The FISK

RADIOLA

MODEL 257

•

Nine Valve, Three Band, A.C. Operated

Superheterodyne

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TECHNICAL INFORMATION

AND SERVICE DATA

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Amalgamated Wireless (Australasia) Ltd

THE FISK RADIOLA, MODEL 257

Nine Valve, Three Band, A.C. Operated, Superheterodyne

TECHNICAL INFORMATION

Electrical Specifications

TUNING RANGE

"Standard Medium Wave" (a).....1500-550 K.C.
"Short Wave" (b).....35-105 metres
"Short Wave" (c).....13-39 metres

ALIGNMENT FREQUENCIES

"Standard Medium Wave" (a)..1400 K.C. 600 K.C.
"Short Wave" (b).....38 metres
"Short Wave" (c).....14 metres

Intermediate Frequency.....460 K.C.

Power Supply Rating.....200-260V., 40-60C.
(Special instruments made for other voltage and frequency ratings)

Power Consumption.....95 watts

VALVE COMPLEMENT

(1) 6K7.....R.F. Amplifier
(2) 6L7.....Converter
(3) 6J7.....Oscillator
(4) 6K7.....I.F. Amplifier
(5) 6H6.....Detector and A.V.C.
(6) 6H6.....Muting Diode
(7) 6L7.....Audio Amplifier
(8) 6L6.....Output
(9) 80.....Rectifier
6G5.....Visual Tuning Indicator

Dial Lamp.....6.3 volts, .25 amp.

Loudspeaker.....10 inch, Type A.N.3 Loudspeaker Transformer.....T.S.3644A

Loudspeaker Field Coil Resistance.....650 ohms

General Circuit Description

The Radiola 257 is a nine valve, three band A.C. operated superheterodyne. The tuning ranges are: 13-39 metres, 35-105 metres and 1500-550 K.C. Features of the Radiola include the use of a 6G5 Visual Tuning Indicator, 6L6 Beam Power Output valve and a Muting System. This system renders the audio system inoperative unless the Radiola is tuned to a carrier wave of sufficient strength to un-block the 6L7 audio amplifier.

Excepting the rectifier and Visual Tuning Indicator, metal valves are used throughout.

Signals are fed from the aerial into the primary coil of the first tuned R.F. circuit, and then from the secondary of the latter through the 6K7 R.F. Amplifier and primary to the secondary of the second tuned circuit. The secondary of this last circuit is connected to the first (super control) grid of the 6L7 converter, and completes the amplifier which operates at the original frequency of the received signal.

The 6L7 converter is excited at its third grid from the 6J7 separate oscillator which is resistance stabilised in frequency.

The intermediate frequency signal is fed via the first I.F. transformer, 6K7 I.F. amplifier, and the second I.F. transformer to the second detector, A.V.C. and muting rectifier circuits. The second detector or signal rectifying diode is connected to the secondary of the second I.F. transformer, while the A.V.C. diode rectifier is coupled to the primary; both of these diode rectifiers are within the one envelope of a 6H6. The primary of the second I.F. transformer is coupled also to one of the diode rectifiers of a second 6H6 and is employed to derive positive bias potentials to unlock the third or muting grid of the 6L7 audio amplifier valve. The other diode unit of the second 6H6 is used to convey the minimum bias potentials from the back bias potential divider to the grids of the 6K7 R.F. amplifier, 6L7 converter and 6K7 I.F. amplifier. The A.V.C. operates on all three of these valves on the broadcast band, and on the two 6K7's alone on both short wave bands. The control grid of the 6G5 Visual Tuning Indicator is fed from the A.V.C. rectifier circuit with approximately two-thirds of the A.V.C. voltage.

Audio frequencies from the signal rectifying diode are taken through the phono-radio switch to the volume control,, and thence to the first grid of the 6L7 audio amplifier valve, on the third grid of which the negative blocking potentials are introduced from the muting control. The audio signal is not transferred to the plate circuit of the 6L7 unless the R.F. signal level at the primary of the second I.F.

transformer is large enough to generate sufficient positive rectified voltage output from the muting rectifier.

The output from the 6L7 audio amplifier is resistance-capacity coupled to the 6L6 output valve which, in turn, is transformer coupled to the loudspeaker

Socket voltages are supplied by a circuit comprising a power transformer T13, an 80 rectifier, two high capacity electrolytic condensers and two filter reactors (T12 and the loudspeaker field.)

Alignment Procedure

Unless it is felt certain that the alignment of the Radiola is incorrect, it is not desirable to alter the adjustments from the factory setting. However, when repairs have been made to I.F. or R.F. circuits or tampering is suspected, alignment becomes necessary.

In aligning the tuned circuits, it is important to apply a definite procedure, as tabulated below, and to use adequate and reliable test equipment. An A.W.A. Modulated Oscillator, Type C.1070, is ideal for the purpose. Visual indication of the output from the Radiola is also necessary, any output meter of conventional design being suitable.

Connect the ground connection of the Modulated Oscillator to the Radiola chassis, and for I.F. alignment remove the grid clip from the 6L7 before connecting the oscillator. See that a 250,000 ohms resistor is connected between the output terminals of the Modulated Oscillator.

During alignment set the volume and sensitivity controls in the maximum clockwise position and regulate the output of the Modulated Oscillator so that a minimum signal is applied to the Radiola to obtain an observable indication. This will avoid A.V.C. action and overloading.

The I.F. adjustments are approached from above and below the chassis — see figs. 2 and 3, and should be adjusted with a non-metallic screwdriver, since the self-apacity of a metallic driver would upset the adjustment. The Padding adjustment, referred to in the chart, is situated on the top of the oscillator coil shield— see fig. 3. The R.F. circuits are aligned by plunger type air trimmers. It will be found advantageous in adjusting the air trimmers to rotate the plunger during the operation in addition to using a steady pressure. As soon as the correct capacity is obtained, lock the air trimmer to make the setting permanent.

"Approx. 550 K.C. No Signal" means that the Radiola should be tuned to a point at or near 550 K.C. where no signal or interference is received from a station or local (heterodyne) oscillator. The term "Dummy Aerial" means the device which should be connected between the output cable of the Modulated Oscillator and the aerial terminal of the Radiola, on short waves only, to simulate the characteristics of the average aerial. The "Dummy Aerial" in this case is a 400 ohms non-inductive resistor.

To check the calibration of the Radiola, connect an aerial and an earth wire and tune a broadcasting station of wavelength between 450 and 550 metres. If there is an error in the calibration, reset the pointer by loosening the mounting screws. Then, repeat instructions 6, 7 and 8 of the chart.

Alignment Order	Oscillator Connection to Radiola	Dummy Aerial	Oscillator Setting	Radiola Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6L7 1st Det. Grid Cap	—	460 K.C.	Approx. 550 K.C. No Signal	2nd I.F. Trans.	Secondary	Max. (Peak)
2	6L7 1st Det. Grid Cap	—	460 K.C.	Approx. 550 K.C. No Signal	2nd I.F. Trans.	Primary	Max. (peak)
3	6L7 1st Det. Grid Cap	—	460 K.C.	Approx. 550 K.C. No Signal	1st I.F. Trans.	Secondary	Max. (Peak)
4	6L7 1st Det. Grid Cap	—	460 K.C.	Approx. 550 K.C. No Signal	1st I.F. Trans.	Primary	Max. (peak)
			Repeat the above adjustments before proceeding.				
5	Aerial Term.	—	600 K.C.	600 K.C.	Oscillator	Padding Adjustment	Max (peak)
6	Aerial Term.	—	1400 K.C.	1400 K.C.	Oscillator	C18	Max. (peak)
7	Aerial Term.	—	1400 K.C.	1400 K.C.	Detector	C12	Max. (peak)
8	Aerial Term.	—	1400 K.C.	1400 K.C.	R.F.	C3	Max. (peak)
9	Aerial Term.	—	600 K.C.	600 K.C.	Oscillator	Padding Adjustment	Max (peak)
			Repeat instructions 6, 7 and 8 before proceeding.				

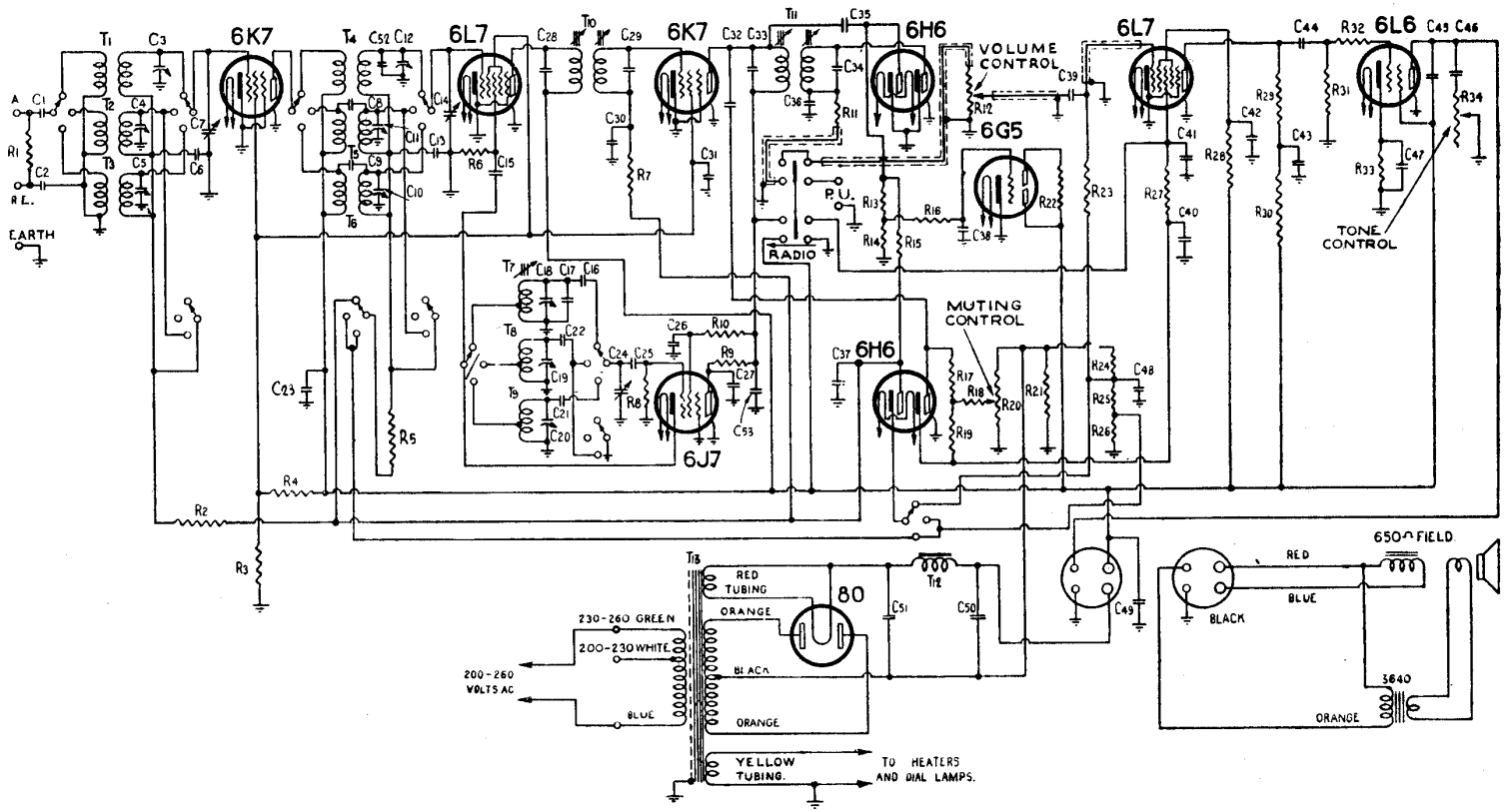


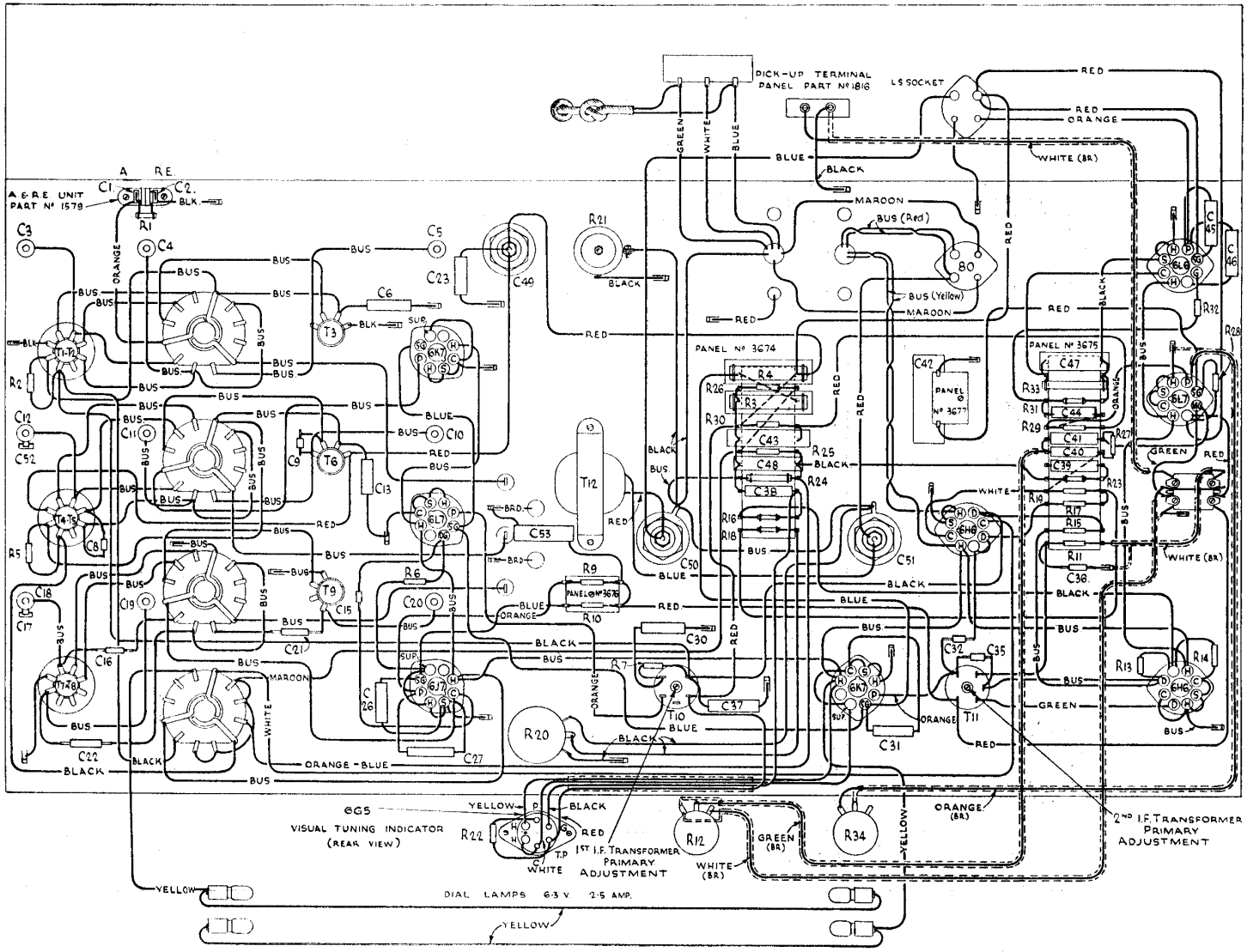
Fig. 1.—Circuit Diagram.

Code	Part No.	COILS
T1	3563	Aerial Coil, 1500-550 K.C.
T2	3563	Aerial Coil, 35-105 metres
T3	3568	Aerial Coil, 13-39 metres
T4	3565	R.F. Coil, 1500-550 K.C.
T5	3565	R.F. Coil, 35-105 metres
T6	3611	R.F. Coil, 13-39 metres
T7	3560	Osc. Coil, 1500-550 K.C.
T8	3611	Osc. Coil, 35-105 metres
T9	3612	Osc. Coil, 13-39 metres
T10	3243	First I.F. Transformer
T11	3244	Second I.F. Transformer
T12	3682	Filter Choke
T13	3667	Power Transformer, 40~ 50~.
T13	3669	Power Transformer, 110V.

Code	Part No.	RESISTORS
R1		100,000 ohms, 1/3 watt
R2		100,000 ohms, 1/3 watt
R3		11,000 ohms, 3 watt
R4		11,000 ohms, 3 watt
R5		100,000 ohms, 1/3 watt
R6		50,000 ohms, 1/3 watt
R7		100,000 ohms, 1/3 watt
R8		50,000 ohms, 1/3 watt
R9		5,000 ohms, 1/3 watt
R10		15,000 ohms, 1/3 watt
R11		100,000 ohms, 1/3 watt
R12	1668	300,000 ohms, Volume Cont.
R13		250,000 ohms, 1/3 watt
R14		500,000 ohms, 1/3 watt
R15		1 Megohm, 1/3 watt
R16		1 3/4 Megohms, 1/3 watt
R17		1 Megohm, 1/3 watt
R18		1 3/4 Megohms, 1/3 watt
R19		1 Megohm, 1/3 watt
R20	3680	3,000 ohms, Muting Cont.
R21	3671	106 ohms, Wire Wound
R22		1 Megohm, 1/3 watt
R23		1 Megohm, 1/3 watt
R24		30,000 ohms, 1/3 watt
R25		10,000 ohms, 1/3 watt
R26		10,000 ohms, 1/3 watt
R27		100,000 ohms, 1/3 watt
R28		200,000 ohms, 1/3 watt
R29		200,000 ohms, 1/3 watt
R30		50,000 ohms, 1/3 watt
R31		500,000 ohms, 1/3 watt
R32		300 ohms, 1/3 watt
R33		190 ohms, 1 watt
R34	2762	100,000 ohms, Tone Cont.

Code	Part No.	CONDENSERS
C1		500 mmfd. Mica
C2		500 mmfd. Mica
C3		2-20 mmfd. Air Trimmer
C4		2-20 mmfd. Air Trimmer
C5		2-20 mmfd. Air Trimmer
C6		.05 mfd. Paper
C7	3665	Variable Condenser
C8		6 mmfd. Mica (F)
C9		6 mmfd. Mica (F)
C10		2-20 mmfd. Air Trimmer
C11		2-20 mmfd. Air Trimmer
C12		2-20 mmfd. Air Trimmer
C13		.05 mfd. Paper
C14	3665	Variable Condenser
C15		115 mmfd. Mica (A)
C16		505 mmfd. Mica Padding
C17		20 mmfd. Mica (K)
C18		2-20 mmfd. Air Trimmer
C19		2-20 mmfd. Air Trimmer
C20		2-20 mmfd. Air Trimmer
C21		3950 mmfd. Mica Padding
C22		2025 mmfd. Mica Padding
C23		.1 mfd. Paper
C24	3665	Variable Condenser
C25		115 mmfd. Mica (A)
C26		.005 mfd. Paper
C27		.005 mfd. Paper
C28		115 mmfd. Mica (A)
C29		115 mmfd. Mica (A)
C30		.05 mfd. Paper
C31		.1 mfd. Paper
C32		115 mmfd. Mica (A)
C33		115 mmfd. Mica (A)
C34		115 mmfd. Mica (A)
C35		115 mmfd. Mica (A)
C36		200 mmfd. Mica (J)
C37		.02 mfd. Paper
C38		.05 mfd. Paper
C39		.02 mfd. Paper
C40		.02 mfd. Paper
C41		.05 mfd. Paper
C42		8 mfd. 500V. Electrolytic
C43		.5 mfd. Paper
C44		.02 mfd. Paper
C45		.005 mfd. Paper
C46		.05 mfd. Paper
C47		25 mfd. 25V. Electrolytic
C48		25 mfd. 25V. Electrolytic
C49		8 mfd. 500V. Electrolytic
C50		8 mfd. 500V. Electrolytic
C51		8 mfd. 500V. Electrolytic
C52		.6 mmfd. Mica (F)
C53		.5 mfd. Paper

Circuit Code.



Fi. 2.—Lay-out Diagram (underneath view).

Alignment Order	Oscillator Connection to Radiola	Dummy Aerial	Oscillator Setting	Radiola Dial Setting	Circuit to Adjust	Adjustment Symbol	Adjust to obtain
10	Aerial Term.	400 ohms	38 metres	38 metres	Oscillator	C19	Max. (peak)*
11	Aerial Term.	400 ohms	38 metres‡	38 metres	Detector	C8	Max. (peak)**
12	Aerial Term.	400 ohms	38 metres‡	38 metres	R.F.	C4	Max. (peak)†
13	Aerial Term.	400 ohms	42 metres	14 metres	Oscillator	C20	Max. (peak)*
14	Aerial Term.	400 ohms	42 metres‡	14 metres	Detector	C10	Max. (peak)**
15	Aerial Term.	400 ohms	42 metres‡	14 metres	R.F.	C5	Max. (peak)††

NOTE.—To align the Radiola at 14 metres with a Type C1070 modulated oscillator, set the oscillator to 42 metres and use the third harmonic.

* Use minimum capacity peak if two peaks can be obtained.

** Use maximum capacity peak if two peaks can be obtained.

† After this adjustment, check for image signal by tuning the Radiola to approx. 42.5M.

†† After this adjustment, check for image signal by tuning the Radiola to approx. 14.6M.

‡ Rock the station selector back and forth through the signal.

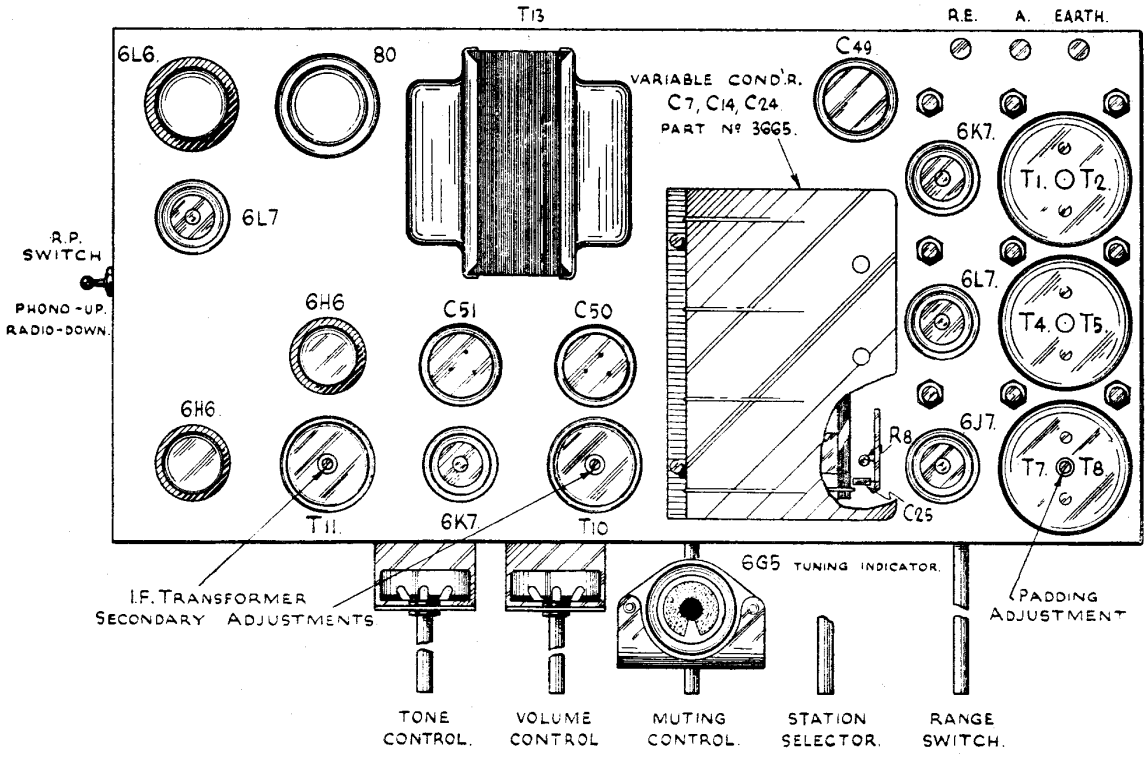


Fig. 3.—Lay-out Diagram (top view).

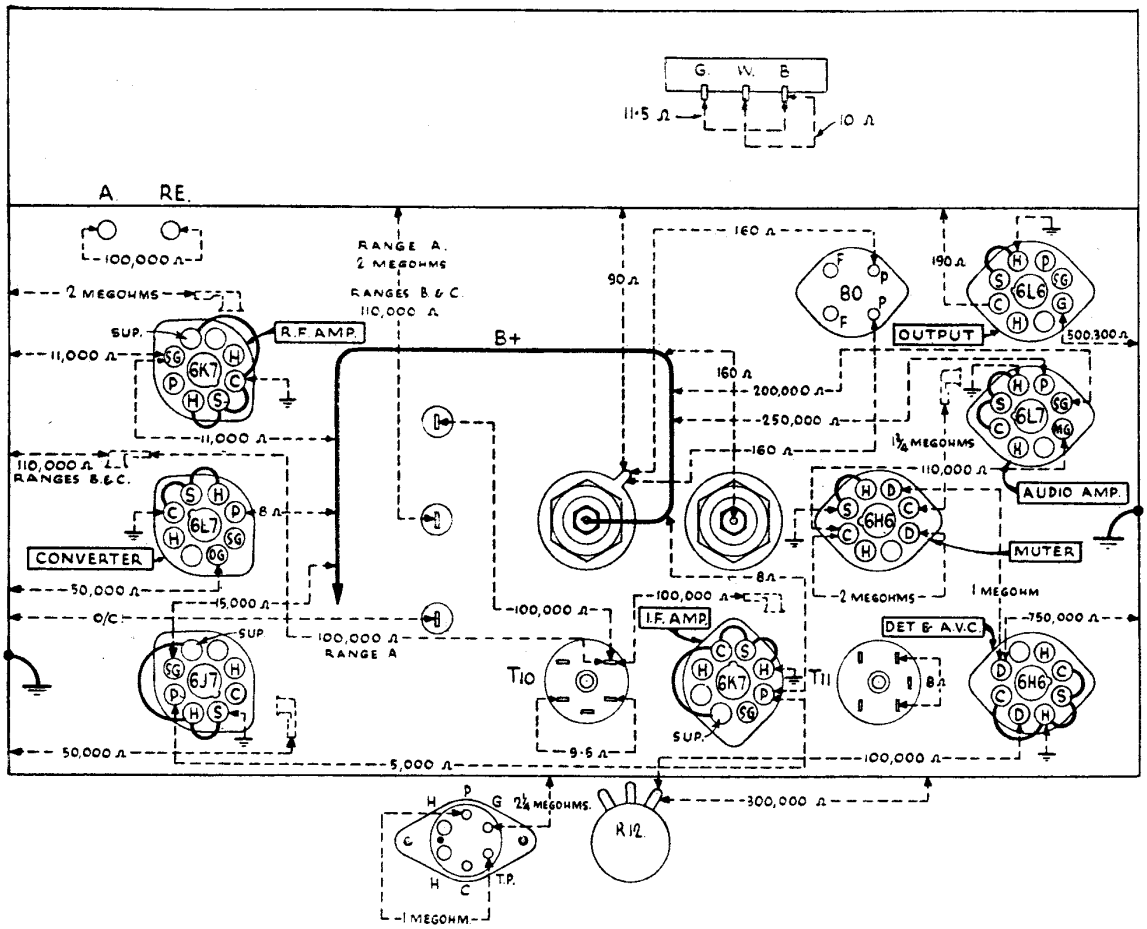


Fig. 4.—Resistance Diagram.

SOCKET VOLTAGES.

VALVE	Chassis to Cathode Volts	Chassis to Screen Grid Volts	Chassis to Plate Volts	Plate Current M.A.	Heater Volts
6K7 R.F. Amplifier					
M.W.	0	100	255	4.5	6.3
S.W.	0	90	250	5.5	
6L7 Converter M.W.	0	100	255	2.0	6.3
S.W.	0	90	250	2.5	
6J7 Oscillator M.W.	0	200	210	3.0	6.3
S.W.	0	190	230	5.5	
6K7 I.F. Amplifier					
M.W.	0	100	255	4.5	6.3
S.W.	0	90	250	5.5	
6H6 Detector and A.V.C.	—	—	—	—	6.3
6H6 Muting Diode	-4.5	—	—	—	6.3
6L7 Audio Amplifier	0	*45	75	0.85	6.3
6L6 Output	13.6	255	245	68.0	6.3
80 Rectifier	760/380 Volts, 105 M.A. total current.				5.0

Voltage across loud speaker field 80 volts.

Measured at 240 volts A.C. supply. No signal input. Controls in maximum clockwise position excepting range switch which is set as desired

* Cannot be measured with ordinary voltmeter.