



RADIO CORPORATION PTY. LTD.

DIVISION OF ELECTRONIC INDUSTRIES LTD.

126-130 GRANT STREET, SOUTH MELBOURNE, S.C.4.

TECHNICAL BULLETIN

BULLETIN FJ-1.
BULLETIN FJM-1.
File:-Receivers AC.
Date: 24/3/47.
Page 1.

SUBJECT-

Model "FJ" (A52) Console

Model "FJM" (B52) Mantel

5 Tube Superheterodyne

Spread Band Receiver

For operation from:-

200-250 Volt 50 Cycle AC. Mains.

This Bulletin Contains:-

1. Technical Specifications
2. General Description
3. Alignment Procedure
4. Circuit Diagram
5. Voltage Table
6. Component Parts List
7. Coil and IF. Transformer Connections

These Receivers are NOT in Production

Information is for Service Purposes ONLY

SUBJECT-Technical Specifications-Models "FJ" and "FJM".

Tube Complement:-

6J8G Converter.
6U7G IF. Amplifier.
6B6G Diode Detector, AVC. and 1st Audio.
6V6G Beam Power Output Amplifier.
5Y3G Full Wave Rectifier.

Intermediate Frequency:-

455 Kilocycles.

Tuning Range:-

Broadcast: 540-1640 Kilocycles.
555.5-182.9 Metres.

Normal Short Wave: 5.85-18.3 Megacycles.
50-16 Metres.

31 Metre Spread Band: 9.5-9.7 Megacycles.
25 Metre Spread Band: 11.6-12.0 Megacycles.

Calibration:-

Straight Line Frequency.

Power Consumption:-

55 Watts (approx.).

General Description:-

The Console Model "FJ" and Mantel Model "FJM" are 5 tube dual wave super-heterodyne receivers incorporating band spreading of the 31 and 25 metre shortwave channels. The overall sensitivity on broadcast is 10 microvolts and 30 microvolts on shortwave for an output of 50 milliwatts with a load impedance of 5,000 ohms.

The circuit consists of tuned aerial and oscillator stages with a triode heptode converter tube type 6J8G followed by an IF. amplifier stage using a type 6U7G tube. A type 6B6G tube for diode detection, AVC. and 1st audio which is resistance capacity coupled to a beam power output amplifier tube type 6V6G. A type 5Y3G tube is used for full wave rectification.

The 25 and 31 metre spread bands are the third and fourth positions respectively on the wave change switch and were selected for band spreading as being the channels on which the best and most consistent reception could be obtained. These two narrow channels are expanded approximately 30 times, or in other words, stations are 30 times easier to tune than on the normal S/wave. band.

Band spreading is achieved by means of series and parallel capacity, and paralleled inductance in the oscillator circuit.



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SUBJECT—Technical Specifications—Models "FJ" and "FJM".

General Description—Continued.

The selectivity curve of the S/wave. aerial transformer is sufficiently broad to cover each bandspread channel, therefore, the aerial gang is disconnected on these two positions and the aerial transformer is peaked in the centre of each band.

The 31 metre band oscillator circuit is controlled by the parallel condenser circuit No. 23 and series condenser 26. Additional parallel capacity is circuit No. 25. The 25 metre band has an auxiliary oscillator coil connected in parallel with the S/wave. oscillator coil secondary and the same series and parallel capacities used as for the 31 metre band.

Bias for the converter, IF. and output tubes is obtained from separate cathode bias circuits and for the 1st audio stage grid leak bias is obtained from the 3 megohm resistor circuit No. 48.

AVC. voltage is obtained from the signal diode and applied to the converter and IF. tubes. Delay is obtained by connecting the AVC. line to the second diode in the 6B6G tube which has a small positive potential applied to it through resistor circuit No. 47, causing it to conduct. No negative voltage is applied to the controlled tubes until the signal diode negative voltage is high enough to cut off the current through this diode. No AVC. is applied to the converter tube on shortwave operation.

Three distinct conditions of tone have been provided in the design of the circuit. The first position provides a condition of maximum intelligibility when receiving long distance stations. In this position no feedback is used. For the second position inverse feedback is applied to the grid of the 6B6G tube from the speaker voice coil via the volume control tap and bringing into operation circuit components 62, 11, 60, 56 and 4, providing bass and treble boost. The third position switches out of circuit resistor 56 and condenser 4 producing bass cut. On positions two and three the circuit operates from very low to maximum volume, but the boost is progressively reduced as maximum is approached.

SUBJECT-Alignment Instructions-Models "FJ" and "FJM".

Equipment:-

Signal Generator.
Output Meter.
Alignment Tool.
Dummy Antenna:-
.01MFD. Mica Capacitor.
200MMFD. Mica Capacitor.
400 Ohm Non-Inductive Resistor.

Alignment Conditions:-

Load Imped. - 5,000 Ohms.
Output Level - 50 Milliwatts.
Vol. Control - Full on (clockwise).
Tone Control - 1st Position (anti-clockwise).

Dial Pointer Setting:-

Fully mesh the condenser gang plates and set the dial pointer on the end of travel mark at the low frequency end of the dial reading.

IF. Alignment:-

Set the signal generator to 455 Kc.

1. Connect the active lead of the generator attenuator with a .01MFD. mica capacitor in series to the control grid of the IF. tube (6U7G). Leave grid clip on tube and peak 2nd IF. primary and secondary.
2. Connect the active lead of the generator attenuator with the .01MFD. capacitor in series to the control grid of the 6J8G converter tube, leave grid clip on the tube and peak 1st IF. primary and secondary. Varb. condenser gang plates full out.

Broadcast Alignment:-

1. Connect the active lead of the generator attenuator with a 200MMFD. mica capacitor in series to the aerial lead.
2. Set the generator to 1400 Kc., tune the receiver to the signal, adjust the B/cast. oscl. trimmer (42) for logging and peak B/cast. aerial coil trimmer (35).
3. Set the generator to 600 Kc., tune the receiver to the signal and adjust the B/cast. series pad (45) for max. output-rock the gang to and fro through the signal while adjusting.
4. Repeat operations No. 2 and 3.



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SUBJECT-Alignment Instructions-Models "FJ" and "FJM".

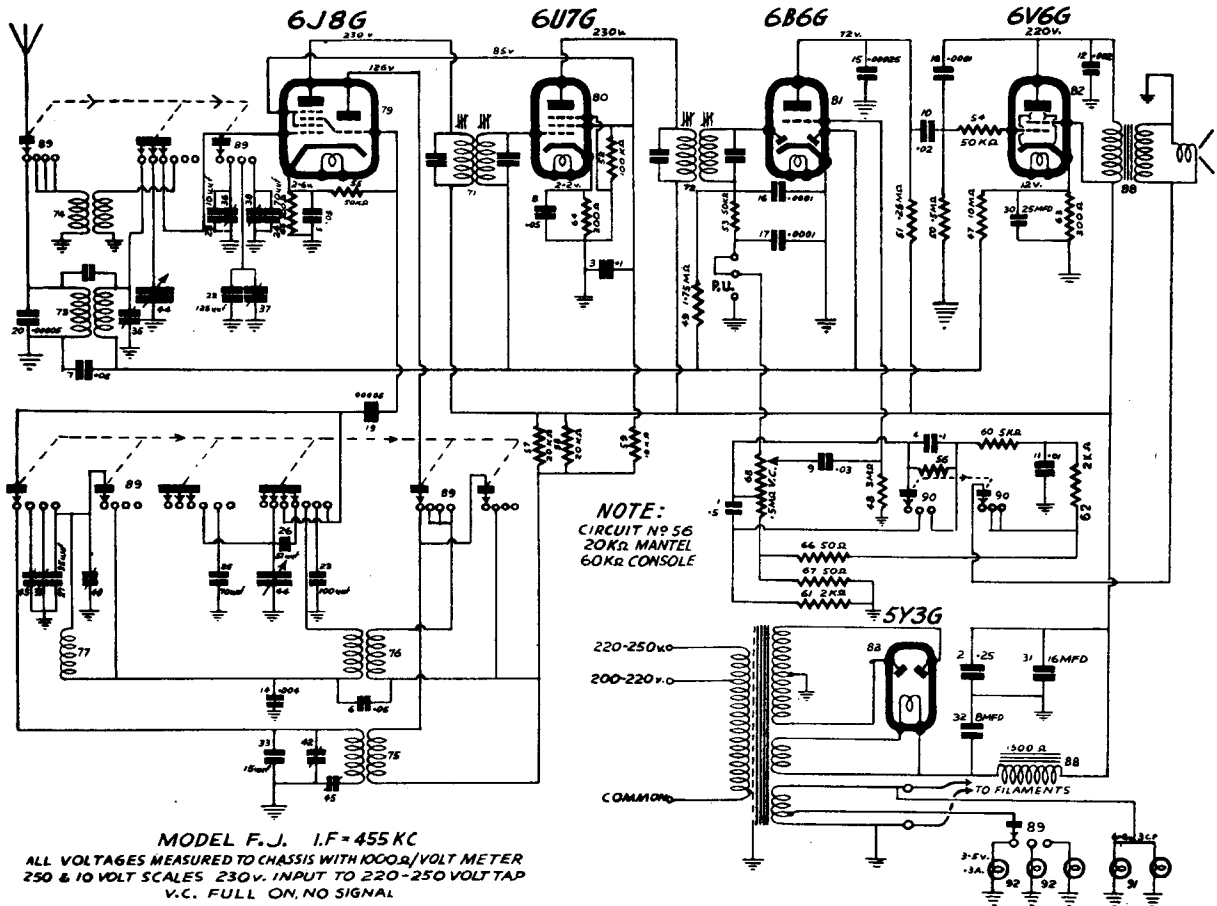
Normal S/wave. Alignment:-

1. Connect the active lead of the generator attenuator with a 400 ohm non-inductive resistor in series to the aerial lead. Turn the wave change switch to the normal S/wave. position. Set the generator to 15 Mc. and tune the receiver to the signal. Adjust the S/wave. oscl. trimmer (43) for logging and peak the S/wave. aerial coil trimmer (36) for max. output. If alignment is correct the image should appear at approximately 16 Mc. on the generator dial and much weaker than the response on signal frequency.

31 Metre Spread-Band Alignment:-The 31 M. spread-band is aligned at the centre frequency of the band, that is 9.6 Mc. Set the generator at 9.6 Mc. and tune the receiver to the signal. Adjust the oscl. trimmer (39) for logging and peak aerial coil trimmer (37).

25 Metre Spread-Band Alignment:-The 25 M. spread-band is aligned in the same manner as the 31 M. spread-band except that the centre frequency is 11.8 Mc., the oscillator trimmer circuit No. 40 and the aerial coil trimmer circuit No. 38.

SUBJECT—Schematic Circuit Diagram—Models "FJ" and "FJM".



NOTE:- Circuit No. 56, 20K ohm changed to 25K ohm (PR 155) on Mantel Only.



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SUBJECT—Voltage Table—Models "FJ" and "FJM".

Equipment:—

DC. Voltmeter: 1000 ohm per volt meter with 0-10, 0-250 and 0-500 volt scales.

AC. Voltmeter: 0-10, 0-250 and 0-500 volt scales.

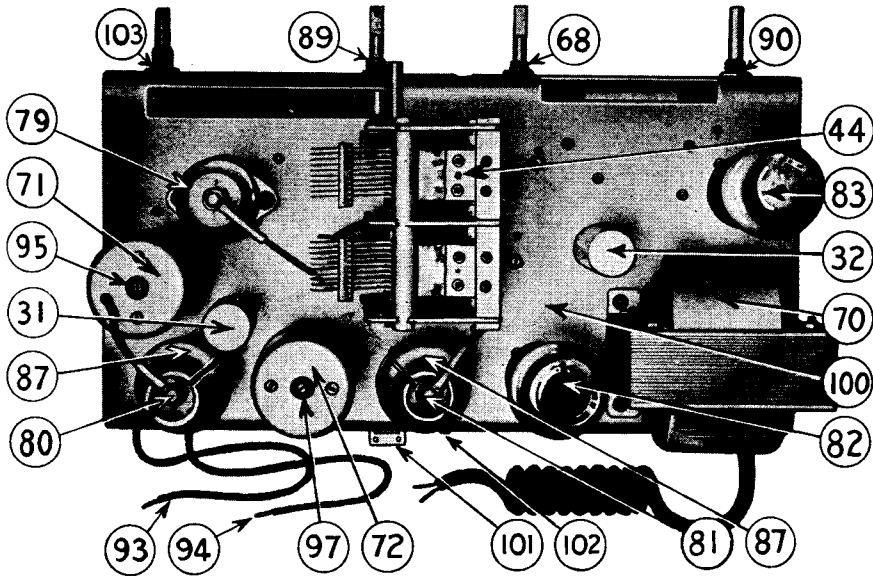
Conditions of Test:—

230 volts 50 cycle AC. input to 220-250 volt primary tap. Set tuned to 1,000 Kc., volume control full on, no signal.

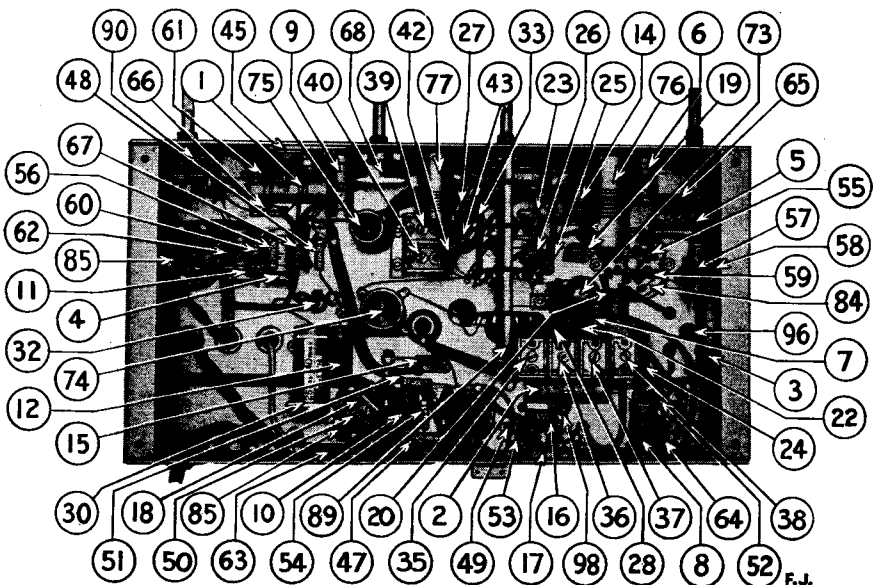
Filament voltages measured across heaters. All other voltages measured from tube socket contacts to chassis.

Tube	Fil.	Plate	Screen	Grid	Osc. Plate	Cathode
6J8G	6.3V.	230V.	85V.	—	126V.	2.6V.
6U7G	6.3V.	230V.	85V.	—	—	2.2V.
6B6G	6.3V.	72V.	—	—	—	—
6V6G	6.3V.	220V.	230V.	—	—	12V.
5Y3G	5V.	330/330V.	RMS. The initial surge voltage across the first electrolytic cond. (32) is 450V. dropping to normal operating value of 340V. DC. voltage drop across field coil is 105V.			

SUBJECT--Top View of Chassis



Bottom View of Chassis.





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TECHNICAL BULLETIN

SUBJECT—Component Parts List—Models "FJ" and "FJM".

<u>Circuit No.</u>	<u>Part Name</u>	<u>Tol.±</u>	<u>Rating</u>	<u>Part No.</u>
1.	.5MFD. Paper Condenser	20%	200V. DCW	PC121
2.	.25MFD. Paper Condenser	20%	400V. DCW	PC128
3.	.1MFD. Paper Condenser	20%	400V. DCW	PC103
4.	.1MFD. Paper Condenser	20%	200V. DCW	PC218
5.	.05MFD. Paper Condenser	20%	200V. DCW	PC102
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.	.03MFD. Paper Condenser	20%	200V. DCW	PC303
10.	.02MFD. Paper Condenser	20%	400V. DCW	PC111
11.	.01MFD. Paper Condenser	20%	600V. DCW	PC140
12.	.002MFD. Paper Condenser	20%	600V. DCW	PC112
13.				
14.	.004MFD. Mica Condenser	5%	1000VT.	PC299
15.	.00025MFD. Mica Condenser	10%	1000VT.	PC126
16.	.0001MFD. Mica Condenser	10%	1000VT.	PC110
17.	.0001MFD. Mica Condenser	10%	1000VT.	PC110
18.	.0001MFD. Mica Condenser	10%	1000VT.	PC110
19.	.00005MFD. Mica Condenser	10%	1000VT.	PC141
20.	.00005MFD. Mica Condenser	10%	1000VT.	PC141
21.				
22.	125MMFD. Silvered Mica Condenser	2½%	1000VT.	PC387
23.	100MMFD. Silvered Mica Condenser	2½%	1000VT.	PC294
24.	70MMFD. Silvered Mica Condenser	2½%	1000VT.	PC333
25.	70MMFD. Silvered Mica Condenser	±.5MMFD.	1000VT.	PC388
26.	51MMFD. Silvered Mica Condenser	±.25MMFD.	1000VT.	PC389
27.	35MMFD. Silvered Mica Condenser	2½%	1000VT.	PC400
28.	10MMFD. Silvered Mica Condenser	2½%	1000VT.	PC307
29.				
30.	25MFD. Electrolytic Condenser	20%	40PV.	PC269 changed to PC318
31.	16MFD. Electrolytic Condenser	20%	525PV.	PC300
32.	8MFD. Electrolytic Condenser	20%	525PV.	PC313
33.	15MMFD. Wire Wound Condenser	5%	—	PC196
34.				
35.	Trim Cond. (B/cast. Ant. Trans.)			
36.	Trim. Cond. (S/wave. Ant. Trans.)			
37.	Trim. Cond. (31 M. Ant. Band-Spread)			
38.	Trim. Cond. (25 M. Ant. Band-Spread)			
39.	Trim. Cond. (31 M. Oscl. Band-Spread)			
40.	Trim. Cond. (25 M. Oscl. Band-Spread)			
		Ant. Trim. Ass'y.		PC401
		Oscl. Trim. Ass'y.		PC402



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SUBJECT-Component Parts List-Models "FJ" and "FJM".

<u>Circuit</u> <u>No.</u>	<u>Part Name</u>	<u>Tol.±</u>	<u>Rating</u>	<u>Part No.</u>
78.				
79.	6J8G Tube			
80.	6U7G Tube			
81.	6B6G Tube			
82.	6V6G Tube			
83.	5Y3G Tube			
84.	8 pin socket			{ PM649 or PM497
85.	8 pin socket (4)			PM532
86.	6 pin socket			PM145
87.	Valve Shield			PM217
88.	{ 6 in. Dynamic Speaker, 1,500 Ohm Field, 5,000 Ohm input (FJM)			PM569
	{ 12 in. Dynamic Speaker, 1,500 Ohm Field, 5,000 Ohm Input (FJ)			PM447
89.	Wave Change Switch			PM650
90.	Acoustinator Control			PM597
91.	Pilot Lamp. Single Contact Bayonet Base 6-8V. 3CP.			PM450
92.	Lamps-band indicator Min. Screw Base. G3½ Bulb 3.5V. .3A			PM121
93.	Aerial Lead			
94.	Earth Lead			
95.	1st IF. Pri. Adj. Screw			
96.	1st IF. Sec. Adj. Screw			
97.	2nd IF. Pri. Adj. Screw			
98.	2nd IF. Sec. Adj. Screw			
99.	Alignment Tool			PM581
<u>MECHANICAL PARTS.</u>				
100.	Metal Chassis			
101.	Pick-up shorting Bar			A101/513
102.	{ One Pin Socket			
	{ Contact			15/58-2
	{ Top Plate			19/96
	{ Bottom Plate			18/96
103.	{ Dial Drive			A103/284
	{ Valve Shield Earth Clips			22/30C
	{ Transformer Cover			20/64
	{ Dial Drum			A134/87
	{ Pilot Lamp Socket Ass'y. (Large)			A106/407
	{ Mains Terminal Strip Ass'y.			A101/30C-3
	{ Dial Drum Springs			27/87

SUBJECT--Component Parts List--Models "FJ" and "FJM".

<u>Circuit No.</u>	<u>Part Name</u>	<u>Tol.±</u>	<u>Rating</u>	<u>Part No.</u>
41.				PC367
42.	Trim. Cond. Wire Wound (B/cast. Oscl. Trans.)			PC367
43.	Trim. Cond. Wire Wound (S/wave. Oscl. Trans.)			PC375
44.	2 Gang Varb. Condenser			PC164
45.	Variable Padder Condenser B/cast. 150-500MMFD.			
46.				
47.	10 Megohm Carbon	10%	1 Watt	PR236
48.	3 Megohm Carbon	10%	$\frac{1}{2}$ Watt	PR282
49.	1.75 Megohm Carbon	10%	Watt	PR248
50.	500,000 Ohm Carbon	10%	$\frac{1}{2}$ Watt	PR245
51.	250,000 Ohm Carbon	10%	$\frac{1}{2}$ Watt	PR249
52.	100,000 Ohm Carbon	10%	$\frac{1}{2}$ Watt	changed to 1 Watt PR496
53.	50,000 Ohm Carbon	10%	Watt	PR103
54.	50,000 Ohm Carbon	10%	Watt	PR160
55.	50,000 Ohm Carbon	10%	Watt	PR160
56.	{ 25,000 Ohm Carbon	10%	Watt (FJM)	PR155
	{ 60,000 Ohm Carbon	10%	Watt (FJ)	PR125
57.	20,000 Ohm Carbon	10%	1 Watt	PR171
58.	20,000 Ohm Carbon	10%	1 Watt	PR171
59.	10,000 Ohm Carbon	10%	$\frac{1}{2}$ Watt	PR164
60.	5,000 Ohm Carbon	10%	Watt	PR250
61.	2,000 Ohm Carbon	10%	Watt	PR253
62.	2,000 Ohm Carbon	10%	Watt	PR253
63.	300 Ohm Wire Wound	10%	1 Watt	PR122
64.	300 Ohm Wire Wound	10%	Watt	PR258
65.	300 Ohm Wire Wound	10%	Watt	PR258
66.	50 Ohm Wire Wound	10%	Watt	PR280
67.	50 Ohm Wire Wound	10%	Watt	PR280
68.	.5 Megohm Carbon Pot. Tapped at 40K Ohms			PR356 changed to PR377
69.				
70.	{ Power Transformer 200-250V. 50 cycle			PT408 changed to PT770
	{ Power Transformer 200-260V. 40 cycle			PT771
71.	1st IF. Transformer			PT461
72.	2nd IF. Transformer			PT462
73.	Antenna Trans. (B/cast.)			PT381
74.	Antenna Trans. (S/wave.)			PT463
75.	Oscl. Coil (B/cast.)			PT383
76.	Oscl. Coil (S/wave.)			PT464
77.	Auxiliary Oscillator Coil (S/wave.)			PT465

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SUBJECT-

MECHANICAL PARTS MODEL "FJ" CONSOLE

Glass Dial Reading	18/407
Dial Frame Ass'y.	A108/407
Dial Pointer Ass'y.	A104/407
Dial Pointer Slider Bar	20/407
Control Knobs (4)	53/81
Control Knob Springs (4)	17/81
Cabinet	87/221
Baffle Board	74/221-1

MECHANICAL PARTS MODEL "FJM" MANTEL

Cabinet	83/221
Knobs	17/81
Pointer Ass'y.	A111/407
Dial Frame	A110/407
Diffuser Glass	27/407
Dial Reading	30/407
Dial Drive	A109/295
Cabinet Feet	96/47
Grille Bars-long	A104/221
Grille Bars-short	A105/221



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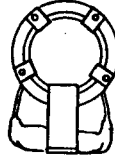
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TECHNICAL BULLETIN

SUBJECT--Coil and IF. Transformer Connections--Models "FJ" and "FJM".

AVC.



EARTH

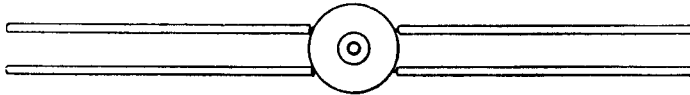
(Outside secondary) GRID

ANTENNA (Inside primary)

ANT. TRANS. B/CAST.

(Junction of circuit
Nos. 57, 58 and 59) RED

BLACK (Padder Cond.)

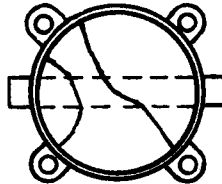


(Oscil. plate) BLUE

GREEN (Oscil. grid cond.)

OSCL. COIL B/CAST.

EARTH



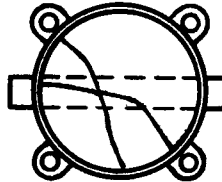
ANTENNA

EARTH

GRID

ANT. TRANS. S/WAVE.

Oscil. grid cond.



(Junction of circuit
Nos. 57, 58, 59 and 6)

Oscil. Plate

SERIES PADDER

OSCL. TRANS. S/WAVE.

(AVC.) BLACK

GREEN (grid)

(6J8G Plate) BLUE

RED (B+)

1ST. IF. TRANS.

(Diode Return) BLACK

GREEN (Diode)

(Plate) BLUE

RED (B+)

2ND IF. TRANS.