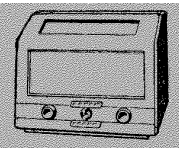
CONFIDENTIAL

This Service Data is for the information of Ekco Appointed Dealers only and must not be copied.

EKCO SERVICE DATA

MODEL A52



MODEL A52 is a five-valve, including rectifier, superheterodyne receiver for operation on A.C. mains.

Design includes, electrical bandspreading, floodlit scale, five tuned wavebands, five pre-selected stations and " Gram " switching. The cabinet is designed with matched walnut veneers, and across the lower front are three controls, left to right :

VOLUME ON/OFF, 12 position SELECTOR switch, TUNING.

On the left side is the 3 position TONE switch.

Sockets are provided for connecting a pick-up and extension speaker.

MAINS SUPPLY : 200-250 volts 40-100 c.p.s. Suitable tappings are arranged on the mains transformer panel and the insulated screw should be inserted into the tapping nearest to the local electric supply.

CONSUMPTION: (TR.1 primary current) 250 milliamps with 225 volts input to the 220-230 volts tapping.

VALVES: V1—ECH35, Frequency changer.
V2—EF39, I.F. amplifier.
V3—EBC33, Demodulator, A.V.C., L.F. amplifier.
V4—EL33, L.F. power amplifier.
V5—AZ31, Directly heated, full-wave rectifier.

Heater voltage for V1 to V4 is 6.3 volts R.M.S. and for V5, 4 volts R.M.S. All valves are Mullard.

PILOT LAMPS: 6.5 volts. 300 milliamps, centre contact screw type.

INTERMEDIATE FREQUENCY: 460 Kc/s.

LOUD-SPEAKER IMPEDANCE: 3 ohms at 400 c.p.s. An external loud-speaker should have a similar impedance. The type fitted in the receiver or an Ekco Type ES31 low impedance speaker is suitable.

Incorporated into the output circuit is the screw type switch, S20, to disconnect the internal speaker, but S20 should not be unscrewed unless an extension speaker or similar load is connected to the EXT.L.S. sockets.

PICK-UP: For a satisfactory output level from the loud-speaker, the output to V3 grid should be approximately 0.3 volts ; most types of pick-up are capable of supplying this.

When using the pick-up, connect the leads to the plugs provided and insert them into the lower pair of sockets on the rear centre panel. Turn the selector switch to either a left or right horizontal position.

WAVERANGES:

S.W.1	21.5— 26.5 Mc/s.		13.95—	11.32 metres.	
S.W.2	15 — 18.5	,,	20 —	16.2	,,
S.W.3	5.8— 12.2	,,	51.7 —	24.6	,,
M.W.	1500 —545 Kc s.		200 —	550	,,
L.W.	300 —150	,,	1000 —	2000	,,

CIRCUIT DETAILS: Across the aerial and earth is connected a filter L26.C1, tuned to 460 Kc/s, to prevent unwanted breakthrough at approximately this frequency from reaching V1 grid.

As the function of a multiband series aerial circuit is not always understood a brief description follows.

For S.W.1 and 2 the circuit is formed by L2.C2. L4 offers no effective impedance on S.W.1. On S.W.2 L3 is short-circuited and being closely coupled to L4, in effect short-circuits L4.

On S.W.3, the circuit is L4.C2, as the impedance of L2 is very low at the lower frequencies.

L6 and C3 resonate on M.W. with R25 added to damp the response. The slight effect of L2.L4 can be disregarded as can the small by-passing effect of C2.

On L.W. L7 and C3 resonate.

The grid coil L1 is used for both S.W.1 and 2, being connected by the switch S5. Individual grid coils are used on the three remaining wavebands.

Each tuned circuit is connected to V1 grid circuit by the selector switch S6 while the grid section of the gang tuning condenser C57 is connected to the manually tuned circuits by the selector switch S3.

On S.W.1, 2 and 3, the effective capacity of C57 is reduced to give wider tuning—electrical bandspread—by connecting C57 to the respective tuned circuits via series and shunt condensers.

Switch S1 shortcircuits L3 on S.W.2. S2 and S4 connect the M.W. and L.W. grid coils to the respective trimmers for the pre-set selector positions.

In the oscillator section, Colpitts oscillator circuits are used on S.W.1 and 2 and the pre-selected positions, but in the former case the circuit is modified by the use of a small feed-back winding L16 in the oscillator grid. This winding, although connected in series with the remaining oscillator grid coils has no effect on the lower frequencies.

On S.W.3, M.W. and L.W. the usual H.F. transformer type of oscillator circuit is used, the anode circuit being tuned.
As in the aerial circuits a common coil L17 is used on S.W.1 and 2, being connected by the switches S8 and S9.

The oscillator section of the gang tuning condenser C58 is connected to the manually tuned circuits by S12, and for S.W.1, 2 and 3, via series and shunt condensers for electrical bandspread.

Switches S10 and S11 connect the oscillator grid and anode to their respective coils for each waveband.

The beat, or intermediate, frequency appearing in V1 anode circuit is coupled by the first I.F. transformer to V2, amplified and coupled by the second I.F. transformer to the signal diode of V3 for demodulation. In the diode load the rectified low frequency signal component is developed, and, after suitable filtering, is coupled by C38 and applied via the volume control R10 and series grid resistor R26 to the triode section of V3.

From V3 anode, the amplified L.F. signal passes through a resistance/capacity circuit to V4 for final amplification and is then transformer coupled to a low impedance, permanent-magnet loud-speaker.

The R/C circuit between V3 and V4 is a combined tone balance and negative feed-back network of special design.

R19.R20 and C48 constitute a top frequency attenuator with C45 giving additional top cut, and the series resistor R23 serves to prevent switch clicks.

C59 gives a small top boost, by decoupling some of the inverse voltage feed-back at the higher frequencies.

C44 has the dual function of L.F. coupling condenser to V4 grid and forming part of the feed-back circuit with R22.R21 and C47.

This circuit has a very high impedance at low frequencies and, being limited by R28, inverse feed-back is effectively cut off below about 70 c.p.s.

Tone control switches S16.S17 and S18 with their associated resistors and condensers are connected into this network to give three separate degrees of tone balance.

Position 1. The high frequency inverse voltages being fed back are decoupled to a larger degree by shunting C59 with C46, thereby giving a boost to the higher frequencies.

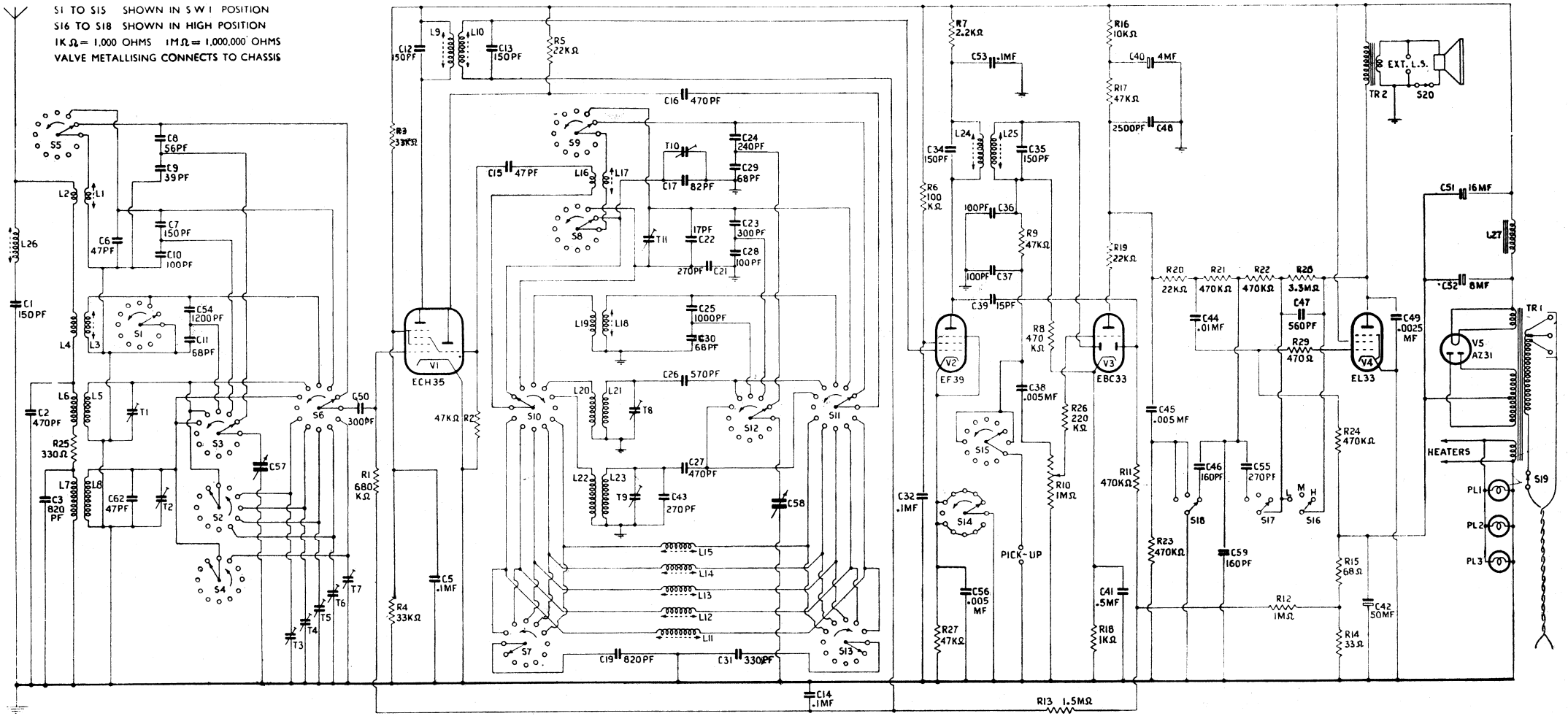
Position 2. C46 is disconnected and top boost reduced. In addition R23 is short-circuited and allows the top cut effect of C45 to operate.

Position 3. The effective impedance of the feed-back circuit is reduced by short circuiting R28.C47 and shunting R22 with C55. This allows more inverse feed-back to occur at the highest and lowest frequencies resulting in a reduced bass with further top cut.

GRAM positions. It will be noticed that the aerial and oscillator switches S1 to S13 are all " open " in position 6 and 12 (the gram positions), so that with the tuned circuits disconnected no radio signals will be heard. In addition V2 is effectively muted by the function of S14. Ganged to S1—S13, it is also " open " on positions 6 and 12, so removing the short circuit from the cathode resistor R27 and condenser, C56. Some 25 volts are developed across R27 and this cuts off V2.

S15, also ganged to S1—S13 connects the pick-up, if used, to the input circuit of V3 triode.

(Continued on page 3)



CIRCUIT DIAGRAM

A.V.C.: Delayed A.V.C. voltage is obtained by coupling a small part of the signal from V2 anode via C39 to the second diode of V3. The rectified voltage developed across the diode load R11.R12 is suitably filtered and fed to the control grids of V1 and V2.

Diode delay voltage is obtained partly across the cathode resistor R18 and partly across R14 to which the end of the diode load is connected.

POWER SUPPLY AND BIAS: These circuits are quite standard, the necessary alternating voltages being provided by TR.1. A directly-heated full-wave rectifying valve, V5, is used for D.C. supply, the output being taken off from the heater and smoothed by C52, L27 and C51. Bias voltage is developed in the H.T. return lead across the fixed potentiometer R14, R15. Full bias is fed via R24 and R29 to V4 control grid and a suitable voltage is taken from the junction and fed via the A.V.C. line to the control grids of V1 and V2. It is important to note that the metallic case of the twin electrolytics C51.C52 and the case of C42 are insulated from chassis, both being connected to the negative side of the bias potentiometer.

CHASSIS REMOVAL: Note—To reduce the need for removing the chassis from the cabinet, the wooden base plate is removable, held only by 6 small wood screws. The underside of the chassis can therefore be exposed sufficiently for most tests to be carried out. First remove the back cover held by seven screws into the cabinet and two into the chassis, then the four control knobs.

Remove the wood screw at each extreme end of the pointers guide rail. Remove the light diffuser strip, at the back of the scale, held by a 4BA screw each end.

Remove the four 2BA screws and large washers from the base of the cabinet. Untie the speaker leads from around the speaker magnet.

Slide back the chassis about half-way then tilt forward a little to allow the pointer tips to clear the cabinet top. **Take good care not to tilt too far forward and so mark the scale.** Withdraw chassis to the extent of the speaker leads.

SPEAKER REMOVAL: With the chassis removed, simply loosen and turn the four speaker clamps, and lift out speaker. When replacing with a different make of speaker, ensure that the drive system is not fouled.

BAFFLE AND GRILLE REMOVAL: With the chassis and speaker removed, remove the ten wood screws securing the baffle.

DRIVE WIRE/CORD REPLACEMENT: In the rare event of the steel wire section breaking, a new length with ready-made loops may be obtained under Part No. B.33563.

(**Note.**—Before fitting new cord, it should be stretched for about 24 hours to prevent slack drive developing after short use. Suggested method: take a length of cord and hang a weight of 14 pounds on bottom end.)

To renew the cord section, take a new length of approximately 34 inches and securely tie off one end to the wire loop. Fully mesh the gang tuning condensers.

Pass the free loop end of the wire section through the left hand upper rim slot in the drive wheel and hook on to the corresponding lug. See diagram. Lay in the wire and cord as shown, and finish up by passing the cord end through the right hand rim slot, pulling the cord reasonably tight. Hook on the spring to the second lug on the drive wheel and pass the cord through the free loop of the spring. Pull the cord end upwards until the spring stretches half an inch and tie off at this point.

To assist the tie off, hold the cord and spring together with a pair of tweezers or similar, then unhook the spring and tie off. Hook on the spring.

Fit the pointers assembly to the cord by clipping the cord round the small tongue in the slider.

POINTER SETTING: With the gang fully meshed, the pointers should be in line with the low frequency ends of their respective scales. Where a large error occurs, slide the pointers assembly along the drive cord as necessary.

For a constant small pointer error, the glass scales can be moved bodily to either side to correct the error. To do this, loosen the three screws holding the scale top edge and slide the scale as required. Tighten screws. This must of course only be done when the chassis is screwed into the cabinet.

ALIGNMENT: Switch to Medium and fully close the gang. Adjust the pointers as and if necessary. To the EXT.L.S. sockets connect an output meter such as a low A.C. volts range of an AVOMETER. Connect the signal generator earth to earth of the receiver and connect the output lead via a 0.1 mfd. capacitor to the top cap of V1. Inject a modulated 460 Kc/s. signal and adjust all four cores of the intermediate frequency transformers in the following order for maximum output. Second I.F. transformer upper and lower, first I.F. transformer upper and lower.

Reduce the input to 200 microvolts (below A.V.C. operating level) and repeat adjustments.

When correctly aligned, an output of 50 milliwatts should be obtained with an input of 100 microvolts.

NOTE ON CALIBRATION: This operation should not be carried out unless an accurate signal generator is available. This particularly applies to the S.W. frequencies.

CALIBRATION: Connect the signal generator leads to aerial and earth respectively.

Switch to M.W.
Tune to and inject 1200 Kc/s. and adjust T8 then T1.
Switch to L.W.
Tune to and inject 270 Kc/s. and adjust T9 then T2.
Switch to S.W.3.
Tune to and inject 7 Mc/s. and adjust the cores of L18 and L3.
Switch to S.W.2.
Tune to and inject 15 Mc/s. and adjust the core of L17.
Tune to and inject 18 Mc/s. and adjust T11 and L1 core.
Repeat these adjustments until there is no further improvement. (Any error on S.W.2 will cause corresponding errors on S.W.1.)
Switch to Waveband 1.
Tune to and inject 21.5 Mc/s. and adjust T10.

COIL AND SWITCH UNIT: On the front of the centre panel are the aerial coils and capacitors for wavebands 1, 2 and 3, along with the aerial switches S2.S3.S6 grouped on one wafer.

On the rear of the panel are assembled the oscillator counterparts, plus the remainder of the ganged switches.

No modifications of any kind should be attempted on this unit, and where component changing becomes necessary it is important that identical components are used and the wiring kept in its original form. By this, it is meant that leads lengths are not exceeded and the wires kept in their same relative positions.

When removing this unit it will be more practical to remove the pre-set coil and trimmer unit also, to obviate the removal of 15 additional leads. From the coil and switch unit there are 22 connections to be removed. In addition there is the earth lead from the 5 bank trimmers and the pilot lamp lead running to V4 socket.

All the connections, except perhaps two, are accessible and can be disconnected at their most convenient ends.

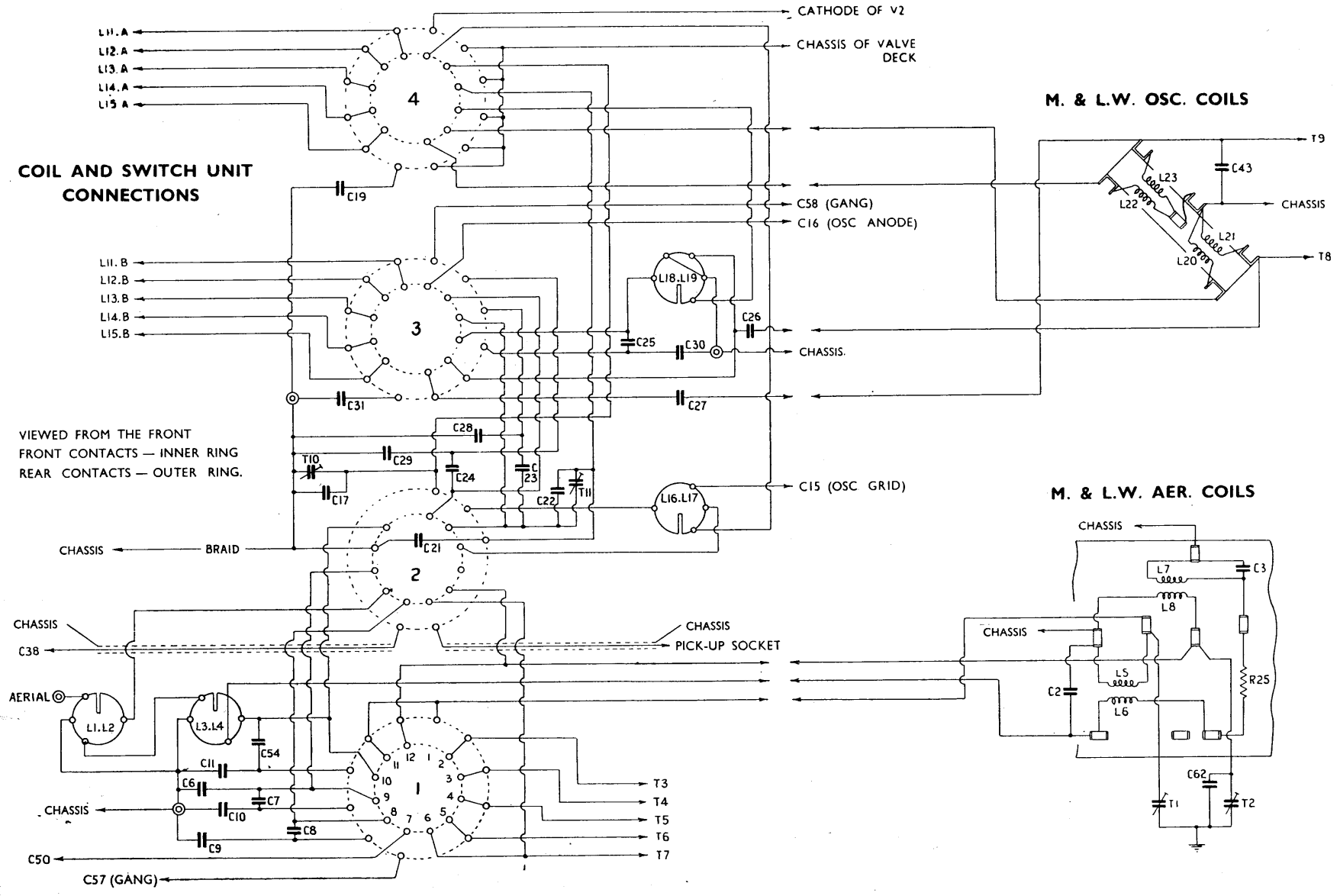
The " odd " leads are not readily apparent, but the first connects from the soldering tag adjacent to the S.W. aerial coils to a chassis soldering tag hidden by the unit. Obviously this lead can only be disconnected at the first named tag. The second lead is a copper braid soldered to chassis at the opening for T10.

With all these leads disconnected, remove the two self threading screws and two 4BA nuts and screws from the front plate, the 6BA nut and screw at each end of the centre panel, then the four 6BA nuts and screws securing the coil and trimmer unit.

Ease back this latter unit to expose the two 6BA screws holding the bracket at the rear of the switch. Remove these. The double unit can now be lifted out.

When refitting, reverse the procedure. Full wiring details are given in the diagrams.

COIL AND SWITCH UNIT CONNECTIONS



M. & L.W. OSC. COILS

M. & L.W. AER. COILS

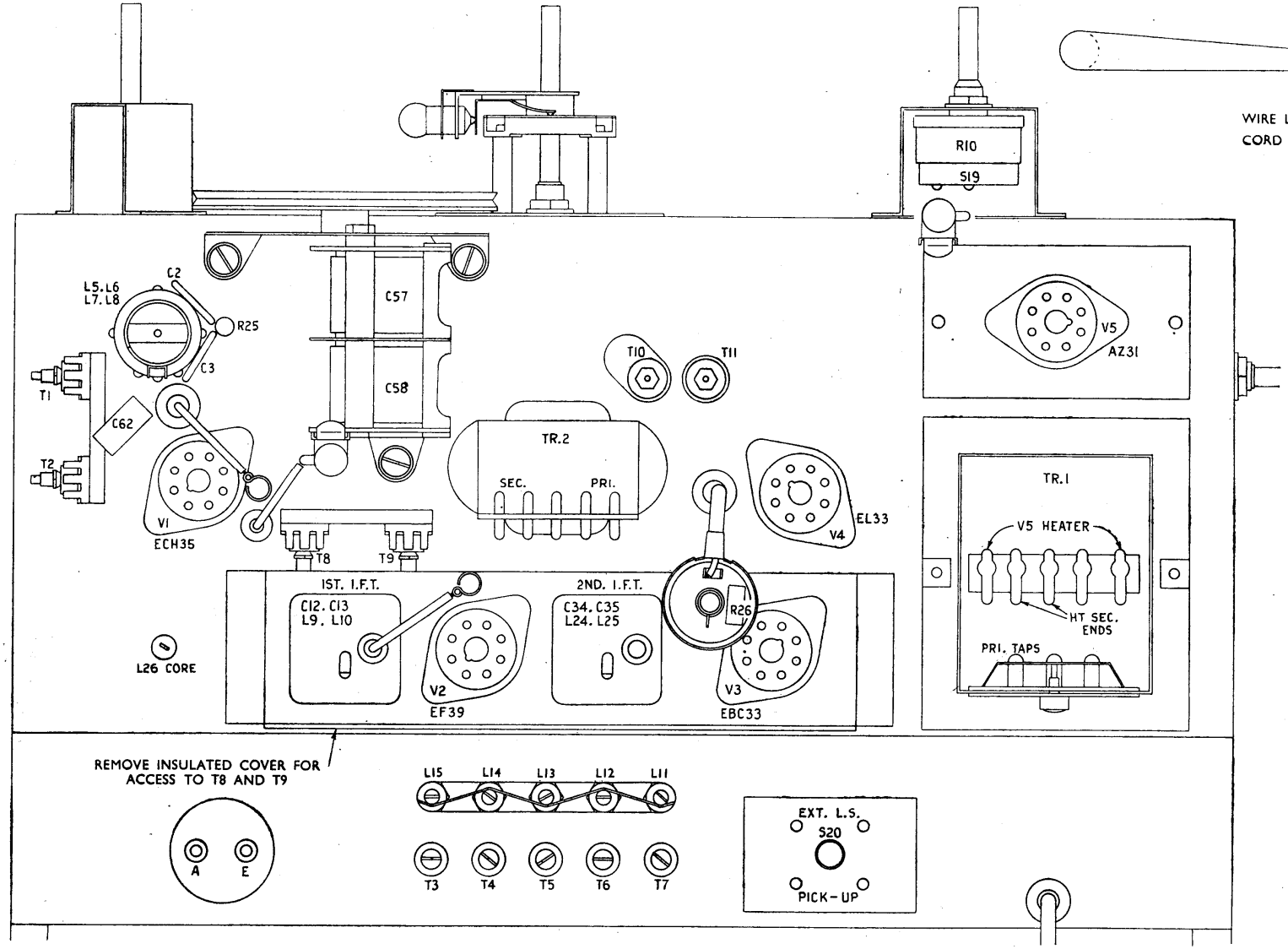
RESISTANCE OF WINDINGS

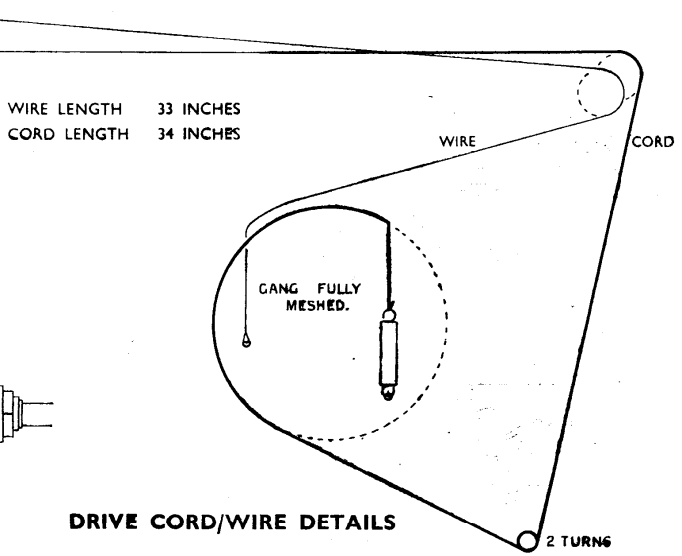
WINDING	OHMS
L1	LESS THAN 1
L2	" " 1
L3	" " 1
L4	" " 1
L5	5
L6	13.5
L7	38
L8	31
L9	9
L10	9
L11	3.7
L12	4
L13	3.5
L14	2
L15	1.8
L16	LESS THAN 1
L17	" " 1
L18	" " 1
L19	" " 1
L20	1.2
L21	3
L22	2
L23	6.5
L24	9
L25	9
L26	8.5
L27	540
TR.1 PRI.	37 + 4 + 4
SEC.	295 + 320
TR.2 PRI.	485
SEC.	LESS THAN 1

VOLTAGE AND CURRENT DATA

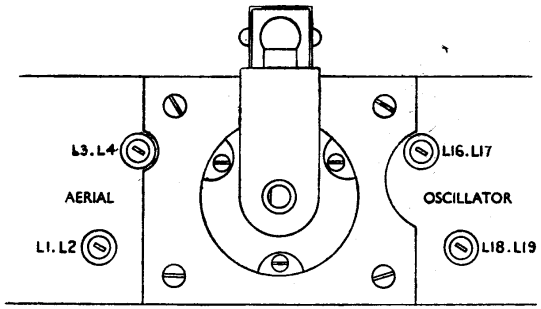
	VALVE	VOLTS	M.A.
1	ANODE	250	3.0
	OSC. ANODE	110	4.8
	SCR. GRID	84	3.0
2	ANODE	233	5.5
	SCR. GRID	79	1.5
	CATHODE*	25	—
3	ANODE	91	1.8
	CATHODE	1.8	1.8
4	ANODE	232	36.0
	SCR. GRID	250	3.7
5	ANODES	290 RMS	70.5
	H.T. OUTPUT	285	62.0

VOLTS ACROSS R14 & R15 6V.
VOLTS ACROSS R14 2.5V.
* ON " GRAM " POSITIONS ONLY.
CONDITIONS: SET TUNED TO 550 METRES.
NO SIGNAL INPUT. 225V. MAINS INPUT.
HIGH RESISTANCE VOLTMETER.
CHASSIS AS " NEGATIVE."

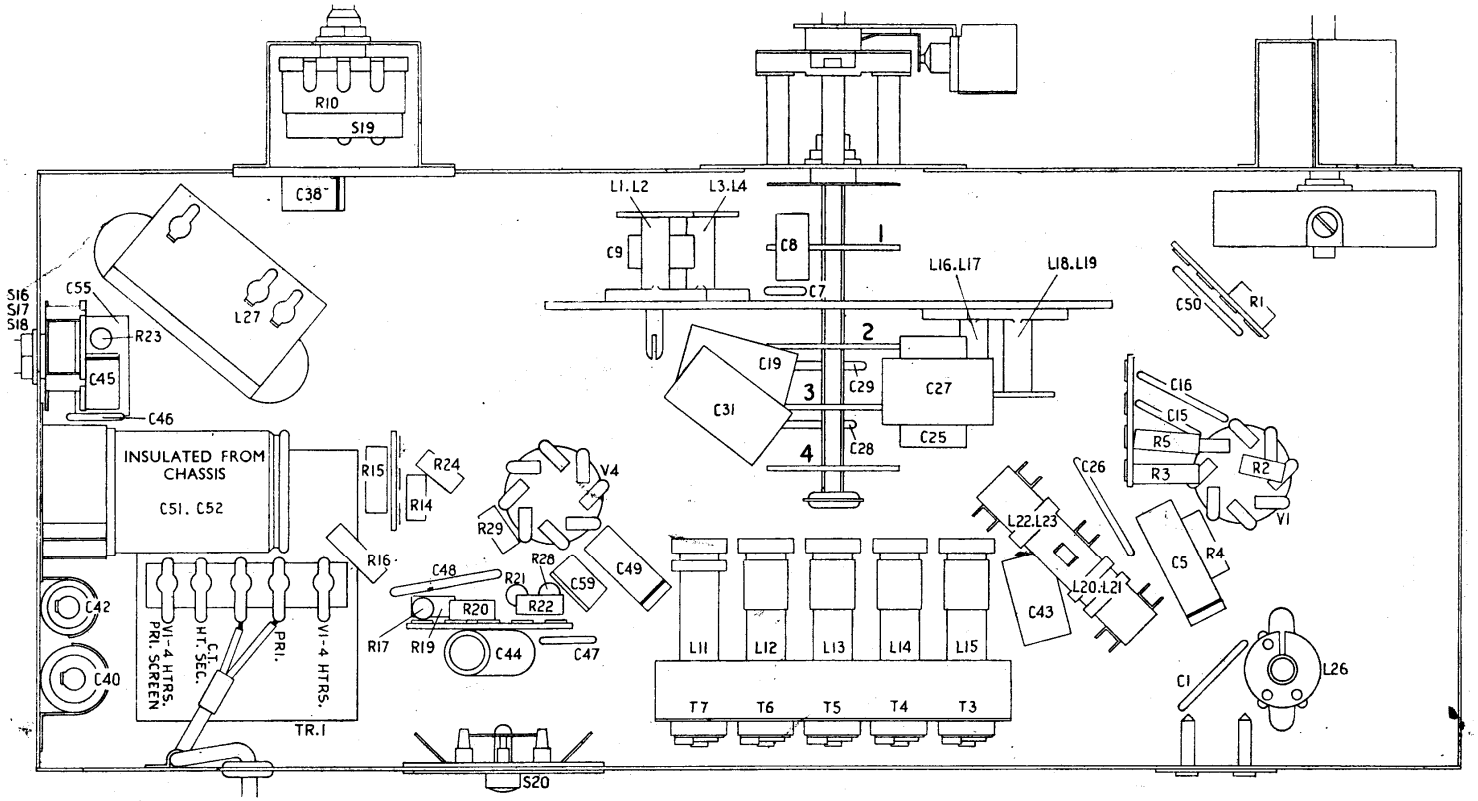




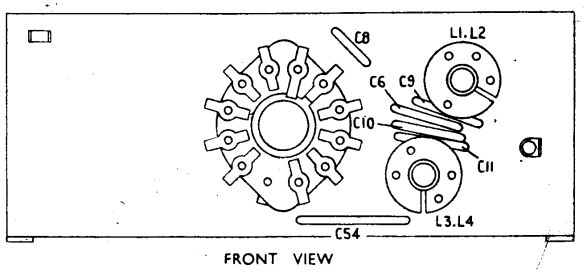
DRIVE CORD/WIRE DETAILS



PART OF CHASSIS FRONT, SHOWING CORES



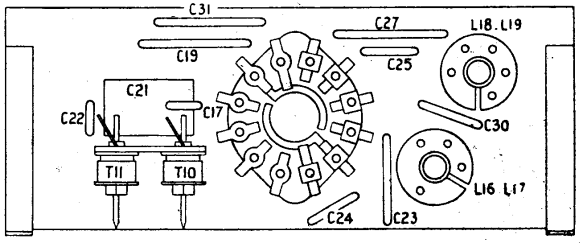
UNDERNEATH OF CHASSIS



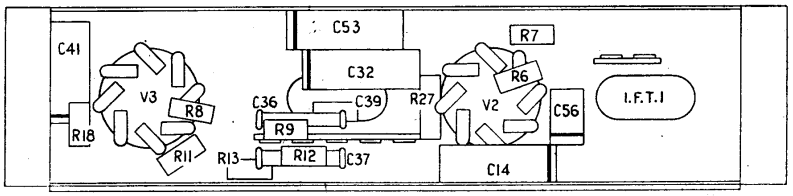
FRONT VIEW

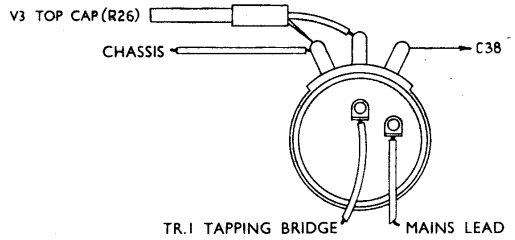
COIL AND SWITCH UNIT

REAR VIEW

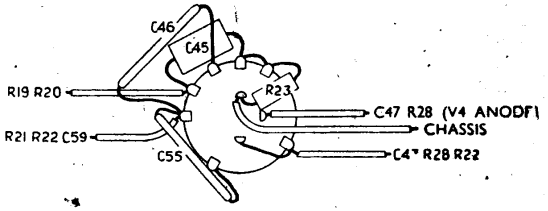


UNDERNEATH OF VALVE DECK





VOLUME CONTROL



TONE CONTROL

SERVICE DEPT., E. K. COLE Ltd.,
Somerton Works, Arterial Road,
Southend-on-Sea
'Phone: Southend 2296
Head Office: Ekco Works, Southend-on-Sea

SCOTTISH SERVICE DEPOT:
Ekco Works, Duchess Road,
Rutherglen, Lanarkshire
'Phone: Rutherglen 2240/3

NORTHERN SERVICE DEPOT:
55, Whitworth Street,
Manchester
'Phone: Central 6711/2

WESTERN SERVICE DEPOT:
14, Redcross Street,
Bristol
'Phone: Bristol 26311