"His Master's Voice"

SERVICE MANUAL

for

FOUR-VALVE DUAL-WAVE VIBRATOR-OPERATED BATTERY RECEIVER

TABLE MODEL 848

CONSOLE MODEL 188

(Incorporating Chassis Type A456DM)

TECHNICAL SPECIFICATION

POWER SUPPLY:

6 volt 130 amp. hour Accumulator.

CONSUMPTION:

1 amp. at 6.0 Volts.

FREQUENCY RANGE:

Broadcast: 540 Kc/s to 1600 Kc/s.
Short-Wave: 16.5 Metres to 51 Metres.

I.F. FREQUENCY:

457.5 Kc/s.

VALVE COMPLEMENT:

1C7G	Converter.
1M5G	I.F. Amplifier.
1K7G	Demod.—AVC—A.F. Amplifier.
1L5G	Power.

DIAL LAMPS (2):

6.3 volts, 0.15 to 0.3 amps.

LOUDSPEAKER:

Model 848: 6in. Permagnetic.
Model 188: 10in. Permagnetic.
Voice Coil Impedance at 400 c.p.s.
6in. Speaker: 3.7 ohms.
10in. Speaker: 2.7 ohms.

DIMENSIONS:	Width	Height	Depth
Model 848	19in.	11¾in.	10-1/8in.
Model 188	32in.	29½in.	12in.

WEIGHT:	Gross	Net
Model 848	36 lbs.	29 lbs.
Model 188	69 lbs.	59 lbs.
Accumulator	56 lbs.	52 lbs.

CIRCUIT DESCRIPTION

These models incorporate a 4-valve vibrator-operated superheterodyne receiver for broadcast and short-wave reception.

FREQUENCY CHANGER:

The aerial, on the broadcast band, is coupled to the signal frequency circuit by means of the iron-dust core aerial transformer L1-L2. For short-wave reception, the short-wave aerial transformer L5-L6 is switched into circuit.

A pentagrid converter is employed as frequency changer. Fixed padding capacitors are used on both wave bands. A variable padding adjustment is provided on the broadcast band by means of an iron dust bolt in the broadcast oscillator coil L3-L4.

I.F. AMPLIFIER

The converter valve is transformer coupled to a super-control pentode, V2, which functions as an I.F. amplifier. The output of this amplifier is in turn transformer coupled to one of the diodes of the following valve. Both transformers are of the permeability tuned type.

DEMODULATOR-AVC-A.F. AMPLIFIER

The AVC diode is capacity coupled to the primary of the 2nd I.F. transformer. Full AVC is applied to the broadcast section of the converter whilst partial AVC is taken to the I.F. and A.F. amplifiers V2 and V3 respectively. AVC diode delay voltage is obtained from the voltage drop across the filaments of preceding valves in the series-parallel filament chain.

Signal demodulation is effected by the remaining diode. The input circuit of the pentode section of this valve may be switched to either the demodulator diode load R7 or to external pick-up terminals. Tone Control is effected, at this stage, by means of switch S2, which gives bass or treble cut as required, by switching appropriate condensers.

The output circuit is resistance-capacity coupled to the grid of the pentode power output valve V4.

POWER STAGE

The output of the power valve is coupled to the speaker by transformer T2. Negative feedback voltage is taken from the secondary of the transformer and fed into the tap of the volume control VR1, through a resistor. This arrangement provides negative feedback over the whole of the audio frequency system. By advancing the volume control setting for higher gain, the feedback factor is reduced. A phasing network comprising R19, C39 is connected across the transformer primary.

Correct matching of the speaker to the power valve is obtained by selecting the appropriate tap on the transformer secondary.

HIGH TENSION SUPPLY

High tension voltage is obtained by means of a synchronous vibrator and associated transformer and filters, the whole being incorporated on a sub-chassis which is shock-mounted on the main receiver chassis. The vibrator cartridge is readily accessible by removing the rubber-lined metal cover enclosing it. The vibrator input circuit is protected by a 5 amp. fuse in the positive side of the circuit. A double-pole single throw switch — combined with the Volume Control—controls the vibrator and valve filament circuits.

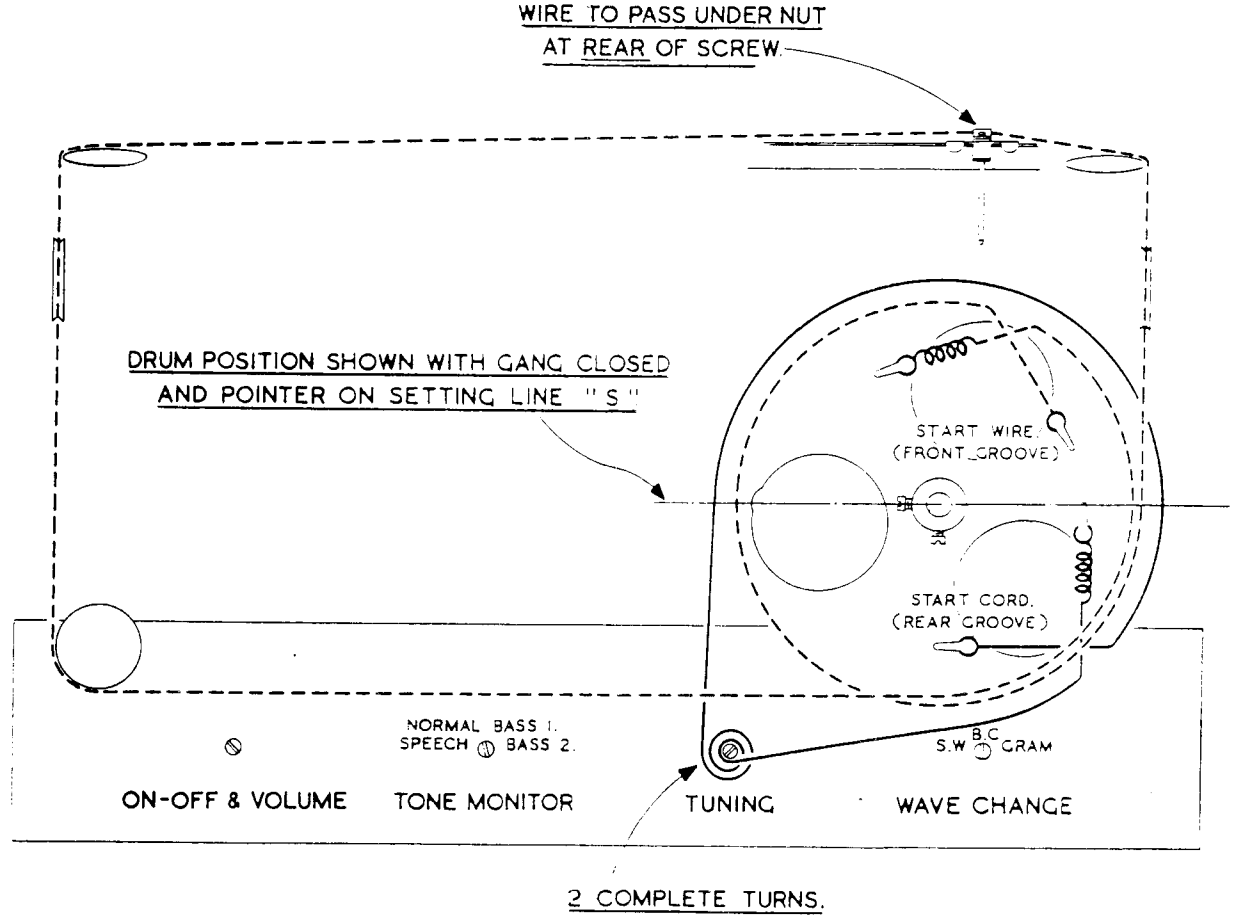
DISMANTLING

MODEL 848

1. Disconnect battery leads.
2. Remove control knobs.
3. Disconnect dial lamp switch plug from chassis.
4. Unscrew two chassis holding screws.
5. Withdraw chassis.

MODEL 188

1. Disconnect battery leads.
2. Remove control knobs.
3. Disconnect speaker and dial lamp switch plugs from chassis.
4. Unscrew two chassis fixing nuts and withdraw bolts.
5. Withdraw chassis.



— DIAL CORD ARRANGEMENT —

RECEIVER ALIGNMENT PROCEDURE

In any case where a component replacement has been made in either the tuned I.F. or R.F. circuits of a receiver, all circuits must be re-aligned, and even if only one coil has been serviced, the whole of the re-alignment should be done 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 about 0.5 volt.

I.F. ALIGNMENT

1. Rotate the volume control fully clockwise, set Tone Monitor switch to "Normal," and the wave-change switch to "Broadcast" (centre) position and fully enmesh the tuning condenser vanes. Connect the output leads of signal generator to the cap of the 1C7G converter valve, through a 0.1 mF. condenser; do not remove grid lead of the converter valve.
2. Tune signal generator to exactly 457.5 Kc/s.
3. Adjust the I.F. transformer trimmer screws for maximum reading on output meter, commencing with the second I.F. transformer and following with the first.
4. Continue this alignment on each transformer 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 iron cores. Start alignment of each individual transformer by first screwing its core well out, and then advancing core into the coil until resonance is obtained.

R.F. ALIGNMENT (BROADCAST)

1. With controls set as for I.F. alignment, connect signal generator output leads in series with a 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, marked "S," on the extreme right of the dial scale. If necessary, the pointer may be adjusted to this position by loosening the cord securing screw provided.
3. Tune signal generator to 600 Kc/s.
4. Rotate tuning knob until the pointer is exactly over 600 Kc/s calibration mark and adjust the oscillator padder screw for maximum response.
5. Rotate tuning knob until the pointer coincides with the 1500 Kc/s calibration mark and adjust the oscillator trimmer and aerial trimmer in turn for maximum response.
6. Repeat operations (3) to (5) inclusive for proper alignment.

R.F. ALIGNMENT (SHORT-WAVE)

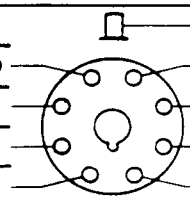
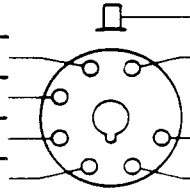
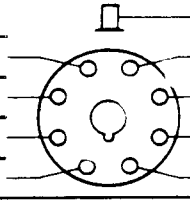
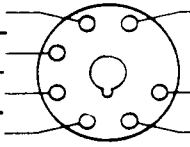
1. Set wave-change switch to "Short-Wave" (clockwise) position. Remove the 200 mmF. condenser from the output lead of the signal generator and replace with a 400 ohm non-inductive resistor; connect to the aerial terminal as before.
2. Rotate tuning knob until the pointer coincides with the 17 metres calibration mark.
3. Tune signal generator to 17 metres (17.65 Mc/s.).
4. Adjust S-W oscillator trimmer for maximum output. Two settings will be found at which this trimmer will peak; care must be taken that the setting finally selected is that which gives the lower capacity. Failure to select the correct position of the two will cause serious tracking error and loss of sensitivity.
5. Adjust S-W aerial trimmer for maximum output whilst "rocking" the gang condenser slightly to obtain the true resonance point.
6. Note that the signal is still tuned in correctly on the dial; if not, readjust S-W oscillator trimmer slightly until dial reads correctly, and repeat operation (5).

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 VOLTAGE OF 6·0 VOLTS, 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	1C7-G	CONVERTER			
					GRID	——	——	4·0 MEG Ω
60	3·0	INFIN.	SCREEN GRID		OSC. GRID		——	50,000 Ω
130	1·8	INFIN.	PLATE		OSC. ANODE	95	2·9	INFIN.
1·96	0·12 AMP.	——	HEATER +		HEATER −	NIL	0·12 AMP.	NIL
			NO CONN.		NO CONN.			
			V2	1M5-G	I.F. AMPLIFIER			
					GRID	——	——	1·0 MEG Ω
60	0·8	INFIN.	SCREEN GRID		NO CONN.			
130	2·5	INFIN.	PLATE					
1·96	0·12 AMP.	——	HEATER +		HEATER −	NIL	0·12 AMP.	NIL
			NO CONN.		NO CONN.			
			V3	1K7-G	AUDIO AMPLIFIER-DEMODULATOR-A.V.C.			
					GRID	——	——	1·5 MEG Ω
——	——	2 MEG Ω	DIODE (A.V.C.)		DIODE (DET.)	——	——	0·55 MEG Ω
35	0·32	INFIN.	PLATE		SCREEN GRID	50	0·14	INFIN
3·92	0·12 AMP.	——	HEATER +		HEATER −	1·96	0·12 AMP.	——
			NO CONN.		NO CONN.			
			V4	1L5-G	OUTPUT AMPLIFIER			
130	1·2	INFIN.	SCREEN GRID		GRID	——	——	1·0 MEG Ω
125	5·7	INFIN.	PLATE					
5·88	0·24 AMP.	——	HEATER +		HEATER −	3·92	0·24 AMP.	——
			NO CONN.		NO CONN.			

REMARKS :-

H.T. VOLTS	=	130 VOLTS.
H.T. CURRENT	=	18·3 MA.
TOTAL FILAMENT VOLTAGE	=	5·88 VOLTS.
TOTAL FILAMENT CURRENT	=	0·24 AMP.
TOTAL BATTERY DRAIN	=	1·0 AMP. AVERAGE CURRENT.

PARTS LIST

RESISTORS

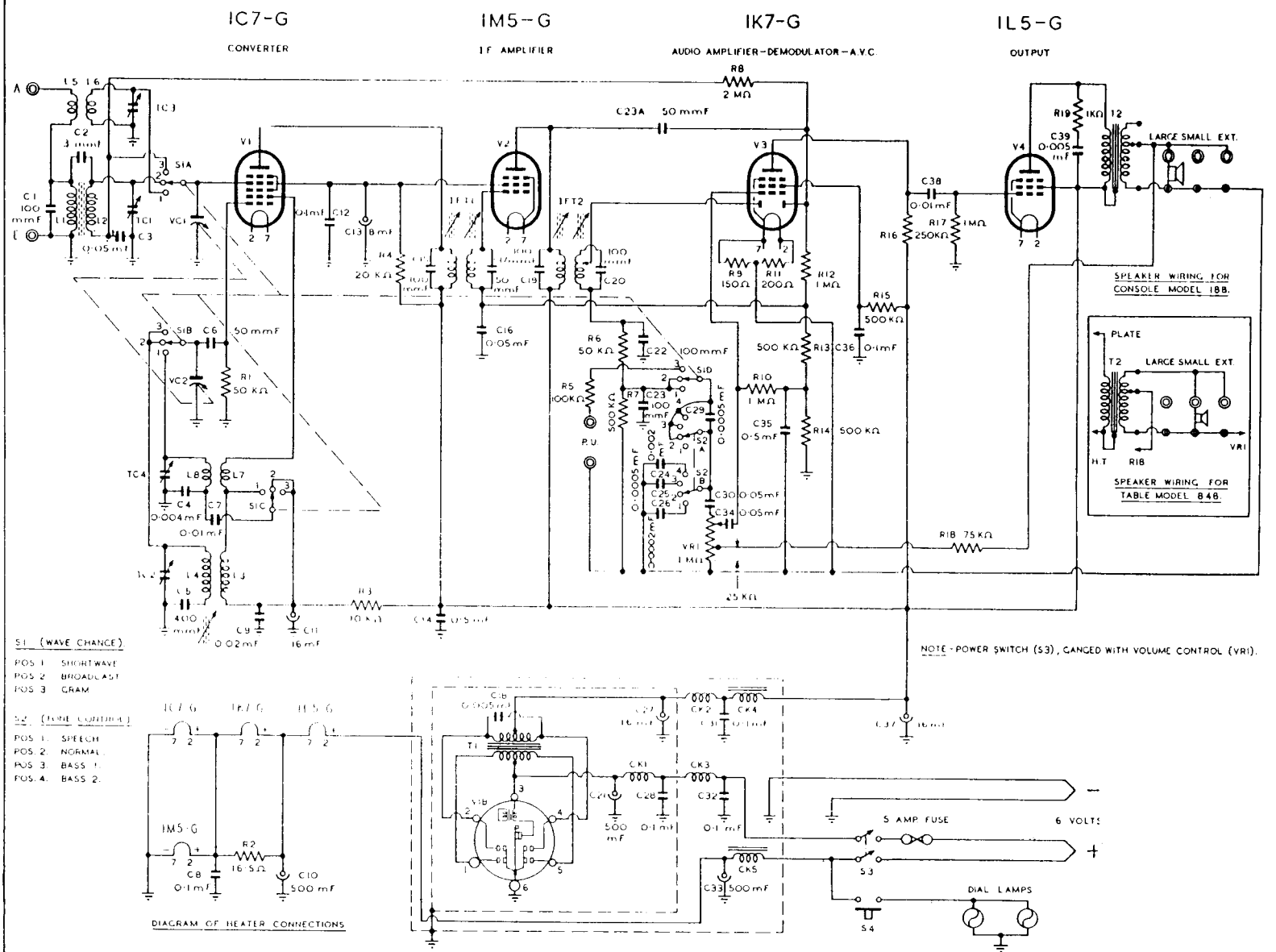
REF.	PART No.	DESCRIPTION
R1	H1X	50,000 ohms ¼ watt ± 10%
R2	AWW3V	16.5 ohms 1 watt ± 5%
R3	F3X	10,000 ohms 1 watt ± 10%
R4	V3X	20,000 ohms 1 watt ± 10%
R5	J1X	100,000 ohms ¼ watt ± 10%
R6	H1X	50,000 ohms ¼ watt ± 10%
R7	O1X	500,000 ohms ¼ watt ± 10%
R8	AA1X	2 megohms ¼ watt ± 10%
R9	YW2V	150 ohms ½ watt ± 5%
R10	P1X	1 megohm ¼ watt ± 10%
R11	AHW2V	200 ohms ½ watt ± 5%
R12	P1X	1 megohm ¼ watt ± 10%
R13	O1X	500,000 ohms ¼ watt ± 10%
R14	O1X	500,000 ohms ¼ watt ± 10%
R15	O3X	500,000 ohms 1 watt ± 10%
R16	N3X	250,000 ohms 1 watt ± 10%
R17	P1X	1 megohm ¼ watt ± 10%
R18	AN1X	75,000 ohms ¼ watt ± 10%
R19	D1X	1,000 ohms ¼ watt ± 10%

CONDENSERS

REF.	PART No.	DESCRIPTION
C1	D0243P	100 mmF. ± 10%
C2	D0243BU	3 mmF. ± 0.5 mmF.
C3	C0013M	0.05 mF. 200V.
C4	D0243CQ	0.004 mF. ± 100 mmF.
C5	D0243AM	400 mmF. ± 5 mmF.
C6	D0243Q	50 mmF. ± 10%
C7	C0013N	0.01 mF. 600V.
C8	C0013Q	0.1 mF. 200V.
C9	C0013I	0.02 mF. 400V.
C10	C0014AV	500 mF. 12 P.V.
C11	C0014BA	16 mF. 350 P.V.
C12	C0013Q	0.1 mF. 200V.
C13	C0014AZ	8 mF. 350 P.V.
C14	C0013A	0.5 mF. 400V.
C15	D4405W	100 mmF. ± 5%
C16	C0013M	0.05 mF. 200V.
C17	D4405X	50 mmF. ± 5%
C18	C0013AK	0.005 mF. 600V.
C19	D4405W	100 mmF. ± 5%
C20	D4405W	100 mmF. ± 5%
C21	C0014AV	500 mF. 12 P.V.
C22	D0243P	100 mmF. ± 10%
C23	D0243P	100 mmF. ± 10%
C23A	D0243Q	50 mmF. ± 10%
C24	D0243H	0.002 mF. ± 10%
C25	D0243L	0.0005 mF. ± 10%
C26	D0243CY	0.0002 mF. ± 10%
C27	C0014BA	16 mF. 350 P.V.
C28	C0013Q	0.1 mF. 200V.
C29	D0243L	0.0005 mF. ± 10%
C30	C0013M	0.05 mF. 200V.
C31	C0013Q	0.1 mF. 200V.
C32	C0013Q	0.1 mF. 200V.
C33	C0014V	500 mF. 12 P.V.
C34	C0013M	0.05 mF. 200V.
C35	C0013L	0.5 mF. 200V.
C36	C0013Q	0.1 mF. 200V.
C37	C0014BA	16 mF. 350 P.V.
C38	C0013N	0.01 mF. 600V.
C39	C0013AP	0.005 mF. 2000V. ± 10%

MISCELLANEOUS

REF.	PART No.	DESCRIPTION
VC1,VC2	C0159A	2 Gang Condenser
VR1: S3	D2350	1 Megohm Potentiometer (Tapped at 25,000 ohms) incor. Switch
S1	D2346	4-Pole 3-Position Switch
S2	D2351	2-Pole 4-Position Switch
S4	D1361B	Push Button Switch
IFT.1	D1985	1st I.F. Transformer
IFT.2	D1987	2nd I.F. Transformer
T1	D2317	Vibrator Transformer
T2	D2318	Output Transformer
CK1	D5624	L.T. R.F. Choke
CK2	D5623	H.T. R.F. Choke
CK3	D1438	L.T. R.F. Choke
CK4	D2228	H.T. Filter Choke
CK5	D1452	L.T. Filter Choke
L1 & L2	D1614D/2	B/C Aerial Coil
L3 & L4	D2224	B/C Oscillator Coil
L5 & L6	D2321/1	S/W Aerial Coil
L7 & L8	D2320	S/W Oscillator Coil
TC.1	D2395	Air Trimmer Condenser
TC.2	D2395	Air Trimmer Condenser
TC.3	D2395	Air Trimmer Condenser
TC.4	D2395	Air Trimmer Condenser
VIB.	D2259	Vib. Cartridge V5124A
	D2420	10in. Permag. Speaker
	D2419	6in. Permag. Speaker
	C0371	Dial Glass
	D2335	Dial Pointer
	D0873	Dial Cord Spring
	D2394	Control Knob
		Dial Lamps. 6.3V. 0.25A. S.C.
		Dial Cord. White No. 1 2ft. 6in.
		Dial Wire (Cored and Braided). 6ft. 6in.
		5 Amp. Fuse Wire, 38 SWG. T.Cu.
		Dial Cord Lug H238



CIRCUIT DIAGRAM OF MODELS 848 AND 188, INCORPORATING CHASSIS TYPE A456DM.