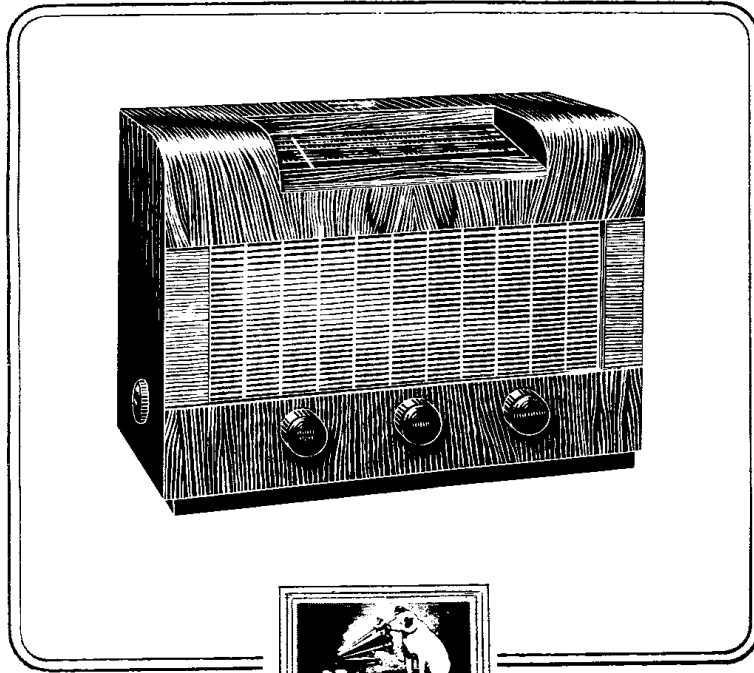


“His Master’s Voice”



The Hallmark of Quality

SERVICE MANUAL

Model 1120

5-valve Superhet Table Receiver

for A.C. Mains

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MODEL 1120

SPECIFICATION

Physical.

Height 12½ inches
Width 18½ inches Overall.
Depth 10 inches
Weight 26 lbs.

Mains Supply.

195 - 255 volts, 50 - 100 cycles A.C. only.

Consumption.

50 watts approx.

Wave Ranges.

S.3. 15.5 - 20.5 metres (19.36 - 14.63 Mc/s).
S.2. 20.5 - 33.0 metres (14.63 - 9.09 Mc/s).
S.1. 33.0 - 100 metres (9.09 - 3.0 Mc/s).
M.W. 190 - 570 metres (1,579 - 526.3 kc/s).
L.W. 720 - 2,000 metres (416.7 - 150.0 kc/s).

Intermediate Frequency.

465 kc/s.

Rated Output.

4.0 watts maximum.

Valves.

Marconi:

X81 (V1) Frequency Changer.
W81 (V2) I.F. Amplifier.
DH81 (V3) Detector, A.G.C. and L.F. Amplifier.
KT81 (V4) Output.
U84 (V5) Rectifier.

Scale Lamps.

Two, 6.8 volts 0.3 amp.

Loudspeaker.

The loudspeaker is a 6½ inch electro-magnet moving coil loudspeaker. The speech coil has a D.C. resistance of 2.9 ohms and an impedance of 3.5 ohms at 1,000 cycles.

External Loudspeaker.

An additional low resistance loudspeaker may be connected to the external loudspeaker sockets. The loudspeaker should have an impedance of approximately 5 ohms.

Connection of Pick-up.

A high resistance pick-up or record player may be connected to the sockets provided. The Volume and Tone controls are operative on gramophone. A Radio/Gram switch is fitted.

CIRCUIT DESCRIPTION

Frequency Changer.

The aerial, is switched on each waveband to special impedance matching coils, and on M.W. and L.W. bands to high impedance coils, these coils are coupled to tuned coils in the grid circuit of the triode-hexode frequency changer V1 (X81).

The tuned grid coils are adjusted by means of iron-dust cores and parallel trimmer condensers.

The local oscillator circuit also has tuned coils adjustable by means of iron-dust cores and parallel

trimmer condensers, the tuned windings being in the anode circuit to give greater stability on the short wavebands.

The reduced frequency coverage on the short waveband is obtained by means of condensers in series with the gang condenser, thus giving ease of tuning on all bands. The first iron-dust cored I.F. transformer (IFT1) couples this valve to the I.F. amplifier.

I.F. Amplifier.

The I.F. Amplifier V2 (W81) is a high slope valve

and amplifies at the intermediate frequency of 465 kc/s. The second I.F. transformer (IFT2) couples this valve to the detector.

Detector, A.G.C. and L.F. Amplifier.

Double-diode triode V₃ (DH81), is used as a detector and A.G.C. rectifier, the volume control VR₁ being the signal diode load. A.G.C. voltage is taken from the D.C. component of the rectified voltage across R₉ and is applied to control the bias of the grid circuits of V₁ and V₂ which are decoupled by R₇ and C₂₆.

L.F. signals taken from VR₁ are applied to the grid of the triode section of V₃ and this section is resistance-capacity coupled to the grid of the output valve.

Output.

The tetrode output valve V₄ (KT81) has its cathode biased by R₁₂. Tone correction is given by C₃₁

and variable tone control by VR₂. The valve supplies the loudspeaker via an output transformer (T₁). External loudspeaker sockets are provided.

H.T. and Heater Supplies.

H.T. is supplied from the mains transformer (T₂) and the full wave rectifier V₅ (U84). Smoothing is obtained by CK and the electrolytic condensers C₃₂ and C₃₃.

The heater supply is taken from a separate winding on the mains transformer. Two scale lamps (LP₁ and LP₂) are connected across this winding.

Pick-up.

A high resistance pick-up or record player may be connected to the sockets provided. The volume and tone controls are operative on gramophone.

INSTALLATION

The Aerial and Earth.

Unless this receiver is connected to an adequate aerial and earth installation, the advantages of the continuous short-waveband, 15.5 - 100 metres, will be minimised or lost. Although the receiver will work on an inside aerial, a high outside aerial is essential for the best reception. Erect 60 to 80 feet of copper wire (including lead-in) as far as possible from buildings and trees. A lightning arrester or switch should be provided and the aerial must be well insulated from all grounded objects.

It is essential that an efficient earth is provided. A copper plate or earth rod buried in moist ground, or, alternatively, a rising main water pipe, forms an efficient earth. *Do not use a telephone earth or a hot water or gas pipe.*

Transit Packing.

Before operating the receiver, the four red-headed transit bolts, beneath the cabinet, must be removed to allow the chassis to float freely on its rubber cushioning.

The transit bolts 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	195 - 215
225	216 - 235
245	236 - 255

DISMANTLING

Ganging and minor adjustments may be carried out without removing the chassis; simply remove the back panel and the service hatch from beneath the cabinet.

Removal of Chassis.

1. Disconnect the receiver entirely from the mains.
2. Remove the Radio/Gram switch knob (spring fixing) and the aerial and earth plugs from the back of the cabinet.
3. Remove the cabinet back (two screws); the back is hinged for convenience.
4. Remove the three knobs from the front of the cabinet (screw fixing) and the knob from the side of the cabinet (spring fixing).
5. Unclip the two scale lamps from their brackets and clip on lugs as shown in diagram on page 5.
6. Loosen the screw clamping the drive cord to the cursor and slip cord free.
7. Remove leads, from output stage to loudspeaker, from beneath the cleat on the cabinet.

8. Remove the four chassis fixing screws from the underside of the cabinet and withdraw chassis.

NOTE:- The loudspeaker is fitted to the cabinet, but sufficient lead is provided for the chassis to be serviced outside the cabinet.

Removal of H.F. Unit.

1. Disconnect the receiver entirely from the mains and remove the chassis. (See above.)
2. Unsolder the lead from the aerial tag to the H.F. unit and the two leads from the gang condenser.
3. Unsolder the following leads from the tag panel on the H.F. unit:-
 - (a) Lead from Tag 2 to Pin 6 V₁.
 - (b) Lead from Tag 3 to Pin 4 V₁.
 - (c) Lead from Tag 5 to Pin 3 V₁.
 - (d) Braided lead from Tag 6 to the spigot of V₁.
4. 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.

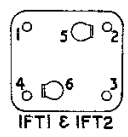
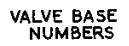
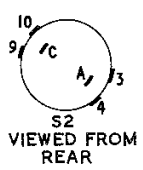
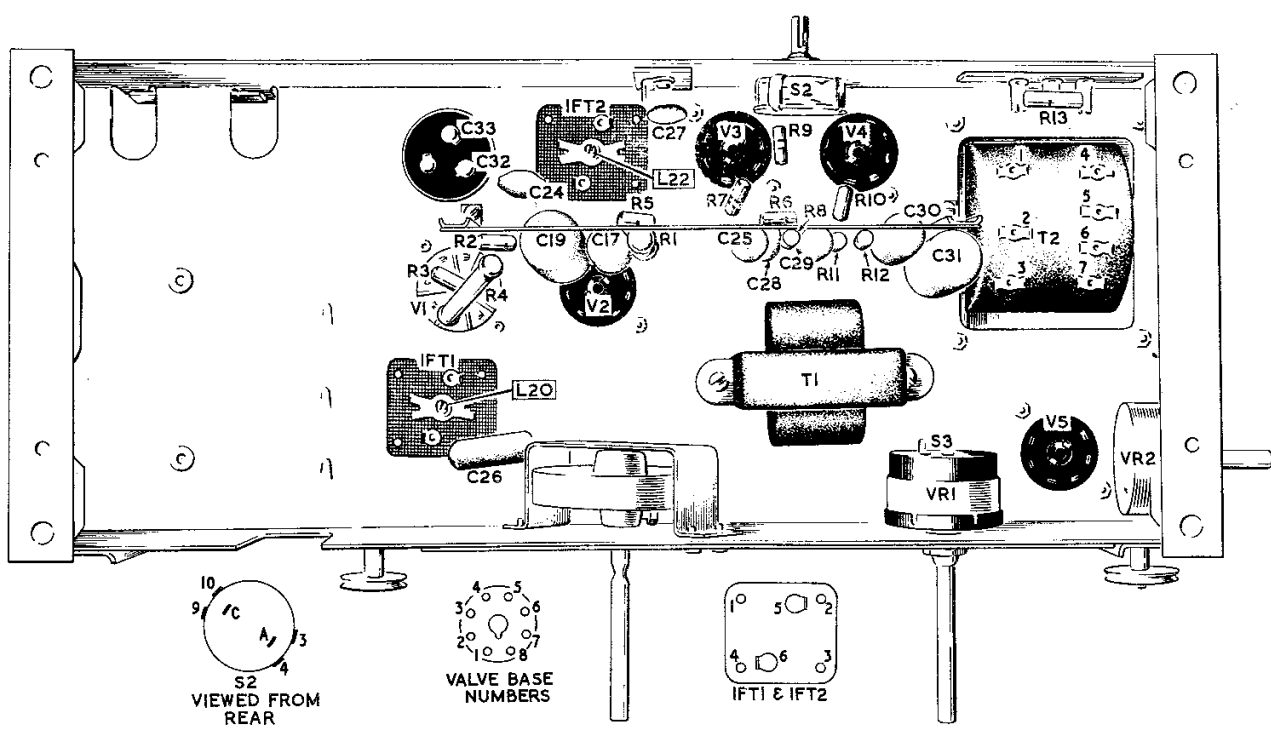
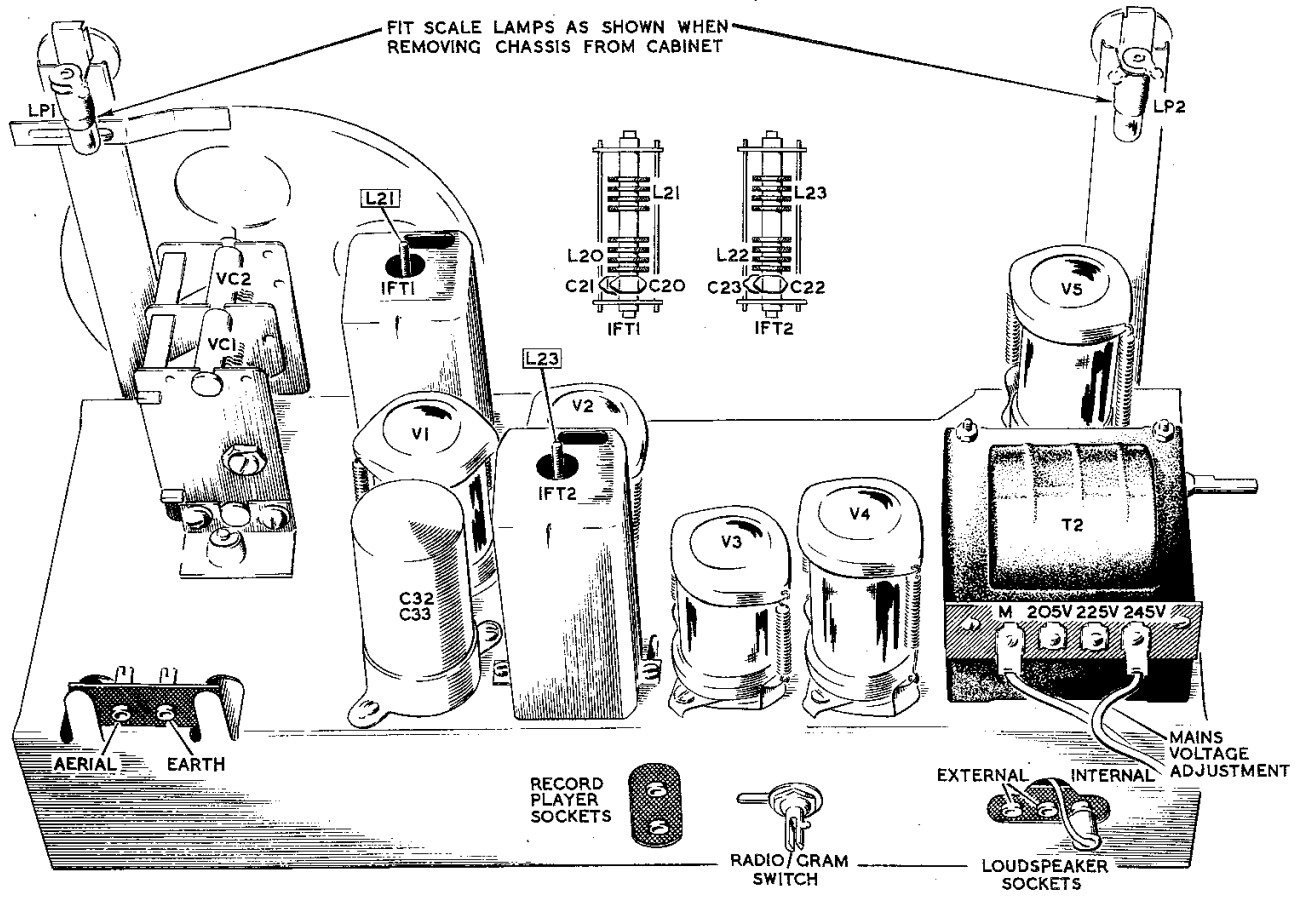
Whilst ganging, the input to the receiver must be progressively reduced as the circuits are brought into line so that the output does not exceed 500 mW. (1.4V across the speech coil).

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

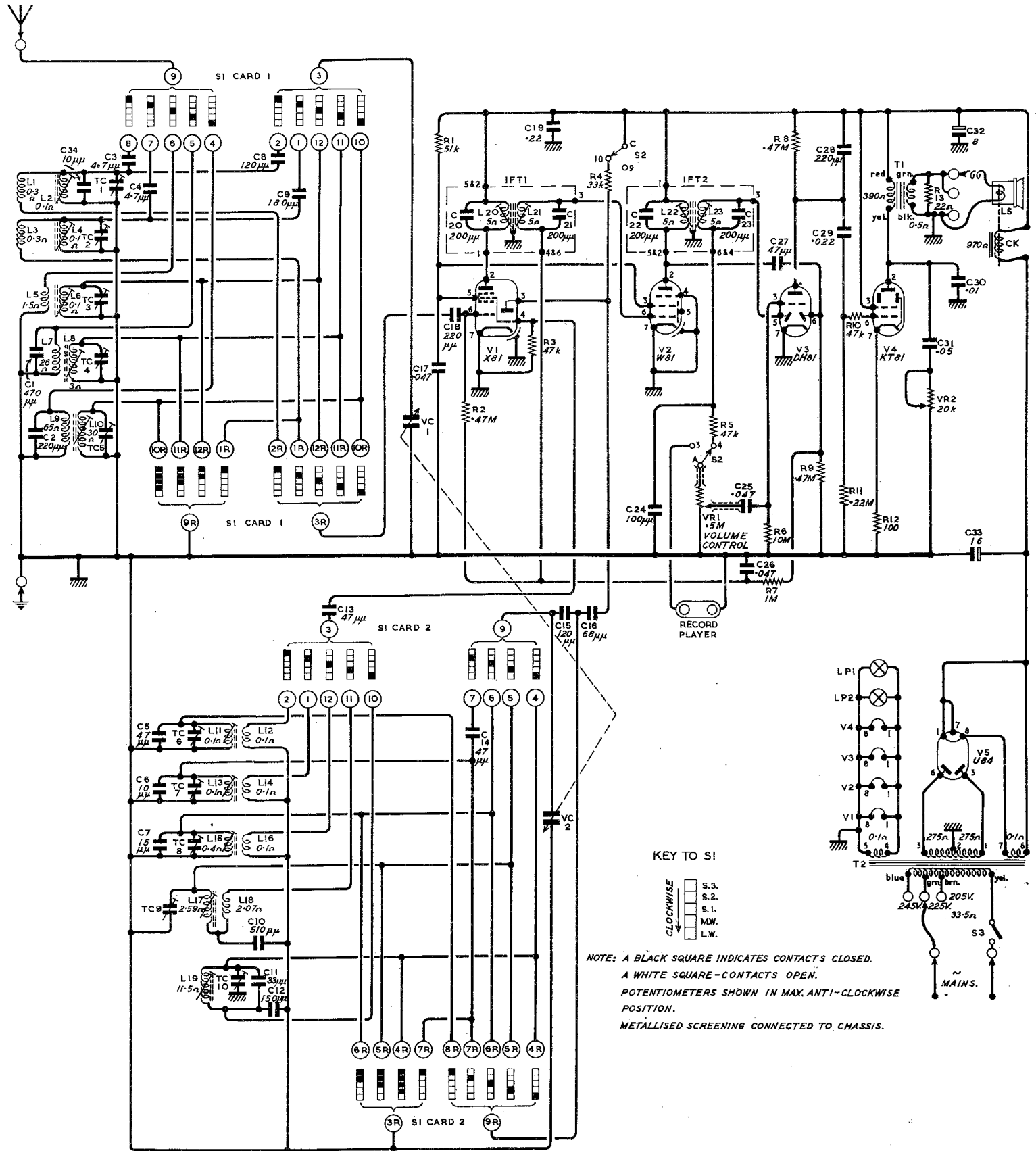
Intermediate Frequency.

Set the waveband switch to M.W., the volume and tone controls fully clockwise and the gang condenser to minimum capacity (plates fully disengaged).

1. Inject a modulated signal at 465 kc/s, via a 0.05 mfd. condenser into the grid of V₂, leaving the grid connection made.
2. Adjust cores L₂₃ and L₂₂ in that order for maximum output.
3. Inject a modulated signal at 465 kc/s, via a 0.05 mfd. condenser, into the grid of V₁, leaving the grid connection made.
4. Adjust cores L₂₁ and L₂₀ in that order for maximum output.



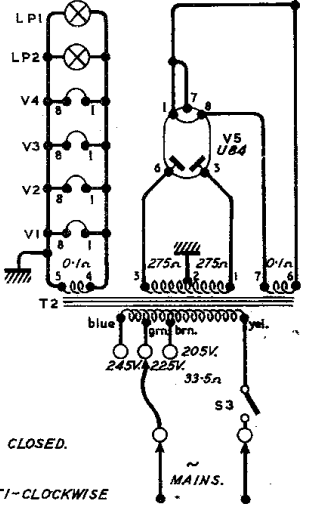
C	1	2	34	3	4,5,6,7	8,10,11,12,9	13	17	20,18	14	19	21,15,16	22,24	23,25,26,27	28,29	31	32,30,33	C					
R								1	2		3	4		5	7	6	8	9	10,11	12	13		R
MISC	L1 to I0, TC1 to 5, TC6 to I0.				L11 to I9.				VC1	VC2	V1, L20	L21	V2	S2	V2, L22, L23, VR1, S2	V3	LPI, LP2	T2, V4, T1	VR2, V5, S3, L5, CK	MISC			

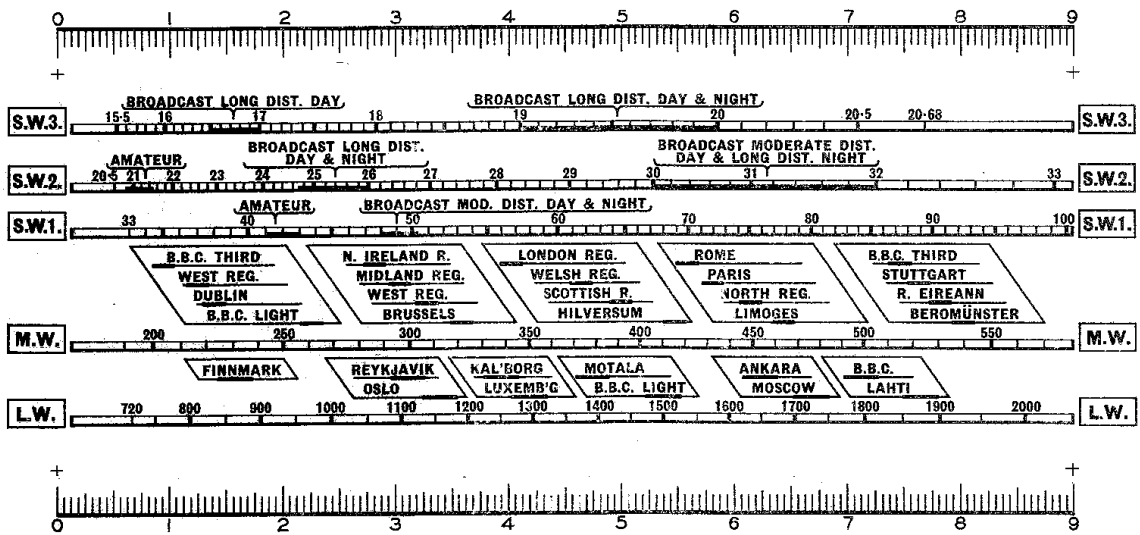
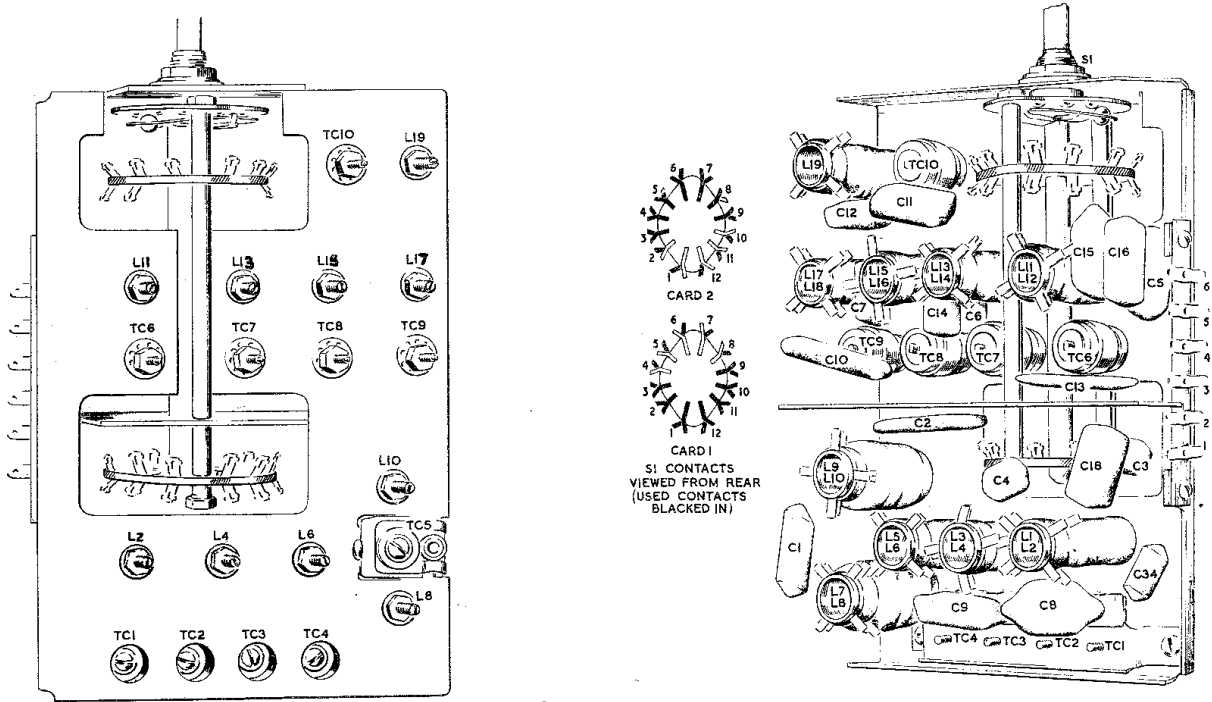


KEY TO SI



NOTE: A BLACK SQUARE INDICATES CONTACTS CLOSED.
 A WHITE SQUARE - CONTACTS OPEN.
 POTENTIOMETERS SHOWN IN MAX. ANTI-CLOCKWISE POSITION.
 METALLISED SCREENING CONNECTED TO CHASSIS.





NOTE:- The setting "20.68" has been reproduced in the above scale for ganging purposes only, and does not appear in the actual wavescale.

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 condenser 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 the end of the bracket mounted above the condenser drum.

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

1. Turn gang condenser to maximum capacity.
2. See that the end of the bracket coincides with 9 inches on the calibration scale.
3. If adjustment is necessary, slacken the two screws securing the bracket and adjust, then tighten the screws securely.

Bandspread.

Unless the signal generator to be used for alignment is known to have an extremely high order of accuracy, it is essential to check the calibration of these ranges on a transmission of known frequency, either during or after ganging. The oscillator circuit inductances may be re-adjusted to bring the tuning to the correct pointer reading on the scale. The receiver should have been switched on for at least a quarter of an hour before making adjustments.

A reproduction of the scales relative to the inch calibrating scale is given so that the wavelength can be interpreted as calibration scale readings for this purpose.

Short Waves.

Set volume and tone controls fully clockwise and waveband switch as required. 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 ₃	1	$7\frac{11}{16}$	20.68	14.5	Adjust L ₁₂ for maximum output.
"	2	Rock Gang	"	"	Adjust L ₂ for maximum output.
"	3	$7\frac{11}{16}$	"	"	Adjust L ₁₁ for maximum output.
"	4	$1\frac{1}{8}$	16.21	18.5	Adjust TC ₆ for maximum output.
"	5	Rock Gang	"	"	Adjust TC ₁ for maximum output.
"	6	$1\frac{1}{8}$	"	"	Adjust TC ₆ for maximum output.
"	7	—	—	—	Repeat operations 1 to 6.

Waveband Switch Position.	Op. No.	Calibration Scale Setting.	Tune test oscillator to m.	Mc/s.	Operation.
S ₂	1	$7\frac{3}{16}$	31.9	9.4	Adjust L ₁₃ for maximum output.
"	2	Rock Gang	"	"	Adjust L ₄ for maximum output.
"	3	$7\frac{3}{16}$	"	"	Adjust L ₁₃ for maximum output.
"	4	$1\frac{1}{8}$	22.2	13.5	Adjust TC ₇ for maximum output.
"	5	Rock Gang	"	"	Adjust TC ₂ for maximum output.
"	6	$1\frac{1}{8}$	"	"	Adjust TC ₇ for maximum output.
"	7	—	—	—	Repeat operations 1 to 6.

Waveband Switch Position.	Op. No.	Calibration Scale Setting.	Tune test oscillator to		Operation.
			m.	Mc/s.	
S1	1	$7\frac{5}{16}$	85.66	3.5	Adjust L15 for maximum output.
"	2	Rock Gang	"	"	Adjust L6 for maximum output.
"	3	$7\frac{5}{16}$	"	"	Adjust L15 for maximum output.
"	4	$1\frac{1}{8}$	35.12	9.06	Adjust TC8 for maximum output.
"	5	Rock Gang	"	"	Adjust TC3 for maximum output.
"	6	$1\frac{1}{8}$	"	"	Adjust TC8 for maximum output.
"	7	—	—	—	Repeat operations 1 to 6.

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	$7\frac{3}{8}$	510	588	Adjust L17 for maximum output.
"	2	Rock Gang	"	"	Adjust L8 for maximum output.
"	3	$7\frac{3}{8}$	"	"	Adjust L17 for maximum output.
"	4	$1\frac{3}{32}$	210	1429	Adjust TC9 for maximum output.
"	5	Rock Gang	"	"	Adjust TC4 for maximum output.
"	6	$1\frac{3}{32}$	"	"	Adjust TC9 for maximum output.
"	7	—	—	—	Repeat operations 1 to 6.

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	$7\frac{1}{2}$	1850	162	Adjust L19 for maximum output.
"	2	Rock Gang	"	"	Adjust L10 for maximum output.
"	3	$7\frac{1}{2}$	"	"	Adjust L19 for maximum output.
"	4	$1\frac{1}{2}$	850	353	Adjust TC10 for maximum output.
"	5	Rock Gang	"	"	Adjust TC5 for maximum output.
"	6	$1\frac{1}{2}$	"	"	Adjust TC10 for maximum output.
"	7	—	—	—	Repeat operations 1 to 6.

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/D5021)

is required for adjusting the oscillator circuit trimmer condensers.

Write for particulars to E.M.I. Sales & 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

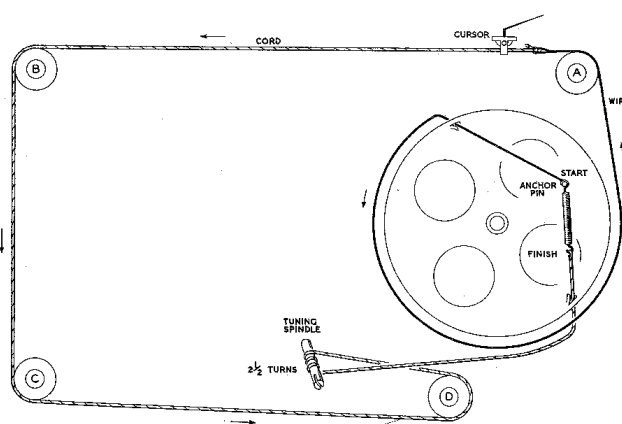
of known wavelength. Adjust pointer to give best compromise on all wavebands, if necessary.

CONDENSER AND POINTER DRIVE

Use only correct wire (S2447) and high grade fishing line (S515). Approximately 22 inches of wire and 48 inches of cord are used.

1. Form a loop with an opening of about $\frac{1}{8}$ inch in diameter at one end of the wire. It will be found that the twisted part of the wire can readily be soldered.
2. Pass loop end of wire through hole in periphery of drum and assemble on anchor pin as shown in diagram.
3. Wind wire nearly a complete turn round drum and take it over pulley marked "A". Arrows show direction.
4. Attach one end of cord to loose end of wire; form a loop in end of wire and solder, tie a knot in end of cord and fix with shellac.
5. Take cord around pulleys marked "B", "C", and "D".
6. Wind two and a half turns round tuning spindle.

7. Take cord round drum and in through hole in periphery of drum. Assemble tension spring as shown. Tie a knot and shellac end of cord.



VALVE TABLE

The following table indicates the approximate voltage and current readings obtained on each valve when the receiver is connected to a 220 volt 50 cycle mains supply. Variations of ± 15 per cent may be anticipated between models. Higher or lower mains voltage will naturally produce a corresponding variation in meter readings in approximate proportion to the change in mains supply.

A high resistance voltmeter should be used to measure voltages. Values stated below were obtained using a meter with a resistance of 500 ohms per volt.

Valve.	Anode.		Screen.		Cathode.	
	Volts to Chassis.	Current mA.	Volts to Chassis.	Current mA.	Volts to Chassis.	Current mA.
V ₁ (X81)	Mx. Osc. 270 100	Mx. Osc. 0.6 4.8	50	1.6	—	7.0
V ₂ (W81)	263	8.25	50	2.5	—	10.75
V ₃ (DH81)	58	0.5	—	—	—	0.5
V ₄ (KT81)	255	32.5	267	5.5	4.0	38
V ₅ (U84)	334 A.C.	—	—	—	340	—

Total H.T. current 56 mA (D.C.). Total A.C. current 218 mA. Total H.T. voltage (smoothed) 271 volts.

SPARE PARTS LIST

Ref.	Description.	Part No.	Ref.	Description.	Part No.	
CABINET AND FITTINGS						
	Cabinet	409101B	C5	47 mmfd. $\pm 2\%$	38000ZJ	
	Cabinet Back	43811A	C6	10 mmfd. $\pm 10\%$	38003BA	
	Scale	37124H	C7	15 mmfd. $\pm 5\%$	38003B	
	Knob—Volume On/Off	40171AE	C8	120 mmfd. $\pm 2\%$	38000TH	
	Knob—Tuning	40171IP	C9	180 mmfd. $\pm 2\%$	38000VE	
	Knob—Waveband	40171IL	C10	510 mmfd. $\pm 2\%$	38001VQ	
	Knob—Tone	35432C	C11	33 mmfd. $\pm 2\%$	38000ZE	
	Knob—Radio/Gram		C12	150 mmfd. $\pm 2\%$	38000TJ	
INDUCTANCES			C13	47 mmfd. $\pm 5\%$	38000E	
L1 } L2 }	15.5 to 20.5 metres Aerial Coil	27389CS	C14	47 mmfd. $\pm 2\%$	38003ZJ	
L3 } L4 }	20.5 to 33 metres Aerial Coil	27389CT	C15	120 mmfd. $\pm 2\%$	38000TH	
L5 } L6 }	33 to 100 metres Aerial Coil	27389CU	C16	68 mmfd. $\pm 5\%$	38000F	
L7 } L8 }	M.W. Aerial Coil	27389DU	C17	0.047 mfd. 350v.	38211DY	
L9 } L10 }	L.W. Aerial Coil	27389DT	C18	220 mmfd. $\pm 5\%$	38000J	
L11 } L12 }	15.5 to 20.5 metres Oscillator Coil	27389CW	C19	0.22 mfd. 350v.	38211EC	
L13 } L14 }	20.5 to 33 metres Oscillator Coil	27389CX	C20	200 mmfd. $\pm 2\%$	see IFT1	
L15 } L16 }	33 to 100 metres Oscillator Coil	27389DG	C21	200 mmfd. $\pm 2\%$		
L17 } L18 }	M.W. Oscillator Coil	27389BX	C22	200 mmfd. $\pm 2\%$	see IFT2	
L19 } L20 }	L.W. Oscillator Coil	27389BW	C23	200 mmfd. $\pm 2\%$		
L21 } L22 }	IFT1 Primary Coil	see IFT1	C24	100 mmfd. 350v.	38050DG	
L23 } L24 }	IFT2 Primary Coil		see IFT2	C25	0.047 mfd. 150v.	38210DY
L25 } L26 }	IFT1 Secondary Coil	see IFT1		C26	0.047 mfd. 150v.	38210DY
L27 } L28 }	IFT2 Secondary Coil		see IFT2	C27	47 mmfd. 500v.	38051DE
L29 } L30 }				C28	220 mmfd. 500v.	38051DJ
L31 } L32 }			C29	0.022 mfd. 350v.	38211DW	
L33 } L34 }			C30	0.01 mfd. 1,000v.	31840N	
L35 } L36 }			C31	0.05 mfd. 1,000v.	31840W	
L37 } L38 }			C32	8 mfd. 450v. }	38150A	
L39 } L40 }			C33	16 mfd. 450v. }		
L41 } L42 }			C34	10 mmfd. $\pm 10\%$	38003BA	
L43 } L44 }			VC1	Gang Condenser }	37101C	
L45 } L46 }			VC2			
L47 } L48 }			TC1	Trimmer 4 - 30 mmfd.	31759A	
L49 } L50 }			TC2	Trimmer 4 - 30 mmfd.		
L51 } L52 }			TC3	Trimmer 4 - 30 mmfd.		
L53 } L54 }			TC4	Trimmer 4 - 30 mmfd.		
L55 } L56 }			TC5	Trimmer 4 - 30 mmfd.		39650A
L57 } L58 }			TC6	Trimmer 3 - 30 mmfd.		35480B
L59 } L60 }			TC7	Trimmer 3 - 30 mmfd.		35480B
L61 } L62 }			TC8	Trimmer 3 - 30 mmfd.		35480B
L63 } L64 }			TC9	Trimmer 3 - 30 mmfd.		35480B
L65 } L66 }			TC10	Trimmer 3 - 30 mmfd.		35480B
CONDENSERS						
C1	470 mmfd.	38051DL				
C2	220 mmfd. $\pm 5\%$	38000J				
C3	4.7 mmfd.	38050NL				
C4	4.7 mmfd.	38050NL				

SPARE PARTS LIST

Ref.	Description.	Part No.	Ref.	Description.	Part No.
RESISTANCES			VALVES		
R1	51,000 ohms \pm 5%	33373NV	V1	X81 Frequency Changer	
R2	0.47 megohms	33360EE	V2	W81 I.F. Amplifier	
R3	47,000 ohms	33360DY	V3	DH81 Detector, A.G.C. and L.F. Amplifier	
R4	33,000 ohms \pm 5%	33373X	V4	KT81 Output	
R5	47,000 ohms	33360DY	V5	U84 Rectifier	
R6	10 megohms	33360EN	TRANSFORMERS AND CHOKES		
R7	1 megohm	33360EG	IFT1	1st I.F. Transformer	39000B
R8	0.47 megohms	33360EE	IFT2	2nd I.F. Transformer	39000B
R9	0.47 megohms	33360EE	T1	Output Transformer	35527H
R10	47,000 ohms	33360DY	T2	Mains Transformer	44390D
R11	0.22 megohms	33360EC	CK	Loudspeaker Field	see L.S.
R12	100 ohms \pm 5%	33334G	MISCELLANEOUS		
R13	22 ohms	33363DC	S1	Waveband Switch	43815A
VR1	0.5 megohms Volume Control and Switch	37900ER	S2	Radio/Gram Switch	32498D
VR2	20,000 ohms Tone Control	37901GG	S3	On/Off Switch	see VR1
			LP1	Scale Lamp	35421D
			LP2	Scale Lamp	35421D
			LS		35340G

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 orders 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.