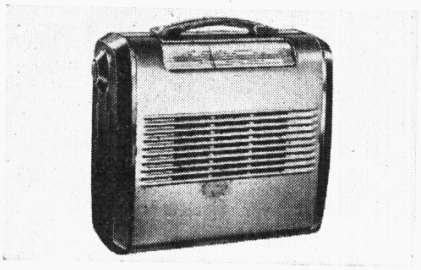
"TRADER" SERVICE SHEET

975

COSSOR 499UB



DESIGNED to operate from self-contained batteries or from A.C. or D.C. mains, the Cossor 499UB is a 4-valve (plus metal rectifier) 2-band portable superhet. Waveband ranges are 187-572 m and 928-2,068 m.

Release date and original price: September, 1950; £14 14s 1d complete with batteries. Purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, C31** (M.W.) or **L2, C31** (L.W.) precedes a heptode valve (**V1, Cossor 1R5**) which operates as frequency changer with internal coupling. Provision is made for the connection of an external aerial.

Oscillator grid coils **L3** (M.W.) and **L4** (L.W.) are tuned by **C32**. Parallel trimming by **C33** (M.W.) and **C10, C33** (L.W.); series tracking by **C9** (M.W.) and **C9, C11, C34** (L.W.). Inductive reaction coupling on M.W. and L.W. by **L5**.

Second valve (**V2, Cossor 1T4**) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C6, L6, L7, C7** and **C16, L8, L9, C17**.

Intermediate frequency 470 kc/s.

Diode signal detector is part of diode pentode valve (**V3, Cossor 1S5**). Audio frequency component in rectified output is developed across manual volume control **R8**, which is the load resistor, and passed via **C20** to C.G. of pentode section. I.F. filtering by **C18, R6** and **C19**. D.C. potential developed across **R8** is fed back as bias via **R7**, giving automatic gain control.

Resistance-capacitance coupling by **R11, C22** and **R12** between **V3** pentode and pentode output valve (**V4, Cossor 3S4**). Fixed tone correction in anode circuit by **C25**.

COMPONENTS AND VALUES

	CAPACITORS	Values	Locations
C1	Aerial coupling ...	5pF	—
C2	A.G.C. decoupling	0·05μF	H4
C3	L.W. trimmer ...	39pF	—
C4	Filament decoupling	0·1μF	G5
C5	Filament decoupling	0·05μF	H4
C6	1st I.F.trans. tuning	60pF	B1
C7	1st I.F.trans. tuning	60pF	B1
C8	V1 osc. C.G. ...	100pF	H5
C9	Tracker	638pF	H5
C10	L.W. trimmer ...	90pF	A1
C11	L.W. tracker ...	275pF	G5
C12	Osc. anode decoup.	0·1μF	G5
C13	A.G.C. decoup. ...	0·05μF	H5
C14	V2 S.G. decoup. ...	0·1μF	G4
C15	Filament decoup....	0·05μF	F5
C16	2nd I.F. trans.	60pF	C1
C17	tuning ...	100pF	C1
C18	I.F. by-passes ...	47pF	F4
C19	I.F. by-passes ...	47pF	E4
C20	A.F. coupling ...	0·001μF	E4
C21	V3 S.G. decoup. ...	0·1μF	G4
C22	A.F. coupling ...	0·001μF	F4
C23*	H.T. smoothing ...	16μF	C3
C24*	V4 G.B. by-pass ...	50μF	F5
C25	Tone corrector ...	0·01μF	C2
C26*	L.T. smoothing ...	100μF	D2
C27*	L.T. smoothing ...	100μF	D2
C28*	H.T. smoothing ...	16μF	C3
C29‡	R.F. by-pass ...	0·01μF	E5
C30	M.W. aerial trim....	—	—
C31†	Aerial tuning ...	—	A3
C32†	Oscillator tuning ...	—	A3
C33‡	M.W. osc. trimmer	—	B1
C34‡	L.W. osc. tracker...	—	B2

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTORS	Values	Locations
R1	A.G.C. decoupling	2.2MΩ	H4
R2	V1 G.B.	1MΩ	H4
R3	V1 osc. C.G. ...	100kΩ	H5
R4	Osc. H.T. feed ...	12kΩ	G5
R5	V2 S.G. H.T. feed	47kΩ	G4
R6	I.F. stopper ...	47kΩ	F4
R7	A.G.C. decoupling	1MΩ	G4
R8	Volume control ...	500kΩ	D1
R9	V3 C.G.	10MΩ	F4
R10	V3 S.G. H.T. feed	10MΩ	F4
R11	V3 anode load ...	2.2MΩ	F4
R12	V4 C.G.	3.3MΩ	G5
R13	V4 G.B.	680Ω	G5
R14	Filament by-passes	1kΩ	F5
R15	Filament by-passes	470Ω	G4
R16	Filament by-passes	150Ω	G4
R17	H.T. smoothing ...	4.7kΩ	E5
R18	Filament ballast ...	2,370Ω	D3
R19	Filament shunts ...	330Ω	B1
R20	Filament shunts ...	330Ω	B1
R21	Filament shunts ...	470Ω	B1
R22	V4 G.B.	150Ω	B1
R23	Surge limiter ...	200Ω	E5
R24	Voltage adj. ...	200Ω	D3

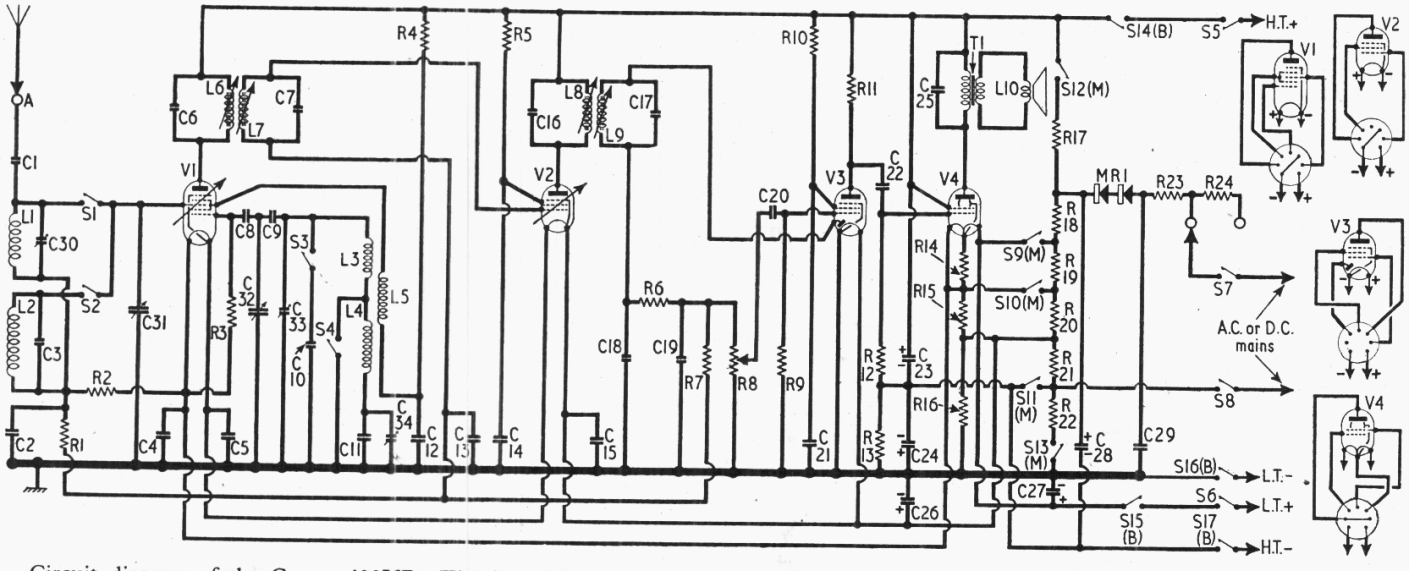
	OTHER COMPONENTS	Approx. values (ohms.)	Locations
L1	M.W. frame aerial	2·3	—
L2	L.W. frame aerial	17·0	—
L3	M.W. osc. tune ...	5·0	G5
L4	L.W. osc. tune ...	8·0	G5
L5	Osc. reaction ...	2·8	G5
L6	1st I.F. trans Pri. ...	18·0	B1
L7	1st I.F. trans Sec. ...	18·0	B1
L8	2nd I.F. trans Pri. ...	12·0	C1
L9	2nd I.F. trans Sec. ...	9·0	C1
L10	Speech coil ...	2·8	—
T1	Primary ...	450·0	C2
T1	Secondary ...	0·6	
S1-S8	Waveband & power sw.	—	A1
S9-S17	Mains/batt. sw. ...	—	B1

For battery operation, power supplies are carried by the switches **S14 (B), S15 (B), S16 (B)** and **S17 (B)**, which close in that position as indicated by the suffix **(B)**. For mains operation these switches open, and **S9 (M), S10 (M), S11 (M)** and **S13 (M)** close. **S5, S6** and **S7, S8** are the battery and mains "on/off" switches.

H.T. current is supplied on mains operation by a half-wave metal rectifier **(MR1, SenTerCel RM2's)** consisting of two units in series for high-voltage mains coverage, although on D.C. mains, while they prevent reversed mains polarity from being applied, they act as a low resistance.

Filament current is taken from the H.T. circuit via the ballast resistor **R18**, and the filaments are shunted by the potential divider **R19, R20, R21** which goes down to the negative end of **R22**, below chassis potential. If a filament open-circuits, the potential divider will prevent the voltage rising to H.T. potential and damaging **C27**, which shunts the filaments. H.T. current through the valves is shunted past the filaments by **R14, R15, R16.**

G.B. potential for **V4** is obtained on battery operation from the drop along **R13**, or on mains from the drop along **R13** and **R22** in parallel, in the negative H.T. lead to chassis.



Circuit diagram of the Cossor 499UB. The junction of **R21** and **R22** is below chassis potential on mains and battery operation.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured on our receiver when it was operating from a new set of batteries. The gang and volume control were turned to maximum and the set was switched to M.W., but there was no signal input.

Voltage measurements were made with an Avo Electronic Testmeter, which introduces no appreciable voltage drop in the circuit to which it is connected, and allowances must be made for other meters.

Valve	Anode		Screen	
	V	mA	V	mA
V1 1R5	84	1·6	55	2·1
V2 1T4	84	2·0	47	0·8
V3 1S5	24	0·03	14	*
V4 3S4	83	3·4	84	0·9

* No appreciable reading.

GENERAL NOTES

Switches.—**S1-S4** are the waveband switches and **S5, S6** are the battery on/off switches, ganged in two rotary units. These are indicated in our front chassis view, and shown in detail in the diagrams inset beside it. In the fully anti-clockwise position of the control knob the set is switched off. In the next position (M.W.) **S1, S4** and **S5, S6** close; in the clockwise position **S2, S3** and **S5, S6** close for L.W. **S7, S8** are the mains on/off switches, in a separate Q.M.B. unit ganged with the waveband control.

S9 (M)—S17 (B) are the mains/battery change over switches, in a single rotary unit indicated

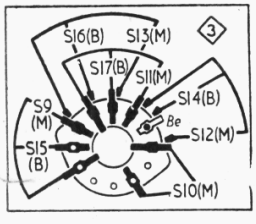
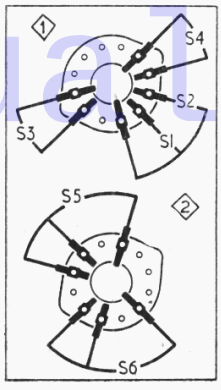


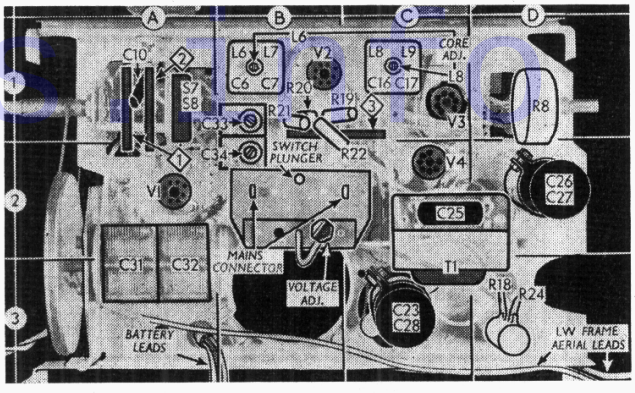
Diagram of the mains | battery change - over switch unit, which is operated by the mains connector.

in our front chassis view by the number **3** in a diamond surround. The arrow indicates the direction in which it is viewed in the diagram above, where the viewer faces the opposite side of the chassis and looks over the top of it.

The switch is spring-loaded to operate normally on batteries. When the mains plug is inserted into its socket, it depresses a plunger which automatically changes the position of the switch wafer, opening the **(B)** switches and closing the **(M)** switches.

Batteries.—The recommended L.T. unit is an Ever Ready "Alldry 31," rated at 7.5 V, with a 2-pin connector. The recommended H.T. Battery consists of two Ever Ready "Batrymax" B104 units, rated at 45 V each and connected in series.





Rear view of the chassis, with diagram of the waveband switch units **1** and **2** inset on the left. A diagram of the mains/battery unit **3** is in col. **1**.

Drive Cord Replacement.—About four feet of good quality waxed flax fishing line is required for a new drive cord, which should be run as seen in the sketch (col. 3), where the system is drawn as seen in a three-quarter perspective from the tuning end and the front of the chassis, with the gang at maximum capacitance.

To fit a new cord it will be necessary to remove the chassis from its plastic end-plates forming the carrying case, as explained under "Dismantling the Set."

DISMANTLING THE SET

Access to Chassis.—Remove back cover (two captive milled nuts beneath case) and front cover (two 6BA nuts, bolts and washers beneath cabinet, and two self-tapping screws behind front edges, reached through gap on left of drive drum and through aperture in right edge of chassis). Plastic scale window can now be lifted off.

Chassis is now accessible from front and rear, but the speaker and scale panel obstruct parts of the front, where most of the small components are situated.

To remove speaker, slacken the fixing ring holding the magnet pot and withdraw speaker, unsoldering its connecting leads from the speech coil tags.

To remove the scale panel, remove the four screws and window-supporting brackets at the ends of the scale panel.

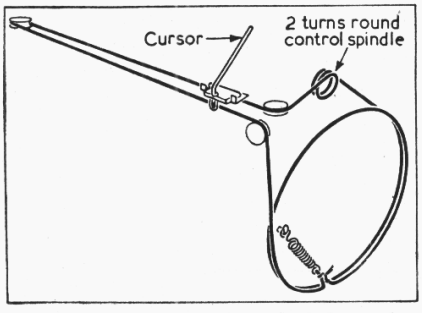
Removing Chassis.—If it is necessary to remove the chassis, remove the two large control knobs (two fixing screws each, inside case) from either end of the carrying case, and the smaller switch control knob, concentric with the tuning control knob, slackening its fixing screw through a hole in the side of the tuning knob bush;

remove the three 4BA ¼in screws (with lock-washers) holding each end of the chassis to the plastic side-members of the carrying case; slide chassis back out of case to extent of frame aerial leads and unsolder them from the tag-strips on the side member and trimmer bracket.

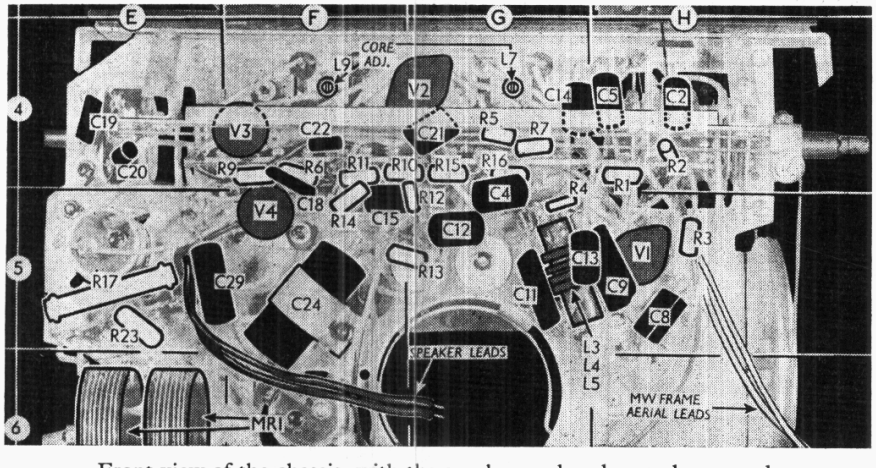
When replacing, the tuning control end of the chassis goes to the side member which carries the trimmer and aerial socket.

The frame aerial leads coming from the chassis tag-strip and waveband switch at the left-hand end of the chassis, go to the top and bottom tags respectively on the paxolin strip beside the trimmer.

The plastic scale window simply lies on the pegs provided for it on the supporting brackets.



Tuning drive system, viewed from the front right corner.



Front view of the chassis, with the speaker and scale panel removed.

CIRCUIT ALIGNMENT

To gain access to the I.F. core adjustments, the back and front covers should be removed from the cabinet and the tuning scale detached from the chassis.

I.F. Stages.—Switch set to M.W., turn the gang and volume control to maximum and connect the signal generator (via a 0.01 μF capacitor in each lead) to the "live" tag on **C31** and chassis. Feed in a 470 kc/s (638·3m) signal and adjust the cores of **L9, L8** (location references F4, C1) and **L7, L6** (G4, B1) in that order, for maximum output, reducing the input as the circuits come into line to avoid A.G.C. action.

Oscillator Stage, M.W.—Refit tuning scale to chassis and check that with the gang at maximum capacitance, the cursor coincides with the high wavelength end of the scales. Couple signal generator via a coil of wire, 5 cms radius 6 cms deep and of 20 turns, located near the receiver. Switch set to M.W., tune to 206.5 m on scale, feed in a 206.5 m (1,450 kc/s) signal and adjust **C33** (B1) for maximum output.

L.W.—Switch set to L.W., tune to 1,875 m on scale, feed in an 1,875 m (160 kc/s) signal and adjust **C34** (B2) for maximum output.

Aerial Stage.—Replace back and front cabinet covers and lay receiver on its back to facilitate adjustment of **C30,** which is accessible through a hole in the paxolin cabinet base. Switch set to M.W., tune to 206.5 m on scale, feed in a 206.5 m (1,450 kc/s) signal and adjust **C30** for maximum output.

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