

LISSEN

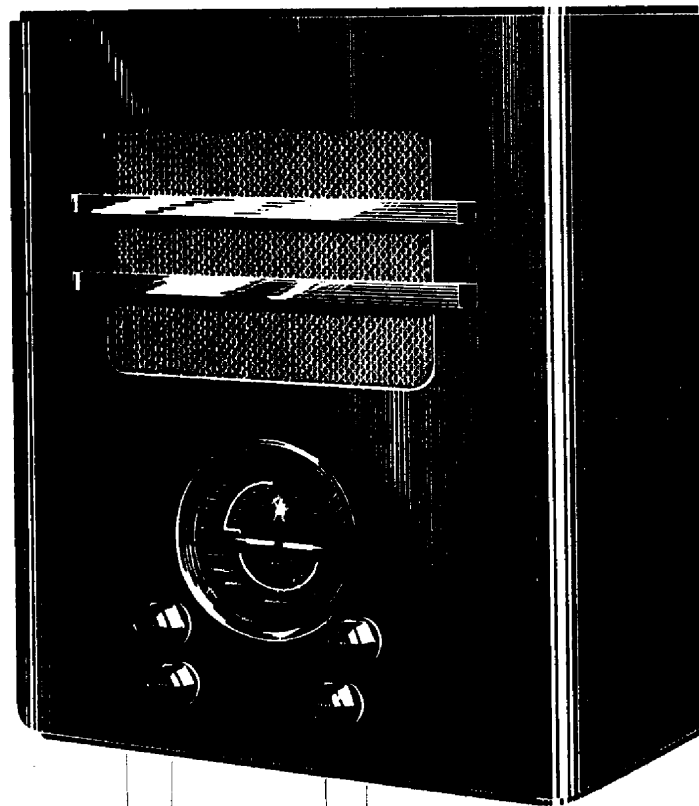
SERVICE MANUAL FOR THREE VALVE BATTERY RECEIVER MODEL 8311.

TECHNICAL SPECIFICATION

THE Lissen model "8311" is a battery operated receiver for operation with an external aerial.

The aerial is coupled to the tuned grid circuit of the R.F. amplifying valve, a variable-mu R.F. pentode (V1). Volume is controlled by the potentiometer, R1, which varies the bias on this valve.

The coupling to the detector valve, a triode (V2) is another tuned circuit. Reaction is obtained by the feed back from the



VOLUME CONTROL
REACTION CONTROL
TUNING CONTROL
SELECTOR SWITCH

coil L8, to the tuned grid circuit of the detector, and is controlled by the reaction condenser C5.

The detector is coupled to the output stage by a shunt fed A.F. transformer.

The output valve is an audio-frequency pentode (V3). A tone correcting network is employed and is so arranged that the high frequency response can be varied if desired. This valve is transformer coupled to the low impedance voice coil of the permanent magnet moving-coil speaker.

GENERAL REMARKS

In the event of trouble check the following details:—

- (1) Batteries: L.T. and H.T., and confirm that the leads are correctly connected.
- (2) Valves: (a) Check characteristics, or (b) substitute valves known to be good.
- (3) Locate trouble to a particular stage by: (a) Checking valve operating conditions, or (b) Stage by stage test with an oscillator, *i.e.*, output stage, detector stage and R.F. stage.
- (4) Locate faulty component by testing with a suitable meter or by substitution, as the case may be.

The following charts are given in the order they will usually be required.

Those readings given in columns A and B are obtained with new (126 volts) and partially discharged (105 volts) H.T. batteries respectively.

The battery plugs should be placed in the sockets indicated below:—

Battery Leads	Battery Sockets
Red lead	H.T. + 126 volts
Blue lead	H.T. + 72
Black lead	H.T. + 9
Brown lead	H.T. — socket
Yellow lead	See notes below

POSITION OF YELLOW BATTERY PLUG

The anode current of a pentode is controlled by the auxiliary grid voltage, which is applied in this case through the yellow battery lead. The auxiliary grid voltage required for the correct anode current will vary with individual valves.

For this reason, the pentode valve is marked with a letter, either A, B, C or D, and this letter represents a certain H.T. + tapping.

The letter A indicates	124½ volts.
” ” B ”	117 ”
” ” C ”	108 ”
” ” D ”	99 ”

The yellow battery lead should be connected into the appropriate socket, as indicated by the above table.

If at any time it is necessary to replace the output valve by one that is not lettered the correct position for the yellow plug may be found as follows:—Remove the first two valves from their sockets, and insert a milliammeter in the Red H.T. lead. Now switch on the set and adjust the position of the Yellow plug until the milliammeter measures as nearly as possible to 5 milliamps. A new H.T. battery of 126 volts should be used for this adjustment.

OPERATING CONDITIONS OF THE VALVES			
All readings are taken with volume control at maximum and with no reaction. (All voltages are measured from chassis.)			
Valve	Circuit	Column A. (New H.T.)	Column B. (Partially discharged H.T.)
R.F. valve, Ever Ready K50M (Metallized)	Anode voltage	117 volts	98 volts
	Anode current	0.7 m.a.	0.5 m.a.
	Screen voltage	63 volts	52 volts
	Screen current	0.2 m.a.	0.1 m.a.
Detector valve, Ever Ready K30C K30D K30K (Metallized)	Anode voltage	50 (approx.) volts	40 volts
	Anode current	2 m.a. (approx.)	1.5 m.a.
Output valve, Ever Ready K70B	Anode voltage	113 volts	95 volts
	Anode current	5 m.a.	4 m.a.
	Aux. grid voltage	Same as yellow battery plug	
	Aux. grid current	0.8 m.a. (approx.)	0.6 m.a. (approx.)
Total current consumption		8 m.a.	6.7 m.a.

If a particular reading should vary considerably from the above table, a systematic check of the circuits associated with the particular valve should be made.

The following tables will facilitate the testing of the components concerned.

Note.—All voltages are measured with a 1,000 ohms per volt meter.

CIRCUIT ANALYSIS		
Valve	Circuit	Associated Components
R.F. valve (V1)	Anode circuit	L5, C8, Red H.T. lead and plug.
	Screen circuit	Blue H.T. lead and plug.
	Grid circuit	L3 and L4, C1, C3 and C7, R1, R2, R5, R6, S1, S3, Brown G.B. lead and plug.
Detector valve (V2)	Anode circuit	L8, T1 primary, R4, C5, C10, C11, Red H.T. lead and plug.
	Grid circuit	L6, L7, C2, C4, C8, C9, R3, S2.
Output valve (V3)	Anode circuit	T2 primary, C12, R7, Tone adjuster plug and socket, Red H.T. lead and plug.
	Aux. grid circuit	Yellow H.T. lead and plug.
	Grid circuit	T1 secondary, R1, R5, R6, S3, Brown G.B. lead and plug.

CONDENSERS			
Circuit Indication	Specification	Location	Component Number
C1 ..	Aerial tuning condenser ..	Fig. 4	80014
C2 ..	Grid circuit tuning condenser	Fig. 4	
C3 ..	Aerial condenser trimmer ..	Fig. 4	
C4 ..	Grid tuning condenser trimmer	Fig. 4	
C5 ..	Reaction condenser .0005 mfd.	Fig. 5	80015
C6 ..	.0003 mfd. mica 350-volt D.C. working ..	Fig. 5	66968
C7 ..	0.1 mfd. tubular 350-volt D.C. working ..	Fig. 5	68020
C8 ..	.00005 mfd. mica, wire ends	Fig. 5	66036
C9 ..	.00005 mfd. mica, wire ends	Fig. 5	66036
C10 ..	.0002 mfd. mica, wire ends	Fig. 5	66038
C11 ..	0.1 mfd. tubular 350-volt D.C. working ..	Fig. 5	68020
C12 ..	.01 mfd. tubular 450-volt D.C. working ..	Fig. 5	68005
C13 ..	.01 mfd. tubular 450-volt D.C. working ..	Fig. 5	68005
C14 ..	8 m. mfd. approx. (twisted wire)	Fig. 5	

INDUCTANCES AND TRANSFORMERS			
Circuit Indication	Specification	Location	Component Number
L1 ..	Droitwich filter, 20 ohms ..	Fig. 5	78066
L2 ..	Aerial coupling coil, 38 ohms	Fig. 4	78069
L3 ..	Medium wave grid coil, 2½ ohms	Fig. 4	
L3, L4	Long wave grid coil, 13 ohms	Fig. 4	
L5 ..	H.F. anode choke, 600 ohms	Fig. 5	79008
L6 ..	Medium wave grid coil, 3 ohms	Fig. 4	78068
L6, L7	Long wave grid coil, 20 ohms	Fig. 4	
L8 ..	Reaction coil, 9 ohms ..	Fig. 4	
L9 ..	Speaker speech coil, 1.5 ohms	Fig. 6	85004
T1 ..	Intervalve transformer, primary, 1000 ohms ; secondary, 9,000 ohms ..	Fig. 5	14805
T2 ..	Output transformer, primary, 700 ohms ; secondary, 0.3 ohms	Fig. 6	Part of Speaker.

RESISTANCES						
Circuit Indication	Specification	Colour Code			Location	Component Number
		Body	Tip	Dot		
R1	Volume control, 3,000	—	—	—	Figs. 4 & 5	81,007
R2	110,000 ohms (½ watt) ..	Brn.	Brn.	Yel.	Fig. 5	71962
R3	2.1 megohms (½ watt) ..	Red	Brn.	Grn.	Fig. 5	71902
R4	30,000 ohms (½ watt) ..	Org.	Blk.	Org.	Fig. 5	71949
R5	800 ohms (½ watt) ..	Gry.	Blk.	Brn.	Fig. 5	71961
R6	1,400 ohms (½ watt) ..	Brn.	Yel.	Red	Fig. 5	71970
R7	30,000 ohms (½ watt) ..	Org.	Blk.	Org.	Fig. 5	71949

Colour Code : Brn. = Brown ; Blk. = Black ; Grn. = Green ; Gry. = Grey ; Org. = Orange ; Yel. = Yellow.

SWITCH POSITIONS		
Circuit Indication	Medium Waves	Long Waves
S1 ..	Closed	Open
S2 ..	Closed	Open
S3 ..	Closed when set is "on"	Open when set is "off"
S4 ..	ditto	ditto

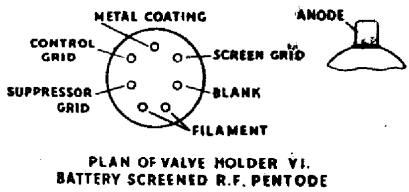
REMOVING THE CHASSIS FROM THE CABINET

The knobs must first be removed by a direct forward pull. Next the speaker plugs are pulled from their sockets.

The two fixing bolts accessible from the underside of the cabinet should now be removed, and the chassis withdrawn from the cabinet.

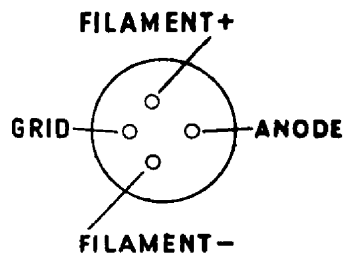
ADJUSTING THE RADIO FREQUENCY CIRCUITS

Rotate the gang till the pointer is at the lower wavelength end of the dial and switch the receiver to the medium waves. Apply a modulated signal of 202 metres to the aerial terminal and adjust the trimming condensers C3 and C4 in turn for maximum output. Finally check this adjustment to make sure that no error has been made.



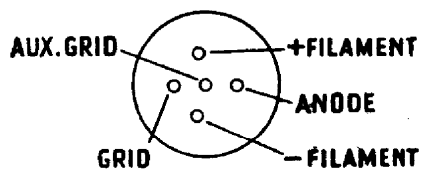
PLAN OF VALVE HOLDER V1.
BATTERY SCREENED R.F. PENTODE

Fig. 1



PLAN OF VALVE HOLDER V2
DETECTOR VALVE

Fig. 2



PLAN OF VALVE HOLDER V3
BATTERY PENTODE OUTPUT VALVE

Fig. 3

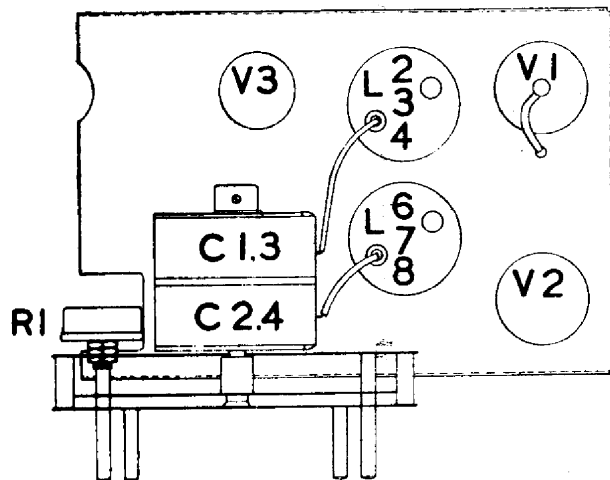


Fig. 4

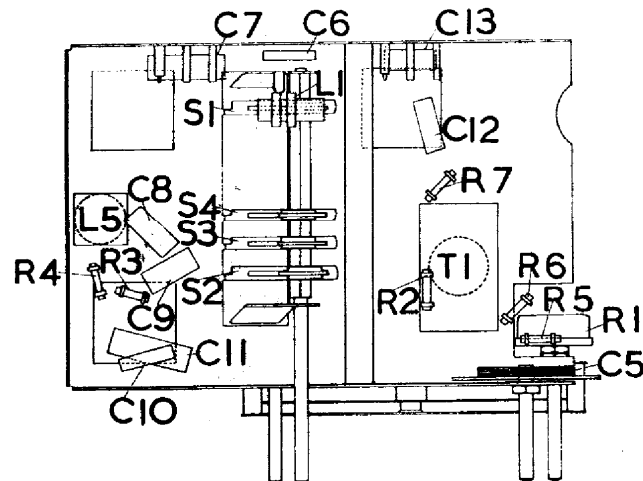


Fig. 5

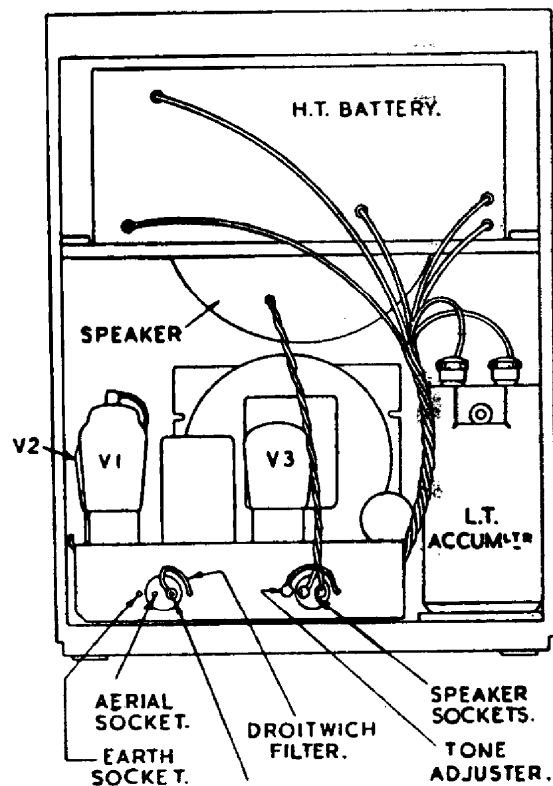
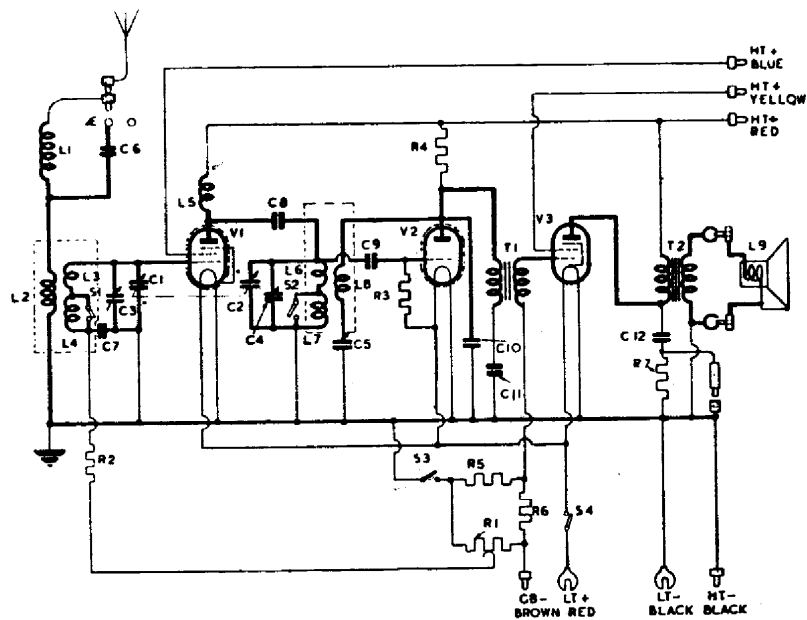


Fig. 6



CIRCUIT DIAGRAM.

Fig. 7.