MARCONIPHONE

SERVICE MANUAL

PRIVATE AND CONFIDENTIAL TO THE TRADE ONLY

MODEL 209 5-VALVE SUPERHET RECEIVER FOR A.C. MAINS

JULY
1936
1936 SERIES
NUMBER TEN
PART NO. 24470

CONTENTS

This Manual contains Specification, complete Servicing Diagrams, and Spare Part List. Basically Model 209 is a simplified version of the Model 219, and reference should be made to the Manual for the letter model for Preliminary Tests, H.F. Tests, &c. The visual tuning indicator and the "Q" switch with its associated components have been deleted. The mains switch is mounted in the old position of the "Q" On-Off switch, and the loudspeaker is of the circular type.

MODEL 209

VOLTAGE RANGE

200 to 250 volts (A.C.).
50 to 100 cycles.

POWER CONSUMPTION

Approximately 60 watts.

FUSES

It is recommended that this instrument is connected only to supply points protected with 2-ampere fuses.

SPEECH OUTPUT

Approximately 2 watts (undistorted).
Anode dissipation of MPT4 output valve, 8 watts.

WAVELENGTH RANGE

Medium waves	200 to 550 metres.
Long waves	1,000 to 2,000 metres.

DIMENSIONS

Height.	Width.	Depth.
18 inches.	$16\frac{1}{8}$ inches.	$10\frac{1}{2}$ inches.

WEIGHT

$36\frac{1}{2}$ lbs. net.
46 lbs. gross.

VALVES

Marconi MX40 (met.)	Frequency Changer.
Marconi VMP4G (met.)	I.F. Amplifier.
Marconi D41 (met.)	Diode Detector and A.V.C. rectifier.
Marconi MH4 (met.)	L.F. Amplifier.
Marconi MPT4	Output Pentode.
Marconi U12	H.T. Rectifier.

LOUDSPEAKER

No. 21970 U.

This loudspeaker incorporates the output transformer T2, and has an energised field with hum-bucking coil. The field is used as H.T. smoothing in the negative lead.

D.C. resistance of speech coil, 4 ohms.

Impedance at 800 cycles, 5 ohms.

D.C. resistance of field, 2,860 ohms.

EXTRA LOUDSPEAKER

This receiver will operate two extra loudspeakers without greatly reducing the volume of the in-built speaker, providing that the speech coil impedances of the extra speakers are not lower than 5 ohms.

The sockets provided are connected directly to the secondary of the output transformer. Adjust extra speakers for direct connection to the speech coil. Marconiphone 143 and 144 are suitable as extras for this model.

If it is required to connect a high resistance speaker, one side should be earthed, whilst the other side should be connected via a 0·1 mfd. condenser to tag No. 8 on the L.S. panel.

CONNECTING A PICK-UP.

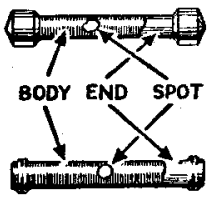
A high resistance pick-up may be permanently connected to the sockets provided. A twin screened lead must be used and on no account should the bottom socket (for lead screening) be connected to the centre socket (" low " side of pick-up). The Marconiphone No. 25 is strongly recommended for this model and should have a 10,000 ohm shunt resistance fitted for perfect input matching.

CIRCUIT DESCRIPTION, ETC.

For Circuit Description, Preliminary Tests, H.F. Tests and Adjustments, etc., see Service Manual for Model 219. The circuit and component diagrams and Valve Table are on the next page.

RESISTANCE COLOUR CODE.

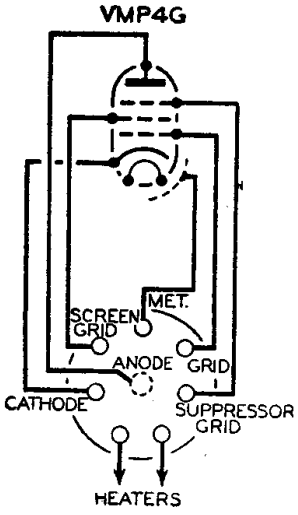
BODY and END Colours. (1st and 2nd figures.)	SPOT Colours. (Additional 0's.)
0 Black	·0 Black.
1 Brown.	0· Brown.
2 Red.	00· Red.
3 Orange.	000· Orange.
4 Yellow.	0,000· Yellow.
5 Green.	00,000· Green.
6 Blue.	
7 Violet.	
8 Grey.	
9 White.	

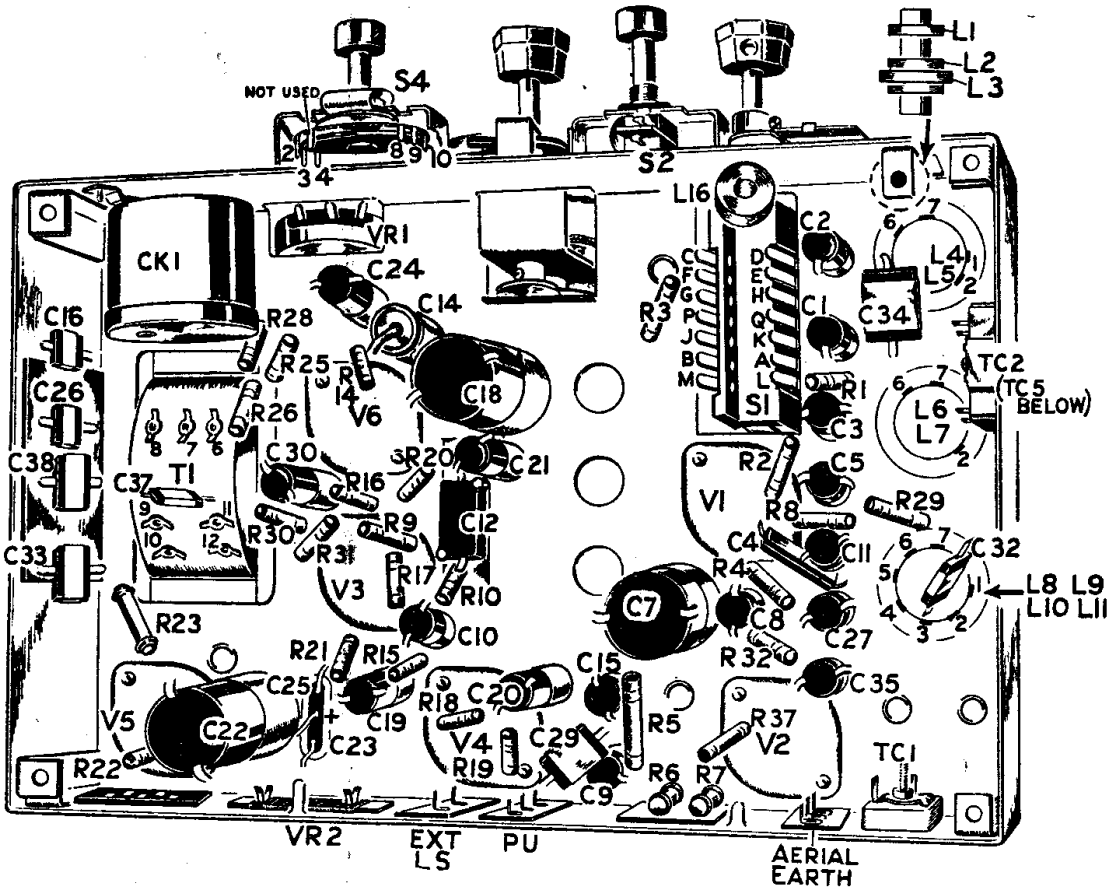


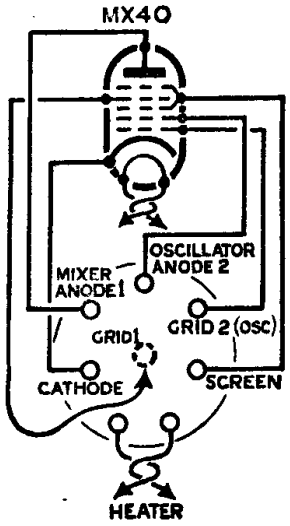
WIRE COLOUR CODE.

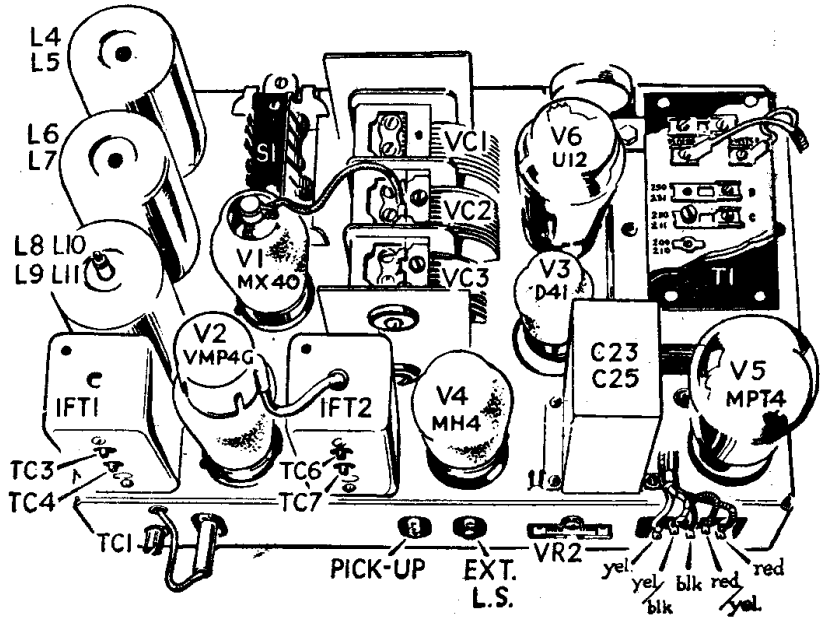
H.T. positive (+)	Red.
Anodes of valves when not direct to H.T. + ...	Red/Yellow.
Screening grids when not direct to H.T. + ...	Red/Black.
Grid circuits	Green.
Mains	Orange.
Heaters, filaments and cathodes ...	Brown.
Earth	Black.
General purpose colour	Yellow.

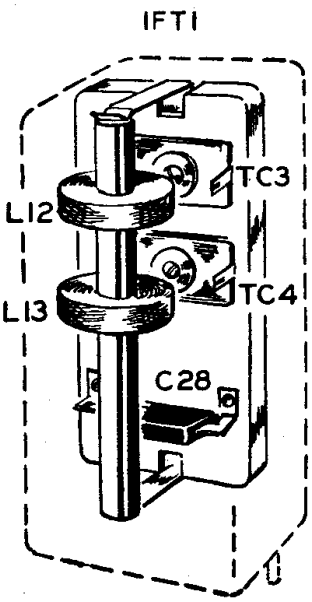
Yellow will be used for leads not falling in the general code, and when stocks of any colour are temporarily exhausted in the factory.

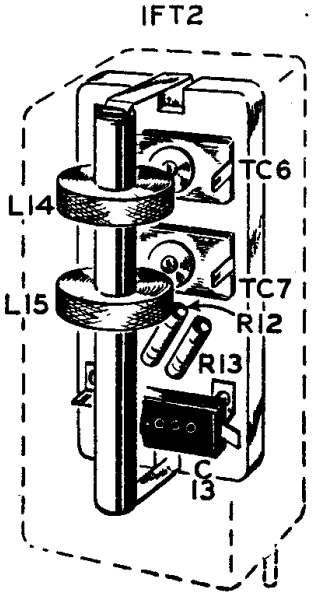

VMP4G
SCREEN GRID
MET.
ANODE
GRID
CATHODE
SUPPRESSOR GRID
HEATERS


NOT USED
S4
S2
L1
L2
L3
CK1
VR1
C24
C14
C16
R28
R25
R14
C26
R26
V6
C18
C38
C30
R20
C21
C37
T1
R16
R30
R9
C12
C33
R31
R17
V3
R10
R23
C10
R21
R15
C25
C22
C19
C23
R18
C20
C15
V5
V4
C29
R5
R37
V2
R22
R19
R6
R7
C9
TC1
VR2
EXT LS
PU
AERIAL
EARTH
L16
C2
L4
L5
C34
C1
TC2
(TC5 BELOW)
S1
R1
L6
L7
C3
R2
C5
VI
R8
R29
C4
C11
C32
R4
C7
C8
C27
R32
C35
L8 L9
L10 L11


MX40
OSCILLATOR ANODE 2
MIXER ANODE 1
GRID
GRID 2 (OSC)
CATHODE
SCREEN
HEATER


L4
L5
L6
L7
L8 L10
L9 L11
S1
VC1
VC2
VC3
V1
MX40
V2
VMP4G
IFT1
IFT2
V4
MH4
V6
U12
V3
P41
T1
C23
C25
V5
MPT4
TC3
TC4
TC6
TC7
TC1
PICK-UP
EXT. L.S.
VR2
yel
blk
red
yel


IFT1
L12
L13
TC3
TC4
C28


IFT2
L14
L15
TC6
TC7
R12
R13
C13

VALVE TABLE

Values given are ± 10 per cent. and are taken on 220-volt mains. Receiver tuned to a point of no reception unless otherwise stated.

VALVES	V1 (MX40)	V2 (VMP4G)	V3 (D41)	V4 (MH4)	V5 (MPT4)	V6 (U12)
Test voltages	2·3 (1·9).	165.	4·5.	4·5.	9·0.	370.
Measured between ...	Met. to chassis.	Anode to chassis.	Met. to chassis.	Met. to chassis.	Between 7 and 8 L.S. panel.	Between 6 and 7 L.S. panel.
Anode/Frame Volts ...	Osc. : 80†. Mixer : 210.	165.	—	90.	225.	—
Screen/Frame Volts ...	60. Gram. : Nil.	85. Gram. : Nil.	—	—	210.	—
Anode feed m/A ...	Osc. Mixer. 1·0 2·0 (0·3). Gram. : Nil.	3·75 (2·0). Gram. : Nil.	—	2·0.	31.	—
Screen feed m/A ...	1·8 (2·5).	1·5 (1·0).	—	—	5·0.	—
Bias volts	2·3 (1·9).	2·5 (1·4).	—	4·5.	10·0.	—
	Cathode/chassis.	Cathode/chassis.	—	Cathode/chassis.	Junction R26, and R28/chassis.	—

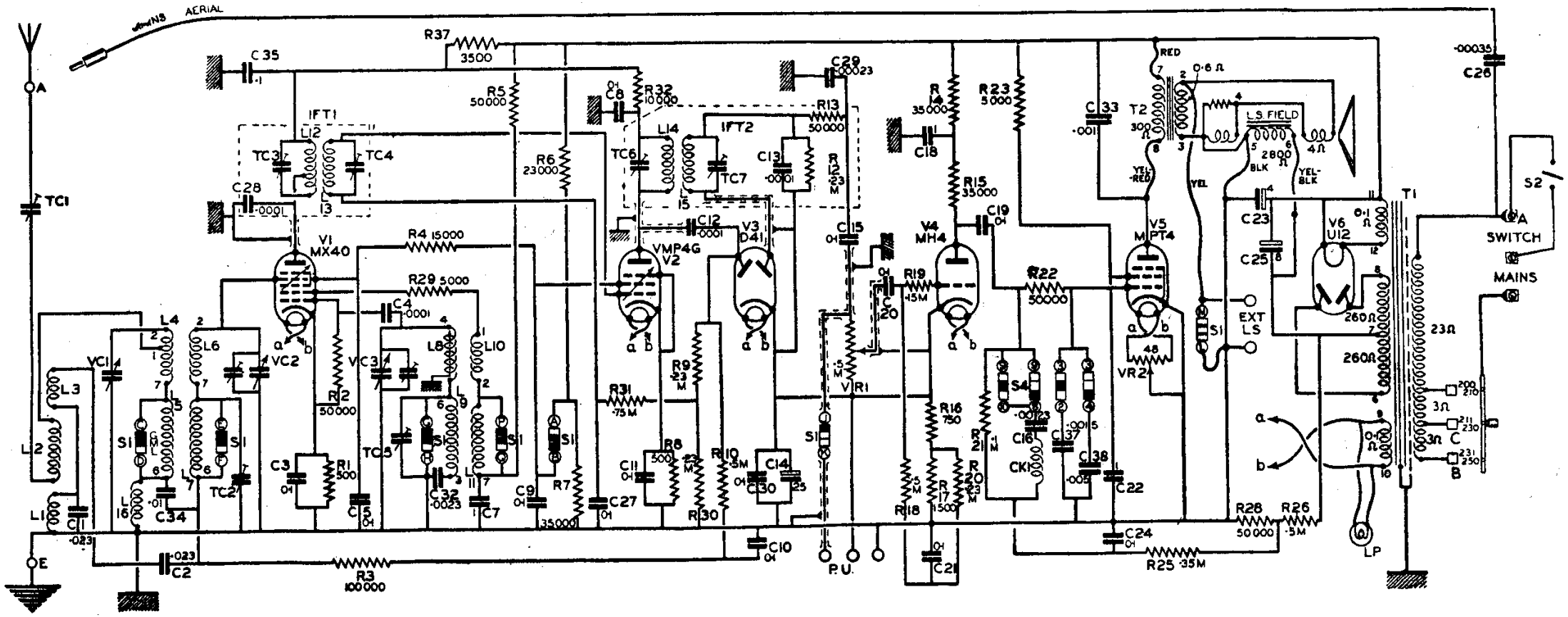
† Signals unobtainable whilst taking this reading.

Values in brackets are those obtained on a strong local station.

Total H.T. current measured at terminal 6 L.S. panel ... ... 52 m/A.

Current through screen potentiometer (R6, R7) ... ... 4 m/A.

Voltage across L.S. field measured between terminal 6 L.S. panel, and chassis ... ... 140 volts.


AERIAL
A
E
TC1
L1
L2
L3
C1 ·023
C2 ·023
R3 100000
L4
L6
L8
L10
L5
L7
L9
VC1
VC2
VC3
S1
C34 ·01
TC2
TC5
C32 ·0023
C3 01
R1 500
C5 01
R2 50000
C4 ·0001
R4 15000
R29 5000
V1 MX40
C35 ·1
R37 3500
R5 50000
R6 23000
IFT1
L12
L13
TC3
TC4
C28 ·0001
C7
C9 01
R7 35000
C27 01
R31 ·75M
C8 01
R32 10000
IFT2
L14
TC6
TC7
C12 ·0001
V2 VMP4G
V3 D41
R9 ·23 M
C11 01
R8 500
R10 ·5M
C14 ·25
C30 01
R30
C10 01
C29 ·0023
R13 50000
C13 ·0001
R12 ·23 M
C15 01
VR1 ·5 M
P.U.
C20 01
V4 MH4
R14 35000
C18 1
R15 35000
C19 01
R19 ·15M
R22 50000
R16 750
R18 ·5 M
R17 1500
R21 ·1 M
R20 ·23 M
S4
C16 ·00123
CK1
C37 ·00115
C38 ·005
C22 1
C24 01
R25 ·35M
C21 01
R23 5000
C33 ·001
T2
RED
0·6 Ω
YEL-RED
YEL
L.S FIELD
2800 Ω
8LK
YEL-BLK
4Ω
C23 4
C25 8
EXT LS
S1
VR2 48
V5 MPT4
V6 U12
0·1 Ω
260Ω
23Ω
3Ω
C
B
T1
C26 ·00035
S2
A
SWITCH
MAINS
R28 50000
R26 ·5M
LP

SPARE PART LIST

MODEL 209

Part No.	Description.	Parts per Inst.	Finish.	Retail List Price. £ s. d.	Per
	Instructions.				
23978	Instruction card	1	—	0 0 6	Each.
	CABINET PARTS AND FITTINGS.				
F9488C	**Cabinet**	1	Pol	3 3 0	,,
8195	Rubber feet	4	—	0 0 8	Doz.
—	Baffle board	1	Std	0 2 9	Each.
23202	Screw, securing baffle board	10	—	0 0 2	Doz.
23950	Felt, top and bottom ($\frac{1}{4}$ in. thick)	2	—	0 0 1½	Each.
23951	Felt, sides ($\frac{1}{4}$ in. thick)	2	—	0 0 1	,,
23968	Wire mesh	1	AnBrSpec	0 3 3	,,
9772	Screw, securing mesh	4	—	0 0 2	Doz.
23948	Felt, top and bottom ($\frac{1}{8}$ in. thick)	2	—	0 0 6	,,
23949	Felt, sides ($\frac{1}{8}$ in. thick)	2	—	0 0 4	,,
—	Front bars, top or bottom	2	Pol	0 2 6	Each.
—	Front bars, centre	2	Pol	0 2 6	,,
8640	Screw, securing front bars	8	—	0 0 2	Doz.
23962	Tuning escutcheon	1	FSpLocal	0 1 3	Each.
15817	Button } securing tuning escutcheon	4	—	0 0 1	,,
9548	Screw } securing tuning escutcheon	4	—	0 0 3	Doz.
14922	Insert nut for speaker fixing	2	CB	0 1 4	,,
23969A	Cabinet back (printed)	1	—	0 2 0	Each.
9559	Screw } securing cabinet back	4	ParB	0 0 2	Doz.
22511	Washer } securing cabinet back	4	ParB	0 0 1	,,
23115B	Knob—tone and mains On/Off	2	BnBakSp Lol	0 0 7	Each.
	LOUDSPEAKER				
21970U	**Loudspeaker**	1	—	1 4 0	Each.
11543J	Field coil	1	—	0 5 6	,,
21456	Washer, presspahn, $\frac{1}{32}$ in. thick	1	—	0 0 4	Doz.
17422	Washer, millboard, $\frac{1}{16}$ in. thick	4	—	0 0 3	,,
21966B	Terminal panel, with 8 tags	1	—	0 1 0	Each.
21968	Top plate	1	CdP	0 1 0	,,
21967	Stud, securing top plate to magnet yoke	4	WN	0 0 1½	,,
22355A	Hum coil	1	—	0 1 6	,,
21965B	Cone chassis, complete with transformer bracket and two studs	1	CDP	0 2 6	,,
11627	Nut securing cone chassis to studs on magnet assembly	4	WN	0 0 6	Doz.
21256A	Speech coil and cone	1	—	0 3 0	Each.
19585	Cardboard washer }	2	—	0 0 1	Doz.
17476	"D" washer } securing spider of cone to studs on cone chassis	2	—	0 0 1	,,
1092	Washer }	2	—	0 0 2	,,
19456	Cone mounting ring	2	—	0 0 3	,,
19457	Felt ring	1	—	0 0 1	Each.
12040AD	T2 Output transformer	1	—	0 7 6	,,
10606	Screw, P.K., securing T2	2	—	0 0 7	Doz.
22781B	Loudspeaker support strap	1	CdP	0 1 4	Each.
22759	Bolt } securing strap to loudspeaker	1	WN	0 0 1½	,,
21890	Washer } securing strap to loudspeaker	1	WN	0 0 1½	Doz.
11216	Screw } securing strap to insert nuts on cabinet	2	WN	0 0 4	,,
14748	Washer } securing strap to insert nuts on cabinet	2	WN	0 0 2	,,
	RADIO UNIT				
22500N	**Radio unit**	1	—	14 0 8	Each.
	The radio unit is similar to that on model 219 except that the mechanical "Q" switch parts, visual tuner, and resistances R24, 33, 34 and 35 are not fitted, R22 (19202E) is altered to—				
19202J	R22—50,000 ohms,	1	—	0 0 9	,,

SPARE PART LIST—*continued.*

Part No.	Description.	Parts per Inst.	Finish.	Retail List Price. £ s. d.	Per
	S5, "Q" On/Off switch becomes S2—Mains On/Off switch. Condenser drive and tuning details differ, as given below.				
23971A	Main bracket with cleat	1	AlSp	0 0 9	Each.
22732	Cleat	1	WN	0 0 4	Doz.
13802	Rivet, securing cleat	1	—	0 0 2	,,
11219	Screw } securing main bracket to chassis	2	WN	0 0 3	,,
3166	Washer, S.P. }	2	—	0 0 2	,,
24100	Screw	1	WN	0 0 7½	,,
23972	Spacer	1	WN	0 0 9	,,
3166	Washer, S.P. } stay for bracket	1	—	0 0 2	,,
11628	Nut	1	WN	0 0 4	,,
23101A	Drive arm and spindle	1	—	0 0 3	Each.
15848	Washer	1	WN	0 0 3	Doz.
23105	Collar	1	WN	0 0 2	Each.
13387	Screw, securing collar to spindle	1	WN	0 0 3	Doz.
22793B	Pointer disc assembly	1	—	0 2 0	Each.
13387	Screw, securing pointer disc to spindle	2	WN	0 0 3	Doz.
23964	Tuning spindle	1	WN	0 0 3	Each.
21823A	Disc drive assembly	1	—	0 0 3	,,
16564	Screw, P.K., securing disc drive to spindle	1	—	0 0 7	Doz.
3825	Spacing collar	1	WN	0 0 10	,,
11829	Collar	1	WN	0 0 1	Each.
14446	Screw, securing collar to spindle	1	WN	0 0 5	Doz.
22798B	Double lampholder assembly	1	—	0 1 6	Each.
23103	Knurled screw, securing lampholder	1	WN	0 0 1	,,
22704E	Lamp	2	—	0 0 9	,,
22986	Circular screen	2	—	0 0 2	Doz.
23960B	Scale frame and support brackets	1	CdP	0 1 6	Each.
12619	Screw, P.K., securing brackets to chassis	4	—	0 0 6	Doz.
23973A	Tuning scale (printed)	1	—	0 2 6	Each.
23963	Glass	2	—	0 0 2½	,,
22731	Clamp }	1	CdP	0 0 1½	,,
23986	Rubber packing } securing top of scale and glasses	1	—	0 0 1½	,,
211	Screw, P.K. }	2	—	0 0 6	Doz.
23984	Clip }	2	CdP	0 0 6	,,
23985	Rubber packing }	4	—	0 0 3	,,
11219	Screw } securing bottom of scale and glass	2	WN	0 0 3	,,
3166	Washer, S.P. }	2	—	0 0 2	,,
11219	Screw }	1	WN	0 0 3	,,
23983	Spacing washer } positioning scale	1	WN	0 0 3	,,
3166	Washer, S.P. }	1	—	0 0 2	,,
23976A	Lamp wiring	1	—	0 0 3	Each.
23987A	Switch lead	1	—	0 0 4½	,,
	C36 is not fitted, C37, C38 and R37 are added.				
22001U	C37—0·0015 mfd.	1	—	0 0 9	,,
22005A	C38—0·005	1	—	0 1 6	,,
19202AG	R37—3,500 ohms	1	—	0 0 9	,,