The FISK

RADIOLA

MODEL 258

•

Five Valve, Three Band, D.C. Operated

Superheterodyne

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TECHNICAL INFORMATION

AND SERVICE DATA

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Amalgamated Wireless (Australasia) Ltd

THE FISK RADIOLA, MODEL 258

Five Valve, Three Band, D.C. Operated, Superheterodyne

TECHNICAL INFORMATION

Electrical Specifications

Tuning Range		Alignment Frequencies	
"Standard Medium Wave" (a)	1500-550 K.C.	"Standard Medium Wave" (a)	1400 K.C.
"Short Wave" (b)	35-105 metres	"Short Wave" (b)	38 metres
"Short Wave" (c)	13-39 metres	"Short Wave" (c)	14 metres

Intermediate Frequency	460 K.C.
Power Supply Rating	200-260 volts D.C.
Power Consumption	90 watts

Valve Complement			
(1) 6D6	R.F. Amplifier	(3) 6D6	I.F. Amplifier
(2) 6A7	Detector-Oscillator	(4) 6B7	Detector, A.V.C. and A.F. Amplifier
		(5) 43	Output Pentode

Dial Lamps	3.2 volts, .35 amps.		
Loudspeaker	10 inch, Type AN5	Loudspeaker Transformer	T.A.2446Y
Loudspeaker Field Coil Resistance	4500 ohms		

WARMING.

Since the circuit elements of D.C. power operated receivers are directly connected to the power supply, great care should be exercised in servicing this chassis.

The Radiola 258 is a five valve, three band, superheterodyne, designed for operation on direct current power supplies within the limits 200-260 volts.

General Circuit Description

TUNED CIRCUITS.

In the R.F., 1st Detector and oscillator stages, the coils for bands "a" and "b" are wound on single forms which are mounted on coil shields on the top of the chassis. The coils for band "c" are wound on separate forms which are mounted on the range switch assembly. A multiple contact rotary switch is used to select the band it is desired to tune and to illuminate the proper tuning dial scale for the band in operation.

Portions of the range switch are also used to short circuit the secondaries of the band "b" aerial, R.F. and oscillator coils, when operating the Radiola on band "c." This is done to prevent these coils resonating at frequencies within band "c" and thus causing dead-spots. The coils are tuned by a three section variable condenser. Plunger type air trimmers are used for alignment purposes and these are mounted in easily accessible locations beside the coil shields on the top of the chassis — see fig 3. Fixed mica padding condensers are used in the oscillator stage for each band, the padding adjustment on the "Standard Medium Wave" band (band "a") being in the form of a magnetite core inserted within the oscillator coil and adjustable from the top of the coil shield — see fig. 3.

Sensitivity boosting on short waves is accomplished by short-circuiting bias resistor R9 to lower the cathode bias voltage on the 6A7 detector-oscillator and 6D6 I.F. amplifier. A variable control R10 is also in the circuit to allow the sensitivity of the Radiola to be controlled manually.

The intermediate frequency amplifier system comprises a 6D6 valve and two I.F. transformers. The stage operates at a basic frequency of 460 K.C. Adjustable magnetite cores are provided for adjusting the inductance of the I.F. transformer primary and secondary windings.

DETECTOR AND A.V.C.

The modulated signal, as obtained from the output of the I.F. stage, is detected by one diode in the 6B7 valve. The audio frequency component, secured by this process, is transferred from the mov-

able arm of the volume control R16, through coupling condenser C42, to the control grid of the 6B7 for voltage amplification. A signal is also transferred via C43 to the other diode in the 6B7 and the D.C. potential produced across R17 (proportional to the incoming signal) is fed to the control grid circuits of the R.F. amplifier, 1st Detector and I.F. amplifier valves to provide A.V.C.

AUDIO SYSTEM.

The audio frequency component, mentioned under "Detector and A.V.C." transferred to the control grid of the 6B7, is amplified by the valve and resistance-capacity coupled to the 43 output pentode. The output of the 43 is transformer coupled to the electro-dynamic loudspeaker by the transformer T.A.3446Y.

FILTER UNIT.

The filter unit is mounted inside the console cabinet and comprises two filter chokes T13 and T14, two by-pass condensers C54 and C55 and a ballast resistor R28. The ballast resistor is of the correct value on leaving the factory to provide the heaters of the valves with the correct voltage when the Radiola is operated on voltages of 230 or above.

If it is desired to operate the Radiola on a circuit supplying below 230V, close the connecting link to short-circuit portion of R28 in order to raise the heater voltage. See fig. 5.

The power supply connection plug is attached to the back of the Radiola in such a way as to disconnect the power when the back is removed. This is in accordance with the wiring rules of the Standards Association of Australia.

EARTH CONNECTION.

In practically all cases, quieter reception will be obtained with an earth wire connected to the terminal provided on the filter unit instead of the terminal marked "R.E." on the Radiola chassis.

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 circuit, 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 6A7 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-capacity 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 wave length between 450 and 550 metres. If there is an error in the calibration, reset the pointer by loosening the mounting screws. Then, repeat instructions 4, 5 and 6 of the chart.

Alignment Order	Oscillator Connection to Radiola	Dummy Aerial	Oscillator Setting	Radiola Dial Setting	Circuit to Adjust	Adjustment Symbol	Adjust to obtain
1	6A7 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No Signal	2nd I.F. Trans.	Secondary and Primary	Max. (peak)
2	6A7 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No Signal	1st I.F. Trans.	Secondary and Primary	Max. (peak)

Repeat the above adjustments before proceeding.

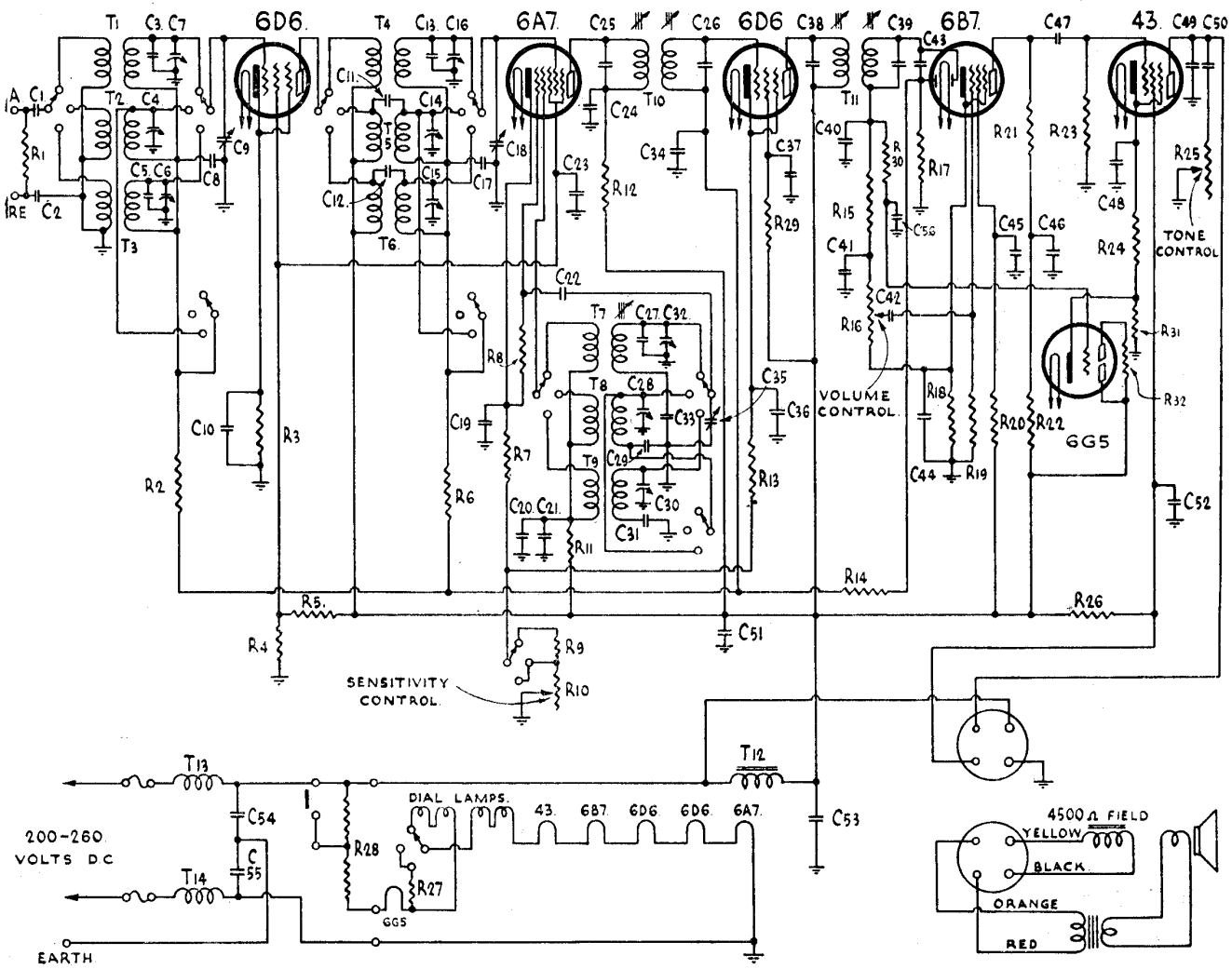

Fig. 1.—Circuit Diagram.

Code	Part	COILS
T1	3563	Aerial coil, 1500-500 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	3569	R.F. coil, 13-39 metres
T7	3567	Osc. coil, 1500-550 K.C.
T8	3567	Osc. coil, 35-105 metres
T9	3570	Osc. coil 13-39 metres
T10	3243	1st I.F. transformer
T11	3244	2nd I.F. transformer
T12	3979	Smoothing Choke
T13	2191	Line Filter Choke
T14	2191	Line Filter Choke

Code	Part	RESISTORS
R1		11,000 ohms, 3 watt
R2		11,000 ohms, 3 watt
R3		100,000 ohms, ⅓ watt
R4		100,000 ohms, ⅓ watt
R5		300 ohms, ⅓ watt
R6		100,000 ohms, ⅓ watt
R7		300 ohms, ⅓ watt
R8		60,000 ohms, ⅓ watt
R9		300 ohms, ⅓ watts
R10	3410	3,000 ohms, Sens. Control
R11		20,000 ohms, 1 watt
R12		300 ohms, ⅓ watt
R13		600 ohms, ⅓ watt
R14		1¾ megohms, ⅓ watt
R15		100,000 ohms, ⅓ watt
R16	1668	300,000 ohms, Vol. Control
R17		1¾ megohms, ⅓ watt
R18		3,000 ohms, ⅓ watt
R19		500,000 ohms, ⅓ watt
R20		1 megohm, 1 watt
R21		200,000 ohms, 1 watt
R22		50,000 ohms, ⅓ watt
R23		300,000 ohms, ⅓ watt
R24		500 ohms, 1 watt
R25	2762	100,000 ohms, Tone Control
R26		1,500 ohms, Wire Wound
R27		24 ohms, Wire Wound
R28		580 ohms, Wire Wound
R29		100,000 ohms, 1 watt
R30		1¼ Megohms, ⅓ watt
R31		50 ohms, ⅓ watt
R32		1 Megohm, ⅓ watt

Code	Part	CONDENSERS
C1		500 mmfd. mica
C2		500 mmfd. mica
C3		6 mmfd. mica (F)
C4		2-20 mmfd. air trimmer
C5		6 mmfd. (F)
C6		2-20 mmfd. air trimmer
C7		2-20 mmfd. air trimmer
C8		.05 mfd. paper
C9	3399	Variable Condenser
C10		.1 mfd. paper
C11		6 mmfd. mica (F)
C12		10 mmfd. mica (B)
C13		6 mmfd. mica (F)
C14		2-20 mmfd. air trimmer
C15		2-20 mmfd. air trimmer
C16		2-20 mmfd. air trimmer
C17		.05 mfd. paper
C18	3399	Variable Condenser
C19		.1 mfd. paper
C20		.05 mfd. paper
C21		2.5 mfd. paper
C22		50 mmfd. mica (D)
C23		.1 mfd. paper
C24		.05 mfd. paper
C25		115 mmfd. mica (A)
C26		115 mmfd. mica (A)
C27		15 mmfd. mica (C)
C28		2-20 mmfd. air trimmer
C29		2025 mmfd. mica Padding
C30		2-10 mmfd. air trimmer
C31		3400 mmfd. mica Padding
C32		2-20 mmfd. air trimmer
C33		440 mmfd. mica Padding
C34		.05 mfd. paper
C35	3399	Variable Condenser
C36		.1 mfd. paper
C37		.1 mfd. paper
C38		115 mmfd. mica (A)
C39		115 mmfd. mica (A)
C40		100 mmfd. mica (G)
C41		100 mmfd. mica (G)
C42		.05 mfd. paper
C43		700 mmfd. mica
C44		25 mfd. 25V Electrolytic
C45		.1 mfd. paper
C46		.5 mfd. paper
C47		.05 mfd. paper
C48		25 mfd. 25V Electrolytic
C49		.005 mfd. paper
C50		.035 mfd. paper
C51		.5 mfd. paper
C52		2.5 mfd. paper
C53		5 mfd. paper
C54		.1 mfd. paper
C55		.1 mfd. paper
C56		.05 mfd. paper

Circuit Code.

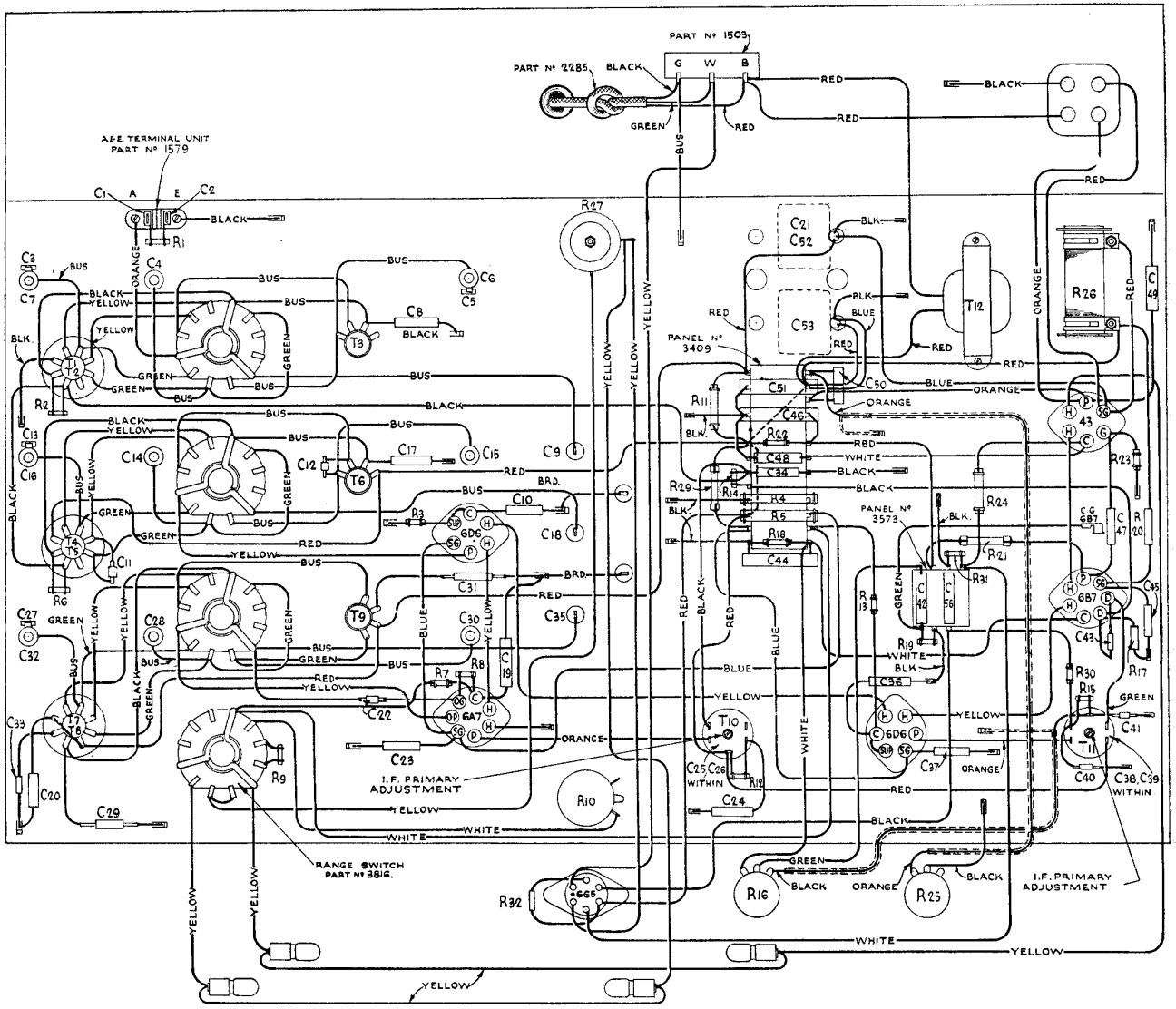

Fig. 2.—Layout Diagram (underneath view).

Alignment Order	Oscillator Connection to Radiola	Dummy Aerial	Oscillator Setting	Radiola Dial Setting	Circuit to Adjust	Adjustment Symbol	Adjust to obtain
3	Aerial Term.	—	600 K.C.	600 K.C.	Oscillator	Padding Adjustment	Max. (peak)
4	Aerial Term.	—	1400 K.C.	1400 K.C.	Oscillator	C32	Max. (peak)
5	Aerial Term.	—	1400 K.C.	1400 K.C.	Detector	C16	Max. (peak)
6	Aerial Term.	—	1400 K.C.	1400 K.C.	R.F.	C7	Max. (peak)
7	Aerial Term.	—	600 K.C.	600 K.C.‡	Oscillator	Padding Adjustment	Max. (peak)
			Repeat adjustments 4, 5 and 6 before proceeding.				
8	Aerial Term.	400 ohms	38 metres	38 metres	Oscillator	C28	Max. (peak)*
9	Aerial Term.	400 ohms	38 metres	38 metres‡	Detector	C14	Max. (peak)**
10	Aerial Term.	400 ohms	38 metres	38 metres‡	R.F.	C4	Max. (peak)†
11	Aerial Term.	400 ohms	14 metres	14 metres	Oscillator	C30	Max. (peak)*
12	Aerial Term.	400 ohms	14 metres	14 metres‡	Detector	C15	Max. (peak)**
13	Aerial Term.	400 ohms	14 metres	14 metres‡	R.F.	C6	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.

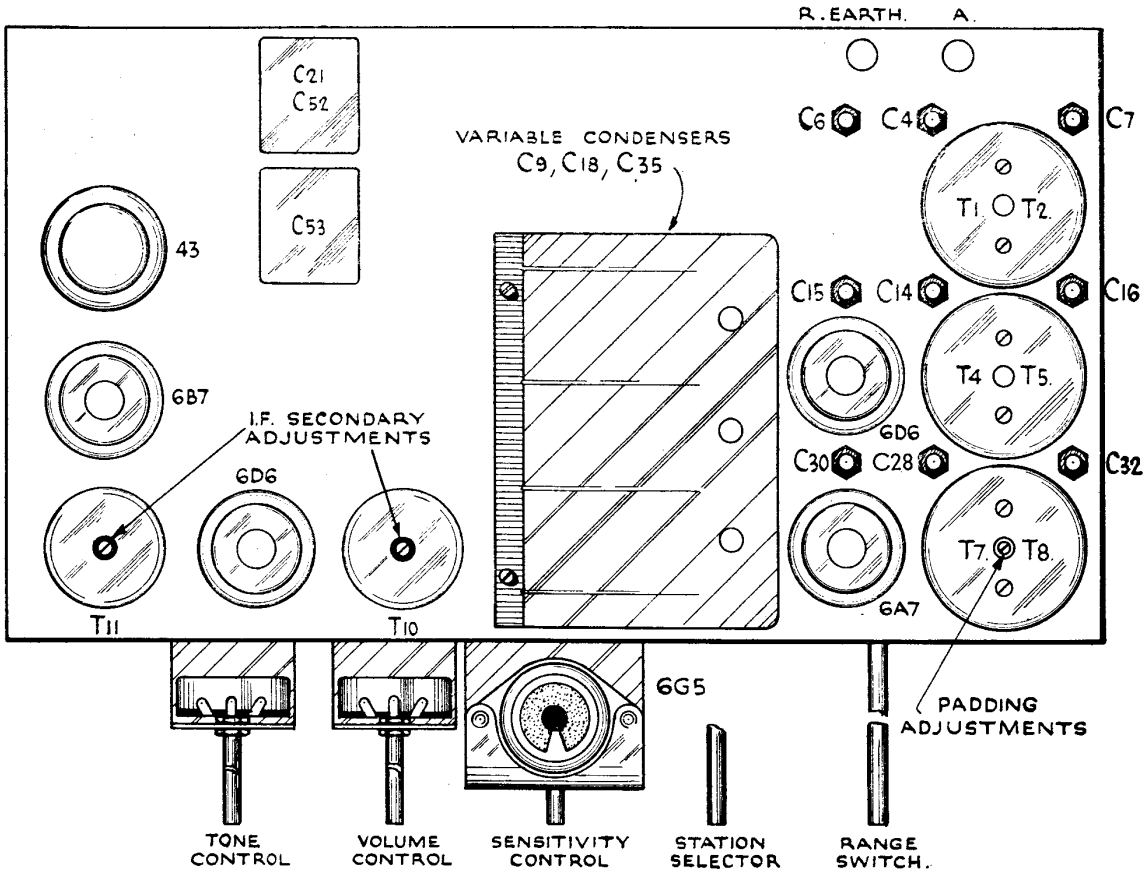

Fig. 3.—Layout Diagram (top view).

RESISTANCE MEASUREMENTS.

The resistance values shown in fig. 4 have been carefully prepared so as to facilitate a rapid check of the circuit for irregularities. To obtain the full benefit from this diagram it is advisable to consult the circuit and layout diagrams when conducting the check. Each value should hold within ± 20%. Variations greater than this limit will usually be a pointer to trouble in the circuit.

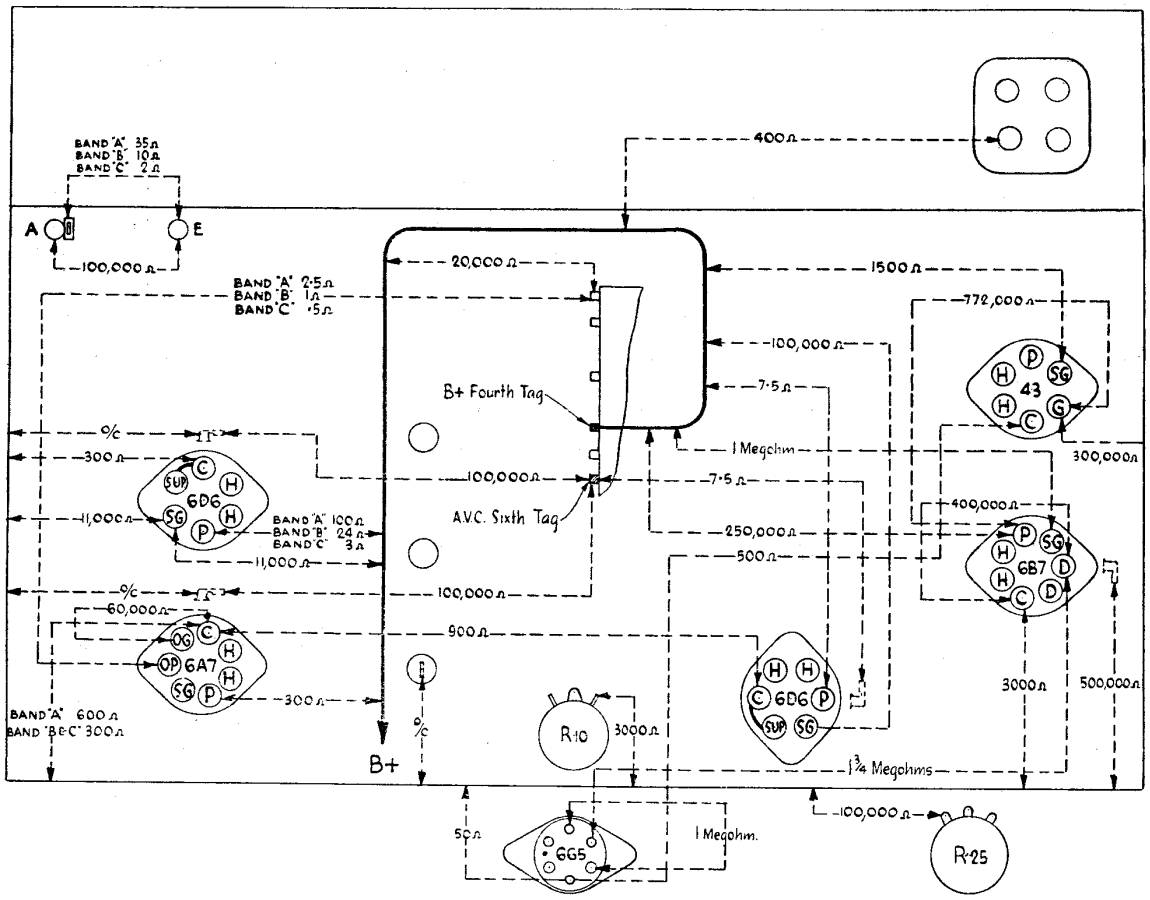

Fig. 4.—Resistance Diagram.

Resistance values were taken with the valves removed from sockets, power supply disconnected, variable condensers in full mesh and volume and sensitivity controls in maximum clockwise position.

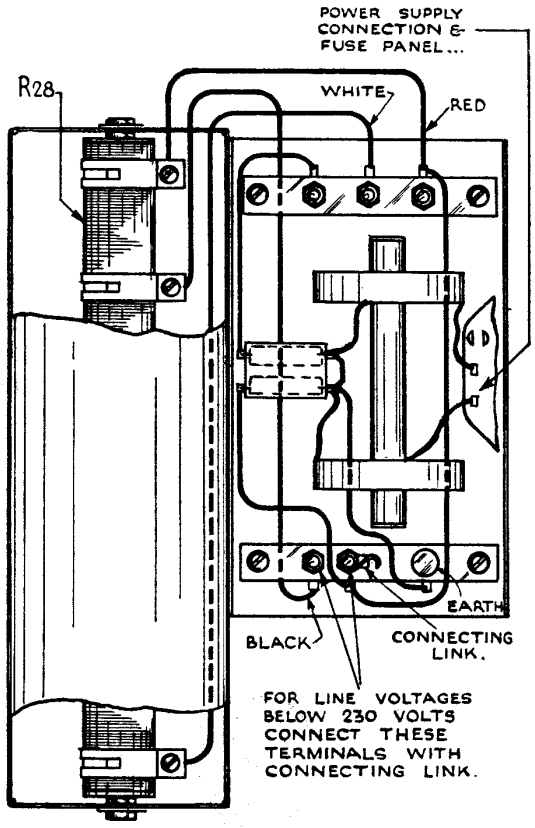

Fig. 5.—Filter Unit.

SOCKET VOLTAGES.

	Chassis to Cathode Volts	Chassis to Screen Grid Volts	Chassis to Plate Volts	Plate Current M.A.	Heater Volts
6D6 R.F. Amplifier	2.0	80	200	7.2	6.3
6A7 Detector M.W.	5.25	80	200	1.4	6.3
S.W. 35-105	2.25	80	200	3.5	—
S.W. 13-39	2.25	80	200	3.5	—
Oscillator	—	—	120	3.5	—
6D6 I.F. Amplifier M.W.	6.5	95	200	4.5	6.3
S.W. 35-105	3.75	85	200	5.5	—
S.W. 13-39	3.75	85	200	5.5	—
6B7 Detector	2.0	*30	*50	0.8	6.3
43 Output Pentode	20.0	120	145	41.0	25.0

Voltage across loudspeaker field—240 volts.

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

* Cannot be measured with ordinary voltmeter.


AWA