	Condenser (.01 mfd.)	30–4051
(63)	Filter Condenser	30–2015
(64)	B Chokes	32–7038
(65)	R. F. Chokes	32–1078
(66)	Resistor (50,000 ohms)	4237
(67)	Resistor (7 ohms)	5110
	Spark Plug Resistors	4531
	Distributor Resistor	4546
	Screw Type Resistor	4851
	Interference Condenser	30–4007
	Dial	27–5022
	Studs	28–6036
	Nuts (mounting)	W55
	Knobs	03334
	Battery Cable	38–5296
	Antenna Lead	38–5161
	Control Unit Assembly	42–5056
	Acorn Nut	W821
	Key	6091

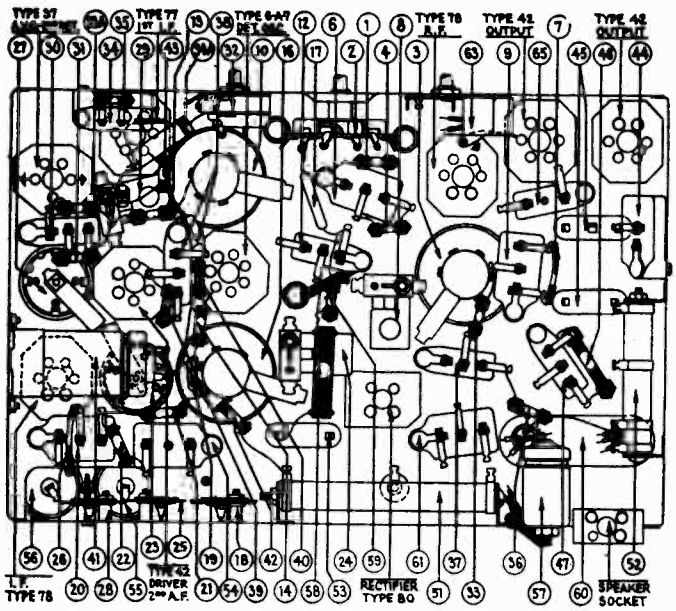
MODEL 14



I. F. 175 K. C.

NOTE: Resistance of U-3 speaker field is 1140 ohms instead of 1420 as shown on diagram above.

MODEL 14
(Codes 122 & 123)



Replacement Parts for Model 14

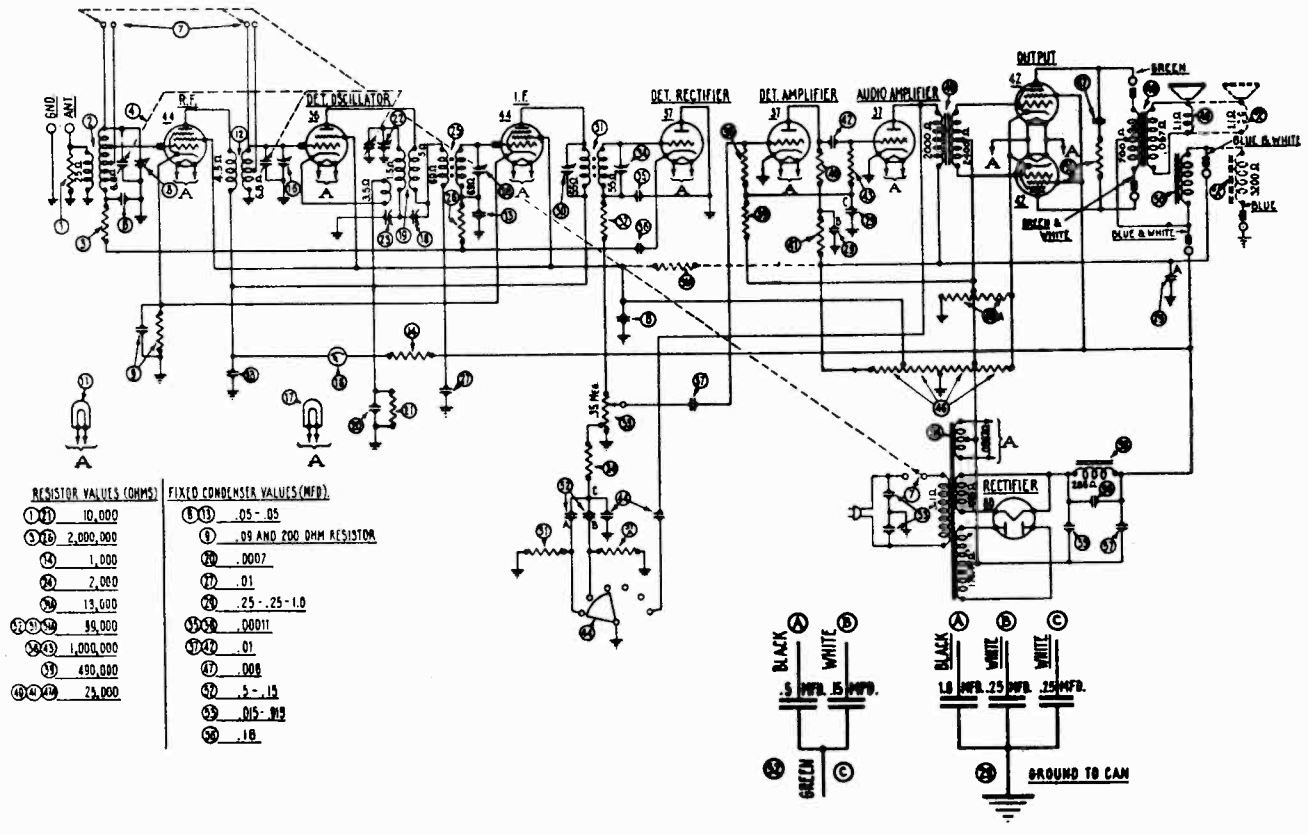
No. on Figs.	Description	Part No.
(1)	Resistor (10,000) (Brown-Black-Orange)	4412
(2)	Wave Band Switch	42-1035
(3)	Antenna Transformer	32-1261
(4)	Resistor (70,000) (Violet-Black-Orange)	5385
(5)	Tuning Condenser Assembly (Code 122)	31-1099
	Tuning Condenser Assembly (Code 123)	31-1100
(6)	Condenser (Double) (.05-.05)	3615-AM
(7)	Resistor (Flexible Wire Wound); (200) (Red-Black-Brown)	7217
(8)	Compensating Condenser (Ant.; H. F.)	04000-A
(9)	Condenser (.18)	4989-AC
(10)	Detector Transformer	32-1256
(11)	Compensating Condenser (Det.; Part of (8))	.....
(12)	Condenser (.05)	3615-AA
(13)	Resistor (2.0 meg.) (Red-Black-Green)	5872
(14)	Resistor (50,000) (Green-Brown-Orange)	4518
(15)	Compensating Condenser (Osc.; H. F.; Part of (8))	.....
(16)	Oscillator Transformer	32-1262
(17)	Condenser (.006)	6359
(18)	Compensating Condenser (Osc.; L. F.)	04000-R
(19)	Condenser (.0001)	4519
(20)	Condenser (Double); (.05-.15)	6287-M
(21)	Resistor (20,000) (Red-Black-Orange)	6650
(22)	Resistor (20,000) (Red-Black-Orange)	6650
(23)	1st, I. F. Transformer	32-1263
(24)	Compensating Condenser (1st, I. F. Pri.)	04000-J
(25)	Compensating Condenser (1st, I. F. Sec.)	04000-H
(26)	Resistor (Flexible Wire Wound) (500) (Green-Black-Brown)	6977
(27)	2nd, I. F. Transformer	32-1264
(28)	Compensating Condenser (2nd, I. F. Pri.)	04000-J
(29)	Compensating Condenser (2nd, I. F. Sec.)	04000-T
(30)	Condenser (Double); (.0001-.0001)	8035-K
(31)	Resistor (.1 meg.) (White-White-Orange)	4411
(32)	Volume Control & "On-Off" Switch	33-5024
(33)	Resistor (10,000) (Brown-Black-Orange)	4412
(33)a	Resistor (240,000) (Red-Yellow-Yellow)	4410
(34)	Condenser (.01)	3903-Z
(34)a	Condenser (.05)	30-4020
(35)	Resistor (1.0 meg.) (Brown-Black-Green)	4409
(36)	Resistor (.1 meg.) (White-White-Orange)	4411
(37)	Condenser (.09)	4989-N
(38)	Condenser (.00011)	4519
	Condenser (.015)	3793-A1
(39)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
(40)	Resistor (.1 meg.) (White-White-Orange)	4411
(41)	Electrolytic Condenser ("A"=1.0 mfd.; "B"=1.0 mfd.; "C"=2.0 mfd.)	30-2029
(42)	Resistor (50,000) (Green-Brown-Orange)	4518
(43)	Resistor (1.0 meg.) (Brown-Black-Green)	4409
(44)	Condenser (.1)	3615-BM
(45)	Input Transformer	32-7057
(46)	Resistor (10,000 ohms) (Brown-Black-Orange)	3524
(47)	Condenser (.01)	3903-P
(48)	Output Transformer	32-7052
(49)	Voice Coil and Cone Assembly	36-3061
(50)	Speaker Field Coil and Pot Assembly (U-3)	36-3162
(51)	Resistor (Wire Wound); (6,500)	33-3033
(52)	Voltage Divider Resistor (Wire Wound)	33-3032
(53)	Filter Choke	32-7115
(54)	Condenser (.25 mfd.)	6287-N
(55)	Condenser (Electrolytic), (8.0 mfd.) (Code122)	30-2022
	Condenser (Electrolytic), (8.0 mfd.) (Code123)	7464
(56)	Condenser (Electrolytic), (8.0 mfd.) (Code122)	30-2025
	Condenser (Electrolytic), (8.0 mfd.) (Code123)	7464
(57)	Condenser (Electrolytic), (10.0 mfd.)	30-2003
(58)	Resistor (32,000) (Orange-Red-Orange)	33-1026
(59)	Resistor (70,000) (Violet-Black-Orange)	5385
(60)	Power Transformer (50-60 cycles)	32-7111
(61)	Condenser (Double); (.015-.015)	3793-R
(62)	Pilot Lamp (Station Selector)	6608
(63)	Tone Control	30-4073
(64)	Condensers, (Internal to (63))	.....
(65)	Condenser, (External to (63))	3615-G
(66)	Shadow Tuning Meter	6497
(67)	Pilot Lamp; (Part of (66) Shadow Tuning Meter)	.....
	Shield ("Push-on" Button)	W-775
	Tube Shield	28-1107
	Four-Prong Tube Socket	7544
	Five-Prong Tube Socket	7546
	Six-Prong Tube Socket	7547
	Seven-Prong Tube Socket	27-6005
	Speaker Socket	4957
	Dial Scale (Station Selector)	27-5013
	Mounting Bolt (Chassis)	W-567
	Mounting Washer (Chassis)	5189
	Mounting Washer (Chassis)	5058
	Knob (large)	03063
	Knob (small)	03064
	Knob Spring	5262
	Bezel	6418
	Bezel Mounting Screw	W-452
	Bezel Felt	6732
	Speaker (K-17) (Baby Grand Only) Output Transformer	32-7078
	Speaker (K-17) (Baby Grand Only) Voice Coil & Cone Assembly	36-3020
	Speaker (K-17) (Baby Grand Only) Speaker Field & Pot Assembly	36-3194
	Speaker Socket *Hole Cover*	7084
	Speaker Cable	L-1632

NOTE 1: In code 122 starting with run No. 3, condensers 55 and 57 are replaced by one condenser, part No. 30-2045, capacity 8 Mfd. and 10 Mfd.

NOTE 2: Starting with run No. 2, condenser 3903Z (.01 Mfd.) is superseded by No. 4989AJ (.09 Mfd.).

NOTE 3: Starting with run No. 2, resistor No. 4411 (.1 Meg.) is superseded by part 4517 (.5 Meg.).

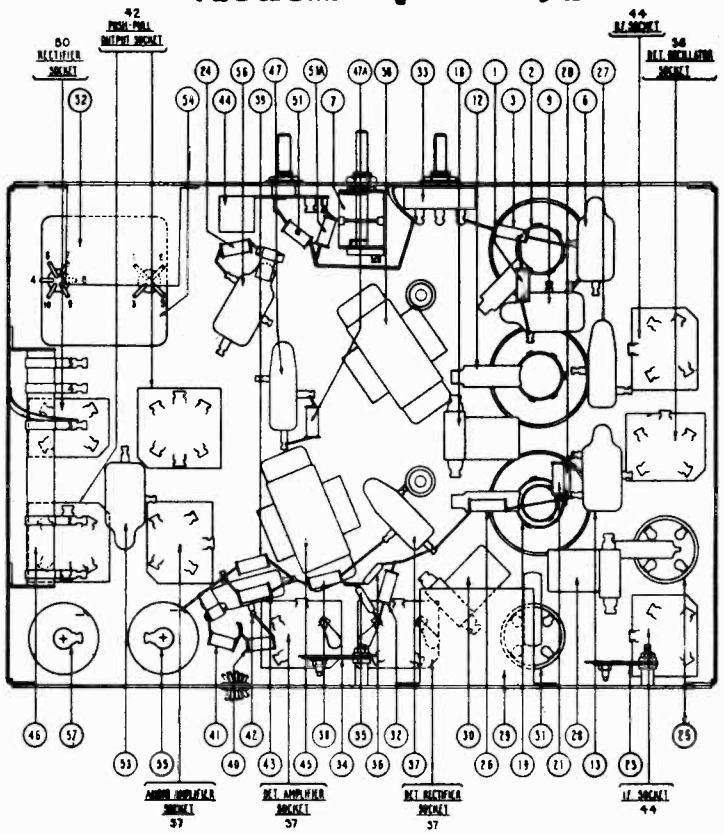
MODELS 14 AND 91



RESISTOR VALUES (OHMS)	
1 21	10,000
5 16	2,000,000
14	1,000
24	2,000
29	13,000
32 51 54	99,000
34 43	1,000,000
39	490,000
40 41 44	25,000

FIXED CONDENSER VALUES (MFD)	
8 11	.05 - .05
9	.09 AND 200 OHM RESISTOR
20	.0007
22	.01
28	.25 - .25 - 1.0
35 36	.00011
37 42	.01
47	.008
52	.5 - .15
53	.015 - MG
56	.10

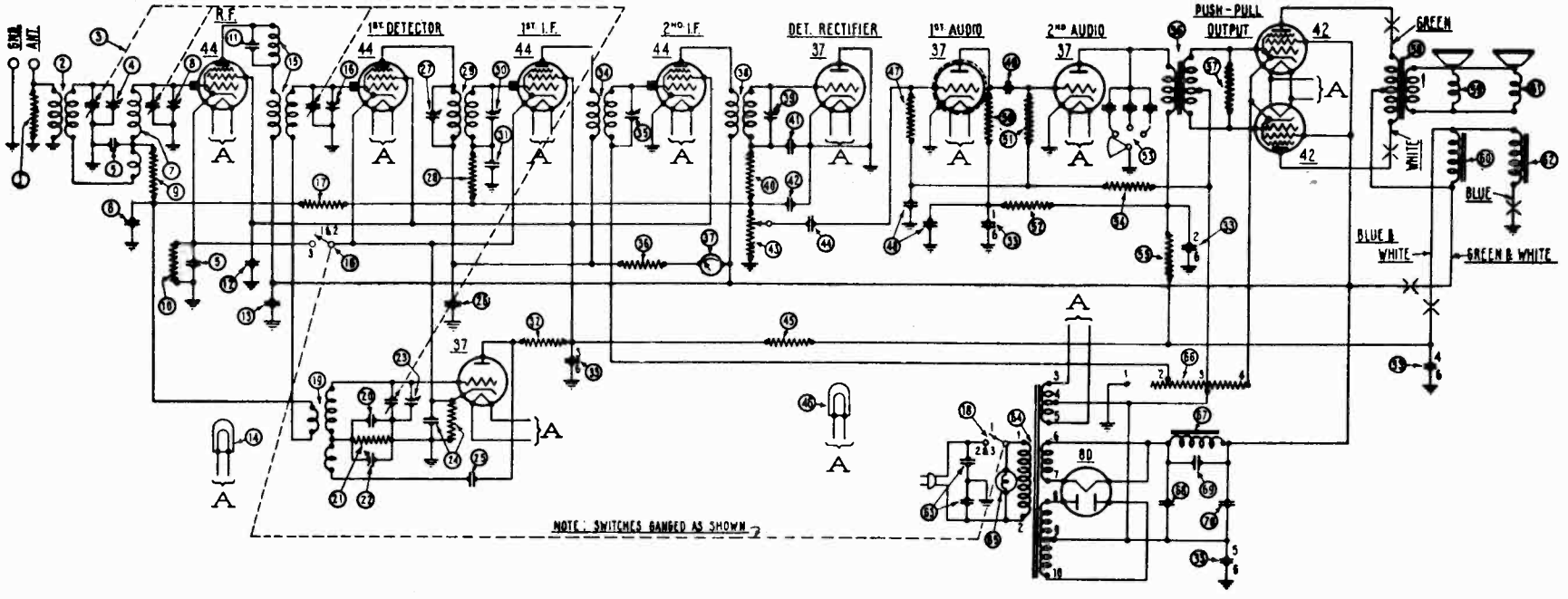
Models 14 and 91



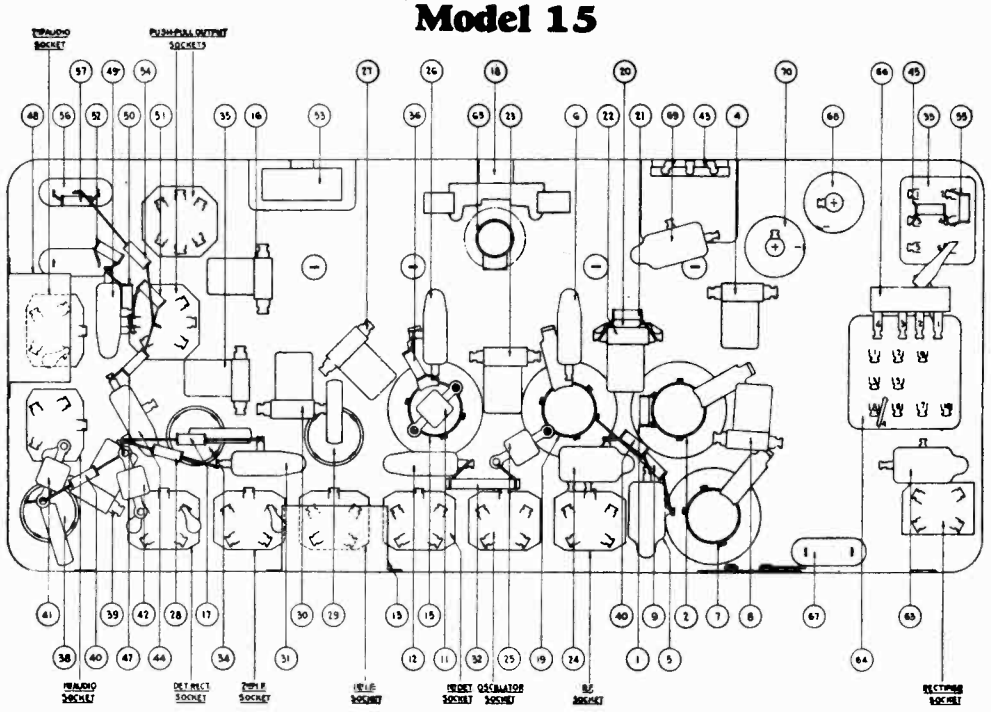
REPLACEMENT PARTS

No. on Figs.	Description	Part No.
①	Resistor (Brown-Black-Orange)	4412
②	R.F. Transformer	32-1069
③	Resistor (Red-Black-Green)	5872
④	Tuning Condenser Assembly	04790
⑤	Compensating Cond. (R.F.) Part of ④	
⑥	Condenser	3615-AM
⑦	"On-Off" and Frequency Switch	42-1002
⑨	Condenser (and Resistor)	6287-C
⑪	Pilot Lamp (Philco Scale)	6608
⑫	Detector Transformer	32-1070
⑬	Condenser	3615-AJ
⑭	Resistor (Brown-Black-Red)	5837
⑮	Compensating Cond. (Detector) Part of ④	
⑯	Tuning Meter	6497
⑰	Pilot Lamp (Tuning Meter)	6608
⑱	Compensating Cond. (1st I.F. Primary)	04000-M
⑲	Oscillator Coil	05985
⑳	Condenser (White and Yellow)	4520
㉑	Resistor (Brown-Black-Orange)	4412
㉒	Comp. Cond. (High Freq.) Part of ④	
㉓	Compensating Condenser (Low Freq.)	04000-B
㉔	Resistor (Red-Black-Red)	6984
㉕	First I.F. Transformer	04319
㉖	Resistor (Red-Black-Green)	5872
㉗	Condenser	3903-AE
㉘	Comp. Cond. (1st I.F. Secondary)	04000-M
㉙	Filter Condenser Bank	04830
㉚	Comp. Cond. (2d I.F. Primary)	04000-M
㉛	Second I.F. Transformer	04320
㉜	Resistor (White-White-Orange)	4411
㉝	Volume Control	8054
㉞	Comp. Cond. (2nd I.F. Secondary)	04000-M
㉟	Condenser (Blue and Golden Yellow)	4519
㊱	Condenser (Blue and Golden Yellow)	4519
㊲	Condenser	3903-P
㊳	Resistor (Brown-Black-Green)	4409
㊴	Resistor (Yellow-White-Yellow)	4517
㊵	Resistor (Red-Green-Orange)	4516
㊶	Resistor (Red-Green-Orange)	4516
㊷	Condenser	3903-P
㊸	Resistor (Brown-Black-Green)	4409
㊹	Tone Control	06698
㊺	Push-Pull Input Transformer	6064
㊻	B.C. Resistor (Wire Wound)	6702
㊻a	B.C. Resist. (Wire Wound) Twin Speaker	6808
㊼	Condenser	7625-B
㊼a	Resistor (Red-Green-Orange)	4516
㊽	Push-Pull Output Trans. (Sing. Speaker)	2585
	Push-Pull Output Trans. (Twin Speaker)	2565
㊾	Voice Coil and Cone Assembly (K-6 and K-12)	02823
㊾a	Voice Coil and Cone Assembly (H-7) Twin Speaker Model	02807
㊿	Speaker Field Assembled with Pot (K-6 and K-12)	02803
㊿a	Speaker Field Assembled with Pot (H-7) Twin Speaker Model	02803
(51)	Resistor (White-White-Orange)	4411
(51)a	Resistor (White-White-Orange)	4411
(52)	Condenser Bank	06713
(53)	Condenser (Double)	3793-E
(54)	Power Trans. (50-60 cycles) Sing. Speak'r	6554
	Power Trans. (25-40 cycles) Sing. Speak'r	6555
	Power Trans. (50-60 cycles) Twin Speak'r	6804
	Power Trans. (25-40 cycles) Twin Speak'r	6805
(55)	Electrolytic Cond. (6 MFD) Sing. Sp'ker	4916
	Electrolytic Cond. (8 MFD) Twin Sp'ker	7464
(56)	Condenser	4989-T
(57)	Electrolytic Cond. (6 MFD) Sing. Sp'ker	4916
	Electrolytic Cond. (8 MFD) Twin Sp'ker	7464
(58)	Filter Choke	4819
	Tube Shields	8005
	Knob (Large)	03063
	Knob (Medium)	03064
	Knob (Small)	03437
	Four Prong Socket	5026
	Five Prong Socket	4956
	Six Prong Socket	6417
	Dial, Complete	04832
	Bezel	6418

Model 15


R.F.
1ST DETECTOR
1ST I.F.
2ND I.F.
DET. RECTIFIER
1ST AUDIO
2ND AUDIO
PUSH-PULL OUTPUT
GREEN
WHITE
BLUE
BLUE & WHITE
GREEN & WHITE
80
NOTE: SWITCHES GANGED AS SHOWN

Model 15

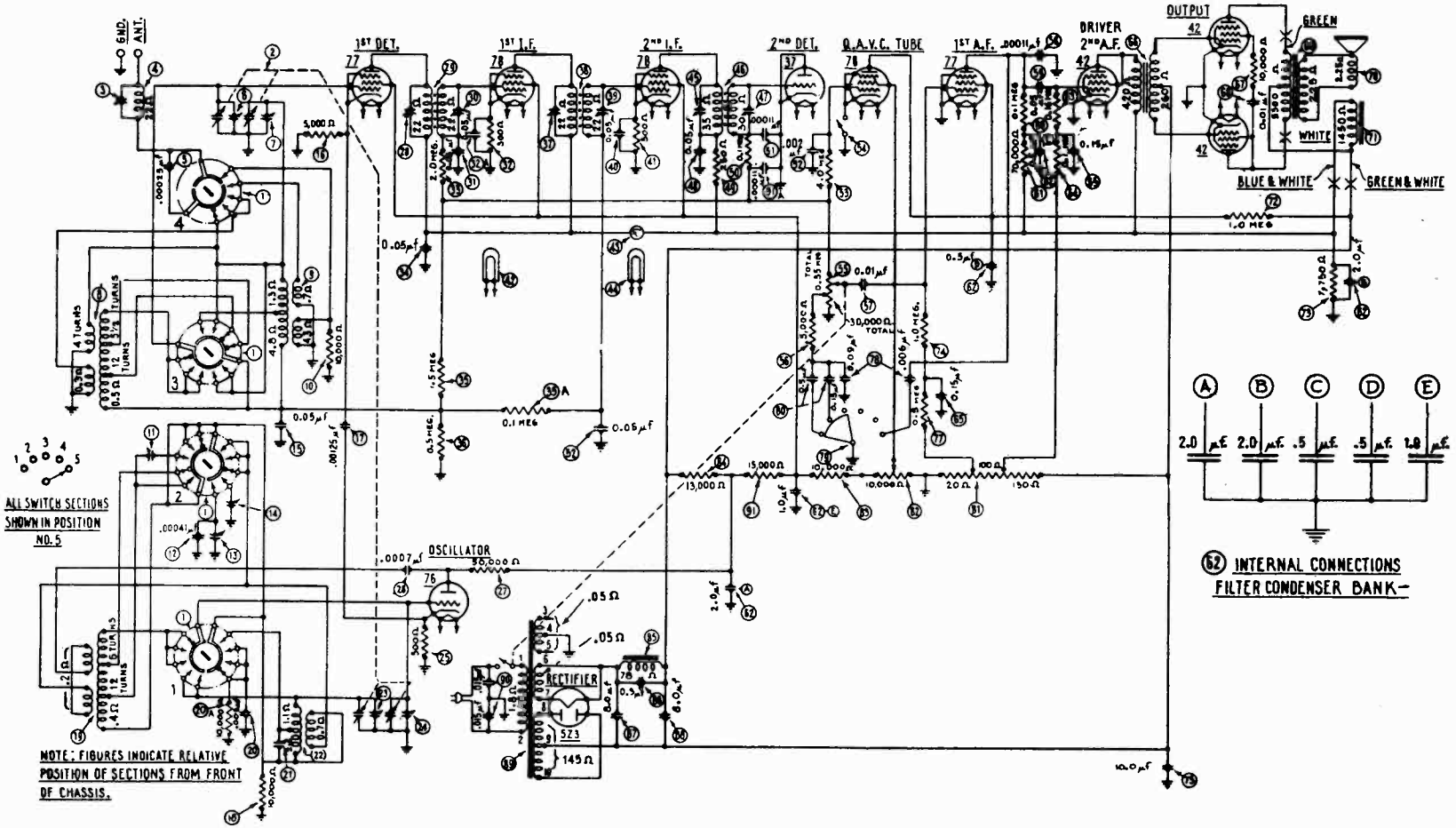


REPLACEMENT PARTS MODEL 15

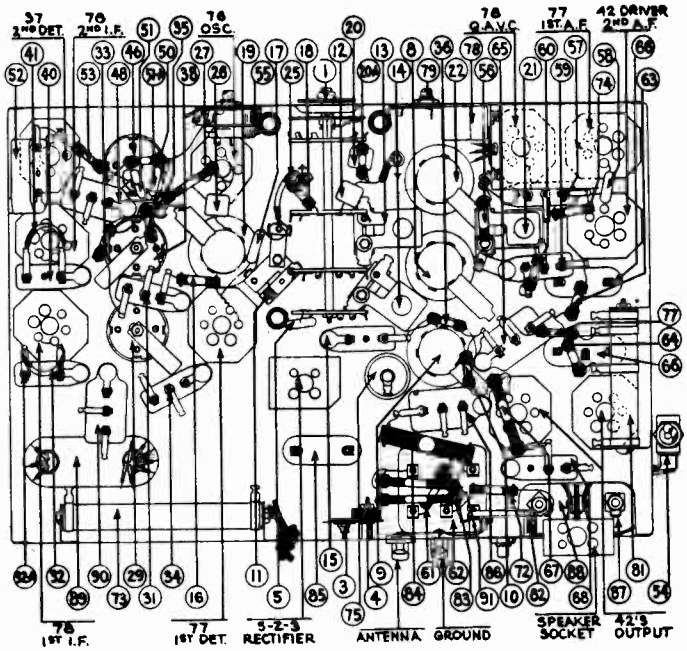
No. on Figs. 1 and 2	Description	Part No.
①	Resistor (10,000 ohms)	4412
②	First R. F. Coil	04981
③	Tuning Condenser Assembly	04941
④	Compensating Condenser—First Antenna	04000-E
⑤	Condenser (.05 mfd.) Double	3615-AM
⑥	Condenser (.05 mfd.)	3615-L
⑦	Second R. F. Coil	04982
⑧	Compensating Condenser—Second Antenna	04000-E
⑨	Resistor (490,000 ohms)	4517
⑩	Resistor (160,000 ohms)	5331
⑪	Condenser (35 mmf.)	4990
⑫	Condenser (.09 mfd.)	4989-D
⑬	Condenser (.25 mfd.)	4264
⑭	Pilot Light	6608
⑮	Detector Transformer	3884-V
⑯	Compensating Condenser—Detector	04000-E
⑰	Resistor (490,000 ohms)	4517
⑱	Distance Switch and Power Switch	6438
⑲	Oscillator Coil	04983
⑳	Condenser (700 mmmf.)	4520
㉑	Resistor (51,000 ohms)	4518
㉒	Compensating Condenser—Low Frequency	04000-F
㉓	Compensating Condenser—High Frequency	04000-E
㉔	Condenser (.09 mfd. and 200 ohm Resistor)	4989-R
㉕	Condenser (110 mfd.)	4519
㉖	Condenser (.05 mmf.)	3615-J
㉗	Compensating Condenser—First I. F. Primary	04000-J
㉘	Resistor (1,000,000 ohms)	4409
㉙	First I. F. Transformer	03038
㉚	Compensating Condenser—First I. F. Secondary	04000-J
㉛	Condenser (.05 mfd.)	3615-J
㉜	Resistor (13,000 ohms)	3766
㉝	Filter Condenser (.015, 3-.5, 1. mfd.) 50-60 cycles	03489
㉞	Second I. F. Transformer	04979
㉟	Compensating Condenser—Second I. F. Secondary	04000-J
㊱	Resistor (1,000 ohms)	5837
㊲	Shadow Tuning Meter	6497
㊳	Third I. F. Transformer	03345
㊴	Compensating Condenser—Third I. F. Secondary	04000-J
㊵	Resistor (99,000 ohms)	4411
㊶	Condenser (110 mmf.)	4519
㊷	Condenser (110 mmf.)	4519
㊸	Volume Control	4694

No. on Figs. 1 and 2	Description	Part No.
㊹	Condenser (.01 mfd.)	3903-AD
㊺	Resistor (5,000 ohms)	5310
㊻	Pilot Light (Shadow Tuning)	6608
㊼	Resistor (1,000,000 ohms)	4409
㊽	Condenser (.25 mfd. Double)	3557
㊾	Condenser (.01 mfd.)	3903-T
㊿	Resistor (25,000 ohms)	4516
(51)	Resistor (1,000,000 ohms)	4409
(52)	Resistor (10,000 ohms)	4412
(53)	Tone Control	04787
(54)	Resistor (490,000 ohms)	4517
(55)	Resistor (5,000 ohms)	5310
(56)	Input Transformer	5062
(57)	Resistor (240,000 ohms) across volume control ends—not illustrated	4410
(58)	Output Transformer	2565
(58a)	Condensor (.002 Mfd.) Blue—across primary of output transformer—not illustrated	6853
(59)	Voice Coil and Cone Assembly (Large) H-7	02807
(60)	Field Coil Assembled with Pot (H-7)	02770
(61)	Voice Coil and Cone Assembly (Small) K-12	02823
(62)	Field Coil Assembled with Pot (K-12)	02803
(63)	Condenser (.015 mfd. Double)	3793-E
(64)	Power Transformer (50-60 cycles)	6672
	Power Transformer (25-40 cycles)	6673
	Power Transformer (50-60 cycles, 230 volts)	6674
(65)	Cabinet Lamp	6600
(66)	Resistor (50 ohms, 50 ohms, 205 ohms)	6700
(67)	Filter Choke	3422
(68)	Electrolytic Condenser (6 mfd.)	6707
(69)	Condenser (.18 mfd.)	4989-K
(70)	Electrolytic Condenser (6 Mfd.)	6706
	Knob (Large)	03063
	Knob (Medium)	03064
	Knob (Small)	03437
	Knob Spring (Large)	4147
	Knob Spring (Small)	5262
	Tube Shield	04962
	Grid Clips	4897
	Four Prong Socket	5026
	Five Prong Socket	4956
	Six Prong Socket	6417
	Dial Scale	4276
	Bezel	6433
	Pilot Bracket Complete	05016
	Cabinet Lamp Socket	6584
	Cabinet Lamp Socket Insulator	6605
	Cone Retaining Ring	2600

MODEL 16


GND.
ANT.
1ST DET.
77
1ST I.F.
78
2ND I.F.
78
2ND DET.
37
A.V.C. TUBE
78
1ST A.F.
77
DRIVER
2ND A.F.
42
OUTPUT
42
GREEN
WHITE
BLUE & WHITE
GREEN & WHITE
OSCILLATOR
76
RECTIFIER
523
145 Ω
ALL SWITCH SECTIONS SHOWN IN POSITION NO. 5
NOTE: FIGURES INDICATE RELATIVE POSITION OF SECTIONS FROM FRONT OF CHASSIS.
A
B
C
D
E
2.0 μf.
2.0 μf.
.5 μf.
.5 μf.
1.0 μf.
(52) INTERNAL CONNECTIONS FILTER CONDENSER BANK—

Model 16



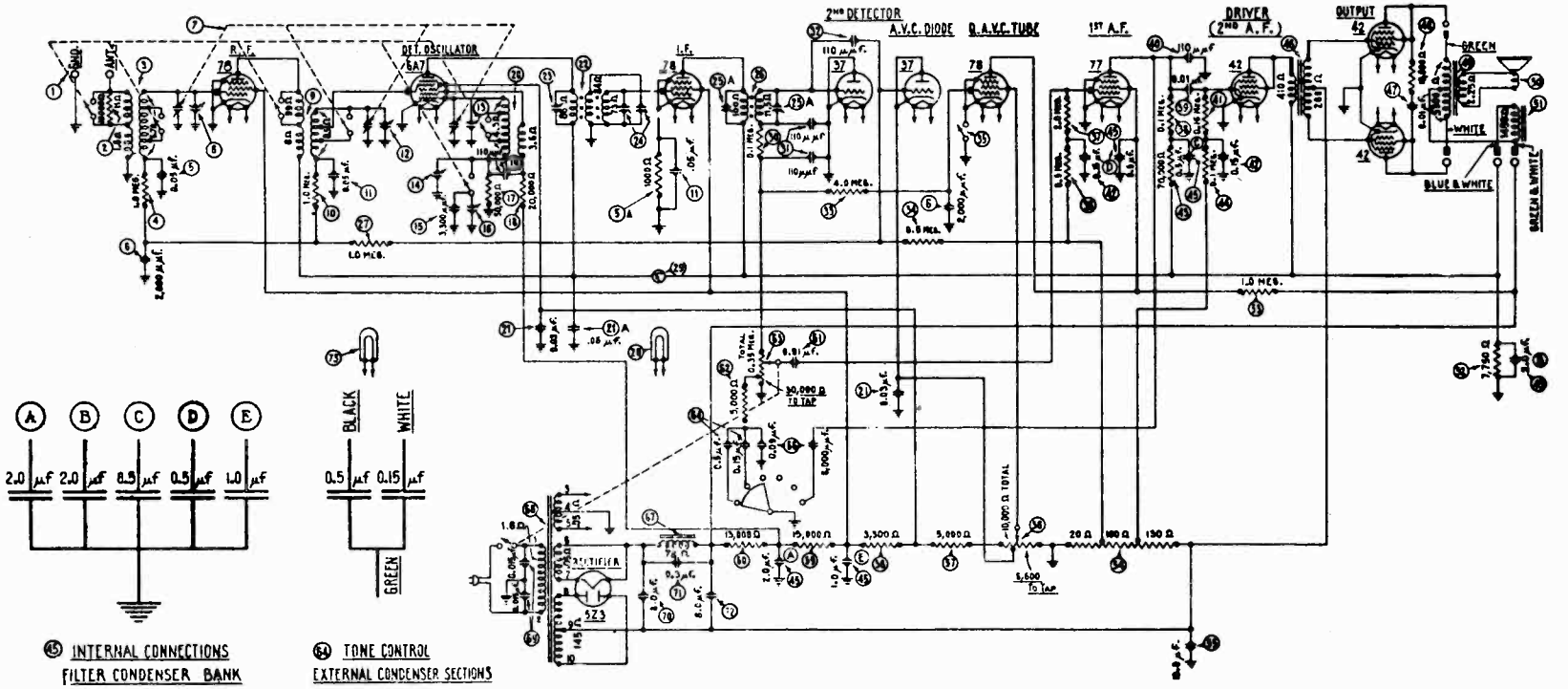
REPLACEMENT PARTS FOR MODEL 16

No. on Figs.	Description	Part No.
(1)	Wave Band Switch	42-1037
(2)	Tuning Condenser Assembly	31-1039
(3)	Compensating Condenser (Wave-trap)	38-5199
(4)	Inductance (Wave-trap)	38-5199
(5)	Condenser	5858
(6)	Compensating Condenser (Ant.; H. F.; Part of (2))	
(7)	Compensating Condenser (Ant.; Broadcast and Police; Part of (2))	
(8)	Antenna Transformer (H. F. Bands)	32-1183
(9)	Antenna Transformer (B'dc't & Police B'ds)	32-1182
(10)	Resistor (Brown-Black-Orange)	4412
(11)	Compensating Condenser (Range 3)	04000-V
(12)	Condenser	30-1000
(13)	Compensating Condenser (Range 2; series)	04000-R
(14)	Compensating Condenser (Range 1; series)	04000-R
(15)	Condenser	3615-L
(16)	Resistor (Green-Black-Red)	5310
(17)	Condenser	5886
(18)	Resistor (Brown-Black-Orange)	4412
(19)	Oscillator Coil (H. F.)	32-1185
(20)	Condenser	7301
(20)a	Resistor (Brown-Black-Orange)	4412
(21)	Compensating Condenser (Range 1; Shunt)	0-4000-A
(22)	Oscillator Coil (Broadcast and Police)	32-1184
(23)	Compensating Condenser (Osc.; H. F.; Part of (2))	
(24)	Compensating Condenser (Osc.; Police; Part of (2))	
(25)	Resistor (Flexible Wire-wound; Green-Black-Brown)	6977
(26)	Condenser	5863
(27)	Resistor (Green-Brown-Orange)	4237
(28)	Compensating Cond'ser (1st, I. F. Primary)	31-6002
(29)	1st, I. F. Transformer	32-1186
(30)	Compensating Cond'r (1st, I. F. Secondary)	Common with (28)
(31)	Condenser	3615-AB
(32)	Resistor (Flexible Wire-wound; Orange-Black-Brown)	33-3010
(32)a	Condenser	3615-AT
(33)	Resistor (Red-Black-Green)	5872
(34)	Condenser	3615-D
(35)	Resistor (Brown-Green-Green)	7009
(25)a	Resistor (White-White-Orange)	4411
(36)	Resistor (Yellow-White-Yellow)	4517
(37)	Compensating Cond'ser (2d, I. F. Primary)	31-6002
(38)	2d, I. F. Transformer	32-1186
(39)	Compensating Cond'r (2d, I. F. Secondary)	Common with (37)
(40)	Condenser	3615-AT
(41)	Resistor (Flexible Wire-wound; Green-Black-Brown)	6977
(42)	Pilot Lamp (Station Selector)	6608
(43)	Shadow Tuning Meter	6497
(44)	Pilot Lamp (Shadow Tuning Meter; Part of (43))	
(45)	Compensating Cond'ser (3d, I. F. Primary)	31-6003
(46)	3d, I. F. Transformer	32-1188
(47)	Compensating Cond'r (3d, I. F. Secondary)	Common with (46)
(48)	Condenser	3615-AS
(49)	Resistor (Part of (48))	
(50)	Resistor (White-White-Orange)	4411
(51)	Condenser	4519
(51)a	Condenser	4519
(52)	Condenser (Double)	7296-G
(53)	Resistor (Yellow-Black-Green)	6010
(54)	Switch (Toggle); Interstation Noise Suppression Circuit	42-1036
(55)	Volume Control and "On-Off" Switch	33-5013
(56)	Resistor (Green-Black-Red)	5310
(57)	Condenser	3903-J
(58)	Condenser	4519
(59)	Condenser	3615-AD
(60)	Resistor (White-White-Orange)	4411
(61)	Resistor (Violet-Black-Orange)	5385
(62)	Filter Condenser Bank	30-4026
(63)	Resistor (Brown-Blue-Yellow)	5331
(64)	Resistor (White-White-Orange)	4411
(65)	Condenser (Double)	6287-J
(66)	Input Transformer	32-7057
(67)	Resistor (Brown-Black-Orange)	3524
(68)	Condenser	3903-F
(69)	Output Transformer	32-7052
(70)	Voice Coil and Cone Assembly	36-3061
(71)	Speaker Field, Assembled with Pot (U-2)	36-3088
(72)	Resistor (Brown-Black-Green)	4409
(73)	Resistor (Wire-wound)	33-3020
(74)	Resistor (Brown-Black-Green)	4409
(75)	Condenser (Electrolytic)	30-2003
(77)	Resistor (Yellow-White-Yellow)	4517
(78)	Condenser (Internal to (79))	
(79)	Tone Control	30-4033
(80)	Condensers (External to (79))	06713
(81)	Voltage Divider Resistor (Wire-wound)	33-3021
(82)	Potentiometer (Interstation Noise Suppression Circuit)	33-5015
(83)	Resistor (Brown-Black-Orange)	3524
(84)	Resistor (Brown-Orange-Orange)	6450
(85)	Filter Choke	32-7056
(86)	Condenser	6287-F
(87)	Condenser (Electrolytic)	30-2011
(88)	Condenser (Electrolytic)	30-2011
(89)	Power Transformer (50–60 ~)	32-7058
(90)	Condenser (Double)	3793-E
(91)	Resistor (Brown-Green-Orange)	5718
	Tube Shield	28-1107
	Four-prong Socket	7545
	Five-prong Socket	7546
	Six-prong Socket	7547
	Knob (Large)	03063
	Knob (Small)	03064

NOTE.—Model 16-121 uses a Type 80 tube in lieu of 5-Z-3. Parts used in the 16-121 chassis that differ from the 16-122 parts above listed are:

(89)	Power Transformer (50–60 ~)	32-7080
(87)	Condenser (Electrolytic) (8.0 Mfd.)	6706
(88)	Condenser (Electrolytic) (8.0 Mfd.)	7464
	Speaker	K-17
	Speaker Socket	7084
	Speaker Cable	L1632

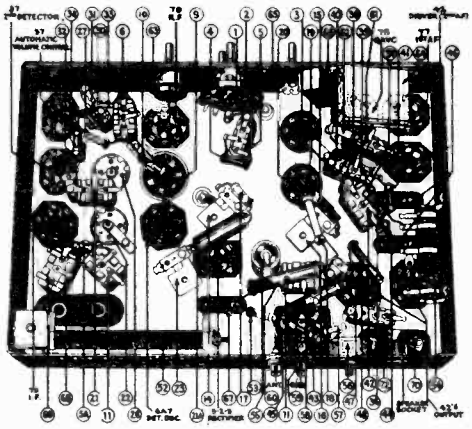
MODEL 17



(45) INTERNAL CONNECTIONS
FILTER CONDENSER BANK

(54) TONE CONTROL
EXTERNAL CONDENSER SECTIONS

MODEL 17

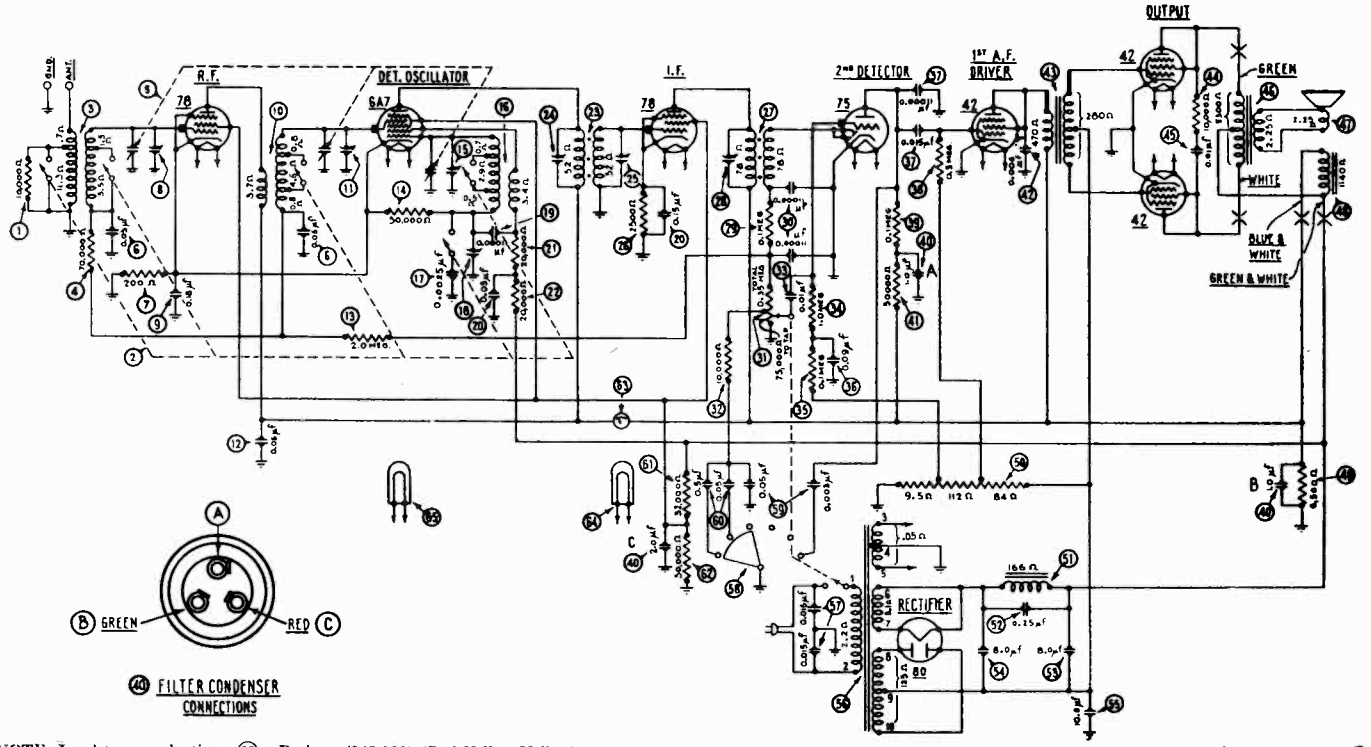


REPLACEMENT PARTS FOR MODEL 17

No. on Figs.	Description	Part Number
①	Wave Band Switch	42-1035
②	Resistor (Brown-Black-Orange)	4412
③	Antenna Transformer	32-1170
④	Resistor (Brown-Black-Green)	4409
⑤	Condenser	3615-BC
⑤a	Resistor (Brown-Black-Red)	5837
⑥	Condenser (Double)	7296-E
⑦	Tuning Condenser Assembly	31-1041
⑧	Compensating Condenser (Ant.; Part of ⑦)	
⑨	1st Detector Transformer	32-1171
⑩	Resistor (Brown-Black-Green)	4409
⑪	Condenser (Double)	3615-AP
⑫	Compensating Condenser (Det.; Part of ⑦)	
⑬	Compensating Cond. (Osc.; Part of ⑦)	
⑭	Compensating Condenser (Oscillator)	04000-R
⑮	Condenser	7301
⑯	Compensating Cond. (High Freq.)	04000-R
⑰	Resistor (Green-Brown-Orange)	4518
⑱	Resistor (Red-Black-Orange)	6649
⑲	Condenser	4519
⑳	Oscillator Transformer	32-1172
㉑	Condenser (Double)	8318-C
㉑a	Condenser	30-4012
㉒	1st I. F. Transformer	32-1173
㉓	Compensating Cond. (1st. I. F. Pri.)	04000-M
㉔	Compensating Cond. (1st. I. F. Sec.) Compensating Cond. (1st. I. F. Tert.)	31-6001
㉕	Compensating Cond. (2nd. I. F. Pri.)	31-6000
㉕a	Compensating Cond. (2nd. I. F. Sec.)	
㉖	2nd. I. F. Transformer	32-1174
㉗	Resistor (Brown-Black-Green)	4409
㉘	Pilot Lamp (Shadow Tuning Meter); (Part of ㉙)	
㉙	Shadow Tuning Meter	6497
㉚	Resistor (White-White-Orange)	4411
㉛	Condenser (Double)	8035-C
㉜	Condenser	4519
㉝	Resistor (Yellow-Black-Green)	6010
㉞	Resistor (Yellow-White-Yellow)	3769
㉟	Switch (Toggle); (Interstation Noise Supp. Ckt.)	42-1036
㊱	Resistor (Yellow-White-Yellow)	4517
㊲	Resistor (Red-Black-Green)	5872
㊳	Resistor (White-White-Orange)	4411
㊴	Condenser	3903-L
㊵	Condenser	4519
㊶	Resistor (Brown-Blue-Yellow)	5331
㊷	Condenser	6287-H
㊸	Resistor (Violet-Black-Orange)	5385
㊹	Resistor (White-White-Orange)	4411
㊺	Filter Condenser Bank	30-4026
㊻	Input Transformer	32-7057
㊼	Condenser	3903-F
㊽	Resistor (Brown-Black-Orange)	3524
㊾	Output Transformer	32-7052
㊿	Voice Coil & Cone Assembly	36-3061
(51)	Speaker Field, Assembled with Pot, (U-2)	36-3088
(52)	Resistor (Wire-Wound)	33-3020
(53)	Resistor (Brown-Black-Green)	4409
(54)	Voltage Divider Resistor (Wire-Wound)	33-3021
(55)	Condenser (Electrolytic)	30-2003
(56)	Potentiometer (Interstation Noise Supp. Ckt.)	33-5015
(57)	Resistor (Green-Black-Red)	5310
(58)	Resistor (Orange-Orange-Red)	7238
(59)	Resistor (Brown-Green-Orange)	5718
(60)	Resistor (Brown-Orange-Orange)	6450
(61)	Condenser	3903-L
(62)	Resistor (Green-Black-Red)	5310
(63)	Volume Control & "On-Off" Switch	33-5013
(64)	Condenser (External to (65))	06713
(65)	Tone Control	30-4028
(66)	Condensers (Internal to (65))	
(67)	Filter Choke	32-7056
(68)	Power Transformer (50-60 ~)	32-7058
(69)	Condenser (Double)	3793-R
(70)	Condenser (Electrolytic)	30-2011
(71)	Condenser	6287-F
(72)	Condenser (Electrolytic)	30-2011
(73)	Pilot Lamp (Station Selector)	6608
	Tube Shield	28-1107
	Four Prong Socket	7545
	Five Prong Socket	7546
	Six Prong Socket	7547
	Seven Prong Socket	27-6005
	Knob (large)	03063
	Knob (small)	03064

NOTE: Model 17-121 uses a Type 80 tube in lieu of 5Z3; Power Transformer (50-60 ~) (68) No. 32-7080; Resistors (Brown-Black-Orange) No. 33-1024 in both (59) and (60); Electrolytic Condensers (70) No. 6707 and (72) No. 7464; Speaker "K-17"; Speaker Socket No. 7084; Speaker Cable L-1632

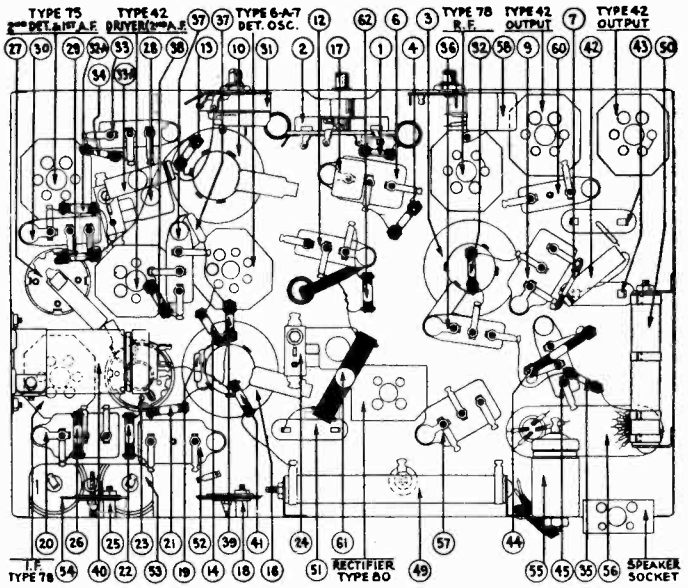
MODEL 18



NOTE: In later production—(32)-a Resistor (240,000) (Red-Yellow-Yellow), Part No. 4410—(*not* shown in Schematic), is connected *between* line running from (18) to junction of (29), (30); and ground. (33)-a Condenser (.05), Part No. 30-4020—(*not* shown in Schematic), is connected *between* high side of Volume Control (31) and junction of (29), (30). (60) External Condenser in Tone Control circuit has but one section (in later production),—the .05 mfd. on point two. Point one goes directly to (32).

NOTE: Values of primary and secondary of (46) Output Transformer, and value of (47) Voice Coil, are given in impedance at 200 cycles, 30 volts. The D. C. resistance of the primary is 350 ohms; of the secondary, .09 ohm, D. C. resistance of (47) is 1.11 ohm.

MODEL 18



REPLACEMENT PARTS FOR MODEL 18

No. on Fig.	Description	Part No.
(1)	Resistor (10,000) (Brown-Black-Orange)	4412
(2)	Wave Band Switch	42-1046
(3)	Antenna Transformer	32-1255
(4)	Resistor (70,000) (Violet-Black-Orange)	5385
(5)	Tuning Condenser Assembly	31-1110
(6)	Condenser (Double) (.05-.05)	3615-AM
(7)	Resistor (Flexible Wire-Wound) (200) (Red-Black-Brown)	7217
(8)	Compensating Condenser (Ant.; H. F.; Part of (5))	....
(9)	Condenser (.18)	4989-AC
(10)	Detector Transformer	32-1256
(11)	Compensating Condenser (Det.; Part of (5))	....
(12)	Condenser (.05)	3615-AA
(13)	Resistor (2.0 meg.) (Red-Black-Green)	5872
(14)	Resistor (50,000) (Green-Brown-Orange)	4518
(15)	Compensating Condenser (Osc.; H. F.; Part of (5))	....
(16)	Oscillator Transformer	32-1257
(17)	Condenser (.0025)	7006
(18)	Compensating Condenser (Osc.; L. F.)	04000-R
(19)	Condenser (.00011)	4519
(20)	Condenser (Double) (.5-.15)	6287-M
(21)	Resistor (20,000) (Red-Black-Orange)	6650
(22)	Resistor (20,000) (Red-Black-Orange)	6650
(23)	1st I. F. Transformer	32-1288
(24)	Compensating Condenser (1st I. F. Primary)	04000-M
(25)	Compensating Condenser (1st I. F. Secondary)	04000-X
(26)	Resistor (2,500) (Red-Green-Red)	7775
(27)	2nd I. F. Transformer	32-1258
(28)	Compensating Condenser (2nd, I. F. Primary)	04000-A
(29)	Resistor (.1 meg.) (White-White-Orange)	4411
(30)	Condenser (Double) (.00011-.00011)	8035-K
(31)	Volume Control and "On-Off" Switch	33-5024
(32)	Resistor (10,000) (Brown-Black-Orange)	4412
(32)-a	Resistor (240,000) (Red-Yellow-Yellow)	4410
(33)	Condenser (.01)	3903-Z
(33)-a	Condenser (.05)	30-4020
(34)	Resistor (1.0 meg.) (Brown-Black-Green)	4409
(35)	Resistor (.1 meg.) (White-White-Orange)	4411
(36)	Condenser (.09)	4989-N
(37)	Condenser (.00011)	4519
	Condenser (.015)	3793-AB
(38)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
(39)	Resistor (.1 meg.) (White-White-Orange)	4411
(40)	Filter Condenser (Electrolytic) (A=1.0 mfd.; B=1.0 mfd.; C=2.0 mfd.	30-2029
(41)	Resistor (50,000) (Green-Brown-Orange)	4518
(42)	Condenser (.006)	30-4024
(43)	Input Transformer	32-7114
(44)	Resistor (10,000) (Brown-Black-Orange)	3524
(45)	Condenser (.01)	3903-P
(46)	Output Transformer	32-7078
(47)	Voice Coil and Cone Assembly	02625
(48)	Speaker Field Coil and Pot Assembly (H-13)	36-3104
(49)	Resistor (Wire-Wound) (6,500)	33-3033
(50)	Voltage Divider Resistor (Wire-Wound)	33-3034
(51)	Filter Choke	32-7115
(52)	Condenser (.25)	6287-N
(53)	Condenser (Electrolytic) (8.0)	6706
(54)	Condenser (Electrolytic) (8.0)	30-2025
(55)	Condenser (Electrolytic) (10.0)	30-2003
(56)	Power Transformer (50-60 ~)	32-7111
(57)	Condenser (Double) (.015-.015)	3793-R
(58)	Tone Control	30-4073
(59)	Condensers (Internal to (58))	....
(60)	Condenser (External to (58))	3615-G
(61)	Resistor (32,000) (Orange-Red-Orange)	33-1026
(62)	Resistor (50,000) (Green-Brown-Orange)	4518
(63)	Shadow Tuning Meter	6497
(64)	Pilot Lamp (Part of (63) Shadow Tuning Meter)	....
(65)	Pilot Lamp (Station Selector)	6608
	Shield ("Push-on Button") for sub-base holes; over (24) and (28) Compensating Condensers	W-775
	Tube Shield	28-1107
	Four-prong Tube Socket	7544
	Six-prong Tube Socket	7547
	Seven-prong Tube Socket	27-6005
	Speaker Socket	4957
	Dial Scale (Station Selector)	27-5013
	Mounting Bolt (Chassis)	W-567
	Mounting Washer (Chassis)	5189
	Mounting Washer (Chassis)	5058
	Knob (large)	03063
	Knob (small)	03064
	Bezel	6418
	Model 18— Code 121 only	
	Speaker (K-17) Output transformer	32-7078
	Speaker (K-17) Voice Coil and Cone Assembly	36-3020
	Speaker (K-17) Speaker Field and Pot Assembly	36-3104
	Speaker Socket Hole Cover	7084
	Speaker Cable	L-1632

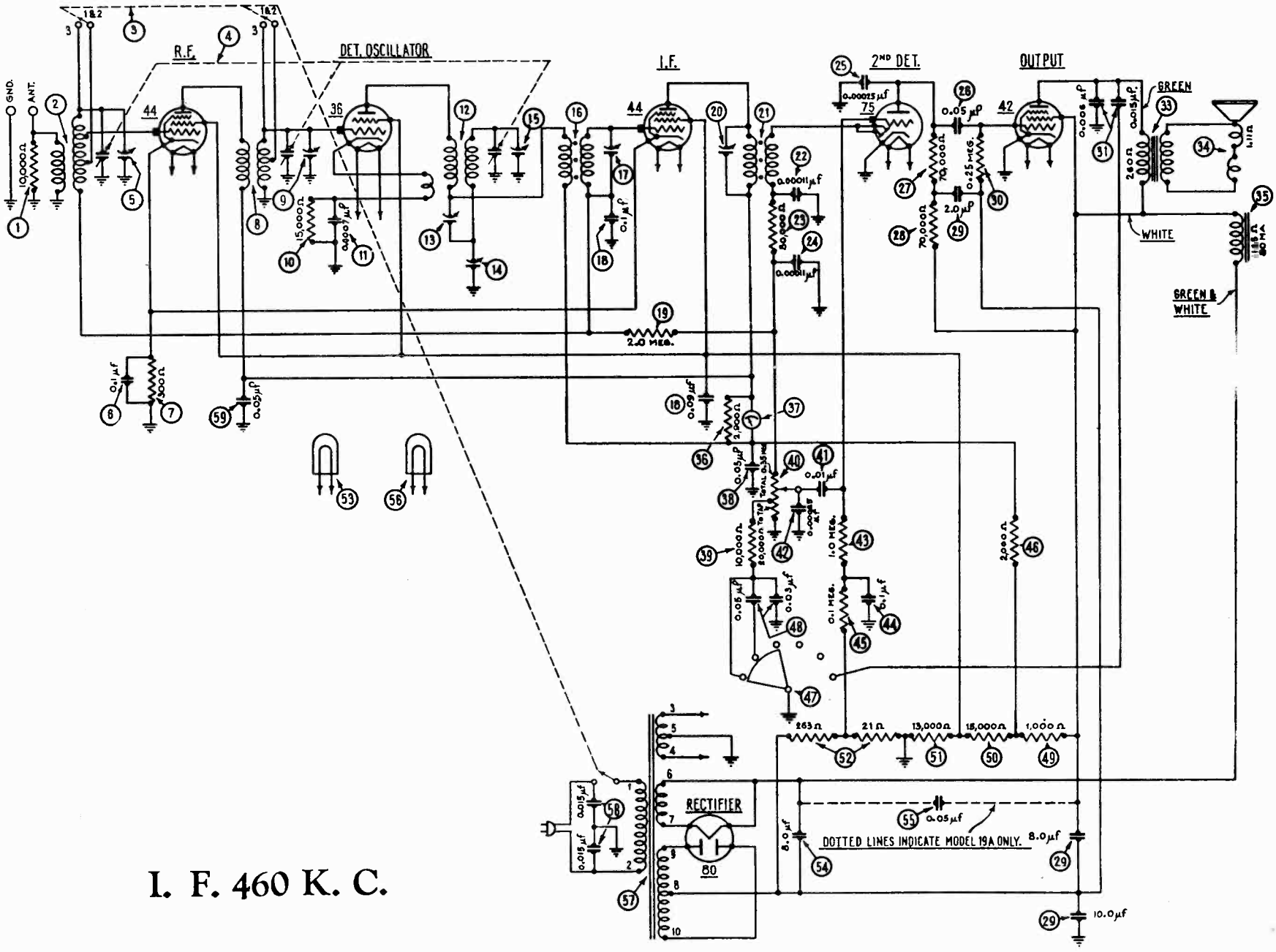
NOTE: The following parts are different in Model 18, Code 123

53 Electrolytic condenser becomes 30-2045.

54 Electrolytic condenser becomes 30-2014.

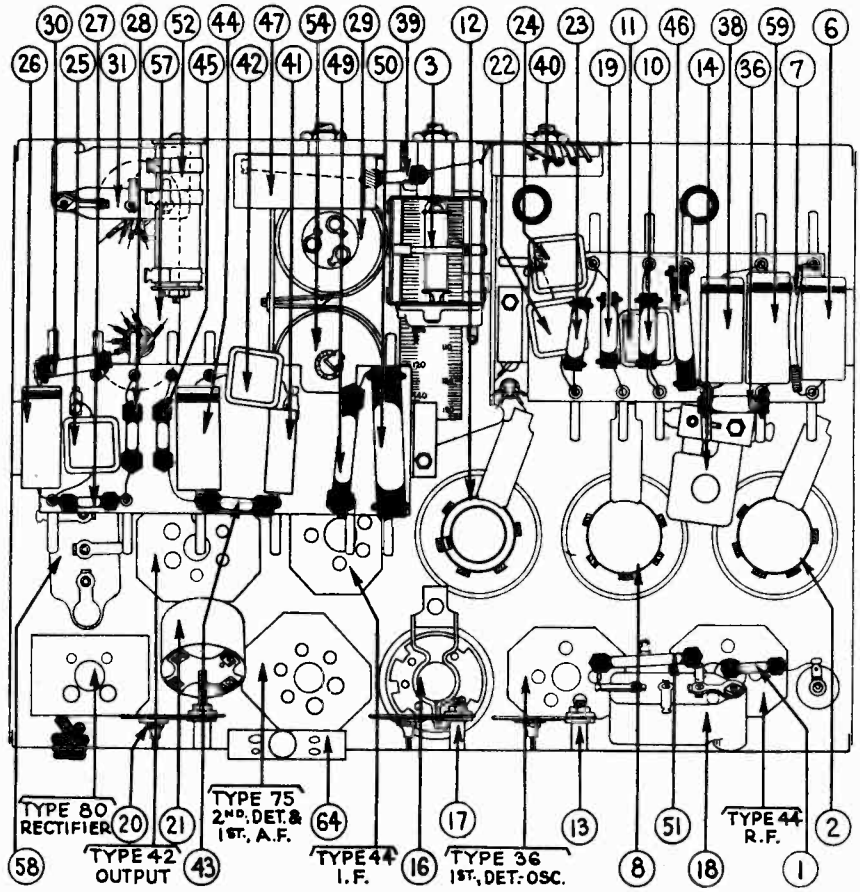
5 Tuning condenser assembly becomes 31-1117.

MODEL 19 (Code 128)



I. F. 460 K. C.

MODEL 19 (Code 128)

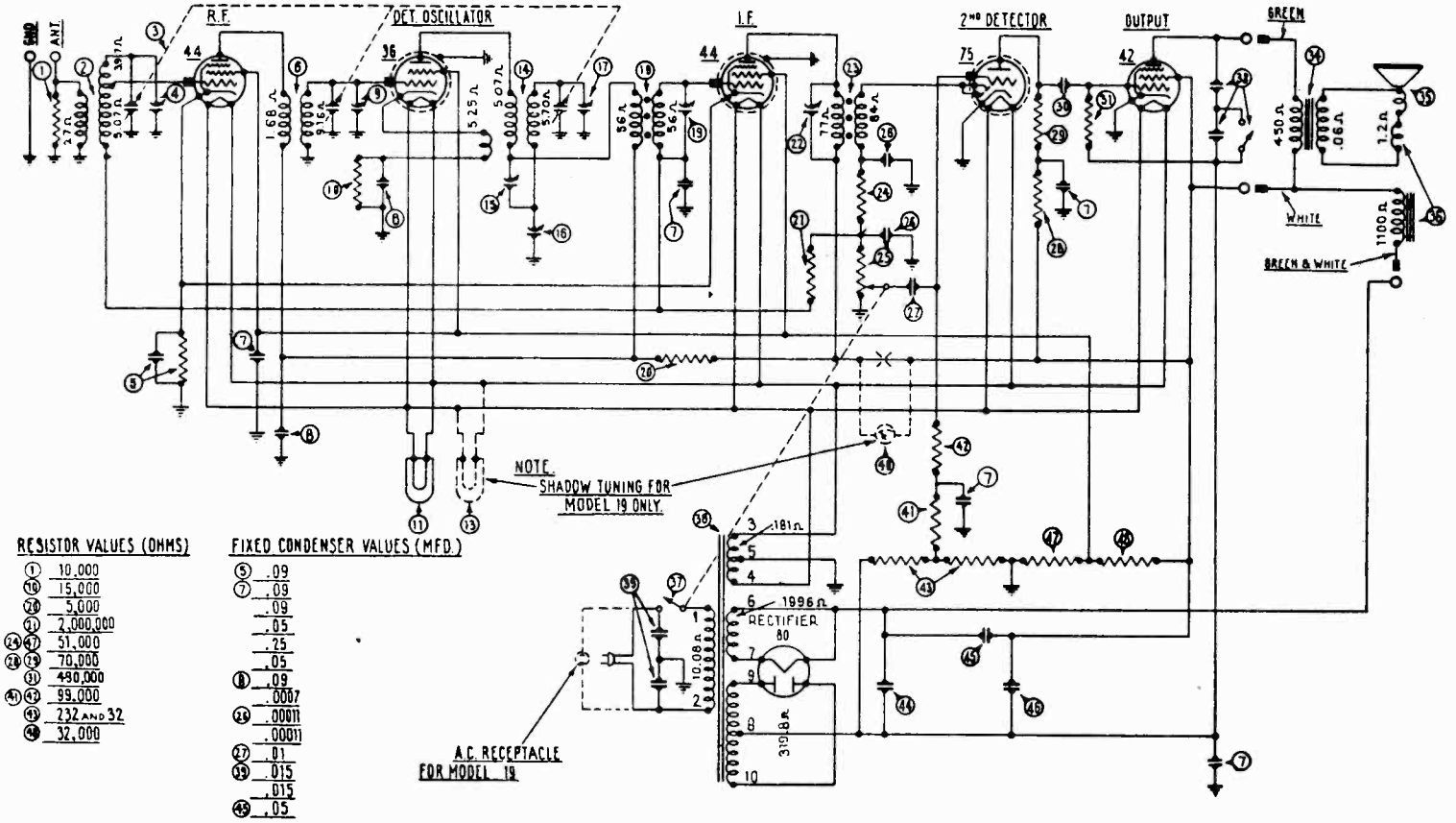


REPLACEMENT PARTS FOR MODEL 19-128

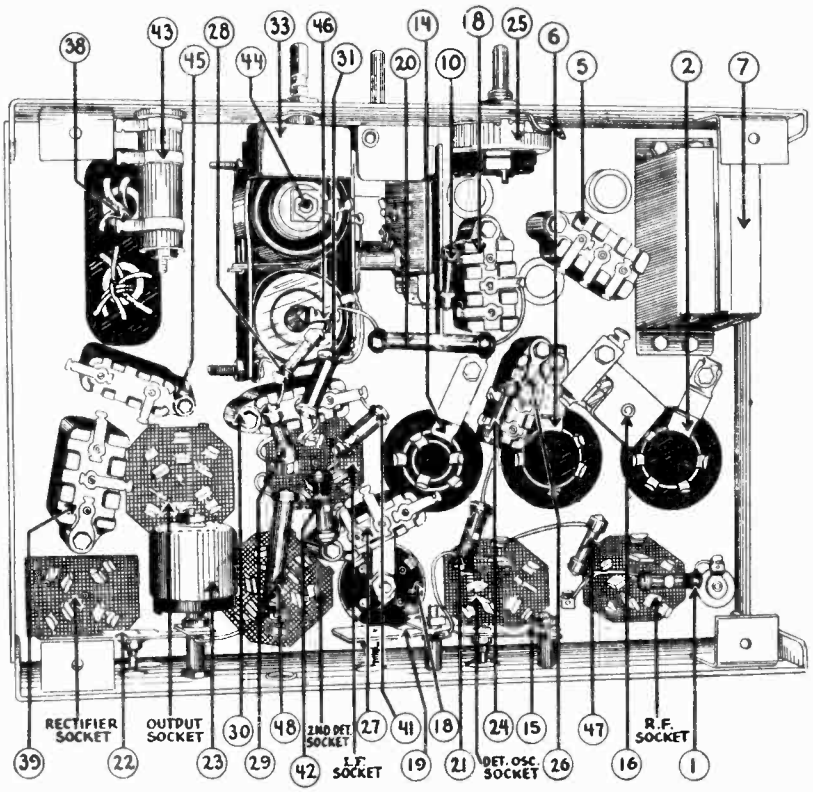
No. on Figs. 2 and 3	Description	Part No.
①	Resistor (10,000 ohms)	33-1000
②	Antenna transformer	32-1062
③	Combined on-off and wave band switch	42-1017
④	Tuning condenser assembly	31-1103
⑤	Compensating condenser (ant.)	Part of ④
⑥	Condenser (.1 mfd.)	30-4122
⑦	Resistor (wire wound 300 ohms flex.)	33-3010
⑧	Detector transformer	32-1063
⑨	Compensating condenser (Det.)	Part of ④
⑩	Resistor (15,000 ohms)	6208
⑪	Condenser (700 mmf.)	5863
⑫	Oscillator transformer	06620
⑬	Compensating condenser (1st IF pri.)	04000M
⑭	Compensating condenser (osc. LF)	04000S
⑮	Compensating condenser (osc. HF)	Part of ④
⑯	1st IF transformer	32-1315
⑰	Compensating condenser (1st IF sec.)	04000M
⑱	Condenser (.1 mfd.)	4989AK
⑲	Resistor (2.0 meg.)	5872
⑳	Compensating condenser (2d IF pri.)	04000A
㉑	2d IF transformer	06622
㉒	Condenser (110 mmf.)	30-1006
㉓	Resistor (50,000 ohms)	4518
㉔	Condenser (110 mmf.)	30-1006
㉕	Condenser (250 mmf.)	5858
㉖	Condenser (.05 mfd.)	30-4123
㉗	Resistor (70,000 ohms)	5385
㉘	Resistor (70,000 ohms)	5385
㉙	Condenser (elec.—2.0, 8.0, 10.0 mfd.)	30-2062X
㉚	Resistor (.25 meg.)	4410
㉛	Condenser (.006-.015 mfd.)	7625D
㉝	Output transformer (H-16)	32-7178
㉞	Speaker voice coil and cone (H-16)	02625

No. on Figs. 2 and 3	Description	Part No.
㉟	Speaker field coil and pot assembly (H-16)	36-3218
㊱	Resistor (2900 ohms)	5309
㊲	Shadow meter	6497
㊳	Condenser (.05 mfd.)	30-4123
㊴	Resistor (10,000 ohms)	4412
㊵	Volume control	33-5000
㊶	Condenser (.01 mfd.)	30-4124
㊷	Condenser (250 mmf.)	5858
㊸	Resistor (1.0 meg.)	4409
㊹	Condenser (.1 mfd.)	30-4122
㊺	Resistor (.1 meg.)	4411
㊻	Resistor (2000 ohms)	4515
㊼	Tone control	38-5519
㊽	Condensers (inside ㊼)	
㊾	Resistor (1000 ohms)	4590
㊿	Resistor (15,000 ohms)	5718
(51)	Resistor (13,000 ohms)	3766
(52)	Resistor (wire wound tapped, 263,21 ohms)	33-3069
(53)	Pilot lamp (station selector)	6608
(54)	Condenser (elec. filter 8 mfd.)	30-2026
(55)	Condenser .05 mfd. (used on 19A only)	30-4020
(56)	Pilot lamp	Part of ㊲
(57)	Power transformer	32-7170
(58)	Condenser (double .015-.015 mfd.)	3793E
(59)	Condenser (.05 mfd.)	30-4123
(60)	Tube shield	8005
(61)	Four prong tube socket	7544
(62)	Five prong tube socket	7546
(63)	Six prong tube socket	7547
(64)	Speaker socket	7828
(65)	Knob (large)	27-4037
(66)	Knob (small)	27-4038
(67)	Drum assembly (with scale)	31-1025

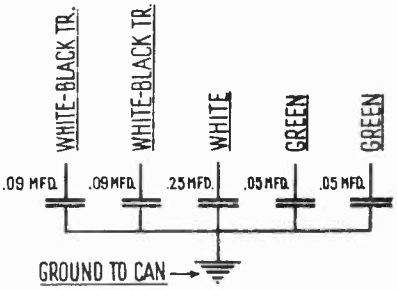
Models 19 and 89



Models 19 and 89



Bottom View of Chassis, Showing Parts

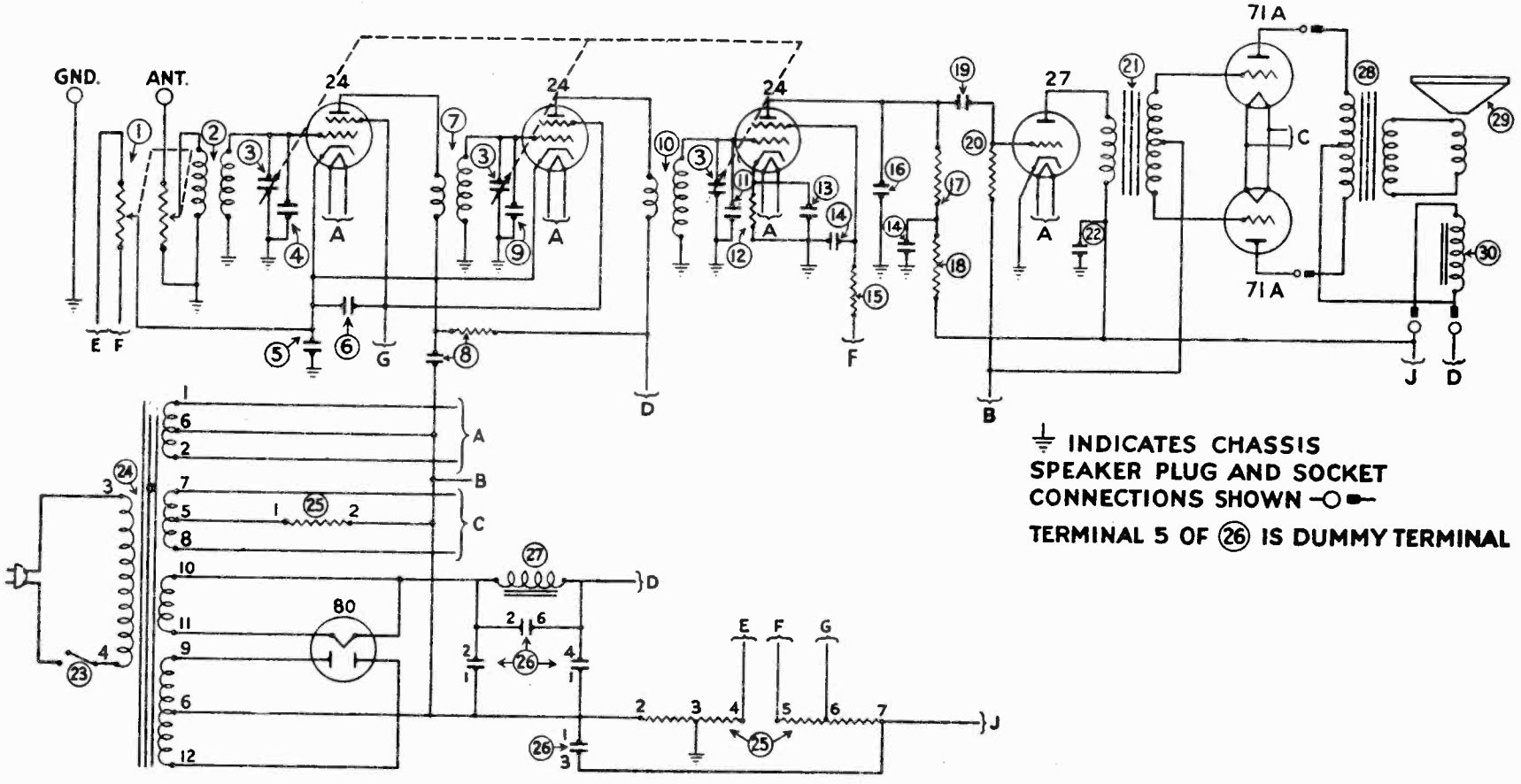


Internal Connections Filter Condenser.

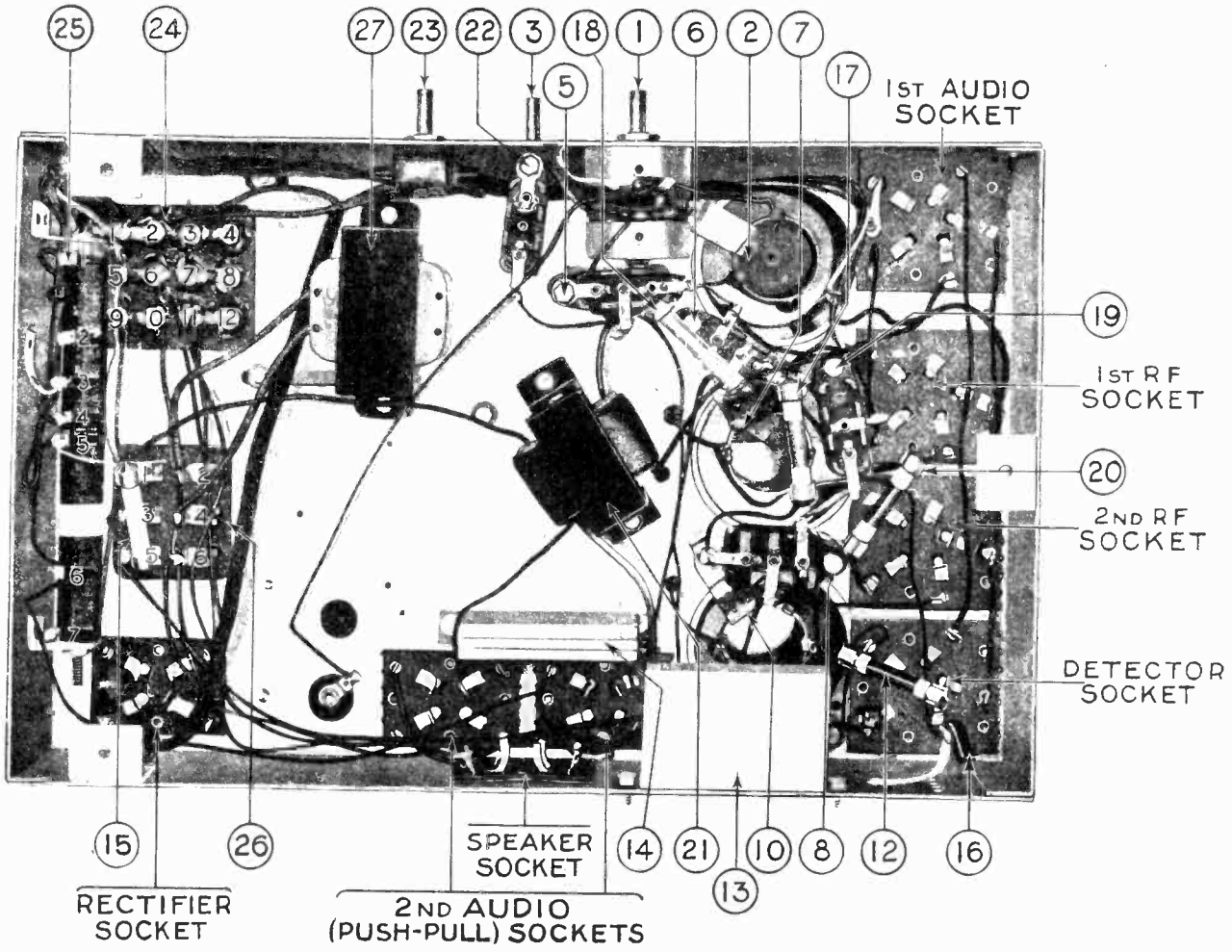
Replacement Parts for Models 19 and 89

		Part No.
①	Resistor (10,000 Ohms) Brown—Black—Orange	4412
②	Antenna Transformer	06619
③	Tuning Condenser Assembly	06577
④	Compensating Condenser—(R.F. Part of Tuning Condenser Assembly)	
⑤	Condenser and Resistor—(.09 Mfd. and 200Ω)	4989-W
⑥	Interstage Transformer	06662
⑦	Filter Cond. Bank (.09—.09—.05—.05—.25)	06624
⑧	Condenser (Double—.09 and .0007 Mfd.)	8174-B
⑨	Compensating Condenser—(R.F. Part of Tuning Condenser Assembly)	
⑩	Resistor (15,000 Ohms) Brown—Green—Orange	6208
⑪	Pilot Lamp	6608
⑫	Dial Scale	7882
⑬	Pilot Lamp—(Shadow Tuning)	6608
⑭	Oscillator Transformer	06620
⑮	Compensating Condenser — (1st I.F. Primary)	04000-M
⑯	Compensating Condenser — (Low Frequency	04000-S
⑰	Compensating Condenser—(R.F. Part of Tuning Condenser Assembly)	
⑱	First I.F. Transformer	06621
⑲	Compensating Condenser (1st I.F. Secondary)	04000-M
⑳	Resistor (5,000 Ohms) Green—Black—Red	3526
㉑	Resistor (2,000,000 Ohms) Red—Black—Green	5872
㉒	Compensating Cond. (2nd I.F. Primary)	04000-A
㉓	Second I.F. Transformer	06622
㉔	Resistor (51,000 Ohms) Green—Brown—Orange	6098
㉕	Volume Control and A.C. Switch	8003
㉖	Condenser (Double—.00011 & .00011 Mfd.)	8035-C
㉗	Condenser (.01 Mfd.)	3903-AB
㉘	Resistor (70,000 Ohms) Violet—Black—Orange	5385
㉙	Resistor (70,000 Ohms) Violet—Black—Orange	5385
㉚	Condenser (.01 Mfd.)	3903-T
㉛	Resistor (490,000 Ohms) Yellow—White—Yellow	4517
㉜	Bezel	8055
㉝	Tone Control	06764
㉞	Output Transformer	2580
㉟	Voice Coil and Cone Assembly	02823
㊱	Speaker Field and Bucking Coil Assembled with Pot (K-7)	02761
㊲	Switch (A.C.) Part of Vol. Control Assembly	
㊳	Power Transformer (50-60 Cycles, 115 Volts)	8046
	Power Transformer (25-40 Cycles—115 Volts)	8047
	Power Transformer (50-60 Cycles—230 Volts)	8048
㊴	Condenser (Double—.015 and .015 Mfd.)	3793-E
㊵	Shadow Tuning	6497-G
㊶	Resistor (99,000 Ohms) White—White—Orange	4411
㊷	Resistor (1,000,000 Ohms) Brown—Black—Green	4409
㊸	B.C. Resistor (235 Ohms and 32 Ohms—Wire Wound)	7998
㊹	Electrolytic Condenser—6 Mfd.	8165
㊺	Condenser (.05 Mfd.)	3615-E
㊻	Electrolytic Condenser—6 Mfd.	8166
㊼	Resistor (51,000 Ohms) Green—Brown—Orange	4518
㊽	Resistor (32,000 Ohms) Orange—Red—Orange	3525
	Tube Shield	8005
	Knob (Large)	03063
	Knob (Small)	03064
	Knob Spring	5262
	Grid Clip	4897
	Four Prong Socket	7544
	Five Prong Socket	7546
	Six Prong Socket	7547
	Pilot Lamp Shield	5760

Models 20, 20-A and 21



Models 20, 20-A and 21



REPLACEMENT PARTS—MODELS 20, 20A and 21

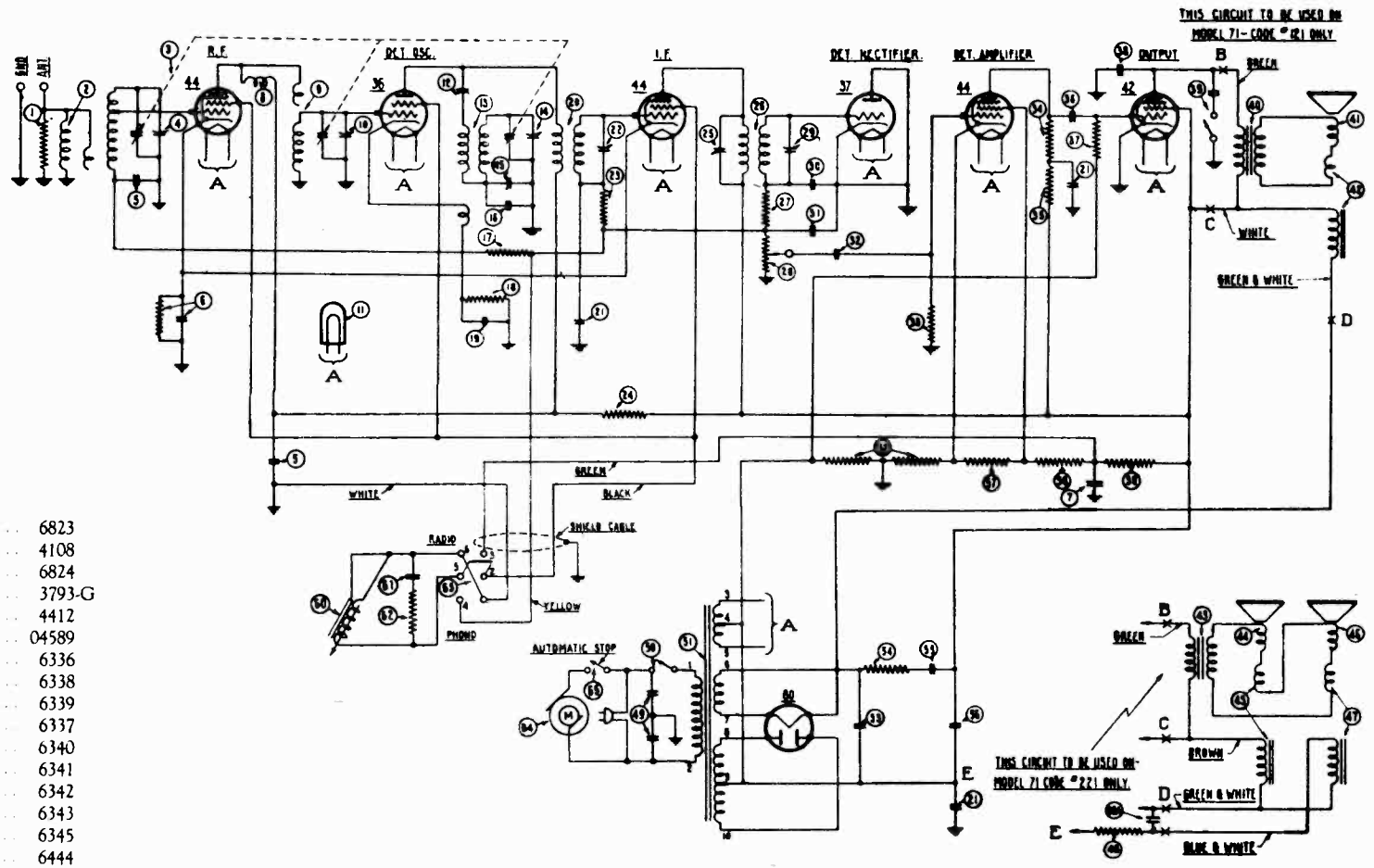
No.	Description	Part No.
①	Volume Control	4094
②	First R. F. Transformer	3884-N
③	Tuning Condenser	4200-A
④	First Compensating Condenser (Part of Tuning Condenser Assembly)	
⑤	By-Pass Condenser (.05)	3615-J
⑥	By-Pass Condenser (.05)	3615-M
⑦	Second R. F. Transformer	3884-P
⑧	By-Pass Condenser (.05) and Resistor	3615-K
⑨	Second Compensating Condenser (Part of Tuning Condenser Assembly)	
⑩	Third R. F. Transformer	3884-P
⑪	Third Compensating Condenser (Part of Tuning Condenser Assembly)	
⑫	Resistor (50,000)	4237
⑬	By-Pass Condenser (.5)	3583
⑭	By-Pass Condenser (double .25)	3557
⑮	Resistor (250,000)	3768
⑯	By-Pass Condenser (.00025)	3082
⑰	Resistor (500,000)	3769
⑱	Resistor (100,000)	3767
⑲	Condenser (.01)	3903-F
⑳	Resistor (500,000)	3769
㉑	Push-pull Input Transformer	4232
㉒	By-Pass Condenser (.05)	3615-L
㉓	On-off Switch	4095

No.	Description	Part No.
㉔	Power Transformer (50-60 cycle)	4234
	Power Transformer (25-60 cycle)	4268
㉕	B. C. Resistor	4230
㉖	Filter Condenser (50-60 cycle)	4235
	Filter Condenser (25-60 cycle)	4269
㉗	Filter Choke	4231
㉘	Push-Pull Output Transformer	2766
㉙	Voice Coil and Cone	2769-B
㉚	Field Coil	2768
	Speaker Plug and Cord	L-1124-A
	Four-Prong Socket Assembly	3977-A
	Speaker Socket	3977-B
	Five-Prong Socket Assembly	3979-A
	R. F. Tube Shield	4228-A
	Volume Control Insulators	4092
	Volume Control Insulators	4286
	Tuning Condenser Dial Scale	4261
	A. C. Cord	L-943-A
	Knob (Large)	4289-A
	Knob (Small)	4290-A
	Cabinet	34000
	Bezel Plate	4252
	Fahnstock Clip	L-1126
	Finishing Rosettes	4267
	Speaker Mounting Screws (three used)	W-493
	Speaker Mounting Screws (one used)	W-483
	Chassis Hold-Down Bolts	W-490
	Feet	W-353

Note:—R. F. Transformers ②, ⑦ and ⑩ should not be confused with R. F. Transformers ③, ⑨, ⑧ and ⑫ on Bulletin 28. They are not interchangeable.

Model 22L

Radio-Phonograph

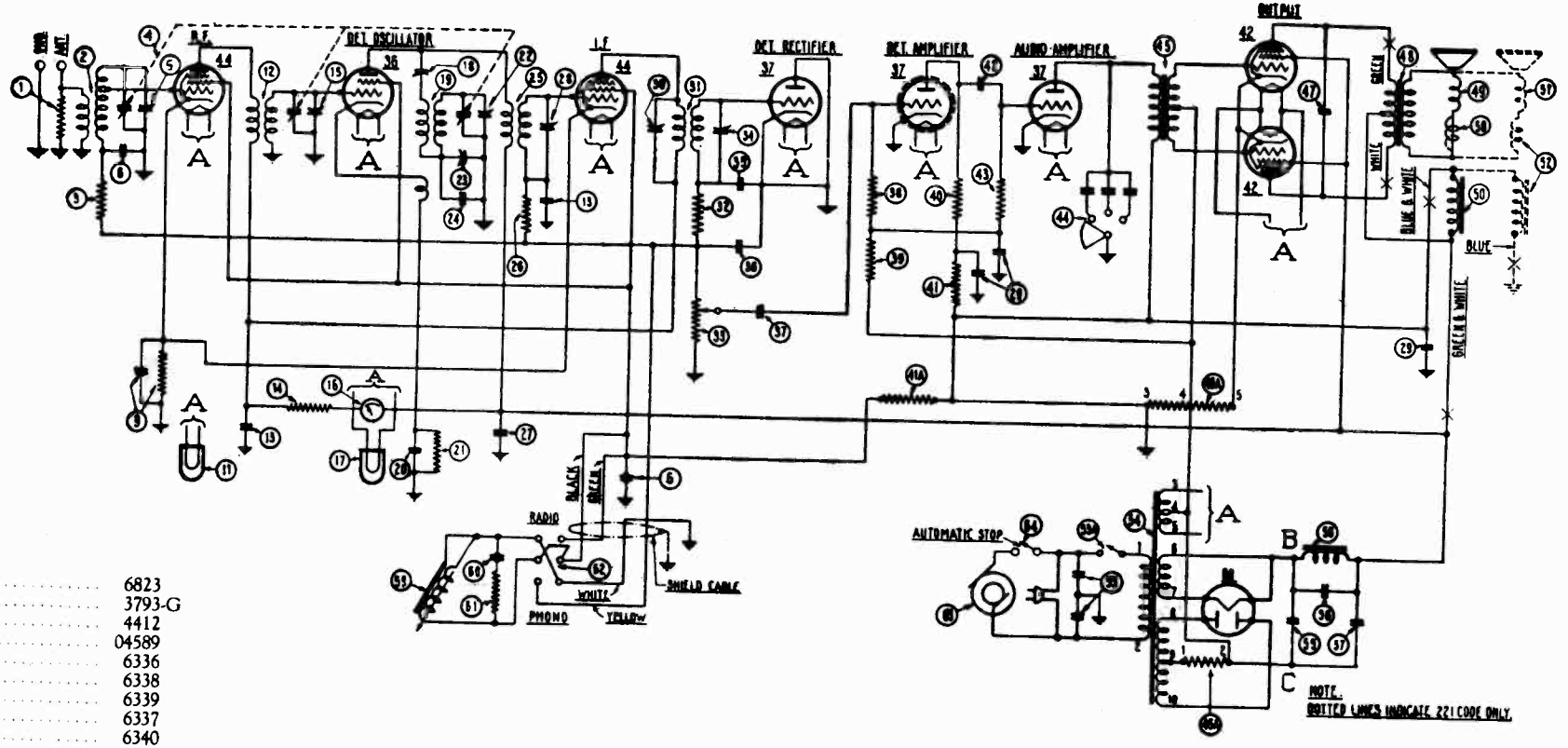


(60)	Electric pickup	6823
	Needle screw	4108
	Tone Arm complete with pickup	6824
(61)	Condenser (.015 Mfd.)	3793-G
(62)	Resistor (10,000 ohms)	4412
(63)	Radio-phono Switch	04589
(64)	Motor (115 volts 60 cycles)	6336
	Motor (115 volts 50 cycles)	6338
	Motor (115 volts 40 cycles)	6339
	Motor (115 volts 25 cycles)	6337
	Motor (230 volts 60 cycles)	6340
	Motor (230 volts 50 cycles)	6341
	Motor (230 volts 40 cycles)	6342
	Motor (230 volts 25 cycles)	6343
(65)	Motor Switch	6345
	Switch Plate	6444
	Switch Indicator	4227
	Switch Knob	03437
	Needle Cup (2 used)	4101
	Used Needle cup	4102
	Motor Speed Indicator Plate	6347
	Turntable	6344
	Cord Connector Plug	4091
	Cord Connector Assembly	4124-A

The Model 22L has the same radio chassis as the model 71-221 except for the additional wiring of the phonograph equipment.

Model 23X

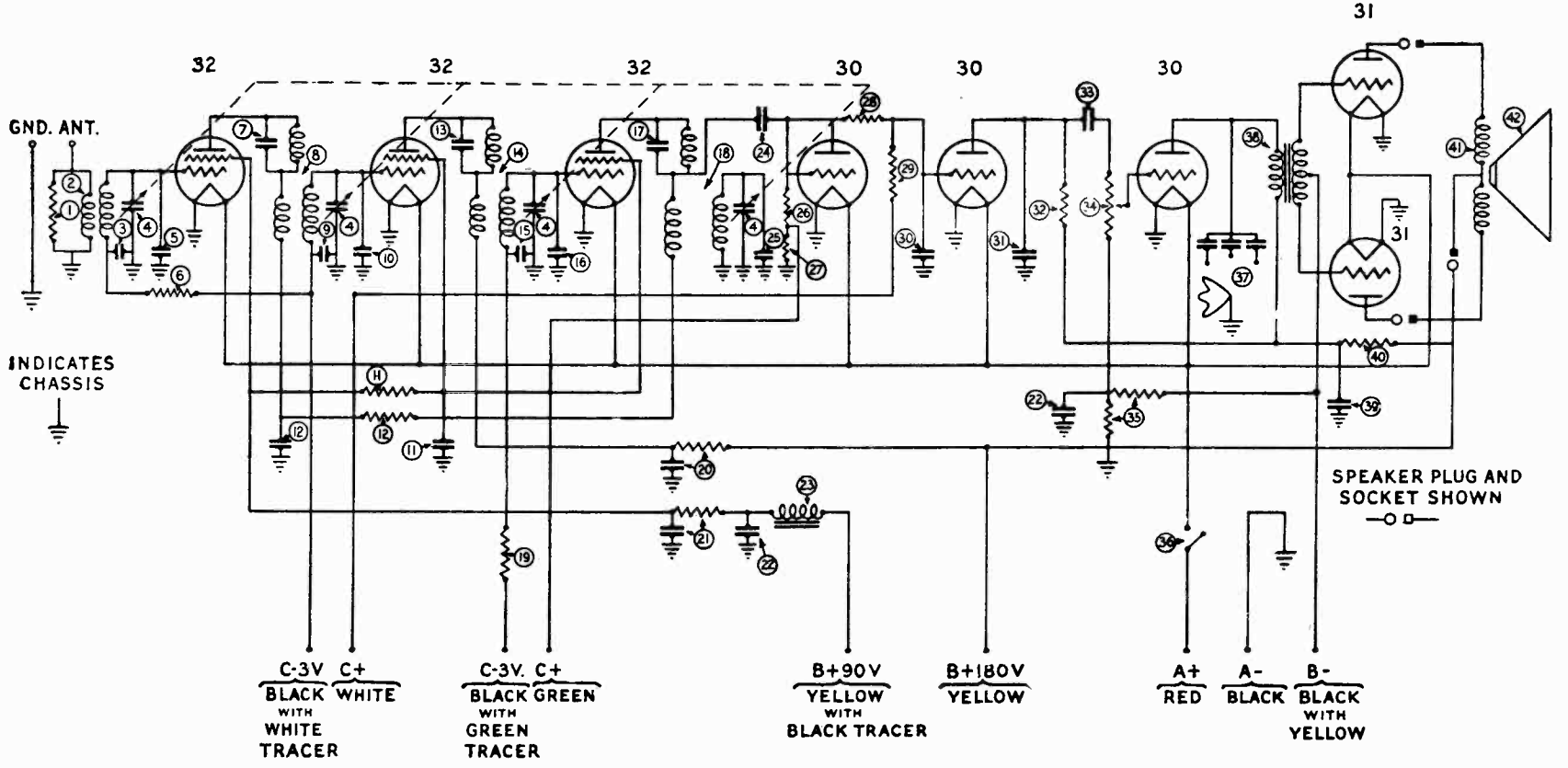
Radio-Phonograph



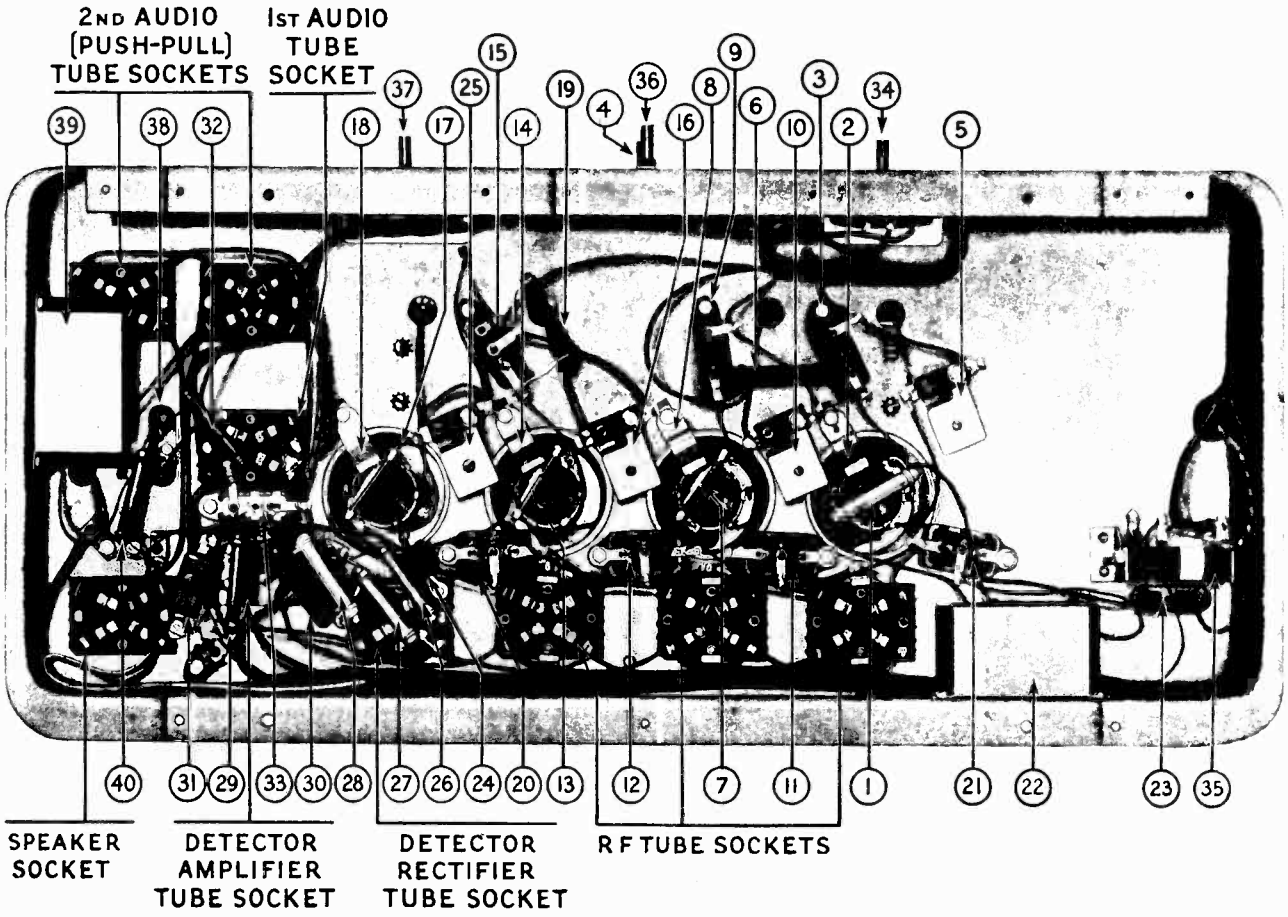
(60)	Electric Pickup	6823
(61)	Condenser (.015 Mfd.)	3793-G
(62)	Resistor 10,000 ohms	4412
(63)	Radio-phonograph switch	04589
(64)	Motor (115 volts 60 cycles)	6336
	Motor (115 volts 50 cycles)	6338
	Motor (115 volts 40 cycles)	6339
	Motor (115 volts 25 cycles)	6337
	Motor (230 volts 60 cycles)	6340
	Motor (230 volts 50 cycles)	6341
	Motor (230 volts 40 cycles)	6342
	Motor (230 volts 25 cycles)	6343
(65)	Motor Switch	6345
	Needle Screw	4108
	Tone Arm complete with pickup	6824
	Switch plate	6444
	Switch Indicator	4227
	Switch knob	03437
	Needle Cup (2 used)	4101
	Used Needle Cup	4102
	Motor Speed Indicator Plate	6347
	Turntable	6344
	Cord Connector Plug	4091
	Cord Connector Assembly	4124-A
	Rubber Washer (4 used for motor board)	4074

The model 23X has the same radio chassis as the model 91-221 except for the additional wiring of the phonograph equipment.

Model 30


31
32
32
32
30
30
30
GND. ANT.
INDICATES CHASSIS
SPEAKER PLUG AND SOCKET SHOWN
C-3V BLACK WITH WHITE TRACER
C+ WHITE
C-3V. BLACK WITH GREEN TRACER
C+ GREEN
B+90V YELLOW WITH BLACK TRACER
B+180V YELLOW
A+ RED
A- BLACK
B- BLACK WITH YELLOW

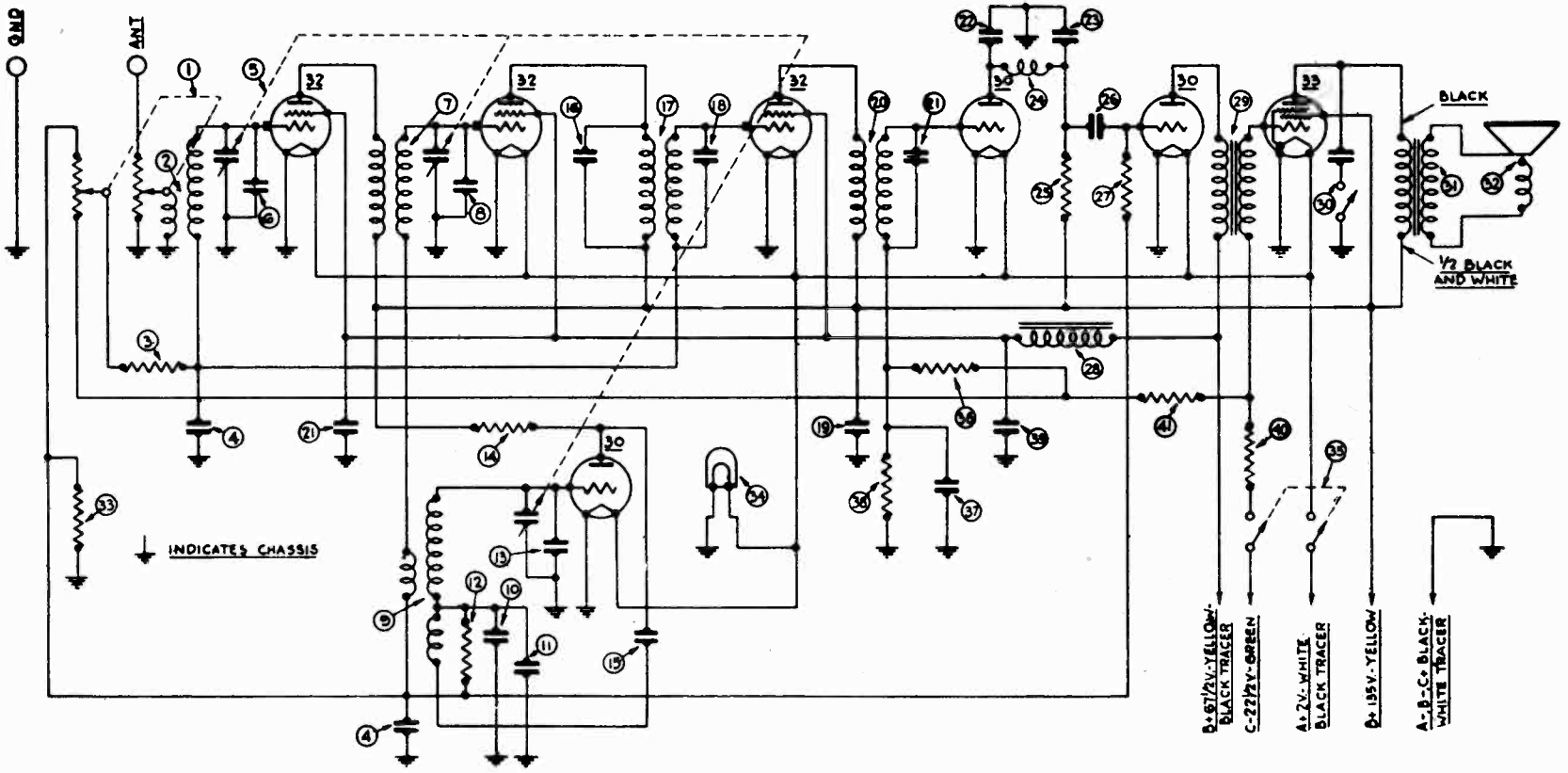
Model 30



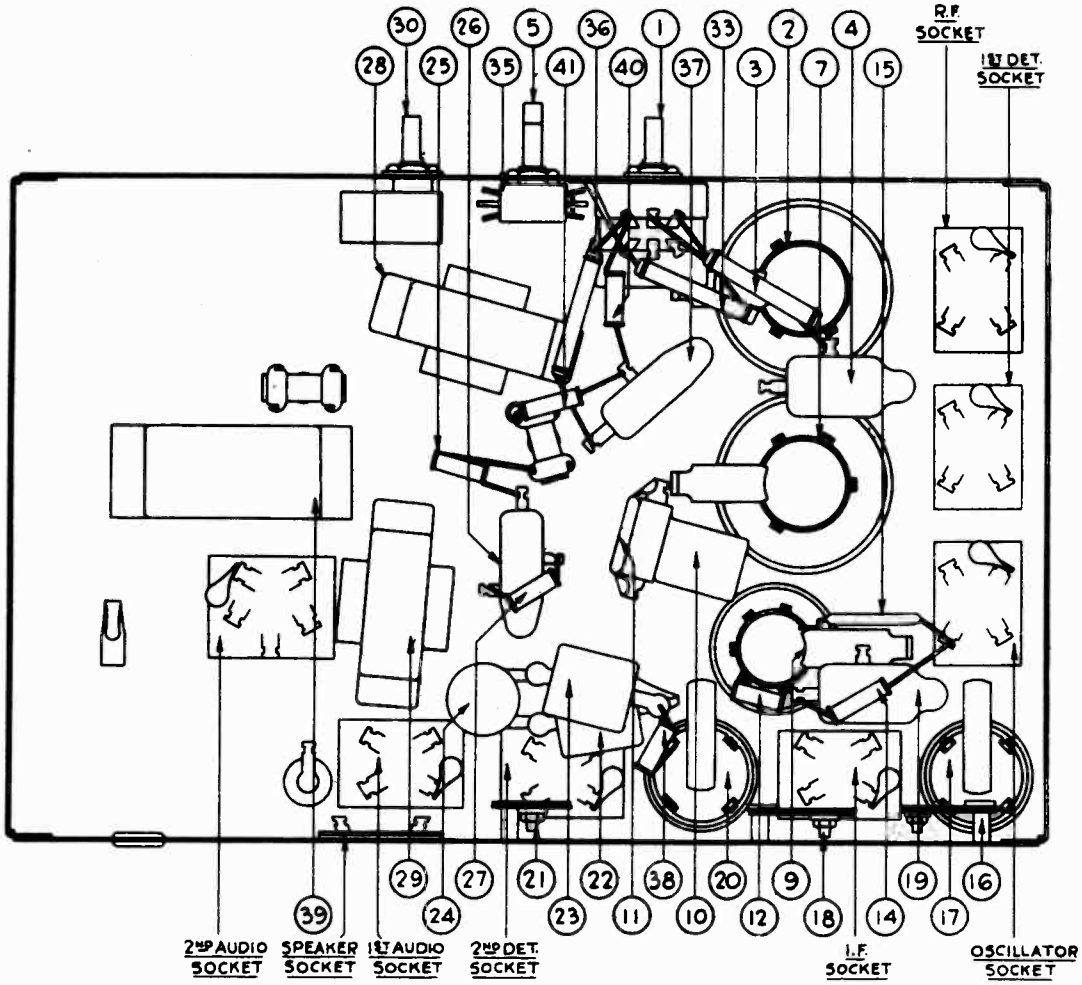
REPLACEMENT PARTS LIST

No. on Figs. 1 and 2	Description	Part No.
①	Resistor (5000)	3526
②	Antenna Coil	4182-A
③	By-Pass Condenser (.05)	3615-E
④	Tuning Condenser	4000-G
⑤	Compensating Condenser	3968-A
⑥	Resistor (70,000)	3542
⑦	Coupling Condenser	3892-A
⑧	Coil—2d R. F.	4182-B
⑨	By-Pass (.05)	3615-E
⑩	Compensating Condenser	3968-A
⑪	By-Pass Condenser (.05) and Resistor	3615-B
⑫	By-Pass Condenser (.05) and Resistor	3615-C
⑬	Coupling Condenser	3892-A
⑭	Coil—3d R. F.	4182-B
⑮	By-Pass Condenser (.05)	3615-F
⑯	Compensating Condenser	3968-A
⑰	Coupling Condenser	3892-A
⑱	Coil—4th R. F.	4182-B
⑲	Resistor (500,000)	3769
⑳	By-Pass Condenser (.05) and Resistor	3615-C
㉑	By-Pass Condenser (.05) and Resistor	3615-B
㉒	By-Pass Condenser (Double .25)	3557
㉓	Filter Choke	3518
㉔	Condenser (.00005)	3774
㉕	Compensating Condenser	3772-A
㉖	Resistor (100,000)	3767
㉗	Resistor (100,000)	3767
㉘	Resistor (250,000)	3768
㉙	Resistor (500,000)	3769
㉚	By-Pass Condenser (.000250)	3082
㉛	By-Pass Condenser (.000250)	3082
㉜	Resistor (500,000)	3769
㉝	By-Pass Condenser (.01)	3903-F
㉞	Volume Control	4093
㉟	Resistor	3864
㊱	On-Off Switch	4095
㊲	Tone Control	4037-A
㊳	Audio Transformer	3242
㊴	By-Pass Condenser (Single .25)	4264
㊵	Resistor (25,000)	3656
㊶	Speaker Motor	2761
㊷	Cone Assembly	2764-A
	Speaker Cord and Plug	L-1127-A
	Knob (Large)	3580-A
	Knob (Small)	3579-A
	Spring (For 3579 and 3580)	3305
	Knob (Switch)	4146-A
	Spring (For 4146)	4147
	Tuning Scale	4139
	Grid Clip	4060-A
	"A" Battery (2-volt) "Philco Drynamic 92-R"	
	Tube Socket (32 type tube) Assembly	3977-C
	Tube Socket	3977-A
	Speaker Socket	3977-B

MODELS 35 & 36


GND
ANT
INDICATES CHASSIS
BLACK
½ BLACK AND WHITE
D+67½V.-YELLOW-BLACK TRACER
C-22½V.-GREEN
A+2V.-WHITE BLACK TRACER
D+135V.-YELLOW
A-B-C+ BLACK-WHITE TRACER

MODELS 35 & 36

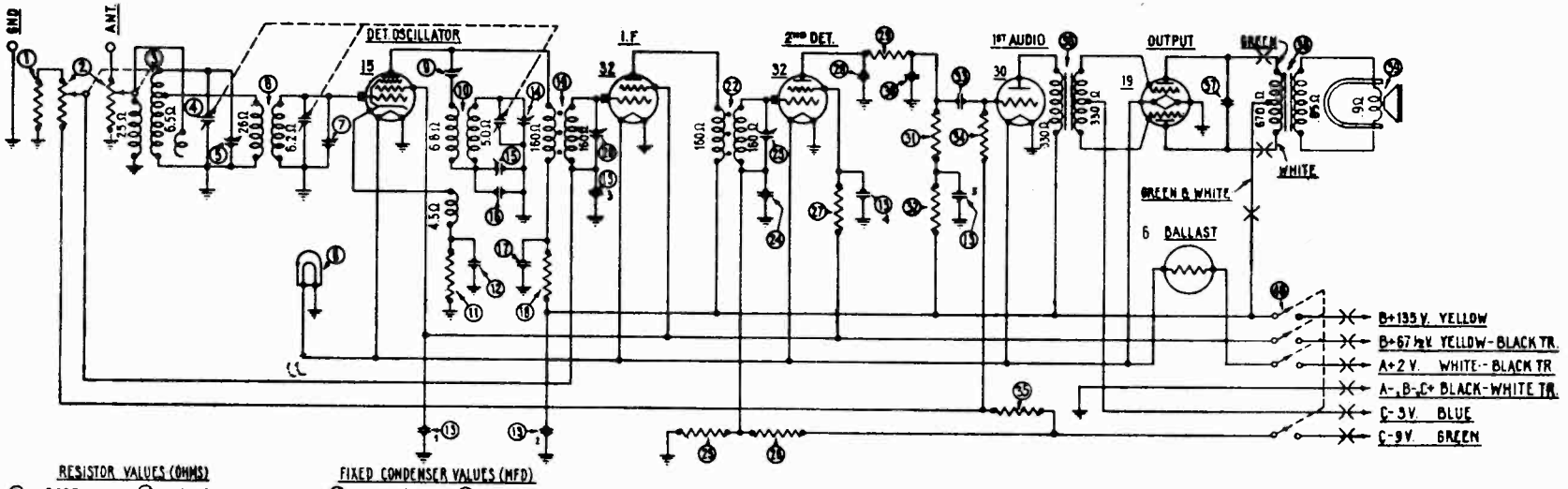


REPLACEMENT PARTS LIST

		Part No.
①	Volume Control	5317
③	Antenna Coil	03320
⑤	Resistor (240,000 Ohms)	3768
④	By-pass Condenser (.09 mfd.)	4989-B
⑤	Tuning Condenser	03076
⑥	Compensating Condenser (part of tuning condenser assembly)	
⑦	First Detector Transformer	03083
⑧	Compensating Condenser (part of tuning condenser assembly)	
⑨	Oscillator Coil	03321
⑩	Compensating Condenser,	Assembled 03249
⑪	Condenser (410 mmf.)	
⑫	Resistor (51,000 Ohms)	4518
⑬	Compensating Condenser (part of tuning condenser assembly)	
⑭	Resistor (51,000 Ohms)	4518
⑮	Condenser (?10 mmf.)	4519
⑯	Compensating Condenser, Assembled	03411
⑰	First I. F. Transformer	03009
⑱	Compensating Condenser, Assembled	03411
⑲	Condenser (.09 mfd.)	4989-B
⑳	Second I. F. Transformer	03092
㉑	Compensating Condenser, Assembled	03411
㉒	Condenser (.002 mfd.)	4059
㉓	Condenser (.002 mfd.)	4059

		Part No.
㉔	Detector R. F. Choke	03086
㉕	Resistor (240,000 Ohms)	4410
㉖	Condenser (.01 mfd.)	3903-J
㉗	Resistor (490,000 Ohms)	4517
㉘	Choke	5314
㉙	Input Transformer	5315
㉚	Tone Control	03140
㉛	Output Transformer	2646
㉜	Voice Coil and Cone	02949
㉝	Resistor (3000 Ohms)	5309
㉞	Pilot Lamp	5316
㉟	Switch	5318
㊱	Resistor (32,000 Ohms)	3525
㊲	Condenser (.09 mfd.)	4989-F
㊳	Resistor (99,000 Ohms)	4411
㊴	Condenser (2 mfd.)	03298
㊵	Resistor (5,000 Ohms)	5310
㊶	Resistor (10,000 Ohms)	4412
	Knob (Large)	03063
	Knob (Small)	03064
	Spring (For Switch Knobs)	4147
	Spring (For Dial Knobs)	5262
	Tube Shield	03306
	Grid Clip	4897
	Grommet (R. F. Transformer Shield)	3747
	Four Prong Socket Assembly	4955
	Five Prong Socket Assembly	4956
	Volume Control Insulator	4092
	Volume Control Insulator	4286
	Dial Assembly Complete	03031
	Bezel	5009
	Pilot Bracket Complete	03011
	Light Shield Screen	4937

Model 37



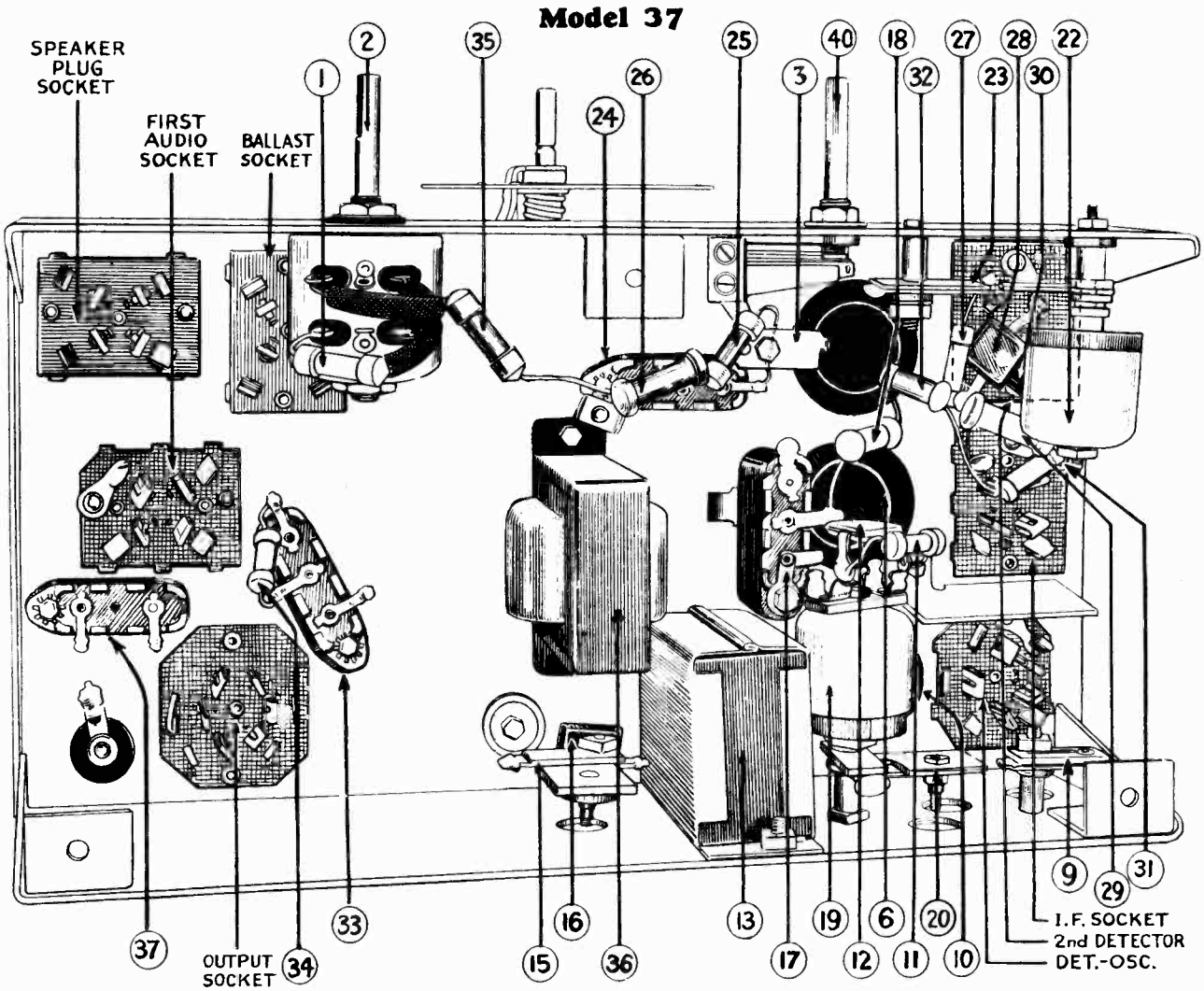
RESISTOR VALUES (OHMS)

①	2,900	㉕	99,000
②	5,000 (DUAL)	㉖	490,000
③	6,000	㉗	90,000
⑥	1,000	㉘	499,000
㉔	51,000	㉙	1,000
㉓	23,000		
㉒	99,000		

FIXED CONDENSER VALUES (MFD)

⑫	.00071	⑰	.05
⑮	– 1 .5	㉑	.05
	– 2 .15	㉚	.00025
	– 3 .1	㉛	.00025
	– 4 .2	㉜	.01
	– 5 .5	㉝	.002
⑨	.00071		

Model 37

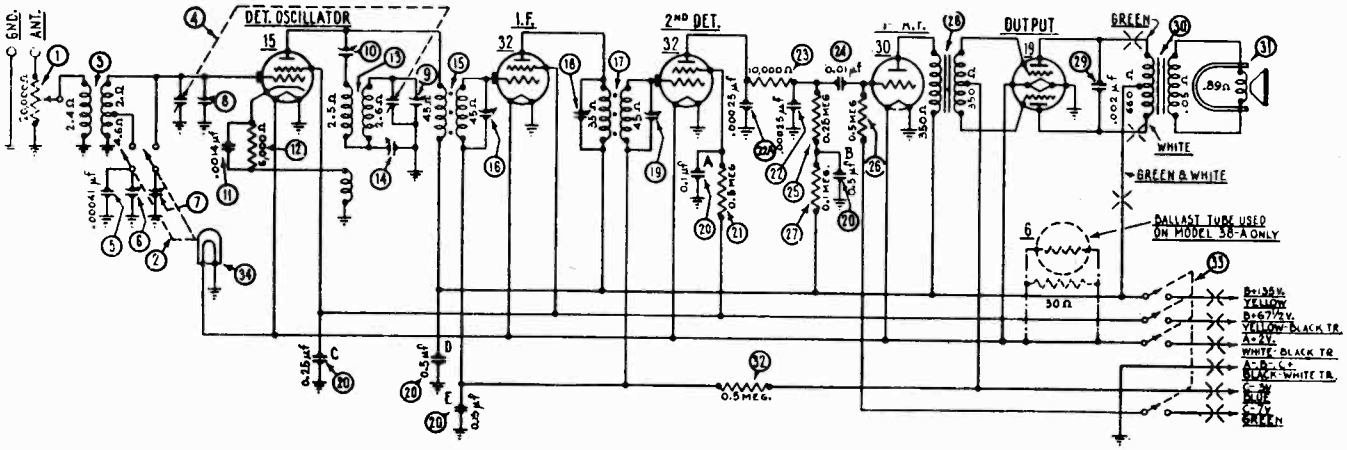


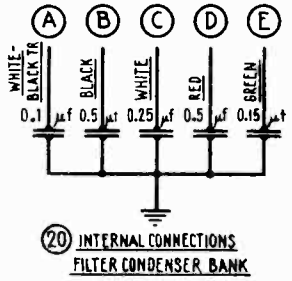
Replacement Parts for Model 37

		Part No.
①	Resistor (2,900 Ohms)	5309
②	Volume Control	7239
③	Antenna Transformer	05726
④	Tuning Condenser Assembly	05740
⑤	Compensating Cond.—Antenna—Part of Tuning Cond. Assembly	
⑥	Detector Transformer	05727
⑦	Compensating Cond. — Detector—Part of Tuning Cond. Assembly	
⑧	Pilot Light	5316
⑨	Comp. Cond.—1st. I.F. Primary	04000-A
⑩	Oscillator Coil	05728
⑪	Resistor (6,000 Ohms)	7352
⑫	Cond. 710 Mmf. White and Yellow	5863
⑬	Filter Cond. Bank (.1, .15, .25, 2-.5 Mfd.)	03915
⑭	Comp. Cond.—High Frequency—Part of Tuning Cond. Assembly	
⑮	Comp. Cond.—Low Frequency	04000-F
⑯	Cond. 710 Mmf. White and Yellow	5863
⑰	Condenser (.05 Mfd.)	3615-AC
⑱	Resistor (1,000 Ohms)	5837
⑲	First I.F. Transformer	05697
⑳	Comp. Condenser — 1st. I.F. Secondary	04000-A

		Part No.
㉒	Second I.F. Transformer	05698
㉓	Comp. Cond. 2nd. I.F. Secondary	04000-A
㉔	Cond. .05 Mfd.	3615-AU
㉕	Resistor (51,000 Ohms)	4518
㉖	Resistor (25,000 Ohms)	4516
㉗	Resistor (99,000 Ohms)	4411
㉘	Condenser 250 Mmf. Yellow	3082
㉙	Resistor (99,000 Ohms)	4411
㉚	Condenser 250 Mmf. Yellow	3082
㉛	Resistor (490,000 Ohms)	4517
㉜	Resistor (99,000 Ohms)	4411
㉝	Condenser (.01 Mfd.)	3903-X
㉞	Resistor (490,000 Ohms)	4517
㉟	Resistor (1,000 Ohms)	5837
㊱	Input Transformer	7233
㊲	Condenser (2,000 Mmf.)	7296-B
㊳	Output Transformer	2646
㊴	Voice Coil and Cone Assembly	02887
㊵	Battery Switch	7283
	Tube Shield	05720
	Knob	03064
	Knob Spring	4147
	Four Prong Socket	5026
	Five Prong Socket	4956
	Six Prong Socket	6417
	Dial Complete	05811
	Bezel	6413

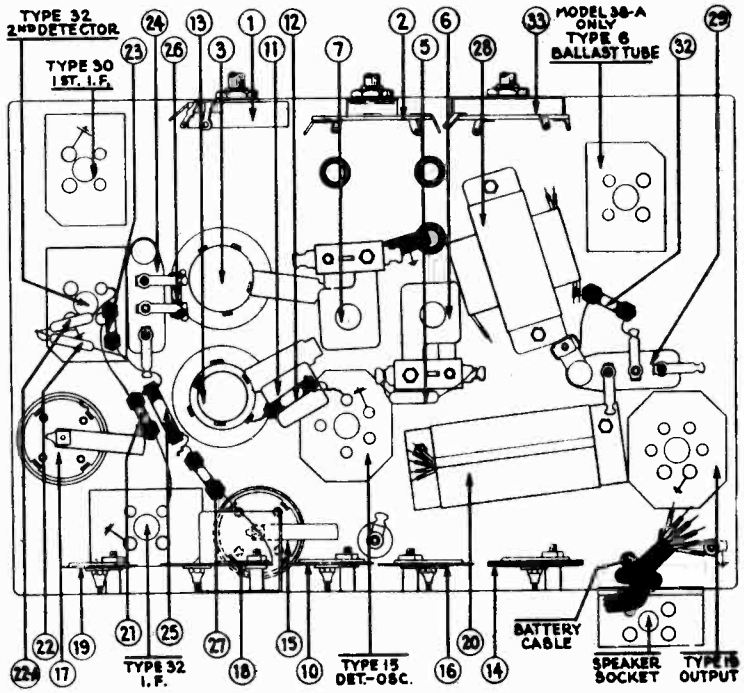
MODELS 38 & 38A





20 INTERNAL CONNECTIONS
FILTER CONDENSER BANK

I. F. 460 K. C.

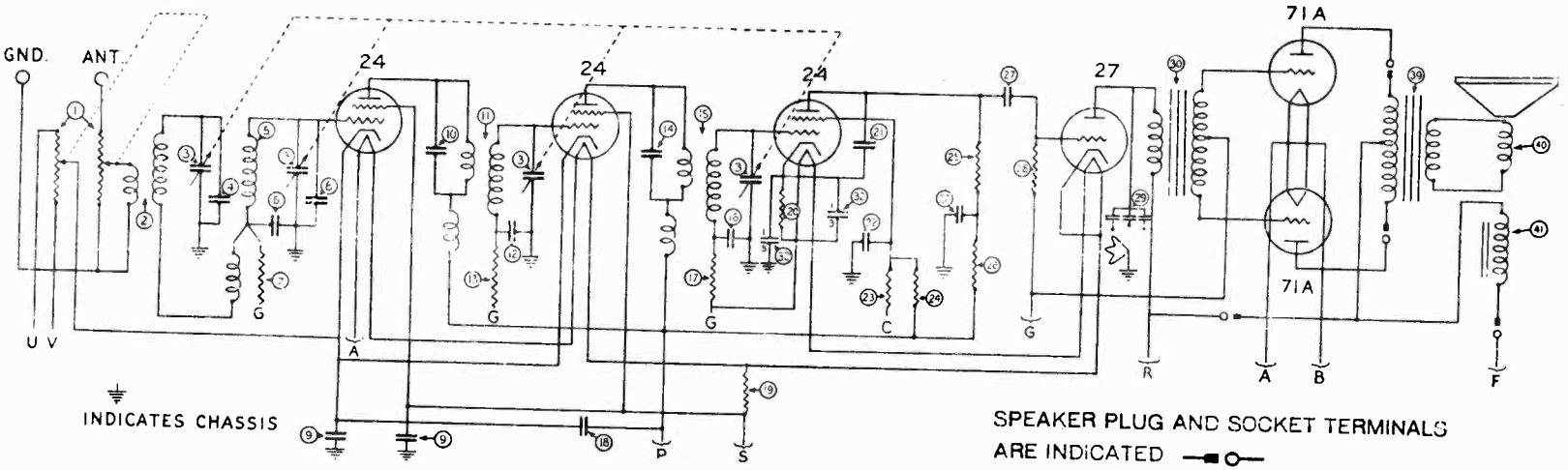


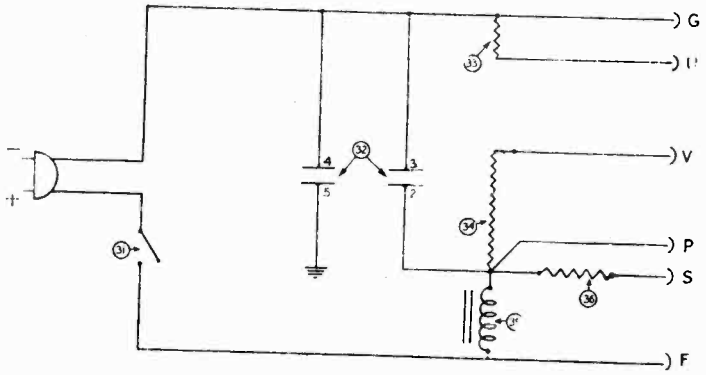
REPLACEMENT PARTS FOR MODELS 38 AND 38-A

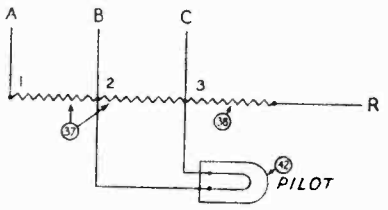
No. on Figs.	Description	Part No.
(1)	Volume Control	33-5017
(2)	Wave-Band Switch	42-1039
(3)	Antenna Transformer	32-1208
(4)	Tuning Condenser Assembly	31-1076
(5)	Condenser (.00041)	30-1000
(6)	Compensating Condenser (Ant.; L.F.; Police)	04000-S
(7)	Compensating Condenser (Ant.; H.F.; Police)	04000-X
(8)	Compensating Condenser (Ant.; H.F.; Part of (4))	
(9)	Compensating Condenser (Osc.; H.F.; Part of (4))	
(10)	Compensating Condenser (1st. I.F. Primary)	04000-A
(11)	Condenser (.0014)	7007
(12)	Resistor (6,000) (Blue-Black-Red)	7352
(13)	Oscillator Transformer	32-1209
(14)	Compensating Condenser (Osc.; L.F.)	04000-S
(15)	1st. I.F. Transformer	32-1251
(16)	Compensating Condenser (1st. I.F. Secondary)	04000-A
(17)	2nd. I.F. Transformer	32-1252
(18)	Compensating Condenser (2nd. I.F. Primary)	04000-A
(19)	Compensating Condenser (2nd. I.F. Secondary)	04000-A
(20)	Filter Condenser Bank	03915
(21)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
(22)	Condenser (.00025)	3082
(22A)	Condenser (.00025)	3082
(23)	Resistor (10,000) (Brown-Black-Orange)	4412

No. on Figs.	Description	Part No.
(24)	Condenser (.01)	3903-Z
(25)	Resistor (.25 meg.) (Red-Yellow-Yellow)	4410
(26)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
(27)	Resistor (.1 meg.) (White-White-Orange)	4411
(28)	Input Transformer	7233
(29)	Condenser (.002)	7296-C
(30)	Output Transformer	2565
(31)	Voice Coil and Cone Assembly (KR-2)	36-3014
(32)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
(33)	Switch ("On-Off"; Battery)	42-1040
(34)	Pilot Lamp (Station Selector)	5316
	Resistor (30 ohm) [(Used across Type 6 ballast tube filament; Model 38-A, only)]	7155
	Shorting Jumper (Model 38; across filament terminals; Type 6 tube socket)	28-8061
	Tube Shield	28-1107
	Four-prong Tube Socket	7545
	Five-prong Tube Socket	7546
	Six-prong Tube Socket	7547
	Speaker Socket	4957
	Battery Cable Assembly (including multi-plug)	38-5265
	Station Selector Dial-scale	27-5019
	Knob (large)	03063
	Knob (small)	03064

Model 41

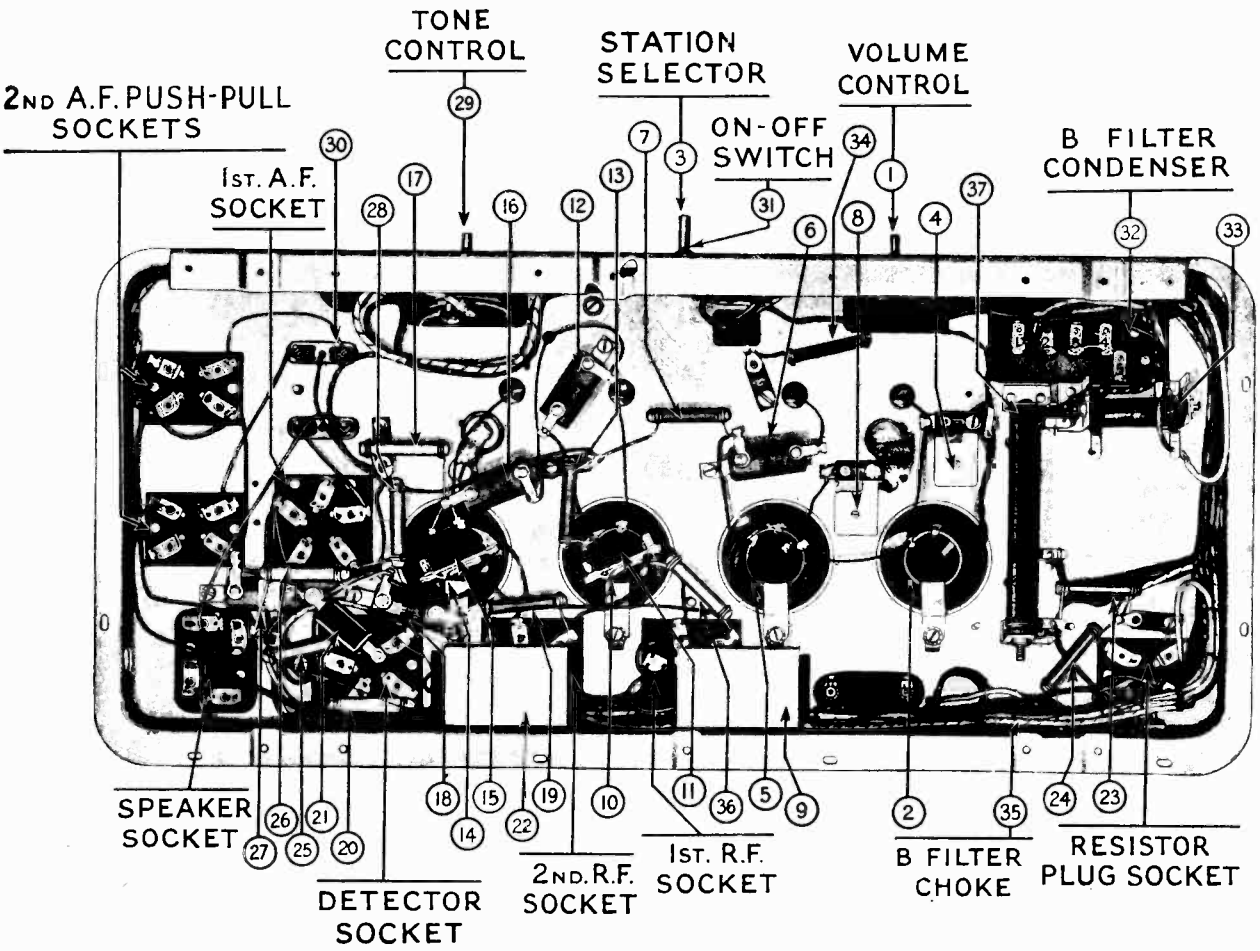






RESISTOR ㊳ IS MOUNTED AT BOTTOM OF CABINET

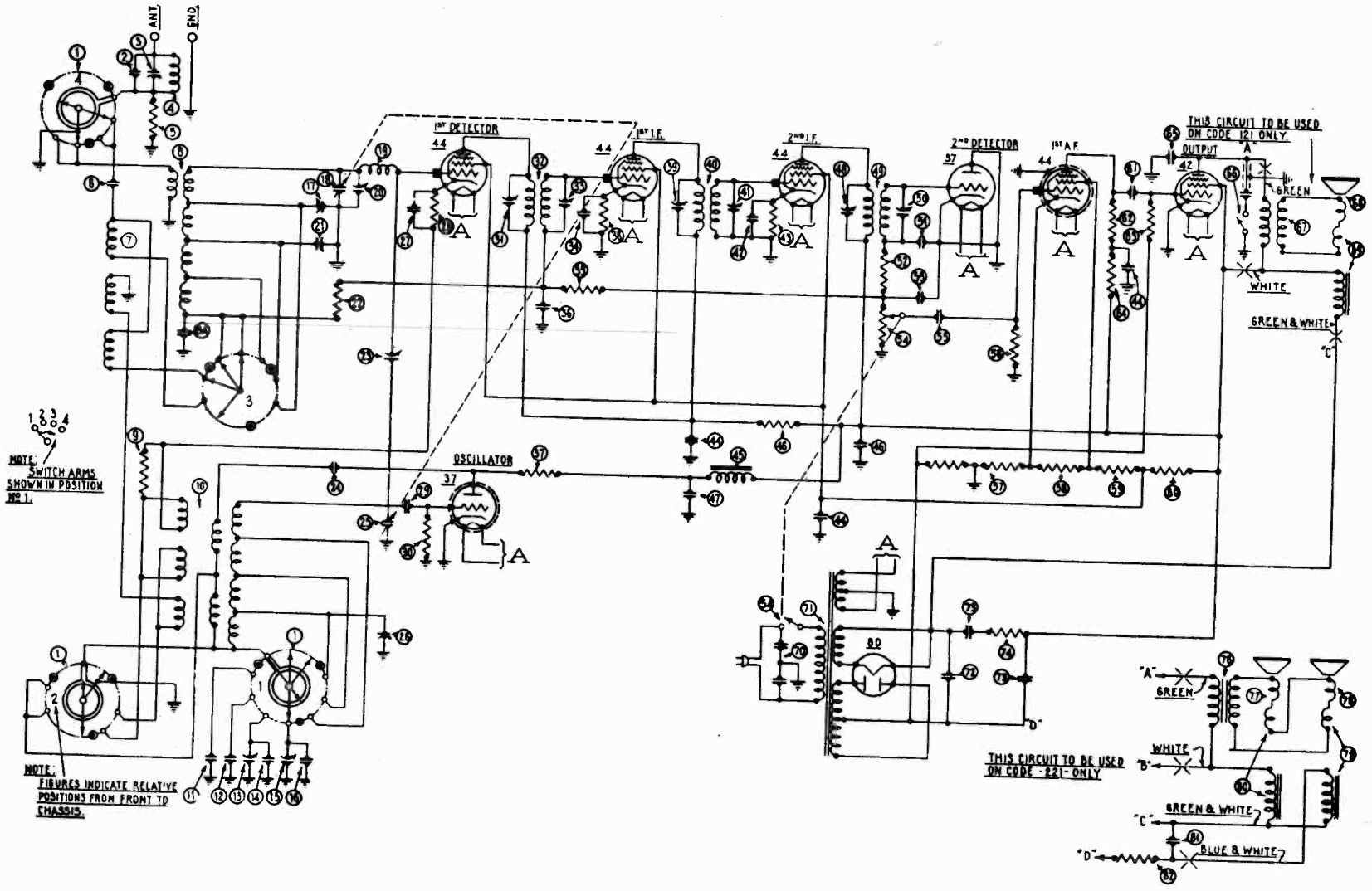
Model 41



REPLACEMENT PARTS

①	Volume Control	4094
②	First R. F. Transformer	3884-A
③	Tuning Condenser	4069-E
④	Compensating Condenser	3772-A
⑤	Second R. F. Transformer	3884-B
⑥	By-Pass Condenser	3584-D
⑦	Resistor	3525
⑧	Compensating Condenser	3772-A
⑨	By-Pass Condenser	3557-A
⑩	Coupling Condenser	3892-A
⑪	Third R. F. Transformer	3884-C
⑫	By-Pass Condenser	3584-D
⑬	Resistor	3525
⑭	Coupling Condenser	3892-A
⑮	Fourth R. F. Transformer	3884-C
⑯	By-Pass Condenser	3584-D
⑰	Resistor	3526
⑱	By-Pass Condenser	3584-D
⑲	Resistor	3656
⑳	Resistor	3767
㉑	By-Pass Condenser	3774
㉒	By-Pass Condenser	3557-A
㉓	Resistor	3766
㉔	Resistor	3542
㉕	Resistor	3769
㉖	Resistor	3767
㉗	By-Pass Condenser	3897-A
㉘	Resistor	3769
㉙	Tone Control	4037-A
㉚	Input Transformer	3872
㉛	On-Off Switch	3517
㉜	Filter Condenser Block	4067
㉝	Resistor	4142
㉞	Resistor	3656
㉟	Choke	3422
㊱	Resistor	3526
㊲	Resistor	4057
㊳	Resistor	4058
㊴	Output Transformer	2848
㊵	Voice Coil and Cone	2814-B
㊶	Field Coil	2799
㊷	Pilot Lamp	3463
	Resistor Conn. Plug	4071
	Knobs (Large)	3580-A
	Knobs (Small)	3579-A
	Knobs (Switch)	3676-A
	Spring (Knob)	3305
	Grid Clip	4060
	Grid Clip Insulator	4061
	Condenser Shield	4065
	Tube Shield	3878-A
	Cushion (Condenser Brace)	3914
	Rubber Washer (Cond. Brace)	3915
	Rubber Washer (Condenser)	3920
	Speaker Plug and Cable	L-1056-A
	Rubber Washer (Furniture)	3558
	Pilot Insulator	4054
	Pilot Guard	4055
	Condenser Brush	3748
	R. F. Transformer Shield	3862
	Bottom Plate	3406
	Compensating Condenser Nut	3151
	Tuning Scale	3794
	Condenser Cable	3484
	Condenser Cable Spring	3012
	Pilot Lamp	3463
	4-hole Tube Socket	3423-A
	5-hole Tube Socket	3442-A

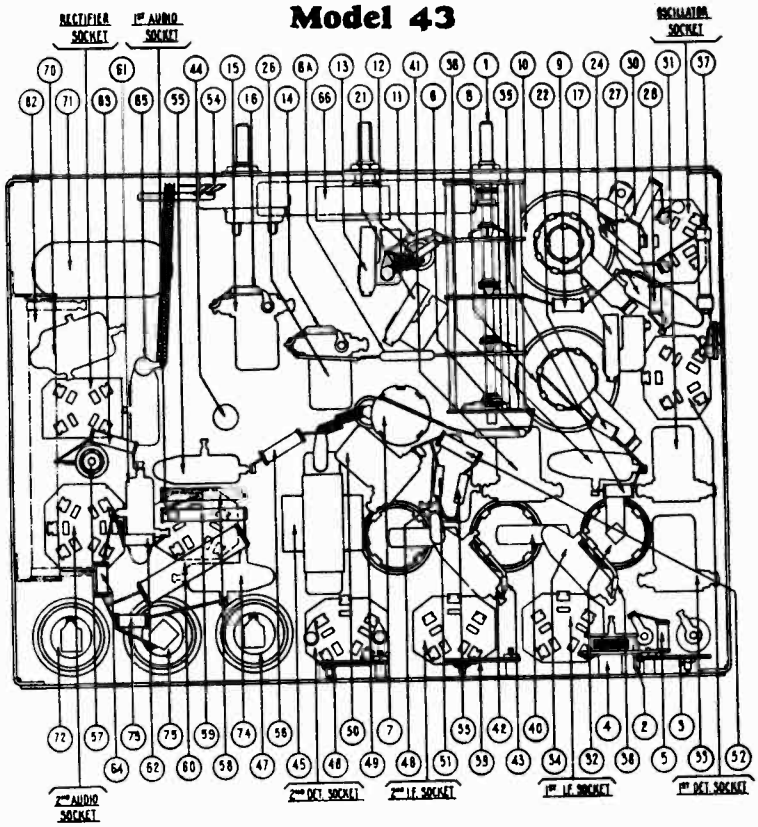
Model 43


ANT.
END.
1ST DETECTOR
1ST I.F.
2ND I.F.
2ND DETECTOR
1ST A.F.
OUTPUT
THIS CIRCUIT TO BE USED ON CODE 121 ONLY
GREEN
WHITE
GREEN & WHITE
OSCILLATOR
80
NOTE: SWITCH ARMS SHOWN IN POSITION No 1.
NOTE: FIGURES INDICATE RELATIVE POSITIONS FROM FRONT TO CHASSIS.
THIS CIRCUIT TO BE USED ON CODE -221- ONLY
"A"
"B"
"C"
"D"
GREEN
WHITE
GREEN & WHITE
BLUE & WHITE

Replacement Parts

Model 43

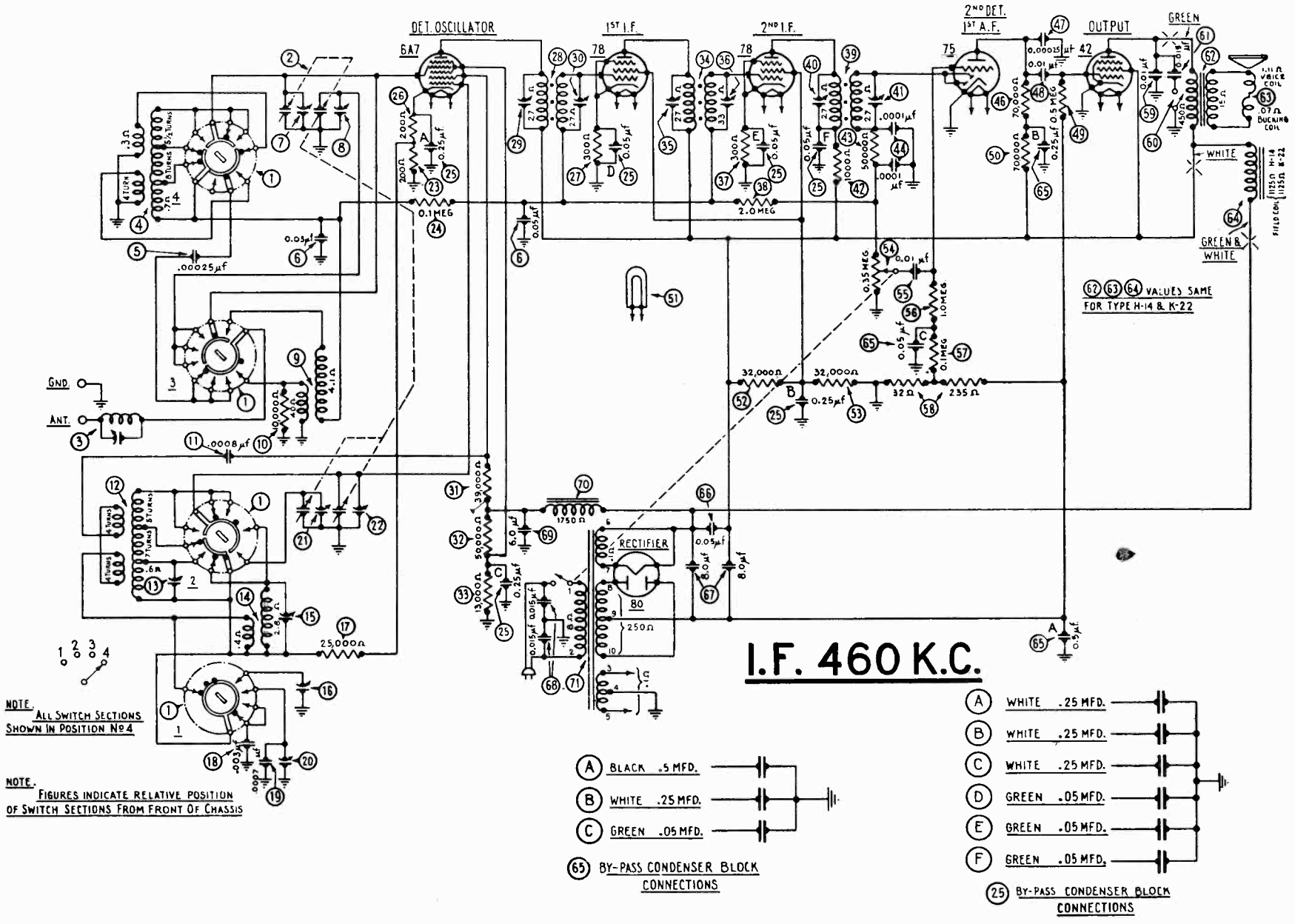
No. on Figs. 2 and 3	Description	Part No.
1	Wave Change Switch	05617
2	Condenser (410 mmf.)	5120
3	Compensating Condenser—450 K. C. Wave Trap	04000B
4	R. F. Choke	05191
5	Resistor (2,000 ohms)	6984
6	Condenser (1000 mmf.)	5215
7	Antenna Coupling Coil	05189
8	Antenna Transformer*	06404
8a	Condenser (3,000 mmf.)	6009
9	Resistor (1,000 ohms)	5837
10	Oscillator Coil*	05624
11	Condenser (1,650 mmf.)	5877
12	Condenser (1,250 mmf.)	5886
13	Compensating Condenser—1400 K. C. End of Second Band	04000F
14	Condenser (250 mmf.)	3082
15	Compensating Condenser—600 K. C. End of First Band	04000F
16	Condenser (250 mmf.)	3082
17	Compensating Condenser—8 Megacycle End Third Band	04000V
18	Tuning Condenser Assembly	05154
19	Grid Coil (Top of Chassis)	05190
20	Compensating Condenser (Part of Tuning Cond. Assembly)	
21	Compensating Condenser (3.5 Megacycle End of Second Band)	04000V
22	Resistor (99,000 ohms)	4411
23	Neutralizing Condenser (Top of Chassis)	04000V
24	Condenser (1000 mmf.)	5837
25	Condenser (50 mmf.) (Top of Chassis)	3774
26	Resistor (490,000 ohms)	4517
26a	Compensating Condenser (1400 K. C. End of First Band)	04000F
27	Resistor (25,000 ohms)	4516
28	Condenser (.05 mfd.)	3615E
29	Resistor (500 ohms)	6977
30	Compensating Condenser	04000C
31	Compensating Condenser—1st I. F. Primary	04000M
32	First I. F. Transformer	05185
33	Compensating Condenser—1st I. F. Secondary	04000M
34	Condenser (.05 mfd.)	3615W
35	Resistor (2,000,000 ohms)	5872
36	Condenser (.05 mfd.)	3615J
37	Resistor (10,000 ohms)	3524
38	Resistor (500 ohms)	6977
39	Compensating Condenser—2nd I. F. Primary	04000M
40	Second I. F. Transformer	05185
41	Compensating Condenser—2nd I. F. Secondary	04000X
42	Condenser (.05 mfd.)	3615W
43	Resistor (500 ohms)	6977
44	Filter Condenser Bank (.25, 2-.5 mfd.)	05239
45	Filter Choke	5930
46	Condenser (.05 mfd. and Resistor 250 ohms)	3615AS
47	Electrolytic Condenser	7556
48	Compensating Condenser—3rd I. F. Primary	04000M
49	Third I. F. Transformer	05185
50	Compensating Condenser—3rd I. F. Secondary	04000M
51	Condenser (110 mmf.)	4519
52	Resistor (99,000 ohms)	4411
53	Condenser (110 mmf.)	4519
54	Volume Control and On-Off Switch	6892
55	Condenser (.01 mfd.)	3903F
56	Resistor (1,000,000 ohms)	4409
57	Wire Wound Resistor (185 and 245 ohms)	6452
58	Resistor (5,000 ohms)	3526
59	Resistor (5,000 ohms)	3526
60	Resistor (13,000 ohms)	6450
61	Condenser (.01 mfd.)	3903N
62	Resistor (70,000 ohms)	5385
63	Resistor (490,000 ohms)	4517
64	Resistor (25,000 ohms)	4516
65	Condenser (.01 mfd.)	3903AA
66	Tone Control	05174



67	Output Transformer	2580
68	Voice Coil and Cone Assembly	02823
69	Speaker Field and Bucking Coil Assembled with Pot (K-7)	02761
70	Condenser (.015 mfd. Double)	3793K
71	Power Transformer—50-60 Cycles, 115 Volts, Single Speaker Models	7074
	25-40 Cycles, 115 Volts, Single Speaker Models	7075
	50-60 Cycles, 230 Volts, " " "	7076
	50-60 Cycles, 115 Volts, Twin Speaker Models	6985
	50-60 Cycles, 230 Volts, " " "	6986
72	Electrolytic Condenser (6 mfd.) 50-60 Cycles	4916
	Electrolytic Condenser (8 mfd.) 25-40 Cycles	6707
73	Resistor (10,000 ohms)	4412
74	Condenser (.05 mfd.)	3615AD
75	Electrolytic Condenser (6 mfd.) 50-60 Cycles	4916
	Electrolytic Condenser (8 mfd.) 25-40 Cycles	6706
76	Output Transformer—Twin Speaker	2564
77	Voice Coil and Cone Assembly	02823
78	Voice Coil and Cone Assembly	02823
79	Speaker Field and Bucking Coil Assembled with Pot (K-9)	02762
80	Speaker Field and Bucking Coil Assembled with Pot (K-10)	02767
81	Condenser (.5 mfd.)	05150
82	Wire Wound Resistor (5,620 ohms) Twin Speaker	6451
	Tube Shield	5387
	Knob (Large)	03063
	Knob (Medium)	03064
	Knob (Small)	03437
	Knob Spring (Large)	5262
	Knob Spring (Small)	4147
	Grid Clip	4897
	Four Prong Socket Assembly	5026
	Five Prong Socket Assembly	4956
	Six Prong Socket Assembly	6417
	Dial Complete	05418
	Bezel	6826
	Tuning Condenser Drive Cord	04834
	Spring	6508
	Chassis Mounting Screw	W-468
	Mounting Washer	W-315
	Rubber Washer	5189

*Supplied in matched pair—Antenna and oscillator coils.

MODEL 44


DET. OSCILLATOR
6A7
1ST I.F.
78
2ND I.F.
78
2ND DET.
1ST A.F.
75
OUTPUT
42
GREEN
WHITE
GREEN & WHITE
GND.
ANT.
RECTIFIER
80
I.F. 460 K.C.
62 63 64 VALUES SAME FOR TYPE H-14 & K-22
NOTE. ALL SWITCH SECTIONS SHOWN IN POSITION No 4
NOTE. FIGURES INDICATE RELATIVE POSITION OF SWITCH SECTIONS FROM FRONT OF CHASSIS
A BLACK .5 MFD.
B WHITE .25 MFD.
C GREEN .05 MFD.
65 BY-PASS CONDENSER BLOCK CONNECTIONS
A WHITE .25 MFD.
B WHITE .25 MFD.
C WHITE .25 MFD.
D GREEN .05 MFD.
E GREEN .05 MFD.
F GREEN .05 MFD.
25 BY-PASS CONDENSER BLOCK CONNECTIONS

MODEL 44

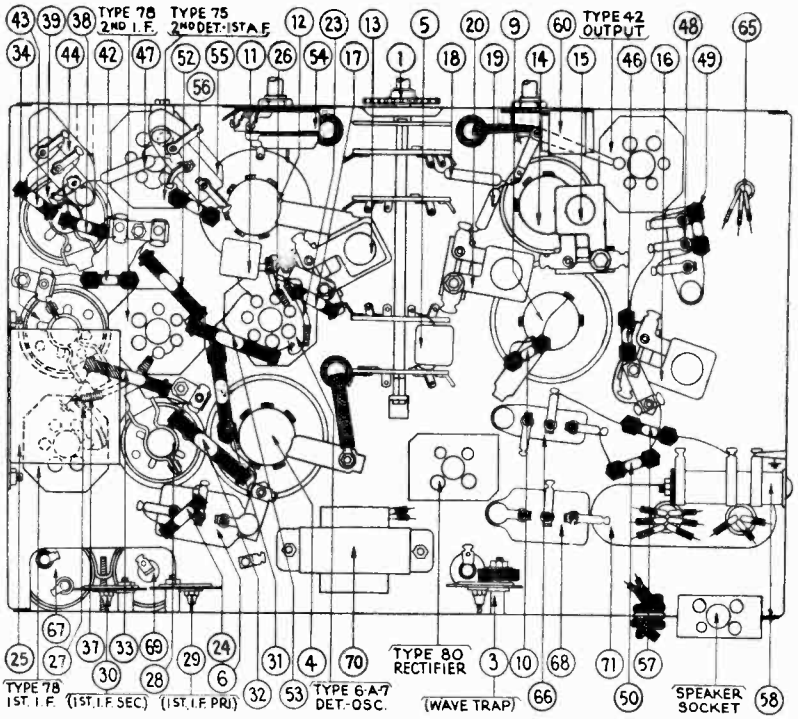


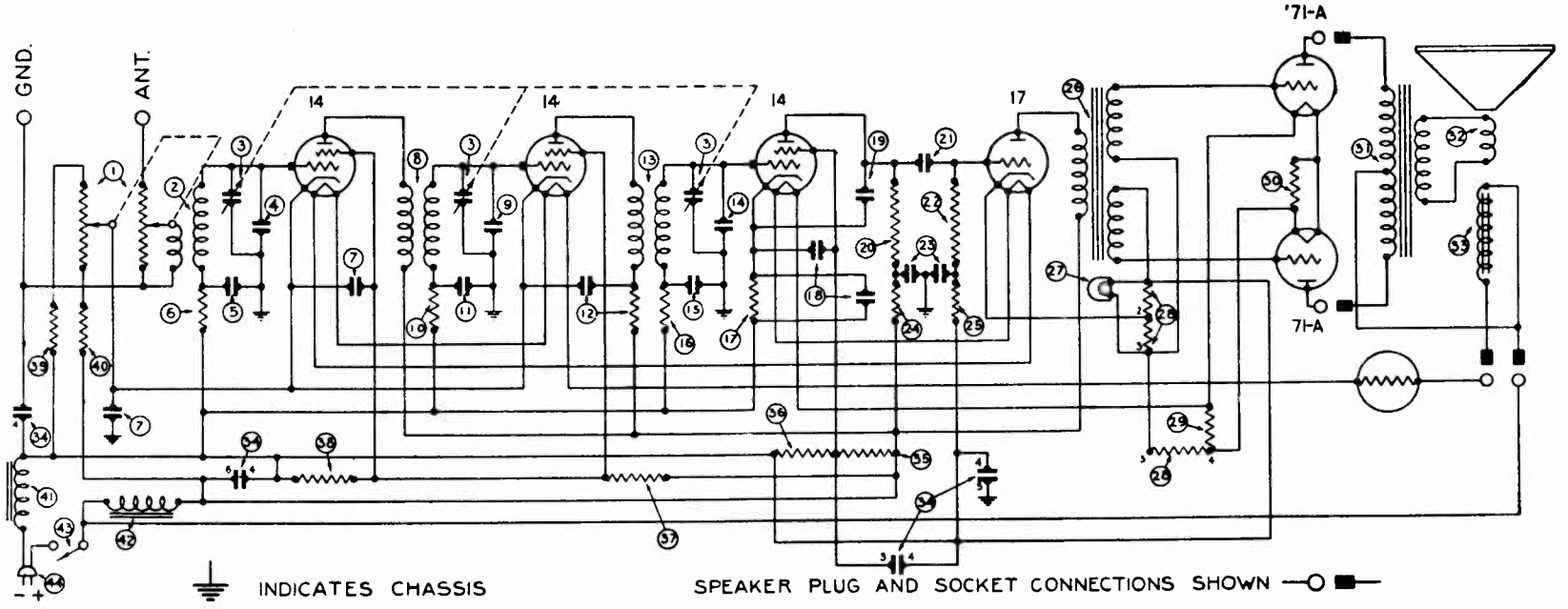
FIG. 4—Bottom View of Chassis, Showing Parts, and Position of Compensating Condensers Located,—and Reached,—from Below Chassis

REPLACEMENT PARTS FOR MODEL 44

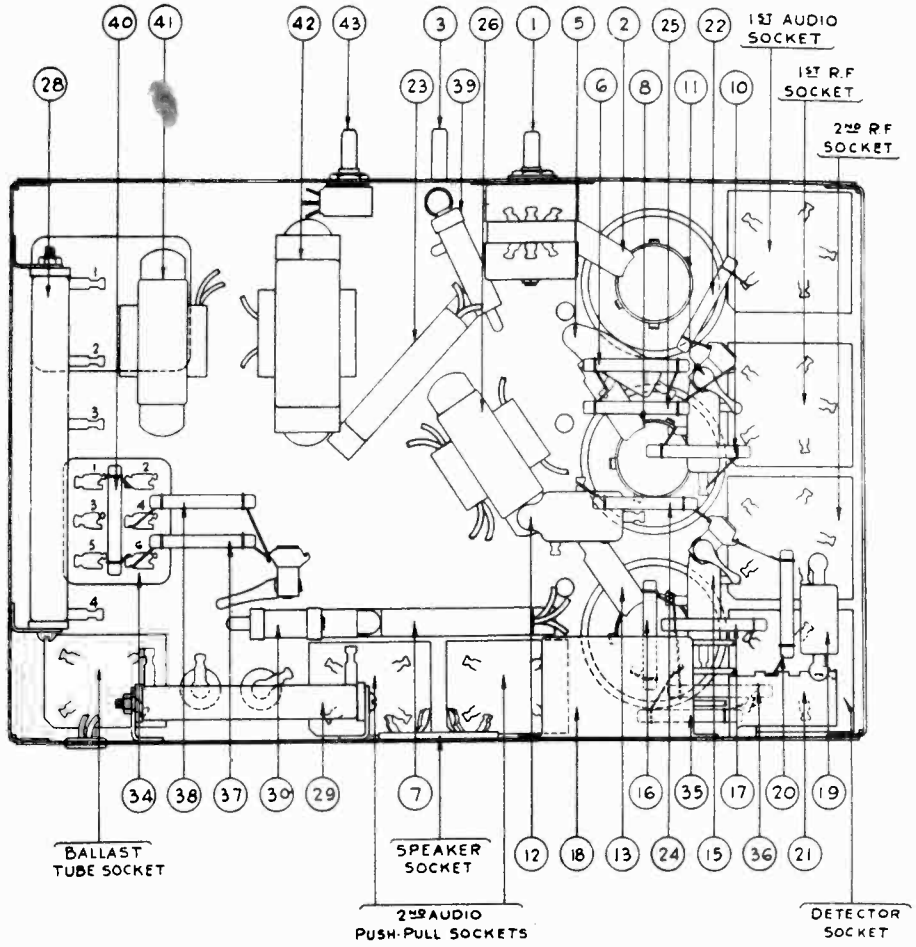
No. on Figs.	Description	Part No.
(1)	Wave-Band Switch	42-1045
(2)	Tuning Condenser Assembly	31-1106
(3)	Wave Trap	38-5199
(4)	Antenna Transformer (H. F. Bands)	32-1271
(5)	Condenser (.00025)	5858
(6)	Condenser (Double) (.05-.05)	3615-AM
(7)	Compensating Condenser (Ant.; H. F.) (Part of (2))	
(8)	Compensating Condenser (Ant.; B'dc'st.) (Part of (2))	
(9)	Antenna Transformer (B'dc'st. Bands)	32-1270
(10)	Resistor (10,000) (Brown-Black-Orange)	4412
(11)	Condenser (.0008)	5878
(12)	Oscillator Transformer (H. F. Bands)	32-1273
(13)	Compensating Condenser (Range 2)	04000-C
(14)	Oscillator Transformer (B'dc'st. Bands)	32-1272
(15)	Compensating Condenser (Osc.; Range 1)	04000-A
(16)	Compensating Condenser (B'dc'st.; Series)	04000-S
(17)	Resistor (25,000) (Red-Green-Orange)	4516
(18)	Condenser (.003)	6009
(19)	Condenser (.0007)	5863
(20)	Compensating Condenser (Range 2; Series)	04000-R
(21)	Compensating Condenser (Osc.; Range 4) (Part of (2))	
(22)	Compensating Condenser (Osc.; Range 3) (Part of (2))	
(23)	Resistor (200) (Flexible Wire-Wound) (Red-Black-Brown)	7217
(24)	Resistor (.1 meg.) (White-White-Orange)	4411
(25)	By-pass Condenser Block (6-section)	30-4077
(26)	Resistor (200) (Flexible Wire-Wound) (Red-Black-Brown)	7217
(27)	Resistor (300) (Flexible Wire-Wound) (Orange-Black-Brown)	33-3010
(28)	1st, I. F. Transformer	32-1274
(29)	Compensating Condenser (1st, I. F. Pri.)	04000-J
(30)	Compensating Condenser (1st, I. F. Sec.)	04000-J
(31)	Resistor (39,000) (Orange-White-Orange)	33-1027
(32)	Resistor (50,000) (Green-Brown-Orange)	5868
(33)	Resistor (13,000) (Brown-Orange-Orange)	3766
(34)	2nd, I. F. Transformer	32-1306
(35)	Compensating Condenser (2nd, I. F. Pri.)	31-6007, (included as part of (34))
(36)	Compensating Condenser (2nd, I. F. Sec.)	
(37)	Resistor (300) (Flexible Wire-Wound) (Orange-Black-Brown)	33-3010
(38)	Resistor (2.0 meg.) (Red-Black-Green)	5872
(39)	3rd, I. F. Transformer	32-1307
(40)	Compensating Condenser (3rd, I. F. Pri.)	31-6007, (included as part of (39))
(41)	Compensating Condenser (3rd, I. F. Sec.)	
(42)	Resistor (1,000) (Brown-Black-Red)	5837
(43)	Resistor (50,000) (Green-Brown-Orange)	4518
(44)	Condenser (Double) (.0001-.0001)	8035-K

No. on Figs.	Description	Part No.
(46)	Resistor (70,000) (Violet-Black-Orange)	5385
(47)	Condenser (.00025)	5858
(48)	Condenser (.01)	3903-AN
(49)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
(50)	Resistor (70,000) (Violet-Black-Orange)	5385
(51)	Pilot Lamp (Station Selector)	6608
(52)	Resistor (32,000) (Orange-Red-Orange)	3525
(53)	Resistor (32,000) (Orange-Red-Orange)	3525
(54)	Volume Control and "On-Off" Switch	33-5025
(55)	Condenser (.01)	3903-J
(56)	Resistor (1.0 meg.) (Brown-Black-Green)	4409
(57)	Resistor (.1 meg.) (White-White-Orange)	4411
(58)	Voltage Divider Resistor	33-3037
(59)	Condenser (.01) (Part of (60))	
(60)	Tone Control	30-4080
(61)	Condenser (.015) (Part of (60))	
(62)	Output Transformer (H-14)	2580
(63)	Voice Coil and Cone Assembly (H-14)	02625
(64)	Speaker Field Coil and Pot Assembly (H-14)	02767
(65)	By-pass Condenser Block (3-section)	30-4087
(66)	Condenser (.05)	3615-H
(67)	Condenser (Electrolytic) (Double) (8.0-8.0)	30-2028
(68)	Condenser (Double) (.015-.015)	3793-H
(69)	Condenser (Electrolytic) (8.0)	30-2020
(70)	Filter Choke	5930
(71)	Power Transformer (50-60 cycle)	32-7137
	Tube Shield	28-1107
	Four-Prong Tube Socket	7544
	Six-Prong Tube Socket	7547
	Seven-Prong Tube Socket	27-6005
	Speaker Socket	4957
	Dial Scale (Station Selector)	27-5028
	Drum Assembly (Tuning Condenser)	31-1055
	Idler Shaft Assembly (Tuning Condenser)	31-1056
	Tuning Shaft Assembly (Tuning Condenser)	31-1057
	Gear (Wave-Band Switch)	28-7012
	Knob (large)	27-4025
	Knob (medium)	03063
	Knob (small)	03064
	Knob Spring	5262
	Knob Screw (Brass) (Secures large knob to shaft)	W-267
	Bezel	27-4039
	Bezel Mounting Screw	W-841
	Bezel Felt	6732
	Mounting Bolt (Chassis)	W-567
	Mounting Washer (Chassis) (Rubber)	5189
	Mounting Washer (Chassis) (Steel)	5058
	Speaker (K-22) **(Baby Grand Only)**:	
	Output Transformer	2580
	Voice Coil and Cone Assembly	36-3174
	Speaker Field Coil and Pot Assembly	02767

Model 46


GND.
ANT.
14
14
14
17
'71-A
71-A
INDICATES CHASSIS
SPEAKER PLUG AND SOCKET CONNECTIONS SHOWN

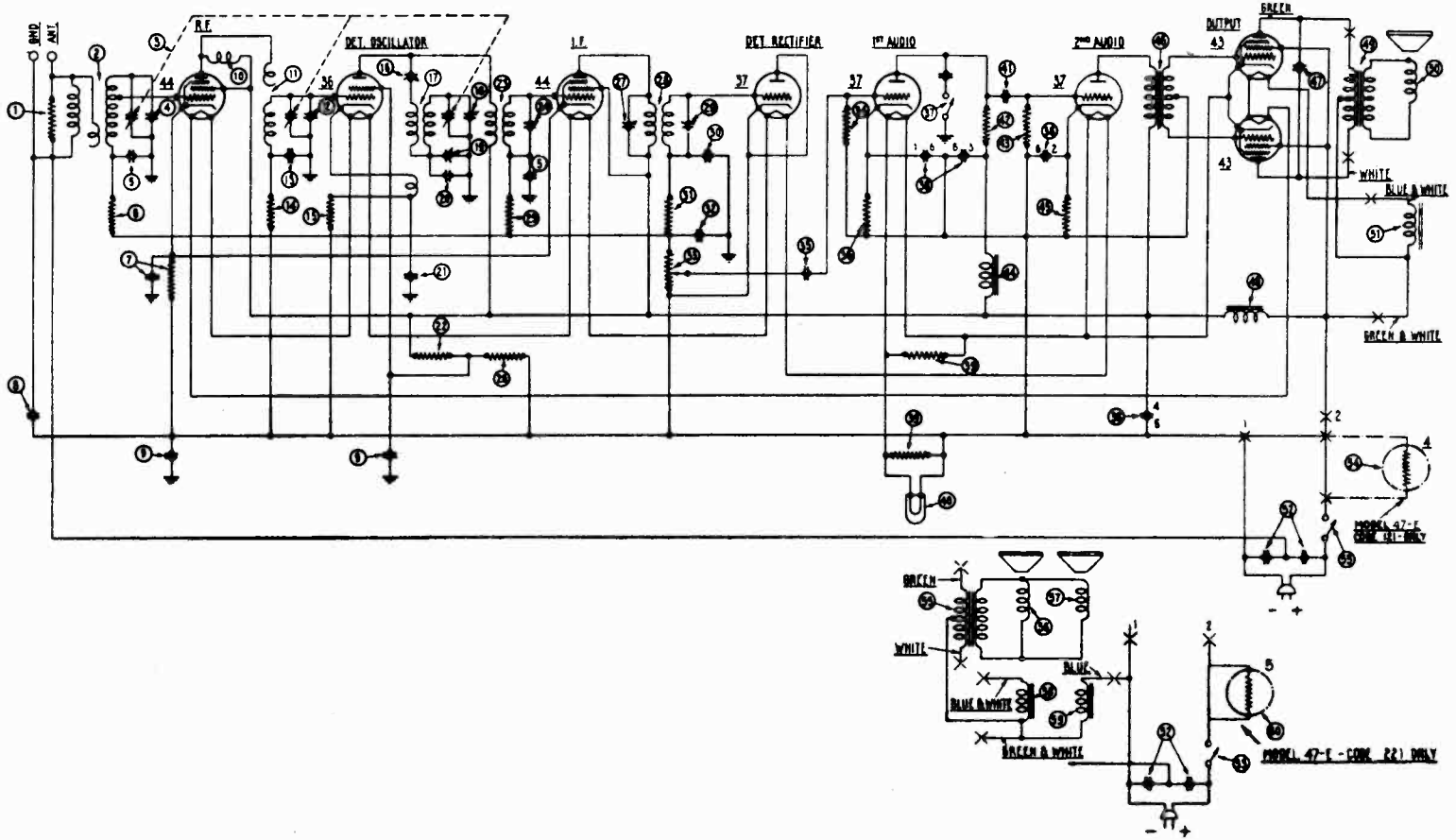
Model 46



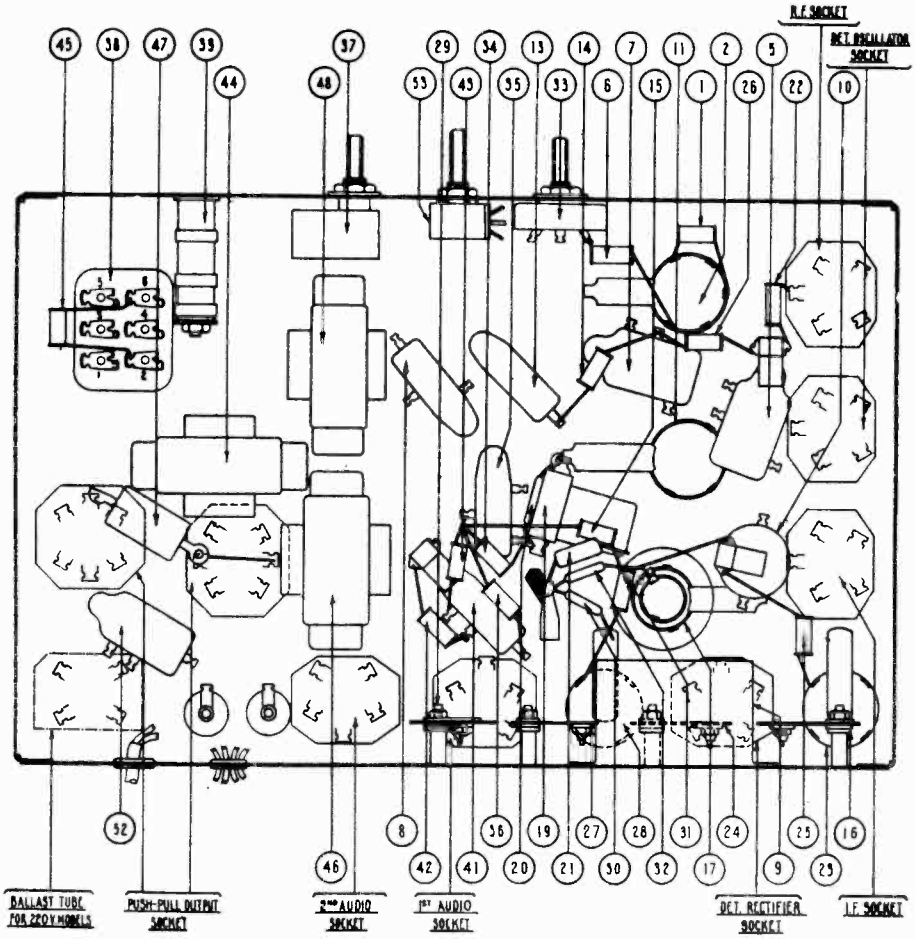
REPLACEMENT PARTS—MODEL 46

①	Volume Control	4141
②	First R. F. Transformer	3884-X
③	Tuning Condenser	4200-D
④	Comepnsating Condenser (Part of Tuning Condenser Assembly)	
⑤	By-Pass Condenser .05	3615-J
⑥	Resistor 32,000 Ohms	3525
⑦	By-Pass Condenser .25	4864
⑧	Second R. F. Transformer	3884-Y
⑨	Compensating Condenser (Part of Tuning Condenser Assembly)	
⑩	Resistor 32,000 Ohms	3525
⑪	By-Pass Condenser .05	3615- M
⑫	Condenser and Resistor .05 and 250 Ohms	3615-K
⑬	Third R. F. Transformer	3884-Y
⑭	Compensating Condenser (Part of Tuning Condenser Assembly)	
⑮	By-Pass Condenser .05	3615- M
⑯	Resistor 5,000 Ohms	3526
⑰	Resistor 32,000 Ohms	3525
⑱	By-Pass Condenser (2-section, .25 each)	4864
⑲	By-Pass Condenser .0005	3910
⑳	Resistor 490,000 Ohms.	3769
㉑	Blocking Condenser .01	3903-H
㉒	Resistor 490,000 Ohms	3769
㉓	By-Pass Condenser (2-section, .25 each)	4864
㉔	Resistor 99,000 Ohms	3767
㉕	Resistor 240,000 Ohms	3768
㉖	Push-Pull Input Transformer	4862
㉗	Pilot Bulb	3463
㉘	Resistor (3-section)	4858-A
㉙	Resistor 200 Ohms	4859-A
㉚	Resistor 210 Ohms	4861
㉛	Push-Pull Output Transformer	2766
㉜	Voice Coil and Cone	2769-B
㉝	Field Coil	2694
㉞	Filter Condenser	4860
㉟	Resistor 70,000 Ohms	3542
㊱	Resistor 32,000 Ohms	3525
㊲	Resistor 13,000 Ohms	3766
㊳	Resistor 70,000 Ohms	3542
㊴	Resistor 250 Ohms	4142
㊵	Resistor 13,000 Ohms	3766
㊶	Line Choke (Neg.)	4886
㊷	Line Choke (Pos.)	4231
㊸	Set Switch	4095
	Line Plug	L-543
	Line Cord and Plug	L-943
	Tube Shield	4228-A
	Knob (Dial)	4289-A
	Spring (Dial Knob)	3305
	Knobs (Switch and Volume Control)	4290-A
	Spring (Switch and Volume Control Knob)	4147
	Grid Clip	4060
	Grid Clip Insulator	4061
	Speaker Plug and Cable	L-1124-A
	R. F. Transformer Shield	3862
	Grommet for R. F. Transformer Shield	3747
	Pilot Lamp Bracket	4871
	Four Prong Socket Assembly	3977-A
	Five Prong Socket Assembly	3979-A
	Speaker Socket	3977-B
	Volume Control Insulators	4092
	Volume Control Insulators	4286
	Cabinet	
	Fahnstock Clip	L-1126
	Finishing Rosettes	4267
	Speaker Mounting Screws (3 used)	W-493
	Speaker Mounting Screws (1 used)	W-483
	Tuning Condenser Dial Scale	4261
	Mica for Compensating Condensers	4318

MODEL 47 SERIES



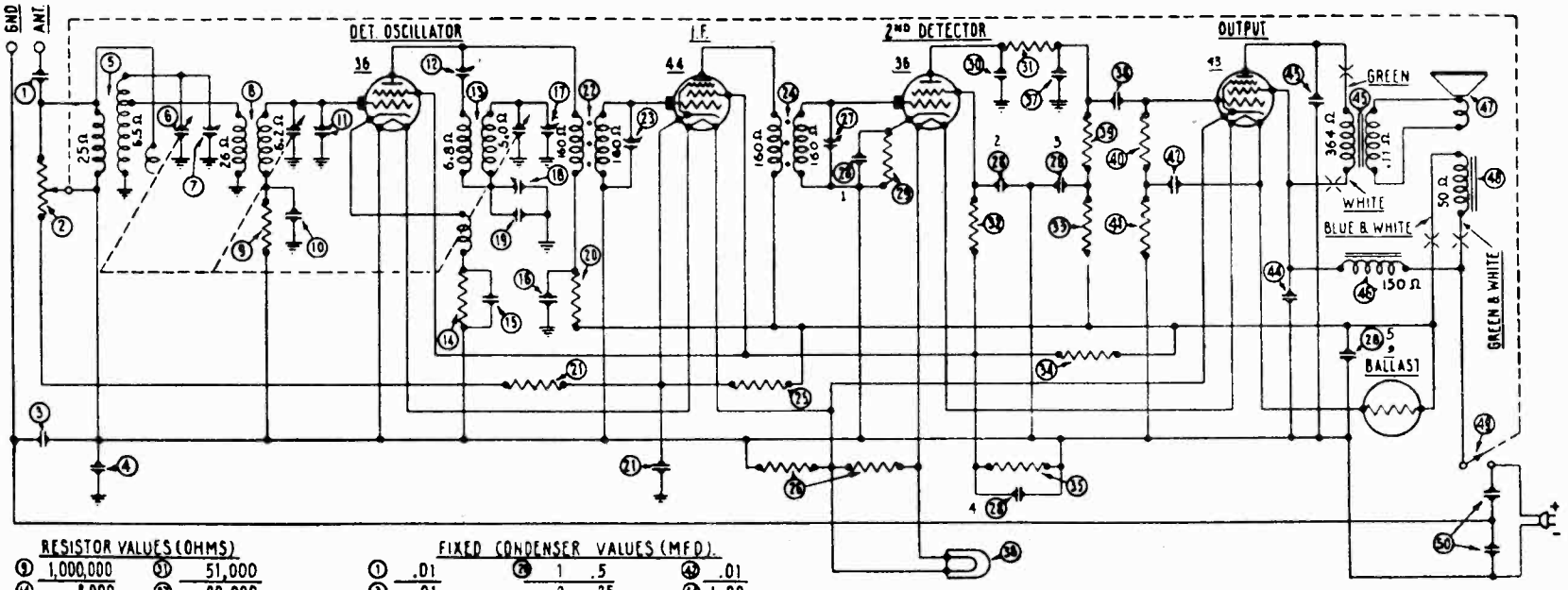
MODEL 47 SERIES



REPLACEMENT PARTS MODEL 47

①	Resistor (10,000 ohms)	4412
②	R. F. Transformer	04339
③	Tuning Condenser Assembly	05098
④	Compensating Condenser—R. F. —Part of Tuning Condenser Assembly	
⑤	Condenser (.05 Mfd. Double)	3615-AF
⑥	Resistor (1,000,000 ohms)	4409
⑦	Condenser (.18 Mfd. & 200 ohm resistor)	4989-S
⑧	Condenser (.05 Mfd.)	3615-H
⑨	Condenser (.25 Mfd. Double)	05109
⑩	R. F. Choke	03103
⑪	Detector Transformer	05093
⑫	Compensating Condenser—Detector—Part of Tuning Condenser Assembly	
⑬	Condenser (.05 Mfd.)	3615-L
⑭	Resistor (1,000,000 ohms)	4409
⑮	Resistor (8,000 ohms)	5838
⑯	Compensating Condenser — 1st I. F. Primary	04000-M
⑰	Oscillator Coil	04186
⑱	Compensating Condenser—High Frequency—Part of Tuning Condenser Assembly	
⑲	Compensating Condenser—Low Frequency	04000-F
⑳	Condenser (410 Mmf.) Yellow and Orange	5120
㉑	Condenser (700 Mmf.) White and Yellow	5863
㉒	Resistor (25,000 ohms)	4516
㉓	First I. F. Transformer	05094
㉔	Compensating Condenser—1st I. F. secondary	04000-A
㉕	Resistor (1,000,000 ohms)	4409
㉖	Resistor (70,000 ohms)	5385
㉗	Compensating Condenser—2nd I. F. Primary	04000-A
㉘	Second I. F. Transformer	05095
㉙	Compensating Condenser—2nd I. F. Secondary	04000-A
㉚	Condenser (110 Mmf.) Blue and Golden Yellow	4519
㉛	Resistor (99,000 ohms)	4411
㉜	Condenser (110 Mmf.) Blue and Golden Yellow	4519
㉝	Volume Control	6499
㉞	Resistor (1,000,000 ohms)	4409
㉟	Condenser (.01 Mfd.)	3903-G
㊱	Resistor (10,000 ohms)	4412
㊲	Tone Control	04757
㊳	Filter Condenser Bank	05003
㊴	Resistor—Wire wound (70 ohms and 16 ohms)	6716
㊵	Pilot Light	6608
㊶	Condenser (.01 Mfd.)	3093-T
㊷	Resistor (25,000 ohms)	4516
㊸	Resistor (1,000,000)	4409
㊹	Filter Choke (High Resistance)	5314
㊺	Resistor (5,000 ohms)	5310
㊻	Input Transformer	6064
㊼	Condenser (.002 Mfd.) Blue	4059
㊽	Filter Choke	6712
㊾	Output Transformer — Single Speaker (K-13)	2550
㊿	Voice Coil and Cone Assembly	02823
(51)	Speaker Field Assembled with Pot (K-13)	02745
(52)	Condenser (.015 Mfd. Double)	3793-M
(53)	On-off Switch	6498
(54)	Ballast Lamp No. 4—Single Speaker	6739
(55)	Output Transformer — Twin Speaker (K-14, K-15)	2544
(56)	Voice Coil and Cone Assembly	02823
(57)	Voice Coil and Cone Assembly	02823
(58)	Speaker Field Assembled with Pot (K-14)	02745
(59)	Speaker Field Assembled with Pot (K-15)	02744
(60)	Ballast Lamp No. 5 — Twin Speaker	6740
	Tube Shield	05058
	Knob (large)	03063
	Knob (medium)	03064
	Knob (small)	03437
	Knob Spring (large)	5262
	Knob Spring (small)	4147
	Grid Clip	4897
	Four Prong Socket Assembly	5026
	Five Prong Socket Assembly	4950
	Six Prong Socket Assembly	6417
	Dial Complete	04832
	Bezel	6435
	Chassis Mounting Screw	W-468
	Mounting Washer	W-315
	Rubber Washer	5189
	Mounting Clamp	6440
	Cone Retaining Ring	2600

Model 48



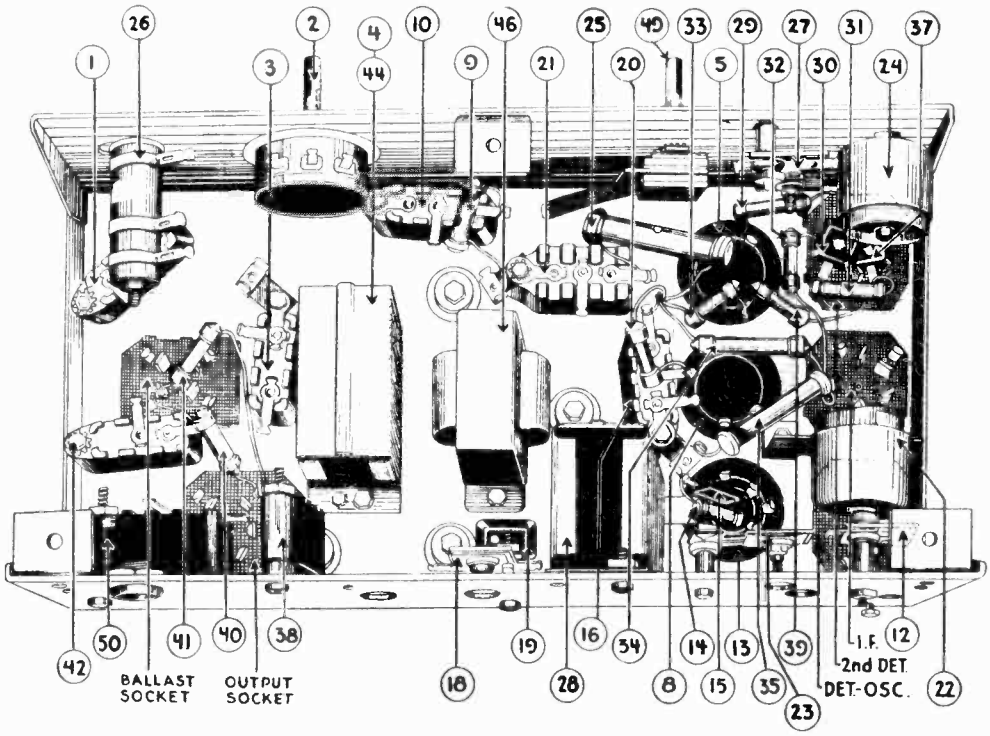
RESISTOR VALUES (OHMS)

9	1,000,000	31	51,000
14	8,000	32	99,000
19	1,000	33	99,000
21	250	34	25,000
23	10,000	35	92,000
29	140 & 30	39	240,000
		41	490,000
		43	99,000

FIXED CONDENSER VALUES (MFD.)

1	.01	26	1 .5	42	.01
2	.01		2 .25	44	1.00
4	2.00		3 .15	50	.015
16	.05		4 .5	52	.01
15	.00071		5 .1		
18	.05	36	.00025		
20	.00071	37	.00025		
27	.05	38	.01		

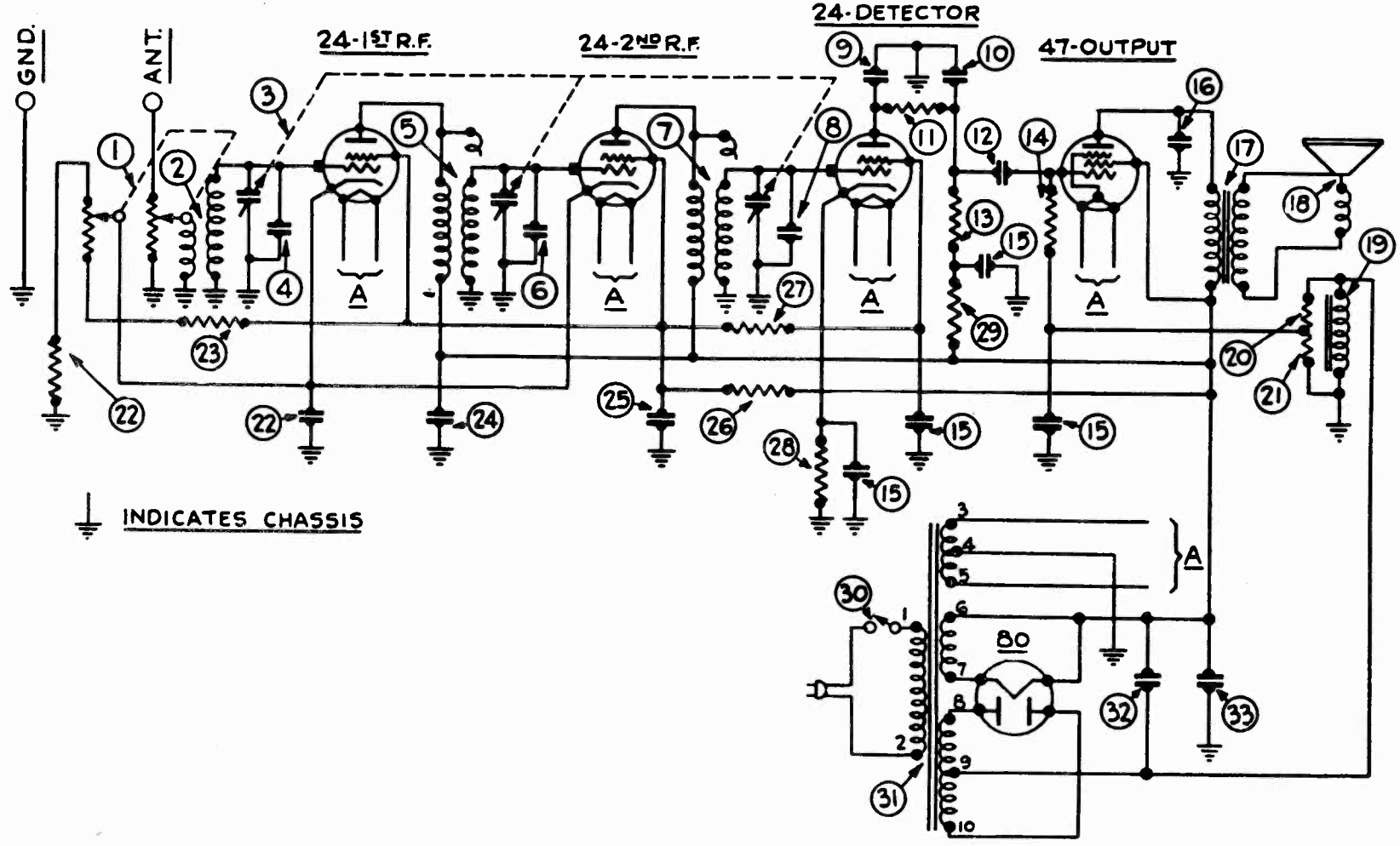
Model 48



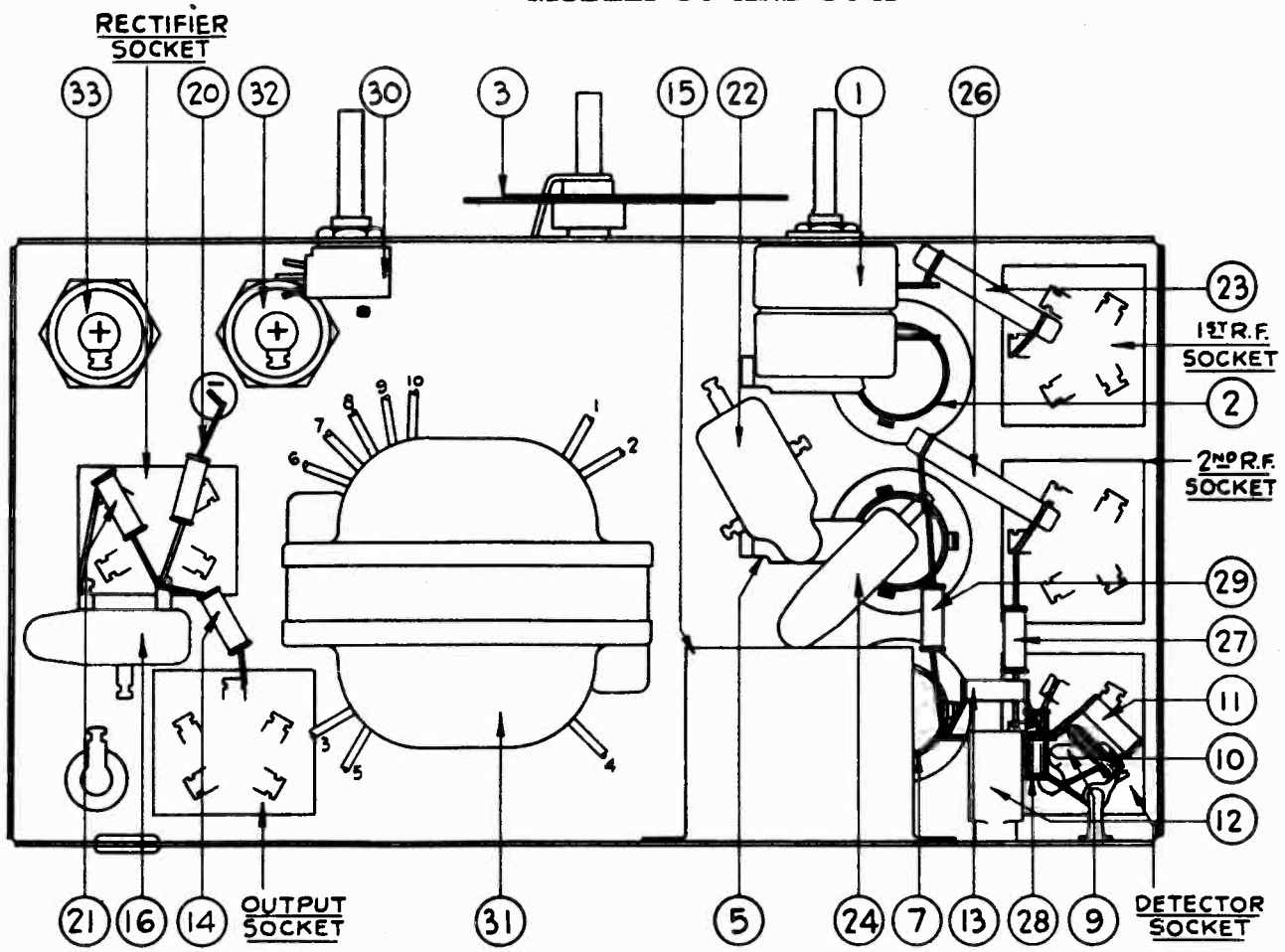
Replacement Parts for Model 48

①	Condenser (.01 Mfd.)	3903-T
②	Volume Control (5,000 Ohms)	5839
③	Condenser (.01 Mfd.)	3903-AK
④	Condenser (2 Mfd.)	05518
⑤	Antenna Transformer	05848
⑥	Tuning Condenser Assembly	05885
⑦	Compensating Cond.—Antenna—Part of Tuning Condenser Assembly	
⑧	Detector Transformer	05849
⑨	Resistor (1,000,000 Ohms)	4409
⑩	Condenser (.05 Mfd.)	3615-J
⑪	Compensating Cond.—Detector, Part of Tuning Condenser Assembly	
⑫	Comp. Cond. First I.F. Primary	04000-A
⑬	Oscillator Coil	
⑭	Resistor (6,000 Ohms)	
⑮	Condenser (710 Mmf.)	5863
⑯	Condenser (.05 Mfd.)	3615-AC
⑰	Compensating Cond.—High Frequency —Part of Tuning Condenser Assembly	
⑱	Comp. Condenser Low Frequency	04000-F
⑲	Condenser (710 Mmf.)	5863
⑳	Resistor (1000 Ohms)	5837
㉑	Condenser (.05 Mfd. and Resistor 250 Ohms)	3615-C
㉒	First I.F. Transformer	04887
㉓	Comp. Cond. First I.F. Secondary	04000-A
㉔	Second I.F. Transformer	03887
㉕	Resistor (10,000 Ohms)	4237
㉖	Resistor—Wire Wound—(140 Ohms and 30 Ohms)	06200
㉗	Compensating Condenser, Second I.F. Secondary	04000-A
㉘	Filter Condenser Bank (.1, .15, .25, 2-.5 Mfd.)	05569
㉙	Resistor (51,000 Ohms)	4518
㉚	Condenser (250 Mmf.)	3082
㉛	Resistor (51,000 Ohms)	4518
㉜	Resistor (99,000 Ohms)	4411
㉝	Resistor (99,000 Ohms)	4411
㉞	Resistor (25,000 Ohms)	3656
㉟	Resistor (32,000 Ohms)	3525
㊱	Pilot Light	6608
㊲	Condenser (250 Mmf.)	3082
㊳	Condenser (.01 Mfd.)	3903-F
㊴	Resistor (240,000 Ohms)	4410
㊵	Resistor (490,000 Ohms)	4517
㊶	Resistor (99,000 Ohms)	4411
㊷	Condenser (.01 Mfd.)	3903-F
㊸	Condenser .01 Mmf. (assembled with ③)	3903AK
㊹	Condenser (1 Mfd.)	05518
㊺	Output Transformer	2660
㊻	Choke	4951
㊼	Voice Coil and Cone Assembly	02861
㊽	Speaker Field Assembly with Pot	02671
㊾	On-Off Switch Assembly with Volume Control	5839
㊿	Condenser (.015 Mfd. Twin)	3793-P
	Tube Shield	03169
	Knob	03064
	Knob Spring	5262
	Grid Clip	4897
	Four Prong Socket	5026
	Five Prong Socket	4956
	Six Prong Socket	6417
	Pilot Light Bracket Complete	05603
	Dial Complete	05811
	Bezel	6413

MODELS 50 AND 50-A



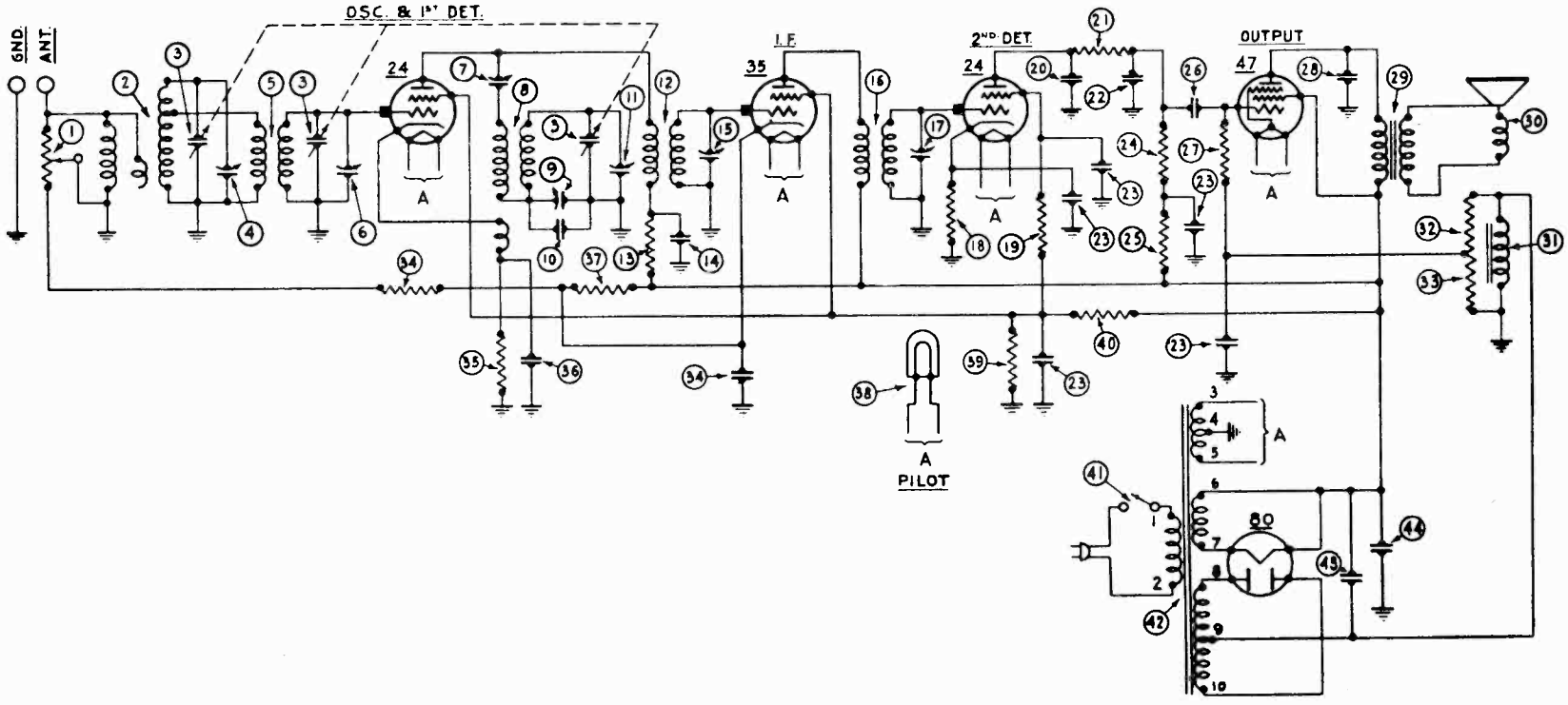
MODELS 50 AND 50-A



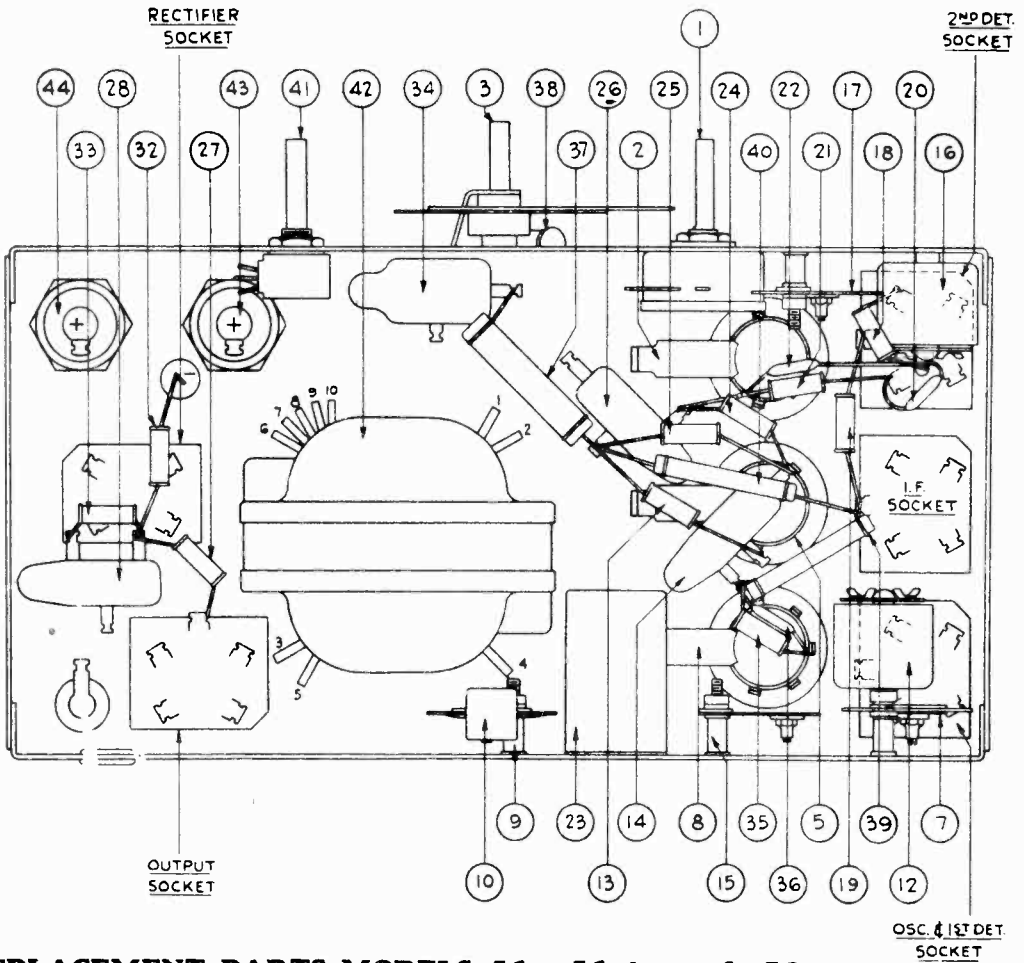
REPLACEMENT PARTS MODELS 50 AND 50-A

①	Volume Control	5232
②	First R. F. Transformer	03283
③	Gang Condenser	03293
④	Compensating Condenser (Part of Gang Condenser Assembly)	
⑤	Second R. F. Transformer	03284
⑥	Compensating Condenser (Part of Gang Condenser Assembly)	
⑦	Third R. F. Transformer	03284
⑧	Compensating Condenser (Part of Gang Condenser Assembly)	
⑨	Condenser—250 Mmf.	3082
⑩	Condenser—250 Mmf.	3082
⑪	Resistor—10,000 Ohms	4412
⑫	Condenser—.01 Mfd.	3903-L
⑬	Resistor—240,000 Ohms	4410
⑭	Resistor—490,000 Ohms	4517
⑮	Bypass Condenser (.15 Mfd., .25 Mfd., 2-.5 Mfd., .1 Mfd.) 50-60 cycles	03459
	(.15 Mfd., .25 Mfd., 2-.5 Mfd., .05 Mfd.) 25-40 Cycles	03455
⑯	Bypass Condenser—.01 Mfd.	3903-N
⑰	Output Transformer	2660
⑱	Voice Coil and Cone Assembly	02970
⑲	Speaker Field (Assembled with Pot and Frame)	02942
⑳	Resistor—490,000 Ohms.	4517
㉑	Resistor—160,000 Ohms.	5331
㉒	Resistor—150 Ohms and Condenser—.05 Mfd.	3615-X
㉘	Resistor—15,000 Ohms	5278
㉔	Bypass Condenser—.05 Mfd.	3615-L
㉕	Bypass Condenser—(.05 Mfd.) (combined with ⑮)	
㉖	Resistor—25,000 Ohms	3656
㉗	Resistor—99,000 Ohms	4411
㉘	Resistor—32,000 Ohms	5279
㉙	Resistor—99,000 Ohms	4411
㉚	On-Off Switch	5382
㉛	Power Transformer—50-60 cycles	5266
	Power Transformer—25-40 cycles	5267
	Power Transformer—50-60 cycles 210-240 volts	5268
㉜	Electrolytic Condenser—6 Mfd.—50-60 cycles	4916
	Electrolytic Condenser—10 Mfd. 25-40 cycles	5142
㉝	Electrolytic Condenser—6 Mfd.—25-40 cycles and 50-60 cycles	4916
	Tube Shield	03390
	Knob (Large)	03064
	Knob (Small)	03427
	Spring (For Dial Knobs) Small	4147
	Spring (For Dial Knobs) Large	5232
	Grid Clip	4897
	Five Prong Socket Assembly	4956
	Four Prong Socket Assembly	5026
	Dial Complete	03322
	Bezel	5383

PHILCO MODELS 51 , 51-A AND 52



PHILCO MODELS 51, 51-A AND 52

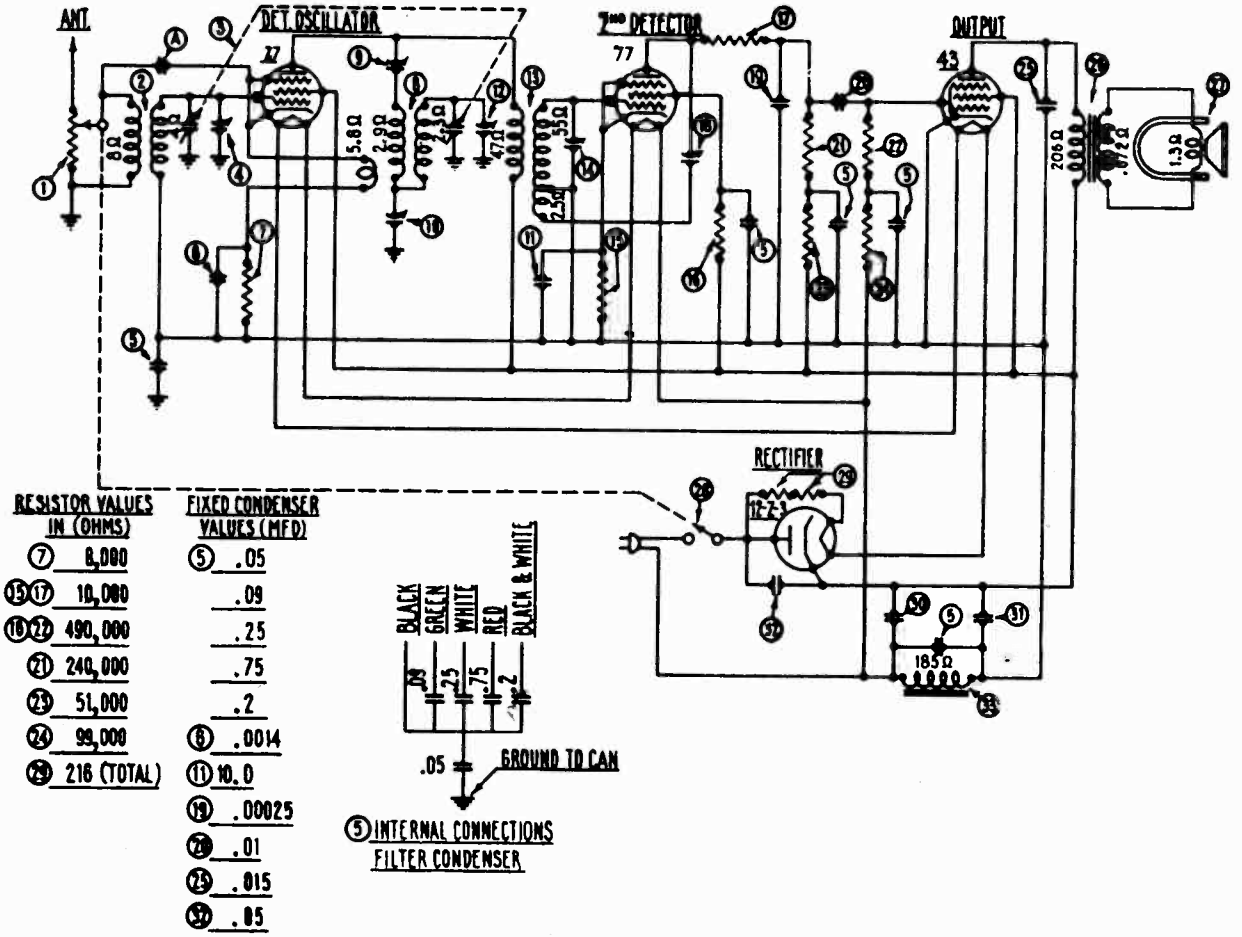


REPLACEMENT PARTS MODELS 51, 51-A and 52

No. on Figs. 1 and 2	Description	Part No.
①	Volume Control	5839
②	Antenna Coil	03880
③	Gang Condenser	03809
④	Compensating Condenser (Part of gang condenser assembly)	
⑤	First R.F. Transformer	03881
⑥	Compensating Condenser (part of gang condenser assembly)	
⑦	Compensating Condenser	04000-A
⑧	Oscillator Coil	03882
⑨	Compensating Condenser	04000-F
⑩	Condenser (710 mmf.)	5863
⑪	Compensating Condenser (part of gang condenser assembly)	
⑫	First I. F. Transformer	03887
⑬	Resistor (1,000 ohms)	5837
⑭	By-pass Condenser (.05 mfd.)	3615-AC
⑮	Compensating Condenser	04000-D
⑯	Second I.F. Transformer	03886
⑰	Compensating Condenser	04000-D
⑱	Resistor (33,000 ohms)	5279
⑲	Resistor (99,000 ohms)	4411
⑳	Condenser (250 mmf.)	5858
㉑	Resistor (10,000 ohms)	4412
㉒	Condenser (250 mmf.)	5858
㉓	Condenser (.1, .15, .25, 2-.5) 50-60 cycles	03915
	Condenser (.2, .15, .25, 2-.5) 25-40 cycles	03945
㉔	Resistor (490,000 ohms)	4517
㉕	Resistor (99,000 ohms)	4411
㉖	Condenser (.01 mfd.)	3903-N
㉗	Resistor (490,000 ohms)	4517
㉘	Condenser (.01 mfd.)	3903-K
㉙	Output Transformer	2660
㉚	Voice Coil and Cone Assembly TYPE "S" (Large)	02887
	TYPE "P" (Small)	02861

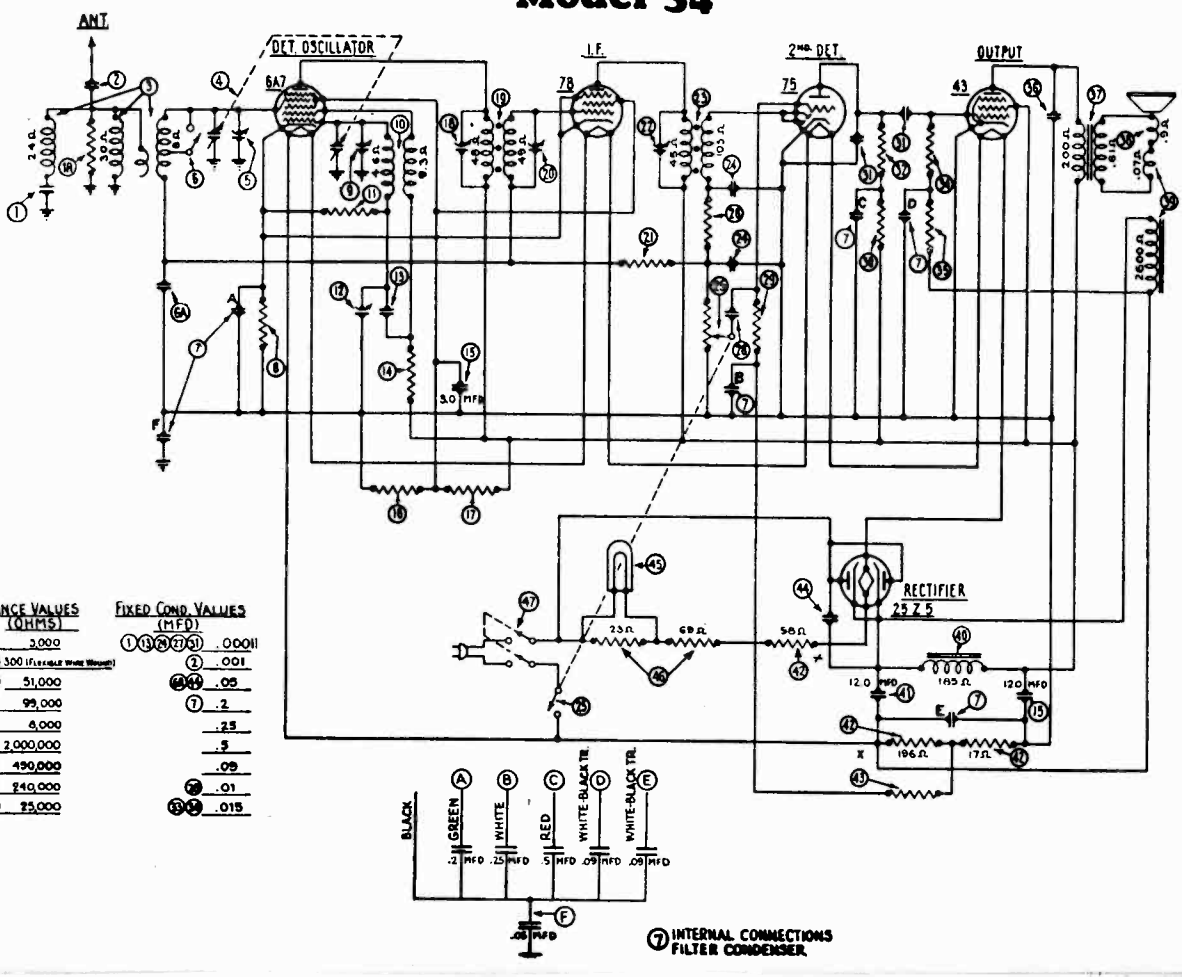
No. on Figs. 1 and 2	Description	Part No.
㉛	Field Coil and Pot Assembly	02942
㉜	Resistor (490,000 ohms)	4517
㉝	Resistor (160,000 ohms)	5331
㉞	Resistor (250 ohms and .05 mfd.)	3615-C
㉟	Resistor (8,000 ohms)	5838
㊱	Condenser (710 mmf.)	5863
㊲	Resistor (51,000 ohms)	5868
㊳	Pilot Light	3463
㊴	Resistor (25,000 ohms)	3656
㊵	Resistor (32,000 ohms)	3525
㊶	On-off Switch	5382
㊷	Power Transformer, 50-60 cycles	5266
	Power Transformer, 25-40 cycles	5267
	Power Transformer, 50-60 cycles, 230 volts	5268
㊸	Electrolytic Condenser (6 mfd.) 50-60 cycles	4916
	Electrolytic Condenser (10 mfd.) 25-40 cycles	5142
㊹	Electrolytic Condenser (6 mfd.)	4916
	By-pass Condenser (across power line) .01 mfd. double, Colonial	
	Clock only	3903-S
	Clock Unit (60 cycles) Model 551	5950
	Clock Glass Model 551	5942
	Tube Shield	04011
	Knob (Large)	03064
	Knob (Small)	03437
	Grid Clip	4897
	Five Prong Socket Assembly	4956
	Four Prong Socket Assembly	5026
	Pilot Light Bracket Complete	03814
	Dial Complete	04031
	Bezel	5879
	Spring (Large)	5262
	Spring (Small)	4147
	Scroll (Model 551)	44613
	Turnings (3 used) Model 551	44607

Model 53



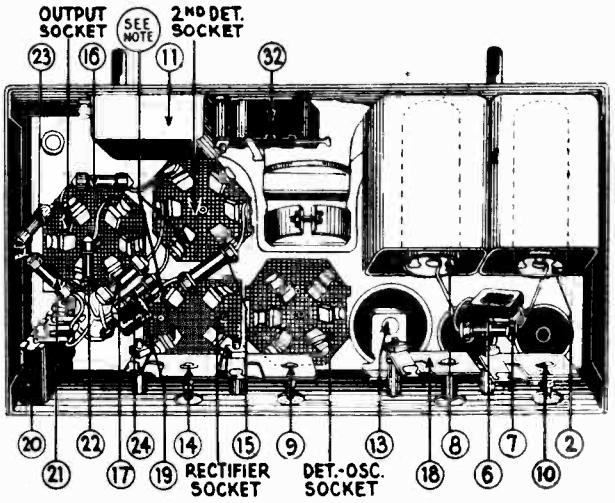
RESISTOR VALUES IN (OHMS)		FIXED CONDENSER VALUES (MFD)	
7	8,000	5	.05
15 17	10,000		.09
18 22	490,000		.25
21	240,000		.75
23	51,000		.2
24	99,000	8	.0014
29	216 (TOTAL)	11	10.0
		19	.00025
		28	.01
		25	.015
		30	.05

Model 54



RESISTANCE VALUES (OHMS)		FIXED COND. VALUES (MFD)	
14 14	2,000	1 13 26 27 31	.0001
6	300 (Flexible wire wound)	2	.001
11 28 30	51,000	44 44	.05
16	99,000	7	.2
17	8,000		.25
21	2,000,000		.5
29 34 43	490,000		.09
32	240,000	38	.01
33	25,000	39 39	.015

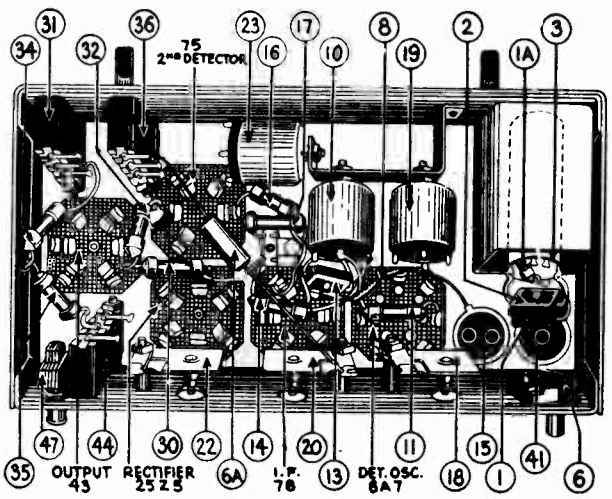
Model 53



Replacement Parts for Model 53

No. on Figs. 2, 3 and 4	Description	Part No.
1	Volume Control	33-5001
2	Antenna Transformer	32-1000
3	Tuning Condenser Assembly	31-1000
4	Compensating Condenser (Part of Tuning Condenser Assembly)	
5	Filter Condenser Block (.05-.09-.25-.75-.2 Mfd.)	30-4000
6	Condenser (.0014 Mfd.)	7007
7	Resistor (8,000 ohms) Gray-Black-Red	5838
8	Oscillator Transformer	32-1001
9	Compensating Condenser (I.F. Primary)	04000-A
10	Compensating Cond. (Low Frequency)	04000-S
11	Condenser (10.0 Mfd.)	7440
12	Compensating Condenser (Part of Tuning Condenser Assembly)	
13	I.F. Transformer	32-1002
14	Compensating Cond. (I.F. Secondary)	04000-A
15	Resistor (10,000 ohms) Brown-Black-Orange	4412
16	Resistor (490,000 ohms) Yellow-White-Yellow	4517
17	Resistor (10,000 ohms) Brown-Black-Orange	4412
18	Compensating Condenser (Regeneration)	04000
19	Condenser (.00025 Mfd.)	3082
20	Condenser (.01 Mfd.)	3903-AM
21	Resistor (240,000 ohms) Red-Yellow-Yellow	4410
22	Resistor (490,000 ohms) Yellow-White-Yellow	4517
23	Resistor (51,000 ohms) Green-Brown-Orange	4518
24	Resistor (99,000 ohms) White-White-Orange	4411
25	Condenser (.015 Mfd.)	3793-S
26	Output Transformer	32-7000
27	Voice Coil and Cone Assembly	36-3000
28	A. C. Switch (Part of Volume Control Assembly)	33-5001
29	Resistors (2 Wire Wound-108 ohms each)	33-3000 / 33-3001
30	Electrolytic Condenser (8 Mfd.)	30-2000
31	Electrolytic Condenser (8 Mfd.)	30-2000
32	Condenser (.05 Mfd.)	3615-E
33	Filter Choke	32-7001
	Tube Shield	7172
	Knobs (Both Controls)	03064
	Four Prong Socket	7544
	Six Prong Socket	7547
	Pointer for Station Selector	28-1019
	Dial	28-1021

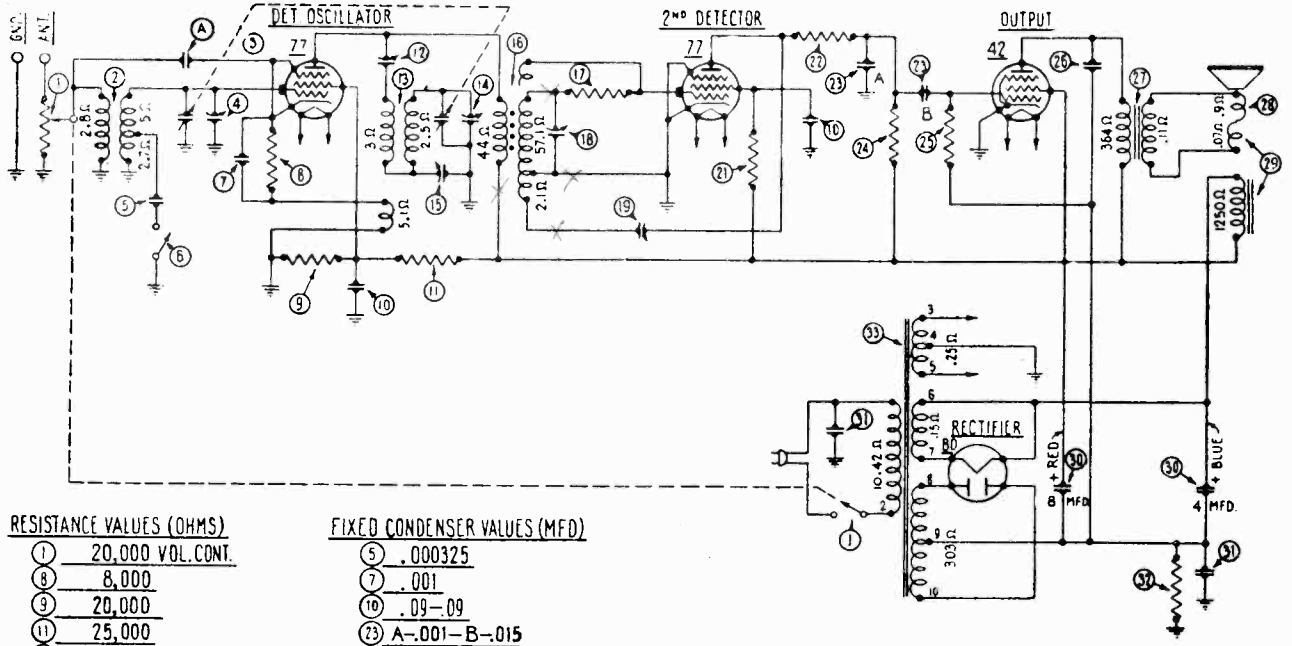
Model 54



Replacement Parts for Model 54

No. on Figs.	Description	Part No.
1	Condenser	30-1005
1a	Resistor (Green-Black-Red)	6096
2	Condenser	5215
3	Antenna Transformer Assembly	32-1117
4	Tuning Condenser Assembly	31-1027
5	Compensating Condenser (Part of 4)	
6	Wave Band Switch	42-1027
6a	Condenser	30-4020
7	Filter Condenser (Block)	30-4023
8	Resistor (Flexible)	33-3010
9	Compensating Condenser (High Frequency 1400) Part of 4	
10	Oscillator Coil	32-1118
11	Resistor (Green-Brown-Orange)	4518
12	Compensating Condenser (Low Freq.)	04000-B
13	Condenser	4519
14	Resistor (Green-Black-Red)	5310
15	Electrolytic Condenser (Double)	30-2002
16	Resistor (White-White-Orange)	4411
17	Resistor (Gray-Black-Red)	5838
18	Compensating Cond. (1st I. F. Primary)	04000-A
19	1st I. F. Transformer	32-1115
20	Compensating Condenser (1st I. F. Secondary)	04000-A
21	Resistor (Red-Black-Green)	5872
22	Compensating Cond. (2nd I. F. Primary)	04000-A
23	2nd I. F. Transformer	32-1116
24	Condenser (Double)	8035-G
25	Volume Control and "On-Off" Switch	33-5010
26	Resistor (Green-Brown-Orange)	4518
28	Condenser	3903AM
29	Resistor (Yellow-White-Yellow)	6097
30	Resistor (Green-Brown-Orange)	4518
31	Condenser (Double)	8035-F
32	Resistor (Red-Yellow-Yellow)	4410
34	Resistor (Yellow-White-Yellow)	4517
35	Resistor (Red-Green-Orange)	4516
36	Condenser	3793-Y
37	Output Transformer	32-7020
38	Voice Coil and Cone Assembly	36-3029
39	Field Coil and Pot Assembly	36-3040
40	Filter Choke	32-7036
41	Electrolytic Condenser	30-2001
42	Resistor (Wire Wound)	33-3012
43	Resistor (Yellow-White-Yellow)	6097
44	Condenser	3615-B
45	Pilot Lamp	4567
46	Resistor (Wire Wound)	33-3011
47	Safety Switch	42-1026
	Tube Shield	28-1130
	Six Prong Socket	7547
	Seven Prong Socket	27-6005
	Tuning Scale	27-5008
	Volume Control Scale	27-5010

MODEL 57



RESISTANCE VALUES (OHMS)

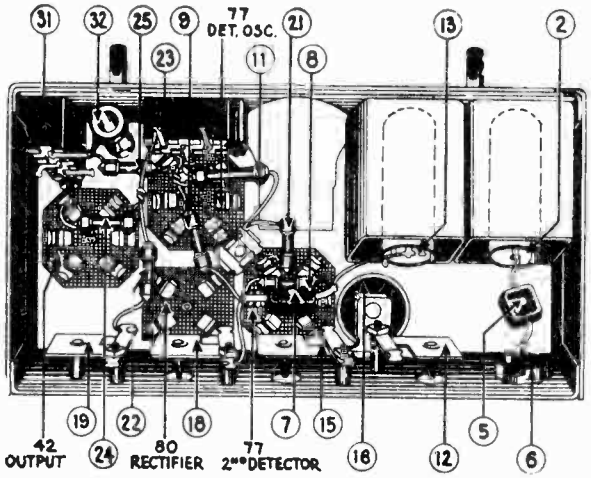
(1)	20,000 VOL. CONT.
(8)	8,000
(9)	20,000
(11)	25,000
(17)	4,000,000
(21)	1,000,000
(22)	10,000
(24)	240,000
(25)	490,000
(32)	325 (WIRE WOUND)

FIXED CONDENSER VALUES (MFD)

(5)	.000325
(7)	.001
(10)	.09—.09
(23)	A—.001—B—.015
(26)	.006
(31)	.015—.015

NOTE (A)—This capacity obtained by pair twisted wires

Model 57



REPLACEMENT PARTS MODEL 57

No. on Figs.	Description	Part No.
①	Volume Control and "On-Off" Switch	33-5011
②	Antenna Transformer	32-1153
③	Tuning Condenser Assembly	31-1035
④	Compensating Condenser (Antenna; Part of ③)	
⑤	Condenser	30-1004
⑥	Wave Band Switch	42-1027
⑦	Condenser	5215
⑧	Resistor (Gray-Black-Red)	5838
⑨	Resistor (Red-Black-Orange)	6650
⑩	Condenser (Double)	4989-C
⑪	Resistor (Red-Green-Orange)	3656
⑫	Compensating Condenser (I. F. Primary)	04000-A
⑬	Oscillator Coil	32-1023
⑭	Compensating Cond. (High Frequency—1400 kilocycles) (Part of ③)	
⑮	Compensating Cond. (Low Frequency)	04000-S
⑯	I. F. Transformer	32-1155
⑰	Resistor (Yellow-Black-Green)	6010

No. on Figs.	Description	Part No.
⑱	Compensating Cond. (I. F. Secondary)	04000-D
⑲	Compensating Condenser	04000
㉑	Resistor (Brown-Black-Green)	4409
㉒	Resistor (Brown-Black-Orange)	4412
㉓	Condenser (Double)	7762-B
㉔	Resistor (Red-Yellow-Yellow)	4410
㉕	Resistor (Yellow-White-Yellow)	3769
㉖	Condenser	7625-E
㉗	Output Transformer	32-7041
㉘	Voice Coil and Cone Assembly	36-3029
㉙	Field Coil and Pot Assembly	36-3081
㉚	Electrolytic Condenser (Double)	30-2004
㉛	Condenser (Double)	3793-R
㉜	Resistor (Wire Wound)	7465
㉝	Power Transformer	32-7046
	Tube Shield	28-1107
	Four Prong Socket	7544
	Six Prong Socket	7547

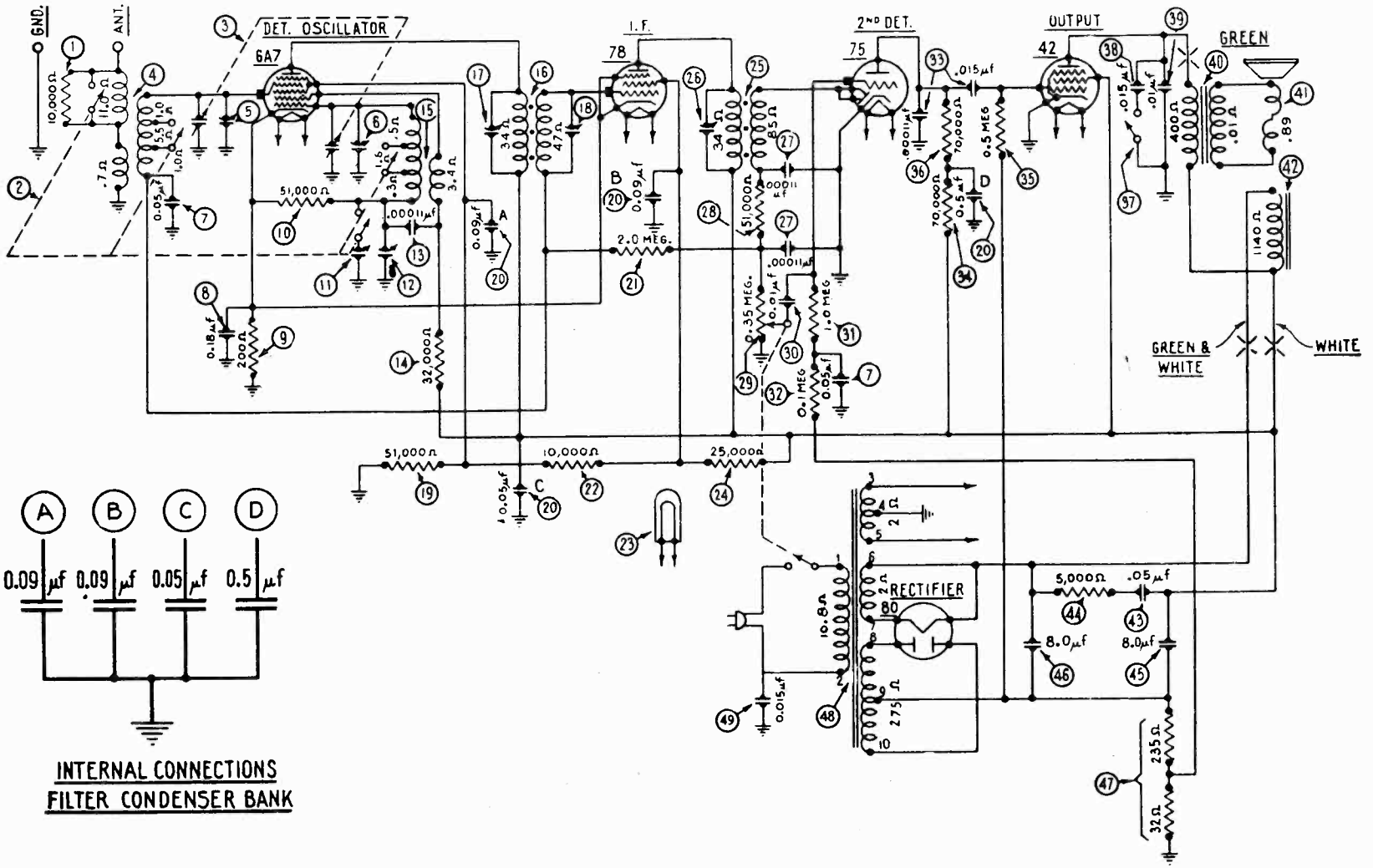
Model 58

The following parts used in Model 58 are different, otherwise replacement parts are the same as Model 57.

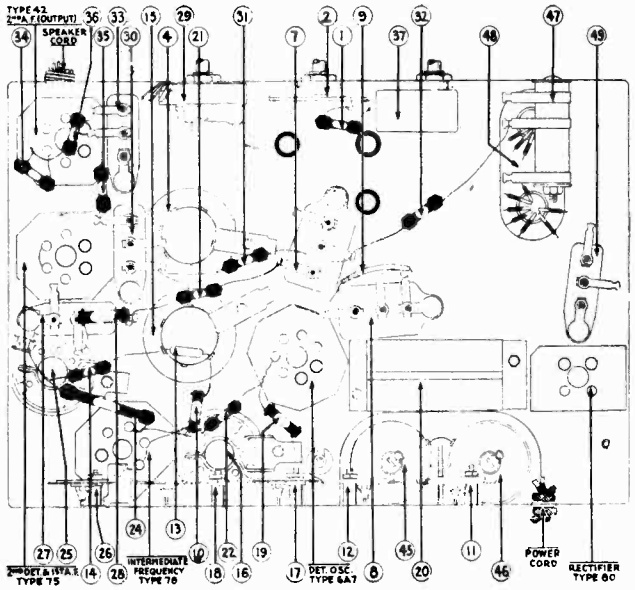
Item	*Part No. (Model 58)*
Tuning Condenser	31-1089
Electrolytic filter condenser	30-2013
Wave-band switch	42-1043
Volume Control	33-5057
Dial scale	27-5023
Pilot light shield	29-1126

Also part No. 3569 (1-watt resistor—490,000 ohms) used in Model 57, is replaced by part No. 4517 (½ watt, 490,000 ohms) in Model 58.

Model 60


GND.
ANT.
DET. OSCILLATOR
6A7
I.F.
78
2ND DET.
75
OUTPUT
42
GREEN
GREEN & WHITE
WHITE
RECTIFIER
80
10,000Ω
11.0Ω
.7Ω
5.5Ω
1.0Ω
.05μf
51,000Ω
.00011μf
.3Ω
1.6Ω
.5Ω
3.4Ω
.09μf
.18μf
200Ω
32,000Ω
2.0 MEG.
34Ω
85Ω
.0011μf
51,000Ω
.35 MEG.
.01μf
1.0 MEG
.1 MEG
.05μf
.015μf
70,000Ω
.5 MEG
.5μf
400Ω
.01Ω
.89
1140Ω
51,000Ω
10,000Ω
25,000Ω
.05μf
10.8Ω
2Ω
4Ω
275Ω
5,000Ω
.05μf
8.0μf
8.0μf
235Ω
32Ω
A
B
C
D
0.09 μf
0.09 μf
0.05 μf
0.5 μf
INTERNAL CONNECTIONS
FILTER CONDENSER BANK

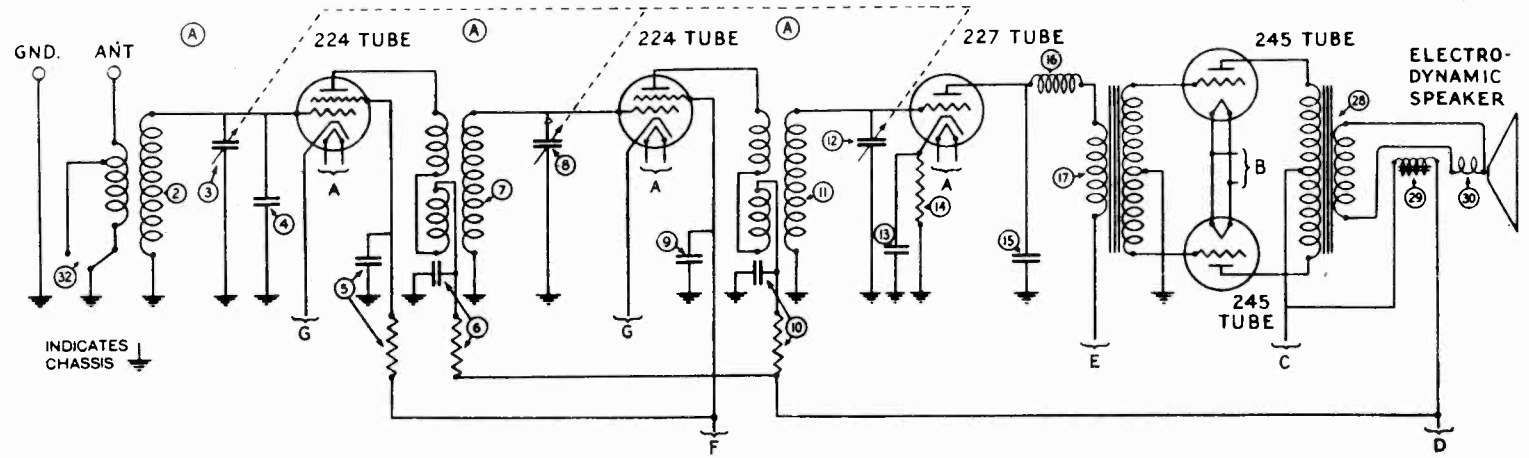
MODEL 60

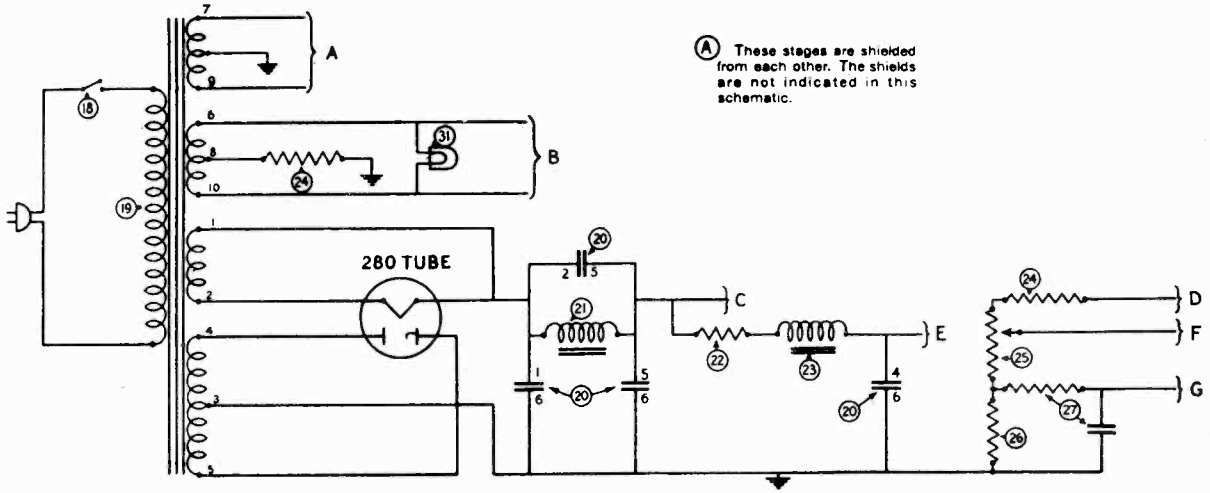


REPLACEMENT PARTS FOR MODEL 60

No. on Figs.	Description	Part No.
①	Resistor (10,000) (Brown-Black-Orange)	4412
②	Wave-Band Switch	42-1001
③	Tuning Condenser Assembly	31-1006
④	Antenna Transformer	32-1047
⑤	Compensating Condenser (Ant.; H. F.; Part of ③)	
⑥	Compensating Condenser (Osc.; H. F.; Part of ③)	
⑦	Condenser (Double) (.05-.05)	3615-AJ
⑧	Condenser (.18)	4989-Z
⑨	Resistor (Flexible Wire-Wound) (200) (Red-Black-Brown)	7217
⑩	Resistor (51,000) (Green-Brown-Orange)	4518
⑪	Compensating Condenser (Osc.; L. F.; Police Band)	04000-S
⑫	Compensating Condenser (Osc.; L. F.; Broadcast Band)	04000-S
⑬	Condenser (.00011)	4519
⑭	Resistor (32,000) (Orange-Red-Orange)	5279
⑮	Oscillator Transformer	32-1048
⑯	First I. F. Transformer	32-1049
⑰	Compensating Cond. (1st I. F. Primary)	04000-M
⑱	Compensating Cond. (1st I. F. Secondary)	04000-A
⑲	Resistor (51,000) (Green-Brown-Orange)	4518
⑳	Filter Condenser Bank	30-4013
㉑	Resistor (2. meg.) (Red-Black-Green)	5872
㉒	Resistor (10,000) (Brown-Black-Orange)	4412
㉓	Pilot Lamp (Station Selector)	6608
㉔	Resistor (25,000) (Red-Green-Orange)	3656
㉕	Second I. F. Transformer	32-1050
㉖	Compensating Cond. (2nd, I. F. Primary)	04000-M
㉗	Condenser (Double) (.00011-.00011)	8035-B
㉘	Resistor (51,000) (Green-Brown-Orange)	4518
㉙	Volume Control and "On-Off" Switch	33-5006
㉚	Condenser (.01)	3903-AP
㉛	Resistor (1.0 meg.) (Brown-Black-Green)	4409
㉜	Resistor (.1 meg.) (White-White-Orange)	4411
㉝	Condenser (Double) (.00011-.015)	8035-D
㉞	Resistor (70,000) (Violet-Black-Orange)	5385
㉟	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
㊱	Resistor (70,000) (Violet-Black-Orange)	5385
㊲	Tone Control	30-4008
㊳	Condenser (Part of ㊲)—(.015)	
㊴	Condenser (Part of ㊲)—(.01)	
㊵	Output Transformer	32-7019
㊶	Voice Coil and Cone Assembly	36-3014
㊷	Speaker Field, assembled with Pot (S-7)	36-3037
㊺	Condenser (Electrolytic) (8.0)	7558
㊻	Condenser (Electrolytic) (8.0)	7558
㊼	Resistor (Wire-Wound)	7998
㊽	Power Transformer (50-60 ~)	8046
㊾	Condenser (.015)	3793-W
	Tube Shield	28-1107
	Four-Prong Tube Socket	7544
	Six-Prong Tube Socket	7547
	Seven-Prong Tube Socket	27-6005

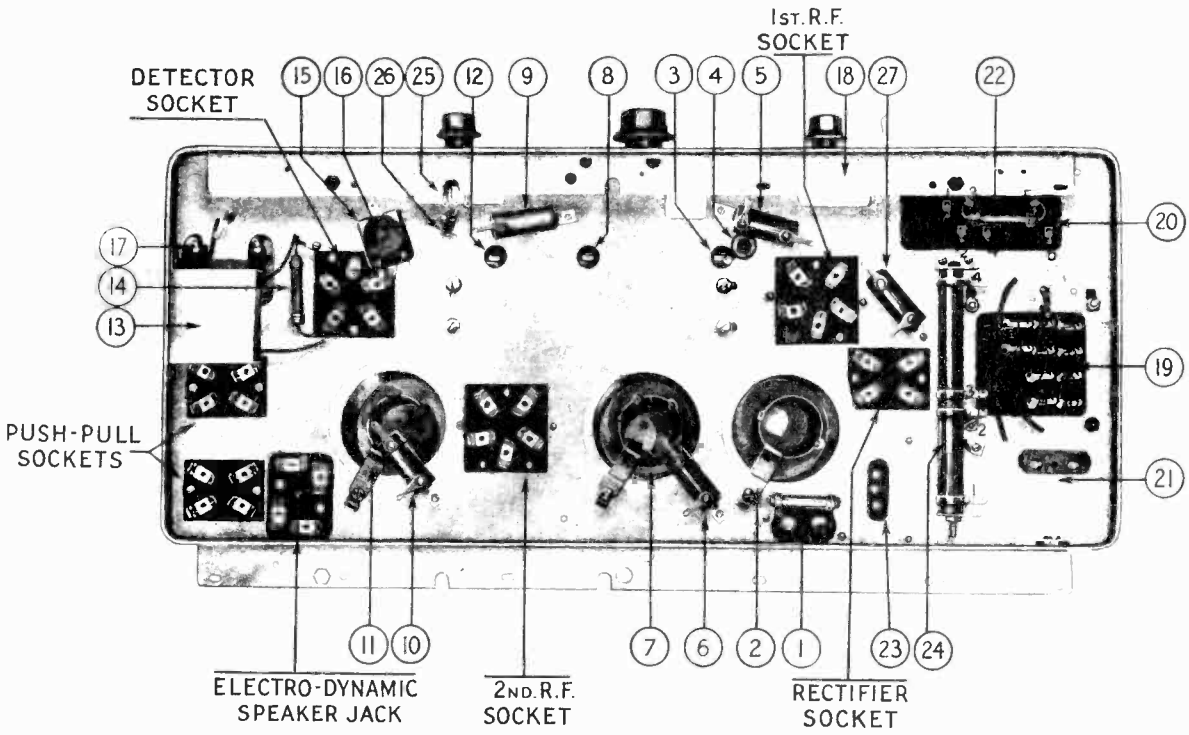
Philco Model 65





(A) These stages are shielded from each other. The shields are not indicated in this schematic.

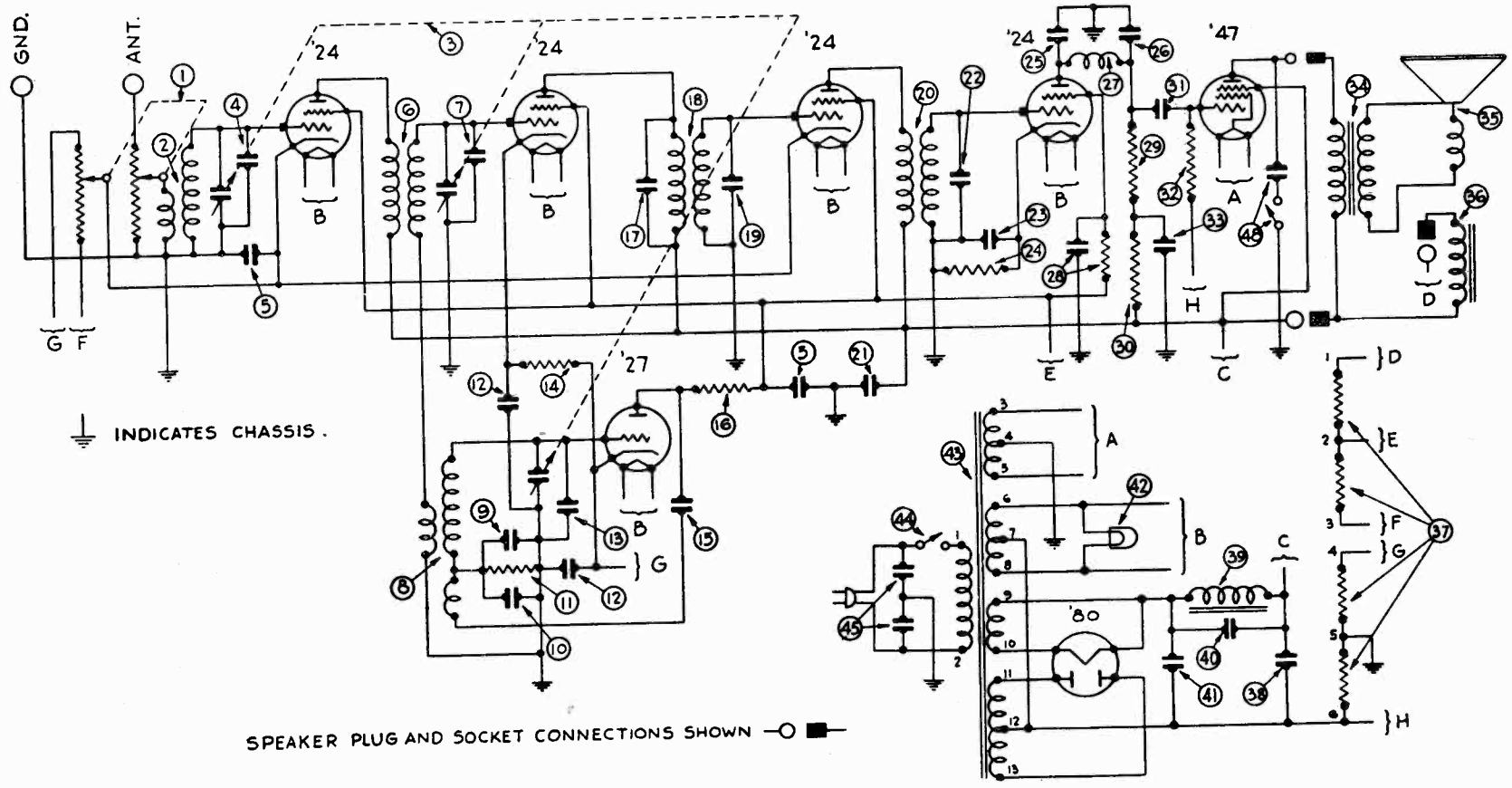
Philco Model 65



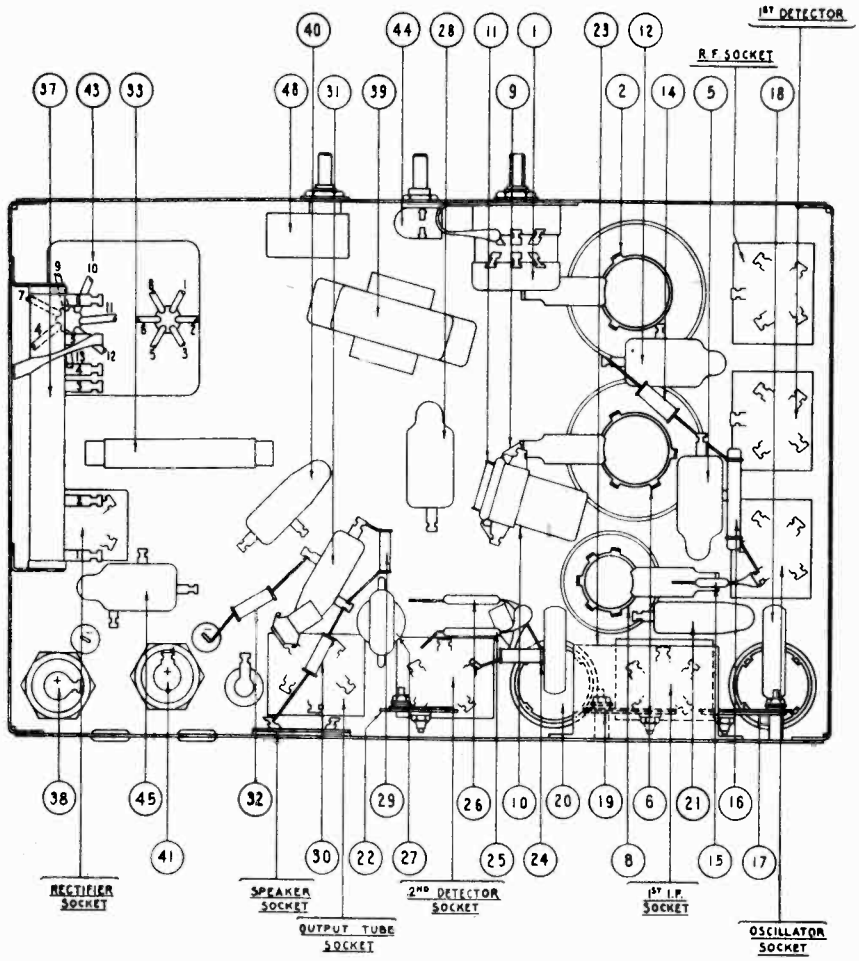
Replacement Parts for Model 65

Number	Description	Part No.
①	Antenna Resistor	3524
②	R. F. Transformer (Antenna Coil)	3506-B
③ – ④ – ⑲	Tuning Condenser	3480-B
⑤	Fixed Compensator	3617-A
⑨	Screen Grid By-Pass Condenser and Resistance	3292-A
⑧ – ㉘	Plate By-Pass Condenser and Resistance	3584-A
⑦ – ⑪	R. F. Transformer	3506-A
⑫	Screen Grid By-Pass Condenser	3292-P
⑮	Detector Cathode By-Pass Condenser	3583
⑯	Detector Cathode Resistor	3525
⑱	.001 Detector Plate By-Pass Condenser	3081
㉕	R. F. Choke	3256-A
㉖	Push-Pull Input Transformer	3537
㉗	Set Power Switch	3517
㉙	Power Transformer	3516
㉚	B Filter Condenser Block	3515
㉛	First Filter Choke	3422
㉜	Detector Plate Resistor	3526
㉝	Second Filter Choke	3518
㉞	BC Resistor	3512
㉟	Volume Control	3528
㊱	Six-Ohm Resistor	3628
㊲	Cathode By-Pass Condenser and Resistance	3292-B
㊳	Push-Pull Output Transformer	2848
㊴	Speaker Field Winding	2850
㊵	Voice Coil and Cone	2844-A
㊶	Pilot Lamp	3463
	Knob (Small)	3579
	Knob (Large)	3580
	Knob Spring	3305
	Four Hole Socket Assembly	3423-A
	Five Hole Socket Assembly	3442-A
	Speaker Plug Socket Assembly	3464-A
	Pilot Lamp Socket Assembly	3556-A
	A.C. Attachment Cord and Plug	L-543-A
	Speaker Plug and Cable	L-1056-A
	Rubber Washer	3558
	Rubber Foot (Set)	3184
	Rubber Foot (Speaker)	2967
	Socket Wrench for Speaker Mounting Bolts	3312

MODELS 70 AND 70-A



MODELS 70 AND 70-A

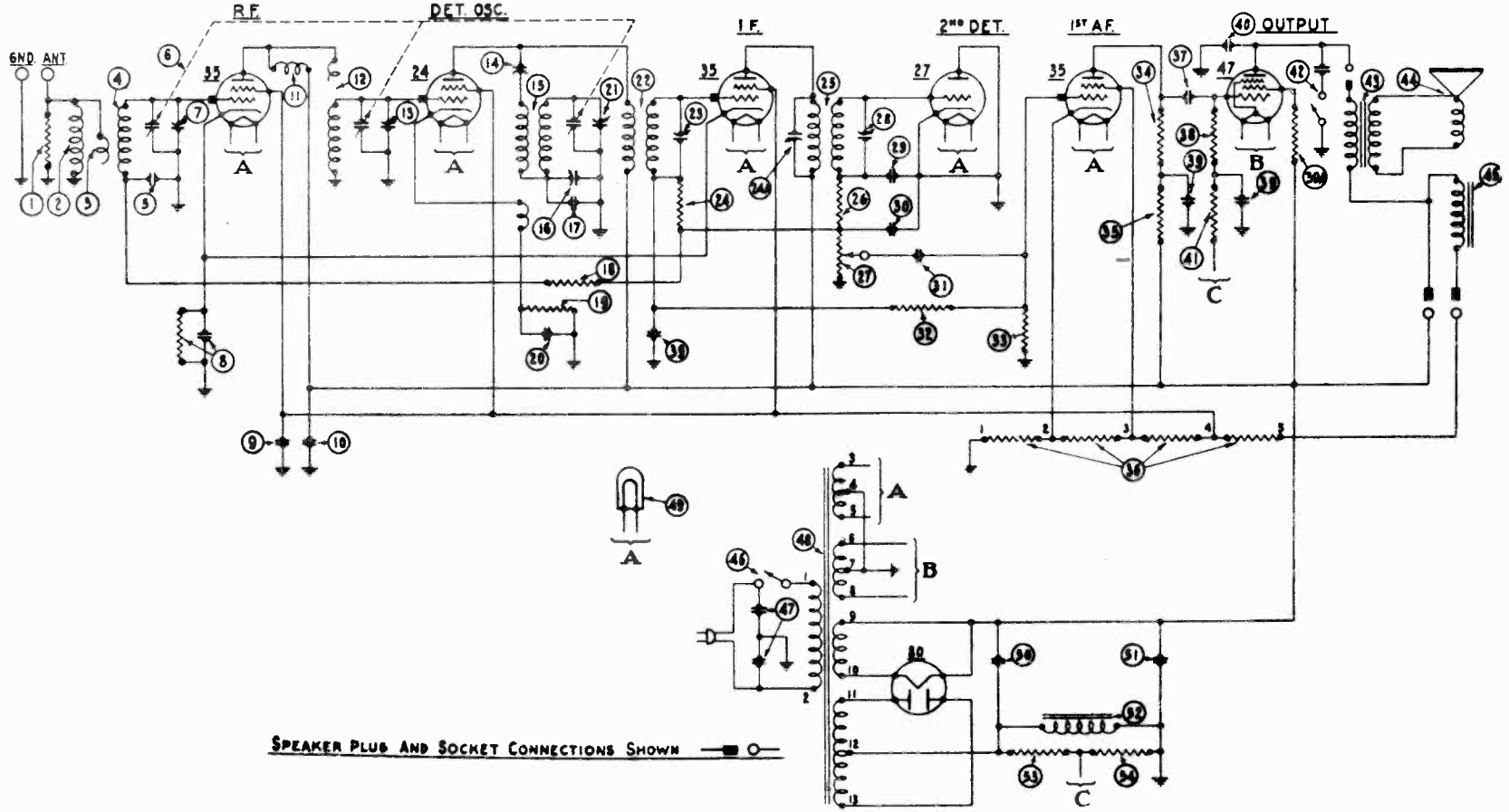


REPLACEMENT PARTS—MODELS 70 AND 70-A

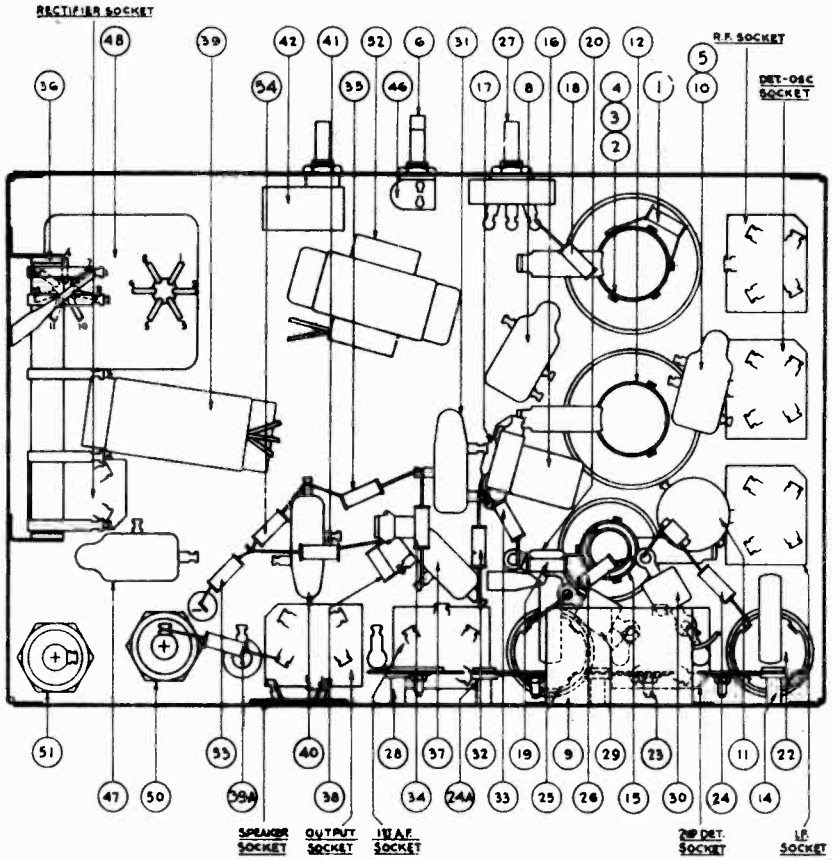
No. on Figs. 3 and 4	Description	Part No
①	Volume Control	5039
②	R. F. Transformer	03082
③	Tuning Condenser (50-60 cycles)	03076
	Tuning Condenser (25-40 cycles)	03077
④	Compensating Condenser — Antenna—(Part of Gang Condenser Assembly)	
⑤	Condenser (.09 mfd. Double)	4989-C
⑥	Detector Transformer	03083
⑦	Compensating Condenser — Detector—(Part of Gang Condenser Assembly)	
⑧	Oscillator Coil	03084
⑨	Condenser (410 mmf.)	5120
⑩	Compensating Condenser—Low Frequency	04000-F
⑪	Resistor (51,000 ohms)	4518
⑫	Condenser (.09 mfd. Double)	4989-C
⑬	Compensating Condenser—High Frequency — (Part of Gang Condenser Assembly)	
⑭	Resistor (5,000 ohms)	5310
⑮	Condenser (110 mmf.)	4519
⑯	Resistor (13,000 ohms)	3766
⑰	Compensating Condenser—1st I. F. Primary	04000-J
⑱	First I. F. Transformer	03091
⑲	Compensating Condenser—1st I. F. Secondary	04000-H
⑳	Second I. F. Transformer	03092
㉑	Condenser (.05 mfd.)	3615-L
㉒	Compensating Condenser—2nd I. F. Secondary	04000-K
㉓	Condenser (.5 mfd.)	3583
㉔	Resistor (51,000 ohms)	4518
㉕	Condenser (500 mmf.)	3910
㉖	Condenser (250 mmf.)	3082
㉗	R. F. Choke	03086
㉘	Condenser (.09 Combined with 250 ohm Resistor)	4989-E
㉙	Resistor (240,000 ohms)	4410
㉚	Resistor (45,000 ohms) 50-60 cycles	5256
	Resistor (99,000 ohms) 25-40 cycles	4411

No. on Figs. 3 and 4	Description	Part No.
㉛	Condenser (.01 mfd.)	3903-L
㉜	Resistor (240,000 ohms)	4410
㉝	Condenser (.25 mfd.)	4264
㉞	Output Transformer	2673
㉟	Voice Coil and Cone Assembly	02996
㊱	Field Coil (Assembled with Pot)	02966
㊲	B. C. Resistor	03079
㊳	Electrolytic Condenser (6 mfd.) 50-60 cycles	4916
	Electrolytic Condenser (10 mfd.) 25-40 cycles	5142
㊴	Choke	4819
㊵	Condenser (.09 mfd.) 50-60 cycles	4989-J
	Condenser (.18 mfd.) 25-40 cycles	4989-K
㊶	Electrolytic Condenser (6 mfd.) 50-60 cycles	4916
	Electrolytic Condenser (10 mfd.) 25-40 cycles	5142
㊷	Pilot Light	3463
㊸	Power Transformer (50-60 cycles)	5117
	Power Transformer (25-40 cycles)	5118
	Power Transformer (50-60 cycles, 230 volts)	5119
㊹	"On-Off" Switch	4095
㊺	Condenser (.015 mfd. Double)	3793-K
	Tube Shield	03987
	Bezel	5312
	Knob (Large)	03064
	Knob (Small)	03437
	Spring (Small)	4147
	Spring (Large)	5262
	Grid Clip	4897
	Five Prong Socket Assembly	4956
	Four Prong Socket Assembly	4955
	Dial Complete	03031

MODELS 70 AND 70-A



MODELS 70 AND 70-A



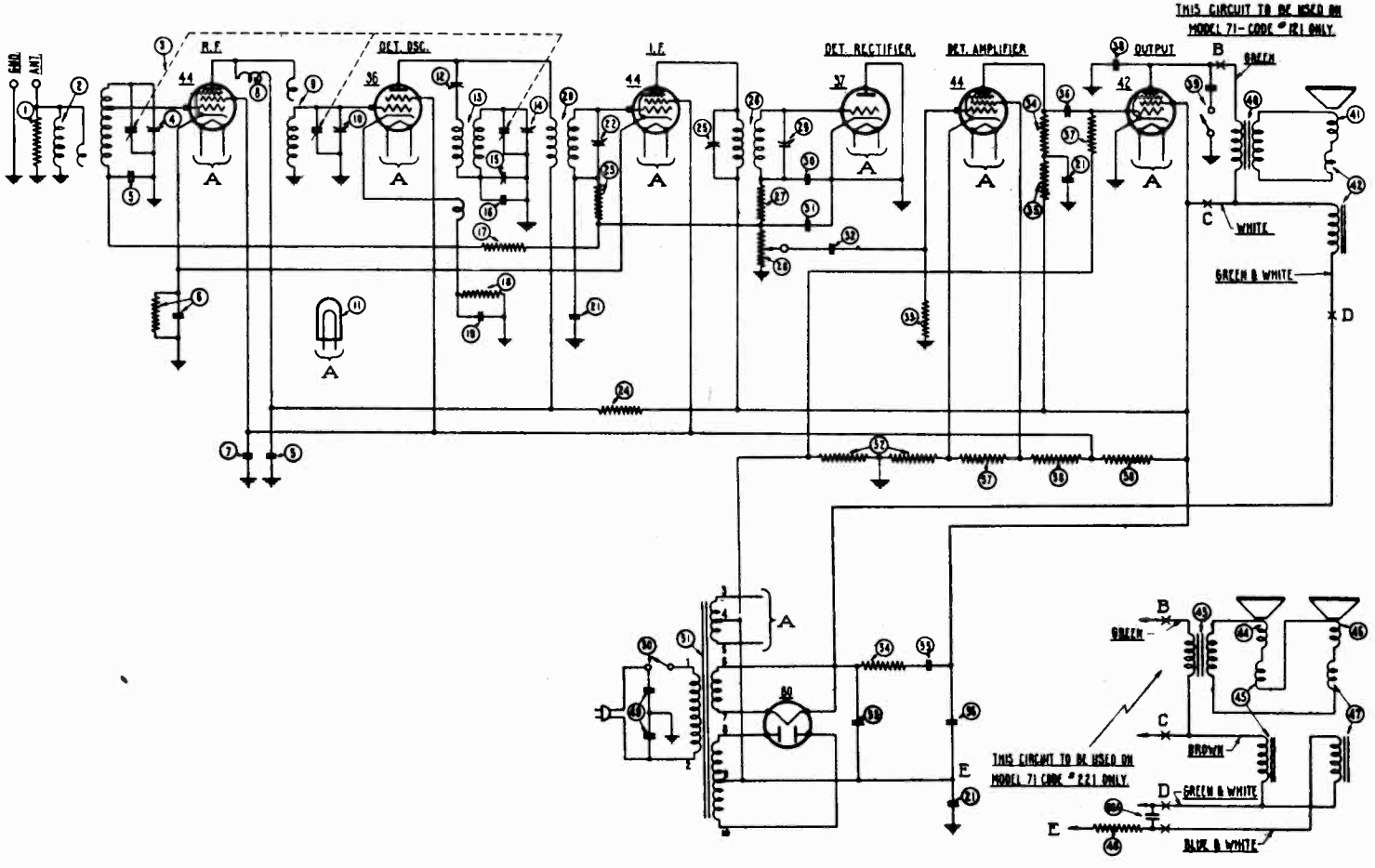
REPLACEMENT PARTS MODELS 70 AND 70-A

(Above Serial No. B-22,000)

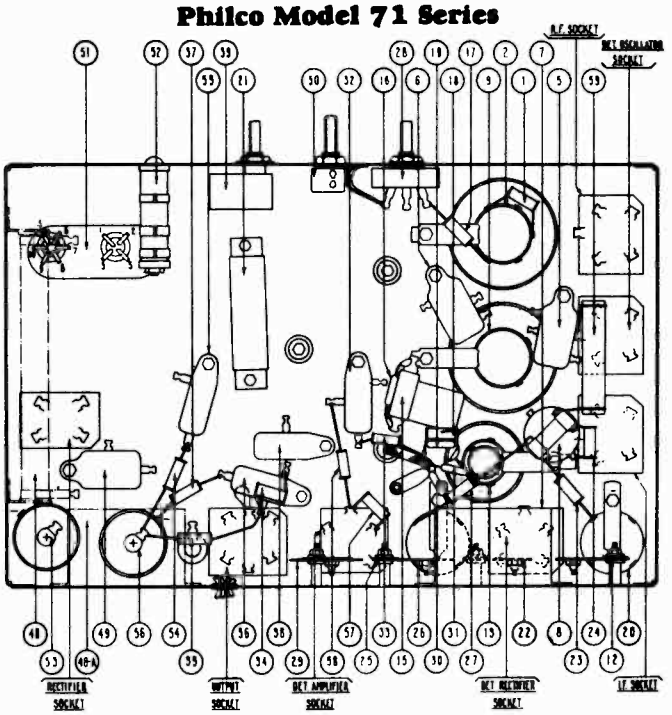
No. on Figs. 3 and 4	Description	Part No.
①	Resistor (10,000 ohms)	4112
②③④	Antenna Coil	04339
⑤	Condenser (.05 mfd.) double	3615-AF
⑥	Tuning Condenser Assembly 50-60 cycles	04164
	Tuning Condenser Assembly 25-40 cycles	04165
⑦	Compensating Condenser — Antenna — (Part of Tuning Condenser Assembly)	
⑧	Condenser (.09 mfd. and 200 ohm Resistor)	4989-L
⑨	Condenser (.5 mfd.)	3583
⑩	Combined with ⑧	
⑪	R. F. Choke	04198
⑫	Interstage Coil	04185
⑬	Compensating Condenser — Detector — (Part of Tuning Condenser Assembly)	
⑭	Compensating Condenser—Coupling	04000-M
⑮	Oscillator Coil	04186
⑯	Compensating Condenser — Low Frequency	04000-F
⑰	Condenser (410 mmf.)	5120
⑱	Resistor (2,000,000 ohms)	5872
⑲	Resistor (10,000 ohms)	4412
⑳	Condenser (700 mmf.)	4520
㉑	Compensating Condenser — High Frequency—(part of Tuning Condenser Assembly)	
㉒	First I. F. Transformer	04190
㉓	Compensating Condenser—First I. F.	04000-M
㉔	Resistor (2,000,000 ohms)	5872
㉔A	Compensating Condenser 2nd I.F. Primary	04000-M
㉕	Second I. F. Transformer	03038
㉖	Resistor (99,000 ohms)	4411
㉗	Volume Control	6015
㉘	Compensating Condenser—Second I. F.	04000-M
㉙	Condenser (110 mmf.)	4519
㉚	Condenser (110 mmf.)	4519
㉛	Condenser (.01 mfd.)	3903-G
㉜	Resistor (4,000,000 ohms)	6010
㉝	Resistor (1,000,000 ohms)	4409
㉞	Resistor (70,000 ohms)	5385
㉟	Resistor (25,000 ohms)	4516

No. on Figs. 3 and 4	Description	Part No.
㊱	B. C. Resistor	04196
㊲	Condenser (.01 mfd.)	3903-T
㊳	Resistor (490,000 ohms)	4517
㊴	Filter Condenser Block (.05, .25, 1.5 mfd.)	04194
㊵A	Resistor (3,000 ohms)	5309
㊶	Condenser (.01 mfd.)	3903-U
㊷	Resistor (330,000 ohms) 50-60 cycles	6046
	Resistor (490,000 ohms) 25-40 cycles	4517
㊸	Tone Control	03637
㊹	Output Transformer	2673
㊺	Voice Coil & Cone Assembly	02996
㊻	Field Coil Assembled with Pot	02966
㊼	On-Off Switch	4095
㊽	Condenser (.015 mfd. Double)	3793-H
㊾	Power Transformer (50-60 cycles)	5117
	Power Transformer (25-40 cycles)	5118
	Power Transformer (50-60 cycles, 230 volts)	5119
㊿	Pilot Light	3463
(51)	Electrolytic Condenser (6 mfd.) 50-60 cycles	4916
	Electrolytic Condenser (14 mfd.) 25-40 cycles	5725
(52)	Electrolytic Condenser (6 mfd.) 50-60 cycles	4916
	Electrolytic Condenser (10 mfd.) 25-40 cycles	5142
(53)	Filter Choke	4819
(54)	Resistor (51,000 ohms)	4518
(55)	Resistor (490,000 ohms)	4517
	Tube Shield	04168
	Knob (Large)	03064
	Knob (Small)	03437
	Knob Spring	4147
	Grid Clip	4897
	Five Prong Socket Assembly	4956
	Four Prong Socket Assembly	4955
	Dial Complete	03031
	Bezel	5312
	Chassis Mounting Screw	W-468
	Mounting Washer	W-315
	Rubber Washer	5189

Philco Model 71 Series



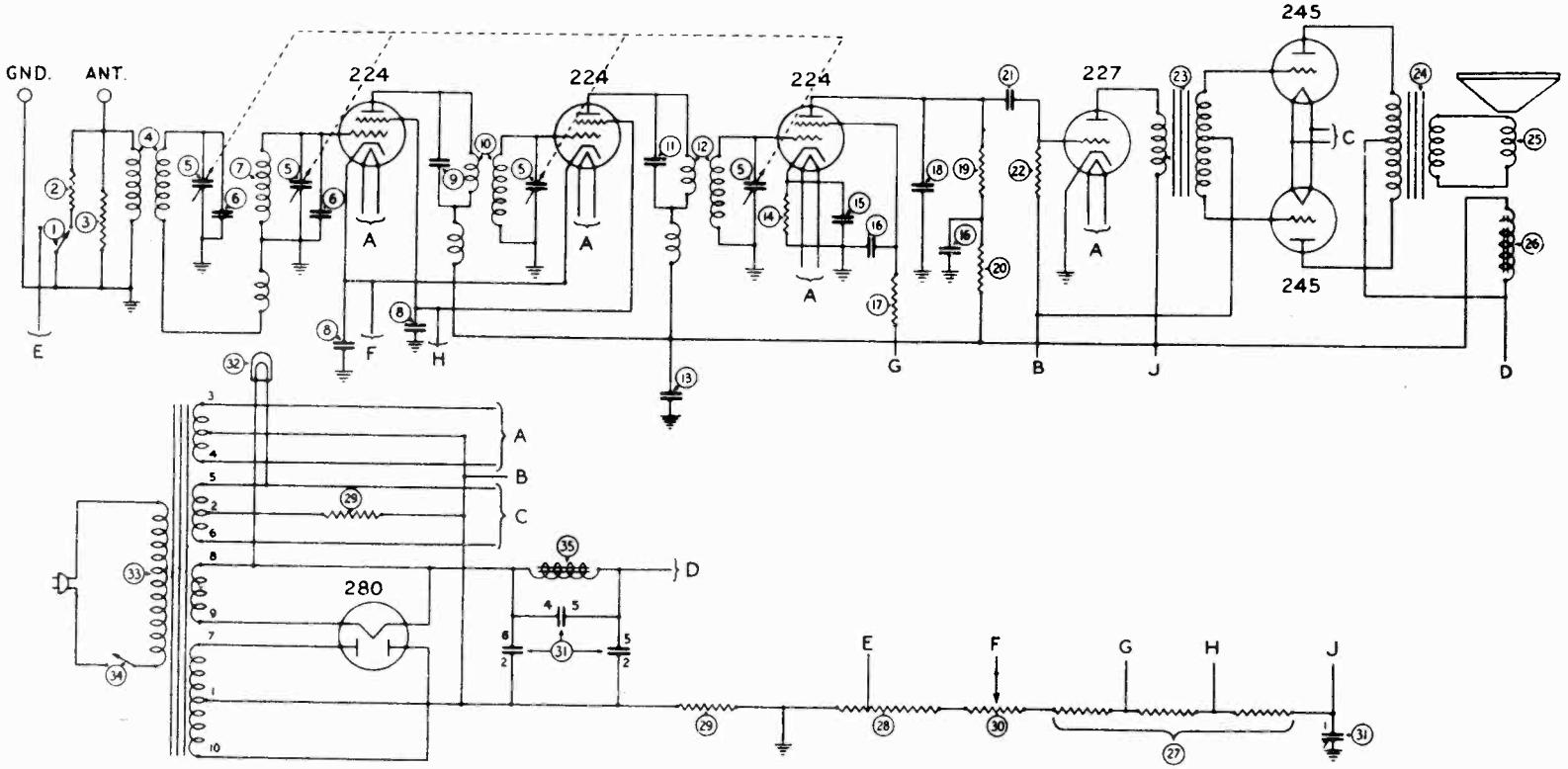
Philco Model 71 Series

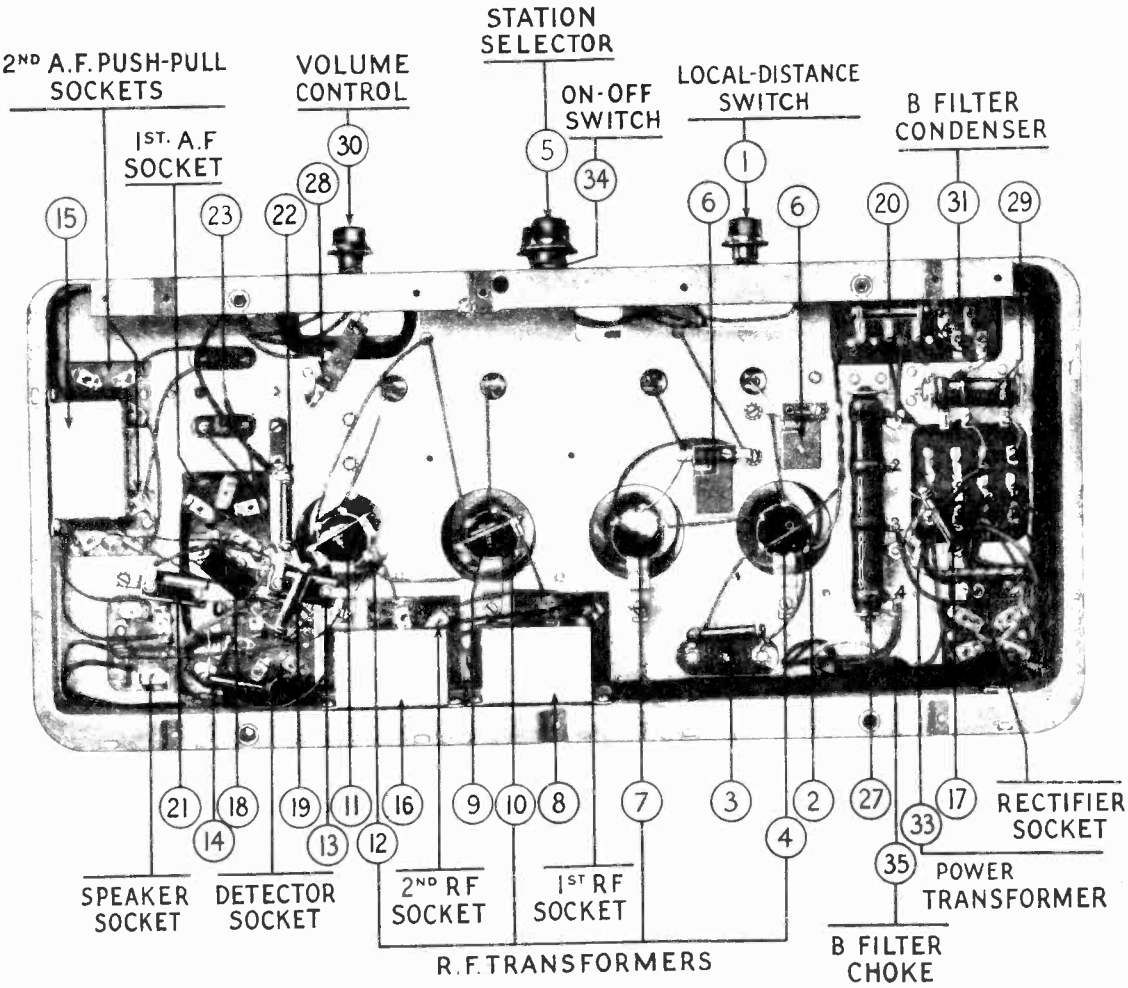


Replacement Parts for Model 71 Series

①	Resistor (10,000 ohms)	4412
②	R. F. Transformer	04339
③	Tuning Condenser (50-60 cycles)	04733
④	Tuning Condenser (25-40 cycles)	04734
⑤	Condenser (.05 Mfd. double)	3615-AF
⑥	Condenser (.09 Mfd. and 200 ohm resistor)	4989-L
⑦	Condenser (.5 Mfd.)	3583
⑧	R. F. Choke	04198
⑨	Detector Transformer	04185
⑩	Compensating Condenser—Detector—Part of tuning condenser assembly	
⑪	Pilot Light	6608
⑫	Compensating Condenser — 1st I. F. primary	04000-M
⑬	Oscillator Coil	04186
⑭	Compensating Condenser—High frequency—Part of tuning condenser assembly	
⑮	Compensating condenser—Low frequency	04000-F
⑯	Condenser (410 Mmf.) (Yellow and Orange)	5120
⑰	Resistor (1,000,000 ohms)	4409
⑱	Resistor (15,000 ohms)	6208
⑲	Condenser (700 Mmf.) (White and Yellow)	4520
⑳	First I. F. Transformer	04190
㉑	Filter Condenser Bank (2 —.05, .25 Mfd.)	04731
㉒	Compensating Condenser — 1st I. F. secondary	04000-M
㉓	Resistor (1,000,000 ohms)	4409
㉔	Resistor (1,000 ohms)	5837
㉕	Compensating Condenser—2nd I. F. primary	04000-M
㉖	Second I. F. Transformer	04319
㉗	Resistor (99,000 ohms)	4411
㉘	Volume Control	6499
㉙	Compensating Condenser—2nd I. F. secondary	04000-M
㉚	Condenser (110 Mmf.) (Blue and Golden Yellow)	4519
㉛	Condenser (110 Mmf.) (Blue and Golden Yellow)	4519
㉜	Condenser (.01 Mfd.)	3903-J
㉝	Resistor (1,000,000 ohms)	4409
㉞	Resistor (70,000 ohms)	5385
㉟	Resistor (25,000 ohms) Single Speaker	4516
	Resistor (51,000 ohms) Twin Speaker Models	4518
㊱	Condenser (.01 Mfd.)	3903-N
㊲	Resistor (490,000 ohms)	4517
㊳	Condenser (.01 Mfd.)	3903-AA
㊴	Tone Control	04757
㊵	Output Transformer — single speaker models	2580
㊶	Voice Coil and Cone assembly	02823
㊷	Speaker Field and Bucking Coil assembled with pot—(K-7) single speaker models	02761
㊸	Output Transformer — Twin speaker models	2564
㊹	Voice Coil and cone assembly	02823
㊺	Speaker Field and Bucking Coil assembled with pot—(K-10) Twin speaker models	02767
㊻	Voice coil and cone assembly	02823
㊼	Speaker field assembled with pot —(K-9) Twin speaker models	02762
㊽	Resistor (5620 ohms) wire wound —Twin speaker models	6451
㊾A	Condenser (.25 Mfd.) Twin Speaker Models	04997
㊾	Condenser (.015 Mfd. Double)	3793-H
㊿	On-off Switch	6498
(51)	Power Transformer—50-60 cycles—single speaker	6454
	Power Transformer—25-40 cycles—single speaker	6455
	Power Transformer—50-60 cycles—230 volts—single speaker	6456
	Power Transformer—50-60 cycles—twin speaker	6457
	Power Transformer—25-40 cycles—twin speaker	6458
	Power Transformer—50-60 cycles—230 volts—twin speaker	6459
(52)	Resistor—wire wound (245 ohms and 185 ohms)	6452
(53)	Electrolytic Condenser (6 Mfd.) (50-60 cycles) single speaker	6453
	8 Mfd. Twin speaker	6707
(54)	Resistor (10,000 ohms)	4412
(55)	Condenser (.05 Mfd.)	3615-G
(56)	Electrolytic Condenser (6 Mfd.) (50-60 cycles) single speaker	4916
	8 Mfd. Twin speaker	6706
(57)	Resistor (5,000 ohms)	5310
(58)	Resistor (5,000 ohms)	5310
(59)	Resistor (13,000 ohms)	6450
	Tube Shield (small)	5387
	Tube Shield (large)	04735
	Knob (large)	03063
	Knob (medium)	03064
	Knob (small)	03437
	Knob Spring (large)	5262
	Knob Spring (small)	4147
	Grid Clip	4897
	Four Prong Socket Assembly	5026
	Five Prong Socket Assembly	4956
	Six Prong Socket Assembly	6417
	Dial Complete	03031
	Bezel	6435
	Chassis Mounting Screw	W-468
	Mounting Washer	W-315
	Rubber Washer	5189
	Mounting Clamp	6440
	Cone Retaining Ring	2600

Philco Model 76

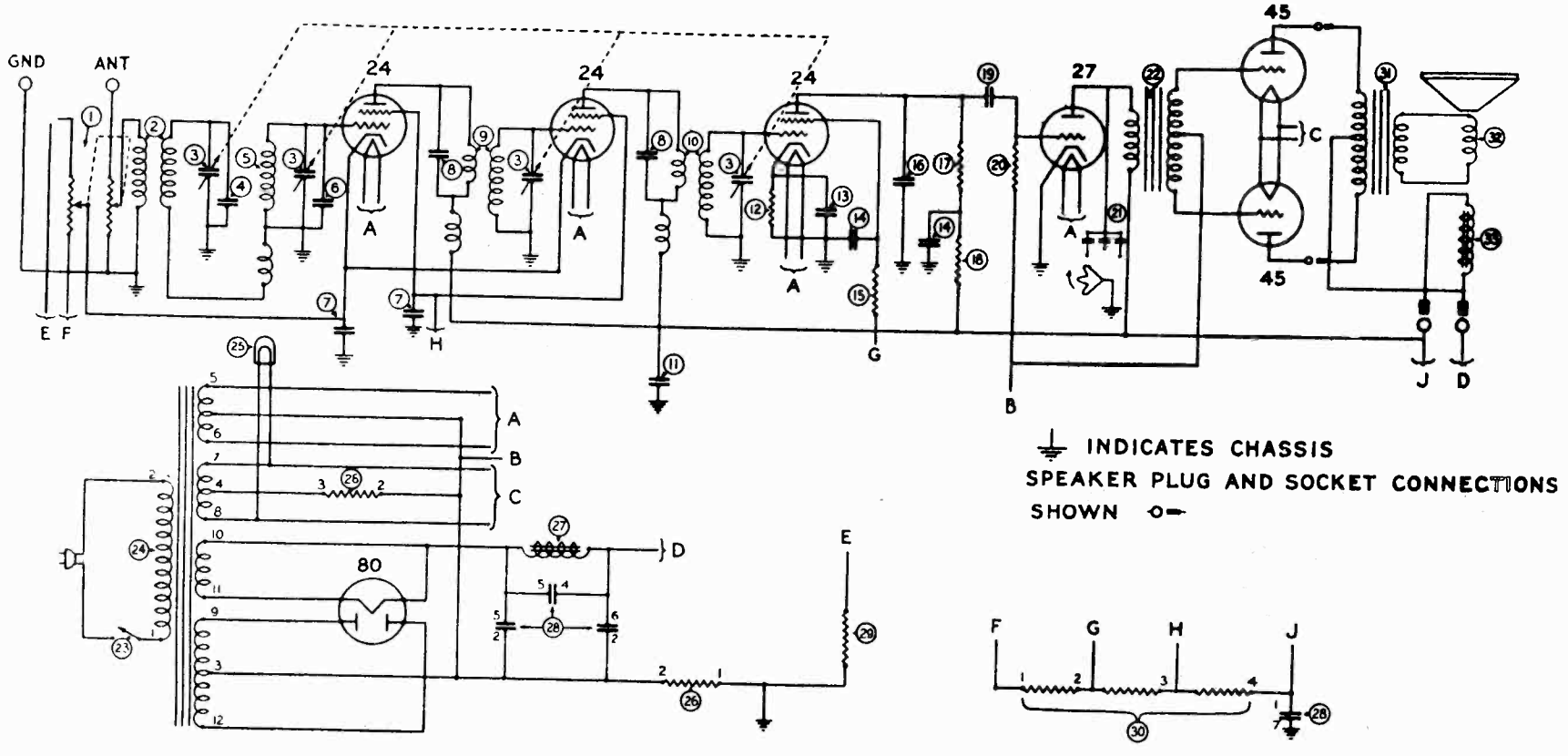




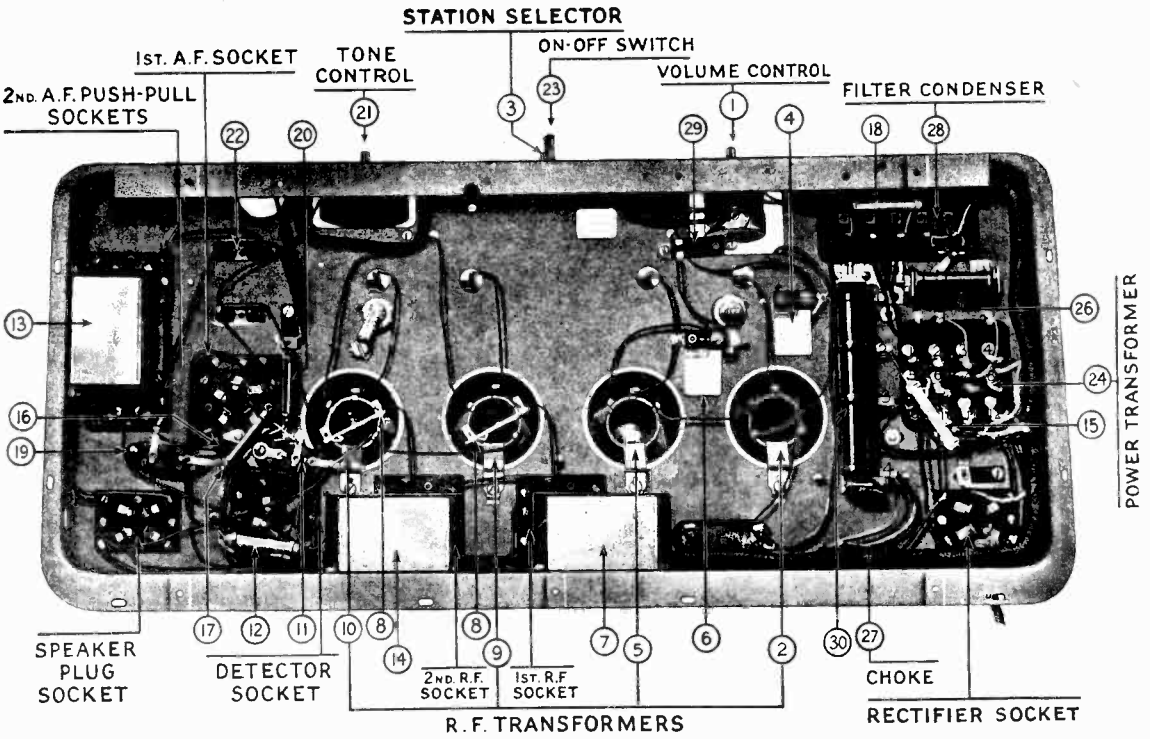
Replacement Parts for Model 76

		Part No.
①	Local-Distance Switch	3675
②	Resistor	3777
③	Resistor	3526
④	1st R. F. Transformer	3884-A
⑤	Tuning Condenser	3376-E
⑥	Compensating Condenser	3772-A
⑦	2d R. F. Transformer	3884-B
⑧	Condenser	3557
⑨	Condenser	3892-A
⑩	3d R. F. Transformer	3884-C
⑪	Condenser	3892-A
⑫	4th R. F. Transformer	3884-C
⑬	Condenser	3584-B
⑭	Resistor	3767
⑮	Condenser	3583
⑯	Condenser	3557
⑰	Resistor	3768
⑱	Condenser	3082
⑲	Resistor	3769
⑳	Resistor	3767
㉑	Condenser	3897-A
㉒	Resistor	3769
㉓	Push-Pull Input Transformer	3872
㉔	Push-Pull Output Transformer	2848
㉕	Speaker Cone and Voice Coil	2814-B
㉖	Speaker Field Coil	2850
㉗	Resistor	3865
㉘	Resistor	3867
㉙	Resistor	3864
㉚	Volume Control	3879
㉛	B Filter Condenser	3870
㉜	Pilot Lamp	3463
㉝	Power Transformer	3868
㉞	On-Off Switch	3517
㉟	B Filter Choke	3422
	Oscillator Kit	3540
	Cabinet Touch-up Kit	3809

Philco Model 77



Philco Model 77

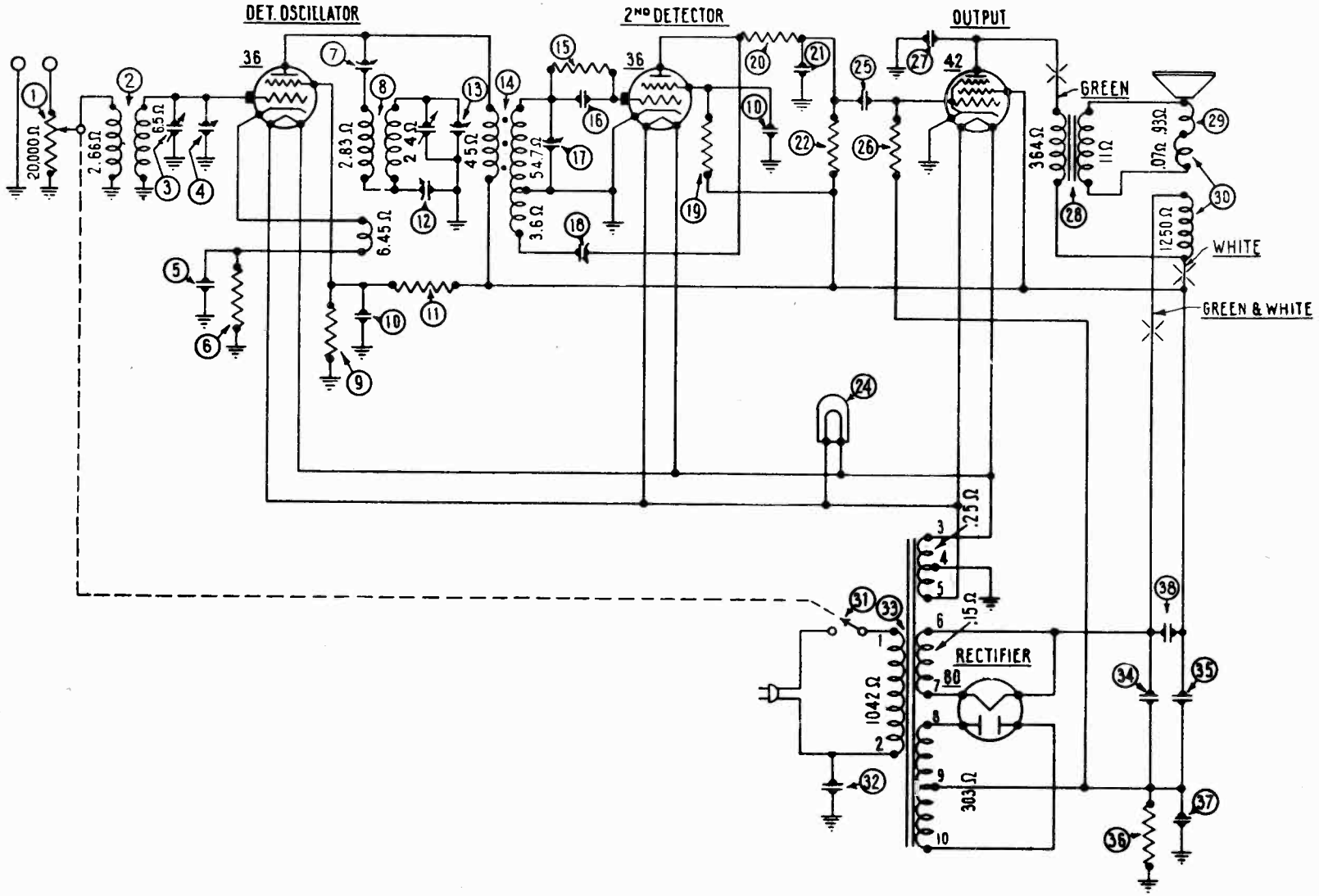


Replacement Parts for Model 77

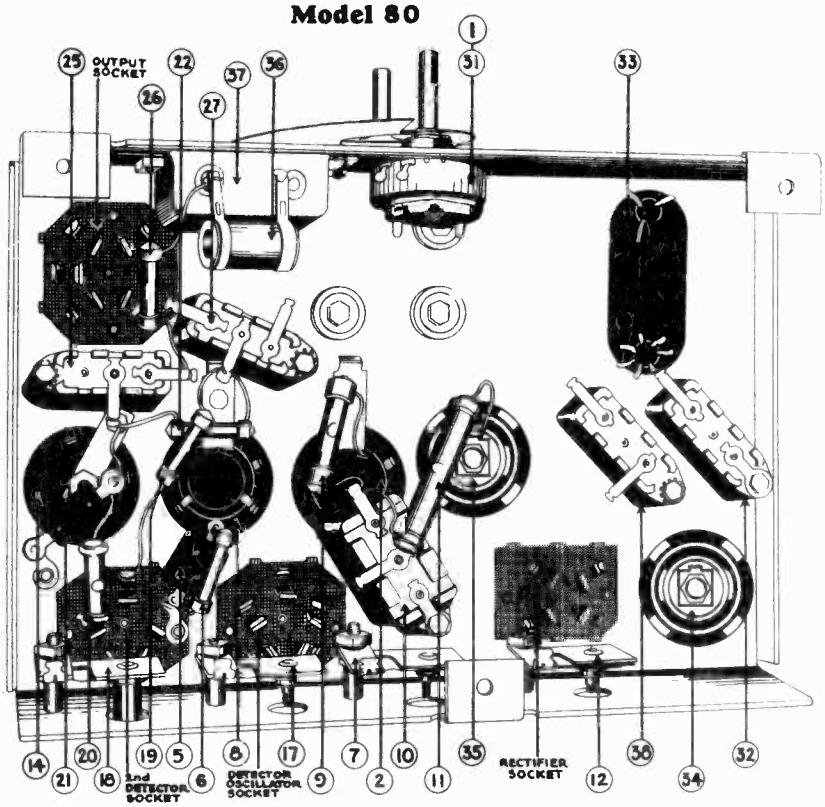
No.	Description	Part No.
①	Volume Control	4094
②	First RF Transformer	3884-A
③	Tuning Condenser	4000-B
④	First Compensating Condenser	3968-A
⑤	Second RF Transformer	3884-B
⑥	Second Compensating Condenser	3772-A
⑦	By-Pass Condenser	3557
⑧	Coupling Condenser	3892-A
⑨	Third RF Transformer	3884-C
⑩	Fourth RF Transformer	3884-C
⑪	By-Pass Condenser	3615-D
⑫	Resistor	3767
⑬	By-Pass Condenser	3583
⑭	By-Pass Condenser	3557
⑮	Resistor	3768
⑯	By-Pass Condenser	3082
⑰	Resistor	3769
⑱	Resistor	3767
⑲	Condenser	3903-F
⑳	Resistor	3769
㉑	Tone Control	4037-A

No.	Description	Part No.
㉒	Input Transformer	3872
㉓	On-Off Switch	4095
㉔	Power Transformer (60 Cycles)	3868
	Power Transformer (25 Cycles)	3869
㉕	Pilot Lamp	3463
㉖	BC Resistor	3864
㉗	Choke	3422
㉘	Filter Condenser (60 Cycles)	3870
	Filter Condenser (25 Cycles)	3871
㉙	C Resistor	4121
㉚	BC Resistor	3865
㉛	Output Transformer	2848
㉜	Voice Coil and Cone	2794-B
㉝	Field Coil	2850
	Knob (Volume Control)	3579-A
	Knob (Tuning Condenser)	3580-A
	Knob (On-Off Switch)	3676-A
	Dial Indicator	4006
	Scale	4118
	Speaker Plug and Cable (Short)	L-1101-A
	Speaker Plug and Cable (Long)	L-1102-A

Model 80


DET. OSCILLATOR
2ND DETECTOR
OUTPUT
36
36
42
20,000Ω
2.66Ω
6.5Ω
2.83Ω
2.4Ω
45Ω
54.7Ω
3.6Ω
6.45Ω
364Ω
11Ω
.07Ω
.93Ω
1250Ω
GREEN
WHITE
GREEN & WHITE
.25Ω
.15Ω
1042Ω
80
303Ω
RECTIFIER

Model 80



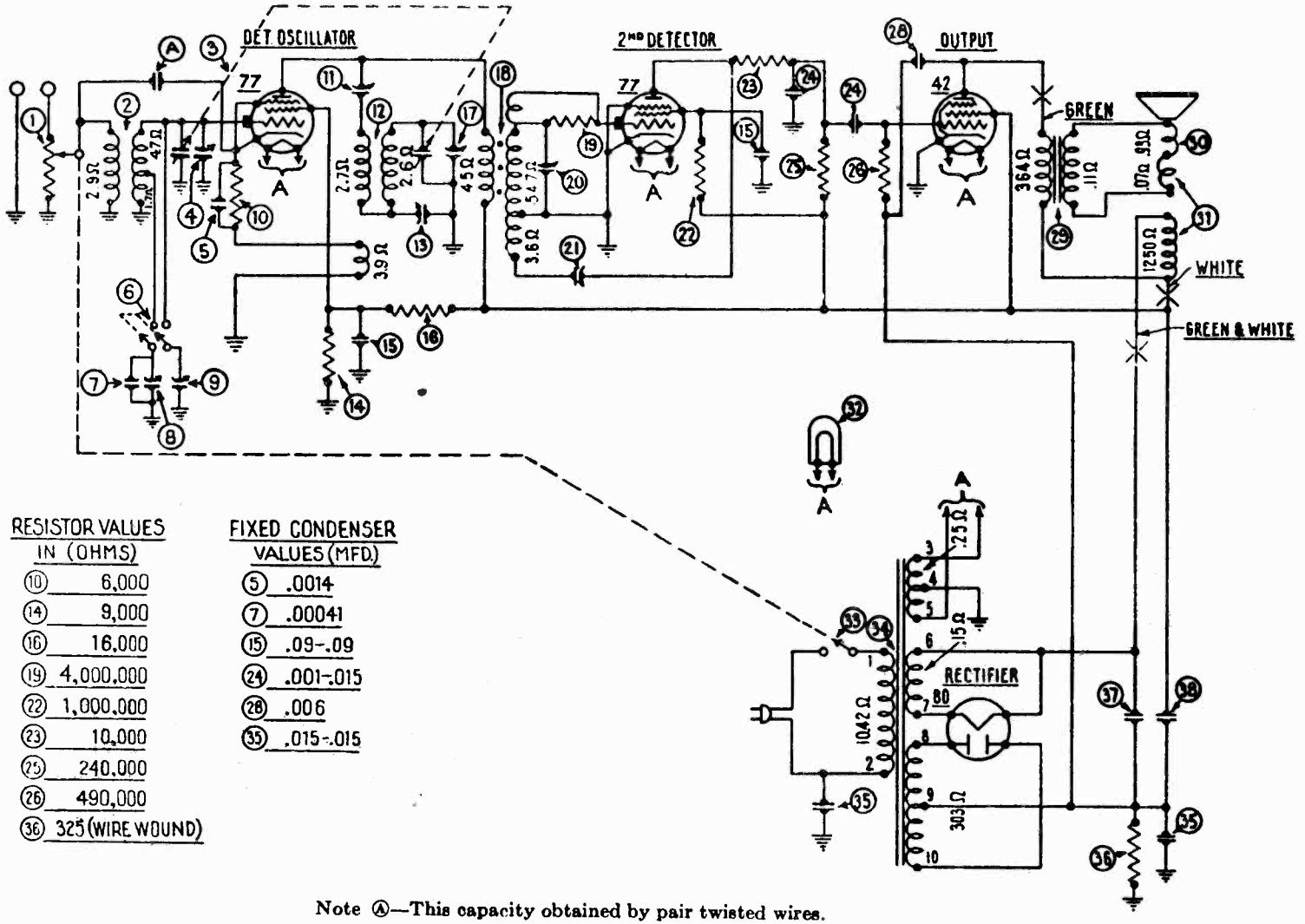
REPLACEMENT PARTS MODEL 80

No. on Figs. 2 and 3	Description	Part No.
(1)	Volume Control—Combined with On-Off Switch	7439
(2)	Antenna Transformer	05831
(3)	Tuning Condenser Assembly	05794
(4)	Compensating Condenser — Antenna — Part of Tuning Con. Assembly	
(5)	Condenser (710 Mmf.) White and Yellow	4520
(6)	Resistor (10,000 Ohms)	4412
(7)	Compensating Condenser—I.F. Primary	04000-A
(8)	Oscillator Coil	05832
(9)	Resistor (9,000 Ohms)	7501
(10)	Condenser (.09 Twin)	4989-B
(11)	Resistor (16,000 Ohms)	7500
(12)	Compensating Condenser — Low Frequency:	04000-S
(13)	Compensating Condenser — High Frequency — Part of Tuning Con. Assembly	
(14)	I.F. Transformer	05834
(15)	Resistor (4,000,000 Ohms) Mounted on I.F. Transformer	6010
(16)	Condenser (50 Mmf.) White—Mounted on I.F. Transformer	3774
(17)	Compensating Condenser—I.F. Secondary	04000-D
(18)	Compensating Condenser	04000
(19)	Resistor (1,000,000 Ohms)	4409*
(20)	Resistor (10,000 Ohms)	4412
(21)	Condenser (1,000 Mmf.) Green and White	5215
(22)	Resistor (240,000 Ohms)	4410
(24)	Pilot Light	6608

No. on Figs. 2 and 3	Description	Part No.
(25)	Condenser (.015 Mfd.)	3793-B
(26)	Resistor (490,000 Ohms)	4517*
(27)	Condenser (.006 Mfd.)	7625-B*
(28)	Output Transformer	2660
(29)	Voice Coil and Cone Assembly	02861
(30)	Speaker Field and Bucking Coil Assembled with Pot	02677*
(31)	On-Off Switch—Combined with Volume Control	7439
(32)	Condenser (.01 Mfd.)	3903-AH*
(33)	Power Transformer 50-60 Cycles	7421
	Power Transformer 25-40 Cycles	7422
	Power Transformer 50-60 Cycles, 230 Volts	7423
(34)	Electrolytic Condenser (8.0 Mfd.)	6707
(35)	Electrolytic Condenser (4.0 Mfd.)	7467
(36)	Resistor (325 Ohms) Wire Wound	7465*
(37)	Electrolytic Condenser—Dry—(10 Mfd.)	7440*
(38)	Condenser (.01 Mfd.)	3903-AJ*
	Bezel	7417
	Dial Complete	05828
	Tube Shield	7172
	Knob (Large)	03063
	Knob (Small)	03064
	Knob Spring	5262
	Grid Clip	4897
	Four Prong Socket Assembly	5026
	Five Prong Socket Assembly	4956
	Six Prong Socket Assembly	6417
	Chassis Mounting Screw	W-567
	Chassis Mounting Washer	W-315
	Rubber Washer	5189
	Pilot Lamp Shield	5760

* A number of circuit changes were made on chassis of run No. 5 and above. This run number is rubber stamped in a star on the back of the chassis. Refering to Figs 2 and 3, the condenser (27) connects to the B- end of resistor (36) instead of to ground. The bucking coil - that section of (30) in series with the voice coil - is shorted out. The 10 mfd. dry electrolytic condenser (37) is eliminated, and replaced with a substitute .015 section combined with (32), part 3793R. The .01 mfd. condenser (38) is eliminated. The positions of (19) (26) and (36) are changed in the chassis from that shown in Fig. 3.

Model 81

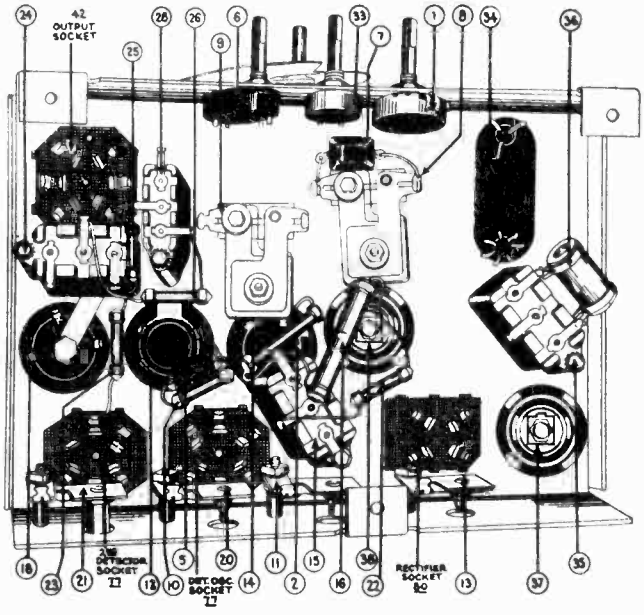


RESISTOR VALUES IN (OHMS)	
(10)	6,000
(14)	9,000
(16)	16,000
(19)	4,000,000
(22)	1,000,000
(23)	10,000
(25)	240,000
(26)	490,000
(36)	325 (WIRE WOUND)

FIXED CONDENSER VALUES (MFD.)	
(5)	.0014
(7)	.00041
(15)	.09-.09
(24)	.001-.015
(28)	.006
(35)	.015-.015

Note Ⓐ—This capacity obtained by pair twisted wires.

MODEL 81

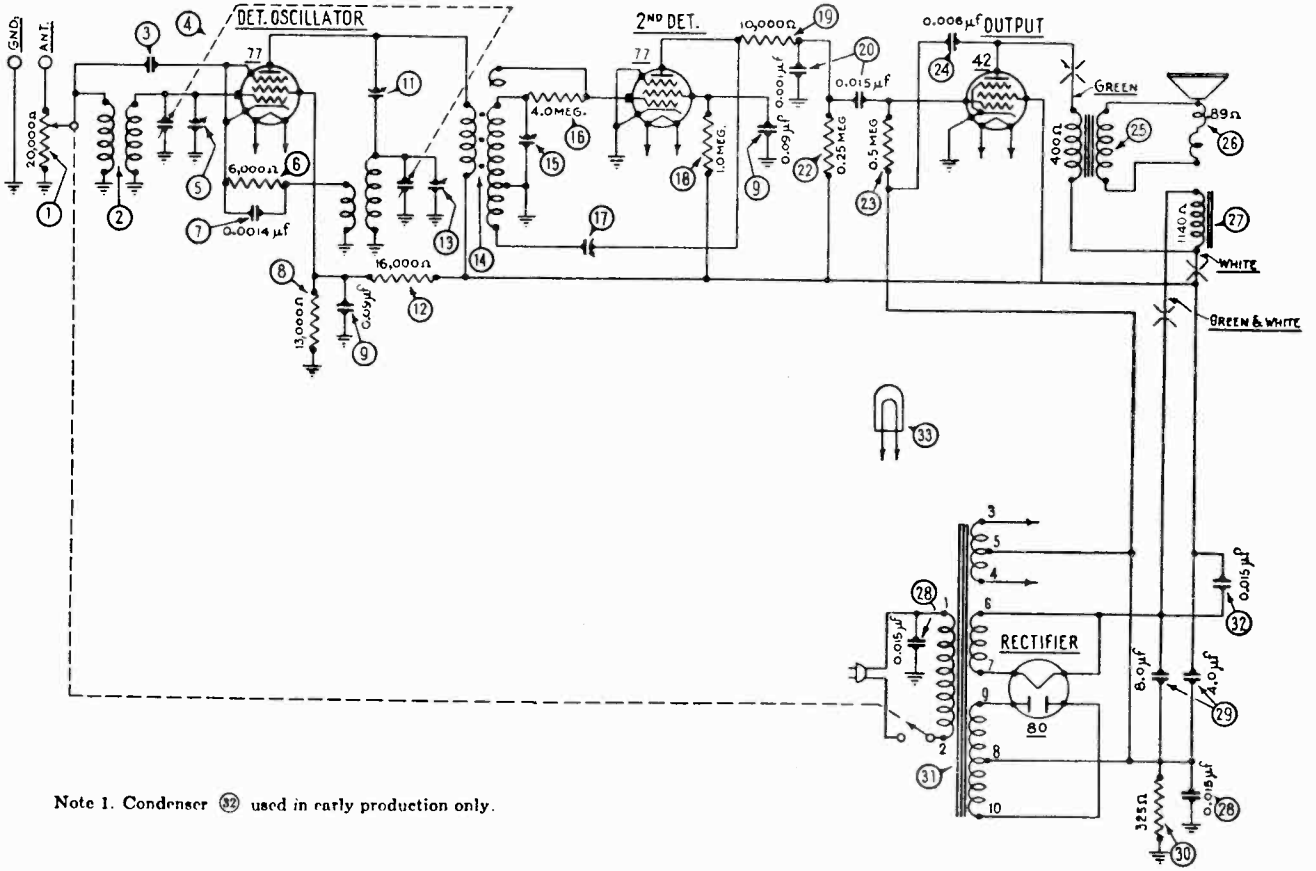


REPLACEMENT PARTS MODEL 81

No. on Figs.	Description	Part No.
(1)	Volume Control*	33-5002
(2)	Antenna Transformer	32-1030
(3)	Tuning Cond. Assembly	31-1006
(4)	Compensating Condenser (Part of (3))	
(5)	Cond. (Red and Black)	7007
(6)	Frequency Switch	42-1000
(7)	Cond. (Orange and Yellow)	30-1000
(8)	Compensating Condenser	04000-S
(9)	Compensating Condenser	04000-X
(10)	Resistor (Blue-Black-Red)	7352
(11)	Compensating Condenser (I.F. Primary)	04000-A
(12)	Oscillator Coil	32-1031
(13)	Compensating Condenser (Low Frequency)	04000-S
(14)	Resistor (White-Black-Red)	7501
(15)	Condenser	4989-B
(16)	Resistor (Brown-Blue-Orange)	7500
(17)	Compensating Condenser (Part of (3))	
(18)	I.F. Transformer	06100
(19)	Resistor (Mounted on I.F. Transformer)	6010
(20)	Compensating Condenser (I.F. Secondary)	04000-D
(21)	Compensating Condenser	04000
(22)	Resistor (Brown-Black-Green)	4409
(23)	Resistor (Brown-Black-Orange)	4412
(24)	Condenser (Double)	7762-B
(25)	Resistor (Red-Yellow-Yellow)	4410
(26)	Resistor (Yellow-White-Yellow)	4517
(28)	Condenser	7625-B
(29)	Output Transformer	2660
(30)	Voice Coil and Cone Assembly	02861
(31)	Speaker Field and Bucking Coil (with Pot)	02667
(32)	Pilot Light	6608
(33)	"On-Off" Switch*	6416-W
(34)	Power Transformer—50-60 Cycles	7421
	Power Transformer—25-40 Cycles	7422
	Power Transformer—50-60 Cycles, 250 Volts	7423
(35)	Condenser (Double)	3793-R
(36)	Resistor (Wire Wound)	7465
(37)	Electrolytic Condenser (8 Mfd.)	7558
(38)	Electrolytic Condenser (4 Mfd.)	7467
	Bezel	7417
	Tube Shield	7172
	Knob (Large)	03063
	Knob (Small)	03064
	Knob Spring	5262
	Grid Clip	4897
	Four Prong Socket Assembly	5026
	Six Prong Socket Assembly	6417
	Chassis Mounting Screw	W-567
	Chassis Mounting Washer	W-315
	Pilot Lamp Shield	5760

*On later production (run No. 3 and above, rubber stamped in a star on back of chassis) volume control (1) and on-off switch (33) was combined. This new volume control and on-off switch is Part Number 7439.

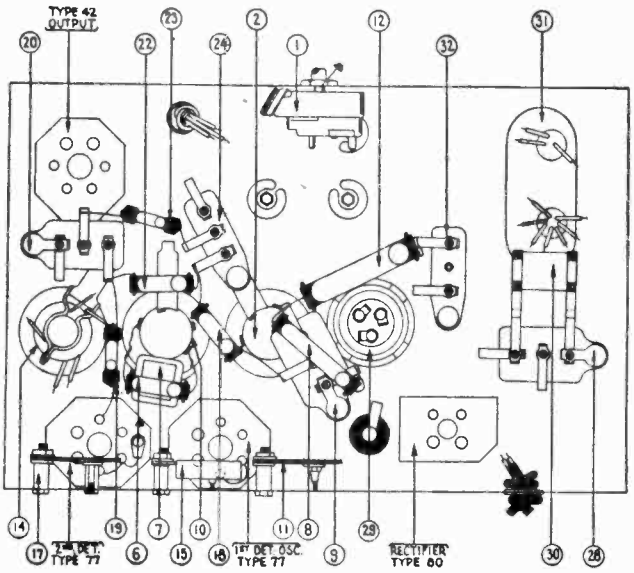
MODEL 84



Note 1. Condenser (32) used in early production only.

I. F. 460 K. C.

MODEL 84

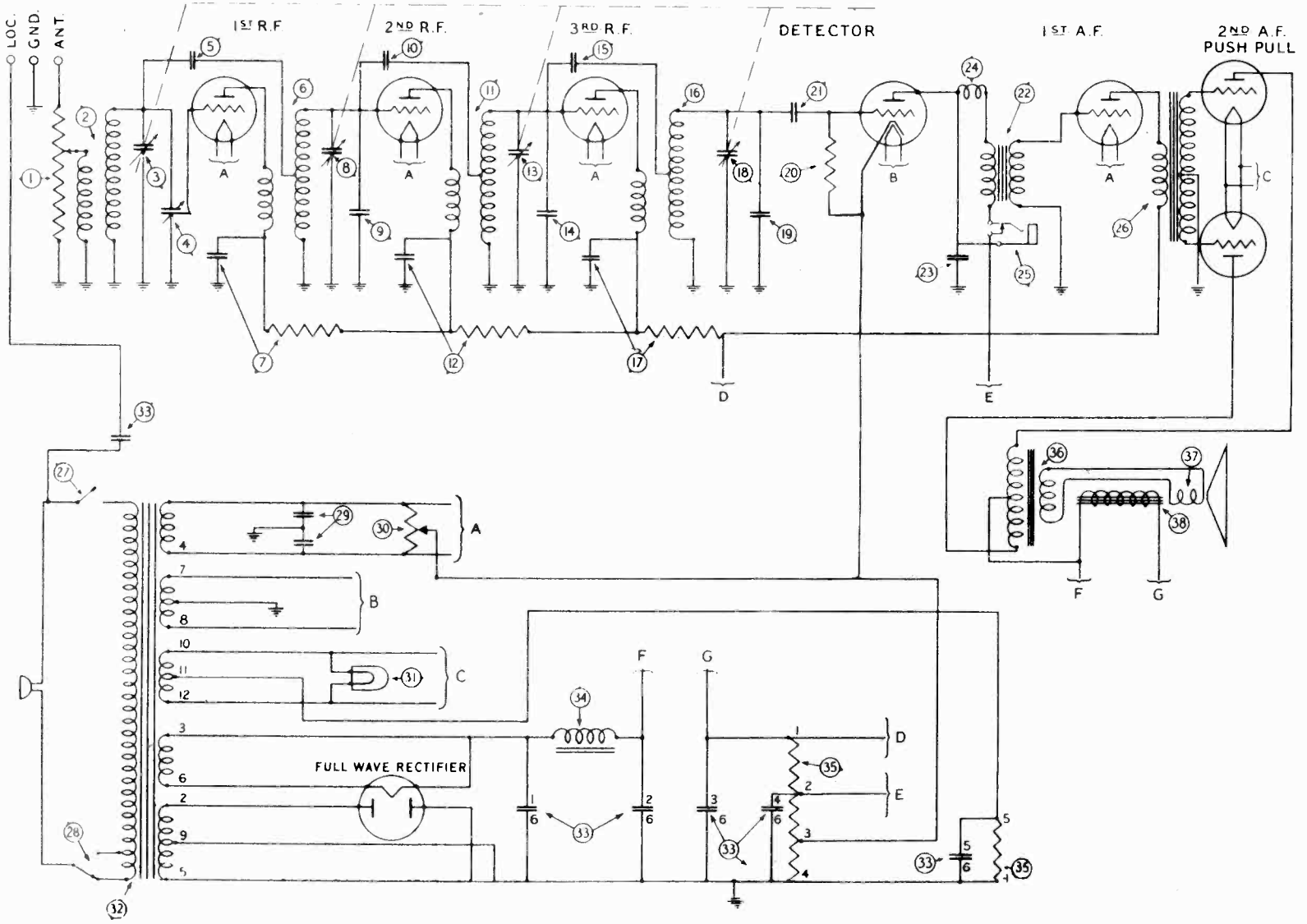


REPLACEMENT PARTS FOR MODEL 84

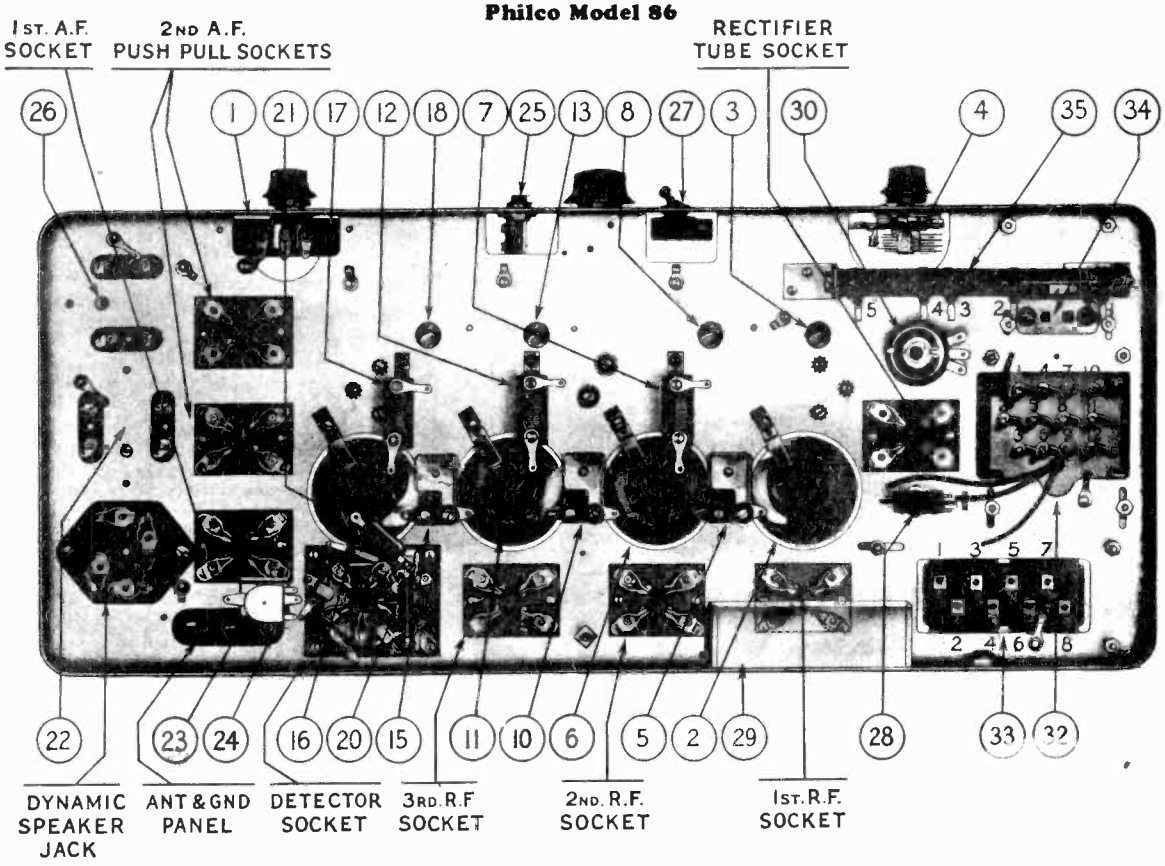
No. on Figs.	Description	Part No.
①	Volume control and on-off switch	33-5055
②	Antenna transformer	32-1310
③	Condenser—capacity obtained by twisting ends of two leads together	
④	Tuning condenser assembly	31-1122
⑤	Compensator (antenna)	Part of ④
⑥	Resistor (6000 ohms: Blue, Black, Red)	7352
⑦	Condenser (.0014 mfd.)	7007
⑧	Resistor (13000 ohms: Brown, orange, orange)	3766
⑨	Condenser (double .09 .09 mfd.)	4980 AK
⑩	Oscillator transformer	32-1311
⑪	Compensator (I.F. primary)	04000A
⑫	Resistor (16000 ohms: Brown, blue, orange)	7500
⑬	Compensator (OSC HF)	Part of ④
⑭	I.F. transformer	32-1313
⑮	Compensator (I.F. sec.)	0-4000Y
⑯	Resistor (4 meg.: Yellow, black, green) inside ⑭	6010
⑰	Compensator (regeneration)	0-4000
⑱	Resistor (1 meg.: Brown, black, green)	4409
⑲	Resistor (10000 ohms: Brown, black, orange)	4412
⑳	Condenser (.015-.001)	7762-B
㉒	Resistor (240000 ohms: Red, yellow, yellow)	4410
㉓	Resistor (490000 ohms: Yellow, white, yellow)	4517
㉔	Condenser .006 mfd.	7625H
㉕	Output transformer	32-7019
㉖	Voice coil and cone assembly	36-3014
㉗	Field coil and pot assembly	36-3243
㉘	Condenser (.015—.015)	3793AD
㉙	Condenser (electrolytic—4.0—8.0 mfd.)	30-2013
㉚	Resistor (wire wound 325 ohms)	7465
㉛	Power transformer	32-7180
㉜	Condenser (.015)	3793 C
㉝	Pilot lamp	6608
㉞	Four prong socket	7544
㉟	Six prong socket	7547
㊱	Tube shield	8005
㊲	Knob	27-4038
㊳	Pointer	27-5007
㊴	AC cord and plug	L-943A
㊵	Speaker cord	L-1474
㊶	Base shield plate	29-1724
㊷	Chassis mounting screw	W-490
㊸	Chassis mounting washer	W 315
㊹	Output transformer shield	36-3025
㊺	Dial scale	27-5031

NOTE: In later production tube shield 36 , No. 8005 is replaced by tube shield No. 28-1820 with lid No. 28-1821.

Philco Model 86



Philco Model 86



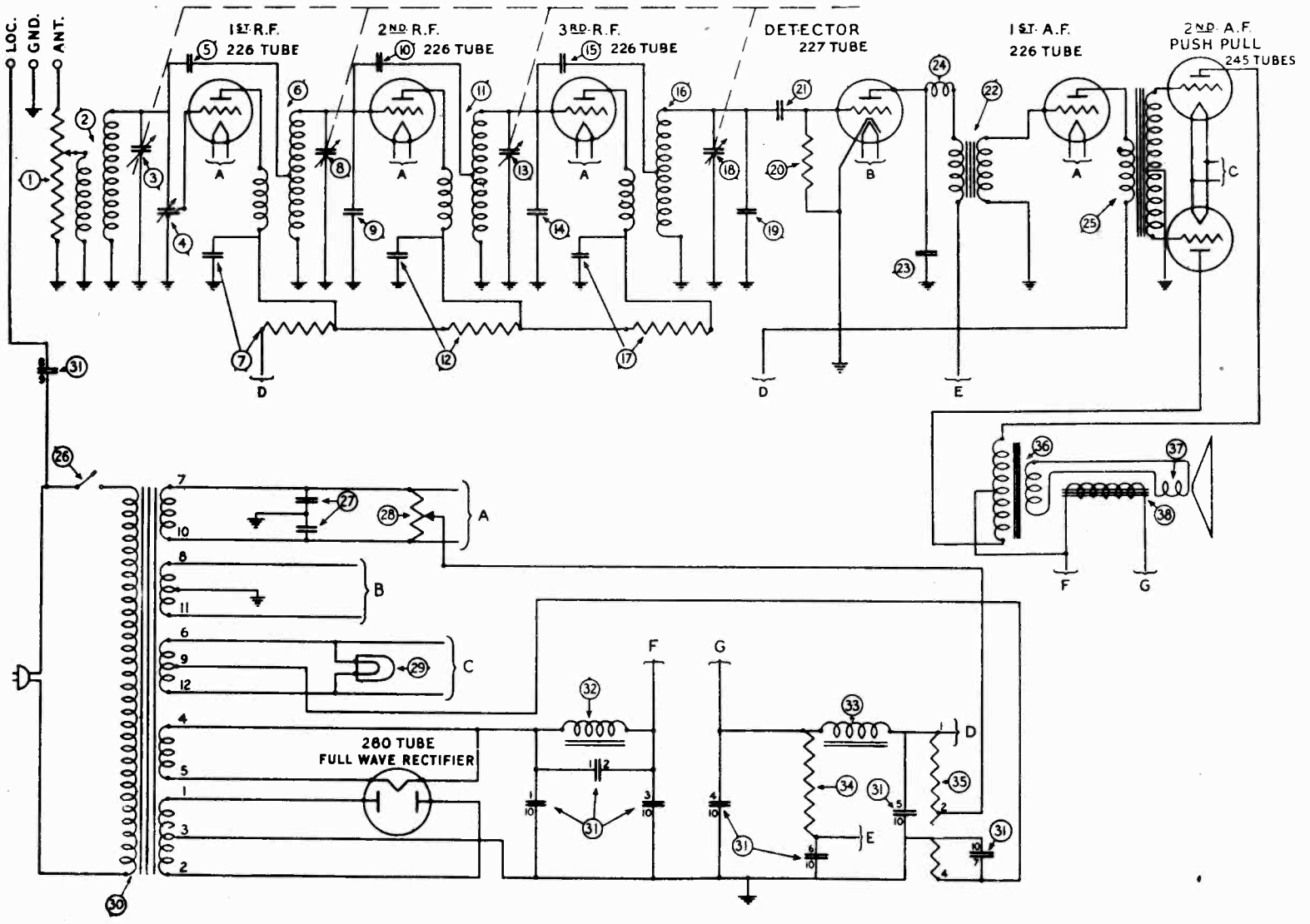
Replacement Parts for Model 86

	Part Name	Part No.
①	Volume Control	3076
②	R. F. Transformer (Antenna Tuning)	3075-B
③ - ⑧ - ⑬ - ⑱	Tuning Condenser (complete with drum and scale)	3001-B
④	Range Control	3133
⑤ - ⑩ - ⑮	Neutralizing Condenser	3025-A
⑥ - ⑪ - ⑯	R. F. Transformer	3075-A
⑦ - ⑫ - ⑰	By-Pass Condenser (.1 mfd. with Plate Resistor Winding)	3292-A
⑨ - ⑭ - ⑲	Compensating Condensers	3282-A
⑳	Grid Leak	3083
㉑	Grid Condenser	3082
㉒	Audio Transformer	3241
㉓	By-Pass Condenser (.001 mfd.)	3081
㉔	Detector R. F. Choke	3256-A
㉕	Phonograph Pick-Up Jack	3087
㉖	Push-Pull Input Transformer	3242
㉗	Power-Toggle Switch	3253
㉘	Primary Tap Switch	3116
㉙	Filament By-Pass Condenser (2 sections .5 mfd.)	3080
㉚	6-Ohm Hum Adjuster	3096
㉛	Pilot Lamp	3105
㉜	Power Transformer (60 cycle)	3271
㉝	Filter Condenser Block (60 cycle)	3246
㉞	Filter Choke Coil	3269
㉟	B-C Section Resistor	3232
㊱	Push-Pull Output Transformer	2897
	Speaker Plug	2871-A
㊲	Speaker Cone and Voice Coil	2898
㊳	Speaker Field Coil	2896
	Cable Spring	3012
	Control Knob Tuning Condenser	3035-A
	Control Knob (Volume and Range Control)	3036-A
	226 Tube Socket	3051-A
	Condenser Drive Cable	3054-A
	Knob Spring	3103
	Fibre Adjusting Wrench	3164
	280 Tube Socket	3169-A
	171 Tube Socket	3170-A
	Pilot Lamp Socket Assembly	3202-A
	Jack Insulator Nut	3231
	Terminal Panel Assembly	3236-A
	Speaker Socket	3247-A
	227 Tube Socket, Spring Type	3263-A
	Jack Insulator	3272
	A.C. Attachment Cord and Plug	L-943-A
	Wiring Cable	L-1037
	Speaker Cable	L-1039
	Socket Wrench for Speaker Mounting Bolts	3312

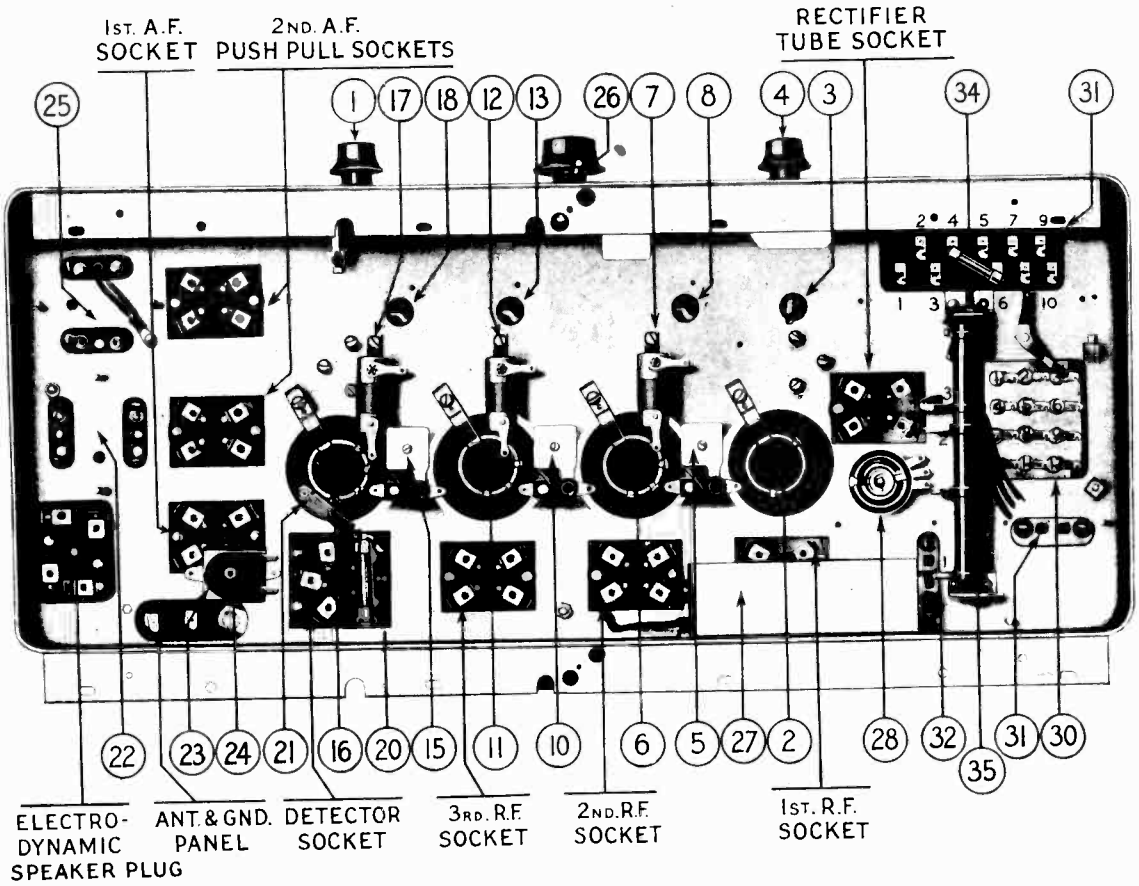
***Note:*—When ordering replacements for 25-cycle Receivers (Model 82) use the following part numbers instead of those given above. All other part numbers remain the same.**

㉜	Power Transformer (25 cycle)	3278
㉝	Filter Condenser Block (25 cycle)	3279

Philco Model 87



Philco Model 87

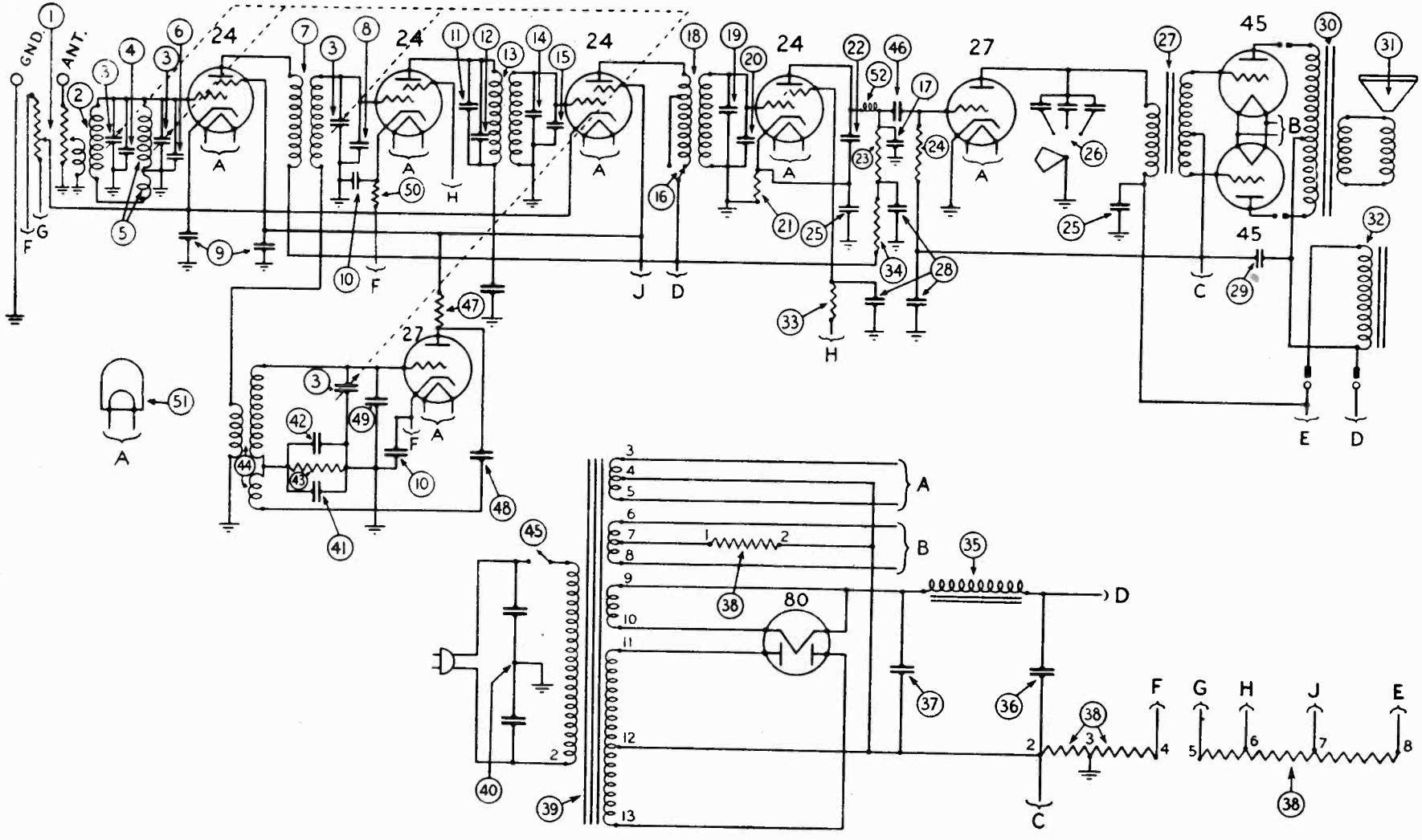


Replacement Parts for Model 87

	Part Name	Part No.
①	Volume Control	3076
②	R. F. Transformer (Antenna Tuning)	3075-B
③ – ⑧ – ⑭ – ⑱	Tuning Condenser (Complete with Drum and Scale)	3001-B
④	Range Control	3133
⑤ – ⑩ – ⑯	Neutralizing Condenser	3441-A
⑥ – ⑪ – ⑰	R. F. Transformer	3075-A
⑦ – ⑫ – ⑲	By-Pass Condenser (.1 mfd. with Plate Resistor Winding)	3292-A
⑧ – ⑭ – ⑱	Compensating Condensers	3435-A
⑨	Grid Leak	3083
⑩	Grid Condenser	3082
⑪	Audio Transformer	3241
⑫	By-Pass Condenser (.001 mfd.)	3081
⑬	Detector R. F. Choke	3256-A
⑮	Push-Pull Input Transformer	3242
⑯	Power Toggle Switch	3501
⑰	Filament By-Pass Condenser (2 Sections .5 mfd.)	3080
⑫	6-Ohm Hum Adjustor	3096
⑳	Pilot Lamp	3463
㉑	Power Transformer	3400
㉒	Filter Condenser Block	3401
㉓	Filter Choke Coil (First)	3422
㉔	Filter Choke Coil (Second)	3472
㉕	Detector Resistor	3542
㉖	B-C Resistor	3399
㉘	Push-Pull Output Transformer	2848
㉗	Speaker Cone and Voice Coil	2844-A
㉘	Speaker Field Coil	2850
	Speaker Plug	2871-A
	Cable Spring	3012
	Control Knob Tuning Condenser	3301
	Control Knob (Volume and Range Control)	3300
	Condenser Drive Cable	3484
	Knob Spring	3305
	Fibre Adjusting Wrench	3164
	4-Hole Tube Socket	3423-A
	Pilot Lamp Socket Assembly	3202-A
	Terminal Panel Assembly	3236-A
	Speaker Socket	3464-A
	5-Hole Tube Socket	3442-A
	A.C. Attachment Cord and Plug	L-943-A
	Speaker Cable	L-1056-A
	Socket Wrench for Speaker Mounting Bolts	3312
	Tuning Scale	3398
	Oscillator Kit	3540
	Wood Switch Plug	3627

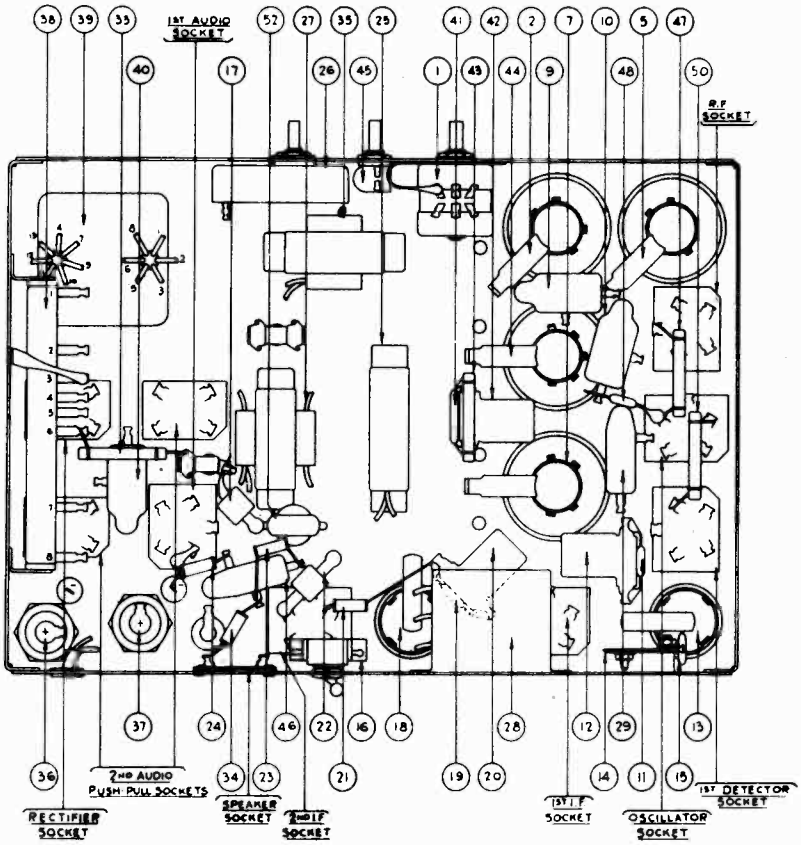
Models 90 and 90-A

WITH 2- TYPE 45 TUBES



Models 90 and 90-A

WITH 2- TYPE 45 TUBES



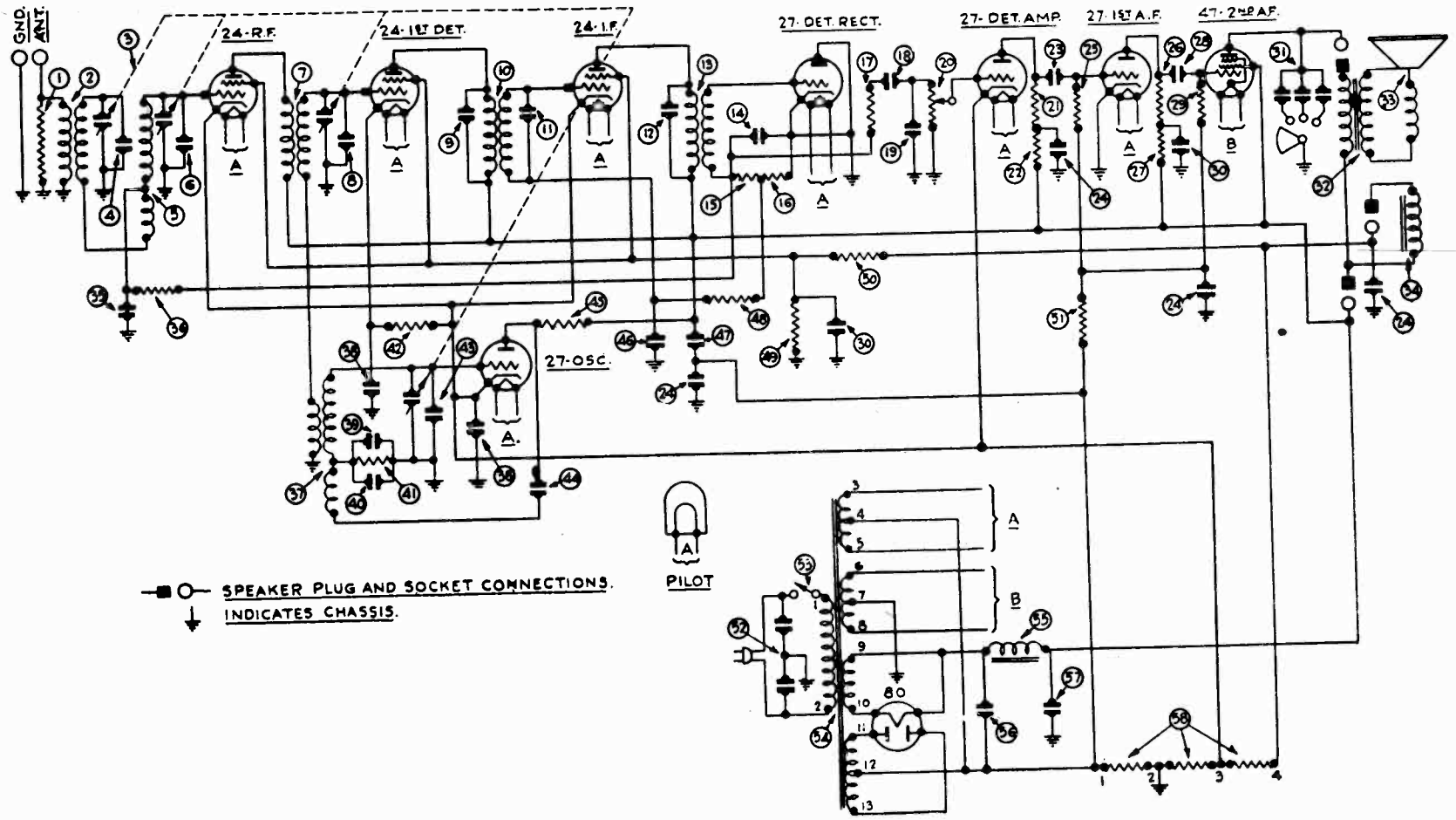
REPLACEMENT PARTS—MODELS 90 and 90-A RECEIVERS

No. on Figs. 3 and 4	Description	Part No.
①	Volume Control	5039
②	1st R. F. Transformer	03013
③	Gang Condenser—50 to 60 cycles	03001
	Gang Condenser—25 to 40 cycles	03078
④	Compensating Condenser (Part of Tuning Condenser Assembly)	
⑤	2nd R. F. Transformer	03014
⑥	Compensating Condenser (Part of Tuning Condenser Assembly)	
⑦	1st Det. Transformer	03015
⑧	Compensating Condenser (Part of Tuning Condenser Assembly)	
⑨	Condenser .09 M. F. (Double)	4989-C
⑩	Condenser .09 M. F. (Double)	4989-B
⑪⑫	Fixed Condenser .00011 / Compensating Condenser — Assembled	3772-C
⑬	1st I. F. Transformer	03009
⑭⑮	Compensating Condenser / Fixed Condenser .00011 — Assembled	03051
⑯	Normal Maximum Switch	3116
⑰	Condenser (.000035 mf)	4990
⑱	2nd I. F. Transformer	03143
⑲⑳	Compensating Condenser / Fixed Condenser .00011 — Assembled	03051
㉑	Resistor—50,000 Ohms	4518
㉒	Condenser .00035	4990
㉓	Resistor—250,000 Ohms	4410
㉔	Resistor—1,000,000 Ohms	4409
㉕	Condenser .5 M. F. (Double)	03024
㉖	Tone Control	4037-A
㉗	1st Audio Transformer	4952
㉘	Condensers 2—.25 M. F. and 1—.5 M. F.	03029
㉙	Condenser .05 M. F.	3615-G
㉚	Output Transformer:	
	H_3 (For Large Cone Assembly)	2848
	K_3 (For Small Cone Assembly)	2766
㉛	Voice Coil Assembly and Cone:	
	H_3 (Large Cone)	02997
	K_3 (Small Cone)	02996
㉜	Speaker Field—Assembled with Pot and Frame	
㉝	Resistor—250,000 Ohms	3768
㉞	Resistor—250,000 Ohms	4410
㉟	Filter Choke	4951
㊱	Condenser 6 M. F. Electrolytic Type (50-60 cycles)	4916
	Condenser 10 M. F. Electrolytic Type (25-40 cycles)	5142
㊲	Condenser 6 M. F. Electrolytic Type (25-40) and (50-60) cycles	4916
㊳	B. C. Resistor	4953
㊴	Power Transformer (50 to 60 cycles)	4938
	Power Transformer (25 to 40 cycles)	4939

No. on Figs. 3 and 4	Description	Part No.
㊵	Condenser .015 M. F. (Double)	3793-E
㊶㊷	Condenser .0007 M. F. Compensating Condenser — Assembled	03050
㊸	Resistor—50,000 Ohms	4237
㊹	Oscillator Coil	03016
㊺	On-Off Switch	4095
㊻	Condenser .001 M. F.	5215
㊼	Resistor—13,000 Ohms	3766
㊽	Condenser .00011 M. F.	4519
㊾	Compensating Condenser (Part of Tuning Condenser Assembly)	
㊿	Resistor—5,000 Ohms	3526
(51)	Pilot Bulb	3463
(52)	R. F. Choke	03086
	Line Cord and Plug	L-943
	Tube Shield	03002
	Knob (large) Dial Control	4958-A
	Spring (Dial Knobs)	4147
	Knobs (small) Tone and Volume Control	4959-A
	Knob (switch)	4290-A
	Grid Clip	4897
	Speaker Plug and Cable	L-1124-A
	Grommet for R. F. Transformer Shield	3747
	Rectifier Tube Socket	5026
	Four Prong Socket Assembly	4955
	Five Prong Socket Assembly	4956
	Speaker Socket	4957
	Volume Control Insulator	4092
	Volume Control Insulator	4286
	Fahnstock Clip	L-1126
	Finishing Rosettes	4267
	Speaker Mounting Screws (3 used)	W-493
	Speaker Mounting Screws (1 used)	W-483
	Dial	5021
	Mica for Gang Condenser Compensating Condenser	3473
	Insulating Washer for Compensating Condenser	3500
	Tuning Condenser Mounting Washer	3914
	Tuning Condenser Mounting Washer	3915
	Tuning Condenser Mounting Sleeve	3916
	Spring for Tuning Condenser	4255
	Bezel	5009
	Complete Pilot Bracket	03081-A
	Dial Disc	4925
	Light Shield Screen	4937
	Friction Drive Bracket	4930
	Brass Collar for Friction Drive	4935
	Shaft	4931

Models 90 and 90-A

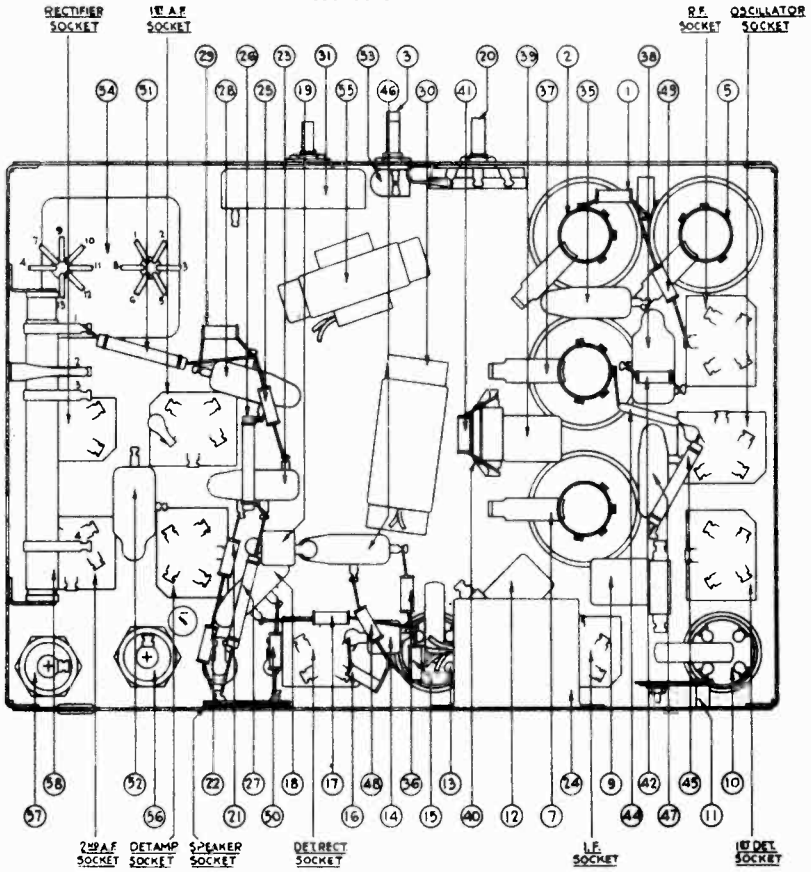
ABOVE SERIAL NO. 237,001
WITH 1- TYPE 47 TUBE



Models 90 and 90-A

ABOVE SERIAL No. 237,001

WITH 1- TYPE 47 TUBE



REPLACEMENT PARTS—MODELS 90 and 90-A RECEIVERS

(Above Serial No. 237,001)

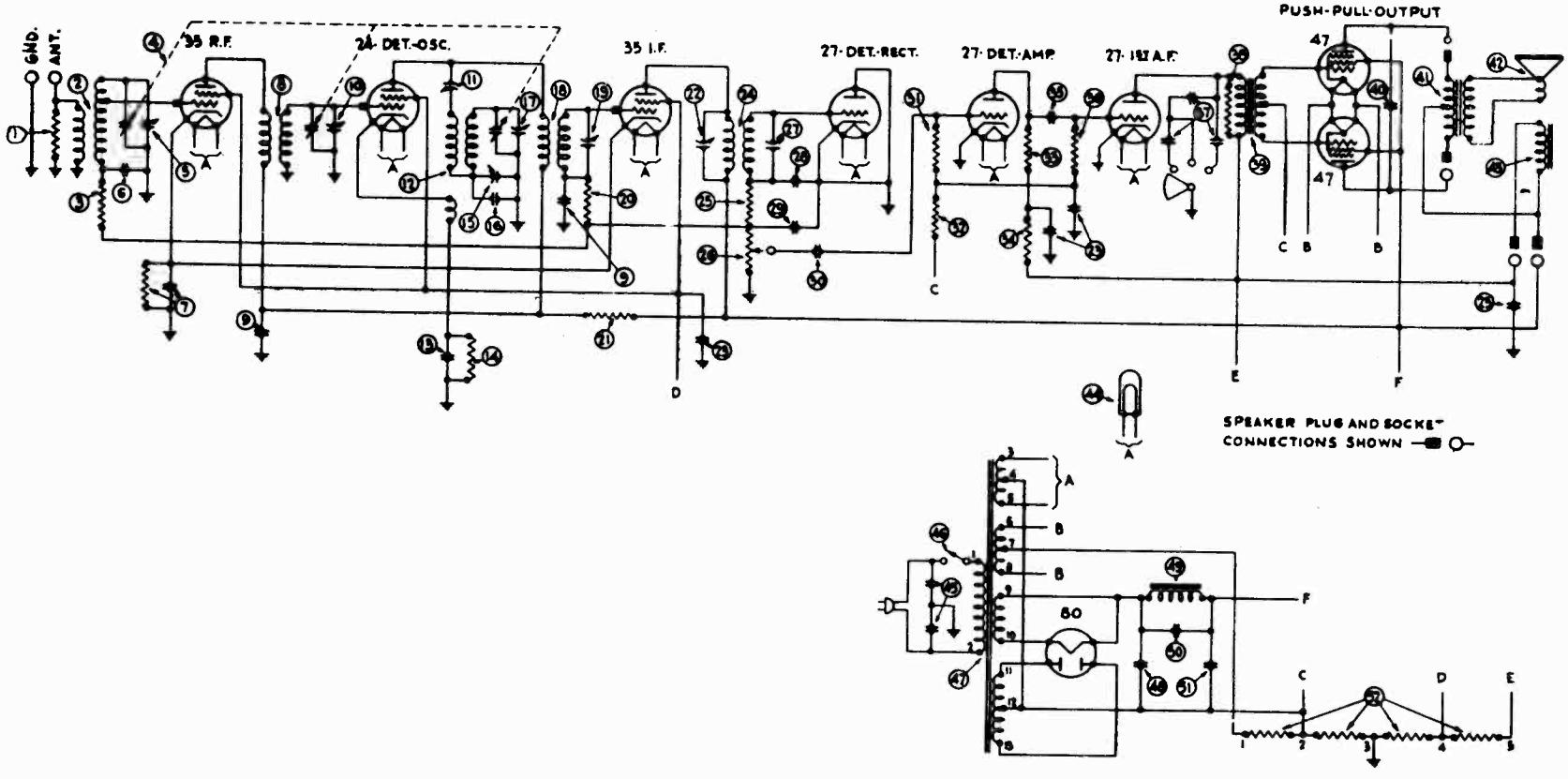
No. on Figs. 3 and 4	Description	Part No.
①	Resistor (10,000 ohms)	4412
②	First R. F. Transformer	03360
③	Gang Condenser (50-60 cycles)	03001
	Gang Condenser (25-40 cycles)	03078
④	Compensating Condenser (part of gang condenser assembly)	
⑤	Second R. F. Transformer	03014
⑥	Compensating Condenser (part of gang condenser assembly)	
⑦	First Detector Transformer	03015
⑧	Compensating Condenser (part of gang condenser assembly)	
⑨	Compensating Condenser (First I. F. Primary)	03315
⑩	First I. F. Transformer	03009
⑪	Compensating Condenser (First I. F. Secondary)	03315
⑫	Compensating Condenser (Second I. F. Primary)	03317
⑬	Second I. F. Transformer	03345
⑭	Condenser (110 mmf.)	4519
⑮	Resistor (51,000 ohms)	4518
⑯	Resistor (51,000 ohms)	4518
⑰	Resistor (99,000 ohms)	4411
⑱	By-Pass Condenser (.01 mfd.)	3903-M
⑲	Condenser (.00025 mfd.)	3082
⑳	Volume Control	5366
㉑	Resistor (51,000 ohms)	4518
㉒	Resistor (70,000 ohms)	5385
㉓	By-Pass Condenser (.01 mfd.)	3903-M
㉔	Condenser (1-.1 mfd., 1-.13 mfd., 2-.25 mfd.)	03325
㉕	Resistor (240,000 ohms)	4410
㉖	Resistor (25,000 ohms)	3656
㉗	Resistor (25,000 ohms)	3656
㉘	By-Pass Condenser (.01 mfd.)	3903-P
㉙	Resistor (240,000 ohms)	4410
㉚	Condenser (.25 mfd., 1 mfd.)	03327
㉛	Tone Control	4037-A
㉜	Output Transformer	2673
㉝	Voice Coil Assembly and Cone:	
	H_2 (Large Cone)	02997
	K_2 (Small Cone)	02996
㉞	Speaker Field (Assembled with pot and frame)	
㉟	By-Pass Condenser (.05 mfd.)	3615-W
㊱	Resistor (490,000 ohms)	4517
㊲	Oscillator Coil	03016
㊳	By-Pass Condenser (.09 mfd.) double	4989-G
㊴	Compensating Condenser } Assembled	03050
㊵	Condenser (.0007 mfd.) }	
㊶	Resistor (51,000 ohms)	4518
㊷	Resistor (5,000 ohms)	5310
㊸	Compensating Condenser (part of tuning condenser assembly)	
㊹	Condenser (110 mmf.)	4519
㊺	Resistor (51,000 ohms)	4237
㊻	By-Pass Condenser (.05 mfd.)	3615-U
㊼	By-Pass Condenser (.05 mfd.)	3615-E
㊽	Resistor (490,000 ohms)	4517
㊾	Resistor (70,000 ohms)	5385
㊿	Resistor (25,000 ohms)	4516
(51)	Resistor (240,000 ohms)	3768
(52)	Condenser (.015 mfd.) double	3793-E
(53)	On-Off Switch	4095
(54)	Power Transformer (50-60 cycles)	5362
	Power Transformer (25-40 cycles)	5363
	Power Transformer (50-60 cycles, 220 volts)	5364
(55)	Choke	4951
(56)	Condenser (6 mfd.) Electrolytic type (50-60 cycles)	4916
	Condenser (10 mfd.) Electrolytic type (25-40 cycles)	5142
(57)	Condenser (6 mfd.) Electrolytic type (50-60 cycles)	4916
	Condenser (10 mfd.) Electrolytic type (25-40 cycles)	5142
(58)	B. C. Resistor	5365
	Line Cord and Plug	L-943
	Tube Shield (Large)	03373
	Tube Shield (27 type)	5387
	Pilot Bulb	2463
	Pilot Bracket Complete	03081-A
	Knob (Large)	4958-A
	Knob (Small)	4959-A
	Knob (Switch)	4290-A
	Spring (For small knobs)	4147
	Spring (For large knobs)	5262
	Grid Clip	4897
	Five Prong Socket Assembly	4956
	Four Prong Socket Assembly	4955
	Volume Control Insulator	4092
	Dial	5021
	Light Shield Screen	4937
	Bezel	5009

MODEL 90

WITH 2- TYPE 47 TUBES

SERIAL No. 32,001 TO B35,000

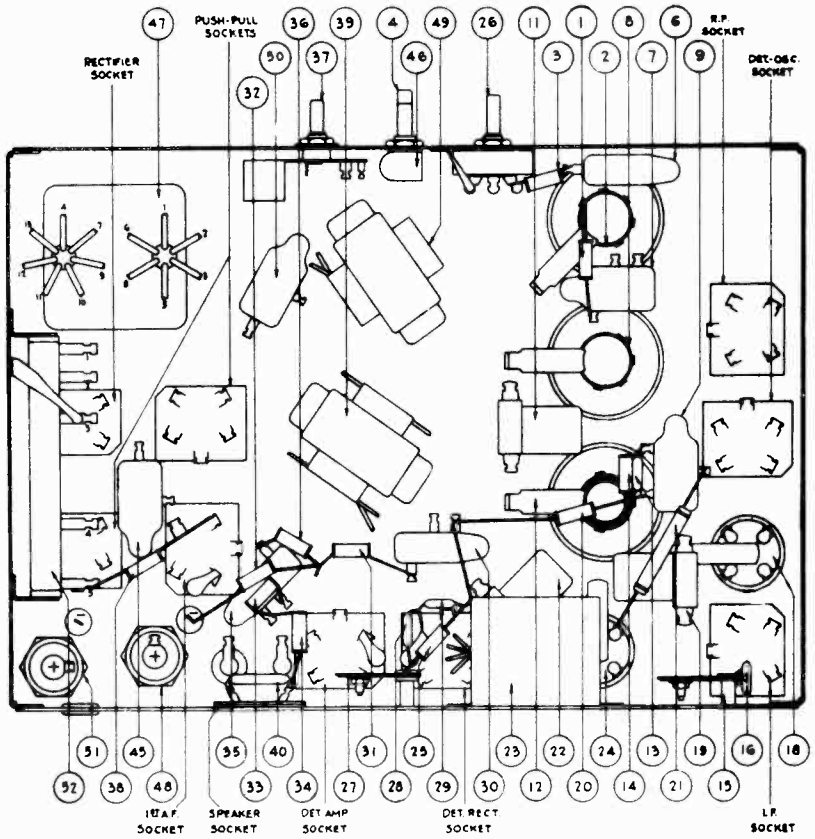
AND ABOVE B53,100



MODEL 90

WITH 2- TYPE 47 TUBES

SERIAL NO. 32,001 TO B35,000 AND ABOVE B53,100



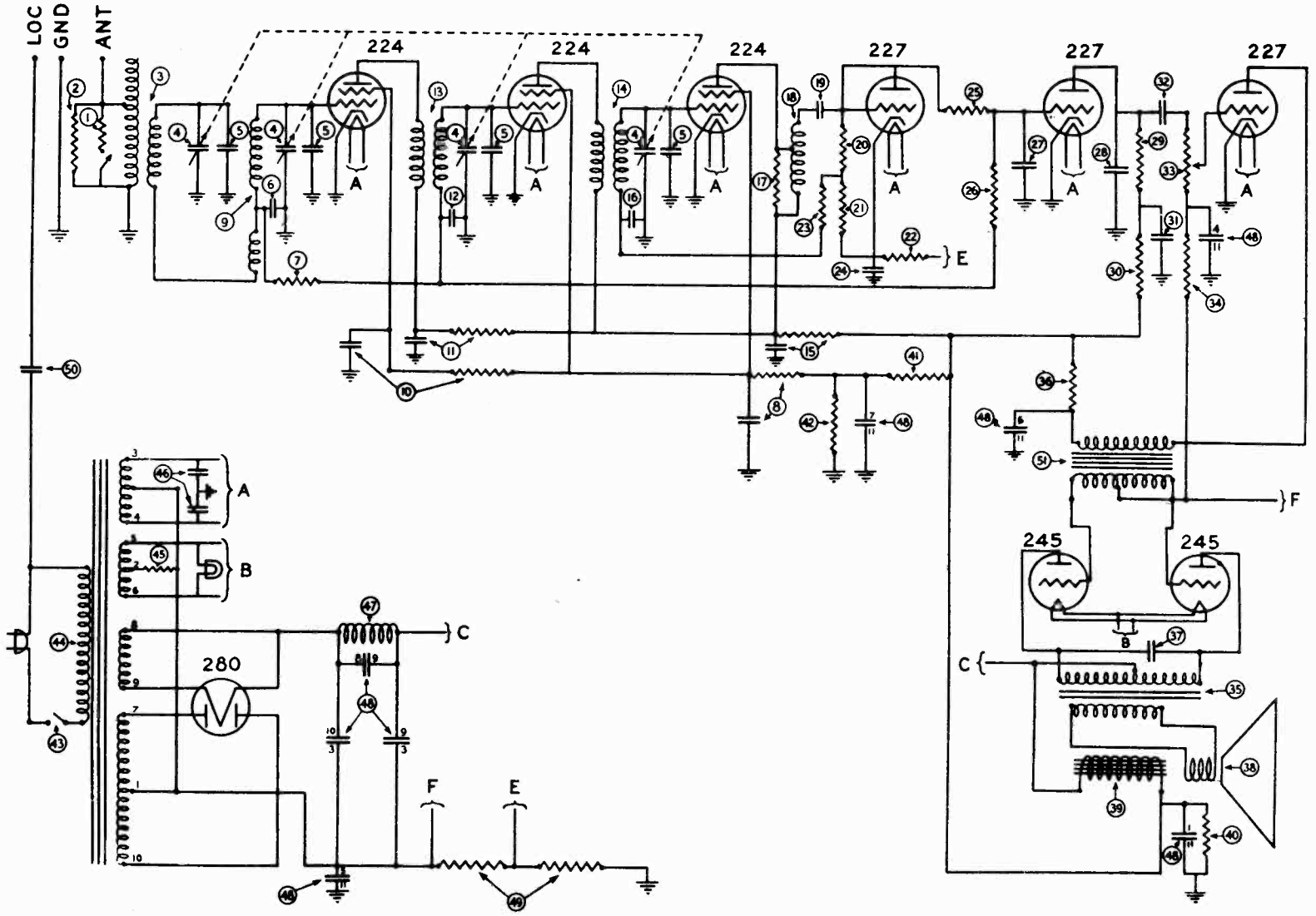
MODEL 90 REPLACEMENT PARTS

No. on Figs. 1 and 2	Description	Part No.
①	Resistor (10,000 Ohms)	4412
②	Antenna Transformer	04317
③	Resistor (1,000,000 Ohms)	4409
④	Tuning Condenser (50–60 cycles)	04309
	Tuning Condenser (25–40 cycles)	04310
⑤	Compensating Condenser — Antenna — Part of Tuning Condenser Assembly	
⑥	Condenser (.05 Mfd.)	3615-L
⑦	Condenser (.09 Mfd. and 200 Ohm Resistor)	4989-L
⑧	Detector Transformer	04408
⑨	Condenser (.09 Mfd.)	3615-AJ
⑩	Compensating Condenser — Detector — Part of Tuning Condenser Assembly	
⑪	Compensating Condenser—Coupling	04000-M
⑫	Oscillator Coil	04409
⑬	Condenser (700 Mmf.)	4520
⑭	Resistor (15,000 Ohms)	6208
⑮	Compensating Condenser—Low Frequency	04000-B
⑯	Condenser (410 Mfd.)	5120
⑰	Compensating Condenser — High Frequency—Part of Tuning Condenser Assembly	
⑱	First I.F. Transformer	04319
⑲	Compensating Condenser—First I.F.	04000-M
⑳	Resistor (1,000,000 Ohms)	4409
㉑	Resistor (1,000 Ohms)	4590
㉒	Compensating Condenser—Second I.F. Primary	04000-M
㉓	Condenser (2–.25, 2–.5 Mfd.)	04407
㉔	Second I.F. Transformer	04320
㉕	Resistor (99,000 Ohms)	4411
㉖	Volume Control	6015
㉗	Compensating Condenser (Second I.F. Secondary)	04000-M
㉘	Condenser (110 Mmf.)	4519
㉙	Condenser (110 Mmf.)	4519
㉚	Condenser (.01 Mfd.)	3903-N
㉛	Resistor (1,000,000 Ohms)	4517
㉜	Resistor (490,000 Ohms)	4516

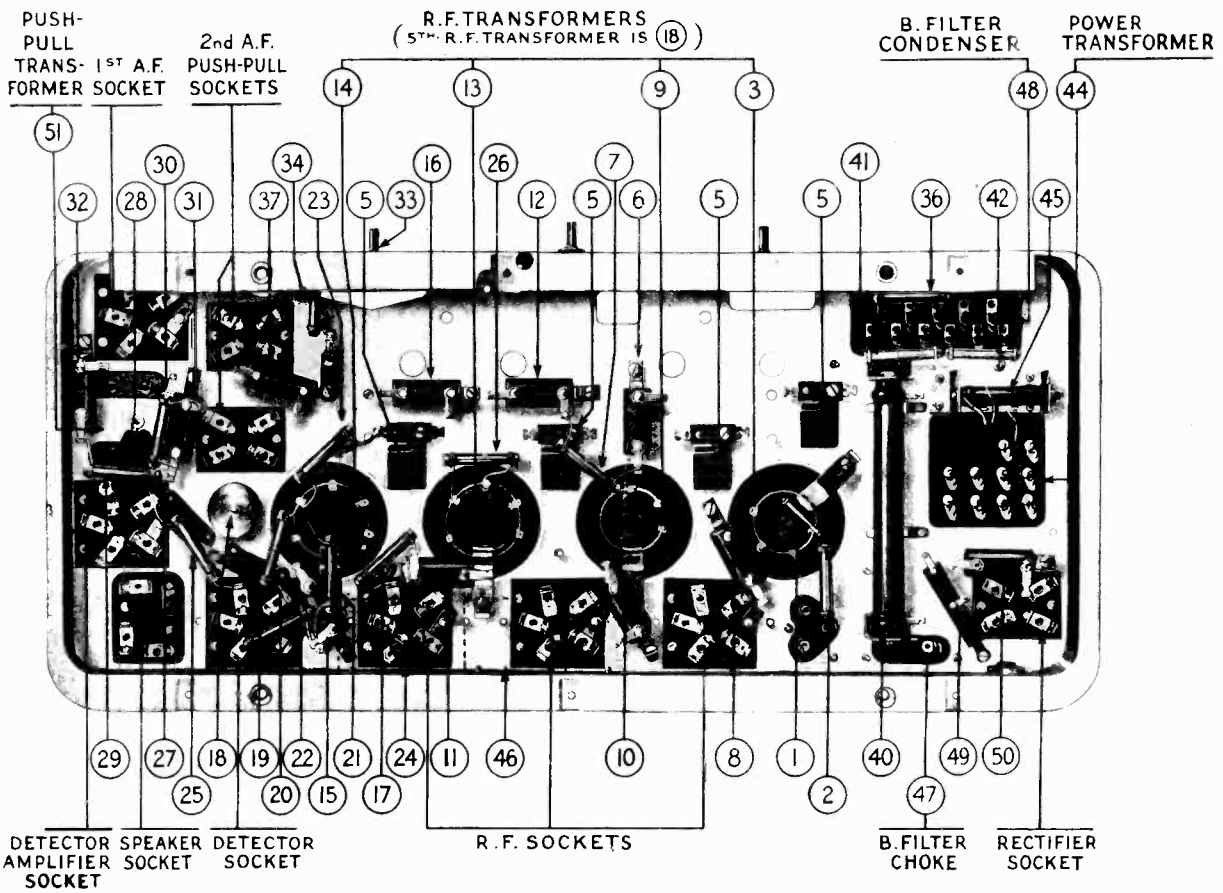
No. on Figs. 1 and 2	Description	Part No.
㉝	Resistor (25,000 Ohms)	4409
㉞	Resistor (25,000 Ohms)	4409
㉟	Condenser (.01 Mfd.)	3903-X
㊱	Resistor (1,000,000 Ohms)	4409
㊲	Tone Control	03137
㊳	Resistor (51,000 Ohms)	4518
㊴	Push-Pull Input Transformer	6064
㊵	Condenser (1,000 Mmf.) *	5215
㊶	Push-Pull Output Transformer	2635
㊷	Voice Coil and Cone Assembly	02874
㊸	Speaker Field Assembled with Pot	02892
㊹	Pilot Light	3463
㊺	Condenser (.015 Mfd. Double)	3793-E
㊻	On-Off Switch	4095
㊼	Power Transformer (50–60 cycles)	6072
	Power Transformer (25–40 cycles)	6073
	Power Transformer (50–60 cycles, 230 volts)	6074
㊽	Electrolytic Condenser (6 Mfd.) 50–60 cycles	4916
㊾	Filter Choke	4819
㊿	Condenser (.15 Mfd.)	6287-B
(51)	Condenser (6 Mfd.)	4916
(52)	B. C. Resistor	6071
	Tube Shield	04311
	Knob (Large)	03063
	Knob (Small)	03064
	Knob (Switch)	03437
	Knob Spring (Large)	5262
	Knob Spring (Small)	4147
	Grid Clip	4897
	Two-Prong Socket Assembly	4956
	Four-Prong Socket Assembly	5026
	Dial Complete	03031
	Bezel	5311
	Chassis Mounting Screw (2 Used)	W-664
	Chassis Mounting Screw (2 Used)	W-567
	Mounting Washer	5058
	Rubber Washer	5189

* This item omitted on later production.

Philco Model 95



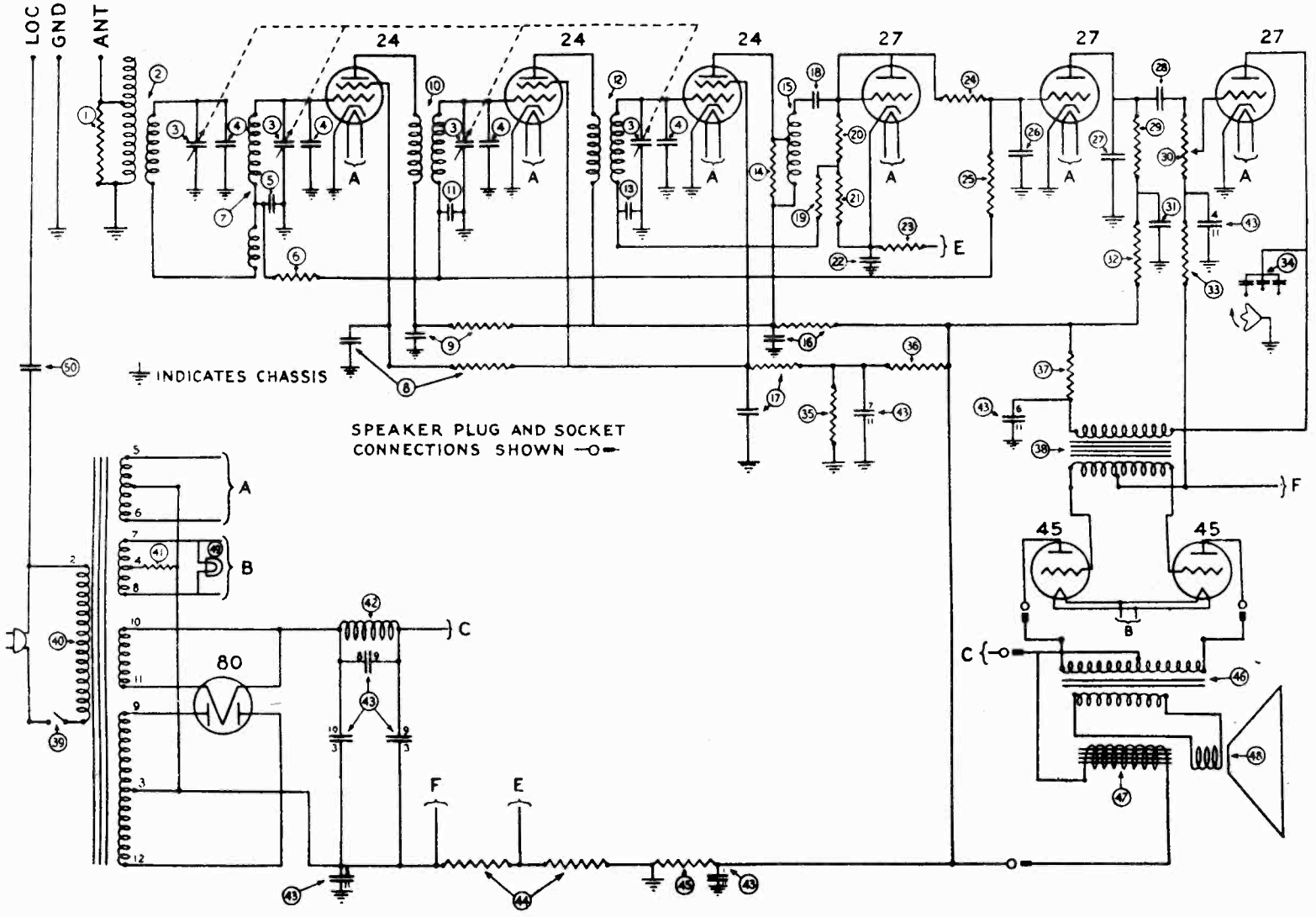
Philco Model 95

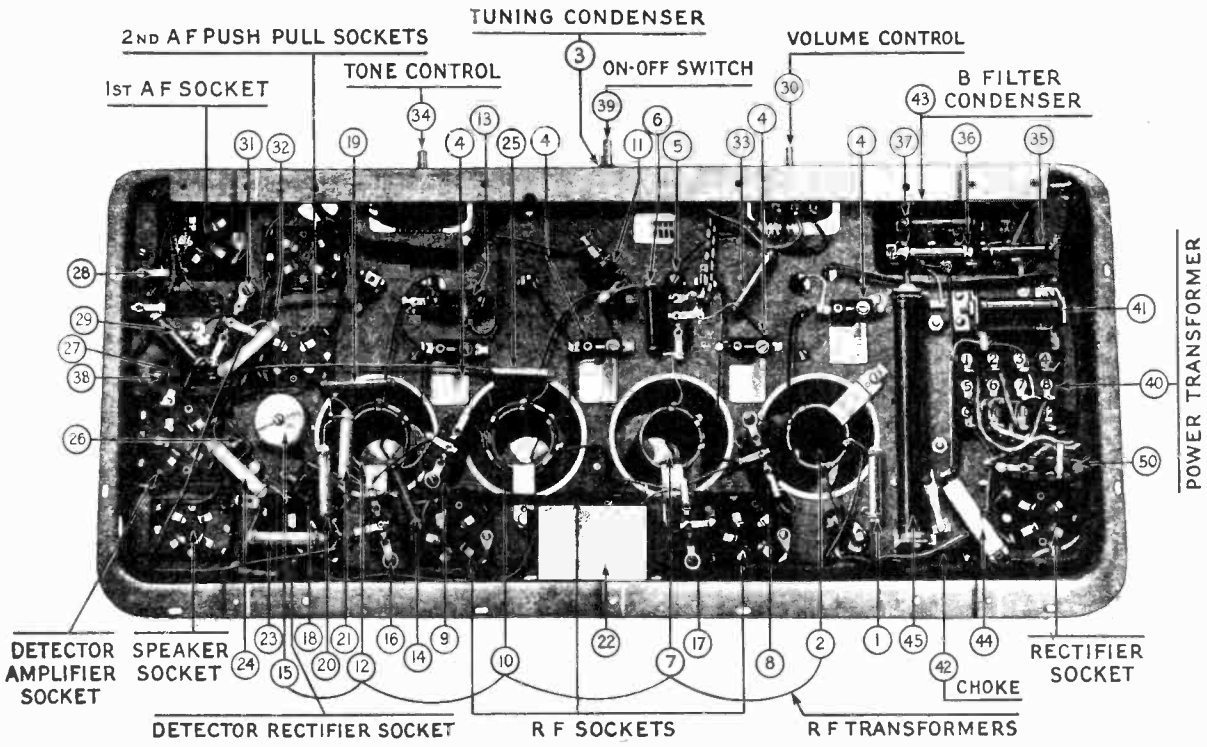


Replacement Parts for Model 95

Number From Diagram		Factory Part No.
①	Resistor	3777
②	Resistor	3526
③	1st R. F. Transformer	3744-A
④	Tuning Condenser	3376-D
⑤	Compensating Condenser	3772-A
⑥	Condenser	3788-A
⑦	Resistor	3542
⑧	Condenser	3584-C
⑨	2d R. F. Transformer	3744-B
⑩	Condenser and Resistor	3787-A
⑪	Condenser and Resistor	3787-A
⑫	Condenser	3788-A
⑬	3d R. F. Transformer	3744-C
⑭	4th R. F. Transformer	3744-C
⑮	Condenser	3584-B
⑯	Condenser	3788-A
⑰	Resistor	3766
⑱	5th R. F. Transformer	3775-B
⑲	Condenser	3774
⑳	Resistor	3767
㉑	Resistor	3767
㉒	Resistor	3767
㉓	Resistor	3769
㉔	Condenser	3583
㉕	Resistor	3768
㉖	Resistor	3769
㉗	Condenser	3082
㉘	Condenser	3082
㉙	Resistor	3769
㉚	Resistor	3768
㉛	Condenser	3584-B
㉜	Condenser	3788-A
㉝	Resistor (Volume Control)	3790
㉞	Resistor	3542
㉟	Push-Pull Output Transformer	2848
㊱	Resistor	3656
㊲	Condenser	3788-A
㊳	Speaker Cone and Voice Coil	2814-B
㊴	Field Coil	2850
㊵	Resistor	3762
㊶	Resistor	3766
㊷	Resistor	3542
㊸	On-Off Switch	3517
㊹	Power Transformer	3752
㊺	Resistor	3763
㊻	Condenser (Filament By-Pass)	3557
㊼	Choke	3422
㊽	B Filter Condenser	3754
㊾	Resistor	3764
㊿	Condenser for "Loc" Terminal	3788-A
(51)	Push-Pull Input Transformer	3537
	Local-Distance Switch	3773
	Pilot Lamp	3463
	Oscillator Kit	3540
	Cabinet Touch-up Kit	3809

Philco Model 96





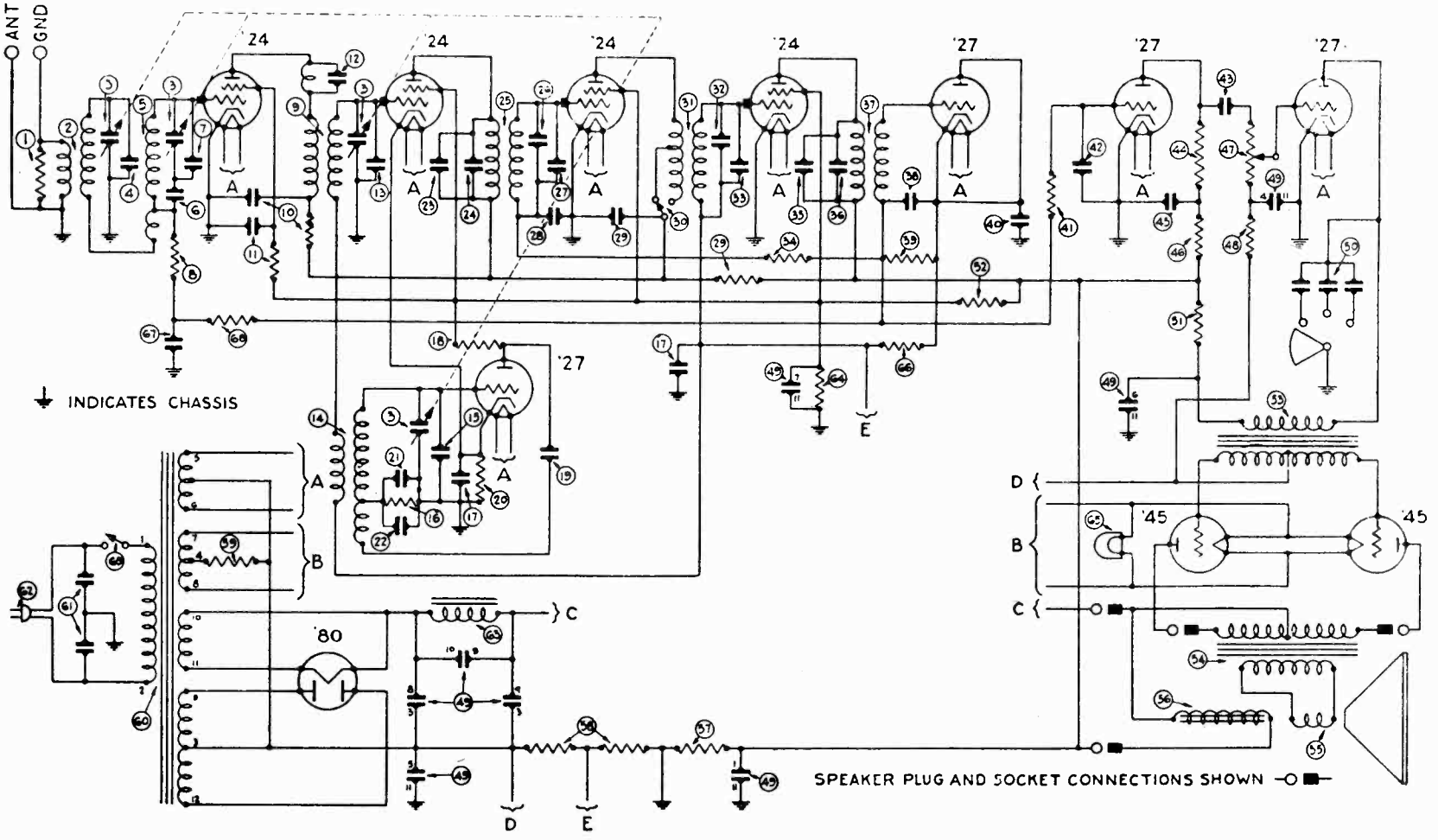
Replacement Parts for Model 96

No.	Description	Part No.
(1)	Antenna Resistor	3526
(2)	First R. F. Transformer	3744-A
(3)	Tuning Condenser	4000-D
(4)	Compensating Condenser	3772-A
(5)	By-Pass Condenser	3615-F
(6)	Resistor	3542
(7)	Second R. F. Transformer	3744-B
(8)	By-Pass Condenser and Resistor	3615-C
(9)	By-Pass Condenser and Resistor	3615-B
(10)	Third R. F. Transformer	3744-C
(11)	By-Pass Condenser	3615-E
(12)	Fourth R. F. Transformer	3744-C
(13)	By-Pass Condenser	3615-E
(14)	Resistor	3766
(15)	Fifth R. F. Transformer	3775-B
(16)	By-Pass Condenser and Resistor	3615-B
(17)	By-Pass Condenser and Resistor	3615-C
(18)	Condenser	3774
(19)	Resistor	3769
(20)	Resistor	3767
(21)	Resistor	3767
(22)	By-Pass Condenser	3583
(23)	Resistor	3767
(24)	Resistor	3768
(25)	Resistor	3769
(26)	By-Pass Condenser	3082
(27)	By-Pass Condenser	3082
(28)	Condenser	3793-C
(29)	Resistor	3769

No.	Description	Part No.
(30)	Volume Control	4093
(31)	By-Pass Condenser	3615-D
(32)	Resistor	3768
(33)	Resistor	3542
(34)	Tone Control	4037-A
(35)	Resistor	3542
(36)	Resistor	3766
(37)	Resistor	3656
(38)	Input Transformer	3537
(39)	On-Off Switch	4095
(40)	Power Transformer (60 Cycle)	3752
(40)	Power Transformer (25 Cycle)	3753
(41)	C Resistor	3763
(42)	Choke	3422
(43)	Filter Condenser (60 Cycle)	3754
(43)	Filter Condenser (25 Cycle)	3755
(44)	Resistor	3764
(45)	B Resistor	3762
(46)	Out-Put Transformer	2848
(47)	Field Coil	2850
(48)	Voice Coil and Cone	2794-B
(49)	Pilot Lamp	3463
(50)	Condenser (LOC)	3793-B
	Knob (Vol. Control)	3579
	Knob (Tuning Condenser)	3580
	Dial Indicator	4006
	Scale	4118
	Speaker Plug and Cable (Short)	L-1101-A
	Speaker Plug and Cable (Long)	L-1102-A

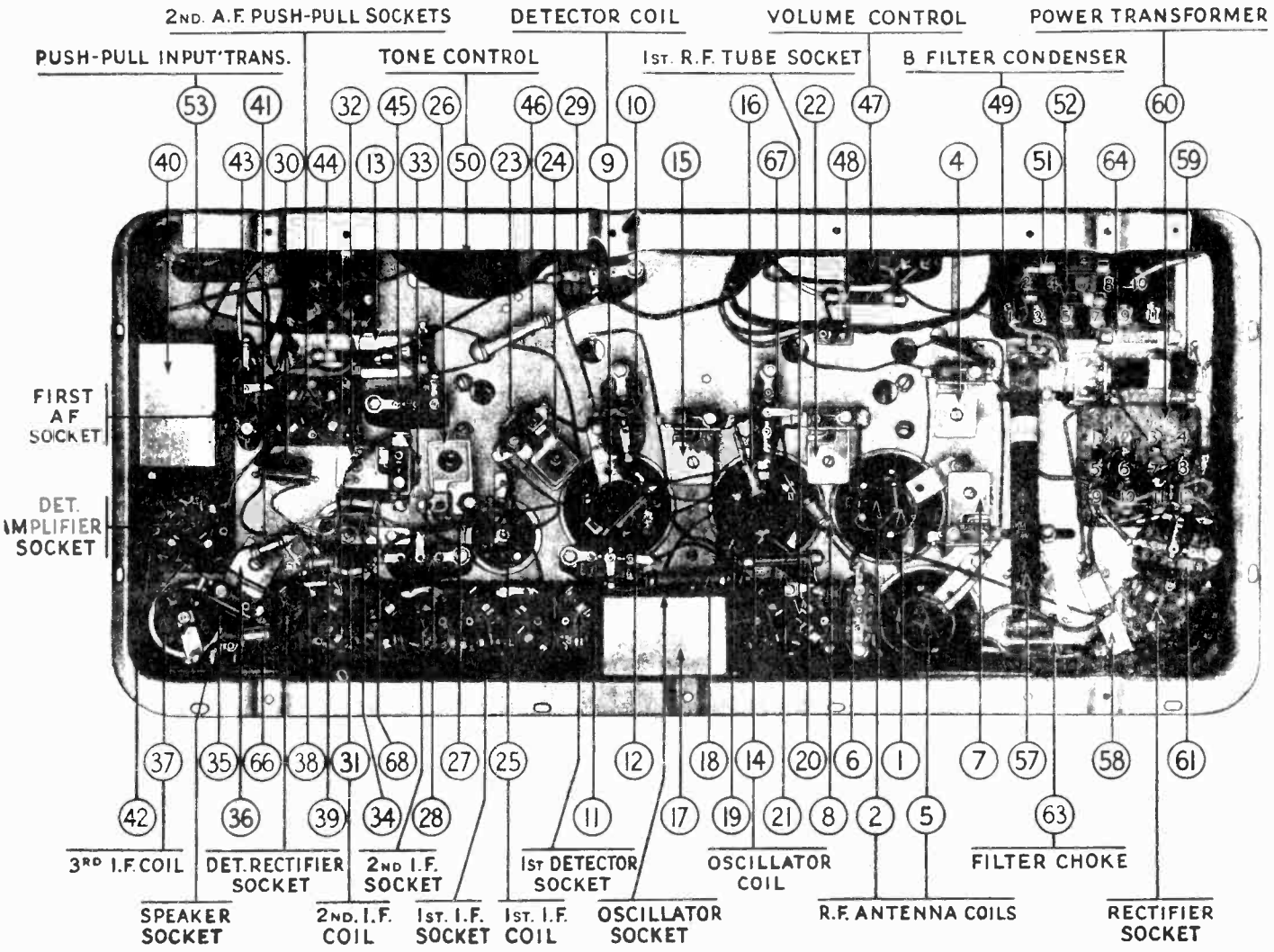
NOTE: The first two Compensating Condensers (4) are 3772-A; the third and fourth Condensers are 3968-A.

MODELS 111 AND 111-A



NOTE: The connection shown between Condenser No. ⑦ and Condenser No. ⑥ should also be connected to ground.

Models 111 and 111-A



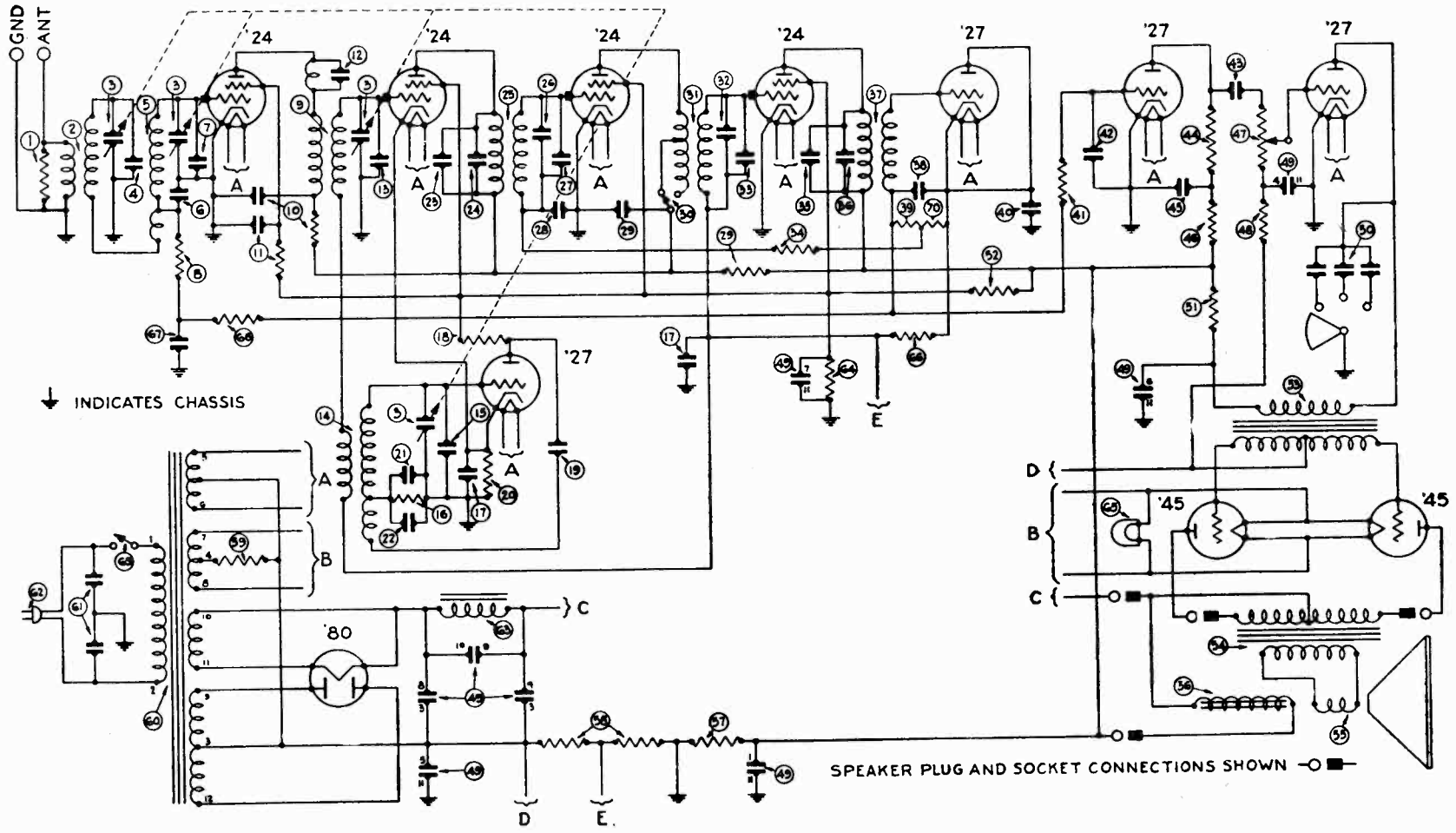
REPLACEMENT PARTS

No. on Figs. 3 and 4	Description	Part No.
1	Resistor—10,000 Ohms	4412
2	1st R. F. Coil	3884-J
3	Tuning Condenser	4000-D
4	Compensating Condenser	3772-A
5	2nd R. F. Coil	3884-T
6	Condenser—.05	3615-L
7	Compensating Condenser	3968-A
8	Resistor—100,000 Ohms	4411
9	1st Detector Coil	3884-V
10	Condenser—.05 and 250 Ohms	3615-C
11	Condenser—.05 and 250 Ohms	3615-C
12	Coupling Condenser	3892-A
13	Compensating Condenser	3968-A
14	Oscillator Coil	3884-U
15	Compensating Condenser	3968-A
16	Resistor—50,000 Ohms	4518
17	Condenser—.25 double	3557
18	Resistor—13,000 Ohms	3766
19	Condenser—.00011	4519
20	Resistor—1,000 Ohms	4590
21	Condenser—.0007	4520
22	Compensating Condenser	3772-B
23	Condenser—.00011	4519
24	Compensating Condenser	3772-C
25	1st I. F. Coil	4501-B
26	Compensating Condenser	3772-C
27	Condenser—.0001	4519
28	Condenser—.05	3615-J
29	Condenser—.05 and 250 Ohms	3615-B
30	Range Switch	3116
31	2nd I. F. Coil	4501-C
32	Compensating Condenser	3772-C
33	Condenser—.00011	4519
34	Resistor—500,000 Ohms	4517
35	Condenser—.00005	4587
36	Compensating Condenser	3772-D
37	3rd I. F. Coil	4501-D
38	Condenser—.00011	4519
39	Resistor—100,000 Ohms	4411

No. on Figs. 3 and 4	Description	Part No.
40	Condenser—.5	3583
41	Resistor—100,000 Ohms	4411
42	Condenser—.00025	3082
43	Condenser—.015	3793-B
44	Resistor—500,000 Ohms	3769
45	Condenser—.05	3615-S
46	Resistor—250,000 Ohms	3768
47	Volume Control	4093
48	Resistor—70,000 Ohms	3542
49	B Filter Condenser Block—60 cycles	3754
	B Filter Condenser Block—25 cycles	3755
50	Tone Control	4037-A
51	Resistor—25,000 Ohms	3656
52	Resistor—25,000 Ohms	3656
53	Push-pull Input Transformer	3537
54	Push-pull Output Transformer	2848
55	Voice Coil and Cone Assembly	2794-B
56	Field Coil	2850
57	B Resistor—10,000 Ohms	4532
58	C Resistor	3761
59	C Resistor—800 Ohms	3763
60	Power Transformer—60 cycles	4446
	Power Transformer—25 cycles	4447
61	Condenser—.015 double	3793-E
62	A C Cord and Plug	L-943-A
63	Filter Choke	3422
64	Resistor—70,000 Ohms	3542
65	Pilot Lamp	3463
66	Resistor—100,000 Ohms	4411
67	Condenser—.05	3615-D
68	Resistor—100,000 Ohms	4411
69	On-Off Switch	4095
	Insulator for Part Nos. 3557-3583	4105
	Pilot Bracket Assembly	4027-A
	Bolt for Pilot Bracket Assembly	W-439
	Tone Control Nut	W-434
	By-pass Condenser Mounting Bolt	W-443
	Bottom Shield Bolt	W-453
	Chassis Mounting Bolt	W-468

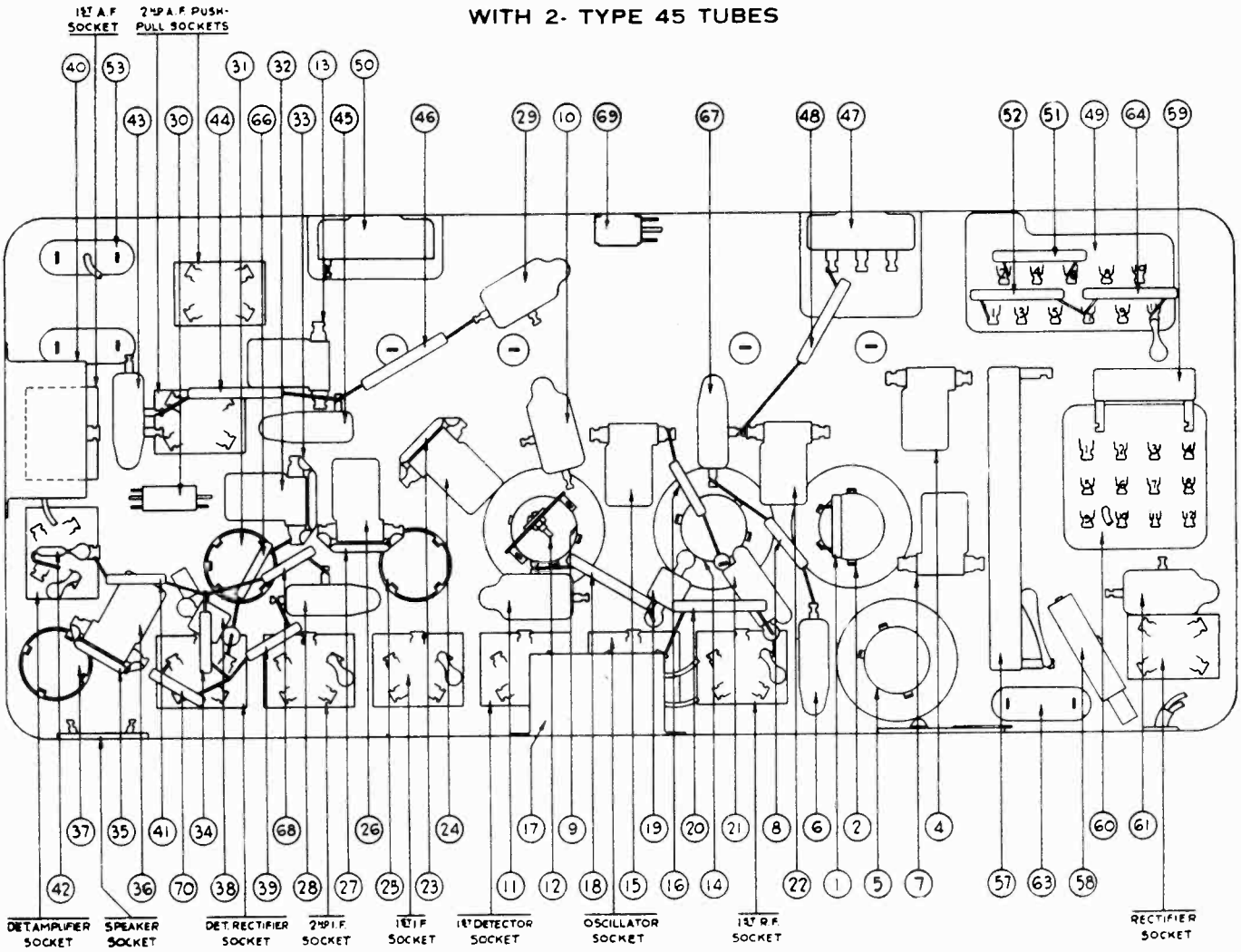
MODELS 112 AND 112-A

WITH 2- TYPE 45 TUBES



MODELS 112 AND 112-A

WITH 2- TYPE 45 TUBES



REPLACEMENT PARTS

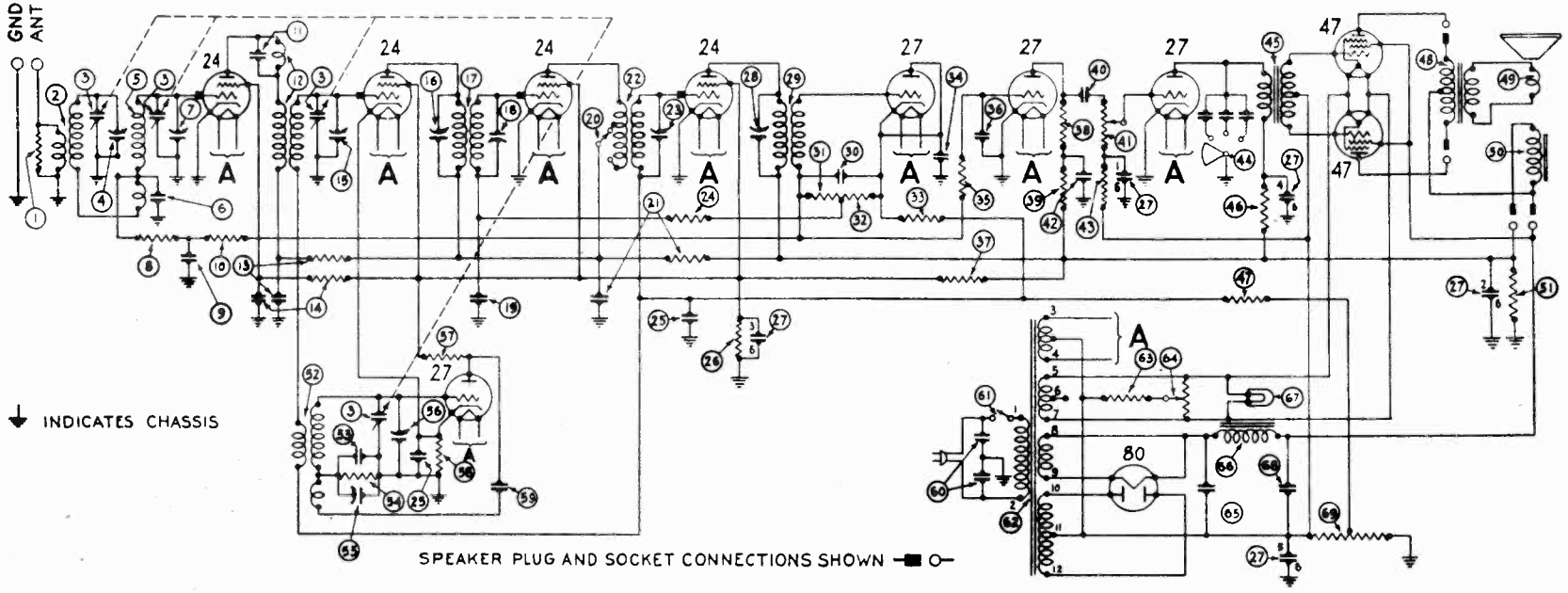
No. on Figs. 3 and 4	Description	Part No.
1	Resistor—10,000 Ohms	4412
2	1st R. F. Coil	3884-J
3	Tuning Condenser	4000-D
4	Compensating Condenser	3772-A
5	2nd R. F. Coil	3884-T
6	Condenser—.05	3615-L
7	Compensating Condenser	3968-A
8	Resistor—100,000 Ohms	4411
9	1st Detector Coil	3884-V
10	Condenser—.05 and 250 Ohms	3615-C
11	Condenser—.05 and 250 Ohms	3615-C
12	Coupling Condenser	3892-A
13	Compensating Condenser	3968-A
14	Oscillator Coil	3884-U
15	Compensating Condenser	3968-A
16	Resistor—50,000 Ohms	4518
17	Condenser—.25 double	3557
18	Resistor—13,000 Ohms	3766
19	Condenser—.00011	4519
20	Resistor—1,000 Ohms	4590
21	Condenser—.0007	4520
22	Compensating Condenser	3772-B
23	Condenser—.00011	4519
24	Compensating Condenser	3772-C
25	1st I. F. Coil	4501-B
26	Compensating Condenser	3772-C
27	Condenser—.0001	4519
28	Condenser—.05	3615-J
29	Condenser—.05 and 250 Ohms	3615-B
30	Range Switch	3116
31	2nd I. F. Coil	4501-C
32	Compensating Condenser	3772-C
33	Condenser—.00011	4519
34	Resistor—500,000 Ohms	4517
35	Condenser—.00005	4587
36	Compensating Condenser	3772-D
37	3rd I. F. Coil	4501-D
38	Condenser—.00011	4519
39	Resistor—50,000 Ohms	4518

No. on Figs. 3 and 4	Description	Part No.
40	Condenser—.5	3583
41	Resistor—100,000 Ohms	4411
42	Condenser—.00025	3082
43	Condenser—.015	3793-B
44	Resistor—500,000 Ohms	3769
45	Condenser—.05	3615-S
46	Resistor—250,000 Ohms	3768
47	Volume Control	4093
48	Resistor—70,000 Ohms	3542
49	B Filter Condenser Block—60 cycles	3754
	B Filter Condenser Block—25 cycles	3755
50	Tone Control	4037-A
51	Resistor—25,000 Ohms	3656
52	Resistor—25,000 Ohms	3656
53	Push-pull Input Transformer	3537
54	Push-pull Output Transformer	2848
55	Voice Coil and Cone Assembly	2794-B
56	Field Coil	2850
57	B Resistor—10,000 Ohms	4532
58	C Resistor	3764
59	C Resistor—800 Ohms	3763
60	Power Transformer—60 cycles	4446
	Power Transformer—25 cycles	4447
61	Condenser—.015 double	3793-E
62	A C Cord and Plug	L-943-A
63	Filter Choke	3422
64	Resistor—70,000 Ohms	3542
65	Pilot Lamp	3463
66	Resistor—100,000 Ohms	4411
67	Condenser—.05	3615-D
68	Resistor—100,000 Ohms	4411
69	On-Off Switch	4095
70	Resistor 50,000 Ohms	4518
	Insulator for Part Nos. 3557-3583	4105
	Pilot Bracket Assembly	4027-A
	Bolt for Pilot Bracket Assembly	W-439
	Tone Control Nut	W-434
	By-pass Condenser Mounting Bolt	W-443
	Bottom Shield Bolt	W-453
	Chassis Mounting Bolt	W-468

MODELS 112 AND 112-A

(Above Serial No. 174,001)

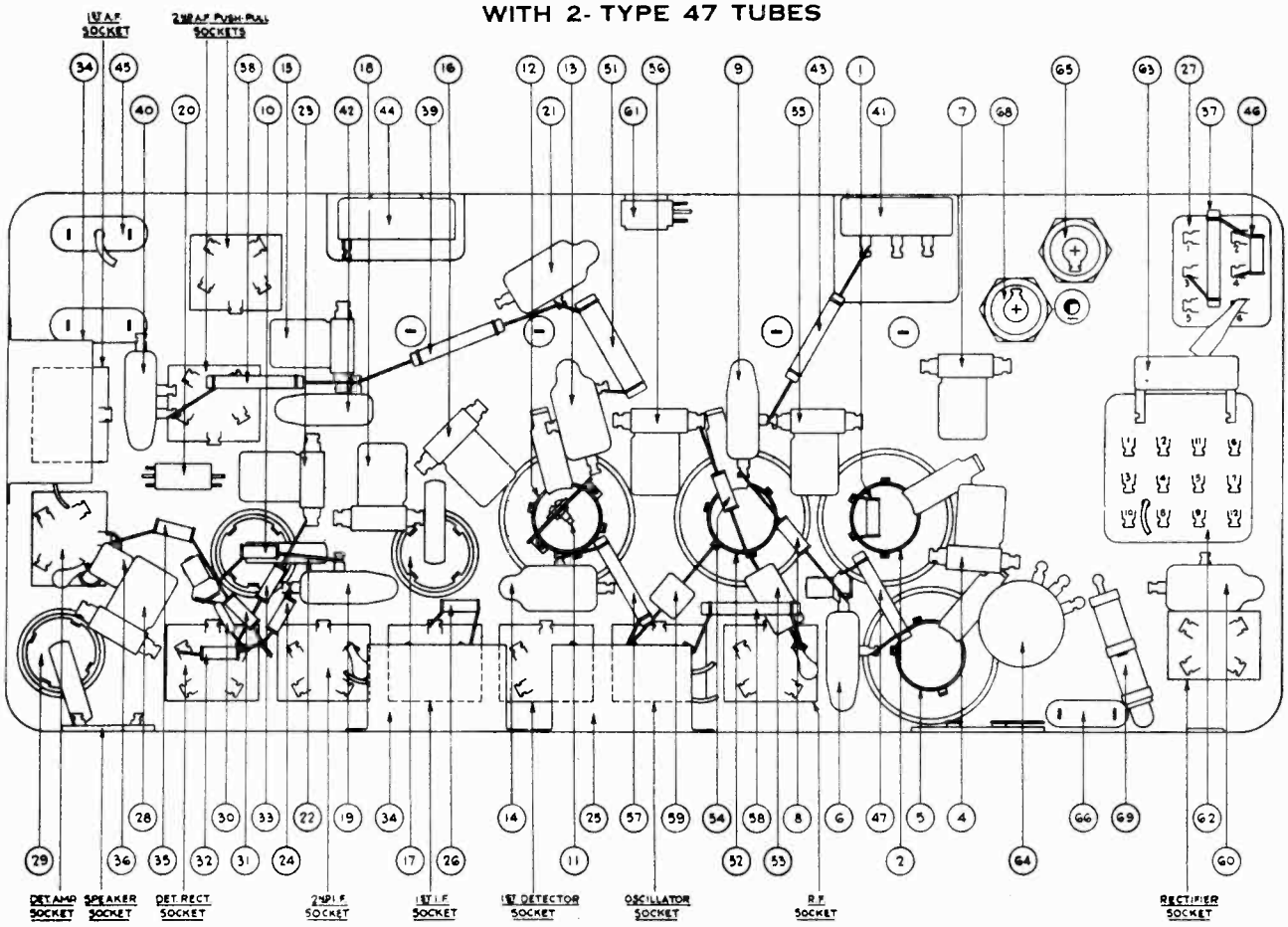
WITH 2- TYPE 47 TUBES



MODELS 112 AND 112-A

(Above Serial No. 174,001)

WITH 2- TYPE 47 TUBES



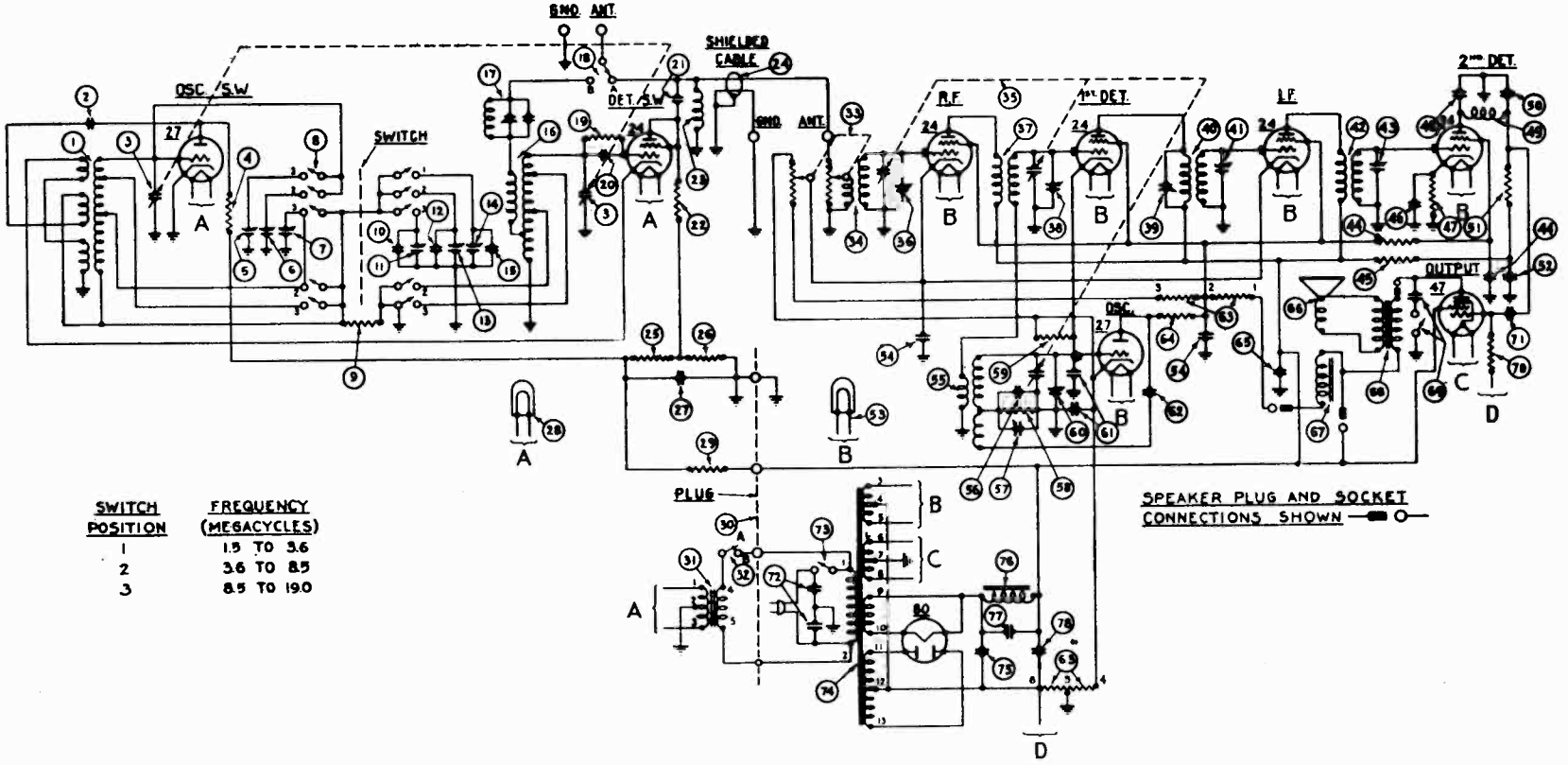
REPLACEMENT PARTS—MODELS 112, 112-A

(Above Serial No. 174,001)

No. on Figs. 3 and 4	Description	Part No.
1	Resistor (10,000 ohms)	4412
2	First R. F. Coil	3884-S
3	Tuning Condenser	4000-D
4	Compensating Condenser	04000-E
5	Second R. F. Coil	3884-T
6	By-pass Condenser (.05 mfd.)	3615-J
7	Compensating Condenser	04000-D
8	Resistor (99,000 ohms)	4411
9	By-pass Condenser (.05 mfd.)	3615-D
10	Resistor (99,000 ohms)	4411
11	Condenser	3892-A
12	First Detector Coil	3884-V
13	By-pass Condenser & Resistor (.05 mfd. and 250 ohms)	3615-Z
14	By-pass Condenser & Resistor (.05 mfd. and 250 ohms)	3615-B
15	Compensating Condenser	04000-E
16	Compensating Condenser	04000-J
17	First I. F. Transformer	03038
18	Compensating Condenser	04000-J
19	By-pass Condenser (.05 mfd.)	3615-J
20	Range Switch	3116
21	By-pass Condenser & Resistor (.05 mfd. and 250 ohms)	3615-B
22	Second I. F. Transformer	03039
23	Compensating Condenser	04000-J
24	Resistor (490,000 ohms)	4517
25	By-pass Condenser (¼ mfd.)	3557
26	Resistor (70,000 ohms)	5385
27	Filter Condenser Block (50-60 cycles)	03489
	Filter Condenser Block (25-40 cycles)	03589
28	Compensating Condenser	04000-L
29	Third I. F. Transformer	03040
30	Condenser (110 mmf.)	4519
31	Resistor (51,000 ohms)	4518
32	Resistor (51,000 ohms)	4518
33	Resistor (99,000 ohms)	4411
34	By-pass Condenser (.5 mfd.) 2 used	3583
35	Resistor (99,000 ohms)	4411
36	Condenser (250 mmf.)	3082
37	Resistor (25,000 ohms)	3656
38	Resistor (99,000 ohms)	3769
39	Resistor (490,000 ohms)	3768
40	Condenser (.015 mfd.)	3793-F

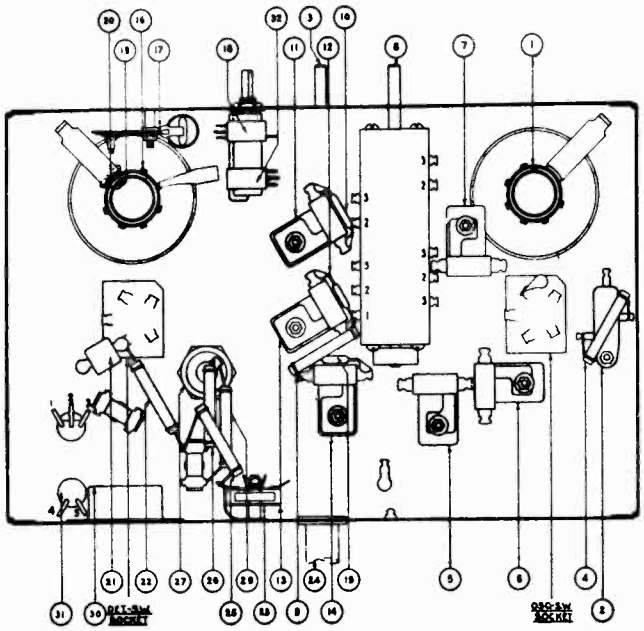
No. on Figs. 3 and 4	Description	Part No.
41	Volume Control	4093
42	By-pass Condenser (.05 mfd.)	3615-S
43	Resistor (70,000 ohms)	3542
44	Tone Control	03137
45	Push-pull Input Transformer	5662
46	Resistor (25,000 ohms)	4516
47	Resistor (13,000 ohms)	3766
48	Push-pull Output Transformer	2635
49	Voice Coil and Cone Assembly	02997
50	Speaker Field (assembled with pot and frame)	02892
51	Resistor (15,000 ohms)	5718
52	Oscillator Coil	3884-U
53	Condenser (700 mmf.)	4520
54	Resistor (50,000 ohms)	4518
55	Compensating Condenser	04000-F
56	Compensating Condenser	04000-E
57	Resistor (13,000 ohms)	3766
58	Resistor (1,000 ohms)	4590
59	Condenser (110 mmf.)	4519
60	By-pass Condenser (.015 mfd. double)	3793-E
61	On-Off Switch'	4095
62	Power Transformer (115 volts 50-60 cycles)	5594
	Power Transformer (115 volts 25-40 cycles)	5595
	Power Transformer (230 volts 50-60 cycles)	5596
63	Resistor (205 ohms)	03513
64	Hum Control Potentiometer	5650
65	Electrolytic Condenser (6 mfd.)	4916
66	Filter Choke	5643
67	Pilot Light	3463
68	Electrolytic Condenser (6 mfd.)	4916
69	Resistor (2 sections 70 ohms each)	3764
	Knob (Large)	03063
	Knob (Small)	03064
	Knob (Switch)	03437
	Spring (for Switch Knob)	5262
	Spring (for Dial Knob)	4147
	Tube Shield	03518
	Grid Clip	4897
	Four Prong Socket Assembly	5026
	Five Prong Socket Assembly	4956
	Volume Control Insulator	4286
	Dial Scale	4276
	Bezel	5010
	Pilot Bracket Complete	4027-A

MODELS 470 AND 470-A

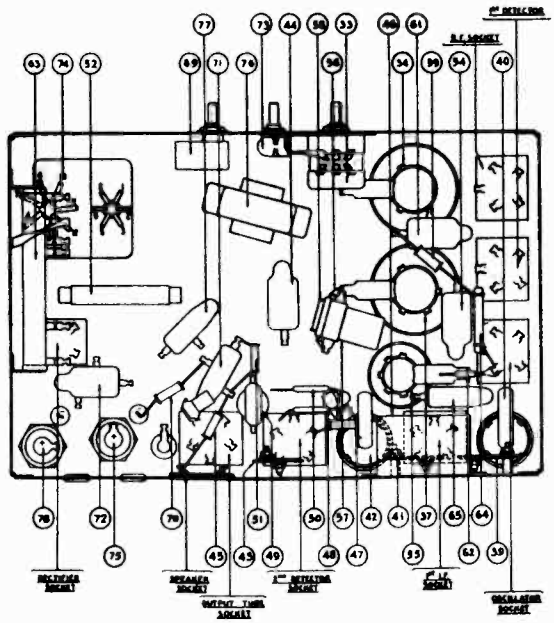


SWITCH POSITION	FREQUENCY (MEGACYCLES)
1	1.5 TO 3.6
2	3.6 TO 8.5
3	8.5 TO 19.0

MODELS 470 AND 470-A



Short Wave Chassis.



Broadcast Chassis.

REPLACEMENT PARTS MODEL 470 AND 470-A

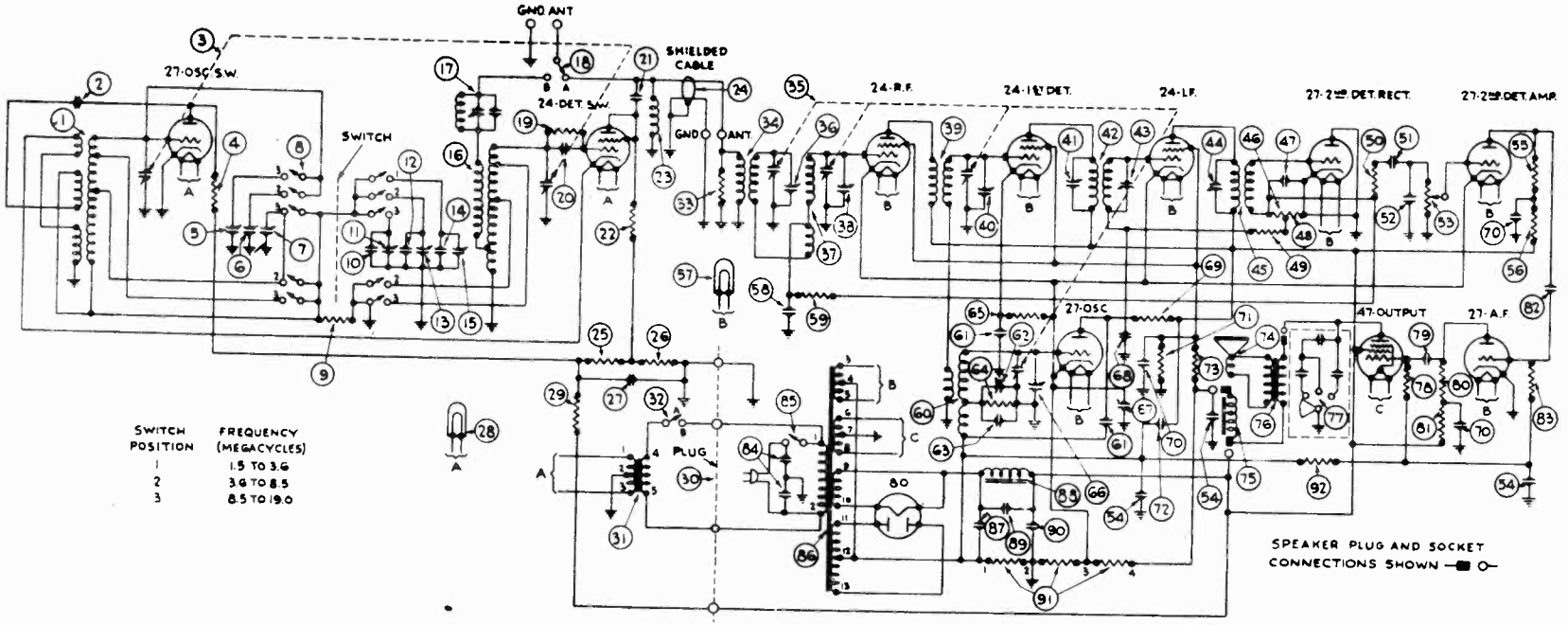
No. on Figs. 1 and 2	Description	Part No.
①	Oscillator Coil*	03734
②	By-pass Condenser (.05 mfd.)	3615-M
③	Gang Condenser Assembly	03692
④	Resistor (13,000 ohms)	3766
⑤	Compensating Condenser (19 MC End of Top Scale)	04000-E
⑥	Compensating Condenser (8.5 MC End of Center Scale)	04000-E
⑦	Compensating Condenser (3.6 MC End of Bottom Scale)	04000-E
⑧	Frequency Control Switch	03751
⑨	Resistor (240,000 ohms)	3768
⑩	Condenser (1,250 mmf.)**	5886
⑪	Compensating Condenser (8.5 MC End of Top Scale**	04000-F
⑫	Condenser (800 mmf.)	5878
⑬	Compensating Condenser (3.6 MC End of Center Scale)	04000-F
⑭	Condenser (250 mmf.)	3082
⑮	Compensating Condenser (1.5 MC End of Bottom Scale)	04000-F
⑯	Detector Transformer*	03734
⑰	Frequency Filter	03662
⑱	Antenna Switch Assembled with ㉒	5796
⑲	Resistor (2 megohms) Assembled with ⑳	03879
⑳	Condenser (110 mmf.) Assembled with ⑲	03879
㉑	Condenser (250 mmf.)	3082
㉒	Resistor (99,000 ohms)	3767
㉓	R. F. Choke	03893
㉔	Shielded Cable	L-1278
㉕	Resistor (32,000 ohms)	3525
㉖	Resistor (32,000 ohms)	3525
㉗	Electrolytic Condenser (6 mfd.)	4916
㉘	Pilot Light (Short Wave Unit)	3463
㉙	Resistor (5,000 ohms)	3526
㉚	Plug	03913
㉛	Filament Transformer (50-60 cycles)	5906
	Filament Transformer (25-40 cycles)	5923
	Filament Transformer (50-60 cycles, 230 volts)	5924
㉜	On-off Switch (Assembled with ㉞)	5796
㉝	Volume Control	5039
㉞	First R. F. Transformer	03082
㉟	Tuning Condenser (50-60 cycles)	03076
	Tuning Condenser (25-40 cycles)	03077
㊱	Compensating Condenser — Antenna — Part of Gang Condenser Assembly	
㊲	First Detector Transformer	03083
㊳	Compensating Condenser — Detector — Part of Gang Condenser Assembly	
㊴	Compensating Condenser — First I. F. Primary	04000-J
㊵	First I. F. Transformer	03091
㊶	Compensating Condenser — First I. F. Secondary	04000-H
㊷	Second I. F. Transformer	03092
㊸	Compensating Condenser—Second I. F.	04000-K
㊹	Resistor (250 ohms Combined with .09 mfd. Condenser)	4989-E

*Includes matched oscillator coil and detector transformer.

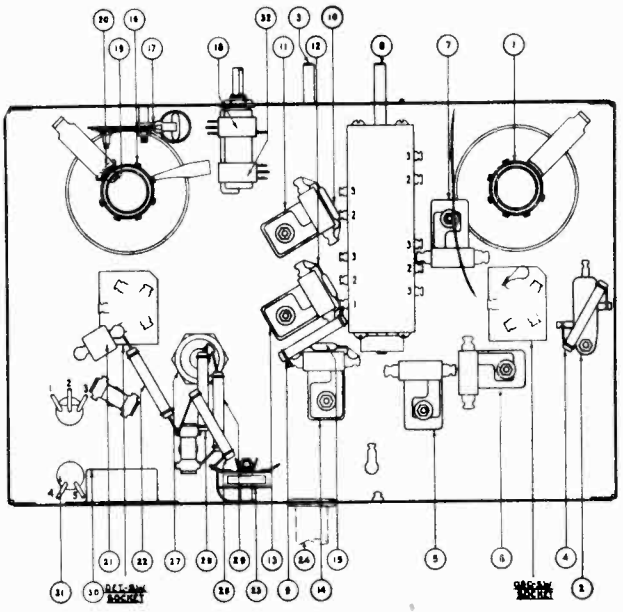
**These parts replaced on later production by .0018 mfd. condenser, part 6018.

No. on Figs. 1 and 2	Description	Part No.
㊺	Resistor (45,000 ohms) 50-60 cycles	5256
	Resistor (99,000 ohms) 25-40 cycles	4411
㊻	Condenser (.5 mfd.)	3583
㊼	Resistor (51,000 ohms)	4518
㊽	Condenser (500 mmf.)	3910
㊾	R. F. Choke	03086
㊿	Condenser (250 mmf.)	3082
(51)	Resistor (240,000 ohms)	4410
(52)	Condenser (.25 mfd.)	4264
(53)	Pilot Light (Broadcast Unit)	3463
(54)	Condenser (.09 mfd. double)	4989-C
(55)	Oscillator Coil	03084
(56)	Condenser (410 mmf.)	5120
(57)	Compensating Condenser—Low Frequency	04000-F
(58)	Resistor (51,000 ohms)	4518
(59)	Resistor (5,000 ohms)	5310
(60)	Compensating Condenser—High Frequency —Part of Gang Condenser Assembly	
(61)	Condenser (.09 mfd. double)	4989-C
(62)	Condenser (110 mmf.)	4519
(63)	B. C. Resistor	03079
(64)	Resistor (13,000 ohms)	3766
(65)	Condenser (.05 mfd.)	3615-L
(66)	Voice Coil and Cone Assembly	02996
(67)	Field Coil Assembled with Pot	02966
(68)	Output Transformer	2673
(69)	Tone Control	03140
(70)	Resistor (240,000 ohms)	4410
(71)	Condenser (.01 mfd.)	3903-L
(72)	Condenser (.015 mfd. double)	3793-K
(73)	"On-off" Switch	4095
(74)	Power Transformer (50-60 cycles)	5117
	Power Transformer (25-40 cycles)	5118
	Power Transformer (50-60, 230 volts)	5119
(75)	Electrolytic Condenser (6 mfd.) 50-60 cycles	4916
	Electrolytic Condenser (10 mfd.) 25-40 cycles	5142
(76)	Choke	4819
(77)	Condenser (.09 mfd.) 50-60 cycles	4989-J
	Condenser (.18 mfd.) 25-40 cycles	4989-K
(78)	Electrolytic Condenser (6 mfd.) 50-60 cycles	4916
	Electrolytic Condenser (10 mfd.) 25-40 cycles	5142
	Line Cord and Plug	L-943
	Tube Shield	03987
	Bezel (Broadcast)	5008
	Bezel (Short Wave)	5178
	Knob (Large)	03063
	Knob (Small)	03064
	Knob (On-Off Switch—Broadcast)	03437
	Knob (Control Switch—Short Wave)	5811
	Spring (For Small Knobs)	4147
	Spring (For Large Knobs)	5262
	Grid Clip	4897
	Five Prong Socket Assembly	4956
	Four Prong Socket Assembly	4955
	Dial Complete (Broadcast)	03031
	Dial Complete (Short Wave)	03890

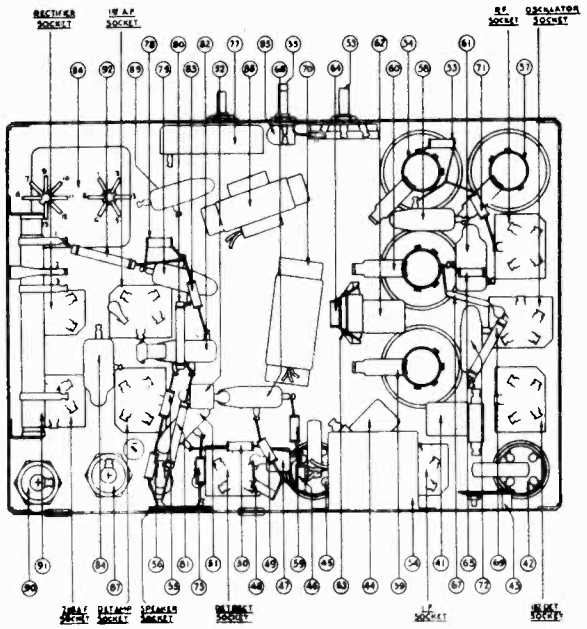
MODEL 490


GND ANT
SHIELDED CABLE
27-OSC'S.W.
24-DET. S.W.
SWITCH
GND
ANT
24-R.F.
24-1ST DET.
24-I.F.
27-2ND DET. RECT.
27-2ND DET. AMP.
27-OSC
47-OUTPUT
27-A.F.
PLUG
80
SPEAKER PLUG AND SOCKET CONNECTIONS SHOWN
SWITCH POSITION
FREQUENCY (MEGACYCLES)
1 1.5 TO 3.6
2 3.6 TO 8.5
3 8.5 TO 19.0

MODEL 490



Short Wave Chassis.



Broadcast Chassis.

REPLACEMENT PARTS MODEL 490

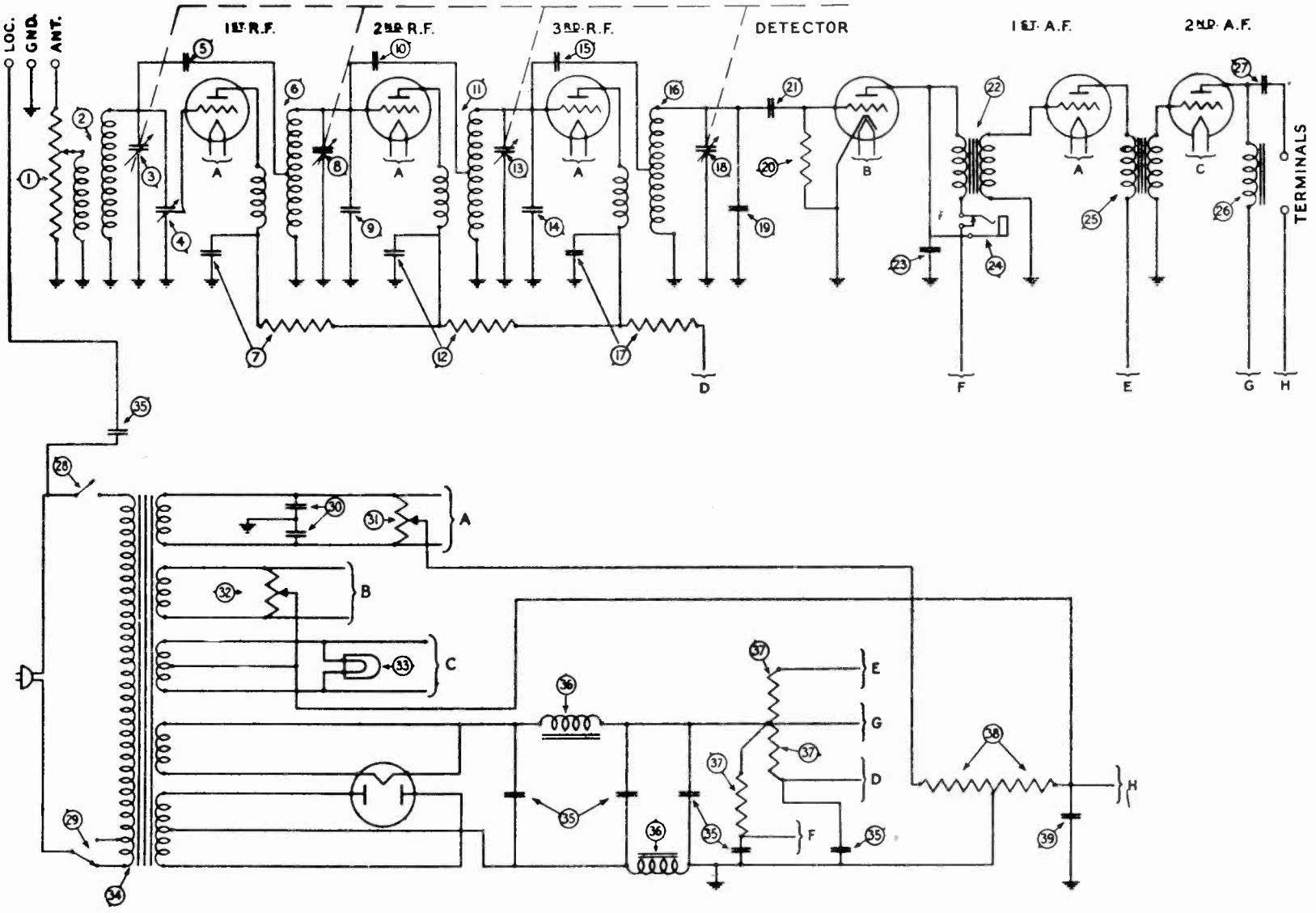
No. on Figs. 1 and 2	Description	Part No.
1	Oscillator Coil*	03734
2	By-pass Condenser (.05 mfd.)	3615-M
3	Gang Condenser Assembly	03692
4	Resistor (13,000 ohms)	3766
5	Compensating Condenser (19 MC end of Top Scale)	04000-E
6	Compensating Condenser (8.5 MC End of Center Scale)	04000-E
7	Compensating Condenser (3.6 MC End of Bottom Scale)	04000-E
8	Frequency Control Switch	03751
9	Resistor (240,000 ohms)	3768
10	Condenser (1,250 mmf.)**	5886
11	Compensating Condenser (8.5 MC End of Top Scale)**	04000-F
12	Condenser (800 mmf.)	5878
13	Compensating Condenser (3.6 MC End of Center Scale)	04000-F
14	Condenser (250 mmf.)	3082
15	Compensating Condenser (1.5 MC End of Bottom Scale)	04000-F
16	Detector Transformer*	03734
17	Frequency Filter	03662
18	Antenna Switch Assembled with 22	5796
19	Resistor (2 megohms) Assembled with 20	03879
20	Condenser (110 mmf.) Assembled with 19	03879
21	Condenser (250 mmf.)	3082
23	Resistor (99,000 ohms)	3767
24	R. F. Choke	03893
25	Shielded Cable	L-1278
26	Resistor (32,000 ohms)	3525
26	Resistor (32,000 ohms)	3525
27	Electrolytic Condenser (6 mfd.)	4916
28	Pilot Light (Short Wave Unit)	3463
29	Resistor (5,000 ohms)	3526
30	Plug	03913
31	Filament Transformer (50-60 cycles)	5906
	Filament Transformer (25-40 cycles)	5923
	Filament Transformer (50-60 cycles, 230 volts)	5924
22	On-off Switch (Assembled with 18)	5796
33	Resistor (10,000 ohms)	4412
34	First R. F. Transformer	03360
35	Gang Condenser Assembly (50-60 cycles)	03001
	Gang Condenser Assembly (25-40 cycles)	03078
36	Compensating Condenser—First R. F.—Part of Gang Condenser Assembly	
37	Second R. F. Transformer	03014
38	Compensating Condenser—Second R. F.—Part of Gang Condenser Assembly	
39	First Detector Transformer	03015
40	Compensating Condenser—First Detector—Part of Gang Condenser Assembly	
41	Compensating Condenser—First I. F. Primary	04000-J
42	First I. F. Transformer	03009
43	Compensating Condenser—First I. F. Secondary	04000-J
44	Compensating Condenser—Second I. F. Primary	04000-L
45	Second I. F. Transformer	03345
46	Resistor (51,000 ohms)	4518
47	Condenser (110 mmf.)	4519
48	Resistor (51,000 ohms)	4518
49	Resistor (490,000 ohms)	4517
50	Resistor (99,000 ohms)	4411
51	Condenser (.01 mfd.)	3903-R
52	Condenser (250 mmf.)	3082
53	Volume Control	5366
54	By-pass Condenser (3—.25 mfd.)	03325

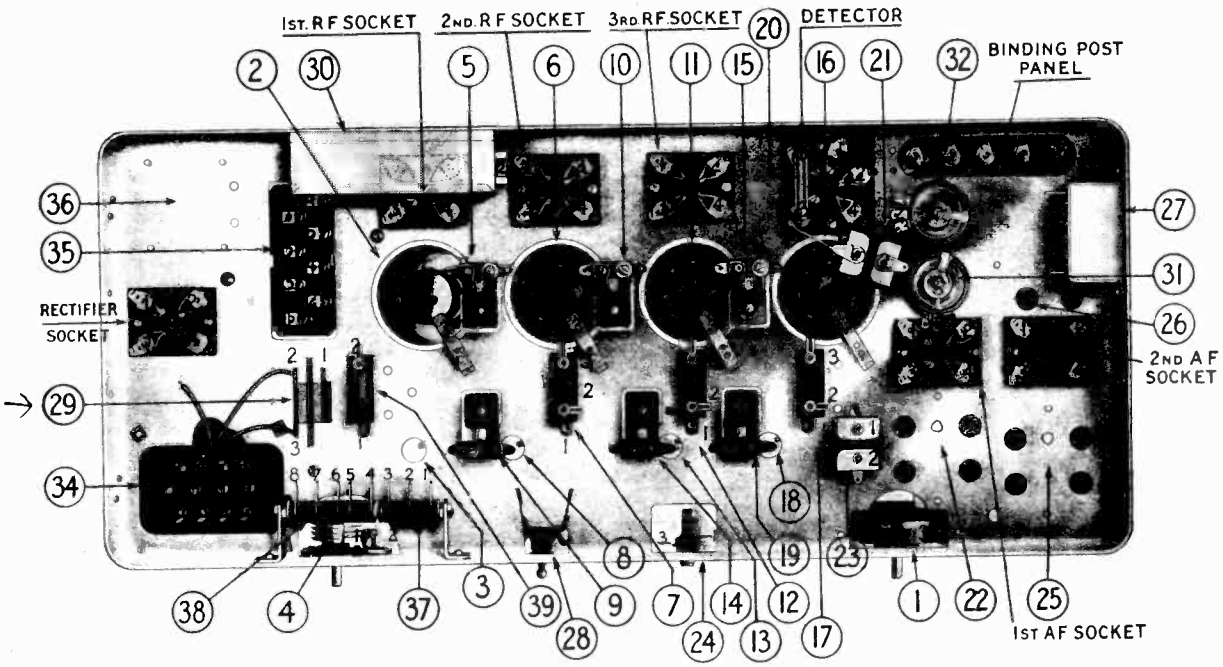
*Includes matched oscillator coil and detector transformer.

**These parts replaced on later production by .0018 mfd. condenser, part 4018.

No. on Figs. 1 and 2	Description	Part No.
55	Resistor (51,000 ohms)	4518
56	Resistor (70,000 ohms)	5385
57	Pilot Light (Broadcast Unit)	3463
58	Condenser (.05 mfd.)	3615-W
59	Resistor (490,000 ohms)	4517
60	Oscillator Coil	03016
61	Condenser (.09 mfd.)	4989-G
62	Compensating Condenser—Low Frequency	04000-B
63	Condenser (700 mmf.)	4520
64	Resistor (51,000 ohms)	4518
65	Resistor (5,000 ohms)	5310
66	Compensating Condenser — High Frequency—Part of Gang Condenser Assembly	
67	Condenser (110 mmf.)	4519
68	Condenser (.05 mfd.)	3615-U
69	Resistor (51,000 ohms)	4237
70	By-pass Condenser (1., .25, .1) 50-60 cycles	03327
	By-pass Condenser (1., .25, .25) 25-40 cycles)	03624
71	Resistor (70,000 ohms)	5385
72	Condenser (.05 mfd.)	3615-E
73	Resistor (25,000 ohms)	4516
74	Voice Coil and Cone Assembly	02996
75	Speaker Field (Assembly with Pot)	02966
76	Output Transformer	2673
77	Tone Control	03137
78	Resistor (240,000 ohms) 50-60 cycles	4410
	Resistor (99,000 ohms) 25-40 cycles	4411
79	Condenser (.01 mfd.)	3903-P
80	Resistor (25,000 ohms)	3656
81	Resistor (25,000 ohms) 50-60 cycles	3656
	Resistor (50,000 ohms) 25-40 cycles	4237
82	Condenser (.01 mfd.)	3903-M
83	Resistor (240,000 ohms)	4410
84	Condenser (.015 mfd. Double)	3793-E
85	On-off Switch	4095
86	Power Transformer (50-60 cycles)	5362
	Power Transformer (25-40 cycles)	5363
	Power Transformer (50-60 cycles, 230 volts	5364
87	Electrolytic Condenser (6 mfd.) 50-60 cycles	4916
	Electrolytic Condenser (10 mfd.) 25-40 cycles	5142
88	Choke	4819
89	By-pass Condenser (.09 mfd.) 50-60 cycles	4989-J
	By-pass Condenser (.18 mfd.) 25-40 cycles	4989-K
90	Electrolytic Condenser (6 mfd.) 50-60 cycles	4916
	Electrolytic Condenser (14 mfd.) 25-40 cycles	5725
91	B. C. Resistor	03457
92	Resistor (240,000 ohms) 50-60 cycles	3768
	Resistor (490,000 ohms) 25-40 cycles	3769
	Line Cord and Plug	L-943
	Tube Shield (Large)	03982
	Tube Shield (27 Type)	5387
	Bezel (Broadcast)	5009
	Bezel (Short Wave)	5175
	Knob (Large)	03063
	Knob (Small)	03064
	Knob (On-Off Switch—Broadcast)	03437
	Knob (Control Switch—Short Wave)	5811
	Spring (For Small Knobs)	4147
	Spring (For Large Knobs)	5262
	Grid Clip	4897
	Five Prong Socket Assembly	4956
	Four Prong Socket Assembly	4955
	Dial Complete (Broadcast)	03031
	Dial Complete (Short Wave)	03890

Philco Model 511





Replacement Parts for Model 511

Number	Name of Part	Factory Part Number (Order by this Number)
①	Volume Control	3076
③	R. F. Transformer (Antenna Tuning)	3075-B
③ – ⑪ – ⑯	R. F. Transformer	3075-A
④	Range Control	3133
	Tuning Condenser (complete with drum and shield)	3001-B
⑤ – ⑩ – ⑮	Neutralising Condenser	3025-A
⑨ – ⑭ – ⑱	Compensating Condenser	3025-B
⑦ – ⑫ – ⑰	By-Pass Condenser .1 mfd. with Plate Resistance Winding	3114-A
㉓	By-Pass Condenser .001 mfd.	3081
㉑	Filament By-Pass Condenser (2 sections .5 mfd.)	3080
㉘	Grid Leak	3083
㉒	Grid Condenser	3082
㉔ – ㉕	A. F. Transformer	3077
㉔	Phonograph Pick-Up Jack	3087
㉖	Output Filter Choke	3078
㉗	Output Filter Condenser .5 mfd.	3079
㉘	Power Switch – Toggle	3117
㉙	Primary Tap Switch	3116
㉑	6-ohm Hum Adjustor	3096
㉒	20-ohm Hum Adjustor	3086
㉖	Pilot Lamp	3105
	Pilot Lamp Socket Assembly	3043-A
	Tube Socket Assembly – 4-hole	3051-A
	Tube Socket Assembly – 5-hole	3157-A
	Tube Socket Insulator 4-hole – red	3124
	Tube Socket Insulator 4-hole – brown	3070
	Tube Socket Insulator 5-hole – brown	3158
㉔	Power Transformer – 50 – 60 cycle	3073
㉔	Power Transformer – 25 – 40 cycle	3106
㉖	Filter Condenser Block – 50 – 60 cycle	3108
㉖	Filter Condenser Block – 25 – 40 cycle	3109
㉖	Filter Choke Coils	Z-224
㉗ – ㉘	B-C 5-section Resistor	3088 (A)
㉗ – ㉘	B-C 4-Section Resistor	3088 (W)
㉗	B Resistor 70,000 ohms	Z-129
㉙	By-Pass Condenser .1 mfd	3114
	Terminal Panel Assembly	3084-A
	Control Knob-Tuning Condenser	3035-A
	Control Knob – Volume and Range Control	3036-A
	A.C. Attachment Cord and Plug	L-943-A
	Wiring Cable	L-946
	Speaker Tone Filter	2946-B
	Fibre Adjusting Wrench	3168

PHILCO CIRCUIT TESTER

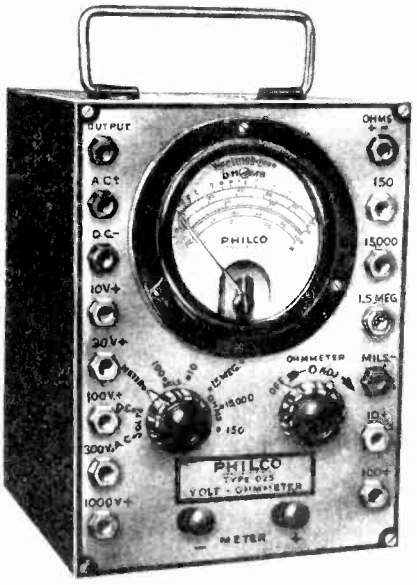
• MODEL 025 •

A.C. VOLTS—D.C. VOLTS—MILLIAMPERES—
AMPERES—OHMS—OUTPUT METER—
CAPACITY METER

The latest addition to PHILCO'S line of testing equipment—an accurate, compact tester for all types of radio sets. Affords simple and quick tests by means of resistance, voltage and current methods.

Modern radio test methods require a unit of this kind for speed, simplicity and accuracy. The many different applications of the meter and the convenient rotary control switch make this instrument unusually valuable to the serviceman, both for outside and shop service work.

Serviceman's Net Price $36.60



Philco Model 025

5 A. C. Voltage Ranges: 0-10 volts; 0-30 volts; 0-100 volts; 0-300 volts; 0-1000 volts. 5 D. C. Voltage Ranges: Same as A. C. Ranges listed above. 5 Output Meter Voltage Ranges: Same as A. C. Ranges listed above. 3 Millammeter Ranges: 0-1 Mil.; 0-10 mils.; 0-100 mils. Special 10 ampere shunt available for automobile radio current tests. 3 Ohmmeter Ranges: 0-1½ megohms; 0-15000 ohms; 0-150 ohms. Meter adaptable for capacity tests. Rotary Switch controls all meter ranges and connections. All necessary Leads, Adaptors and Batteries furnished complete.

Philco 024 Signal Generator

A compact, smoothly operating and beautifully finished instrument. Frequency-range scales and designations of controls are etched in brass lettering on black panel. Top, sides and back have special black "crackle" finish. Brass handle provides easy portability. Ball-bearing tuning condenser provides extremely fine adjustment. Shielded antenna lead with Universal clip included for connection to receiver. The "A" battery is held in place by a special spring cap, removable without tools. Entire instrument mounted on special felt feet. At the price quoted, no serviceman can afford to be without one.

PHILCO SIGNAL GENERATOR

• MODEL 024 •

INTERMEDIATE AND BROADCAST FREQUENCIES

The Model 024 Philco Signal Generator is a complete, self-contained, accurately calibrated instrument, designed to cover all frequencies from 105 K. C. to 2000 K. C. All necessary batteries and tubes are included within the container. No external connections of any kind required.

Modern Superheterodynes cannot be adjusted properly without a high-grade signal generator, but many servicemen have been unable to pay the high prices previously asked for quality equipment. The PHILCO MODEL 024 now makes it possible for every serviceman to own a high quality Signal Generator at a figure about equivalent to the sum collected on his first six RADIO MANUFACTURERS SERVICE jobs.

MODEL 024 SIGNAL GENERATOR

Complete with Batteries and Tube

Serviceman's Net Price $13.50

PHILCO ALL-PURPOSE SET TESTER

• MODEL 048 •

PORTABLE! . . . COMPACT! . . . ACCURATE!

CIRCUIT TESTER + SIGNAL GENERATOR

Handles every Service Job and meets all Testing Requirements from the Crystal Set up to the latest Super with duo-diode-triode tubes. Will not become obsolete with future radio developments.

5 A. C. Voltage Ranges
5 D. C. Voltage Ranges
3 D. C. Milliammeter Ranges
3 Ohmmeter Ranges
5 A. C. Output Meter Ranges
Capacity Meter

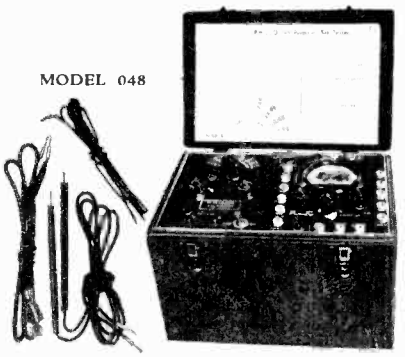
Complete Tube Test

Variable Frequency I. F. and R. F. Signal Generator from 105 K. C. to 2000 K. C.

All Test Prods, Leads, Batteries, Tube, etc. included—

Serviceman's Net Price Complete $48.60

MODEL 048

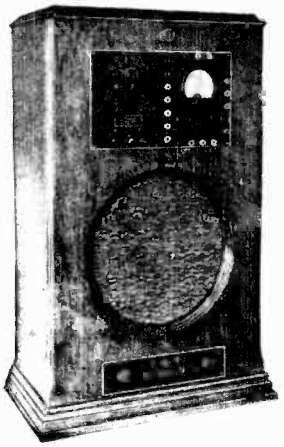


READ THESE SPECIFICATIONS!

Twenty-two meter ranges and signal generator at a price made possible by Philco laboratory design and construction. Rugged instrument—easy to read, quick change of scales, no danger of taking false readings. Accurate signal generator, calibrated in K. C. on the instrument panel (no graphs to consult). Finest type precision movement meter. All test leads designed to simplify your service job. Real universal clip for connections of screen grid tubes or antenna post, sturdy test prods designed for long service. New exclusive Philco output circuit adapters, will fit 4-, 5-, 6-, 7 and 8-prong sockets, connect output meter to any type output circuit without removing tubes from chassis. All leads plug into tester panel.

PHILCO UNIVERSAL TEST CABINET

• MODEL 059 •



SPECIFICATIONS OF MODEL 059

Auditorium speaker capable of handling up to 15 watts, or the full output from the most powerful modern receivers. Speaker may be operated from sets having either single or push-pull output tubes. Field exciter, including type 80 tube, built into the tester. Four dummy fields built in for connecting in place of speaker on set being tested. Output meter on panel can be immediately connected to set by turning the switch at the top of the cabinet.
Complete facilities for every necessary test to a receiver are provided in the "All-Purpose" tester, which is built into the Universal Test Cabinet.
Dimensions: Height, 27¾ in.; width, 18 in.; depth, 9 in. Weight (with batteries), 62 lbs.

BUILT-IN POWER SPEAKER WITH EXCITER
ELIMINATES BRINGING IN THE CUSTOMER'S SPEAKER
ABSOLUTELY UNIVERSAL—TESTS *ANY* RADIO

Designed especially for members of Radio Manufacturers Service, this De Luxe Complete Testing Cabinet presents an unusually rich appearance, commanding immediate interest and respect by the customer and public. In addition to being in the most convenient and economical form for high-speed testing, its appearance alone will add prestige to your place of business. Precision-built, and housed in an artistic cabinet, it is bound to return ample dividends on your investment.

Everything a Well-Equipped Service Department Needs:

Built-in 15-watt Speaker, for radio chassis test.
Universal Speaker Plug and Socket, with necessary Cables.
Signal Generator, variable 105 to 2000 K. C.
Visual and Audible Output Indicators.
5 A. C. Voltage Ranges.
5 D. C. Voltage Ranges.
3 D. C. Milliammeter Ranges.
3 Ohmmeter Ranges.
5 A. C. Output Meter Ranges.
Capacity Meter.
Tube Tester.
Necessary Tubes and Batteries included.
All Necessary Connecting Leads, Test Prods and Adapters included.

No longer necessary to have many types of extra speakers available to test chassis. The built-in speaker in the Model 059 automatically eliminates this expense and bother. Strictly Universal Speaker Plug and Socket.
Cuts your trouble in half. Now you can remove only the chassis on service calls.

TESTS A. C. SETS, BATTERY SETS, AUTO SETS.

Complete . . . Convenient . . . Attractive . . . Efficient

Serviceman's Net Price Complete $90.00

New

PHILCO ALL-WAVE AERIAL

THE *First* AERIAL TO ELIMINATE NOISE ON *all* BANDS!

$7.50
LIST PRICE

You've been waiting for it — now it's here!
NOTHING LIKE IT ON THE MARKET!

Easy to Sell - It's Designed, Built and Advertised by PHILCO!

PHILCO

REG. U.S. PAT. OFF.

Service Bulletin—No. 188

Models 34 and 34A

Philco models 34 and 34A are superheterodyne "all wave" receivers designed for reception of both broadcast and short wave stations; they operate from batteries as a source of power. Model 34 is intended for use with a 2-volt storage battery and a dry B-and-C battery unit; model 34A uses a dry A battery in connection with the dry B-and-C unit.

Model 34 uses seven tubes; model 34A has in addition a ballast tube (type 1-C-1). The chassis of the two sets are identical, but the model 34 when shipped has a jumper wire across the filament contacts of the ballast tube (1-C-1), socket. This wire should be left in place as long as the set is operated on the storage battery. In model 34A the jumper wire is removed and the ballast tube (1-C-1) must be in place at all times.

Model 34 uses the following Philco low-current-drain 2-volt tubes:

Detector Oscillator	1C6
Intermediate Frequency (2)	34
2nd Detector	30
1st A.F.	32
Driver	30
Output	19
Ballast (34A only)	1-C-1

Model 34 is intended for use with the Philco type 172-R 2-volt storage A battery, model 34A uses Philco type 896 dry A battery. Both sets use the Philco type P968 combination B & C battery unit.

The current drain is: A battery—750 milliamperes; B battery—16 to 19 milliamperes. The ballast tube used in the model 34A keeps the voltage delivered by the dry A battery to the filament at nearly two volts at all times.

The Intermediate Frequency of the set is 460 Kilocycles. The range of receivable frequencies is 520 to 22,000 K.C.

Table 1—Tube Socket Data*

CIRCUIT	Det.-Osc.	1st I. F.	2nd I. F.	2nd Det.	1st A. F.	Driver	Output
TYPE TUBES	1C6	34	34	30	32	30	19
Filament Volts	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Plate Volts	P-135 G2-120	135	135	..	40	135	135
Screen Grid Volts	67½	67½	67½	..	35	..	..

*The above values were obtained from the underside of the chassis, using test prods and leads, with a high-resistance multi-range D. C. voltmeter. The Philco Model 048 All Purpose Set Tester is highly recommended for all tests of this character. Receiver volume control at maximum; station selector at 520 kilocycles. Readings taken with a plug-in adapter will not be satisfactory.

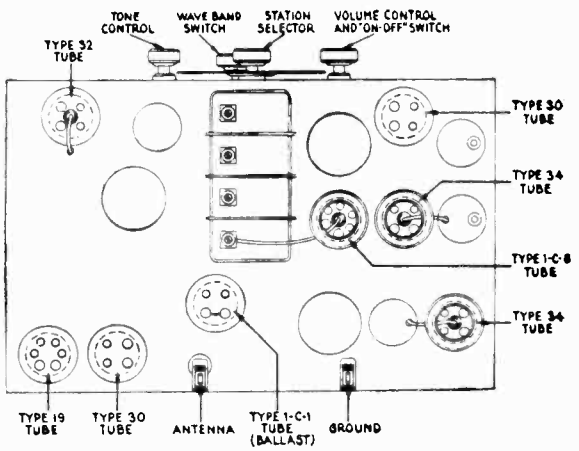


FIG. 1—Top View of Chassis

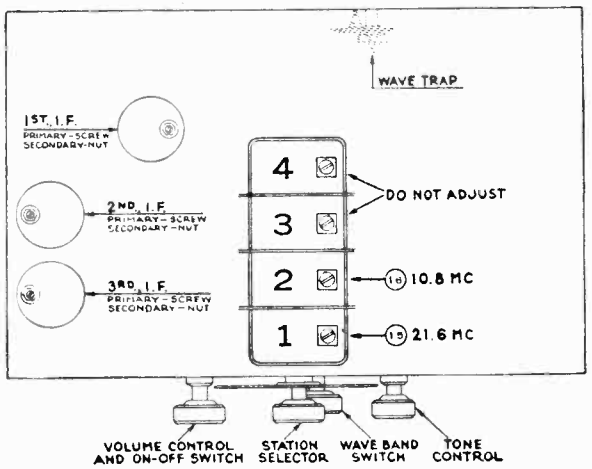


FIG. 2—Position of Compensating Condensers Reached from *Above* Chassis

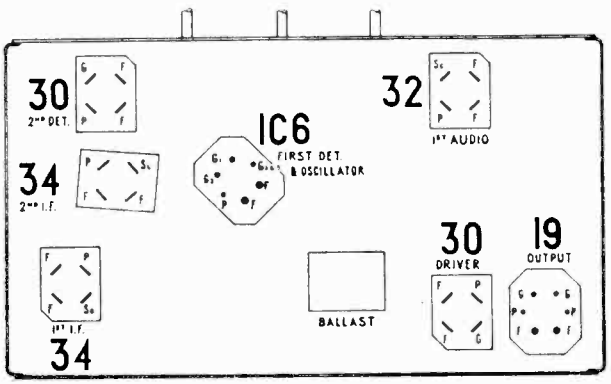


FIG. 3—Tube Socket Layout (View of Underside)

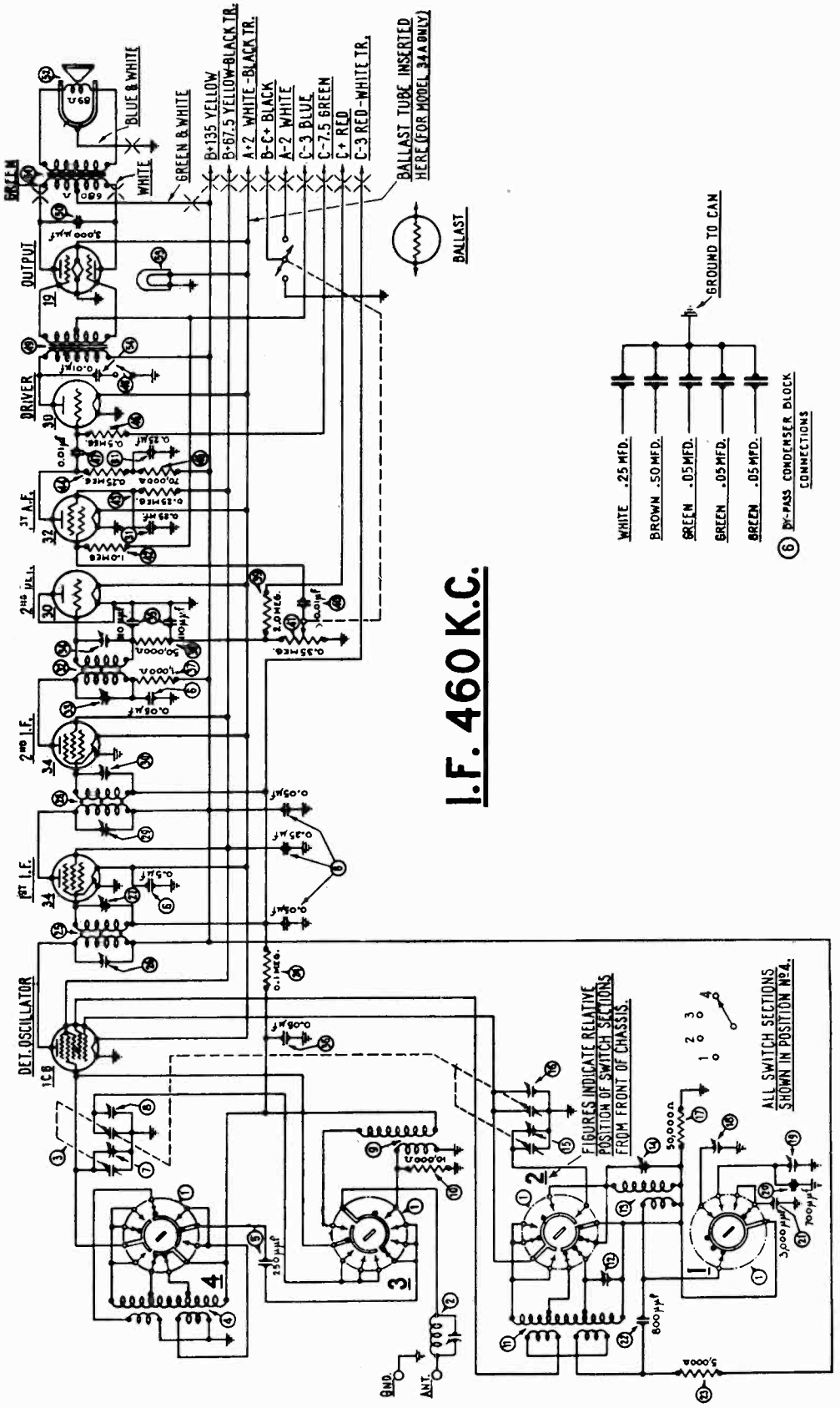


FIG. 4—Schematic Wiring Diagram

NOTE: Output transformer is mounted on receiver (under chassis) instead of on speaker as indicated in diagram. Also speaker magnet is not grounded.

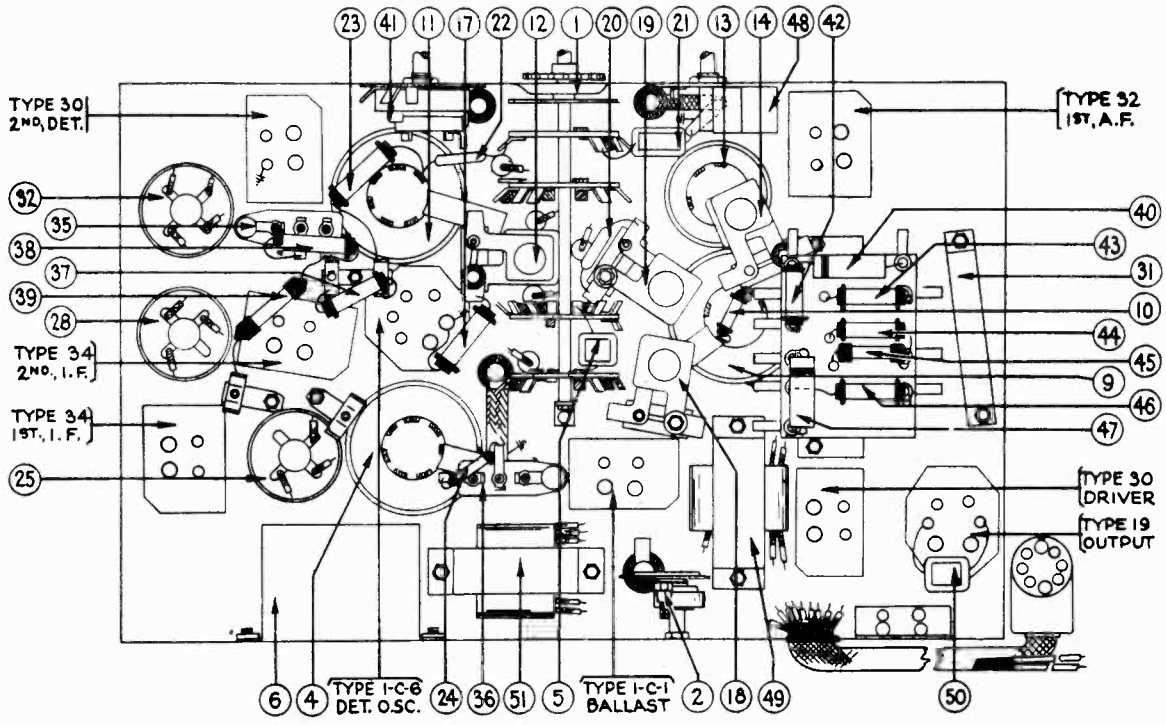


FIG. 5—Bottom View of Chassis, Showing Parts, and Position of Compensating Condensers Reached from Below Chassis

MODEL 34 PARTS

No. on Figs.	Description	Part No.	List Price Each
1	Wave-Band Switch	42-1045	$3.60
2	Wave Trap	38-5199	.30
3	Tuning Condenser Assembly	31-1153	6.25
4	Antenna Transformer (H. F. Bands)	32-1271	.70
5	Condenser (.00025 mfd.)	3082	.35
6	By-pass Condenser Block (.25-.5-.05-.05-.05 mfd.)	30-4151	1.00
7	Compensating Condenser (Ant. H. F.)	Part of 3	....
8	Compensating Condenser (Ant. B'cst)	Part of 3	....
9	Antenna Transformer (Broadcast)	32-1270	.55
10	Resistor (10,000 ohms—Brown-Black-Orange)	33-1000	.25
11	Oscillator Transformer (H. F. Bands)	32-1273	.35
12	Compensating Condenser (Range 2)	04000-C	.15
13	Oscillator Transformer (Broadcast)	32-1272	.70
14	Compensating Condenser (Osc. Range 1)	04000-A	.15
15	Compensating Condenser (Osc. Range 4)	Part of 3	....
16	Compensating Condenser (Osc. Range 3)	Part of 3	....
17	Resistor (50,000 ohms—Green-Brown-Orange)	4518	.25
18	Compensating Condenser (Broadcast; Series)	04000-S	.35
19	Compensating Condenser (Range 2; Series)	04000-R	.45
20	Condenser (.0007 mfd.)	5863	.35
21	Condenser (.003 mfd.)	6009	.60
22	Condenser (.0008 mfd.)	6021	.35
23	Resistor (5,000 ohms—Green-Black-Red)	5310	.25
24	Resistor (100,000 ohms—White-White-Orange)	6099	.25
25	First I. F. Transformer	32-1341	1.35
26	Compensating Condenser (1st I. F. Pri.)	31-6007, Inc. as part of 25	....
27	Compensating Condenser (1st I. F. Sec.)		....
28	Second I. F. Transformer	32-1341	1.35
29	Compensating Condenser (2nd I. F. Pri.)	31-6007, Inc. as part of 28	....
30	Compensating Condenser (2nd I. F. Sec.)		....
31	Condenser (.25-.25 mfd.) (By-pass)	30-4150	.70
32	3rd I. F. Transformer	32-1342	1.35
33	Compensating Condenser (3rd I. F. Pri.)	31-6007, Inc. as part of 32	....
34	Compensating Condenser (3rd I. F. Sec.)		....
35	Condenser (.00011 mfd. twin)	8035-C	$0.25
36	Condenser (.05 mfd.)	3615-J	.35
37	Resistor (1,000 ohms—Brown-Black-Red)	5837	.25
38	Resistor (50,000 ohms—Green-Brown-Orange)	4518	.25
39	Resistor (2 meg.—Red-Black-Green)	5872	.25
40	Condenser (.01 mfd.)	30-4124	.25
41	Volume Control and On-Off Switch	33-5064	1.45
42	Resistor (1.0 meg.—Brown-Black-Green)	4409	.25
43	Resistor (330,000 ohms—Orange-Orange-Yellow)	4410	.25
44	Resistor (.25 meg.—Red-Yellow-Yellow)	6046	.25
45	Resistor (70,000 ohms—Violet-Black-Orange)	5385	.25
46	Resistor (.5 meg.—Yellow-White-Yellow)	4517	.25
47	Condenser (.01 mfd.)	30-4124	.25
48	Tone Control	30-4152	.50
49	Audio (Input) Transformer	7233	1.80
50	Condenser (.003 mfd.)	7301	.45
51	Output Transformer	32-7223	1.50
52	Voice Coil & Cone Assembly (KR-6)	36-3157	.50
53	Pilot Lamp	5316	.35
54	Condenser (.01 mfd.)	Part of 48	....
	Pilot Lamp Bracket	38-5633	.55
	Battery Cable	41-3083	2.00
	Tube Shield (1)	28-1107	.10
	Tube Shield (2)	8005	.06 ea.
	Six Prong Socket	7547	.11
	Four Prong Socket	7544	.10
	Speaker Socket	4957	.10
	Knob (Medium)	03063	.10
	Knob (Small)	03064	.10
	Knob (Large)	27-4025	.10
	Dial Assembly	31-1162	1.25
	Dial Scale	27-5039	.60
	Idler Shaft Assembly	31-1056	.25
	Gear (Wave-Band Switch)	28-7012	.20
	Mounting Bolt	W-567	3.00 per C.
	Mounting Washer (Rubber)	5189	.04
	Mounting Washer (Steel)	5058	.85 per C.

ADJUSTING MODEL 34

The compensating condensers of Model 34 have been adjusted accurately before shipment. If later adjustment is required, in most cases only the intermediate frequency and low frequency compensating condensers should be done. Extreme care must be given the adjustment of the high frequency circuits, and the adjustment should NOT be undertaken unless the receiver is seriously out of alignment.

DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections numbered 3 and 4 of the Tuning Condenser Assembly. These have been adjusted, and sealed, at the factory.

Philco Model 048 All-Purpose Set Tester, which incorporates a signal generator covering broadcast and police band frequencies, is recommended for the adjustment of the intermediate frequency and low frequency compensating condensers.

Philco Model 091 crystal-controlled Signal Generator is recommended for the high frequency adjustments. It gives an accurate and constant 3600 kilocycle (3.6 megacycle) signal, the harmonics of which include the necessary high frequencies for adjusting the compensating condensers in the high frequency circuits.

1—ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 1C6 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 to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 34) and adjust each of the I.F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I.F. compensating condensers is shown in Figure 2. Each of these transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

2—ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 1C6). 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 (Range 1) and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap ② 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 Figures 2 and 5. It is reached from the rear of the chassis.

3—ADJUSTMENT OF THE DIAL FREQUENCIES—Model 34 has four separate frequency bands or ranges, each obtained by one of the four positions of the wave-band switch. There is a compensating condenser for each range, which must now be adjusted. In the following procedure, the frequency ranges referred to, and obtained by the different positions of the switch are:

Range 1.....520 K.C.—1500 K.C.
Range 2.....1.5 M.C.—4.0 M.C.
Range 3.....4.0 M.C.—11.0 M.C.
Range 4.....11.0 M.C.—23.0 M.C.

Connect the output terminals of the Model 091 or equivalent Signal Generator, to the "ANT" and "GND" terminals of the receiver chassis. Connect an output meter to the primary terminals of the Output Transformer of the receiver. Set the Wave-Band Switch to Range 4, and the Station Selector at 21.6 M.C. The sixth harmonic of the 3.6 M.C. crystal in the Model 091 Signal Generator is picked up at this point. Adjust the compensating condenser ⑮ on Section 1 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 3, and the Station Selector to 10.8 M.C. Here, the third harmonic of the 3.6 M.C. crystal will be heard. Adjust the compensating condenser ⑯ on Section 2 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 2, and adjust the Station Selector to 3.6 M.C. The "Antenna" connection between the Signal Generator and the receiver chassis must be removed for this adjustment, otherwise the output of the Signal Generator will be too great. Adjust the compensating condenser ⑫ to give maximum response in the output circuit. This compensating condenser is located underneath the chassis and is not accessible from above. See Figure 5.

This concludes adjustments requiring the Model 091 (or equivalent) high frequency signal generator.

The Model 048 or its equivalent is now used again. Turn the Wave-Band Switch of the set to Range 2 and the Station Selector to 1.5 M.C. Set the Signal Generator at 1500 K.C. Make sure the "Antenna" connection between the Signal Generator and the Chassis has been restored. Adjust compensating condenser ⑲ located underneath the chassis, (Figure 5). Adjustment is made from the underside of the chassis.

Tune the Wave-Band Switch to Range 1 and the Station Selector to 1400 K.C. Set the Signal Generator at 1400 K.C. Adjust compensating condenser ⑭, which is located underneath the chassis. (See Figure 5). This adjustment is made from the underside of chassis.

Finally, with Wave-Band Switch at Range 1, and Station Selector at 520 K.C., set the Signal Generator at 520 K.C. and adjust compensating condenser ⑱ (Figure 5). This compensating condenser is also mounted underneath the chassis, and reached from below.

For proper and accurate adjustment of Model 34, the procedure must be followed exactly in the order given. The adjustment should not be undertaken without proper equipment as mentioned above.

PHILCO RADIO AND TELEVISION CORPORATION

March, 1934
Printed in U. S. A.

Service Department

PHILCO

REG. U.S. PAT. OFF

Service Bulletin—No. 189

Model 32

Philco Model 32 is a superheterodyne radio receiver designed to operate directly from a 32 volt D. C. (direct current) electric system, such as used on many farms for lighting purposes. In this model the filaments of the tubes (except the rectifier) are connected in series, while the necessary plate and grid voltages are secured from a special vibrator-and-rectifier unit, contained in a separate metal box mounted on a shelf of the radio cabinet. The rectifier tube is inside the vibrator-and-rectifier unit box. It obtains its filament voltage from a secondary winding of the transformer which is also located in the vibrator-and-rectifier unit box.

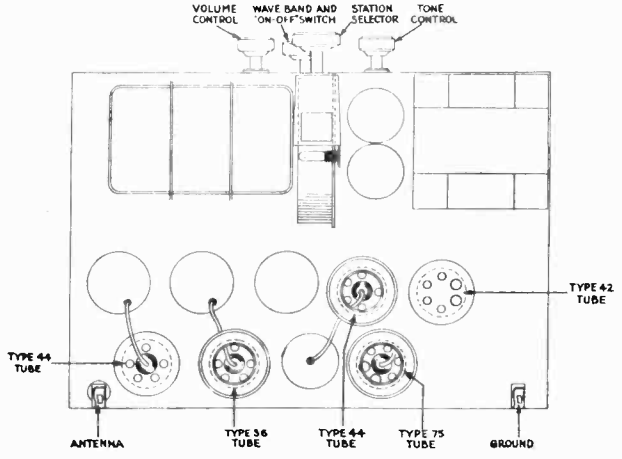


Fig. 1—Top View of Model 32

NOTE: In 32-volt systems where the batteries are old, the voltage is high (40 volts) when generator is running (due to the higher internal resistance of the batteries). In such cases it will help conserve life of the tubes in the set if battery charging is done at periods of the day when the radio is not in use.

Model 32 uses the following tubes: R. F., type 39-44; Detector-Oscillator, type 36; I. F., type 39-44; 2d detector, type 75; Output type 42; Rectifier, type 84.

The frequency range of the model 32 is 520 to 3260 kilocycles. The intermediate frequency (I. F.) is 260 K. C. The power consumption is 50 watts when the line voltage is 32, and approximately 70 watts when the line voltage reaches 38.

With a line voltage of 35 volts to the vibrator and an effective voltage of 28 at primary of power transformer (voltage from white lead to white-black-tracer), the A. C. voltage across secondary should be about 300 volts at 65 milliamperes. Secondary voltage measured from yellow lead to yellow-green-tracer. Voltage across 84 filament approximately 7 volts at .5 amperes. (Filament leads have blue insulation.)

Tube Socket Data Line Voltage 34 Volts

Circuit	RF	Det.-Osc.	IF	AF	Output	Rect.
Type Tube	39-44	36	39-44	75	42	84
Filament Volts	6.8	6.8	6.8	6.8	6.8	6.8
Plate Volts	205	200	235	155	220	300
Screen Grid Volts (SG to K)	85	83	85	.....	240	.....
Cathode Volts (K to Gnd)	4	8.5	4	0	0	.....

The above voltage values were obtained with a high-resistance, multi-range D. C. voltmeter. The readings were taken from the underside of the chassis, with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER is an ideal instrument for taking these readings, and is highly recommended for this purpose. When the above values were obtained, the Station Selector was set at the low frequency (550 K. C.) end of the scale; the Volume Control was at maximum

Fig. 2—Terminal Arrangement of Tube Sockets Viewed from Under Side of Chassis

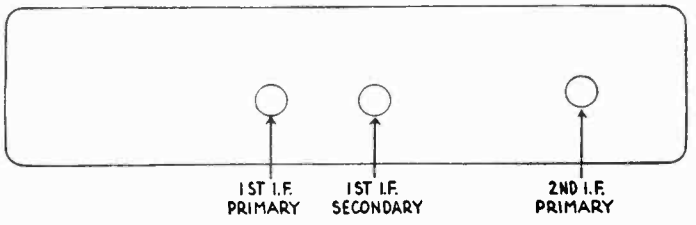


Fig. 3—Rear of Model 32 Chassis, showing location of I.F. Compensating Condensers. I.F. of Model 32 is 260 K. C.

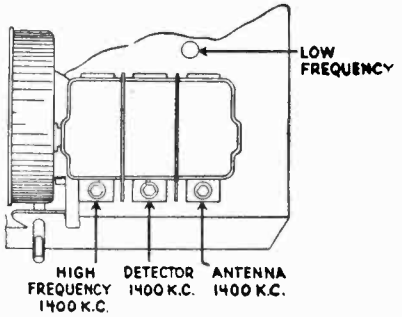


Fig. 4—Top View of Chassis Showing Compensating Condensers Mounted on Tuning Condenser, also Low Frequency Compensating Condenser.

ADJUSTMENT OF MODEL 32

COMPENSATING CONDENSERS

These receivers are adjusted accurately before they are shipped from the Factory. If re-adjustment is required, it is usually necessary to re-align only the intermediate frequency compensating condensers. Fig. 3 shows the location of these compensating condensers. The intermediate frequency is 260 kilocycles.

An accurately calibrated signal generator is required for these adjustments. The PHILCO MODEL 024 is a precision signal generator supplying frequencies from 105 kilocycles to 2000 kilocycles and is recommended for this work.

To adjust the I. F. condensers, remove the grid cap clip from the type 36 tube and connect the shielded antenna lead from the signal generator to the grid cap. Connect the ground lead from signal generator to ground post of set.

Connect the primary terminals of the output transformer to an output meter. Set the signal generator frequency switch at 260 K. C., turn it and the receiver "on" and adjust the attenuator of the signal generator so as to get a half scale deflection on the meter. Now with the fibre hex wrench, adjust each of the I. F. condensers in turn so as to obtain maximum reading in the meter.

If re-adjustment of the intermediate frequency circuits is not sufficient to restore sensitivity, the high frequency and low frequency compensating condensers are re-aligned as described in the following paragraphs. Figure 4 shows the location of these compensating condensers.

When making these adjustments replace the grid clip on the 36 tube, and connect the antenna and ground leads from the signal generator direct to the antenna and ground posts of set.

The High Frequency compensating condenser is first adjusted. This adjustment is made with the signal generator set at 1400 kilocycles. Next the Detector and Antenna Condensers, located on the tuning condenser assembly, should be adjusted, with the signal generator still operating at 1400. It may be necessary to readjust the attenuator on the signal generator for these adjustments.

The last adjustment is that of the low frequency (LF) compensating condenser which is accessible from above through the hole in chassis alongside the tuning condenser assembly. This adjustment is made with the signal generator set to give a 700 K. C. signal.

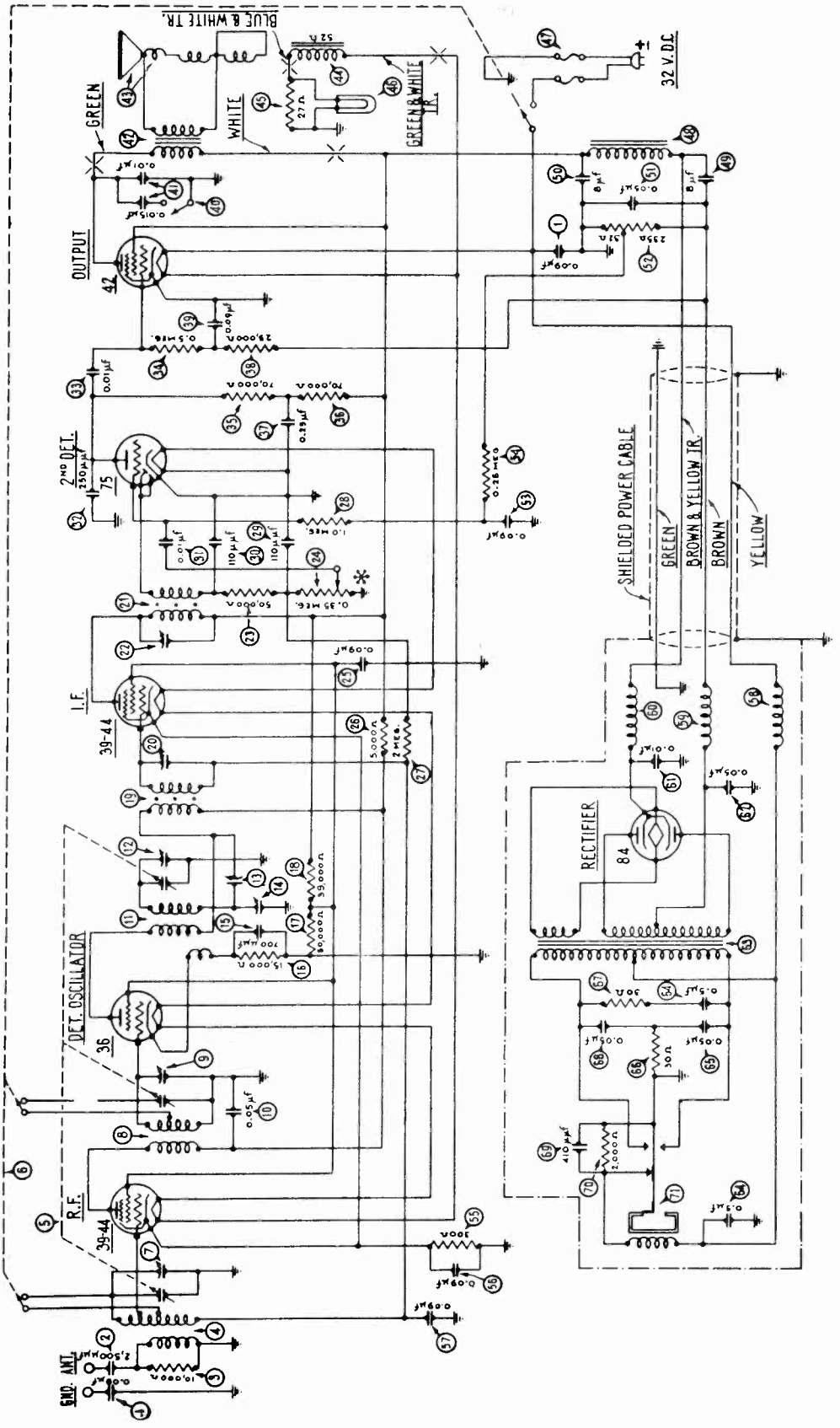


Fig. 5—Wiring Diagram—Model 32

* MUST BE GROUNDED AT 75 CATHODE

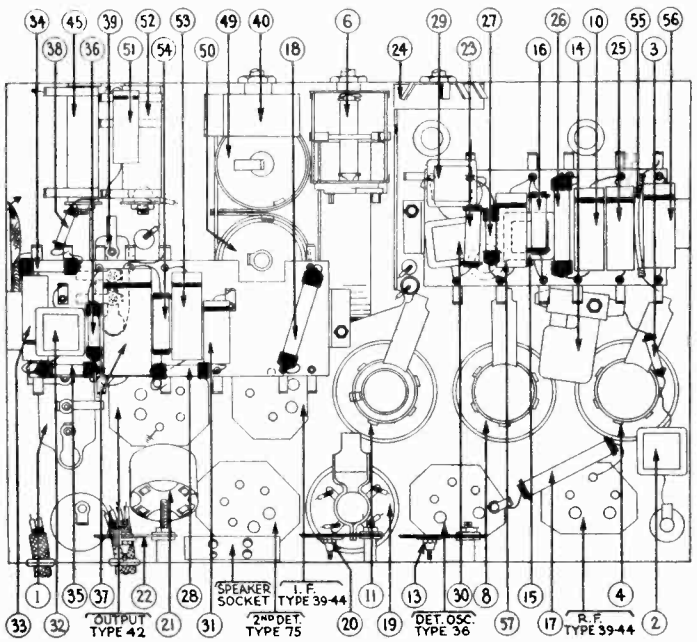


Fig. 6—Bottom View of Chassis

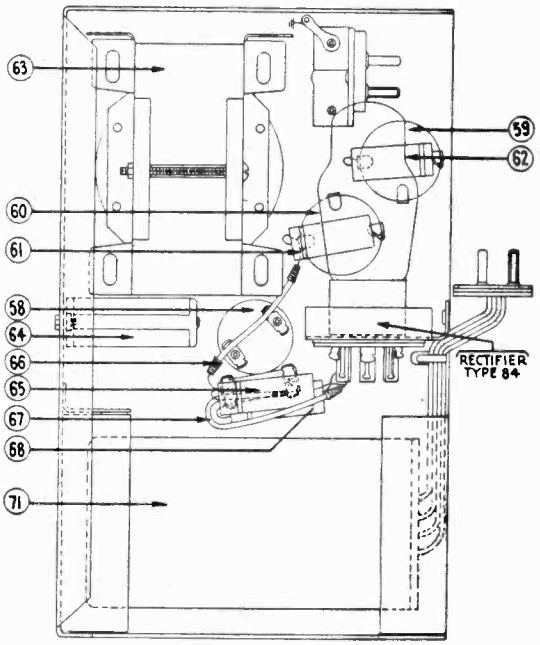


Fig. 7—Bottom of Vibrator and Rectifier Unit

REPLACEMENT PARTS FOR MODEL 32

No. on Figs. 6 and 7	Description	Part No.	List Price
(1)	Condenser (.09 mfd.—.09 mfd.)	4989-G	$0.40
(2)	Condenser (.0025 hfd.) (mica)	7006	.40
(3)	Resistor (10,000 ohms—Brown-Black-Orange)	33-1000	.25
(4)	Antenna Transformer	32-1062	.70
(5)	Tuning Condenser Assembly	31-1059	5.00
(6)	Wave-band & On-off Switch	42-1017	1.00
(7)	Compensating Condenser (ant.)	Part of (5)	....
(8)	Detector Transformer	32-1063	.50
(9)	Compensating Condenser (det.)	Part of (5)	....
(10)	Condenser (.05 mfd. tubular)	30-4123	.35
(11)	Oscillator Transformer	06620	.90
(12)	Compensating Condenser (osc. H. F.)	Part of (5)	....
(13)	Compensating Condenser (1st I. F. pri.)	04000-M	.20
(14)	Compensating Condenser (osc. L. F.)	04000-S	.35
(15)	Condenser (.0007 mfd.—mica)	5863	.35
(16)	Resistor (15,000 ohms) (Brown-Green-Orange)	6208	.25
(17)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(18)	Resistor (39,000 ohms) (Orange-White-Orange)	33-1027	.25
(19)	First I. F. Transformer	32-1289	.60
(20)	Compensating Condenser (1st I. F. secondary)	04000-M	.20
(21)	Second I. F. Transformer	06622	1.20
(22)	Compensating Condenser (2d I. F. primary)	04000-A	.15
(23)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(24)	Volume Control (350,000 ohms)	33-5065	1.00
(25)	Condenser (.09 mfd. tubular)	30-4122	.35
(26)	Resistor (5,000 ohms) (Green-Black-Red)	3526	.25
(27)	Resistor (2 meg. Red-Black-Green)	5872	.25
(28)	Resistor (1 meg. Brown-Black-Green)	4409	.25
(29)	Condenser (.00011 mfd.—mica)	30-1006	.35
(30)	Condenser (.00011 mfd.—mica)	30-1006	.35
(31)	Condenser (.01 mfd. tubular)	30-4124	.25
(32)	Condenser (.00025 mfd.—mica)	3082	.35
(33)	Condenser (.01 mfd. tubular)	30-4145	.25
(34)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
(35)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(36)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	$0.25
(37)	Condenser (.25 mfd. tubular)	30-4134	.45
(38)	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
(39)	Condenser (.09 mfd.) (Bakelite block type)	4989-AL	.35
(40)	Tone Control	06764	.50
(41)	Condensers	Part of (40)	....
(42)	Output Transformer (For K-26 spkr.)	32-7042	.95
(43)	Voice Coil and Cone (For K-26 spkr.)	36-3174	.40
(44)	Field Coil and Pot Assembly (K-26)	36-3306	2.85
(45)	Resistor (Pilot light) (27 ohms)	33-3132	.20
(46)	Pilot Lamp	4567	.12
(47)	Line Fuses (Located in line plug) (3 amp.)	45-2046	ea. .06
(48)	Filter Choke	32-7213	1.60
(49)	Condenser (Electrolytic—8 mfd. wet)	30-2026	1.50
(50)	Condenser (Electrolytic—8 mfd. dry)	30-2014	1.70
(51)	Condenser (.05 mfd. tubular)	30-4020	.35
(52)	B. C. Resistor (235—32 ohms)	7998	.20
(53)	Condenser (.09 mfd. tubular)	30-4122	.35
(54)	Resistor (.25 meg.) (Red-Yellow-Yellow)	4410	.25
(55)	Resistor (Flexible—300 ohms)	33-3010	.20
(56)	Condenser (.09 mfd. tubular)	30-4122	.35
(57)	Condenser (.09 mfd. tubular)	30-4122	.35
	Speaker Plug Socket	4957	.10
	Line Plug Assembly with Cord (Less fuses)	L-1738	.85

VIBRATOR AND RECTIFIER UNIT

(58)	R. F. Choke (Low voltage)	32-1375	$0.40
(59)	R. F. Choke (High voltage)	32-1348	.30
(60)	R. F. Choke (High voltage)	32-1348	.30
(61)	Condenser (.01 mfd. tubular)	30-4145	.25
(62)	Condenser (.05 mfd. tubular)	30-4020	.35
(63)	Power Transformer	32-7218	4.95
(64)	Condenser (.5 mfd.—.5 mfd.—metal case)	30-4155	.85
(65)	Condenser (.05 mfd. tubular)	30-4020	.35
(66)	Resistor (30 ohms flexible wire wound)	33-3119	.25
(67)	Resistor (30 ohms flexible wire wound)	33-3119	.25
(68)	Condenser (.05 mfd. tubular)	30-4020	.35
(69)	Condenser (.00041 mfd.—mica)	Inside 71	....
(70)	Resistor (2,000 ohms)	Inside 71	....
(71)	Vibrator Unit	38-5640	6.00

ELIMINATION OF NOISE INTERFERENCE CAUSED BY THE FARM LIGHTING SYSTEM

The operation of a radio receiver directly from a 32 volt farm lighting system is sometimes interfered with by noises in reception, caused by the operation of the lighting system's charging equipment. These noises are radiated from the service lines and picked up by the antenna and lead-in. A certain amount of the noise also comes directly thru the lines. A whirring or crackling noise may be caused by sparking at the brushes of the generator; and a "clicking" by the sparks at the spark plug of the gasoline motor used to drive the generator, and by the operation of the "breaker" in the spark coil primary.

Installation of the proper type of antenna system is of considerable importance in eliminating these troublesome noises. For maximum freedom from noise the antenna should be the special Philco "Three-Purpose" aerial system, which was designed to prevent pick-up of noise by the antenna lead-in.

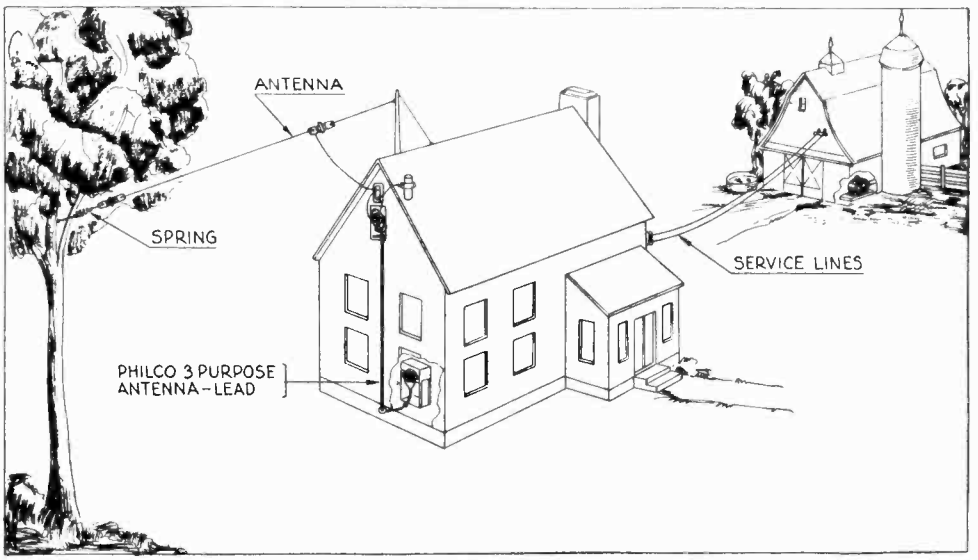


Fig. 8—Best Method of Antenna Installation for Model 32

The antenna wire should in all cases be run in a direction from the house opposite to that of the service leads from the lighting system, as indicated in Fig. 8. Where the Three-Purpose System is used, the instructions furnished with it should be very carefully followed. Note that this system employs a special "transmission line" lead-in, at each end of which a special transformer is installed. The transformers must be installed as per instructions, and if this is done the transmission line (lead-in) will be completely noise-proof. All other necessary parts for the antenna installation such as ground clamps, lighting arrester, etc. are included with the Three-Purpose Antenna System.

Philco has designed a special interference-suppression and filter for 32 volt systems which will eliminate most if not all of the interference encountered in the majority of installations. This unit consists of filter chokes and condensers, and is connected directly in the output lines of the generator as per instructions supplied with this special unit. The unit may be obtained from your Philco Distributor.

It is generally advisable also to connect a ½ mfd. fixed condenser (Philco Part No. 30-4015) from each set of generator brushes to the frame of the generator (which should be grounded). The method of locating these condensers is indicated in Fig. 9 which shows a cut-away view of one end of a generator. These condensers help eliminate the whirring or crackling caused by the generator brushes.

To reduce the clicking noise caused by the ignition at the spark plug, a suppressor (Philco Part No. 4531) should be inserted in series between the terminal of the plug and the cable leading to it. See Fig. 10.

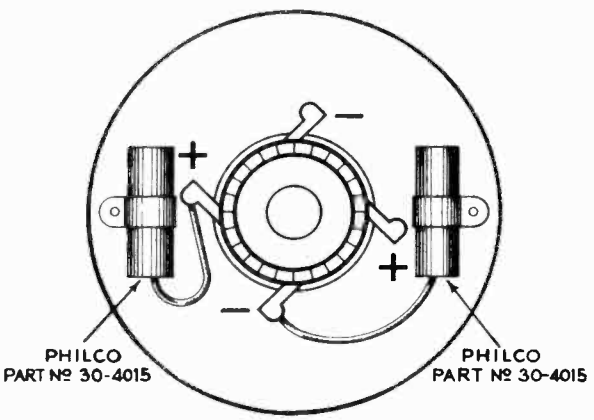


Fig. 9—Condensers Attached to Generator for Suppressing Interference

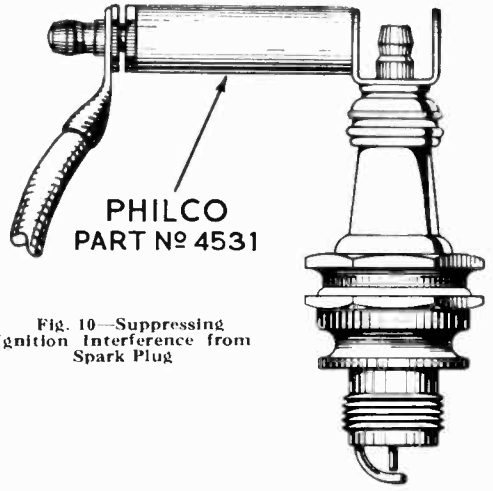


Fig. 10—Suppressing Ignition Interference from Spark Plug

USE PHILCO REPLACEMENT PARTS AND TUBES FOR EVERY MAKE RADIO.
GET COMPLETE CATALOG FROM YOUR DISTRIBUTOR.

PHILCO RADIO & TELEVISION CORPORATION

Service Department

April, 1934
Printed in U. S. A.

PHILCO

REG. U.S. PAT. OFF.

Service Bulletin — No. 191

Model 45

Philco Model 45 is a six tube receiver operating on alternating current and 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 45 uses a type 6-A-7 detector-oscillator, two type 39-44 I. F. Tubes, type 75 2d detector, type 42 output tube, and type 80 rectifier. The power consumption is 65 watts. The intermediate frequency is 460 K.C.

Tube Socket Voltages

CIRCUIT	Det. Osc.	1st IF	2d IF	2d Det.	Output	Rect.
Type Tube	6A7	39-44	39-44	75	42	80
Filament (F to F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P to K)	260	255	255	175	250	335
Screen Grid (SG to K)	G1-35 G2-135 G3&5-85	75	75	...	260	...
Cathode (K to F)	4.2	3.8	3.8	0	0	...

The above tests were made with an AC voltmeter for filament voltages and a high resistance DC voltmeter for all others. Dial at 550 KC, volume control at maximum. Test made with test prods applied to socket terminals underneath chassis. Line voltage 115.

Power Transformer Voltages

Terminals	Volts	Circuit	Color Leads
1-2	120	Primary	White
3-4	5.0	Fil. of 80	Blue
5-7	680	Plates of 80	Yellow
8-10	6.3	Filaments	Black
6	...	Center of 5-7	Yellow—Green tr.
9	...	Center of 8-10	Black—Yellow tr.

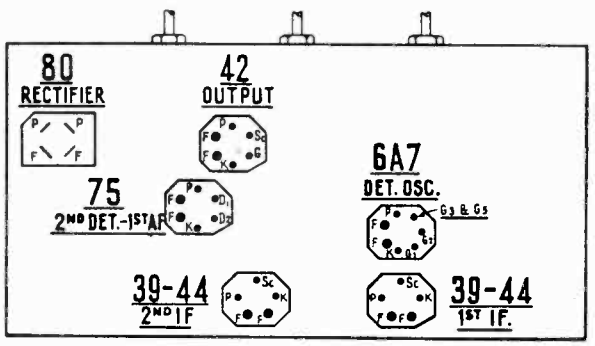


Fig. 1—Tube Socket Layout (underside)

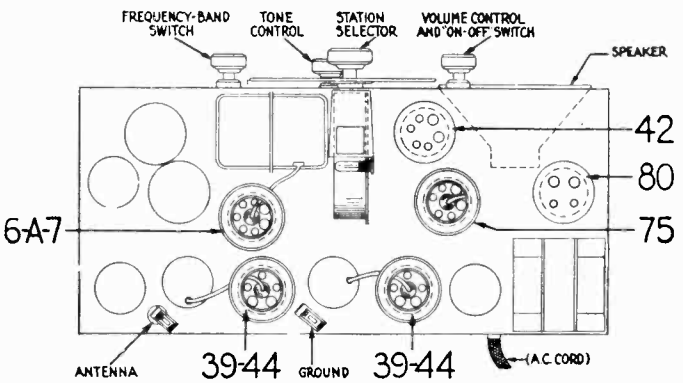


Fig. 2—Chassis Top View

Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in model 45, an accurately calibrated signal generator and a special insulated padding wrench are needed. We suggest the Philco Model 024 Signal Generator or the 048 Tester which includes a similar instrument.

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 6A7 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 to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 45) 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 thru a hole in the top of the coil shield. In the dual compensators, 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 6A7). 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 ① is located at rear and underneath the chassis, and is shown in Figure 4. It is reached from the rear of the chassis, by inserting the fibre wrench thru the hole near right-hand rear corner of chassis.

DETECTOR, 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 ⑦ (nearest tuning control) to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser ⑪ (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 (⑮ in Fig. 4) to maximum reading. This adjustment is reached thru the hole in top of chassis, between the two electrolytic condensers (left hand end of chassis when facing rear).

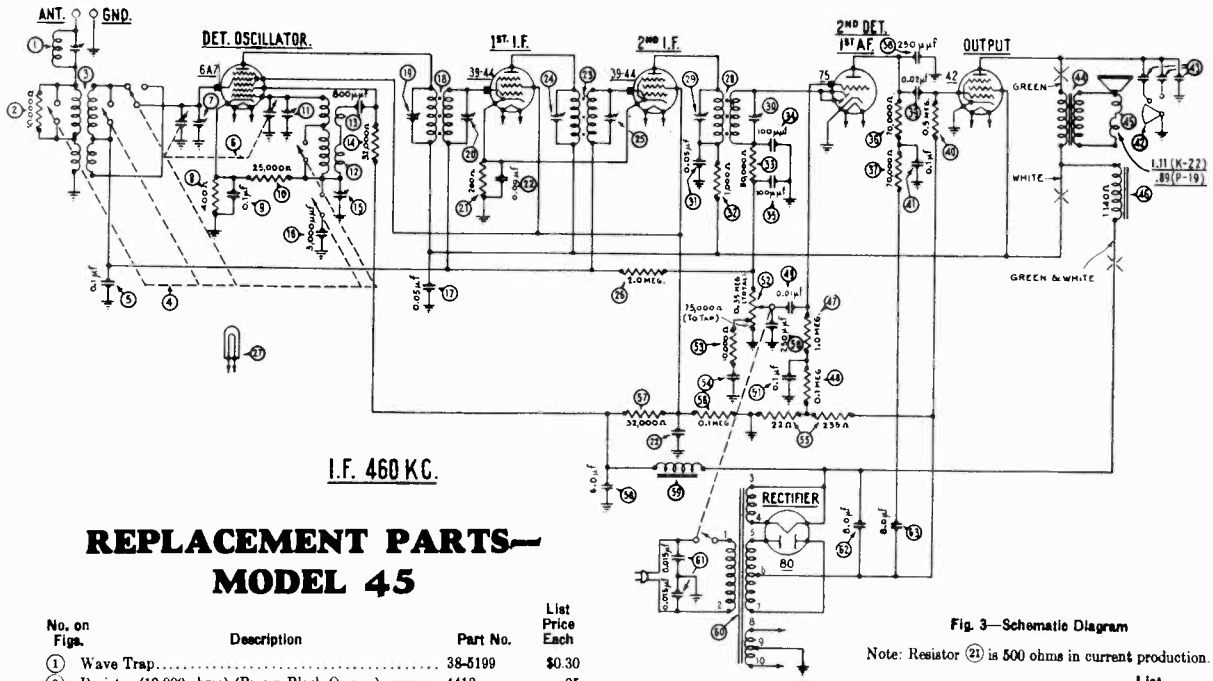


Fig. 3—Schematic Diagram

Note: Resistor (21) is 500 ohms in current production.

REPLACEMENT PARTS— MODEL 45

No. on Figs.	Description	Part No.	List Price Each
(1)	Wave Trap	38-5199	$0.30
(2)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(3)	Antenna Transformer	32-1360	.60
(4)	Wave Band Switch	42-1062	1.10
(5)	Condenser (.1 Mfd.) (Tubular)	30-4122	.35
(6)	Tuning Condenser Assembly	31-1169	4.40
(7)	Compensating Condenser (Det.)	Part of (6)	....
(8)	Resistor (400 ohms—Flexible wire wound)	33-3016	.20
(9)	Condenser (.1 Mfd.) (Tubular)	30-4122	.35
(10)	Resistor (25,000 ohms) (Red-Green-Orange)	4516	.25
(11)	Compensating Condenser (Osc. H. F.)	Part of (6)	....
(12)	Oscillator Transformer	32-1361	.65
(13)	Condenser (.0008 Mfd.—Mica)	5878	.35
(14)*	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
(15)	Compensating Condenser (Osc. L. F.)	04000-S	.35
(16)	Condenser (.003 Mfd.—Mica)	7301	.45
(17)	Condenser (.05 Mfd.—Tubular)	30-4123	.35
(18)	1st I. F. Transformer	32-1362	1.50
(19)	Compensating Condenser (1st I. F. Primary)	Part of (18)	....
(20)	Compensating Condenser (1st I. F. Secondary)	Part of (18)	....
(21)	Resistor (500 ohms—Flexible wire wound)	6977	.20
(22)	Condenser (.09 Mfd. twin) (Bakelite block)	4989-Z	.40
(23)	2d I. F. Transformer	32-1363	1.50
(24)	Compensating Condenser (2d I. F. Primary)	Part of (23)	....
(25)	Compensating Condenser (2d I. F. Secondary)	Part of (23)	....
(26)	Resistor (2 megs.) (Red-Black-Green)	5872	.25
(27)	Pilot Lamp	6608	.11
(28)	3d I. F. Transformer	32-1364	1.55
(29)	Compensating Condenser—3d I. F. Primary	Part of (28)	....
(30)	Compensating Condenser—3d I. F. Secondary	Part of (28)	....
(31)	Condenser (.05 Mfd. Tubular)	30-4123	.35
(32)	Resistor (1,000 ohms) (Brown-Black-Red)	5837	.25
(33)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(34)	Condenser (.0001 Mfd. Mica)	30-1031	....
(35)	Condenser (.0001 Mfd. Mica)	30-1031	....
(36)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(37)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(38)	Condenser (.00025 Mfd. Mica)	5858	.35
(39)	Condenser (.02 Mfd. Tubular)	30-4113	.30
(40)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.25
(41)	Condenser (.1 Mfd.) (Tubular)	30-4170	.35
(42)	Tone Control	30-4178	.75
(43)	Condensers	Inside 42	....
(44)	Output Transformer (Code 121)	32-7041	.95
*	Output Transformer (Code 122)	2580	1.25
(45)*	Voice Coil & Cone Assembly P-19 (Compact)	36-3027	.50
	K-22 (Lowboy)	36-3174	.40
(46)*	Field Coil and Pot Assembly P-19 (Compact)	36-3298	3.00
	K-22 (Lowboy)	02767	2.70
(47)	Resistor (1 meg.) (Brown-Black-Green)	4409	.25
(48)	Resistor (.1 meg) (White-White-Orange)	4411	.25
(49)	Condenser (.01 Mfd. Tubular)	30-4124	.25

*Does not appear in Fig. 4.

No. on Figs.	Description	Part No.	List Price Each
(50)	Condenser (.00025 Mfd. Mica)	5858	$0.35
(51)	Condenser (.1 Mfd. Tubular)	30-4122	.35
(52)	Volume Control and On-Off Switch	33-5066	1.45
(53)	Resistor 10,000 ohms (Brown-Black-Orange)	33-1000	.25
(54)	Condenser (Code 121) (.05 Mfd.) (Bakelite Block)	3615-W	.35
	Condenser (Code 122) (.09 Mfd.) (Bakelite Block)	4989-AM	.35
(55)	Voltage Divider (BC Resistor 22—235 ohms) (Wire wound)	33-3037	.20
(56)	Resistor .1 meg (White-White-Orange)	3767	.25
(57)	Resistor 32,000 ohms (Orange-Red-Orange)	33-1026	.35
(58)	Condenser (Electrolytic—6 Mfd.)	30-2020	1.40
(59)	Filter Choke	32-7018	1.50
(60)	Power Transformer	32-7226	4.25
(61)	Condenser (.015 Mfd. twin—Bakelite block)	3793-E	.40
(62) (63)	Condenser (Electrolytic 8—8 Mfd. 450 Volts)	30-3028	2.40
	A. C. Cord and Plug Assembly	L-943-A	.60
	Tube Shield	28-1107	.10
	Four Prong Socket	4955	.10
	Five Prong Socket	4956	.11
	Six Prong Socket	6417	.11
	Seven Prong Socket	27-6005	.11
	Speaker Socket (Lowboy set—code 122)	4957	.10
	Knob	27-4052	.10
	Knob (Large) (Lowboy only)	27-4051	.10
	Dial Assembly	31-1208	.45
	Dial Scale	27-5042	.17
	Mounting screw (Compact set)	W-1345	2.75 C.
	Mounting Washer (Compact set)	5058	.85 C.
	Foot (Rubber)	27-4116	.05

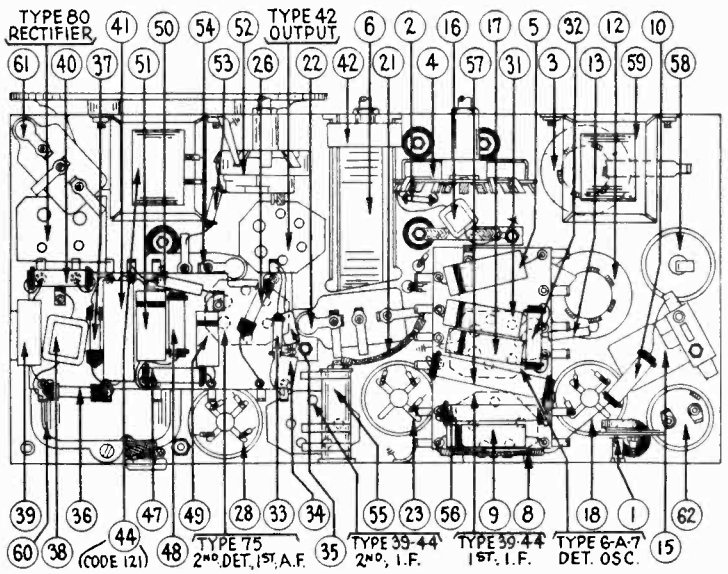


Fig. 4—Bottom View Showing Parts

May, 1934
Printed in U. S. A.

PHILCO RADIO & TELEVISION CORPORATION

PHILCO

REG. U.S. PAT. OFF

Service Bulletin — No. 192

Model 59

Philco Model 59 is a four-tube superheterodyne receiver operating on alternating current, capable of receiving standard broadcasts, and police calls on the first (lowest) police range. The tubes are as follows: Type 77 detector-oscillator, type 77 second detector, type 42 output and type 80 rectifier. The intermediate frequency is 460 K.C. The power consumption of model 59 is 52 watts.

Tube Socket Data—Line 115 Volts

Circuit	Det. Osc.	2nd Det.	Output	Rectifier
Type Tube	77	77	42	80
Filament Volts—F to F	6.3	6.3	6.3	4.8
Plate Volts—P to K	235	45	235	300
Screen Grid Volts—SG to K	110	35	250	....
Control Grid Volts—CG to K	10.5	.25	.25	....
Cathode Volts—K to F	25	15	15	....

Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1– 2	105–125	Primary	White
3– 5	6.3	Filament	Black
6– 7	5.0	Filament of 80	Blue
8–10	580	Plates of 80	Yellow
4	...	Center Tap of 3–5	Black-Yellow Tracer
9	...	Center Tap of 8–10	Yellow-Green Tracer

*All of the above readings were taken from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high resistance multirange D. C. voltmeter for all other readings. Volume control at maximum and station selector turned to low frequency end. Readings taken with a plug-in adapter will NOT be satisfactory. The Philco Model 048 All-Purpose Set Tester is recommended for all tests of Model 59.

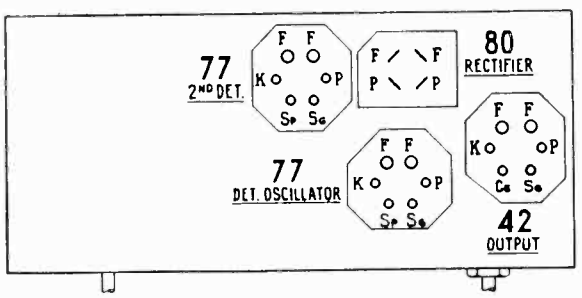


Fig. 1—Tube Socket Layout (Viewed from Bottom)

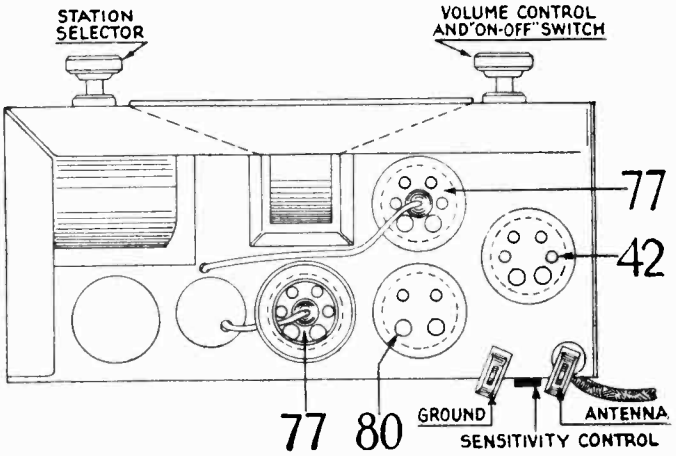


Fig. 2—Top View of Chassis

Adjusting Compensating Condensers

In Model 59 the I. F. primary and secondary condensers and the "regeneration" compensating condenser are located at the rear of chassis and accessible from the rear; the "ANT" and "OSC H. F." are located on the side of the tuning condenser gang.

Referring to Fig. 3, the I. F. primary and secondary condensers ⑧ and ⑮ should be adjusted first. Use an accurate signal generator such as the Philco Model 024. Remove the grid cap clip from the detector-oscillator tube and connect the antenna lead from the signal generator to the cap of this tube. Connect the ground lead from the signal generator to the ground terminal of the set. Connect the primary terminals of the output transformer to an output meter. Set the frequency switch of the signal generator at 460 K.C. (the I. F. of model 59), and turn the switches of the set and signal generator on. Turn volume control full on. Turn the dial pointer on the set to 600, and then adjust the I. F. compensating condensers ⑧ and ⑮ by means of a fibre wrench so that maximum reading is obtained in the output meter. If the needle goes off scale, adjust the attenuator on the signal generator so that a lower reading is obtained.

Next adjust the ANT. and OSC. H. F. (high frequency) condensers ④ and ⑨ located on the tuning condenser gang. To adjust these condensers it is necessary to remove the chassis from the cabinet, necessitating removing back plate, base screws, knobs and pointers. Replace the grid clip on the 77 tube and connect the antenna and ground leads of the signal generator direct to the antenna and ground terminals of the set. Set the signal generator switch at 1400, turn the tuning condenser shaft until the rotary plates barely start to mesh with the stationary ones. Tune in the 1400 K.C. signal here and adjust condensers ④ and ⑨ for maximum output meter reading. When replacing the dial pointer, be sure it is mounted exactly as it was removed.

Finally adjust the regeneration condenser ⑯. With the set connected to an antenna, turn the station selector to receive a station at about 130 on the dial. With a screw driver turn the small fibre hex-head screw (which operates the regeneration condenser) located at rear of chassis below antenna and ground terminals, clockwise until the set squeals or oscillates. Then turn the hex-screw ¼ of a turn back until the squealing stops. Tune in other stations on different points on the scale to make sure that the squealing is eliminated. It will be necessary to readjust this condenser if a different type 77 tube is used for second detector.

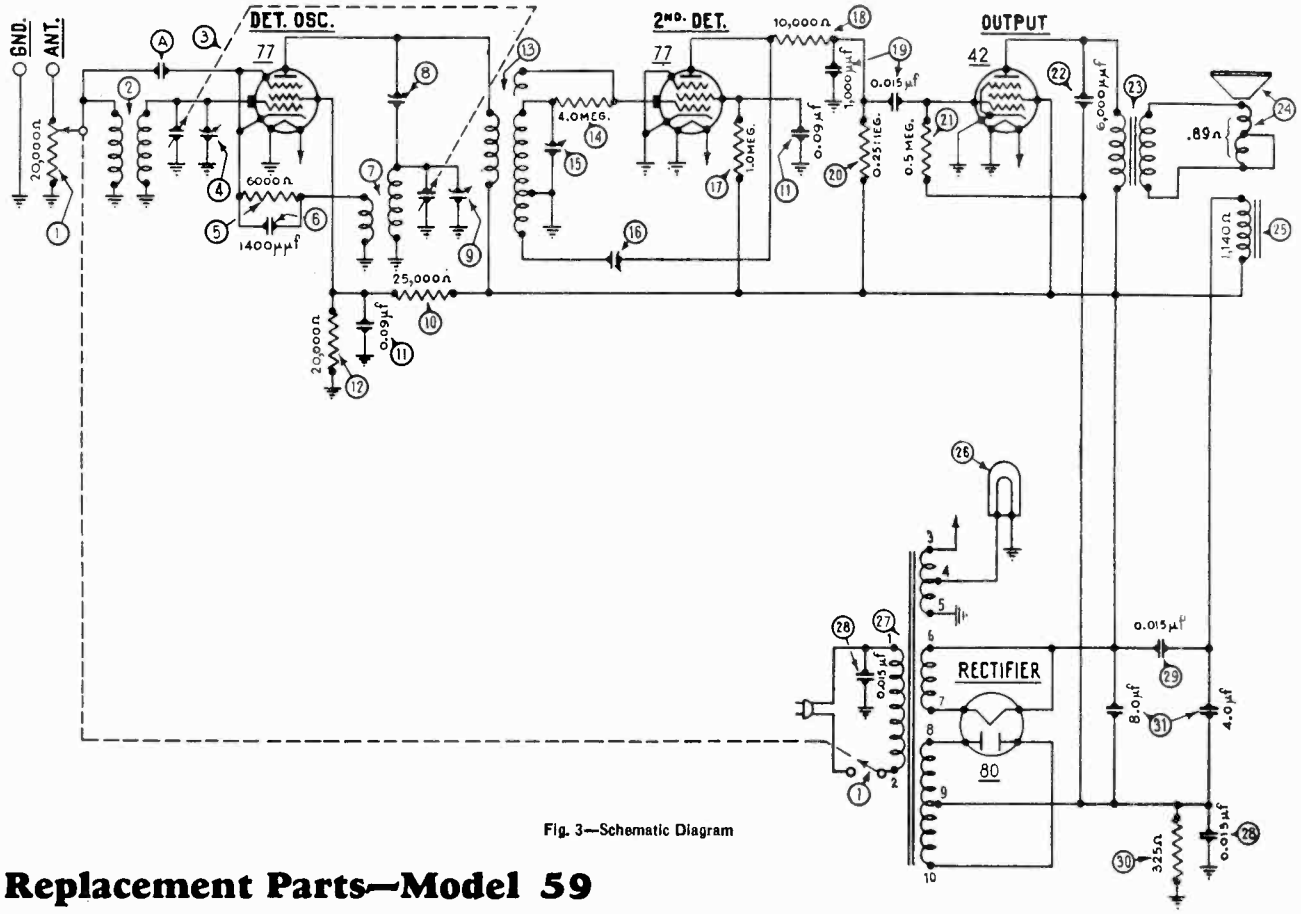


Fig. 3—Schematic Diagram

Replacement Parts—Model 59

No. on Diagram	Item	Part No.	List Price
(1)	Volume Control and On-Off Switch	33-5057	$1.40
(2)	Antenna Transformer	32-1388	.45
(3)*	Tuning Condenser Assembly	31-1190	2.75
(4)*	Compensating Condenser—Ant.	Part of (3)	....
(5)	Resistor (6,000 ohms—Blue-Black-Red)	7352	.25
(6)	Condenser (.0014 Mfd.—Mica)	7007	.35
(7)	Oscillator Transformer	32-1389	.40
(8)	Compensating Condenser (I. F. Primary)	04000-A	.15
(9)*	Compensating Condenser (Osc. H. F.)	Part of (3)	....
(10)	Resistor (25,000 ohms—Red-Green-Orange)	3656	.25
(11)*	Condenser (.09 twin—Black Bakelite)	4989-C	.40
(12)	Resistor (20,000 ohms—Red-Black-Orange)	6650	.25
(13)	I. F. Transformer	32-1155	1.20
(14)*	Resistor (4 Megohms—Yellow-Black-Green)	6010	.25
(15)	Compensating Condenser (I. F. Secondary)	04000-D	.15
(16)	Compensating Condenser (Regeneration)	04000	.20
(17)	Resistor (1 Megohm—Brown-Black-Green)	33-1096	.25
(18)	Resistor (10,000 ohms—Brown-Black-Orange)	33-1000	.25
(19)	Condenser (.015-.0001 Mfd. Block type)	7762-B	.30
(20)	Resistor (250,000 ohms—Red-Yellow-Yellow)	33-1097	.25
(21)	Resistor (500,000 ohms—Yellow-White-Yellow)	6097	.25
(22)*	Condenser (.006 Mfd. Block type)	7625-E	.25
(23)*	Output Transformer	32-7041	.95
(24)*	Voice Coil and Cone Assembly	36-3029	.75
(25)*	Field Coil and Pot Assembly	36-3081	1.75
(26)*	Pilot Lamp	6608	.11
(27)	Power Transformer	32-7064	3.15
(28)	Condenser (.015 Mfd. Twin)	3793-R	.40
(29)	Condenser (.015 Mfd.)	See Note A below	
(30)	Resistor (Wire wound 325 ohms)	7465	.15
(31)	Condenser (Electrolytic 8.0—4.0 Mfd.)	30-2013	1.95
	Tube Shield	28-1107	.10
	Four Prong Tube Socket	7544	.10
	Six Prong Tube Socket	7547	.11
	A. C. Cord and Plug	L-943A	.60
	Dial Scale	27-5023	.15

*Does not show in Fig. 4.

Note A: Condenser (29) not used in production.

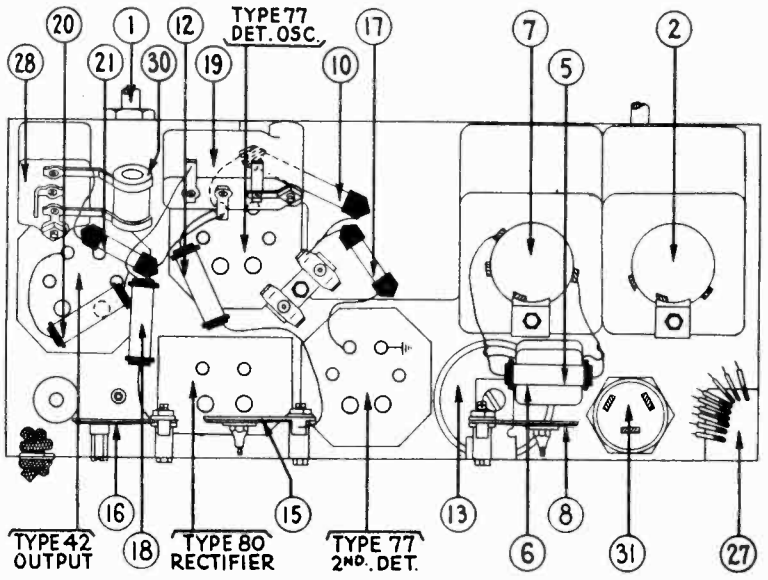


Fig. 4—Base View

PHILCO RADIO & TELEVISION CORPORATION
Service Department

May, 1934
Printed in U. S. A

PHILCO

REG. U.S. PAT. OFF

Service Bulletin — No. 193

Model 144

Philco Model 144 is a six-tube superheterodyne receiver operating on alternating current (A. C.) and designed for reception of any frequency from 520 K.C. to 23,000 K.C. (23 megacycles). It is equipped with shadow-tuning, four-point tone-control with fixed bass compensation; Model 144 has 5 watts output. The intermediate frequency (I. F.) is 460 K.C. Tubes used are the following Philco high-efficiency types:—

Detector-Oscillator	Type 6A7
1st I. F.	Type 78
2nd I. F.	Type 78
2nd Detector 1st A. F.	Type 75
Output	Type 42
Rectifier	Type 80

The power consumption of model 144 is 70 watts.

Tube Socket Voltages—Line Voltage 115

CIRCUIT	Det.-Osc.	1st I. F.	2nd I. F.	A. F.	Output	Rectifier
TUBE	6A7	78	78	75	42	80
Filament Volts (F-F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts (P-K)	250	230	230	185	300	350
Screen Grid Volts (SG-K)	60	75	75	...	310	...
Cathode Volts (K-Gnd)	1.4	2	2	0	0	...
6A7—G2 to K	160	...	...	...	...	...
6A7—G1 to K	20	...	...	...	...	...

Above values were obtained by means of an A. C. voltmeter for filament voltages and a high resistance D. C. voltmeter for all others. All values obtained from underside of chassis with test prods. Positions of controls were: Volume Control—maximum; Wave-Band Switch—extreme left (counter-clockwise); Dial at 520 K.C.

Philco Model 048 All-Purpose Tester is recommended for making the above tests. Use the illustration below (Fig. 1) as a guide to determine the points to be voltage-tested.

Power Transformer Voltages

Terminals	A. C. Volts	Circuit	Color of Leads
1–2	120	Primary	White
3–4	6.3	Filaments	Black
6–7	5.0	Filament of 80	Blue
8–10	746	Plates of 80	Yellow
5	...	Center tap of 3–4	Black—Yellow tracer
9	...	Center tap of 8–10	Yellow—Green tracer

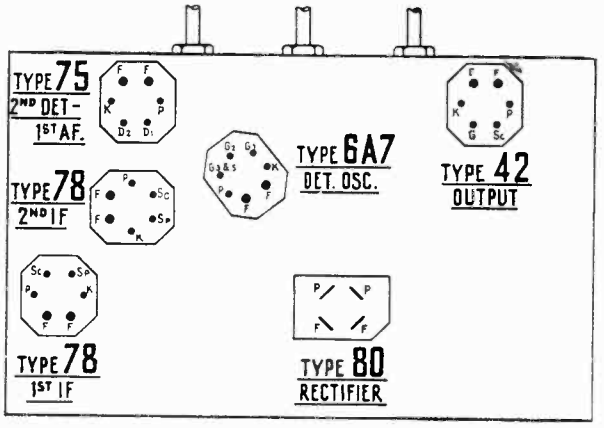


Fig. 1—Tube Sockets (underside)

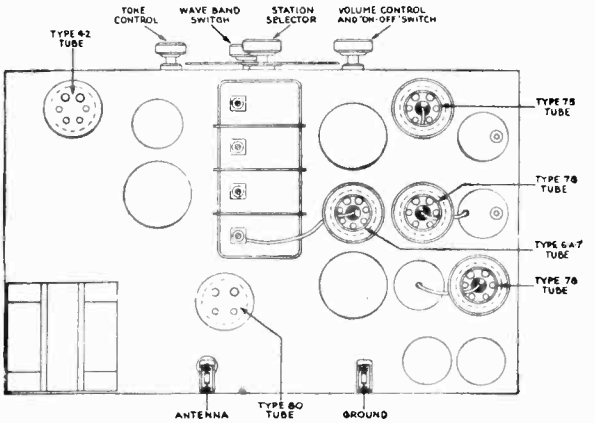


Fig. 2—Chassis—Top View

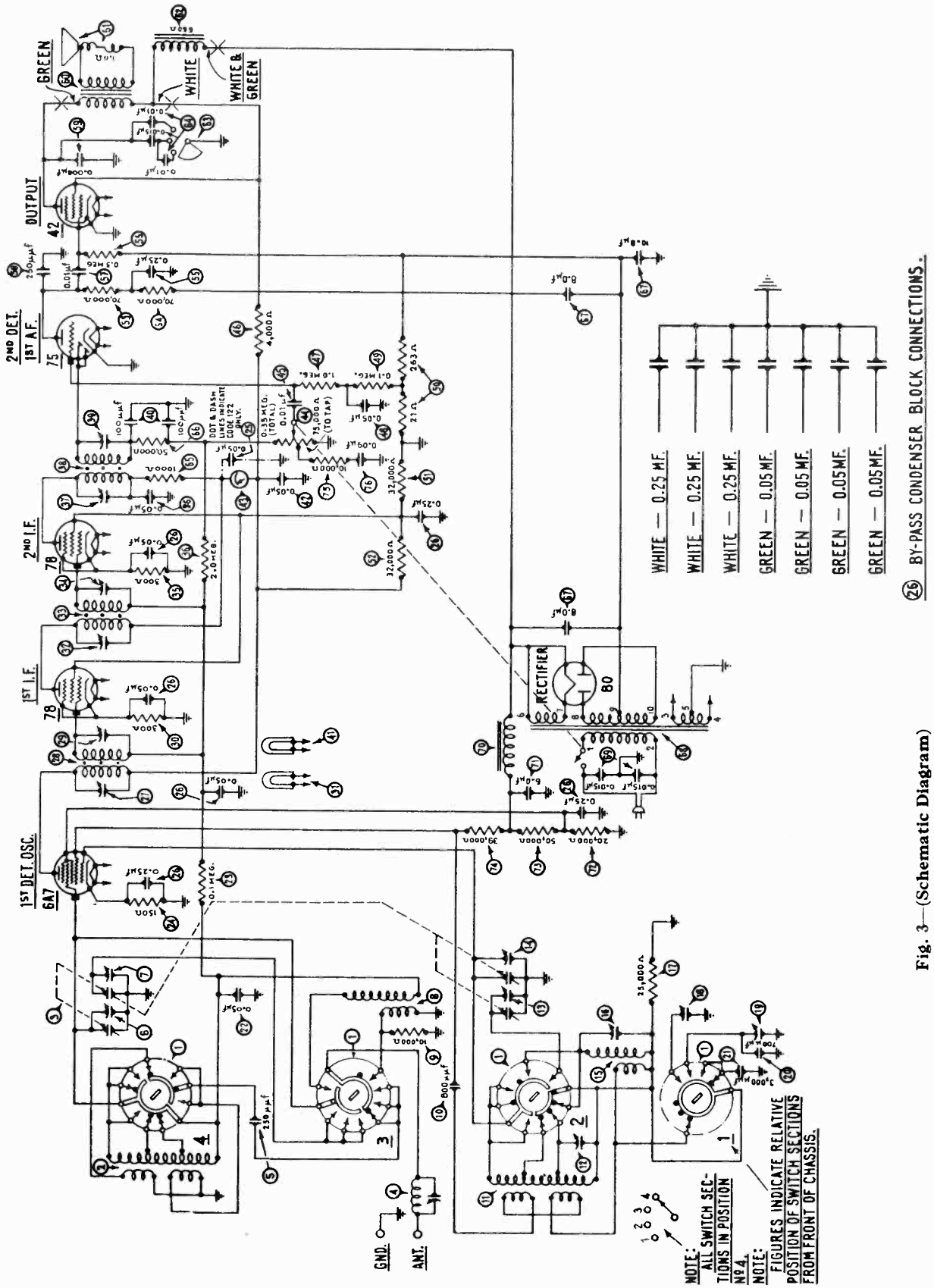


Fig. 3—(Schematic Diagram)

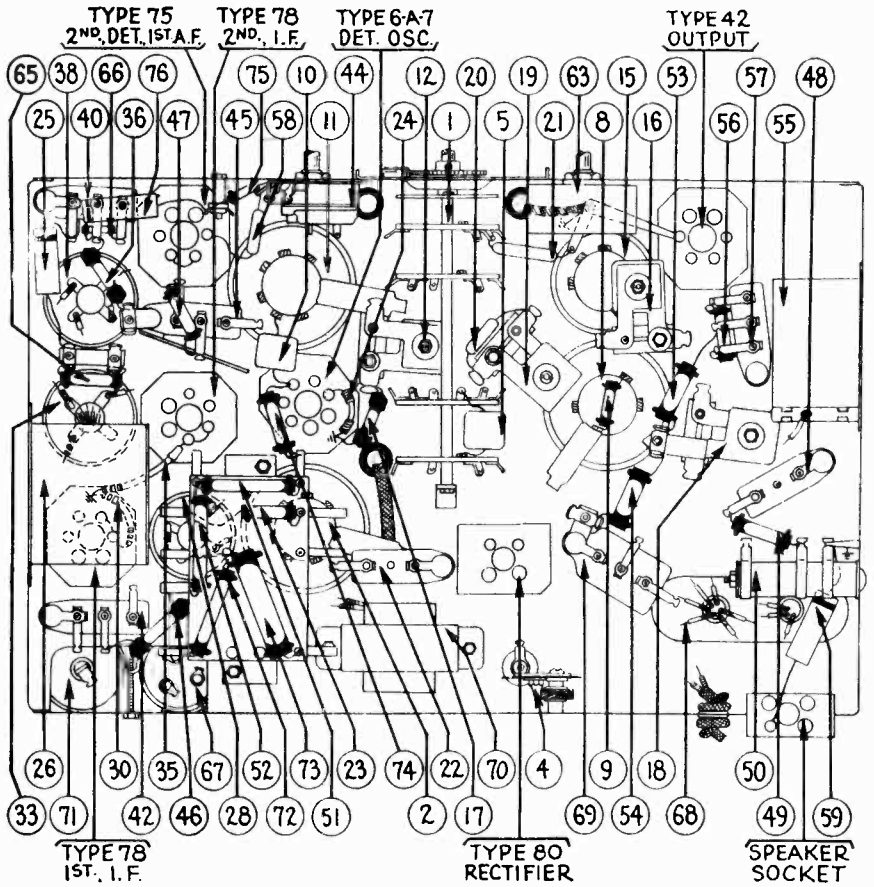


Fig. 4—(Base View)

REPLACEMENT PARTS — MODEL 144

Nos. on Diagram	Description	Part No.	List Price
(1)	Wave-Band Switch	42-1045	$3.60
(2)	Antenna Transformer (H. F. Bands)	32-1271	.70
(3)	Tuning Condenser Assembly	31-1175	....
(4)	Wave Trap	38-5487	.55
(5)	Condenser (.00025 Mica)	3082	.35
(6)	Compensating Condenser (Ant. H. F.)	Part of (3)	....
(7)	Compensating Condenser (Ant. Broadcast)	Part of (3)	....
(8)	Antenna Transformer (Broadcast Band)	32-1270	.55
(9)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
(10)	Condenser (.0008 Mfd. Mica)	6021	.35
(11)	Oscillator Transformer (H. F. Bands)	32-1273	.35
(12)	Compensating Condenser (Range 2)	04000C	.15
(13)	Compensating Condenser (Osc. Range 4)	Part of (3)	....
(14)	Compensating Condenser (Osc. Range 3)	Part of (3)	....
(15)	Oscillator Transformer (Broadcast)	32-1272	.70
(16)	Compensating Condenser (Osc. Broadcast)	04000A	.15
(17)	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
(18)	Compensating Condenser (Broadcast Series)	04000S	.35
(19)	Compensating Condenser (Range 2; Series)	04000R	.45
(20)	Condenser (.0007 Mfd. Mica)	4520	.35
(21)	Condenser (.003 Mfd. Mica)	7301	.45
(22)	Condenser (.05 Mfd. Bakelite Block)	3615-L	.35
(23)	Resistor (100,000 ohms) (White-White-Orange)	4411	.25
(24)	Resistor (150 ohms Flexible Wire-Wound)	33-3140	.20
(25)	Condenser (.05 mfd. tubular) (Used in Code 122 only)	30-4123	.35
(26)	Condenser Block (.25, .25, .25, .05, .05, .05, .05)	30-4167	1.15
(27)	Compensating Condenser (1st I. F. pri.)	Part of (28)	....
(28)	1st I. F. Transformer	32-1369	1.50
(29)	Compensating Condenser (1st I. F. Sec.)	Part of (28)	....
(30)	Resistor (300 ohms Flexible Wire-Wound)	33-3010	.20
(31)	Pilot Lamp	6608	.11
(32)	Compensating Condenser (2d I. F. Pri.)	Part of (33)	....
(33)	2d I. F. Transformer	32-1306	.90
(34)	Compensating Condenser (2d I. F. Sec.)	Part of (33)	....
(35)	Resistor (300 ohms Flexible Wire-Wound)	33-3010	.20
(36)	Resistor (2 Megs.) (Red-Black-Green)	33-1025	.25
(37)	Compensating Condenser (3d I. F. Pri.)	Part of (38)	....
(38)	3d I. F. Transformer	32-1307	.80
(39)	Compensating Condenser (3d I. F. Sec.)	Part of (38)	....
(40)	Condenser (.0001 Mfd. Twin—Bakelite Block)	8035-L	.25
(41)	Pilot Lamp for Shadowmeter	Part of (43)	....
(42)	Condenser (.05 Mfd. Bakelite Block)	3615AB	.35
(43)	Shadowmeter	6497	2.50
(44)	Volume Control & On-Off Switch	33-5068	1.45
(45)	Condenser (.01 Mfd. Bakelite Block)	3903J	.25
(46)	Resistor (4,000 ohms) (Yellow-Black-Red)	7832	$0.25
(47)	Resistor (1 Meg.) (Brown-Black-Green)	4409	.25
(48)	Condenser (.05 Mfd. Bakelite Block)	3615-L	.35
(49)	Resistor (100,000 ohms) (White-White-Orange)	4411	.25
(50)	Resistor BC (263 ohms, 21 ohms, Wire-Wound)	33-3069	.25
(51)	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
(52)	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
(53)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(54)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(55)	Condenser (25 Mfd.) (Metal Case)	4264	.60
(56)	Resistor (500,000 ohms) (Yellow-White-Yellow)	4517	.25
(57)	Condenser (.01 Mfd. Bakelite Block)	3903AN	.25
(58)	Condenser (.00025 Mfd. Mica)	30-1032	.35
(59)	Condenser (.006 Mfd. Tubular)	30-4024	.40
(60)	Output Transformer	32-7178	1.60
(61)	Voice Coil & Cone Assembly	(H-16) 02625	.80
		(K-23) 36-3174	.40
(62)	Field Coil & Pot Assembly	H-16 (36-3218)	3.50
		K-23 (36-3239)	3.75
(63)	Tone Control	30-4168	.75
(64)	Condensers (Inside 63)	Part of (63)	....
(65)	Resistor (1,000 ohms) (Brown-Black-Red)	5837	.25
(66)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
(67)	Condenser—Electrolytic (8-8-10 Mfd.)	30-2073	3.45
(68)	Power Transformer	32-7234	4.75
(69)	Condenser (.015 Mfd. Twin)	3793-H	.40
(70)	Filter Choke	5930	1.75
(71)	Condenser (6 Mfd. Electrolytic)	30-2020	1.40
(72)	Resistor (20,000 ohms) (Red-Black-Orange)	6649	.25
(73)	Resistor (50,000 ohms) (Green-Brown-Orange)	5868	.35
(74)	Resistor (39,000 ohms) (Orange-White-Orange)	33-1027	.25
(75)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
(76)	Condenser (.02 Mfd. Tubular)	30-4113	.30
	A. C. Cord and Plug Assembly	L-943A	.60
	Dial Assembly	31-1206	1.25
	Dial Scale	27-5044	.65
	Chassis Mounting Screw	W-1358A	2.60 C.
	Chassis Mounting Foot (Rubber)	27-4116	.05
	Chassis Mounting Foot (Plate)	27-7497	.35 C.
	Tube Shield	28-1107	.10
	4 Prong Tube Socket	7544	.10
	6 Prong Tube Socket	7547	.11
	7 Prong Tube Socket	27-6005	.11
	Speaker Socket	4957	.10
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Knob (Station Selector)	27-4127	.10

Adjusting Compensating Condensers

The compensating condensers of Model 144 have been adjusted accurately before shipment. If later adjustment is required, in most cases only the intermediate frequency and low frequency compensating condensers should be done. Extreme care must be given the adjustment of the high frequency circuits, and the adjustment should NOT be undertaken unless the receiver is seriously out of alignment.

DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections numbered 3 and 4 of the Tuning Condenser Assembly (Fig. 5). These have been adjusted, and sealed, at the factory.

Philco Model 024, an accurately calibrated signal generator covering broadcast and police band frequencies, is recommended for the adjustment of the intermediate frequency and low frequency compensating condensers.

Philco Model 091 crystal-controlled Signal Generator is recommended for the high frequency adjustments. It gives an accurate and constant 3600 kilocycle (3.6 megacycle) signal, the harmonics of which include the necessary high frequencies for adjusting the compensating condensers in the high frequency circuits.

1—ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6A7 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 an output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 144) and adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I. F. compensating condensers is shown in Figure 5. Each of the I. F. transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

2—ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). 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 (extreme left) and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap ④ condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ④ is located at rear and underneath the chassis, and is shown in Figures 4 and 5. It is reached from the rear of the chassis.

3—ADJUSTMENT OF THE DIAL FREQUENCIES—Model 144 has four separate frequency bands or ranges, each obtained by one of the four positions of the wave-band switch. There is a compensating condenser for each range, which must now be adjusted. In the following procedure, the frequency ranges referred to, and obtained by the different positions of the switch are:

Range 1	520 K.C.—1500 K.C.
Range 2	1.5 M.C.—4.0 M.C.
Range 3	4.0 M.C.—11.0 M.C.
Range 4	11.0 M.C.—23.0 M.C.

Connect the output terminals of the Model 091 or equivalent Signal Generator, to the "ANT" and "GND" terminals of the receiver chassis. Connect an output meter to the primary terminals of the Output Transformer of the receiver. Set the Wave-Band Switch to Range 4, and the Station Selector at 21.6 M.C. The sixth harmonic of the 3.6 M.C. crystal in the Model 091 Signal Generator is picked up at this point. Adjust the compensating condenser ⑬ on Section 1 of Tuning Condenser for maximum response in the output of the receiver. Turn the Wave-Band Switch to Range 3, and the Station Selector to 10.8 M.C. Here, the third harmonic of the 3.6 M.C. crystal will be heard. Adjust the compensating condenser ⑭ on Section 2 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 2, and adjust the Station Selector to 3.6 M.C. The "Antenna" connection between the Signal Generator and the receiver chassis must be removed for this adjustment, otherwise the output of the Signal Generator will be too great. Adjust the compensating condenser ⑫ to give maximum response in the output meter. This compensating condenser is located underneath the chassis and is not accessible from above. See Figure 4.

This concludes adjustments requiring the Model 091 (or equivalent) high frequency signal generator.

The Model 024 or its equivalent is now used again. Turn the Wave-Band Switch of the set to Range 2 and the Station Selector to 1.5 M.C. Set the Signal Generator at 1500 K.C. Make sure the "Antenna" connection between the Signal Generator and the Chassis has been restored. Adjust compensating condenser ⑲ located underneath the chassis, (Figure 4). Adjustment is made from the underside of the chassis.

Turn the Wave-Band Switch to Range 1 and the Station Selector to 1400 K.C. Set the Signal Generator at 1400 K.C. Adjust compensating condenser ⑯, which is located underneath the chassis. (See Figure 4). This adjustment is made from the underside of the chassis.

Finally, with Wave-Band Switch at Range 1, and Station Selector at 520 K.C., set the Signal Generator at 520 K.C. and adjust compensating condenser ⑱ (Figure 4). This compensating condenser is also mounted underneath the chassis, and reached from below.

For proper and accurate adjustment of Model 144, the procedure must be followed exactly in the order given. The adjustment should not be undertaken without proper equipment as mentioned above.

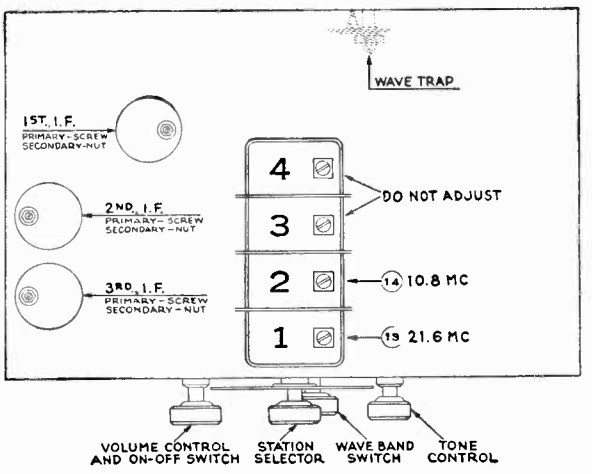


Fig. 5—Position of Compensating Condensers Reached from Above Chassis

PHILCO RADIO AND TELEVISION CORPORATION
Service Department

May, 1934
Printed in U. S. A

PHILCO

REG. U.S. PAT. OFF

Service Bulletin — No. 195

Model 29

Philco Model 29 is a superheterodyne receiver operating on alternating current and 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 and the right in megacycles. A two-position switch changes reception from standard to short-waves. This model is equipped with shadow tuning, three point tone control with fixed bass compensation, and automatic volume control. The output is 5 watts.

Model 29 uses a type 6-A-7 detector-oscillator, two type 39-44 I. F. tubes, type 75 2d detector, type 42 output tube, and type 80 rectifier. The power consumption is 70 watts. The intermediate frequency is 460 K.C.

Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in Model 29, an accurately calibrated signal generator and a special insulated padding wrench and screwdriver are needed. We suggest the Philco Model 024 Signal Generator or the 048 Tester which includes a similar instrument. Philco No. 3164 wrench and 27-1159 screwdriver are recommended in addition.

Adjustments are made in the following order:—

ADJUSTMENT OF INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6-A-7 tube and connect the "ANT" output terminal on 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 to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 29) turn wave-band switch of receiver to left and dial to 600 K.C. Turn receiver and Signal Generator "ON". 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 metal "Cans" near the rear of chassis. Each of these transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF 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 signal generator. The Wave Trap ① is located at rear and underneath the chassis, and is shown in Figure 4. It is reached from the rear of the chassis, thru hole at right hand end of set base.

DETECTOR; 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 ⑦ (nearest tuning control), to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser ⑪, 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 (⑮ in Fig. 4) to maximum reading. This adjustment is reached thru the hole in top of chassis, between the two electrolytic condensers (left-hand end of chassis when facing rear).

Tube Socket Voltages—(Line Voltage 115)

Function	Det. Osc.	1st I. F.	2nd I. F.	2nd Det.	Output	Rectifier
Type	6A7	39/44	39/44	75	42	80
Filament (F to F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P to K)	210	200	200	200	300	310
Screen (SG to K)	80	80	80	...	315	...
Cathode (K to GND)	4.8	4.8	4.8	0	0	...
6-A-7 Grid G1 to K	35	...	...	...	...	...
6-A-7 Grid G2 to K	170	...	...	...	...	...

Power Transformer Voltages

Terminals	A. C. Volts	Circuit	Color of Leads
1-2	120	Primary	White
3-4	5.0	Fil. of 80	Blue
5-7	746	Plates of 80	Yellow
8-10	6.3	Filaments	Black
6	...	Center of 5-7	Black—Yellow Tracer
9	...	Center of 8-10	Yellow—Green Tracer

The above tests were made with an A. C. voltmeter for filament voltages and a high-resistance D. C. voltmeter for all others. Dial at 550 K.C., wave-band switch to left, volume control at maximum. Tests made with test prods applied to sockets underneath chassis.

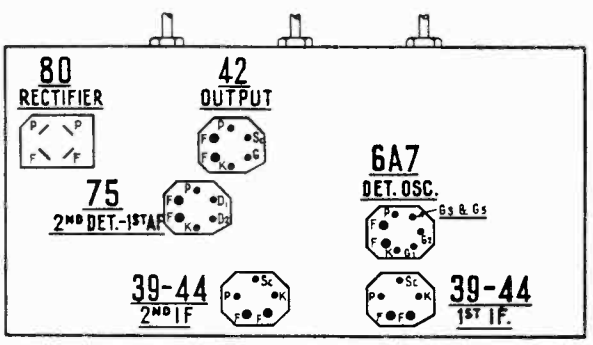


Fig. 1—Tube Socket Layout

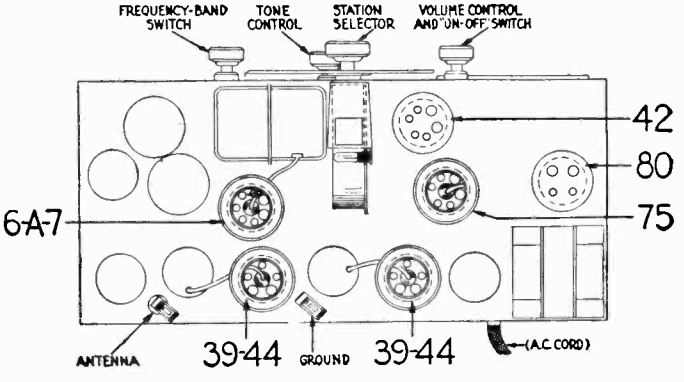


Fig. 2—Top View

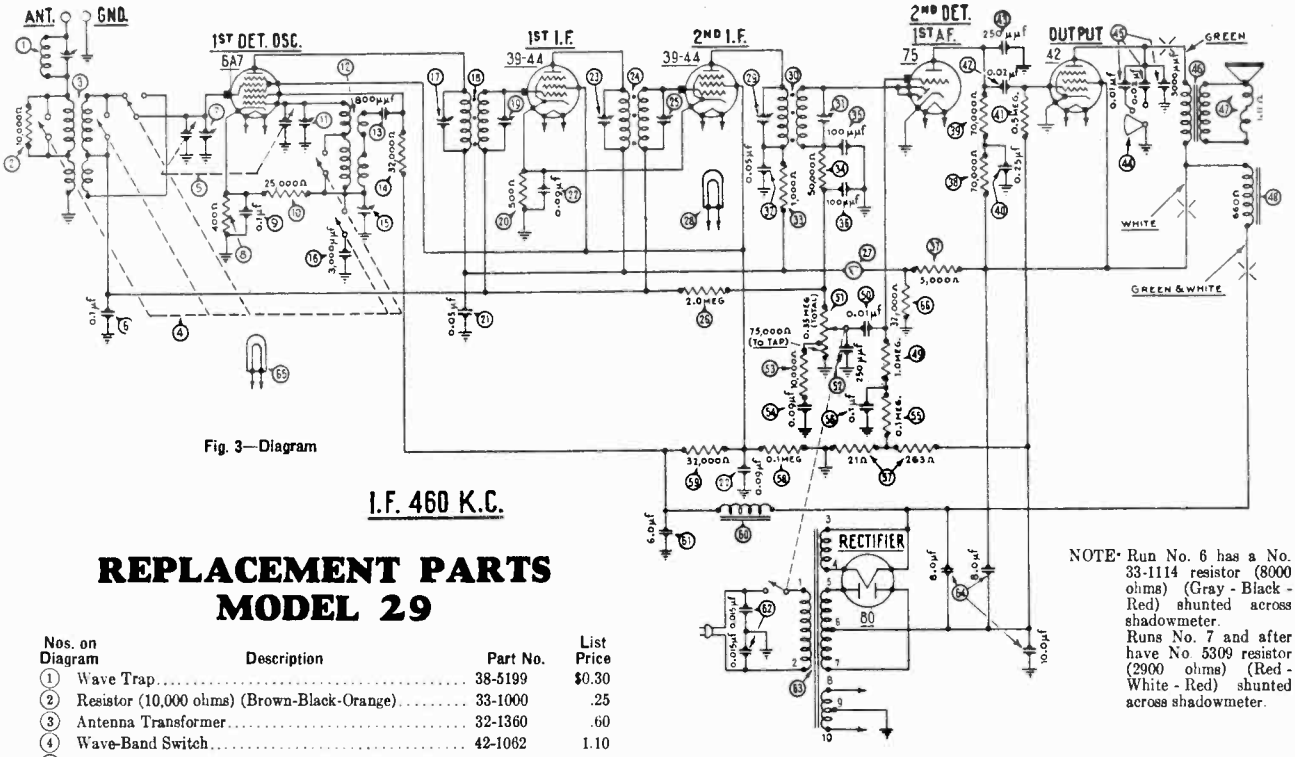


Fig. 3—Diagram

REPLACEMENT PARTS
MODEL 29

Nos. on Diagram	Description	Part No.	List Price
(1)	Wave Trap	38-5199	$0.30
(2)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
(3)	Antenna Transformer	32-1360	.60
(4)	Wave-Band Switch	42-1062	1.10
(5)	Tuning Condenser Assembly	*31-1192	....
(5)	Condenser (.1 Mfd. Tubular)	30-4122	.35
(7)	Compensating Condenser (Det.)	Part of (5)	....
(8)	Resistor (400 ohms Flexible Wire-Wound)	33-3016	.20
(9)	Condenser (.1 Mfd. Tubular)	30-4122	.35
(10)	Resistor (25,000 ohms) (Red-Green-Orange)	4516	.25
(11)	Compensating Condenser (Osc. H. F.)	Part of (5)	....
(12)	Oscillator Transformer	32-1361	.65
(13)	Condenser (.0008 Mfd. Mica)	5878	.35
(14)	Resistor (32,000 ohms) (Orange-Red-Orange)	3525	.25
(15)	Compensating Condenser (Osc. L. F.)	04000S	.35
(16)	Condenser (.003 Mfd. Mica)	7301	.45
(17)	Compensating Condenser (1st I. F. Primary)	Part of (18)	....
(18)	First I. F. Transformer	32-1362	1.50
(19)	Compensating Condenser (1st I. F. Sec.)	Part of (18)	....
(20)	Resistor (500 ohms Flexible Wire-Wound)	6977	.20
(21)	Condenser (.05 Mfd. Tubular)	30-4123	.35
(22)	Condenser (.09 Mfd. Twin) (Bakelite Block)	4989-Z	.40
(23)	Compensating Condenser (2d I. F. Pri.)	Part of (24)	....
(24)	2d I. F. Transformer	32-1363	1.50
(25)	Compensating Condenser (2d I. F. Sec.)	Part of (24)	....
(26)	Resistor (2 Megohms) (Red-Black-Green)	5872	.25
(27)	Shadowmeter	6497	2.50
(28)	Pilot Lamp (Shadowmeter)	Part of (27)	....
(29)	Compensating Condenser (3d I. F. Pri.)	Part of (30)	....
(30)	3d I. F. Transformer	32-1364	1.55
(31)	Compensating Condenser (3d I. F. Sec.)	Part of (30)	....
(32)	Condenser (.05 Mfd. Tubular)	30-4123	.35
(33)	Resistor (1,000 ohms) (Brown-Black-Red)	5837	.25
(34)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
(35)	Condenser (.0001 Mfd. Mica)	30-1031	....
(36)	Condenser (.0001 Mfd. Mica)	30-1031	....
(37)	Resistor (5,000 ohms) (Green-Black-Red)	3526	.25
(38)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(39)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(40)	Condenser (.25 Mfd. Tubular)	30-4134	.45
(41)	Resistor (500,000 ohms) (Yellow-White-Yellow)	4517	.25
(42)	Condenser (.02 Mfd. Tubular)	30-4113	.30
(43)	Condenser (.00025 Mfd. Mica)	5858	.35
(44)	Tone Control	30-4178	.75
(45)	Condensers (Inside 44)	Part of (44)	....
(46)	Output Transformer	32-7178	1.60
(47)	Voice Coil and Cone Assembly (H-16)	02625	.80
(48)	Field Coil and Pot Assembly (H-16)	36-3218	3.50
(49)	Resistor (1 Meg.) (Brown-Black-Green)	4409	.25
(50)	Condenser (.01 Mfd. Tubular)	30-4124	.35
(51)	Volume Control and On-Off Switch	33-5066	1.45
(52)	Condenser (.00025 Mfd. Mica)	5858	.35
(53)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
(54)	Condenser (.09 Mfd.) (Bakelite Block)	4989-AM	.35

NOTE: Run No. 6 has a No. 33-1114 resistor (8000 ohms) (Gray - Black - Red) shunted across shadowmeter.
Runs No. 7 and after have No. 5309 resistor (2900 ohms) (Red - White - Red) shunted across shadowmeter.

Nos. on Diagram	Description	Part No.	List Price
(55)	Resistor (100,000 ohms) (White-White-Orange)	4411	$0.25
(56)	Condenser (.1 Mfd. Tubular)	30-4122	.35
(57)	B. C. Resistor (263 ohms; 23 ohms; Wire-Wound)	33-3069	.25
(58)	Resistor (.1 Meg.) (White-White-Orange)	3767	.25
(59)	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
(60)	Filter Choke	32-7018	1.50
(61)	Condenser (Electrolytic—6 Mfd.)	30-2020	1.40
(62)	Condenser (.015 Mfd. Twin—Bakelite Case)	3793-E	.40
(63)	Power Transformer	32-7229	5.25
(64)	Condenser (Electrolytic—8 Mfd., 8 Mfd., 10 Mfd.)	30-2073	3.45
(65)	Pilot Lamp (Dial)	6608	.11
(66)	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
	A. C. Cord and Plug Assembly	L-943-A	.60
	Tube Shield	28-1107	.10
	Four-Prong Socket	7544	.10
	Five-Prong Socket	7547	.11
	Six-Prong Socket	7546	.11
	Seven-Prong Socket	27-6005	.11
	Speaker Socket	4957	.10
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Dial Assembly	*31-1208	.45
	Dial Scale	27-5042	.25
	Chassis Mounting Screw	W-1345A	2.75 C.
	Chassis Mounting Foot (Steel)	29-1983	.03
	Chassis Mounting Foot (Rubber)	27-4116	.05
	Chassis Mounting Foot Plate	27-7497	.35 C.
	Screw (Foot mtg.)	W-644A	1.50 C.

*Note: Some Model 29 sets use tuning condenser assembly No. 31-1250, which has dial assembly 31-1245. This is not interchangeable with 31-1192 and 31-1208.

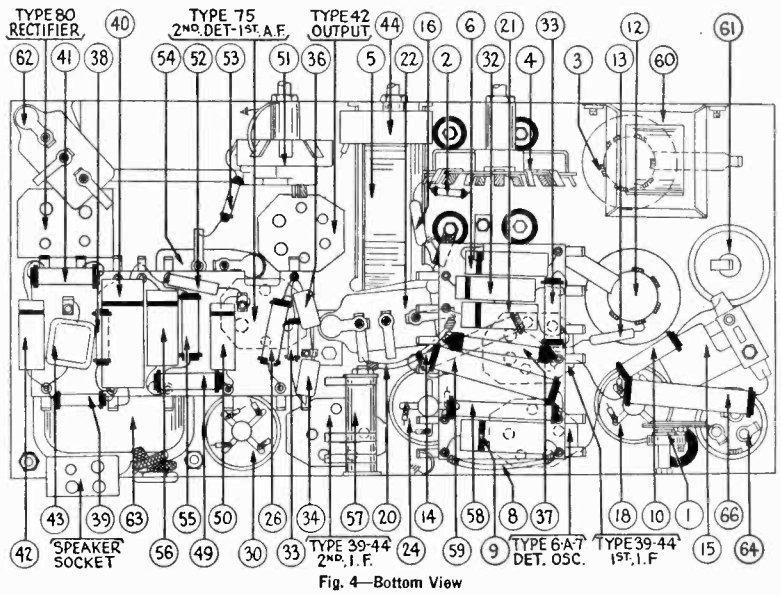


Fig. 4—Bottom View

PHILCO RADIO & TELEVISION CORPORATION
Service Department

June. 1934
Printed in U. S. A

PHILCO

REG. U.S. PAT. OFF

Service Bulletin — No. 197

Model 66

Model 66 is a five-tube superheterodyne radio receiver, capable of receiving either standard broadcasts (and police calls up to 1720 K.C.), or short-wave stations within a frequency range of 5.5 to 16.0 megacycles. The frequency range on standard broadcast is 540-1720 kilocycles.

The tubes used are: Type 6A7 detector-oscillator, type 78 intermediate frequency, type 75 2d detector, type 42 output and type 80 rectifier. The intermediate frequency of the Model 66 is 460 K.C. and the power consumption is 60 watts.

Tube Socket Voltages—Line Voltage 115

Tube	6A7	78	75	42	80
Circuit	Det. Osc.	I. F.	2d Det.	Output	Rect.
Filament (F-F)	6.3	6.3	6.3	6.3	5.0
Plate (P-K)	260	260	160	250	340
Screen (SG-K)	85	85	...	260	...
Cathode (K-F)	2.1	2.2	0	0	...

6A7–G1-K: 20; 6A7–G2-K: 130.

The above voltages were obtained by using a high resistance multi-range DC voltmeter, and an AC voltmeter for filaments. Tests made with test prods applied to tube sockets at underside of chassis (see Fig. 1). Volume control at maximum, dial at low frequency end of scale.

Power Transformer Data

Terminals	Volts	Circuit	Color of Leads
1–2	105–125	Primary	White
3–5	6.3	Filaments	Black
6–7	5.0	Filament of 80	Blue
8–10	680	Plates of 80	Yellow
4	...	Center Tap of 3–5	Black—Yellow Tracer
9	...	Center Tap of 8–10	Yellow—Green Tracer

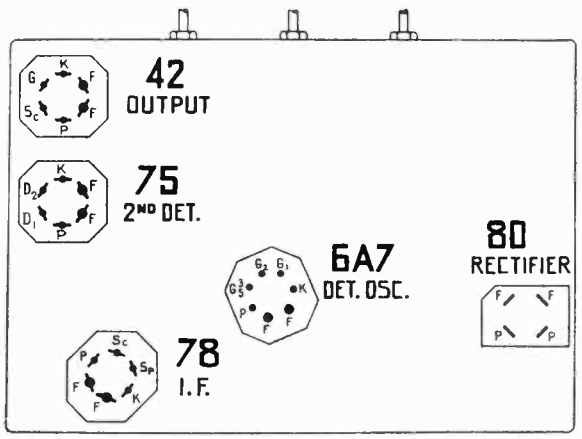


Fig. 1—Tube Sockets (Underside)

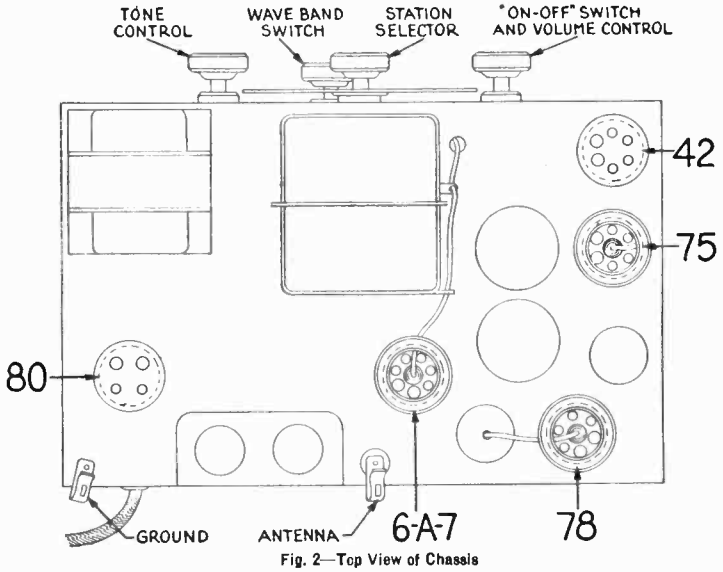


Fig. 2—Top View of Chassis

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 66 Receiver requires the use of an accurate signal generator such as Philco Model 024, an efficient output meter (Philco Model 012 or Model 025 are recommended), and a suitable fibre hex wrench. Connect the output meter to the plate and cathode prongs of the 42 output tube.

Adjustments are made in the following order:

(1)—I. F. (Intermediate Frequency)—Remove grid clip from cap on 6A7 tube and connect antenna lead from signal generator to cap of tube. Connect ground lead to ground post on set. Turn on set and signal generator; set wave switch of latter to 460 K. C. (the I. F. of Model 66) and dial of set at 540, wave band switch to left. Adjust each of the four I. F. compensating condensers ⑰, ⑲, ㉒ and ㉔ in turn so that maximum reading is obtained in the output meter. If the meter reading goes off scale, adjust the attenuator on the signal generator so as to get a lower reading. These I. F. condensers (visible in Fig. 4) are adjusted by inserting the hex wrench thru the holes in rear of chassis sub-base (except one to extreme left when facing rear of set). Two of the holes are covered by small metal buttons which can be removed temporarily by hand.

(2)—WAVE TRAP—Replace grid clip on cap of 6A7 tube and connect antenna lead from signal generator to antenna post on set. Set signal generator at 460 K. C. and adjust wave trap ① so as to get MINIMUM reading in output meter.

(3)—ANT. and OSC. H. F.—These adjustments ⑦ and ⑪ are located on top of the tuning condenser assembly at right (facing front of set) and adjusted from above. The "ANT" ⑦ is nearest front of set. Set signal generator at 1700 and dial of set at 1700 and adjust these two condensers to get maximum output meter reading.

(4)—OSC. L. F.—This condenser ⑬ is located underneath chassis (see Fig. 4) and is reached from underneath. Set dial of set and signal generator switch at 600, and adjust for maximum reading.

PHILCO RADIO & TELEVISION CORPORATION

Service Department

June, 1934
Printed in U. S. A.

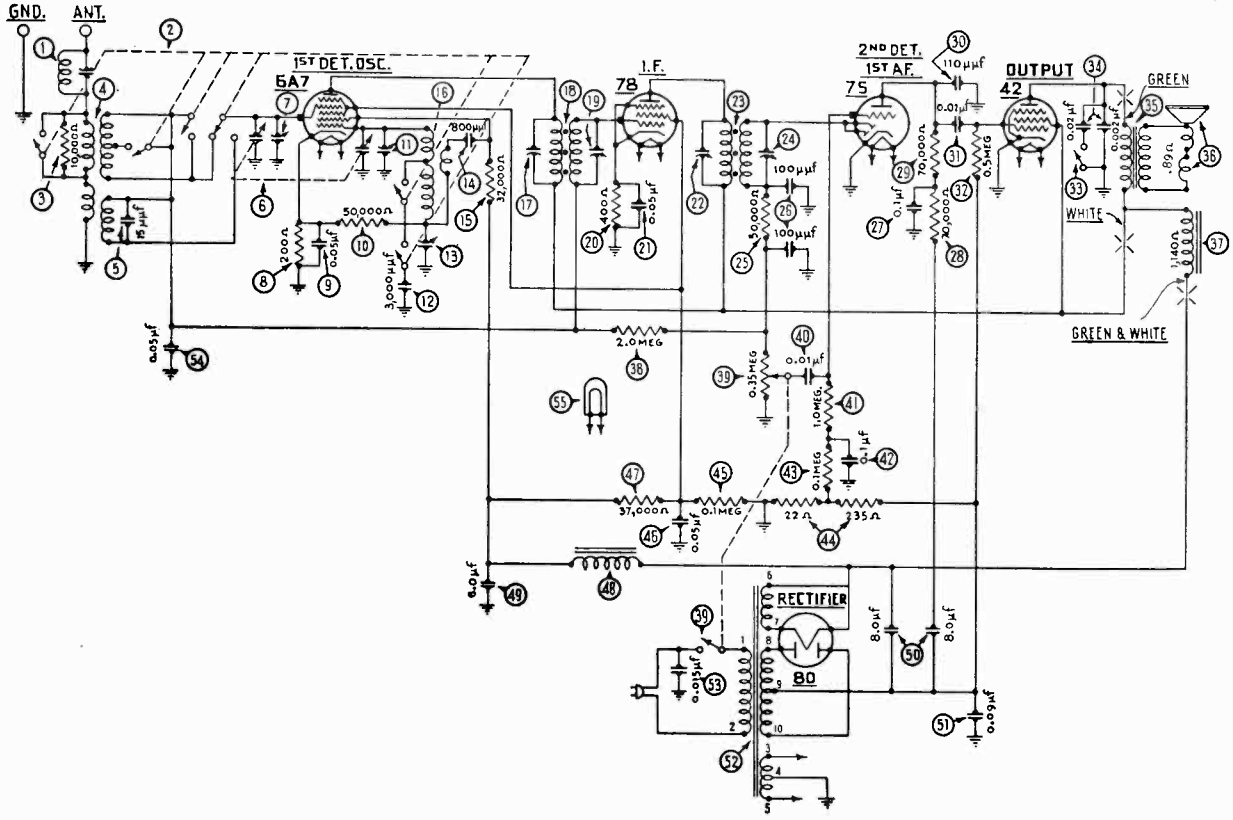


Fig. 3—Schematic Design

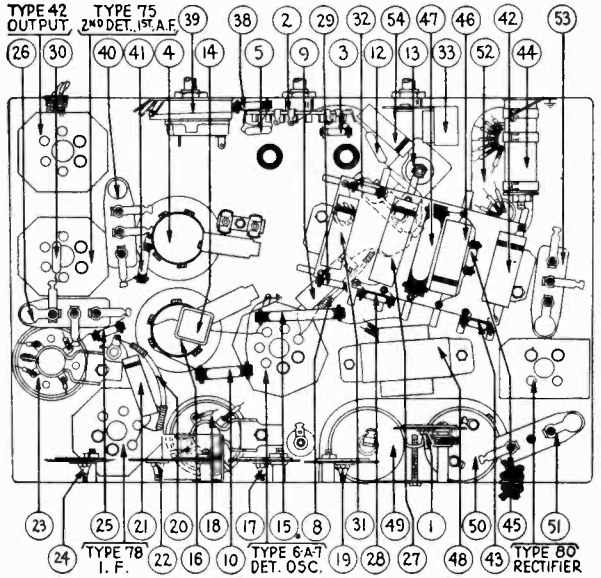


Fig. 4—Base View

Replacement Parts for Model 66

No. on Figs.	Description	Part No.	List Price
(1)	Wave Trap	38-5199	$0.30
(2)	Wave-band Switch	42-1066	.90
(3)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
(4)	Antenna Transformer	32-1412	.85
(5)	Condenser (.000015 Mfd.)	30-1030	.35
(6)	Tuning Condenser Assembly	31-1231	3.65
(7)	Compensating Condenser (ANT)	Part of (6)	....
(8)	Resistor (200 ohms Flexible) (Red-Black-Brown)	7217	.20
(9)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(10)	Resistor (50,000 ohms) (Green-Green-Orange)	6098	.25
(11)	Compensating Condenser (OSC. HF)	Part of (6)	....
(12)	Condenser (.003 Mfd. Mica)	30-1028	.60
(13)	Compensating Condenser (Osc. I. F.)	04000-S	.35
(14)	Condenser (.0008 Mfd. Mica)	5878	35
(15)	Resistor (32,000 ohms) (Orange-Red-Orange)	5279	.25
(16)	Oscillator Transformer	32-1413	.60
(17)	Compensating Condenser (1st I. F. Pri.)	04000M	.20
(18)	1st I. F. Transformer	32-1414	1.00
(19)	Compensating Condenser (1st I. F. Secondary)	04000M	.20
(20)	Resistor (400 ohms Flexible)	33-3016	.20
(21)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(22)	Compensating Condenser (2d I. F. Primary)	04000M	.20
(23)	2d I. F Transformer	32-1415	$1.00
(24)	Compensating Condenser (2d I. F. Secondary)	04000J	.20
(25)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
(26)	Condenser (.0001 Mfd. Twin Bakelite Block)	8035-B	.25
(27)	Condenser (.1 Mfd. Tubular)	30-4170	.35
(28)	Resistor (70,000 ohms) (Violet-Black-Orange)	33-1115	.25
(29)	Resistor (70 000 ohms) (Violet-Black-Orange)	33-1115	.25
(30)	Condenser (.00011 Mfd. Mica)	30-1006	.35
(31)	Condenser (.02 Mfd. Tubular)	30-4113	.30
(32)	Resistor (500,000 ohms) (Yellow-White-Yellow)	6097	.25
(33)	Tone Control	30-4192	.50
(34)	Condensers in Tone Control	Inside (33)	....
(35)	Output Transformer	32-7019	1.25
(35)	Voice Coil & Cone Assembly (S-12)	36-3014	.60
(37)	Field Coil and Pot. Assembly (S-12)	36-3341	2.75
(38)	Resistor (2 Megohms) (Red-Black-Green)	33-1025	.25
(39)	Volume Control and On-Off Switch	33-5006	1.45
(40)	Condenser (.01 Mfd.) (Bakelite Block)	3903-AB	.25
(41)	Resistor (1 Megohm) (Brown-Black-Green)	33-1096	.25
(42)	Condenser (.1 Mfd.)	30-4122	.35
(43)	Resistor (.1 Meg.) (White-White-Orange)	6099	.25
(44)	Resistor (B. C. Wire-wound) (22 [illegible] ohms)	33-3037	.20
(45)	Resistor (.1 Meg.) (White-White-Orange)	6099	$0.25
(46)	Condenser (.05 Mfd. Tubular)	30-4123	.35
(47)	Resistor (37,000 ohms) (Orange-Violet-Orange)	33-1098	.35
(48)	Filter Choke	32-7018	1.50
(49)	Condenser (Electrolytic—6 Mfd.)	30-2021	1.55
(50)	Condenser (Electrolytic—8-8 Mfd.)	30-2028	2.40
(51)	Condenser (.09 Mfd. Bakelite Block)	4989-D	.35
(52)	Power Transformer	8046	3.45
(53)	Condenser (.015 Mfd. Bakelite Block)	3793-W	.35
(54)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(55)	Dial Light	6608	.11
	Four Prong Socket	7544	.10
	Six Prong Socket	7547	.11
	Seven Prong Socket	27-6005	.11
	Tube Shield	28-1107	.10
	Chassis Mounting Screw	W-567	3.00C
	Chassis Mounting Washer (Metal)	W-315	.50C
	Chassis Mounting Washer (Rubber)	5189	.04
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Dial Assembly	31-1234	.30
	Dial Scale	27-5057	.10
	A. C. Cord and Plug Assembly	[illegible]8A	.60

PHILCO

REG. U.S. PAT. OFF

Service Bulletin — No. 194

Model 118

Philco Model 118 is an eight tube superheterodyne radio receiver operating on alternating current (A. C.) and designed for reception on either the standard broadcast band (including police bands up to 1720 K. C.), or a major section of the short wave band. A two-position switch changes reception from broadcast to short-wave. The frequency ranges are 540 to 1720 K. C. and 4.2 to 12 megacycles.

Model 118 is equipped with shadow-tuning, four point tone control with fixed bass compensation, and automatic volume control. The power consumption is 110 watts and the undistorted output of the Super Class "A" Amplifier is 10 watts. The intermediate frequency (I. F.) is 260 K. C.

Model 118 is equipped with the following tubes:

R. F.	Type 78
Detector-Oscillator	Type 6A7
I. F.	Type 78
2d Det. 1st A. F.	Type 75
Driver	Type 42
Output tubes (2) (Connected as triodes)	Type 42
Rectifier	Type 80

Tube Socket Voltages—Line Voltage 115

Function	R.F.	Det.-Osc.	I.F.	A.F.	Driver	Output		Rect.
Type	78	6A7	78	75	42	42	42	80
Filament (F-F)	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P-K)	180	180	200	125	195	280	280	315
Screen (SG-K)	80	175	80	...	195	290	290	...
Cathode (K to F)	2.5	2.6	3.2	0	0	0	0	...
6A7 G^1 to K	26							
6A7 G^2 to K	150							

Power Transformer Voltages

Terminals	A.C. Volts	Circuit	Color of Leads
1-2	120	Primary	White
3-5	6.3	Filaments	Black
6-7	5.0	Filament of 80	Blue
8-10	760	Plates of 80	Yellow
4	...	Center Tap of 3-5	Black—Yellow Tracer
9	...	Center Tap of 8-10	Yellow—Green Tracer

The above tests were made with an A. C. voltmeter for filament voltages and a high resistance D. C. voltmeter for all others. Dial at 550 K. C., wave band switch to left, volume control at maximum. Tests made with test prods applied to sockets underneath chassis. Philco Model 048 All-purpose Tester or Model 025 Circuit Tester are recommended for these tests. Use Fig. 1 in making tests given in left hand table above.

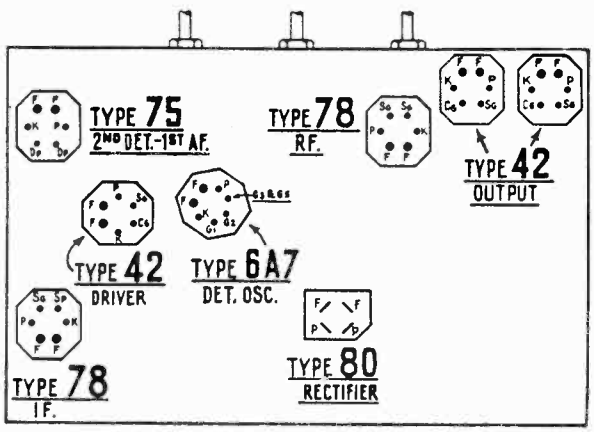


Fig. 1. Tube Socket Layout

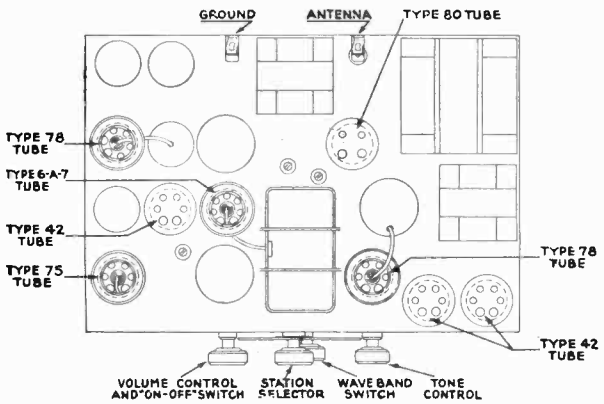


Fig. 2. Top View

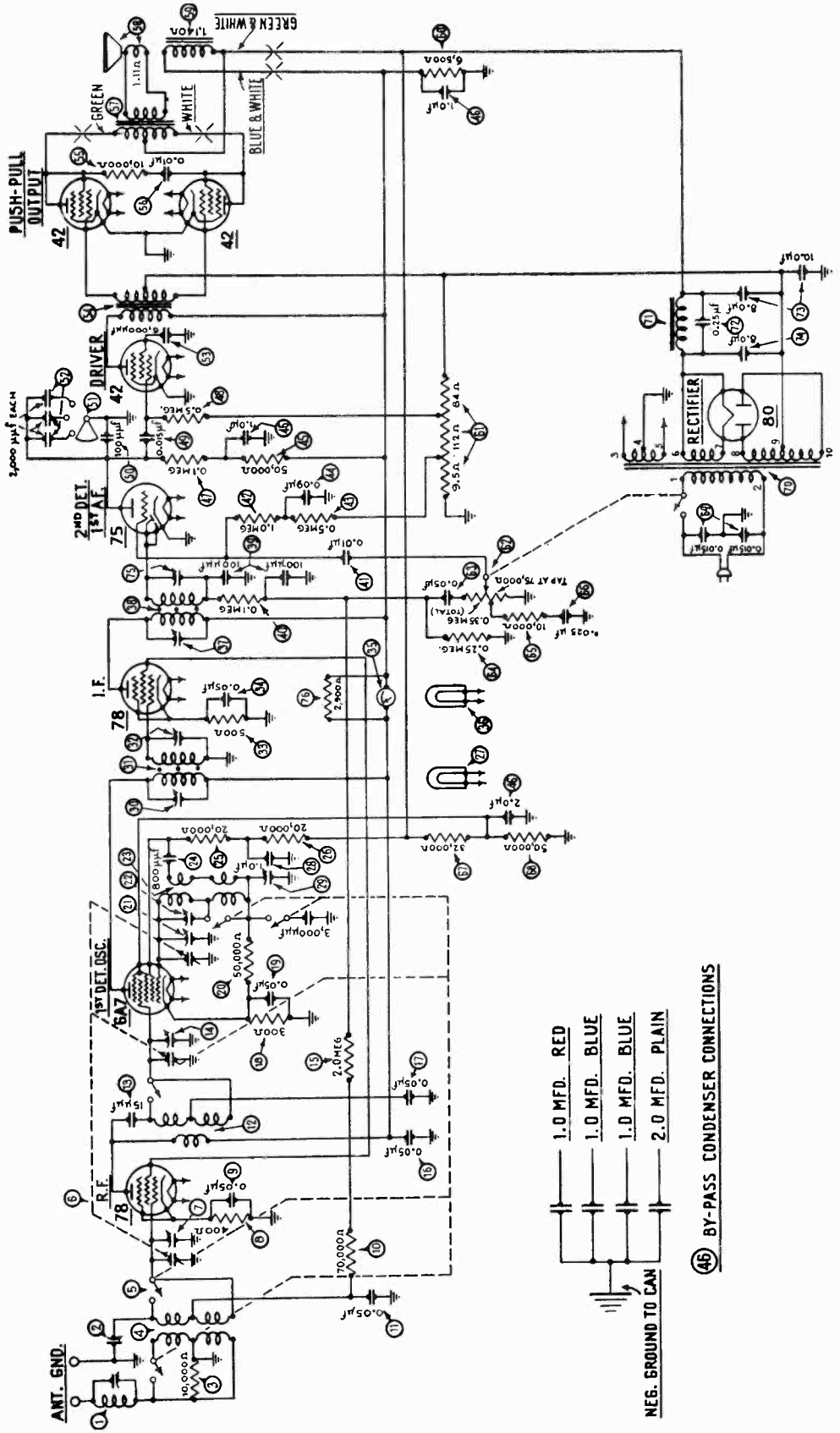


Fig. 3. Schematic Diagram

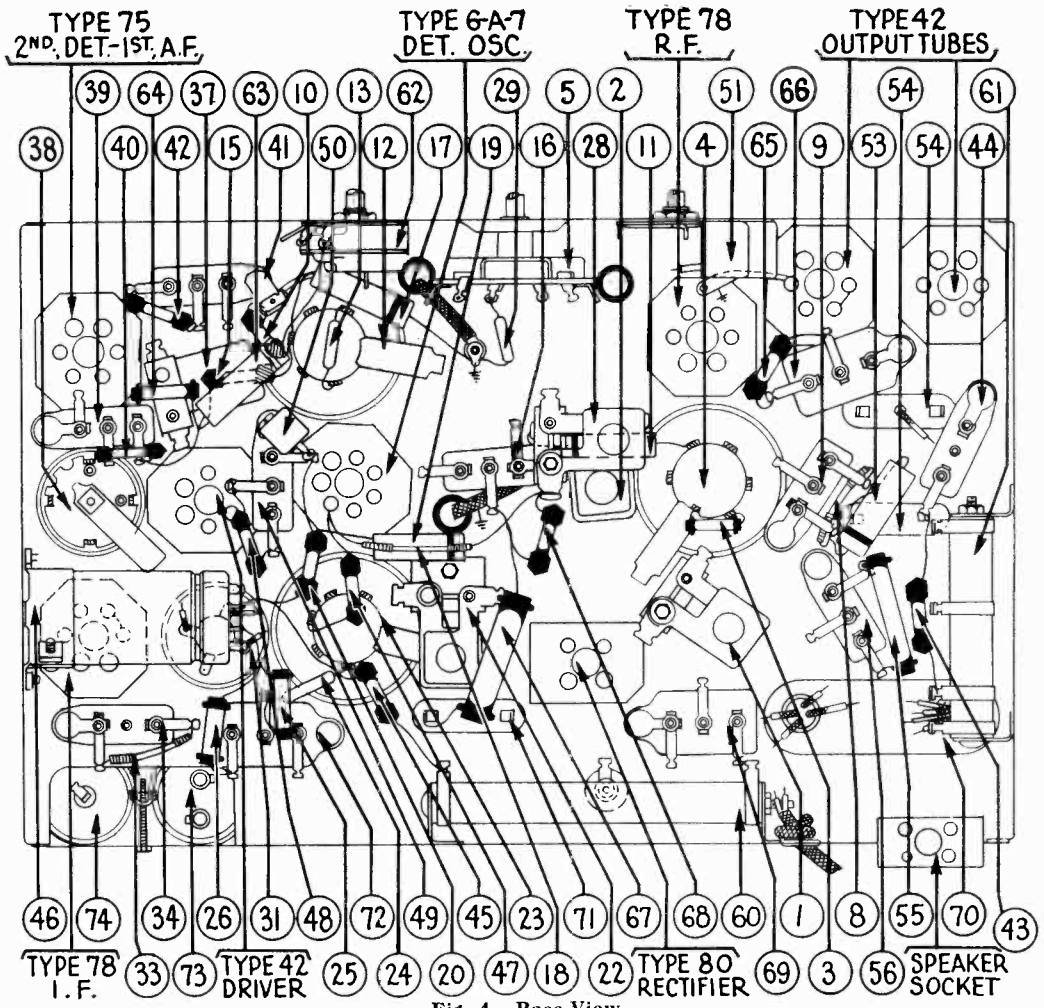


Fig. 4. Base View

Replacement Parts for Model 118

No. on Diagram	Description	Part No.	List Price
(1)	Wave Trap	38-5740	.45
(2)	Compensating Condenser (Ant.-H. F.)	04000D	$0.15
(3)	Resister (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
(4)	Antenna Transformer	32-1378	1.00
(5)	Wave Band Switch	42-1046	.80
(6)	Tuning Condenser Assembly	31-1173	6.25
(7)	Compensating Condenser (Ant.-Broadcast)	Part of (6)	....
(8)	Resistor (400 ohms Flexible Wire-Wound)	33-3016	.20
(9)	Condenser (.05 Mfd.) (Bakelite Block)	3615BK	.35
(10)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(11)	Condenser (.05 Mfd.) (Tubular)	30-4020	.35
(12)	Detector Transformer	32-1379	.70
(13)	Condenser (.000015 Mfd.) (Mica)	30-1030	.35
(14)	Compensating Condenser (Det.)	Part of (6)	....
(15)	Resistor (2 Meg.) (Red-Black-Green)	5872	.25
(16)	Condenser (.05 Mfd.) (Bakelite Block)	3615D	.35
(17)	Condenser (.05 Mfd.) (Tubular)	30-4020	.35
(18)	Resistor (300 ohms Flexible Wire-Wound)	33-3010	.20
(19)	Condenser (.05 Mfd.) (Tubular)	30-4020	.35
(20)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(21)	Compensating Condenser (Osc. H. F. Bdcst.)	Part of (6)	....
(22)	Compensating Condenser (Osc. H. F. Shortwave)	31-6016	.30
(23)	Oscillator Transformer	32-1380	.70
(24)	Condenser (.0008 Mfd. Mica)	5878	.35
(25)	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
(26)	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
(27)	Pilot Lamp (Station Selector)	6608	.11
(28)	Compensating Condenser (Osc. L. F.)	04000R	.45
(29)	Condenser (.003 Mfd. Mica)	7301	.45
(30)	Compensating Condenser (1st I. F. Pri.)	Part of (31)	....
(31)	1st I. F. Transformer	32-1381	1.50
(32)	Compensating Condenser (1st I. F. Sec.)	Part of (31)	....
(33)	Resistor (500 ohms Flexible Wire-Wound)	6977	.20
(34)	Condenser (.05 Mfd.) (Bakelite Block)	3615AU	.35
(35)	Shadowmeter	6497	2.50
(36)	Shadowmeter Pilot Lamp	Part of (35)	....
(37)	Compensating Condenser (2d I. F. Pri.)	*04000A	.15
(38)	2d I. F. Transformer (Early Prod. 32-1258)	32-1424	....
(39)	Condenser (.0001 Mfd. Twin) (Bakelite Block)	8635-K	.25
(40)	Resistor (.1 Meg.) (White-White-Orange)	4411	.25
(41)	Condenser (.01 Mfd. Bakelite Block)	3903Z	.25
(42)	Resistor (1 Meg.) (Brown-Black-Green)	4409	.25
(43)	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
(44)	Condenser (.09 Mfd. Bakelite Block)	4989D	.35

No. on Diagram	Description	Part No.	List Price
(45)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	$0.25
(46)	Condenser (Electrolytic 1, 1, 1, and 2 Mfd.)	30-2078	2.45
(47)	Resistor (.1 Meg.) (White-White-Orange)	4411	.25
(48)	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
(49)	Condenser (.015 Mfd. Bakelite Block)	3793F	.35
(50)	Condenser (.0001 Mfd. Mica)	4519	.35
(51)	Tone Control	30-4186	.75
(52)	Condensers (In Tone Control)	Part of (51)	....
(53)	Condenser (.006 Mfd. Tubular)	30-4024	.40
(54)	Input Transformer	32-7114	2.00
(55)	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.25
(56)	Condenser (.01 Mfd. Bakelite Block)	3903P	.25
(57)	Output Transformer	32-7078	1.40
(58)	Voice Coil and Cone Assembly	H-13-02625	.80
		K-17-36-3020	.60
(59)	Field Coil and Pot Assembly	36-3104	2.70
(60)	Resistor (Wire-Wound) (6500 ohms)	33-3033	.30
(61)	Resistor (Wire-Wound) (9.5, 112, 84 ohms)	33-3034	.20
(62)	Volume Control and On-Off Switch	33-5024	1.45
(63)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(64)	Resistor (240,000 ohms) (Red-Yellow-Yellow)	4410	.25
(65)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(66)	Condenser (.025 Mfd. Bakelite Block)	7653D	.35
(67)	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
(68)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(69)	Condenser (.015 Mfd. Twin) (Bakelite Block)	3793R	.40
(70)	Power Transformer	32-7111	5.75
(71)	Filter Choke	32-7115	1.80
(72)	Condenser (.25 Mfd.)	6287-R	.40
(73)	Condenser (Elec. 8 Mfd. 10 Mfd.)	30-2045	1.95
(74)	Condenser (Elec. 8 Mfd.)	30-2025	2.00
(75)	Compensating Condenser (2d I. F. Secondary)	Part of (38)	....
(76)	Resistor (2900 ohms) (Red-White-Red)	5309	.25
	Chassis Mtg. Screw	W-1345A	2.25C.
	Chassis Mtg. Washer	29-2089	.35C.
	Chassis Mtg. Foot (Rubber)	27-4116	.05
	Chassis Mtg. Foot Plate	27-7497	.35C.
	Knob Assembly (Large)	27-4051	.10
	Knob Assembly (Small)	27-4052	.10
	Dial Assembly	31-1205	.50
	Dial Scale	27-5046	.35 C.
	Tube Shield	28-1107	.10
	4 Prong Socket	7544	.10
	6 Prong Socket	7547	.11
	7 Prong Socket	27-6005	.11
	Speaker Socket	4957	.10
	A. C. Cord and Plug	L-943A	.60

*See Note below Fig. 4.

Note: Part (37), is as shown above only in early production. In later production this part is incorporated as part of (38), not visible from below.

Adjusting Compensating Condensers

For adjusting compensating or padding condensers in Model 118, an accurately calibrated signal generator covering the broadcast range of frequencies is required and also a crystal controlled signal generator for the high frequency adjustments. For the former we suggest the Philco Model 024 Signal Generator and for the latter the Model 091, Crystal Controlled high frequency signal generator. The actual adjusting calls for a special insulated hex wrench and insulated screwdriver. Philco Part No. 3164 Fibre Wrench and No. 27-1159 Screwdriver are recommended. An output meter is also required, for connection to the receiver.

I. F. ADJUSTMENT—The I. F. (intermediate frequency) of Model 118 is 260 K. C.

Remove the grid clip from the top of the 6A7 tube and connect the shielded antenna lead from the Signal Generator to the cap of this tube. Connect the ground lead of the Signal Generator to the ground post of receiver. Connect the output meter to the primary terminals of the output transformer of receiver. Set the waveband switch at the left position (standard broadcast).

Set the wave switch on the Signal Generator at 260 K. C., and the dial of the receiver at 550. Turn on the set (volume full on), and the Signal Generator. Now adjust the 1st I. F. Primary and Secondary condensers (Nos. ㉚ and ㉜ in Fig. 3) and the 2d I. F. primary and secondary condensers (㉗ and ㉘) to give maximum reading on the output meter. The I. F. primary condenser is adjusted by turning the screw on top of the I. F. transformer and the secondary is adjusted by turning the nut. The I. F. transformers are in the smaller metal "cans". The screw and nut are reached through the hole in top. If the needle on the output meter goes off the scale, turn down the "attenuator" on the Signal Generator until a lower reading is obtained.

Note: In early production the 1st I. F. compensating condensers only are adjusted as described above. Part ㉘ is not used. The 2d I. F. primary ㉗ is an 04000A condenser reached and adjusted through hole in top of chassis near the 42 driver tube.

WAVE TRAP—Remove antenna lead from grid cap of 6A7 tube and attach it to antenna post on set. Replace cap on 6A7 tube. With Signal Generator still operating at 260 K. C., adjust wave-trap condenser (① in Figs. 3 & 4) so as to get MINIMUM reading in output meter. This adjustment is made from underneath the chassis.

ANTENNA, DETECTOR AND OSCILLATOR H. F. (Broadcast)—These condensers Nos. ⑦, ⑭, and ㉑, are located on top of the tuning condenser gang, adjustment made by means of the fibre wrench. Set the signal generator at 1500 K. C., tune in the signal at 1500 on dial and adjust these condensers in the order given, to give maximum output reading. ⑦ is located on the section nearest the front and ⑭ on the center section.

OSCILLATOR—LOW FREQUENCY—This is condenser ㉘ (see Figs. 3 and 4) located underneath chassis and accessible from underneath. Use the fibre wrench. Set signal generator switch at 600, tune in the signal at 600 on the dial and adjust condenser to maximum.

ANT. AND OSC. H. F.—SHORTWAVE—The crystal controlled signal generator is used for these adjustments. These are condensers ② (Ant. H. F.) and ㉒ (Osc. H. F.) located underneath chassis, and adjusted from underneath. The fundamental frequency of the Philco Model 091 crystal controlled signal generator is 3600 K. C. or 3.6 megacycles. The third harmonic of this is 10.8 M. C. Turn the waveband switch of the set to the right and the dial to just below 11 M. C. The 10.8 harmonic should be picked up here and the two condensers should be adjusted to give maximum reading on the output meter, on this signal.

PHILCO RADIO & TELEVISION CORPORATION
Service Department

June, 1934
Printed in U. S. A

PHILCO

REG. U.S. PAT. OFF

Service Bulletin — No. 198

Model 18 (Code 124)

Model 18 (code 124) is an eight-tube superheterodyne receiver, for operation on alternating current (A.C.) The range of receivable frequencies is from 530 to 1720 kilocycles which includes standard broadcasts and police stations on the first (lowest) police band. The tubes used are: Type 78 R.F.; type 6A7 detector-oscillator; type 78 I.F.; type 75 2d detector, 1st A.F.; type 42 driver; two type 42 output tubes, and type 80 rectifier. The intermediate frequency is 260 kilocycles.

Tube Socket Voltages

Circuit	R. F.	Det. Osc.	I. F.	1st A. F.	Driver	Output (Class "A")		Recti-fier
Type Tube	78	6A7	78	75	42	42	42	80
Filament (F-F)	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P-K)	210	210	210	120	205	280	280	350
Screen Grid (SG-K) (6A7)	80		80		200	300	300	
G1-K		35						
G2-K		130						
Cathode (K-F)	2.8	2.8	5.3	0	0	0	0	

Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1-2	105-125	Primary	White
3-5	6.3	Filament	Black
6-7	5.0	Filament of 80	Blue
8-10	760	Plates of 80	Yellow
4		Center Tap of 3-5	Black—Yellow Tracer
9		Center Tap of 8-10	Yellow—Green Tracer

All the above values were obtained from the underside of the chassis, using test prods and leads with an A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The **Philco Model 048 All-Purpose Set Tester** is highly recommended for this use. Volume control at maximum and station selector at 520 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

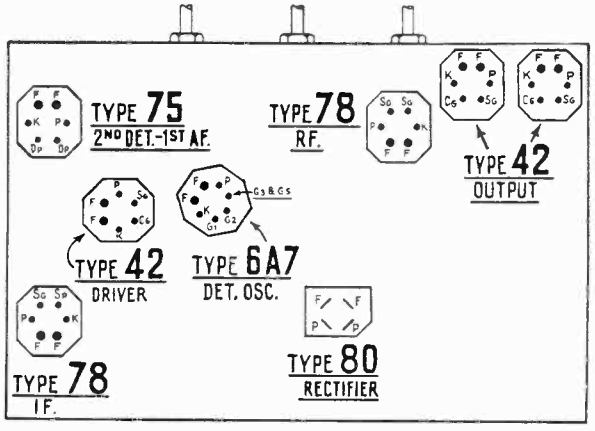


Fig. 1—Socket Layout (Underneath)

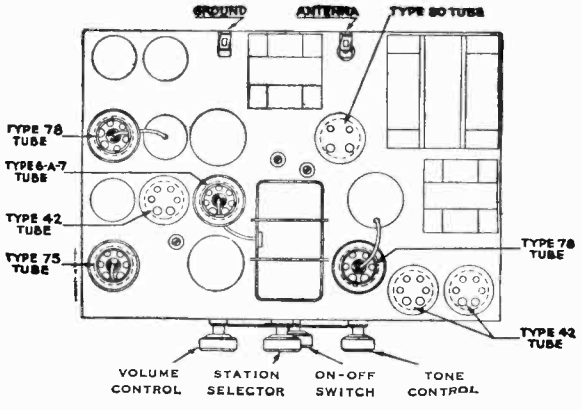


Fig. 2—Top View of Chassis

Adjusting Compensating Condensers

The adjustment of the compensating or padding condensers in Model 18 (124) requires an accurate signal generator, such as the Philco Model 024, an output meter, and a special insulated hex wrench. The adjustments are made as follows:

1. I. F. (Intermediate Frequency). Remove the grid clip from the cap on the 6A7 tube and attach the shielded antenna lead from the signal generator to the grid cap of the 6A7. Set the switch of the signal generator at 260 K. C. (the I. F. of Model 18) and the dial of the set at 550. Turn on the set and signal generator. Adjust each of the three I. F. compensating condensers in turn to give maximum reading in the output meter (connected to primary of output transformer). If the needle on the meter goes off scale, turn down the attenuator adjustment on the signal generator. See Fig. 4 for locations of the I. F. compensating condensers. The first and 2d I. F. primary condensers ㉑ and ㉕ are accessible through the two holes in the chassis sub-base directly over them. The 1st I. F. secondary ㉔ is accessible from the rear.

2. ANT. H. F., DET., and OSC. H. F. CONDENSERS (⑤, ⑩, and ⑫.) These are located on top of the tuning condenser assembly and adjusted from above. ⑤ is mounted on the section nearest front of set. Replace the grid cap clip on the 6A7 and connect the antenna lead of signal generator direct to antenna post of set for these adjustments. Set signal generator at 1500 and dial of set at 1500.

3. OSC., L. F.—This adjustment ⑮ is made from rear of chassis (see Fig. 4). Set Signal Generator and dial of set at 600. The tuning condenser assembly should be "rocked" while this adjustment is being made.

PHILCO RADIO & TELEVISION CORPORATION

Service Department

June, 1934
Printed in U. S. A

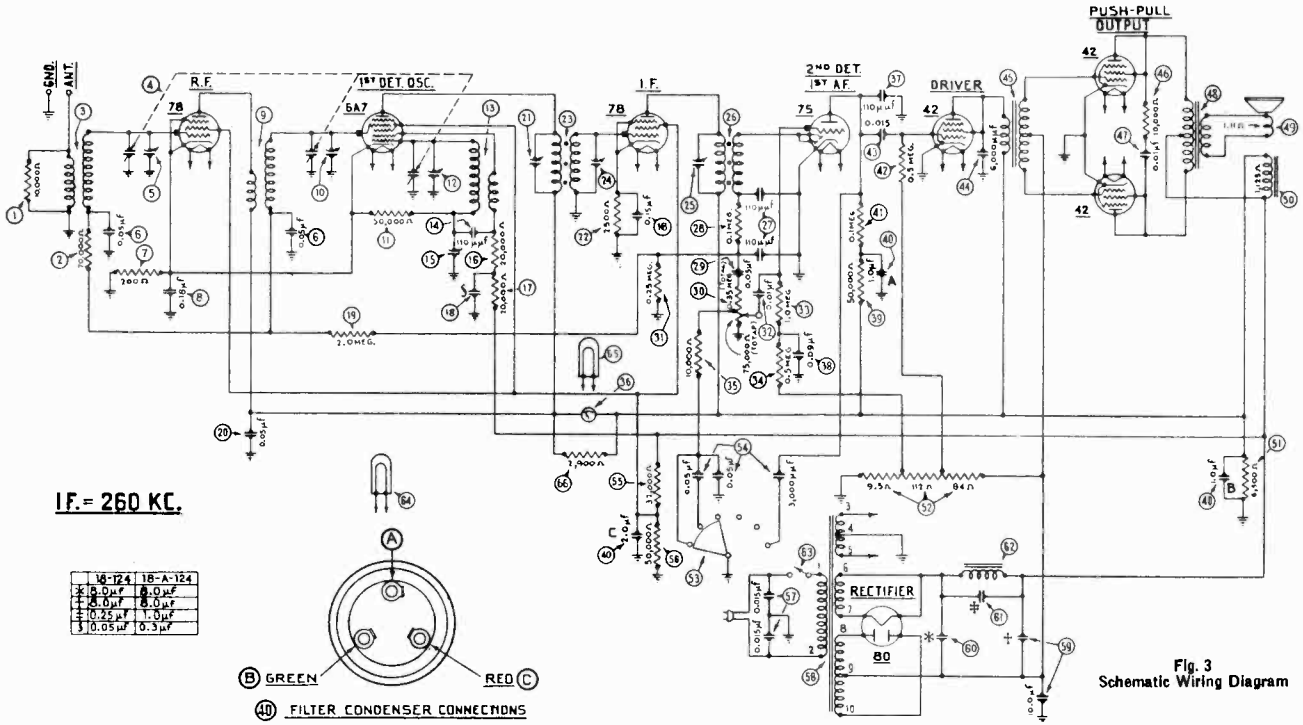


Fig. 3
Schematic Wiring Diagram

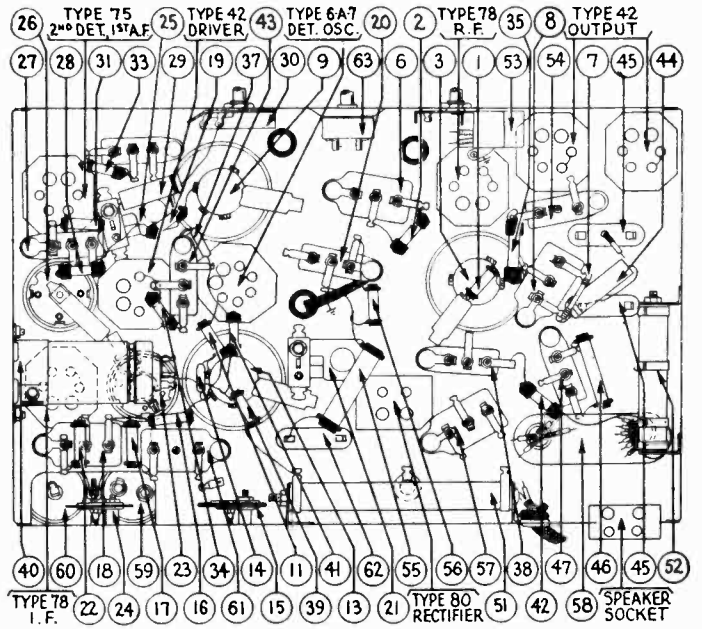


Fig. 4—Bottom View of Chassis Showing Parts

NOTE: A resistor No. 5309 (2900 ohms) (red-white-red) is used, shunted across the shadowmeter. Not shown in Fig. 3 or Fig. 4.

Replacement Parts for Model 18 (Code 124)

No. on Figs.	Description	Part No.	List Price
(1)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	$0.25
(2)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385	.25
(3)	Antenna Transformer	32-1396	.60
(4)	Tuning Condenser Assembly	31-1196	6.00
(5)	Compensating Condenser (Ant.)	Part of (4)	....
(6)	Condenser (.05 Twin—Bakelite Block)	3615AM	.40
(7)	Resistor (200 ohms Flexible Wire-wound)	7217	.20
(8)	Condenser (.09 Twin-Bakelite Block)	4989AC	.40
(9)	Detector Transformer	32-1397	.50
(10)	Compensating Condenser (Det.)	Part of (4)	....
(11)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(12)	Compensating Condenser (Osc. H. F.)	Part of (4)	....
(13)	Oscillator Transformer	32-1398	.45
(14)	Condenser (.00011 Mfd. Mica)	4519	.35
(15)	Compensating Condenser (Osc. L. F.)	04000R	.45
(16)	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
(17)	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.25
(18)	Condenser (Double: .05—.15 Bakelite Block)	6287M	.40
(19)	Resistor (2 Meg.) (Red-Black-Green)	5872	.25
(20)	Condenser (.05 Mfd. Bakelite Block)	3615AA	.35
(21)	Compensating Condenser (1st I. F. Pri.)	04000M	.20
(22)	Resistor (2500 ohms) (Red-Green-Red)	7775	.25
(23)	1st I. F. Transformer	32-1288	.55
(24)	Compensating Condenser (1st I. F. Secondary)	04000X	.20
(25)	Compensating Condenser (2d I. F. Primary)	04000A	.15
(26)	2d I. F. Transformer	32-1258	.55
(27)	Condenser (.00011 Mfd. Twin-Bakelite Block)	8035-K	$0.25
(28)	Resistor (.1 Meg. White-White-Orange)	4411	.25
(29)	Condenser (.05 Mfd. Tubular Paper)	30-4020	.35
(30)	Volume Control (350,000 ohms Tapped at 75,000)	33-5069	1.00
(31)	Resistor (.25 Meg.) (Red-Yellow-Yellow)	4410	.25
(32)	Condenser (.01 Mfd. Bakelite Block)	3903-Z	.25
(33)	Resistor (1. Meg.) (Brown-Black-Green)	4409	.25
(34)	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
(35)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(36)	Shadowmeter	45-2028	2.50
(37)	Condenser (.00011 Mica)	4519	.35
(38)	Condenser (.09 Mfd.) (Bakelite Block)	4989-N	.35
(39)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(40)	Condenser (Electrolytic—1, 1, 2 Mfd.)	30-2029	1.20
(41)	Resistor (.1 Meg.) (White-White-Orange)	4411	.25
(42)	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.25
(43)	Condenser (.015 Mfd. Bakelite)	3793AB	.35
(44)	Condenser (.006 Mfd. Tubular Paper)	30-4024	.40
(45)	Input (Audio) Transformer	32-7114	2.00
(46)	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.25
(47)	Condenser (.01 Mfd. Bakelite Block)	3903-P	.25
(48)	Output Transformer	32-7078	1.40
(49)	Voice Coil and Cone Assembly { H-13	02625	.80
	K-17	36-3159	.50
(50)	Field Coil and Pot. Assembly	36-3104	2.70
(51)	Resistor (B) (6500 ohms Wire-wound)	33-3033	.30
(52)	Resistor (Voltage Divider—9.5, 112, 84 ohms Wire-wound)	33-3034	$0.20
(53)	Tone Control	30-4073	.75
(54)	Condensers (in Tone Control)	Inside (53)	....
(55)	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026	.35
(56)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(57)	Condenser (Twin .015 Mfd. Bakelite Block)	3793-R	.40
(58)	Power Transformer	32-7111	5.75
(59)	Condenser (Electrolytic 8 and 10 Mfd.)	30-2045	1.95
(60)	Condenser (Electrolytic 8 Mfd.)	30-2025	2.00
(61)	Condenser (.25 Mfd. Bakelite Block)	6287-N	.40
(62)	Filter Choke	32-7115	1.80
(63)	On-Off Switch	42-1064	.40
(64)	Pilot Lamp (Station Selector)	6608	.11
(65)	Pilot Lamp (Shadowmeter)	Part of (36)	....
(66)	Resistor (2900 ohms) (Red-White-Red)	5309	.25
	A. C. Cord and Plug Assembly	L-943A	.60
	Tube Shield	28-1107	.10
	4 Prong Socket	7544	.10
	6 Prong Socket	7547	.11
	7 Prong Socket	27-6005	.11
	Speaker Socket	4957	.10
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Chassis Mfg. Screw	W-1345-A	2.75C
	Chassis Mfg. Washer	29-2089	.35C
	Chassis Mfg. Foot (Rubber)	27-4116	.05
	Chassis Mfg. Foot Plate	27-7497	.35C
	Dial Assembly	31-1207	.50
	Dial Scale	27-5049	.25

PHILCO

REG. U.S. PAT. OFF

Service Bulletin—No. 199

Model 49

Model 49 is a superheterodyne radio receiver designed for operation on 115 volts direct current (D. C.) only. Model 49 covers two bands of frequencies—from 530 to 1720 KC and from 4.2 to 12.0 megacycles. This gives either standard or short wave reception by turning the wave-band switch on the panel. The intermediate frequency (I. F.) of the set is 260 kilocycles. The power consumption of Model 49 is 50 watts. The receiver uses the following tubes: Type 6A7 detector-oscillator; type 78, R. F.; type 78, I. F.; type 85 2nd detector—1st A. F.; type 76 driver; two (2) type 43 output tubes.

Adjusting Compensating Condensers

For adjusting compensating or padding condensers in Model 49, an accurately calibrated signal generator covering the broadcast range of frequencies is required and also a crystal controlled signal generator for the high frequency adjustments. For the former we suggest the Philco Model 024 Signal Generator and for the latter the Model 091, Crystal Controlled high frequency signal generator. The actual adjusting calls for a special insulated hex wrench and insulated screwdriver. Philco Part No. 3164 Fibre Wrench and No. 27-1159 Screwdriver are recommended. An output meter is also required, for connection to the receiver. Figs. 1 and 2 show the locations of the various compensating condensers.

I. F. ADJUSTMENT—The I. F. (intermediate frequency) of Model 49 is 260 K. C.

Remove the grid clip from the top of the 6A7 tube and connect the shielded antenna lead from the Signal Generator to the cap of this tube. Connect the ground lead of the Signal Generator to the ground post of receiver. Connect the output meter adapter leads to the plates of the output tubes (type 43) in the receiver. Set the wave-band switch at the left position (standard broadcast).

Set the wave switch of the Signal Generator at 260 K. C., and the dial of the receiver at 550. Turn on the set (volume full on), and the Signal Generator. Now adjust the 1st I. F. Primary and Secondary condensers (Nos. ㉑ and ㉓ in Fig. 2) and the 2d I. F. primary and secondary condensers (㉖ and ㉘) to give maximum reading on the output meter. The I. F. primary condenser is adjusted by turning the screw on top of the I. F. transformer and the secondary is adjusted by turning the nut. The I. F. transformers are in the smaller metal "cans". The screw and nut are reached through the hole in top. If the needle on the output meter goes off the scale, turn down the "attenuator" on the Signal Generator until a lower reading is obtained.

NOW REMOVE Antenna lead of signal generator from grid cap of 6A7 tube and reconnect it to antenna post of receiver. Replace cap on 6A7 tube.

ANTENNA, DETECTOR AND OSCILLATOR H. F. (Broadcast)—These condensers Nos. ⑧, ⑫, and ⑭, are located on top of the tuning condenser gang (See Fig. 2) adjustment made by means of the fibre wrench. Set the signal generator at 1500 K. C., tune in the signal at 1500 on dial and adjust these condensers in the order given, to give maximum output reading. ⑧ is located on the section nearest the front and ⑫ on the center section.

OSCILLATOR—LOW FREQUENCY—This is condenser ⑰ (see Fig. 1) located underneath chassis and accessible from underneath. Use the fibre wrench. Set signal generator switch at 600, tune in the signal at 600 on the dial and adjust condenser to maximum.

ANT. AND OSC. H. F.—SHORTWAVE—The crystal controlled signal generator is used for these adjustments. These are condensers ④ (Ant.) and ⑮ (Osc. H. F.) located underneath chassis. ④ is adjusted from underneath, and ⑮ from above, thru hole in sub-base directly behind tuning condenser assembly. The fundamental frequency of the Philco Model 091 crystal controlled signal generator is 3600 K. C. or 3.6 megacycles. The third harmonic of this is 10.8 M. C. Turn the wave-band switch of the set to the right and the dial to just below 11 M. C. The 10.8 harmonic should be picked up here and the two condensers should be adjusted to give maximum reading on the output meter, on this signal.

Tube Socket Voltages—Line Voltage 120 D.C.

TUBE		Filament F to F	Plate P to K	Screen Grid SG to K	Cathode K to F
Type	Circuit				
78	R. F.	5.8	85	100	30
6A7	Det.-Osc.	5.7	90	G3&5-K:65 G2 -K:80 G1 -K:12	22
78	I. F.	6.3	90	100	15
85	2d Det.—1st A. F.	6.3	40	...	15
76	Driver	6.3	100	...	20
43 43	Output	2.6 2.6	100 100	105 105	60 60

All readings above made with a high resistance multirange D. C. voltmeter using test prods applied to tube sockets underneath chassis (See Fig. 1). Volume control at maximum, wave-band switch at left (standard broadcast) and dial at 550 K.C.

Philco Model 025 Circuit Tester or 048 All-Purpose Tester are highly recommended for making the above tests.

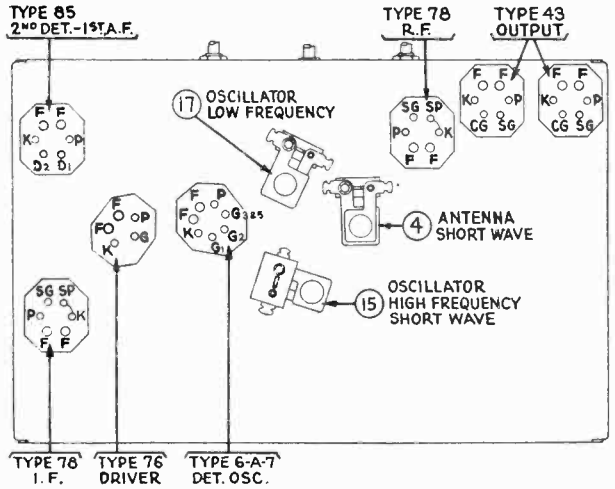


Fig. 1—Tube Sockets

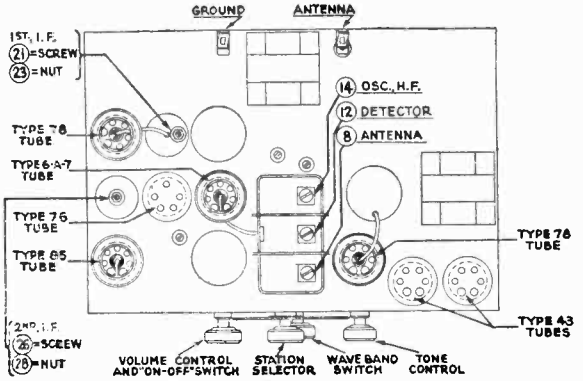


Fig. 2—Top View

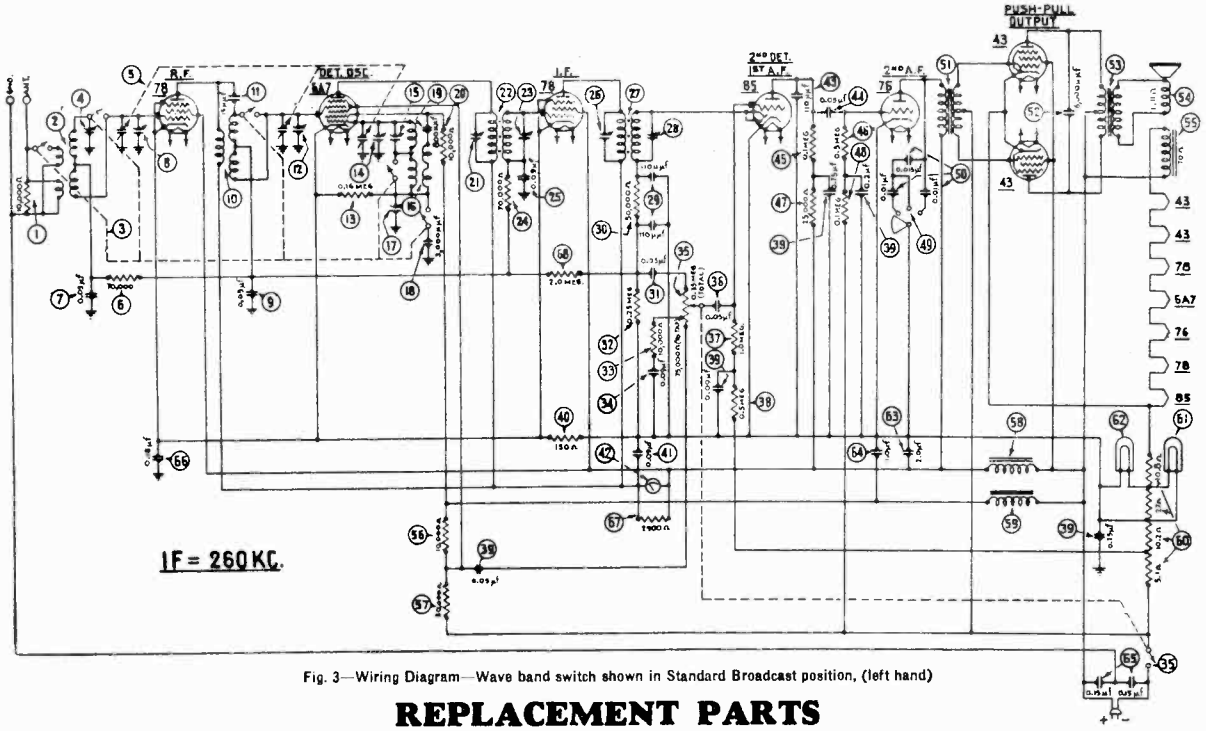


Fig. 3—Wiring Diagram—Wave band switch shown in Standard Broadcast position, (left hand)

REPLACEMENT PARTS

Nos. on Diagram	Description	Part No.	List Price
(1)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	$0.25
(2)	Antenna (R. F.) Transformer	32-1379	.70
(3)	Wave-band Switch	42-1046	.80
(4)	Compensating Condenser (Ant. S. W.)	04000D	.15
(5)	Tuning Condenser Assembly	31-1334	6.85
(6)	Resistor (70,000 ohms) (Violet-Black-Orange)	33-1115	.25
(7)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(8)	Compensating Condenser (Ant.)	Part of (5)	....
(9)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(10)	Detector Transformer	32-1427	.90
(11)	Condenser (.000015 Mica)	30-1030	.35
(12)	Compensating Condenser (Det.)	Part of (5)	....
(13)	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331	.25
(14)	Compensating Condenser (Osc. H. F.)	Part of (5)	....
(15)	Compensating Condenser (Osc. S. W.)	31-6016	.15
(16)	Oscillator Transformer	32-1428	.70
(17)	Compensating Condenser (Osc. L. F.)	04000R	.45
(18)	Condenser (.003 Mfd. Mica)	30-1028	.60
(19)	Condenser (.0008 Mfd. Mica)	6021	.35
(20)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(21)	Compensating Condenser (1st I. F. Primary)	Part of (22)	....
(22)	First I. F. Transformer	32-1381	1.50
(23)	Compensating Condenser (1st I. F. Secondary)	Part of (22)	....
(24)	Resistor 70,000 ohms (Violet-Black-Orange)	33-1115	.25
(25)	Condenser (.09 Mfd. Bakelite Block)	4989N	.35
(26)	Compensating Condenser (2d I. F. Primary)	Part of (27)	....
(27)	2d I. F. Transformer	32-1424	1.60
(28)	Compensating Condenser (2d I. F. Secondary)	Part of (27)	....
(29)	Condenser (.00011 Twin Bakelite Block)	8035E	.25
(30)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.25
(31)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(32)	Resistor (250,000 ohms) (Red-Yellow-Yellow)	33-1097	.25
(33)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	.25
(34)	Condenser (.09 Mfd. Bakelite Block)	4989-P	.35
(35)	Volume Control and On-Off Switch	33-5024	1.45
(36)	Condenser (.05 Mfd. Bakelite Block)	3615-H	.35
(37)	Resistor (1 Meg.) (Brown-Black-Green)	33-1096	.25
(38)	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.25
(39)	Condenser (Metal Case Block) (.2-.75-.25-.05-.09)	30-4144	1.30
(40)	Resistor (200 ohms Flexible Wire-Wound)	7217	.20
(41)	Condenser (.09 Mfd. Bakelite Block)	4989P	.35
(42)	Shadowmeter	45-2042	2.50
(43)	Condenser (.00011 Mfd. Mica)	30-1006	.35
(44)	Condenser (.05 Mfd. Bakelite Block)	3615AX	.35
(45)	Resistor (.1 Meg.) (White-White-Orange)	6099	.25
(46)	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.25
(47)	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013	.25
(48)	Resistor (.1 Meg.) (Yellow-White-Yellow)	6099	.25
(49)	Tone Control	30-4043	.75
(50)	Condensers in Tone Control	Part of (49)	....
(51)	Audio Transformer	32-7211	5.75
(52)	Condenser (.006 Mfd. Bakelite Block)	7625-E	.25
(53)	Output Transformer	2550	1.75
(54)	Voice Coil and Cone Assembly	H-10 02625	.80
		K-13 36-3159	.50

Nos. on Diagram	Description	Part No.	List Price
(55)	Field Coil and Pot Assembly	02745	$4.25
(56)	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.25
(57)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518	.25
(58)	Filter Choke	32-7213	1.60
(59)	Filter Choke	32-7018	1.50
(60)	B. C. Resistor (Wirewound: 5.1-10.2-27.0-10.8 ohms)	33-3128	.25
(61)	Pilot Lamp (Dial)	4567	.09
(62)	Pilot Lamp (Shadowmeter)	Part of (42)	....
(63)	Condenser (2.0 Mfd. Metal Case)	30-4140	.80
(64)	Condenser (1.0 Mfd. Metal Case)	04357	.75
(65)	Condenser (.15 Mfd. Twin Bakelite Block)	6287-T	.40
(66)	Condenser (.09 Mfd. Twin Bakelite Block)	4989AP	.35
(67)	Resistor (2900 ohms) (Red-White-Red)	5309	.25
(68)	Resistor (2 Meg.) (Red-Black-Green)	33-1025	.25
	Dial Assembly	31-1205	.50
	Dial Scale	27-5046	.25
	Knob (large)	27-4051	.10
	Knob (small)	27-4052	.10
	Five Prong Socket	7546	.10
	Six Prong Socket	7547	.10
	Seven Prong Socket	27-6005	.11
	Chassis Mtg. Screw	W-1358A	2.60 C.
	Chassis Mtg. Foot (Rubber)	27-4116	.05
	Chassis Mtg. Foot Plate	27-7497	.35 C.
	Chassis Mtg. Washer	29-2089	.35 C.
	Speaker Socket	4957	.10
	Cord & Plug Assembly	L-943A	.60

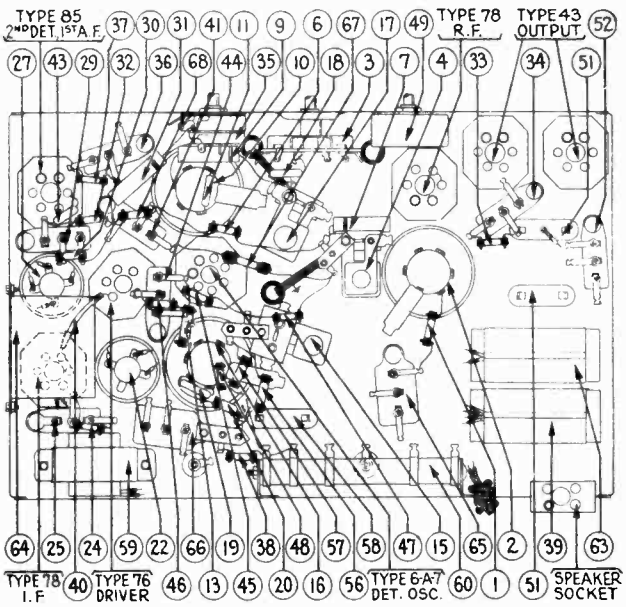


Fig. 4—Bottom View

PHILCO RADIO & TELEVISION CORPORATION
Service Department

July, 1934
Printed in U. S. A.

PHILCO

REG. U.S. PAT. OFF.

Service Bulletin — No. 201

Model 200

Philco Model 200 is a superheterodyne radio receiver designed especially to deliver high fidelity reproduction of broadcasts. The audio response of this model extends from 30 to 7500 cycles. This is made possible partly by the design of the R. F. and I. F. circuits, which are so arranged that by means of a set of variable resistances in the I. F. circuits the tuning can either be broadened to take in the high fidelity transmissions which cover more than a single channel, where conditions permit; or sharpened when necessary and when full high fidelity cannot be used to advantage. The design of the audio circuit, speaker and cabinet and the use of a special "Sound-Diffuser" consisting of a scientifically arranged group of sound-radiating vanes, also contribute greatly to the high fidelity result.

The Selectivity-Fidelity Control is the most important adjustment in this receiver. To operate this control properly requires a thorough understanding of its functions and its relationship to the performance of the set. Broad tuning in the R. F. and I. F. circuits is required for the passage of a broadcast signal without any tendency to lose the higher audio frequencies contained in the side bands. This condition is obtained when the selectivity-fidelity control is turned to the extreme right hand position. In this position, maximum fidelity and minimum selectivity will be obtained. This setting will enable the audio amplifier and speaker to reproduce the widest possible range of audio frequencies, but should only be used when no broadcasting station within the range of the receiver is operating on a channel within ten kilocycles of the station being received. As the control is turned toward the left, the selectivity is gradually increased with an attendant gradual decrease in response to the higher frequencies. With this control in the left hand position, the tuning will be extremely sharp.

Model 200 uses the following tubes: Type 78 R. F., type 6A7 detector-oscillator, two type 78 I. F., type 37 Shadowmeter control tube, type 75 2d detector—1st audio, type 42 driver, two type 42 output tubes used as triodes and a type 5Z3 rectifier. The intermediate frequency (I. F.) is 175 kilocycles and the power consumption is 130 watts. The Model 200 will receive broadcasts from 540 to 1720 kilocycles, which includes all standard broadcasts and some of the police broadcast frequencies. This model is for use on alternating current (A. C.) only.

Tube Socket Voltages

Circuit	R.F.	Det. Osc.	1st I.F.	2d I.F.	Shadow-meter Control	A.F.	Dri-ver	Out-put	Rect.
Type Tube / Test Points	78	6A7	78	78	37	75	42	42	5Z3
F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
P to K	225	210	210	220	63	110	225	335	350*
SG to K	80	(G3&5-K) 73	73	76	...	...	225	335 335	...
K to Gnd	3	8	8	4	0	0	0	0 0	...
CG to K	0.2	0	0.2	4	0	...	0.2	35 35	...
6A7—G¹ to K	22.0								
6A7—G² to K	90.0								

Power Transformer Data

Terminals	A.C. Volts	Circuit	Color of Leads
1–2	120	Primary	White
3–5	780	Plates of 5Z3	Yellow
6–7	5.0	Filament of 5Z3	Blue
8–10	6.3	Filaments	Black
4	...	Center Tap of 3–5	Yellow—Green Tracer
9	...	Center Tap of 8–10	Black—Yellow Tracer

Use Fig. 1 when testing voltages as per table above.

The above voltages were obtained using a high resistance D. C. voltmeter for plate, grid and cathode tests, and an A. C. voltmeter for filaments. Line voltage 115, dial at 55, volume control at maximum, fidelity control at middle position. *P to ground.

Philco Model 025 Circuit Tester is recommended for making these tests.

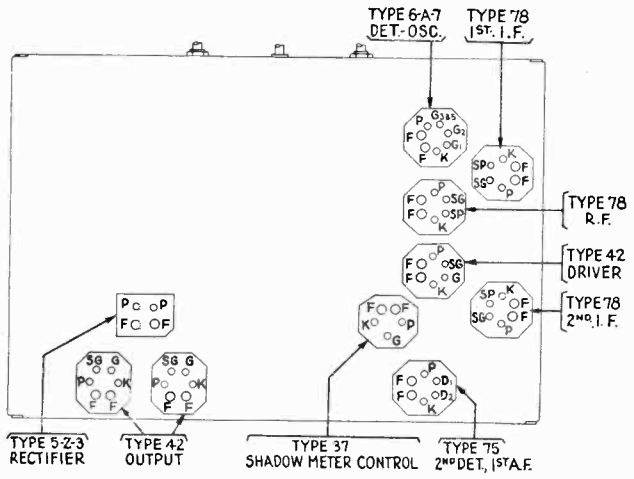


Fig. 1—Tube Sockets (Viewed from Underneath)

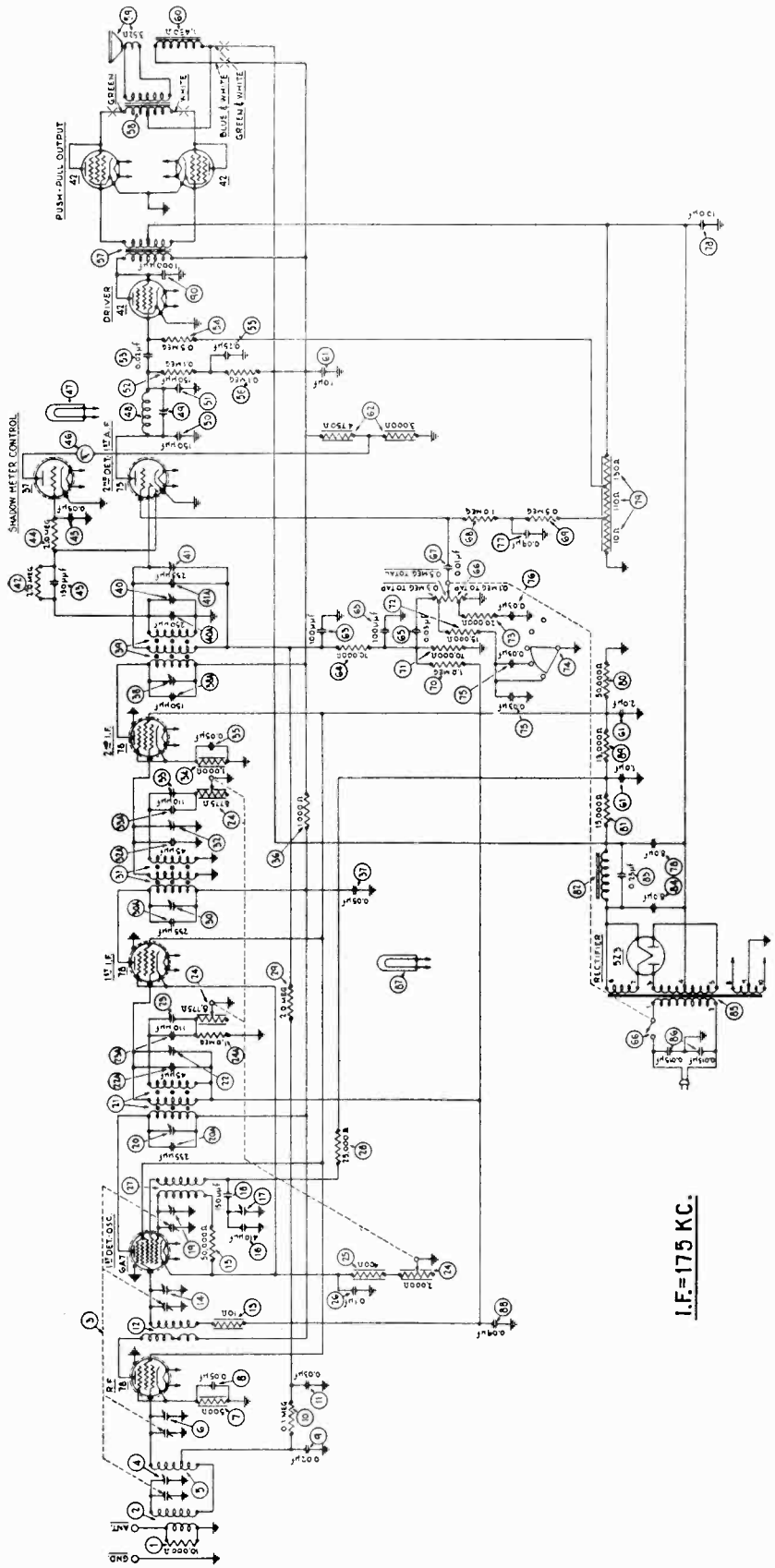


Fig. 2. Schematic Wiring Diagram.

NOTE: An 8000 ohm resistor, 33-3016 (Gray-Black-Red) is added across the 2000 ohm section of (24)

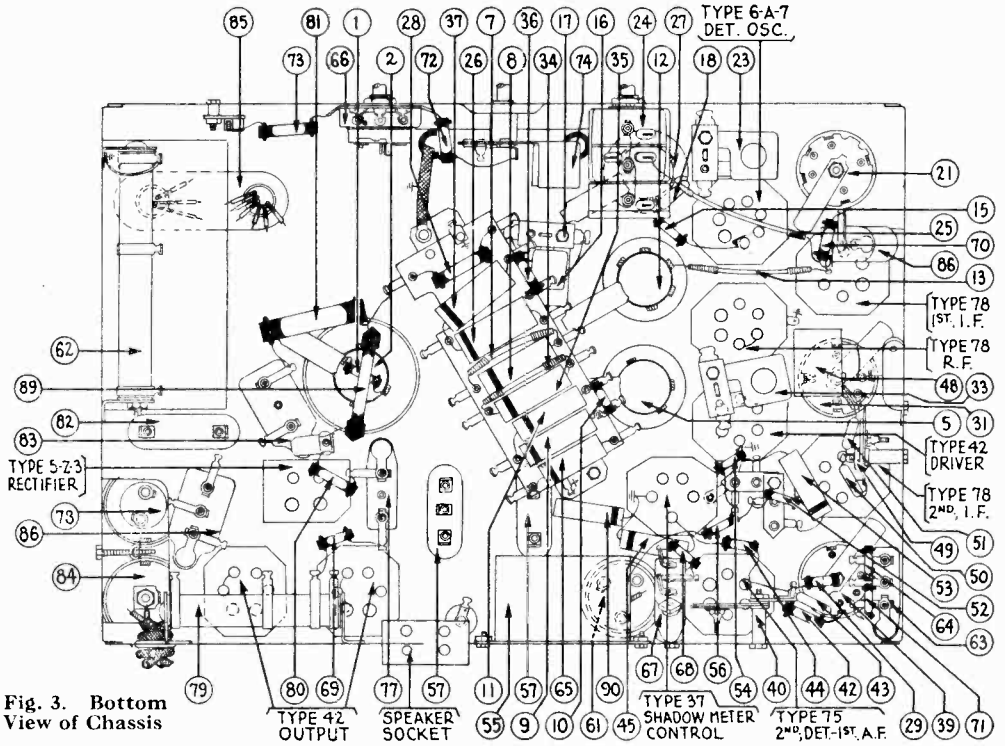


Fig. 3. Bottom View of Chassis

No. on Diagram	Description	Part No.	List Price
(1)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000	$0.20
(2)	Antenna Transformer	32-1420	.60
(3)	Tuning Condenser Assembly	31-1217	8.25
(4)	Compensating Condenser (Ant.)	Part of (3)	....
(5)	R. F. Transformer	32-1421	.45
(6)	Compensating Condenser (R. F.)	Part of (3)	....
(7)	Resistor (500 ohms) (Flexible; Green-Black-Brown)	6977	.20
(8)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(9)	Condenser (.02 Mfd. Tubular)	30-4113	.30
(10)	Resistor (100,000 ohms) (White-White-Orange)	6099	.20
(11)	Condenser (.03 Mfd. Tubular)	30-4025	.30
(12)	Detector Transformer	32-1422	.90
(13)	Resistor (10 ohms Flexible Wire-Wound)	33-3139	.20
(14)	Compensating Condenser (Det.)	Part of (3)	....
(15)	Resistor (50,000 ohms) (Green-Brown-Orange)	5868	.20
(16)	Condenser (.00041 Mfd. Mica)	30-1000	.35
(17)	Compensating Condenser (Osc. L. F.)	04000R	.45
(18)	Condenser (.00015 Mfd. Mica)	30-1033	.35
(19)	Compensating Condenser (Osc. H. F.)	Part of (3)	....
(20)	Compensating Condenser (1st I. F. Pri.)	Part of (21)	....
(20)A	Condenser (.000235 Mfd. Mica)	30-1037	.35
(21)	First I. F transformer	32-1403	1.25
(22)	Compensating Condenser (1st I. F. Sec.)	Part of (21)	....
(22)A	Condenser (.000045 Mfd. Mica)	30-1034	.35
(23)	Compensating Condenser (1st I. F. Tertiary)	04000A	.15
(23)A	Condenser (.00011 Mfd. Mica)	30-1035	.35
(24)	Fidelity-Selectivity Control (Wire-Wound Resistors) (2000, 8775. 8775 ohm)	33-5070	2.50
(24)A	Resistor (1 Meg.) (Brown-Black-Green)	33-1096	.20
(25)	Resistor (400 ohms Flexible Wire-Wound)	33 3016	.20
(26)	Condenser (.1 Mfd. Tubular)	30-4122	.35
(27)	Oscillator Transformer	32-1423	.45
(28)	Resistor (25,000 ohms) (Red-Green-Orange)	4516	.20
(29)	Resistor (2 Megs.) (Red-Black-Green)	33-1025	.20
(30)	Compensating Condenser (2d I. F. Primary)	Part of (31)	....
(30)A	Condenser (.000235 Mfd. Mica)	30-1037	.35
(31)	2d I. F. Transformer	32-1403	1.25
(32)	Compensating Condenser (2d I. F. Sec.)	Part of (31)	....
(32)A	Condenser (.000045 Mfd. Mica)	30-1034	.35
(33)	Compensating Condenser (2d I. F. Tertiary)	04000A	.15
(33)A	Condenser (.00011 Mfd. Mica)	30-1035	.35
(34)	Resistor (1,000 ohms) (Flexible Wire-Wound)	33-3017	.20
(35)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(36)	Resistor (1,000 ohms) (Brown-Black-Red)	5837	.20
(37)	Condenser (.05 Mfd. Tubular)	30-4123	.35
(38)	Compensating Condenser (3d I. F. Primary)	Part of (39)	....
(38)A	Condenser (.00015 Mfd. Mica)	30-1041	.35
(39)	Third I. F. Transformer	32-1404	1.25
(40)	Compensating Condenser (3d I. F. Tertiary)	04000X	.20
(40)A	Condenser (.00025 Mfd. Mica)	30-1038	.35
(41)	Compensating Condenser (3d I. F. Secondary)	Part of (39)	....
(41)A	Condenser (.000235 Mfd. Mica)	30-1037	.35
(42)	Resistor (2 Megs.) (Red-Black-Green)	33-1025	.20
(43)	Condenser (.00015 Mfd. Mica)	30-1033	.35
(44)	Resistor (2 Megs.) (Red-Black-Green)	33-1025	.20
(45)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(46)	Shadowmeter	45-2028	2.50
(47)	Pilot Lamp (Shadowmeter)	Part of (46)	....
(48)	Filter Coil (10 K. C.)	32-7261	$0.85
(49)	Compensating Condenser (10 K.C. Audio Filter Trap Circuit)	04000B	.25
(50)	Condenser (.00015 Mfd. Mica)	30-1033	.35
(51)	Condenser (.00015 Mfd. Mica)	30-1033	.35
(52)	Resistor (100,000 ohms) (White-White-Orange)	6099	.20
(53)	Condenser (.02 Mfd. Tubular)	30-4113	.30
(54)	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.20
(55)	Condenser (.25 Mfd. Metal Case)	4264	.60
(56)	Resistor (100,000 ohms) (White-White-Orange)	6099	.20
(57)	Audio Transformer	32-7057	2.75
(58)	Output Transformer (On Speaker)	32-7247	2.10
(59)	Voice Coil and Cone Assembly (U-7 Speaker)	36-3321	1.75
(60)	Field Coil and Pot Assembly (U-7 Speaker)	36-3088	8.00
(61)	Condenser (Electrolytic—1, 1, 2 Mfd.)	30-2080	1.85
(62)	B. C. Resistor (Wire-Wound—4750 ohms, 3000 ohms)	33-3138	.45
(63)	Condenser (.0001 Mfd. Twin—Bakelite Block)	8035-P	.25
(64)	Resistor (70,000 ohms) (Violet-Black-Orange)	33-1115	.20
(65)	Condenser (.03 Mfd. Tubular)	30-4025	.30
(66)	Volume Control (500,000 ohms Tapped at 100,000) and On-Off Switch	33-5071	1.50
(67)	Condenser (.01 Mfd. Bakelite Block)	3903-G	.25
(68)	Resistor (1 Meg.) (Brown-Black-Green)	33-1096	.20
(69)	Resistor (500,000 ohms) (Yellow-White-Yellow)	6097	.20
(70)	Resistor (1 Meg.) (Brown-Black-Green)	33-1096	.20
(71)	Resistor (70,000 ohms) (Violet-Black-Orange)	33-1115	.20
(72)	Resistor (15,000 ohms) (Brown-Green-Orange)	6208	.20
(73)	Resistor (20,000 ohms) (Red-Black-Orange)	6650	.20
(74)	Bass Compensator	30-4196	.75
(75)	Condensers (In Bass Compensator)	Part of (74)	....
(76)	Condenser (.03 Mfd. Tubular)	30-4025	.30
(77)	Condenser (.09 Mfd. Bakelite Block)	4989AR	.35
(78)	Condenser (Electrolytic—8 10 Mfd.)	30-2046	1.85
(79)	B. C. Resistor (10 110, 130 ohms)	33-3137	.30
(80)	Resistor (51,000 ohms) (Green-Brown-Orange)	4518	.20
(81)	Resistor (15,000 ohms) (Brown-Green-Orange)	5718	.35
(82)	Filter Choke	32-7056	2.20
(83)	Condenser (.25 Mfd. Bakelite Block)	6287-S	.40
(84)	Condenser (Electrolytic—8 Mfd.)	30-2011	1.40
(85)	Power Transformer, 115 volts 60 cycles	32-7258	7.25
	" " 115 volts 25 cycles	32-7259	11.25
(86)	Condenser (.015 Mfd. Twin Bakelite Block)	3793-K	.40
(87)	Pilot Lamp (Station Selector)	6608	.09
(88)	Condenser (.09 Mfd. Bakelite Block)	4989N	.35
(89)	Resistor (13,000 ohms) (Brown-Orange-Orange)	3766	.20
(90)	Condenser (.001 Mfd. Tubular)	30-4201	.25
	Four Prong Socket	7544	.10
	Five Prong Socket	7546C	.11
	Six Prong Socket	6417C	.11
	Seven Prong Socket	27-6005	.11
	Speaker Socket	4957	.10
	Dial Assembly	31-1255	.60
	Dial Scale	27-5049	.25
	Knob (Large)	27-4051	.10
	Knob (Small)	27-4052	.10
	Chassis Mtg. Screw	W1388A	.40C
	Chassis Mtg. Foot (Rubber)	27-4116	.05
	Chassis Mtg. Foot (Steel)	29-1983	.03
	Chassis Mtg. Foot Plate	27-7497	.35C
	Tube Shield	28-1107	.10
	A. C. Cord and Plug Assembly	L-943A	.60

Adjusting Compensating Condensers in Model 200

The quality performance of this receiver depends to a great extent upon providing a wide channel through the R. F. and I. F. stages to permit the passage of a broadcast signal without cutting of the side bands.

In order to produce this wide tuning band, the set must be carefully and accurately adjusted. These adjustments will be more critical than in the conventional radio, and the procedure will be somewhat more complicated.

In making the adjustments, it is necessary to use an unmodulated signal generator. The PHILCO Model 048 Set Tester or the Model 024 Signal Generator can be readily adapted for this purpose by the installation of a single-pole double-throw switch, and an additional grid leak resistor, as shown in Figure 4. This switch will adapt the signal generator for either a modulated or an unmodulated signal.

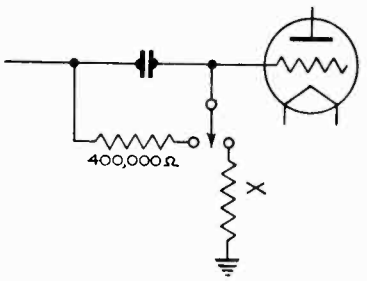
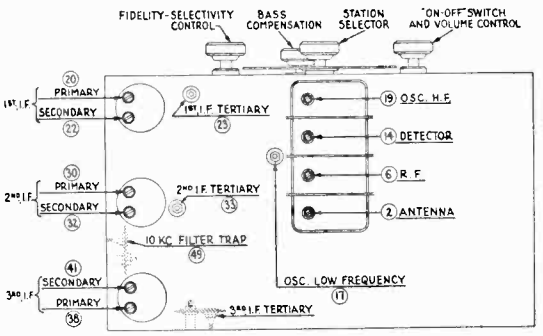


Figure 4 Adaptation of Signal Generator Circuit for Use in Making Adjustments on Model 200.



Locations of Adjusting Condensers.

With an unmodulated signal, it is not possible to obtain an indication of output by means of the usual form of output meter. An indirect indication can be obtained, however, through the automatic volume control system by connecting a high resistance voltmeter having a scale reading of 0-5 or 0-10 volts across the R. F. cathode resistor ⑦, shown in the wiring diagram Fig. 2. This connection can be made conveniently through the use of leads equipped with test clips. With this arrangement, maximum output at the second detector will be indicated by a minimum reading of the meter, and vice versa. In other words, the action will be just the opposite of an output meter used to measure audio frequency voltage at the power output stage. With no signal applied to the receiver, the bias voltage indicated by the voltmeter, will be approximately 3 volts. This voltage will be reduced by the application of a signal to the R. F. or I. F. input circuits.

I. F. ADJUSTMENTS

After preparing the unmodulated signal generator and connecting the voltmeter as directed, proceed as follows:

1. Set the receiver tuning dial at its extreme low frequency position. Remove the grid clip from the cap of the 6-A-7 detector oscillator tube, and connect the signal generator antenna lead in its place. Connect the ground lead from the signal generator to the ground terminal of the chassis. Adjust the signal generator frequency to exactly 175 K. C. Turn the fidelity control of the receiver all the way to the left.
2. Adjust the 6 I. F. padding condensers ⑳, ㉒, ㉚, ㉜, ㊶ and ㊳ (see Fig. 5) in the tops of the 3 I. F. cans, for maximum output (minimum meter reading), starting with the compensator or padder at the front of the chassis, and continuing with the adjustments toward the rear of the set. During these adjustments, the output of the signal generator should be regulated to maintain a voltmeter reading of approximately 2 volts.
3. Connect a 250 Mmf. Condenser from the plate of the 2nd I. F. tube to ground. This will increase the voltmeter reading to approximately 2.5 volts.
4. Readjust the 3d I. F. secondary padder ㊶ for maximum output.
5. Readjust the 3rd I. F. primary padder ㊳ for maximum output. Do not touch the grid padder ㊶ again.
6. Turn the fidelity selectivity control all the way to the right.
7. Adjust the 1st & 2nd I. F. tertiary padders ㉓ and ㉝ for MINIMUM output (maximum voltmeter reading).
8. Leaving the fidelity selectivity control in the right hand position, it will be found, upon varying the frequency of the signal generator, that two definite dips will appear in the voltmeter reading—one at 167 K. C. and another at 182 K. C. These dips in the voltmeter reading indicate peaks in the tuning curve. The amplitude of these peaks should be equal; that is, the same voltmeter reading should be obtained at both 167 K. C. and 182 K. C. Any variations in these two readings can be corrected by a *slight* readjustment of the 3rd I. F. primary padder ㊳. If the peak at 167 K. C. is higher than the one at 182 K. C., the primary padder will have to be turned out. If the reverse is true, the capacity of this padder must be increased. In any case, the voltmeter readings must be made equal by dividing the differences through readjustment.

R. F. ADJUSTMENTS.

The R. F. portion of the receiver is adjusted as follows:

9. Replace the grid clip on the detector-oscillator tube and connect the antenna terminal of the signal generator to the antenna terminal of the chassis. Turn the fidelity selectivity control all the way to the left and set the receiver dial at 1,500 K. C. The same type of output indication is employed as in the I. F. adjustments.
10. Adjust the signal generator for a frequency of 1,500 K. C. Adjust the "oscillator" padding condenser ⑲ and the "detector" padding condenser ⑭ for maximum output and in the order mentioned. Regulate the signal generator output control to maintain a voltmeter reading of 2 volts as before.
11. Turn in padder ⑥ (R. F.) until the voltmeter reads 2.5 volts and then adjust padder ② (ANT.) for maximum output.
12. Readjust padder ⑥ for maximum output. Do not touch padder ② again.
13. Set the receiver dial and the signal generator at 600 K. C. Adjust the "oscillator low frequency" padder ⑰ for maximum output. As the R. F. tuning is rather broad, there will be a considerable range on the dial that will give about the same output when the oscillator L. F. padder is adjusted for maximum. The padder must be adjusted at the middle of this range. This point may be determined with accuracy in the following manner: Starting with the usual voltmeter reading of 2 volts, slowly turn the receiver dial toward the low frequency end and, at the same time, readjust the padder ⑰ for maximum output until a point is reached where the maximum output is indicated by a voltmeter reading of 2.5 volts. Note carefully the exact dial reading at this point. Follow the same procedure while turning the dial in the opposite direction until the output reading decreases to the same value. Set the dial at the exact center of these two points and readjust padder ⑰ for maximum output.
14. Adjust the 3d I. F. tertiary padder ㊵ to give minimum width in the shadow tuning meter in the receiver. This padder is reached from rear of chassis.

ADJUSTMENT OF 10 K. C. FILTER

The 10 K. C. filter in the audio circuit will rarely require readjustment. As the proper adjustment of this padder (㊾ on diagram) requires an accurately calibrated audio oscillator, it should be reset only in the event that it has been tampered with or in cases where it has become necessary to replace one of the elements of this filter. An emergency adjustment of this filter can be made in the following manner:

15. Connect the signal generator to the control grid of the type 6-A-7 tube, leaving the grid clip in place.
16. Disconnect the voltmeter from resistor ⑦ and connect an output meter to the plates of the power output tubes in the usual way.
17. Set the receiver dial at 550 K. C. At this point, the oscillator in the receiver will be tuned to 725 K. C. The adjustment of the signal generator (switch in unmodulated position) to approximately this same frequency will cause an audible beat note to be heard in the speaker. By means of the signal generator tuning control, reduce the frequency of this beat note until zero beat is reached, at which point the output meter reading will decrease to 0. Turning the receiver dial in either direction will gradually increase the frequency of the audible note so that at 540 or 560 K. C. a 10,000 K. C. note will be heard. At either of these points, the padder ㊾ should be adjusted for minimum reading of the output meter.

September, 1934

Printed in U. S. A.

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.

TUBE SOCKET VOLTAGES

	On Line Voltage 120 A.C.						On Line Voltage 120 D.C.					
Type Tube	6-A-7	39-44	39-41	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.

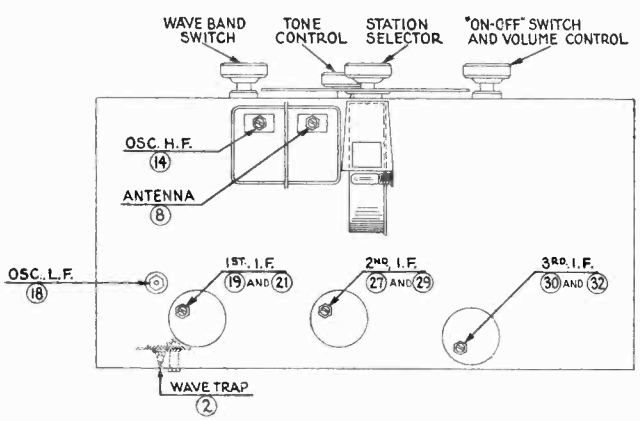


Fig. 1—Top View Showing Location of Compensating Condensers.

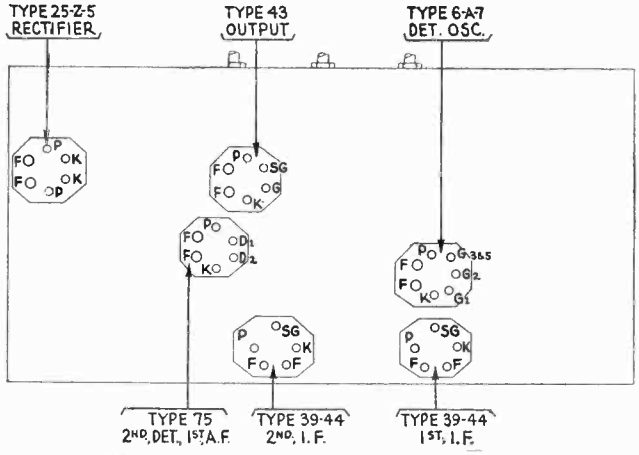


Fig. 2—Bottom View of Sockets for Testing Voltages.

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 compensators, 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).

Printed in U.S.A.

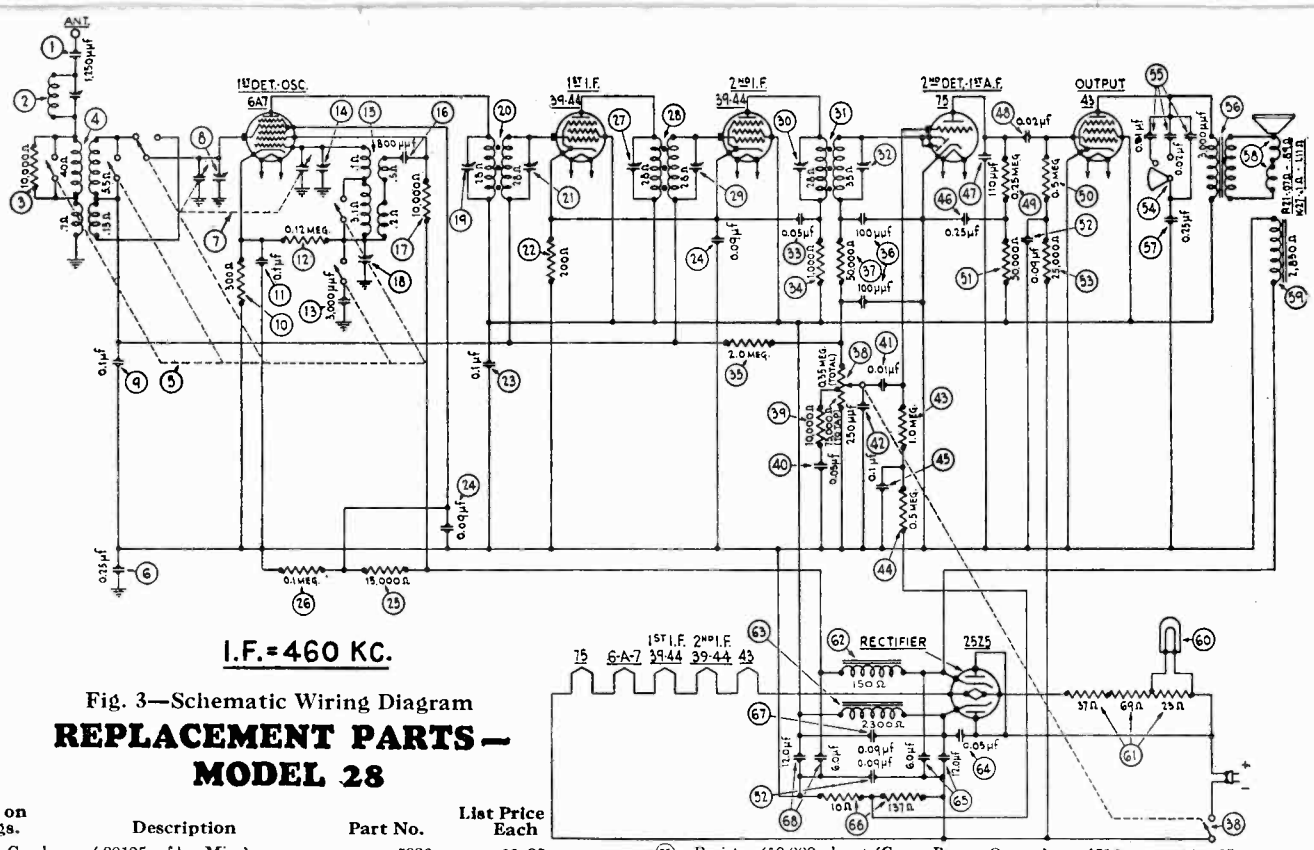


Fig. 3—Schematic Wiring Diagram

REPLACEMENT PARTS—MODEL 28

No. on Figs.	Description	Part No.	List Price Each
(1)	Condenser (.00125 mfd.—Mica)	5886	$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.)	040008	.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)	....
	Condenser (.05 mfd.—Tubular)	30–4020	.35
(33)	Resistor (1000 ohms) (Brown-Black-Red)	5837	.25
(34)	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	.65
	Voice Coil and Cone Assembly K-27	36–3159	.80
(59)	Field Coil and Pot Assembly P-21	36–3357	3.50
	Field Coil and Pot Assembly K-27	36–3352	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

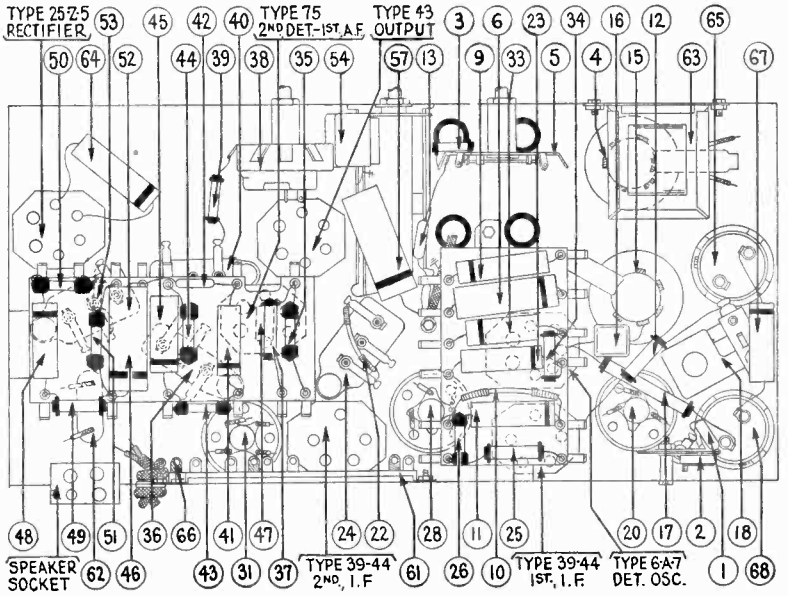


Fig. 4—Bottom View of Chassis Showing Parts.

PHILCO

REG. U.S. PAT. OFF.

Service Bulletin—No. 205

Model 16—Codes 125 and 126

Model 16 (codes 125 and 126) is an eleven tube all-wave superheterodyne receiver covering a continuous frequency range from 550 to 22500 kilocycles. This range is divided into 4 sections or bands any of which may be brought into use by means of a four-position wave-band switch. As each position of the switch is reached the scale on the dial corresponding to that position is illuminated, this being accomplished by the use of four pilot lamps connected to the switch.

Model 16 has automatic volume control, and four point tone control with fixed bass compensation. The bass compensation can be eliminated (when desired on certain types of programs or stations) by means of a toggle switch located on the side of the cabinet.

The intermediate frequency of the Model 16 is 460 kilocycles. The power consumption of the code 125 set is 120 watts; of the code 126 is 130 watts. This set is designed for use on alternating current only, of the voltage and frequency specified on the chassis nameplate. It employs the following tubes:

RF.....Type 78
1st Detector.....Type 77
Oscillator.....Type 76
1st I. F.....Type 78
2nd I. F.....Type 78
2nd Detector.....Type 37
1st A. F.....Type 77
Driver.....Type 42 as triode
Output Tubes (2).....Type 42 as triodes
Rectifier (code 125).....Type 80
Rectifier (code 126).....Type 5Z3

Power Transformer Data
Line Voltage 120

Terminals	A.C. Volts	Circuit	Color of Leads
1-2	120	Primary	White
3-5	*720	Plates of Rectifier	Yellow
6-7	5.0	Filament of Rectifier	Blue
8-9	6.3	Filaments	Black
4	...	Center Tap of 3-5	Yellow—Green Tracer

*780 in code 126

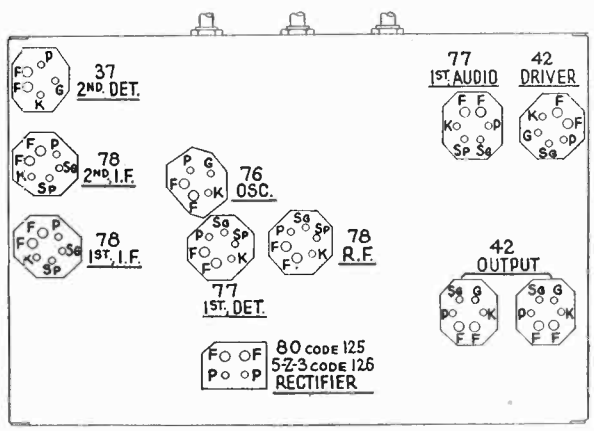


Fig. 1—Tube Sockets (Underside of Chassis)

Socket Voltages (Code 125)
Line Voltage 115

Tube Function	78 R.F.	77 1st Det.	76 Osc.	78 1st I.F.	78 2d I.F.	37 2d Det.	77 1st Aud.	42 Driver	42 Output	80 Rect.
Circuit										
F to F.....	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
P to K.....	175	185	70	180	180	0	60	190	275 ea.	...
SG to K.....	65	62	...	65	65	...	48	190	275 ea.	...
K to Gnd.....	2.4	4.8	5.4	2.3	2.5	0	0	0	0	...

Socket Voltages (Code 126)
Line Voltage 115

Tube Function	78 R.F.	77 1st Det.	76 Osc.	78 1st I.F.	78 2d I.F.	37 2d Det.	77 1st Aud.	42 Driver	42 Output	80 Rect.
Circuit										
F to F.....	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
P to K.....	210	220	75	215	215	0	70	215	330	...
SG to K.....	75	70	...	75	80	...	56	215	330	...
K to Gnd.....	2.8	5.8	6.1	2.8	3.3	0	0	0	0	...

The above voltages were obtained from sockets under chassis by using a high resistance D.C. voltmeter for all plate, grid and cathode voltages and an A.C. voltmeter for filament voltages. (Refer to Fig. 1 when testing voltages.) Volume control was full "on", wave band switch in standard broadcast position and dial at 55. Philco 025 Circuit Tester is recommended for making the above tests.

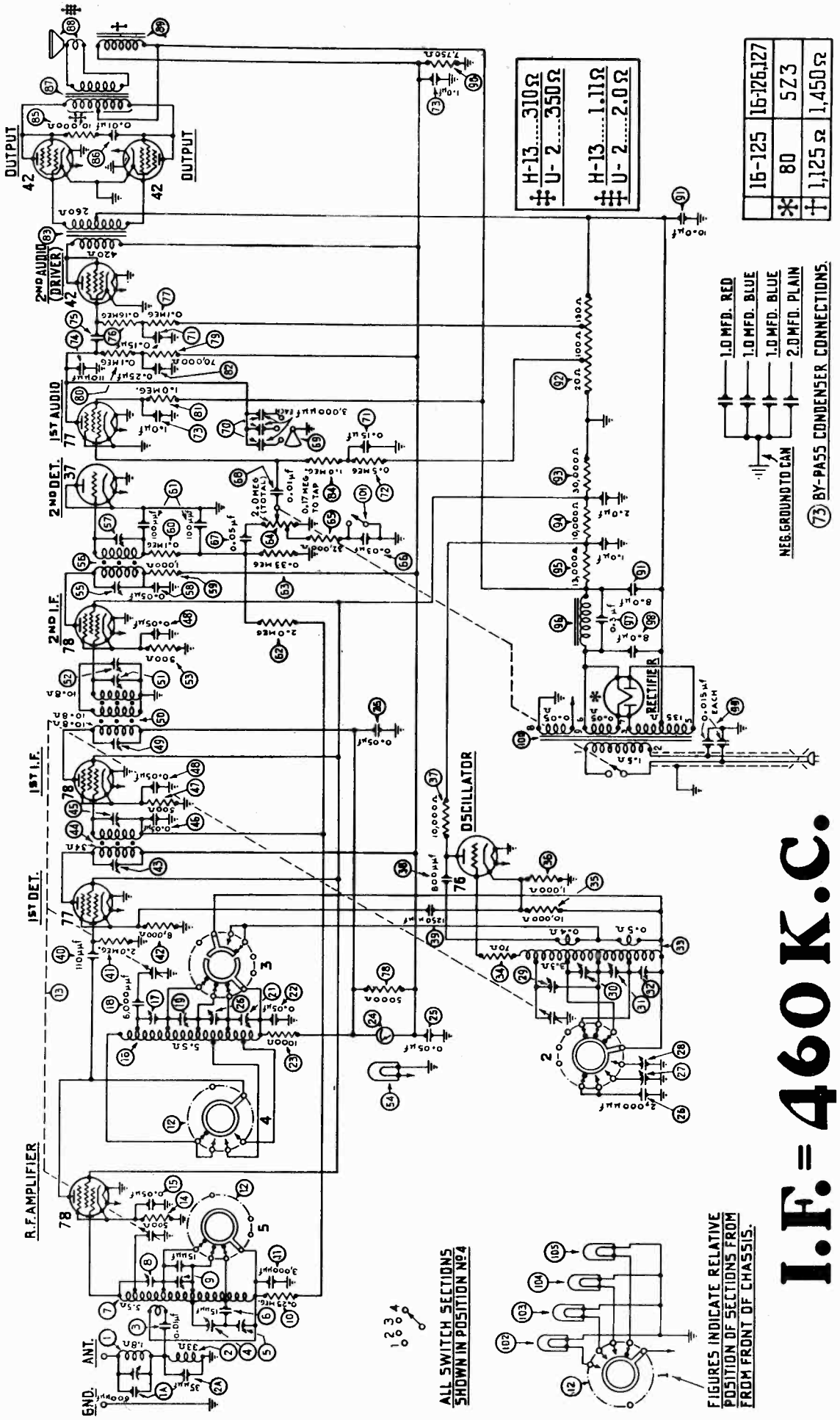


Fig. 2—Schematic Diagram

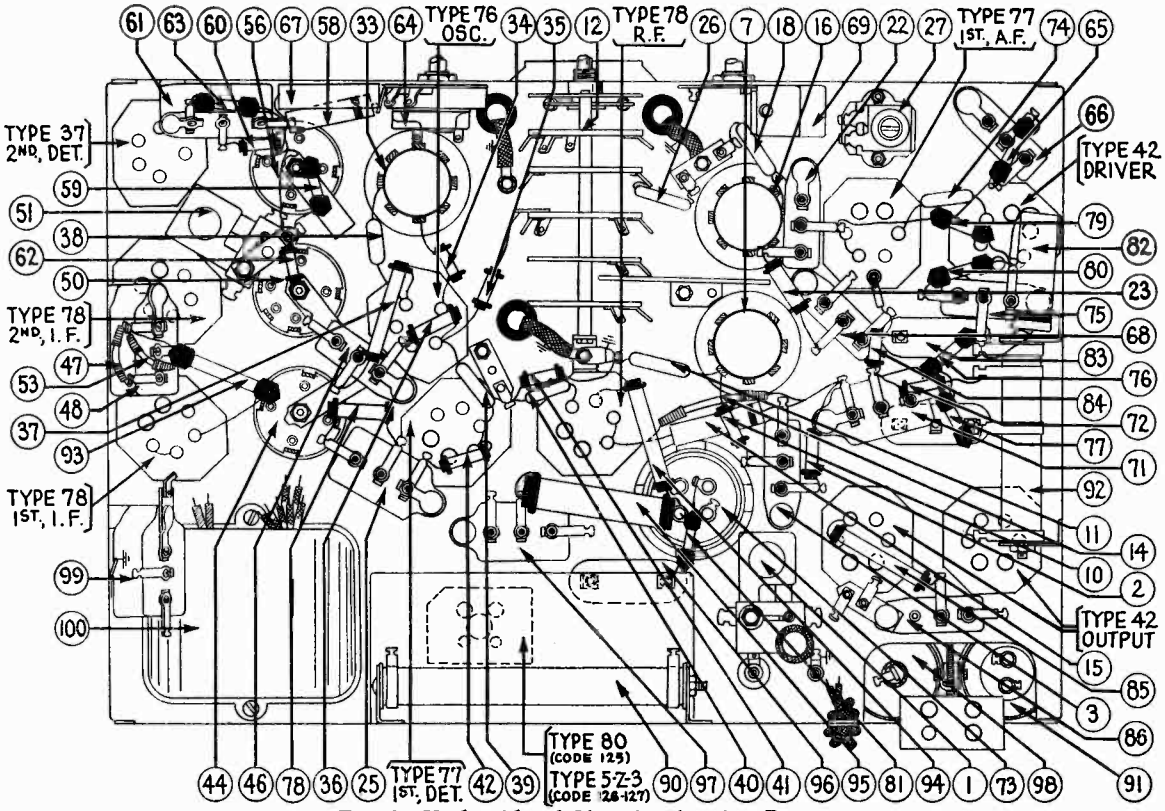


Fig. 3—Underside of Chassis, showing Parts

REPLACEMENT PARTS—MODEL 16—CODES 125 AND 126

Nos. on Diagram	Description	Part No	List Price
①	Wave Trap	38-6049	$0.30
①a	Condenser (.0006 Mfd. Mica	30-1049	.35
②	Antenna Choke Assembly	32-1514	.30
②a	Condenser (.000035 Mfd. Mica)	30-1044	.35
③	Condenser (.01 Mfd. Bakelite Block)	3903 N	.25
④	Compensating Condenser (Ant. Band 2)	†Part of 31-6026	....
⑤	Compensating Condenser (Ant. Band 1)	†Part of 31-6026	....
⑥	Condenser (.000015 Mfd. Mica)	30-1030	.35
⑦	Ant. Transformer	32-1467	....
⑧	Compensating Condenser (Ant. Band 4)	†Part of 31-6026	....
⑨	Compensating Condenser (Ant. Band 3)	†Part of 31-6026	....
⑨a	Condenser (.000015 Mfd. Mica)	30-1030	.35
⑩	Resistor (.25 Meg.) (Red-Yellow-Yellow)	4410	.20
⑪	Condenser (.003 Mfd. Mica)	7301	.45
⑫	Wave Band Switch	42-1079	3.50
⑬	Tuning Condenser Assembly	31-1350	6.50
⑭	Resistor (500 ohms Flexible Wirewound)	6977	.20
⑮	Condenser (.05 Mfd. Tubular)	30-4020	.35
⑯	R.F. Transformer	32-1468	2.30
⑰	Compensating Condenser (R.F.; Band 4)	†Part of 31-6026	....
⑱	Condenser (.006 Mfd. Mica)	30-1043	.60
⑲	Compensating Condenser (R.F.; Band 3)	†Part of 31-6026	....
⑳	Compensating Condenser (R.F.; Band 2)	†Part of 31-6026	....
㉑	Compensating Condenser (R.F.; Band 1)	†Part of 31-6026	....
㉒	Condenser (.05 Mfd. Bakelite Block)	3615 BL	.35
㉓	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
㉔	Shadowmeter	45-2028	2.50
㉕	Condenser (.05 Mfd. Twin Bakelite Block)	3615 BS	.40
㉖	Condenser (.002 Mfd. Mica)	30-1042	.40
㉗	Compensating Condenser (Osc. L.F.; Range 2)	31-6028	.85
㉘	Compensating Condenser (Osc. L.F.; Range 1)		
㉙	Compensating Condenser (Osc. H.F.; Range 4)		
㉚	Compensating Condenser (Osc. H.F.; Range 3)	31-6026	.85
㉛	Compensating Condenser (Osc. H.F.; Range 2)		
㉜	Compensating Condenser (Osc. H.F.; Range 1)		
㉝	Oscillator Transformer	32-1469	2.40
㉞	Resistor (70 ohms) (Violet-Black-Black)	33-1129	.20
㉟	Resistor (10000 ohms) (Brown-Black-Orange)	33-1000	.20
㊱	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
㊲	Resistor (10000 ohms) (Brown-Black-Orange)	3524	.20
㊳	Condenser (.0008 Mfd. Mica)	5878	.35
㊴	Condenser (.00125 Mfd. Mica)	5886	.35
㊵	Condenser (.00011 Mfd. Mica)	4519	.35
㊶	Resistor (2 Meg.) (Red-Black-Green)	33-1025	.20
㊷	Resistor (8000 ohms) (Gray-Black-Red)	33-1157	.20
㊸	Compensating Condenser (1st I.F. Pri.)	Part of ㊹	....
㊹	1st I.F. Transformer	32-1188	.65
㊺	Compensating Condenser (1st I.F. Sec.)	Part of ㊹	....
㊻	Condenser (.05 Mfd. Bakelite Block)	3615 AA	.35
㊼	Resistor (500 ohms Flexible Wirewound)	6977	.20
㊽	Condenser (.05 Mfd. Twin Bakelite Block)	3615 AJ	.40
㊾	Compensating Condenser (2nd I.F. Pri.)	Part of ㊿	....
㊿	2nd I.F. Transformer	32-1470	....
(51)	Compensating Condenser (2nd I.F. Tertiary)	04000R	.45
(52)	Compensating Condenser (2nd I.F. Sec.)	Part of ㊿	....
(53)	Resistor (500 ohms Flexible Wirewound)	6977	.20
(54)	Pilot Lamp for Shadowmeter	Part of (24)	....
(55)	Compensating Condenser (3rd I.F. Pri.)	Part of (56)	....
(56)	3rd I.F. Transformer	32-1188	.65
(57)	Compensating Condenser (3rd I.F. Sec.)	Part of (56)	....
(58)	Condenser (.05 Mfd. Tubular)	30-4123	.35
(59)	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
(60)	Resistor (.1 Meg.) (White-White-Orange)	6099	.20
(61)	Condenser (.0001 Mfd. Twin Bakelite Block)	8035 B	.25
(62)	Resistor (2 Meg.) (Red-Black-Green)	33-1025	.20
(63)	Resistor (330000 ohms) (Orange-Orange-Yellow)	6046	.20
(64)	Volume Control (350000 ohms total) & On-Off Switch	33-5022	1.45
(65)	Resistor (32000 ohms) (Orange-Red-Orange)	5279	.20

†31-6026: list price $0.85.

Nos. on Diagram	Description	Part No.	List Price
(66)	Condenser (.03 Mfd. Bakelite Block)	8318 F	....
(67)	Condenser (.05 Mfd. Tubular)	30-4020	$0.35
(68)	Condenser (.01 Mfd. Bakelite Block)	3903 G	.25
(69)	Tone Control	30-4204	.75
(70)	Condensers (Inside (69))	Part of (69)	....
(71)	Condenser (.15 Mfd. Bakelite Block)	6287 J	.40
(72)	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.20
(73)	Condenser (Electrolytic—1,1, 1,2 Mfd.)	30-2078	2.45
(74)	Condenser (.00011 Mfd. Mica)	30-1031	.35
(75)	Condenser (.05 Mfd. Bakelite Block)	3615 AD	.35
(76)	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331	.20
(77)	Resistor (.1 Meg.) (White-White-Orange)	4411	.20
(78)	Resistor (5000 ohms) (Green-Black-Red)	5310	.20
(79)	Resistor (70000 ohms) (Violet-Black-Orange)	5385	.20
(80)	Resistor (.1 Meg.) (White-White-Orange)	4411	.20
(81)	Resistor (1 Meg.) (Brown-Black-Green)	4409	.20
(82)	Condenser (.25 Mfd. Tubular)	30-4146	.40
(83)	Audio Transformer	32-7057	2.75
(84)	Resistor (1 Meg.) (Brown-Black-Green)	33-1096	.20
(85)	Resistor (10000 ohms)	3524	.20
(86)	Condenser (.01 Mfd. Bakelite Block)	3903 F	.25
(87)	Output Transformer (U-2)	32-7052	2.00
	(H-13)	32-7078	1.40
(88)	Voice Coil and Cone Assembly (U-2)	36-3061	1.40
	(H-13)	02625	1.20
(89)	Field Coil and Pot Assembly (U-2)	36-3088	8.00
	(H-13)	36-3104	2.70
(90)	Resistor (B.C. Wirewound 7750 ohms)	33-3020	.35
(91)	Condenser (Electrolytic—8 & 10 Mfd.)	30-2045 (code 125)	1.80
		30-2046 (code 126)	1.85
(92)	Resistor (Voltage Divider—20 ohms, 100 ohms, 130 ohms)	33-3021	.20
(93)	Resistor (30000 ohms) (Orange-Black-Orange)	7836	.20
(94)	Resistor (10000 ohms) (Brown-Black-Orange)	3524	.20
(95)	Resistor (13000 ohms) (Brown-Orange-Orange) (3-watt)	6450	.40
(96)	Filter Choke	32-7056	2.20
(97)	Condenser (.3 Mfd. Bakelite Block)	6287 F	.40
(98)	Condenser (Electrolytic—8 Mfd.)	30-2023* (code 125)	1.10
		30-2011 (code 126)	1.40
(99)	Condenser (.015 Mfd. Twin)	3793 E	.40
(100)	Power Transformer 60 Cycle 115 Volts (code 125)	32-7291	7.00
	Power Transformer 25 Cycle 115 Volts (code 125)	32-7292	9.25
	Power Transformer 60 Cycle 115 Volts (code 126)	32-7283	7.00
	Power Transformer 25 Cycle 115 Volts (code 126)	32-7284	....
(101)	Bass Compensation Switch (Toggle Type)	3253	.45
(102)	Pilot Lamp (Dial Section)	34-2031	.45
(103)	Pilot Lamp (Dial Section)	34-2031	.12
(104)	Pilot Lamp (Dial Section)	34-2031	.12
(105)	Pilot Lamp (Dial Section)	34-2031	.12
	Tube Socket (4 Prong)	7544	.12
	Tube Socket (5 Prong)	27-6013	.11
	Tube Socket (6 Prong)	7547	.11
	Speaker Socket	7828	.10
	Tube Shield (Short Type)	28-1107	.10
	Tube Shield (Tall Type)	28-1820	.06
	Dial Assembly	31-1287	....
	Dial Scale	27-5064	.60
	Chassis Mounting Screw (code 125)	W 1358A	2.60 C
	Chassis Mounting Screw (code 126)	W 1346	.60 C
	Chassis Mounting Foot	27-4116	.05
	Chassis Mounting Foot Plate	27-7497	.35 C
	Chassis Mounting Washer	29-2089	.35 C
	Knob (Waveband Switch, code 126)	27-4051	.10
	Knob (Volume Control and Tone Control)	27-4052	.10
	Knob (Station Selector)	27-4139	.10
	Knob (Fine Tuning Control)	27-4140	.10
	Bass Compensation Switch Plate	28-2415	.05

*After Run No. 5: 30-2025, list price $1.35.

Adjusting Compensating Condensers

Model 16 (Codes 125, 126, 127)

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 77 tube), and connect the "ANT" output terminal of the Model 048 or 024 signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver.

2. Connect the 0 to 20 volt range of the output meter in the Model 048 or 025 tester to the plate prongs of the two output tubes or to the two bottom prongs of the speaker plug.

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the broadcast band, wave band switch to extreme left, and with the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. Using the Philco fibre adjusting screw driver, part No. 27-7059, adjust the I. F. compensating condensers in the following order to give maximum reading in the output meter: ㊼, ㊺, ㊷, ㊾, ㊶, ㊺, ㊸. (Fig. 4).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the first detector grid cap.

2. Set the wave-band switch of the receiver to the extreme left (broadcast position) (Range No. 1, 550–1500 K.C.), and turn the station selector to 550 K.C.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap ① condenser until a minimum reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment.

Adjustment of High Frequency Padders

1. Leaving the output meter connected to the receiver connect the Philco Model 091 signal generator to the antenna and ground terminals of the chassis and place the signal generator in operation.

2. Turn the wave-band switch to Range 4 (extreme right) and adjust the station selector to 18.0 megacycles, at which point the fifth harmonic of the 3600 K.C. signal will be heard. By means of the Philco padder wrench, part No. 3164, adjust the oscillator, R.F. and antenna padders for maximum reading in the output meter and in the order mentioned. These padders are numbered ㉙, ⑰ and ⑧, respectively in figure No. 4. To make certain that the adjustment has been correctly made check the sixth harmonic at 21.6 M.C. on the dial.

3. Turn the wave-band switch to Range 3 (4.1–10.0 M.C.) and adjust the tuning dial to 7.2 M.C. (the second harmonic of the 3600 K.C. signal). Adjust the oscillator, R.F. and antenna padders (㉚, ⑲ and ⑨, respectively) for maximum output. Check the calibration of the dial at the upper portion of the third band by tuning in the image of the 10.8 M.C. signal at approximately 9.9 on the dial. (If there is an appreciable error in calibration at this point, readjust padder ㉚ for maximum output. Return the dial to the 7.2 M.C. position, tuning for maximum output. Readjust padders ⑲ and ⑨.)

4. Turn the wave-band switch to scale No. 2 (1.5–4.0 M.C.) and tune in the fundamental frequency from the signal generator at 3.6 M.C. Adjust padders ㉛, ⑳ and ④ for maximum output.

5. At this point it will again be necessary to make use of the broadcast type signal generator Models 024, 048 or equivalent. Connect the output of this signal generator to the antenna and ground terminals of the chassis. Turn the station selector dial to 1.5 M.C. (Range 2) and adjust the signal generator to the same frequency (1500 K.C.). Adjust padder ㉗ (nut).

6. Turn the wave-band switch to Range No. 1 (broadcast band) and set the dial at 1500 K.C. Adjust the signal generator to this frequency and adjust padders ㉜, ㉑ and ⑤ for maximum output.

7. Tune the receiver and the signal generator to 600 K.C. and adjust padder ㉘ (screw) for maximum output.

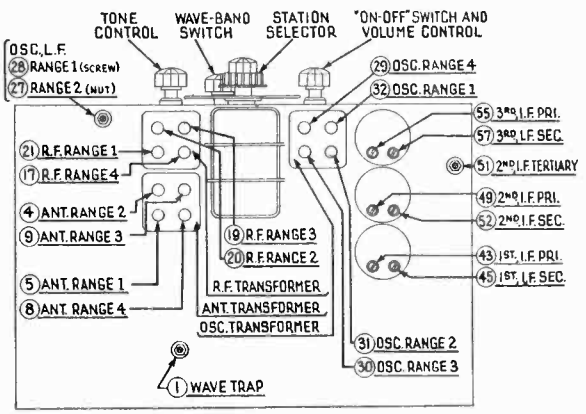


Fig. 4—Locations of Compensating Condensers

USE PHILCO REPLACEMENT PARTS AND TUBES FOR EVERY MAKE RADIO. GET COMPLETE CATALOG FROM YOUR DISTRIBUTOR.

SERVICE BULLETIN
No. 236

For Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

Model 600

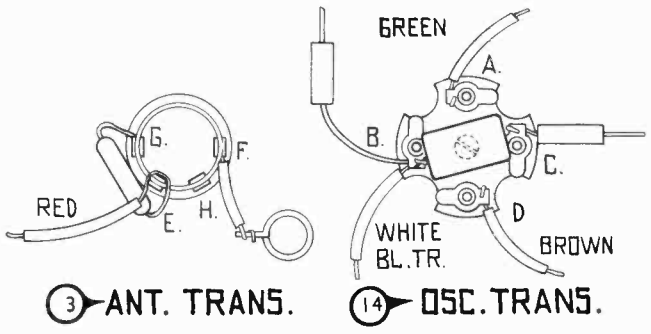


Fig. 1. Transformer Terminal Code

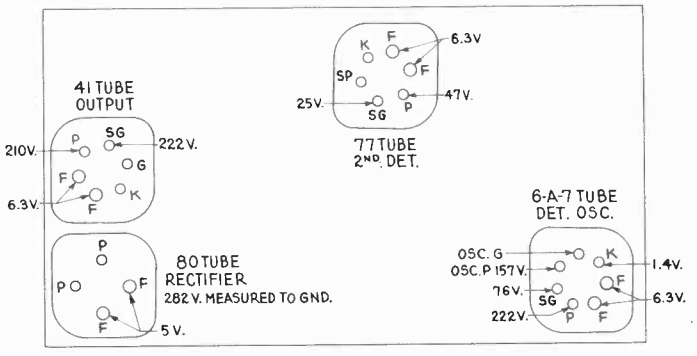


Fig. 2. Tube Sockets as Viewed from Bottom (Measured from Socket Terminal to B—)

Specifications

TYPE CIRCUIT: Superheterodyne with pentode output.

POWER SUPPLY: 115 V., 60 cycle A.C.

TUBES USED: 1 type 6A7, Det. Osc., 1 type 77, 2nd Det., 1 type 41, Output, 1 type 80 Rectifier.

FREQUENCY RANGE: 530-1800 K.C.

INTERMEDIATE FREQUENCY: 460 K.C.

CURRENT CONSUMPTION: 45 watts.

SPEAKER: B-6.

POWER OUTPUT: ½ watt.

Adjusting Compensating Condensers

Adjustment of compensating condensers in Model 600 requires an accurate signal generator covering I.F., and standard-wave frequencies. The **PHILCO Model 088 All-Wave Signal Generator,** having a continuous range of from 100 to 20,000 K.C., is ideal for this purpose.

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

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 compensaters are shown in Fig. 4. Connect the output meter to the plate and cathode contacts of the type 41 power tube (using the adapters provided with the "025") and set it at the 0-30 volt range.

INTERMEDIATE FREQUENCY: Connect the 088 signal generator antenna lead to the grid of the 6A7 (removing grid clip) and the ground lead to the ground post or some part of the chassis. Adjust sensitivity control (23) approximately 1½ turns from tight (counter clockwise), then set the 088 signal generator at 460 K.C. and the attenuator for approximately ¼ scale reading on output meter. Adjust condensers (18) and (20) for maximum reading on output meter. Turn sensitivity control (23) in (clockwise) until a low hiss or click (oscillation) is heard. Then turn it out (counter clockwise) approximately ¼ turn.

STANDARD and POLICE: Remove the 088 signal generator antenna lead from the grid of the 6A7 (replacing grid clip) and connect it to the aerial post on the set. Turn the condenser gang all the way out (minimum capacity) and place a .006" (six thousandth inch) gauge between the stator and rotor plates. Turn the condenser gang in until the correct spacing (.006") is had between the rotor and stator plates. The pointer on the front of the cabinet should be set at 1800 K.C. to coincide with this condenser gang setting.

With the condenser gang set in this manner, set the 088 signal generator at 1800 K.C. and adjust condensers (5) and (6) for maximum reading on output meter.

Set the condenser gang and 088 signal generator at 600 K.C. and adjust condenser (16) for maximum output meter reading.

Care should be taken to adjust the 088 signal generator attenuator for approximately ¼ scale output meter reading for each stage before attempting to adjust compensators.

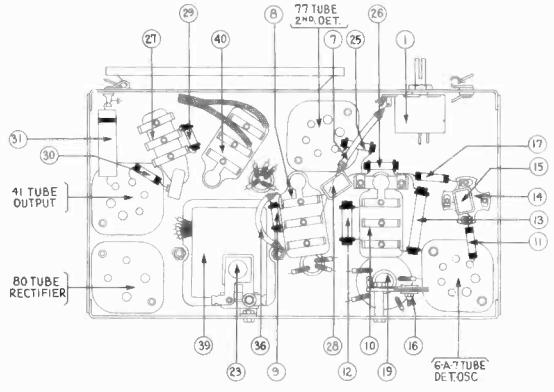


Fig. 3. Base View

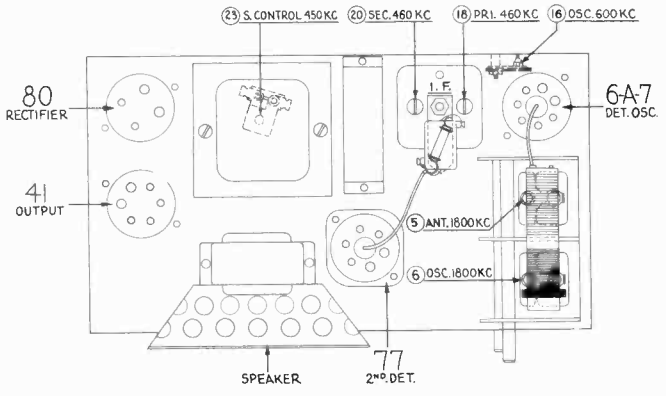
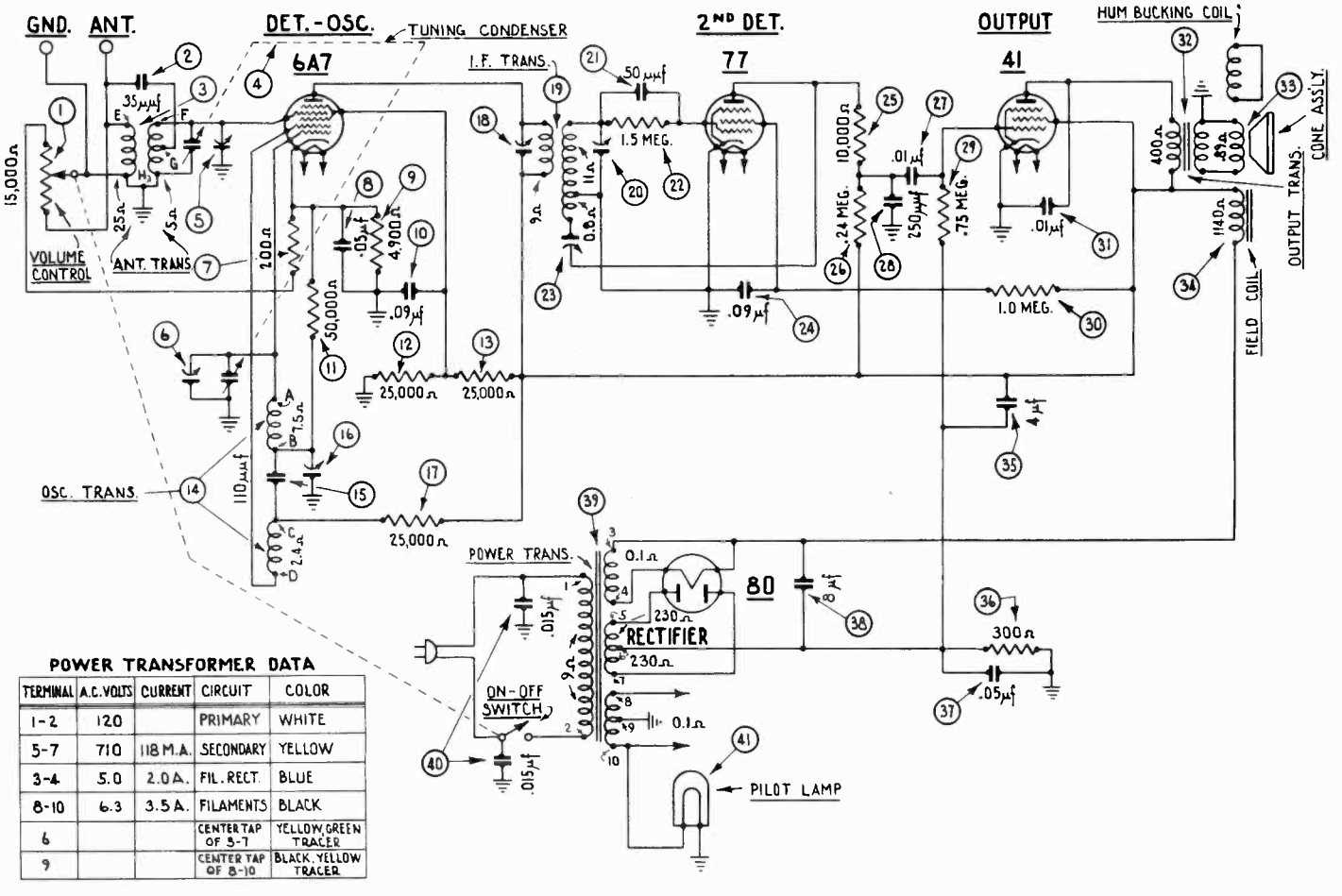


Fig. 4. Location of Compensators

Replacement Parts for Model 600

Schematic Number	Part and Description	Part No.	Price List
①	Volume Control	33-5152	...
②	Condenser (35 Mmf. Mica)	30-1044	$.20
③	Ant. Transformer	32-2030	1.40
④	Tuning Condenser	31-1755	2.75
⑤	Compensater (Det. 1500 K.C.)	Part of ①	...
⑥	Compensater (Osc. 1500 K.C.)	Part of ④	...
⑦	Resistor (200 ohm)	7217	.20
⑧	Condenser (.05 mf. Twin Bakelite)	3615-DG	.40
⑨	Resistor (4900 ohm, ½ watt)	33-249334	.20
⑩	Condenser (.09 mf. Twin Bakelite)	4989-DG	.40
⑪	Resistor (51,000 ohm, ¼ watt)	33-351143	.20
⑫	Resistor (25,000 ohm, ½ watt)	33-325343	.20
⑬	Resistor (25,000 ohm, 1 watt)	33-325443	.20
⑭	Osc. Transformer	32-2043	1.20
⑮	Condenser (110 mmf. Mica)	30-1031	.20
⑯	Compensater (Osc. Series) (600 K.C.)	04000 S	.35
⑰	Resistor (25,000 ohm, ½ watt)	33-325343	.20
⑱	Compensater (I.F. Pri) (460 KC.)	Part of ⑲	...
⑲	I.F. Transformer	32-2031	1.50
⑳	Compensater (I.F. Sec.) (460 KC.)	Part of ⑲	...
㉑	Condenser (50 mmf. Mica)	30-1029	.20
㉒	Resistor (1.5 meg., ¼ watt)	33-515133	.20
㉓	Sensitivity Control	31-6086	.45
㉔	Condenser (.09 mf.)	Part of ⑩	...
㉕	Resistor (10,000 ohm, ¼ watt)	33-310133	.20
㉖	Resistor (240,000 ohm, ¼ watt)	33-424143	.20
㉗	Condenser (.01 mf. Bakelite)	3903-SU	.25
㉘	Condenser (.00025 mf.) (Mica)	30-1032	.25
㉙	Resistor (750,000 ohm, ¼ watt)	33-475133	.20
㉚	Resistor (1.0 meg., ¼ watt)	33-510143	.20
㉛	Condenser (.01 mf.) (Tubular)	30-4124	.25
㉜	Output Transformer	32-7041	.95
㉝	Voice Coil Cone Assy.	36-3029	.60
㉞	Field Coil Assy.	36-3593	2.50
㉟	Elec. Condenser (4.-8. mf.)	30-2149	1.95
㊱	Resistor (300 ohm)	33-3121	.25
㊲	Condenser (.05 mf.)	Part of ⑭	...
㊳	Elec. Condenser (8.0 mf.)	Part of ㉟	...
㊴	Power Transformer (110 V., 60 Cycle)	32-7552	3.25
㊵	Condenser (.015 mf. Twin)	3793-DG	.40
㊶	Pilot Lamp (6.3 Volt)	34-2064	.09
	Power Transformer (230 V., 50-60 Cycle)	32-7554	...
	Power Transformer (110 V., 25 Cycle)	32-7553	...
	Tube Shield Body	28-2726	.10
	Tube Shield Base	28-2725	.03
	Tube Socket (6-prong)	27-6036	.11
	Tube Socket (7-prong)	27-6037	.11
	Tube Socket (4-prong)	27-6044	.10
	Volume Control Mtg. Nut	W-648-A	.20C
	Chassis Mtg. Screw	W-1587-A	.75C
	Chassis Mtg. Nut	W-124-A	.35C
	Chassis Mtg. Washer	W-410-A	.15C
	Chassis Mtg. Washer	W-291-A	.40C
	Baffle	27-8232	.04
	Dial	27-5179	.20
	Knob (Station Selector)	27-4302	...
	Knob (Volume, On-Off)	27-4273	.10
	Bottom Shield Assy.	29-3795	.40
	Bottom Shield Ins.	27-8122	.05
	Pointer	27-7933	.01
	Pilot Lamp Bracket Assy.	38-7581	.20
	Coupling (For Tuning Knob)	28-6426	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



POWER TRANSFORMER DATA

TERMINAL	A.C. VOLTS	CURRENT	CIRCUIT	COLOR
1-2	120		PRIMARY	WHITE
5-7	710	118 M.A.	SECONDARY	YELLOW
3-4	5.0	2.0 A.	FIL. RECT.	BLUE
8-10	6.3	3.5 A.	FILAMENTS	BLACK
6			CENTER TAP OF 5-7	YELLOW, GREEN TRACER
9			CENTER TAP OF 8-10	BLACK, YELLOW TRACER

Fig. 5. Schematic Wiring Diagram

SERVICE BULLETIN
No. 237

For Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

Model 602

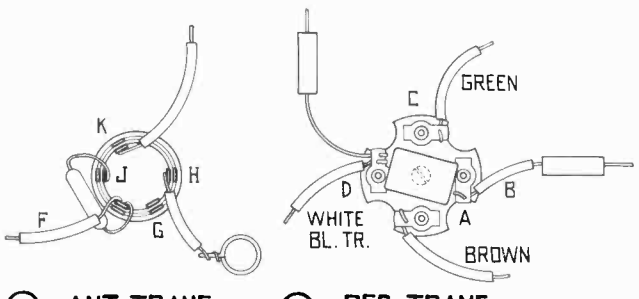


Fig. 1. Transformer Terminal Code

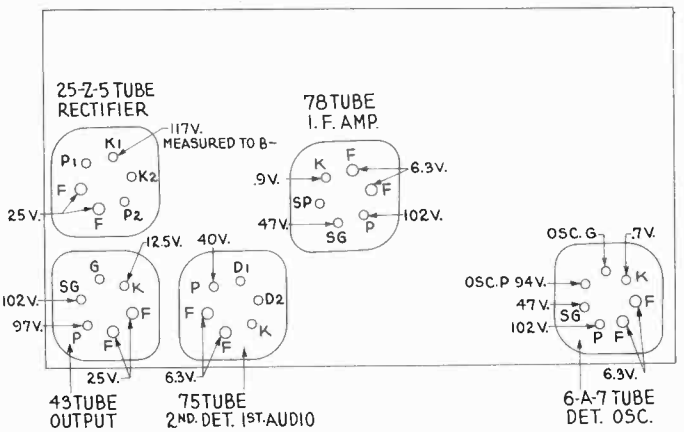


Fig. 2. Tube Sockets as Viewed from Bottom (Measured from Socket Terminal to B—)

Specifications

TYPE CIRCUIT: Superheterodyne with pentode output.

POWER SUPPLY: 115 V., 25 or 60 cycle A. C., D. C.

TUBES USED: 1 type 6A7, Osc. Det., 1 type 78 I.F. Amplifier, 1 type 75, 2nd Det. 1st audio, 1 type 43 output, 1 type 25Z5, rectifier.

FREQUENCY RANGE: 530-1800 K.C.

INTERMEDIATE FREQUENCY: 460 K.C.

CURRENT CONSUMPTION: 55 watts.

SPEAKER: B-4.

POWER OUTPUT: ¾ watt.

Adjusting Compensating Condensers

Adjustment of compensating condensers in Model 602 requires an accurate signal generator covering I.F., and standard-wave frequencies. The **PHILCO Model 088 All-Wave Signal Generator,** having a continuous range of from 100 to 20,000 K.C., is ideal for this purpose.

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

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. 4. Connect the output meter to the plate and cathode contacts of the type 43 power tube (using the adapters provided with the "025") and set it at the 0-30 volt range.

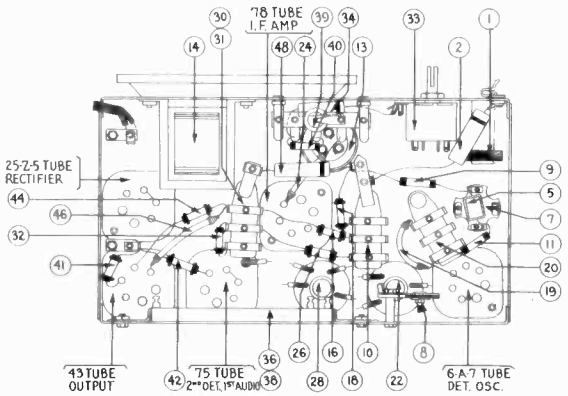


Fig. 3. Base View

INTERMEDIATE FREQUENCY: Turn the condenser gang all the way in (maximum capacity) and set the volume control of set at maximum (clockwise). Connect the 088 signal generator antenna lead to the grid of the 78 I.F. tube through a .00025 mf. condenser and the ground lead to the ground post of the set. Set the 088 signal generator attenuator for approximately ¼ scale reading on output meter. Adjust condensers ㉗ and ㉙ for maximum output meter reading.

Remove the 088 signal generator antenna lead from the grid of the 78 and connect it to the grid of the 6A7, adjust condensers ㉑ and ㉓ for maximum output meter reading.

WAVE TRAP: Connect the 088 signal generator antenna lead to the aerial post of set. Adjust condenser ①a for *minimum* output meter reading.

STANDARD and POLICE: Turn the condenser gang all the way out (minimum capacity) and place a .006" (six thousandth inch) gauge between the stator and rotor plates. Turn the condenser gang in until the correct spacing (.006") is had between the rotor and stator plates. The pointer on the front of the cabinet should be set at 1800 K.C. to coincide with this condenser gang setting.

With the condenser gang set in this manner, set the 088 signal generator at 1800 K.C. and adjust condensers ④a and ⑯a for maximum output meter reading.

Set the condenser gang and 088 signal generator at 600 K.C. and adjust condenser ⑧ for maximum output meter reading.

Care should be taken to adjust the 088 signal generator attenuator for approximately ¼ scale output meter reading for each stage before attempting to adjust compensators.

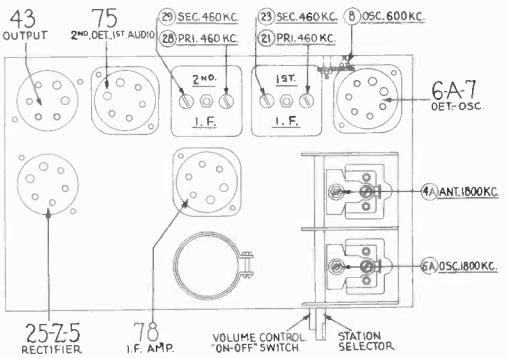


Fig. 4. Location of Compensators

Replacement Parts for Model 602

Schematic Number	Part and Description	Part No.	Price List
①	Wave Trap Coil	32-2007	$ .50
①a	Wave Trap Compensator	04000D	.15
②	Condenser (.001 Mf. Tubular)	30-4201	.20
③	Condenser (15 mmf. Mica)	30-1030	.20
④	Ant. Transformer	32-2003	1.40
④a	Compensater (Osc. 1800 KC.)		
⑤	Osc. Transformer	32-2041	1.20
⑥	Tuning Condenser	31-1794	...
⑥a	Compensater (Ant. 1800 KC.)		
⑦	Condenser (35 mmf. Mica)	30-1044	.20
⑧	Compensator (Osc. Series) (600 Kc.)	04000S	.35
⑨	Resistor (4900 ohm, ½ watt)	33-249333	.20
⑩	Condenser (.05 Mf. Bakelite)	3615-OSU	.35
⑪	Resistor (120.000, ½ watt)	33-412334	.20
⑫	Condenser (.25-.05-.05-.05-.15-.01 mf)	30-4410	1.00
⑬	Elec. Condenser (16-16-10 mf.)	30-2148	3.20
⑭	Filter Choke	32-7544	.95
⑮	Elec. Condenser (16 mf.)	Part of ⑬	...
⑯	Resistor (51,000 ohm, ¼ watt)	33-351143	.20
⑰	Condenser (.05 mf.)	Part of ⑫	...
⑱	Resistor (15,000 ohm, ¼ watt)	33-315133	.20
⑲	Resistor (200 ohm wirewound)	7217	.20
⑳	Condenser (.03 mf. Bakelite)	8318-OSU	.35
㉑	Compensator (1st I.F. Pri.)	Part of ㉒	...
㉒	1st I.F. Transformer	32-2005	1.50
㉓	Compensater (1st I.F. Sec.)	Part of ㉒	...
㉔	Resistor (300 ohm wirewound)	33-3010	.20
㉕	Condenser (.05 mf.)	Part of ⑫	...
㉖	Resistor (2.0 meg., ¼ watt)	33-520143	.20
㉗	Compensater (2nd I.F. Pri.)	Part of ㉘	...
㉘	2nd I.F. Transformer	32-2006	1.50
㉙	Compensator (2nd I.F. Sec.)	Part of ㉘	...
㉚	Condenser (.00011 mf. twin)	8035-ODU	.25
㉛	Condenser (.00011 mf.)	Part of ㉚	...
㉜	Resistor (51,000 ohm, ¼ watt)	33-351143	.20
㉝	Volume Control (0.5 meg.)	33-5145	1.45
㉞	Condenser (.01 mf. Tubular)	30-4145	.20
㉟	Condenser (.05 mf.)	Part of ⑫	...
㊱	B. C. Resistor (133-15 ohm)	33-3225	.55
㊲	Pilot Lamp	34-2068	.16
㊳	Resistor (15 ohm)	Part of ㊱	...
㊴	Bias Cell	41-8009	.20
㊵	Resistor (1.0 meg., ¼ watt)	33-510144	.20
㊶	Resistor (70,000 ohm, ¼ watt)	33-370133	.20
㊷	Resistor (240.000 ohm, ¼ watt)	33-424143	.20
㊸	Condenser (.15 mf.)	Part of ⑫	...
㊹	Resistor (490.000 ohm, ¼ watt)	33-449143	.20
㊺	Condenser (.01 mf.)	Part of ⑫	...
㊻	Resistor (400 ohm wirewound) (Flexible)	33-3122	.25
㊼	Elec. Condenser (10 mf.)	Part of ⑬	...
㊽	Condenser (.01 mf. Tubular)	30-4169	.20
㊾	Output Transformer	32-7566	...
㊿	Voice Coil Cone Assy.	36-3029	.60
51	Field Coil Assy.	36-3040	2.40
	Volume Control Mtg. Nut	W-684-A	1.25C
	B.C. Resistor Mtg. Screw	W-650-A	.40C
	B.C. Resistor Mtg. Nut	W-95-A	.30C
	Tube Shield Base	28-2725	.03
	Tube Shield Body	28-2726	.10
	Chassis Mtg. Screw	W-1587-A	.75C
	Chassis Mtg. Nut	W-124-A	.35C
	Chassis Mtg. Washer	W-410-A	.15C
	Chassis Mtg. Washer	W-291-A	40C
	Speaker Baffle	40-5840	...
	Dial	27-5188	...
	Pointer	27-8236	...
	Shield Bottom Assy.	29-3605	...
	Shield Bottom Insulator	27-8182	.02
	Tube Socket (6-prong)	27-6036	.11
	Tube Socket (7-prong)	27-6037	.11
	Knob (Volume, On-Off)	27-4273	.10
	Knob (Station Selector)	27-4302	...
	Elec. Condenser Support	6440	.05
	Elec. Condenser Insulator	27-7836	.06
	Pilot Lamp Bracket Assy.	38-7513	.50
	Ant. Coil Mfg. Bracket	28-3546	.03
	Bias Cell Assy.	38-7436	.15
	Coupling (For Tuning Knob)	28-6426	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

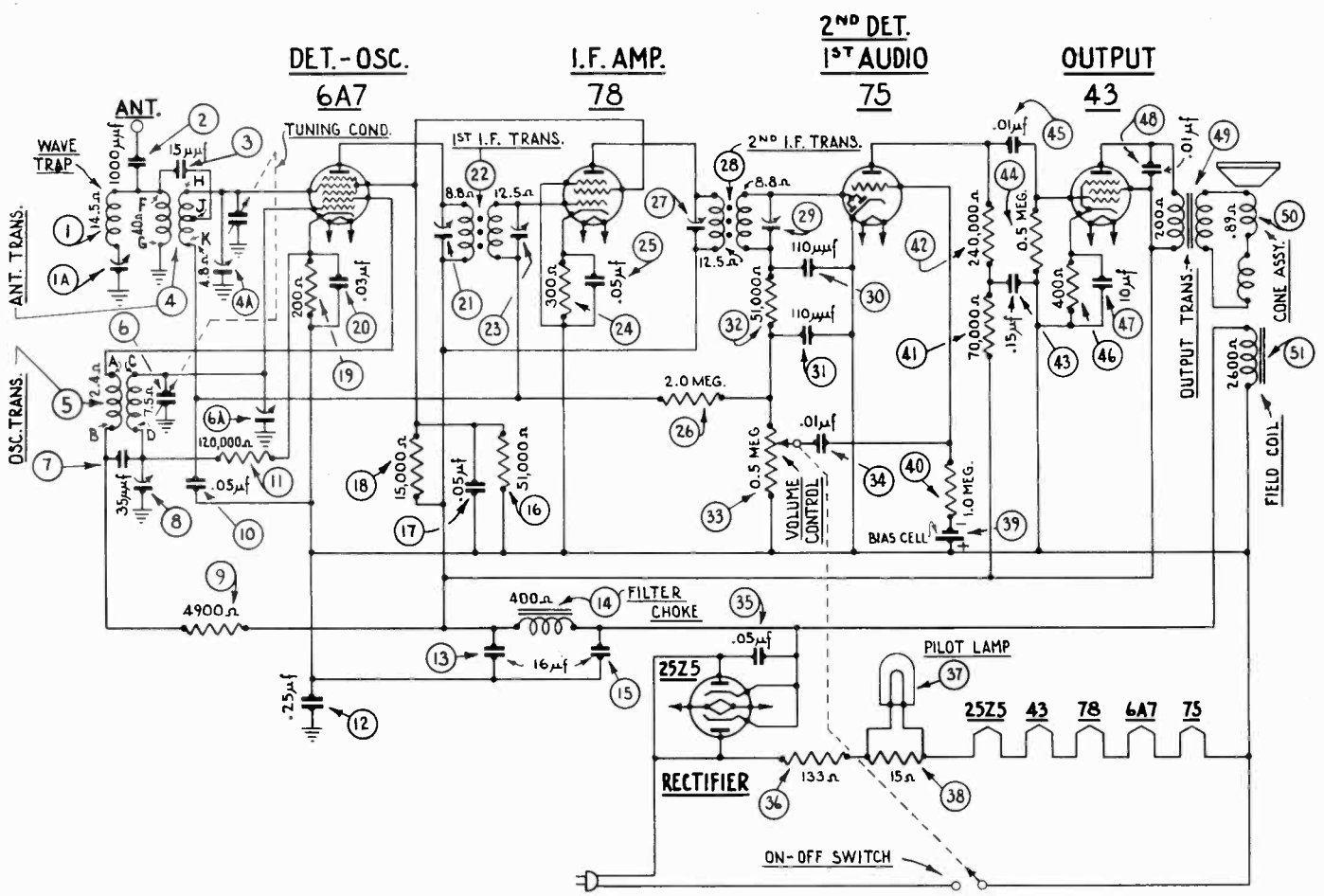


Fig. 5. Schematic Wiring Diagram

PHILCO . . . . . Model 655

SERVICE BULLETIN
No. 235

For Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

Model 655

General Specifications

TYPE CIRCUIT: Superheterodyne, with preselector R.F. amplifier, and push-pull triode output (10 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

POWER SUPPLY: 115v., 60 cycle A.C.

TUBES USED: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42, Driver; 2 type 42's, Push-Pull Output; 1 type 80, Rectifier.

WAVE BANDS: Three: (1) Short-wave; (2) Police, aircraft and amateur; (3) Standard.

COVERAGE OF EACH BAND: Band 1, 5.75–18 M.C.; Band 2, 1.75–5.8 M.C.; Band 3, 540–1750 K.C.

TUNING DRIVE: Dual planetary, ball bearing, 80 to 1 ratio for slow-speed tuning; glowing arrow wave band indicator.

PROGRAM CONTROL: 4-position, with bass compensation effective in first position (counter-clockwise).

INTERMEDIATE FREQUENCY: 460 K.C.

POWER CONSUMPTION: 100 watts.

SPEAKER: 655 Baby Grand Model—K17; Furniture Model—H13.

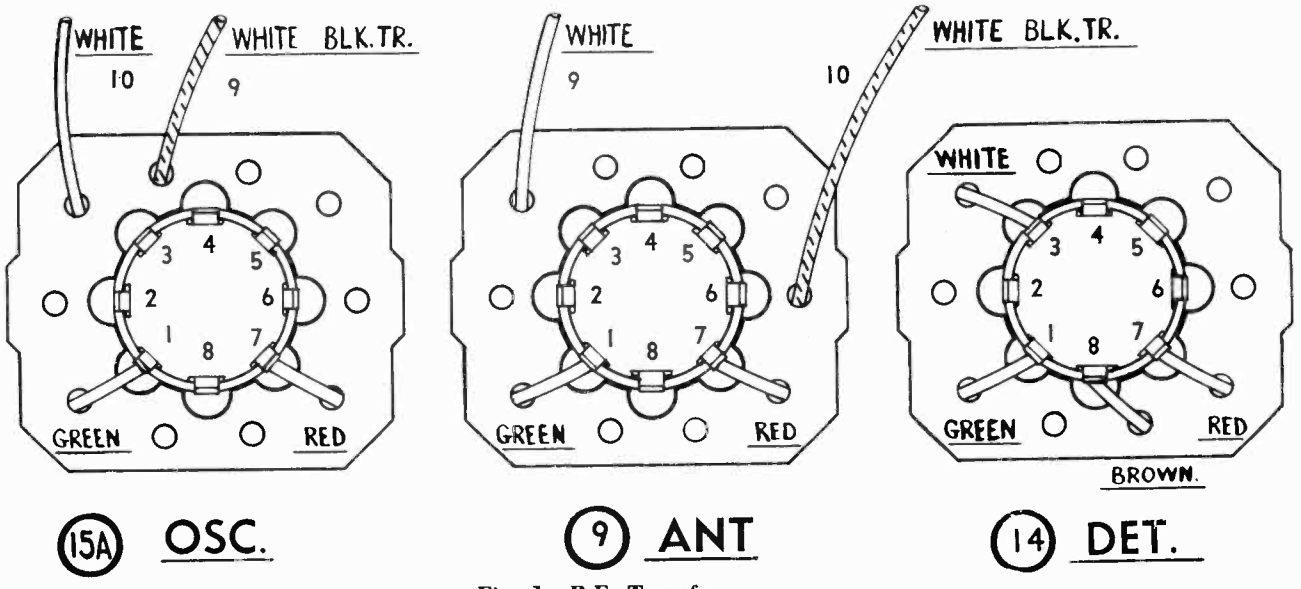


Fig. 1. R.F. Transformers

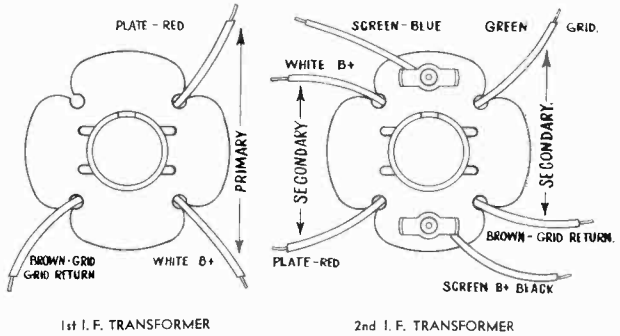


Fig. 2. I.F. Transformers

TUBE SOCKET VOLTAGES
(Measured from Tube Contact to Gnd.)

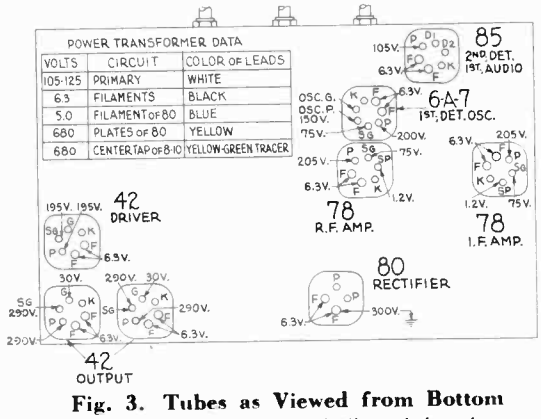


Fig. 3. Tubes as Viewed from Bottom

The voltages at the points indicated by the arrows above were obtained with a Philco type 025 Circuit Tester which contains a high resistance (1000 ohms per volt) voltmeter. Volume control at minimum, waveband switch at standard broadcast. K17 speaker.

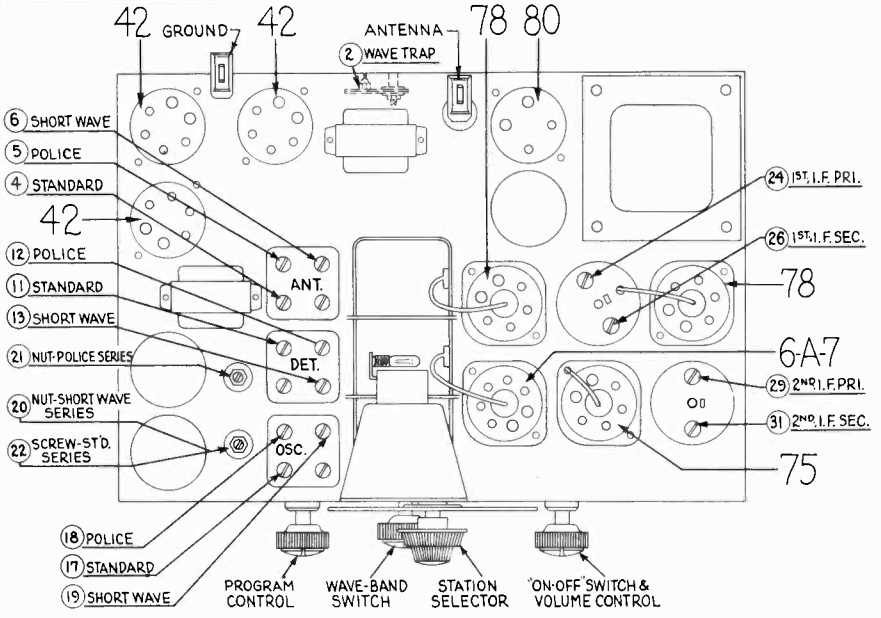


Fig. 4. Location of Compensating Condensers

Adjusting Compensating Condensers

Adjustment of compensating condensers in Model 655 requires an accurate signal generator covering I.F., standard-wave, police and short-wave frequencies. The **PHILCO Model 088 All-Wave Signal Generator,** having a continuous range of from 100 to 20,000 K.C., is ideal for this purpose.

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

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. 4. Connect the output meter to the plate contacts of the type 42 output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

INTERMEDIATE FREQUENCY: Set the signal generator at 460 K.C. with attenuator set at minimum, connect a .001 mf. condenser in series with its antenna lead and attach it to the grid cap of the 78 I.F. amplifier tube. Connect ground lead to ground terminal on set. Set the dial at 55 and turn the waveband switch to position 3 (extreme left). Adjust the volume control of set to almost maximum, and the 088 attenuator so that about one-fourth (¼) scale reading is had on the output meter. With a fibre screwdriver adjust condensers ㉙ and ㉛ (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 78 I.F. tube; place it on the grid of the 6A7. Adjust 088 attenuator as before, then proceed to adjust condensers ㉔ and ㉖ (1st I.F.) for maximum output meter reading. Then remove the 088 oscillator lead. 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 wave trap ② until a minimum reading is obtained in the output meter.

SHORT WAVE: In adjusting the short wave or high frequency band, the det. compensator will have a tendency to "pull" or **change** the frequency of the oscillator. By shunting a padding or variable condenser (about .00025 Mf.) across the oscillator section of the gang (front section) and tuning it so that the second harmonic, 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. Turn wave band switch to position 1 (extreme right). 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 condensers ⑥ and ⑱ (antenna and det.) for maximum reading of the output meter. Disconnect shunt condenser and tune condenser ⑲ (osc.) for correct dial calibration. The set, oscillator frequency, when correctly adjusted, will be higher than that of the incoming signal. In order to check this it should be possible to pick up the 18 M.C. 088 oscillator signal as an image signal by increasing the 088 output and tuning the set to approximately 17.1 M.C.

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 ⑳ (nut) for maximum output meter reading. Readjust condenser ⑲ at 18.0 M.C.

POLICE: Turn wave band switch to position 2 (center), set signal generator at 5500 and dial of set at 5.5. Adjust condensers ⑱, ⑤ and ⑪ (osc., ant., and det.) for maximum output. Turn the set dial to 1.8 and the signal generator to 1800. Adjust condenser ㉑ (nut) (osc. series) for maximum output meter reading.

STANDARD WAVE: Turn waveband switch to position 3 (extreme left), set signal generator at 1500 and dial of set at 150. Now adjust the oscillator, antenna and det. "Standard" condensers. These are ⑰, ④ and ⑪ respectively.

Turn the dial to 60, set signal generator at 600 and adjust condenser ㉒ (oscillator standard series), (screw) for maximum output meter reading.

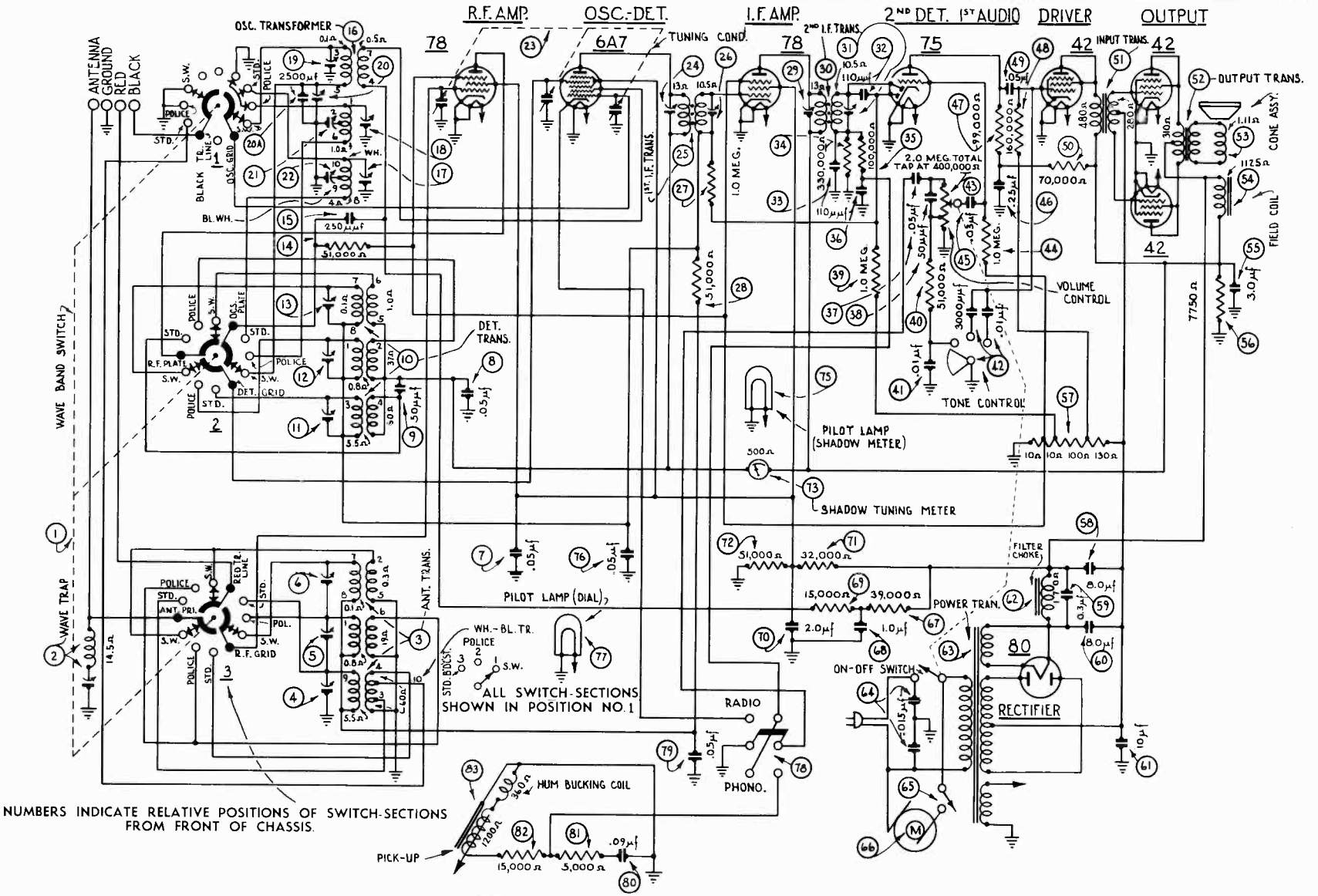


Fig. 5. Schematic Diagram of Model 655

Model 655

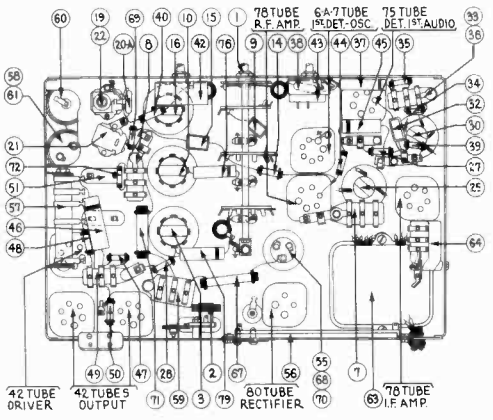


Fig. 6. Base View

Schematic Number	Part and Description	Part No.	List Price
①	Wave Band Switch	42-1153	$2.00
②	Wave Trap	38-6850	1.10
③	Ant. Transformer	32-1867	3.00
④	Compensater (Standard) (Ant.)	31-6058	.60
⑤	Compensater (Police) (Ant.)		
⑥	Compensater (Short-Wave) (Ant.)		
⑦	Condenser (.05 mf. Bakelite)	3615-SG†	.35
⑧	Condenser (.05 mf. Bakelite)	3615-SG†	.35
⑨	Condenser (50 mmf. Mica)	30-1029	.20
⑩	Det. Transformer	32-1868	3.00
⑪	Compensater (Standard) (Det.)	31-6063	.50
⑫	Compensater (Police) (Det.)		
⑬	Compensater (Short-Wave) (Det.)		
⑭	Resistor (51,000 ohm, ¼ watt)	33-351143	.20
⑮	Condenser (.00025 mf. Mica)	30-1032	.25
⑯	Osc. Transformer	32-1976	1.75
⑰	Compensater (Standard) (Osc.)	31-6058	.60
⑱	Compensater (Police) (Osc.)		
⑲	Compensater (Short-Wave) (Osc.)		
⑳	Compensater (Std. Series) (Osc.)	31-6027	.70
⑳a	Condenser (.0025 Mica)	7006	.40
㉑	Compensater (Police Series) (Osc.)	31-6073	.50
㉒	Compensater (Short-Wave Series) (Osc.)	Part of ⑳	
㉓	Tuning Condenser	31-1555	4.50
㉔	Compensater (1st I.F. Pri.)	31-6053	.50
㉕	1st I.F. Transformer	32-1917	1.75
㉖	Compensater (1st I.F. Sec.)	Part of ㉔	
㉗	Resistor (1.0 meg., ¼ watt)	33-510143	.20
㉘	Resistor (51,000 ohm, ¼ watt)	33-351143	.20
㉙	Compensater (2nd I.F. Pri.)	31-6053	.50
㉚	2nd I.F. Transformer	32-1836	1.60
㉛	Compensater (2nd I.F. Sec.)	Part of ㉙	
㉜	Condenser (.00011 mf. Mica)	30-1030	.20
㉝	Condenser (.00011 mf. Twin Bakelite)	8035-DG†	.25
㉞	Resistor (330,000 ohm, ¼ watt)	33-433133	.20
㉟	Resistor (99,000 ohm, ¼ watt)	33-399143	.20
㊱	Condenser (.00011 mf.)	Part of ㊳	
㊲	Condenser (.05 mf. Tubular)	30-4020	.20
㊳	Condenser (50 mmf. mica)	30-1029	.20
㊴	Resistor (1.0 megohm, ¼ watt)	33-510143	.20
㊵	Resistor (51,000 ohm, ¼ watt)	33-351143	.20
㊶	Condenser (.01 mf.)	Part of ㊷	
㊷	Program Control	30-4378‡	.75
㊸	Volume Control	33-5108	1.45
㊹	Resistor (1.0 megohm, ¼ watt)	33-510143	.20
㊺	Condenser (.03 mf. Tubular)	30-4025	.20
㊻	Condenser (.25 mf. Tubular)	30-4134	.35
㊼	Resistor (99,000 ohm, ¼ watt)	33-399143	.20
㊽	Resistor (160,000 ohm, ¼ watt)	33-416133	.20
㊾	Condenser (.05 mf. Bakelite)	3615-SU†	.35
㊿	Resistor (70,000 ohm, ¼ watt)	33-370133	.20
(51)	Input Transformer	32-7114	3.00
(52)	Output Transformer	32-7078	1.25
(53)	Voice Coil & Cone Assy. (B.G. K-17)	*36-3159	.80
(54)	Field Coil Assy. (B G. K-17)	†36-3104	2.70
(55)	Electrolytic Condenser (3.0-1.0-2.0 mf.)	30-2122	1.85
(56)	B. C. Resistor (7750 ohm)	33-3211	.65
(57)	B. C. Resistor (10-10-100-130 ohm)	33-3226	.25
(58)	Electrolytic Condenser (8.0-10.0 mf.)	30-2045	1.80
(59)	Condenser (.3 mf. Bakelite)	6287-DU†	.40
(60)	Electrolytic Condenser (8.0 mf.)	30-2025*	1.35
(61)	Electrolytic Condenser (10 mf.)	Part of (58)	
(62)	Filter Choke	32-7115	1.80
(63)	Power Transformer (115 V., 60 cycle)	32-7402	4.50
(64)	Condenser (.015 Twin Bakelite)	3793-DG†	.40
(65)	Phono-motor switch assy.	6345	3.15
(66)	Phono-motor (115 V., 60 cycle)	35-1002	23.00
(67)	Resistor (39,000 ohm, 1 watt)	33-339443	.20
(68)	Electrolytic Condenser (1.0 mf.)	Part of (55)	
(69)	Resistor (15,000 ohm, ¼ watt)	33-315133	.20
(70)	Electrolytic Condenser (2.0 mf.)	Part of (58)	
(71)	Resistor (32,000 ohm, 2 watt)	33-332533	.30
(72)	Resistor (51,000 ohm, ½ watt)	33-351343	.20
(73)	Shadow Tuning Meter	45-2083	2.50
(74)	Pilot lamp (shadow meter)	34-2064	.09
(75)	Condenser (.05 mf. Tubular)	30-4020	.20
(77)	Pilot lamp (dial)	34-2039	.15
(78)	Phono-radio switch assy.	35-3014	1.30
(79)	Condenser (.05 mf. Tubular)	30-4020	.20
(80)	Condenser (.09 mf. Bakelite)	4989-SU†	.35
(81)	Resistor (5,000 ohm)	33-250123	.20
(82)	Resistor (15,000 ohm)	33-315133	.20
(83)	Pickup head	35-2014	7.25
	Pickup arm	35-2010	8.30
	Phono-motor (115 V., 50 cycle)	35-1007	23.00
	Phono-motor (115 V., 40 cycle)	35-1003	35.00
	Phono-motor (115 V., 25 cycle)	35-1008	35.00
	Phono-motor (230 V., 60 cycle)	35-1004	28.50
	Phono-motor (230 V., 50 cycle)	35-1009	....
	Phono-motor (230 V., 40 cycle)	35-1005	....
	Phono-motor (230 V., 25 cycle)	35-1006	....
	Hum Bucking coil	32-1940	1.10
	Radio-phono switch plate	28-2250	.10
	Switch Pointer	4277	.02
	Needle Cup	28-2222	.05
	Needle Cup Cover	28-2223	.05
	Speed Change lever	28-1648	.25
	Speed Change lever spring	28-1649	.05
	Speed Change lever spacer	28-6103	.03
	Speed Change lever washer	5577	.25C
	Turntable	35-3001	9.00
	Motor Board	25869	3.00
	Motor Board mtg. washer	27-4199	1.60C
	Motor Board mtg. washer	28-2089	.30C
	Motor Board mtg. washer	W-464-A	.55C
	Motor Board mtg. screw	W-461-B	.01
	Motor Board mtg. nut	W-149-A	.45C
	Motor Connector plug	4091	.30
	Shadow Meter light shield	28-2917	.02
	Glowing arrow screen	27-5159	.10
	Glowing arrow mask	27-5160	.20
	Scale guard	27-8140	.01
	Screen bracket	29-3061	.07
	Mask arm	29-3274	.03
	Coupling	29-3339	.06
	Link	29-3338	.03
	Shadow Screen	27-5120	1.50C
	Speaker Cable	02722	.30
	Knob (Phono-Radio)	03334	.10
	Knob (Tuning)	27-4206	.12
	Knob (Slow Speed Tuning)	27-4207	.10
	Knob (Volume Program Control)	27-4208	.10
	Knob (Wave Band)	27-4225	.10
	Socket (4-prong)	27-6044	.10
	Socket (6-prong)	27-6036	.11
	Socket (7-prong)	27-6037	.11
	Speaker Socket	27-6043	.08
	Tube Shield Body	28-2726	.10
	Tube Shield Base	28-2725	.03
	R. F. Shield	38-6921	.35
	I. F. Shield	38-6808	.25
	Wave Switch Nut	W-684-A	1.25C
	Power Transformer (115 V., 25 cycle)	32-7403	9.00
	Power Transformer (230 V., 50-60 cycle)	32-7404	7.50
	Electrolytic Condenser clamp	6440	.05
	Electrolytic Condenser insulator	27-7194	.01
	Chassis Mtg. screw	W-1496-A	1.60C
	Chassis Mtg. washer (rubber)	27-4201	1.40C
	Chassis Mtg. cushion (rubber)	27-4202	.03
	Chassis Mtg. sleeve	28-3101	.04
	Mask	28-3433	.25
	Bezel	28-3164	.50
	Bezel mtg. screw	W-1494	.30C
	Bezel glass	27-8113	.07
	Bezel glass gasket	27-8036	.01
	Dial scale	27-5165	.30
	Hub & set screw assy.	31-1724	.15
	Pilot lamp bracket assy.	38-6789	.50
	B.C. Resistor mtg. screw	W-888	1.00C
	B.C. Resistor mtg. nut	W-317-A	.40C
	B.C. Resistor spacer	3791	.45C
	Front Bumper	27-4200	3.75C
	Dial scale (inverted type code 123)	27-5183	.30
	Speaker Trans. Terminal cover	02824	.10
	Bottom shield	38-7189	.40
	Speaker mtg. bolt	29-3128	.02
	Speaker mtg. nut	W 124-A	.35C
	*Voice coil cone assy. (Furn. H-13)	02625	1.20
	†Field coil assy. (Furn. H-13)	02803	2.70

*Code 122—30-2014 ‡Code 122—30-4379 †Code 122—Use Type "O" (ODG, etc.) Prefix Condensers

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SERVICE BULLETIN
No. 238

For Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

Model 625

Type Circuit: Superheterodyne, with preselector R.F. amplifier, and pentode output (3 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42 Output; 1 type 80 Rectifier.

Wave Bands: Three—(1) standard (with some Police); (2) Police, Aircraft and Amateur; (3) Short-wave.

Coverage of Each Band: Band 1, 540-1720 K.C.; Band 2, 1750 to 5800 K.C. (1.75-5.8 megacycles); Band 3, 5700-18000 K.C. (5.7 to 18.0 megacycles).

Tuning Drive: Two-speed gear drive, ball bearing. 50 to 1 ratio for slow-speed tuning.

Program Control: 3-position, with bass compensation effective in first position.

Intermediate Frequency: 460 K.C.

Power Consumption: 65 watts.

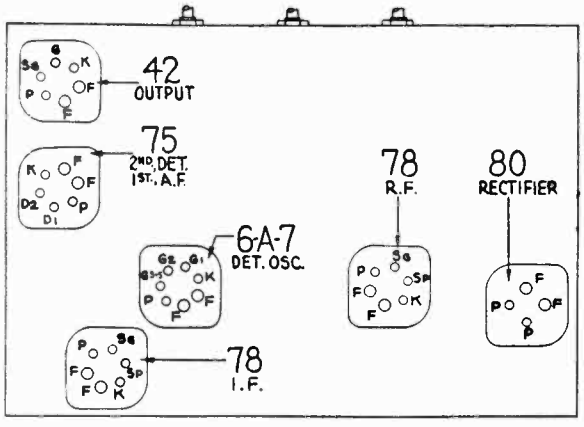


Fig. 1. Tube Sockets as viewed from bottom.

Tube Socket Voltages
Measured to Ground

Tube	78 R.F.	6A7 Det. Osc.	78 I.F.	75 2d Det.	42 Output
Point P	258	258	258	153	243
SG	95	95	95	...	258
K	...	...	2.85	...	...
	6A7: $G_{3\ \&\ 5}$ = 173				

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at maximum; dial at 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points. Line voltage 115 volts.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1–2	120	.....	Primary	White
3–5	680	65 M.A.	Secondary	Yellow
6–7	5.0	2.0 A.	Fil. Rect.	Blue
8–9	6.3	2.0 A.	Filaments	Black
4	...	.....	Center Tap of 3-5	Yellow, Green Tracer

Adjusting Compensating Condensers
Model 625

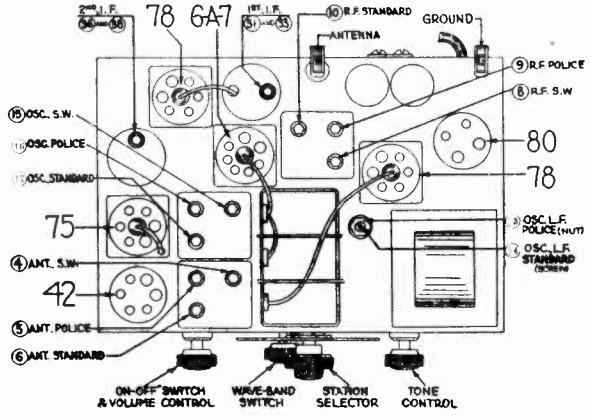


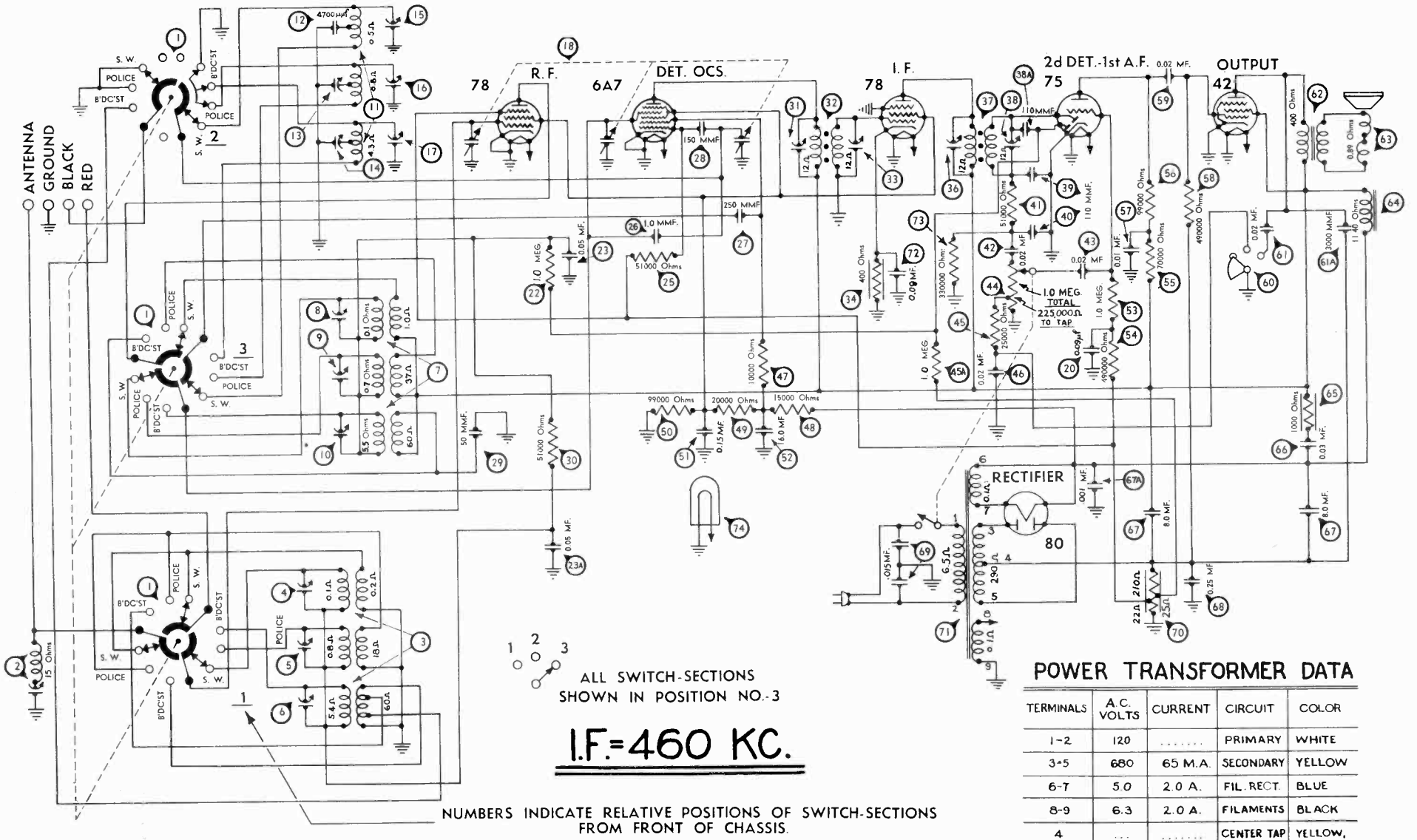
Fig. 2. Locations of Compensating Condensers

The adjustment of the compensating condensers in Model 625 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal at certain frequencies in the short wave band. Philco Model 088 All-wave signal generator is ideal for these requirements. Or you can use the Philco Model 024 or 048A instrument for the broadcast frequencies, and the Model 091 crystal controlled short wave signal generator for the "short-wave" frequencies. The location of all compensating condensers is shown in Fig. 2. An output meter is also needed, such as in Philco Model 025.

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 6A7 tube), and connect the "ANT" output terminal of the broadcast signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver.

2. Connect the 0 to 30 volt range of the output meter in the Philco 048A or 025 unit to the plate and cathode of the output tube or to the two bottom prongs of the speaker plug.



POWER TRANSFORMER DATA

TERMINALS	A.C. VOLTS	CURRENT	CIRCUIT	COLOR
1-2	120	.....	PRIMARY	WHITE
3-5	680	65 M.A.	SECONDARY	YELLOW
6-7	5.0	2.0 A.	FIL. RECT.	BLUE
8-9	6.3	2.0 A.	FILAMENTS	BLACK
4	...	.....	CENTER TAP OF 3-5	YELLOW, GREEN TRACER

Fig. 3. Schematic Diagram of Model 625

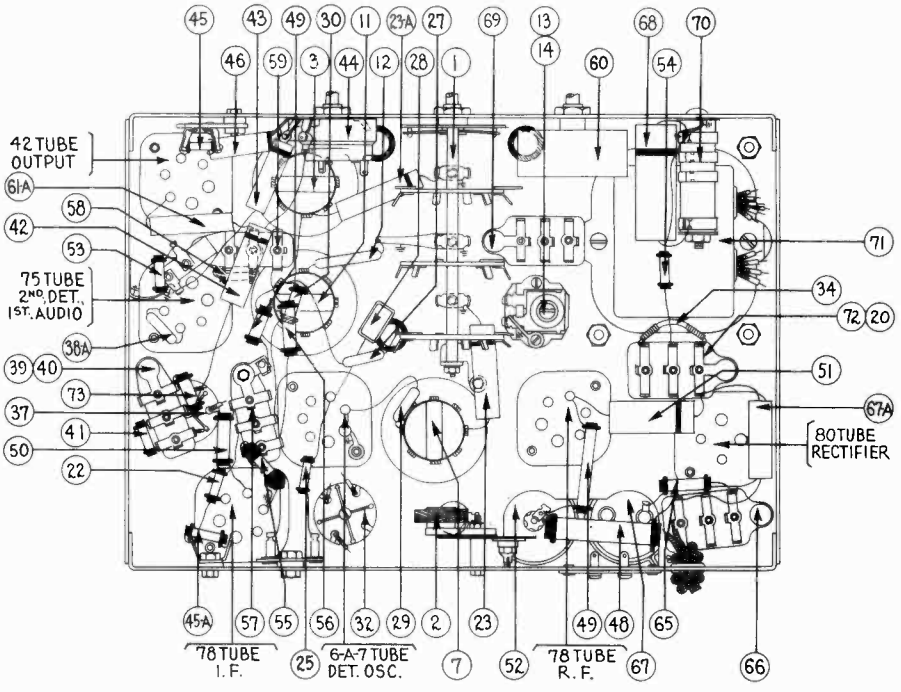


Fig. 4. Bottom View of Chassis

Replacement Parts—Model 625

	Description	Part No.	Price List
①	Waveband Switch	42-1152	$1.75
②	Wavetrap	38-6850	1.10
③	Antenna Transformer	32-1867	3.00
④	Compensater (Ant. S.W.)	Part of ③	....
⑤	Compensater (Ant. Police)	Part of ③	....
⑥	Compensater (Ant. Standard)	Part of ③	....
⑦	R. F. Transformer	32-1868	3.00
⑧	Compensater (R.F. Short-Wave)	Part of ⑦	....
⑨	Compensater (R.F. Police)	Part of ⑦	....
⑩	Compensater (R.F. Standard)	Part of ⑦	....
⑪	Oscillator Transformer	32-1869	2.50
⑫	Condenser (.0047 Mfd. Mica)	30-1052	.60
⑬	Compensater (Osc. Police Series) (Nut)	31-6027	.70
⑭	Compensater (Osc. Standard Series) (Screw)	Part of ⑬	....
⑮	Compensater (Osc. S.W.)	Part of ⑪	....
⑯	Compensater (Osc. Police)	Part of ⑪	....
⑰	Compensater (Osc. Standard)	Part of ⑪	....
⑱	Tuning Condenser Assembly	31-1741	....
⑲	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG	.40
㉒	Resistor (1. Meg.) (Red, Black, Green)	33-1096	.20
㉓	Condenser (.05 Mfd. Tubular)	30-4020	.35
㉓a	Condenser (.05 Mfd. Tubular)	30-4020	.35
㉕	Resistor (5000 ohms) (Green, Brown, Orange)	6098	.20
㉖	Condenser (1 Mmf.). Wires Twisted	Part of ⑱	....
㉗	Condenser (.00025 Mfd. Mica)	30-1032	.35
㉘	Condenser (.00015 Mfd. Mica)	30-1033	.35
㉙	Condenser (.00005 Mfd. Mica)	30-1029	.35
㉚	Resistor (51,000 ohms) (Green, Brown, Orange)	6098	.20
㉛	Compensater (1st I.F. Primary)	Part of ㉜	....
㉜	1st I.F. Transformer	32-2019	....
㉝	Compensater (1st I.F. Secondary)	Part of ㉜	....
㉞	Resistor (400 ohms Flexible) (Yellow, Black, Brown)	33-3016	.20
㉟	Compensater (2nd I.F. Pri.)	Part of ㊱	....
㊱	2nd I.F. Transformer	32-2020	....
㊲	Compensater (2nd I.F. Sec.)	Part of ㊱	....
㊳a	Condenser (.00011 Mfd. Mica)	30-1031	.35
㊳	Condenser (.00011 Mfd. (Twin Bakelite)	8035 DG	.25
㊵	Condenser (.00011 Mfd. Mica)	Part of ㊴	....
㊶	Resistor (5000 ohms) (Green, Brown, Orange)	6098	.20
㊷	Condenser (.02 Mfd. Tubular)	30-4215	.30
㊸	Condenser (.02 Mfd. Tubular)	30-4215	.30
㊹	Volume Control and On-Off Switch	33-5105	1.45
㊺	Resistor (25000 ohms) (Red, Green, Orange)	33-1013	.20
㊺a	Resistor (1. Meg.) (Brown, Black, Green)	33-1096	.20
㊻	Condenser (.02 Mfd. Tubular)	30-4215	.30
㊼	Resistor (10000 ohms) (Brown, Black, Orange)	33-310334	.20
㊽	Resistor (15000 ohms) (Brown, Green, Orange)	5718	.35
㊾	Resistor (20000 ohms) (Red, Black, Orange)	6649	.20
㊿	Resistor (99000 ohms) (White, White, Yellow)	6099	.20
(51)	Condenser (.15 Mfd. Tubular)	30-4191	.35

	Description	Part No.	Price List
(52)	Condenser (16 Mfd. Electrolytic)	30-2118	$1.65
(53)	Resistor (1 Meg.) (Brown, Black, Green)	33-1096	.20
(54)	Resistor (490,000 ohm) (Yellow, White)	6097	.20
(55)	Resistor (70000 ohms) (Violet, Black, Orange)	33-1115	.20
(56)	Resistor (99000 ohms) (White, White, Yellow)	6099	.20
(57)	Condenser (.09 Mf.) (Bakelite)	4989-SG	.35
(58)	Resistor (490,000 ohm) (Yellow, White, Yellow)	6097	.20
(59)	Condenser (.03 Mfd. Bakelite)	8318-SU	.35
(60)	Tone Control	30-4332	.75
(61)	Condenser in Tone Control (.02 Mf.)	Part of (60)	....
(61)a	Condenser (.003 Mfd. Tubular)	30-4042	.25
(62)	Output Transformer	32-7019	1.25
(63)	Voice Coil & Cone Assembly (S-14 Speaker)	36-3157	.80
(64)	Field Coil & Pot Assembly (S-14 Speaker)	36-3495	2.75
(65)	Resistor (1000 ohms) (Brown, Black, Red)	33-1028	.20
(66)	Condenser (.3 Mfd. Bakelite Block)	6287-DU	.40
(67)	Condenser (8 Mfd. & 8 Mfd. Electrolytic)	30-2079	2.40
(67)a	Condenser (.001 Mf.)	30-4310	.25
(68)	Condenser (.25 Mfd. Tubular)	30-4146	.40
(69)	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
(70)	Resistor (BC Wirewound, 22 ohms, 25 ohms, 210 ohms)	33-3222	.20
(71)	Power Transformer (115 Volts 60 Cycles)	32-7381	4.00
	(115 Volts 25 Cycles)	32-7382	6.25
	(230 Volts 50 Cycles)	32-7418	....
(72)	Condenser (.09 Mfd.)	Part of (59)	....
(73)	Resistor (330,000 ohms) (Orange, Orange, Yellow)	33-1200	.20
(74)	Pilot Lamp	34-2064	.09
	Dial Scale	27-5098	.25
	Dial Hub and Set Screw	31-1550	.15
	Dial Front Spring	28-2837	.10
	Knob (Station Selector)	27-4206	.12
	Knob (Fine Tuning)	27-4207	.10
	Knob (Waveband)	27-4219	.10
	Knob (Tone, Volume)	27-4208	.10
	Tube Shield	28-2726	.10
	Tube Shield Base	28-2725	.03
	Tube Socket (4 Prong)	27-6034	.10
	Tube Socket (6 Prong)	27-6036	.11
	Tube Socket (7 Prong)	27-6037	.11
	Speaker Plug Socket	27-6033	.08
	Chassis Mtg. Screw	W-1495	1.50perC.
	Chassis Mtg. Washer (Rubber)	27-4198	.01
	Electric Cord and Plug	L-943-A	.60
	Bezel	28-2928	.35
	Bezel Glass	27-7887	.60
	Glowing Arrow Mask	27-5162	.20
	Glowing Arrow Screen	27-5161	.10
	Mask Arm	29-3274	.03
	Link	29-3285	.04
	Coupling	29-3586	.10

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the standard broadcast band, wave band switch to extreme left (clockwise), and have the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. The I.F. compensating condensers are located at the tops of the I.F. coil shields. The primary is adjusted by turning the screw in top and the secondary by the nut. Adjust condensers ㊱ and ㊳ (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers ㉛ and ㉝ (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (standard band), (540-1720 K.C.), turn the station selector to 55.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap ② condenser until a MINIMUM reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment. The wave-trap compensator is reached from rear of chassis.

Adjustment of High and Low Frequency Compensators

1. With the wave-band switch still at Range No. 1 (broadcast band), set the dial at 1700 K.C. Set the signal generator at this frequency and adjust compensators ⑰, ⑥ and ⑩ for maximum output. These are the oscillator, antenna, and R.F. "standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator ⑭ (screw) for maximum output. This is the oscillator L.F. standard compensator.

3. Turn the wave-band switch to the second (middle) position. Set the dial at 3.6 M.C., at which point the fundamental of the 091 signal will be heard. If the Model 088 signal generator is being used, set it at 3.6 M.C. Adjust condensers ⑯, ⑤ and ⑨ in succession. These are the oscillator, antenna and R.F. police band adjustments.

4. Turn the tuning dial to 1.8 M.C., and set the signal generator (Model 024 or Model 088) at 1800 K.C. Adjust condenser ⑬ (Osc. L.F., police) (nut), to maximum signal.

5. Turn the wave-band switch to Band 3 (extreme right) and adjust the station selector to 18.0 megacycles. Set the signal generator at 18 M.C. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., antenna S.W. and R.F. S.W. compensators for maximum reading in the output meter. These are numbered ⑮, ④ and ③ respectively in figure No. 2.

PHILCO . . . . . Model 635

SERVICE BULLETIN
No. 239

For Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

Model 635

Type Circuit: Superheterodyne, with preselector R.F. amplifier, and pentode output (5 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42 Output; 1 type 80 Rectifier.

Wave Bands: Three—(1) Short Wave (with some Police); (2) Police, Aircraft and Amateur; (3) Standard.

Coverage of Each Band: Band 1, 540-1720 K.C.; Band 2, 1750 to 5800 K.C. (1.75-5.8 megacycles); Band 3, 5700-18000 K.C. (5.7 to 18.0 megacycles).

Tuning Drive: Two-speed gear drive, ball bearing. 50 to 1 ratio for slow-speed tuning.

Tone Control: 3-position, with bass compensation effective in first position.

Intermediate Frequency: 460 K.C.

Power Consumption: 70 watts.

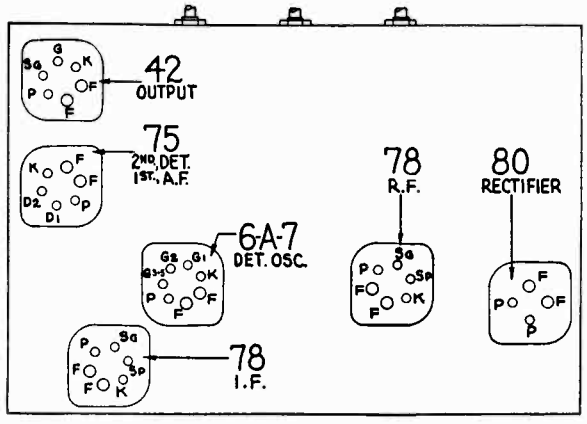


Fig. 1. Tube Sockets as viewed from bottom

Tube Socket Voltages
Measured to Ground

Tube	78 R.F.	6A7 Det. Osc.	78 I.F.	75 2d Det.	42 Output
Point P	245	245	245	188	298
SG	102	102	102	...	311
K	...	...	2.6	...	...
	6A7: $G_{3\&5}$ = 175				

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at maximum; dial at 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points. Line voltage 115 volts.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1–2	120	.....	Primary	White
3–5	746	78 M.A.	Secondary	Yellow
6–7	5.0	2.0 A.	Fil. Rect.	Blue
8–9	6.3	2.25 A.	Filaments	Black
4	...	.....	Center Tap of 3-5	Yellow, Green Tracer

Adjusting Compensating Condensers
Model 635

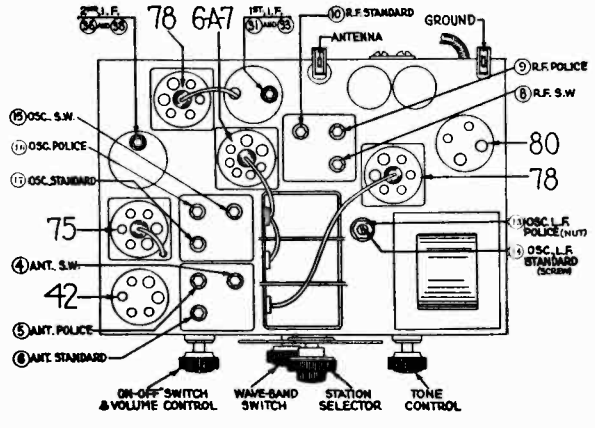


Fig. 2. Location of Compensating Condensers

The adjustment of the compensating condensers in Model 635 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal at certain frequencies in the short wave band. Philco Model 088 All-wave signal generator is ideal for these requirements. Or you can use the Philco Model 024 or 048A instrument for the broadcast frequencies, and the Model 091 crystal controlled short wave signal generator for the "short wave" frequencies. The location of all compensating condensers is shown in Fig. 2. An output meter is also needed, such as in Philco Model 025

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 6A7 tube), and connect the "ANT" output terminal of the broadcast signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver.

2. Connect the 0 to 30 volt range of the output meter in the Philco 048A or 025 unit to the plate and cathode of the output tube or to the two bottom prongs of the speaker plug.

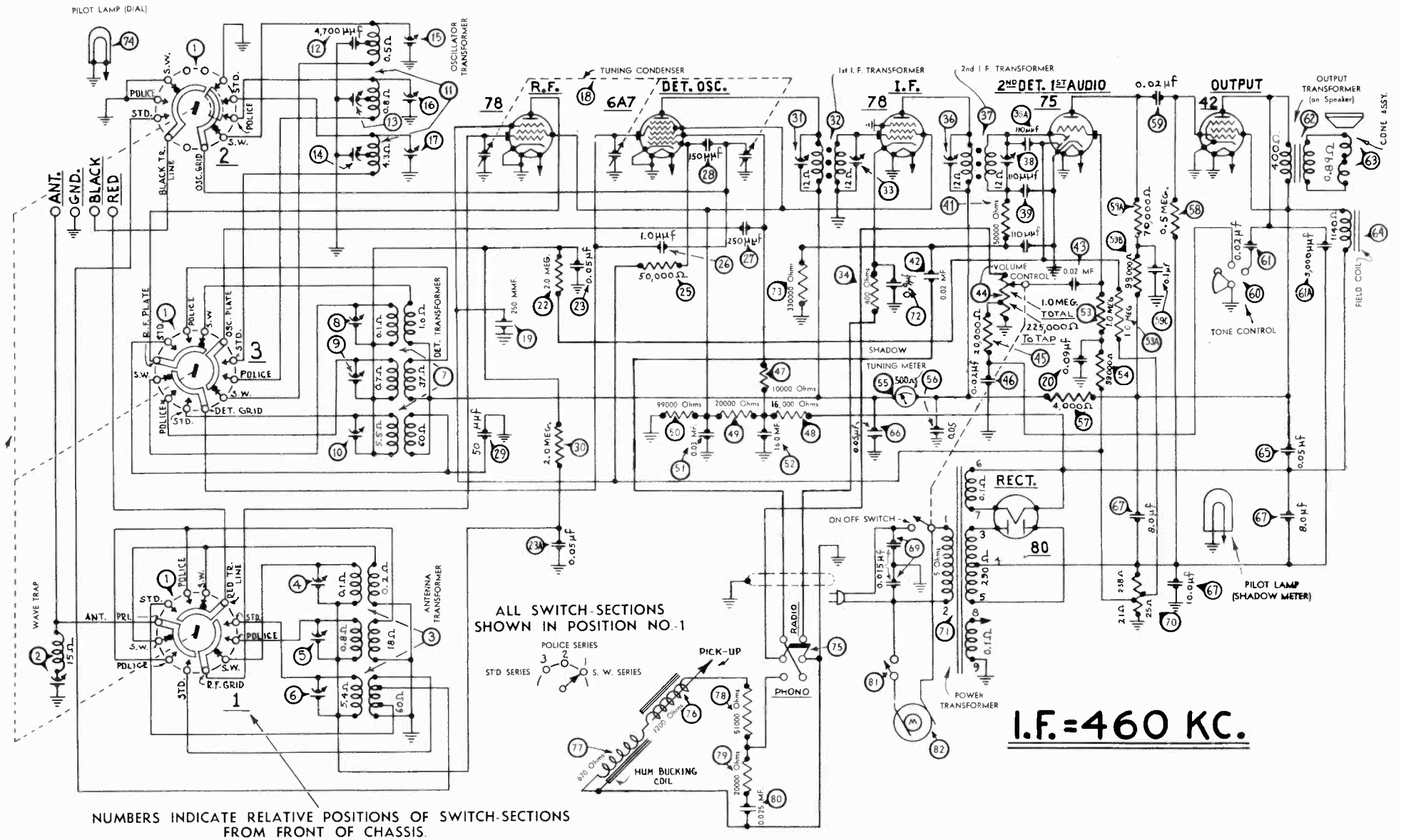


Fig. 3. Schematic Diagram of Model 635

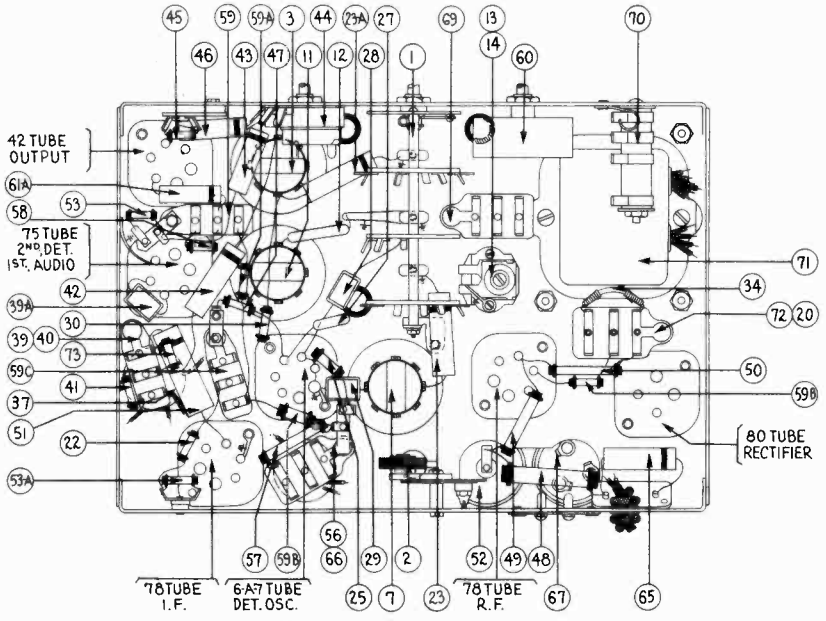


Fig. 4. Bottom View of Chassis

Replacement Parts—Model 635

	Description	Part No.	List Price
①	Wave Band Switch	42-1152	$1.75
②	Wavetrap	38-6850	1.10
③	Antenna Transformer	32-1867	3.00
④	Compensater (Ant. S.W.)	Part of ㉑	....
⑤	Compensater (Ant. Police)	Part of ㉓	....
⑥	Compensater (Ant. Standard)	Part of ㉕	....
⑦	R. F. Transformer	32-1868	3.00
⑧	Compensater (R.F. Short-Wave)	Part of ⑦	....
⑨	Compensater (R.F. Police)	Part of ⑦	....
⑩	Compensater (R.F. Standard)	Part of ⑦	....
⑪	Oscillator Transformer	32-1869	2.50
⑫	Condenser (.0047 Mfd. Mica)	30-1052	.60
⑬	Compensater (Osc. L.F. Police)	31-6027	.70
⑭	Compensater (Osc. L.F. Standard)	Part of ⑫	....
⑮	Compensater (Osc. S.W.)	Part of ⑪	....
⑯	Compensater (Osc. Police)	Part of ⑪	....
⑰	Compensater (Osc. Standard)	Part of ⑪	....
⑱	Tuning Condenser Assembly	31-1741	....
⑲	Condenser (.00025 Mica)	5858	.25
⑳	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG‡	.40
㉒	Resistor (1 Meg.) (Brown, Black, Green)	33-1096	.20
㉓	Condenser (.05 Mfd. Tubular)	30-4020	.35
㉓a	Condenser (.05 Mfd. Tubular)	30-4020	.35
㉔	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
㉖	Condenser (1 Mmfd.)	Part of ⑱	....
㉗	Condenser (.00025 Mfd. Mica)	30-1032	.35
㉘	Condenser (.00015 Mfd. Mica)	30-1033	.35
㉙	Condenser (.00005 Mfd. Mica)	30-1029	.35
㉚	Resistor (51000 ohms) (Green, Brown, Orange)	6098	.20
㉛	Compensater (1st I.F. Primary)	Part of ㉜	....
㉜	1st I.F. Transformer	32-1646	2.25
㉝	Compensater (1st I.F. Secondary)	Part of ㉜	....
㉞	Resistor (400 ohms Flexible) (Yellow, Black, Brown)	33-3016	.20
㉟	Compensater (2nd I.F. Pri.)	Part of ㊲	....
㊲	2nd I.F. Transformer	32-1647	2.25
㊳	Compensater (2nd I.F. Sec.)	Part of ㊲	....
㊴	Condenser (.00011 Mfd.) (Twin Bakelite)	8035-DG‡	.35
㊴a	Condenser (.00011 Mfd. Mica)	30-1031	.35
㊵	Condenser (.00011)	Part of ㊴	....
㊶	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
㊷	Condenser (.02 Mfd. Tubular)	30-4215	.30
㊸	Condenser (.02 Mfd. Tubular)	30-4215	.30
㊹	Volume Control and On-Off Switch	33-5105	1.45
㊺	Resistor (20000 ohms) (Red, Black, Orange)	33-1178	.20
㊻	Condenser (.02 Mfd. Tubular)	30-4215	.30
㊼	Resistor (10000 ohms) (Brown, Black, Orange)	4412	.20
㊽	Resistor (16000 ohms) (Brown, Black, Orange)	33-316633	.30
㊾	Resistor (20000 ohms) (Red, Black, Orange)	3524	.20
㊿	Resistor (20000 ohms) (Red, Black, Orange)	6649	.20
(51)	Condenser (.15 Mfd. Tubular)	30-4191	.40
(52)	Condenser (16 Mfd. Electrolytic)	30-2118*	1.65
(53)	Resistor (1 Meg.) (Brown, Black, Green)	33-1096	.20
(53)a	Resistor (1. Meg.) (Brown, Black, Green)	33-1096	.20
(54)	Resistor (99000 ohms) (White, White, Orange)	6099	.20
(55)	Shadow Tuning Meter	45-2083	2.50
(56)	Condenser (.05 Mf. Twin Bakelite)	3615-DG‡	.40
(57)	Resistor (4000 ohms) (Yellow, Black, Red)	33-1031	.20

	Description	Part No.	List Price
(58)	Resistor (490,000 ohms) (Yellow, White, Yellow)	33-1097	$0.20
(59)	Condenser (.02 Mfd. Bakelite)	8318-SU‡	.30
(59)a	Resistor (70000 ohms) (Violet, Black, Orange)	5385	.20
(59)b	Resistor (99000 ohms) (White, White, Orange)	6099	.20
(59)c	Condenser (.09 Mf. Bakelite)	4989-SG‡	.35
(60)	Tone Control (3 position)	30-4332†	.75
(61)	Condenser in Tone Control	Part of (60)	....
(61)a	Condenser (.003 Mfd. Tubular)	30-4042	.25
(62)	Output Transformer	32-7178	1.60
(63)	Voice Coil & Cone Assembly (K-32)	36-3159	.80
(64)	Field Coil & Pot Assembly (K-32)	36-3498	3.25
(65)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(66)	Condenser (.05 Mfd.)	Part of (56)	....
(67)	Condenser (8 Mfd., 8 Mfd., 10 Mfd. Electrolytic)	30-2073	2.15
(68)	Pilot Lamp (Shadow Tuning Meter)	Part of (53)	....
(69)	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG‡	.40
(70)	Resistor (BC Wirewound—22 ohms, 25 ohms, 210 ohms)	33-3222	.20
(71)	Power Transformer (115 Volts 60 Cycles)	32-7384	5.50
	(115 Volts 25 Cycles)	32-7385	7.75
	(230 Volts 50 Cycles)	32-7420	....
(72)	Condenser (.09 Mf.)	Part of (20)	....
(73)	Resistor (330,000 ohms) (Orange, Orange, Yellow)	33-1200	.20
(74)	Pilot Lamp	34-2039	.09
(75)	Phono Switch Cable Assy.	35-3014	1.30
(76)	Pickup Head Assy.	35-2014	7.25
(77)	Hum Bucking Coil Assy.	32-1940	1.10
(78)	Resistor (51,000 ohms)	6098	.20
(79)	Resistor (20,000 ohms)	33-1178	.20
(80)	Condenser (.025 Mf.)	7653-SU‡	.35
(81)	Automatic Stop	6345	3.15
(82)	Phono. Motor (115 V. 60 Cycle)	35-1112	20.00
	Dial Scale	27-5098	.25
	Dial Hub & Set Screw	31-1550	.15
	Dial Front Spring	28-2837	.10
	Knob (Station Selector)	27-4206	.12
	Knob (Fine Tuning)	27-4207	.10
	Knob (Waveband)	27-4219	.10
	Knob (Volume Control, Tone Control)	27-4208	.10
	Tube Shield	28-2726	.10
	Tube Shield Base	28-2725	.03
	Tube Socket (4-Prong)	27-6034	.10
	Tube Socket (6-Prong)	27-6036	.11
	Tube Socket (7-Prong)	27-6037	.11
	Speaker Plug Socket	27-6033	.08
	Chassis Mtg. Screw	W-1495	1.50perC.
	Chassis Mtg. Washer (Rubber)	27-4198	.01
	Electric Cord & Plug	L-943-A	.60
	Glowing Arrow Mask	27-5162	.20
	Glowing Arrow Screen	27-5161	.10
	Mask Arm	29-3274	.03
	Link	29-3285	.04
	Coupling	29-3586	.10
	Shadow Screen	27-5120	1.50C
	Inverted Dial Scale	27-5121	....

*CODE 124—30-2126 † 30-4350 ‡ Use "O" (ODG, etc.) Type Condensers

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the standard broadcast band, wave band switch to extreme left (clockwise), and have the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. The I.F. compensating condensers are located at the tops of the I.F. coil shields. The primary is adjusted by turning the screw in top and the secondary by the nut. Adjust condensers ㊱ and ㉘ (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers ㉛ and ㉝ (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (standard band), (540-1720 K.C.), turn the station selector to 55.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap ② condenser until a MINIMUM reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment. The wave-trap compensator is reached from rear of chassis.

Adjustment of High and Low Frequency Compensators

1. With the wave-band switch still at Range No. 3 (broadcast band), set the dial at 1700 K.C. Set the signal generator at this frequency and adjust compensators ⑰, ⑧ and ⑩ for maximum output. These are the oscillator, antenna, and R.F. "standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator ⑭ (screw) for maximum output. This is the oscillator L.F. standard compensator.

3. Turn the wave-band switch to the second (middle) position. Set the dial at 3.6 M.C. at which point the fundamental of the 091 signal will be heard. If the Model 088 Signal Generator is being used, set it at 3.6 M.C. Adjust condensers ⑯, ⑤ and ⑨ in succession. These are the oscillator, antenna and R.F. police band adjustments.

4. Turn the tuning dial to 1.8 M.C., and set the signal generator (Model 026 or Model 088) at 1800 K.C. Adjust condenser ⑬ (Osc. L.F., police) (nut), to maximum signal.

5. Turn the wave-band switch to Band 1 (extreme right) and adjust the station selector to 18.0 megacycles. Set the signal generator at 18 M.C. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., antenna S.W. and R.F. S.W. compensators for maximum reading in the output meter. These are numbered ⑮, ④ and ⑧ respectively in figure No. 2.

PHILCO . . . . . Model 645

SERVICE BULLETIN
No. 234

For Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

Model 645

General Specifications

TYPE CIRCUIT: Superheterodyne, with preselector R.F. amplifier, and push-pull pentode output (7 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

POWER SUPPLY: 115v., 60 cycle A.C.

TUBES USED: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 85, 2d Detector and 1st A.F.; 2 type 42 Push-Pull Output; 1 type 80 Rectifier.

WAVE BANDS: Three: (1) Short-wave; (2) Police, aircraft and amateur; (3) Standard.

COVERAGE OF EACH BAND: Band 1, 5.75–18 M.C.; Band 2, 1.75–5.8 M.C.; Band 3, 540–1750 K.C.

TUNING DRIVE: Dual planetary, ball bearing, 80 to 1 ratio for slow-speed tuning; glowing arrow wave band indicator.

PROGRAM CONTROL: 4-position, with bass compensation effective in first position (counter-clockwise).

INTERMEDIATE FREQUENCY: 460 K.C.

POWER CONSUMPTION: 85 watts.

SPEAKER: 645 Baby Grand Model—K31; Furniture Model—H121.

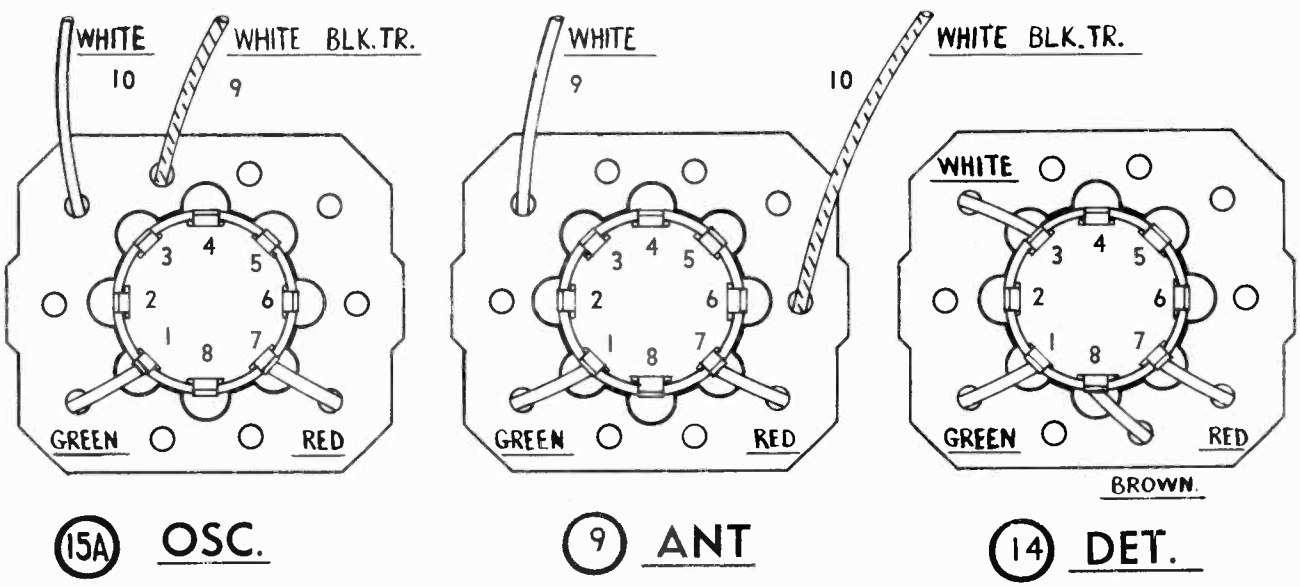


Fig. 1. R.F. Transformers

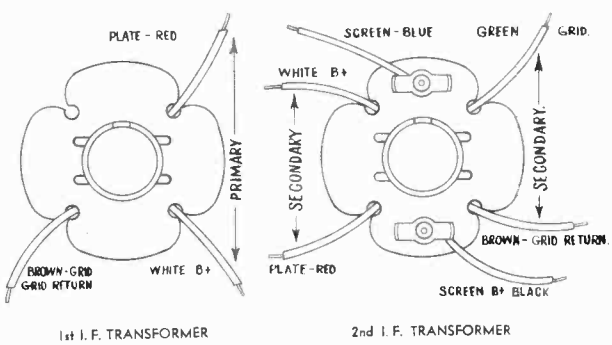


Fig. 2. I.F. Transformers

TUBE SOCKET VOLTAGES
(Measured from Tube Contact to Gnd.)

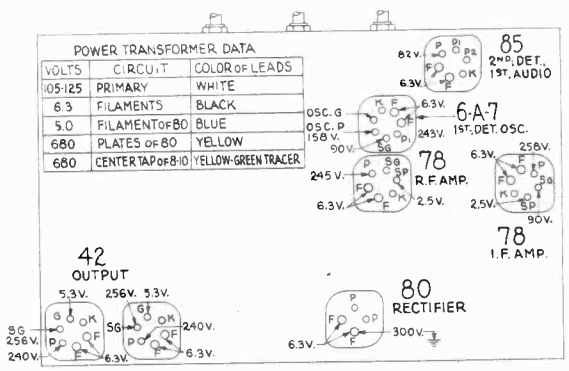


Fig. 3. Tubes as Viewed from Bottom

The voltages at the points indicated by the arrows above were obtained with a Philco type 025 Circuit Tester which contains a high resistance (1000 ohms per volt) voltmeter. Volume control at minimum, waveband switch at standard broadcast. K31 speaker.

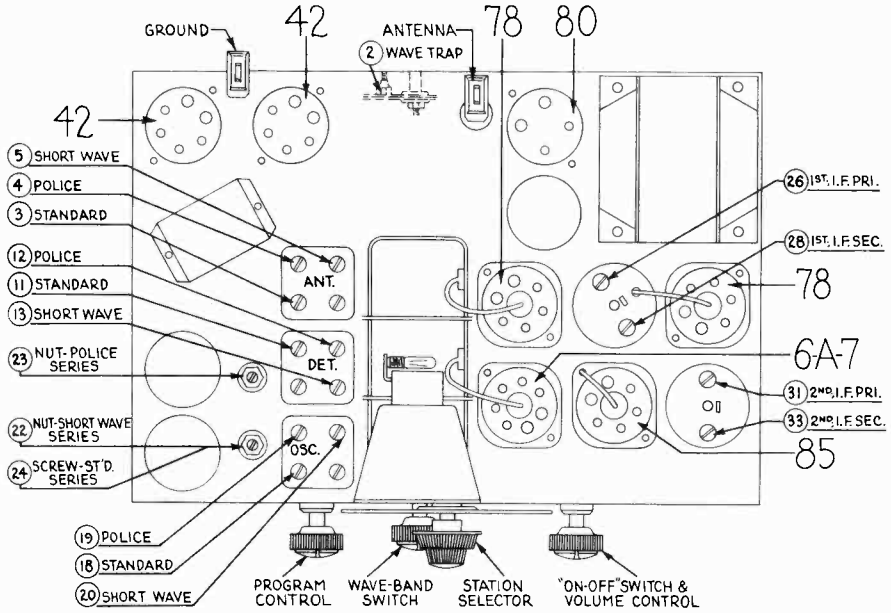


Fig. 4. Location of Compensating Condensers

Adjusting Compensating Condensers

Adjustment of compensating condensers in Model 645 requires an accurate signal generator covering I.F., standard-wave, police and short-wave frequencies. The **PHILCO Model 088 All-Wave Signal Generator,** having a continuous range of from 100 to 20,000 K.C., is ideal for this purpose.

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

Philco No. 3104 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. 4. Connect the output meter to the plate contacts of the type 42 output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

INTERMEDIATE FREQUENCY: Set the signal generator at 460 K.C. with attenuator set at minimum, connect a .001 mf. condenser in series with its antenna lead and attach it to the grid cap of the 78 I.F. amplifier tube. Connect ground lead to ground terminal on set. Set the dial at 55 and turn the waveband switch to position 3 (extreme left). Adjust the volume control of set to almost maximum, and the 088 attenuator so that about one-fourth (¼) scale reading is had on the output meter. With a fibre screwdriver adjust condensers ㉛ and ㉝ (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 78 I.F. tube; place it on the grid of the 6A7. Adjust 088 attenuator as before, then proceed to adjust condensers ㉖ and ㉘ (1st I.F.) for maximum output meter reading. Then remove the 088 oscillator lead. 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 wave trap ② until a minimum reading is obtained in the output meter.

SHORT WAVE:. In adjusting the short wave or high frequency band, the det. compensator will have a tendency to "pull" or **change** the frequency of the oscillator. By shunting a padding or variable condenser (about .00025 Mf.) across the oscillator section of the gang (front section) and tuning it so that the second harmonic, 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. Turn wave band switch to position 1 (extreme right). 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 condensers ⑤ and ⑬ (antenna and det.) for maximum reading of the output meter. Disconnect shunt condenser and tune condenser ⑳ (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 pick up 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 ㉒ (nut) for maximum output meter reading. Readjust condenser ⑳ at 18.0 M.C.

POLICE: Turn wave band switch to position 2 (center), set signal generator at 5500 and dial of set at 5.5. Adjust condensers ⑲, ④ and ⑫ (osc., ant., and det.) for maximum output. Turn the set dial to 1.8 and the signal generator to 1800. Adjust condenser ㉓ (nut) (osc. series) for maximum output meter reading.

STANDARD WAVE: Turn waveband switch to position 3 (extreme left), set signal generator at 1500 and dial of set at 150. Now adjust the oscillator, antenna and det. "Standard" condensers. These are ⑱, ③ and ⑪ respectively. Turn the dial to 60, set signal generator at 600 and adjust condenser ㉔ (oscillator standard series), (screw) for maximum output meter reading.

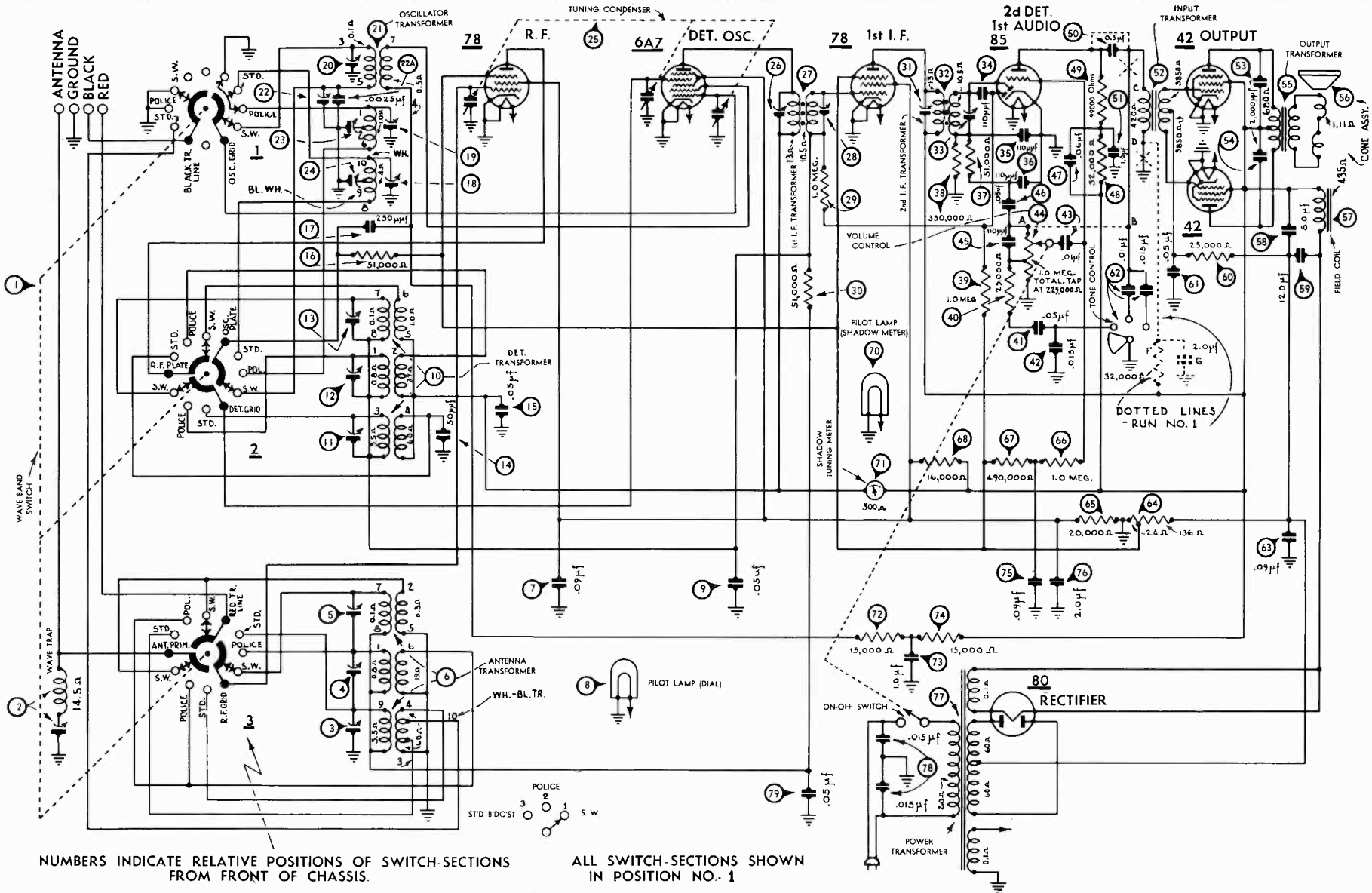


Fig. 5. Schematic Diagram of Model 645

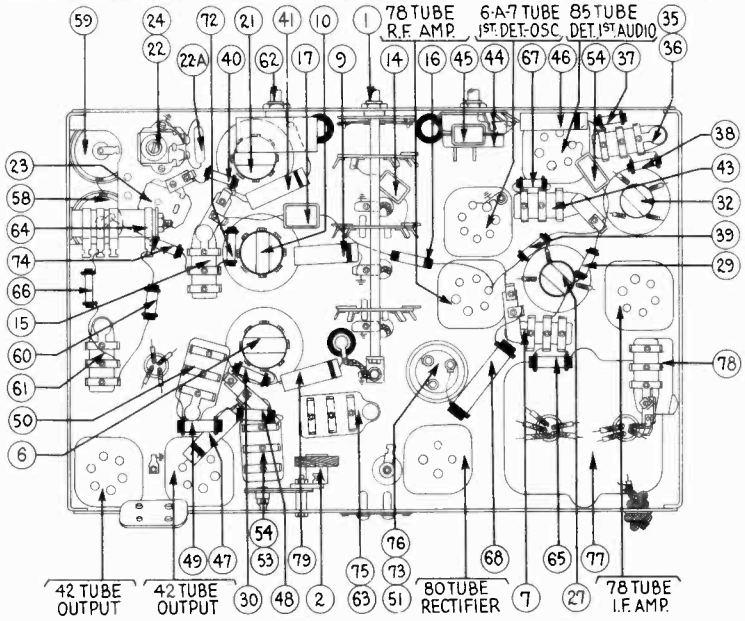


Fig. 6. Base View

Model 645

Schematic Number	Part and Description	Part No.	List Price
①	Wave Band Switch	42-1153	$2.00
②	Wave Trap	38-6850	1.10
③④⑤	Compensater (Ant. Standard) / (Ant. Police) / (Ant. Short-Wave)	31-6058	.60
⑥	Ant. Transformer	32-1867	3.00
⑦	Condenser (.09 mf. Bakelite)	4989-SG	.35
⑧	Pilot Lamp (Dial)	34-2039	.15
⑨	Condenser (.05 mf. Tubular)	30-4020	.20
⑩	Det. Transformer	32-1868	3.00
⑪⑫⑬	Compensater (Det. Standard) / (Det. Police) / (Det. Short-Wave)	31-6063	.50
⑭	Condenser (50 mmf.)	30-1029	.20
⑮	Condenser (.05 Bakelite)	3615-SG	.35
⑯	Resistor (51,000 ohms, ¼ watt)	33-351143	.20
⑰	Condenser (.00025 mf. Mica)	30-1056	.40
⑱⑲⑳	Compensater (Osc. Standard) / (Osc. Police) / (Osc. Short-Wave)	31-6058	.60
㉑	Osc. Transformer	32-1976	1.75
㉒	Compensater (Short-Wave Series)	31-6027	.70
㉒a	Condenser (.0025 mf. Mica)	7006	.40
㉓	Compensater (Police Series)	31-6073	.50
㉔	Compensater (Standard Series)	Part of ㉒	
㉕	Tuning Condenser Assy.	31-1555	4.50
㉖	Compensater (1st I.F. Pri.)	31-6053	.50
㉗	1st I.F. Transformer	32-1917	1.75
㉘	Compensater (1st I.F. Sec.)	Part of ㉖	
㉙	Resistor (1.0 Meg., ¼ watt)	33-510143	.20
㉚	Resistor (51,000 ohm, ¼ watt)	33-351143	.20
㉛	Compensater (2nd I.F. Pri.)	31-6053	.50
㉜	2nd I.F. Transformer	32-1836	1.60
㉝	Compensater (2nd I.F. Sec.)	Part of ㉛	
㉞	Condenser (.00011 mf. Mica)	30-1031	.20
㉟	Condenser (.00011 mf. Twin Bakelite)	8035-DG	.25
㊱	Condenser (.00011 mf.)	Part of ㉜	
㊲	Resistor (51,000 ohm, ¼ watt)	33-351143	.20
㊳	Resistor (330,000 ohm, ¼ watt)	33-433133	.20
㊴	Resistor (1.0 Meg., ¼ watt)	33-510143	.20
㊵	Resistor (25,000 ohm, ¼ watt)	33-325243	.20
㊶	Condenser (.05 mf. Tubular)	30-4020	.20
㊷	Condenser (.015 mf.)	Part of ㊿	
㊸	Condenser (.01 mf. Bakelite)	3903-SU	.25
㊹	Volume Control (1.0 Meg. ohm)	33-5113	1.45
㊺	Condenser (.00011 mf. Mica)	30-1031	.20
㊻	Condenser (.05 mf. Tubular)	30-4020	.20
㊼	Condenser (.06 mf. Tubular)	30-4123	.20
㊽	Resistor (32,000 ohm, ¼ watt)	33-332333	.20
㊾	Resistor (99,000 ohm, ¼ watt)	33-399343	.20
㊿	Resistor (.3 mf. Twin Bakelite)	6287-DU	.40
(51)	Elec. Condenser (1.0 mf., 1.0 mf., 2.0 mf.)	30-2080	1.85
(52)	Audio Input Transformer	32-7532	4.25
(53)	Condenser (.002 mf. Twin Bakelite)	7296-DU	.30
(54)	Condenser (.002 mf.)	Part of (53)	
(55)	Output Transformer	2585	1.25
(56)	Voice Coil Cone Assy. (B. G. K31)	36-3159	.80
(57)	Field Coil Assy. (B. G. K. 31)	36-3463	3.75
(58)	Electrolytic Condenser (8. mf.)	30-2025	1.35
(59)	Electrolytic Condenser (12 mf.)	30-2117	1.50
(60)	Resistor (25,000 ohm, ¼ watt)	33-325243	.20
(61)	Condenser (.05 mf. Bakelite)	3615-SG	.35

Schematic Number	Part and Description	Part No.	List Price
(62)	Program Control	30-4406	$0.75
(63)	Condenser (.09 mf. Twin Bakelite)	4989-DG	.40
(64)	B.C. Resistor (136 ohm, 24 ohm)	33-3236	.20
(65)	Resistor (20,000 ohm, 1 watt)	33-320433	.20
(66)	Resistor (490,000 ohm, ¼ watt)	33-449143	.20
(67)	Resistor (1.0 meg. ohm, ¼ watt)	33-510143	.20
(68)	Resistor (16,000 ohm, 3 watt)	33-316633	.30
(70)	Pilot Lamp (Shadow Meter)	34-2064	.09
(71)	Shadow Meter	45-2083	2.50
(72)	Resistor (15,000 ohm, ¼ watt)	33-315133	.20
(73)	Electrolytic Condenser (1.0 mf.)	Part of (51)	
(74)	Resistor (15,000 ohm, ¼ watt)	33-315133	.20
(75)	Condenser (.09 mf.)	Part of (63)	
(76)	Electrolytic Condenser (2.0 mf.)	Part of (51)	
(77)	Power Transformer (110 V., 60 cycle)	32-7462	6.00
(78)	Condenser (.015 mf. Twin Bakelite)	3793-DG	.40
(79)	Condenser (.05 mf. Tubular)	30-4020	.20
	Power Transformer (115 V., 25 cycle)	32-7407	9.00
	Power Transformer (220 V., 50-60 cycle)	32-7464	6.50
	4-prong Socket	27-6044	.10
	6-prong Socket	27-6036	.11
	7-prong Socket	27-6037	.11
	Speaker Socket	27-6043	.08
	R.F. Transformer Shield	38-6921	.35
	I.F. Transformer Shield	38-6808	.25
	Tube Shield Base	28-2725	.03
	Tube Shield Body	28-2726	.10
	Shadow Meter Light Shield	28-2917	.02
	Electrolytic Condenser Clamp	6440	.05
	Electrolytic Condenser Insulator	27-7194	.01
	Dial Scale	25-5165	.30
	Dial Hub Assy.	31-1724	.15
	Screen Bracket Assy.	29-3061	.07
	Scale Guard	27-8140	.01
	Glowing Arrow Mask	27-5160	.20
	Glowing Arrow Screen	27-5159	.10
	Mask Arm	29-3274	.03
	Link	29-3338	.03
	Coupling	29-3339	.06
	Sub. Base Mtg. Foot	29-2959	.03
	Chassis Mtg. Screw	W-1496-A	1.60C
	Chassis Mtg. Washer (Rubber)	27-4201	1.40C
	Chassis Mtg. Cushion (Rubber)	27-4202	.03
	Knob (Tuning)	27-4206	.12
	Knob (Slow Speed Tuning)	27-4207	.10
	Knob (Volume, Tone)	27-4208	.10
	Knob (Wave Band)	27-4225	.10
	Bezel	28-3164	.50
	Bezel Mounting Screw	W-1494	.30C
	Bezel Glass	27-8113	.07
	Bezel Glass Gasket	27-8036	.01
	Shadow Screen	27-5120	1.50C
	Speaker Cable	02722	.30
	Bottom Shield	38-7189	.40
	Mask	28-3433	.25
	Pilot Lamp Bracket Assy.	38-6789	.50
	Front Bumper	27-4200	3.75C
	Speaker Mtg. Bolt	29-3128	.02
	Speaker Mtg. Nut	W-124-A	.35C
	*Voice Coil Cone Assy. (Furn. H-21)	02625	1.20
	□Field Coil Assy. (Furn. H-21)	36-3461	3.75
	G. Elec. Condenser (2.0 mf.)	Part of 30-2080	
	F. Resistor (32,000 ohm)	3525	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PHILCO . . . . . Model 665

SERVICE BULLETIN
No. 240

Special Data for Members
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

General Specifications

Type Circuit: Superheterodyne, with push-pull pentodes connected as triodes in output; output 10 watts; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: Ten (10) Total: 1 type 78 R.F., 1 type 77 1st detector, 1 type 76 oscillator, 2 type 78 I.F., 1 type 75 2nd detector 1st audio, 1 type 42 driver, 2 type 42 output, 1 type 80 rectifier.

Wave Bands: Four—(1) Shortwave; (2) Police and amateur; (3) Standard Broadcast; (4) Longwave (weather forecasts).

Frequency Ranges: Band (1)—5.7-18.0 Megacycles; Band (2)—1.75-5.8 Megacycles; Band (3)—540 to 1750 K.C.; Band (4)—150-390 K.C.

Program Control: 4 positions: (1) Mellow, (2) Brilliant, (3) Normal, (4) Noise reducing. Last two positions recommended for foreign short wave stations.

Tuning Meter: Shadow type tuning meter, mounted directly above scale.

Waveband Indicator: Glowing arrow on tuning scale shifts to proper scale when waveband switch is turned.

Automatic Volume Control: Fully effective on all stations.

Bass Compensation: Automatic: Effective on first two positions of program control, with volume control turned down.

Tuning Drive: Dual planetary, ball bearing. 80 to 1 ratio for slow-speed tuning, 10 to 1 on main knob.

Intermediate Frequency: 460 K.C.

Power Consumption: 90 watts.

Speaker: Type H-13.

Tube Socket and Power Transformer Voltages
Line Voltage 115

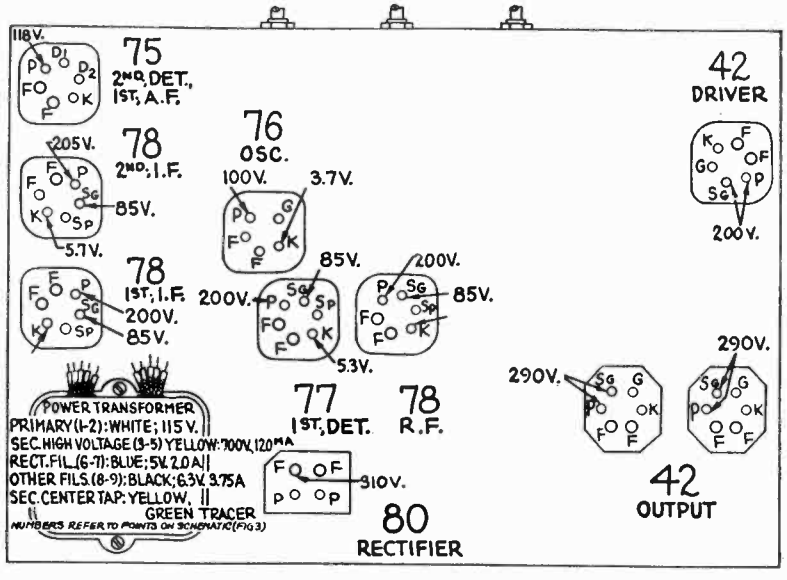


Fig. 1. Sockets as Viewed from Bottom

Socket voltages (measured to ground) obtained at points indicated by arrows. Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to sockets on underside of chassis. Volume control at minimum; dial at 60; waveband switch at standard broadcast (2d position from left). H-13 Speaker used.

Adjusting Compensating Condensers

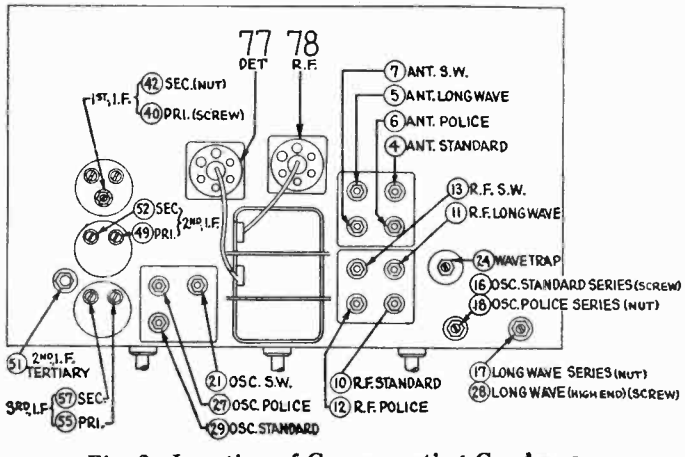


Fig. 2. Location of Compensating Condensers

Adjustment of compensating condensers in Model 665 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 20,000 K.C. (all fundamental frequencies) will be ideal for this purpose.

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

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 contacts of the output tubes (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., and attach its antenna lead to the grid cap of the 77 1st detector tube (having removed the grid clip from the tube). Connect the ground

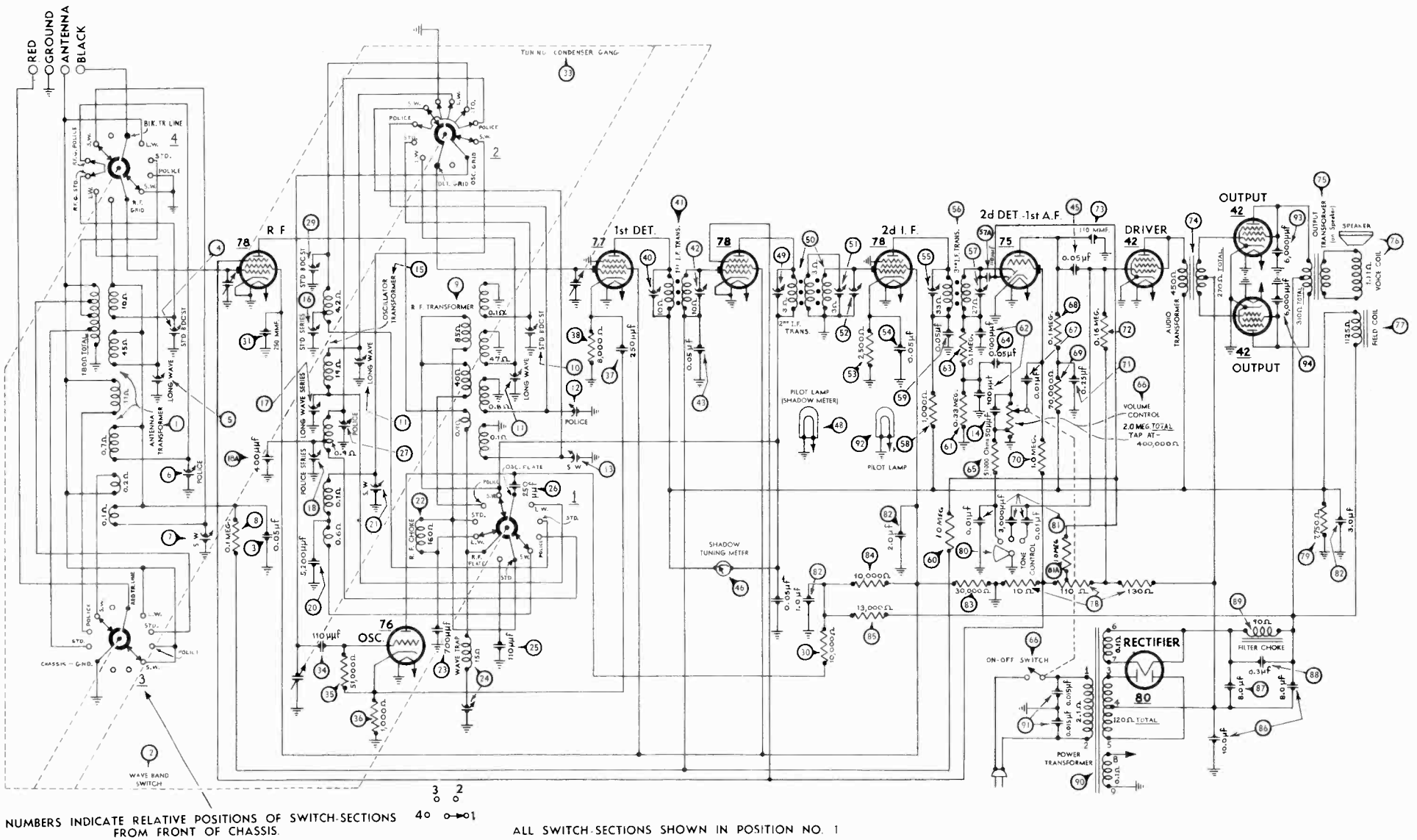
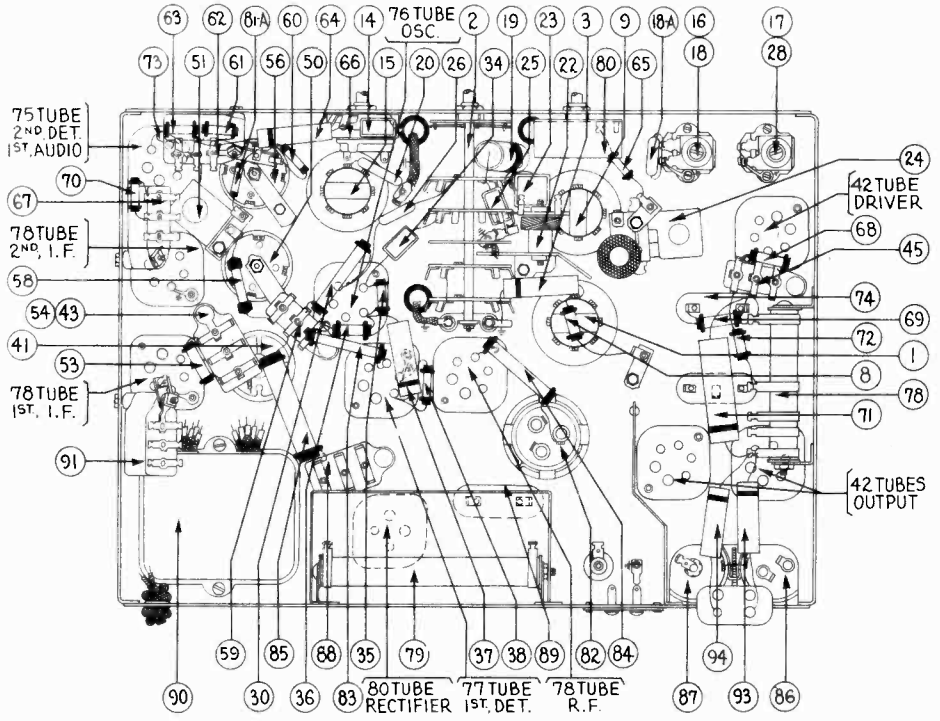


Fig. 3 — Schematic Diagram — Model 665



Replacement Parts—Model 665

①	Antenna Transformer	32-1750	$3.25
②	Waveband Switch	42-1120	2.50
③	Condenser (.05 Mfd. Tubular)	30-4020	.35
④	Compensater (Ant. Standard)	Part of ①	
⑤	Compensater (Ant. Longwave)	Part of ①	
⑥	Compensater (Ant. Police)	Part of ①	
⑦	Compensater (Ant. Shortwave)	Part of ①	
⑧	Resistor (99,000 ohm)(White, White, Orange)	33-399343	.20
⑨	R. F. Transformer	32-1751	3.00
⑩	Compensater (R. F. Standard)	Part of ⑨	
⑪	Compensater (R. F. Longwave)	Part of ⑨	
⑫	Compensater (R. F. Police)	Part of ⑨	
⑬	Compensater (R. F. Shortwave)	Part of ⑨	
⑭	Condenser (.00005 Mfd. Mica)	30-1029	.20
⑮	Oscillator Transformer	32-1752	2.25
⑯	Compensater (Standard Series)	Part of 31-6027	.70
⑰	Compensater (Longwave Series)	Part of 31-6054	.45
⑱a	Condenser (.0004 Mfd. Mica)	30-1000	.25
⑱	Compensater (Osc. Police Series)	Part of 31-6027	.70
⑲	Condenser (.1 Mfd. Tubular)	30-4170	.25
⑳	Condenser (.0052 Mfd. Mica)	30-1058	.55
㉑	Compensater (Osc. Shortwave)	Part of ⑱	
㉒	R. F. Choke	32-1745	.65
㉓	Condenser (.0007 Mfd. Mica)	5863	.25
㉔	Wave Trap	38-6850	1.10
㉕	Condenser (.00011 Mfd. Mica)	30-1031	.20
㉖	Condenser (.00025 Mfd. Mica)	30-1032	.25
㉗	Compensater (Osc. Police)	Part of ⑱	
㉘	Compensater (Longwave H. F. End)	Part of 31-6054	.45
㉙	Compensater (Osc. Standard)	Part of ⑱	
㉚	Resistor (10000 ohms) (Brown, Black, Orange)	33-310433	.20
㉛	Condenser (.00025 Mica)	30-1032	.25
㉜	Tuning Condenser Assembly	31-1609	5.50
㉞	Condenser (.00011 Mfd. Mica)	30-1031	.20
㉟	Resistor (51000 ohms)(Green, Brown, Orange)	33-351143	.20
㊱	Resistor (1000 ohms)(Brown, Black, Red)	33-210343	.20
㊲	Condenser (.00025 Mica)	30-1032	.25
㊳	Resistor (8000 ohms)(Gray, Black, Red)	33-280133	.20
㊵	Compensater (1st I. F. Primary)	Part of ㊵	
㊶	1st I. F. Transformer	* 32-1642	2.00
㊷	Compensater (1st I. F. Secondary)	Part of ㊵	
㊸	Condenser (.05 Mfd. Bakelite Block)	+ 3615-DG	.40
㊹	Condenser (.05 Mfd. Bakelite Block)	+ 3615-SU	.35
㊺	Shadow Tuning Meter	45-2083	2.50
㊻	Pilot Lamp (Shadow Tuning Meter)	Part of ㊻	
㊽	Compensater (2nd I. F. Primary)	31-6067	.45
㊾	2nd I. F. Transformer	32-1865	1.00
㊿	Compensater (2nd I. F. Tertiary)	04000-R	.45
(51)	Compensater (2nd I. F. Secondary)	Part of ㊽	
(52)	Resistor (2500 ohms)(Red, Green, Red)	33-225333	.20
(54)	Condenser (.05 Mfd. Twin Bakelite Block)	Part of ㊸	
(55)	Compensater (3rd I. F. Primary)	Part of 31-6003	.45
(56)	Third I. F. Transformer	△ 32-1188	.65
(57)	Compensater (3rd I. F. Secondary)	Part of 31-6003	.45
(58)a	Condenser (.110 Mmf. Mica)	30-1031	.20
(58)	Resistor (1000 ohms)(Brown, Black, Red)	33-210633	.20
(59)	Condenser (.05 Mfd. Bakelite)	3615-SG	.35
(60)	Resistor (1.0 Meg. ¼ Watt)	33-510143	.20
(61)	Resistor (330000 ohms)(Orange, Orange, Yellow)	33-33133	.20
(62)	Condenser (.00011 Mfd. Twin Bakelite Block)	+ 8035-DG	.25
(63)	Resistor (99000 ohms)(White, White, Orange)	33-399143	.20
(64)	Condenser (.05 Mfd. Tubular)	30-4020	.20
(65)	Resistor (5000 ohms)(Green, Brown, Orange)	33-351143	.20
(66)	Volume Control & On-Off Switch	33-5110	$1.45
(67)	Condenser (.01 Mfd. Bakelite Block)	+ 3903-SU	.25
(68)	Resistor (99000 ohms)(White, White, Orange)	33-399143	.20
(69)	Resistor (70000 ohms)(Violet, Black, Orange)	33-370343	.20
(70)	Resistor (1 Meg.)(Brown, Black, Green)	33-510143	.20
(71)	Condenser (.25 Mfd. Tubular)	30-4134	.35
(72)	Resistor (160000 ohms)(Brown, Blue, Orange)	33-416133	.20
(73)	Condenser (.00011 Mfd. Mica)	30-1031	.20
(74)	Audio Transformer	32-7057	3.50
(75)	Output Transformer	32-7078	1.25
(76)	Cone & Voice Coil Assembly (H-13)	02625	1.20
(77)	Field Coil & Pot Assembly (H-13)	36-3104	2.70
(78)	Resistor (B. C. Wirewound)(10 ohms, 110 ohms, 130 ohms)	33-3226	.25
(79)	Resistor (Wirewound, 7750 ohms)	33-3020	.35
(80)	Tone Control	□ 30-4378	.75
(81)	Condensers in Tone Control	Part of (80)	
(81)a	Resistor (1.0 Meg. ¼ Watt)	33-510143	.20
(82)	Condenser (Electrolytic)(3 Mfd., 2 Mfd., 1 Mfd.)	30-2122	1.85
(83)	Resistor (30000 ohms)(Orange, Black, Orange)	33-330443	.20
(84)	Resistor (10000 ohms)(Brown, Black, Orange)	33-310433	.20
(85)	Resistor (13000 ohms)(Brown, Orange, Orange)	33-313633	.30
(86)	Condenser (Electrolytic, 8 Mfd., 10 Mfd.)	30-2045	1.80
(87)	Condenser (Electrolytic, 8 Mfd.)	○ 30-2025	1.35
(88)	Condenser (3 Mfd. Bakelite Block)	+ 6287-DU	.40
(89)	Filter Choke	32-7056	2.20
(90)	Power Transformer 115 Volts 60 Cycles	32-7440	6.00
	115 Volts 25 Cycles	32-7441	8.75
	230 Volts 50 Cycles	32-7442	6.75
(91)	Condenser (.015 Mfd. Twin Bakelite Block)	+ 3793-DG	.40
(92)	Pilot Lamp (Dial)	34-2039	.15
(93)	Condenser (.006 Mfd. Tubular)	30-4024	.25
(94)	Condenser (.006 Mfd. Tubular)	30-4024	.25
	Dial Scale	27-5115	.40
	Dial Mask and Hub Assembly	31-1724	.15
	Dial Hub	28-7129	.10
	Dial Spring Clamp	28-2837	.10
	Socket—4-Prong	27-6042	.10
	Socket—5-Prong	27-6035	.11
	Socket—6-Prong	27-6036	.11
	Speaker Plug Socket	27-6033	.08
	Knob (Volume, Tone, Waveband)	27-4208	.10
	Knob (Station Selector)	27-4206	.12
	Knob (Slow Speed)	27-4207	.10
	Tube Shield (4 used)	28-2726	.10
	Tube Shield (2 used)	28-2755	.05
	Tube Shield Base	28-2725	.03
	A. C. Cord & Plug	L-943A	.60
	Bezel	28-3165	.50
	Bezel Glass	27-8011	.55
	Chassis Mtg. Bolt	W-1496A	1.60 per C
	Chassis Mtg. Washer (Rubber)	27-4201	1.40 per C
	Chassis Mtg. Bumper (Rubber)	27-4200	3.75 per C
	Mask	27-5136	.30
	Scale and Mask Guide	29-3272	.05
	R. F. Shield Assy.	38-6938	.35
	I. F. Shield Assy.	38-6872	.35
	Elec. Condenser Clamp	29-2460	.05
	Elec. Condenser Clamp	6440	.05
	Elec. Condenser Insulator	27-7194	.01
	Shadow Meter Light Shield	28-2917	.02
	Wave Switch Coupling	28-7150	.20
	Inverted Dial Scale	27-5123	.40

* Code 122: 32-1864 △ Code 122: 32-1866 □ Code 122: 30-4379 ○ Code 122: 30-2014

+ The letter O should be added to parts (43), (45), (62), (65), (87), (88), (91), for Code 122. Example (3615-DG = 3615-ODG).

Adjusting Compensating Condensers (Continued)

terminal of the Signal Generator to the ground terminal of the set. Turn on the set, turn the waveband switch to standard broadcast (second position from left) and set dial at 60. Turn condenser ⑤① (2nd I.F. tertiary) all the way down before adjusting the other I.F. Compensators. Now with the fibre screwdriver, adjust condensers ⑤⑦ and ⑤⑧ (3rd I.F.), ⑤② and ④⑨ (2nd I.F.), and then ④② and ④⓪ (1st I.F.) until maximum reading is obtained in the output meter. Turn down the "attenuator" on the signal generator if the output meter needle goes off the scale. Now adjust condenser ⑤① (2nd I.F. tertiary) for maximum reading.

WAVE TRAP—Connect the Signal Generator antenna lead to the grid cap of the 78 R.F. tube. Replace the grid clip on the 77 tube cap. With the signal generator operating at 460 K.C. and the set controls adjusted as for I.F., adjust wavetrap ㉔ until the **minimum** reading is obtained in the output meter.

SHORTWAVE—Turn wave band switch to the shortwave position (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, Antenna, and R.F. shortwave compensators in turn, for maximum reading. These are ㉑, ⑱ and ⑦ respectively.

POLICE AND AMATEUR BAND—Turn the waveband switch to position 3 (from left). Set the dial and signal generator at 4.5 megacycles and adjust condensers ㉗, ⑫ and ⑥ respectively for maximum reading.

Set the signal generator at 1800 K.C. and turn the dial to 1.8. Adjust condenser ⑱ (nut), oscillator police series, to maximum reading.

STANDARD BROADCAST BAND—Turn the waveband switch to position 2 (from left). Set the dial and signal generator at 1500 K.C. and adjust condensers ㉖, ⑩ and ④ for maximum reading.

Set the dial and signal generator at 600 K.C. and adjust condenser ⑯ (screw), broadcast series, for maximum reading.

LONGWAVE BAND—Turn waveband switch to position 1 (left). Set the dial and signal generator at 340 K.C. and adjust condenser ㉘ (screw) to maximum. Then adjust ⑪ and ⑤ for maximum reading. Finally, set the dial and signal generator at 175 K.C. and adjust condenser ⑰ (nut) for maximum reading. This is the longwave series compensator.

Complete

REPLACEMENT PARTS CHART

for every model

PHILCO

HOME RADIO

AUTO RADIO

●

5,000,000 Philco Radios in use.

High quality of Philco thus a proven fact.

DON'T SUBSTITUTE IN YOUR SERVICE WORK!

Use Philco Parts to maintain
Philco Quality!

●

PHILCO RADIO & TELEVISION CORPORATION
PHILADELPHIA

October 1934

Printed in U. S. A.

REPLAC

(NUMBERS

Model No.	Volume Control	On-off Switch	R. F. Transformers	I. F. Transformers	Osc. Transformer	Power Transformer	Input or Audio. Transformer	Filter Choke	Filter Condenser	Electrolytic Condensers	Tone Control	B. C. Resistor	Tuning Condenser	Dial Assembly	Pilot Lamp	Wave-band Switch
14 (Early)	8054	6498	05984 05985	04319 04320	05983	6804	6064	4819	04830	4916(1) 7464(2)	06698	6808	06609	06817	6608	.....
14 (With Police)	8054	42–1002(3)	32–1069 32–1070	04319 04320	05983	6804	6064	4819	30–2007	30–2024 30–2025	06698	6808	31–1015(4) 31–1048(5)	31–1026	6608	With On-Off Sw.
14 (Late)	33–5024	*	32–1261 32–1256	32–1263 32–1264	32–1262	32–7111	32–7057	32–7115	30–2022(6) 30–2025	30–2003	30–4073	33–3062	31–1099(5) 31–1100(9)	31–1118(8) 31–1026(5)	6608	42–1035
15 (Early)	7050(10) 8054(11)	6438	04981 04982 05033	03038 04979 03345	04983	6672	5662	3422	03489	6706 & 30–2025(10) 4916(11)	04787(10) 30–4004(11)	6700	04941	4276(12)	6608	.....
15 (Later)	8054	42–1030	32–1143 32–1144 32–1145	03038 04979 03345	04983	6672	6664	3422	03489	4916	04787	6700	04941	4276(12)	6608	.....
16 (Codes 121–2–3)	33–5022	*	HF 32–1183 BC 32–1182	32–1186 32–1186 32–1188	HF 32–1185 BC 32–1184	32–7058(14) 32–7080(13)	32–7057	32–7056	30–4026	30–2011(15) 6706 & 7464(5)	30–4069(16)	33–3021	31–1106(17)	31–1058(18)	6608	42–1037
16 (Codes 125–6–7)	33–5022	*	32–1467 32–1468	32–1188 32–1470 32–1188	32–1469	32–7291(19) 32–7283(20)	32–7057	32–7056	30–2045(19) 30–2046(20)	30–2078 30–2023(19) 30–2011(20)	30–4204	33–3021	31–1350	31–1363	6608	42–1079
17	33–5023	*	32–1170 32–1171	32–1173 32–1174	32–1172	32–7058(14) 32–7080(13)	32–7057	32–7056	30–2045(19) 30–2046(20)	30–2078 30–2023(19) 30–2011(20)	30–4070	33–3021	31–1041(21)	31–1066	6608	42–1035
18 (Codes 121–2–3)	33–5024	*	32–1255 32–1256	32–1288 32–1258	32–1257	32–7111	32–7114	32–7115	30–2029	6706(22) 30–2025 30–2003(22	30–4073	33–3033	31–1110(23)	31–1066(32)	6608	42–1046
18 (124)	33–5069	42–1064	32–1396 32–1397	32–1288 32–1258	32–1398	32–7111	32–7114	32–7115	30–2045	30–2025	30–4073	33–3033	31–1196	31–1207	6608	.....
19 (Early)	33–5004	6498	06619 06662	06621 06622	06620	8046	.....	.....	06624	8095 8095	30–4003	7998	06577(5) 06702(13)	06697(5) 06766(13)	6608	.....
19 (With Police)	33–5000	42–1017	32–1062 32–1063	06621 06622	06620	8046	.....	.....	06624	30–2020 8166(9)	30–4003	7998	31–1004(9) 31–1013(24) 31–1014(59)	31–1028(9) 31–1024(24) 31–1025(59)	6608	With On-Off Sw.
19 (Code 128)	33–5000	42–1017	32–1062 32–1063	32–1315 06622	06620	32–7170	.....	.....	30–2062	30–2026	30–4003	33–3069	31–1103 31–1104(25)	31–1025 31–1024(25)	6608	With On-Off Sw.
20	4094	6498	3884N 3884P 3884P	.....	.....	4234	4232	4231	4235	.....	.....	4230	‡	4209B	3463	.....
21	4094	6498	3884N 3884P 3884P	.....	.....	4813	4232	4819	.....	4818	.....	4824	‡	4209B	3463	.....
28	33–5066	*	32–1360	32–1362 32–1363 32–1364	32–1361	.....	.....	6658 32–7018	30–2083	30–2083	30–4211	33–3159	31–1366	31–1208	4567	42–1062
29	33–5066	*	32–1360	32–1362 32–1363 32–1364	32–1361	32–7229	.....	32–7018	30–2073	30–2020	30–4178	33–3069	31–1192	31–1208	6608	42–1062
30	4093	6498	4182A 4182B 4182B 4182B	.....	.....	.....	3242	3518	.....	.....	04787	3864	4000G	03031	5316	.....
32	33–5063	42–1017	32–1062 32–1063	32–1289 06622	06620	32–7218	.....	32–7213	.....	30–2026 30–2014	06764	7998	31–1059	31–1025	4567	With On-Off Sw.
34	33–5064	*	HF 32–1271 BC 32–1270	32–1341 32–1341 32–1342	HF 32–1273 BC 32–1272	.....	7233	.....	30–4151	.....	30–4152(26)	.....	31–1153	31–1162	5316	42–1045
35	5317	5318	03320 03083	03009 03092	03321	.....	5315	5314	.....	.....	04757	.....	03076	03031	5316	.....
37	7239	7283	05726 05727	05697 05698	05728	.....	7233	.....	03915	.....	.....	.....	05740	05811	5316	.....
38	33–5017	42–1040	32–1208	32–1251 32–1252	32–1209	.....	7233	.....	03915	.....	.....	.....	31–1076	31–1084	5316	42–1039
38 (Code 123)	33–5087	42–1040	32–1518	32–1251 32–1252	32–1519	.....	7233	.....	03915	.....	.....	.....	31–1401	31–1408	5316	42–1039
40	4056	6498	3884A 3884B 3884C 3884C	.....	.....	.....	3872	3422	4067	.....	04787	4057	4069E	3794(12)	3463	.....
41 & 42	4094	3517	3884A 3884B 3884C 3884C	.....	.....	.....	3872	3422	4067	.....	04787	4057	4069E	3794(12)	3463	.....

REPLACEMENT PARTS FOR ALL PHILCO AUTO RADIOS

Vibrator Unit (on all models using it): Part No. 38-5036

Model	Vol. Con. & Switch Assembly	Tone Control	R. F. Transf.	I. F. Transf.	OSC. Transf.	Power Transf.	Input Transf.	Output Transf.	Filter Choke
3	4463*	.....	4401A 4401B 4401B 3775B	.....	.....	.....	3241	2706	.....
5	33-5009	.....	32-1152	32-1086 32-1087	32-1085	32-7030	.....	32-7026	.....
6	7525	.....	06914 06915	06932 05970	06916	.....	.....	2598	.....
7	6109	.....	04348 04509	04352 04353	04508	.....	.....	2598	.....
8	7322	05366	04348 04509	04352 04353	04508	.....	6582	2565	.....
9	7525	05366	06914 06915	06932 05970	06916	.....	7652	32-7039	.....
10	Dir. Drive 38-5280 Airplane 38-5511	30-4056	32-1220 32-1221	32-1236 32-1237	32-1222	32-7098	.....	32-7102	32-7038
10-122	38-5851	30-4056	32-1220 32-1221	32-1236 32-1237	32-1222	32-7098	.....	32-7102	32-7104
11	Dir. Drive 38-5606 Airplane 38-5534	.....	32-1331 32-1332	32-1329 32-1237	32-1333	32-7216	.....	32-7214	32-7215
12	7525	05366	04348 04509	04352 04353	04508	.....	6582	2565	.....
700	38-5534	30-4180	32-1331 32-1332	32-1329 32-1237	32-1333	32-7216	.....	32-7214	32-7215
800	Dir. Drive 38-5606 Airplane 38-5534	30-4142	32-1220 32-1221	32-1236 32-1237	32-1222	32-7098	32-7206	32-7205	32-7104
800-122	38-5851	30-4220	32-1462 32-1463	32-1471 32-1449	32-1222	32-7098	32-7206	32-7205	32-7104

Model	Complete Designation	Car & Year							
A	PAD PAL	Packard 1934	7525	05366	32-1197 32-1198	06932 05970	06916	.....	7652	32-7039	.....
B	PBD-10	Packard 1934	7525	.....	32-1197 32-1198	06932 05970	06916	32-7110	.....	2598	32-7118
C	SCD NCD	Stude. 1934 Nash 1934	38-5280	.....	32-1220 32-1221	32-1236 32-1237	32-1222	32-7098	.....	32-7102	32-7038
C-122	SCD	Stude. 1934	38-5935	30-4056	32-1220 32-1221	32-1236 32-1237	32-1222	32-7098	.....	32-7102	32-7104
D	NDD SDD CDS	Nash 34 Stude. 34 Chrysler 1933	38-5280	30-4056	32-1220 32-1221	32-1236 32-1237	32-1222	32-7131	.....	32-7102	32-7038
D-122	NDD	Nash 1934	38-5935	30-4056	32-1220 32-1221	32-1236 32-1237	32-1222	32-7131	.....	32-7102	32-7104
E	MED	Pierce Arrow 1934	38-5511	30-4056	32-1220 32-1221	32-1236 32-1237	32-1222	32-7098	.....	32-7102	32-7038
G	CGD HGD	Chrysler 1934 Dodge DeSoto Ply. 1934 Hup. 1934	33-5056	30-4127	32-1220 32-1221	32-1236 32-1237	32-1222	32-7110	.....	2598	32-7118
G-122	CGD HGD	Chrysler 1934 Dodge DeSoto Ply. 1934 Hup. 1934	33-5067	30-4189	32-1331 32-1332	32-1329 32-1237	32-1333	32-7253	.....	32-7042	32-7254
H	HHD	Hup. 1934	38-5534	30-4142	32-1220 32-1221	32-1236 32-1237	32-1222	32-7098	32-7206	32-7205	32-7104
H-122	HHD PHD	Hup. 1934 Pack. 1935	38-5851 38-6022	30-4208	32-1462 32-1463	32-1471 32-1449	32-1222	32-7098	32-7206	32-7205	32-7104
J	SJD NJD	Stude. 1934 Nash 1934	38-5606	.....	32-1331 32-1332	32-1329 32-1237	32-1333	32-7216	.....	32-7214	32-7215
N	FND	Ford 1934	33-5067	.....	32-1331 32-1332	32-1329 32-1237	32-1333	32-7232	.....	32-7019	32-7233
Q	NQD SQD	Nash 1934 Stude. 1934	38-5606	30-4180	32-1331 32-1332	32-1329 32-1237	32-1333	32-7216	.....	32-7245	32-7215
R	CRD HRD	Chr. Dod. Ply. 1934 Hup. 1934	38-5534	.....	32-1331 32-1332	32-1329 32-1237	32-1333	32-7216	.....	32-7214	32-7215

*Vol. Control Only. Switch is No. 4705.

EMENT PARTS FOR ALL PHILCO

IN PARENTHESIS FOLLOWING PART NUMBERS REFER TO NOTES AT BOTTOM

Model No.	Volume Control	On-off Switch	R. F. Transformers	I. F. Transformers	Osc. Transformer	Power Transformer	Input or Audio. Transformer	Filter Choke	Filter Condenser	Electrolytic Condensers	Tone Control	B. C. Resistor	Tuning Condenser	Dial Assembly	Pilot Lamp	Wave-band Switch
43	6892	*	05189 05624	05185 05185 05185	05184	7074(27)	.....	5930	05239	4916	05174	6451(10) 6452	05154	05418	6608	6895
44	33–5025	*	HF 32–1270 BC 32–1271	32–1274 32–1306	HF 32–1273 BC 32–1272	32–7137	.....	5930	30–2079	30–2020	30–4080	33–3037	31–1106	31–1107	6608	42–1045
45	33–5066	*	32–1360	32–1362 32–1363 32–1364	32–1361	32–7226	.....	32–7018	30–2079	30–2030	30–4178	33–3037	31–1169(60)	31–1208	6608	42–1062
46	4141	6498	3884X 3884Y 3884Y	.....	.....	.....	4862	.....	4860	.....	.....	4858A	‡	4209B	3463	.....
47	6499	6498	04339(28) 05093(28)	05094 05095	04186(29)	.....	6064	6712 5314	05003	.....	04757	6716	05098(30)	04832(31)	6608	.....
48	6415	*	05848 05849	04887 03887	06665	.....	.....	4819	05569	.....	.....	7852	05885	05811	6608	.....
49	33–5024	*	32–1379 32–1427	32–1381 32–1424	32–1428	.....	32–7211	32–7213 32–7018	04357 30–4140	.....	30–4043	33–3128	31–1334	31–1205	4567	42–1046
50	5232	5382	03283 03284 03284	.....	.....	5266	.....	.....	03459	4916	.....	.....	03293	03322	3463	.....
51 & 52	6415	5382	03880(33) 03881(33)	03887 03886	03882(34)	5266	.....	.....	03915	4916	.....	.....	03809(35)	04031(36)	3463	.....
53	33–5001	*	32–1000	32–1002	32–1001	.....	.....	32–7001	30–4000	30–2000 30–2001	.....	.....	31–1000	28–1021(12)	.....	.....
54	33–5010	*	32–1117	32–1115 32–1195(37)	32–1118	.....	.....	32–7036	30–4023	30–2002 30–2001	.....	33–3012	31–1034	.....	4567	42–1027
57	33–5011	*	32–1153	32–1155	32–1168	32–7064(38)	.....	.....	30–2013	30–2013	.....	7465	31–1049	.....	.....	42–1027(39)
58	33–5057	*	32–1153	32–1155	32–1168	32–7064(38)	.....	.....	30–2013	30–2013	.....	7465	31–1089	28–5023(12)	6608	42–1043
59	33–5057	*	32–1388	32–1155	32–1389	32–7064(38)	.....	.....	30–2013	30–2013	.....	7465	31–1190	28–5023(12)	6608	42–1043
60	33–5006	*	32–1047	32–1049(40) 32–1050(40)	32–1048	8046	.....	.....	30–4063(41)	7558	30–4008	7998	31–1006	31–1090	6608	42–1001
65	3528	6498	3506B 3506A	.....	.....	3516	3537	3422	3515	.....	.....	3512	3480B	3398(12)	3463	.....
66	33–5006	*	32–1412	32–1414 32–1415	32–1413	8046	.....	32–7018	30–2079	30–2021	30–4212	33–3037	31–1231	31–1234	6608	42–1066
70	5039	6498	03082 03083	03091 03092	03084	5117	.....	4819	04559	4916	04757	5125	03076	03031	3463	.....
70(AVC)	6015	6498	04339 04185	04190 03038	04186	5117	.....	4819	04559	4916	03637	6008	04164	03031	3463	.....
71	6499	6498	04339(43) 04185(43)	04190 04319	04186(44)	6454(45)	.....	.....	05324	6453 4916 6706	04787(42)	6451(2) 6452	04733(46)	04832(47)	6608	.....
76	3879	6498	3884A 3884B 3884C 3884C	.....	.....	3868	3872	3422	3870	.....	.....	3865	3376E	3794(12)	3463	.....
77	4094	6498	3884A 3884B 3884C 3884C	.....	.....	3868	3872	3422	3870	.....	04787	3865	4000B	4118(12)	3463	.....
80	33–5005	*	05831(48)	06100	05832(49)	7421	.....	.....	30–2025	7467	.....	7465	05794(50)	05828(51)	6608	.....
81	33–5002	*	32–1030	06100	32–1031	7421	.....	.....	30–2025	7467	.....	7465	31–1017(52)	.....	6608	.....
84	33–5055	*	32–1310	32–1313	32–1311	32–7180	.....	.....	30–2013	.....	.....	7465	31–1122	27–5031(12)	6608	.....
86	3076	3253	3075B 3075A	.....	.....	3271	3242	3269	3246	.....	.....	3232	3001C ‡	3047(12)	6608	.....
87	3076	3253	3075B 3075A	.....	.....	3400	3242	3422 3472	3401	.....	.....	3399	3001C ‡	3398 (12)	3463	.....
89 (Early)	33–5004	*	06619 06662	06621 06622	06620	8046	.....	.....	06624	30–2020 8166	06764	7998	06577	06624	6608	.....
89 (With Police)	33–5007	42–1002	32–1062 32–1063	06621(55) 06622	06620	8046	.....	.....	06624	30–2020 8166	06764	7998	31–1059(56)	31–1025	6608	With On-Off Sw.
90 (2–45's)	5039	6498	03013 03014 03015	03009 03143	03016	4938	4952	4819	.....	4916	04787	4953	03001	03031	3463	.....
90 (1–47)	5724	6498	03360 03014 03015	03009 03345	03016	5362	.....	4819	.....	4916	04787	5365	03001	03031	3463	.....
90 (2–47's)	6015	6498	04317 04408	04319 04320	04409	6072	6064	4819	04407	4916	04787	6702	04309	03031	3463	.....

RADIOS

OF PAGE 4)

Model No.	Volume Control	On-off Switch	R. F. Transformers	I. F. Transformers	Osc. Transformer	Power Transformer	Input or Audio. Transformer	Filter Choke	Filter Condenser	Electrolytic Condensers	Tone Control	B. C. Resistor	Tuning Condenser	Dial Assembly	Pilot Lamp	Wave-band Switch
91 (Early)	6499	6498	04317 04409	04319 04320	04408	6554(1) 6557(2)	6064	4819	04830	2–4916(1) 6706 & 30–2025(2)	04787	6071(1) 6807(2)	04790(57)	04832(58)	6608	.....
91 (Late)	8054	42–1002	32–1069 32–1070	04319 04320	05985	6554(1) 6804(2)	6064	4819	04830	2–4916(1) 2–7464(2)	04787(7)	6702(1) 6808(2)	31–1011	.....	6608	With On-Off Sw.
95	3790	6498	3744A 3744B 3744C 3744C	.....	.....	3752	3537	3422	3754	.....	.....	3762	3376D	3794(12)	3463	.....
96	4093	6498	3744A 3744B 3744C 3744C 3775B	.....	.....	3752	3537	3422	3754	.....	04787	3762	4000D ‡	4118(12)	3463	.....
111	4093	6498	3884S 3884T 3884V	03038 03039 03040	3884U	4446	3537	3422	3754	.....	04787	4532	4000D ‡	4276(12)	3463	.....
112 (2–45's)	4093	6498	3884S 3884T 3884V	03038 03039 03040	3884U	4446	3537	3422	3754	.....	04787	4532 3763	4000D ‡	4276(12)	3463	.....
112 (2–47's)	4093	6498	3884S 3884T 3884V	03038 03039 03040	3884U	5594	5662	5643	03489	4916	04787	3764	4000D ‡	4276(12)	3463	.....
118	33–5024	*	32–1378 32–1379	32–1381 32–1424	32–1380	32–7111	32–7114	32–7115	30–2078	30–2025 30–2045	30–4186	33–3034	31–1173	31–1205	6608	42–1046
144	33–5068	*	HF 32–1271 BC 32–1270	32–1369 32–1306 32–1307	HF 32–1273 BC 32–1272	32–7234	.....	32–7018	30–2073	30–2020	30–4168	33–3069	31–1175	31–1206	6608	42–1045
200	33–5071	*	32–1420 32–1421 32–1422	32–1403 32–1403 32–1404	32–1423	32–7258	32–7057	32–7056	30–2046	30–2011 30–2080	30–4196	33–3137	31–1217	31–1255	6608	.....
201	33–5071	*	32–1481 32–1482	32–1483 32–1483 32–1484	32–1504	32–7258	32–7057	32–7018 32–7056	30–2046	30–2080 30–2011	.....	33–3137	31–1379	31–1205	34–2040	42–1083
470	5039	5796	03082 03083	03091 03092	03084	5117	.....	4819	.....	4916	04757	5125	03076	03031 03890	3463	03751
490	5724	4095	03360 03014 03015	03009 03345	03016	5362	.....	4819	03327	4916	04787	5365	03001	03031 03890	3463	03751
511	3076	3117	3075B 3075A	.....	.....	3073	.....	Z–224	Z–406	.....	.....	3088W	3001E ‡	3047(12)	6608	.....

NOTES

R. F. and I. F. Transformers are listed in the order they appear in circuit diagrams.

‡ Not replaceable. Return to Distributor for exchange.

* Combined with Vol. control.

(1) One-speaker sets.
(2) 2-speaker sets.
(3) LZX only; code 222 is 42–1031; code 121 is 42–1019.
(4) Code 222.
(5) Code 122.
(6) Code 123 uses two 30–2014.
(7) Models with bass comp: 06698.
(8) Code 123 (RX).
(9) Code 123.
(10) Code 221.
(11) Code 223.
(12) Scale only.
(13) Code 121.
(14) Code 122 and 123.
(15) Code 121 (two used).
(16) Run 14 & 15: 30–4168; run 16 & after 30–4204.
(17) Code 123: 31–1077.
(18) Code 123: 31–1115.
(19) Code 125.
(20) Code 126 & 7.
(21) Code 123: 31–1078.
(22) After run 6, use one 30–2045 in place of these two.
(23) Code 123: 31–1117.
(24) Code 124–5 (LZ&LZX).
(25) Code 129 (LZ).
(26) Run 3 and after: 30–4168.
(27) Code 221: 6895.
(28) Code 123 or 223: 05988. 06146.
(29) Code 123 or 223: 05987.
(30) Code 123 or 223: 06144.‡ Code 125: 06123
(31) Code 123 or 223: 05992.
(32) Code 123: 31–1118
(33) Code 123 & 223: 05726 05727
(34) Code 123 & 223: 05728.
(35) Code 123 & 223: 05829; after 10/19/32: 06359.
(36) Code 123 & 223: 05811; after 10/19/32: 06358.
(37) Before run 4: 32–1116.
(38) Before run 4: 32–7046.
(39) Run 6 and after: 42–1043.
(40) Run 6 and after: 32–1304. 32–1305.
(41) Before run 3:30–4013.
(42) Before run 3:05153.
(43) Code 123 or 223: 05988. 05989.
(44) Code 123 or 223: 05987.
(45) Two-speaker sets: 6457.
(46) Code 123 or 223: 05986 Code 125: 06581.
(47) Code 123, 223 & 125: 05992.
(48) Above run 12: 06888; with dial to 170: 32–1125.
(49) Above run 12: 06887; with dial to 170: 32–1120.
(50) With dial to 170: 31–1031.
(51) With dial to 170: 31–1032.
(52) Before run 4: 05794.
(53) Before run 4: 05828.
(55) After run 2: 32–1289.
(56) Before run 5: 31–1010.
(57) Code 123 & 223: 05982
(58) Code 123 & 223: 05992.
(59) Code 126.
(60) Later Prod: 31–1290.

REPLACEMENT PARTS FOR ALL PHILCO AUTO RADIOS

Model	Field Coil Assem.	Pilot Lamp	Speaker Cone	Tuning Cond.	Filter Cond.	Control Shafts Tuning	Control Shafts Volume	Dial
3	Not Furnished	6608	02996	4372A	.....	4507		4461
5	36–3046	6608	02861	31–1019	30–2008	28–8006	28–8007	27–5006
6	02794	6608	36–3159	04308	04354	6128	6129	8255
7	02794	6608	36–3159	04308	.....	6128	6129	6043
8	02794	6608	36–3159	04308	.....	6128	6129	6043
9	02795	6608	36–3159	04308	04959	6128	6129	8255
10	36–3130	6608	36–3159	Dir. Dr. 31–1083 Air. 31–1202	30–2015	28–8139 (Air Pl. 28–8206)	28–8141 (Air Pl. 28–8206)	27–5022 42–5173
10-122	36–3130	34–2039	36–3159	31–1202	30–2015	28–8206	28–8206	42–5173
11	36–3046	6608	02861	Dir. Dr. 31–1149 Air. 31–1199	30–2072	28–8139 (Air Pl. 28–8206)	28–8141 (Air Pl. 28–8206)	Dir. Dr. 27–5038 Air. 42–5175
12	02794	6608	36–3159	04308	04959	6128	6129	8255
700	36–3046	34–2031 or 34–2039	36–3157	31–1199	30–2072	28–8206	28–8206	42–5189
800	36–3130	6608	36–3159	Dir. Dr. 31–1083 Air. 31–1202	30–2015	28–8139 (Air Pl. 28–8206)	28–8141 (Air Pl. 28–8206)	Dir. Dr. 27–5022 Air. 42–5173
800-122	02795	34–2039	36–3159	31–1202	30–2015	28–8206	28–8206	42–5191
P A D	02795	6608	36–3159	04308	06088	28–8100	28–8103	8255
P B D	36–3140	6608	36–3159	04308	04354	28–8100	28–8103	8255
C Nash	36–3130	6608	36–3159	31–1083	30–2015	28–8181	28–8182	27–5034
C Stude.	36–3130	6608	36–3159	31–1083	30–2015	28–8169	28–8170	27–5027
C-122 Stude.	36–3130	34–2039	36–3159	31–1083	30–2015	28–8169	28–8170	27–5027
D Nash	36–3130	6608	36–3159	31–1083	30–2015	28–8181	28–8182	27–5034
D Stude.	36–3130	6608	36–3159	31–1083	30–2015	28–8169	28–8170	27–5027
D Chrysler	36–3130	6608	36–3159	31–1083	30–2015	28–8139	28–8141	27–5022
D-122 Nash	36–3130	34–2039	36–3159	31–1083	30–2015	28–8181	28–8182	27–5034
E	36–3130	34–2031	36–3159	31–1126	30–2015	28–8206	28–8206	42–5130
G Chyr. 6 / Ply. / Dodge	36–3140	34–2031 or 34–2039	36–3159	31–1182	30–2030	28–8188	28–8198	42–5122 42–5123
G Chr. Airf.	36–3140	34–2031 or 34–2039	36–3159	31–1182	30–2030	28–8218	28–8219	42–5122 42–5133
G DeS. Airf.	36–3140	34–2031 or 34–2039	36–3159	31–1182	30–2030	28–8201	28–8202	42–5124
G Hup.	36–3140	34–2031 or 34–2039	36–3159	31–1182	30–2030	28–8226	28–8227	42–5208
G-122 Chr. 6 / Ply. / Dodge	36–3046	34–2039	36–3157	31–1214	30–2030	28–8188	28–8198	42–5204 42–5205
G-122 Chr. Airf.	36–3046	34–2039	36–3157	31–1214	30–2030	28–8218	28–8219	42–5204 42–5202
G-122 DeS. Airf.	36–3046	34–2039	36–3157	31–1214	30–2030	28–8201	28–8202	42–5200
G-122 Hup.	36–3046	34–2039	36–3157	31–1214	30–2030	28–8226	28–8227	42–5208
H	02795	6608	36–3159	31–1202	30–2015	28–8214	28–8214	42–5125
H-122	02795	34–2039	36–3159	31–1202	30–2015	28–8214	28–8214	42–5125
J Nash	36–3046	6608 or 34–2039	02861	31–1149	30–2072	28–8181	28–8182	27–5041
J Stude.	36–3046	6608 or 34–2039	02861	31–1149	30–2072	28–8169	28–8170	27–5040
N (Ford)	36–3046	34–2038	02861	31–1166	30–2030	28–8241	28–8242	42–5166
Q Nash	36–3046	34–2031	36–3157	31–1340	30–2072	28–8181	28–8182	27–5041
Q Stude.	36–3046	34–2031	36–3157	31–1340	30–2072	28–8169	28–8170	27–5040
R Hup.	36–3046	6608 or 34–2039	02861	31–1164	30–2072	28–8214	28–8214	42–5208
R Chrysler 6 / Dodge / Plymouth	36–3046	34–2031	02861	31–1164	30–2072	28–8234	28–8234	42–5176

Special Date for Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

SERVICE BULLETIN
No. 245

Model 37-60

General Description

Model 37-60 is a 5 tube superheterodyne receiver for operation on alternating current and has two tuning ranges, covering Standard Broadcast and American short-wave reception up to 7 megacycles. The new Philco High Efficiency self-centering glass tubes are used.

The circuit incorporates the Philco Aerial Tuning System—controlled by the range switch—which provides maximum sensitivity and noise reduction when used with the Philco All Wave Aerial.

The red and black leads of the All Wave Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided at the rear of the chassis. Connect the jumper of the terminal panel across terminals 3 and 4.

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

CONSTRUCTION

The chassis is constructed in three basic assembly units.

The Radio Frequency unit contains a 6A8G tube which functions as a Detector-Oscillator, tuning condenser, antenna and oscillator coils for each tuning range, selector switch—compensating condensers for all coils and other parts necessary for the associated circuits. The unit is separately mounted on rubber grommets, cushioning it from the main chassis.

The Intermediate Frequency unit, mounted on the right-hand side of the chassis (facing the front) consists of the Intermediate Frequency coils compensating condensers, a 6K7G tube for I. F. Amplifier stage, and a 6Q7G tube as the second detector-automatic volume control and first audio stage.

All voltages supplied to the I. F. and R. F. units are furnished from a terminal strip mounted in this unit.

The Power Pack and audio output circuits, together with the required Voltage dividers and filter condensers are mounted in the power unit. All high Voltage A. C. Wiring is housed in the power transformer assembly which includes the rectifier socket.

Although unit construction has changed the appearance of this model, the service bulletin will be of great assistance in checking through all stages of the receiver. The Wiring Diagram, as usual, is numbered, indicating all important parts. These numbers correspond with the parts layout shown in Fig. 6. In addition, the range switch wafers are shown on the schematic diagram. The contacts on each wafer are lettered and numbered to indicate their connection points in the schematic diagram, which are also lettered and numbered. The physical drawings of each coil used in the receiver are also shown on schematic diagram Fig. 5. The connections of these coils are numbered on the coil itself and on the schematic diagram.

Fig. 1 shows the Voltage measurements taken from the bottom of the socket at each contact. In Fig. 2, the correct position of the dial indicator, for proper adjustment of the compensators is shown. Figs. 3 and 4, are the location of the I. F. and R. F. compensators respectively.

This Receiver is supplied in two models, type B and type F. These instructions, however, are used for both types.

Electrical Specifications

Voltage Rating) 115 Volts. A. C.
Frequency Rating: 50-60 Cycle.
For 25-40 cycle operation use Power Transformer, marked with asterisks in Parts List.
Power Consumption: 60 Watts.
Type and Number of Philco Tubes: 1 type 6A8G First Detector-oscillator; 1 type 6K7G I. F. Amplifier; 1 type 6Q7G 2nd Detector, A. V. C., and 1st Audio; 1 type 6F6G Pentode Output and 1 type 5Y4G, Rectifier.
Speaker: S7.
Type of Circuit: Superheterodyne with Pentode Power Output.
Intermediate Frequency: 470 K. C.
Undistorted Power Output: 3 Watts.
Tuning Ranges: Two—(1): 530 to 1720 K.C., (2): 2.3 to 7.4 M.C.

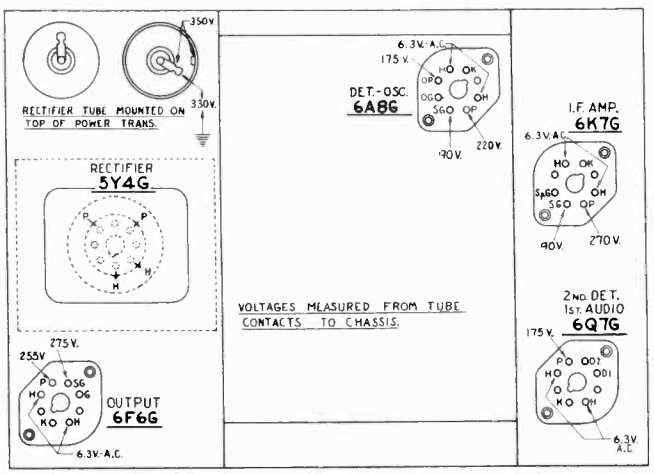


Fig. 1—Socket Voltages Viewed from Underside of Chassis

Measurements taken with Philco Model 025 Circuit Tester which contains a 1000 ohm per volt voltmeter. Line voltage, 115—Wave Switch in Broadcast Position. Dial turned to 600 KC.

POWER TRANSFORMER DATA

Lead No. Shown on Schematic	A. C. Volts	Current	Circuit	Color	Resistance
1-2	120	—	Primary	White	50 ohms
5-7	670	70 M. A.	High Voltage Sec.	Yellow	145 ohms 155 ohms
3-4	5.0	2.0 A	Fil. Rect.	Blue	.1 ohms
8-9	6.7	2.1 A	Fil.	Black	.1 ohms
6	—	—	Center Tap of 5-7	Yellow Green Tr	—

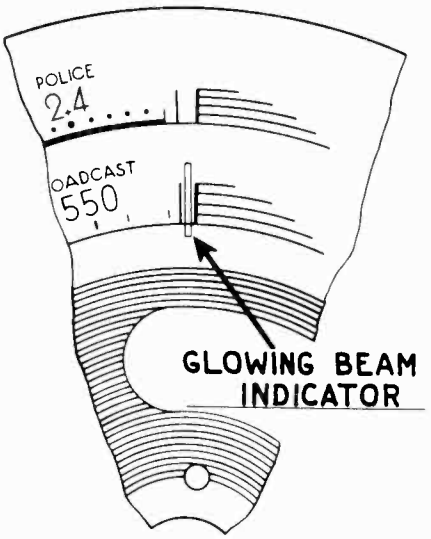


Fig. 2—Dial Calibration

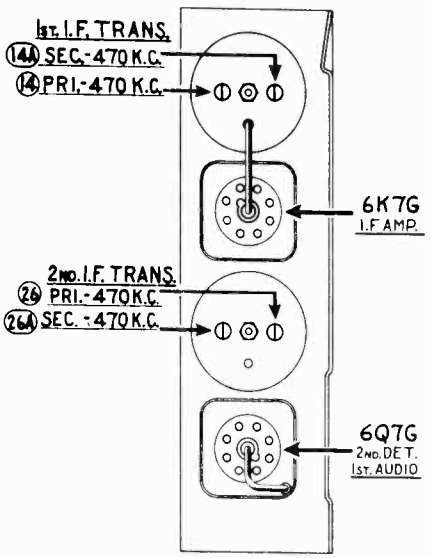


Fig. 3—Locations of I. F. Compensators Top of Chassis

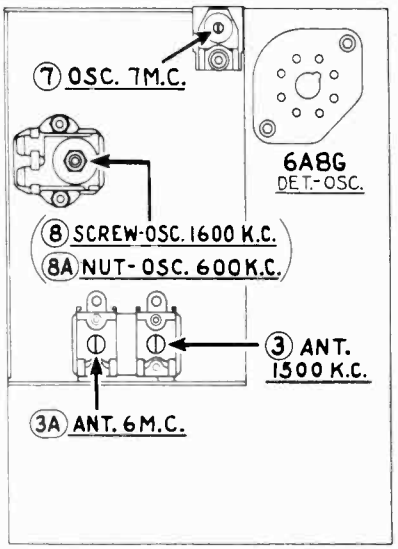


Fig. 4—Locations of R. F. Compensators Underside of Chassis

Adjustment of Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I. F. Circuit, three in the Oscillator Circuit, and two in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

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 to adjust 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 very sensitive output meter and is recommended for these adjustments.

Philco Fibre Wrench No. 3164 and Fibre Handle Screw-driver No. 27-7059 complete the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 3 and 4.

The following procedure must be observed in adjusting the compensators:

DIAL ADJUSTMENT—The Tuning condenser is set at the maximum capacity position, by turning the tuning knob counter-clockwise. Loosen the set screw of dial hub and set dial, (see Fig. 2) with Glowing Indicator centered between the index lines at the low frequency end of scale.

OUTPUT METER—The Output Meter is attached to the Plate and Cathode terminals of the (6F6G tube) and adjusted to use the (0-30) volt scale. When adjusting each circuit, care should be taken to have the signal generator attenuator set to give approximately ¼ scale reading on output meter.

INTERMEDIATE FREQUENCY CIRCUIT

1 Turn wave band switch to Range 1. Rotate the tuning control to approximately 600 K. C. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the grid of the 6A8G tube, and the ground lead of Signal Generator to the chassis.

2 Set Signal Generator indicator for 470 K. C., adjust attenuator for approximately ¼ scale reading on output meter. Then adjust compensators (26)a 2nd I. F. Sec., (26) 2nd I. F. Pri., (14)a 1st I. F. Sec., (14) 1st I. F. Pri., for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT—Range 2: 2.3 to 7.4 M. C.

1 Turn Range switch to Range 2. Remove signal generator output lead from the grid of 6A8G tube.

2 Attach signal generator output lead through a 0.1 mfd. condenser to the ANT. TERMINAL No. 1, on aerial panel, and the generator ground to chassis. Connect TERMINAL No. 2, to GROUND TERMINAL No. 3, with connector link provided on the panel.

3 Set Signal Generator and receiver dials for 7.0 M. C. Now adjust compensator (7) for maximum reading on output meter. Then turn Signal Generator and Receiver to 6.0 M. C., and adjust compensator (3)a for maximum output.

RANGE 1: 530 to 1720 K. C.

1 Turn range switch to Range 1. Turn the Receiver dial to 1600 K. C. Then adjust compensators (8) and (3) for maximum reading on output meter.

The 088 Signal Generator dial is set at 800 K. C. and the second harmonic of this frequency (1600 K. C.) is used in making the above adjustment.

2 The low frequency end of the band is now tuned by turning Signal Generator and Receiver dials to 600 K. C. and adjusting compensator (8)a—see note (a) below—for maximum output.

(a) When compensator (8)a osc. series is being adjusted, the Tuning Condenser must be rolled for maximum output. This is accomplished as follows: First tune compensator (8)a for maximum output. Then vary the Tuning Condenser for maximum output at 600 K. C. Now retune Compensator (8)a, and again vary the tuning condenser back and forth about 600 K. C., for maximum output. This operation of first tuning the Compensator, then the Tuning Condenser is continued until maximum output is obtained at the 600 K. C. frequency.

3 Set the Signal Generator and Receiver dials for 1600 K. C. and re-adjust Compensator (8) for maximum output. Then turn the dials to 1500 K. C. and re-adjust compensator (3) for maximum reading on output meter.

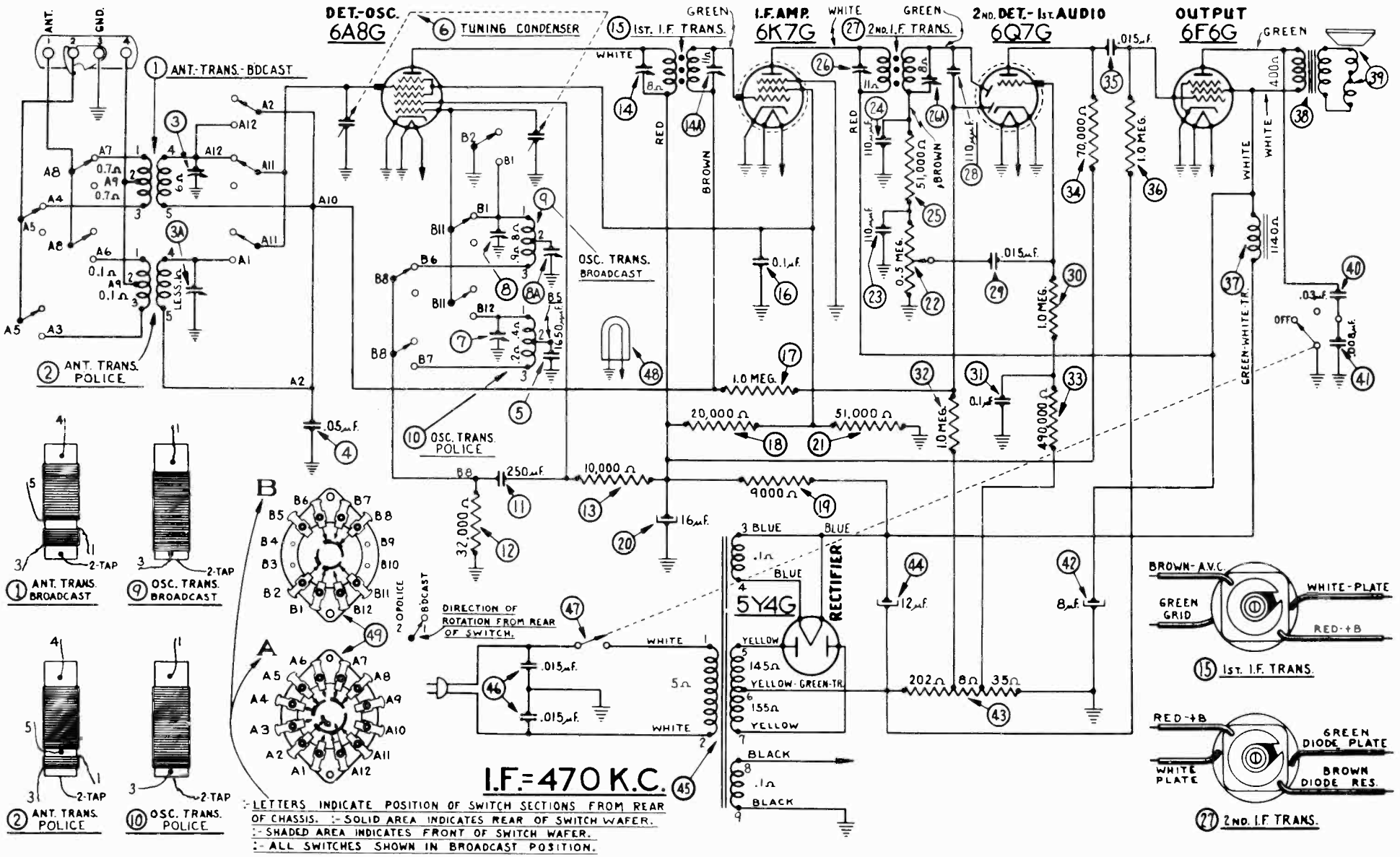


Fig. 5—Schematic Diagram—Model 37-60

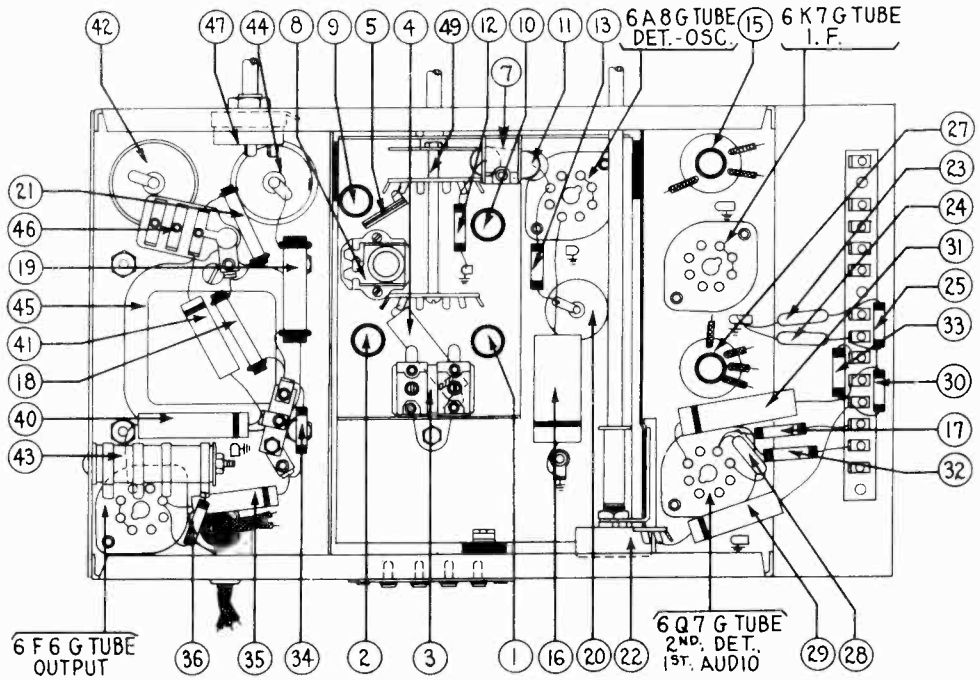


Fig. 6—Base View of Chassis

Replacement Parts—Model 37-60

Schem. No.	Description	Part No.	Price List
①	Antenna Transformer (Broadcast)	32-2108	$0.80
②	Antenna Transformer (Police)	32-2119	.65
③	Compensator ANT 1600 K.C.	31-6093	.40
③A	ANT. Compensator 6 meg.	Part of ③	
④	Condenser (.05 mfd. Tubular)	30-4444	.20
⑤	Condenser (1650 mfd. Semi-fixed)	31-6096	.40
⑥	Tuning Condenser	31-1826	3.00
⑦	Oscillator Compensator (Police 7 M.C.)	31-6101	.20
⑧	Oscillator Compensator (Broadcast) 1600 K.C. Screw	31-6100	.40
⑧A	Compensator (600 K.C. Nut)	Part of ⑧	
⑨	Oscillator Transformer (Broadcast)	32-2120	.65
⑩	Oscillator Transformer (Police)	32-2121	.40
⑪	Condenser (.250 mmfd. Mica)	30-1032	.25
⑫	Resistor (32000 ohms ½ watt)	33-332339	.20
⑬	Resistor (10000 ½ watt)	33-310339	.20
⑭	Compensator (Pri. 1st I.F.)	Part of ⑮	
⑭A	Compensator (Sec. 1st I.F.)	Part of ⑮	
⑮	1st I.F. Transformer	32-2100	1.50
⑯	Condenser (.1 mfd. Tubular)	30-4170	.25
⑰	Resistor (1 meg. ½ watt)	33-510344	.20
⑱	Resistor (20000 ohms 1 watt)	33-320439	.20
⑲	Resistor (9000 ohms 2 watts)	33-290539	.30
⑳	Electrolytic Condenser (16 mf.)	30-2118	1.65
㉑	Resistor (51000 ohms ½ watt)	33-351439	.20
㉒	Volume Control	33-5157	1.00
㉓	Condenser (mica 110 mmfd.)	30-1031	.20
㉔	Condenser (mica 110 mmfd.)	30-1031	.20
㉕	Resistor (51000 ohms ½ watt)	33-351339	.20
㉖	Compensator 2nd I.F. Pri.	Part of ㉗	
㉖A	Compensator 2nd I.F. Sec.	Part of ㉗	
㉗	2nd I.F. Transformer Unit	32-2102	1.50
㉘	Condenser (mica 110 mmfd.)	30-1031	.20
㉙	Condenser (Tubular .015 mfd.)	30-4358	.20
㉚	Resistor (1 meg. ½ watt)	33-510339	.20
㉛	Condenser (Tubular .1 mfd.)	30-4122	.20
㉜	Resistor (1 megohm ½ watt)	33-510339	.20
㉝	Resistor (490000 ohm ½ watt)	33-449339	.20
㉞	Resistor (70000 ohm ½ watt)	33-370339	.20
㉟	Condenser (Tubular .015 mfd.)	30-4226	.20
㊱	Resistor (1 meg. ½ watt)	33-510339	.20
㊲	Field Coil Assembly	36-3039	2.75
㊳	Output Transformer	32-7019	
㊴	Cone & Voice Coil Assembly	36-3157	.80
㊵	Condenser (Tubular .03 mfd.)	30-4380	.20
㊶	Condenser (Tubular .008 mfd.)	30-4112	.20
㊷	Electrolytic Condenser (8 mfd.)	30-2024	1.10
㊸	Bias Resistor	33-3277	.20
㊹	Electrolytic Condenser (12 mfd.)	30-2117	1.20
㊺	Power Transformer (50-60 cycle, 115 volts)	32-7583	4.25
	*Power Transformer (25-40 cycle, 115 volts)	32-7584	
㊻	Condenser (Bakelite Twin .015 mfd.)	3793 DG	.40

Schem. No.	Description	Part No.	Price List
㊼	Tone Control & Power Switch	42-1180	$0.75
㊽	Pilot Lamp	34-2039	.15
㊾	Wave Switch	42-1195	1.50
	Dial	27-5196	.30
	Dial Hub	28-7152 FA-3	.10
	Dial Hub Clamp	28-2837 FA-3	.10
	Set Screw	N-1506 Per C	2.00
	Screen Bracket & Screen Assembly	31-1878	.25
	Pilot Lamp Socket Assembly	38-7706	.35
	Tube Socket 7 Prong	27-6057	.11
	Tube Socket 8 Prong	27-6058	.11
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	I. F. Coil Shield	38-7763	.20
	R.F. Trans. Mtg. Plate	28-3808	.02
	R.F. Trans. Mtg. Spacer	27-8228	.01
	R.F. Trans. Mtg. Screw	W-1635 Per C	.30
	R.F. Mtg. Grommet	27-4317	.04
	R.F. Mtg. Sleeve	28-2257 FA-3	.01
	R.F. Mtg. Bushing	27-8339 Per C	.40
	Screw	W-729	
	Vernier Drive Assem.	31-1879	
	B.C. Resistor Mtg. Screw	W-512 Per C	.90
	B.C. Resistor Mtg. Nut	W-317A Per C	.40
	Volume Control Shaft	28-6498	
	Volume Control Shaft Spring	28-4117 Per C	.40
	Washer Volume Control Shaft	28-4186	
	Washer Volume Control Shaft	4436 Per C	1.50
	Volume Control Shaft Retaining Clip	28-8610	.03
	Volume Control Mtg. Nut	W-684 FA-3 Per C	1.25
	Tone Control Mtg. Nut	W-684 FA-3 Per C	1.25
	Insulator	27-8320 Per C	.40
	I.F. Terminal Panel	38-7703	.25
	I.F. Terminal Spacer	4122	.01
	Knob Tuning	27-4321	.10
	Knob Volume, Tone	27-4332	.10
	Knob Selector Switch	27-4332	.10
	Chassis Mtg. Screw		
	Tuning Condenser Grommet	27-4325	.02
	Screw	W-650 FA-3 Per C	.40
	Baffle Assembly B Cabinet	40-5935	
	A.C. Cord	L-2183	.40
	Speaker Cable	L-2181	.25
	Clamp Electrolytic Condenser	6440	.05
	Insulator Electrolytic Condenser	27-7194	.01
	Grid Cap	38-3888	.01
	Spacer (Compensating Condenser)	29-6032	.04
	Screw	W-1653 FA-3 Per C	.30
	†B Speaker S-7	36-1009	5.75
	Nut Mtg. Speaker	W-124 A Per C	1.35
	Baffle Assem. F Cabinet	40-5933	

*25 cycle Transformer 32-7584 used in Model 37-60A.
†Speaker used in F & B Cabinet.

PHILCO . . . . . Model 37-61

Special Data for Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

SERVICE BULLETIN
No. 246

Model 37-61

General Description

Model 37-61 is a 5 tube superheterodyne receiver for operation on alternating current and has two tuning ranges, covering standard broadcast and short wave reception. It, also, uses the new Philco High Efficiency self-centering glass tubes.

The circuit includes the Philco Foreign Tuning System—controlled by the range switch—providing maximum sensitivity and noise reduction when used with the New Philco High-Efficiency Aerial, supplied with the receiver.

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 at the rear of the chassis. Connect the jumper of the terminal panel across terminal 3 and 4. A good ground connection is required in all installations. Make the ground connection to terminal 3 on the terminal panel.

If a temporary aerial is used, the jumper should be across terminal 2 and 3. The aerial connects to terminal 1 and the ground to terminal 3.

CONSTRUCTION

The chassis is constructed in three basic assembly units.

The Radio Frequency unit contains a 6A8G tube which functions as a Detector-Oscillator, tuning condenser, antenna and oscillator coils for each tuning range, selector switch—compensating condensers for all coils and other parts necessary for the associated circuits. The unit is separately mounted on rubber grommets, cushioning it from the main chassis.

The Intermediate Frequency unit, mounted on the right-hand side of the chassis facing the front, consists of the Intermediate Frequency coils, compensating condensers, a 6K7G tube for I. F. Amplifier stage, and a 6Q7G tube as the second detector-automatic volume control and first audio stage. All voltages supplied to the I. F. and R. F. units are furnished from a terminal strip mounted in this unit.

The Power Pack and audio output circuits, together with the required Voltage dividers and filter condensers are mounted in the power unit. All high Voltage A. C. Wiring is housed in the power transformer assembly which includes the rectifier socket.

Although unit construction has changed the appearance of this model, the service bulletin will be of great assistance in checking through all stages of the receiver. The Wiring Diagram, as usual, is numbered, indicating all important parts. These numbers correspond with the parts layout shown in Fig. 6. In addition, the range switch wafers are shown on the schematic diagram. The contacts on each wafer are lettered and numbered to indicate their connection points in the schematic diagram, which are also lettered and numbered. The physical drawings of each coil used in the receiver are also shown on schematic diagram Fig. 5. The connections of these coils are numbered on the coil itself and on the schematic diagram.

Fig. 1 shows the Voltage measurements taken from the bottom of the socket at each contact. In Fig. 2, the correct position of the dial indicator, for proper adjustment of the compensators is shown. Figs. 3 and 4 show the location of the I. F. and R. F. compensators respectively.

This receiver will be supplied in two model cabinets type B, and F. These instructions, however, will cover both type cabinets.

Electrical Description

Voltage Rating: 115 Volts. A. C.
Frequency Rating: 50-60 Cycle.
For 25 to 40 cycle operation use Power Transformer, marked with asterisks in Parts List.
Power Consumption: 60 Watts.
Type and Number of Philco Tubes: 1 type 6A8G First Detector-oscillator; 1 type 6K7G I. F. Amplifier; 1 type 6Q7G 2nd Detector, A. V. C., and 1st Audio; 1 type 6F6G Pentode Output and 1 type 5Y4G, Rectifier.
Speaker: S7.
Type of Circuit: Superheterodyne with Pentode Power Output.
Intermediate Frequency: 470 K. C.
Undistorted Power Output: 3 Watts.
Tuning Ranges: Two—(1): 530 to 1720 K. C.; (2): 5.7 to 18.2 M. C.

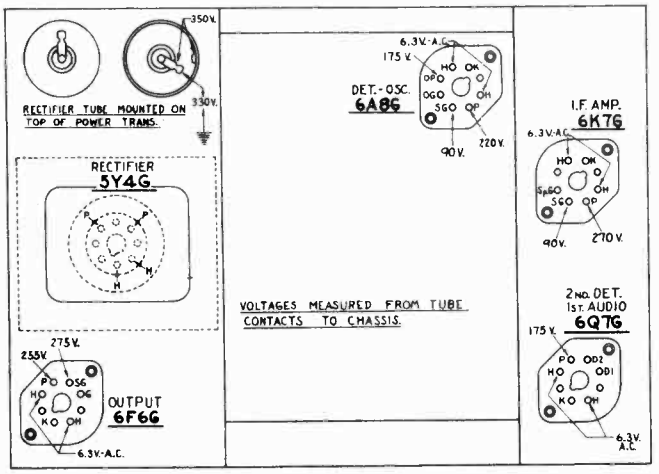


Fig. 1—Socket Voltages Viewed from Underside of Chassis

Measurements taken with PHILCO MODEL 025 Circuit Tester which contains a 1000 ohms per volt Voltmeter. Line voltage, 115—Range Switch in Broadcast Position. Dial tuned to 600 K. C.

POWER TRANSFORMER DATA

Lead No. Shown on Schematic	A. C. Volts	Current	Circuit	Color	Resistance
1-2	120	—	Pri.	White	5 ohms
3-4	5.0	2.0A	Fil. Rect.	Blue	.1 ohm
5-7	670	70 M. A.	High Voltage Sec.	Yellow	145 ohm 155 ohm
6	—	—	Center Tap of 5-7	Yellow Green Tr.	—
8-9	6.7	2.1A	Fil.	Black	.1 ohm

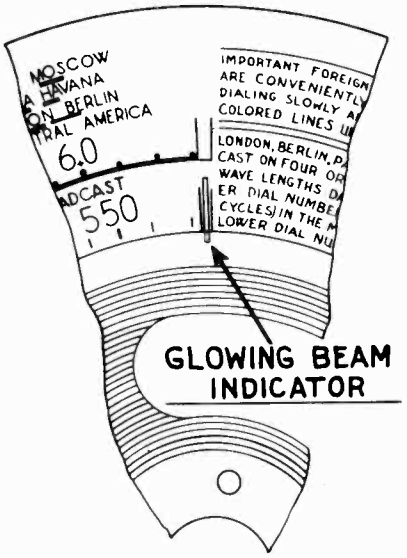


Fig. 2—Dial Calibration

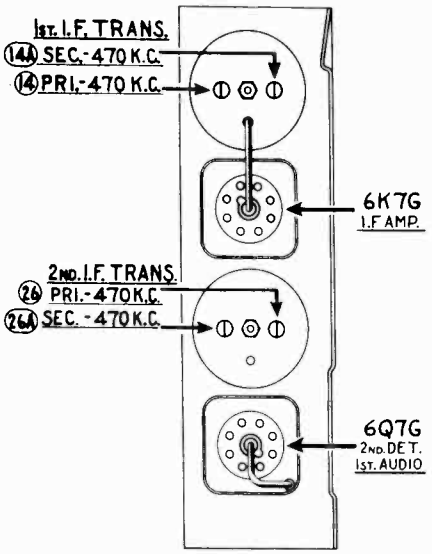


Fig. 3—Locations of I. F. Compensators Top of Chassis

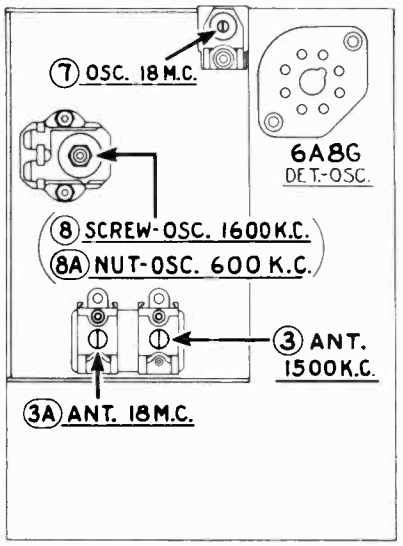


Fig. 4—Locations of R. F. Compensators Underside of Chassis

Adjustment of Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I. F. Circuit; three in the Oscillator Circuit; and two in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

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 20000 K. C. is recommended to adjust 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 very sensitive output meter and is recommended for these adjustments.

Philco Fibre Wrench No. 3164 and Fibre Handle Screw-driver No. 27-7059 complete the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 3 and 4.

The following procedure must be observed in adjusting the compensators:—

DIAL ADJUSTMENT—The Tuning Condenser is set at the maximum capacity position, by turning the tuning knob counter-clockwise. Loosen the set screw of dial hub and set dial, (see Fig. 2) with Glowing Indicator centered between the index lines at the low frequency end of scale.

OUTPUT METER—The Output Meter is connected to the Plate and Cathode terminals of the (6F6G) tube and adjusted to use the (0-30) Volt scale. When adjusting each circuit, care should be taken to have the Signal Generator attenuator set to give approximately ¼ scale reading on output meter.

INTERMEDIATE FREQUENCY CIRCUIT

1 Turn range switch to Range 1. Rotate the tuning control to approximately 600 K. C. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the grid of the 6A8G tube.

2 Set Signal Generator indicator for 470 K. C. adjust attenuator for approximately ¼ scale reading on output meter. Then adjust compensators (26)a 2nd I. F. Sec., (26) 2nd I. F. Pri., (14)a 1st I. F. Sec., (14) 1st I. F. Pri., for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT

Range 2.—5.7 to 18 M. C.

1 Remove the signal generator output lead and series condenser from the 6A8G tube and connect them to the ANT. TERMINAL No. 1, on aerial input panel (rear of chassis) and the generator ground lead to GND. TERMINAL No. 3, rear of chassis. Connect TERMINAL No. 2 to GROUND TERMINAL No. 3 with connector link provided on the panel.

2 Set range switch in position No. 2 (S. W.). Turn signal generator and receiver dials to 18 M. C. and adjust compensator (7) Osc. for maximum output.

3 The adjustment of the antenna compensator on the high frequency range causes a slight detuning of the oscillator circuit. In order to overcome this detuning effect, connect a variable condenser of approximately 350 mfd., having a good vernier drive, across the oscillator section of the tuning condenser. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser so that the second harmonic of the receiver oscillator will beat against the signal from the signal generator. The antenna compensator (3)a should then be adjusted to give maximum output.

4 Now remove the external condenser from the tuning condenser of receiver and turn compensator (7) osc. to the maximum capacity position (clockwise), then without moving signal generator or receiver tuning condenser, turn compensator (7) (counter-clockwise) until a second peak is reached on the output meter. The first peak is caused by tuning to the image frequency signal and must be neglected. Compensator (7) is adjusted on the second peak to give maximum output.

RANGE 1: 530 to 1720 K. C.

Turn range switch to Range No. 1. Turn the Receiver dial to 1600 K. C. Then adjust compensators (8) and (3) for maximum reading on output meter.

The 088 Signal Generator dial is set at 800 K. C. and the second harmonic of this frequency (1600 K. C.) is used in making the above adjustment.

2 The low frequency end of the band is now tuned by turning Signal Generator and Receiver dials to 600 K. C. and adjusting compensator (8)a—see note (a) below—for maximum output.

(a) When compensator (8)a osc. series is being adjusted, the Tuning Condenser must be rolled for maximum output. This is accomplished as follows: First tune compensator (8)a for maximum output. Then vary the Tuning Condenser for maximum output at 600 K. C. Now retune Compensator (8)a and again vary the tuning condenser back and forth at 600 K. C., for maximum output. This operation of first tuning the Compensator, then the Tuning Condenser is continued until maximum output is obtained at the 600 K. C. frequency.

3 Set the Signal Generator and Receiver Dials for 1600 K. C. and re-adjust Compensator (8) for maximum output. Then turn the dials to 1500 K. C. and re-adjust compensator (3) for maximum reading on output meter.

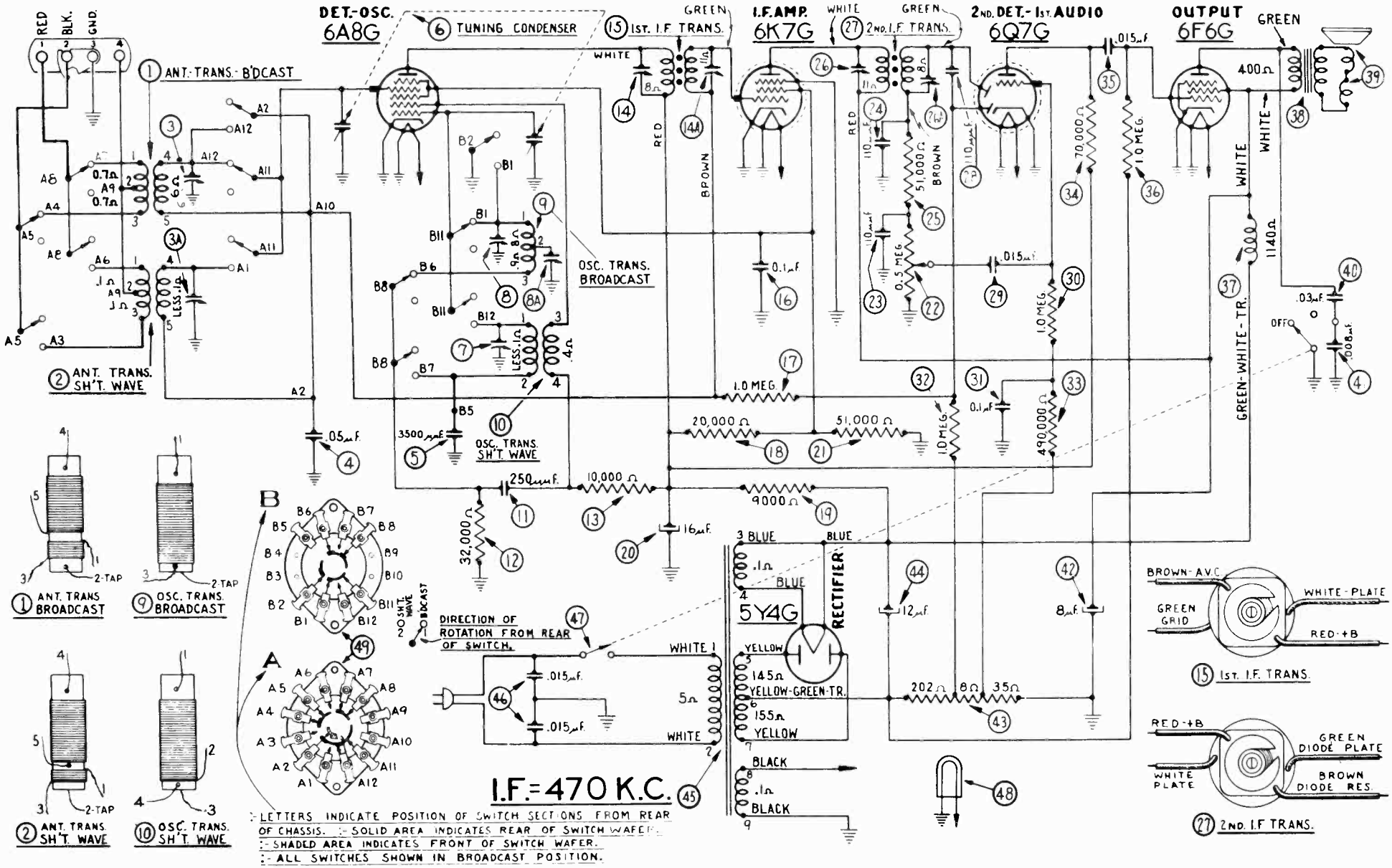


Fig. 5—Schematic Diagram—Model 37-61

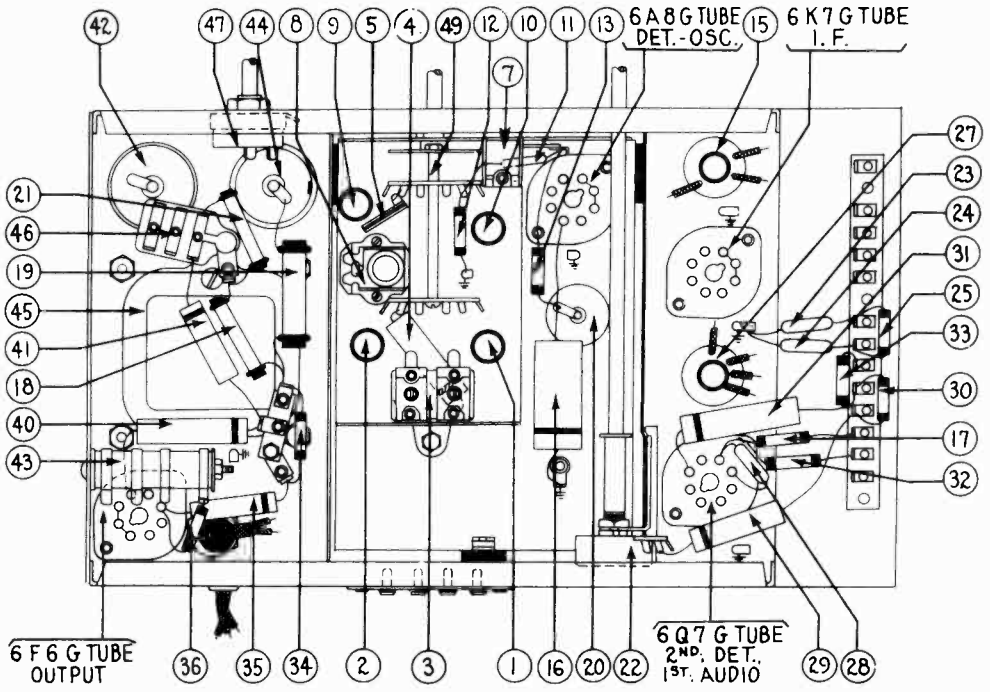


Fig. 6—Base View of Chassis

Replacement Parts—Model 37-61

Schem. No.	Description	Part No.	Price List
①	Antenna Trans. Broadcast	32-2108	$0.80
②	Antenna Trans. S.W.	32-2142	.50
③	Compensator Twin Ant. 1500 K.C.	31-6093	.40
③A	Compensator Ant. 18 M.C.	Part of ③	
④	Condenser (Tubular .05 mfd.)	30-4444	.20
⑤	Condenser Semi-fixed 3500 mfd.	31-6103	.60
⑥	Tuning Condenser	31-1851	3.25
⑦	Compensator Osc., 18 M.C.	31-6101	.20
⑧	Compensator Osc., 1600 K.C. "Screw"	31-6100	.40
⑧A	Compensator Osc., 600 K.C. "Nut"	Part of ⑧	
⑨	Transformer Osc. Broadcast	32-2120	.65
⑩	Transformer Osc. S.W.	32-2143	.60
⑪	Condenser (Tubular 250 mfd.)	30-1032	.25
⑫	Resistor (32000 ohms ½ watt)	33-332339	.20
⑬	Resistor (10000 ohms ½ watt)	33-310339	.20
⑭	Compensator (1st I.F. Pri. 470 K.C.)	Part of ⑮	
⑭A	Compensator (1st I.F. Sec. 470 K.C.)	Part of ⑮	
⑮	1st I.F. Transformer	32-2100	1.50
⑯	Condenser (Tubular 0.1 mfd.)	30-4170	.25
⑰	Resistor (1 megohm ½ watt)	33-510339	.20
⑱	Resistor (20000 ohm, 1 watt)	33-320439	.20
⑲	Resistor (9000 ohms, 2 watt)	33-290539	.30
⑳	Electrolytic condenser, 16 mfd.	30-2118	1.65
㉑	Resistor (51000 ohms 1 watt)	33-351439	.20
㉒	Volume Control	33-5157	1.00
㉓	Condenser (110 mmfd. Mica)	30-1031	.20
㉔	Condenser (110 mmfd. Mica)	30-1031	.20
㉕	Resistor (51000 ohms ½ watt)	33-351339	.20
㉖	Compensator (2nd I.F. Pri.) 470 K.C.	Part of ㉗	
㉖A	Compensator (2nd I.F. Sec.) 470 K.C.	Part of ㉗	
㉗	2nd I.F. Transformer	32-2102	1.50
㉘	Condenser (110 mmfd. Mica)	30-1031	.20
㉙	Condenser (.015 mfd. Tubular)	30-4358	.20
㉚	Resistor (1 megohm ½ watt)	33-510339	.20
㉛	Condenser (0.1 mfd. Tubular)	30-4122	.20
㉜	Resistor (1.0 megohm ½ watt)	33-510339	.20
㉝	Resistor (490,000 ohm ½ watt)	33-449339	.20
㉞	Resistor (70000 ohm ½ watt)	33-370339	.20
㉟	Condenser (.015 mfd. Tubular)	30-4226	.20
㊱	Resistor (1 megohm ½ watt)	33-510339	.20
㊲	Field Coil Assembly	36-3039	2.75
㊳	Output Transformer	32-7019	.85
㊴	Cone and Voice Coil Assembly	36-3157	.80
㊵	Condenser (.03 mfd. Tubular)	30-4380	.20
㊶	Condenser (.008 mfd. Tubular)	30-4112	.20
㊷	Electrolytic Condenser (8 mfd.)	30-2024	1.10
㊸	Bias Resistor (245 ohm)	33-3277	.20
㊹	Electrolytic Condenser 12 mfd.	30-2117	1.20
㊺	Power Transformer (50-60 cycle 105-120 volt)	32-7583	4.25
	*Power Transformer (25 cycle 115 volt)	32-7584	
㊻	Condenser Bakelite Twin (.015-.015 mfd.)	3793 DG	.40
㊼	Tone Control & AC Switch	42-1180	.75
㊽	Pilot Lamp	34-2039	.15

Schem. No.	Description	Part No.	Price List
㊾	Wave Switch Assembly	42-1195	$1.50
	Dial	27-5205	
	Dial Hub	28-7152 FA-3	.10
	Dial Hub Clamp	28-2837 FA-3	.10
	Set Screw	N-1506	Per C 2.00
	Screen Bracket & Screen Assembly	31-1878	.25
	Pilot Lamp Socket Assembly	28-7706	.35
	Tube Socket (7-prong)	27-6057	.11
	Tube Socket (8-prong)	27-6058	.11
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	I.F. Coil Shield	38-7763	.20
	R.F. Transformer Mtg. Plate	28-3808	.02
	R.F. Transformer Mtg. Spacer	27-8228	.01
	R.F. Transformer Mtg. Screw	W-1635	Per C .30
	R.F. Unit Mtg. Grommet	27-4317	.04
	R.F. Unit Mtg. Sleeve	28-2257 FA-3	.01
	R.F. Unit Mtg. Washer	W-425A W-729 FA-3	Per C .25
	Screw	27-4325	.02
	Tuning Condenser Mtg. Grommet	W-650 FA-3	Per C .40
	Tuning Condenser Mtg. Screw	W-512	Per C .90
	B.C. Resistor Mtg. Screw	W-317A	Per C .40
	B.C. Resistor Mtg. Nut	28-6498	.10
	Volume Control Shaft	28-4186	
	Volume Control Shaft Washer	4436	Per C 1.50
	Volume Control Shaft Washer	28-4117	Per C .40
	Volume Control Shaft Spring	28-8610	.03
	Volume Control Shaft Retaining Clip	W-684 FA-3	Per C 1.25
	Volume Control Mtg. Nut	W-684 FA-3	Per C 1.25
	Tone Control Mtg. Nut	27-8320	Per C .40
	Tone Control Insulator	38-7703	.25
	I.F. Terminal Panel	31-1879	
	Vernier Tuning Assembly	W-1599 FA-3	
	Vernier Tuning Screws	28-4001	Per C .25
	I.F. Terminal Spacer	27-4330	.10
	Knob Tuning	27-4331	.10
	Knob Tuning Vernier	27-4332	.10
	Knob Volume, Tone Controls	27-4332	.10
	Knob Wave-Switch		
	Chassis Mtg. Screw	40-5935	
	Baffle Assembly B cabinet	40-5933	
	Baffle Assembly F Cabinet	L-2183	.40
	A.C. Cord	L-2181	.25
	Speaker Cable	6440	.05
	Clamp Electrolytic Condenser	27-7194	.01
	Insulator Electrolytic Condenser	38-3888	.01
	Grid Cap	29-6032	.04
	Spacer Compensating Condenser	W-1653 FA-3	Per C .30
	Screw	36-1009	5.75
	Speaker S7	W-124	Per C .35
	Nut Speaker Mtg.	W-1604	Per C .50
	Screw Speaker Mtg.	28-3895 FA-3	
	Bottom Shield Plate (F Cabinet)		

*Power Transformer used in Model 37-61A

Prices Subject to Change Without Notice

PHILCO . . . . . Model 37-84

For Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

SERVICE BULLETIN
No. 244

Model 37-84, Code-122

General Specifications

TYPE CIRCUIT: Superheterodyne with Pentode output.
POWER SUPPLY: 115 V., 60 cycle A.C.
TUBES USED: 1 type 6J7G, Det Osc., 1 type 6J7G 2nd detector—first audio, 1 type 6F6G output, 1 type 5Y4G Rectifier.
FREQUENCY RANGE: 540-1700 K.C.
INTERMEDIATE FREQUENCY: 470 K.C.
POWER CONSUMPTION: 45 watts.
SPEAKER: SB.
POWER OUTPUT: ½ watt.

Adjusting Compensating Condensers

To accurately adjust the compensating condensers in the Model 37-84 receiver, it is necessary to use a signal generator of high stability on all frequencies, such as the PHILCO MODEL 088 Signal Generator This instrument has a continuous frequency range from 110 to 20,000 K.C., and is designed to meet every requirement of the serviceman.

An output meter is also needed,—**PHILCO Model 025 Circuit Tester** includes a very sensitive output meter.

Convenient tools to use in adjusting the compensators are the **PHILCO No. 3164 Fibre Wrench** and **No. 27-7059 Fibre Handled Screw-driver.**

The locations of the various compensating condensers are shown in Fig. 1. Connect the output meter to the plate and cathode contacts of the 6F6G power tube. and adjust it to use the 0-30 volt range.

When adjusting each circuit, care should be taken to have the signal generator attenuator set to approximately ¼ scale reading on output meter.

Intermediate Frequency Circuit

1. Turn gang condenser to maximum capacity (counter-clockwise) and set the volume control of the receiver in the maximum position (clockwise).

2. Connect the 088 signal generator output lead through a .1 mfd. condenser, to the grid of the 6J7G Detector-oscillator tube and the generator ground to the chassis.

3. Turn the sensitivity control ⑰ to maximum capacity position (clockwise), and then release 1½ turns (counter-clockwise).

4. Set signal generator at 470 K.C. and adjust compensators ⑪ and ⑮ for maximum reading on the output meter. Then turn sensitivity control ⑰ clockwise until a hiss (oscillation) is heard. Now turn sensitivity control ⑰ counter-clockwise until the hiss ceases, then continue for ¼ turn more.

TUBE SOCKET VOLTAGES
(Measured from Tube Contact to Chassis)

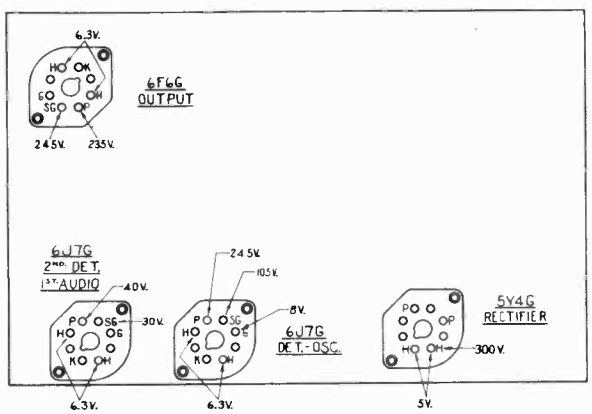


Fig. 2. Tubes as viewed from underside of Chassis

The voltages at the points indicated by the arrows above were obtained with a Philco type 025 Circuit Tester which contains a high resistance (1000 ohms per volt) voltmeter.

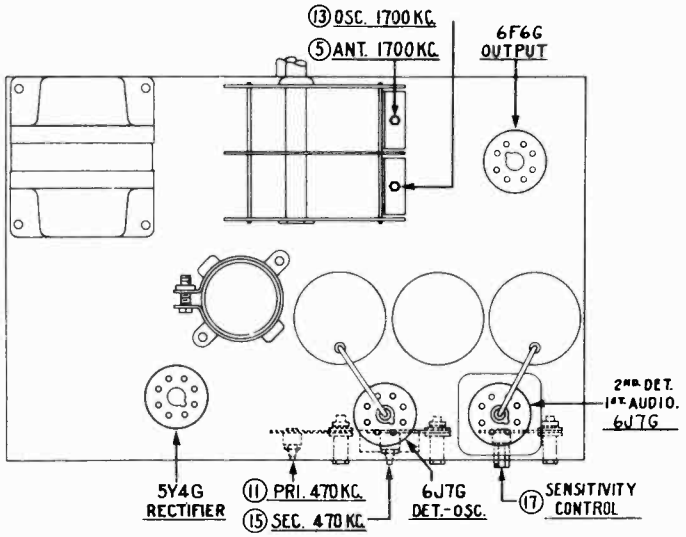


Fig. 1. Locations of Compensating Condensers

Radio Frequency Circuit

1. Turn the gang condenser to the minimum capacity position (extreme clockwise) and place a .006" (six-thousandths inch) gauge between the stator and rotor plates Now turn the gang counter-clockwise until stator and rotor plates touch gauge.

2. Remove gauge from gang condenser. Now place signal generator output lead through a 100 mmfd. condenser to the aerial post of the receiver. Set signal generator at 850 K.C., (using second harmonic, 1700 K.C.). Adjust compensators ⑬ osc., and ⑤ ant,, for maximum reading on output meter.

3. Turn signal generator to 1400 K.C. and adjust gang condenser for maximum output. Then adjust compensator ⑤ for maximum reading on output meter.

4. After the above adjustments are completed, the dial pointer is checked for calibration by turning signal generator to 1000 K.C. Then tune receiver for maximum signal The dial pointer should then indicate 1000 K.C.

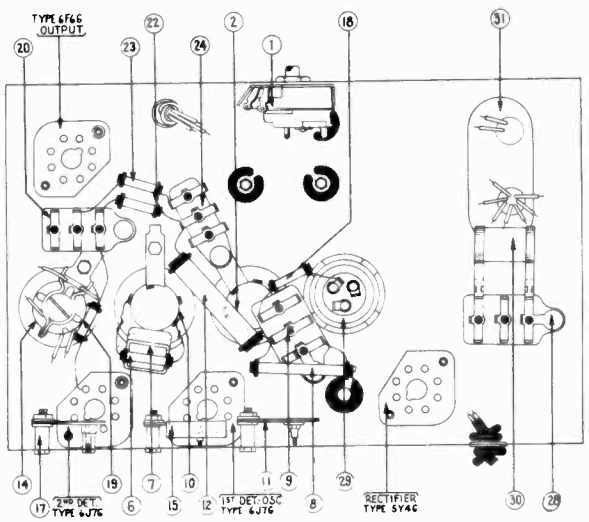
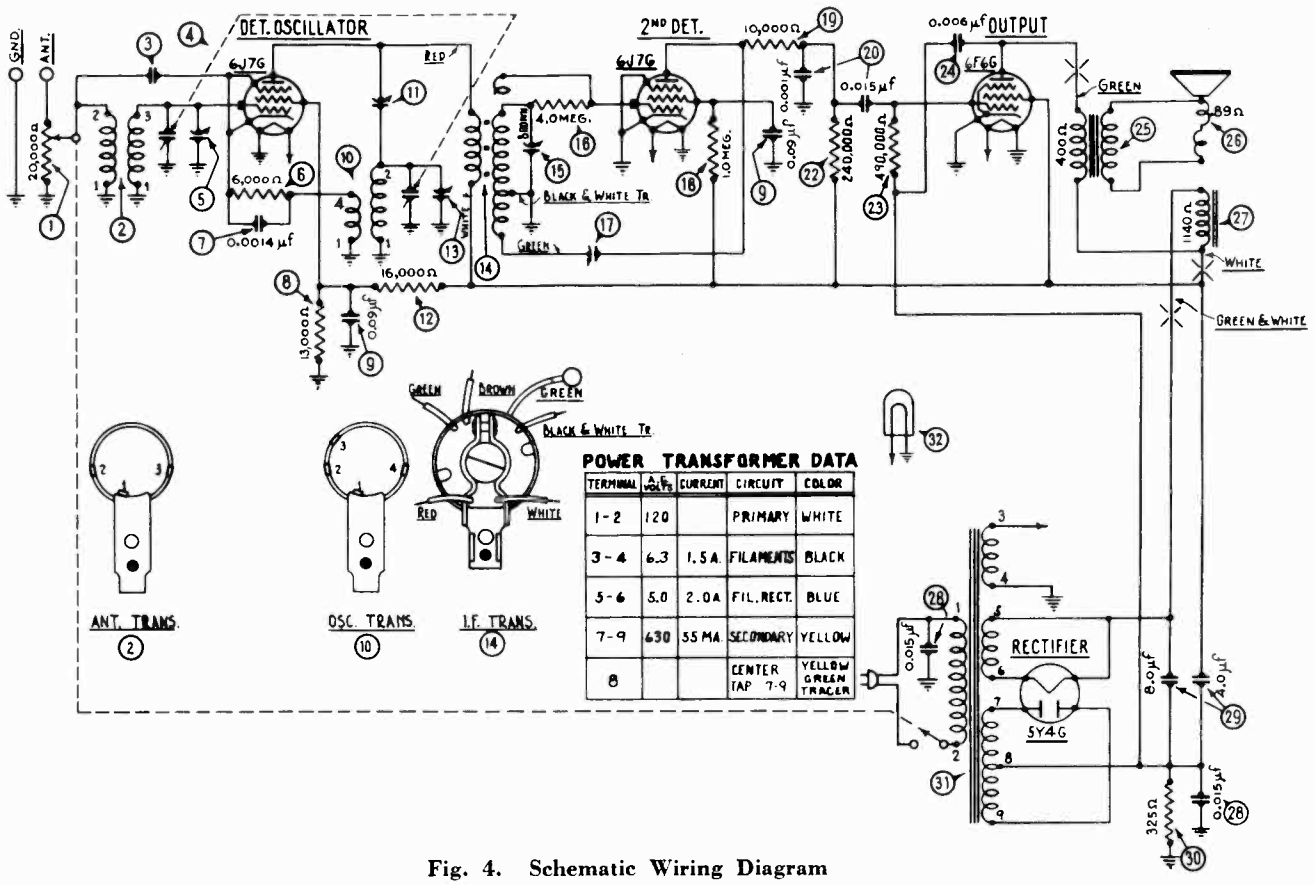


Fig. 3. Base view of Chassis

Replacement Parts for Model 37-84

No. On Figs.	Description	Part No.	List Price
①	Volume Control and On-off Switch	33-5055	1.45
②	Antenna Transformer	32-1310	.40
③	Condenser—Capacity obtained by twisting end of two leads together		
④	Tuning Condenser Assembly	31-1122	4.00
⑤	Compensator (Antenna)	Part of ④	...
⑥	Resistor (6000 ohms, ½ watt)	33-260339	.20
⑦	Condenser (.0014 mfd. Mica)	7007	.30
⑧	Resistor (13,000 ohms, ½ watt)	33-313439	.20
⑨	Condenser (Double .09-.09 mfd. Bakelite)	4989-DG	.40
⑩	Oscillator Transformer	32-1311	.40
⑪	Compensator (I. F. Primary)	04000A	.15
⑫	Resistor (16.000 ohms, 3 watt)	33-316639	.30
⑬	Compensator (Osc. 1700 K.C.)	Part of ④	...
⑭	I.F. Transformer	32-1313	1.05
⑮	Compensator (I.F. Sec.)	0-4000Y	.15
⑯	Resistor (4 meg.) inside (14)	35-540339	.20
⑰	Sensitivity Control	0-4000	...
⑱	Resistor (1 meg., ½ watt)	33-510339	.20
⑲	Resistor (10,000 ohms, ½ watt)	33-310339	.20
⑳	Condenser (.015-.001 mfd. Bakelite)	7762-EU	.25
㉑	Eliminated by Production Changes		
㉒	Resistor (24,000 ohms, ½ watt)	33-424339	.20
㉓	Resistor (490.000 ohms, ½ watt)	33-449339	.20
㉔	Condenser (.006 mfd. Bakelite)	7625-SU	.25
㉕	Output Transformer	32-7019	.85
㉖	Voice Coil and Cone Assembly	36-3157	...
㉗	Field Coil and Pot Assembly	36-3243	1.70
㉘	Condenser (.015-.015 mfd. Bakelite)	7762-EU	.40

No. On Figs.	Description	Part No.	List Price
㉙	Condenser (Electrolytic 4-8. mfd.)	30-2013	1.95
㉚	Resistor (Wire Wound 325 ohms)	7465	.15
㉛	Power Transformer (50-60 cycle 115)	32-7180	3.60
	Power Transformer (25 cycle 115)	7422	...
㉜	Pilot Lamp	6608	.09
	Eight Prong Socket Rectifier	27-6053	.11
	Seven Prong Socket	27-6057	.11
	Tube Shield	28-2726	.10
	Tube Shield Cap	28-2727	.02
	Knob	27-4282	.10
	Pointer	27-7933	.01
	AC Cord and Plug	L-2183	.00
	Speaker Cord	L-1474	.15
	Base Shield Plate	27-7452	.10
	Chassis Mounting Screw	W-490-A	2.75C
	Chassis Mounting Washer	W-315-A	.50C
	Output Transformer Shield	36-3025	.08
	Dial	27-5210	1.50C
	R.F. Shield Assembly	38-5483	.50
	Speaker Mounting Screw	W-1604	...
	Speaker Mounting Nut	W-124-A	...
	Speaker SB	36-1073	...
	Baffle Silk Assembly	40-5961	...
	Spacer Padder Assem.	3098	...
	Screw Padder Assem.	W-614 FA-3	
	Nut Padder Assemb.	W-95 FA-3	
	Felt Washer Tuning Knob	27-7807	...
	Pilot Lamp Assem.	38-7578	...



TERMINAL	A.C. VOLTS	CURRENT	CIRCUIT	COLOR
1-2	120		PRIMARY	WHITE
3-4	6.3	1.5 A.	FILAMENTS	BLACK
5-6	5.0	2.0 A	FIL. RECT.	BLUE
7-9	630	55 MA.	SECONDARY	YELLOW
8			CENTER TAP 7-9	YELLOW GREEN TRACER

Fig. 4. Schematic Wiring Diagram

PHILCO . . . . . Model 37-89

FOR MEMBERS OF
RADIO MANUFACTURERS SERVICE

SERVICE BULLETIN No. 247

Electrical Specifications

Type of Circuit: Superheterodyne. Pentode Power Output.

Power Supply: 115 volts A. C. 50 to 60 or 25 to 40 cycles.

Power Consumption: 65 Watts.

Philco Tubes Used: 2 type 6K7G, R. F. and I. F. Circuit; 1 type 6A8G, Detector Oscillator; 1 type 6Q7G, 2nd Detector, A. V. C., and 1st Audio; 1 type 6F6G, Output and 1 type 5Y4G, Rectifier.

Intermediate Frequency: 470 K. C.

Tuning Ranges: Two. Range 1—530 to 1650 K. C. Range 2—1500 to 3700 K. C.

Speaker: S-16.

Power Output: 3 watts.

Aerial Connections: The Philco ALL Wave Aerial is recommended for use with this receiver, to obtain maximum sensitivity and noise reduction. The red and black leads of the "transmission line" (lead-in) are connected to terminals 1 and 2 respectively on the terminal panel provided at the rear of the chassis. Connect the link provided on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the link is connected across terminals 2 and 3, the aerial connects to terminal 1.

A good ground connection is desirable in all installations. Make the ground connection from the nearest water or radiator pipe to terminal 3 on the terminal panel.

Adjusting Compensator

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 Wrench No. 3164 and Fibre Handle Screw-Driver No. 27-7059 complete the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 2 and 3.

The following procedure must be observed in adjusting the compensators:

DIAL ADJUSTMENT—The tuning condenser is set at the maximum capacity position, by turning the tuning knob clockwise. Loosen the set screw of dial hub and set dial, with Glowing Indicator centered between the first and second index lines at the low frequency end of scale.

OUTPUT METER—The 025 Output Meter is connected to the plate and cathode terminals of the 6F6G tube. Adjust the meter to use the (0-30) volt scale.

During the I. F. and R. F. adjustment, the signal generator output should be maintained at the lowest possible level that will give an indication on the output meter.

INTERMEDIATE FREQUENCY CIRCUIT

1. Turn selector switch to range 1 (counter-clockwise). Rotate the tuning control to approximately 600 K. C. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the grid of the 6A8G tube and the output ground lead to the receiver chassis.

2. Set signal generator dial indicator for 470 K. C. Adjust attenuator for approximately ¼ scale reading on output meter. Then adjust compensators (20s) 2nd I. F. Sec., (20p) 2nd I. F. Pri., (19s) 1st I. F. Sec., and (19p) 1st I. F. Pri. for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range 1—530-1650 K. C.

1. Leave selector switch in range 1. Remove the signal generator output lead and .1 mfd. condenser from the grid of the 6A8G tube.

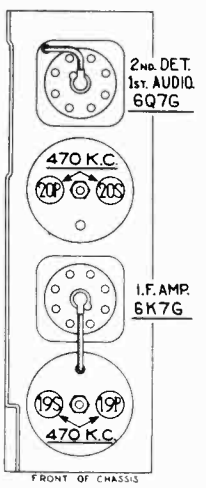


Fig. 2—I. F. Compensator

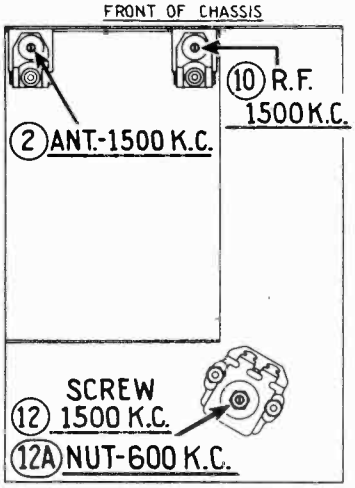


Fig. 3—R. F. Compensators

SOCKET VOLTAGES

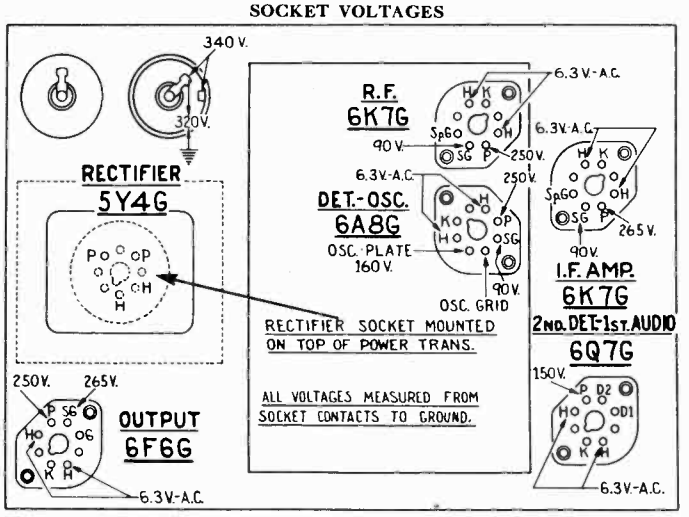


Fig. 1. View of Sockets from Underside Chassis

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.

2. Attach the signal generator output lead through the .1 mfd. condenser to the antenna terminal No. 1 on the aerial panel and the generator ground lead to terminal 3. Connect Terminal No. 2 to ground Terminal No. 3 with connector link provided on the panel.

3. Set signal generator and receiver dials for 1500 K. C. Now adjust compensators ⑫ Osc. (screw), ⑩ R. F., and ② Ant. for maximum reading on output meter.

4. The low frequency end of the band is now tuned by turning signal generator and receiver dials to 600 K. C. and adjusting compensator ⑫a (see note A below) for maximum output.

(A) When compensator ⑫a Osc. series (nut) is being adjusted, the tuning condenser must be rolled for maximum output. This is accomplished as follows: First tune compensator ⑫a for maximum output at 600 K. C. Then vary the tuning condenser back and forth about the 600 K. C. dial mark for the maximum output point. Now retune compensator ⑫a and again varying the tuning condenser back and forth about 600 K. C. until the maximum output point is reached. This operation of first tuning the compensator, then the tuning condenser is continued until the maximum output is obtained at the 600 K. C. frequency.

5. Turn signal generator and receiver tuning dials to 1500 K. C., then readjust compensators ⑫ Osc.; ⑩ R. F.; ② Ant. for maximum reading on output meter.

Tuning Range 2:

1. The compensating condenser adjustments of Band 1, takes care of Band 2, therefore no compensating condensers are required on the band.

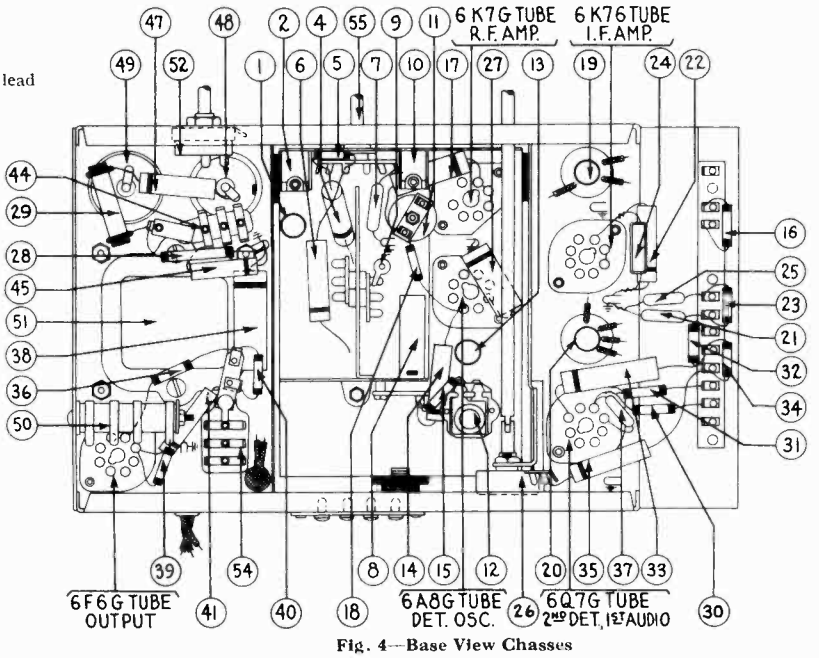


Fig. 4—Base View Chasses

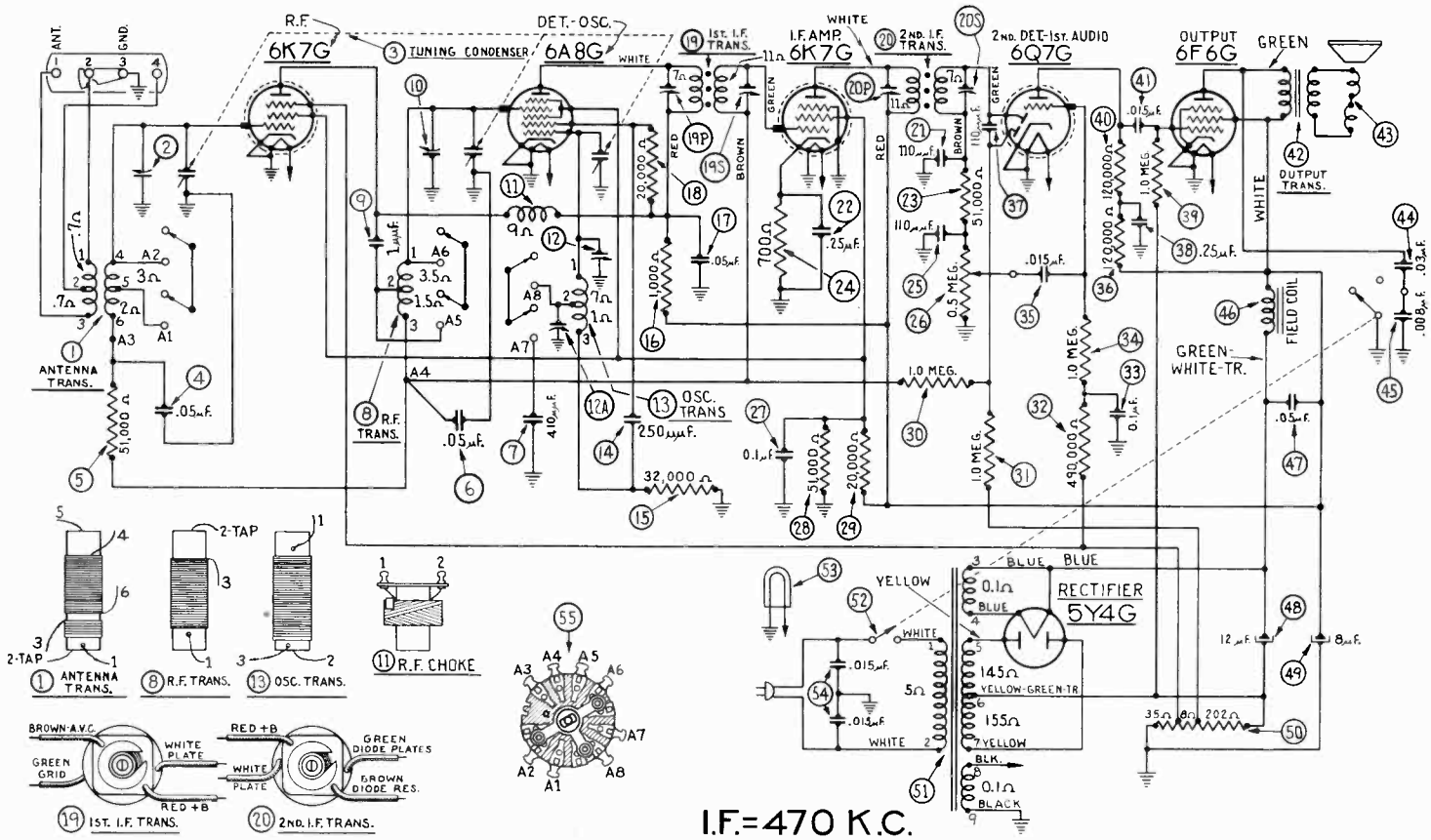


Fig. 5—Schematic Diagram—Model 37-89

Replacement Parts — Model 37-89

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer	32-2127	$0.80
2	Compensator	31-6100	.40
3	Tuning Condenser	31-1833	4.00
4	Condenser (.05 mfd. tubular)	30-4020	.20
5	Resistor (51000 ohms ½ watt)	33-351339	.20
6	Condenser (.05 mfd. tubular)	30-4020	.20
7	Condenser (410 mmfd.)	30-1000	.25
8	R. F. Transformer	32-2128	.60
9	Condenser Two Wires Twisted		
10	Compensator	31-6100	.40
11	Choke	32-2139	.35
12	Compensator	31-6101	.20
13	Osc. Transformer	32-2120	.65
14	Condenser (250 mmfd. mica)	30-1032	
15	Resistor (32,000 ohms ½ watt)	33-351339	.20
16	Resistor (1000 ohms, ½ watt)	33-210339	.20
17	Condenser (.05 mfd. tubular)	30-4123	.20
18	Resistor (20000 ohms, ½ watt)	33-320339	.20
19	1st I. F. Transformer	32-2100	1.50
20	2nd I. F. Transformer	32-2102	1.50
21	Condenser (110 mmfd. mica)	30-1031	.20
22	Condenser (.25 mfd. tubular)	30-4446	.20
23	Resistor (51000 ohms, ½ watt)	33-351334	.20
24	Resistor (700 ohm, ½ watt)	33-1220	20
25	Condenser (110 mmfd. mica)	30-1031	.20
26	Volume Control	33-5157	1.00
27	Condenser (0.1 mfd. tubular)	30-4455	.25
28	Resistor (51000 ohms, 1 watt)	33-351439	.20
29	Resistor (20000 ohms, 2 watt)	33-320539	.30
30	Resistor (1 meg. ½ watt)	33-510339	20
31	Resistor (1 meg. ½ watt)	33-510339	.20
32	Resistor (490000 ohms ½ watt)	33-449339	.20
[illegible]	Condenser (0.1 mfd. tubular)	30-4122	.20
	r (1 megohm, ½ watt)	33-510339	.20

Schem. No.	Description	Part No.	List Price
35	Condenser (.015 mfd. tubular)	30-4358	$0.20
36	Resistor (120000 ohms, ½ watt)	33-412339	.20
37	Condenser (110 mmfd. mica)	30-1031	.20
38	Condenser (.25 mfd. tubular)	30-4134	.35
39	Resistor (1 megohm, ½ watt)	33-510339	.20
40	Resistor (120000 ohms, ½ watt)	33-412339	.20
41	Condenser (.015 mfd. tubular)	30-4226	.20
42	Output Transformer	32-7019	.85
43	Cone & Voice Coil	36-3157	.80
44	Condenser (.03 mfd. bakelite)	8318-SU	.35
45	Condenser (.008 mfd. tubular)	30-4112	.20
46	Field Coil & Pot Assembly	36-3664	
47	Condenser (.05 mfd. tubular)	30-4020	.20
48	Electrolytic Condenser (12 mfd.)	30-2117	1.20
49	Electrolytic Condenser (8 mfd.)	30-2024	1.10
50	Bias Resistor (245 ohms, Taps 35 and 43 ohms)	33-3277	.20
51	Power Transformer (115 volt, 50 to 60 cycle)	32-7583	4.25
52	Tone Control & A. C. Switch	42-1180	.75
53	Pilot Lamp	34-2039	.15
54	Condenser (.015, 015 mfd. bakelite)	3793-DG	.40
55	Wave Switch	42-1194	.60
	Dial	27-5204	.35
	Dial Hub	28-7152	.10
	Dial Clamp	28-2837	.10
	Screen Bracket & Screen Assembly	31-1878	.25
	Screw	W-650	Per C .40
	Vernier Drive	31-1844	
	Pilot Lamp Assembly	38-7706	.35
	Insulator Tone Control	27-8320	Per C .40
	Nut Tone Control	W-684	Per C 1.25
	Lock Washer	W-1624	Per C .50
	Volume Control Shaft	28-6498	.10

Schem. No.	Description	Part No.	List Price
	Shaft Spring	28-4117	Per C$0.40
	Washer	6717	.02
	Washer	4436	Per C 1.50
	Shaft Retaining Clip	28-8610	.03
	Mtg. Grommet	27-4317	.04
	Mtg. Washer Sleeve	28-2257	.01
	Mtg. Sleeve Bushing	27-8339	Per C .40
	Mtg. Screw	W-729	Per C .45
	Mtg. Washer	28-3927	.01
	R. F. Unit Support	28-3856	.10
	Support Locking Plate	28-3975	.01
	Support Locking Plate	28-3889	.02
	Screw	W-644	Per C 1.50
	Knobs Tuning	27-4321	.10
	Knob Volume, Waveswitch, Tone	27-4332	.10
	Baffle Silk Assembly B, Cabinet	40-5935	.75
	Baffle Silk Assembly F, Cabinet	40-5933	
	Speaker S-16	36-1225	5.75
	Screw Speaker Mtg.	W-1604	Per C .50
	Lockwasher Speaker Mtg.	W-291	Per C .40
	Washer Speaker Mtg.	W-410	Per C .15
	Nut Speaker Mtg.	W-124	Per C .35
	Screw Chassis Mtg.		
	Washer Chassis Mtg.	28-2089	Per C .30
	Bezel Frame & Plate	40-5938	.10
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	28-3967	.35
	Bezel Screw	W-1644	Per C .50
	Bottom Shield Plate F, Cabinet		
	I. F. Coil Shield	38-7763	.20
	Speaker S16 B, F Cabinets	36-1225	

black type indicate circled figures in base view.

PHILCO . . . . . Model 37-89

FOR MEMBERS OF
RADIO MANUFACTURERS SERVICE

SERVICE BULLETIN No. 247

Electrical Specifications

Type of Circuit: Superheterodyne. Pentode Power Output.

Power Supply: 115 volts A. C. 50 to 60 or 25 to 40 cycles.

Power Consumption: 65 Watts.

Philco Tubes Used: 2 type 6K7G, R. F. and I. F. Circuit; 1 type 6A8G, Detector Oscillator; 1 type 6Q7G, 2nd Detector, A. V. C., and 1st Audio; 1 type 6F6G, Output and 1 type 5Y4G, Rectifier.

Intermediate Frequency: 470 K. C.

Tuning Ranges: Two. Range 1—530 to 1650 K. C. Range 2—1500 to 3700 K. C.

Speaker: S-16.

Power Output: 3 watts.

Aerial Connections: The Philco ALL Wave Aerial is recommended for use with this receiver, to obtain maximum sensitivity and noise reduction. The red and black leads of the "transmission line" (lead-in) are connected to terminals 1 and 2 respectively on the terminal panel provided at the rear of the chassis. Connect the link provided on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the link is connected across terminals 2 and 3, the aerial connects to terminal 1.

A good ground connection is desirable in all installations. Make the ground connection from the nearest water or radiator pipe to terminal 3 on the terminal panel.

Adjusting Compensator

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 Wrench No. 3164 and Fibre Handle Screw-Driver No. 27-7059 complete the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 2 and 3.

The following procedure must be observed in adjusting the compensators:

DIAL ADJUSTMENT—The tuning condenser is set at the maximum capacity position, by turning the tuning knob clockwise. Loosen the set screw of dial hub and set dial, with Glowing Indicator centered between the first and second index lines at the low frequency end of scale.

OUTPUT METER—The 025 Output Meter is connected to the plate and cathode terminals of the 6F6G tube. Adjust the meter to use the (0-30) volt scale.

During the I. F. and R. F. adjustment, the signal generator output should be maintained at the lowest possible level that will give an indication on the output meter.

INTERMEDIATE FREQUENCY CIRCUIT

1. Turn selector switch to range 1 (counter-clockwise). Rotate the tuning control to approximately 600 K. C. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the grid of the 6A8G tube and the output ground lead to the receiver chassis.

2. Set signal generator dial indicator for 470 K. C. Adjust attenuator for approximately ¼ scale reading on output meter. Then adjust compensators (20s) 2nd I. F. Sec., (20p) 2nd I. F. Pri., (19s) 1st I. F. Sec., and (19p) 1st I. F. Pri. for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range 1—530-1650 K. C.

1. Leave selector switch in range 1. Remove the signal generator output lead and .1 mfd. condenser from the grid of the 6A8G tube.

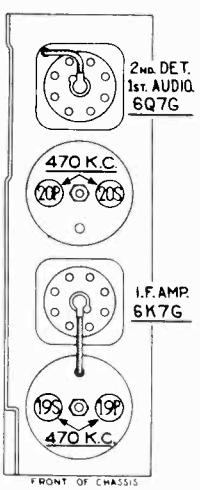


Fig. 2—I. F. Compensator

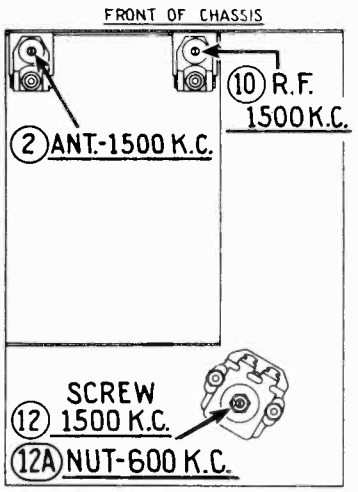


Fig. 3—R. F. Compensators

SOCKET VOLTAGES

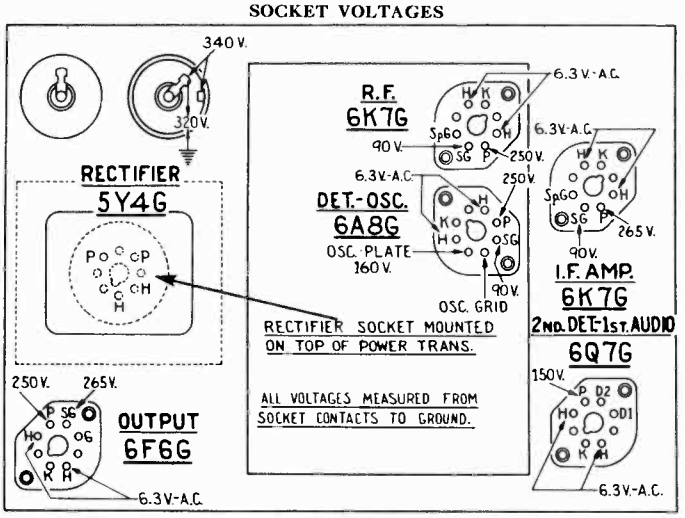


Fig. 1. View of Sockets from Underside Chassis

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.

2. Attach the signal generator output lead through the .1 mfd. condenser to the antenna terminal No. 1 on the aerial panel and the generator ground lead to terminal 3. Connect Terminal No. 2 to ground Terminal No. 3 with connector link provided on the panel.

3. Set signal generator and receiver dials for 1500 K. C. Now adjust compensators ⑫ Osc. (screw), ⑩ R. F., and ② Ant. for maximum reading on output meter.

4. The low frequency end of the band is now tuned by turning signal generator and receiver dials to 600 K. C. and adjusting compensator ⑫a (see note A below) for maximum output.

(A) When compensator ⑫a Osc. series (nut) is being adjusted, the tuning condenser must be rolled for maximum output. This is accomplished as follows: First tune compensator ⑫a for maximum output at 600 K. C. Then vary the tuning condenser back and forth about the 600 K. C. dial mark for the maximum output point. Now retune compensator ⑫a and again varying the tuning condenser back and forth about 600 K. C. until the maximum output point is reached. This operation of first tuning the compensator, then the tuning condenser is continued until the maximum output is obtained at the 600 K. C. frequency.

5. Turn signal generator and receiver tuning dials to 1500 K. C., then readjust compensators ⑫ Osc.; ⑩ R. F.; ② Ant. for maximum reading on output meter.

Tuning Range 2:

1. The compensating condenser adjustments of Band 1, takes care of Band 2, therefore no compensating condensers are required on the band.

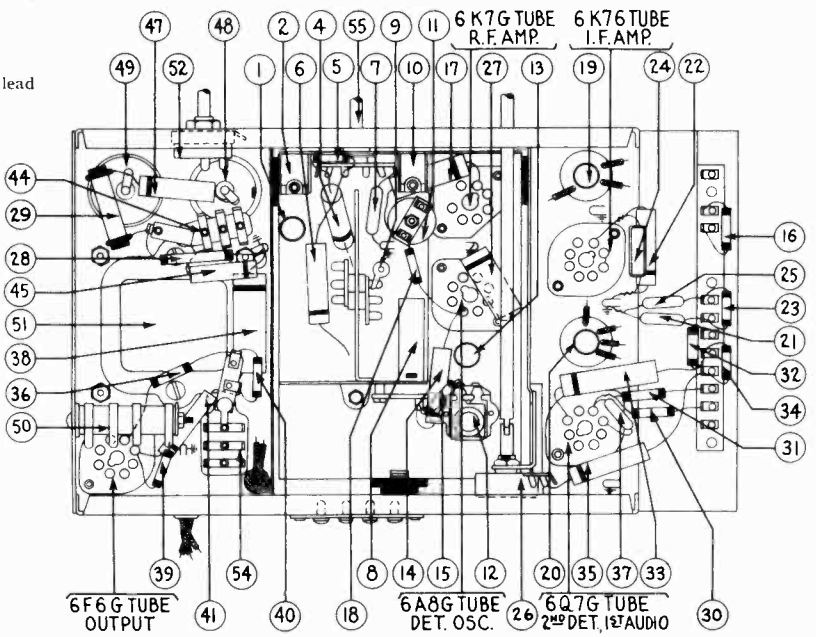


Fig. 4—Base View Chasses

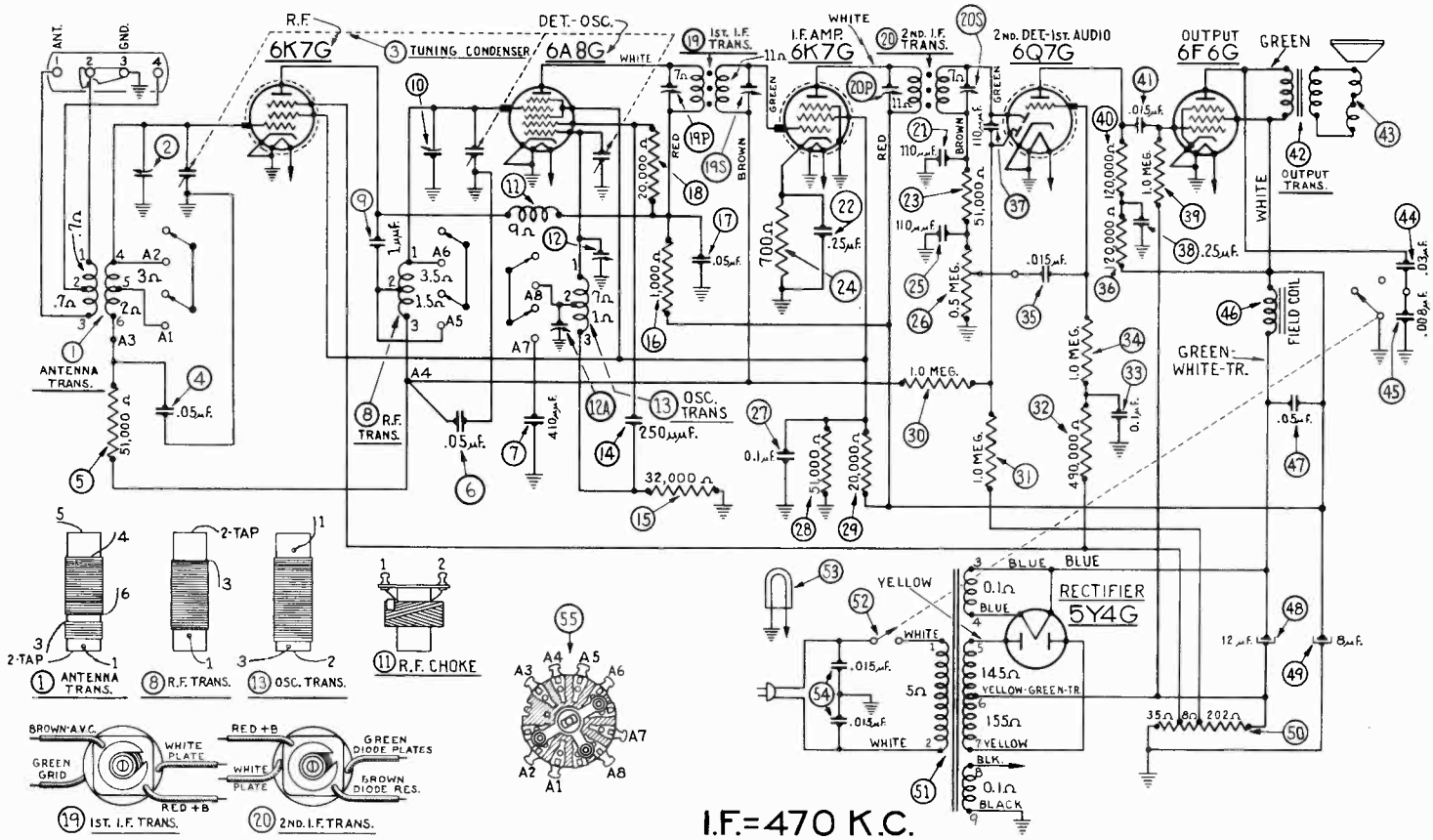


Fig. 5—Schematic Diagram—Model 37-89

Replacement Parts — Model 37-89

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer	32-2127	$0.80
2	Compensator	31-6100	.40
3	Tuning Condenser	31-1833	4.00
4	Condenser (.05 mfd. tubular)	30-4020	.20
5	Resistor (51000 ohms ½ watt)	33-351339	.20
6	Condenser (.05 mfd. tubular)	30-4020	.20
7	Condenser (410 mmfd.)	30-1000	.25
8	R. F. Transformer	32-2128	.60
9	Condenser Two Wires Twisted		
10	Compensator	31-6100	.40
11	Choke	32-2139	.35
12	Compensator	31-6101	.20
13	Osc. Transformer	32-2120	.65
14	Condenser (250 mmfd. mica)	30-1032	
15	Resistor (32,000 ohms ½ watt)	33-351339	.20
16	Resistor (1000 ohms, ½ watt)	33-210339	.20
17	Condenser (.05 mfd. tubular)	30-4123	.20
18	Resistor (20000 ohms, ½ watt)	33-320339	.20
19	1st I. F. Transformer	32-2100	1.50
20	2nd I. F. Transformer	32-2102	1.50
21	Condenser (110 mmfd. mica)	30-1031	.20
22	Condenser (.25 mfd. tubular)	30-4446	.20
23	Resistor (51000 ohms, ½ watt)	33-351334	.20
24	Resistor (700 ohm, ½ watt)	33-1220	20
25	Condenser (110 mmfd. mica)	30-1031	.20
26	Volume Control	33-5157	1.00
27	Condenser (0.1 mfd. tubular)	30-4455	.25
28	Resistor (51000 ohms, 1 watt)	33-351439	.20
29	Resistor (20000 ohms, 2 watt)	33-320539	.30
30	Resistor (1 meg. ½ watt)	33-510339	20
31	Resistor (1 meg. ½ watt)	33-510339	.20
32	Resistor (490000 ohms ½ watt)	33-449339	.20
33	Condenser (0.1 mfd. tubular)	30-4122	.20
34	Resistor (1 megohm, ½ watt)	33-510339	.20
35	Condenser (.015 mfd. tubular)	30-4358	$0.20
36	Resistor (120000 ohms, ½ watt)	33-412339	.20
37	Condenser (110 mmfd. mica)	30-1031	.20
38	Condenser (.25 mfd. tubular)	30-4134	.35
39	Resistor (1 megohm, ½ watt)	33-510339	.20
40	Resistor (120000 ohms, ½ watt)	33-412339	.20
41	Condenser (.015 mfd. tubular)	30-4226	.20
42	Output Transformer	32-7019	.85
43	Cone & Voice Coil	36-3157	.80
44	Condenser (.03 mfd. bakelite)	8318-SU	.35
45	Condenser (.008 mfd. tubular)	30-4112	.20
46	Field Coil & Pot Assembly	36-3664	
47	Condenser (.05 mfd. tubular)	30-4020	.20
48	Electrolytic Condenser (12 mfd.)	30-2117	1.20
49	Electrolytic Condenser (8 mfd.)	30-2024	1.10
50	Bias Resistor (245 ohms, Taps 35 and 43 ohms)	33-3277	.20
51	Power Transformer (115 volt, 50 to 60 cycle)	32-7583	4.25
52	Tone Control & A. C. Switch	42-1180	.75
53	Pilot Lamp	34-2039	.15
54	Condenser (.015, 015 mfd. bakelite)	3793-DG	.40
55	Wave Switch	42-1194	.60
	Dial	27-5204	.35
	Dial Hub	28-7152	.10
	Dial Clamp	28-2837	.10
	Screen Bracket & Screen Assembly	31-1878	.25
	Screw	W-650	Per C .40
	Vernier Drive	31-1844	
	Pilot Lamp Assembly	38-7706	.35
	Insulator Tone Control	27-8320	Per C .40
	Nut Tone Control	W-684	Per C 1.25
	Lock Washer	W-1624	Per C .50
	Volume Control Shaft	28-6498	.10
	Shaft Spring	28-4117	Per C$0.40
	Washer	6717	.02
	Washer	4436	Per C 1.50
	Shaft Retaining Clip	28-8610	.03
	Mtg. Grommet	27-4317	.04
	Mtg. Washer Sleeve	28-2257	.01
	Mtg. Sleeve Bushing	27-8339	Per C .40
	Mtg. Screw	W-729	Per C .45
	Mtg. Washer	28-3927	.01
	R. F. Unit Support	28-3856	.10
	Support Locking Plate	28-3975	.01
	Support Locking Plate	28-3889	.02
	Screw	W-644	Per C 1.50
	Knobs Tuning	27-4321	.10
	Knob Volume, Waveswitch, Tone	27-4332	.10
	Baffle Silk Assembly B, Cabinet	40-5935	.75
	Baffle Silk Assembly F, Cabinet	40-5933	
	Speaker S-16	36-1225	5.75
	Screw Speaker Mtg.	W-1604	Per C .50
	Lockwasher Speaker Mtg.	W-291	Per C .40
	Washer Speaker Mtg.	W-410	Per C .15
	Nut Speaker Mtg.	W-124	Per C .35
	Screw Chassis Mtg.		
	Washer Chassis Mtg.	28-2089	Per C .30
	Bezel Frame & Plate	40-5938	.10
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	28-3967	.35
	Bezel Screw	W-1644	Per C .50
	Bottom Shield Plate F, Cabinet		
	I. F. Coil Shield	38-7763	.20
	Speaker S16 B, F Cabinets	36-1225	

Figures in black type indicate circled figures in base view.

For Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

SERVICE BULLETIN
No. 242

Model 37-600

Specifications

TYPE CIRCUIT: Superheterodyne with pentode output.

POWER SUPPLY: 115 V., 60 cycle A.C.

TUBES USED: 1 type 6A8G, Det. Osc., 1 type 6J7G, 2nd Det., 1 type 6K6G, Output, 1 type 5Y4G Rectifier.

FREQUENCY RANGE: 530-1800 K.C.

INTERMEDIATE FREQUENCY: 470 K.C.

CURRENT CONSUMPTION: 45 watts.

SPEAKER: B-6.

POWER OUTPUT: ½ watt.

Adjusting Compensating Condensers

To accurately adjust the compensating condensers in the **Model 37-600** receiver, it is necessary to use a signal generator of high stability on all frequencies, such as the **PHILCO Model 088 Signal Generator.** This instrument has a continuous frequency range from 110 to 20,000 K.C., and is designed to meet every requirement of the serviceman.

An output meter is also needed,—**PHILCO MODEL 025 Circuit Tester** includes a very sensitive output meter.

Convenient tools to use in adjusting the compensators are the **Philco No. 3164 Fibre Wrench** and **No. 27-7059 Fibre Handled Screw-driver.**

The locations of the various compensating condensers are shown in Fig. 1. Connect the output meter to the plate and cathode contacts of the 6K6G power tube, and adjust it to use the 0-30 volt range.

When adjusting each circuit, care should be taken to have the signal generator attenuator set for approximately ¼ scale reading on output meter.

Intermediate Frequency Circuit

1. Connect the 088 signal generator output lead through a .1 mfd. condenser to the grid of the 6A8G tube and the ground lead to the chassis.

2. Turn the sensitivity compensator ㉓ to maximum capacity position (clockwise), and then release it; 1½ turns (counter-clockwise).

3. Turn gang condenser to approximately 600 K.C. Set the signal generator at 470 K.C.

4. Adjust the compensator ⑱ and ⑳ for maximum reading on the output meter. Then turn the sensitivity compensator ㉓ clockwise until a hiss, (oscillation) is heard. Now turn the compensator ㉓ counter-clockwise until hiss ceases, then continue for ¼ turn more.

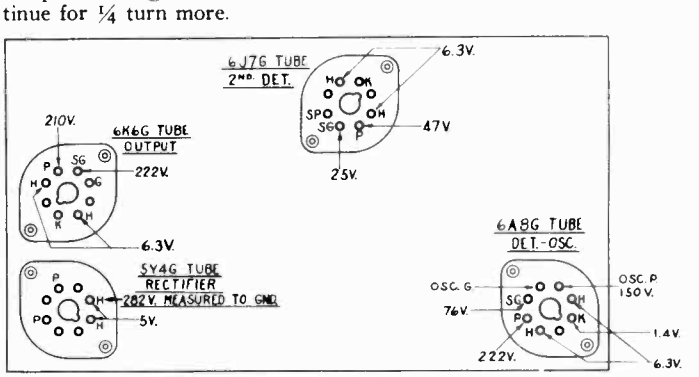


Fig. 2. Tube Sockets as Viewed from Underside of Chassis. (Measured from Socket Terminal to Ground Volume Control in Maximum Position)

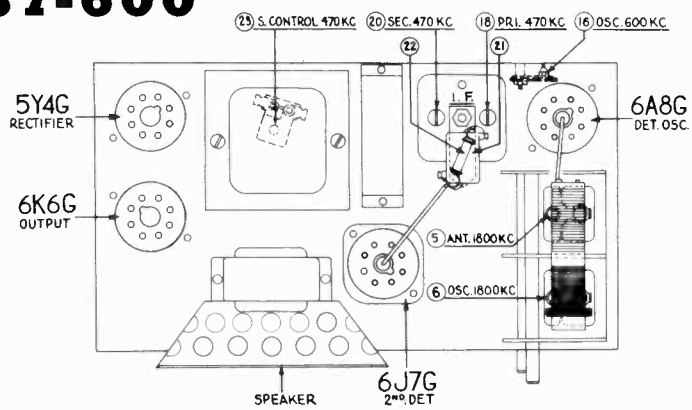


Fig. 1. Location of Compensators

Radio Frequency Circuit

1. Remove the signal generator output lead from the 6A8G tube, and connect it to the aerial lead of the receiver through a 100 mmfd. condenser.

2. Turn the gang condenser to minimum capacity position, (counter-clockwise) and place a .006" (six-thousands inch) gauge between the stator and rotor plates. Now turn the gang clockwise until stator and rotor plates touch gauge.

3. Remove gauge from gang condenser. Now set signal generator at 900 K.C., (using second harmonic 1800 K.C.), adjust compensators ⑥ and ⑤ for maximum reading on output meter.

4. Turn the signal generator and receiver gang condenser to 600 K.C., and adjust compensator ⑯. In doing so, the gang condenser must be rolled slightly above and below the 600 K.C. signal until the maximum reading is indicated on the output.

5. Turn the gang condenser to 1800 K.C. and signal generator to 900 K.C., (using second harmonic of signal generator 1800 K.C.), readjust compensator ⑥ for maximum reading on output meter. Set gang as per paragraph 2, for this adjustment.

6. Turn the gang condenser and signal generator to 1400 K.C., readjust compensator ⑤ for maximum reading on output meter. After the above adjustments are completed and receiver is placed in the cabinet, the dial pointer is properly placed by turning the signal generator to 1000 K.C. Then tune receiver for maximum signal. The dial pointer is then placed on gang shaft, so that it indicates 1000 K.C. on dial.

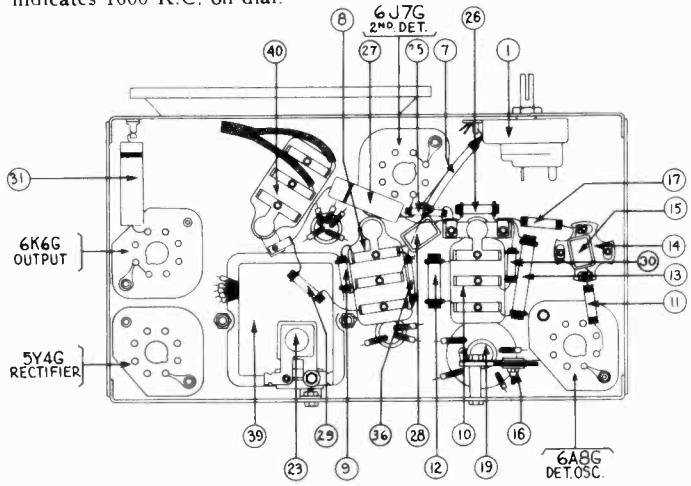


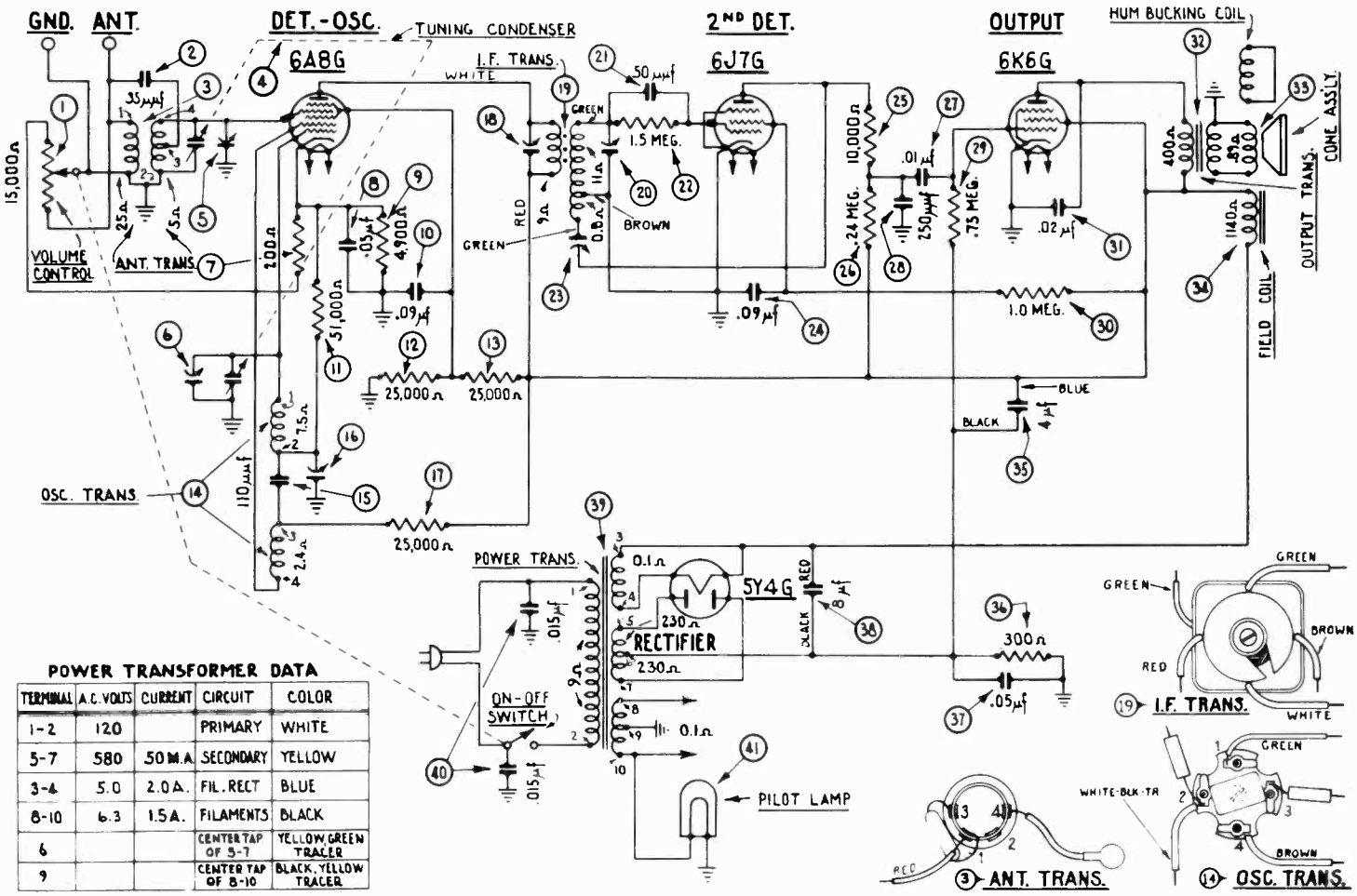
Fig. 3. Base View

Printed in U. S. A.

Replacement Parts for Model 37-600

Schematic Number	Part and Description	Part No.	Price List
①	Volume Control	33-5152	$1.45
②	Condenser (35 Mmf. Mica)	30-1044	.20
③	Ant. Transformer	32-2144	1.40
④	Tuning Condenser	31-1794	3.00
⑤	Compensator (Det. K.C.)	Part of ④	...
⑥	Compensator (Osc. K.C.)	Part of ④	...
⑦	Resistor (300 ohm)	33-3010	.20
⑧	Condenser (.05 mf. Twin Bakelite)	3615-DG	.40
⑨	Resistor (4900 ohm, ½ watt)	33-249339	.20
⑩	Condenser (.09 mf. Twin Bakelite)	4989-DG	.40
⑪	Resistor (51,000 ohm, ½ watt)	33-351339	.20
⑫	Resistor (25,000 ohm, ½ watt)	33-325339	.20
⑬	Resistor (25,000 ohm, 1 watt)	33-325439	.20
⑭	Osc. Transformer	32-2043	1.20
⑮	Condenser (110 mmf. Mica)	30-1031	.20
⑯	Compensator (Osc. Series) (600 K.C.)	04000 S	.35
⑰	Resistor (25,000 ohm, ½ watt)	33-325339	.20
⑱	Compensator (I.F. Pri) (460 K.C.)	Part of ⑲	...
⑲	I.F. Transformer	32-2031	1.50
⑳	Compensator (I.F. Sec.) (460 K.C.)	Part of ⑲	...
㉑	Condenser (50 mmf. Mica)	30-1029	.20
㉒	Resistor (1.5 meg., ¼ watt)	33-515139	.20
㉓	Sensitivity Compensator	31-6086	.45
㉔	Condenser (.09 mf.)	Part of ⑩	...
㉕	Resistor (10,000 ohm, ¼ watt)	33-310339	.20
㉖	Resistor (240,000 ohm, ½ watt)	33-424339	.20
㉗	Condenser (.01 mf.)	30-4169	.20
㉘	Condenser (.00025 mf.) Mica	30-1032	.25
㉙	Resistor (750,000 ohm, ¼ watt)	33-475339	.20
㉚	Resistor (1.0 meg., ¼ watt)	33-510339	.20
㉛	Condensor (.02 mf.) (Tubular)	30-4113	.20
㉜	Output Transformer	32-7567	1.00
㉝	Voice Coil Cone Assy	36-3029	.60
㉞	Field Coil Assy	36-3609	2.50
㉟	Elec. Condenser (4 mf.)	30-2149	1.95
㊱	Resistor (300 ohm)	33-3121	.25
㊲	Condenser (.05 mf.)	Part of ⑧	...
㊳	Elec. Condenser (8.0 mf.)	Part of ㉟	...
㊴	Power Transformer (110 V., 60 Cycle)	32-7552	3.25
㊵	Condenser (.015 mf. Twin)	3793-DG	.40
㊶	Pilot Lamp (6.3 Volt)	34-2064	.09
	Power Transformer (230 V., 50-60 Cycle)	32-7554	...
	Power Transformer (110 V., 25 Cycle)	32-7553	5.75
	Tube Shield Body	28-2726	.10
	Tube Shield Base	28-3898	.03
	Tube Socket (7-prong)	27-6057	.11
	Tube Socket (8-prong)	27-6058	.11
	Tube Socket (5-prong)	27-6053	.11
	Volume Control Mtg. Nut	W-648-A	.20C
	Chassis Mtg. Screw	W-1656-A	.75C
	Chassis Mtg. Nut	W-124-A	.35C
	Chassis Mtg. Washer	W-151-A	.15C
	Chassis Mtg. Washer	W-291-A	.40C
	Baffle	40-5951	...
	Dial	27-5193	.15
	Knob (Station Selector)	27-4308	.10
	Knob (Volume, On-Off)	27-4309	.10
	Bottom Shield Assy	29-3795	.40
	Bottom Shield Ins.	27-8122	.05
	Pointer	28-3789	.03
	Pilot Lamp Bracket Assy	38-7529	.30
	A.C. Cord Assy	L-2183	.40
	Speaker, B6	36-1205	6.00
	Aerial Lead	38-5144	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



POWER TRANSFORMER DATA

TERMINAL	A.C. VOLTS	CURRENT	CIRCUIT	COLOR
1-2	120		PRIMARY	WHITE
5-7	580	50 M.A.	SECONDARY	YELLOW
3-4	5.0	2.0A.	FIL. RECT	BLUE
8-10	6.3	1.5A.	FILAMENTS	BLACK
6			CENTER TAP OF 5-7	YELLOW GREEN TRACER
9			CENTER TAP OF 8-10	BLACK, YELLOW TRACER

Fig. 4. Schematic Wiring Diagram

PHILCO . . . . . Model 37-602

For Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

SERVICE BULLETIN
No. 243

Model 37-602

Specifications

TYPE CIRCUIT: Superheterodyne with pentode output.
POWER SUPPLY: 115 V., 25 or 60 cycle, A. C.; D. C.
TUBES USED: 1 type 6A8G, Osc. Det., 1 type 6K7G I.F. Amplifier, 1 type 6Q7G, 2nd Det. 1st audio, 1 type 25A6G output, 1 type 25Z6G rectifier.
FREQUENCY RANGE: 530--1800 K.C.
INTERMEDIATE FREQUENCY: 470 K.C.
CURRENT CONSUMPTION: 55 watts.
SPEAKER: B-4.
POWER OUTPUT: ¾ watt.

Adjusting Compensating Condensers

To accurately adjust the compensating condensers in the Model 37-602 receiver, it is necessary to use a signal generator of high stability on all frequencies such as the **PHILCO Model 088 Signal Generator.** This instrument has a continuous frequency range from 110 to 20,000 K.C., and is designed to meet every requirement of the serviceman.

An output meter is also needed,—**PHILCO Model 025 Circuit Tester** includes a very sensitive output meter.

Convenient tools to use in adjusting the compensators are the **PHILCO No. 3164 Fibre Wrench** and **No. 27-7059 Fibre Handled Screw-driver.**

The locations of the various compensating condensers are shown in Fig. 1. Connect the output meter to the plate and cathode contacts of the (25A6G) power tube and adjust it to use the 0-30 volt range.

Intermediate Frequency Circuit

1. Turn the gang condenser to the maximum capacity position (extreme clockwise) and set the Volume Control of the receiver at the maximum position (extreme clockwise).

2. Connect the signal generator output lead through a .1 mfd. condenser to the grid of the 6K7G tube, and the generator ground lead to any point of chassis.

3. Set the signal generator at 470 K.C. and adjust ㉗ and ㉙ for maximum reading on the output meter.

4. Remove signal generator output lead and .1 mfd. condenser, from the grid of 6K7G and connect it to the grid of 6A8G. Now adjust condensers ㉑ and ㉓ for maximum reading on the output meter.

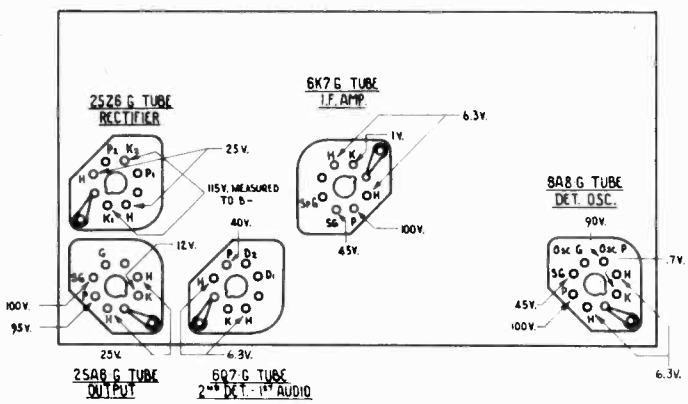


Fig. 2. Tube Sockets as viewed from underside of chassis. (Voltages measured from socket contacts to B—)

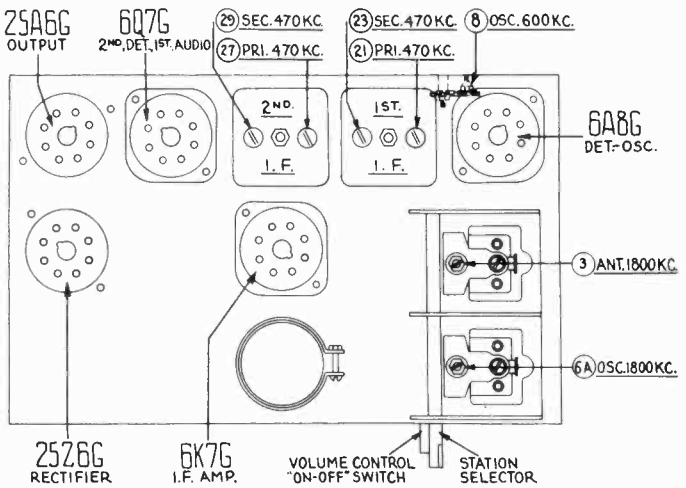


Fig. 1. Location of Compensators

Radio Frequency Circuit

1. Remove the signal generator output lead from the 6A8G tube and connect it to the aerial lead of the receiver through a 100 mmfd. condenser. Turn the gang condenser to the minimum capacity position (extreme counter clockwise) and place a .006" (six thousandth inch) gauge between the stator and roter plates. Now turn the gang clockwise until stator and rotor plates touch gauge.

2. Remove gauge from gang condenser. Now set signal generator at 900 K.C. (using second harmonic (1800 K.C.) adjust compensators ⑥A and ③ for maximum reading on the output meter.

3. Turn the signal generator and receiver gang condenser to 600 K.C., and adjust compensator ⑧. In doing so, the gang condenser must be rolled slightly above and below the 600 K.C. signal until the maximum reading is indicated on the output meter.

4. Turn the gang condensor to 1800 K.C. and signal generator to 900 K.C., (using second harmonic of signal generator 1800 K.C.), readjust compensator ⑥A for maximum reading on output meter. Set gang as given in paragraph 1, for this adjustment.

5. Turn the gang condenser and signal generator to 1400 K.C., readjust compensator ③ for maximum reading on output meter. After the above adjustments are completed and receiver is placed in the cabinet, the dial pointer is properly placed by turning the signal generator to 1000 K.C. Then tune receiver for maximum signal. The dial pointer is then placed on gang shaft, so that it indicates 1000 K.C. on dial.

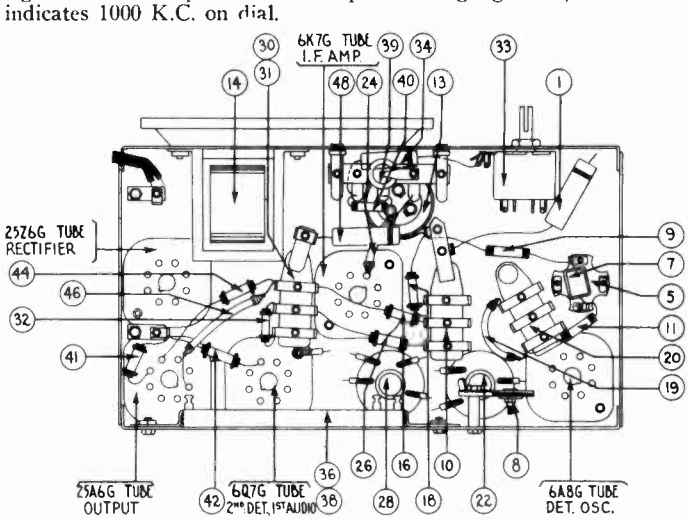


Fig. 3. Base View

Replacement Parts for Model 37-602

Schematic Number	Part and Description	Part No.	Price List
1	Condenser (.001 Mf. Tubular)	30-4201	$.20
2	Condenser (35 mmf. Mica)	30-1044	.20
3	Compensator (Ant. 1800 KC.)		
4	Ant. Transformer	32-2140	1.40
5	Osc. Transformer	32-2041	1.20
6	Tuning Condenser	31-1794	3.00
6a	Compensator (Osc. 1800 KC.)		
7	Condenser (35 mmf. Mica)	30-1044	.20
8	Compensator (Osc. Series) (600 Kc.)	04000S	.35
9	Resistor (4900 ohm, ½ watt)	33-249339	.20
10	Condenser (.05 Mf. Bakelite)	3615-OSU	.35
11	Resistor (120,000, ½ watt)	33-412339	.20
12	Condenser (.25-.05-.05-.05-.15-.01 mf.)	30-4410	1.00
13	Elec. Condenser (16-16-10 mf.)	30-2148	3.20
14	Filter Choke	32-7544	.95
15	Elec. Condenser (16 mf.)	Part of 13	...
16	Resistor (51,000 ohm, ¼ watt)	33-351339	.20
17	Condenser (.05 mf.)	Part of 12	...
18	Resistor (15,000 ohm, ¼ watt)	33-315339	.20
19	Resistor (300 ohm wirewound)	33-3010	.20
20	Condenser (.03 mf. Bakelite)	8318-OSU	.35
21	Compensator (1st I.F. Pri.)	Part of 22	...
22	1st I.F. Transformer	32-2005	1.50
23	Compensator (1st I.F. Sec.)	Part of 22	...
24	Resistor (300 ohm wirewound)	33-3010	.20
25	Condenser (.0.5 mf.)	Part of 12	...
26	Resistor (2.0 meg., ¼ watt)	33-520339	.20
27	Compensator (2nd I.F. Pri.)	Part of 28	...
28	2nd I.F. Transformer	32-2006	1.50
29	Compensator (2nd I.F. Sec.)	Part of 28	...
30	Condenser (.00011 mf. twin)	8035-ODU	.25
31	Condenser (.00011 mf.)	Part of 30	...
32	Resistor (51,000 ohm, ¼ watt)	33-351339	.20
33	Volume Control (0.5 meg.)	33-5145	1.45
34	Condenser (.01 mf. Tubular)	30-4145	.20
35	Condenser (.05 mf.)	Part of 12	...
36	Resistor (133-15 ohm)	33-3235	.55
37	Pilot Lamp	34-2068	.16
38	Resistor (15 ohm)	Part of 36	...
39	Bias Cell	41-8009	.20
40	Resistor (1.0 meg., ¼ watt)	33-510339	.20
41	Resistor (70,000 ohm, ¼ watt)	33-370339	.20
42	Resistor (240,000 ohm, ¼ watt)	33-424339	.20
43	Condenser (.15 mf.)	Part of 12	...
44	Resitor (490,000 ohm, ¼ watt)	33-449339	.20
45	Condenser (.01 mf.)	Part of 12	...
46	Resistor (400 ohm wirewound) (Flexible)	33-3122	.25
47	Elec. Condenser (10 mf.)	Part of 13	...
48	Condenser (.02 mf. Tubular)	30-4113	.20
49	Output Transformer	32-7566	1.10
50	Voice Coil Cone Assy	36-3029	.60
51	Field Coil Assy	36-3040	2.40
	Volume Control Mtg. Nut	W-684-A	1.25C
	B.C. Resistor Mtg. Screw	W-650-A	.40C
	B.C. Resistor Mtg. Nut	W-95-A	.30C
	Tube Shield Base	28-3898	.03
	Tube Shield Body	28-2726	.10
	Chassis Mtg. Screw	W-1656-A	.75C
	Chassis Mtg. Nut	W-124-A	.35C
	Chassis Mtg. Washer	W-151-A	.15C
	Chassis Mtg. Washer	W-291-A	.40C
	Speaker Baffle	40-5951	...
	Dial	27-5193	...
	Pointer	28-3789	...
	Shield Bottom Assy	38-7765	...
	Shield Bottom Insulator	27-8182	.02
	Tube Socket (7-prong)	27-6057	.11
	Tube Socket (5-prong)	27-6053	.11
	Knob (Volume, On-Off)	27-4309	.10
	Knob (Station Selector)	27-4308	.10
	Elec. Condenser Support	6440	.05
	Elec. Condenser Insulator	27-7836	.06
	Pilot Lamp Bracket Assy	38-7513	.50
	Ant. Coil Bracket	28-3546	.03
	Bias Cell Assy	38-7436	.15
	Speaker B4	36-1194	6.00
	A.C. Cord Assem	L-2183	.40
	Aerial Lead Assem	38-5144	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

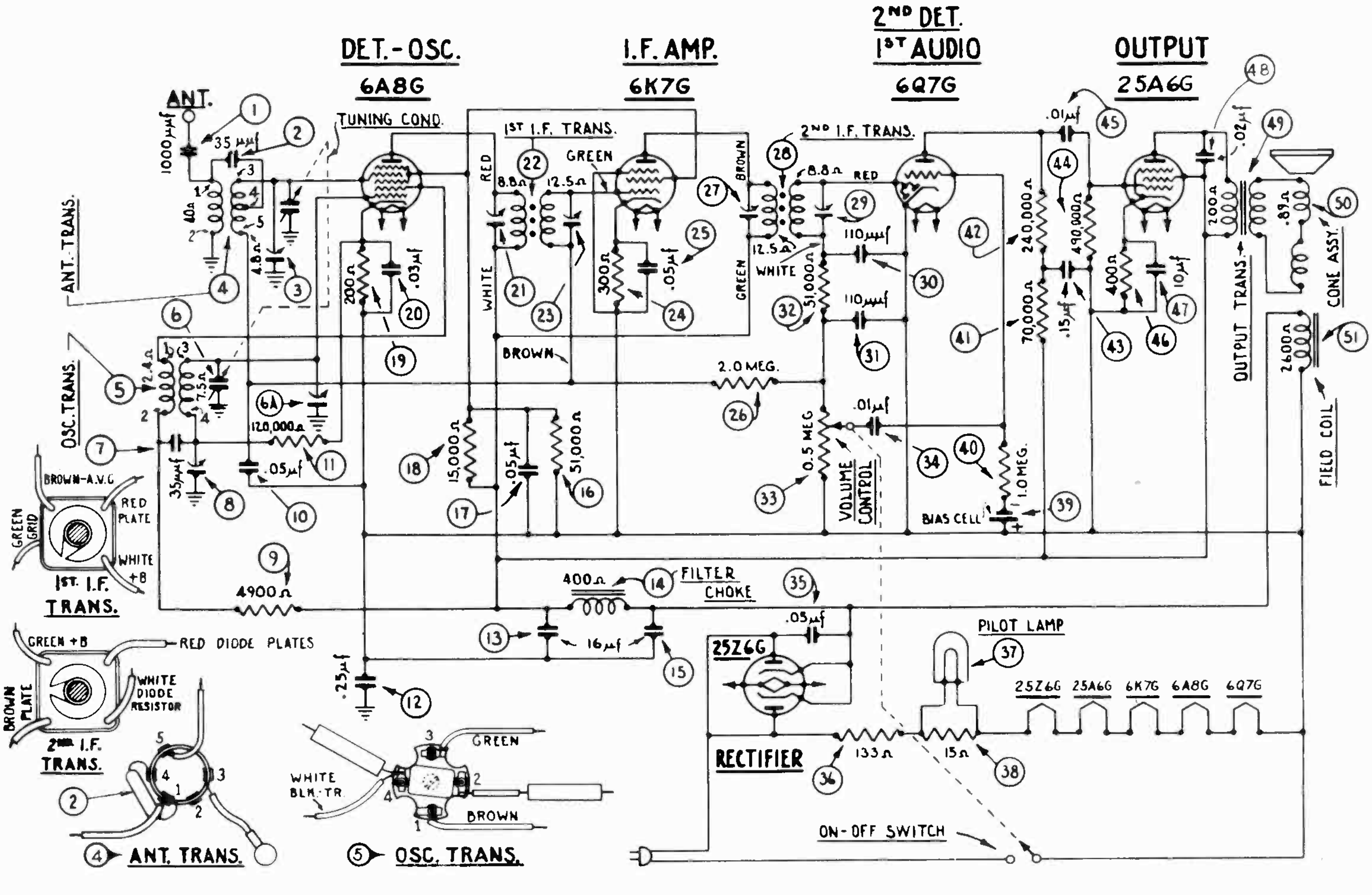


Fig. 4. Schematic Wiring Diagram

Special Data for Members of
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

SERVICE BULLETIN
No. 249

Model 37-610
Codes, 121-122

General Description

Model 37-610 is a 5 tube superheterodyne receiver for operation on alternating current, having three tuning ranges, covering standard broadcast and short-wave frequencies and using the New Philco High-Efficiency self-centering glass tubes.

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, supplied with the receiver.

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 at the rear of the chassis. Connect the jumper of the terminal panel across terminal 3 and 4.

If a temporary aerial is used, the jumper should be across terminal 2 and 3. The aerial connects to terminal 1 and the ground to terminal 3.

A good ground connection is desirable in all installations—with the Philco High-Efficiency Aerial, a ground lead and ground clamp are provided. Make the ground connection from the nearest water or radiator pipe to terminal 3 on the terminal panel.

CONSTRUCTION

The chassis is constructed in three basic assembly units.

The Radio Frequency unit contains a 6A8G tube which functions as a Detector-Oscillator, tuning condenser, antenna and oscillator coils for each tuning range, selector switch—compensating condensers for all coils and other parts necessary for the associated circuits. The unit is separately mounted on rubber grommets, cushioning it from the main chassis.

The Intermediate Frequency unit, mounted on the right-hand side of the chassis, facing front, consists of the Intermediate Frequency coils, compensating condensers, a 6K7G tube for I. F. Amplifier stage, and a 6Q7G tube as the second detector-automatic volume control and first audio stage.

All voltages supplied to the I. F. and R. F. units are furnished from a terminal strip mounted in this unit.

The Power Pack and audio output circuits, together with the required Voltage dividers and filter condensers are mounted in the power unit.

Although unit construction has changed the appearance of this model, the service bulletin will be of great assistance in checking through all stages of the receiver. The Wiring Diagram, as usual, is numbered, indicating all important parts. These numbers correspond with the parts layout shown in Fig. (6). In addition, the range switch wafers are shown on the schematic diagram. The contacts on each wafer are lettered and numbered to indicate their connection points in the schematic diagram, which are also lettered and numbered. The physical drawings of each coil used in the receiver are also shown on schematic diagram Fig. (5). The connections of these coils are numbered on the coil itself and on the schematic diagram.

Fig. 1 shows the Voltage measurements taken from the bottom of the sockets at each contact. In Fig. 2, the correct position of the dial indicator, for proper adjustment of the compensators is shown. Fig. 3, and 4, are the location of the I. F. and R. F. compensators respectively.

The Model 37-610 code 121 receiver is used in cabinets type B and J. In code 122 receiver, Type T cabinet is used. This receiver differs from code 121, only in the rectifier socket mounting and power transformer. The socket is placed adjacent to the 6F6G output tube and power transformer (Part No. 32-7626) is used. Location of rectifier socket is shown in Figs. 1 and 6.

Electrical Specifications

Voltage Rating) 115 Volts. A. C.
Frequency Rating: 50-60 and
For 25 to 40 cycle operation, use Power Transformer marked with asterisk in parts list.
Power Consumption: 60 Watts.
Type and Number of Tubes: 1 type 6A8G, Detector-Oscillator; 1 type 6K7G, I. F.; 1 type 6Q7G; 2nd Detector, A. V. C. and 1st audio; 1 type 6F6G, Output; and 1 type 5Y4G Rectifier.
Undistorted Output: 3 Watts.
Type Circuit: Superheterodyne with Pentode Output.
Intermediate Frequency: 470 K. C.
Tuning Ranges: 3. Range 1; 530 to 1720 Kilocycles.
Range 2; 2.3 to 7.4 Megacycles.
Range 3; 7.35 to 22 Megacycles.
Speaker Code: 121.—HS.
Speaker Code: 122.—S7.

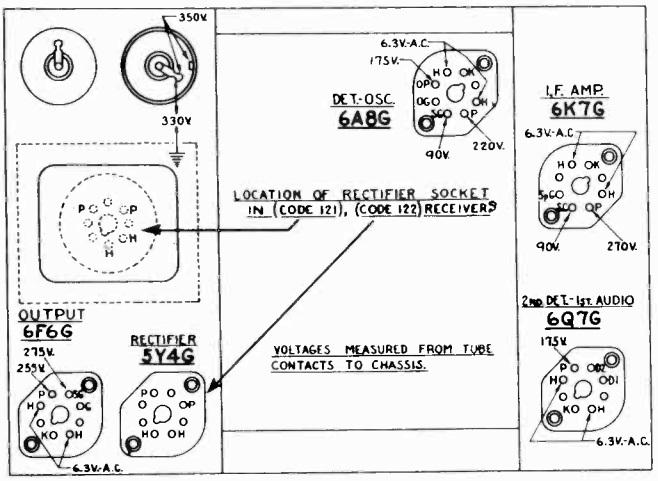


Fig 1—Tube Socket Voltages Viewed from Underside of Chassis

The Voltages Indicated by Arrows were Measured with a PHILCO 025 CIRCUIT TESTER which contains a 1000 ohm per volt Voltmeter. Range Switch in Broadcast Position. 115 volt line.

POWER TRANSFORMER DATA

Lead No. Shown on Schematic	A C Volts	Currents	Circuit	Color	Resistance
1-2	120	—	Pri.	White	5 ohms
3-4	5.0	2.0A	Fil. Rectifier	Blue	.1 ohms
5-7	670	70 M.A.	High Voltage Sec.	Yellow	145 ohms 155 ohms
6	—	—	Center Tap of 5-7	—	—
8-9	6.7	2.1A	Fil.	Black	.1 ohms

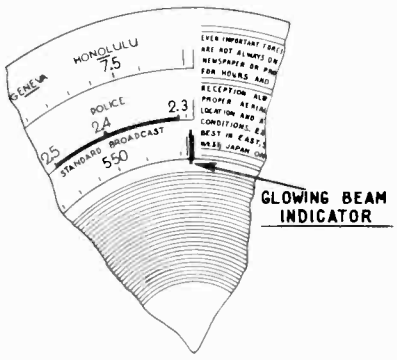


Fig. 2—Dial Calibration

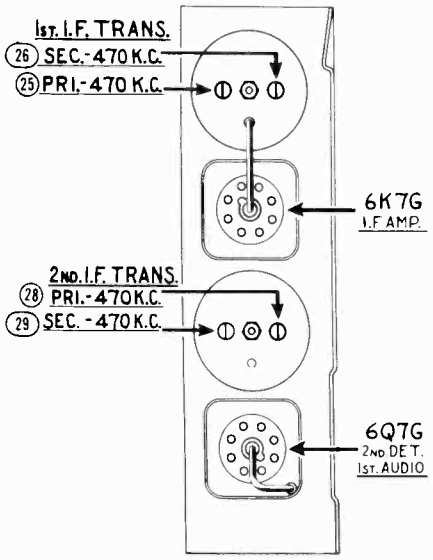


Fig. 3—Locations of I.F. Compensators Top of Chassis

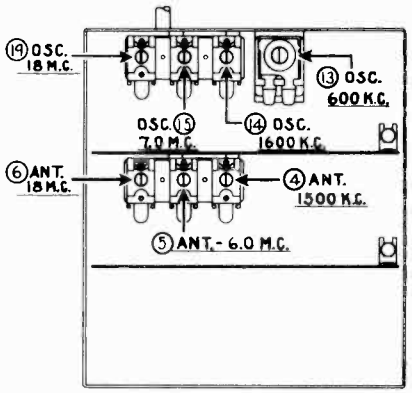


Fig. 4—Locations of R.F. Compensators Underside of Chassis

Alignment of Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I. F. Circuit, four in the Oscillator Circuit, and three in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

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 20000 K. C. is recommended to adjust 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 Wrench No. 3164 and Fibre Handle Screw-driver No. 27-7059 complete the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 3 and 4.

The following procedure must be observed in adjusting the compensators:—

DIAL ADJUSTMENT—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 condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of dial hub, then turn dial until the glowing indicator is centered between the index lines of dial scale (see Fig. 2). Now tighten the dial hub set screw in this position.

OUTPUT METER—The 025 Output Meter is connected to the plate and cathode terminals of the (6F6G) tube. Adjust the meter to use the (0-30) volt scale.

Before adjusting the compensators of each circuit, the signal generator attenuator should be set to give approximately ¼ scale reading on output meter.

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 and the ground connection of output lead to the chassis.

2 The tuning range switch is set in position No. 1 (Broadcast). Rotate the tuning condenser of receiver to the maximum capacity position (counter-clockwise), and adjust the signal generator for 470 K. C.

3 Adjust compensators (29) 2nd I. F. Sec., (28) 2nd I. F. Pri., (26) 1st I. F. Sec. and (25) 1st I. F. Pri. for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range—7.3 to 22.0 M. C.

1 Remove the signal generator output lead from grid of 6A8G tube and connect it through a 0.1 mf. condenser to terminal No. 1 on aerial input panel, rear of chassis. Connect generator ground lead to chassis. Terminals 2 and 3 of aerial input panel must be connected with connector link provided on the panel.

2 Set tuning range switch in position No. 3. Turn signal generator and receiver dial to 18.0 M. C. and adjust compensators (19) osc., and (6) ant. for maximum output.

The adjustment of the antenna compensator on the high frequency range causes a slight detuning of the oscillator circuit. In order to overcome this detuning effect, connect a variable condenser of approximately 350 mmf., having a good vernier drive, across the oscillator section of the tuning condenser. Leaving the signal generator and receiver dials at 18.0 M.C., tune the added condenser so that the second harmonic of the receiver oscillator will beat against the signal from the 088 signal generator. The antenna compensator (6) should then be adjusted to give maximum output. Now remove the external condenser and turn compensator (19) to maximum capacity (clockwise) then without moving signal generator or receiver tuning condenser, back off compensator (19) (counter-clockwise) until a second peak is reached on the output meter. Note:—The first peak is caused by tuning to the image signal and must be neglected.

Tuning Range: 2.3 to 7.4 Megacycles.

1 Turn range switch to position No. 2 (Police). Rotate signal generator and receiver dials to 7.0 M.C. Then adjust compensator (15) for maximum output. Now turn signal generator and receiver dials to 6.0 M.C. and adjust compensator (5) for maximum reading on output meter.

Tuning Range: 530 to 1720 Kilocycles.

1 Set range switch in position No. 1 (standard broadcast). The 088 signal indicator is set at 800 K. C. and the receiver dial at 1600 K. C.

(a) In adjusting the receiver at 1600 K. C., the second harmonic of 800 K. C., to which the signal generator is tuned, is used.

Now adjust compensator (14) osc., (4) ant. for maximum output.

2 The low frequency end of the band is now tuned by turning signal generator and receiver dials to 600 K. C. and adjust compensator (13) for maximum output. When compensator (13) osc. series is being adjusted, the tuning condenser must be rolled for maximum output. This is accomplished as follows: First tune compensator (13) for maximum output. Then vary the tuning condenser for maximum output about 600 K. C. Now retune compensator (13), and again vary the tuning condenser back and forth at 600 K. C. for maximum output. This operation of first tuning the compensator, then the tuning condenser is continued until maximum output is obtained at the 600 K. C. frequency.

3 After the low frequency (600 K. C.) end of range 1 is adjusted, the 1600 K. C. end is re-adjusted, as given in Paragraph 1 above, to correct any variation that the low frequency series compensator may have caused in the alignment of the high frequency end.

4 Now turn signal generator and receiver dial to 1500 K. C. and re-adjust compensator (4) for maximum output.

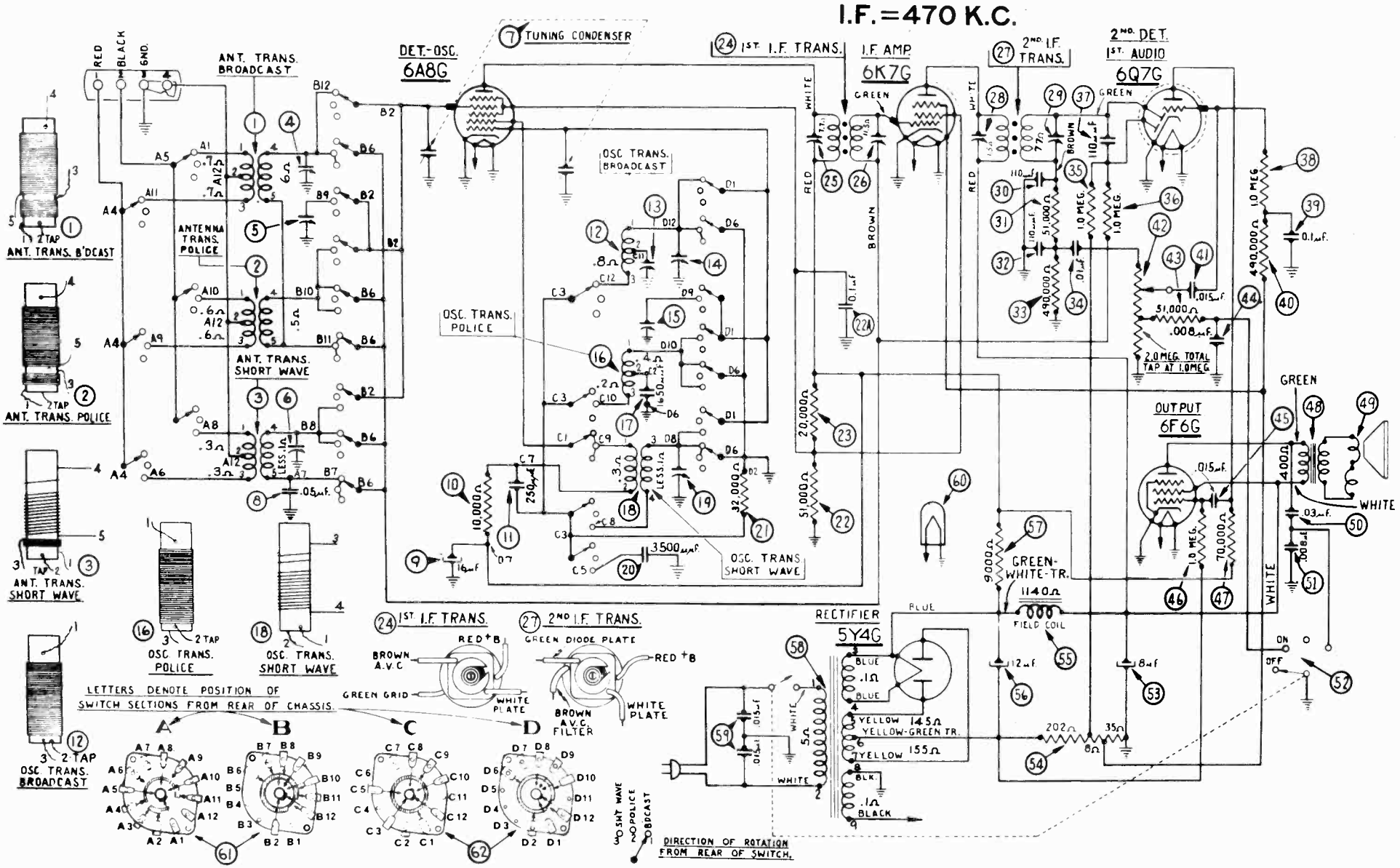


Fig. 5—Schematic Diagram—Model 37-610

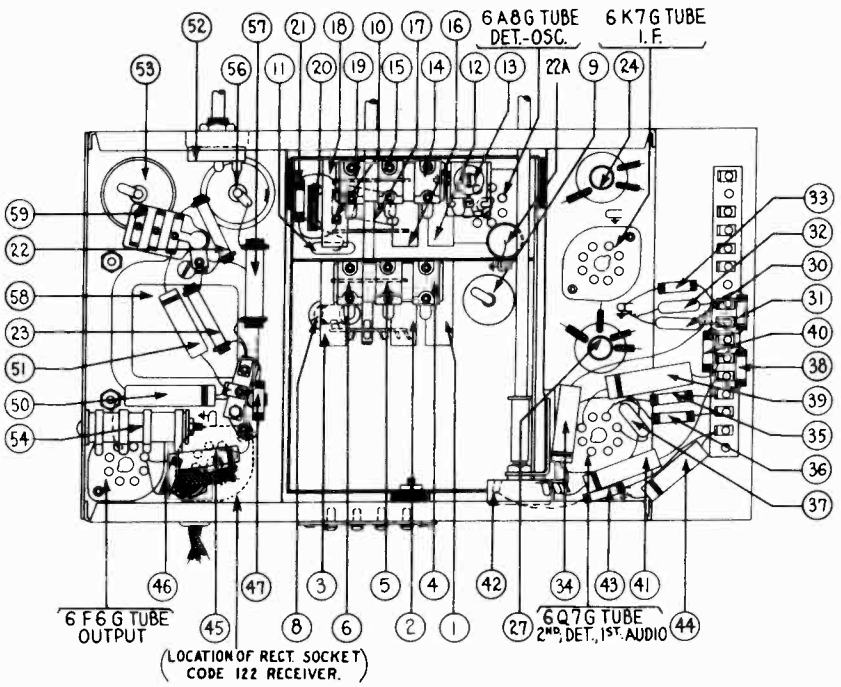


Fig. 6—Base View of Chassis

Replacement Parts—Model 37-610

Schem. No.	Description	Part No.	Price List
①	Antenna Transformer (Broadcast)	32-2108	$0.80
②	Antenna Transformer (Police)	32-2119	.65
③	Antenna Transformer (Short-Wave)	32-2109	.75
④	Compensator (Broadcast)	31-6092	.60
⑤	Compensator Ant. (Police)	Part of ④	
⑥	Compensator Ant. (Short-Wave)	Part of ④	
⑦	Tuning Condenser	31-1821	3.50
⑧	Condenser (.05 mfd. Tubular)	30-4020	.20
⑨	Electrolytic Condenser 16 mfd.	30-2118	1.65
⑩	Resistor (10000 ohm ½ watt)	33-310339	.20
⑪	Condenser (250 mmfd. Mica)	30-1032	.25
⑫	Oscillator Transformer (Broadcast)	32-2120	.65
⑬	Compensator Osc. Series 600 K.C.	31-6056	.55
⑭	Compensator Osc. 1600 K.C.	31-6092	.60
⑮	Compensator Osc. 7.0 Meg.	Part of ⑭	
⑯	Oscillator Transformer (Police)	32-2121	.40
⑰	Condenser (Semi-fixed 1650 mfd.)	31-6096	.40
⑱	Oscillator Transformer (S.W.)	32-2110	.75
⑲	Compensator (Osc. 18.0 megacycles)	Part of ⑭	
⑳	Condenser (Semi-fixed 3500 mfd.)	31-6097	.50
㉑	Resistor (32000, ½ watt)	33-332339	.20
㉒	Resistor (51000, ½ watt)	33-351339	.20
㉒A	Condenser (.1 mfd. Tubular)	30-4170	.25
㉓	Resistor (20000 ohm, ½ watt)	33-320439	.20
㉔	1st I. F. Transformer	32-2100	1.50
㉕	Compensator 1st I. F. Transformer	Part of ㉔	
㉖	Compensator 1st I. F. Transformer	Part of ㉔	
㉗	2nd I. F. Transformer	32-2102	1.50
㉘	Compensator 2nd I. F. Transformer	Part of ㉗	
㉙	Compensator 2nd I. F. Transformer	Part of ㉗	
㉚	Condenser (110 mmfd. Mica)	30-1031	.20
㉛	Resistor (51000 ohm, ½ watt)	33-351339	.20
㉜	Condenser (110 mmfd. Mica)	30-1031	.20
㉝	Resistor (490000 ohm ½ watt)	33-449339	.20
㉞	Condenser (.01 mfd. Tubular)	30-4124	.25
㉟	Resistor (1 megohm ½ watt)	33-510339	.20
㊱	Resistor (1 megohm ½ watt)	33-510339	.20
㊲	Condenser (110 mfd. Mica)	30-1031	.20
㊳	Resistor (1 megohm ½ watt)	33-510339	.20
㊴	Condenser (0.1 mfd. Tubular)	30-4122	.20
㊵	Resistor (490000 ohms, ½ watt)	33-449339	.20
㊶	Condenser (.015 mfd. Tubular)	30-4358	.20
㊷	Volume Control	33-5158	1.00
㊸	Resistor (51000, ½ watt)	33-510339	.20
㊹	Condenser (.008 mfd. Tubular)	30-4112	.20
㊺	Condenser (.015 mfd. Tubular)	30-4226	.20
㊻	Resistor (1 megohm ½ watt)	33-510339	.20
㊼	Resistor (70000 ohm ½ watt)	33-370339	.20
㊽	Output Transformer	32-7019	.85
㊾	Voice Coil and Cone	36-3157	.80
㊿	Condenser (.03 mfd. Tubular)	30-4380	.20
(51)	Condenser (.008 mfd. Tubular)	30-4112	.20
(52)	Tone Control and AC Switch	42-1182	.75
(53)	Electrolytic Condenser (8 mfd.)	30-2024	1.10
(54)	Resistor C-Bias	33-3277	.20
(55)	Field Coil Assembly	36-3039	2.75
(56)	Electrolytic Condenser (12 mfd.)	30-2117	1.20
(57)	Resistor (9000 ohm 2 watt)	33-290539	.30

Schem. No.	Description	Part No.	Price List
(58)	Power Transformer 50-60 cycle 115 volts	32-7583	$4.25
	Power Transformer 25-40 cycle 115 volts	32-7584	
	*Power Transformer 50-60 cycle 115 volts Code 122	32-7626	
	**Power Transformer 25-40 cycle 115 volts Code 122	32-7627	
(59)	Condenser (Twin Bakelite, .015-.015 mfd.)	3793 DG	.40
(60)	Pilot Lamp	34-2039	.15
(61)	Wave Switch Antenna Section	42-1170	1.10
(62)	Wave Switch Osc. Section	42-1172	1.10
	I. F. Wiring Panel	38-7703	.25
	I. F. Wiring Panel Spacer	28-4001 Per C	.25
	Ant. Panel	38-7714	
	Tube Socket 7 prong	27-6057	.11
	Tube Socket 8 prong	27-6058	.11
	Tube Socket Rectifier, Code 122	27-6053	.11
	Tube Shield	28-2726	.10
	I. F. Transformer Shield	38-7763	.20
	AC Cable	L-2183	.40
	Speaker Cable	L-2181	.25
	Grommet Mtg. Tuning Condenser	27-4325	.02
	Grommet Mtg. R. F. Unit	27-4317	.04
	Mtg. Sleeve R. F. Unit	28-2257 FA-3	.01
	Mtg. Screw R. F. Unit	W-729 FA-3 Per C	.45
	Mtg. Washer R. F. Unit	28-3927	.01
	Pilot Lamp Assembly	38-7706	.35
	Bracket Electrolytic Condenser	6440	.05
	Bracket Screw Electrolytic Condenser	W-1446 FA-3 Per C	.40
	Bracket Nut Electrolytic Condenser	W-95 FA-3 Per C	.30
	Chassis Mtg. Screw	W-1358A Per C	2.60
	Wave Switch Indexing Plate & Shaft	42-1173 Rev-E	.50
	Dial	27-5203	.50
	Dial Hub	28-7187 FA-3	.12
	Dial Set Screw	W-1641	.02
	Dial Clamp	28-2837 FA-3	.10
	Dial Screen Assembly	38-7912	.10
	Dial Gear	28-7185	.10
	Drive Gear	31-1884	.25
	Scale Guard	27-8324	.02
	Dial Gear Thrust Spring	28-8611	.01
	Dial Gear C. Washer	28-3904	.01
	Dial Gear Thrust Washer	28-3976	.30
	Mask	27-5198	.30
	Mask Washer	27-8318 Per C	.50
	Mask Arm and Link Assembly	31-1866	.35
	Mask Guide	38-7844	
	Spring	28-8624 Per C	.50
	Lens	27-8310	.02
	Knob Tuning Control	27-4330	.10
	Knob Vernier	27-4331	.10
	Knob—Tone & Volume	27-4332	.10
	Knob—Wave Switch	27-4326	.10
	Volume Control Shaft	28-6499	.10
	Volume Control Spring	28-4117 Per C	.40
	Retaining Clip	28-8610	.03
	Washer	28-4186 Per C	.75
	Washer	4436 Per C	1.50
	Nut Tone Volume Controls	W-684 FA-3 Per C	1.25
	Speaker S7	36-1009	
	Speaker HS	36-1220	

*Code 122, **Code 122, 25 cycle operation.

PHILCO . . . . . Model 37-620

FOR MEMBERS OF
RADIO MANUFACTURERS SERVICE

SERVICE BULLETIN
No. 250

General Description

Model 37-620 is a 6 tube superheterodyne receiver for operation on alternating current, having three tuning ranges, covering standard broadcast and short-wave frequencies, and using the new Philco High-Efficiency self-centering glass tubes.

The circuit includes the Philco "Foreign Tuning System"—controlled by the tuning range switch—which provides maximum sensitivity and noise reduction, when used with the **Philco High Efficiency Aerial** supplied with the receiver. One stage of Radio Frequency amplification which greatly increases the signal-to-noise ratio, automatic bass compensation in the volume control circuit, and a separate diode circuit for automatic volume control are also incorporated in this receiver.

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 at 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 to terminal 3.

A good ground connection is desirable in all installations. Make the ground connection from the nearest water or radiator pipe to terminal 3 on the terminal panel.

CONSTRUCTION

The chassis is constructed in three basic assembly units, concentrating each circuit in a single unit.

(1) The Radio Frequency unit, located in the center of the chassis, contains a 6K7G tube which functions as a Radio Frequency Amplifier; a 6A8G tube, for the Detector-Oscillator circuit; individual Antenna, R. F. Amplifier and Oscillator coils for each tuning range; selector switch; compensating condensers for all coils; and other parts necessary for the associated circuits. The unit is separately mounted on rubber grommets, cushioning it from the main chassis.

(2) The Intermediate Frequency unit, mounted on the right hand side of the chassis (facing front of set) consists of the Intermediate Frequency transformers, compensating condensers, a 6K7G tube for the I. F. Amplifier stage, and a 6Q7G tube as the second detector—automatic volume control and first audio stage. All voltages supplied to the I. F. and R. F. units are furnished from a terminal strip mounted on this unit.

(3) The Power Pack and Audio Output circuits, together with the required voltage dividers and filter condensers are mounted in the power unit. This unit contains a 6F6G tube and a 5Y4G tube for the Power output and rectifier circuits respectively; and the combined tone control and power switch. The socket for the 5Y4G tube is mounted on the power transformer.

Schematic Diagram Fig. 5 is numbered, indicating all important parts. These numbers correspond with the parts layout shown in Fig. 6. In addition, the range switch wafers are shown on the schematic diagram. The contacts on each wafer are lettered and numbered to indicate their connection points in the schematic diagram, which are also lettered and numbered. The physical drawings of each coil used in the receiver are also shown on schematic diagram Fig. 5. The connections of these coils are numbered on the coil Drawing and on the schematic diagram.

Fig. 1 shows the Voltage measurements taken from the bottom of the sockets at each contact. In Fig. 2, the correct position of the dial indicator, for proper adjustment of the compensator condenser is shown. Fig. 3 and 4 are the locations of the I. F. and R. F. compensators respectively.

This receiver is used in cabinets type B and J. These instructions, however, will cover both types.

Electrical Specifications

Voltage Rating: 115 Volts AC.

Frequency Rating: 50 to 60 cycles.
For 25 to 40 cycle operation, the Power Transformer marked with asterisk in the parts list is used.

Power Consumption: 65 Watts

Types and Number of Tubes: 2 type 6K7G, R. F. and I. F. Amplifiers; 1 type 6A8G, Detector-Oscillator; 1 type 6Q7G, 2nd Detector, Automatic Volume Control and 1st Audio; 1 type 6F6G, Output; and 1 type 5Y4G Rectifier.

Undistorted Output: 3 watts.

Intermediate Frequency: 470 K. C.

Tuning Ranges: Three, Range 1.—530 to 1720 Kilocycles; Range 2.—2.3 to 7.4 Megacycles; Range 3.—7.35 to 22 Megacycles.

Speakers: B Cabinet—S-7.
J Cabinet—HS.

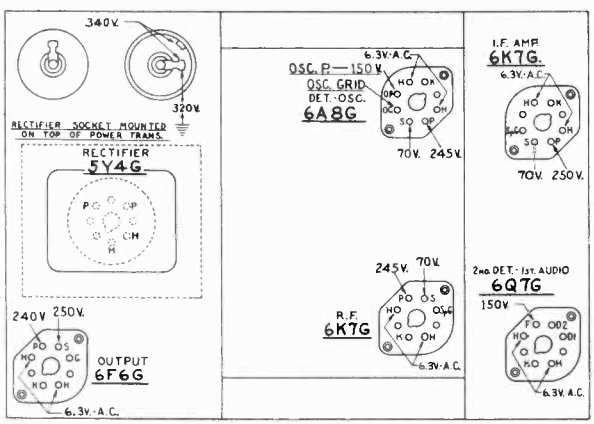
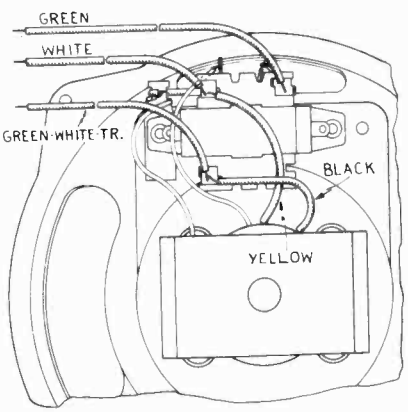


Fig. 1—Socket Voltages
Measured from Socket Contact to Ground
Underside of Chassis View

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.

POWER TRANSFORMER DATA

Lead No. Shown on Schematic	A.C. Volts	Current	Circuit	Color	Resistance
1–2	120	—	Pri.	White	5 ohms
3–4	5.0	2.0 A.	Fil. Rectifier	Blue	.1 ohm
5–7	670	70 Ma.	High Voltage Sec.	Yellow	145 ohms 155 ohms
6	—	—	Center Tap of 5–7	—	—
8–9	6.7	2.1 A.	Fil.	Black	.1 ohm



Speaker Wiring

When replacing any part of the speaker, the hum bucking coil connections should be connected for minimum hum.

Run 2.

While the circuit arrangement remains the same, the position of the parts is slightly changed in this Run. Bakelite condenser (67) Part No. 3793-DG is removed from front and placed in the rear of the chassis. Tubular condenser (67) Part No. 30-4380 is replaced with a Part No. 8318-SU bakelite condenser, placed in the position formerly held by 3793-DG.

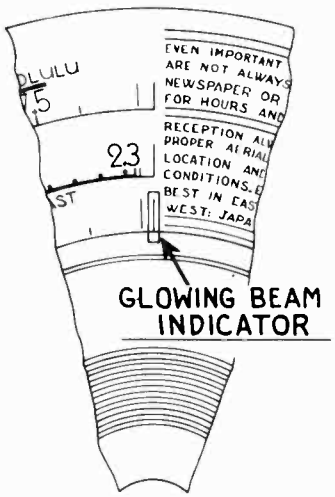


Fig. 2—Dial Calibration

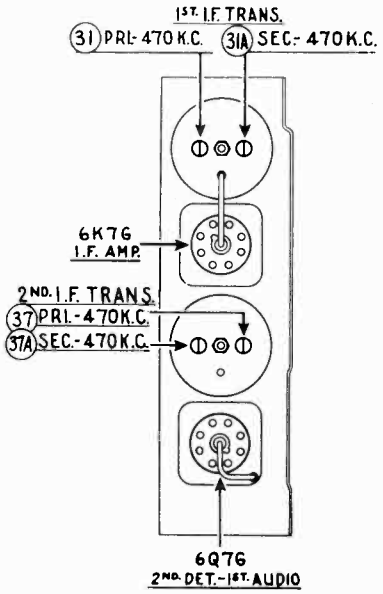


Fig. 3—Locations of I. F. Compensators

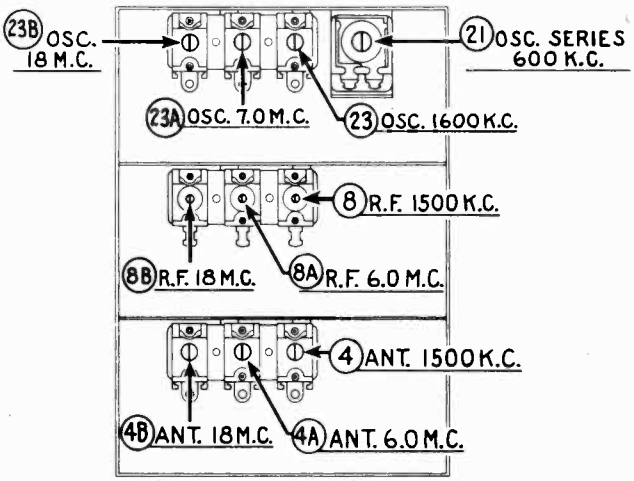


Fig. 3—Locations of R. F. Compensators

Adjustment of Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I. F. Circuit, four in the Oscillator Circuit, three in the R. F. Amplifier Circuit and three in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

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 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. 3 and 4.

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 condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the first index line of dial scale (see Fig. 2). Now tighten the dial hub set screw in this position.

OUTPUT METER—The 025 Output Meter is connected to the plate and cathode terminals of the (6F6G) tube. Adjust the meter to use the (0-30) Volt Scale.

During the I. F. and R. F. adjustments, the signal generator output should be maintained at the lowest possible level that will give indication on the output meter.

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.

2 Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to the maximum capacity position (counter-clockwise), and adjust the signal generator for 470 K. C.

3 Adjust compensators (37)a 2nd I. F. Sec., (37) 2nd I. F. Pri., (31)a 1st I. F. Sec., and (31) 1st I. F. Pri. for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range—7.3 to 22.0 M. C.

1 Remove the signal generator output lead from the grid of 6A8G tube, and connect it through a .1 mfd. condenser to terminal No. 1 on aerial input panel, and the generator ground lead to terminal No. 3, rear of chassis.

(a) Terminals 2 and 3 of aerial input panel must be connected with connector link provided on the panel, during these adjustments.

2 Set the tuning range switch in position No. 3 (Short Wave). Turn the signal generator and receiver dials to 18. M. C. and adjust compensators (23)b Osc., (8)b R. F. and (4)b Ant. for maximum output. (See Note (a) below).

(a) The adjustment of the Radio Frequency compensator on the high frequency range causes a slight detuning of the oscillator circuit. In order to overcome this detuning effect, connect a variable condenser of approximately 350 mmfd., having a good vernier drive, across the oscillator section of the tuning condenser. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser so that the second harmonic of the receiver oscillator will beat against the signal from the 088 signal generator bringing in the signal. The antenna and R. F. compensator (4)b and (8)b should then be adjusted to give maximum output. Now remove the external condenser and turn compensator (23)b to maximum capacity (clockwise) then without moving signal generator or receiver tuning condenser, back off compensator (23)b (counter-clockwise) until a second peak is reached on the output meter. The first peak is caused by tuning to the image frequency signal and must not be used.

Tuning Range 2.3 to 7.4 M. C.

1 Turn the range switch to position No. 2 (police). Rotate the signal generator and receiver dials to 7.0 M. C. Then adjust compensator (23)a for maximum output. Now turn the signal generator and receiver dials to 6.0 M. C. and adjust compensators (8)a R. F. and (4)a Ant. for maximum reading on the output meter.

Tuning Range 530 to 1720 K. C.

1 Set the range switch in position No. 1 (Broadcast). Set the 088 Signal Generator indicator at 800 K. C. and the receiver dial at 1600 K. C.

(a) In adjusting the receiver at 1600 K. C. the second harmonic of 800 K. C., to which the signal generator is tuned, is used. The second harmonic of 800 K. C. is 1600 K. C. Now adjust compensators (23) Osc., (8) R. F. and (4) Ant. for maximum reading on output meter.

2 The low frequency end of the range is now tuned by turning the signal generator and receiver dials to 600 K. C. and adjusting compensator (21) Osc. Series—(see Note (a) below)—for maximum reading on output meter.

(a) While compensator (21) is being adjusted, the tuning condenser must be rolled for maximum output. This is accomplished as follows:—First tune compensator (21) for maximum output. Then vary the tuning condenser for maximum output at 600 K. C. Now retune compensator (21), and again vary the tuning condenser back and forth at 600 K. C. for maximum output. This operation of first turning the compensator then the tuning condenser is continued until maximum output is obtained at the 600 K. C. frequency.

3 After the low frequency (600 K. C.) end of the range is adjusted, the 1600 K. C. end is readjusted, as given in Paragraph (1) above, to correct any variation that the low frequency series compensator may have caused in the alignment of the high frequency end.

4 Now turn the signal generator and receiver dials to 1500 K. C. and readjust compensators (4) ant., and (8) R. F., for maximum output.

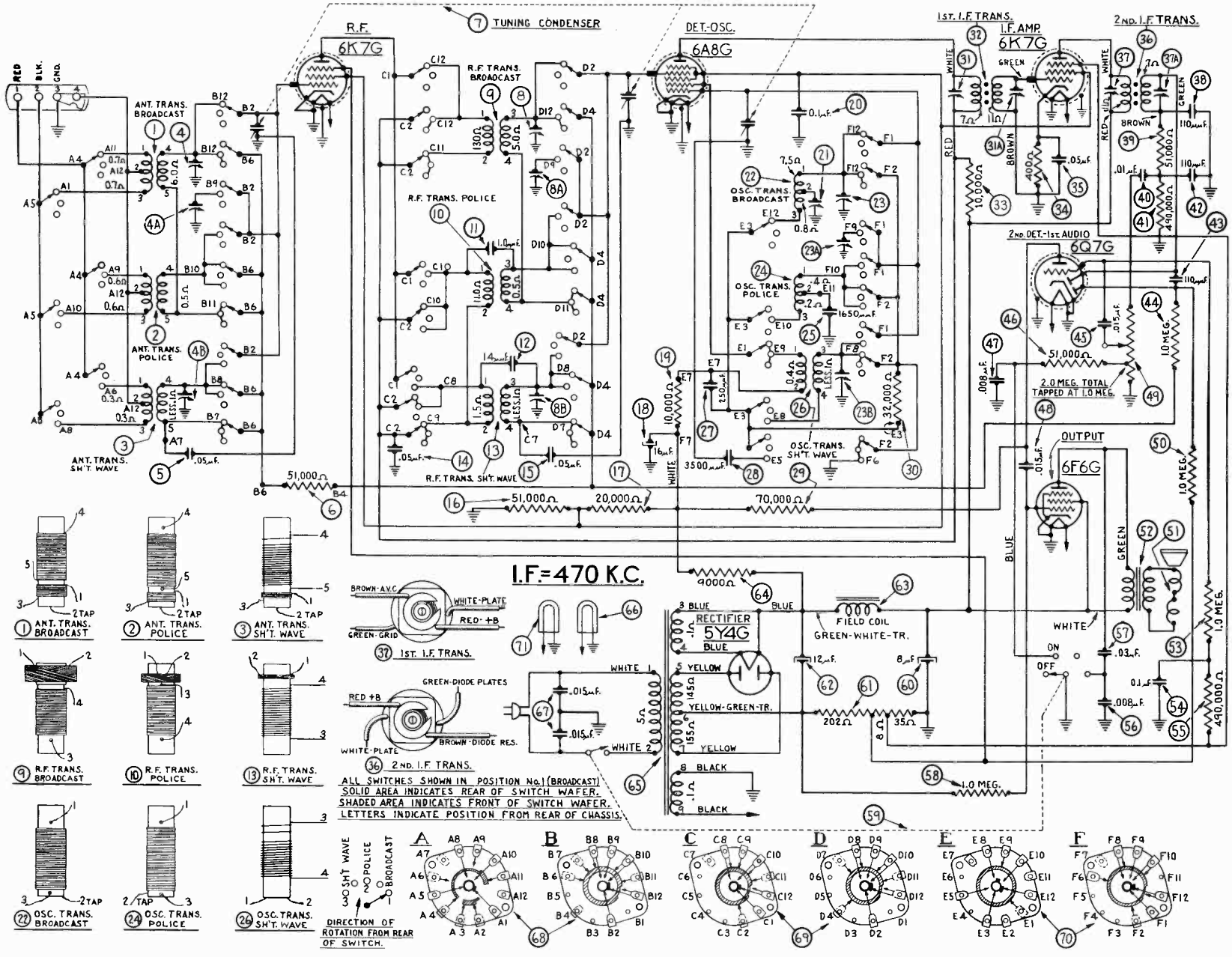


Fig. 5—Schematic Diagram

Model 37-620

Use . . .

PHILCO MODEL 025 CIRCUIT TESTER

•

The Most Compact Self-Contained Complete Radio Circuit and Value Testing Instrument

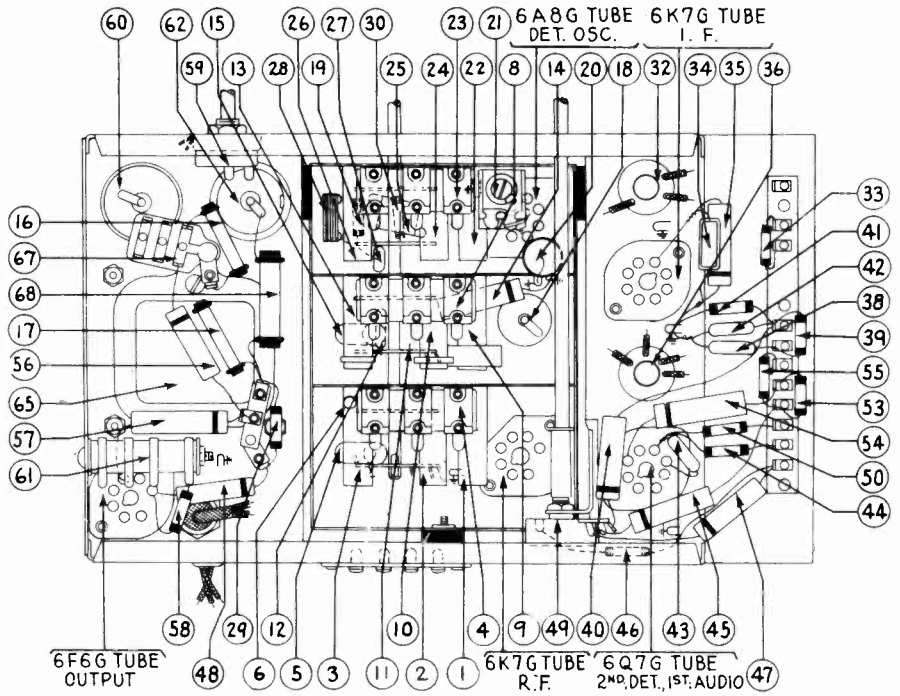


Fig. 6—Base View

Replacement Parts—Model 37-620

Schem. No.	Description	Part No.	Price List
1	Antenna Transformer (Broadcast)	32-2108	$0.80
2	Antenna Transformer (Police)	32-2119	.65
3	Antenna Transformer (S. W.)	32-2109	.75
4	Compensator Ant. 1500 K.C.	31-6092	.60
5	Condenser (.05 mfd. Tubular)	30-4020	.20
6	Resistor (51000 ohms ½ watt)	33-351339	.20
7	Tuning Condenser	31-1818	4.50
8	Compensator (R. F. 1500 K.C.)	31-6092	.60
9	R. F. Transformer (Broadcast)	32-2105	.75
10	R. F. Transformer (Police)	32-2106	.65
11	Condenser (1.0 mmfd.)		
12	Condenser (14 mmfd. Mica)	30-1073	.20
13	R. F. Transformer (S. W.)	32-2126	.55
14	Condenser (.05 mfd. Tubular)	30-4123	.20
15	Condenser (.05 mfd. Tubular)	30-4020	.20
16	Resistor (51000 ohms 1 watt)	33-351439	.20
17	Resistor (20000 ohms 1 watt)	33-320439	.20
18	Electrolytic Condenser (16 mfd.)	30-2118	1.65
19	Resistor (10000 ohms ½ watt)	33-310339	.20
20	Condenser (.1 mfd. Tubular)	30-4170	.25
21	Compensator (Osc. Series 600 K.C.)	31-6056	.55
22	Osc. Transformer (Broadcast)	32-2120	.65
23	Compensator (Osc. 1600 K.C.)	31-6092	.60
24	Osc. Transformer (Police)	32-2121	.40
25	Condenser (1650 mmfd. Semi-fixed)	31-6096	.40
26	Osc. Transformer (S.W.)	32-2110	.75
27	Condenser (250 mmfd. Mica)	30-1032	.25
28	Condenser (3500 mmfd. Semi-fixed)	31-6097	.50
29	Resistor (70000 ohms ½ watt)	33-370339	.20
30	Resistor (32000 ohms ½ watt)	33-332339	.20
31	Compensator (1st I. F. Pri. 470 K.C.)	Part of 39	
32	1st I. F. Transformer	32-2100	1.50
33	Resistor (1000 ohms ½ watt)	33-210339	.20
34	Resistor (400 ohm Bakelite)	33-1211	.20
35	Condenser (.05 mfd. Tubular)	30-4020	.20
36	2nd I. F. Transformer	32-2102	1.50
37	Compensator (2nd I. F. Pri. 470 K.C.)	Part of 42	
38	Condenser (110 mmfd. Mica)	30-1031	.20
39	Resistor (51000 ohms ½ watt)	33-351339	.20
40	Condenser (.01 mfd. Tubular)	30-4124	.25
41	Resistor (490000 ohms ½ watt)	33-449339	.20
42	Condenser (110 mmfd. Mica)	30-1031	.20
43	Condenser (110 mmfd. Mica)	30-1031	.20
44	Resistor (1 megohm ½ watt)	33-510339	.20
45	Condenser (.015 mfd. Tubular)	30-4358	.20
46	Resistor (51000 ohms, ½ watt)	33-351339	.20
47	Condenser (.006 mfd. Tubular)	30-4112	.20
48	Condenser (.015 mfd. Tubular)	30-4226	.20
49	Volume Control	33-5158	1.00
50	Resistor (1 megohm ½ watt)	33-510339	.20
51	Voice Coil and Cone. S7 Speaker	36-3014	.80
	Voice Coil & Cone. HS Speaker	36-3627	
52	Output Transformer. S7 & HS Speaker	32-7019	.85
53	Resistor (1 megohm ½ watt)	33-510339	.20
54	Condenser (0.1 mfd. Tubular)	30-4122	.20
55	Resistor (490000 ohms ½ watt)	33-449339	.20
56	Condenser (.008 mfd. Tubular)	30-4112	.20
57	Condenser (.03 mfd. Tubular)	30-4380	.20
58	Resistor (1 megohm ½ watt)	33-510339	.20
59	Tone Control and A. C. Switch	42-1182	.75
60	Electrolytic Condenser (8 mfd.)	30-2024	1.10
61	Bias Resistor	33-3277	.20
62	Electrolytic Condenser (12 mfd.)	30-2117	1.20
63	Field Coil Assembly. S7 Speaker	36-3039	2.75
	Field Coil Assem. HS Speaker	36-3690	
64	Resistor (9000 ohms, 2 watt)	33-290539	$0.30
65	Power Transformer (115 Volt 50-60 cycle)	32-7583	4.50
*	Power Transformer (115V; 25-40 cycle)	38-7584	
66	Pilot Lamp	34-2039	.15
67	Condenser (.015-.015 mfd. Double Bakelite)	3793 DG	.40
68	Wave Switch Antenna	42-1170	1.10
69	Wave Switch R. F.	42-1171	1.00
70	Wave Switch Osc.	42-1172	1.10
	Wave Switch Indexing Plate & Shaft	42-1173	.50
	Pilot Lamp Assembly	38-7706	.35
	Dial	27-5203	.50
	Dial Hub	28-7187	.12
	Dial Clamp	28-2837	.10
	Dial Hub Set Screw	W-1641	.02
	Dial Gear	28-7185	.10
	Dial Guard	27-8324	.02
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	Per C .30
	"C" Washer	28-3904	.01
	Drive Gear	31-1884	.25
	Vernier Drive	31-1871	.75
	Mask	27-5198	.30
	Mask Arm Assembly	31-1866	.35
	Mask Guide on Lamp Bracket Support	28-7844	.15
	Mask Washer	27-8318	Per C .50
	Dial Screen Assem	38-7912	.30
	Spring	28-8624	Per C .50
	Lens	27-8310	.02
	Volume Control Shaft	28-6499	.10
	Volume Control Shaft Spring	28-4117	Per C .40
	Retaining Clips	28-8610	.03
	Washer	28-4186	Per C .75
	Socket 8 prong	27-6058	.11
	Socket 7 prong	27-6057	.11
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	I. F. Shield	38-7763	.20
	Terminal Panel I. F. Unit	38-7703	.25
	Washer I. F. Unit	28-4001	Per C .25
	Wiring Panel	38-6306	.03
	Wiring Panel Power Unit	38-5864	.02
	Grommet Mtg. Tuning Condenser	27-4325	.02
	Grommet R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	28-2257	.01
	Spacer Mtg. R. F. Unit	27-8339	Per C .40
	Screw Mtg. R. F. Unit	W-729	Per C .45
	Washer Mtg. R. F. Unit	28-3927	.01
	Insulator, Mtg. Elect. Cond	27-7194	.01
	Bracket Mtg. Elect. Cond.	6440	.05
	Antenna Panel	38-7714	.15
	Speaker Cable	L-2181	.25
	A. C. Cord	L-2183	.40
	Speaker S7—B. Cabinet	36-1009	5.75
	Speaker HS—J. Cabinet	36-1220	6.25
	Knobs Tuning	27-4330	.10
	Knobs Tuning Vernier	27-4331	.10
	Knobs Wave Switch	27-4326	.10
	Knobs Tone & Volume	27-4332	.10
	Bezel Frame & Plate Assembly	40-5939	.75
	Gasket	27-8311	.01
	Glass	27-8298	.05
	Ring	28-3967	.35
	Screw Bezel Mtg.	W-1644	Per C .50
	Nut Mtg. Volume & Tone Control	W-684	Per C 1.25
	Chassis Mtg. Screw	W-1358A	Per C 2.60
	Chassis Mtg. Washer	28-2089	Per C .30

* 25-40 cycle operation.

Figures in black type indicate circled figures in Base View.

Prices Subject to Change Without Notice

PHILCO . . . . . Model 37-630

FOR MEMBERS OF
RADIO MANUFACTURERS SERVICE

SERVICE BULLETIN
No. 251

General Description

Model 37-630 is a 6 tube superheterodyne receiver for operation on alternating current, having three tuning ranges, covering standard broadcast and short-wave frequencies, and using the new Philco High-Efficiency self-centering glass tubes.

The circuit includes the Philco "Foreign Tuning System" controlled by the tuning range switch which provides maximum sensitivity and noise reduction, when used with the **Philco High Efficiency Aerial** supplied with the receiver. One stage of Radio Frequency amplification which greatly increases the signal to noise ratio, automatic bass compensation in the volume control circuit, shadow tuning and a separate diode circuit for automatic volume control are also incorporated in this receiver.

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 at 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 to terminal 3.

A good ground connection is desirable in all installations. Make the ground connection from the nearest water or radiator pipe to terminal 3 on the terminal panel.

The chassis is constructed in three basic assembly units, concentrating each circuit in a single unit.

The Radio Frequency unit, located in the center of the chassis, contains a 6K7G tube which functions as a Radio Frequency Amplifier; a 6A8G tube, for the Detector-Oscillator circuit; individual Antenna, R. F. Amplifier and Oscillator coils for each tuning range; selector switch; compensating condensers for all coils; and other parts necessary for the associated circuits. The unit is separately mounted on rubber grommets, cushioning it from the main chassis.

The Intermediate Frequency unit, mounted on the right hand side of the chassis (facing front of set) consists of the Intermediate Frequency transformers, compensating condensers, a 6K7G for the I. F. Amplifier stage, and a 6Q7G tube as the second detector —automatic volume control and first audio stage. All voltages supplied to the I. F. and R. F. units are furnished from a terminal strip mounted in this unit.

The Power Pack and Audio Output circuits, together with the required voltage dividers and filter condensers are mounted in the power unit. This unit contains a 6F6G tube and a 5Y4G tube for the Power Output and Rectifier Circuits respectively, and the combined tone control and power switch.

Schematic Diagram, Fig. 5, is numbered, indicating all important parts. These numbers correspond with the parts layout shown in Fig. 6. In addition, the range switch wafers are shown on the schematic diagram. The contacts on each wafer are numbered and lettered to indicate their connection points in the schematic diagram, which are also lettered and numbered. The physical drawings of each coil used in the receiver are also shown on schematic diagram Fig. 5. The connections of these coils are numbered on the coil drawing and on the schematic diagram.

Fig. 1 shows the Voltage measurements taken from the bottom of the socket at each contact. In Fig. 2, the correct position of the dial indicator, for proper adjustment of the compensator condenser is shown. Fig. 3 and 4 are the locations of the I. F. and R. F. compensators respectively.

This receiver is used in cabinets type X code 121 and type T code 122. These instructions, however, will cover both types.

Electrical Specifications

Voltage Rating: 115 Volts A.C.

Frequency Rating: 50 to 60 cycles.
For 25 to 40 cycle operation the Power Transformer marked with asterisk in parts list is used.

Power Consumption: 65 Watts.

Types and Number of Tubes: 2 type 6K7G, R. F. and I. F. Amplifiers; 1 type 6A8G, Detector-Oscillator; 1 type 6Q7G, 2nd Detector, Automatic Volume Control and 1st Audio; 1 type 6F6G, Output; and 1 type 5Y4G Rectifier.

Undistorted Output: 3 watts.

Intermediate Frequency: 470 K. C.

Tuning Ranges: Three. Range 1.—530 to 1720 Kilocycles; Range 2.—2.3 to 7.4 Megacycles; Range 3.—7.35 to 22 Megacycles.

Speakers: X Cabinet—H24
T Cabinet—K38

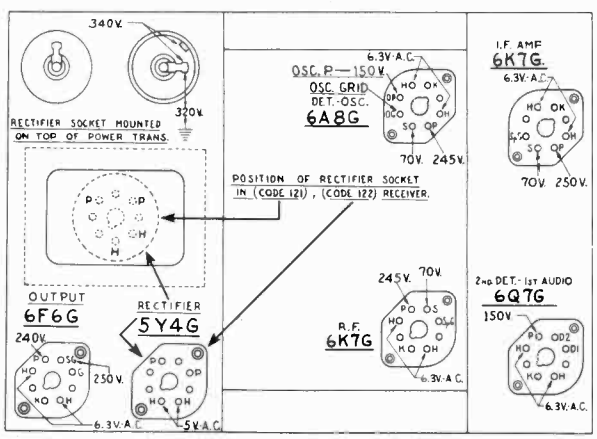
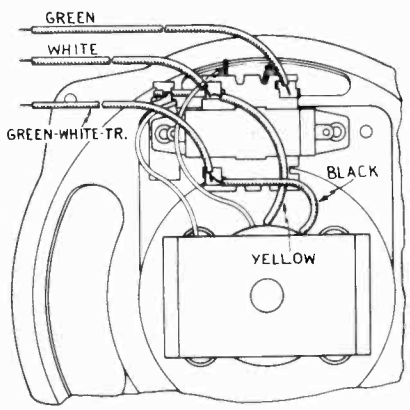


Fig. 1. Socket Voltages
Measured from Socket Contact to Ground
Underside of Chassis View

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.

POWER TRANSFORMER DATA

Lead No. Shown on Schematic	A.C. Volts	Current	Circuit	Color	Resistance
1–2	120	—	Pri.	White	5 ohms
3–4	5.0	2.0 A.	Fil. Rectifier	Blue	.1 ohm
5–7	670	70 Ma.	High Voltage Sec.	Yellow	145 ohms 155 ohms
6	—	—	Center Tap of 5–7	—	—
8–9	6.7	2.1 A.	Fil.	Black	.1 ohm



Speaker Wiring

When replacing any part of the speaker, the hum bucking coil connections should be connected for minimum hum.

Run 2.

While the circuit arrangement remains the same, the locations of the parts are slightly changed in this Run. Bakelite condenser (67) Part No. 3793-DG is removed from front and placed in the rear of the chassis. Tubular condenser (42) Part No. 30-4380 is replaced with a Part No. 8318-SU bakelite condenser placed in the position formerly held by 3793-DG.

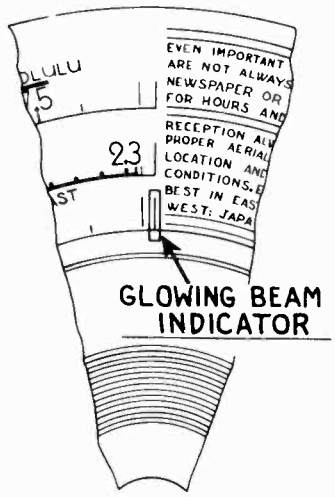


Fig. 2—Dial Calibration

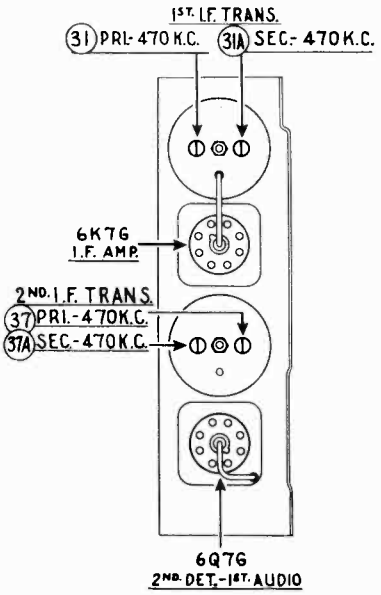


Fig. 3—Locations of I. F. Compensators

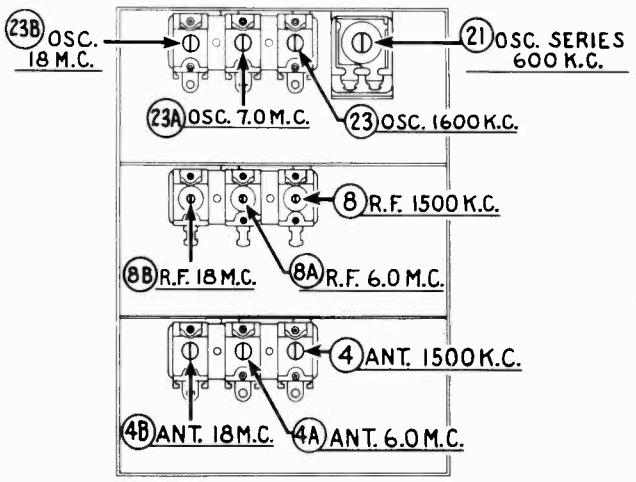


Fig. 4—Locations of R. F. Compensators

Alignment of the Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I. F. Circuit, four in the Oscillator Circuit, three in the R. F. Amplifier Circuit and three in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

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 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. 3 and 4.

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 condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the first index line of dial scale (see Fig. 2). Now tighten the dial hub set screw in this position.

Shadow Meter Adjustment—Remove aerial and allow tubes to warm up. Then adjust shadow meter as follows:

1 Move the Shadow meter coil backwards and forwards, until the shadow is within one-eighth of an inch of each side of the screen.
2 Remove the Rectifier tube from its socket, and rotate the shadow meter coil for minimum shadow width.
3 Replace the Rectifier tube. The shadow should then return to maximum width or within one-eighth of an inch of each side of the screen. If the shadow does not return to maximum width, operations 1 and 2 should be continued until it does.

Output Meter—The 025 Output Meter is connected to the plate and cathode terminals of the (6F6G) tube. Adjust the meter to use the (0-30) Volt Scale.

During the I. F. and R. F. adjustments, the signal generator output should be maintained at the lowest possible level that will give an indication on the output meter.

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.
2 Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to the maximum capacity position (counter-clockwise), and adjust the signal generator for 470 K. C.
3 Adjust compensators (37)a 2nd I. F. Sec., (37) 2nd I. F. Pri., (31)a 1st I. F. Sec., and (31) 1st I. F. Pri. for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range—7.3 to 22.0 M. C.

1 Remove the signal generator output lead from the grid of 6A8G tube, and connect it through a .1 mfd. condenser to terminal No. 1 on aerial input panel, and the generator ground lead to terminal No. 3, rear of chassis.
(a) Terminals 2 and 3 of aerial input panel must be connected with connector link provided on the panel, during these adjustments.
2 Set the tuning range switch in position No. 3 (Short Wave). Turn the signal generator and receiver dials to 18 M. C. and adjust compensators (23)b Osc., (8)b R. F. and (4)b Ant. for maximum output. (See Note (a) below).
(a) The adjustment of the Radio Frequency compensator on the high frequency range causes a slight detuning of the oscillator circuit. In order to overcome this detuning effect, connect a variable condenser of approximately 350 mmfd., having a good vernier drive, across the oscillator section of the tuning condenser. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser so that the second harmonic of the receiver oscillator will beat against the signal from the 088 signal generator bringing in the signal. The antenna and R. F. compensators (4)b and (8)b should then be adjusted to give maximum output. Now remove the external condenser and turn compensator (23)b to maximum capacity (clockwise) then without moving signal generator or receiver tuning condenser, back off compensator (23)b (counter-clockwise) until a second peak is reached on the output meter. The first peak is caused by tuning to the image frequency signal and must not be used.

Tuning Range 2.3 to 7.4 M. C.

1 Turn the range switch to position No. 2 (police). Rotate the signal generator and receiver dials to 7.0 M. C. Then adjust compensator (23)a for maximum output. Now turn the signal generator and receiver dials to 6.0 M. C. and adjust compensators (8)a R. F. and (4)a Ant. for maximum reading on the output meter.

Tuning Range 530 to 1720 K. C.

1 Set the range switch in position No. 1 (Broadcast). Set the 088 Signal Generator indicator at 800 K. C. and the receiver dial at 1600 K. C.
(a) In adjusting the receiver at 1600 K. C. the second harmonic of 800 K. C., to which the signal generator is tuned, is used. The second harmonic of 800 K. C. is 1600 K. C. Now adjust compensators (23) Osc., (8) R. F. and (4) Ant. for maximum reading on output meter.
2 The low frequency end of the range is now tuned by turning the signal generator and receiver dials to 600 K. C. and adjusting compensator (21) Osc. Series—(see Note (a) below)—for maximum reading on output meter.
(a) While compensator (21) is being adjusted, the tuning condenser must be rolled for maximum output. This is accomplished as follows:—First tune compensator (21) for maximum output. Then vary the tuning condenser for maximum output at 600 K. C. Now retune compensator (21), and again vary the tuning condenser back and forth at 600 K. C. for maximum output. This operation of first turning the compensator then the tuning condenser is continued until maximum output is obtained at the 600 K. C. frequency.
3 After the low frequency (600 K. C.) end of the range is adjusted, the 1600 K. C. end is readjusted, as given in Paragraph (1) above, to correct any variation that the low frequency series compensator may have caused in the alignment of the high frequency end.
4 Now turn the signal generator and receiver dials to 1500 K. C. and readjust compensators (4) Ant., and (8) R. F., for maximum output.

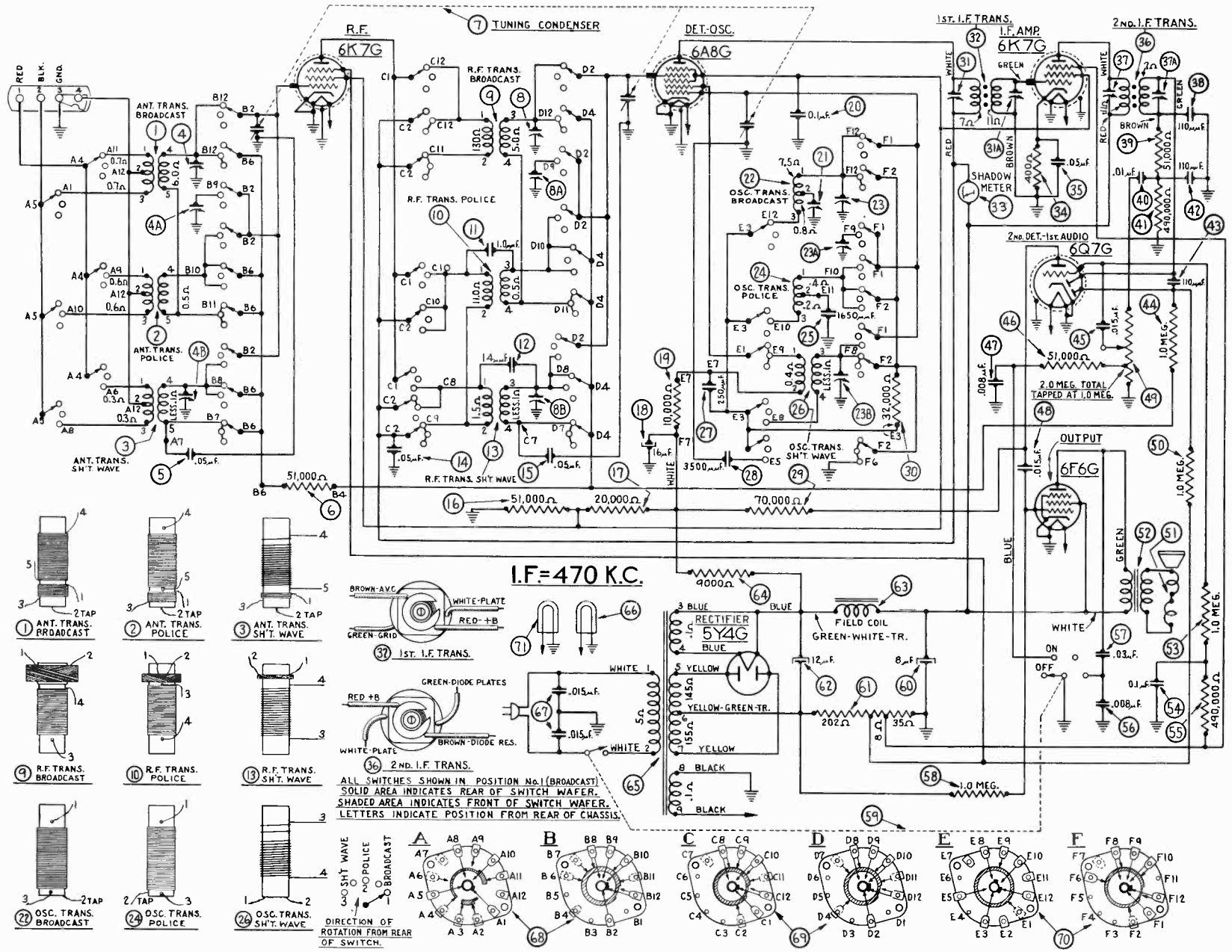


Fig. 5—Schematic Diagram

Model 37-630

Use . . .

PHILCO MODEL 088 SIGNAL GENERATOR

•

The Instrument Designed and Specified by Philco Engineers for Adjusting Philco Radios

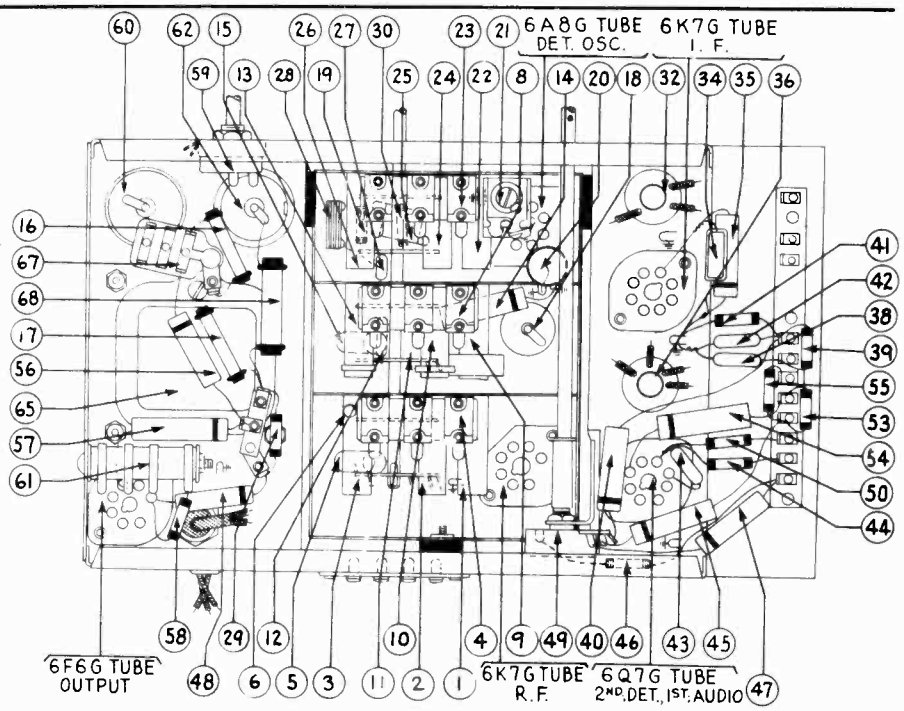


Fig. 6—Base View

Parts List—Model 37-630

Schematic No.	Description	Part No.	List Price
1	Antenna Transformer (Broadcast)	32-2108	$0.80
2	Antenna Transformer (Police)	32-2119	.65
3	Antenna Transformer (S. W.)	32-2109	.75
4	Compensator Ant. 1500 K. C.	31-6092	.60
5	Condenser (.05 mfd. Tubular)	30-4020	.20
6	Resistor (51000 ohms ½ watt)	33-351339	.20
7	Tuning Condenser	31-1818	4.50
8	Compensator (R. F. 1500 K.C.)	31-6092	.60
9	R. F. Transformer (Broadcast)	32-2105	.75
10	R. F. Transformer (Police)	32-2106	.65
11	Condenser (1.0 mmfd.)		
12	Condenser (14 mmfd. Mica)	30-1073	.20
13	R. F. Transformer (S. W.)	32-2126	.55
14	Condenser (.05 mfd. Tubular)	30-4123	.20
15	Condenser (.05 mfd. Tubular)	30-4020	.20
16	Resistor (51000 ohms 1 watt)	33-351439	.20
17	Resistor (20000 ohms 1 watt)	33-320439	.20
18	Electrolytic Condenser (16 mfd.)	30-2118	1.65
19	Resistor (10000 ohms ½ watt)	33-310339	.20
20	Condenser (.1 mfd. Tubular)	30-4170	.25
21	Compensator (Osc. 600 K.C.)	31-6056	.55
22	Osc. Transformer (Broadcast)	32-2120	.65
23	Compensator (Osc. 1600 K.C.)	31-6092	.60
24	Osc. Transformer (Police)	32-2121	.40
25	Condenser (1650 mmfd. Semi-fixed)	31-6096	.40
26	Osc. Transformer (S.W.)	32-2110	.75
27	Condenser (250 mmfd. Mica)	30-1032	.25
28	Condenser (3500 mmfd. Semi-fixed)	31-6097	.50
29	Resistor (70000 ohms ½ watt)	33-370339	.20
30	Resistor (32000 ohms ½ watt)	33-332339	.20
31	Compensator (1st I. F. Pri. 470 K.C.)	Part of 39	
32	1st I. F. Transformer	32-2100	1.50
33	Shadowmeter	45-2189	2.50
34	Resistor (400 ohm Bakelite)	33-1211	.20
35	Condenser (.05 mfd. Tubular)	30-4020	.20
36	2nd I. F. Transformer	32-2102	1.50
37	Compensator (2nd I. F. Pri. 470 K.C.)	Part of 42	
38	Condenser (110 mmfd. Mica)	30-1031	.20
39	Resistor (51000 ohms ½ watt)	33-351339	.20
40	Condenser (.01 mfd. Tubular)	30-4124	.25
41	Resistor (490000 ohms ½ watt)	33-449339	.20
42	Condenser (110 mmfd. Mica)	30-1031	.20
43	Condenser (110 mmfd. Mica)	30-1031	.20
44	Resistor (1 megohm ½ watt)	33-510339	.20
45	Condenser (.015 mfd. Tubular)	30-4358	.20
46	Resistor (51000 ohms, ½ watt)	33-351339	.20
47	Condenser (.006 mfd. Tubular)	30-4112	.20
48	Condenser (.015 mfd. Tubular)	30-4226	.20
49	Volume Control	33-5158	1.00
50	Resistor (1 meghom ½ watt)	33-510339	.20
51	Voice Coil and Cone, H24 Speaker	02625	1.20
	Voice Coil and Cone, K38 Speaker	36-3174	.80
52	Output Transformer, H24	2580	1.00
	Output Transformer, K38	2580	1.00
53	Resistor (1 megohm ½ watt)	33-510339	.20
54	Condenser (0.1 mfd. Tubular)	30-4122	.20
55	Resistor (490000 ohms ½ watt)	33-449339	.20
56	Condenser (.008 mfd. Tubular)	30-4112	.20
57	Condenser (.03 mfd. Tubular)	30-4380	.20
58	Resistor (1 megohm ½ watt)	33-510339	.20
59	Tone Control and A. C. Switch	42-1182	.75
60	Electrolytic Condenser (8 mfd.)	30-2024	1.10
61	Bias Resistor	33-3277	.20
62	Electrolytic Condenser (12 mfd.)	30-2117	1.20
63	Field Coil Assembly, H24 Speaker	36-3665	
	Field Coil Assembly, K38 Speaker	36-3718-01	
64	Resistor (9000 ohms, 2 watt)	33-290539	.30
65	Power Transformer (115 Volt 50-60 cycle) Code 121	32-7583	4.50
	Power Transformer (115 Volt 25-40 cycle) Code 121	32-7584	6.50
	Power Transformer (115 Volt 50-60 cycle) Code 122	32-7626	4.25
	Power Transformer (115 Volt 50-60 cycle) Code 122	32-7627	

Schematic No.	Description	Part No.	List Price
66	Pilot Lamp	34-2039	$0.15
67	Condenser (.015-.015 mfd. Double Bakelite)	3793 DG	.40
68	Wave Switch Antenna	42-1170	1.10
69	Wave Switch R. F.	42-1171	1.00
70	Wave Switch Osc.	42-1172	1.10
	Wave Switch Indexing Plate & Shaft	42-1173	.50
	Pilot Lamp Assembly	38-7706	.35
	Dial	27-5203	.50
	Dial Hub	28-7187	.12
	Dial Clamp	28-2837	.10
	Dial Hub Set Screw	W-1641	.02
	Dial Gear	28-7185	.10
	Dial Guard	27-8324	.02
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	Per C .30
	"C" Washer	28-3904	.01
	Drive Gear	31-1884	.25
	Vernier Drive	31-1871	.75
	Mask	27-5198	.30
	Mask Arm Assembly	31-1866	.35
	Mask Guide on Lamp Bracket Support	28-7844	.15
	Mask Washer	27-8318	Per C .50
	Dial Screen Assem.	38-7912	.30
	Spring	28-8624	Per C .50
	Lens	27-8310	.02
	Volume Control Shaft	28-6499	.10
	Volume Control Shaft Spring	28-4117	Per C .40
	Retaining Clips	28-8610	.03
	Washer	28-4186	Per C .75
	Socket 8 prong	27-6058	.11
	Socket 7 prong	27-6057	.11
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	I. F. Shield	38-7763	.20
	Terminal Panel I. F. Unit	38-7703	.25
	Washer I. F. Unit	28-4001	Per C .25
	Wiring Panel	38-6306	.03
	Wiring Panel Power Unit	38-5864	.02
	Grommet Mtg. Tuning Condenser	27-4325	.02
	Grommet R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	28-2257	.01
	Spacer Mtg. R. F. Unit	27-8339	Per C .40
	Screw Mtg. R. F. Unit	W-729	Per C .45
	Washer Mtg. R. F. Unit	28-3927	.01
	Insulator Mtg. Electrolytic Condenser	27-7194	.01
	Bracket Mtg. Electrolytic Condenser	6440	.05
	Antenna Panel	38-7714	.15
	Speaker Cable	L-2181	.25
	A. C. Cord	L-2183	.40
	Knobs Tuning	27-4330	.10
	Knobs Tuning Vernier	27-4331	.10
	Knobs Wave Switch	27-4326	.10
	Knobs Tone & Volume	27-4332	.10
	Shadowmeter Lamp Shield	28-2917	.02
	Shadowmeter Mtg. Spring	28-8623	
	MODEL T CABINET		
	Bezel Frame & Plate Assembly	40-5937	
	Bezel Frame Gasket	27-8311	
	Bezel Frame Rubber	5198	.01
	Bezel Frame Glass	27-8298	.05
	Bezel Frame Ring	28-3967	.35
	Speaker K-38	36-1262	
	Baffle & Silk Assembly	40-5973	
	MODEL X CABINET		
	Bezel Frame & Plate Assembly	40-5945	
	Bezel Frame Gasket	27-8312	
	Bezel Frame Glass	27-8299	
	Bezel Frame Ring	28-3987	
	Speaker H-24	36-1224	
	Baffle and Silk Assembly	40-5972	

Figures in black type indicate circled figures in Base View.

Prices Subject to Change Without Notice

FOR MEMBERS OF
RADIO MANUFACTURERS SERVICE

SERVICE BULLETIN
No. 253

SERVICE DATA

Model 37-640 is a 7 tube superheterodyne receiver for operation on alternating current, having three tuning ranges, covering standard broadcast and short-wave frequencies. The chassis is constructed in three basic assembly units, concentrating the R. F., I. F. and Audio Output circuits in individual units.

The circuit consists of the **"PHILCO FOREIGN TUNING SYSTEM"**—controlled by the range switch—providing maximum sensitivity and noise reduction, when used with the **PHILCO HIGH EFFICIENCY AERIAL.** One stage of radio frequency amplification which increases the signal to noise ratio, Automatic Bass Compensation in the volume control circuit, Shadow Tuning, a separate diode circuit for the Automatic Volume Control and a push-pull pentode audio output circuit are also incorporated in this receiver.

Aerial Connections

The Philco High Efficiency Aerial is recommended, for use with this receiver, to obtain maximum performance. A terminal panel is provided at the rear of the chassis for connecting the aerial. This panel contains four screw terminals and a connecting link.

When using the PHILCO HIGH EFFICIENCY AERIAL connect the red and black leads of the Aerial transmission line (lead-in) to terminals 1 and 2 respectively and the ground lead to terminal 3. The connector link should be across terminals 3 and 4.

If a temporary aerial and ground is used shift the connecting link to rest across terminals 2 and 3 and connect the aerial and ground to terminals 1 and 3 respectively.

REMOVING SWITCH AND COIL ASSEMBLIES FROM R. F. UNIT

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 grommet, 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 the unit) then pull shaft straight out. Removal of the volume control shaft is also necessary.

IMPORTANT—When selector switch shaft is replaced, care should be taken to have all wafer rotors in the same position so that index projection on the end of shaft will slide freely into notched hole in wafer rotors. **Never** force shaft into rotors.

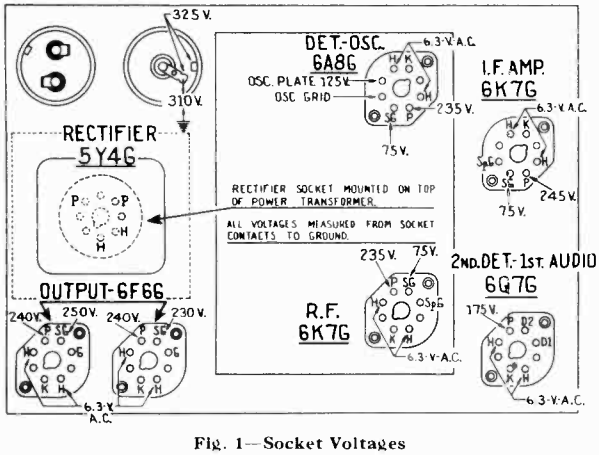


Fig. 1—Socket Voltages Measured from Underside of Chassis

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.

AERIAL SWITCH AND COIL ASSEMBLY. FIRST SECTION FROM REAR OF UNIT

a. Remove screw holding shield plate to unit base. This screw is located in the right hand corner of shield plate, facing rear underside of chassis.

b. Unsolder the leads connecting the range switch to the aerial panel and I. F. terminal panel; tubular condenser ⑤ to the tuning condenser stator plate and ground lead from assembly shield to unit frame—lift assembly straight out of unit.

R. F. AMPLIFIER ASSEMBLY, CENTER SECTION

a. Remove screw holding shield plate to unit base.

b. Unsolder the leads connecting the range switch to I. F. terminal panel and 6K7G plate socket contact, tubular condenser ⑮ to the tuning condenser housing, selector switch contact (D2) to the tuning condenser stator plates, tubular condenser ⑭ to shield ground lug and shield to R. F. unit base. The amplifier assembly may then be removed.

OSCILLATOR SWITCH AND COIL ASSEMBLY. THIRD SECTION FROM REAR OF UNIT

a. The oscillator assembly may now be removed by unscrewing the four screws holding shield to R. F. base. These screws are located on each side of the R. F. base.

b. Unsolder the leads connecting range switch to the 6K7G socket contacts and terminal panel in the I. F. unit, condenser ⑰ lead from tuning condenser housing and lead connecting selector switch to the tuning condenser stator plates. Then unsolder wires connecting selector switch to electrolytic condenser ⑯ and 6A8G socket contacts.

Parts are replaced by following the above procedure in the reverse order.

Electrical Specifications

Voltage Rating: 115 A. C.

Frequency Rating: 50 to 60 cycle.
For 25 to 40 cycle operation use Power Transformer marked with asterisk in parts list.

Power Consumption: 80 watts.

Type and Number of Tubes: 2 type 6K7G—R. F. and I. F. Amplifier; 1 type 6A8G—Det. Oscillator; 1 type 6Q7G—2nd Det., 1st Audio, A. V. C.; 2 type 6F6G—Push-pull Output; 1 type 5Y4G—Rectifier.

Undistorted Output: 5 watts.

Intermediate Frequency: 470 K. C.

Tuning Ranges: Three. Range 1—530 to 1720 K. C. Range 2—2.3 to 7.4 M. C. Range 3—7.35 to 22 M. C.

Speakers: K-34 B Cabinet.
H-25 X-MX Cabinet.

POWER TRANSFORMER DATA

Schematic Lead Number	A.C. Volts	Current	Circuit	Color	Resistance
1-2	120	. . .	Pri.	White	3 ohms
3-4	5.0	2.0A	Fil. Rect.	Blue	1 ohms
5-7	670	100 M.A	High Voltage Sec.	Yellow	70 ohms 75 ohms
6	. . .	. . .	Center Top of 5-7	. . . . .	Yellow Green
8-9	6.7	3.0A	Fil. Tubes	Black	1 ohm

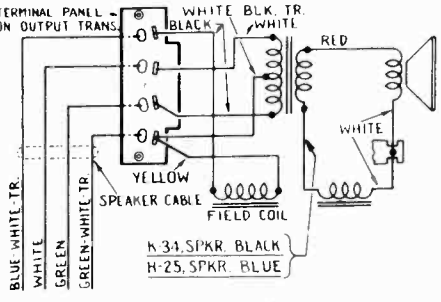


Fig. 2—Speaker Wiring

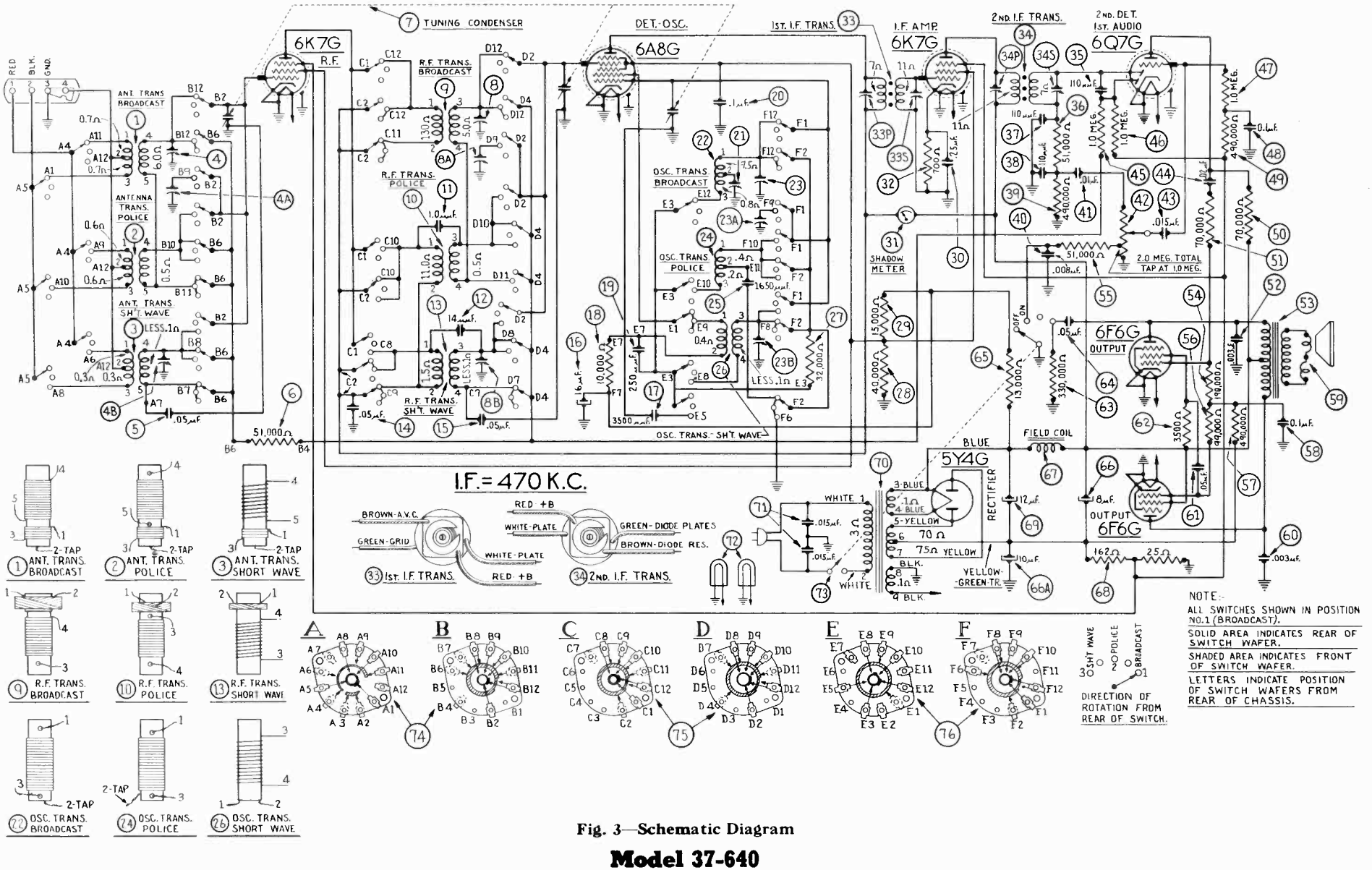


Fig. 3—Schematic Diagram

Model 37-640

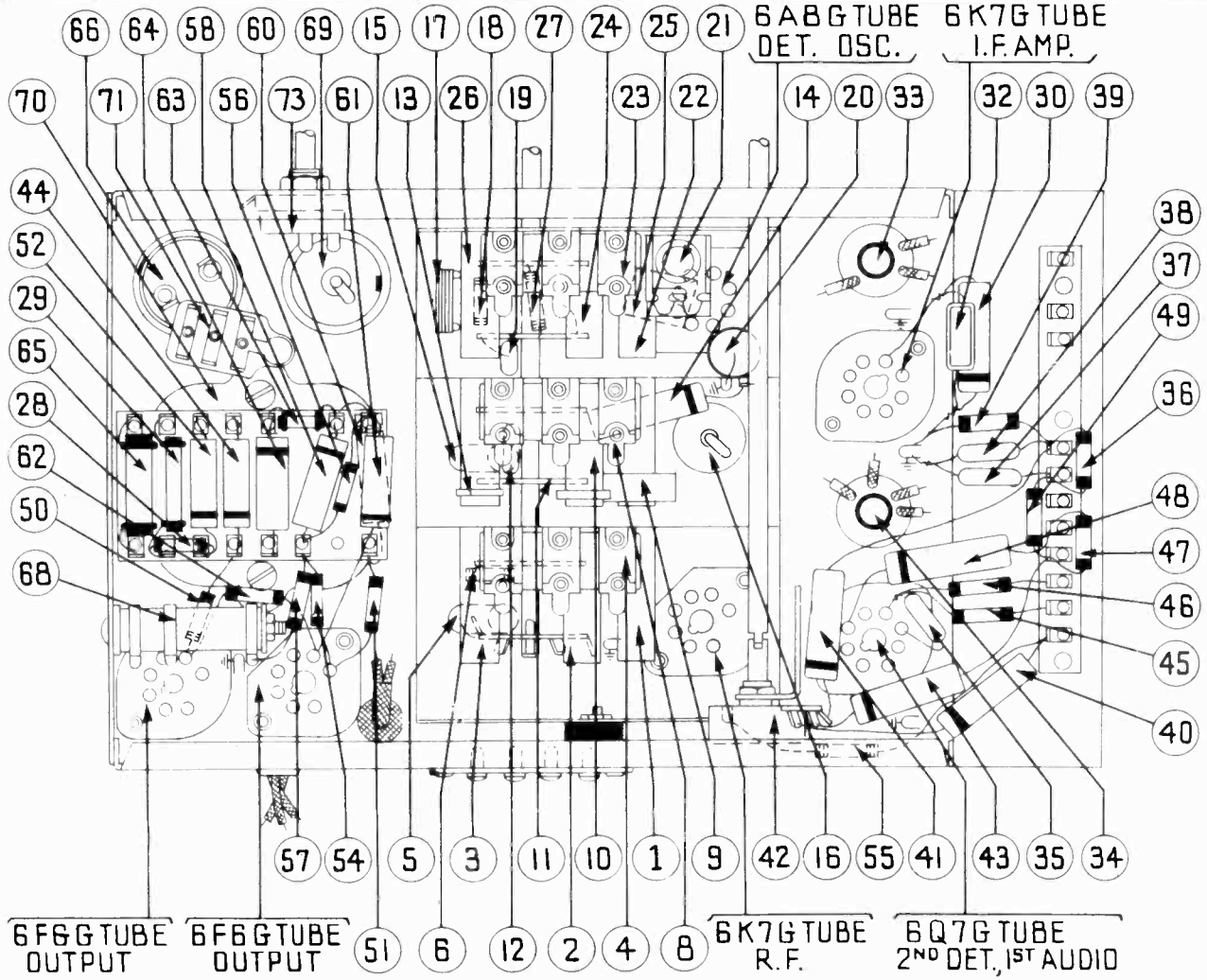


Fig. 4—Base View

Replacement Parts—Model 37-640

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Broadcast)	32-2108	$0.80
2	Antenna Transformer (Police)	32-2119	.65
3	Antenna Transformer (S. W.)	32-2109	.75
4	Compensating Condensers Ant.	31-6092	.60
5	Condenser (.05 mfd. tubular)	30-4020	.20
6	Resistor (51000 ohms ½ watt)	33-351339	.20
7	Tuning Condenser	31-1820	5.00
8	Compensating Condensers R. F.	31-6092	.60
9	R. F. Transformer (Broadcast)	32-2105	.75
10	R. F. Transformer (Police)	32-2106	.65
11	Condenser		
12	Condenser (14 mmfd. mica)	30-1073	.20
13	R. F. Transformer (S. W.)	32-2126	.55
14	Condenser (.05 mfd. tubular)	30-4123	.20
15	Condenser (.05 mfd. tubular)	30-4020	.20
16	Electrolytic Condenser (16 mfd.)	30-2118	1.65
17	Condenser (3500 mmfd. semi-fixed)	31-6097	.50
18	Resistor (10000 ohms ½ watt)	33-310339	.20
19	Condenser (250 mmfd. mica)	30-1032	.25
20	Condenser (.1 mfd. tubular)	30-4170	.25
21	Compensator (Osc. Series Broadcast)	31-6056	.55
22	Osc. Transformer (Broadcast)	32-2120	.65
23	Compensating Condensers Osc.	31-6092	.60
24	Osc. Transformer (Police)	32-2121	.40
25	Condenser (1650 mmfd. semi-fixed)	31-6096	.40
26	Osc. Transformer (S. W.)	32-2110	.75
27	Resistor (32000 ohms ½ watt)	33-332339	.20
28	Resistor (40000 ohms ½ watt)	33-340339	.20
29	Resistor (15000 ohms 1 watt)	33-315439	.20
30	Condenser (.25 mfd. tubular)	30-4446	.20
31	Shadow meter	45-2189	2.50
32	Resistor, 700 ohms, Violet, Black, Brown	33-1220	.20
33	1st I. F. Transformer	32-2100	1.50
34	2nd I. F. Transformer	32-2102	1.50
35	Condenser (110 mmfd. mica)	30-1031	.20
36	Resistor (51000 ohms, ½ watt)	33-351339	.20
37	Condenser (110 mmfd. mica)	30-1031	.20
38	Condenser (110 mmfd. mica)	30-1031	.20
39	Resistor (490000 ohms ½ watt)	33-449339	.20
40	Condenser (.008 mfd. tubular)	30-4112	.20
41	Condenser (.01 mfd. tubular)	30-4124	.25
42	Volume Control	33-5158	1.00
43	Condenser (.015 mfd. tubular)	30-4358	.20
44	Condenser (.02 mfd. tubular)	30-4113	.20
45	Resistor (1 megohm ½ watt)	33-510339	.20
46	Resistor (1 megohm ½ watt)	33-510339	.20
47	Resistor (1 megohm ½ watt)	33-510339	.20
48	Condenser (.1 mfd. tubular)	30-4122	.20
49	Resistor (490000 ohms ½ watt)	33-449339	$0.20
50	Resistor (70000 ohms ½ watt)	33-370339	.20
51	Resistor (70000 ohms ½ watt)	33-370339	.20
52	Condenser (.003 mfd. tubular)	30-4042	.20
53	Output Transformer B, X, MX	32-7634	1.50
54	Resistor (190000 ohms ½ watt)	33-419339	.20
55	Resistor (51000 ohms ½ watt)	33-351339	.20
56	Resistor (99000 ohms ½ watt)	33-399339	.20
57	Resistor (490000 ohms ½ watt)	33-449339	.20
58	Condenser (.1 mfd. tubular)	30-4122	.20
59	Cone & Voice Coil K-34 Speaker	36-3174	.80
	Cone & Voice Coil H-25 Speaker	02625	1.20
60	Condenser (.003 mfd. tubular)	30-4042	.20
61	Condenser (.05 mfd. tubular)	30-4123	.20
62	Resistor (3500 ohms ½ watt)	33-235339	.20
63	Resistor (330000 ohms ½ watt)	33-433339	.20
64	Condenser (.05 mfd. tubular)	30-4454	.25
65	Resistor (13000 ohms 2 watt)	33-313539	
66	Electrolytic Condenser	30-2045	1.80
67	Field Coil Assembly K-34 Speaker	36-3239	3.75
	Field Coil Assembly H-25 Speaker	36-3218	3.50
68	Bias Resistor	33-3276	.20
69	Electrolytic Condenser (12 mfd.)	30-2117	1.20
70	Power Transformer 115 V., 50-60 cycles	32-7597	5.25
	Power Transformer 115 V., 25-40 cycles	32-7598	
71	Condenser (.015-.015 mfd. double)	3793-DG	.40
72	Pilot Lamp	34-2039	.15
73	Tone Control & A. C. Switch	42-1182	.75
74	Ant. Switch	42-1170	1.10
75	R. F. Range Switch	42-1171	1.00
76	Osc. Range Switch	42-1172	1.10
	Selector Switch Indexing Plate & Shaft	42-1173	.50
	Pilot Lamp Assembly	38-7706	.35
	Dial	27-5214	.40
	Dial Hub	28-7187	.12
	Dial Clamp	28-2837	.10
	Set Screw	W-1641	.02
	Dial Guard	27-8324	.02
	Dial Gear	28-7185	.10
	Thrust Spring	28-8611	.01
	C Washer	28-3904	.01
	Thrust Washer	28-3976 Per C	.30
	Drive Gear	31-1884	.25
	Vernier Drive	31-1871	.75
	Mask	27-5198	.30
	Mask Arm Assembly	31-1866	.35
	Mask Guide Lamp Bracket Support	38-7844	.15
	Mask Washer	27-8318 Per C	.50
	Indicator Bracket & Lens Assem.	38-7912	$0.30
	Spring	28-8624 Per C	.50
	Lens	27-8310	.02
	Volume Control Shaft	28-6499	.10
	Volume Control Shaft Spring	28-4117 Per C	.40
	Retaining Clips	28-8610	.03
	Washer	28-4186 Per C	.75
	Washer	4436 Per C	1.50
	Socket Power Trans.	27-6052	
	Socket 8 prong	27-6058	.11
	Socket 7 prong	27-6057	.11
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	I. F. Shield	38-7763	.20
	Terminal Panel I. F. Unit	38-7703	.25
	Spacer	28-4001 Per C	.25
	Grommet Mtg. Tuning Condenser	27-4325	.02
	Grommet R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	28-2257	.01
	Spacer Mtg. R. F. Unit	27-7807 Per C	.50
	Screw Mtg. R. F. Unit	W-729 Per C	.45
	Washer Mtg. R. F. Unit	28-3927	.01
	Insulator Mtg. Electrolytic Condenser	27-7194	.01
	Bracket Mtg. Electrolytic Condenser	6440	.05
	Nut Mtg. Volume & Tone Control	W-684	1.25
	Antenna Panel	38-7714	.15
	Speaker Cable	41-3201	
	A. C. Cord	L-2183	.40
	Knob Tuning	27-4330	.10
	Knobs Tuning Vernier	27-4331	.10
	Knob Wave Switch	27-4326	.10
	Knob Tone & Volume	27-4332	.10
	Shadow Meter Mtg. Spring	28-8623 Per C	.70
	Speaker K-34, B Cabinet	36-1229	7.25
	Speaker H-25	36-1236	8.25
	Model B Cabinet		
	Bezel Frame & Plate Assembly	40-5927	.30
	Glass	27-8298	.05
	Bezel Ring	28-3967	.35
	Gasket	27-8311	.01
	Model X & MX Cabinets		
	Bottom Shield Plate	28-3895	
	Bezel Frame & Plate Assembly	40-5945	.70
	Gasket	27-8312	.01
	Screws	W-1644 Per C	.50
	Glass	27-8299	.06
	Ring	28-3987	.40

Figures in black type indicate circled figures in Base View.

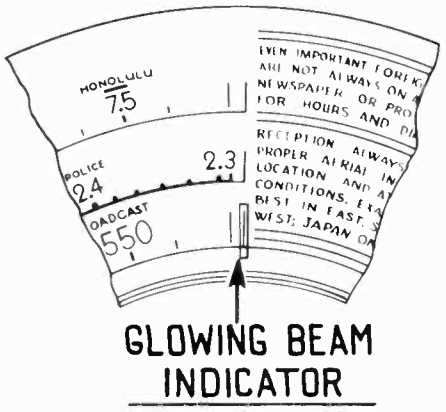


Fig. 5—Dial Calibration

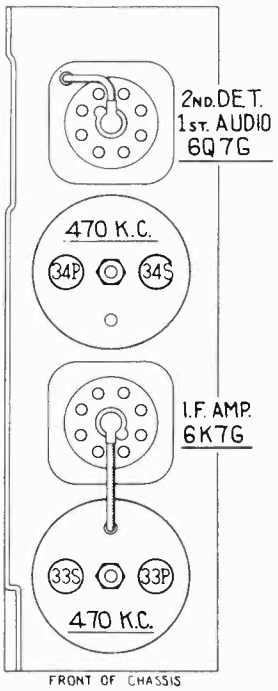


Fig. 6—Location of I. F. Compensators

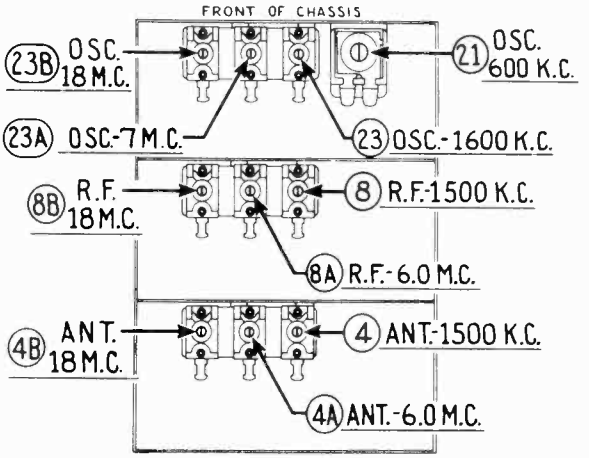


Fig. 7—Locations of R. F. Compensators

Alignment of Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I. F. Circuit, four in the Oscillator Circuit, three in the R. F. Amplifier Circuit and three in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

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 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 condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the first 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 shadow meter as follows:

1—Move the Shadow meter coil backwards and forwards, until the shadow is within one-eighth of an inch of each side of the screen.

2—Remove the Rectifier tube from its socket, and rotate the shadow meter coil for minimum shadow width.

3—Replace the Rectifier tube. The shadow should then return to maximum width or within one-eighth of an inch of each side of the screen. If the shadow does not return to maximum width, operations 1 and 2 should be continued until it does.

OUTPUT METER—The 025 Output Meter is connected to the plate and cathode terminals of one (6F6G) tube. Adjust the meter to use the (0-30) Volt Scale.

During the I. F. and R. F. adjustments, the signal generator output should be maintained at the lowest possible level that will give an indication on the output meter.

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.

2—Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to the maximum capacity position (counter-clockwise), and adjust the signal generator for 470 K. C.

3—Adjust compensators 34s 2nd I. F. Sec., 34p 2nd I. F. Pri., 33s 1st I. F. Sec., and 33p 1st I. F. Pri. for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range—7.3 to 22.0 M. C.

1—Remove the signal generator output lead from the grid of 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.
(a) Terminals 2 and 3 of aerial input panel must be connected with connector link provided on the panel, during these adjustments.

2—Set the tuning range switch in position No. 3 (Short Wave). Turn the signal generator and receiver dials to 18 M. C. and adjust compensators 23b Osc., 8b R. F. and 4b Ant. for maximum output (see note (a) below).
(a) The adjustment of the Radio Frequency compensator on the high frequency range causes a slight detuning of the oscillator circuit. In order to overcome this detuning effect, connect a variable condenser of approximately 350 mmfd., having a good vernier drive, across the oscillator section of the tuning condenser. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser so that the second harmonic of the receiver oscillator will beat against the signal from the 088 signal generator bringing in the signal. The antenna and R. F. compensator (4 b and 8 b should then be adjusted to give maximum output. Now remove the external condenser and turn compensator 23b to maximum capacity (clockwise) then without moving signal generator or receiver tuning condenser, back off compensator 23b (counter-clockwise) until a second peak is reached on the output meter. The first peak is caused by tuning to the image frequency signal and must not be used.

Tuning Range—2.3 to 7.4 M. C.

1—Turn the range switch to position No. 2 (police). Rotate the signal generator and receiver dials to 7.0 M. C. Then adjust compensator 23a for maximum output. Now turn the signal generator and receiver dials to 6.0 M. C. and adjust compensators 8a R. F. and 4a Ant. for maximum reading on the output meter.

Tuning Range—530 to 1720 K. C.

1—Set the range switch in position No. 1 (Broadcast). Set the 088 Signal Generator indicator at 800 K. C. and the receiver dial at 1600 K. C.
(a) In adjusting the receiver at 1600 K. C. the second harmonic of 800 K. C., to which the signal generator is tuned, is used. The second harmonic of 800 K. C. is 1600 K. C. Now adjust compensators 23 Osc., 8 R. F. and 4 Ant. for maximum reading on output meter.

2—The low frequency end of the range is now tuned by turning the signal generator and receiver dials to 600 K. C. and adjusting compensator 21 Osc. series (see Note (a) below) for maximum reading on output meter.
(a) While compensator 21 is being adjusted, the tuning condenser must be rolled for maximum output. This is accomplished as follows: First tune compensator 23 for maximum output. Then vary the tuning condenser for maximum output at 600 K. C. Now retune compensator 21 and again vary the tuning condenser back and forth at 600 K. C. for maximum output. This operation of first turning the compensator then the tuning condenser is continued until maximum output is obtained at the 600 K. C. frequency.

3—After the low frequency (600 K. C.) end of the range is adjusted, the 1600 K. C. end is readjusted, as given in Paragraph (1) above, to correct any variation that the low frequency series compensator may have caused in the alignment of the high frequency end.

4—Now turn the signal generator and receiver dials to 1500 K. C. and readjust compensators 4 Ant., and 8 R. F., for maximum output.

PHILCO . . . . . Model 37-640

FOR MEMBERS OF
RADIO MANUFACTURERS SERVICE

SERVICE BULLETIN
No. 253

SERVICE DATA

Model 37-640 is a 7 tube superheterodyne receiver for operation on alternating current, having three tuning ranges, covering standard broadcast and short-wave frequencies. The chassis is constructed in three basic assembly units, concentrating the R. F., I. F. and Audio Output circuits in individual units.

The circuit consists of the **"PHILCO FOREIGN TUNING SYSTEM"**—controlled by the range switch—providing maximum sensitivity and noise reduction, when used with the **PHILCO HIGH EFFICIENCY AERIAL.** One stage of radio frequency amplification which increases the signal to noise ratio, Automatic Bass Compensation in the volume control circuit, Shadow Tuning, a separate diode circuit for the Automatic Volume Control and a push-pull pentode audio output circuit are also incorporated in this receiver.

Aerial Connections

The Philco High Efficiency Aerial is recommended, for use with this receiver, to obtain maximum performance. A terminal panel is provided at the rear of the chassis for connecting the aerial. This panel contains four screw terminals and a connecting link.

When using the PHILCO HIGH EFFICIENCY AERIAL connect the red and black leads of the Aerial transmission line (lead-in) to terminals 1 and 2 respectively and the ground lead to terminal 3. The connector link should be across terminals 3 and 4.

If a temporary aerial and ground is used shift the connecting link to rest across terminals 2 and 3 and connect the aerial and ground to terminals 1 and 3 respectively.

REMOVING SWITCH AND COIL ASSEMBLIES FROM R. F. UNIT

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 grommet, 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 the unit) then pull shaft straight out. Removal of the volume control shaft is also necessary.

IMPORTANT—When selector switch shaft is replaced, care should be taken to have all wafer rotors in the same position so that index projection on the end of shaft will slide freely into notched hole in wafer rotors. **Never** force shaft into rotors.

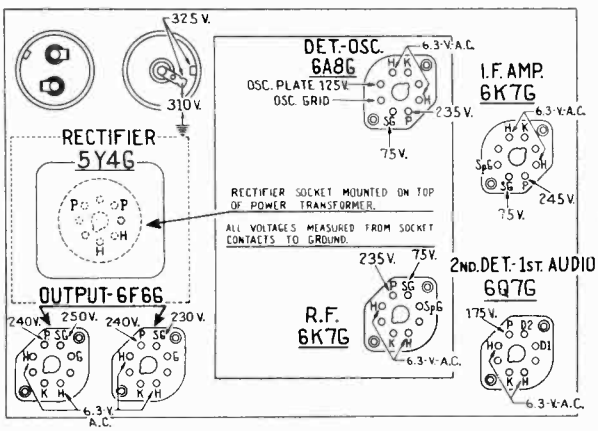


Fig. 1—Socket Voltages Measured from Underside of Chassis

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.

AERIAL SWITCH AND COIL ASSEMBLY. FIRST SECTION FROM REAR OF UNIT

a. Remove screw holding shield plate to unit base. This screw is located in the right hand corner of shield plate, facing rear underside of chassis.

b. Unsolder the leads connecting the range switch to the aerial panel and I. F. terminal panel; tubular condenser ⑤ to the tuning condenser stator plate and ground lead from assembly shield to unit frame—lift assembly straight out of unit.

R. F. AMPLIFIER ASSEMBLY, CENTER SECTION

a. Remove screw holding shield plate to unit base.

b. Unsolder the leads connecting the range switch to I. F. terminal panel and 6K7G plate socket contact, tubular condenser ⑮ to the tuning condenser housing, selector switch contact (D2) to the tuning condenser stator plates, tubular condenser ⑭ to shield ground lug and shield to R. F. unit base. The amplifier assembly may then be removed.

OSCILLATOR SWITCH AND COIL ASSEMBLY. THIRD SECTION FROM REAR OF UNIT

a. The oscillator assembly may now be removed by unscrewing the four screws holding shield to R. F. base. These screws are located on each side of the R. F. base.

b. Unsolder the leads connecting range switch to the 6K7G socket contacts and terminal panel in the I. F. unit, condenser ⑰ lead from tuning condenser housing and lead connecting selector switch to the tuning condenser stator plates. Then unsolder wires connecting selector switch to electrolytic condenser ⑯ and 6A8G socket contacts.

Parts are replaced by following the above procedure in the reverse order.

Electrical Specifications

Voltage Rating: 115 A. C.

Frequency Rating: 50 to 60 cycle.
For 25 to 40 cycle operation use Power Transformer marked with asterisk in parts list.

Power Consumption: 80 watts.

Type and Number of Tubes: 2 type 6K7G—R. F. and I. F. Amplifier; 1 type 6A8G—Det. Oscillator; 1 type 6Q7G—2nd Det., 1st Audio, A. V. C.; 2 type 6F6G—Push-pull Output; 1 type 5Y4G—Rectifier.

Undistorted Output: 5 watts.

Intermediate Frequency: 470 K. C.

Tuning Ranges: Three. Range 1—530 to 1720 K. C. Range 2—2.3 to 7.4 M. C. Range 3—7.35 to 22 M. C.

Speakers: K-34 B Cabinet.
H-25 X-MX Cabinet.

POWER TRANSFORMER DATA

Schematic Lead Number	A.C. Volts	Current	Circuit	Color	Resistance
1-2	120	...	Pri.	White	3 ohms
3-4	5.0	2.0A	Fil. Rect.	Blue	.1 ohms
5-7	670	100 MA	High Voltage Sec.	Yellow	70 ohms 75 ohms
6	...	...	Center Top of 5-7	.....	Yellow Green
8-9	6.7	3.0A	Fil. Tubes	Black	.1 ohm

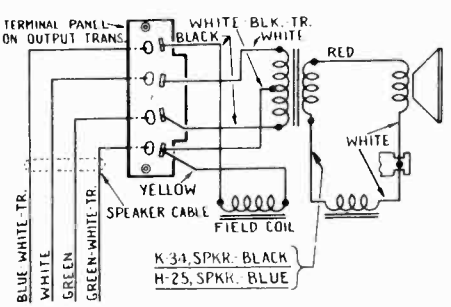


Fig. 2—Speaker Wiring

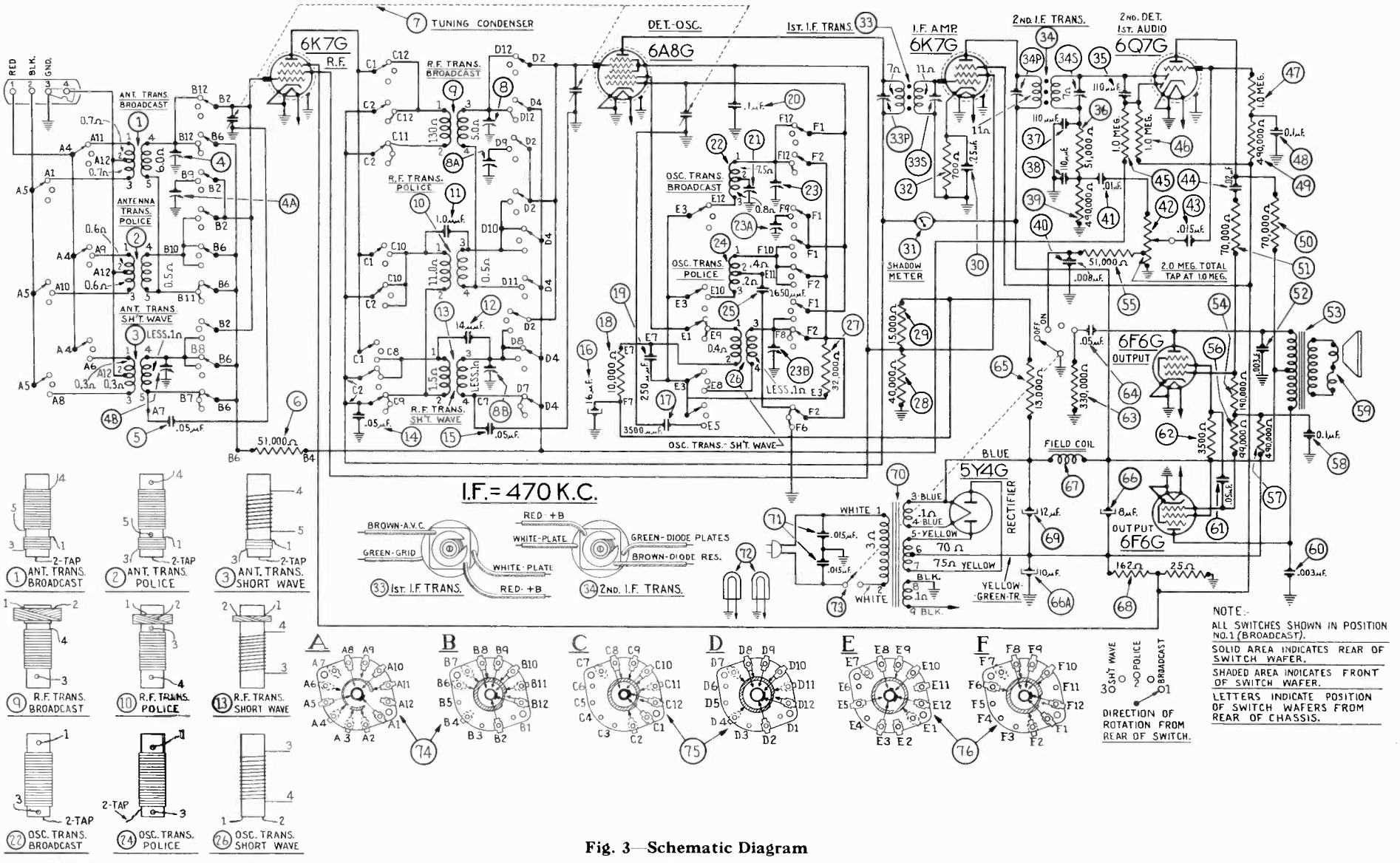


Fig. 3—Schematic Diagram

Model 37-640

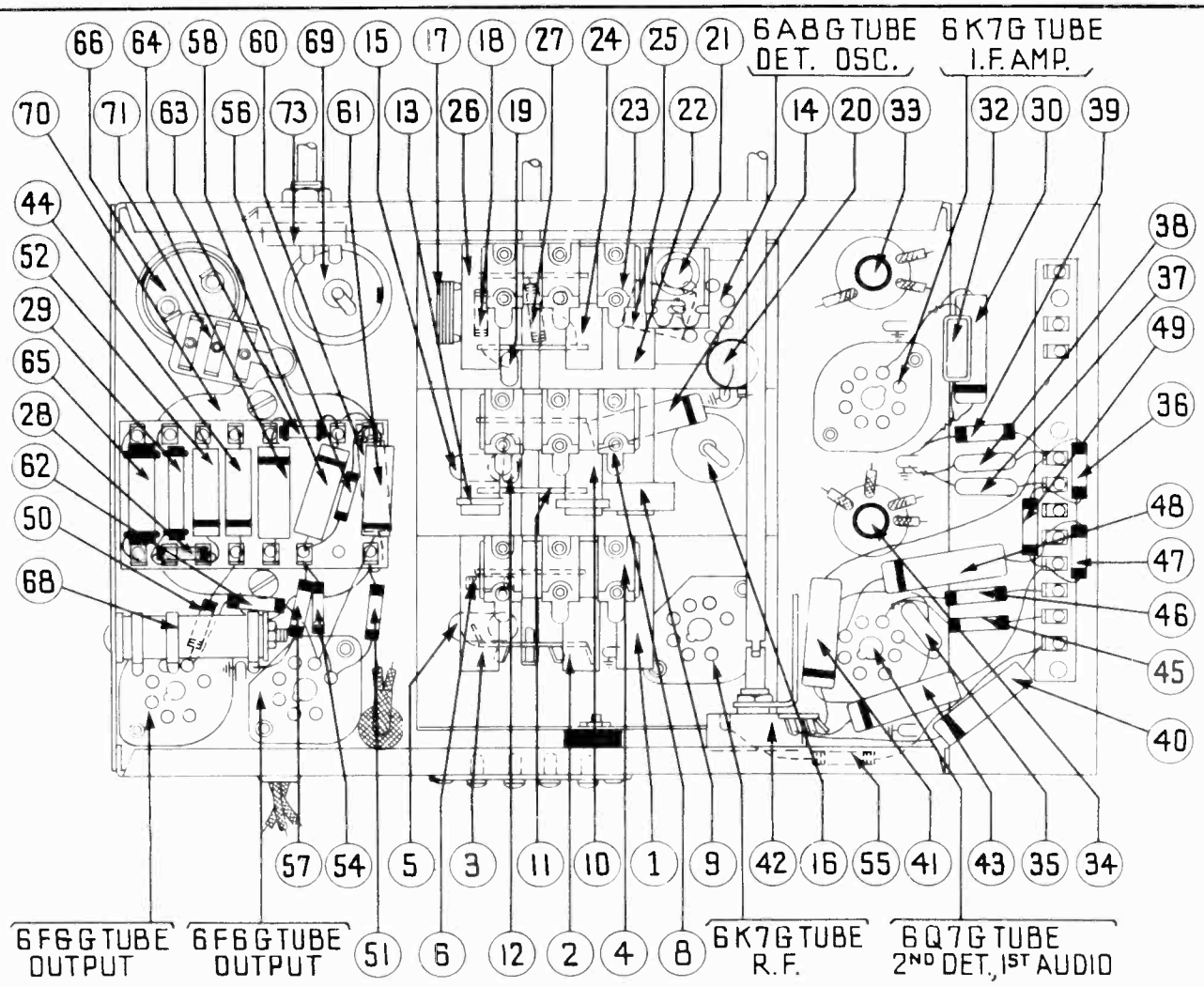


Fig. 4—Base View

Replacement Parts—Model 37-640

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Broadcast)	32-2108	$0.80
2	Antenna Transformer (Police)	32-2119	.65
3	Antenna Transformer (S. W.)	32-2109	.75
4	Compensating Condensers Ant.	31-6092	.60
5	Condenser (.05 mfd. tubular)	30-4020	.20
6	Resistor (51000 ohms ½ watt)	33-351339	.20
7	Tuning Condenser	31-1820	5.00
8	Compensating Condensers R. F.	31-6092	.60
9	R. F. Transformer (Broadcast)	32-2105	.75
10	R. F. Transformer (Police)	32-2106	.65
11	Condenser		
12	Condenser (14 mmfd. mica)	30-1073	.20
13	R. F. Transformer (S. W.)	32-2126	.55
14	Condenser (.05 mfd. tubular)	30-4123	.20
15	Condenser (.05 mfd. tubular)	30-4020	.20
16	Electrolytic Condenser (16 mfd.)	30-2118	1.65
17	Condenser (3500 mmfd. semi-fixed)	31-6097	.50
18	Resistor (10000 ohms ½ watt)	33-310339	.20
19	Condenser (250 mmfd. mica)	30-1032	.25
20	Condenser (.1 mfd. tubular)	30-4170	.25
21	Compensator (Osc. Series Broadcast)	31-6056	.55
22	Osc. Transformer (Broadcast)	32-2120	.65
23	Compensating Condensers Osc.	31-6092	.60
24	Osc. Transformer (Police)	32-2121	.40
25	Condenser (1650 mmfd. semi-fixed)	31-6096	.40
26	Osc. Transformer (S. W.)	32-2110	.75
27	Resistor (32000 ohms ½ watt)	33-332339	.20
28	Resistor (40000 ohms ½ watt)	33-340339	.20
29	Resistor (15000 ohms 1 watt)	33-315439	.20
30	Condenser (.25 mfd. tubular)	30-4446	.20
31	Shadow meter	45-2189	2.50
32	Resistor, 700 ohms, Violet, Black, Brown	33-1220	.20
33	1st I. F. Transformer	32-2100	1.50
34	2nd I. F. Transformer	32-2102	1.50
35	Condenser (110 mmfd. mica)	30-1031	.20
36	Resistor (51000 ohms, ½ watt)	33-351339	.20
37	Condenser (110 mmfd. mica)	30-1031	.20
38	Condenser (110 mmfd. mica)	30-1031	.20
39	Resistor (490000 ohms ½ watt)	33-449339	.20
40	Condenser (.008 mfd. tubular)	30-4112	.20
41	Condenser (.01 mfd. tubular)	30-4124	.25
42	Volume Control	33-5158	1.00
43	Condenser (.015 mfd. tubular)	30-4358	.20
44	Condenser (.02 mfd. tubular)	30-4113	.20
45	Resistor (1 megohm ½ watt)	33-510339	.20
46	Resistor (1 megohm ½ watt)	33-510339	.20
47	Resistor (1 megohm ½ watt)	33-510339	.20
48	Condenser (.1 mfd. tubular)	30-4122	.20
49	Resistor (490000 ohms ½ watt)	33-449339	$0.20
50	Resistor (70000 ohms ½ watt)	33-370339	.20
51	Resistor (70000 ohms ½ watt)	33-370339	.20
52	Condenser (.003 mfd. tubular)	30-4042	.20
53	Output Transformer B, X, MX	32-7634	1.50
54	Resistor (190000 ohms ½ watt)	33-419339	.20
55	Resistor (51000 ohms ½ watt)	33-351339	.20
56	Resistor (99000 ohms ½ watt)	33-399339	.20
57	Resistor (490000 ohms ½ watt)	33-449339	.20
58	Condenser (.1 mfd. tubular)	30-4122	.20
59	Cone & Voice Coil K-34 Speaker	36-3174	.80
	Cone & Voice Coil H-25 Speaker	02625	1.20
60	Condenser (.003 mfd. tubular)	30-4042	.20
61	Condenser (.05 mfd. tubular)	30-4123	.20
62	Resistor (3500 ohms ½ watt)	33-235339	.20
63	Resistor (330000 ohms ½ watt)	33-433339	.20
64	Condenser (.05 mfd. tubular)	30-4454	.25
65	Resistor (13000 ohms 2 watt)	33-313539	
66	Electrolytic Condenser	30-2045	1.80
67	Field Coil Assembly K-34 Speaker	36-3239	3.75
	Field Coil Assembly H-25 Speaker	36-3218	3.50
68	Bias Resistor	33-3276	.20
69	Electrolytic Condenser (12 mfd.)	30-2117	1.20
70	Power Transformer 115 V., 50-60 cycles	32-7597	5.25
	Power Transformer 115 V., 25-40 cycles	32-7598	
71	Condenser (.015-.015 mfd. double)	3793-DG	.40
72	Pilot Lamp	34-2039	.15
73	Tone Control & A. C. Switch	42-1182	.75
74	Ant. Switch	42-1170	1.10
75	R. F. Range Switch	42-1171	1.00
76	Osc. Range Switch	42-1172	1.10
	Selector Switch Indexing Plate & Shaft	42-1173	.50
	Pilot Lamp Assembly	38-7706	.35
	Dial	27-5214	.40
	Dial Hub	28-7187	.12
	Dial Clamp	28-2837	.10
	Set Screw	W-1641	.02
	Dial Guard	27-8324	.02
	Dial Gear	28-7185	.10
	Thrust Spring	28-8611	.01
	C Washer	28-3904	.01
	Thrust Washer	28-3976 Per C	.30
	Drive Gear	31-1884	.25
	Vernier Drive	31-1871	.75
	Mask	27-5198	.30
	Mask Arm Assembly	31-1866	.35
	Mask Guide Lamp Bracket Support	38-7844	.15
	Mask Washer	27-8318 Per C	.50
	Indicator Bracket & Lens Assem.	38-7912	$0.30
	Spring	28-8624 Per C	.50
	Lens	27-8310	.02
	Volume Control Shaft	28-6499	.10
	Volume Control Shaft Spring	28-4117 Per C	.40
	Retaining Clips	28-8610	.03
	Washer	28-4186 Per C	.75
	Washer	4436 Per C	1.50
	Socket Power Trans.	27-6052	
	Socket 8 prong	27-6058	.11
	Socket 7 prong	27-6057	.11
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	I. F. Shield	38-7763	.20
	Terminal Panel I. F. Unit	38-7703	.25
	Spacer	28-4001 Per C	.25
	Grommet Mtg. Tuning Condenser	27-4325	.02
	Grommet R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	28-2257	.01
	Spacer Mtg. R. F. Unit	27-7807 Per C	.50
	Screw Mtg. R. F. Unit	W-729 Per C	.45
	Washer Mtg. R. F. Unit	28-3927	.01
	Insulator Mtg. Electrolytic Condenser	27-7194	.01
	Bracket Mtg. Electrolytic Condenser	6440	.05
	Nut Mtg. Volume & Tone Control	W-684	1.25
	Antenna Panel	38-7714	.15
	Speaker Cable	41-3201	
	A. C. Cord	L-2183	.40
	Knob Tuning	27-4330	.10
	Knobs Tuning Vernier	27-4331	.10
	Knob Wave Switch	27-4326	.10
	Knob Tone & Volume	27-4332	.10
	Shadow Meter Mtg. Spring	28-8623 Per C	.70
	Speaker K-34. B Cabinet	36-1229	7.25
	Speaker H-25	36-1236	8.25
	Model B Cabinet		
	Bezel Frame & Plate Assembly	40-5927	.30
	Glass	27-8298	.05
	Bezel Ring	28-3967	.35
	Gasket	27-8311	.01
	Model X & MX Cabinets		
	Bottom Shield Plate	28-3895	
	Bezel Frame & Plate Assembly	40-5945	.70
	Gasket	27-8312	.01
	Screws	W-1644 Per C	.50
	Glass	27-8299	.06
	Ring	28-3987	.40

Figures in black type indicate circled figures in Base View.

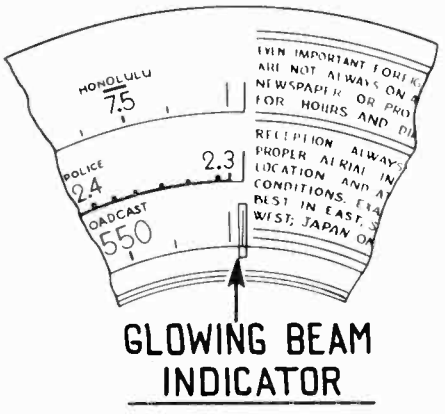


Fig. 5—Dial Calibration

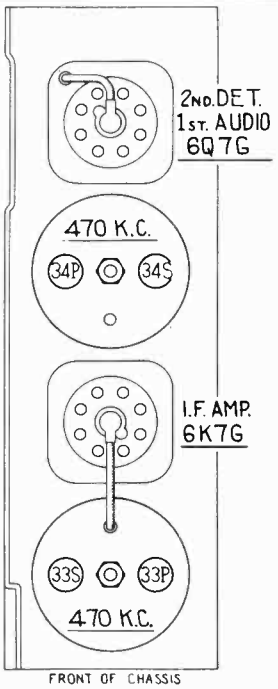


Fig. 6—Location of I. F. Compensators

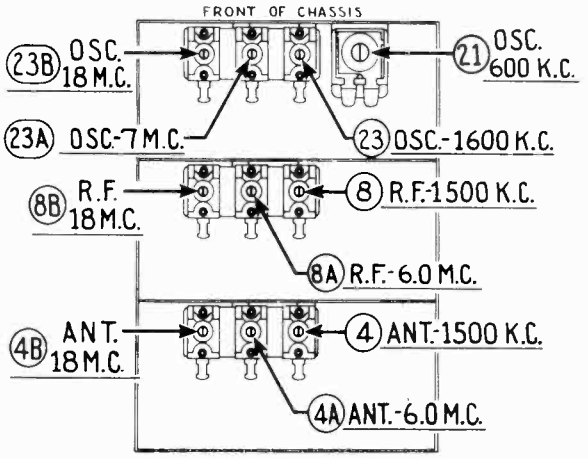


Fig. 7—Locations of R. F. Compensators

Alignment of Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I. F. Circuit, four in the Oscillator Circuit, three in the R. F. Amplifier Circuit and three in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

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 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 condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the first 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 shadow meter as follows:

1—Move the Shadow meter coil backwards and forwards, until the shadow is within one-eighth of an inch of each side of the screen.

2—Remove the Rectifier tube from its socket, and rotate the shadow meter coil for minimum shadow width.

3—Replace the Rectifier tube. The shadow should then return to maximum width or within one-eighth of an inch of each side of the screen. If the shadow does not return to maximum width, operations 1 and 2 should be continued until it does.

OUTPUT METER—The 025 Output Meter is connected to the plate and cathode terminals of one (6F6G) tube. Adjust the meter to use the (0-30) Volt Scale.

During the I. F. and R. F. adjustments, the signal generator output should be maintained at the lowest possible level that will give an indication on the output meter.

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.

2—Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to the maximum capacity position (counter-clockwise), and adjust the signal generator for 470 K. C.

3—Adjust compensators ㊳s 2nd I. F. Sec., ㊴p 2nd I. F. Pri., ㊳s 1st I. F. Sec., and ㊴p 1st I. F. Pri. for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range—7.3 to 22.0 M. C.

1—Remove the signal generator output lead from the grid of 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.
(a) Terminals 2 and 3 of aerial input panel must be connected with connector link provided on the panel, during these adjustments.

2—Set the tuning range switch in position No. 3 (Short Wave). Turn the signal generator and receiver dials to 18 M. C. and adjust compensators ㉓b Osc., ⑧b R. F. and ④b Ant. for maximum output (see note (a) below).
(a) The adjustment of the Radio Frequency compensator on the high frequency range causes a slight detuning of the oscillator circuit. In order to overcome this detuning effect, connect a variable condenser of approximately 350 mmfd., having a good vernier drive, across the oscillator section of the tuning condenser. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser so that the second harmonic of the receiver oscillator will beat against the signal from the 088 signal generator bringing in the signal. The antenna and R. F. compensator ④b and ⑧b should then be adjusted to give maximum output. Now remove the external condenser and turn compensator ㉓b to maximum capacity (clockwise) then without moving signal generator or receiver tuning condenser, back off compensator ㉓b (counter-clockwise) until a second peak is reached on the output meter. The first peak is caused by tuning to the image frequency signal and must not be used.

Tuning Range—2.3 to 7.4 M. C.

1—Turn the range switch to position No. 2 (police). Rotate the signal generator and receiver dials to 7.0 M. C. Then adjust compensator ㉓a for maximum output. Now turn the signal generator and receiver dials to 6.0 M. C. and adjust compensators ⑧a R. F. and ④a Ant. for maximum reading on the output meter.

Tuning Range—530 to 1720 K. C.

1—Set the range switch in position No. 1 (Broadcast). Set the 088 Signal Generator indicator at 800 K. C. and the receiver dial at 1600 K. C.
(a) In adjusting the receiver at 1600 K. C. the second harmonic of 800 K. C., to which the signal generator is tuned, is used. The second harmonic of 800 K. C. is 1600 K. C. Now adjust compensators ㉓ Osc., ⑧ R. F. and ④ Ant. for maximum reading on output meter.

2—The low frequency end of the range is now tuned by turning the signal generator and receiver dials to 600 K. C. and adjusting compensator ㉑ Osc. series (see Note (a) below) for maximum reading on output meter.
(a) While compensator ㉑ is being adjusted, the tuning condenser must be rolled for maximum output. This is accomplished as follows: First tune compensator ㉑ for maximum output. Then vary the tuning condenser for maximum output at 600 K. C. Now retune compensator ㉑ and again vary the tuning condenser back and forth at 600 K. C. for maximum output. This operation of first turning the compensator then the tuning condenser is continued until maximum output is obtained at the 600 K. C. frequency.

3—After the low frequency (600 K. C.) end of the range is adjusted, the 1600 K. C. end is readjusted, as given in Paragraph (1) above, to correct any variation that the low frequency series compensator may have caused in the alignment of the high frequency end.

4—Now turn the signal generator and receiver dials to 1500 K. C. and readjust compensators ④ Ant., and ⑧ R. F., for maximum output.

Printed in U. S. A.

PHILCO . . . . . Model 37-660

FOR MEMBERS OF
RADIO MANUFACTURERS SERVICE

SERVICE BULLETIN
No. 257

SERVICE DATA

Model 37-660 is a 9 tube superheterodyne receiver designed for operation on alternating current. It has four tuning ranges, covering standard broadcast and short-wave frequencies. The chassis is constructed in four basic assembly units, 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 pentode 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 ½ inch. The assembly may now be removed by loosening set screw of range switch arm, then pull 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 and assembly shield plate ground leads.

2. Unsolder the two leads from the gang condenser terminal panel which connect to the range switch. Also lead of tubular condenser (7) at the ground lug on the R.F. Unit.

3. Remove screw holding 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 connects to the range switch. Then remove ground leads of shield plate.

2. Unsolder the leads from the gang condenser terminal panels and the lead of tubular condenser (18) at the ground lug on R.F. Unit base.

3. Remove the screw holding 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 assembly straight out.

OSCILLATOR ASSEMBLY—Front Section

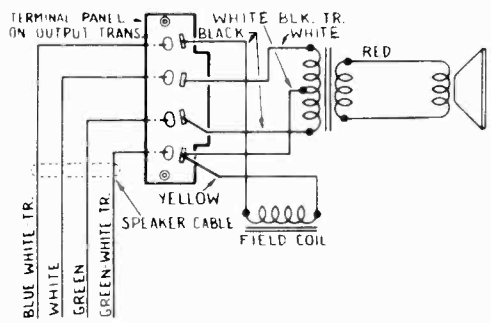
1. The oscillator assembly can be removed by unscrewing the two screws located on each side of the R.F. Unit.

2. Unsolder the wires connecting range switch to bakelite condenser (78) in the power unit. electrolytic condenser (21) in the R.F. Unit and OSC plate contact on the 6A8G socket.

3. Remove the leads from the gang condenser terminal panels and the lead of Mica condenser (24) at the ground lug on R.F. Unit base.

Electrical Specifications

Power Supply: 115 V.
Frequency: 50-60 cycle.
For 25 to 40 cycle operation, use the Power transformer marked with asterisk in the parts list.
Consumption: 130 Watts.
Intermediate Frequency: 470 K. C.
Output: 10 Watts.
Philco Tubes: 6K7G—R.F. Amplifier; 6A8G—Oscillator and first detector; 6K7G—I.F. Amplifier; 6J5G—2nd detector, A.V.C.; 6K5G—1st Audio; 6J5G Phase Inverter; 2-6F6G—Output; 5Y4G—Rectifier.
Tuning Ranges: Range 1—530 to 1720 K. C.; Range 2—2.3 to 7.4 M. C.; Range 3—7.35 to 11.6 M. C.; Range 4—11.5 to 18.2 M. C.
Speakers: X cabinet—H-27; B cabinet—K-36.



Speaker Wiring for Types K-36 and H-27

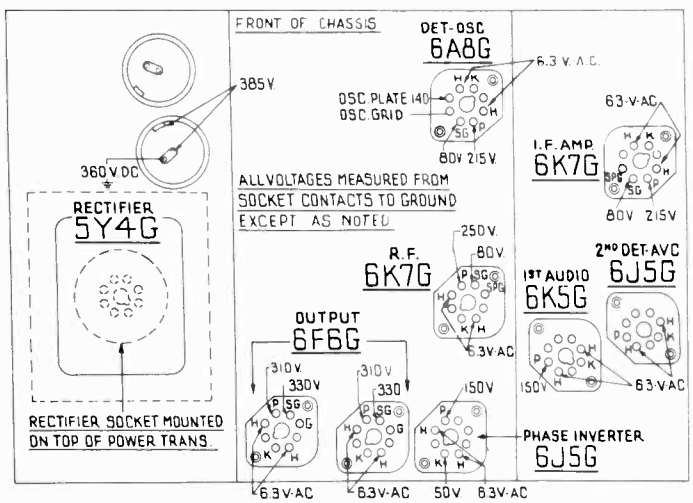


Fig. 1—Socket Voltages—Underside of Chassis View

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.

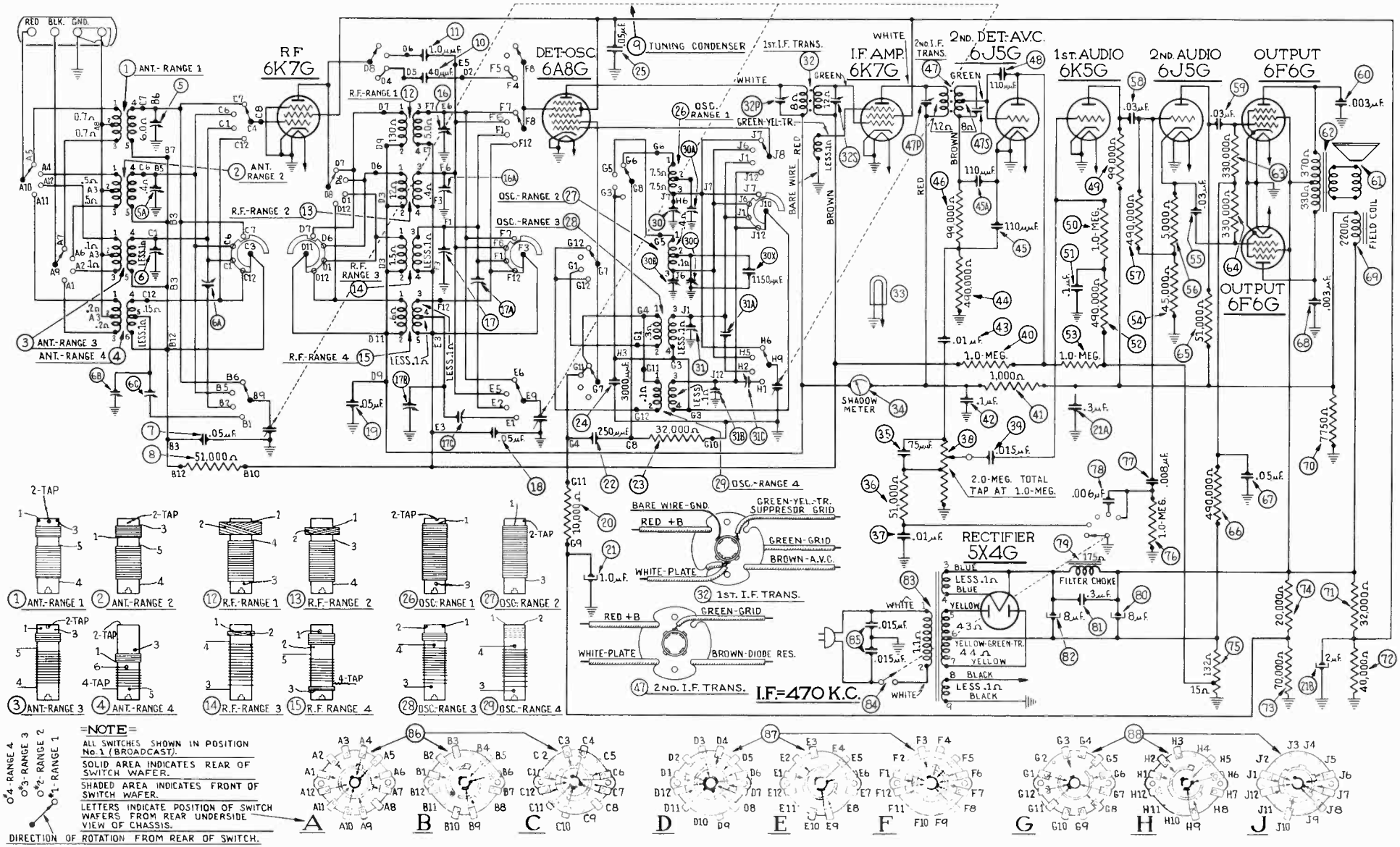


Fig. 2—Schematic Diagram

Model 37-660

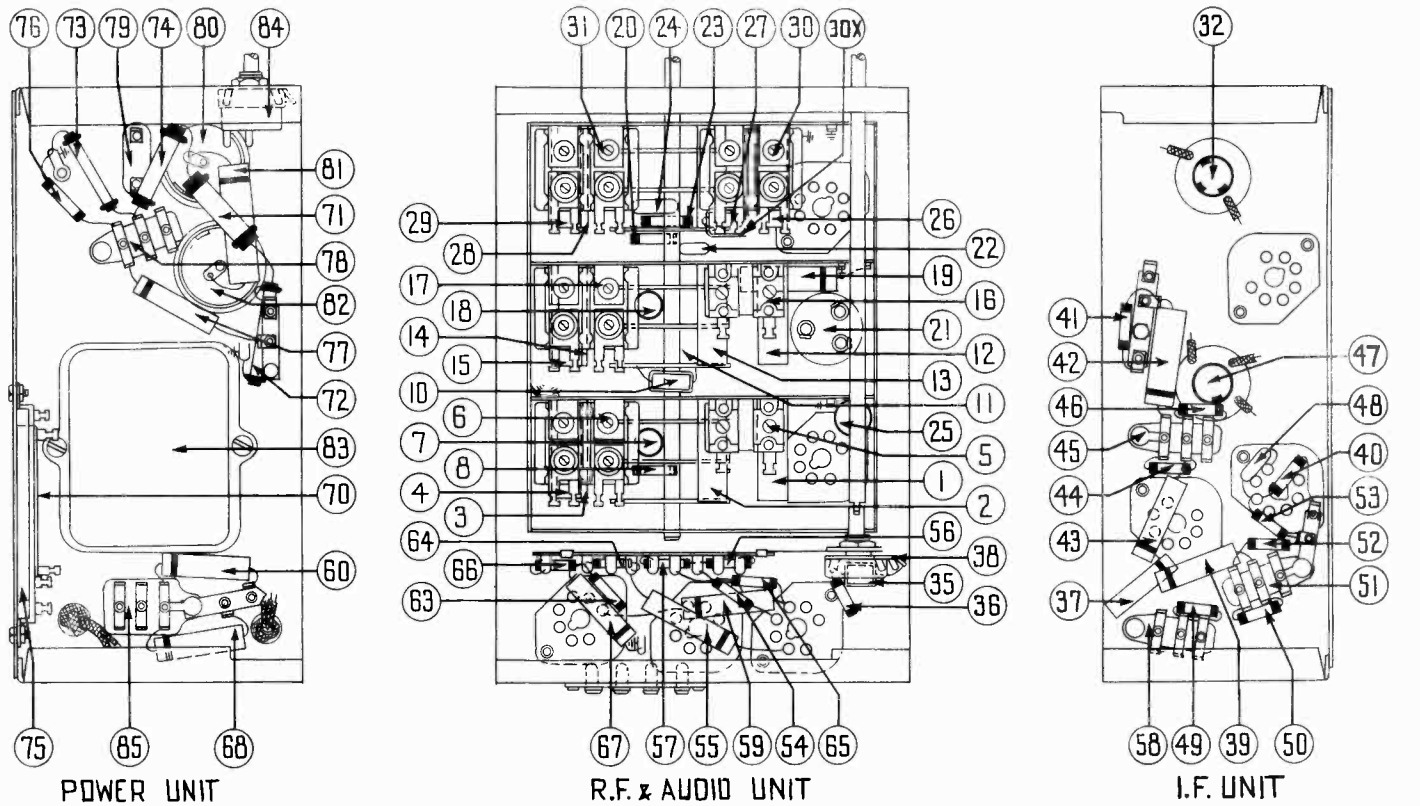


Fig. 3—Parts Locations—Underside View of Chassis.

Replacement Parts—Model 37-660

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (530 to 1720 K.C.)	32-2108	$0.80
2	Antenna Transformer (2.3 to 7.4 M.C.)	32-2119	.65
3	Antenna Transformer (7.35 to 11.6 M.C.)	32-2185	.70
4	Antenna Transformer (11.5 to 18.2 M.C.)	32-2175	.80
5	Compensator (Two sections) brown dot	31-6120	
6	Compensator (Four sections) brown dot	31-6105	
7	Condenser (.05 mfd. tubular)	30-4020	.20
8	Resistor (51000 ohms, ½ watt)	33-351339	.20
9	Tuning Condenser	31-1855	4.50
10	Condenser (40 mmfd. mica)	30-1076	.20
11	Condenser twisted wire & lugs		
12	R.F. Transformer (530 to 1720 K.C.)	32-2105	.75
13	R.F. Transformer (2.3 to 7.4 M.C.)	32-2106	.65
14	R.F. Transformer (7.3 to 11.6 M.C.)	32-2178	.60
15	R.F. Transformer (11.5 to 18.2 M.C.)	32-2176	.70
16	Compensator (Two sections) brown dot	31-6120	
17	Compensator (Four sections) red dot	31-6106	
18	Condenser (.05 mfd. tubular)	30-4020	.20
19	Condenser (.05 mfd. tubular)	30-4123	.20
20	Resistor (10000 ohms, ½ watt)	33-310339	.20
21	Electrolytic Condenser (three sections 1, 2, 3 mfd.)	30-2122	1.85
22	Condenser (250 mmfd. mica)	30-1032	.25
23	Resistor (32000 ohms, ½ watt)	33-332339	.20
24	Condenser (.003 mfd. mica)	30-1028	.45
25	Condenser (.05 mfd. tubular)	30-4123	.20
26	Oscillator Transformer (530 to 1720 K.C.)	32-2120	.65
27	Oscillator Transformer (2.3 to 7.4 M.C.)	32-2121	.40
28	Oscillator Transformer (7.3 to 11.6 M.C.)	32-2186	.70
29	Oscillator Transformer (11.5 to 18.2 M.C.)	32-2182	.70
30	Compensator (Four sections) yellow dot	31-6108	
30x	Condenser (1150 mmf)	30-1081	
31	Compensator (Four sections) brown dot	31-6105	
32	1st I.F. Transformer	32-2169	
33	Pilot Lamp Shadowmeter	34-2039	.15
34	Shadowmeter	45-2189	2.50
35	Condenser (75 mmfd. mica)	30-1053	.20
36	Resistor (51000 ohms, ½ watt)	33-351339	.20
37	Condenser (.006 mfd. tubular)	30-4125	.20
38	Volume Control	33-5158	1.00
39	Condenser (.015 mfd. tubular)	30-4358	.20
40	Resistor (1 megohm, ½ watt)	33-510339	.30
41	Resistor (1000 ohms, ½ watt)	33-210339	.20
42	Condenser (.1 mfd. tubular)	30-4170	.25
43	Condenser (.01 mfd. tubular)	30-4124	.25
44	Resistor (490000 ohms, ½ watt)	33-449339	.20
45	Condenser (110 mmfd. twin bakelite)	8035-DG	.25
46	Resistor (99000 ohms, ½ watt)	33-399339	$0.20
47	2nd I.F. Transformer	32-2171	
48	Condenser (110 mmfd. mica)	30-1031	.20
49	Resistor (99000 ohms, ½ watt)	33-399339	.20
50	Resistor (1 megohm, ½ watt)	33-510339	.30
51	Condenser (.1 mfd. bakelite)	4989-SG	.35
52	Resistor (490000 ohms, ½ watt)	33-449339	.20
53	Resistor (1 megohm, ½ watt)	33-510339	.30
54	Resistor (45000 ohm, ½ watt)	33-345339	.20
55	Condenser (.03 mfd. tubular)	30-4380	.20
56	Resistor (5000 ohms, ½ watt)	33-250339	.20
57	Resistor (490000 ohms, ½ watt)	33-449339	.20
58	Condenser (.03 mfd. bakelite)	8318-SU	.35
59	Condenser (.03 mfd. tubular)	30-4380	.20
60	Condenser (.003 mfd. tubular)	30-4469	
61	Cone & Voice Coil (H-27)	02625	1.20
	Cone & Voice Coil (K-36)	36-3020	
62	Output Transformer (H-27, K-36)	32-7634	1.50
63	Resistor (330000 ohms, ½ watt)	33-433339	.20
64	Resistor (330000 ohms, ½ watt)	33-433339	.20
65	Resistor (51000 ohms, ½ watt)	33-351339	.20
66	Resistor (490000 ohms, ½ watt)	33-449339	.20
67	Condenser (.05 mfd. tubular)	30-4444	.20
68	Condenser (.003 mfd. tubular)	30-4469	
69	Field Coil (H-27, K-36)	36-3673	
70	Resistor (7750 ohms, wirewound)	33-3279	
71	Resistor (32000 ohms, 2 watts)	33-332539	
72	Resistor (40000 ohms, 1 watt)	33-340339	
73	Resistor (70000 ohms, 1 watt)	33-370439	.20
74	Resistor (20000 ohms, 2 watt)	33-320539	
75	Bias Resistor (Wirewound)	33-3278	
76	Resistor (1 megohm, ½ watt)	33-510339	.20
77	Condenser (.008 mfd. tubular)	30-4112	.20
78	Condenser (.006 mfd. bakelite)	7625-SU	.25
79	Filter Choke	32-7115	1.80
80	Electrolytic Condenser 8 uf.	30-2026	1.05
81	Condenser (.3 mfd. tubular)	30-4465	
82	Electrolytic Condenser 8 uf.	30-2026	1.05
83	Power Transformer (115 V., 50-60 Cycles)	32-7615	
*	Power Transformer (115 V., 25-40 Cycles)	32-7616	
84	Tone Control & AC Switch	42-1184	.75
85	Condenser (.015 Twin Bakelite)	3793-DG	.40
86	Antenna Range Switch	42-1202	1.50
87	R.F. Range Switch	42-1203	1.50
88	Oscillator Range Switch	42-1204	1.50
	Switch Indexing Plate & Shaft	42-1186	
	Dial	27-5209	.55
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Screw Set	W-1641	
	Dial Gear	28-7185	$0.10
	Drive Gear	31-1884	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	.30 C
	C Washer	28-3904	.01
	Vernier Drive Assem.	31-1871	
	Mask	27-5240	
	Mask Arm & Link Assembly	31-1887	
	Mask Washer	27-8318	.50 C
	Mask Guide Bracket	38-7876	
	Screen & Lens Holder Assembly	31-1900	
	Pilot Lamp Assembly	38-7706	.35
	Shadow Meter Lamp Shield	28-2917	.02
	Shadow Meter Mtg. Spring	28-8623	.70 C
	Socket, 7 Prong	27-6057	.11
	Socket, 8 Prong	27-6052	
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	Volume Control Shaft	28-6500	.12
	Retaining Clips	28-8610	.03
	Washer (Volume Control)	28-4186	.75 C
	Washer Volume Control (Spring)	4436	1.50 C
	Spring	28-4117	.40 C
	Grommet Mtg. R.F. Unit	27-4317	.04
	Sleeve Mtg. R.F. Unit	28-2257	.01
	Screw Mtg. R.F. Unit	W-729	.45 C
	Washer	28-3927	.01
	Mtg. Rubber Tuning Condenser	27-4325	.02
	Speaker Cable	41-3202	
	A. C. Cord	L-2183	.40
	Terminal Panel Ant.	38-7714	.15
	Knob Assembly	27-4330	.10
	Knob Assembly	27-4331	.10
	Knob Assembly	27-4332	.10
	Knob Assembly	27-4326	.10
	"B" CABINET		
	Speaker K-36	36-1233	
	Bezel Frame & Plate Assembly	40-5946	
	Gasket	27-8312	.01
	Glass	27-8299	.06
	Ring	28-3987	.40
	"X" CABINET		
	Speaker H-27	36-1240	
	Screw Mtg. Speaker	W-709	
	Bezel Frame & Plate Assembly	40-5948	
	Glass	27-8300	.06
	Ring	28-3988	.45
	Gasket	27-8313	.01
	Bottom Shield Plate	28-4031	.45

Figures in black type indicate circled figures in Base View.

Prices Subject to Change without Notice

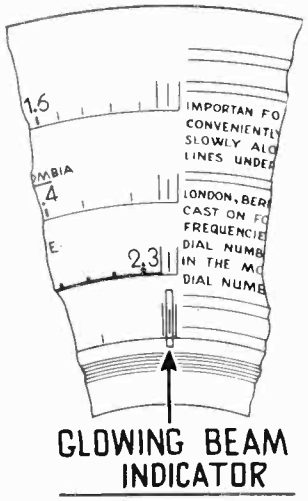


Fig. 4—Dial Calibration

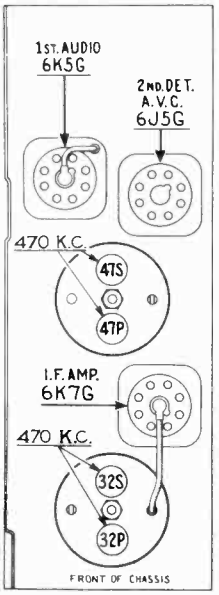


Fig. 5—Locations of I.F. Compensators Top of Chassis

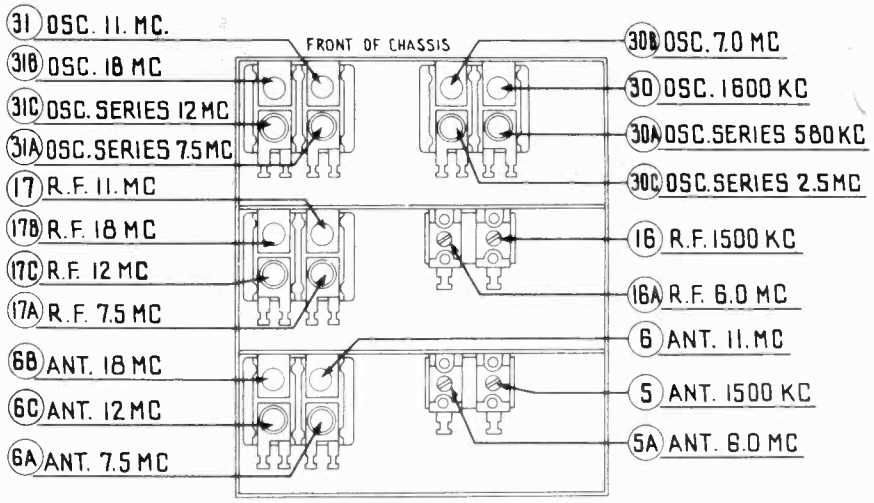


Fig. 6—Locations of R.F. Compensators Underside of Chassis

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 to adjust 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.

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 set screw of the dial hub, then turn dial until the glowing indicator is centered between the first and second index lines of dial scale (see Fig. 4). Now tighten the dial hub set screw in this position.

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

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 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 rectifier tube from its socket, and rotate coil until shadow reaches minimum width. This width must not exceed $^{3}/_{32}$ of an inch.

3. Replace the 5X4G rectifier tube in its socket. The shadow should then widen to not more than $^{3}/_{16}$ inch or less than $^{1}/_{16}$ 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 (47)s 2nd I.F. sec., (47)p 2nd I.F. Pri., (32)s 1st I.F. Sec. and (32)p 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 with 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 with the shorting link provided on the panel.

2. Set the range switch in position 4. Turn the receiver and signal generator dials to 18 M. C. Now adjust compensator (31)b 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 signal generator attenuator and turning receiver dial to this frequency mark on the dial.

3. The antenna and R.F. compensators (6)b and (17)b are now adjusted by connecting a variable condenser of approximately 350 mmfd.—having a good vernier drive—across the oscillator compensator (31)b contact (first contact from left side of the receiver facing rear underside view 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 thereby bringing in the signal. The antenna and R.F. compensators (6)b and (17)b are then adjusted for maximum output. Now remove the external condenser and readjust compensator (31)b as given in paragraph 2 above.

4. Turn signal generator and receiver dials to 12 M. C. and adjust compensator (31)c for maximum output. Then adjust compensators (17)c and (6)c for maximum output.

5. Now turn signal generator and receiver dials to 18 M. C. and readjust compensators (31)b Osc., (6)b Ant. and (17)b 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 3. Rotate signal generator and receiver dials to 11 M. C. Now adjust compensator (31) 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 (17) R.F. and (6) 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 from compensator (31) contact to ground. This contact is the third one from left side of the receiver facing rear underside view of chassis. Also use a 11 M. C. signal.

3. Readjust compensator (31) Osc. as given in paragraph 1 above.

4. Turn signal generator and receiver dial to 7.5 M. C. and adjust compensators (30)a Osc. series (17)a R.F. and (6)a Ant. for maximum output.

5. Due to the slight interaction of the high and low frequency compensators of this range, compensators (31) osc., (17) R.F. and (6) Ant. are readjusted using procedure in paragraphs 1 and 2 above.

Tuning Range 2.3 to 7.4 M. C.

1. Set range switch in Position 2. Turn signal generator and receiver dials to 7.0 M. C. Now adjust compensators (30)b Osc., (16)a R.F. and (5)a Ant. for maximum output.

2. Turn signal generator and receiver dials to 2.35 M. C. Compensator (30)c is now adjusted for maximum as follows:

First tune compensator (30)c for maximum output. Then vary the tuning condenser for maximum output about the 2.35 dial mark. Now retune compensator (30)c, and again vary the tuning condensers back and forth about the 2.35 dial mark for maximum output. This operation of first tuning the compensator, then the tuning condenser is continued until maximum output is obtained at or about the 2.35 dial mark.

If the signal generator is not accurately calibrated the maximum point on the dial of the receiver may fall slightly above or below the dial mark.

3. Turn the signal generator and receiver dials to 7.0 M. C. and readjust compensator (30)b for maximum output. Then turn signal generator and receiver dials to 6.0 M. C. and adjust compensators (16)a R.F. and (5)a Ant. for maximum output.

Tuning Range 530 to 1720 K. C.

1. Set range switch in position No. 1 (Broadcast). Rotate signal generator and receiver dials to 1600 K. C. Now adjust compensators (30) Osc., (16) R.F. and (6) Ant. for maximum output.

2. Tune signal generator and receiver dials to 580 K. C. Compensator (30)a Osc. series is then adjusted for maximum output as given in paragraph 2 under tuning range 2.3 to 7.4 M. C., the only difference in the procedure being in the frequency used.

3. Readjust compensator (30) for maximum output, by turning signal generator and receiver dials to 1600 K. C.

4. Turn signal generator and receiver dials to 1500 K. C. and adjust compensators (16) R.F. and (5) Ant. for maximum output.

PHILCO

REG. U.S. PAT. OFF.

1937

CHANGES IN MODELS

Since Publication of Each Service Bulletin

A PHILCO SERVICE PLAN

Grouped under each model and arranged according to Run No.—Current models included.—Dec. 15, 1936, to July 1, 1937.

The following pages contain complete listings of all major changes—involving changes in circuit, part numbers or anything of interest to the serviceman—in Philco receivers current at the time of printing. These changes date back to the date of publication of the last printing of the Philco Service Bulletin on each model; the number of the Bulletin is given in each case for reference.

Ownership of this folder in addition to Service Bulletins, gives the serviceman a complete record on each model; thus he will not be inconvenienced at finding, when servicing a current set, that it differs from that shown in the original Service Bulletin

The Run Number on models prior to March, 1937, is stamped on the top of the chassis with a rubber stamp and the Code Number of the set is given on the chassis name plate or name label (at rear of chassis).

Beginning on March 1, 1937, the Model, Code and Run Numbers are stamped in one location on the rear of the chassis.

Model 37-9

(Code 121) Service Bulletin 269

Run 2

	Old Part	New Part
(35) Elect. Cond. (16 mfd.)..	30-2118	30-2194—18 mfd.

To improve the I. F. Circuit operation, a Part No. 30-4455, .1 mfd. condenser is connected from the red primary lead of I. F. Transformer **(53)** to ground.

To prevent distortion at minimum volume, the green and white wire connecting the volume control **(67)** center lug to the automatic tuning dial audio switch **(93)**, must be kept clear of compensator **(54)** and the diode circuit of the 6Q7G.

Run 3 **CIRCUIT CHANGES**

Electrolytic Condenser Change—

	Old Part	New Part
(70) Elect. Cond. (10, 20 mfd.)	30-2183	30-2201 8, 10 mfd.
8 mfd. section replaces **(70)**		
10 mfd. section replaces **(70)**a		
(72) Elect. Cond. (8) mfd.....	30-2024	30-2200 18 mfd.

Range Switch changed

	Old Part	New Part
(39) Range Switch R. F.	42-1283	42-1314

DIAL CALIBRATION

The dial calibration of this receiver is the same as that given for model 37-10 and 37-11 Bulletin 268.

Models 37-10—37-11

(Code 121) Service Bulletin 268

Run 2

2nd I. F. and Discriminator Transformer Change:

	Old Part	New Part
(48) Transformer	32-2335	32-2362

This change is shown on Service Bulletin.

Run 3

To improve the operation of the discriminator circuit, the transformer **(48)** wiring to the 6H6G is changed as follows:

Use Fig. 1, 6H6G socket, of Bulletin 268 for reference.

Interchange.....P1 and K1
Interchange.....P2 and K2

Also interchange the wires of resistors **(65)** and **(66)** on the terminal panel which is attached to condenser **(63)**.

Run 4

The 6A8G tube is changed to self biasing as follows:

A resistor, 100 ohms, Part No. 33-1219 is connected in series with the 6A8G tube cathode and a condenser .01 mfd., Part No. 30-4479 is used to bypass the resistor.

To prevent audio interference, remove the green and white wire of audio switch **(37)** from the volume control **center contact** and connect it to the high side of Volume Control; that is, the contact which is connected to condenser **(58)**.

Remove

	Old Part	New Part
Model 37-10 **(81)** condenser .05 mfd.....	3615SU	8326SU .05 mfd., 600 v.
Model 37-11 **(81)** condenser .03, .05 mfd.....	3615YU	8326SU .05 mfd., 600 v.
Model 37-11 **(81A)** condenser .03 part of 81..		30-4447 .03 mfd., 600 v.

CORRECTION

Schematic Diagram, Fig. 4

The A. V. C. bias contacts of the R. F. transformers, shown as connected to D4 should be D3.

Lead No. 4 of R. F. transformer **(33)** is connected to the three contacts at D11 instead of one.

Models 37-10—37-11

(Code 125) Service Bulletin 268-A

Run 2

Elect. Condenser Change—

	Old Part	New Part
(31) Elect. Cond. (16 mfd.)...	30-2118	30-2194 (18 mfd.)

Run 3

Bleeder Resistor change to correct voltages of screens and oscillator.

37-10

	Old Part	New Part
(80) Resistor (10,000 ohms, 3 watt)	33-310639	33-275639 (7500 ohms, 3 watt)
(83) Resistor (15,000 ohms, 3 watt)	33-315639	33-290539 (9000 ohms, 2 watt)
(86) Resistor (51,000 ohms, 1 watt)	33-351439	33-332339 (32000 ohms, ½ watt)

37-11

	Old Part	New Part
(80) Resistor (10,000 ohms, 3 watt)	33-310639	33-275639 (7500 ohms, 3 watt)
(83) Resistor (15,000 ohms, 3 watt)	33-315639	33-310539 (10000 ohms, 2 watt)
(86) Resistor (51,000 ohms, 1 watt)	33-351439	33-332439 (32000 ohms, 1 watt)

Run 4

Base Compensation change—

	Old Part	New Part
(41) Condenser .015 mfd. Bakelite...	3793SU	3615SU .05 mfd.

R. F. Range Switch change—

	Old Part	New Part
R. F. Range Switch.....	42-1283	42-1314

Model 37-33

Service Bulletin 255

Run 4 Change

	Old Part	New Part
(12) 1st I. F. Transformer.....	32-2100	32-2296
(13) 2nd I. F. Transformer.....	32-2102	32-2298

The second I. F. Transformer (13) has a tertiary winding which is connected in series with the 1D5G screen circuit.

Model 37-34

Service Bulletin 262

Run 2

	Old Part	New Part
(17) 1st I. F. Transformer.....	32-2100	32-2296
(18) 2nd I. F. Transformer.....	32-2102	32-2298

The second I. F. Transformer (18) has a tertiary winding which is connected in series with the 1D5G screen circuit.

Model 37-38

Service Bulletin 256

To prevent oscillation in the I. F. Circuit a tubular condenser, Part No. 30-4020 is connected from the screens of the 1C7G Det. Osc. and 1D5G I. F. tubes to ground.

Part Changes

	Old Part	New Part
(15) 1st I. F. Transformer.....	32-2100	32-2296
(28) 2nd I. F. Transformer.....	32-2102	32-2298

The 2nd I. F. Transformer (28) has a tertiary winding which is connected in series with the 1D5G screen circuit.

Model 37-60

Service Bulletin 245

Tone Control Circuit Changes

	Old Part	New Part
(40) Bakelite Condenser .03 mfd.... (See Change No. 1)	8318SU 400 volt	8328SU 600 volt
(41) Tubular Condenser .008 mfd. 400 volt	30-4112	30-4317 600 volt

CORRECTION

	Incorrect	Correct
Drive Assembly	31-1879	31-1863

Model 37-61

Service Bulletin 246

Tone Control Circuit Changes

	Old Part	New Part
(40) Bakelite Condenser .03 mfd.... (See Change No. 1)	8318SU	8328SU 600 volt
(41) Tubular Condenser .008 mfd.— 400 volt	30-4112	30-4317 600 volt

Model 37-62

Service Bulletin 274

Run 2

Screen resistor change to eliminate oscillation.

Schematic No.	Old Part	New Part
(11) Resistor 25,000 ohms, 1 watt	33-325439	33-332439 (32,000 ohms)

Model 37-89

Service Bulletin 247

Run 5

The I. F. Transformers were changed beginning with Run 5 as follows:

Schematic No. Part	Old Part	New Part
(19) 1st I. F. Transformer.....	32-2100	32-2274
(20) 2nd I. F. Transformer.....	32-2102	32-2276
(24) Resistor 700 ohm.....	33-1220	33-1211 400 Ohms

The first I. F. Transformer, Part No. 32-2274 has a stabilizing winding which is placed in series with the suppressor grid of the 6K7G I. F. tube. The short or yellow colored lead is connected to the ground lug and the long lead to the suppressor grid.

Run 6

To improve oscillator action, change the following resistor:

(15) Resistor 32000 ohms.....	33-351339	33-370339 70000 ohms

Tone control condensers changed to higher Voltage rating.

(44) Condenser .03 mfd.....	8318SU	8328SU .03 mfd. Bakelite
(45) Condenser .008 mfd.....	30-4112	30-4317 .008 mfd. Tubular

Model 37-116

(Codes 121, 122, 126) Service Bulletin 258

The following paragraph should be added to the INTERMEDIATE FREQUENCY CIRCUIT adjustments, Paragraph 4, after the last word equalize. Also, change the padder adjustment from 71S to 71P.

"This adjustment is used to compensate for slight differences between peaks. If the padder must be turned more than 3/16 of a turn in either direction to equalize the peaks, all I. F. padders should be carefully readjusted as given in paragraph 2 and 3 above."

Code 121-122

Speaker Change

Speaker change from "W"-Part No. 37-1219 to "W4"—Part No. 36-1284.

W4—Part Nos.

Cone Ass'y	36-3808
Field Coil Ass'y.....	36-3788
Output Trans.	32-7751

CIRCUIT DIFFERENCE

Code 122 and 126 Automatic Tuning Models

Code 126 Receiver differs from Code 122 only in the pushpull audio output circuit.

In Code 126 the audio output circuit uses 6A5G cathode type tubes.

Potentiometer (128) is removed and the cathodes of the 6A5G tubes grounded.

CONVERSION FOR 25 CYCLE OPERATION

Code 125, 126

See information on differences between Codes 121, 122 and 125, 126 as given in Change Notice No. 5, for Bulletin 258.

	60 Cycle	25 Cycle
(126) Elect. Cond. 4 mfd...	30-2174	30-2026 8 mfd.
(127) Elect. Cond. 4 mfd...	30-2174	30-2026 8 mfd.
(129) Power Transformer— 115 Volts, 50 to 60 cycle	32-7688	32-7689 115 volt, 25 to 40 cycle

The following additional parts are used in 25 cycle Receivers only. A 1.5 mfd. Condenser, Part No. 30-4104 is connected across Filter Choke (125). This condenser is mounted in the space formerly occupied by potentiometer (128) in Code 121 and 122 Receivers.

An Electrolytic Condenser, Part No. 30-2058, 8 mfd. is connected from Electrolytic Condenser 62B to ground. This Condenser is mounted in the I. F. unit.

Condenser (116) is relocated in the power unit.

Model 37-602

Service Bulletin 243

	Old Part	New Part
(48) Condenser (.02 mfd. tubular)..	30-4113	30-4481 .02 mfd.

Model 37-610

(Code 122) Service Bulletin 249

Schematic No.	Old Part	New Part
(51) Condenser .008 mfd. 400 volt	30-4112	30-4317 .008 mfd., 1,000 volt

Model 37-610

(Codes 125, 126) Service Bulletin 249-B

Incorrect Part Numbers

	Incorrect	Correct
(52) Power Trans. (115) volts, 50 to 60 cycles, Code 126).....	32-7526	32-7626
Power Trans. (115 volts, 25 to 40 cycles, Code 126)	32-7527	32-7627

This correction is shown in Service Bulletin.

Model 37-611

(Code 121) Service Bulletin 252

Run 2

Filament voltage dropping resistor change. This change is shown on the service bulletin.

Old Part	New Part
33-3235	33-3292

Run 3

Tone control change. The correct Part No. 42-1224 is listed on the service bulletin.

Run 4

The following parts are changed, beginning with Run 4:

Schematic No.	Old Part	New Part
(18) Electrolytic Condenser	30-2157 (4-8 mfd.)	30-2173 (10-10 mfd.)
(19) Condenser .01 mfd. tubular....	30-4122	4989-DU (.09 mfd. Dual)
(44) Elec. Cond. (10-20 mfd.).....	30-2166	30-2124 (16 mfd.)

Resistor (43), 33-3122 is now wired in the R. F. unit.

Run 5

To eliminate oscillation below 550 K. C., connect a resistor, Part No. 33-210339, 1000 ohms, in series with the red primary lead of the 2nd I. F. transformer **(23)**; also, connect a condenser 30-4123 .05 mfd. from the red wire contact to ground.

I. F. transformer changes are as follows:

Schematic No.	Old Part	New Part
(20) 1st I. F. Trans.	32-2100	32-2296
(23) 2nd I. F. Trans.	32-2102	32-2298

This change can be identified by a small dab of orange paint on the under side of the I. F. unit.

The 2nd I. F. Transformer, Part No. 32-2298 has a tertiary winding which is connected in series with the screen grid of the 6K7G I. F. tube. The short or colored rubber lead is connected to the screen of the 6K7G and the long yellow lead to the screen supply. The primary and secondary leads are connected as shown on the schematic diagram.

CORRECTION

	Incorrect	Correct
(30) Volume Control	33-5158	33-5166

Models 37-620—37-630

(Codes 125, 126) Service Bulletin 251-A

Incorrect Part No.

(29) Resistor (700 ohms, ½ watt) Part No. 38-7834 should be 400 ohms ½ watt, Part No. 33-1211 Bakelite.

Schematic No.	Bulletin Incorrect	Correct Early Run	New Switch Beginning 2/15/37
(69) R. F. Range Switch	42-1245	42-1283 White and Green Dot	42-1314 Yellow and Brown Dot
(70) R. F. Range Switch	42-1170	42-1282 Yellow and Green Dot	

The difference between the old range switch and new one is an additional contact and lug. A condenser, Part No. 30-1044, 35 mmfd. is wired from the lug to ground. This places the condenser across the R. F. Transformer **(24)** primary.

Model 37-623

Service Bulletin 259

Run 4

	Old Part	New Part
(28) 1st I. F. Transformer	32-2100	32-2296
(30) 2nd I. F. Transformer	32-2102	32-2298

The 2nd I. F. Transformer **(30)** has a tertiary winding which is connected in series with the screen of the 1D5G tube.

Model 37-624

Service Bulletin 263

	Old Part	New Part
(40) 1st I. F. Transformer	32-2100	32-2296
(41) 2nd I. F. Transformer	32-2102	32-2298

The 2nd I. F. Transformer **(41)** has a tertiary winding which is connected in series with the screen circuit of the 1D5G I. F. tube.

Model 37-640

(Codes 121, 125) Service Bulletin 253

CIRCUIT DIFFERENCES

Code 125 differs from Code 121 in the R. F. unit only. The same R. F. unit used in the 37-630, Code 125—Service Bulletin 251A—is also used for Model 37-640, Code 125. Therefore, the schematic diagram and parts used in the R. F. unit shown in Service Bulletin 251A apply to the 37-640, code 125.

Model 37-641

(Code 121) Service Bulletin 265

Run 4

Shadowmeter changed to plug-in type Part No. 45-2308.

Run 4-4

	Old Part	New Part
(21) Condenser .25 mfd. tubular....	30-4446	30-4191 .15 mfd.

I. F. Transformer change—

(38) 1st I. F. Transformer	32-2100	32-2296
(35) 2nd I. F. Transformer	32-2102	32-2298

This change can be identified by a small dab of orange paint on the under side of the I. F. unit.

The 2nd I. F. Transformer, Part No. 32-2298 has a tertiary winding in series with the screen grid of its 6K76 I. F. tube. The short or colored lead is connected to the screen of the 6K7G tube. The long yellow lead connects to the screen supply. The primary and secondary leads are connected as shown on the schematic diagram.

To improve operation of receiver at 18 megs, the following condensers are added:

30-1032 250 mmfd. from screen of det-osc. to ground.
30-4455 .1 mfd. condenser connects from B negative to ground in the I. F. unit.

See Supplement to

Model 37-641

(Code 125) Service Bulletin 265

Run 1-2

To improve operation of Receiver at 18 megs., the following condensers are added:

30-1032 250 mmfd. condenser from screen of det. osc. to ground.
30-4455 .1 mfd. condenser connects from B negative to ground in the I. F. Unit.

Run 3

Resistor Part No. 33-1228, 33 ohms, 2 watts, shunted across pilot lamp to decrease voltage.

Range Switch changed and condenser added to improve performance on the broadcast range. See replacement parts change notice for Code 125.

	Shown on List Incorrect	Correct	New Switch
(76) Range Switch (R. F.)	42-1245	42-1283	42-1314

A condenser, Part No. 30-1044, 35 mmfd. is connected across the primary of the R. F. Transformer **(26)** The condenser is wired from the additional lug on this new range switch to ground.

Model 37-650

Service Bulletin 254

Run 4

Beginning with Run 4, the following tone control condensers are changed to a higher voltage rating to prevent break down.

Schematic No.	Part	Old Part	New Part
(54)	.03 mfd. Bakelite	3615YU	30-4380 .03 mfd.
(54)A	.05 mfd.	Part of 54	8326SU .05 mfd.
(14)	Condenser .1 mfd.	30-4170	30-4455 .1 mfd.

Model 37-660

Service Bulletin 257

CORRECTION

The rectifier tube is shown on Fig. 1 and under the Electrical Specifications as 5Y4G is incorrect. The correct Rectifier is 5X4G as shown on the Schematic Diagram Fig. 2.

Model 37-665

Service Bulletin 264

Run 3

Tone control condenser change to a higher voltage rating.

	Old Part	New Part
(65) Condenser (.05, .03 mfd. dual bakelite)	3615YU	30-4380 .03 mfd.
(65)A Condenser (.05 mfd. part of 65)		8326SU .05 mfd.

Model 37-670

Service Bulletin 260

Range Switch Change to increase sensitivity.

	Early Production	Later Production
(94) Range Switch (R. F.)	42-1212 Yellow Red Orange	42-1255 Green

The difference in these switches is in the lug arrangement of "D" wafer. In 42-1212 switches, condenser **(11)** is wired from D2 to D4 as shown on the schematic diagram. Condenser **(11)** on 42-1255 switches is wired from D10 to E10 and E10 is wired to F2. Lug D2 and D4 have been eliminated on 42-1225 to separate the plate circuit of the 6K7G and the grid of the 6A8G tube.

The color markings of each switch is located on the sleeve holding the wafers together.

Model 37-675

Service Bulletin 261

Schematic No.	Part	Old Part	New Part
(84)	Magnetic Tuning Transformer	32-2217	32-2361

Model 37-690

(Code 121) Service Bulletin 267

Bias resistor (177) changed to eliminate noisy operation.

	Old Part	New Part
(177) Resistor three taps..	33-3302	33-3311 two taps

See Change No. 1 for replacing the 80 and 325 ohm section of Part No. 33-3302. The new resistor, Part No. 33-3311 replaces the 3000 and 2240 ohm sections of Part No. 33-3302.

To reduce rumble caused by extreme low frequency station response, the following condenser and resistor is changed.

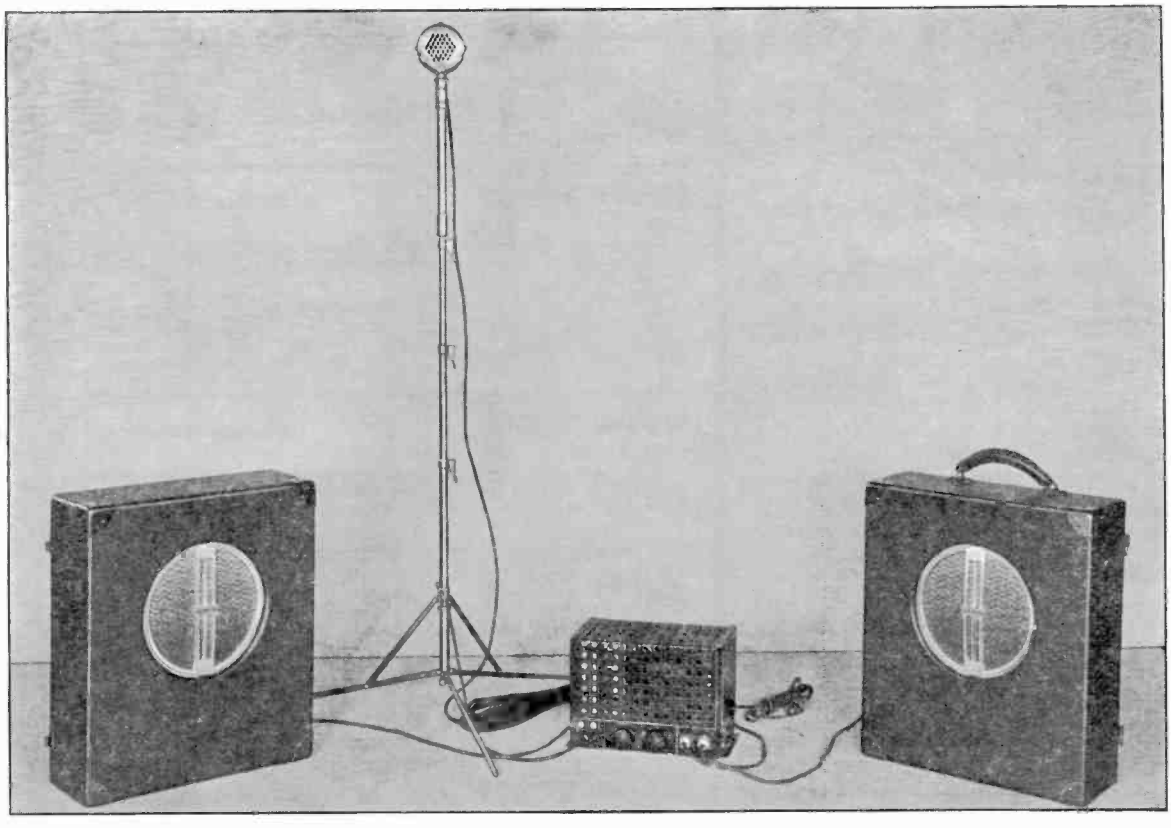
Schematic No.	Old Part	New Part
(100) 490,000 ohm	33-449339	33-399339
(112X) .1 mfd.	30-4455	30-4508 .13 mfd.

The 80 and 300 ohm sections of Resistor (177), Part No. 33-3302, which were changed to flexible resistors on Change Notice No. 1, are now replaced with bakelite resistors as follows:

Old Part	New Part
33-3027, 75 ohms—flexible	33-1229, 75 ohms—bakelite
33-3121, 300 ohms—flexible	33-1214, 300 ohms—bakelite

Schematic No.	Shown on Bulletin as	New
(197) Field Coil CB2....	37-3739	36-3836

New PHILCO Model 905
PORTABLE SOUND AMPLIFIER



Net Dealer Price
$66.00
Complete Ready to Use

High-Power
Two Speakers
3-Purpose
Crystal
Microphone

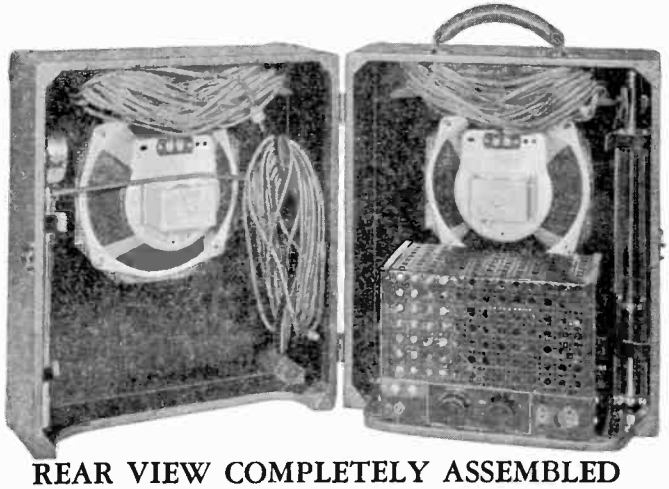
Every radio dealer and service organization should have one of these new portable amplifiers, (1) For demonstrating its many valuable and practical uses to prospective purchasers, (2) For advertising his own business, and (3) For rental purposes to business, charitable, social, and religious organizations. A splendidly engineered, ruggedly-built, high performance unit. . . . Philco quality and dependability throughout.

High-gain high-power amplifier conservatively rated at 10 watts undistorted output. Two eight-inch special perma-dynamic speakers covering full frequency range—one in each half of case—each supplied with 35′ of flexible two-conductor rubber covered cable.

High-quality crystal microphone with collapsible chrome-plated extension stand, usable in any one of the three standard positions. Microphone is supplied with 25′ of special high-impedance microphone cable.

Control switch and receptacles for speaker and microphone plugs conveniently located on front panel of amplifier case. Separate positions for "voice" and "music" permit best reproduction of any type program.

Additional "phono" position provides for reproducing records.



REAR VIEW COMPLETELY ASSEMBLED

Philco Radio & Television Corporation
PIHLADELPHIA, PA.

PHILCO . . . . . Universal Bakelite Condensers

SERVICE BULLETIN No. 289 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

THIS bulletin contains the complete list of Philco Black Bakelite "By Pass" condensers, New Universal types, discontinued types with replacements and condensers with internal resistors.

The method of identifying the lugs to which the sections are wired in the New Universal and original type bakelite condensers differs. Two diagrams, Figs. 1 and 2, show these lug arrangements and are referred to in the columns listing the various condensers.

UNIVERSAL LUG ARRANGEMENT

The Universal Condenser part numbers are composed of four numerals and two or three letters following the numerals. This coding system indicates whether the condenser is a single or twin section; contains two condensers of different values; grounded or ungrounded to the metal mounting hole lug or contains high or low melting point wax.

Using Fig. 1 for reference all part nos. with the same four numerals have the same capacity between lugs 1 and 3. The first letter following the numerals indicates the capacity between lugs "1" and "2", and the second letter whether the mounting hole lug is grounded ("G") or ungrounded ("U"). If the first letter is ("D") two condensers of the same value are connected between "1" and "2" and "1" and "3". If the first letter is "S" a single condenser is used between lugs "1" and "3". If the first letter is other than "S" or "D"; example "E", two sections of different capacities are used. The lug connections of each section are shown under the "Capacity Wiring Lugs" column opposite the part number.

Condensers using high melting point wax have an additional letter "O" placed between the numerals and the last two letters of the above code—example "3165-ODG." If the wax is of the standard type, the "O" is omitted.

Discontinued condensers with the new universal replacements and standard type condenser still carried in stock are listed on page two.

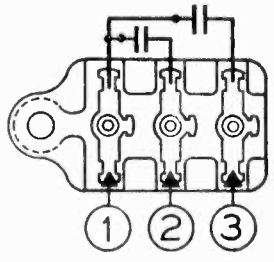


Fig. 1. Universal Wiring

Philco Universal Black Bakelite Condensers

Use Fig. 1 for Wiring Lug Identification

PART No. 3615
Working Voltage 400

Part No.	No. Cap. Sections	Capacity Wiring Lugs 1 & 3	Capacity Wiring Lugs 1 & 2
3615-ODG	2	.05	.05
3615-ODU	2	.05	.05
3615-OSG	1	.05	....
3615-OSU	1	.05	....
3615-XG	2	.05	.0014
3615-YU	2	.05	.03

PART No. 3793
Working Voltage 600

3793-ODG	2	.015	.015
3793-ODU	2	.015	.015
3793-OSU	1	.015	....
3793-SG	1	.015	....

PART No. 3903
Working Voltage 600

3903-DG	2	.01	.01
3903-DU	2	.01	.01
3903-LU	2	.01	.006
3903-ODU	2	.01	.01
3903-OSG	1	.01	....
3903-OSU	1	.01	....

PART No. 4989
Working Voltage 200

4989-CU	2	.10	.05
4989-FG	2	.10	.01
4989-OFU	2	.10	.01
4989-HG	2	.10	.15
4989-ODG	2	.10	.10
4989-ODU	2	.10	.10
4989-OSG	1	.10	....
4989-SU	1	.10	....

PART No. 6287
Working Voltage 200

Part No.	No. Cap. Sections	Capacity Wiring Lugs 1 & 3	Capacity Wiring Lugs 1 & 2
6287-CU	2	.15	.05
6287-ODG	2	.15	.15
6287-ODU	2	.15	.15
6287-SG	1	.15	....
6287-SU	1	.15	....

PART No. 7296
Working Voltage 1000

7296-DG	2	.002	.002
7296-ODU	2	.002	.002
7296-SG	1	.002	....
7296-SU	1	.002	....

PART No. 7442
Working Voltage 1000

7442-DG	2	.005	.005
7442-SG	1	.005	....

PART No. 7625
Working Voltage 1000

7625-DG	2	.006	.006
7625-DU	2	.006	.006
7625-SG	1	.006	....
7625-SU	1	.006	....

PART No. 7653
Working Voltage 600 Volts

7653-DG	2	.025	.025
7653-DU	2	.025	.025
7653-OSG	1	.025	....
7653-OS	1	.025	....

PART No. 7762
Working Voltage 1200

Part No.	No. Cap. Sections	Capacity Wiring Lugs 1 & 3	Capacity Wiring Lugs 1 & 2
7762-DG	2	.001	.001
7762-DU	2	.001	.001
7762-FU	2	.001	.011
7762-OEU	2	.001	.015
7762-OSU	1	.001	....

PART No. 8035
Working Voltage 1200

8035-EU	2	.00011	.015
8035-ODG	2	.00011	.00011
8035-ODU	2	.00011	.00011
8035-SG	1	.00011	....
8035-SU	1	.00011	....

PART No. 8174
Working Voltage 1200

8174-DG	2	.007	.007
8174-DU	2	.007	.007
8174-SG	1	.007	....

PART No. 8317
Working Voltage 1000

8317-DU	2	.00025	.00025
8317-ODG	2	.00025	.00025
8317-OSG	1	.00025	....
8317-SU	1	.00025	....

PART No. 8318
Working Voltage 400

8318-DG	2	.03	.03
8318-DU	2	.03	.03
8318-OSG	1	.03	....
8318-SU	1	.03	....

Universal Bakelite Condensers Continued

PART No. 8320
Working Voltage 600

Part No.	No. Sections	Capacity Wiring Lugs	
		1 & 3	1 & 2
8320-DG	2	.003	.003
8320-DU	2	.003	.003
8320-SG	1	.003	.....

PART No. 8325
Working Voltage 600

8325-SU	1	.008	.....

PART No. 8326
Working Voltage 600

8326-OSU	1	.05	.....

PART No. 8327
Working Voltage 200

8327-DU	1	.04	.....

PART No. 8328
Working Voltage 600

8328-SU	1	.03	.....

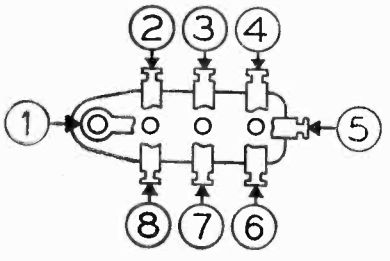


Fig. 2

Miscellaneous Condensers

Condensers With Internal Resistors

Lug Arrangements shown in Fig. 2

Part No.	Cap. Mfd.	Wire Resis. Ohms	Resis. Wiring Lugs	Cond. Wiring Lugs
3615-K	.05	250	3-5	5-8
3615-X	.05	150	1-7	1-5
3615-Z	.05	250	5-7	1-5
3615-AS	.05	250	3-6	1-6
4989-E	.09	250	5-7	1-5
4989-L	.09	200	3-8	4-8
4989-R	.09	200	3-8	4-8
4989-S	Twin .09	200	2-3	3-6
4989-W	.09	200	1-7	1-6
4989-Y	.09	200	5-7	1-5
4989-AA	.09	200	7-8	6-8
4989-AG	.09	300	1-7	1-6
6287-D	.15	200	2-3	3-6
6287-E	.15	200	1-4	1-3

Condensers Using the Lug Arrangement Shown in Fig 2

Part No.	Capacity Mfd. Each Section	Cond. Wiring Lugs	Part No.	Capacity Mfd. Each Section	Cond. Wiring Lugs
6287-G	.05 .15	5-8 7-8	8035-D	.015 .0001	3-4 1-4
6287-K	.15 .09	1-3 1-5	8035-H	.015 .0001	3-5 1-3
6287-M	.05 .15	1-4 1-3	8174-B	.0007 .05	1-6 1-3
6287-N	.09 .15	2-4	8206-B	..... .10	2-6 .....
6287-P	.09 .15	2-4	8317-B	.00025 .00025	1-6 1-7
6287-S	.09 .15	 2-6	8317-C	.00025 .00025	6-8 7-8
7296-G	.05 .002	1-3 1-5	8318-E	.03 .05	1-6 1-7
7296-H	.01 .002	1-3 1-5	8320-B	.003	2-6 .....
7442-B	..... .005	2-6	8320-C	.003 .003	1-5 1-7
7625-D	.015 .006	3-4 1-4	8322-B	.0014 .05	1-3 1-6
7625-F	.001 .006	2-7 2-6	8323-B	.07 .03	1-7 1-6

Discontinued Bakelite Condensers with Replacements

Original Part No.	Replacement
3615-B	3615-AS
3615-C	3615-AS
3615-D	3615-OSG
3615-E	3615-OSU
3615-F	3615-OSU
3615-G	3615-OSU
3615-H	3615-OSU
3615-J	3615-OSG
3615-L	3615-OSG
3615-M	3615-OSU
3615-N	3615-OSG
3615-P	3615-AS
3615-R	3615-AS
3615-S	3615-OSG
3615-T	3615-X
3615-U	3615-OSG
3615-W	3615-OSG
3615-Y	3615-X
3615-AA	3615-OSG
3615-AB	3615-OSG
3615-AC	3615-OSG
3615-AD	3615-OSU
3615-AE	3615-OSG
3615-AF	3615-ODU
3615-AG	3615-OSG
3615-AH	3615-OSG
3615-AJ	3615-ODG
3615-AK	3615-OSG
3615-AL	3615-AS
3615-AM	3615-ODG
3615-AN	3615-OSG
3615-AP	3615-ODG
3615-AT	3615-OSG
3615-AU	3615-OSG
3615-AW	3615-OSG
3615-AX	3615-OSU
3615-AY	3615-OSG
3615-AZ	3615-OSG
3615-BA	3615-ODU
3615-BB	3615-OSU
3615-BC	3615-OSG
3615-BD	3615-OSU
3615-BE	3615-OSU
3615-BF	3615-OSU
3615-BG	3615-ODU

Original Part No.	Replacement
3615-BH	3615-OSG
3615-BJ	3615-OSU
3615-BK	3615-OSG
3615-BL	3615-OSG
3615-BM	3615-ODG
3615-BN	3615-ODG
3615-BP	3615-OSU
3615-BR	3615-OSU
3793-B	3793-OSU
3793-C	3793-OSU
3793-D	3793-OSU
3793-E	3793-ODG
3793-F	3793-OSU
3793-G	3793-OSU
3793-H	3793-ODG
3793-J	3793-OSU
3793-K	3793-ODG
3793-L	3793-ODU
3793-M	3793-ODU
3793-N	3793-OSU
3793-P	3793-ODU
3793-R	3793-ODG
3793-S	3793-OSU
3793-T	3793-OSU
3793-U	3793-OSU
3793-W	3793-SG
3793-X	3793-OSU
3793-Y	3793-OSU
3793-Z	3793-SG
3793-AB	3793-OSU
3793-AC	3793-OSU
3793-AD	3793-ODG
3793-AE	3793-ODG
3903-F	3903-OSU
3903-G	3903-OSU
3903-H	3903-OSU
3903-J	3903-OSU
3903-K	3903-SG
3903-L	3903-OSU
3903-M	3903-OSU
3903-N	3903-OSU
3903-P	3903-OSU
3903-R	3903-OSU

Original Part No.	Replacement
3903-S	3903-DG
3903-T	3903-OSU
3903-U	3903-SG
3903-W	3903-OSU
3903-X	3903-OSU
3903-Y	3903-OSU
3903-Z	3903-OSU
3903-AA	3903-SG
3903-AB	3903-OSU
3903-AC	3903-DG
3903-AD	3903-OSU
3903-AE	3903-SG
3903-AF	3903-SG
3903-AG	3903-SG
3903-AH	3903-SG
3903-AJ	3903-DU
3903-AK	3903-DU
3903-AL	3903-OSU
3903-AM	3903-OSU
3903-AN	3903-OSU
3903-AP	3903-OSU
3903-AR	3903-OSU
4989-B	4989-ODG
4989-C	4989-ODG
4989-D	4989-SG
4989-F	4989-SG
4989-G	4989-ODG
4989-H	4989-ODG
4989-J	4989-SU
4989-K	4989-ODU
4989-M	4989-ODU
4989-N	4989-SG
4989-P	4989-SU
4989-T	4989-ODU
4989-U	4989-SU
4989-X	4989-W
4989-Z	4989-ODG
4989-AB	4989-SU
4989-AC	4989-ODG
4989-AD	4989-ODG
4989-AE	4989-ODG
4989-AF	4989-ODU
4989-AH	4989-ODG

Original Part No.	Replacement
4989-AJ	4989-SU
4989-AK	4989-ODG
6287-B	6287-SU
6287-C	6287-D
6287-F	6287-ODU
6287-H	6287-ODG
6287-J	6287-ODG
6287-L	6287-ODU
6287-R	6287-ODU
6287-T	6287-ODU
7625-B	7625-SU
7625-C	7625-SU
7625-E	7625-SU
7625-G	7625-SG
7625-H	7625-SU
7625-J	7625-SU
7296-B	7296-SU
7296-C	7296-SU
7296-D	7296-SG
7296-E	7296-DG
7296-F	7296-SG
7762-B	7762-OEU
7762-C	7762-SU
7762-D	7762-SU
8318-B	8318-SU
8318-C	8318-ODG
7653-B	7653-SU
7653-C	7653-DG
8035-B	8035-ODG
8035-C	8035-ODG
8035-E	8035-ODU
8035-F	8035-EU
8035-G	8035-ODU
8035-K	8035-ODG
8035-M	8035-ODG
8035-N	8035-ODG
8035-L	8035-ODG
8035-R	8035-ODU
8035-S	8035-ODU
8035-T	8035-OEU

PHILCO RADIO AND TELEVISION CORPORATION
Parts and Service Division
Philadelphia, Pa.

August 1937

Printed in U. S. A.

PHILCO TRANSITONE
SERVICE BROADCAST

JANUARY, 1936

MODEL 816 RECEIVER

THE PHILCO Transitone Model 816 is Philco's newest automobile radio. It is a highly developed superheterodyne single-unit type Receiver with all the outstanding features required in such a fine instrument.

THE NEW RECEIVER IS EQUIPPED WITH AN ADJUSTABLE ANTENNA STAGE, WHICH MAKES IT POSSIBLE TO OPERATE THE RECEIVER AT MAXIMUM EFFICIENCY ON ANY ROOF-TYPE OR UNDER-CAR TYPE ANTENNA.

The Receiver, speaker and full-wave PHILCO Vibrator are housed in a rugged, compact, fully shielded container, which is designed for quick and easy installation on the dash of all automobiles. When installed in the car, the loud speaker faces the front seat, so that the extremely powerful PHILCO electro dynamic speaker, concealed behind an artistic grille, delivers its full-toned reproduction toward the occupants of the car with utmost fidelity.

All tubes used are the latest PHILCO high-efficiency tubes, designed especially for automobile radio.

PHILCO's system of automatic volume control used in this Receiver not only gives that smooth, elastic control which counteracts fading while driving along and prevents blasting of local stations, but also subdues the harsh interference usually present between stations.

The new Receiver is ALL-ELECTRIC, operating entirely from the car battery system. The full-wave PHILCO Vibrator is built in as an integral part of the Receiver.

Interference filters to cut out the motor interference set up by the car ignition system and specially designed shielding make the Receivers especially easy to install.

The Model 816 Receiver is furnished with the new streamline "wide vision" control which can be installed on the edge of the instrument board. This control unit is exceptionally attractive and is designed to blend harmoniously with the instrument boards of practically all cars. The circuit and layout of the Models 816B-816C and 816P Receivers are the same as the Model 816. However, these Receivers are equipped with a special "customed" control unit which matches the instrument board fittings, and is designed for installation in the space provided for radio control in the instrument board of the 1936 Buick, Chevrolet and Pontiac cars.

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 2).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 1.

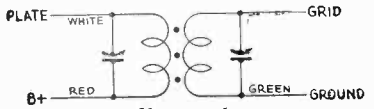


FIGURE 1

If replacements are ever necessary, replace the entire coil assembly, 32-1928 for the first I. F. stage and 32-1929 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL 816 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

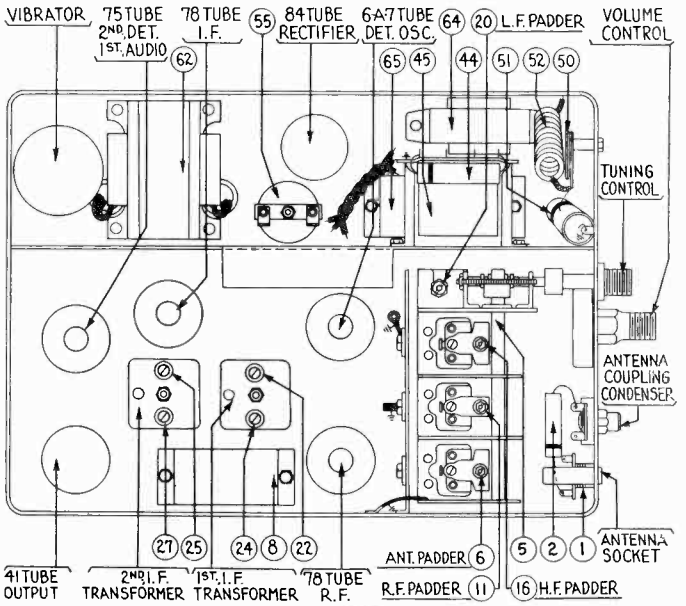


FIGURE 2

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 2 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. (See Figure 2 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder (16) and the R. F. padder (11) until

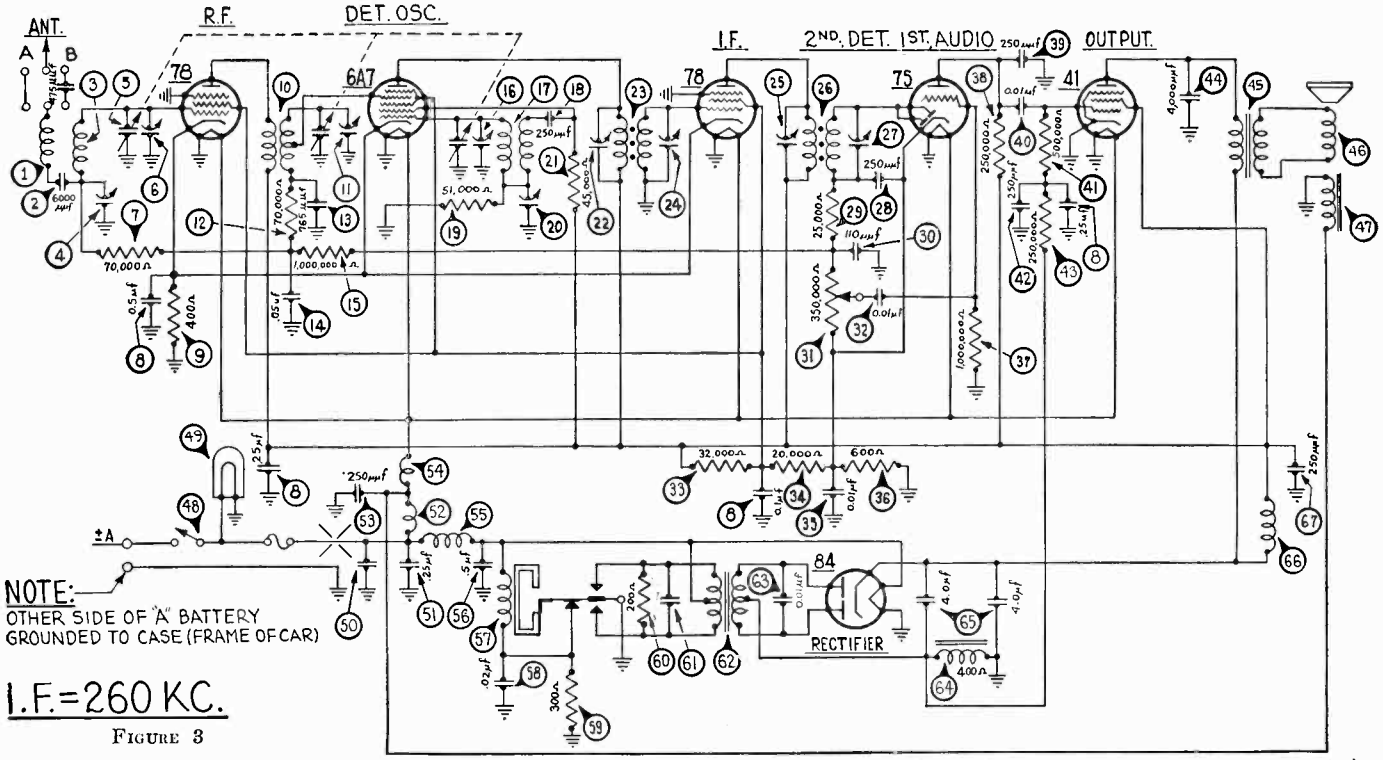


FIGURE 3

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A."

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B."

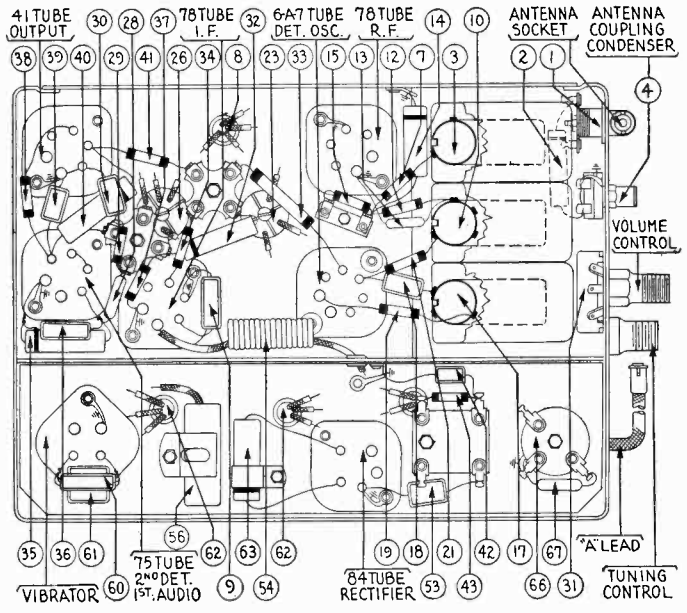


FIGURE 4

the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and set the signal generator at 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw ⑳ for maximum reading on the output meter.

HIGH FREQUENCY RE-ADJUSTMENT—Turn the tuning condenser plates out of mesh as far as they will go and set the signal generator at 1550 K. C. Then adjust the high frequency padder ⑯ again for maximum reading on the output meter.

ANTENNA—Connect the generator lead to the antenna cable assembly (made up of Part No. L1915 loom, 1-27-7133 terminal and 40 inches of 16 strand No. 30 wire), using a 200 mmfd. condenser in series between the two leads. Place the connector plug in the antenna socket on the Receiver. Plug the cable into the antenna socket.

Turn the tuning condenser in mesh to 580 K. C., and adjust the signal generator for 580 K. C. Adjust the Antenna coupling condenser ④ for maximum reading.

Turn the tuning condenser to 1400 K. C. and set the generator for 1400 K. C. Adjust the padders ⑪ and ⑥ for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.

When installing the radio in a car, follow the installation instructions carefully. The correct connector must be used in the antenna lead connector in the Receiver and the antenna coupling condenser must be adjusted to the car antenna.

MODEL 816 PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-7516
②	Condenser (6000 mmfd.)	30-4445
③	Antenna Transformer	32-1984
④	Antenna Coupling Condenser	31-6082
⑤	Tuning Condenser	31-1767
⑥	First Padder (on Tun. Cond.)	
⑦	Resistor (70,000 ohms)	33-370334
⑧	Condenser (.1-.25-.25-.5 mfd.)	30-4374
⑨	Resistor (400 ohms)	33-1211
⑩	R. F. Transformer	32-1985
⑪	Second Padder (on Tun. Cond.)	
⑫	Resistor (70,000 ohms)	33-370334
⑬	Condenser (765 mmfd.)	30-1069
⑭	Condenser (.05 mfd.)	30-4144
⑮	Resistor (1,000,000 ohms)	33-510344
⑯	Third Padder (on Tun. Cond.)	
⑰	Oscillator Transformer	32-1986
⑱	Condenser (250 mmfd.)	30-1032
⑲	Resistor (51,000 ohms)	33-351344
⑳	Low Frequency Padder	31-6083
㉑	Resistor (45,000 ohms)	33-345344
㉒	Padder (Pri. 1st I. F. Trans.)	
㉓	First I. F. Transformer	32-1928
㉔	Padder (Sec. 1st I. F. Trans.)	
㉕	Padder (Pri. 2nd I. F. Trans.)	
㉖	Second I. F. Transformer	32-1929
㉗	Padder (Sec. 2nd I. F. Trans.)	
㉘	Condenser (250 mmfd.)	30-1032
㉙	Resistor (25,000 ohms)	33-325344
㉚	Condenser (110 mmfd.)	30-1031
㉛	Volume Control (350,000 ohms)	33-5148
㉜	Condenser (.01 mfd.)	30-4124
㉝	Resistor (32,000 ohms)	33-332433
㉞	Resistor (20,000 ohms)	33-320334
㉟	Condenser (.01 mfd.)	30-4124
㊱	Resistor (600 ohms)	33-1212
㊲	Resistor (1,000,000 ohms)	33-510344
㊳	Resistor (250,000 ohms)	33-424344
㊴	Condenser (250 mmfd.)	30-1032
㊵	Condenser (.01 mfd.)	30-4145
㊶	Resistor (500,000 ohms)	33-449344
㊷	Condenser (250 mmfd.)	30-1032
㊸	Resistor (250,000 ohms)	33-424344
㊹	Condenser (4000 mmfd.)	30-4185
㊺	Output Transformer	32-7495
㊻	Cone and Voice Coil	36-3526
㊼	Field Coil Assembly	32-9236
㊽	On-Off-Switch (BCP)	42-1159
㊽	On-Off-Switch (816)	42-1160
㊾	Pilot Lamp	34-2039
㊿	Condenser (450 mmfd.)	31-6065
(51)	Condenser (.25 mfd.)	30-4446
(52)	"A" Choke	32-1464
(53)	Condenser (250 mmfd.)	30-1032
(54)	Filament Choke	32-1930
(55)	Vibrator Choke	32-1968
(56)	Condenser (.5 mfd.)	30-4047
(57)	Vibrator	38-5036
(58)	Condenser (.02 mfd.)	30-4039
(59)	Resistor (300 ohms)	33-3130
(60)	Resistor (200 ohms)	33-1210
(61)	Condenser (.05 mfd.)	30-4444
(62)	Power Transformer	32-7482
(63)	Condenser (.01 mfd.)	30-4381
(64)	Filter Choke	32-7491
(65)	Filter Condenser (4-4 mfd.)	38-7684
(66)	R. F. Choke	32-1932
(67)	Condenser (250 mmfd.)	30-1032
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Clamps (Speaker Mtg.)	29-3131
	Speaker Cable	41-3180
	Control Assembly (816)	42-5534
	Scale Assembly	42-5539
	Interference Condenser (½ mfd.)	30-4007
	Distributor Resistor	33-1196
	Tuning and Volume Shaft	28-8495
	Tee Bolt (Receiver Mtg.)	28-6161
	Nuts (Receiver Mtg.)	W518A
	Bracket (Control Mtg.)	29-3711
	Fuse	7227
	Fuse Insulator	27-7729
	Antenna Loom Assembly (816)	41-3191
	Connector Plug	29-6123
	Connector Plug Insulator	27-8199
	Condenser Connector	30-4112
	Control Assembly (816B-C)	42-5561
	Control Assembly (816P)	42-5562
	Scale Assembly (816B-C)	42-5570
	Scale Assembly (816P)	42-5540
	Knob (816P)	27-4299
	Knob (816B-C)	27-4288
	Knob (816)	27-4289
	Knob Base	28-3698

Printed in U. S. A.

PHILCO TRANSITONE
SERVICE BROADCAST

FEBRUARY 20, 1937

MODEL 827

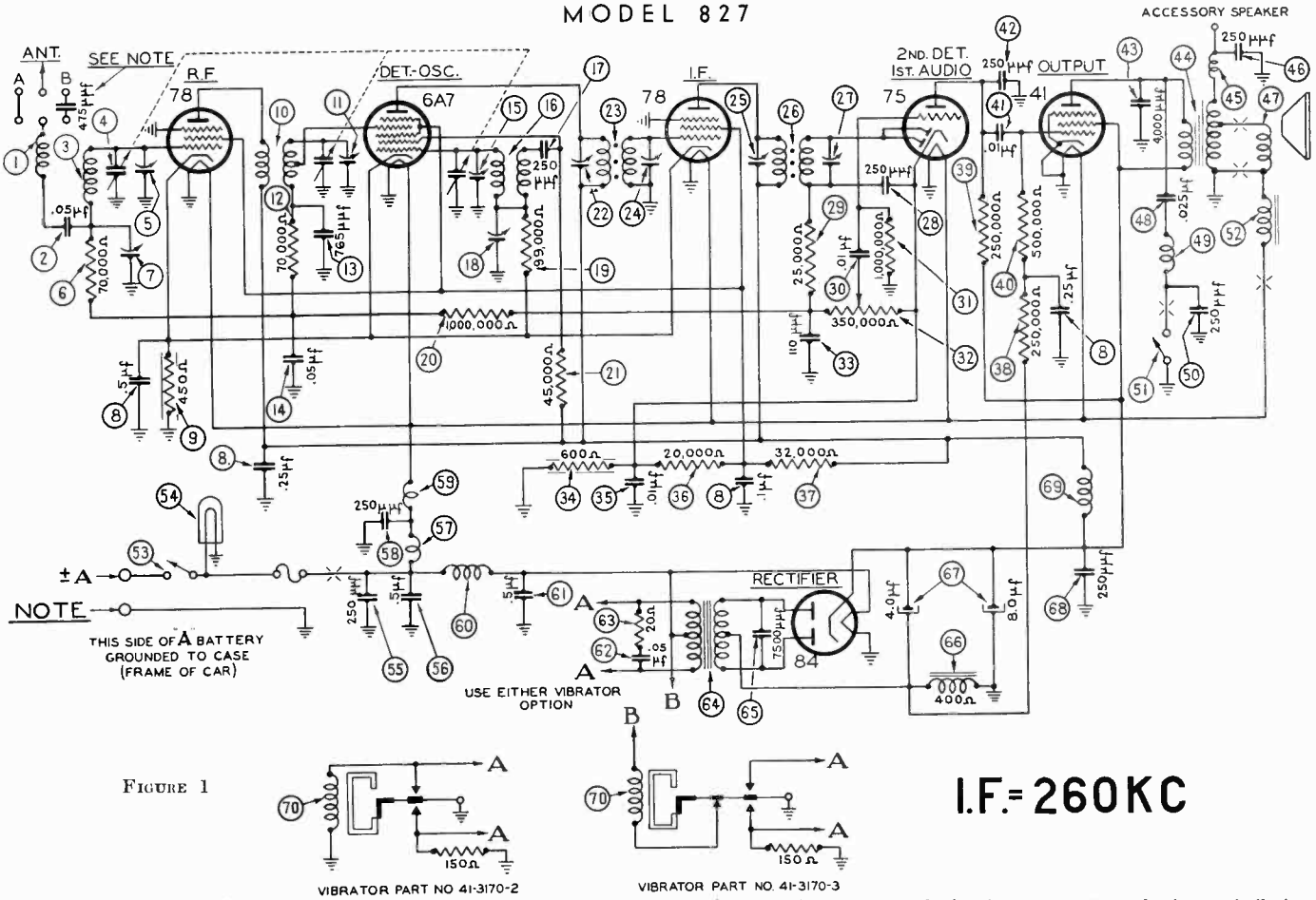


FIGURE 1

VIBRATOR PART NO 41-3170-2

VIBRATOR PART NO. 41-3170-3

I.F.= 260KC

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 827 PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-8651
②	Condenser (.05 mfd.)	30-4414
③	Antenna Transformer	32-2516
④	Tuning Condenser	31-1930
⑤	First Padder (on tun. cond.)	
⑥	Resistor (70,000 ohms)	33-370344
⑦	Antenna Compensating Condenser	31-6082
⑧	Condenser (.1-.25-.25-.5 mfd.)	30-4415
⑨	Resistor (450 ohms)	33-1218
⑩	R. F. Transformer	32-2307
⑪	Second Padder (on tun. cond.)	
⑫	Resistor (70,000 ohms)	33-370344
⑬	Condenser (765 mmfd.)	30-1069
⑭	Condenser (.05 mfd.)	3615-0SC
⑮	Third Padder (on tun. cond.)	
⑯	Oscillator Transformer	32-2308
⑰	Condenser (250 mmfd.)	30-1032
⑱	Low Frequency Padder	31-6102
⑲	Resistor (99,000 ohms)	33-399344
⑳	Resistor (1,000,000 ohms)	33-510344
㉑	Resistor (45,000 ohms)	33-345344
㉒	Padder (Pri. 1st I.F. Trans.)	
㉓	First I. F. Transformer	32-2026
㉔	Padder (Sec. 1st I. F. Trans.)	
㉕	Padder (Pri. 2nd I.F. Trans.)	
㉖	Second I. F. Transformer	32-2027
㉗	Padder (Sec. 2nd I.F. Trans.)	
㉘	Condenser (250 mmfd.)	30-1032
㉙	Resistor (25,000 ohms)	33-325344
㉚	Condenser (.01 mfd.)	3903-0SU
㉛	Resistor (1,000,000 ohms)	33-510344
㉜	Volume Control (350,000 ohms)	33-5148
㉝	Condenser (110 mmfd.)	30-1031
㉞	Resistor (600 ohms)	33-1212
㉟	Condenser (.01 mfd.)	3903-0SG
㊱	Resistor (20,000 ohms)	33-320344
㊲	Resistor (32,000 ohms)	33-332434
㊳	Resistor (250,000 ohms)	33-424344
㊴	Resistor (250,000 ohms)	33-424344
㊵	Resistor (500,000 ohms)	33-449344
㊶	Condenser (.01 mfd.)	3903-0SU
㊷	Condenser (250 mmfd.)	30-1032
㊸	Condenser (4000 mmfd.)	30-4185
㊹	Output Transformer	32-7815
㊺	Choke	32-1374
㊻	Condenser (250 mmfd.)	30-1032
㊼	Cone & Voice Coil	36-3586
㊽	Condenser (.025 mfd.)	7653-0SU
㊾	Choke	32-1464
㊿	Condenser (250 mmfd.)	30-1032
(51)	Tone Control Switch	42-1225
(52)	Field Coil Assembly	36-3597
	Complete Speaker (CD)	36-1267
(53)	On & Off Switch	42-1318
(54)	Pilot Lamp	34-2040
(55)	Condenser (250 mmfd.)	30-1032
(56)	Condenser (.5 mfd.)	30-4015
(57)	"A" Choke	32-1604
(58)	Condenser (250 mmfd.)	30-1032
(59)	Filament Choke	32-2535
(60)	Vibrator Choke	32-2039
(61)	Condenser (.5 mfd.)	30-4015
(62)	Condenser (.05 mfd.)	30-4414
(63)	Resistor (20 ohms)	33-020344
(64)	Power Transformer	32-7550
(65)	Condenser (7,500 mmfd.)	30-4420
(66)	Filter Choke	32-7545
(67)	Filter Condenser (4-8 mfd.)	30-2150
(68)	Condenser (250 mmfd.)	30-1032
(69)	"B" Choke	32-1281
(70)	Vibrator (OPTIONAL)	41-3170-2 / 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Shaft	L-2767
	Control Assembly	42-5713
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227

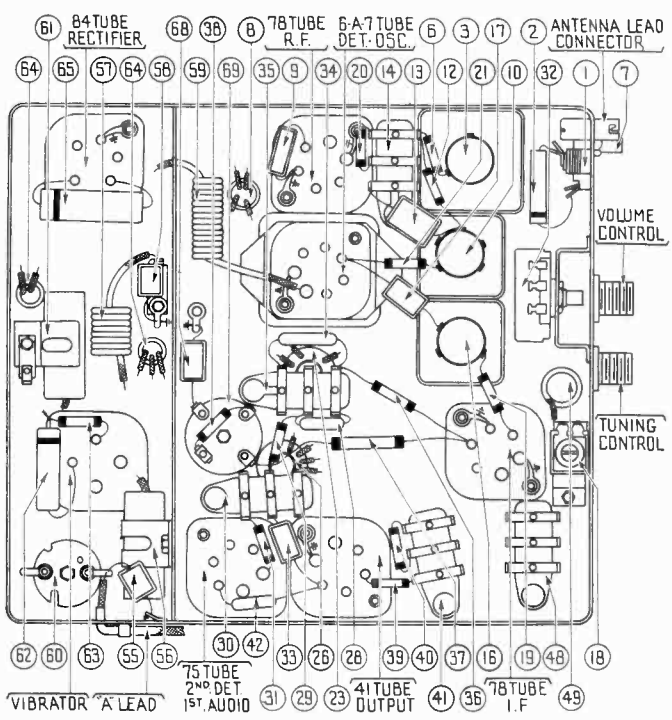


FIGURE 2

No.	Description	Part No.	No.	Description	Part No.
	Fuse Insulator	27-7729		Nut	W-518
	Tee Bolt	28-6161		Receiver Housing	38-8571

I. F. TRANSFORMERS AND PADDERS

The I. F. Transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

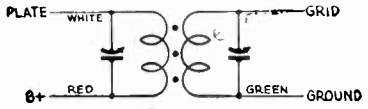


FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL 827 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 1. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder ㉗ on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉕ for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder ㉔ on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉒ for maximum reading. Readjust padders ㉕ and ㉗ with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grip cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go.

With the tuning condenser in this position, adjust the high frequency padder ⑮ and the R. F. padder ⑪ until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

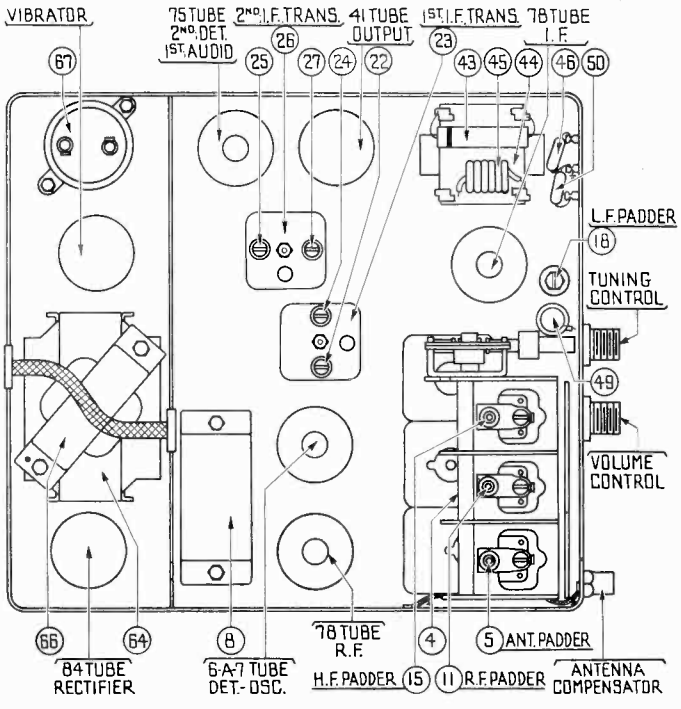


FIGURE 4

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and set the signal generator at 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw ⑱ for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT — Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder ⑮ again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA — WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna lead assembly (made up of Part No. 41-3191 lead and a 200 mmfd. condenser, Part No. 30-1013), in series between the lead and the signal generator. Plug the lead into the antenna lead connector on the end of the Receiver.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders ⑪ and ⑤ for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO
REG. U. S. PAT. OFF.
TRANSITONE

Printed in U. S. A.

PHILCO TRANSITONE
SERVICE BROADCAST

MARCH 15, 1937

MODEL 827-K

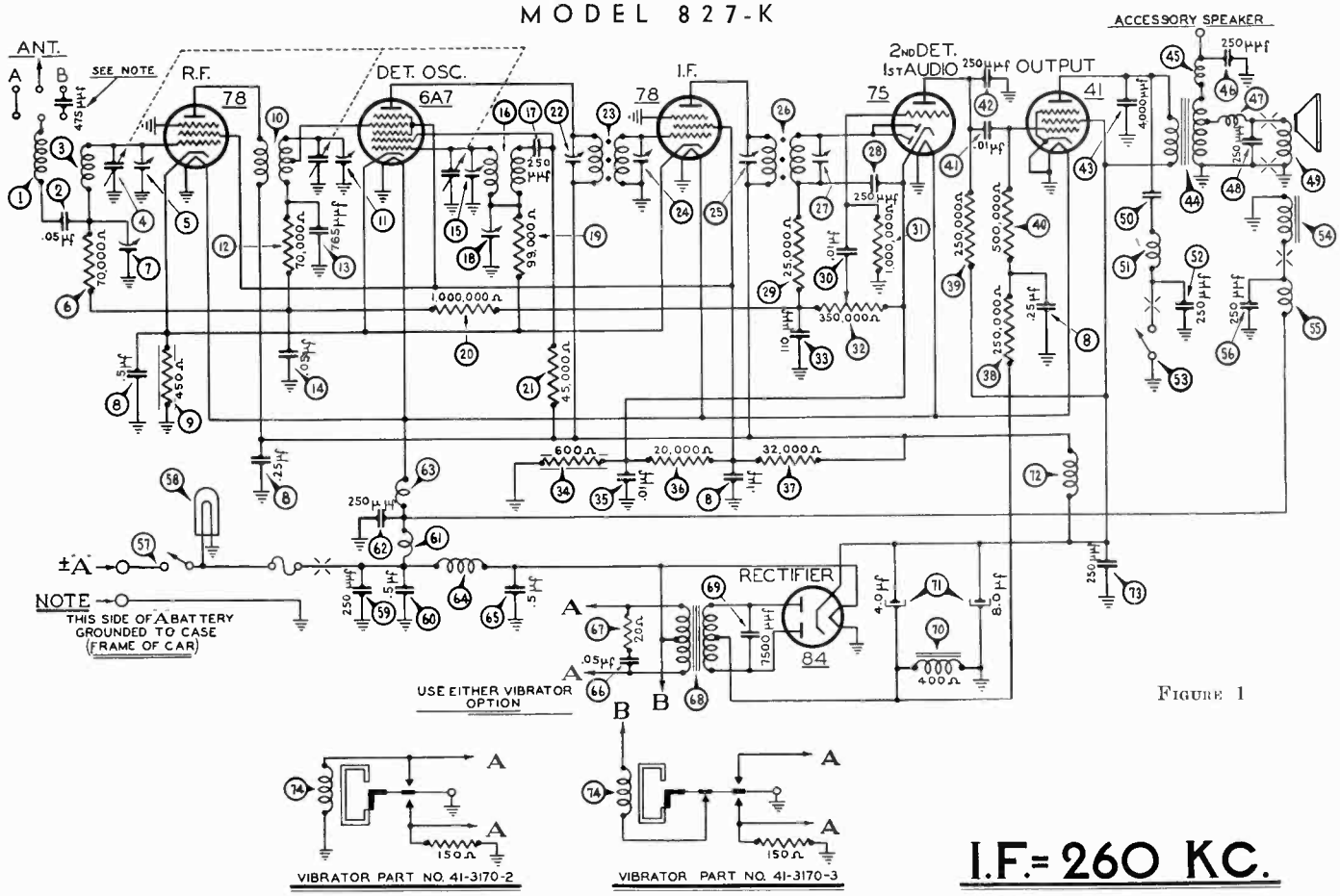


FIGURE 1

I.F.= 260 KC.

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 827K PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8651
2	Condenser (.05 mfd.)	30-4444
3	Antenna Transformer	32-2516
4	Tuning Condenser	31-1930
5	First Padder (on Tun. Cond.)	
6	Resistor (70,000 ohms)	33-370344
7	Antenna Compensating Condenser	31-6082
8	Condenser (.1-.25-.25-.5 mfd.)	30-4415
9	Resistor (450 ohms)	33-1218
10	R. F. Transformer	32-2307
11	Second Padder (on Tun. Cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (765 mmfd.)	30-1069
14	Condenser (.05 mfd.)	3615-0SG
15	Third Padder (on Tun. Cond.)	
16	Oscillator Transformer	32-2308
17	Condenser (250 mmfd.)	30-1032
18	Low Frequency Padder	31-6102
19	Resistor (99,000 ohms)	33-399344
20	Resistor (1,000,000 ohms)	33-510344
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I.F. Trans.)	
23	First I. F. Transformer	32-2026
24	Padder (Sec. 1st I.F. Trans.)	
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2027
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (.01 mfd.)	3903-0SU
31	Resistor (1,000,000 ohms)	33-510344
32	Volume Control (350,000 ohms)	33-5148
33	Condenser (110 mmfd.)	30-1031
34	Resistor (600 ohms)	33-1212
35	Condenser (.01 mfd.)	3903-0SG
36	Resistor (20,000 ohms)	33-320344
37	Resistor (32,000 ohms)	33-332434
38	Resistor (250,000 ohms)	33-424344
39	Resistor (250,000 ohms)	33-424344
40	Resistor (500,000 ohms)	33-449344
41	Condenser (.01 mfd.)	3903-0SU
42	Condenser (250 mmfd.)	30-1032
43	Condenser (4000 mmfd.)	30-4185
44	Output Transformer	32-7816
45	Choke	32-1374
46	Condenser (250 mmfd.)	30-1032
47	Choke	32-2535
48	Condenser (250 mmfd.)	30-1032
49	Cone & Voice Coil	36-3159
50	Condenser (.025 mfd.)	7653-0SU
51	Choke	32-1464
52	Condenser (250 mmfd.)	30-1032
53	Tone Control Switch	42-1225
54	Field Coil Assembly	36-3513
	Complete Speaker (A47)	36-1331
55	Choke	32-1930
56	Condenser (250 mmfd.)	30-1032
57	On & Off Switch	42-1318
58	Pilot Lamp	34-2040
59	Condenser (250 mmfd.)	30-1032
60	Condenser (.5 mfd.)	30-4015
61	"A" Choke	32-1604
62	Condenser (250 mmfd.)	30-1032
63	Filament Choke	32-2535
64	Vibrator Choke	32-2039
65	Condenser (.5 mfd.)	30-4015
66	Condenser (.05 mfd.)	30-4444
67	Resistor (20 ohms)	33-020344
68	Power Transformer	32-7550
69	Condenser (7500 mmfd.)	30-4420
70	Filter Choke	32-7545
71	Filter Condenser (4-8 mfd.)	30-2150
72	"B" Choke	32-1281
73	Condenser (250 mmfd.)	30-1032
74	Vibrator (OPTIONAL)	41-3170-2
		41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Shaft	L-2767
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227

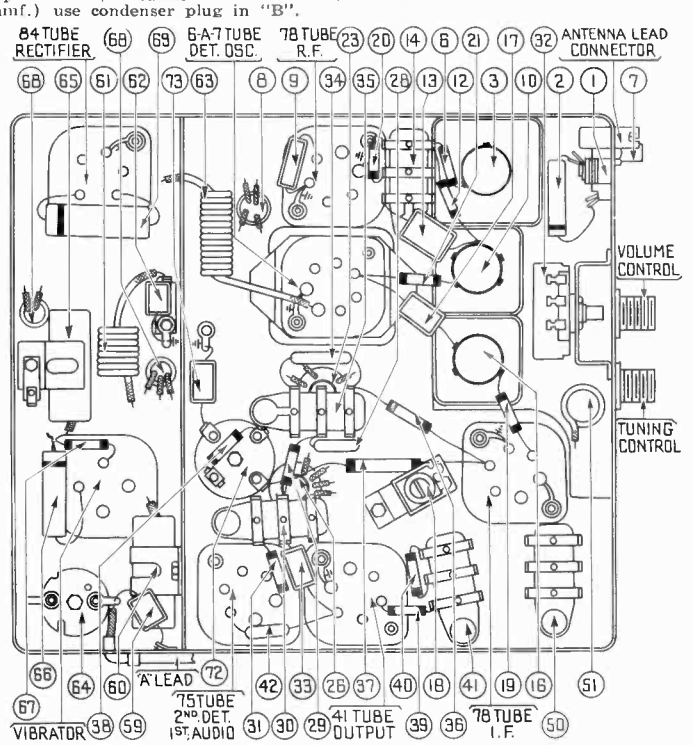


FIGURE 2

No.	Description	Part No.	No.	Description	Part No.
	Fuse Insulator	27-7729		Receiver Housing	38-8573
	Tee Bolt (Rec. Mtg.)	28-6161		Stud (Speaker Mtg.)	6122
	Nut (Rec. Mtg.)	W518		Nut (Speaker Mtg.)	W55

I. F. TRANSFORMERS AND PADDERS

The I. F. Transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

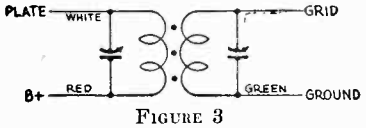


FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL 827-K ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder ㉗ on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉕ for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder ㉔ on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉒ for maximum reading. Readjust padders ㉕ and ㉗ with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grip cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go.

With the tuning condenser in this position, adjust the high frequency padder ⑮ and the R. F. padder ⑪ until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

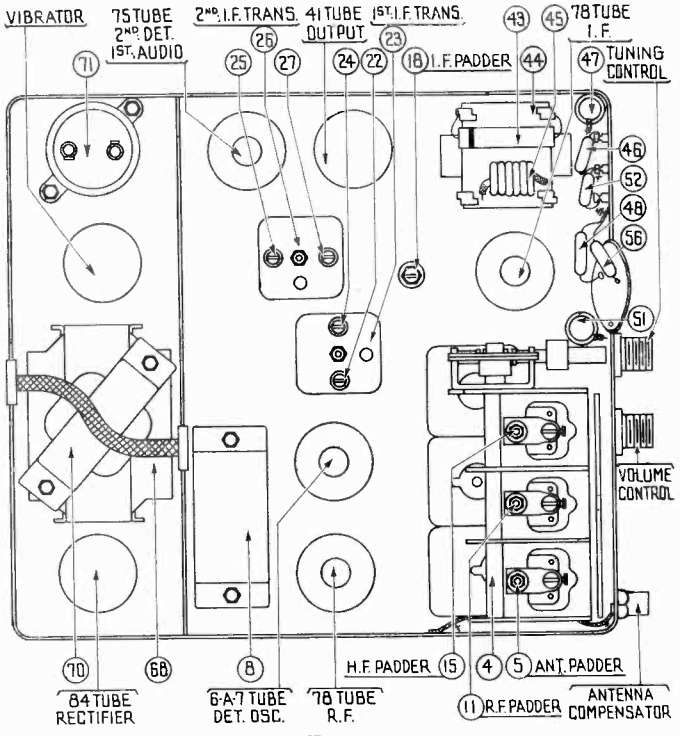


FIGURE 4

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and set the signal generator at 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw ⑱ for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT — Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder ⑮ again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA — WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna lead assembly (made up of Part No. 41-3191 lead and a 200 mmfd. condenser, Part No. 30-1013), in series between the lead and the signal generator. Plug the lead into the antenna lead connector on the end of the Receiver.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders ⑪ and ⑤ for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO
REG. U. S. PAT. OFF.
TRANSITONE

Printed in U. S. A.

PHILCO TRANSITONE
SERVICE BROADCAST

MARCH 5, 1937

NASH — PHILCO MODEL N-1434-H, TWO UNIT RECEIVER

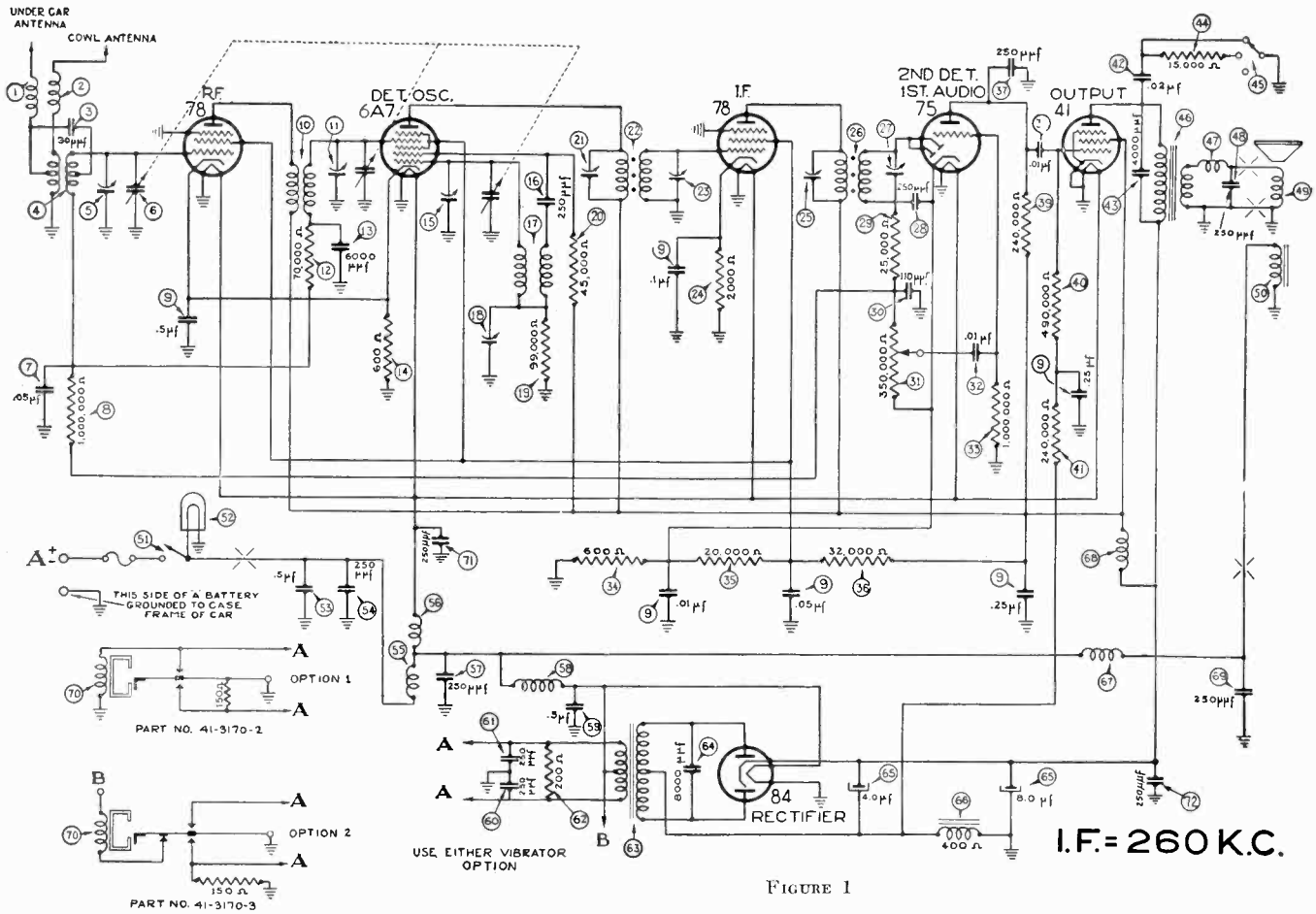


FIGURE 1

MODEL N-1434-H PARTS LIST

No.	Description	Part No.
(1)	Antenna Choke	38-8106
(2)	Antenna Choke	38-8106
(3)	Condenser (30 mmfd.)	30-1059
(4)	Antenna Transformer	32-2461
(5)	First Padder (on tun. cond.)	
*(6)	Tuning Condenser	31-1912
(7)	Condenser (.05 mfd.)	30-4444
(8)	Resistor (1,000,000 ohms)	33-510344
(9)	Condenser (.01-.05-.1-.25-.25-.5 mfd)	30-4478
(10)	R. F. Transformer	32-2231
(11)	Second Padder (on tun. cond.)	
(12)	Resistor (70,000 ohms)	33-370344
(13)	Condenser (6,000 mmfd.)	30-4445
(14)	Resistor (600 ohms)	33-1212
(15)	Third Padder (on tun. cond.)	
(16)	Condenser (250 mmfd.)	30-1032
(17)	Oscillator Transformer	32-2232
*(18)	Low Frequency Padder	31-6056
(19)	Resistor (99,000 ohms)	33-399344
(20)	Resistor (45,000 ohms)	33-345344
(21)	Padder (Pri. 1st I.F. Trans.)	
(22)	First I. F. Transformer	32-2286
(23)	Padder (Sec. 1st I.F. Trans.)	
(24)	Resistor (2,000 ohms)	32-220334
(25)	Padder (Pri. 2nd I.F. Trans.)	
(26)	Second I. F. Transformer	32-2167
(27)	Padder (Sec. 2nd I.F. Trans.)	
(28)	Condenser (250 mmfd.)	30-1032
(29)	Resistor (25,000 ohms)	33-325344
(30)	Condenser (110 mmfd.)	30-1031
(31)	Volume Control (350,000 ohms)	33-5139
(32)	Condenser (.01 mfd.)	30-4479
(33)	Resistor (1,000,000 ohms)	33-510344
(34)	Resistor (600 ohms)	33-1212
(35)	Resistor (20,000 ohms)	33-320334
(36)	Resistor (32,000 ohms)	33-332444
(37)	Condenser (250 mmfd.)	30-1032
(38)	Condenser (.01 mfd.)	30-4115
(39)	Resistor (240,000 ohms)	33-424344
(40)	Resistor (490,000 ohms)	33-449344
(41)	Resistor (240,000 ohms)	33-424344
(42)	Condenser (.02 mfd.)	30-4495
(43)	Condenser (4,000 mmfd.)	30-4185
(44)	Resistor (15,000 ohms)	33-315344
*(45)	Tone Control Switch	42-1273
*(46)	Output Transformer	32-7495
(47)	Choke	32-1374
(48)	Condenser (250 mmfd.)	30-1032
(49)	Cone & Voice Coil	36-3526
*(50)	Field Coil Assembly	32-9236
*(51)	On & Off Switch Assembly	42-5617
(52)	Pilot Lamp	34-2039
(53)	Condenser (.5 mfd.)	30-4474
(54)	Condenser (250 mmfd.)	30-1032
(55)	"A" Choke	32-1374
(56)	Filament Choke	32-1438
(57)	Condenser (250 mmfd.)	30-1032
(58)	Vibrator Choke	32-2537
(59)	Condenser (.5 mfd.)	30-4474
(60)	Condenser (250 mmfd.)	30-1032
(61)	Condenser (250 mmfd.)	30-1032
(62)	Resistor (200 ohms)	33-120344
(63)	Power Transformer	32-7720
(64)	Condenser (8,000 mmfd.)	30-4420
(65)	Filter Condenser (4-8 mfd.)	30-2179
(66)	Filter Choke	32-7722
(67)	Choke	32-2269
(68)	"B" Choke	32-1281
(69)	Condenser (250 mmfd.)	30-1032
(70)	Vibrator (OPTIONAL)	41-3170-3
(71)	Condenser (250 mmfd.)	30-1032
(72)	Condenser (250 mmfd.)	30-1032
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Inductive Suppressor	32-2250
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt (Rec. mtg.)	28-6161

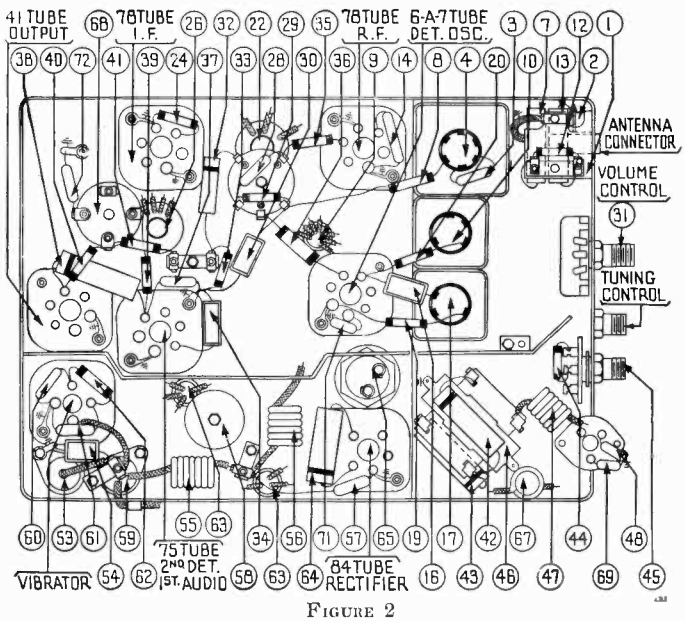


FIGURE 2

No.	Description	Part No.
	Nut (Rec. mtg.)	W518A
	Speaker Cable	41-3247
	Tuning & Volume Knob	28-7214
	Tone Control Knob	28-7215
	Knob Base	28-4184
	Tuning & Volume Shaft	28-8695
	Tone Control Shaft	28-8696
	Scale Assembly	42-5644
	Control Mtg. Wrench	28-4380
	Receiver Housing	38-1727
	Tow Strap	36-3403

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

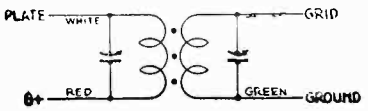


FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2286 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL N-1434 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder ㉗ on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉕ for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap.) Adjust the secondary screw padder ㉓ on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉑ for maximum reading. Readjust padders ㉕ and ㉗ with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position, adjust the high frequency padder ⑮ and the R. F. padder ⑪ until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

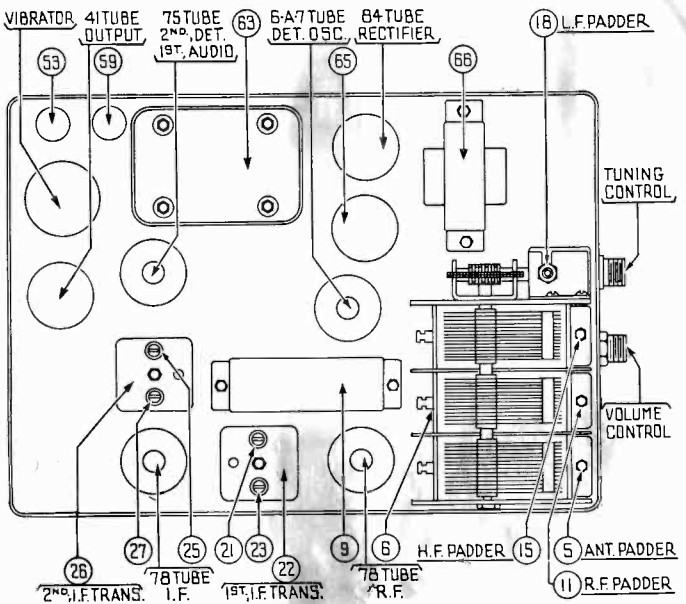


FIGURE 4

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw ⑱ for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder ⑮ again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna cable assembly, made up of Part No. L-2650 lead, and a 22 mmfd. condenser (Part No. 30-1067) in series between the lead and the signal generator. Plug the cable into the COWL ANTENNA CONNECTOR on the end of the Receiver.

Follow this padding procedure regardless of whether the Receiver is used with the Cowl or Under-car antenna.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders ⑪ and ⑤ for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO
REG. U. S. PAT. OFF.
TRANSITONE
PHILADELPHIA, PA.

MARCH 5, 1937

Printed in U. S. A.

PHILCO TRANSITONE
SERVICE BROADCAST

MARCH 1, 1937

STUDEBAKER — PHILCO MODEL S-1437, TWO UNIT RECEIVER

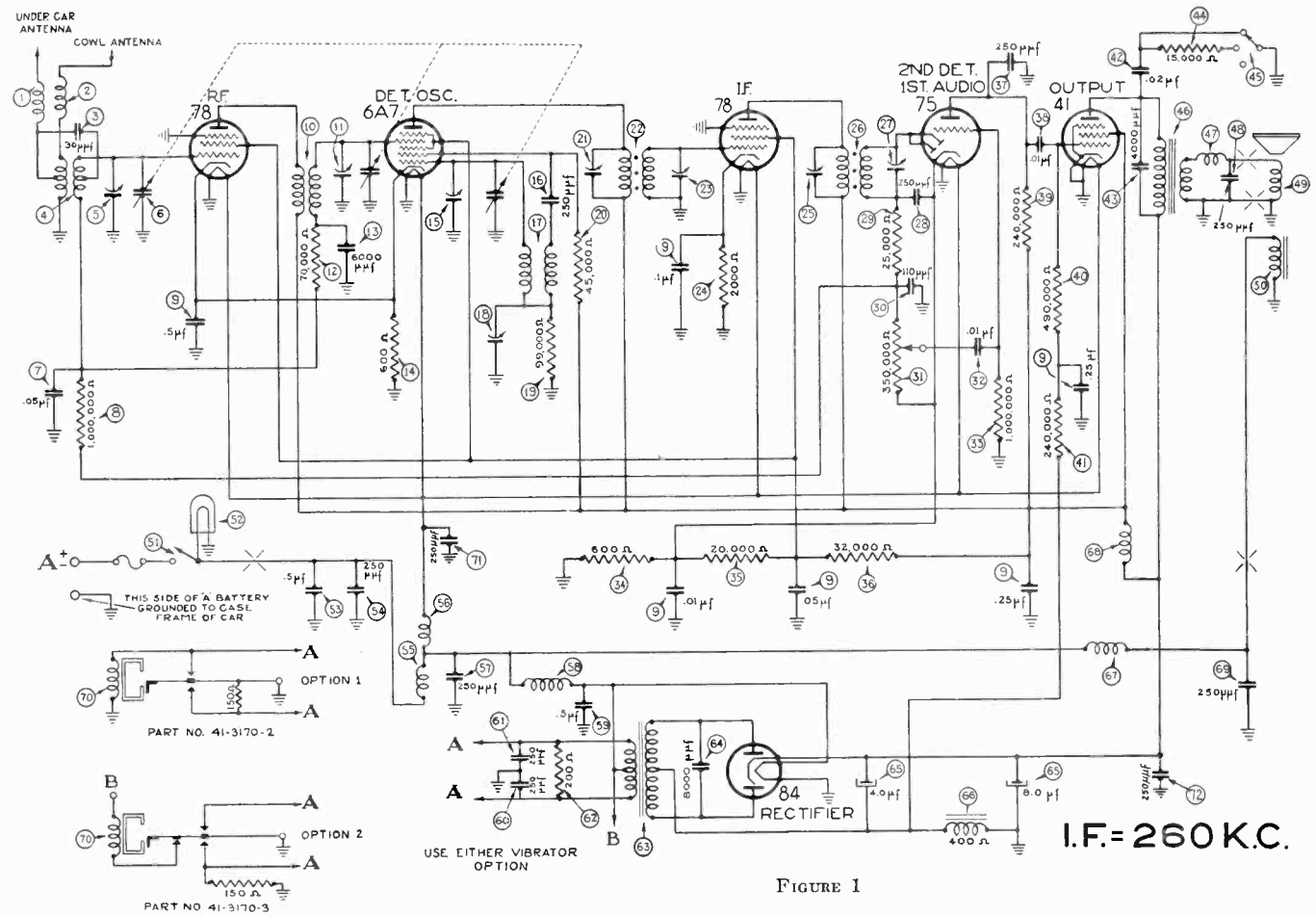


FIGURE 1

MODEL S-1437 PARTS LIST

No.	Description	Part No.
(1)	Antenna Choke	38-8106
(2)	Antenna Choke	38-8106
(3)	Condenser (30 mmfd.)	30-1059
(4)	Antenna Transformer	32-2461
(5)	First Padder (on tun. cond.)	
*(6)	Tuning Condenser	31-1912
(7)	Condenser (.05 mfd.)	30-4444
(8)	Resistor (1,000,000 ohms)	33-510344
(9)	Condenser (.01-.05-.1-.25-.25-.5 mfd)	30-4478
(10)	R. F. Transformer	32-2231
(11)	Second Padder (on tun. cond.)	
(12)	Resistor (70,000 ohms)	33-370344
(13)	Condenser (6,000 mmfd.)	30-4445
(14)	Resistor (600 ohms)	33-1212
(15)	Third Padder (on tun. cond.)	
(16)	Condenser (250 mmfd.)	30-1032
(17)	Oscillator Transformer	32-2232
*(18)	Low Frequency Padder	31-6056
(19)	Resistor (99,000 ohms)	33-399344
(20)	Resistor (45,000 ohms)	33-345344
(21)	Padder (Pri. 1st I.F. Trans.)	
(22)	First I. F. Transformer	32-2286
(23)	Padder (Sec. 1st I.F. Trans.)	
(24)	Resistor (2,000 ohms)	33-220334
(25)	Padder (Pri. 2nd I.F. Trans.)	
(26)	Second I. F. Transformer	32-2167
(27)	Padder (Sec. 2nd I.F. Trans.)	
(28)	Condenser (250 mmfd.)	30-1032
(29)	Resistor (25,000 ohms)	33-325344
(30)	Condenser (110 mmfd.)	30-1031
(31)	Volume Control (350,000 ohms)	33-5139
(32)	Condenser (.01 mfd.)	30-4479
(33)	Resistor (1,000,000 ohms)	33-510344
(34)	Resistor (600 ohms)	33-1212
(35)	Resistor (20,000 ohms)	33-320334
(36)	Resistor (32,000 ohms)	33-332444
(37)	Condenser (250 mmfd.)	30-1032
(38)	Condenser (.01 mfd.)	30-4445
(39)	Resistor (240,000 ohms)	33-424344
(40)	Resistor (490,000 ohms)	33-449344
(41)	Resistor (240,000 ohms)	33-424344
(42)	Condenser (.02 mfd.)	30-4495
(43)	Condenser (4,000 mmfd.)	30-4185
(44)	Resistor (15,000 ohms)	33-315344
*(45)	Tone Control Switch	42-1273
*(46)	Output Transformer	32-7495
(47)	Choke	32-1374
(48)	Condenser (250 mmfd.)	30-1032
(49)	Cone and Voice Coil	36-3526
*(50)	Field Coil Assembly	32-9236
*(51)	On & Off Switch Assembly	42-5617
(52)	Pilot Lamp	34-2039
(53)	Condenser (.5 mfd.)	30-4474
(54)	Condenser (250 mmfd.)	30-1032
(55)	"A" Choke	32-1374
(56)	Filament Choke	32-1438
(57)	Condenser (250 mmfd.)	30-1032
(58)	Vibrator Choke	32-2537
(59)	Condenser (.5 mfd.)	30-4474
(60)	Condenser (250 mmfd.)	30-1032
(61)	Condenser (250 mmfd.)	30-1032
(62)	Resistor (200 ohms)	33-120344
(63)	Power Transformer	32-7720
(64)	Condenser (8,000 mmfd.)	30-4420
(65)	Filter Condenser (4-8 mfd.)	30-2179
(66)	Filter Choke	32-7722
(67)	Choke	32-2269
(68)	"B" Choke	32-1281
(69)	Condenser (250 mmfd.)	30-1032
(70)	Vibrator (OPTIONAL)	41-3170-2
		41-3170-3
(71)	Condenser (250 mmfd.)	30-1032
(72)	Condenser (250 mmfd.)	30-1032
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Inductive Suppressor	32-2250
	Interference Condenser	30-4007
	Distributor Condenser	30-1087
	Fuse	7227
	Fuse Insulator	27-7729
	Static Collector (Pres.)	28-3584
	Static Collector (Dict.)	38-7405

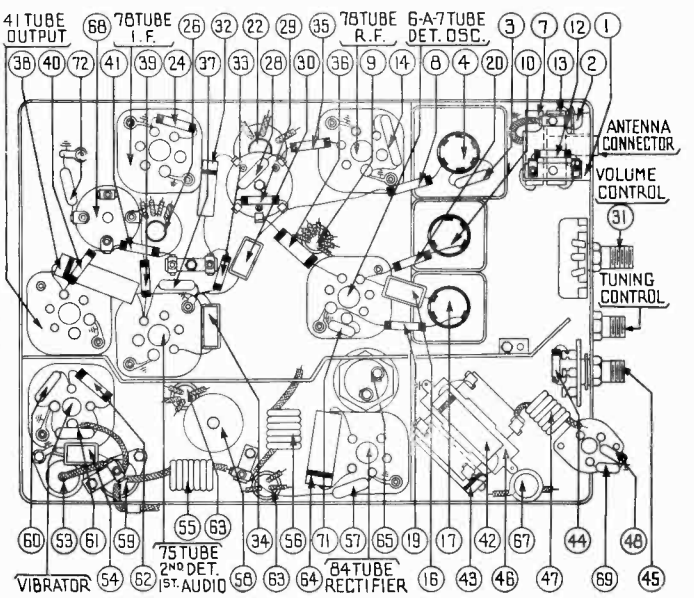


FIGURE 2

No.	Description	Part No.
	Tee Bolt (Rec. Mtg.)	28-6161
	Nut (Rec. Mtg.)	W-518A
	Speaker Cable	41-3231
	Ground Strap	38-7425
	Tuning & Volume Knob	28-7211
	Tone Control Knob	28-7212
	Tuning Shaft	28-8666
	Volume Shaft	28-8667
	Tone Control Shaft	28-8668
	Scale Assembly	42-5630
	Receiver Housing	38-1727

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

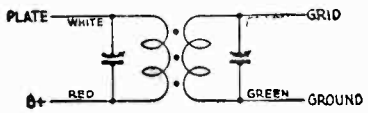


FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2286 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL S-1437 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder ㉗ on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉕ for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder ㉓ on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉑ for maximum reading. Readjust padders ㉕ and ㉗ with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position, adjust the high frequency padder ⑱ and the R. F. padder ⑪ until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

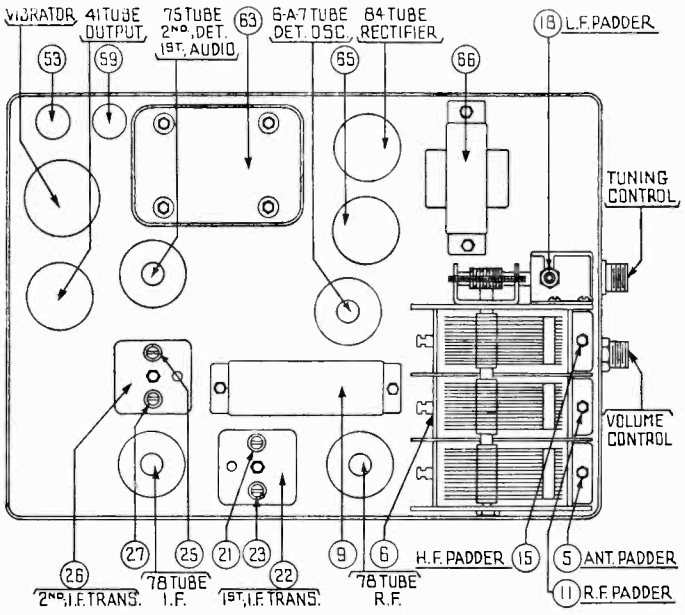


FIGURE 4

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw ⑱ for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder ⑮ again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna cable assembly, made up of Part No. L-2650 lead, and a 22 mmfd. condenser (Part No. 30-1067) in series between the lead and the signal generator. Plug the cable into the COWL ANTENNA CONNECTOR on the end of the Receiver.

Follow this padding procedure regardless of whether the Receiver is used with the Cowl or Under-car antenna.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders ⑪ and ⑤ for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO
REG. U. S. PAT. OFF.
TRANSITONE
PHILADELPHIA, PA.

MARCH 1, 1937

Printed in U. S. A.

PHILCO . . . . . Model 38-1, Code 121

SERVICE BULLETIN No. 293 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Electrical Specifications

Model 38-1, Code 121 is a twelve-tube, A.C. operated superheterodyne receiver with three tuning ranges covering the frequencies listed below and employs the **Philco Automatic Tuning Dial Mechanism.** Additional design features incorporated in this receiver are: Magnetic Tuning Control on the broadcast tuning range; Automatic Volume Control; bass compensation; special push-pull pentode audio output circuit designed for the reduction of harmonic distortion; Adjustable Iron Core I. F. Transformers; Four Point Tone Control; R. F. Circuit completely shielded and contained in one unit; all aligning compensators accessible from the top of the chassis.

POWER SUPPLY: Voltage	Frequency Cycles	Power Consumption
115	50 to 60	150 Watts
115	25 to 40	150 Watts
115 or 230	50 to 60	150 Watts

Different transformers are required for operation on the voltages and frequencies listed above. The part numbers for these transformers are listed on page 3. 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.

FREQUENCY RANGES: Three.
Range one—530 to 1720 K. C.
Range two—2.3 to 7.4 M. C.
Range three—7.35 to 22.0 M. C.

INTERMEDIATE FREQUENCY: 470 K. C.

AUDIO OUTPUT: 10 watts.

PHILCO TUBES USED: 6U7G, R. F. amplifier; 6A8G, Det. Osc.; 6N7G, Osc. Control; 6K7G, I. F. amplifier; 6H6G, Magnetic Tuning Discriminator; 6R7G, 2nd detector, 1st Audio; 6J5G, Audio Phase inverter; two 6J5G, Driver; two 6F6G, output; and a 5X4G, rectifier.

TONE CONTROL: Four Point.
A. Brilliant—for speech.
B. Bright—for normal reception of music.
C. Mellow—first noise-reducing stage.
D. Deep—noise-reducing for distant reception.

PHILCO SPEAKER: U-28.

CABINET: Type XX.

Aerial Connections

To obtain the full advantage of the sensitivity of this receiver the **Philco High Efficiency Aerial** supplied with the instrument must 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.

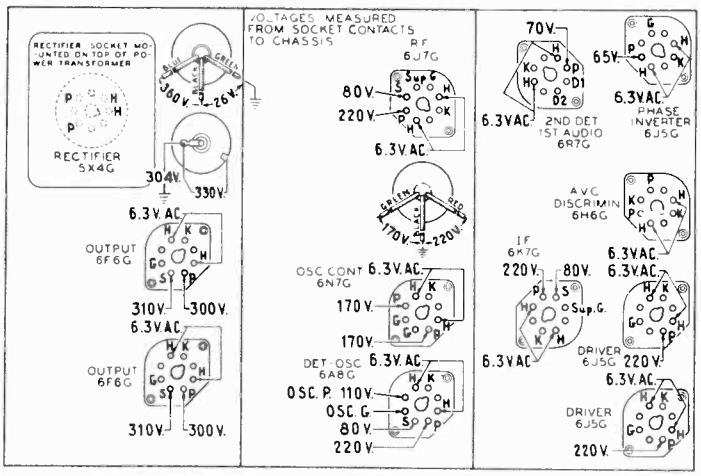


Fig. 1. Underside View of Chassis showing Socket Voltages

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.

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. When referring to bulletin 273, use the dial parts list for Model 37-10 as the same parts are used on Model 38-1. There are four automatic dial parts, however, which differ from those shown in bulletin 273. These parts are marked with an asterisk on page 3 of this bulletin.

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. transformers are shown on page 2. Each transformer is marked with the corresponding schematic diagram circled number. The connections of the R. F. transformer are numbered to indicate the connecting points in the circuit diagram which are correspondingly marked.

The colors of the I. F. transformer leads are marked on the schematic diagram.

Range switch lugs are marked with a letter and number—example (A2)—indicating the connecting point in the circuit diagram. Each range switch section is marked with a letter indicating the position of the section from the rear of the chassis. Section "A" is used in the oscillator circuit. Section "B" the "RF" circuit, and Section "C" the antenna circuit.

The colors of the connections on the power transformer and speaker unit are also marked on the schematic diagram.

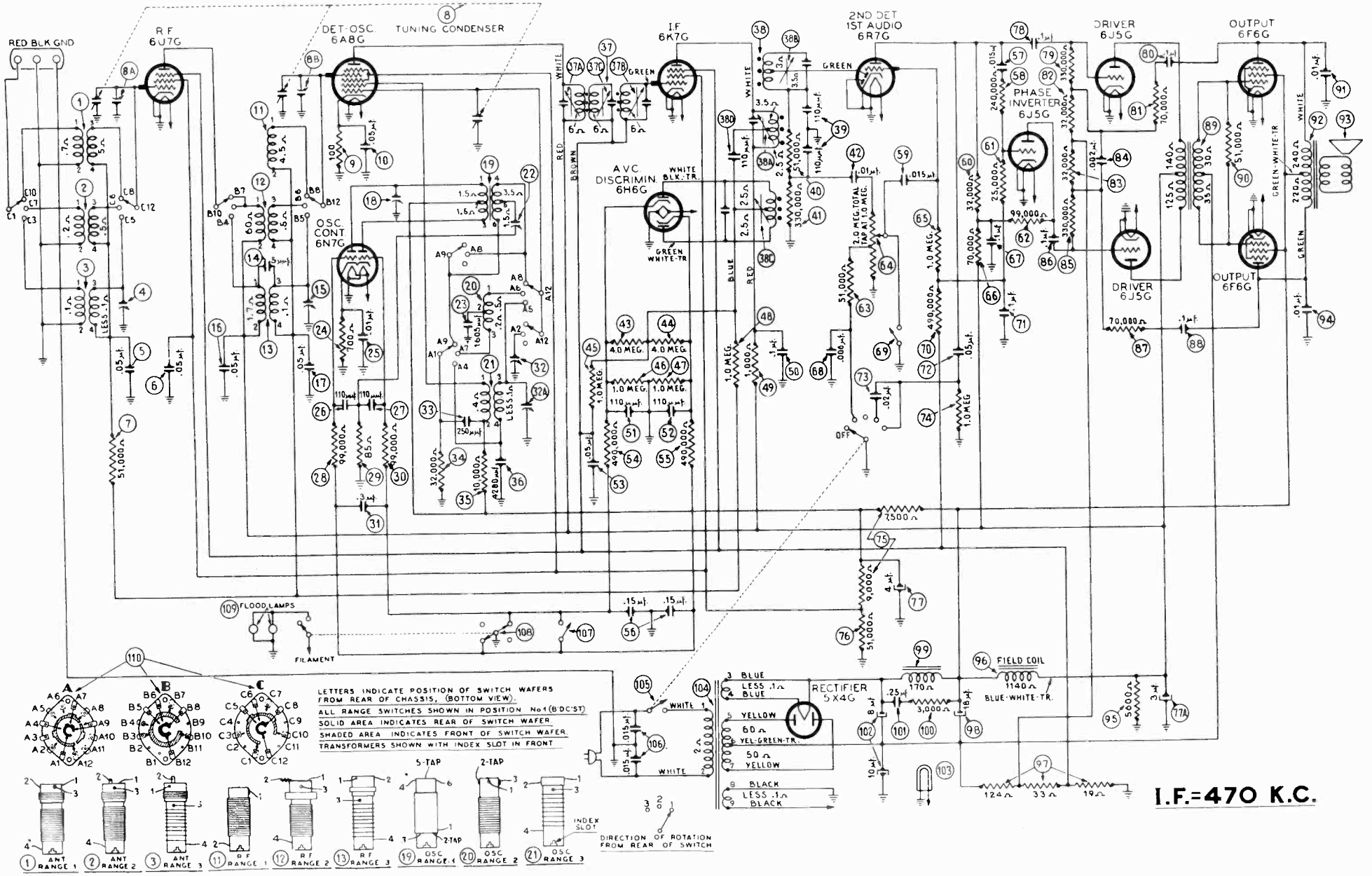


Fig. 2. Schematic Diagram

Model 38-1, Code 121

Replacement Parts

Model 38-1, Code 121

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2575	$0.70
2	Antenna Transformer (Range 2)	32-2576	.70
3	Antenna Transformer (Range 3)	32-2573	.70
4	Compensator, Antenna (Range 3)	31-6160	.30
5	Condenser (.05 μf tubular)	30-4519	.20
6	Condenser (.05 μf—.05 μf Bakelite)	3615DG	.40
7	Resistor (51,000 Ω, ½ watt)	33-351339	.20
8	Tuning Condenser Assembly	30-2075	
9	Resistor (100 Ω, ½ watt)	33-110339	.20
10	Condenser (.05 μf, tubular)	30-4020	.20
11	R. F. Transformer (Range 1)	32-2379	.40
12	R. F. Transformer (Range 2)	32-2382	1.00
13	R. F. Transformer (Range 3)	32-2385	1.20
14	Condenser (5 μμf mica)	30-1097	.20
15	Compensator (R. F. Range 3)	31-6212	
16	Condenser—Part of 6		
17	Condenser (.05 μf tubular)	30-4519	.20
18	Compensator, Osc. (Range 1)	31-6212	
19	Osc. Transformer (Range 1)	32-2373	1.60
20	Osc. Transformer (Range 2)	32-2383	.70
21	Osc. Transformer (Range 3)	32-2386	.70
22	Compensator, Range 1 series	31-6151	.40
23	Condenser (1605 μμf mica)	31-6201	.40
24	Resistor (700 Ω, ½ watt)	33-170339	.20
25	Condenser (.01 μf tubular)	30-4479	.20
26	Condenser (110 μμf mica)	30-1031	.20
27	Condenser (110 μμf mica)	30-1031	.20
28	Resistor (99,000 Ω, ½ watt)	33-399339	.20
29	Resistor (85 Ω, ½ watt)	33-085339	.20
30	Resistor (99,000 Ω, ½ watt)	33-399339	.20
31	Condenser (.3 μf Bakelite)	6287DG	.40
32	Compensator (2 sections)	31-6211	
33	Condenser (250 μμf mica)	30-1032	.25
34	Resistor (32,000 Ω, ½ watt)	33-332339	.20
35	Resistor (10,000 Ω, ½ watt)	33-310339	.20
36	Condenser (4280 μμf mica)	31-6202	.50
37	1st I. F. Transformer	32-2741	3.50
38	2nd I. F. Transformer	32-2742	
39	Condenser (110 μμf—110 μμf Bakelite)	8035DG	.25
40	Resistor (51,000 Ω, ½ watt)	33-351339	.20
41	Resistor (330,000 Ω, ½ watt)	33-433339	.20
42	Condenser (.01 μf tubular)	30-4479	.20
43	Resistor (4.0 meg., ½ watt)	33-540339	.20
44	Resistor (4.0 meg., ½ watt)	33-540339	.20
45	Resistor (1.0 meg., ½ watt)	33-510339	.20
46	Resistor (1.0 meg., ½ watt)	33-510339	.20
47	Resistor (1.0 meg., ½ watt)	33-510339	.20
48	Resistor (1.0 meg., ½ watt)	33-510339	.20
49	Resistor (1,000 Ω, ½ watt)	33-210339	.20
50	Condenser (.1 μf tubular)	30-4455	.25
51	Condenser (110 μμf mica)	30-1031	.20
52	Condenser (110 μμf mica)	30-1031	.20
53	Condenser (.05 μf Bakelite)	3615SG	.35
54	Resistor (490,000 Ω, ½ watt)	33-449339	.20
55	Resistor (490,000 Ω, ½ watt)	33-449339	.20
56	Condenser (.15 μf—.15 μf Bakelite)	6287DG	.40
57	Condenser (.015 μf tubular)	30-4226	.20
58	Resistor (240,000 Ω, ½ watt)	33-424339	.20
59	Condenser (.015 μf tubular)	30-4226	.20
60	Resistor (32,000 Ω, ½ watt)	33-332339	.20
61	Resistor (25,000 Ω, ½ watt)	33-325339	.20
62	Resistor (99,000 Ω, ½ watt)	33-399339	.20
63	Resistor (51,000 Ω, ½ watt)	33-351339	.20
64	Volume Control	33-5233	
65	Resistor (1.0 meg., ½ watt)	33-510339	.20
66	Resistor (20,000 Ω, ½ watt)	33-370339	.20
67	Condenser (.1 μf tubular)	30-4455	.25
68	Condenser (.006 μf tubular)	30-4445	.20
69	Audio Shorting Switch (Part of Auto. Tuner—See parts (6) and (16) Bulletin 273)		
70	Resistor (490,000 Ω, ½ watt)	33-449339	.20
71	Condenser (.1 μf tubular)	30-4499	.20
72	Condenser (.05 μf Bakelite)	3615SU	.35
73	Condenser (.02 μf tubular)	30-4113	.20
74	Resistor (1.0 meg., ½ watt)	33-510339	.20
75	Resistor, wire-wound (7,500 Ω—9,000 Ω)	33-3320	.65
76	Resistor (51,000 Ω, 1 watt)	33-351439	$0.20
77	Electrolytic Condenser (4 μf—3 μf)	30-2243	1.50
78	Condenser (.1 μf tubular)	30-4455	.25
79	Resistor (330,000 Ω, ½ watt)	33-433399	.20
80	Condenser (.1 μf tubular)	30-4455	.25
81	Resistor (70,000 Ω, ½ watt)	33-370339	.20
82	Resistor (32,000 Ω, ½ watt)	33-332339	.20
83	Resistor (32,000 Ω, ½ watt)	33-332339	.20
84	Condenser (.05 μf tubular)	30-4177	.25
85	Resistor (330,000 Ω, ½ watt)	33-433339	.20
86	Condenser (.1 μf tubular)	30-4455	.25
87	Resistor (70,000 Ω, ½ watt)	33-370339	.20
88	Condenser (.1 μf tubular)	30-4455	.25
89	Input Transformer	32-7671	2.50
90	Resistor (51,000 Ω, ½ watt)	33-351339	.20
91	Condenser (.01 μf tubular)	30-4381	.25
92	Output Transformer	32-7914	1.85
93	Cone & Voice Coil Assembly (U28 Speaker)	36-3799	
94	Condenser (.01 μf tubular)	30-4381	.25
95	Resistor (5,600 Ω, wire-wound)	33-3282	.60
96	Field & Pot Assembly (U28 Speaker)	36-3162	11.00
97	Resistor, Three Sections (124 Ω—33 Ω—19 Ω)	33-3319	.50
98	Electrolytic Condenser (18 μf)	30-2200	1.40
99	Choke	32-7115	1.80
100	Resistor (3,000 Ω, ½ watt)	33-230339	.20
101	Condenser (.25 μf tubular)	30-4446	$0.25
102	Electrolytic Two Sections (8 μf—10 μf)	30-2201	1.75
103	Pilot Lamp	34-2064	.09
104	Power Transformer (115 v. 50 to 60 cycles)	32-7869	
	Power Transformer (115 v. 25 to 40 cycles)	32-7870	
	Power Transformer (115/230 v, 50 to 60 cycles)	32-7871	
105	Tone Control	42-1268	.75
106	Condenser (.015 μf—.015 μf Bakelite)	3793DG	.40
107	A.F.C. Shorting Switch (Part of Auto. Tuner—See part (8) Bulletin 273)	45-2330	
108	A.F.C. Switch Manual	42-1269	1.80
109	Flood Lamp	34-2064	.09
110	Wave Switch Complete	42-1362	3.00
	MODEL 38-1		
	Automatic Tuning Mechanism Complete	38-9145	
	Brace (Automatic Mechanism)	28-4119	
	Cable (Speaker)	41-3329	
	Cable (Power)	L-2183	
	Clip (Mtg. R. F. Coils)	28-5002	
	Coupling (Tuning Condenser)	31-1961	
	Coupling (Range Switch Shaft & Mask)	38-8693	
	Knob (Range Switch)	27-4326	
	Knob (Tuning)	27-4330	
	Knob (Vernier)	27-4331	
	Knob (Tone, Volume)	27-4332	
	Mtg. Rubber (Chassis)	27-4564	
	Mtg. Rubber (Rear of R. F. Unit)	27-4197	
	Mtg. Rubber (Front of R. F. Unit)	27-4581	
	Pilot Lamp Assembly	38-9100	
	Shield (R. F. Unit)	38-8969	
	Shield Base (Round)	8004	
	Shield Base	28-2725	
	Shield (Tube) (Square)	28-2726	
	Shield (6U7G Tube)	28-5031	
	Shield (Round)	8005	
	Socket (6 prong)	27-6086	
	Socket (7 prong) (6F6G Tubes)	27-6057	
	Socket (7 prong)	27-6087	
	Speaker (U-28)	36-1361	
	Support (Rear of R. F. Unit)	38-8923	
	Terminal Panel (Ant.)	38-8746	
	CABINET PARTS		
	Bezel Assembly	38-8833	
	Cover (Back of Cabinet)	27-8865	
	AUTOMATIC TUNING MECHANISM		
	*Cover (Handle)	28-5092	
	*Dial	27-5358	
	*Dial Screen Holder	31-2053	
	*Escutcheon Assembly (Station tabs)	45-2472	

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

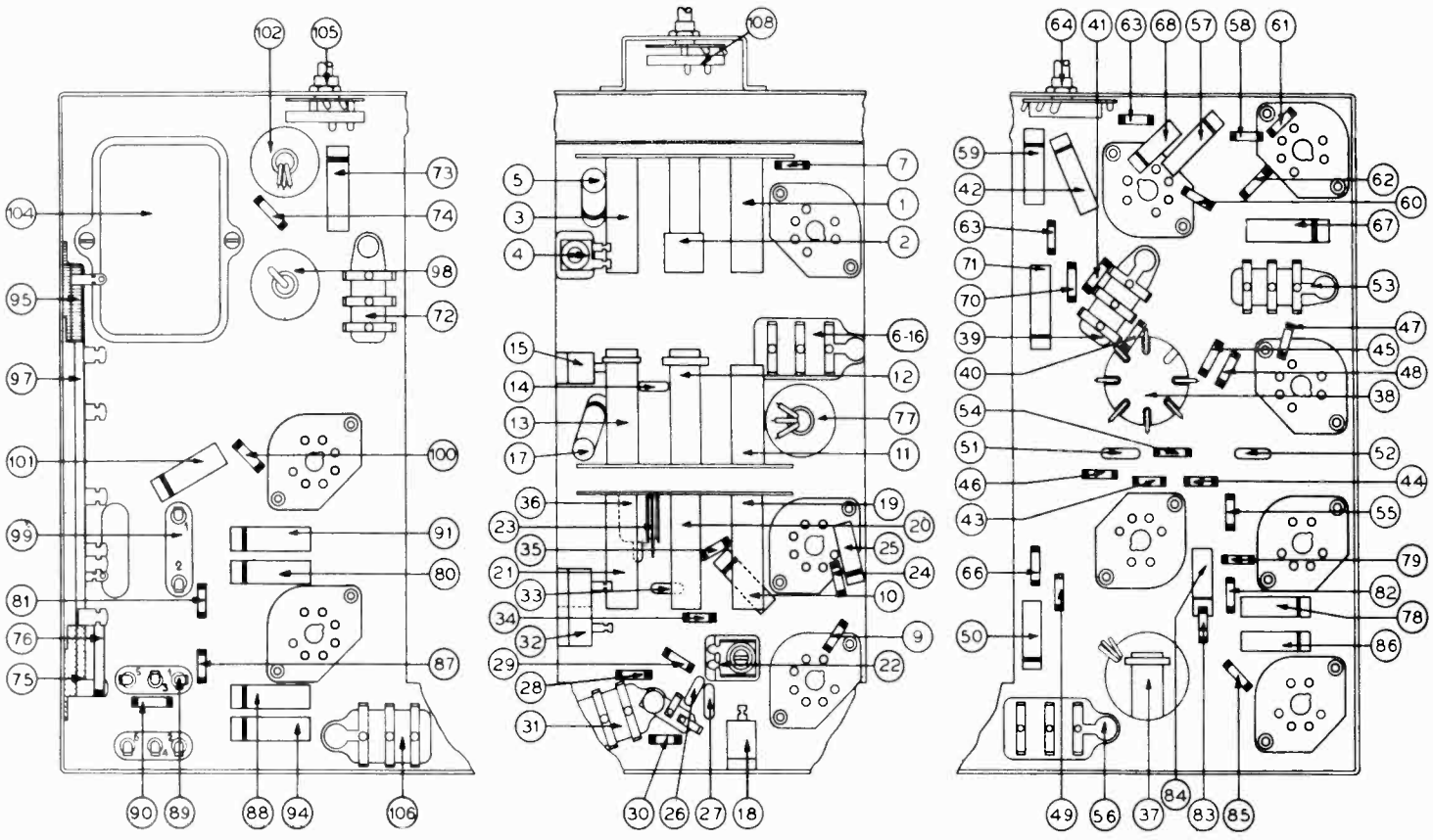


Fig. 3. Part Locations, Underside of Chassis

The Genuine PHILCO Replacement Parts listed above must be used to obtain the Accurate Balanced Performance built into this Philco Model

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the intermediate and tuning 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 Fiber Handle Screw Driver, part number 27-7059 and Fibre Wrench, part number 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of one of the 6F6G 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 2. See Fig. 4. With dial and tuning condenser in this position tighten set screws.

2. Turn the tuning condenser control until the indicator is on the 2.2 M. C. mark.

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.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

INTERMEDIATE FREQUENCY CIRCUIT

A. Set the receiver and signal generator controls as follows:

1. Range Switch (Broadcast Position)
2. Volume Control (Maximum)
3. Magnetic Tuning Switch "Off"
4. Tone Control First Position
5. Signal Generator Dial 470 K.C.

B. Connect the signal generator output cable through a .1 mfd. condenser to the grid of the 6A8G Det. Osc. tube and connect the cableground to the receiver chassis. Set the generator "attenuator" for maximum output. Adjust the I. F. Compensators as follows:

1. Turn compensator (37C) in until the output meter reading decreases almost to zero.

2. Now adjust the compensators, (37B) and (37A), for maximum output; then readjust (37C) for maximum output.

3. Turn compensator (38C) in about three turns; then adjust compensators (38B) and (38A) for maximum output. The adjustment of compensator 38C is given in the "Magnetic Tuning Circuit Adjustments" below.

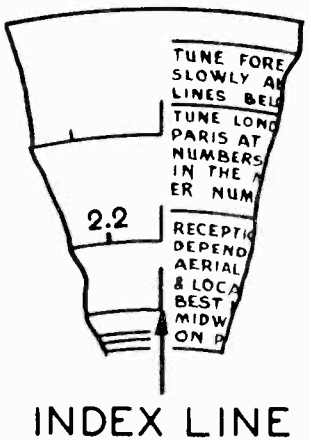


Fig. 4. Dial Calibration

RADIO FREQUENCY CIRCUIT

1. Set the controls as given under "Intermediate Frequency Circuit" 1 to 4 and set the range switch, signal generator and receiver dials as given under the adjustments of each tuning range in the following procedure.

Connect the Signal Generator output cable into the "Med" jack of the generator panel and connect the other end through a .1 mfd. condenser to the "Red" terminal of the receiver aerial panel (rear of chassis). The ground connection of the cable should be connected to the "Blk" terminal.

2. Adjust the "R. F." compensators for maximum output as follows:

Tuning Range: 530 to 1720 K. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
1	1550 K. C.	(18), (8B), and (8A)
1	580 K. C.	(22), Roll Tuning Condenser. See Note B.
1	1550 K. C.	(18), (8B), (8A)

Tuning Range 2.3 to 7.4 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
2	6.0 M. C.	(32)

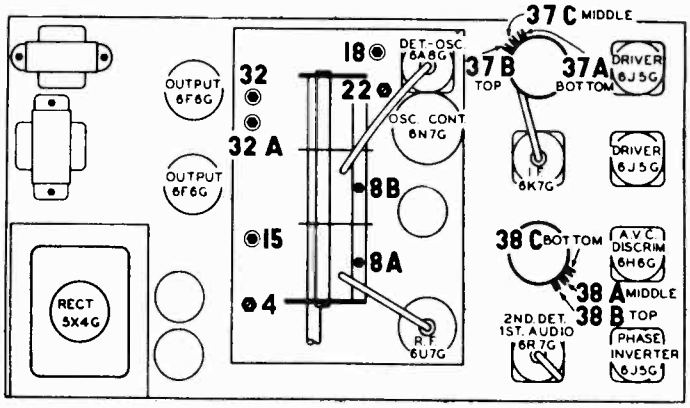


Fig. 5. Compensator Locations

Tuning Range: 7.35 to 22.0 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
3	18.0 M. C.	(32A), (15), (4) **Roll tuning condensers when adjusting (15) and (4). See Note B, check image at 17.060. See Note A.**
3	18.0 M. C.	(32A)

MAGNETIC TUNING CIRCUIT ADJUSTMENTS

1. Set the Magnetic Tuning switch in the "out" position.

2. Turn the signal generator indicator to 1000 K. C. and adjust the "Attenuator" control for a weak signal.

3. Adjust volume control for a readable indication on the output meter.

4. Now tune the receiver dial for maximum output at 1000 K. C. The dial must be tuned very accurately to the 1000 K. C. signal in order to make the following adjustment correctly.

5. Turn the Magnetic Tuning Switch "In" and adjust compensator (38C) 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 turn the switch from the "out" to the "in" position. With the switch in either position, the tone of the station being received 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 compensator (38C) should be carefully readjusted.

NOTE "A"—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 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 any high frequency range.

NOTE "B"—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; 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. 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.

PHILCO RADIO AND TELEVISION CORPORATION
Parts and Service Division
Philadelphia, Pa.

August 1937 Printed in U. S. A.

PHILCO . . . . . Model 38-2, Code 121

SERVICE BULLETIN No. 294 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Electrical Specifications

Model 38-2, Code 121, is an eleven tube, A. C. operated superheterodyne receiver with three tuning ranges covering the frequencies listed below, and employs the PHILCO AUTOMATIC TUNING DIAL MECHANISM. Additional design features incorporated in this receiver are: Magnetic Tuning Control on the broadcast tuning range; Automatic Volume Control; Bass Compensation; Special Push-pull Pentode Audio Output circuit designed for the reduction of harmonic distortion; Four Point Tone Control; R. F. Circuit completely shielded and contained in one unit; all aligning compensators accessible from the top of the chassis.

POWER SUPPLY:

Voltage	Frequency Cycles	Power Consumption
115	50 to 60	140 Watts
115	25 to 40	140 Watts
115/230	50 to 60	140 Watts

Different transformers are required for operation on the voltages and frequencies listed above. The part numbers for these transformers are listed on page 3. A special transformer for operation on either 115 or 230 volt—50 to 60 cycles 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.

FREQUENCY RANGES: Three.
Range one—530 to 1720 K. C.
Range two—2.3 to 7.4 M. C.
Range three—7.35 to 22.0 M. C.

INTERMEDIATE FREQUENCY: 470 K. C.

AUDIO OUTPUT: 7 Watts.

PHILCO TUBES USED: 6U7G, R. F. Amplifier; 6A8G, Det. Osc.; 6N7G Osc. Control; 6K7G, I. F. Amplifier; 6H6G, Magnetic Tuning Discriminator; 6R7G, 2nd Det., A.V.C., 1st. Audio; 6J5G, Audio Phase Inverter; 6J5G, 2nd Audio; Two 6F6G, Output; and 5X4G, Rectifier.

TONE CONTROL: Four Point.
A. Brilliant—for speech.
B. Bright—for normal reception of music.
C. Mellow—first noise-reducing stage.
D. Deep—Noise-reducing for distant reception.

PHILCO SPEAKER: H32.

CABINET: Type XX.

Aerial Connections

To obtain the full advantage of the sensitivity of this receiver the **Philco High Efficiency Aerial** supplied with the instrument must 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.

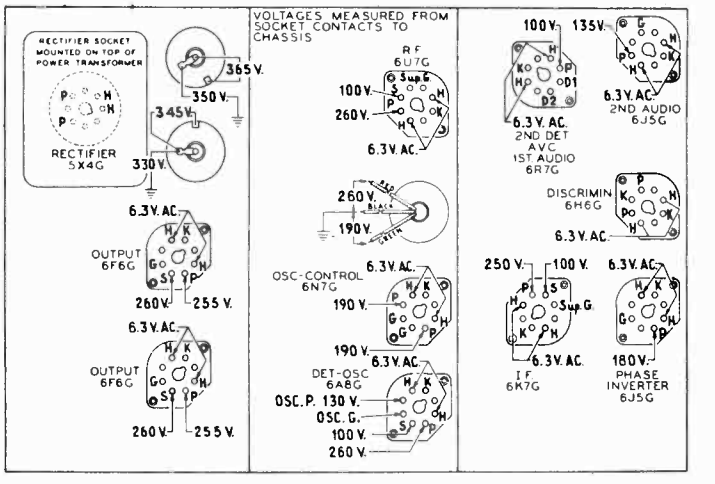


Fig. 1. Underside View of Chassis showing Socket Voltages

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.

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. When referring to bulletin 273, use the dial parts list for Model 37-10 as the same parts are used on Model 38-2. There are four automatic dial parts, however, which differ from those shown in bulletin 273. These parts are marked with an asterisk on page 3 of this bulletin.

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. transformers are shown on page 2. Each transformer is marked with the corresponding schematic diagram circled number. The connections of the R. F. transformer are numbered to indicate the connecting points in the circuit diagram which are correspondingly marked.

The colors of the I. F. transformer leads are marked on the schematic diagram.

Range switch lugs are marked with a letter and number—example (A2)—indicating the connecting point in the circuit diagram. Each range switch section is marked with a letter indicating the position of the section from the rear of the chassis. Section "A" is used in the oscillator circuit. Section "B" the "RF" circuit, and Section "C" the antenna circuit.

The colors of the connections on the power transformer and speaker unit are also marked on the schematic diagram.

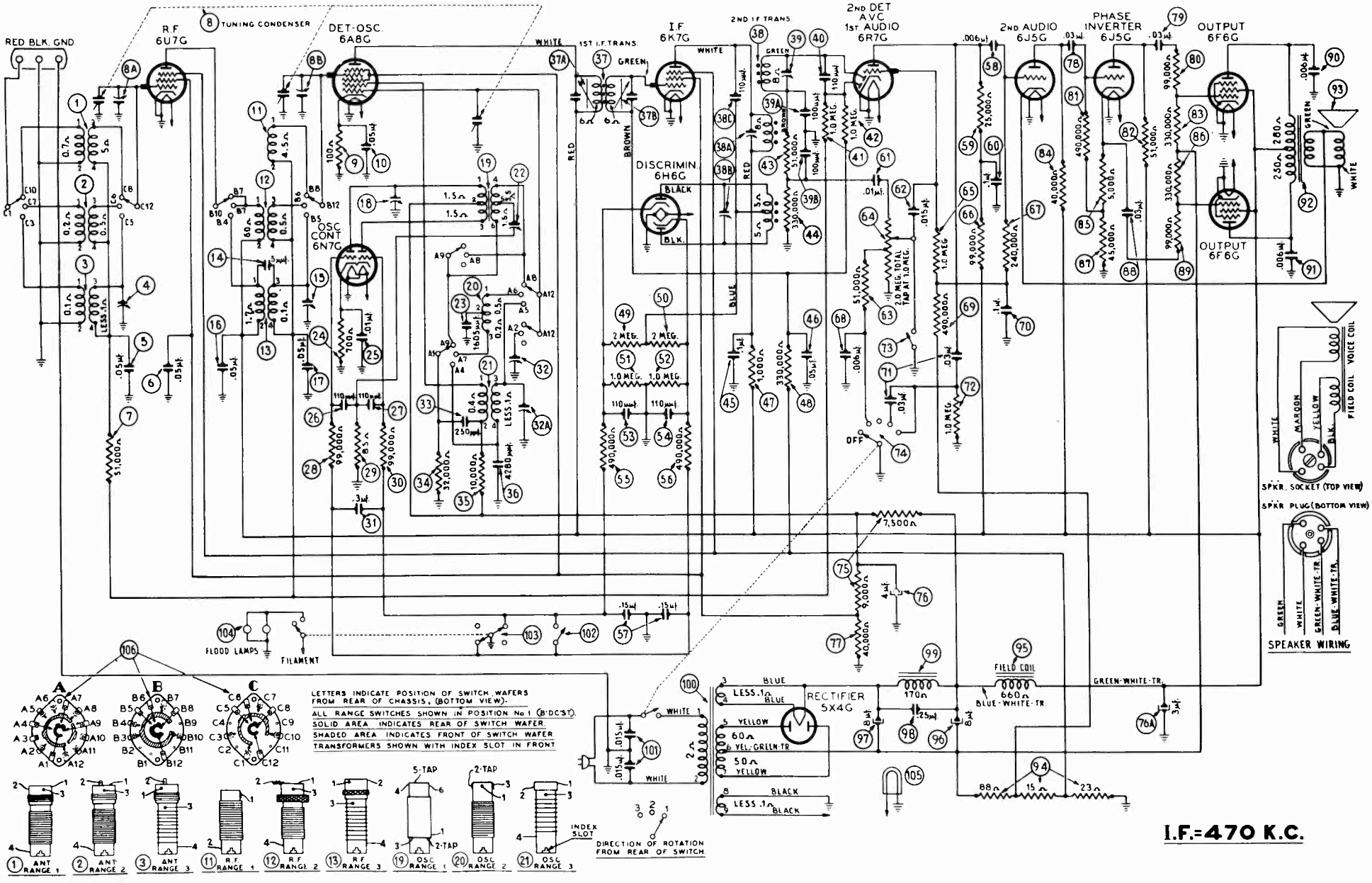


Fig. 2. Schematic Diagram

Model 38-2, Code 121

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2575	$0.70
2	Antenna Transformer (Range 2)	32-2576	.70
3	Antenna Transformer (Range 3)	32-2573	.70
4	Compensator, Antenna (Range 3)	31-6160	.30
5	Condenser (.05μf tubular)	30-4519	.20
6	Condenser (.05μf—.05μf, Bakelite)	3615DG	.40
7	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
8	Tuning Condenser Assembly	31-2075	
9	Resistor (.100 Ω, ½ Watt)	33-110339	.20
10	Condenser (.05 μf, tubular)	30-4020	.20
11	R. F. Transformer (Range 1)	32-2379	.40
12	R. F. Transformer (Range 2)	32-2382	1.00
13	R. F. Transformer (Range 3)	32-2385	1.20
14	Condenser (5 μμf, Mica)	30-1097	.20
15	Compensator (R. F. Range 3)	31-6212	
16	Condenser—Part of 6		
17	Condenser (.05 μf, Tubular)	30-4519	.20
18	Compensator Osc. (Range 1)	31-6212	
19	Osc. Transformer (Range 1)	32-2373	1.60
20	Osc. Transformer (Range 2)	32-2383	.70
21	Osc. Transformer (Range 3)	32-2386	.70
22	Compensator (Range 1 Series)	31-6151	.40
23	Condenser (1605 μμf, Mica)	31-6201	.40
24	Resistor (200 Ω, ½ Watt)	33-170339	.20
25	Condenser (.01 μf, Tubular)	30-4479	.20
26	Condenser (110 μμf, Mica)	30-1031	.20
27	Condenser (110 μμf, Mica)	30-1031	.20
28	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
29	Resistor (85 Ω, ½ Watt)	33-085339	.20
30	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
31	Condenser (.3 μf, Bakelite)	6287DG	.40
32	Compensator (2 Sections)	31-6211	
33	Condenser (250 μμf, Mica)	30-1032	.25
34	Resistor (32,000 Ω, ½ Watt)	33-332339	.20
35	Resistor (10,000 Ω, ½ Watt)	33-310339	.20
36	Condenser (4280 μμf, Mica)	31-6202	.50
37	1st. I. F. Transformer	32-2604	2.20
38	2nd I. F. Transformer	32-2362	3.30
39	Compensator	31-6203	.30
40	Condenser (110 μμf, Mica)	30-1031	.20
41	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
42	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
43	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
44	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
45	Condenser (.1 μf, Tubular)	30-4455	.25
46	Condenser (.05, Bakelite)	3615SG	.35
47	Resistor (1000 Ω, ½ Watt)	33-210339	.20
48	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
49	Resistor (2.0 Meg., ½ Watt)	33-520339	.20
50	Resistor (2.0 Meg., ½ Watt)	33-520339	.20
51	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
52	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
53	Condenser (110 μμf, Mica)	30-1031	.20
54	Condenser (110 μμf, Mica)	30-1031	.20
55	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
56	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
57	Condenser (.15 μf—.15 μf, Bakelite)	6287DG	.40
58	Condenser (.006 μf, Tubular)	30-4445	.20
59	Resistor (25,000 Ω, ½ Watt)	33-325339	.20
60	Condenser (.1 μf, Tubular)	30-4455	.25
61	Condenser (.01 μf, Tubular)	30-4479	.20
62	Condenser (.015 μf, Tubular)	30-4226	.20
63	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
64	Volume Control	33-5233	1.00
65	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
66	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
67	Resistor (240,000 Ω, ½ Watt)	33-424339	.20
68	Condenser (.006 μf, Tubular)	30-4467	.20
69	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
70	Condenser (.1 μf, Tubular)	30-4499	.20
71	Condenser (.03 μf—.03 μf, Bakelite)	8318DU	.40
72	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
73	Audio Shorting Switch (Parts (6) and (16) Bulletin 273)		
74	Tone Control	42-1268	.75
75	Resistor (7,500 Ω — 9,000 Ω Wire Wound)	33-3320	.65
76	Electrolytic Condenser (4 μf—3 μf)	30-2243	1.50
77	Resistor (40,000 Ω, 1 Watt)	33-340439	$0.20
78	Condenser (.03 μf, Tubular)	30-4449	.20
79	Condenser (.03 μf, Tubular)	30-4449	.20
80	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
81	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
82	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
83	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
84	Resistor (40,000 Ω, ½ Watt)	33-340339	.20
85	Resistor (5,000 Ω, ½ Watt)	33-250339	.20
86	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
87	Resistor (45,000 Ω, ½ Watt)	33-345339	.20
88	Condenser (.03 μf, Tubular)	30-4449	.20
89	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
90	Condenser (.006 μf, Tubular)	30-4445	.20
91	Condenser (.006 μf, Tubular)	30-4445	.20
92	Output Transformer	32-7754	1.50
93	Cone & Voice Coil Assembly	36-3801	1.40
94	Resistor (88—15—23 Ω)	33-3321	.40
95	Field & Pot. Assembly	36-3941	
96	Electrolytic Condenser	30-2211	1.00
97	Electrolytic Condenser	30-2211	1.00
98	Condenser (.25 μf, Tubular)	30-4446	.25
99	Choke	32-7115	1.80
100	Power Transformer (115V — 50-60 Cycles)	32-7869	
	PowerTransformer(115V,25-40cycles)	32-7870	
	Power Transformer (115/230V, 50-60 cycles)	32-7871	
101	Condenser (.015 μf—.015 μf, Bakelite)	3793DG	$0.40
102	A. F. C. Shorting Switch	45-2330	1.20
103	A. F. C. Switch	42-1269	
104	Flood Lamp Bulb	34-2064	.09
105	Pilot Lamp	34-2064	.09
106	Wave Switch	42-1362	3.00
	Automatic Tuning Mechanism (complete)	38-9145	
	Cable (Power)	L-2183	.40
	Cable (Speaker)	41-3329	
	Clip (R. F. Coils)	28-5002	.02
	Coupling (Tuning Condenser)	31-1961	.80
	Coupling (Range Switch & Mash)	38-8693	
	Knob (Range Switch)	27-4326	.10
	Knob (Tuning)	27-4330	.10
	Knob (Vernier)	27-4331	.10
	Knob (Tone, Volume)	27-4332	.10
	Mtg. Rubber (Chassis)	27-4564	.10
	Mtg. Rubber (Rear of R. F. Unit)	27-4197	.08
	Mtg. Rubber (Front of R. F. Unit)	27-4581	
	Shield (R. F. Unit)	38-8969	
	Shield (Tube) (Square)	28-2726	$0.10
	Shield (Tube) (Round)	8005	.10
	Shield Base (Square)	28-2725	.03
	Socket Assembly (Pilot Lamp)	38-9100	
	Socket (6 prong)	27-6086	.11
	Socket (7 prong) (6F6G tubes)	27-6057	.11
	Socket (7 prong)	27-6087	.11
	Speaker H-32	36-1299	
	Support (rear of R. F. Unit)	38-8923	
	Terminal Panel (Antenna)	38-8746	.15
	CABINET PARTS		
	Bezel Assembly	38-8833	2.50
	Cover (Back of cabinet)	27-8864	1.00
	AUTOMATIC TUNING MECHANISM PARTS		
	*Cover (handle)	28-5092	.50
	*Dial	27-5358	
	*Dial Screen Holder	31-2053	.75
	*Escutcheon Assembly (Station tabs)	45-2472	

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

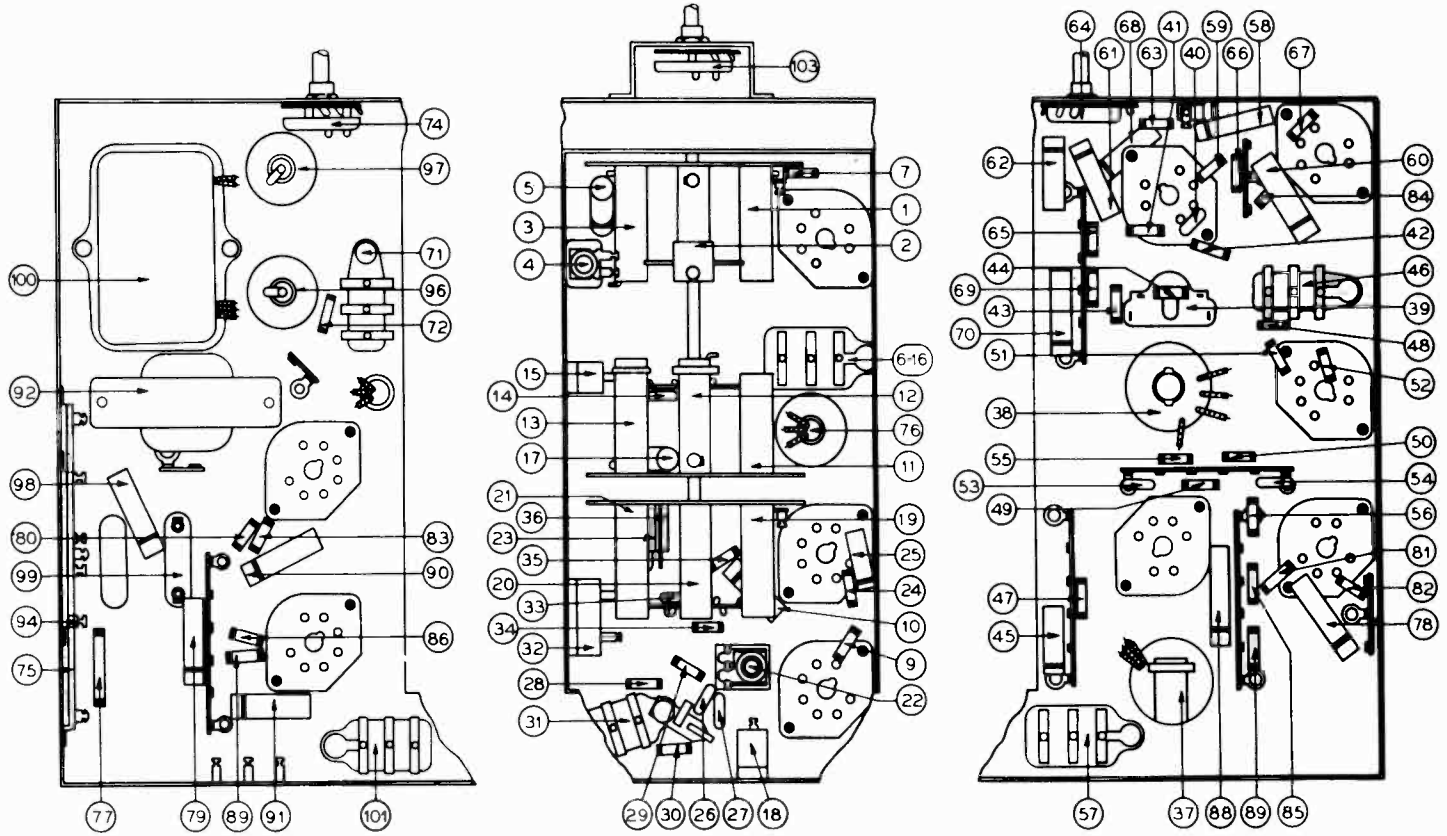


Fig. 3. Part Locations, Underside of Chassis

The Genuine PHILCO Replacement Parts listed above must be used to obtain the Accurate Balanced Performance built into this Philco Model

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the intermediate and tuning 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 6F6G 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 2. See Fig. 4. With dial and tuning condenser in this position, tighten set screws.

2. Turn the tuning condenser control until the indicator is on the 2.2 M. C. Mark.

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

A. Set the receiver and signal generator controls as follows:

1. Range Switch (Broadcast)
2. Volume Control (Maximum)
3. Magnetic Tuning Switch "out"
4. Tone control & A. C. switch first position.
5. Signal generator dial 470 K. C.

B. Connect the signal generator output cable through a .1 mfd. condenser to the grid of the 6A8G Det. Osc. tube and connect the cableground to the receiver chassis. Now adjust the following compensators for maximum output (38A), (39), (37B), and (37A).

RADIO FREQUENCY CIRCUIT

1. Set the controls as given under "Intermediate Frequency Circuit" 1 to 4 and set the range switch, signal generator and receiver dials as given under the adjustments of each tuning range in the following procedure.

Connect the Signal Generator output cable into the "Med" jack of the generator panel and connect the other end through a .1 mfd. condenser to the "Red" terminal of the receiver aerial panel (rear of chassis). The ground connection of the cable should be connected to the "Blk" terminal.

2. Adjust the "R. F." compensators for maximum output as follows:

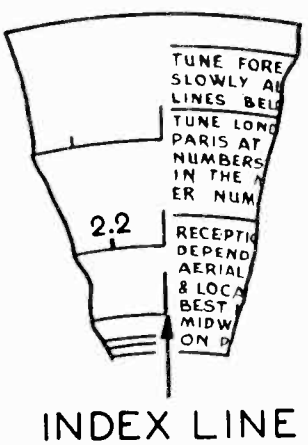


Fig. 4. Dial Calibration

Tuning Range: 530 to 1720 K. C.

Range Switch Position	Signal Generator and Receiver Dials	Compensators in Order
1	1550 K. C.	(18), (8B) and (8A)
1	580 K. C.	(22) Roll gang. Note B
1	1550 K. C.	(18), (8B), (8A)

Tuning Range 2.3 to 7.4 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
2	6.0 M. C.	(32)

Tuning Range 7.35 to 22.0 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
3	20.0 M. C.	(32A), (15), (4) Roll Tuning condensers when adjusting (15) and (4). See Note B. Check image at 17.060. See Note A.
3	20.0 M. C.	(32A)

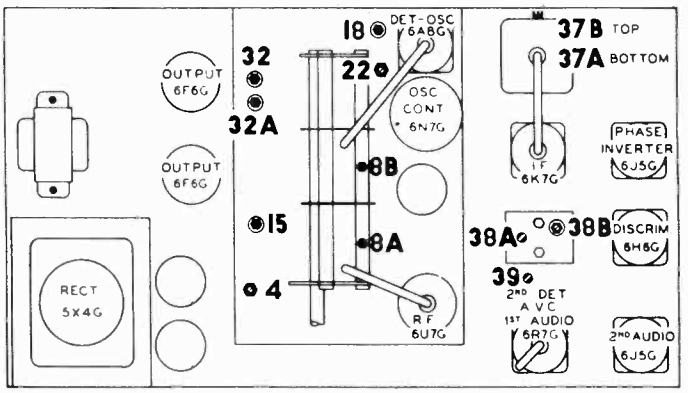


Fig. 5. Compensator Locations

MAGNETIC TUNING CIRCUIT ADJUSTMENTS

1. Set the Magnetic Tuning switch in the "out" position.

2. Turn the signal generator indicator to 1000 K. C. and adjust the "Attenuator" control for a weak signal.

3. Adjust volume control for a readable indication on the output meter.

4. Now tune the receiver dial for maximum output at 1000 K. C. The dial must be tuned very accurately to the 1000 K. C. signal in order to make the following adjustment correctly.

5. Turn the Magnetic Tuning switch "in" and adjust compensator (38B) 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 turn the switch from the "out" to the "in" position. With the switch in either position, the tone of the station being received 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 "out" 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 compensator should be carefully readjusted.

NOTE "A"—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 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 any high frequency range.

NOTE "B"—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; 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. 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.

PHILCO RADIO AND TELEVISION CORPORATION
Parts and Service Division
Philadelphia, Pa.

August 1937 Printed in U. S. A.

PHILCO . . . . . Model 38-3—Code 121

RADIO MANUFACTURERS SERVICE — Your Guarantee of Best Radio Service — A PHILCO SERVICE PLAN

SERVICE BULLETIN No. 277 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Electrical Specifications

TYPE CIRCUIT: Superheterodyne, with such features as: magnetic tuning control on the broadcast range; automatic volume control; Iron core adjusted first I. F. transformer; push-pull Pentode audio output, using screen phase inversion; Bass compensation in the Volume Control circuit, and the Philco Automatic Tuning Mechanism.

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycles	110 watts
115	25 to 40 cycles	110 watts

Different Transformers are required for operation on the frequencies list above. These are shown on the parts list.

INTERMEDIATE FREQUENCY: 470 K. C.

UNDISTORTED OUTPUT: 5 watts.

PHILCO TUBES USED: Nine. One 6U7GRF, one 6K7G I. F. amplifier; one 6A8G, Det. Osc.; one 6N7G, osc. control; one 6H6G, discriminator; one 6Q7G, 2nd det. 1st audio; two 6F6G output, and one 5Y4G rectifier.

TUNING RANGE: Three. Range one—530 to 1720 K. C. Range two—2.3 to 7.4 M. C. Range three—7.35 to 22 M. C.

TONE CONTROL: Four positions.

SPEAKER: H29.

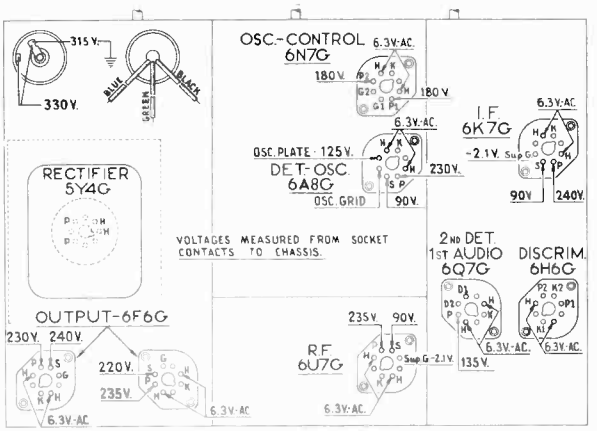


Fig. 1. Socket Voltages, Underside of Chassis—The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains an accurate voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 077 signal generator, using fundamental frequency from 115 to 36000 K. C. is the correct instrument for the 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 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance volume control of receiver until a readable indication is noted after signal generator is connected in the following adjustments.

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

1. Loosen the shaft coupling set screws. Then turn the tuning condenser fully closed and the dial to the first index line. Now tighten the shaft coupling set screws, and rotate the dial until the 520 K. C. mark is midway between the index line and the glowing beam indicator.
2. With condenser in this position loosen the set screws of the shaft coupling on the tuning condenser.
3. Then turn the tuning dial until the glowing beam indicator is entered on the index line.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

4. Now tighten the shaft coupling set screws.

INTERMEDIATE FREQUENCY CIRCUIT

With signal generator output lead connected through a .1 mfd. condenser to the grid of the 6A8G det-osc. tube; and controls set as follows, adjust I. F. compensators for maximum output.

a. Magnetic Tuning Knob (34) off
b. Tone Control (93) normal
c. Volume Control (68) maximum
d. Receiver dial 580 K. C.
e. Signal generator 470 K. C.
f. Range Switch position (Broadcast)
g. Compensators in order (53), (51A), (45A), (45B).

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1720 K. C.

1. Connect the signal generator output lead through a .1 mfd. condenser to "RED" terminal of the aerial panel and the generator ground to the chassis of the receiver.
2. Other controls set as given under intermediate frequency circuit, with the exception of those as follows: Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
1	1600 K. C.	1600 K. C.	(27) (7B) (7A)
1	580 K. C.	580 K. C.	(28) Roll gang through signal when padding this compensator. (See Note B)
1	1600 K. C.	1600 K. C.	(27)
1	1500 K. C.	1500 K. C.	(7B) (7A)

Tuning Range 2.3 to 7.4 M. C. Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
2	6 M. C.	6 M. C.	(27A)

Tuning Range 7.35 to 22 M. C. Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
3	18 M. C.	18 M. C.	(27B) check image at 17.06 M. C. (See Note A) (11) (4) Use shunt condenser on (27B) or rock gang through signal when padding compensator No. 11 (See Note C)
3	18 M. C.	18 M. C.	(27B)

MAGNETIC TUNING ADJUSTMENT: Set the range switch in position one (530 to 1720 K. C.) and the magnetic tuning switch in the "out" position. Now turn the signal generator and receiver dial to any frequency in the Broadcast band. The receiver dial must be adjusted very accurately for maximum output.

Set the magnetic tuning control in the "on" position (clockwise). Compensator (51B) of the magnetic tuning transformer is now adjusted for maximum output.

The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off" and "on." In either position, there should be no change in the tone of the signal. If a change of tone or hiss develops, it indicates a shift in frequency and the adjustment must be repeated.

NOTE A—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). Then slowly turn compensator counter-clockwise until a second maximum peak is obtained on the output meter. This second peak is the fundamental signal, and the compensator must be adjusted for maximum output with it. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting this compensator.

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

NOTE B—First tune compensator (28) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (28) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (28) 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 eliminate the effect of the R. F. compensator detuning the Osc. circuit, a variable tuning condenser of approximately 350 mmfd. is connected from the oscillator compensator to ground when designated in the padding instruction above. Tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

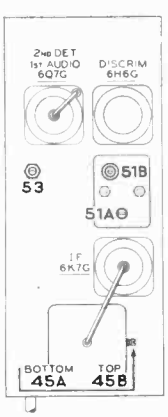


Fig. 2. I. F. Compensators Top of Chassis

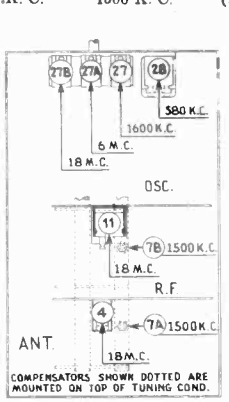


Fig. 3. R. F. Compensators Underside of Chassis

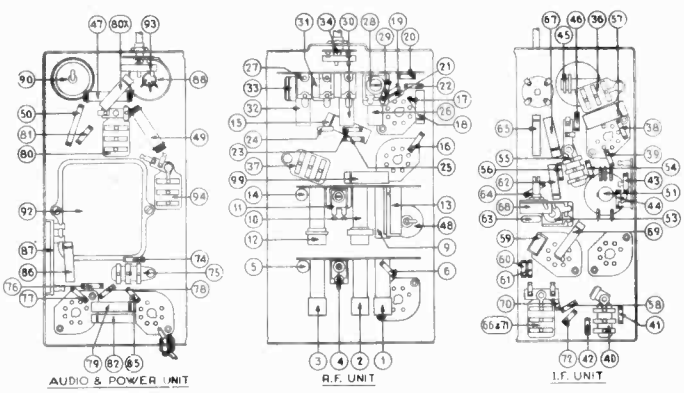


Fig. 4. Schematic Diagram Model 38-3

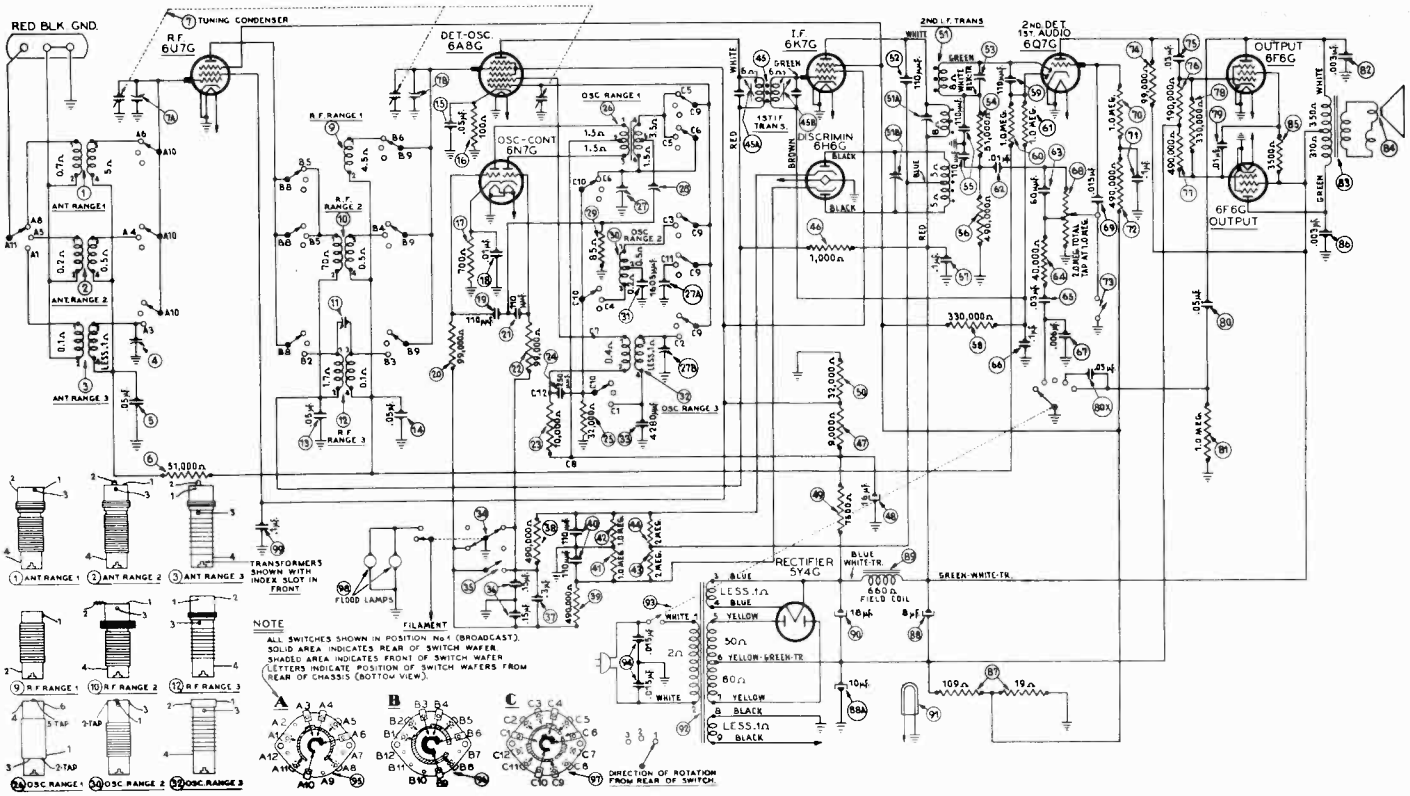


Fig. 5. Part Locations, Underside of Chassis

Replacement Parts — Model 38-3

Schem. No.	Description	Part No.	List Price
1	Antenna transformer (range 1)	32-2575	
2	Antenna transformer (range 2)	32-2576	
3	Antenna transformer (range 3)	32-2573	
4	Compensator antenna, single	31-6161	$0.30
5	Condenser (0.05 mf. tubular)	30-4444	.20
6	Resistor (51,000 ohms, ½ watt)	33-351339	.20
7	Tuning Condenser	31-1963	4.00
8	Remove prior to production		
9	R. F. transformer (range 1)	32-2379	.40
10	R. F. transformer (range 2)	32-2382	1.00
11	Compensator (single) R. F.	31-6160	.30
12	R. F. Transformer (range 3)	32-2385	1.20
13	Condenser (0.05 mf. tubular)	30-4123	.20
14	Condenser (0.05 mf. tubular)	30-4020	.20
15	Condenser (0.05 mf. tubular)	30-4020	.20
16	Resistor (100 ohms, ½ watt)	33-110339	.20
17	Resistor (700 ohms, ½ watt)	33-170339	.20
18	Condenser (0.01 mf. tubular	30-4479	.20
19	Condenser (110 mmf. mica)	30-1031	.20
20	Resistor (99,000 ohms, ½ watt)	33-399339	.20
21	Condenser (110 mmf. mica)	30-1031	.20
22	Resistor (99,000 ohms, ½ watt)	33-399339	.20
23	Resistor (10,000 ohms, ½ watt)	33-310339	.20
24	Condenser (250 mmf. mica)	30-1032	.25
25	Resistor (32,000 ohms, ½ watt)	33-332239	.20
26	Osc. transformer (range 1)	32-2373	1.60
27	Compensator (osc. series)	31-6151	.40
28	Compensator osc.	31-6170	.75
29	Resistor (85 ohms, ½ watt)	33-085339	.20
30	Osc. transformer (range 2)	32-2383	.70
31	Condenser (1605 mmf. tracking)	31-6155	.40
32	Osc. transformer (range 3)	32-2386	.70
33	Condenser (4280 mmf. tracking)	31-6156	.60
34	Switch (magnetic tuning, manual)	42-1269	.75
35	Switch (magnetic tuning, automatic dial)	45-2330	1.20
36	Condensers (0.15 mf. dual bakelite)	6287 DG	.40
37	Condenser (0.3 mf. double bakelite)	6287 DU	.40
38	Resistor (490,000 ohms, ½ watt)	33-449339	.20
39	Resistor (490,000 ohms, ½ watt)	33-449339	.20
40	Condensers (110 mmf. dual bakelite)	8035 DG	.25
41	Resistor (1.0 meg., ½ watt)	33-510339	.20
42	Resistor (1.0 meg., ½ watt)	33-510339	.20
43	Resistor (2.0 meg., ½ watt)	33-520339	.20
44	Resistor (2.0 meg., ½ watt)	33-520339	.20
45	1st I. F. transformer	32-2604	
46	Resistor (1000 ohms, ½ watt)	33-210339	.20
47	Resistor (9000 ohms, 2 watts)	33-290539	.30
48	Condenser (16 mf. electrolytic)	30-2194	1.60
49	Resistor (7500 ohms, 3 watts)	33-275639	.30
50	Resistor (32,000 ohms, 1 watt)	33-332439	$0.20
51	2nd I. F. transformer (discriminator)	32-2376	3.30
52	Condenser (110 mmf. mica) mounted in 51	30-1031	.20
53	Compensator	31-6147	.40
54	Resistor (51,000 ohms, ½ watt)	33-351339	.20
55	Condenser (110 mmf. dual bakelite)	8035 DG	.25
56	Resistor (490,000 ohms, ½ watt)	33-349339	.20
57	Condenser (0.1 mf. tubular)	30-4455	.25
58	Resistor (330,000 ohms, ½ watt)	33-333339	.20
59	Condenser (110 mmf. mica)	30-1031	.20
60	Resistor (1.0 meg., ½ watt)	33-510339	.20
61	Resistor (1.0 meg., ½ watt)	33-510339	.20
62	Condenser (0.01 mf. tubular)	30-4479	.20
63	Condenser (60 mf. mica)	30-1040	
64	Resistor (40,000 ohms, ½ watt)	33-340339	.20
65	Condenser (0.03 mf. tubular)	30-4449	.20
66	Condenser (0.1 mf. dual bakelite)	4989 DG	.40
67	Condenser (0.006 mf. tubular)	30-4445	.20
68	Volume Control	33-5158	1.00
69	Condenser (0.015 mf. tubular)	30-4358	.20
70	Resistor (1.0 meg., ½ watt)	33-510339	.20
71	Part of 66		
72	Resistor (490,000 ohms, ½ watt)	33-449339	.20
73	Audio shorting switch (stationary insulated section)	28-4110	.15
	Audio shorting switch (movable section)	45-2350	.15
74	Resistor (99,000 ohms, ½ watt)	33-399339	.20
75	Condenser (0.03 mf. bakelite)	8318 SU	.35
76	Resistor (190,000 ohms, ½ watt)	33-319339	.20
77	Resistor (490,000 ohms, ½ watt)	33-349339	.20
78	Resistor (330,000 ohms, ½ watt)	33-433339	.20
79	Condenser (0.01 mf. tubular)	30-4169	.20
80	Condenser (0.05 mf. bakelite)	8326 SU	.25
80A	Condenser (0.03 mf. tubular)	30-4447	.20
81	Resistor (1.0 meg., ½ watt)	33-510339	.20
82	Condenser (0.003 mf. tubular)	30-4469	.20
83	Output transformer	32-7754	1.50
84	Cone and voice coil assembly	36-3801	1.40
85	Resistor (3500 ohms, ½ watt)	33-235339	.20
86	Condenser (0.003 mf. tubular)	30-4469	.20
87	Resistor (bias 128 ohms)	33-3280	.30
88	Condenser (electrolytic 8 mf., 10 mf.)	30-2201	1.75
89	Field Coil Assembly	36-3218	4.25
90	Condenser (electrolytic 18 mf.)	30-2200	1.40
91	Pilot Lamp	34-2039	.07
92	Power transformer (115 volts, 50 to 60 cycles)	32-7606	6.25
	Power transformer (115 volts, 25 cycle)	32-7607	9.00
	Power transformer (110/220 volts, 50 to 60 cycles)	32-7608	$8.00
93	Tone Control and A. C. Switch	42-1268	.75
94	Condensers (0.015 mf. dual bakelite)	3793 DG	.40
95	Range Switch (antenna)	42-1324	
96	Range Switch (R. F.)	42-1314	.75
97	Range Switch (osc.)	42-1284	.75
98	Flood Lamps	34-2039	.07
99	Condenser (0.1 mf. tubular)	30-4455	.25
	38-3 Code 121		
	Brace	28-4119	.05
	Cable A. C.	L-2778	
	Cable Speaker	41-3258	.50
	Coupling (Tuning Condenser)	31-1961	.80
	Coupling (Range Switch)	28-7198	.15
	Clip (volume shaft)	28-4394	.01
	Control Screw (station index)	31-1898	.15
	*Cover (handle)	28-5092	
	Dial	27-5283	.90
	*Dial & Station Tab Escutcheon	45-2472	
	Floodlight Socket Assembly	38-8802	
	Gear, Dial Assembly (small)	45-2348	.60
	Gear, Dial Assembly (large)	45-2347	.60
	Handle (Dial)	45-2329	.75
	Hub Assembly (Handle)	45-2344	.50
	Housing (Control Screws)	28-7196	1.00
	Knob Tuning	27-4330	.10
	Knob Vernier	27-4331	.10
	Knob Tone & Volume	27-4332	.10
	Knob (Range Switch)	27-4326	.10
	Mask Guide	28-4118	.25
	Mask & Link Assembly	45-2401	.70
	Mtg. Feet-Rubber—(Chassis)	27-4564	.10
	Pilot Lamp Assembly	38-7706	.35
	Reflector Ring	28-4609	.35
	Ring Retaining Mask Assembly	28-7195	.20
	Screen Holder Assembly	31-2053	
	Shaft (Vol. Cont.)	38-8285	.12
	Shaft & Plate (Range Switch)	42-1287	.50
	Socket (7 prong)	27-6087	
	Socket (6 prong)	27-6086	
	Speaker H-29	36-1293	
	Vernier Drive Assembly	45-2342	2.40

*A complete list of the automatic tuning mechanism parts is given in Bulletin 273. Those parts shown above marked with an asterisk differ from those shown on Bulletin 273.

PHILCO RADIO AND TELEVISION CORPORATION

Parts and Service Division

Philadelphia, Pa.

April, 1937

Printed in U. S. A.

PHILCO . . . . . Models 38-4 & 38-5—Code 121

SERVICE BULLETIN No. 281 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Electrical Specifications

TYPE CIRCUIT: An eight tube A.C. operated super-heterodyne circuit is incorporated in these receivers with features, such as Philco foreign tuning system; a high gain R.F. amplifier; two tuning ranges; iron core adjusted I.F. transformers; automatic volume control; bass compensation, and a pentode push-pull audio output circuit.

The same circuit is used in both models. The features, however, such as tuning mechanism; speaker, and cabinets differ in each model.

Mode. 38-4 employs **the Philco Cone-Centric Automatic Tuning System;** Type "H29" dynamic speaker unit and is assembled in a console cabinet type "XX".

Model 38-5 differs from the 38-4 in the tuning mechanism. The tuning mechanism of this receiver is of the manually operated type with vernier control and incorporates a shadowmeter for visual tuning. The receiver is designed for a table model cabinet type "B" and a console cabinet type "X". The B cabinet utilizes a dynamic speaker type "K39" and the "X" cabinet a dynamic speaker type "H29".

POWER SUPPLY: Voltage	Frequency	Consumption
110	60 cycle	95 watts
110	25 to 40 cycle	95 watts
115/230	50 to 60 cycle	95 watts

Different transformers are required for operation on the frequencies listed above. The part numbers of these transformers are listed on page 3.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: Two Range 1—540 to 1720 K. C.
Range 2—5.7 to 18.2 M. C.

UNDISTORTED OUTPUT: 5 watts.

PHILCO TUBES USED: Eight—6U7G, R. F. amp.; 6A8G, Det. Osc.; 6K7G, I. F. amp.; 6J5G, 2nd Det., A.V.C.; 6K5G, 1st audio; two 6F6G, audio output; and one 5Y4G rectifier.

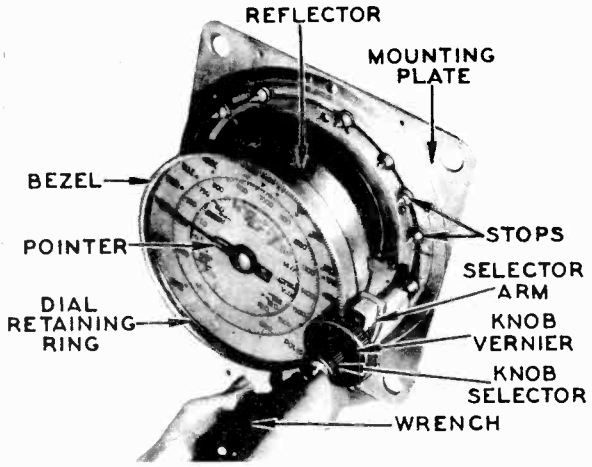


Fig. 2—Cone-Centric Automatic Tuning Mechanism, Model 4

TONE CONTROL: Four positions.

SPEAKERS:	37-4	37-5
B cabinet	—	K39
X cabinet	—	H29
XX cabinet	H29	—

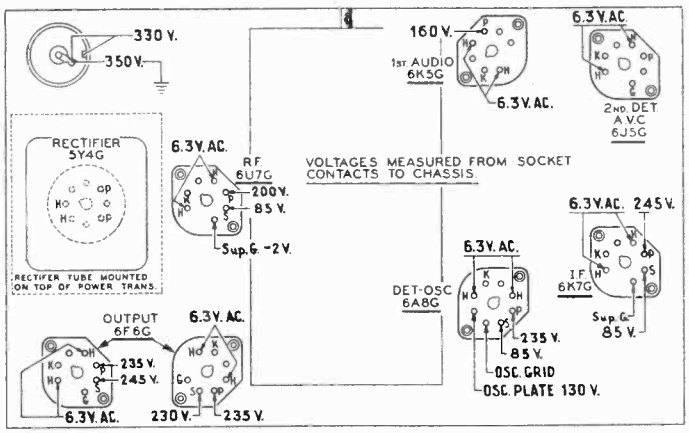


Fig. 1—Socket Voltages—Underside of Chassis View

The Voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains a sensitive voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Service Data

FOR CONE-CENTRIC TUNING MECHANISM—MODEL 4

Complete information for setting the stations on the Cone-Centric Tuning mechanism of Model 38-4 will be found in the instruction sheet (Form No. 39-5533) which is supplied with each set.

The locations of a few assemblies of the Cone-Centric Automatic Tuning mechanism is illustrated in Fig. 2. The part numbers and prices of these assemblies are listed on page 3. A complete list of replacement parts and detailed service data for the mechanism will be found in bulletin 282.

Aerial Connections

To obtain the full advantage of the sensitivity of these receivers, the Philco High Efficiency Aerial Part No. 40-6112 must be used.

For attaching the aerial to the receiver a terminal panel is provided at the rear of the chassis. This panel contains three screw terminals marked "Red", "Blk" and "Gnd". Connect the red and black wires of the Philco High Efficiency Aerial transmission line to the "Red" and "Blk" terminals respectively.

If you use a temporary aerial, connect it to the "Red" terminal. A good ground connection is necessary for best reception. The terminal mark "Gnd" should be connected to a water pipe or any other good ground source.

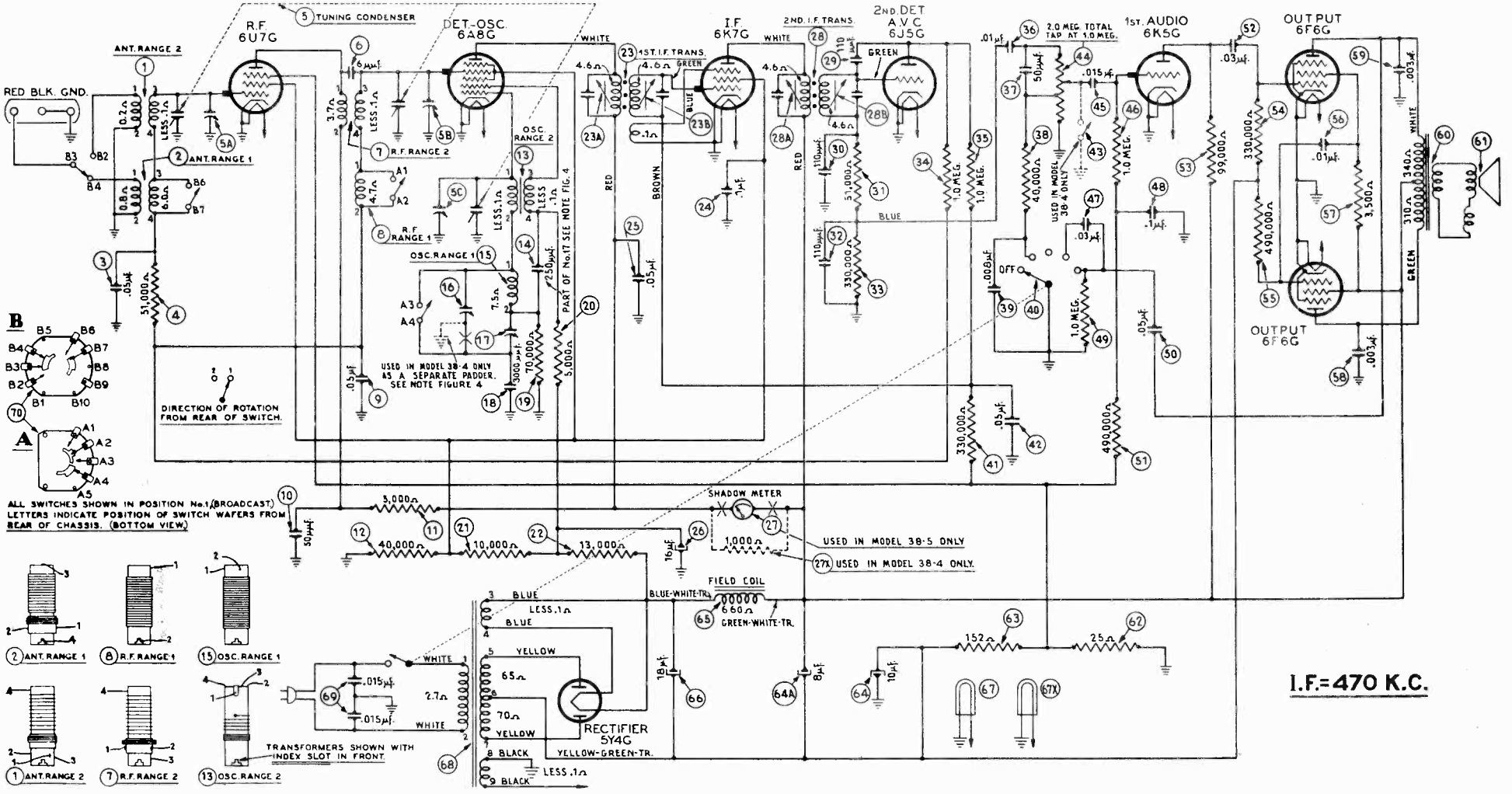


Fig. 3—SCHEMATIC DIAGRAM

Models 38-4, 38-5; Code 121

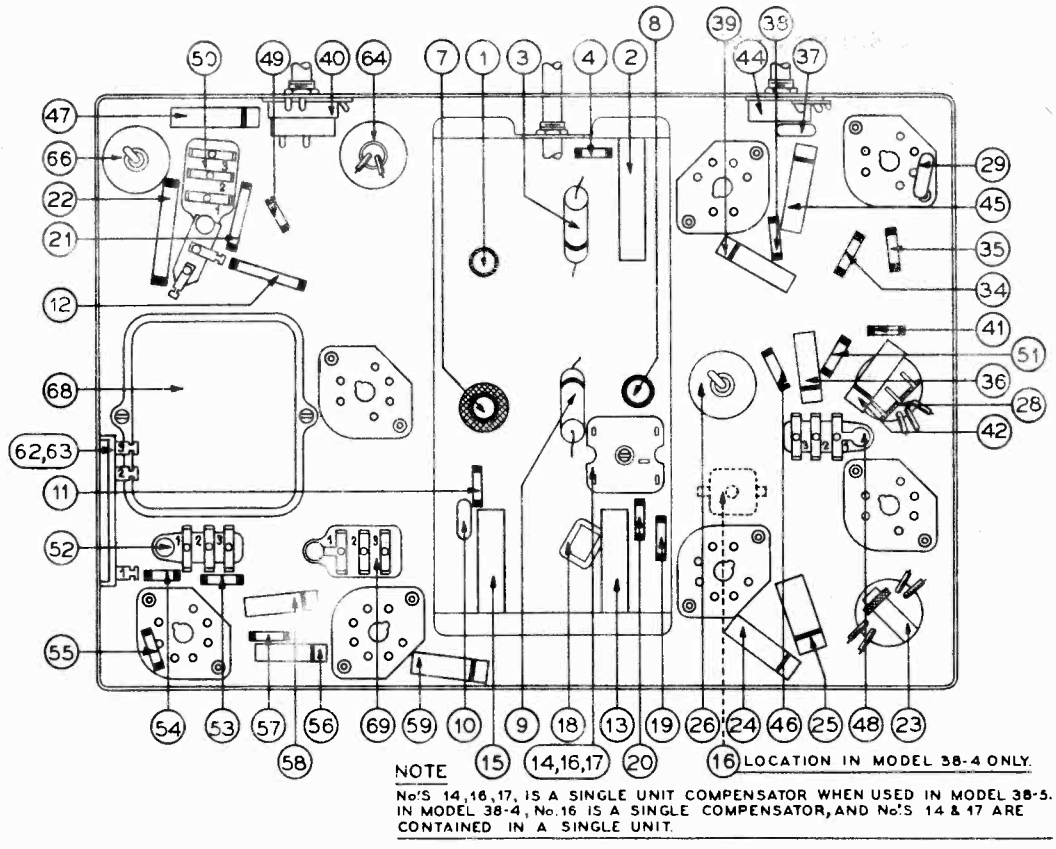


Fig. 4—Locations of Parts, Underside of Chassis

REPLACEMENT PARTS—Models 38-4, 38-5

Schem. No.	Description	Part No.	List Price
1	Antenna transformer (range 2)	32-2558	
2	Antenna transformer (range 1)	32-2629	
3	Condenser (.05 mfd. tubular	30-4444	$0.20
4	Resistor (51000 ohms, ½ watt)	33-351339	.20
5	Tuning Condenser assembly (Model 4)	31-2038	
	Tuning Condenser (Model 5)	31-2052	
6	Condenser (strip of copper foil, 6 mmd.)		
7	R. F. transformer (range 2)	32-2632	
8	R. F. transformer (range 1)	32-2630	
9	Condenser (.05 mfd., tubular)	30-4444	.20
10	Condenser (50 mmfd., mica)	30-1029	.20
11	Resistor (5000 ohms, ½ watt)	33-250339	.20
12	Resistor (40000 ohms, 1 watt)	33-340439	.20
13	Osc. transformer (range 2)	32-2633	1.25
14	Condenser (250 mmfd.) on compensator section. See Note fig. 4		
15	Osc. transformer (range 1)	32-2631	
16	Compensators (dual, 1500 and 580 K.C. Model 5)	31-6194	
	Compensators (air type, 1500 K.C. Model 4)	31-6196	
17	Compensator (580 K.C., Model 5; Part of 16)		
	Compensator (580 K.C. Model 4, condenser 14 is part of this unit	31-6199	
18	Condenser (3000 mmfd., mica)	30-1028	.45
19	Resistor (70,000 ohms, ½ watt)	33-370339	.20
20	Resistor (5000 ohms, ½ watt)	33-250339	.20
21	Resistor (10000 ohms, 1 watt)	33-310439	.20
22	Resistor (13000 ohms, 2 watt)	33-313539	.30
23	First I. F. transformer	32-2643	
24	Condenser (0.1 mfd., tubular)	30-4455	.55
25	Condenser (0.05 mfd., tubular)	30-4123	.20
26	Condenser (electrolytic, 16 mfd.)	30-2212	1.05
27	Shadowmeter (Model 38-5)	45-2307	2.50
27X	Resistor (1000 ohms, ½ watt)	33-210339	.20
28	Second I. F. transformer	32-2645	
29	Condenser (110 mmfd., mica)	30-1031	.20
30	Condenser (110 mmfd., mica)	30-1031	.20
31	Resistor (51000 ohms, ½ watt)	33-351339	.20
32	Condenser (110 mmfd., mica)	30-1031	.20
33	Resistor (330000 ohms, ½ watt)	33-433339	.20
34	Resistor (1.0 megohm, ½ watt)	33-510339	.20
35	Resistor (1.0 megohm, ½ watt)	33-510339	.20
36	Condenser (0.01 mfd., tubular)	30-4124	.25
37	Condenser (50 mmfd., mica)	30-1029	.20
38	Resistor (40000 ohms, ½ watt)	33-340339	.20
39	Condenser (0.008 mfd., tubular)	30-4112	.20
40	Tone Control Switch and off-on switch	42-1341	
41	Resistor (330000 ohms, ½ watt)	33-433339	.20
42	Condenser (0.05 mfd., tubular)	30-4519	$0.20
43	(Used on Model 38-4 only) Audio shorting switch, section of 45-2476 Selector arm		
44	Volume Control (Model 5)	33-5224	
	Volume Control (Model 4)	33-5225	
45	Condenser (0.015 mfd., tubular)	30-4358	.20
46	Resistor (1.0 megohms, ½ watt)	33-510339	
47	Condenser (.03 mfd., tubular)	30-4447	
48	Condenser (0.1 mfd. bakelite)	4989SG	.35
49	Resistor (1.0 megohms, ½ watt)	33-510339	.20
50	Condenser (.05 mfd., bakelite)	8326SU	.25
51	Resistor (490000 ohms, ½ watt)	33-449339	.20
52	Condenser (0.03 mfd., bakelite)	8318SU	.35
53	Resistor (99000 ohms, ½ watt)	33-399339	.20
54	Resistor (330000 ohms, ½ watt)	33-433339	.20
55	Resistor (490000 ohms, ½ watt)	33-449339	.20
56	Condenser (0.01 mfd., tubular)	30-4169	.20
57	Resistor (3500 ohms, ½ watt)	33-235339	.20
58	Condenser (0.003 mfd., tubular)	30-4469	.20
59	Condenser (0.003 mfd., tubular)	30-4469	.20
60	Out put transformer (H29, K39)	32-7754	1.50
61	Voice Coil and Cone Assembly (K39)	36-3174	1.00
	Voice Coil and Cone Assembly (H29)	36-3801	1.40
62	Bias resistors (25 ohms and 152 ohms)	33-3317	
63	Part of 62, 152 ohm Section		
64	Dual Electrolytic Condenser (8 & 10 mfd.)	30-2201	1.75
65	Field Coil and Pot Assembly (H29)	36-3218	4.25
	Field Coil and Pot Assembly (K39)	36-3239	4.25
66	Electrolytic Condenser (18 mfd.)	30-2200	1.40
67	Pilot Lamp	34-2064	.07
67X	Lamp (Shadowmeter Model 5)	34-2064	
68	Power Transformer, 115V, 50/60 cycles	32-7837	
	" " 115V, 25/40 cycles	32-7598	8.00
	" " 115/230V, 50-60 cycles	32-7839	
69	Condensers (0.015 mfd., dual bakelite)	3793DG	.40
70	Range Switch (Model 5)	42-1335	
	Range Switch (Model 4)	42-1340	
	Brace (38-4, Tuning Unit)	28-5119	
	Cable (Speaker) (38-5 & 38-4)	41-3324	
	Cable Power	L-2778	.40
	Cable (Shadowmeter, Model 5)	41-3225	.40
	Clip (R. F. Transformer)	28-5002	.02
	Dial (38-4, Supplied by Distributor, in each district)	27-5337	
	Dial Pointer Assembly	38-8925	
	Dial 38-5	27-5330	
	Dial Washer 38-5	27-4598	
	Dial Clamp 38-5	28-5089	.03
	Gear (Small) Cone-Centric	45-2490	
	Gear (Large) Cone-Centric	45-2491	
	Knob Ass'y Vernier (Large) 38-4	45-2477	
	Knob Ass'y Selector (Small) 38-4	27-4572	
	Knob (Tuning) (Model 5)	27-4330	$0.10
	Knob (Tuning, Vernier) (Model 5)	27-4331	.10
	Knob (Tone & Volume)	27-4332	.10
	Mtg. Plate Ass'y, Cone-Centric Tuning Mechanism	45-2479	
	Mtg. Washer, Rubber (Chassis)	27-4571	
	Mtg. Cushion (Tuning Condenser)	27-4599	
	Mtg. Corners (Chassis)	27-4564	.10
	Pilot Lamp Socket Assembly (38-5)	38-8954	
	Reflector Assembly Cone-Centric Mechanism	45-2478	
	Selector Arm Assembly (Cone-Centric)	45-2476	
	Shield (R. F. Unit) 38-5	38-8814	
	Screen Brkt. Assembly (38-5)	31-2050	
	Socket (7 prong)	27-6087	.11
	Socket (6 prong)	27-6086	.11
	Socket (6 Prong) Power Tubes	27-6057	.11
	Terminal Panel (Ant.)	38-8746	
	Tube Shield (Square)	28-2726	.10
	Tube Shield (Round)	28-5031	.12
	Tube Shield Base (Square)	28-2725	.03
	Tube Shield Base (Round)	28-5030	
	Vernier Drive (Model 5)	31-2089	
	Wrench (Station, Setting) Model 4	45-2475	.45
	Wrench (Set Screws)	45-2481	.40
	38-4XX CABINET		
	Bezel Ring (Cabinet)	28-5128	
	Bezel Gasket	27-8893	
	Speaker H29	36-1293	8.25
	38-5 X CABINET		
	Bezel Frame Assembly	40-6129	1.10
	Bezel Gasket	27-8313	.01
	Bezel Glass	27-8300	.06
	Bezel Ring	28-5080	.70
	38-5 B CABINET		
	Bezel (Frame Assembly)	40-6127	
	Bezel Gasket	27-8312	.01
	Bezel Glass	27-8299	.06
	Bezel Ring	28-5079	.60
	Speaker K39	36-1285	

Prices subject to change without notice.

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 6F6G 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.

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

Model 38-4

1. Loosen the tuning condenser shaft coupling set screws (use wrench Part No. 45-2481), and turn the tuning condenser to the maximum capacity position (Plates fully meshed). Turn the selector knob until the dial pointer is on the small black dot at the low frequency end of the Range One scale. With condenser and pointer set in this position tighten set screws.
2. Now turn the selector knob clockwise until the dial pointer moves 1/16 of an inch to the left of the small dot and the first straight line on the scale (See Fig. 6). Hold pointer and condenser in this position, and carefully loosen shaft coupling set screws.

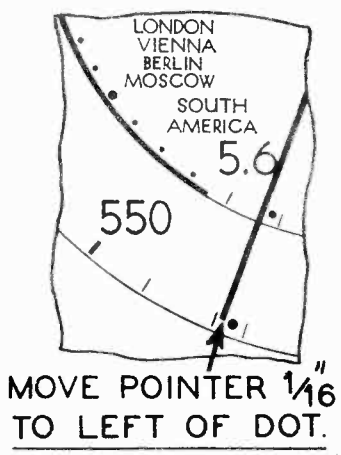


Fig. 6. Dial Calibration Model 4

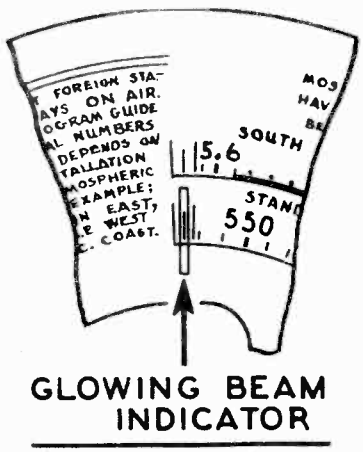


Fig. 7. Dial Calibration Model 5

3. After set screws are loose, turn the selector knob until dial pointer is again on the small black dot at the low frequency end of Range One scale.

Be careful when turning the selector knob that the position of the tuning condenser is not disturbed.

Tighten shaft coupling set screws with condenser and dial pointer in this position.

Model 38-5

1. Turn the tuning condenser to maximum capacity position (plate fully meshed).
2. Holding the tuning condenser in this position, loosen the dial clamp; then turn the dial until the indicator is centered on the middle index line (See Fig. 7). Tighten clamp in this position.

Before any of the following adjustments are made, the receiver should be turned "on" for at least 5 minutes.

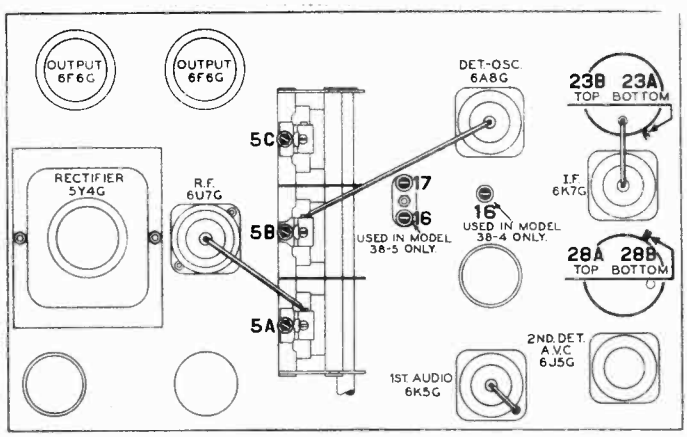


Fig. 5. Locations of Compensators—Top of chassis

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A8G, det. osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls, and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Receiver Volume Control maximum.
4. Range Switch Broadcast Position.
5. Adjust compensators (28B), (28A), (23B), and (23A) for maximum output. If the output meter goes off scale when adjusting the compensators retard signal generator attenuator.

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18.2 M. C.

1. With one end of the shielded lead of the signal generator output lead in the "Med" jack, connect the other end through the .1 mfd. condenser to the "Red" terminal of the aerial panel of the receiver. The output lead ground must be connected to the black terminal or to the chassis.
2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	(5C) See Note A

Tuning Range: 530 to 1720 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1500 K. C.	(16), (5B), (5A)
1	580 K. C.	(17)
1	1500 K. C.	(16), (5B), (5A)

NOTE A—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 counterclockwise 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 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.

PHILCO RADIO AND TELEVISION CORPORATION
Parts and Service Division
Philadelphia, Pa.

May, 1937 Printed in U. S. A.

RADIO MANUFACTURERS SERVICE — Your Guarantee of Best Radio Service — A PHILCO SERVICE PLAN

SERVICE BULLETIN No. 280 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Models 38-7, Code 121, 124; 38-8, Code 121; 38-9, Code 121

Electrical Specifications

Models 38-7, 38-8 and 38-9 receivers employ a six tube A. C. operated superheterodyne circuit with such features as: Two tuning ranges covering standard and short wave broadcasts; Philco foreign tuning system; automatic volume control; bass compensation; tone control, and pentode audio output circuit.

The same circuit is used for each receiver. The features, however such as, tuning mechanism, speakers and cabinets differ in each model.

Model 38-7 in addition to the features given above employs the Philco automatic tuning mechanism with cone-centric tuning. The chassis of this model is built into a console cabinet type XX, Table Cabinet Type "T" and is designated code 121. The same chassis built into a type "CS" cabinet is identified as code 124.

Model 38-8 differs from the 38-7 in that a manually operated tuning mechanism with shadowmeter tuning is used. This receiver is built into a type "X" cabinet with a type "HS" dynamic speaker.

Model 38-9 is identically the same as model 38-8 with the exception that the shadowmeter is not used, and that the speaker and cabinet types differ. This model is assembled in a type "T" cabinet with dynamic speaker type "S7" and a "K" type cabinet using a dynamic speaker type "HS".

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycles	70 Watts
115	25 to 40 cycles	70 Watts
115/220V	50 to 60 cycles	70 Watts

Different transformers are required for operation on the frequencies listed above. These are shown on the Parts List.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: Two Range one 530 to 1720 K. C.
Range two 5.7 to 18.2 M. C.

UNDISTORTED OUTPUT: 3 watts.

PHILCO TUBES USED: Six—one 6A8G, det. osc.; one 6K7G, I. F. amp.; one 6J5G, 2nd Det. A. V. C.; one 6K5G 1st audio; one 6F6G, output; one 5Y4G rectifier.

TONE CONTROL: Three positions with A. C. switch attached.

CABINETS AND SPEAKERS:	Cabinet	Speaker
38-7 Code 121	XX	H31
38-7 Code 121	T	K41
38-7 Code 124	CS	K41
38-8 Code 121	X	HS
38-9 Code 121	K	HS
38-9 Code 121	T	S7
38-9 Code 121	X	HS

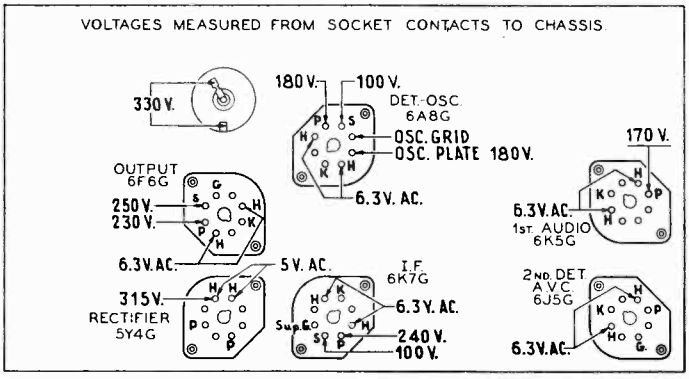


Fig. 1—Socket Voltages—Underside of Chassis View

The Voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains a sensitive voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

SERVICE DATA FOR AUTOMATIC TUNING MECHANISM—MODEL 7

Complete information for setting the stations on the cone-centric tuning mechanism of Model 38-7 is covered in the instruction form no. (39-5533) which is supplied with each set.

A few major assemblies of the automatic cone-centric tuning mechanism are listed on page 3 of this bulletin. A complete list of replacement parts, however, and detailed service data for the automatic mechanism, will be found in bulletin 282.

SHADOW METER ADJUSTMENT Model 38-8

Apply power to the receiver and allow tubes to warm up. Then adjust shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 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 rectifier tube from its socket, and rotate the shadowmeter coil until shadow reaches minimum width. This width should not exceed 3/32 of an inch.

3. Replace the 5Y4G rectifier tube in its socket. The shadow should then widen to not more than 3/16 inch or less than 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 again.

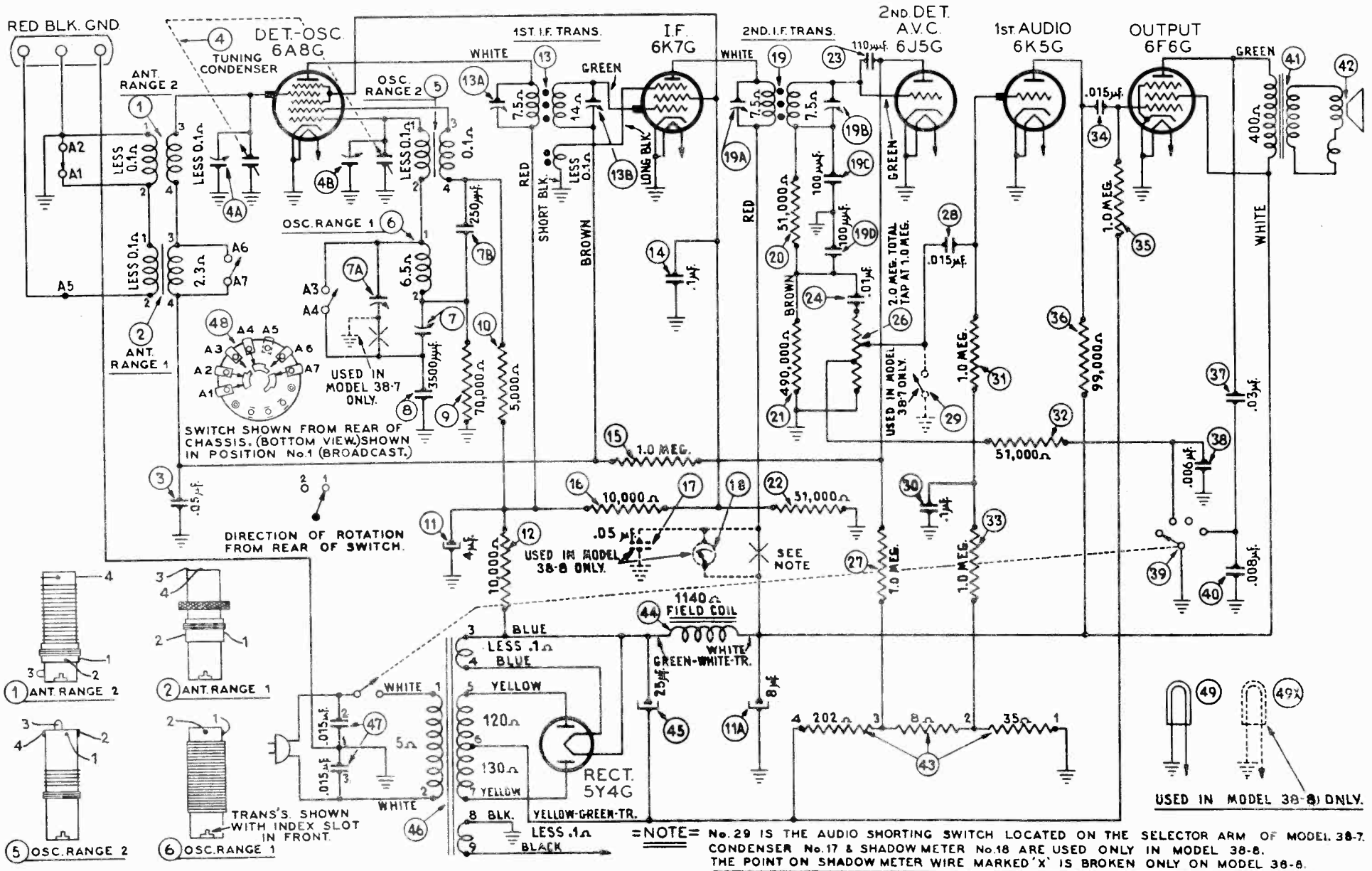


Fig. 2—SCHEMATIC DIAGRAM

Models 38-7, Code 121, 124; 38-8, Code 121; 38-9, Code 121

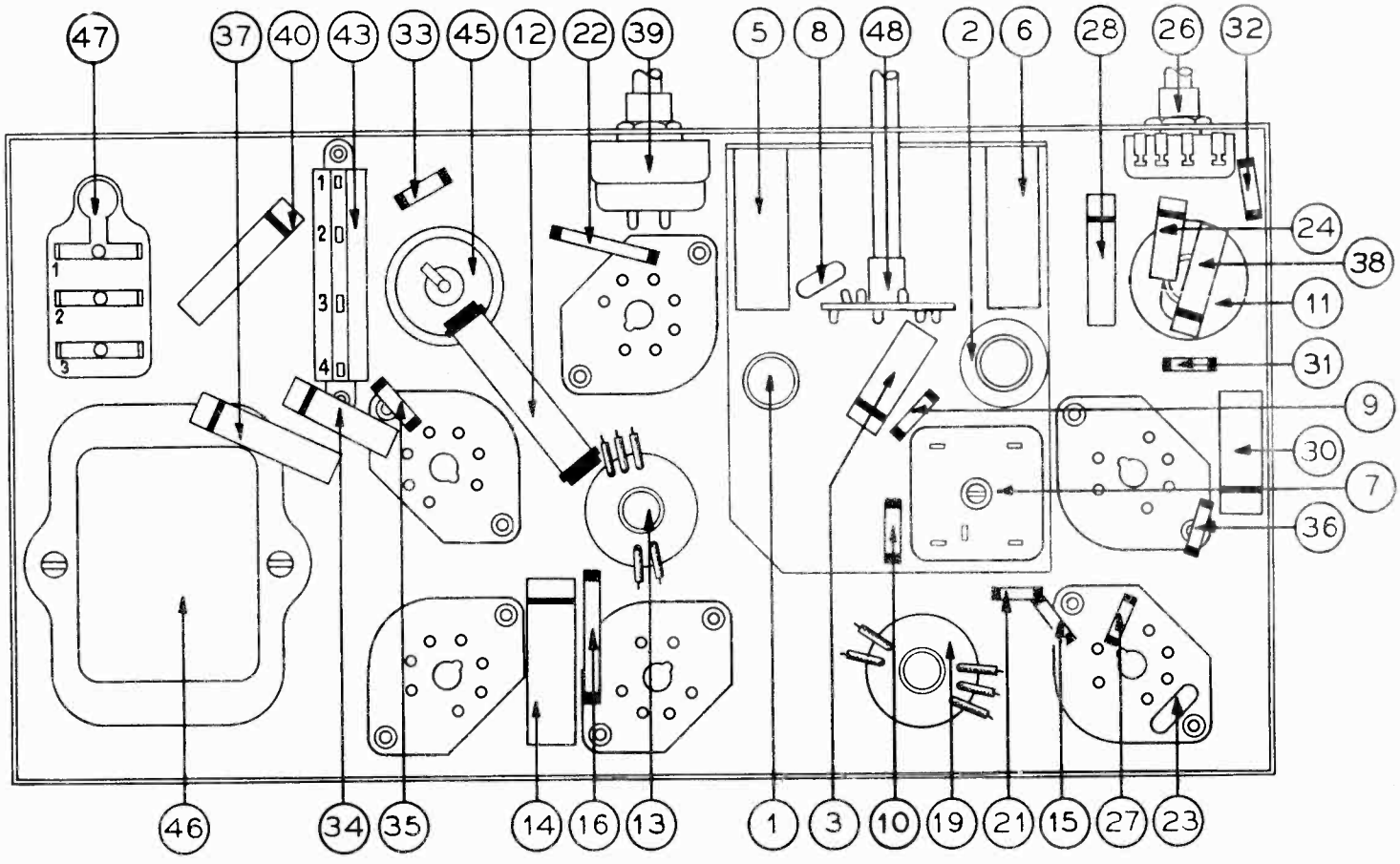


Fig. 4. Part Locations, Underside of Chassis.

REPLACEMENT PARTS

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer—Short Wave	32-2558	
2	Antenna Transformer—Broadcast	32-2557	$1.25
3	Condenser .05 mf.	30-4519	.20
4	Tuning Condenser, Models 8 and 9	31-2026	
	Tuning Condenser, Model 7	31-2040	
5	Osc. Transformer—Short Wave	32-2560	1.25
6	Osc. Transformer—Broadcast	32-2559	
7	Compensator Dual Models 8 and 9	31-6188	
	Compensator, 580 KC. (Model 7)	31-6195	
7A	Compensator Model 7 (1500 KC.)	31-6196	
8	Condenser 3500 mmf. mica	30-1094	.40
9	Resistor 70,000 ohms (½ watt)	33-370339	.20
10	Resistor 5000 ohms (½ watt)	33-250339	.20
11	Condenser, Electrolytic Dual (4 and 8 mfd.)	30-2217	
12	Resistor 10,000 ohms (3 watt)	33-310639	.30
13	1st I. F. Transformer	32-2580	
14	Condenser .1 mf.	30-4455	.25
15	Resistor 1.0 meg. (½ watt)	33-510339	.20
16	Resistor 10,000 mmf. (1 watt)	33-310439	.20
17	Condenser .05 mf. (38-8 only)	30-4454	
18	Shadowmeter (38-8 only)	45-2307	2.50
19	2nd I. F. Transformer	32-2582	
20	Resistor 51,000 mmf. (mounted in 19)	33-351339	.20
21	Resistor 490,000 ohms (½ watt)	33-449339	.20
22	Resistor 51,000 ohms (1 watt)	33-351439	.20
23	Condenser, mica, 110 mmf.	30-1031	.20
24	Condenser .01 mf.	30-4479	.20
25	Removed Prior to Production		
26	Volume Control	33-5216	
27	Resistor 1 meg. (½ watt)	33-510339	.20
28	Condenser .015 mf.	30-4358	.20
29	Audio Shorting Switch (38-7 only) Part of Selector Crank		
30	Condenser .1 mf.	30-4499	.20
31	Resistor 1.0 meg. (½ watt)	33-510339	.20
32	Resistor 51,000 mf. (½ watt)	33-351339	.20
33	Resistor 1.0 meg. (½ watt)	33-510339	.20
34	Condenser .015 mf.	30-4515	.20
35	Resistor 1.0 meg. (½ watt)	33-510339	.20
36	Resistor 99,000 mf. (½ watt)	33-399339	.20
37	Condenser .03 mf.	30-4447	.20
38	Condenser .06 mf.	30-4467	.20
39	Tone Control	42-1327	
40	Condenser .008 mf.	30-4112	$0.20
41	Output Transformer (Model 7)	32-7862	
	Output Transformer (Models 8 and 9)	32-7019	.85
42	Cone and Voice Coil Assembly (H31)	36-3801	1.40
	Cone and Voice Coil Assembly (K41)	36-3174	1.00
	Cone and Voice Coil Assembly (HS)	36-3796	1.20
	Cone and Voice Coil Assembly (S7)	36-3157	1.00
43	Bias Resistor	33-3316	
44	Field Coil Assembly (H31)	36-3665	4.25
	Field Coil Assembly (K41)	36-3931	
	Field Coil Assembly (HS)	36-3690	3.50
	Field Coil Assembly (S7)	36-3039	3.50
45	Electrolytic Condenser	30-2219	
46	Power Transformer, 115V, 50/60 cycle	32-7833	
	Power Transformer, 110V, 25 to 40 cycle	32-7627	
	Power Transformer, 115/230V, 50/60 cycle	32-7835	
47	Condenser .015—.015 mf., 25 mf.	3793DG	.40
48	Wave Switch	42-1325	
49	Pilot Lamp, Models 8 and 9	34-2064	

MODELS 38-7, 8, 9 PARTS

Description	Part No.	List Price
Pilot Lamp, Model 7	34-2184	
Cable (Power)	L-2778	.40
Cable (Speaker)	L-2840	
Cable (Shadowmeter, Model 8)	41-3225	.40
Dial, Models 8 and 9	27-5327	
Dial Clamp	27-5089	
Dial Washer	27-4598	
Knob	27-4330	.10
Knob	27-4331	.10
Knob	27-4332	.10
Mtg. Corner, Rubber (Chassis)	27-4564	.10
Mtg. Rubber (Tuning Condenser)	27-4599	
Screen Brkt. Assembly (Models 8 and 9)	31-2047	
Socket (7 prong)	27-6087	
Socket (6 prong)	27-6086	
Socket Ass'y (Pilot lamp) Models 8 & 9	38-8844	
Vernier Drive Ass'y, Models 8 and 9	31-2072	

MODEL 37-8 PARTS

Description	Part No.	List Price
Bracket Assembly	45-2479	
Brace (Mtg. Unit)	28-5118	
Bearing (Main Shaft)	28-7242	
Bezel Assembly (Scale)	40-6136	
Coupling Assembly	31-2056	
Dial Model 7, supld. by your distributor	27-5338	
Dial Retaining Ring	28-5107	
Dial Mechanism, Cone-centric complete	31-2092	
Escutcheon Ring	28-5128	
Felt (Stop Cover)	27-8822	
Gear, Tuning Condenser (small)	45-2490	
Gear, Tuning Condenser (large)	45-2491	
Knob (Selector)	27-4572	
Knob (Vernier)	45-2477	
Knob Spring	28-8761	
Knob Retaining Screw	28-6672	
Reflector Assembly	45-2478	
Selector Crank Assembly	45-2476	
Shaft (Coupling)	28-6675	
Stop Assembly	31-2055	
Stop Cover (Mounted on Selector Crank)	28-5088	
Shaft (Tuning Condenser Gear)	28-6675	
Pointer Assembly	38-8925	
Wrench (Setting Stops)	45-2475	

CABINET PARTS MODEL 8

Description	Part No.	List Price
Baffle and Silk Assembly (X)	40-6448	
Bezel Plate Assembly (X)	40-6129	
Bezel Gasket	27-8313	$0.01
Bezel Glass	27-8300	.06
Bezel Ring	28-5080	

CABINET PARTS MODEL 9

Description	Part No.	List Price
Baffle and Silk Assembly (X cabinet)	40-6448	
Baffle and Silk Assembly (K cabinet)	40-6139	
Baffle and Silk Assembly (T cabinet)	40-6140	
Bezel Plate Assembly (K, X)	40-6128	
Bezel Plate Assembly (T)	40-6124	.90
Bezel Gasket (X, K)	27-8313	.01
Bezel Gasket (T)	27-8311	.01
Bezel Glass (K, X)	27-8300	.06
Bezel Glass (T)	27-8298	.05
Bezel Ring (K, X)	28-5080	
Bezel Ring (T)	28-5078	.55

Prices to subject to change without notice.

Alignment of Compensator

EQUIPMENT REQUIRED: (1) Signal Generator, using a fundamental frequency covering the intermediate and tuning ranges of the receivers. 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 No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of the 6F6G tube. 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.

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

Model 38-7: 1. Loosen the shaft coupling set screws, using wrench Part No. 45-2481; then turn the tuning condenser to the maximum capacity position (plate fully meshed). Now turn the selector knob until the dial pointer is on the small black circle at the low frequency end of the Range One scale. With condenser and pointer set in this position tighten set screws. **2.** Now turn the selector knob (clockwise) until the dial pointer moves 1/16 of an inch from the small circle (clockwise), see Fig. 5. Leave pointer in this position and loosen coupling set screws. **3.** After loosening set screws, turn the selector knob until pointer is again on the small black dot at low frequency end of Range One scale. Be careful when turning the selector knob that the position of tuning condenser is not disturbed. Tighten coupling set screws with condenser and dial pointer in this position.

Models 8 and 9: 1. Turn the tuning condenser to maximum capacity position (plates fully meshed). **2.** Loosen the clamp of dial, then turn the dial—being careful that position of tuning condenser is not disturbed—until the glowing indicator is centered on the middle index line at the low frequency end of Range One scale. Tighten the dial clamp in this position.

Note—Before the following adjustments are performed, the receiver must be turned on and allowed to heat for 15 minutes.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator output lead into the "Med" Jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A8G, det. osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls, and adjust the I. F. compensator as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.

2. Turn the receiver dial to 580 K. C.

3. Receiver Volume Control maximum.

4. Range Switch Broadcast Position.

5. Adjust compensators (19B), (19A), (13B), and (13A) for maximum output. If the output meter goes off scale when adjusting the compensators retard signal generator attenuator.

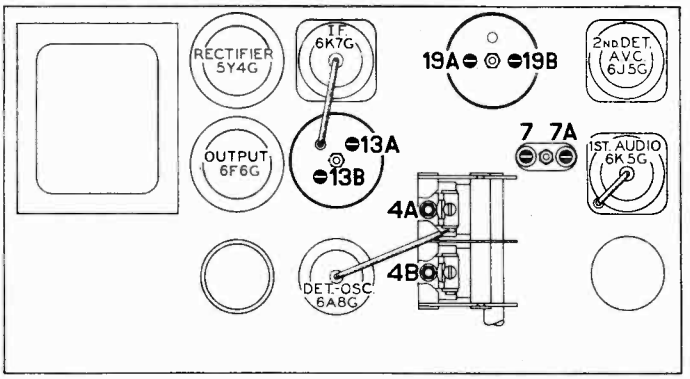


Fig. 4—Locations of Compensators—Top of Chassis

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18 M. C.

1. Insert the Signal Generator output lead in the "Med." jack on the panel, and connect the other end through the .1 mfd. condenser to the "Red" terminal of the aerial panel of the receiver. The output lead ground must be connected to the "Blk" terminal or to the chassis.

2. Leave the receiver volume control at maximum. Then set the controls and adjust the R. F. compensators as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
2	18 MC.	4B See Note A

Tuning Range: 530 to 1720 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1500 KC.	(7A), (4A)
1	580 KC.	7
1	1500 KC.	7A

NOTE A—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). Now, slowly turn compensator counter-clockwise until a second maximum peak is obtained on the output meter. The second peak is the fundamental signal, and must be used in adjusting the receiver for maximum output. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting this compensator.

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

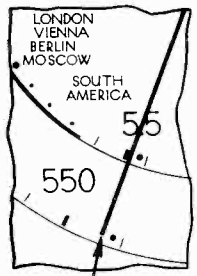


Fig. 5 Dial Calibration Model 38-7

PHILCO RADIO AND TELEVISION CORPORATION
Parts and Service Division
Philadelphia, Pa.

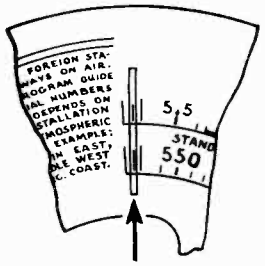


Fig. 6 Dial Calibration Models 38-8; 38-9

April, 1937

Printed in U. S. A.

PHILCO . . . . . Model 38-10—Code 121

SERVICE BULLETIN No. 283 *for members of*
RADIO MANUFACTURERS SERVICE
A PHILCO Service Plan

Electrical Specifications

TYPE OF CIRCUIT: Five tube, A.C. operated superheterodyne circuit with features, such as two tuning ranges covering the frequencies shown under "Tuning Ranges"; Automatic Volume Control; a Pentode Audio Output Stage.

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

Different transformers are required to operate the receiver on the voltage and frequency ratings listed above. The part number of these transformers are shown on the Parts List Page 2.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: Two—Range 1, 540 to 1720 K. C.
Range 2, 5.7 to 18 M. C.

UNDISTORTED OUTPUT: 3 watts.

PHILCO TUBES USED: Five—one 6A8G, Det. osc.; one 6K7G, I. F.; one 6Q7G, 2nd Det. 1st audio; one 6F6G, output, and one 5Y4G, Rectifier.

TONE CONTROL: Two position with A.C. switch attached.

SPEAKERS: Type S7 in T Cabinet, HS in F Cabinet.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, using 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 36,000 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 the 6F6G 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.

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

1. Turn the tuning condenser to maximum capacity position (plate fully meshed).

2. Holding the tuning condenser in this position, loosen the clamp and turn the dial until the indicator is centered on the middle index line (See Fig. 3). Tighten clamp with dial in this position.

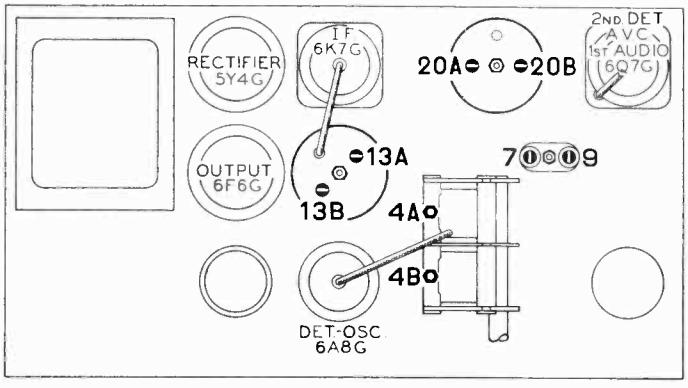


Fig. 2. Locations of Compensators—Top of Chassis

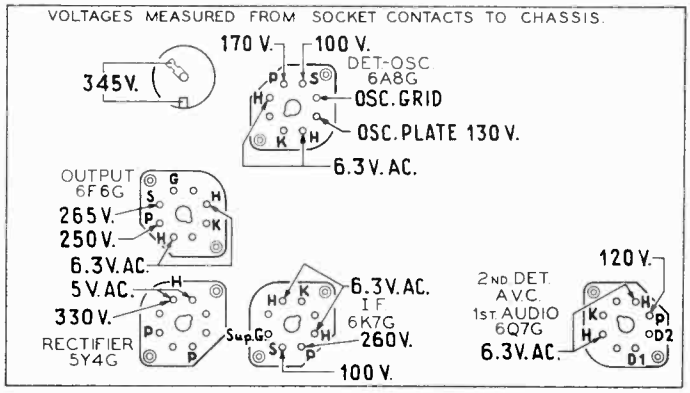


Fig. 1. Socket Voltages, Underside of Chassis

The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains an accurate voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A8G, det. osc. tube and the ground connection of the signal generator to the chassis. Set the Signal Generator and receiver controls, and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Receiver volume control maximum.
4. Range Switch Broadcast Position.
5. Adjust compensators (20B), (20A), (13B), (13A) for maximum output.

If the output meter goes off scale when adjusting the compensators retard signal generator attenuator.

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18 M. C.

1. With one end of the shielded lead of the signal generator output lead in the "Med" jack, connect the other end through the .1 mfd. condenser to the "Red" terminal of the aerial panel of the receiver. The output lead ground must be connected to the black terminal or to the chassis.

2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	4B

Tuning Range: 530 to 1720 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1500 K. C.	7, 4A
1	580 K. C.	(9)
1	1500 K. C.	7, 4A

NOTE A—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 counterclockwise 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 maximum capacity position of the compensator is the image signal, and must not be used in adjusting this 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.

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (range 2)	32-2558	$0.70
2	Antenna Transformer (range 1)	32-2557	1.25
3	Condenser (0.05 mfd. tubular)	30-4519	.20
4	Tuning Condenser Assembly	31-2026	5.00
5	Osc. Transformer (range 2)	32-2560	
6	Osc. Transformer (range 1)	32-2559	.50
7	Compensators (dual, 1500 K. C.)	31-6188	.50
8	Range Switch	42-1325	.75
9	Compensator (Part of 7, 580 K. C.)		
10	Condenser (3500 mmfd., mica)	30-1094	.40
11	Resistor (70,000 ohms, 1/2 watt)	33-370339	.20
12	Condenser (dual electrolytic 4 and 8 mfd.)	30-2217	
13	1st I. F. Transformer	32-2580	
14	Condenser (250 mmfd.) Part of 7		
15	Resistor (5,000 ohms, 1/2 watt)	33-250339	.20
16	Resistor (10,000 ohms, 3 watts)	33-310639	.30
17	Condenser (0.1 mfd., tubular)	30-4455	.25
18	Resistor (1.0 megohm, 1/2 watt)	33-510339	.20
19	Resistor (10,000 ohms, 1 watt)	33-310439	.20
20	2nd I. F. Transformer	32-2582	
21	Resistor (51,000 ohms, 1/2 watt)	33-351339	.20
22	Condenser (110 mmfd., mica)	30-1031	.20
23	Condenser (100 mmfd.) part of No. (20)		
24	Condenser (100 mmfd.) part of No. (20)		
25	Volume Control	33-5215	
26	Resistor (51,000 ohms, 1 watt)	33-351439	.20
27	Resistor (1.0 megohm, 1/2 watt)	33-510339	.20
28	Condenser (0.015 mfd. tubular)	30-4358	.20
29	Resistor (1.0 megohm, 1/2 watt)	33-510339	.20
30	Condenser (0.1 mfd. tubular)	30-4499	.20
31	Resistor (1.0 megohm, 1/2 watt)	33-510339	.20
32	Resistor (330,000 ohms, 1/2 watt)	33-433339	.20
33	Condenser (0.015 mfd. tubular)	30-4515	.20
34	Resistor (490,000 ohms, 1/2 watt)	33-449339	.20
35	Condenser (0.02 mfd., tubular)	30-4215	.20
36	Resistor (99,000 ohms, 1/2 watt)	33-399339	.20
37	Tone Control off-on switch	42-1326	
38	Condenser (0.03 mfd., tubular)	30-4447	.20
39	Condenser (0.008 mfd. tubular)	30-4112	.20
40	Output Transformer	32-7019	.85
41	Cone and Voice Coil Assembly (S-7)	36-3157	1.00
	Cone and Voice Coil Assembly (HS)	36-3796	1.20
42	Pilot Lamp	34-2064	.09
43	Bias Resistor	33-3316	.35
44	Field Coil Assembly (S7)	36-3039	3.50
	Field Coil Assembly (HS)	36-3690	3.50
45	Condenser (electrolytic, 12 mfd.)	30-2210	1.20
46	Power Transformer		
	110 volt, 50 to 60 cycle	32-7833	4.00
	110 volt, 25 to 40 cycle	32-7627	5.50
	Power Trans. 115/230, 50 to 60 cycles	32-7835	
47	Condenser (0.015 mfd., dual bakelite)	3793DG	.40
	Cable (Power)	L-2778	.40
	Cable (Speaker)	L-2840	
	Dial	27-5327	
	Dial Washer	27-4598	
	Dial Clamp	28-5089	.03
	Knob (Tuning)	27-4330	.10
	Knob (Vernier)	27-4331	.10
	Knob (Tone & Volume)	27-4332	.10
	Mtg. Cushions (Tuning Condenser)	27-4599	.20
	Mtg. Rubber (Chassis)	27-4564	.10
	Pilot Lamp Assembly	38-8844	
	Screen Bracket Assembly	31-2047	
	Socket (6 prong)	27-6086	.11
	Socket (7 prong)	27-6087	.11
	Socket (7 prong)	27-6053	.11
	Socket (7 prong)	27-6057	.11
	Terminal Panel (Ant.)	38-8746	
	Vernier Drive	31-2072	

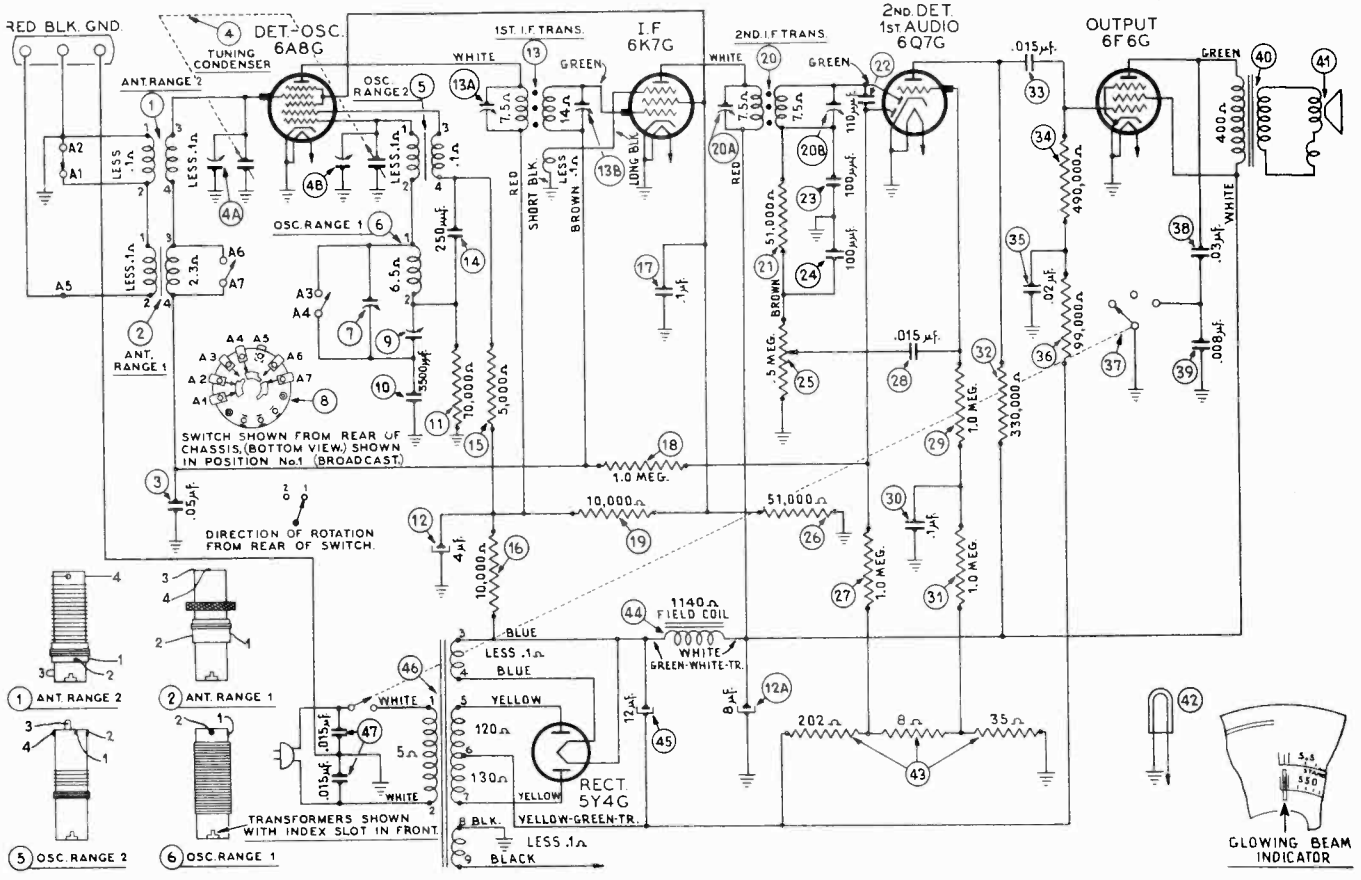


Fig. 3. Schematic Diagram 38-10, Code 121

SCHEMATIC MODEL 38-10 I.F. = 470 K.C.
CODE 121

Schem. No.	Description	Part No.	List Price
	38-10 F CABINET		
	Speaker (HS)	36-1220	$6.25
	Bezel Plate & Frame	40-6126	
	Bezel Gasket	27-8312	.01
	Bezel Glass	27-8299	.06
	Bezel Ring	28-5079	.60
	38-10 T CABINET		
	Speaker S7	36-1009	5.75
	Bezel Plate & Frame	40-6124	.90
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	28-5078	.55

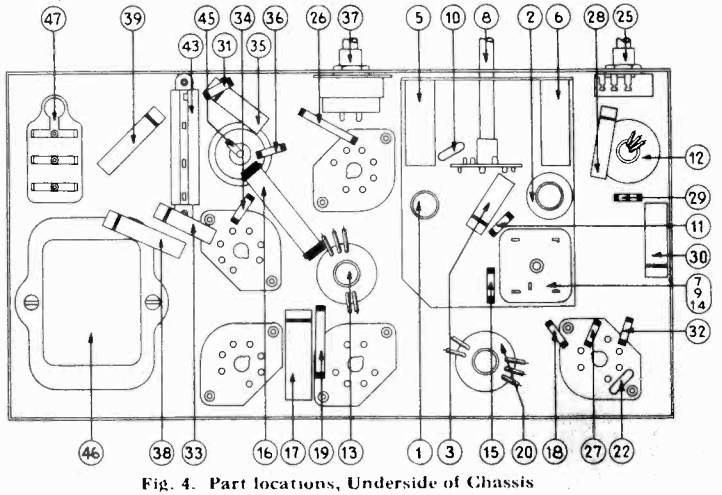


Fig. 4. Part locations, Underside of Chassis

PHILCO RADIO AND TELEVISION CORPORATION
Parts and Service Division
Philadelphia, Pa.

May, 1937 Printed in U. S. A.

PHILCO . . . . . Model 38-12—Code 121

SERVICE BULLETIN No. 284 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Specifications

TYPE OF CIRCUIT: A.C. operated, superheterodyne with automatic volume control, Pentode audio output, and covers the standard broadcast and state police frequencies.

POWER SUPPLY:	Voltage	Frequency Cycles	Power Consumption
	115	50 to 60	40 watts

INTERMEDIATE FREQUENCY: 470 K.C.

R.F. TUNING RANGE: 540 to 1720 K.C.

AUDIO OUTPUT: 2 watts.

PHILCO TUBES USED: Five: One 6A7, Det. Osc.; One 78, I.F.; One 75, 2nd Det., 1st Audio; One 41, Output, and One 84, Rectifier.

TUNING MECHANISM: 8 to 1 Ratio using Pulley and Cord.

CABINET: Type "T" and "C."

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, using 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 36,000 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 the 41 tube. 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.

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

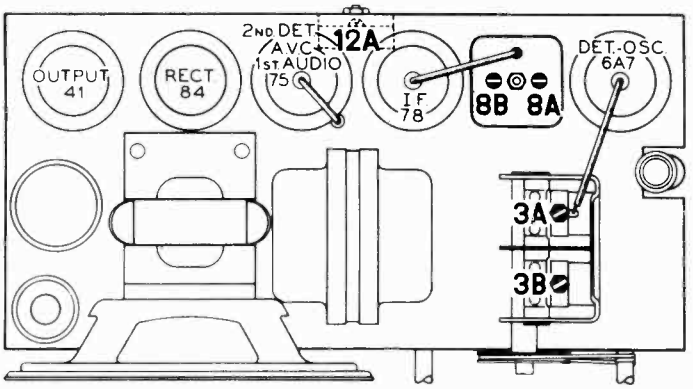


FIG. 2.—Locations of Compensators.

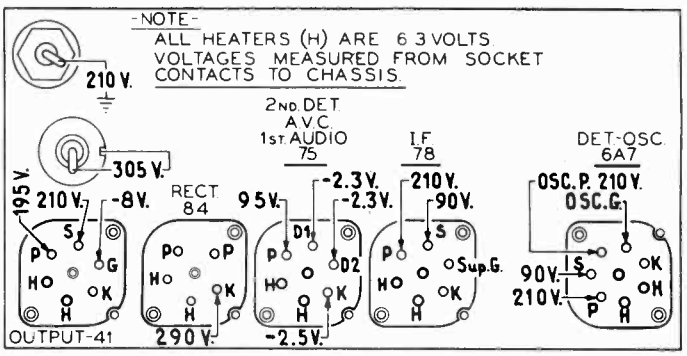
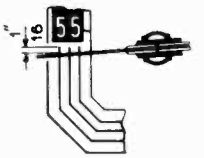


FIG. 1.—Socket Voltages—Underside of Chassis View.

The Voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume Control at minimum —Tuning condenser set for no signal—line voltage 115 A.C.

1 Turn the tuning condenser to maximum capacity position (plates fully meshed).

2 Holding the tuning condenser in this position, turn the pointer until it is 1/16 of an inch below the three lines of the scale at the 550 K.C. end. (See Fig. 3.) This is the correct position of pointer at maximum capacity of tuning condenser.



POINTER SETTING TUNING CONDENSER CLOSED

FIG. 3.—Dial Pointer Calibration.

Intermediate Frequency Circuit

Insert the signal generator shielded output lead into the "Med." jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A7 Det. Osc. tube, and the ground connection of the signal generator to the chassis. Set the Signal Generator and receiver controls, and adjust the I.F. compensators as follows:

1 Set Signal Generator at 470 K.C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.

2 Turn the receiver dial to 580 K.C.

3 Receiver volume control maximum.

4 Adjust compensators, (12A), (8B), (8A), for maximum output. If the output meter goes off scale when adjusting the compensators, retard the signal generator attenuator.

Radio Frequency Circuit

TUNING RANGE: 540 to 1720 K.C.

1 With one end of the shielded lead of the signal generator output lead in the "Med." jack, connect the other end through a 100 mmfd. condenser to the white aerial wire (rear of chassis). Connect the signal generator ground to the brown lead or to the chassis of the receiver.

2 Set the controls and adjust the R.F. compensators as follows:

Volume Control	Signal Generator and Receiver Dial	R.F. Compensators in Order	
Max.	1500 K.C.	(3B)	(3A)

Replacement Parts Model 38-12

Schematic No.	Description	Part No.	List Price
1	Antenna Transformer ...	32-2583	
2	Condenser (0.05 mfd. tubular) ...	30-4444	$0.20
3	Tuning Condenser Assembly) ...	31-2068	
4	Compensator (Part of tuning condenser 3)		
5	Resistor (51,000 ohms, ½ watt) ...	33-351339	.20
6	110 mmfd. mica ...	30-1031	.20
7	Oscillator Transformer ..	32-2586	
8	First I.F. Transformer...	32-2672	
9	Resistor (2 megohms) ...	33-520339	.20
10	Condenser (0.03 mfd. tubular) ...	30-4449	.20
11	Resistor (40,000 ohms, ½ watt) ...	33-340339	.20
12	Second I.F. Transformer.	32-2674	
13	Resistor (51,000 ohms, ½ watt) ...	33-351339	.20
14	Volume Control ...	33-5230	1.45
15	Condenser (0.01 mfd. tubular) ...	30-4479	.20
16	Resistor (4 megohms, ½ watt) ...	33-540339	.20
17	Condenser (250 mmfd. mica) ...	30-1032	.25
18	Resistor (190,000 ohms, ½ watt) ...	33-419339	.20
19	Condenser (0.01 mfd. tubular) ...	30-4169	.20
20	Resistor (490,000 ohms, ½ watt) ...	33-449339	.20
21	Condenser (0.01 mfd. tubular) ...	30-4169	.20
22	Output Transformer ...	32-7861	
23	Cone and Voice Coil Assembly ...	36-3981	
24	Resistor (70 ohms, ½ watt) ...	33-070339	.20
25	Resistor (250 ohms, ½ watt) ...	33-1259	
26	Condenser (Electrolytic 4 mfd.) ...	30-2236	.90
*27	Field coil assembly (not supplied; see Note)		
28	Condenser (Electrolytic 12 mfd.) ...	30-2235	1.20
29	Power Transformer (115V, 50 to 60 cycle) ...	32-7826	3.00
30	Condenser (0.01 mfd., .01 mfd.) ...	3903-DG	.30
31	Pilot Lamp ...	34-2068	.12
	Bezel and Glass Assembly	40-6158	
	Bezel Clamp ...	28-5153	.01
	Bracket (Tuning Condenser) ...	28-5060	

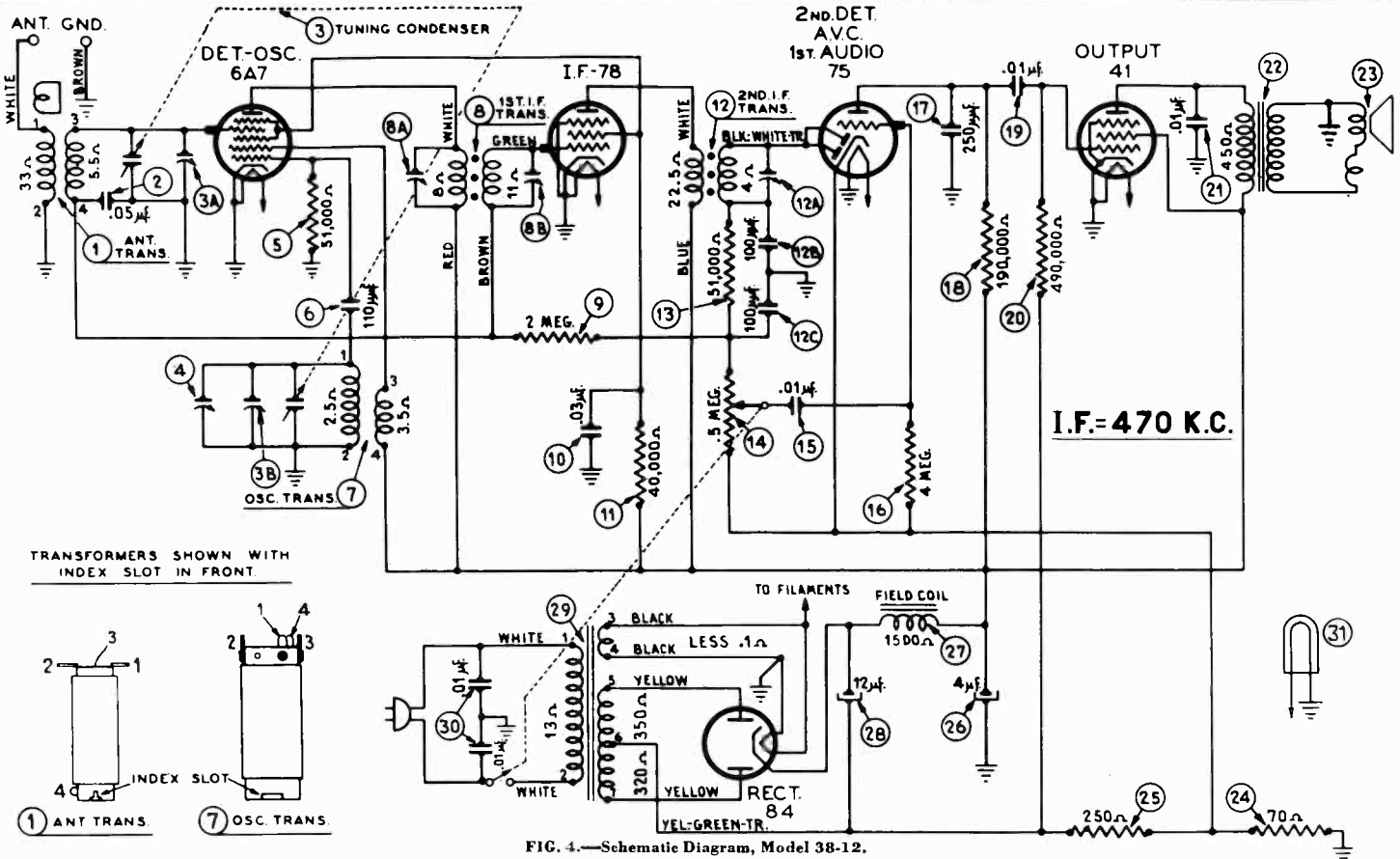


FIG. 4.—Schematic Diagram, Model 38-12.

Cable (Power)	L-2778	.40
Clip (R.F. Trans. small)	28-5002	.02
Clip (R.F. Trans. large)	28-5003	.03
Clip (Tuning Shaft)	28-8610	.03
Dial Assembly	31-2097	
Dial Pointer	28-5185	.15
Dial Drive Cord Assembly	31-2082	.10
Dial Drive Drum	28-6662	
Dial Drive Spring	28-8751	
Knob (Tuning and Volume)	27-4604	
Shaft Assembly (Tuning)	38-9102	
Shield (Tube)	28-5059	
Socket (6 prong)	27-6036	.11
Socket (7 prong)	27-6037	.11
Socket (5 prong)	27-6035	.11
Stop—Rubber	27-4540	
Speaker Model BO-1	36-1366	
Pilot Lamp Assembly	38-9041	

* Entire Speaker must be replaced when field coil is open or damaged.

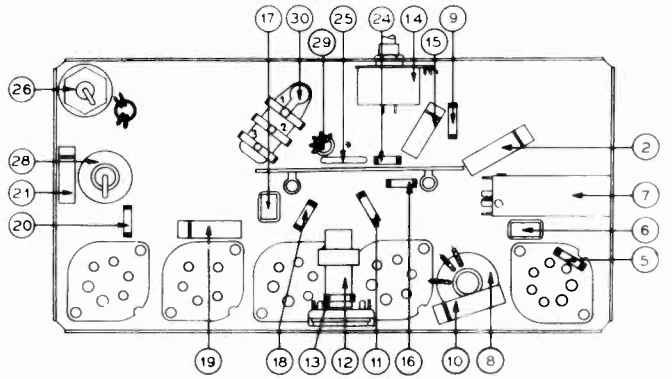


FIG. 5.—Part Locations Underside of Chassis.

PHILCO RADIO AND TELEVISION CORPORATION
Parts and Service Division
Philadelphia, Pa.

PHILCO . . . . . Model 38-14, Codes 121 & 124

RADIO MANUFACTURERS SERVICE — Your Guarantee of Best Radio Service — A PHILCO SERVICE PLAN

SERVICE BULLETIN No. 288 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Electrical Specifications

TYPE OF CIRCUIT: A. C. or D. C. operated superheterodyne with automatic volume control, pentode audio output, and covers the standard broadcast, municipal and state police frequencies, first class amateur (night) and many night foreign and American short-wave stations.
Code 121 & 124 chasses of this Model are identical with the exception of electrolytic condensers, speaker and cabinets. These differences are listed on the part list.

POWER SUPPLY: Voltage 115 — Power Consumption 55 watts

INTERMEDIATE FREQUENCY: 470 K. C.

R. F. TUNING RANGES: 540 to 1720 K. C.
2.3 to 7.4 M. C.

AUDIO OUTPUT: 1 watt

PHILCO TUBES USED: Five: one 6A7, Det. osc.; one 78, I. F.; one 75, 2nd Det., 1st Audio; one 43, Output, and one 25Z5 Rectifier.

TUNING MECHANISM: 12 to 1 Ratio using Pulley and Cord.

CABINET: Type "T," Code 121
Type "CS," Code 124

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, using 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 36,000 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 the 43 tube. 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.

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

1. Turn the tuning condenser to maximum capacity position (plates fully meshed).

2. Holding the tuning condenser in this position, turn the pointer until it is parallel with the index lines (see Fig. 3). This is the correct position of pointer at maximum capacity of tuning condenser.

INTERMEDIATE FREQUENCY CIRCUIT

When adjusting the following compensators, a Philco Set Transformer Part No. 32-2763 must be connected in the signal generator output circuit as follows:

Insert the signal generator output lead into the "Med" jack and the ground lead into the "Gnd" jack of the signal generator.

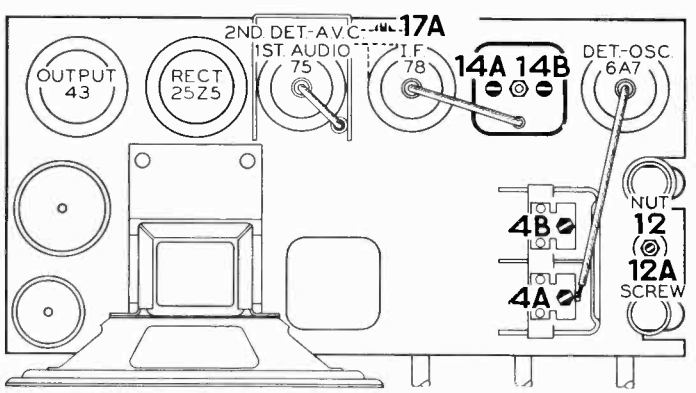


Fig. 2. Locations of Compensators—Top of Chassis

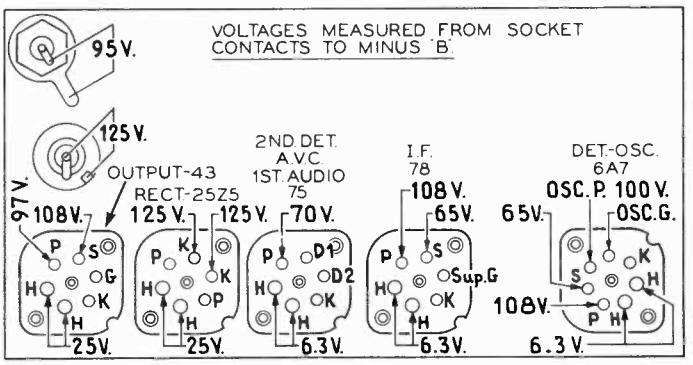
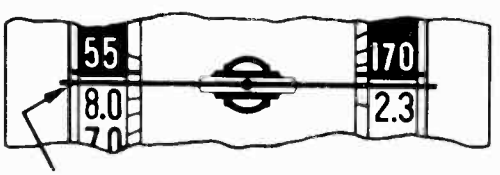


Fig. 1. Socket Voltage—Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester,** which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.

Connect the other end of the output lead to terminal No. 1 on the Set Transformer and the cable ground to Terminal No. 2. No. 3 and 4 terminals of Set Transformer are then connected to the chassis and 6A7 grid respectively of the receiver with short pieces of wire. Insert a 0.1 mfd. in series with the No. 4 lead which connects to the grid.



SET POINTER PARALLEL WITH INDEX LINES

Fig. 3. Dial Pointer Calibration

Set the signal generator and receiver controls and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Range Switch Broadcast position.
4. Receiver volume control maximum.
5. Adjust compensators, (17A), (14B), (14A), for maximum output. If the output meter goes off scale when adjusting the compensators, retard the signal generator attenuator.

RADIO FREQUENCY CIRCUIT

Tuning Range: 2.3 to 7.4 M. C.

1. Remove terminal No. 4 lead of set transformer from the 6A7 grid and connect to the aerial wire of the receiver through a 400 ohm resistor. Remove the .1 mfd. condenser when using the 400 ohm resistor.

2. Set the controls and adjust the R. F. compensators as follows:

Range Switch	Volume Control	Signal Generator and Receiver Dial	R. F. Compensators
Shortwave	Max.	6 M. C.	(4B)

Tuning Range: 530 to 1720 K. C.

1. Remove the 400 ohm resistor from the No. 4 lead and replace with a 100 mmfd. condenser and reconnect to the aerial wire.

Set the controls and adjust the R. F. compensators as follows:

Range Switch	Volume Control	Signal Generator and Receiver Dial	R. F. Compensators in Order
Broadcast	Max.	1550 K. C.	(12A), (4A)
	Max.	580 K. C.	(12) Roll Tuning Condenser
	Max.	1550 K. C.	(12A), (4A)

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Cond. (tubular .001 mf.)	30-4453	$0.20
2	Ant. Trans. (Range 2)	32-2720	
3	Ant. Trans. (Range 1)	32-2718	
4	Tuning Cond. Assembly	31-2094	
5	Cond. (tubular .15 mf.)	30-4191	.25
6	Cond. (tubular .05 mf.)	30-4519	.20
7	Resistor (120,000 ohm ½ watt)	33-412399	.20
8	Cond. (mica 250 mmf.)	30-1032	.25
9	Cond. (tubular .05 mf.)	30-4444	.20
10	Resistor (5000 ohm ½ watt)	33-250339	.20
11	Osc. Trans.	32-2719	
12	Compensator	31-6209	
13	Cond. (mica 1650 mmf.)	5877	.35
14	I. F. Trans. (1st)	32-2672	2.20
15	Resistor (25,000 ohm ½ watt)	33-325339	.20
16	Resistor (2 meg. ½ watt)	33-520339	.20
17	I. F. Trans. (2nd)	32-2674	1.50
18	Resistor (51,000 ohm ½ watt)	33-351339	.20
19	Cond. (tubular .01 mf.)	30-4479	.20
20	Volume Control	33-5236	
21	Resistor (4.0 meg. ½ watt)	33-540339	.20
23	Resistor (120,000 ohm ½ watt)	33-412339	.20
24	Resistor (490,000 ohm ½ watt)	33-449339	.20
25	Cond. (tubular .02 mf.)	30-4215	.20
26	Output Trans. (B 0-2)	32-7874	
	Output Trans. (S-18)	32-7395	1.10
27	Cone and Voice Coil Assembly (S-18)	36-3014	
	Cone and Voice Coil Assembly (B-0-2)	36-3981	
28	Electrolytic Cond. (20 mf. Code 121)	30-2245	.95
	Electrolytic Cond. (Code 124)	30-2275	
29	Resistor (27 ohm ½ watt)	33-027339	.20
30	Cond. (tubular) .05 mf.	30-4444	.20
31	Resistor (300 ohm, 2 watt)	33-1258	
32	Electrolytic Cond. (16 mf. Code 121)	30-2246	.90
	Electrolytic Cond. (Code 124)	30-2277	
33	Choke	32-7868	
34	Field Coil and Pot. Assembly (S-18)	36-3985	
	*Field Coil and Pot. Assembly (B 0-2) (See Speaker Note below).		
35	Condenser (tubular .01 mf.)	30-4169	.20
36	Filament Resistor (133 ohm—15 ohm)	33-3322	.65
37	Pilot Lamp	34-2068	.12
38	Range Switch	42-1366	.70
Cable Speaker (Code 124)		L-2984	
Cable (Power)		L-2778	.40
Clip, Small (Mtg. R. F. Coil)		28-5002	.02
Clip, Large (Mtg. R. F. Coil)		28-5003	.03
Dial Ass'y		31-2098	
Dial Pointer		28-5201	.20
Dial Drive Cord		31-2096	.10
Dial Drive Shaft		38-9001	
Insulator Washer (Electrolytic)		27-8882	
Insulator Washer (Electrolytic)		27-8883	
Insulator Cover 1¾ (Elec. Cond. 32)		27-8800	
Insulator Cover, 2¼ (Elec. Cond. 32)		27-8905	

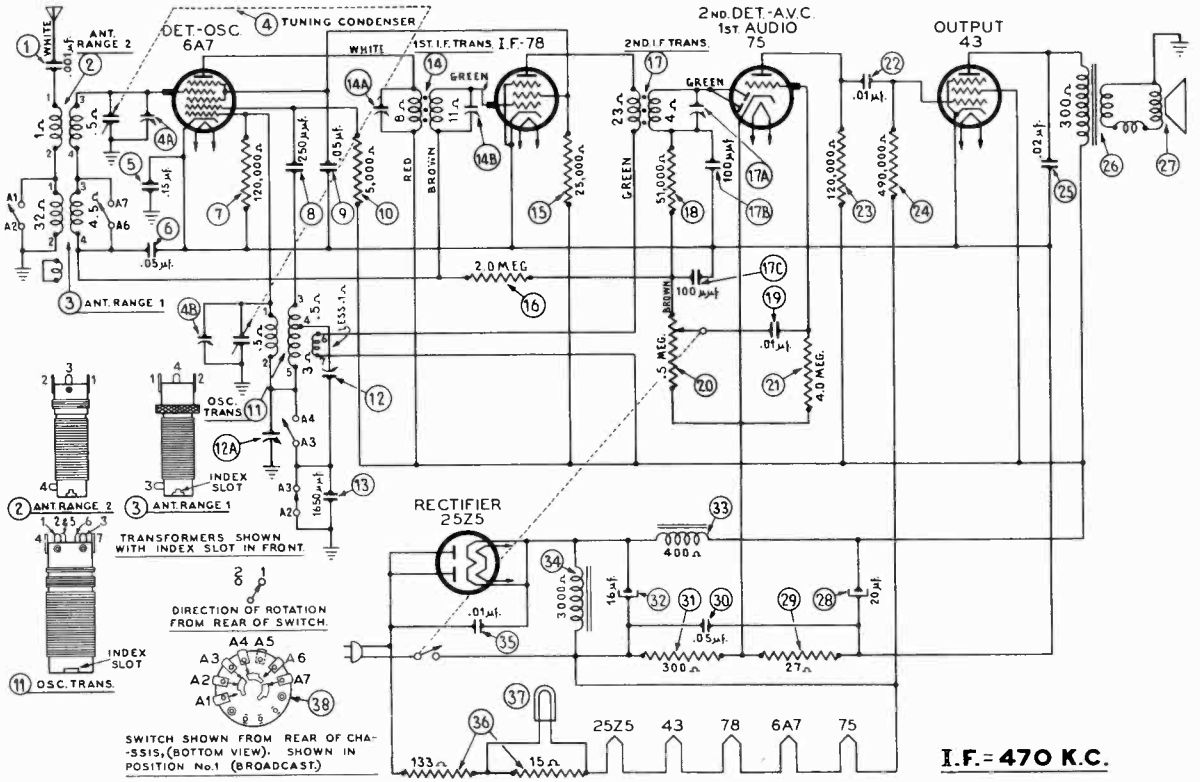


Fig. 4. Schematic Diagram, Model 38-14, Code 121

Schem. No.	Description	Part No.	List Price
	Knob Ass'y	27-4604	
	Mtg. Rubber Dial	27-4150	$0.01
	Mtg. Rubber (Tuning Condenser)	27-4596	
	Pilot Lamp Ass'y	38-9127	
	Pilot Lamp	34-2068	.12
	Pully (Tuning Condenser)	31-1283	.30
	Speaker (B 0-2, Code 121)	36-1367	
	Speaker (S-18, Code 124)		
	Socket (6 prong)	27-6036	.11
	Socket (7 prong)	27-6037	.11
	Washer "C" (Tuning Shaft)	28-3904	.01
	Bezel and Glass (Code 121)	40-6158	
	Bezel and Glass (Code 124)	40-6264	
	Bezel Clamp	28-5153	.02

*Entire Speaker must be replaced when field coil is open or damaged.

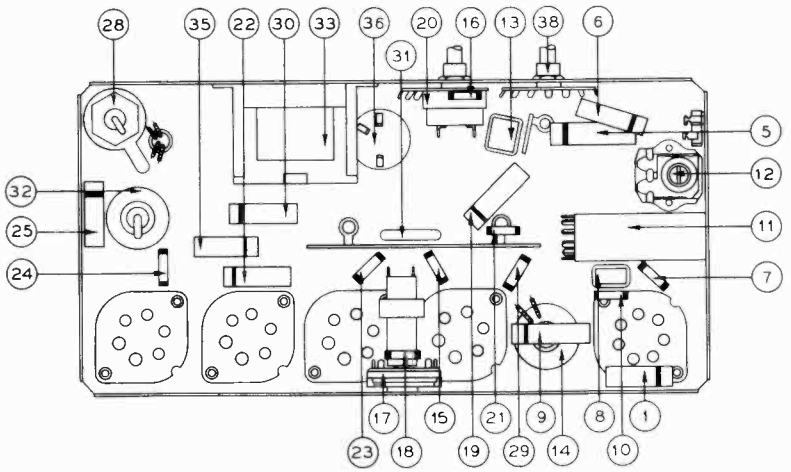


Fig. 5. Part locations, Underside of Chassis

PHILCO RADIO AND TELEVISION CORPORATION

July, 1937 **Parts and Service Division Philadelphia, Pa.** Printed in U. S. A.

PHILCO . . . . . Model 38-15, Codes 121 & 124

RADIO MANUFACTURERS SERVICE — Your Guarantee of Best Radio Service — A PHILCO SERVICE PLAN

SERVICE BULLETIN No. 291 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Specifications

TYPE OF CIRCUIT: A.C. operated, Superheterodyne circuit, incorporating two tuning ranges covering standard and short wave broadcasts, automatic volume control, and a pentode audio output circuit. When built into a Type "T" cabinet, the receiver is identified as Code 121. In the Chairside Cabinet, Type "CS", the speaker is removed from the receiver chassis and mounted in the cabinet. The receiver is then identified as Code 124.

POWER SUPPLY:

Voltage	Frequency Cycles	Power Consumption
115	50 to 60	40 watts

INTERMEDIATE FREQUENCY: 470 K.C.

R.F. TUNING RANGES: 540 to 1720 K.C.
5.7 to 18.0 M.C.

AUDIO OUTPUT: 2 watts

PHILCO TUBES USED: Five: One 6A7, Det. Osc.; One 78, I.F.; One 75, 2nd Det., 1st Audio; One 41, Output, and One 84, Rectifier.

TUNING MECHANISM: 8 to 1 Ratio using Pulley and Cord.

CABINET: Type "T" and "CS"

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, using 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 36,000 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 the 41 tube. 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.

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

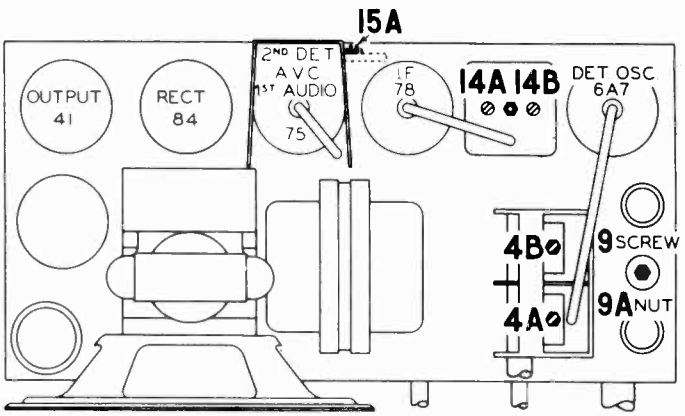


Fig. 2.—Locations of Compensators

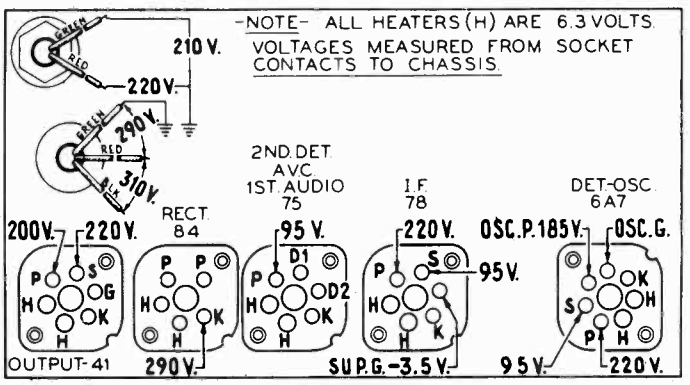


Fig. 1. Socket Voltages, Underside of Chassis View

The Voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume Control at minimum—Tuning condenser set for no signal—line voltage 115 A.C.

1. Turn the tuning condenser to maximum capacity position (plates fully meshed).

2. Holding the tuning condenser in this position, turn the pointer until it is in the position shown in Fig. 3. This is the correct position of pointer at maximum capacity of tuning condenser.

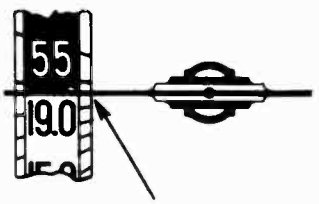


FIG.3—Dial Pointer Calibration

Intermediate Frequency Circuit

Insert the signal generator shielded output lead into the "Med." jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A7 Det. Osc. tube, and the ground connection of the signal generator to the chassis. Set the Signal Generator and receiver controls, and adjust the I.F. compensators as follows:

1. Set Signal Generator at 470 K.C. Turn "Multiplier" Control to 1000 and the "Attentuator" for maximum output.
2. Turn the receiver dial to 580 K.C.
3. Receiver volume control maximum.
4. Range Switch (Broadcast)
5. Adjust compensators, (15A), (14B), (14A), for maximum output. If the output meter goes off scale when adjusting the compensators, retard the signal generator attenuator.

Radio Frequency Circuit

Tuning Range 5.7 to 18.0 M.C.

1. With one end of the shielded lead of the signal generator output lead in the "Med" jack, connect the other end through a 400 ohm resistor to the white aerial wire (rear of chassis). Connect the signal generator ground to the brown lead or to the chassis of the receiver.

2. Set the controls and adjust the R.F. compensators as follows:

Range Switch Position	Signal Generator and Receiver Dial	R. F. Compensators in Order
Short Wave	18.0 M.C.	(4B)

Tuning Range 530 to 1720 K.C.

1. Remove the 400 ohm resistor from aerial lead and replace with a 100 mmfd. condenser.

2. Set the controls and adjust the R.F. compensators as follows;

Range Switch Position	Signal Generator and Receiver Dial	R. F. Compensators in Order
Broadcast	1550 K.C.	(9), (4A)
	580 K.C.	(9A) Roll tuning condenser
	1550 K.C.	(9), (4A)

Replacement Parts
Model 38-15, Code 121, 124

Schem. No.	Description	Part No.	List Price
1	Ant. Trans. (Range 2)	32-2821	
2	Ant. Trans. (Range 1)	32-2822	
3	Range Switch	42-1366	$0.70
4	Tuning Condenser Assembly	31-2095	4.00
5	Condenser (5$\mu\mu$f, mica)	30-1097	.20
6	Condenser (.05 μf, tubular)	30-4519	.20
7	Resistor (51000 Ω, ½ W.)	33-351339	.20
8	Osc. Trans. (Range 1 and 2)	32-2823	
9	Compensator	31-6100	.40
10	Condenser (3500 $\mu\mu$f, mica)	30-1094	.40
11	Condenser (250 $\mu\mu$f, mica)	30-1032	.25
12	Resistor (5000 Ω, ½ W.)	33-250339	.20
13	Resistor (10,000 Ω, 1 W.)	33-310439	.20
14	1st. I. F. Trans.	32-2672	2.20
15	2nd. I. F. Trans.	32-2674	1.50
16	Resistor (51,000 Ω, ½ W.)	33-351339	.20
17	Resistor (2 Meg., ½ W.)	33-520339	.20
18	Condenser (.03 μf, tubular)	30-4449	.20
19	Resistor (32,000 Ω, ½ W.)	33-332339	.20
20	Volume Control & Power Switch	33-5230	1.45
21	Condenser (.01 mfd., tubular)	30-4514	.20
22	Resistor (4 meg., ½ W.)	33-540339	.20
23	Condenser (.01 μf, tubular)	30-4514	.20
24	Resistor (190,000 Ω, ½ W.)	33-419339	.20
25	Resistor (490,000 Ω, ½ W.)	33-449339	.20
26	Condenser (250 $\mu\mu$f, mica)	30-1032	.25
27	Condenser (.01 μf, tubular)	30-4169	.20
28	Output Trans. Code 121 (B01 Speaker)	32-7861	
	Output Trans. Code 124 (S19 Speaker)	32-7019	
29	Cone & Voice Coil Assembly, Code 121 (B01 Speaker)	36-3981	
	Cone & Voice Coil Assembly, Code 124 (S19 Speaker)	36-3014	
30	Electrolytic Condenser (2-4 mfd.)	30-2265	
31	Electrolytic Condenser (10-12 μf.)	30-2263	
32	*Speaker Field Code 121 (B01) See Note		
	Speaker Field Assembly, Code 124, (S19 Speaker)	36-3987	
33	Resistor (250 Ω, 1 W.)	33-1259	
34	Resistor (70 Ω)	33-070339	.20
35	Pilot Lamp	34-2064	.20
36	Power Trans. (115 V., 50 to 60 cycle)	32-7826	3.00
37	Condenser (.01-.01 μf, Bakelite)	3903-DG	.30
	Condenser Code 124, (.01-.01 μf, Bakelite)	3903-0 DG	.30
	Bezel & Glass Assembly (Code 121)	40-6158	1.20
	Bezel & Glass Assembly (Code 124)	40-6264	
	Bezel Clamp	28-5153	.02
	Cable (Power, Code 121)	L2778	.40
	Cable (Power Code 124)	L2985	
	Clip, Small (R. F. Trans.)	28-5002	.02
	Clip, Large (R. F. Trans.)	28-5003	.03
	Dial Assembly	31-2137	

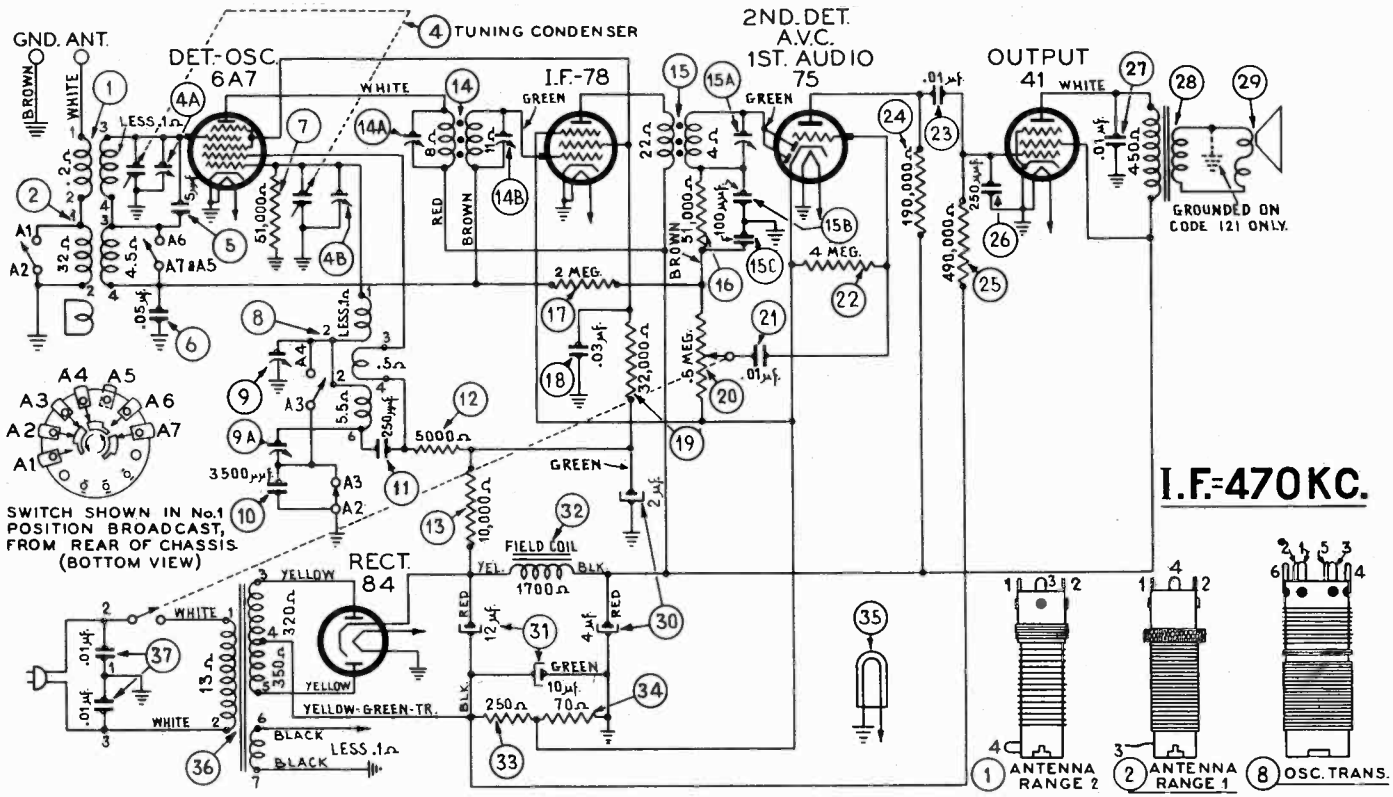


Fig. 4.—Schematic Diagram, Model 38-15

Schem. No.	Description	Part No.	List Price
	Dial Pointer	28-5201	$0.20
	Dial Drive Cord	31-2096	.10
	Dial Drive Shaft	38-9001	
	Knob	27-4604	.10
	Mtg. Rubber (Dial)	27-4150	.01
	Mtg. Rubber (Tuning Condenser)	27-4596	
	Pulley (Tuning Condenser)	31-1283	.30
	Shield (Tube)	28-5059	.05
	Speaker (B01, Code 121)	36-1366	
	Speaker (S19, Code 124)	36-1382	
	Socket Assembly (Pilot Lamp)	38-9041	.35
	Socket (6 Prong)	27-6036	.11
	Socket (7 Prong)	27-6037	.11
	Socket (5 Prong)	27-6035	.11

* Speaker must be replaced when field is open or shorted.

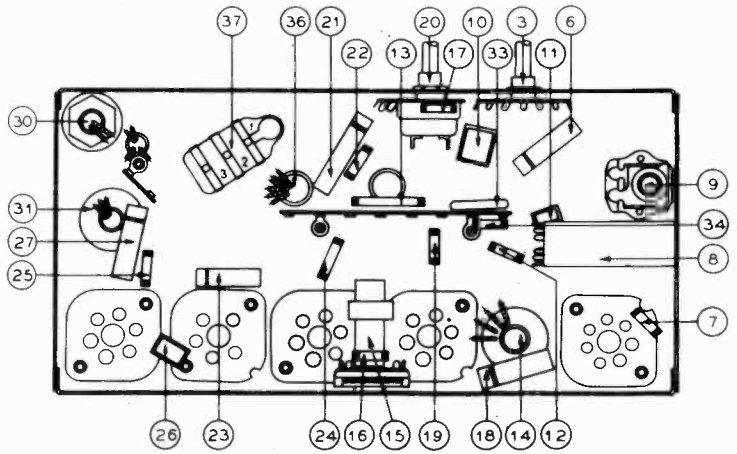


Fig. 5.—Part Locations Underside of Chassis

PHILCO

Philadelphia, Pa.

Printed in U. S. A.

PHILCO . . . . . Model 38-60—Code 125

SERVICE BULLETIN No. 279 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Electrical Specifications

TYPE CIRCUIT: Superheterodyne, with Automatic Volume Control and a pentode audio output circuit.

POWER SUPPLY: Voltage	Frequency	Consumption
115	50 to 60	60 watts
115	25 to 40	60 watts
115/220	50 to 60	60 watts

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGE: Two—Range one 530 to 1720 K. C.
Range two 2.3 to 7.4 M. C.

UNDISTORTED OUTPUT: 3 watts.

PHILCO TUBES USED: One 6A8G, Det. Osc.; one 6K7G, I. F.; one 6Q7G, 2nd Det. audio; one 6F6G, audio output; and one 5Y4G, Rectifier.

TONE CONTROL: Two position.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator using a fundamental frequency range covering the intermediate and tuning ranges of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 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 the 6F6G tube. Adjust the meter to use the (0-30) volt scale and advance attenuator control of the generator until a readable indication is noted on the output meter after a signal is applied to the receiver in the following adjustments.

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

1. Turn the tuning condenser to the maximum capacity position, then loosen dial hub, set screws and rotate the dial (condenser at maximum capacity) until the glowing beam indicator is centered between the first and second index lines at the low frequency end of the broadcast scale.

2. With dial in this position, tighten dial hub set screws.

INTERMEDIATE FREQUENCY CIRCUIT

Connect the 077 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. Then set the controls of the signal generator and receiver as follows:

a. Signal Generator 470 K. C.

b. Receiver dial at 580 K. C.

c. Range switch of receiver at Range One.

d. Volume Control maximum.

e. Adjust I. F. Compensator (18B), (18A), (14B), (14A) for maximum output.

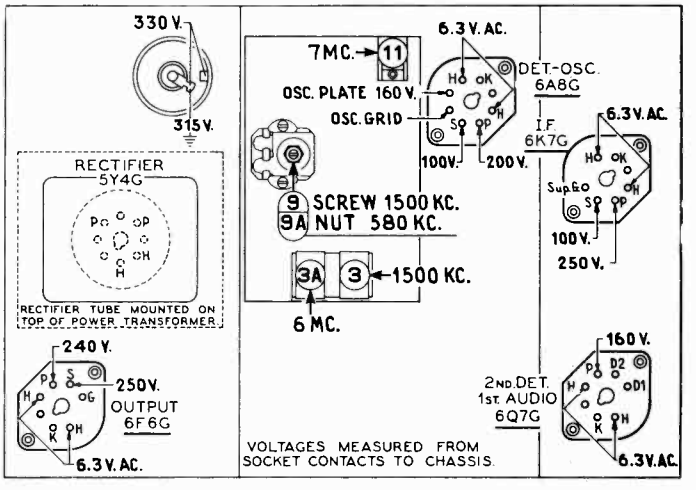


Fig. 1. R. F. Compensators and Voltage Readings, underside of chassis. The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains a sensitive voltmeter. Volume control at minimum, range switch in broadcast position, line voltage 115 A. C.

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1720 K. C.

1. Connect the signal generator output lead through a 200 mmfd. condenser from the "med" post of the generator to the aerial terminal; and the output lead ground connection to the chassis.

2. The R. F. Compensators are adjusted as follows for maximum output:

Range Switch Position	Signal Generator and Receiver Dial	Compensators In Order
1	1500 K. C.	(9) (3)
1	580 K. C.	(9A) Note A
1	1500 K. C.	(9) (3)

Tuning Range 2.3 to 7.4 M. C.

Remove the 200 mmfd. from the output lead and replace with a 400 ohm carbon resistor and reconnect to the antenna terminal.

Range Switch Position	Signal Generator and Receiver Dial	Compensators In Order
2	7.0 M. C.	(11)
2	6.0 M. C.	(3A)

NOTE A—First tune compensator (9A) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (9A) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (9A) 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.

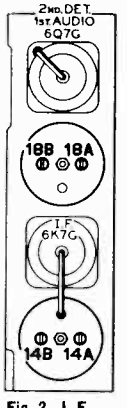


Fig. 2. I. F. Compensators top of chassis

Replacement Parts

Schem. No.	Description	Part No.	List. Price
1	Antenna transformer (range 1)	32-2588	$1.00
2	Antenna transformer (range 2)	32-2246	.70
3	Compensator (2 section)	31-6093	.40
4	Tuning condenser	31-1826	3.00
5	Condenser (.05 mf. tubular)	30-4444	.20
6	Resistor (10,000 ohms, ½ watt)	33-310339	.20
7	Condenser (250 mmf. mica)	30-1032	.25
8	Resistor (120,000 ohms, ½ watt)	33-412339	.20
9	Compensator (2 section)	31-6100	.40
10	Oscillator transformer (range 1)	32-2380	.50
11	Compensator	31-6101	.20
12	Condenser (1650 mmf.)	31-6096	.40
13	Oscillator transformer (range 2)	32-2121	.70
14	I. F. Transformer (first)	32-2580	2.20
15	Condenser (.1 mf. tubular)	30-4455	.25
16	Resistor (1 meg., ½ watt)	33-510339	.20
17	Resistor (20,000 ohms, 1 watt)	33-320439	.20
18	Second I. F. transformer	32-2582	2.20
19	Condenser (110 mmf.) Part of 18		
20	Resistor (51,000 ohms)	33-351339	.20
21	Condenser (110 mmf.) Part of 18		
22	Volume control	33-5157	1.00
23	Resistor (51,000 ohms, 1 watt)	33-351439	.20
24	Condenser (110 mmf. mica)	30-1031	.20
25	Condenser (.015 mf. tubular)	30-4358	.20
26	Resistor (1 meg., ½ watt)	33-510339	.20
27	Condenser (.1 mf. tubular)	30-4122	.20
28	Resistor (1 meg., ½ watt)	33-510339	.20
29	Resistor (490,000 ohms, ½ watt)	33-449339	.20
30	Resistor (70,000 ohms, ½ watt)	33-370339	.20
31	Condenser (.015 mf. tubular)	30-4226	.20
32	Resistor (1 meg., ½ watt)	30-510339	.20
33	Output transformer (S7)	32-7019	.85
34	Cone and voice coil assembly	36-3157	1.00
35	Field coil assembly (S7)	36-3039	3.50
36	Condenser (.03 mf. bakelite)	8328-SU	.35
37	Condenser (.008 mf. tubular)	30-4317	.20
38	Condenser (8 mf. electrolytic)	30-2211	
39	Bias resistor (wire wound)	33-3316	
40	Condenser (12 mf. electrolytic)	30-2210	
41	Resistor (9000 ohms, 2 watts)	33-290539	.30
42	Power transformer		
	115 volts, 50-60 cycle	32-7583	4.50
	115 volts, 25-40 cycle	32-7584	6.50
	115/230 volts, 50-60 cycle	32-7585	6.50
43	Condenser (.015 mf.-.015 mf. dual bakelite)	3793-DG	.40
44	Tone control and off-on switch	42-1180	.75
45	Condenser (16 mf. electrolytic)	30-2212	
46	Pilot lamp	34-2039	.07
47	Range switch	42-1333	
	Cable Speaker	L-2181	.25
	Cable A. C.	L-2778	
	Dial	27-5196	.45
	Dial Hub	28-7152	.10
	Dial Clamp	28-2837	.10
	Dial Set Screw	W-1506	2.00 C
	Knob (Tuning)	27-4321	.10
	Knob (Tone & Volume)	27-4332	.10
	Pilot Lamp Socket Assembly	38-7706	.35
	Screen Bracket Assembly	31-1878	.25
	Speaker S7	36-1009	5.75
	Shaft (Vol. Cont.)	38-8058	.12
	Shaft Spring	28-4117	.40 C
	Shaft Clip	28-4394	.01
	Socket (6 prong)	27-6086	
	Socket (7 prong)	27-6087	
	Vernier Drive Assembly	31-1863	
	F CABINET		
	Baffle & Silk	40-6142	
	Bezel Assembly	40-6130	$1.00
	Bezel Gasket	27-8312	.01
	Bezel Glass	27-8299	.06
	Bezel Ring	28-5079	.60
	B CABINET		
	Baffle & Silk	40-6093	
	Bezel Plate & Frame	40-6117	.90
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	27-5078	.55

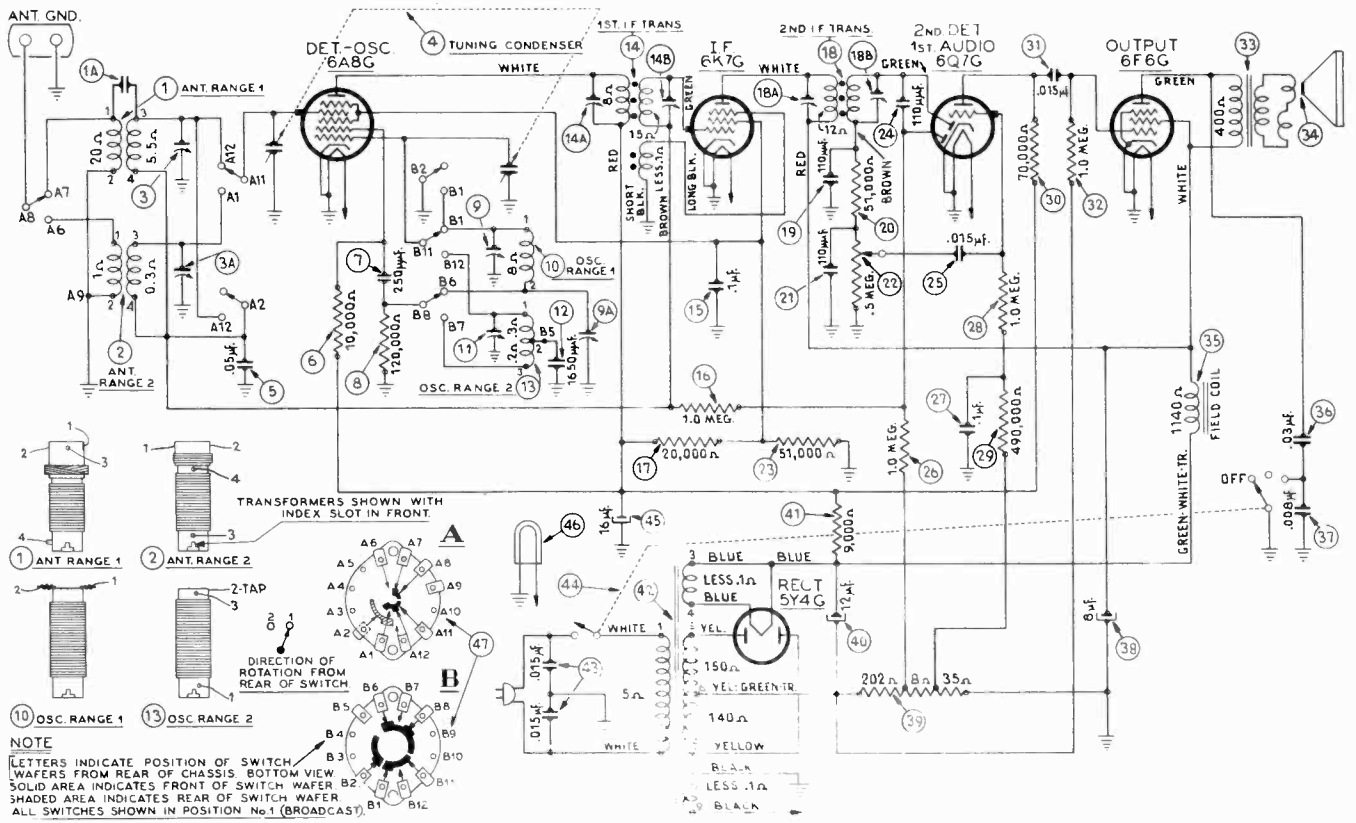


Fig. 3. Schematic Diagram 38-60, Code 125

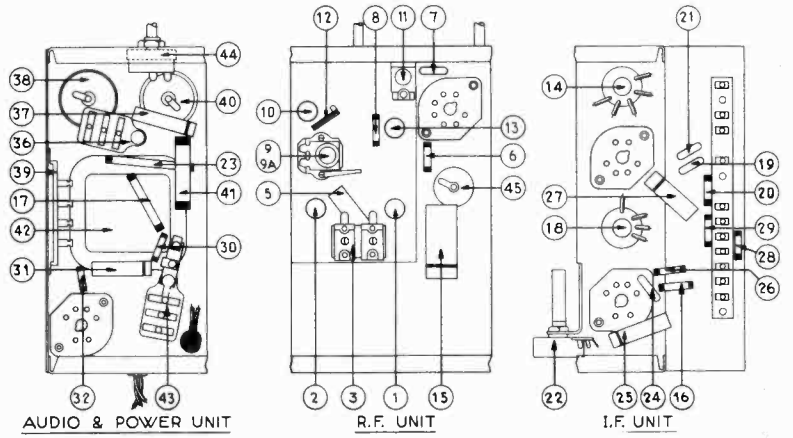


Fig. 4. Part Locations, underside of chassis

PHILCO RADIO AND TELEVISION CORPORATION
Parts and Service Division
Philadelphia, Pa.

April, 1937 Printed in U.S.A.

PHILCO . . . . . Model 38-89—Code 125

SERVICE BULLETIN No. 278 *for members of*
RADIO MANUFACTURERS SERVICE
A PHILCO Service Plan

Electrical Specifications

TYPE OF CIRCUIT: Superheterodyne with automatic volume control and a pentode audio output circuit.

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycles	65 watts
115	25 to 40 cycles	65 watts
115/220	50 to 60 cycles	

Different transformers are required for operation on the frequencies listed above. They are shown on the parts list.

INTERMEDIATE FREQUENCY: 470 K. C.

UNDISTORTED OUTPUT: 3 watts.

PHILCO TUBES USED: Six; one 6U7G, R. F. amp.; one 6A8G, Det. Osc.; one 6K7G, I. F. amp.; one 6Q7G, 2nd Det. 1st audio; one 6F6G, output, and one 5Y4G, Rectifier.

TUNING RANGES) Two—Range one 530 to 1650 K. C.
Range two 1500 to 3700 K. C.

TONE CONTRÓL: Two positions.

SPEAKERS: Type S in B cabinet.
Type HS in K cabinet.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator—Philco Model 077 Signal Generator—using fundamental frequency from 115 to 36000 K. C. is the correct instrument for the 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 the 6F6G tube. Adjust the meter to use the (0-30) volt scale and advance attenuator control of the generator until a readable indication is noted.

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

1. Turn the tuning condenser to the maximum capacity position. Then loosen dial hub, set screws and rotate the dial (condenser at maximum capacity) until the glowing beam indicator is center on second index line at the low frequency end of the broadcast scale.

2. With dial in this position, tighten dial hub set screws.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator output lead in the med. jack, and connect the other end through a .1 mfd. condenser to the grid of the 6A8G det. osc. tube. The ground connection of the signal generator is connected to the chassis. Set the signal generator controls and adjust the I. F. compensators as follows:

a. Set 077 Signal Generator indicator at 470 K. C. Turn the multiplier control to 1000, and set the gain control for maximum output.
b. Receiver Dial 580 K. C.
c. Receiver volume control full "on".
d. Adjust compensator (24B), (24A), (16B) and (16A) for maximum output. If the output meter goes off scale when adjusting the compensators retard signal generator attentuator.

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1650 K. C.

1. Insert the signal generator output lead in the "medium jack" on the panel, and connect the other end through the .1 mfd. condenser to the antenna terminal of the receiver. The output lead ground must be connected to the chassis.

2. Leave the receiver volume control full on. Then set the controls and adjust the R. F. compensators as follows:

Range Switch Position	Signal Generator and Receiver Dial	Compensators In Order
1	1500 K. C.	(5C), (5B), (5A)
1	580 K. C.	(10) (See Note A)
1	1500 K. C.	(5C), (5B), (5A)

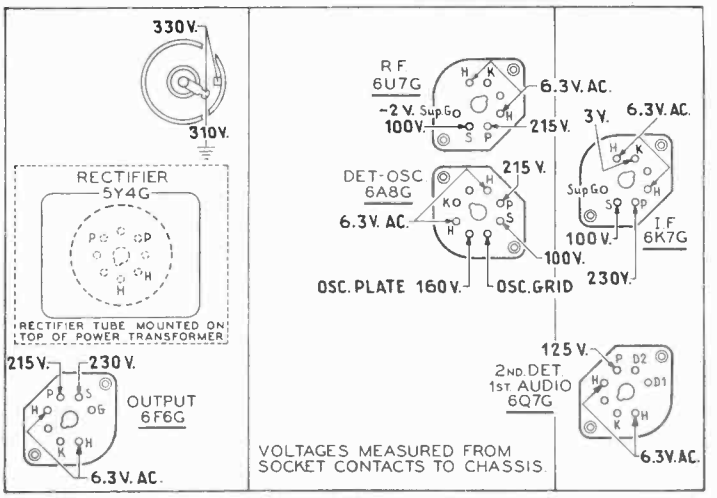


Fig. 1. Socket Voltages under side of chassis

The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains an accurate voltmeter. Volume control at minimum, range switch in broadcast position, line voltage 115 A. C.

Tuning Range 1500 to 3700 K. C.

The alignment of this tuning range is taken care of by the Range 1 adjustments.

NOTE A—First tune compensator (10) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (10) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn compensator (10) 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.

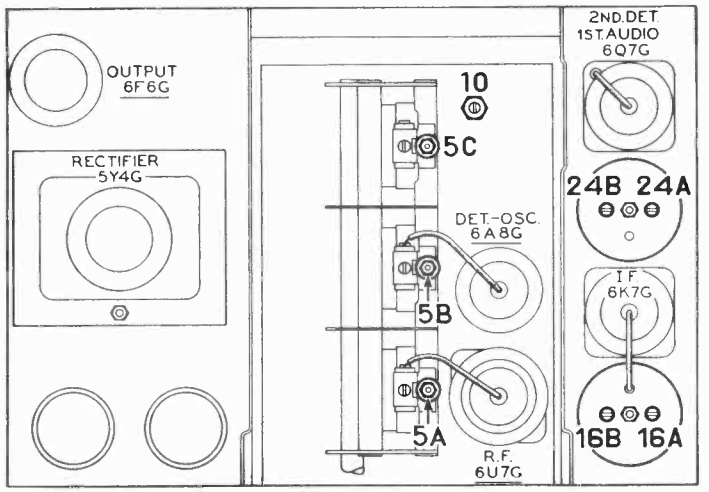


Fig. 2. Locations of Compensators. Top of chassis.

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna transformer	32-2592	
2	Condenser (0.05 mf. tubular)	30-4519	$0.20
3	Resistor (51,000 ohms, ½ watt)	33-351339	.20
4	Condenser (0.05 mf. tubular)	30-4519	.20
5	Tuning Condenser assembly	31-2033	
6	Condenser (1.0 mmf. twisted wire)		
7	R. F. transformer	32-2128	.70
8	R. F. choke coil	32-2139	.35
9	Wave Switch	42-1334	
10	Compensator	31-6056	.55
11X	Condenser (10 mmf. mica)	30-1065	.20
11	Oscillator transformer	32-2120	1.00
12	Condenser (410 mmf. mica)	30-1000	.25
13	Resistor (120,000 ohms, ½ watt)	33-412339	.20
14	Condenser (250 mmf. mica)	30-1032	.25
15	Resistor (20,000 ohms, ½ watt)	33-320339	.20
15	1st I. F. transformer	32-2580	2.20
17	Condenser (0.05 mf. tubular)	30-4123	.20
18	Resistor (1,000 ohms, ½ watt)	33-210339	.20
19	Resistor (400 ohms, 1 watt, wire wound)	33-1211	.20
20	Condenser (0.25 mf. tubular)	30-4446	.25
21	Condenser (0.1 mf. tubular)	30-4455	.25
22	Resistor (51,000 ohms, ½ watt)	33-351, 339	.20
23	Resistor (20,000 ohms, ½ watt)	33-320, 339	.20
24	2nd I. F. transformer	32-2582	2.20
25	Condenser (110 mmf. mica)	30-1031	.20
26	Condenser (110 mmf. mica)	30-1031	.20
27	Resistor (51,000 ohms, ½ watt)	33-351,339	.20
28	Volume Control	33-5157	1.00
29	Condenser (110 mmf. mica)	30-1031	.20
30	Resistor (1.0 meg., ½ watt)	33-510, 339	
31	Condenser (0.015 mf. tubular)	30-4358	.20
32	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
33	Condenser (0.1 mf. tubular)	30-4122	.20
34	Resistor (490,000 ohms, ½ watt)	33-449, 339	.20
35	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
36	Condenser (0.015 mf. tubular)	30-4226	.20
37	Resistor (120,000 ohms, ½ watt)	33-412, 339	.20
38	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
39	Resistor (120,000 ohms, ½ watt)	33-412, 339	.20
40	Condenser (0.25 mf. tubular)	30-4449	.20
41	Output transformer	32-7019	.85
42	Cone and voice coil assembly (S16)	36-3014	1.00
	Cone and voice coil assembly (HS3)	36-3796	
43	Tone control and power switch	42-1180	
44	Condenser (0.03 mf. bakelite)	8328-SU	.35
45	Condenser (0.008 mf. tubular)	30-4317	.20
46	Condenser (electrolytic, 8 mf.)	30-2211	
47	Bias resistor	33-3284	.30
48	Field coil assembly (S16)	36-3664	
	Field coil assembly (HS3)	36-3928	
49	Condenser (0.05 mf. tubular)	30-4020	.20
50	Condenser (electrolytic, 12 mf.)	30-2210	
51	Power transformer (115 v., 50-60 cycles)	32-7583	4.50
	(115 v., 25-40 cycles)	32-7584	6.50
	(115/230 v., 50-60 cycles)	32-7585	6.50
52	Condensers (0.015 mf. dual bakelite)	3793-DG	.40
53	Pilot Lamp	34-2064	.07
	Cable (Power)	L-2778	
	Cable (Speaker)	L-2181	.25
	Dial	27-5204	.35
	Dial Hub	28-7152	.10
	Dial Clamp	28-2837	.10
	Dial Set Screws	W-1506	2.00c
	Knob (Tuning)	27-4321	.10
	Knob (Vol., Range, Tone)	27-4332	.10
	Mtg. Spacer Bushing	27-4359	.02
	Mtg. Rubber Chassis	5189	.03
	Pilot Lamp Assembly	38-7706	.35
	Screen Bracket assembly	31-1878	

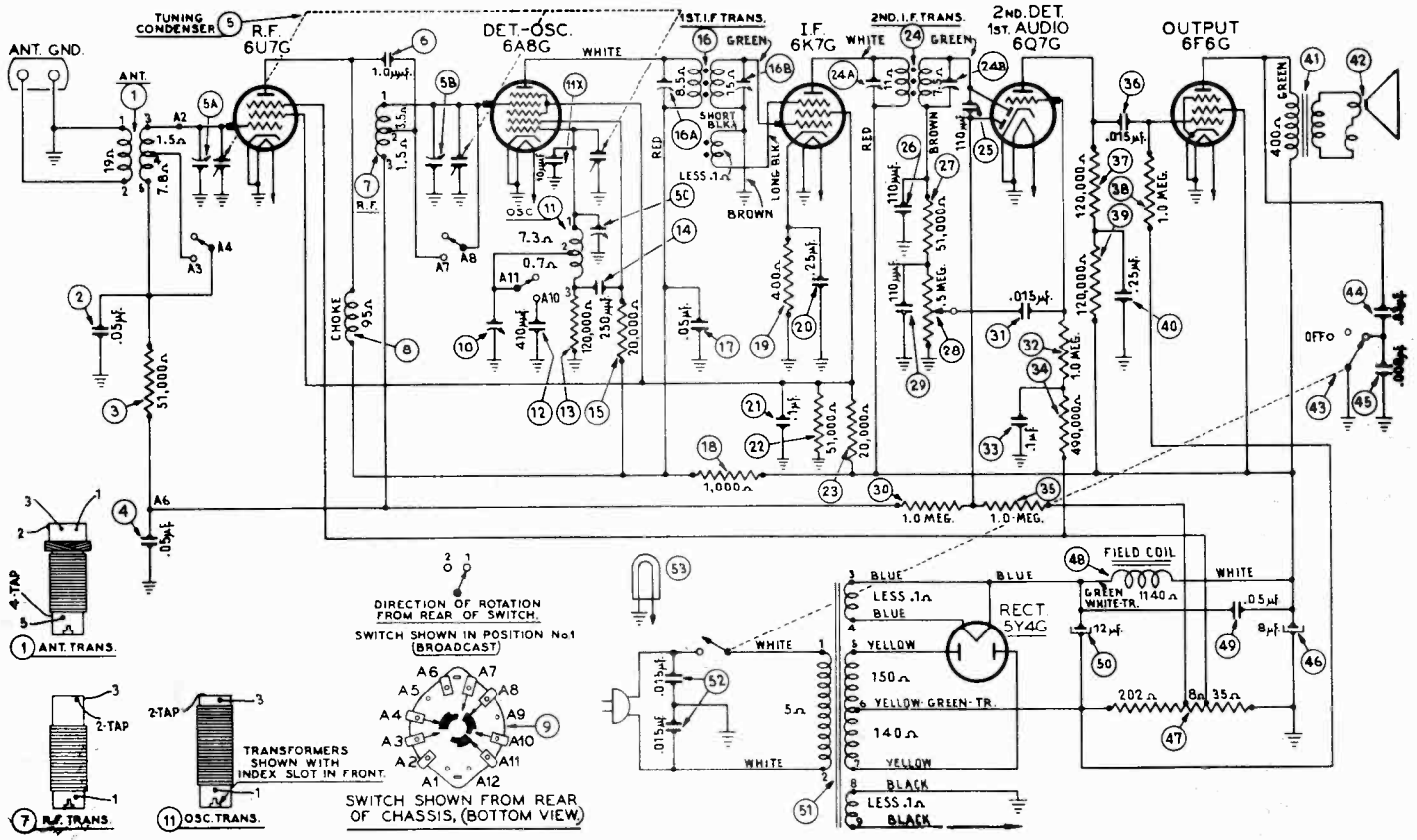


Fig. 3. Schematic Diagram Model 38-89, Code 125

Description	Part No.	List Price
Shield Tube, Round	28-5031	
Shield Tube, Square	28-2726	$0.10
Shield Base (Tube)	27-5030	.35
Shaft (Volume Control)	38-8058	.12
Socket 7 prong	27-6087	
Socket 6 prong	27-6086	
"K" CABINET		
Baffle & Silk	40-6139	
Bezel Frame & Plate	40-6130	1.00
Bezel Gasket	27-8312	.01
Bezel Glass	27-8299	.06
Bezel Ring	28-5079	
Speaker (HS3)	36-1350	
"B" CABINET		
Baffle & Silk Assembly	40-6093	
Bezel Frame & Plate Assembly	40-6117	.90
Bezel Gasket	27-8311	.01
Bezel Glass	27-8298	.05
Bezel Ring	28-5078	
Speaker (S16)	36-1225	5.75

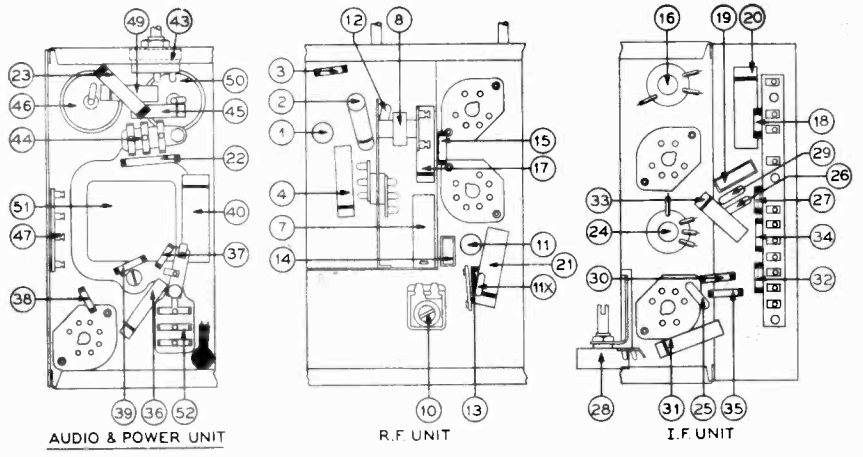


Fig. 4. Part Locations, underside of chassis.

PHILCO RADIO AND TELEVISION CORPORATION
Parts and Service Division
Philadelphia, Pa.

April, 1937 Printed in U. S. A.

B. The Philco Model 077 Station Setter is plugged in and turned on.

C. The "Band Switch" is turned to Range B, and the modulation control set to "Mod off".

Fig. 2—Tuning Handle and Wrench Engaging stop

D. The output leads of the Station Setter are plugged into the "ground" and "high" posts, and the "multiplier" and "attenuator" controls set to maximum.

E. The clip lead from the Model 077 Station Setter is then clipped to the insulation on the wire that is soldered to the middle section of the tuning condenser gang of Model 4. (See Fig. 1.) In the Model 7—the lead is clipped to the insulation on the wire that is soldered to the rear section (nearest the back of the radio) of the tuning condenser.

F. The other Station Setter lead is connected to the radio chassis.

G. The Station Setter is tuned to 470 K.C.

H. As the tuning indicator of the Station Setter approaches 470 K.C. a hiss will be heard in the radio set. As the tuning indicator passes 470 K.C. there will be two pronounced loud peaks of hiss with a minimum position in between.

I. The Model 077 Station Setter must be adjusted to the point of minimum hiss in between the two peaks.

J. Connect a Philco High Efficiency Aerial to the receiver.

III. SETTING STATION-STOPS FOR AUTOMATIC TUNING

A. As shipped by Philco the stops are closely placed together on the right side of the dial.

B. The station nearest 1500 desired on the dial scale must be aligned first. The next stop is then used for the next station lower in frequency, and so on for the rest of the stations.

C. Rotate the tuning handle to the right until it is directly over the first stop

1. Press knob in to engage stop.
2. Holding knob in this position, insert the Philco Wrench, Part No. 45-2475, in the hole of the tuning knob until it engages the stop screw head. (See Fig 2.)
3. Turn wrench counter-clockwise to loosen screw.
4. When screw is loose, rotate tuning handle until Station Finder hand is at the station to be received. Be careful to keep tuning handle and wrench engaged with the station stop, so that the stop is moved along its track to the position it is to occupy for automatically tuning the station.

D. As the Station Finder hand approaches the desired station a whistle will be heard—first very shrill and then gradually getting lower in frequency as the station is tuned in.

1. When the whistle is first heard, tune with slow-speed Station Selector knob.
2. At the exact point at which the station is perfectly tuned, this low frequency whistle will no longer be heard. This is the exact point at which the station indexing stop must be locked.
3. When this point is reached, turn the wrench clockwise and lock the stop in position, being careful when tightening screw that the station is not detuned, which would cause whistle to reappear.
4. If the whistle reappears after tightening screw, repeat the above procedure (III D).

E. The procedure given in paragraphs III C and III D is followed in setting the remaining stations.

SETTING STATIONS ON CONE-CENTRIC AUTOMATIC TUNING MODELS . . .

Using the Philco Station Setter Model 077 and Philco Wrench No. 45-2475

★

Setting up Automatic Tuning Models is a straightforward operation. In order to make sure that the correct procedure is followed, these detailed instructions have been prepared.

This work requires the use of a Philco Model 077 Station Setter and a Part No. 45-2475 Station-Stop Wrench.

★

There are three steps required in setting up Cone-Centric Automatic Tuning Models

I. Installing the special local dial.

II. Adjusting the Model 077 Station Setter to the receiver.

III. Setting the Station-Stop for each station on the dial.

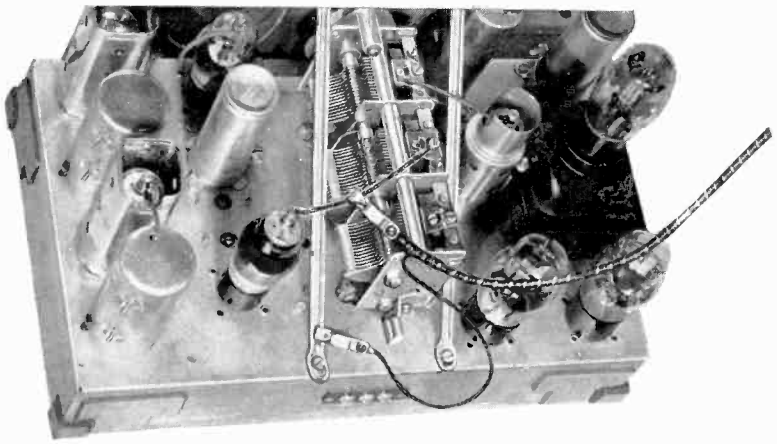


Fig. 1—Connecting Station Setter Output Lead to Wire on Tuning Condenser

I. INSTALLING THE SPECIAL LOCAL DIAL.

A. Remove the tuning knobs from the Station Selector arm. The knobs are held in position by a special knob screw which has a screw driver slot in the end. To remove the knobs, separate them and grasp the shaft with a pair of pliers. It is important that the pliers hold the shaft in between the two knobs so as not to damage the spring which disengages the slow-speed tuning knob. The knob screw can be removed while holding the shaft with pliers.

B. Remove the small screws on either side of the Station Selector knobs, and take off Station-Stop cover.

C. Press in the knurled bezel, turn counter-clockwise and remove.

D. Remove the Station Finder hand by drawing it straight out and away from the radio chassis. This hand is keyed in its correct position and is pressed on to the end of its shaft. Be sure to draw it straight away from the set. Do not turn the hand as you take it off.

E. Remove round dial-retaining spring.

F. Remove the dial furnished with the receiver.

G. Place the special local dial in position, which is fixed automatically by an index.

H. Place the round retaining spring over the dial edge.

I. Replace the finder hand and the bezel.

J. Replace knobs but not cover plate.

II. ADJUSTING THE MODEL 077 STATION SETTER TO THE RECEIVER

NOTE: The receiver and station setter must be turned on for 5 minutes before performing the following adjustments.

A. The receiver is turned on and set for operation the broadcast band. The receiver approximately 540 K.C. and the volume control set about half way on. The tone control should be in the "normal" position.

PHILCO . . . . . Model 38-116, Code 121

RADIO MANUFACTURERS SERVICE — Your Guarantee of Best Radio Service — A PHILCO SERVICE PLAN

SERVICE BULLETIN No. 286 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

SPECIFICATIONS

TYPE OF CIRCUIT: Model 38-116, code 121 employs a fifteen tube A.C. operated superheterodyne circuit with a spread-band 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; treble-selectivity expander unit in the intermediate frequency circuit; audio bass compensation; acoustic clarifiers to eliminate cabinet resonance; special push-pull audio output circuit using 6L6G beam tubes, and the **Philco** automatic tuning mechanism.

POWER SUPPLY:	Voltage	Frequency Cycles	Power Consumption
	115	50 to 60	165 watts
	115	25 to 40	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: 6K7G R.F.; 6L7G Mixer; 6A8G Oscillator; 6N7G Oscillator control; two 6K7G I. F.; 6K7G 2nd Detector 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 "W4" 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.

Range switch lugs are marked with a letter and number—example (A2)—indicating the connecting point in the circuit diagram.

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

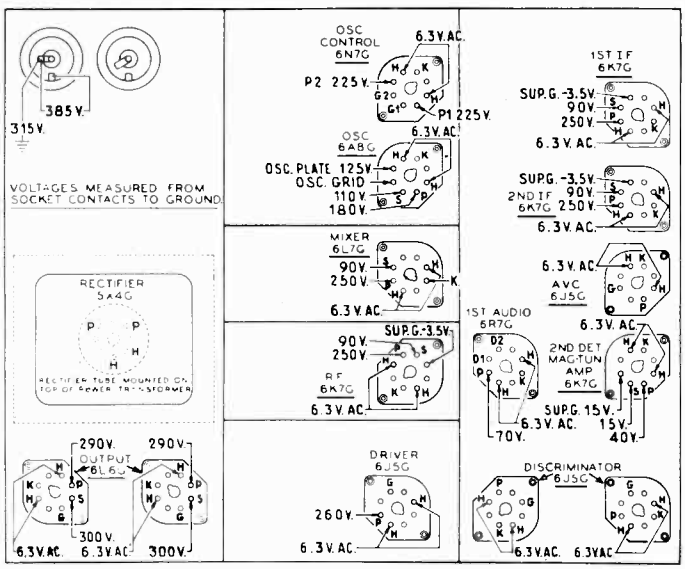


Fig. 1. Underside View of Chassis showing Socket Voltages

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.

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** supplied with the instrument must 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.

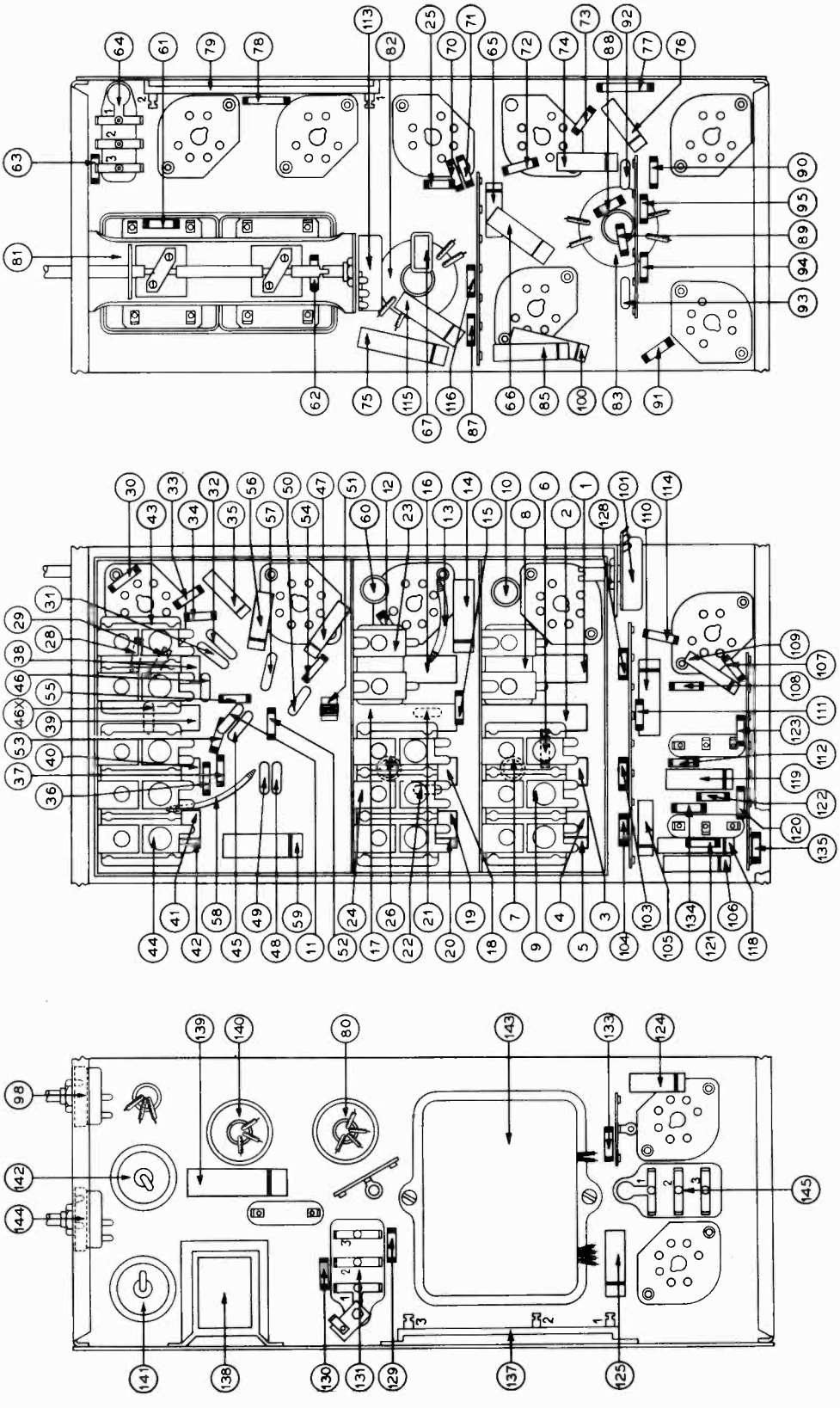


Fig. 2. Underside View of Chassis

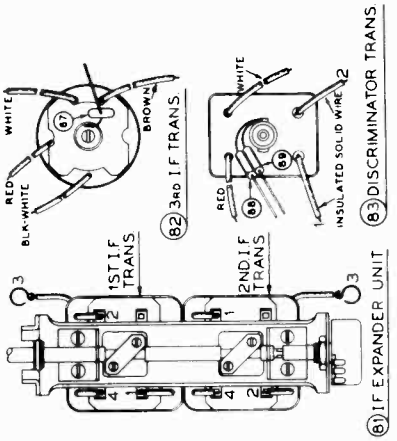


Fig. 4. I. F. Transformer Connections

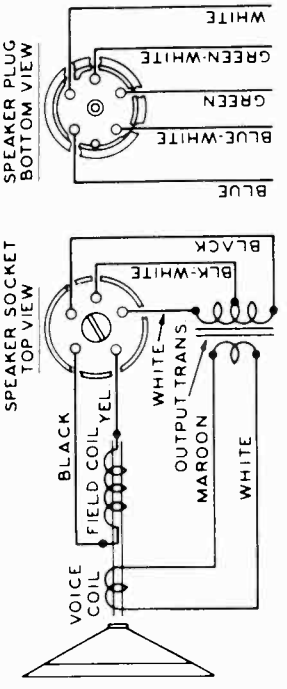


Fig. 3. Speaker Wiring

REPLACEMENT PARTS—Models 38-116, Code 121

Schem. No.	Description	Part No.	List Price
1	Ant. Trans. (Range 1)	32-3208	
2	Ant. Trans. (Range 2)	32-2146	$1.20
3	Ant. Trans. (Range 3)	32-2183	1.20
4	Ant. Trans. (Range 4)	32-2185	1.20
5	Ant. Trans. (Range 5)	32-2175	1.20
6	Resistor (51,000—½ watt)	33-351339	.20
7	Condenser (0.5 mf. tubular)	30-4444	.20
8	Compensator (Range 1 & 2 Ant.)	31-6093	.40
9	Compensator (3, 4 & 5 Ant.)	31-6112	1.40
10	Condenser (.05 mf. tubular)	30-4123	.20
11	Condenser (600 mmf. mica)	30-1049	.25
12	Resistor (1 meg. ½ watt)	33-510339	.20
13	Resistor (400 ohms 1 watt wire wound)	33-1211	.20
14	Condenser (.05 mf. tubular)	30-4444	.20
15	Resistor (10,000 ohms ½ watt)	33 310339	.20
16	R. F. Trans. (Range 1)	32-2105	1.00
17	R. F. Trans. (Range 2)	32-2147	.70
18	R. F. Trans. (Range 3)	32-2177	.70
19	R. F. Trans. (Range 4)	32-2178	.70
20	R. F. Trans. (Range 5)	32-2176	1.20
21	Condenser (5 mmf. mica)	30-1077	.20
22	Condenser (40 mmf. mica)	30-1076	.20
23	Compensator (R. F. Range 1 & 2 R. F.)	31-6093	.40
24	Compensator (R. F. Range 3, 4, 5)	31-6113	1.40
25	Resistor (51,000 ½ watt)	33-351339	.20
26	Condenser (.05 mf. tubular)	30-4519	.20
27	Tuning Condenser	31-1892	3.75
28	Resistor (20 ohms, ½ watt)	33-020339	.20
29	Resistor (20 ohms, ½ watt)	33-020339	.20
30	Resistor (700 ohms, ½ watt)	33-170339	.20
31	Condenser (250 mmf. mica)	30-1032	.25
32	Condenser (250 mmf. mica)	30-1032	.25
33	Resistor (99,000 ohms, ½ watt)	33-399339	.20
34	Resistor (99,000 ohms, ½ watt)	33-399339	.20
35	Condenser (.02 mf. tubular)	30-4481	.20
36	Resistor (8,000 ohms, ½ watt)	33-280339	.20
37	Resistor (20,000, ½ watt)	33-320339	.20
38	Osc. Trans. (Range 1)	32-2191	1.00
39	Osc. Trans. (Range 2)	32-2194	1.00
40	Osc. Trans. (Range 3)	32-2197	.70
41	Osc. Trans. (Range 4)	32-2198	.70
42	Osc. Trans. (Range 5)	32-2199	.70
43	Compensator (Range 1 & 2 Osc.)	31-6124	1.00
44	Compensator (Range 3, 4 & 5 Osc.)	31-6117	1.20
45	Condenser (250 mmf. mica)	30-1032	.25
46	Condenser (600 mmf. mica)	30-1049	.25
46X	Condenser (600 mmf. mica)	30-1049	.25
47	Condenser (.01 mf. tubular)	30-4169	.20
48	Condenser (25 mmf. mica)	30-1067	.20
49	Condenser (55 mmf. mica)	30-1045	.20
50	Condenser (200 mmf. mica)	30-1078	.25
51	Choke (R. F.)	32-2242	.30
52	Resistor (75,000 ½ watt)	33-375339	.20
53	Resistor (20,000 ½ watt)	33-320339	.20
54	Resistor (32,000 ½ watt)	33-332339	.20
55	Resistor (10,000 ½ watt)	33-310339	$0.20
56	Condenser (.02 mf. tubular)	30-4481	.20
57	Resistor (10 ohms wire wound)	33-1219	.20
58	Resistor (300 ohms, wire wound)	33-3121	.25
59	Condenser (.05 mf. tubular)	30-4123	.20
60	Condenser (.05 mf. tubular)	30-4123	.20
61	Resistor (1000 ohms, ½ watt)	33-210339	.20
62	Resistor (1000 ohms, ½ watt)	33-210339	.20
63	Resistor (500 ohms, ½ watt)	33-150339	.20
64	Condenser (.1 mf. Bakelite)	4989SG	.35
65	Condenser (.01 mf. tubular)	30-4514	.20
66	Condenser (.01 mf. tubular)	30-4499	.20
67	Condenser (110 mmf. mica)	30-1031	.20
68	Condenser (110 mmf., Part of 82)	30-1031	
69	Resistor (51,000 ohms, ½ watt, Part of 82)	33-351339	.20
70	Resistor (1 meg., ½ watt)	33-510339	.20
71	Resistor (1 meg., ½ watt)	33-510339	.20
72	Resistor (2000 ohms, ½ watt)	33-220339	.20
73	Resistor (2000 ohms, ½ watt)	33-220339	.20
74	Condenser (.05 mf. tubular)	30-4444	.20
75	Condenser (.05 mf. tubular)	30-4518	.20
76	Condenser (.05 mf. tubular)	30-4444	.20
77	Resistor (6,000 1 watt)	33-260439	.20
78	Resistor (70,000 1 watt)	33-370439	.20
79	Resistor (14,000 wire wound)	33-3291	.40
80	Condenser (Elec. 8—8—6 mf.)	30-2232	2.50
‡81	I. F. Expander Unit (For 1st and 2nd I. F. Trans. See Note)	38-8912	10.00
82	I. F. Transformer (3rd)	32-2660	
83	Discriminator Trans.	32-2661	
84	110 mf. Condenser (Part of 83)	30-1031	.20
85	Condenser (.004 mf.)	30-4456	.20
86	Condenser (Part of 82)		
87	Resistor (160,000 ohm, ½ watt)	33-416339	.20
88	Resistor (2 meg., ½ watt)	33-520339	.20
89	Resistor (2 meg., ½ watt)	33-520339	.20
90	Resistor (1 meg., ½ watt)	33-510339	.20
91	Resistor (1 meg., ½ watt)	33-510339	.20
92	Condenser (110 mmf. mica)	30-1031	.20
93	Condenser (110 mmf. mica)	30-1031	.20
94	Resistor (490,000 ohms, ½ watt)	33-449339	.20
95	Resistor (490,000 ohms, ½ watt)	33-449339	.20
96	Condenser (.1—.1—.7 mf.)	30-4466	1.40
97	A.F.C. Shorting Switch	42-1216	.75
98	Flood Lights	34-2064	.09
99	A.F.C. Shorting Switch (Part of Mech. Tuner)	45-2330	1.20
100	Condenser (.01 mf. tubular)	30-4169	.20
101	Volume Control	33-5158	1.00
102	Audio Shorting Switch (Part of Mech. Tuner—See parts (6) and (16) Bulletin 273)		
103	Resistor (70,000 ohms, ½ watt)	33-370339	.20
104	Resistor (2 meg., ½ watt)	33-520339	.20
105	Condenser (.008 mf. tubular)	30-4112	.20
106	Condenser (.008 mf. tubular)	30-4112	.20
107	Resistor (490,000 ohms, ½ watt)	33-449339	.20
108	Resistor (32,000 ohms, ½ watt)	33-332339	.20
109	Condenser (.004 mf. tubular)	30-4456	.25
110	Condenser (.01 mf. tubular)	30-4455	.20
111	Resistor (51,000 ohms, ½ watt)	33-351339	.20
112	Resistor (99,000 ½ watt)	33-399339	.20
113	Potentiometer	33-5235	
114	Resistor (330,000 ohms, ½ watt)	33-433339	.20
115	Condenser (.02 mf. tubular)	30-4481	.20
116	Resistor (1 meg., ½ watt)	33-510339	.20
117	Input Trans.	32-7865	
118	Condenser (.05 mf. tubular)	30-4518	.20
119	Condenser (.05 mf. tubular)	30-4518	.20
120	Resistor (99,000 ½ watt)	33-399339	.20
121	Resistor (10,000 ½ watt)	33-310339	.20
122	Resistor (10,000 ½ watt)	33-310339	.20
123	Resistor (99,000 ½ watt)	33-399339	.20
124	Condenser (.02 mf. tubular)	30-4481	.20
125	Condenser (.02 mf. tubular)	30-4189	.35
126	Output Trans.	32-7751	2.00
127	Cone and Voice Coil Assembly	36-3647	2.50
128	Resistor (490,000 ½ watt)	33 449339	.20
129	Resistor (51,000 ½ watt)	33 351339	.20
130	Resistor (25,000 ½ watt)	33 325339	.20
131	Condenser (.1—.1 mf. Bakelite)	4899DG	.40
132	Field Coil Assembly	36-3788	15.00
133	Resistor (20 ohms, ½ watt)	33-020339	.20
134	Resistor (3,000 ohms, ½ watt)	33-230339	.20
135	Resistor (2,000 ohms, ½ watt)	33-220339	.20
136	Choke (85 ohm)	32-7056	2.20
137	Resistor (4,000 — 1,000 ohms, wire wound)	33-3289	.50
138	Choke (400 ohm)	32-7722	1.20
139	Condenser (.3 mf. tubular)	30-4465	.25
140	Condenser Elec. (8—10 mf.)	30-2201	1.75
141	Elec. Cond. (8 mf.)	30-2026	1.05
142	Elec. Cond. (8 mf.)	30-2026	1.05
143	Power Transformer (115 V., 50 to 60 cycle)	32-7699	7.50
	Power Transformer (115 V., 25 to 40 cycle)	32-7700	
	Power Transformer (115/220 V., 50 to 60 cycle)	32-7701	
144	Power and Tone Switch	42-1196	$0.75
145	Condenser (.015—.015 Bakelite)	3793DG	.40
146	Range Switch (Osc.)	42-1217	2.00
147	Range Switch (R. F.)	42-1255	1.60
148	Range Switch (Ant.)	42-1211	1.60
149	Pilot Lamp	34-2064	
	Acoustic Clarifier	36-1155	1.25
	Automatic Tuning Mech. Complete	31-2063	
	Bezel Assembly (Cabinet)	38-8833	
	Bezel Gasket	27-8828	.08
	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)	27-8411	.04
	Coupling (Range Switch and Mask)	38-8693	
	Coupling (Tuning Condenser and Dial Mechanism)	31-1961	
	*Cover (Handle of Automatic Mech.)	28-5092	
	*Dial	27-5340	.80
	*Dial Screen Holder	31-2053	
	*Escutcheon Assembly (Station Tabs)	45-2472	
	†Floodlight Socket Assembly, 4 Sockets	38-8210	
	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	38-8051	
	Shaft and Index Plate (Range Switch)	42-1208	.50
	Shaft (I. F. Expander)	28-6496	.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 (W4)	36-1284	
	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	
Screws (Back Cover, Cabinet)	W-1803	
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

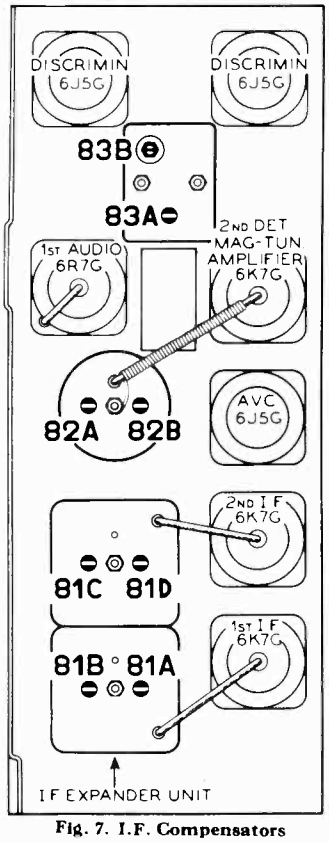


Fig. 7. I.F. Compensators

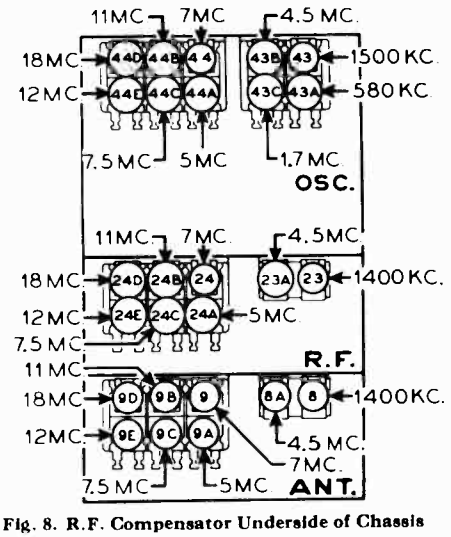


Fig. 8. R.F. Compensator Underside of Chassis

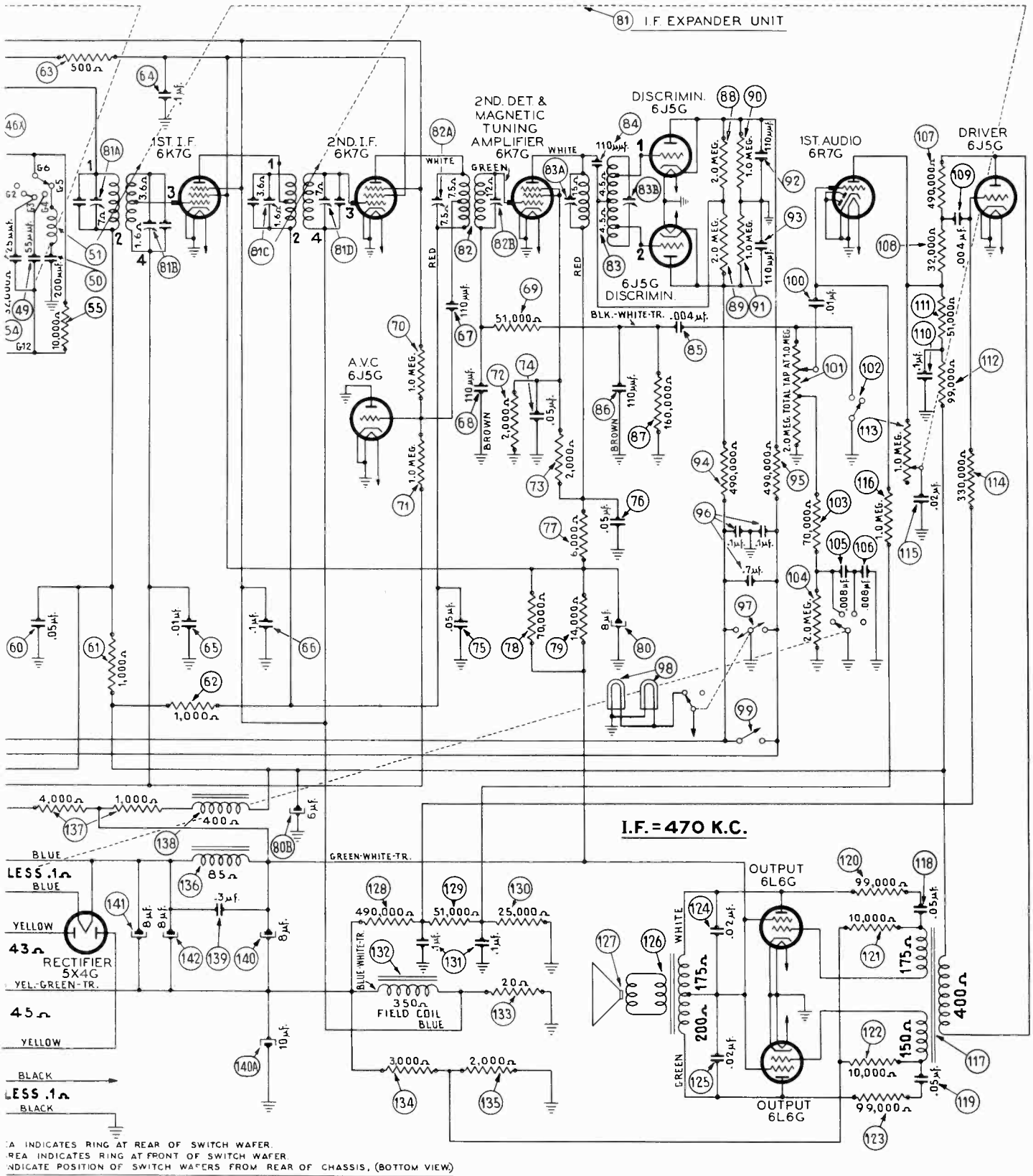
*These Automatic Tuning Mechanism Parts differ from those shown in Service Bulletin 273.

‡1st I. F. Transformer Section 32-2727

2nd I. F. Transformer Section 32-2728

†Pilot and Floodlight Socket Assembly, 3 Sockets. Used on later type receivers 38-8487

Prices Subject to Change without Notice


81 I.F. EXPANDER UNIT
1ST I.F. 6K7G
2ND. I.F. 6K7G
2ND. DET & MAGNETIC TUNING AMPLIFIER 6K7G
DISCRIMIN. 6J5G
6J5G DISCRIMIN.
1ST AUDIO 6R7G
DRIVER 6J5G
A.V.C. 6J5G
I.F. = 470 K.C.
OUTPUT 6L6G
OUTPUT 6L6G
RECTIFIER 5X4G
350Ω FIELD COIL BLUE
BLK.-WHITE-TR. .004μf.
GREEN-WHITE-TR.
BLUE WHITE-TR.
YEL.-GREEN-TR.
WHITE
GREEN
BROWN
RED
BLUE
YELLOW
BLACK
A INDICATES RING AT REAR OF SWITCH WAFER.
REA INDICATES RING AT FRONT OF SWITCH WAFER.
NDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS, (BOTTOM VIEW)

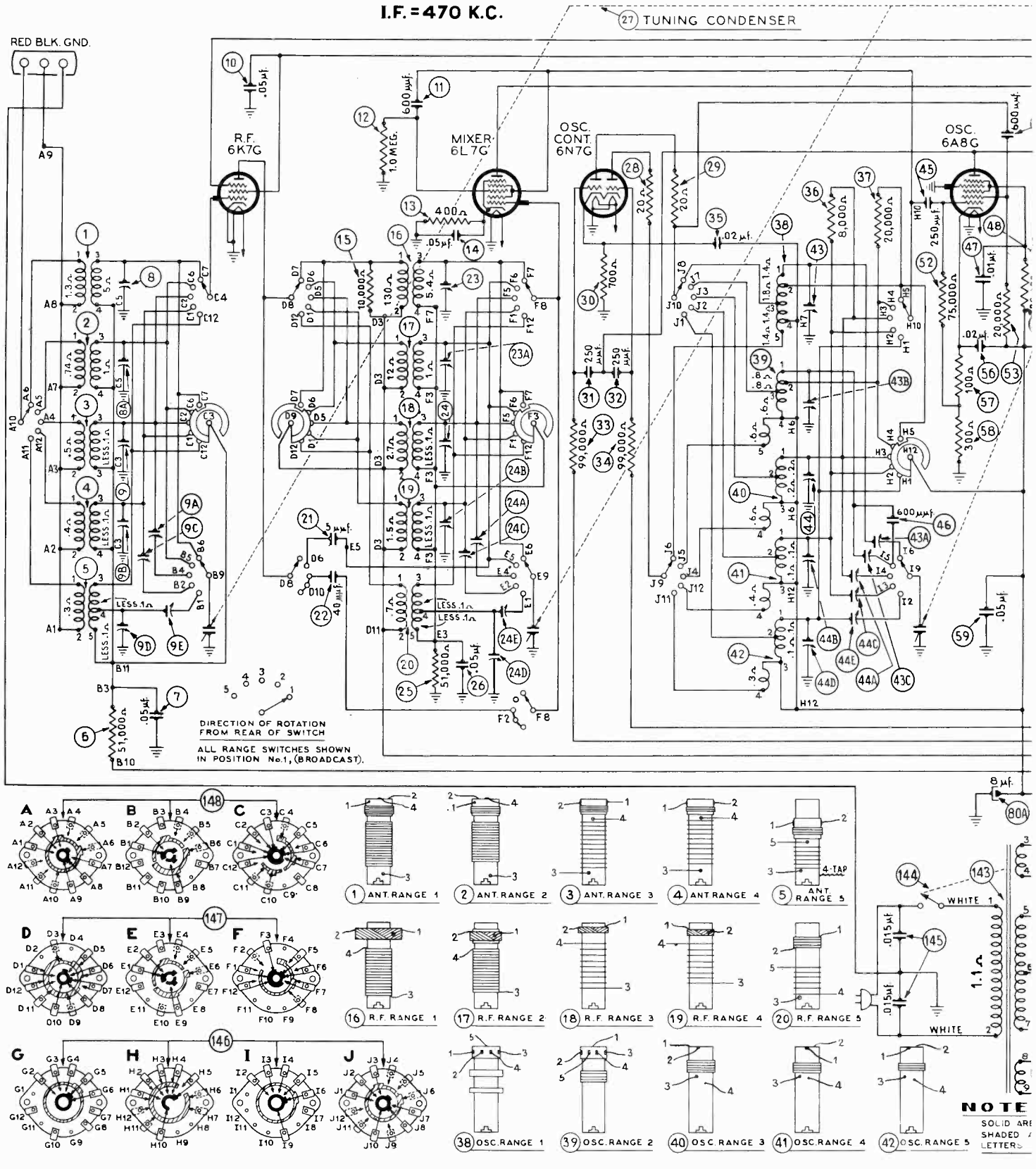


Fig. 5. Schematic Diagra

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 the broadcast band. See Fig. 0. With dial and tuning condenser in this position tighten set screws.
2. Turn the tuning condenser control until the indicator is on the 520 K.C. mark. See Fig. 6.
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.

NOTE: 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.

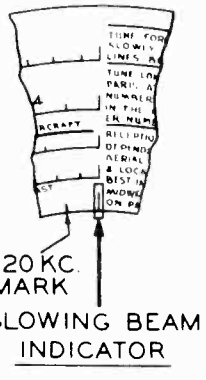


Fig. 6. Dial Calibration

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:

a. Close compensator (**82B**) by turning to the extreme clockwise position, then pad compensator (**82A**) for maximum output. Now readjust compensator (**82B**) for maximum output.

b. Connect the Signal Generator output lead through the **.1** mfd. condenser to the grid of the 6L7G tube, and adjust the following compensators for maximum output: (**81D**), (**81C**), (**81A**), (**81B**).

c. Repad (**82A**)—See **Note A.** Check for two equal peaks. Fidelity control in expanded position (counter-clockwise).

RADIO FREQUENCY CIRCUIT

1. 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 under the adjustments of each tuning range in the following procedure.

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.

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

Tuning Ranges 530 to 1600 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 1	1500 K. C.	(43), (8), (23)
Position 1	580 K. C.	(43A) Roll Tuning Condenser. See Note B
Position 1	1500 K. C.	(43)
Position 1	1400 K. C.	(8), (23)

Tuning Range 4.7 to 7.4 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 3	7.0 M. C.	(44)
Position 3	5.0 M. C.	(44A)
Position 3	7.0 M. C.	(44), (9), (24)
Position 3	5.0 M. C.	(44A), (9A), (24A)
Position 3	7.0 M. C.	(44), (9), (24)

Tuning Range 7.35 to 11.6 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 4	11.0 M. C.	(44B)
Position 4	7.5 M. C.	(44C)
Position 4	11.0 M. C.	(44B), (9B), (24B) Roll Tuning Condenser. See Note B
Position 4	7.5 M. C.	(44C), (9C), (24C)
Position 4	11.0 M. C.	(44B), (9B), (24B) Roll Tuning Condenser. See Note B

Tuning Range 1.58 to 4.75 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 2	4.5 M. C.	(43B), (8A), (23A)
Position 2	1.7 M. C.	(43C)
Position 2	4.5 M. C.	(43B), (8A), (23A)

Tuning Range 11.5 to 18.2 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 5	18.0 M. C.	(44D)
Position 5	12.0 M. C.	(44E)
Position 5	18.0 M. C.	(44D), (9D), (24D) Roll Tuning Condenser. See Note B and C. Check image at 17.060 M. C.
Position 5	12.0 M. C.	(44E), (9E), (24E) Roll Tuning Condenser. See Note B
Position 5	18.0 M. C.	(44D), (9D), (24D), Roll Tuning Condenser. See Note B and C. Check image at 17.060 M. C.

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 (82A) must be slightly readjusted to the right or left (not more than ⅛ of a turn) until the peaks are equalized. This adjustment is used to compensate for slight differences between peaks. If the compensator must be turned more than ⅛ of a turn in either direction to equalize the peaks, all padders should be carefully readjusted as given under "Intermediate Frequency Circuit" adjustment procedure. 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.

NOTE "B"—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; 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. 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 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 any 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 expanded position (extreme clockwise).

d. Now, adjust the "Attenuator" control of the signal generator for a weak signal, and turn the indicator to 1000 K. C. 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 (**83B**) slightly to the right or left (about ¼ turn) and proceed with adjustment "g."

g. Adjust compensator (**83A**) primary of the discriminator transformer for **minimum** output; then readjust compensator (**83B**) 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.

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 1500 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 (**83A**) should be carefully readjusted.

LIST PRICES

for Items in

PHILCO "COMPLETE REPLACEMENT PARTS CHART"

Part Number	List Price	Part Number	List Price	Part Number	List Price	Part Number	List Price	Part Number	List Price	Part Number	List Price	Part Number	List Price	Part Number	List Price
2515	$1.75	4567	$0.09	03014	$0.50	05831	$0.50	30–2046	$1.85	32–1000	$0.50	32–1413	$0.60	33–5004	$1.45
2550	1.75	4813	8.00	03015	.60	05832	.80	30–2062	2.60	32–1001	.80	32–1414	1.00	33–5005	1.45
2565	1.80	4818	1.80	03016	.60	05848	.65	30–2072	2.50	32–1002	.80	32–1415	1.00	33–5006	1.45
2580	1.25	4819	1.80	03031	.75	05849	.55	30–2073	3.15	32–1023	1.05	32–1420	.60	33–5007	1.00
2585	1.55	4824	.85	03038	.90	05885	4.80	30–2078	2.45	32–1030	.60	32–1421	.45	33–5009	1.70
2590	2.25	4858A	.90	03039	1.00	05901	.90	30–2079	2.40	32–1047	.65	32–1422	.90	33–5010	1.45
2598	1.40	4860	5.10	03040	.90	05902	.60	30–2080	1.85	32–1048	.75	32–1423	.45	33–5011	1.45
2706	2.00	4862	2.50	03076	6.00	05903	.55	30–2083	1.70	32–1049	.60	32–1424	1.60	33–5017	1.00
3047	.10	4916	1.50	03082	.75	05970	1.00	30–4000	1.20	32–1050	.60	32–1427	.90	33–5022	1.45
3073	7.75	4938	8.00	03083	.65	05975	.80	30–4003	.75	32–1062	.70	32–1428	.70	33–5023	1.45
3075A	1.20	4952	2.75	03084	.60	05982	5.10	30–4004	.75	32–1063	.50	32–1449	1.40	33–5024	1.45
3075B	1.20	4953	.70	03091	.90	05983	.75	30–4008	.50	32–1069	.75	32–1462	1.10	33–5025	1.45
3076	1.40	5039	1.80	03092	1.00	05984	.55	30–4013	.80	32–1070	.50	32–1463	1.10	33–5055	1.45
3088W	2.00	5117	6.50	03143	1.20	05985	.50	30–4023	1.20	32–1085	.45	32–1467	2.50	33–5056	1.70
3117	.75	5125	.75	03283	.90	05986	5.00	30–4026	3.60	32–1086	.65	32–1468	2.30	33–5057	1.45
3232	1.95	5232	1.80	03284	.90	05987	.75	30–4043	.75	32–1087	.65	32–1469	2.40	33–5063	1.00
3241	2.75	5266	4.25	03293	5.40	05988	.65	30–4056	.75	32–1115	.80	32–1470	1.00	33–5064	1.45
3242	2.75	5314	2.10	03320	.90	05989	.45	30–4063	.85	32–1116	.90	32–1471	1.40	33–5066	1.45
3246	17.00	5315	2.25	03321	.60	05992	.45	30–4069	.75	32–1117	1.50	32–1481	.75	33–5067	1.70
3253	.45	5316	.23	03322	.60	06088	1.50	30–4070	.75	32–1118	1.20	32–1482	1.00	33–5068	1.45
3269	4.25	5317	1.80	03327	1.20	06100	1.50	30–4073	.75	32–1120	1.10	32–1483	1.15	33–5069	1.00
3271	8.00	5318	1.20	03345	.90	06144	5.00	30–4080	.50	32–1143	1.10	32–1484	1.30	33–5071	1.50
3376D	12.00	5362	6.25	03360	.65	06146	.45	30–4127	.75	32–1144	1.00	32–1504	.70	33–5087	1.00
3376E	12.00	5365	.50	03459	1.50	06358	.40	30–4140	.80	32–1145	1.00	32–1518	.60	34–2031	.12
3398	.10	5382	.45	03489	2.10	06359	5.00	30–4142	.75	32–1152	.50	32–1519	.60	34–2038	.13
3399	1.50	5594	7.00	03751	3.60	06404	1.50	30–4151	1.00	32–1153	.60	32–7001	.80	34–2039	.15
3400	8.00	5643	1.80	03809	5.40	06523	5.50	30–4152	.50	32–1155	1.20	32–7005	1.40	34–2040	.14
3401	14.00	5662	3.25	03880	.90	06574	.60	30–4168	.75	32–1168	.85	32–7018	1.50	36–3029	.60
3422	3.00	5724	1.00	03881	.90	06577	4.80	30–4178	.75	32–1170	.85	32–7019	1.25	36–3039	2.75
3463	.09	5796	1.50	03882	1.05	06581	5.60	30–4180	.75	32–1171	.85	32–7020	.80	36–3040	2.40
3472	4.25	5930	1.75	03886	1.20	06609	5.10	30–4186	.75	32–1172	.90	32–7026	1.25	36–3046	2.00
3480B	10.80	6008	.50	03887	1.50	06619	.55	30–4189	.75	32–1173	.90	32–7030	2.25	36–3058	.32
3501	.55	6015	1.00	03890	.60	06620	.90	30–4192	.75	32–1174	.75	32–7036	.90	36–3061	1.40
3506A	1.50	6064	2.25	03915	1.30	06621	.60	30–4196	.75	32–1182	.55	32–7038	1.15	36–3074	8.75
3506B	1.10	6071	.50	04031	.45	06622	1.20	30–4204	.75	32–1183	.50	32–7039	1.75	36–3081	1.75
3512	1.50	6072	5.85	04164	6.00	06624	.90	30–4208	.85	32–1184	.35	32–7041	.95	36–3088	8.00
3515	13.50	6109	1.80	04185	.60	06662	.55	30–4211	.75	32–1185	.60	32–7042	.95	36–3104	2.70
3516	9.00	6128	1.20	04186	1.20	06665	.85	30–4212	.50	32–1186	.65	32–7046	3.60	36–3130	2.70
3517	.70	6129	1.20	04190	.50	06697	.55	30–4220	.80	32–1188	.65	32–7051	1.50	36–3140	3.50
3518	3.30	6415	1.00	04308	6.30	06698	.75	31–1000	2.10	32–1195	.90	32–7052	2.00	36–3157	.80
3528	1.20	6438	1.50	04309	6.00	06702	4.80	31–1004	4.80	32–1197	.75	32–7056	2.20	36–3159	.80
3537	3.15	6451	.30	04317	.80	06764	.50	31–1006	2.35	32–1198	.55	32–7057	2.75	36–3162	8.00
3744A	1.50	6452	.20	04319	.90	06766	.50	31–1010	4.75	32–1208	.50	32–7058	6.25	36–3218	3.50
3744B	1.20	6453	1.50	04320	.90	06817	.35	31–1011	5.00	32–1209	.75	32–7064	3.15	36–3238	.80
3744C	1.80	6454	3.75	04339	.90	06887	1.10	31–1013	4.75	32–1220	.50	32–7078	1.40	36–3239	3.75
3752	9.00	6457	5.00	04348	.90	06888	.40	31–1014	4.75	32–1221	.65	32–7080	5.40	36–3243	1.70
3754	7.50	6498	.45	04352	1.35	06916	.95	31–1015	5.00	32–1222	.45	32–7098	2.40	36–3245	4.00
3762	1.15	6499	1.00	04353	1.35	27–5006	.30	31–1017	2.40	32–1236	1.40	32–7102	1.50	36–3298	3.00
3763	.35	6554	5.20	04354	1.30	27–5022	.30	31–1019	3.60	32–1237	1.40	32–7104	1.15	36–3306	2.85
3764	.25	6557	6.00	04357	.75	27–5027	.30	31–1031	3.60	32–1251	1.05	32–7110	2.70	36–3321	1.75
3775B	.85	6582	2.15	04407	1.20	27–5034	.25	31–1032	.35	32–1252	1.05	32–7111	5.75	36–3325	2.80
3790	1.55	6608	.09	04408	1.20	27–5038	.30	31–1034	2.10	32–1255	.55	32–7114	2.00	36–3341	2.75
3794	.20	6658	1.50	04409	.80	27–5040	.30	31–1041	4.50	32–1256	.55	32–7115	1.80	36–3352	4.00
3864	.75	6672	5.85	04508	1.20	27–5041	.30	31–1048	4.50	32–1257	.60	32–7118	2.00	36–3357	3.50
3865	1.20	6700	.25	04509	.60	28–8006	1.20	31–1049	2.10	32–1258	.55	32–7131	2.50	38–5280	1.70
3868	9.00	6702	.50	04559	1.20	28–8007	1.20	31–1058	1.20	32–1261	.70	32–7137	3.85	38–5511	1.70
3870	7.50	6706	1.55	04733	5.10	28–8100	.65	31–1059	5.00	32–1262	.65	32–7170	4.50	38–5534	1.80
3872	3.00	6707	1.55	04757	.50	28–8103	.65	31–1076	2.70	32–1263	.65	32–7178	1.60	38–5606	1.70
3879	1.00	6712	1.50	04787	.75	28–8139	1.10	31–1077	.....	32–1264	.65	32–7180	3.60	38–5851	1.70
3884A	.90	6716	.20	04790	5.10	28–8141	1.10	31–1078	6.00	32–1270	.55	32–7205	1.40	38–5935	1.70
3884B	.65	6804	5.50	04830	.90	28–8169	1.20	31–1083	4.50	32–1271	.70	32–7206	1.80	42–1001	.60
3884C	1.00	6807	.40	04832	.45	28–8170	1.20	31–1089	2.30	32–1272	.70	32–7211	2.35	42–1002	1.00
3884N	.90	6808	.25	04887	1.40	28–8172	1.35	31–1099	4.75	32–1273	.35	32–7213	1.60	42–1017	1.00
3884P	1.05	6892	1.45	04941	6.60	28–8181	1.10	31–1100	4.75	32–1274	.55	32–7214	1.00	42–1019	.85
3884S	.80	6895	3.00	04959	.90	28–8182	1.10	31–1103	5.00	32–1288	.55	32–7215	.90	42–1027	.55
3884T	.55	7050	1.00	04979	.55	28–8188	.80	31–1104	5.85	32–1289	.60	32–7216	2.60	42–1030	1.00
3884U	.90	7074	4.50	04981	.55	28–8198	.95	31–1106	5.30	32–1304	.65	32–7218	4.95	42–1031	1.10
3884V	1.00	7233	1.80	04982	.40	28–8201	2.40	31–1110	4.50	32–1305	.55	32–7223	1.50	42–1035	.80
3884X	.80	7239	1.80	04983	.50	28–8202	2.40	31–1115	1.20	32–1306	.90	32–7226	4.25	42–1037	3.20
3884Y	.65	7283	1.50	05003	4.20	28–8206	1.10	31–1122	4.00	32–1307	.80	32–7229	5.25	42–1039	.45
4000B	12.00	7322	1.80	05033	.65	28–8214	.95	31–1126	6.50	32–1310	.40	32–7232	2.40	42–1040	.65
4000D	9.00	7421	3.00	05093	.45	28–8218	2.25	31–1149	5.50	32–1311	.40	32–7233	1.00	42–1043	.30
4000G	12.00	7464	1.35	05094	.60	28–8219	2.25	31–1153	6.25	32–1313	1.05	32–7234	4.75	42–1045	3.60
4056	1.00	7465	.15	05095	.60	28–8226	1.00	31–1164	5.50	32–1315	.55	32–7243	1.10	42–1046	.80
4057	.95	7467	1.05	05098	5.10	28–8227	1.00	31–1166	5.00	32–1329	1.40	32–7245	1.20	42–1062	1.10
4067	6.60	7525	1.80	05102	.65	28–8234	.80	31–1169	4.40	32–1331	.60	32–7247	2.10	42–1064	.40
4069E	12.00	7557	1.25	05153	.50	28–8241	.80	31–1173	6.25	32–1332	.70	32–7253	2.50	42–1066	.90
4093	1.40	7558	1.25	05154	4.80	28–8242	.80	31–1175	7.25	32–1333	.45	32–7254	1.00	42–1079	3.50
4094	1.80	7652	1.80	05174	.50	30–2000	1.20	31–1182	5.50	32–1341	1.35	32–7256	1.80	42–1083	2.00
4095	.50	7852	.25	05184	1.45	30–2001	1.25	31–1190	2.75	32–1342	1.35	32–7258	7.25	42–5122	.50
4118	.40	7998	.20	05185	.65	30–2002	1.30	31–1192	4.50	32–1360	.60	32–7275	1.85	42–5123	.35
4141	1.80	8046	3.45	05189	.60	30–2003	.95	31–1196	6.00	32–1361	.65	32–7283	7.00	42–5124	.50
4182A	.75	8054	1.50	05239	1.20	30–2007	.90	31–1199	5.50	32–1362	1.50	32–7291	7.00	42–5125	1.40
4182B	1.20	8095	1.30	05324	1.20	30–2008	1.80	31–1202	6.25	32–1363	1.50	33–1120	.35	42–5130	.50
4209B	.50	8166	1.05	05366	.75	30–2011	1.40	31–1205	.50	32–1364	1.55	33–1125	.35	42–5133	
4230	1.00	8255	.30	05418	.65	30–2013	1.95	31–1206	1.25	32–1369	1.50	33–3012	.30	42–5166	
4231	1.80	02625	1.20	05569	1.20	30–2014	1.50	31–1208	.45	32–1378	1.00	33–3021	.20	42–5173	
4232	2.25	02741	2.70	05624	3.90	30–2015	2.00	31–1214	5.25	32–1379	.70	33–3033	.30	42–517	
4234	7.75	02745	4.25	05697	1.20	30–2020	1.10	31–1217	8.25	32–1380	.70	33–3034	.20	42	
4235	4.50	02767	2.70	05698	.90	30–2021	1.15	31–1231	3.65	32–1381	1.50	33–3037	.20		
4276	.25	02794	4.80	05726	.65	30–2023	1.10	31–1255	.60	32–1388	.45	33–3062	.55		
4372A	6.60	02795	2.70	05727	.55	30–2024	1.10	31–1334	6.85	32–1389	.40	33–3069	.25		
4401A	1.00	02803	2.70	05728	.80	30–2025	1.35	31–1340	6.25	32–1396	.60	33–3128	.2		
4401B	.75	02861	.65	05740	5.10	30–2026	1.20	31–1350	6.50	32–1397	.50	33–3137			
4446	9.00	02996	.90	05794	3.00	30–2028	2.15	31–1366	5.70	32–1398	.45	33–3159			
4461	.45	03001	7.50	05811	.40	30–2029	1.85	31–1379	8.25	32–1403	1.25	33–5000			
4463	1.80	03009	1.05	05828	.25	30–2030	1.90	31–1401	3.50	32–1404	1.25	33–50			
4507	.65	03013	.75	05829	4.80	30–2045	1.80	31–1408	.30	32–14	.85	33			
4532	.50														

PHILCO

REG. U.S. PAT. OFF.

1938

CHANGES IN MODELS

Since Publication of Each Service Bulletin

Grouped under each model and arranged according to Run No. — Current models included.

The following pages contain complete listings of all major changes — involving changes in circuit, part numbers or anything of interest to the serviceman — in Philco models current at the time of printing. These are all the changes which have been made since the date of publication of the last printing of the Philco Service Bulletin on each model; the number of the Bulletin is given in each case for reference.

Ownership of this folder in addition to Service Bulletins, gives the serviceman a complete record on each model; thus he will not be inconvenienced at finding, when servicing a current set, that it differs from that shown in the original Service Bulletin.

The Run Number on models prior to March, 1937, is stamped on the top of the chassis with a rubber stamp. The Code Number is given on the chassis or cabinet name label.

Beginning on March 1, 1937, the Model, Code and Run Numbers are stamped in one location on the rear of the chassis.

MODEL 680 — **Bulletin 228**

Correction:

	Incorrect	Correct
(5) Ant. Transformer Broadcast(3 and 4)	32-1811	32-1812
(5)a Ant. Transformer Broadcast(1 and 2)	32-1812	32-1811

MODEL 37-89 — **Bulletin 247**

Correction - Parts List

Schematic No.	Incorrect No.	Correct No.
(2) Compensator(Ant. 1500 K.C.)	31-6100	31-6101
(10) Compensator(R.F. 1500 K.C.)	31-6100	31-6101
(12) Compensator(Osc. 600-1500 K.C.)	31-6101	31-6100

MODEL 37-624 — **CODE 125** — **See Supplement to Bulletin 263**

	Old Part	New Part
New Part		
Range Switch (R.F.)	42-1283	42-1314
Identification colors on metal support	White - Green	Yellow-Brown

---

MODEL 37-641 — **CODE 125** — **Bulletin 265**

Correction: Schematic Diagram Fig. 5

The cathode of the 6K7G, R.F. tube should be connected at the junction of Resistors 6 and 9, and Condenser 28.

MODEL 38-1 — **CODE 121** — **Bulletin 293**

The following parts must be changed in addition to the power transformer for 25 cycle operation.

Remove (100) resistor, 3,000 ohms, Part No. 33-230339 and (101) condenser .25 mfds., Part No. 30-4446. Add condenser Part No. 30-4549 and wire the white wires of this condenser across choke (99). The red wire is connected to the junction of condensers (67), resistor (62)and resistor (66). Ground the housing of the condenser to the chassis. Also, remove electrolytic condenser (102) 8, and 10 mfd. Part No. 30-2201 and replace with electrolytic condenser, Part No. 30-2183 20, and 10 mfd. The 20 mfd. replaces the 8 mfd. of 30-2201.

Run 3

A 250 mmfd. condenser, Part No. 30-1032, was connected from the screen of the 6U7G to ground to prevent parasitic oscillations.

Run 4

Beginning with Run 4 Receivers, the 6U7G R.F. tube is replaced with a 6K7G tube to eliminate parasitic oscillations. In addition to the tube change, the green wire connecting the screen contact of the 6U7G tube and Condenser (6) was increased in length. This wire should circle around the 6U7G tube socket towards the front of the R.F. unit and then back to condenser (6). Place the wire as close to the base as is possible. The 250 mmfd. condenser, Part No. 30-1032, added in Run 3 Receivers is removed on this Run.

MODEL 38-2 — **CODE 121** — **Bulletin 294**

The following parts must be changed in addition to the power transformer for 25 cycle operation. Remove (98) condenser .25 mfd., Part No. 30-4446 and replace with condenser, 1 mf. - .5 mf. Part No. 30-4549.

Connect the white wires of condenser, 30-4549 across choke (99) and the red wire to the junctions of (59), (60) and (66). Also, remove electrolytic condenser (96) 8 mfd., Part No. 30-2211 and replace with electrolytic condenser, Part No. 30-2200 16 mfd.

Run 2 Intermediate Frequency Circuit Changes

Beginning with run 2, the I. F. circuit has been changed to use permeability tuned I. F. transformers. These changes and the locations of the Commensators are shown on the Schematic Diagram below. The schematic part numbers differ from those in Bulletin 294.

The wires from each circuit, however, on this diagram have been marked indicating the connecting points in the circuit diagram of Bulletin 294.

The Compensator adjustments are as follows:

A. Set the receiver and signal generator controls as follows:

1. Range Switch (Broadcast Position).
2. Volume Control (Maximum).
3. Magnetic Tuning Switch "Off."
4. Tone Control First Position.
5. Signal Generator Dial 470 K.C.

B. Connect the signal generator output cable through a .1 mfd. condenser to the grid of the 6A8G Det. Osc. tube and connect the cable-ground to the receiver chassis. Set the generator "attenuator" for maximum output. Adjust the I. F. Compensators as follows:

1. Turn compensator (1XB) in until the output meter reading decreases almost to zero.
2. Now adjust the compensator (1XA) and (1XC) for maximum output; then readjust (1XB) for maximum output.
3. Turn compensator (2XC) in about three turns; then adjust compensators (2XA) and (2XB) for maximum output. The adjustment procedure for compensator (2XC) is the same as that given in the "Magnetic Tuning Circuit Adjustments" of Bulletin 294.

MODEL 38-2 Con't. — **CODE 121** — **Bulletin 294**

Replacement Parts

RUN 2

Schem. No.	Description	Part No.	List Price
1X	1st I. F. Transformer	32-2741	$3.50
2X	2nd I.F. Transformer	32-2742	4.00
3X	Condenser .05 mfd. bakelite	3615 SG	.35
4X	Resistor 4.0 meg., ½ watt	33-540339	.20
5X	Resistor 4.0 meg., ½ watt	33-540339	.20
6X	Resistor 1.0 meg., ½ watt	33-510339	.20
7X	Resistor 1.0 meg., ½ watt	33-510339	.20
8X	Resistor 1.0 meg., ½ watt	33-510339	.20
9X	Resistor 1.0 meg., ½ watt	33-510339	.20
10X	Condenser 110 mmfd. mica	30-1031	.20
11X	Condenser 110 mmfd. mica	30-1031	.20
12X	Resistor 490,000 ohms, ½ watt	33-449339	.20
13X	Resistor 490,000 ohms, ½ watt	33-449339	.20
14X	Resistor 1000 ohms, ½ watt	33-210339	.20
15X	Resistor 51,000 ohms, ½ watt	33-351339	.20
16X	Condenser 110-110 mmfd. bakelite	8035 DG	.25
17X	Condenser .01 mfd. tubular	30-4479	.20
18X	Resistor 330,000 ohms, ½ watt	33-433339	.20
19X	Volume Control	33-5233	1.00
20X	Resistor 51,000 ohms, ½ watt	33-351339	.20
21X	Condenser .015 mfd. tubular	30-4226	.20
22X	Resistor 1.0 meg., ½ watt	33-510339	.20
23X	Audio shorting switch	See Bul. No. 294	
24X	Condenser .006 mfd. tubular	30-4467	.20
25X	Condenser .03 mfd., .03 mfd. bakelite	8318 DU	.40
26X	Resistor 490,000 ohms, ½ watt	33-449339	.20
27X	Resistor 1.0 meg., ½ watt	33-510339	.20
28X	Condenser .1 mfd. tubular	30-4455	.25
29X	Condenser .015 mfd. tubular	30-4226	.20
30X	Condenser .03 mfd. tubular	30-4449	.20
31X	Resistor 32,000 ohms, ½ watt	33-332339	.20
32X	Resistor 99,000 ohms, ½ watt	33-399339	.20
33X	Condenser Part of 25X		
34X	Condenser .1 mfd. tubular	30-4455	.25
35X	Resistor 240,000 ohms, ½ watt	33-424339	.20
36X	Condenser .1 mfd. tubular	30-4439	.20
37X	Resistor 70,000 ohms, ½ watt	33-370339	.20

For Schematic Diagram showing Run No. 2 Changes in Model 38-2 Code 121, See Page 4.

Run 3

A 250 mmfd. Condenser, Part No. 30-1032, was connected from the screen of the 6U7G to ground to prevent parasitic oscillations.

Run 4

Beginning with Run 4 Receivers, the 6U7G R. F. tube is replaced with a 6K7G tube to eliminate parasitic oscillations. In addition to the tube change, the green wire connecting the screen contact of the 6U7G tube and Condenser 6 was increased in length. This wire should circle around the 6U7G tube socket towards the front of the R. F. unit and then back to Condenser 6. Place the wire as close to the base as is possible. The 250 mmfd. Condenser, Part No. 30-1032, added in Run 3 Receivers is removed on this Run.

MODELS 38-4 and 38-5 — **CODE 121** — **Bulletin 281**

For 25 cycle operation, using power transformer 32-7598, a condenser 30-4289, .1 mfd. is connected across the speaker field coil (65).

MODEL 38-4

The following parts were changed in the Bass Compensation Circuit in order to reduce station rumble.

Schematic No.	Original Part No.	New Part No.
(36) Condenser (.01 mfd.)	30-4125	30-4555 (.0015 mfd.)
(38) Resistor (40,000 ohms ½ watt)	33-340339	33-332339(32,000 ohms)

Run 3

In order to further reduce frequency drift at the high frequency end of the broadcast tuning range, Compensator (16), 1500 K.C., Part No. 31-6196 was replaced with Part No. 31-6206, and two Condensers, Part No. 30-1097 connected in parallel with the new condenser.

Range 1 Oscillator Transformer (15 also changed from Part No. 32-2631 to 32-2894 in Receivers of Run 3.

Run 4 MODEL 38-4
Run 2 MODEL 38-5

To improve the performance of the Oscillator Circuit on the short wave bands. Resistor (19) 70,000 ohms, Part No. 33-370339 was changed to 51,000 ohms, Part No. 33-351339.

The part number for the tone control (40) should be listed as follows:

(40) Tone Control and Off-on Switch (38-5) 42-1341
Tone Control and Off-on Switch (38-4) 42-1346

MODEL 38-7 **CODE 121, 124** **Bulletin 280**

Run 2

To provide uniform performance of the oscillator circuit, a 20 ohm resistor, Part No. 33-020339 was connected in series with the cathode of the 6A8G Det. osc. tube.

The following parts in Code 124 Chassis were changed to reduce bass response.

Schematic No.	Old Part	New Part
(24) Condenser (.01 mfd.)	30-4479	30-4201 (.001 mfd.)
(32) Resistor (51,000 ohms, ½ watt)	33-351339	33-340339 (40000Ω ½W)
(38) Condenser (.006 mfd.)	30-4467	30-4479 (.01 mfd.)

Run 3

In order to further reduce frequency drift at the high frequency end of the broadcast tuning range, compensator (7A) 1500 K.C., Part No. 31-6196 was replaced with Part No. 31-6206.
In addition to this change a new thermal compensator, Part No. 31-6232 was connected in parallel with compensator (7A) and mounted adjacent to resistor (12). The resistor is mounted to the chassis with a mounting clamp, Part No. 28-5388 and an asbestos insulator, Part No. 27-8977. The resistor must be mounted in this manner, otherwise the thermal compensator will not function properly.

Run 4

The new Thermal Compensator, Part No. 31-6232 which was added to the Receiver in Run 3, is replaced with two fixed Condensers, Part No. 30-1097 in Run 4 Receivers.

Run 5

The 20 ohm Resistor, Part No. 33-020339 Resistor connected in series with the 6A8G Det-Osc. tube cathode in Run 3 Receiver was removed.

The Part Numbers for the Volume Control (26), Tone Control (39) and Range Switch (48) as listed in the bulletin are correct for Models 38-8 and 38-9. The correct part numbers, however, for these parts in the Model 38-7, codes 121-124 are as follows:

(26) Volume Control (38-7)	33-5225
(39) Tone Control (38-7)	42-1347
(48) Range Switch (38-7)	42-1339

MODEL 38-8 **Code 121** **Bulletin 280**

Run 2

The following parts were changed to increase the sensitivity of the shadowmeter:

Schematic No.	Old Part	New Part
(12) Resistor (10,000 ohms, 3 watt)	33-310639	33-313639 (13,000 ohms)
(17) Condenser (.05 mfd.)	30-4454	30-4134 (.25 mfd.)

Run 3

To provide uniform performance of the oscillator circuit, a 20 ohm resistor, Part No. 33-020339 was connected in series with the cathode of the 6A8G Det. Osc. tube.

Run 4

Schematic	Original Part Number	New Part Number
(40) Condenser (.008 mfd.)	30-4112	30-4456 (.004 mfd.)

The above change was made to increase the audio response in the high frequencies.

MODEL 38-9 **Code 121** **Bulletin 280**

Run 2

To provide uniform performance of the oscillator circuit, a 20 ohm resistor, Part No. 33-020339 was connected in series with the cathode of the 6A8G Det. Osc. tube.

Run 3 MODEL 38-9
Run 5 MODEL 38-8

The 20 ohm Resistor, Part No. 33-020339, connected in the 6A8G cathode circuit in Run 2 was removed in the above Run Numbers.

MODEL 38-10 **Code 121** **Bulletin 283**

Run 2

To provide uniform performance of the oscillator circuit, a 20 ohm resistor, Part No. 33-020339 was connected in series with the Cathode of the 6A8G, Det. Osc. tube.

When using Power Transformer, Part No. 32-7627 for 25 cycle operation, Condenser (35), Part No. 30-4215, .02 mfd. should be changed to Part No. 30-4373, .06 mfd.

Correction

The location of Compensators 7 and 9 shown in Figure 2 should be reversed.

MODEL 38-12 **Code 121** **Bulletin 284**

Condenser changes for improved operation:

Schematic No.	Original No.	New Part No.
(2) Condenser (.05 mfd. tubular)	30-4444	30-4519 (.05 mfd.)
(19) Condenser (.01 mfd.)	30-4169	30-4514 (.01 mfd.)

Run 2

New type mounting on Tuning Condenser.

	Original Part No.	New Part No.
(3) Tuning Condenser Assembly	31-2068	31-2177

Run 3

IMPORTANT: Wire Dress to Eliminate Hum.

1. Dress the green wire connecting the Diodes of the 75 tube to the 2nd I.F. transformer as far as possible away from the filament prongs of the 75 tube.

2. The brown wire connecting resistor 12 to the high side of the Volume Control should be dressed under the coil of I.F. transformer 12 .

3. The grid lead of the 75 tube should be dressed toward the back of the receiver and between the tube and shield.

The 2nd I.F. Transformer (12) changed from Part No. 32-2674 to Part No. 32-2944.

Note: Condenser (12B) and (12C) are part of the padder in these transformers.

The wiring of the new transformer 32-2944 is shown on this change notice.
For I.F. Transformer 32-2944 See Page 4.

MODEL 38-12 Con't. **Code 121** **Bulletin 284**

Run 5

Speaker Unit changed from type "B0-1", Part No. 36-1366 to type "B-7", Part No. 36-1390. These speakers are interchangeable. The cone assembly for the "B-7" speaker is Part No. 45-1344 and the Field Coil, Part No. 32-9473.

MODEL 38-14 **CODE 121, 124** **Bulletin 288**

Correction:

Schematic No.	Incorrect No.	Correct No.
12 Compensator	31-6209	31-6100
20 Volume Control	33-5236	33-5230

A Condenser, Part No. 30-1097, 5 mmfd. was connected across the secondary of shortwave transformer 2 . The condenser is connected to lugs 3 and 4 of the transformer shown on the schematic diagram.

Run 2

The 2nd I.F. Transformer (17) is changed from Part No. 32-2674 to Part No. 32-2944. The wiring lugs of the compensator on the new transformer are slightly rearranged. A drawing of the transformer is shown on this change notice and indicates the correct wiring point of each lug in the circuit.

For I.F. Transformer 32-2944 see Page 4.

MODEL 38-15 **CODE 121, 124** **Bulletin 291**

Run 2

The wiring of the 2nd detector circuit (75 tube) changed from a single rectifying circuit to a double rectifying circuit. Connect the 110 mmfd. condenser between the two diode contacts of the 75 tube socket. Remove the shorting wire that connects these two contacts and leave the wire from the 2nd transformer connected to one diode.
Connect one end of each of the one megohm resistors to the other diode. One of these one megohm resistors replaces the 2 megohm resistors 17 , Part No. 33-520339, and the other is connected to the cathode of the 75 tube.

Remove the Volume Control lug that is connected to C Negative and connect to ground.

The same diode circuit as is shown in Service Bulletin 283 for Model 38-10 is now incorporated in Model 38-15.

Run 3

Wiring relocated, no change in the circuit.

Run 4

Sub-base wiring panel changed from Part No. 38-9226 to Part No. 38-9007. No change in circuit.

Run 5

The 2nd I.F. Transformer Assembly 15 changed from Part No. 32-2674 to Part No. 32-2944. The wiring of the new transformer, 32-2944, is shown on this change notice. Condenser (15B) and (15C) are part of the padder in these assemblies.

For I.F. Transformer 32-2944 See Page 4.

Run 6

Speaker unit in code 121 chassis changed from type B0-1, Part No. 36-1366, to type B-7, Part No. 36-1390. These speakers are interchangeable. The cone assembly for the B-7 speaker is 45-1344 and the field coil, Part No. 32-9473.

MODEL 38-22 **Code 121 124** **Bulletin 285**
MODEL 38-23 **Code 121**

Run 2 Change to prevent hum

To prevent hum when the volume control is on full, the red and brown leads from the 2nd I.F. Transformer (18) must be placed as far as possible away from the cable and pilot lamp leads at the rear of the chassis.

Pilot lamp resistor added

Resistor, Part No. 33-3027, 75 ohms was shunted across Pilot lamp (52) to prevent high voltage burning lamp out.

Run 3 MODEL 38-22

Replaced 3 wire speaker cables, Part No. 41-3336 (41-3337 in Code 124) with 5-wire speaker cables, Part No. 41-3366. The extra wires in the 5-wire cable are for shorting the Voice Coil when tuning Receiver automatically.

Run 4 MODEL 38-22

Cone-centric tuner insulated from chassis, using the following insulators:
Tuner Insulator, Part No. 27-8986 Brace Insulator, Part No. 27-8983 Bushing, Part No. 27-8987.

Remove the blue audio shorting wire from the terminal panel (underside of chassis) and connect to the Cone-centric Dial Mounting Frame.

Run 6 MODEL 38-22

In order to further reduce frequency drift at the high frequency end of the broadcast tuning range, compensator (10B) 1500 K.C., Part No. 31-6196 was replaced with compensator, Part No. 31-6206. In addition to this change a new thermal compensator, Part No. 31-6227 was connected in parallel with compensator (10B) and mounted in back of the 6A8G det. osc. tube socket.

Run 7

Two fixed condensers, Part No. 30-1097, connected in parallel with compensator (10B) in place of the new thermal compensator, Part No. 31-6227, which was used in Run 6 Receivers.

Run 8 MODEL 38-22 Run 4 MODEL 38-23

Replaced ballast resistor (51) , Part No. 33-3334 with ballast lamp, Part No. 34-2193, for 110 V., A.C., D.C. operation; and pilot lamp (52), Part No. 34-2184 with Part No. 34-2192 in the 38-22 Receiver. The same ballast resistor change is made in the 38-23, the pilot lamp, however, is changed from Part No. 34-2064 to 34-2068.

The wiring of the socket for the new ballast lamp is as shown in the diagram on Page 4.

The filter choke (46) listed as 32-7744 should be 32-7544.

MODEL 38-33 Code 121 Bulletin 292

Correction:

Schematic No.	Incorrect No.	Correct No.
Bezel Throat	27-5248	28-5248

The pilot lamp (37) listed as 34-2150 should be 34-2065.

MODEL 38-35 Code 121 Bulletin 296

Wire dress to prevent hum

Beginning with Run 3 receivers, the red wire which connects the filament of the 6Q7G tube to the on-off switch has been lengthened. The wire now follows the rear, side and front channels of the chassis close to the base, instead of being connected directly from the switch to the socket contact.

MODEL 38-38 Code 121 Bulletin 290

The cone assembly part number for the HR20 speaker is 36-3797.

Correction:

The schematic diagram, Figure 3 is correct. The sub title, however, shown as 38-10, Code 121, is incorrect and should be changed to 38-38, Code 121.

Run 3

Beginning with Run 3 resistor (21) 8000 ohms, Part No. 33-280339 was removed from the 90 volt tap and reconnected to the 135 volt tap of the battery cable. At the same time, the value was changed from 8000 ohms to 25000 ohms, Part No. 33-325339. The battery cable ass'y was also changed from Part No. 41-3198 to Part No. 41-3394.

Run 4

Resistor (38) 900 ohms, Part No. 33-1223 changed to 2000 ohms, Part No. 33-220339. This change made to decrease current drain on the "BC" battery.

MODEL 38-39 Code 121 Bulletin 287

In order to reduce maximum volume buzz, the following parts were changed:

Schematic No.

	Original No.	New Part No.
(22) Resistor(11.7 ohms, ½ w.)	33-1264	33-1273 12.3 ohms
(30) Resistor(2 megohms, ½ w.)	33-520339	33-540339 4 megohms, ½ w.
(27) Resistor(160,000 ohms, ½ w.)	33-416339	33-424339 240,000 ohms, ½ w.

In order to increase oscillator strength the S. W. osc. coil was changed:

	Original No.	New Part No.
(7) Transformer (Osc. S. W.)	32-2668	32-2891

Correction:

	Incorrect No.	Correct No.
(6) Tuning Condenser	31-2065	31-2025
(56) Choke	32-2247	32-1374

MODEL 38-40 Code 121 Bulletin 298

Run 3

The following changes were made to improve the action of the oscillator circuit.

	Original Part No.	New Part No.
(5) Oscillator Transformer (Range 2)	32-2668	32-2897
(10) Resistor (8000 ohms)	33-280339	33-250339 (5000 ohms)
(14) Electrolytic Condenser (8-8 mfd.)	30-2079	30-2291 (8-8 mfd.)

The Electrolytic Condenser and resistor change is shown on the service bulletin.

Run 4

Beginning with Run 4, Condenser 28 .05 mfd. tubular and Condenser 42 .05 mfd. tubular, Part No. 30-4444 have been replaced with a dual bakelite condenser .05 -05 mfd., Part No. 3615 DQ. The new condenser is mounted adjacent to the filter choke 26 . Other parts have been slightly rearranged in this section of the chassis. The circuit, however, remains the same as is shown on the service bulletin.

MODEL 38-116 Code 121 Bulletin 286

Run 2

To prevent audio leakage when volume control is off. Resistor (25) and (116) and Condenser (100) have been slightly rearranged in the I. F. unit (See Fig. 2) - beginning with this Run number. The audio shorting wire (Green wire) of switch (102) is now wired to the movable contact of volume control (101) instead of the high side as shown on the schematic diagram.

Correction

The Dial Part Number listed as 27-5340 should be 27-5207.

Correction

Schematic No.

	Incorrect No.	Correct No.
(1) Ant. Transformer (Range 1)	32-3208	32-2108

To improve the holding characteristics of the magnetic tuning circuit a Condenser, Part No. 30-1097, 5 mmfd., is connected from the grid (marked No. 2 on the Schematic diagram), of the 6J5G discriminator tube, to ground.

25 Cycle Operation

When operating the Receiver on 25 cycle current using Power Transformer 32-7700, Condenser (139), Part No. 30-4465 is replaced with two Condensers, Part No. 30-4227.

Correction - Schematic Diagram

A ground connection should be added to A1 at the point where the No. 2 connection of Ant. Trans. (5) is connected.

The screen grid of the 6L7G tube should be connected to Resistor (63) instead of the point as shown on the diagram.

Remove the connection from Resistor (29) and Condenser (46X) and reconnect between Resistor (28) and Condenser (46X).

Remove the connection from Resistor (29) and Condenser (46X). Then reconnect Condenser (46X) between Resistor (28) and the Range Switch Connection J9.

MODEL 38-116 Code 125 Bulletin 286 A

Run 3

Bass Compensation parts relocated and changed

Resistors (103) and (104) and Condensers (105) and (106) were removed from the audio unit and mounted in the Power Unit in back of the A. F. C. Switch (96). No change in the circuit.

Tubular Condenser (118) and (119), Part No. 30-4518, .05 mfd. changed to bakelite Condensers, Part No. 36158U .05 mfd.

Compensator change to improve padding of antenna short wave section.

	Original Number	New Part Number
(6) Compensator (Ant.)	31-6084	31-6237

Run 4

The parts in the oscillator section slightly rearranged -- no change in circuit.

Lead dress items to improve padding.

The white plate lead of the 6A8G Det. Osc. tube should be dressed away from the oscillator coil (30).

Orange Lead of 1500 K. C. Padder (36) should be separated from 4.5 M.C. Padder (36A).

6A8G Osc. Grid and plate leads should be dressed clear of each other and away from Resistor 19 .

Run 5

Bass Compensator Part relocated to eliminate hum at 50% rotation of the Volume Control.

Resistors (103) and (104) and Condenser (105) and (106) which were removed from audio unit and mounted in power (see Run 3 above) have been relocated in audio unit adjacent to the Volume Control 85 . No change in the circuit.

All leads coming from the tone control must be dressed clear of the A. C. Switch and Wires.

The following schematic numbers in the Change Notice for Runs 3 and 5 should be changed to correspond with the Diagram of Page 3.

Incorrect	Correct
Resistors (103) and (104)	(89), (95)
Condensers (105) and (106)	(91), (92)
Tubular Condensers (118) and (119)	(99), (104)

Run 6

The Primary Winding of Range 4 oscillator transformer, Part No.32-2628 has been redesigned to prevent parasitic oscillations. The revised coil can be identified by a daub of red, yellow and white paint on the coil tube and will be stocked as 32-2628A.

When this transformer is used, a 15,000 ohm resistor, Part No. 33-315339 shunted across Range 4 Primary of Transformer 33 prior to Run 6 is removed. This change is shown in Bulletin 286A.

Run 7

Condenser added and Range Switch changed to improve performance on Ranges 4 and 5.

	Original Part No.	New Part No.
128 Range Switch (R. F. Section)	42-1355	42-1404

The new switch, Part No. 42-1404 has an additional lug which grounds when switch is in Range 5 position. A 250 mmfd. condenser, Part No. 30-1032, is connected from this lug on the switch to compensator (36B). When connected between these two points, the condenser is shunted across the primary of Range 4 Osc. Transformer 33 . When this change was made, Transformer 33 , Part No. 32-2628A was changed to 32-2628B.

The identification color on Oscillator Transformer 33 , Part No. 32-2628B is red, yellow and black. The red, yellow, and black coils must be used when the 250 mmfd. condenser is used.

Run 8

To prevent parasitic oscillations and improve the performance of the oscillator circuit at 18 M.C., a 100 ohm resistor, Part No.33-110339, is connected between the 6A8G oscillator anode and the plate of the 6N7G.

The brown wire, which formerly connected these two socket contacts is removed, the resistor replacing the wire.

MODEL 38-690 Code 125 Supplement to Wiring Diagram

Run 1

To stabilize the oscillator circuit, a resistor, 15,000 ohms, Part No. 33-315339, was shunted across the primary of the Range 4 section of Oscillator Transformer 37 .

Run 2

The primary winding of Range 4, Oscillator Transformer 37, Part No. 32-2628, has been redesigned to prevent parasitic oscillations. The revised coil can be identified by a daub of red, yellow and white paint on the coil tube.

When the new transformer is used the 15,000 ohm Resistor, Part No. 33-315339 shunt across Range 4 primary of Transformer 37 in Run 1 Receiver is removed. This change is shown in the Schematic Diagram.

Run 3

Condenser added and range switch changed to improve the performance of the oscillator circuit on Ranges 4 and 5 as follows:

	Original Part No.	New Part No.
(182) Range Switch (R.F. Section)	42-1355	42-1404

The new switch, Part No. 42-1404 has an additional lug, which grounds when switch is in Range 5 position.

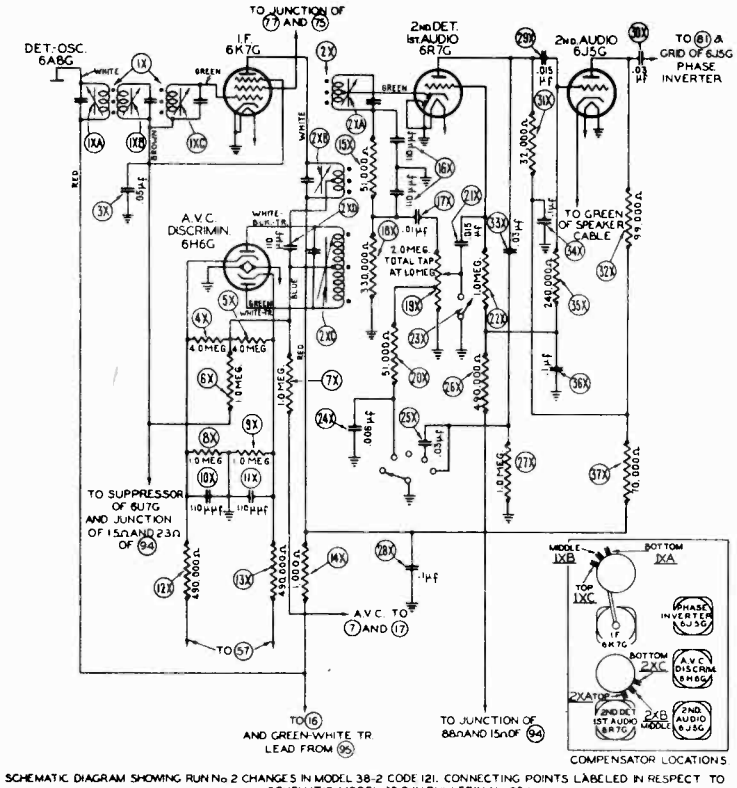
A 250 mmfd. condenser, Part No. 30-1032, is connected from this lug on the switch to Compensator (40B). When connected between these two points, the condenser is shunted across the primary of Range 4 oscillator transformer 37 in Range 5 position.

The identification color on the Oscillator Transformer 37 , Part No. 32-2628, which was changed to red, yellow and white is now changed to red, yellow and black. The red, yellow and black coils must be used when the 250 mmfd. condenser is used.

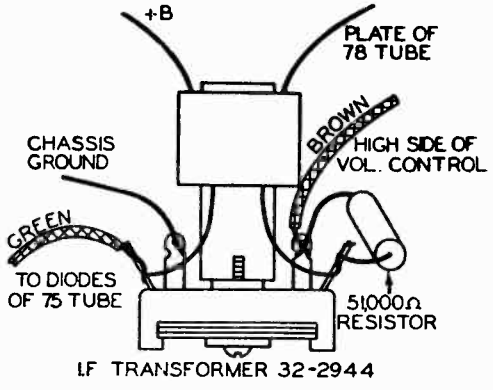
Run 4

To prevent oscillation and to improve the performance of the oscillator circuit at 18 M.C., a 100 ohm resistor, Part No. 33-110339, is connected between the 6A8G oscillator anode and the plate of the 6N7G tube. The brown wire which formerly connected these two socket contacts is removed - the resistor replacing the wire.

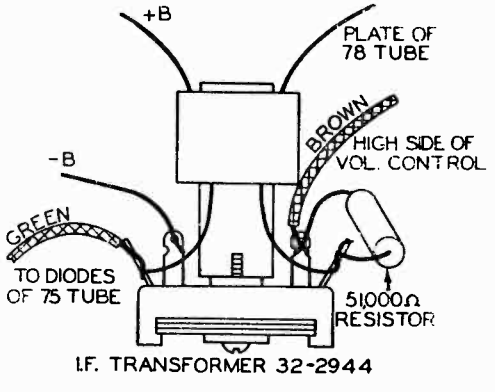
Service Note: To prevent hum, Condenser (123) must be placed as far as is possible away from the A.C. switch of the audio bass control (122).



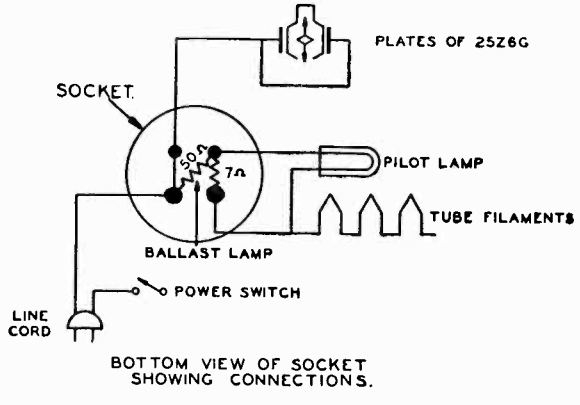
SCHEMATIC DIAGRAM SHOWING RUN No. 2 CHANGES IN MODEL 38-2 CODE 121. CONNECTING POINTS LABELED IN RESPECT TO SCHEMATIC MODEL 38-2 IN BULLETIN No. 294.



MODEL 38-12 - Code 121
Run 3

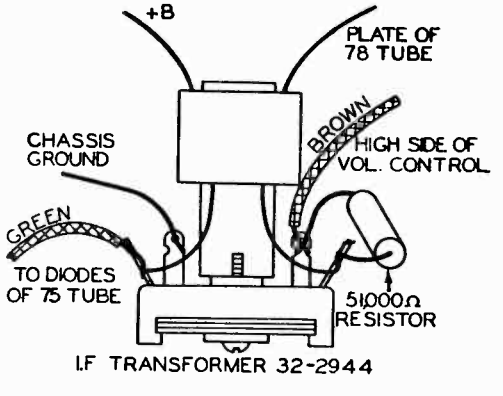


MODEL 38-14 - Code 121, 124
Run 2



BOTTOM VIEW OF SOCKET SHOWING CONNECTIONS.

MODEL 38-22 - Code 121, 124
Run 8
MODEL 38-23 - Code 121
Run 4



MODEL 38-15 - Code 121, 124
Run 5

PHILCO . . . . . Dial Drive Assemblies

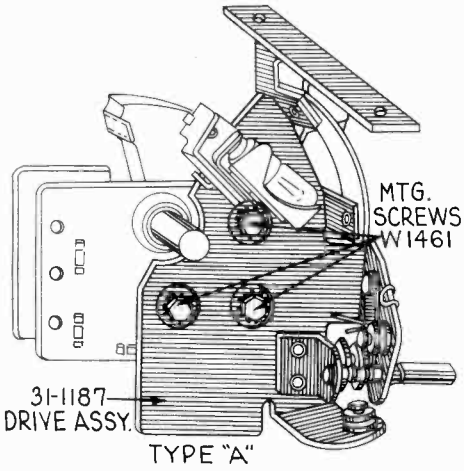
SERVICE BULLETIN
No. 231

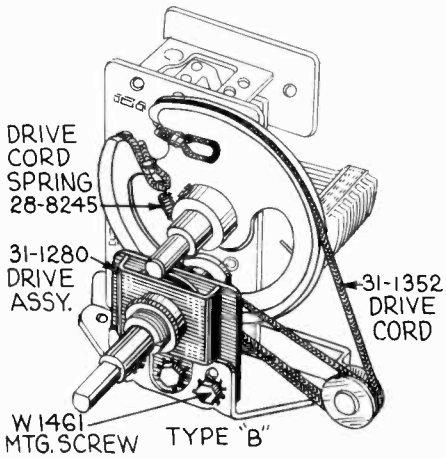
For Members of RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

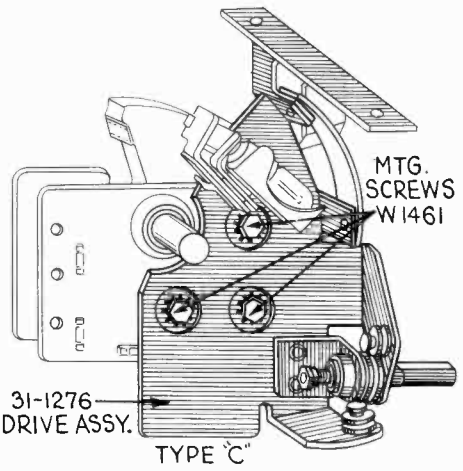
Model	Type Drive	Illus.	Complete Drive Assy.	Drive Cord	Drive Cord Spring	Dial	Inverted Dial	Dial Hub Assy.	Drive Bracket	Drive Ring and Hub
4	Friction		03011			03890				
14	Cable		31-1065	04834	7776	31-1066	31-1118			
15	Cable		4016A	4020A	7776	4276				
16 (Code 121-2-3)	Friction (Rubber)	"R"	45-2149			31-1058	31-1115			
16 (Code 125-6-7)	Cable & Vernier	"B"	31-1280	31-1352	28-8245	31-1363	31-1420			
17	Cable		31-1065	04834	7776	31-1066	31-1095			
18	Cable		31-1065	04834	7776	31-1066 31-1207*	31-1241			
19	Cable		31-1119	06920	7776	31-1025	31-1024			
20-21	Friction		45-2150			4209B				
28	Cable & Vernier	"D"	31-1186	31-1457	7776	31-1208				
28CSX	Cable	"C"	31-1276	31-1457	7776		31-1481			
29	Cable & Vernier	"A"	31-1187	31-1457	7776	31-1208				
29	Cable & Vernier	"C"	31-1276	31-1457	7776	31-1245	31-1481			
30	Cable		4016A	3484A	3012	4139 (Scale)				
32	Cable		31-1074	31-1457	7776	31-1025				
34	Friction (Rubber)	"R"	45-2149			31-1162				
35-36	Friction		03011			03031				
37	Friction		03430			05811				
38	Vernier	Types "O," "S," and "T" used on this model—see illustration				31-1084				
39	Vernier	Types "O," "S," and "T" used on this model—see illustration				31-1471				
40-41-42	Cable		3393A	3484A	3012	3794				
43	Cable		05365	4020A	7776	05418				
44	Friction (Rubber)	"R"	45-2149			31-1107				
45	Cable & Vernier	"D"	31-1186	31-1457	28-8252	31-1208				
45	Cable & Vernier	"F"	31-1275	31-1457	28-8252	31-1208				
46	Friction		45-2150			4209B				
47	Cable		04835	04834	7776	04832				
48	Friction		45-2151			05811				
49	Cable & Vernier	"J"	45-2152	31-1456	7776	31-1205				
50	Friction		06522			03322				
51-52	Friction		45-2150			04031				
54	Vernier	Types "P" and "Q" used on this model—see illustration.				27-5008				
58-59	Vernier	Types "P" and "Q" used on this model—see illustration.				27-5051				

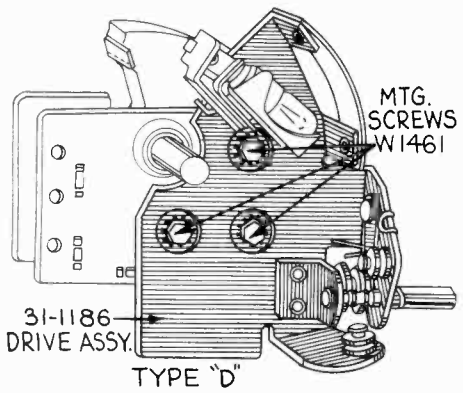
INVERTED DIAL SCALES ARE USED ON ALL MODELS HAVING CABINET INDENTIFICATION AS FOLLOWS: CSX; LZX; LZ; RX; AND MODEL 660L.

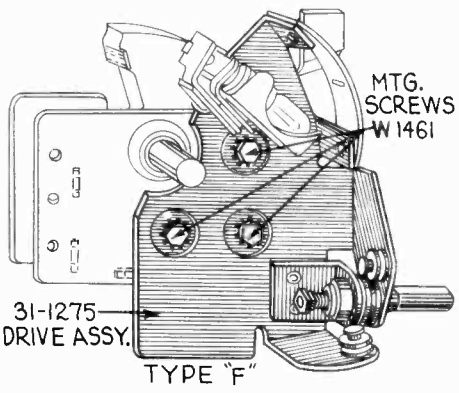
* Covers Police Frequencies.

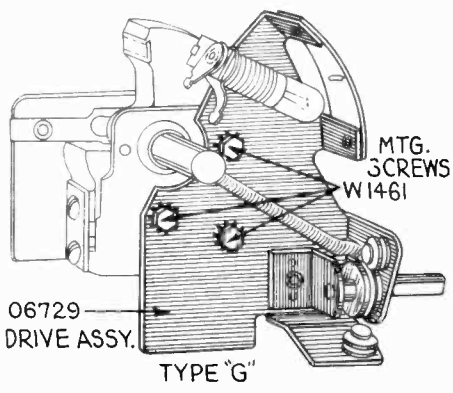


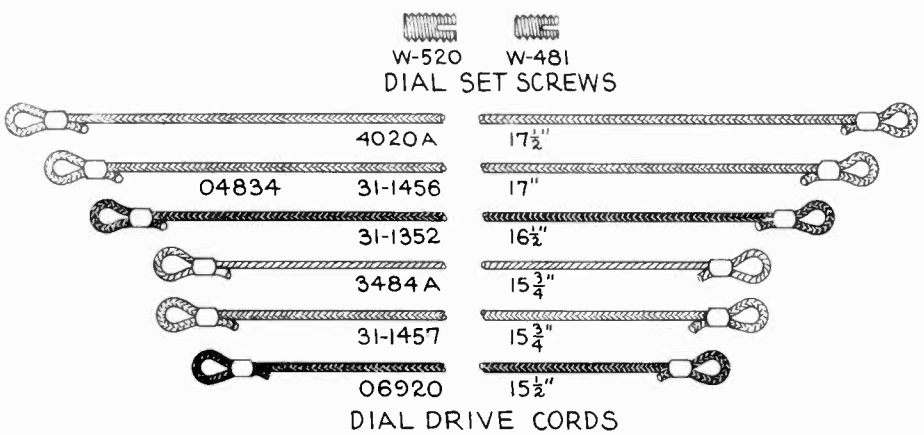


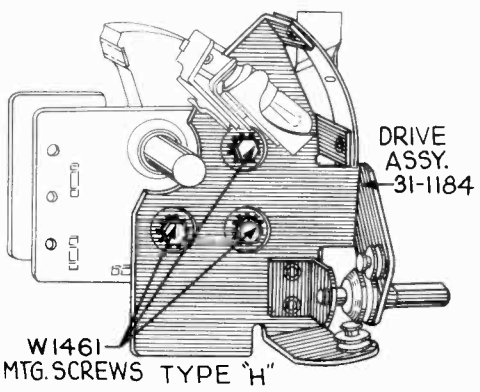










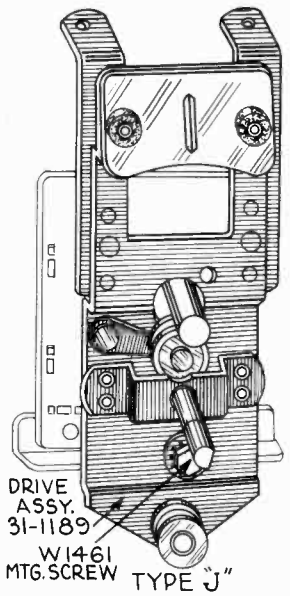


Here is complete information on dial drives for all Philco Models. This bulletin also contains a list of other miscellaneous parts such as dials, dial set screws, mounting screws and drive cords.

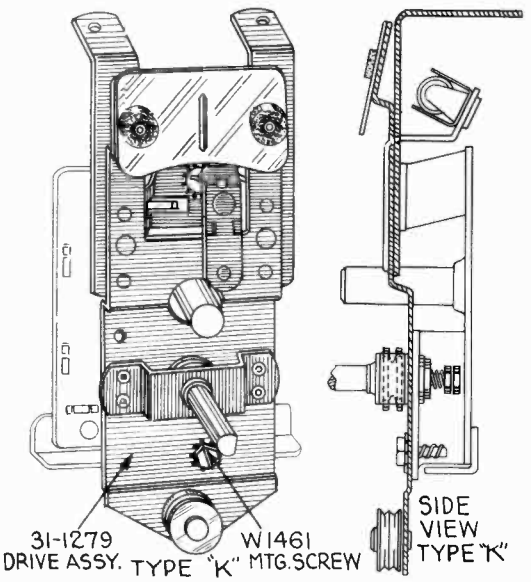
Illustrations of the various types of drives are provided to facilitate selecting the correct replacement assembly for models on which more than one type drive was used. These illustrations are listed by letters in the third column of the table.

To use this bulletin correctly, first locate the model number of the set being repaired. It will be found in the first column. If the model has more than one type drive, it will be listed more than once. Next, follow across to the third column for the number of the illustration. If no illustration is shown, use the assembly number in the fourth column. If an illustration is indicated, refer to pages 2 and 3, and use the assembly number of the drive that is identical to the drive assembly being repaired.

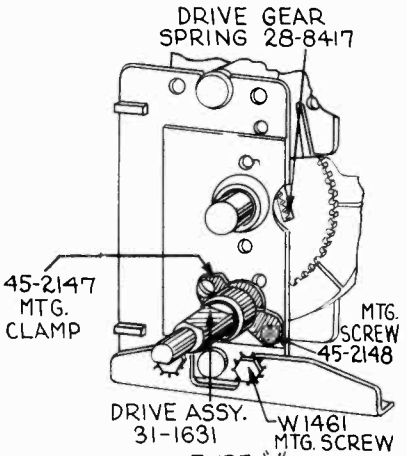
We recommend the replacement of the entire drive assembly in all cases if it is defective. This will insure a smooth working dial, plus long life.



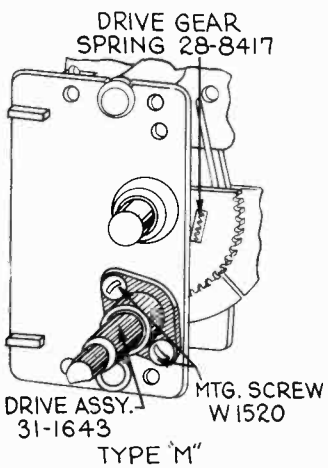
TYPE "J"



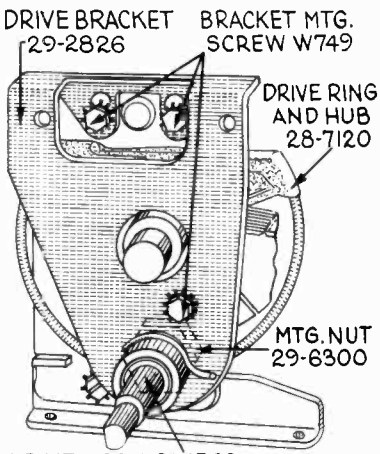
TYPE "K"



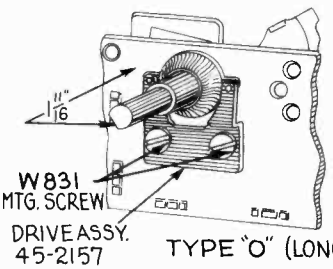
TYPE "L"



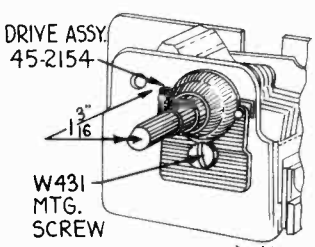
TYPE "M"



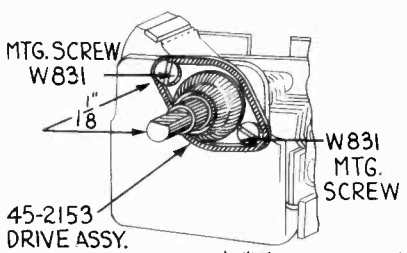
TYPE "N"



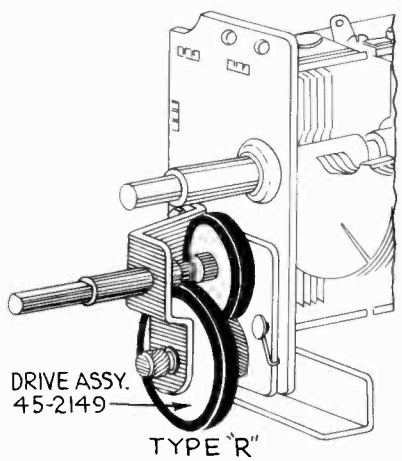
TYPE "O" (LONG SHAFT)



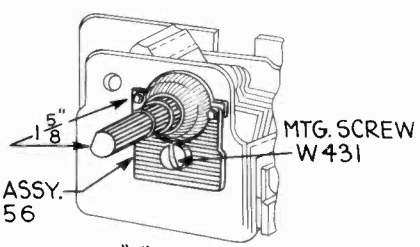
TYPE "P" (SHORT SHAFT)



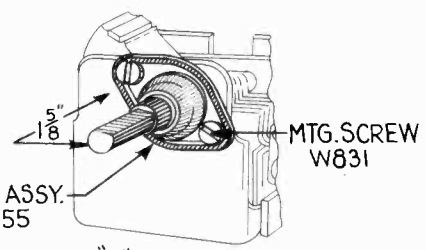
TYPE "Q" (SHORT SHAFT)



TYPE "R"



TYPE "S" (LONG SHAFT)



TYPE "T" (LONG SHAFT)

Model	Type Drive	Illus.	Complete Drive Assy.	Drive Cord	Drive Cord Spring	Dial	Inverted Dial	Dial Hub Assy.	Drive Bracket	Drive Ring and Hub
60	Vernier	Types "O," "S," and "T" used on this model—see illustration				31-1090 31-1472A				
65	Cable		3393A	3484A	3012	3398 (Scale)				
66	Vernier	Types "O," "S," and "T" used on this model—see illustration				31-1234				
70	Friction		03011			03031				
71	Friction		04835			04832	05992			
76	Cable		3393A	3484A	3012	3794 (Scale)				
77	Cable		4016A	4020A	3012	4118				
86-87	Cable		4016A	3484A	7776	3047 (Scale)¶				
89	Cable	"G"	06729- 06802‡	31-1157	7776	06697				
89	Cable	"H"	31-1184	31-1157	3012	31-1590				
90	Friction		03011			03031				
91	Cable		04836	04834	7776	04832	31-1026			
95	Cable		3393A	3484A	3012	3794 (Scale)				
96	Cable		4016A	4020A	7776	4118				
97	Cable & Vernier	"B"	31-1280	31-1352	28-8245	31-1513				
111-112	Cable		4016A	4020A	7776	4276				
116	Vernier	"N"	31-1563			27-5107		28-7129	29-2826	
118	Cable & Vernier	"J"	45-2152	31-1456	7776	31-1205	31-1241			
118	Cable & Vernier	"K"	31-1279	31-1456	7776	31-1414				
144	Cable & Vernier	"B"	31-1280	31-1352	28-8245	31-1206				
200	Cable		31-1065	31-1456	7776	31-1255				
201	Cable & Vernier		31-1382	31-1456	7776	31-1205				
610	Vernier	"L" or "M"	31-1643			27-5131		31-1550		
611	Vernier	"L" or "M"	31-1643			27-5097		31-1550		
620	Vernier	"L" or "M"	31-1631			27-5098		31-1550		
623	Vernier	"L" or "M"	31-1643			27-5097		31-1550		
624	Vernier	"L" or "M"	31-1643			27-5163		31-1724		
625	Vernier	"L" or "M"	31-1631			27-5098		31-1550		
630-635	Vernier	"L" or "M"	31-1631			27-5098	27-5121	31-1550		
640	Vernier	"N"	31-1563			27-5103	27-5122	31-1550	29-2826	28-7120
641	Vernier	"N"	31-1563			27-5125		31-1550	29-2826	28-7120
642	Vernier	"L" or "M"	31-1631			27-5098		31-1550		
643	Vernier	"N"	31-1563			27-5124		31-1550	29-2826	28-7120
645	Vernier	"N"	31-1563			27-5165		31-1724	29-2826	28-7120
650	Vernier	"N"	31-1563			27-5103	27-5122	31-1550	29-2826	28-7120
651	Vernier	"N"	31-1563			27-5170		31-1724	29-2826	28-7120
655	Vernier	"N"	31-1563			27-5165		31-1724	29-2826	28-7120
660-665	Vernier	"N"	31-1563			27-5115	27-5123	28-7129	29-2826	28-7120
680	Vernier	"N"	31-1563			27-5127		28-7129	29-2826	28-7120

‡ With shadow meter bracket.
¶ Model 87—Dial scale No. 3398.

PHILCO

Parts and Service Division

January, 1936

Printed in U. S. A.

PHILCO . . . . . Dial Drive Assemblies

SERVICE BULLETIN No. 231A for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

A complete list of dial drive parts used in all Philco radio sets is contained in this bulletin. The dial drive parts for sets from 1928 to 1936 are listed on pages 1 and 5. Drive parts for the 1937 sets are listed on page 5 and those for the 1938 sets on page 6. The various types of drives are illustrated on pages 2, 3 and 4.

The different dial parts and assemblies used in each model are listed under separate columns on pages 1, 5 and 6. When the type of dial drive or parts required for a model is desired, locate the model in the first column. Then directly opposite the model number in the second column, the type of drive will be indicated. The third column refers to the illustration appearing on pages 2, 3 or 4 — also, whether one or more types are used. The part numbers of the various assemblies and parts required in the drive mechanism will be found in the other columns.

The dial part numbers listed under the "Inverted Dial" column is used on all models having the following cabinet identifications: CSX, LZX, LZ, RX and Model 660L.

Service information and a complete replacement part list for the sets using the **Philco Automatic Tuning Dial mechanism** will be found in Service Bulletin 273.

The replacement parts for the **Cone-Centric Tuning Dial mechanism,** however, are listed on page 6 of this bulletin. Illustrations of the Cone-Centric mechanisms are shown on page 4.

PHILCO DIAL DRIVE ASSEMBLIES — 1928 TO 1936

Model	Type Drive	Illus.	Complete Drive Assy.	Drive Cord	Drive Cord Spring	Dial	Inverted Dial	Dial Pointer Assy.	Drive Bracket	Drive Ring and Hub
4	Friction	"NA"	03011			03890				
14	Cable	"K"	04836	04834	7776	31-1066	31-1118			
15	Cable	Note A	4016A	4020A	7776	4276				
16 (Code 121-2-3)	Friction (Rubber)	"R"	45-2149			45-2364	31-1115			
16 (Code 125-6-7)	Cable & Vernier	"B"	31-1280	31-1352	28-8245	31-1363	31-1420			
17	Cable	"K"	04836	04834	7776	31-1066	31-1095			
18	Cable	"K"	04836	04834	7776	31-1066 31-1207*	31-1241			
19	Cable	"G"	31-1119	06920	7776	31-1025	31-1024			
20-21	Friction	"NA"	45-2150			4209B				
28	Cable & Vernier	"D"	31-1186	31-1457	7776	31-1208	31-1481 (CSX)			
29	Cable & Vernier	"A"	31-1276	31-1457	7776	31-1208				
	Two Types	"C"	31-1276	31-1457	7776	31-1245	31-1481			
30	Cable	Note A	4016A	3484A	3012	4139 (Scale)				
32	Cable	"H"	31-1184	31-1457	7776	31-1025				
34	Friction (Rubber)	"R"	45-2149			31-1162				
35-36	Friction	"NA"	03011			03031				
37	Friction	"NA"	03430			05811				
38	Vernier	Types "O," "S," and "T" used on this model—see illustration				31-1084				
39	Vernier	Types "O," "S," and "T" used on this model—see illustration				31-1471				
40-41-42	Cable		Note A	3484A	3012	3794				
43	Cable	"K"	05365	4020A	7776	05418				
44	Friction (Rubber)	"R"	45-2149			31-1107				
45	Cable & Vernier	"D"	31-1186	31-1457	28-8252	31-1208				
45	Cable & Vernier	"F"	31-1275	31-1457	28-8252	31-1208				
46	Friction	"NA"	45-2150			4209B				
47	Cable	"K"	04835	04834	7776	04832				
48	Friction	"NA"	45-2151			05811				
49	Cable & Vernier	"J"	45-2152	31-1456	7776	31-1205				
50	Friction	"NA"	03430			03322				
51-52	Friction	"NA"	45-2150			04031				
53	Direct Drive—No replacement					28-1021		28-1019		
54	Vernier	Types "P" and "Q" used on this model—see illustration				27-5008		27-7933		
57	Direct Drive—No replacement					28-1021		27-7152		
58-59	Vernier	Types "P" and "Q" used on this model—see illustration				27-5023		27-7933		
60	Vernier	Types "O," "S," and "T" used on this model—see illustration				31-1090 31-1792				
65	Cable		Note A	3484A	3012	3398 (Scale)				
66	Vernier	Types "O," "S," and "T" used on this model—see illustration				31-1234				
70	Friction	"NA"	03011			03031				
71	Cable	"K"	04835	04834		04832	05992			
76	Cable		Note A	3484A	3012	3794 (Scale)				
77	Cable	Note A	4016A	4020A	3012	4118				
81	Vernier	Types "O" and "T" used on this model—see illustration				31-1032		27-5007		
86-87	Cable	Note A	4016A	3484A	7776	3047 (Scale) ¶				
89	Cable-Two Types	"G"	06729- 06802‡	31-1457	7776	06697				
		"H"	31-1184	31-1457	3012	31-1590				
90	Friction	"NA"	03011			03031				
91	Cable	"K"	04836	04834	7776	04832	31-1026			
95	Cable		Note A	3484A	3012	3794 (Scale)				
96	Cable	Note A	4016A	4020A	7776	4118				
97	Cable & Vernier	"B"	31-1280	31-1352	28-8245	31-1513				

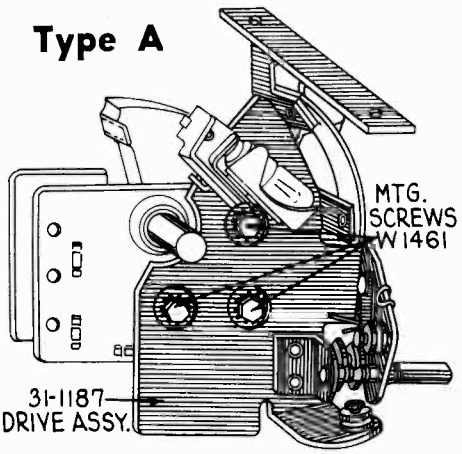
* Covers Police Frequencies.

‡ With shadow meter bracket.

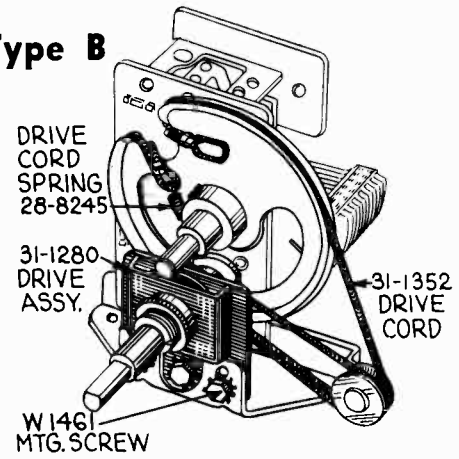
¶ Model 87—Dial scale No. 3398.

Note A. No Replacement—Return Condenser to Local Distributor for Repairs.

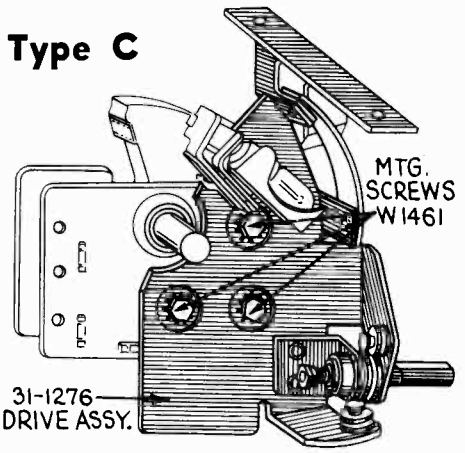
Type A



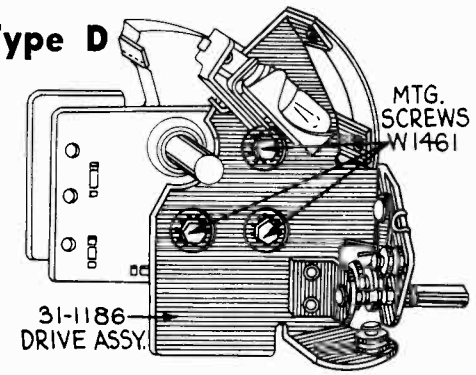
Type B



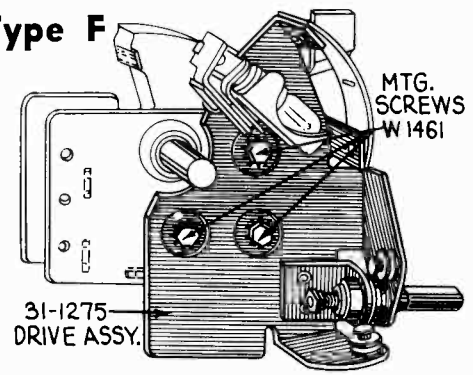
Type C



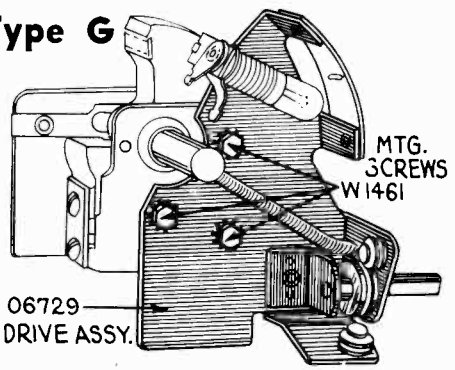
Type D



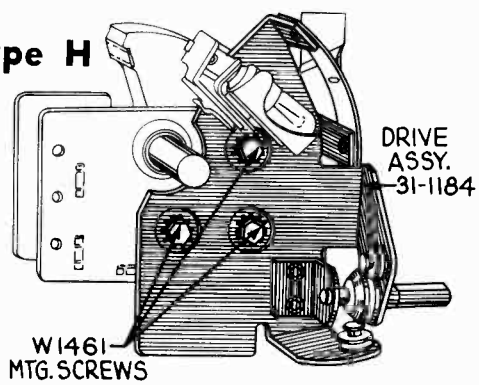
Type F



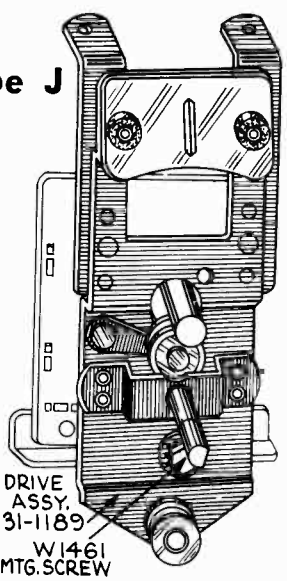
Type G



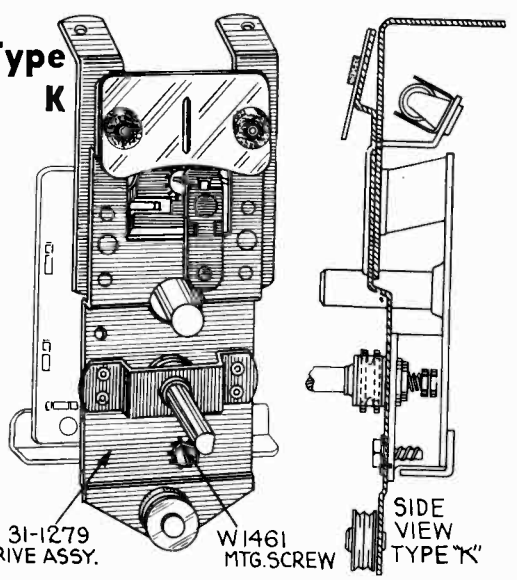
Type H



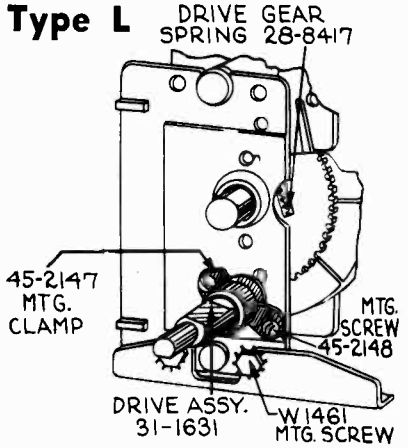
Type J



Type K



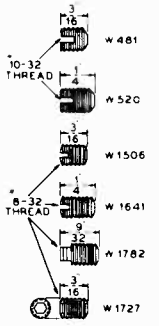
Type L



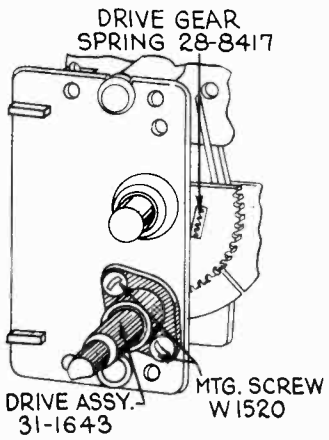
DIAL DRIVE CORDS

	Length (inches)
06920	15½
3484A	15¾
4020A	17½
31-1352	16½
31-1456	17
31-1457	15¾
31-2082	8⅜
31-2086	8⅝
31-2096	12⅛

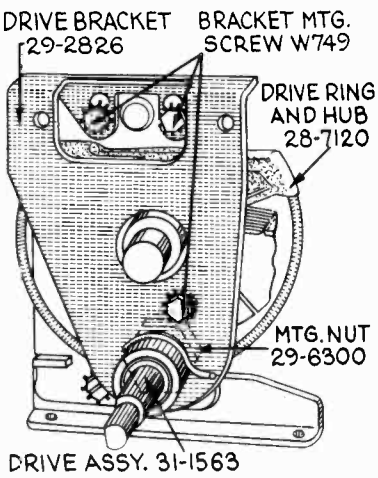
SET SCREWS



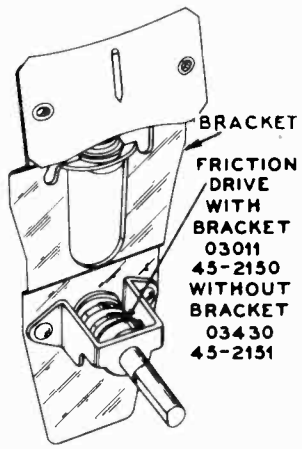
Type M



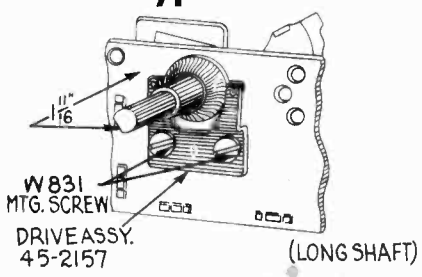
Type N



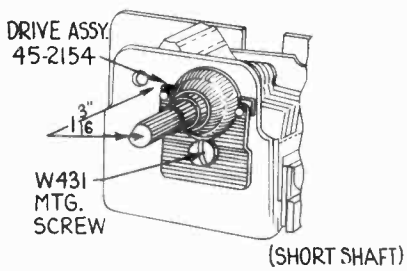
Type NA



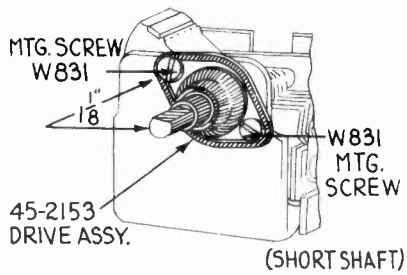
Type O



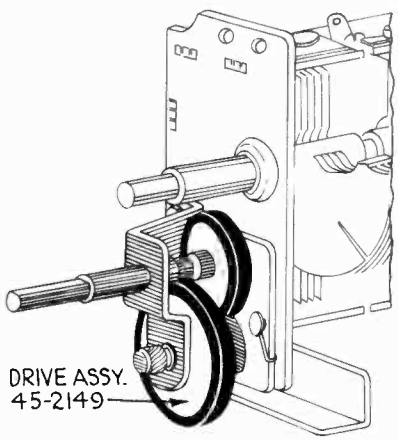
Type P



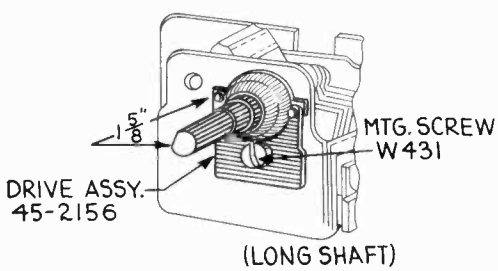
Type Q



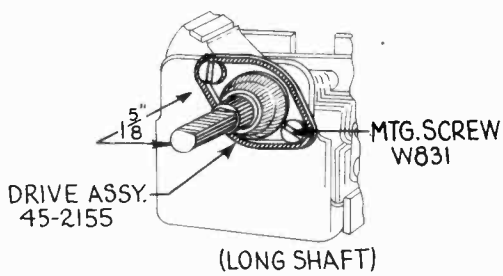
Type R



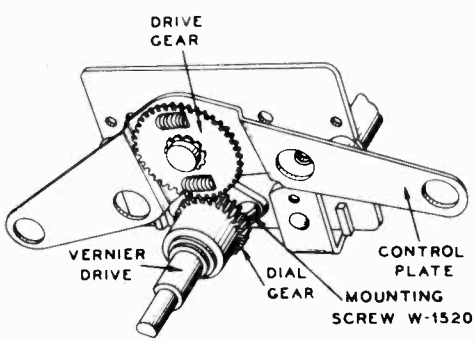
Type S



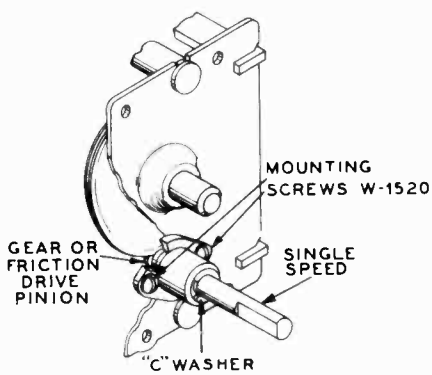
Type T



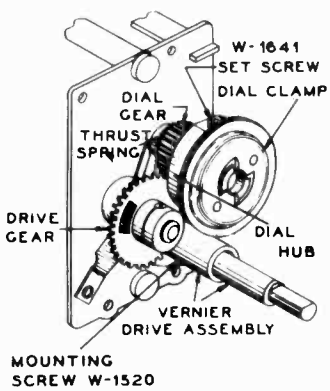
Type U



Type V



Type W



DIAL DRIVE ASSEMBLIES — 1938 MODELS

Model	Type Drive	Illus.	Dial or Dial and Pointer	Dial Washer and Clamp	Vernier Drive or Tuning Shaft Ass'y	Drive Cord	Drive Spring	Drive Pulley
38-1	Automatic Tuning Dial—See Bulletin 273							
38-2	Automatic Tuning Dial—See Bulletin 273							
38-3	Automatic Tuning Dial—See Bulletin 273							
38-4	Cone-Centric Tuner Type—See Page 6 for Part List							
38-5	Vernier	X	27-5330	Washer 27-4598 Clamp 28-5089	31-2089			
38-7	Cone-Centric Tuner Type—See Page 6 for Part List							
38-8	Vernier	X	27-5327	Washer 27-4598 Clamp 28-5089	31-2072			
38-9	Vernier	X	27-5327	Washer 27-4598 Clamp 28-5089	31-2072			
38-10	Vernier	X	27-5327	Washer 27-4598 Clamp 28-5089	31-2072			
38-12	Cable	Y	31-2097 Pointer 28-5185		38-9102 Clip 28-3904	31-2082	28-8751	Pulley 28-6662 Screw W-1400
38-14, Codes 121 and 124	Cable	Z	31-2098 Pointer 28-5201		38-9001 Shaft	31-2096	6508	31-1283
38-15, Codes 121 and 124	Cable	Z	31-2137 Pointer 28-5201		38-9001	31-2096	6508	31-1283
38-22, Codes 121 and 124	Cone-Centric Tuner Type—See Page 6 for Part List							
38-23 Code 121	Vernier	X	27-5327	Washer 27-4598 Clamp 28-5089	31-2072			
38-33 Code 121	Cable	Z	31-2107 Pointer 28-5201		Shaft 38-9107 Clip 28-3904	31-2086	28-8751	28-6662 Set Screw W-1400
38-34 Code 121	Vernier	V	27-5252	Hub 28-7152 Clamp 28-2837 Set Screw W-1506	31-1863 ◉			
38-34 Code 125	Cable	Z	31-2107 Pointer 28-5201		Shaft 38-9107 Clip 28-3904	31-2086	28-8751	28-6662 Set Screw W-1400
38-35 Code 121	Cable	Z	31-2107 Pointer 28-5201		Shaft 38-9107 Clip 28-3904	31-2086	28-8751	28-6662 Set Screw W-1400
38-38 Code 121	Vernier	X	27-5333	Washer 27-4598 Clamp 28-5089	31-2128			
38-39	Vernier	X	27-5333	Washer 27-4598 Clamp 28-5089	31-2128			
38-40	Vernier	X	27-5333	Washer 27-4598 Clamp 28-5089	31-2128			
38-60 Codes 121 and 125	Vernier	V	27-5196	Hub 28-7152 Clamp 28-2837 Set Screw W-1506	31-1863 ◉			
38-62 Code 121	Vernier	Long T Shaft	27-5287	Hub 28-7152 Clamp 28-2837 Set Screw W-1506	45-2426			
38-89 Codes 121 and 125	Vernier	V	27-5204	Hub 28-7152 Clamp 28-2837 Set Screw W-1506	31-1844 ◉			
38-93 Code 121	Vernier	Q	27-5280 (121) Pointer 27-7933		45-2171			
38-93 Code 125	Cable 125	Y	31-2108 (125) Pointer 28-5201		38-9102 "C" Washer 28-3904	31-2086	28-8751	28-6662 Set Screw W1400
38-116, Codes 121 and 125			27-5207 (121) 27-5340 (125)	Automatic Tuning—See Service Bulletins 273, 286 and 286A				
38-620, Codes 121 and 125	Gear-Vernier	Same as 37-620, Code 125						
38-623, Codes 121 and 125	Gear-Vernier	Same as 37-623, Code 125						
38-624, Codes 121 and 125	Gear-Vernier	Same as 37-624, Code 125						
38-640 Code 121	Gear-Vernier	Same as 37-640, Code 125						
38-690, Codes 121 and 125			27-5207 (121) 27-5340 (125)	Automatic Tuning—See Bulletin 273				
38-2620, Codes 121, 125, 325	Same as 37-2620							
38-2670, Codes 121, 125, 325	Same as 37-2670							

◉ Specify whether gear or friction pinion is required.

CONCENTRIC TUNING DIAL — REPLACEMENT PARTS

(See Page 4 for locations of Parts)

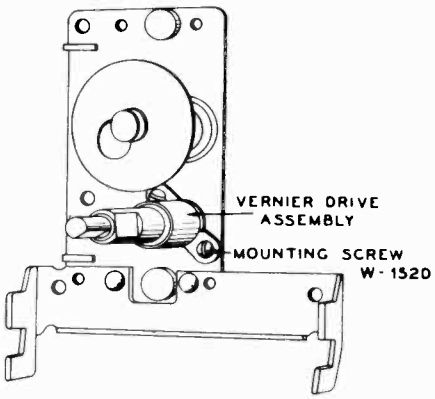
Fig. No.	Description	Part No.	List Price
1	Dial Retaining Ring	28-5107	$0.10
2	Dial (Models 38-7, 38-22)	27-5338	..
	Dial (Model 38-4)	27-5337	..
3	Drive Shaft	28-6675	.10
4	Pointer	38-8925	.25
5	Pilot Lamp (Models 4 and 7)	34-2064	.09
	Pilot Lamp (Model 22)	34-2192	.15
6	Bezel Assembly	40-6136	1.20
7	Reflector Assembly	45-2478	.75
8	Main Bearing	28-7242	.60
9	Mounting Bracket Assembly	45-2479	1.75
10	Coupling Assembly	31-2056	1.25
11	Pawl	28-5072	..
12	Cone	31-2055	.10
13	Selector Crank Assembly	45-2476	1.75
14	Mask and Felt (Selector Crank)	45-2556	.85
15	Spring	28-8761	.04
16	Indexing Plunger	38-8812	..
17	Knob (Small)	27-4572	.35
17X	Knob (Large)	45-2477	$0.20
18	Screw (Knob)	28-6672	.10
19	Insulating Washers	27-8806	.90/c
20	Insulating Washers	27-8806	.90/c
21	Contact Spring	27-8909*	..
22	Pawl Pin	28-6674	..
23	Spring (Pawl)	28-8756	..
	Spring Pin	28-6616	..
24	Screw (Audio Shorting Switch)	W-164	..
25	Indexing Plunger	28-5055	..
26	Spring (Indexing Plunger)	28-8757	..
27	Screw (Indexing Plunger)	28-6661	..
28	Lock Nut	W-434	..
29	Shorting Contact (Selector Arm)	45-2619	..
30	Retaining Screw	28-6666	..
31	Spring	28-8758	..
	Selector Crank Assembly	45-2476	1.75
	Gear (Small) Tuning Condenser	45-2490	.60
	Gear (Large) Tuning Condenser	45-2491	.50

PHILCO RADIO AND TELEVISION CORPORATION
Parts and Service Division
Philadelphia, Pa.

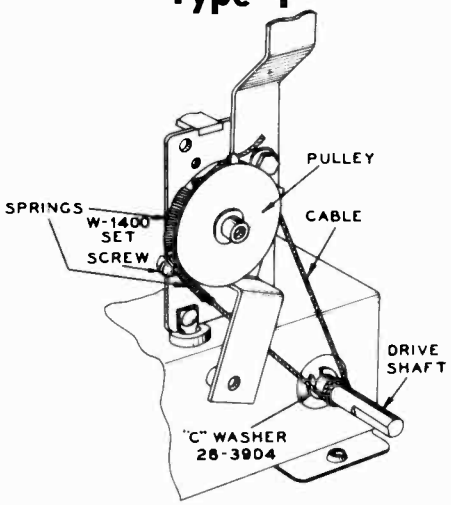
November, 1937

Printed in U. S. A.

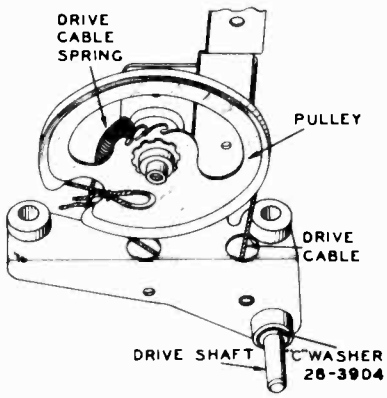
Type X



Type Y



Type Z



CONCENTRIC TUNING DIAL

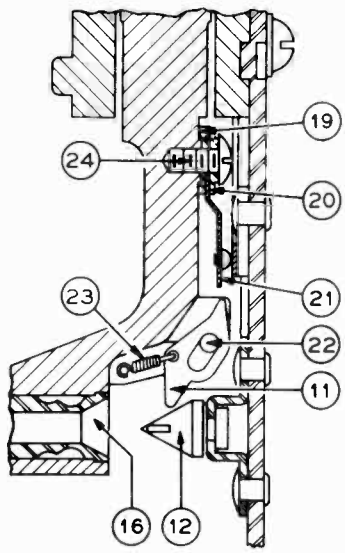
(See Page 6 for Replacement Part Numbers)

Illustrations of the **Cone-Centric Automatic Tuning Unit** are shown in Figures 1, 2 and 3 below.

Figure 1 shows a side cutaway view of the complete unit. Figure 2 is a cross section view of the selector arm showing the audio shorting switch, silent tuning pawl and stator cone.

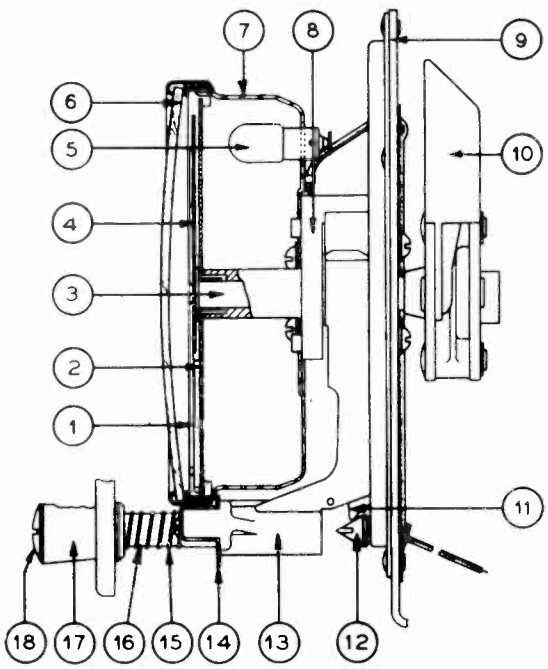
Figure 3 is a bottom cross section view of the selector arm showing the audio shorting switch (29) and indexing plunger (25).

The parts in each view are numbered. These numbers correspond to those given in the "Fig. No." column of the Parts List, page 6.



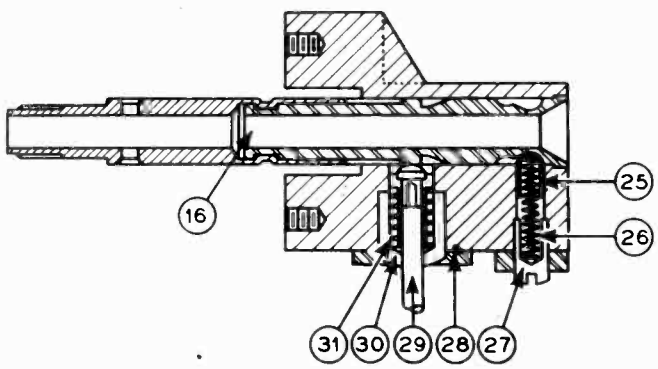
CUTAWAY VIEW OF SELECTOR ARM SHOWING PAWL AND SILENT TUNING SWITCH

Fig. 2



SIDE CUTAWAY VIEW OF CONE-CENTRIC AUTOMATIC TUNING UNIT

Fig. 1



BOTTOM CUTAWAY VIEW OF SELECTOR ARM PLUNGER ASSEMBLY

Fig. 3

DIAL DRIVE ASSEMBLIES — 1928 TO 1936 (continued)

Model	Type Drive	Illus.	Complete Drive Assy.	Drive Cord	Drive Cord Spring	Dial	Inverted Dial	Dial Pointer Assy.	Drive Bracket	Drive Ring and Hub
111-112	Cable		4016A	4020A	7776	4276				
116	Vernier	"N"	31-1563			27-5107		28-7129	29-2826	
118	Cable-Two Types	"J"	45-2152	31-1456	7776	31-1205	31-1241			
		"K"	31-1279	31-1456	7776	31-1414				
144	Cable & Vernier	"B"	31-1280	31-1352	28-8245	31-1364				
	Friction (Rubber)	"R"	45-2149			31-1206				
200	Cable		04836	31-1456	7776	31-1255				
201	Cable & Vernier		31-1382	31-1456	7776	31-1205				
600	Direct Drive No replacement		Condenser must be replaced			27-5179 Pointer 27-7933				
602	Vernier Single Speed	Q Split Shaft	45-2469			27-5188 Pointer 27-8236				
604	Gear-Vernier	U	See Model 37-604 for part numbers							
610	Vernier	"L" or "M"	31-1643			27-5131		31-1550		
611	Vernier	"L" or "M"	31-1643			27-5097		31-1550		
620	Vernier	"L" or "M"	31-1643			27-5098		31-1550		
623	Vernier	"L" or "M"	31-1643			27-5097		31-1550		
624	Vernier	"L" or "M"	31-1643			27-5163		31-1724		
625	Vernier	"L" or "M"	31-1643			27-5098		31-1550		
630-635	Vernier	"L" or "M"	31-1643			27-5098	27-5121	31-1550		
640	Vernier	"N"	31-1563			27-5103	27-5122	31-1550	29-2826	31-1600
641	Vernier	"N"	31-1563			27-5125		31-1550	29-2826	31-1600
642	Vernier	"L" or "M"	31-1643			27-5098		31-1550		
643	Vernier	"N"	31-1563			27-5131		31-1550	29-2826	31-1600
645	Vernier	"N"	31-1563			27-5165		31-1724	29-2826	31-1600
650	Vernier	"N"	31-1563			27-5103	27-5122	31-1550	29-2826	31-1600
651	Vernier	"N"	31-1563			27-5170		31-1724	29-2826	31-1600
655	Vernier	"N"	31-1563			27-5165		31-1724	29-2826	31-1600
660-665	Vernier	"N"	31-1563			27-5115	27-5123	28-7129	29-2826	31-1600
680	Vernier	"N"	31-1563			27-5127		28-7129	29-2826	31-1600

DIAL DRIVE ASSEMBLIES — 1937 MODELS

Model	Type Drive	Illus.	Dial	Dial Hub† and Clamp	Drive Gears	Vernier Assy.
37-9	Automatic Tuning Model—See Bulletin 273 for Parts					
37-10-37-11 Codes 121 and 125	Automatic Tuning Model—See Bulletin 273 for Parts					
37-33	Vernier	Q Solid Shaft	27-5243 Pointer 27-7933			31-1925
						45-2171
37-34	Vernier	V	27-5252	Hub 28-7152 Clamp 28-2837 W-1506 Set Screw		31-1863 ⊙
37-38	Vernier	V	27-5196	Hub 28-7152 Clamp 28-2837 Set Screw W-1506		31-1863 ⊙
37-60	Vernier	V	27-5196	Hub 28-7152 Clamp 28-2837		31-1863 ⊙
37-61	Vernier	M	27-5205	Hub 28-7152 Clamp 28-2837		31-1879
37-62	Vernier	T Long Shaft	27-5287	Hub 28-7152 Clamp 28-2837		45-2426
37-84		This receiver uses a direct drive assembly	27-5210 Dial Dial Pointer 27-7933			
37-89	Vernier Single Speed	V	27-5204	Hub 28-7152 Clamp 28-2837		31-1844 ⊙
37-93	Vernier	Q	27-5280 Pointer 27-7933			45-2171
37-116 Codes 121 and 122, 126	Vernier (121)	W	27-5249 (121)	Hub 28-7187 (121) Clamp 28-2837 (121)	Solid 28-7185* Two Section 31-1884	31-1871 Code 121
	Automatic (122)	For Code 122 Parts—See Service Bulletin 273				
37-600	Vernier Single Speed	Q ★	27-5193 Pointer 28-3789			45-2469
37-602	Vernier Single Speed	Q ★	27-5193 Pointer 28-3789			45-2469
37-604	Gear-Vernier	U	31-1799 Ass'y of Hub and Dial		Two Section 31-1787 Solid 28-6436	31-1877
37-610 Codes 121 and 125	Gear-Vernier	W	27-5203, Code 121 27-5285, Code 125	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-611 Code 121	Gear-Vernier	W	27-5203, Code 121 27-5285 (125)	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-620 and 630 Codes 121-125	Gear-Vernier	W	27-5203, Code 121 27-5285 (125)	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-623 Codes 121 and 125	Gear-Vernier	W	27-5214 (121) 27-5285 (125)	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-624 Codes 121 and 125	Gear-Vernier	W	27-5214 (121) 27-5285 (125)	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-640 Codes 121 and 125	Gear-Vernier	W	27-5214 (121) 27-5285 (125)	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-641 Code 121	Gear-Vernier	W	27-5214 (121) 27-5285 (125)	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-643 Code 121	Gear-Vernier	W	27-5250	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-650 Code 121	Gear-Vernier	W	27-5248	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-660 Code 121	Gear-Vernier	W	27-5209	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-665 Code 121	Gear-Vernier	W	27-5244	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-670 Code 121	Gear-Vernier	W	27-5213	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-675 Codes 121 and 122	Gear-Vernier (Code 121)	W	27-5249 (121)	Hub 28-7187 (121) Clamp 28-2837 (121)	Two Section 31-1884 Solid 28-7185*	31-1871 (Code 121)
	Automatic Tuning Dial (Code 122)		27-5207 (122)	For Code 122 Parts—See Bulletin 273		
37-690	Automatic Tuning—See Bulletin 273					
37-2620 Code 121	Gear-Vernier	W	27-5245	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-2650 Code 121	Gear-Vernier	W	27-5269	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871
37-2670	Gear-Vernier	W	27-5266	Hub 28-7187 Clamp 28-2837	Two Section 31-1884 Solid 28-7185*	31-1871

† Set Screw W-1506.
⊙ Specify whether gear or friction pinion is required.
★ Tuning shaft of this model is split.

* Additional parts required.
Set Screw W-1641.
Thrust Spring 28-8611.
Thrust Washer 28-3976.
C Washer 28-3904.