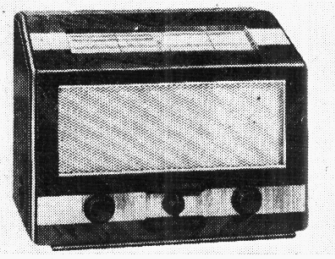
Supplement to The Wireless & Electrical Trader, March 19, 1949

"TRADER" SERVICE SHEET

900

EKCO A52

Band-spread and Pre-set Station Superhet



THREE band-spread S.W. ranges are provided in the Ekco A52, in addition to M.W. and L.W. The waveband ranges are 11.32-13.95 m. (S.W.1), 16.2-20 m. (S.W.2), 24.6-51.7 m. (S.W.3), 200-550 m. (M.W.) and 1,000-2,000 m. (L.W.) Also, there are four M.W. and one L.W. pre-set station circuits. Selection of these circuits is controlled by a 12-position switch unit, gram operation being provided at two settings. The receiver operates from A.C. mains of 200-250V, 40-100 c/s. A similar chassis is employed in the console C87.

Release dates and original prices: A52, October 1947, £28 7*s*; *C87, December* 1948, £33 13*s* 2*d*+*P.T.*

CIRCUIT DESCRIPTION

On M.W. and L.W. aerial input is via coupling coils **L4** (M.W.) and **L5** (L.W.) to single-tuned circuits **L8** (M.W.) and **L9** (L.W.), tuned manually by **C56**. For automatic tuning in these circuits, **C56** is replaced by one of the pre-set trimmer-type capacitors **C62-C66**, selected via **S33-S42**. I.F. filtering is by **L1, C1.**

On S.W., where the aerial is inductively coupled by **L2, L3,** band-spreading is achieved by connecting the tuning capacitor to the appropriate coil via a combination of series and shunt capacitors which limit the tuning range. On S.W.1, **C56** is connected to **L6** via **C4, C5** and **S2, S9**; on S.W.2 via **C7-C9** and **S5, S10,** and on S.W.3 to **L7** via **C10, C11** and **S11.**

First valve **(V1, Mullard metallized ECH35)** is a triode-hexode operating as frequency changer with internal coupling. Triode oscillator anode coils **L16** (M.W.) and **L17** (L.W.) are tuned manually by **C61,** with parallel trimming by **C59**, (M.W.), **C18, C60** (L.W.) and series tracking by **C28** (M.W.), **C29** (L.W.). For automatic tuning all the foregoing circuits are disconnected and replaced by one of the pre-set iron-dust cored Colpitts oscillator coils **L18-L22,** selected via **S43-S62.**

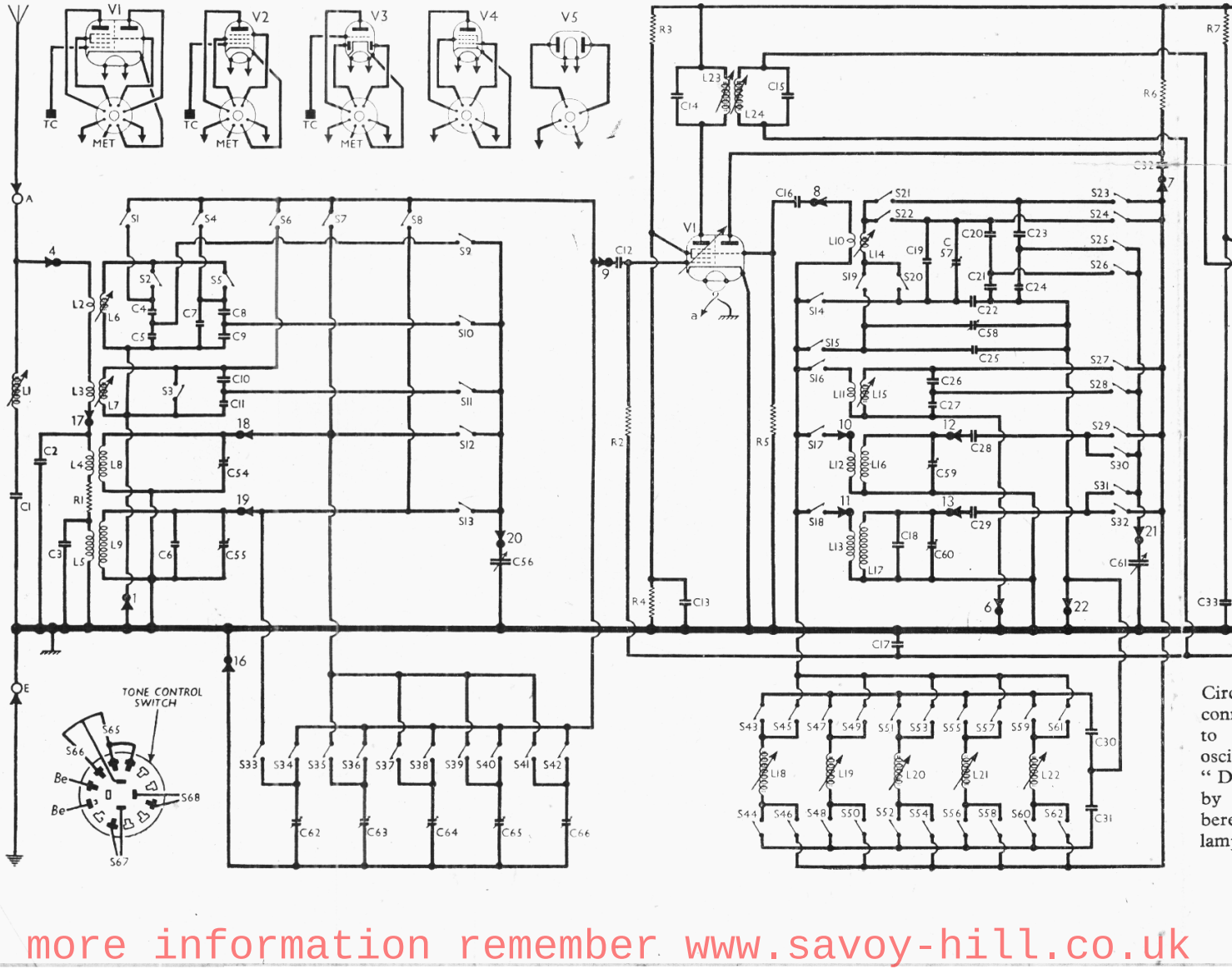
For S.W. operation band-spread tuning is again obtained by the series and shunt capacitor method. On S.W.1, **C61** is connected to **L14** via **C23, C24, C25, C58** and **S19, S21, S25;** on S.W.2 via **C19, C20, C21, C22, C57** and **S20, S22, S26;** and on S.W.3 to **L15** via **C26, C27** and **S28.** Inductive reaction coupling, by **L10-L13,** is employed on all bands, with additional coupling on S.W.1 and S.W.2 due to the common impedance of trackers **C25, C58** (S.W.1) and **C22** (S.W.2) 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.

Intermediate frequency 460 kc/s.

Diode second detector is part of double diode triode valve **(V3, Mullard metallized EBC33),** the second diode of which provides A.G.C. voltage. Provision is also made for the connection of a gramophone pick-up across the volume control **R12,** via **S64,** radio reception being muted by biassing back **V2,** due to the inclusion of **R8** in its cathode circuit. This resistor is normally short-circuited by **S63.**

Resistance-capacitance coupling by **R16, R23, C45, R22,** via grid stopper **R27,** between **V3** triode and pentode output valve **(V4, Mullard EL33).** A three-position voltage negative feedback circuit is provided for tone control purposes, with fixed tone correction by **C51.**



COMPONENTS AND VALUES

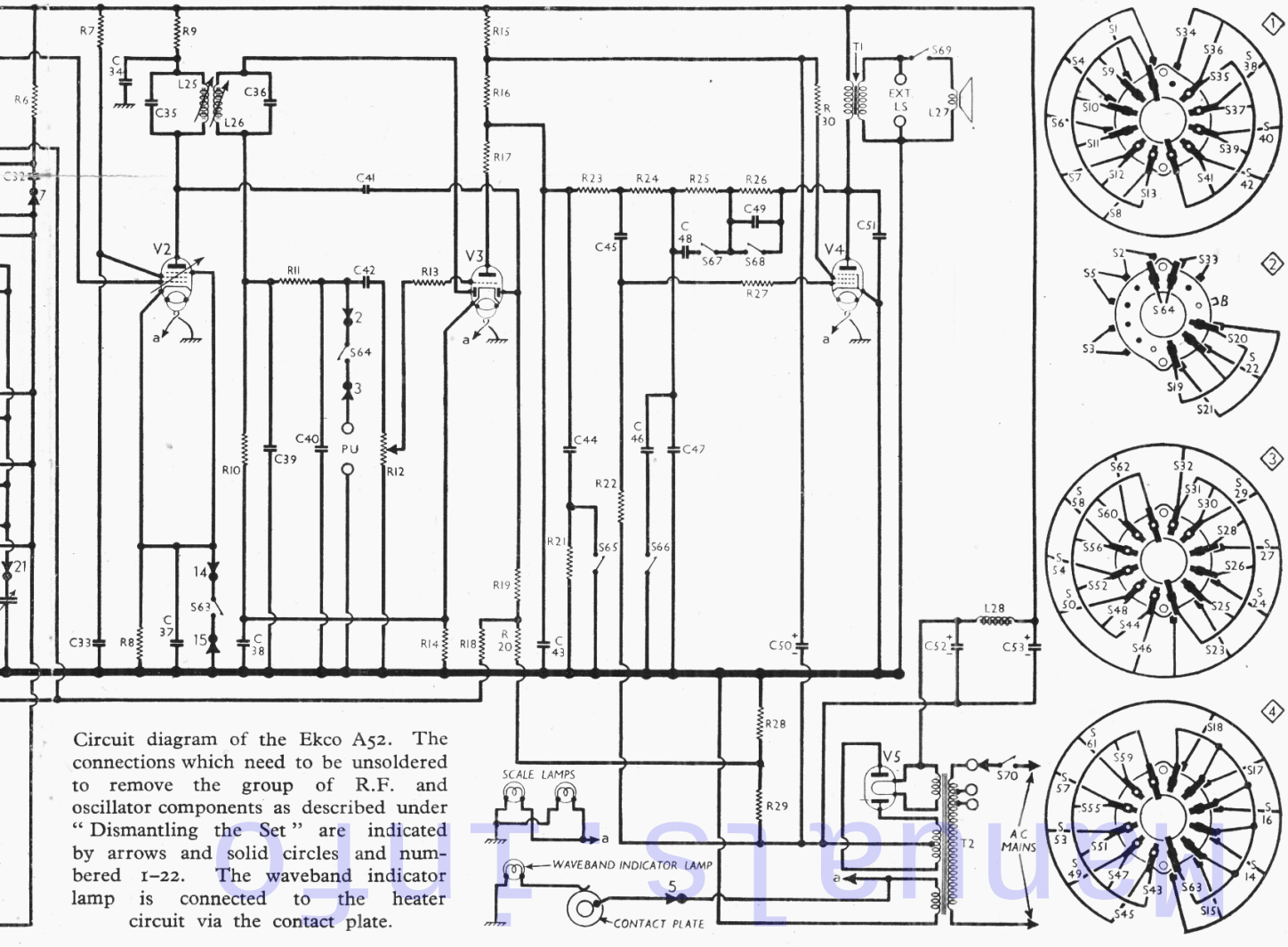
	RESISTORS	Values (ohms)	Locations
R1	Aerial series ...	330	A1
R2	V1 hex. C.G. ...	680,000	L4
R3	V1 S.G. H.T. potential divider ...	33,000	L5
R4		33,000	L5
R5	V1 osc. C.G. ...	47,000	L5
R6	Osc. anode load ...	22,000	L5
R7	V2 S.G. feed ...	100,000	M7
R8	V2 cath. resistor ...	47,000	M7
R9	V2 H.T. decoupling	2,200	M7
R10	Sig. diode load ...	470,000	N7
R11	I.F. stopper ...	47,000	N7
R12	Volume control ...	1,000,000	G3
R13	V3 grid stopper ...	220,000	C2
R14	V3 G.B., part A.G.C. delay	1,000	N7
R15	H.T. feed resistor ...	10,000	G5
R16	V3 triode anode load resistors ...	47,000	G6
R17		22,000	G6
R18	A.G.C. decoupling	1,500,000	N7
R19	A.G.C. diode load resistors ...	470,000	N7
R20		1,000,000	N7
R21	Part tone control ...	470,000	E4
R22	V4 C.G. resistor ...	470,000	G5
R23	Parts of tone control circuit ...	22,000	G6
R24		470,000	G5
R25		470,000	H5
R26		1,000,000	H5
R27	V4 C.G. stopper ...	470	G5
R28	V1, V2, V4 fixed G.B., part A.G.C. delay, resistors ...	33	G5
R29		68	G5
R30	V4 S.G. stopper ...	100	G5

	CAPACITORS	Values (μF)	Locations
C1	I.F. filter tuning ...	0·00015	L6
C2	Aerial M.W. shunt	0·00047	A1
C3	Aerial L.W. shunt	0·00082	A1
C4	Aerial S.W.1. band-spread capacitors	0·000056	J4
C5		0·000039	H4
C6	Aerial L.W. trim. ...	0·000047	A2
C7	Aerial S.W.2. band-spread capacitors	0·000047	H4
C8		0·00015	J4
C9		0·0001	H4
C10	Aerial S.W.3. band-spread capacitors	0·0012	J4
C11		0·000068	H4
C12	V1 hex. C.G. ...	0·0003	L4
C13	V1 S.G. decoup. ...	0·1	L5
C14	1st I.F. transformer tuning	0·00015	A2
C15		0·00015	A2
C16	V1 osc. C.G. ...	0·000047	L5
C17	A.G.C. decoupling	0·1	M7
C18	Osc. L.W. trim. ...	0·00027	K5
C19	Oscillator S.W.2. band-spread capacitors ...	0·000017	H4
C20		0·0003	K4
C21		0·0001	J5
C22		0·00027	H4
C23	Oscillator S.W.1. band-spread capacitors	0·00024	J4
C24		0·000068	J4
C25		0·000082	H4
C26	Oscillator S.W.3. band-spread capacitors	0·001	K5
C27		0·000068	K4
C28	Osc. M.W. tracker	0·00057	K5
C29	Osc. L.W. tracker	0·00047	J5
C30	Osc. pre-set tuning reaction	0·00082	H4
C31		0·00033	H4
C32	Osc. anode coup. ...	0·00047	L4
C33	V2 S.G. decoup. ...	0·1	N7

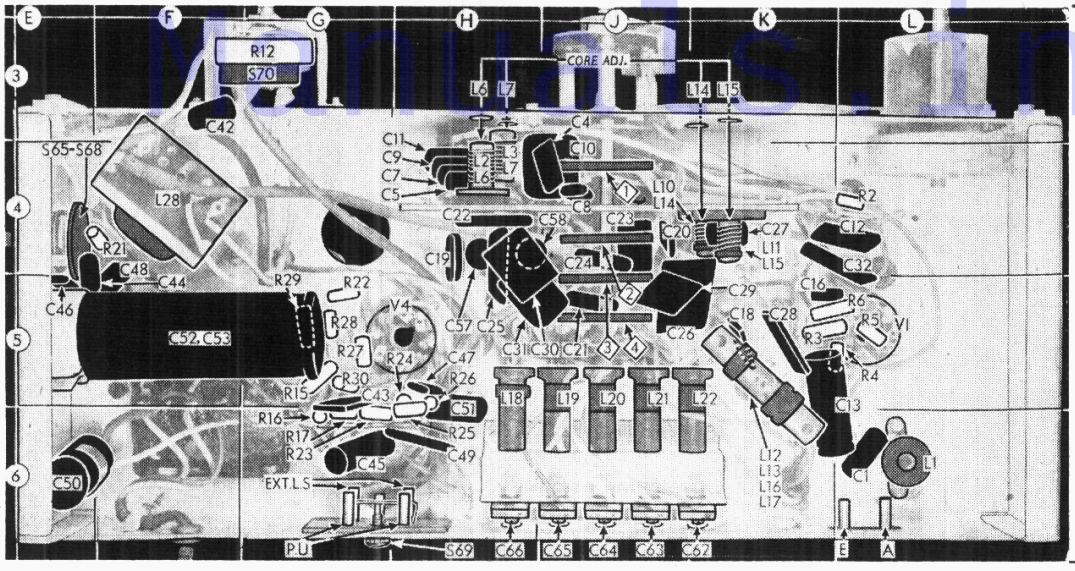
Continued next col.

	CAPACITORS (*continued*)	Values (μF)	Locations
C34	V2 anode decoup. ...	0·1	N7
C35	2nd I.F. transformer tuning ...	0·00015	B2
C36		0·00015	B2
C37	V2 cath. by-pass	0·005	M7
C38	V3 cath. by-pass ...	0·5	N7
C39	I.F. by-passes ...	0·0001	N7
C40		0·0001	N7
C41	A.G.C. coupling ...	0·000015	N7
C42	A.F. coupling ...	0·005	F3
C43	I.F. by-pass ...	0·0025	G5
C44	Part tone control ...	0·005	E4
C45	A.F. coupling ...	0·01	G6
C46	Parts of tone control circuit ...	0·00016	E5
C47		0·00016	H5
C48		0·00027	E4
C49		0·002	H6
C50*	H.T. feed decoup.	4·0	E6
C51	Tone corrector ...	0·0025	H5
C52*	H.T. smoothing capacitors ...	8·0	F5
C53*		16·0	F5
C54‡	Aerial M.W. trim.	—	A1
C55‡	Aerial L.W. trim. ...	—	A2
C56†	Aerial tuning ...	—	B1
C57‡	Osc. S.W.2. trim. ...	0·00003	H4
C58‡	Osc. S.W.1. track ...	0·00003	H4
C59‡	Osc. M.W. trim. ...	—	A2
C60‡	Osc. L.W. trim. ...	—	B2
C61†	Oscillator tuning ...	—	B1
C62‡	Aerial M.W. and L.W. pre-set tuning capacitors ...	—	K6
C63‡		—	J6
C64‡		—	J6
C65‡		—	J6
C66‡		—	H6

*Electrolytic. † Variable. ‡Pre-set.



Circuit diagram of the Ekco A52. The connections which need to be unsoldered to remove the group of R.F. and oscillator components as described under "Dismantling the Set" are indicated by arrows and solid circles and numbered 1–22. The waveband indicator lamp is connected to the heater circuit via the contact plate.



Under-chassis view. Most of the RF and oscillator circuit components are tightly grouped round the waveband switches, and access to them can be gained only by removing the whole group. This entails unsoldering 22 leads as described under "Dismantling the Set." Diagrams of the waveband switches are inset on the right of the circuit diagram overleaf.

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	I.F. filter coil ...	8·5	L6
L2	Aerial coupling coils	Very low	H4
L3		Very low	H4
L4		13·5	A1
L5		38·0	A1
L6	Aerial tuning coils	Very low	H4
L7		Very low	H4
L8		5·0	A1
L9		31·0	A1
L10	Oscillator reaction coils	Very low	K4
L11		Very low	K4
L12		1·2	K5
L13		2·0	K5
L14	Oscillator tuning coils	Very low	K4
L15		Very low	K4
L16		3·0	K5
L17		6·5	K5
L18		3·7	H5
L19	Oscillator M.W. and L.W. pre-set tuning coils ...	4·0	J5
L20		3·5	J5
L21		2·0	J5
L22		1·8	K5
L23	1st I.F.trans. Pri.	9·0	A2
L24	1st I.F.trans. Sec.	9·0	A2
L25	2nd I.F. trans. Pri.	9·0	B2
L26	2nd I.F. trans. Sec.	9·0	B2
L27	Speech coil ...	2·7	—
L28	Smoothing choke ...	540·0	F4
S1-S64	Waveband, gram and pre-set tuning switches	—	J4
S65-S68	Tone control switches	—	E4
S69	Int. spkr. switch ...	—	G6
S70	Mains sw., g'd R12	—	G3
T1	Output trans. Pri.	485·0	B2
	Output trans. Sec.	0·4	B2
T2	Mains trans. Pri., total	45·0	D2
	Mains trans. Heat. sec.	Very low	D2
	Mains trans. Rect. heat. sec., ...	Very low	D2
	Mains trans. H.T. sec., total ...	615·0	D2

DISMANTLING THE SET

The cabinet is fitted with a detachable plywood bottom cover, upon removal of which (six countersunk-head wood screws) access may be gained to most of the under-chassis components.

Removing Chassis.—Remove the four control knobs (recessed grub screws); from the rear of the cabinet remove the two cheese-head screws securing the scale backing plate, and the two round-head wood-screws retaining the ends of the cursor guide rail; remove the four cheese-head screws (with metal washers) securing the chassis to the base of the cabinet, and slide out the chassis to the extent of the speaker leads.

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

Removing Tuning Assembly.—In the following instructions each lead has been allocated a number which is repeated in the circuit diagram, where its point of connection is indicated.

Viewing the underside of the chassis from the rear, unsolder the following leads: 1, yellow lead from chassis at the tag at the left-hand side of the paxolin panel; 2, screened lead from **C42** at one tag of **S64** on wave-band switch wafer 2; 3, screened lead from P.U. socket at one tag of **S64** on switch wafer 2; 4, white lead from **A** socket at tag at right-hand side of paxolin panel; 5, green lead from wave-band indicator lamp at pin 2 on **V1**; 6, blue sleeved wire from right-hand bracket of paxolin panel at an adjacent chassis tag; 7, red/white lead at its junction with **C32**; 8, brown lead at its junction with **C16**; 9, brown lead at its junction with **C12**; 10, green lead from switch wafer 4 at a tag on **L12**; 11, red lead from switch wafer 4 at a tag on **L13**; 12, lead from **C28** at a tag on **L16**; 13, lead from **C29** at a tag on **L17**; 14, red/blue lead at **S63** (bottom tag on switch wafer 4); 15, white lead at **S63** (next tag on switch wafer 4); 16, sleeving covered wire from **C62-C66** at an adjacent chassis tag.

Viewing the chassis deck from the rear, unsolder: 17, white lead at front tag on **L4, L8**; 18, green lead at front left-hand tag on **L4, L8**; 19, red lead at rear left-hand tag on **L5, L9**; 20, brown lead from **S9—S13** at front section **(C56)** of gang; 21, brown lead from **S25, S28, S30, S31** at rear section of gang; 22, braided lead from **C57, C58** to a chassis tag which is accessible through the adjusting hole provided in the chassis deck for **C58.**

GENERAL NOTES

Switches.—**S1-S64** are in four ganged units whose control rotates continuously. The units are shown in detail in the diagrams on the right of the circuit diagram overleaf, as seen from the rear. The associated table appears in cols. 5 and 6 on this side of the Sheet. In it, a dash indicates open, and **C**, closed.

Scale and Indicator Lamps.—These are rated at 6.5 V, 0.3 A, and have M.E.S. bases.

External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (about 3 Ω) external speaker.

Chassis Divergencies.—**C47** may be omitted, and **R30** may be omitted, as may also **R27.** **R26** may be 3,300,000 Ω or 20,000,000 Ω, and **C49** may be 0.00056 μF. There may be a 50 μF electrolytic across **R28, R29,** and **C50** would then be returned to chassis. Sometimes a 0.9 Ω ballast resistor is inserted in the "**a**" lead to the scale and indicator lamps.

DRIVE CORD REPLACEMENT

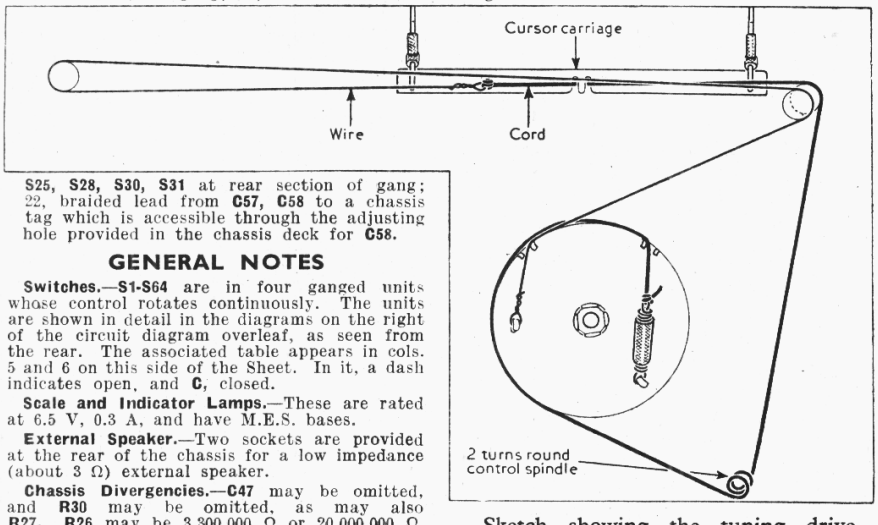
The drive cord consists of 33in of stranded steel wire (obtainable, ready looped, from the manufacturers under Part No. B33563) and about 36in of cord. The sketch below shows the course taken by this combination, as seen when viewed from the front when the gang is at maximum capacitance.

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.

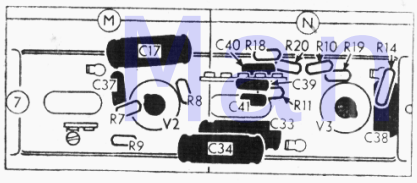
The drive wire should then be run at shown, passing in an anti-clockwise direction over the front right-hand pulley, anti-clockwise over the left-hand pulley; the cord section, continuing the run, should then pass clockwise over the rear right-hand pulley, down to the control spindle, and twice round 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 seen from the front with the gang at maximum.



Components beneath the I.F. sub-assembly, as seen when it is freed and turned over on its leads.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted by the manufacturers. Their receiver was operating from 230 V mains, using the 220-230 V tapping on the mains transformer, and was tuned to 500 m. Voltages were measured with a 1,000 Ω per volt meter, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 ECH35	255	1·95	78	2·45
	Oscillator			
	115	5·0		
V2 EF39	235	4·2	97	2·0
V3 EBC33	92	1·9	—	—
V4 EL33	241	29·0	210	3·0
V5 AZ31	290†	—	—	—

† Each anode, A.C.

CIRCUIT ALIGNMENT

I.F. Stages.—Switch set to M.W. turn gang and volume control to maximum, connect signal generator, via an 0.1 μF in the "live" lead, to control grid (top cap) of **V1** and the **E** socket, feed in a 460 kc/s (652.1 m) signal, and adjust the cores of **L26, L25, L24** and **L23** (location references B2, A2) for maximum output. When correctly aligned an input signal of 100 μV should produce 50 mW power output.

R.F. and Oscillator Stages.—With the gang at maximum capacitance the cursors should coincide with the high wavelength ends of their respective scales. Errors may be corrected by sliding the cursor carriage along the drive cord. For S.W. alignment a crystal controlled signal generator is desirable, and the receiver should finally be checked against broadcast stations of known wavelength. Transfer "live" signal generator lead to **A** socket, via a suitable dummy aerial.

M.W.—With set still switched to M.W., tune to 250 m on scale, feed in a 250 m (1,200 kc/s) signal, and adjust **C59** (A2) and **C54** (A1) for maximum output. To gain access to the former capacitor it will be necessary to remove the paxolin cover (three machine screws) at the side of **V2, V3** sub-assembly.

L.W.—Switch set to L.W., tune to 1,111 m on scale, feed in a 1,111 m (270 kc/s) signal, and adjust **C60** (B2) and **C55** (A2) for maximum output.

S.W.3.—Switch set to S.W.3, tune to 42.87 m on scale, feed in a 42.87 m (7 Mc/s) signal, and adjust the cores of **L15** (K3) and **L7** (H3) for maximum output.

S.W.2.—Switch set to S.W.2, tune to 20 m on scale, feed in a 20 m (15 Mc/s) signal, and adjust the core of **L14** (K3) for maximum output. Tune to 16.67 m on scale, feed in a 16.67 m (18 Mc/s) signal, and adjust **C57** (C1) and the core of **L6** (H3) for maximum output. Repeat these adjustments until no improvement results and note that any error on this band will be repeated on S.W.1.

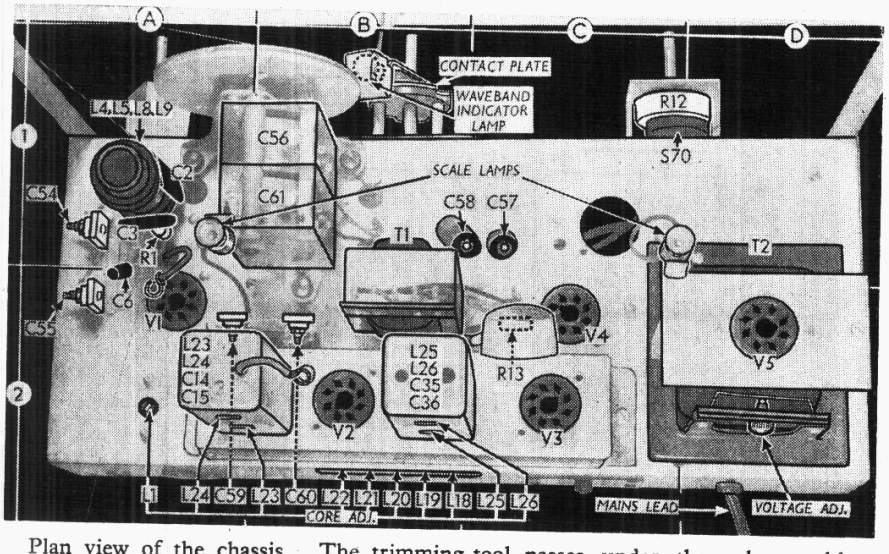
S.W.1.—Switch set to S.W.1, tune to 13.96 m on scale, feed in a 13.96 m (21.5 Mc/s) signal, and adjust **C58** (B1) for maximum output.

I.F. Filter.—Switch set to M.W., tune to 500 m on scale, feed in a strong 460 kc/s signal, and adjust the core of **L1** (A2) for minimum output.

Pre-set Tuning

The pre-set tuning circuits should be reset after alignment, but this should be carried out at the customer's address on broadcast stations. The tuning range is shown above each plunger, on the rear chassis flange.

Switch	S.W.1	S.W.2	S.W.3	M.W.	L.W.	Gram.	P.S.1	P.S.2	P.S.3	P.S.4	P.S.5	Gram.
S1	C	—	—	—	—	—	—	—	—	—	—	—
S2	C	—	—	—	—	—	—	—	—	—	—	—
S3	—	C	—	—	—	—	—	—	—	—	—	—
S4	—	C	—	—	—	—	—	—	—	—	—	—
S5	—	C	—	—	—	—	—	—	—	—	—	—
S6	—	—	C	—	—	—	—	—	—	—	—	—
S7	—	—	—	C	—	—	—	—	—	—	—	—
S8	—	—	—	—	C	—	—	—	—	—	—	—
S9	C	—	—	—	—	—	—	—	—	—	—	—
S10	—	C	—	—	—	—	—	—	—	—	—	—
S11	—	—	C	—	—	—	—	—	—	—	—	—
S12	—	—	—	C	—	—	—	—	—	—	—	—
S13	—	—	—	—	C	—	—	—	—	—	—	—
S14	—	C	—	—	—	—	—	—	—	—	—	—
S15	C	—	—	—	—	—	—	—	—	—	—	—
S16	—	—	C	—	—	—	—	—	—	—	—	—
S17	—	—	—	C	—	—	—	—	—	—	—	—
S18	—	—	—	—	C	—	—	—	—	—	—	—
S19	C	—	—	—	—	—	—	—	—	—	—	—
S20	—	C	—	—	—	—	—	—	—	—	—	—
S21	C	—	—	—	—	—	—	—	—	—	—	—
S22	—	C	—	—	—	—	—	—	—	—	—	—
S23	C	—	—	—	—	—	—	—	—	—	—	—
S24	—	C	—	—	—	—	—	—	—	—	—	—
S25	C	—	—	—	—	—	—	—	—	—	—	—
S26	—	C	—	—	—	—	—	—	—	—	—	—
S27	—	—	C	—	—	—	—	—	—	—	—	—
S28	—	—	C	—	—	—	—	—	—	—	—	—
S29	—	—	—	C	—	—	—	—	—	—	—	—
S30	—	—	—	C	—	—	—	—	—	—	—	—
S31	—	—	—	—	C	—	—	—	—	—	—	—
S32	—	—	—	—	C	—	—	—	—	—	—	—
S33	—	—	—	—	—	—	—	—	—	—	—	—
S34	—	—	—	—	—	—	—	—	—	—	C	—
S35	—	—	—	—	—	—	—	—	—	—	—	—
S36	—	—	—	—	—	—	—	—	—	C	—	—
S37	—	—	—	—	—	—	—	—	—	—	—	—
S38	—	—	—	—	—	—	—	—	C	—	—	—
S39	—	—	—	—	—	—	—	—	—	—	—	—
S40	—	—	—	—	—	—	—	C	—	—	—	—
S41	—	—	—	—	—	—	—	—	—	—	—	—
S42	—	—	—	—	—	—	C	—	—	—	—	—
S43	—	—	—	—	—	—	—	—	—	—	—	—
S44	—	—	—	—	—	—	—	—	—	—	C	—
S45	—	—	—	—	—	—	—	—	—	—	C	—
S46	—	—	—	—	—	—	—	—	—	—	C	—
S47	—	—	—	—	—	—	—	—	—	—	C	—
S48	—	—	—	—	—	—	—	—	—	C	—	—
S49	—	—	—	—	—	—	—	—	—	C	—	—
S50	—	—	—	—	—	—	—	—	—	C	—	—
S51	—	—	—	—	—	—	—	—	—	—	—	—
S52	—	—	—	—	—	—	—	—	C	—	—	—
S53	—	—	—	—	—	—	—	—	C	—	—	—
S54	—	—	—	—	—	—	—	—	C	—	—	—
S55	—	—	—	—	—	—	—	—	C	—	—	—
S56	—	—	—	—	—	—	—	C	—	—	—	—
S57	—	—	—	—	—	—	—	C	—	—	—	—
S58	—	—	—	—	—	—	—	C	—	—	—	—
S59	—	—	—	—	—	—	—	C	—	—	—	—
S60	—	—	—	—	—	—	C	—	—	—	—	—
S61	—	—	—	—	—	—	C	—	—	—	—	—
S62	—	—	—	—	—	—	C	—	—	—	—	—
S63	C	C	C	C	C	—	C	C	C	C	C	—
S64	—	—	—	—	—	C	—	—	—	—	—	C



Plan view of the chassis. The trimming-tool passes under the sub-assembly to reach **C59** and **C60**. The underside of the sub-assembly is shown in col. 4.

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