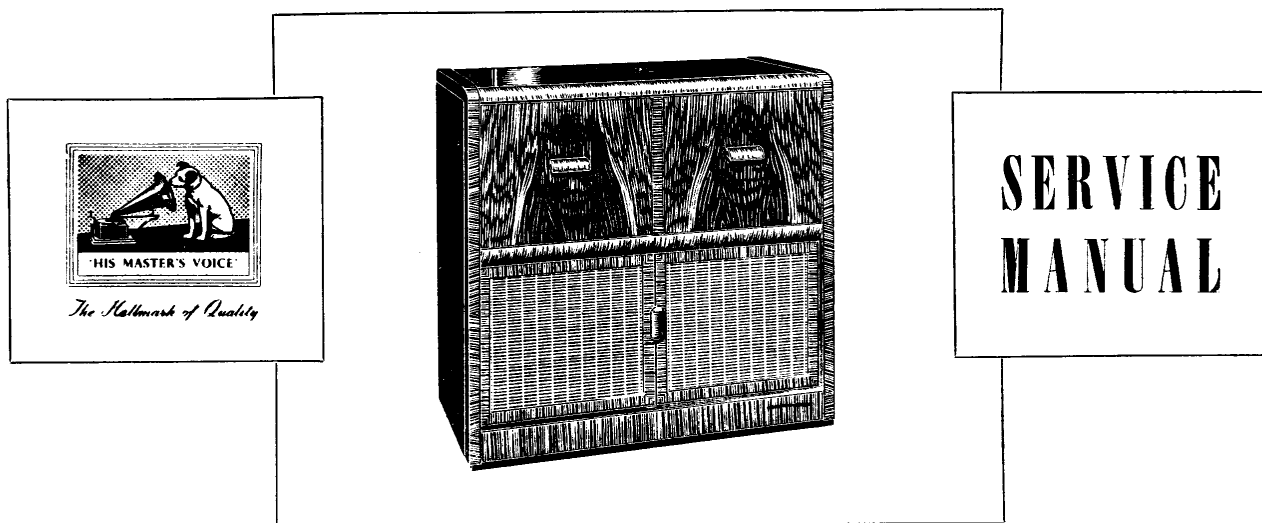


"HIS MASTER'S VOICE"



MODEL 1614 5-VALVE CONSOLE AUTO-RADIOGRAM FOR A.C. MAINS

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MODEL 1614

SPECIFICATION

Physical.

Height	33 inches	} Overall.
Width	35½ inches	
Depth	18 inches	
Weight		

Mains Supply and Consumption.

200—250 volts A.C., 50—100 c.p.s.
Consumption—60 watts on Radio.
75 watts on Gram.

Rated Output.

5 watts maximum.

Intermediate Frequency.

470 kc/s.

Wave Ranges.

S.W.2	..	16—50 metres (18·75—6·0 Mc/s).
S.W.1	..	50—187 metres (6·0—1·604 Mc/s).
M.W.	..	187—582·5 metres (1,604—515 kc/s).
L.W.	..	719—2,026 metres (418·4—148 kc/s).

Scale Lamps and Fuses.

Four Lamps—6·8 volts, 0·5 amp.
Two Fuses—1 amp. Cartridge Type.

Valves.

V1	X78	..	Frequency Changer.
V2	W77		I.F. Amplifier.
V3	DH77		Detector, A.G.C. and A.F. Amplifier.
V4	KT61		Output.
V5	U10		Rectifier.

Loudspeaker.

This is a 13½-inch elliptical cone, permanent magnet moving coil loudspeaker. The speech coil has a D.C. resistance of 4 ohms and an impedance of 5 ohms at 1,000 cycles.

The flux density is 8,000 lines sq./cm.

Sockets are provided for the connection of an external loudspeaker.

Pick-Up.

No. 15 pick-up—D.C. resistance of pick-up and hum-bucking coil, 24 ohms.

Motor.

Squirrel Cage Type.

Automechanism.

Type 45000AL—plays one side of up to eight 10-inch or 12-inch records, unmixed.

For further details, *see* separate manual.

INSTALLATION

The Aerial and Earth.

The receiver must be connected to an adequate aerial and earth installation. A lightning arrester or switch should be provided.

Do not use a telephone earth or a hot water or gas pipe as an earth.

Transit Packing.

1. Remove the tape securing the gang capacitor, and remove the four red-headed transit bolts, beneath the cabinet, to allow the chassis to float freely on its rubber cushioning.
2. Remove the four red-headed screws from the corners

of the mechanism plate and replace with the chromium screws and washers contained in the cotton bag.

3. Remove the packing and tape securing the record retaining arm and the pick-up.

NOTE.—*The transit packing should be kept in case the instrument is transported at some future occasion.*

Mains Supply.

The voltage range covered by the terminals is as follows:—

Terminal.	Voltages.
205	200—215
225	216—235
245	236—250

DISMANTLING

Before attempting any dismantling, ensure that the instrument is completely disconnected from the supply.

Removal of Radio Chassis.

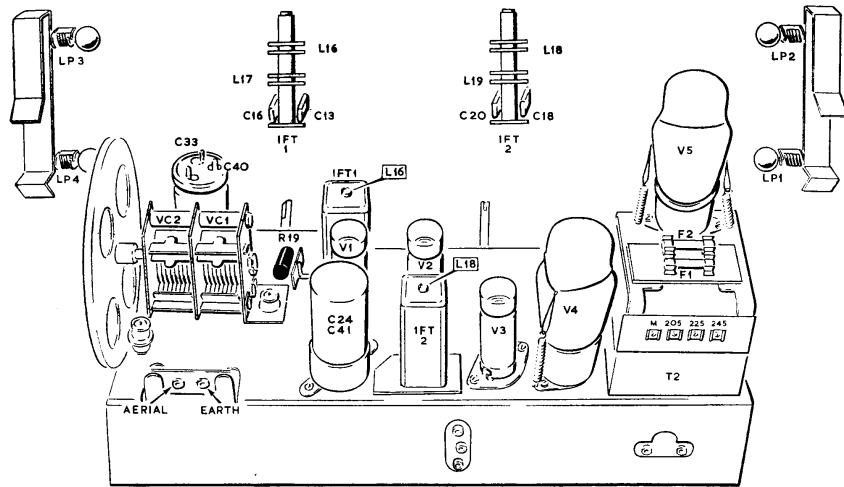
1. Remove external connections, pull off the EXT L.S. switch knob and remove back panel, two screws.
2. Disconnect following leads from chassis: Aerial and

Earth, External L/S, Earthing Lead and remove motor leads from Mains Transformers.

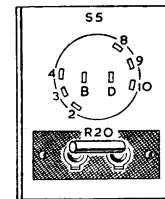
3. Remove scales lamps and brackets.

4. Remove control knobs.

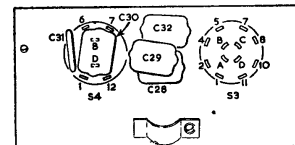
5. Open record compartment door and loosen screw securing drive cord and slip cord free. This screw is situated directly above compartment door.



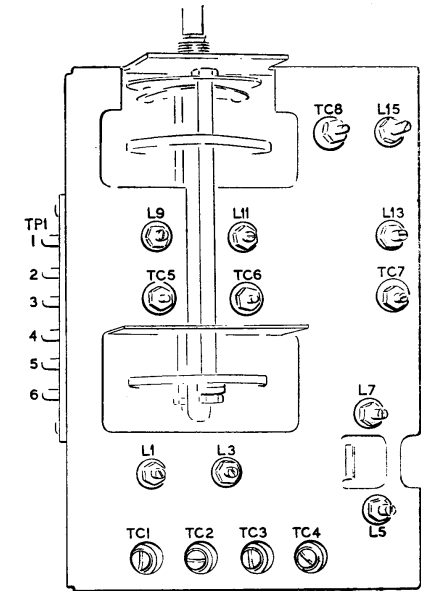
TOP-SIDE CHASSIS VIEW



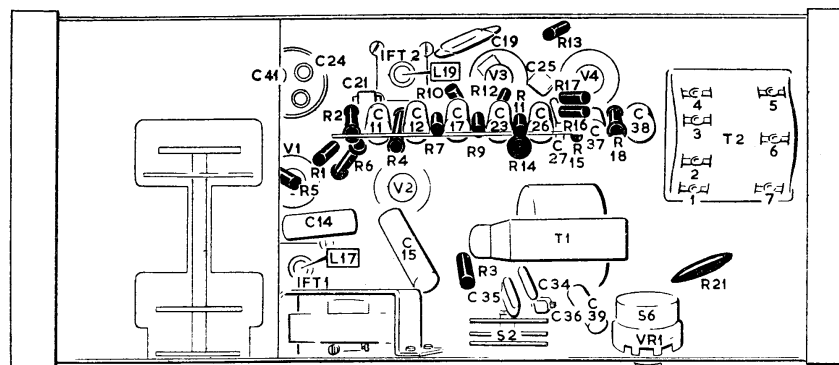
EXTERNAL LOUDSPEAKER SWITCH VIEWED FROM REAR



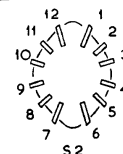
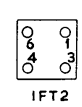
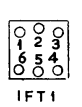
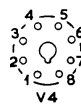
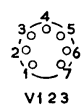
EXTENDED FREQUENCY RANGE (S4) & RADIO GRAM (S3) SWITCHES VIEWED FROM REAR



TOP-SIDE H.F. UNIT

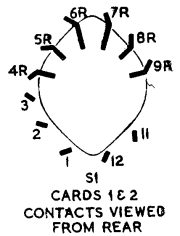
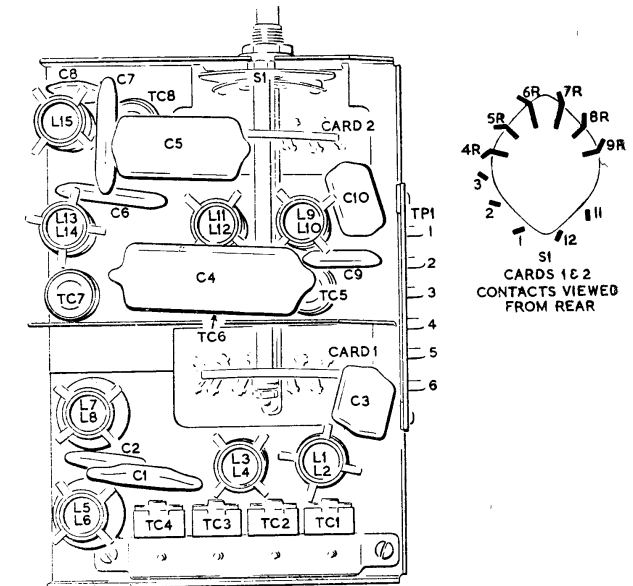


VALVE BASE NUMBERS



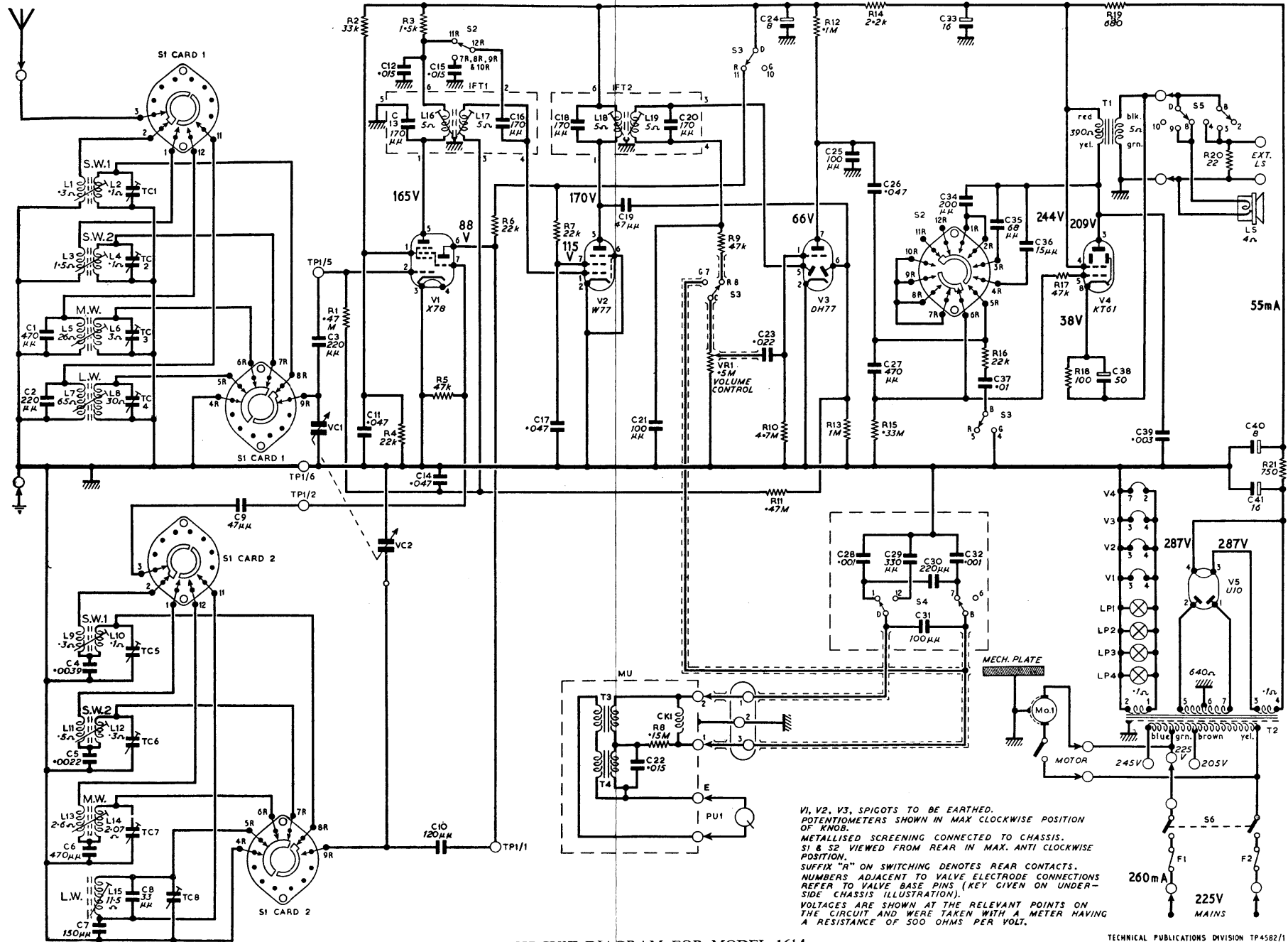
AS VIEWED FROM REAR

UNDER-SIDE CHASSIS VIEW



UNDER-SIDE H.F. UNIT

C	1,2	4,5,6,7	8	9	10	11,12,13	14,15,16	17,18	19,21,22	23,24	25,28	26,27,29,31,30,34	33,32	37,35	36	38,39	40,41	C	
R	1	2	3	4	5	6	7	8	9	10,11	12,13	14,15	16	17	18	19	20	21	R
MISC.	L1 TO L15	TC1 TO TC8	VC1	VC2	L16, V1	S2, L17, IFT1	V2, L8, IFT2, T3, T4, L19, CK1	VRI, S3	V3	S2, S4	Mo, 1	V4, T1, LP1, 2, 3, 4	F1, S5, S6	V5	F2, T2	MISC.			



V1, V2, V3, SPIGOTS TO BE EARTHED.
 POTENTIOMETERS SHOWN IN MAX CLOCKWISE POSITION
 OF KNOB.
 METALLISED SCREENING CONNECTED TO CHASSIS.
 S1 & S2 VIEWED FROM REAR IN MAX. ANTI CLOCKWISE
 POSITION.
 SUFFIX "R" ON SWITCHING DENOTES REAR CONTACTS.
 NUMBERS ADJACENT TO VALVE ELECTRODE CONNECTIONS
 REFER TO VALVE BASE PINS (KEY GIVEN ON UNDER-
 SIDE CHASSIS ILLUSTRATION).
 VOLTAGES ARE SHOWN AT THE RELEVANT POINTS ON
 THE CIRCUIT AND WERE TAKEN WITH A METER HAVING
 A RESISTANCE OF 500 OHMS PER VOLT.

CIRCUIT DIAGRAM FOR MODEL 1614

6. Remove four chassis fixing screws (accessible from the record compartment).

7. Remove two screws securing Extended Frequency Unit.

8. Remove chassis.

Removal of Automechanism.

1. Open automech. flap and secure Pick-up (to its rest position) and Record retaining arm.

2. Remove two left-hand side panels.

3. Remove back panel from automechanism.

4. Remove mains lead, Pick-up leads and Earthing lead.

5. Remove four screws from corners of Mechanism plate and lift out Mechanism.

Removal of H.F. Unit.

1. Unsolder the leads from the Aerial and Earth tags to the H.F. Unit and the two leads to the gang capacitor.

2. Unsolder the following leads from the tag panel on the H.F. Unit:—

(a) Lead from Tag 1 to Pin 6 V1, and Resistor R6 (22,000 ohms).

(b) Lead from Tag 2 to Pin 7 V1.

(c) Lead from Tag 5 to Pin 2 V1.

(d) Braided lead from Tag 6 to spigot of V1.

3. Remove the four P.K. screws and withdraw the unit.

I.F. AND R.F. ALIGNMENT

General.

If the I.F. circuits have been disturbed, complete I.F. and R.F. alignment must follow. Either S.W., M.W. or L.W. bands can be reganged without affecting the other bands. The S.W. bands can also be reganged independently.

The oscillator tracks at a higher frequency than the signal on all wavebands.

Whilst ganging, the input to the receiver must be progressively reduced as the circuits are brought into line so that the output does not exceed 500 mW (1.4 across the speech coil).

An A.C. voltmeter (rectifier type) connected across the loudspeaker speech coil may be used as an output meter.

Intermediate Frequency.

Set the waveband switch to M.W., the Volume control fully clockwise and the Tone control fully anti-clockwise less one position.

1. Connect a 30,000 ohm resistor across tags 3 and 4 of IFT2. Inject a modulated signal at 470 kc/s into the grid

of V1 and adjust core of L18 for maximum output.

Place the 30,000 ohm resistor across tags 1 and 6 of IFT2 and adjust core of L19 for maximum output.

2. Remove resistor and adjust cores of L17 and L16 in that order for maximum output.

Radio Frequency—Setting Up Calibration Scale.

As the wavescale is not assembled to the chassis, a calibration scale is printed on the back of the gang capacitor drum. This scale is calibrated in inches and sixteenths of an inch, which correspond to the frequencies given in the ganging tables, and is read against a pointer mounted above the capacitor drum.

Before commencing R.F. ganging operations, it is essential to check the position of the pointer in relation to the calibration scale as follows:—

1. Turn gang capacitor to maximum capacity.
2. See that the pointer coincides with 9 inches on the calibration scale.
3. If adjustment is necessary, slacken the nut securing the pointer and adjust, then tighten the nut securely.

Short Waves.

Set Volume control fully clockwise and Tone control fully anti-clockwise, less one position. Inject test signal into aerial and earth sockets via a S.W. dummy aerial.

Waveband Switch Position.	Op. No.	Calibration Scale Setting.	Tune Test Oscillator to m. Mc/s.		Operation.
S.W.2	1	$8\frac{7}{16}$	50	6	Adjust L10 for maximum output. Adjust L2 for maximum output. Adjust L10 for maximum output. Adjust TC5 for maximum output. Adjust TC1 for maximum output. Adjust TC5 for maximum output. Repeat operations 1 to 6.
	2	Rock Gang	50	6	
	3	$8\frac{7}{16}$	50	6	
	4	$\frac{13}{16}$	16.8	17.8	
	5	Rock Gang	16.8	17.8	
	6	$\frac{13}{16}$	16.8	17.8	
	7	—	—	—	

Waveband Switch Position.	Op. No.	Calibration Scale Setting.	Tune Test Oscillator to		Operation.
			m.	Mc/s.	
S.W.1	1	$6\frac{5}{8}$	150	2	Adjust L12 for maximum output. Adjust L4 for maximum output. Adjust L12 for maximum output. Adjust TC6 for maximum output. Adjust TC2 for maximum output. Adjust TC6 for maximum output. Repeat operations 1 to 6.
	2	Rock Gang	150	2	
	3	$6\frac{5}{8}$	150	2	
	4	$\frac{27}{32}$	54.5	5.5	
	5	Rock Gang	54.5	5.5	
	6	$\frac{27}{32}$	54.5	5.5	
	7	—	—	—	

Medium Waves.

Controls as before, but with Waveband switch set to M.W. M.W. dummy aerial to be used.

Waveband Switch Position.	Op. No.	Calibration Scale Setting.	Tune Test Oscillator to		Operation.
			m.	kc/s.	
M.W.	1	$7\frac{3}{16}$	510	588	Adjust L14 for maximum output. Adjust L6 for maximum output. Adjust L14 for maximum output. Adjust TC7 for maximum output. Adjust TC3 for maximum output. Adjust TC7 for maximum output. Repeat operations 1 to 6.
	2	Rock Gang	510	588	
	3	$7\frac{3}{16}$	510	588	
	4	$\frac{7}{16}$	186.9	1,605	
	5	Rock Gang	210	1,427	
	6	$\frac{7}{16}$	186.9	1,605	
	7	—	—	—	

Long Waves.

Controls as before, but with Waveband switch set to L.W. L.W. dummy aerial to be used.

Waveband Switch Position.	Op. No.	Calibration Scale Setting.	Tune Test Oscillator to		Operation.
			m.	kc/s.	
L.W.	1	$7\frac{1}{2}$	1,850	162	Adjust L15 for maximum output. Adjust L8 for maximum output. Adjust L15 for maximum output. Adjust TC8 for maximum output. Adjust TC4 for maximum output. Adjust TC8 for maximum output. Repeat operations 1 to 6.
	2	Rock Gang	1,850	162	
	3	$7\frac{1}{2}$	1,850	162	
	4	$1\frac{1}{2}$	850	353	
	5	Rock Gang	850	353	
	6	$1\frac{1}{2}$	850	353	
	7	—	—	—	

Ganging Tools.

A 4 BA non-metallic box spanner, together with a small non-metallic screwdriver inserted through the spanner, should be used for adjusting the coil cores. A special

box spanner (Stock No. Q/D 5021) is required for adjusting the oscillator circuit trimmer capacitors. Write for particulars to E.M.I. Sales and Service Ltd., Dealers' Service Development Division, 100, Blyth Road, Hayes, Middlesex.

CALIBRATION

Replace chassis in cabinet and check calibration at about the middle of the tuning scale on a station of known wave-

length. Adjust pointer to give best compromise on all wavebands, if necessary.

CAPACITOR AND POINTER DRIVE

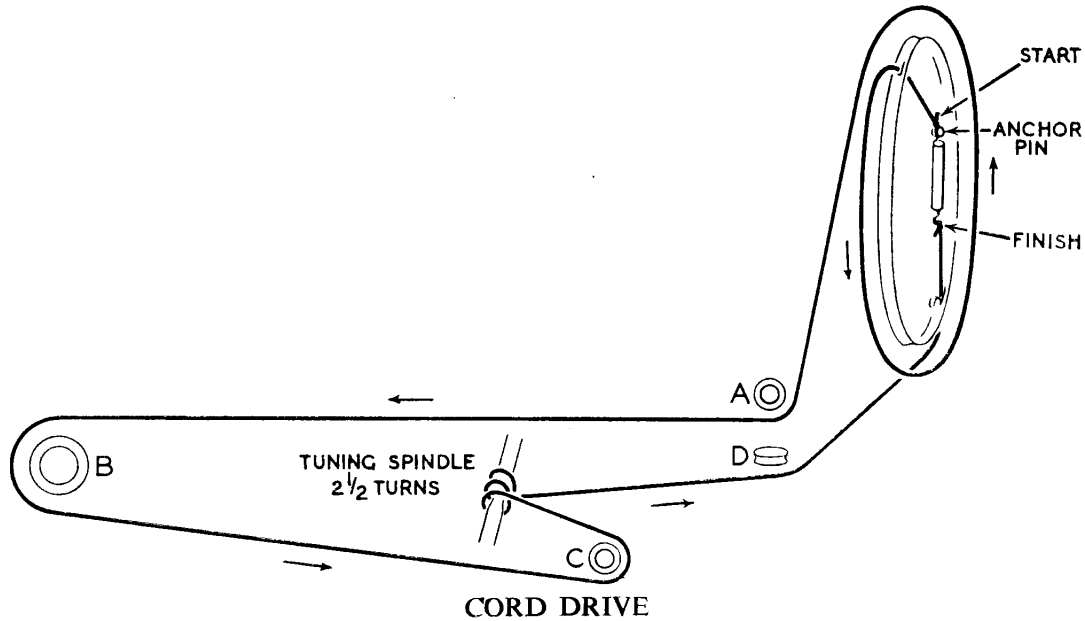
Use only correct nylon cord 6370 × 0012; approximately 72 inches of cord is used.

1. Form a loop in one end of cord with an opening of approximately $\frac{1}{8}$ -inch in diameter and assemble on anchor pin.

2. Wind cord round pulleys as shown in diagram.

3. Secure cord to tension spring and assemble spring.

NOTE.—The knots, to prevent slipping, should be tied as reef knots and secured with shellac.



NO. 2 SQUIRREL CAGE MOTOR

Mechanisms using this motor have the turntable driven via the intermediate pulley assembly (*see illustration*).

Electrical Data.

Voltage Range: 200—250 V., 50 c.p.s. only.

Wattage: Maximum 13.5 watts.

Current: Maximum 0.14 amps.

Resistance: Coil resistance 150 ohms.

Insulation: Not less than 50 megohms at 500 volts D.C.

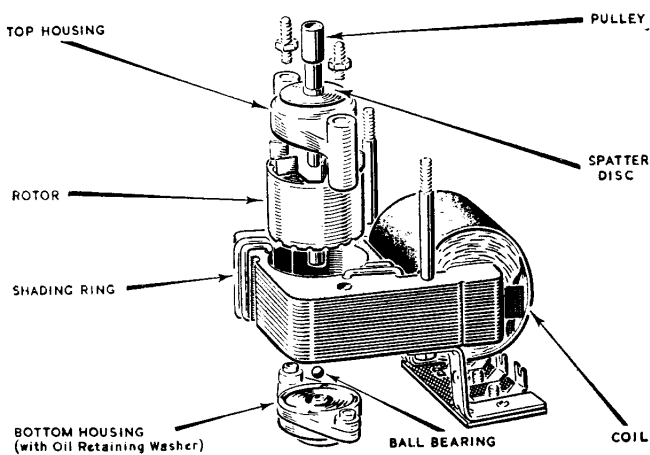
To Remove Motor from Mechanism Plate.

1. Remove the turntable (3 screws).

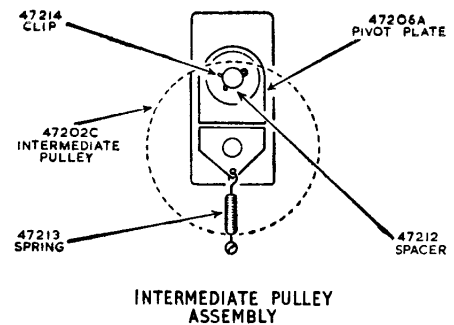
2. Detach connections from motor.

3. Remove the nuts and washers securing the motor to the mechanism plate.

NOTE.—If any serious fault occurs with this motor the complete motor should be returned to E.M.I. Sales and Service Limited.



No. 2 SQUIRREL CAGE MOTOR



INTERMEDIATE PULLEY ASSEMBLY

SPARE PARTS LIST

Ref.	Description.	Part No.	Ref.	Description.	Part No.
RESISTORS.					
R1	0.47 megohms	33360E	C36	15 mmfd.	38050DB
R2	33,000 ohms, \pm 5%	33373X	C37	0.01	38212DU
R3	1,500 ohms	33360DP	C38	50 mfd., 12 V.	38151F
R4	22,000 ohms, \pm 5%	33373W	C39	0.003 mfd., 1,000 V.	38214D
R5	47,000 ohms	33360DY	C40	8 mfd., Electrolytic, 450 V.	See C33
R6	22,000 ohms	33373W	C41	16 mfd. Electrolytic, 450 V.	See C24
R7	22,000 ohms, \pm 5%	33360W	VC1	} Gang Capacitor	37101C
R8	0.15 megohms	33360AB	VC2		
R9	47,000 ohms	33360DY	TC1	Trimmer, 4-30 mmfd.	} 31759A
R10	4.7 megohms	33360EL	TC2	Trimmer, 4-30 mmfd.	
R11	0.47 megohms	33360EE	TC3	Trimmer, 4-30 mmfd.	
R12	0.1 megohms	33360EA	TC4	Trimmer, 4-30 mmfd.	
R13	1 megohm	33360EG	TC5	Trimmer, 4-30 mmfd.	35480B
R14	2,200 ohms, \pm 5%	33379Q	TC6	Trimmer, 4-30 mmfd.	35480B
R15	0.33 megohms	33360ED	TC7	Trimmer, 4-30 mmfd.	35480B
R16	22,000 ohms	33360DW	TC8	Trimmer, 4-30 mmfd.	35480B
R17	47,000 ohms	33360DY	INDUCTANCES.		
R18	100 ohms, \pm 5%	33334G	L1	} 16-50 Metres Aerial Coil	27389FC
R19	680 ohms, \pm 5%	37871M	L2		
R20	22 ohms	33363DC	L3	} 50-187 Metres Aerial Coil	27389FF
VR1	0.5 megohms Volume Control	37944FW	L4		
CAPACITORS.					
C1	470 mmfd.	38051DL	L5	} M.W. Aerial Coil	27389DU
C2	220 mmfd., \pm 10%	38000BJ	L6		
C3	220 mmfd., \pm 10%	38000BJ	L7	} L.W. Aerial Coil	27389DT
C4	0.0039 mfd., \pm 10%	38002QW	L8		
C5	0.0022 mfd., \pm 2%	38002WA	L9	} 16-50 Metres Oscillator Coil	27389FD
C6	470 mmfd., \pm 2%	38001VP	L10		
C7	150 mmfd., \pm 2%	38000TJ	L11	} 50-187 Metres Oscillator Coil	27389FE
C8	33 mmfd., \pm 5%	38004D	L12		
C9	47 mmfd., \pm 5%	38004E	L13	} M.W. Oscillator Coil	27389BX
C10	120 mmfd., \pm 5%	38000JG	L14		
C11	0.47 mfd.	38211DY	L15	L.W. Oscillator Coil	27389BW
C12	0.015 mfd., \pm 5%	38253R	L16	IFT1 Primary Coil	} See IFT1
C13	170 mmfd.	See IFT1	L17	IFT1 Secondary Coil	
C14	0.22 mfd., 150 V.	38910EC	L18	IFT2 Primary Coil	} See IFT2
C15	0.015 mfd., \pm 5%	38253R	L19	IFT2 Secondary Coil	
C16	170 mmfd., \pm 2%	See IFT1	VALVES.		
C17	0.047 mfd.	38211DY	V1	X78—Frequency Changer	
C18	170 mmfd., \pm 2%	See IFT2	V2	W77—I.F. Amplifier	
C19	47 mmfd., 500 V.	38051DE	V3	DH77—Detector A.G.C. and A.F. Amplifier	
C20	170 mmfd., \pm 2%	See IFT2	V4	K761—Output	
C21	100 mmfd.	38050DG	V5	U10—Rectifier	
C22	0.015 mfd.	38211DV	TRANSFORMERS AND CHOKES.		
C23	0.022 mfd.	28211DW	T1	Output Transformer	35527H
C24	8 Rd Electrolytic 450 V.	38150A	T2	Mains Transformer	44430G
C25	100 mmfd.	38050DG	T3	Pick-up Transformer	34720AW
C26	0.047 mfd.	38216DY	T4	Pick-up Transformer	34720F
C27	470 mmfd., 500 V.	38051DL	L57	Filter choke	14545F
C28	1,000 mmfd., \pm 5%	38004N	AUTOMECHANISM.		
C29	330 mmfd., \pm 5%	38001K		Automechanism complete	45000AL
C30	220 mmfd., \pm 5%	38001J		Motor complete	46580C
C31	100 mmfd.	380006			
C32	1,000 mmfd., \pm 5%	38004N			
C33	16 Electrolytic 450 V.	38150A			
C34	900 mmfd., \pm 2%	38001TK			
C35	68 mmfd., 500 V.	38051DF			

Ref.	Description.	Part No.	Ref.	Description.	Part No.
MOTOR SPARE PARTS.					
	Stator laminations and Shading Rings	46580A		Washer	201804
	Laminations (Coil)	46581A		Nut	200404
	Coil	44395A		Spring	47213
	Top housing with pulley, spatter disc fan, Rotor	46585B		See separate manual for complete Automech. Spare Parts List.	
	Bottom housing with oil retaining washer	46582A	MISCELLANEOUS.		
	Ball	249	F1	1·0 amp. Fuse	38825D
	Screw	47208	F2	1·0 amp. Fuse	38825D
	Spacer	47209	S1	Automech. Switch	See Automechanism
	Washers	22511	S2	Tone Control Switch	R38208A
	Spacer	47210	S3	Radio-Gram Switch	R3232B
	Washer	201804	S4	Extended Range Switch	R3231B
	Nut	200404	S5	Extended L.S. Switch	35419B
	Intermediate Pulley	47202C	S6	Mains ON/OFF Switch	See Volume Control
	Clip	47214	LS1	Loudspeaker	46600E
	Pivot plate	47206A	LP1	} Lamps, 6·8 V., 0·5 amp.	46938A
	Screw	200048G	LP2		
	Washer	47211	LP3		
	Spacer	47212	LP4		

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

1. Model number and serial number.
2. Spare part number and description, as given above.
3. Quantity required.

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

Order spare parts from—

**E.M.I. SALES AND SERVICE LTD., SPARE PARTS DIVISION,
SHERATON WORKS, WADSWORTH ROAD,
GREENFORD, MIDDLESEX.**

Telephone : PERivale 6666.

Telegraphic Address : Emiservice, Greenford, Middlesex.

The Company reserves the right to make any modifications without notice.