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PYE P87BQ

All-dry 2-band Portable Superhet

EMPLOYING frame aerial windings wound in slots on the outer edges of its carrying case, the Pye P87BQ is a 4-valve 2-band portable superhet designed to operate from all-dry batteries. The waveband ranges are, 185-565m and 1,070-1,875m.

Release date and original price: April 1954, £10 6s 8d. Batteries and purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input by **L1, C22** (M.W.) and **L2, C22** (L.W.) to heptode frequency changer valve **(V1, Mullard DK96).**

Oscillator grid coil **L3** is tuned by **C23** for both M.W. and L.W. operation. Parallel trimming by **C24** (M.W.) and **C7, C24** (L.W.); series tracking by **C8.** Reaction coupling from oscillator anode via **C9, L4** and the common impedance of the tracker.

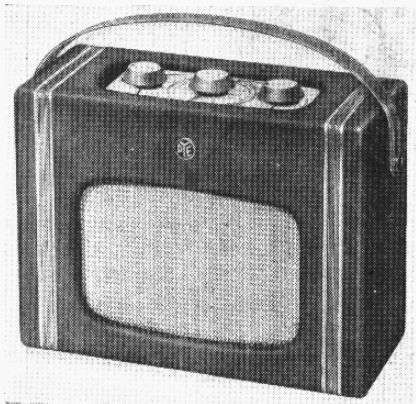
Second valve **(V2, Mullard DF96)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned tansformer couplings **C3, L5, L6, C4** and **C11, L7, L8, C12.**

Intermediate frequency 470 kc/s.

Diode signal detector is part of diode pentode valve **(V3, Mullard DAF96).** Audio frequency component in its rectified output is developed across volume control **R7,** which operates as diode load, and passed via **C15** to control grid of pentode section. I.F. filtering by **C13, R5** and **C14.**

D.C. potential developed across **R7** is fed back as bias to **V1** and **V2** giving automatic gain control.

Resistance-capacitance coupling via **R10, C17** and **R12** between **V3** and pentode output valve **(V4, Mullard DL96).** Tone correction in anode circuit by **C18.**



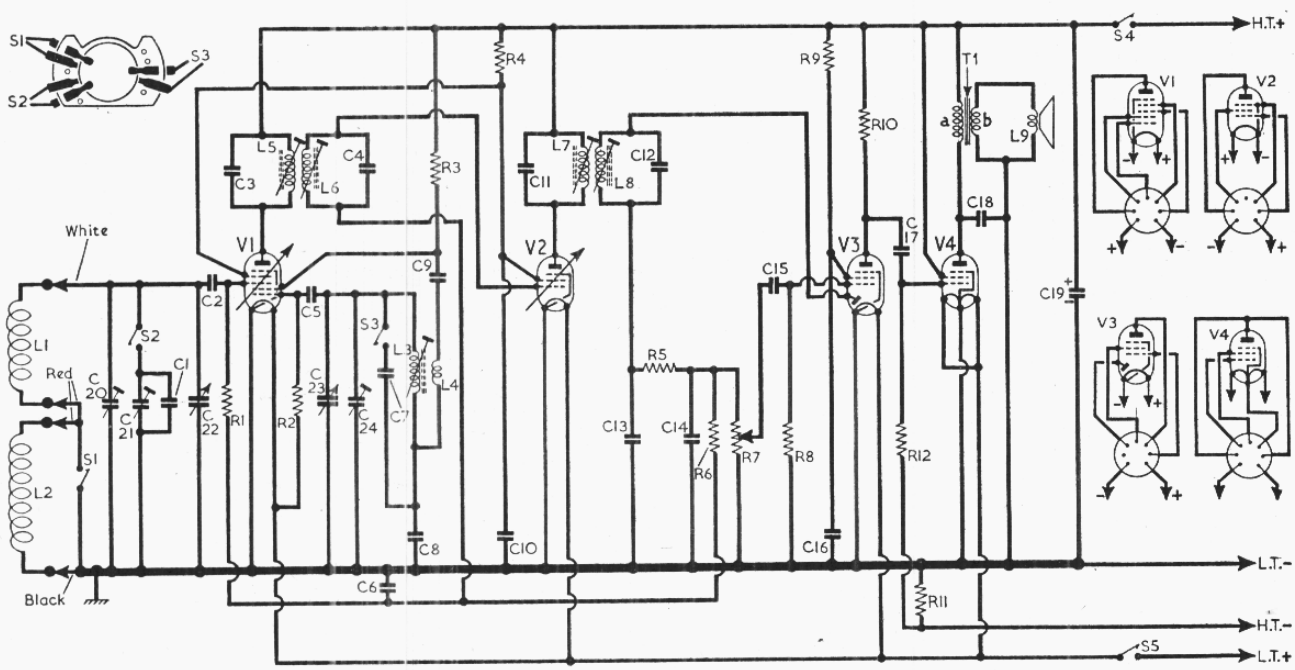
Appearance of the Pye P87BQ.

COMPONENTS AND VALUES

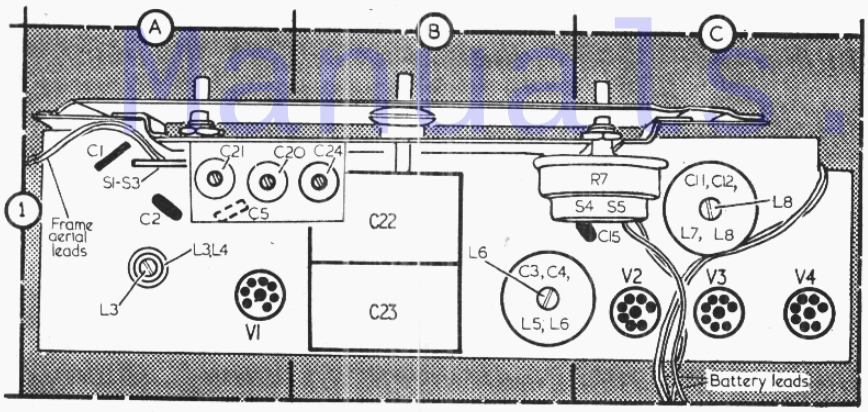
	CAPACITORS	Values	Locations
C1	L.W. aerial trim. ...	130pF	A1
C2	V1 C.G.	100pF	A1
C3	1st I.F. trans.	100pF	B1
C4	tuning	100pF	B1
C5	V1 osc. C.G. ...	100pF	A1
C6	A.G.C. decoupling	0·01μF	E3
C7	L.W. osc. trim. ...	470pF	G2
C8	Osc. tracker ...	560pF	F2
C9	Osc. reaction coup.	100pF	F3
C10	S.G. decoupling ...	0·01μF	G3
C11	2nd I.F. trans.	100pF	C1
C12	tuning	100pF	C1
C13	I.F. by-passes ...	100pF	D2
C14		100pF	E2
C15	A.F. coupling ...	0·002μF	C1
C16	V3 S.G. decoupling	0·05μF	E2
C17	A.F. coupling ...	0·01μF	D3
C18	Tone correction ...	0·002μF	—
C19*	Battery reservoir...	8μF	E2
C20‡	M.W. aerial trim....	40pF	A1
C21‡	L.W. aerial trim. ...	40pF	A1
C22†	Aerial tuning ...	528pF§	B1
C23†	Oscillator tuning ...	528pF§	B1
C24‡	M.W. osc. trim. ...	40pF	B1

* Electrolytic. † Variable. ‡ Pre-set.
§ "Swing" value, min. to max.

	RESISTORS	Values	Locations
R1	V1 C.G.	1MΩ	F3
R2	V1 osc. C.G. ...	27kΩ	F3
R3	Osc. anode load ...	47kΩ	F3
R4	S.G. H.T. feed ...	27kΩ	E3
R5	I.F. stopper ...	100kΩ	D2
R6	A.G.C. decoupling	4·7MΩ	E3
R7	Volume control ...	1MΩ	C1
R8	V3 C.G.	10MΩ	E3
R9	V3 S.G. H.T. feed...	10MΩ	D3
R10	V3 anode load ...	2·2MΩ	D3
R11	V4 G.B.	470Ω	D3
R12	V4 C.G.	4·7MΩ	D3



Circuit diagram of the Pye P87BQ. The connections to the frame aerials **L1** and **L2** are colour coded, and their connections to the frame aerial tags are indicated in "Dismantling" overleaf. Inset in the top left-hand corner of the diagram is the waveband switch unit.



Rear view of the chassis, showing all the R.F. and oscillator adjustments. The frame aerial and speaker leads are connected as described under "Dismantling" in column 3.

Components and Values—(*Continued*)

	OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Frame aerial coils...		1·6	—
L2			12·0	—
L3	Osc. tuning coil ...		2·5	A1
L4	Osc. reaction coil ...		0·5	A1
L5	1st I.F. trans.	Pri.	10·0	B1
L6		Sec.	10·5	B1
L7	2nd I.F. trans.	Pri.	10·0	C1
L8		Sec.	10·5	C1
L9	Speech coil ...		2·5	—
T1	O.P. trans.	a ...	870·0	—
		b ...	—	—
S1-S3	Waveband switches		—	A1
S4, S5	Battery switches ...		—	C1

CIRCUIT ALIGNMENT

I.F. Stages.—Remove chassis from carrying case as described in "Dismantling," and stand it on the bench with its tuning scale uppermost. Do not disconnect the frame aerial leads.

Connect output of signal generator, via an 0.1 μF capacitor in the "live" lead, to control grid (pin 6) of **V1** and chassis. Switch receiver to M.W. and tune it to the high wavelength end of the band. Feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L8** (location reference C1), **L7** (D2), **L6** (B1) and **L5** (E3) for maximum output. Repeat these adjustments until no further improvement results, reducing the input as the circuits come into line to prevent A.G.C. operation.

R.F. and Oscillator Stages.—Replace chassis in carrying case. The batteries should also be in their normal positions in the case.

M.W.—With receiver switched to M.W., tune to 500 m. Feed in a 500 m (600 kc/s) signal and adjust the core of **L3** (A1) for maximum output. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C24** (B1) for maximum output. Repeat these adjustments until no further improvement results, then tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C20** (A1) for maximum output.

L.W.—Switch receiver to L.W., feed in a 1,402 m (214 kc/s) signal, and tune it in on receiver. Adjust **C21** (A1) for maximum output.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' figures. They were measured on a receiver which was operating from a new set of batteries and tuned to 200m on M.W., but there was no signal input.

Voltages were measured with a Model 8 Avometer, chassis being the negative connection in every case. The total H.T. consumption was 9.5mA, and the total L.T. consumption was 0.125A. The voltage measure across **R11** was 4.5V, the positive meter lead being connected to chassis in this case.

Valve	Anode		Screen	
	V	mA	V	mA
V1 DK96 ...	85·5	0·45	70	0·1
	Oscillator			
	30·0	1·05		
V2 DF96 ...	85·5	1·3	70	0·5
V3 DAF96 ...	38·0	0·027	15	0·007
V4 DL96 ...	80·0	5·2	85·5	0·9

GENERAL NOTES

Switches.—**S1-S3** are the waveband switches ganged in a single rotary unit on the upper side of the chassis. This unit is indicated in the rear illustration of the chassis and shown in detail in the diagram inset in the top left-hand corner of the circuit diagram overleaf where it is drawn as viewed from beneath the chassis. Starting from the fully anti-clockwise setting of the control, the switch operations are, M.W., **S1** closed, L.W., **S2, S3** closed.

S4, S5 are the Q.M.B. battery switches ganged with the volume control **R7.**

Batteries.—Those recommended by the manufacturers are: H.T., Ever Ready B117, or Vidor L5515, rated at 90V; L.T., Ever Ready AD32, or Vidor L5049, rated at 1.5V. Viewing the carrying case from the rear, the L.T. battery goes in the left-hand side, and the H.T. battery in the right-hand side.

Frame Aerials—These are wound in two external slots at opposite ends of the carrying case and are covered with ribbed plastic strips. If it becomes necessary to inspect the frame aerials, these strips can easily be pulled out of the slots.

DISMANTLING

Removing Chassis.—Unsolder frame aerial leads from the tag strips in either side of the carrying case;

unsolder the three speaker leads from their terminations on the output transformer;

unplug leads from batteries, and remove batteries from carrying case;

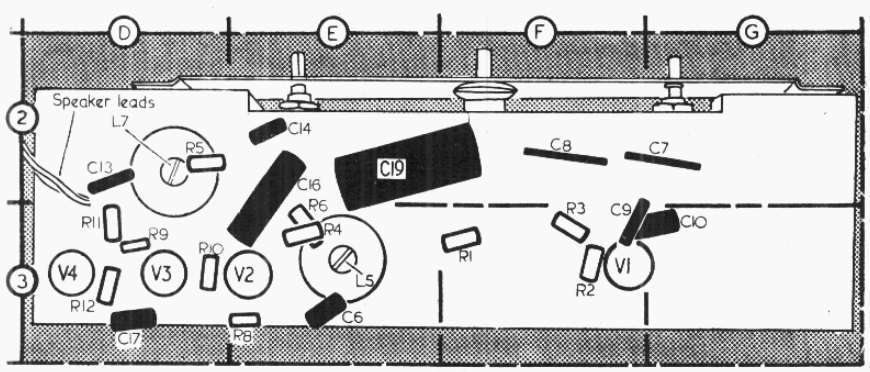
remove two 4BA bolts securing rear edge of scale backing plate to carrying case;

slide chassis rearwards to disengage the front edge of the scale backing plate from its securing clip in the carrying case;

slide right-hand edge (viewed from rear) of chassis as far as possible into the right-hand front corner of carrying case, and then withdraw chassis with its left-hand edge leading.

When replacing, the frame aerial leads should be connected to the tags in the carrying case as follows: long red lead to lower tag and black lead to upper tag on right-hand side (viewed from rear) of carrying case; short red lead to lower tag, and white lead to upper tag on right-hand side of case.

The speaker leads should be re-connected as follows: White lead to first tag from left (viewed from rear) on the output transformer; red lead to second tag from left, and black lead to third tag.



Front view of chassis. The speaker leads shown in location D2 connect to the output transformer **T1** which is mounted on the speaker in the carrying case. The tone correction capacitor **C18** is also located in the carrying case.

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