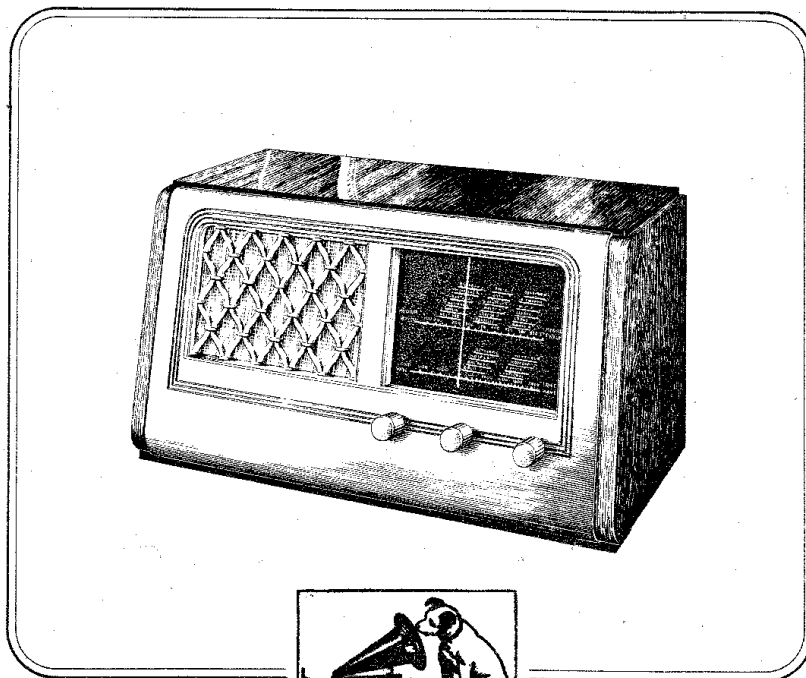


# “His Master’s Voice”



## SERVICE MANUAL

Model 1115  
6-valve Table Model  
for A.C./D.C. Mains

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# MODEL 1115

## SPECIFICATION

### Physical.

Height . . . . .  $8\frac{3}{4}$  inches.  
Width . . . . . 15 "  
Depth . . . . .  $8\frac{1}{2}$  "  
Net Weight . . . . . 13 lb. approx.

### Mains Supply and Consumption.

195 to 255 volts A.C./D.C.  
40 to 100 cycles.  
Consumption 60 watts.

### Wave Ranges.

M.W. 180 to 575 metres (1,666.6 to 521.7 kc/s).  
L.W. 900 to 2,000 " (333.3 to 150 kc/s).  
Intermediate frequency . . . . . 465 kc/s.

### Rated Output.

2.8 watts maximum.

### Valves.

Marconi:  
X76M (V1) Frequency Changer.  
W76 (V2) I.F. Amplifier.  
DH76 (V3) Detector, A.V.C. and  
L.F. Amplifier.  
KT71 (V4) } Output Valves  
KT71 (V5) } in Push-Pull.  
U76 (V6) H.T. Rectifier.

### Pilot Lamps.

5 volt, 0.15 amp. Part No. 35420C.

### Loudspeaker.

Part No. 33701H. 5 inch diameter,  
P.M. speaker.  
Speech coil D.C. resistance - 3.5 ohms.  
" " impedance at 1,000 cycles - 5.0 ohms.

## CIRCUIT DESCRIPTION

### Frequency Changer.

The frame aerial is tuned by one section (VC1) of the gang condenser and signals are fed to the grid of the triode-hexode frequency changer, V1 (X76M). On L.W. a loading coil, L2, is in series with the frame aerial.

The triode section of V1 has a tuned grid circuit (L3, VC2 for M.W. and L5, VC2 for L.W.) which is inductively coupled (L4) on M.W. and capacity coupled (C9) on L.W. An inductively tuned iron-dust cored I.F. transformer (IFT1) couples the hexode anode of V1 to the grid of V2.

### I.F. Amplifier.

This valve, V2 (W76), amplifies at the intermediate frequency of 465 kc/s. A second inductively tuned iron-dust cored I.F. transformer (IFT2) couples this valve to the detector.

### Detector, A.V.C. and L.F. Amplifier.

This valve, V3 (DH76), is a double-diode-triode. One diode is used as a detector and A.V.C. rectifier, the second diode being strapped to the cathode. The

volume control (VR1) forms the diode load, and I.F. and R.F. filtering is effected by C13, R7 and C12. The D.C. component across VR1 is applied as A.V.C. voltage to the grid circuits of V1 and V2, which are decoupled by R6 and C3. L.F. signals from VR1 are applied, via C15, to the grid of the triode section of V3 and then resistance-capacity coupled by R10 and C17 to the push-pull input auto-transformer, T1.

### Output Stage.

The auto-transformer, T1, feeds the two push-pull output pentodes (V4, V5) which are biased by R12 and R24 (without decoupling capacitors so that a measure of negative feed-back is introduced). No variable tone control is fitted, but a permanent degree of tone correction is effected by C27. The push-pull output transformer, T2, couples the output valves to the loudspeaker. A safety load resistance, R22, is connected across the secondary of T2 to protect the valves and transformer in the event of there being no speaker connected to the transformer. No extra loudspeaker sockets are provided.

### *H.T. and L.T. Supplies.*

On A.C. mains, H.T. is derived from the half wave rectifier V6 (U76). On D.C. mains, the valve acts as a small series resistance. The reservoir condenser is C22, and smoothing is effected by the

choke CK1 and electrolytic condenser C18. H.F. filtering is provided by C19, C20 and C21. The L.T. supply is from the mains via the tubular tapped resistance, which comprises R15 to R20.

## INSTALLING.

### *Aerial.*

Normally the receiver will operate satisfactorily with the built-in frame aerial, but where reception conditions are difficult, for example, in heavily-screened metal-frame buildings or in areas very remote from broadcasting stations, an external aerial may be required. In the first case, an aerial located on the roof *outside the building* and well above possible sources of electrical interference is recommended. In the second case, an indoor aerial may prove adequate, but if it does not, an outside one as high as possible and not more than 60 feet total length should be erected.

### *Earth.*

**AN EARTH MUST NOT BE CONNECTED TO THIS RECEIVER.**

### *General.*

1. The chassis fixing screws must be covered by means of the insulated caps provided.
2. The receiver must not be operated with the control knobs removed. If they become loose this fault should be rectified *immediately*.
3. On A.C. mains, the mains plug should be tried both ways to see which gives the best reception with the least hum. On D.C. mains, only one position of the plug in the mains outlet socket is correct; if no results are obtained on first plugging in, the plug should be reversed in the outlet socket.

## DISMANTLING.

### *Removal of chassis.*

1. Disconnect the instrument entirely from the mains.
2. Remove the card back (four screws).
3. Pull off the knobs. They are fixed only by spring clips.
4. Remove the four insulator caps from under the cabinet and remove the four screws thus revealed.

5. Withdraw the chassis by pulling on the two pillars to which the frame aerial is fixed. Care should be taken not to damage the frame aerial or its mounting.

### **NOTE:**

The loudspeaker and mains resistance are assembled to the cabinet, but sufficient lead is provided for operating the receiver outside the cabinet. The controls should not be manipulated unless the knobs are fitted.

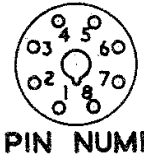
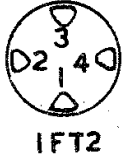
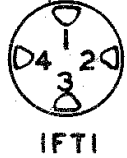
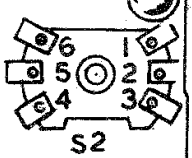
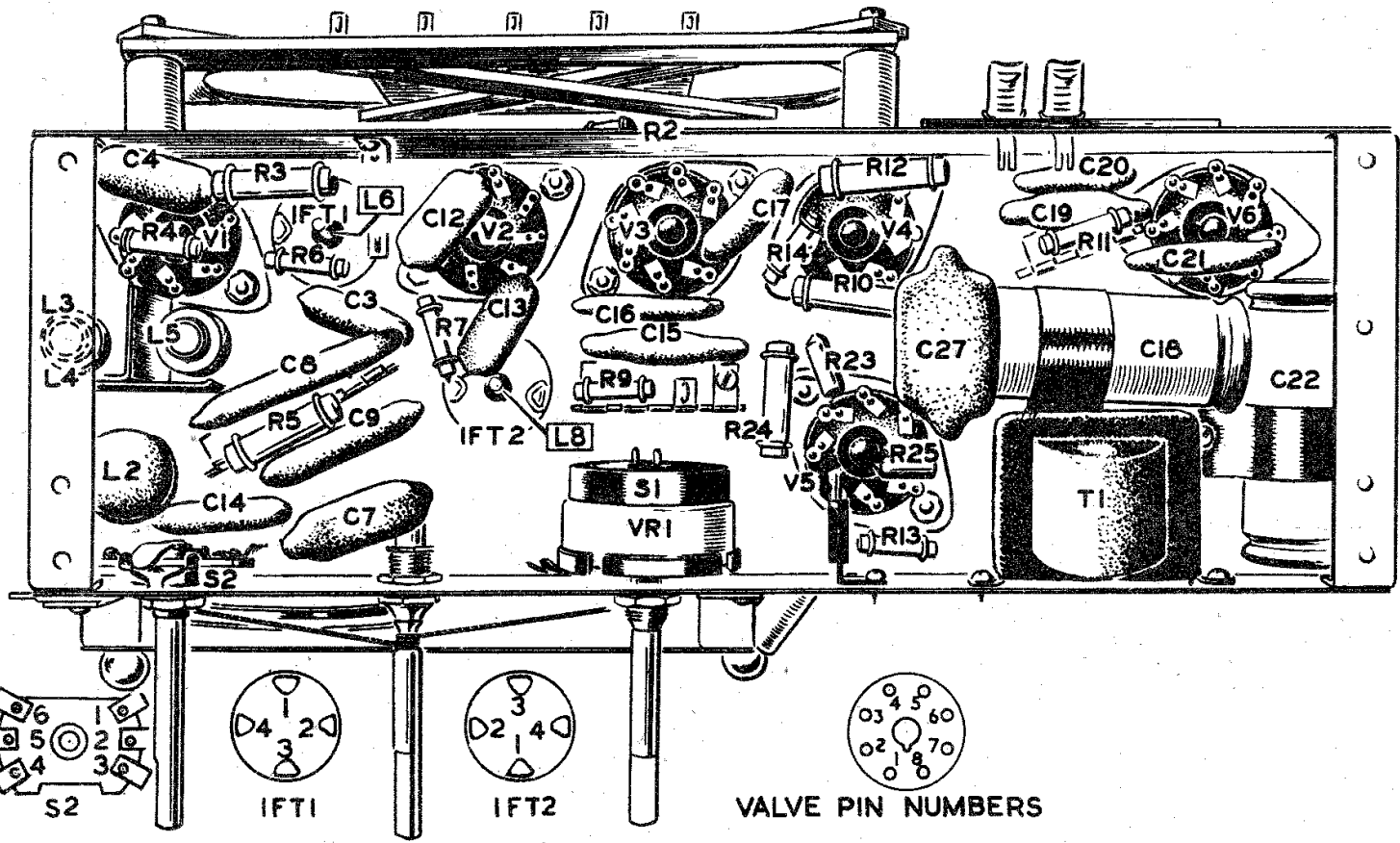
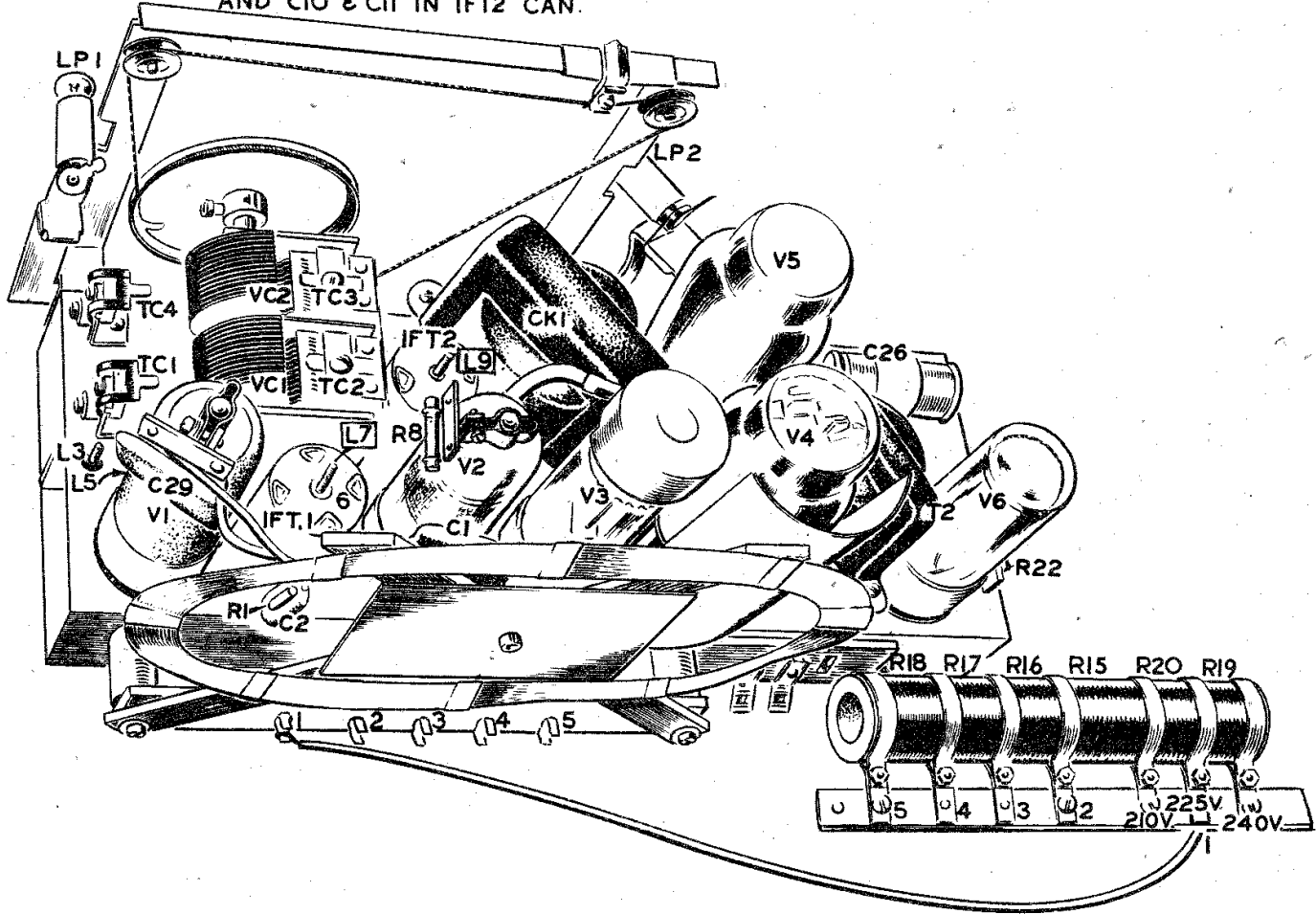
## H.F. TESTS AND ADJUSTMENTS.

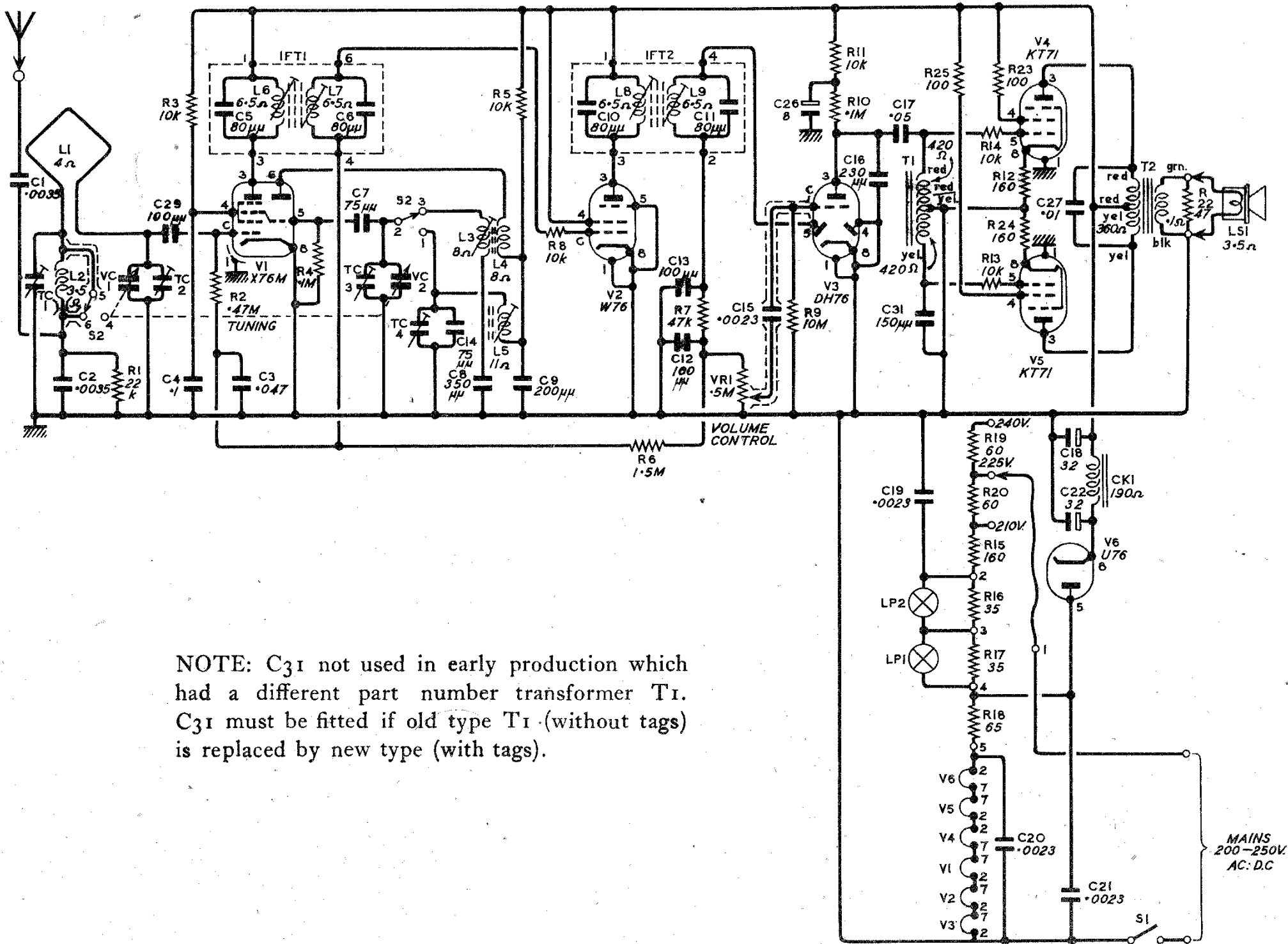
### *General.*

If I.F. circuits have been disturbed complete I.F. and R.F. alignment must follow. Whilst ganging, the input to the receiver must be progressively reduced as the circuits are brought into line so that the output does not exceed 500 m W.

A high impedance meter (with isolating condenser) may be connected between the anode of one of the output valves and chassis, or an A.C. voltmeter connected across the loudspeaker speech coil, may be used as an output meter.

C5 & C6 ARE IN IFT1 CAN  
AND C10 & C11 IN IFT2 CAN.





NOTE: C<sub>31</sub> not used in early production which had a different part number transformer T<sub>1</sub>. C<sub>31</sub> must be fitted if old type T<sub>1</sub> (without tags) is replaced by new type (with tags).

### I.F. Ganging.

Set volume control to fully clockwise, wavechange switch to M.W. and gang condenser to maximum.

1. Inject a signal at 465 kc/s, via a 0.005 mfd. condenser in each lead, to grid of V1 and chassis (leaving grid connection made).
2. Adjust cores of L9, L8, L7, and L6, in that order, for maximum output.
3. Repeat operation 2.

### Calibration Scale.

As the wavescale is assembled to the cabinet, a calibra-

tion scale is fixed beneath the cursor on 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 tables, and is read against the centre of the cursor. Before commencing R.F. ganging, it is essential to check the position of the pointer in relation to the calibration scale, i.e., with gang condenser at maximum the centre of the cursor should coincide with 5 inches on the scale. If adjustment is necessary, slacken the screw holding the cursor to the drive wire and adjust; then tighten securely the screw.

### R.F. Ganging.

Connect test oscillator leads to the aerial socket and chassis via a dummy aerial, the chassis connection being made via a 0.005 mfd. condenser. Set volume control fully clockwise.

### Medium Waves.

Set wavechange switch to M.W. Use M.W. dummy aerial.

Op. No.	Gang condenser or calibration scale setting.	Tune test oscillator to		Operation.
		m.	kc/s.	
1	Gang at minimum	180	1667	Adjust TC3 for maximum output.
2	Set to $1\frac{29}{32}$ "	210	1429	Adjust TC2 for maximum output.
3	Tune in and "rock" gang ( $4\frac{13}{32}$ "	510	588	Adjust L3 core for maximum output.
4	--	--	--	Repeat operations 1, 2 and 3.

### Long Waves.

Set wavechange switch to L.W. Use L.W dummy aerial.

Op. No.	Gang condenser or calibration scale setting.	Tune test oscillator to		Operation.
		m.	kc/s.	
1	Gang at minimum	900	333.3	Adjust TC4 for maximum output.
2	Set to $2\frac{1}{8}$ "	1,000	300	Adjust TC1 for maximum output.
3	Tune in and "rock" gang ( $4\frac{13}{32}$ "	1,850	162.2	Adjust L5 core for maximum output.
4	--	--	--	Repeat operations 1, 2 and 3.

## 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 the best compromise on both wavebands, if necessary.

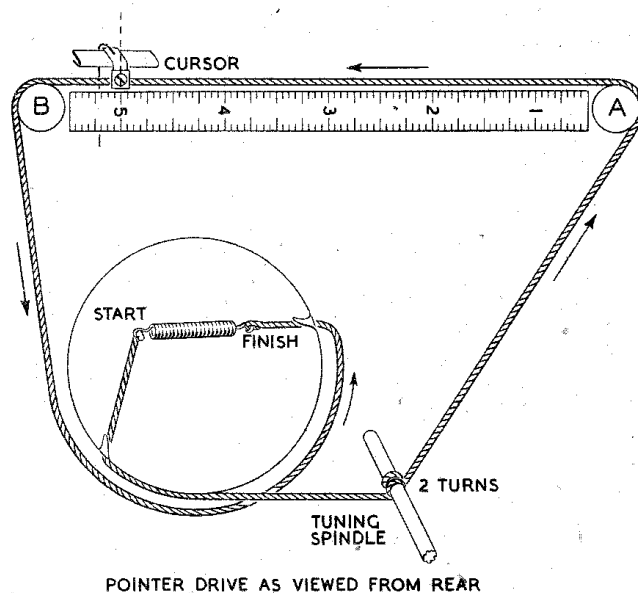
## CONDENSER AND POINTER DRIVE.

Use only the correct high grade flax fishing line when renewing this drive. Supplies of this cord may be obtained from E.M.I. Sales and Service Ltd., Sheraton Works, Hayes, Middlesex.

Approximately 28 inches of cord is required.

1. Form a loop with an opening about  $\frac{1}{8}$ " in diameter at one end. This end can be knotted and fixed with shellac.
2. Pass loop through hole in periphery of drum and assemble on anchor pin as shewn in diagram.
3. Take cord partly round drum and wind round spindle two complete turns. Arrows show direction.
4. Take cord over pulley "A", across to and over pulley "B".
5. Take cord partly round drum and in through the hole in periphery.
6. Assemble the tension spring as shown, tie a knot in cord and fix with shellac.

7. Fix cursor to cord. Replace chassis in cabinet, and adjust pointer to read correct wavelengths - see calibration above.



## VALVE TABLE.

The following table indicates the approximate voltage and current readings obtained in 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.

A high resistance voltmeter should be used to measure voltage.

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

Valves.	Heaters.	Anode.		Screen.		Cathode.	
	Volts to Chassis.	Volts to Chassis.	Current mA.	Volts to Chassis.	Current mA.	Volts to Chassis.	Current mA.
V <sub>1</sub> (X76M)	39 A.C.	Mx. 110 Osc. 77	Mx. 2.1 Osc. 2.1	65	4.0	-	9.0
V <sub>2</sub> (W76)	26 A.C.	105	11.6	105	2.9	-	14.5
V <sub>3</sub> (DH76)	13 A.C.	50	0.4	-	-	-	0.4
V <sub>4</sub> (KT71)	87 A.C.	98	29.0	102	5.0	4.7	34.0
V <sub>5</sub> (KT71)	135 A.C.	98	29.0	102	5.0	4.7	34.0
V <sub>6</sub> (U76)	165 A.C.	175 A.C.	-	-	-	125	-

Total H.T. current 91.0 mA D.C.    A.C. current at mains lead 270 mA.    Total H.T. volts (smoothed) 110 v.

# SPARE PARTS LIST

Ref.	Description.	Part No.	Ref.	Description.	Part No.				
<b>INDUCTANCES.</b>									
L1	Frame aerial . . . . .	35486	R3	10,000 ohms, $\frac{1}{2}$ w. . . . .	33368BU				
L2	L.W. aerial coil . . . . .	35598	R4	0.1 megohms, $\frac{1}{4}$ w. . . . .	33362EA				
L3, L4	M.W. oscillator grid and anode coils . . . . .	35286A	R5	10,000 ohms $\frac{1}{2}$ w. . . . .	33368BU				
L5	L.W. oscillator coil . . . . .	35286C	R6	1.5 megohms, $\frac{1}{4}$ w. . . . .	33362EH				
L6	IFT1 primary coil . . . . .	} See	R7	47,000 ohms, $\frac{1}{4}$ w. . . . .	33362DY				
L7	IFT1 secondary coil . . . . .		} IFT1	R8	10,000 ohms, $\frac{1}{4}$ w. . . . .	33362DU			
L8	IFT2 primary coil . . . . .	} See	R9	10 megohms, $\frac{1}{4}$ w. . . . .	33362EN				
L9	IFT2 secondary coil . . . . .		} IFT2	R10	0.1 megohms, $\frac{1}{2}$ w. . . . .	33368CA			
<b>CONDENSERS.</b>									
C1	0.0035 mfd. . . . .	22005J	R11	10,000 ohms, $\frac{1}{4}$ w. . . . .	33362DU				
C2	0.0035 mfd. . . . .	22005J	R12	160 ohms, $\frac{1}{2}$ w. . . . .	33368EU				
C3	0.047 mfd. . . . .	36700F	R13	10,000 ohms, $\frac{1}{4}$ w. . . . .	33362DU				
C4	0.1 mfd. . . . .	36700G	R14	10,000 ohms, $\frac{1}{4}$ w. . . . .	33362DU				
C5	80 mmfd. $\pm 2\%$ . . . . .	} See	R15	160 ohms	} Mains dropping . . . . . 36128A resistance				
C6	80 mmfd. $\pm 2\%$ . . . . .		} IFT1	R16		35 ohms			
C7	75 mmfd. . . . .	117903CC	R17	35 ohms					
C8	350 mmfd. $\pm 2\%$ . . . . .	117906AB	R18	65 ohms					
C9	200 mmfd. $\pm 2\%$ . . . . .	117904AC	R19	60 ohms					
C10	80 mmfd. $\pm 2\%$ . . . . .	} See	R20	60 ohms					
C11	80 mmfd. $\pm 2\%$ . . . . .		} IFT2	R22	47 ohms, $\frac{1}{2}$ w. . . . .	33368E			
C12	100 mmfd. . . . .	117903CD	R23	100 ohms, $\frac{1}{4}$ w. . . . .	33362DG				
C13	100 mmfd. . . . .	117903CD	R24	160 ohms, $\frac{1}{2}$ w. . . . .	33368EU				
C14	75 mmfd. $\pm 2\%$ . . . . .	117903AC	R25	100 ohms, $\frac{1}{4}$ w. . . . .	33362DG				
C15	0.0023 mfd. . . . .	22001AG	VR1	0.5 megohms volume control and mains switch . . . . .	27655KP				
C16	230 mmfd. . . . .	22001AD	<b>TRANSFORMERS AND CHOKES.</b>						
C17	0.05 mfd. . . . .	36355F	IFT1	1st. I.F. transformer . . . . .	33860G				
C18	32 mfd. . . . .	35507B	IFT2	2nd. I.F. transformer . . . . .	33860F				
C19	0.0023 mfd. . . . .	22001AG	T1	Inter-valve transformer . . . . .	37050D				
C20	0.0023 mfd. . . . .	22001AG	T2	Output transformer . . . . .	34695D				
C21	0.0023 mfd. . . . .	22001AG	CK1	Choke . . . . .	22628AN				
C22	32 mfd. . . . .	See C18	<b>VALVES.</b>						
C26	8 mfd. . . . .	123977K	V1	X76M	Marconi				
C27	0.01 mfd. . . . .	22005B	V2	W76	"				
C29	100 mmfd. . . . .	117903CD	V3	DH76	"				
C31	150 mmfd. . . . .	22001AC	V4	KT71	"				
VC1, VC2	Midget gang condenser . . . . .	33660B	V5	KT71	"				
TC2, TC3			4-30 mmfd. . . . .	25618A	V6	U76	"		
TC1					4-30 mmfd. . . . .	25618A	<b>MISCELLANEOUS.</b>		
TC4									
<b>RESISTANCES.</b>									
R1	22,000 ohms, $\frac{1}{4}$ w. . . . .	33362DW	LP1, LP2	Pilot lamps, 5 v. 0.15 amp. . . . .	35420C				
R2	0.47 megohms, $\frac{1}{4}$ w. . . . .	33362EE	LS1	Loudspeaker . . . . .	33701H				
			S2	Wavechange switch . . . . .	35564A				
				Cabinet . . . . .	401501				



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.,  
SHERATON WORKS,  
HAYES, MIDDLESEX.

Telephone: Southall 2468.

Telegraphic Address: Service, Hayes, Middlesex.

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

# “HIS MASTER’S VOICE”

6-valve Table Model

for A.C./D.C. Mains

Model 1115



## DISMANTLING

Owing to a modification in early production of the method of insulating the screws fixing the chassis to the cabinet, the procedure for “Dismantling” in the Service Manual should read as follows:-

### Removal of Chassis.

1. Disconnect the instrument entirely from the mains.
2. Remove the card back (four screws).
3. Pull off the knobs (spring fixing).
4. Remove the insulator caps covering the two rear screws and the wax from the two front screws underneath the cabinet.  
Remove the four screws thus revealed.
5. Withdraw the chassis by pulling on the two pillars to which the frame aerial is fixed. Care should be taken not to damage the aerial or its mounting.

NOTE: The loudspeaker and mains resistance are assembled to the cabinet, but sufficient lead is provided for operating the receiver outside the cabinet. The controls should not be manipulated unless the knobs are fitted. On re-assembly, make sure that the two front screws are covered with wax and the two rear screws by the insulator caps.

### I.F. AMPLIFIER VALVE (W76)

Valves of this type used in later production had fitted in their cathode circuit a bias resistor and de-coupling condenser. When replacing one of these valves, these two components should be fitted to those instruments in which they are not included already, i.e., a 100 ohm resistor (Part No.33362DG) and 0.047 mfd condenser (Part No.36700F) should be fitted to pin 8 of the valve base of V<sub>2</sub>, the other end of both components being connected to chassis. Pins 1 and 5 should still be connected to chassis.

### VALUE OF R<sub>7</sub>.

In later production, the value of resistor R<sub>7</sub> was altered to 0.1 megohms (Part No.33362EA). This change should be made on any model which shows a tendency to R.F. instability.