

'TRADER' SERVICE SHEET

252

COSSOR 484
(AND 438 CONSOLE)

AN unusual type of circuit is employed in the Cossor 484 3-valve (plus rectifier) 3-band A.C. superhet. There is no I.F. amplifying valve, but variable reaction can be applied to the I.F. transformer. Different intermediate frequencies are used on S.W., and on M.W. and L.W.

The set is for mains of 200-250 V, 40-100 C/S, and has a short-wave range of 16-53 metres. There is provision for an extension speaker.

An identical chassis is fitted in the 438 console receiver but this *Service Sheet* was prepared on a 484.

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1** and coupling coils **L1** (S.W.), **L2** (M.W.) and **L3** (L.W.) to single tuned circuits **L4**, **C24** (S.W.), **L5**, **C24** (M.W.) and **L6**, **C24** (L.W.), which precede first valve (**V1**, Cossor metallised 41STH), a triode-hexode operating as frequency changer with internal coupling. Oscillator grid coils **L7** (S.W.), **L8** (M.W.) and **L9** (L.W.) are tuned by **C25**; parallel trimming by **C26** (S.W.), **C27** (M.W.) and **C10**, **C28** (L.W.); series tracking by **C29** (S.W.), **C30** (M.W.) and **C31** (L.W.). Anode

reaction by coils **L10** (S.W.), **L11** (M.W.) and **L12** (L.W.). Gain control of hexode section by variable resistance **R5** in cathode circuit, which also forms part of S.G. potentiometer **R2**, **R3**, **R5**.

No valve amplification other than that afforded by **V1** is employed in the intermediate frequency stage. A single tuned-primary tuned-secondary transformer **C5**, **L13**, **L15**, **C9** of special design behaves as a normal transformer on M.W. and L.W., with adjustable iron-dust cores for trimming. On S.W., however, **S13** and **S16** open so that **C5** and **C9** are no longer in circuit; **S14** closes so that **L13** and **L15** are coupled by **C7**; **C32**, via **S15**, becomes the trimmer and the intermediate frequency is changed.

Intermediate frequencies:—

S.W., 1,363 KC/S; M.W., 465 KC/S. I.F. transformer output is fed to second detector valve (**V2**, Cossor metallised MSPenB), an R.F. pentode operating on grid leak system with **R9** and **C12**. Reaction is applied from anode by coil **L14** in I.F. transformer assembly and is controlled by variable condenser **C33**, ganged with **R5**.

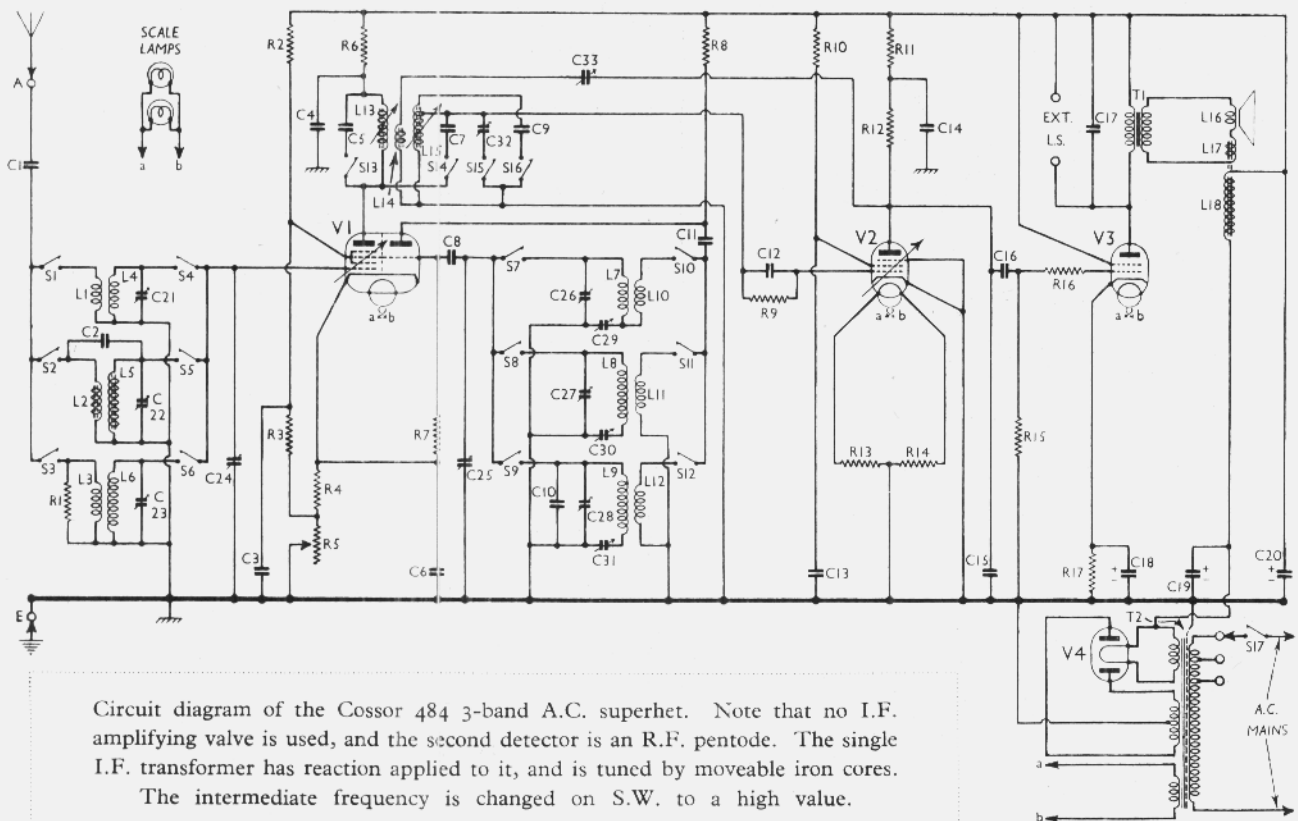
Resistance-capacity coupling by **R12**,

C16 and **R15** between **V2** and tetrode or pentode output valve (**V3**, Cossor 420T or 42MP/Pen). Provision for connection of high impedance external speaker across primary of internal speaker input transformer **T1**.

H.T. current is supplied by full-wave rectifying valve (**V4**, Cossor 442BU). Smoothing by speaker field **L18** and dry electrolytic condensers **C19**, **C20**.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)	
R1	L.W. aerial circuit damping ..	50,000	
R2	V1 S.G. H.T. feed pot. }	20,000	
R3		30,000	
R4		V1 hexode fixed G.B. ..	250
R5		V1 hex. gain control, ganged C33 ..	10,000
R6		V1 hex. anode decoupling ..	5,000
R7	V1 osc. C.G. resistance ..	50,000	
R8	V1 osc. anode H.T. feed ..	25,000	
R9	V2 grid leak ..	3,000,000	
R10	V2 S.G. H.T. feed ..	1,000,000	
R11	V2 anode decoupling ..	100,000	
R12	V2 anode load ..	100,000	
R13	V2 heater potentiometer }	15	
R14		15	
R15	V3 C.G. resistance ..	500,000	
R16	V3 C.G. I.F. stopper ..	100,000	
R17	V3 G.B. resistance ..	140	

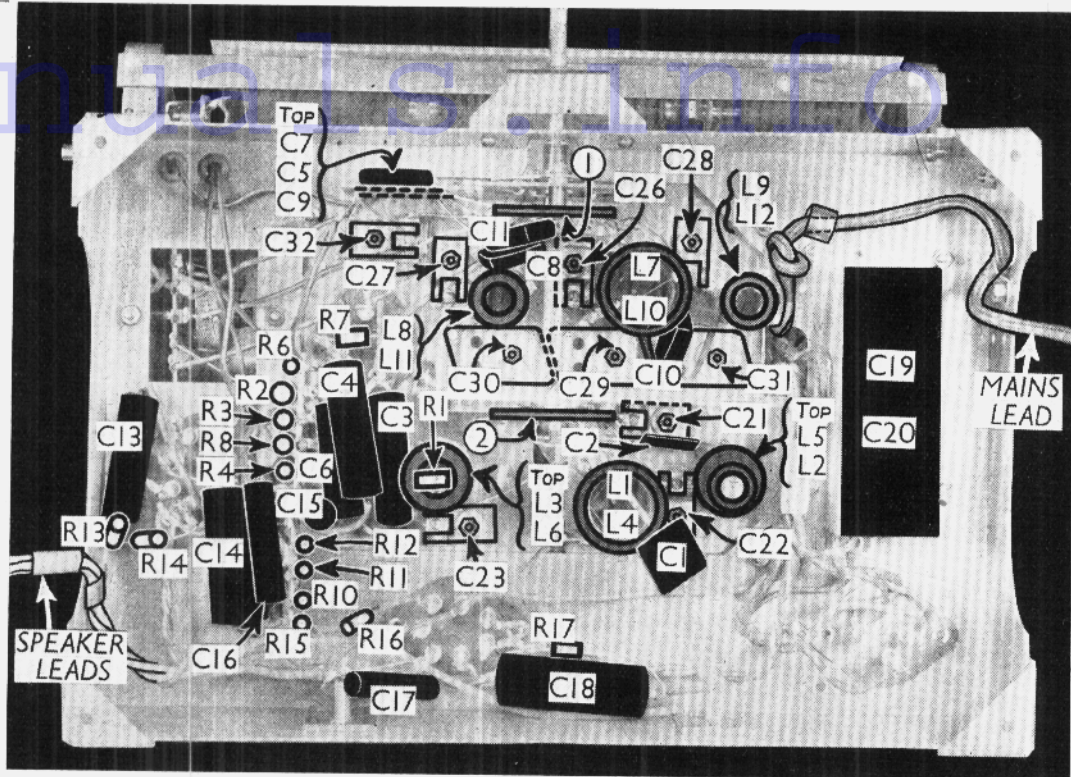


Circuit diagram of the Cossor 484 3-band A.C. superhet. Note that no I.F. amplifying valve is used, and the second detector is an R.F. pentode. The single I.F. transformer has reaction applied to it, and is tuned by moveable iron cores. The intermediate frequency is changed on S.W. to a high value.

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Manuals Info

Under-chassis view. Six coil units, each with two coils, are indicated, while the various trimmers are disposed round them, being attached to the chassis. C5 and C9 are below C7.



CONDENSERS		Values (μF)
C1	Aerial series condenser	0.0005
C2	Additional M.W. coupling condenser	0.00001
C3	V1 S.G. decoupling	0.1
C4	V1 hex. anode decoupling	0.1
C5	I.F. trans. pri. M.W. and L.W. fixed trimmer	0.000155
C6	V1 cathode by-pass	0.1
C7	I.F. trans. S.W. pri./sec. coupling	0.0002
C8	V1 osc. C.G. condenser	0.0002
C9	I.F. trans. sec. M.W. and L.W. fixed trimmer	0.000165
C10	Osc. circuit L.W. fixed trimmer	0.00005
C11	V1 osc. anode coupling	0.0003
C12	V2 C.G. condenser	0.0001
C13	V2 S.G. decoupling	0.1
C14	V2 anode decoupling	0.25
C15	V2 anode R.F. by-pass	0.0002
C16	V2 to V3 A.F. coupling	0.01
C17	Fixed tone corrector	0.01
C18	V3 cathode by-pass	50.0
C19*	H.T. smoothing	8.0
C20*		8.0
C21†	Aerial circuit S.W. trimmer	—
C22†	Aerial circuit M.W. trimmer	—
C23†	Aerial circuit L.W. trimmer	—
C24†	Aerial circuit tuning	—
C25†	Oscillator circuit tuning	—
C26†	Osc. circuit S.W. trimmer	—
C27†	Osc. circuit M.W. trimmer	—
C28†	Osc. circuit L.W. trimmer	—
C29†	Osc. circuit S.W. tracker	—
C30†	Osc. circuit M.W. tracker	—
C31†	Osc. circuit L.W. tracker	—
C32†	I.F. trans. S.W. trimmer	—
C33†	Reaction control, ganged R5	0.0003

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS (Continued)		Approx. Values (ohms)
L10	Osc. anode S.W. reaction	16.0
L11	Osc. anode M.W. reaction	0.3
L12	Osc. anode L.W. reaction	2.25
L13	I.F. trans. primary	3.0
L14	V2 anode reaction coil	0.9
L15	I.F. trans. secondary, total	3.5
L16	Speaker speech coil	2.0
L17	Hum neutralising coil	0.1
L18	Speaker field coil	2,000.0
T1	Speaker input	850.0
	trans. Pri. Sec.	0.3
T2	Mains Heater sec.	25.0
	trans. Rect. heat. sec.	0.1
	(H.T. sec., total)	0.2
S1-S16	Waveband switches	420.0
S17	Mains switch	—

DISMANTLING THE SET

Removing Chassis.—If it is desired to remove the chassis from the cabinet, remove the volume control and tuning knobs complete with their extensions (three screws, two in the latter) and remove the wave-change switch knob with its extension (screw). Now remove the back screw holding the steel bar to the top of the cabinet, push the bar forward and withdraw it.

Next remove the cleat holding the speaker leads to the side of the cabinet (brad) and the four bolts (with washers and lock washers) holding the chassis to the shelf.

By tilting the back upwards the chassis can now be withdrawn to the extent of the speaker leads, which should be sufficient for normal purposes.

To free the chassis entirely, disconnect the speaker leads (screw terminals) and draw these and the mains lead up through the shelf. *When replacing*, connect the speaker leads as follows, numbering the terminals from bottom to top:—1, yellow; 2, red; 3, blue.

Removing Speaker.—To remove the speaker slacken the four clamps (nuts and lock washers) holding it to the sub-baffle. *When replacing*, see that the transformer is on the right.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 230 V, using the 220 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the combined volume and reaction control was at *minimum*, but there was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 41STH*	255	Very low	180	Very low
V2 MSPenB	50	0.8	20	0.3
V3 42OT	230	36.0	260	8.1
V4 42BU	335†	—	—	—

* Oscillator anode, 145 V, 4.6 mA.
† Each anode, A.C.

GENERAL NOTES

Switches.—S1-S16 are the wavechange switches, ganged in two rotary units beneath the chassis, which are indicated in our under-chassis view, and shown in detail in the diagrams on page VIII.

The table (p. VIII) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and C, closed.

S17 is the Q.M.B. mains switch, fitted to the panel at the right hand side of the cabinet.

Continued overleaf

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial S.W. coupling coil	0.1
L2	Aerial M.W. coupling coil	7.0
L3	Aerial L.W. coupling coil	48.0
L4	Aerial circuit S.W. tuning coil	Very low
L5	Aerial circuit M.W. tuning coil	1.25
L6	Aerial circuit L.W. tuning coil	17.0
L7	Osc. circuit S.W. tuning coil	Very low
L8	Osc. circuit M.W. tuning coil	1.1
L9	Osc. circuit L.W. tuning coil	9.0

COSSOR 484—Continued

Coils. L1, L4, L2, L5, L3, L6, L7, L10, L8, L11 and L9, L12 are on separate unscreened tubular formers beneath the chassis. In the case of the S.W. units, L4 and L7 are the thick copper wire windings. The special I.F. transformer, L13-L15 is in a screened unit on the chassis deck. This unit also contains R9 and C12. The coils L13 and L15 are trimmed by adjusting their cores through holes at the right of the screen. L13 is adjusted through the upper hole, and L15 through the lower.

Scale Lamps.—These are fitted in special rubber holders, which can be removed by rotating and withdrawing. The lamps are Osram M.E.S. types, rated at 6.5 V, 0.3 A, having small sized bulbs.

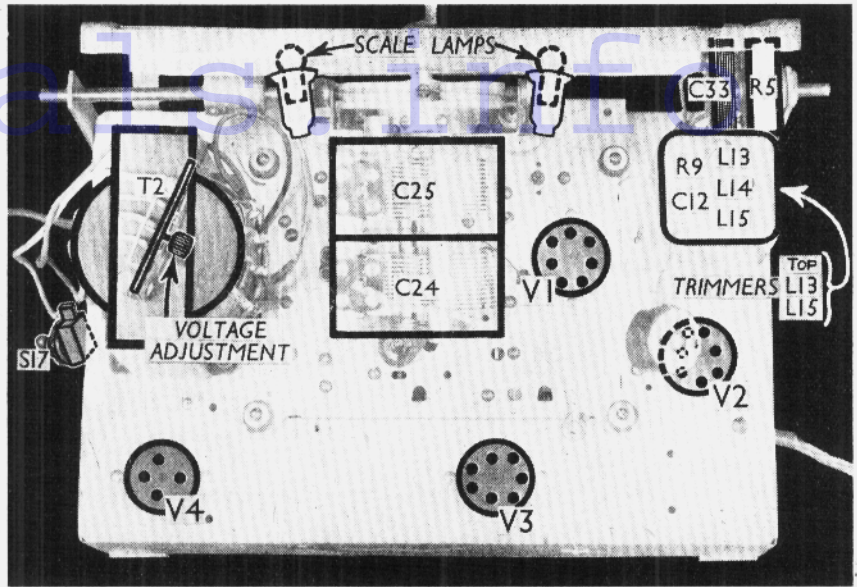
External Speaker.—Sockets are provided at the rear of the chassis for a high impedance (8,000 Ω) external speaker.

Condensers C19, C20.—These are two 8 μF dry electrolytics in a single carton beneath the chassis having a common negative (black) lead. The red lead is the positive of C19, and the yellow, the positive of C20.

Trimmer Condensers.—There are ten of these, all mounted beneath the chassis, and adjustable by hexagonal nuts. In most cases the actual chassis forms one of the "plates," and only one connection (to the moving plate) goes to the trimmer.

CIRCUIT ALIGNMENT

I.F. Stage.—The I.F. coils have moveable cores which are used for I.F. trimming purposes in much the same way as normal



Plan view of the chassis. The moveable cores of the I.F. coils L13, L15 are reached through holes at the right hand side of the I.F. unit. S17 is normally fitted at the right hand side of the cabinet.

I.F. trimming condensers. It is, however, essential to use a non-metallic screwdriver for adjusting the cores, which are accessible through holes in one side of the I.F. coil can, and may be screwed in or out as required.

On the M.W. and L.W. bands the fixed condensers C5 and C9 are connected in parallel with L13 and L15, and tuning is effected by adjusting the cores (I.F., 465 KC/S).

On the S.W. band L13 and part of L15 are connected in parallel, L15 being fed via C7, and C32 is used for tuning to the correct frequency (I.F., 1,363 KC/S). The coil cores must not be re-adjusted after tuning them to 465 KC/S.

It is important to make sure that no reaction is applied during the I.F. adjustments. The best way to ensure this is to disconnect the I.F. reaction condenser C33.

First stop the oscillator circuit from oscillating by shorting out C25 (e.g. by connecting the common tag of S7-S9 to chassis). Connect signal generator to control grid (top cap) of V1 and chassis, and feed in a 465 KC/S signal, with the set switched to M.W. or L.W., reaction condenser disconnected, and volume control at maximum.

Adjust the cores of L13 and L15 for maximum output.

Switch set to S.W., feed in a 1,363 KC/S signal, and adjust C32 for maximum output.

Remove short on C25, but leave C33 disconnected.

R.F. and Oscillator Stages.—S.W.—Connect signal generator to A and E sockets, and switch set to S.W. Feed in an 18 MC/S (16.6 m.) signal, tune to 18 MC/S on scale, and adjust C26, then C21, for maximum output. Feed in a 7 MC/S (49.9 m.) signal, tune to 7 MC/S on scale, and adjust C29 for maximum output, rocking the gang slightly for optimum results.

M.W.—Switch set to M.W., feed in a

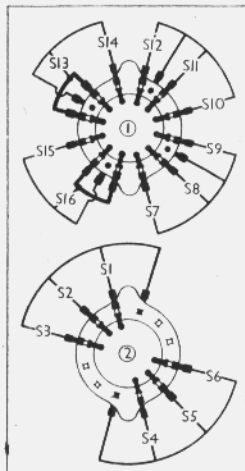
1,400 KC/S (214 m.) signal, tune to 214 m. on scale, and adjust C27, then C22, for maximum output. Feed in a 575 KC/S (522 m.) signal, tune to 522 m. on scale, and adjust C30 for maximum output, rocking the gang slightly.

L.W.—Switch set to L.W., feed in a 300 KC/S (1,000 m.) signal, tune to 1,000 m. on scale, and adjust C28, then C23, for maximum output. Feed in a 160 KC/S (1,875 m.) signal, tune to 1,875 m. on scale, and adjust C31 for maximum output, while rocking the gang slightly.

Finally, re-connect the reaction condenser, C33.

COSSOR 484 SWITCH TABLE AND DIAGRAMS

Switch	S.W.	M.W.	L.W.
S1	C	—	—
S2	—	C	—
S3	—	—	C
S4	C	—	—
S5	—	C	—
S6	—	—	C
S7	C	—	—
S8	—	C	—
S9	—	—	C
S10	C	—	—
S11	—	C	—
S12	—	—	C
S13	—	C	C
S14	C	—	—
S15	C	—	—
S16	—	C	C



Switch diagrams, looking from the rear of the underside of the chassis.

MAINTENANCE PROBLEMS

I WAS confronted with the problem of adapting an Ekco UAW78 from the ordinary standard voltage to 120 V D.C.

By measuring approximately half-way between the top end of the mains resistance and the 200 V tapping, I carefully removed the insulation from the mains resistance at that point, and having made a clip of the same width as the others, clamped this in position and extended the mains tapping lead to suit.

The only snag encountered was that the pilot lamp behind the light beam indicator was rather dull, but nevertheless it was quite sufficient to see the tuning position correctly.

As this model uses a P.M. speaker, results obtained were excellent on all wave bands, but it must be pointed out that this experiment would have been less successful had an energised speaker been used.—W. JOYCE, TIDWORTH.

NOTE.—Users of this hint should be careful to see that in making a new tapping on the series resistance they do not apply a voltage to the valve heaters which is higher than normal.—TECH. ED.