"TRADER" SERVICE SHEET

885

ULTRA U506

HOUSED in a small plastic table cabinet, the Ultra U506 is a 4-valve (plus rectifier) 2-band receiver designed for A.C. or D.C. mains of 200-250 V, 40-100 c/s in the case of A.C. Miniature Mazda valves are used, with B8A bases. Slots in the chassis facilitate removal and replacement of waveband switch and volume control units.

Release date and original price: December 1947, £13 17*s.* 6*d.*, *reduced June* 1948 *to* £13 15*s.* 4*d.* *Purchase tax extra.*

CIRCUIT DESCRIPTION

Input from attached aerial via isolating capacitor **C1** and coupling coils **L2** (M.W.) and **L3** (L.W.) to single-tuned circuits **L4, C25** (M.W.) and **L5, C25** (L.W.). An acceptor circuit **L1, C2** shunts the aerial coupling coils and filters out signals at the intermediate frequency.

First valve **(V1, Mazda 10C1)** is a triode-hexode operating as frequency changer with internal coupling. Triode oscillator grid coils **L6** (M.W.) and **L7** (L.W.) are tuned by **C26.** Parallel trimming by **C27** (M.W.) and **C10, C28** (L.W.); series tracking by **C11** (M.W.) and **C12** (L.W.). Reaction coupling from anode, via **C13,** by coil **L8** on M.W., and by the common impedance of **C12** in grid and anode circuits on L.W.

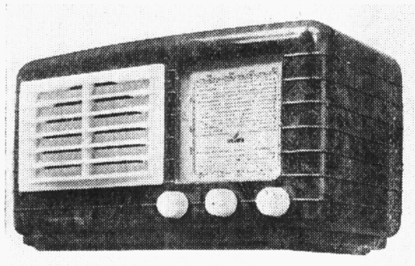
Second valve **(V2, Mazda 10F9)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-transformer couplings **C7, L9, L10, C8** and **C14, L11, L12, C15,** in which the tuning capacitors are fixed and alignment adjustments are carried out by varying the positions of the iron-dust cores.

Intermediate frequency 465 kc/s.

Diode second detector is part of double diode triode valve **(V3, Mazda 10LD11),** one diode of which is unused and wired to cathode. Audio frequency component in rectified output is developed across manual volume control **R6,** which is also the diode load resistor, and passed via A.F. coupling capacitor **C17** and C.G. resistor **R7** to grid of triode section, which operates as A.F. amplifier. I.F. filtering by **C16, R5** in diode circuit.

Resistance-capacitance coupling by **R8, C18, R9** between **V3** triode and beam tetrode output valve **(V4, Mazda 10P13),**

(*Continued col.* 1 *overleaf*)



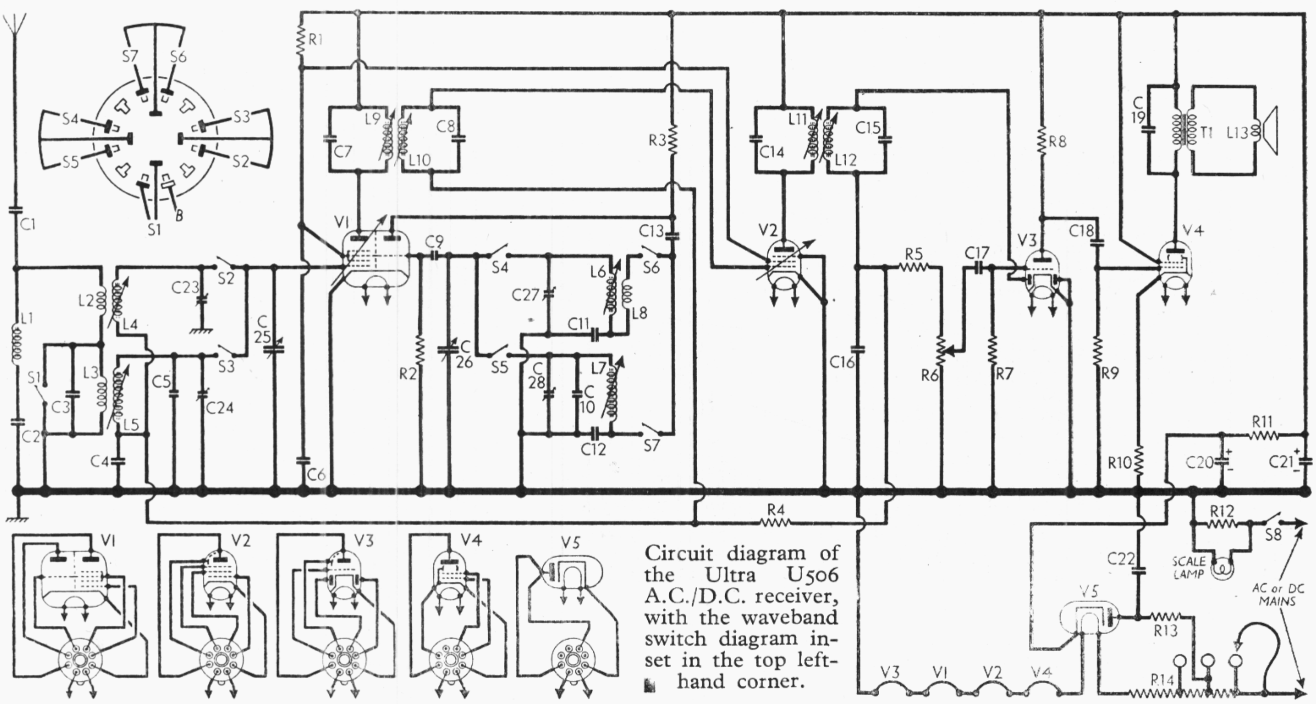
COMPONENTS AND VALUES

RESISTORS		Values (ohms)	Locations
R1	S.G.'s H.T. feed ...	27,000	K5
R2	V1 osc. C.G. ...	22,000	N5
R3	Osc. anode load ...	56,000	M5
R4	A.G.C. decoup. ...	1,000,000	L4
R5	I.F. stopper ...	100,000	K4
R6	Volume control ...	1,000,000	K3
R7	V3 triode C.G. ...	4,700,000	H4
R8	V3 triode load ...	100,000	H5
R9	V4 C.G. resistor ...	330,000	H5
R10	V4 G.B. resistor ...	270	G4
R11	H.T. smoothing ...	1,200	D2
R12	Scale lamp shunt ...	33	J4
R13	V5 surge limiter ...	100	F4
R14	Heater ballast ...	980†	E2

† Tapped at 700Ω + 200Ω + 80Ω from V5 heater.

CAPACITORS		Values (μF)	Locations
C1	Aerial isolator ...	0·005	A2
C2	I.F. filter tune ...	0·0001	A2
C3	Aerial L.W. shunt	0·0001	M4
C4	A.G.C. decoupling	0·05	M5
C5	Aerial L.W. trim. ...	0·00003	M4
C6	S.G.'s decoupling ...	0·05	K4
C7	1st I.F. transformer	0·0001	B2
C8	tuning	0·0001	B2
C9	V1 osc. C.G. ...	0·000075	N4
C10	Osc. L.W. trimmer	0·000075	M5
C11	Osc. M.W. tracker	0·00045	L4
C12	Osc. L.W. tracker ...	0·0002	L4
C13	Osc. anode coup. ...	0·0001	N4
C14	2nd I.F. transformer	0.0001	C2
C15	tuning	0·00018	C2
C16	I.F. by-pass ...	0·00027	J4
C17	A.F. coupling capa-	0·01	J4
C18	citors	0·01	H5
C19	Tone corrector ...	0·01	H3
C20*	H.T. smoothing	16·0	C1
C21*	capacitors ...	24·0	C1
C22	Mains R.F. by-pass	0·01	F4
C23‡	Aerial M.W. trim. ...	0·00007	A1
C24‡	Aerial L.W. trim. ...	0·00007	N4
C25†	Aerial tuning ...	0·000394	B1
C26†	Oscillator tuning ...	0·000394	B2
C27‡	Osc. M.W. trim. ...	0·00007	N4
C28‡	Osc. L.W. trim. ...	0·00007	N4

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Ultra U506 A.C./D.C. receiver, with the waveband switch diagram inset in the top left-hand corner.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	I.F. filter coil ...	7·5	A2
L2	Aerial coupling coils	47·0	A1
L3	Aerial coupling coils	175·0	N4
L4	Aerial tuning coils	3·0	A1
L5	Aerial tuning coils	20·0	N4
L6	Oscillator tuning coils	3·5	L4
L7	Oscillator tuning coils	7·5	L5
L8	Osc. M.W. react....	1·75	L4
L9	1st I.F. trans. Pri.	7·0	B2
L10	1st I.F. trans. Sec.	7·0	B2
L11	2nd I.F. trans. Pri.	7·0	C2
L12	2nd I.F. trans. Sec.	6·0	C2
L13	Speech coil ...	3·0	E1
T1	Output trans. Pri.	300·0	H4
	Output trans. Sec.	0·75	H4
S1-S7	W/band switches...	—	N3
S8	Mains sw., g'd R6...	—	K3

Circuit Description—*continued*

and fixed tone correction in tetrode anode circuit by **C19.**

When the receiver is operating from A.C. mains, H.T. current is supplied by half-wave rectifying valve **(V5, Mazda U404),** which behaves as a low resistance with D.C. mains. Smoothing by resistor **R11** and electrolytic capacitors **C20, C21.**

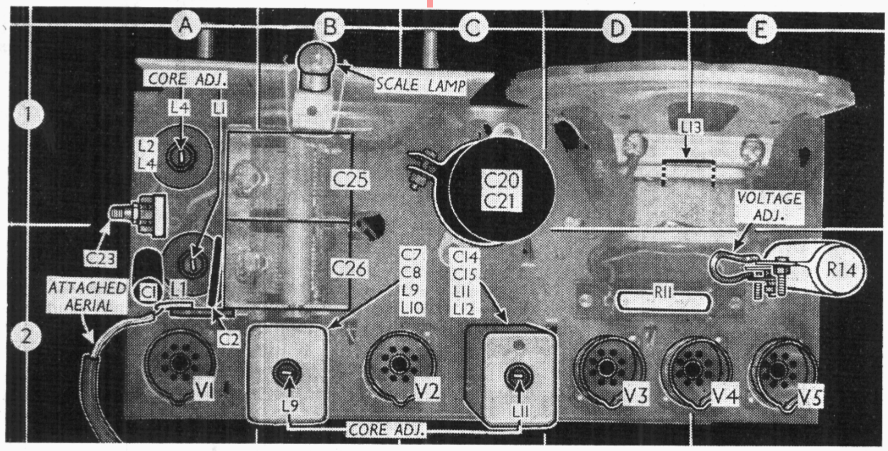
Valve heaters, together with scale lamp and adjustable ballast resistor **R14,** are connected in series across mains input. Mains R.F. filtering by **C22.**

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted by the manufacturers, and represent average "no signal" values to be expected in a receiver operating on A.C. mains of 230 V. Voltages were measured on the 400 V. scale of a model 7 Avometer, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 10C1	186	1·3	50	4·4
	Oscillator			
	49	2·7		
V2 10F9	186	3·0	50	1·0
V3 10LD11	39	1·5	—	—
V4 10P13	179	26·0	186	6·3
V5 U404	†	—	—	—

† Cathode to chassis 244 V, D.C.



Plan view of the chassis, showing the aerial and I.F. transformer primary core adjustments. The attached aerial lead is soldered to a tag mounted on the frame of the gang unit.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (recessed grub screws) and felt washers, from the front of the cabinet.

From the underside of the cabinet remove the four machine screws securing the chassis and slide out the chassis and speaker as a single unit.

When replacing, do not omit to cover the heads of the chassis retaining screws and the control knob grub screws with a suitable insulating compound.

Drive Cord Replacement.—This is very simple. The cord goes round the upper half of the drive drum and makes 2½ turns round the control spindle, still travelling in the same circular direction.

Access to the drum is obtained by removing the pointer (pull-off) and scale panel (slots under waveband switch and volume control fixing nuts) after unclipping scale lamp holder.

GENERAL NOTES

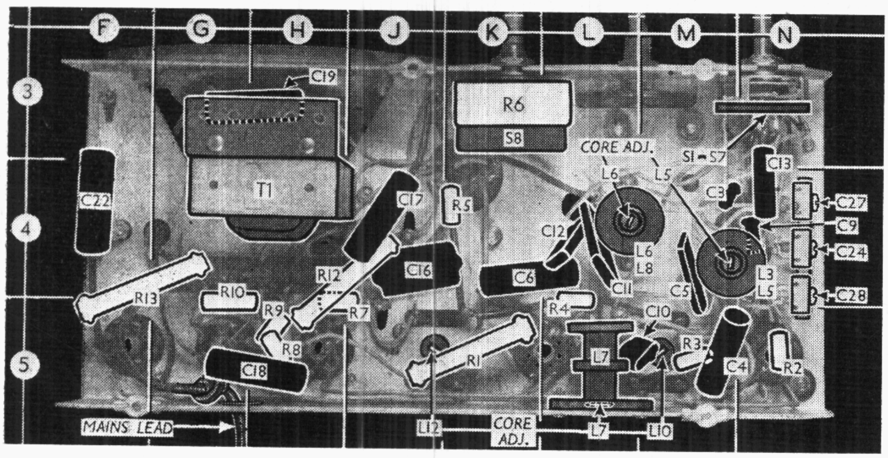
Switches.—**S1-S7** are the waveband switches, ganged in a single two-position rotary unit beneath the chassis. This is indicated in our under-chassis view, and shown in detail in the diagram inset in the top left-hand corner of the circuit diagram overleaf, where it is drawn as seen from the rear of an inverted chassis.

S1, S2, S4 and **S6** close on M.W. (knob anti-clockwise) and open on L.W.; **S3, S5** and **S7** close on L.W. and open on M.W.

Scale Lamp.—This is an Osram M.E.S. type, with a small clear spherical bulb, rated at 3.5 V., 0.15 A. It is shunted by **R12,** and is energised by the combined heater and H.T. currents.

Resistor R11.—This is the H.T. smoothing resistor, in a wire-wound enamelled unit rated at 1,200Ω, 5 W. It is mounted on a small panel on the chassis deck.

Chassis Divergencies.—In some chassis, **C5** may be omitted, and **C3** may be 0.00007μF. Also, **C23, C24, C27** and **C28** may be 0.00005μF.



Under-chassis view. The waveband switch unit S1-S7 is shown in detail in the diagram inset in the circuit diagram overleaf. The oscillator and I.F. transformer secondary core adjustments are indicated.

CIRCUIT ALIGNMENT

The chassis must be removed from the cabinet before commencing operations.

I.F. Stages.—Connect signal generator, via an 0.1 μF isolating capacitor in each lead, to control grid (pin 6) of **V1** and chassis, switch set to M.W., turn gang and volume control to maximum, and feed in a 465 kc/s (645.16 m) signal. Adjust the cores of **L12, L11, L10** and **L9** (location references J5, C2, M5, B2) for maximum output, progressively attenuating the input signal as the circuits are aligned to minimize A.G.C. action. Finally, disconnect "live" signal generator lead from **V1.**

R.F. and Oscillator Stages.—With the gang at maximum capacitance the pointer should be horizontal. It may be adjusted in position by rotating it on the gang spindle. Transfer "live" signal generator lead to attached aerial connecting tag (A2), via a suitable dummy aerial.

I.F. Filter.—With the set switched to M.W., feed in a 465 kc/s signal, and adjust the core of **L1** (A2) for minimum output.

M.W.—With the set switched to M.W., tune to 230 m on scale, feed in a 230 m (1,304 kc/s) signal, and adjust **C27** (N4) and **C23** (A1) for maximum output. Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and adjust the cores of **L6** (L4) and **L4** (A1) for maximum output. Repeat these operations until no improvement results.

L.W.—Switch set to L.W., tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust **C28** and **C24** (N4) for maximum output. Tune to 2,000 m on scale, feed in a 2,000 m (150 kc/s) signal, and adjust the cores of **L7** (L5) and **L5** (M4) for maximum output. Repeat these operations until no improvement results.

Printed in England by The Cornwall Press Ltd., Paris Garden, London, S.E.1