

"TRADER" SERVICE SHEET

899

MARCONIPHONE P20B

All-Dry "Personal" Portable

THE Marconiphone P20B is a "Personal" receiver in a casket-shaped die-cast case with a spring-loaded lid and a hinged base. Miniature components are used throughout, and the battery is a combined H.T. and L.T. unit. The complete receiver weighs 4lb.

Release date and original price: December 1948; £11 19s. 6d. complete, plus purchase tax.

CIRCUIT DESCRIPTION

Tuned frame aerial input by **L1**, **C23** (M.W.), with the addition of loading coil **L2** on L.W., precedes a heptode valve (**V1**, Marconi **X17**) operating as frequency changer with electron coupling.

Oscillator grid coils **L3** (M.W.) and **L4**, **L4** (L.W.) are tuned by **C24**, with parallel trimming by **C6**, **C25** (M.W.) and **C7**, **C26** (L.W.). Tracking is by series capacitor **C8** on both bands.

Capacitive reaction coupling is employed on both bands, due to the common impedance of **C8** in grid and anode circuits, with additional inductive coupling on M.W. by **L5**.

Second valve (**V2**, Marconi **W17**) is variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-transformer couplings **C3**, **L6**, **L7**, **C4** and **C11**, **L8**, **L9**, **C12** in which the timing capacitors are fixed and alignment is effected by adjusting the positions of the iron-dust cores.

Intermediate frequency 365 kc/s.

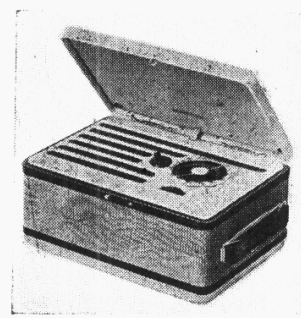
Diode second detector is part of single diode pentode valve (**V3**, Marconi **ZD17**). Audio frequency component in rectified output is developed across manual volume control **R5**, which is the diode load resistor, and passed via A.F. coupling capacitor **C14** and C.G. resistor **R6** to grid of pentode section, which operates as A.F.

amplifier. I.F. filtering by **C13** and **C16** in diode and pentode anode circuits respectively.

The D.C. potential developed across **R5** is tapped off and fed back, through a decoupling circuit, as G.B. to F.C. and I.F. valves, giving automatic gain control.

Resistance-capacitance coupling by **R8**, **C17**, **R9** between **V3** pentode and pentode output valve (**V4**, Marconi **N17**), the twin filament sections of which are wired in parallel. Fixed tone correction by **C18** in anode circuit, and negative voltage feedback by **R10**.

The G.B. potential for **V4** is obtained from the drop across **R11** in the H.T. negative lead to chassis.



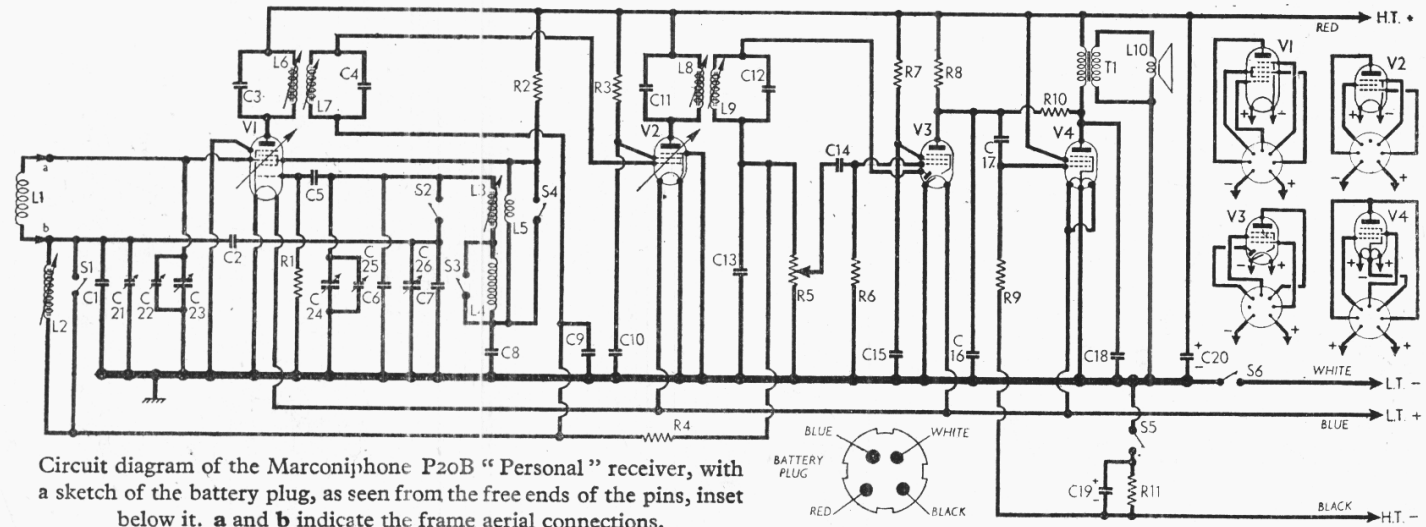
COMPONENTS AND VALUES

CAPACITORS		Values (μF)	Locations
C1	L.W. aerial trim ...	0-00003	A1
C2	L.W. neutralizing ...	0-00001	A2
C3	1st I.F. transformer {	0-0001	C1
C4		tuning ...	0-0001
C5	V1 osc. C.G. ...	0-0001	C2
C6	Osc. M.W. trim ...	0-00001	B2
C7	Osc. L.W. trim ...	0-00015	A1
C8	Osc. tracker ...	0-0005	D8
C9	A.G.C. decoupling ...	0-1	G8
C10	V2 S.G. decoupling ...	0-1	E6
C11	2nd I.F. trans. {	0-0001	B1
C12		former tuning ...	0-0001
C13	I.F. by-pass ...	0-0001	E6
C14	A.F. coupling ...	0-005	G5
C15	V3 S.G. decoupling ...	0-1	F7
C16	I.F. by-pass ...	0-0001	F6
C17	A.F. coupling ...	0-01	F6
C18	Tone corrector ...	0-005	A4
C19*	G.B. by-pass ...	20-0	B4
C20*	H.T. reservoir ...	2-0	A2
C21†	Aerial L.W. trim ...	—	A1
C22†	Aerial M.W. trim ...	—	B2
C23†	Aerial tuning ...	0-00037	B2
C24†	Oscillator tuning ...	0-00037	B2
C25†	Osc. M.W. trim ...	—	B2
C26†	Osc. L.W. trim ...	—	A1

RESISTORS		Values (ohms)	Locations
R1	V1 osc. C.G. ...	100,000	D7
R2	Osc. anode load ...	22,000	D6
R3	V2 S.G. feed ...	22,000	E5
R4	A.G.C. decoupling ...	2,200,000	B6
R5	Volume control ...	1,000,000	G7
R6	V3 pent. C.G. ...	6,800,000	F5
R7	V3 S.G. feed ...	2,200,000	E5
R8	V3 pent. load ...	470,000	E5
R9	V4 C.G. resistor ...	1,000,000	G6
R10	F.B. coupling ...	2,200,000	F5
R11	V4 G.B. resistor ...	1,000	B4

OTHER COMPONENTS		Approx. Values (ohms)	Location
L1	Frame aerial ...	1-5	—
L2	L.W. loading coil ...	16-0	A2
L3	Oscillator tuning {	2-75	C2
L4		coils ...	4-5
L5	Osc. reaction coil ...	1-0	C2
L6	1st I.F. { Pri. ...	11-0	C1
L7		trans. { Sec. ...	11-0
L8	2nd I.F. { Pri. ...	11-0	B1
L9		trans. { Sec. ...	11-0
L10	Speech coil ...	10-0	B3
T1	Speaker { Pri. ...	730-0	B4
	trans. { Sec. ...	1-0	B4
S1-S4	W/band switches ...	—	F8
S5	H.T. circuit switch ...	—	B4
S6	L.T. circuit switch ...	—	B4

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Marconiphone P20B "Personal" receiver, with a sketch of the battery plug, as seen from the free ends of the pins, inset below it. **a** and **b** indicate the frame aerial connections.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted by the manufacturers, who give the total H.T. current as 8 mA. Their receiver was operating with the volume control at maximum, and voltages were measured with a 1,000 ohms per volt meter, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 X17	62	0.08	26	1.4
V2 W17	62	1.35	44	0.5
V3 ZD17	13	0.1	6	†
V4 N17	59	3.6	62	†

† Measurement impracticable, owing to compactness of chassis.

GENERAL NOTES

Switches.—S1-S4 are the waveband switches, ganged in a slide-operated switch mounted on the upper side of the chassis. **S1** and **S3** close on M.W., and **S2** and **S4** close on L.W.

S5, S6 are the battery circuit switches, ganged in a spring-loaded plunger-operated unit mounted at one end of the chassis near the speaker. The plunger is depressed when the lid is closed, opening the switches. They close automatically when the lid is opened.

Coils.—The frame winding is concealed in the lid. It is mounted on the rear face of the panel which lines the inside of the lid, and can be reached upon removal of four press-studs. Its lead terminations are indicated in our underside view of the chassis by the letters **a** and **b**.

The oscillator coils and L.W. aerial coils are in two unscreened units on the underside of the chassis. Each has an adjustable iron-dust core.

Batteries and Leads.—The combined all-dry H.T. and L.T. battery is a Marconiphone or an Ever Ready "Batrymax" type B114, with a 4-pin outlet socket. A diagram of the associated plug, drawn as seen from the free ends of the pins, is inset in the circuit diagram overleaf. The L.T. section is rated at 1.5 V, and the H.T. section at 69 V.

DISMANTLING THE SET

To gain access to the battery, place the receiver on a piece of cloth, face downward with the lid closed, and press the stud located above the carrying handle, when the back cover may be opened on its hinge.

Removing Assembly.—Open the lid and very carefully ease off the tuning knob (push fit); close the lid and place receiver face downward again; with the back of the carrying case open, remove the 6BA nut located at each corner of the assembly, and lift off the body and back cover; unsolder the two cream plastic covered frame aerial connecting leads, at points indicated in our underside view of the chassis, by the letters **a, b** (location reference B2), and remove the 6BA securing nut and cleat of these leads at the centre of the chassis; remove the 6BA nut located at each corner of the chassis, and lift the chassis off the front panel.

When replacing, note that the four thin 6BA nuts must be used to secure the chassis assembly to the front panel.

CIRCUIT ALIGNMENT

For I.F. alignment purposes it is necessary to remove the chassis from the carrying case and front panel, but the frame aerial leads must not be disconnected. A suitable tool for adjustment of the iron-dust cores (E.M.I. Stock No. Q/D5025) is available from the Service Develop-

ment Division, 100, Blythe Road, Hayes, Middlesex.

I.F. Stages.—Connect signal generator, via an 0.1 μF capacitor in the "live" lead, to control grid (pin 6) of **V2** and chassis. Turn gang to minimum capacitance and volume control to maximum. Switch set to M.W., feed in a 365 kc/s (821.8 m) signal, and adjust the cores of **L9** and **L8** (location references E5, B1), in that order, for maximum output.

Transfer "live" signal generator lead to control grid (pin 6) of **V1** and adjust the cores of **L7** and **L6** (D6, C1), in that order, for maximum output.

R.F. and Oscillator Stages.—Couple the signal generator output via a loop of wire set up on the bench at a minimum distance of two feet from the frame aerial.

M.W.—Tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C25** (B2) for maximum output. Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and adjust the core of **L3** (C2) for maximum output. Repeat the 200 m adjustment, and then feed in a 230 m (1,300 kc/s) signal, and adjust **C22** (B2) for maximum output.

L.W.—Switch set to L.W., tune to 1,500 m on scale, feed in a 1,500 m (200 kc/s) signal, and adjust **C26** (A1) for maximum output. Feed in a 1,000 m (300 kc/s) signal, tune it in, and adjust **C21** (A1) for maximum output. Feed in a 1,500 m signal, tune it in, and adjust the core of **L2** (A2) for maximum output. Finally, repeat the 1,000 m adjustment.

Upper view (below) and underside view (right) of the chassis. The frame aerial connections **a** and **b** are indicated in the underside view, just below the gang unit **C23, C24**.

