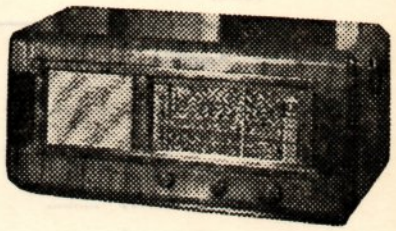
TECHNICAL INFORMATION
AND
SERVICE DATA

AWA RADIO

MODELS 1004 & 1004-Z

FIVE VALVE, SEVEN BAND, VIBRATOR OPERATED SUPERHETERODYNES



ISSUED BY

AMALGAMATED WIRELESS (A/SIA.) LTD.

ELECTRICAL SPECIFICATIONS.

FREQUENCY RANGES:

(1)	1500-540 Kc/s	(200-555 M.)
(2)	4.0-1.5 Mc/s	75-200 M.)
(3)	9.7-3.6 Mc/s	(31-83.5 M.)
(4)	12.0-9.0 Mc/s	(25-32 M.)
(5)	15.0-11.7 Mc/s	(20-25.7 M.)
(6)	19.0-15.0 Mc/s	(15.8-20 M.)
(7)	22.3-17.7 Mc/s	(13.5-17 M.)

INTERMEDIATE FREQUENCY ..... 455 Kc/s

Vibrator Power Unit Operation:

1—6 volt accumulator and Vibrator Power Unit, 17770.

BATTERY CONSUMPTION ..... 1.0 amp.

DIAL LAMPS (3) ..... 6.3 volt, 0.25 amp.

FUSE ..... 5 amp.

VALVE COMPLEMENT:

Model 1004-Z.

(1) 1M5G R.F. Amplifier*.
(2) 1C7G Converter.
(3) 1M5G I.F. Amplifier*.
(4) 1K7G Detector, A.V.C., and A.F. Amplifier.
(5) 1L5G Output.

* 1D5G in Model 1004.

VIBRATOR ..... A.W.A.-OAK Type V5124

LOUDSPEAKER (Permanent Magnet):

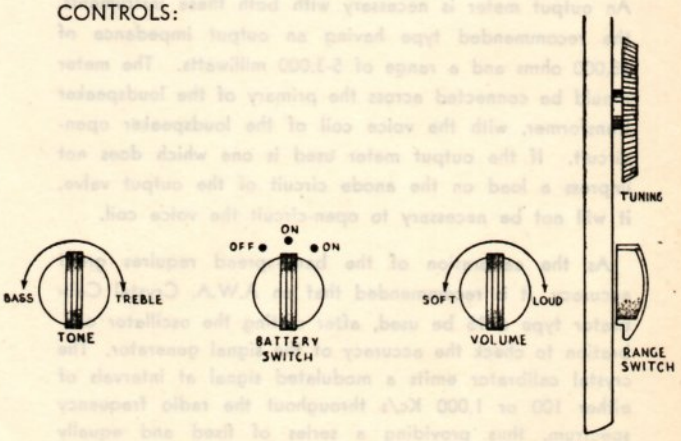
7 inch—Code No. AY32 or AY21.

Transformer—XA3.

V.C. Impedance—3 ohms at 400 C.P.S.

UNDISTORTED POWER OUTPUT: ..... 360 milliwatts

CONTROLS:



MECHANICAL SPECIFICATIONS.

	Height.	Width.	Depth.
Cabinet Dimensions (inches)	12	26	11
Chassis Base Dimensions (inches)	3½	16	7½

Overall Chassis Height 9

Weight (nett lbs.) 39

Cabinet Finish ..... Walnut Veneer

SOCKET VOLTAGES

Valve.	Bias Volts.	Screen Volts.	Screen Current.	Anode Volts.	Anode Current.	Filament Volts.
1M5G R.F. Amplifier	0	58	0.74	153	2.6	2.0
1C7G Converter, M.W.	−2.0	52	2.0	152	0.8	4.0
S.W.	−2.0	59	1.7	152	1.2	4.0
Oscillator, M.W.	—	—	—	57	2.4	—
S.W.	—	—	—	115	4.0	—
1M5G I.F. Amplifier	0	58	0.74	153	2.6	2.0
1K7G Detector	−2.0	40	0.05	65	0.13	4.0
1L5G Output	−4.0	155	2.2	150	10.0	6.0

Measurements taken with 1,000 ohms per volt meter, no signal input, and volume control in maximum clockwise position.

* A.V.C. bias on M/W and 75-200 M. bands.

† Zero bias on M/W and 75-200 M., A.V.C. on other bands.

ALIGNMENT PROCEDURE.

Alignment should be necessary only when adjustments have been altered from the factory setting, or when repairs have been made to the tuned circuits. Climatic conditions should not seriously affect the receiver.

It is important to apply a definite procedure as given in the booklet, and to use adequate and reliable test equipment. Instruments ideally suited to the requirments are either A.W.A. Junior Signal Generator type 2R3911 or the A.W.A. Modulated Oscillator type J6726 and C1070*. An output meter is necessary with both these instruments, the recommended type having an output impedance of 15,000 ohms and a range of 5-3,000 milliwatts. The meter should be connected across the primary of the loudspeaker transformer, with the voice coil of the loudspeaker open-circuit. If the output meter used is one which does not impress a load on the anode circuit of the output valve, it will not be necessary to open-circuit the voice coil.

As the calibration of the band-spread requires great accuracy, it is recommended that an A.W.A. Crystal Calibrator type 6795 be used, after setting the oscillator calibration to check the accuracy of the signal generator. The crystal calibrator emits a modulated signal at intervals of either 100 or 1,000 Kc/s throughout the radio frequency spectrum, thus providing a series of fixed and equally spaced calibration points of known accuracy. When using this instrument, care should be taken to select the correct signal. With the crystal set at the 1,000 Kc/s position, a spurious image signal can generally be obtained by turning the tuning control of the receiver to a point approximately 100 Kc/s higher in frequency. This is a useful check as to whether a harmonic or spurious image is being tuned. If a crystal calibrator is not available, broadcasting stations of known frequency my be used as an alternative.

When using a signal generator or modulated oscillator, with the tuning of the receiver fixed, two frequencies can be tuned from the test instrument, one 0.92 Mc/s higher in frequency than the other. In all cases the desired frequncy is the lower of the two.

A convenient alignment jig designed to hold the receiver chassis and fitted with a dial scale and pointer may be obtained from the Service Dept. of the Company. With this jig, alignment may be carried out with the chassis coupled to an actual scale, thus ensuring that the calibration will be correct when the chassis is placed in the cabinet, otherwise use the 0-180° calibration scale on the drum. (See alignment table.)

For all alignment purposes, connect the low side of the signal generator to the receiver chassis.

Perform alignment in the proper order, as shown in the chart, starting from No. 1 and following all operations across, then No. 2, etc.

Keep the volume control set in the maximum clockwise position and regulate the output of the test instrument so that a minimum signal is introduced to the receiver to give a standard indication on the output meter. This will avoid A.V.C. action and over-loading.

When the receiver has been satisfactorily aligned, seal the adjusting screws with a small quantity of cellulose cement.

* If a type J6726 or C1070 instrument is used, see that a 0.25 megohm resistor is connected between the output terminals, and, for short wave alignment, a 400 ohm non-inductive resistor in series with the active output lead.

ALIGNMENT TABLE

Alignment Order.	Test Inst. Connect to Receiver.	Frequency Setting	Band Setting.	Calibration Scale Setting.	Circuit to Adjust.	Adjust to Obtain.	Adjustment Symbol.
1	IC7G Cap*	455 kc/s	Broadcast	0°	2nd I.F. Trans.	Core L36	Max. Peak
2	IC7G Cap*	455 kc/s	Broadcast	0°	2nd I.F. Trans.	Core L35	Max. Peak
3	IC7G Cap*	455 kc/s	Broadcast	0°	1st I.F. Trans.	Core L34	Max. Peak
4	IC7G Cap*	455 kc/s	Broadcast	0°	1st I.F. Trans.	Core L33	Max. Peak
			Recheck 1, 2, 3 and 4				
5	Aerial	600 kc/s	Broadcast	19°	Oscillator†	Core L31	Calibration
6	Aerial	1500 kc/s	Broadcast	168°	Oscillator	C16	Calibration
7	Aerial	1450 kc/s	Broadcast	158°	Radio Frequency	C25	Max. Peak
8	Aerial	1450 kc/s	Broadcast	158°	Aerial	C12	Max. Peak
			Recheck 5, 6, 7 and 8				
9	Aerial	17.8 Mc/s	22.3-17.7 Mc/s	18°	Oscillator	Core L19	Calibration
10	Aerial	17.8 Mc/s	22.3-17.7 Mc/s	18°	Radio Frequency†	C28	Max. Peak
11	Aerial	17.8 Mc/s	22.3-17.7 Mc/s	18°	Aerial	C6	Max. Peak
12	Aerial	21.0 Mc/s	22.3-17.7 Mc/s	149°	Oscillator	C14	Calibration
13	Aerial	15.2 Mc/s	19.0-15.0 Mc/s	27°	Oscillator	Core L21	Calibration
14	Aerial	11.8 Mc/s	15.0-11.7 Mc/s	25°	Oscillator	Core L23	Calibration
15	Aerial	11.8 Mc/s	15.0-11.7 Mc/s	25°	Radio Frequency†	C29	Max. Peak
16	Aerial	11.8 Mc/s	15.0-11.7 Mc/s	25°	Aerial	C8	Max. Peak
17	Aerial	9.5 Mc/s	12.0-9.4 Mc/s	24°	Oscillator	Core L25	Calibration
18	Aerial	9.0 Mc/s	9.7-3.6 Mc/s	156°	Oscillator	C23	Calibration
19	Aerial	9.0 Mc/s	9.7-3.6 Mc/s	156°	Radio Frequency†	C27	Max. Peak
20	Aerial	9.0 Mc/s	9.7-3.6 Mc/s	156°	Aerial	C9	Max. Peak
21	Aerial	4.0 Mc/s	9.7-3.6 Mc/s	19°	Oscillator	Core L27	Calibration
			Recheck 18, 19, 20 and 21				
22	Aerial	1.6 Mc/s	4.0-1.5 Mc/s	15°	Oscillator	Core L29	Calibration
23	Aerial	3.7 Mc/s	4.0-1.5 Mc/s	153°	Oscillator	C24	Max. Peak

Finally, recheck broadcast band. This is necessary only if the setting of C14 has been altered.

† Rock the tuning control back and forth through the signal.

* With Grid Clip connected. A 0.001 uF capacitor should be connected in series with the "high" side of the test instrument.

The column headed "Calibration Scale Setting" refers to the 180° scale on the ganged tuning capacitor drive drum. In taking readings on this scale, read from the right-hand edge of the pointer; that is the edge nearest the rear of the chassis. Check the setting of the drum before taking readings. The zero mark should be opposite the pointer with the tuning capacitor fully closed.

DESCRIPTION OF TUNING CIRCUIT ADJUSTMENTS

Broadcast Band.

The broadcast band adjustments follow usual practice with three trimming capacitors—C12 aerial, C25 R.F., C16 oscillator and a variable magnetite core for L.F. adjustment of the oscillator coil L31, L32.

9.7-3.6 Mc/s Band.

Adjustments are the same as those used on the broadcast band, that is with three trimming capacitors—C9 aerial, C27 R.F., C23 oscillator and a variable magnetite core for L.F. adjustment of the oscillator coil L27, L28.

4.0-1.5 Mc/s Band.

All capacitors in the aerial and R.F. sections are common with those in the 9.7-3.6 Mc/s band, the change of band being accomplished by switching tapped coils. The oscillator section, however, is provided with a separate capacitor, C24, for tracking with the signal circuit at the H.F. end, and a variable magnetite core for L.F. adjustment of the oscillator coil L29, L30.

22.3-17.7 Mc/s Band.

At the L.F. end of this band there are three adjustments, a magnetite core in the oscillator coil L19, L20 and trimming capacitors C28 R.F. and C6 aerial. Small capacitors C1, C30 and C17 are used in series with the ganged tuning capacitors to accomplish band spreading at the L.F. end of this band. The oscillator circuit is made to track with the signal ciruit at the H.F. end by adjustment of capacitor C10. The three series capacitors are chosen to give three point tracking between the signal and oscillator circuits.

19.0-15.0 Mc/s Band.

The capacity system is the same as for the 22.3-17.7 Mc/s band, the change of band being accomplished by switching coils, the oscillator coil L21, L22 being fitted with a variable magnetite core for L.F. adjustment.

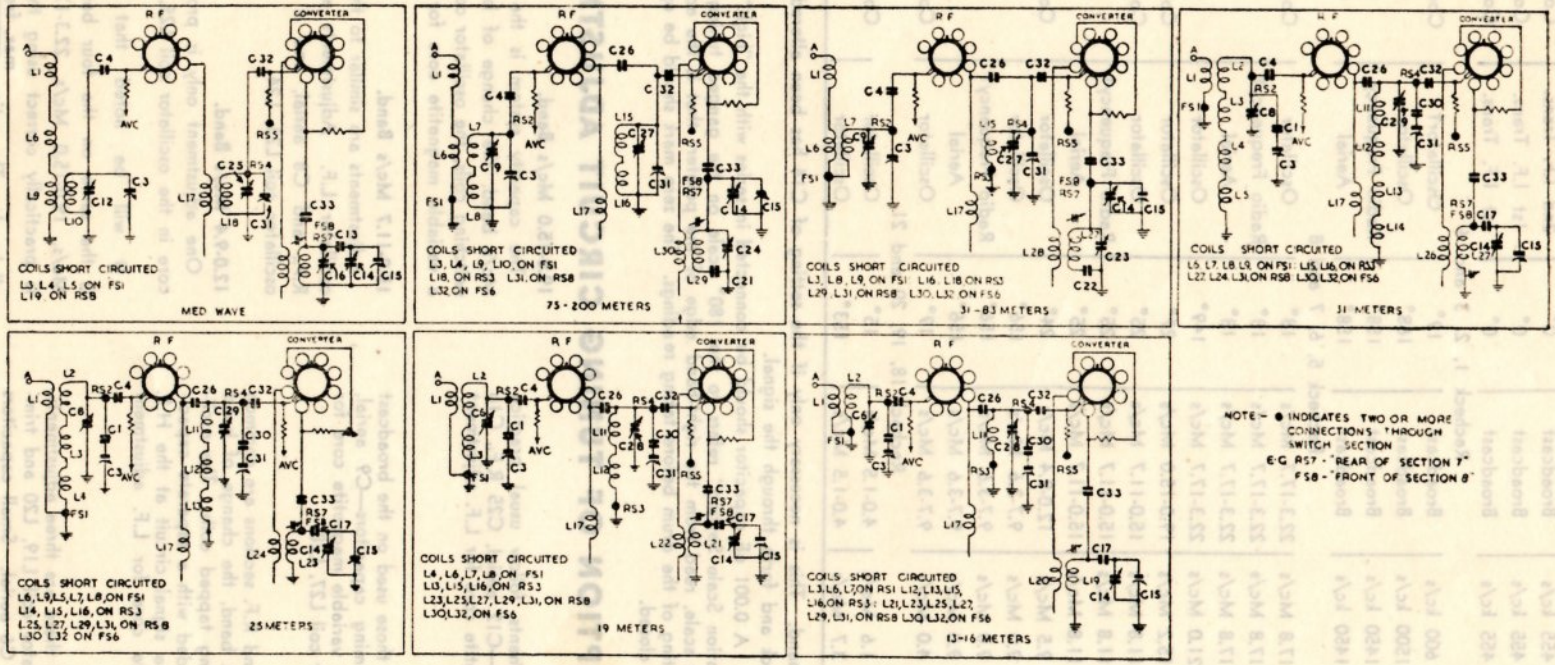
15.0-11.7 Mc/s Band.

Adjustments are similar to those on 22.3-17.7 Mc/s band, oscillator L.F. Adjustments are trimming capacitors C29 R.F., and C8 aerial, and a variable magnetite core in oscillator coil L23, L24.

12.0-9.4 Mc/s Band.

One adjustment only is provided, a variable magnetite core in the oscillator coil L25, L26.

It will be noted that the Ratio $\frac{\text{max. frequency}}{\text{min. frequency}}$ is the same on the four band, 12.0-9.4 Mc/s, 15.0-11.7 Mc/s, 19.0-15.0 Mc/s, 22.3-17.7 Mc/s, and the tracking is practically correct using the same series capacitor for all bands. The ratio $\frac{\text{max. frequency}}{\text{min. frequency}}$ is also the same on the 4.0-1.5 Mc/s and the 9.7-3.7 Mc/s bands, but, due to the greatly different frequency spectrum of the oscillator, the series capacitors in the two oscillator circuits are different.



TUNING CIRCUIT DIAGRAM.

SIMPLE SHORT WAVE CALIBRATION ADJUSTMENT.

The short wave calibration may be adjusted slightly, without removing the chassis from the cabinet for full alignment by adjusting the four cores, L19, L21, L23 and L25 after a station of known frequency is received.

The correct procedure is as follows:

(1) Set the dial pointer so that calibration is correct on the medium wave band.

(2) To adjust the calibration of the 22.3-17.7 Mc/s band, tune in the known station, and to shift the pointer position to the left, turn L9 clockwise or vice versa until the station can be tuned in at its assigned frequency.

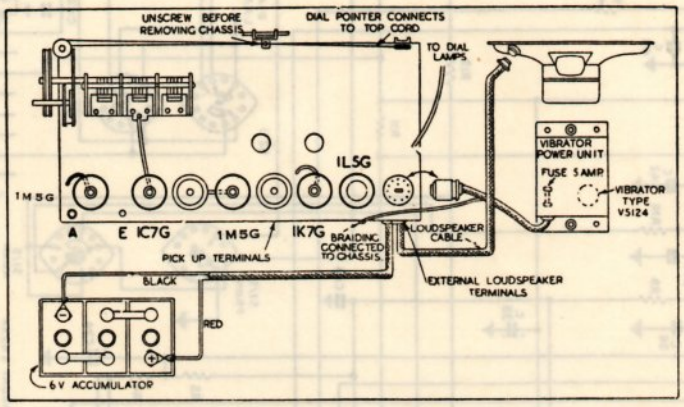
(3) The adjustments for the 19.0-15.0, 15.0-11.7, and 12.0-9.4 Mc/s bands are similar, using L21, L23 and L25 respectively.

VIBRATOR POWER UNIT No. 17770.

Operating from a 6 volt accumulator, the Vibrator Power Unit supplies the correct H.T. supply voltage for the receiver. It contains a plug in vibrator cartridge, step-up transformer, an efficient filter system and a 5 amp. fuse, which is located within the unit.

The unit is connected to the receiver by means of a cable and plug. See "Battery Connections" diagram.

To remove the vibrator unit from the cabinet, disconnect the cable from the receiver and unscrew the three holding screws which pass through the base of the cabinet.



BATTERY CONNECTION.

CHASSIS REMOVAL AND REPLACEMENT.

(1) Turn the Phono-Range Switch to the 22.3-17.7 Mc/s position and then remove three control knobs from the front of the cabinet. These knobs are each held by one set screw. To remove the two knobs at the side of the cabinet, proceed as follows:—

The knobs pull straight off. Do not loosen the set screw in the lower knob. If difficulty is experienced in removing this knob, refer to the label adhered to the inside of the cabinet for instructions.

(2) Disconnect the loudspeaker and vibrator cables.

(3) Disconnect the dial pointer from the drive cord, first unscrewing the thumb nut.

(4) Disconnect the sheathed cord, which actuates the band indicator on the dial scale. The cord is connected to the dial assembly at two points, the sheath to the top left-hand corner of the dial assembly (viewed from the rear) and the cord to the band indicator. Loosen the thumb screws at these points and carefully free the cord from the assembly.

(5) The chassis is held in the cabinet by four bolts. Remove these and withdraw the chassis from the cabinet.

(6) Replacing the chassis in the cabinet is a direct reversal of the above instructions, but care must be taken to connect the dial pointer to the drive cord as follows:—

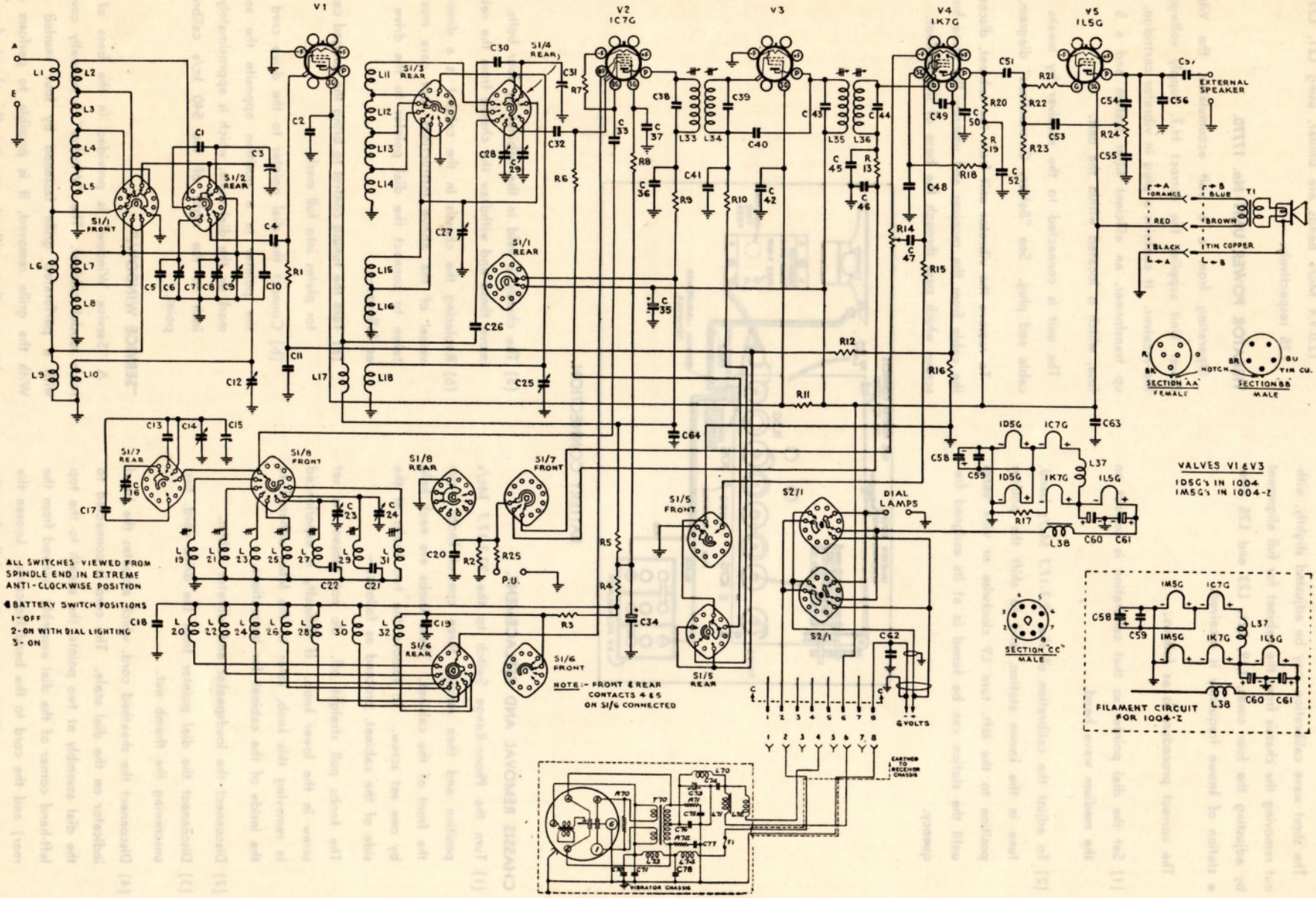
(a) Turn the tuning control to bring the ganged capacitor plates into full mesh.

(b) Connect the dial pointer to the drive cord with the pointer in a position opposite the setting mark on the dial scale, which is approximately 1/4 inch to the right of the 540 kc/s calibration point.

"SERVICE WINDOW."

A "Service Window" is provided in the base of the table model cabinet. The "Window" is normally covered with a perforated grille fastened by four knurled nuts. With the grille removed, it is possible to perform most service operations without removing the chassis from the cabinet.

CIRCUIT DIAGRAM



CIRCUIT CODE

Circuit Code No.	Description.	Stock Code or Part No.
	INDUCTORS.	
L1, 2	Aerial Coil, 13-16 metres	9852
L1, 2, 3	Aerial Coil, 16-20 metres	9852
L1, 2, 3, 4—	Aerial Coil, 20-25 metres	9852
L1, 2, 3, 4, 5—	Aerial Coil, 25-31 metres	9852
L6, 7	Aerial Coil, 31-83 metres	9854
L6, 7, 8	Aerial Coil, 75-200 metres	9854
L9, 10	Aerial Coil, Broadcast 1500-540 kc.	10369A
L11	R.F. Coil, 13-16 metres	9853
L11, 12	R.F. Coil, 16-20 metres	9853
L11, 12, 13—	R.F. Coil, 20-25 metres	9853
L11, 12, 13, 14—	R.F. Coil, 25-31 metres	9853
L15	R.F. Coil, 31-83 metres	9855
L15, 16	R.F. Coil, 75-200 metres	9855
L17, 18	R.F. Coil, Broadcast 1500-540 kc.	10368A
L19, 20	Osc. Coil, 13-16 metres	9747
L21, 22	Osc. Coil, 16-20 metres	9746
L23, 24	Osc. Coil, 20-25 metres	9745
L25, 26	Osc. Coil, 25-31 metres	9744
L27, 28	Osc. Coil, 31-83 metres	9743
L29, 30	Osc. Coil, 75-200 metres	9742
L31, 32	Osc. Coil, Broadcast 1500-540 kc.	10054A
L33, 34	1st I.F. Transformer	8286Z
L35, 36	2nd I.F. Transformer	8287Z
L37	Low Tension R.F. Filter Choke	3149
L38	Low Tension A.F. Smoothing Choke	8243E

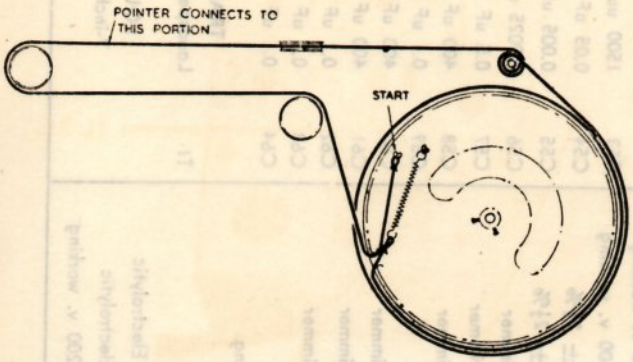
Circuit Code No.	Description.	Stock Code or Part No.
	RESISTORS.	
R1	1 megohm, ½ watt	
R2	50,000 ohms, ½ watt	
R3	25,000 ohms, 1 watt	
R4	500 ohms, 1 watt	
R5	5,000 ohms, 1 watt	
R6	1 megohm, ½ watt	
R7	50,000 ohms, ½ watt	
R8	40,000 ohms, 1 watt	
R9	320 ohms, ½ watt	
R10	0.1 megohm, ½ watt	
R11	63,000 ohms, 1 watt	
R12	1.6 megohms, ½ watt	
R13	50,000 ohms, ½ watt	
R14	0.5 megohm, Volume Control	
R15	1.6 megohms, ½ watt	
R16	2 megohms, ½ watt	
R17	16.6 ohms, 3 watts, wire wound (1004 only)	
R18	1 megohm, 1 watt	
R19	50,000 ohms, 1 watt	
R20	0.2 megohm, 1 watt	
R21	50,000 ohms, ½ watt	
R22	0.4 megohm, ½ watt	
R23	0.1 megohm, ½ watt	
R24	0.1 megohm, Tone Control	
R25	20,000 ohms, ½ watt	
	CAPACITORS.	
C1	52 uuF Mica	
C2	0.1 uF Paper, 200 v. working	
C3	12-430 uuF Tuning	
C4	200 uuF Mica	

Circuit Code No.	Description.	Stock Code or Part No.
C5	12 uuF Mica	
C6	1-25 uuF Air Trimmer	
C7	12 uuF Mica	
C8	1-25 uuF Air Trimmer	
C9	1-25 uuF Air Trimmer	
C10	12 uuF Mica	
C11	0.05 uF Paper, 200 v. working	
C12	1-25 uuF Air Trimmer	
C13	490 uuF Mica ± 2½%	
C14	2-10 uuF Air Trimmer	
C15	12-430 uuF Tuning	
C16	11-29 uuF Air Trimmer	
C17	42 uuF N.750 Mica	
C18	0.1 uF Paper, 200 v. working	
C19	0.1 uF Paper, 200 v. working	
C20	0.01 uF Paper, 600 v. working	
C21	1350 uuF Mica ± 2½%	
C22	2550 uuF Mica ± 2½%	
C23	2-20 uuF Air Trimmer	
C24	11-29 uuF Air Trimmer	
C25	1-25 uuF Air Trimmer	
C26	200 uuF Mica	
C27	1-25 uuF Air Trimmer	
C28	1-25 uuF Air Trimmer	
C29	1-25 uuF Air Trimmer	
C30	52 uuF Mica	
C31	12-430 uuF Tuning	
C32	200 uuF Mica	
C33	70 uuF Mica	
C34	20 uF 200 P.V. Electrolytic	
C35	8 uF 525 P.V. Electrolytic	
C36	0.05 uF Paper, 200 v. working	

Circuit Code No.	Description.	Stock Code or Part No.
C37	0.1 uF Paper, 200 v. working	
C38	70 uuF Silvered Mica	
C39	70 uuF Silvered Mica	
C40	4 uuF Mica	
C41	0.01 uF Paper, 600 v. working	
C42	0.1 uF Paper, 200 v. working	
C43	70 uuF Silvered Mica	
C44	70 uuF Silvered Mica	
C45	110 uuF Mica	
C46	110 uuF Mica	
C47	0.02 uF Paper, 600 v. working	
C48	0.1 uF Paper, 200 v. working	
C49	50 uuF Mica	
C50	200 uuF Mica	
C51	0.02 uF Paper, 600 v. working	
C52	0.5 uF Paper, 400 v. working	
C53	1500 uuF Mica	
C54	0.05 uF Paper, 400 v. working	
C55	0.005 uF Paper, 600 v. working	
C56	0.0025 uF Paper, 600 v. working	
C57	0.5 uF Paper, 400 v. working	
C58	400 uF 12 P.V. Electrolytic	
C59	0.1 uF Paper, 400 v. working	
C60	400 uF 12 P.V. Electrolytic	
C61	400 uF 12 P.V. Electrolytic	
C62	0.1 uF Paper, 400 v. working	
C63	0.1 uF Paper, 200 v. working	
C64	0.1 uF Paper, 200 v. working	
	TRANSFORMER.	
T1	Loudspeaker Transformer	XA3
	LOUDSPEAKER.	
	7-inch Permanent Magnet:	AY21 or AY32

TUNING DRIVE CORD REPLACEMENT.

The accompanying diagram shows the route of the cord and the method of attachment. Whilst fitting the cord, keep it taut and adjust the length so that the tension spring measures approximately 2 inches long when fitted. The spring should be sheathed to prevent it rattling against the drum.



LOUDSPEAKER SERVICE.

It is inadvisable to attempt loudspeaker repairs other than adjustment of the voice coil and replacement of the transformer. The fitting of a new cone should be done only by service departments suitably equipped to do the work.

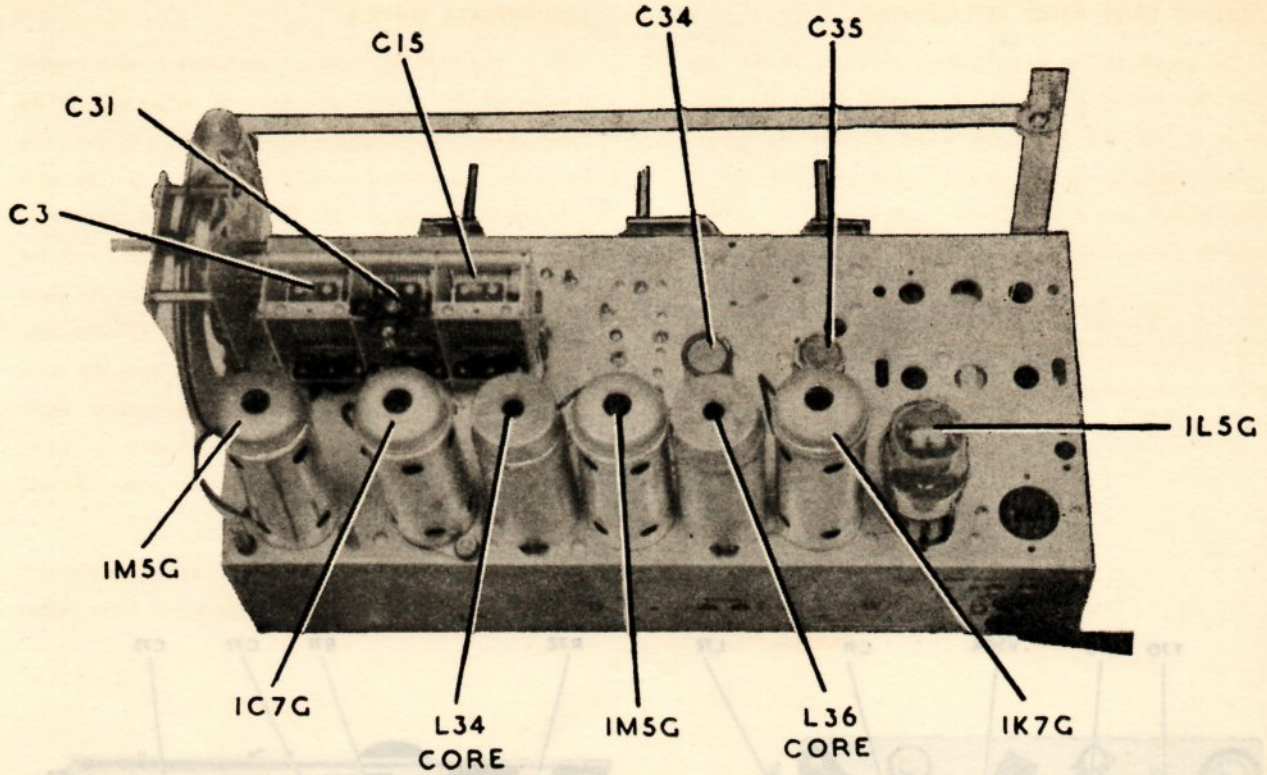
To centre the voice coil, first remove the dust cover. To do this, use a very sharp razor blade and cut the centre out of the dust cover, cutting just inside the edge of the voice coil former, which can be felt with the fore-finger. Do not attempt to tear the cover from the cone. Loosen the suspension screws, insert three narrow paper "feelers" in the gap and re-tighten the suspension screws. The "feelers" should be approximately 3/16 inch wide and 0.006 inch thick.

After adjusting, test the loudspeaker, and, if satisfactory, fasten a replacement dust cover in place with Latex rubber cement.

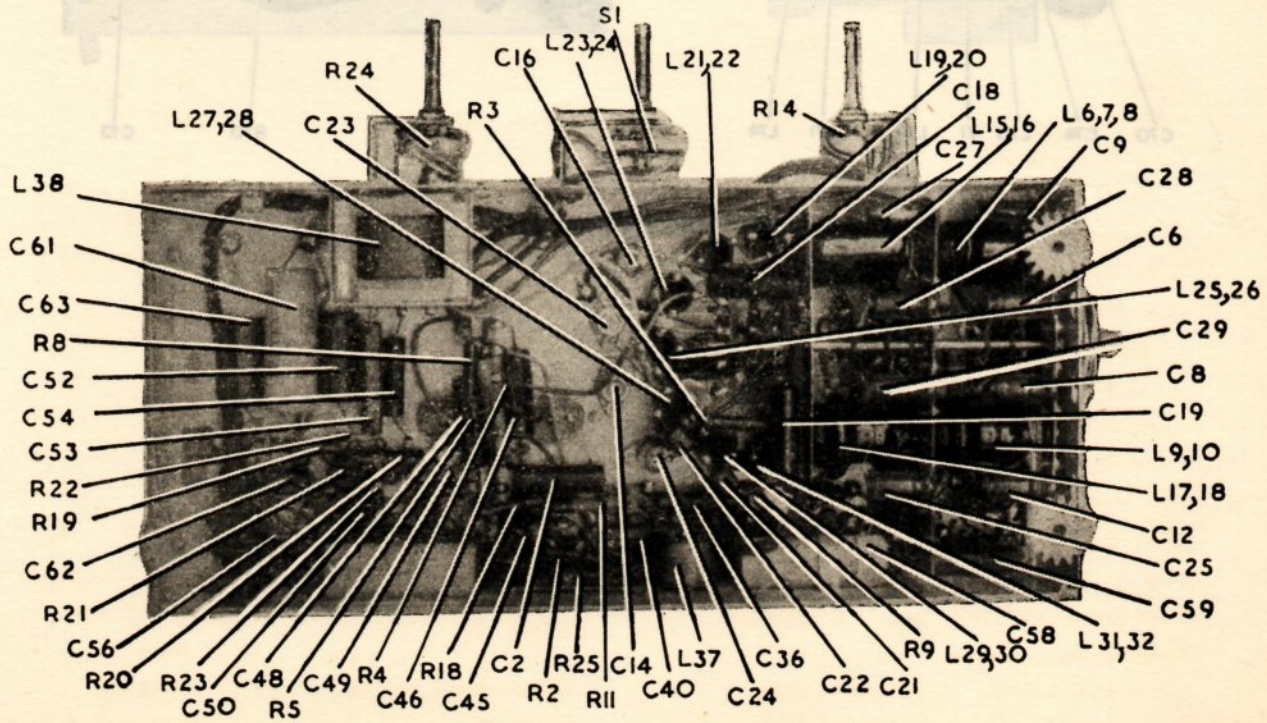
MECHANICAL REPLACEMENT PARTS.

Item.	Part No.
Cabinet	C67Z
Cable, band indicator	20374
Cable, loudspeaker—	
AY32 or AY21	19186
Cable, pick-up	17725
Cable, dial lamp	19682
Core, Magnetite—	
Small	11403
Large	11400
Cone assembly, loudspeaker	9356
Dial Frame Assembly	20249A
Dial Scale	20159
Drum, band indicator	20372
Knob	4589
Knob, range switch	5846
Knob, tuning	9407
Mount plate assembly, tuning drive	17816
Pulley, brass	7885
Screen, I.F. transformer	3351

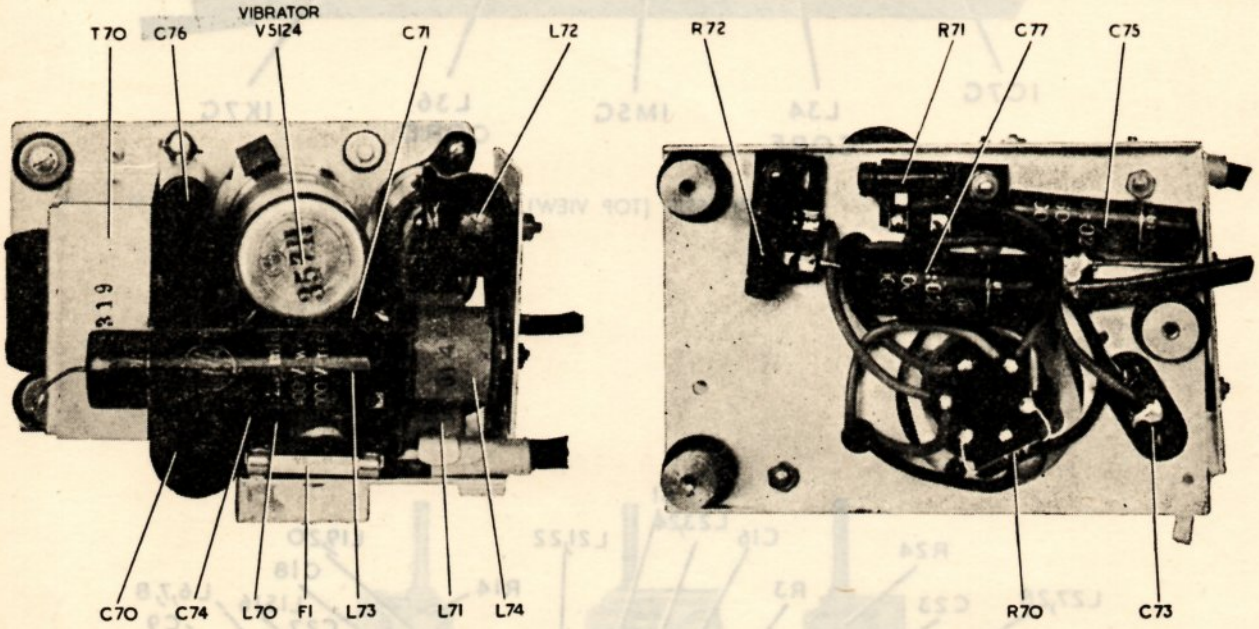
Item.	Part No.
Cap	8372
Screen, Valve	8147
Cap	8148
Register	4733
Socket, dial lamp	4194
Socket, valve	4704
Socket, valve, cushion	7326
Spindle, tuning drive	9812
Spindle, range switch extension	19066
Spindle, tuning control extension	19583
Spring, band indicator	8364
Spring, drive tension	6641
Strip, tag, 1 way	7628
2 way	8863
3 way	9877
7 way	19664
Vibrator Power Unit No.	17770
Socket Vibrator	8498
Strip, tag—2 way	8570



CHASSIS (TOP VIEW).



CHASSIS (UNDERNEATH VIEW).



VIBRATOR POWER UNIT