



"His Master's Voice"

SERVICE MANUAL

MODEL 1451

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SPECIFICATION

Printed circuit, 2-waveband, 4-valve (plus metal rectifier), mains/battery portable. A superheterodyne circuit is employed incorporating a ferrite-rod aerial

and a special, high sensitivity, 5-in. diameter loudspeaker. The receiver is housed in a hinged-lid cabinet measuring 10 $\frac{3}{4}$ in. wide by 4 $\frac{3}{4}$ in. deep by 7 $\frac{1}{2}$ in. high, the base

of which is removable for access to batteries, storage space for detachable mains cord, and the mains voltage adjustment plug. A safety device prevents removal of the base when the mains input plug is connected.

Waverange Coverage

Medium Wave: 182—557 Metres.
Long Wave: 1,090—1,920 Metres.

Power Supplies

Mains: 200—250 Volts D.C.; 200—250 Volts A.C., 50—100 c/s. Power consumption: 12.5 W. approximately.

Batteries: H.T. 90 Volts—Ever Ready B126, Drydex 526, Vidor L5512, Oldham K782.

L.T. 7.5 Volts—Ever Ready All-dry 38, Drydex H1187, Vidor L5048, Oldham K782.

A battery/mains changeover switch is accessible from the base of the cabinet.

Valves

- V1 DK96 Frequency-changer.
- V2 DF96 I.F. amplifier.
- V3 DAF96 Detector and audio amplifier.
- V4 DL96 Audio output.

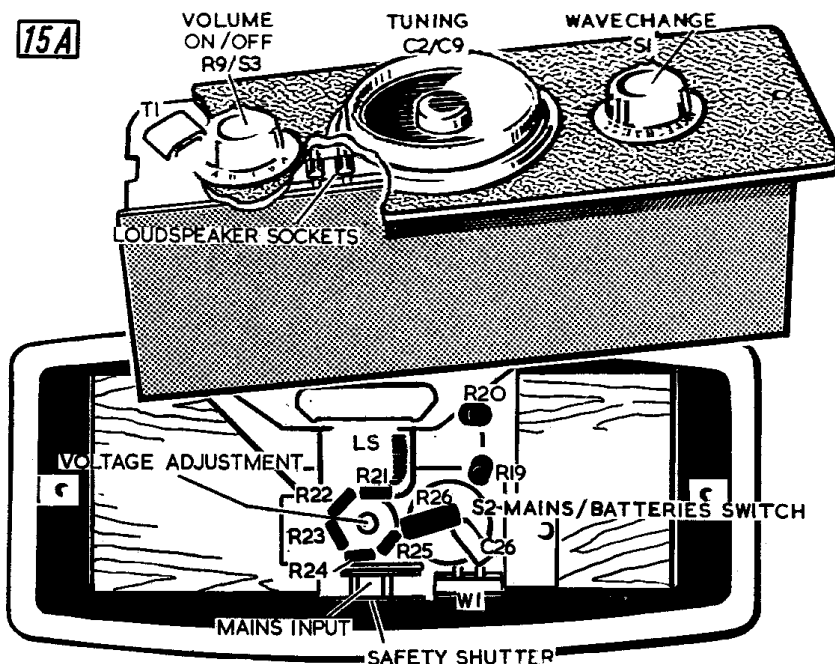


Fig. 1. Power sub-chassis viewed from top of cabinet with control panel and main chassis freed. The hinged lid is not shown.

PRICE 9d.

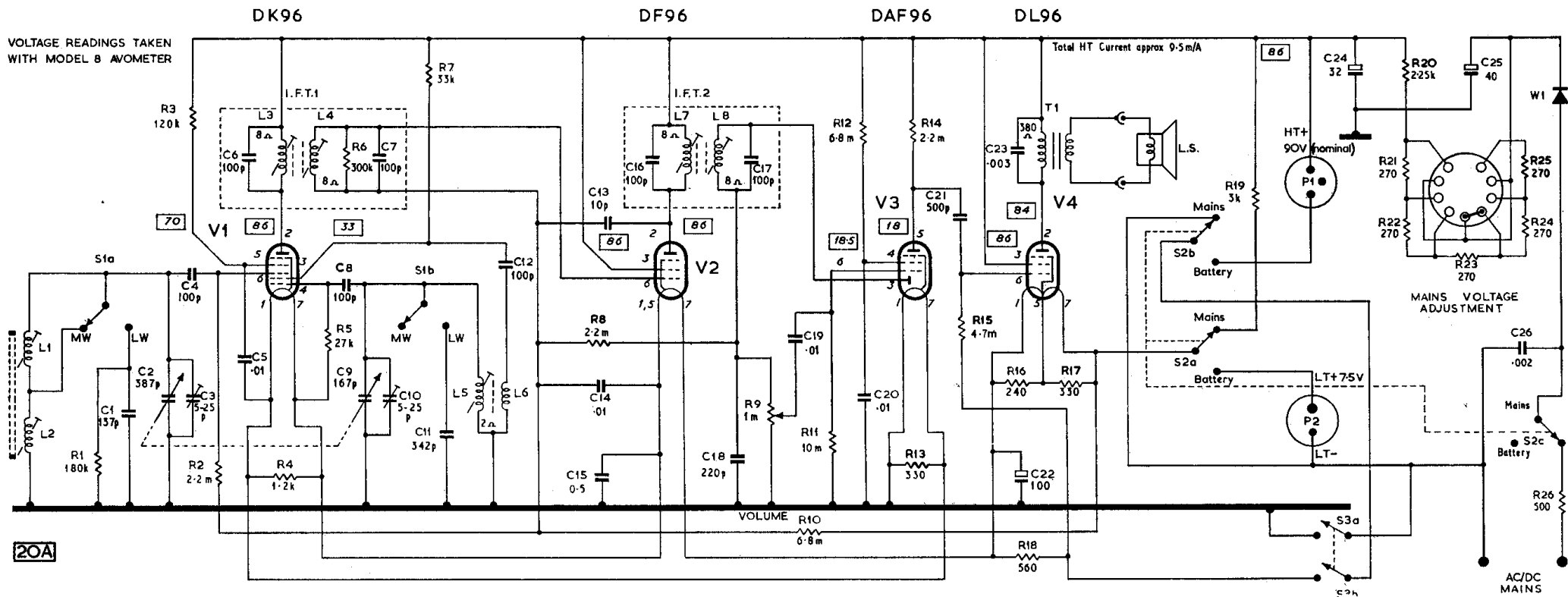


Fig. 2. Circuit Diagram. Voltage readings taken with a 20,000 Ω /volt meter are shown in rectangles. The D.C. resistance of inductances are given where these are 1 Ω or greater. Note: R6 is omitted in some receivers.

CIRCUIT DESCRIPTION

On M.W., S1a short circuits the L.W. coil L1 on the ferrite-rod aerial and the M.W. coil L2 is tuned by section C2 of the tuning gang capacitor and trimmer C3. For L.W. operation, L1 and L2 are in series, damped by R1 and shunted by fixed trimmer C1. The signal is coupled to the frequency changer V1 (DK96) by C4.

In the tuned grid oscillator circuit, L5 is tuned by section C9 of the gang capacitor and trimmer C10. On L.W., an additional fixed trimmer C11 is switched by S1b across the tuned circuit. The design of C9 enables optimum tracking to be maintained over both tuning ranges without series padders.

V2 (DF96) is the transformer coupled I.F. amplifier, and the diode section of V3 (DAF96) operates as the detector. The volume control R9 forms the diode load, and C18 the I.F. filter. The D.C. component of the rectified voltage developed across R9 is filtered by R8/C14 and fed to the control grid circuits of V1 and V2, providing automatic gain control. Since both V1 and V2 filaments are above chassis potential and the diode load R9 is returned to chassis, R8/R9/R10 form a potential divider across the L.T. supply and provide standing bias conditions for V1 and V2.

The pentode section of V3 operates as the audio amplifier and is resistance capacitance coupled to the output valve V4 (DL96).

During battery operation, H.T. negative is connected by S2b through R18 to the low potential side of V4 filament and not to chassis. This ensures that the screen and anode currents of V4 do not flow in the filament circuits of the other valves. The voltage drop across R18 provides grid bias for V4. The 7.5 V. filament circuit is completed through S2A to L.T. battery positive.

During mains operation, one side of the mains input is connected to chassis and V4 grid bias is derived from the voltage drop across V1/V2/V3 filaments which are shunted by R18 to bypass V4 screen and anode currents. S2a connects the series fed filaments through voltage dropper R19 to the smoothed H.T. line.

PRINTED PANEL SERVICING

If it should be necessary to solder directly to a printed conductor, use a 60/40 resin cored solder and make the joint quickly to avoid overheating. Do not use a corrosive flux.

Resistor or Capacitor Replacement

Cut out the faulty component so that as much as possible of the original lead out wires remain for connecting the new component. Use a low consumption iron and solder to the connecting wires—not to the printed conductor. Do not apply the bit for longer than is necessary.

Other Components

Heavier components secured to the panel by clip lugs or tags which make electrical connections should be removed by a heavier type iron, but the heat and pressure must be applied to the lug or tag and not to the copper conductor. A small stiff-haired brush may assist in breaking the connection.

Fused Sections of the Printed Conductor

Restore the connection with a jumper wire on the component side of the panel.

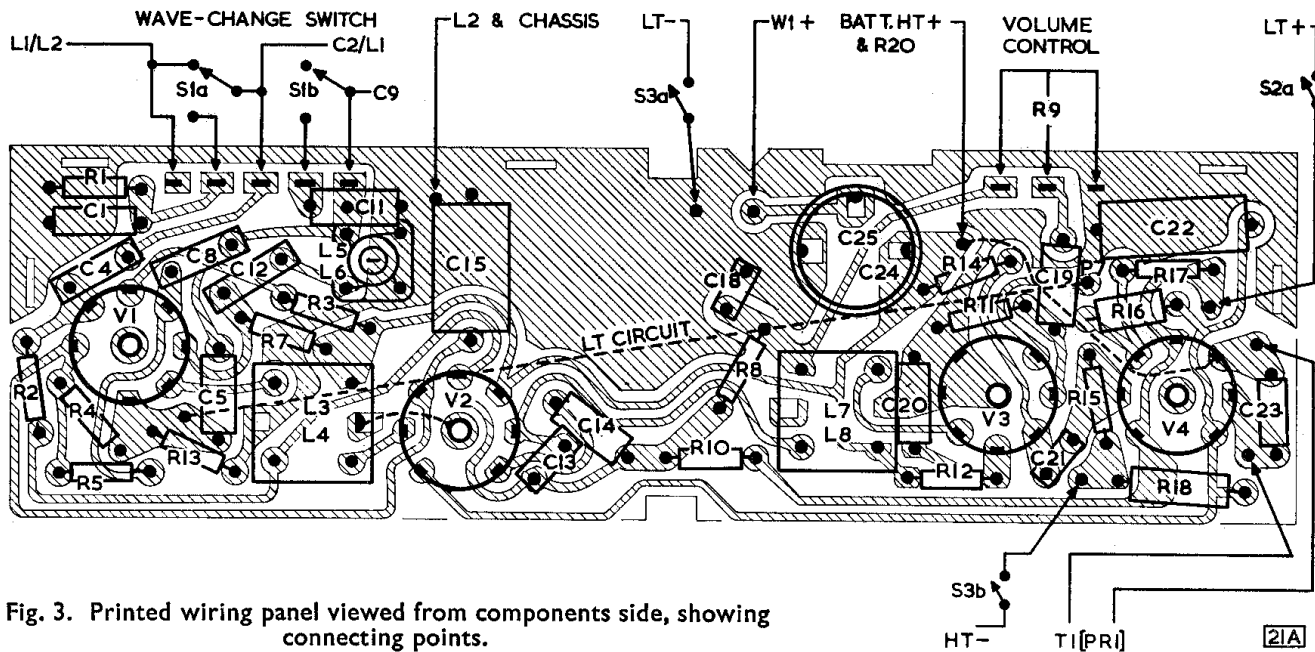


Fig. 3. Printed wiring panel viewed from components side, showing connecting points.

ALIGNMENT

Throughout alignment, the signal input level to the receiver must be kept as low as possible to avoid A.G.C. action.

I.F. Circuits

Switch receiver to M.W., turn gang to minimum capacitance position and volume control to maximum. Inject a 470 Kc/s modulated signal through a 0.1 μ F capacitor at the control grid of V1 (pin 6). Peak L8, L7, L4 and L3 in that order.

R.F. Circuits

M.W. must be aligned first. Signals to be injected via a loop loosely coupled to the ferrite-rod aerial. The scale incorporates 'Pad' (low frequency) and 'Trim' (high frequency) markers on M.W. and a Calibration check point on L.W.

Range	Frequency	Cursor Position	Adjust
M.W.	1,300 Kc/s	Trim Marker	C10, C3
	600 Kc/s	Pad Marker	L5, L2*

* Adjust by sliding RING along aerial rod.

L.W.	210 Kc/s	{ Tune to Signal	L1*
		{ Check Calibration	

* Adjust by sliding COIL FORMER along aerial rod.

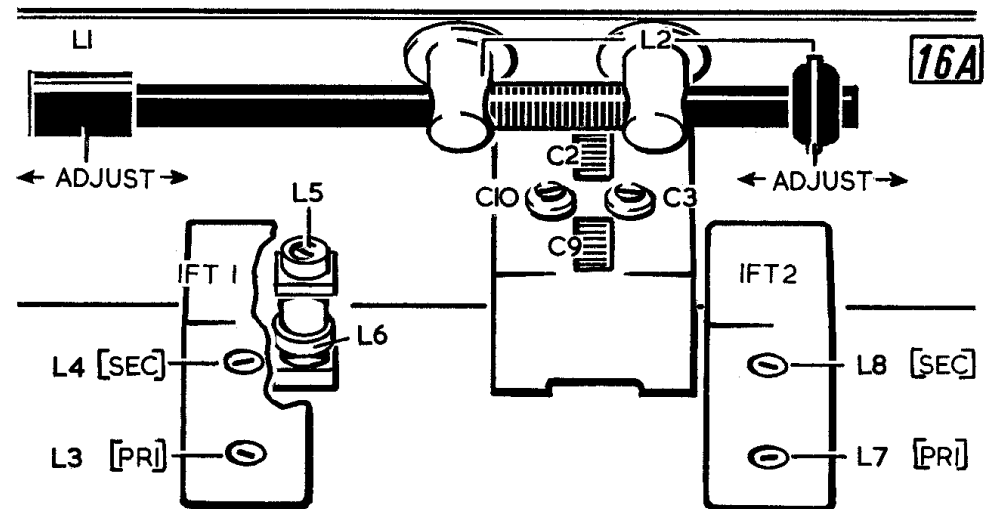


Fig. 4. Location of components requiring adjustment during Alignment.

MECHANICAL DETAILS

Chassis Removal

Raise hinged lid and remove the two 4BA brass screws from the control panel. Lift the freed panel and attached main chassis clear of the cabinet, then disconnect the loudspeaker speech coil leads from their sockets (see Fig. 1).

The power-pack sub-chassis is secured to the top of the cabinet partition by two wood screws and these should be removed. If the battery plugs are also freed and the mains input plug disconnected, both chassis sections can then be completely withdrawn from the cabinet.

Loudspeaker Removal

First remove both chassis and sub-chassis from the cabinet. The loudspeaker baffle is fixed in grooved runners on the inside cabinet front by two wood screws accessible from the battery compartment. When these screws are removed, the baffle and speaker may be slid out of the battery compartment. The loudspeaker is secured to the baffle by four 4BA screws and nuts around its perimeter.

SPARE PARTS LIST

Description	Part No.
Cabinet	V25589
Cabinet Base Knurled Nut	Z25641
Carrying Strap	Z25623
Carrying Strap Fixing Stud	Z25627
Control Panel	X25591
Knob:—	
Battery/Mains	Y25590
Spring Clip	45931
Knob:—	
Wavechange, Volume/On-Off	Y25442
Spring Clip	Z7058
Indicator Disc, Wavechange	Z25597
Indicator Disc, Volume/On-Off	Z25596
Mains Lead Assembly	NI0816/2
Rod Aerial Mounting (Clips 37255)	Y10787
Tuning Dial Assembly:—	
Brass Ring Surround	V17806
Cursor Disc	Z25598
Knob (Spring Clip Z7058)	X25428/1
Voltage Adjustment Plug	10812

RESISTORS

All $\frac{1}{4}$ -watt carbon types unless otherwise stated.

Ref.	Value	Rating	Function and Part No.
R1	180K Ω	10%	L.W. aerial shunt
R2	2.2M Ω	10%	V1 grid leak
R3	120K Ω	10%	V1 S.G. H.T. feed
R4	1.2K Ω	10%	V1 filament shunt
R5	27K Ω	10%	V1 oscillator grid leak
R6*	300K Ω	20%	L4 damping
R7	33K Ω	20%	Oscillator H.T. feed
R8	2.2M Ω	10%	A.G.C. decoupling
R9	1M Ω	Log. Pot.	Volume control. Z25446
R10	6.8M Ω	10%	A.G.C. standing bias
R11	10M Ω	20%	V3 grid leak
R12	6.8M Ω	10%	V3 S.G. H.T. feed
R13	330 Ω	10%	V3 filament shunt
R14	2.2M Ω	10%	V3 anode load
R15	4.7M Ω	10%	V4 grid leak
R16	240 Ω	10%	V4 filament shunt
R17	330 Ω	10%	
R18	560 Ω	5%	V4 grid bias. 561GC05
R19	3K Ω	2%	Filament ballast. 302RW03
R20	2.25K Ω	2%	H.T. smoothing. 47201
R21	270 Ω	20%	Voltage adjustment
R22	270 Ω		
R23	270 Ω		
R24	270 Ω		
R25	270 Ω		
R26	500 Ω		

* Omitted in some receivers

CAPACITORS

Electrolytics excepted, tolerances $\pm 20\%$ unless otherwise stated. Where no working voltage is given, this should be taken as 300 Volts D.C.

Ref.	Value	Rating	Volts	Function and Part No.
C1	137pF	2%		L.W. aerial trimmer. 45755
C2	387pF*	Variable		Aerial tuning
C3	5.25pF	Pre-set		Aerial trimmer } Z25409
C4	100pF			V1 grid coupling
C5	0.01 μ F			V1 S.G. decoupling
C6	100pF	2%		L3 tuning
C7	100pF	2%		L4 tuning
C8	100pF			V1 oscillator C.G. coupling
C9	167pF*	Variable		Oscillator tuning
C10	5.25pF	Pre-set		Oscillator trimmer } Z25409
C11	342pF	2%		L.W. oscillator trimmer. 45754
C12	100pF			V1 oscillator feedback coupling
C13	10pF	$\pm \frac{1}{2}$ pF		V2 neutralizing
C14	0.01 μ F		150 V.	A.G.C. decoupling
C15	0.5 μ F			Filament I.F. bypass
C16	100pF	2%		L7 tuning
C17	100pF	2%		L8 tuning
C18	220pF			I.F. bypass
C19	0.01 μ F			V3 C.G. coupling
C20	0.01 μ F			V3 S.G. decoupling
C21	500pF			V4 C.G. coupling
C22	100 μ F		6 V. D.C.	V4 bias bypass. Z13229/3
C23	0.003 μ F		400 V.	Tone correction
C24	32 μ F	Electro.		H.T. smoothing
C25	40 μ F	Electro.		H.T. reservoir
C26	0.002 μ F		300 V. A.C.	Mains bypass

* Swing Value

INDUCTORS AND TRANSFORMERS

Ref.	Function	Part No.
L1 } L2 } L3 } L4 }	Ferrite-rod aerial	Y10782
L5 } L6 }	1st I.F. transformer	*
L7 } L8 }	Oscillator tuning	Y25454
	Oscillator feedback	
T1	2nd I.F. transformer	Z25356
	Audio output transformer	Z25447

* Z25460-including R6. Z25356-R6 not required

MISCELLANEOUS

Ref.	Function and Description	Part No.
LS	5 in., 3 Ω speech coil	Y16001/8
P1	H.T. battery plug	Z7554
P2	L.T. battery plug	24580/1
S1A & B	Wavechange switch	Z25364
S2A & C	Battery/Mains switch	Z25646
S3A & B	On/Off switch (ganged with R9)	Z25446
W1	Rectifier	Z10810

The manufacturers reserve the right to vary specifications or use alternative materials as may be deemed necessary or desirable at any time.