

PRIVATE AND CONFIDENTIAL TO THE TRADE ONLY

MARCONIPHONE SERVICE MANUAL



1933 SERIES. No. 6.

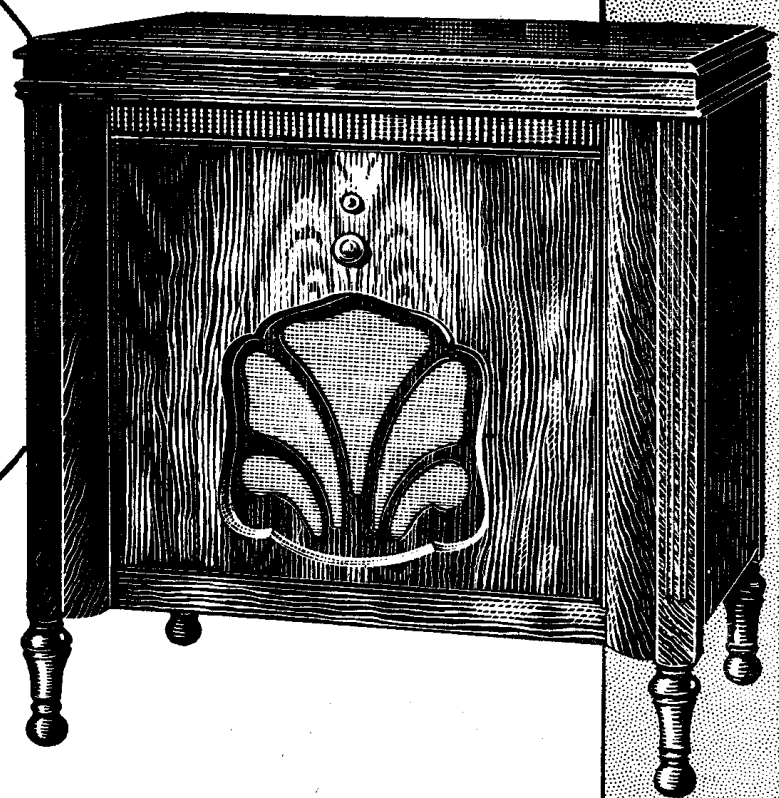
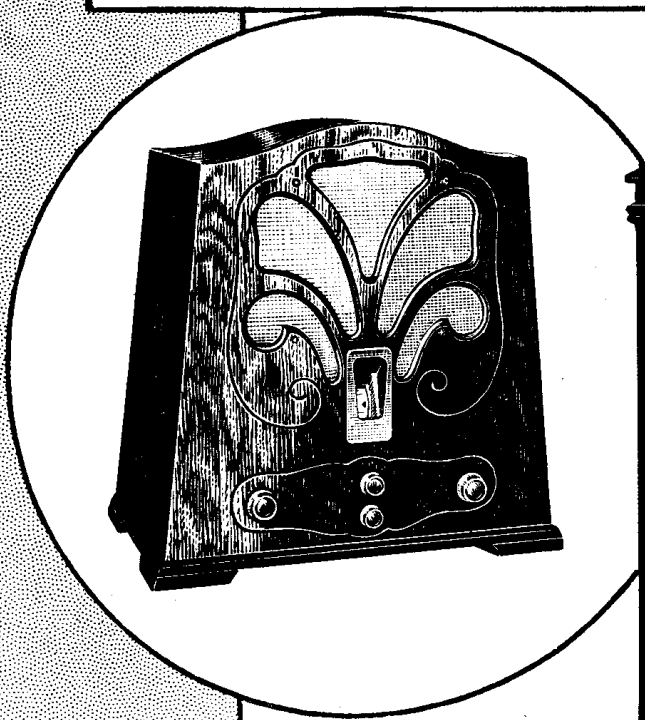
JANUARY, 1933

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Model 256. 7-VALVE TRANSPORTABLE for A.C. MAINS.
Model 258. 7-VALVE AUTO. RADIO-GRAM. for A.C. MAINS.

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256-
258
A.C.

THE INFORMATION CONTAINED IN THIS MANUAL APPLIES EQUALLY TO MODELS 256 AND 258, WITH THE EXCEPTION OF THE SPECIFICATION AND INSTRUCTIONS FOR DISMANTLING FOR MODEL 258, WHICH ARE GIVEN SEPARATELY ON PAGE 17.

BRIEF SPECIFICATION. (Model 256 only.)

VOLTAGE RANGE.

200 to 250 volts (A.C.).

FREQUENCY RANGE.

50 to 100 cycles .

This instrument is designed to work only on the voltages for which it is adjusted. Should any variation be experienced the supply company must be notified immediately.

POWER CONSUMPTION.

Approximately 95 watts.

FUSES.

This instrument must not be connected to a supply which is "fused" for more than $2\frac{1}{2}$ amperes (working current).

SPEECH OUTPUT.

$2\frac{1}{2}$ watts (undistorted).

15 watts (anode dissipation of PX 4 output valve).

WAVELENGTH RANGE.

Medium waves—200 to 550 metres.

Long waves—900 to 2,000 metres.

DIMENSIONS.

Overall Height.

20 inches.

51 cm.

Overall Width.

$18\frac{3}{4}$ inches.

47.5 cm.

Overall Depth.

12 inches.

30.5 cm.

WEIGHT.

Net weight,

50 lbs.

22.7 kg.

Weight packed,

70 lbs.

31.7 kg.

LOUDSPEAKER.

Electro-magnetic moving coil type.

For connections of cable see page 4.

CIRCUIT DESCRIPTION. (Both Models.)

Aerial Coupling

Pre-set compensating condenser TC 5 (to be set on installation) aligns the first tuned circuit (L 1, L 2, VC 1) of a magnetically coupled band pass filter, the secondary of which (L 3, L 4, VC 2) tunes the grid of :—

Ist High-Frequency Amplifier

(Marconi VMS 4). A Variable Mu valve having bias control by VR 1, and choke capacity coupled (L 15, C 4) to the :—

1st Detector Valve (Mixer)

(Marconi MS 4). An anode bend detector with tuned grid circuit (L 5, L 6, VC 3) and biased by a cathode resistance (R 4) common to the Oscillator.

Oscillator

(Marconi MH 4). Tuned grid (L 7, L 8 and VC 4) magnetically coupled to the grid circuit of the 1st detector valve, in the anode of which is the primary (L 11, TC 1) of the 1st band pass I.F. transformer, the secondary (L 12, TC 2) being connected to the grid of:—

Intermediate Frequency Amplifier

(Marconi VMS 4). A Variable Mu valve with bias control by VR 1, coupled by second I.F. transformer to:—

2nd Detector

(Marconi MH 4). An anode bend detector with cathode bias resistances (R 10, R 11), the bias being reduced for "gramophone" by the shorting out of R 11. This valve is resistance capacity coupled (R 12, C 12) to the intervalve transformer (T 1) the secondary of which is connected to:—

Power Output

(Marconi PX 4). Biassed by R 15 connected to centre point of filament potentiometer (VR 3), which also acts as a **hum control**. The output transformer T 3 (which is mounted on the loudspeaker) is in the anode circuit of this valve.

Rectifier

(Marconi U 12). This valve supplies the high-tension current for all stages, and energising current for the loudspeaker field.

WARNING.

Marconi valves have been selected for these instruments because of their high performance and special electrical characteristics. Inferior performance or actual damage may result if valves other than the specified Marconi valves are employed.

CONTROLS.

Tuning. Four gang condenser tuning 1st band pass filter, 1st detector and oscillator grid circuits.

Switch. Four position-wave-range, gramophone and main "ON—OFF."

Brilliance or tone. Variable resistance VR 4 in series with C 19 connected to grid of output valve (V 6).

Volume. Radio and gramophone volume controls VR 1 and VR 2 are coupled together and operated by one knob. The 20,000-ohm potentiometer (VR 1) in the cathode circuits of V 1 and V 4 controls the bias on these Variable Mu valves.

EXTRA LOUDSPEAKERS.

Up to two extra **low resistance** moving coil speakers may be connected to the extra loudspeaker sockets without appreciable drop in volume. **High resistance speakers** may be connected across terminals 3 and 4 of the output transformer panel (on loudspeaker), but great care must be taken to insulate the leads and terminal points thoroughly as terminals 3 and 4 are at 300 volts potential above earth. Always connect the positive (+) terminal of the speaker to terminal 3.

PICKUP.

A high resistance pickup may be connected to the pickup sockets; the connecting lead must be metal screened and the screening connected to earth. The volume control incorporated in the set will control the strength of record reproduction. If, however the pickup is already fitted with a volume control this should be used to control the strength of record reproduction, the control on Model 256 being set to maximum. **THE MARCONIPHONE PICKUP IS PARTICULARLY RECOMMENDED.**

FAULT FINDING TABLE.

Symptom.	Possible Causes.	Tests.
NO RADIO OR GRAM Valves and pilot lamp do not light Pilot lamp and valves light	Defective mains transformer or mains lead ... Damaged valves Defective smoothing Disconnection in loudspeaker cable or output transformer.	Continuity tests 22, 23, 24, 25 (page 15). See valve tables (page 12). Continuity test 20. Continuity tests 26, 27, 28, 29 (page 15).
GOOD GRAM, NO RADIO	Faulty valves Faulty tuning circuits	See valve tables (page 12). Continuity tests (page 14). See also page 8.
GOOD RADIO, NO GRAM.	Faulty volume control VR 2 or wiring ... Damaged pickup. Switch contacts J and K not opening	Test VR 2. Examine.
OSCILLATION ON RADIO.	Earth wiring disconnected or wrongly connected.	See page 8.
WEAK RADIO	Set out of gang (flat tuning) Defective valves	See page 10. See valve table (page 12).
WEAK GRAM	Switch contacts N and P not opening... ..	Examine.
HUM	See page 8.	
CRACKLE OR BUZZ ...	See page 9.	

DISMANTLING. (Model 256 only.)

Dismantling Instructions for Model 258 are given on page 18.

REPLACEMENT OF PILOT LAMP.

1. Disconnect instrument from mains and remove back.
2. Remove pilot lamp holder which is clipped to end plate of ganged condenser.
3. Renew lamp with 6-volt screw-in type, and replace holder, being sure that the leads do not foul the wavelength scale.

REMOVAL OF CHASSIS.

1. Remove knobs and back of cabinet.
2. Loosen cleat holding loudspeaker cable to front of cabinet, and disconnect cable from terminal panel on speaker.
3. Remove 4 hexagon-headed screws from underside of cabinet and remove transit screws (if still in place).
4. Withdraw chassis from cabinet.

REMOVAL OF LOUDSPEAKER.

1. Disconnect loudspeaker cable (if still connected).
2. Remove four nuts (inside cabinet) holding loudspeaker.

Note.—Do not unscrew cross-headed screws at front of cabinet.

The loudspeaker cable should be connected as follows :—

On Chassis.	Wire Colour.	On Loudspeaker.
Terminal C	Green.	Terminal 1.
„ B	White.	„ 3.
„ A	Yellow.	„ 4.
„ 24	Black.	„ 5.
„ 25	Red.	„ 6.

REPLACING CONDENSER CORD DRIVE. (See Fig. 1.)

The cord drive is the same on each model.

1. (Model 256 only.) Remove VR 4 as far as wiring will permit.
2. Procure a piece of flax fishing line (breaking strain approx. 40 lbs.). This may be obtained from

E.M.I. Service, Ltd.,

Sheraton Works,

Hayes, Middlesex.

Telephone : Southall 2468.

Please quote Specification S. 515.

Approximate length for one instrument 27 inches.

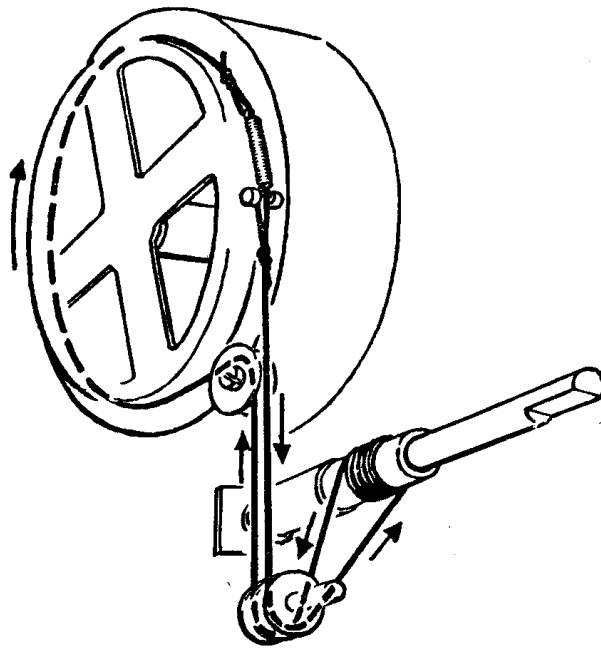


Fig. 1.

3. Double back 1 inch of cord and tie a knot so that a loop end is formed.
4. Fully disengage condenser vanes and turn tuning control spindle as far as possible in an anti-clockwise direction.
5. Put the loop end of cord over small stud on condenser drum and wind cord in the direction indicated by arrows.

A STIFF PIECE OF COPPER WIRE WITH A HOOKED END WILL BE FOUND USEFUL IN MANIPULATING THE CORD.

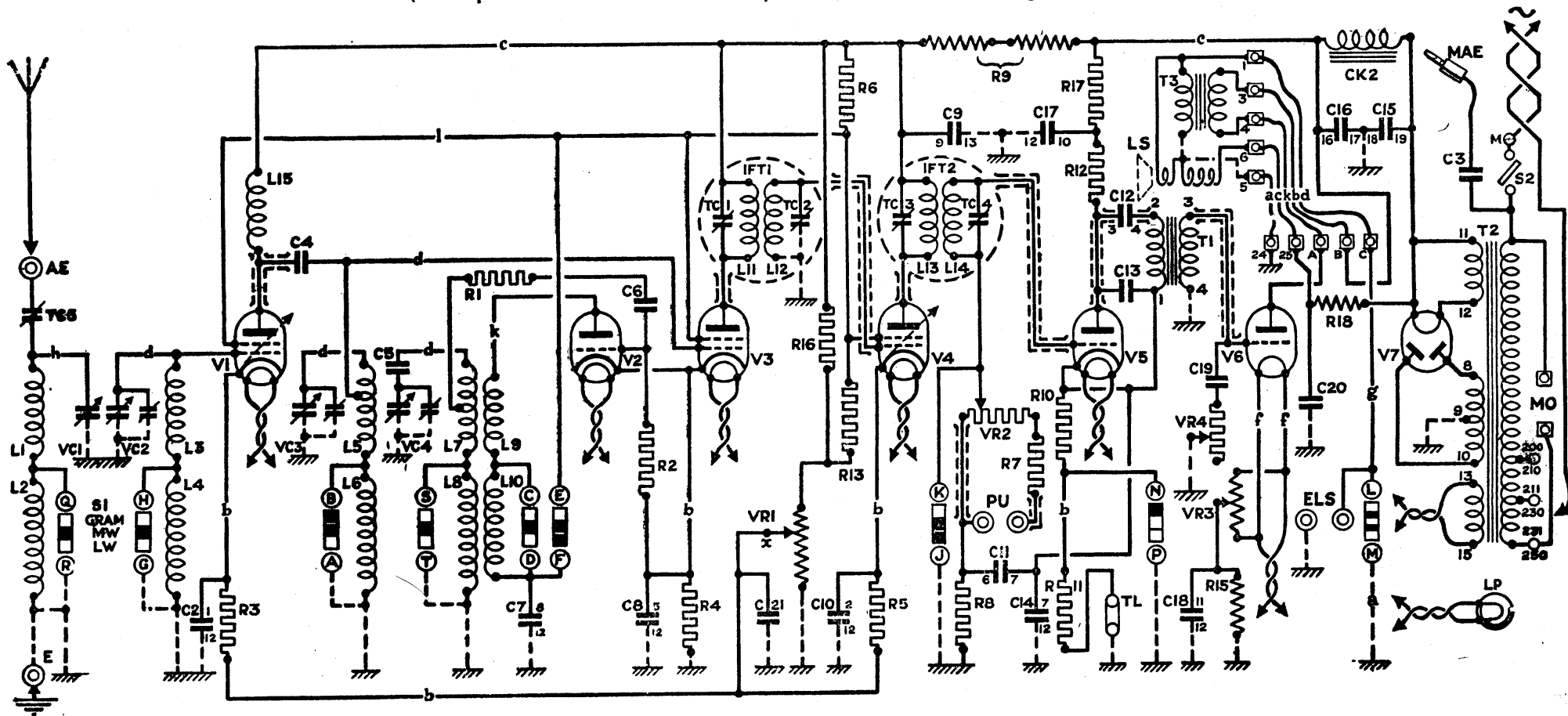
There should be six complete turns on the tuning control spindle, which should not overlap one another.

IMPORTANT.—The tuning control spindle must be kept in its anti-clockwise stop position while cord is being assembled.

6. Pull cord tight, double back 1 inch, and tie a knot so that a loop is formed on end. The loop end should be made so that the coils of tension spring are opened when spring is hooked on to stud. In this way a constant tension is exerted on the cord.
7. Check over the wavelength readings by tuning to a medium wave station of known wavelength. If the pointer does not register accurately, adjust by slacking off grub screws fixing wavelength drum to condenser spindle, and repositioning drum.

THEORETICAL CIRCUIT DIAGRAM.

(Component numbers correspond with those in Figs. 3 and 4.)



An additional resistance (R19—450 ohms) may be found in series with CK 2. Its position in the above circuit will be between right hand end of CK 2 and lug 19 of C 15.

Fig. 2.

WIRING COLOUR CODE.

(The circuit diagram is coded with the small letters.)

a	Black	...	...	...	...	...	Earth.
b	White	...	...	...	...	...	Cathode.
c	Red	...	...	...	...	...	H.T. positive.
d	Green	...	...	...	...	...	Grid.
e	Blue	...	...	...	...	...	Pickup.
f	Brown	...	...	...	...	...	Heaters.
g	Pink	...	...	...	...	...	Loudspeaker.
h	Purple	...	...	...	...	...	Aerial.
j	Orange	...	...	...	...	...	Mains.
k	Yellow	...	...	...	...	...	Anode.
l	Yellow with Red Tracer	...	...	...	...	...	Screen of screen grid valve.
p	Green with Red Tracer	...	...	...	...	...	Bottom of grid circuit not direct to earth.
r	Green with White Tracer	...	...	...	...	...	Mid position of tuning coil.

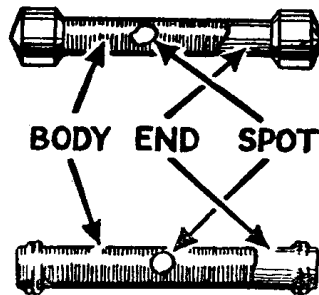
RESISTANCE COLOUR CODE.

Resistances are coded with three colours :—

- BODY colour indicates 1st figure.
- END colour indicates 2nd figure.
- SPOT colour indicates additional 0's.

BODY and END Colours.
(1st and 2nd figures.)

- 0 Black.
- 1 Brown.
- 2 Red.
- 3 Orange.
- 4 Yellow.
- 5 Green.
- 6 Blue.
- 7 Violet.
- 8 Grey.
- 9 White.



SPOT Colours.
(Additional 0's.)

- .0 Black.
- 0. Brown.
- 00. Red.
- 000. Orange.
- 0,000. Yellow.
- 00,000. Green.

Examples :—

BODY—brown, END—blue, SPOT—red	...	...	...	1,600 ohms.
Orange (whole resistance)	...	...	...	33,000 ohms.
BODY—green, END—black	...	...	...	5,000,000 ohms.
BODY—red, END—violet, SPOT—black	...	...	...	27.0 ohms

All values must be read in three figures, thus an all orange resistance equals—orange body (3), orange end (3) and orange tip (000).

Note.—An additional white spot may be found on resistances. THIS HAS NO BEARING ON THE RESISTANCE VALUE.

LOCATION OF FAULTS AND GENERAL TESTING.

Make sure that the loudspeaker magnet is being energised by applying a screwdriver near the pole-piece. Correct feed for loudspeaker field 25 milliamps. Ascertain that speech circuit is correct by momentarily contacting a *small* battery across terminals 1 and 5 while the field is energised. This should produce a definite sound in the speaker. See that all connecting leads are securely connected and are continuous.

The loudspeaker cable should be connected as shown on page 4.

First test the instrument on gramophone. If "gram" results are good but radio is poor, the fault will be found in that part of the circuit preceding V 5.

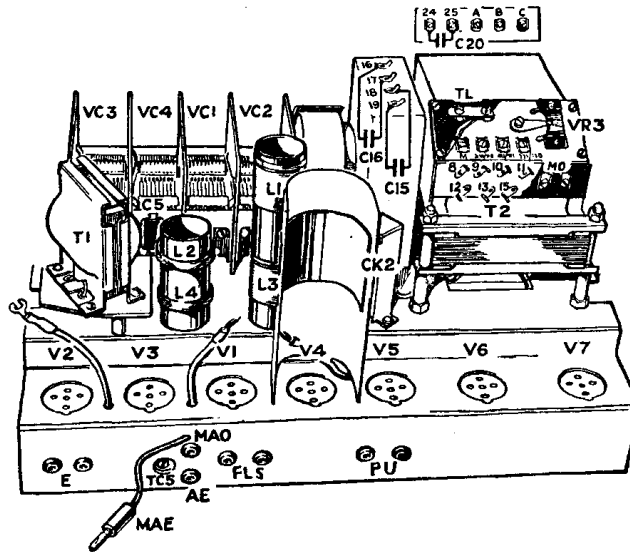


Fig. 3.
Top Components of Radio Unit.

A progressive contacting of the aerial plug on to the following points may help to locate a fault in the radio portion of the receiver. Follow these tests through in the order given, first setting the instrument to the wave-length of the local station and turning the volume control three-quarters full on.

Test Point.	Components eliminated and tests to make.	Correct Results.
Fixed vanes VC 1	TC 5	Normal results.
Fixed vanes VC 2	Tuning circuit L 1, L 2, VC 1—Continuity Test 1 ...	Loud results.
Anode V1	Tuning circuit L 3, L 4, VC 2—Continuity Test 2... ..	Weak but clear results.
Fixed vanes VC 3	L 15, C 4, also V 1 and all its associated feed, bias, etc., components. Continuity Tests 13 and 14. See also valve tables.	Weak but clear results.

HUM.

If the hum is very bad examine grid of V 5 for disconnection. (See Test 9.)

The Filament wiring may be "earthing"—test anode feed of V 6. (See Test No. 23.)

Test CK 2 for short-circuited turns (Test 20) and C 16 and C 17 for complete or partial breakdown.

See that hum control (VR 3) is correctly set.

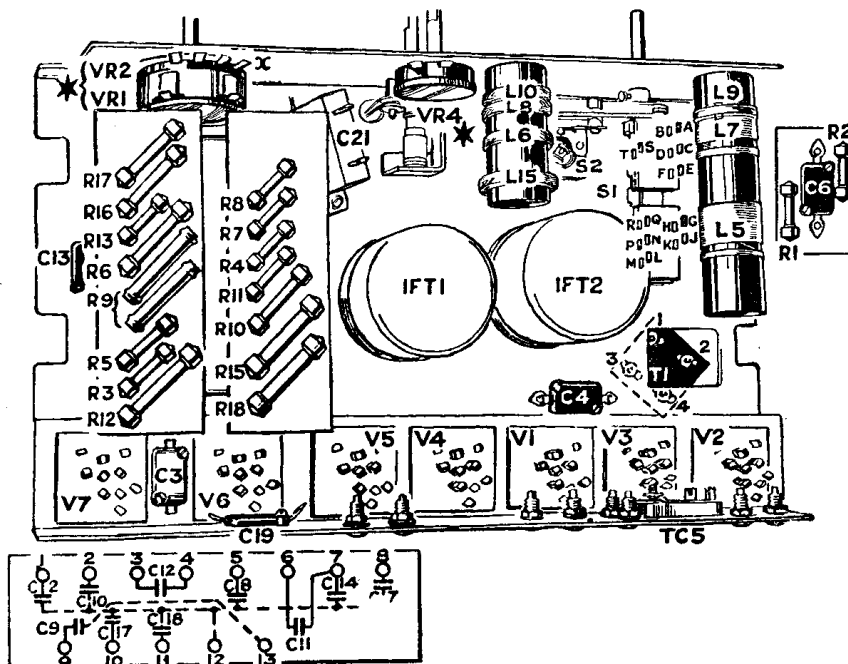
CRACKLE OR BUZZ.

This may be caused by

- (a) A condenser breaking down.
- (b) Bad connection or dry joint.
- (c) A faulty non-inductive resistance. (Try continuity tests.)
- (d) Speech coil rubbing on pole pieces. (See Speaker Manual, available shortly.)
- (e) Bad contact at valve legs or inter-electrode contact in valves. (Clean valve legs or try new valves.)
- (f) Loose components (mechanical rattle).

In Model 256 a potential source of rattle is the wave-range indicator scale. This may be adjusted by means of the two screws in the supports immediately under the guide bar. Unscrew these screws until the correct pressure is exerted by the spring (at the back) on to the ball bearings to afford free movement of the guide bar without too much play.

See also notes on interference, page 19.



* **NOTE.**—In model 258 VR 4 will be found in the position of VR 1 and 2 and VR 1 and 2 assembly mounted on front (inside) of cabinet.
The additional resistance R 19 (see Circuit Diagram) will be between R 18 and R 15.

Fig. 4.
Bottom Components of Radio Unit.

CONDENSER BREAK-DOWN.

Remove all valves except rectifier (U 12) and disconnect speaker field (black or red wire). By removing black wire from terminal 9 on mains transformer (T 2) and inserting milliammeter between wire and terminal, the leakage current through the screen grid potentiometer network (R 6, R 13, R 16, VR 1) can be measured. The reading should be approximately 7 milliamps.†

If this reading is considerably exceeded, it is evident that either one or more of the smoothing or anode by-pass condensers (such as C 15, C 16, C 17, C 9, etc.) are broken down, or that there is an "earth" somewhere in the H.T. feed system.

If the reading is **low** or if there is no reading at all suspect R 6, R 13, R 16 or VR 1.

†**Note.**—This value is considerably higher than the **actual** value. The voltage rises to approximately 500 volts (main H.T. test point) due to the valves being out.

H.F. TESTS AND ADJUSTMENTS.

INSTABILITY.

If instability is encountered, i.e., the set oscillates and causes a whistle in the loudspeaker similar to a straight set, carefully examine all earth leads for disconnection. See also that the screening of all H.F. leads is connected to chassis (earth).

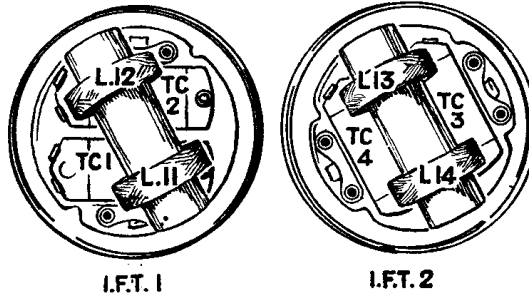


Fig. 5.

Location of Components in Intermediate Frequency "Cans."

Where new coils have been fitted, the earth wiring **MUST BE REPLACED EXACTLY AS IT WAS**, otherwise instability may result. (See Fig. 6.)

Unless adequate test equipment is available it is suggested that replacement of coil units L 6, 8, 10 and 15 should not be attempted, as this work entails considerable knowledge of the instrument.

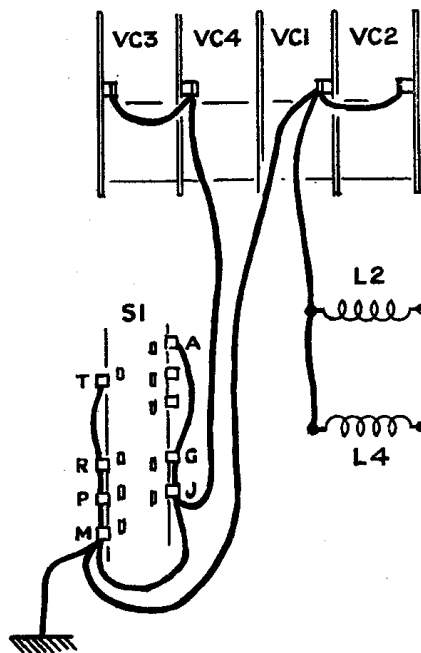


Fig. 6.

Correct Connection of Earthing Leads.

TRIMMING OF I.F. TRANSFORMERS.

If a new unit is fitted to an I.F. transformer such as L 11 and L 12, the circuits should be re-trimmed. A local modulated oscillator is most useful for this work as it supplies a signal of constant power, frequency and note.

Note.—Care should be taken when making adjustments to trimming condensers that the screwdriver has an insulated handle and that the blade does not touch the chassis. A piece of insulating tape wrapped round the blade will prevent this.

TO TRIM WITH AN OSCILLATOR.

Remove V 2 and put switch in MW position. Set the oscillator to 125 Kc. and loosely couple to set by a coupling coil lying on bench or anywhere adjacent to L 5, 7 and 9. Measurement of output is best made with an output meter which may be a 0-5 milliammeter connected in place of the test link TL. Alternatively, an AC milliammeter (0-25 M.A. scale) may be connected across the extra loudspeaker sockets. Output can, however, be judged by the ear, but not as well as by a meter. Adjust the trimmers for maximum response in the following order :—

1. TC 3 ... Top left screw.
2. TC 4 ... Bottom left screw.
3. TC 1 ... Bottom right screw.
4. TC 2 ... Top right screw.

Positions given viewing chassis from back.

Now set the oscillator to 128 Kc. and retrim No. 3 (TC 1). Reset oscillator to 125 Kc. and retrim No. 4 (TC 2). Go over TC 3 and 4 again in the same order to verify the setting, **but do not touch No. 3 (TC 1) setting.**

TRIMMING ON SIGNALS.

Tune in a weak station of between 250 and 350 metres, preferably in daylight so that there is no possibility of fading. Where only one I.F. transformer has been renewed or repaired, adjust the trimmers on the new I.F. transformer for maximum, but do not touch the trimmers on the other I.F. transformer. If it is IFT 2 which has been renewed, the trimming should now be left, but if it is IFT 1, TC 1 must be unscrewed **one half-turn**, and TC 2 screwed up a fraction of a turn. An A.C. milliammeter connected to the loudspeaker sockets cannot be used to measure broadcast signals.

To ascertain that the intermediate frequency is approximately correct (125 Kc.) tune in to Northern Regional (480 metres). Now advance the volume control until past overloading point and a strong whistle should be heard when the tuning control is moved this way and that.

REGANGING OF TUNING CONDENSERS.

Where any tuning coils such as L 1 and L 3 have been replaced or new wiring inserted, the trimmers on the ganged condenser must be adjusted. A local modulated oscillator and an output meter or an ordinary signal may be used (see "Trimming I.F. Transformers"). Unscrew all trimmers to minimum.

It is best to gang roughly first on the local station (or a powerful signal from the oscillator) at approximately 250 metres. Adjust trimmer on VC 4 first, then on VC 2, and lastly on VC 3. Now tune to a faint signal of not more than 220 metres and adjust trimmer of VC 4 more carefully.

Note. Maximum signals may be obtained at two distinct settings of this trimmer, but the setting where the trimmer is nearest to minimum (unscrewed) **must be used.** Now tune to a faint signal of between 250 and 300 metres and carefully adjust trimmers on VC 2 and VC 3 for maximum response. **Never attempt to gang on long waves**, and remember that when the signal **overloads** the set, the sound output **falls.**

Be very careful not to bend or disarrange the wires just under the end of the chassis and adjacent to L 5, 7 and 9, or the set may be thrown out of gang.

VALVE TESTING.

Before taking any other readings it is advisable to test all valves for filament continuity and inter-electrode contact with AVO meter, ohmeter, or battery and a pair of phones.

QUICK VALVE TESTING.

Bias values (and consequently a check on valve emission) may be quickly obtained on V 1, V 2, V 3, V 4 or V 5 by measuring with a voltmeter between the metallised coating of the valve and chassis. (For values, see Valve Table.)

VALVE TABLE.

(Readings given are ± 10 per cent.)

All readings taken with valves in position and on Avometer Scale indicated.

Valves.	Location	Appearance	Temperature	Function	Anode Feed. D.C. M.A.	Avo Scale	Anode/Frame. Volts D.C.	Avo Scale.	Screen Feed. Milliamps. D.C.	Avo Scale	Screen/Frame. Volts D.C.	Avo Scale	G.B. Volts.	Avo Scale	Fil. or Heater Volts	Notes.
U 12 (V 7)	Extreme right	Faint glow	Hot	Rectifier	45 each Anode	0-12	—	—	—	—	—	—	—	—	4 volts A.C. (see note)	DO NOT ATTEMPT TO MEASURE FILAMENT OR ANODE VOLTAGES.
PX 4 (V 6)	2nd from right	No glow	Hot	Output	50	0-12	300*	1,200	—	—	—	—	37	120	4 volts A.C.	Grid bias measured between grid and filament.
MH 4 (V 5)	3rd from right	No glow	Warm	2nd Detector	Radio 0.9 Gram. 2.2	0-012	195	1,200	—	—	—	—	Radio 3.5 Gram. 2.0	12	4 volts A.C.	Grid bias measured between metallised coating and earth.
VMS 4 (V 4)	Centre (Shielded)	No glow	Warm	Amplifier I.F.	Radio 5.5 to zero† Gram. 7.0 to zero†	0-012	190 to 270*	1,200	Radio 1.7 to zero† Gram. 2.0 to zero†	0-012	Radio 53 to 87* Gram. 60 to 105*	120	Radio 2.0 to 45* Gram. 2.5 to 60*	120	4 volts A.C.	Grid bias measured between metallised coating and earth.
MS 4 (V 3)	2nd from left	No glow	Warm	1st Detector	Radio 0.15 to 0.3* Gram. 1.0 to 4.0*	0-012	190 to 270*	1,200	0.1	0-012	Radio 53 to 87* Gram. 60 to 105*	120	Radio 4.0 to 7.5* Gram. 3.0 to 6.5*	12	4 volts A.C.	Grid bias measured between metallised coating and earth.
MH 4 (V 2)	Extreme left	No glow	Warm	Oscillator	Radio 2.0 to 6.0* Gram. —	0-012	Radio 50 to 75* Gram. —	120	—	—	—	—	Radio 4.0 to 7.5* Gram. 3.0 to 6.5*	12	4 volts A.C.	Grid bias measured between metallising and earth. NO SIGNALS WITH VALVE TEST ADAPTER IN POSITION.
VMS 4 (V 1)	3rd from left	No glow	Warm	H.F. Amplifier	Radio 5.5 to zero† Gram. 7.0 to zero†	0-012	190 to 270*	1,200	Radio 1.7 to zero† Gram. 2.0 to zero†	0-012	Radio 53 to 87* Gram. 60 to 105*	120	Radio 2.0 to 45* Gram. 2.5 to 60*	120	4 volts A.C.	Grid bias measured between metallised coating and earth.

* Reading increases when volume control is retarded.

† Reading decreases when volume control is retarded.

NOTE.—(1) Feed of V 5 may be obtained by opening testing link TN and inserting M.A. meter.

(2) Bias of V 6 can be obtained by measuring between centre point of VR 3 and earth.

(3) Total H.T. feed (90 M.A.) can be obtained by detaching wire from Terminal 9 (T 2) and inserting M.A. meter between black wire and Terminal 9.

25 M.A. of the total feed is used to energise the loudspeaker field.

VALVE READINGS.

Always test for H.T. voltage at main test point before taking valve readings. **Main H.T. test-point** —terminal 3 on loudspeaker panel (white wire) not less than 290 volts to chassis (all valves in). If the voltage is lower than this, suspect rectifier valve or smoothing condensers C 15, C 16 or C 20 and check total H.T. feed. (See Note 3 below Valve Table.)

If the instrument is fitted with the additional resistance R 19 (see Circuit Diagram) all voltages will be slightly lower than values given.

If voltage is high, test CK 2 (Test No. 20) or emissions of valves.

VALVE FAULT TABLE.

Valve.	Symptom.	Condition.	Components to suspect.	Test Nos. (See pages 14, 15.)
V 7	No anode feed	No signals ...	Valve or T 2 (mains transformer) windings.	22, 23, 24 and 25.
V 6	No anode volts	No signals ...	Primary T 3 (terminals 3 and 4) or connecting cable.	26.
	Anode volts, but no anode feed...	No signals ...	VR 3 (bad contact at slider?) R 15	18, 30.
V 5	No anode volts	No signals ...	R 12, R 17, C 12	16.
	Anode volts, but no anode feed...	No signals ...	R 10, R 11	15.
	Anode volts, but low anode feed on gram	Faint gram. ...	Contacts N and P of S 1 not closing	15.
V 4	No anode volts	No signals ...	L 13, R 9, C 9	8 and 14.
	Anode volts, but no anode or screen feed	No signals ...	R 5, VR 1	12.
V 3	No anode volts	No signals ...	L 11, R 9, C 9	6, 14.
	Anode volts, but no anode or screen feed	No signals ...	R 4	11.
V 2	No anode volts	No signals ...	L 9, L 10, R 6, R 9, C 7	5, 13, 14.
	Anode volts, but no feed ...	No signals ...	R 4	11.
	Anode volts, high anode feed ...	No signals ... (Valve not oscillating)	L 7, L 8, R 1, R 2, C 6 or valve ...	4.
V 1	No anode volts	Faint signals	L 15, R 9, C 9	6, 14.
	Anode volts, but no screen or anode feeds.	Faint signals	R 3, VR 1	10.
V 1, 3 and 4	No screen volts	No signals ...	R 6, C 7, R 9	13, 14.
	High screen volts	Weak signals	R 13, R 16, VR 1	17.
V 1, 2, 3, 4, 5, 6	High anode feed on any valve ...	Weak or distorted signals No signals ...	Bias resistance by-pass condensers C 2, 8, 21, 10, 14 or 18. Disconnection in grid circuits or components.	— 2, 3, 7, 9, 21.
V 1, 2, 3, 4, 5, 6 or 7	Low anode feed on any valve ...	Faint distorted signals	Valve may have lost emission (try new valve).	—
V 1, 2, 3, 4, 5 or 6	Low anode voltage on any valve	Faint distorted signals	Complete or partial break-down of anode bypass condensers C 7, 9 or 17.	—

CONTINUITY TESTS WITH CHASSIS IN POSITION.

(Valves out and mains disconnected).

Component Test No.	Components.	Test between	Resistance values ± 10 per cent.
TUNING COILS.			
1	L 1 and L 2	Fixed vanes VC 1 and chassis ...	Switch M.W. 3.0 ohms ; L.W. 23.0 ohms.
2	L 3 and L 4	Fixed vanes VC 2 and chassis ...	Switch M.W. 3.0 ohms ; L.W. 23.0 ohms.
3	L 5 and L 6	Fixed vanes VC 3 and chassis ...	Switch M.W. 4.0 ohms ; L.W. 23.0 ohms.
4	L 7 and L 8	Condenser C 5 and chassis ...	Switch M.W. 3.5 ohms ; L.W. 14.0 ohms.
5	L 9 and L 10	Anode socket V 2 and screen socket V 1, 3 or 4	Switch M.W. 2.0 ohms ; L.W. 6.0 ohms. Gram. Infinity. To chassis 50,000 ohms.
6	L 11 and L 15	Anode lead V 1 and anode lead V 3	97.0 ohms.—To chassis 20,000 ohms.
7	L 12	Grid V 6 and chassis	51.0 ohms.
8	L 11 and L 13	Anode lead V 3 and anode lead V 4	95.0 ohms.—To chassis 20,000 ohms.
9	L 14	Grid socket V 5 and chassis ...	51.0 ohms (Switch M.W. or L.W.).
RESISTANCES.			
10	R 3 and V.R. 1	Cathode V 1 and chassis	Volume minimum, 20,000 ohms. Volume maximum, 330 ohms.
11	R 4	Cathode socket V 2 or 3 and chassis.	2,000 ohms.
12	R 5 and VR 1	Cathode V 4 and chassis	Volume minimum, 20,000 ohms. Volume maximum, 330 ohms.
13	R 6 and L 15... ..	Anode tag V 1 and screen socket V 1. Anode tag V 1 and chassis ...	25,000 ohms (slight indication on avometer 10,000 ohm scale). 20,000 ohms.
14	R 9 and L 15... ..	Anode tag V 1 and white wire in loudspeaker cable (terminal 3). Terminal 3 and chassis	6,000 ohms. 14,000 ohms.
15	R 10 and R 11	Cathode V 5 and chassis	Switch M.W. or L.W., 6,000 ohms. Switch " Gram.", 1,000 ohms.
16	R 12 and R 17	Anode socket V 5 and white wire in loudspeaker cable (terminal 3) Anode socket V 5 and chassis ...	75,000 ohms (very slight indication on avometer 10,000 ohm scale). 90,000 ohms.
17	R 13 and VR 1	Screen socket V 1, 3 or 4 and chassis.	70,000 ohms (very slight indication on avometer 10,000 ohm scale).

CONTINUITY TESTS WITH CHASSIS IN POSITION—continued.

Component Test No.	Components.	Test between	Resistance values ± 10 per cent.
	RESISTANCES—continued.		
18	R 15	Centre point of VR 3 (hum control) and chassis.	800 ohms.
19	R 18	Filament socket V 7 and red wire in loudspeaker cable (terminal 6) Terminal 6 and chassis	3,000 ohms. 10,600 ohms. (loudspeaker field).
	TRANSFORMERS AND CHOKES.		
20	CK 2 (and R 19)	Lug 19 and lug 16 on condenser block.	750 ohms (or 1,200 ohms if R 19 is fitted).
21	T 1 (secondary)	Grid socket V 6 and chassis ...	6,000 ohms.
22	T 2 (mains) rectifier filament winding	Across filament sockets V 7 ...	0.1 ohms. To chassis, 13,000 ohms.
23	T 2 (filament winding) ...	Across filament sockets V 1, 2, 3, 4, 5 or 6.	.1 ohm (test to chassis 1,000 ohms)
24	T 2 (H.T. windings) ...	Each anode socket V 7 to chassis...	180 ohms one side ; 230 ohms the other side. Across anode sockets, 410 ohms.
25	T 2 (Primary)	Across "MO" terminals ... "M" terminal to 200-210 tapping ... "M" terminals to 211 tapping ... 230 tapping	19 ohms (whole winding). 15 ohms. 17 ohms. Test to chassis infinity.
26	T 3 (Primary)	Terminals 3 and 4 on loudspeaker panel	150 ohms.—To chassis 14,000 ohms.
27	T 3 (Secondary)	Terminals 1 and 5	2 ohms. The speech coil leads must be disconnected from tags to obtain reading on speech coil.
	LOUDSPEAKER.		
28	Field	Terminals 5 and 6 on panel ...	10,600 ohms.
29	Speech coil	Across ends	9 ohms. Model 256. 11 ohms. ,, 258.
	HUM CONTROL.		
30	VR 3	Across ends	20 ohms (one brown lead must be disconnected).

RESISTANCE VALUES OF COMPONENTS (± 10 PER CENT.)

L 1 — MW 3.0 ohms.	T 1.
L 2 — LW 20.0 "	Lugs 1 and 2 (Prim.) ... 1,700.0 ohms.
L 3 — MW 3.0 "	Lugs 3 and 4 (Sec.) ... 6,000.0 "
L 4 — LW 20.0 "	T 2. Primary.
L 5 — MW 3.5 "	M to 200/210 ... 15.0 ohms.
L 6 — LW 20.0 "	200/210 to 211/230 ... 2.0 "
L 7 — MW 3.5 "	211/230 to 231/250 ... 2.0 "
L 8 — LW 11.0 "	T 2. Secondaries.
L 9 — MW 2.0 "	8 and 9 180 "
L 10 — LW 4.0 "	9 and 10 230.0 "
L 11 — IFT 1 47.0 "	11 and 12 0.1 "
L 12 — IFT 1 51.0 "	13 and 15 0.1 "
L 13 — IFT 2 47.0 "	T 3. (on loudspeaker).
L 14 — IFT 2 51.0 "	Primary 3 and 4 ... 150 "
L 15 — HF choke ... 50.0 "	Secondary 5 and 6 ... 2.0 "
CK 2 — 750.0 "	

SPARE PART LIST AND VALUES OF ELECTRICAL COMPONENTS.

Description.	Part No.	Description.	Part No.	
L 1 Tuning coil—	11980-D	C 6 300 mmf.	15719-D	
L 3 M.W. aerial		C 7 1 mf.		
L 2 L.W. aerial		C 8 .5 "		
L 4 L.W. H.F. grid	11984-C	C 9 1 "	7581-A	
L 5 M.W. 1st det. grid		C 10 .1 "		
L 7 M.W. oscillator		C 11 .5 "		
L 9 M.W. reaction	11980-B	C 12 .1 "	15719-G	
L 6 L.W. 1st det. grid		C 13 2,000 mmf.		
L 8 L.W. oscillator		C 14 .5 mf.		
L 10 L.W. reaction	11984-A	C 15 4 "	15763-B	
L 11 Tuning coil		C 16 6 "		
L 12 " "		C 17 1 "		
TC 1 Trimmer	7597-D	C 18 4 "	7581-A	
TC 2 70-140 mmf.		C 19 2,000 mmf.		
L 13 Tuning coil		C 20 4 mf.		
L 14 " "	7597-E	C 21 1 "	8349-A	
TC 3 Trimmer		Fixed resistance—		
TC 4 70-140 mmf.		R 1 5,000 ohms... ..		5787-F
L 15 H.F. choke	11984-A	R 2 25,000 "	5787-H	
TC 5 Trimmer, 5-70 mmf.		R 3 320 "	5787-V	
VC 1 } Ganged condenser, 450 mmf. and		R 4 2,000 "	5787-A	
VC 2 } trimmers	11737-C	R 5 320 "	5787-V	
VC 3 }		R 6 25,000 "	5786-C	
VC 4 }		R 7 200,000 "	5787-D	
CK 2 L.F. choke	12045-C	R 8 100,000 "	5786-H	
T 1 Intervalve transformer... ..		R 9 2- (3,000 ohms each) 6,000 ohms ...	10451-Q	
T 2 Mains transformer		R 10 1,000 ohms... ..	5787-K	
VR 1 20,000 ohms	K or Q	R 11 5,000 "	5787-F	
VR 2 100,000 ohms		R 12 50,000 "	5786-A	
VR 3 Potentiometer, 20 ohms		R 13 50,000 "	5787-P	
VR 4 Tone control, 600,000 ohms	6000-P	R 15 800 "	13525-C	
Fixed condenser—		R 16 100,000 "	5787-Q	
C 2 .1 mf.		R 17 25,000 "	5786-C	
C 3 300 mmf.	7581-A	R 18 3,000 "	13525-C	
C 4 50 "		R 19 450 ohms... ..	10451-B	
C 5 1,700 "		S 1 } Wave change switch	12540-C	
		S 2 }		
		LP Lamp, 6-volt	1575-A	

MODEL 258.

Except for the following particulars the information given for Model 256 is applicable.

SPECIFICATION.

VOLTAGE RANGE.

200 to 250 volts (A.C.).
Frequency range 50 to 60 cycles.

POWER CONSUMPTION.

Radio, 95 watts (approximately).
Gram., 125 watts (approximately).

FUSES.

This instrument must not be connected to a supply which is "fused" for more than $2\frac{1}{2}$ amperes (working current).

SPEECH OUTPUT.

$2\frac{1}{4}$ watts (undistorted).
15 watts (anode dissipation of output valve).

WAVELENGTH RANGE.

Medium waves, 200 to 550 metres.
Long waves, 900 to 2,000 metres.

DIMENSIONS.

Overall Height.
 $33\frac{1}{2}$ inches.
85.5 cm.

Overall Width.
 $30\frac{3}{4}$ inches.
78.2 c.m

Overall Depth.
 $21\frac{3}{8}$ inches.
53.5 cm.

WEIGHT.

Net weight,	152 lbs.	69 kg.
Weight, packed,	254 lbs.	115.3 kg.

LOUDSPEAKER.

Large electro-magnet moving coil.

MOTOR.

Type 24. Disc induction (see separate Service Manual already issued).

Important.—The voltage adjusting links of this motor **must not be altered.**

AUTO-MECHANISM.

Type "K" (see separate Service Manual).

PICK-UP.

Type 14. D.C. resistance, 6,000 ohms (see separate Service Manual already issued).

DISMANTLING (Model 258 only).

Dismantling instructions for Model 256 are on page 4.

REPLACEMENT OF PILOT LAMP.

1. Disconnect instrument from mains and remove back.
2. Remove pilot lamp holder which is clipped to the end plate of the ganged condenser.
3. Renew lamp with 6 volt screw in type, and replace holder, being sure that the leads do not catch on the wave length scale.

REPLACEMENT OF CONDENSER DRIVE.

See information given for Model 256, page 5.

REMOVAL OF AUTO MECHANISM.

1. Remove back.
2. Disconnect the five leads marked E, P.U. and M.O. on terminal strip of auto mechanism.
3. Remove four screws on top of motor board.
4. Lift out mechanism by lifting handles situated just behind record jaws.

Do NOT lift by pick-up or record jaws.

When replacing motor board lower the front edge first, afterwards lowering the back edge.

REMOVAL OF RADIO UNIT.

1. Remove auto mechanism as above.
2. Remove four screws fixing radio control panel.
3. Withdraw four bolts from bottom of cabinet.
These bolts fix cradles in which lower extremities of chassis brackets rest.
4. Disconnect multiple cable from transformer T 3 (on loudspeaker). For reconnection see page 4.
5. Remove volume control knob (front of cabinet).
6. Remove volume control by taking out two screws fixing bracket to cabinet, and loosening cleat fastening leads.
7. Slide the radio control panel (complete with chassis) into centre of cabinet and carefully withdraw. Great care must be exercised in lifting chassis from cabinet, or coils may be damaged.

REMOVAL OF LOUDSPEAKER.

1. Disconnect loudspeaker cable (for reconnection see page 4).
2. Remove four bolts fixing loudspeaker supporting bracket to floor of cabinet.
3. Withdraw speaker.

ELECTRICAL INTERFERENCE.

Before attributing disturbing noises to a fault within the instrument the following simple tests should be made :—

Switch on the receiver and, having tuned to a point where signals are not being received, make and break the aerial lead. If the aerial is picking up disturbances a decrease in noise will be noticed when aerial is disconnected.

On the other hand, if no difference is noticed in noise level whether aerial is connected or not, the interference may be due to high frequency (H.F.) brought to the instrument via the current supply, or to a fault in the receiver.

If interfering noises are due to a bad connection in the receiver, a jar will sometimes aggravate the noise and so assist in defining the trouble—see Faults Table.

Loose or faulty pilot lamps will give rise to severe crackling. If a flickering lamp is noticed and a renewal does not improve matters, suspect a bad connection in the heater circuits of the valves. See that valves are fully inserted and that pilot lamps are tightly screwed in.

H.F. INTERFERENCE.

Electrical machinery or flashing signs will invariably give rise to the type of interference known as "H.F." and will cause crackling or "frying" noises in the speaker. Attention is drawn to the activities of H.M. Post Office and the British Broadcasting Corporation in investigating this type of interference.

What to do.

1. Make absolutely certain that the interference is not within the instrument by employing the tests previously described.
2. Obtain from a Post Office (or the B.B.C.) a copy of the special questionnaire form issued by them.
3. Fill in the form accurately, giving in addition to the answers required :—
 - (a) Name of the manufacturer of the receiver.
 - (b) The manufacturer's Cat. No. of the receiver.
4. Send the questionnaire back as directed together with **brief** notes as to possible source of interference which your local knowledge may suggest.
5. The P.O./B.B.C. organisation is one for investigating the **cause** of complaint with a view to ascertaining whether a cure can be effected. Such investigations may be both delicate and lengthy and require both goodwill and tact to bring to a successful conclusion. Your customer should not therefore be assured of a cure, and it should not be suggested to the owner (if known) of the interfering apparatus that your application to the B.B.C. is in any way a measure of retaliation.
6. It is of the utmost importance that this valuable channel of co-operation with H.M. Post Office and the B.B.C. should not be employed until every possible test has been made to ensure that the interference complained of comes definitely from a source **exterior** to the instrument.

THE INTERFERENCE MANUAL.

You are advised, in your own interests, to obtain the new Marconiphone Manual "Electrical Interference with Broadcast Reception." This is a most comprehensive treatment of the subject, extending over 32 pages and dealing fully with the symptoms, cause and remedy of all types of interference. In conjunction with the Manual, four special 12-inch Records have been made of the various interference noises, each fully cross-indexed for rapid identification.

The nett price of the Manual and Records in an album is 7s. 6d. Orders should be sent to the Marconiphone Co., Ltd., Radio House, Tottenham Court Road, London, W.1.

ANTI-STATIC AERIAL EQUIPMENT.

Attention is also drawn to the Anti-Static Aerial Equipment marketed by E.M.I. Service, Ltd. This equipment has been designed on the principle described under "Matched Impedance Aerial Coupling System" in the Interference Manual, and eliminates static interference picked up by the down lead. The equipment is now available as a separate unit to secure efficient static-free reception on both medium and long waves in the worst areas. Full particulars may be obtained from:—

E.M.I. SERVICE, LTD., SHERATON WORKS, HAYES, MIDDLESEX.

Please address all **service** communications respecting Marconiphone Models 256/258 and all orders for Spare Parts to:—

E.M.I. SERVICE, LTD.,
SHERATON WORKS,
HAYES, MIDDLESEX.

Telephone: Southall 2468.

Always quote the type and serial number of the instrument.

A complete Spare Part List is published separately, Part No. 14374.

The following alterations to that list should be noted:—

Page 2.—"10971E, Loudspeaker complete." *Price should read "£1 15 0."*

Page 3.—After "7576B, Lampbracket with holder," *should follow "13743 Knurled screw, 6d. per doz."*

Page 3.—Part Nos. for "TC5" *should read "11737C or 16240C."*

Page 6 (bottom).—"L5, L7 and L9" *should read "11980B."*

