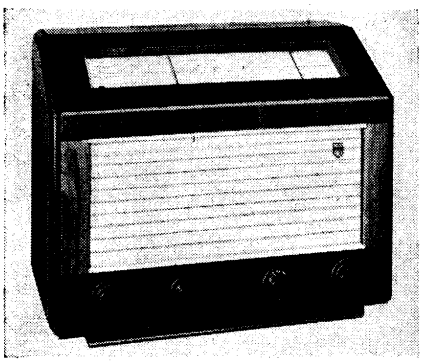
Supplement to The Wireless & Electrical Trader, October 30, 1948

"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 Ecko 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 18*s plus purchase tax.*

CIRCUIT DESCRIPTION

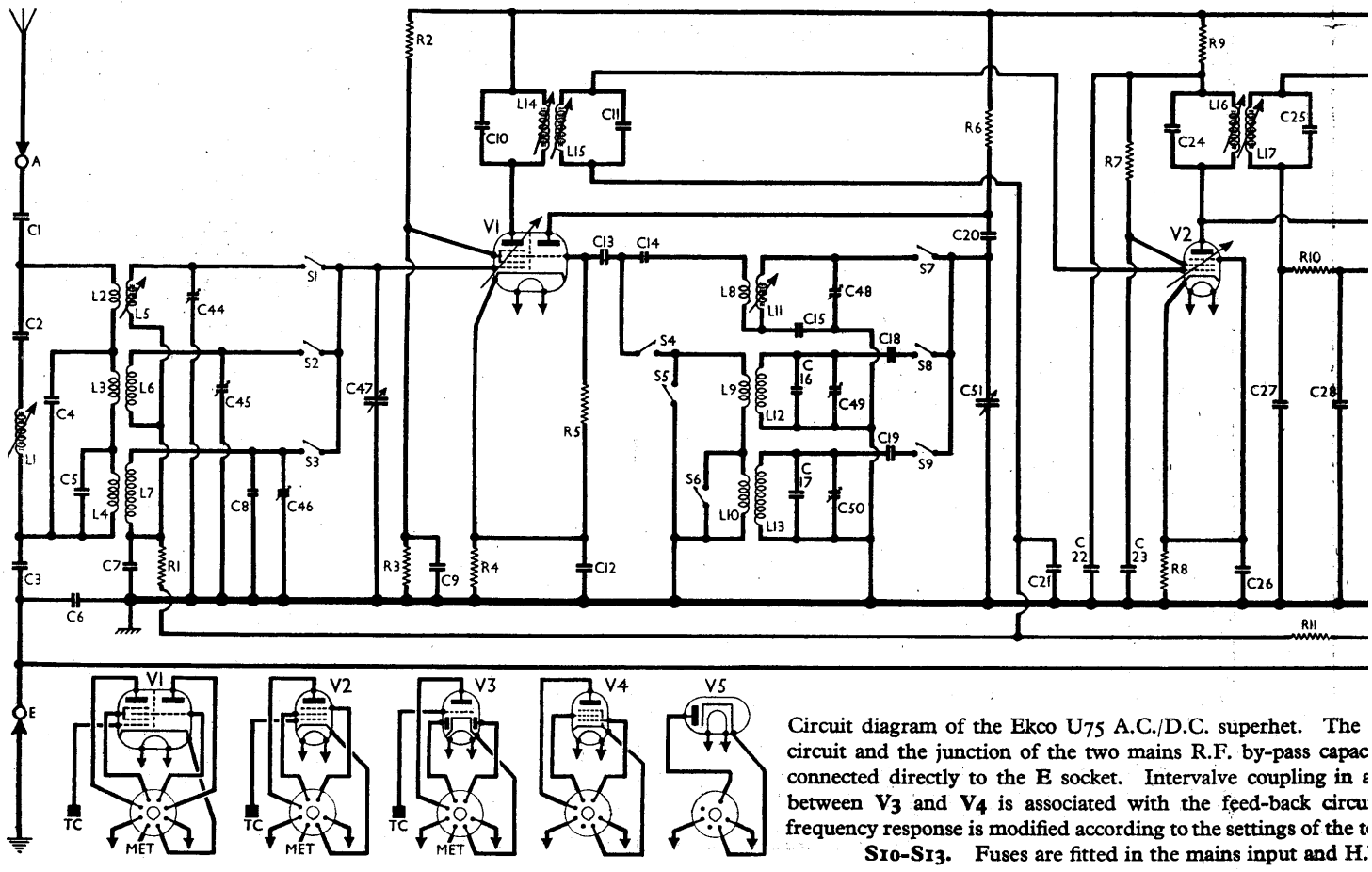
Aerial input is via isolating capacitor **C1** and coupling coils **L2** (S.W.), **L3** (M.W.) and **L4** (L.W.) to single-tuned circuits **L5, C47** (S.W.), **L6, C47** (M.W.) and **L7, C47** (L.W.). I.F. filtering by **C2, L1** across aerial coupling circuit.

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 capacitative 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 capac connected directly to the E socket. Intervalve coupling in a between **V3** and **V4** is associated with the feed-back circu frequency response is modified according to the settings of the t **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.

COMPONENTS AND VALUES

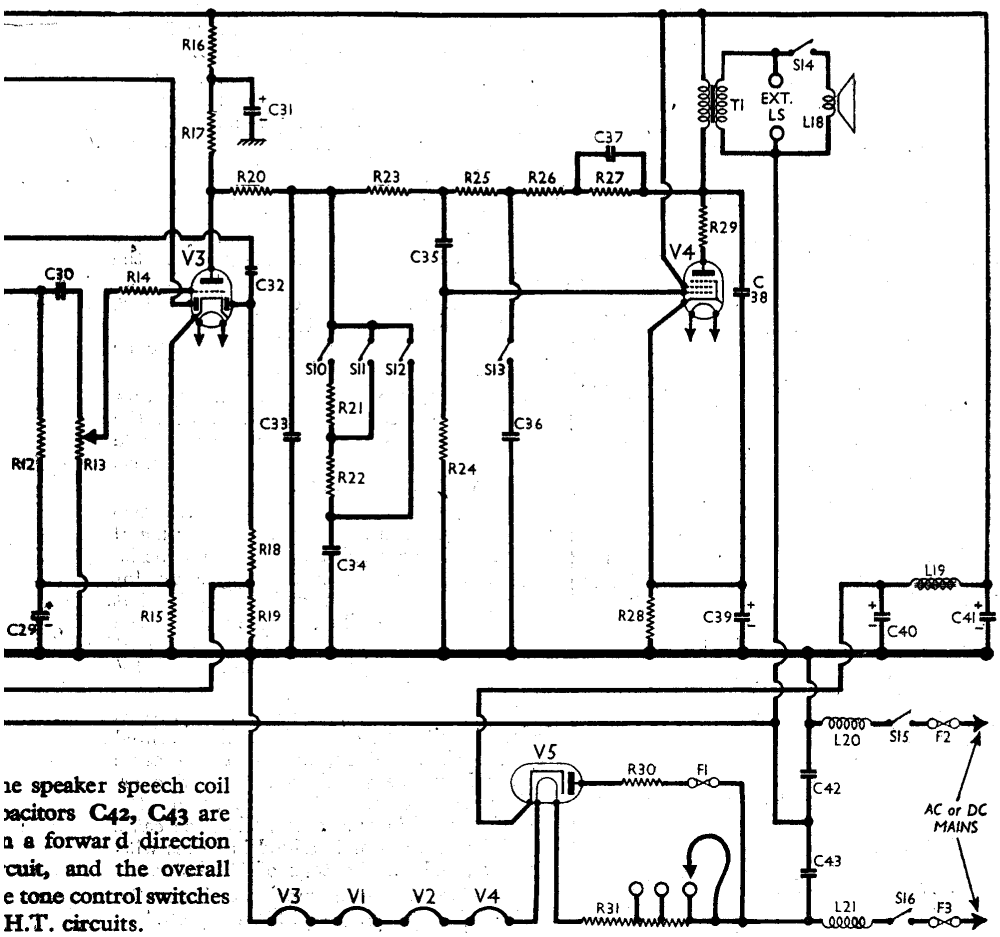
If the component numbers given in these tables are used when ordering replacements, dealers are advised to mention the fact, as these numbers may differ from those in the makers' diagram.

	RESISTORS	Values (ohms)	Locations
R1	V1 A.G.C. decoup.	100,000	M3
R2	V1 S.G. H.T. potential divider ...	33,000	M4
R3		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 resistors ...	470,000	L4
R19		1,000,000	L4
R20	Parts of tone control circuit ...	22,000	J4
R21		470,000	J3
R22		33,000	J3
R23		22,000	J4
R24	V4 C.G. resistor ...	470,000	J4
R25	Parts of tone control circuit ...	470,000	J3
R26		1,000,000	J3
R27		3,300,000	J3
R28	V4 G.B. resistor ...	110	K4
R29	V4 anode stopper...	100†	J4
R30	V5 surge limiter ...	47	J5
R31	Heater ballast ...	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 tuning	0·00015	B2
C11		0·00015	B2
C12	V1 cath. by-pass ...	0·1	N4
C13	V1 osc. C.G. capacitors	0·0002	M4
C14		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. transformer tuning ...	0·00015	C2
C25		0·00015	C2
C26	V2 cath. by-pass ...	0·1	M5
C27	I.F. by-passes ...	0·0001	K5
C28		0·0001	K5
C29*	V3 cath. by-pass ...	25.0	K5
C30	A.F. coupling ...	0·005	H3
C31*	H.T. decoupling ...	4.0	L5
C32	A.G.C. coupling ...	0·000015	K5
C33	Parts of tone control circuit ...	0·001	K4
C34		0·005	J3
C35	A.F. coupling ...	0·01	J4
C36	Parts of tone control circuit ...	0·0001	J3
C37		0·001	J3
C38	Tone corrector ...	0·0025	K4
C39*	V4 cath. by-pass ...	25.0	K3
C40*	H.T. smoothing capacitors ...	8·0	H5
C41*		24.0	H5
C42	Mains R.F. by-passes	0·1	H4
C43		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.



ıe speaker speech coil
›acitors **C42, C43** are
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cuit, and the overall
e tone control switches
H.T. circuits.

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	I.F. filter coil ...	8·6	N5
L2	Aerial coupling coils	Very low	M3
L3		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 coils	Very low	L4
L9		1·5	L4
L10		2·1	K4
L11	Oscillator tuning coils	Very low	L4
L12		3·5	L4
L13		6·6	K4
L14	1st I.F. trans. Pri. ...	9·0	B2
L15	Sec. ...	9·0	B2
L16	2nd I.F. trans. Pri. ...	9·0	C2
L17	Sec. ...	9·0	C2
L18	Speech coil ...	2·1	—
L19	Smoothing choke ...	560·0	H3
L20	Mains R.F. filter chokes	1·6	H4
L21		1·6	H4
T1	Output trans. Pri. ...	365·0	C1
	Sec. ...	0·4	C1
S1-S9	W/band switches ...	—	L3
S10-S13	Tone control switches ...	—	J3
S14	Int. spkr. switch ...	—	J5
S15	Mains switches, ganged R13 ...	—	G3
S16			
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

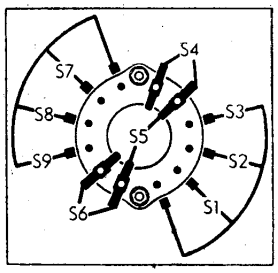


Diagram of the waveband switch unit **S1-S9**, drawn as seen when viewed from the rear of an inverted chassis. Below is the associated switch table.

Switch	S.W.	M.W.	L.W.
S1	C	—	—
S2	—	C	—
S3	—	—	C
S4	—	C	C
S5	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			
	98	2.9		
V2 EF39	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) and shown in detail in the diagram in col. 1, where it is drawn as seen when viewed from the rear of an inverted chassis.

The table below it 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.

S10-S13 are the tone control switches, ganged in a second three-position single rotary unit indicated in our under-chassis illustration (location J3). This unit is shown in detail in the diagram below, where it is drawn as seen from the rear of an inverted chassis. In the deep position (knob anti-clockwise) **S12** closes; in the central position, **S11** and **S13** close; and the brilliant position (knob fully clockwise) **S10** and **S13** close.

S14 is the screw-type internal speaker muting switch, mounted on the external speaker panel at the rear of the chassis.

Tone Control Switch Unit

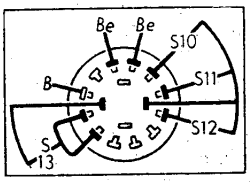


Diagram of the tone control switch unit, drawn as seen when viewed from the rear of an inverted chassis.

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, 1¼in long and rated at 500 mA. **F2** and **F3** are the mains input circuit fuses, 1in long and rated at 1 A each.

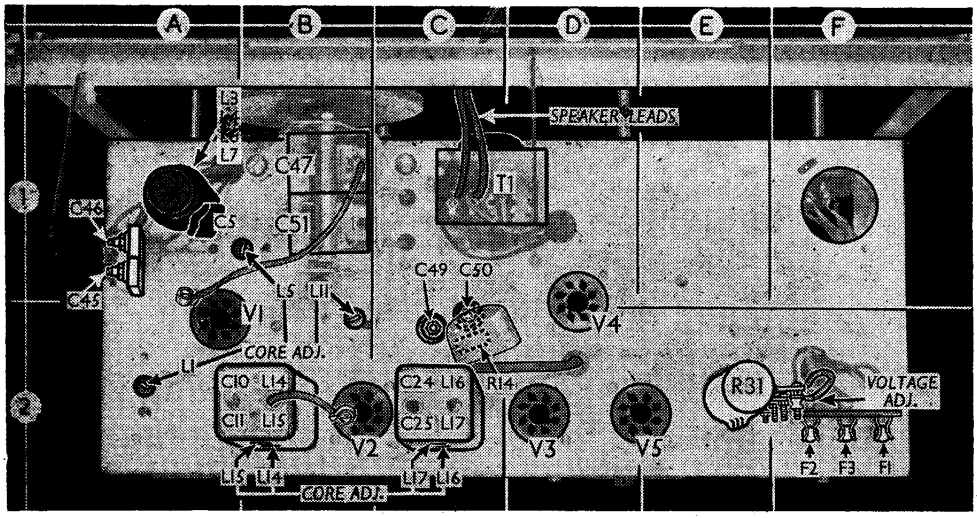
External Speaker.—Two sockets are provided on a panel at the rear of the chassis for the connection of a low impedance (about 3-4 Ω) external speaker. Switch **S14,** which is associated with them, permits the internal speaker to be muted.

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.

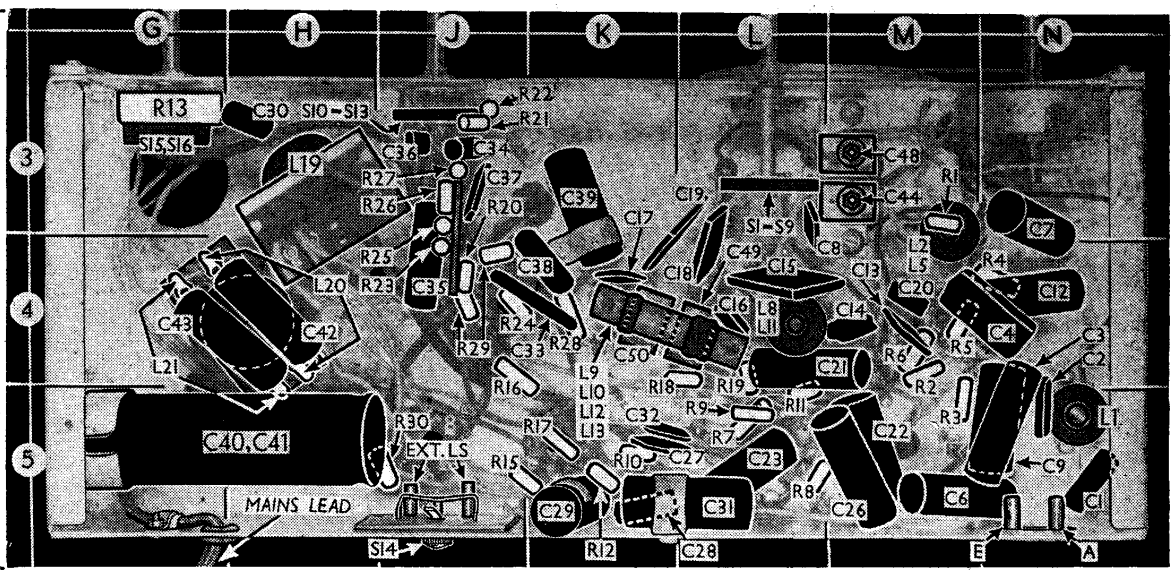
Capacitors C40, C41.—These are two dry electrolytics in a single tubular metal container, mounted beneath the chassis. The red tag is the positive connection for **C41** (24 μF) and the yellow tag is that of **C40** (8 μF), while the black tag is the common negative connection. Our unit was a Hunts type 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 150Ω resistor may be fitted.

DRIVE CORD REPLACEMENT

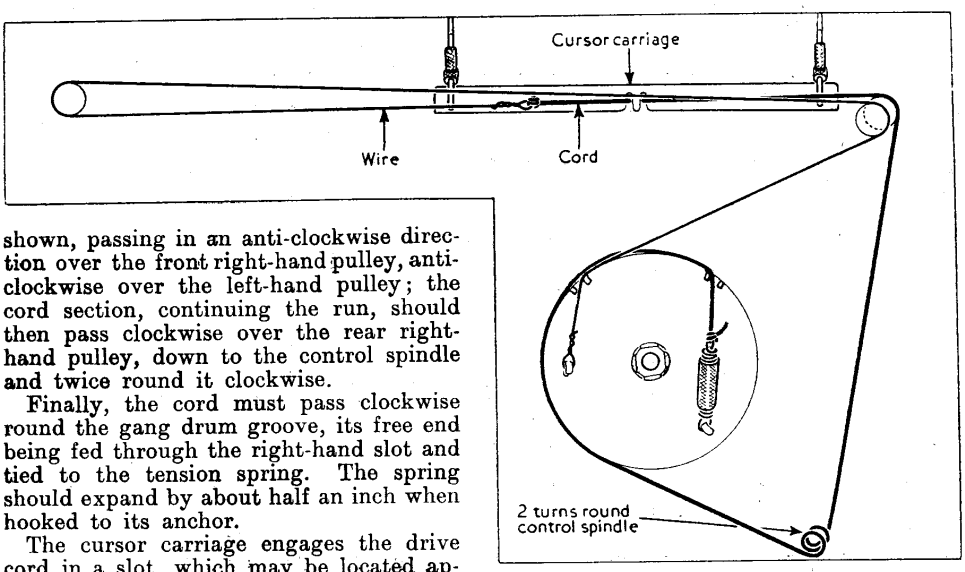
The drive cord consists of 33in of stranded steel wire (obtainable, ready looped, from the manufacturers under Part No. B33563) and about 36in of cord. The sketch below shows the course taken by this combination, as seen when viewed from the front when the gang is at maximum capacitance.

Tie 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 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 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."



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.

CIRCUIT ALIGNMENT

The makers stress the importance of ensuring, when working on A.C. mains with the chassis on the bench, that the "chassis" side of the supply is the earthed side of the mains, especially during alignment operations. As a test, connect a 0.1 μF 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 μF 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 μF 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.

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