

NUMBER FORTY-SEVEN
(VOLUME TWO)

'TRADER' SERVICE SHEETS

LISSEN MODEL 8111 A.C. SUPERHET

THE Lissen Model 8111 A.C. superhet is a receiver of advanced design employing an octode frequency changer, and a separate double-diode valve giving second detection and a form of quiet A.V.C. In addition to Model 8111, which is for 200-250 V, 40-100 c.p.s. mains, there is Model 8116 for 200-250 V, 25-40 c.p.s. and Model 8117 for 100-110 V, 40-100 c.p.s. mains. Apart from the mains transformer, these other models are similar to Model 8111.

CIRCUIT DESCRIPTION

Two alternative aerial connections to coupling coil **L1** which gives almost equal efficiency with long and short aerials. **A1** tapping is for normal use, while **A2**, connected via a fixed series condenser **C1**, is for use when the receiver is operated in swamp areas. Band-pass input filter has been designed to give good second channel suppression and also complete freedom from M.W. breakthrough on L.W. Primary **L2**, **L3** tuned by **C19**; secondary **L4**, **L5** tuned by **C21**: inductive coupling.

First valve (**V1**, Ever Ready metallised **A80A**) is an octode operating as frequency-

changer with electron coupling. Oscillator grid coils **L6**, **L7**, tuned by condenser **C23** with specially-shaped vanes for tracking; anode reaction coil **L8**. Sensitivity control consists of variable resistance **R5** in cathode circuit, and has the effect of varying fixed G.B. applied to pentode section. On gramophone, oscillator triode section functions as L.F. amplifier feeding output valve.

Second valve is a variable-mu H.F. pentode (**V2**, Ever Ready metallised **A50N**) operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **L9**, **L10** and **L11**, **L12**.

Intermediate frequency 127 KC S.

Diode second detector forms part of separate double diode valve (**V3**, Ever Ready metallised **A20B**). Second diode, fed from **V2** anode by **C13**, provides D.C. potential which is developed across **R15**, **R16** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from drop along **V4** cathode resistances **R20**, **R21**.

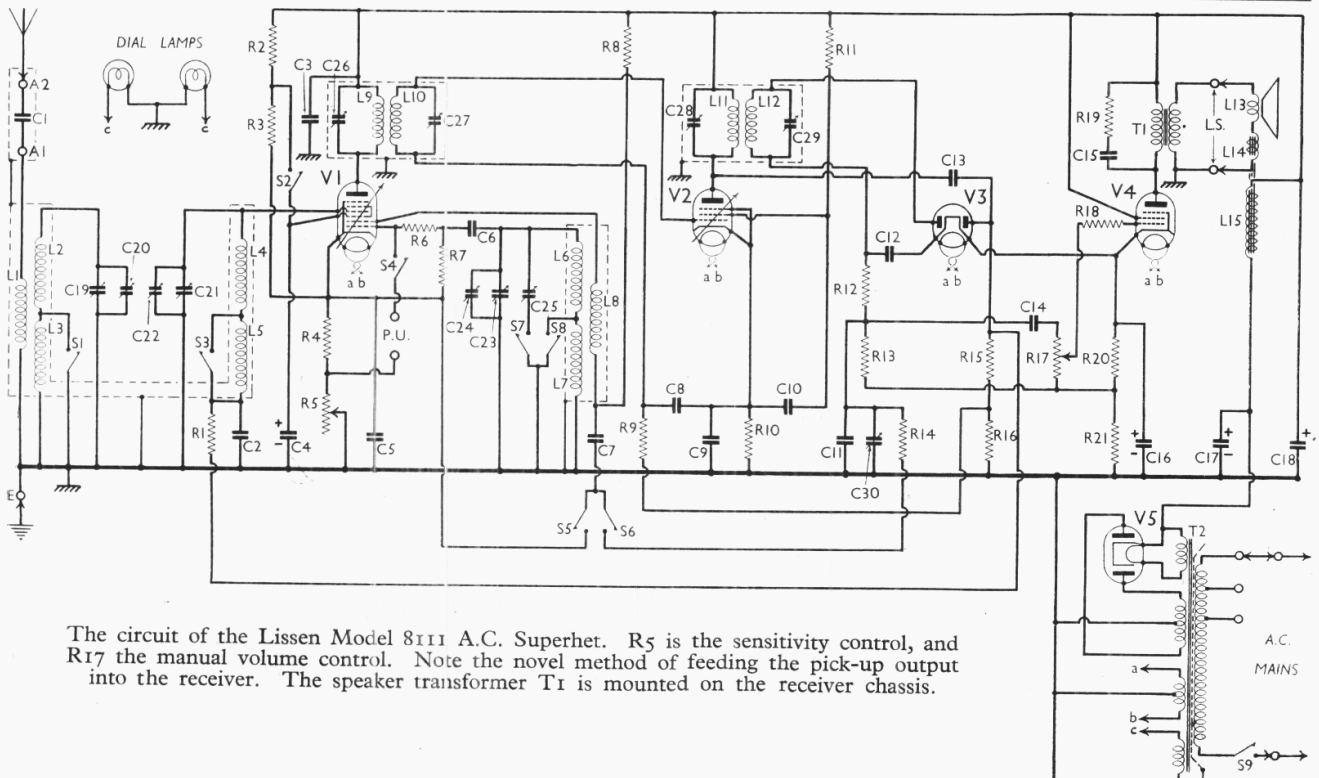
Audio frequency output from rectifier

diode is passed by way of coupling condenser **C14**, manual volume control **R17** and I.F. stopper **R18** to grid of output pentode (**V4**, Ever Ready **A70C**). Tone control by means of variable condenser **C30** shunted across grid circuit. Impedance correcting network, **R19**, **C15**, across primary of output transformer. H.T. current is supplied by I.H.C. full-wave rectifying valve (**V5**, Ever Ready **A11B**). Smoothing by speaker field winding **L15** and dry electrolytic condensers **C17**, **C18**.

Provision for connection of gramophone pick-up in grid circuit of **V1** triode section by switch **S4**. When the main switch control is set to "G," **S4** is closed, and G.B. is applied to the triode grid, with the result that the valve ceases to oscillate. **S5** opens, and **S6** closes, thus connecting by-pass condenser **C7** in circuit as a coupling condenser to **V4** grid via the normal coupling condenser **C14** and volume control **R17**. **S2** removes the S.G. voltage from **V1** and thus prevents radio break-through.

COMPONENTS AND VALUES

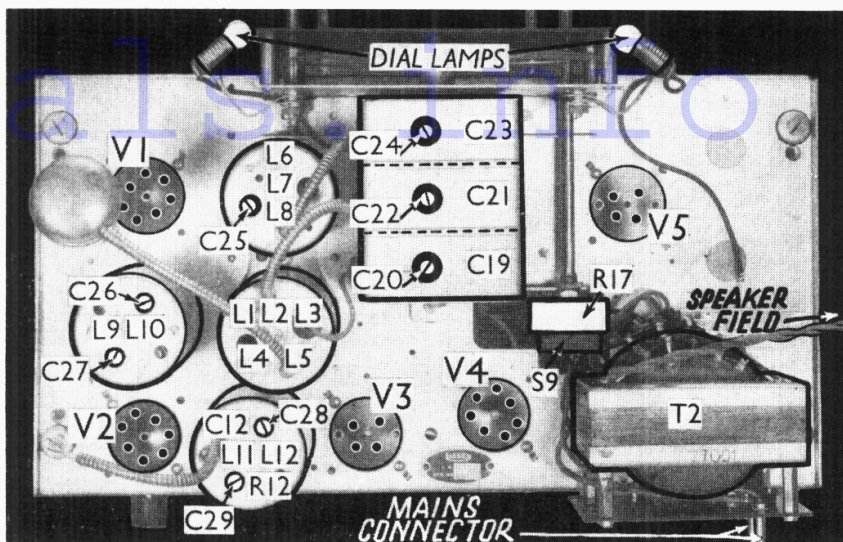
Resistances		Values (ohms)
R1	V1 pent. cont. grid decoupling	510,000
R2		40,000
R3		40,000
R4	V1 fixed G.B. resistance	300
R5	Sensitivity control	2,000
R6	V1 osc. grid series resistance	1,000
R7	V1 osc. grid resistance	100,000
R8	V1 osc. anode decoupling	100,000
R9	V2 cont. grid decoupling	510,000



The circuit of the Lissen Model 8111 A.C. Superhet. **R5** is the sensitivity control, and **R17** the manual volume control. Note the novel method of feeding the pick-up output into the receiver. The speaker transformer **T1** is mounted on the receiver chassis.

Resistances (contd.)		Values (ohms)
R10	V2 fixed G.B. resistance	200
R11	V2 S.G. H.T. feed	80,000
R12	I.F. stopper	100,000
R13	V3 rectifier diode load	200,000
R14	Stopper in pick-up circuit	100,000
R15	V3 A.V.C. diode load	510,000
R16		510,000
R17	Manual volume control	500,000
R18	V4 grid I.F. stopper	25,000
R19	Part of V4 impedance corrector	10,000
R20	V4 G.B. and A.V.C. delay voltage resistances	150
R21		500

Condensers		Values (μF)
C1	Aerial series condenser	0.000015
C2	V1 pent. cont. grid decoupling	0.25
C3	V1 pent. anode decoupling	0.1
C4	V1 S.G.'s by-pass	2.0
C5	V1 cathode by-pass	0.1
C6	V1 osc. grid condenser	0.001
C7	V1 osc. anode decoupling	0.1
C8	V2 cont. grid decoupling	0.1
C9	V2 cathode by-pass	0.1
C10	V2 S.G. by-pass	0.1
C11	I.F. by-pass	0.0001
C12	I.F. by-pass	0.0001
C13	Coupling to A.V.C. diode	0.0001
C14	L.F. coupling to V4	0.05
C15	Part of V4 impedance corrector	0.01
C16	V4 cathode by-pass	20.0
C17	H.T. smoothing	8.0
C18		8.0
C19	Band-pass primary tuning	—
C20	Band-pass primary trimmer	—
C21	Band-pass secondary tuning	—
C22	Band-pass secondary trimmer	—
C23	Oscillator tuning	—
C24	Oscillator main trimmer	—
C25	Oscillator L.W. trimmer	—
C26	1st I.F. trans. pri. tuning	—
C27	1st I.F. trans. sec. tuning	—
C28	2nd I.F. trans. pri. tuning	—
C29	2nd I.F. trans. sec. tuning	—
C30	Tone control condenser, variable	0.0005



Plan view of the chassis. The second I.F. unit (L11, L12, C28, C29) also contains the fixed condenser C12 and the resistance R12. C25 in the L6, L7, L8 unit is the oscillator L.W. trimmer.

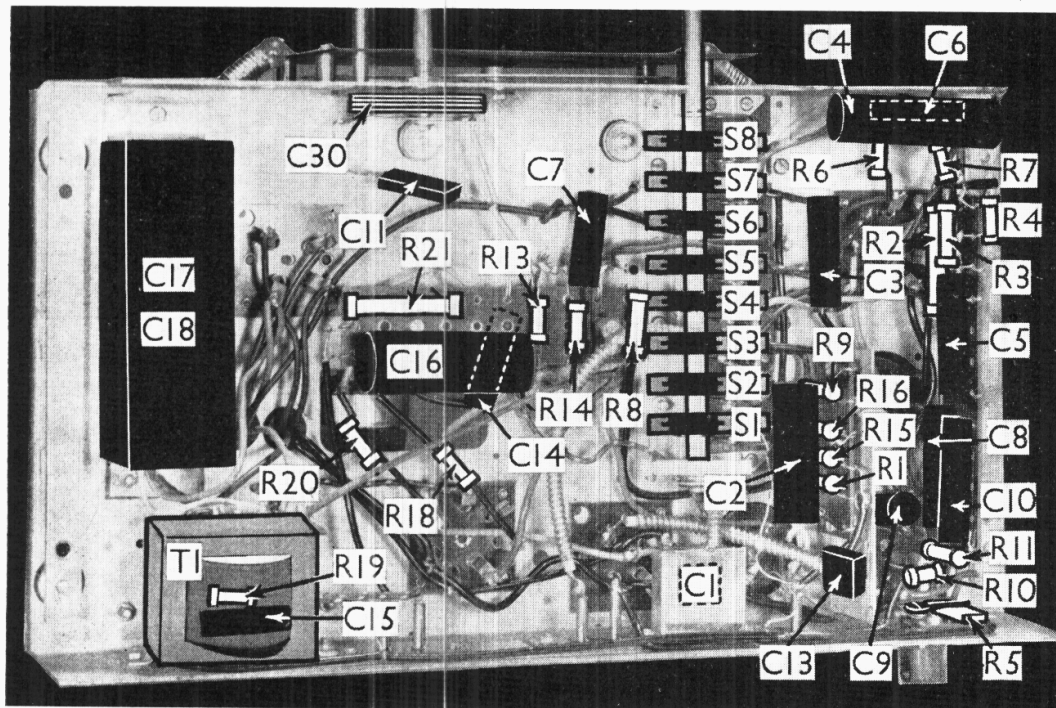
Other Components		Values (ohms)
L1	Aerial coupling coil	24.0
L2	Band-pass primary coils	2.3
L3		15.0
L4		2.3
L5	Band-pass secondary coils	15.0
L6		1.74
L7	Oscillator tuning coils	1.52
L8	Oscillator anode coil	45.0
L9	1st I.F. trans. ...	Pri. 93.0
L10		Sec. 93.0
L11	2nd I.F. trans. ...	Pri. 42.0
L12		Sec. 42.0
L13	Speaker speech coil	1.5
L14	Hum neutralising coil	0.3
L15	Speaker field coil	3,000
Tr	Output trans. ...	Pri. 700
		Sec. 0.32

Other Components (contd.)		Values (ohms)	
T2	Mains trans. ...	Pri. total	43.0
		Heater sec.	0.07
		Dial lamp sec.	0.35
		Rect. heater sec.	0.13
	H.T. sec.	340	
S1, S3	Wave-band switches, ganged ...	—	
S7, S8		Gram. pick-up switches, ganged	—
S2, S4			—
S5, S6		Mains switch, ganged	R17
S9			—

DISMANTLING THE SET

Many under-chassis repairs can be carried out without taking the chassis out of the cabinet. It is only necessary

(Continued overleaf)



Under-chassis view. The switches S1-S8 in the switch assembly are clearly marked. R5 is the sensitivity control. C1 is inside a small screening box. C17 and C18 are two dry electrolytics in a single unit.

LISSEN MODEL 8111
(Continued)

to remove the false bottom of the cabinet, which is held in position by wood screws.

Removing Chassis.—Should this become necessary, first remove the knobs. No grub screws are used, but the knobs may be tight, due to the fact that the retaining springs clip into grooves in the spindles. If this is the case, string looped behind the knob, and given a sharp pull will generally remove the knob. Do not lose the flat spring which is inside knob.

Now remove the four special bolts from the underside of the cabinet which hold the chassis. Free the speaker leads from the clip at the right-hand side of the cabinet, when the chassis can be withdrawn to the extent of the leads. As these are long, it will generally be unnecessary to disconnect them.

To remove the chassis entirely, unplug the two leads from the rear of the chassis, which go to the speaker speech coil, and disconnect the two field leads from the screws on the speaker terminal strip.

Removing Speaker.—This is held to its sub-baffle by four fixing bolts, the nuts of which should be removed.

VALVE ANALYSIS

The voltage and current readings listed in the table are those given by Lissen for an average chassis working with the sensitivity control (R5) at maximum (minimum resistance), and with no signal input.

All voltages were measured with a high resistance voltmeter, chassis being negative.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 A80A*	275	1.2	72	4.0
V2 A50N	275	6.0	105	2.5
V3 A20B	—	—	—	—
V4 A70C	258	27.0	275	3.1
V5 A11B	350†	—	—	—

* Osc. anode (G2) 77V, 2.2 mA.
† A.C., each anode.

GENERAL NOTES

Switches.—S1-S8 are the waveband switches, which are in one unit, seen in the under-chassis view. Of these, S5 and S6, and S7 and S8, really form two single-pole change-over switches, but they are shown separately in our circuit diagram for clarity. The table (col. 2)

gives the switch positions for the various settings. "O" indicates open, and "C," closed.

Switch	M.W.	L.W.	Gram.
S1	C	O	C
S2	C	C	O
S3	C	O	C
S4	O	O	C
S5	C	C	O
S6	O	O	C
S7	O	C	O
S8	C	O	C

S9 is the Q.M.B. mains switch which is ganged with the volume control, R17.

Coils.—These are in four units, seen in our plan chassis view. L1-L5 are the signal frequency band-pass coils, L6-L8 the oscillator coils, and L9, L10, and L11, L12 the I.F. transformers.

To remove the band-pass coil unit screen, undo the two nuts under the chassis holding it in position. Now unsolder the two leads to the gang condenser, release the two screened cable earthing clips, and the valve screening cap on one of the leads, when the screen may be removed. The coil unit itself is held in position by a single screw, located under the chassis between S1 and S2. To remove the coils entirely, the leads to it must be unsoldered.

A similar procedure is necessary to remove the oscillator coil screen, and the coils themselves. In this case the coil fixing screw is between S5 and S6. It should be noted that the brass rod projecting from the top of this unit is merely for locating purposes.

To remove the I.F. transformers, unsolder the leads to the contacts at the base, and in the case of L11, L12 the two lead out wires, and undo the two nuts holding each screen to the chassis. The complete units can then be removed. The coils are held in the screens by two screws at the top of each screen.

Note that in the case of the second I.F. transformer, the unit contains, in addition to L11 and L12, a fixed condenser and resistance, C12 and R12.

The oscillator L.W. trimmer, C25, is adjusted through a hole in the top of the oscillator coil screen.

Dial Lamps.—There are two of these, wired in parallel. Each is an Osram M.E.S. type, rated at 3.5 V, 0.3 A. They are under-run from a separate 2 V winding on the mains transformer.

Extension Speaker.—This should be of

the low resistance type, with a resistance of 1.5 to 2.5 O. It is plugged into the socketed plugs used to connect the internal speaker to the receiver, or it may be used alone by first unplugging the internal speaker leads.

Condenser C1.—The alternative aerial series condenser C1 is enclosed, together with the aerial sockets, in a small screening box seen in the under-chassis view.

Condensers C17, C18.—These are two 8μF electrolytics, 450 V D.C. working, in a single unit. They have a common negative lead (black). The red lead is the positive of C17 and the yellow the positive of C18.

Variable resistance R5.—This is the sensitivity control, and is seen attached to the back of the chassis in our under-chassis view. It is adjustable by a knob.

CIRCUIT ALIGNMENT

I.F. Circuits.—These should be adjusted before the signal frequency and oscillator circuits. The procedure is to apply a modulated signal of 127 KC/S between the frequency changer control grid (G4 of V1) and chassis. Connect a 2μF condenser between the oscillator anode (G2 of V1) and chassis. Connect a suitable output meter across the primary of T1. When adjusting the primary trimmer of either I.F. transformer, a 50,000 O resistance is connected across the secondary, and when adjusting the secondary, the resistance is placed across the primary.

The trimmers should be adjusted in the following order: C29, C28, C27, C26. Adjust for maximum output as indicated on the output meter. Remove the 2 μF condenser and the 50,000 O resistance.

Signal Frequency and Oscillator Circuits. Set the tuning control so that the gang condenser is at its stop in the minimum position. If the pointer does not coincide with the two index marks at the top and bottom of the dial, release the centre fixing screw and move the pointer to this position. Tighten up the screw again.

Apply a modulated signal of 196m. to the aerial terminal, and switch the receiver to M.W., keeping the tuning control at the minimum stop. Adjust the tuning condenser trimmers for maximum output in the following order: C24, C22, C20.

Switch the receiver to L.W., rotate the tuning condenser until the pointer indicates exactly 1,300 m., and apply a signal of this wavelength. Now adjust C25 for maximum output.

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