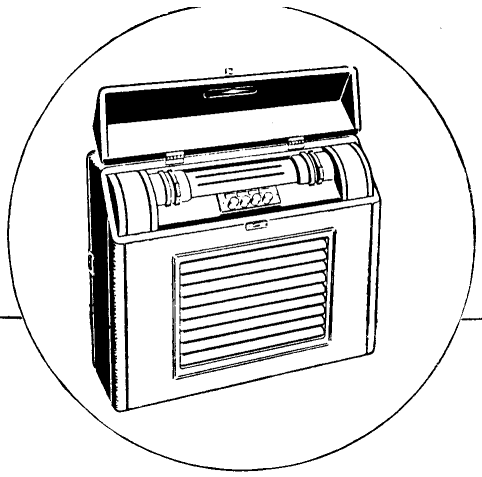
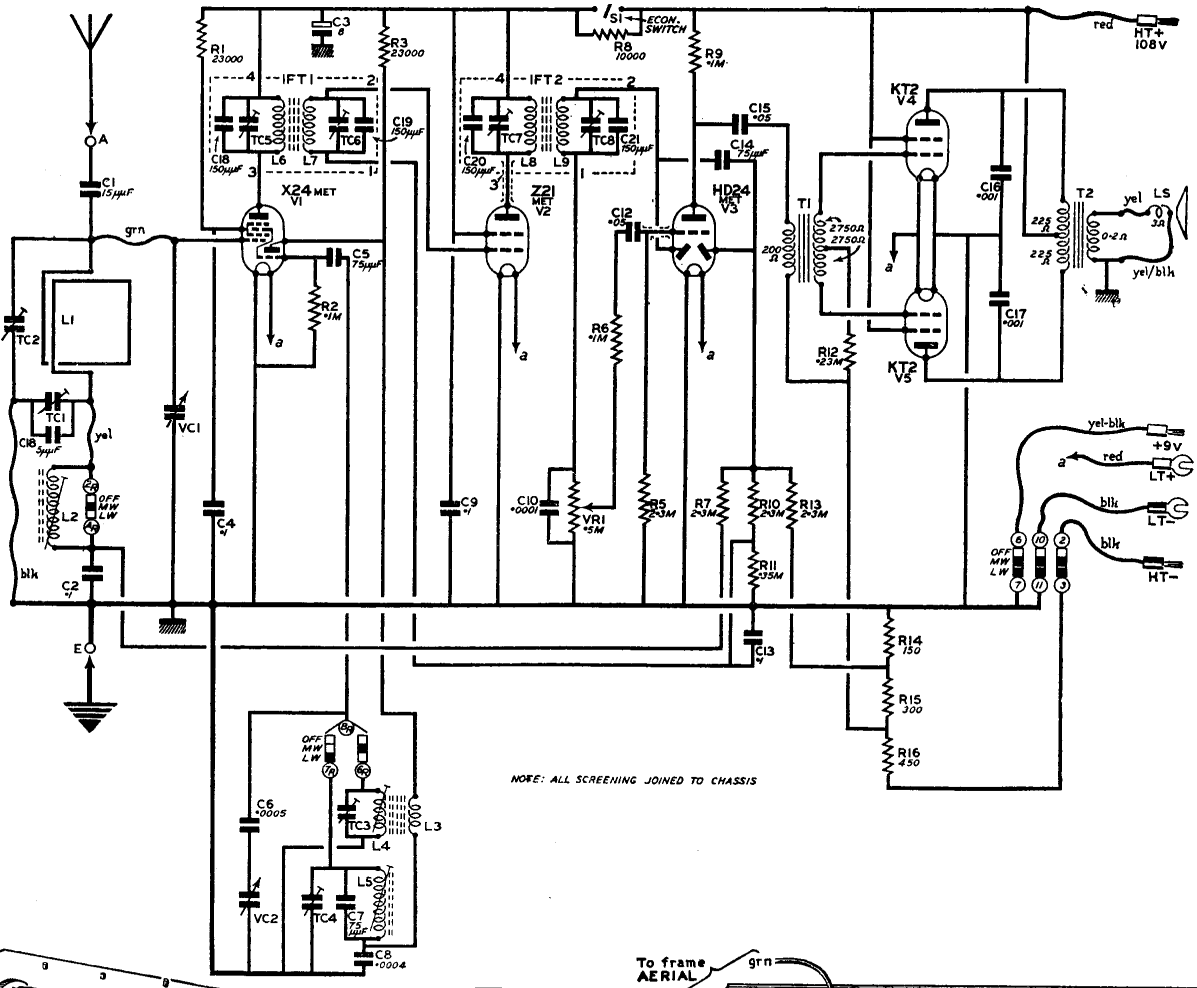
• PRELIMINARY SERVICE INFORMATION •

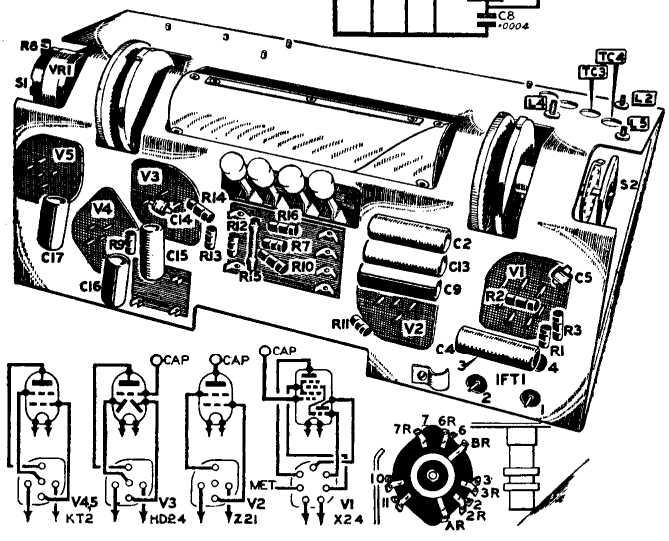
MARCONIPHONE

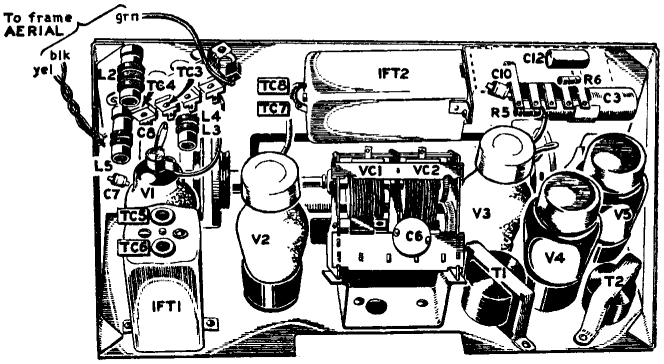
5-VALVE BATTERY PORTABLE

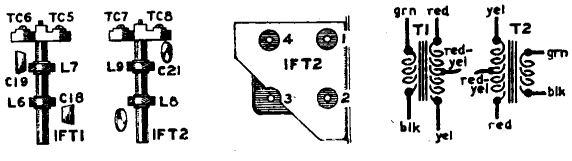
MODEL 895











VALVE TABLE.

(Voltage, Current and Resistance Tests.)

Voltage and current values ± 15 per cent., taken on a receiver operating on a new H.T. battery reading 109V. on load, switched to M.W., economy switch at " max.," and tuned to point of no reception. Resistance readings approximate, taken with batteries disconnected.

	ANODE			SCREEN			BIAS		GRID
	Volts	Milliamps	Resistance to chassis	Volts	Milliamps	Resistance to chassis	Volts	Measured	Resistance to chassis
V1 (X24 met) ...	Mxr 100 Osc 67	0·8 1·4	∞	60	1·7	∞	1·5	Junction R14 & R15 to chassis	4·95M
V2 (Z21 met) ...	100	1·9	∞	100	0·8	∞	0·17	*	·35M
V3 (HD24 met) ...	57	0·4	∞	—	—	—	—	—	2·3M
V4 (KT2)	98	0·8	∞	100	0·2	∞	4·5	Junction R15 & R16 to chassis	·23M
V5 (KT2)	98	0·8	∞	100	0·2	∞	4·5	Junction R15 & R16 to chassis	·23M

Total current 9·0 mA (measured at HT +).

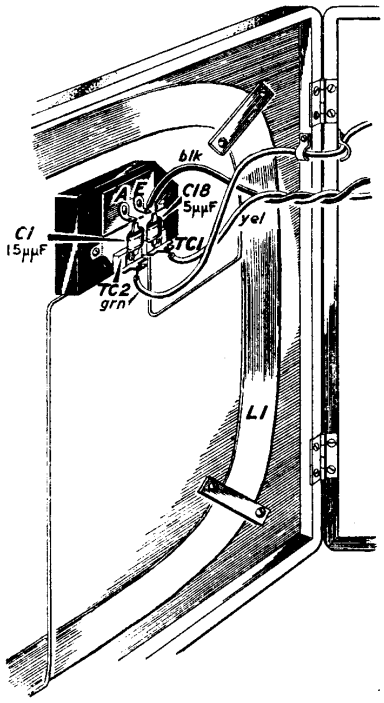
* Owing to high resistances of network this value cannot be measured.

NOTES :

The chassis is secured by four metal screws and two wood screws. Two of the former secure it to the top of the cabinet whilst the other two will be found adjacent to V1 and V5. The wood screws secure the lower edge of the chassis on either side of the cut-out for the loudspeaker.

The intermediate frequency is 465 kc/s. By removing the escutcheon round the aerial and earth sockets the two aerial circuit trimmers TC1 and TC2 are accessible. These may be adjusted as an expedient measure to ensure greatest sensitivity, for example when the H.T. battery is renewed, etc. Adjust TC1 for maximum output on a signal of about 225 metres and TC2 on as near 1350 metres as possible, whilst " rocking " the gang condenser.

Owing to the necessity for ensuring that the frame aerial is correctly aligned with the battery and receiver it is recommended that complete ganging should not be attempted without the full instructions.



Issued by—

E.M.I SERVICE LTD., Sheraton Works, Hayes, Middlesex.

• CONTINUATION SERVICE SHEET •

MARCONIPHONE MODEL 895

• *This sheet together with the PRELIMINARY SERVICE INFORMATION constitutes the complete Service Manual for this model. A Spare Parts List will be issued separately*

IMPORTANT NOTE

The 150 μμF condenser shown as C18 across L6 in the Preliminary Service Sheet should be marked C22. The correct C18 is that across TC1.

SPECIFICATION

Height.—11⅛ inches.

Width.—15 inches.

Depth.—6¾ inches.

Net Weight.—23 lb. 1 oz. (including batteries).

Consumption.

H.T. ... ... 9·0 mA. (economy 6·0 mA).
L.T. ... ... 0·8A.

Wave-Ranges.

M.W. ... ... 200 to 565 metres.
L.W. ... ... 900 to 2,000 metres.

Batteries.

L.T. ... 2-volt Accumulator Exide type PC3.
H.T. ... 108-volt Marconiphone cat. No. B496.

Valves.

Marconi	X24 Met	(V1)	Frequency Changer.
,,	Z21 Met	(V2)	I.F. Amplifier.
,,	HD24 Met	(V3)	Detector, A.V.C. and L.F. Amplifier.
,,	KT2	(V4)	Push-pull Output Valves.
,,	KT2	(V5)	

Rated Output.—800 milliwatts maximum.

Extra Loudspeaker.

Match as near as possible to 5 ohms impedance. Connexion may be made to the speech coil tags.

CIRCUIT DESCRIPTION

FREQUENCY CHANGER.

The first valve is a triode-hexode frequency changer (X24), the grid tuning circuit of which consists of the tuned frame aerial L1. This acts as the tuning inductance for M.W. and is loaded by means of the iron-cored coil L2 for L.W. Oscillations are produced from the tuned grid coils L4 and L5 by coupling coil (L3) in the case of M.W. and by coupling condenser (C8) in the case of L.W.

I.F. AMPLIFIER.

The first iron-cored I.F. transformer couples the anode of V1 to the I.F. amplifier V2 (Z21). This pentode valve is in turn coupled by a second I.F. transformer to V3. The intermediate frequency is 465 kc/s.

DETECTOR AND A.V.C.

A double diode triode (HD24) provides demodulation, A.V.C. voltage and L.F. amplification. The signal diode has as a load resistance VR1, the volume control. The A.V.C. diode is fed from the signal diode via C14. The tapped load R10, R11, is connected to a grid bias point to provide delay and initial bias for V1 and V2 which are also A.V.C. controlled. The volume control VR1 feeds the grid of the triode portion of V3 which is parallel-feed transformer coupled to V4 and V5.

OUTPUT STAGE.

The push-pull output valves (V4 & V5, KT2) are coupled to the loudspeaker by the output transformer, T2. Tone correcting condensers C16 & C17 are fitted in the anode circuit. Bias for these valves is obtained by tapping off the voltage drop across a potentiometer R14, R15, R16, connected across 9 volts of the H.T. battery.

PRELIMINARY TESTS

The following tests, if systematically carried out, will help in locating a fault in the receiver.

1. Battery Test.—Measure the total H.T. feed at the H.T. + lead. With the battery economy switch in the "Max." position this should be between 4 and 10mA according to the condition of the H.T. battery.

A higher value indicates possible faulty output valves or short somewhere on H.T. line ; a low value indicates low current due possibly to faulty valves, bias resistance (R14, 15 or 16) or feed line.

The minimum on-load voltages for the batteries are :
H.T. ... ... 60 volts.
L.T. ... ... 1·8 volts.

If values are below this replace H.T. battery or recharge accumulator.

2. L.F. Test.—Touch the top terminal of V3 with wetted finger, a distinct click or whistle should be heard if the L.F. stages (V3, V4 and V5) and loudspeaker are in order. Speech coil continuity can be checked by contacting a small battery or an ohmmeter across the speech coil.

3. H.F. Test.—To check that the mixer valve V1 (X24) is oscillating, connect a low reading milliammeter in series with R2 (filament end).

If C6 (anchor tag) is now shorted to chassis the current should cease if the valve is functioning correctly. If not, check oscillator circuit, L3, L4, L5, C7, C8, etc.

GANGING

Do not attempt to make any adjustment to the circuits of this receiver unless you have adequate equipment as outlined below. All necessary oscillators, trimming tools, etc., essential for the correct adjustment of H.F. and I.F. circuits can be obtained from :—

E.M.I SERVICE LIMITED

Always follow any adjustment to I.F. trimmers with complete R.F. alignment (M.W. and L.W.).

The E.M.I Service output meter should be connected across the primary of T2, output transformer, but if an A.C. voltmeter (low impedance) is used connect it across the speech coil.

Having removed the chassis from the cabinet and the back of the cabinet with frame, reassemble the chassis, batteries, and frame on the bench in *exactly their correct relative positions.*

The space between the frame wire and the battery must be $\frac{3}{8}$ inch, the battery label should face away from the aerial, and the frame leads should be "dressed" to approximately the positions they would occupy in the cabinet.

During ganging the input to the receiver from the oscillator must be kept low, and progressively reduced as the circuits are brought into line so that the output meter reading does not exceed 50 mW. or 0·4 V. with the receiver volume control at maximum.

Do not use an H.T. battery with a voltage of less than 100 V. (on load) for ganging purposes.

I.F. ALIGNMENT.

Set up the chassis as described above, except that for I.F. alignment the positions of the frame aerial (which must be connected) and batteries are not critical. Remove the small metal screen (shown dotted in the chassis diagram in the Preliminary Service Sheet) just above the connexions to IFT2.

Set receiver to M.W. gang condenser to minimum and volume control and economy switch to "Max."

Connect oscillator leads to top grid V2 via 0·1 μF condenser, leaving valve lead in position, and chassis. Tune oscillator exactly to 465 kc/s. (645·2 metres) and connect a damping circuit consisting of a 35,000 ohm resistance and a 0·1 μF condenser in series across L9.

1. Adjust TC7 for maximum output.

2. Remove damping circuit from L9 and connect across L8 ; adjust TC8 for maximum output.

3. Inject oscillator signal into grid V1, connect damping circuit across L6 and adjust to TC6 for maximum output.

4. Connect damping circuit across L7 and adjust TC5 for maximum output.

5. Do *not* readjust trimmers except to follow through the whole of the operations again if necessary.

6. Replace screen over I.F. connexions.

R.F. GANGING.

To inject the ganging signal the screened oscillator earthy lead should be connected to the receiver chassis and the " hot " lead (not more than 6 inches long) left free. Alternatively, if this does not provide sufficient input, connexion can be made to the aerial socket via a condenser of not more than 5 $\mu\mu$F.

IMPORTANT.—See that chassis, batteries and frame aerial are in their correct respective positions.

Do not attempt to align M.W. circuits only without following up with L.W.

1. See that the scale registers on the special mark when the gang condenser is at maximum.

2. Set receiver (by scale) and oscillator to 200 m. (1,500 kc/s.) and adjust TC3 for maximum output.

3. Tune oscillator to 225 metres (1,333 kc/s.) tune in, and adjust TC2 for maximum output.

4. Tune oscillator to 520 metres (576·9 kc/s.) tune in, and adjust core of L4, whilst " rocking " gang, for maximum output.

5. Repeat operations 2, 3 and 4.

6. Set oscillator and receiver (by scale) to 900 metres (333·3 kc/s.) and adjust TC4 for maximum output.

7. Tune oscillator to 1,350 metres (222·2 kc/s.) tune in signal and adjust TC1 for maximum output whilst " rocking " gang.

8. Set receiver (by scale) and oscillator to 1,900 metres (157·9 kc/s.) and adjust L2 and L5 cores for maximum output.

9. Repeat operations 6, 7 and 8.

10. Replace receiver in cabinet and finally check over adjustment of TC1 and TC2 on 225 and 1,350 metres.

CONDENSER DRIVE

Approximately 19 inches of cord Spec. S 515 is required for one drive.

1. Set gang condenser to maximum, and scale drum to position shown.

2. Assemble end of cord on anchor pillar and wind as shown (1, 2, 3 and 4).

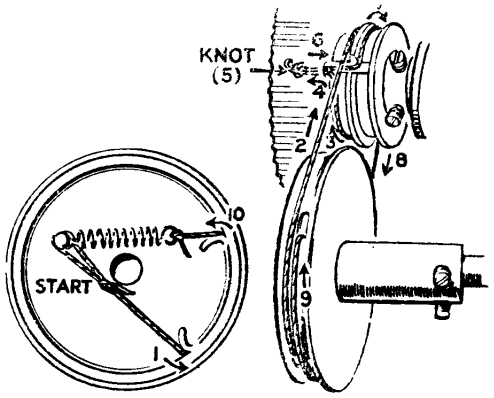
3. The knot 5 must be tied so that the drum is at its maximum stop whilst the gang is also at maximum, the cord being reasonably taut.

4. Wind cord as shown (6, 7, 8, 9 and 10).

5. Assemble spring in position so that cord is tensioned.

6. Check that gang max. stop is reached at same moment as drum stop, adjusting if necessary by either or both pairs of set screws on drum and condenser drive wheel.

Warning.—Do not tighten screws of moulded drive disc too much or the material may crack.



SPARE PART STOCK NUMBERS AND ELECTRICAL VALUES

Component.	Resistance.	Stock No.
L1	0·7 ohm.	31501A
L2	9·0 ohms.	31407F
L3	1·8 ,,	31407B
L4	2·2 ,,	
L5	7·0 ,,	31407C
L6	3·75 ,,	See IFT 1
L7	3·75 ,,	
L8	3·75 ,,	See IFT2
L9	3·75 ,,	
IFT1		26330CQ
IFT2		26330CM

	Description.	
T1	Coupling transformer.	18792G
T2	Output transformer.	19255V
C1	15μμF.	22164D
C2	0·1μF.	24900AA
C3	8μF electrolytic.	17250K
C4	0·1μF.	24900AA
C5	75μμF.	22164K
C6	0·0005μF ± 2%	30433H
C7	75μμF.	22164K
C8	0·0004μF ± 2%.	28444X
C9	0·1μF.	24900AA
C10	0·0001μF.	22164L
C12	0·05μF.	24900W
C13	0·1μF.	24900AA
C14	75μμF.	22164K
C15	0·05μF.	24900W
C16	0·001μF.	24900A

Component.	Description.	Stock No.
C17	0·001μF.	24900A
C18	5μμF.	22164H
C19	150μμF.	28444C
C20	150μμF.	28444C
C21	150μμF.	28444C
*C22	150μμF.	28444C
VC1 and VC2	Gang condenser.	31590B
TC1	Dual trimmer condenser.	32668A
TC2		
TC3	Dual trimmer condenser.	31759A
TC4		
R1	23,000 ohms, ¼ w.	24150G
R2	0·1 megohm, ¼ w.	24150L
R3	23,000 ohms, ¼ w.	24150G
R5	2·3 megohms, ¼ w.	24150AM
R6	0·1 megohm, ¼ w.	24150L
R7	2·3 megohms, ¼ w.	24150AM
R8	10,000 ohms, ½ w.	25900B
R9	0·1 megohm, ¼ w.	24150L
R10	2·3 megohms, ¼ w.	24150AM
R11	0·35 megohm, ¼ w.	24150AK
R12	0·23 megohm, ¼ w.	24150M
R13	2·3 megohms, ¼ w.	24150AM
R14	150 ohms ± 5%, ½ w.	24150AV
R15	300 ohms ± 5%, ½ w.	30020DX
R16	450 ohms ± 5%, ½ w.	30020 DY
VR1	0·5 megohm.	27655EW
S1		
S2	Wavechange switch.	25001D
LS	Loudspeaker, complete.	20750A

* *See IMPORTANT NOTE on page 1.*

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