Private and Confidential ***For Trade Use Only***

"His Master's Voice"

SERVICE MANUAL

for

FOUR - VALVE MEDIUM - WAVE

BATTERY - OPERATED PORTABLE RECEIVER

CHASSIS B1

•

THE GRAMOPHONE COMPANY LIMITED
(*Incorporated in England*)
HOMEBUSH - - - N.S.W.

•

PART No. 682-2821

TECHNICAL SPECIFICATION

POWER SUPPLY:

One 1.5 Volt L.T. Battery,
Eveready Type 745.
Two 45 Volt H.T. Batteries,
Eveready Type 482.

AVERAGE CONSUMPTION:

L.T. ..... 0.25 Amps.
H.T. ..... 12 mA.

I.F. FREQUENCY:

457.5 Kc/s.

FREQUENCY RANGE:

530 Kc/s to 1600 Kc/s.

VALVE COMPLEMENT:

1R5 — Frequency Changer

1T4 — I.F. Amplifier

1S5 — Demod.-AVC-A.F. Amplifier

3V4 — Power Amplifier.

CIRCUIT DESCRIPTION

This chassis incorporates a 4-valve battery-operated superheterodyne receiver for medium-wave reception within the above frequency range.

FREQUENCY CHANGER: V1

The highly-efficient loop aerial, which serves as the aerial coil, is connected to the frequency changer grid. A coupling winding is provided, which is connected to terminals on the back of the cabinet for use when external aerial and earth are used.

A pentagrid valve is employed as a frequency changer, whose oscillator functions with a fixed padder condenser. A variable padding adjustment is provided by means of an iron-dust core in the oscillator coil L2-3. It should be noted that this type of frequency changer employs the screen grid as the oscillator plate. A neutralization capacitor is connected between signal grid and oscillator grid circuit.

I.F. AMPLIFIER: V2

The frequency changer is transformer-coupled to a super-control pentode, which operates as an I.F. amplifier. The output of this amplifier is, in turn, transformer-coupled to the diode of V3. Both I.F. transformers are of the permeability-tuned type.

DEMODULATOR - A.V.C. - A.F. AMPLIFIER: V3

A.V.C. is obtained from the diode load resistor and filtered by R1-C1 and applied to the frequency changer stage. Reduced A.V.C. for the I.F. stage is obtained through the dividing network R5 and R6. Audio frequency currents are applied to the volume control which, in turn, transfers them to the pentode section of V3, which is grid leak biased. The plate circuit is resistance-capacity coupled to the pentode output valve, V4.

AUDIO OUTPUT AMPLIFIER: V4

The audio output is coupled to the loudspeaker by the output transformer, T.1. Bias for this valve is obtained from resistor R13 in the H.T. negative lead. Inverse feedback is provided by condenser C18 connected between the secondary of the output transformer and the screen of the 1S5 A.M. Amplifier.

DISMANTLING

(1) Remove the two screws which are located near the top of the cabinet back. Lift the back clear of the two brackets at the base.

(2) Disconnect the two leads which are connected to the loop aerial tags. The back may now be completely removed.

(3) Remove the plugs from high tension and low tension batteries.

(4) Lay the receiver front downwards on a piece of felt or similar soft material.

(5) Remove the two nuts which secure the chassis assembly to the cabinet. The chassis, complete with knobs, can now be lifted clear from the cabinet.

Note: Removal of the chassis from the cabient can be effected without removing the batteries. Care must be taken that I.F. transformer adjustment screws and oscillator trimmer condenser are not damaged or disturbed in the process.

(6) To remove the batteries, loosen the battery clamp by partly unscrewing the two screws on the bottom of the cabinet.

RECEIVER ALIGNMENT PROCEDURE

In any case where a component replacement has been made in either the tuned I.F. or R.F. circuits of the receiver, all circuits must be re-aligned and, even if only one coil has been serviced, the whole of the re-alignment should be undertaken in the order given. An output meter should always be connected across the voice coil terminals of the speaker to indicate when the circuits are tuned to resonance. In carrying out the following operations, it is important that the input to the receiver from the signal generator should be kept low, and progressively reduced as the circuits are brought into line, so that the output meter reading does not exceed 0.5 volt.

I.F. ALIGNMENT

(1) Rotate the volume control fully clockwise, set tuning condenser for the plates to be fully meshed. Connect the output leads of a signal generator through a 0.1 mF. condenser to the stator plates terminal of the front section of the 2-gang capacitor; this point is connected to the frequency changer grid.

(2) Tune signal generator to exactly 457.5 Kc/s.

(3) Adjust the I.F. transformer trimmer screws for maximum reading on the output meter, commencing with the second I.F. transformer and following with the first.

(4) Continue this alignment on both transformers in turn until no greater output can be obtained. It is necessary to repeat this procedure twice to ensure good alignment.

Note: If trimmer screws are screwed too far in, it may be possible to obtain a false peak due to coupling effects between the cores. Start alignment of each individual transformer by first screwing its core well out, and then advancing the core into the coil until resonance is obtained.

R.F. ALIGNMENT

(1) (*a*) Replace chassis base plate and check that , when the 2-gang capacitor is fully enmeshed, the pointer coincides with the setting point on the extreme left-hand side of the dial back plate.

(*b*) Instal the receiver in the cabinet; the pointer should now coincide with the setting mark at the bottom left-hand side of the dial scale.

(*c*) Set volume control to maximum and re-connect loop aerial to receiver (top lead to top terminal).

(*d*) Connect signal generator through a 5000 ohm resistor to A and E loop terminals.

(2) Tune the signal generator to 600 Kc/s.

(3) Rotate tuning knob until pointer is exactly under the 600 Kc/s calibration point on the dial scale; this point may be found directly under 7ZL.

(4) Adjust the oscillator padder screw for maximum response.

(5) Set signal generator to 1500 Kc/s.

(6) Rotate tuning knob until pointer coincides with the 1500 Kc/s calibration point, which is located to the right of 7DY on the dial scale.

(7) Adjust oscillator trimmer for maxium response.

(8) Repeat operations (2) to (7) inclusive until correct calibration is achieved.

(9) Close cabinet back and adjust the aerial trimmer at 1500 Kc/s for maximum response; access to the trimmer is provided by a hole in the cabinet back.

Note: For operation (9) it is essential that batteries be installed.

EXTERNAL BATTERY OPERATION

If it is desired to operate this receiver from external batteries, disconnect the plugs from the internal batteries, undo the clip which binds the battery cord into a hank and extend battery lead to its fullest extent. Bring out the lead through the slot at the bottom of the cabinet back and connect plugs to the external batteries.

The following heavy duty batteries are recommended for this purpose:

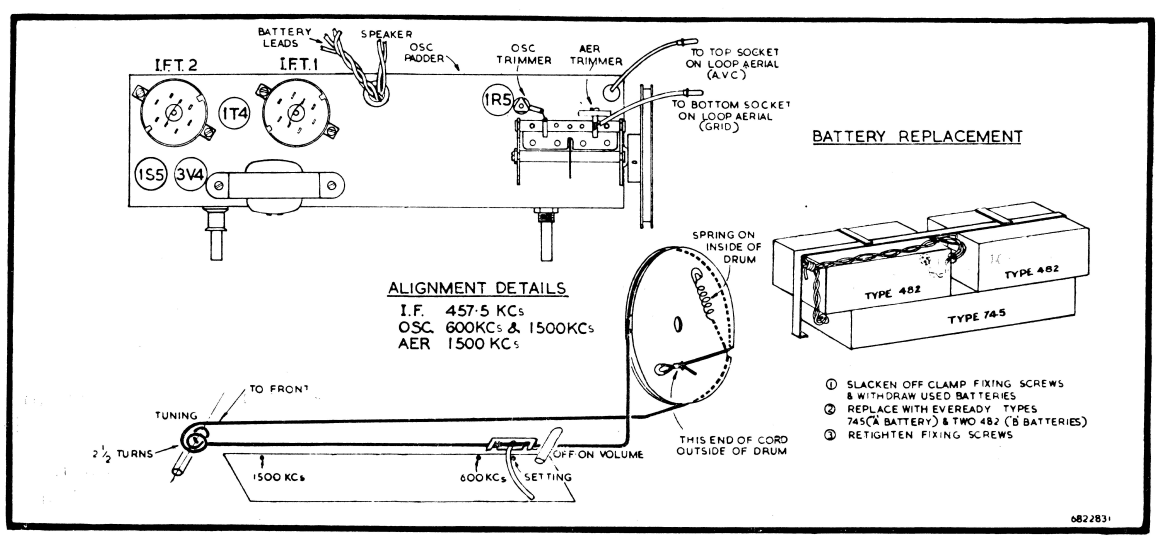
One 1.5 Volt L.T. Battery, Type X250.
Two 45 Volt H.T. Batteries, Type 770.

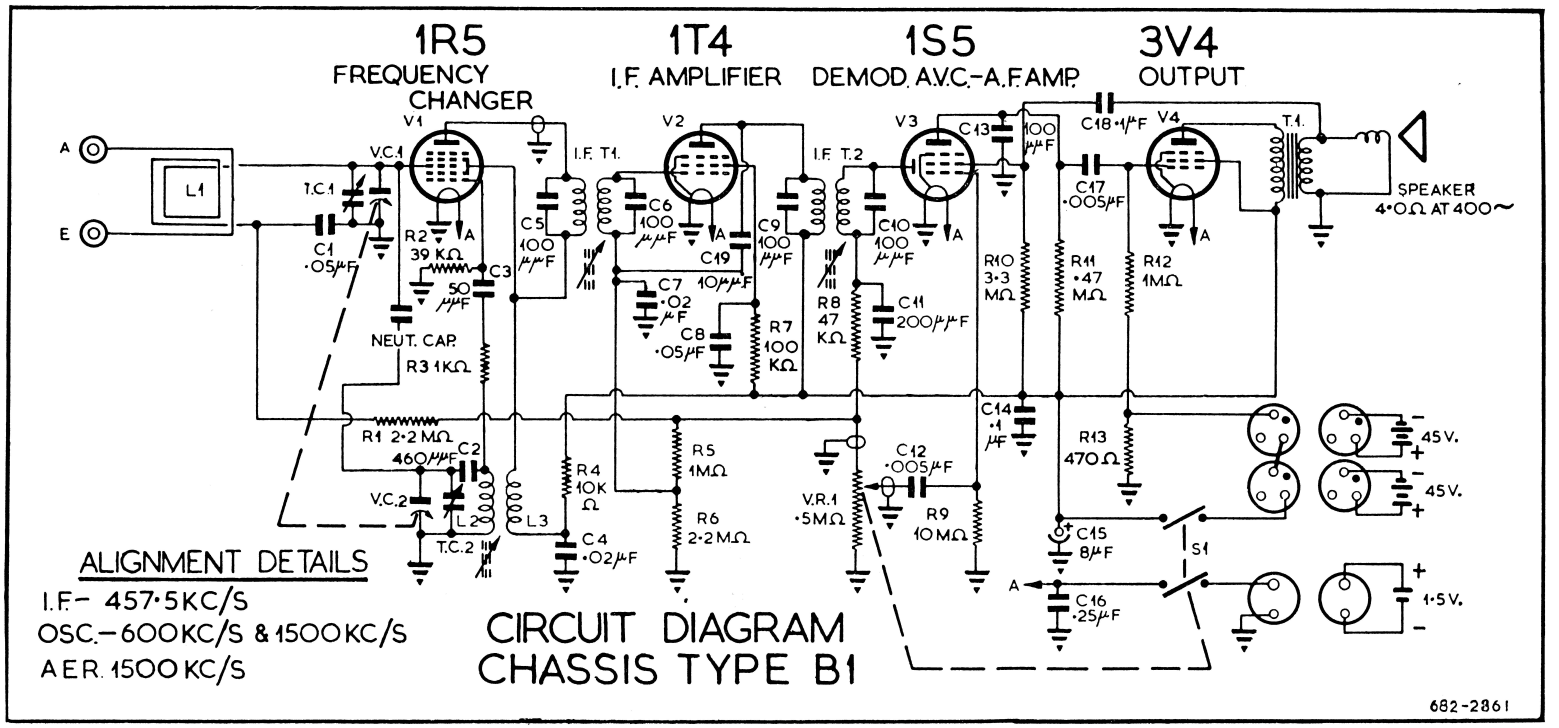
ADDITIONAL DATA

Any further service information may be obtained by addressing an enquiry to the "Service Division, The Gramophone Company Limited, 575-577 Parramatta Road, Leichhardt" (telephone LM 1491).

During the course of production of this receiver, the Company reserves the right, without notice, to make any modification or improvements in design which may be necessary to meet prevailing conditions.

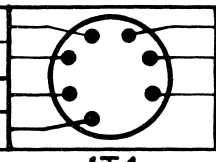
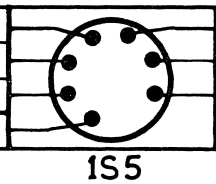
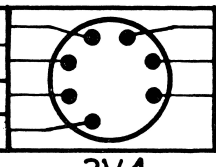
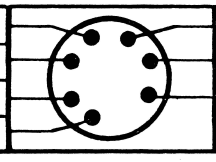
Information concerning changes, which is likely to be of benefit to retailers and servicemen, will be notified as far as possible by issuing a Technical Data Sheet.




1R5
FREQUENCY CHANGER
1T4
I.F. AMPLIFIER
1S5
DEMOD. A.V.C.–A.F. AMP.
3V4
OUTPUT
V1
V2
V3
V4
A
E
L1
V.C.1
T.C.1
C1 ·05μF
R2 39 KΩ
C3 50 μμF
NEUT. CAP.
R3 1KΩ
R1 2·2 MΩ
460μμF
C2
V.C.2
T.C.2
L2
L3
C5 100 μμF
I.F. T1.
R4 10K Ω
C4 ·02μF
C6 100 μμF
C19 10μμF
C7 ·02 μF
C8 ·05μF
R5 1MΩ
R6 2·2 MΩ
C9 100 μμF
I.F. T.2
R7 100 KΩ
R8 47 KΩ
C10 100 μμF
C11 200μμF
V.R.1 ·5MΩ
C12 ·005μF
R9 10MΩ
C13 100 μμF
R10 3·3 MΩ
C14 ·1 μF
R11 ·47 MΩ
R12 1MΩ
C18 ·1μF
C17 ·005μF
T.1.
SPEAKER 4·0Ω AT 400~
R13 470Ω
C15 8μF
C16 ·25μF
S1
45V.
45V.
1·5V.
ALIGNMENT DETAILS
I.F.– 457·5KC/S
OSC.–600KC/S & 1500KC/S
AER. 1500 KC/S
CIRCUIT DIAGRAM
CHASSIS TYPE B1
682-2861

VOLTAGE TABLE

- VOLTAGE READINGS TAKEN WITH METER RESISTANCE OF 1,000 OHMS PER VOLT
- VOLTAGE AND CURRENT READINGS WITHIN ±15 %
- RESISTANCE READINGS ARE APPROXIMATE.

VOLTS TO CHASSIS	CURRENT M.A.	RESISTANCE TO CHASSIS	VALVE ELECTRODE	BOTTOM VIEW OF VALVE SOCKET	VALVE ELECTRODE	VOLTS TO CHASSIS	CURRENT M.A.	RESISTCE TO CHASSIS
			V1	1R5	FREQUENCY CHANGER			
———	0·3	39 KΩ	OSC GRID		FILAMENT−	NIL	———	NIL
45	2·9	INFIN.	SCREEN		GRID	———	———	2·5 MΩ
45	0·9	INFIN.	PLATE		FILAMENT+	1·4	50	———
NIL	50	NIL	FILAMENT−					
			V2	1T4	I.F. AMPLIFER			
———	———	———	NO CONN.		FILAMENT−	NIL.	———	NIL.
30	0·5	INFIN.	SCREEN		GRID	———	———	1·0 MΩ
84	1·1	INFIN.	PLATE		FILAMENT+	1·4	50	———
NIL.	50	NIL	FILAMENT−					
			V3	1S5	AUDIO AMPLIFER DEMOD.-AV.C.			
5	0·02	INFIN.	SCREEN		PLATE	15	0·1	INFIN.
———	———	0·48 MΩ	DIODE		GRID	———	———	10 MΩ
———	———	———	NO CONN.		FILAMENT+	1·4	50	———
NIL	50	NIL	FILAMENT−					
			V4	3V4	OUTPUT			
———	———	———	NO CONN.		FILAMENT−	NIL	100	NIL
84	1·3	INFIN.	SCREEN		GRID	———	———	1 MΩ
82	5·8	INFIN.	PLATE		FILAMENT+	1·4	100	———
1·4	100	———	FILAMENT+					

REMARKS

H.T. VOLTS	=	84	VOLTS.
H.T. CURRENT	=	12	M.A. AVERAGE.
TOTAL FILAMENT VOLTAGE	=	1·4	VOLTS
TOTAL FILAMENT CURRENT	=	250	M.A.
BIAS VOLTAGE	=	5·5	VOLTS.

PARTS LIST

RESISTORS

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
R1	7400202	2.2 megohms ½ watt	R8	7400122	47,000 ohms ½ watt
R2	7400232	39,000 ohms ½ watt	R9	7420232	10 megohms 1 watt
R3	7400022	1,000 ohms ½ watt	R10	7420212	3.3 megohms 1 watt
R4	7400082	10,000 ohms ½ watt	R11	7420172	470,000 ohms 1 watt
R5	7400192	1.0 megohm ½ watt	R12	7400192	1.0 megohm ½ watt
R6	7400202	2.2 megohms ½ watt	R13	7400012	470 ohms ½ watt
R7	7400142	100,000 ½ watt			

CAPACITORS

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
C1	2790121	0.05 mF. 200v. wkg.	C11	2730081	200 pF. ± 20%
C2	2730301	460 pF. ± 5 pF.	C12	2790031	0.005 mF. 600v. wkg.
C3	2730041	50 pF. ± 10%	C13	2730051	100 pF. ± 10%
C4	2790091	0.02 mF. 400v. wkg.	C14	2790151	0.1 mF. 200v. wkg.
C5	2750041	100 pF. ± 5%	C15	2690011	8 mF. 125v. wkg.
C6	2750041	100 pF. ± 5%	C16	2790231	0.25 mF. 200v. wkg.
C7	2790091	0.02 mF. 400v. wkg.	C17	2790031	0.005 mF. 600v. wkg.
C8	2790121	0.05 mF. 200v. wkg.	C18	2790151	0.1 mF. 200v. wkg.
C9	2750041	100 pF. ± 5%	C19	2730011	10 pF. ± 10%
C10	2750041	100 pF. ± 5%		5260921	Neutralizing Capacitor.

MISCELLANEOUS

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
VC1-2	2810062	2-gang Condenser		6710061	Pointer Assembly
VR1-S1	6770004	0.5 megohm Potentiometer, incorporating switch		8400091	Dial Cord Spring
				2970011	Dial Cord, White
IFT1	9060005	1st I.F. Transformer		5170071	Control Knob
IFT2	9060013	2nd I.F. Transformer		6680041	2-pin Plug
T1	9050004	Output Transformer		6680051	3-pin Plug
L1	2530131	Loop Aerial		3810061	Dial Drum
L2-L3	2570134	Oscillator Coil		8370131	Dial Drive Spindle
TC1	2810082	Trimmer Capacitor		2440081	Clip Knob
TC2	2810031	Trimmer Capacitor			