"TRADER" SERVICE SHEET

1158

PYE PE39U Series

Covering Models PE39U, P53U & P93U

NINE wavebands, including one trawler band and five band-spread S.W. bands, are provided in the Pye PE39U, a 4-valve (plus rectifier) superhet, designed to operate from A.C. or D.C. mains of 100-125 V and 200-250 V, 25-100 c/s in the case of A.C. The waveband ranges are 1,025-1,930 m, 195-560 m, 65-203 m, 31-67 m, and five band-spread ranges covering the 31 m, 25 m, 19 m, 16 m and 13 m bands, to quote them in their correct sequence.

The P53U and P93U use identical chassis and are described under "General Notes" overleaf.

Release dates and original prices: PE39U, April, 1953, £17 13s; P53U, April, 1952, £23 16s 3d; P93U, February, 1954, £18 5s 8d. Purchase tax extra.

CIRCUIT DESCRIPTION

On the four normal tuning bands the aerial is coupled by **C2, C3** (M.W. and L.W.), **C2, C3** (S.W.1) and **C2, C3, C4, L1** (S.W.2) to single tuned circuits **L2, C44** (L.W.), **L3, C44** (M.W.), **L4, C44** (S.W.1) and **L5, C44** (S.W.2). **C44** is directly connected to the tuning circuits on these bands via **S22**. On M.W. and L.W. S1 and S2 close to give capacitative bottom coupling.

On the five band-spread ranges, **S22** opens and **S23** closes to connect the band-spreading capacitors **C7** and **C6** in circuit with **C44**. The aerial is then coupled via **C2, C3** and **C5** to the band-spread coils **L6** (31 m band), **L7** (25 m band), **L8** (19 m band), **L9** (16 m band) or **L10** (13 m band).

First valve **(V1, Mullard UCH42)** is a triode hexode operating as frequency changer with internal coupling. On the four normal tuning bands, the oscillator anode coils **L14** (L.W.), **L15** (M.W.), **L16** (S.W.1) and **L17** (S.W.2) are tuned by **C46**, switch **S61** being closed on these bands. Parallel trimming by **C45** (M.W.) and **C16** (S.W.2); series tracking **C15** (M.W.), **C14** (S.W.1) and **C13** (S.W.2). Reaction coupling from grid via **L11** (M.W.), **L12** (S.W.1) and **L13** (S.W.2), with additional coupling across the common impedance of the trackers.

For L.W. operation, **S24, S25, S52** and **S62** close to connect the oscillator coil **L14** in a Colpitts circuit with **C12, C18, C19.**

For band-spread operation **S61** opens and **S24, S62** close, and the band-spread oscillator coils **L18** (31 m band), **L19** (25 m band), **L20** (19 m band), **L21** (16 m band) and **L22** (13 m band) are connected in a Colpitts circuit with **C12, C18, C19, C20** and **C46**. Tuning is performed by **C46** via band-spreading capacitors **C19, C20.**

Second valve **(V2, Mullard UF41)** is a variable-mu R.F. pentode, operating as intermediate frequency amplifier with tuned transformer couplings **C9, L23, L24, C10; C23, L25, L26, C24.**

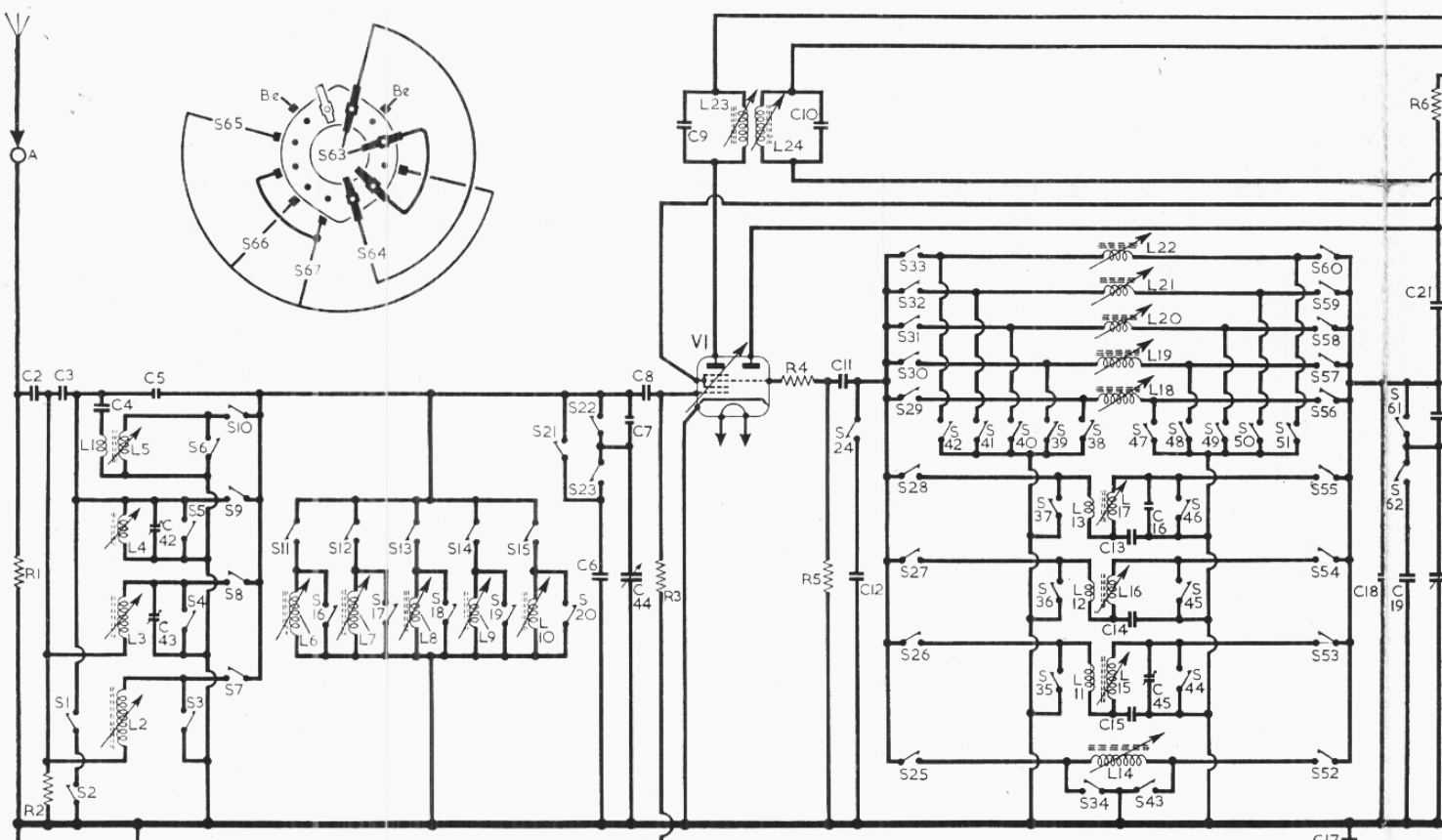
Intermediate frequency 470 kc/s.

Diode signal detector is part of double diode triode valve **(V3, Mullard UBC41).** Audio frequency component in its rectified output is developed across load resistors **R8, R9,** and passed via **C27, C28,** volume control **R10** and **C29** to control grid of triode section.

Second diode of **V3** is fed via **C26** from **V2** anode, and the resulting D.C. potential developed across load resistor **R15** is fed back as bias to **V1** and **V2,** giving automatic gain control.

Resistance-capacitance coupling by **R13, C34** and **R16** between **V3** and pentode output valve **(V4, Mullard UL41).** Fixed tone correction in anode circuit by **C40.** Provision is made for the connection of a low-impedance external speaker across winding **c** on **T1.**

A proportion of the voltage in winding **d** on **T1,** developed across **R21, R22** and **R23,** is applied as negative feed-back to the volume control circuit via frequency correcting network **R19, R20, C36, C37, C38** and **C39.** Four-position tone control is provided by switches **S65, S66, S67** which change the frequency characteristic of this network. **S63** is also one of the



Circuit diagram of the Pye PE39U. Models P53U and P93U use an ident
S64 is an incidental switch and only closes in the "off" position of the t
switch. **S66** remains permanently closed and acts as a link between **C37, C38** an

Correction. An aerial coupling coil should be shown with **L4,** for S.W.1, like

Appearance of the Pye PE39U. Model P93U is somewhat similar in appearance, but Model P53U employs a wooden cabinet.

tone control switches, and when open gives bass cut via **C28**. **S64** closes only in the "off" position of the control. **S66** never opens, but continuity is derived through it.

H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Mullard UY41)**. Smoothing by **R24** and electrolytic capacitors **C31, C32**. Residual hum is neutralized by feeding the H.T. current through section **a** of **T1** primary winding. The valve heaters, together with ballast resistors **R28, R29** are connected in series across the mains input. The scale lamps are connected in series with a separate ballast resistor **R27** across the valve heaters. **R25, R26** protect the scale lamps, and **R30** protects **V5**, from current surges.

COMPONENT VALUES AND LOCATIONS

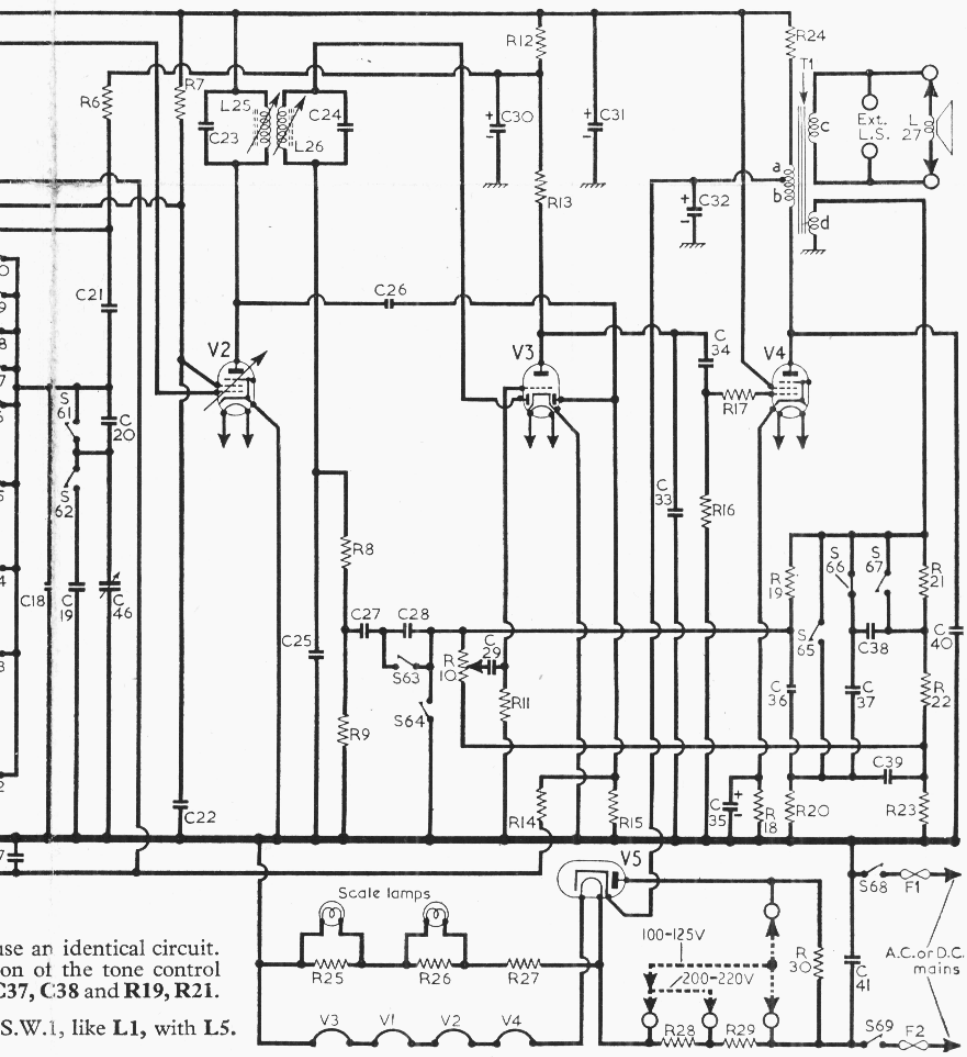
	RESISTORS	Values	Locations
R1	Aerial shunts	470kΩ	G5
R2	Aerial shunts	22kΩ	G5
R3	V1 C.G.	1MΩ	G4
R4	V1 osc. stabilizer	470Ω	G4
R5	V1 osc. C.G.	100kΩ	G4
R6	Osc. anode feed	6·8kΩ	G4
R7	S.G. feed	15kΩ	F4
R8	Diode load resistors	220kΩ	F4
R9	Diode load resistors	220kΩ	F4
R10	Volume control	1MΩ	F3
R11	V3 C.G.	10MΩ	F4
R12	H.T. feed	2·2kΩ	F4
R13	V3 anode load	220kΩ	F4
R14	A.G.C. decoupling	1MΩ	F4
R15	A.G.C. diode load	1MΩ	F5
R16	V4 C.G.	470kΩ	F4
R17	V4 C.G. stopper	10kΩ	F4
R18	V4 G.B.	180Ω	F3
R19	Parts tone control	2·2MΩ	E4
R20	Parts tone control	390Ω	E3
R21	Parts tone control	4·7kΩ	E3
R22	Parts tone control	2·2kΩ	E3
R23	Parts tone control	220Ω	F3
R24	H.T. smoothing	1kΩ	F4
R25	Scale lamp shunts	100Ω	D2
R26	Scale lamp shunts	100Ω	D2
R27	Scale lamp ballast	1kΩ	D2
R28	Heater ballast	130Ω	D2
R29	Heater ballast	450Ω	D2
R30	V5 surge limiter	300Ω	D2

	CAPACITORS	Values	Locations
C1	Earth isolator	0·01μF	G5
C2	Aerial couplers	560pF	G5
C3	Aerial couplers	2,400pF	H4
C4	Aerial couplers	330pF	G4
C5	Aerial couplers	5·6pF	G5
C6	S.W. band-spread capacitors	100pF	H5
C7	S.W. band-spread capacitors	47pF	H5
C8	V1 C.G.	100pF	G4
C9	1st I.F. trans. tuning	100pF	C1
C10	1st I.F. trans. tuning	100pF	C1
C11	V1 osc. C.G.	100pF	H4
C12	S.W. osc. trimmer	150pF	H4
C13	S.W.2 osc. tracker	6,200pF	H3
C14	S.W.1 osc. tracker	1,700pF	H4
C15	M.W. osc. tracker	360pF	H4
C16	S.W.2 trimmer	62pF	H4
C17	A.G.C. decoupling	0·04μF	G4
C18	Osc. trimmer	15pF	G3
C19	S.W. band-spread capacitors	150pF	H4
C20	S.W. band-spread capacitors	150pF	H3
C21	Osc. anode coup.	560pF	H3
C22	S.G. decoupling	0·05μF	G4
C23	2nd I.F. trans. tuning	100pF	C2
C24	2nd I.F. trans. tuning	100pF	C2
C25	I.F. by-pass	100pF	F5
C26	A.G.C. coupling	47pF	F5
C27	A.F. coupling	0·02μF	F3
C28	Part tone control	0·005μF	E3
C29	A.F. coupling	0·04μF	F3
C30*	H.T. smoothing	16μF	C1
C31*	H.T. smoothing	60μF	D1
C32*	H.T. smoothing	60μF	D1
C33	I.F. by-pass	100pF	F5
C34	A.F. coupling	0·005μF	F4
C35*	V4 cath. by-pass	50μF	F5
C36	Parts tone control	82pF	E3
C37	Parts tone control	0·02μF	E3
C38	Parts tone control	0·25μF	E5
C39	Parts tone control	0·04μF	E3
C40	Tone correction	0·005μF	C2
C41	Mains R.F. by-pass	0·01μF	E4
C42‡	S.W.1 aerial trim.	50pF	G4
C43‡	M.W. aerial trim.	50pF	H4
C44†	Aerial tuning	528pF	A1
C45‡	M.W. osc. trim.	50pF	H3
C46†	Osc. tuning	528pF	A1

* Electrolytic. † Variable. ‡ Pre-set.

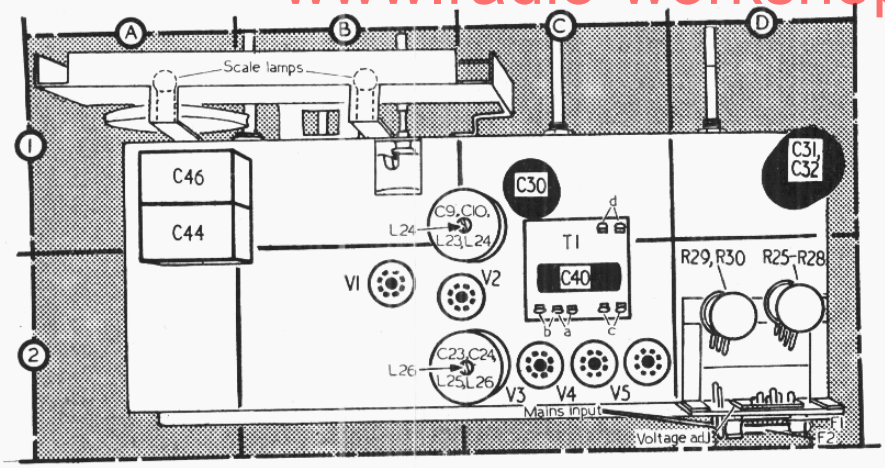
	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	S.W.2 aerial coup.	5·0	G5
L2	Aerial tuning coils	23·0	H5
L3	Aerial tuning coils	3·0	H5
L4	Aerial tuning coils	—	G5
L5	Aerial tuning coils	—	G5
L6	Aerial tuning coils	—	G5
L7	Band-spread tuning coils	—	H5
L8	Band-spread tuning coils	—	H5
L9	Band-spread tuning coils	—	H5
L10	Band-spread tuning coils	—	H5
L11	Oscillator reaction coils	—	H4
L12	Oscillator reaction coils	—	H4
L13	Oscillator reaction coils	—	H4
L14	Oscillator tuning coils	5·0	H3
L15	Oscillator tuning coils	3·0	H4
L16	Oscillator tuning coils	—	H4
L17	Oscillator tuning coils	—	H4
L18	Band-spread tuning coils	—	G3
L19	Band-spread tuning coils	—	G3
L20	Band-spread tuning coils	—	G4
L21	Band-spread tuning coils	—	G4
L22	Band-spread tuning coils	—	G4
L23	1st I.F. trans. Pri.	10·0	C1
L24	1st I.F. trans. Sec.	10·0	C1
L25	2nd I.F. trans. Pri.	10·0	C2
L26	2nd I.F. trans. Sec.	10·0	C2
L27	Speech coil	2·5	—
T1	O.P. trans. a	17·0	C2
T1	O.P. trans. b	450·0	C2
T1	O.P. trans. c	—	C2
T1	O.P. trans. d	11·5	C2
S1-S62	Waveband switches	—	H4
S63-S67	Tone switches	—	E3
S68, S69	Mains switches	—	E4
F1, F2	2 amp. fuses	—	D2

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.



ıse an identical circuit. on of the tone control C37, C38 and R19, R21.

S.W.1, like **L1**, with **L5**.



Plan view of the chassis. The tags on the output transformer **T1** are labelled **a, b, c,** and **d** to identify the sections similarly labelled in the circuit diagram overleaf.

CIRCUIT ALIGNMENT

I.F. Stages.—Remove the chassis from the cabinet, switch receiver to M.W., turn gang and volume control to maximum. Connect output of signal generator, via an 0.1 μF capacitor in the "live" lead, to control grid (pin 6) of **V1** and chassis. Feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L26** (location reference C2), **L25** (F5), **L24** (C1) and **L23** (F4) for maximum output.

R.F. and Oscillator Stages.—As the tuning scale is mounted in the cabinet, and the following adjustments have to be carried out with the chassis on the bench, reference is made during alignment to a substitute tuning scale printed on the left-hand side (viewed from front of chassis) edge of the scale backing plate. This scale has 100 divisions and it is read off against the lower edge of the cursor carriage.

With the gang at maximum capitance the reading on the substitute scale should be 100, and if any error is found, the cursor carriage can be slid up or down the drive cord to correct it. When the chassis is inserted in the cabinet, the cursor should coincide with the extreme top edges of the clear tuning sections of the scale, with the gang at maximum capacitance. The signal generator output should be connected via a standard dummy aerial to the **A** and **E** sockets.

L.W.—Switch receiver to L.W., tune to 1,400 m (55 on substitute scale), feed in a 1,400 m (214 kc/s) signal and adjust the cores of **L14** (H3) and **L2** (H5) for maximum output.

M.W.—Switch receiver to M.W., tune to 500 m (82 on scale), feed in a 500 m (600 kc/s) signal and adjust the cores of **L15** (H4) and **L3** (H5) for maximum output. Tune receiver to 200 m (10 on scale), feed in a 200 m (1,500 kc/s) signal and adjust **C45** (H3) and **C43** (H4) for maximum output. Repeat these adjustments until calibration is correct.

S.W.1.—Switch receiver to S.W.1, tune to 200 m (100 on scale), feed in a 200 m (1,500 kc/s) signal and adjust the cores of **L16** (H4) and **L4** (G5) for maximum output. Tune receiver to 90.9 m (28 on scale), feed in a 90.9 m (3.3 Mc/s) signal and adjust **C42** (G4) for maximum output. Repeat these adjustments until calibration is correct.

S.W.2.—Switch receiver to S.W.2, tune to 41.67 m (46 on scale), fed in a 41.67 m (7.2 Mc/s) signal and adjust the cores of **L17** (H4) and **L5** (G5) for maximum output.

31 m band.—Switch receiver to 31 m, tune to 9.6 Mc/s (50 on scale), feed in a 9.6 Mc/s (31.25 m) signal and adjust the cores of **L18** (G3) and **L6** (G5) for maximum output.

25 m band.—Switch receiver to 25 m, tune to 11.8 Mc/s (50 on scale), feed in an 11.8 Mc/s (25.42 m) signal and adjust the cores of **L19** (G3) and **L7** (H5) for maximum output.

19 m band.—Switch receiver to 19 m, tune to 15.3 Mc/s (50 on the scale), feed in a 15.3 Mc/s (19.61 m) signal and adjust the cores of **L20** (G4) and **L8** (H5) for maximum output.

16 m band.—Switch receiver to 16 m, tune to 17.8 Mc/s (50 on scale), feed in a 17.8 Mc/s (16.85 m) signal and adjust the cores of **L21** (G4) and **L9** (H5) for maximum output.

13 m band.—Switch receiver to 13 m, tune to 21.6 Mc/s (50 on scale), feed in a 21.6 Mc/s (13.89 m) signal and adjust the cores of **L22** (G4) and **L10** (H5) for maximum output.

GENERAL NOTES

Switches.—**S1-S62** are the waveband and radio/gram change-over switches, ganged in three rotary units beneath the chassis. These are indicated in our underside chassis illustration, where they are identified by diamonds and arrows numbered **1, 2, 3.** They are shown again in detail in the diagrams (next col.), where they are drawn as seen from the rear of an inverted chassis.

The table in col. 4 gives the switch positions for the nine control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and **C,** closed.

S63-S67 are the tone control switches, ganged in a single rotary unit beneath the chassis. This unit is shown in detail in the diagram inset in the top left corner of the circuit diagram overleaf, and has its own table of switch action for the five settings (below). With this unit is ganged the double-pole Q.M.B. mains switch unit **S68, S69,** which opens in the fully anti-clockwise position of the control. As in the case of the waveband switch table, a dash indicates open, and **C,** closed.

S64 occurs incidentally in the construction of the switch unit, and closes only in the "off" position of the control. **S66** is not a switch at all, as it remains closed throughout the range of control. We show it because it forms part of the connecting link between **C37, C38** and **R19, R21,** etc.

Scale Lamps.—These are two lamps, with large spherical bulbs and M.E.S. bases, rated at 6 V, 0.04 A.

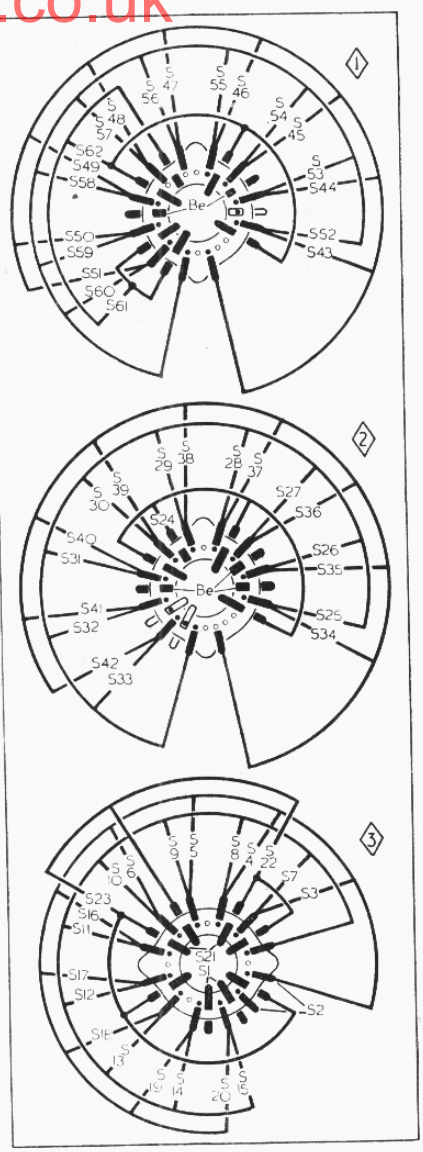
External Speaker.—Two pairs of sockets are provided at the rear of the chassis for the connection of the internal and an external speaker. The impedance of an external speaker should be low, about 2-4 Ω.

Model P53U.—This is an early version of the PE39U, using an identical chassis but housed in a wooden cabinet instead of a plastic one. It employs a different tuning scale on which the S.W.1 and S.W.2 tuning scales are marked in Mc/s instead of metres.

Model P93U.—This employs a chassis identical to that used in the PE39U, but has a slightly different cabinet and tuning scale.

Tone Control Switch Table

Switch	Off	F	B	M	S
S63 ...	—	C	—	C	—
S64 ...	C	—	—	—	—
S65 ...	—	—	—	C	C
S66 ...	C	C	C	C	C
S67 ...	C	—	C	—	C



Diagrams of the waveband switch units, drawn as seen from the rear of an inverted chassis. These units are identified in our under-chassis illustration.

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 210 V, the voltage adjustment being set to the 200-220 V tapping.

Voltage readings were measured on the 10 V and 250 V ranges of a Model 8 Avometer, chassis being negative.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 UCH42	140	1·7	62	3·7	—
	Oscillator				
	112	3·0			
V2 UF41	140	5·4	62	1·6	—
V3 UBC41	66	0·3	—	—	—
V4 UL41	150	36·0	140	6·8	7·7
V5 UY41	190*	—	—	—	165·0†

*A.C. reading. †Cathode current, 58.5 mA

Switch	L.W.	M.W.	S.W.1	S.W.2	31 m	25 m	19 m	16 m	13 m
S1	C	C	—	—	—	—	—	—	—
S2	C	C	C	C	C	C	C	C	—
S3	—	C	C	C	C	C	C	C	C
S4	—	—	C	C	C	C	C	C	C
S5	C	—	—	C	C	C	C	C	C
S6	C	C	—	—	C	C	C	C	—
S7	C	—	—	—	—	—	—	—	—
S8	—	C	—	—	—	—	—	—	—
S9	—	—	C	—	—	—	—	—	—
S10	—	—	—	C	—	—	—	—	—
S11	—	—	—	—	C	—	—	—	—
S12	—	—	—	—	—	C	—	—	—
S13	—	—	—	—	—	—	C	—	—
S14	—	—	—	—	—	—	—	C	—
S15	—	—	—	—	—	—	—	—	C
S16	C	C	C	C	—	C	C	C	C
S17	C	C	C	C	—	—	C	C	C
S18	C	C	C	C	C	—	—	—	C
S19	C	C	C	C	C	C	—	—	C
S20	C	C	C	C	C	C	C	—	—
S21	C	—	—	—	—	—	—	—	—
S22	C	C	C	C	—	—	—	—	—
S23	—	—	—	—	C	C	C	C	C
S24	C	—	—	—	C	C	C	C	—
S25	C	—	—	—	—	—	—	—	—
S26	—	C	—	—	—	—	—	—	—
S27	—	—	C	—	—	—	—	—	—
S28	—	—	—	C	—	—	—	—	—
S29	—	—	—	—	C	—	—	—	—
S30	—	—	—	—	—	C	—	—	—
S31	—	—	—	—	—	—	C	—	—
S32	—	—	—	—	—	—	—	C	—
S33	—	—	—	—	—	—	—	—	C
S34	—	C	C	C	C	C	C	C	C
S35	C	C	C	C	C	C	C	C	C
S36	C	C	C	C	C	C	C	C	C
S37	C	C	C	C	C	C	C	C	C
S38	C	C	C	C	C	C	C	C	C
S39	C	C	C	C	C	C	C	C	C
S40	C	C	C	C	C	C	C	C	C
S41	C	C	C	C	C	C	C	C	C
S42	C	C	C	C	C	C	C	C	C
S43	—	C	C	C	C	C	C	C	C
S44	C	C	C	C	C	C	C	C	C
S45	C	C	C	C	C	C	C	C	C
S46	C	C	C	C	C	C	C	C	C
S47	C	C	C	C	C	C	C	C	C
S48	C	C	C	C	C	C	C	C	C
S49	C	C	C	C	C	C	C	C	C
S50	C	C	C	C	C	C	C	C	C
S51	C	C	C	C	C	C	C	C	—
S52	C	—	—	—	—	—	—	—	—
S53	—	C	—	—	—	—	—	—	—
S54	—	—	C	—	—	—	—	—	—
S55	—	—	—	C	—	—	—	—	—
S56	—	—	—	—	C	C	—	—	—
S57	—	—	—	—	—	C	—	—	—
S58	—	—	—	—	—	—	C	—	—
S59	—	—	—	—	—	—	—	C	—
S60	—	—	—	—	—	—	—	—	C
S61	C	C	C	C	C	C	C	C	C
S62	C	—	—	—	C	C	C	C	C

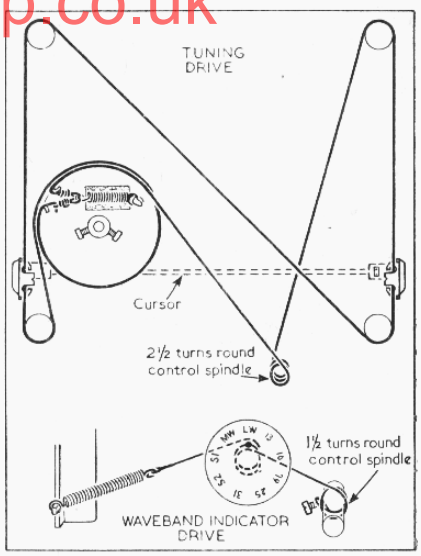
DRIVE CORD REPLACEMENT

About four and a half feet of nylon-braided glass yarn is required for a new drive cord. It should be run as shown in the upper sketch seen in the drawings at the head of the next column, where the system is drawn as seen from the rear of an upright chassis with the gang at minimum capacitance. The manufacturers quote the exact cord length, measured between the centres of the end loops, as 51 inches.

WAVEBAND INDICATOR DRIVE

About one foot of 7 strand 42 S.W.G. tinned steel wire is required for a new indicator drive. A soldered end loop should be made at one end of the wire and a knot tied in the wire $1\frac{5}{16}$in from the centre of this loop. The knot should be soldered, and a second soldered loop should be made at the other end of the wire so that the overall length of the drive wire, between the centres of the loops, measures $8\frac{5}{16}$in. The drive wire should be fitted as indicated in the sketch below the diagram of the tuning drive system. In this sketch, the drive wire is drawn as viewed from the front of the chassis. The knot should be "keyed" into the groove on the waveband indicator bush.

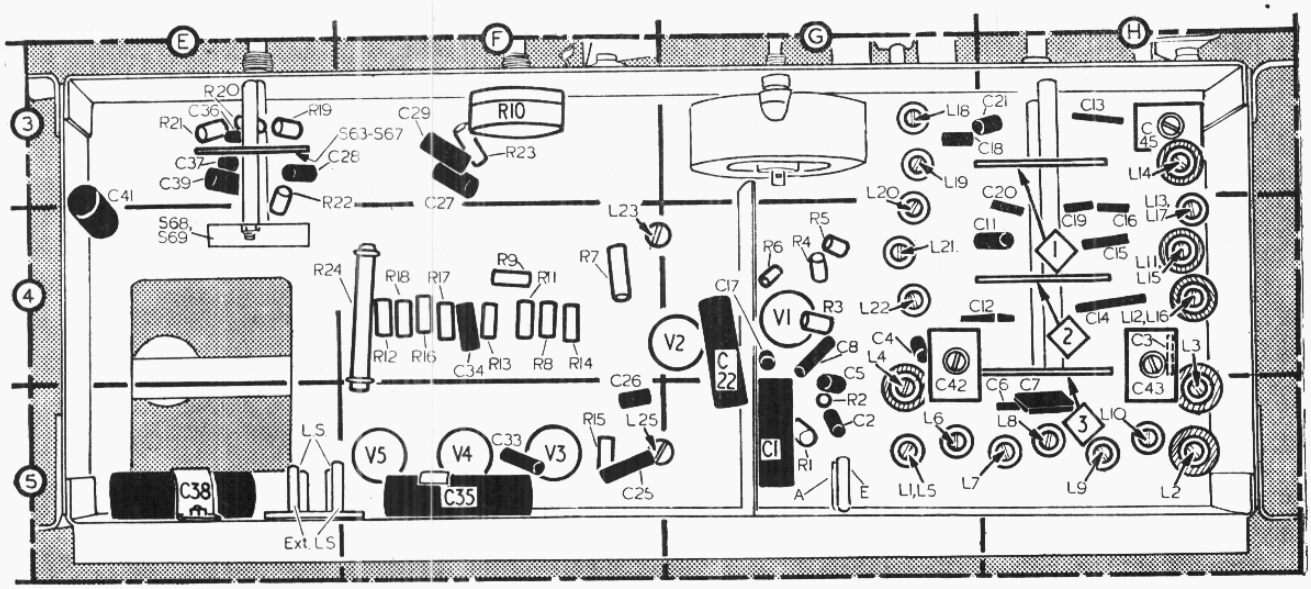
Left: Table showing the operation of the waveband switches.



Sketch of the tuning drive and waveband indicator drive systems. Instructions for replacement of these drives appear on the left, in the next column.

Service Sheet Correction

OWING to an unfortunate oversight, the wrong base connection diagram was shown for the PL83 sound output valve in Service Sheet 1130/T50, which covers the Bush TV22A Series. It is shown as having the same base connections as the EF80, which is shown correctly in the first diagram, counting from the left. The correct connections are: Pin 1, screen grid; 2, control grid; 3, cathode; 4, 5, heaters; 6, suppressor; 7, anode; 8, internal screen; 9, blank. Readers are requested to strike out the existing base diagram for V14 to prevent misleading future users.



Underside view of the chassis, showing all the R.F. and oscillator alignment adjustments.

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