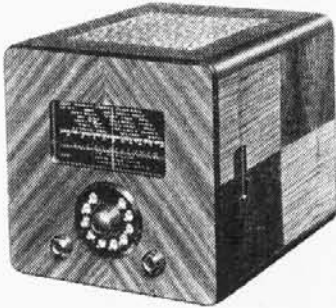


'TRADER' SERVICE SHEET

320

# COSSOR 3952

## AND 395 AC SUPERHETS



The Cossor 3952, with its Teledial. The 395 is in a different cabinet and has no automatic dial.

**T**O the Cossor 3952 receiver there is fitted a telephone-type tuning dial which can be pre-set for the tuning of ten stations, the gang condenser being rotated to predetermined positions according to the hole in which the finger is inserted. The receiver is a 4-valve (plus rectifier) AC 2-band superhet suitable for mains of 200-250 V, 40-100 C/S, and has provision for both a gramophone pick-up and an extension speaker. Feet are fitted so that the cabinet can be stood up horizontally or vertically.

An identical chassis is employed in the 395 receiver, but this does not include the Teledial tuning, as it is called, with its muting switch, and has a different cabinet. This *Service Sheet* was prepared on a 3952.

### CIRCUIT DESCRIPTION

Aerial input via series condenser **C1**, coupling coil **L1** and coupling condenser **C2** to inductively coupled band-pass filter. Primary coils **L2, L3** are tuned by **C21**; secondaries **L5, L6** by **C23**. Image suppression by coil **L4**.

First valve (**V1, Cossor metallised 41MPG**) is a heptode operating as frequency changer with electron coupling. Oscillator grid coils **L8 (MW)** and **L9 (LW)** are tuned by **C25**; parallel trimming by **C26 (MW)** and **C27 (LW)**; series tracking by **C29 (MW)** and **C28 (LW)**. Reaction by coils **L10 (MW)** and **L11 (LW)**.

Second valve (**V2, Cossor metallised MVS/Pen**) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C30, L12, L13, C31** and **C32, L14, L15, C33**. Switch **S6**, across **L12**, closes on gramophone position of waveband switch, muting radio.

### Intermediate frequency 465 KC/S.

Diode second detector is part of double diode triode valve (**V3, Cossor metallised DDT**). Audio frequency component in rectified output is developed across manual volume control **R7**, which also operates as load resistance, and passed via AF coupling condenser **C13**, CG resistance **R9** and IF stopper **R8** to CG of triode section, which operates as AF amplifier.

Second diode of **V3**, fed from **V2** anode via **C10**, provides DC potential which is developed across load resistance **R13**

and passed back through decoupling circuit as GB to FC and IF valves, giving automatic volume control. Delay voltage is obtained from drop along both resistances **R10** in cathode circuit and **R18** in negative lead to chassis.

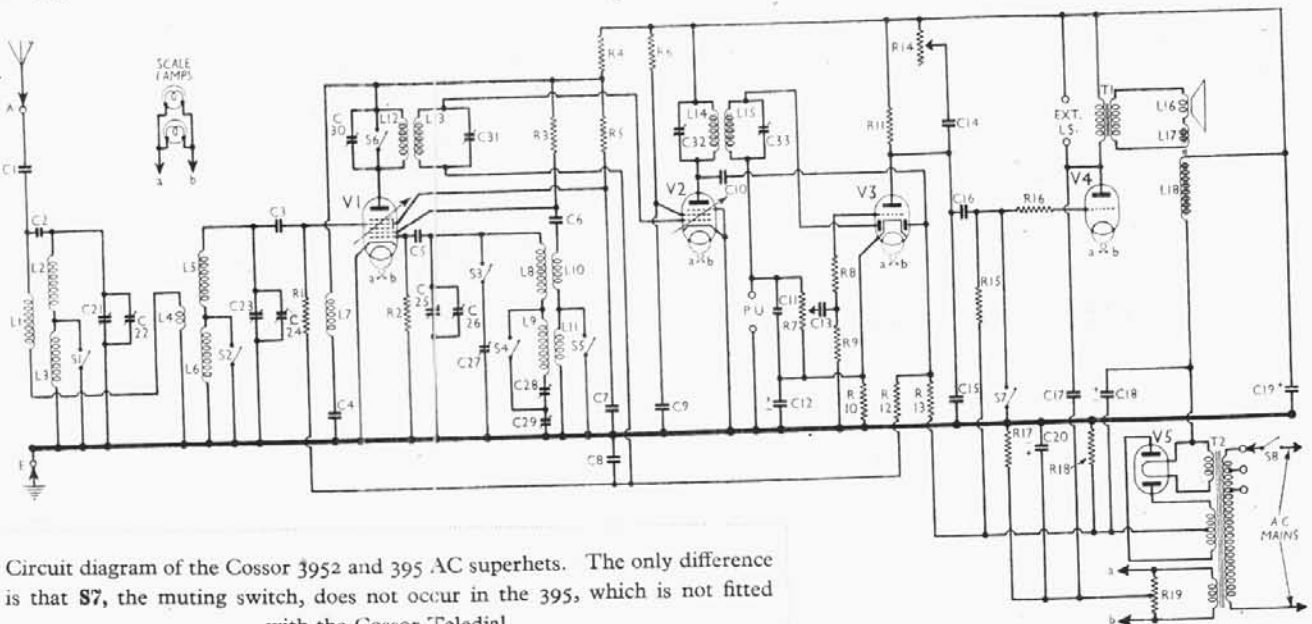
Resistance-capacity coupling by **R11, C16, R15** via stopper **R16** between **V3** triode and triode output valve (**V4, Cossor 4XP**). Switch **S7**, connected between junction of **R15, R16** and chassis, is part of the Teledial mechanism and closes, muting the receiver, when one of the selector buttons is depressed. For purposes of adjustment the muting screw can be slacked off a few turns, rendering **S7** inoperative.

Variable tone control by **R14, C14** across **R11** in anode circuit of **V3**. Fixed tone correction by **C17** in anode circuit of **V4**. Provision for connection of high impedance external speaker across primary of internal speaker input transformer **T1**.

HT current is supplied by full-wave rectifying valve (**V5, Cossor 442BU**). Smoothing by speaker field **L18** and dry electrolytic condensers **C18, C19**.

### DISMANTLING THE SET

**Removing Chassis.**—To remove the chassis from the cabinet, first remove the three control knobs (recessed screws) and the four rubber feet (pull), each of which has a metal ball. Now remove the four bolts (with lock washers) thus exposed, and the two round-head wood screws holding the tuning scale to the front of the cabinet.



Circuit diagram of the Cossor 3952 and 395 AC superhets. The only difference is that **S7**, the muting switch, does not occur in the 395, which is not fitted with the Cossor Teledial.



Then disconnect the speaker leads (screw terminals) and remove the speaker by slackening the four clamps holding it to the sub-baffle (wing nuts), when the chassis can be withdrawn.

When replacing, see that there is a metal ball in each of the rubber feet and position the speaker transformer so that the transformer is at the back. Connect the speaker leads as follows, numbering the terminals from left to right:—1, blue; 2, red; 3, yellow, and note that the projection on the back of the tuning dial must engage in the slot in the selector plate.

**Removing Speaker.**—If it is desired to remove the speaker from the cabinet, disconnect the leads and slacken the four clamps holding it to the sub-baffle (wing nuts). When replacing, see that the transformer is at the back and connect the leads as follows, numbering the terminals from left to right:—1, blue; 2, red; 3, yellow.

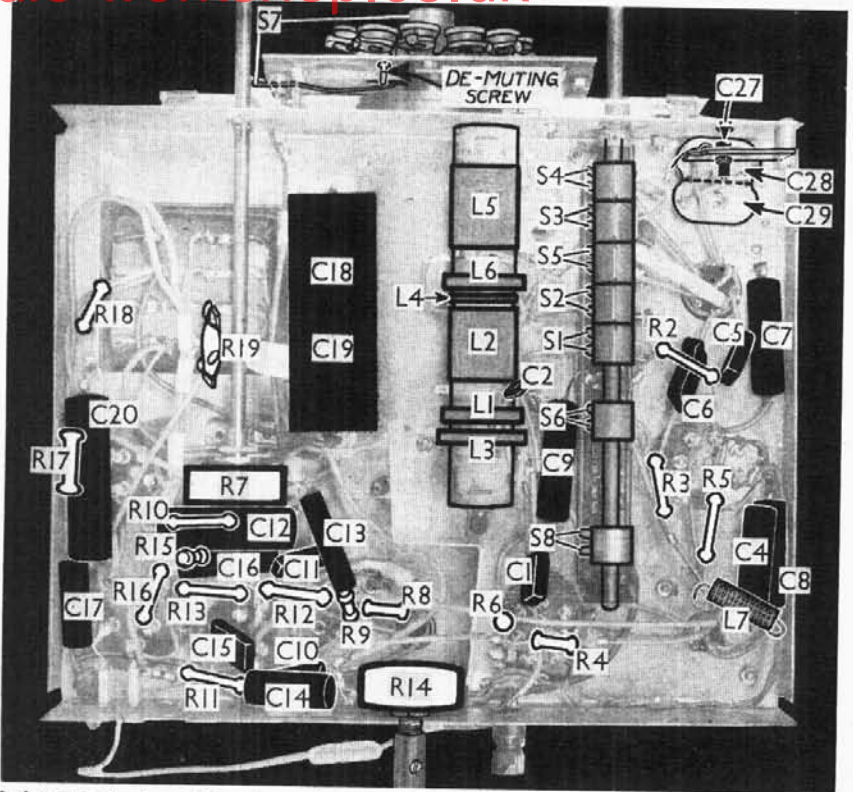
**COMPONENTS AND VALUES**

RESISTANCES		Values (ohms)
R1	V1 tetrode CG resistance	1,000,000
R2	V1 osc. CG resistance	50,000
R3	V1 osc. anode HT feed	50,000
R4	V1 SG, tet. anode and osc. anode HT feed	4,000
R5	V1 SG HT feed	50,000
R6	V2 SG HT feed	100,000
R7	Manual volume control: V3 signal diode load	500,000
R8	IF stopper	250,000
R9	V3 triode CG resistance	2,000,000
R10	V3 GB and part AVC delay	2,000
R11	V3 triode anode load	50,000
R12	AVC line decoupling	2,000,000
R13	V3 AVC diode load	2,000,000
R14	Variable tone control	20,000
R15	V4 CG resistance	500,000
R16	V4 grid stopper	100,000
R17	V4 GB resistance	500
R18	Part of AVC delay	25
R19	Heater circuit pot., total	*25

\* Centre-tapped.

CONDENSERS		Values (µF)
C1	Aerial series condenser	0.0003
C2	Aerial coupling condenser	0.000025
C3	V1 tetrode CG condenser	0.001
C4	V1 SG, tet. anode and osc. anode decoupling	0.1
C5	V1 osc. CG condenser	0.0002
C6	V1 osc. anode coupling	0.002
C7	V1 SG decoupling	0.1
C8	AVC line decoupling	0.05
C9	V2 SG decoupling	0.1
C10	Coupling to V3 AVC diode	0.0001
C11	IF by-pass	0.00005
C12*	V3 cathode by-pass	50.0
C13	AF coupling to V3 triode	0.01
C14	Part of variable tone control	0.02
C15	IF by-pass	0.0005
C16	V3 triode to V4 AF coupling	0.01
C17	Fixed tone corrector	0.002
C18*	HT smoothing	8.0
C19*	V4 cathode by-pass	8.0
C20*	Band-pass pri. tuning	25.0
C21†	Band-pass pri. MW trimmer	—
C22†	Band-pass pri. MW trimmer	—
C23†	Band-pass sec. tuning	—
C24†	Band-pass sec. MW trimmer	—
C25†	Oscillator circuit tuning	—
C26†	Osc. circuit MW trimmer	—
C27†	Osc. circuit LW trimmer	—
C28†	Osc. circuit LW tracker	—
C29†	Osc. circuit MW tracker	—
C30†	1st IF trans. pri. tuning	—
C31†	1st IF trans. sec. tuning	—
C32†	2nd IF trans. pri. tuning	—
C33†	2nd IF trans. sec. tuning	—

\*Electrolytic. †Variable. ‡Pre-set.



Under-chassis view. The de-muting screw works in conjunction with the muting switch S7, and both are fully explained in "General Notes."

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial coupling coil	9.5
L2	Band-pass primary coils	3.5
L3	Image rejector coil	13.5
L4	Image rejector coil	0.4
L5	Band-pass secondary coils	3.5
L6	Band-pass secondary coils	13.5
L7	Decoupling circuit RF choke	Very low
L8	Osc. circuit MW tuning coil	3.0
L9	Osc. circuit LW tuning coil	5.25
L10	Oscillator MW reaction	1.25
L11	Oscillator LW reaction	3.25
L12	1st IF trans. Pri.	2.0
L13	1st IF trans. Sec.	2.0
L14	2nd IF trans. Pri.	2.0
L15	2nd IF trans. Sec.	2.0
L16	Speaker speech coil	2.0
L17	Hum neutralising coil	0.1
L18	Speaker field coil	2,000.0
T1	Speaker input trans. Pri.	170.0
	Sec.	0.2
	Pri., total	25.0
T2	Mains trans. Heater sec.	0.1
	Rec. heat. sec.	0.1
	HT sec., total	440.0
S1-S5	Waveband switches	—
S6	Radio muting switch	—
S7	"Teledial" muting switch	—
S8	Mains switch	—

**VALVE ANALYSIS**

Valve voltages and currents given in the table (col. 3) are those measured in our receiver when it was operating on mains of 233 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 there was no signal input.

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 41MPG	217	1.8	87	3.0
	Oscillator			
	96	2.3		
V2 MVS/Pen	250	5.5	103	1.4
V3 DDT	147	1.6	—	—
V4 4XP	243	15.0	—	—
V5 442BU	340†	—	—	—

† Each anode, AC.

**GENERAL NOTES**

**Switches.**—S1-S5 are the waveband switches, S6 is the radio muting switch (for gram.) and S8 is the mains switch, all included in a rotary barrel type of unit beneath the chassis. The switches are indicated in our under-chassis view.

The table below gives the switch positions for the four control settings, starting from the "off" setting, and proceeding clockwise. A dash indicates open, and C closed.

Switch	Off	MW	LW	Gram.
S1	—	C	—	—
S2	—	C	—	—
S3	—	—	C	—
S4	—	C	—	—
S5	—	C	—	—
S6	—	—	—	C
S8	—	C	C	C

S7 is shown in our diagram as a switch for muting the receiver whilst the Teledial is being operated. It is closed when any one of the push-buttons makes contact with the metal plate behind the dial. When the button is released, S7 opens. The plate is connected to the

Continued overleaf



**COSSOR—Continued**

grid circuit of **V4** via a screw passing through the plate, and bearing on a metal arm, which is connected by a lead to the junction of **C16** and **R16**. The buttons are at chassis potential.

When setting up the dial for new stations, it is necessary to remove the muting when a button is depressed, and this is achieved by unscrewing the demuting screw until it no longer makes contact with the metal arm, making **S7** inoperative. When the dial has been re-adjusted, the screw is tightened up, bringing **S7** into action again.

**Coils.**—**L1-L6** are in an unscreened tubular unit beneath the chassis, and **L7** is a small choke formed of a single self-supporting coil of wire, also beneath the chassis. **L8-L11** and the IF transformers **L12, L13** and **L14, L15** are in three screened units on the chassis deck.

**Scale Lamps.**—These are two Osram MES types, rated at 6.3 V, 0.3 A, and having small bulbs.

**External Speaker.**—Two sockets are provided at the rear of the chassis for a high impedance (3,000  $\Omega$ ) external speaker.

**Condensers C18, C19.**—These are two 8 $\mu$ F dry electrolytics in a single carton beneath the chassis. The black lead is the negative of **C18**, the red lead the positive of **C18**, the brown lead the negative of **C19** and the yellow lead the positive of **C19**.

**Trackers C28, C29.**—These are adjusted

through holes in the chassis deck.

**Trimmer C27.**—This is adjusted through a hole in the front member of the chassis.

**Resistance R19.**—This is a 25  $\Omega$  centre tapped wire-wound unit, mounted between two tags on **T2** beneath the chassis.

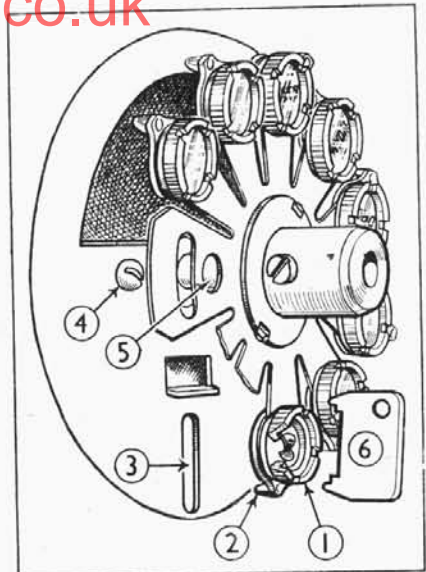
**A, E Extension Leads.**—Two rubber-covered leads are incorporated inside the braiding of the mains lead, so that the set can be moved about a room with only one cable to look after. Normal aerial and earth connections can be used if desired, however.

**3952 AUTOMATIC DIAL**

Adjustment of buttons for particular stations is achieved by virtue of the fact that the pegs on their arms are off-set from the centres of the buttons, and on rotating a button on its axis by means of the key, the peg can take up any position, within the limits of its off-setting, relative to the axis of the button. Each button by adjustment can cover a distance of about  $\frac{1}{8}$  in. round the dial.

It should be pointed out that with this system the buttons must be in the order of wavelength of the stations chosen, since each button only covers a certain section of the tuning range.

When initially adjusting a button for a given station, it is essential that the set should not be muted. Provision is therefore made for cutting out the muting when a button is depressed, by means of the screw (4). This is reached by first rotating the selector plate (with the dial removed) until the hole (5) comes over screw (4). The screw is then turned anti-clockwise until, with a button depressed, the set remains alive.



Perspective sketch of the Teledial, with the moulded dial removed and two of the control plate tongues cut away.

To select a station, tune it in roughly by turning the centre boss. Press the button nearest to the indicating stud, and move it to the right or left until the peg (2) drops into the slot (3). Then by means of the key (6), rotate the button, keeping the peg in the slot, until the station is correctly tuned in.

Next screw up the screw (4) until the muting circuit is in action again, insert the disc carrying the name of the station selected into the recess in the button, and replace the moulded dial, seeing that the projection behind it fits into the slot in the tongue of the selector plate on the left of hole (5). Tighten the dial set screw.

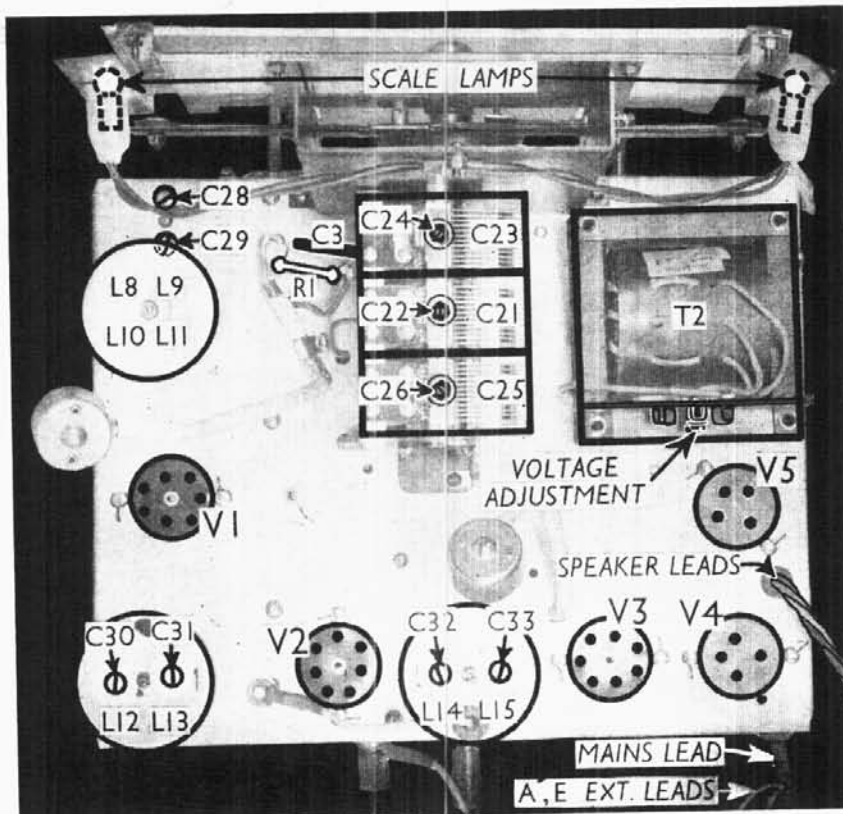
**CIRCUIT ALIGNMENT**

**IF Stages.**—Connect signal\* generator between control grid (top cap) of **V1** and chassis. Short circuit **C25** and switch set to LW. Feed in a 405 KC/S signal, and adjust **C33, C32, C31** and **C30**, in that order, for maximum output and correct shape of response curve. This should have a slight dip at its centre. Keep the input low to avoid AVC effects. Remove short circuit from **C25**.

**RF and Oscillator Stages.**—With gang at maximum, pointer should cover the vertical lines at the extreme right-hand ends of the scales. Connect signal generator to **A** and **E** terminals.

**MW.**—Switch set to MW, feed in a 214 m (1,400 KC/S) signal, tune to 214 m on scale, and adjust **C26, C24** and **C22** in turn for maximum output. Feed in a 522 m (575 KC/S) signal, tune it in, and adjust **C29** for maximum output, while rocking the gang for optimum results.

**LW.**—Switch set to LW, and feed in a 1,000 m (300 KC/S) signal. Tune to 1,000 m on scale, and adjust **C27** for maximum output. Feed in a 1,875 m (160 KC/S) signal, tune it in, and adjust **C28** for maximum output while rocking the gang for optimum results.



Plan view of the chassis. The **A** and **E** extension leads are in the same casing as the mains lead.