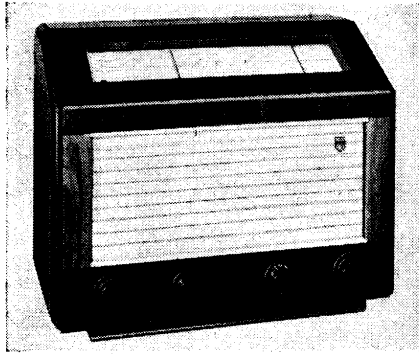


"TRADER" SERVICE SHEET

884

EKCO U75

A.C./D.C. THREE-BAND SUPERHET



The Ekco U75 A.C./D.C. superhet.

THREE wavebands are covered in the Ekco U75, a 4-valve (plus rectifier) superhet designed to operate from A.C. or D.C. mains of 200-250 V, 40-80 c/s in the case of A.C. The S.W. range is 16-51 m.

The three-position tone control switch is associated with a negative feed-back circuit between the two A.F. stages. Provision is made for the connection of an external speaker.

Attention is drawn to the makers' warnings as to the danger of damage when operating the chassis on the bench. This appears at the end of "Dismantling the Set" and the beginning of "Circuit Alignment." The mains circuit fuses provide a certain amount of protection.

Release date and original price: June 1948; £18 18s plus purchase tax.

CIRCUIT DESCRIPTION

Aerial input is via isolating capacitor C1 and coupling coils L2 (S.W.), L3 (M.W.) and L4 (L.W.) to single-tuned circuits L5, C47 (S.W.), L6, C47 (M.W.) and L7, C47 (L.W.). I.F. filtering by C2, L1 across aerial coupling circuit.

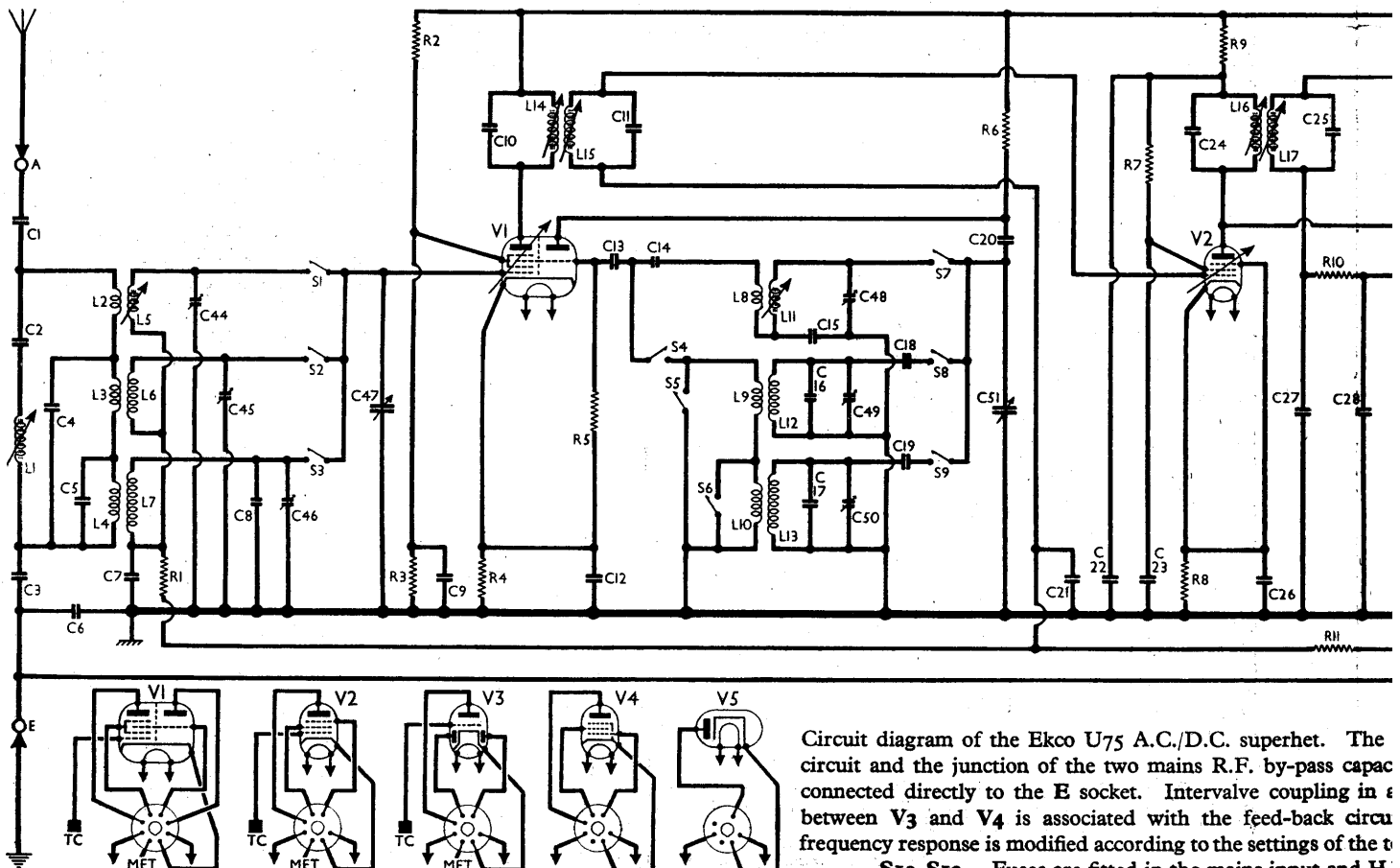
First valve (V1, Mullard metallized CCH35) is a triode-hexode operating as frequency changer with internal coupling. Triode oscillator anode coils L11 (S.W.), L12 (M.W.) and L13 (L.W.) are tuned

by C51, with parallel trimming by C48 (S.W.), C16, C49 (M.W.) and C17, C50 (L.W.), and series tracking by C15 (S.W.), C18 (M.W.) and C19 (L.W.). Inductive reaction coupling to C.G. circuit by L8 (S.W.), L9 (M.W.) and L10 (L.W.), with additional capacitive coupling on S.W. due to the common impedance of tracker C15 in grid and anode circuits.

Second valve (V2, Mullard metallized EF39) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-transformer couplings C10, L14, L15, C11 and C24, L16, L17, C25 in which the tuning capacitors are fixed and alignment adjustments are effected by varying the positions of the iron-dust cores.

Intermediate frequency 460 kc/s.

Diode second detector is part of double diode triode valve (V3, Mullard metallized EBC33). Audio frequency component in rectified output is developed across diode load resistor R12 and passed via A.F. coupling capacitor C30, manual volume control R13 and grid stopper R14 to C.G. of triode section, which operates as A.F.



Circuit diagram of the Ekco U75 A.C./D.C. superhet. The circuit and the junction of the two mains R.F. by-pass capacitors connected directly to the E socket. Intervale coupling in a between V3 and V4 is associated with the feed-back circuit frequency response is modified according to the settings of the S10-S13. Fuses are fitted in the mains input and H.

amplifier. I.F. filtering by C27, R10, C28 in diode circuit and R14 in triode grid circuit.

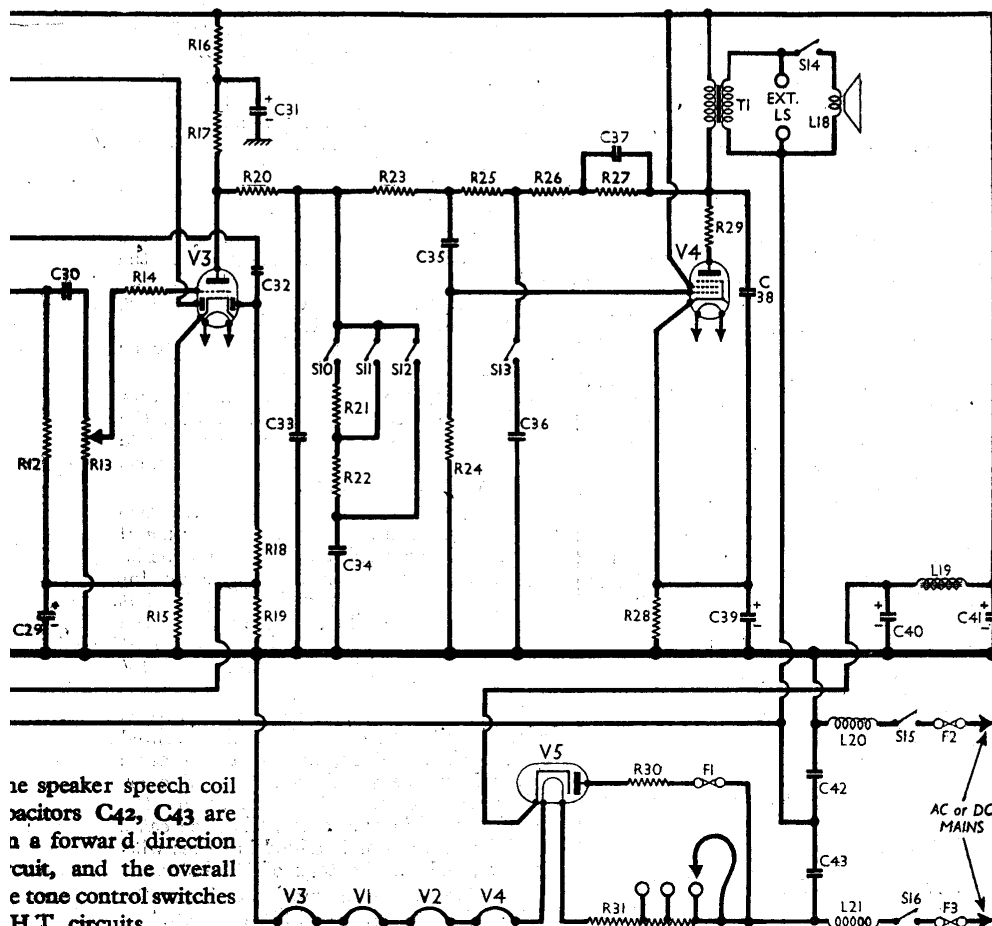
Second diode of V3, fed from V2 anode via C32, provides D.C. potential which is developed across load resistors R18, R19 and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic gain control.

Resistance-capacitance coupling by R17, C35, R24, via a portion of the negative feed-back network, between V3 triode and pentode output valve (V4, Mullard CL33). A four-position switch S10-S13 enables the frequency response of the feed-back network comprising R20, C33, R21, R22, C34, R23, R25, C36, R26, C37, R27 to be modified for tone control purposes, and C38 gives fixed tone correction in V4 anode circuit.

Provision is made for the connection of a low impedance external speaker across T1 secondary winding, and a screw-type switch S14 permits muting of the internal speaker when desired.

When the receiver is operated from A.C. mains H.T. current is supplied by half-wave rectifying valve (V5, Mullard CY31), which behaves as a low resistance with D.C. mains.

Valve heaters, together with adjustable ballast resistor R31, are wired in series across mains input, and a filter circuit comprising chokes L20, L21 and capacitors C42, C43 suppresses mains-borne interference.



ie speaker speech coil
acitors C42, C43 are
a a forward direction
cuit, and the overall
e tone control switches
H.T. circuits.

COMPONENTS AND VALUES

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

RESISTORS		Values (ohms)	Locations
R1	V1 A.G.C. decoup.	100,000	M3
R2	V1 S.G. H.T. po-	33,000	M4
R3	tential divider ...	33,000	M5
R4	V1 fixed G.B. ...	330	N4
R5	V1 osc. C.G. ...	47,000	M4
R6	Osc. anode load ...	22,000	M4
R7	V2 S.G. feed ...	100,000	L5
R8	V2 fixed G.B. ...	330	L5
R9	H.T. feed resistor ...	2,200	L5
R10	I.F. stopper ...	47,000	K5
R11	A.G.C. decoupling	1,000,000	L5
R12	Signal diode load ...	470,000	K5
R13	Volume control ...	1,000,000	G3
R14	V3 grid stopper ...	220,000	C2
R15	V3 G.B., A.G.C. delay ...	1,200	J5
R16	H.T. decoupling ...	10,000	J4
R17	V3 triode load ...	47,000	K5
R18	A.G.C. diode load	470,000	L4
R19	resistors ...	1,000,000	L4
R20	Parts of tone con-	22,000	J4
R21	trol circuit ...	470,000	J3
R22	A.G.C. decoupling	33,000	J3
R23	V4 C.G. resistor ...	22,000	J4
R24	Parts of tone con-	470,000	J4
R25	trol circuit ...	470,000	J3
R26	V4 G.B. resistor ...	1,000,000	J3
R27	V4 anode stopper ...	3,300,000	J3
R28	V5 surge limiter ...	110	K4
R29	Heater ballast ...	100†	J4
R30		47	J5
R31		846*	E2

* Tapped at 646 Ω + 100 Ω + 100 Ω from V5 heater.

† Two 50 Ω resistors in series in our sample.

CAPACITORS		Values (μF)	Locations
C1	Aerial isolator ...	0.0025	N5
C2	I.F. filter tuning ...	0.00015	N5
C3	Earth isolator ...	0.1	N5
C4	Aerial M.W. shunt	0.00047	N4
C5	Aerial L.W. shunt	0.00082	A1
C6	Earth isolator ...	0.1	M5
C7	V1 hex. C.G. decoup.	0.1	N3
C8	Aerial L.W. trim...	0.000082	L3
C9	V1 S.G. decoup. ...	0.1	N5
C10	1st I.F. transformer	0.00015	B2
C11	tuning ...	0.00015	B2
C12	V1 cath. by-pass ...	0.1	N4
C13	V1 osc. C.G. capaci-	0.0002	M4
C14	tors ...	0.00005	M4
C15	Osc. S.W. tracker ...	0.0047	L4
C16	Osc. M.W. trim. ...	0.000017	L4
C17	Osc. L.W. trim. ...	0.00022	K4
C18	Osc. M.W. tracker	0.00054	L4
C19	Osc. L.W. tracker	0.0004	L3
C20	Osc. anode coup. ...	0.0001	M4
C21	V2 C.G. decoup. ...	0.1	L4
C22	H.T. feed decoup.	0.1	M5
C23	V2 S.G. decoup. ...	0.1	L5
C24	2nd I.F. transfor-	0.00015	C2
C25	mer tuning ...	0.00015	C2
C26	V2 cath. by-pass ...	0.1	M5
C27	I.F. by-passes ...	0.0001	K5
C28	V3 cath. by-pass ...	0.0001	K5
C29*	A.F. coupling ...	25.0	K5
C30	A.F. decoupling ...	0.005	H3
C31*	H.T. decoupling ...	4.0	L5
C32	A.G.C. coupling ...	0.000015	K5
C33	Parts of tone con-	0.001	K4
C34	trol circuit ...	0.005	J3
C35	A.F. coupling ...	0.01	J4
C36	Parts of tone con-	0.0001	J3
C37	trol circuit ...	0.001	J3
C38	Tone corrector ...	0.0025	K4
C39*	V4 cath. by-pass ...	25.0	K3
C40*	H.T. smoothing ...	8.0	H5
C41*	capacitors ...	24.0	H5
C42	Mains R.F. by-	0.1	H4
C43	passes ...	0.1	H4
C44†	Aerial S.W. trim ...	—	M3
C45†	Aerial M.W. trim...	—	A1
C46†	Aerial L.W. trim...	—	A1
C47†	Aerial tuning ...	—	B1
C48†	Osc. S.W. trim. ...	—	M3
C49†	Osc. M.W. trim. ...	—	L4
C50†	Osc. L.W. trim. ...	—	K4
C51†	Oscillator tuning ...	—	B1

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	I.F. filter coil ...	8.6	N5
L2	Aerial coupling	Very low	M3
L3	coils ...	12.5	A1
L4		36.0	A1
L5	Aerial tuning coils	Very low	M3
L6		4.0	A1
L7		29.0	A1
L8	Oscillator reaction	Very low	L4
L9	coils ...	1.5	L4
L10		2.1	K4
L11	Oscillator tuning	Very low	L4
L12	coils ...	3.5	L4
L13		6.6	K4
L14	1st I.F. { Pri. ...	9.0	B2
L15	trans. { Sec. ...	9.0	B2
L16	2nd I.F. { Pri. ...	9.0	C2
L17	trans. { Sec. ...	9.0	C2
L18	Speech coil ...	2.1	—
L19	Smoothing choke ...	560.0	H3
L20	Mains R.F. filter	1.6	H4
L21	chokes ...	1.6	H4
T1	Output { Pri. ...	365.0	C1
S1-S9	trans. { Sec. ...	0.4	C1
S10-S13	W/and switches ...	—	L3
S14	Tone control	—	J3
S15	switches ...	—	J3
S16	Int. spkr. switch ...	—	J5
S17	Mains switches,	—	G3
S18	ganged R13 ...	—	—
F1	H.T. fuse, 0.5A. ...	—	F2
F2, F3	Mains fuses, 1.0 A. ...	—	F2

DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs (recessed grub screws); from the rear of the cabinet remove the two 4BA cheese-head screws securing the scale backing plate, and the two short round-head wood screws which retain the ends of the cursor guide rail; from the underside of the cabinet remove the four long round-head wood screws securing two plastic covers which protect the heads of the chassis retaining screws; remove the four 2BA round-head screws (with metal washers) securing the chassis to the base of the cabinet, and slide out the chassis. Unless specially desired, it is unnecessary to unsolder the speaker leads.

When replacing, do not omit to cover

the heads of the control knob grub screws with a suitable insulating compound.

Removing Speaker.—Loosen the fixing nuts of the four speaker retaining clamps, swivel the clamps aside, and lift out the speaker.

When replacing, the connecting panel should be at the top.

Warning.—If the receiver is inserted loosely in the cabinet while connected to the mains, or if it is operated while chassis and speaker are lying on the bench, care should be taken to avoid contact between speaker frame and chassis, as the speech coil and chassis are at different mains potentials and a "flash-over" may occur between speech coil and speaker frame, especially if an earth lead is connected. There exists also the danger explained at the beginning of "Circuit Alignment."

Waveband Switch Unit

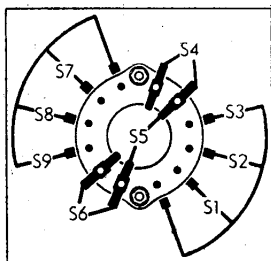


Diagram of the waveband switch unit **S1-S9**, drawn as seen when viewed from the rear of an inverted chassis. Below is the associated switch table.

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

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted by the manufacturers. Their receiver was operating from 225 V A.C. mains and was tuned to 300 m, but there was no signal input.

Voltages were measured with a meter having an internal resistance of 1,000 ohms per volt.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 CCH35	192	1.0	70	1.4
	Oscillator	2.9		
V2 EF30	183	3.5	67	1.1
V3 EBC33	90	1.6	—	—
V4 CL33	176	42.5	192	4.5
V5 CY31†	—	—	—	—

† Cathode to chassis, 229V, D.C.

GENERAL NOTES

Switches.—**S1-S9** are the waveband switches, ganged in a single rotary unit beneath the chassis. The unit is indicated in our under-chassis view (location L3)

Tone Control Switch Unit

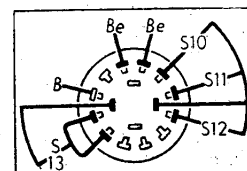


Diagram of the tone control switch unit, drawn as seen when viewed from the rear of an inverted chassis.

S15, S16 are the Q.M.B. mains switches, ganged with the volume control **R13**.

Fuses F1, F2, F3.—These three fuses are mounted on the fuse panel at the right-hand rear corner of the chassis deck. **F1** is the H.T. circuit fuse, 1½ in long and rated at 500 mA. **F2** and **F3** are the mains input circuit fuses, 1 in long and rated at 1 A each.

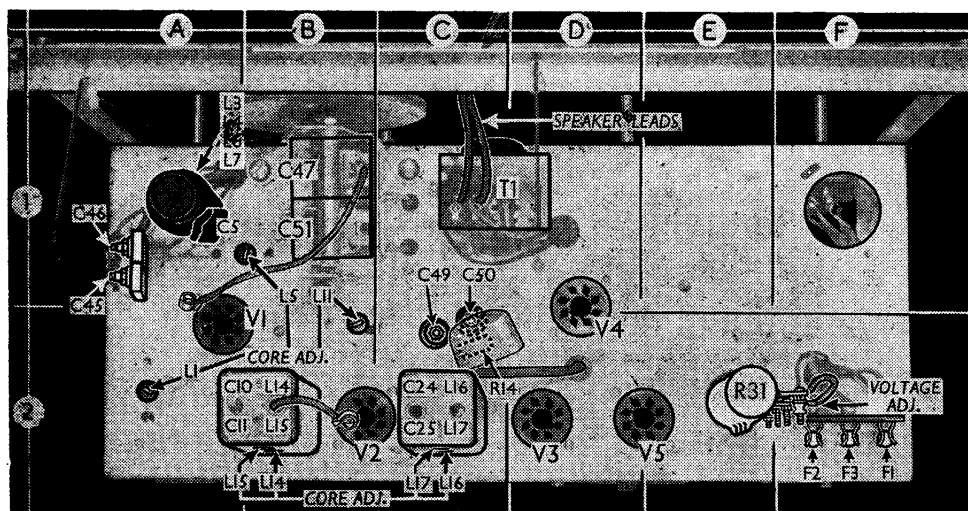
External Speaker.—Two sockets are provided on a panel at the rear of the chassis for the connection of a low impedance (about 3-4 Ω) external speaker. Switch **S14**, which is associated with them, permits the internal speaker to be muted.

Care must be taken that the speaker leads do not come into contact with the chassis, as the external speaker sockets are connected to true earth and the chassis is "live" to the mains.

Capacitors C40, C41.—These are two dry electrolytics in a single tubular metal container, mounted beneath the chassis. The red tag is the positive connection for **C41** (24 μF) and the yellow tag is that of **C40** (8 μF), while the black tag is the common negative connection. Our unit was a Hunts type K44, rated at 350 V D.C. working.

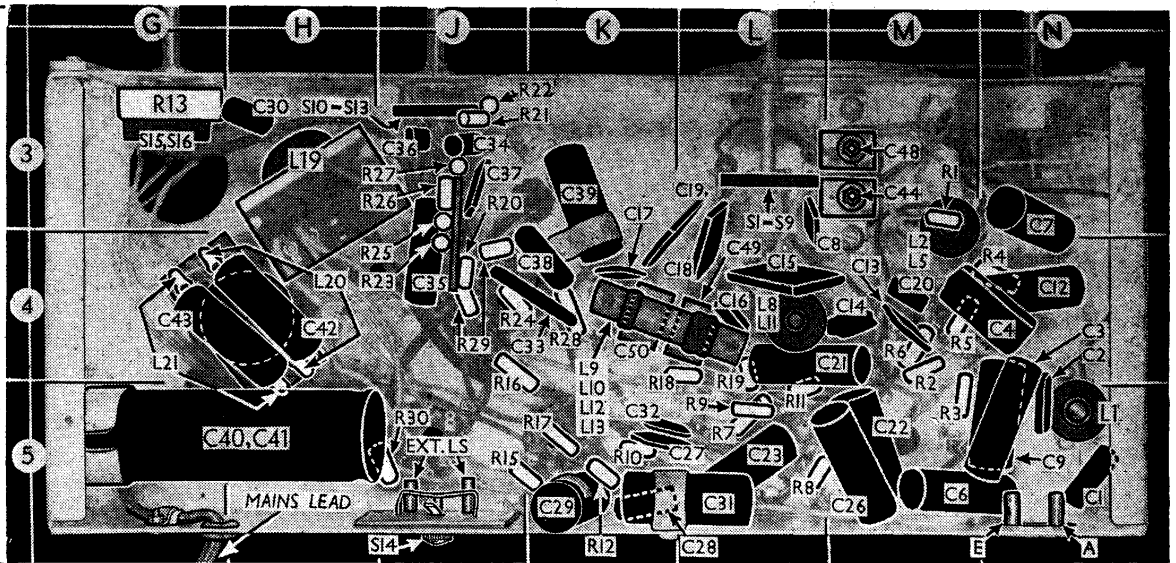
Resistor R31.—In our sample this was a single vitreous enamelled unit mounted on the chassis deck, but in a few cases the unit where we show it has an overall resistance of 783 Ω instead of the 846 Ω quoted in our tables. In such cases a 63 Ω 6 W resistor is added in series with it, mounted on the tags of **V5** holder.

Resistor R28.—In most receivers the value of **R28** will be 110 Ω as quoted in



Plan view of the chassis. The positions of the core adjustments for the aerial I.F. filter, the S.W. coils and the four I.F. transformer coils are indicated here, as are also the M.W. and L.W. capacitor trimmers. The S.W. capacitor trimmers **C44** and **C48** are beneath the chassis. **R14** is in the top cap connector of **V3**.

Under-chassis view. The mains R.F. filter coil tags (L20, L21) are indicated on the panel carrying C42 and C43. Detailed diagrams of the waveband switch unit (seen at location L3) and the tone control switch unit (seen at J3) appear in cols. 1 and 3 respectively.



our tables, but in some cases a 150 Ω resistor may be fitted.

DRIVE CORD REPLACEMENT

The drive cord consists of 33in of stranded steel wire (obtainable, ready looped, from the manufacturers under Part No. B33563) and about 36in of cord. The sketch below shows the course taken by this combination, as seen when viewed from the front when the gang is at maximum capacitance.

The one end of the cord to one of the looped ends of the steel wire, pass the free loop at the other end of the wire through the left-hand slot in the gang drive drum flange, and hook it to the anchor, as shown in the sketch.

The drive wire should then be run as

"chassis" side of the supply is the earthed side of the mains, especially during alignment operations. As a test, connect a 0.1 μ F capacitor in series with the earth lead, and "touch" its free end to the chassis; if sparking occurs, reverse the mains plug.

Failure to observe this precaution may result in the burning out of one of the filter coils (L20) if the chassis contacts the earth lead or some other earthed conductor.

I.F. Stages.—Connect signal generator, via an 0.1 μ F capacitor in the "live" lead, to control grid (top cap) of V1 and the E socket, switch set to M.W., and turn the volume control and gang to maximum. Feed in a 460 kc/s (652.1 m)

signal, and adjust the cores of L17, L16, L15 and L14 (location references C2, B2) for maximum output.

R.F. and Oscillator Stages.—For these operations the chassis must be in position in the cabinet. With the gang at maximum capacitance the cursors should be vertical and coincident with the high wavelength ends of the three scales. They may be adjusted in position by sliding the cursor carriage along the drive cord.

Transfer "live" signal generator lead, via an 0.0002 μ F capacitor, to A socket.

S.W.—Switch set to S.W., tune to 20 m on scale, feed in a 20 m (15 Mc/s) signal, and adjust C48 (M3) and C44 (M3) for maximum output. Tune to 50 m on scale, feed in a 50 m (6 Mc/s) signal, and adjust the cores of L11 (B2) and L5 (B1) for maximum output.

M.W.—Switch set to M.W., tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust C49 (C2) for maximum output. Tune to 231 m on scale, feed in a 231 m (1,300 kc/s) signal, and adjust C45 (A1) for maximum output.

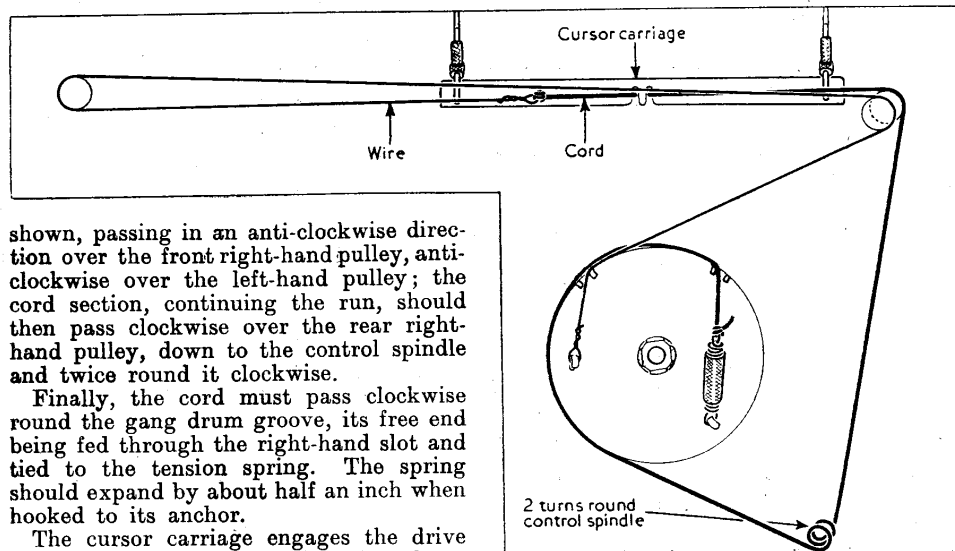
L.W.—Switch set to L.W., tune to 1,200 m on scale, feed in a 1,200 m (250 kc/s) signal, and adjust C50 (C2) and C46 (A1) for maximum output.

I.F. Filter.—Switch set to M.W., tune to 550 m on scale, feed in a 460 kc/s signal, and adjust the core of L1 (A2) for maximum output.

SERVICE SHEET REPRINTS

REPRINTS of *Trader Service Sheets* can be obtained from our Cash Sales department at 8d each or 7s per dozen post free, irrespective of size. Cash should be sent with the order.

Apparatus covered by these Service Sheets is listed in the Index, a copy of which will be posted upon receipt of a rd stamp. Those Sheets which are now out of print are clearly indicated in the Index.



shown, passing in an anti-clockwise direction over the front right-hand pulley, anti-clockwise over the left-hand pulley; the cord section, continuing the run, should then pass clockwise over the rear right-hand pulley, down to the control spindle and twice round it clockwise.

Finally, the cord must pass clockwise round the gang drive drum groove, its free end being fed through the right-hand slot and tied to the tension spring. The spring should expand by about half an inch when hooked to its anchor.

The cursor carriage engages the drive cord in a slot, which may be located approximately in the first instance just above the gang spindle, final adjustment being made when the chassis is in the cabinet, as explained under "Circuit Alignment."

CIRCUIT ALIGNMENT

The makers stress the importance of ensuring, when working on A.C. mains with the chassis on the bench, that the

Sketch showing the tuning drive system as it appears when viewed from the front when the gang is at maximum capacitance. Part of the drive cord is of steel wire, and part twine, the junction of the two being clearly visible in the sketch. The two cursors are carried at the ends of a common carriage.