

"His Master's Voice"

SERVICE MANUAL

MODEL 1415 BATTERY PORTABLE RECEIVER



"His Master's Voice" products are made to a standard of design and quality approved by The Gramophone Co. Ltd., registered proprietor of the trade mark.



SPECIFICATION

Batteries

This receiver is designed for use with the following high tension and low tension dry batteries:—

	Ever-Ready	Drydex	Vidor
High Tension 90 V.	B126	526	L5512
Low Tension 1.5 V.	All-dry 35	H1184	L5040

Wavelengths

Medium	-	-	182 — 557 Metres.
Long	-	-	1090—1920 Metres.

Valves

V1	DK96	Frequency Changer
V2	DF96	I.F. Amplifier
V3	DAF96	Detector and Audio Amplifier
V4	DL96	Audio Output

Loudspeaker

P.M., 5in. diameter, 3Ω speech coil.

Case Dimensions

10 $\frac{3}{4}$ in. wide x 4 $\frac{1}{2}$ in. high x 9 $\frac{3}{4}$ in. deep.

PRICE 1/-

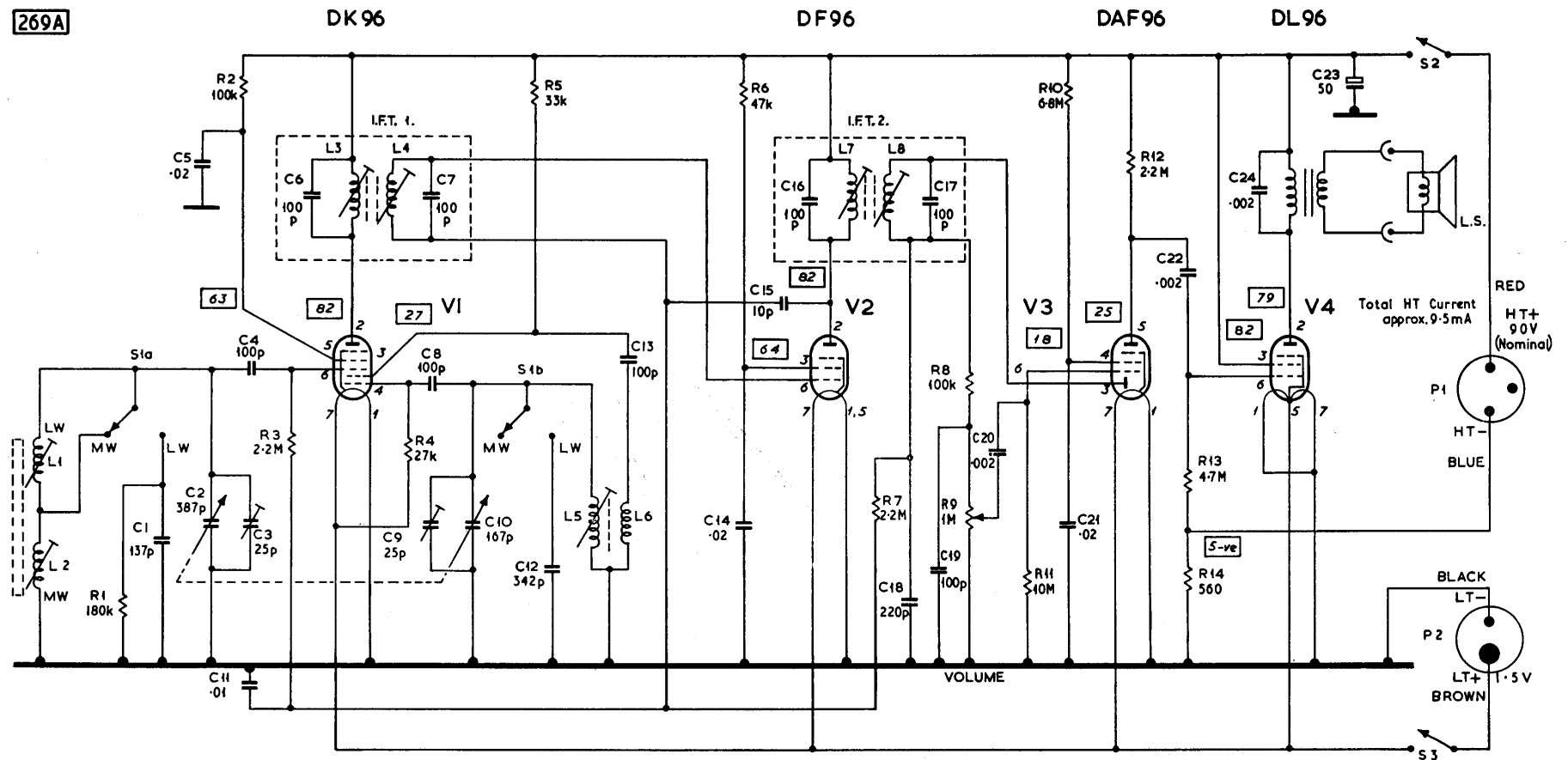


Fig. 1. Circuit diagram of model 1415. Numbers adjacent to valve electrodes denote pin connections. Voltage measurements are shown in rectangles.

CIRCUIT ALIGNMENT

IF Alignment

Switch receiver to MW, turn gang to minimum capacitance position and volume control to maximum. Inject a 470 Kc/s modulated signal through a 0.1 uF capacitor at the control grid of **V1** (pin 6).

Adjust **L3**, **L4**, **L7** and **L8** in that order for maximum output, reducing the input voltage as each circuit is brought to resonance in order to avoid AGC action.

It is important that the adjustments listed above are carried out in the sequence given, otherwise, using the more conventional procedure will result in an unsatisfactory IF response in some receivers.

RF Alignment

Sufficient signal voltage for alignment purposes can be induced in the ferrite-rod aerial if the output lead of the signal generator is terminated in a closed loop in close proximity to the receiver. Do not make a direct connection.

The Medium waveband must be aligned first.

1. Switch to MW and turn the tuning knob until the calibration marker at the edge of the scale, between 200 and 300 Metres, is over the cursor line. Inject 1300 Kc/s signal and adjust **C9** for maximum output.
2. Turn to the calibration marker at 500

Metres and inject 600 Kc/s signal. Adjust **L5** for maximum output.

3. Repeat 1 and 2 until no further improvement can be obtained.
4. Set tuning gang to the high frequency calibration marker, inject 1300 Kc/s and adjust **C3** for maximum output.
5. With tuning dial set to the 500 metre marker and with a 600 Kc/s signal, alter the position of the adjusting ring on the ferrite-rod aerial to give maximum output.
6. Switch to LW, inject 210 Kc/s and rotate the tuning knob until the signal is received. Adjust the position of the LW coil (**L1**) on the ferrite-rod aerial for maximum output.

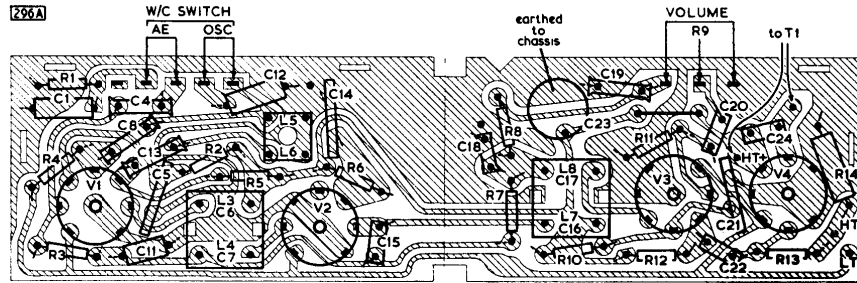


Fig. 2. Printed Board

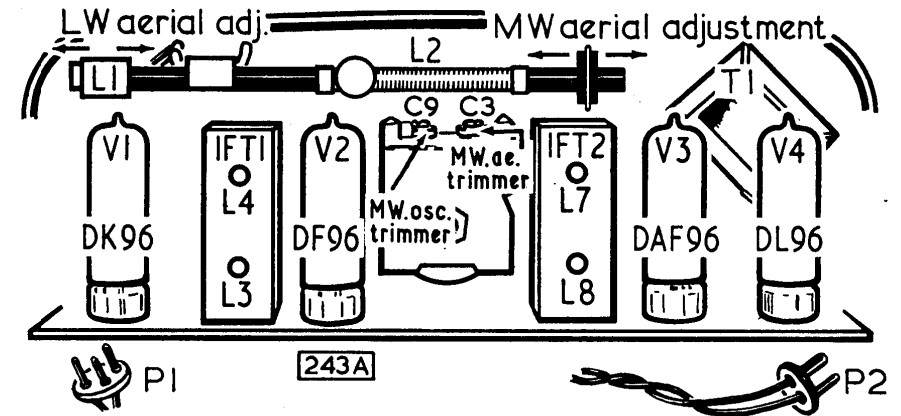


Fig. 3. Alignment Diagram.

RESISTORS

(All 1/4 Watt carbon, 20% tolerance unless otherwise stated)

Ref.	Value	Rating	Function and Part No.
R 1	180KΩ	10%	LW aerial shunt
R 2	100KΩ		V1 SG HT feed
R 3	2.2MΩ	10%	V1 grid leak
R 4	27KΩ	10%	V1 oscillator grid leak
R 5	33KΩ		Oscillator HT feed
R 6	47KΩ		V2 SG HT feed
R 7	2.2MΩ	10%	AGC decoupling
R 8	100KΩ		IF filter
R 9	1MΩ	Log. Pot.	Volume control—Z25365
R10	6.8MΩ	10%	V3 SG HT feed
R11	10MΩ	10%	V3 grid leak
R12	2.2MΩ	10%	V3 anode load
R13	4.7MΩ	10%	V4 grid leak
R14	560Ω	5%	1/4W V4 grid bias

INDUCTORS AND TRANSFORMERS

Ref.	Description and Function	Part No.
L1	LW aerial	} Ferrite-Rod Y10782
L2	MW aerial	
L3	Primary	} IF Transformer 1 Z25356
L4	Secondary	
L5	Oscillator tuning	} Y25454
L6	Oscillator feedback	
L7	Primary	} IF transformer 2 Z25356
L8	Secondary	
T1	AF output transformer	Z25447

CAPACITORS

(All 350V 20% tolerance unless otherwise stated)

Ref.	Value	Rating	Function and Part No.
C 1	137pF	2%	LW fixed aerial trimmer—45755
C 2	387pF	Variable	Aerial tuning—Z25409
C 3	5-25pF	Pre-set	MW aerial trimmer
C 4	100pF		V1 CG coupling
C 5	.02uF	150V	V1 SG decoupling
C 6	100pF		L3 tuning
C 7	100pF		L4 tuning
C 8	100pF	750V	Oscillator CG coupling
C 9	5-25pF	Pre-set	MW oscillator trimmer
C10	167pF	Variable	Oscillator tuning—Z25409
C11	.01uF	150V	AGC decoupling
C12	342pF	2%	LW fixed oscillator trimmer—45754
C13	100pF	750V	Oscillator feedback coupling
C14	.02uF		V2 SG decoupling
C15	10pF	±1pF	V2 neutraliser
C16	100pF		L7 tuning
C17	100pF		L8 tuning
C18	220pF	750V	IF bypass
C19	100pF		IF filter
C20	.002uF		V3 CG coupling
C21	.02uF	150V	V3 SG decoupling
C22	.002uF		V4 CG coupling
C23	50uF	100V	HT decoupling
C24	.002uF		Tone correction

MISCELLANEOUS

Ref.	Description and Function	Part No.
S1A	} Wavechange switch	Z25364
S1B		
S2	} On-off switch	Z10791
S3		
P1	HT battery plug	Z7554
P2	LT battery plug	24590/1
LS	Loudspeaker, 5 in. diameter, 3Ω speech coil.	Y16001/8

THE CIRCUIT

Separate LW and MW coils are provided on the ferrite-rod aerial, the long wave winding, L1, being short circuited by S1a on medium waves. The aerial circuit is tuned by C2 with trimmer C3 effective on MW. On LW a fixed trimming capacitor C1, shunted by damping resistor R1, is switched across the circuit by S1a. C4 couples the signal to the frequency changer, V1 (DK96).

In the oscillator tuned circuit, no series padders are employed, tracking being maintained by the use of a special tuning capacitor.

The oscillator grid coil, L5, is tuned by C10 and trimmer C9 on medium waves and on long waves an additional capacitor, C12, is connected across the circuit by S1b. V2 (DF96) functions as an IF amplifier, neutralised by C15 and the diode section of V3 (DAF96) as the signal detector. The volume control R9 forms the diode load and the DC component of the rectified signal, decoupled by R7 and C11, is applied as AGC voltage to the grid circuits of V1 and V2.

The pentode section of V3 operates as an audio amplifier and is RC coupled to V4 (DL96) the output valve. The grid bias voltage for V4 is developed across R14 in the negative return circuit of the HT battery.

VOLTAGE AND CURRENT MEASUREMENTS

The following voltage and current measurements were taken with a model 8 Avometer, voltages being measured on the 100V. range with the exception of V4 bias voltage for which the 10V. range was used.

GENERAL MEASUREMENTS

Total HT Current	9mA
HT Voltage	82V.

VALVE MEASUREMENTS

Ref.	Valve Type	Anode		Screen	
		Volts	mA	Volts	mA
V1	DK96	82	0.45	(G4)69 (G2)30	0.12 1.6
V2	DF96	82	1.1	67	—
V3	DAF96	12	30uA	16	—
V4	DL96	79	4.8	82	0.9

MECHANICAL SPARES

Part Description	Part No.
Aerial mounting (Ferrite-rod)	Y10787/1
Case (complete with handle, etc.)	N25463
Control knobs :	
Tuning dial	X25428/1
Volume and wavechange	Y25468
Control knob retaining clip	37309
Cursor disc	Z25609
Escutcheon	V17804
Escutcheon decorative ring	Y17806
Escutcheon retaining spring (hinge pin)	Z17801
Escutcheon latch spring (wire)	Z17802
Lid switch clip	37255
or	
Lid switch mounting plate	Z17521
Switch button	Z25467
Wooden dowel	Z12812

CHASSIS REMOVAL

The control escutcheon is retained at its pivot points by spring wire clips which become accessible when the escutcheon is raised to its vertical position. One only has to be withdrawn to enable the complete assembly to be lifted out of the case. If it becomes necessary to remove the chassis, pull off the control knobs and withdraw the three chassis fixing screws.

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

Address all service enquiries to :—

THE BRITISH RADIO CORPORATION LIMITED (SERVICE DIVISION)

LONDON : ELEY'S ESTATE, ANGEL ROAD, EDMONTON, N.18. Telephone : EDMonton 3060.
 BIRMINGHAM : 24 SHEEPCOTE STREET, 15. Telephone : Midland 5291. Telegrams : Eleclampo, Birmingham.
 MANCHESTER : DERBY STREET, CHEETHAM, 8. Telephone : Deansgate 8484.
 GLASGOW : 160/162 BATTLEFIELD ROAD, S.2. Telephone : Langside 9251/2/3/4