"TRADER" SERVICE SHEET
1122

G.E.C. BC5246

and BC6245, A.C. and A.C./D.C. Transportables

THE G.E.C. BC5246 is a compact 4-valve (plus rectifier) 3-band transportable table receiver, designed to operate from A.C. mains of 190-250 V, 40-100 c/s. The waveband ranges are 1,000-2,000 m, 187-572 m, 13.5-50 m.

Model BC6245 is an A.C./D.C. version of model BC5246, differences between them being covered in the circuit diagram below, where the aerial input, power output and mains supply circuits for the BC6245 are re-drawn on either side of the main circuit. Other differences between the models are covered in the component and valve voltage tables.

Release date and original price, both models: August 1953, £12 14s 5d. Purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input on M.W. by **L1, C27** and on L.W. by **L1, L2, C27.** For S.W. reception an external aerial is necessary and is coupled via **L3** to single-tuned circuit **L4, C27.** Provision is also made for the connection of an external aerial on M.W. and L.W., and when in use it is coupled to the tuned grid circuits by the common impedance of **C1. R1** shunts the aerial circuit to prevent modulation hum. In the A.C./D.C. model **C30** and **C31** isolate the **A** and **E** sockets from chassis and **L14** shunts the aerial circuit to by-pass modulation hum voltages. **R17** prevents the build-up of static charges on the aerial.

First valve **(V1, Osram X79** (A.C. model) or **X109** (A.C./D.C. model)**)** is a triode hexode operating as frequency changer with internal coupling. Oscillator grid coils **L5** (S.W.), **L6** (M.W.) and **L7** (L.W.) are tuned by **C28.** Parallel trimming by **C29** (M.W.) and **C9** (L.W.); series tracking by **C11** (M.W.) and **C10, C11** (L.W.). Reaction coupling from oscillator anode by **L8** (S.W.) and across the common impedance of tracker **C11** (M.W. and L.W.).

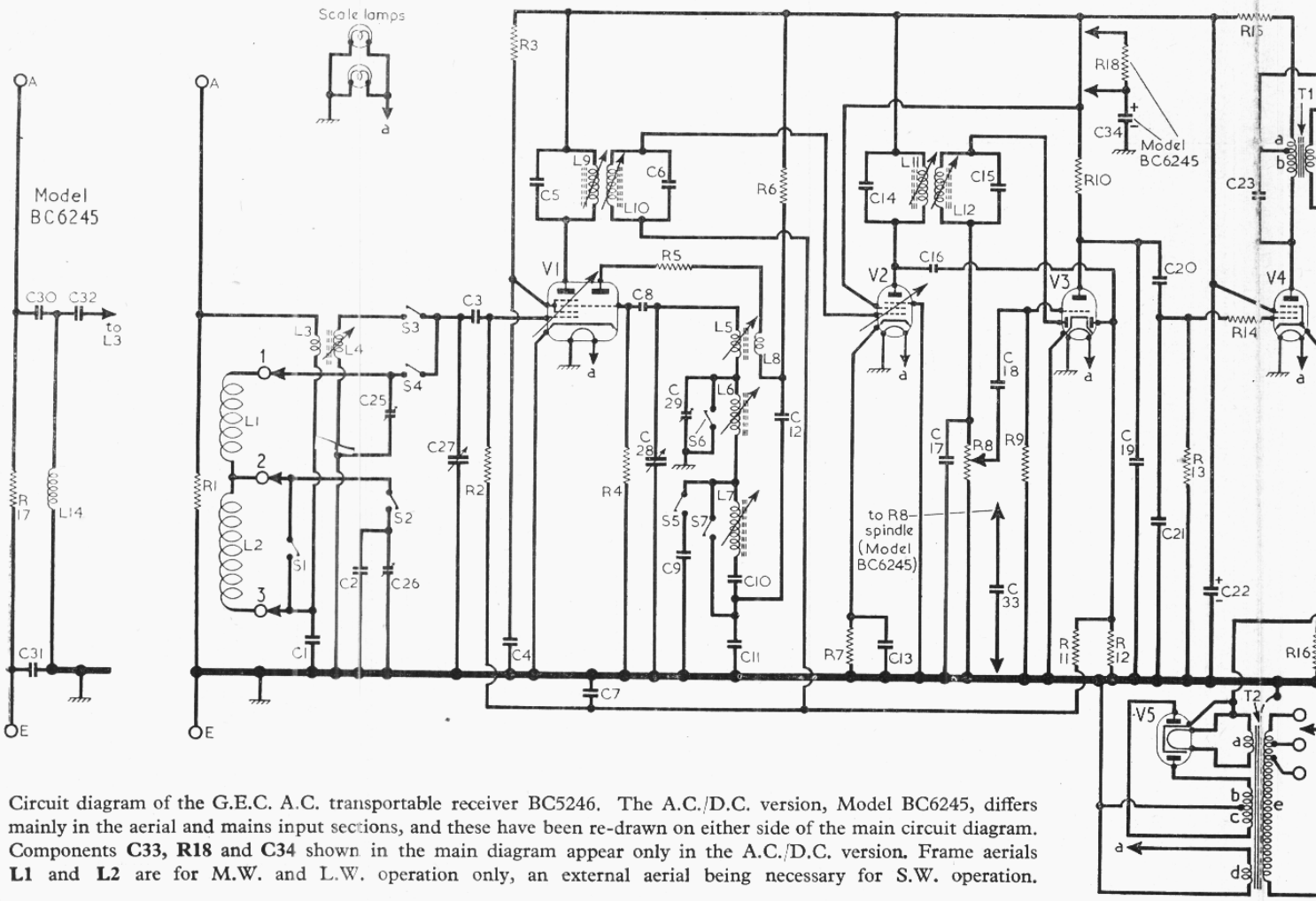
Second valve **(V2, Osram W77** (A.C. model) or **W107** (A.C./D.C. model)**)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C5, L9, L10, C6** and **C14, L11, L12, C15.**

Intermediate frequency 470 kc/s.

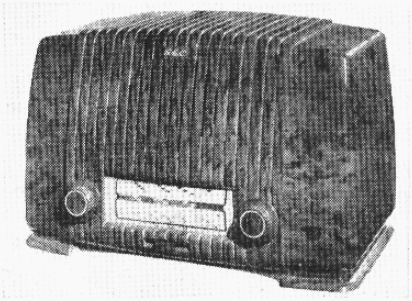
Diode signal detector is part of double diode triode valve **(V3, Osram DH77** (A.C. model) or **DH107** (A.C./D.C. model)**).** A.F. component in rectified output is developed across volume control **R8,** which operates as diode load, and is passed via **C18** to triode section. I.F. filtering by **C17** and **C19.**

Second diode of **V3** is fed from **V2** anode via **C16,** and the resulting D.C. potential developed across load resistor **R12** is fed back as bias to **V1** and **V2,** giving automatic gain control.

Resistance - capacitance coupling by



Circuit diagram of the G.E.C. A.C. transportable receiver BC5246. The A.C./D.C. version, Model BC6245, differs mainly in the aerial and mains input sections, and these have been re-drawn on either side of the main circuit diagram. Components **C33, R18** and **C34** shown in the main diagram appear only in the A.C./D.C. version. Frame aerials **L1** and **L2** are for M.W. and L.W. operation only, an external aerial being necessary for S.W. operation.



Appearance of BC5246 and BC6245.

R10, C20 and **R13** between **V3** and pentode output valve **(V4, Osram N78** (A.C. model) or **N108** (A.C./D.C. model)**).** Tone correction in grid circuit by **C21,** in anode circuit by **C23,** and in cathode circuit (A.C. model only) by the negative feed-back voltage developed across **R16.**

In the A.C. model, H.T. current is supplied by I.H.C. full-wave rectifying valve **(V5, Osram U78).** Smoothing by **R15** and electrolytic capacitors **C22** and **C24,** residual hum being neutralized by passing the current through section **a** of the primary winding on the output transformer.

(*Continued in column 6*)

COMPONENT VALUES AND LOCATIONS

RESISTORS		Values	Locations
R1	Mod. hum shunt ...	10kΩ	G4
R2	V1 C.G.	1MΩ	G4
R3	V1 S.G. feed ...	47kΩ†	G4
R4	V1 osc. C.G. ...	100kΩ	G4
R5	Osc. stabilizer ...	680Ω	G4
R6	Osc. anode feed ...	33kΩ‡	G4
R7	V2 G.B.	470Ω§	F4
R8	Volume control ...	1MΩ	D3
R9	V3 C.G.	10MΩ	E4
R10	V3 anode load ...	150kΩ	E4
R11	A.G.C. decoupling	1MΩ	E4
R12	A.G.C. diode load	470kΩ	E4
R13	V4 C.G.	270kΩ	E4
R14	V4 C.G. stopper ...	10kΩ	E3
R15	H.T. smoothing ...	4·7kΩ	B2
R16	V4 G.B.	150Ω	E3
R17	Aerial shunt ...	1MΩ	—
R18	H.T. decoupling ...	8·2kΩ	—
R19	V5 surge limiter ...	270Ω	—
R20	Brimistor CZ1 ...	—	—
R21	Heater ballast ...	1,040Ω*	—

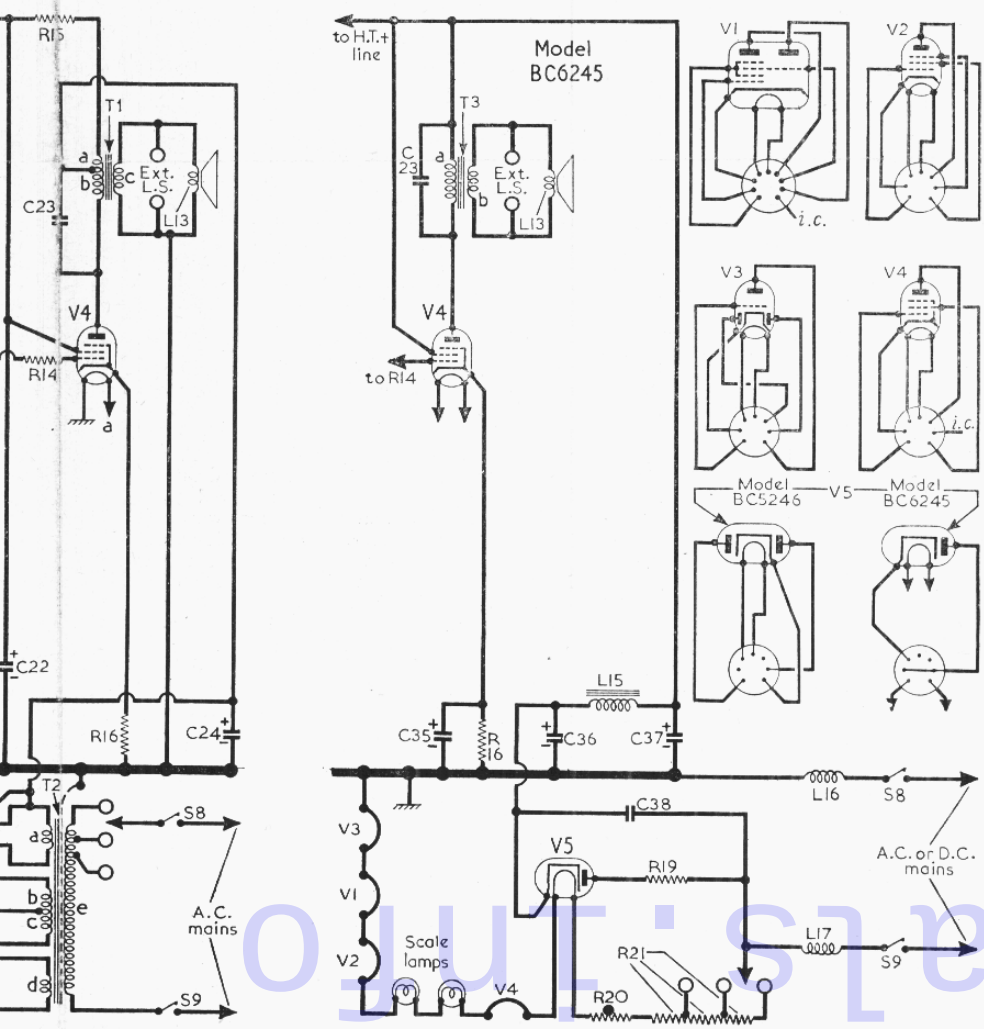
* Tapped at 420Ω+310Ω+310Ω from R20.
† 100kΩ, ‡ 10kΩ, § 270Ω } A.C./D.C. model

CAPACITORS		Values	Locations
C1	Ext. aerial coupling	3,950pF	F3
C2	L.W. aerial trim. ...	130pF	F3
C3	V1 C.G.	100pF	G3
C4	V1 S.G. decoupling	0·05μF	G4
C5	1st I.F. trans. tuning ...	120pF	A2
C6		120pF	A2
C7	A.G.C. decoupling	0·05μF	F4
C8	V1 osc. C.G. ...	47pF	G4
C9	L.W. osc. trim. ...	166pF	G3
C10	L.W. osc. tracker...	180pF	G3
C11	M.W. osc. tracker...	425pF	G3
C12	Osc. reaction coup.	0·005μF	G3
C13	V2 cath. decoupling	0·04μF	F4
C14	2nd I.F. trans. tuning ...	120pF	B2
C15		120pF	B2
C16	A.G.C. coupling ...	22pF	F4
C17	I.F. by-pass ...	300pF	E4
C18	A.F. coupling ...	0·02μF	E4
C19	I.F. by-pass ...	500pF	E4
C20	A.F. coupling ...	0·005μF	E4
C21	Tone corrector ...	0·005μF	E4
C22*	H.T. smoothing ...	32μF	B2
C23	Tone corrector ...	0·01μF	E3
C24*	H.T. smoothing ...	16μF	B2
C25‡	M.W. aerial trim ...	—	G3
C26‡	L.W. aerial trim. ...	—	G3
C27†	Aerial tuning ...	—	A1
C28†	Oscillator tuning ...	—	A1
C29‡	M.W. osc. trim. ...	—	G3
C30	Chassis isolators ...	0·001μF	—
C31		0·02μF	—
C32	Aerial coupling ...	0·02μF	—
C33	R8 spindle isolator	0·01μF	—
C34*	H.T. decoupling ...	4μF	—
C35*	V4 cath. by-pass ...	100μF	—
C36*	H.T. smoothing ...	32μF	—
C37*		32μF	—
C38	Mains R.F. by-pass	0·01μF	—

* Electrolytic. † Variable. ‡ Pre-set.

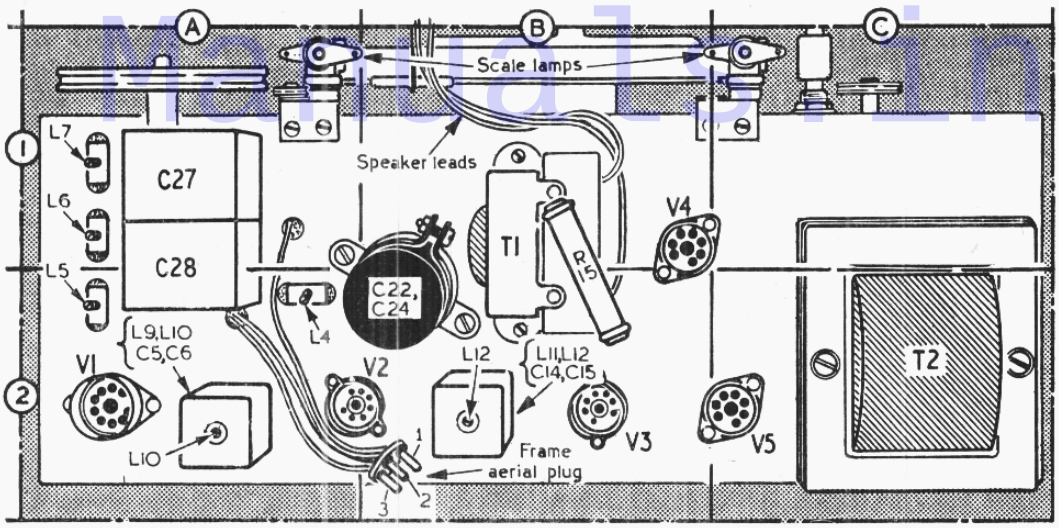
OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	M.W. frame aerial	1·0	—
L2	L.W. frame aerial...	14·0	—
L3	S.W. coupling coil...	—	F3
L4	S.W. aerial tuning	—	F3
L5	Oscillator tuning coils ...	—	G4
L6		2·5	G3
L7		7·0	G3
L8	S.W. reaction coil...	—	G4
L9	1st I.F. trans. Pri.	8·5	A2
L10	1st I.F. trans. Sec.	8·5	A2
L11	2nd I.F. trans. Pri.	8·5	B2
L12	2nd I.F. trans. Sec.	8·5	B2
L13	Speech coil ...	2·5	—
L14	R.F. choke ...	48·0	—
L15	Smoothing choke...	600·0	—
L16	Mains R.F. filter chokes ...	2·5	—
L17		2·5	—
T1	O.P. trans. (BC 5246) a ...	24·0	B1
	b ...	460·0	
	c ...	—	
T2	Mains Trans. (BC 5246) a ...	—	C2
	b ...	270·0	
	c ...	270·0	
	d ...	—	
	e, total	34·0	
T3	O.P. trans. (BC 6245) a ...	430·0	—
	b ...	—	
S1-S7	Waveband switches	—	G3
S8, S9	Mains sw., g'd R8...	—	D3

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



Circuit Description—*continued.*

In the A.C./D.C. model H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Osram U107).** Smoothing by choke **L15** and electrolytic capacitors **C36** and **C37.** Valve heaters, together with scale lamps, thermistor **R20** and ballast resistor **R21** are connected in series across the mains input. **R20** protects the valve heaters and scale lamps from current surges, and **R19** protects **V5** from current surges. Mains R.F. filtering by **C38** and chokes **L16, L17.**



Plan view of the chassis showing the 3-pin frame aerial connector. The pins are numbered and refer to similarly numbered connections in the circuit diagram overleaf. In the A.C. / D.C. model, the heater ballast resistor **R21** is mounted horizontal on the chassis in place of **T2.**

GENERAL NOTES

Switches.—**S1-S7** are the waveband switches ganged in a single rotary unit beneath the chassis. The unit is indicated in our under chassis illustration and shown in detail in the diagram below.

The associated switch table gives the switch operations for the three control settings, starting with the slide-type switch control in the extreme left-hand position (viewed from front). A dash indicates open and **c** closed.

S8, S9 are the Q.M.B. mains on/off switches ganged to the volume control **R8.**

Scale Lamps, A.C. Model.—Two 6.5 V, 0.3 A lamps with small clear spherical bulbs and M.E.S. bases.

Scale Lamps, A.C./D.C. Model.—Two 6.5 V, 0.115 A lamps with small clear spherical bulbs and M.E.S. bases. A spare lamp is mounted inside the receiver on the back cover.

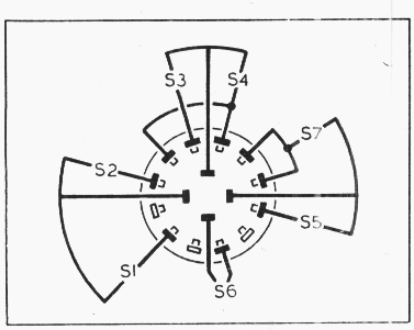
Model BC6245.—This is an A.C./D.C. version of the BC5246 on which this *Service Sheet* is based. The main differences are in the aerial and mains input circuits, and these sections are redrawn on either side of the main circuit diagram overleaf.

Differences in values are indicated in the component tables and a separate valve voltage table is given for each model. The heater ballast resistor **R21** is mounted horizontally on the deck of the chassis in place of the mains transformer **T2.** Apart from these changes, however, the remaining information applies to both models.

Modifications.—In early A.C. models **C13** and **C21** were omitted, and the screen grids of **V1** and **V2** were fed from a common H.T. resistor.

Switch	M.W.	S.W.	L.W.
S1	c	—	—
S2	—	—	c
S3	—	c	—
S4	c	—	c
S5	—	—	c
S6	—	c	—
S7	c	c	—

Above : Table showing switch operations.
Below : Waveband switch diagram drawn as seen from rear of inverted chassis.



CIRCUIT ALIGNMENT

All the core and trimmer adjustments can be made accessible by removing the cabinet back and base cover.

I.F. Stages.—Switch receiver to M.W. and tune receiver to a point at the high wavelength end of the band where there is no signal pick-up. Connect output of signal generator, via an 0.1 μF capacitor in each lead, to control grid (pin 1) of **V2** and chassis. Feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L12** (location reference B2) and **L11** (F4) for maximum output. Transfer signal generator "live" lead to **V1** control grid (pin 2). Feeding in a 470 kc/s signal, adjust the cores of **L10** (A2) and **L9** (G4) for maximum output. Repeat these adjustments, transfering signal generator "live" lead to **V2** control grid when re-adjusting the cores of **L11** and **L12.**

R.F. and Oscillator Stages.—The following adjustments are accessible with the chassis in its cabinet, but if the chassis is withdrawn, then the adjustments can be carried out with the aid of the substitute tuning scale which is printed on the front edge of the cursor rail. Readings on this scale are made against the right-hand edge of the cursor carriage (viewed from front of receiver) and are quoted in brackets after each calibration wavelength in the following instructions. Check that with the gang at maximum capacitance, the cursor coincides with the high wavelength end of the S.W. tuning scale, or that the right-hand edge of the cursor carriage coincides with 90 on the substitute tuning scale. Transfer signal generator leads, via a dummy aerial, to **A** and **E** sockets.

S.W.—Switch receiver to S.W. and tune to 50 m (85). Feed in a 50 m (6 Mc/s) signal and adjust the cores of **L5** (A2) and **L4** (A2) for maximum output. Repeat these adjustments.

M.W.—Switch receiver to M.W. and tune to 500 m (71.5). Feed in a 500 m (600 kc/s) signal and adjust the core of **L6** (A1) for maximum output. Tune receiver to 200 m (6), feed in a 200 m (1,500 kc/s) signal and adjust **C29** (G3) and **C25** (G3) for maximum output. Repeat these adjustments until no further improvement results.

L.W.—Switch receiver to L.W. and tune to 1,304 m (26). Feed in a 1,304 m (230 kc/s) signal and adjust the core of **L7** (A1) and **C26** (G3) for maximum output. Repeat these adjustments. If adjustments are subsequently made to the S.W. or L.W. cores or trimmers the complete R.F. and oscillator alignment should be repeated.

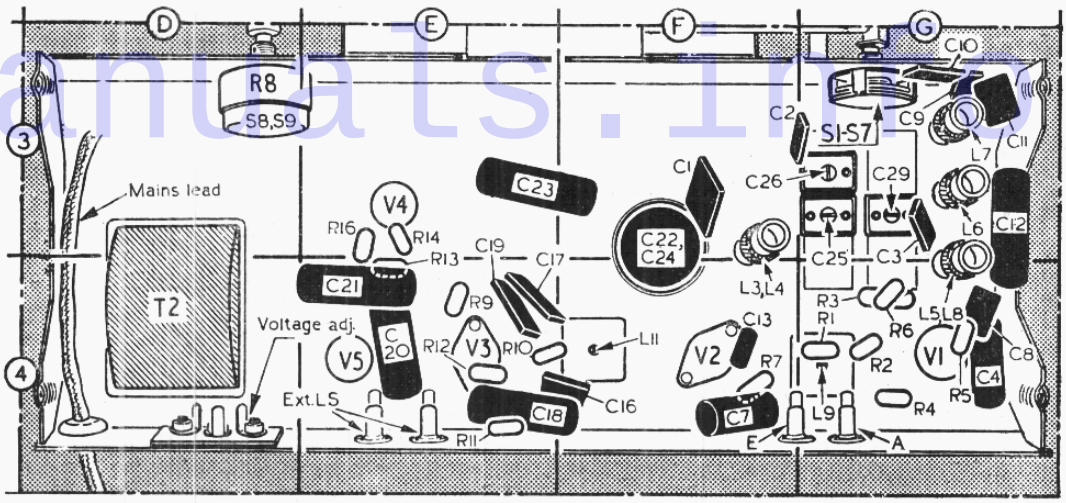
Sensitivity Figures

Connect output of signal generator directly to the **A** and **E** sockets, and connect a 0-100 V A.C. voltmeter across the output transformer primary winding (section **b** of **T1** or section **a** of **T3**). The sensitivity figures quoted below indicate the signal generator output required to produce a 13.5 V reading (50 milliwatts) on the A.C. voltmeter. As these figures were measured on new receivers at the factory, sensitivities within the range of −50% to +100% are acceptable. The signal generator output should be modulated by 400 c/s to a depth of 30%.

S.W.—Switch receiver to S.W., feed in a 50 m (6 Mc/s) signal and tune it in on receiver. Check that to obtain a 13.5 V meter reading, the signal generator output is about 36 μV.

M.W.—Switch receiver to M.W., feed in a 500 m (600 kc/s) signal and tune it in on receiver. Check that for a 13.5 V meter reading, the signal generator output is about 20 μV. Check that the same sensitivity is obtained at 200 m (1,500 kc/s).

L.W.—Switch receiver to L.W., feed in a 1,304 m (230 kc/s) signal and tune it in on receiver. Check that for a 13.5 V meter reading, the signal generator output is about 30 μV.



Under-chassis view showing the three trimmers (location G3) adjusted in the R.F. and oscillator alignment. The core adjustments of **L4, L5, L6** and **L7** are accessible from the top of the chassis deck and are indicated in our plan view of the chassis

DRIVE CORD REPLACEMENT

For both A.C. and A.C./D.C. models, approximately two feet of high-grade fishing line, plaited and waxed, and about a foot of stranded steel flexible wire are required for the complete tuning drive, which consists of two parts. Suitable lengths can be obtained from the makers' service department, Greycoat Street, Westminster, London, S.W.1.

Our sketch shows the complete system as seen when viewed from the front with the gang at minimum capacitance. The wire is made up into a length measuring 10⅛in overall, with a soldered loop about ¼in diameter each end. The cord should be tied to one of the loops and the remaining loop anchored round the plastic lug in the drive drum. The wire should then be led out through the top gap in the drum, and run anti-clockwise down to and under the first pulley. Continue on as shown in the sketch at the foot of columns 4 and 5, finally tying off the cord to one end of the tension spring and anchoring the other end of the spring in one of the holes in the lower half of the drive drum. The tension on the drive cord can be varied by anchoring the spring in any one of the three holes provided.

Turn the gang to maximum capacitance and slide the cursor carriage along the scale backing plate until its right-hand edge (viewed from front) coincides with 90 on the substitute tuning scale. Finally, clamp the drive cord and drive wire under the clips on the cursor carriage.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' information, and were measured with the receiver operating from A.C. mains of 230 V. The receivers were switched to M.W. and tuned to 200 m, but there was no signal input.

Voltages were measured on the 15 V and 750 V ranges of a 1,000 ohms-per-volt meter, chassis being the negative connection in each case.

A.C. Model

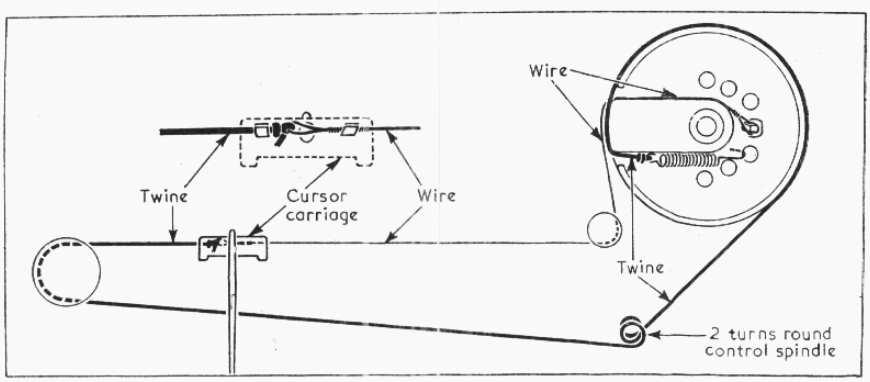
Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 X79 ...	200 (Oscillator 85)	2·0 (3·2)	64	2·9	—
V2 W77 ...	200	5·0	200	1·4	3·0
V3 DH77 ...	80	0·8	—	—	—
V4 N78 ...	275	23·0	200	3·5	4·0
V5 U78 ...	250*	—	—	—	290·0†

* A.C. reading, each anode.
† Cathode current 42 mA.

A.C./D.C. Model

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 X109 ...	156 (Oscillator 115)	0·6 (3·7)	40	1·2	—
V2 W107 ...	156	4·5	140	1·2	1·5
V3 DH107 ...	60	0·5	—	—	—
V4 N108 ...	142	42·5	156	7·5	7·5
V5 U107 ...	215*	—	—	—	200·0†

* A.C. reading. † Cathode current 62mA.



Sketch of the tuning and cursor drive system as seen from the front of the chassis with the gang at minimum capacitance. Both drive cord and wire are used in this system.

Service Sheet Correction

Owing to an oversight when writing up the circuit description of the Pye P65MBQ in *Service Sheet* 1114, it was stated that for mains operation filament current was supplied via R13, whereas from a study of this rather complex circuit diagram it is obvious that the output valve V5 is connected in series with the rest of the receiver, and all the current, H.T. and L.T., must be drawn from V5 cathode.

At the same time, attention is drawn to the omission of an asterisk in the valve equivalents table in *Service Sheet* 1105, where N37 is shown as an equivalent of PL82. It will be appreciated as a favour if users will insert an asterisk against the N37 entries opposite PL82, to indicate that the base connections are different.

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