"TRADER" SERVICE SHEET

972

PYE P27UBQ

Mains/Battery Portable Superhet

THE frame aerial winding in the Pye P27UBQ is housed in a flap which covers the front of the receiver when closed. When opened, the flap stands on top of the receiver, where the frame is clear of obstacles.

The receiver is a 4-valve (plus rectifier) 2-band portable superhet designed to operate from A.C. or D.C. mains or from self-contained dry batteries. The change-over is effected by means of a 5-way 2-position connecting plug.

Release date and original price: January 1950, £14 14s 1d *without batteries. Purchase tax extra.*

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, C26** (M.W.) or **L1,** loading coil **L2** and **C26** (L.W.) precedes a heptode valve **(V1, Mullard DK91)** which operates as frequency changer with electron coupling.

Oscillator grid coil **L3** is tapped, and a section of it is tuned by **C27** on M.W., with parallel trimming by **C9** and series tracking by **C10.** For L.W. the same circuit is used, shunted by the capacitance of **C8.** Inductive reaction coupling via **C11** by the reaction section of **L3.**

Second valve **(V2, Mullard DF91)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C4, L4, L5, C5** and **C13, L6, L7, C14.**

Intermediate frequency 465 kc/s.

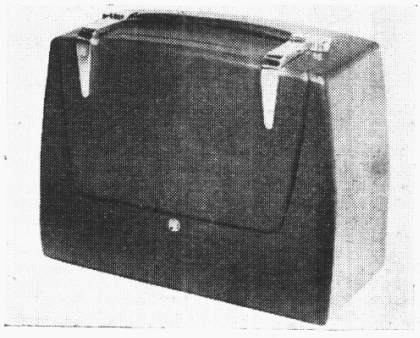
Diode signal detector is part of diode pentode valve **(V3, Mullard DAF91).** Audio frequency component in rectified output is developed across manual volume control **R10,** which is the load resistor, and passed via **C18** to control grid of pentode section, which acts as A.F. amplifier. I.F. filtering by **C15, R9** and **C16.**

Resistance-capacitance coupling by **R13, C21** and **R15** between **V3** pentode and pentode output valve **(V4, Mullard DL92).** A proportion of the speech coil voltage in **T1** secondary is fed back, via the potential divider **R19, R20,** in inverse phase to the grid of **V3.** Additional negative feed-back is applied via **C20** between the anodes of **V3** and **V4.**

For battery operation, power supplies are carried by links **B,** and for mains operation by links **M,** which are contained in the mains/battery conversion plug.

Mains H.T. current is supplied by half-wave metal rectifier **(MR1, SenTerCel RM2's)** consisting of two units in series for 250 V mains coverage. Smoothing by **R16, R22** and electrolytic capacitors **C17, C22** and **C23.** Filament current is also taken from the H.T. circuit, via a tap on the potential divider **R21,** whose "earthy" limb shunts the filament circuit.

The filaments are connected in series for mains and battery operation. Bias is obtained from the appropriate points in the filament chain, that for **V1** and **V2** being applied to the A.G.C. line from the potential divider formed by **R7, R8, R9, R10** and **R20** from **V2** filament to chassis. G.B. to **V4** is increased by the inclusion of **R11** in the chain. **R2, R17** and **R18** by-pass the H.T. current from the valves past the filaments to chassis.



COMPONENTS AND VALUES

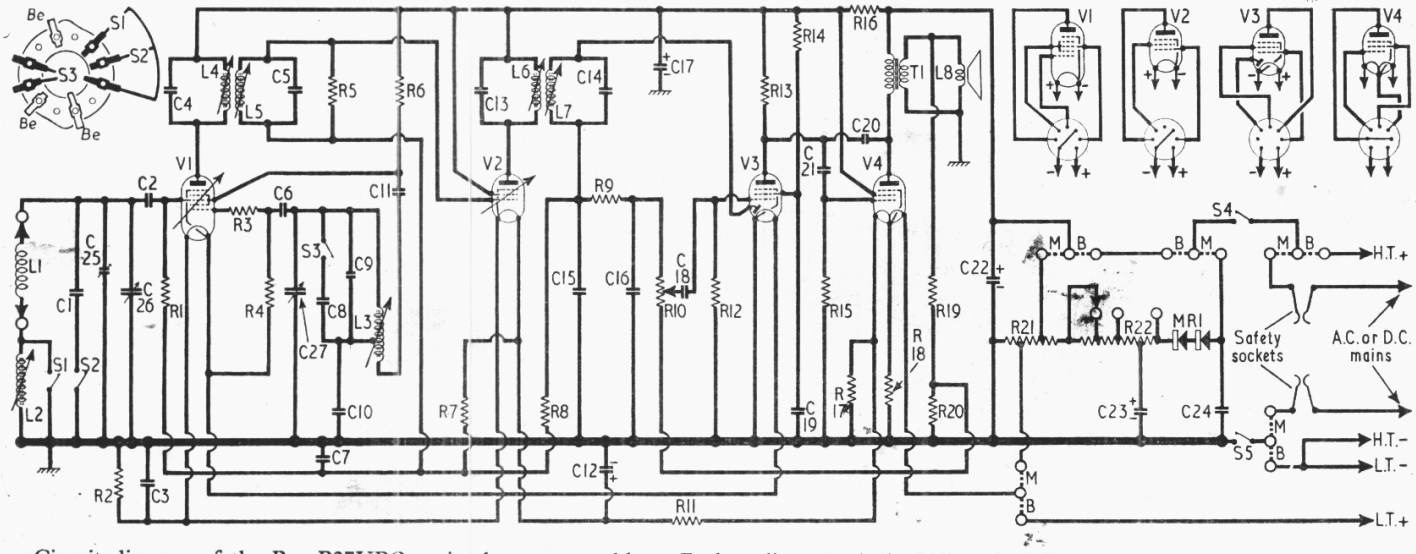
	RESISTORS	Values	Locations
R1	V1 hex. C.G. ...	1MΩ	F4
R2	Fil. shunt ...	1kΩ	E4
R3	Osc. grid stopper	2·2kΩ	F3
R4	V1 osc. C.G. ...	100kΩ	F3
R5	I.F. trans. shunt	1MΩ	E4
R6	Osc. anode feed ...	10kΩ	E3
R7	G.B. feed ...	22MΩ	E4
R8	A.G.C. decoupling	4.7MΩ	E4
R9	I.F. stopper ...	47kΩ	D4
R10	Volume control ...	1MΩ	E3
R11	Filament series ...	27Ω	D4
R12	V3 C.G.	10MΩ	D4
R13	V3 anode load ...	1MΩ	D4
R14	V3 S.G. feed ...	10MΩ	D4
R15	V4 C.G.	1MΩ	D4
R16	H.T. smoothing ...	6·8kΩ	D3
R17	Filament H.T. shunts ...	2.2kΩ	D4
R18		2·2kΩ	D4
R19	Neg. feedback pot.	10kΩ	C1
R20	divider ...	2·2kΩ	D3
R21	Filament ballast ...	*3,500Ω	A2
R22	Voltage adjust. ...	†2,000Ω	A2

* Tapped at 1,900Ω + 1,500Ω + 100Ω from chassis.

† Tapped at 200Ω + 1,100Ω + 350Ω + 350Ω from R21.

	CAPACITORS	Values	Locations
C1	L.W. trimmer ...	180pF	G3
C2	V1 C.G.	100pF	F4
C3	Filament by-pass	0.1μF	E4
C4	1st I.F. trans.	100pF	B2
C5	tuning	100pF	B2
C6	V1 osc. C.G. ...	100pF	F3
C7	A.G.C. decoupling	0.01μF	E4
C8	L.W. trimmer ...	560pF	F3
C9	M.W. trimmer ...	39pF	F3
C10	Tracker	560pF	F3
C11	Osc. anode coup.	330pF	F3
C12*	Filament smoothing	100μF	C1
C13	2nd I.F. trans.	100pF	C2
C14	tuning	100pF	C2
C15	I.F. by-passes ...	100pF	D4
C16		100pF	D4
C17*	H.T. smoothing ...	32μF	B1
C18	A.F. coupling ...	0.002μF	D4
C19	V3 S.G. by-pass ...	0.05μF	D4
C20	Neg. feed-back ...	15pF	D4
C21	A.F. coupling ...	0.01μF	D4
C22*	H.T. smoothing ...	60μF	C1
C23*		32μF	B1
C24	R.F. by-pass ...	0.05μF	G3
C25‡	M.W. aerial trim	50pF	G3
C26†	Aerial tuning ...	—	A1
C27†	Oscillator tuning	—	A2

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Pye P27UBQ mains-battery portable. Broken lines marked **"M"** and **"B"** indicate the connections made by the mains-battery plug in its two positions. Inset at top left is a diagram of the waveband switch unit, as seen from the rear.

OTHER COMPONENTS			Approx. Values (ohms)	Locations
L1	Frame aerial ...		1·6	—
L2	L.W. coil ...		14·0	G3
L3	Osc. coil, total ...		3·3	F3
L4	1st I.F. trans.	Pri.	10·0	B2
L5		Sec.	10·0	B2
L6	2nd I.F. trans.	Pri.	10·0	C2
L7		Sec.	10·0	C2
L8	Speech coil ...		2·8	C1
T1	Pri.		870·0	C1
	Sec.		Very low	
S1-S3	Waveband switches		—	F3
S4, S5	Power sw. g'd S1-S3		—	F3

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted by the manufacturers. Readings were taken on the 400 V scale of a model 7 Avometer when the receiver was operating from a mains supply of 230 V A.C., chassis being the negative connection. The unsmoothed voltage, measured from the junction of **R22, MR1** to chassis, was 198 V, and the smoothed voltage, across **C22,** was 96 V. The readings quoted for the receiver when it was operating from batteries are slightly lower than those given below.

Valve		Anode		Screen	
		V	mA	V	mA
V1	DK91	65	0.2	47	1.5
V2	DF91	65	1.3	65	0.48
V3	DAF91	*	*	*	*
V4	DL92	89	5.8	65	1.1

* No appreciable reading.

GENERAL NOTES

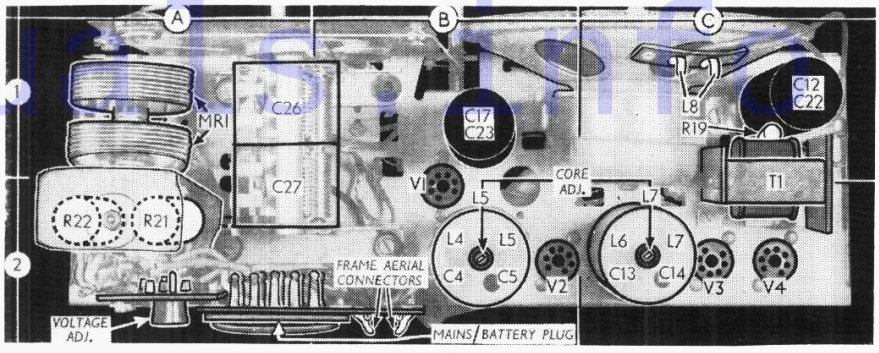
Switches.—**S1-S3** are the waveband switches, ganged in a single 3-position rotary unit beneath the chassis. This is indicated in our under-chassis view, and shown in detail in the diagram inset in the top left-hand corner of the circuit diagram overleaf. **S1** closes on M.W. (control knob fully clockwise), and **S2, S3** close for L.W. (control knob central). In the anti-clockwise position, the set is switched off. **S4, S5** are the Q.M.B. on/off switches, ganged with the waveband switch unit, which operate for mains or battery operation. They open when the control knob is turned fully anti-clockwise.

Mains/Battery Plug.—On a panel at the rear of the chassis are fifteen sockets, arranged in three horizontal rows of five each. Into these goes the change-over plug, whose five shorting straps connect the middle row of sockets to the upper row (for mains operation) or the lower row (for battery operation).

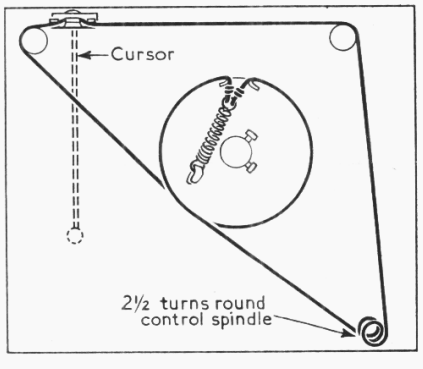
This action is indicated in the circuit diagram by five sets of three open circles (to represent the sockets), joined by broken lines marked **M** and **B** to indicate which two of each set are joined for mains or battery operation respectively.

Batteries and Leads.—The recommended H.T. battery is a Pye type K4, rated at 90V, for which two wander-plug leads are provided The L.T. supply consists of two 4.5V dry batteries connected in series to give 9V. Types recommended are Vidor V 0008, Drydex H30 and Ever Ready 126, which are fitted with screw terminals.

A special connecting plate is provided for them which automatically connects them in series if its markings are followed.



Plan view of the chassis. **R21, R22** are shrouded with a woven asbestos cover. The reversible mains-battery change-over plug is indicated at the rear of the chassis.



Sketch of the drive cord system, as seen from the rear with the gang at maximum.

Frame Aerial.—The frame winding is enclosed in the cover flap, which is hinged on the carrying handle clasps on top of the case, so that it stands on top of the receiver when in use. A flexible flat twin lead runs through one of the hinges to effect connection with the receiver, where spring clip terminals are provided.

Capacitors C12, C22.—These are two large-capacitance electrolytics in a single container mounted on the chassis deck. **C12** is rated at 100μF, 50V, and **C22** at 60μF, 150V. **C12** is protected against damage, resulting from a voltage rise upon the removal of a valve or the breaking of a filament, by the bottom limb of **R21,** which shunts the filaments.

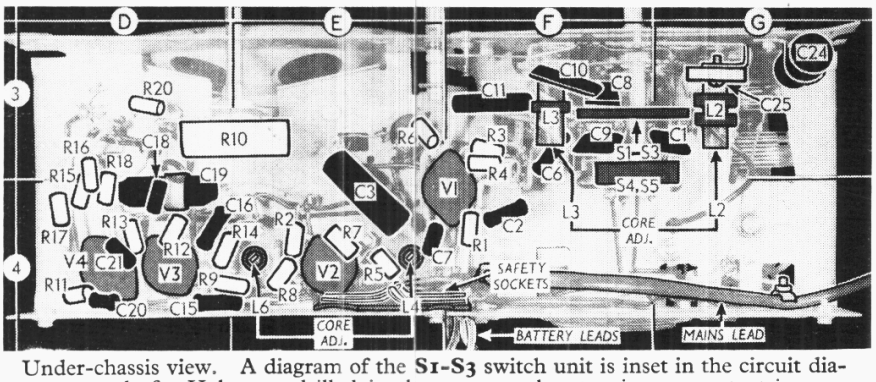
Our sample unit was a Dubilier "Drilitic" type CRE. Two positive tags emerge from the bottom of the case, which itself forms the negative connection.

Drive Cord Replacement.—Thirty inches of nylon braided glass yarn is required for a new drive cord, which should be run as shown in the sketch (col. 2), where the system is drawn as seen from the rear of the chassis with the gang at maximum capacitance, although to anchor the spring the gang must be turned to minimum. The makers quote the exact length of the made-up cord as 23⅞in measured between the centres of ⅛in end loops.

DISMANTLING THE SET

Removing Chassis.—Remove three knobs (recessed grub screws) from front of set;
remove wood screw holding top of speaker to front of case;
unclip two frame aerial leads from panel on rear of chassis;
remove two 4BA bolts with washers from top corners of rear of chassis;
slide chassis out of case, when underside of chassis can be made accessible by removing the three 6BA bolts (with washers) securing the base cover to the rear edge of chassis, and pivoting the cover forward to disengage it from the hooks along front edge of chassis.

Removing Speaker.—Unsolder leads from speech coil tags;
remove 4BA bolt, in front of T1, securing fixing clamp to speaker magnet, and withdraw speaker.
When replacing, check that the rubber strip is in position between clamp and magnet, and that speech coil tags are at "one o'clock."



Under-chassis view. A diagram of the **S1-S3** switch unit is inset in the circuit diagram overleaf. Holes are drilled in the rear member to give access to trimmers **L2, L3, C25.**

CIRCUIT ALIGNMENT

I.F. Stages.—Remove chassis from case, connect signal generator via a 0.1 μF capacitor to control grid (pin 6) of **V1,** switch set to L.W., turn gang and volume control to maximum, feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L7, L6, L5** and **L4** (location references E4, B2, C2), in that order, for maximum output, reducing the input as the circuits come into line to avoid A.G.C. action.

R.F. and Oscillator Stages.—Replace chassis in case and check that with the gang at maximum capacitance, the cursor coincides with the 2,000 m mark on the L.W. scale. The following adjustments are accessible through holes in the rear of the chassis.

M.W.—Switch set to M.W., tune to 500 m on scale, feed in a 500 m (600 kc/s) signal and adjust the core of **L3** (F3) for maximum output. Disconnect signal generator lead from **V1** C.G. and lay it near the frame aerial, tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal and adjust **C25** (G3) for maximum output.

L.W.—Switch set to L.W., tune to 1,330 m on scale, feed in a 1,330 m (167 kc/s) signal and adjust the core of **L2** (G3) for maximum output.

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