"His Master's Voice"

SERVICE MANUAL

for

FOUR-VALVE DUAL-WAVE

VIBRATOR OPERATED BATTERY RECEIVER

MODEL 847

(Incorporating Chassis 455 D/S)

TECHNICAL SPECIFICATION

BATTERY

The battery required for the operation of this receiver is as follows: One 6 volt 130 amp. hour accumulator. The battery should be recharged every six weeks or alternatively whenever the specific gravity as measured with a hydrometer falls below 1.140 or the voltage with the receiver in operation falls below 5.4 volts.

CONSUMPTION

The battery consumption of this model is 0.7 amp. with a battery of 6.0 volts.

SPEECH OUTPUT

Approximately 0.25 watt.

WAVE-LENGTH RANGE

187.5 to 545 metres (1600 to 550 Kc.).
16.5 to 52 metres (18.17 to 5.77 Mc.).

DIMENSIONS

Height	Length	Depth
11"	20"	10"

WEIGHT

	Nett	Gross
Receiver	26 lbs.	31 lbs.
Battery	51 lbs.	56 lbs.

VALVES

1C7G	Converter
1D5GP	I.F.
1K7G	Demodulator, A.V.C. and 1st A.F.
1L5G	Power output.

LOUDSPEAKER

The loudspeaker used is of the permanent magnet type with a cone diameter of 8"; the voice coil impedance is 2.3 ohms at 400 cycles.

CIRCUIT DESCRIPTION

This model embodies a four-valve superheterodyne chassis comprising a pentagrid converter followed by an I.F. amplifier. Demodulation is effected and A.V.C. voltage is obtained in the diode circuits of the following valve, which is a duo-diode-pentode. The pentode section of this valve functions as an audio amplifier and is resistance capacity coupled to the pentode output valve.

Coupling to the aerial on the broadcast band is effected through an iron cored transformer having a normal tuned secondary.

The I.F. transformers are permeability tuned and employ Litz wound coils with sliding iron cores.

Full A.V.C. voltage is applied to converter and I.F. valves whilst partial A.V.C. is taken to the audio valve; no A.V.C. voltage is applied to the short-wave converter grid.

Padding on the broadcast band is effected by adjustment of the oscillator secondary inductance, by means of an adjustable iron core in conjunction with a fixed padding condenser. On the short-wave band no padding adjustment is required.

The valve filaments are arranged in a series parallel network. The power valve grid bias is obtained from a voltage drop in this network.

WAVE BAND SWITCHING

This is carried out by means of a two-position switch. The oscillator primary coils are connected in series, as are the aerial primaries, and are not switched; however, a little feedback is applied across the padding condenser on the short-wave band and this is switched in and out by contacts on the wave-change switch. The first position of the switch (anti-clockwise) connects the short-wave coils and associated components in circuit, whilst the second position does the same with the broadcast components.

TONE MONITOR

This control combines the function of a battery "ON/OFF" switch. The tone is controlled by a four-position switch which functions as follows:

1st Position: Receiver switched off.

2nd Position: Normal reproduction.

3rd Position: High audio frequency cut introduced.

4th Position: Increased high audio frequency cut.

DIAL LAMPS

(6.3 volts, 0.15-0.3 amp.).

The dial lighting is controlled by a push button mounted on the side of the cabinet which should be pressed during the process of tuning in. When released, this button will extinguish the dial lighting, thus saving unnecessary drain on the battery.

VIBRATOR CIRCUIT DESCRIPTION

Circuit of the vibrator unit used with this model is shown on page 4. This unit includes the vibrator itself, which is enclosed in a separate metal container, arranged so that it can be plugged into or removed from a socket located in the vibrator unit in a manner similar to a valve. The remainder of the vibrator unit consists of the necessary transformer and filters, the whole being contained in a metal box provided with rubber mounting buffers and coupled to the battery and chassis by means of a special plug and leads.

A 5 amp. fuse is located in the vibrator positive low tension circuit.

DISMANTLING

REMOVAL OF CHASSIS

1. Remove knobs.
2. Disconnect loudspeaker and battery plug.
3. Disconnect the two leads from the pilot lamp switch on the side of the cabinet.
4. Remove four fixing screws from the underside of the cabinet; the chassis is now free.

REMOVAL OF VIBRATOR UNIT AND LOUDSPEAKER

1. Disconnect cable plug from chassis.
2. Remove four screws holding vibrator unit in cabinet and withdraw.
3. Disconnect speaker leads from jacks in side of chassis.
4. Remove four screws holding speaker chassis and remove speaker.

VOLTAGE TABLE

Values given are ± 15% with receiver tuned to a point of no reception (broadcast band) and a low tension battery voltage of 6 volts. If a voltmeter with an internal resistance of less than 1000 ohms per volt is used, allowance must be made for the voltage drop caused by the voltmeter.

	1C7G	1D5GP	1K7G	1L5G
Plate to chassis volts	95	95	32	108
Plate current (ma)	0.9	1.4	0.2	5.2
Osc. plate to chassis volts	85			
Osc. plate current (ma)	2.0			
Screen to chassis volts	38	38	43	110
Screen current (ma)	1.4	0.6	0.07	1.1
Bias voltages	0	0	—2	—3
Filament voltages (accumulator = 6.0 volts)	2.0	2.0	2.0	2.0

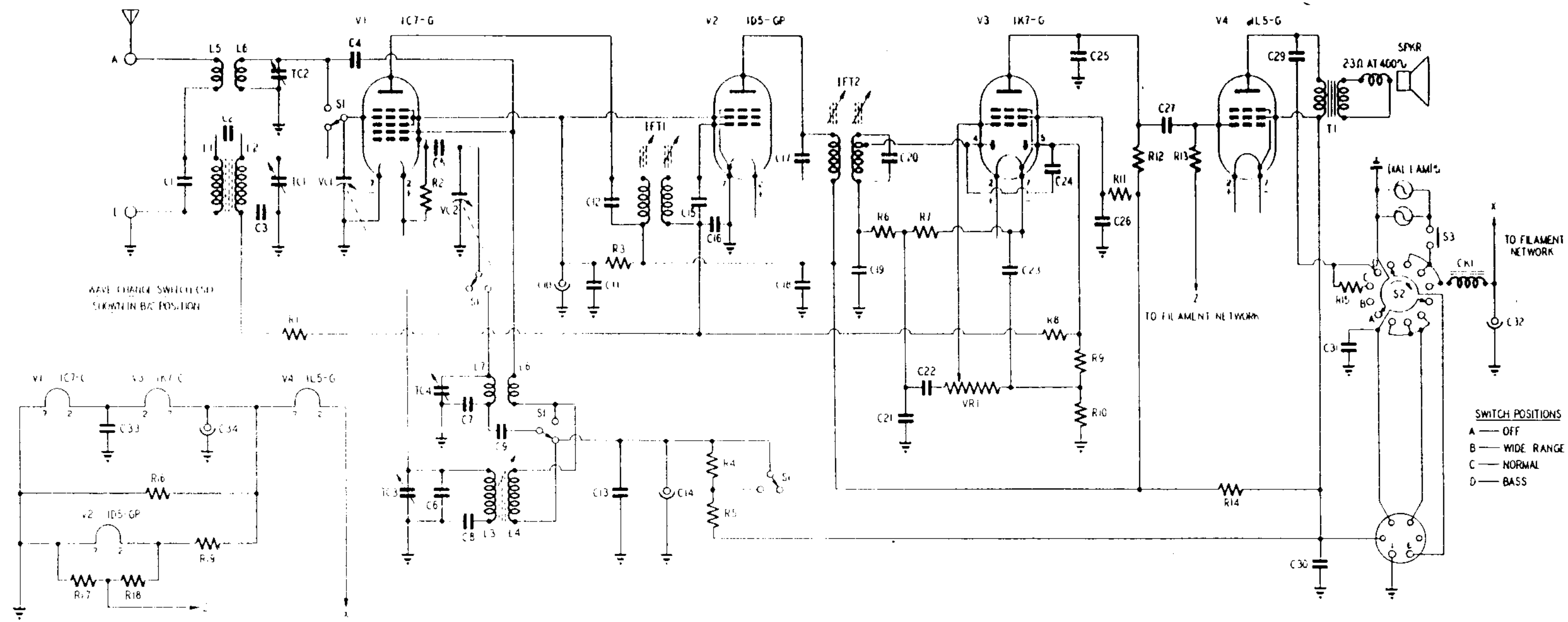
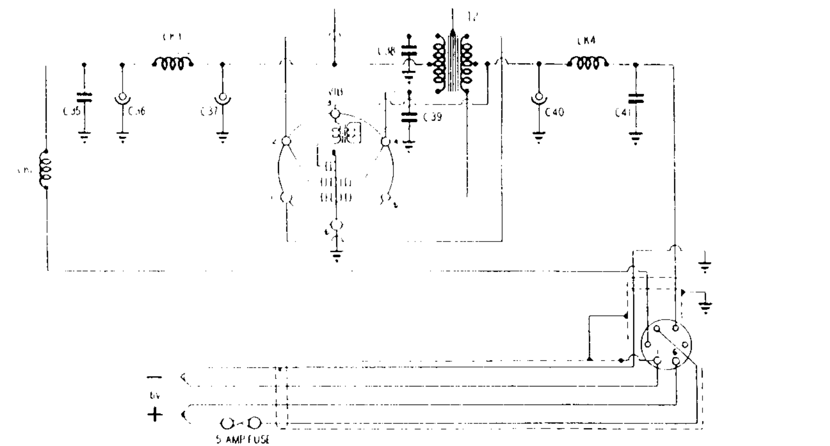


DIAGRAM OF FILAMENT CONNECTIONS

NOTE - VIBRATOR PLUG AND SOCKET VIEWED LOOKING ON PINS



REF	PART No	DESCRIPTION
R1	J1XX	100,000 OHM 1/4 WATT
R2	H1X	50,000 OHM 1/4 WATT
R3	AE1X	25,000 OHM 1/4 WATT
R4	X1X	5,000 OHM 1/4 WATT
R5	AR1X	7,500 OHM 1/4 WATT
R6	H1XX	50,000 OHM 1/4 WATT
R7	O1X	500,000 OHM 1/4 WATT
R8	AA1XX	2 MEGOHM 1/4 WATT
R9	AA1X	2 MEGOHM 1/4 WATT
R11	O1X	500,000 OHM 1/4 WATT
R12	N1X	250,000 OHM 1/4 WATT
R13	P1X	1 MEGOHM 1/4 WATT
R14	BK1X	3,500 OHM 1/4 WATT
R15	[illegible]	10,000 OHM 1/4 WATT
R16		66.6 OHM 1 WATT ±5% IRC BW1
R17	[illegible]	5,000 OHM 1/4 WATT
R18	[illegible]	5,000 OHM 1/4 WATT
R19		33 OHM 1/2 WATT ±5% IRC BW1/2
R10	B02X	300,000 OHM 1/4 WATT
A.B.&C.4	C0159	417 MMFD 2 GANG CONDENSER
VR1	D1942	1 MEGOHM POTENTIOMETER
IFT1	D1817	1ST I.F. TRANSFORMER
IFT2	D1818	2ND I.F. TRANSFORMER
L1&L2	D1614D	B/C AERIAL COIL
L3&L4	D2002	B/C OSCILLATOR COIL
L5&L6	D2003	S/W AERIAL COIL
L7&L8	D2005	S/W OSCILLATOR COIL
S1	D1952	WAVE CHANGE SWITCH
S2	D1958	TONE MONITOR & BATTERY SWITCH
S3	D1361B	PUSH BUTTON SWITCH
CK1	D0664	L.T. CHOKE
TC1&TC2 TC3&TC4	D0786	AIR TRIMMER 1.5 MMFD-18 MMFD
		DIAL LAMPS 6.3V 0.25AMP
V1		1C7-G VALVE
V2		1D5-GP VALVE
V3		1K7-G VALVE
V4		1L5-G VALVE

REF	PART No	DESCRIPTION
C1	D0243P	100 MMFD ±10%
C2	D0243BH	3 MMFD ±0.5 MMFD
C3	C0013M	0.05 MFD 200V
C4	D2315	NEUT COND 1.4 MMFD ±0.[illegible] MMFD
C5	D0243BR	25 MMFD ±10%
C6	D4405Y	15 MMFD ±5%
C7	D0243CU	4000 MMFD ±100 MMFD
C8	D0243BH	437 MMFD ±5 MMFD
C9	C0013N	0.01 MFD 600V
C10	C0014AZ	8 MFD 350 PV
C11	C0013O	0.1 MFD 200V
C12	D4405W	100 MMFD ±5%
C13	C0013N	0.01 MFD 600V
C14	C0014BA	16 MFD 350 PV
C15	D4405X	50 MMFD ±5%
C16	C0013T	0.02 MFD 400V
C17	D4405W	100 MMFD ±5%
C18	C0013L	0.5 MFD 200V
C19	D0243CU	100 MMFD ±20%
C20	D4405W	100 MMFD ±5%
C21	D0243CU	100 MMFD ±20%
C22	C0013N	0.01 MFD 600V
C23	C0013L	0.5 MFD 200V
C24	D4405F	50 MMFD ±10%
C25	D0243CV	250 MMFD ±20%
C26	C0013O	0.1 MFD 200V
C27	C0013N	0.01 MFD 600V
C29	C0013S	0.02 MFD 600V
C30	D0243K	0.001 MFD
C31	C0013AJ	0.004 MFD 600V
C32	C0014AV	500 MFD 12 PV
C33	C0013O	0.1 MFD 200V
C34	C0014AV	500 MFD 12 PV
SPKR	D1906B	8" PERMAG SPEAKER VC 2.3Ω
T1	D1502K	OUTPUT TRANSFORMER
	D2354	DIAL GLASS

REF	PART No	DESCRIPTION
VIB	D2259	6V OAK 6 PIN SYNCH. VIBRATOR
T2	D1934	VIBRATOR TRANSFORMER
CK1	D1425	RF CHOKE H.T.
CK3	D1437	H.T. CHOKE
CK4	D1438	RF CHOKE L.T.
C35	D0243B[illegible]	0.007 MFD ±10%
C36	C0014AG	24 MFD 150 PV
C37	C0014CD	8 MFD 525 PV
C38	C0013AM	0.02 MFD 600V ±10%
C39	C0013AM	0.02 MFD 600V ±10%
C40	C0014V	500 MFD 12 PV
C41	C0013O	0.1 MFD 200V

RADIO FREQUENCY TESTS AND ADJUSTMENTS

If a coil or other component associated with the H.F. or I.F. side of the receiver has been replaced or repaired, or if the wiring has been disarranged, all circuits must be realigned.

For all alignment operations, an output meter having a range of approximately 0-2 volts A.C. should be connected across the speaker voice coil.

I.F. alignment should always precede H.F. alignment and even if only one coil or one range of coils has been serviced, the whole of the realignment should be done in the order given, i.e., broadcast band first followd by short-wave band. In carrying out the following operations, it is important that the input to the receiver from the oscillator should be kept low and progressively reduced as the circuits are brought into line, so that the reading on the meter does not exceed about 0.5 volt.

I.F. ALIGNMENT

Principal components and adjustments referred to in the following procedure are identified by stencilling on the top of the chassis. Before commencing alignment, the Tone Monitor should be set to its second position, i.e., "Normal." Rotate the Volume Control fully clockwise and set the Wave Change Switch to broadcast position; make sure that the vanes of the tuning condenser are fully meshed. Connect one of the output leads of the signal generator to the grid cap of the 1C7G valve through a 0.1 mfd. condenser and the other to the chassis.

NOTE: Do not disconnect the grid lead from the 1C7G grid.

1. Tune signal generator to exactly 457.5 Kc. Beginning with the second I.F. adjust the trimmer screws on the I.F. transformers for maximum deflection of the output meter. Continue this alignment on each transformer in turn until no greater output can be obtained.

NOTE: If trimmer screws are screwed in too far, it may be possible to obtain a false peak due to coupling effects between the movable iron cores. Any trimmer which appears to require screwing too far in should be screwed out considerably until the true peak is found.

R.F. ALIGNMENT (Broadcast Band)

With control set as for I.F. alignment, connect the signal generator output leads through a standard dummy antenna of 200 mmfd. capacity to the aerial terminal and chassis. Check that when the gang condenser is fully meshed, the pointer falls directly behind the setting line marked 'S' at the extreme bottom right of the scale; the pointer is a friction fit on the condenser spindle, and can be rotated to bring it to the correct setting.

1. Tune signal generator to 600 Kc.
2. Rotate tuning knob until pointer is exactly over the 600 Kc. mark on scale and by means of the oscillator padder screw align receiver so that the 600 Kc. signal is tuned in exactly on calibration.
3. Tune signal generator to 1600 Kc.
4. Set pointer exactly over 1600 Kc. point on scale and adjust broadcast oscillator trimmer until signal is correctly tuned in with the pointer on the 1600 Kc. calibration.
5. Tune receiver and signal generator to 1500 Kc.
6. Adjust broadcast aerial trimmer for maximum output on the output meter.
7. Repeat operations 1 to 6 inclusive. Note that any broadcast stations receivable are tuned in correctly on calibration.

SHORT-WAVE ALIGNMENT

1. Set Wave Change Switch to short-wave range (fully anti-clockwise). Remove the standard dummy antenna from the output lead of the signal generator and substitute a 400 ohm non-inductive resistor; connect to aerial terminal as previously.
2. Tune signal generator to 16.5 metres (18.17 Mc.).
3. Rotate tuning knob until pointer is over 16.5 metre calibration, and adjust short-wave oscillator trimmer until maximum output is obtained. Two settings will be found at which the trimmer will peak; care should be taken to see that the setting selected is that which gives the lower capacity in the trimmer (plunger further out). Failure to select the correct position will cause serious tracking error and loss of sensitivity.
4. Tune receiver and signal generator to 17 metres (17.64 Mc.).
5. Adjust the short-wave aerial trimmer for maximum output while rocking the ganged condenser to obtain the correct resonant point.
6. Check the foregoing adjustments to ensure that the correct settings have been obtained in all trimmers.

ADDITIONAL DATA

Any further service information desired can be obtained by addressing an enquiry to the Service Department, The Gramophone Company Limited, 2 Parramatta Road, Homebush, N.S.W.

(The Company reserves the right to make any modifications without notice).