

COSSOR 3783

3-BAND A.C. RECEIVER

THE Cossor 3783 3-valve (plus rectifier) A.C. 3-band receiver is of particular interest in that it operates as a superhet on the short waves and as a T.R.F. receiver on the medium and long waves. It has a short-wave range of 17-25-52.5 metres and is suitable for mains of 200-250 V, 40-100 C/S. Provision is made for an extension speaker.

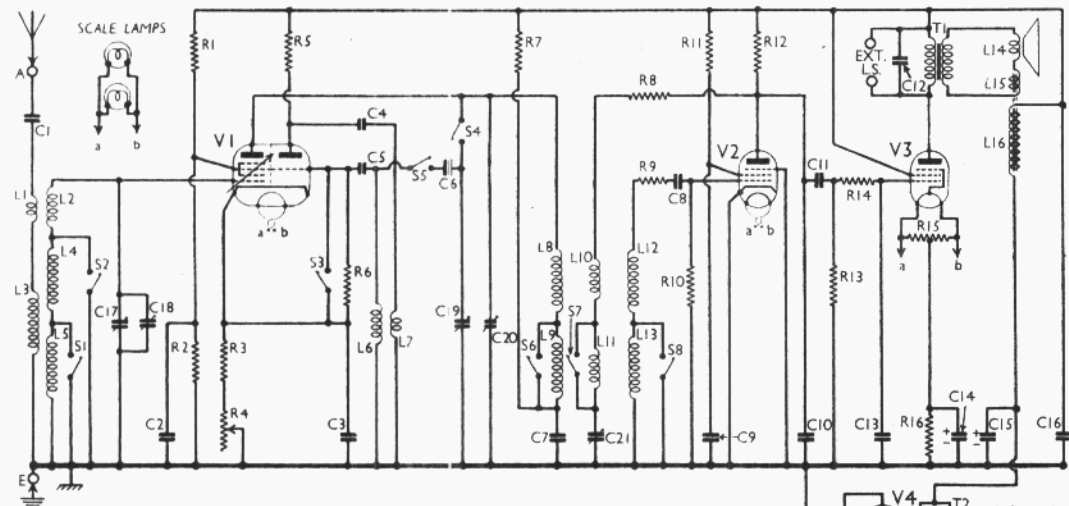
CIRCUIT DESCRIPTION

Aerial input via fixed series condenser **C1** and coupling coils **L1** (S.W.) and **L3** (M.W. and L.W.) to single tuned circuits comprising **L2**, **C17** (S.W.) and **L2**, **L4**, **L5**, **C17** (M.W. and L.W.).

First valve (**V1**, Cossor metallised **41STH**) is a triode-hexode operating as variable-mu R.F. amplifier on M.W. and L.W., and as frequency changer on S.W. with grid coil **L6** tuned by **C19**, tracking by **C6**, and anode reaction coil **L7**.

Tuned-primary transformer coupling by **C19**, **L8**, **L9**, **L12**, **L13** between **V1** and R.F. pentode detector (**V2**, Cossor metallised **MS/Pen**) which operates on grid leak system with **C8** and **R10**. Reaction is applied from anode by coils **L10**, **L11** and controlled by variable condenser **C21**. On S.W. band, the R.F. transformer operates as an untuned intermediate frequency transformer with reaction.

Resistance-capacity coupling by **R12**, **C11**, and **R13** between detector and directly-heated-filament pentode output



valve (**V3**, Cossor **PT41**). Fixed tone correction in anode circuit by **C12**. Provision for connection of high-impedance external speaker across primary of **T1**.

H.T. current is supplied by full-wave rectifying valve (**V4**, Cossor **442BU**). Smoothing by speaker field coil **L16** and electrolytic condensers **C15**, **C16**.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 S.G.'s H.T. potential divider	50,000
R2	V1 fixed G.B. resistance	200,000
R3	V1 gain control	100
R4	V1 osc. anode resistance	12,000
R5	V1 osc. anode resistance	10,000
R6	V1 osc. C.G. resistance	50,000
R7	V1 hexode anode decoupling	10,000
R8	Reaction circuit stabiliser	300
R9	V2 C.G. circuit stabiliser	200
R10	V2 grid leak	1,000,000
R11	V2 S.G. H.T. feed	500,000
R12	V2 anode load	100,000
R13	V2 C.G. resistance	500,000
R14	V3 C.G. R.F. stopper	100,000
R15	V3 filament pot	25
R16	V3 G.B. resistance	300

CONDENSERS		Values (μF)
C1	Aerial series condenser	0.0005
C2	V1 S.G.'s by-pass	0.1
C3	V1 cathode by-pass	0.1
C4	V1 osc. anode condenser	0.00005
C5	V1 osc. C.G. condenser	0.00005
C6	Osc. S.W. tracker	0.0012
C7	V1 hexode anode decoupling	0.1
C8	V2 C.G. condenser	0.0001
C9	V2 S.G. by-pass	0.1
C10	V2 anode R.F. by-pass	0.0002
C11	V2 to V3 A.F. coupling	0.01
C12	Tone corrector	0.005
C13	V3 C.G. R.F. by-pass	0.0002
C14	V3 G.B. circuit by-pass	50.0
C15	H.T. smoothing	6.0
C16	H.T. smoothing	4.0
C17	Aerial circuit tuning	—
C18	Aerial circuit trimmer	—
C19	H.F. trans. and osc. tuning	—
C20	H.F. trans. pri. trimmer	0.00003
C21	Reaction control	0.0005

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS

		Approx. Value (ohms)
L1	Aerial S.W. coupling coil	0.2
L2	Aerial S.W. tuning coil	Very low
L3	Aerial M.W. and L.W. coupling	8.7
L4	Aerial M.W. and L.W. tuning coils	1.3
L5	coils	13.0
L6	Osc. tuning coil (S.W.)	Very low
L7	Osc. reaction coil (S.W.)	7.0
L8	H.F. trans. primary (M.W. and L.W.)	1.6
L9		12.5
L10	Reaction coils	0.5
L11		3.5
L12	H.F. trans. secondary (M.W. and L.W.)	1.3
L13		12.5
L14	Speaker speech coil	2.1
L15	Hum neutralising coil	0.1
L16	Speaker field coil	2500.0
T1	Speaker input trans. (Pri. Sec.)	210.0 0.25
		60.0
T2	Mains trans. (L.T. sec. Rect. fil. sec. H.T. sec. total)	0.15 0.2 1300.0
S1-8	Waveband switches	—
S9	Mains switch	—

DISMANTLING THE SET

A detachable bottom is fitted to the receiver and upon removal (two screws and washers) gives access to most of the under-chassis components.

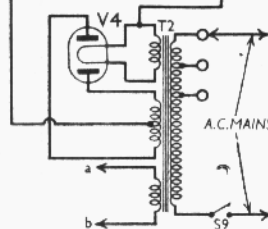
Removing Chassis.—If it should be necessary to remove the chassis from the cabinet, first remove the small trimmer knob (screw down the centre) taking care not to lose the three washers, and then remove the other four knobs (recessed screws). Now remove the detachable bottom and the four bolts (with washers and lock washers) holding the chassis to the bottom of the cabinet.

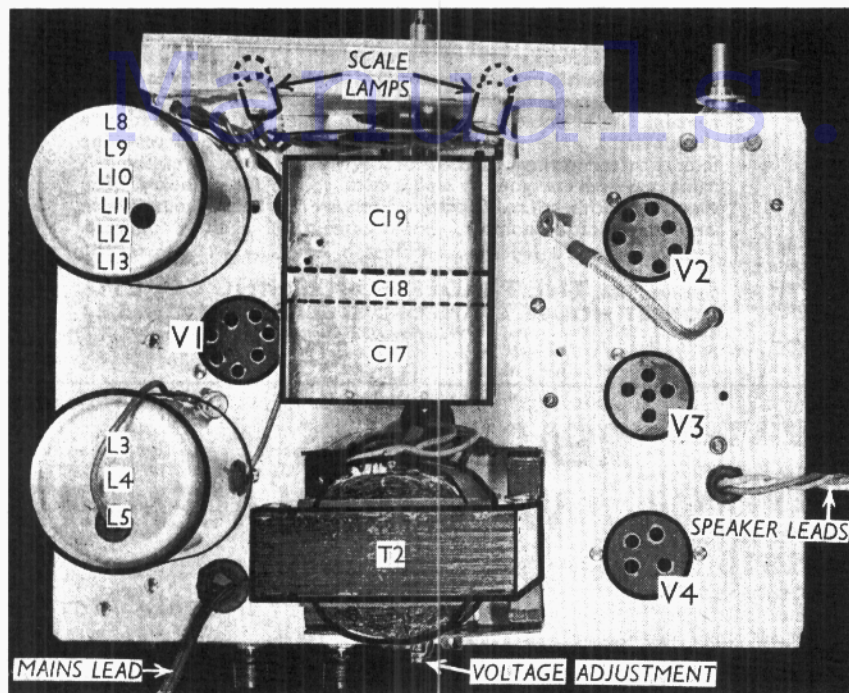
Next take out the two round-head wood screws holding the top of the tuning scale to the front of the cabinet and free the mains lead from the cleat on the side of the cabinet. The chassis can now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.

When replacing the knobs, fix the large tuning knob first and then place on the spindle the wire washer and the two others, in that order, before replacing the small trimmer knob.

To free the chassis entirely, unsolder the speaker leads and when replacing,

Circuit diagram of the Cossor 3783 3-band A.C. receiver. It operates as a simple superhet on the S.W. band only, the circuit on M.W. and L.W. being that of a 3-stage T.R.F. model.





Plan view of the chassis. C18 is operated by a shaft concentric with the main tuning spindle.

connect them as follows, numbering the tags from left to right: 1, blue; 2, red; 3 and 4 joined together, yellow.

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

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 volume control was at maximum, but the reaction control was at minimum. 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*	140	4.6	60	2.2
V2 MS/Pen	75	0.8	30	0.4
V3 PT41	185	24.0	195	5.5
V4 442BU	310†	—	—	—

* Oscillator anode 90V, 9.9 mA.
† Each anode, A.C.

GENERAL NOTES

Switches.—S1-S9 are the waveband

Switch	M.W.	L.W.	S.W.
S1	C	O	C
S2	O	O	C
S3	C	C	O
S4	C	C	O
S5	O	O	C
S6	C	O	C
S7	C	O	C
S8	C	O	C
S9	C	C	C

and mains switches, ganged together in a single unit beneath the chassis, the individual switches being indicated in our under-chassis view. The table (col. 1) gives the switch positions for the various control settings, rotating clockwise from the "off" position." All switches except S1 are open in the "off" position.

Coils.—L1, L2 and L6, L7 are on two tubular formers beneath the chassis, L2 and L6 being the bare copper windings. L3-L5 and L8-L13 are in two screened units on the chassis deck.

Scale Lamps.—These are two 6.5 V, 0.3A Osram M.E.S. types.

Condenser C18.—The aerial circuit trimmer is incorporated in the ganged unit, in the same compartment as C17. It is operated by a spindle concentric with the main tuning spindle.

External Speaker.—Two sockets are provided at the rear of the chassis for a high impedance (8,000 O) external speaker. Cossor Model 595 is recommended.

Condensers C15, C16.—These are two dry electrolytics in a single carton beneath the chassis, with a common negative (black) lead. The red lead is the positive of C15 (6μF), and the yellow the positive of C16 (4μF).

Resistance R15.—This is a centre-tapped wire-wound component.

Condenser C6.—In our chassis, this consists of two units in parallel.

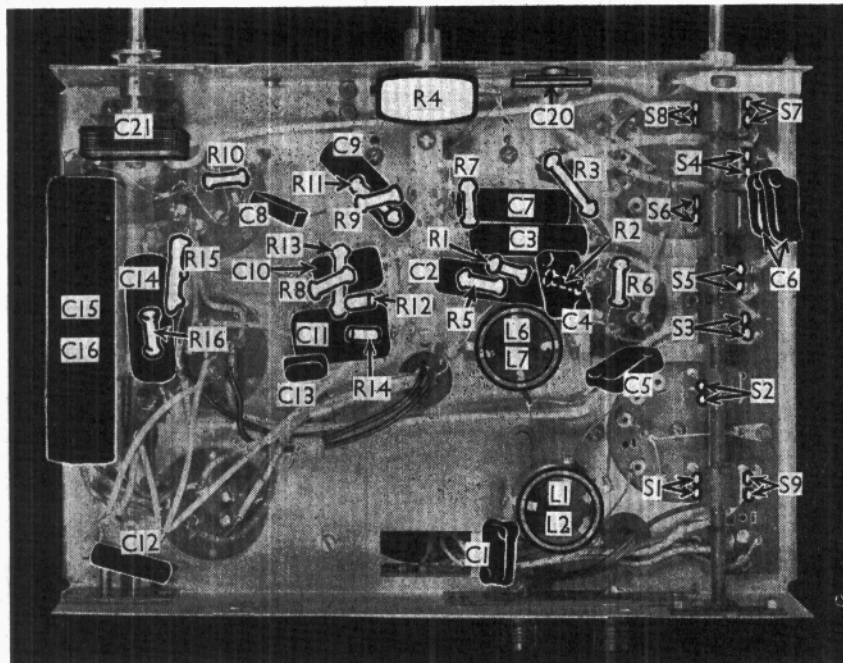
Condenser C20.—This is adjustable through a hole in the front of the chassis.

CIRCUIT ALIGNMENT

For alignment purposes this receiver should be treated as an ordinary straight H.F., detector and L.F. type. The S.W. band will be brought into line automatically after aligning on the M.W. band.

Switch the set to the M.W. band, and tune the set to 300 m. on the scale, after making sure that the pointer indicates 200 m. when the tuning knob is rotated fully anti-clockwise.

Inject a 300 m. signal at the A and E terminals, and adjust C18 (concentric with main tuning knob) for maximum output. Next adjust C20 (through hole in front of chassis), for maximum output, at the same time rocking knob of C18 in an attempt to increase the output. Alignment should be performed with a fair amount of reaction in use, the control knob being about half-way between minimum and maximum.



Under-chassis view. All the switches are indicated, C6 consists of two condensers in parallel. C20 is adjusted through the front of the chassis.