

NUMBER FIFTY-ONE
(VOLUME TWO)

'TRADER' SERVICE SHEETS

MARCONIPHONE

MODEL 235

3-VALVE (PLUS RECTIFIER) A.C. RECEIVER

THE Marconiphone Model 235 is a 3-valve (plus valve rectifier) A.C. receiver, employing a "straight" circuit, with a screened tetrode H.F. amplifier, triode detector and high-efficiency output pentode. The M.C. speaker and smoothing condensers are on a separate small chassis, while the cabinet is of rectangular shape, with a black imitation leather covering, and chromium-plated fittings.

CIRCUIT DESCRIPTION

Two alternative aerial connections (A2 via fixed resistance R1) to coupling coil L1. Single tuned input circuit L2, L3, C15 precedes initial variable-mu tetrode H.F. amplifier (V1, Marconi metallised VMS4B). Gain control by variable cathode resistance R5, which varies G.B. applied.

Tuned-anode coupling by L4, L5, C18 to triode detector (V2, Marconi MH41) operating on grid leak system with C6 and R8. Reaction applied to anode coils by coils L6, L7, and controlled by variable condenser C20. Fixed condenser C4 prevents damage to V1 anode tuning coils in the event of a short-circuit occurring in C18 or C19. Efficient H.F. filtering in detector anode circuit by choke L8 and condensers C8, C9.

No provision for connection of gramophone pick-up.

Resistance-capacity coupling to high-efficiency output pentode (V3, Marconi N41) with tone compensation by single fixed condenser C12 in anode circuit.

H.T. current is supplied by full-wave rectifying valve (V4, Marconi U12). Smoothing by means of speaker field winding L11 and dry electrolytic condensers C13, C14. Hum control by pre-set variable potentiometer across heater secondary of mains transformer T2.

COMPONENTS AND VALUES

Resistances		Values (ohms)
R1	Aerial series resistance	23,000
R2	V1 S.G. pot. divider	35,000
R3		23,000
R4	V1 fixed G.B. resistance	230
R5	V1 gain control	14,000
R6	V1 anode decoupling	5,000
R7	Reaction series resistance	100
R8	V2 grid leak	2,300,000
R9	V2 anode decoupling	100,000
R10	V2 anode resistance	50,000
R11	V3 grid resistance	230,000
R12	V3 grid H.F. stopper	100,000
R13	V3 G.B. resistance	50
R14	Hum control	48.5

Condensers		Values (μF)
C1	V1 cathode by-pass	0.1
C2	V1 S.G. by-pass	0.5
C3*	V1 anode decoupling	2.0
C4	T.A. circuit D.C. blocking	0.05
C5	V1 anode decoupling	0.1
C6	V2 grid condenser	0.000075
C7*	V2 anode decoupling	1.0
C8	V2 anode H.F. by-passes	0.00075
C9		0.00075
C10	L.F. coupling to V3	0.1
C11*	V3 cathode by-pass	25.0
C12	V3 anode tone compensator	0.002
C13*	H.T. smoothing	8.0
C14*		8.0
C15	Aerial circuit tuning	—
C16	Aerial circuit main trimmer	—
C17	Aerial circuit L.W. trimmer	—
C18	H.F. anode circuit tuning	—
C19	H.F. anode circuit trimmer	—
C20	Reaction condenser	0.0008

* Dry electrolytics.

Other Components		Values (ohms)
L1	Aerial coupling coil	12.0
L2	Aerial tuning coils	3.0
L3		24.0
L4	H.F. anode tuning coils	3.0
L5		24.0
L6	Reaction Coils	0.75
L7		2.0
L8	V2 anode H.F. choke	90.0
L9	Speaker speech coil	1.75
L10*	Hum neutralising coils	0.5
L11	Speaker field winding	2,000
T1	Speaker input trans.	Pri. ... 750.0 Sec. ... 0.2
T2	Mains trans.	Pri. total ... 29.0 Heater sec. ... 0.1 Rect. fil. sec. ... 0.1 H.T. sec. ... 680.0
Sr-S3	Waveband switches, ganged	—
S4	Mains switch	—

* Two in series.

DISMANTLING THE SET

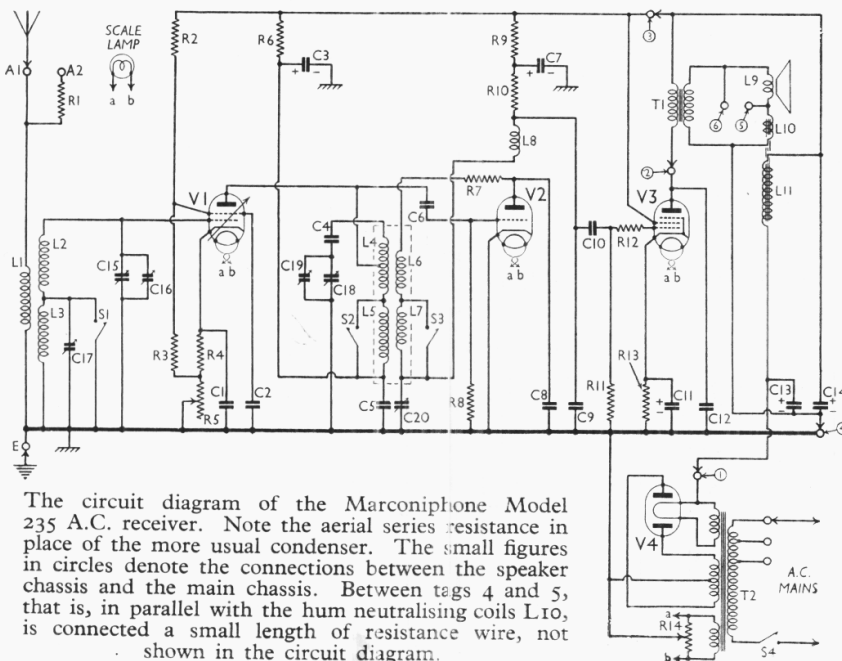
Removing Chassis.—Remove control knobs (special set screws entering slots in the shafts). Unsolder speaker unit cable from panel on receiver chassis. The tags are numbered, and the code is 1, Red; 2, Red and yellow; 3, Red and black; 4, Black. Remove switch leads from the screw terminals on top of mains transformer. Detach mains lead from clip on side of cabinet. Receiver chassis is held by four hexagon-headed bolts. Remove these from beneath the cabinet, when chassis may be withdrawn.

Removing Speaker Chassis.—This is held to bottom of cabinet by four nuts and bolts. The chassis is not fixed to front of cabinet, but when replacing it, push it firmly against the cabinet front before tightening up the fixing bolts.

The terminal panel on speaker chassis has tags numbered 1-6. The first four correspond with those on the receiver chassis terminal panel, while 5 and 6 are for the connection of a low resistance external speaker.

VALVE ANALYSIS

The voltage and current readings listed in the table are those given by Marconiphone for an average chassis working with no aerial or earth connections. The volume control was set at maximum and



The circuit diagram of the Marconiphone Model 235 A.C. receiver. Note the aerial series resistance in place of the more usual condenser. The small figures in circles denote the connections between the speaker chassis and the main chassis. Between tags 4 and 5, that is, in parallel with the hum neutralising coils L10, is connected a small length of resistance wire, not shown in the circuit diagram.

reaction was at minimum. All voltages were measured with a low consumption meter, chassis being negative.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 VMS4B	170	4.0	70	0.6
V2 MH41	65	1.0	—	—
V3 N41	170	42.0	400	10.0
V4 U12	330*	—	—	—

* Each anode, A.C.

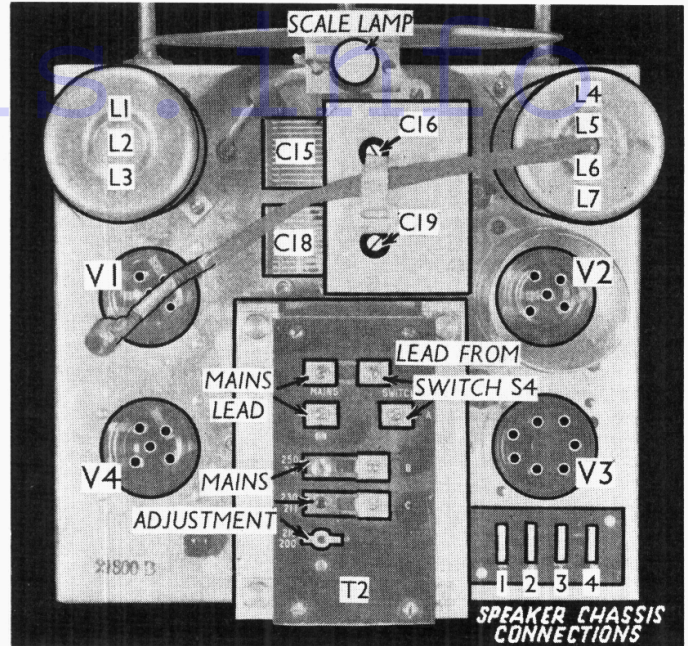
GENERAL NOTES

Switches.—S1-S3 are the waveband switches, in a ganged assembly seen in the under-chassis view. Each switch is formed of a fixed metal sector and a fixed contact finger, between which a metal contact slides. The latter is fitted in an insulated rotor. In our under-chassis view we have indicated the two tags of each switch. All the switches are closed on the M.W. band and open on the L.W. band.

S4 is the Q.M.B. mains switch fitted at the right-hand side of the cabinet. The leads from it are clamped under the two connectors marked "Switch" on the insulated panel above the mains transformer.

Coils.—These are in two screened units on top of the chassis. On removing the screens, which are held to the chassis by two brackets each, and to the coil unit by a radial bolt and nut in each case, the

Plan view of the main chassis. Note the tags to which the speaker chassis cable is connected, also the screw terminals for the mains lead and switch S4 lead.



coils will be seen wound on a tubular former. The order of the coils from top to bottom is, in the first unit, L2, L1, L3, and in the second unit, L4, L6, L5, L7. The choke L8 is seen in the under-chassis view.

Scale Lamp.—This is an Osram M.E.S. type, rated at 6.2 V, 0.3 A, and having a frosted bulb.

External Speaker.—This may be connected to the tags numbered 5 and 6 on the speaker chassis terminal panel. It should be of the low impedance type, with a coil resistance of about 2 O.

Condensers C13, C14.—These are two electrolytics mounted on the platform of the speaker chassis. In our case they are two separate units of the tubular type, but in other chassis they may be in a single 8+8 μF pack, with a common negative lead. In this case the yellow lead is the positive of C13 and the red lead the positive of C14.

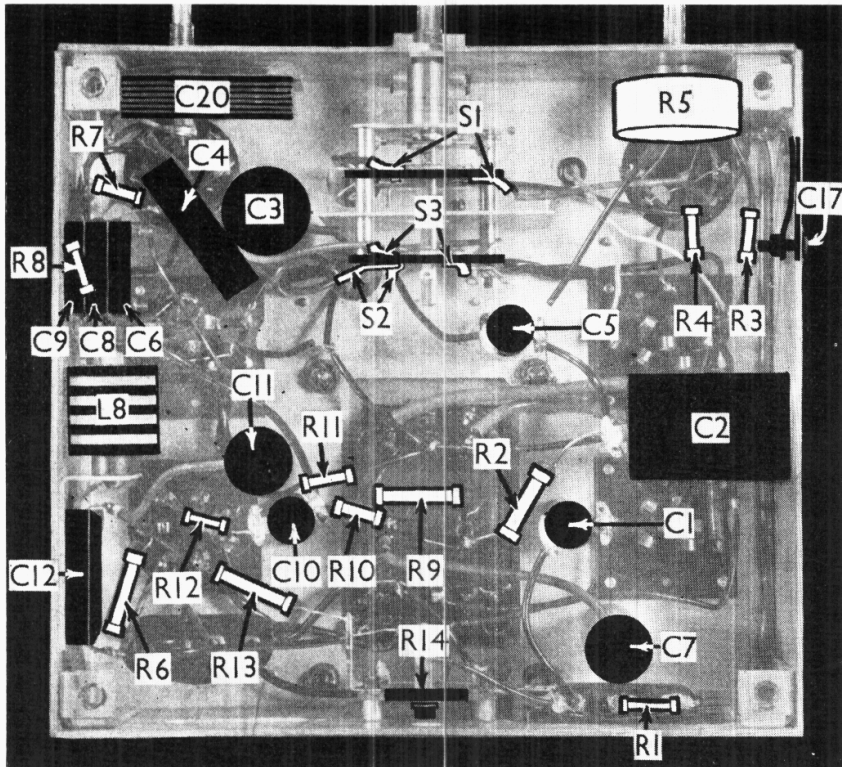
Trimmer C17.—This is a pre-set condenser consisting of an adjustable plate, a sheet of insulating material, and the side of the chassis, which forms the other plate.

Hum Coils.—There are two of these in series, indicated in the speaker chassis view overleaf. They are shown as one coil, L10, in the circuit diagram. Part is wound over the field coil, L11, while the remainder is round one arm of the magnet. In addition, a small external resistance is connected across L10, but is not shown in the circuit diagram. It is actually a small length of resistance wire, inside empire sleeving, connected between tags 4 and 5 on the speaker chassis terminal panel. The value of this resistance is about 1 ohm in our chassis.

Hum Resistance R14.—This is a low resistance potentiometer, attached to the back of the chassis, and adjustable through a hole in the chassis.

Condenser Mountings.—Several of the small tubular condensers are mounted in tubular cans, into which they are slipped, the wiring holding them in position. It should be noted that these condensers have both connections brought out at one end, and the ordinary types, with one connection at each end, are not suitable for replacement purposes, unless they are suspended on the wiring in the

(Continued overleaf)



Under-chassis view. R14 is the hum control, while C17, attached to the side of the chassis, is the aerial L.W. trimmer. C3, C7 and C11 are dry electrolytics. The tags belonging to the wavechange switches S1-S3 are indicated.

MARCONIPHONE MODEL 235

(Continued)

ordinary way, the tubular cans being left empty.

Condensers C3, C7, C11.—These are three tubular electrolytics, mounted by single nuts and studs, which form the negative connections to the chassis.

CIRCUIT ALIGNMENT

If an oscillator and output meter are available, the procedure is as follows:—

Connect an aerial and earth to the receiver, and also connect the oscillator output leads to the aerial and earth sockets. Connect the output meter, which may be a 0.2 V A.C. voltmeter, joined to the tags 4 and 6 on the speaker chassis terminal panel.

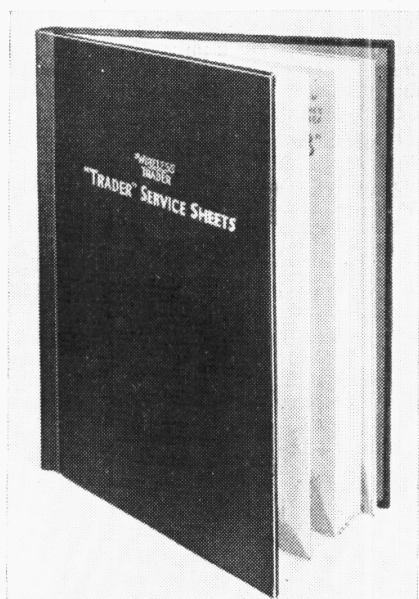
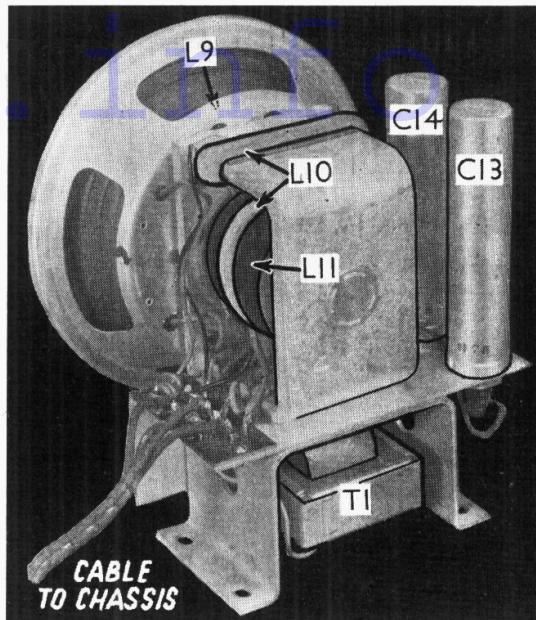
Unscrew **C16** and **C19** to minimum. Insert chassis into cabinet, and tune condenser to exactly 200 m. on the scale. Carefully remove chassis without disturbing condenser. Tune oscillator to 200 m., set receiver volume control **R5** to maximum, and reaction control **C20** just short of oscillation. Adjust **C19** for maximum output, reducing input from

oscillator progressively so that the reading on output meter is below 0.5 V. Similarly adjust **C16**. Re-adjust **C19**, then **C16** if necessary.

Place chassis in cabinet, and tune to 1,400 m. on scale. Remove chassis carefully. Set wave-change switch to L.W., and adjust oscillator to 1,400 m. Set reaction control just short of oscillation. Adjust **C17** for maximum output.

The receiver may also be similarly adjusted on actual signals if an oscillator is not available.

The speaker chassis, **C13** and **C14** may consist of a single pack instead of the two tubular types shown. **L10** is in two sections, clearly indicated here by arrows, the whole being shunted by a small wire resistance (not shown), connected between tags 4 and 5 on the panel.



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