Supplement to The Wireless & Electrical Trader, October 30, 1948

"TRADER" SERVICE SHEET

884

EKCO U75

A.C./D.C. THREE-BAND SUPERHET

The Ekco U75 A.C./D.C. superhet.

THREE wavebands are covered in the Ecko U75, a 4-valve (plus rectifier) superhet designed to operate from A.C. or D.C. mains of 200-250 V, 40-80 c/s in the case of A.C. The S.W. range is 16-51 m.

The three-position tone control switch is associated with a negative feed-back circuit between the two A.F. stages. Provision is made for the connection of an external speaker.

Attention is drawn to the makers' warnings as to the danger of damage when operating the chassis on the bench. This appears at the end of "Dismantling the Set" and the beginning of "Circuit Alignment." The mains circuit fuses provide a certain amount of protection.

Release date and original price: June 1948; £18 18*s plus purchase tax.*

CIRCUIT DESCRIPTION

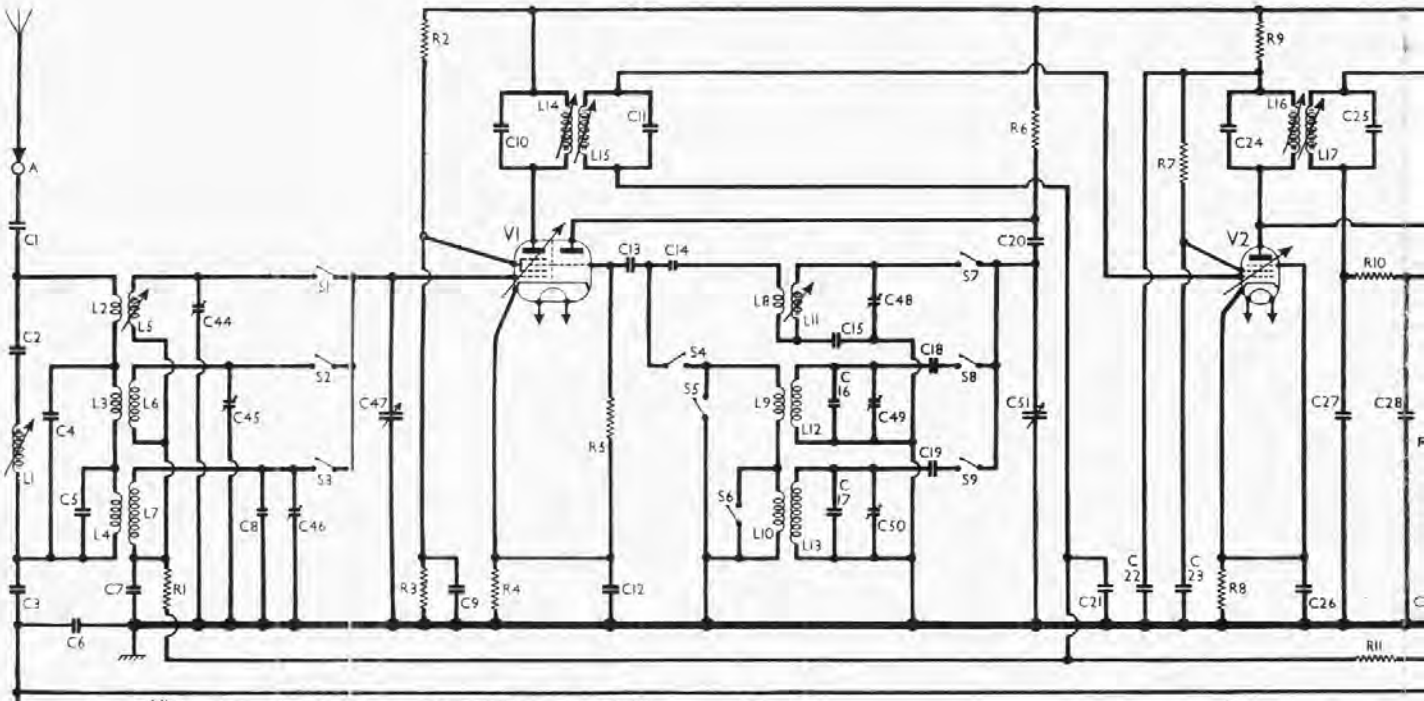
Aerial input is via isolating capacitor **C1** and coupling coils **L2** (S.W.), **L3** (M.W.) and **L4** (L.W.) to single-tuned circuits **L5, C47** (S.W.), **L6, C47** (M.W.) and **L7, C47** (L.W.). I.F. filtering by **C2, L1** across aerial coupling circuit.

First valve **(V1, Mullard metallized CCH35)** is a triode-hexode operating as frequency changer with internal coupling. Triode oscillator anode coils **L11** (S.W.), **L12** (M.W.) and **L13** (L.W.) are tuned by **C51,** with parallel trimming by **C48** (S.W.), **C16, C49** (M.W.) and **C17, C50** (L.W.), and series tracking by **C15** (S.W.), **C18** (M.W.) and **C19** (L.W.). Inductive reaction coupling to C.G. circuit by **L8** (S.W.), **L9** (M.W.) and **L10** (L.W.), with additional capacitative coupling on S.W. due to the common impedance of tracker **C15** in grid and anode circuits.

Second valve **(V2, Mullard metallized EF39)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-transformer couplings **C10, L14, L15, C11** and **C24, L16, L17, C25** in which the tuning capacitors are fixed and alignment adjustments are effected by varying the positions of the iron-dust cores.

Intermediate frequency 460 kc/s.

Diode second detector is part of double diode triode valve **(V3, Mullard metallized EBC33).** Audio frequency component in rectified output is developed across diode load resistor **R12** and passed via A.F. coupling capacitor **C30,** manual volume control **R13** and grid stopper **R14** to C.G. of triode section, which operates as A.F.



Circuit diagram of the Ekco U75 A.C./D.C. superhet. The circuit and the junction of the two mains R.F. by-pass capa connected directly to the **E** socket. Intervalve coupling in between **V3** and **V4** is associated with the feed-back circ frequency response is modified according to the settings of the **S10-S13.** Fuses are fitted in the mains input and H

amplifier. I.F. filtering by **C27, R10, C28** in diode circuit and **R14** in triode grid circuit.

Second diode of **V3,** fed from **V2** anode via **C32,** provides D.C. potential which is developed across load resistors **R18, R19** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic gain control.

Resistance-capacitance coupling by **R17, C35, R24,** via a portion of the negative feed-back network, between **V3** triode and pentode output valve **(V4, Mullard CL33).** A four-position switch **S10-S13** enables the frequency response of the feed-back network comprising **R20, C33, R21, R22, C34, R23, R25, C36, R26, C37, R27** to be modified for tone control purposes, and **C38** gives fixed tone correction in **V4** anode circuit.

Provision is made for the connection of a low impedance external speaker across **T1** secondary winding, and a screw-type switch **S14** permits muting of the internal speaker when desired.

When the receiver is operated from A.C. mains H.T. current is supplied by half-wave rectifying valve **(V5, Mullard CY31),** which behaves as a low resistance with D.C. mains.

Valve heaters, together with adjustable ballast resistor **R31,** are wired in series across mains input, and a filter circuit comprising chokes **L20, L21** and capacitors **C42, C43** suppresses mains-borne interference.

COMPONENTS AND VALUES

If the component numbers given in these tables are used when ordering replacements, dealers are advised to mention the fact, as these numbers may differ from those in the makers' diagram.

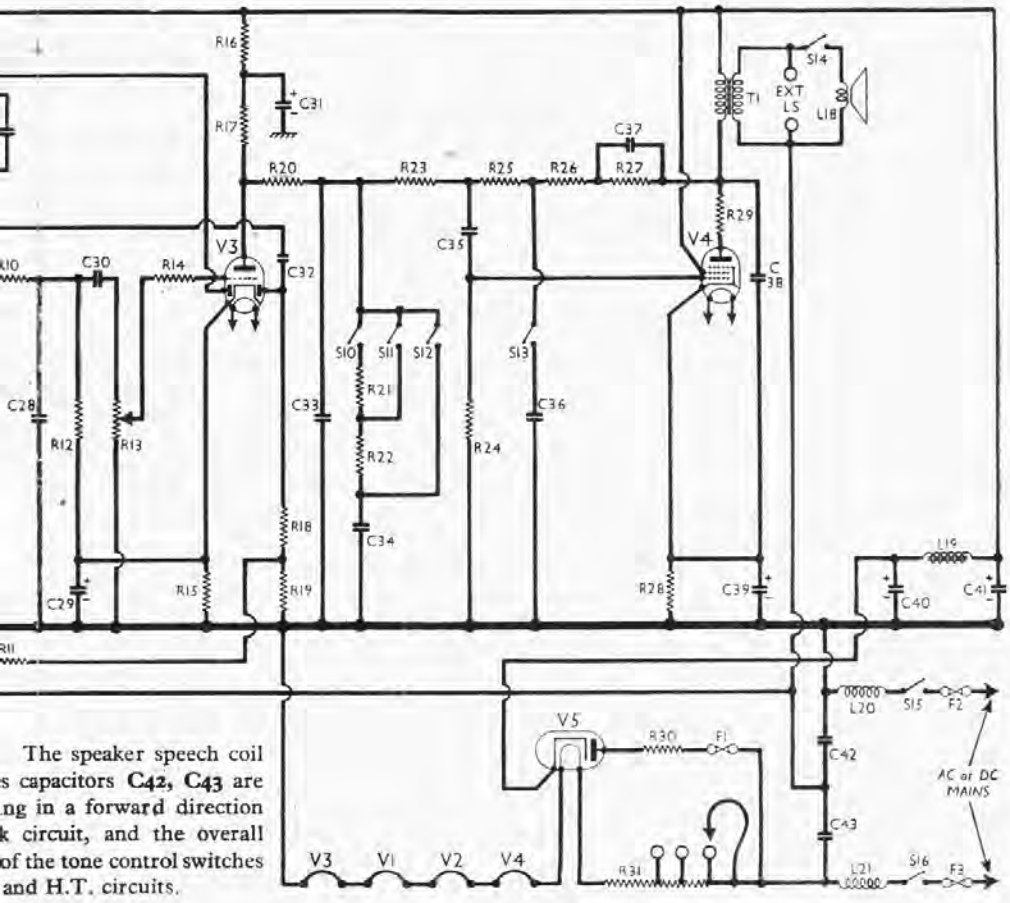
	RESISTORS	Values (ohms)	Locations
R1	V1 A.G.C. decoup.	100,000	M3
R2	V1 S.G. H.T. potential divider	33,000	M4
R3	V1 S.G. H.T. potential divider	33,000	M5
R4	V1 fixed G.B.	330	N4
R5	V1 osc. C.G.	47,000	M4
R6	Osc. anode load	22,000	M4
R7	V2 S.G. feed	100,000	L5
R8	V2 fixed G.B.	330	L5
R9	H.T. feed resistor	2,200	L5
R10	I.F. stopper	47,000	K5
R11	A.G.C. decoupling	1,000,000	L5
R12	Signal diode load	470,000	K5
R13	Volume control	1,000,000	G3
R14	V3 grid stopper	220,000	C2
R15	V3 G.B. A.G.C. delay	1,200	J5
R16	H.T. decoupling	10,000	J4
R17	V3 triode load	47,000	K5
R18	A.G.C. diode load	470,000	L4
R19	A.G.C. diode load resistors	1,000,000	L4
R20	Parts of tone control circuit	22,000	J4
R21	Parts of tone control circuit	470,000	J3
R22	Parts of tone control circuit	33,000	J3
R23	Parts of tone control circuit	22,000	J4
R24	V4 C.G. resistor	470,000	J4
R25	Parts of tone control circuit	470,000	J3
R26	Parts of tone control circuit	1,000,000	J3
R27	Parts of tone control circuit	3,300,000	J3
R28	V4 G.B. resistor	110	K4
R29	V4 anode stopper	100†	J4
R30	V5 surge limiter	47	J5
R31	Heater ballast	846*	E2

* Tapped at 646 Ω + 100 Ω + 100 Ω from V5 heater.
† Two 50 Ω resistors in series in our sample.

	CAPACITORS	Values (μF)	Locations
C1	Aerial isolator	0·0025	N5
C2	I.F. filter tuning	0·00015	N5
C3	Earth isolator	0·1	N5
C4	Aerial M.W. shunt	0·00047	N4
C5	Aerial L.W. shunt	0·00082	A1
C6	Earth isolator	0·1	M5
C7	V1 hex. C.G. decoup.	0·1	N3
C8	Aerial L.W. trim.	0·000082	L3
C9	V1 S.G. decoup.	0·1	N5
C10	1st I.F. transformer tuning	0·00015	B2
C11	1st I.F. transformer tuning	0·00015	B2
C12	V1 cath. by-pass	0·1	N4
C13	V1 osc. C.G. capacitors	0·0002	M4
C14	V1 osc. C.G. capacitors	0·00005	M4
C15	Osc. S.W. tracker	0·0047	L4
C16	Osc. M.W. trim.	0·000017	L4
C17	Osc. L.W. trim.	0·00022	K4
C18	Osc. M.W. tracker	0·00054	L4
C19	Osc. L.W. tracker	0·0004	L3
C20	Osc. anode coup.	0·0001	M4
C21	V2 C.G. decoup.	0·1	L4
C22	H.T. feed decoup.	0·1	M5
C23	V2 S.G. decoup.	0·1	L5
C24	2nd I.F. transformer tuning	0·00015	C2
C25	2nd I.F. transformer tuning	0·00015	C2
C26	V2 cath. by-pass	0·1	M5
C27	I.F. by-passes	0·0001	K5
C28	I.F. by-passes	0·0001	K5
C29*	V3 cath. by-pass	25·0	K5
C30	A.F. coupling	0·005	H3
C31*	H.T. decoupling	4·0	L5
C32	A.G.C. coupling	0·000015	K5
C33	Parts of tone control circuit	0·001	K4
C34	Parts of tone control circuit	0·005	J3
C35	A.F. coupling	0·01	J4
C36	Parts of tone control circuit	0·0001	J3
C37	Parts of tone control circuit	0·001	J3
C38	Tone corrector	0·0025	K4
C39*	V4 cath. by-pass	25·0	K3
C40*	H.T. smoothing capacitors	8·0	H5
C41*	H.T. smoothing capacitors	24·0	H5
C42	Mains R.F. by-passes	0·1	H4
C43	Mains R.F. by-passes	0·1	H4
C44‡	Aerial S.W. trim.	—	M3
C45‡	Aerial M.W. trim.	—	A1
C46‡	Aerial L.W. trim.	—	A1
C47†	Aerial tuning	—	B1
C48‡	Osc. S.W. trim.	—	M3
C49‡	Osc. M.W. trim.	—	L4
C50‡	Osc. L.W. trim.	—	K4
C51†	Oscillator tuning	—	B1

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	I.F. filter coil	8·6	N5
L2	Aerial coupling coils	Very low	M3
L3	Aerial coupling coils	12·5	A1
L4	Aerial coupling coils	36·0	A1
L5	Aerial tuning coils	Very low	M3
L6	Aerial tuning coils	4·0	A1
L7	Aerial tuning coils	29·0	A1
L8	Oscillator reaction coils	Very low	L4
L9	Oscillator reaction coils	1·5	L4
L10	Oscillator reaction coils	2·1	K4
L11	Oscillator tuning coils	Very low	L4
L12	Oscillator tuning coils	3·5	L4
L13	Oscillator tuning coils	6·6	K4
L14	1st I.F. trans. Pri.	9·0	B2
L15	1st I.F. trans. Sec.	9·0	B2
L16	2nd I.F. trans. Pri.	9·0	C2
L17	2nd I.F. trans. Sec.	9·0	C2
L18	Speech coil	2·1	—
L19	Smoothing choke	560·0	H3
L20	Mains R.F. filter chokes	1·6	H4
L21	Mains R.F. filter chokes	1·6	H4
T1	Output trans. Pri.	365·0	C1
T1	Output trans. Sec.	0·4	C1
S1-S9	W/band switches	—	L3
S10-S13	Tone control switches	—	J3
S14	Int. spkr. switch	—	J5
S15	Mains switches, ganged R13	—	G3
S16		—	
F1	H.T. fuse, 0·5A.	—	F2
F2 F3	Mains fuses, 1·0 A.	—	F2



The speaker speech coil
s capacitors **C42, C43** are
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of the tone control switches
and H.T. circuits.

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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.

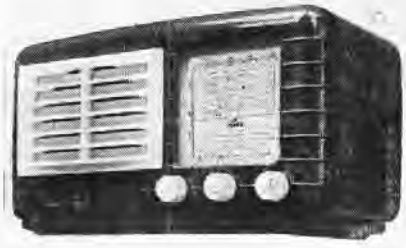
Second valve **(V2, Mazda 10F9)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-transformer couplings **C7, L9, L10, C8** and **C14, L11, L12, C15,** in which the tuning capacitors are fixed and alignment adjustments are carried out by varying the positions of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



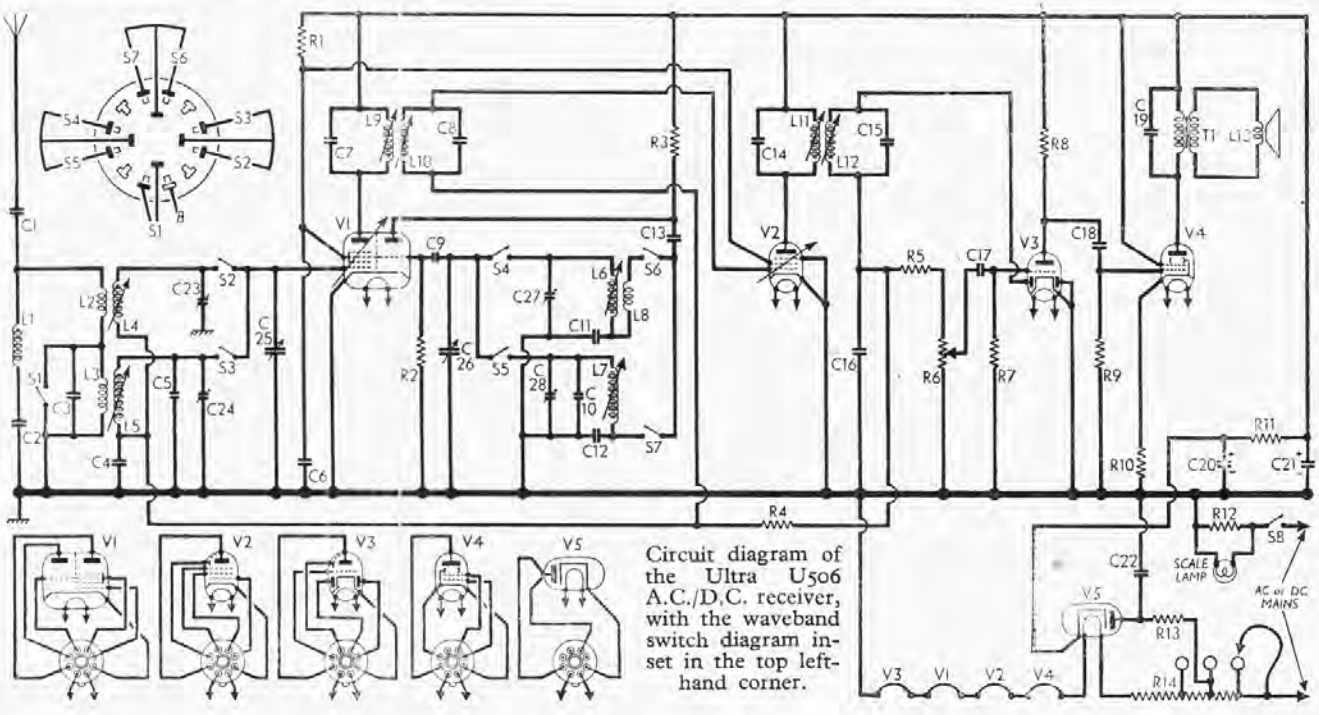
COMPONENTS AND VALUES

	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 tuning	0·0001	B2
C8		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 tuning	0·0001	C2
C15		0·00018	C2
C16	I.F. by-pass ...	0·00027	J4
C17	A.F. coupling capacitors	0·01	J4
C18		0·01	H5
C19	Tone corrector ...	0·01	H3
C20* C21*	H.T. smoothing capacitors	16·0 24·0	C1 C1
C22	Mains R.F. by-pass	0·01	F4
C23‡	Aerial M.W. trim....	0·00007	A1
C24‡	Aerial L.W. trim....	0·00·07	N4
C25†	Aerial tuning ...	0·000·04	B1
C26†	Oscillator tuning ...	0·00 0304	B2
C27‡	Osc. M.W. trim. ...	0·00 07	N4
C28‡	Osc. L.W. trim. ...	0·00 07	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.**

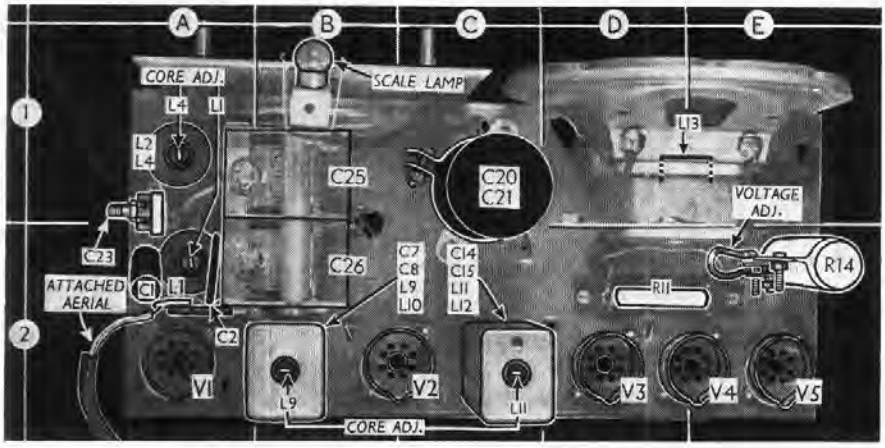
Valve heaters, together with scale lamp and adjustable ballast resistor **R14,** are connected in series across mains input. Mains R.F. filtering by **C22.**

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.

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 6.5 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.

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.

CIRCUIT ALIGNMENT

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

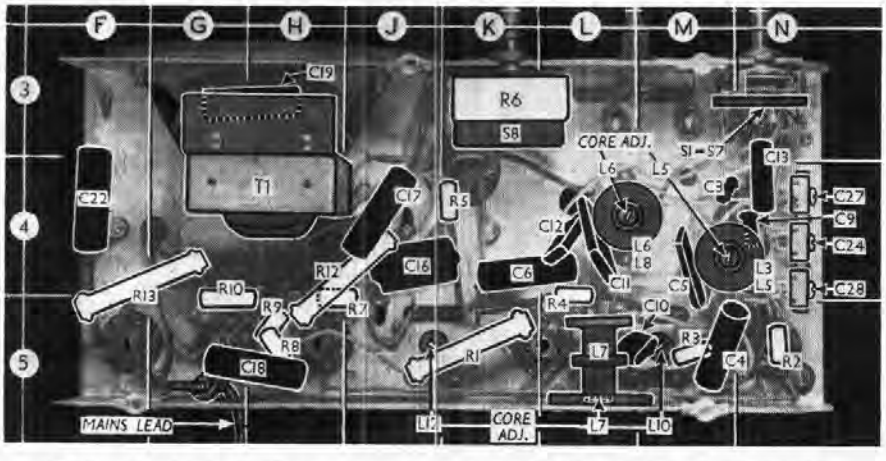
I.F. Stages.—Connect signal generator, via an 0.1 μF isolating capacitor in each lead, to control grid (pin 6) of **V1** and chassis, switch set to M.W., turn gang and volume control to maximum, and feed in a 465 kc/s (645.16 m) signal. Adjust the cores of **L12, L11, L10** and **L9** (location references 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.



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.

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