RADIO CORPORATION PTY. LTD.
DIVISION OF ELECTRONIC INDUSTRIES LTD.
126-130 GRANT STREET, SOUTH MELBOURNE, S.C.4.
TECHNICAL BULLETIN

BULLETIN: HR-1
File: Receivers
Battery
Date: 19/4/51
Page: 1.

SUBJECT:

MANTEL MODEL "HR"

5 Valve Superheterodyne Four Band Receiver Incorporating Bandspreading of the 19, 25 and 31 Metre Shortwave Bands.

FOR OPERATION FROM

1.5 Volts "A" Battery
and
90 Volts "B" Battery
(Two 45 Volt "B" Batteries in Series)
} Plug-in type batteries.

POWER CONSUMPTION

"A" Battery:—300 Milliamps (does not include dial lamps)
"B" Battery:— 11 Milliamps (no signal)

POWER OUTPUT

250 Milliwatts—max.
100 Milliwatts—undistorted

TUNING RANGES

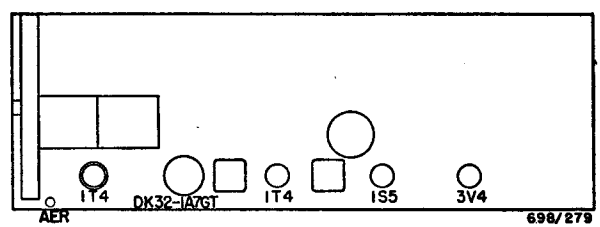
Broadcast Band.....	535—1610 Kc/s
19 Metre Band.....	14.9—15.5 Mc/s
25 Metre Band.....	11.6—12.1 Mc/s
31 Metre Band.....	9.4—9.8 Mc/s

RECEIVER COVERAGE (approx).

560.7—186.3 Metres	
(Bandspread)	20.13—19.29 Metres
(Bandspread)	25.86—24.79 Metres
(Bandspread)	31.91—31.63 Metres

This Bulletin Contains:

1. Alignment Instructions.
2. Circuit Diagram.
3. Component Parts List.
4. Connections for I.F. and R.F. Trans.
5. Valve Placement Diagram.
6. Dial Drive Cording Diagram.
7. Battery Replacement Diagram.



VALVE PLACEMENT DIAGRAM

SUBJECT–Alignment Instructions–Model "HR"

Alignment Conditions

Load impedance 10,000 Ohms

Output Level 25 Milliwatts

Volume Control, Max. Vol. (fully clockwise)

Tone Control, Treble Tone position No. 4

Intermediate freq. 455 Kc/s.

Battery Supply "A" Battery 1.5 Volts
"B" Battery 90 Volts

Equipment

Signal Generator

Output Meter

Mica Capacitor 0.01 MFD
Dummy Antenna 200 MMFD Mica Capacitor

Dummy Antenna 400 Ohm non-inductive resistor

Alignment Tools Type M195 and PM581

Operation No.	Generator Connection	Generator Frequency	Dummy Antenna	Instructions
1.	To control grid of 1T4 IF tube (pin No. 6)	455Kc/s	0.01MFD mica capacitor in series with generator.	Turn wave change switch to B/cast band. Leave grid wire attached to socket pin. Peak 2nd I.F. trans. pri. and sec. for max. output.
2.	To control grid of DK32/1A7GT	455 Kc/s	0.01MFD mica capacitor in series with generator.	Gang plates fully out of mesh. Leave grid cap on tube. Peak 2nd I.F. trans. pri. and sec. for max. output.
3.				Set centre of dial pointer on centre of end of travel mark near 550 Kc/s cond. gang plates fully meshed.
4.	To antenna terminal	600 Kc/s	200MMFD mica capacitor in series with generator.	Turn gang and dial pointer until dial pointer is on 600 Kc/s dial mark. Leave the gang and dial pointer set in this position and peak the B/cast. oscl. coil. ind. trim. (iron core) for max. output.
5.	To antenna terminal	1400 Kc/s	200MMFD mica capacitor in series with generator.	Turn gang and dial pointer to 1400 Kc/s dial mark. Adjust B/cast. oscl. coil. trim. cond. for log-ging and peak B/cast. ant. and RF. trans. trim. condensers for max. output.

SUBJECT–Function of Manual Controls–Model "HR".

CONTROLS–There are four control knobs, which are as follows:–

DIAL LAMP AND TONE CONTROL SWITCH–Situated on the left-hand end of the cabinet.

Position 1.–Dial illumination is provided in this position to assist when selecting the required station. Continuous dial illumination means that the dial lamps are consuming current from the battery; therefore, to reduce battery consumption after selecting the required station, switch the dial lamps off by turning the switch further to one of the three tone positions as desired.

Position 2.–This position provides a wide range frequency response for listening to musical programmes.

Position 3.–The bass notes are cut slightly in this position to give clarity of tone when listening to plays, talks, etc.

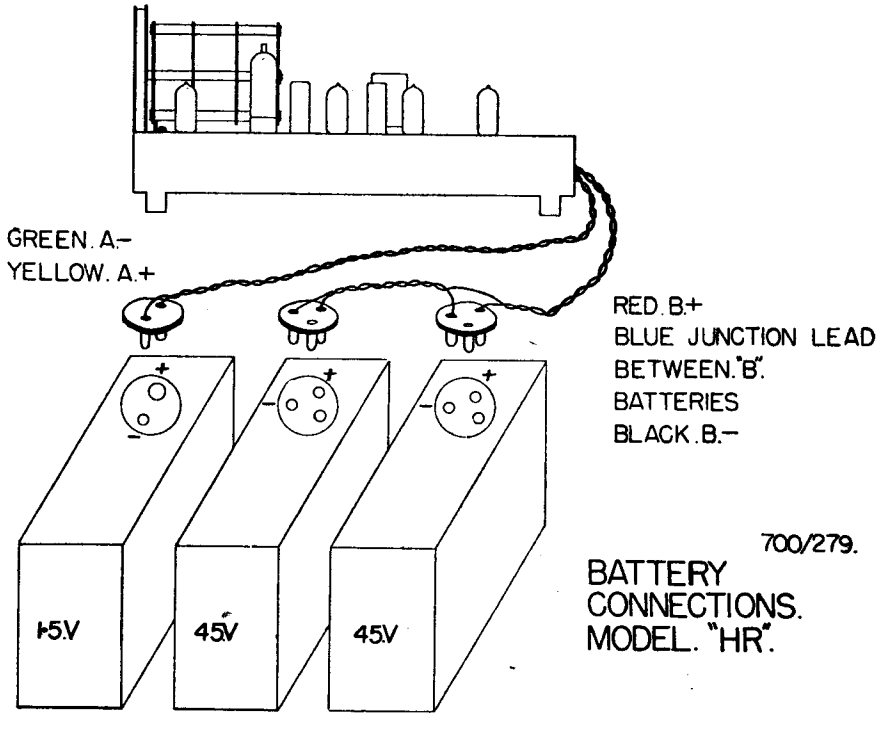
Position 4.–This position provides a condition of tone which gives maximum intelligibility when listening to distant or overseas stations.

ON-OFF BATTERY SWITCH AND VOLUME CONTROL.–A twist of the front left-hand knob switches on the current to the receiver. Turning the knob further increases the volume. Always turn the receiver OFF when not in use by turning the volume control knob fully anti-clockwise until a "click' is heard.

TUNING CONTROL.–The front right-hand knob is the manual tuning control. Turning this knob moves the pointer along the dial scale for selection of the required station.

WAVE CHANGE SWITCH.–The knob on the right-hand end of the cabinet is the wave change switch. The knob is illuminated when the dial lamps are switched on. The colours in the knob correspond to the colours of the shortwave bands on the dial and indicate the shortwave band the switch is turned to for tuning in the desired station.

SUBJECT–Battery Connections.



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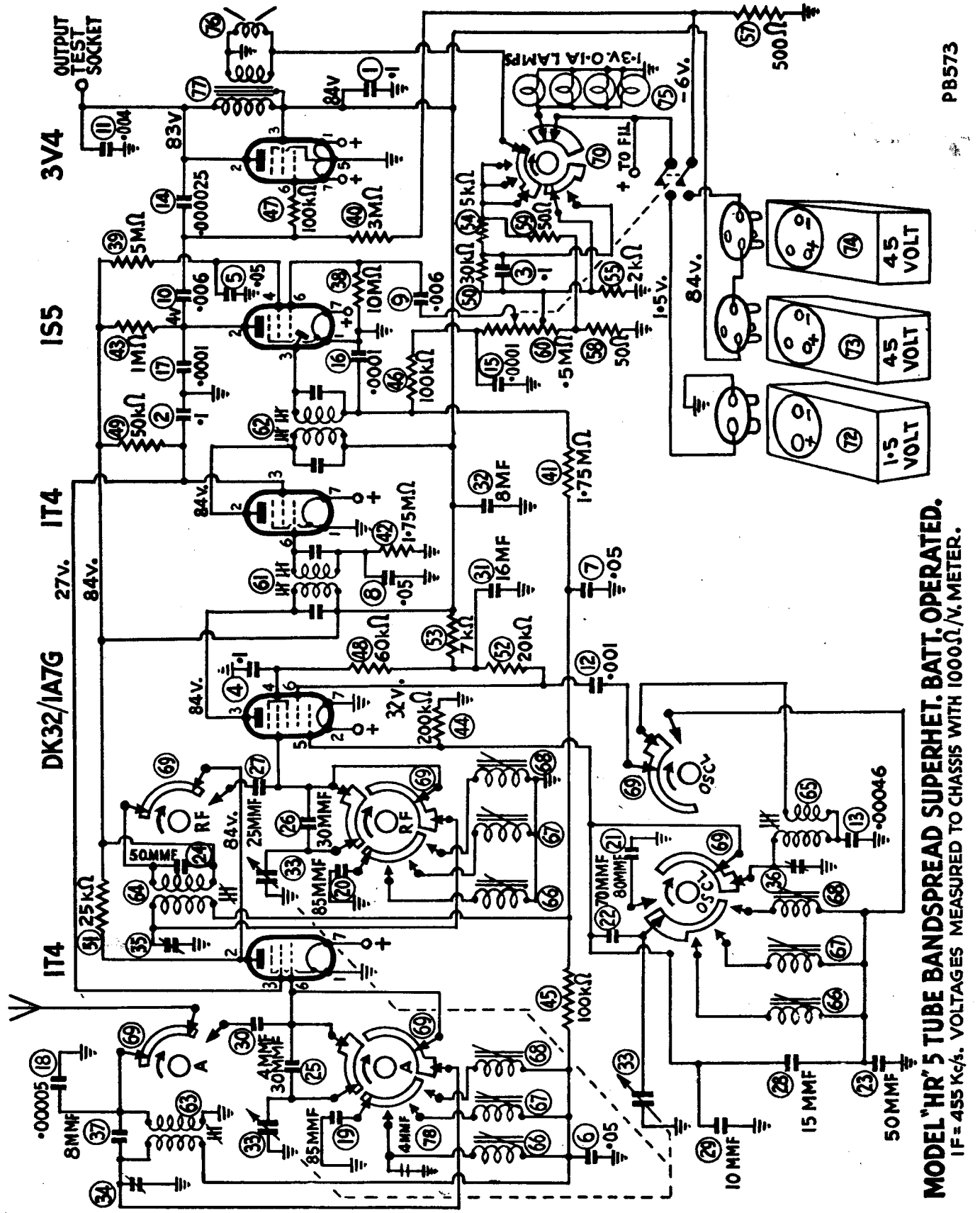
BATTERY CONNECTIONS. MODEL. "HR".

Circuit Diagram Model "HR"

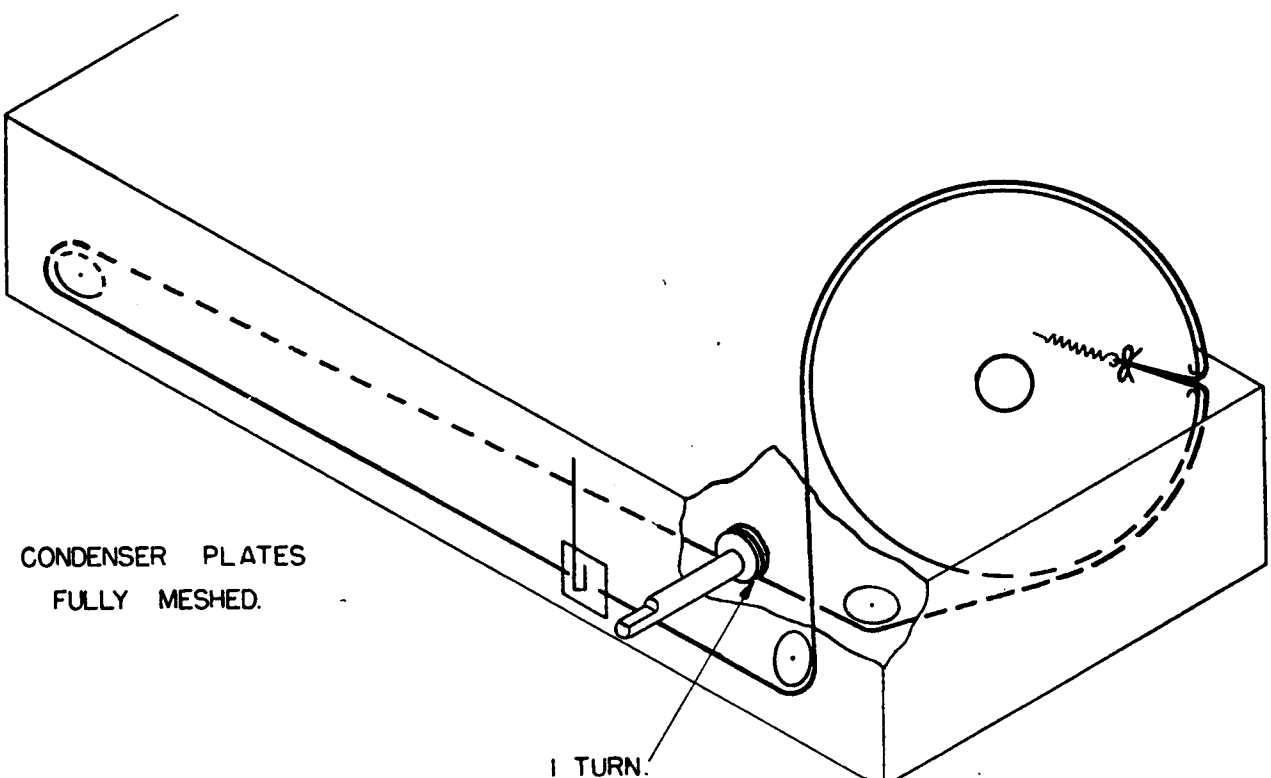


SUBJECT- Cording of Dial Drive

The length of cord required is 5 ft. 6 in. which includes about 6 in. to spare for tying to the tension spring.

Dial cord part No. 7/282.

Tension spring part No. 21/698.



19, 25 AND 31 METRE ANT. TRANS.

Lead from top lug (iron core end):-
GRID

Lead from bottom lug (mounting end):-
AVC.

19, 25 AND 31 METRE RF. TRANS.

Lead from top lug (iron core end):-
GRID

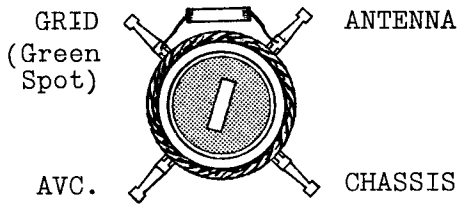
Lead from bottom lug (mounting end):-
CHASSIS

19, 25 AND 31 METRE OSCL. COIL

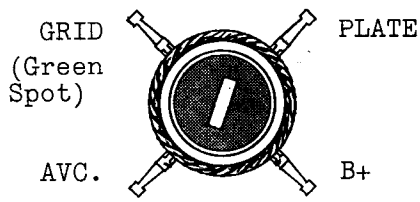
Lead from top lug (iron core end):-
GRID

Lead from bottom lug (mounting end):-
PLATE

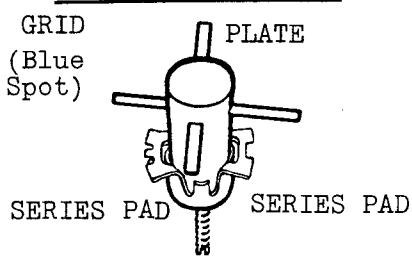
ANTENNA TRANS. B/CAST.



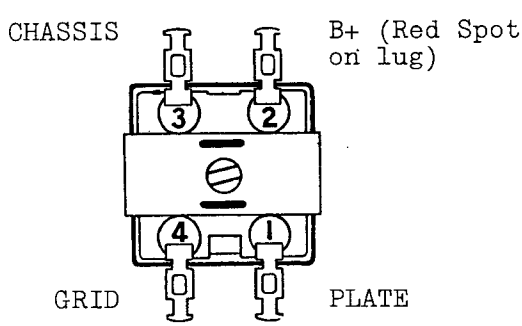
RF. TRANS. B/CAST.



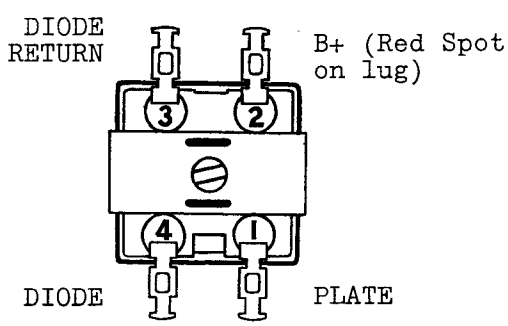
OSCL. COIL B/CAST.



1ST IF. TRANS.



2ND IF. TRANS.



6.	To antenna terminal	600 Kc/s	200MMFD mica capacitor in series with generator.	Turn gang and dial pointer to 600 Kc/s dial mark. Leave the gang and dial pointer set in this position. Re-peak the B/cast. oscl. coil. ind. trim. (iron core) then peak the B/cast. ant. and RF. trans. ind. trimmers (iron cores) for max. output. Do not rock the gang to and fro through the signal while adjusting or move the dial pointer off 600 Kc/s dial mark until after the inductance trimmers of these three transformers have been peaked for max. output.
7.	To antenna terminal	1400 Kc/s	200MMFD mica capacitor in series with generator.	Turn gang and dial pointer to 1400 Kc/s dial mark. Adjust B/cast oscl. coil. trim. cond. for logging and peak B/cast. ant. and RF. trans. trim. condensers for max. output.
8.				Turn wave change switch to 31 metre band (this band must be aligned before the 25 and 19 metre bands).
9.	To antenna terminal	9.6 Mc/s	400 Ohm non-inductive resistor in series with generator.	Turn dial pointer and gang to 9.6 Mc/s. Adjust 31 metre band oscl. coil. ind. trim. (iron core) for logging and peak 31 metre ant. and RF. trans. trims. (iron cores) for max. output. Rock gang to and fro through the signal while adjusting.
10.	To antenna terminal	11.8 Mc/s	400 Ohm non-inductive resistor in series with generator.	Turn wave change switch to 25 metre band. Turn dial pointer and gang to 11.8 Mc/s. Adjust 25 metre band oscl. coil. ind. trim. (iron core) for logging and peak ant. and RF. trans. trims. (iron cores) for max. output. Rock gang to and fro through the signal while adjusting.
11.	To antenna terminal	15.2 Mc/s	400 Ohm non-inductive resistor in series with generator.	Turn wave change switch to 19 metre band. Turn dial pointer and gang to 15.2 Mc/s. Adjust 19 metre band oscl. coil. ind. trim. (iron core) for logging and peak ant. and RF. trans. trims. (iron cores) for max. output. Rock gang to and fro through the signal while adjusting.

12. Check the logging of the shortwave bands on some well-known shortwave stations. If a crystal calibrator is available check the logging at each 100 Kc/s mark on the dial.

Circuit No.	Description	Tol.±	Rating	Part No.
1.	.1MFD Paper Condenser	20%	400V DCW	PC103
2.	.1MFD Paper Condenser	20%	400V DCW	PC103
3.	.1MFD Paper Condenser	20%	200V DCW	PC218
4.	.1MFD Paper Condenser	20%	200V DCW	PC218
5.	.05MFD Paper Condenser	20%	400V DCW	PC109
6.	.05MFD Paper Condenser	20%	200V DCW	PC102
7.	.05MFD Paper Condenser	20%	200V DCW	PC102
8.	.05MFD Paper Condenser	20%	200V DCW	PC102
9.	.006MFD Paper Condenser	20%	600V DCW	PC217
10.	.006MFD Paper Condenser	20%	600V DCW	PC217
11.	.004MFD Paper Condenser	20%	600V DCW	PC221
12.	.001MFD Mica Condenser	10%	1000VT	PC108
13.	.00046MFD Mica Condenser	2½%	1000VT	PC728
14.	.000025MFD Mica Condenser	1MMFD	1000VT	PC802
15.	.0001MFD Mica Condenser	10%	1000VT	PC110
16.	.0001MFD Mica Condenser	10%	1000VT	PC110
17.	.0001MFD Mica Condenser	10%	1000VT	PC110
18.	.00005MFD Mica Condenser	10%	1000VT	PC141
19.	85MMFD Silvered Mica Condenser	2½%	1000VT	PC809
20.	85MMFD Silvered Mica Condenser	2½%	1000VT	PC809
21.	80MMFD Silvered Mica Condenser	2½%	1000VT	PC798
22.	70MMFD Silvered Mica Condenser	2½%	1000VT	PC799
23.	50MMFD Silvered Mica Condenser	2½%	1000VT	PC801
24.	50MMFD Silvered Mica Condenser	2½%	1000VT	PC801
25.	30MMFD Silvered Mica Condenser	1MMFD	1000VT	PC810
26.	30MMFD Silvered Mica Condenser	1MMFD	1000VT	PC810
27.	25MMFD Silvered Mica Condenser	1MMFD	1000VT	PC802
28.	15MMFD Silvered Mica Condenser	1MMFD	1000VT	PC811
29.	10MMFD Ceramicon Condenser	1MMFD–0	500V DCW	PC844
30.	4MMFD Ceramicon Condenser	1MMFD–0	500V DCW	PC830
31.	16MFD Electrolytic Condenser) Composite type			
32.	8MFD Electrolytic Condenser) each	20%	350PV	PC804
33.	3 Gang Variable Condenser			PC652
34.	1.5–18MMFD Trimmer Condenser			PC250
35.	1.5–18MMFD Trimmer Condenser			PC250
36.	0–30MMFD Trimmer Condenser (Wire Wound)			PC663
37.	8MMFD Ceramicon Condenser (Part of antenna transformer circuit No. 63)			
38.	10 Megohm Carbon Resistor	10%	1 Watt	PR236
39.	5 Megohm Carbon Resistor	10%	1 Watt	PR355
40.	3 Megohm Carbon Resistor	10%	½ Watt	PR282
41.	1.75 Megohm Carbon Resistor	10%	½ Watt	PR248
42.	1.75 Megohm Carbon Resistor	10%	½ Watt	PR248
43.	1 Megohm Carbon Resistor	10%	1 Watt	PR520
44.	200,000 Ohm Carbon Resistor	10%	½ Watt	PR255
45.	100,000 Ohm Carbon Resistor	10%	½ Watt	PR103
46.	100,000 Ohm Carbon Resistor	10%	½ Watt	PR103
47.	100,000 Ohm Carbon Resistor	10%	½ Watt	PR103
48.	60,000 Ohm Carbon Resistor	10%	1 Watt	PR415
49.	50,000 Ohm Carbon Resistor	10%	1 Watt	PR115

Circuit No.	Description	Tol.±	Rating	Part No.
50.	30,000 Ohm Carbon Resistor	10%	½ Watt	PR151
51.	25,000 Ohm Carbon Resistor	10%	1 Watt	PR116
52.	20,000 Ohm Carbon Resistor	10%	1 Watt	PR171
53.	7,000 Ohm Carbon Resistor	10%	1 Watt	PR640
54.	5,000 Ohm Carbon Resistor	10%	½ Watt	PR250
55.	2,000 Ohm Carbon Resistor	10%	½ Watt	PR253
56.				
57.	500 Ohm Wire Wound Resistor	10%	1 Watt	PR289
58.	50 Ohm Wire Wound Resistor	10%	½ Watt	PR280
59.	50 Ohm Wire Wound Resistor	10%	½ Watt	PR280
60.	.5 Megohm Carbon Potentiometer tapped at 40K Ohms and with DP.ST switch on rear of housing			PR662
61.	1st I.F. Transformer			PT869
62.	2nd I.F. Transformer			PT869
63.	Antenna Transformer B/cast			PT905
64.	R.F. Transformer B/cast			PT906
65.	Oscl. Coil B/cast			PT860
66.	Spreadband Coil 31 Metre (red spot on coil former)			PT912
67.	Spreadband Coil 25 Metre (white spot on coil former)			PT913
68.	Spreadband Coil 19 Metre (blue spot on coil former)			PT914
69.	Wave-change switch			S166
70.	Tone control switch			S167
71.	Press-down Antenna Terminal			PM306
72.	1.5 Volt "A" Battery heavy duty type with plug-in socket			M138
73.	45 Volt "B" Battery heavy duty type with plug-in socket			M137
74.	45 Volt "B" Battery heavy duty type with plug-in socket			M137
75.	Dial Lamp 1.3 Volt 0.1 Amp G3½ size bulb min. screw base			M251
76.	12" Permag Speaker—no input trans.			K147
77.	Speaker Input Trans. 10,000–3.7 Ohms Imped. Code No. KCB 57			PT916
78.	4MMF Ceramicon Condenser +1MMF –0			PC830

Description	Part No.	Description	Part No.
Cabinet Back	19/698	Dial Pointer Ass'y	A101/698
Knob–side (2)	178/81	Dial Retaining Cup (2)	3/683–1
Knob–front (2)	167/81	Cabinet–bakelite	155/81
Knob–circlip	161/81	Light Button–clear	27/688–3
Clips–back retaining	17/620	Light Button–green	27/688–2
Dial Lamp Shield	24/698	Light Button–blue	27/688–4
Dial Lamp Socket Ass'y	A105/661	Light Button–red	27/688–1
Wave Band Lamp Socket Ass'y	A110/698	Dial Background Ass'y	A112/698
		Cabinet Mount Foot Ass'y	A138/30C
Midget Valve Socket Plate (3)	15/698	Coil Mount Clip	6/622
Valve Shield	38/635	I.F. Trans. Mount Clip	7/670
Midget Socket	A104/58	Grid Clip	873/495
8 Pin Socket	PM532	Grommet–cond. mount.	64/30A
Speaker Lead Junction Strip Ass'y	A105/698	Dial Drum	A104/698
Dial Reading N.S.W.	41/698–2	Dial Cord	7/282
Dial Reading Vic.–Tas.	41/698–3	Wood Pulley ⅝" dia.	13/613
Dial Reading Qld.	41/698–4	Wood Pulley ¾" dia.	17/87
Dial Reading S.A.–W.A.	41/698–5	Pulley Stud	18/87
		Dial Cord Spring	21/698