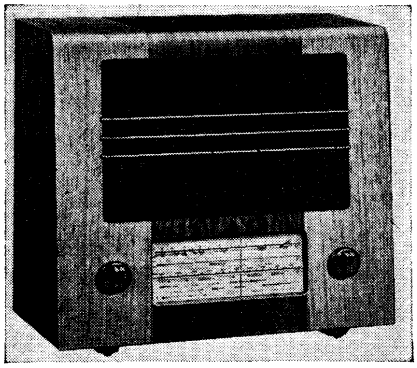
Supplement to The Wireless & Electrical Trader, November 1, 1947

"TRADER" SERVICE SHEET

835

COSSOR 470AC and 480K CONSOLE



The appearance of the 470AC table superhet. The 480K uses a similar chassis but its cabinet is a floor console.

THE Cossor 470 AC is a 4-valve (plus rectifier) 3-band superhet designed to operate from A.C. mains of 200-255 V, 40-100 c/s. The S.W. range is 16-50 m.

The 480K is a console employing an identical chassis, except for the transfer of the connecting panel from the chassis to the rear of the cabinet.

Release dates and original prices: 470 *AC, May,* 1947, £21 11*s.* 6*d. plus* £4 12*s.* 9*d. purchase tax;* 480*K, July,* 1947, £27 16*s* 6*d. plus* £5 19*s.* 8*d. purchase tax.*

CIRCUIT DESCRIPTION

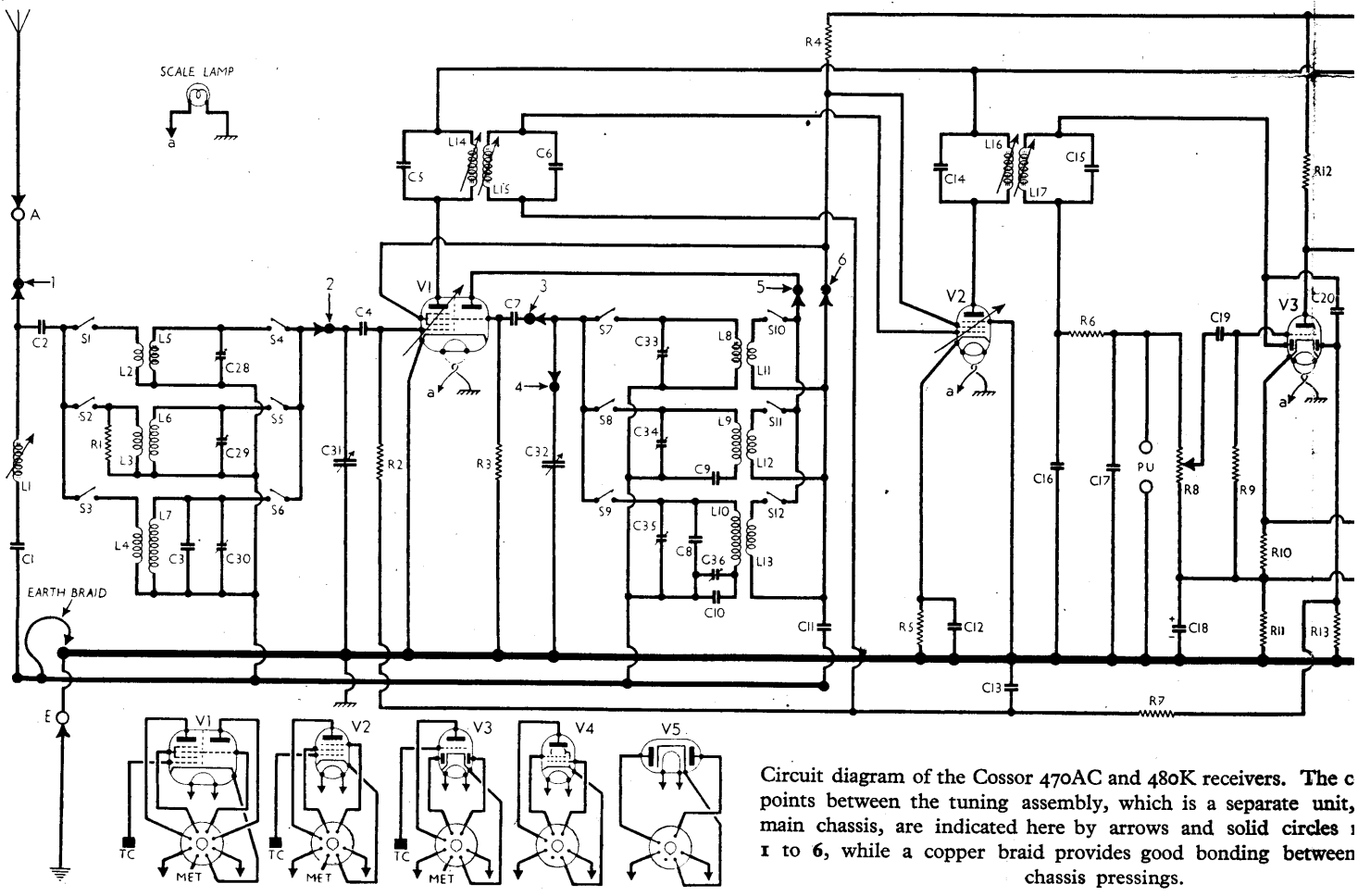
Aerial input is via series capacitor **C2** and coupling coils **L2** (S.W.), **L3** (M.W.) and **L4** (L.W.) to single-tuned circuits **L5, C31** (S.W.), **L6, C31** (M.W.) and **L7, C31** (L.W.). Tuned acceptor circuit **L1, C1** across aerial-earth circuit filters out interference at intermediate frequency.

First valve **(V1, Cossor metallized OM10)** is a triode hexode operating as frequency changer with internal coupling. Triode oscillator grid coils **L8** (S.W.), **L9** (M.W.) and **L10** (L.W.) are tuned by **C32.** Parallel trimming by **C33** (S.W.) **C34** (M.W.) and **C8, C35** (L.W.); series tracking by **C9** (M.W.) and **C10, C36** (L.W.). Reaction coupling from anode by coils **L11** (S.W.), **L12** (M.W.) and **L13** (L.W.).

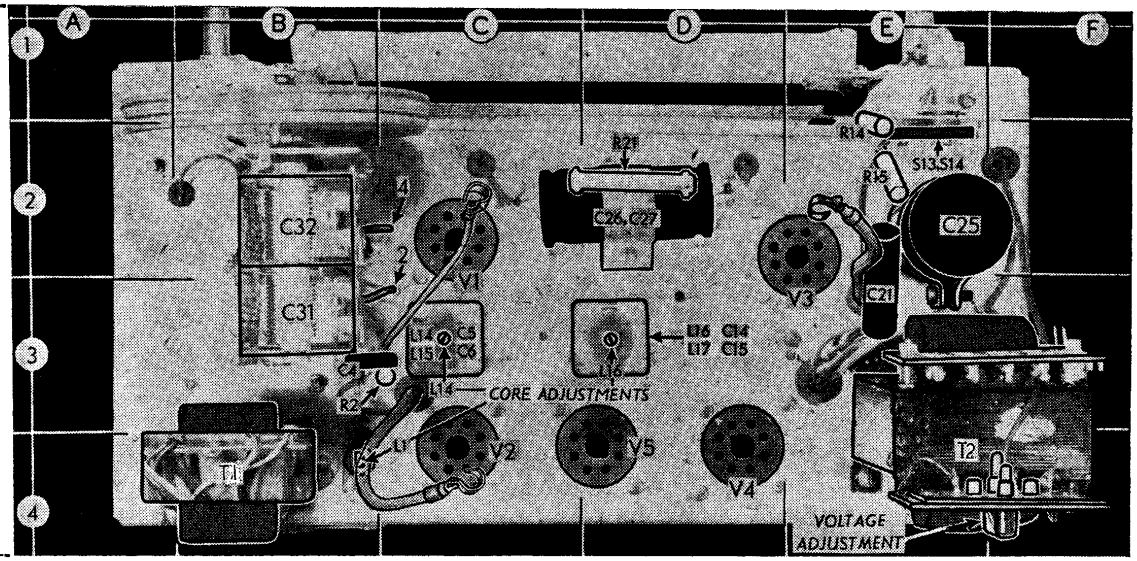
Second valve **(V2, Cossor metallized OM6)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary transformer couplings **C5, L14, L15, C6** and **C14, L16, L17, C15,** in which all the tuning capacitors are fixed and alignment adjustments are carried out by varying the positions of the iron-dust cores.

Intermediate frequency 465 kc/s.

Diode second detector is part of double diode triode valve **(V3, Cossor metallized OM4).** Audio frequency component in rectified output is developed across manual volume control **R8,** which is also the diode load resistor, and passed via A.F. coup-



Circuit diagram of the Cossor 470AC and 480K receivers. The c points between the tuning assembly, which is a separate unit, main chassis, are indicated here by arrows and solid circles 1 1 to 6, while a copper braid provides good bonding between chassis pressings.



Plan view of the chassis. **R21** is an H.T. smoothing resistor, mounted directly on to the end tags of the dual electrolytic capacitor unit **C26, C27.** The core adjustments for L1 and the I.F. transformer primaries are indicated here. Connections **2** and **4** from the tuning assembly are seen near the gang. A diagram of the tone control switch unit **S13,S14,** appears in col. 5 overleaf.

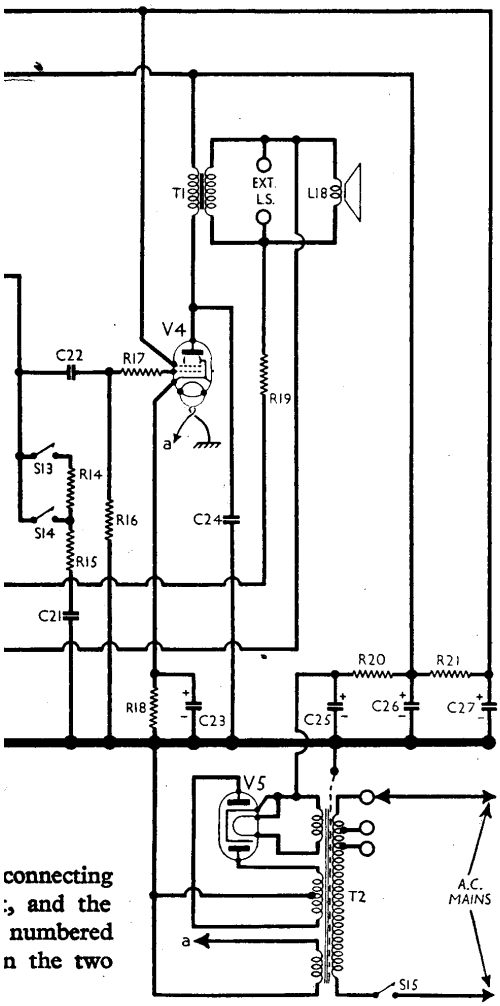
ling capacitor **C19** and C.G. resistor **R9** to control grid of triode section, which operates as A.F. amplifier. I.F. filtering by **C16, R6** and **C17** in diode circuit. Provision for the connection of a gramophone pick-up across **R8.**

Second diode of **V3,** fed from **L17** via **C20,** provides D.C. potential, which is developed across load resistor **R13** and fed back through a decoupling circuit as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage, together with G.B. for triode section, is obtained from the drop across **R10** and **R11** in **V3** cathode lead to chassis.

Three-position tone control in **V3** anode circuit by **S13, S14** in conjunction with **R14, R15** and **C21,** and resistance-capacitance coupling by **R12, C22** and **R16,** via grid stopper **R17,** between **V3** triode and beam tetrode output valve **(V4, Cossor 6V6G).** Fixed tone correction in anode circuit by **C24.**

Voltages appearing across the secondary winding of the output transformer **T1** are applied to **V3** cathode circuit, via the attenuating resistor **R19,** giving negative feed-back. Provision for the connection of a low impedance external speaker across **T1** secondary.

H.T. current is supplied by I.H.C. full-wave rectifying valve **(V5, Cossor 6X5G).** Smoothing by resistors **R20, R21** and electrolytic capacitors **C25, C26** and **C27.**



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COMPONENTS AND VALUES

If the following component numbers are used when ordering replacements, dealers are advised to mention the fact, as these numbers may differ from those in the manufacturer's diagram.

	CAPACITORS	Values (μF)	Location
C1	I.F. filter tuning ...	0·000225	K8
C2	Aerial series ...	0·0005	K7
C3	L.W. trimmer ...	0·000025	L7
C4	V1 hex. C.G. ...	0·0003	B3
C5	1st I.F. trans. tuning	0·0001	C3
C6		0·0001	C3
C7	V1 osc. C.G. ...	0·0001	J6
C8	Osc. L.W. trim. ...	0·000075	K7
C9	Osc. M.W. tracker	0·00057	K6
C10	Osc. L.W. tracker...	0·00014	K7
C11	H.T. decoupling ...	0·1	K6
C12	Cathode by-pass ...	0·01	J8
C13	A.V.C. decoupling	0·1	H6
C14	2nd I.F. trans. tuning	0·0001	D3
C15		0·0001	D3
C16	I.F. by-pass capacitors	0·0001	I6
C17		0·0001	I6
C18*	Cathode by-pass ...	25·0	H6
C19	A.F. coupling ...	0·005	H6
C20	A.V.C. coupling ...	0·0001	H6
C21	Tone control ...	0·05	E3
C22	A.F. coupling ...	0·01	I6
C23*	Cathode by-pass ...	25·0	H7
C24	Tone corrector ...	0·01	H8
C25*	H.T. smoothing capacitors ...	8·0	E2
C26*		8·0	D2
C27*		8·0	D2
C28‡	Aerial S.W. trim....	—	K6
C29‡	Aerial M.W. trim....	—	K7
C30‡	Aerial L.W. trim....	—	K7
C31†	Aerial tuning ...	—	B3
C32†	Osc. tuning ...	—	B2
C33‡	Osc. S.W. trim. ...	—	K6
C34‡	Osc. M.W. trim. ...	—	K7
C35‡	Osc. L.W. trim. ...	—	K7
C36‡	L.W. tracker ...	—	K7

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTORS	Values (ohms)	Location
R1	M.W. shunt ...	3,300	L7
R2	V1 hex. C.G. ...	330,000	B3
R3	V1 osc. C.G. ...	12,000	J6
R4	H.T. feed	10,000	I6
R5	V2 fixed G.B. ...	270	J7
R6	I.F. stopper ...	47,000	I7
R7	A.V.C. decoupling	2,200,000	H6
R8	Volume control ...	500,000	H5
R9	V3 C.G. resistor ...	4,700,000	H7
R10	V3 G.B. and A.V.C. delay	100	H6
R11		2,200	H7
R12	Anode load ...	100,000	I6
R13	A.V.C. diode load...	1,000,000	H7
R14	Tone control resistors	6,800	E2
R15		6,800	E2
R16	V4 C.G. resistor ...	470,000	I7
R17	Grid stopper ...	100,000	I6
R18	V4 G.B. resistor ...	270	H7
R19	F.-B. coupling ...	220	H6
R20	H.T. smoothing resistors	1,500	H6
R21		3,900	D2

	OTHER COMPONENTS		Approx. Values (ohms)	Location
L1	I.F. filter coil ...		4·0	K8
L2	Aerial coupling coils		0·7	L6
L3			20·0	L7
L4			48·0	K7
L5	Aerial tuning coils ...		Very low	L6
L6			3·25	L7
L7			34·0	K7
L8	Oscillator tuning coils		Very low	K6
L9			2·25	K6
L10			14·0	K7
L11	Oscillator reaction coils		26·0	K6
L12			1·2	K6
L13			7·7	K7
L14	1st I.F. trans.	Pri.	9·0	C3
L15		Sec.	9·0	C3
L16	2nd I.F. trans.	Pri.	9·0	D3
L17		Sec.	9·0	D3
L18	Speech coil		1·5	—
T1	Output trans....	Pri.	370·0	B4
		Sec.	0·4	B4

(Continued overleaf)

OTHER COMPONENTS (*continued*)		Approx. Values (ohms)	Location
T2	Mains trans. Pri., total	48·0	E4
	Mains trans. Heater sec.	Very low	E4
	Mains trans. Rect.heat.sec.	0·4	E4
	Mains trans. H.T.sec.total	1,400·0	E4
S1-S12	W/band switches ...	—	L6
S13, S14	Tone switches ...	—	E2
S15	Mains switch, ganged R8	—	H5

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 226 V, using the 216-234 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the M.W. 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 Avometer, chassis being the negative connection.

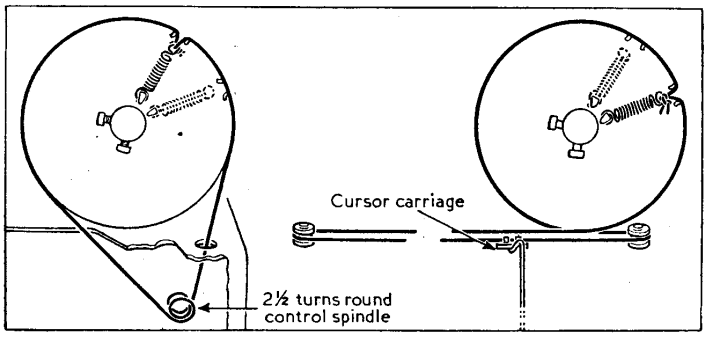
Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 OM10	264	7·6	87	4·2
	Oscillator			
	87	5·7		
V2 OM6	264	5·4	87	2·0
V3 OM4	51	1.75	—	—
V4 6V6G	247	36·0	197	2·7
V5 6X5G	366†	—	—	—

† Each anode, A.C.

DRIVE CORD REPLACEMENT

There are two separate cords, one for the gang drive from the tuning control spindle, and the other for the scale cursor. Both are quite simple, and their courses can be seen from the sketches below, where they are shown separately.

Cursor Drive.—This should be fitted first as it runs in the rear groove on the drive drum. A yard of twine is just about sufficient for the job, and the two ends are tied together, after threading one of them through the loop at the outer end of the tension spring, inside the drum. The cursor can be slipped on afterwards and its two claws clamped on to the cord so that it registers with the vertical dots at the high-wavelength extremity. The cursor carriage rides on a guide rail formed by an inclined edge at the front of the chassis deck.



Sketches showing the main gang (left) and scale cursor (right) drive cord systems as seen from the front when the gang is at maximum. Each has its own tension spring.

Gang Drive.—This requires a couple of feet of cord, and is even more straightforward than the former one except that it passes through two openings in the chassis deck. It occupies the front groove on the drum, and has its own tension spring.

DISMANTLING THE SET

A slot is provided in the underside of the cabinet to give access to all the R.F. alignment trimmer capacitors.

Removing Chassis.—Remove two control knobs (recessed grub screws) from each of the concentric spindles;

remove the four cheese-head bolts (with large metal washers) securing the chassis to the base of the cabinet, and slide out the chassis to the extent of the speaker leads, which is sufficient for most purposes.

To free the chassis entirely, unsolder the speaker leads from tags on the output transformer.

When replacing, connect the speaker leads to the left-hand pair of tags on the output transformer, when viewing the chassis from the rear.

Removing Speaker.—Remove the four cheese-head bolts securing the speaker to sub-baffle.

When replacing, the leads should emerge from the dust-bag on the left, and if they have been unsoldered they should be reconnected as previously described.

Removing Tuning Assembly.—Untie and detach the gang drive cord (with tension spring);

remove the split retaining washer from the waveband switch spindle, and slide off the brass gang drive sleeve;

from the underside of the chassis remove the cross brace, giving access to the tuning assembly (one round-head screw at each end);

unsolder the six leads from the tuning assembly, at points indicated in our pictures by the numbers one to six, and the earth braid from the gang;

with a box spanner remove the four nuts from the chassis deck, close to the gang, and lift out the assembly, rear end first.

When replacing, the six leads should be reconnected to the numbered points indicated in our chassis pictures, as follows: black from **L1**, to 1; mauve, to 2; black from **S7-S9**, to 3; grey, to 4; pink to 5; black from **C11**, to 6. Connections 2 and 4 are on the gang, the leads passing through holes in the chassis deck.

The earth braid from the gang should be soldered to the lug on the tuning assembly which projects through the chassis deck, and the gang drive cord should be refitted in accordance with the instructions given under "Drive cord replacement."

Waveband Switch Diagram and Table

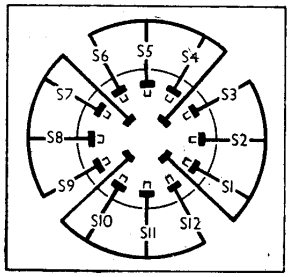


Diagram of the waveband switch unit, as seen from the rear of an inverted chassis. The associated table is on the right.

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

GENERAL NOTES

Switches.—S1-S12 are the waveband switches, ganged in a single rotary unit beneath the chassis. The unit is indicated in our under-chassis view, and is shown in detail in the diagram in col. 2, where it is drawn as seen when viewed from the rear of an inverted chassis.

The table above gives the switch positions for the three control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and **C**, closed.

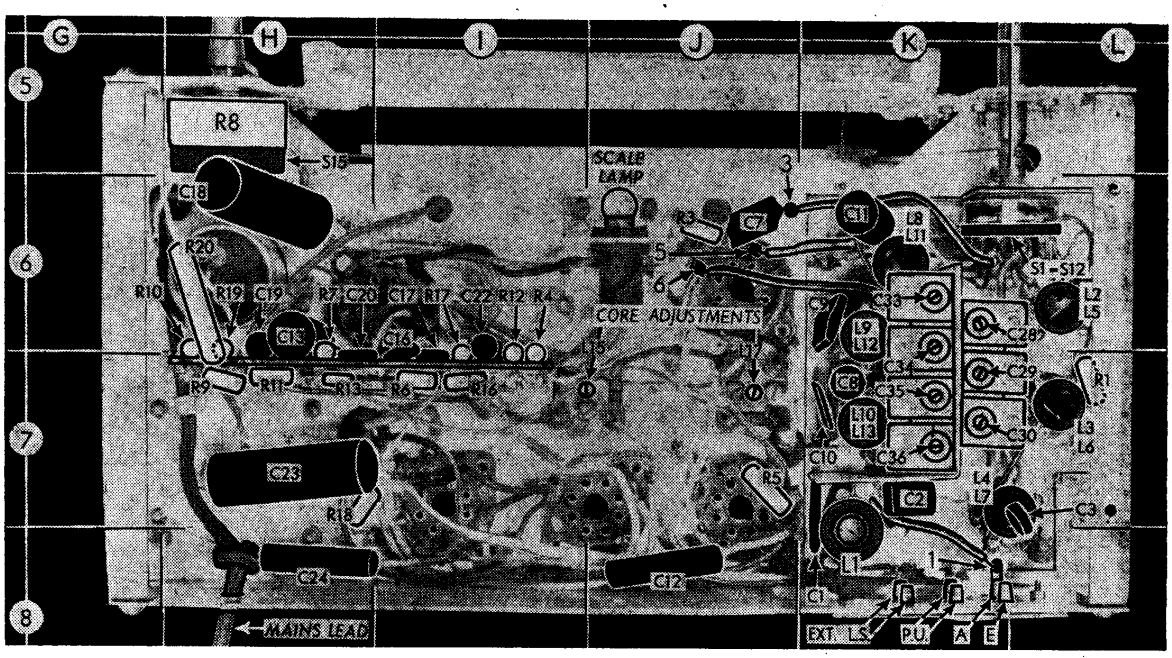
S13, S14 are the tone control switches, in a 3-position rotary unit mounted on a bracket on the chassis deck. The unit is indicated in our plan view and shown in detail in the diagram in col. 5. Its spindle is operated by a sliding link coupling from a hollow sleeve concentric with the volume control spindle.

In the fully anti-clockwise position of the control knob ("Mellow" tone) **S14** closes; in the centre position ("Medium") **S13** closes; or in the fully clockwise position ("Brilliant") neither closes.

S15 is the Q.M.B. mains switch, ganged with the manual volume control **R8.**

Coils.—All the R.F. and oscillator coils **L2-L7** and **L8-L13,** with the I.F. filter coil **L1,** are in seven unscreened tubular units in a removable tuning assembly beneath the chassis, together with the waveband switch unit, trimmers, trackers and other associated components.

Six coloured leads and an earthing braid provide the connections between this



Under-chassis view. The outline of the tuning-assembly is visible, and the four connections 1, 3, 5 and 6 as shown in the circuit diagram are indicated. The earthing braid is on the chassis deck. A diagram of the waveband switch unit appears in col. 2. The I.F. transformer secondary core adjustments are indicated at the centre of the chassis.

assembly and the rest of the chassis, and these are all indicated in our circuit diagram and chassis illustrations. Instructions are given under "Dismantling the Set" for removal and replacement of the assembly.

The I.F. transformers are in two screened units on the chassis deck with their tuning capacitors, the core adjustment screws projecting from either end.

Scale Lamp.—This is a Cossor lamp, with small clear spherical bulb and an M.E.S. base. It screws into a rubber-shrouded holder which has a bayonet-type mounting on a bracket behind the scale. Replacements should be of Cat. No. M. 201505, rated at 8 V, 0.3 A. Our sample was rated at 6.5 V, 0.3 A.

External Speaker.—Two sockets are provided on the panel at the rear of the chassis for the connection of a low impedance (about 4Ω) external speaker.

Capacitor C25.—This is a tubular metal-cased unit with positive (red) and negative tags at one end, rated at 8 μF, 450 V D.C. working, surge proof. Our sample was a Hunts list No. K6WAN.

Capacitors C26, C27.—These are two electrolytics in a single double-ended tubular metal-cased unit, rated at 8 μF, 450 V D.C. working, 500 V peak. The positive connections are the two end-tags, which are coded red and yellow, and the case forms the common negative connection.

Although the red tag is specified as the reservoir section, it is immaterial which way round the unit is connected in this receiver as neither section acts as a reservoir. **R21** is connected directly between the two positive tags.

Chassis Divergencies.—In some chassis, the I.F. filter circuit **L1, C1** may be connected directly across **L3,** where we show **R1,** instead of across the common aerial/earth circuit.

Coupling on L.W. may be capacitative, via a 0.0015μF capacitor (shunted by a 12,000Ω resistor) between the bottom of **L7** and chassis, **L4** being discarded and its leads short-circuited. **C2** may be directly in the aerial lead, and the cores of **L5** and **L8** may be adjustable.

The tone control circuit may be modified by the removal of **R15,** its connections being short-circuited, giving deeper tone. **C21** would then become 0.01 μF.

Different I.F. transormers may be used, wound with Litzendraht wire, when **V2** cathode resistor **R5** becomes 1,000 Ω. Our sample used a 270 Ω resistor, and the part number of our I.F. transformers was MC415002/2.

CIRCUIT ALIGNMENT

I.F. Stages.—For this operation the chassis must be removed from the cabinet. Connect signal generator leads to control grid (top cap) of **V1,** via a 0.01 μF capacitor, and chassis. Switch set to M.W., tune to 500 m on scale, and turn volume control to maximum. Feed in a 465 kc/s (645.16 m) signal, and adjust the cores **L17, L16, L15** and **L14,** in that order, for maximum output, keeping the input low to avoid A.V.C. action.

R.F. and Oscillator Stages.—A slot is provided in the underside of the cabinet to give access to all R.F. alignment trimmer capacitors. With the gang at maximum capacitance the pointer should coincide with the vertical dotted lines close to the right-hand top and bottom edges of the scale. Transfer signal generator leads to **A** and **E** sockets, via a suitable dummy aerial.

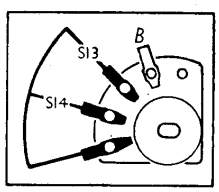


Diagram of the tone control switch unit, drawn as seen from the rear of the chassis deck.

S.W.—Switch set to S.W., tune to 16.6 m on scale, feed in a 16.6 m (18 Mc/s) signal, and adjust **C33,** then **C28,** for maximum output.

M.W.—Switch set to M.W., tune to 214 m (vertical line on scale), feed in a 214 m (1,400 kc/s) signal, and adjust **C34,** then **C29,** for maximum output.

L.W.—Switch set to L.W., tune to 1,153 m on scale, feed in a 1,153 m (260 kc/s) signal, and adjust **C35,** then **C30,** for maximum output. Tune to 1,875 m on scale, feed in a 1,875 m (160 kc/s) signal, and adjust **C36** for maximum output. Finally, repeat 1,153 m and 1,875 m adjustments.

I.F. Filter.—Switch set to M.W., tune to 500 m on scale, feed in a 465 kc/s signal, and adjust the core of **L1** for minimum output.

Service Short-Cut

Ever Ready Model "C"

Referring to the Every Ready All Dry Portable, I thought that the following experience may prove of some interest and help to other dealers whose windows may become very hot in spite of sun blinds.

On two occasions when asked to demonstrate two similar models after taking them from the window and fitting batteries, very poor reception was obtained. There was apparently no distortion but sensitivity was very low.

After checking every likely cause the trouble was traced to the alignment of the second I.F. transformer in each case. Both these sets were O.K. when first placed in the window, so it would appear that for some reason heat alters the capacitance of the trimmers or the inductance of the coils.

Having realigned same no further trouble has been experienced in hot or cold weather.—**E. H. K.,** Barnehurst.

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