Radio Manuals Info

Supplement to The Wireless & Electrical Trader, July 24, 1948

"TRADER" SERVICE SHEET

870

PYE 18A & G18K

COVERING EXPORT VERSIONS 38A & G38K

A SEVEN-POSITION "Tonemaster" control (including the "Off" position) is used in the Pye 18A receiver, and the chassis features the usual quick-release facility. It is a 3-valve (plus rectifier) 3-band superhet, designed to operate from A.C. mains of 200-250 V, 40-100 c/s.

The differences in the G18K autoradiogram are explained overleaf, but otherwise it employs a chassis like that in the 18A. The 38A (table) and G38K (A.R.G.) are export versions of these models, in which a universal voltage mains transformer is fitted. The details are explained overleaf.

Release dates and original prices: 18A, November, 1947, £19 19s; G18K, February, 1948, £73 10s. Purchase tax extra.

CIRCUIT DESCRIPTION

On S.W., input from plate aerial is inductively coupled by **L2** to single-tuned circuit **L4, C31.**

On M.W. and L.W., frame aerial input is provided by **L1** in conjunction with loading coils **L5** (M.W.) and **L6** (L.W.), tuned by **C31.** Provision is made for the connection of an external aerial, which is operative on all bands, insertion of the aerial plug automatically opening **S1** to disconnect the shunt capacitor **C1** across the M.W. and L.W. coupling coil **L3.**

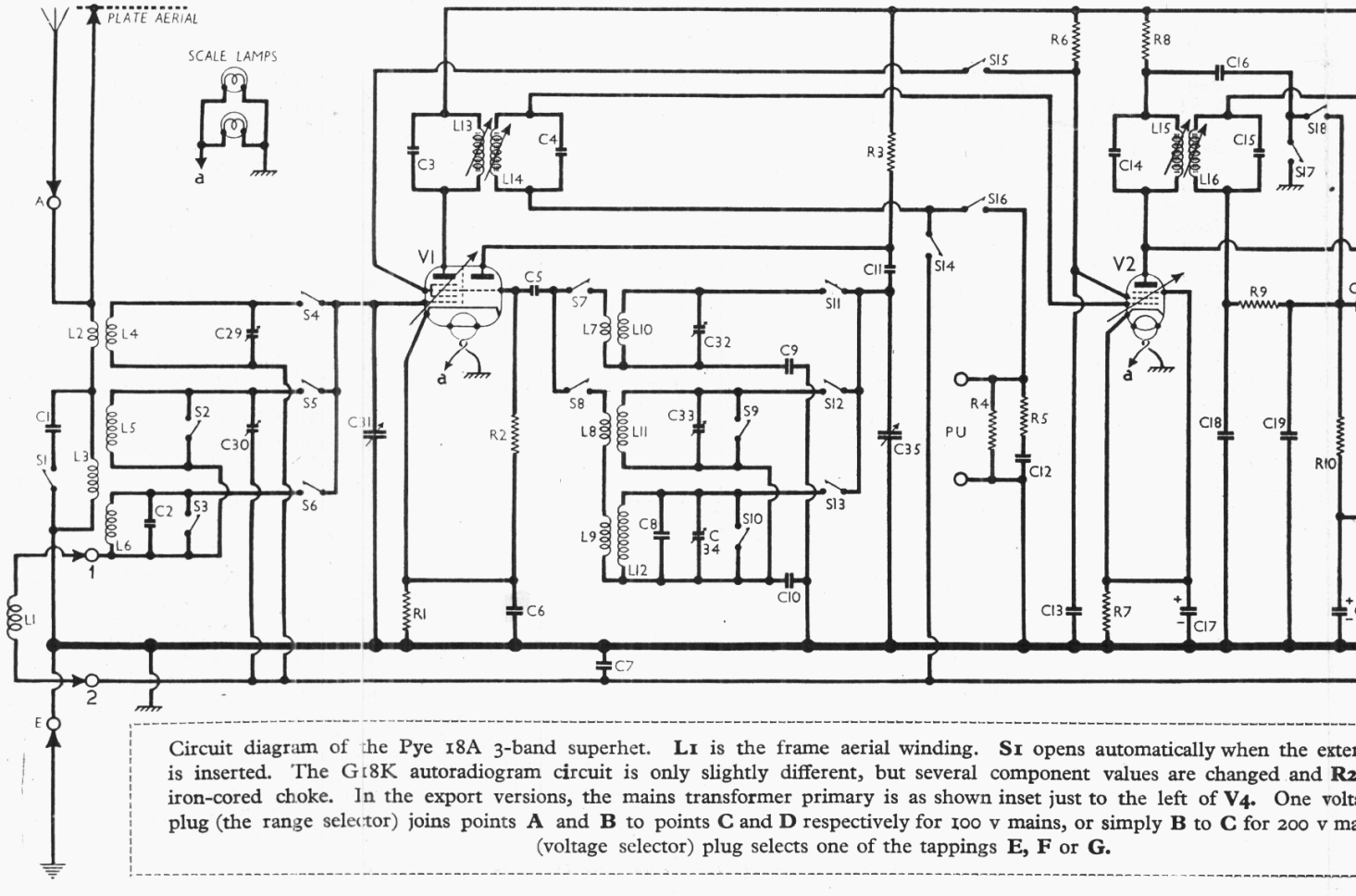
First valve **(V1, Mullard metallized ECH35)** is a triode-hexode operating as frequency changer with internal coupling. Triode oscillator anode coils **L10** (S.W.), **L11** (M.W.) and **L12** (L.W.) are tuned by **C35.** Parallel trimming by **C32** (S.W.), **C33** (M.W.) and **C8, C34** (L.W.); series tracking by **C9** (S.W.) and **C10** (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.

Second valve **(V2, Mullard metallized EF39)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C3, L13, L14, C4** and **C14, L15, L16, C15.** **Intermediate frequency 465 kc/s.**

Diode second detector is part of double diode pentode output valve **(V3, Mullard metallized EBL31).** Audio frequency component in rectified output is developed across load resistor **R10** and passed via A.F. coupling capacitor **C21,** manual volume control **R11** and grid stopper **R13,** to control grid of pentode section. I.F. filtering by **C18, R9, C19** in diode circuit and **R13** in pentode C.G. circuit.

Second diode of **V3,** fed from **V2** anode via **C22,** provides D.C. potential which is developed across load resistor **R18** and fed back through a decoupling circuit as G.B. to F.C. and I.F. valves, giving A.V.C.

Delay voltage, together with G.B. for pentode section, is obtained from the drop across **R15, R16** in **V3** cathode lead to chassis. Fixed tone correction in pentode anode circuit by **C23,** and provision for the connection of a low-impedance external speaker across **T1** secondary winding, via **S25. S26** permits the internal speaker to be muted.



Circuit diagram of the Pye 18A 3-band superhet. **L1** is the frame aerial winding. **S1** opens automatically when the exter is inserted. The G18K autoradiogram circuit is only slightly different, but several component values are changed and **R2** iron-cored choke. In the export versions, the mains transformer primary is as shown inset just to the left of **V4.** One volt plug (the range selector) joins points **A** and **B** to points **C** and **D** respectively for 100 v mains, or simply **B** to **C** for 200 v ma (voltage selector) plug selects one of the tappings **E, F** or **G.**

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On "Radio" operation, voltage negative feed-back is provided from **V3** anode, via the potential divider network **C25, R19, R20, C24, R21, C26** and limiting resistor **R14,** to the control grid circuit. Switches **S19-S24** permit the frequency response to be modified by manipulation of the circuit arrangement, giving a four-position "Radio" tone control: "Fidelity," "Brilliant," "Mellow 1," and "Mellow 2."

In the "Fidelity" position **S20** and **S22** close, so that **C25, R19, R20** and **R21, C26,** in parallel, form the potential divider, and the voltage developed across **R21** is fed back via **C24** and **R14.**

In the "Brilliant" position **S19** and **S21** close. **R14** is then directly connected to the potential divider and **C24, R21** are connected in series across **C26.**

In the "Mellow" positions **S20, S22** close again, as for "Fidelity," but in position "M1" **S23** closes also, short-circuiting **R20;** and in position "M2" **S24** closes, short-circuiting **R19** and **R20.**

S22 is shown in the circuit diagram as five separate switches a, b, c, d and e, and **S20** and **S24** are each shown as two separate switches a and b, connected in parallel.

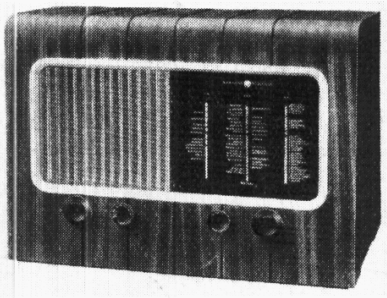
For "Gram" operation **V2** is converted to an A.F. amplifier by connecting the pick-up, shunted by a tone correcting network **R4, R5, C12,** in its control grid circuit via **S16.** The amplified signal developed across **R8** in the anode circuit is fed via **C16** and **S18** to **V3** C.G. circuit.

A further two positions are provided on the tone control switch for "Gram" operation, entitled "Fidelity" and "Mellow." These correspond to the previously described positions "Fidelity" and "M2" on "Radio."

H.T. current is supplied by full-wave rectifying valve **(V4, Mullard AZ31).** Smoothing by resistor **R22** and electrolytic capacitors **C27, C28.**

COMPONENTS AND VALUES

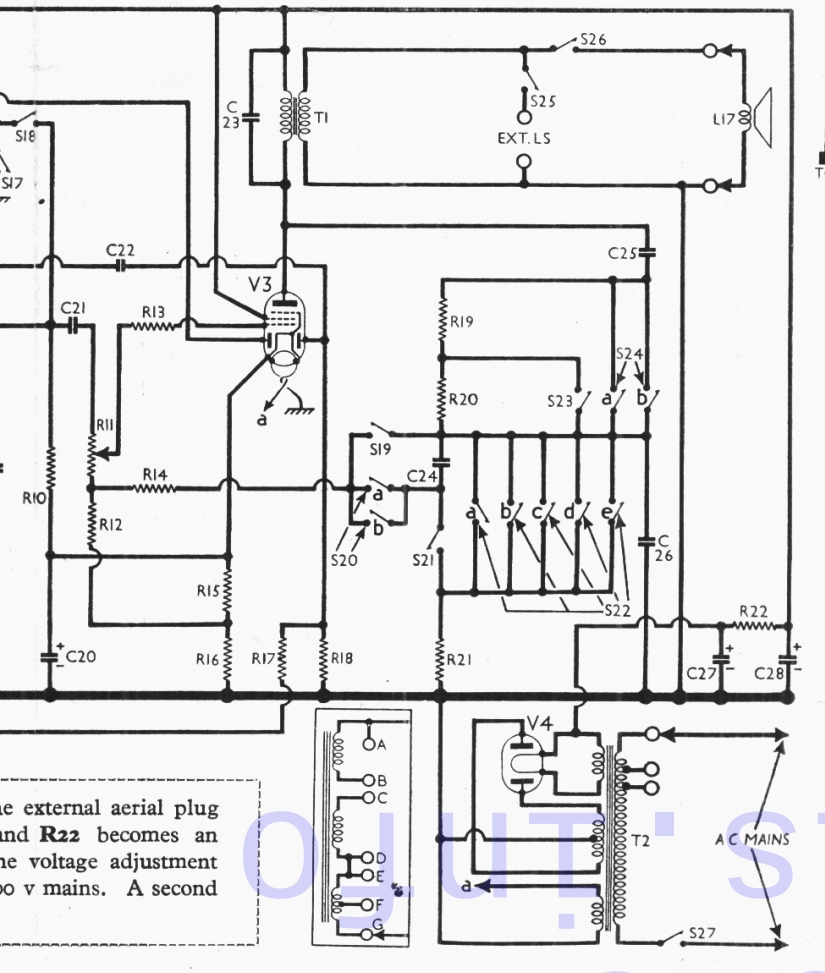
	RESISTORS	Values (ohms)	Locations
R1	V1 fixed G.B. ...	220	J4
R2	V1 osc. C.G. ...	47,000	J4
R3	Osc. H.T. feed ...	47,000	I5
R4	P.U. shunt ...	220,000	F6
R5	P.U. tone corrector	15,000	F5
R6	S.G's H.T. feed ...	47,000	I6
R7	V2 fixed G.B. ...	330	H6
R8	V3 anode load ...	2,200	H5
R9	I.F. stopper ...	47,000	G6
R10	Sig. diode load ...	470,000	G6
R11	Volume control ...	1,000,000	E3
R12	F.-B. coupling ...	2,200	F5
R13	V3 grid stopper ...	47,000	C2
R14	F.-B. coupling ...	15,000	F3
R15, R16	V3 pent G.B. and A.V.C. delay ...	220	F6
		470	F6
R17	A.V.C. decoupling	1,000,000	G5
R18	A.V.C. diode load ...	1,000,000	G5
R19	Tone control resistors ...	27,000	F3
R20		22,000	F3
R21		47,000	G4
R22	H.T. smoothing ...	3,000	H5

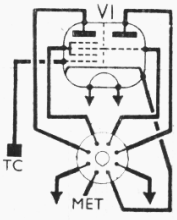


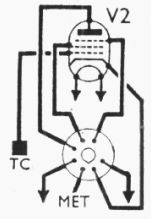
	CAPACITORS	Values (μF)	Locations
C1	Aerial shunt ...	0·00022	A1
C2	Aerial L.W. trim. .	0·000056	A1
C3, C4	1st I.F. transformer tuning	0·00007	A2
		0·00007	A2
C5	V1 osc. C.G. ...	0·00005	I4
C6	V1 cath. by pass ...	0·1	J4
C7	A.V.C. decoup. ...	0·1	A1
C8	Osc. L.W. trim. ...	0·00033	H3
C9	Osc. S.W. tracker .	0·005	H4
C10	M.W., L.W. tracker	0·00057	H3
C11	Osc. anode coup....	0·00005	I4
C12	P.U. tone corrector	0·05	F6
C13	S.G.'s decoupling .	0·1	I5
C14, C15	2nd I.F. transformer tuning ...	0·00007	C2
		0·00007	C2
C16	V3 anode capacitor	0·1	G6
C17*	V2 cath. by pass ...	50·0	H5
C18, C19	I.F. by passes ...	0·0001	G6
		0·0001	G6
C20*	V3 cath. by pass ...	25·0	F5
C21	A.F. coupling ...	0·01	F4
C22	A.V.C. coupling ...	0·00001	G6
C23	Tone corrector ...	0·001	G5
C24, C25, C26	Parts of tone control circuit ...	0·02	G3
		0·02	F4
		0·01	G3
C27*, C28*	H.T. smoothing cap-acitors	8·0	C2
		32·0	C2
C29‡	Aerial S.W. trim....	0·00005	A1
C30‡	Aerial M.W. trim. .	0·00005	A1
C31†	Aerial tuning ...	0·000532	B1
C32‡	Osc. S.W. trim. ...	0·00005	H4
C33‡	Osc. M.W. trim. ...	0·00005	H4
C34‡	Osc. L.W. trim. ...	0·00005	I4
C35†	Oscillator tuning .	0·000532	B1

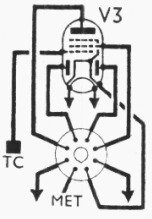
* Electrolytic. † Variable. ‡ Pre set.

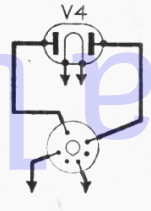
	OTHER COMPONENTS	Approx. Values (ohms)	Location
L1	Frame aerial ...	0·7	A1
L2, L3	Aerial coupling coils	0·3	A1
		54·0	A1
L4	Aerial tuning coils	Very low	A1
L5		1·5	A1
L6		13·5	A1
L7	Osc. S.W. reaction	21·0	I4
L8, L9	Osc. M.W. and L.W. reaction, total ...	2·9	H4 H3
L10, L11	Oscillator tuning coils	Very low	I4
		3·4	H4
L12		4·2	H3
L13, L14	1st I.F. trans. Pri. Sec.	8·5	A2
		8·5	A2
L15, L16	2nd I.F. trans. Pri. Sec.	8·5	C2
		8·5	C2
L17	Speech coil ...	1·5	—
T1	Output trans. Pri. Sec.	560·0	C1
		0·3	C1
T2	Mains trans. Pri., total	19·5	D2
	Heat. sec.,	0·1	D2
	Rect. heat. sec. ...	0·1	D2
	H.T. sec., total ...	370·0	D2
S1	External aerial sw.	—	J6
S2-S13	Waveband switches	—	I3
S14-S18	Radio-Gram switches	—	F4
S19-S24	Tone control switches	—	F3
S25	Ext. speaker sw. ...	—	F6
S26	Int. speaker sw. ...	—	F6
S27	Mains sw., g'd S14-824	—	F4











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Waveband Switch Table

Switch	S.W.	M.W.	L.W.
S2	C	—	—
S3	—	C	—
S4	C	—	—
S5	—	C	—
S6	—	—	C
S7	C	—	—
S8	—	C	C
S9	C	—	—
S10	—	C	—
S11	C	—	—
S12	—	C	—
S13	—	—	C

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 230 V, using the 216-235 V tapping on the mains transformer.

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	ECH35	241	2·6	80	2·1
		Oscillator			
		83	3·2		
V2	EF39	227	4·6	80	1·3
V3	EBL31	225	26·0	241	2·9
V4	AZ31	327†	—	—	—

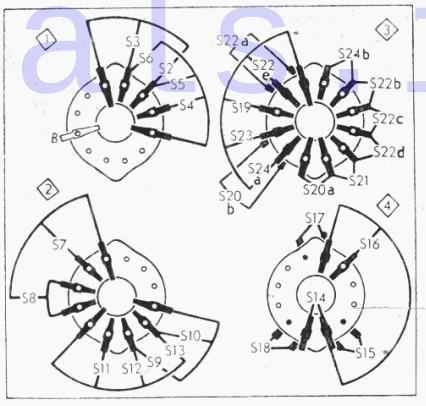
† Each anode, A.C.

GENERAL NOTES

Switches.—S2-S13 are the waveband switches, ganged in two rotary units beneath the chassis. These are indicated in our under-chassis view (right-hand pair) where they are identified by numbers **1** and **2** in diamonds, with arrows to indicate the direction in which they are viewed in the left-hand diagrams in col. 2, where the units are shown in detail.

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.

S14-S24 are the "Tonemaster" tone control and radio/gram switches, ganged into two further rotary units beneath the chassis. These are indicated (the left-hand pair) in our under-chassis view, where they are identified by the numbers **3** and **4** in diamonds, with arrows to indicate the direction in which they are viewed in the right-hand diagrams above, where the units are shown in detail.



Diagrams of the Waveband (left) and "Tonemaster" (right) switch units as seen from the rear of an inverted chassis. The associated tables are at the head of cols. 1 and 3.

The table (col. 3) gives the switch positions for the six control settings, starting from the first active radio position and turning clockwise. (The fully anti-clockwise position of the control knob switches the set off.) A dash indicates open, and **C,** closed.

S1 is a jack-type switch associated with the aerial socket. When the frame aerial is being used, **S1** is closed, but when the external aerial plug is inserted **S1** opens automatically.

S27 is the Q.M.B. mains switch, operated by the "Tonemaster" control spindle. It opens in the fully anti-clockwise position of the control knob.

Scale Lamps.—These are two Mazda M.E.S. types, with large spherical frosted bulbs, rated at 6.5 V, 0.3 A.

External Speaker.—Two sockets at the rear of the chassis are provided for the connection of a low impedance (2-4 Ω) external speaker. Associated with the sockets are the push-pull switches **S25, S26,** which permit either speaker, or both, to be operated as required.

Tone Control Switch Table

Switch	RADIO Fid.	RADIO Bri.	RADIO M1	RADIO M2	GRAM. Fid.	GRAM. Mel.
S14	C	C	C	C	—	—
S15	C	C	C	C	—	—
S16	—	—	—	—	C	C
S17	C	C	C	C	—	—
S18	—	—	—	—	C	C
S19	—	C	—	—	—	—
S20a	C	—	C	C	—	C
S20b	—	—	—	—	C	—
S21	—	C	—	—	—	—
S22a	—	—	—	—	—	C
S22b	—	—	—	—	C	—
S22c	—	—	—	C	—	—
S22d	—	—	C	—	—	—
S22c	C	—	—	—	—	—
S23	—	—	C	—	—	—
S24	—	—	—	C	—	—
S24b	—	—	—	—	—	C

Export Models.—The 38A is the export version of the 18A, and the G38K is the export version of the G18K. The only difference between the home and export versions lies in the provision of a universal voltage primary on the mains transformer in the export models.

There are two 100 V primaries, which may be connected in parallel or series, and the lower one has an additional section, beyond 100 V, tapped to permit adjustment to mains up to 50 V beyond the range of the large sections. The three tappings shown are rated for (E) 0-15 V, (F) 16-35V, (G) 36-50 V, which may be additional to the 100 V or 200 V arrangement of the main sections. A diagram is inset beneath the circuit overleaf.

RADIOGRAM MODIFICATIONS

Basically, the chassis of the radiogram versions G18K and G38K are the same as the table models, but a fairly large number of small changes are made, principally in component values.

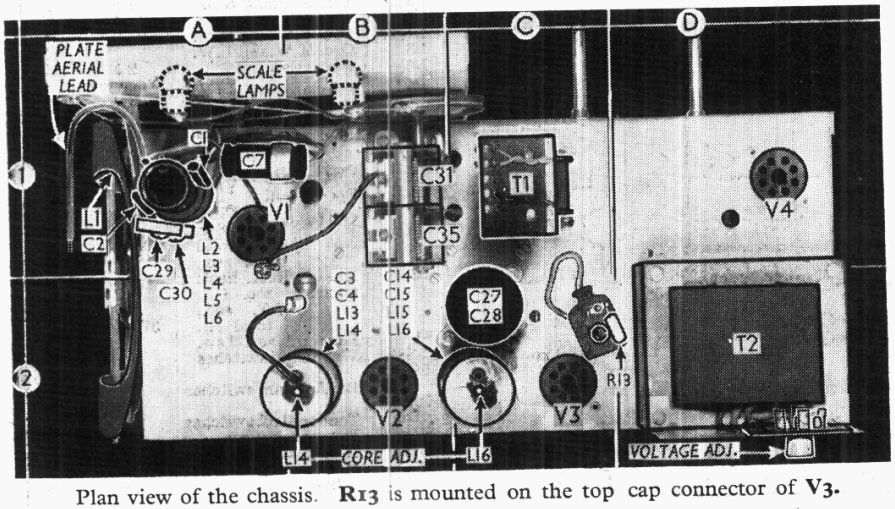
The H.T. smoothing resistor **R22** is replaced by an iron-cored choke (D.C. resistance 200 Ω), which is fitted on the chassis-deck, near **T1.** This results in a rise in H.T. positive line potential to about 270 V, which is countered by the addition of a decoupling circuit (4,700 Ω and 2 μF) between **R8** and the H.T. positive line in **V2** anode circuit. Here also a 0.01 μF capacitor is added between **R8, C16** and chassis, and a 2 μF capacitor is shunted across **C13.**

The value of **R5** is changed to 4,700 Ω, **R6** is changed to 68,000 Ω, **R8** to 10,000 Ω, **R15** to 150 Ω, **R16** to 470 Ω, and **C12** to 0.25 μF. For drive cord, see below.

DRIVE CORD REPLACEMENT

Models 18A and 38A.—One yard of Nylon braided glass yarn is required for cord replacement, this length leaving a comfortable margin for tieing off. It is most conveniently fitted if made up first, with a loop tied at each end. The makers quote the length as 28¾ in between the centres of the two loops; the measured overall length of our sample, when stretched between two pins, was 29¼ in.

The right-hand sketch (col. 4) shows the course followed by the cord as it would be seen from the front if the scale backing plate did not obscure it; actually this plate must be in position to support the drive. Inset in the drawing is a sketch



Plan view of the chassis. **R13** is mounted on the top cap connector of **V3.**

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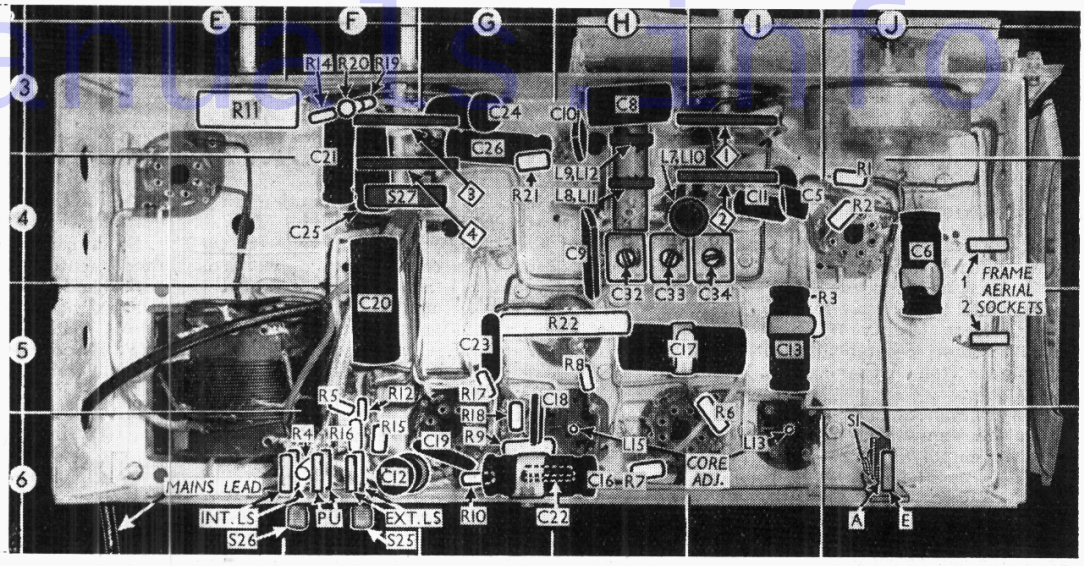


Under-chassis view. The wave-band and "Tone-master" switch units are indicated here and shown in detail in the diagrams in col. 2, where they are identified by the numbers in diamonds. **S27** is mounted on the "Tonemaster" unit. The pick-up, Ext. L.S. and Int. L.S. sockets are combined in a single assembly with **S25** and **S26.**

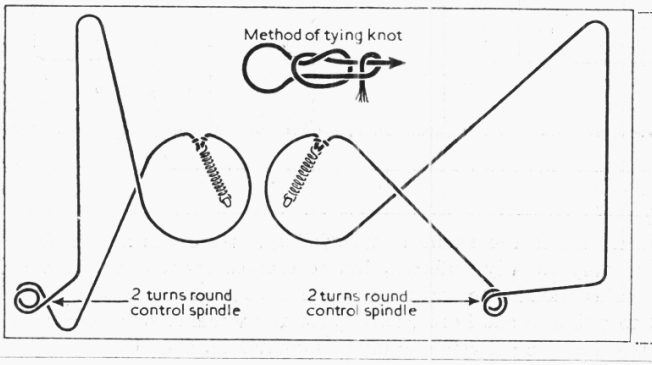
showing a suitable knot for making the loops in the material used for the cord. It should be so tied that the strain is taken in the direction of the arrow; the spare end should be pulled up tight and then left free, the surplus being snipped off.

Having made two turns of cord round the control spindle in the direction shown in our sketch, pass the right-hand (vertical) length of cord up round its two pulleys, bring the left-hand length up behind the scale backing plate to meet it, and loop the two ends on to one end of the tension spring, closing the hook on the spring so that the loops do not slip off. It is helpful if the scale lamps are removed.

Now anchor the other end of the spring to the tag inside the gang drum (on rear face) and strain the cord over the drum groove, crossing the cord in figure-eight fashion as shown in the sketch.

Finally, adjust drum so that the groove opening is at the top as shown in one sketch when the gang is at maximum, and slip on the pointer, weaving the cord between its tongues, and adjust as explained under "Circuit Alignment."

Models G18K and G38K.—In the radiogram versions, the method is generally the same as for the table models, but it is expedient to work from the rear of the scale assembly. Our sketch (on the left) therefore is drawn from the rear, and shows the position of the drum again when the gang is at maximum. The length of the cord between loop centres is given in this case as $26\frac{3}{8}$ in.



Drive cord sketches for the table models (right) as seen from the front, and auto-radiograms (left) as seen from the rear, when the gang is at maximum. A recommended knot is shown inset.

CIRCUIT ALIGNMENT

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, removing the original top cap connector but connecting a 500,000 Ω resistor between the top cap of the valve and the A.V.C. line. A convenient point for this connection is the bare wire joining **C29, C30** on the aerial coil (location reference A1).

Switch set to M.W., turn gang and volume control to maximum, feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L13, L14, L15** and **L16** (I6, B2, H6, C2) for maximum output. Finally, remove the 500,000 Ω resistor and replace top cap connector.

R.F. and Oscillator Stages.—Since the calibrated glass scale is mounted in the cabinet and alignment adjustments must be carried out with the chassis on the bench, a substitute scale is printed on the rear of the scale backing plate. This scale has 100 divisions, and readings on it are taken against the upper edge of the top tongue of the three-tongued drive cord clamp on the cursor carriage.

Thus, with the gang at maximum capacitance, the reading on the substitute scale should be 98 degrees, and if any adjustment is required the cursor carriage may be slid up or down the drive cord as necessary. Transfer the "live" signal generator lead to **A** socket via a suitable dummy aerial.

M.W.—With set still switched to M.W., tune to 6 deg on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C33** (H4) and **C30** (A1) for maximum output. Tune to 76 deg on scale, feed in a 500 m (600 kc/s) signal, and check calibration.

L.W.—Switch set to L.W., tune to 28 deg on scale feed in a 1,200 m (250 kc/s) signal, and adjust **C34** (I4) for maximum output. Tune to 72 deg 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 4 deg on scale, feed in a 17.5 m (17.14 Mc/s) signal, and adjust **C32** (H4) and **C29** (A1) for maximum output. Tune to 72 deg on scale, feed in a 43 m (6.98 Mc/s) signal, and check calibration. If any error exsits, the turns spacing of **L10** (I4) should be altered to correct it. Then adjust the turns spacing of **L4** (A1) for maximum output. Repeat the S.W. adjustments.

DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs (pull off);
detach the plate aerial lead from the spring clip inside the top of the cabinet;
withdraw the two speaker lead plugs from their sockets at the rear of the chassis.
If the two cheese-head fixing screws are now removed from the lower rear corners of the chassis, and the chassis is withdrawn for about two inches and lifted slightly at the rear, it may be withdrawn from the cabinet.
When replacing, ensure that the projections on the chassis retaining bars in the cabinet are engaged with the holes provided in the front chassis member before inserting the fixing screws.

Removing Speaker.—Remove chassis, unclip the leads, remove the fixing nuts, and lift out speaker.

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