'TRADER' SERVICE SHEET 277

PYE BABY Q

4-VALVE BATTERY PORTABLE

THE Pye Baby Q is a 4-valve battery-operated portable receiver with a self-contained frame aerial. It has provision for the connection of an external aerial and earth, and there are also sockets for headphones.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, L2, C11** to pentode valve (**V1, Ever Ready metallised K50M**) operating as R.F. amplifier with gain control by variable resistance **R1** in heater circuit, which varies filament current. Provision for connection of external aerial via **C1,** if required.

Tuned anode coupling by **L5, L6, C14** between **V1** and triode detector valve (**V2, Ever Ready metallised K30K**) which operates on grid leak system with **C4** and **R4, R5.** Reaction is applied from anode via stabilising resistance **R3** by coils **L3, L4** and controlled by **C13.** R.F. filtering by **C5, R8** in anode circuit.

Resistance-capacity coupling, via **R8,** by **R7, C6** and **R9** between **V2** and triode A.F. amplifying valve (**V3, Ever Ready metallised K30K**). Fixed tone correction in anode circuit by **C7.**

Parallel-fed transformer coupling by **R10, C8** and **T1** between **V3** and pentode output valve (**V4, Ever Ready K70B** or **Mazda Pen220**). Fixed tone correction in anode circuit by **C9.** Provision for connection of headphones by plug and sockets device across primary of transformer **T2.** When the plug is fully inserted switch **S3** opens, muting internal speaker.

G.B. potential for **V4** is automatically obtained from drop along **R11** in H.T. negative lead to chassis.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (pull off) and remove the control escutcheon by (1) removing the two screws (with rectangular washers) holding the escutcheon and (2) the nuts and rectangular washers from the two screws holding both the escutcheon and handle. Remove the scale pointer.

Next remove the valves, disconnect the frame aerial leads (screw terminals) and unsolder the leads from the chassis to the headphone jack and the lead from the chassis to the speaker frame. Now remove the four screws (with washers) holding the chassis to the metal flanges on the sides of the cabinet, when the chassis can be withdrawn from the cabinet.

When replacing, note that the red lead goes to the further socket of the headphone jack, while the black braided lead goes to the nearer socket; do not forget to re-solder the black rubber covered lead earthing the speaker frame. Connect the leads to the frame aerial terminal panel as follows, numbering the tags from left to right :— 1, black ; 2, yellow ; 3, green.

Removing Speaker.—If it is desired to remove the speaker from the cabinet, first remove the chassis and then slacken the two round-head wood screws holding the fibre insulating plates and swivel the plates out of the way. Now remove the four screws (with washers) holding the speaker to the sub-baffle. *When replacing,* see that the transformer is on the left.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 (filament) gain control, ganged C13	15
R2	V1 anode H.T. feed	10,000
R3	Reaction circuit stabiliser	100
R4, R5	V2 grid leak resistances	2,100,000 2,100,000
R6	V2 anode decoupling	30,000
R7	V2 anode load	30,000
R8	R.F. stopper	110,000
R9	V3 C.G. resistance	1,100,000
R10	V3 anode load	50,000
R11	V4 auto-G.B. resistance	300

	CONDENSERS	Values (μF)
C1	External aerial series condenser	0·000005
C2*	V1 anode decoupling	2·0
C3*	V2 anode decoupling	2·0
C4	V2 C.G. condenser	0·0001
C5	V2 anode R.F. by-pass	0·0002
C6	V3 C.G. condenser	0·01
C7	Fixed tone corrector	0·003
C8	A.F. coupling	0·1
C9	Fixed tone corrector	0·003
C10*	V4 auto-G.B. by-pass	20·0
C11†	Frame aerial tuning	—
C12‡	Frame aerial M.W. trimmer	—
C13†	Reaction control, ganged R1	—
C14†	V1 anode circuit tuning	—
C15‡	V1 anode circuit M.W. trimmer	—

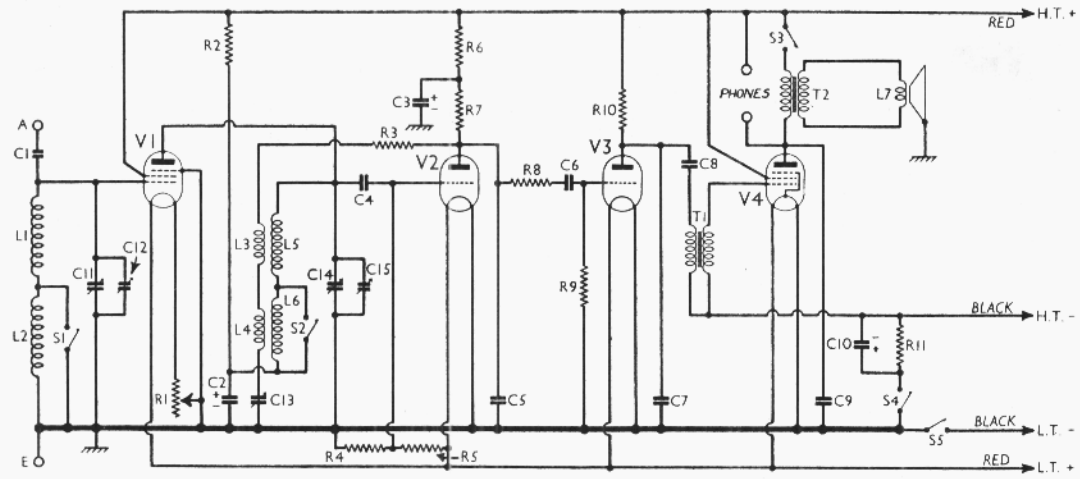
* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Frame aerial windings	1·72
L2		23·3
L3	Reaction coils, total	8·75
L4		
L5	V1 anode circuit tuning coils	3·8
L6		11·7
L7	Speaker speech coil	3·0
T1	Intervalve trans. Pri.	460·0
	Sec.	1,620·0
T2	Speaker input trans. Pri.	1,000·0
	Sec.	0·5
S1, S2	Waveband switches	—
S3	Internal speaker switch	—
S4	H.T. circuit switch	—
S5	L.T. circuit switch	—

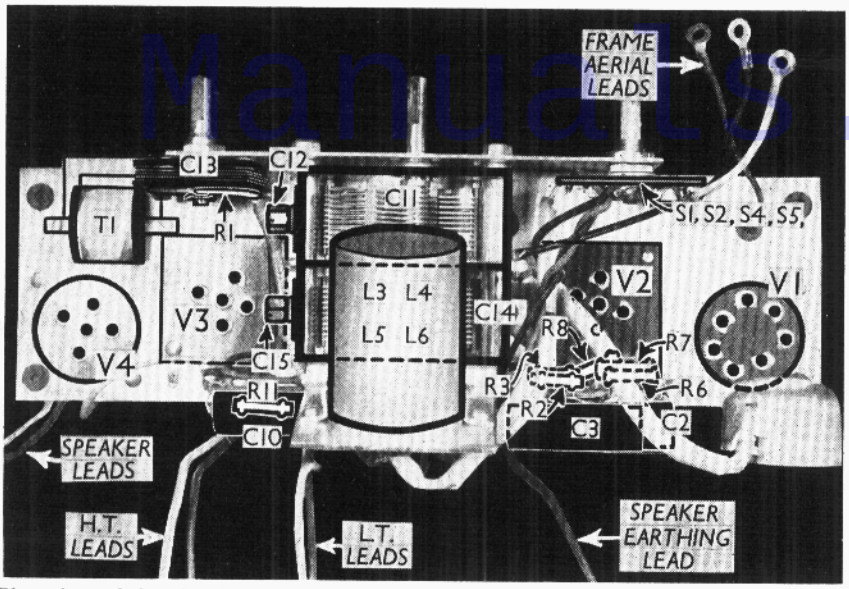
VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with a new H.T. battery reading 93 V, on load. The receiver was tuned to the lowest wavelength on the medium band, but there was no signal input as the frame aerial connections were shorted.

The combined gain and reaction control was set so that the slider of the gain



Circuit diagram of the Pye Baby Q battery portable. **R1** and **C13** are ganged together to form a combined gain and reaction control.



Plan view of the chassis. A diagram of the switch unit looking in the direction of the arrow is in column 3.

control was just at the clockwise end of the resistance winding, but the vanes of the reaction condenser were not in mesh. This position is easily determined by feel.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

If **V4** should become unstable, as in our case, when measurements are being made of its anode current, it can be stabilised by connecting a non-inductive condenser of about 0·1 μF from that electrode to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 K50M	70	1·3	90	0·4
V2 K30K	42	0·6	—	—
V3 K30K	50	0·6	—	—
V4 K70B	88	3·7	90	0·6

GENERAL NOTES

Switches.—**S1** and **S2** are the waveband switches, and **S4, S5** the battery circuit switches, ganged together in a single rotary unit, mounted on the front member of the chassis. This is indicated in our plan chassis view, and the switches are shown in detail in the diagram on this page, which is drawn looking from the rear of the top of the chassis.

The table below gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and **C** closed.

Switch	Off	M.W.	L.W.
S1	C	C	—
S2	—	C	—
S4	—	C	C
S5	—	C	C

S3 is the internal speaker jack switch, incorporated in one of the "phone" sockets, which opens when headphone or external speaker plugs are fully inserted into the 'phone sockets. These, incidentally, are situated on a panel at the right-hand side of the cabinet. **S3**, therefore, is not shown in our chassis illustrations.

Coils.—**L1** and **L2** are the frame aerial windings, brought out to three screw terminals on a small panel inside the cabinet. **L3-L6** are in a screened unit mounted above the gang condenser by means of a plate screwed to the rear frame member of the gang.

Headphones.—Two sockets are provided at the right-hand side of the cabinet for a pair of high resistance (8,000 O) headphones, or an extension speaker. By pushing the plugs fully home, **S3** opens and mutes the internal speaker.

Condenser C1.—This is a very small condenser, formed of one enamelled wire spirally wound over another. It is situated inside the cabinet between the external aerial socket and the screw terminal forming the top connection of **L1.**

Resistance R1.—This is combined with the reaction control **C13.** For the first half of the travel of the slider, **R1** decreases in value. When the minimum value of **R1** is reached, the slider passes over a thick copper track, and reaction is then applied by the increasing capacity of **C13** during the remainder of the travel of the control.

Batteries.—L.T., 2 V 20 AH celluloid-cased jelly acid cell, marked "L.T. battery for Baby Q," reference number 88022. H.T., 90 V H.T. battery, marked "For Baby Q," size 8⅜ in. by 5⅛ in. by 3 in. G.B. is automatic.

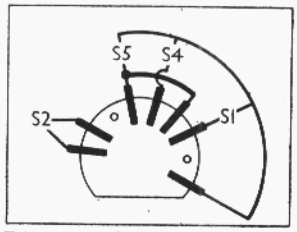


Diagram of the switch unit, seen from the rear of the deck of the chassis.

Battery Leads and Voltages.—Black lead, spade tag, L.T. negative; red lead, spade tag, L.T. positive 2 V; black lead and plug H.T. negative; red lead and plug, H.T. positive 90 V.

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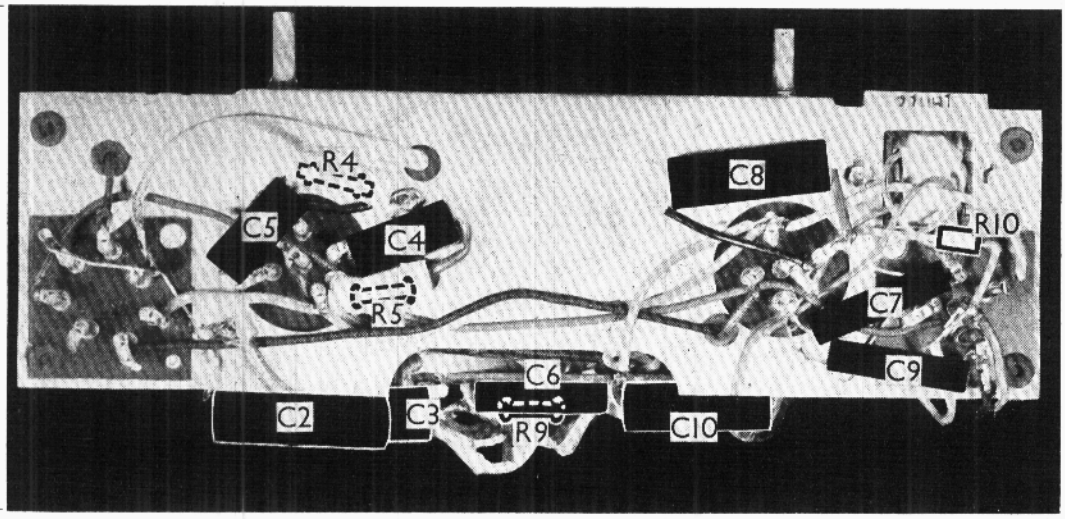

Under-chassis view. Some of the components at the back also appear on the plan view above.

MAINTENANCE PROBLEMS

Hints Contributed by Service Engineers

Speaker Speech Coil Fault

I HAD a Pye SP/B for service, the complaint being that it gave inferior tone at more than about quarter volume. Placing a pick-up in the grid circuit of the HD22 showed exactly the same fault. Checking the remaining part of the A.F. circuit revealed nothing.

The speaker was then removed, and a test on the gap between the speech coil former and the centre pole indicated that the speech coil was centred and free.

Upon closer examination, however, I noticed that the flexible speech coil leads were taut, and one side of the pole was polished bright a small distance towards the rear.

Apparently at large volumes when the coil was drawn in the taut leads drew the coil to one side, causing it to rub the pole piece. Unsoldering the leads and extending them cleared up the whole trouble.—D. W. WOOD, CLUN.

Fuse-Holder Leakage

A HALCYON 4501 A.C./D.C. radiogram came in for service, and on reference to *The Trader* Service Sheet No. 78 for model 4701 the circuit appeared to be similar.

The fault was that one of the 1 A fuses blew as soon as radio was switched on. The fuses in this instrument are in the mains leads, and are held in Belling-Lee single 1¼-in. cartridge type fuseholders, these holders being screwed to the chassis. It was noticed that it was always the same fuse which blew, **F1** in *The Trader* Service Sheet.

A new fuse was fitted and an ohmmeter put across the mains leads, which showed 100 O resistance. Keeping the ohmmeter in the same position, the valve heaters were disconnected, the metal rectifier **MR2** was disconnected, **C27** was disconnected and fuse **F2** was removed, but in each case the resistance remained 100 O.

I then removed the **F2** fuseholder and found that, at the mains side, the underside of the bakelite had been burned, and was acting as a 100 O resistor, therefore causing the partial short across the mains.—E. DOWNIE, EDINBURGH.

Effect of Cathode-Heater Short

A NEWLY received Mullard MUS6 was connected up on the test-bench for the usual preliminaries prior to being put into stock, when it was found to be faulty, signals being conspicuous by their absence.

The output pentode was first removed in order to substitute a valve known to be good, when it was noticed that the remaining valves still kept glowing, in spite of the fact that the valves are series connected in the receiver, as is usual in the majority of A.C./D.C. receivers. Accompanying this was a smell of burning cellulose enamel, which made the writer switch off somewhat sharply, and the right-hand side chassis unit was removed, as the burning seemed localised at this end.

It was then found that the cathode bias resistance of V2 was burnt to a cinder, so the makers' circuit diagram—which luckily had just arrived—was carefully studied to find a likely cause of the trouble.

It was deduced that a S/C between cathode and heater of V2 would cause the cathode bias resistance to pass the combined heater current of V1 and V2, if either V3 or V4 were removed from their sockets.

The valve holder and wiring showed no signs of such a S/C, so the valve itself was put through its paces on a Mullard Master Test Panel, when the neon on this glowed when the cathode button was pressed, proving the writer's deduction to be correct. A new valve and the fitting of a fresh bias resistor brought the set to concert pitch again.—R. A. COATES, WHITBY.

A Crop of Resistor Faults

A PYE E/AC receiver came in recently for service, having a reduced general performance with distortion.

The anode current of the output valve was measured, and found to be high, so the two series resistors which are in parallel across the L.S. field were replaced, correcting the grid bias, and restoring the current to normal.

It was then noted that, when tuned to resonance on strong signals, the set had a tendency to cut out. This trouble was cured by replacing the cathode resistors of the double diode triode. The existing ones were found to be very high in value.

On testing the set generally the performance was now much better, except for a rhythmic rushing background to all strong signals. Further test showed the I.F. valve to have low anode volts and high screen volts. The I.F. anode feed resistor was replaced (high again) which brought the volts back to normal and completely cured the trouble. This last effect seemed to suggest I.F. oscillation at a fairly low frequency as in a dynatron oscillator.—J. GIBBONS, WALLASEY.

Intermittent Contact to Gang Condenser

RECENTLY a Philco model 281 A.C. superhet receiver was in for attention, and was giving noise and intermittent signals when the tuning knob was turned or touched. A short between the vanes of the ganged condenser assembly was suspected.

Tests revealed no such short and the leads to the condensers were examined and found to be O.K. with no dry joints. The faults persisted, and on examination it was noted the condenser assembly was floating on rubber washers, being secured by screws which entered the frame from below. The moving vanes depended for their earthing on a lead from chassis to a tag on one of these screws. On moving this lead the trouble could be produced or removed at will.

As a quick check a test lead with a clip at each end was connected between the chassis and condenser frame, and was found to clear the faults. As the condenser frame had a convenient hole in its side, a small nut and bolt was fitted, and a new lead taken to chassis.

The receiver was aligned and tested out O.K. except for a buzz at certain frequencies. This trouble was traced to the fabric behind the speaker fret having parted, in places, from the wood, and the flakes of glue adhering to the fabric were vibrating against the fret.—W. G. GOUGH, WORCESTER.

PYE BABY Q—*Continued*

CIRCUIT ALIGNMENT

Scale Adjustment.—With the chassis in the cabinet, rotate the tuning control clockwise until pointer is at high wavelength end of scale. Push the flat end of a pencil or rod against the condenser vanes and rock the gang until it can be felt that the rotor vanes are fully in mesh with those of the stator. The pointer should now be located at the mark at the top end of the L.W. scale. If not, adjust it by removing the control knob and inserting a fine screwdriver between the escutcheon plate and the tuning spindle. The pointer is fitted with a friction collar to the spindle.

R.F. Circuits.—All adjustments should be made with the chassis in the cabinet and the volume control midway between minimum and maximum positions.

Connect signal generator via a dummy aerial to the external **A** and **E** sockets and feed in a 210 m. (1,425 KC/S) signal. Switch set to M.W., tune to 210 m. on scale, and adjust **C15** and **C12** for maximum output.

Check calibration at 550, 900 and 1,900 m.

HINTS REQUIRED

Service engineers who come across unusual faults are invited to send a brief description of them to the Technical Editor for publication.

Descriptions of more or less standard faults which are commonly encountered are not required, unless it so happens that a particular receiver is found to be prone to a certain fault.

Payment will be made for all hints used. Please write on one side of the paper only, with spacing between lines.