The FISK

RADIOLA

MODELS 52 and 163

•

Five Valve, Two Band, A.C. Operated

Superheterodynes

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TECHNICAL INFORMATION

AND SERVICE DATA

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Amalgamated Wireless (Australasia) Ltd

WORLD WIDE WIRELESS

THE FISK RADIOLA, MODELS 52 and 163

Five Valve, Two Band, A.C. Operated, Superheterodynes

TECHNICAL INFORMATION

Electrical Specifications

TUNING RANGES		ALIGNMENT FREQUENCIES
"Standard Medium Wave"	"A" .. 1500-500 K.C.	"Standard Medium Wave" .... 1400 K.C. 600 K.C.
"Short Wave"	"B" .... 16-50 metres	"Short Wave" .... 18 metres

Intermediate Frequency .... 460 K.C.

Power Supply Rating .... 200-260V., 50-60C. Power Consumption .... 50 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) 42 .... Output Pentode

(5) 80 .... Rectifier

6U5 or 6G5 Visual Tuning Indicator

Dial Lamps .... 6.3 volts, .25 amp.

Loudspeaker .... AE5 (Mantel) .... AJ1 (Console)

Loudspeaker Transformer .... TG52E (Mantel) .... TG113D (Console)

Loudspeaker Field Coil Resistance .... 1600 ohms

General Description

The chassis used in the Mantel and Console models are similar and differ, mainly, only in the method of mounting the loudspeaker and the type employed.

In the Mantel model, the loudspeaker is mounted on the chassis and, in the case of the Console, in the lower compartment of the cabinet and connected by a four lead cable and plug.

Visual tuning is provided in the Console only, a 6U5 or 6G5 Visual Tuning Indicator being employed.

Features of these receivers include the following:

Air trimmers and inductance tuning ensures permanent alignment of efficiently and delicately tuned R.F. and I.F. circuits; fixed condensers and inductances specially impregnated against moisture, thus ensuring sustained efficient performance under all climatic conditions; automatic volume control; continuously variable tone control; straight line frequency tuning condenser allowing a greater number and more even spacing of call signs; chassis of high grade steel, heavily plated with cadmium to resist corrosion and suspended on rubber mountings.

Alignment Procedure

Unless it is felt certain that the alignment is incorrect it is not desirable to alter the adjustment from the factory setting. Alignment is necessary, however, if the adjustments have been altered from the original setting or repairs have been effected to any of the tuned circuits.

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 C1070, in conjunction with an output meter of conventional design, is ideal for the purpose.

The R.F. circuits are aligned by plunger type air trimmers. A special tool Part No. 5371 is available for the alignment of air-trimmers. It is constructed of steel, with the adjustment tool on end and a deep centred socket wrench for locking the trimmer on the other. Owing to the construc-

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.

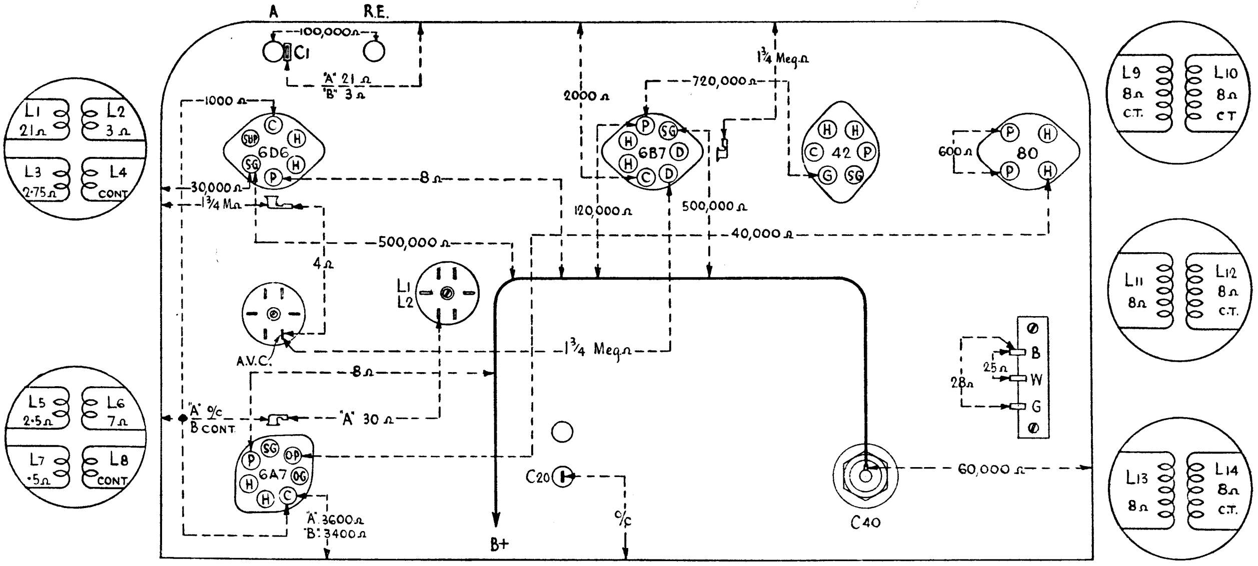


Fig. 5.—Resistance Diagram.

Resistance values were taken with valves removed, variable condenser in full mesh, volume control in maximum clockwise position and sensitivity switch at Local (L.)

SOCKET VOLTAGES.

VALVE	Bias Voltages	Screen Grid to Chassis Volts	Plate to Chassis Volts	Plate Current M.A.	Heater Volts
6A7 Detector M.W.	5.0†	85	240	1.5	6.3
S.W.	3.0†	80	240	2.5	—
Oscillator	—	—	160	3.5	—
6D6 I.F. Amplifier					
M.W.	4.5†	85	240	3.0	6.3
S.W.	3.0†	80	240	4.0	—
6B7 Reflex Amplifier	5.5†	65*	80*	2.5	6.3
42 Pentode	**—18‡**	**240**	**220**	**30.0**	**6.3**
80 Rectifier	600/300 volts 50 ma total current				5.0
	Voltage across L.S. field 80 volts				

*Cannot be measured with ordinary voltmeter.

‡Control Grid to chassis. Cannot be measured with ordinary voltmeter.

†Cathode to chassis.

Measured at 240 volts A.C. supply. No signal input. *Volume control* in maximum clockwise position and *sensitivity switch* in distant (D) position.

tion of air trimmers and their locations on the receiver chassis, alignment without the aid of this tool will be difficult. 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 trimmer with the tool to make the setting permanent.

The I.F. transformers and the oscillator circuit, at 600 K.C., are adjusted by magnetite cores inserted within the windings. The adjustment screws are shown in figs. 1 and 3, and these require the use of a non-metallic screwdriver, since the self-capacity of a metal screwdriver will render accuracy most difficult. A special tool part No. 5372 is also available for this purpose, which in addition to being non-metallic fits conveniently over the adjustment screw, simplifying the operation.

See that a 250,000 ohms resistor is connected between the output terminals of the test oscillator.

Connect the ground connection of the test oscillator to the chassis of the receiver during alignment, and when aligning the I.F. stages, remove the grid clip from 6A7 before connecting the oscillator.

Perform alignment in the proper order, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown in figs. 1 and 3. Keep the volume control set in the maximum clockwise position and regulate the output of the test oscillator so that a minimum signal is applied to the receiver to obtain an observable output indication. This will avoid A.V.C. action and overloading.

"Approx. 550 K.C. no signal," mentioned in the chart, means that the receiver 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 Receiver, 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 receiver, connect an aerial and an earth wire and tune a broadcasting station of frequency between 700 and 550 K.C. If an error is apparent, re-set the pointer by loosening the set screw. Then repeat adjustments 8 and 9 of the chart.

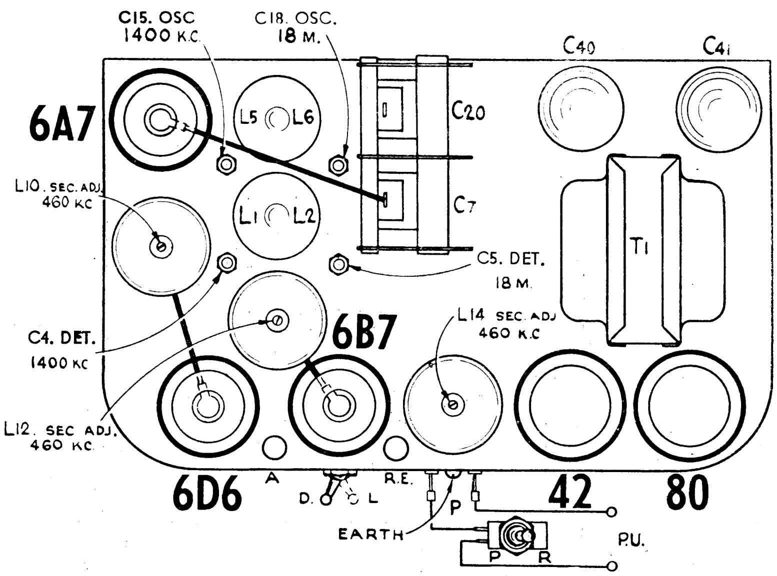


Fig. 1.—Lay-out Diagram (top view).

Alignment Order	Oscillator Connection to Receiver	Dummy Aerial	Oscillator Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbol	Adjust to Obtain
1	6A7 Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	3rd I.F. Trans.	L14	Max. (peak)
2	6A7 Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	3rd I.F. Trans.	L13	Max. (peak)
3	6A7 Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	2nd I.F. Trans.	L12	Max. (peak)
4	6A7 Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	2nd I.F. Trans.	L11	Max. (peak)

Alignment Order	Oscillator Connection to Receiver	Dummy Aerial	Oscillator Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbol	Adjust to Obtain
5	6A7 Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	1st I.F. Trans.	L10	Max. (peak)
6	6A7 Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	1st I.F. Trans.	L9	Max. (peak)

Repeat the above adjustments before proceeding.

Alignment Order	Oscillator Connection to Receiver	Dummy Aerial	Oscillator Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbol	Adjust to Obtain
7	Aerial Term.	—	600 K.C.	600 K.C.	Oscillator	L6 Osc. 600 K.C.	Max. (peak)
8	Aerial Term.	—	1400 K.C.	1400 K.C.	Oscillator	C15	Max. (peak)
9	Aerial Term.	—	1400 K.C.	1400 K.C.	Detector	C4	Max. (peak)
10	Aerial Term.	—	600 K.C.	600 K.C.†	Oscillator	L6 Osc. 600 K.C.	Max. (peak)

Repeat adjustments 8 and 9 before proceeding.

Alignment Order	Oscillator Connection to Receiver	Dummy Aerial	Oscillator Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbol	Adjust to Obtain
11	Aerial Term.	400 ohms.	18 metres	18 metres	Oscillator	C18	Max. (peak)*
12	Aerial Term.	400 ohms.	18 metres	18 metres†	Detector	C5	Max. (peak)‡

† Rock the tuning control back and forth through the signal.
* Use minimum capacity peak if two peaks can be obtained.
‡ Use maximum capacity peak if two peaks can be obtained.

CIRCUIT MODIFICATION.

All receivers of these models produced after 8/3/38 inst., include the following modification. Instructions are given for making the alteration to receivers produced prior to this date.

(1) Condenser C33 removed and replaced with I.F. filter, part No. 5441. The filter requires only one hole for mounting. The lower rivet of the two which fasten the cover plate at the rear of the chassis should be removed and the hole used.

(2) Resistor R16 changed to 1 megohm 1 watt.

(3) Resistor R19 changed to 250,000 ohms 1 watt.

(4) A 250,000 ohms 1 watt resistor connected from screen grid of 6B7 to chassis.

The connections of the Volume Control R17 and resistor R18 are rearranged, the Volume Control now being in the diode circuit and R18 in the grid circuit of the 6B7. No extra leads are necessary to make the alterations, which are as follows:

(1) Disconnect R18 from where it joins C32 and connect it to the third tag on the panel to which its other end is still connected. This should place R18 between tags one and three on the panel.

(2) Remove the black lead in the Volume Control shielded cable from the third tag on the panel and connect it to the point on C32 from which R18 was removed.

In the case of the Radiola 163 condenser C42 should be removed from the panel and connected to the abovementioned point on C32.

IMPORTANT.

On completion of the modification it will be necessary to re-align the intermediate frequency stages at 460 K.C.

SHORT WAVE INSTABILITY.

Reference to the circuit code will show a .02 ufd. paper condenser connected in parallel with C28. This has been done to provide a more efficient filter, giving greater stability on the high frequency end of the short wave band and became effective on the 17/3/38.

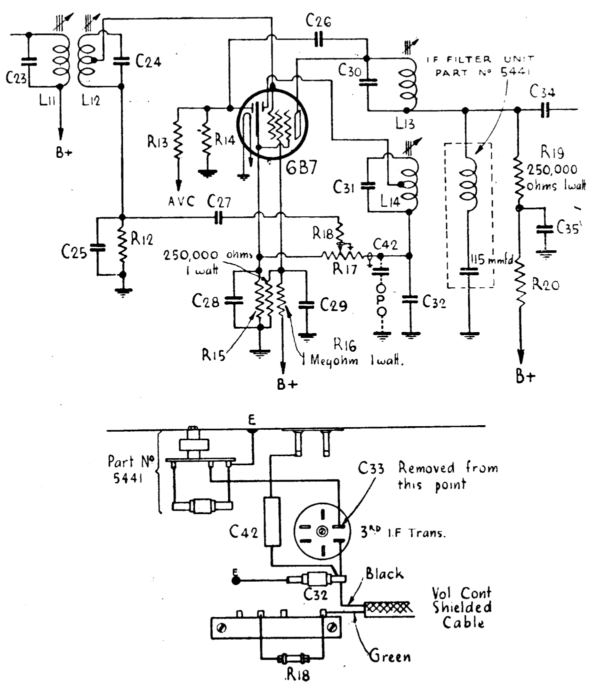
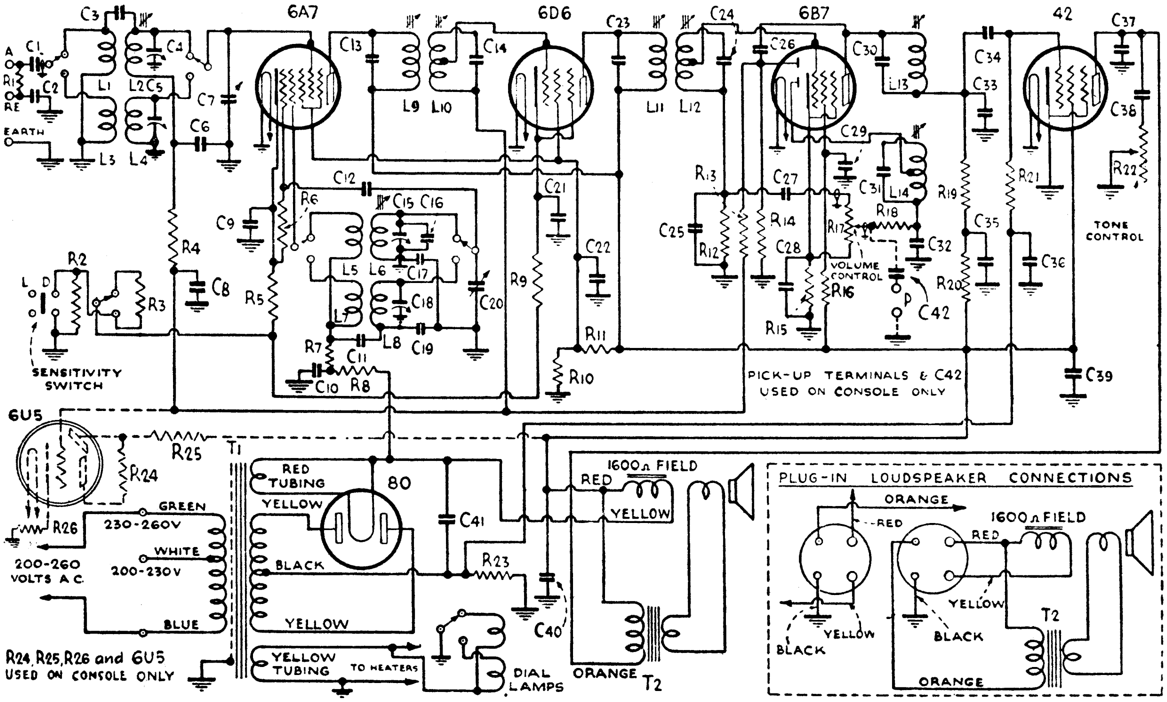


Fig. 4.—Circuit Modification.



Code	Part	COILS
L1, L2	4353	Aerial Coil, 1500-550 K.C.
L3, L4	4331	Aerial Coil, 16-50 metres
L5, L6	4354	Osc. Coil, 1500-550 K.C.
L7, L8	4332	Osc. Coil, 16-50 metres
L9, L10	4327	First I.F. Transformer
L11, L12	4327	Second I.F. Transformer
L13, L14	4329	Third I.F. Transformer
		TRANSFORMERS
T1	4321A	Power Transformer 50-60C.
T1	4323A	Power Transformer 40C.
T1	4325A	Power Transformer 110V.
T2		Loudspeaker Transformer T.G.52 (52), T.G.113 (163)
		RESISTORS
R1		100,000 ohms, 1/3 watt
R2		2,000 ohms, 1/3 watt
R3		200 ohms, 1/3 watt
R4		100,000 ohms, 1/3 watt
R5		400 ohms, 1/3 watt
R6		60,000 ohms, 1/3 watt
R7		20,000 ohms, 1/3 watt
R8		20,000 ohms, 1 watt
R9		600 ohms, 1/3 watt
R10		30,000 ohms, 1 watt
R11		30,000 ohms, 1 watt

Code	Part	RESISTORS
R12		1.75 megohms, 1/3 watt
R13		1.75 megohms, 1/3 watt
R14		1.75 megohms, 1/3 watt
R15		2,000 ohms, 1/3 watt
R16		500,000 ohms, 1 watt
R17	4285	250,000 ohms, Vol. Control
R18		300,000 ohms, 1/3 watt
R19		100,000 ohms, 1 watt
R20		20,000 ohms, 1/3 watt
R21		300,000 ohms, 1/3 watt
R22	4284	100,000 ohms, Tone Control
R23		400 ohms, 3 watt W.W.
R24		1 megohm, 1 watt (163)
R25		20,000 ohms, 1 watt (163)
R26		600 ohms, 1/3 watt (163)
		CONDENSERS
C1		500 mmfd. Mica
C2		500 mmfd. Mica
C3		4 mmfd. Mica (I)
C4	3658	2-10 mmfd. Air Trimmer
C5	3661	2-20 mmfd. Air Trimmer
C6		.05 mfd. Paper
C7	4326 (52) 4328 (163)	Variable Condenser
C8		.05 mfd. Paper
C9		.1 mfd. Paper
C10		8 mfd. 450 volt Electrolytic
C11		.05 mfd. Paper
C12		110 mmfd. Mica (L)

Code	Part	CONDENSERS
C13		115 mmfd. Mica (A)
C14		130 mmfd. Mica (H)
C15	3661	2-20 mmfd. Air Trimmer
C16		14 mmfd. Mica (C)
C17		440 mmfd. Mica (Padder)
C18	3658	2-10 mmfd. Air Trimmer
C19		3500 mmfd. Mica (Padder)
C20	4326 (52) 4328 (163)	Variable Condenser
C21		.1 mfd. Paper
C22		.1 mfd. Paper
C23		115 mmfd. Mica (A)
C24		130 mmfd. Mica (H)
C25		200 mmfd. Mica (J)
C26		50 mmfd. Mica (D)
C27		.05 mfd. Paper
C28		25 mfd. 25V. Elect. with .02 mfd. Paper in Parallel
C29		.1 mfd. Paper
C30		115 mmfd. Mica (A)
C31		130 mmfd. Mica (H)
C32		200 mmfd. Mica (J)
C33		700 mmfd. Mica
C34		.05 mfd. Paper
C35		.25 mfd. Paper
C36		25 mfd. 25 volt Elect.
C37		.005 mfd. Paper
C38		.035 mfd. Paper
C39		.5 mfd. Paper
C40		8 mfd. 500 V. Elect.
C41		8 mfd. 500 V. Elect.
C42		.05 mfd. Paper (163)

Fig. 2.—Circuit Diagram and Code.

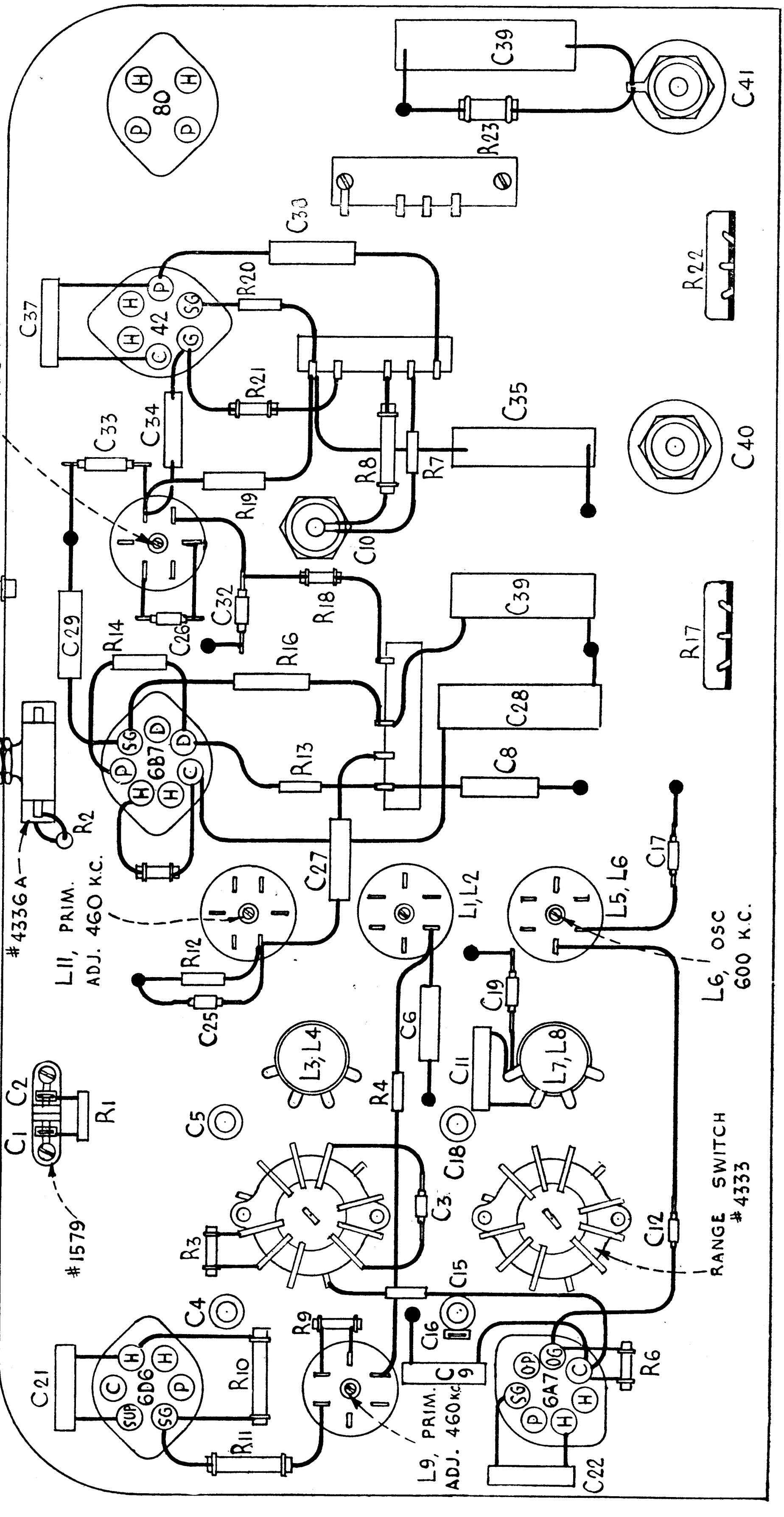


Fig. 3.—Lay-out Diagram (underneath view).

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