MARCONIPHONE

SERVICE MANUAL

PRIVATE AND CONFIDENTIAL TO THE TRADE ONLY

3-VALVE BATTERY RECEIVER MODEL 314

MAR.
1937

1937 SERIES
NUMBER ELEVEN
Part No. 26267

3-VALVE BATTERY MODEL 314

SPECIFICATION

WAVELENGTH RANGE

Medium waves ... ... 170–580 metres.
Long waves ... ... 850–2,000 metres.

DIMENSIONS

Height ... ... 14 inches.
Width ... ... $20\frac{3}{4}$ inches.
Depth ... ... $9\frac{1}{2}$ inches.

WEIGHT

$34\frac{3}{4}$ lb. including batts. (net).
$21\frac{1}{2}$ lb. less batts.

BATTERY SPECIFICATION

High Tension 114 volts with 6 volts grid bias (Marconiphone Cat. No. B.498).
Low Tension 2 volts 45 Ah. accumulator Exide type DFG.

CONSUMPTION

L.T., 0·4 ampere (approximately).
H.T., 6·5 milliamps (average).

VALVES

Marconi S23 (met.) H.F. Amplifier.
,, HL2 (met.) Detector.
,, PT2 Output Valve.

LOUDSPEAKER

Type No. 24760F.
This loudspeaker has the latest type of high flux density aluminium-nickel magnet.
D.C. resistance of speech coil ... ... 4 ohms.
Impedance at 800 cycles ... ... 5 ohms.

EXTRA LOUDSPEAKERS

This receiver will operate an extra loudspeaker without greatly reducing the volume of the in-built speaker, provided that the speech coil impedance of the extra speaker is not lower than 5 ohms. Adjust the extra speaker for direct connexion to speech coil. Marconiphone Model 144 is very suitable.

HIGH RESISTANCE LOUDSPEAKER

A high resistance (moving iron type) loudspeaker may be connected in parallel with the output transformer by soldering leads to the anode and screen pins on the output valve (PT2), the + L.S. lead going to the screen.

CONNECTING A PICK-UP

A high resistance pick-up may be connected to the sockets provided, the Marconiphone No. 25 Pick-up being recommended. This pick-up should be connected with a 100,000 ohm volume control and a 250,000 ohm series resistance for correct matching.

NOTE.—The pick-up must not be left connected when the set is in use on radio.

CIRCUIT DESCRIPTION

The aerial is aperiodically coupled to the screen-grid H.F. amplifier valve (S23) by means of coils L1, L3 and L2, L4. The aperiodic coil L2 is shorted out when not in use by waveband switch S1, thus ensuring that the aperiodic section is always tuned to the waveband in use, and by its inclusion the grid circuit of the valve is not damped by the aerial. A condenser C1 isolates the bias supply to the grid of this valve. A variable resistance in the filament circuit enables the sensitivity to be sufficiently reduced even when in close proximity to a local station.

A tuned circuit in the anode circuit of the H.F. amplifier and the condenser C3 couple this valve to the triode detector valve (HL2), which operates as a leaky grid detector.

Arrangements are made for connecting a pick-up in the grid circuit. Reaction is obtained by means of coils L7 and L8, coupled to the previous tuned circuit (L5, L6) and made variable by condenser VC3. Oscillation by this circuit on its fundamental frequency is prevented by the resistance R3. An efficient decoupling arrangement, consisting of resistances R6 and R7 and condensers C4, C5 and C6, is included in the anode circuit of the detector, which is coupled to the output valve (PT2) by a parallel fed auto-transformer, connected in such a manner as to ensure the highest possible step-up ratio. The battery switch disconnects both the H.T. and G.B. batteries in addition to the L.T. when in the "Off" position, thus obviating any possibility of current leakage.

DISMANTLING INSTRUCTIONS

REMOVAL OF CHASSIS

1. Remove batteries and knobs. (NOTE.—When re-assembling make sure that ends of grub-screws locate with grooves in spindles.)

2. Unsolder loudspeaker leads from speaker.

3. Remove four fixing bolts from bottom of cabinet. The chassis may now be withdrawn.

NOTE.—The speaker leads are sufficiently long to enable the chassis to be withdrawn for inspection without disconnecting the loudspeaker.

REMOVAL OF SPEAKER

1. Disconnect leads from speaker.

2. Remove four fixing screws. The speaker may now be withdrawn.

RE-GANGING

When new coils or components have been fitted or the wiring in the H.F. part of the receiver disarranged in any way the receiver must be re-ganged by adjusting TC1 and the trimmer across VC1. This is best accomplished with a local modulated oscillator, although ganging may be carried out on broadcast signals.

GANGING WITH AN OSCILLATOR

For this operation a modulated oscillator capable of tuning over the MW and LW bands and an output meter are required. Alternatively a 0–3 (A.C.) voltmeter connected across the extra L.S. terminals may be used as an output meter, and if neither of these is available the strength may be judged aurally.

Connect an aerial and earth to the receiver to preserve correct operating conditions and couple the output terminals of the oscillator to the A and E sockets on the receiver. Tune the oscillator to 195 metres and switch the receiver to medium waves, adjusting sensitivity control to maximum and reaction control as far as possible without oscillation. Tune the signal in on the receiver and adjust the trimmer on VC1 for maximum output, at the same time rocking the gang condenser.

Tune oscillator to 900 metres, switch receiver to long waves, adjust reaction control to maximum as before, and adjust TC1 for maximum output, at the same time rocking the gang condenser.

The scale calibrations should be ignored during ganging operations, the pointer afterwards being adjusted to effect the best compromise.

GANGING ON BROADCAST SIGNALS

Re-ganging on broadcast signals is preferably accomplished during daylight hours, and the output must be judged aurally.

Tune in a weak non-fading station on approximately 210 metres and adjust the trimmer on VC1 as specified for oscillator ganging. Re-tune receiver to a weak station on approximately 1,000 metres and adjust TC1 as previously specified. A strong signal will overload the receiver and cause a *fall* in volume, and therefore should not be used for ganging purposes.

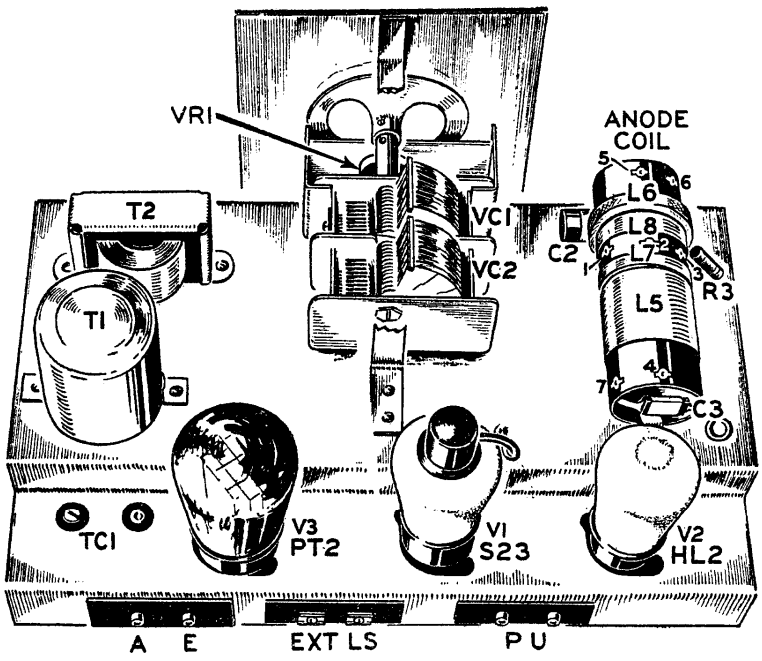
GENERAL FAULTS TABLE

Symptom.	Possible Cause.	Suggested Remedy.
Set will not operate	Damaged valves	Try new valves. (First ascertain that H.T. battery is connected correctly.)
	Plugs or spade tags on battery leads not making contact	Widen plug points slightly. Clean spade tags and accumulator terminals and apply vaseline.
	Flexible lead not connected to anode of H.F. valve.	
	S23 valve receiving no filament supply.	Check VR1 and make sure it is making contact by testing voltage at filament sockets.
Weak signals accompanied by low-pitched hum or distorted low-pitched signals	H.T. battery partially run down ...	Try H.T. + 60 plug in higher socket. Replace H.T. battery when voltage on load is less than 70 volts.
Weak undistorted signals	Pick-up connected	Disconnect both pick-up leads.
	Damaged S23 valve	Try new valve.
	H.F. wire disconnected	Check continuity.
Crackling or " frying " noises	Valves making bad contact	Clean valve pins.
	Loose plugs	Open points.
	Dirty contacts on accumulator... ...	Scrape clean and smear on small quantity of vaseline.
Distorted signals	L.T. battery connexions reversed ...	Connect L.T. correctly.
	Powerful signals overloading instrument.	Retard sensitivity control.

CONTINUITY CHECKS

Disconnect batteries and remove valves.

Component.	Measured between	Switch.	Resistance.
L1	Aerial and earth sockets	MW	20 ohms.
L1 + L2	Aerial and earth sockets	LW	140 ohms.
L3	Fixed vanes VC1 and chassis	MW	3·5 ohms.
L3 + L4	Fixed vanes VC1 and chassis	—	22 ohms.
L5	Fixed vanes VC2 and tag 6 on coil former...	MW	3·5 ohms.
L5 + L6	Fixed vanes VC2 and tag 6 on coil former	LW	19 ohms.
L7	Tags 1 and 2 on former	—	2 ohms.
L8	Tags 2 and 3 on former	—	5 ohms.
VR1	V1 (S23) filament socket and chassis	—	0–55 ohms.
R1	Grid V1 (S23) and green/yellow/black battery lead ...	—	1 megohm.
R4	Pick-up socket (R.H.) and L.T. lead	—	2·3 megohms.
L7, L8, R3	Anode V2 (HL2) and fixed vanes VC3	—	107 ohms.
T1 Primary and Secondary ...	Yellow/black battery lead and grid V3 (PT2)	—	3,080 ohms.
T2 Primary	Anode V3 (PT2) and red battery lead (HT +)	—	800 ohms.
Secondary	Across Ext. L.S. terminals (disconnect L.S.)	—	0·7 ohms.
Speech coil	Across tags on L.S. (disconnect T2 secondary)	—	4·0 ohms.


VR1
ANODE COIL
T2
VC1
VC2
C2
L6
L8
L7
R3
L5
T1
C3
TC1
V3 PT2
V1 S23
V2 HL2
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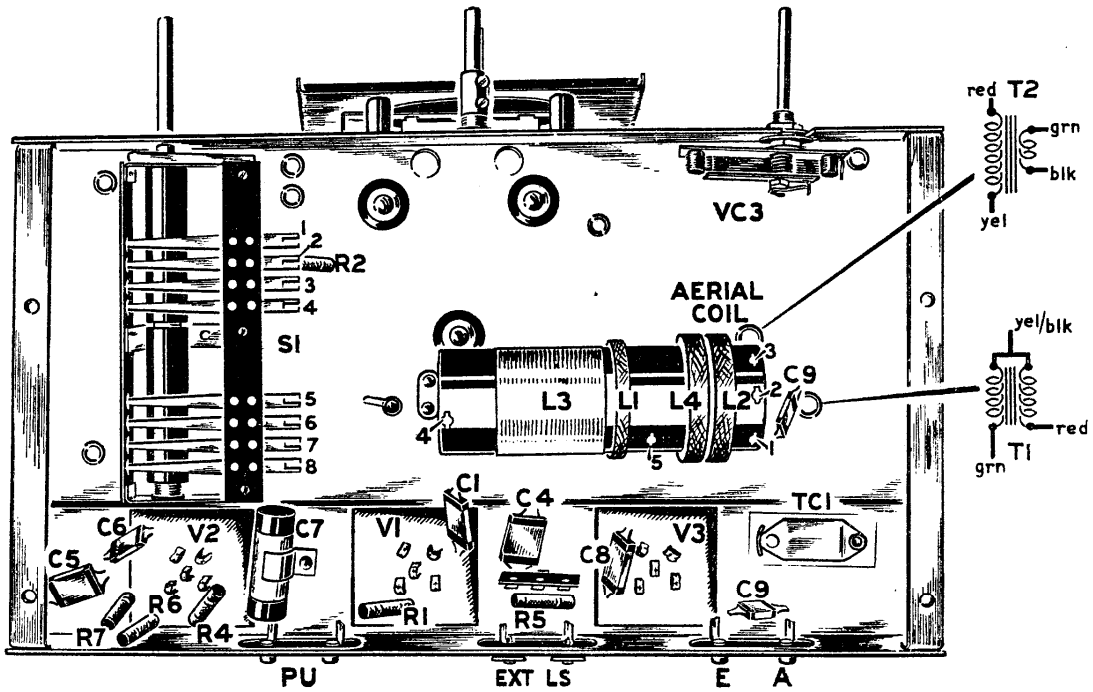
red T2
grn
blk
yel
VC3
R2
AERIAL COIL
S1
L3
L1
L4
L2
C9
yel/blk
red
grn
T1
C1
C4
TC1
C6
V2
C7
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V3
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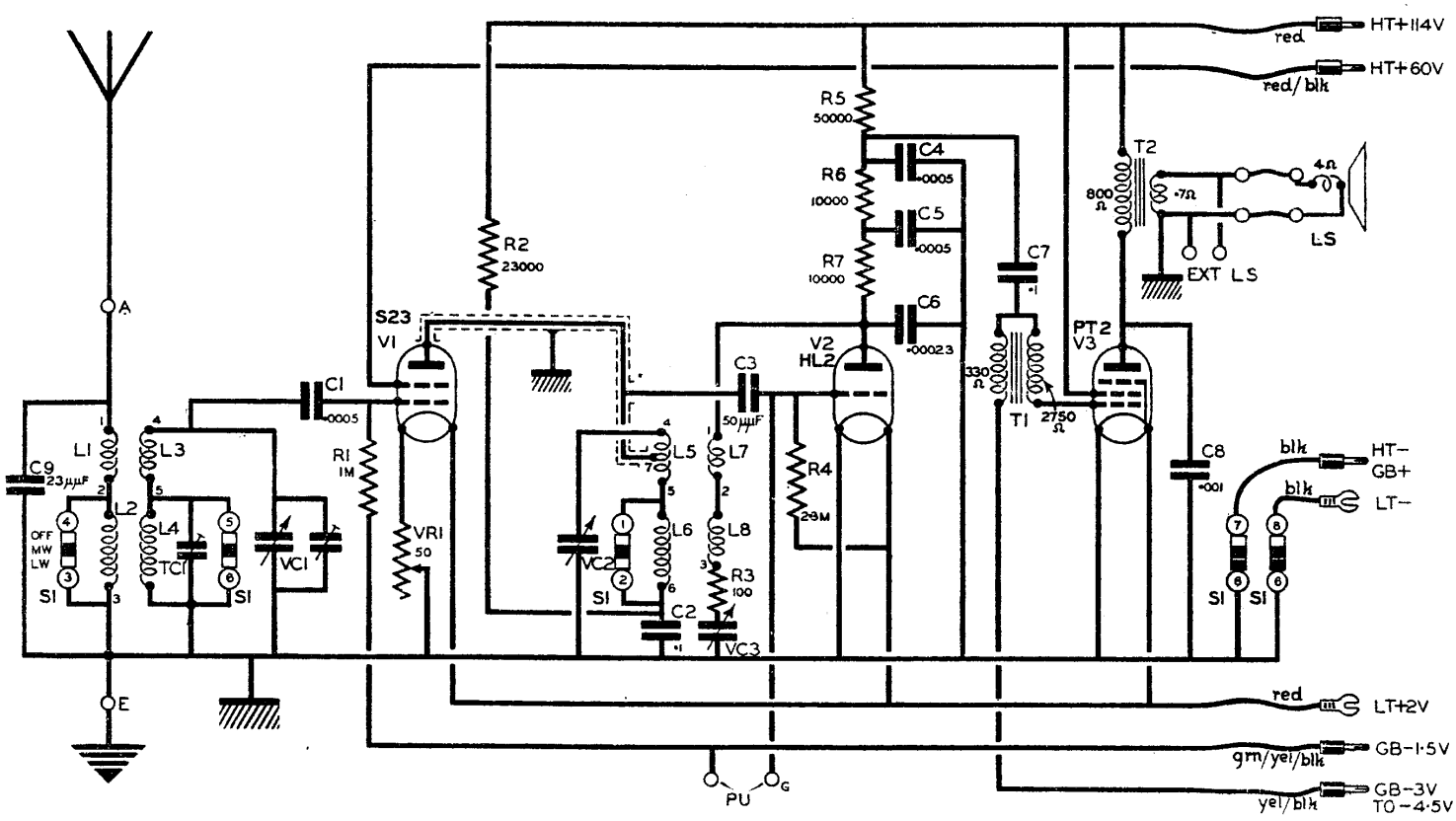

VALVE TABLE

Values ± 20 per cent., receiver tuned to a point of no reception.

Valves.	V1 S23	V2 HL2	V3 PT2
Anode-Frame, volts	90	40	110
Screen-Frame, volts	60	—	114
Anode Feed, mA	0·8	0·8	4·5
Screen Feed	·3 (measured at red/black battery leads	—	1·5

Total H.T. feed measured H.T. — = 7·9mA.
Total L.T. feed measured L.T. — = 0·4 amp.
All readings taken with sensitivity control fully advanced and with a new H.T. battery reading full 114 volts.

SPARE PART LIST
MODEL 314

Part No.	Description.	Parts per Inst.	Finish.	Retail List Price. £ s. d.	Per
	Instructions.				
25246	Instruction Book	1	—	0 0 6	Each.
80305	Cabinet Label	1	—	0 0 6	Doz.
	CABINET PARTS AND FITTINGS.				
82232A	Cabinet	1	Pol	2 13 0	Each.
8195	Rubber feet	4	—	0 0 8	Doz.
—	Baffle board, with insert nuts	1	Std	0 3 0	Each.
14922	Insert nut, for speaker	4	CB	0 1 4	Doz.
16020	Ornamental bolt }	4	BzP	0 0 1	Each.
14761	Ornamental washer }	4	BzP	0 0 7	Doz.
11627	Nut } securing baffle to front of cabinet	4	WN	0 0 6	,,
14997	Washer }	4	WN	0 0 2	,,
9547	Screw }	5	—	0 0 2	,,
25200	Wire mesh	1	AnBr	0 5 0	Each.
9772	Screw, securing wire mesh to baffle board	6	—	0 0 2	Doz.
—	Felt for wire mesh, black $\frac{1}{8}$-in., S. 1429, 225/82316	—	—	0 0 9	Sq. ft.
—	Felt for wire mesh, black $\frac{1}{4}$-in., S. 1459, 225/84316	—	—	0 1 0	,,
—	Felt for glass, $\frac{1}{16}$-in., S. 1601, 225/84601	—	—	0 0 $4\frac{1}{2}$	,,
24873	Bracket for cabinet back	6	—	0 0 1	Each.
8602	Screw, for bracket	12	—	0 0 2	Doz.
24308B	Cabinet back	1	—	0 2 9	Each.
19896	Screw } securing cabinet back	6	ParB	0 0 1	,,
19895	Washer }	6	ParB	0 0 4	Doz.
25235	Tuning escutcheon	1	—	0 0 6	Each.
25270	Tuning window	1	—	0 0 $1\frac{1}{2}$	,,
8644	Screw, securing escutcheon	4	BzP	0 0 4	Doz.
25228	Clamp }	4	ParB	0 0 6	,,
25229	Clamp, rubber } securing window	4	—	0 0 2	,,
8644	Clamp, screw }	4	WN	0 0 3	,,
	CONTROLS.				
16554B	Knob—switch	1	—	0 0 7	Each.
16555B	Knob—volume	1	—	0 0 7	,,
17286A	Knob—tune	1	—	0 0 7	,,
10674	Grub screw, securing knobs	3	WN	0 0 4	Doz.
17594	Filament knob	1	—	0 0 5	Each.
16277	Nut } securing filament knob	1	BzP	0 0 8	Doz.
11038	Washer }	2	WN	0 0 2	,,
	LOUDSPEAKER.				
24760F	**Loudspeaker**	1	—	0 17 6	Each.
24760C	Cone chassis, with 4 brackets and two studs	1	CdP	0 2 0	,,
25222A	Magnet	1	—	0 9 0	,,
24765	Stud } securing magnet to cone chassis	4	AcD	0 0 1	,,
11627	Nut }	4	WN	0 0 6	Doz.
16401D	Speech coil and cone	1	—	0 4 0	Each.
16010	Cone mounting ring, inner	1	—	0 0 3	,,
16011	Cone mounting ring, outer	1	—	0 0 1	,,
16012	Felt	1	—	0 0 2	,,
11636	Nut }	2	AcD	0 0 4	Doz.
1035	Washer } securing spider of cone to studs on cone chassis	2	AcD	0 0 1	,,
16007	Card washer }	2	—	0 0 1	,,
12568A	Terminal panel, with 2 tags	1	—	0 0 4	Each.
11806	Tag	2	SP	0 0 7	Doz.
211	Screw, P.K., securing panel to cone chassis	2	—	0 0 6	,,
23280	Dust bag	1	—	0 0 6	Each.
11311	Screw } securing loudspeaker to baffle board	4	WN	0 0 2	Doz.
14120	Washer }	4	WN	0 0 2	,,

SPARE PART LIST—*continued*

Part No.	Description.	Parts per Inst.	Finish.	Retail List Price. £ s. d.	Per
	LEADS, PLUGS, CLEATS, ETC.				
16289J	Aerial and P.U. plugs, yellow	3	—	0 0 2	Each.
16289B	Earth plug, black	1	—	0 0 2	,,
12613	Cleat	1	WN	0 0 1	,,
3047	Cleat	1	WN	0 0 6	Doz.
8692	Wood screw, securing cleats	2	WN	0 0 2	,,
16300J	**Radio unit**	1	—	3 6 9	Each.
11312	Screw	4	WN	0 0 2	Doz.
14997	Washer } securing radio unit	4	WN	0 0 2	,,
10173C	Spring washer	4	—	0 0 2	,,
	INDUCTANCES.				
25247A	L1—M.W. Aerial coil L2—L.W. Aerial coil L3—M.W. Grid coil L4—L.W. Grid coil } Aerial coil assembly with two brackets	1	—	0 5 9	Each.
11045	Bracket	2	WN	0 0 1	,,
12619	Screw, P.K., securing former of coil to brackets	2	—	0 0 6	Doz.
25247B	L5—M.W. Anode coil L6—L.W. Anode coil L7—M.W. Reaction coil L8—L.W. Reaction coil } H.F. transformer complete with two fixing brackets	1	—	0 4 9	Each.
11045	Bracket	2	WN	0 0 1	,,
12619	Screw, P.K., securing former of coil to brackets	2	—	0 0 6	Doz.
12619	Screw, P.K., securing coils to chassis	8	—	0 0 6	,,
14542R	T1—Intervalve transformer	1	—	0 9 0	Each.
12619	Screw, P.K., securing T1	2	—	0 0 6	Doz.
22624H	T2—Output transformer	1	—	0 6 6	Each.
12619	Screw, P.K., securing T2	2	—	0 0 6	Doz.
	RESISTANCES.				
24150P	R1—1 megohm	1	—	0 0 9	Each.
24150G	R2—23,000 ohms	1	—	0 0 9	,,
24150AA	R3—100 ohms	1	—	0 0 9	,,
24150AM	R4—2·3 megohms	1	—	0 0 9	,,
24150J	R5—50,000 ohms	1	—	0 0 9	,,
24150F	R6—10,000 ohms	1	—	0 0 9	,,
24150F	R7—10,000 ohms	1	—	0 0 9	,,
11031B	VR1—Variable resistance, 50 ohms	1	—	0 1 0	,,
211	Screw, P.K., securing VR1	2	—	0 0 6	Doz.
	CONDENSERS.				
22001E	C1—0·0005 mfd. condenser	1	—	0 0 9	Each.
24900AA	C2—0·1 mfd. condenser	1	—	0 1 4	,,
22001A	C3—0·00005 mfd. condenser	1	—	0 0 9	,,
22001E	C4—0·0005 mfd. condenser	1	—	0 0 9	,,
22001E	C5—0·0005 mfd. condenser	1	—	0 0 9	,,
22001AD	C6—0·00023 mfd. condenser	1	—	0 0 9	,,
24900AA	C7—0·1 mfd. condenser	1	—	0 1 4	,,
21325	Clip, securing C7	1	AcD	0 0 8	Doz.
13810	Rivet, securing clip	1	—	0 0 3	,,
22001F	C8—0·001 mfd. condenser	1	—	0 0 9	Each.
22164E	C9—0·000023 mfd. condenser	1	—	0 0 9	,,
18712N	VC1 and VC2, tuning condenser—see Condenser drive and tuning details	1	—	0 7 6	,,
10611G	VC3—0·0005 mfd. variable condenser (volume control)	1	—	0 4 9	,,
22635	Washer } securing VC3	2	WN	0 0 3	Doz.
12441	Nut } securing VC3	1	WN	0 0 1	Each.

SPARE PART LIST—*continued*

Part No.	Description.	Parts per Inst.	Finish.	Retail List Price. £ s. d.	Per
	CONDENSERS—*continued.*				
11738A	TC1—Trimmer adjusting plate and bush	1	—	0 0 1	Each.
11744	Eyelet }	1	—	0 0 3	Doz.
19907	Bush }	2	—	0 0 2	Each.
21829	Insulation }	1	—	0 0 1½	Doz.
13325	Insulating washer } securing TC1	1	—	0 0 1	,,
1530	Insulating washer }	2	—	0 0 1	,,
11320	Adjusting screw }	1	—	0 0 1½	,,
6461	Adjusting screw washer }	1	WN	0 0 1	,,
	CONDENSER DRIVE AND TUNING DETAILS				
16286E	Tuning condenser and drive assembly	1	—	0 12 0	Each.
18712N	Two-gang condenser	1	—	0 7 6	,,
17357	Mica...	1	—	0 0 9	Doz.
17356	Trimmer plate	1	—	0 0 6	,,
17362	Insulating washer	1	—	0 0 1	,,
22333	Adjusting screw	1	WN	0 0 1	,,
17359	Earth spring	2	SP	0 0 6	,,
11031B	VR1—50 ohms	1	—	0 1 0	Each.
211	Screw, P.K., securing VR1	2	—	0 0 6	Doz.
16274B	Spindle, with spring contact for VR1	1	—	0 0 5	Each.
16286A	Bracket and bush	1	CdP	0 0 9	,,
25242A	Drive spindle assembly	1	—	0 0 6	,,
11041	Split ring	1	—	0 0 6	Doz.
16280	Thrust bracket	1	WN	0 0 2	Each.
11227	Screw }	2	WN	0 0 6	Doz.
3165	Washer, S.P. } securing thrust bracket to bush in drive bracket	2	—	0 0 2	,,
25240A	Drive disc and bush	1	—	0 0 4½	Each.
22331	Screw, securing bush to spindle of gang condenser	2	WN	0 0 2	Doz.
14791	Screw }	3	WN	0 0 4	,,
3166	Washer } securing drive bracket assembly to condenser gang ...	3	—	0 0 2	,,
25540A	Condenser plate, with three studs	1	CdP	0 0 6	Each.
21765	Screw }	2	WN	0 0 1½	Doz.
12442	Washer } securing condenser plate to gang condenser	2	—	0 0 2	,,
21236	Rubber bush }	3	—	0 0 1	Each.
14997	Washer }	3	WN	0 0 2	Doz.
3167	Washer, S.P. } securing two-gang condenser	3	—	0 0 2	,,
11627	Nut }	3	WN	0 0 6	,,
24728B	Pointer	1	CBLoc	0 0 2	Each.
13893	Screw, securing pointer to spindle of gang condenser	1	WN	0 0 8	Doz.
25243A	Tuning scale	1	—	0 1 0	Each.
25542	Strap, securing scale to chassis	1	CdP	0 0 3	,,
8777	Screw, P.K., securing strap to chasis	2	—	0 0 6	Doz.
12619	Screw, P.K., securing scale to strap	1	—	0 0 6	,,
11219	Screw }	2	WN	0 0 3	,,
6461	Washer } securing scale to pillars on chassis	2	WN	0 0 1	,,
	SWITCHES.				
11056F	S1—Wave change and On/Off switch	1	—	0 6 6	Each.
11057	Spindle	1	CdP	0 0 3	,,
11051L	Rotor, with two short contacts, front end of switch	1	—	0 0 9	,,
11051K	Rotor, with one long and one medium contact at rear end of switch ...	1	—	0 0 9	,,
11059	Locating cam	1	CdP	0 0 3	,,
11063	Collar between rotors	1	CdP	0 0 2	,,
10674	Grub screw, securing locating cam and collar	2	WN	0 0 4	Doz.
12567	Spring }	1	—	0 0 6	,,
1039	Washer } at rear end of spindle	2	CdP	0 0 2	,,
21763	Spring, on locating cam	1	—	0 0 1	Each.
11054B	Strip, with eight spring contacts	1	—	0 2 6	,,
11062	Guard strip holding ends of contacts	1	—	0 0 2	,,
211	Screw, P.K., securing contact strip and guard strip	6	—	0 0 6	Doz.
12619	Screw, P.K., securing S1	4	—	0 0 6	Doz.

SPARE PART LIST—*continued*

Part No.	Description.	Parts per Inst.	Finish.	Retail List Price. £ s. d.	Per
	VALVE HOLDERS AND PANELS.				
10545	Valve panel	3	—	0 0 2	Each.
10546	Valve leg clip	13	SP	0 0 7	Doz.
10547	Valve panel cover, with red spot...	3	—	0 0 2	Each.
13703	Valve panel cover	3	—	0 0 2	,,
13804	Rivet, securing valveholders	12	—	0 0 3	Doz.
16550A	Aerial and Earth panel, with two sockets and two tags	1	—	0 0 4	Each.
16073A	P.U. panel, with two sockets and two tags	1	—	0 0 4	,,
11692A	Ex. L.S. panel, with two tags and terminal screws	1	—	0 0 7	,,
11228	Terminal screw	2	WN	0 0 4	Doz.
13803	Rivet, securing panels	6	—	0 0 3	,,
21404A	Insulated valve cap for V1	1	—	0 0 4	Each.
24020A	Tag panel, with three tags	2	—	0 0 2	,,
10606	Screw, P.K., securing one panel	1	—	0 0 7	Doz.
13810	Rivet, securing other panel	1	—	0 0 3	,,
	BUSHES CLEATS AND LEADS ETC.				
16755	Insulation bush, small	4	—	0 0 1	Each.
16756	Insulation bush, large	5	—	0 0 1	,,
16576	Long earthing tag	6	SP	0 0 3	Doz.
25226A	H.T. lead, with 5 plugs	1	—	0 2 6	Each.
3475G	Plug, yellow	5	—	0 0 1½	,,
25227A	L.T. lead, with two tags	1	—	0 0 6	,,
8519	Tag	2	—	0 0 1	,,
12613	Cleat, for H.T. lead	1	WN	0 0 1	,,
11228	Screw }	1	WN	0 0 4	Doz.
11629	Nut } securing cleat	1	WN	0 0 6	,,
3165	Washer, S.P. }	1	—	0 0 2	,,
3047	Cleat, for L.T. lead and speaker lead	1	WN	0 0 6	,,
11228	Screw }	1	WN	0 0 4	,,
11629	Nut } securing cleat	1	WN	0 0 6	,,
3165	Washer, S.P. }	1	—	0 0 2	,,
3047	Cleat, for valve packing	2	WN	0 0 6	,,
10606	Screw, P.K., securing cleat	2	—	0 0 7	,,
22686C	Loudspeaker lead	1	—	0 0 6	Each.
7155	Cleat, securing anode lead	1	WN	0 0 1	,,

"FINISH" CODE.

AcD	... ...	Acid Dip.	
BzP	... ...	Bronze Polish.	
CB	... ...	Camera Black.	
CdP	... ...	Cadmium Plated.	
ParB	... ...	Parkerised Black.	
Pol	... ...	Polished.	
SP	....	Silver Plated.	
WN	... ...	White Nickel.	

In order to expedite delivery of spare part orders, please quote :—

1. Model number and serial number.
2. Spare part number, description, and " finish " as given in the above list.
3. Quantity required.

Unless full particulars are quoted, delay in execution of orders must inevitably result.

Order spare parts from :—

E.M.I. SERVICE, LTD.,
SHERATON WORKS,
HAYES, MIDDLESEX.

Telephone : Southall 2468. Telegraphic Address : Service, Hayes, Middlesex.

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