PHILCO

Radio Service Bulletin No. 92

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

Model CA-638

TYPE CIRCUIT: Six valve Superheterodyne Unit-constructed Receiver with full A.V.C. and Pentode output (4 watts) for operation on Short, Medium and Long wave-bands. Built-in connections for di-pole or Philco All-wave Noise Reducing Aerial, automatic bridge-balanced aerial selector and alternative link connections—"C" for di-pole aerial and "B" for Philco All-wave Noise Reducing Aerial. Provision is made for connecting a pick-up which may be left permanently connected to the Receiver if desired, as the gramophone operation is controlled by the extreme clockwise rotation of the wave-change switch. Provision is also made for connecting an external speaker of the permanent magnet moving-coil type, having an impedance of 2–3 ohms.

POWER SUPPLY: Alternating current mains of 200–229 volts or 230–250 volts, 50–100 cycles, when the voltage adjusting plug is screwed fully into the correct socket on the rear-of-cabinet panel.

WAVE-BANDS: COVERAGE: Three; (*a*) Long, 2,000–930 metres (150–322.5 kc.); (*b*) Medium, 550–200 metres (545.4–1,500 kc.); (*c*) Short, 5.8–18 mc. (51.7–16.6 metres).

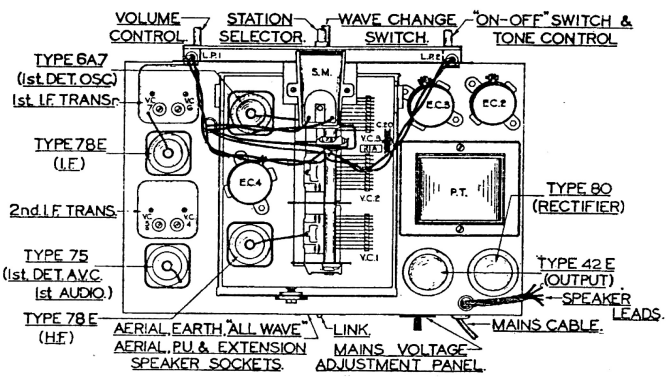
TUNING DRIVE: Two-speed drive-ratios 8–1 and 40–1 for slow and accurate tuning, new full vision spread band scale, and shadow-meter tuning device.

TONE CONTROL: Four positions, enabling a fine degree of tone between brilliant and mellow to be obtained. The "On-off" switch is combined with this control, thus enabling a particular setting of the separate volume-control to be maintained.

LOUD SPEAKER: A 9¾-inch diameter fully energised moving-coil speaker is used. This speaker gives the highest efficiency audio output, and greater bass response is obtained due to the large baffle.

INTERMEDIATE FREQUENCY: 470 kc.

POWER CONSUMPTION: 65 watts (approx.).



TOP CHASSIS DIAGRAM.

TABLE 1—VOLTAGES

Valve socket readings to chassis taken with an 065, 077 or J3 Philco Set Tester, using the 500, 250 and 10 volts ranges. Volume control at minimum, tone control fully brilliant, wave-change switch in M.W. position and no aerial connected. A.C. line 230 volts 50 cycles.

POSITION	VALVE	ANODE	SCREEN	BIAS
H.F. Amplifier, S.3	78E	Pin 3. 220 v.	Pin 4. 75 v.	Pin 5. –1.25 v.
1st Detector and Oscillator, S.4 ...	6A7	Pin 3. 245 v. Pin 5. 120 v.*	Pin 4. 75 v.	Pin 7. 2.5 v.
I.F. Amplifier, S.6	78E	Pin 3. 245 v.	Pin 4. 75 v.	Pin 5. –1.25 v.
2nd Detector, A.V.C. and 1st L.F. Amplifier S.5	75	Pin 3. 140 v.	—	—
Pentode Output, S.2	42E	Pin 3. 265 v.	Pin 4. 275 v.	–20 v.†
Full-wave Rectifier, S.1	80	Pin 3. 320 v. A.C. Pin 4. 320 v. A.C.	—	—

* Oscillator Anode Volts.
† Bias measured between TB. 1/1 and chassis.
Total D.C. 380 volts, measured between V.2/2 and TB.1/1.
V.2 filament, 5 volts A.C.; V.1, 3, 4, 5, 6 heaters and L.P.1, L.P.2, and L.P.3 filaments, each 6.3 volts A.C. measured between Pins 1 and 2 on each socket.

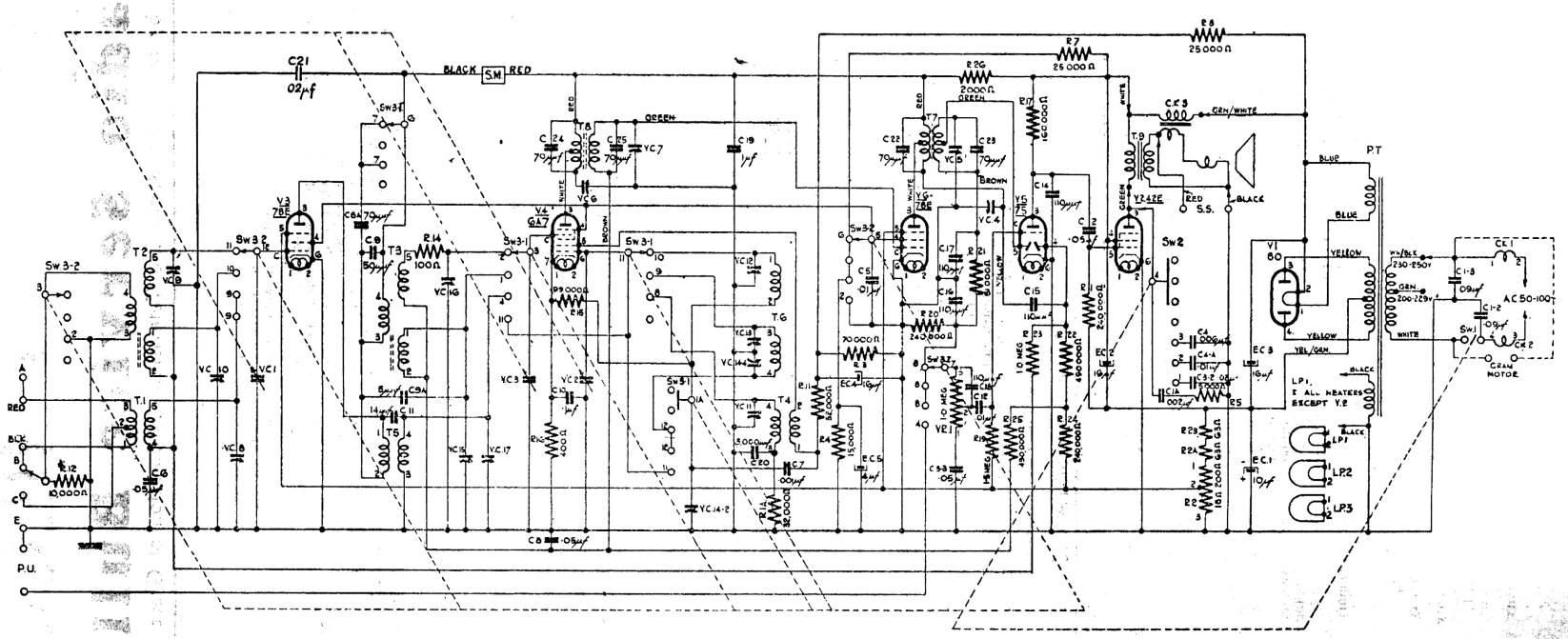
TABLE 2—RESISTANCES OF COILS.

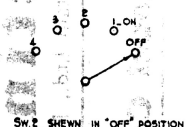
Link on TB.3 to be in socket "B."

REF. NO.	TEST PROD. 1.	TEST PROD. 2.	RESISTANCE (Ohms.)
T.1 Primary...	TB.3 Socket "A"	TB.3 Socket "Blk"	Less than 0.1
T.1 Primary Tapping	TB.3 Socket "A"	TB.3 Socket "C"	,, ,, 0.1
T.1 Secondary	V.3 Cap	TB.10/3	Sw.3. S.W. 0.1 ,, Gram 0.1 ,, L.W. 60 ,, M.W. 60 ,, S.W. Zero ,, Gram 60
T.2 Primary...	TB.3 Socket "Blk"	Chassis	
T.2 Secondary	V.3 Cap	TB.10/3	,, L.W. 40 ,, M.W. 2.5
S.M.	TB.10/10	TB.10/9	3,500 approx.
T.3 Primary...	Sw.3/1 tag 5	TB.10/9	60
T.3 Secondary	V.4 Cap	TB.7/1	Sw.3. L.W. 150 approx. (R.14 in series) ,, M.W. 2.5
T.5 Primary...	V.3/3	Sw.3/1 tag 5	2
T.5 Secondary	V.4/Cap	Chassis	,, S.W. 0.1 ,, Gram 100,000 approx.
T.8 Primary...	TB.10/10	VC.6 tag (inside can)	8
T.8 Primary Tapping	TB.10/10	V.4/3	4
T.8 Secondary	V.6 Cap	TB.7/1	8
T.4 Primary...	V.4/6	C.20 tag	Sw.3. S.W. 0.1 ,, Gram Infinity

REF. NO.	TEST PROD. 1.	TEST PROD. 2	RESISTANCE (Ohms.)
T.4 Secondary	V.4/5	TB.6/1	0.1
T.6	V.4/6	Sw.3/1 tag 1.A	Sw.3. L.W. 16.5 ,, M.W. 2.5
T.7 Primary...	TB.10/10	TB.8/1	8
T.7 Primary Tapping	TB.10/10	V.6/3	4
T.7 Secondary	TB.10/2	VC.5 tag (Inside can)	8
T.7 Secondary Tapping	TB.10/2	V.5/5	4
T.9 Primary...	V.1/3	TB.10/12	265 approx.
T.9 Secondary	Output Transformer Lead 1	Output Transformer Lead 2	0.2** 2 **
Speech Coil ...	V.2/2	TB.10/12	1,140
CK.3	C.1/2	200-229 v. tap	Sw.1. "ON" 30
P.T. Primary	C.1/2	230-250 v. tap	,, "ON" 35
P.T. Primary			,, "OFF" Infinity
H.T. Secondary	V.2/3	TB.1/1	240
H.T. Secondary	V.2/4	TB.1/1	240
Rectifier L.T. Secondary	V.2/1	V.2/2	0.1††
Heater L.T. Secondary	V.1/1	V.1/2	0.2††
CK.1	TB.1A/2	C.1/3	2.5
CK.2	TB.1A/3	C.1/2	2.5

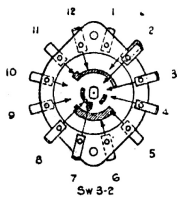
** Resistance of T.9 secondary alone and Speech Coil alone (taken when disconnected).
†† Resistance of L.T. windings taken with all valves removed.
NOTE.—Reference numbers for valves should be read in conjunction with the socket numbers, e.g. V.1-S.1.





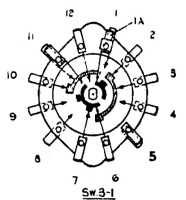
Sw.2 SHEWN IN "OFF" POSITION

Sw.2.



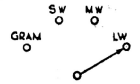
Sw 3-2

VIEWS OF SWITCHES FROM REAR CHASSIS BEING UPSIDE DOWN



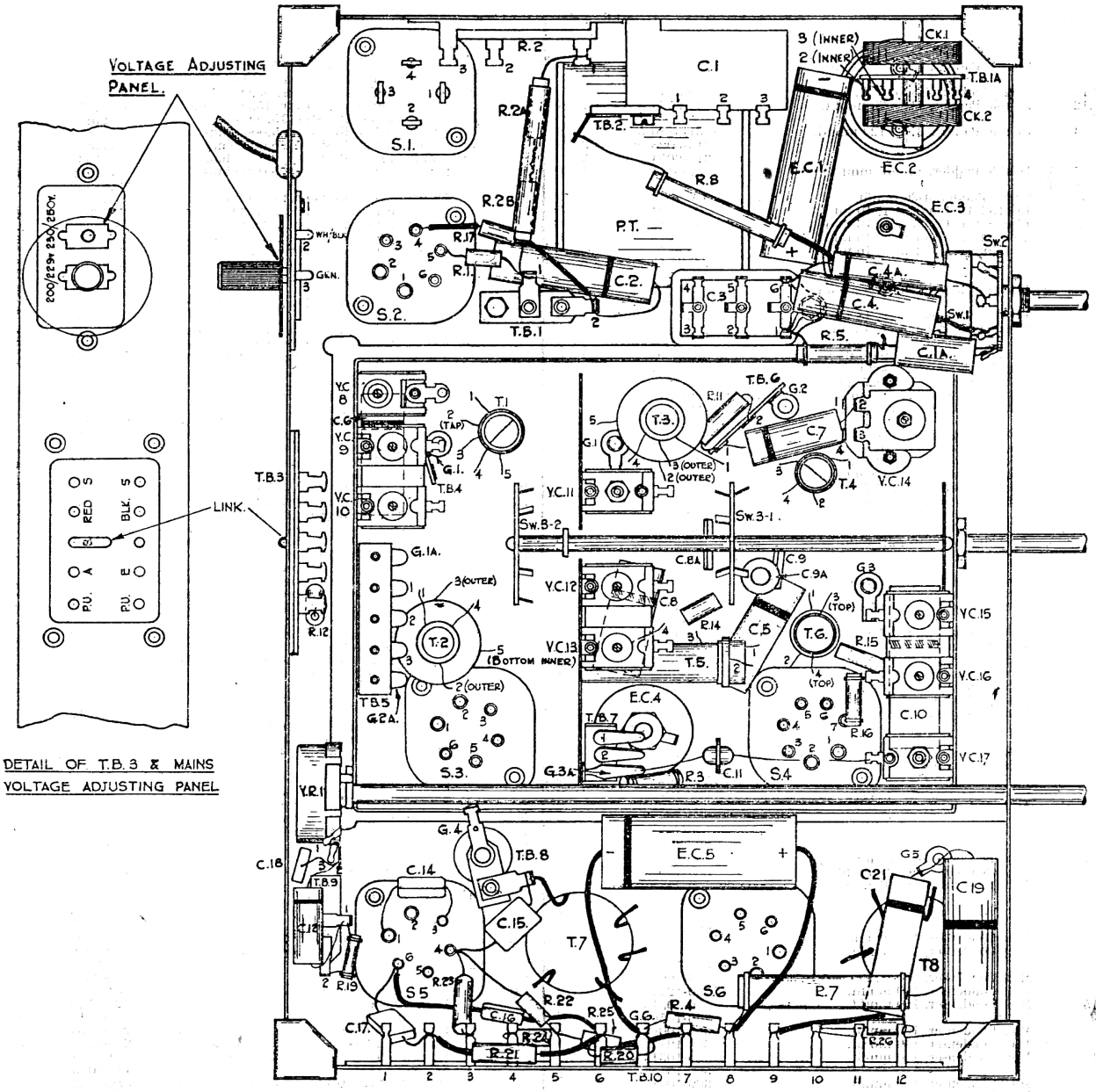
Sw 3-1

NOTE - SOLID AREA INDICATES FRONT OF SWITCH WAFER
SHADED AREA INDICATES REAR OF SWITCH WAFER



SW 3 SHEWN IN L.W POSITION

CIRCUIT DIAGRAM—MODEL CA-638.



UNDER CHASSIS DIAGRAM—MODEL C-638.

ALIGNMENT PROCEDURE.—Same as for Model A638 ARG (see Radio Service Bulletin No. 81).

PARTS AND PRICE LIST—MODEL CA 638.

Ref. No.	Description.	Part No.	List Price £ s. d.
T.1	S.W. Aerial Transformer	320-1257	2 3
T.2	M. and L.W. Aerial Transformer	320-1214	5 6
T.3	M. and L.W. H.F. Transformer	320-1216	5 9
T.4	S.W. Oscillator Transformer	320-1259	2 9
T.5	S.W. H.F. Transformer	320-1258	2 9
T.6	M. and L.W. Oscillator Coil	320-1232	2 6
T.7, VC.4, VC.5	2nd I.F. Transformer and Trimmers Assembly	320-1234	12 0
C.22	Ceramic Condenser, 70 mmfd. (Special) ...		
C.23	Ceramic Condenser, 70 mmfd. (Special) ...		
T.8, VC.6, VC.7	1st I.F. Transformer and Trimmers Assembly	320-1233	12 6
C.24	Ceramic Condenser, 70 mmfd. (Special) ...		
C.25	Ceramic Condenser, 70 mmfd. (Special) ...		
T.9	Output Transformer, Part No. 320-8062... Speech Coil and Cone, Part No. 360-4019...	Complete Speaker	2 2 0
CK.3	Field Coil	360-1124†	
CK.2, CK.1, VC.1	Mains Filter Choke and Screen Assembly	320-1260	3 6
VC.2, VC.3	Three Gang Condenser	31-1818	1 1 0
VC.8	Single Padder, 4-30 mmfd.	31-6161	1 0

† When ordering Speaker parts, the letter which will be found in the part number of the speaker must also be given.
Above prices do not apply in Eire.

PARTS AND PRICE LIST—MODEL CA 638.

Ref. No.	Description.	Part No.	List Price £ s. d.
VC.9 } VC.10 }	Double Padder, 110+30 mmfd. ...	31-6179	1 6
VC.11	Single Padder, 4-30 mmfd.	310-6043	1 0
VC.12 } VC.13 }	Double Padder, 110+30 mmfd.	31-6179	1 6
VC.14	Double Padder, 375+120 mmfd. ...	31-6180 or	1 8
		310-6028 or	2 2
		310-6054	2 3
VC.15 } VC.16 }	Double Padder, 80+15 mmfd.	31-6115	1 10
VC.17	Single Padder, 4-30 mmfd.	310-6043	1 0
EC.1	Electrolytic Condenser, 10 mfd.	300-4031	1 6
EC.2	Electrolytic Condenser, 16 mfd.	300-2013	5 8
EC.3	Electrolytic Condenser, 16 mfd.	300-2013	5 8
EC.4	Electrolytic Condenser, 16 mfd.	30-2118 or	5 4
		300-2013 or	5 8
		309-2003	4 8
	or Electrolytic Condenser, 8+8 mfd. ...	30-2079 or	6 8
		30-2028	6 0
	or Electrolytic Condenser, 18 mfd.	30-2200	4 8
EC.5	Electrolytic Condenser, 4 mfd.	300-2008 or	2 6
		309-2004	1 9
C.1	Moulded Condenser, .09+.09 mfd. ...	4989-DG	1 6
C.1A	Tubular Condenser, .002 mfd.	30-4177	9
	or Tubular Condenser, .0025 mfd.	309-4215	9
	or Tubular Condenser, .003 mfd.	30-4042	9
C.2	Tubular Condenser, .05 mfd.	30-4123 or	9
		30-4518	
	or Tubular Condenser, .04 mfd.	309-4021	9
C.3	Moulded Condenser, .02+.05 mfd. ...	3615-ZU	2 1
C.4	Tubular Condenser, .006 mfd.	30-4024	9
	or Tubular Condenser, .008 mfd.	30-4524	9
	or Tubular Condenser, .0065 mfd. ...	309-4217	9
C.4A	Tubular Condenser, .01 mfd.	30-4145 or	9
		30-4051 or	9
		309-4118	9
C.5	Tubular Condenser, .01 mfd.	30-4145 or	9
		30-4051 or	9
		309-4018	9
C.6	Tubular Condenser, .05 mfd.	30-4020	9
	or Tubular Condenser, .04 mfd.	309-4021	9
C.7	Tubular Condenser, .001 mfd.	30-4201 or	9
		309-4113	9
C.8	Tubular Condenser, .05 mfd.	30-4020	9
	or Tubular Condenser, .04 mfd.	309-4021	9
C.8A	Mica Condenser, 70 mmfd.	300-1049	1 0
	or Mica Condenser, 77 mmfd.	300-1209	4
	or Mica Condenser, 100 mmfd.	309-1008	7
	or Silvered Mica Condenser, 65 mmfd. ...	309-1507	10
C.9	Mica Condenser, 50 mmfd.	300-1015 or	9
		300-1045 or	8
		300-1058	1 0
	or Mica Condenser, 60 mmfd.	300-1229	4
C.9A	Ceramic Condenser, 5 mmfd.	300-1044 or	1 0
		300-1074	1 0
	or Ceramic Condenser, 4 mmfd.	300-1075	1 0
C.10	Tubular Condenser, .1 mfd.	30-4122 or	9
		309-4023 or	9
		300-4024 or	1 8
		30-4455	9
C.11	Ceramic Condenser, 14 mmfd.	300-1070	1 0
	or Ceramic Condenser, 10 mmfd.	300-1068	1 0
C.12	Tubular Condenser, .01 mfd.	30-4124 or	9
		30-4145 or	9
		30-4479 or	9
		309-4018	9
	or Mica Condenser, 10,000 mmfd.	300-1039	2 8
C.14	Mica Condenser, 110 mmfd.	30-1031 or	8
		300-1056	8
	or Mica Condenser, 100 mmfd.	309-1008	7
	or Mica Condenser, 140 mmfd.	300-1212	6
C.15	Mica Condenser, 110 mmfd.	30-1031 or	8
		300-1056	8
	or Mica Condenser, 100 mmfd.	309-1008	7
	or Mica Condenser, 140 mmfd.	300-1212	6
C.16	Mica Condenser, 110 mmfd.	30-1031 or	8
		300-1056	8
	or Mica Condenser, 100 mmfd.	309-1008	7
	or Mica Condenser, 140 mmfd.	300-1212	6
C.17	Mica Condenser, 110 mmfd.	30-1031 or	8
		300-1056	8
	or Mica Condenser, 100 mmfd.	309-1008	7
	or Mica Condenser, 140 mmfd.	300-1212	6
C.18	Mica Condenser, 110 mmfd.	300-1056	8
	or Mica Condenser, 100 mmfd.	309-1008	7
C.19	Tubular Condenser, .1 mfd.	30-4170 or	9
		30-4455 or	9
		300-4024 or	1 8
		309-4123	9
C.20	Mica Condenser, 3,000 mmfd.	31-6219 or	2 0
		310-6055	5 3
C.21	Tubular Condenser, .02 mfd.	30-4113	9
	or Tubular Condenser, .025 mfd.	309-4020	9
R.1	¼ watt Insulated Resistor, 240,000 ohms	330-2002	8
	or ¼ watt Carbon Resistor, 240,000 ohms ...	33-1097 or	8
		330-1017	8
	or ¼ watt Insulated Resistor, 250,000 ohms	339-2025	8
R.1A	¼ watt Insulated Resistor, 32,000 ohms ...	330-2031	8
	or ¼ watt Insulated Resistor, 32,000 ohms ...	330-2025 or	8
		330-2021	8
R.2	Candohm Wirewound Resistor, 18+200 ohms	33-3345	1 9
R.2A	¼ watt Insulated Resistor, 63 ohms ...	330-2044	8
	or ¼ watt Carbon Resistor, 63 ohms ...	330-1037	8
R.2B	¼ watt Insulated Resistor, 63 ohms ...	330-2044	8
	or ½ watt Carbon Resistor, 63 ohms ...	330-1037	8

Ref. No.	Description.	Part No.	List Price £ s. d.
R.3	¼ watt Carbon Resistor, 70,000 ohms ...	5385	8
	or ¼ watt Insulated Resistor, 70,000 ohms ...	330-2034	8
	or ¼ watt Insulated Resistor, 65,000 ohms ...	339-2022	8
R.4	¼ watt Insulated Resistor, 15,000 ohms ...	330-2016	8
	or ¼ watt Carbon Resistor, 15,000 ohms ...	6208	8
R.5	¼ watt Carbon Resistor, 5,000 ohms ...	5310	8
	or ¼ watt Carbon Resistor, 6,000 ohms ...	7352	8
	or 1 watt Carbon Resistor, 6,000 ohms ...	330-1035	8
R.7	2 watt Carbon Resistor, 25,000 ohms ...	33-1072 or	1 0
		339-1320	8
R.8	1 watt Carbon Resistor, 25,000 ohms ...	3656	8
R.11	¼ watt Insulated Resistor, 32,000 ohms ...	330-2031	8
	or ¼ watt Insulated Resistor, 20,000 ohms ...	330-2049	8
	or ¼ watt Insulated Resistor, 20,000 ohms ...	330-2033	8
R.12	¼ watt Insulated Resistor, 10,000 ohms ...	330-2014	8
	or ¼ watt Insulated Resistor, 10,000 ohms ...	339-2018	
	or ¼ watt Carbon Resistor, 10,000 ohms ...	33-1000 or	8
		330-1014	8
R.14	¼ watt Insulated Resistor, 100 ohms ...	330-2060 or	8
		339-2008	8
R.15	¼ watt Insulated Resistor, 99,000 ohms ...	330-2012	8
	or ¼ watt Insulated Resistor, 99,000 ohms ...	330-2003	8
	or ¼ watt Insulated Resistor, 100,000 ohms	339-2023	8
	or ¼ watt Carbon Resistor, 99,000 ohms ...	33-1165	8
R.16	¼ watt Carbon Resistor, 400 ohms ...	330-1012	8
	or ¼ watt Insulated Resistor, 450 ohms ...	330-2042	8
	or ¼ watt Wirewound Resistor, 300 ohms ...	330-3007	9
R.17	¼ watt Insulated Resistor, 160,000 ohms	330-2024	8
	or ¼ watt Insulated Resistor, 170,000 ohms	330-2053	8
	or ¼ watt Insulated Resistor, 150,000 ohms	339-2024	8
	or ¼ watt Carbon Resistor, 200,000 ohms ...	33-1184	8
	or ¼ watt Carbon Resistor, 200,000 ohms ...	33-1048	8
R.19	¼ watt Carbon Resistor, 1.5 megohms ...	33-1188	8
R.20	¼ watt Insulated Resistor, 240,000 ohms	330-2002	8
	or ¼ watt Carbon Resistor, 240,000 ohms ...	33-1097 or	8
		330-1017	8
	or ¼ watt Insulated Resistor, 250,000 ohms	339-2025	8
R.21	¼ watt Insulated Resistor, 51,000 ohms ...	330-2004	8
	or ¼ watt Insulated Resistor, 51,000 ohms ...	330-2015	8
	or ¼ watt Insulated Resistor, 65,000 ohms ...	339-2022	8
R.22	¼ watt Insulated Resistor, 490,000 ohms	330-2001	8
	or ¼ watt Carbon Resistor, 490,000 ohms ...	6097 or	8
		330-1020	8
	or ¼ watt Insulated Resistor, 490,000 ohms	330-2013	8
	or ¼ watt Carbon Resistor, 500,000 ohms ...	33-1036	1 9
	or ¼ watt Insulated Resistor, 400,000 ohms	339-2026	8
R.23	¼ watt Insulated Resistor, 1 megohm ...	330-2018	8
R.24	¼ watt Insulated Resistor, 240,000 ohms	330-2002	8
	or ¼ watt Carbon Resistor, 240,000 ohms ...	33-1097 or	8
		330-1017	8
	or ¼ watt Insulated Resistor, 250,000 ohms	339-2025	8
R.25	¼ watt Insulated Resistor, 490,000 ohms	330-2001	8
	or ¼ watt Carbon Resistor, 490,000 ohms ...	6097 or	8
		330-1020	8
	or ¼ watt Insulated Resistor, 490,000 ohms	330-2013	8
	or ¼ watt Carbon Resistor, 500,000 ohms ...	33-1036	1 0
	or ¼ watt Insulated Resistor, 400,000 ohms	339-2026	8
R.26	¼ watt Insulated Resistor, 2,000 ohms ...	330-2023	8
VR.1	Volume Control, 1 megohm	330-5021	8 6
SW.1	On-Off Switch ... ... }	420-1036	5 3
SW.2	Tone Switch ... ... }		
SW.3	Wave-change Switch	420-1031	8 9
	6-prong Valve Holder	27-6036	1 0
	4-prong Valve Holder	27-6044 or	1 0
		270-6010	1 0
	7-prong Valve Holder	27-6037	1 0
P.T.	Power Transformer, 50-100 cycles ...	320-8005	1 7 6
	or Power Transformer, 25-100 cycles ...	320-8020	1 16 6
LP.1 & 2	Pilot Bulbs	34-2141	1 0
S.M.	Shadowmeter	450-2001P	8 0
LP.3	Shadowmeter Bulb	34-2141	1 0
	Valve Shield...	28-2726	3
	Grid Clip	28-2214	doz. 6
	Rubber Grommet	270-7264	each 1
	Rubber Buffers	270-7189	each 1
	Mains Cable	LO-1009	2 2
	Speaker Cable	LO-1035	1 8
	Mains Voltage Adjusting Panel	380-5342	5
	Mains Voltage Adjusting Plug	380-5340	doz. 3 0
	Scale Holder Assembly	380-1074	7 2
	Dial Scale, Part No. 270-7597 ... ... }	Assembly	
	Sticker Tape, Part No. 270-1017 ... ... }	380-5530	
	Wave-Band Indicator Assembly	380-5587	1 4
	Vernier Dial Assembly	380-5586	2 0
	Pointer and Hub Assembly	389-5026	4 0
	Rubber Cushion Plate	27-7497	doz. 2
	Chassis Corner Feet (Rubber)	27-4116	each 4
	Chassis Mounting Washers	29-2089	doz. 2
	Chassis Mounting Bolts	W-1345	each 1
	Cable Clamp	28-2345	doz. 5
	Large Tuning Knob and Spring	270-4120	each 8
	Small Tuning Knob and Spring	270-4118	8
	Knob (Wave-change) and Spring ...	270-4118	8
	Knob (Tone) and Spring	270-4114	8
	Knob (Volume) and Spring	270-4140	8
	Knob (Spring for Large Knob)	28-1738	doz. 4
	Knob (Spring for Small Knob)	280-5262	doz. 4
	Red Wander Plug	380-5087	doz. 2 6
	Black Wander Plug	380-5015	doz. 2 6
V.1	Type 80 Full Wave Rectifier Valve ...	3149	
V.2	Type 42E Pentode Output Valve... ...	6447-E	
V.3	Type 78E Variable-mu H.F. Pentode Valve	8315-E	
V.4	Type 6A7 Variable-mu Heptode Valve ...	34-2002	
V.5	Type 75 Double-Diode Triode Valve ...	8002	
V.6	Type 78E Variable-mu H.F. Pentode Valve	8315-E	
	Instruction Manual	390-3662	

†When ordering Speaker parts, the letter which will be found in the part number of the speaker must also be given

ABOVE PRICES DO NOT APPLY IN I.F.S.