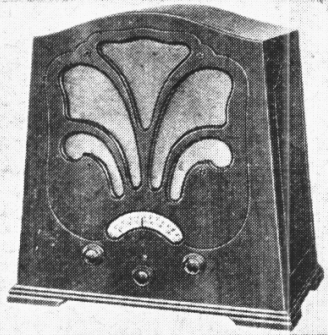


"TRADER" SERVICE SHEET

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MARCONI 253AC, 254AC/RG & 271RG, HMV 436; COLUMBIA 355 & 620RG



The Marconiphone 253.

THE Marconiphone 253AC is a 3-valve (plus rectifier) TRF receiver designed to operate from AC mains of 200-250 V, 50-60 C/S.

A similar chassis is employed in the Marconiphone 254 and 271 AC radiograms, in the HMV 436 and Columbia 355 AC table models, and in the Columbia 620 AC radiogram.

Release dates: Marconiphone 253, 1932; 254, 271, 1933; HMV 436, 1933; Columbia 355, 620, 1932.

CIRCUIT DESCRIPTION

Aerial input direct via S1, or via alternative series condensers C1, C2, and tappings on coils to band-pass filter. Primary coils L1, L2 tuned by C22; secondaries L3, L4 by C24. Coupling by C3.

First valve (V1, Marconi MS4B) is a tetrode operating as RF amplifier with gain control by variable resistance R4. Fixed minimum GB is obtained from R6.

Choke-capacity coupling by L9, C6 between V1 and triode detector valve (V2, Marconi MH4) which operates on the grid leak system with C8 and R8, and whose control grid circuit is tuned by L7, L8 and C27. Reaction is applied from anode via coils L5, L6 and controlled by variable condenser C26, which is ganged with R4.

Provision for connection of gramophone pick-up in grid circuit via switch S12. Input is developed across R9 and volume control R10, which is ganged with R4, C26, the total output being limited by the drop across R9. When the control is turned to "Gram," S13 closes and S11 opens, to mute radio, while S14 opens to permit the application of GB to V2.

Parallel-fed transformer coupling by R13, C13 and T1 between V2 and pentode output valve (V3, Marconi MPT4). Fixed tone correction by C15 across T1 secondary and C17 in anode circuit. Provision for connection of low-impedance external speaker across T2 secondary.

HT current is supplied by full-wave rectifying valve (V4, Marconi U12). Smoothing by speaker field L13, in negative HT lead, and condensers C19, C20. GB for V3 is obtained from tapping on L13. Provision for mains aerial coupling via C21 by a plug on a flying lead, and for power to gramophone motor by terminals on mains transformer T3.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted in the makers' manual. They represent conditions to be expected in an average receiver operating on radio with the volume control advanced, but with no signal input. Voltages given were measured on the 1,200 V scale of a DC Avometer, except in the case of V1 screen, which was measured on the 120 V scale. The negative meter lead was connected to chassis.

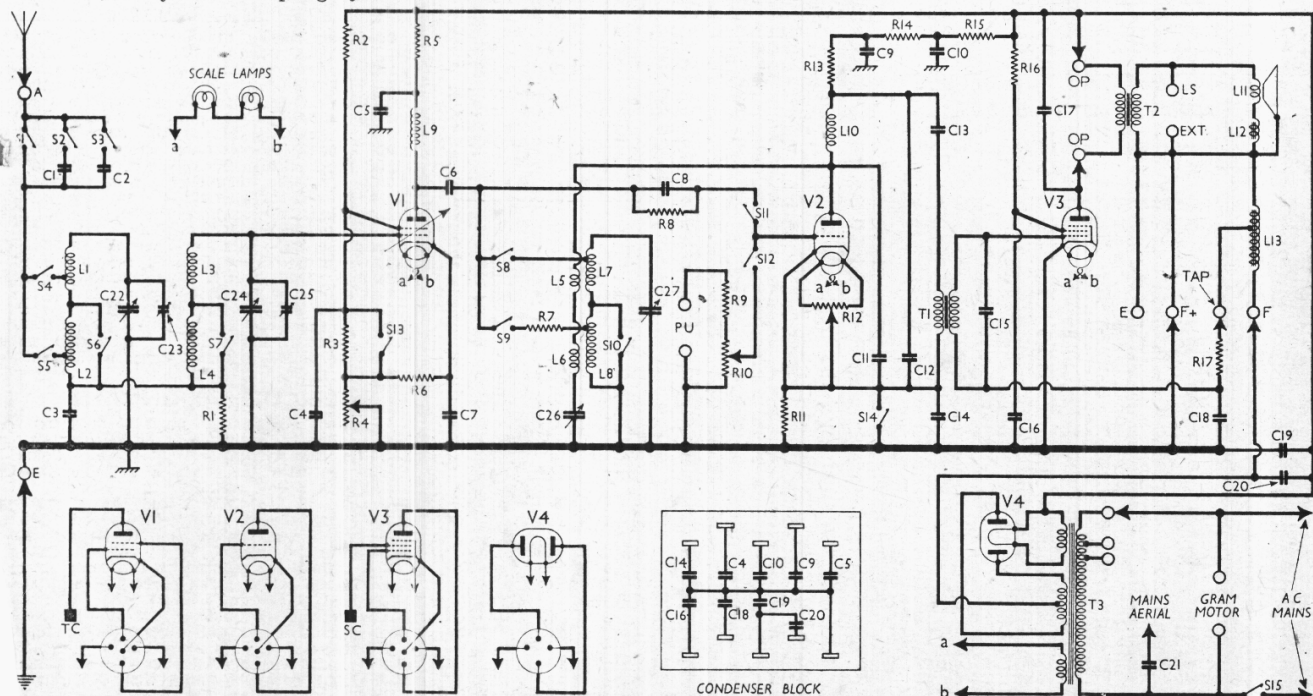
Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 MS4B	230	3.5	62	0.6
V2 MH4	40	1.8	—	—
V3 MPT4	250	36.0	210	6.5
V4 U12	—	25.0†	—	—

† Note: DC current, each anode.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 CG resistance	2,000
R2	V1 SG HT potential divider	50,000
R3	...	75,000
R4	V1 gain control*	10,000
R5	V1 anode HT feed	10,000
R6	V1 fixed GB	320
R7	RF coupling LW damping	2,000
R8	V2 grid leak	500,000
R9	PU limiting resistance	50,000
R10	PU input gain control*	6,000
R11	V2 (gram) GB resistance	1,000
R12	V2 heater circuit pot.	20
R13	V2 anode load	35,000
R14	V2 anode decoupling resistances	35,000
R15	...	35,000
R16	V3 SG HT feed	10,000
R17	V3 CG decoupling	200,000

* Ganged C26.



Circuit diagram of the Marconiphone 253AC receiver. Inset beneath the circuit is a diagram of the condenser block, viewed in the position shown in the under-chassis view.

CONDENSERS		Values (μ F)
C1	Aerial series condensers	0.00015
C2		0.00025
C3	Band-pass coupling ...	0.02
C4	V1 SG decoupling ...	0.1
C5	V1 anode decoupling ...	1.0
C6	V1 to V2 RF coupling ...	0.0001
C7	V1 cathode by-pass ...	0.1
C8	V2 CG condenser ...	0.0001
C9	V2 anode decoupling condensers	1.0
C10		1.0
C11	RF by-pass condensers ...	0.0005
C12		0.0005
C13	AF coupling to T1 ...	0.1
C14	V2 cathode by-pass ...	2.0
C15	Fixed tone corrector ...	0.0001
C16	V3 SG decoupling ...	2.0
C17	Fixed tone corrector ...	0.002
C18	V3 CG decoupling ...	2.0
C19	HT smoothing condensers	2.0
C20		3.0
C21	Mains aerial coupling ...	0.001
C22†	Band-pass pri. tuning ...	—
C23†	B-P pri. MW trimmer ...	—
C24†	Band-pass sec. tuning ...	—
C25†	B-P sec. MW trimmer ...	—
C26†	Reaction control* ...	—
C27†	RF circuit tuning ...	—

† Variable. ‡ Pre-set. * Ganged R4, R10.

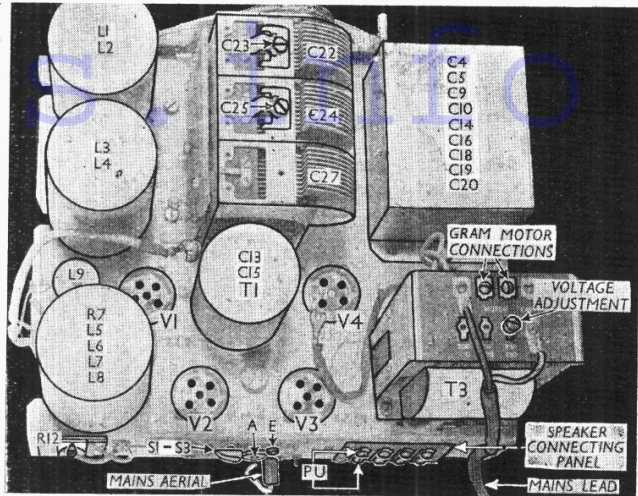
OTHER COMPONENTS		Approx. Values (ohms)
L1	Band-pass primary coils	1.6
L2		16.0
L3	Band-pass secondary coils ...	1.6
L4		16.5
L5	Reaction coils, total ...	4.0
L6		4.0
L7	RF circuit tuning coils ...	1.6
L8		17.5
L9	V1 anode RF choke ...	90.0
L10	RF filter choke ...	90.0
L11	Speaker speech coil ...	8.0
L12	Hum neutralising coil ...	0.5
L13	Speaker field coil, total*	2,250.0
T1	Intervalve { Pri. ...	875.0
	{ Sec. ...	5,000.0
T2	Speaker input { Pri. ...	775.0
	{ Sec. ...	2.0
T3	Mains { Pri., total ...	44.0
	{ Heater sec. ...	0.1
	{ Rect. heat. sec. ...	0.1
	{ HT sec., total ...	1,275.0
S1-S3	Aerial selector switches ...	—
S4-S10	Waveband switches ...	—
S11-S14	Radio/gram switches ...	—
S15	Mains switch ...	—

* Tapped at 250 Ω from F+ (chassis) end.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (recessed grub screws) from the front of the cabinet;

Plan view of the chassis. The detachable screen round V2 and V3 was removed for photographing. The connections to the condenser block appear beneath the chassis, and are indicated in the under-chassis view below.



from the panel at the rear of the chassis, disconnect the five leads from the speaker; remove four cheese-head bolts (with metal and rubber washers) holding the chassis to the bottom of the cabinet.

When replacing, two rubber washers should go on each fixing bolt, one either side of the cabinet base.

The speaker leads should be connected as follows:

Lower row: SPK. Tap, green; OP, red; SPK.FLD, grey.

Upper row: OP, yellow; +SPK.FLD, black.

These terminals are all repeated on a panel on the speaker itself, and it is not so important that the colours are correct as it is that a given terminal on one panel shall be connected to the corresponding terminal on the other.

Removing Speaker.—Disconnect the speaker leads at one end, and remove the four hexagon fixing nuts (with lock-washers) holding the speaker to the sub-baffle.

When replacing, the transformer should be on the right, and the leads should be connected as previously indicated.

GENERAL NOTES

Switches.—S1-S3 are the aerial series selector switches for positions A1, A2 and A3 on the aerial connecting panel. In the direct (A1 setting, minimum selectivity) position, S1 is closed. In the most selective (A3 setting) position, S3 is closed.

S4-S10 are the waveband switches, and S11-S14 the radio/gram change-over and radio muting switches in a single barrel-type unit indicated in our under-chassis view, where the switches are identified. The table below gives the switch

positions for three of the control settings, the fourth being "off." A dash indicates open, and C, closed.

S15 is the QMB mains switch, cam operated from the S4-S14 switch spindle.

Scale Lamps.—These are two MES types rated at 3.5 V, 0.3 A. They are connected in series across the heater circuit.

External Speaker.—Two terminals marked "EXT. LS" are provided on the connecting panel on the speaker assembly for a low impedance (6-12 Ω) external speaker.

Switch Table

Switch	MW	LW	Gram
S4	—	—	—
S5	C	—	—
S6	—	C	—
S7	—	—	C
S8	—	—	—
S9	—	C	—
S10	—	—	C
S11	—	—	—
S12	—	C	—
S13	—	—	C
S14	C	C	—

Condenser Block.—Condensers C4, C5, C9, C10, C14, C16, C18, C19 and C20 are contained in a multiple block mounted on the chassis deck. The connecting tags are underneath the block and they project into the under-chassis compartment through an aperture in the chassis pressing. A diagram of the tag positions inset beneath the circuit diagram overleaf shows the internal connections of the block. It is drawn as seen when viewed from the rear of the underside of the chassis as seen in our under-chassis view, where the position of the connecting panel is indicated.

Condenser C3.—This has a capacity of 0.02 μ F comprising two 0.01 μ F mica condensers connected in parallel. It is important that replacements should be non-inductive.

Condenser C13.—In our chassis, this was contained in the metal casing of T1, with C15, but in some chassis it may be a separate unit, where it will be found mounted beneath the chassis near C7.

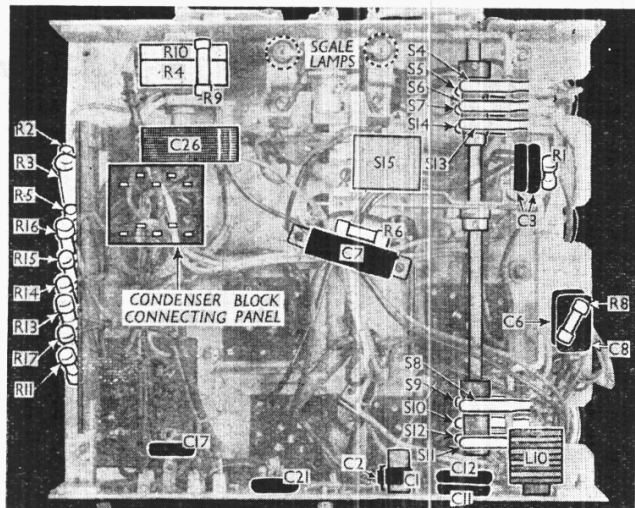
CIRCUIT ALIGNMENT

Alignment adjustments must be made on the MW band only, with the aerial selector switch S1-S3 in the A1 (central) position. Connect signal generator leads via a suitable dummy aerial to A and E sockets.

Switch set to MW, feed in a 300 (1,000 KC/S) signal, tune it in, and adjust C7, then C25, for maximum output. Repeat the adjustments.

Now adjust the pointer by the screw on front of the cabinet, and check the calibrat at several points on the MW and LW scale finally setting the pointer for the best compromise, and re-wax the heads of the trimmer.

Where possible, it is advisable to give a check on C23 with the set operating on a broadcast signal, with the aerial with which it normally operate.



Under-chassis view. The connecting tags of the condenser block are indicated in the same position as they appear in the diagram, inset beneath the circuit diagram, overleaf. R10, R4 and C26 form a ganged volume control assembly.