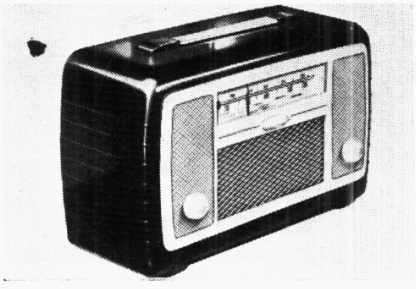
"TRADER" SERVICE SHEET

945

ULTRA

U626 "Troubadour"



DESIGNED with an eye to accessibility for service work, the Ultra U626 "Troubadour" has a single-plate vertical chassis pressing which can be removed from the cabinet in a matter of moments and allows free access to all components and adjustments.

The receiver is a compact 4-valve (plus rectifier) 2-band superhet designed to operate from A.C. or D.C. mains of 200-250 V. The waveband ranges are 190-550 m and 1,200-2,000 m. An unusual feature is the employment of a single oscillator circuit for both wavebands.

Release date and original price: September, 1949; £11 12s, plus purchase tax.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, C23** (M.W.) or **L2, L3, L1, C23** (L.W.) precedes a triode-heptode valve **(V1, Mazda 10C1)** which operates as frequency changer with internal coupling.

A single oscillator anode coil **L5,** tuned by **C27,** is used for both wavebands, with parallel trimming by **C26** (M.W.) and **C7, C24** (L.W.), and series tracking by **C6, C25** (M.W. and L.W.). Inductive reaction coupling to grid by **L4** (M.W. and L.W.) with damping by **R3** on M.W. band only.

Second valve **(V2, Mazda 10F9)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C3, L6, L7, C4** and **C11, L8, L9, C12** in which the tuning capacitors are fixed, and alignment adjustments are effected by varying the positions of the iron-dust cores.

Intermediate frequency 465 kc/s (or 470 kc/s).

Diode second detector is part of double diode triode valve **(V3, Mazda 10LD11** or **Mullard UBC41).** Audio frequency component in recti-

(Continued col. 1 overleaf)

COMPONENTS AND VALUES

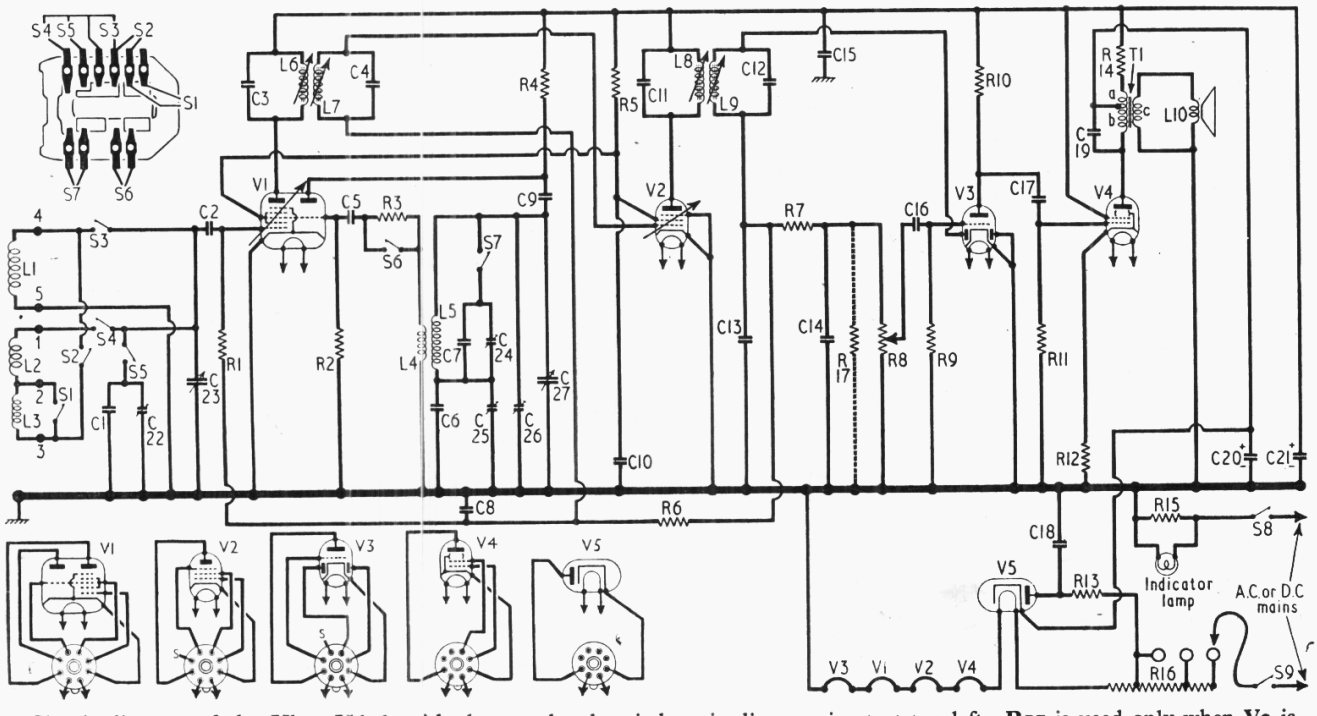
	RESISTORS	Values	Locations
R1	V1 hept. C.G. ...	470kΩ	G4
R2	V1 osc. C.G. ...	47kΩ	G4
R3	L.W. damper ...	1·8kΩ	A1
R4	Osc. anode load ...	68kΩ	G4
R5	V1, V2 S.G. decoup.	27kΩ	G4
R6	A.G.C. decoupling	1MΩ	E4
R7	I.F. stopper ...	100kΩ	D4
R8	Volume control ...	1MkΩ	C2
R9	V3 triode C.G. ...	4·7MΩ	D4
R10	V3 triode load ...	100kΩ	D4
R11	V4, C.G.	330kΩ	D4
R12	V4, G.B. resistor ...	300Ω	D4
R13	Surge limiter ...	120Ω	E3
R14	Smoothing resistor	1·8kΩ	D4
R15	Lamp shunt ...	39Ω	C2
R16	Heater ballast ...	910Ω†	B1
R17	Diode load* ...	180kΩ	C2

* Used only when V3 is Mullard UBC41. † Tapped at 700Ω + 120Ω + 90Ω from V5 heater.

	CAPACITORS	Values	Locations
C1	L.W. fixed trim. ...	170pF	A1
C2	V1, hept. C.G. ...	390pF	A2
C3	1st I.F. transformer	120pF	A2
C4	tuning	120pF	A2
C5	V1, osc. C.G. ...	120pF	F4
C6	L.W., M.W., fixed tracker ...	570pF	A2
C7	L.W. fixed trim. ...	520pF	A2
C8	A.G.C. decoupling	0·05μF	F4
C9	Osc. anode coup....	120pF	G4
C10	V1, V2 S.G. decoup.	0·05μF	F4
C11	2nd I.F. transformer	100pF	C2
C12	tuning	100pF	C2
C13	I.F. by-passes ...	200pF	D4
C14		100pF	C2
C15	H.T. R.F. by-pass	0·05μF	E4
C16	A.F. coupling ...	0·01μF	D4
C17		0·01μF	D4
C18	Mains R.F. by-pass	0·01μF	F3
C19	Tone corrector ...	0·01μF	D3
C20*	H.T. Smoothing	24μF	A2
C21*		16μF	A2
C22‡	Aerial L.W. trim.	55pF	A1
C23†	Aerial tuning ...	§528pF	A1
C24‡	Osc. L.W. trim. ...	55pF	A1
C25‡	Osc. L.W., M.W., track	55pF	A2
C26‡	Osc. M.W. trim. ...	55pF	B2
C27†	Oscillator tuning...	§528pF	A1

* Electrolytic. † Variable. ‡ Pre-set. § "Swing" Value, min. to max.

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	M.W. frame aerial	1·1	On back cover
L2	L.W. frame aerial...	1·9	
L3	L.W. loading coil...	12·0	
L4	Osc. coupling coil...	3·0	G4
L5	Osc. tuning coil ...	3·3	G4
L6	1st I.F. trans. Pri.	7·0	A2
L7	Sec.	7·0	A2
L8	2nd I.F. trans. Pri.	10·0	C2
L9	Sec.	10·0	C2
L10	Speech coil ...	2·5	—
T1	Output trans. Pri: (a)...	20·0	
	(b)	380·0	C2
	Sec. (c)	0·2	
S1-S7	Waveband switches	—	A1
S8, S9	Mains sw., g'd. R5	—	C2



Circuit diagram of the Ultra U626, with the waveband switch unit diagram inset at top left. **R17** is used only when **V3** is a Mullard UBC41.

CIRCUIT DESCRIPTION—*Continued*

fied output is developed across the manual volume control **R8**, which (together with **R17** if the Mullard valve is used) is also the diode load resistor, and passed via **C16** and **R9** to the grid of the triode section, which operates as A.F. amplifier.

The D.C. potential developed across **R8** is tapped off and fed back through decoupling circuits as G.B. to I.F. and F.C. valves, giving automatic gain control.

Resistance-capacitance coupling by **R10, C17** and **R11** between **V3** anode and beam tetrode output valve **(V4, Mazda 10P13)**. Fixed tone correction by **C19** in anode circuit.

When the receiver is operating from A.C. mains, H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Mazda U404)** which, with D.C. mains, behaves as a low resistance. Smoothing is effected by resistor **R14** and electrolytic capacitors **C20** and **C21**, residual hum being neutralized by passing the receiver H.T. current through a portion of **T1** primary winding. Valve heaters, together with indicator lamp and heater ballast resistor **R16** are connected in series across the mains input. Mains R.F. filtering by **C18**.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted by the manufacturers. Their receiver was operating from A.C. mains of 230 V and switched to M.W., but there was no signal input.

Where voltages exceeded 100 V, they were measured on the 1,000 V range of a model 7 Avometer, but where they were lower than this the 400 V range was used.

Valve	Anode		Screen		Cath
	V	mA	V	mA	V
V1 10C1	180	1·3	45	3·7	—
	Oscillator				
	37	2·0			
V2 10F9	180	3·5	45	1·1	—
V3 10LD11	32	1·3	—	—	—
V4 10P13	205	25·0	180	5·0	8·5
V5 U404	205†	—	—	—	213·0

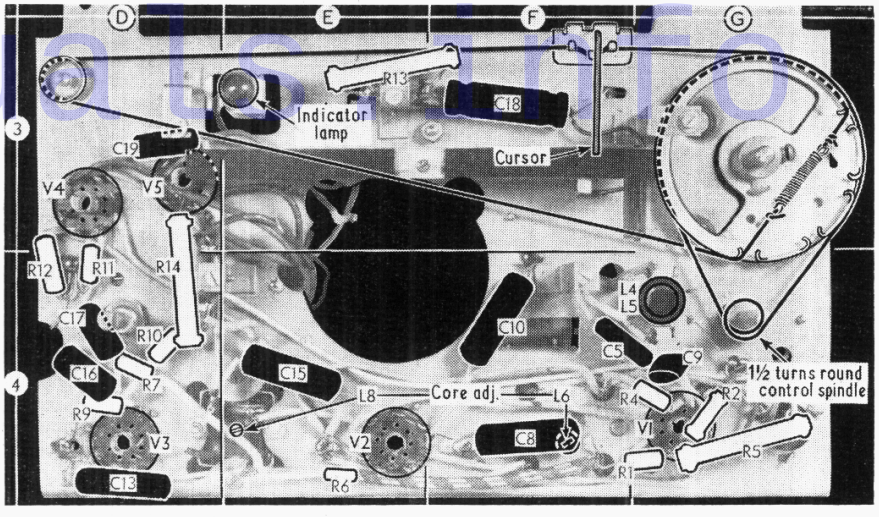
† A.C. Cathode Current 43mA.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (pull-off);
invert receiver and remove two wax-embedded screws from the underside of the cabinet, then replace cabinet on its feet;
free back cover (three screws) to extent of frame aerial leads and withdraw two screws from the upper corners of the chassis;
the chassis, complete with speaker, may now be withdrawn.

When replacing, do not omit to replace wax over the heads of the chassis-fixing screws.

If the leads have been unsoldered from the tags on the back cover, they should be connected as follows, numbering the tags from left to right as viewed from the rear: 1, blue; 2, green; 3, white; 4, red; 5, black.



Front view of the vertical chassis, with the drive cord clearly indicated. The speaker, which has been removed, provides a bearing for the waveband switch bar, which has a lateral movement.

GENERAL NOTES

Switches.—**S1-S7** are the waveband switches, ganged in a lever-operated unit with a lateral switch movement. The unit is indicated in our rear view of the chassis, and shown in detail in the diagram inset with the circuit diagram overleaf, where it is viewed in the same direction. In the M.W. position (slider to right in our diagram) **S1**, and **S3** are closed; in the L.W. position, **S2, S4, S5, S6** and **S7** are closed.

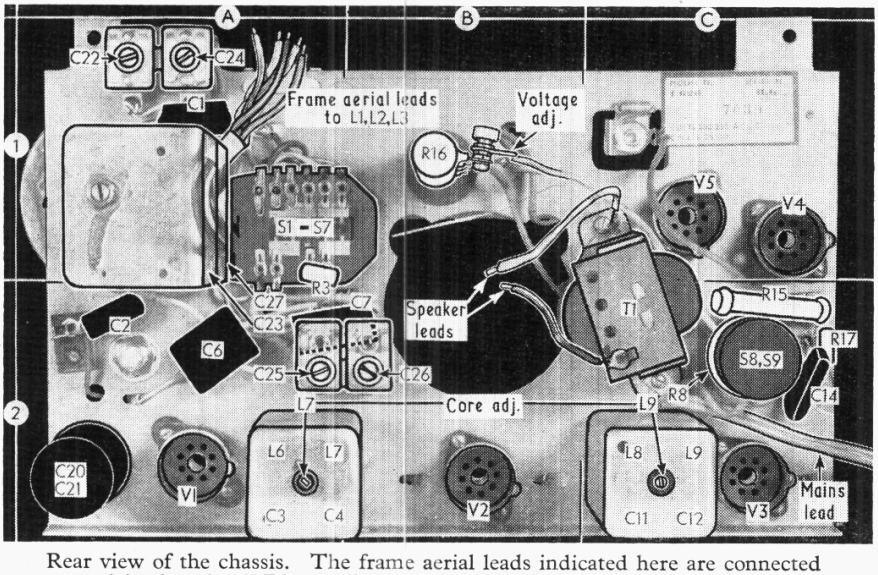
S8, S9 are the Q.M.B. mains switches, ganged with the volume control **R8**.

Frame Windings.—The M.W. frame aerial winding **L1** and the L.W. one **L2** are mounted on the back cover of the receiver and connected to a row of tags on a strip on which the L.W. loading coil **L3** is mounted. If the two fixing screws are removed, and the back cover is allowed to fall, as though hinged at the bottom, the tags are then numbered from left to right as viewed from the rear, to agree with the numbers in our diagram. **L3** is situated between tags 2 and 3.

Drive Cord Replacement.—About four feet of Nylon braided glass yarn is required for a new drive cord. Its course is shown clearly in our front view of the chassis.

Chassis Modification.—Although most of these receivers are fitted with the Mazda 10LD11 valve in **V3** socket, a number have gone out with the Mullard UBC41. These valves are quite satisfactory alternatives, but two circuit changes are required when substituting one for another. Our chassis had the Mazda valve, and the appropriate components are quoted in this *Service Sheet*, but when the Mullard valve is used **R10** must be changed to 330 kΩ and **R8** is shunted by **R17**, which we show dotted in our circuit diagram.

Scale Lamp.—The scale lamp has an M.E.S. base, a small clear spherical bulb, and is rated at 3.5 V, 0.15 A. It is shunted by **R15.**



Rear view of the chassis. The frame aerial leads indicated here are connected as explained under "Dismantling the Set", the tag numbers being shown in the circuit diagram.

CIRCUIT ALIGNMENT

The chassis should be removed from its cabinet for alignment operations.

I.F. Stages.—Switch set to M.W., turn gang and volume controls to maximum, connect signal generator (with a suitable capacitor in each lead) to tag 4 (red lead) on back cover. Feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L9, L8, L7,** and **L6** (location references C2, E4, A2 and F4) for maximum output. The makers suggest that the I.F. stages be aligned at 470 kc/s (638.3 m) when the Copenhagen Plan comes into effect.

R.F. and Oscillator Stages.—With the gang at maximum capacitance the cursor should be vertical and coincident with the last dot at the high wavelength end of the tuning scale. It may be adjusted in position by sliding the cursor carriage along the drive cord. For the R.F. adjustments a coil should be made up as follows for connection to the signal generator: Wind 13¾ turns of 18 S.W.G. enamelled wire on to a former of ⅜in diameter for a length of 1¾in. It should be placed approximately 6in from the frame aerial of the receiver.

M.W.—With the set still switched to M.W., connect coil to signal generator output and tune receiver to 200 m (dot on scale), feed in a 200 m (1,500 kc/s) signal and adjust **C26** (B2) for maximum output. Tune to 500 m (dot on scale), feed in a 500 m (600 kc/s) signal, and adjust **C25** (A2) for maximum output. Repeat these adjustments rocking the gang slightly for optimum results.

L.W.—(These adjustments should always be made *after* the M.W. alignment.) Switch set to L.W., tune to 1,362 m (dot on scale), feed in a 1,362 m (220 kc/s) signal, and adjust **C24** and **C22** (A1) for maximum output.

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