



MODEL CR68 is specially designed for use in motor coaches. Separate versions are available for 12 volt or 24 volt operation and either version may be obtained with direct or extension controls. It is a 5-valve, including rectifier, pre-set tuned superheterodyne receiver offering one L.W. and five M.W. programmes. Provision is made for the use of a microphone. *The only external components are the loud-speaker(s), aerial, microphone and its transformer and the battery. On the models with extension controls, the pilot lamp is also external. The two main controls are right: STATION SELECTOR; and left, VOLUME ON/OFF.

A RADIO-MICROPHONE switch is fitted at the lower left of the main front plate.

BATTERY VOLTAGE AND CONSUMPTION 12 volts, 2.7 amps. 24 volts, 1.7 amps.

BATTERY CONNECTION: The battery lead should be connected to the "A2" terminal on the voltage regulator unit mounted on the bulkhead of the coach.

FUSES: 12 volts, 5 amperes. 24 volts, 3 amperes.

Higher rated fuses should not be used.

The fuse is inserted in the spring-loaded fuse socket in the battery lead, which should be examined to ensure that it contains an insulating sleeve. Absence of this sleeve will cause the fuse to be short circuited.

VALVES: V1—ECH 21 Frequency changer.
V2—EF22 I.F. amplifier.
V3—EBL21 Demodulator, L.F. power amplifier.
V4—EF22 L.F. amplifier.
V5—EZ35 I.H. full-wave rectifier.

V1 to V4 have Loctal bases, V5 an international octal base. All valves are Mullard.

Note.—As valve heaters are wired in series/parallel, do not remove any valve whilst the supply is switched on.

NON-SYNCHRONOUS VIBRATOR: 12 volts Part No. C19878. 24 volts Part No. C34549.

IMPEDANCE AT LOUD-SPEAKER TERMINALS: 1.5 to 3 ohms at 400 c.p.s. When two speakers are used, wire in parallel, and when using four, wire in series/parallel.

INTERMEDIATE FREQUENCY: 465 Kc/s. The I.F. transformers are tuned by iron dust cores.

MICROPHONE: Moving Coil hand-set or throat-type.

CIRCUIT DETAILS: Signals from the aerial pass through a U.H.F. filter L1, C8, an I.F. filter L16, C9, and a series aerial condenser C5 to V1 grid circuit. The U.H.F. filter is effective over the accepted band width of spark interference. The I.F. filter is permeability tuned to 465 Kc/s to suppress any break-through of signals at or about the intermediate frequency. C6 the aerial trimming condenser, when set in conjunction with the aerial capacitance, forms a suitable shunt capacity to allow the grid coils to be resonated over their allotted ranges.

Signal voltages developed in the tuned grid circuit are coupled by C10 via the grid stopper R2 to G1 of V1.

The oscillator circuit formed by an oscillator coil and C1, C7, C32 is a Colpitt's type and operates on the high frequency side of the aerial signal. C2 is a D.C. blocking condenser and R4 the oscillator grid leak. The beat or intermediate frequency appearing in V1 anode circuit is coupled by T1 to V2, amplified and coupled by T2 to V3 diode circuit for demodulation.

C21 is an H.F. by-pass condenser. The rectified L.F. component developed across the diode load, R8, is passed via the potentiometer formed by R9, R10, through the RADIO/MICROPHONE switch S5, then partly to V4 control grid (through the decoupling resistor R14) and partly through R10 as A.V.C. voltage. The microphone voltage is fed to V4 grid via the microphone transformer T5, C4 and S5.

The function of R17, S7 is described under switching details.

From V4 anode, the amplified output is R.C. coupled by C28, R16, to the pentode section of V3 for final amplification before being fed by the output transformer to the loud-speaker.

A.V.C. voltage is filtered by R10, C15, R1 and applied to the grid circuits of V1, V2, and V4.

Bias is developed in the H.T. return lead across R13 and filtered by the network R12, C22, R15, C29, before being fed via R16 to V3 pentode grid and R21 to V1 grid.

Prior to the ON/OFF switch S6, in the input lead is included a U.H.F. filter L14, C33, and an additional 0.1 mfd. condenser C13 to prevent any interference carried by the battery circuit from reaching the receiver by way of the H.T. system and heater wiring. Between the vibrator and the valve heaters connection is a filter to keep vibrator hash and ripple from the heaters and car wiring.

The interrupted D.C. caused by the operation of the vibrator contacts induces an A.C. voltage across the vibrator transformer primary. This in turn induces a higher A.C. voltage across the secondary which is rectified by V5 to provide the H.T. supply. The 12-volt transformer secondary is tuned by C26, C27 and the 24-volt transformer primary by C18, while C26, R27 is a phase changing network necessary on the 24 volt model, to minimise sparking at the vibrator contacts. R6, R7, C20 further reduce sparking and thus eliminate R.F. interference. D.C. output of V5 is smoothed by C30, R19, C24.

SWITCHING DETAILS: Switches S1, S2, S3, are the three main (coil) selectors and each occupies a rear face of the three wafers. S4 occupies the front face of the front wafer and therefore operates in tandem with the selectors. Its function is to short-circuit to chassis the screen grid (G2) of V4 during the interval of time between the break and remake of the selectors, thereby silencing switch clicks during station selecting. S7 is the spring-loaded switch in the centre of the main front plate and constructed to close when the cover plate is removed. When the switch is normal (open), the A.V.C. circuit's function to flatten the tuning and thereby minimise fading effects. This condition makes it difficult to adjust the pre-selector controls aurally, as the "peak" is hardly noticeable, especially to the ear.

With S7 closed, as it will be when the pre-selectors are exposed, R17 is connected to chassis to complete an additional potentiometer in V4 grid circuit. The main effect resulting is the removal of sufficient A.V.C. voltage to make the aerial tuning peaks more pronounced.

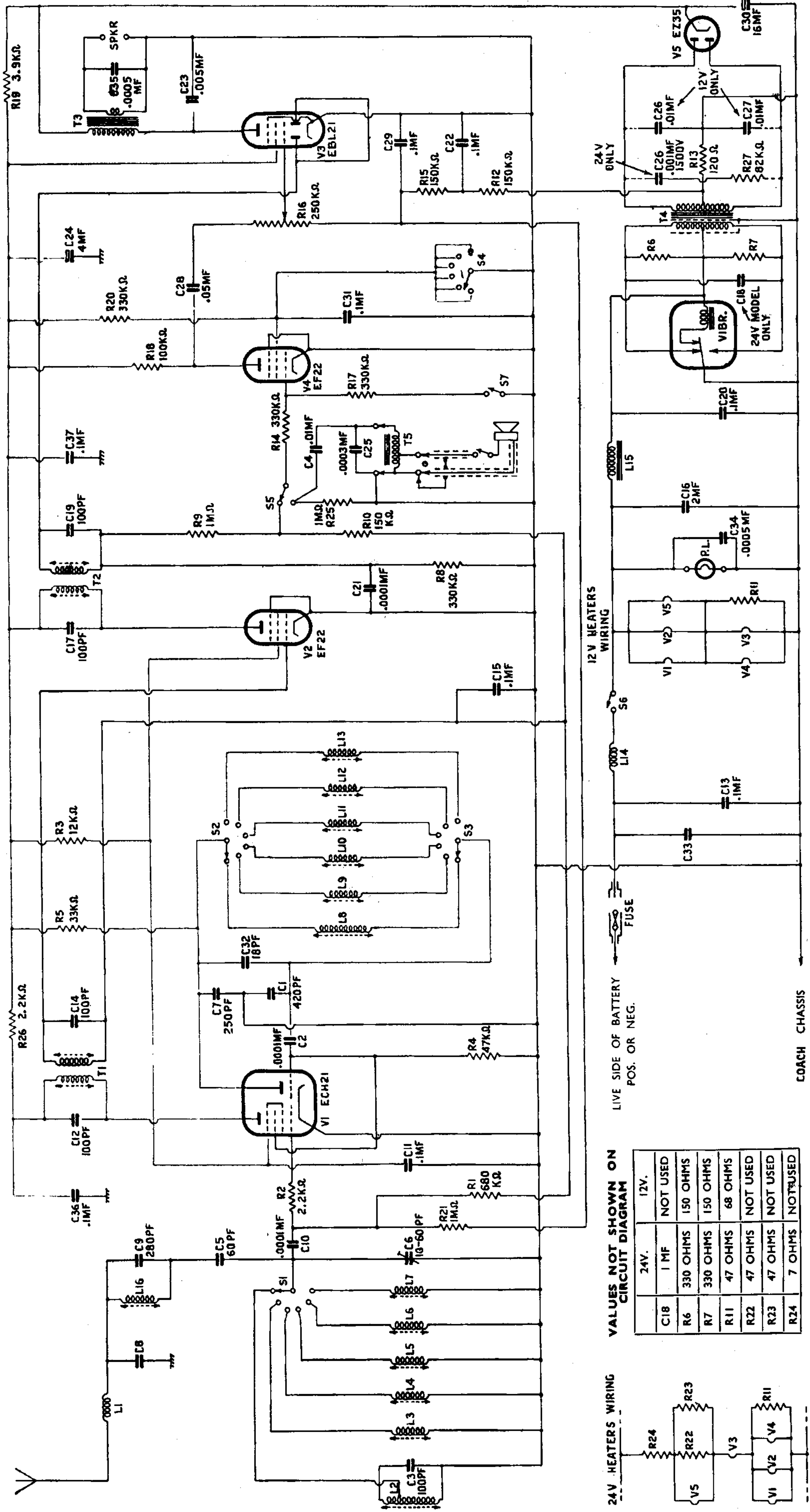
S5 is the RADIO/MICROPHONE switch.

CHASSIS REMOVAL: Assuming that the complete receiver has been removed from the coach, remove the two P.K. self-tapping screws from the top rim of the front plate, the two on the lower rim, then the two 4BA screws at the back. The metal body can now be slipped off.

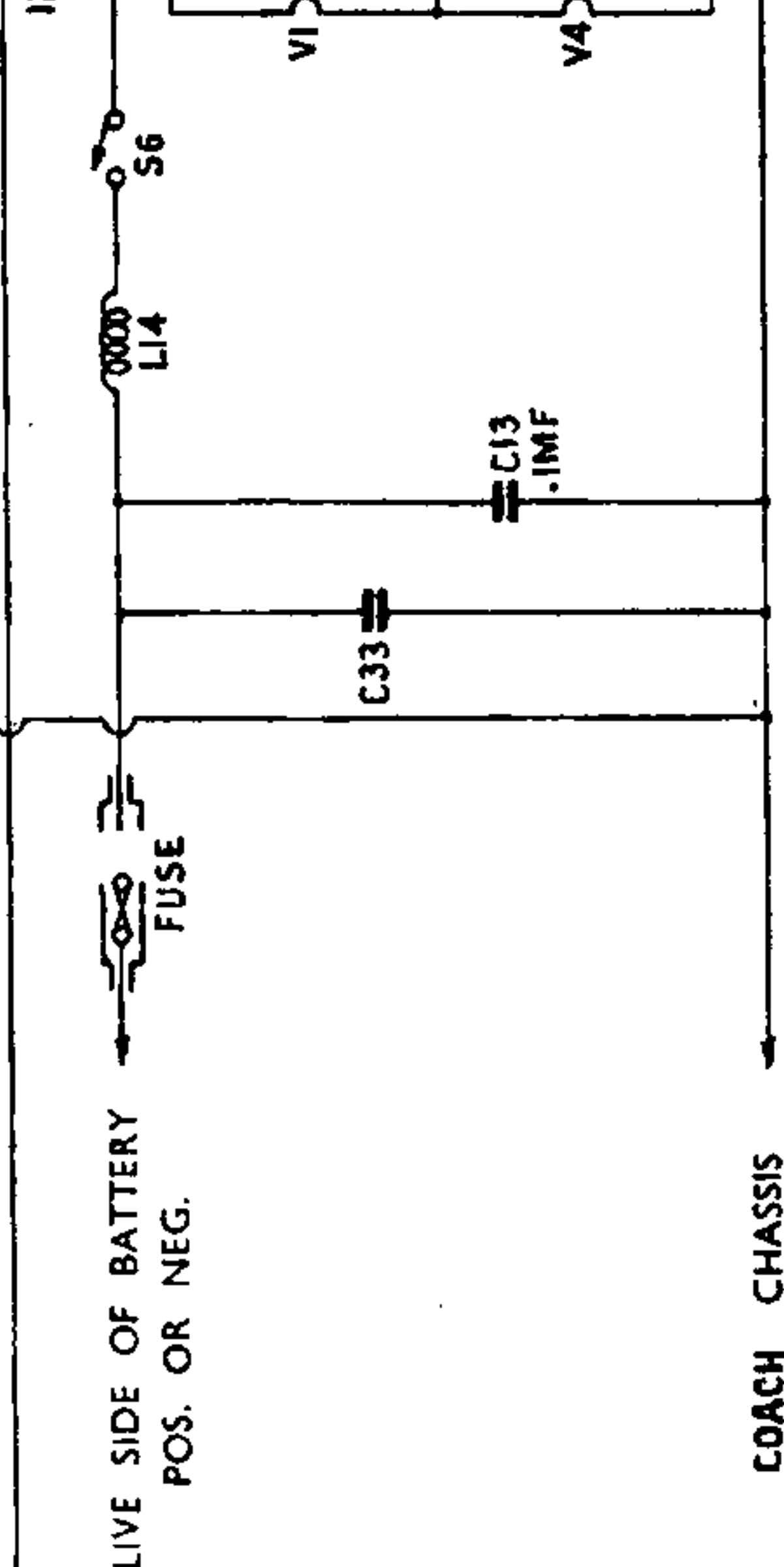
COMPONENT REMOVAL: As some of the components appear difficult to replace the following information is given to save unnecessary dismantling.

Front Plate Assembly. Unsolder the two loud-speaker leads then the three leads and the three resistors from the lower rear of the coil and switch unit.

(Continued page 3)



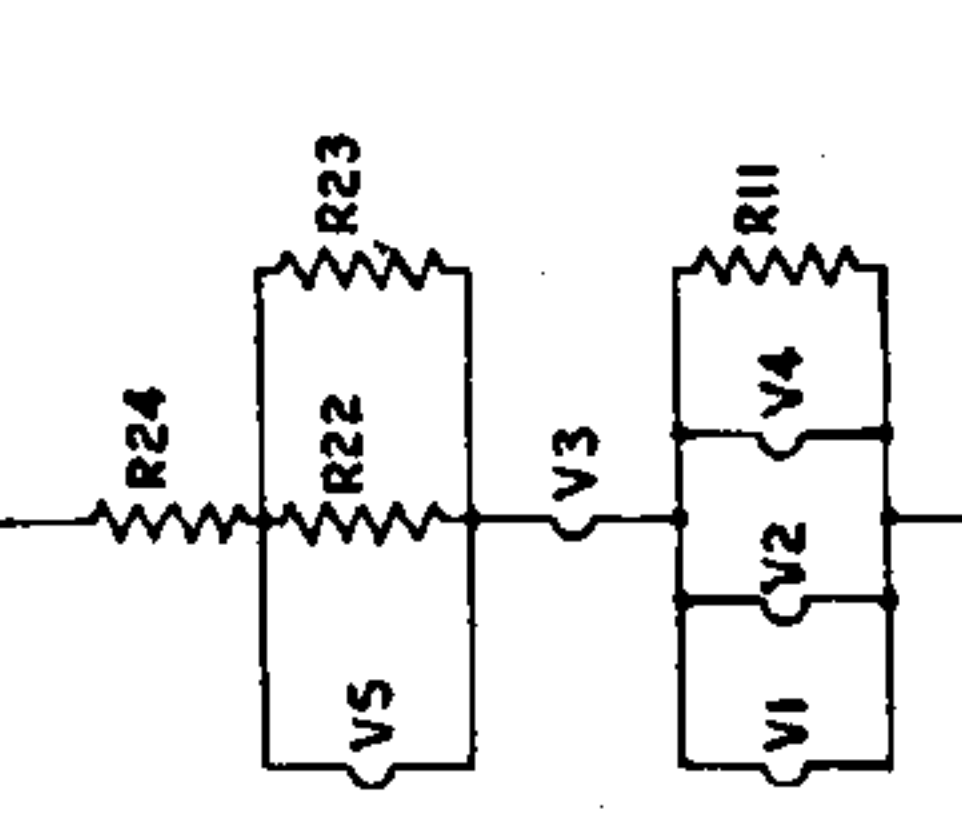
12V HEATERS WIRING



VALUES NOT SHOWN ON CIRCUIT DIAGRAM

Component	24V	12V
C18	1 MF	NOT USED
R6	330 OHMS	150 OHMS
R7	330 OHMS	150 OHMS
R11	47 OHMS	68 OHMS
R22	47 OHMS	NOT USED
R23	47 OHMS	NOT USED
R24	7 OHMS	NOT USED

24V HEATERS WIRING

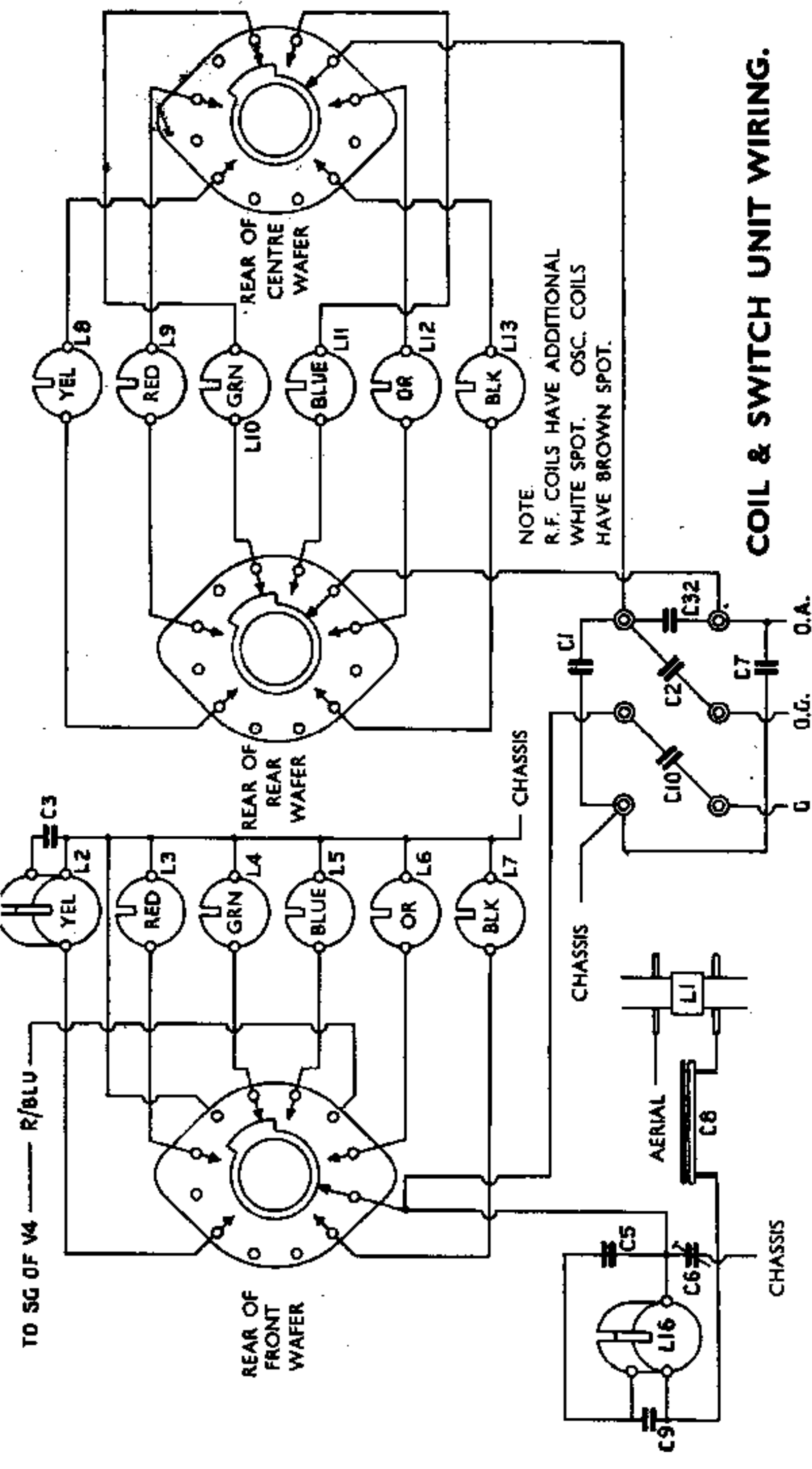


CIRCUIT DIAGRAM

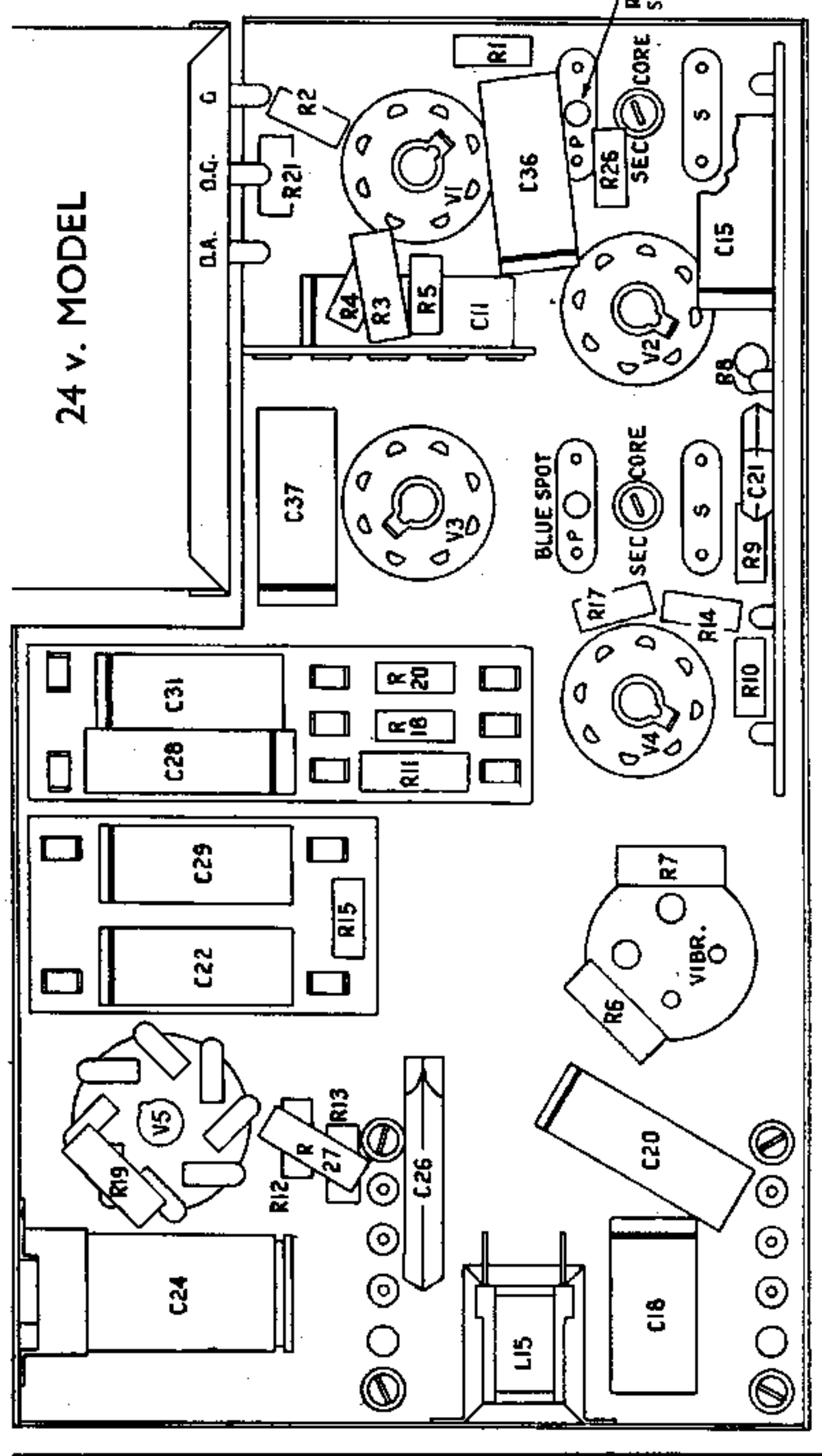
COACH CHASSIS

LIVE SIDE OF BATTERY POS. OR NEG.

FUSE



COIL & SWITCH UNIT WIRING.



24 v. MODEL

COIL UNIT ALIGNMENT: Note.—Do not use unnecessary force when fully unscrewing the adjusters as this may cause the iron dust cores to be broken from the brass stems.

In order to ensure that the adjusters will cover their allotted ranges in accordance with the station setting details in the Instruction Booklet, the coil unit should be realigned as follows: Switch to position 6 (H.F. end of M.W. band) and inject a 200 metres (1,500 Kc/s.) signal to the aerial socket via a capacity of approximately 100 pf. Fully unscrew the core of L7 then adjust L13 core and C6 trimmer for maximum output.

C6 is now correctly set to match the circuits to the dummy aerial in use and all adjusters (including No. 6) may now be reset to the required wavelengths, the calibration being in accordance with the printed instructions.

AERIAL MATCHING: When the set is finally installed in the coach, the only adjustment necessary will be as for the initial installation, i.e. switch to the weakest station of positions 2, 3, 4, 5 or 6, and readjust C6 for maximum output.

Output Transformer. Unsolder the six leads from the tag panel. One securing screw is accessible underneath the chassis, the other being covered by the panel alongside V5. Remove the two 6BA panel securing screws and lift the panel over V5 socket to expose the screw concerned.

I.F. ALIGNMENT: Note.—When adjusting each I.F.T. core, two peaks will be noticed, one each side of the coil centre. Tune to the first peak encountered when screwing in. Connect the receiver to the battery and switch on. Turn the station selector to position 3 (low frequency end of medium waveband) and connect output meter to the loud-speaker tags. Inject a modulated 465 Kc/s. signal via a 0.1 mfd. condenser to the grid G1 of V1.

Adjust all I.F.T. cores for maximum output in the following order: 2nd I.F.T. lower and upper, 1st I.F.T. lower and upper, reducing the signal input as necessary when peaking.

I.F. FILTER ADJUSTMENT: Remain on position 3 and inject a 550 Kc/s signal into aerial socket then adjust the cores of L10 and L4 for maximum output. Inject a 465 Kc/s signal then adjust the core of L16 for minimum output.

Remove the five 4BA screws securing the side wings to the main chassis, then ease the front plate forward slightly. Unsolder the battery input lead from C33 and the two leads from the battery filter unit to S6.

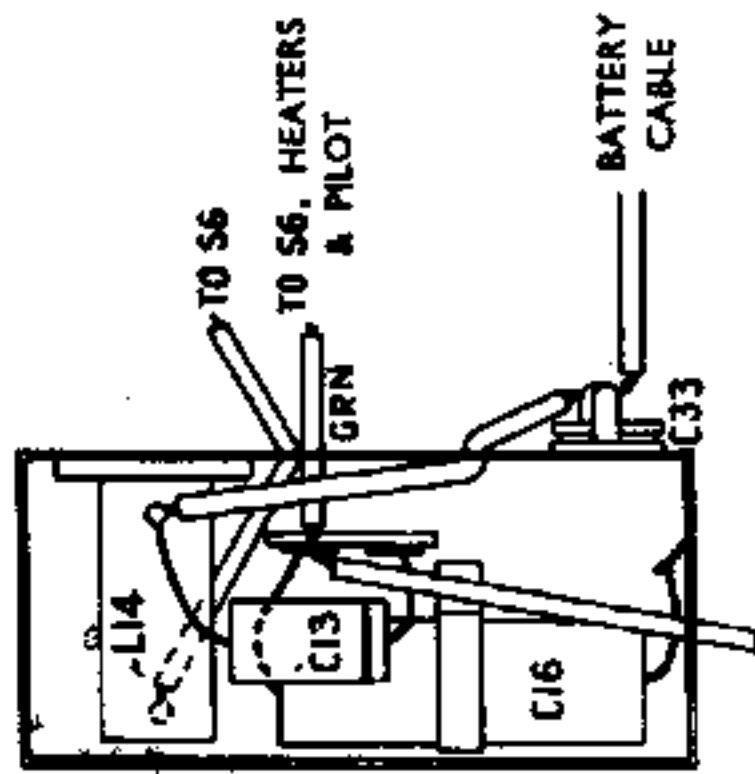
The complete front plate assembly can now be drawn clear to the extent of the cable form. Unsolder these connections as and if necessary.

Coil and Switch Unit. Proceed as above. Remove the facia and knobs or small front plate, as applicable, then the two 4BA screws between the two rows of adjusters and the 4BA round-headed screw below the selector spindle. Unsolder the bonding connection. The unit can now be lifted clear.

Before trying to remove the lid covering this unit, first clean the three outlet tags of surplus solder, etc., to enable them to pass through the insulating strip without breakage.

Battery Filter Unit. Remove the front plate assembly as above, then unsolder the lead from the unit to L15. Remove the base mounting screws on the 4 mfd. condenser, C24. Moving this condenser to one side will expose two P.K. screws. Remove these and the unit can be lifted off.

BATTERY INPUT FILTER

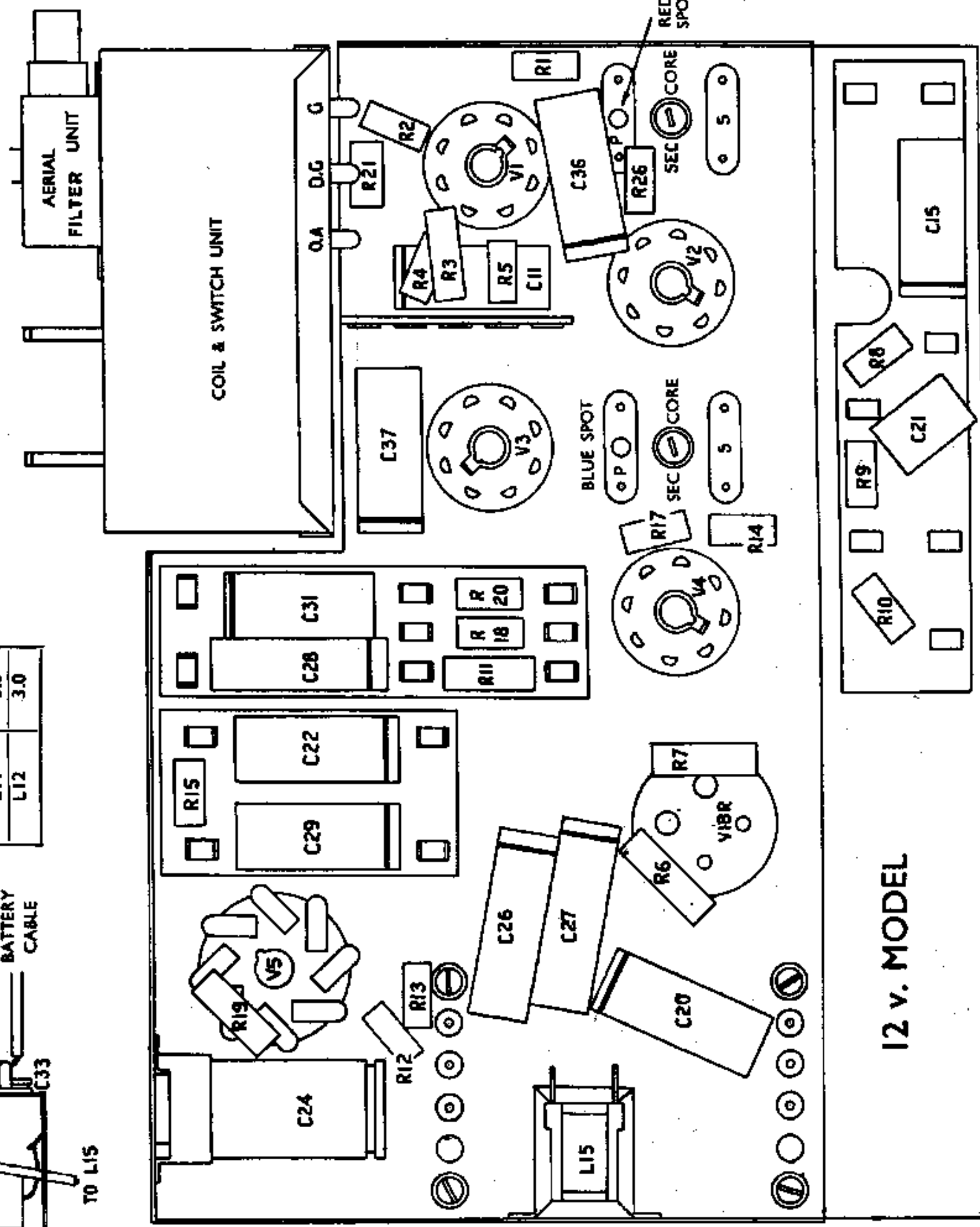


RESISTANCE OF WINDINGS

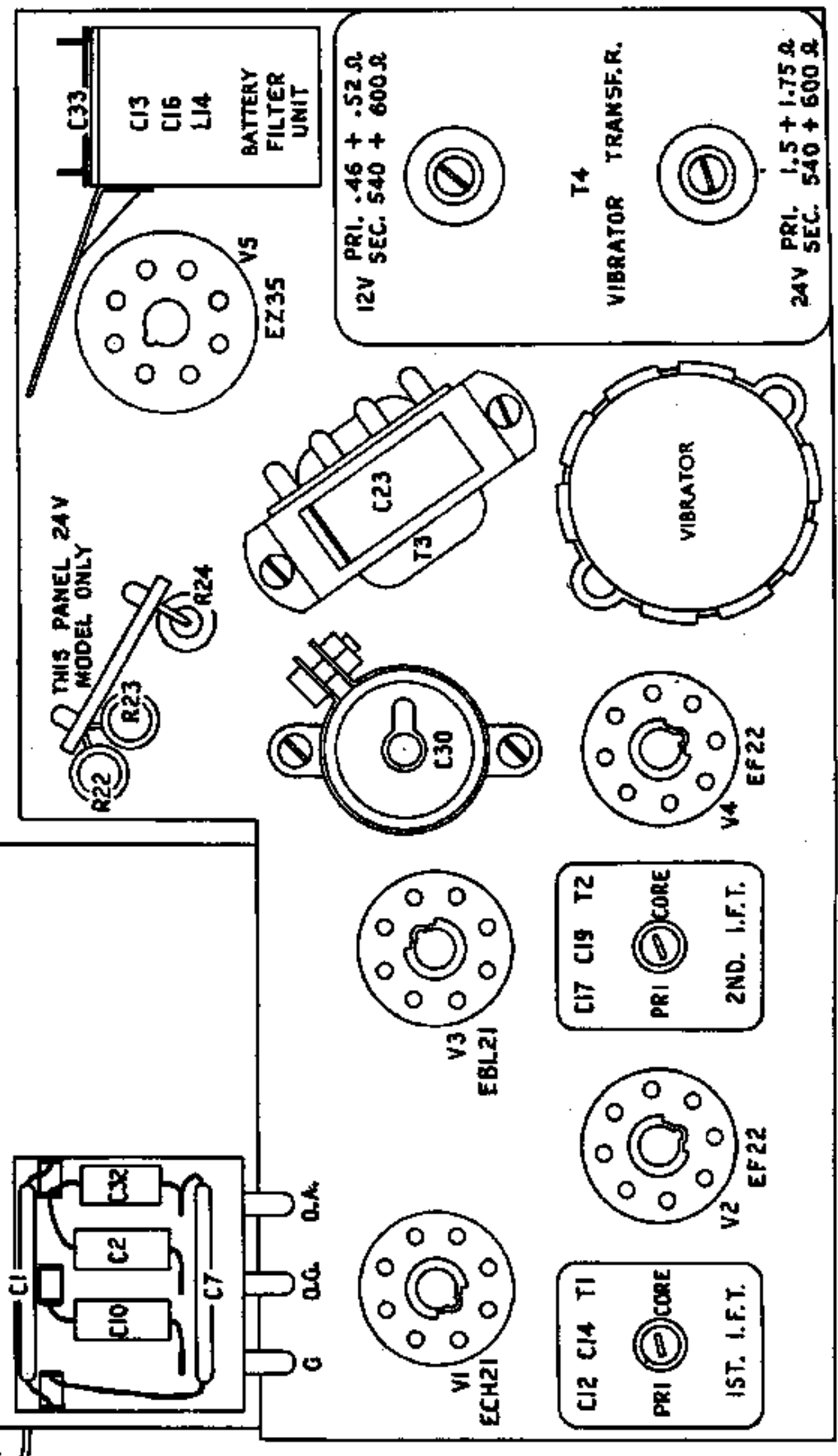
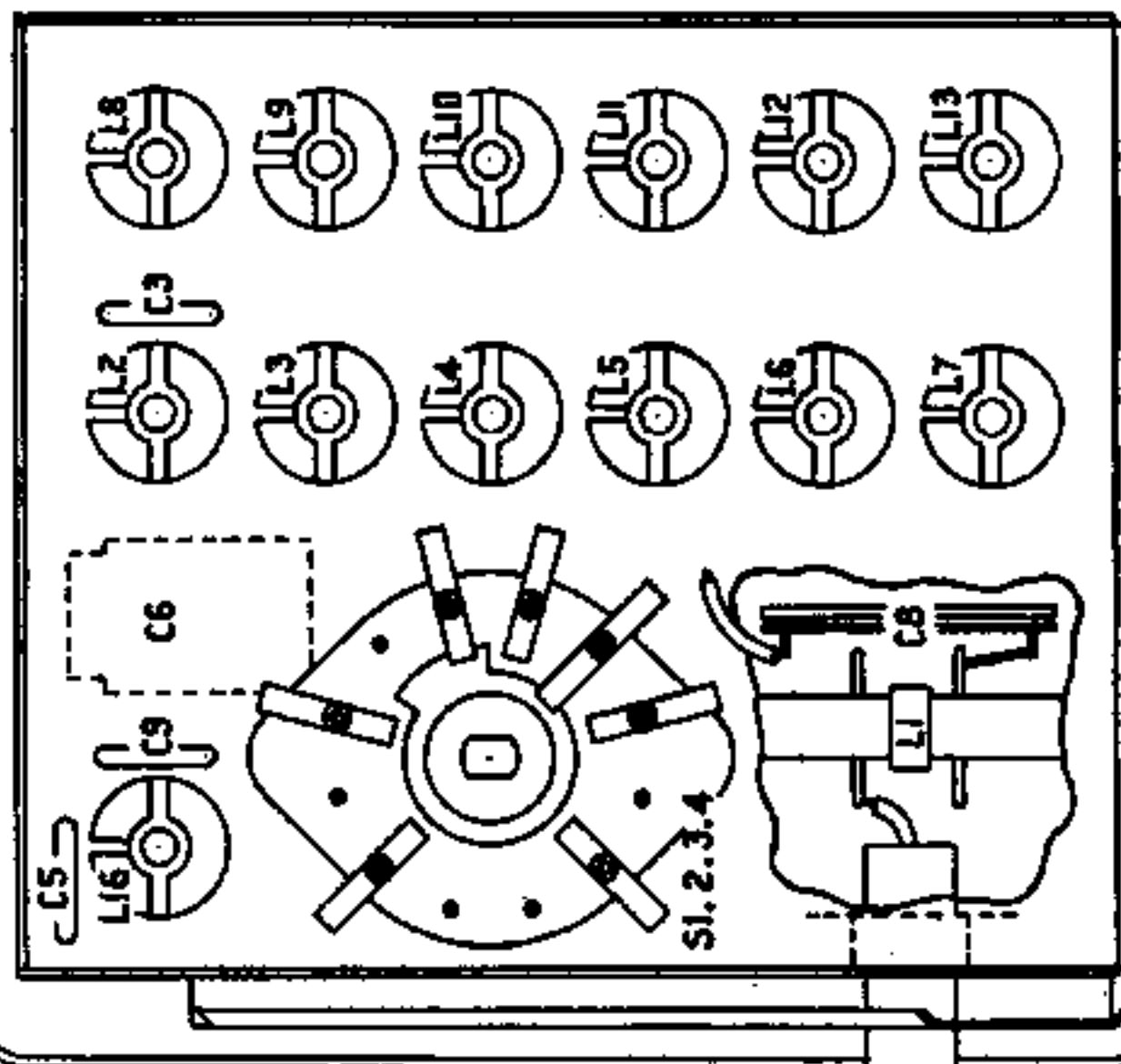
WINDING	OHMS	WINDING	OHMS
L1	.93	L13	2.4
L2	49	L14	.06
L3	7.6	L15	.07
L4	13	L16	10.3
L5	10	PRI	14.3
L6	8.5	SEC	14.3
L7	6.1	PRI	14.3
L8	13.4	SEC	14.3
L9	2.8	PRI	490
L10	3.6	SEC	.22
L11	3.3		
L12	3.0		

VOLTAGE AND CURRENT DATA

VALVE	ANODE		SCREEN	
	VOLTS	M.A.	VOLTS	M.A.
1	200	1	90	3
2	88	2	90	1
3	175	3.6	200	3
4	220	2.3	30	0.4
5	270	2.4	230	39



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