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"TRADER" SERVICE SHEET

538

COSSOR M44

AC/DC TRANSPORTABLE

FIVE separate units go to make up the Cossor M44, a 3-valve (plus rectifier) 2-band AC/DC transportable TRF receiver. Three of the units are interconnected by plugs and sockets; the other two by soldered leads. In two instances, top-cap valve connectors (**V1** and **V3**) form interconnections.

The receiver is designed to operate from mains of 200 to 240 V.

Release date: *June*, 1938.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1** (MW), **L2** (LW) and **C20** to variable-mu RF pentode amplifier **(V1, Cossor metallised 202VPB).** Gain control by **R3** in association with **R1, R2** and **R4.** Provision for connection of external aerial via **C1.**

Tuned-anode coupling by **L5** (MW), plus **L6** (LW), and **C22** between **V1** and second RF pentode **(V2, Cossor metallised 202SPB)** which operates as leaky grid detector with **C6** and **R5.** Reaction from anode via **L3** and **L4** is controlled by **C24.**

Resistance-capacity coupling by **R8, C10** and **R10** between **V2** and pentode output valve **(V3, Cossor 402PenA).** RF filtering in **V2** anode circuit by **C8, R9, C9,** and in **V3** grid circuit by **R11, C11.** Fixed tone correction by **C15** in anode circuit.

When operating with AC mains, HT current is supplied by half-wave rectifying valve **(V4, Cossor 40SUA),** which with DC mains behaves as a low resistance. Smoothing by speaker field **L9** and electrolytic condensers **C12** and **C17.**

Valve heaters, with ballast resistance **R15,** are connected across mains input. A filter circuit, **L10, L11** and **C18, C19,** enclosed in a separate screening case with mains switches **S3, S4,** suppresses mains borne interference. The scale lamp with its shunt **R14** is connected in series with the mains lead to chassis, so that it is energised both by AC and DC current components.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with AC mains of 236 V, using the 240 V tapping on the mains resistance.

The receiver was tuned to the lowest wavelength on the MW band, the volume control was at maximum, and the reaction control at minimum. **V1** top cap was connected directly to chassis.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 202VPB	140	4·4	100	1·4
V2 202SPB	25	1·0	22	0·3
V3 402PenA	154	48·0	137	12·5
V4 40SUA	200†	—	—	—

† Cathode to chassis, DC.

DISMANTLING THE SET

Altogether, the receiver is divided into five units, which are identified in this *Service Sheet* as: frame aerial assembly; receiver chassis; power and output unit; mains filter unit; and speaker assembly. Dismantling must be carried out in the following order.

Removing Power and Output and Filter Units:—

Withdraw the top-cap connector from **V3;**

Withdraw from the sockets on the speaker transformer and receiver chassis the two 4-pin plugs connecting them to the power and output unit;

withdraw the scale lamp holder from its bracket on the receiver chassis;

unsolder from the earth socket, at the top of the carrying case, the blue lead from the mains filter unit;

remove the two cheese-head screws (with washers) holding the power and output unit to the bottom of the case;

remove from inside the case the two nuts and

(Continued overleaf.)

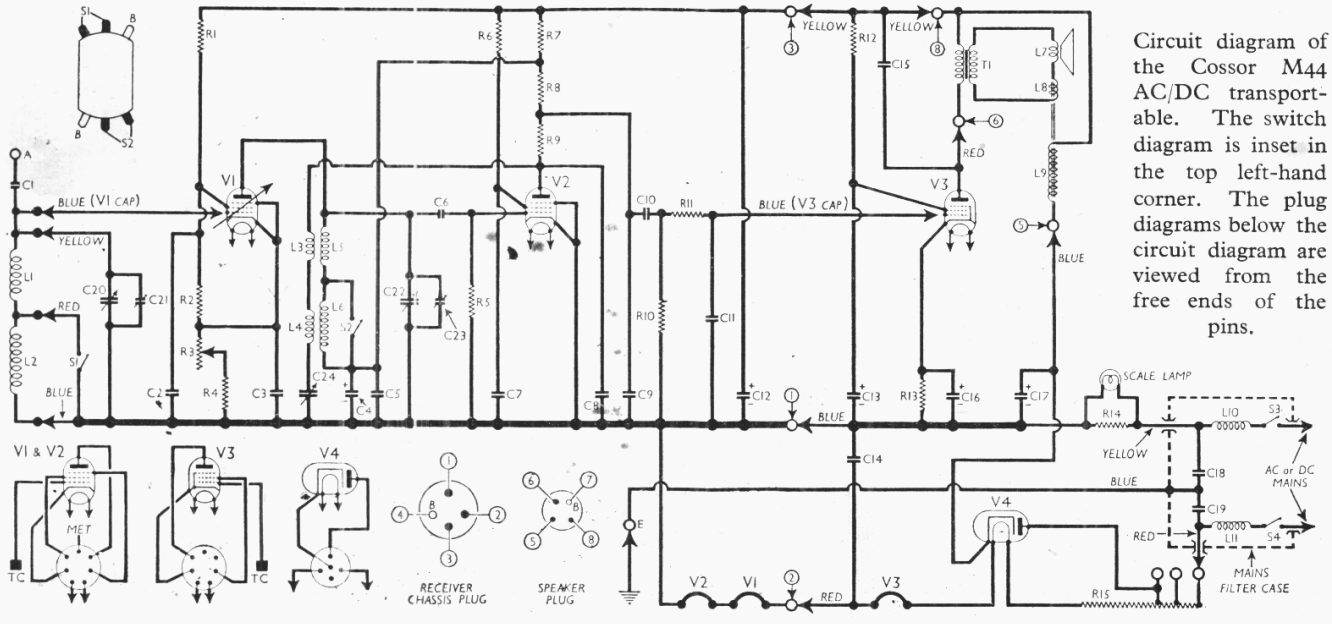
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 SG feed potential divider	15,000
R2		40,000
R3	V1 gain control	12,000
R4	V1 fixed GB resistance	150
R5	V2 grid leak	1,000,000
R6	V2 SG HT feed	500,000
R7	V1, V2 anodes decoupling	5,000
R8	V2 anode load resistance	100,000
R9	RF stopper	15,000
R10	V3 CG resistance	500,000
R11	V3 grid stopper	250,000
R12	V3 SG HT feed	2,500
R13	V3 GB resistance	130
R14	Scale lamp shunt	35
R15	Heater circuit ballast, total	518†

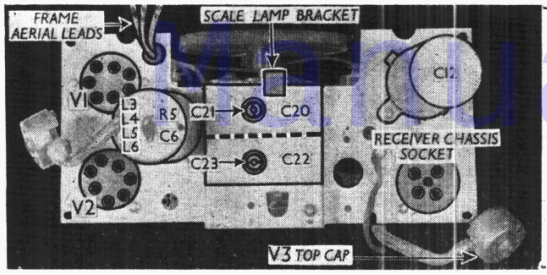
† Tapped at 395Ω + 60Ω + 63Ω from V4 heater.

	CONDENSERS	Values (μF)
C1	Ext. aerial series condenser	0·000005
C2	V1 SG decoupling	0·1
C3	V1 cathode by-pass	0·1
C4*	V1, V2 anodes decoupling	2·0
C5	V1, V2 anodes RF by-pass	0·1
C6	V2 CG condenser	0·000025
C7	V2 SG decoupling	0·1
C8	RF by-pass condensers	0·0005
C9		0·0005
C10	V2 to V3 AF coupling	0·05
C11	RF by-pass condenser	0·0002
C12*	HT smoothing condenser	16·0
C13*	V3 SG decoupling	2·0
C14	Heater circuit RF by-pass	0·01
C15	Fixed tone corrector	0·01
C16*	V3 cathode by-pass	50·0
C17*	HT smoothing condenser	32·0
C18	Mains RF by-pass condensers	0·01
C19		0·01
C20†	Frame aerial tuning	—
C21‡	Frame aerial MW trimmer	—
C22†	V1 anode circuit tuning	—
C23‡	V1 anode MW trimmer	—
C24†	Reaction control	0·00035

* Electrolytic. † Variable. ‡ Pre-set.

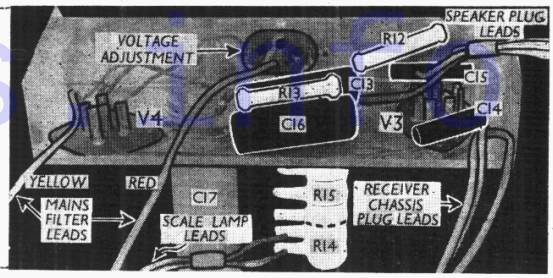


Circuit diagram of the Cossor M44 AC/DC transportable. The switch diagram is inset in the top left-hand corner. The plug diagrams below the circuit diagram are viewed from the free ends of the pins.



Left—Plan view of receiver chassis. **V1** top cap connector is attached to the frame assembly, which is not shown.

Right—Three - quarter view of the underside of the power and output unit. The speaker, chassis, mains filter and scale lamp leads are indicated.



OTHER COMPONENTS		Approx. Values (ohms)
L1, L2	Frame aerial windings	1·0, 7·5
L3, L4	Reaction coils, total	6·0
L5, L6	V1 anode tuning coils	3·0, 27·0
L7	Speaker speech coil	2·0
L8	Hum neutralising coil	0·1
L9	Speaker field coil	400·0
L10, L11	Mains filter chokes	10·0, 10·0
T1	Speaker input trans. Pri. / Sec.	310·0 / 0·3
S1, S2	Waveband switches	—
S3, S4	Mains switches	—

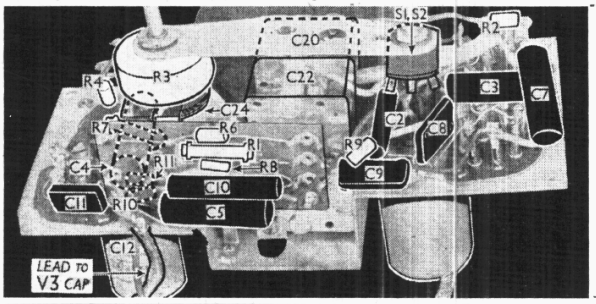
DISMANTLING THE SET (*continued*)

ornamental headed screws holding the mains filter unit to the side of the case;
withdraw the two units, drawing the mains lead through the slot in the case.
When replacing, the thick metal washers fit in the recesses in the bottom of the case; the thin ones cover them.

Removing Frame Aerial Assembly.—First remove the power and output and filter units;
unsolder from the frame aerial connecting panel at the top of the assembly the three leads on tags 1, 3 and 4 (numbering from left to right when viewed from the rear), connecting it to chassis;
withdraw from **V1** the top cap connector (this is connected to tag 2);
remove from each side member of the frame support one countersunk-head wood screw, holding it to the case;
carefully withdraw the assembly.
When replacing, see that the holes for the power and output unit fixing bolts coincide with those in the bottom of the case, and connect the frame leads as follows:
1, yellow;
3, red;
4, blue (from chassis).

Removing Receiver Chassis.—First remove the power and output and filter units and the frame aerial assembly;
remove the three control knobs (recessed screws);
remove the four round-head wood screws holding the chassis to the mounting blocks on the front of the case.
When replacing, slip the two earthing tags under the heads of the two lower chassis fixing screws.

Removing Speaker.—First remove the power and output and filter units and the frame aerial assembly;
remove the four hexagon nuts (with metal washers) holding the sub-baffle to the front of the case, and the four ornamental-headed fixing screws.
The speaker and sub-baffle can now be eased away out of the case, but they cannot be separated until the hollow rivets (with brass washers) holding them together have been removed.
When replacing, the transformer should be on the right, and the bottom edge of the speaker rim must be fitted into a slot recessed in the bottom of the case.



Underside view of receiver chassis. The **S1, S2** switch unit is indicated here, and shown in detail in the top left-hand corner of the circuit diagram overleaf. Several components are shown dotted through the mounting panel on the left.

GENERAL NOTES

Switches.—S1, S2 are the waveband switches, in a rotary unit on the chassis deck. A diagram of the unit, as seen in our under-chassis view, is inset in the top left-hand corner of the circuit diagram.

S3, S4 are the QMB mains switches, mounted in the separate mains filter unit.

Coils.—L1, L2 are the frame aerial windings and are not seen in our chassis illustrations.

The tuned anode and reaction coils **L3-L6** are in a screened unit on the chassis deck with **C6** and **R5.** The mains filter chokes **L10, L11** are in the filter unit case with **C18, C19,** and are not seen in our illustrations.

Scale Lamp.—This is an MES type lamp, rated at 8V, 0.2 A, with a spherical bulb. It is connected with its shunt resistance **R14** in series with the chassis side of the mains lead.

Resistances R14, R15.—These are two separate resistances, but are both made up in a single unit. This unit is of the wire-wound vitreous enamelled type, and has six connecting tags. The bottom tag is at one end of **R15,** and is connected to **V4** heater; the next three are the voltage adjustment tappings at the other end of **R15;** the two top tags are at the ends of **R14,** and the scale lamp leads are connected to them.

Condenser C12.—This is a 16 μF Hunts surge-proof electrolytic, in a tubular metal container, mounted on the receiver chassis deck. It is rated at 350 V working.

Condenser C17.—This is a Plessey surge-limiting type, rated at 32 μF, 350 V working. The tubular metal container forms the negative connection. It is mounted on the deck of the power and output unit.

Mains Input Filter Unit.—The mains switches **S3, S4** and the filter circuit **L10, L11, C18, C19** are contained in a metal screening box, by which the mains leads enter the receiver. The screen is indicated by a broken surround in our circuit diagram, but the unit does not appear in our chassis illustrations. The two outlet leads are indicated and colour coded in our circuit diagram.

The double-pole mains switch toggle and the mains lead entry are on a panel on one face of the unit which is mounted behind an aperture in one side of the carrying case, so that they appear on the outer side of the carrying case when mounted. The screening box is connected directly to the **E** socket of the receiver.

Receiver Chassis Plug.—This is a standard 4-pin valve base type plug, three pins of which are used to connect the receiver chassis to the power and output unit. A diagram of the plug, viewing the free ends of the pins, is inset beneath the circuit diagram. Three pins, numbered 1, 2 and 3, are used, and the fourth is blank. The pin numbers agree with the numbers in circles at the three corresponding intersecting points in the circuit diagram, where the plug lead colours are indicated. The plug is attached to the power and output unit, and the socket is mounted on the receiver chassis deck. A fourth connecting lead between the two units is provided by the top-cap connector to **V3.** This lead is attached to the receiver chassis.

Speaker Plug.—This is another 4-pin plug, but of a different type, in which only three pins are used. The points at which they occur are indicated in the circuit diagram by the numbers 5, 6 and 8, which are repeated in the diagram of the plug, again viewing the free ends of the pins, beneath the circuit diagram. Pin 7 is blank. The plug is attached to the power and output unit, and the socket is mounted on the speaker input transformer.

CIRCUIT ALIGNMENT

With the gang at minimum, the scale pointer should coincide with the red mark at 200 m on the scale. Couple the signal generator via a turn or two of wire wound round the outside of the case.

MW.—Switch set to MW, and set volume control at a point just short of oscillation. Tune to 214 m on scale, feed in a 214 m (1,400 KC/S) signal, and adjust **C21** and **C23** for maximum output, readjusting the volume control as the circuits come into line. Check calibration at 500 m (600 KC/S).

LW.—There are no adjustments for this, but calibration should be checked at various points. Finally, adjust **C21** while receiving a reliable broadcast signal.

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