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# SERVICE ELECTRICAL and RADIO CHARTS

TRADING

EKCO B38  
MULLARD MAST  
PHILIPS 747  
ULTRA U405  
ANNUAL INDEX

## ULTRA U405

Four valve plus rectifier, two-waveband super-het for operation from AC-DC mains, 200-260 volts, 40-100 cycles. Marketed by Ultra Electric Ltd., Western Avenue, London, W.3. First production, December, 1945. Retail price, £12 17s. 6d., plus £2 5s. 6d. tax.

AERIAL circuit incorporates an IF rejector circuit L1-C2 with T1 allowing adjustment. Inductive coupling via S1, C3, L2, on MW and S2, L3 on LW is employed to the frequency changer V1. The grid circuit comprises S3 with L4 and

trimmer T2 on MW and S4 with L5 and C13 in parallel with T3 on LW. VC1 is the main tuning condenser.

C4 and R11 feed AVC control volts to this stage. Cathode bias is provided by R1 decoupled by C5. Screen supply is derived from R4 decoupled by C11.

Oscillator section of V1 derives its anode voltage from R3, the tuned anode circuits being parallel coupled by C8. On MW S7 leads to L8 with trimmer T4 and padder T5 in parallel with C7. On LW S8 closes (S7 opens) bringing in L9. Here a fixed trimmer C9 is in parallel with T6 and the padder is T7 in parallel with C10. VC2 is the oscillator portion of the tuning condenser gang.

L6 and L7 on MW and LW respectively apply the oscillator voltages to the grid via S5 and S6. R2 and C6 provide automatic leak-and-condenser

bias, C6, being at the earthy end of the inductance for convenience of mounting.

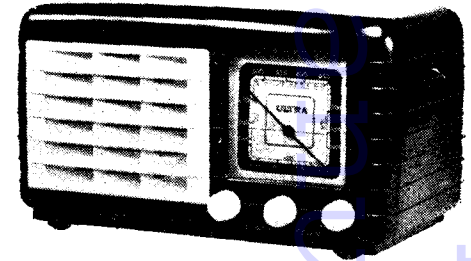
The anode circuit of the hexode portion of V1 passes through the primary of the first IF transformer comprising C23 and C24 with permeability-tuned coils L10 and L11.

AVC is applied through the secondary to the grid of IF valve (V2) via C27 and R6 which form a low-pass filter. Cathode bias, by C15, and R5, is also utilised.

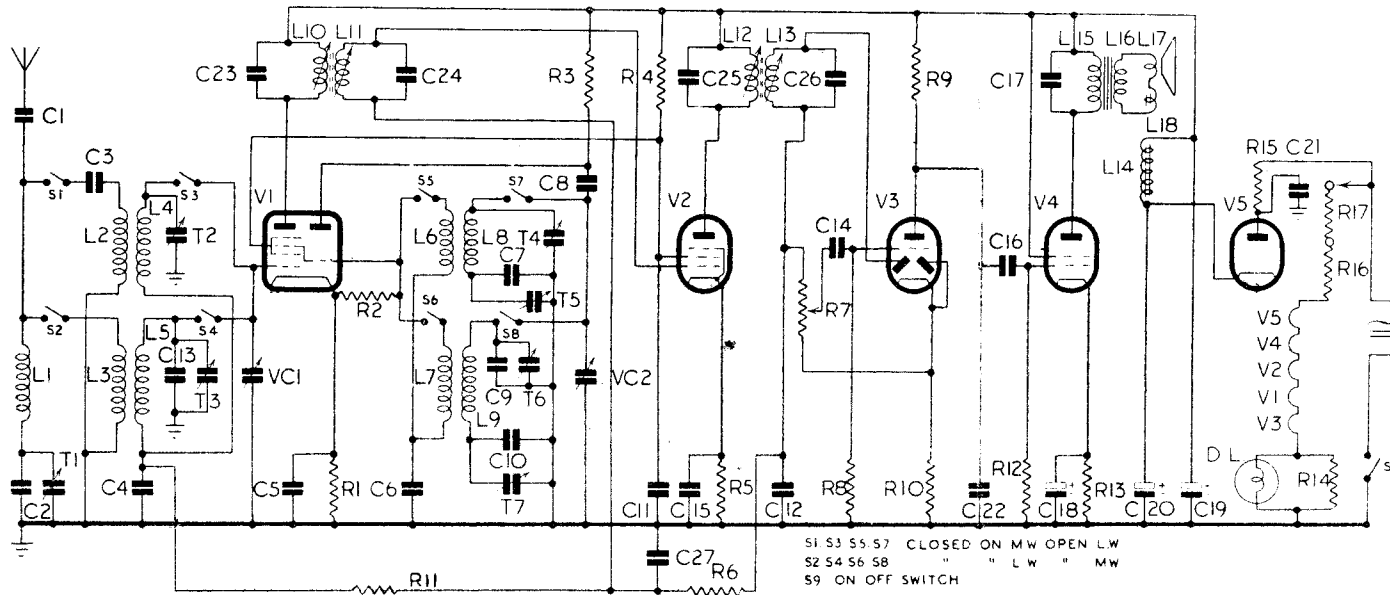
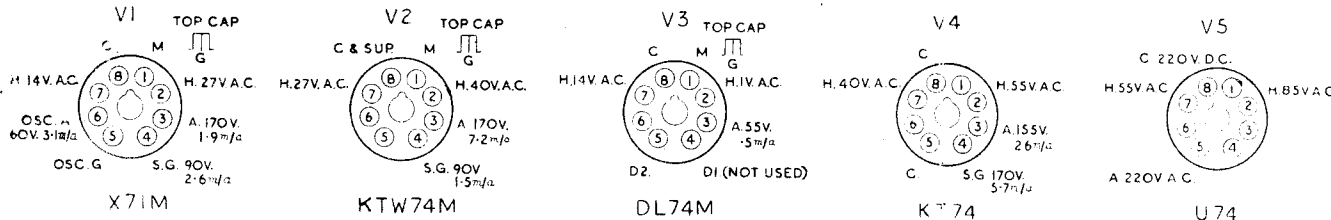
IFT2 consisting of C25, L12 and C26, L13 applies the signal to one diode of V3, the other diode being strapped to cathode. Volume control R7, together with C12, forms the load of the active diode. AVC is derived from the remote end of this component; there is no arrangement for AVC delay.

C14 and grid leak R8 apply the audio voltages

Continued overleaf



This review of the Ultra post-war U405 introduces a new method of presenting the figures hitherto given in the "Valve Readings" table. It will be seen they are written against the appropriate pins in the valve base diagrams on the left. Note that heater voltages are also given, as measured with respect to chassis.



### RESISTORS

R	Watts	Ohms	R	Watts	Ohms
1		270	10		2700
2		47000	11		470000
3		33000	12		470000
4		22000	13		330
5		270	14	2	60
6		2.2meg	15	1	100
7	V/C	1 meg	16	25	797
8		1 meg.	17	25	109
9		220000			

### INDUCTORS

L	Ohms	L	Ohms
1	7-9	10	7-9
2	2-3	11	7-9
3	14-16	12	7-9
4	4.5-5.5	13	7-9
5	11.5-13.5	14	1000
6	1.8-2.2	15	450
7	5-6	16	.5
8	3.1-3.9	17	2.8
9	6-8	18	.1

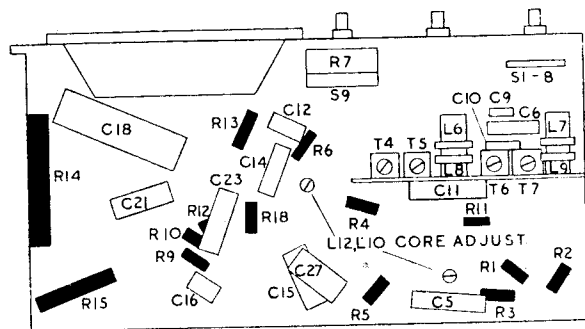
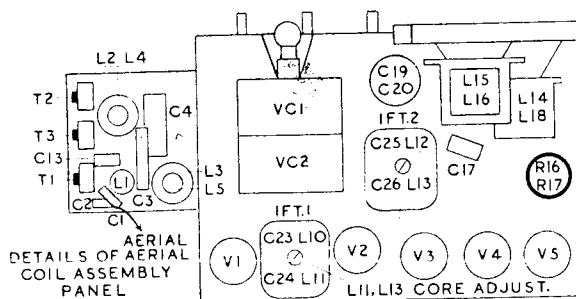
### CAPACITORS

C	Mfids	C	Mfids
1	.005	16	.01
2	180 pfd.	17	.005
3	470 pfd.	18	Electro-lytic .50
4	.05	19	24
5	.05	20	16
6	470 pfd.	21	.05
7	500 pfd.	22	470 pfd.
8	100 pfd.	23	120 pfd.
9	100 pfd.	24	120 pfd.
10	180 pfd.	25	120 pfd.
11	.05	26	120 pfd.
12	100 pfd.	27	.05
13	47 pfd.	VC1	Tuning 494 pfd.
14	.005	VC2	gang 494 pfd.
15	.05	Trimners	4-70 pfd.

# ULTRA U405

Continued

Right: How components are disposed on the surface of the neat chassis of the Ultra U405. Details are shown of the aerial coil assembly panel which carries three of the trimmers.



Left: Diagram identifying the parts mounted below the chassis. There is an oscillator coil assembly which includes four of the trimmers. IF transformer adjustments are by iron-dust core.

to the triode grid. R10 gives negative feed-back because there is no by-pass capacitor.

Resistance-capacity coupling by R9, C16, R12 is employed to the output valve V4. C22 provides further IF filtering and a small measure of high-note cut. R13, C18 from the cathode bias circuit for V4, full HT being applied to the screen. C17 across the primary the output transformer gives more treble cut.

Either 200-235 or 235-260 volts DC or AC mains may be utilised by a tapping on the ballast resistor R16-R17. The heater chain, with pilot lamp and its shunt R14, completes this circuit. Pilot lamp is rated at 2.5 v .2AMES cap.

The single diode rectifier (V5) utilises a limiting resistor R15 in its anode lead and an RF by-pass C21 to earth. Smoothing is accomplished by C20, speaker field L14 and C19.

VALVES.—The Osram 74 series was used in sets with serial numbers up to 5299 on Model U405; up to 799 on model EU4051 (export).

The 76 series is used in sets with serial numbers upwards of 5300 on Model U405: 800 in EU4051.

The two sets of valves have somewhat similar characteristics but X71, KTW74, DL74 cannot be replaced by X76, KTW76, DL76, respectively, without first removing spacer washers between valve holders and chassis.

All the valves take .16A and have 13 volt heaters except the KT74, 15 volts and U74, 30 volts.

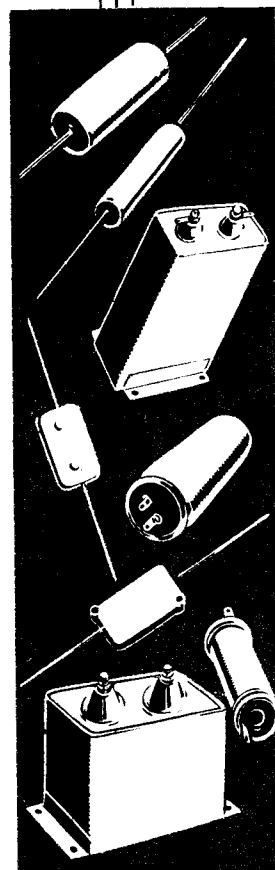
CHASSIS REMOVAL.—Remove from base PK screws and knobs. Re-insulate with wax on re-fitting because chassis is live. An earth connection must *not* be made to this chassis.

GENERAL REMARKS.—Receiver will become warm in use and all cooling screens must be replaced if it has been necessary to remove them. Cooling space must be left between back of cabinet and wall to allow for ventilation and improve re-production.

POWER CONSUMPTION.—Approx. 100 watts.

## ALIGNMENT INSTRUCTIONS

Apply Signal as Below	Tune Receiver to	Adjust in Order stated for Max. Output
(1) 470 kc between top cap of V1 and chassis via .05 mfd condenser, after removing existing lead and connecting 1 megohm resistor between grid and chassis	MW 550 metres	L13, L12, L11 L10
(2) 470 kc between aerial socket and chassis via .05 mfd condenser	MW 550 metres	T1 for minimum
(3) 1.5 mc as in (2)	MW 200 metres	T4, T2
(4) 600 kc as in (2)	MW 500 metres	T5
(5) 300 kc as in (2)	LW 1000 metres	T6, T3
(6) 150 kc as in (2)	LW 2000 metres	T7



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