Philco Radio Service Bulletin No. 27.

Published by the Philco Radio & Television Corporation of Great Britain Ltd., Perivale, Greenford, Middlesex

Model 98 (Series 1)

THE PHILCO RADIO MODEL 98 is a seven-valve superheterodyne long, broadcast and short-wave receiver, operating from alternating current mains. The frequency (wave-band) coverage permits reception of all short-wave (high frequency) transmissions from 16.7 to 52.6 metres. The receiver is equipped with a three point wave-band switch. The ranges are:—

1. 145—350 kc. (2,068—875 metres) Long wave-band.
2. 538—1,720 kc. (555—174 metres) Medium wave-band.
3. 5.7—18 megacycles (52.6—16.7 metres) Short wave-band.

The receiver employs one type 78E Radio Frequency amplifier; one type 6A7 oscillator and first detector; one type 78E Intermediate Frequency amplifier; one type 85 Automatic Volume Control, second detector, and audio amplifier; two type 42E Push-pull Output Pentodes; and one type 80 Rectifier. One part of the 85 valve is used as a Driver stage for the pair of 42E Push-pull Pentode valves, which deliver up to 5 watts undistorted output from the speaker.

A shadow tuning meter is incorporated, and a pilot lamp is supplied for each wave-band. The lamp illuminating each one of the three wave-bands is automatically controlled by the wave-band switch.

When a standard aerial and earth are used connection is made to the binding posts on top of the chassis. Where the Philco All-wave Aerial is used two terminals marked "Red" and "Blk." are employed for connecting the transmission line. These terminals are to be found at the rear of the chassis. The use of the Philco All-wave Aerial is highly recommended, especially in cases where "man-made static" is excessive.

Tone control has three positions with bass compensation.

The intermediate frequency is 460 kc.

Power consumption is 90 watts.

TABLE 1.—VALVE SOCKET DATA.

Valve Point.	78E R.F.	6A7 Det. Osc.	78E I.F.	85 2nd Det.	42E Output.
P	230	250	250	110	245
SG	95	97	95	—	255
K	2.3	2.6	3	—	—
		6A7: G2 = −14; G3 & 5 = 155.			

Above voltages are obtainable by using either a Philco 048 or 048A set tester, which is recommended for this test, using test prods applied to the underside of the chassis. Volume control at maximum; dial at 55; wave-band switch on Band 2. Use Fig. 1 for test points.

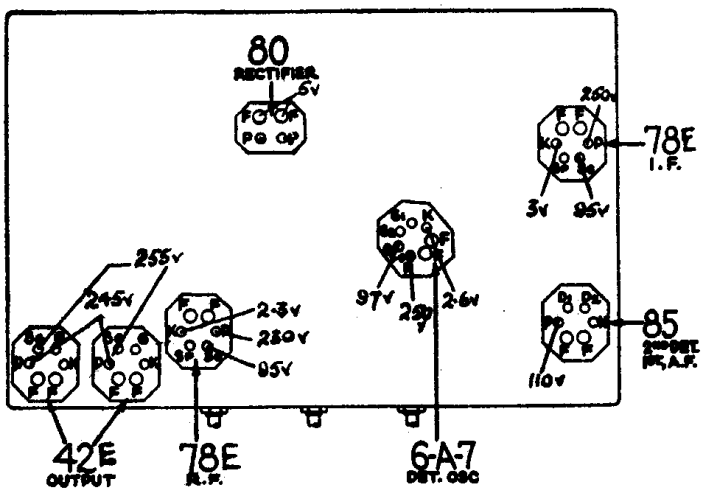
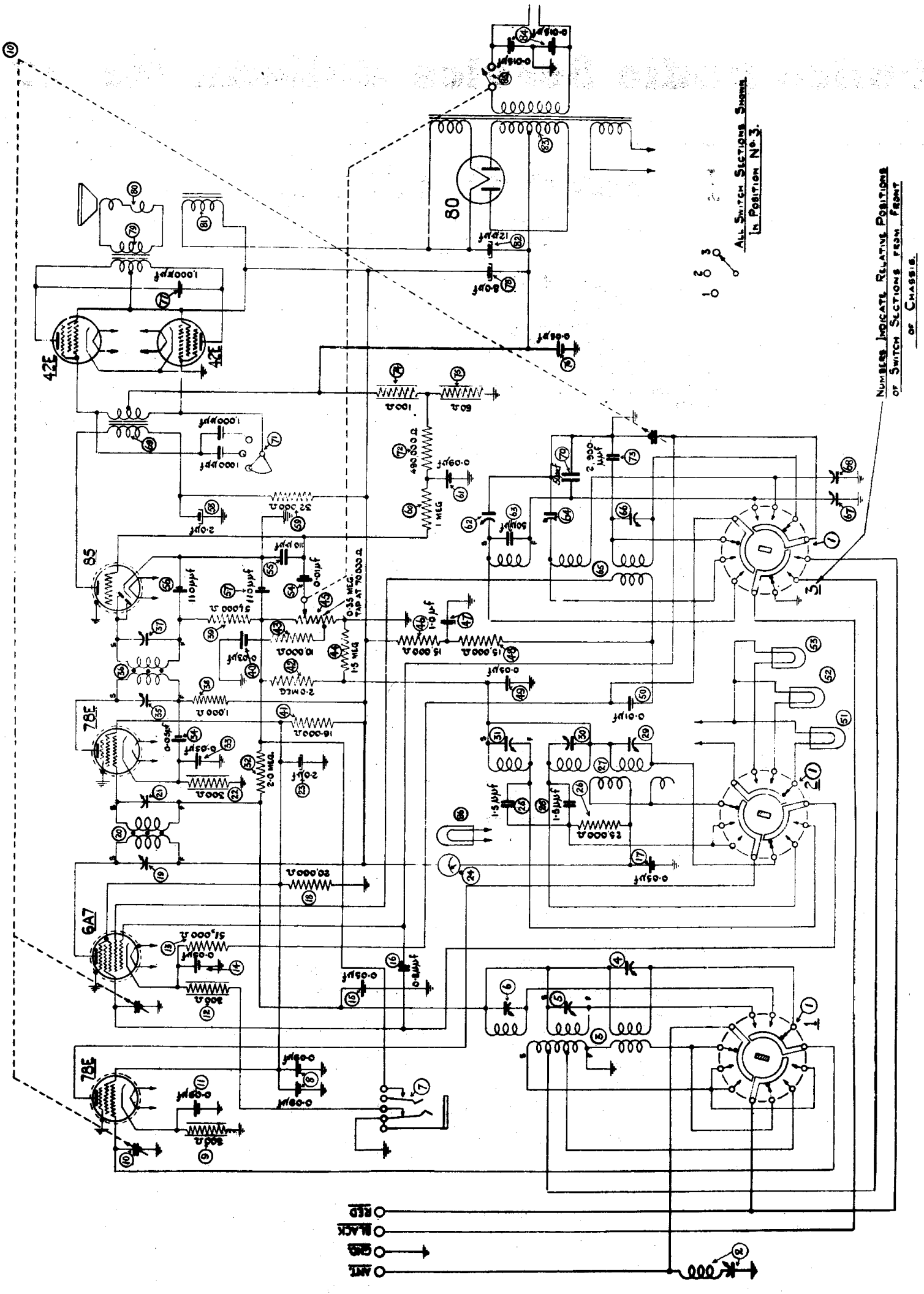


TABLE 2.—POWER TRANSFORMER DATA.

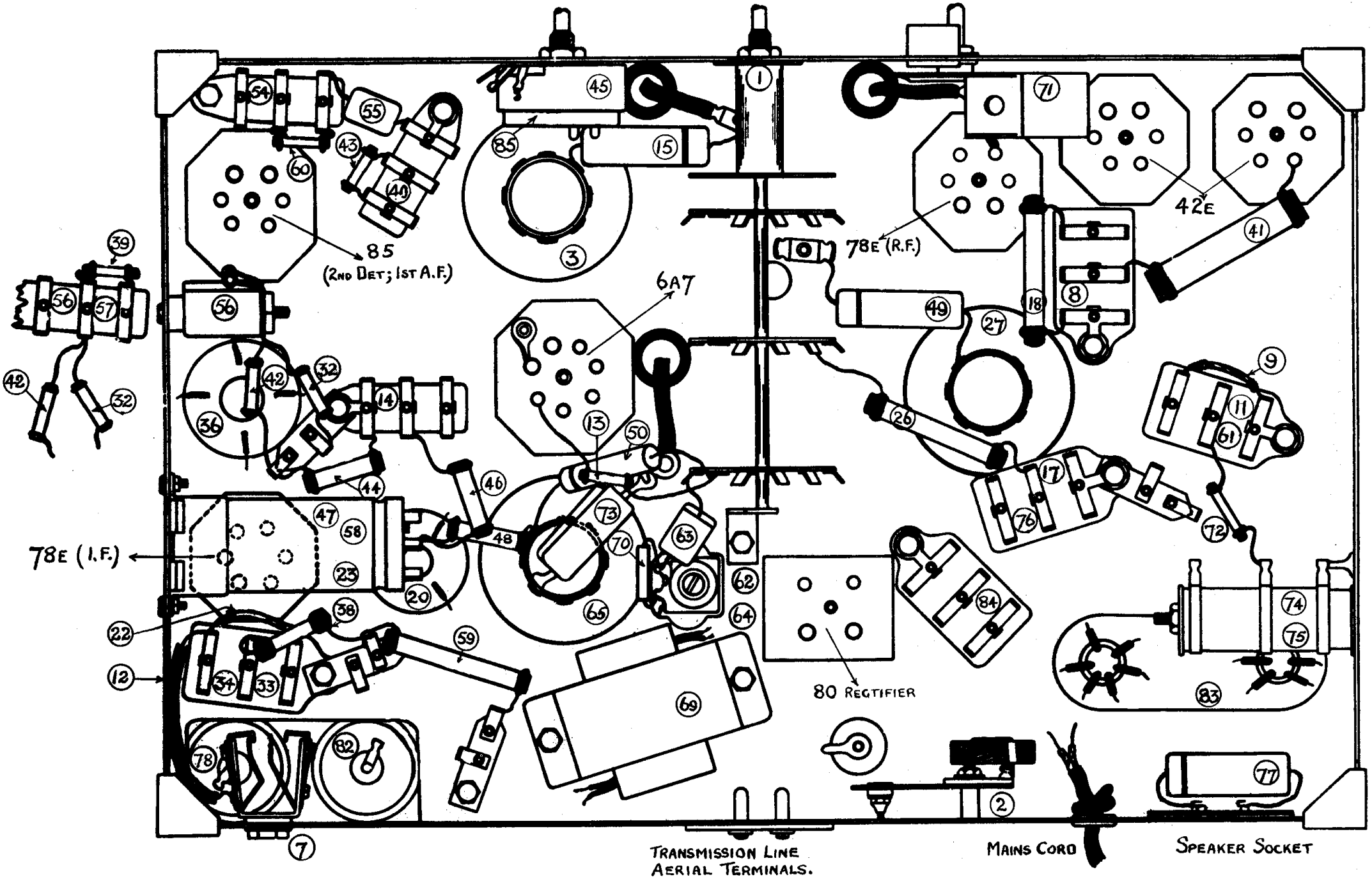
Terminals.	A.C. volts.	Current.	Circuit.	Colour.
1—12 (2—11 joined)	240	—	—	—
1—11 (joined)				
2—12 (joined)	120	—	Primary	—
3—5	660	118 m.a.	Secondary	Yellow
6—7	5.0	2.0 a.	Fil. Rect.	Blue/Green
8—9	6.3	3.5 a.	Filaments	Black
4	—	—	Centre tap of 3—5	Yellow, Green Tracer



SCHEMATIC DIAGRAM OF MODEL 98. (SERIES 1)

BOTTOM VIEW OF CHASSIS

MODEL 98 (SERIES 1)



Adjusting Compensating Condensers — Model 98

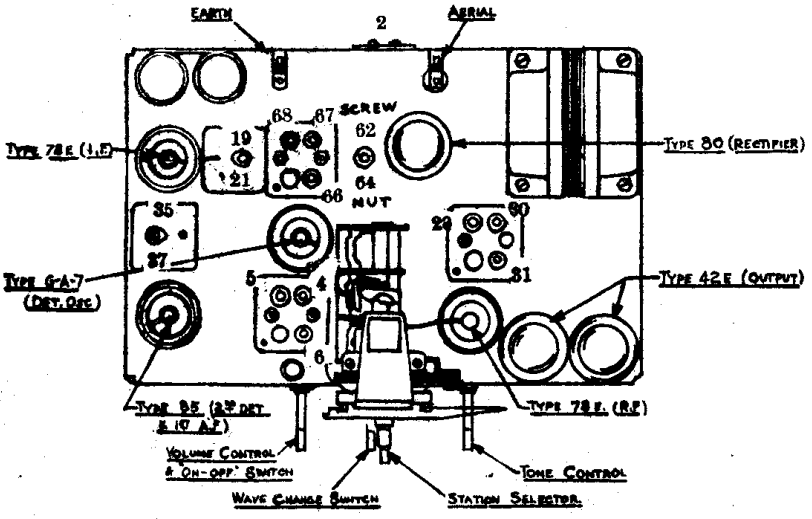
Set 048 oscillator to 460 kcs. Attach output leads of 048 to earth terminal and grid of 6A7 valve, and ouput of set to output meter. Pad I.F. padders Nos. 19 and 21, 35 and 37 to maximum.

Connect aerial lead to aerial terminal and pad wave trap padder No. 2 to give *minimum* reading on output meter. Wave trap padder is at back of chassis.

Turn wave-band switch fully clockwise (short wave). Connect output of 091 Crystal oscillator to aerial and earth terminals of set. Set scale to 18 mc. and adjust padder 66, 29 and 4 to maximum. Check that image is received at 1,710 mc. on scale. If it is not, set scale at 18 mc. and slacken off 66 until signal is heard again and then repeat above procedure.

Turn switch to middle position (M.W.). Connect lead from oscillator (make certain calibration is correct) to aerial and earth. Set scale at 1,400 kc. feed in 1.400 kc. signal and pad 68, 30 and 6 to maximum. Roll gang, feed in 600 kc. signal and pad 64 (nut) to maximum. Check 30 and 6 at 1,400 kcs. Transfer aerial and earth connections to doublet connections at back of chassis. Output should be about the same as with standard connection at this frequency (1,400 kc.).

Set scale to 260 kcs., switch anti-clockwise (L.W.). Feed in 260 kcs. signal and pad 67, 31 and 5 to maximum. Roll gang and pad 62 (screw) to maximum at 175 kcs. Re-check 67, 31 and 5 at 260 kcs.



List of Parts — Model 98 (Series I)

1.	Wave Change Switch	42-1106
2.	Wave Trap Inductance and Padder	38-6850
3.	Aerial Transformer	32-1664
4.	Padding Condenser (Aerial H.F. 18 Mc.)	
5.	Padding Condenser (Aerial H.F. 175 Kc.)	Part of 3
6.	Padding Condenser (Aerial H.F. 1,400 Kc.)	
7.	Pickup Jack	6585
8.	Twin Bakelite Condenser (.09+ .09 mfd.)	4989DG.
9.	Resistor (300 w.) (orange, black, brown),	33-3010
10.	Gang Condenser	31-1496
11.	Twin Bakelite Condenser (.09 mfd.) (with 61)	4989DG.
12.	Resistor (300 w.) (orange, black, brown)	33-3010
13.	Resistor (51,000 w.) (green, black, orange)	6098
14.	Bakelite Block Condenser (.05 mfd.)	3615SG.
15.	Tubular Condenser (.05 mfd.)	30-4020
16.	Neutralising Capacity (.8 uuf.) Top of Gang Condenser.	
17.	Twin Bakelite Condenser (.05 mfd.) (with 76)	3615DG.
18.	Resistor (20,000 w.) (red, black, orange)	6649
19.	Padding Condenser 1st I.F. Primary	Part of 20
20.	1st I.F. Transformer (and Padder Assembly)	32-1631
21.	Padding Condenser 1st I.F. Secondary	Part of 20
22.	Resistor (300 w.) (orange, black, brown)	33-3010
23.	Electrolytic condenser (2 mfd.) (plain lug). with 47, 58	30-2114
24.	Shadow Tuning Meter	450-2001
25.	Neutralising Capacity (1.5 uuf.) (eyelet on wave-change switch)	*
26.	Resistor (25,000 w.) (red, green, orange)	3656
27.	R.F. Transformer	32-1666
28.	Neutralising capacity (1.5 uuf.) (eyelet on wave-change switch)	*
29.	Padding Condenser Det. Grid H.F. 18 Mc.	
30.	„ „ „ 1,400 Kc.	Part of 27.
31.	„ „ „ 177 Kc.	
32.	Resistor (2,000,000 w.) (red, black, green)	33-1172
33.	Twin Bakelite Block Condenser (.05 mfd.)	3615DU.
34.	„ „ „ „ „	Part of 33.
35.	Padding Condenser 2nd I.F. Primary	Part of 36.
36.	2nd I.F. Transformer (and Padding Assembly)	32-1632
37.	Padding Condenser 2nd I.F. Secondary	Part of 36.
38.	Resistor (1,000 w.) (brown, black, red)	5837
39.	Resistor (51,000 w.) (green, black, brown)	6098
40.	Moulded Condenser (.03 mfd.)	8318DG.
41.	Resistor (16,000 w.) (brown, blue, orange)	7500
42.	Resistor (2,000,000 w.) (red, black, green)	33-1172
43.	Resistor (10,000 w.) (brown, black, orange)	33-1159
44.	Resistor (1,500,000 w.) (brown, green, green)	7009
45.	Volume Control	33-5068
46.	Resistor (15,000 w.) (brown, green, orange)	6208
47.	Electrolytic condenser (1 mfd.) yellow tag, with 23, 58	30-2114
48.	Resistor (15,000 w.) (brown, green, orange)	6208
49.	Tubular Condenser (.05 mfd.)	30-4020
50.	Tubular Condenser (.01 mfd.)	30-4169
51.	Dial Bulb	
52.	„ „	34-2031
53.	„ „	
54.	By-pass Condenser (.01 mfd.)	3903SU.
55.	Fixed condenser (110 uuf.)	30-1031
56.	Moulded Condenser (110 uuf.)	8035DG.
57.	„ „ „ Part of 56)	
58.	Electrolytic Condenser (2 mfd.) red tag, with 23, 47	30-2114
59.	Resistor (32,000 w.) (orange, red, orange)	3525
60.	Resistor (1,000,000 w.) (brown, black, green)	33-1171
61.	Twin Bakelite Condenser (.09 mfd.) with 11	4989DG.
62.	Padding Condenser 260 Kc. Tracker (with 64)	31-6044
63.	Mica Condenser (50 uuf.)	30-1029
64.	Padding Condenser 600 Kc. Tracker (with 62)	31-6044
65.	Oscillator Transformer	32-1665
66.	Padding Condenser Osc. H.F. 18 Mc.)	
67.	„ „ „ 175 Kc.)	Part of 65.
68.	„ „ „ 1,400 Kc.)	
69.	L.F. Transformer	32-7372
70.	Mica Condenser (50 uuf.)	30-1029
71.	Tone Control Switch	30-4311
72.	Resistor (490,000 w.) (yellow, white, yellow)	6097
73.	Mica Condenser (2,900 uuf.) (red, blue, blue)	30-1054
74.	Resistor 100 w. B.C. Resistor	33-3208
75.	„ 60 w. „ Part of 74	
76.	Moulded Condenser (.05 mfd.) with 17	3615DG.
77.	Tubular Condenser (1,000 uuf.)	30-4201
78.	Electrolytic Condenser (8 mfd.)	30-2025
79.	Output Transformer	2585
80.	Speech Coil and Cone	36-3159
81.	Speaker Field Coil	
82.	Electrolytic Condenser (12 mfd.)	30-2117
83.	Mains Transformer (100-130 or 200-250 v., 50 cycles)	32-7371
84.	Twin Bakelite Block Condenser (.015+ .015 mfd.)	3793DG.
85.	On-off Switch	Part of 45
86.	Shadowmeter Bulb	Optional 34-2064 or 6608
	Complete Speaker Assembly (K31)	36-1151
	Bezel	27-4120
	Drive Cord for Dial	27-7755
	Chassis Bolts	W1496a W

* Eliminated on some receivers where neutralising capacity is obtained by wiring dress.

Philco Radio Service Bulletin No. 28

Published by the Philco Radio & Television Corporation of Great Britain Ltd., Perivale, Greenford, Middlesex

Model 98 (Series 2) Run Number 4.

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

This Service Bulletin covers only the second series of the Model 98, the first series being covered by a separate Bulletin.

The second series Models may be readily recognised by the fact that they have four waveband coverage and are stamped on the back of the chassis "second series."

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

Valves Used: 1 type 78E, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78E, I.F.; 1 type 85, 2nd Detector and 1st A.F.; 2 type 42E, Push-Pull Output; 1 type 80 Rectifier.

Wave Bands: Four: (1) Long-wave; (2) Medium; (3) Short-wave; (4) Ultra Short-wave.

Coverage of Each Band: (1) 145 to 390 K.Cs. (2050-770 metres); (2) 540 to 1720 K.Cs. (555-175 metres); (3) 2.2 to 2.6 M.C. (136-115 metres); (4) 5800 to 18000 K.Cs. (52-16.7 metres).

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

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

Intermediate Frequency: 451 K.C.

Power Consumption: 85 watts.

Speaker: K-31.

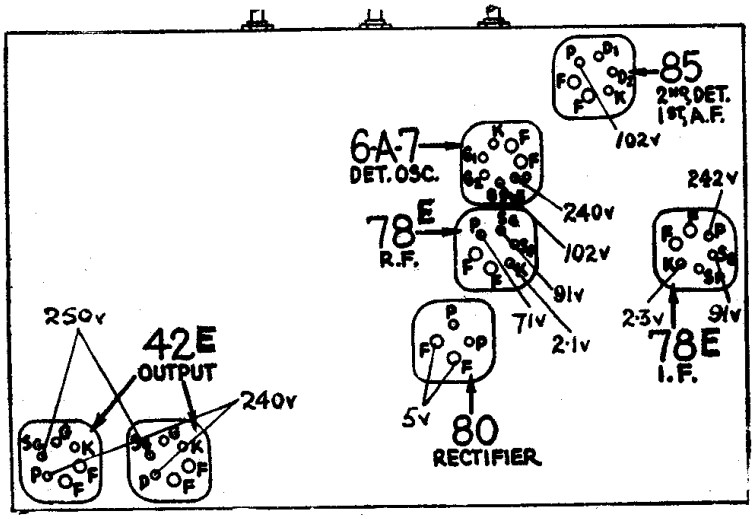


Fig. 1. Valve Sockets as viewed from bottom.

Valve Socket Voltages (Line Voltage 230)

Measured to Earth

Valve	78E R.F.	6A7 Det. Osc.	78E I.F.	85 2nd Det.	42E Output
Point P	71	240	242	102	240
SG	91	91	91	—	250
K	2.1	2.2	2.3	—	—

6A7: G 3 & 5 = 102V. 80 Fil.—Earth: 300V.

Above voltages were obtained by using a PHILCO 048A All-purpose Tester, using test prods applied to underside of chassis. Volume control at minimum; dial at 55; waveband switch at medium broadcast. Use Fig. 1 for test points. Type K-31 speaker employed.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Colour
2 & 11 joined 1 & 12 mains	200-260 v. 40-100 cycles	—	Primary	1 and 11 White 2 and 12 White/Black
1 & 11 joined 2 & 12 form mains	100-130 v. 40-100 cycles	—	"	"
1 and 2	115 (25 cycles)	—	"	White
3 and 5	710	118 M.A.	Secondary	Yellow
6 and 7	5.0	2.0 A.	Fil. Rect.	Blue
8 and 9	6.3	3.5 A.	Filaments	Black
4	—	—	Centre Tap of 3 and 5	Yellow, Green Tracer

Adjusting Compensating Condensers

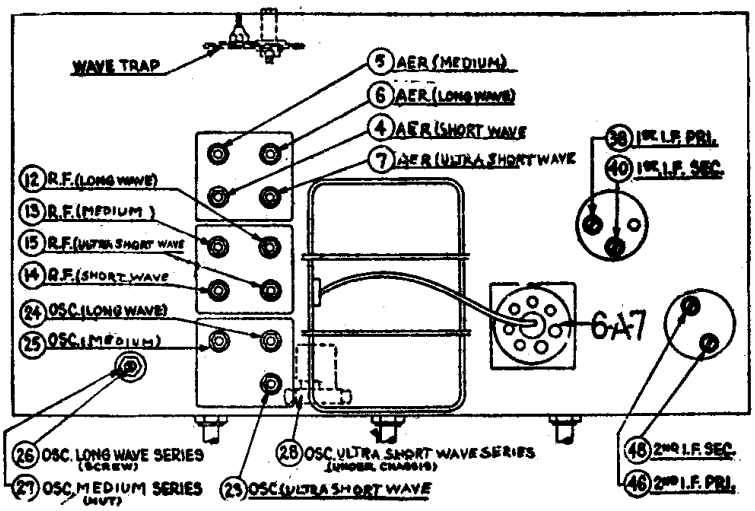


Fig. 2. Locations of Compensating Condensers

Adjustment of compensating condensers in Model 98 (Series 2) requires an accurate signal generator covering long-wave, medium wave, short, and ultra short-wave frequencies. The PHILCO Models 048A and 091 Signal Generators are ideal for this purpose.

An output meter is also needed. PHILCO Model 048A 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 is shown in Fig. 2. Connect the output meter to the plate contacts of the 42E output valves (using the adapters provided with the 048A) and set it at the 0-30 volt range.

I.F.—Set the Signal Generator at 451 K.C., and attach its aerial lead to the grid cap of the 6A7 valve on the Model 98 (having removed the grid clip from the valve). Connect the earth terminal of the Signal Generator to the earth terminal of the set. Turn on the set, turn the waveband switch to second position (medium) and set dial at 55. Now with the fibre screwdriver, adjust condensers (46) and (48) 2nd I.F.) and then (38) 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.

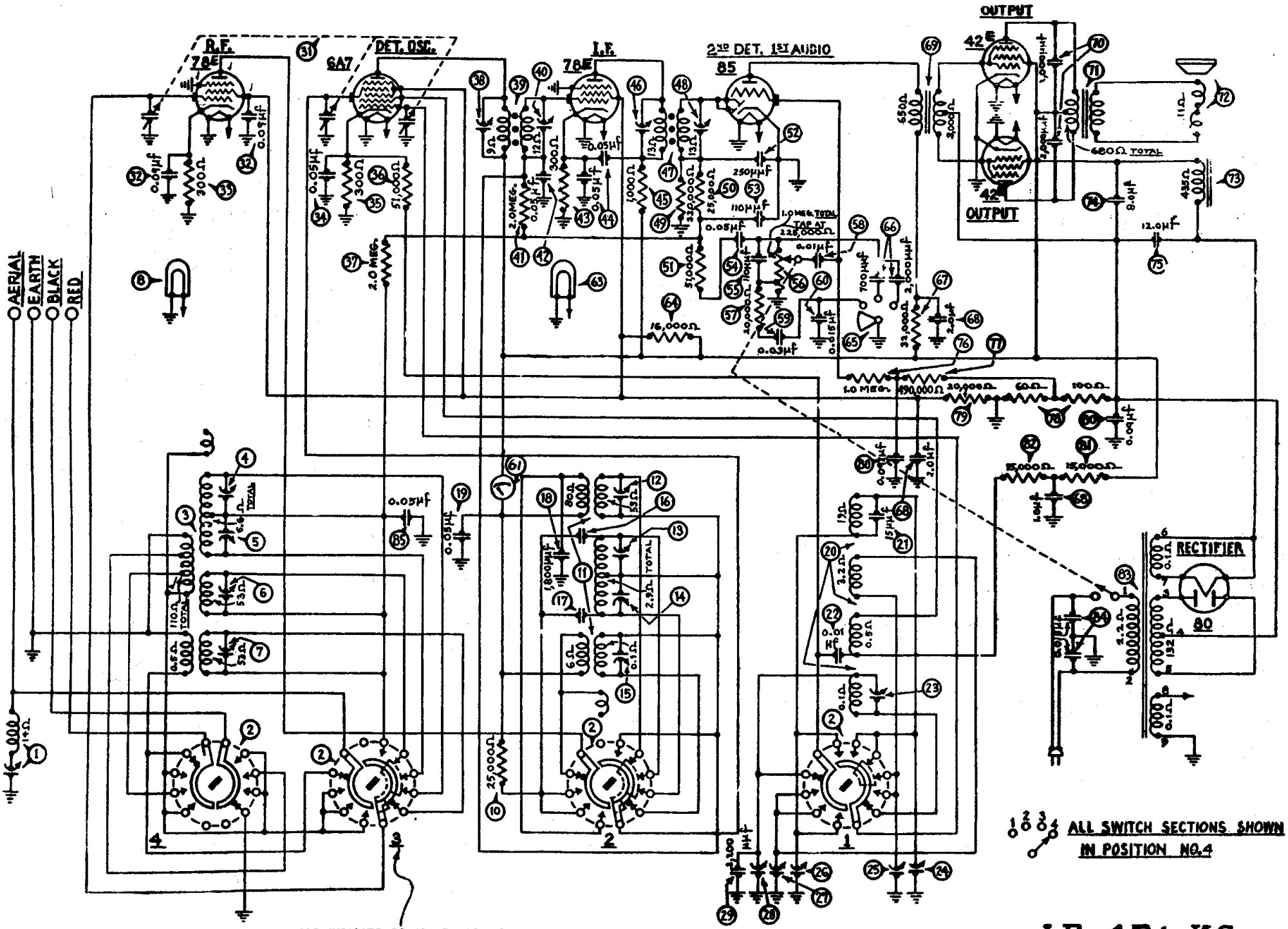


Fig. ?. Schematic Diagram of Model 98 (Series 2).

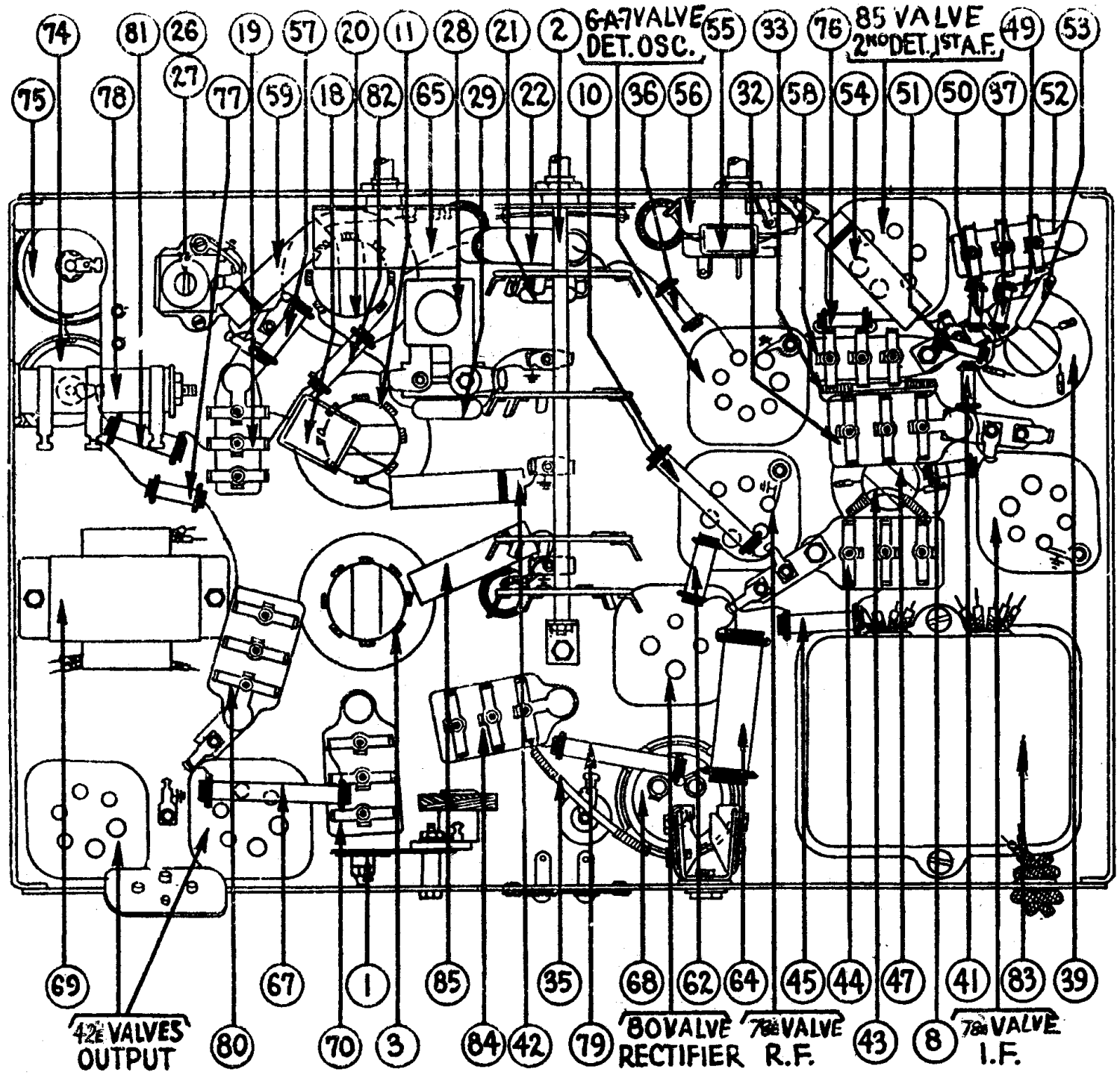


Fig. 3. Bottom View of Chassis

WAVE TRAP—Connect the Signal Generator aerial and earth leads to the aerial and earth terminals of the set. Replace the grid clip on the 6A7 valve cap. With the signal generator operating at 451 K.C. and the set controls adjusted as for I.F., adjust wavetrap (1) until the minimum reading is obtained in the output meter.

ULTRA-SHORTWAVE—Turn waveband switch to position 4 (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, R.F., and aerial compensators in turn, for maximum reading. These are (23), (15) and (7) respectively.

Turn the dial to 6.0 M.C., set the signal generator at 6.0 M.C., and adjust condenser (28) for maximum reading. This compensator is located underneath the chassis and reached from underneath. (See Fig. 3).

MEDIUM WAVE—Turn waveband switch to position 2 (medium wave), set signal generator at 1500 and dial of set at 150. Now adjust the oscillator, R.F., and aerial "Medium" condensers. These are (25), (13) and (5) respectively.

Now turn the dial to 60, set signal generator at 600 and adjust condenser (27) (oscillator medium-series) (nut) for maximum reading.

SHORT WAVE BAND—Turn waveband switch to position 3 from left (short wave); set dial at 2.4 and signal generator at 2400 K.C. Adjust condensers (14) and (4) for maximum reading. (Aerial and R.F. short wave.)

LONG WAVE BAND—Turn waveband switch to position 1 (left) (Long wave). Set dial at 35 and signal generator at 350 K.C. Adjust condensers (24), (12) and (6) (oscillator, R.F., and Aerial long wave) for maximum reading.

Turn dial to 17, signal generator to 170 and adjust condenser (26) (long wave series) (screw) for maximum reading.

Replacement Parts—Model 98 (Series 2)

	Description.	Part No.
1	Wave Trap	38-6850
2	Waveband Switch	42-1114
3	Aerial Transformer	32-1708
4	Compensating Condenser (Aer.) (Shortwave)	Part of 3
5	Compensating Condenser (Aer.) (Medium)	Part of 3
6	Compensating Condenser (Aer.) (Longwave)	Part of 3
7	Compensating Condenser (Aer.) (Ultra S.W.)	Part of 3
8	Dial Lamp	34-2064
10	Resistor (25,000 ohms) (Red-Green-Yellow)	3656
11	R.F. Transformer	32-1709
12	Compensating Condenser (R.F. Longwave)	Part of 11
13	Compensating Condenser (R.F. Medium)	Part of 11
14	Compensating Condenser (R.F. Short)	Part of 11
15	Compensating Condenser (R.F. Ultra S.W.)	Part of 11
16	Condenser	Part of 11
17	Condenser	Part of 11
18	Condenser (.0018 Mfd. Mica)	6018
19	Condenser (.05 Mfd. Bakelite Block)	3615-SG
20	Oscillator Transformer	32-1710
21	Condenser (.000015 Mfd. Mica)	30-1030
22	Condenser (.01 Mfd. Tubular)	*30-4145
23	Compensating Condenser (Osc. U.S.W.)	Part of 20
24	Compensating Condenser (Osc. Longwave)	Part of 20
25	Compensating Condenser (Osc. Medium and Short)	Part of 20
26	Compensatnig Condenser (Osc.L.W.Series)	Part of 31-6044
27	Compensating Condenser (Osc. Med. Series)	Part of 31-6044
28	Compensating Condenser (Osc. U.S.W. Series)	04000-R
29	Condenser (.0022 Mfd. Mica)	30-1057
31	Tuning Condenser Assembly	31-1555
32	Condenser (.09 Mfd. Twin Bakelite)	4989-DG
33	Resistor (300 ohms) (Orange-Black-Black)	83-3010
34	Condenser (.05 Mfd. Tubular) (On top of chassis)	30-4327
35	Resistor (300 ohms Flexible) (Orange-Black-Black)	33-3010
36	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
37	Resistor (2 Megs.) (Red-Black-Green)	33-1025
38	Compensating Condenser (1st I.F. Primary)	Part of 39
39	1st I.F. Transformer	32-1835
40	Compensating Condenser (1st I.F. Secondary)	Part of 39
41	Resistor (2 Megs.) (Red-Black-Green)	33-1025
42	Condenser (.05 Mfd. Tubular)	30-4020
43	Resistor (300 ohms Flexible) (Orange-Black-Black)	33-3010
44	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DU
45	Resistor (1,000 ohms) (Brown-Black-Red)	5837
46	Compensating Condenser (2nd I.F. Primary)	Part of 47
47	2nd I.F. Transformer	32-1836
48	Compensating Condenser (2nd I.F. Secondary)	Part of 47
49	Resistor (330,000 ohms) (Orange-Orange-Yellow)	33-1200
50	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013
51	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
52	Condenser (.00025 Mfd. Bakelite Block)	8317-SG
53	Condenser (.00011 Mfd. Mica)	30-1031
54	Condenser (.05 Mfd. Tubular)	30-4020
55	Condenser (.00011 Mfd. Mica)	30-1031
56	Volume Control and On-Off Switch	33-5113
57	Resistor (20,000 ohms) (Red-Black-Orange)	6650
58	Condenser (.01 Mfd. Bakelite Block)	3903-SU
59	Condenser (.03 Mfd. Mica)	30-4025
60	Condenser (in Tone Control)	Part of 66
61	Shadow Tuning Meter	45-2080
62	Resistor (4,000 ohms) (Yellow-Black-Red)	33-1040
63	Pilot Lamp (Shadow Tuning Meter)	Part of 61
64	Resistor (16,000 ohms) (Brown-Blue-Orange)	33-1201
65	Tone Control	30-4333
66	Condensers in Tone Control	Part of 65
67	Resistor (32,000 ohms) (Orange-Red-Orange)	3525
68	Condenser (Electrolytic) (2 Mfd., 2 Mfd., 1 Mfd.)	30-2114
69	L.F. Transformer (Top of Chassis)	32-7471
70	Condenser (.002 Mfd. Twin Bakelite Block)	7296-DU
71	Output Transformer	K-31
72	Voice Coil & Cone Assembly	36-3159 K-31
73	Field Coil & Pot Assembly	36-3463 K-31
74	Condenser (8 Mfd. Electrolytic)	30-2025
75	Condenser (12 Mfd. Electrolytic)	30-2117
76	Resistor (1 Meg.) (Brown-Black-Green)	33-1171
77	Resistor (.5 Meg.) (Yellow-White-Yellow)	33-1169
78	Resistor (B.C. Wirewound, 60 ohms, 100 ohms)	33-3208
79	Resistor (20,000 ohms) (Red-Black-Orange)	6649
80	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG
81	Resistor (15,000 ohms) (Brown-Green-Orange)	6208
82	Resistor (15,000 ohms) (Brown-Green-Orange)	6208
83	Power Transformer, 100-130 or 200-250 volts 50 cycles	32-7464
	Power Transformer, 115 volts 25 cycles	32-7370
	Power Transformer, 200-250 volts 25 cycles	32-7425
84	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG
85	Condenser (.05 Mfd. Tubular)	30-4020
	Dial Scale	27-5103
	Dial Hub and Set Screw Assembly	28-7122
	Dial Spring Clamp	28-2837
	Valve Shield	28-2726
	Valve Shield Base	28-2725
	Socket (4-Prong)	27-6034
	Socket (6-Prong)	27-6036
	Socket (7-Prong)	27-6037
	Socket (Speaker Plug)	27-6033
	Knob (Station Selector)	27-4206
	Knob (Fine Tuning)	27-4207
	Knob (Waveband)	27-4219
	Knob (Volume Control or Tone Control)	27-4208
	Bezel and Glass Assembly	40-5724
	Glass	27-8010
	Chassis Mtg. Screw	W-1495
	Chassis Mtg. Washer	27-4198
	Chassis Mtd. Rubber Bumper	27-4197

* After Run 2, this is 30-1032 Mica

PHILCO

Radio Service Bulletin No. 28A

Published by the Philco Radio & Television Corporation of Great Britain Ltd., Perivale, Greenford, Middlesex

MODEL 98 RADIOGRAM.

TYPE CIRCUIT: Seven valve superheterodyne receiver employing the same circuit as Model 98 (Series 2), but with the following refinements.

GRAMOPHONE: Automatic record changing equipment is incorporated which will play eight 10 inch or eight 12 inch records consecutively if desired; any record can be rejected or repeated whilst the instrument is in operation should it be desired to do so, and the turntable is automatically stopped at the conclusion of the final record of any series. Single eight inch records also can be played.

OPERATION of the gramophone is controlled by a separate switch located below the wave change switch which makes change over from radio to gramophone without the possibility of radio break through.

CONTROLS: All controls are on the motor board.

REMOVAL OF CHASSIS: This is easily effected by loosening the bracket nuts inside cabinet, allowing the chassis to be lowered and lifted out after the knobs have been removed.

Technical data is the same as for Model 98 (Series 2) which is set out in Philco Radio Service Bulletin, No. 28.

PARTS LISTS.

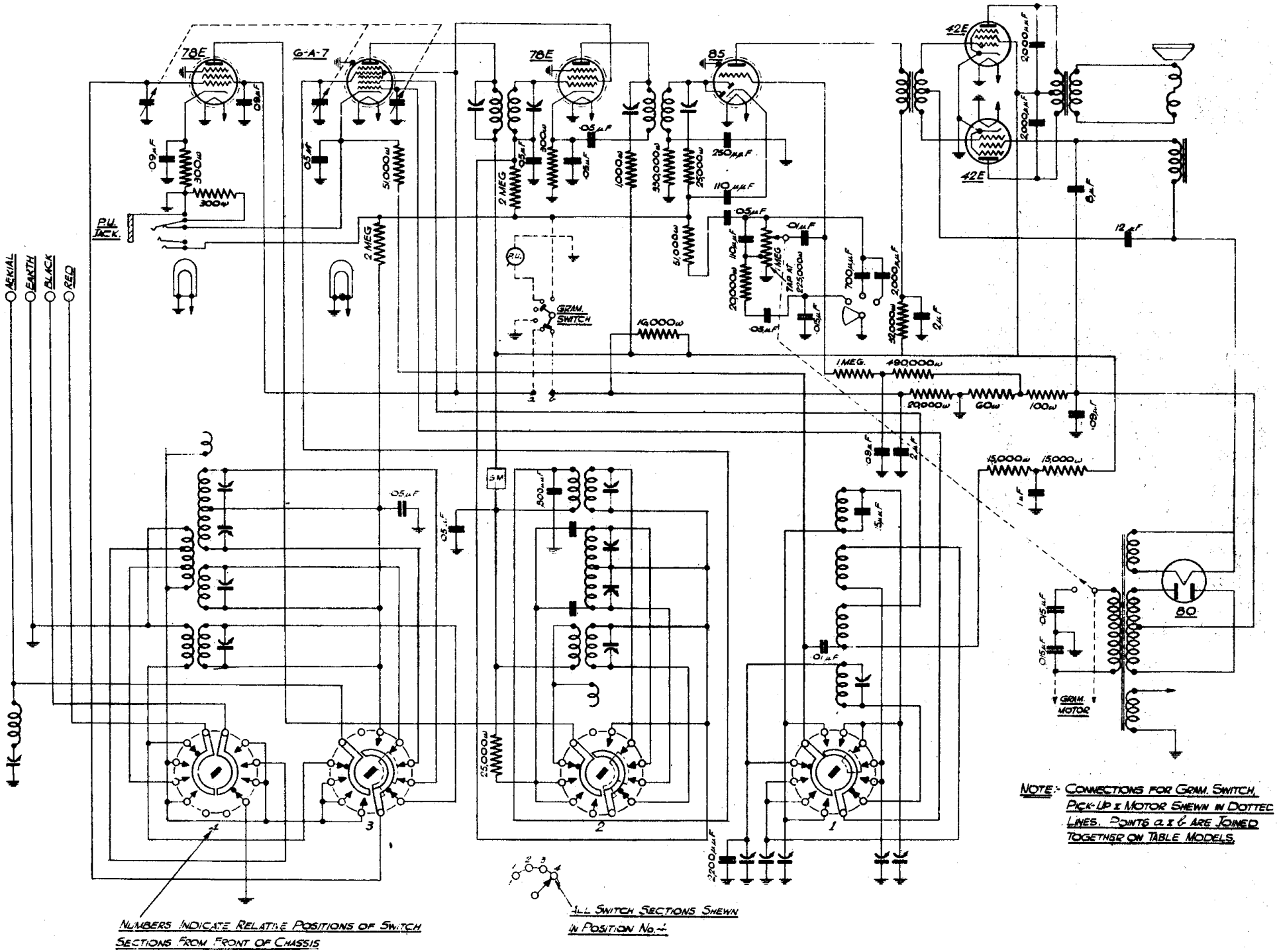
Similar to the Parts List for Model 98 (Series 2) but with the following exceptions:—

Delete	74	Condenser (8 mfd. Electrolytic)	Part No. 30-2025
	75	Condenser (12 mfd. Electrolytic)	,, ,, 30 2117
Add	74	Condenser (8 mfd. Electrolytic)	Part No. 300-2000
	75	Condenser (8 mfd. + 4 mfd. Electrolytic)	,, ,, 300-2001
		Radiogram Switch	,, ,, 420-1005
		Automatic Record Changer, motor, turntable and pick-up assembly complete	,, ,, 350-2003

Erratum. Items numbered 23, 24 and 25 " Oscillator Compensating Condensers " should read as " Part of 20," and not 22 as stated.

Item 62 " Resistor (4,000 ohms) " Part No. 33-1040 is not used in Run 4 and a note should be made to this effect.

A printer's error occurs in Item 26. The word should be " compensating." Also, the last item should read " Chassis *Mounting* Rubber Bumper—Part 27-4197."



SCHEMATIC DIAGRAM.

MODEL 98 RADIOGRAM.