"His Master's Voice"

SERVICE MANUAL

for

FIVE - VALVE BROADCAST

BATTERY-OPERATED PORTABLE RECEIVER

MODEL B61A

TECHNICAL SPECIFICATION

POWER SUPPLY:

1.5 Volt L.T. Battery. Eveready Type 745.
2 x 45 Volt H.T. Battery. Eveready Type 482.

AVERAGE CONSUMPTION:

L.T. — 0.30 amps.
H.T. — 12 mA.

I.F. FREQUENCY:

457.5 Kc/s.

FREQUENCY RANGE:

540 Kc/s to 1600 Kc/s.

VALVE COMPLEMENT:

1T4	R.F. Amplifier
1R5	Converter
1T4	I.F. Amplifier
1S5	Demod.-AVC-A.F. Amplifier
3V4	Power Amplifier.

LOUDSPEAKER:

8-inch Permagnetic.
Voice Coil Impedance at 400 cycles 2.0 ohms.

DIMENSIONS:

Packed	Width	16in.
	Height	14¼in.
	Depth	6½in.
Unpacked	Width	15-3/8in.
	Height	12-1/4in.
	Depth	5-5/8in.

WEIGHT:

	Gross	Net
Without Batteries	13 lbs.	11 lbs.
With Batteries	-	17 lbs.

CIRCUIT DESCRIPTION

This model incorporates a 5-valve battery operated superheterodyne receiver for broadcast reception.

R.F. AMPLIFIER

The loop aerial which serves as the aerial coil is connected to the R.F. amplifier. A resistor-inductor combination (L1-R1) is employed to minimise tracking variations due to aerial capacity changes, when an external aerial is employed. This amplifier, which is neutralised by means of C1A, is coupled by the R.F. coil to the converter.

CONVERTER

A pentagrid converter 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 broadcast oscillator coil (L5 L6). It is worthy of note that this type of converter employs the screen grid as the oscillator plate. Neutralisation is achieved by means of condenser C5.

I.F. AMPLIFIER

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

DEMODULATOR-AVC-A.F. AMPLIFIER

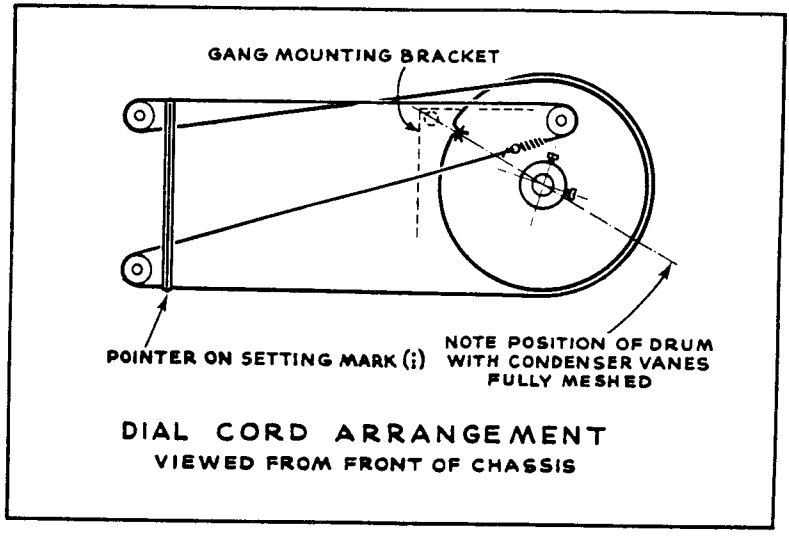
AVC is obtained from the diode load resistor and is filtered by R3 and C11 and applied to RF, converter and I.F. stages. Audio frequency currents are applied to the volume control which, in turn, transfers them to the pentode sections of V4, which is grid leak biased. The plate circuit is resistance-capacity-coupled to the pentode output valve V5.

POWER STAGE

The output of the power valve is coupled to the speaker by the transformer T1. Bias for this valve is obtained from a resistor R14 in the B— lead.

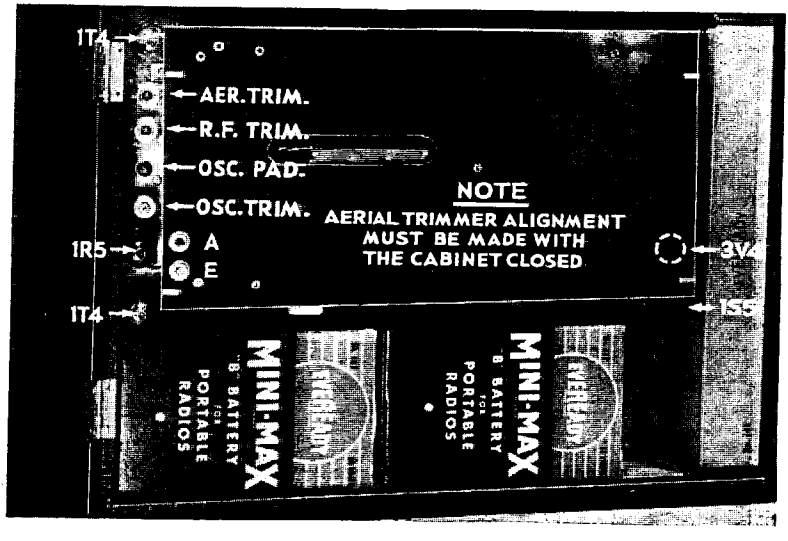
DISMANTLING

1. Unlatch the case fasteners and swing lid open.
2. Remove batteries and connecting plugs.
3. Unscrew the three mounting screws. (Two are located on the right-hand side of the cabinet, whilst the third is located between the two I.F. transformers).
4. Withdraw chassis.



DIAL CORD ARRANGEMENT
VIEWED FROM FRONT OF CHASSIS

REAR VIEW OF COMPLETE ASSEMBLY WITH LID OPEN.



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 realignment 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 solder lug of the centre section of the three gang condenser. (This is the converter 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. With controls set as for I.F. alignment, connect signal generator output leads in series with 200 mmF. condenser to the aerial and earth terminals of the receiver.
2. Check that when the gang condenser is fully meshed the pointer coincides with the setting line (three dots on the left-hand side of the dial scale). If necessary the pointer may be adjusted to this position by sliding the pointer along the dial cord after loosening of the pointer claws.
3. Tune signal generator to 600 Kc/s.
4. Rotate tuning knob until the pointer is exactly under the 600 Kc/s calibration point. Adjust the oscillator padder screw for maximum response.
5. Rotate tuning knob until pointer coincides with the 1500 Kc/s calibration point and adjust the oscillator trimmer, R.F. trimmer and aerial trimmer in turn for maximum response.
6. Repeat operations (3) to (5) inclusive for proper alignment. It is advisable to check the alignment of the aerial trimmer when the lid is closed and if necessary, to change the trimmer setting. A hole has been provided in the lid for this specific purpose.

EXTERNAL BATTERY OPERATION

For external operation of this receiver the following batteries are recommended:

1 Eveready 1.5V. No. X250P.
2 Eveready 45V. No. 770P.

These may be connected by means of an extension battery cable (H.M.V. Part No. C0439), which is available upon order.

ADDITIONAL DATA

Any further service information desired may be obtained by addressing an enquiry to the "Service Department, The Gramophone Co. Ltd., 2 Parramatta Road, Homebush, N.S.W."

VOLTAGE TABLE

- VOLTAGES AND CURRENTS ARE WITH THE RECEIVER OPERATING WITH BATTERY TERMINAL VOLTAGES OF 1·5 V AND 90V RESPECTIVELY, AND TUNED TO A POINT OF NO RECEPTION ON THE BROADCAST BAND.
- 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 MA.	RESISTANCE TO CHASSIS	VALVE ELECTRODE	BOTTOM VIEW OF VALVE SOCKET	VALVE ELECTRODE	VOLTS TO CHASSIS	CURRENT MA	RESISTANCE TO CHASSIS
			V1	1T4	R.F. AMPLIFIER			
—	—	—	NO CONN		FILAMENT −	NIL	—	NIL
25	0·25	INFIN	SCREEN		GRID	—	—	2·7MΩ
83	0·70	INFIN	PLATE		FILAMENT +	1·4	50	—
NIL	50	NIL	FILAMENT −					
			V2	1R5	CONVERTER			
—	—	100 KΩ	OSC. GRID		FILAMENT −	NIL	—	NIL
54	1·95	INFIN	SCREEN		GRID	—	—	2·6 MΩ
53	0·95	INFIN	PLATE		FILAMENT +	1·4	50	—
NIL	50	NIL	FILAMENT −					
			V3	1T4	I.F. AMPLIFIER			
—	—	—	NO CONN		FILAMENT −	NIL	—	NIL
40	0·83	INFIN	SCREEN		GRID	—	—	2·5 MΩ
83	1·90	INFIN	PLATE		FILAMENT +	1·4	50	—
NIL	50	NIL	FILAMENT −		—	—	—	—
			V4	1S5	AUDIO AMPLIFIER − DEMODULATOR − A.V.C.			
8	0·05	INFIN	SCREEN		PLATE	6	0·10	INFIN
—	—	0·55 MΩ	DIODE		GRID	—	—	10MΩ
—	—	—	NO CONN		FILAMENT +	1·4	50	—
NIL	50	NIL	FILAMENT −					
			V5	3V4	OUTPUT AMPLIFIER			
—	—	—	NO CONN		FILAMENT −	NIL	100	NIL
83	1·10	INFIN	SCREEN		GRID	—	—	2 MΩ
83	4·17	INFIN	PLATE		FILAMENT +	1·4	100	—
1·4	100	—	FILAMENT +					

REMARKS:

H.T. VOLTS	=	83 VOLTS
H.T. CURRENT	=	12 MA AVERAGE
TOTAL FILAMENT VOLTAGE	=	1·4 VOLTS
TOTAL FILAMENT CURRENT	=	300 MA
BIAS VOLTAGE	=	7 VOLTS

PARTS LIST

RESISTORS

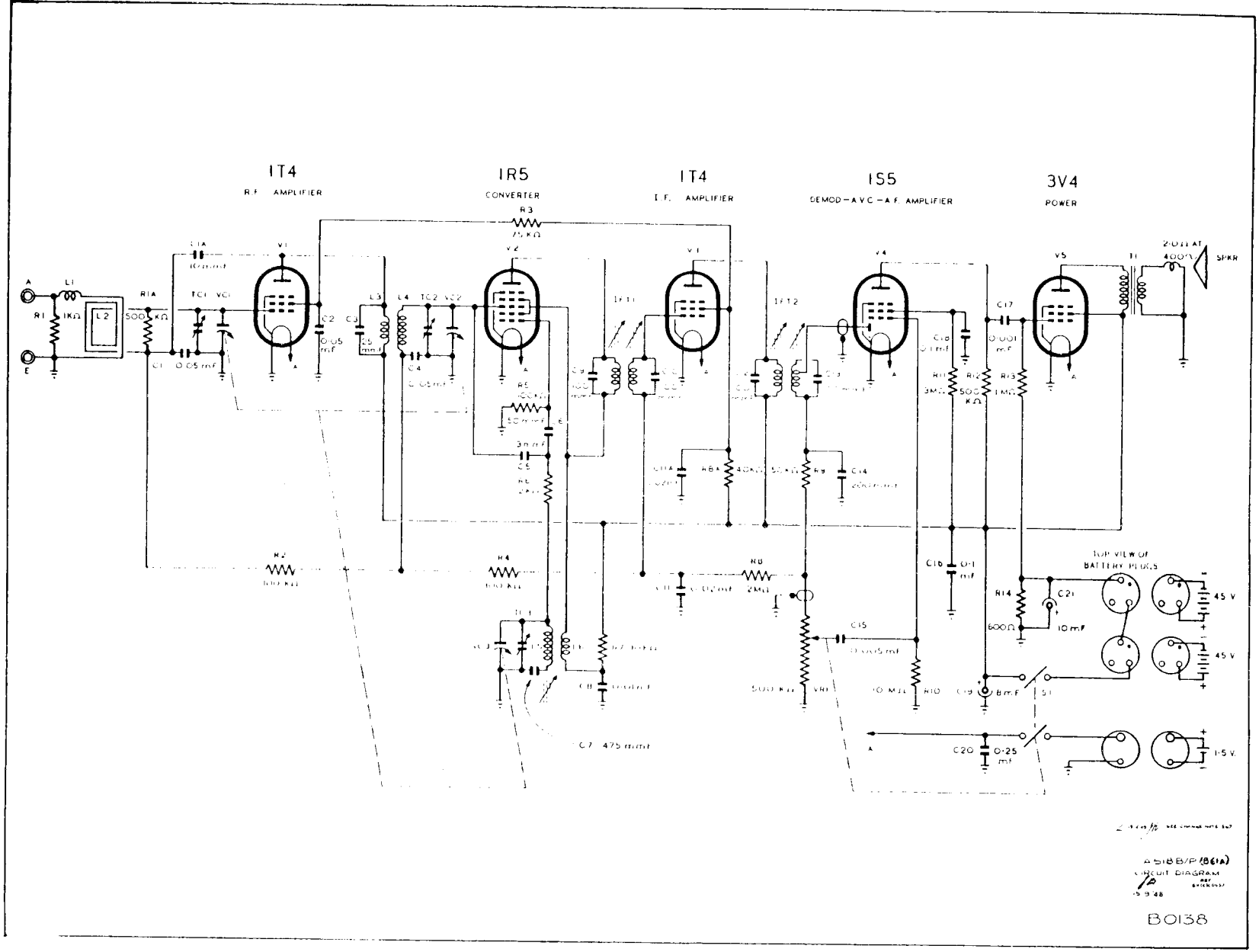
REF.	PART No.	DESCRIPTION
R1	D2X	1,000 ohms ½ watt ± 10%
R1A	O2X	.5 megohm ½ watt ± 10%
R2	J2X	.1 megohm ½ watt ± 10%
R3	AN3X	75,000 ohms 1 watt ± 10%
R4	J2X	.1 megohm ½ watt ± 10%
R5	J2X	.1 megohm ½ watt ± 10%
R6	AJ2X	2,000 ohms ½ watt ± 10%
R7	F2X	10,000 ohms ½ watt ± 10%
R8	DH2X	2 megohms ½ watt ± 10%
R8A	S3X	40,000 ohms 1 watt ± 10%
R9	H2X	50,000 ohms ½ watt ± 10%
R10	DJ3X	10 megohms 1 watt ± 10%
R11	AL3X	3 megohms 1 watt ± 10%
R12	O3X	½ megohm 1 watt ± 10%
R13	P2X	1 megohm ½ watt ± 10%
R14	BA2X	600 ohms ½ watt ± 10%

CONDENSERS

REF.	PART No.	DESCRIPTION
C1	C0013M	0.5 mF. 200 V.W.
C1A	D4405AD	10 mmF. ± 20%
C2	C0013M	.05 mF. 200 V.W.
C3	D0243BE	25 mmF. ± 20%
C4	C0013M	.05 mF. 200 V.W.
C5	D0243BU	3 mmF. ± 1.0 mmF.
C6	D0243Q	50 mmF. ± 20%
C7	D0243DA	475 mmF. ± 2%
C8	C0013N	.01 mF. 600 V.W.
C9	D4405W	100 mmF. ± 5%
C10	D4405W	100 mmF. ± 5%
C11	C0013I	.02 mF. 400 V.W.
C11A	C0013I	.02 mF. 400 V.W.
C12	D4405W	100 mmF. ± 5%
C13	D4405W	100 mmF. ± 5%
C14	D0243AV	200 mmF. ± 20%
C15	D0243C	.005 mF. ± 20%
C16	C0013Q	.1 mF. 200 V.W.
C17	D0243K	.001 mF. ± 10%
C18	C0013Q	.1 mF. 200 V.W.
C19	C0014CH	8 mF. 125V.
C20	C0013P	.25 mF. 200 V.W.
C21	C0014CJ	10 mF. 40V.

MISCELLANEOUS

REF.	PART No.	DESCRIPTION
VC1, VC2, VC3	C0430	3 Gang Condenser
VR1: S1	D2548	½ Megohm Potentiometer incorporating Switch
IFT.1	D2550	1st I.F. Transformer
IFT.2	D2319	2nd I.F. Transformer
T1	D2551	Output Transformer
L1	D2225	Loading Coil
L2	C0432	Loop Aerial
L3 L4	D2549	R.F. Coil
L5-L6	D2224	Oscillator Coil
TC.1	D2552	Mica Trimmer Condenser
TC.2	D2552	Mica Trimmer Condenser
TC.3	D2383A	Air Trimmer Condenser
SPKR.	C0429	8in. Permag. Speaker
	C0436/A	Perspex Dial
	D2537	Dial Pointer
	D1554•	Dial Cord Spring
	D2675	Control Knob (Ivory)
		Dial Cord, White, No. 1, 3ft. 8in.
	D2607	2-pin Plug
	D2609	3-pin Plug
		45 V. Battery, Eveready Type 482
		1.5 V. Battery, Eveready Type 745



CIRCUIT DIAGRAM OF MODEL B61A.