



# ECLIPSE RADIO PTY. LTD.

(A DIVISION OF ELECTRONIC INDUSTRIES LTD.)

11-21 STURT STREET, SOUTH MELBOURNE

## TECHNICAL BULLETIN

Bulletin EMP-1

File : Receivers, A.C.

Date : 26/2/47

SUBJECT:

Type EMP Radio - Phonograph

5 tube Dual Wave

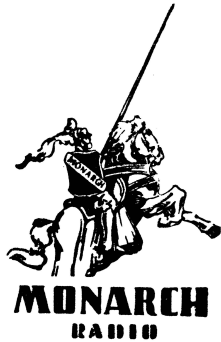
Superheterodyne Receiver

For Operation from:-

200-500 volt 50 cycle A.C. 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 I.F. Transformer Connections.
8. Photographic Illustrations



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SUBJECT:—Technical Specifications— Receiver EMP

Tube Complement:—

Type 6J8G Triode-Heptode Converter  
Type 6U7G Intermediate Frequency Amplifier  
Type 6B6G Detector, A.V.C. and 1st Audio  
Type 6V6GT Beam Power Amplifier  
Type 5Y3GT Full Wave Rectifier

Intermediate Frequency:— 455 Kcs.

Tuning Range:—

Broadcast. 540 Kilocycles to 1640 Kilocycles.  
555 Metres to 182.9 Metres.

Shortwave. 5.8 Megacycles to 18.5 Megacycles.  
15 Metres to 16 Metres.

Calibration:— Straight Line Frequency.

Power Consumption:—Radio Operation 50 Watts (Approx.)  
Phonograph Operation 75 Watts (Approx.)

General Description:—

The model EMP is a 5 valve dual wave superheterodyne Radio-Phonograph, for operation from the 200-250 volt 50 cycle A.C. mains. When fitted with a suitable transformer (See parts list on page 9 of this Bulletin) it can be operated from the 200-260 volt 40 cycle A.C. mains.

Radio Operation:—

The circuit consists of a triode Heptode converter tube type 6J6G followed by an I:F: amplifier using a type 6U7G tube, a type 6B6G tube for diode detection, A.V.C. and 1st audio which is resistance capacity coupled to a beam power output amplifier tube type 6V6GT. A type 5Y3G tube is used for full wave rectification.

Bias for the converter, I.F. and output tubes is obtained from separate cathode bias circuits and for the 1st audio stage bias is obtained from the voltage drop across the 3 megohm resistor (circuit No. 36) in the 6B6G tube grid circuit.





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SUBJECT:-Technical Specifications- Receiver EMP

### Radio Operation:-(Contd.)

AVC. voltage is obtained from the signal diode and applied to the converter and I.F. tubes. Delay is obtained by connecting the AVC. line to the second diode in the 6B6G which has a small positive potential applied to it through resistor (circuit No. 35) 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.

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. In 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 50, 11, 49, 41 and 4, providing bass and treble boost. This position is normally used for local reception. The third position switches out of circuit resistor 41 and condenser 4, producing bass cut. This position is used when greatest clarity of speech is required. On positions two and three the circuit operates from very low to maximum volume but the boost is progressively reduced as maximum is approached.

For operation on the broadcast band the wave change is turned to the centre position. When it is desired to operate the receiver on the shortwave band, this switch is tuned to the left (anti-clockwise). When the receiver is operating on shortwaves, no A.V.C. is applied to the converter.

### Phonograph Operation:-

For phonograph operation the wave change switch is turned to the right (clockwise).

This operation (a) Disconnects the output of the I.F. amplifier from the volume control.

(b) Connects the phonograph pick-up into the volume control circuit.

(c) Disconnects the antenna from the antenna transformers.

(d) Earths the signal grid of the converter tube.

Functions a, c and d ensure that radio signals will not be heard during use of the instrument as a phonograph.

The volume control and tone control operate in the same manner as when using as a radio receiver.



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Date : 26/2/47

SUBJECT—Alignment Procedure—Receiver Type "EMP"

### EQUIPMENT:—

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

### ALIGNMENT CONDITIONS:—

Load Impedance — 5,000 ohms  
Output Level — 50 Milliwatts  
Volume Control — Maximum Volume (Fully clockwise)  
Tone Control — Fully Anti-clockwise

### ALIGNMENT:—

Intermediate Frequency — 455 Kcs.

Do not use a screwdriver or alignment tool with an iron point for aligning I.F. Transformers. A special tool part number PM581 is available from the factory, or failing this an insulated rod with a small brass blade may be used.

### Tuning Range:—

Broadcast Band 540 — 1640 Kcs.  
Shortwave Band 5.8 — 18.5 Mcs.

Set the dial pointer on the end of travel mark on the dial calibration near 550 Kcs.

(Condenser gang plates fully meshed).



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SUBJECT—Alignment Procedure—Receiver Type "EMP"

Operation	Generator Connection	Frequency	Dummy Antenna	Instructions
Wave Change Switch on B/cast Position.				
1.	To grid of 6U7G Tube	455 Kcs.	.01MFD. Mica Capacitor in series with generator	Leave grid cap on tube. Gang plates full out. Peak 2nd I.F. Transformer primary and secondary.
2.	To grid of 6J8G Tube	455 Kcs.	.01MFD. Mica Capacitor in series with generator	Leave grid cap on tube. Gang plates full out. Peak 1st I.F. Transformer primary and secondary.
3.	To antenna lead	600 Kcs.	200MMFD. Mica Capacitor in series with generator	Turn dial pointer to 600 Kcs. Peak B/cast oscillator coil inductance trimmer, rocking gang to and fro while adjusting for maximum output.
4.	To antenna lead	1400 Kcs.	200MMFD. Mica Capacitor in series with generator	Turn dial pointer to 1400 Kcs. Adjust B/cast oscillator trimmer for logging and peak B cast aerial coil trimmer.
Turn Wave Change Switch to S/Wave Position.				
5.	To antenna lead	16 Mcs.	400 ohm non-inductive resistor in series with generator	Turn dial pointer to 16 Mcs. Adjust S wave oscillator trimmer for logging and peak S wave aerial coil trimmer.



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Bulletin EMP-1

File : Receivers, A.C.

Date : 26/2/47

SUBJECT—Voltage Table—Receiver Type "EMP"

## EQUIPMENT:

D.C. Voltmeter — 1,000 ohm/volt meter with 0-10  
0-250 and 0-500 volt scales.  
A.C. Voltmeter — 0-10, 0-250 and 0-500 volt scales.

## CONDITIONS OF TEST:

Heater voltages measured across filaments.  
Tube voltages measured from socket contacts to chassis.  
230 volts 50 cycle A.C. input.  
Receiver turned to 1,000 Kcs. volume control full on  
(max. volume) no signal.

TUBE	FIL.	PLATE	SCREEN	CATHODE	OSCL. PLATE
6J8G	6.3V.	250V.	80V.	2.5V.	150V.
6U7G	6.3V.	250V.	80V.	2V.	
6B6G	6.3V.	80V.			
6V6GT	6.3V.	235V.	250V.	13V.	
5Y3G	5V.	330/330V. RMS. The initial surge voltage across the first electrolytic (circuit No. ) is 430 volts dropping to normal operating value of 340 volts. DC voltage across field coil is 90 volts.			

POWER CONSUMPTION: 50 watts (approx.)



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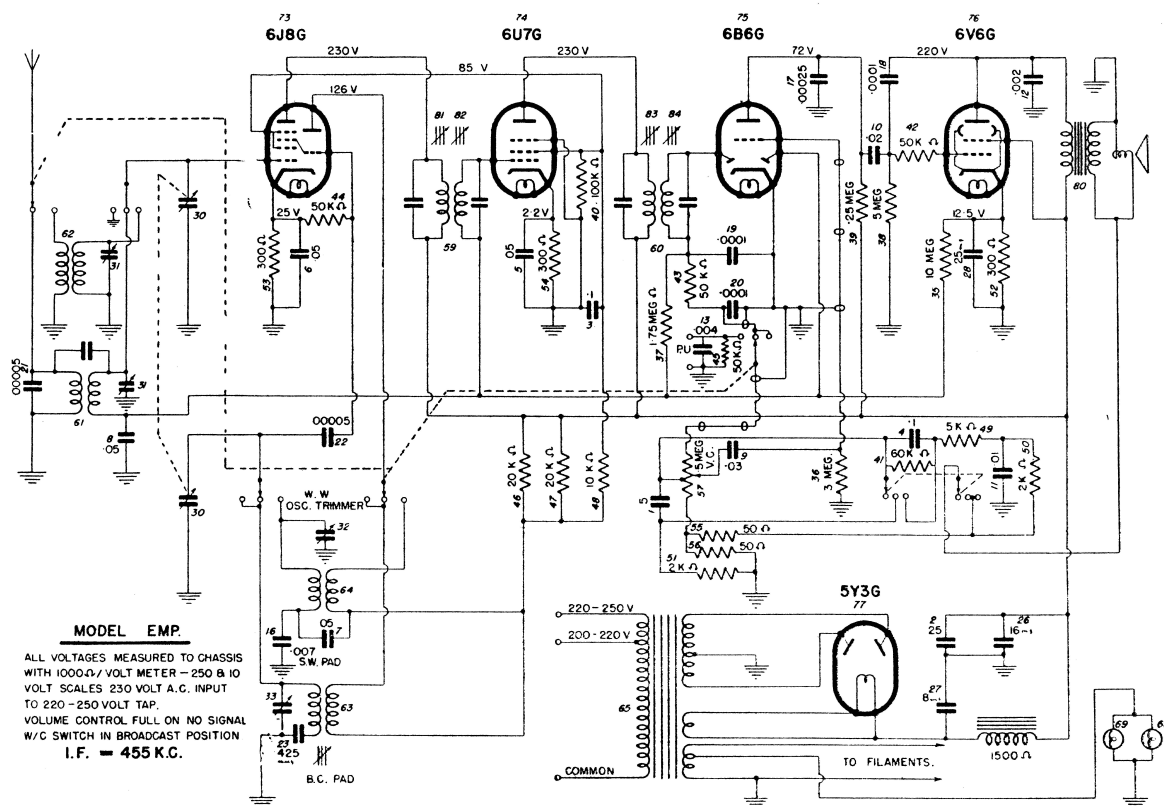
## TECHNICAL BULLETIN

Bulletin EMP-1

File : Receivers, A.C.

Date : 26/2/47

SUBJECT:-Schematic Circuit Diagram- Receiver Type "EMP"



NOTE:- (1) The voltage on the cathode of the 6J8G tube which reads 25v should read 2.5v.

(2) The value of the high tension R.F. by-pass condenser, circuit No. 2 is .25 mfd.



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Bulletin EMP-1

File : Receivers, A.C.

Date : 26/2/47

SUBJECT:-Component Parts List-Electrical-Receiver Type EMP

Circuit No.	Part Name	Rating	Tol. ±	Eclipse Part No.
1.	.5mfd Paper Condenser	200V.	20%	PC121
2.	.25mfd Paper Condenser	400V.	20%	PC128
3.	.1mfd Paper Condenser	400V.	20%	PC103
4.	.1mfd Paper Condenser	200V.	20%	PC218
5.	.05mfd Paper Condenser	200V.	20%	PC102
6.	.05mfd Paper Condenser	200V.	20%	PC102
7.	.05mfd Paper Condenser	200V.	20%	PC102
8.	.05mfd Paper Condenser	200V.	20%	PC102
9.	.03mfd Paper Condenser	200V.	20%	PC303
10.	.02mfd Paper Condenser	200V.	20%	PC111
11.	.01mfd Paper Condenser	200V.	20%	PC140
12.	.002mfd Paper Condenser	200V.	20%	PC112
13.	.004mfd Paper Condenser	200V.	20%	PC221
14.				
15.				
16.	.007mfd Mica Condenser	1000V.	5%	PC672
17.	.00025mfd Mica Condenser	1000V.	10%	PC126
18.	.0001mfd Mica Condenser	1000V.	10%	PC110
19.	.0001mfd Mica Condenser	1000V.	10%	PC110
20.	.0001mfd Mica Condenser	1000V.	10%	PC110
21.	.00005mfd Mica Condenser	1000V.	10%	PC141
22.	.00005mfd Mica Condenser	1000V.	10%	PC141
23.	.000425mfd Mica Condenser	1000V.	2½%	PC683
24.				
25.				
26.	16mfd Electrolytic Condenser	525PV.	20%	PC303
27.	8mfd Electrolytic Condenser	525PV.	20%	PC313
28.	25mfd Electrolytic Condenser	40PV.	20%	PC660
29.				
30.	2 Gang Tuning Condenser			PC636
31.	Double Trimmer Assembly			PC661
32.	0-30mfd W/W. Condenser			PC663
33.	0-30mfd W/W. Condenser			PC663
34.				
35.	10 megohm Carbon Resistor	1 Watt	10%	PR236
36.	3 megohm Carbon Resistor	1 Watt	10%	PR282
37.	1.75 megohm Carbon Resistor	½ Watt	10%	PR248
38.	.5 Megohm Carbon Resistor	½ Watt	10%	PR245



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File : Receivers, A.C.

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SUBJECT—Component Parts List—Electrical—Receiver Type EMP

Circuit No.	Part Name	Rating	Tol. ±	Eclipse Part No.
39.	250,000 Ohm Carbon Resistor	1 Watt	10%	PR496
40.	100,000 Ohm Carbon Resistor	½ Watt	10%	PR103
41.	60,000 Ohm Carbon Resistor	½ Watt	10%	PR125
42.	50,000 Ohm Carbon Resistor	½ Watt	10%	PR160
43.	50,000 Ohm Carbon Resistor	½ Watt	10%	PR160
44.	50,000 Ohm Carbon Resistor	½ Watt	10%	PR160
45.	50,000 Ohm Carbon Resistor	½ Watt	10%	PR160
46.	20,000 Ohm Carbon Resistor	1 Watt	10%	PR171
47.	20,000 Ohm Carbon Resistor	1 Watt	10%	PR171
48.	10,000 Ohm Carbon Resistor	½ Watt	10%	PR164
49.	5,000 Ohm Carbon Resistor	½ Watt	10%	PR250
50.	2,000 Ohm Carbon Resistor	½ Watt	10%	PR253
51.	2,000 Ohm Carbon Resistor	½ Watt	10%	PR253
52.	300 Ohm Wire Wound Resistor	1 Watt	10%	PR122
53.	300 Ohm Wire Wound Resistor	½ Watt	10%	PR258
54.	300 Ohm Wire Wound Resistor	½ Watt	10%	PR258
55.	50 Ohm Wire Wound Resistor	½ Watt	10%	PR280
56.	50 Ohm Wire Wound Resistor	½ Watt	10%	PR280
57.	.5 Megohm Carbon Volume Control tapped at 40,000 ohms			PR377
58.				
59.	1st I.F. Transformer			PT768
60.	2nd I.F. Transformer			PT769
61.	B/C. Aerial Coil			PT381
62.	S/W Aerial Coil			PT463
63.	B/C. Oscillator Coil			PT793
64.	S/W Oscillator Coil			PT464
65.	{Power Transformer 200-250 Volt 50 Cycle			PT770
	{Power Transformer 200-260 Volt 40 Cycle			PT771
66.	Octal Sockets (5)			PM532
67.	6 Pin Socket			PM146
68.	Press Down Terminals (2)			PM306
69.	6-8v. 3 C.P. Dial Lamp			PM450
70.	Tone Switch			PM597
71.	Change Wave Switch			S123
72.	Tuning Control			
73.	Type 6J8G Tube			
74.	Type 6U7G Tube			
75.	Type 6B6G Tube			



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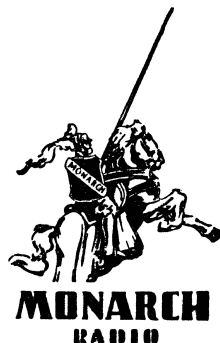
File : Receivers, A.C.

Date : 26/2/47

SUBJECT—Component Parts List—Electrical—Receiver Type EMP

Circuit No.	Part Name	Eclipse Part No.
76.	Type 6V6GT Tube	
77.	Type 5Y3G Tube	
87.	Pick Up Socket Assembly	
79.	Pick Up Socket Assembly	
80.	12" Dynamic Speaker	
	5,000 Ohm input 1500 Ohm Field	PM447
81.	1st I.F. Primary Adjusting Screw	
82.	1st I.F. Secondary Adjust. Screw	
83.	2nd I.F. Primary Adjusting Screw	
84.	2nd I.F. Secondary Adjust. Screw	





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SUBJECT—Component Parts List—Mechanical—Receiver Type EMP

Part Name	Eclipse Part No.
Chassis Assembly	A101/E243
Lever Assembly	A107/E243
Pointer Assembly	A102/E243
Light Diffuser Assembly	A104/E243
Condenser Bayonet Plate	17/E203
Dial Drum	A103/E243
Diffuser Tension Spring	10/526
Dial Drive Spindle	10/E243
Flywheel	86/87
Dial Cord	7/282
Lamp Socket Assembly	A108/E243
Lamp Socket Bush	17/245
Phone Tips	11/252
Lamp Socket Spring	55/245
Lid Lift Springs 2)	14/277
Dial Reading	27/E243
Needle Cups(2)	42/245
Knobs (4)	1/E252
Knob Inserts (4)	17/81
Felt Inserts (4)	66/30C
Valve Shields	PM217
Earth Clips - Valve Shields	22/30C
Grid Clips	873/495
Coil Mounting Piece	94/30C
Terminal Strip Assembly	A103/509
Mains Contact Strip Assembly	A105/E243



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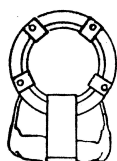
File : Receivers, A.C.

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SUBJECT—COIL AND I.F. TRANSFORMER CONNECTIONS—Receiver Type EMP

A.V.C.

(Outside Secondary)  
Grid

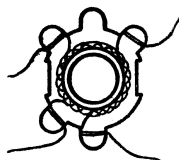


Earth

Antenna (Inside Primary)

ANT. TRANS. B/CAST

(To W/change Switch) Osc. Grid



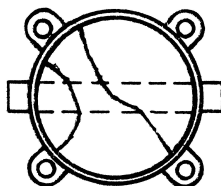
Osc. Plate To W/change  
Switch

Junction of circuit Nos.  
46, 47, 48 and 7.

Series Pad (Circuit No. 23)

OSC. COIL B/CAST

Earth



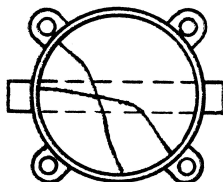
Antenna

Earth

Grid

ANT. TRANS. S/WAVE

(To W/c Switch) Osc. Grid



Junction of circuit Nos.  
46, 47, 48 and 7.

(To W/c Switch) Osc. Plate

Series Pad (Circuit No. 16)

OSC. COIL S/WAVE



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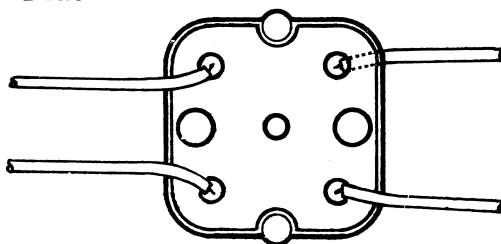
SUBJECT—I.F. TRANSFORMER CONNECTIONS— Receiver Type EMP

(Junction of Circuit Nos.

35, 37 and 8)

Black

Green (6U7G Grid)



(6J8G Plate) Blue

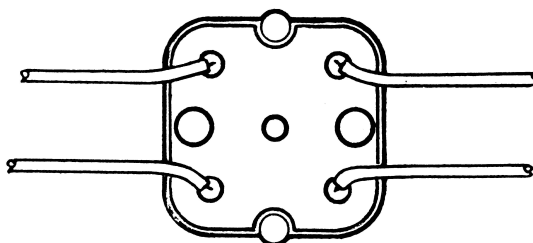
Red B +  
1ST I.F. TRANSFORMER

(Junction of Circuit Nos.

19, 43 and 37)

Black

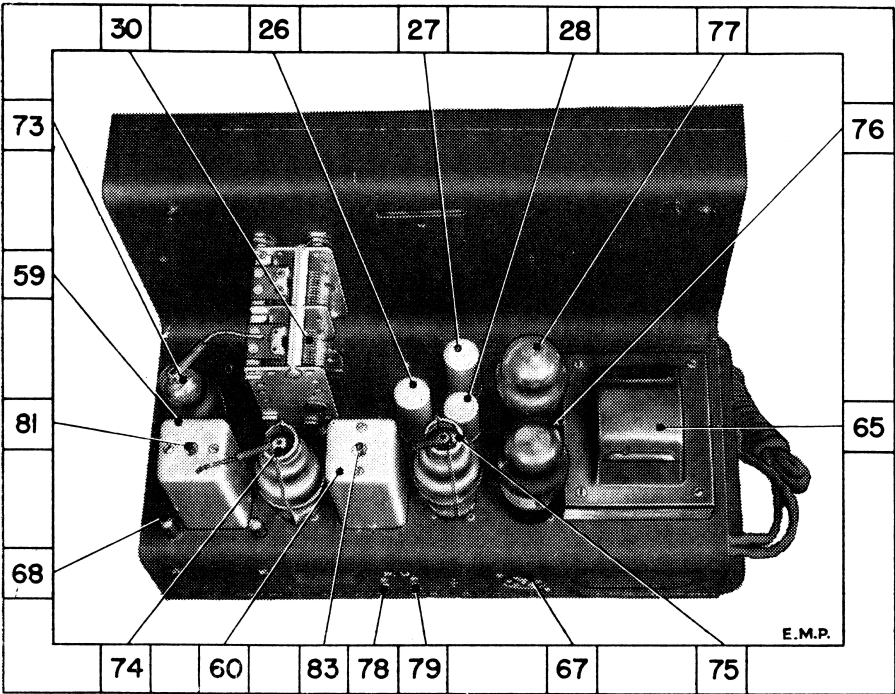
Green (6B6G Diode)



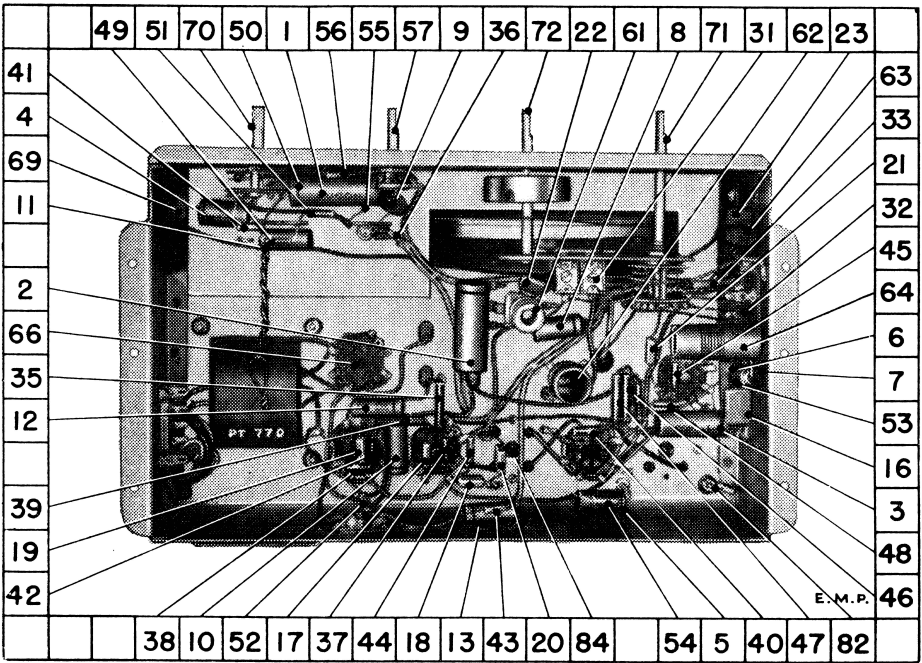
(6U7G Plate) Blue

Red B +  
2ND I.F. TRANSFORMER

SUBJECT-Photographic Illustrations- Receiver Type EMP



Top View Model "EMP"



Bottom View Model "EMP"