

NUMBER EIGHTY-FIVE

'TRADER' SERVICE SHEETS

ULTRA 66

A.C. TABLE AND CONSOLE MODELS

THE Ultra 66 chassis employs a variable-mu pentode H.F. amplifier, a pentode detector and a pentode output valve, a feature of the circuit being a Droitwich wave-trap which can be brought into use by means of a second aerial socket. Sockets are fitted for an extension speaker and are arranged so that it can be used independently of, or simultaneously with, the built-in speaker.

Both table and console versions of the receiver are made, the standard models being for A.C. mains of 200-250 V, 40-100 c.p.s. Special models are made for supplies of 100-130 V and 25 c.p.s.

CIRCUIT DESCRIPTION

Two alternative aerial connections, **A1** direct, and **A2** via Droitwich filter **L1**, **C11** and series condenser **C1** to coupling coils **L2**, **L3**. Single-tuned circuit **L4**, **L5**, **C12** precedes variable-mu pentode H.F. amplifier (**V1**, **Mazda metallised AC/VP1**). Gain control by variable cathode resistance **R3** which varies G.B. applied.

Choke-fed tuned-grid coupling by **L6**, **C3**, **L7**, **L8** and **C14** to H.F. pentode detector (**V2**, **Mazda metallised AC/S2/Pen**)

operating on anode bend system with G.B. resistance **R4** in cathode circuit. No reaction. No provision for gramophone pick-up. H.F. by-passing by condenser **C5**.

Resistance-capacity coupling by **R5**, **C6** and **R7** to output pentode (**V3**, **Mazda AC/2/Pen**). Tone correction in anode circuit by fixed condenser **C7**. Provision for connection of low-impedance external speaker across secondary of internal speaker transformer **T1**. Plug and socket device enables speech coil circuit to be broken.

H.T. current is supplied by an I.H.C. full-wave rectifying valve (**V4**, **Mazda UU3**). Smoothing by speaker field winding **L11** and electrolytic condensers **C9**, **C10**.

DISMANTLING THE SET

Removing Chassis.—To remove the chassis from the cabinet, detach the back (eight countersunk-head wood screws), the three control knobs (recessed grub screws) and the three chassis fixing bolts (with washers), the heads of which are underneath the cabinet. The chassis can now be withdrawn to the extent of

the speaker leads, which is enough for normal purposes. *When replacing*, see that the control knob marked with red and green spots is fitted to the wave-change switch.

To free the chassis entirely, remove the speaker (see below) and unsolder the leads to it. *When replacing*, connect the leads as follow, numbering the tags from right to left with the speaker lying on the bench (input transformer in front):—1, red; 2, blank; 3, yellow; 4, blank; 5, black/white. The blue lead should be connected to the tag on the frame of the speaker.

Removing Speaker.—If it is necessary to remove the speaker, remove the nuts and washers from the four bolts holding it to the sub-baffle. *The speaker should be replaced* with the transformer on the right.

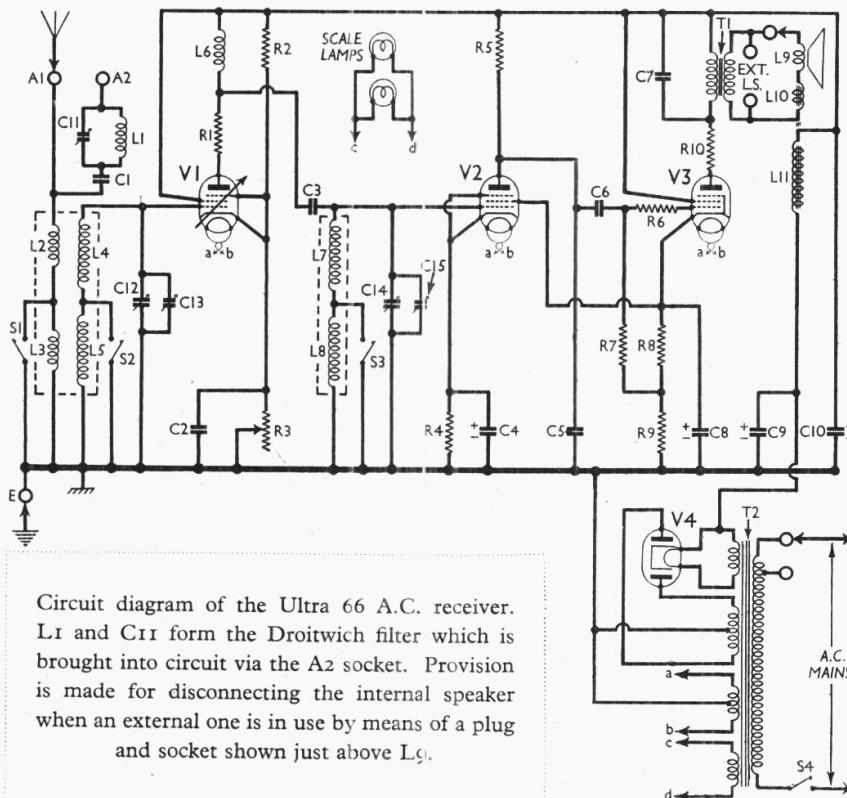
COMPONENTS AND VALUES

Resistances		Values (ohms)
R1	V1 anode circuit stabiliser ..	50
R2	Part of gain cont. circuit ..	50,000
R3	V1 gain control ..	10,000
R4	V2 G.B. resistance ..	15,000
R5	V2 anode load ..	500,000
R6	V3 grid H.F. stopper ..	50,000
R7	V3 anode load ..	1,000,000
R8	V3 G.B. and V2 S.G. voltage resistances ..	138
R9		138
R10	V3 anode circuit stabiliser ..	60

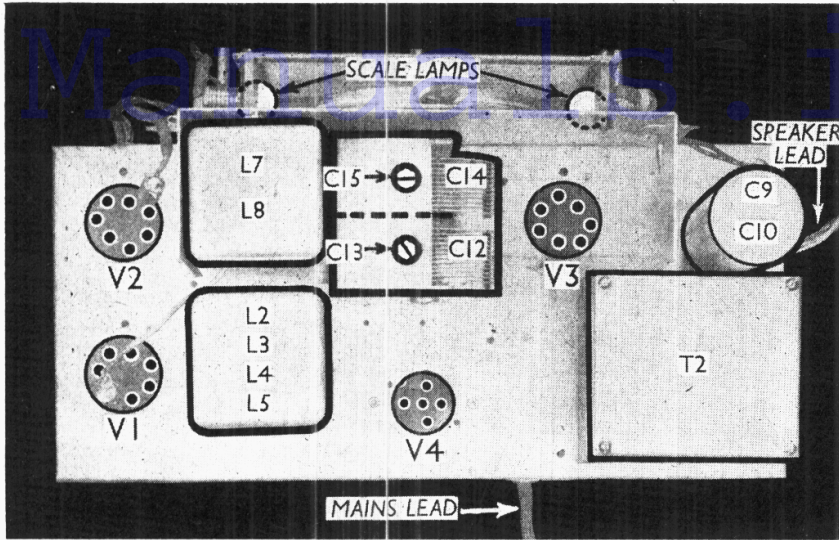
Condensers		Values (μF)
C1	Aerial series condenser ..	0.00001
C2	V1 cathode by-pass ..	0.1
C3	H.F. coupling to L7, L8 ..	0.00001
C4*	V2 cathode by-pass ..	10.0
C5	V2 anode H.F. by-pass ..	0.0002
C6	L.F. coupling to V3 ..	0.01
C7	Tone corrector ..	0.01
C8*	V3 cathode by-pass ..	50.0
C9*	H.T. smoothing ..	8.0
C10*		16.0
C11†	Droitwich filter tuning ..	—
C12†	Aerial circuit tuning ..	—
C13‡	Aerial circuit trimmer ..	—
C14‡	H.F. circuit tuning ..	—
C15‡	H.F. circuit trimmer ..	—

* Electrolytic † Variable ‡ Pre-set.

Other Components		Values (ohms)
L1	Droitwich filter coil ..	11.3
L2	Aerial coupling coils ..	14.7
L3		73.3
L4		4.2
L5	Aerial tuning coils ..	12.0
L6	V1 anode H.F. choke ..	500.0
L7	H.F. tuning coils ..	4.2
L8		12.0
L9	Speaker speech coil ..	3.6
L10	Hum neutralising coil ..	0.15
L11	Speaker field coil ..	1,500.0
T1	Speaker input trans. { Pri. ..	330.0
		Sec. ..
	Pri. total ..	31.0
	Heater sec. ..	0.05
	Lamp sec. ..	0.2
	Rect. heat. sec. ..	0.1
	H.T. sec. ..	820.0
Sr-S3	Waveband switches ..	—
S4	Mains switch, ganged R3 ..	—



Circuit diagram of the Ultra 66 A.C. receiver. L1 and C11 form the Droitwich filter which is brought into circuit via the A2 socket. Provision is made for disconnecting the internal speaker when an external one is in use by means of a plug and socket shown just above L9.



Plan view of the chassis. C9 and C10 are two electrolytic condensers in a single tubular metal container.

VALVE ANALYSIS

Valve voltages and currents given in the table below were measured with the receiver operating on mains of 225 V, using the 230-250 V tapping. There was no signal input and the volume control was at maximum. Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 AC/VP1	270	16.0	280	5.0
V2 AC/S2Pen	75	Very low	11	Very low
V3 AC/2Pen	260	35.0	275	7.3
V4 UU3	360*	—	—	—

* Each anode, A.C.

GENERAL NOTES

Switches.—S1-S3 are the wave-change switches, ganged in a single unit, and shown in our under-chassis view. They are all *closed* on the M.W. band and *open* on the L.W. band. The switch unit has a third position, clockwise from "L.W.," but this is not used.

S4 is the Q.M.B. mains switch, ganged with the volume control, R3.

Coils.—With the exception of L1 and L6, all the coils are in two screened units on the chassis deck. L1 is unscreened, and is secured to the back-plate of the chassis. L6 is also beneath the chassis. They are marked in our under-chassis view.

Scale Lamps.—There are two of these, both being Osram M.E.S. types rated at 4.5 V, 0.3 A.

External Speaker.—Two sockets are

provided for this on a paxolin panel attached to the internal speaker. It should be of the low resistance type (about 4-5 Ω), and Ultra type 30 (chassis) or type 45 (cabinet) models are recommended. By withdrawing the plug from the socket to one side of the external speaker sockets, the internal speaker speech coil is disconnected.

Condensers C9, C10.—These are two electrolytics in a tubular metal unit on the chassis deck. Three leads emerge from the insulating fixing bush beneath the chassis. The black lead is the common negative, the yellow lead the positive of C9 (8μF) and the red lead the positive of C10 (16μF).

Resistances R8, R9.—These are really formed of a single wire wound resistance on a tubular former, which is centre tapped.

Condensers C1, C3.—These are two small flat cylindrical condensers, each having a capacity of 10 μF.

CIRCUIT ALIGNMENT

If no signal generator is available, first set gang condenser to maximum and adjust pointer to cover the two vertical marks on scale. Now tune in a weak signal at about 250 m. Adjust C15 for best volume, reducing volume control if necessary to help in obtaining the correct tuning point. Now adjust C13 similarly.

With a signal generator, the same procedure is adopted, except that the oscillator is used to provide a weak 250 m. signal.

NOTE.—On some sets a mark appears to the left of the top vertical line on the scale. Where this is present the pointer should be adjusted to this mark initially.

C11 is the Droitwich filter trimmer, and adjustment may be carried out by connecting the aerial to the A2 socket, tuning the set to Droitwich, and adjusting C11 for *minimum* volume. To receive Droitwich at its best strength, use aerial socket A1.

Under-chassis view. Note the two small fixed condensers C1 and C3. The three wave-change switches are clearly indicated. R8 and R9 are formed of a single centre-tapped wire wound resistance.

