

TRADER SERVICE SHEETS

NUMBER TWENTY-NINE
(VOLUME TWO)

LISSEN MODEL 8093

3-VALVE (Plus Rectifier) A.C. RECEIVER

THE 1934-5 Lissen model 8093 receiver is an A.C. table console instrument employing a 3-valve (plus rectifier) straight circuit, comprising a variable-mu tetrode H.F. amplifier, a triode detector and an output pentode. Iron-cored coils are used, and there are three tuned circuits.

CIRCUIT DESCRIPTION

Two alternative aerial connections by way of series condensers **C1** and **C2** to coil **L1** coupled to M.W. primary of band-pass input filter. Primary **L2**, **L3** tuned by **C18**; secondary **L8**, **L9** tuned by **C20**; inductive link coupling by coils **L4**, **L5**, **L6**, **L7**. First valve (**V1**, Lissen metallised AC SGV) is a variable-mu tetrode operating as H.F. amplifier. Gain controlled by variable G.B. resistance **R4** in cathode circuit.

Choke-fed tuned-grid coupling by **L10**, **C4**, **L11**, **L12** and **C22** to triode detector (**V2**, Lissen metallised AC HL) working on power grid system with **C6** and **R5**. Reaction applied from anode to H.F. coils by means of coils **L13**, **L14**, and controlled by variable condenser **C24** which is ganged with the volume control **R4**. Resistance **R6** in cathode circuit of **V2** provides G.B. potential when a gramophone pick-up is used. Detector anode H.F. filtering by **L15** and **C10**.

Resistance-capacity fed transformer coupling by **R8**, **C9** and **T1** to output pentode (**V3**, Mazda AC Pen or Lissen AC PT). Two-point tone control by condenser **C14** in anode circuit. Condenser **C13** with **T2** primary forms choke-capacity output filter for external speaker.

H.T. current supplied by full-wave rectifying valve (**V4**, Lissen UU41). Smoothing by L.F. choke **L16** and dry electrolytic condensers **C15**, **C16**. High-resistance speaker field winding **L19** across main H.T. supply. Fuse **F1** (250 mA) protects rectifier.

DISMANTLING THE SET

The base of the cabinet is closed by a thin wooden board, held by six wood screws. On removing this, most of the under-chassis components can be reached, without having to remove the chassis. However, if this proves necessary, proceed as follows:—

Removing Chassis.—Remove the three knobs (grub screws). When replacing these, remember that the centre one is marked "Tune," that on the left "Vol," and that on the right "LMO." There is a flat on the right-hand spindle for the grub screw, ensuring that the correct indications of switch position are given.

Now unclip the 4-way speaker lead from the side of the cabinet, and remove the four round-head brass screws holding chassis to cabinet. Chassis may now be withdrawn sufficiently for normal work. To remove it entirely, unsolder the four speaker leads from the tags on the speaker input transformer. When replacing, the white leads go to the two outer tags, and the blue leads to the two inner tags.

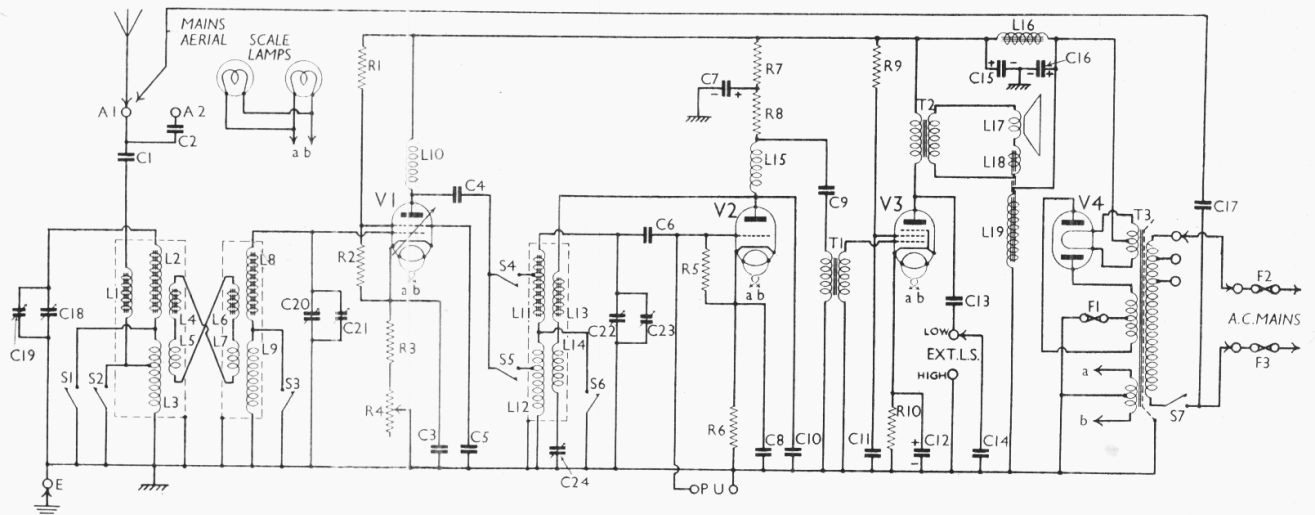
Removing Speaker.—Should this become necessary, it is best to undo the four nuts on the screws holding the speaker to its sub-baffle. Do not attempt to remove the sub-baffle, as the ornamental headed screws holding it in position are apparently of aluminium, and the heads are easily damaged. Replace speaker with the transformer at the bottom of the chassis.

COMPONENTS AND VALUES

Resistances		Values (ohms)
R1	V1 S.G. pot. divider ..	30,000
R2		
R3	V1 fixed G.B. resistance ..	100
R4	Gain control, variable ..	5,000
R5	V2 grid leak ..	500,000
R6	V2 G.B. resistance ..	600
R7	V2 anode decoupling ..	25,000
R8	V2 anode resistance ..	25,000
R9	V3 aux. grid H.T. feed ..	10,000
R10	V3 G.B. resistance ..	300

Condensers		Values (μF)
C1	Aerial series condensers ..	0.0005
C2		
C3	V1 cathode by-pass ..	1.0
C4	H.F. coupling to L11, L12 ..	0.0001
C5	V1 S.G. by-pass ..	1.0
C6	V2 grid condenser ..	0.00004
C7	V2 anode decoupling, electrolytic ..	4.0
C8	V2 cathode by-pass ..	0.1
C9	L.F. coupling to T1 ..	0.1
C10	V2 anode H.F. by-pass ..	0.001
C11	V3 aux. grid by-pass ..	1.0
C12	V3 cathode by-pass, electrolytic ..	15.0
C13	Coupling to ext. speaker ..	1.0
C14	Tone control condenser ..	0.01
C15	H.T. smoothing, electrolytics ..	1.0
C16		
C17	Mains aerial condenser ..	0.005
C18	Band-pass pri. tuning ..	0.0005
C19	Band-pass pri. trimmer, pre-set ..	—
C20	Band-pass sec. tuning ..	0.0005
C21	Band-pass sec. trimmer, pre-set ..	—
C22	H.F. tuning ..	0.0005
C23	H.F. trimmer, pre-set ..	—
C24	Reaction condenser, variable ..	0.0005

(Continued overleaf)



The circuit of the Lissen Model 8093 A.C. receiver. Note that the M.W. coils are iron-cored. The dotted enclosures indicate the screening cans. L19 is the speaker field, and L16 is the smoothing choke. C24 is the reaction condenser, and is combined with R4 to form a dual volume and reaction control. Note the three fuses, F1, F2, F3.

LISSEN MODEL 8093 (A.C.)
(continued)

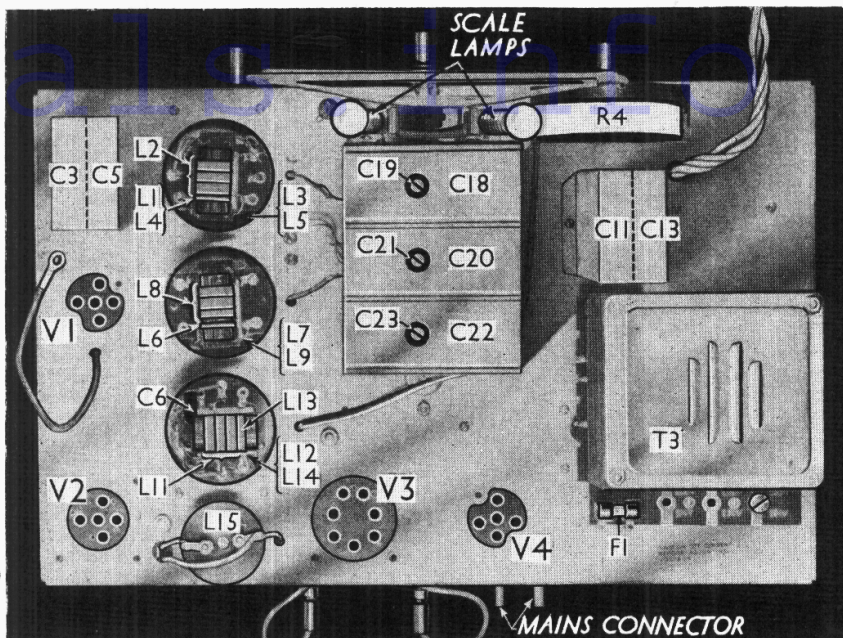
Other Components		Values (ohms)
L1	M.W. aerial coupling coil	1.0
L2	Band-pass primary coils	2.0
L3		20.0
L4		
L5	Band-pass link coupling coils	Very low
L6		
L7		
L8	Band-pass secondary coils	2.0
L9		20.0
L10	V1 anode H.F. choke	45.0
L11	Tuned-grid H.F. coils	2.0
L12		20.0
L13		0.6
L14	Reaction coils	1.0
L15		1.0
L16	V2 anode H.F. choke	45.0
L17	H.T. smoothing choke	400
L18	Speaker speech coil	2.0
L19	Hum neutralising coil	0.1
	Speaker field winding	10,000
T1	Intervalve trans.	Pri. 1,200
		Sec. 7,500
T2	Speaker input trans.	Pri. 730.0
		Sec. 0.5
	Mains trans.	Pri. total 30.0
		Heater sec. 0.1
		Rect. fil. sec. 0.2
		H.T. sec. 300.0
S1-S6	Waveband switches, gauged	
S7	Mains switch	
F1	H.T. circuit fuse	
F2-F3	T3 primary fuses	

VALVE ANALYSIS

The voltage and current readings given in the table below were obtained from an average chassis working with no aerial or earth connected, and with the gain control set at maximum (about half a turn of the combined volume and reaction control). All voltages were measured on the 1,200 V scale of an Avometer with the chassis as negative.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 AC, SGV	250	6.0	75	0.5
V2 AC, HL	70	4.0	—	—
V3 AC, Pen	230	32.0	190	5.5
V4 UU41	280*	—	—	—

* Each anode, A.C.



Plan view of the chassis. The coil screens have been removed. L3, L5 are below L1, L2, L4; L7, L9 below L6, L8, and L12, L14 below L11, L13. C6 is a small fixed condenser. R4 and C24 (not seen) form the dual volume-reaction control.

GENERAL NOTES

Coils.—The tuning coils are in three units, with screw-on screens. These screens have been removed in our plan chassis view. The M.W. coils in each case are iron cored, while the L.W. sections (indicated by arrows, but not seen in our chassis view) are air cored, and situated horizontally beneath the paxolin baseplates of the M.W. coils. Note that the third unit, L11, L12, L13, L14, contains also a small fixed condenser C6, covered by a piece of green sleeving.

Switches.—There are six waveband switches, S1-S6, in one assembly, and these are indicated in the under-chassis

view. The remaining switch, S7, is a Q.M.B. mains switch, also shown in the under-chassis view, and operated by a striker on the wave-change switch spindle. There is no radio-gram switch. The table below shows the open and closed positions of the waveband switches.

Switch	Off	M.W.	L.W.
S1	Closed	Closed	Open
S2	Closed	Closed	Open
S3	Closed	Closed	Open
S4	Closed	Closed	Open
S5	Open	Open	Closed
S6	Closed	Closed	Open

Scale Lamps.—These are Lissen M.E.S. types, rated at 6.2 V, 0.3 A.

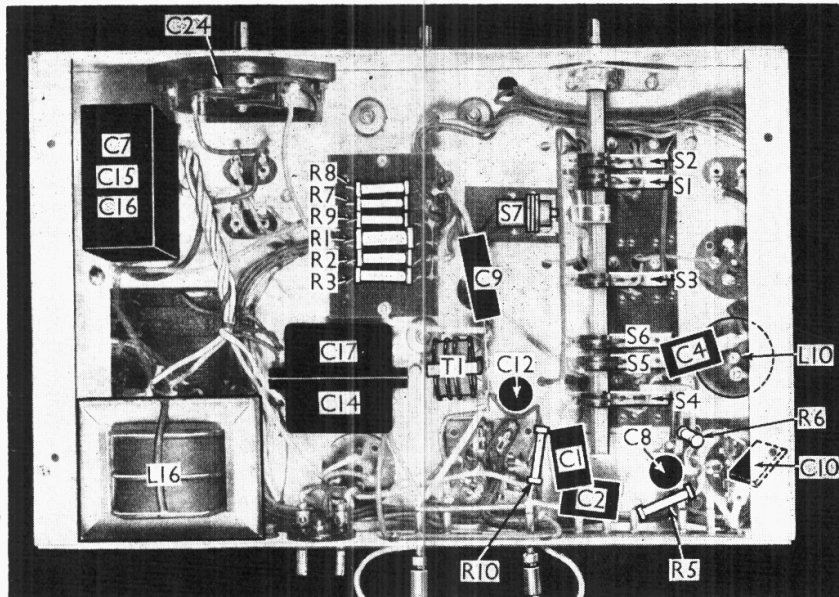
Volume Control.—This is a dual component, incorporating the variable bias resistance R4 and the reaction condenser C24. It is arranged so that the moving plates of C24 do not begin to mesh with the fixed plates until R4 is practically at its maximum.

Fuses.—There are three of these. F1 is a 250 mA H.T. fuse mounted on the voltage adjustment panel of T3, while F2 and F3 are 0.5 A types incorporated in the special mains plug.

Condensers C3, C5; C11, C13.—These are two double units, mounted on top of the chassis. The positions of the individual condensers are indicated in our plan chassis view. The connecting tags are beneath the chassis.

Condensers C7, C15, C16.—These are three 4 μF dry electrolytics with a common (black) negative lead. The two red leads are the positives of C15 and C16, while the blue lead is the positive of C7.

Condenser C12.—This is a small 15 μF electrolytic. The chassis mounting bolt is the negative connection, while the positive is a double tag.



Under-chassis view. The switches are clearly numbered.