

'TRADER' SERVICE SHEET  
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# Cossor 3864 AND 3764

FOUR bands are covered by the Cossor 3864 5-valve (plus rectifier) A.C. superhet, the two short-wave ranges being 13-40 metres (referred to below as S.W.1) and 38-100 metres (S.W.2). The chassis has a signal frequency amplifier, provision for using a doublet aerial and sockets for a gramophone pick-up and extension speaker, a jack switch allowing the internal speaker to be disconnected.

A very similar chassis is fitted in the 3764 receiver, and as this Service Sheet was prepared on the 3864, the differences are explained under "General Notes."

**CIRCUIT DESCRIPTION**

Aerial input (A1) via coupling coils L1 (S.W.1), L3 (S.W.2), L5 (M.W.) and L7 (L.W.) to single-tuned circuits L2 (S.W.1), L4 (S.W.2), L6 (M.W.), L8 (L.W.) and C36. A2 socket provided for use where a doublet aerial is employed.

First valve (V1, Cossor metallised MVS/Pen) is a variable-mu R.F. pentode signal frequency amplifier with tuned-secondary transformer coupling to triode-hexode frequency changer (V2, Cossor metallised 418TH). Primaries L9 (S.W.1), L11 (S.W.2), L13 (M.W.) and L15 (L.W.); secondaries L10 (S.W.1), L12 (S.W.2), L14 (M.W.) and L16 (L.W.) tuned by C41. V2 operates with internal coupling.

Oscillator tuning circuit L17 (S.W.1), L19 (S.W.2), L21 (M.W.), L23 (L.W.) and tuning condenser C42; trimming by C43 (S.W.1), C45 (S.W.2), C47 (M.W.) and C13, C49 (L.W.); tracking by C11, C44 (S.W.1), C12, C46 (S.W.2), C48 (M.W.) and C14, C50 (L.W.); anode reaction coils L18 (S.W.1), L20 (S.W.2), L22 (M.W.) and L24 (L.W.).

Single variable-mu R.F. pentode I.F. amplifier (V3, Cossor metallised MVS/Pen) operates with tuned-primary tuned-secondary transformer couplings C51, L25, L26, C52 and C53, L27, L28, C54.

Intermediate frequency 465 KC/S.

Diode second detector forms part of double diode triode valve (V4, Cossor Metallised DDT). Audio-

Resistance-capacity coupling by R15, C25, R19, via grid stopper R21 between V4 triode and pentode output valve (V5, Cossor 42 MP/Pen). Fixed tone correction in anode circuit by R18, C26, C28; variable tone control in anode circuit of V4 triode by R17, C23. Provision for connection of high resistance external speaker across primary of T1. S39 is a jack for disconnecting the internal speaker if required.

H.T. current is provided by full wave rectifying valve (V6, Cossor 442 BU). Smoothing by speaker field L31 and dry electrolytic condensers C30, C31. Two scale lamps are connected in parallel across the heater secondary of T2.

**DISMANTLING THE SET**

**Removing Chassis.**—To remove the chassis from the cabinet, remove the four control knobs (recessed grub screws) at the front of the cabinet and the mains switch at the side (nut and lock nut). Now remove the two bolts (with nuts and washers) holding the chassis platform to the wooden strip across the back of the cabinet and free the leads from the speaker (screw terminals).

By tilting the back upwards, the chassis can now be withdrawn. When replacing, connect the speaker leads as follows, numbering the terminals from bottom to top:—1, yellow; 2, blue; 3, red.

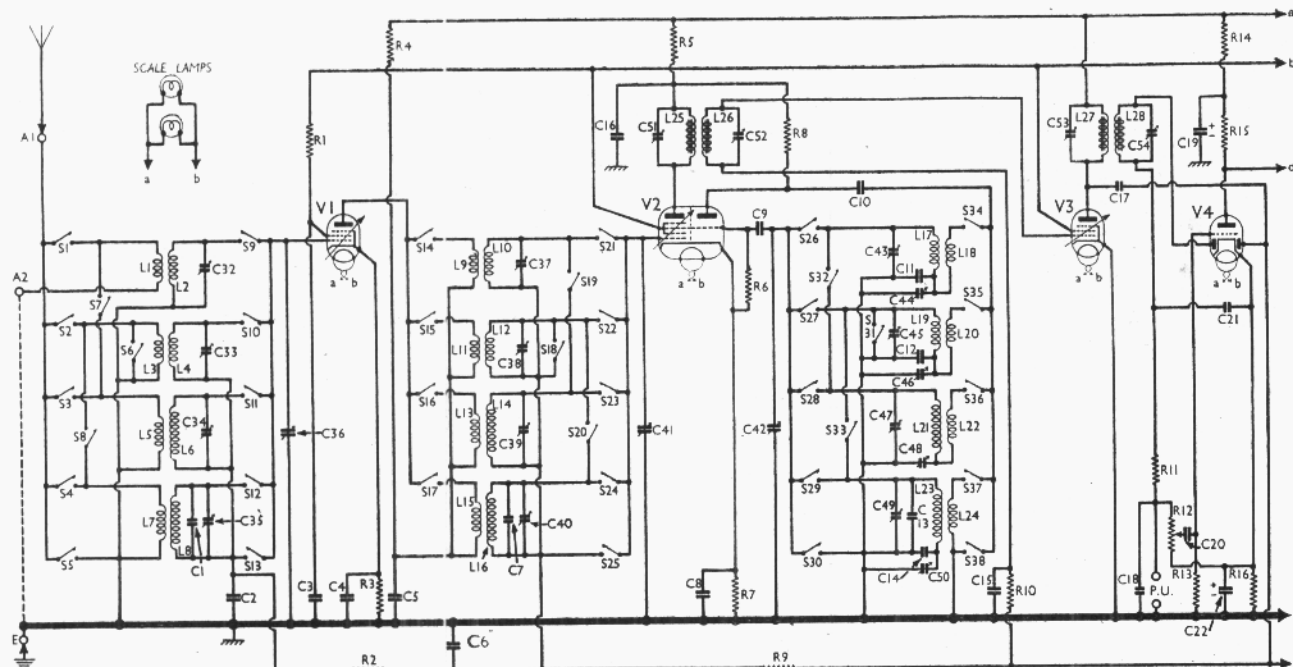
If it is desired to remove the platform from the chassis, remove the four bolts (with washers and rubber washers) holding it to the chassis. When replacing, note that there is a hole drilled in one side of the platform which should be positioned over the trimmer C49, and do not forget to replace the large rubber washers between the chassis and the platform.

**Removing Speaker.**—If it is necessary to remove the speaker from the cabinet, slacken the four clamps holding it to the sub-baffle and when replacing, see that the transformer is on the right.

**COMPONENTS AND VALUES**

RESISTANCES		Values (Ohms)
R1	V1 S.G. feed	4,000
R2	V1 C.G. decoupling	1,000,000
R3	V1 fixed G.B. resistance	750
R4	V1 anode decoupling	4,000
R5	V2 anode decoupling	4,000
R6	V2 osc. C.G. resistance	25,000
R7	V2 fixed G.B. resistance	300
R8	V2 osc. anode H.T. feed	30,000
R9	V1, V2 A.V.C. line decoupling	1,000,000
R10	V3 C.G. decoupling	2,000,000
R11	Part of I.F. filter	50,000
R12	Manual vol. cont. and V4 sig. diode load	500,000
R13	V4 triode C.G. resistance	1,000,000
R14	V4 triode anode decoupling	50,000
R15	V4 triode anode coupling	50,000
R16	V4 fixed G.B. resistance	2,000
R17	Part of variable tone control circuit	20,000
R18	Part of fixed tone compensator	10,000
R19	V5 C.G. resistance	250,000
R20	V5 C.G. R.F. stopper	100,000
R21	V5 G.B. resistance	150
R22	V1, V2, V3 S.G. H.T. potential divider	10,000
R23	V1, V2, V3 S.G. H.T. potential divider	8,000
R24	A.V.C. delay voltage resistance	30
R25	V4 A.V.C. diode load resistance	1,000,000
R26	Hum neut. pot.*	25

\* Centre-tapped.



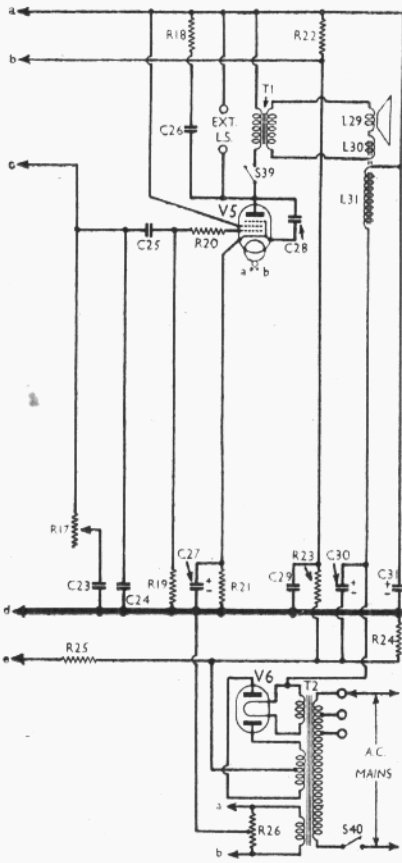
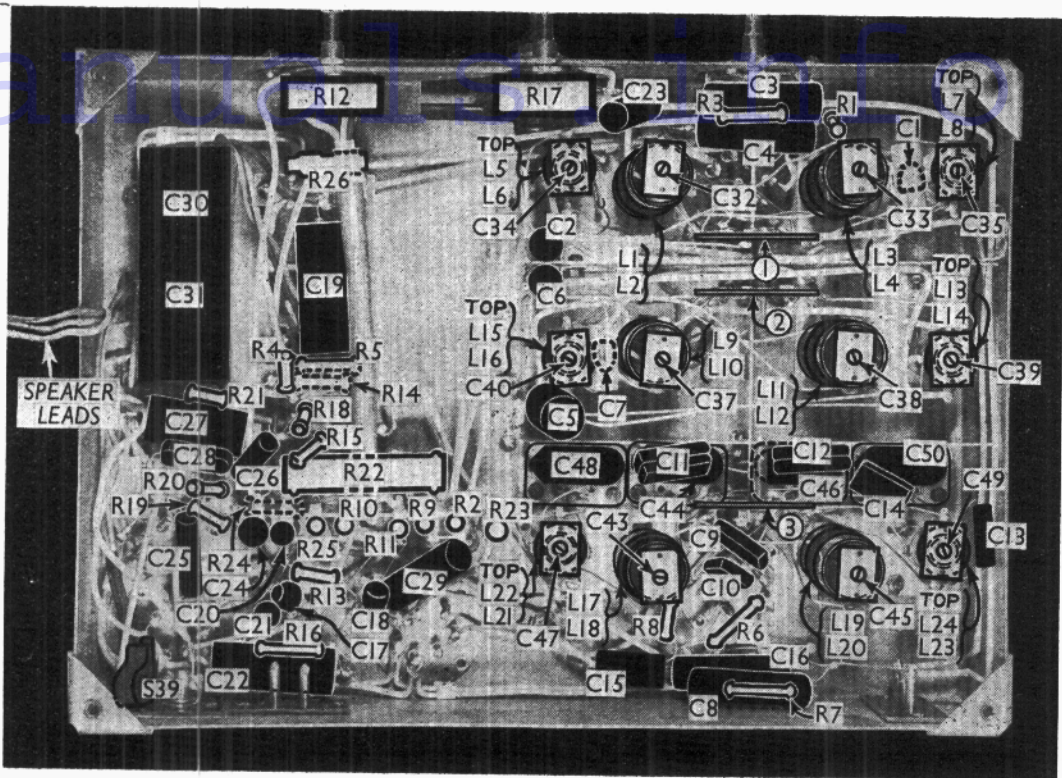
frequency component in rectified output is developed across manual volume control R12 and passed via coupling condenser C20 to C.G. of triode section, which operates as A.F. amplifier. Provision for gramophone pick-up across R12 and R16.

Second diode of V4, fed from V3 anode via C17 provides D.C. potential which is developed across R25 and fed back through decoupling circuits as G.B. to R.F., F.C. and I.F. valves, giving automatic volume control. Delay voltage obtained by drop across R24 in H.T. negative line.

Circuit diagram of the Cossor 3864 4-band A.C. superhet. The output stage and power supply arrangements are in col. 1 opposite. Model 3764 has a similar circuit, except for the volume control and pick-up connections, which are described under "General Notes."

## Materials

Under-chassis view. The switch units are indicated by numbers in circles and arrows, and are shown in detail on page VIII. The trackers C44, C46, C48 and C50 are adjustable through holes in the chassis deck. C1 and C7 are inside insulating sleeving.



CONDENSERS		Values (μF)
C1	Aerial circ. sec. fixed trimmer (L.W.)	0.00004
C2	V1 C.G. decoupling	0.05
C3	V1 S.G. by-pass	0.1
C4	V1 cathode by-pass	0.1
C5	V1 anode R.F. by-pass	0.25
C6	V1, V2 A.V.C. line decoupling	0.05
C7	R.F. trans. sec. L.W. fixed trimmer	0.00005
C8	V2 cathode by-pass	0.1
C9	V2 osc. C.G. condenser	0.0001
C10	V2 osc. anode coupling	0.002
C11	Osc. circ. S.W.1 fixed tracker	0.0032
C12	Osc. circ. S.W.2 fixed tracker	0.001475
C13	Osc. circ. L.W. fixed trimmer	0.00008
C14	Osc. circ. L.W. fixed tracker	0.00008
C15	V3 C.G. decoupling	0.05
C16	V2 anodes decoupling	0.1
C17	Coupling to V4 A.V.C. diode	0.00005
C18	I.F. by-pass	0.00005
C19*	V4 anode decoupling	2.0
C20	A.F. coupling to V4 triode	0.01
C21	I.F. by-pass	0.00005
C22*	V4 cathode by-pass	25.0
C23	Part of variable T.C. circuit	0.03
C24	V4 triode anode by-pass	0.001
C25	A.F. coupling to V5	0.01
C26	Part of tone compensator	0.01
C27*	V5 cathode by-pass	25.0
C28	V5 anode by-pass	0.0005
C29	V1, V2, V3 S.G. decoupling	0.1
C30*	H.T. smoothing	8.0
C31*	H.T. smoothing	8.0
C32†	Aerial circuit S.W.1 trimmer	—
C33†	Aerial circuit S.W.2 trimmer	—
C34†	Aerial circuit M.W. trimmer	—
C35†	Aerial circuit L.W. trimmer	—
C36†	Aerial circuit tuning	—
C37†	R.F. trans. S.W.1 trimmer	—
C38†	R.F. trans. S.W.2 trimmer	—
C39†	R.F. trans. M.W. trimmer	—
C40†	R.F. trans. L.W. trimmer	—
C41†	R.F. transformer tuning	—
C42†	Osc. circuit tuning	—
C43†	Osc. circuit S.W.1 trimmer	—
C44†	Osc. circuit S.W.1 tracker	—
C45†	Osc. circuit S.W.2 trimmer	—
C46†	Osc. circuit S.W.2 tracker	—
C47†	Osc. circuit M.W. trimmer	—
C48†	Osc. circuit M.W. tracker	—
C49†	Osc. circuit L.W. trimmer	—
C50†	Osc. circuit L.W. tracker	—
C51†	1st I.F. trans. pri. tuning	—
C52†	1st I.F. trans. sec. tuning	—
C53†	2nd I.F. trans. pri. tuning	—
C54†	2nd I.F. trans. sec. tuning	—

OTHER COMPONENTS		Approx. Values (Ohms)
L1	Aerial S.W.1 coupling	0.05
L2	Aerial S.W.1 tuning	0.05
L3	Aerial S.W.2 coupling	0.1
L4	Aerial S.W.2 tuning	0.075
L5	Aerial M.W. coupling	28.0
L6	Aerial M.W. tuning	4.5
L7	Aerial L.W. coupling	140.0
L8	Aerial L.W. tuning	19.5
L9	R.F. trans. S.W.1 pri.	0.1
L10	R.F. trans. S.W.1 sec.	Very low
L11	R.F. trans. S.W.2 pri.	0.2
L12	R.F. trans. S.W.2 sec.	0.05
L13	R.F. trans. M.W. pri.	2.0
L14	R.F. trans. M.W. sec.	2.75
L15	R.F. trans. L.W. pri.	7.5
L16	R.F. trans. L.W. sec.	19.0
L17	Osc. S.W.1 tuning	Very low
L18	Osc. S.W.1 reaction	0.05
L19	Osc. S.W.2 tuning	0.05
L20	Osc. S.W.2 reaction	0.1
L21	Osc. M.W. tuning	1.0
L22	Osc. M.W. reaction	0.4
L23	Osc. L.W. tuning	8.5
L24	Osc. L.W. reaction	3.0
L25	1st I.F. trans. (Pri.)	2.5
L26	1st I.F. trans. (Sec.)	2.5
L27	2nd I.F. trans. (Pri.)	2.5
L28	2nd I.F. trans. (Sec.)	2.5
L29	Speaker speech coil	2.0
L30	Hum neutralising coil	0.05
L31	Speaker field coil	1500.0
T1	Speaker input trans. (Pri.)	650.0
	Speaker input trans. (Sec.)	0.4
	Mains trans. (Pri. (total))	20.0
	Mains trans. (Heater sec.)	0.1
	Mains trans. (Rect. heat. sec.)	0.2
	Mains trans. (H.T. sec. (total))	350.0
S1-38	Wavechange switches	—
S39	Internal speaker switch	—
S40	Mains switch	—

### VALVE ANALYSIS

Valve voltages and currents given in the table (p.VIII) 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 there was no signal input.

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

Continued overleaf

\* Electrolytic. † Variable. ‡ Pre-set.

**COSSOR 3864—Continued**

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 MVS Pen	260	1.5	90	0.7
V2 41STH*	240	1.5	100	1.2
V3 MVS Pen	270	4.0	100	1.0
V4 DDI	120	1.1	—	—
V5 42MP Pen	250	35.0	270	0.5
V6 442BU	340†	—	—	—

\* Oscillator anode 80V, 5.7 mA.  
† Full anode, A.C.

**GENERAL NOTES**

**Switches.**—S1-S38 are the waveband switches, in three gauged rotary units beneath the chassis. They are indicated in our under-chassis view, and shown in detail in the diagrams on this page. The table (col. 1) gives the switch positions for the five control settings, starting from the fully anti-clockwise position. O indicates open, and C closed.

S39 is the internal speaker switch, of the jack type, which opens when an external speaker is plugged fully into the sockets provided at the rear of the chassis. S40 is the Q.M.B. mains switch, which is mounted at the left-hand side of the cabinet.

**Coils.**—All the R.F. and oscillator coils are in pairs on tubular formers in screened compartments beneath the chassis, with their parallel pre-set trimmers mounted above them. There is one trimmer to each pair of coils. The coils are all indicated in the under-chassis view. In the case of the S.W.1 and S.W.2 bands, the two coils on each former are inter-wound, but in all cases the tuned coil is of thick bare copper wire.

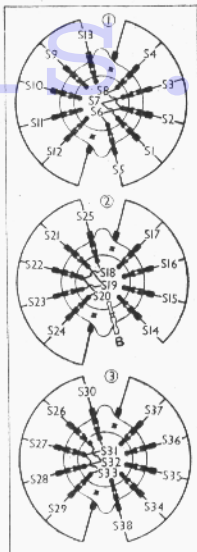
The I.F. transformers, L25, L26 and L27, L28 are in two screened units on the chassis deck, with their associated trimmers.

**Scale Lamps.**—These are two Osram M.E.S. types, rated at 6.2 V, 0.3 A. They are sprayed white in our chassis.

**External Speaker.**—Provision is made at the rear of the chassis for a high impedance (8,000 Ω) external speaker. By pushing its plug fully home, S39 opens and disconnects the primary of T1, thus muting the internal speaker.

**Osc. Trackers.**—The variable trackers for the four bands are mounted beneath the chassis, but are adjustable from above through holes in the chassis deck. The fixed trackers, C11, C12, C14, are beneath the chassis, and, in the case of C11 and C12, consist

**DIAGRAM AND TABLE OF SWITCH UNIT**



Switch diagrams as seen from the rear of the underside of the chassis. The switches marked at the centre of each unit are formed by flat contacts on the rotors which short certain of the fixed contacts.

Switch	Gram.	S.W.1	S.W.2	M.W.	L.W.
S1	O	C	O	O	O
S2	O	O	O	O	O
S3	O	O	O	O	O
S4	C	O	O	O	O
S5	O	C	O	O	O
S6	O	C	O	O	O
S7	O	O	C	O	O
S8	O	O	C	O	O
S9	O	O	C	O	O
S10	O	O	C	O	O
S11	O	O	O	C	O
S12	O	O	O	C	O
S13	C	O	O	O	O
S14	O	C	O	O	O
S15	O	O	C	O	O
S16	O	O	C	O	O
S17	O	O	O	C	O
S18	O	C	O	O	O
S19	O	O	C	O	O
S20	O	O	C	O	O
S21	O	C	O	O	O
S22	O	O	C	O	O
S23	O	O	O	C	O
S24	O	O	O	C	O
S25	C	O	O	O	O
S26	O	C	O	O	O
S27	O	O	C	O	O
S28	O	O	C	O	O
S29	O	O	O	C	O
S30	C	O	O	O	O
S31	O	C	O	O	O
S32	O	O	C	O	O
S33	O	O	O	C	O
S34	O	C	O	O	O
S35	O	O	C	O	O
S36	O	O	O	C	O
S37	O	O	O	C	O
S38	C	O	O	O	O

of two condensers in parallel to make up the required capacity.

**Condensers C30, C31.**—These are two 8 μF dry electrolytics in a single carton beneath the chassis, but they do not use a common connection. C30 has a black negative and red positive lead and C31 a blue negative and yellow positive lead.

**Resistance R20.**—This may not occur in early chassis.

**Model 3764.** In the alternative model (3764) the chassis is almost identical, with the exception of the pick-up circuit. Instead of the arrangement shown in our circuit, R12 is replaced by a centre-tapped fader potentiometer (0.5 MO ± 0.5 MO). The bottom of R11 goes to the top of this control, the top of R16 goes to the centre tap and to one side of pick-up, while the other side of pick-up goes to the bottom of the control. The slider goes to C20, as in our circuit.

**Aerial Arrangements.**—Socket A1 is for use with a normal aerial, and in this case A2 must be connected to E. A metal strap is provided for this purpose.

A2 is only in use when a doublet aerial is employed, the connections from this going to A1 and A2, and the metal strap being removed. The dotted connection in our circuit diagram represents the metal strap when in use.

**CIRCUIT ALIGNMENT**

**I.F. Stages.**—Connect signal generator to hexode control grid (top cap) of V2 and chassis, feed in a 165 KC/S signal and adjust C54, C58, C52 and C51 for maximum output in each case, reducing input, if necessary, to avoid A.V.C. action.

**R.F. and Osc. Stages.**—First see that scale pointer is horizontal when gang is at maximum or minimum.

Connect signal generator to A1 and E sockets (A2 being connected to E).

**S.W.1.**—Feed in a 20 MC/S (15 m.) signal, tune to 20 MC/S on scale, and adjust C43, C37 and C32 for maximum output. Feed in a 9 MC/S (33 m.) signal, tune to 9 MC/S on scale, and adjust C44 for maximum output, rocking the gang slightly if necessary for optimum output.

**S.W.2.**—Proceed as above, but adjust C45, C38 and C33 at 7 MC/S (43 m.), and C46 at 3 MC/S (100 m.).

**M.W.**—Proceed as above, but adjust C47, C39 and C34 at 1,400 KC/S (214 m.), and C48 at 575 KC/S (522 m.).

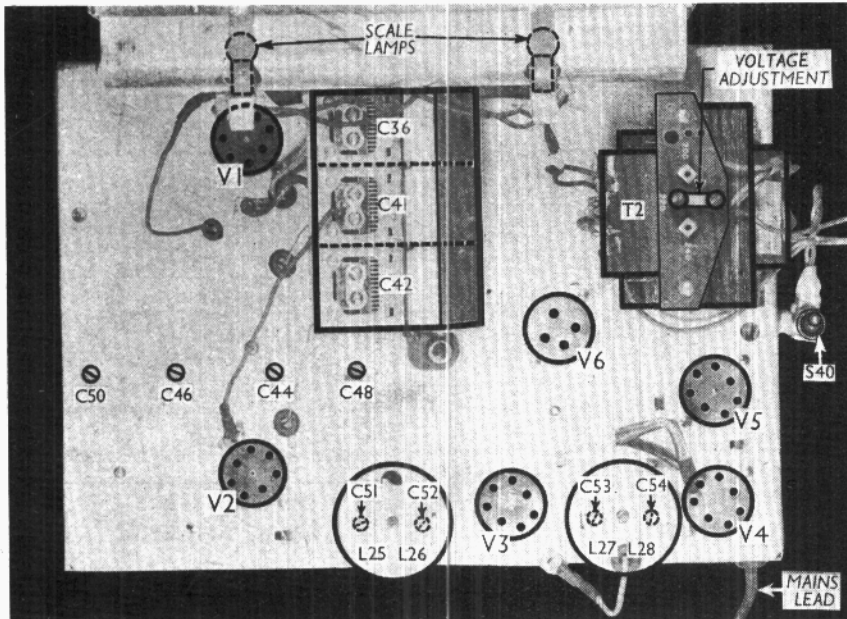
**L.W.**—Proceed as above, but adjust C49, C40 and C35 at 300 KC/S (1,000 m.), and C50 at 160 KC/S (1,875 m.).

**SERVICE SHEETS**

**I—208**

On page VIII last week we published an alphabetical index of the "Trader" Service Sheets we have produced since their inception.

Although two hundred and eight Sheets have been published, the actual models covered number over two hundred and eighty. If, in addition, equivalents with associated manufacturers' models are counted, the information contained in our Service Sheets must be applicable to nearly three hundred and fifty receivers altogether.



Plan view of the chassis. Note the screws which adjust the four trackers. S40 normally fits on the side of the cabinet.