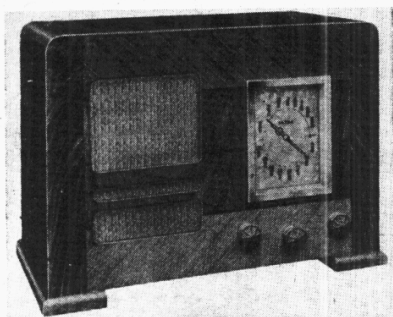


"TRADER" SERVICE SHEET

587

ULTRA 55

(Serial Nos. above Y3000)



THIS Service Sheet deals only with Ultra 55 receivers bearing a serial number higher than Y3000. An earlier version, bearing serial numbers between Y1000 and Y3000, was produced, but it was entirely different in many ways from the later model. The serial number of our chassis was Y7880.

The receiver is a 2-valve, 2-band, TRF model designed for AC or DC mains of 200-250 V, but in the first valve, the two sections are used independently as a variable-mu RF pentode and a triode respectively. A barretter is employed in the heater circuit, and no voltage adjustment is necessary.

Release date : 1935.

CIRCUIT DESCRIPTION

Two alternative aerial input sockets, **A1, A2**, are provided. Input from socket **A2** is via coupling coils **L1, L2** to single tuned circuit **L3** (MW) plus **L4** (LW) and **C16**, which precede pentode section of triode-pentode valve (**V1, Mazda metalised TP2620**).

In this receiver the two sections of **V1** are independent. The pentode section operates as a variable-mu RF pentode, its output being choke-capacity coupled via **L5, C6** to the triode section, which operates as an anode bend detector. The control grid of the triode section is tuned by **L6** (MW) plus **L7** (LW) and **C19**, and reaction is applied from the anode via **C7** and the coil **L8**.

Gain control is obtained from a variable potentiometer **R2** in the cathode circuit, the slider being returned to the pentode control grid, so that the GB can be varied. **R1** limits the minimum GB value for the pentode section and provides GB for the triode section. It should be observed that, although the DC paths of the tuned circuits return to their bias points in the usual manner, the return paths to chassis are made to **V1** cathode, and then via **C5** to chassis.

Transformer coupling by **T1** between **V1** triode and pentode output valve (**V2, Mazda Pen 3520**). Fixed tone correction by **C11** in anode circuit. Provision for connection of low impedance external speaker, and, by means of a plug and socket device, for muting the internal speaker.

Again, it should be noted, the associated circuits are returned to chassis via **V1** cathode and **C5**. The total HT current flowing through **V1** and **V2**, therefore, flows also through **R1** and **R2, R3**.

When the receiver is operating from AC mains, HT current is supplied by IHC half-wave rectifying valve (**V3, Mazda U4020**) which, with DC mains, behaves as a low resistance. Smoothing is effected by an iron-cored choke **L12** and dry electrolytic condensers **C13, C14**. The speaker

field coil **L11** is connected directly across the output of the rectifier **V3**.

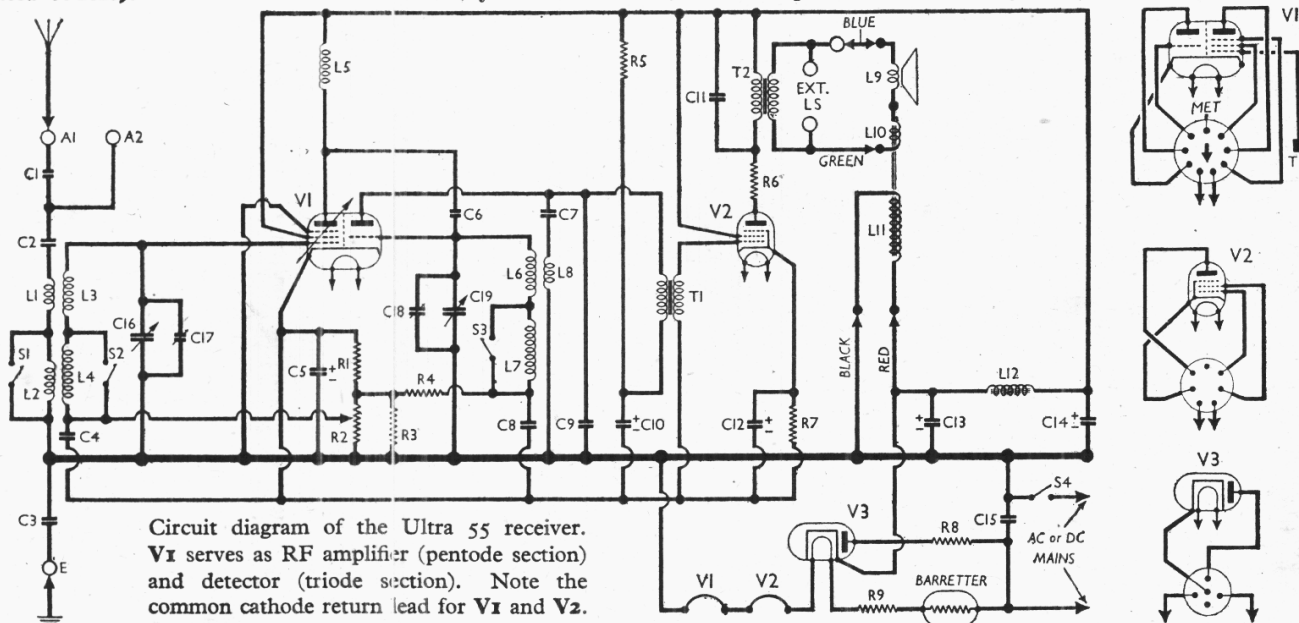
Valve heaters, together with ballast resistance **R9** and current regulating barretter (**Philips C1**), are connected in series across the mains input circuit. Mains RF filtering by **C15**.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 pentode fixed GB ...	80
R2	V1 pentode gain control ...	10,000
R3	and shunt ...	330
R4	V1 triode CG decoupling ...	150,000
R5	V1 triode anode HT feed ...	40,000
R6	V2 anode stopper ...	60
R7	V2 GB resistance ...	110
R8	V3 anode current limiter ...	50
R9	Part heater circuit ballast	150

CONDENSERS		Values (μF)
C1	A1 series condenser ...	0.00002
C2	Aerial isolating condenser	0.004
C3	Earth isolating condenser	0.1
C4	V1 pent. CG decoupling	0.5
C5*	V1 cathode by-pass ...	20.0
C6	RF coupling to V1 triode	0.00001
C7	Reaction coupling ...	0.0001
C8	V1 triode CG decoupling	0.1
C9	RF by-pass ...	0.0003
C10*	V1 triode anode decoupling ...	2.0
C11	Fixed tone corrector ...	0.01
C12*	V2 cathode by-pass ...	50.0
C13*	HT smoothing condenser ...	8.0
C14*	HT smoothing condenser ...	16.0
C15	Mains RF by-pass ...	0.1
C16†	Aerial circuit tuning ...	—
C17†	Aerial MW trimmer ...	—
C18†	RF MW trimmer ...	—
C19†	RF circuit tuning ...	—

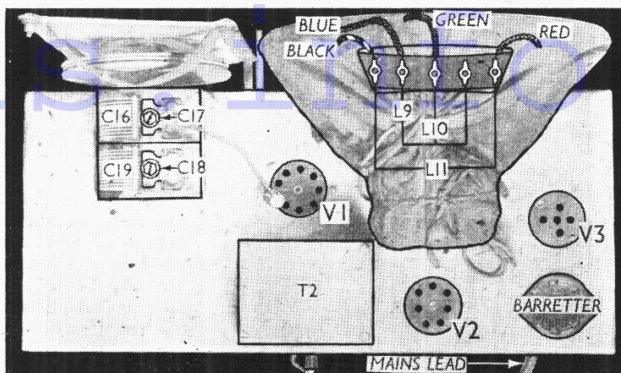
* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Ultra 55 receiver. **V1** serves as RF amplifier (pentode section) and detector (triode section). Note the common cathode return lead for **V1** and **V2**.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial coupling coils ...	1-5
L2		48-5
L3		4-7
L4	Aerial MW tuning ...	11-3
L5	V1 pent. anode choke ...	500-0
L6	RF MW tuning coil ...	4-7
L7	RF LW tuning coil ...	11-3
L8	Reaction coil ...	1-0
L9	Speaker speech coil ...	4-7
L10	Hum neutralising coil ...	0-2
L11	Speaker field coil ...	9,000-0
L12	HT smoothing choke ...	500-0
T1	Intervalve { Pri. ...	230-0
	trans. { Sec. ...	2,500-0
T2	Output { Pri. ...	400-0
	trans. { Sec. ...	0-35
S1-S3	Waveband switches	—
S4	Mains switch, ganged R2	—

Plan view of the chassis. The speaker connections are indicated, and they are colour coded to agree with the connecting points in the circuit diagram overleaf.



DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (recessed grub screws); remove the four cheese-head screws (with large metal washers) holding the chassis to the bottom of the cabinet.

The chassis may now be withdrawn complete with the speaker.

When replacing, do not omit to replace the cardboard sub-baffle before inserting the chassis.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our chassis when the receiver was operating on AC mains of 235 V. The receiver was tuned to the lowest wavelength on the MW band, and the volume control was advanced, but there was no signal input. Voltages were measured on the 400 V scale of a model 7 Avometer, chassis being negative.

As the valves in our chassis were not new, currents in particular may vary considerably in other chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TP2620	{ 190 Triode section	{ 3-7 0-4	194	2-4
V2 Pen3520	170	42-0	194	8-2
V3 U4020	225	—	—	—

† Cathode to chassis, DC.

GENERAL NOTES

Switches.—S1-S3 are the waveband switches, in three separate ganged units mounted on the coil assembly beneath the chassis. They are indicated in our under-chassis view. All three close on MW and open on LW.

S4 is the QMB mains switch, ganged with the gain control R2.

External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (about 6-8 Ω) external speaker. A further socket, on the extreme right, when viewed from the rear, and a plug on a flying lead, permit the internal speaker to be muted if desired.

Speaker Connections.—A row of tags on a fibre panel provides the junctions between the internal and external connections of the speaker. These leads are indicated, with their code colours, in our plan view, but the colours in our chassis did not coincide with those given in the makers' manual. Our colours, reading from left to right, were: black (with white tracer); blue (with black tracer); green; blank; red. The makers' coding is: plain black; black with white tracer; green; blank; red with white tracer, respectively.

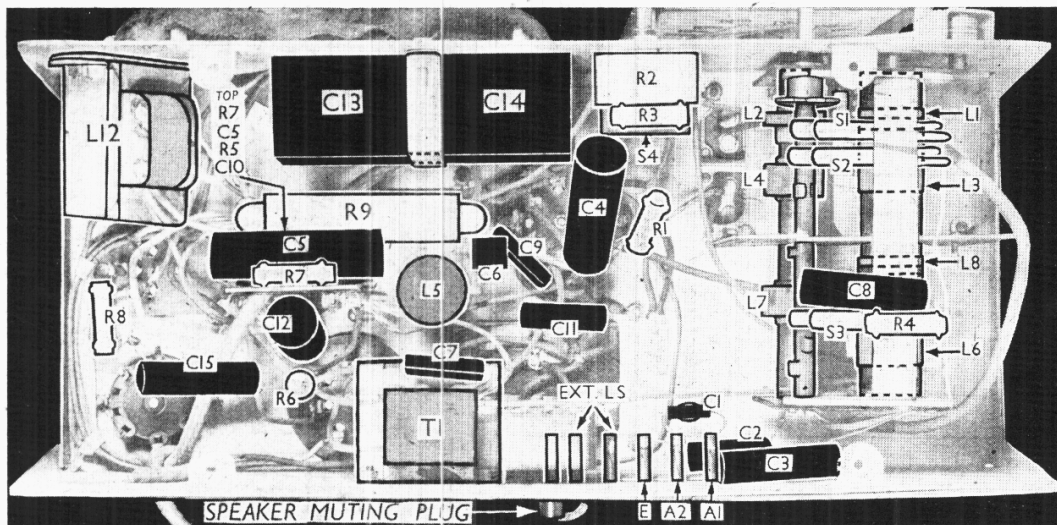
Resistance R9.—This is of the "Cand-ohm" type, wire-wound and enclosed in a metal sheath. Any replacement resistance would need to be able to dissipate 6 watts continuously.

Condensers C13, C14.—These are two Hunts dry electrolytics of the surgeproof type in a single rectangular carton fitted beneath the chassis. They are rated at 450 V working. The red lead is the positive of C14 (16 μF), and the yellow lead the positive of C13 (8 μF); the black lead is the common negative connection.

CIRCUIT ALIGNMENT

With the gang at minimum, the long hand of the pointer should bisect the vacant space on the scale between 550 m and the horizontal line dividing the MW and LW scales. Connect signal generator leads via a suitable dummy aerial to A2 and E sockets, and turn the gain control to maximum.

Switch set to MW, tune to 200 m on scale, feed in a 200 m (1,500 KC/S) signal, and adjust C18 for maximum output. Then adjust C17 for maximum output. Check calibration at several points on both scales. There is no separate LW adjustment.



Under-chassis view. R9 is a metal cased wire-wound resistance. The three waveband switches are indicated on the coil assembly on the right, and the coils are shown beneath them. R7, C5, R5 and C10, reading from top to bottom, are on a small vertical panel just behind R9.