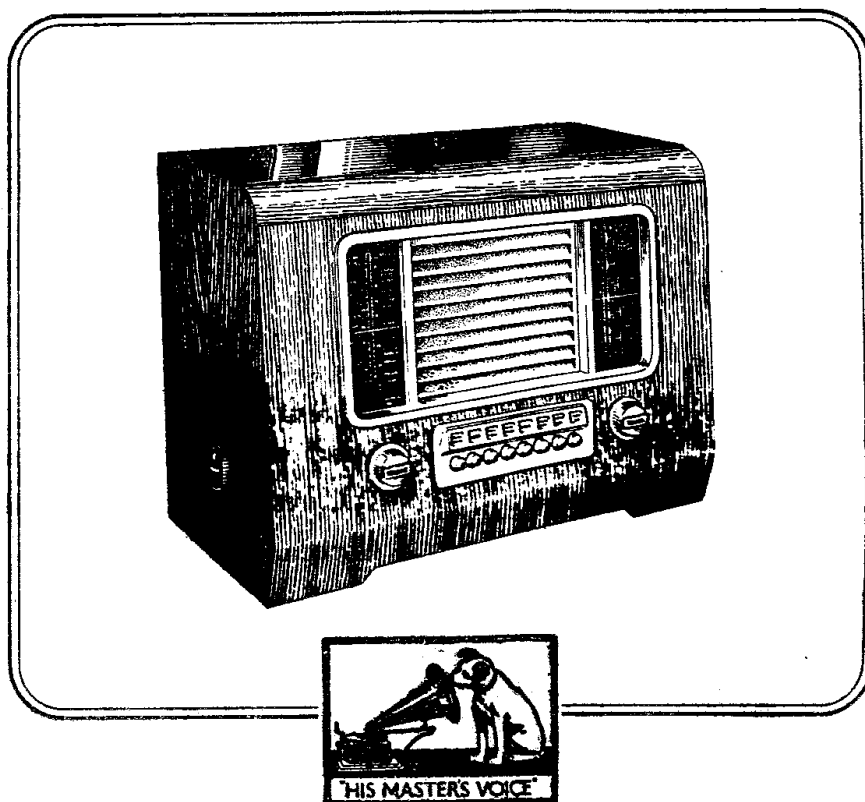


# “His Master’s Voice”



## SERVICE MANUAL

Model 1119

5-valve Press-button Superhet Table Model  
for A.C. Mains

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# MODEL 1119

## SPECIFICATION

### Physical.

Height	.	.	.	.	.	14½ inches.
Width	.	.	.	.	.	19½ "
Depth	.	.	.	.	.	10½ "
Net Weight	.	.	.	.	.	32½ lb.

### Mains Supply and Consumption.

195 to 255 volts, 40 to 60 cycles A.C.  
Consumption 70 watts.

### Wave Ranges.

#### Manual

S.W.	16.3 to 51.7 metres	(18.4 to 5.8 Mc/s.)
M.W.	192 to 575	" (1565 to 522 kc/s.)
L.W.	850 to 2,000	" (353 to 150 kc/s.)

#### Press-buttons

1 & 2	1,250 to 2,000 metres	(240 to 150 kc/s.)
3 & 4	325 to 550	" (923 to 545 kc/s.)
5	200 to 345	" (1,500 to 870 kc/s.)

NOTE.—When the models leave the factory the press-buttons are tuned as follows:—1. Radio Paris (1,648 metres); 2. National (1,500 metres); 3. North Regional (449 metres); 4. London Regional (342 metres); 5. Nationals (261 metres). A sheet containing names of other stations is supplied to enable owners to change the names in the panels above the press-buttons if the settings are altered.

*Intermediate Frequency.* 465 kc/s.

*Rated Output.* 4.5 watts maximum.

### Valves.

#### Marconi.

X61M	(V1)	Frequency Changer.
KTW61M	(V2)	I.F. Amplifier.
DH63M	(V3)	Detector, A.V.C. and L.F. Amplifier.
KT61	(V4)	Output.
U50	(V5)	Rectifier.

*Pilot Lamps.* 7.0 volts, 0.32 amp.

### Loudspeaker.

8-inch diameter electro-magnetic moving coil speaker.  
D.C. resistance of speech coil, 3½ ohms.  
Impedance at 1,000 cycles, 5 ohms.

### Extra Loudspeakers.

One or two low-resistance loudspeakers may be connected to the sockets provided and should be adjusted to a total impedance of as near as possible to 5 ohms. A loudspeaker switch is provided at the back of the receiver.

### Connection of Pick-up.

A high resistance pick-up or record player may be connected to the sockets provided.

A Radio-Gram switch is fitted in the back of the receiver. The volume and tone controls are operative on gramophone.

NOTE.—The setting of press-button trimmers must be done on customer's mains after setting receiver to correct voltage and allowing 10 to 15 minutes for warming up.

## CIRCUIT DESCRIPTION

### Aerial Circuit.

High impedance inductive coupling is employed on all bands to high-efficiency tuned circuits. The medium and long wave coils are iron-cored (L4 and L5) and image rejection on L.W. is provided by C4. The press-button circuits employ the same M.W. and L.W. inductances

(L4 and L5) as for manual tuning, but pre-set condensers (TC1-3, 5, 6) are switched across them instead of the variable condenser VC1. The pre-set press-button circuits are isolated by means of switches S8 and S9 on manual tuning.

### *Frequency Changer.*

A triode-hexode (X61M) valve is used. Inductive and capacitive coupled circuits (L6, L7 and L8, L9) on M.W. and S.W. produce oscillations, whilst on long waves a capacity coupling (C18) is used; the intermediate frequency is 465 kc/s. For the press-button ranges a fixed capacity (C28) has pre-set inductances (L11-L15) switched in a capacity (C18) coupled circuit.

### *I.F. Amplifier.*

The first iron-cored I.F. transformer (IFT1), in the anode circuit of V1, couples V1 to the high slope KTW61M I.F. amplifier (V2). This valve has I.F. transformer (IFT2) coupling it to the second detector valve.

### *Second Detector.*

A tuned secondary feeds the signal diode of V3 (DH63M) which has a load resistance R9, R28, R10. On M.W. and L.W. and press-buttons the signal is tapped off through C17, on S.W. the signal is tapped off through C42 and in both cases is fed through volume control VR1. This pro-

duces bass cut on S.W., switch S3 being operated by the S.W. press-button. The A.V.C. diode is fed through C23 and the voltage produced across R16 is applied to V1 and V2.

### *Output Stage.*

Resistance-capacity (R13, C24) coupling is employed between the DH63M and the KT61 output valve. The latter has a tone control circuit (C26, VR2) connected across the primary of the output transformer T1, which feeds the loudspeaker.

### *Rectifier.*

A full wave U50 rectifier supplies H.T. current. Smoothing is by the L.S. field (CK1) in conjunction with electrolytic condensers C30, C29.

### *Gramophone.*

In the gram. position of switch S2 the H.T. supply to the oscillator circuit is dis-connected and the pick-up terminals are connected to the volume control.

## INSTALLING

### *The Aerial and Earth.*

This receiver is equipped with a built-in aerial plate. In good circumstances, *i.e.*, not in areas of strong electrical interference, or in a steel frame or heavily screened building, no external aerial will be needed to obtain reception from a selection of stations on all three wavebands. In difficult reception circumstances and wherever it is desired to get the maximum sensitivity from the receiver, erect a high outside aerial, 60 to 80 feet total length, as far as possible away from walls, trees, gutters, etc. Point the aerial towards any potential source of interference, such as overhead trolley, or power lines, or

any roadway carrying heavy motor traffic. An adequate lightning switch should be fitted. It is essential that an efficient earth is provided. A copper plate or rod buried about 3 feet deep in moist ground provides a good earth, or alternatively, connection can be made to a rising water main. Never use a gas pipe, a telephone cable, or a hot water pipe as an earth.

**IMPORTANT.**—The mains voltage is best ascertained by direct measurement on the customer's premises. The voltages covered by the terminals are 195-215, 216-235, 236-255 volts.

## DISMANTLING

Minor replacements and adjustments may be carried out by removing the back and the service hatch from underneath the cabinet. For ganging and major replacements the chassis must be removed.

### *Removal of Chassis.*

1. Disconnect the receiver entirely from the mains. Remove the aerial and earth plugs and disconnect plate aerial lead.

2. Remove two front knobs (screw fixing) and pull off the tone control knob at side of cabinet (spring fixing).

3. Remove the card back (four screws).

4. Remove the four pilot lamps (clip fixing). Unscrew the two cursors from the condenser drive wire.

5. Remove the four fixing screws from the underside of the cabinet.

6. Withdraw the chassis.

**NOTE.**—The scale and the two cursors are fitted to the cabinet.

## H.F. TESTS AND ADJUSTMENTS

### *General.*

If I.F. circuits have been disturbed complete I.F. and R.F. alignment must follow. Whilst ganging, the input to the receiver from the test oscillator must be progressively reduced as the circuits are brought into line so that the output does not exceed 500 mW. An A.C. voltmeter connected across the loudspeaker speech coil may be used as an output meter.

### *I.F. Ganging.*

Press S.W. button, set volume control fully clockwise and tone control fully anti-clockwise and gang condenser at maximum.

1. Inject a modulated signal at 465 kc/s, via a 0.05 mfd. condenser, into grid of V2 and chassis. (Leaving grid connection made).
2. Shunt L18 with a 33,000 ohms resistor and adjust L19 for maximum output.
3. Shunt L19 as above and adjust L18 for maximum output.
4. Inject a modulated signal at 465 kc/s, via a 0.05 mfd. condenser, into grid of V1 and chassis. (Leaving grid connection made).
5. Shunt L16 as above and adjust L17 for maximum output.
6. Shunt L17 as above and adjust L16 for maximum output.

NOTE.—L18 and L19 must not be adjusted when oscillator is connected to grid of V1.

### *R.F. Ganging—Medium Waves.*

Set volume control fully clockwise, and tone control fully anti-clockwise. Connect oscillator leads to the aerial socket (via a M.W. dummy aerial) and chassis. Press M.W. button.

### *Press-button Ganging.*

Set volume control fully clockwise and tone control fully anti-clockwise, connect test oscillator to aerial and earth sockets.

1. Depress button No. 1 and set oscillator to desired wave-length.
2. Adjust L15 and TC6 in that order for maximum output
3. Check adjustment in the same order.
4. Continue in the same manner with the remaining buttons, adjust L14 and TC5 for button No. 2; L13 and TC3 for button No. 3; L12 and TC2 for button No. 4; L11 and TC1 for button No. 5.

The setting of each button should now be checked on the broadcast signal of the stations selected, preferably on the customer's mains.

### *Setting up Calibration Scale.*

As the wave-scale is assembled to the cabinet, a calibration scale is fitted to the front of the chassis and is to be used for R.F. ganging purposes. This scale is calibrated in inches and sixteenths of an inch which correspond to frequencies as given in the ganging operation and are read against the *trailing edge* of the red tab fitted to the wire drive. Before commencing R.F. ganging operations it is essential to check the position of the calibration scale and the red tab in relation to the gang condenser.

1. Turn gang condenser to maximum.
2. See that the *trailing edge* of the red tab coincides with  $5\frac{1}{2}$  inches on the calibration scale.
3. If adjustment is necessary slacken the two screws securing the scale and adjust; then tighten securely the two screws.

Op. No.	Gang condenser or calibration scale setting.	Tune test oscillator to		Operation.
		m.	kc/s.	
1	Set to $\frac{35}{16}$ "	210	1,427	Adjust TC8 for maximum output.
2	Set to $\frac{35}{16}$ "	210	1,427	Adjust TC7 for maximum output.
3	Set to $4\frac{1}{2}$ "	510	588	Adjust core L9 for maximum output.
4	Set to $4\frac{1}{2}$ "	510	588	Adjust core L4 for maximum output.
5	—	—	—	Repeat operations 1, 2, 3 and 4 for maximum output.

**Long Waves.**

Controls as before and press L.W. button. Use same dummy aerial.

Op. No.	Gang condenser or calibration scale setting.	Tune test oscillator to m. kc/s.		Operation.
1	Set to $1\frac{3}{8}$ "	1,000	300	Adjust TC9 for maximum output.
2	Set to $1\frac{3}{8}$ "	1,000	300	Adjust TC4 for maximum output.
3	Set to $4\frac{11}{32}$ "	1,850	162	Adjust core L10 for maximum output.
4	Set to $4\frac{11}{32}$ "	1,850	162	Adjust core L5 for maximum output.
5	—	—	—	Repeat operations 1, 2, 3 and 4.

**Short Waves.**

Controls as before and press S.W. button. Use S.W. dummy aerial.

Op. No.	Gang condenser or calibration scale setting.	Tune test oscillator to m. Mc/s.		Operation.
1	Set to $5\frac{1}{8}$ "	50	6	Adjust L7 loop for maximum output.
2	Set to $5\frac{1}{8}$ "	50	6	Adjust L2 loop for maximum output.

## CALIBRATION

Replace the chassis in the cabinet and assemble both cursors to the drive wire. With gang condenser at maximum, set pointers so that they line up with the top mark on the wavescale. Check calibration at about the

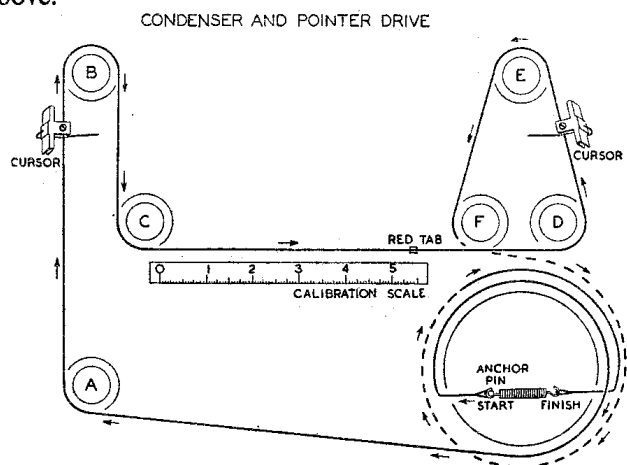
middle of the tuning scale on stations of known wavelength and adjust pointers if necessary. On medium and long waves it may be found necessary to adjust the pointer to get the best possible compromise on both wavebands.

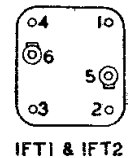
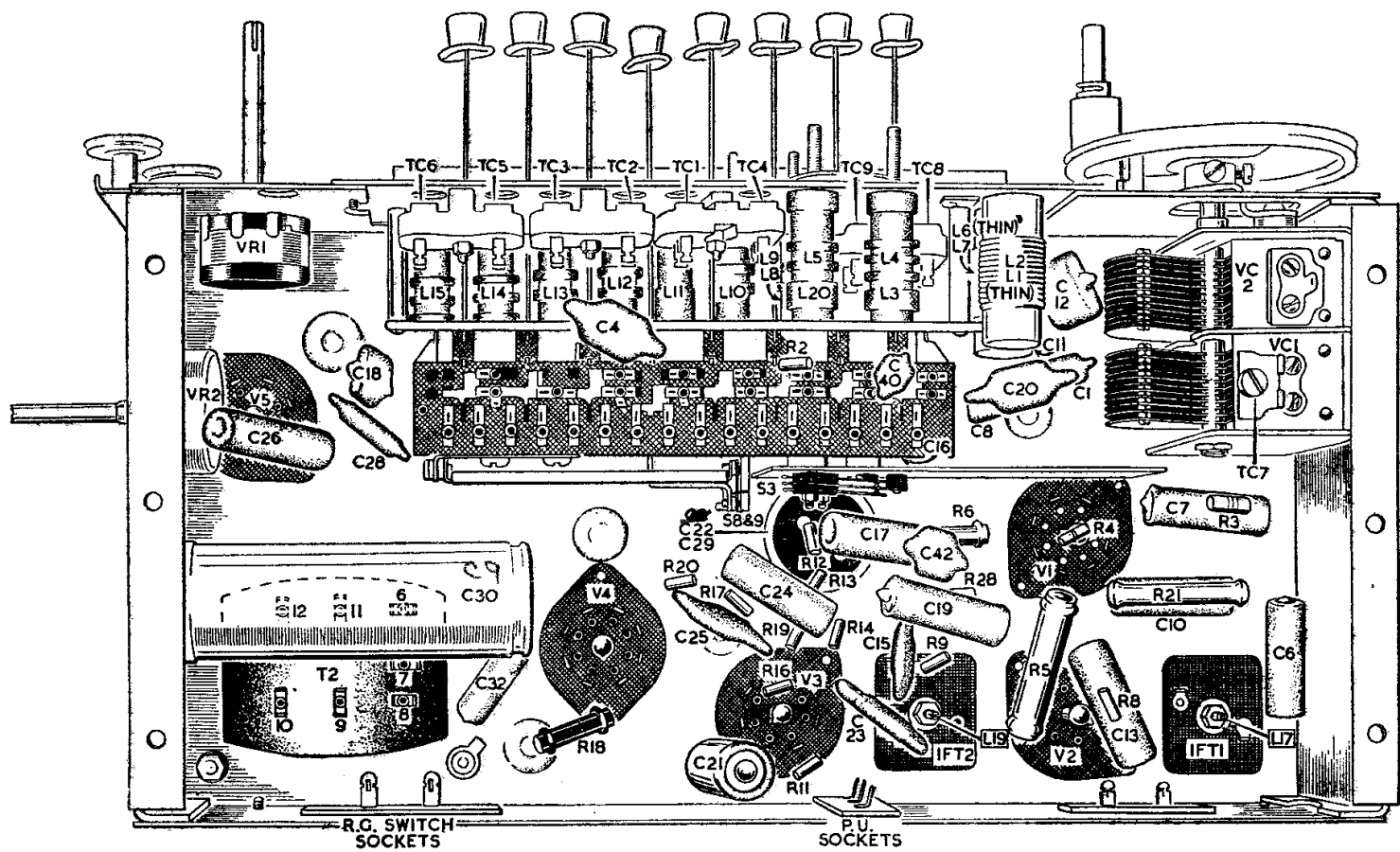
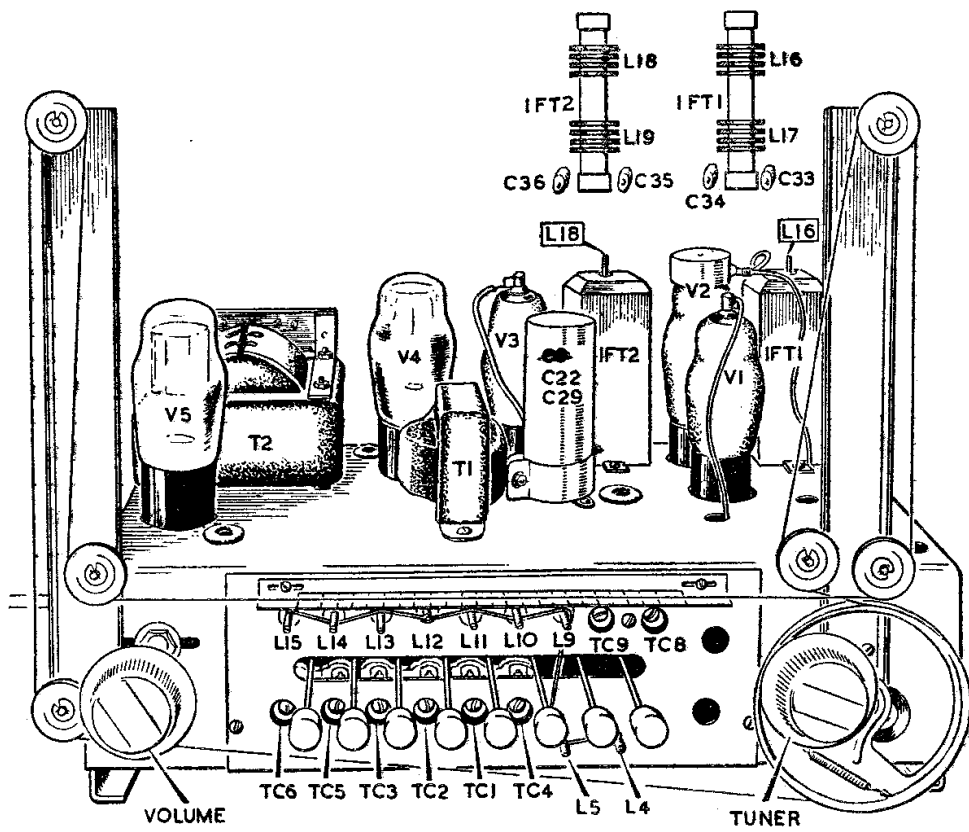
## CONDENSER AND POINTER DRIVE

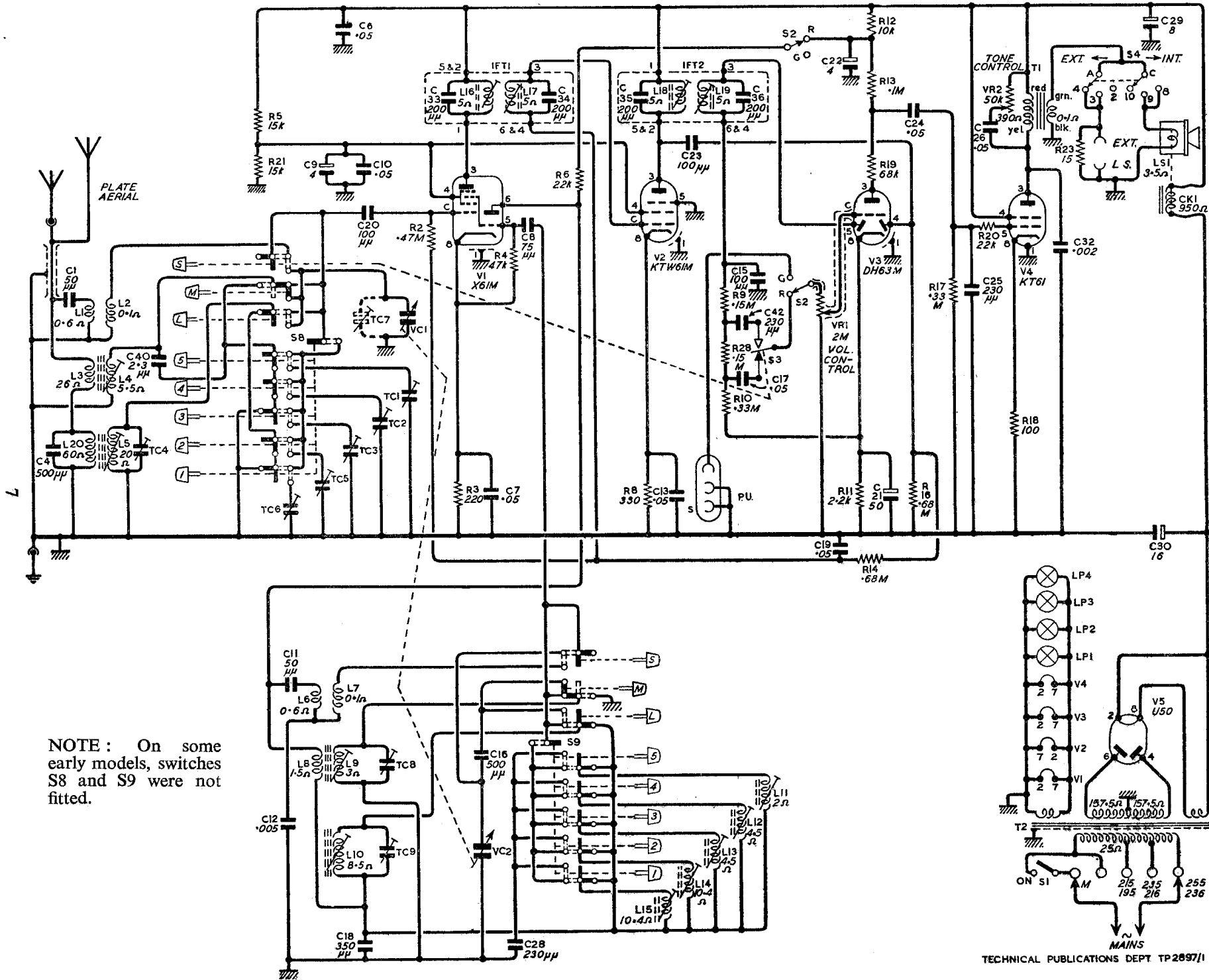
Use only the correct wire when renewing this drive. Supplies of this wire may be obtained from E.M.I. Sales and Service, Ltd., Sheraton Works, Hayes, Middlesex. Approximately 88 inches of wire is used.

1. Form a loop with an opening 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 be readily soldered.
2. Pass loop through hole in periphery of drum and assemble on anchor pin as shown in diagram. Arrows show direction.
3. Wind wire three-quarters of a turn round drum and take straight across under pulley "A" and partly round pulley "B".
4. Take wire down and under pulley "C" and straight across to pulley "D".
5. Take wire under pulley "D", over pulley "E" and under pulley "F".
6. Take wire a complete turn round drum and in through hole in periphery.

7. Assemble the tension spring as shown, twist wire and solder.
8. Replace chassis in cabinet, and assemble cursors to wire. Check setting of pointers as given in Calibration above.







NOTE: On some early models, switches S8 and S9 were not fitted.

## 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 and with no input signal. Variations of  $\pm 15\%$  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.

Values stated below were obtained using a meter with a resistance of 500 ohms per volt.

Valves.	Anode.		Screen.		Cathode.	
	Volts to Chassis.	Current mA.	Volts to Chassis.	Current mA.	Volts to Chassis.	Current mA.
V1 (X61M)	Mx. 244   Osc. 65	Mx. 5.8   Osc. 6.0	92	1.3	2.8	13.1
V2 (KTW61M)	244	8.2	92	2.7	3.5	10.9
V3 (DH63M)	68	0.5	—	—	0.9	0.5
V4 (KT61)	230	35.2	245	5.9	4.7	41.1
V5 (U50)	319 A.C.	—	—	—	Heater	
					315	—

Total H.T. current, 72 mA. D.C.

Total H.T. Voltage (smoothed) 245 volts.

Voltage drop across Speaker field coil 70 volts.



## SPARE PARTS LIST

Ref.	Description.	Part No.	Ref.	Description.	Part No.
<b>INDUCTANCES.</b>					
L1	S.W. aerial coil	} 27388J	TC5	125-450 mmfd.	} 26350BN
L2	S.W. grid coil		TC6	125-450 mmfd.	
L3	M.W. aerial coil	} 27389AR	TC7		} See VC1
L4	M.W. grid coil		TC8	8-45 mmfd.	
L5	L.W. grid coil (with L20)	27389F	TC9	10-135 mmfd.	} 26350BW
L6	S.W. oscillator reaction coil	} 27388H	<b>RESISTANCES.</b>		
L7	S.W. oscillator grid coil		R2	0.47 megohms, $\frac{1}{4}$ w.	33362EE
L8	M.W. oscillator reaction coil	} 27389D	R3	220 ohms, $\frac{1}{4}$ w.	33362DJ
L9	M.W. oscillator grid coil		R4	47,000 ohms, $\frac{1}{4}$ w.	33362DY
L10	L.W. oscillator grid coil	27389G	R5	15,000 ohms, $\pm 10\%$ 2 w.	33377BV
L11	M.W. P.B. oscillator grid coil	27389M	R6	22,000 ohms, $\frac{1}{2}$ w.	33368DW
L12	M.W. P.B. oscillator grid coil	27389N	R8	330 ohms, $\frac{1}{4}$ w.	33362DK
L13	M.W. P.B. oscillator grid coil	27389N	R9	0.15 megohms, $\frac{1}{4}$ w.	33362EB
L14	L.W. P.B. oscillator grid coil	27389C	R10	0.33 megohms, $\frac{1}{4}$ w.	33362ED
L15	L.W. P.B. oscillator grid coil	27389C	R11	2,200 ohms, $\frac{1}{4}$ w.	33362DQ
L16	IFT1 primary coil	See	R12	10,000 ohms, $\frac{1}{2}$ w.	33368DU
L17	IFT1 secondary coil	IFT1	R13	0.1 megohms, $\frac{1}{4}$ w.	33362EA
L18	IFT2 primary coil	See	R14	0.68 megohms, $\frac{1}{4}$ w.	33362EF
L19	IFT2 secondary coil	IFT2	R16	0.68 megohms, $\frac{1}{4}$ w.	33362EF
L20	L.W. aerial coil	See L5	R17	0.33 megohms, $\frac{1}{4}$ w.	33362ED
<b>CONDENSERS.</b>					
C1	50 mmfd.	22164J	R18	100 ohms, $\pm 5\%$ , $\frac{1}{2}$ w.	33368G
C4	500 mmfd.	22001E	R19	68,000 ohms, $\frac{1}{4}$ w.	33362DZ
C6	0.05 mfd.	36355F	R20	22,000 ohms, $\frac{1}{4}$ w.	33362DW
C7	0.05 mfd.	36355F	R21	15,000 ohms, 1 w.	33373DV
C8	75 mmfd.	22001AB	R23	15 ohms, 1 w.	33382DB
C9	4 mfd.	30241B	R28	0.15 megohms, $\frac{1}{4}$ w.	33362EB
C10	0.05 mfd.	36355F	VR1	2 megohms volume control	27655FB
C11	50 mmfd.	22164J	VR2	50,000 ohms tone control	27655KL
C12	0.005 mfd. $\pm 10\%$	117906CK	<b>VALVES.</b>		
C13	0.05 mfd.	36355F	V1	X61M	Marconi
C15	100 mmfd.	22001B	V2	KTW61M	"
C16	500 mmfd. $\pm 2\%$	117904AF	V3	DH63M	"
C17	0.05 mfd.	36355F	V4	KT61	"
C18	350 mmfd. $\pm 2\%$	117904AE	V5	U50	"
C19	0.05 mfd.	36355F	<b>TRANSFORMERS AND CHOKES.</b>		
C20	100 mmfd.	22001B	IFT1	1st I.F. transformer	30123V
C21	50 mfd. 12 v.	17250F	IFT2	2nd I.F. transformer	30123V
C22	4 mfd.	See C9	T1	Output transformer	32365A
C23	100 mmfd.	22001B	T2	Mains transformer	35523C
C24	0.05 mfd.	36355F	CK1	Choke	See LS1
C25	230 mmfd.	22001AD	<b>MISCELLANEOUS.</b>		
C26	0.05 mfd.	36355F	S1	On-Off switch	See VR1
C28	230 mmfd. $\pm 2\%$	117904AK	S2	Radio-Gram. switch	32498D
C29	8 mfd.	See C9	S3	Switch	See P.B. Unit
C30	16 mfd.	33594A	S4	External L.S. switch	35419B
C32	0.002 mfd.	31840E	S8	Aerial switch	} 36848B
C33	200 mmfd. $\pm 2\%$	See	S9	Oscillator switch	
C34	200 mmfd. $\pm 2\%$	IFT1		Press-button switch	27387A
C35	200 mmfd. $\pm 2\%$	See		Press-button unit and switch assembly	27390Y
C36	200 mmfd. $\pm 2\%$	IFT2	LP1, LP2, LP3, LP4	Pilot lamp, 7-volt, 0.32 amp.	35421A
C40	2.3 mmfd.	22164H	LS1	Loudspeaker	27410W
C42	230 mmfd.	22001AD		Cabinet	RA114
VC1 } VC2 }	Gang Condenser	18712V			
TC1	10-135 mmfd.	} 26350BP			
TC4	10-135 mmfd.				
TC2	125-450 mmfd.	} 26350BN			
TC3	125-450 mmfd.				

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,  
HAYES, MIDDLESEX.

Telephone: Southall 2468.

Telegraphic Address: Service, Hayes, Middlesex.

*The Company reserves the right to make any modification without notice.*