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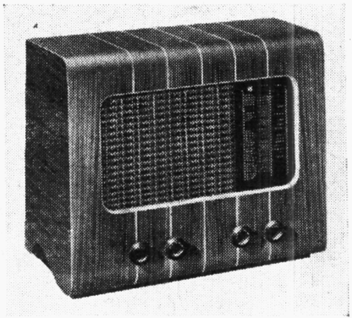
"TRADER" SERVICE SHEET

846

PYE K47C

TRANSPORTABLE A.C./D.C. TABLE RECEIVER



A FRAME aerial for M.W. and L.W. and a plate aerial for S.W. are provided in the Pye K47C, a 4-valve (plus rectifier) 3-band superhet designed for A.C. or D.C. mains of 200-250 V. There is provision for connecting an external aerial, and the circuit includes an R.F. amplifier.

A coupling transformer isolates the pick-up sockets from the mains, and these and the external speaker sockets are returned to the earth socket.

Release date and original price: October 1947; £22 1s plus purchase tax.

CIRCUIT DESCRIPTION

On S.W., input from plate aerial is inductively coupled by **L1** to single-tuned circuit **L2, C38.**

On M.W., tuned frame aerial input is provided by **L3, C38,** with the addition of loading coil **L4** on L.W., and provision is made for the connection of an external aerial, which is operative on all bands, via series capacitor **C3.**

First valve **(V1, Mullard metallized EF39)** is a variable-mu R.F. pentode operating as signal frequency amplifier with tuned anode coupling by **L5, C41** (S.W.), **L6, C41** (M.W.) and aperiodic coupling by **R5** (L.W.) to triode-hexode valve **(V2, Mullard metallized CCH35)** which operates as frequency changer with internal coupling.

Triode oscillator anode coils **L10** (S.W.), **L11** (M.W.) and **L12** (L.W.) are tuned by **C45.** Parallel trimming by **C42** (S.W.), **C43** (M.W.) and **C12, C44** (L.W.); series tracking by **C13** (S.W.) and **C14** (M.W. and L.W.). Inductive reaction coupling to control grid by coils **L7** (S.W.), **L8** (M.W.) and **L9** (L.W.), with additional capacitative coupling across the impedance of the trackers, which are common to grid and anode circuits.

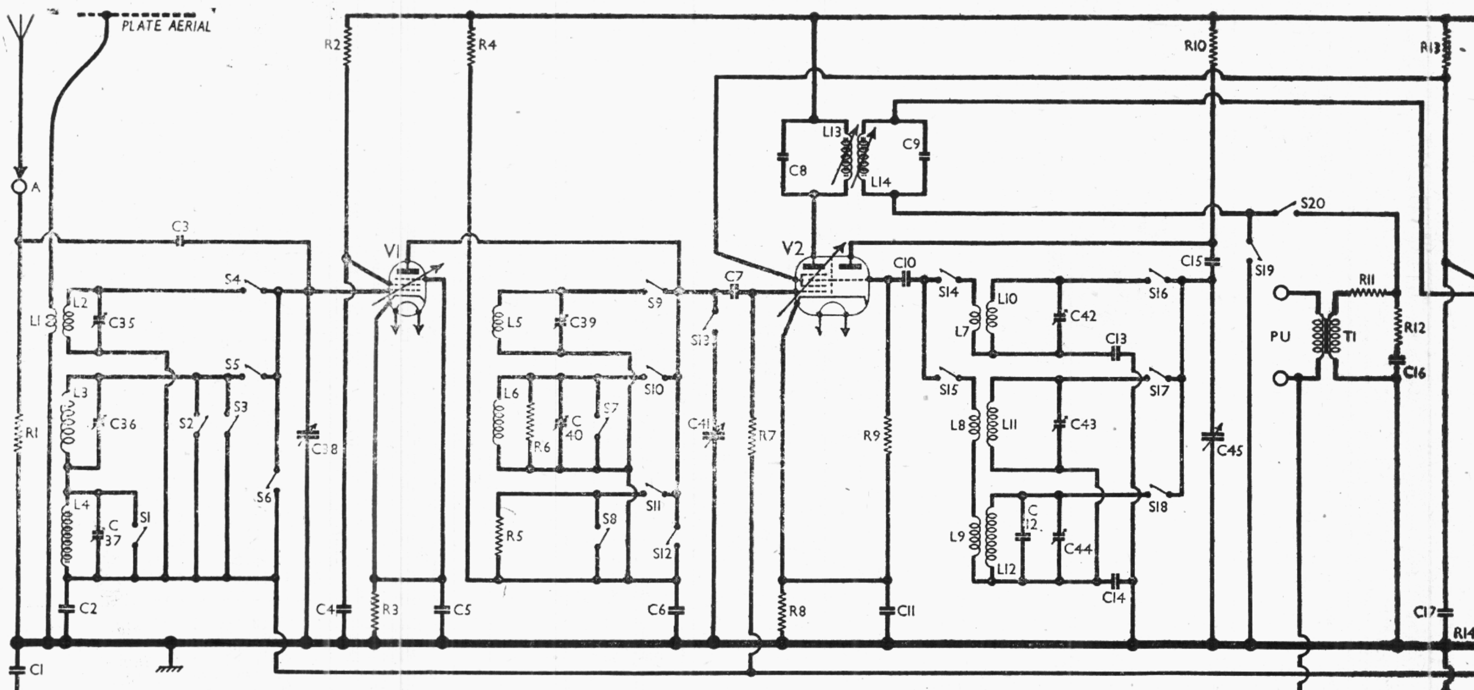
Third valve **(V3, Mullard metallized EF39)** is a second R.F. pentode, operating with fixed grid bias as intermediate frequency amplifier with tuned-primary, tuned-secondary transformer couplings **C8, L13, L14, C9** and **C20, L15, L16, C21,** in which the tuning capacitors are fixed and alignment is carried out by varying the positions of the iron-dust cores.

Intermediate frequency 465 kc/s.

Diode second detector is part of double diode pentode output valve **(V4, Mullard metallized CBL31).** Audio frequency component in rectified output is developed across load resistor **R17** and passed via A.F. coupling capacitor **C26,** manual volume control **R18** and grid stopper **R20** to control grid of pentode section. I.F. filtering by **C23, R16** and **C24** in diode circuit.

Second diode of **V4,** fed from **V3** anode via **C27,** provides D.C. potential which is developed across load resistor **R25** and fed back through a decoupling circuit as G.B. to R.F. and F.C. stages, giving A.V.C. Delay voltage, together with G.B. for pentode section, is obtained from the drop across **R21, R22** in **V4** cathode lead to chassis. Fixed tone correction in pentode anode circuit by **C28,** and provision for the connection of a low-impedance external speaker across **T2** secondary via sockets on the internal speaker plugs.

For "Gram" operation, **V3** is con-



Circuit diagram of the Pye K47C A.C./D.C. superhet. The S.W. aerial coil **L1** is connected to an internal plate aerial, the M.W. aerial tuning coil **L3** is wound as a frame aerial, and socket **A** is provided for the connection of an external aerial via **C3** to the control grid of the R.F. amplifier **V1**. This valve is R.-C. coupled on L.W. to the next valve. An isolating transformer couples the pick-up sockets to the I.F. amplifier **V3**, which becomes an A.F. amplifier on Gram. In some cases **R1** may be in parallel with **C3**, and the scale lamp circuit may be in the "negative" mains lead.

verted to an A.F. amplifier by connecting the secondary winding of the pick-up isolating transformer **T1** in its grid circuit, via **S19, S20** and a tone correcting network. The amplified signal developed across **R15** in the anode circuit is fed via **C22** and **S22** to **V4** C.G. circuit.

Voltage negative feed-back is provided from **V4** anode via the potential divider network **C30, R28, R29, C29, R30, C31,** and limiting resistor **R23,** to the control grid circuit. Switches **S25-S30** permit the frequency response to be modified by manipulation of the circuit arrangement, giving a four-position tone control: Fidelity, Brilliant, Mellow 1 and Mellow 2.

In the Fidelity position **S26** and **S28** close, so that **C30, R28, R29,** and **R30, C31** in parallel, form the potential divider, and the voltage developed across **R30** is fed back via **C29** and **R23.**

In the Brilliant position, **S26** and **S28** are open, and **S25, S27** closed. **R23** is now directly connected to the potential divider and **C29** and **R30** are connected in series across **C31.**

In the Mellow positions, **S26** and **S28** close again, and **S25, S27** open, as for Fidelity, but in position M1 **S29** closes, short-circuiting **R29,** and in position M2 **S30** closes, short-circuiting **R28** and **R29.**

S28 is shown in the circuit diagram as three separate switches **a, b** and **c** connected in parallel. Although it is contrary to our normal practice to show switches thus in the circuit diagram, it is necessary in this instance in order that the diagram shall agree with the practical switch data overleaf.

When the receiver is operated from A.C. mains, H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Mullard CY31),** which, with D.C. mains, behaves as a low resistance. Smoothing by iron-cored choke **L18** and electrolytic capacitors **C33, C34.**

Valve heaters, together with scale lamps and adjustable ballast resistor, are connected in series across mains input. Mains R.F. filtering by **C32,** and earth isolation by **C1.**

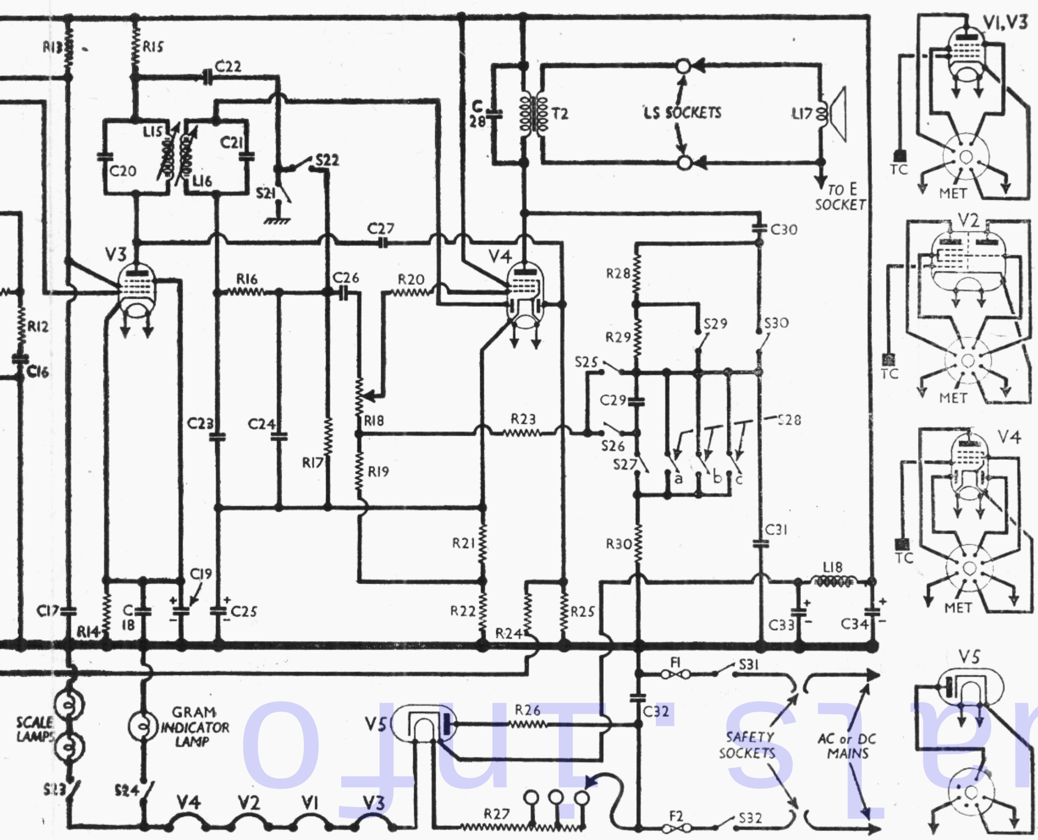
COMPONENTS AND VALUES

RESISTORS		Values (ohms)	Location
R1	Aerial shunt ...	500,000	H5
R2	V1 S.G. feed ...	33,000	H7
R3	V1 fixed G.B. ...	330	I6
R4	V1 anode feed ...	1,000	H7
R5	V1 L.W. anode load	4,700	H7
R6	R.F. M.W. shunt ...	22,000	H6
R7	V2 hex. C.G. ...	470,000	J6
R8	V2 fixed G.B. ...	330	J7
R9	V2 osc. C.G. ...	47,000	J7
R10	Osc. H.T. feed ...	47,000	I7
R11	Part P.U. tone corrector	470,000	H8
R12		150,000	H8
R13	S.G.'s H.T. feed ...	33,000	I8
R14	V3 G.B. resistor ...	220	H8
R15	V3 anode feed ...	4,700	G8
R16	I.F. stopper ...	47,000	G8
R17	Sig. diode load ...	470,000	G8
R18	Volume control ...	1,000,000	F5
R19	F.-B. coupling ...	4,700	F8
R20	Grid stopper ...	47,000	C4
R21	V4 pent. G.B. and A.V.C. delay ...	220	G8
R22		220	F8
R23	F.-B. coupling ...	15,000	F5
R24	A.V.C. decoupling	1,000,000	G8
R25	A.V.C. diode load ...	1,000,000	G8
R26	V5 surge limiter ...	82	E6
R27	Heater ballast ...	750*	D3
R28	Tone control resistors	27,000	F5
R29		22,000	F5
R30		47,000	G6

*Tapped at 570 Ω + 90 Ω + 90 Ω from V5 heater.

CAPACITORS		Values (μF)	Location
C1	Earth isolator ...	0·01	I8
C2	V1 C.G. decoupling	0·1	B2
C3	Aerial series ...	0·000005	H5
C4	V1 S.G. decoup. ...	0·1	I6
C5	V1 cath. by-pass. ...	0·1	H6
C6	V1 anode decoup....	0·1	H6
C7	V2 hex. C.G. ...	0·0001	I6
C8	1st I.F. transformer tuning	0·00007	B4
C9		0·00007	B4
C10	V2 osc. C.G. ...	0·0001	I7
C11	V2 cath. by-pass ...	0·1	J7
C12	L.W. fixed trim ...	0·00033	H7
C13	Osc. S.W. tracker...	0·005	I7
C14	M.W., L.W. tracker	0·00057	H7
C15	Osc. anode coup. ...	0·0001	I7
C16	P.U. tone corrector	0·002	H8
C17	S.G.'s decoupling ...	0·1	I8
C18	V3 cath. by-passes	0·1	H8
C19*		50·0	J8
C20	2nd I.F. transformer tuning ...	0·00014	C4
C21		0·00014	C4
C22	V3 anode capacitor	0·1	H7
C23	I.F. by-passes ...	0·0001	G8
C24		0·0001	G8
C25*	V4 cath. by-pass ...	25·0	F8
C26	A.F. coupling ...	0·01	G8
C27	A.V.C. coupling ...	0·00001	H8
C28	Tone corrector ...	0·001	G7
C29	Parts of negative feed-back circuit	0·02	G5
C30		0·02	G6
C31		0·01	G6
C32	R.F. by-pass ...	0·1	F8
C33*	H.T. smoothing ...	16·0	C3
C34*		24·0	C3
C35‡	Aerial S.W. trim....	0·00005	B2
C36‡	Aerial M.W. trim....	0·00005	A3
C37‡	Aerial L.W. trim....	0·00005	A3
C38†	Aerial tuning ...	0·000532	B2
C39‡	R.F. S.W. trim. ...	0·00005	H6
C40‡	R.F. M.W. trim. ...	0·000015	H6
C41†	R.F. tuning ...	0·000532	B3
C42‡	Osc. S.W. trim. ...	0·00005	I7
C43‡	Osc. M.W. trim. ...	0·00005	H7
C44‡	Osc. L.W. trim. ...	0·00005	H7
C45†	Oscillator tuning ...	0·000532	B3

* Electrolytic. † Variable. ‡ Pre-set.



OTHER COMPONENTS		Approx. Values (ohms)	Location
L1	Aerial S.W. coup. ...	0·1	B2
L2	Aerial tuning coils	Very low	B2
L3		1·0	A2
L4		8·0	A3
L5	R.F. S.W. tuning...	Very low	H6
L6	R.F. M.W. tuning...	2·0	G6
L7	Osc. S.W. reaction	24·0	I7
L8	Osc. M.W. and L.W. reaction, total ...	2·25	H7
L9			H7
L10	Osc. tuning coils ...	Very low	I7
L11		3·8	H7
L12		4·5	H7
L13	1st I.F. trans. Pri. ...	10·0	B4
L14	Sec. ...	10·0	B4
L15	2nd I.F. trans. Pri. ...	6.5	C4
L16	Sec. ...	6.5	C4
L17	Speech coil ...	2·5	—
L18	H.T. choke ...	530·0	D2
T1	Pick-up trans. Pri. ...	1,150·0	G8
	Sec. ...	5,200·0	G8
T2	Output trans. Pri. ...	550·0	E7
	Sec. ...	0·3	E7
S1-S24	Waveband switches	—	—
S25-S30	Tone control switches... ...	—	G5
S31, S32	Mains switches ...	—	G6
F1,F2	Mains fu es, 1·0 A.	—	D4

DISMANTLING THE SET

The bottom of the cabinet is fitted with a detachable cardboard cover, upon removal of which (four round-head wood screws) access may be gained to most of the components beneath the chassis deck. Removal of the chassis, however, is only a few moments' work.

Removing Chassis.—Remove the four control knobs (pull-off) after slackening their recessed grub screws.

(Continued overleaf)

Withdraw the two speaker lead plugs from their sockets at the rear of the chassis.
Remove the two fixing screws from the lower rear corners of the chassis.
Withdraw chassis about two inches, then lift the rear edge and slide it out. It should be noted that if it is desired to operate the chassis on the bench, the mains safety plug, which is secured to the receiver back by a paxolin and plywood carrier (two wood screws), must be in position in its sockets beneath the mains fuse panel.

Removing Speaker.—With the chassis removed, free the speaker leads from the soft metal clip on the side of the cabinet, and remove the four nuts (with spring washers) securing the speaker to the sub-baffle.

When replacing, the connecting panel should point towards the bottom right-hand corner of the cabinet, when viewed from the rear.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on A.C. mains of 222 V, using the 216-235 V tapping on the heater ballast resistor.

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 Universal Avometer, chassis being the negative connection.

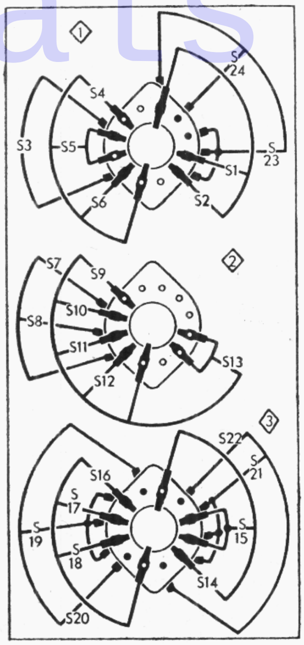
Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 EF39	205	8·3	137	2·4
V2 CCH35	212 Oscillator 72	2·1 2·8	87	2·1
V3 EF39	185	5·5	87	1·7
V4 CBL31	196	33·0	212	3·9
V5 CY31†	—	—	—	—

† Cathode to chassis, 250 v. D.C.

GENERAL NOTES

Switches.—S1-S24 are the waveband and radio/gram change-over switches, ganged in three rotary units beneath the chassis. These units are indicated in our under-chassis view, and shown in detail in the diagrams in col. 2, where they are drawn as seen from the rear of an inverted chassis. The table (col. 3) gives the switch positions for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and **C**, closed.

Waveband Switch Diagrams and Table



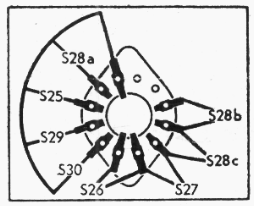
Diagrams of the three waveband switch units drawn as seen when viewed from the rear of an inverted chassis, numbered in diamond enclosures to agree with the under-chassis illustration. The associated table is on the right.

Switch	S.W.	M.W.	L.W.	Gram.
S1	—	C	—	—
S2	C	—	—	—
S3	C	—	—	—
S4	C	—	—	—
S5	—	C	C	—
S6	—	—	—	C
S7	C	—	—	—
S8	—	C	—	—
S9	C	—	—	—
S10	—	C	—	—
S11	—	—	C	—
S12	—	—	—	C
S13	C	C	—	—
S14	C	—	—	—
S15	—	C	C	—
S16	C	—	—	—
S17	—	C	—	—
S18	—	—	C	—
S19	C	C	C	—
S20	—	—	—	C
S21	C	C	C	—
S22	—	—	—	C
S23	C	C	C	—
S24	—	—	—	C

S25-S30 are the tone control switches, ganged in a single five-position unit beneath the chassis. Four positions are used for tone control, and the fifth to operate the QMB mains switches **S31, S32,** which are ganged with it. This unit is indicated in our under-chassis view, and shown in detail in the diagram in col. 3, where the associated table beneath it shows the switch positions for the four tone control settings, starting from the "OFF" position and turning the control clockwise. A dash indicates open, and **C**, closed.

In order to show clearly the action of **S28,** this has been divided into three parts, numbered **a, b, c,** as these are widely separated on the unit and connected in parallel. If all the parallel connections on the switch unit were shown as such they would confuse the diagram.

Tone Control Switch Unit

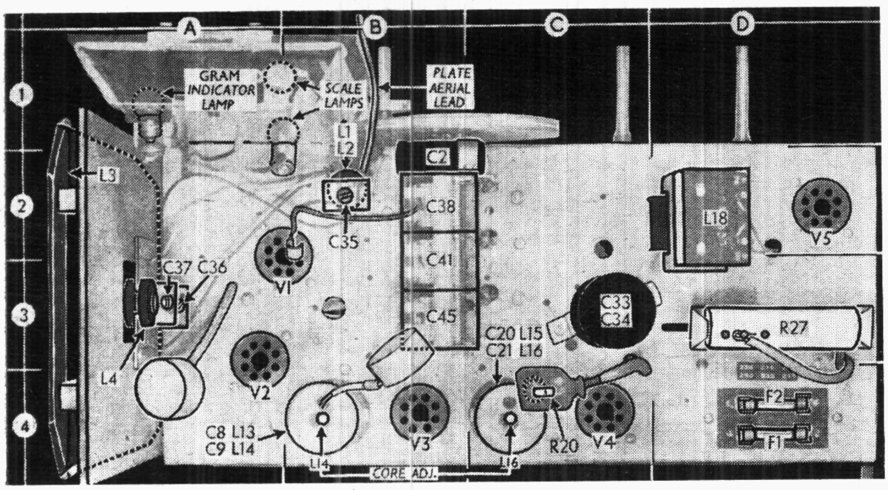


Switch	FID	BRI	M1	M2
S25	—	C	—	—
S26	C	—	C	C
S27	—	C	—	—
S28a	C	—	—	—
S28b	—	—	—	C
S28c	—	—	C	—
S29	—	—	C	—
S30	—	—	—	C

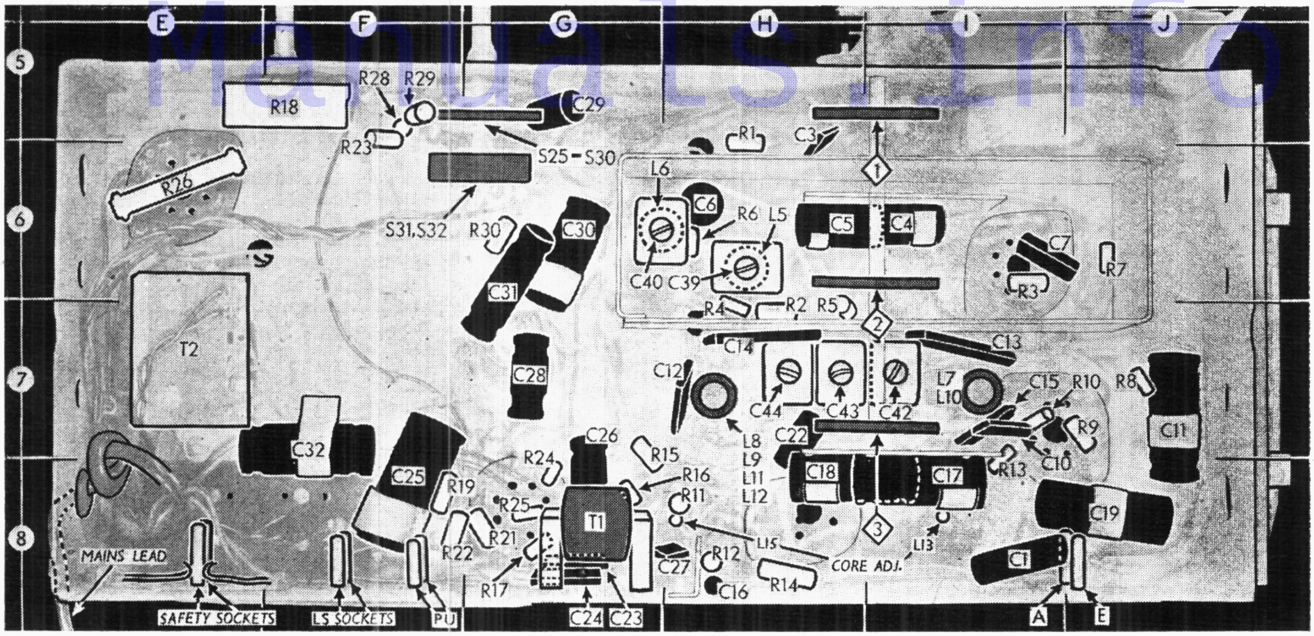
Diagram of the tone control switch unit **S25–S30** (above), as seen from the rear of an inverted chassis with the mains switch removed. **S28a, b** and **c** are connected in parallel. Below it is the associated switch table.

The sketch in col. 4 shows this unit again, in the same position, as it appears when wired ready for fitting into the chassis. When a new unit is fitted, it is advisable to wire it up thus beforehand, while all the tags are accessible.

External Speaker. — The secondary winding of the output transformer **T2** is brought out to a pair of sockets at the rear of the chassis, and from these the internal speaker or a low impedance (2-4 Ω) external speaker may be operated. If both are required together, the external



Plan view of the chassis, showing the frame winding **L3**, with trimmers and L.W. loading coil **L4**, forming a vertical assembly on the left. The heater circuit ballast resistor **R27**, seen on the right, should be rated at about 45W.

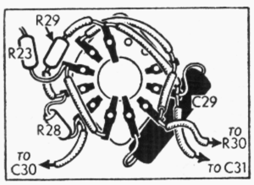


Under-chassis view. The waveband switch units, numbered 1, 2 and 3 in diamond enclosures, are indicated right of the centre, and the tone control switch unit **S25–S30** is indicated left of centre. These units are all shown in detail in the diagrams in cols. 2 and 3. The pins shown in the safety sockets at the bottom left corner are normally fixed to the back cover of the receiver.

speaker plugs may be inserted in sockets in the tops of the internal speaker plugs.

Scale and Indicator Lamps.—These are three Osram M.E.S. type lamps, with small clear spherical bulbs, rated at 4 V, 0.3 A. In early versions they were wired between the "negative" side of the mains and chassis, instead of directly in the heater circuit as in our sample, and they were then rated at 6 V, 0.3 A.

Capacitors C33, C34.—These are two dry electrolytics in a tubular metal con-



Sketch showing the tone control switch unit, wired ready for fitting into the chassis.

tainer on the chassis deck. Of the three tags on its base, the red lead is the positive of **C33** (16 μF), the yellow is the positive of **C34** (24 μF), and the black is the common negative. Both are rated at 350 V D.C. working, but the red-tagged section is rated as reservoir. Our unit was a Hunt's List No. K12.

Fuses.—**F1** and **F2** are the mains circuit fuses, rated at 1 A each, 1¼in in length.

CIRCUIT ALIGNMENT

I.F. Stages.—Connect signal generator via an 0.1μF capacitor in the "live" lead, to control grid (top cap) of **V2** and the **E** socket, removing the original top cap connector but connecting a 500,000Ω resistor between the top cap of the valve and the A.V.C. line. A convenient point on the A.V.C. line is the tag on the frame aerial connecting panel to which is connected a brown plastic covered lead.

Switch set to M.W., turn volume control to maximum, and tune to 570 m on scale. Feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L13, L14, L15** and **L16** (chassis locations I8, B4, H8, C4) for maximum output. Finally, remove the 500,000 Ω resistor and replace top cap.

R.F. and Oscillator Stages.—With the gang at maximum, the pointer should be level with the three black dots at the upper ends of the scales. It may be adjusted by rotating the drive drum on the gang spindle after loosening the fixing screw. Transfer "live" signal generator lead to **A** socket, via a suitable dummy aerial.

M.W.—With set still switched to M.W., tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C43** (H7), **C40** (G6) and **C36** (A3) for maximum output. Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and check calibration.

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 **C44** (H7) and **C37** (A3) for maximum output. Tune to 1,800 m on scale, feed in an 1,800 m (166.7 kc/s) signal, and check calibration.

S.W.—Switch set to S.W., using a 400 Ω dummy aerial, tune to 17.5 m on scale, feed in a 17.5 m (17.14 Mc/s) signal, and adjust **C42** (I7), **C39** (H6) and **C35** (B2) for maximum output. Feed in a 43 m (6.98 Mc/s) signal, tune it in, and check calibration. If it is out, adjust the turns of **L10** (I7) to correct it; then adjust the turns of **L5** (H6) and **L2** (B2) for maximum output. Repeat the S.W. adjustments.

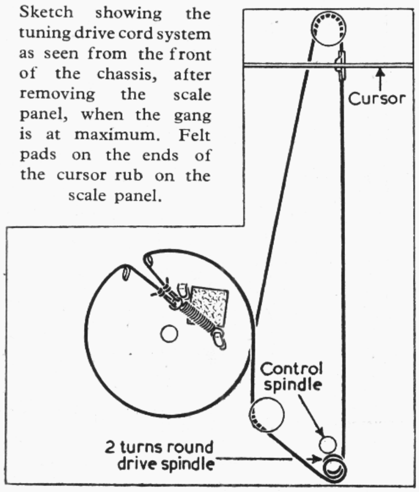
DRIVE CORD REPLACEMENT

Four feet of Nylon braided glass yarn is sufficient for the drive cord replacement, this length including an ample margin for tieing off.

The scale glass must first be dismounted by removing the upper clamp (two set screws) and slackening the screws in the bottom one. The glass can then be lifted out, with its rubber packing pieces.

The sketch (next col.) then shows the course taken by the cord, as seen when viewed from the front of the chassis with the gang at maximum, although in practice the lower portion is partly obscured by metal plates.

One end of the cord should be tied to the free end of the tension spring, which is hooked to its anchor. The cord then passes out of the drum through the gap, clockwise round the drum, down under the guide pulley, then through the slot in the scale backing plate and under the drive spindle round which it makes 2½ turns anti-clockwise. Finally it goes up to the top pulley, over it, and down under the gang drum back to the free end of the



Sketch showing the tuning drive cord system as seen from the front of the chassis, after removing the scale panel, when the gang is at maximum. Felt pads on the ends of the cursor rub on the scale panel.

spring, passing out of the scale assembly through the upper slot.

The cursor carrying plate is clamped lightly on to the long vertical run of cord, then fixed with the cursor about 1¼in below the centre of the upper pulley. Fine adjustment can be made by turning the drum in the gang spindle when the scale is in position. With the gang at maximum, the cursor should be level with the spots at the tops of the three scales. The felt pads on the cursor rub on the edges of the scale panel.

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