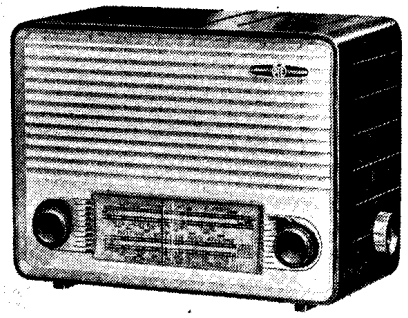
"TRADER" SERVICE SHEET

1165

PYE P78

A.C. Transportable Superhet



FITTED with self-contained frame aerials, the Pye P78 is a 3-valve (plus rectifier) 2-band transportable superhet designed to operate from A.C. mains of 200-250 V, 40-100 c/s. The waveband ranges are 187-560 m and 1,000-2,000 m.

Release date and original price: September 1953; £12 14s 5d. Purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input by **L1, C28** (M.W.) or **L1, L2, C28** (L.W.) to triode hexode valve **(V1, Mullard ECH42)** which operates as frequency changer with internal coupling. Provision is made for the connection of an external aerial and earth, the aerial being coupled to the tuned circuits via the common impedance of **C2.**

Oscillator anode coils **L4** (M.W.) and **L5** (L.W.) are tuned by **C30.** Parallel trimming by **C29** (M.W.) and **C11** (L.W.); series tracking by **C9** (M.W.) and **C10** (L.W.). Reaction coupling across the common impedance of the trackers with additional coupling on M.W. via **L3.**

Second valve **(V2, Mullard EBF80)** is a double diode R.F. pentode, its pentode section operating as intermediate frequency amplifier with tuned transformer couplings **C5, L6, L7, C6** and **C15, L8, L9, C16.**

Intermediate frequency 470 kc/s

One diode section of **V2** operates as signal detector, the audio frequency component in its rectified output being developed across volume control **R13** and passed via **C19** to grid of **V3a** (triode section of **V3, Mullard ECL80).**

Second diode of **V2** is fed from **V2** pentode anode via **C14,** and the resulting D.C. potential, developed across **R7,** is

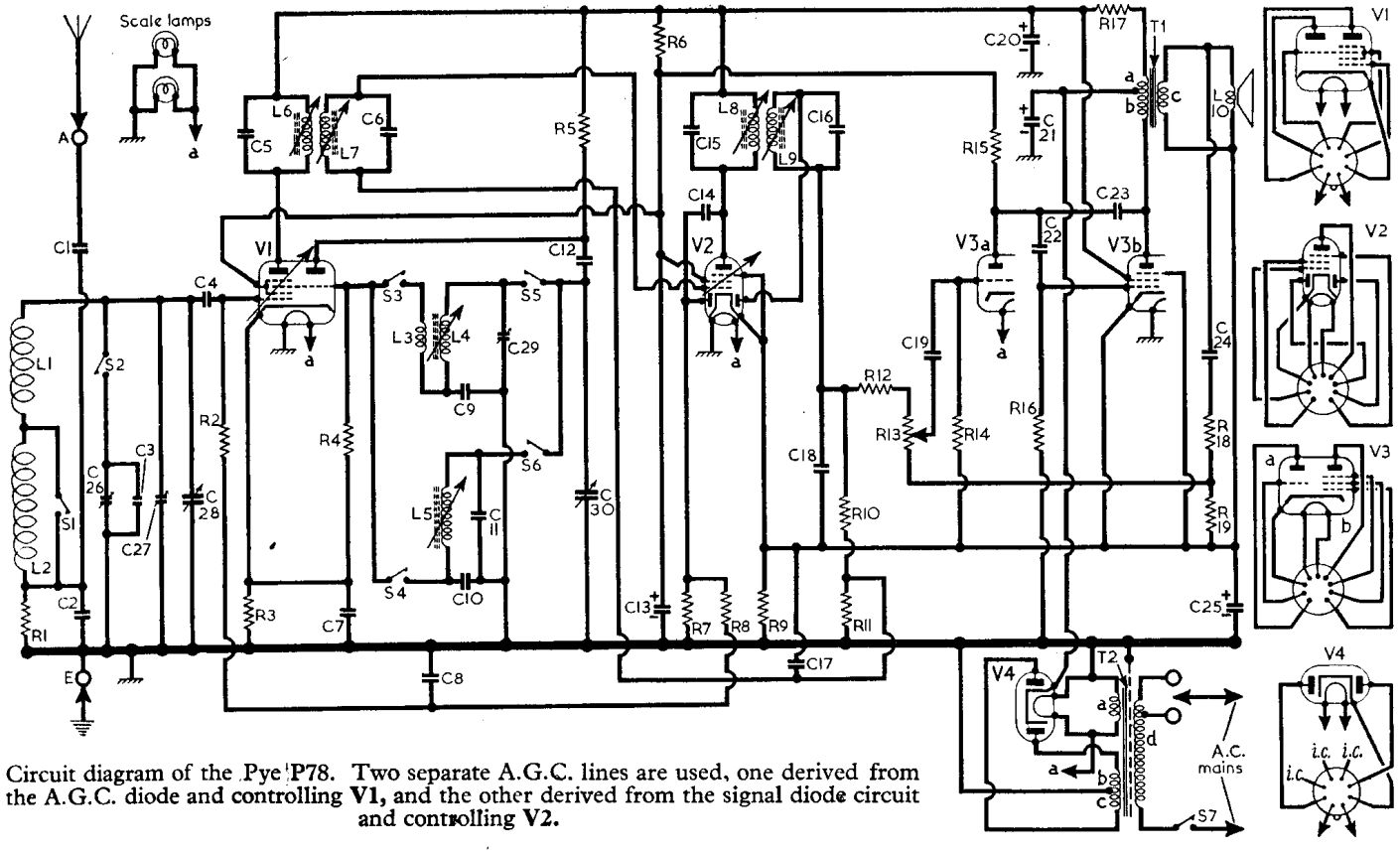
(Continued col. 1 overleaf)

COMPONENTS AND VALUES

	RESISTORS	Values	Locations
R1	Aerial shunt ...	22kΩ	G3
R2	V1 C.G.	2·2MΩ	F4
R3	V1 G.B.	220Ω	F4
R4	V1 osc. C.G. ...	47kΩ	G4
R5	Osc. anode load ...	47kΩ	F4
R6	S.G. H.T. feed ...	22kΩ	E3
R7	A.G.C. diode load	1MΩ	E3
R8	A.G.C. decoupling	1MΩ	F4
R9	V2 G.B.	330Ω	E3
R10	A.G.C. pot. divider	2·2MΩ	F4
R11	A.G.C. pot. divider	6·8MΩ	F4
R12	I.F. stopper ...	100kΩ	E3
R13	Volume control ...	800kΩ	D3
R14	V3a C.G.	10MΩ	E3
R15	V3a anode load ...	100kΩ	E3
R16	V3b C.G.	470kΩ	E4
R17	H.T. smoothing ...	1·8kΩ	E3
R18	Neg. feed-back ...	1kΩ	D3
R19	Neg. feed-back ...	470Ω	E3

	CAPACITORS	Values	Locations
C1	Aerial couplers	470pF	G4
C2	Aerial couplers	2,400pF	G3
C3	L.W. aerial trim.	82pF	G3
C4	V1 C.G.	100pF	G4
C5	1st I.F. trans.	100pF	B2
C6	1st I.F. trans. tuning	100pF	B2
C7	V1 cath. by-pass	0·04μF	G4
C8	A.G.C. decoupling	0·02μF	F4
C9	M.W. osc. tracker	360pF	G3
C10	L.W. osc. tracker	180pF	F3
C11	L.W. osc. trimmer	200pF	G4
C12	Osc. anode coupling	100pF	G4
C13*	S.G. decoupling ...	16μF	B1
C14	A.G.C. coupling ...	100pF	E4
C15	2nd I.F. trans.	100pF	B2
C16	2nd I.F. trans. tuning	100pF	B2
C17	A.G.C. decoupling	0·02μF	F4
C18	I.F. by-pass ...	470pF	E3
C19	A.F. coupling ...	0·01μF	D3
C20*	H.T. smoothing ...	16μF	B1
C21*	H.T. smoothing ...	16μF	B1
C22	A.F. coupling ...	0·01μF	E4
C23	Neg. feed-back	100pF	F4
C24	Neg. feed-back	1·0μF	E3
C25*	V3 cath. by-pass	50μF	E3
C26‡	L.W. aerial trim.	50pF	F3
C27‡	M.W. aerial trim.	50pF	F3
C28†	Aerial tuning ...	528pF	A1
C29‡	M.W. osc. trimmer	50pF	F3
C30†	Oscillator tuning	528pF	A2

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Pye P78. Two separate A.G.C. lines are used, one derived from the A.G.C. diode and controlling **V1,** and the other derived from the signal diode circuit and controlling **V2.**

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Frame aerials ...	3·0	A2
L2		20·0	A2
L3	M.W. osc. reaction	0·4	G3
L4	Oscillator tuning	2·0	G3
L5	coils	7·5	F3
L6	1st I.F. trans. Pri.	10·0	B2
L7	Sec.	10·8	B2
L8	2nd I.F. trans. Pri.	10·0	B2
L9	Sec.	10·8	B2
L10	Speech coil ...	2·5	—
T1	O.P. trans. a ...	5·0	
	b ...	465·0	B1
	c ...	—	
T2	Mains trans. ... a	—	
	b	150·0	C2
	c	160·0	
	d, total	56·0	
S1-S6	Waveband switches	—	G3
S7	Mains sw., g'd R13	—	D3

Circuit Description—*continued.*

fed back as bias to **V1**, giving automatic gain control. A second source of A.G.C. voltage is obtained from the signal diode circuit via potential divider **R10, R11,** and is fed as bias to **V2.**

Resistance-capacitance coupling by **R15, C22** and **R16** between **V3a** and pentode output valve (section **b** of **V3**). Tone correction is obtained via two negative feedback paths, one between the anodes of **V3b** and **V3a** via **C23,** and the other between **T1** secondary circuit and the volume control via potential divider **C24, R18, R19.**

H.T. current is supplied by full-wave I.H.C. rectifier **(V4, Mullard EZ40).** Smoothing by **R17** and electrolytic capacitors **C20, C21.** Residual hum is neutralized by passing H.T. current through section **a** of **T1** primary winding.

CIRCUIT ALIGNMENT

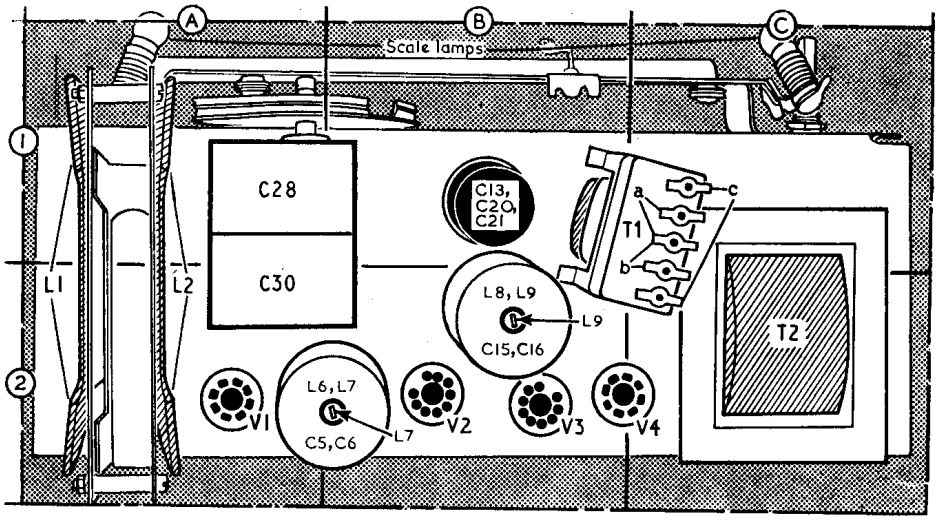
As the tuning scale is fixed in the cabinet, the following adjustments should be carried out with the chassis in the cabinet. All the adjustments are made easily accessible upon the removal of the cabinet back and base covers.

I.F. Stages.—Switch receiver to M.W. and turn gang to maximum capacitance. Connect output of signal generator, via an 0.1 μF capacitor in each lead, to control grid (pin 6) of **V1** and to chassis. Feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L9** (location reference B2), **L8** (F3), **L7** (B2) and **L6** (F4) for maximum output. Repeat these adjustments until no further improvement results.

R.F. and Oscillator Stages.—Transfer signal generator leads, with isolating capacitors, to **A** and **E** leads. Check that with gang at maximum capacitance the cursor coincides with the calibration dot at the high wavelength end of the L.W. tuning scale.

M.W.—Switch receiver to M.W., tune to 500 m, feed in a 500 m (600 kc/s) signal and adjust the core of **L4** (G3) for maximum output. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C29** (F3) and **C27** (F3) for maximum output. Repeat these adjustments until no further improvement results.

L.W.—Switch receiver to L.W., tune to 1,400 m, feed in a 1,400 m (214 kc/s) signal and adjust **C26** (F3) and the core of **L5** (F3) for maximum output.



Plan view of chassis. The windings of the O.P. transformer are coded **a, b, c** here to agree with the markings in the circuit diagram overleaf.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturer's information. They were measured with the receiver operating from 210 V A.C. mains and tuned to a point at the high wavelength end of M.W. where there was no signal input.

Voltage readings were taken on the 10 V and 250 V ranges of a Model 8 Avometer, chassis being the negative connection in each case.

Valve	Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1 ECH42	197	2·0	90	3·3	1·7
	Oscillator				
	70	2·7			
V2 EBF80	197	3·4	90	1·3	8·0
V3 ECL80 a	32	0·6	—	—	8·0
V3 ECL80 b	218	15·0	197	2·8	8·0
V4 EZ40 ...	204*	—	—	—	204·0†

* A.C. reading, each anode.
† Cathode current, 31·1 mA.

GENERAL NOTES

Switches.—**S1-S6** are the waveband switches, ganged in a single rotary unit beneath the chassis. This is indicated in our underside drawing of the chassis, and shown in detail in the small diagram above, where it is drawn as seen in the direction of the indicating arrow in the chassis illustration.

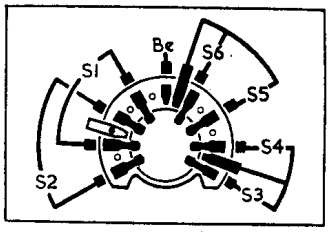


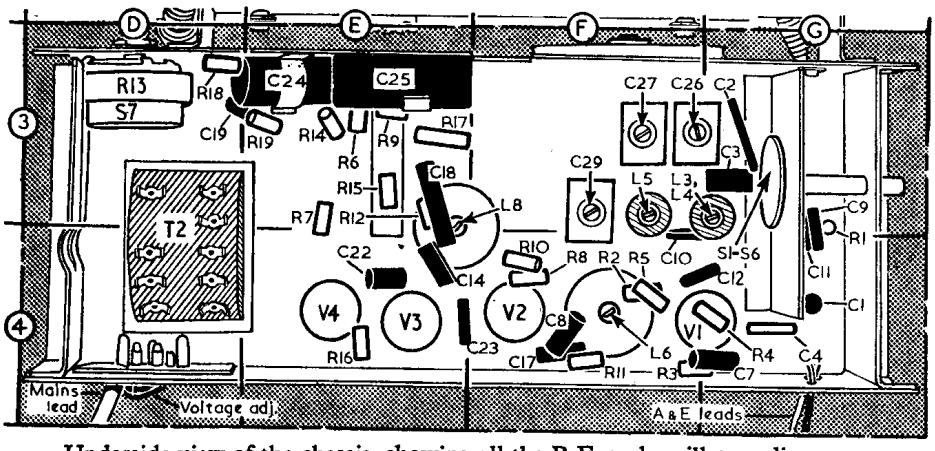
Diagram of the waveband switch unit. In the associated switch table below, a dash indicates open, and C, closed.

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

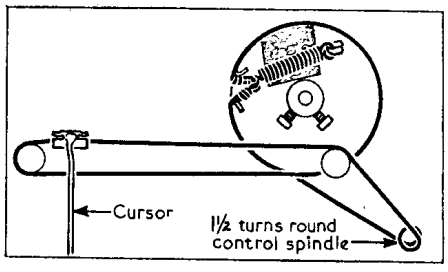
S7 is the Q.M.B. mains switch, ganged with the volume control **R13.**

Scale Lamps.—These are 6.5 V 0.3 A lamps with small clear spherical bulbs and M.E.S. bases.

Drive Cord Replacement.—Three feet of nylon-braided glass yarn is required for a new tuning drive cord, this length leaving an ample margin for tying off. It should be run as shown in the sketch below, where the system is drawn as seen when viewed from the front with the gang at minimum capacitance.



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



Sketch of the tuning drive system.

Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1.