"TRADER" SERVICE SHEET

1081

KOLSTER-BRANDES HR10

and HG30 Autoradiogram

FITTED with a quick-release device for rapid removal of the chassis, the Kolster-Brandes HR10 receiver is a 4-valve (plus rectifier) 3-band superhet designed to operate from A.C. mains only of 200-250 V, 50-100 c/s, via an auto-transformer. The chassis is "live" to the mains. A three-core mains lead permits earthing of the external speaker circuit where a 3-pin wiring system is employed. The waveband ranges are 16.3-51 m, 187-570 m and 880-2,100 m.

The HG30 is an autoradiogram employing a Garrard 3-speed record-changer. The chassis in it is a modified version of the HR10, the main differences being in the audio frequency circuit, but it is also fitted with a double-wound mains transformer, and the chassis can be earthed directly.

Release date and original prices: August 1952 (both models); HR10, £16 0s 5d; HG30, £52 19s. Purchase tax extra.

CIRCUIT DESCRIPTION

Aerial input via **L1** (S.W.) and "bottom" capacitative coupler **C4** (M.W. and L.W.) to single tuned circuits **L2, C28** (S.W.), **L3, C28** (M.W.) and **L4, C28** (L.W.), which precede heptode valve **(V1, Brimar 6BE6)** operating as frequency changer with electron coupling.

In the table model the **A** and **E** sockets are isolated by **C1** and **C2** from the chassis, which is "live" to the mains. **R1** prevents the build-up of static charges on the aerial, and **R2** provides a shunt path for modulation hum components. In the gram model a double-wound mains transformer is used, isolating the chassis from the mains input and making **R1, C2** and **C3** no longer necessary, and these components are omitted as indicated in the circuit diagram.

Oscillator grid coils **L5** (S.W.), **L6** (M.W.) and **L7** (L.W.) are tuned by **C29.** Parallel trimming by **C30** (S.W.), **C31** (M.W.) and **C11** (L.W.); series tracking by **C9** (M.W.) and **C10** (L.W.) in the high potential ends of the circuits. Reaction coupling from cathode by coils **L8** (S.W.), **L9** (M.W.) and by a tap on **L7** (L.W.) Oscillator stabilization by **R5.**

Second valve **(V2, Brimar 6BA6)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C6, L10, L11, C7** and **C16, L12, L13, C17.**

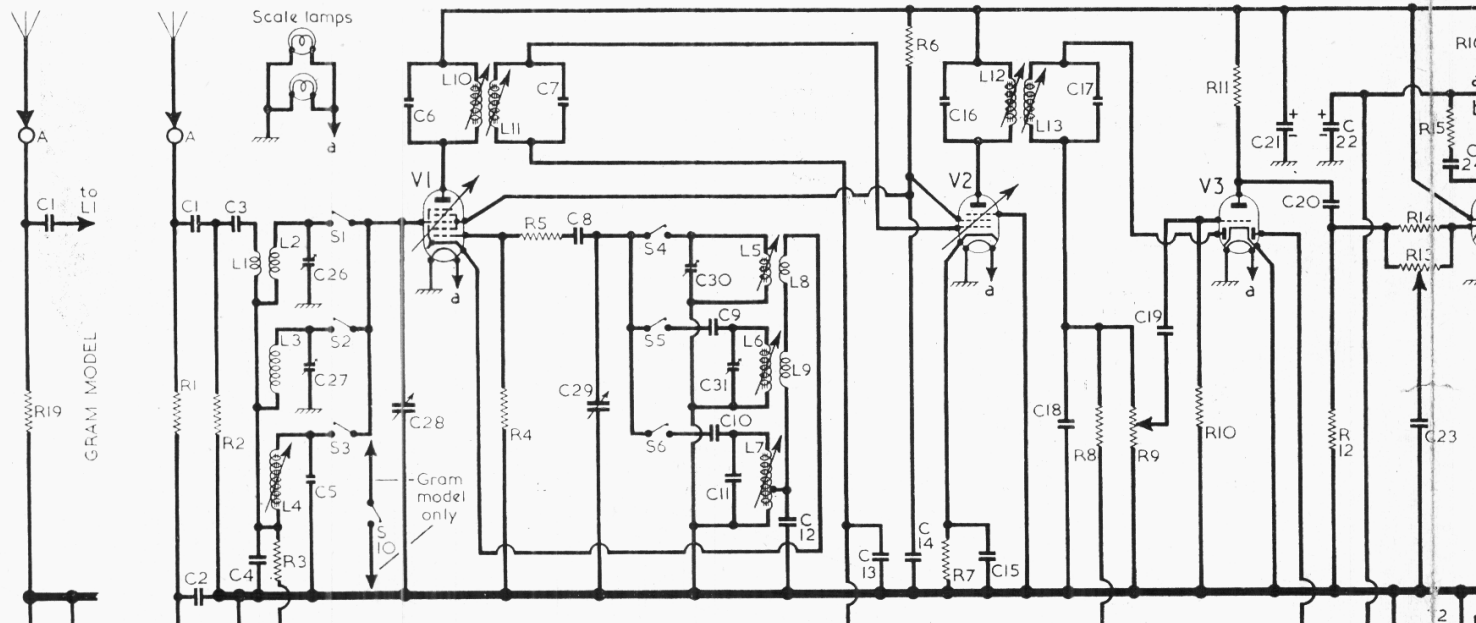
Intermediate frequency 422 kc/s.

Diode signal detector is part of double diode triode valve **(V3, Brimar 6AT6).** Audio frequency component in rectified output is developed across volume control **R9,** which acts as diode load, and is passed via **C19** to grid of triode section.

D.C. potential developed across **R9** is fed back as bias to **V1** and **V2** giving automatic gain control. Second diode of **V3** is connected to the A.G.C. line and prevents it from going positive. I.F. filtering by **C18.**

In the gram model the pick-up is connected across volume control **R24** via **S12,** which closes in the gram position of the waveband switch control. **S10** closes and **S11** opens in this position to prevent radio break-through. At low level settings of the volume control **C35, R25** and **R26** give bass compensation. At higher settings their effect is negligible. In the table receiver no provision is made for the connection of a gramophone pick-up, and all these switches are omitted. In the table receiver, resistance-capacitance coupling is effected by **R11, C20** and **R12,** via the tone control circuit across **R14,** between **V3** and tetrode output valve **(V4, Brimar 6AQ5).** Fixed tone correction by **R15, C24** and by negative feed-back introduced by the omission of the normal by-pass capacitor in the cathode circuit.

The variable tone control circuit **R13, C23** introduces a variable degree of high-



Circuit diagram of the Kolster-Brandes HR10 radio receiver (left) with a section diagram (right) showing audio frequency circuit in the autoradiogram HG30. The aerial circuit of the HG30 is shown alone on the extreme left. The only other difference between the two is the switch **S10,** in the aerial tuning circuit, which occurs only in the HG30.

The appearance of the K.-B. HR10. The HG30 ARG is shown overleaf.

note attenuation. Provision is made for the connection of a low-impedance external speaker across the output transformer secondary winding. Switch **S7** is provided to permit the internal speaker to be muted.

In the gram version the coupling circuit between **V3** and **V4** is different. **V3** anode is fed via **R28,** and **V4** screen is fed from the same point. Coupling is by **R29, C36** and **R30,** and the tone control circuit is modified, **R31, C39** being shunted across **R30. V4** cathode circuit is bypassed by **C42.**

H.T. current is supplied by I.H.C. full-wave rectifying valve **(V5, Brimar 6X4).** Smoothing by **R16** and electrolytic capacitors **C21, C22** in the table model, and by **R33, C37** and **C38** in the gram model.

(Continued column 1 overleaf)

COMPONENT VALUES AND LOCATIONS

	RESISTORS	Values	Locations
R1	Anti-static shunt	1MΩ	G4
R2	Mod. hum shunt ...	1kΩ	G4
R3	A.G.C. decoup. ...	100kΩ	G3
R4	V1 osc. C.G. ...	22kΩ	F3
R5	Osc. stabilizer ...	47Ω	F3
R6	S.G. H.T. feed ...	*16·5kΩ	E3
R7	V2 G.B.	47Ω	E3
R8	A.G.C. decoup. ...	2·2MΩ	E3
R9	Volume control ...	500kΩ	E3
R10	V3 C.G.	10MΩ	E4
R11	V3 anode load ...	470kΩ	E4
R12	V4 C.G.	220kΩ	D3
R13	Tone control ...	250kΩ	D3
R14	Part tone control ...	470kΩ	E3
R15	Tone corrector ...	15kΩ	D4
R16	H.T. smoothing ...	820Ω	D4
R17	V4 G.B.	†280Ω	E4
R18	V5 surge limiter ...	‡165Ω	F4
R19	Aerial shunt ...	2·2kΩ	—
R20	I.F. stopper ...	100kΩ	—
R21	A.G.C. decoupling	2·2MΩ	—
R22	P.U. shunt ...	1·5MΩ	—
R23	P.U. series ...	2·2MΩ	—
R24	Volume control ...	500kΩ	—
R25	Tone compensators	4·7kΩ	—
R26	Tone compensators	10kΩ	—
R27	V3 C.G.	10MΩ	—
R28	H.T. feed ...	1kΩ	—
R29	V3 anode load ...	470kΩ	—
R30	V4 C.G.	220kΩ	—
R31	Tone control ...	250kΩ	—
R32	Tone corrector ...	15kΩ	—
R33	H.T. smoothing ...	1kΩ	—
R34	V4 G.B.	240Ω	—

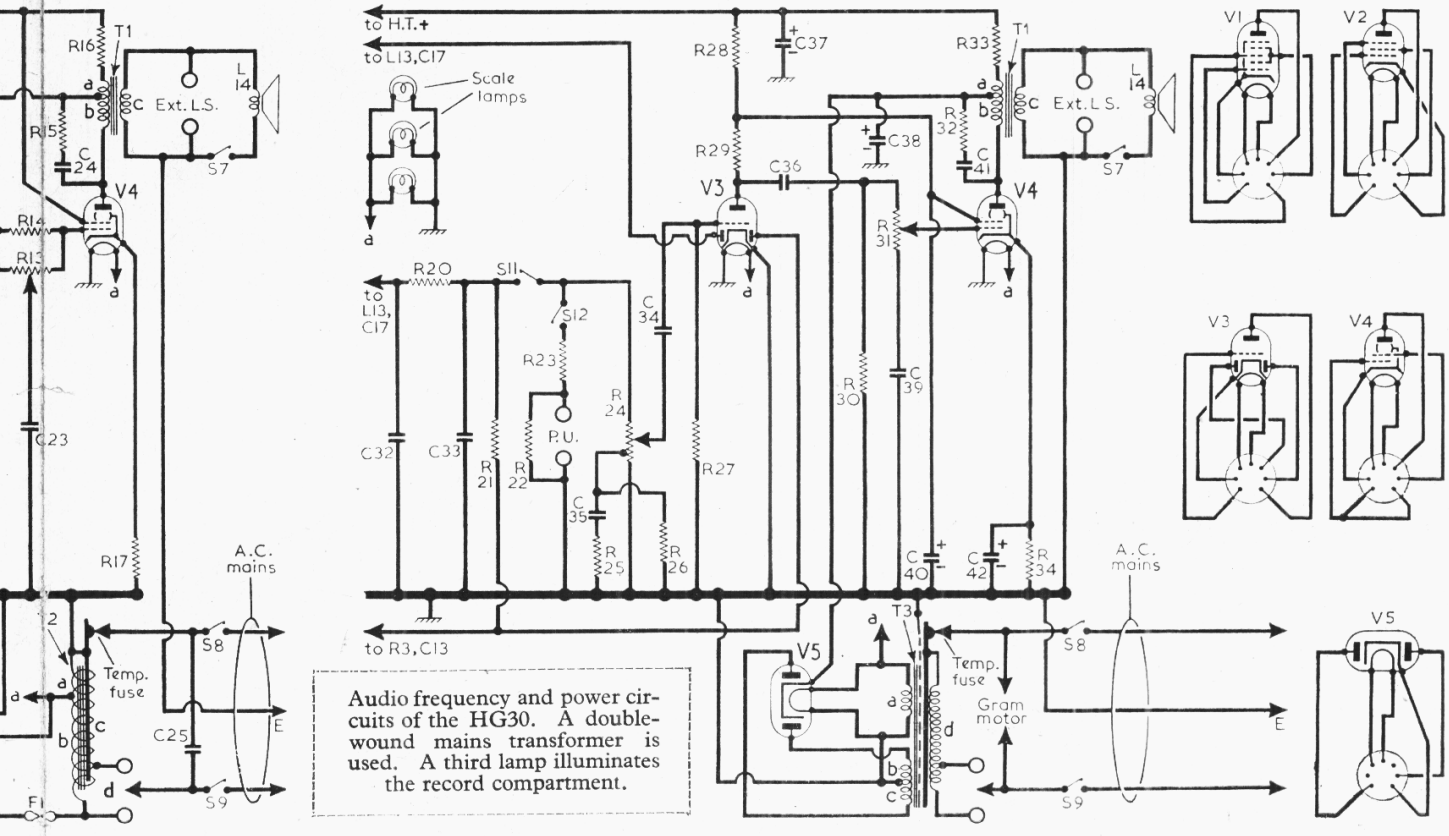
* Two 33kΩ resistors in parallel.
† Two 560Ω resistors in parallel.
‡ Two 330Ω resistors in parallel.

	CAPACITORS	Values	Locations
C1	Aerial and earth isolators ...	0·001μF	G4
C2	Aerial and earth isolators ...	0·01μF	G4
C3	Aerial coupling ...	0·005μF	G4
C4	Aerial coupling ...	0·005μF	G4
C5	L.W. aerial trim. ...	48pF	G4
C6	1st I.F. trans. ...	88pF	B1
C7	1st I.F. trans. tuning	88pF	B1
C8	V1 osc. C.G. ...	100pF	F3
C9	M.W. osc. tracker	410pF	F4
C10	L.W. osc. tracker	180pF	F3
C11	L.W. osc. trim. ...	100pF	F3
C12	Osc. reaction coup.	0·001μF	F3
C13	A.G.C. decoup. ...	0·02μF	F4
C14	S.G. decoupling ...	0·1μF	F3
C15	V2 cath. by-pass	0·04μF	E3
C16	2nd I.F. trans.	88pF	B2
C17	2nd I.F. trans. tuning	88pF	B2
C18	I.F. by-pass ...	330pF	E3
C19	A.F. couplings ...	0·003μF	E3
C20	A.F. couplings ...	0·02μF	D3
C21*	H.T. smoothing ...	32μF	C1
C22*	H.T. smoothing ...	32μF	C1
C23	Part tone control	800pF	E3
C24	Tone corrector ...	0·01μF	D4
C25	Mains R.F. by-pass	0·1μF	D3
C26‡	S.W. aerial trim.	40pF	G4
C27‡	M.W. aerial trim.	40pF	G4
C28†	Aerial tuning ...	—	A2
C29†	Oscillator tuning ...	—	A1
C30‡	S.W. osc. trim. ...	40pF	F4
C31‡	M.W. osc. trim.	40pF	G4
C32	I.F. by-passes ...	100pF	—
C33	I.F. by-passes ...	100pF	—
C34	A.F. coupling ...	0·01μF	—
C35	Tone compensator	0·05μF	—
C36	A.F. coupling ...	0·01μF	—
C37*	H.T. smoothing ...	20μF	—
C38*	H.T. smoothing ...	30μF	—
C39	Part tone control	800pF	—
C40*	H.T. decoupling ...	10μF	—
C41	Tone corrector ...	0·003μF	—
C42*	V4 cath. by-pass	30μF	—

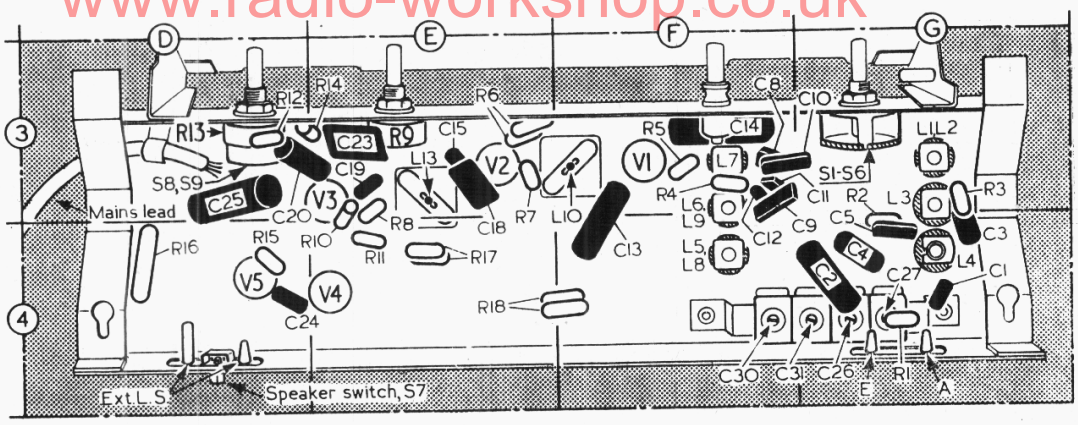
* Electrolytic. † Variable. ‡ Pre-set.

If the component numbers given in the accompanying tables are used when ordering replacement parts, dealers are advised to mention the fact on the order, as these numbers may differ from those used in the manufacturers' diagram.

("Other Components" table is overleaf.)



Audio frequency and power circuits of the HG30. A double-wound mains transformer is used. A third lamp illuminates the record compartment.



Underside view of the chassis. A diagram of the waveband switch unit **S1-S6** appears at the foot of col. 4.

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.

S7 is the screw-type speaker switch, mounted in a panel on the rear member of the chassis. When it is unscrewed (by turning it anti-clockwise a few times) the internal speaker speech coil is open-circuited, muting the speaker.

S8, S9 are the Q.M.B. mains switches, ganged with the variable tone control **R13.**

Scale Lamps.—These are two M.E.S.-type lamps with clear tubular bulbs. The makers' service manual quotes them as being Part No. 201/193, rated at 6 V, 0.2 A. Those in our sample were marked Ph. Gt. Brit. 6.5 V 0.3 A. They are mounted in rubber grommets which fit into recesses stamped in the scale backing plate. To remove the grommet from the lamp, stand the lamp up on its centre contact pip and press downwards on the grommet with both thumbs.

Fuse F1.—This is a standard 1¼in glass cartridge fuse mounted on the chassis deck behind the mains transformer. It is rated at 250 mA (colour coding brown).

Temperature Fuse.—This fuse actually consists of a special kind of solder, with a low temperature melting point. In practice the solder is used to hold a hair-pin of springy phosphor-bronze strip to a bar of metal embedded in the windings of the mains transformer, so that if the latter overheats for any length of time, the heat conducted up to the joint melts the solder, releasing the strip.

Normally when it "blows" it should be possible to replace it merely by melting the solder again with a clean soldering iron, holding the strip in place. In no circumstances must ordinary solder be added. If more solder is required, it should be obtained from the makers.

Record Unit.—The auto-changer is a Garrard RC75 3-speed unit taking 8 records unmixed. The pick-up is an Acos with a compromise type of sapphire needle that will suit 78, 45 and 33⅓ records. The pick-up is coded with a spot of white paint on the needle.

The makers of the radiogram state that where queries arise involving reference to the makers, dealers should approach the Garrard Engineering & Manufacturing Co., Ltd., direct concerning the changer, or Cosmocord, Ltd., concerning the pick-up.

External Speaker.—Two sockets are provided at the rear of the chassis for the connection of a low impedance (about 2-4Ω) external speaker. A switch **S7** mounted on the same terminal panel permits the internal speaker to be muted.

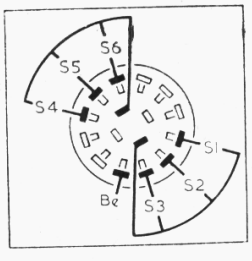


Diagram of the waveband switch unit, viewed from the rear of an inverted chassis. Below is the associated table.

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

CIRCUIT ALIGNMENT

I.F. Stages.—Remove chassis from cabinet and place it in a convenient position on the bench. Connect signal generator output, via an 0.1μF capacitor in each lead, to control grid (pin 7) of **V1** and chassis. Switch receiver to M.W. and turn gang to minimum capacitance. Feed in a 422 kc/s (710.8 m) signal and adjust the cores of **L13** (location reference E3), **L12** (B2), **L11** (B1) and **L10** (F3) for maximum output, reducing the input as the circuits come into line to avoid A.G.C. action. Repeat these adjustments.

R.F. and Oscillator Stages.—As the tuning scale remains fixed in the cabinet when the chassis is withdrawn, reference should be made during the following alignment operations to the calibration marks on the scale backing plate. Check that with the gang at maximum capacitance the cursors coincide with the "D" calibration marks on the backing plate. Transfer signal generator leads, via a standard dummy aerial, to **A** and **E** sockets.

M.W.—Switch receiver to M.W. and tune left-hand cursor to M.W. calibration mark near centre of backing plate. Feed in a 600 kc/s (500 m) signal and adjust the core of **L6** (B2) for maximum output. Tune left-hand cursor to M.W. calibration mark at left-hand end of backing plate, feed in a 1,400 kc/s (214 m) signal and adjust **C31** (A2) and **C27** (A2) for maximum output. During the final adjustment of **C27** rock the gang for optimum results. Repeat these adjustments until no further improvement results.

L.W.—Switch receiver to L.W., tune left-hand cursor to L.W. calibration mark, feed in a 225 kc/s (1,333 m) signal and adjust the cores of **L7** (B1) and **L4** (A2) for maximum output. Repeat these adjustments and then check the M.W. alignment, re-adjusting **L6, C31** and **C27,** if necessary, as previously described.

The appearance of the autoradiogram HG30.

S.W.—Switch receiver to S.W., tune right-hand cursor to calibration mark "S" near centre of scale. Feed in a 6 Mc/s (50 m) signal and adjust the core of **L5** (B2) for maximum output. Tune right-hand cursor to calibration mark "S" near right-hand end of backing plate. Feed in a 15 Mc/s (20 m) signal and adjust **C30** (A2) and **C26** (A2) for maximum output, rocking the gang while adjusting **C26** for optimum results. Repeat these adjustments until no further improvement results.

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*

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	S.W. Aerial coup....	—	G3
L2	Aerial tuning coils	—	G3
L3		3·4	G3
L4		18·0	G4
L5	Oscillator tuning coils	—	F4
L6		4·4	F3
L7		*8·0	F3
L8	Osc. reaction coils...	—	F4
L9		—	F3
L10	1st I.F. trans. Pri.	20·0	B1
L11	1st I.F. trans. Sec.	20·0	B1
L12	2nd I.F. trans. Pri.	20·0	B2
L13	2nd I.F. trans. Sec.	20·0	B2
L14	Speech coil ...	2·2	—
T1	O.P. trans. a ...	1·5	
	O.P. trans. b ...	160·0	C2
	O.P. trans. c ...	—	
T2	Mains trans. Table Model a ...	—	
	Mains trans. Table Model b ...	200·0	
	Mains trans. Table Model c ...	174·0	B2
	Mains trans. Table Model d ...	26·0	
T3	Mains trans. Gram Model a ...	—	
	Mains trans. Gram Model b ...	290·0	
	Mains trans. Gram Model c ...	290·0	—
	Mains trans. Gram Model d, total	49·0	
S1-S6	Waveband switches	—	G3
S7	Speaker switch ...	—	D4
S8, S9	Mains sw., g'd R13	—	D3
S10-S12	Gram switches ...	—	—
F1	H.T. fuse, 250 mA	—	B2

* Tapped at 0·6Ω from chassis.

Circuit Description—*continued*

Residual hum is neutralized in both models by passing the H.T. current through section **a** of **T1** primary winding.

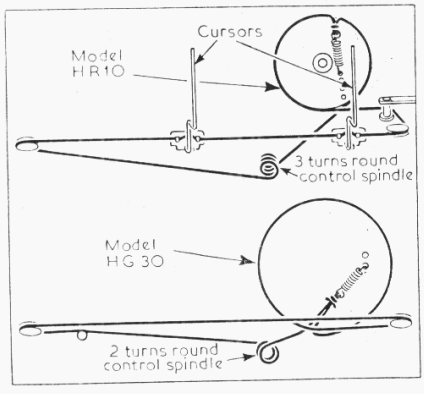
In the table model the anodes of **V5** are strapped to form a half-wave rectifier and are fed from the 240 V tap on the mains auto-transformer **T2.** Another tapping on **T2** feeds the heaters of all the valves, including **V5.** **R18** and fuse **F1** protect **V5** from current surges and overloads respectively.

In the gram model a double-wound mains transformer is used and **V5** operates as a full-wave rectifier with H.T. windings **b** and **c** on **T3.** Winding **a** on **T3** feeds the heaters of all the valves, including **V5.**

In both models a temperature fuse is fitted to the mains transformer and consists of a spring contact, which is held by a low melting-point alloy to a copper strip embedded in the mains transformer, near the primary winding. One side of the mains is connected to the transformer primary through the temperature fuse, and if the transformer becomes overheated owing to a component breakdown, the copper strip conducts heat to the fusible alloy and melts it, releasing the spring contact and breaking the mains input circuit.

DRIVE CORD REPLACEMENT

Table Receiver.—Four feet of high-grade flax fishing line is required for a new drive cord, and this length leaves an ample margin for tying off. The cord should be run as shown in the upper drawing in the accompanying sketch,



Sketches showing the drive cord systems in the HR10 (above) and HG30 (below) models, as seen from the front, with the gang at maximum.

where the system is drawn as seen from the front with the gang at maximum capacitance. The maker's Part No. for a new drive cord assembly is 290/174.

Both ends of the cord are tied to the same end of the tension spring. The makers' manual gives the number of turns round the control spindle as two, but in our sample there were three turns. The cord runs over a pulley at each end of the scale assembly, but behind the right-hand pulley in our sketch it runs round a smooth guide pin also, to bring it into line with the gang drum.

Radiogram.—Below the sketch of the drive for the table receiver, which was drawn from our sample chassis, is reproduced the maker's sketch of the drive system in the radiogram. This is viewed from the front also, with the gang at the maximum capacitance. About 5ft of cord is required.

It follows very much the same lines as that in the table receiver, but the guide pin on the right is omitted and another is introduced on the left to bring the cord into line with the left-hand pulley. The maker's Part No. for a new drive cord assembly is 290/174/1.

DISMANTLING

Removing Chassis.—Remove control knobs (pull off) and unsolder leads from speech coil tags on speaker;

remove two 2BA bolts (with shake-proof washers) from front corners of chassis and withdraw chassis, disengaging it from the wood screws at the rear of the cabinet.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured on our receiver when it was operating from A.C. mains of 230 V. The receiver was switched to M.W. and tuned the high wavelength end of the band with the volume control at maximum, but there was no signal input.

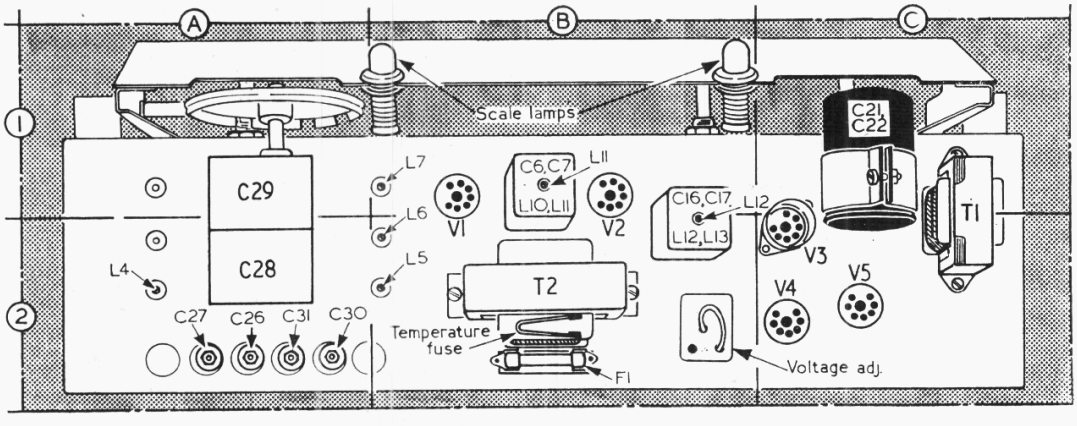
Voltage readings were measured with an Avo Electronic TestMeter, and as this instrument has a high internal resistance allowance should be made for the current drawn by other types of meter. Chassis was the negative connection in every case. The manufacturers' voltage figures for the gram model are about 10 per cent higher than the figures they quote for the table model.

Valve	Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1 6BE6 ...	204	1·7	80	5·8	—
V2 6BA6 ...	204	5·6	80	2·0	0·36
V3 6AT6 ...	60	0·33	—	—	—
V4 6AQ5 ...	215	29·0	204	4·2	9·2
V5 6X4 ...	200†	—	—	—	220·0*

* Cathode current, 47mA. † A.C. reading.

GENERAL NOTES

Switches.—S1-S6 are the waveband switches, ganged in a single rotary unit beneath the chassis. The unit is indicated in our underside view of the chassis, and it is shown in detail in the diagram in col. 4, where it is drawn as seen when viewed from the rear of an inverted chassis.



Plan view of the chassis. The temperature fuse consists of a hair-pin-shaped phosphor-bronze strip soldered with special solder to the end of a heat-conducting bar sunk into the windings of the mains transformer.