

NUMBER NINETY - FIVE

'TRADER' SERVICE SHEETS

HALCYON 3401

3-VALVE (PLUS RECTIFIER) A.C./D.C. RECEIVER

THE Halcyon 3401 receiver incorporates a 3-valve (plus rectifier) A.C./D.C. chassis suitable for use on mains of 190-260 V (40-100 c.p.s. in the case of A.C.), adjustment for various mains voltages being made by means of a tapped resistance. The circuit consists of a variable-mu pentode H.F. amplifier, a pentode detector and a pentode output valve.

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1**, M.W. coupling coil **L2**, and L.W. choke coil **L1** to single tuned circuit **L3**, **L4**, **C16** which precedes variable-mu pentode H.F. amplifier (**V1**, Mullard metallised **VP13C**). Gain control by variable cathode resistance **R3** which varies G.B. applied and also forms aerial-earth shunt.

Tuned-secondary transformer coupling by **L5**, **L6**, **L8**, **L9** and **C19** to H.F. pentode detector (**V2**, Mullard metallised **SP13C**) operating on grid leak system with **C5** and **R4**. Reaction is applied from anode by coil **L7** and controlled by variable condenser **C18**. H.F. by-passing by condenser **C8**. No provision for connection of gramophone pick-up.

Resistance-capacity coupling by **R7**, **C9** and **R8** to output pentode (**V3**, Mullard **Pen36C**). Tone correction by fixed condenser **C11** in anode circuit. Provision for connection of low-impedance external speaker across secondary of internal speaker transformer **T1**. Switch device **S5** cuts internal speaker speech coil out of circuit.

When the receiver is used with A.C. mains, H.T. current is supplied by a half-wave rectifying valve (**V4**, Mullard **UR1C**), which, with D.C. supplies, behaves as a resistance of low value. Smoothing by section of speaker field coil **L12** and dry electrolytic condensers **C13**, **C14**.

Heaters of valve are connected in series, together with tapped ballast resistance **R12**, across mains input circuit. Choke coils **L13** and **L14** are coupled, and form a filter for the suppression of mains-borne interference.

COMPONENTS AND VALUES

Resistances		Values (ohms)
R1	V1 S.G. H.T. feed	50,000
R2	V1 fixed G.B. resistance	300
R3	V1 gain control	50,000
R4	V2 grid leak	1,000,000
R5	V2 S.G. H.T. feed	500,000
R6	V2 anode decoupling	50,000
R7	V2 anode load	100,000
R8	V3 grid resistance	500,000
R9	V3 aux. grid H.T. feed	5,000
R10	V3 G.B. resistance	150
R11	Scale lamp shunt	15
R12	Heater circuit ballast, total	825

Condensers		Values (μF)
C1	Aerial series condenser	0.0003
C2	Earth blocking condenser	0.1
C3	V1 S.G. by-pass	0.5
C4	V1 cathode by-pass	0.1
C5	V2 grid condenser	0.0001
C6	V2 S.G. by-pass	0.1
C7	V2 anode decoupling	0.5
C8	V2 anode H.F. by-pass	0.001
C9	L.F. coupling to V3	0.1
C10*	V3 aux. grid by-pass	2.0
C11	Tone corrector	0.0005
C12*	V3 cathode by-pass	50.0
C13*	H.T. smoothing	8.0
C14*		30.0
C15	V4 anode-cathode by-pass	0.05
C16†	Aerial circuit tuning	0.0005
C17†	Aerial circuit trimmer	—
C18†	Reaction control	0.0005
C19†	H.F. trans. sec. tuning	0.0005
C20*	H.F. trans. sec. trimmer	—

* Electrolytic. † Variable. ‡ Pre-set.

Other Components		Approx. Values (ohms)
L1	Aerial choke coil (L.W.)	23.0
L2	Aerial coupling coil (M.W.)	1.75
L3	Aerial tuning coils	3.2
L4		32.8
L5	H.F. transformer primary	3.25
L6		12.75
L7	Reaction coil	7.75
L8	H.F. transformer secondary	3.0
L9		30.0
L10	Speaker speech coil	2.5
L11	Hum neutralising coil	0.1
L12	Speaker field coil, total	10,325.0
L13	Mains circuit filter chokes	4.5
L14		4.5
T1	Speaker input trans.	350.0
S1-S4	Waveband switches	—
S5	Int. speaker switch	—
S6	Mains switch	—
F1, F2	Mains circuit fuses, 500 mA	—

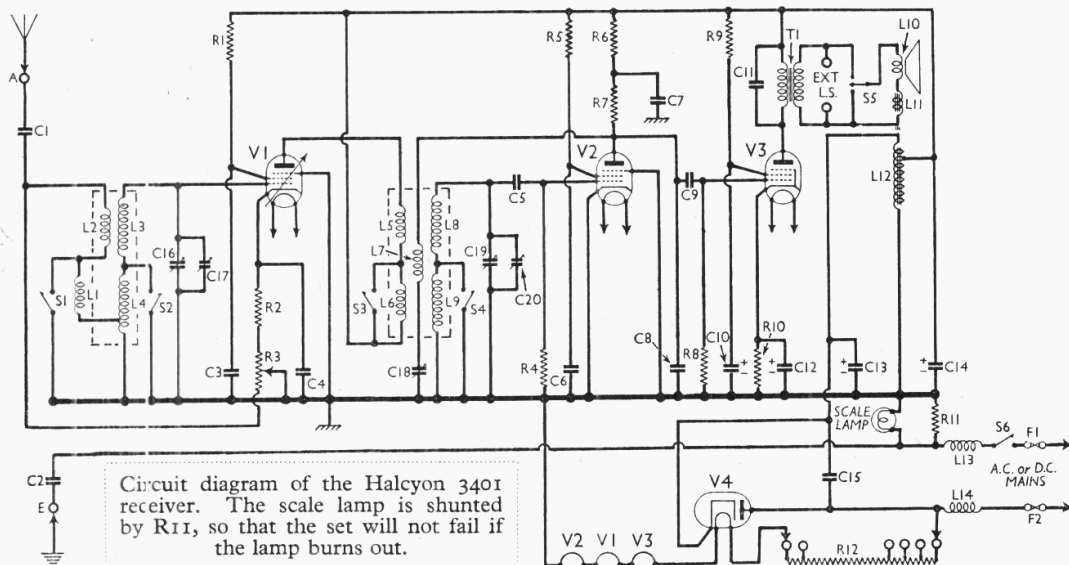
DISMANTLING THE SET

Removing Chassis.—To remove the chassis from the cabinet, first remove the three control knobs (recessed grub screws) and the four bolts (with washers) holding the chassis to the bottom of the cabinet. The chassis can now be withdrawn to the extent of the speaker leads, which should be sufficient for normal purposes.

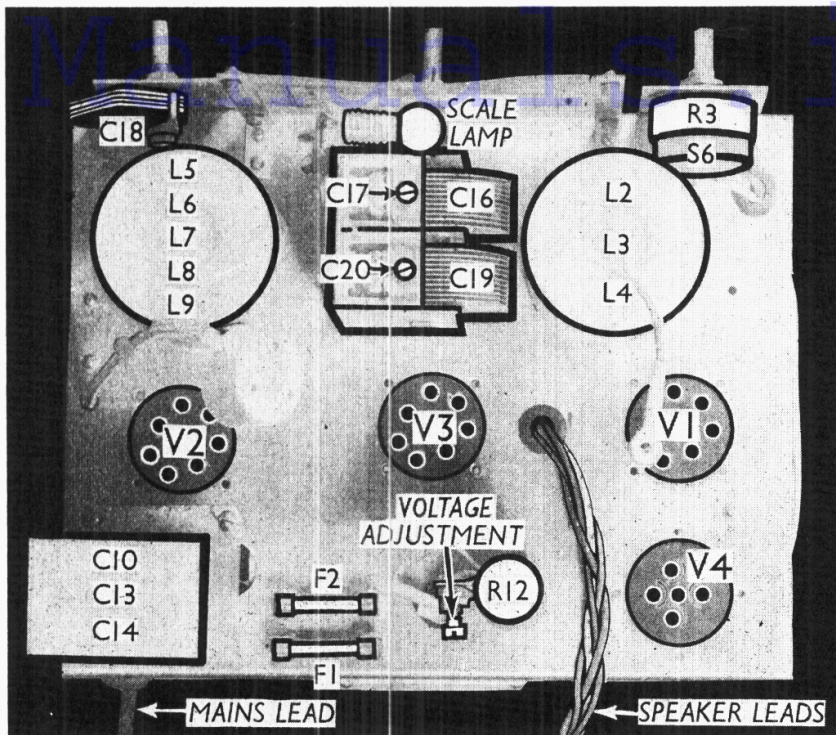
To free the chassis entirely, unsolder the leads to the speaker. *When replacing*, connect the leads as follow:—Left-hand panel, top tag, yellow/black; bottom tag, blue/yellow. Right-hand panel, top tag, brown; bottom tag, red.

Removing Speaker.—To remove the speaker from the cabinet, unsolder the speaker leads and remove the nuts and lock washers from the three screws holding the speaker to the sub-baffle. There are actually six screws in three pairs, and those concerned are the "clockwise" ones of each pair. The others secure the protective grille for the diaphragm.

When replacing, see that the transformer is on the left and connect the leads as above.



Circuit diagram of the Halcyon 3401 receiver. The scale lamp is shunted by R11, so that the set will not fail if the lamp burns out.



Plan view of the chassis. Two fuses are fitted, and the voltage adjustment consists of tappings on R12.

VALVE ANALYSIS

Valve voltages and currents given in the table (col. 3) were measured with the receiver operating on A.C. mains of 230 V and with the adjustment set to that voltage. The volume control

was at maximum but the reaction control was at minimum, and there was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, using the chassis as negative.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 VP13C	200	4.4	110	1.6
V2 SP13C...	40	0.9	50	0.3
V3 Pen30C	190	33.0	160	8.0
V4 UR1C...	235†	—	—	—

† Cathode to chassis, D.C.

GENERAL NOTES

Switches.—S1-S4 are the waveband switches, ganged in a single rotary unit, which is mounted horizontally beneath the chassis, and operated by a lever projecting through the front of the chassis. The switches are indicated in our under-chassis view, and are all closed on the M.W. band and open on the L.W. band.

S5 is shown in the circuit diagram as a single pole change-over switch for cutting out the speech coil of the internal speaker when an external speaker is in use. Actually, it consists of a sliding link device mounted on the internal speaker terminal strip. When the link is between the centre and upper screws, the internal speaker is disconnected.

S6 is the Q.M.B. mains switch, ganged with the gain control R3.

Coils.—L2-L4 and L5-L9 are in two screened units on the chassis deck. L1 is beneath the chassis, and is mounted below the L2-L4 unit. The coil is in two sections. L13 and L14, also beneath the chassis, are the two mains filter chokes.

Scale Lamp.—The lamp in our set is merely marked "3.5 V." Actually its consumption is 0.15 A, and it is of the M.E.S. type. Since it is shunted by R11, failure of the lamp will not break the heater circuit, and therefore the set will continue to operate.

Fuses F1, F2.—These are standard 1½ in. glass tubular types, rated at 500 mA.

External Speaker.

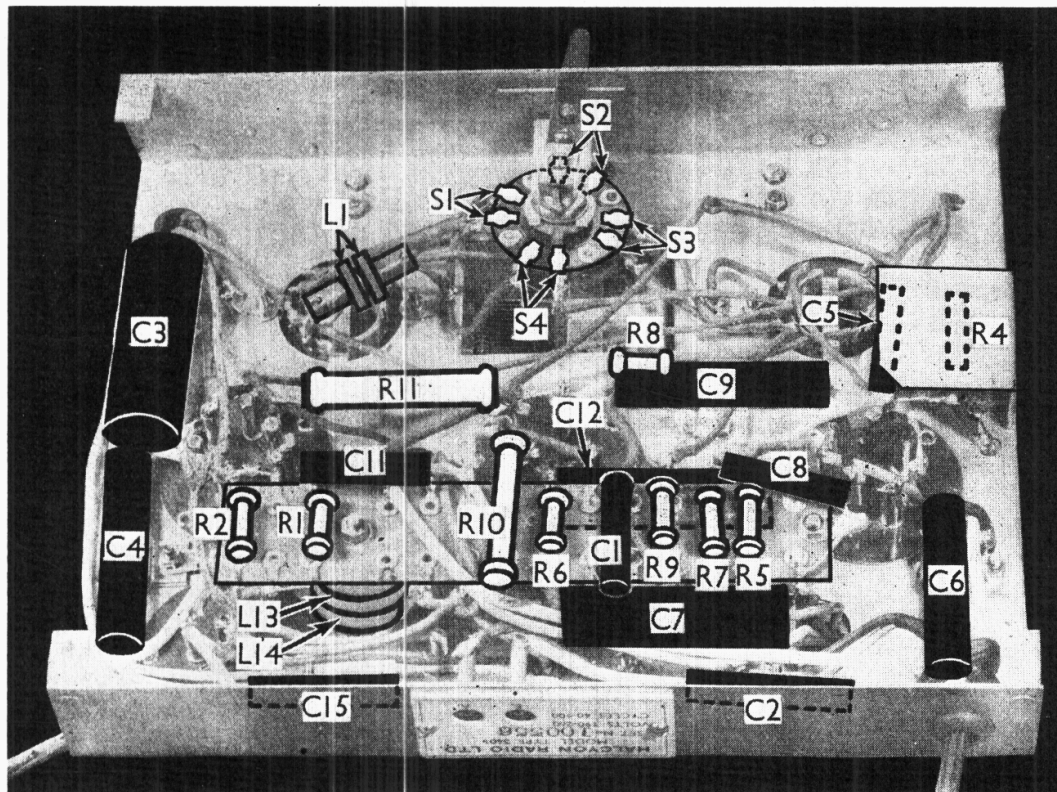
—This should be of the low resistance type (2-3 Ω), and should be connected to the two outer screws of the link device on the internal speaker transformer. (See also "Switches.")

Resistance R12.

—This ballast resistance is tapped at each end for mains voltage adjustment in 10 V steps.

Condensers C10, C13, C14.

—There are three dry electrolytics in a single rectangular metal case. The black lead is the common negative, the blue the positive of C10 (2 μF), the yellow the positive of C13 (8 μF) and the red the positive of C14 (30 μF).



Under-chassis view. The switches are clearly marked.