

MODEL ARG210 is a high fidelity, auto-radiogram, suitable for standard or long playing records, employing a Garrard automatic changer and a five-valve, three-waveband chassis.

It is housed in a contemporary styled cabinet with a sapele mahogany veneer finish, and operates from an A.C. mains supply.

MAINS SUPPLY. 200-250 volts, 50 c.p.s., A.C.

MAINS CONSUMPTION.

Radio, 215 mA at 230 volts input.

Gram, 345 mA at 230 volts input.

CONTROLS. Front centre : ' VOLUME/ON-OFF ' ; Beneath the lid : left, ' TONE CONTROL/R-GRAM ' switch ; centre, ' WAVEBAND SELECTOR ' ; right, ' TUNING '.

PILOT LAMPS. 6.5 volt, 0.3 amp M.E.S.

VALVES.

V1	ECH42	Frequency Changer
V2	EF41	I.F. Amplifier
V3	EBF80	Det., A.V.C., A.F. Amplifier
V4	EL84	Output
V5	EZ40	H.T. Rectifier

V1, V2, and V5 bases are type B8A, V3 and V4 have Noval bases.

RECORD CHANGER. Garrard RC75A.

Later models of the ARG210 incorporate the latest Garrard Model RC110 record changer, and it may be found that some records, not made to latest standards, will not carry the pick-up near enough to the centre spindle to operate the trip mechanism.

The changer mechanism is designed to operate when the pick-up stylus reaches a radius of $2\frac{3}{4}$ in. $\pm \frac{1}{8}$ in. and all modern record pressings have a run-off groove well within this radius.



There are, however, records which can still be bought on which the run-off groove is outside this limit, and if it is desired to play these, they must be played singly.

WAVEBANDS

Long	1,000-2,000 metres	300-150 Kc/s.
Medium	190- 570 metres	1,580-526 Kc/s.
Short	16- 52 metres	18.75-5.77 Mc/s.

INTERMEDIATE FREQUENCY. 465 Kc/s.

LOUD-SPEAKER IMPEDANCE. 3 ohms at 400 c.p.s.

A high-grade 10 in. diameter moving-coil speaker is fitted, giving a wide frequency response.

EXTENSION LOUD SPEAKER. There is provision for the connection of an extension loud-speaker which should have an impedance similar to the internal speaker. A muting switch, situated on the socket panel, permits the internal speaker to be silenced. It is, however, unwise to open circuit the internal speaker before connecting the external speaker and the reverse procedure when replacing the internal speaker.

OUTPUT. 4.5 watts Maximum.

PICK-UP. A lightweight, turnover, crystal-type pick-up is provided with the record player. The pick-up head incorporates two permanent sapphire-tipped styli, and by means of a simple lever movement, either stylus can be selected according to the type of record to be played.

REPLACEMENT OF STYLI. Should it become necessary to replace a stylus, it can be removed from the pick-up head simply by applying gentle leverage under the shank of the stylus with a pair of tweezers, or similar tool.

All styli are painted according to their function, i.e., red for 33, 45 r.p.m. and green for 78 r.p.m.

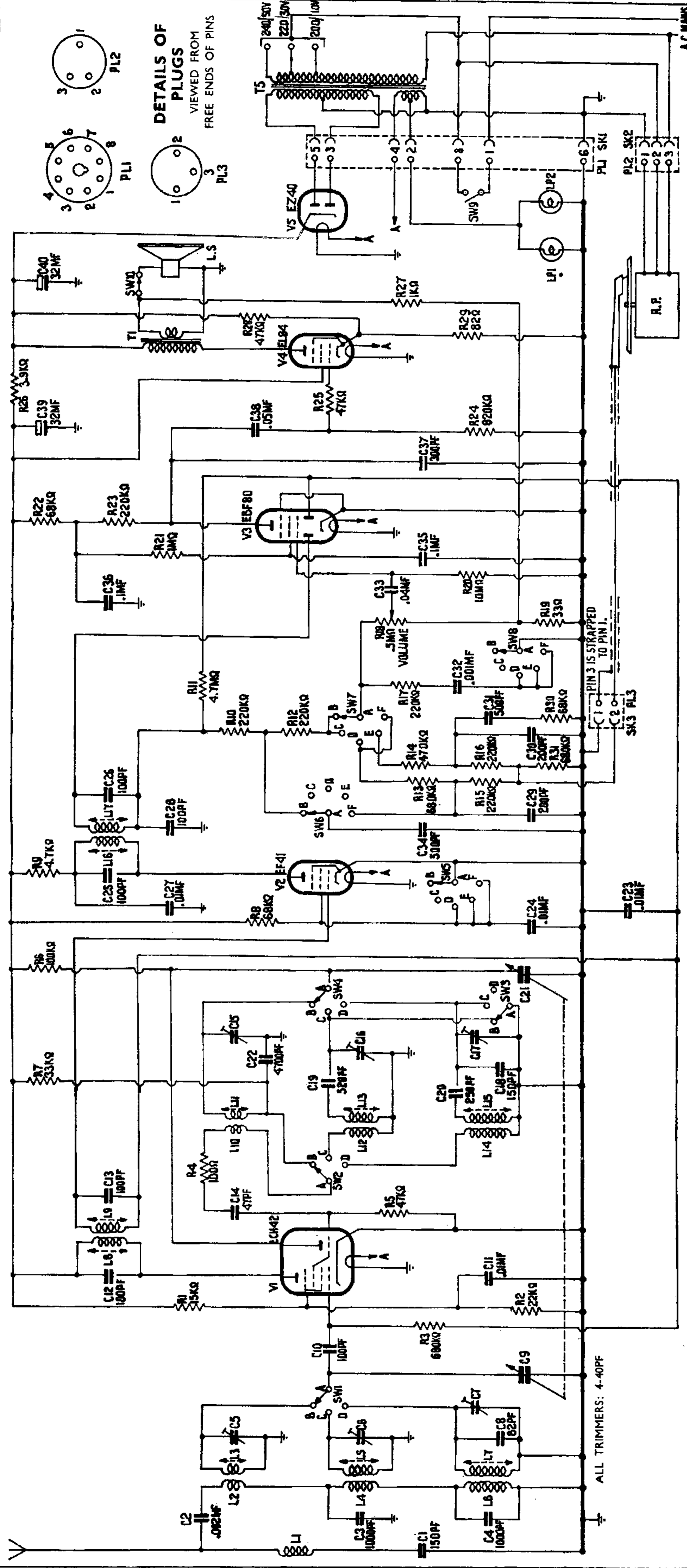
After replacement always ensure that the two small claws, located at the head of the stylus, fit over the insulated transmission piece of the pick-up.

CIRCUIT DETAILS.

FREQUENCY CHANGER AND I.F. STAGES. Signals from the aerial input are fed via the coupling capacitor C2 to the SW, MW, and LW tuned input circuits, each of which is shunted by a trimmer, and selected by the switch SW1. The latter also connects

(Continued on page 3)

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40.



CIRCUIT DIAGRAM

in circuit, the main tuning capacitor C9. Coil L1 and the capacitor C1 act as an effective I.F. trap against any unwanted signals close to the receiver's Intermediate Frequency.

The signal is then passed via C10 to the control grid of the frequency changer valve V1.

Three individual tuned H.F. transformers form the oscillator section, covering the LW, MW, and SW bands, the grid coils of each being selected by SW2 which connects the appropriate coil to the triode section of V1. H.T. to the triode anode is shunt fed via R6 on LW and MW, and series fed via R7 on the SW band. Anode coils of the three H.F. transformers are selected by a switch SW4 which also connects in circuit, the main tuning capacitor C21. SW3-4 also ensure that the band lower to the one selected is in effect, 'short circuited' thus rendering it inoperative and preventing absorption.

The oscillator signal combines with the incoming signals to form an I.F. at the mixer anode, which is fed via the 1st I.F. transformer L8.L9 to the grid of V2 for amplification.

The switch SW5 functions only on the gram positions. The I.F. stage is made inoperative by shorting the screen supply down to chassis, thus preventing possible radio breakthrough whilst on gram operation.

The amplified signal at the anode of V2 is passed via the 2nd I.F. transformer L16.L17, to the diode of V3 for demodulation. C28, connected from the secondary of the I.F. transformer to chassis, is an I.F. filter.

tone CONTROL CIRCUIT. There are three positions of tone for gram operation, and two for radio.

Gram. Top cut is provided by resistance-capacity networks connected to positions D, E and F of the switch SW7, whilst bass boost is obtained via the switch SW8 through R17 and C32. Maximum top cut on gram is also provided by C34 capacitor, switched into circuit via SW6.

Radio. Positions B and C of SW7 provide a path for the A.F. feed and, when on position B, SW6 provides top cut through C34.

DET., A.V.C. AND A.F. AMPLIFICATION CIRCUITS. After rectification, the A.F. component is fed via the diode load circuit R10.R12.R18.R19, through C33 to the grid of the pentode section of V3 for amplification.

H.T. is supplied to V3 via the anode load resistors R23 and R22, which, in conjunction with C36, provide additional smoothing in the circuit. Voltage for the screen is obtained through the dropping resistor R21, decoupled by a capacitor C35.

A part of the rectified component is fed back as a bias voltage to the control grids of V1 and V2 stages to provide A.V.C.

The A.F. signal at the anode of V3 is then fed via C38 and R25 to the grid of V4 for final amplification. In the cathode circuit of V4 are two resistors R28 and R29, the former reduces any small amount of hum that may be present, whilst the latter provides auto bias. Feedback is obtained from the secondary of the output transformer T1 and fed to the grid circuit of V3 via R27, R19 and C33.

POWER SUPPLIES. The mains transformer T5 is located on the base of the cabinet, and the primary switching and secondary connections are made through a plug and socket (PL1-SK1) connection.

The A.C. input is applied to the primary of the transformer, and is adjustable by means of three tapping positions, which should be correctly set at the time of installation, according to the local supply voltage.

Heater voltages are obtained from a separate winding and passed to the parallel connected heaters of valves V1-V5 and the two pilot lamps LP1.LP2.

H.T. is obtained from a full wave rectifier V5, the output of which is smoothed by C40.R26 and C39.

ALIGNMENT PROCEDURE.

I.F. Switch to MW and fully mesh the tuning capacitors. Set the 'TONE' switch fully anti-clockwise and the 'VOLUME' control fully clockwise. Connect an output meter to the EXT. L.S. sockets leaving SW10 closed.

Inject a modulated 465 Kc/s. signal via a 0.1 mfd capacitor to pin 6 of V1 and adjust the I.F.T. cores for maximum output in the following order. 2nd I.F.T. upper and lower, then 1st I.F.T. upper and lower.

Inject the signal to the A.E. sockets, then adjust the I.F. filter core (L1) for minimum output, selecting the dip with the core mostly out.

R.F. Inputs to A.E. socket via a standard dummy aerial. Adjust in all cases for maximum output, consistent with calibration.

Switch to SW. Adjust L11 core then L3 core at 6 Mc/s., followed by C15 and C5 at 18 Mc/s. Repeat until satisfactory.

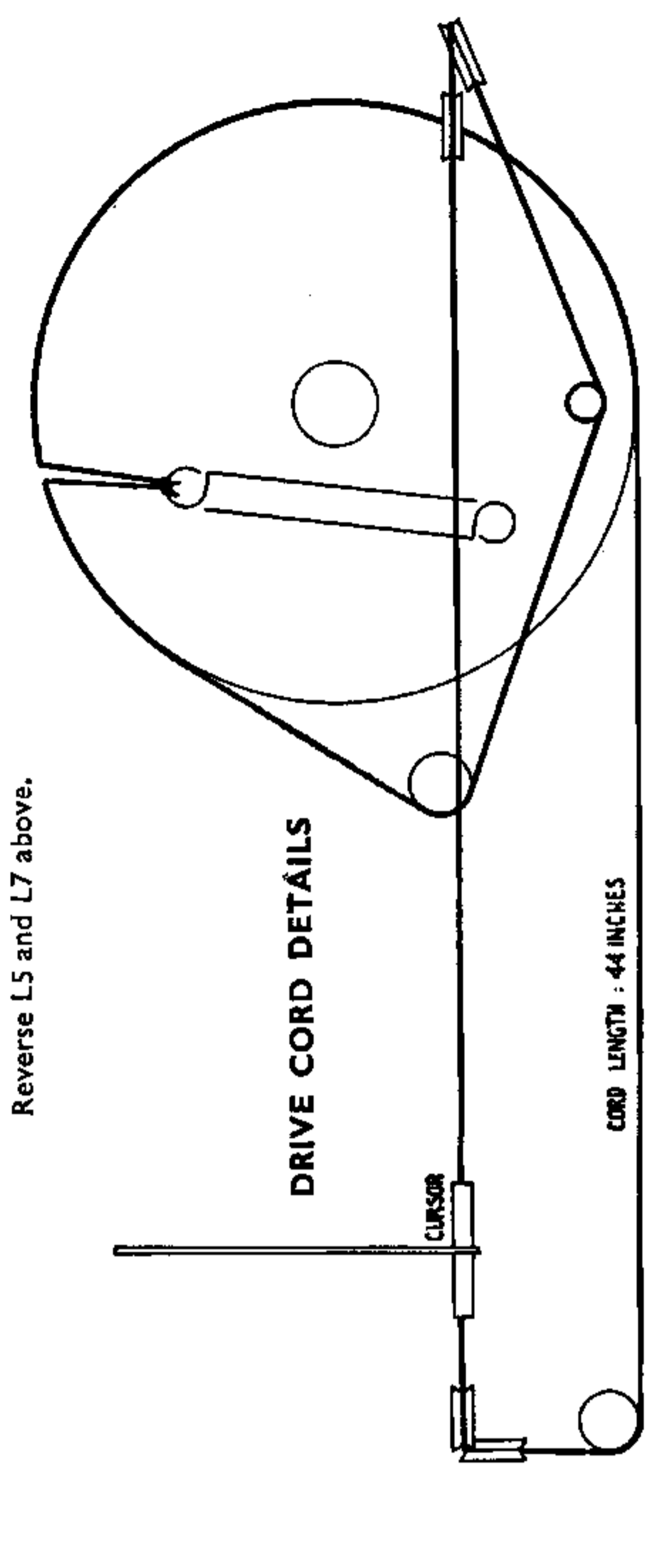
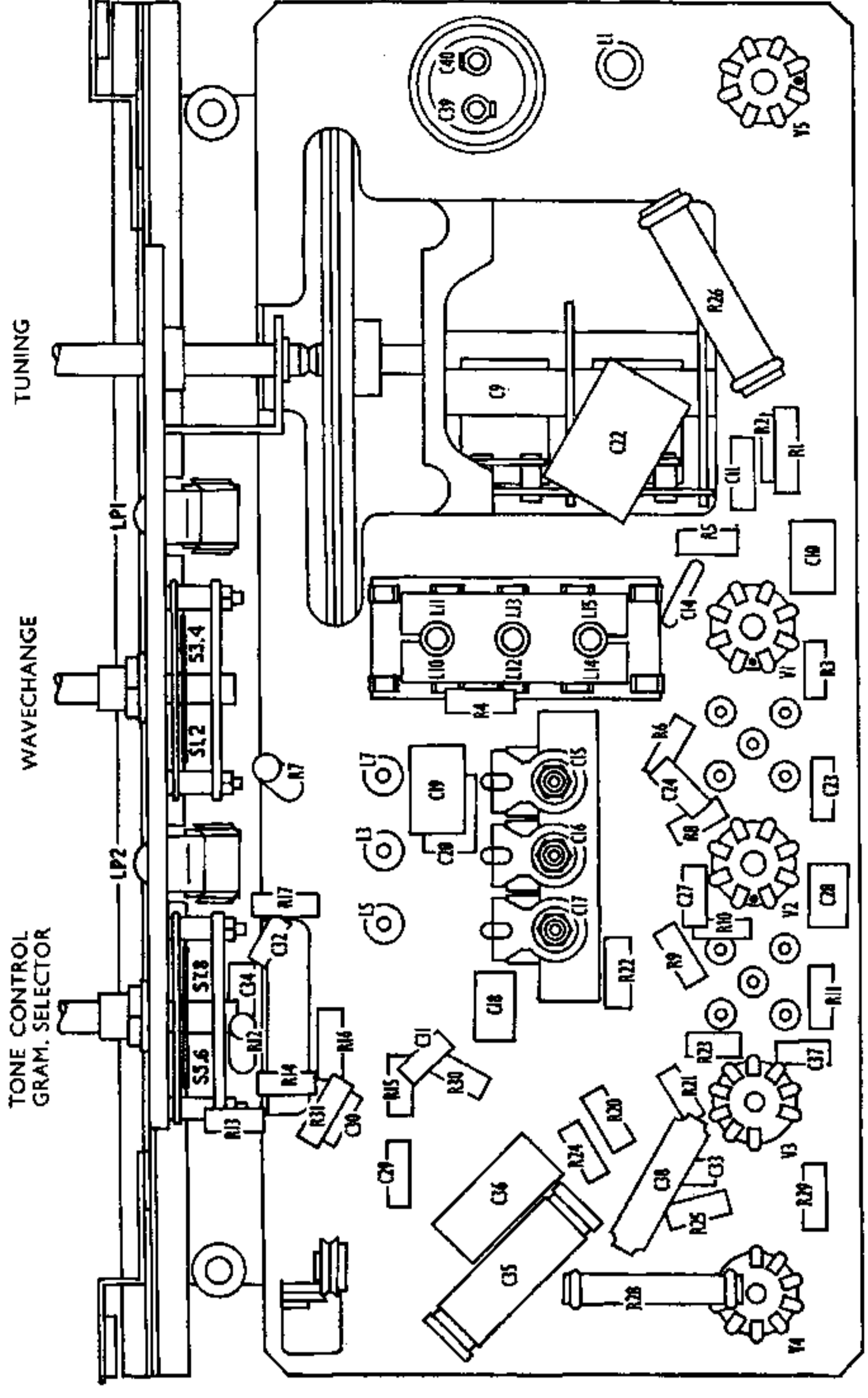
Switch to MW. Adjust L13 core at 550 Kc/s. and L5 core at 650 Kc/s. Adjust C16 and C6 at 1,400 Kc/s. Repeat as necessary.

Switch to LW. Adjust L15 core then L7 core at 160 Kc/s. and finally C17, C7 at 280 Kc/s. Repeat as necessary.

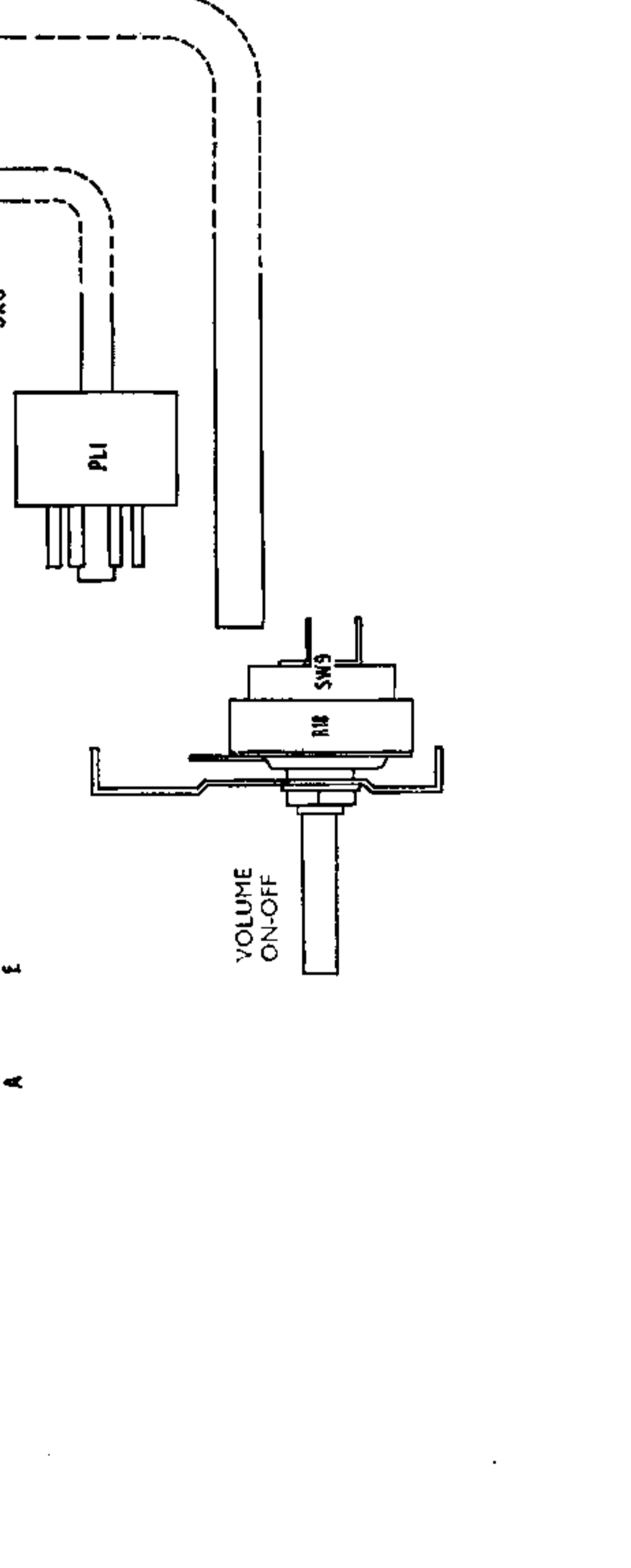
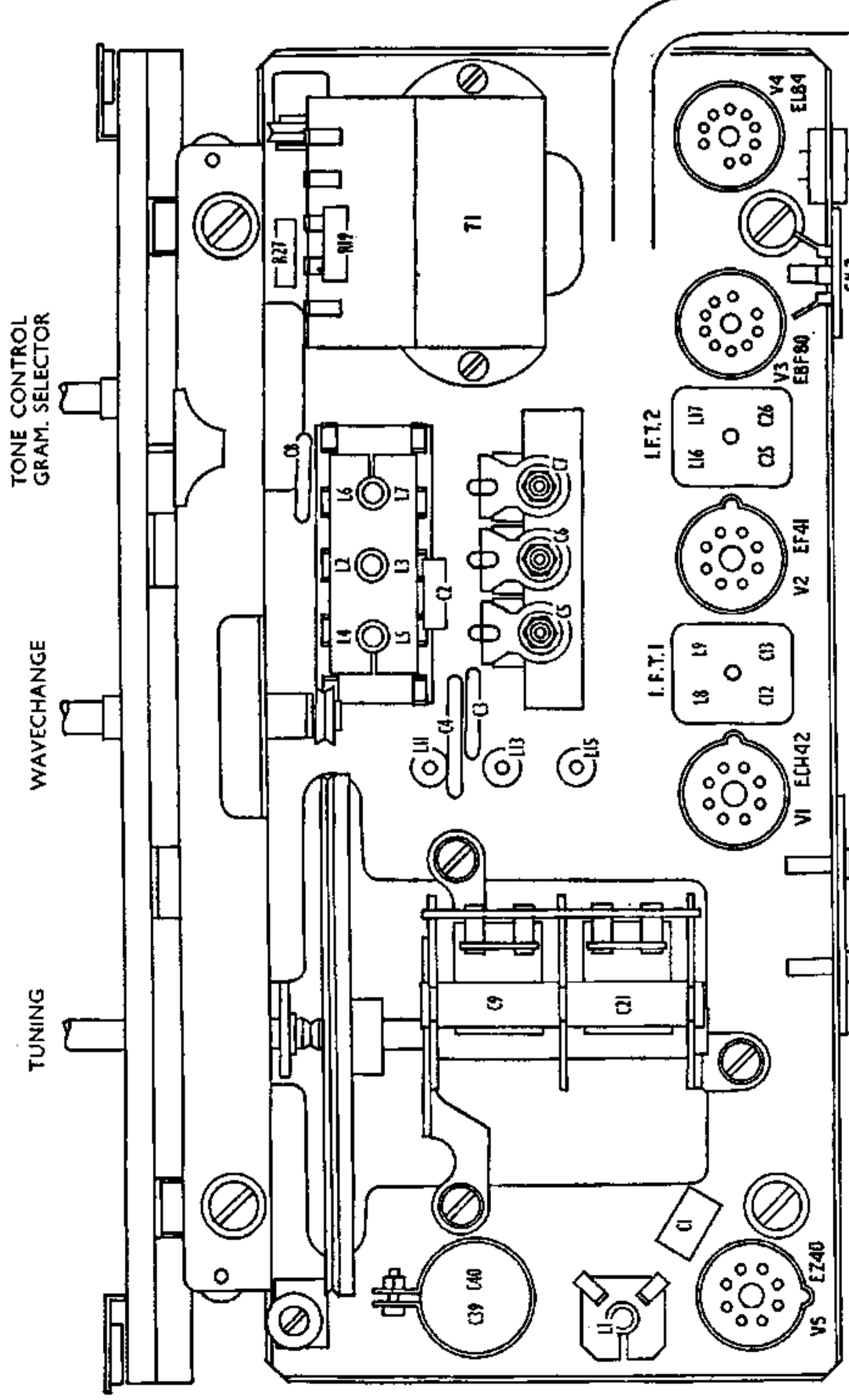
CHASSIS REMOVAL. Disconnect the mains. Remove the nine back cover screws, then withdraw the A.E. plugs, and disconnect the L.S. leads from the 3-way connector. Withdraw the 3-pin plug to pick-up, and the octal plug to the mains transformer. Remove the record container by unscrewing its two base screws and lifting upwards. Remove the V/C rear cover (4 screws) then the two screws holding the bracket and finally, pass the complete V/C assembly into the cabinet.

The chassis is held to its fascia board by four screws at the front. Remove the knobs and these four screws, and the chassis may then be withdrawn.

(Continued on page 5)



Reverse L5 and L7 above.



VALVE BASE DATA

| VALVE | BASE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-------|-------|----|------|------|------|----|----|------|---|------|
| ECH42 | B8A | H | A.H. | A.T. | GT | G2 | GI | K | H | — |
| EF41 | B8A | H | A | K.G3 | K.G3 | G2 | GI | K.G3 | H | — |
| EBF80 | NOVAL | G2 | GI | K.G3 | H | H | A | D | D | K.G3 |
| EL84 | NOVAL | — | GI | K | H | H | — | A | — | G2 |
| EZ40 | B8A | H | A | — | — | — | A | K | H | — |

D.C. RESISTANCE OF WINDINGS

| WINDING | OHMS | PART NO. |
|-----------------------|------|----------|
| L1 I.F. Filter | 10.8 | DP13936 |
| L2 S.W. Aer. Pri. | 0.15 | DP22063 |
| L3 S.W. Aer. Sec. | 0.11 | |
| L4 M.W. Aer. Pri. | 6.9 | SAI704 |
| L5 M.W. Aer. Sec. | 3.8 | |
| L6 L.W. Aer. Pri. | 16.7 | SA5215 |
| L7 L.W. Aer. Sec. | 24.8 | |
| L8 I.F. Coil Pri. | 14.0 | SA5210 |
| L9 I.F. Coil Sec. | 14.0 | |
| L10 S.W. Osc. Pri. | 0.43 | DP22064 |
| L11 S.W. Osc. Sec. | 0.10 | |
| L12 M.W. Osc. Pri. | 0.90 | DP22064 |
| L13 M.W. Osc. Sec. | 2.40 | |
| L14 L.W. Osc. Pri. | 3.30 | SAI704 |
| L15 L.W. Osc. Sec. | 7.50 | |
| L16 I.F. Coil Pri. | 14.0 | SA5215 |
| L17 I.F. Coil Sec. | 14.0 | |
| T1 Output Trans. Pri. | 540 | SA5210 |
| T1 " " Sec. | 0.35 | |
| T5 Mains Trans. Pri. | 37 | SA5210 |
| T5 " " Sec.(H.T.) | 430 | |
| T5 " " Sec.(L.T.) | 0.16 | |

VOLTAGE AND CURRENT DATA

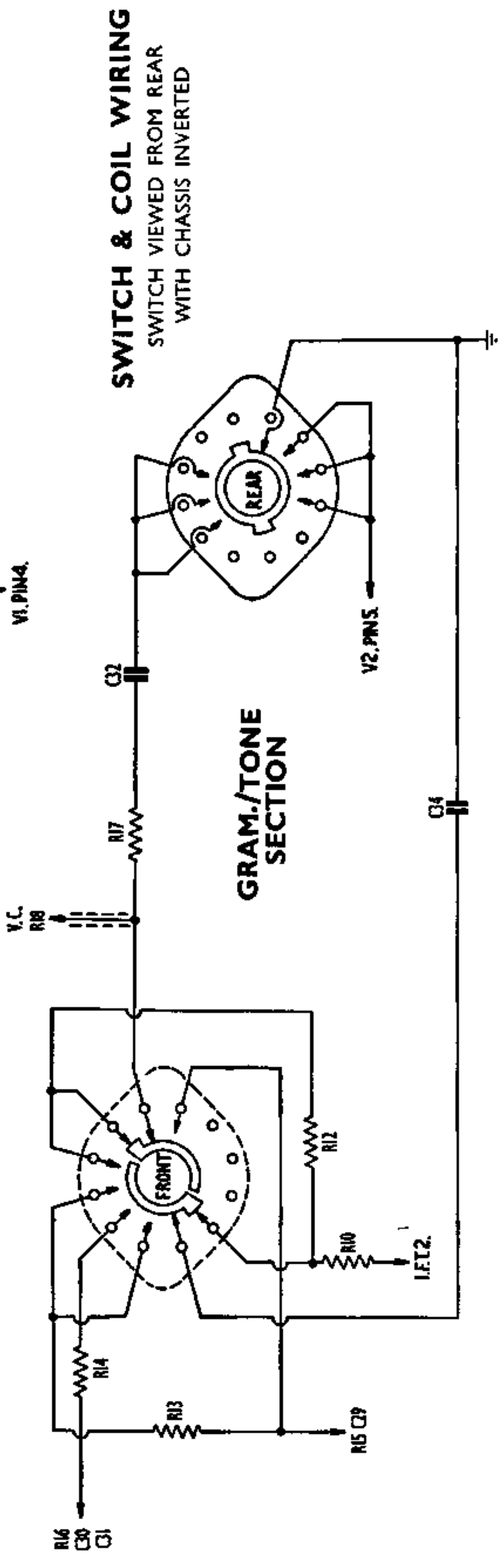
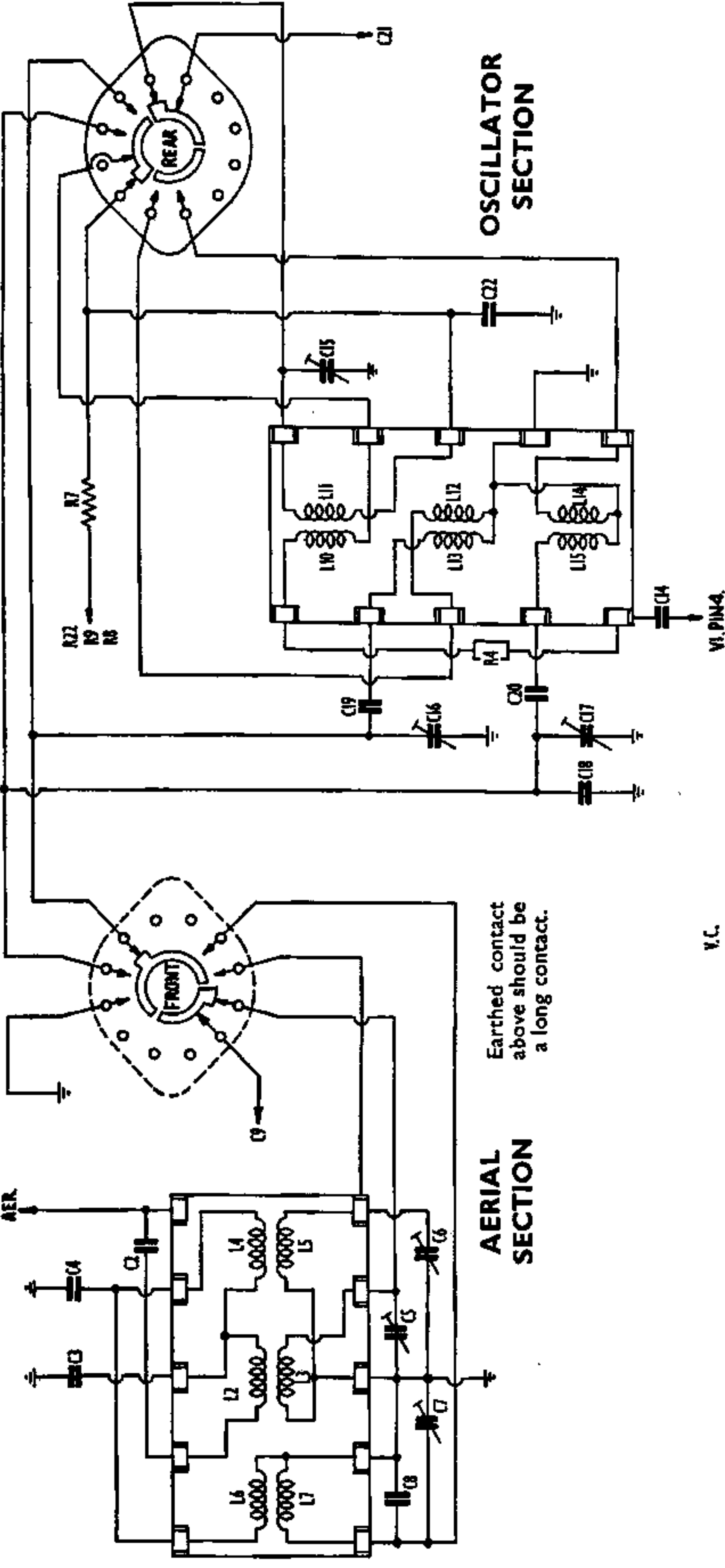
| VALVE | ANODE | | SCREEN | | CATHODE | | GRID |
|-------|----------|------|--------|------|---------|------|------|
| | V | mA | V | mA | V | mA | |
| V1 | 175 | 5.1 | 60 | 3.0 | — | 9.3 | —1.1 |
| V2 | 152 | 4.8 | 80 | 1.4 | — | 6.2 | —1.1 |
| V3 | 55 | 0.4 | 12 | 0.13 | — | 0.53 | —0.9 |
| V4 | 240 | 42.0 | 175 | 4.7 | 4.25 | 46.7 | — |
| V5 | 255 A.C. | — | — | — | 262 | 71 | — |

ECH42 TRIODE ANODE CURRENT

| BAND | FREQUENCY | CURRENT (mA) |
|------|-------------|--------------|
| S.W. | 6 Mc/s. | 3.4 |
| S.W. | 15 Mc/s. | 3.5 |
| M.W. | 550 Kc/s. | 1.2 |
| M.W. | 1,500 Kc/s. | 1.1 |
| L.W. | 150 Kc/s. | 1.3 |
| L.W. | 300 Kc/s. | 1.2 |

All measurements are taken with a 20,000 ohms/volt meter and voltages taken with respect to chassis.

Conditions : Receiver quiescent and set to the L.F. end of the Medium waveband. 230 volts mains input.



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