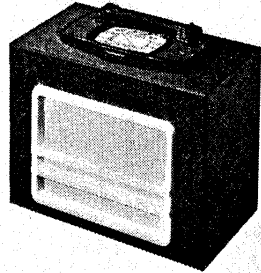


'TRADER' SERVICE SHEET

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# H.M.V. 681

## BATTERY PORTABLE



**O**f the portable type with a self-contained frame aerial, the H.M.V. 681 is a 4-valve battery 2-band receiver with a tetrode RF amplifier, a triode detector, a triode first AF amplifier and a tetrode output valve. Provision is made for an external aerial and earth, and for headphones.

### CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, L2, C19** to variable-mu tetrode valve (**V1, Marconi metalised W21**) which operates as RF amplifier. Provision for connection of external aerial via **C1**, and earth, if required.

Tuned-anode coupling by **L5, L6, C23** between **V1** and triode detector valve (**V2, Marconi metalised HL21**) operating on grid leak system with **C7** and **R3**. Reaction is applied from anode via **C6** and coils **L3, L4**, and controlled by potentiometer **R9** which also forms the gain control for **V1** so that the two functions are combined in one control. RF filtering by resistance-capacity network **R6, R7, C8, C9, C10** in anode circuit.

Resistance-capacity coupling by **R5, C12, R8** between **V2** and triode AF amplifying valve (**V3, Marconi metalised HL2**). RF filtering in anode circuit by **C13**.

Auto-transformer coupling by **R10, C14**, and **T1** between **V3** and tetrode output valve (**V4, Marconi KT2**). Provision for connection of headphones via isolating condenser **C17** between anode and chassis. Fixed tone correction by **C15** in anode circuit.

GB potentials for **V1**, fixed and variable, and GB for **V3** and **V4**, are obtained automatically from drop along resistances **R11, R12** and **R13** which form a potential divider in HT negative lead to chassis.

### COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 CG decoupling .. ..	1,000,000
R2	V1 anode and SG HT feed ..	10,000
R3	V2 CG resistance .. ..	2,300,000
R4	V2 anode decoupling .. ..	35,000
R5	V2 anode load .. ..	50,000
R6	Parts of V2 anode RF filter circuit .. ..	10,000
R7	V3 grid leak .. ..	10,000
R8	V3 grid leak .. ..	1,000,000
R9	V1 gain and reaction control ..	100,000
R10	V3 anode load .. ..	75,000
R11	V1 fixed, V3 and V4 auto GB potential divider resistances	750
R12		230
R13		50

OTHER COMPONENTS		Approx. Values (ohms)
L1	Frame aerial windings .. ..	0.9
L2		50.0
L3		0.8
L4		1.8
L5		1.1
L6		9.5
L7	Speaker speech coil .. ..	3.0
T1	Intervalve auto-trans., total ..	3310.0
T2	Output trans. { Pri. .. ..	540.0
	{ Sec. .. ..	0.5
S1, S2	Waveband switches .. ..	—
S3	HT circuit switch .. ..	—
S4	LT circuit switch .. ..	—

CONDENSERS		Values (µF)
C1	External aerial series .. ..	0.00001
C2	V1 CG decoupling .. ..	0.05
C3	RF by-pass .. ..	0.05
C4*	V1 anode and SG decoupling ..	1.0
C5	V1 anode and SG RF by-pass ..	0.1
C6	V2 anode reaction coupling ..	0.0005
C7	V2 CG condenser .. ..	0.0001
C8	Parts of V2 anode RF filter circuit .. ..	0.0001
C9		0.0005
C10		0.0001
C11*	V2 anode decoupling .. ..	2.0
C12	V2 to V3 AF coupling .. ..	0.01
C13	V3 anode RF by-pass .. ..	0.001
C14	AF coupling to T1 .. ..	0.05
C15	Fixed tone corrector .. ..	0.005
C16*	HT circuit reservoir .. ..	2.0
C17	Phone socket isolating .. ..	0.01
C18*	Auto GB by-pass .. ..	50.0
C19†	Frame aerial tuning .. ..	—
C20†	Frame aerial MW trimmer .. ..	—
C21†	V1 anode MW trimmer .. ..	—
C22†	V1 anode LW trimmer .. ..	—
C23†	V1 anode circuit tuning .. ..	—

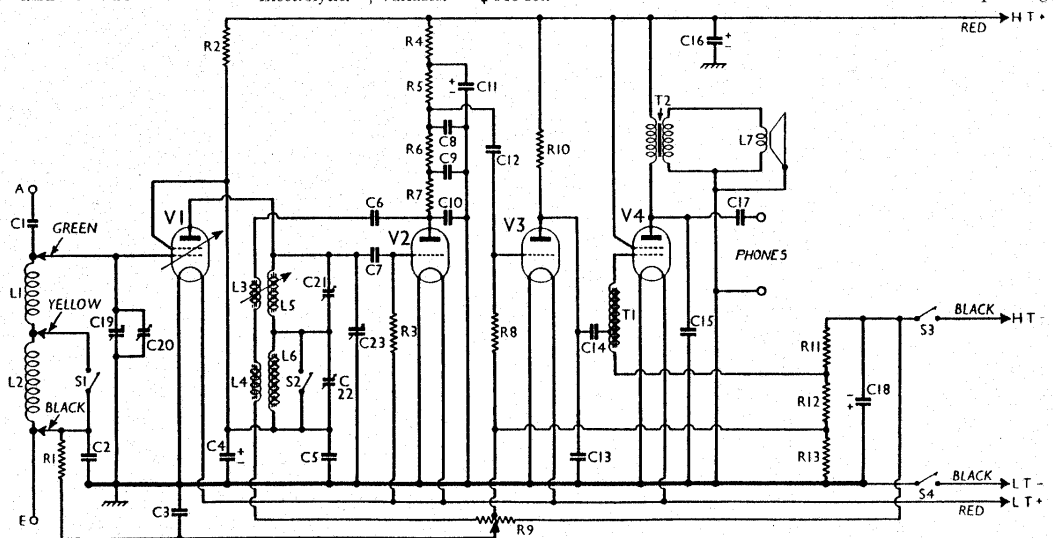
### DISMANTLING THE SET

**Removing Chassis.**—To remove the chassis from the cabinet, first remove the back and the batteries, and then the handle (four round-head screws tapped into the brackets for the fixing screws for the back) and the escutcheon (two countersunk-head screws). Now turn the gang condenser to maximum and make a mark on the cabinet to coincide with the line on the tuning dial so that the dial can be replaced correctly. Remove the dial (two screws accessible from the inside of the cabinet) and the two knobs (pull off).

Next unsolder the leads from the frame terminal panel, the yellow/black speaker lead from the chassis and the green lead from the speaker. Remove **V4** and the headphone socket panel (two round-head wood screws).

Then remove the two round-head wood screws holding the chassis bracket to the top of the cabinet and the four screws (with washers and lock washers) holding the chassis to the front of the cabinet.

The chassis can now be withdrawn from the cabinet and when replacing,



Circuit diagram of the H.M.V. 681 battery portable.

connect the frame leads as follows:—yellow to bottom tag; black to nearer centre tag; green to the furthest tag. With the gang condenser at maximum set the dial by the mark previously made on the cabinet.

**Removing Speaker.**—The speaker can be removed from the cabinet without first removing the chassis. Unsolder the green lead from the speaker terminal panel and the yellow/black lead from the chassis, then remove the three screws (with washers) holding the speaker to the sub-baffle. When replacing, see that the terminal panel is pointing to the top right-hand corner of the cabinet.

**VALVE ANALYSIS**

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with a new HT battery reading 90 V on load. The receiver was tuned to the lowest wavelength on the medium band and the combined volume and reaction control was set at a point just short of oscillation. There was no signal input as the frame connections were shorted.

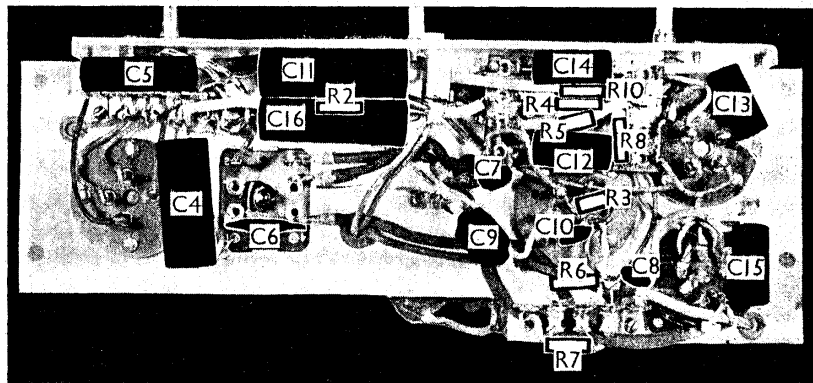
Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 W21 ..	67	1.0	67	0.3
V2 HL2 ..	28	0.5	—	—
V3 HL2 ..	46	0.5	—	—
V4 KT2 ..	82	3.7	84	0.7

**GENERAL NOTES**

**Switches.**—S1 and S2 are the waveband switches, and S3, S4 the HT and LT circuit switches respectively, in a single rotary unit indicated in our plan chassis view. A diagram of the unit is in col. 2. In the fully anti-clockwise position of the control knob ("off"), all switches are open. In the central position (MW) all switches are closed, and in the clockwise position (LW) S1 and S2 are open, and S3 and S4 closed.

**Coils.**—L1, L2 are the frame aerial windings, with connections to tags on the external A, E panel inside the cabinet. The thick wire winding is L1 and the fine



Under-chassis view. The adjustment for the core of L5 is at the base of the coil unit, just above C6.

wire L2. Three colour-coded leads connect the frame windings to the receiver, and are identified in the circuit diagram and plan chassis view.

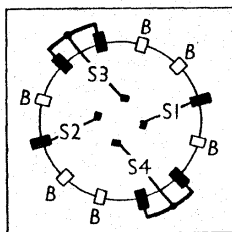
L3-L6 are in a screened unit on the chassis deck, which also contains the trimmers C21 and C22. The core of L5 is adjustable from beneath.

Condenser C1.—This is mounted on the external A, E panel inside the cabinet,

associated with one of the sockets and is normally inside the cabinet, but is shown to the left of our plan chassis view with the sockets on their panel.

**Batteries.**—LT, Exide PO3 2 V 16 AH celluloid-cased unspillable cell. HT, Marconiphone No. B628 90 V dry battery. GB is automatic.

**Battery Leads and Voltages.**—Black lead, spade tag, LT negative; red lead, spade tag, LT positive 2 V; black lead, yellow plug, HT negative; red lead, yellow plug, HT positive 90 V.



Switch diagram, looking from the rear of the top of the chassis.

and does not appear in our chassis pictures.

**Headphones.**—Two sockets are provided on the right-hand side of the cabinet (looking from the front), for a pair of high resistance (2,000 O) headphones (or a small external speaker). The sockets are isolated from the HT supply. C17 is

**CIRCUIT ALIGNMENT**

**MW.**—Remove chassis from cabinet, turn gang to minimum, insert a thin card between "heel" of rotor of one section and its stator, and turn rotor until card is just gripped. Remove card without disturbing gang. Connect a 1.0 MO resistance across green and black frame aerial leads (leaving frame disconnected) and connect signal generator to grid of V1 via a 0.1 μF condenser, and chassis.

Switch set to MW, feed in a 200 m (1,500 KC/S) signal, and adjust C21 for maximum output.

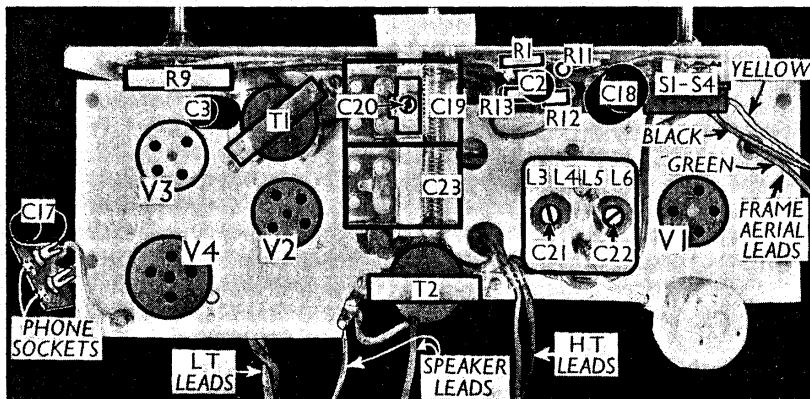
Replace receiver in cabinet, set gang as before, and adjust pointer knob to read 200 m on scale. Turn pointer to 550 m on scale, note position of gang, remove chassis from cabinet, and re-set gang to its 550 m position. Feed in a 550 m (545.4 KC/S) signal, and adjust iron core of L5 (from beneath the coil unit) for maximum output.

Repeat the 200 m and 550 m adjustments until no further improvement results.

Replace receiver in cabinet, disconnecting 1.0 MO resistance and re-connecting frame. Adjust signal generator to 200 m (1,500 KC/S), and couple output to the frame aerial by means of a loop of wire. Tune the signal in, and adjust C20 for maximum output, while rocking the gang. Re-check setting of C21.

**LW.**—Switch set to LW, feed in a 1,000 m (300 KC/S) signal, and tune it in. Adjust C22 for maximum output, while rocking the gang.

During alignment, reaction should be advanced as far as possible without causing oscillation.



Plan view of the chassis. A diagram of the S1-S4 unit is in Col. 2 above. The frame aerial leads are colour-coded.