The FISK

RADIOLETTE

MODELS 40 AND 43

•

Four Valve, Two Band, D.C. Operated

Superheterodyne

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TECHNICAL INFORMATION

AND SERVICE DATA

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Amalgamated Wireless (Australasia) Ltd

THE FISK RADIOLETTE, MODELS 40 & 43

Four Valve, Two Band, D.C. Operated, Superheterodynes

TECHNICAL INFORMATION

Electrical Specifications

TUNING RANGES	ALIGNMENT FREQUENCIES
"Standard Medium Wave" (a).....200-550 metres	"Standard Medium Wave".... 1400 K.C. (214 M.) 600 K.C.
"Short Wave" (b).....19-50 metres	"Short Wave".....20 metres
Intermediate Frequency.....460 K.C.	
Power Supply Rating.....190-260 Volts D.C.	Power Consumption.....90 watts
VALVE COMPLEMENT	
(1) 6A7.....Detector-Oscillator	(3) 6B7..I.F. Amp., 2nd Det., A.V.C. and A.F. amp.
(2) 6D6.....I.F. Amplifier	(4) 43.....Output Pentode
Loudspeaker.....Type AE2 (R40), AJ2 (R43)	Loudspeaker Trans...TG54E (R40), TG116E (R43)
Loudspeaker Field Coil Resistance.....1000 ohms (R40), 4500 ohms (R43)	
Replacement fuses.....3 amp.	
Dial Lamps.....3.2 volts, .35 amp.	

WARNING.

SINCE THE CIRCUIT ELEMENTS OF D.C. POWER OPERATED RECEIVERS ARE DIRECTLY CONNECTED TO THE POWER SUPPLY, GREAT CARE SHOULD BE EXERCISED IN SERVICING THESE CHASSIS.

The Radiolette 43 is the console equivalent of the Radiolette 40, and although the chassis are electrically similar, they differ slightly in mechanical construction. The main difference is the incorporation of the filter circuit of the Radiolette 40 in the chassis assembly, where in the Radiolette 43 it is a separate unit mounted inside the console cabinet.

Four controls operate the Radiolette; from left to right they are: Volume Control, Station Selector, Range Switch and Sensitivity Control. The power supply connection plug is attached to in the back of the Radiolette 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.

General Circuit Description

The conventional superheterodyne type of circuit, consisting of a combined first detector-oscillator stage, an I.F. amplifier stage, a combined I.F. amplifier, second detector, A.V.C. and audio amplifier stage, and a power output stage is used.

DETECTOR-OSCILLATOR.

The aerial is coupled to the control grid of the 6A7 detector-oscillator by the aerial coils T1 or T2, which are tuned by the front section of the variable condenser C5. In the 6A7 the incoming signal is combined with a locally generated oscillator signal, 460 K.C. higher in frequency, to form the I.F. or beat frequency. The frequency separation of 460 K.C. is constant throughout the entire tuning range, due to the design of the oscillator circuit components. An adjustable padding condenser (C19) is employed on Band "A," but no adjustment is required for Band "B," where a fixed padding condenser is used. The additional bias resistor R9, in the cathode circuit of the 6A7, is short-circuited by a section of the Range Switch, on Band "B," to boost the sensitivity of the Radiolette at the higher frequencies.

I.F. AMPLIFIER.

Two stages of I.F. amplification are used in which three transformers are employed. Excepting the secondary of the third I.F. transformer, which is untuned, the primaries and secondaries are tuned to resonance by compression type trimmer condensers. The 6D6 amplifies in the first stage and the pentode section of the 6B7 in the second. The diode plates of the 6B7 are connected and the signal is applied to them by the secondary of the third I.F. transformer for rectification across resistors R16 and R17. The rectification of the signal produces a D.C. voltage in the diode circuit proportional to the signal being received, and this is applied via filter R15 and C7 to the control grid

circuits of the 6A7 and 6D6 valves to provide automatic volume control.

AUDIO AMPLIFIER.

The audio component in the diode circuit is selected by the Volume Control and fed to the control grid circuit of the 6B7, via condenser C29, for amplification. It will be noted that the pentode section of the 6B7 is employed as both an I.F. and an audio amplifier. The amplified audio signal is resistance capacity coupled to the grid circuit of the 42 output pentode. This valve amplifies the signal to a suitable level for reproduction by the loudspeaker. The transformer T8 provides the necessary matching between the output valve and the loudspeaker.

LOUDSPEAKER.

The loudspeaker fitted to the Radiolette 40 is a 6 inch electrodynamic with a field coil resistance of 1000 ohms. The field is inserted in the B+ circuit for excitation and is used for smoothing.

An 8 inch electro-dynamic loudspeaker is supplied with the Radiolette 43, and is connected to the chassis by means of a five lead cable and plug. The field coil has a resistance of 4500 ohms and is connected directly across the power supply for excitation. A filter choke T9 is included in the filter circuit of the Radiolette 43 but is omitted in the Radiolette 40 since the loudspeaker field coil serves the purpose.

HEATER VOLTAGE.

The heaters of all the valves and dial lamps are connected in series with the ballast resistor R3 across the power supply. The ballast resistor is of the correct value, when leaving the factory, to provide the heaters with their correct operating voltages when the power supply is of 230 volts or above. When it is desired to operate the Radiolette 40 on a power supply of below 230 volts, the ballast resistor should be connected as shown in fig. 5 by transferring the connecting lead to the vacant terminal on the resistor.

An adjustment is provided for the same purpose in the Radiolette 43. Resistor R3 is included in the Filter Unit, which is located in the side of the console cabinet. For a power supply of below 230 volts, the connecting link on the filter unit should be closed. See fig. 7.

Alignment Procedure

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

In aligning the tuned circuits it is important to apply a definite procedure, as described below, and to use adequate and reliable test equipment. An A.W.A. Modulated Oscillator TYPE C1070 is ideal for the purpose. Visual indication of the output from the Radiolette during alignment is also necessary, any output meter of conventional design being suitable.

I.F. ALIGNMENT.

The I.F. adjustments 1, 2, 3, 4, and 5 are shown in the layout diagrams. Each circuit must be aligned to a basic frequency of 460 K.C.

To align, proceed as follows:—

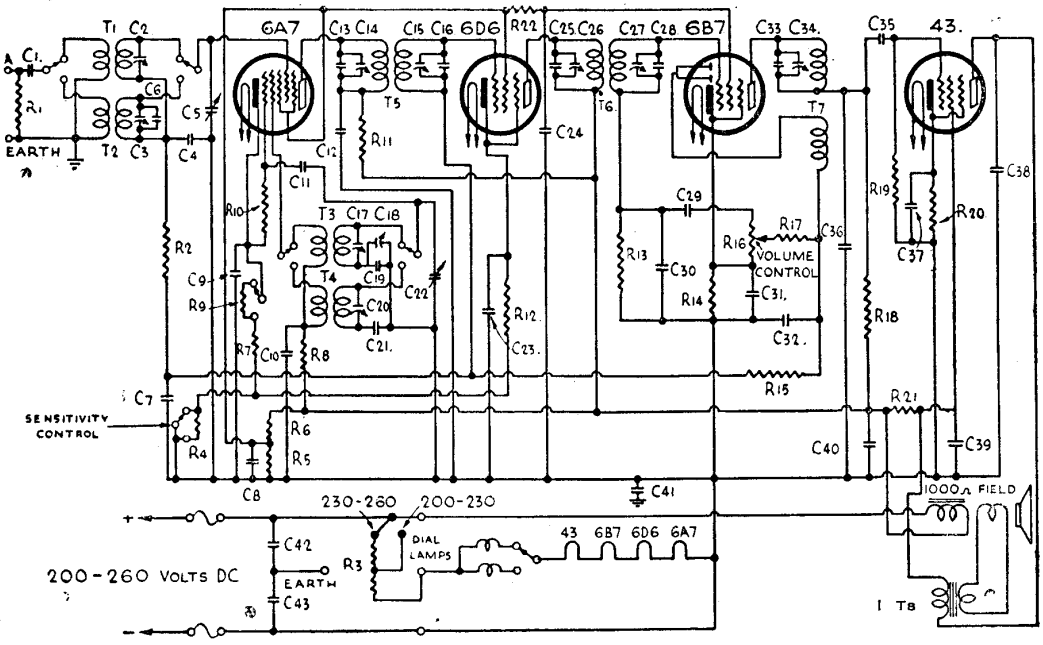
1. Remove the grid clip from the control grid of the 6A7 and connect the output of the Modulated Oscillator, the ground connection being connected to the earth terminal of the Radiolette, that is, the terminal adjacent to the aerial terminal.
2. Connect an output meter in the plate circuit of the 43 ouput pentode.
3. Switch the Radiolette ON and allow a space of approximately one minute before making adjustments to enable the valves to assume their normal operating characteristics.
4. Set the Station Selector pointer of the Radiolette to 550 metres on the dial scale, and turn the Volume Control to the maximum clockwise position.
5. Set the Modulated Oscillator to 460 K.C. and switch it ON.
6. Adjust the ouput meter of the Modulated Oscillator so that a slight indication is aparrent on the output meter. If a reading is not obtained, it may be that the power supply connection plug is reversed in the socket. If such is the case the Radiolette will not operate.

NOTE.—The output of the Modulated Oscillator should be maintained at the lowest level consistent with a good output indication. This will avoid A.V.C. action and overloading.

7. Beginning with adjustment No. 1 (see figs. 2 or 4) a non-metallic screwdriver is used to adjust the trimmer to a point where the maximum output reading is obtained. When the output meter reading becomes excessive, it should be reduced by adjusting the output of the Modulated Oscillator.

IMPORTANT.

The Volume Control must not be used for this purpose, as inaccurate alignment will result if it is altered from the maximum clockwise position.



Code	Part No.	COILS
T1	2684A	Aerial Coil, 200-550 Metres
T2	2684A	Aerial Coil, 19-50 Metres
T3	1557A	Osc. Coil, 200-550 Metres
T4	1557A	Osc. Coil, 19-50 Metres
T5	1523A	First I.F. Transformer
T6	1523B	2nd I.F. Transformer
T7	1530A	Third I.F. Transformer
T8	TG54	Loudspeaker Transformer

		RESISTORS
R1		100,000 ohms, ⅓ watt
R2		100,000 ohms, ⅓ watt
R3	3299	640 ohms, wire wound
R4		1,500 ohms, ⅓ watt
R5		30,000 ohms, 1 watt
R6		40,000 ohms, 1 watt
R7		300 ohms, ⅓ watt
R8		20,000 ohms, ⅓ watt
R9		600 ohms, ⅓ watt
R10		60,000 ohms, ⅓ watt
R11		300 ohms, ⅓ watt
R12		600 ohms, ⅓ watt
R13		500,000 ohms, ⅓ watt
R14		2,000 ohms, ⅓ watt
R15		1¾ Megohms, ⅓ watt

Code	Part No.	RESISTORS
R16	2688	300,000 ohms, Volume Control
R17		300,000 ohms, ⅓ watt
R18		100,000 ohms, 1 watt
R19		300,000 ohms, ⅓ watt
R20		500 ohms, 1 watt
R21	2087	1,500 ohms, wire wound
R22		100,000 ohms, ⅓ watt

		CONDENSERS
C1		500 mmfd. Mica
C2		5-20 mmfd. Mica Trimmer
C3		5-20 mmfd. Mica Trimmer
C4		.05 mfd. Paper
C5	2964	Variable Condenser
C6		10 mmfd. Mica (B)
C7		.05 mfd. Paper
C8		.1 mfd. Paper
C9		.1 mfd. Paper
C10		2.5 mfd. Paper
C11		50 mmfd. Mica (D)
C12		.05 mfd. Paper
C13		130 mmfd. Mica (H)
C14		10-50 mmfd. Mica Trimmer
C15		10-50 mmfd. Mica Trimmer

Code	Part No.	CONDENSERS
C16		130 mmfd. Mica (H)
C17		5-20 mmfd. Mica Trimmer
C18		10-50 mmfd. Mica Trimmer
C19		390 mmfd. Mica Padding
C20		5-20 mmfd. Mica Trimmer
C21		2800 mmfd. Mica Padding
C22	2964	Variable Condenser
C23		1 mfd. Paper
C24		.1 mfd. Paper
C25		130 mmfd. Mica (H)
C26		10-50 mmfd. Mica Trimmer
C27		10-50 mmfd. Mica Trimmer
C28		130 mmfd. Mica (H)
C29		.01 mfd. Paper
C30		200 mmfd. Mica (J)
C31		25 mfd. 25 Volt Electrolytic
C32		200 mmfd. Mica (J)
C33		130 mmfd. Mica (H)
C34		10-50 mmfd. Mica Trimmer
C35		.01 mfd. Paper
C36		700 mmfd. Mica
C37		25 mfd. 25 Volt Electrolytic
C38		.01 mfd. Paper
C39		2.5 mfd. Paper
C40		5.0 mfd. Paper
C41		.5 mfd. Paper
C42		.1 mfd. Paper
C43		.1 mfd. Paper

Fig. 1.—Circuit Diagram and Code (40).

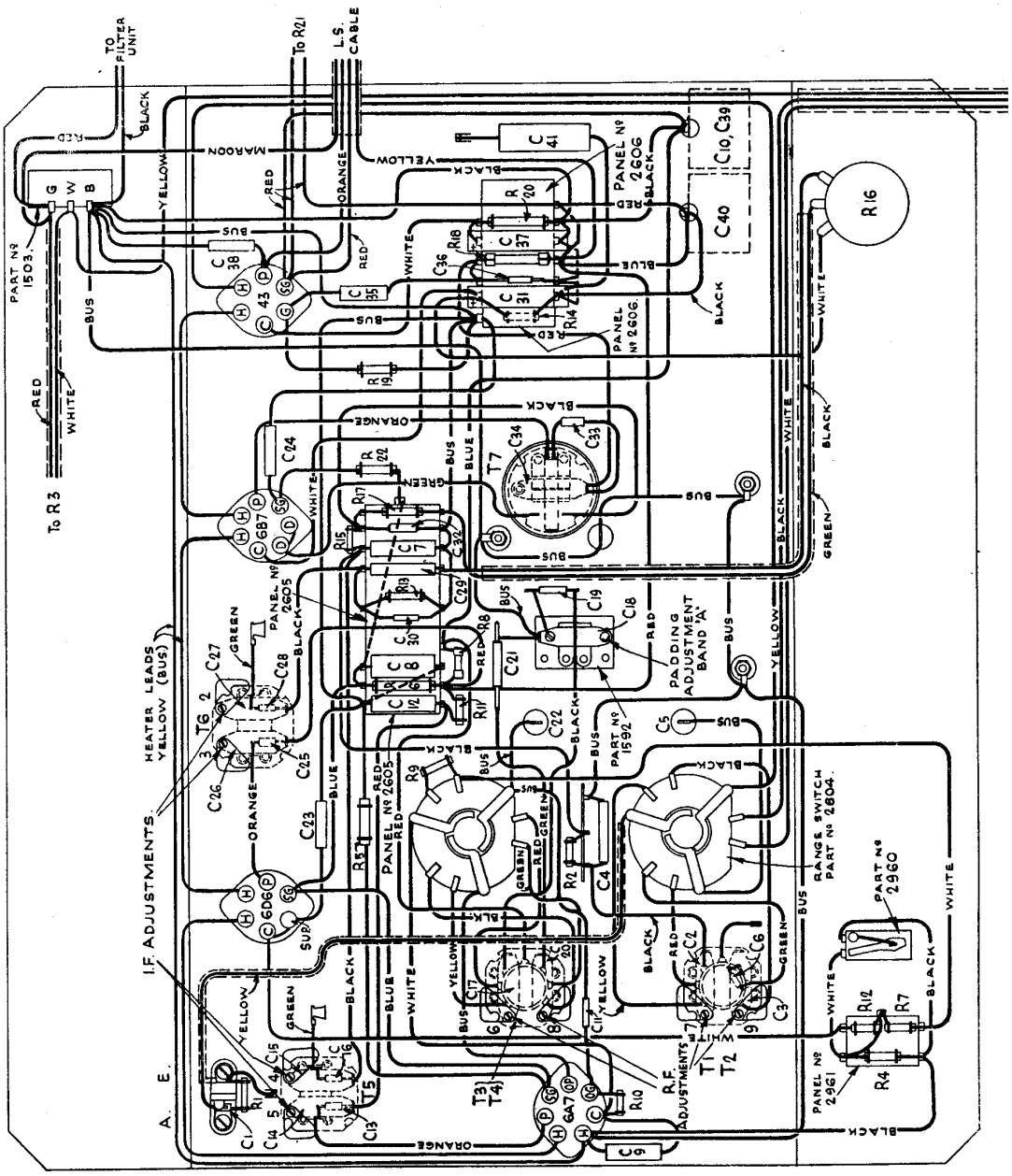
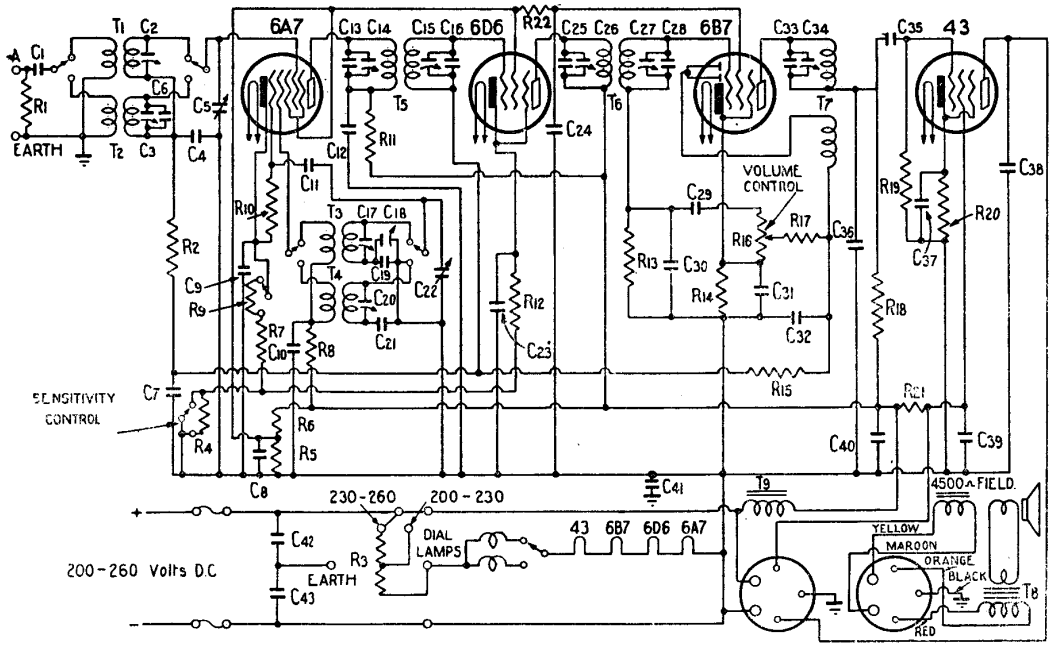


Fig. 2.—Lay-out Diagram (underneath view), Radiolette 40.



Code	Part No.	COILS
T1	2684A	Aerial Coil, 200-550 Metres
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T3	1557A	Osc. Coil, 200-550 Metres
T4	1557A	Osc. Coil, 19-50 Metres
T5	1523A	First I.F. Transformer
T6	1523B	Second I.F. Transformer
T7	1530A	Third I.F. Transformer
T8	TG116	Loudspeaker Transformer
T9	3292B	Smoothing Choke
		RESISTORS
R1		100,000 ohms, ⅓ watt
R2		100,000 ohms, ⅓ watt
R3	2614	640 ohms, wire wound
R4		1,500 ohms, ⅓ watt
R5		30,000 ohms, 1 watt
R6		40,000 ohms, 1 watt
R7		300 ohms, ⅓ watt
R8		20,000 ohms, ⅓ watt
R9		600 ohms, ⅓ watt
R10		60,000 ohms, ⅓ watt
R11		300 ohms, ⅓ watt
R12		600 ohms, ⅓ watt
R13		500,000 ohms, ⅓ watt
R14		2,000 ohms, ⅓ watt
R15		1¼ Megohms, ⅓ watt
R16	2688	300,000 ohms, Volume Control
R17		300,000 ohms, ⅓ watt
R18		100,000 ohms, 1 watt
R19		300,000 ohms, ⅓ watt
R20		500 ohms, 1 watt
R21	3590	2,300 ohms, wire wound
R22		100,000 ohms, ⅓ watt
		CONDENSERS
C1		500 mmfd. Mica
C2		5-20 mmfd. Mica Trimmer
C3		5-20 mmfd. Mica Trimmer
C4		.05 mfd. Paper
C5	2964	Variable Condenser
C6		10 mmfd. Mica (B)
C7		.05 mfd. Paper
C8		.1 mfd. Paper
C9		.1 mfd. Paper
C10		2.5 mfd. Paper
C11		50 mmfd. Mica (D)
C12		.05 mfd. Paper
C13		130 mmfd. Mica (H)
C14		10-50 mmfd. Mica Trimmer
C15		10-50 mmfd. Mica Trimmer
C16		130 mmfd. Mica (H)
C17		5-20 mmfd. Mica Trimmer
C18		10-50 mmfd. Mica Trimmer
C19		390 mmfd. Mica Padding
C20		5-20 mmfd. Mica Trimmer
C21		2800 mmfd. Mica Padding
C22	2964	Variable Condenser
C23		.1 mfd. Paper
C24		.1 mfd. Paper
C25		130 mmfd. Mica (H)
C26		10-50 mmfd. Mica Trimmer
C27		10-50 mmfd. Mica Trimmer
C28		130 mmfd. Mica (H)
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C30		200 mmfd. Mica (J)
C31		25 mfd. 25 Volt Electrolytic
C32		200 mmfd. Mica (J)
C33		130 mmfd. Mica (H)
C34		10-50 mmfd. Mica Trimmer
C35		.01 mfd. Paper
C36		700 mmfd. Mica
C37		25 mfd. 25 Volt Electrolytic
C38		.01 mfd. Paper
C39		2.5 mfd. Paper
C40		5.0 mfd. Paper
C41		.5 mfd. Paper
C42		.1 mfd. Paper
C43		.1 mfd. Paper

Fig. 3.—Circuit Diagram and Code (43).

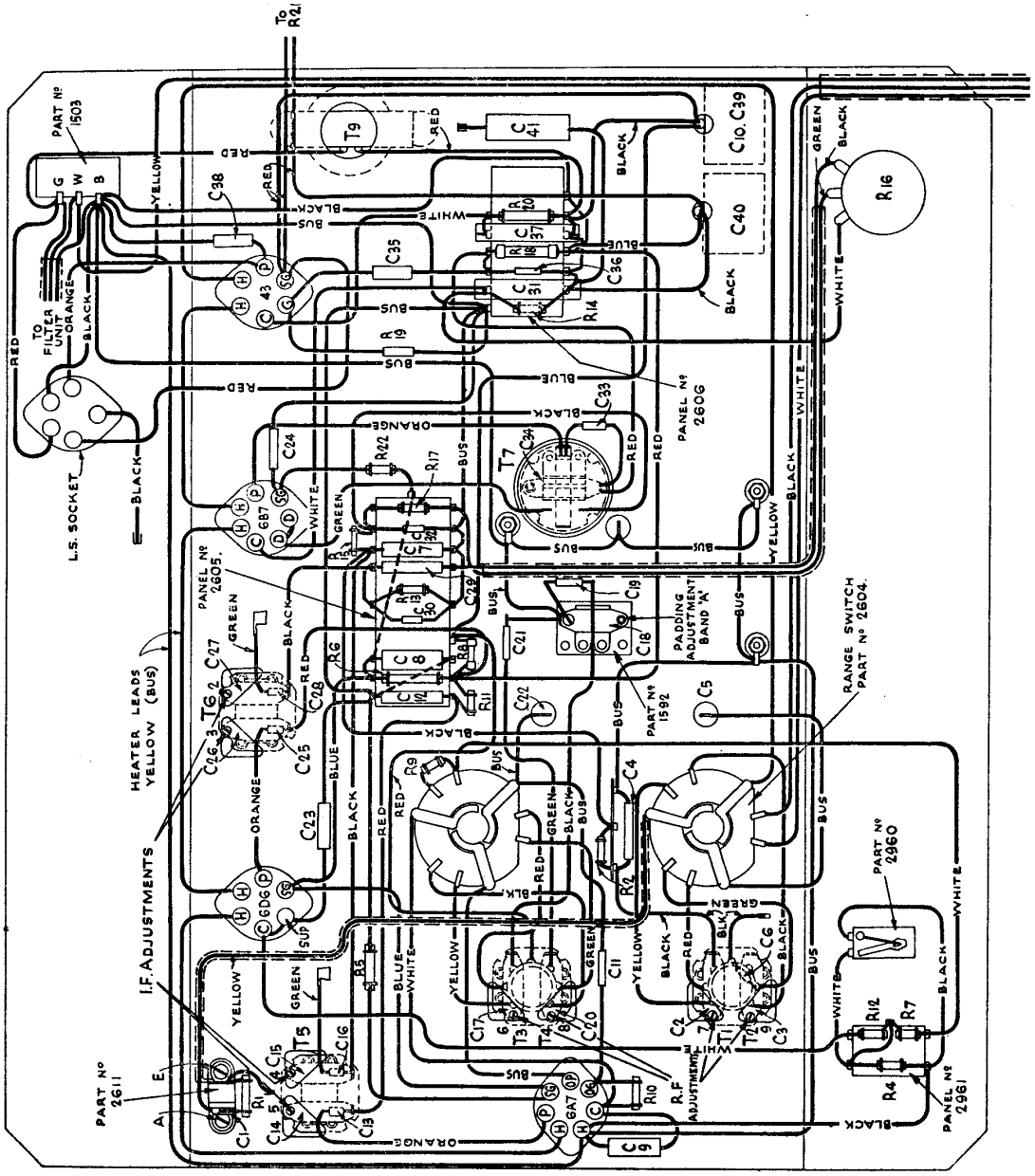

Fig. 4.—Lay-out Diagram (underneath view), Radiolette 43.

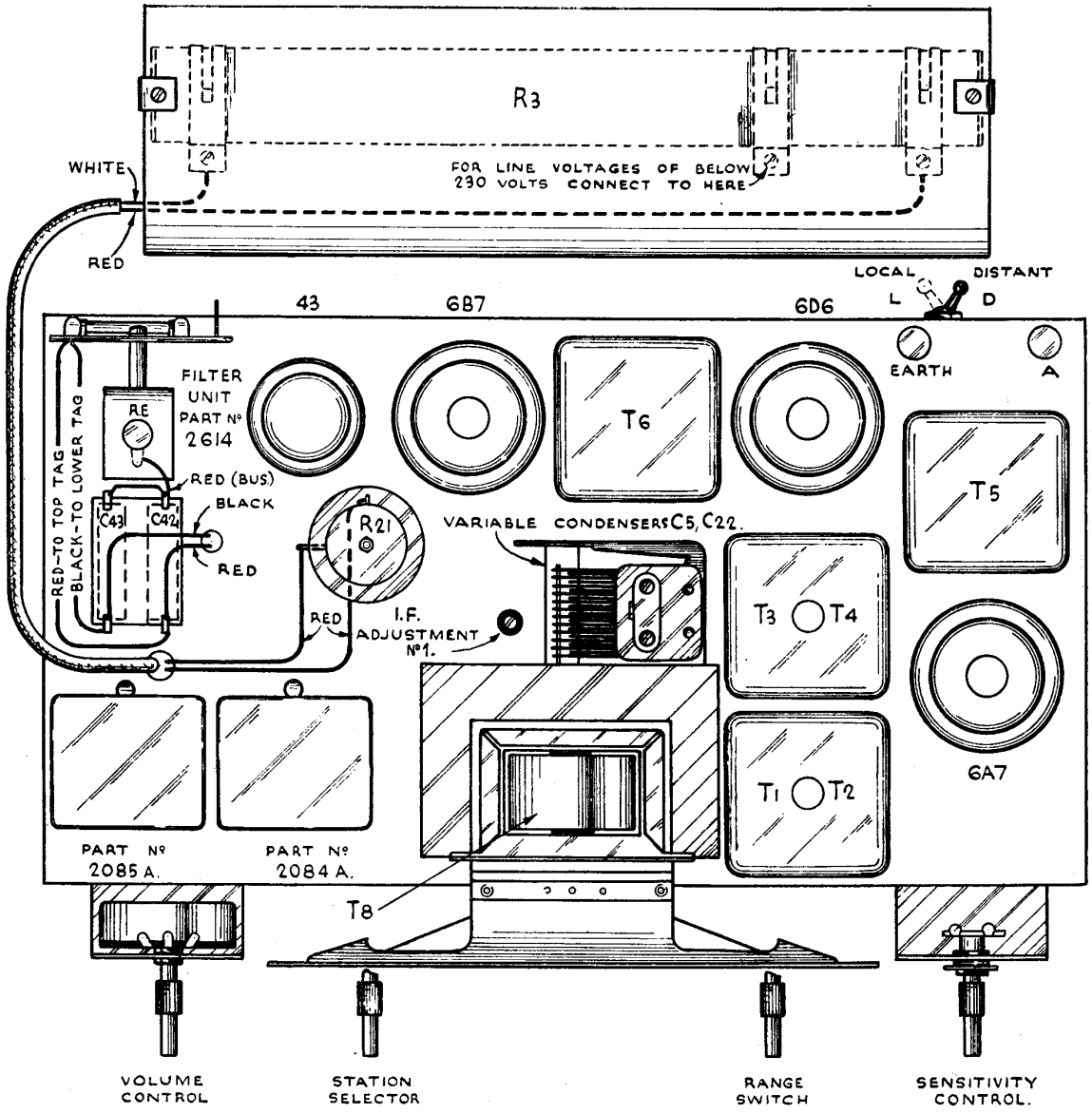

Fig. 5.—Lay-out Diagram (top view), Radiolette 40.

Proceed with adjustments 2, 3, 4 and 5 in the same manner. It is advisable to repeat the adjustments in the same sequence to assure that the maximum output is obtained.

R.F. ALIGNMENT.

The R.F. adjustment screws are located beneath the tuning coils — T1 — T2, T3 — T4. They are numbered in the correct alignment order — 6, 7, 8 and 9. See figs. 2 or 4.

To align proceed as follows:—

Band "A" (200-550M).

1. Connect the output of the Modulated Oscillator to the aerial terminal marked "A," the ground connection being connected to the earth terminal as for the I.F. alignment.
2. Set the Station Selector pointer to approx. 214 metres. See that the Sensitivity Control is in the maximum clockwise position.
3. Set the Modulated Oscillator to 214 metres (1400 K.C.).
4. Tune the Radiolette to the modulated signal and adjust the output of the Modulated Oscillator so that a slight indication is produced on the output meter.

NOTE.—The output of the Modulated Oscillator

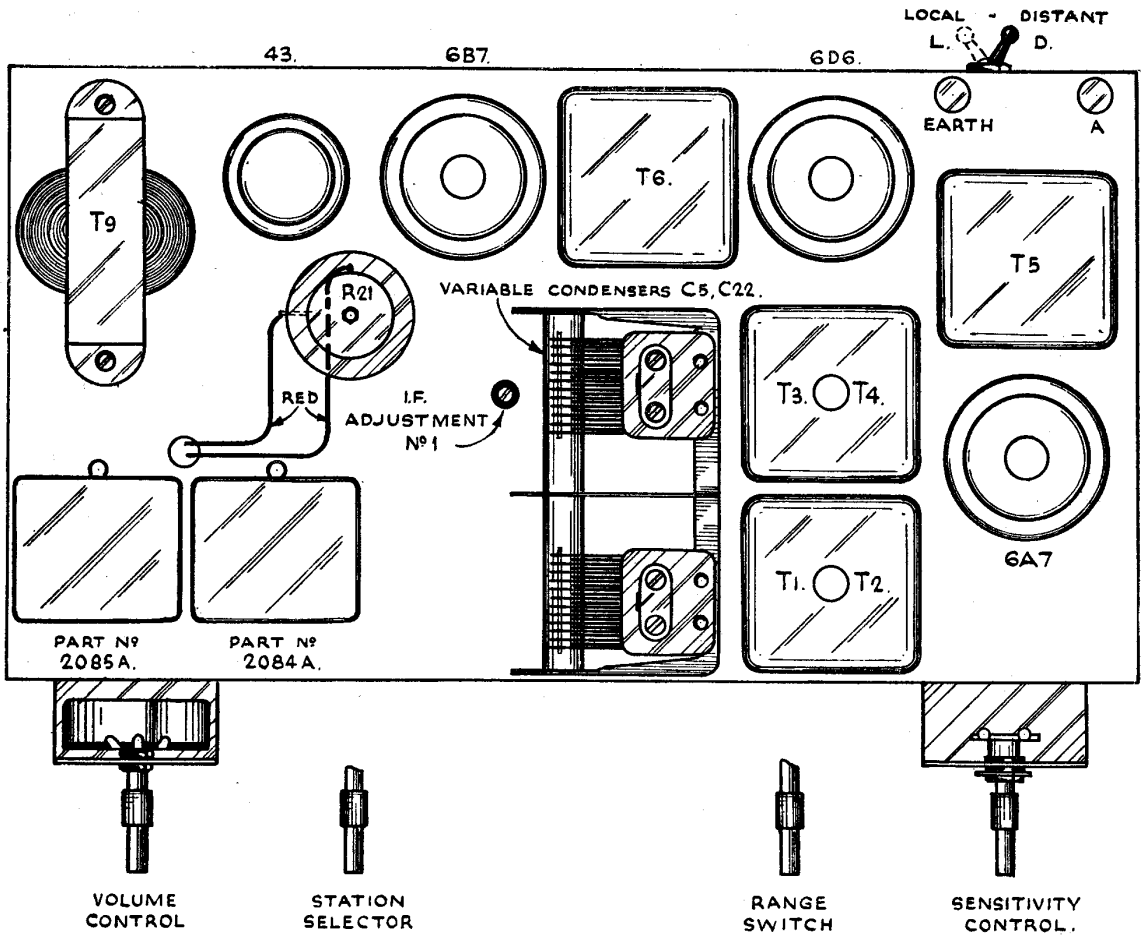

Fig. 6.—Lay-out Diagram (top view), Radiolette 43.

should be maintained at the lowest level consistent with a good output indication.

5. Reset the Station Selector pointer to 214 metres and adjust the oscillator trimmer (No. 6) with a non-metallic screwdriver to a point where the maximum reading is obtained on the output meter.
6. Adjust the aerial trimmer adjustment (No. 7) to give maximum output.
7. Set the Modulated Oscillator to 500 metres (600 K.C.).
8. Tune the Radiolette to the modulated signal.
9. Adjust the padding condenser (C18), which is approached from the front of the chassis, with a suitable screwdriver, while tuning the Radiolette continuously through the signal. Adjust to the highest reading on the output meter.
10. Disconnect the Modulated Oscillator and connect an aerial and an earth wire to the Radiolette.

Tune a broadcasting station of wave-length between 450 and 500 metres. If the Radiolette is out of calibration, re-set the pointer by loosening the set screws. This will correct the calibration at the low frequency and of the scale. Repeat instructions 5 and 6 to correct the calibration at the high frequency end.

Band "B" (19-50M).

A 400 ohms non-inductive resistor should be connected between the output cable of the Modulated Oscillator and the aerial terminal, for short wave alignment, to simulate the characteristics of the average aerial.

1. Set the Station Selector pointer to 20 metres.
2. Set the Modulated Oscillator to 20 metres.
3. Reduce the capacitance of the oscillator trimmer (No. 8) and adjust by turning the screw in a clockwise direction, to the first "peak" reading on the output meter. Check for the image signal, which should be received at approximately 21.4 metres. It will probably be necessary to increase the output of the Modulated Oscillator for this

check. Retune the Radiolette to 20 metres and reduce the output of the Modulated Oscillator to its previous value.

4. Increase the capacitance of the aerial trimmer (No. 9) and adjust in an anti-clockwise direction to the first "peak" reading on the output meter while tuning the Radiolette continuously through the signal.

NOTE.—It will be noticed on the short wave band that the oscillator and aerial trimmers have two positions at which the signal will give maximum output. While the lower capacitance is correct for the oscillator trimmer, the reverse is the case in respect to the aerial trimmer.

EARTH CONNECTION.

Two earth terminals are provided, one connected to the chassis frame and the other connected in the filter circuit. In practically all cases, quieter reception will be obtained with the earth wire connected to the latter. This terminal is located above the power fuse panel in the Radiolette 40 — see fig. 5 and on the Filter Unit in the Radiolette 43 — see fig. 7.

RESISTANCE MEASUREMENTS.

The resistance values shown 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.

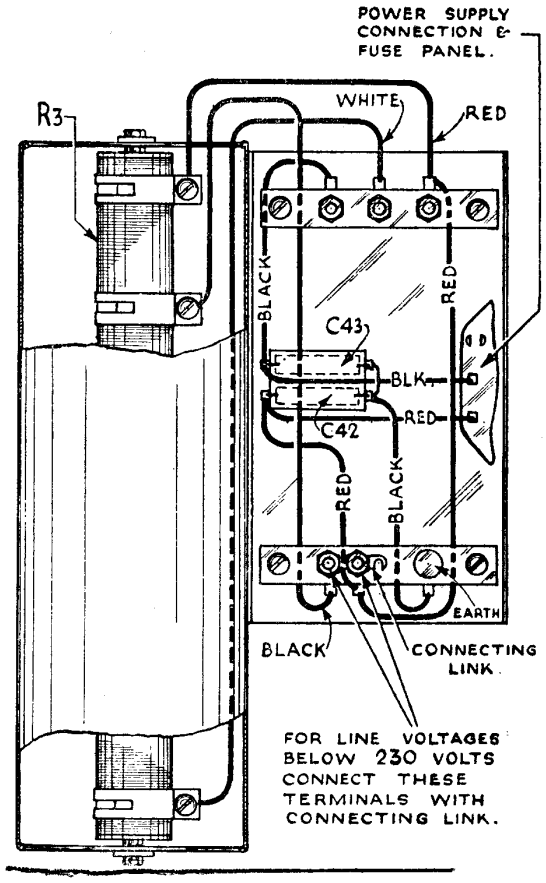

Fig. 7.—Filter Unit (Model 43).

SOCKET VOLTAGES.

VALVE	Cathode to Negative Volts	Screen Grid to Negative Volts	Plate to Negative Volts	Plate Current M.A.	Heater Volts
6A7 Detector M.W.	3.0	48	195	1.0	6.3
S.W.	1.6	45	195	2.4	—
Oscillator	—	—	148	2.4	—
6D6 I.F. Amplifier M.W.	2.0	48	195	3.7	6.3
6B7 Detector	1.5	25	90*	0.8	6.3
43 Pentode	16.5	142	132	24.5	25.0

Voltage across Loudspeaker field — 45 volts (Radiolette 40)

Voltage across Loudspeaker field — 240V. (Radiolette 43)

Measured at 240 volts D.C. supply. No signal input. Sensitivity control in maximum clockwise position.

* Cannot be measured accurately with ordinary voltmeter.

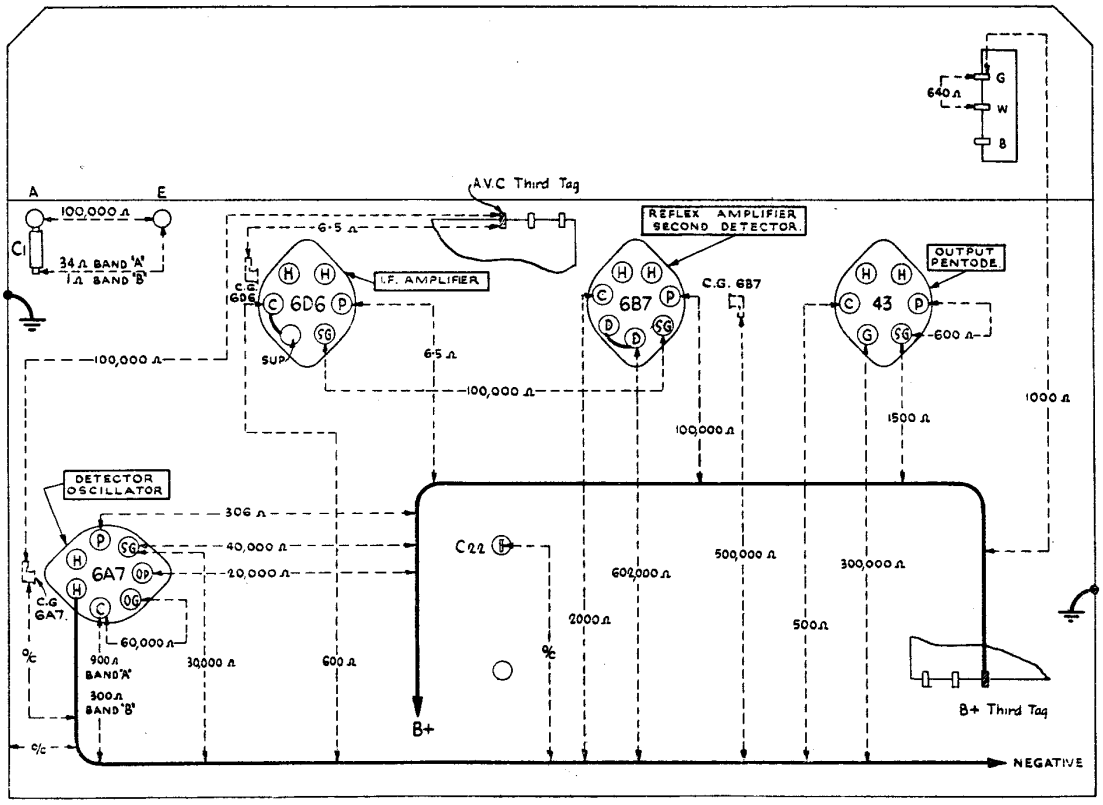

Fig. 8.—Resistance Diagram, Radiolette 40.

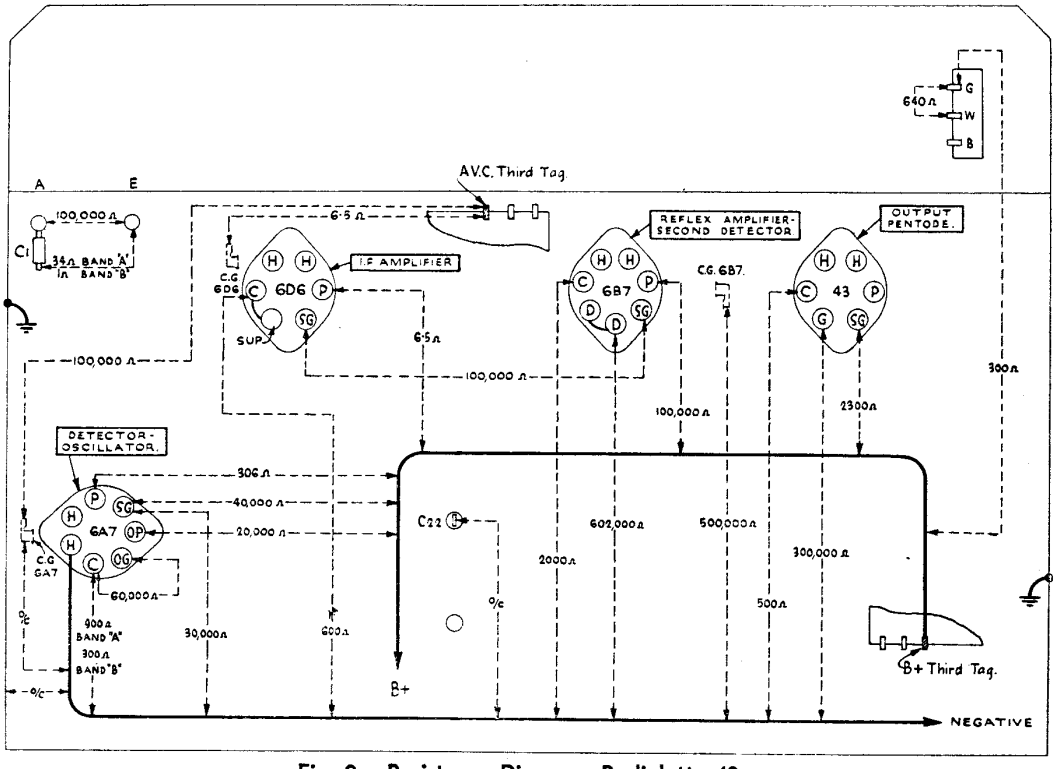

Fig. 9.—Resistance Diagram, Radiolette 43.

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


AWA