

# LISSEN

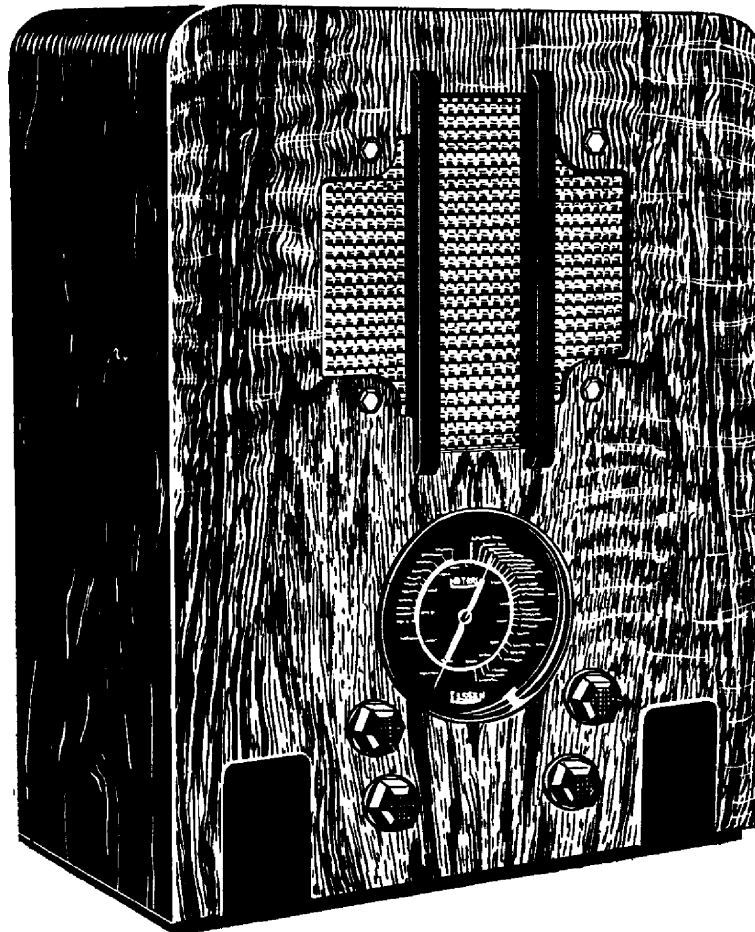
## SERVICE MANUAL FOR BATTERY OPERATED RECEIVER MODEL 8115

### TECHNICAL SPECIFICATION

**T**HE Lissen model " 8115 " 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, R8, 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



coil L7, 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 (120 volts) and partially discharged (100 volts) H.T. batteries respectively.

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

Battery Leads	Battery Sockets
Red lead .. ..	H.T. + 120 volts
Black lead (1) .. ..	H.T. - socket
Black lead (2) .. ..	G.B. + socket
Brown lead .. ..	G.B. - 12 volts
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 120 volts.	
" " B " 115 "	
" " C " 106 "	
" " D " 106 "	

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 4.5 milliamps. A new H.T. battery of 120 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	120 volts	90 volts
	Anode current	1.6 m.a.	1.0 m.a.
	Screen voltage	72 volts	67 volts
Detector valve, Ever Ready K30D (Metallized)	Screen current	0.5 m.a.	.3 m.a.
	Anode voltage	20 volts	16 volts
	Anode current	1.6 m.a.	1.3 m.a.
Output valve, Ever Ready K70B	Anode voltage	118 volts	97 volts
	Anode current	4.3 m.a.	3.7 m.a.
	Aux. grid voltage	Same as yellow battery plug	
	Aux. grid current	1.2 m.a. (approx.)	1.0 m.a. (approx.)
Total current consumption		9.2 m.a.	7.3 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 voltmeter.

**CIRCUIT ANALYSIS**

Valve	Circuit	Associated Components
R.F. valve (V1)	Anode circuit	L4. C11. Red H.T. lead and plug.
	Screen circuit	R2. C10. Red H.T. lead and plug.
	Grid circuit	L2 and L3. C1, C3 and C9. R1, R7, R8, R9. S1, S3. Brown G.B. lead and plug.
Detector valve (V2)	Anode circuit	L7, L8. R4, R5. C5, C13, C14, C15. Red H.T. lead and plug.
	Grid circuit	L5, L6. C2, C4, C11, C12. R3. S2.
Output valve (V3)	Anode circuit	T2 primary. C16. R6. Tone adjuster plug and socket. Red H.T. lead and plug.
	Aux. grid circuit	Yellow H.T. lead and plug.
	Grid circuit	T1 secondary. R7, R8, R9. S3. Brown G.B. lead and plug.

**CONDENSERS**

Circuit Indication	Specification	Location	Component Number
C1 ..	Aerial tuning condenser ..	Fig. 4	80,014
C2 ..	Grid circuit tuning condenser ..	Fig. 4	80,014
C3 ..	Aerial condenser trimmer ..	Fig. 4	80,014
C4 ..	Grid tuning condenser trimmer ..	Fig. 4	80,014
C6 ..	Reaction condenser .0005 mfd. ..	Fig. 5	80,013
C6 ..	8mmfd. approx. (twisted wire) ..	Fig. 5	
C7 ..	.0003 mfd. mica 350 volt D.C. working ..	Fig. 5	66,968
C8 ..	.000005 mfd. (disc type) ..	Fig. 4	71,261
C9 ..	0.1 mfd. tubular 350 volt D.C. working ..	Fig. 5	68,020
C10	0.1 mfd. tubular 350 volt D.C. working ..	Fig. 5	68,020
C11	.00005 mfd. (Hood type) ..	Fig. 4	71,250
C12	.00005 mfd. (Hood type) ..	Fig. 4	71,250
C13	0.5 mfd. tubular 350 volt D.C. working ..	Fig. 5	68,019
C14	.0002 mfd. mica 350 volt D.C. working ..	Fig. 5	66,967
C15	0.1 mfd. tubular 350 volt D.C. working ..	Fig. 5	68,020
C16	.01 mfd. tubular 450 volt D.C. working ..	Fig. 5	68,004

**INDUCTANCES AND TRANSFORMERS**

Circuit Indication	Specification	Location	Component Number
L1 ..	Aerial coupling coil, 24 ohms	Fig. 4	78,019
L2 ..	Medium wave grid coil, 3.0 ohms ..	Fig. 4	78,019
L2, L3	Long wave grid coil, 18 ohms	Fig. 4	78,019
L4 ..	H.F. anode choke, 550 ohms	Fig. 5	79,008
L5 ..	Medium wave grid coil, 2.2 ohms ..	Fig. 4	78,017
L5, L6	Long wave grid coil, 18 ohms	Fig. 4	78,017
L7 ..	Reaction coil, 2.4 ohms	Fig. 4	78,017
L8 ..	Detector Anode Choke, 350 ohms ..	Fig. 5	79,010
L9 ..	Speaker speech coil, 1.2 ohms	Fig. 6	85,004
T1 ..	Intervalve transformer, primary, 930 ohms; secondary, 8,800 ohms ..	Fig. 5	77,012
T2 ..	Output transformer, primary, 830 ohms; secondary, 0.8 ohms ..	Fig. 5	77,032

**RESISTANCES**

Circuit Indication	Specification	Colour Code			Location	Component Number
		Body	Tip	Dot		
R1	110,000 ohms (½ watt) ..	Brn.	Brn.	Yel.	Fig. 5	11,962
R2	40,000 ohms (½ watt) ..	Yel.	Blk.	Org.	Fig. 5	71,918
R3	2.1 megohms (½ watt) ..	Red	Brn.	Grn.	Fig. 5	71,902
R4	11,000 ohms (½ watt) ..	Brn.	Brn.	Org.	Fig. 5	71,963
R5	40,000 ohms (½ watt) ..	Yel.	Blk.	Org.	Fig. 5	71,918
R6	31,000 ohms (½ watt) ..	Org.	Brn.	Org.	Fig. 5	71,965
R7	800 ohms (½ watt) ..	Gry.	Blk.	Brn.	Fig. 5	71,961
R8	Volume control, 3,000 ohms ..	—	—	—	Fig. 5	81,007
R9	1,500 ohms (½ watt) ..	Brn.	Grn.	Red	Fig. 5	71,906

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 four fixing bolts ("A" in Fig. 6) accessible from the underside of the cabinet should now be removed, and the chassis withdrawn from the cabinet.

It should be noted that to get access to the underside of the chassis it is only necessary to remove the card base plate of the cabinet, which is held in place by four wood screws.

**ADJUSTING THE GANGED CONDENSER AND DIAL POINTER**

Rotate the gang till the pointer is at the higher wavelength end of the scale. Push a flat ended rod through the hole in the side of the gang cover and against the vanes. Now rock the vanes by means of the rotor drive until it is felt that the rotors are fully in mesh. If the pointer does not coincide with the two index marks at the top and bottom of the scale, release the centre fixing screw and move the pointer into this position.

**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.

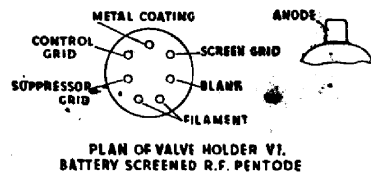


Fig. 1

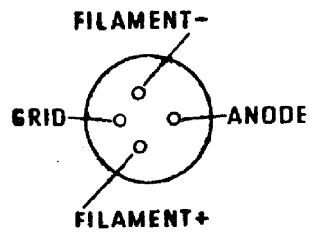


Fig. 2

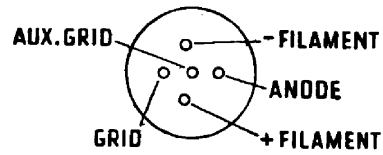


Fig. 3

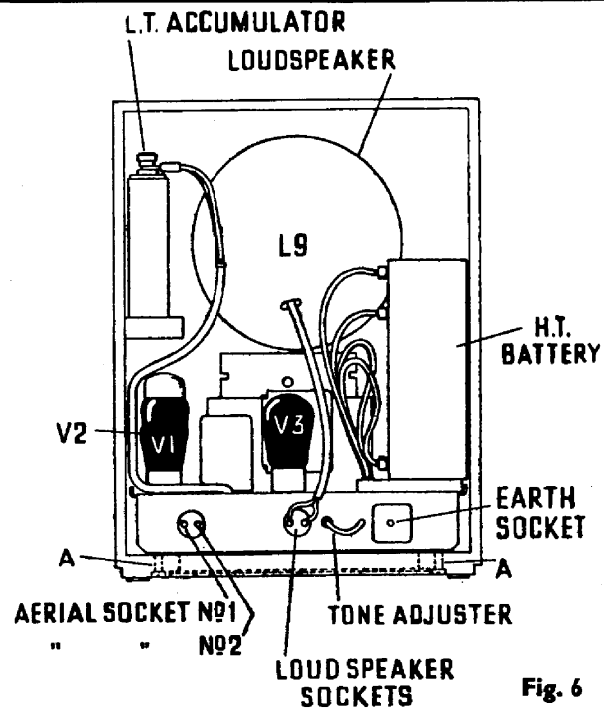


Fig. 6

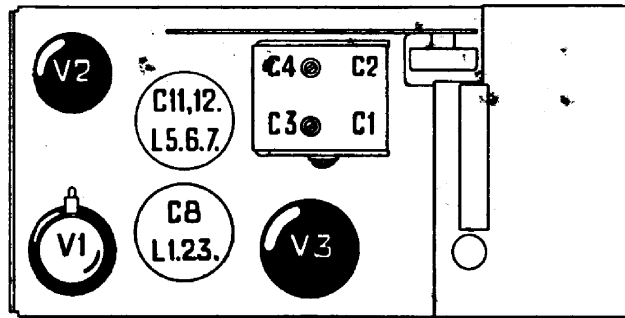


Fig. 4

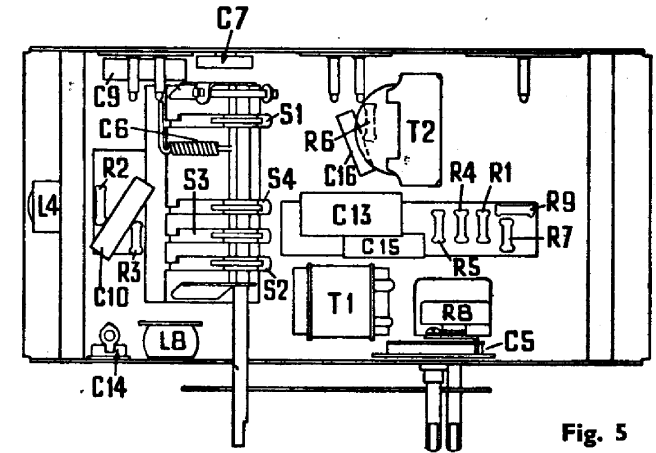
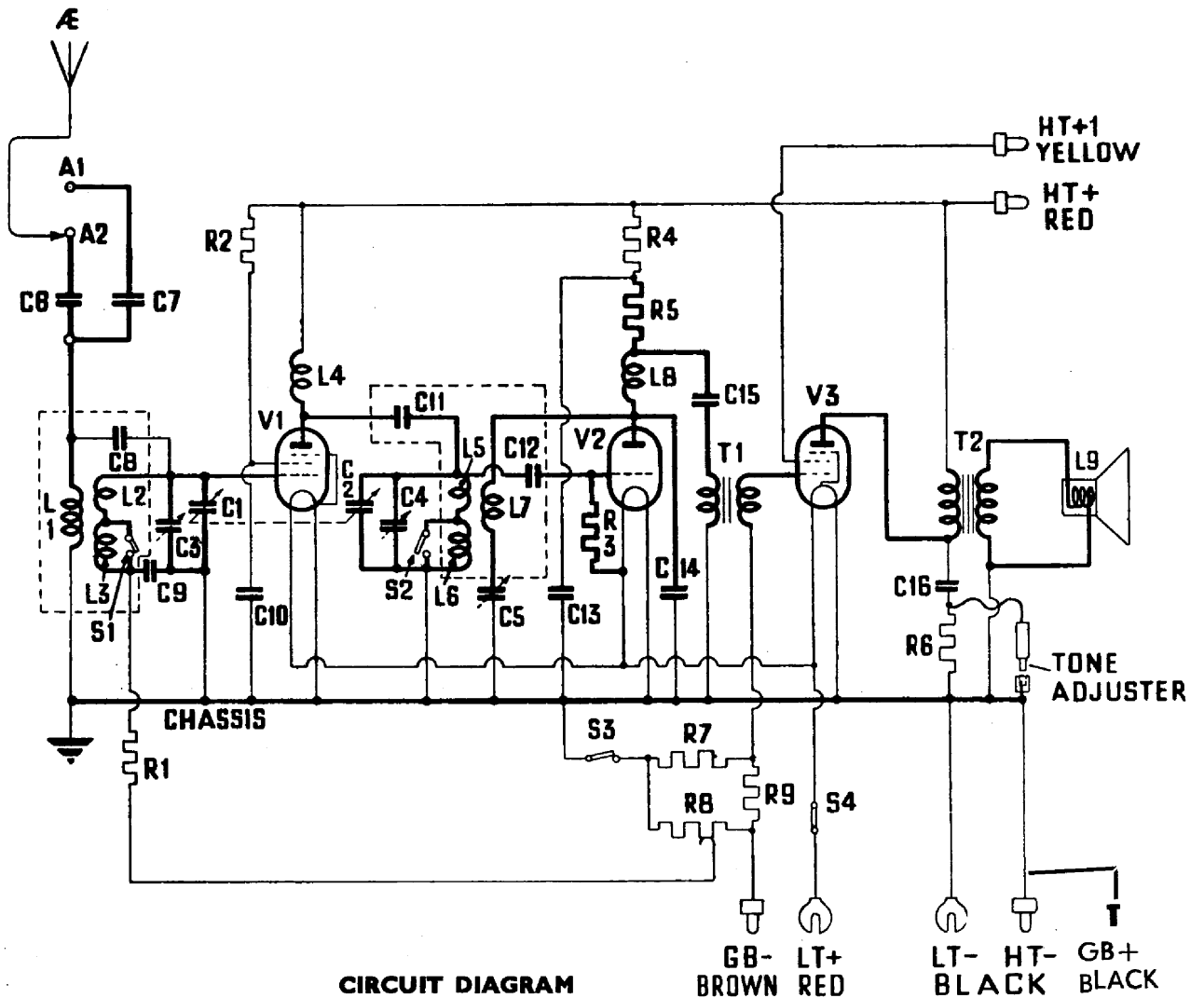


Fig. 5



CIRCUIT DIAGRAM