

Circuit diagram of the Beethoven P202 Baby Portable battery receiver. L1 and L2 are the frame aerial windings. V4 is a battery output tetrode. All bias is obtained automatically. S5 is incorporated in the pilot lamp holder.

### COMPONENTS AND VALUES

CONDENSERS		Values (μF)
C1*	V1 S.G. and anode decoupling	2.0
C2	V1 anode circuit L.W. fixed trimmer	Very low
C3	V2 C.G. condenser	0.00015
C4*	V2 anode decoupling	2.0
C5	V2 to V3 A.F. coupling	0.0025
C6	V2 anode R.F. by-pass	0.00005
C7	Fixed tone correctors.	0.004
C8		0.001
C9	A.F. coupling to T1	0.05
C10*	Automatic G.B. by-pass	25.0
C11	Fixed tone corrector	0.004
C12*	H.T. circuit reservoir	4.0
C13†	Frame aerial circuit tuning	—
C14†	Frame aerial circuit M.W. trimmer	—
C15†	Reaction control	—
C16†	V1 anode circuit tuning	—
C17†	V1 anode circuit M.W. trimmer	—

\* Electrolytic. † Variable. ‡ Pre-set.

RESISTANCES		Values (ohms)
R1	V1 S.G. and anode H.T. feed	4,000
R2	V2 grid leak and filament pot.	4,000,000
R3		4,000,000
R4	V2 anode decoupling	6,000
R5	V2 anode load	30,000
R6	V2 anode R.F. stopper	6,000
R7	V3 C.G. resistance	500,000
R8	V3 anode load	20,000
R9	V4 C.G. R.F. stopper	250,000
R10	Automatic G.B. resistance	300

OTHER COMPONENTS		Approx. Values (ohms)	
L1	Frame aerial windings	2.2	
L2		12.2	
L3	Reaction coil	4.1	
L4	V1 anode circuit tuning coils	3.25	
L5		28.0	
L6	Speaker speech coil	3.0	
T1	Intervalve auto-trans., total	5,000.0	
T2	Speaker input trans.	Pri.	590.0
		Sec.	0.2
V1, S2	Waveband switches	—	
S3	H.T. circuit switch	—	
S4	L.T. circuit switch	—	
S5	Pilot lamp switch	—	

### VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on an H.T. battery reading 80 V on load. The receiver was tuned to the lowest wavelength on the medium band and the reaction control was at minimum. There was no signal input, the frame aerial connections being shorted.

Voltages were measured on the 1,200 V scale of an Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VP2	75	0.6	75	0.2
V2 PM2HL	45	0.7	—	—
V3 PM2HL	60	1.0	—	—
V4 KT2	80	3.0	80	0.7

### GENERAL NOTES

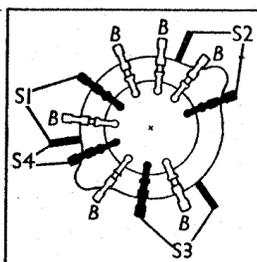
**Switches.**—S1, S2 are the wavechange switches, and S3, S4 the H.T. and L.T. circuit switches, all ganged in a single rotary unit, indicated in our view of the chassis resting on its back, with the control spindles at the top. The switches are shown in detail in the diagram on this page, where they are drawn as seen looking in the direction of the arrow in the chassis illustration.

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	M.W.	OFF	L.W.
S1	C	—	—
S2	C	—	—
S3	C	—	C
S4	C	—	C

S5 is the pilot lamp switch, combined with the pilot lamp holder in the centre of the speaker grille. On rotating the holder by the milled disc, S5 closes or opens, switching the light on or off.

Switch diagram, looking in the direction of the arrow in the chassis view above.



**Coils.**—Apart from the frame aerial windings, L1, L2, which are built into the cabinet, the R.F. anode coils, L3-L5, are in a screened unit in the centre of the chassis.

**Pilot Lamp.**—This can be reached by pulling out the combined holder and switch from the centre of the speaker grille, and then withdrawing the rear portion of the holder, which is sprung into the casing. The lamp is an Osram M.E.S. type, rated at 3.5 V, 0.15 A. It is fitted with a small bulb.

**External Phones.**—Two sockets are provided at the left-hand side of the cabinet for a pair of high resistance headphones.

**External Aerial.**—A socket is provided at the right hand side of the cabinet for an external aerial.

**Batteries.**—L.T., Sterling 2 V 14 AH celluloid-cased jelly acid cell, type 5002. H.T., special Sterling 80 V H.T. battery, with positive and negative strip contacts, type 2002. Grid bias is automatic.

**Battery Leads.**—The only leads used are for L.T. Red lead, black spade tag, L.T. negative; red lead, red spade tag, L.T. positive 2 V. The H.T. battery makes contact with two flat strips fitted inside the top of the cabinet. The battery should be inserted with its contact strips at the top, with the side from which the strips emerge facing towards the speaker (free ends of the contact strips to the back of the cabinet). Looking from the back of the cabinet, the right hand contact is negative.

**Valve V4.**—Note that this is a battery tetrode, but the connections are the same as those of the corresponding pentode.

### CIRCUIT ALIGNMENT

This must be carried out with the receiver chassis connected up normally in the cabinet. Remove the metal "name" plate at the right-hand side of the cabinet, which will expose the adjusting screws of the two trimmers. Couple a coil to the frame aerial windings (a few turns of wire round the cabinet will suffice), connect the signal generator to the ends of this coil, and feed in a 200 m. (1,500 KC/S) signal. Tune to 200 m. on scale, and adjust C17, then C14 for maximum output. It may be desirable finally to re-adjust C14 on an actual station of low power, after the temporary coupling coil has been removed.