The FISK

RADIOLA

MODEL 260

•

Seven Valve, Three Band, Battery Operated

Superheterodyne

•

TECHNICAL INFORMATION

AND SERVICE DATA

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Amalgamated Wireless (Australasia) Ltd

THE FISK RADIOLA, MODEL 260

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TECHNICAL INFORMATION

Electrical Specifications

TUNING RANGE		ALIGNMENT FREQUENCIES	
"Standard Medium Wave" (a)	1500-550 K.C.	"Standard Medium Wave" (a)	1400 K.C. 600 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.

CURRENT CONSUMPTION	260B	260V
"A" battery at 2 volts	1.04 amps.	
"A" battery at 6 volts		1.2 amps.
"B" battery at 135 volts	14-16 M.A.	(Supplied from Vibrator power unit)
Replacement Fuse		3 amp.

Note: Replacement Fuse for 260B is $\frac{3}{8}$ amp.

VALVE COMPLEMENT

(1) 1C4 .... R.F. Amplifier	(4) 1C4 .... I.F. Amplifier
(2) 1C6 .... Detector-Oscillator	(5) 1K6 .... Det. A.V.C. and A.F. amp.
(3) 1C4 .... I.F. Amplifier	(6) 1K4 .... Audio Amplifier
(7) 19 .... Class B Output	

Dial Lamps .... 2.5 volts, .06 amp.

Loudspeaker (Permanent Magnet) ...... Type AL1 Loudspeaker Transformer T.A.31Y

The Radiola 260 is a seven valve, three band battery operated receiver. The plate supply may be from "B" batteries or from a vibrator power unit as desired. The conversion from one to the other does not entail any alteration to the chassis.

General Circuit Description

TUNED CIRCUITS.

In the R.F. Detector and Oscillator stages the coils for bands "a" and "b" are wound on single forms which are mounted in 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 shield on the top of the chassis, see fig. 3. Fixed 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.

Sections of the range switch are used to raise the screen grid voltages on the 1C6 detector-oscillator and both 1C4 I.F. amplifier valves on short waves to boost the sensitivity. A section of the switch is also used to remove A.V.C. from the 1C6 on short waves and apply 3 volts fixed bias.

The intermediate frequency amplifier system comprises two 1C4 valves and three 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 of the 1K6 valve. The audio frequency component, secured by this process, is transferred from the movable arm of the Volume Control R15 through the coupling condenser C43 to the control grid of the 1K6 for voltage amplification. A signal is also fed from the primary of the third I.F. transformer to the other diode in the 1K6 and the D.C. potential developed across R16 is fed to the R.F. Amplifier, Detector-Oscillator and I.F. amplifier valves for A.V.C.

AUDIO SYSTEM.

The amplified audio signal from the 1K6 is resistance-capacity coupled to the 1K4 audio amplifier, which further amplifies it, and thence it is transformer coupled to the 19 class B output. The output from the 19 is transformer coupled to the permanent magnet loudspeaker.

Bias voltages are supplied by a 4½ volt "C" bias battery, which is mounted in clip on the chassis.

Vibrator Power Unit

The Vibrator power unit supplies the correct socket voltages for the operation of the Radiola. It contains a plug-in type vibrator, step-up transformer, and an efficient filter system.

Rectification of the high voltage is accomplished by means of the synchronous vibrator. The complete unit is acoustically housed in a soundproof case to prevent mechanical noise and has been carefully adjusted at the factory by special equipment to ensure quiet operation over an extensive period of life. No adjustments should be attemted on a vibrator suspected of being faulty. If a fault is suspected, the vibrator should be returned to the company for test or a replacement installed. The plug-in feature affords easy removal or replacement.

The case is lined with soundproofing material and, in addition, the vibrator power unit is suspended on sponge-rubber pads within the case. When fitting the unit in the case, first make certain that the vibrator is firmly seated in its socket and is making good contact. Also, when fitting, see that the vibrator is not moved out of place by side contact with the sponge-rubber pad. The pad is placed in the correct position to provide a gentle downward pressure on the vibrator.

The instrument is protected by a fuse, which is located in the vibrator power unit cable. It is necessary when replacing the fuse to sheath it in the tubing provided before inserting in the fuse holder. If the tubing is not used, the fuse is useless and the installation is deprived of protection. Before inserting a replacement fuse, always examine the installation to determine the fault which caused the fuse to "blow."

Replacement Fuse ....3 amp.

Proper connection of the power unit to the receiver unit is essential. In the event of noisy operation, see that the earth lug attached to the cable is firmly connected to the receiver chassis. A tapped hole and screw are provided on the receiver chassis, adjacent to the power unit socket, for the purpose. Do not connect an earth wire to the power unit other than this, as interference will result.

Fig. 6 shows the accumulator connections and it is important that the leads should always be arranged as shown. Do not reverse the blue and black leads and space them as far apart as possible on the connecting strap to avoid vibrator buzz, which might otherwise result if these two leads are joined or touch each other. As the cable is permanently connected to the accumulator, keep it smeared with light grease or vaseline.

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 1C6 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 control 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.

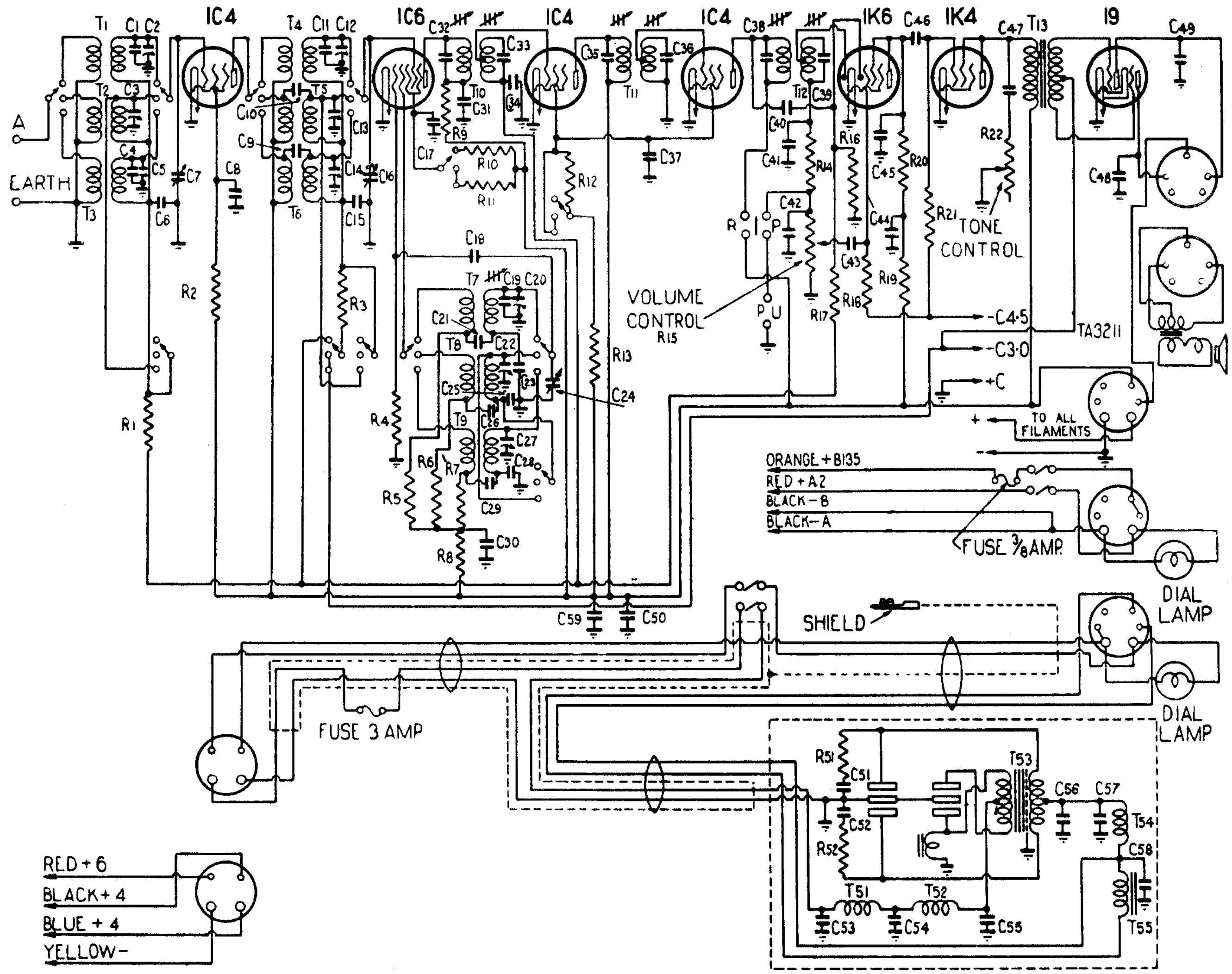

Fig. 1.—Circuit Diagram.

Code	Part No.	COILS — RECEIVER UNIT
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	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	3621	First I.F. Transformer
T11	3621	Second I.F. Transformer
T12	3623	Third I.F. Transformer
T13	3628	Audio Driver Transformer
		COILS — POWER UNIT
T51	3149	R.F. Choke
T52	3294	R.F. Choke
T53	3290	Vibrator Transformer, 4V
T54	3303	R.F. Choke
T55	3292	Smoothing Choke
		RESISTORS — RECEIVER UNIT
R1		100,000 ohms, 1/3 watt
R2		60,000 ohms, 1/3 watt
R3		100,000 ohms, 1/3 watt
R4		60,000 ohms, 1/3 watt
R5		50,000 ohms, 1/3 watt
R6		10,000 ohms, 1/3 watt
R7		5,000 ohms, 1/3 watt
R8		5,000 ohms, 1/3 watt
R9		300 ohms, 1/3 watt
R10		60,000 ohms, 1/3 watt
R11		40,000 ohms, 1/3 watt
R12		100,000 ohms, 1/3 watt
R13		200,000 ohms, 1/3 watt
R14		100,000 ohms, 1/3 watt
R15	1507	500,000 ohms, Vol. Control

Code	Part No.	RESISTORS — RECEIVER UNIT
R16		1¾ Megohm, 1/3 watt
R17		1¾ Megohm, 1/3 watt
R18		500,000 ohms, 1/3 watt
R19		50,000 ohms, 1/3 watt
R20		100,000 ohms, 1/3 watt
R21		500,000 ohms, 1/3 watt
R22	2762	100,000 ohms, Tone Control
		RESISTORS — POWER UNIT
R51		50 ohms, 1/3 watt
R52		50 ohms, 1/3 watt
		CONDENSERS—RECEIVER UNIT
C1		6 mmfd. Mica (F)
C2		2-20 mmfd. Air Trimmer
C3		2-20 mmfd. Air Trimmer
C4		6 mmfd. Mica (F)
C5		2-20 mmfd. Air Trimmer
C6		.05 mfd. Paper
C7	3399	Variable Condenser
C8		.1 mfd. Paper
C9		10 mmfd. Mica (B)
C10		6 mmfd. Mica (F)
C11		6 mmfd. Mica (B)
C12		2-20 mmfd. Air Trimmer
C13		2-20 mmfd. Air Trimmer
C14		2-20 mmfd. Air Trimmer
C15		.05 mfd. Paper
C16	3399	Variable Condenser
C17		.1 mfd. Paper
C18		50 mmfd. Mica (D)
C19		15 mmfd. Mica (C)
C20		2-20 mmfd. Air Trimmer
C21		.05 mfd. Paper
C22		2-20 mmfd. Air Trimmer
C23		440 mmfd. Mica Padding
C24	3399	Variable Condenser
C25		2025 mmfd. Mica Padding

Code	Part Nos.	CONDENSERS — RECEIVER UNIT
C26		.05 mfd. Paper
C27		2-20 mmfd. Air Trimmer
C28		3400 mmfd. Mica
C29		.05 mfd. Paper
C30		8 mfd. 500V. Electrolytic
C31		.05 mfd. Paper
C32		115 mmfd. Mica (A)
C33		115 mmfd. Mica (A)
C34		.05 mfd. Paper
C35		115 mmfd. Mica (A)
C36		115 mmfd. Mica (A)
C37		.1 mfd. Paper
C38		115 mmfd. Mica (A)
C39		115 mmfd. Mica (A)
C40		700 mmfd. Mica
C41		100 mmfd. Mica (G)
C42		100 mmfd. Mica (G)
C43		.05 mfd. Paper
C44		.5 mfd. Paper
C45		200 mmfd. Mica (J)
C46		.05 mfd. Paper
C47		.035 mfd. Paper
C48		.005 mfd. Paper
C49		.005 mfd. Paper
C50		8 mfd. 500V. Electrolytic
C59		.5 mfd. Paper
		CONDENSERS—POWER UNIT
C51		.02 mfd. Paper
C52		.02 mfd. Paper
C53		.1 mfd. Paper
C54		.25 mfd. Paper
C55		.25 mfd. Paper
C56		8 mfd. 500V. Electrolytic
C57		.02 mfd. Paper
C58		.5 mfd. Paper

Circuit Code.

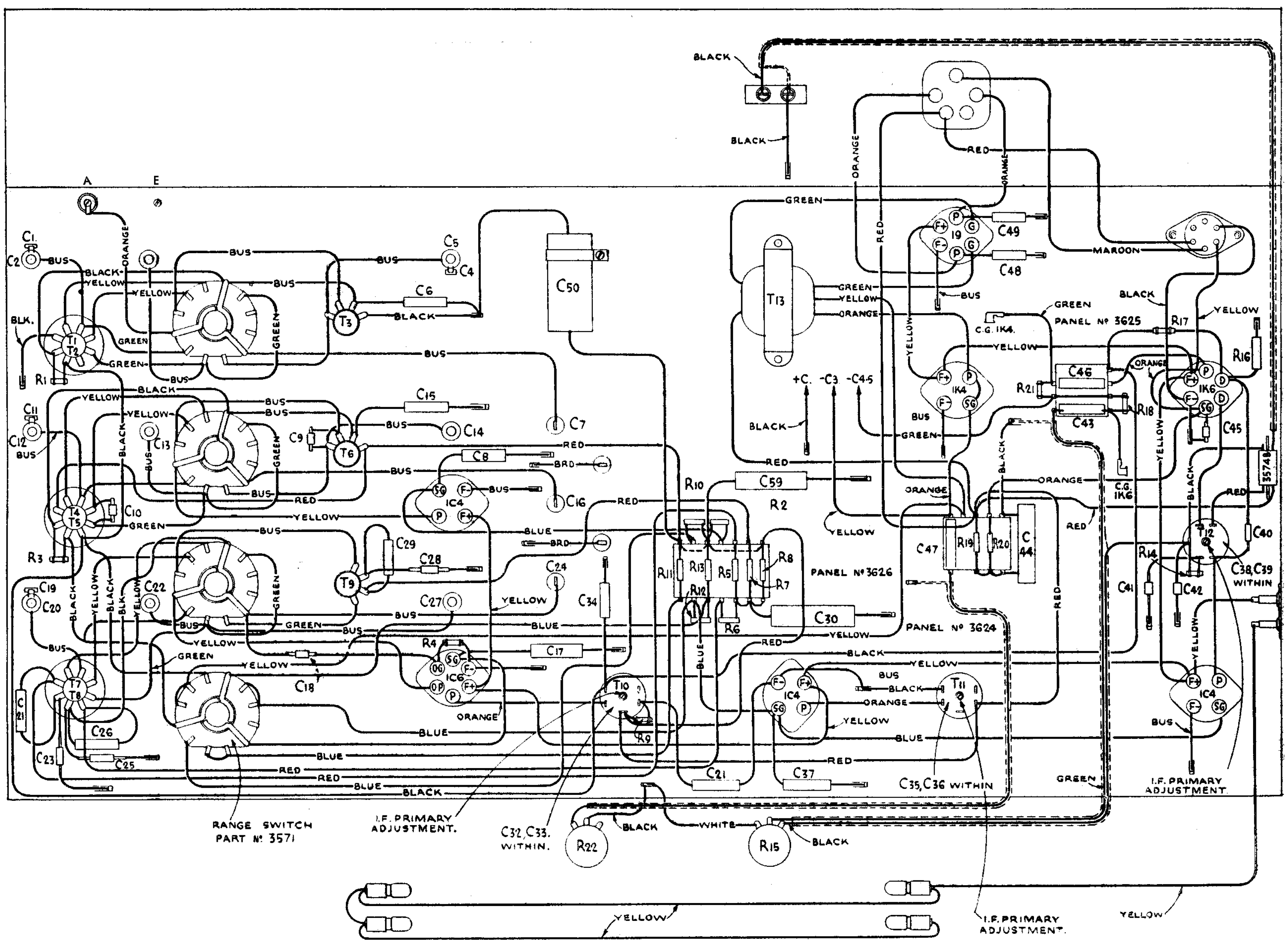

Fig. 2.—Lay-out Diagram (underneath view).

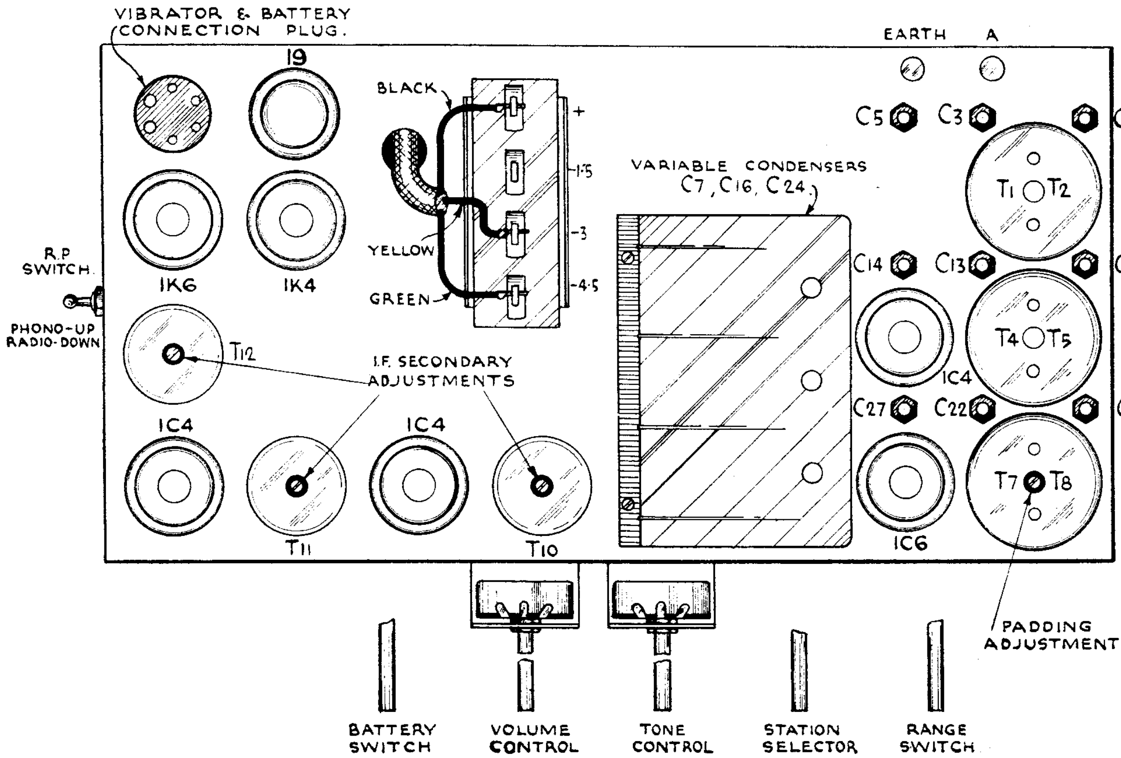

Fig. 3.—Lay-out Diagram (top view).

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 will 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 4, 5 and 6 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	1C6 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No Signal	3rd I.F. Trans.	Secondary and Primary	Max. (peak)
2	1C6 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No Signal	2nd I.F. Trans.	Secondary and Primary	Max. (peak)
3	1C6 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.

Alignment Order	Oscillator Connection to Radiola	Dummy Aerial	Oscillator Setting	Radiola Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
4	Aerial Term.	—	600 K.C.	600 K.C.	Oscillator	Padding Adjustment	Max. (peak)
5	Aerial Term.	—	1400 K.C.	1400 K.C.	Oscillator	C20	Max. (peak)
6	Aerial Term.	—	1400 K.C.	1400 K.C.	Detector	C12	Max. (peak)
7	Aerial Term.	—	1400 K.C.	1400 K.C.	R.F.	C2	Max. (peak)
8	Aerial Term.	—	600 K.C.	600 K.C.‡	Oscillator	Padding Adjustment	Max. (peak)
Repeat instructions 5, 6 and 7 before proceeding.							
9	Aerial Term.	400 ohms	38 metres	38 metres	Oscillator	C22	Max. (peak)*
10	Aerial Term.	400 ohms	38 metres	38 metres‡	Detector	C13	Max. (peak)**
11	Aerial Term.	400 ohms	38 metres	38 metres‡	R.F.	C3	Max. (peak)†
12	Aerial Term.	400 ohms	42 metres	14 metres	Oscillator	C27	Max. (peak)*
13	Aerial Term.	400 ohms	42 metres	14 metres‡	Detector	C14	Max. (peak)**
14	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. 42.5 metres.

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

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

Conversion from "B" Battery to Vibrator Power Unit Operation

The "A" and "B" batteries and the battery cable should be removed. To remove the cable, it is first necessary to remove the chassis from the cabinet to allow access to the battery switch, which is bolted to the cabinet shelf.

Two holes are provided in the base of the cabinet to receive the protruding bolts attached to the Vibrator Power Unit case. Mount the Vibrator Power Unit and fit the switch attached to the cable in the same position as that removed in the previous paragraph. The chassis may then be replaced in the cabinet and connected; that is, to the loudspeaker and vibrator power unit.

A short cable is provided for connecting the 6 volt accumulator. Connect as shown in fig. 6 and refer to the section headed Vibrator Power Unit. The accumulator should then be placed in the base of the cabinet and connected to the vibrator power unit.

Conversion from Vibrator Power Unit to "B" Battery Operation

Disconnect and remove the accumulator, disconnect the power unit cable from the chassis and remove the chassis from the cabinet. Detach the battery switch from the cabinet shelf and remove the vibrator power unit.

Mount the switch attached to the replacement battery cable in the same position as the switch removed previously and replace the chassis in the cabinet connecting the loudspeaker and the vibrator power unit.

Instal the 2 volt accumulator and the three 45 volt "B" batteries and connect them according to the circuit diagram.

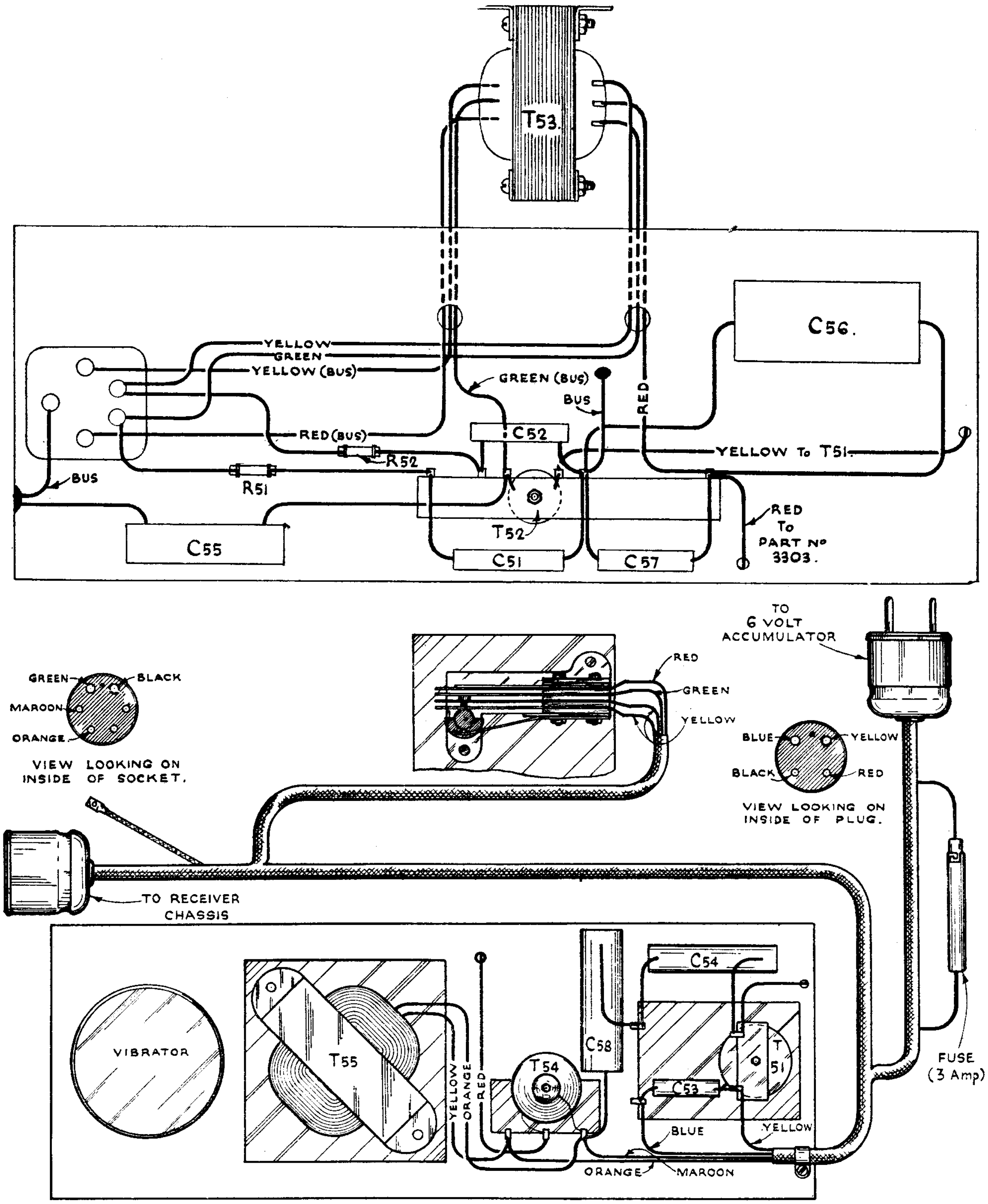

Fig. 4.—Vibrator Power Unit (underneath and top views).

RESISTANCE MEASUREMENTS.

The resistance values shown in fig. 5 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.

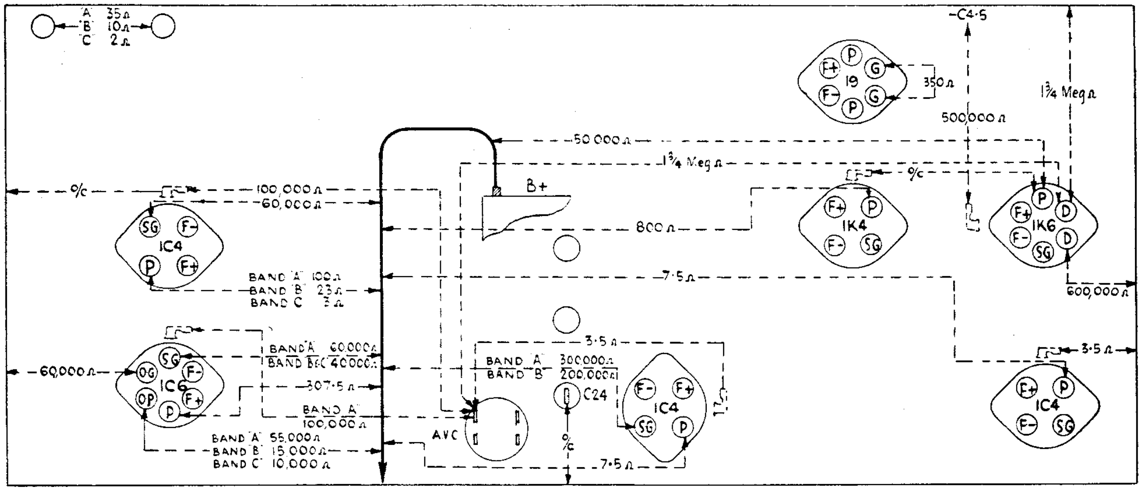

Fig. 5.—Resistance Diagram.

Resistance values were taken with the valves removed from sockets, batteries disconnected, variable condensers in full mesh and volume control in maximum clockwise position.

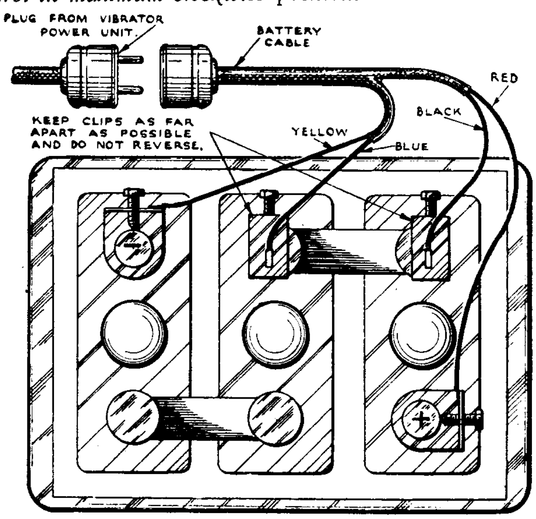

Fig. 6.—Accumulator Connections.

SOCKET VOLTAGES.

VALVE	Chassis to Control Grid Volts	Chassis to Screen Grid Volts	Chassis to Plate Volts	Plate Current M.A.	Filament Volts
1C4 R.F. Amplifier—	0	*60	135	2.5	2.0
1C6 Detector M.W.	0	*30	130	2.5	2.0
S.W.	–3	*60	130	2.0	–
Oscillator M.W.	–	–	55	1.5	–
S.W.	–	–	100	3.0	–
1C4 I.F. Amplifier—					
M.W.	0	*30	135	0.5	2.0
S.W.	0	*45	135	1.0	–
1C4 I.F. Amplifier—					
M.W.	0	*30	135	0.5	2.0
S.W.	0	*45	135	1.0	–
1K6 Detector	–4.5	–	60	.35	2.0
1K4 Triode	–4.5	–	130	3.5	2.0
19 Output	–3	–	130	4.0	2.0

Measured with no signal input.

* Cannot be measured with an ordinary voltmeter.