MARCONIPHONE P20B

SERVICE MANUAL

MODEL P20B

PERSONAL RECEIVER

CONTENTS

Part No. 42998

AUGUST, 1948

MODEL P20B

SPECIFICATION

Physical.

Height ... ... $3\frac{3}{8}$ inches
Length ... ... 7 inches
Width ... ... $4\frac{7}{8}$ inches
} Overall.

Weight ... ... 4 lbs. (including battery).

Voltage Supply.

Battery—Marconiphone Type B114.
H.T. 69 volts ; L.T. 1·5 volts.

Consumption.

H.T., 8 mA. ; L.T., 250 mA.

Wave Ranges.

M.W. ... 200—550 metres (1,500—545·4 kc/s).
L.W. ... 1,000—2,000 metres (300—150 kc/s).

Intermediate Frequency.

365 kc/s.

Valves.

Marconi.

X17	V1	Frequency Changer.
W17	V2	I.F. Amplifier.
ZD17	V3	Detector, A.V.C. and L.F. Amplifier.
N17	V4	Output.

Rated Output.

80 milliwatts maximum.

Loudspeaker.

This is a 3-inch permanent magnet, moving coil loudspeaker. The speech coil has a D.C. resistance of 8·3 ohms and an impedance of 10 ohms at 500 cycles.

CIRCUIT DESCRIPTION

Frequency Changer.

For M.W. operation, the frame aerial (L1) is tuned by one section (VC1) of the gang condenser. On L.W. loading coil (L2) is in series with L1. The signals are fed directly to the grid of V1 (X17). The oscillator section of V1 has tuned grid circuits (L4, VC2 for M.W. and L5, L4, VC2 for L.W.) which are inductively coupled to the oscillator anode. The first I.F. transformer (IFT1) couples this valve to the I.F. amplifier V2.

I.F. Amplifier.

This valve, V2 (W17), amplifies at the intermediate frequency of 365 kc/s. The second I.F. transformer (IFT2) couples this valve to the detector.

Detector, A.V.C. and L.F. Amplifier.

The diode of the diode-pentode, V3 (ZD17), is used as a detector and A.V.C. rectifier. The volume control (VR) forms the diode load. The A.V.C. voltage is taken from the D.C. component of the speech voltage across VR, and is applied to control the bias of the grid circuits of V1 and V2, which are decoupled by R4 and C11. Resistance—capacity coupling is employed between the pentode section of V3 and the output valve.

Output.

The output valve, V4 (N17), is biased by the voltage drop across R10 in the main H.T. negative lead. A permanent degree of negative feedback is provided via R8, and tone correction is given by C17. This valve supplies the loudspeaker via an output transformer (T1).

Battery Supplies.

The H.T. and L.T. positive supply leads are permanently fixed to the receiver, the receiver being switched on and off by switch S2 in the H.T. and L.T. negative supply leads. This switch is operated by raising and lowering the lid of the receiver.

DISMANTLING

Removal of Radio Unit.

1. Open lid and carefully pull off the tuning knob.

2. Place the receiver face downwards with the lid closed.

3. Open the base by pressing the catch button at the strap end.

4. Disconnect the battery.

5. Remove the four nuts which retain the body. Lift the body clear.

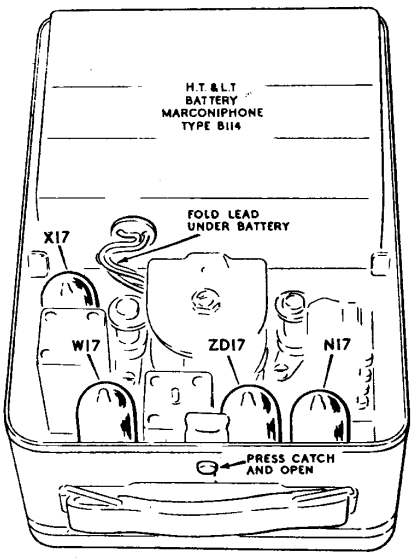
6. Unsolder the twin aerial connector lead from the gang condenser and tag.

7. Remove the four corner nuts and one centre nut, which retain the chassis and lift the aerial lead cleat off the centre stud.

8. Remove radio unit.

Replacement of Battery.

Place the receiver face downwards with the lid closed, press the end catch and swing open the base. Lift the used battery carefully from its supports and remove the non-reversible four-pin plug. Insert the plug into the new battery and place the battery on its supports with the lead folded under (as shown in the illustration). Close the base.



H.F. ADJUSTMENTS

General.

Unless it is definitely suspected that there is mis-alignment of the I.F. circuits, it is not recommended that the I.F. transformers be disturbed. If alignment is necessary, the iron-dust cores should be adjusted by means of the special tool (Stock No. Q/D5025) supplied by E.M.I. Sales and Service Ltd., Dealer's Service Development Division, 100, Blythe Road, Hayes, Middlesex.

An A.C. voltmeter (rectifier type) connected across the loudspeaker speech coil may be used as an output meter.

Intermediate Frequency.

Turn Volume Control to maximum and set gang condenser to minimum capacity (plates fully disengaged). Set Waveband Switch to M.W.

1. Inject a signal at 365 kc/s, via a 0·1 mfd. condenser, into the grid of V2.

2. Tune L9, L8 in that order for maximum output.

3. Inject a signal at 365 kc/s, via a 0·1 mfd. condenser, into the grid of V1.

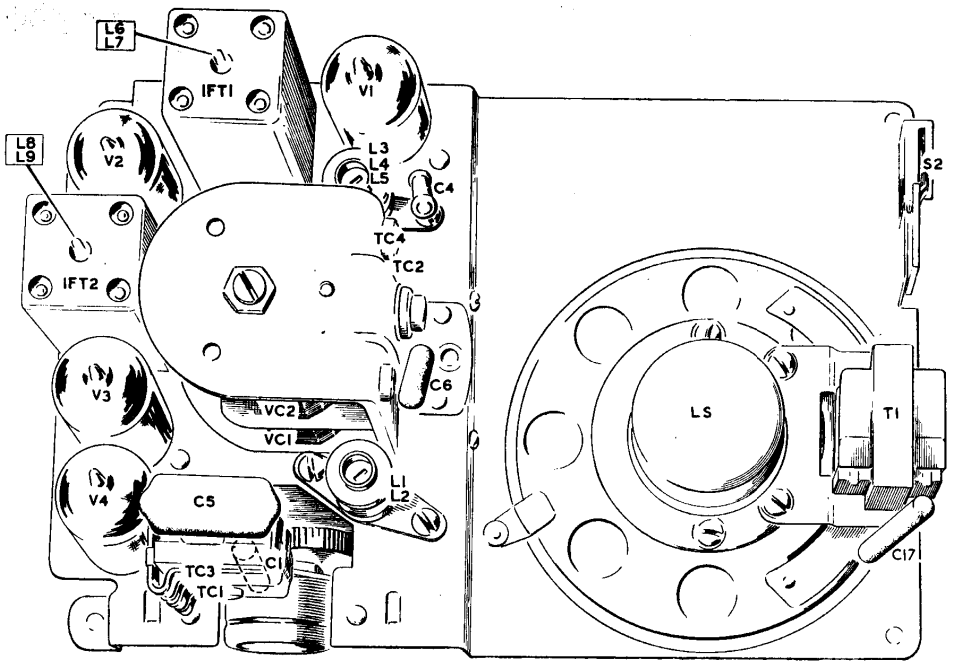
4. Tune L7, L6 in that order for maximum output.

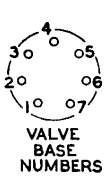
Radio Frequency.

Turn Volume Control to maximum. Connect a small loop aerial to the output leads of a signal generator and set up loop at a minimum distance of two feet from the frame aerial.

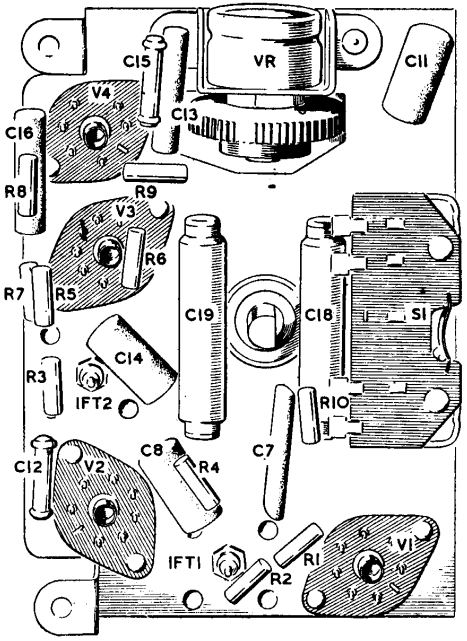
MEDIUM WAVES—Set Waveband Switch to M.W.

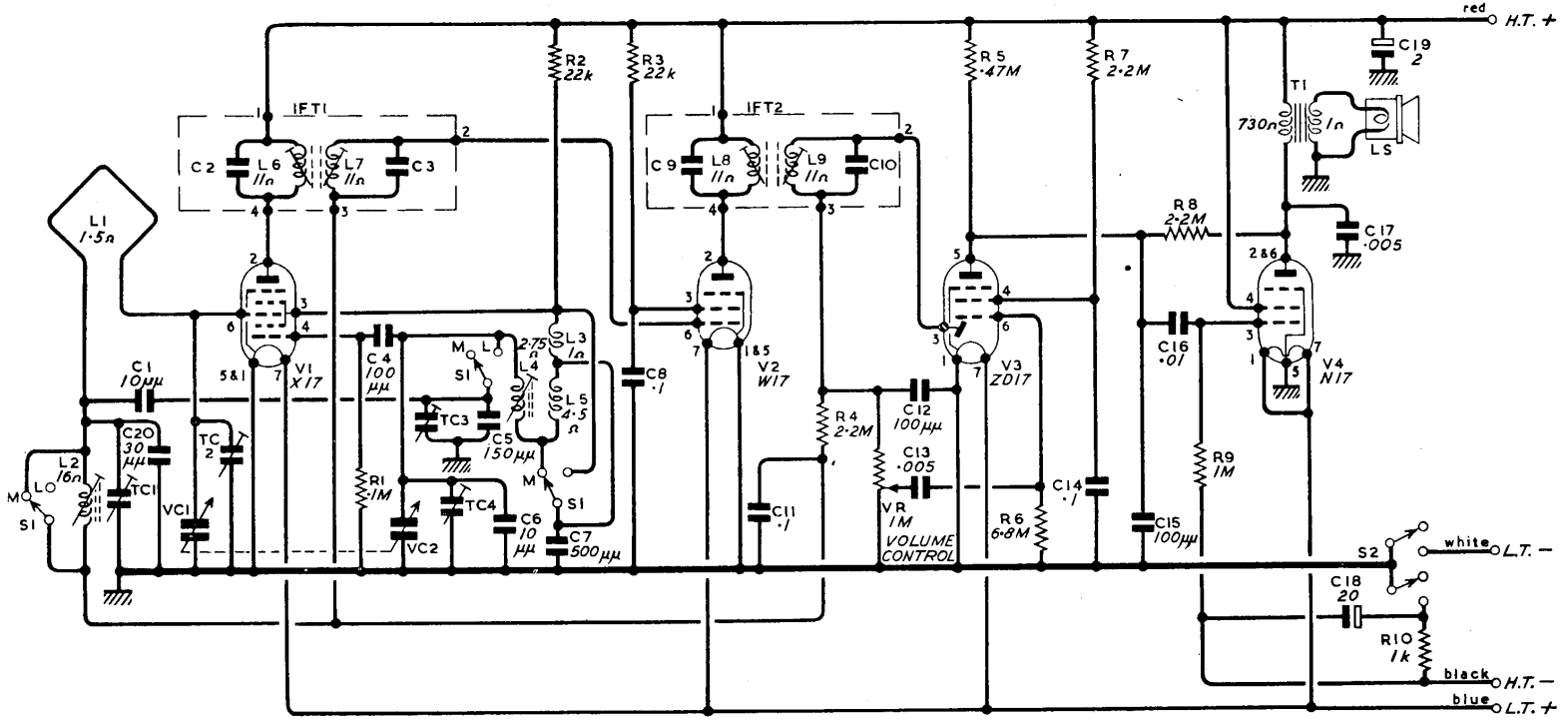
Op. No.	Gang Condenser Setting m.	Tune Test Oscillator to m.	kc/s.	Operation.
1	200	200	1,500	Tune TC4 for maximum output.
2	500	500	600	Adjust L4 core for maximum output.
3	—	—	—	Repeat operation 1.
4	Tune in signal	230	1,300	Tune TC2 for maximum output.





VALVE BASE NUMBERS





VR SHOWN IN MAX. ANTI-CLOCKWISE POSITION.

TECHNICAL PUBLICATIONS DEPT TP. 3463/1

LONG WAVES—Set Waveband Switch to L.W.

Op. No.	Gang Condenser Setting m.	Tune Test Oscillator to m.	kc/s.	Operation.
1	1,500	1,500	200	Tune TC3 for maximum output.
2	Tune in signal	1,000	300	Tune TC1 for maximum output.
3	Tune in signal	1,500	200	Adjust L2 core for maximum output.
4	—	—	—	Repeat operation 2.

VALVE TABLE

The following table indicates the approximate voltage and current readings obtained on each valve when the receiver is operating at maximum output. Variations of ±15 per cent. may be anticipated between models. Values stated below were obtained using a meter with a resistance of 1,000 ohms per volt.

VALVE.	ANODE.			SCREEN.		FILAMENT.	
	Volts to Chassis.		Current mA.	Volts to Chassis.	Current mA.	Volts to Chassis.	Current mA.
	Mx.	Osc.	Mx. Osc.				
V1 (X17) ...	62	26	0·08 1·4	—	—	1·4	*
V2 (W17) ...	62		1·35	44	0·5	1·4	*
V3 (ZD17) ...	13		0·1	6	*	1·4	*
V4 (N17) ...	59		3·6	62	*	1·4	*

Total H.T. voltage, 62 v. (H.T.+ to chassis).
Voltage across R10, 8 v.
Total H.T. current, 8 mA.
Total L.T. current, 250 mA.

* Owing to the compactness of this receiver, it is impracticable to measure currents in the electrodes marked thus.

SPARE PARTS LIST

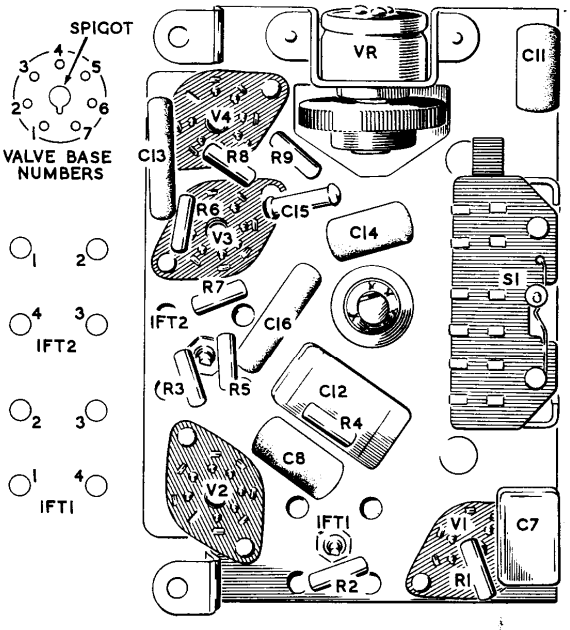
A comprehensive Spare Parts List for this model will be issued at a later date and will be obtainable from E.M.I. Sales and Service, Ltd., Technical Information Division, Sheraton Works, Wadsworth Road, Greenford, Middlesex.

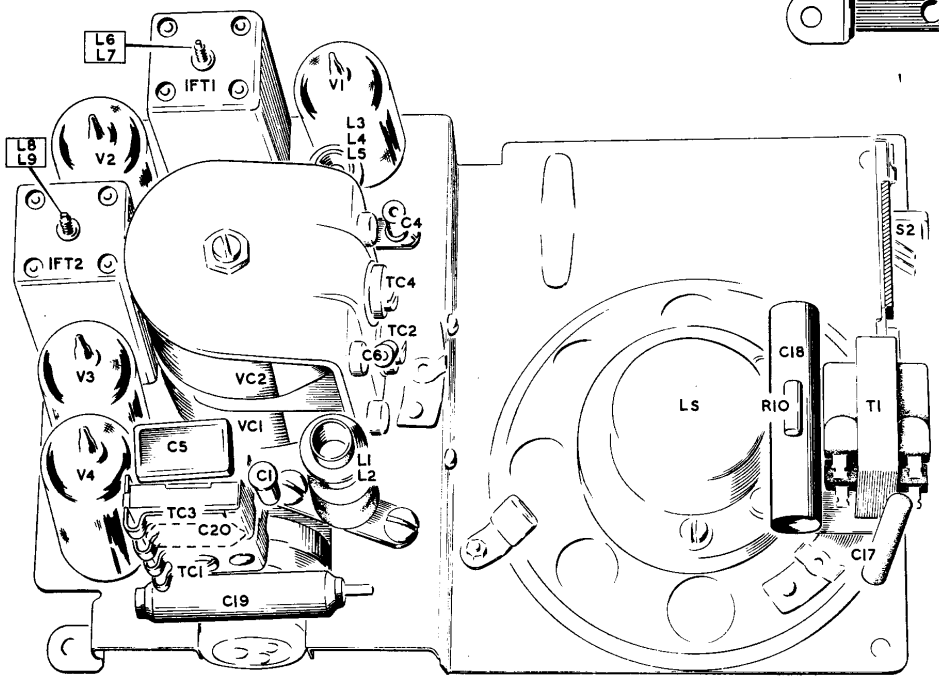
MARCONIPHONE

Model P20B
Personal Receiver

COMPONENT DIAGRAMS

The disposition of components on early production (up to Serial No. 2,300) is as shown on page 4 of the Service Manual, Part No. 42998. After this, the positon of certain components was changed in order to facilitate servicing; the diagrams shown indicate this new component layout. The circuit diagram remains unchanged.





ISSUED BY:- **E.M.I. SALES & SERVICE LTD., HAYES, MIDDLESEX.**

Part No. 43072

November 1948

Technical Publications Division.

MARCONIPHONE P20B

SPARE PARTS LIST

The Marconiphone Personal Receiver

Part No.	Description.	Quantity.
	INSTRUCTIONS	
42981	Instruction Card	1
42982	Cabinet Label	1
	CABINET PARTS AND FITTINGS	
CP94242	Case Sleeve and Base Assembly complete with Handle	1
CP94504	Case Base Cover complete with Hinge, etc.	1
CP94845	Hinge	1
P79861/4/4	Rivet Securing Hinge	6
P94263	Sponge Rubber Pad	1
P94264	Die Cast Sleeve (body)	1
P95143	Leathercloth Covering for Sleeve	1
CP94265	Spring Catch Assembly	1
P79863/2/4	Rivet securing Spring Catch Assembly	1
P93396/1	Handle Support Base	1
P79863/2/4	Rivet securing Handle Support Base	1
P93398	Handle Links	2
CP93397/1	Leather Handle	1
CP94244	Lid and Escutcheon Assembly	1
P94777	Lid Catch	1
P79861/2/4	Rivet securing Lid Catch	2
CP94276	Lid Hinges	2
P79861/5/4	Rivet securing Hinges	4
P94245/2	Nameplate	1
P94903	Rivet securing Nameplate	2
CP95712	Aerial Cover Plate	1
CP70660	L1, Frame Aerial Coil	1

Part No.	Description.	Quantity.
	CABINET PARTS AND FITTINGS—continued	
P86377/2	Press-stud securing Aerial Cover Plate	4
CP94243	Loudspeaker Baffle and Silk	1
P94283	Tuning Scale	1
CP94779/1	Spring Catch on Escutcheon	1
P79861/19/4	Rivet securing Catch	1
	CONTROLS	
P94713	Waveband Knob	1
P94714	Bearing Pin securing Waveband Knob	1
P94287	Tuning Knob	1
P86378/6	Spring for Tuning Knob	1
P94257	Volume Control Knob	1
38/2423/9	Grub-secrew for Volume Control Knob	1
	LOUDSPEAKER	
CP69670/2	3-inch P.M. Loudspeaker and Output Transformer	1
P94238	Loudspeaker Clip securing Loudspeaker	1
200406	Nut securing Loudspeaker	1
	RADIO UNIT	
CP94240	Radio Unit complete	1
200506	Nut securing Radio Unit to Escutcheon Assembly	4
	INDUCTANCES	
CP70660	L1, Frame Aerial Coil	1
CP70869	L2, L.W. Aerial Loading Coil	1
12619	P.K. Screw securing L2	2
CP70636	L3, L4 and L5, M.W. and L.W. Oscillator Coils	1
12619	P.K. Screw securing L3 and L5	2
—	L6 and L7. See IFT1.	
—	L8 and L9. See IFT2.	
CP69703/1	IFT1, 1st I.F. Transformer with L6, L7 and C2, C3	1
CP69703/1	IFT2, 2nd I.F. Transformer with L8, L9 and C9, C10	1
CP69713/3	T1, Output Transformer	1

Part No.	Description.	Quantity.
	RESISTANCES	
P85531/25	R1, 0·1 megohms	1
P85531/21	R2, 22,000 ohms	1
P85531/21	R3, 22,000 ohms	1
P85531/33	R4, 2·2 megohms	1
P85531/29	R5, 0·47 megohms	1
P85531/36	R6, 6·8 megohms	1
P85531/33	R7, 2·2 megohms	1
P85531/33	R8, 2·2 megohms	1
P85531/31	R9, 1 megohm	1
P85532/35	R10, 1,000 ohms	1
CP94908	VR1, 1 megohm, Volume Control and Nut	1
	CONDENSERS	
P93090/2	C1, 10 mmfd., 10%	1
—	C2 and C3. See IFT1.	
P93090	C4, 100 mmfd., 10%	1
P78824/19	C5, 150 mmfd., 5%	1
P93090/2	C6, 10 mmfd., 10%	1
P78824/18	C7, 500 mmfd., 2%	1
P86293/1	C8, 0·1 mfd.	1
—	C9 and C10. See IFT2.	
P86293/1	C11, 0·1 mfd.	1
P93090*	C12, 100 mmfd., 10%	1
P86259/14	C13, 0·005 mfd.	1
P86293/1	C14, 0·1 mfd.	1
P93090	C15, 100 mmfd., 10%	1
P86259/12	C16, 0·01 mfd.	1
P86259/14	C17, 0·005 mfd.	1
P82695/6	C18, 20 mfd., 12 v., Electrolytic	1
P86295/2	C19, 2 mfd., 150 v., Electrolytic	1
P86457/1	C20, 30 mmfd.	1
CP70823	TC1, Trimmer Condenser	1
—	TC2. See VC1.	
CP70823	TC3, Trimmer Condenser	1
—	TC4. See VC2.	
CP68832R/9	VC1 and VC2. Twin Gang Condenser	1

* On later models, C12 is 500 mmfd., Part Number P78006/2

Part No.	Description.	Quantity.
	SWITCHES	
CP70782	S1, Waveband Switch Assembly	1
200068B	Screws securing S1	2
CP70662	S2, ON/OFF Switch Assembly	1
10606	P.K. Screw securing S2	1
	MISCELLANEOUS	
CP94249	Battery Plug and Lead Assembly	1
CP69635	Valveholder	4
P94278	Aerial Lead	1
B114	Battery H.T. 69 v., L.T. 1·5 v.	1

In order to expedite delivery of spare part orders, please quote :—

1. Model number and serial number.
2. Spare part number and description as given above.
3. Quantity required.

Unless full particulars are quoted, delay in execution of orders must inevitably result.

Order spare parts from :—

E.M.I. SALES AND SERVICE LTD.,

SPARE PARTS DIVISION,

SHERATON WORKS,

WADSWORTH ROAD,

GREENFORD, MIDDLESEX.

Telephone : PERivale 6666.

Telegraphic Address : Emiservice, Greenford, Middlesex.

The Company reserves the right to make any modifications without notice.

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