MODEL CR61 is an eight-valve, all wave, superheterodyne car radio receiver.

It offers free tuning on the Medium and Short wave-bands and band-spread tuning on three additional S.W. bands. Also included are four pre-set positions for three M.W. and one L.W. programmes.

Dual concentric controls are positioned each side of the escutcheon containing the flood-lit scale.

These controls are, L.H. inner—VOLUME. L.H. outer—9 position SELECTOR. R.H. inner—TUNING. R.H. outer—3 position TONE.

Even with this generous specification, the CR61 is very compact and, in order to afford the greatest latitude for installation, has been built in four units—Control Head, Receiver, Power Pack, Loud-speaker(s).

Three suitable flexible shafts and one lead assembly connect the control head to the receiver. One twin lead connects the power pack to the receiver.

The power pack may be fitted to either of the two sides, the back, underneath or remote from the receiver. The loudspeakers may be positioned where convenient.

VALVES: V1—EAF42 R.F. amplifier. V2—ECH42 Frequency changer. V3—EAF42 I.F. Amplifier. V4—EAF42 Demodulator, A.V.C. L.F. amplifier. V5. V6—EL42 Push-pull. L.F. amplifiers. V7—EA50 Noise limiter. V8—EZ41 Full wave rectifier.

PILOT LAMPS: 12 volts 200 m.a. 6 volts 300 m.a. Both types are centre contact, screw type.

CONSUMPTION: 12 volts—3.4 amps. 6 volts—5.6 amps. Includes pilot lamps current.

WAVEBANDS:

19M.	15.0—	15.6 Mc/s.
25M.	11.6—	12.3 Mc/s.
31M.	9.3—	10.1 Mc/s.
S.W.	3.3—	7.4 Mc/s.
M.W.	515	—1640 Kc/s.
Pre-set 1	1000	—1540 Kc/s.
„ 2	790	—1220 Kc/s.
„ 3	550	— 880 Kc/s.
„ 4	167	— 245 Kc/s.

INTERMEDIATE FREQUENCY: 465 Kc/s.

LOUDSPEAKER IMPEDANCE: 1.5 to 3 ohms. When using two speakers, connect in parallel. For four speakers wire in series/parallel.

OUTPUT: 4 watts. Slightly less on 6-volts model.

WEIGHT: Receiver 7¼ lbs. Power pack 3½ lbs. Control Unit 1¼ lbs. 5 in. loudspeaker ¾-lbs. Drives and leads ¾-lbs.

NOTE: All versions of model CR61 employ the same theoretical circuit.

12-volt and 6-volt models are identical except for the necessary changes in the vibrator, vibrator transformer, fuse, heater wiring, pilot lamps.

Models CR61 A B and C vary only in external mechanical details due to their adaption for different types of car.

/1 models vary only in the face colour of the control head and the knobs.

The description and details following are based on the 12 volt CR61 which can be taken as standard except for the above mentioned points.

CIRCUIT DETAILS—TUNED CIRCUITS: The anode section is so named to prevent confusion between the 1st and 2nd grid circuits but is actually the F.C. grid circuit with the anode of V1 R.C. coupled to it.

The oscillator circuits are Colpitts on the four S.W. bands and tuned anode for the M.W. and L.W. bands.

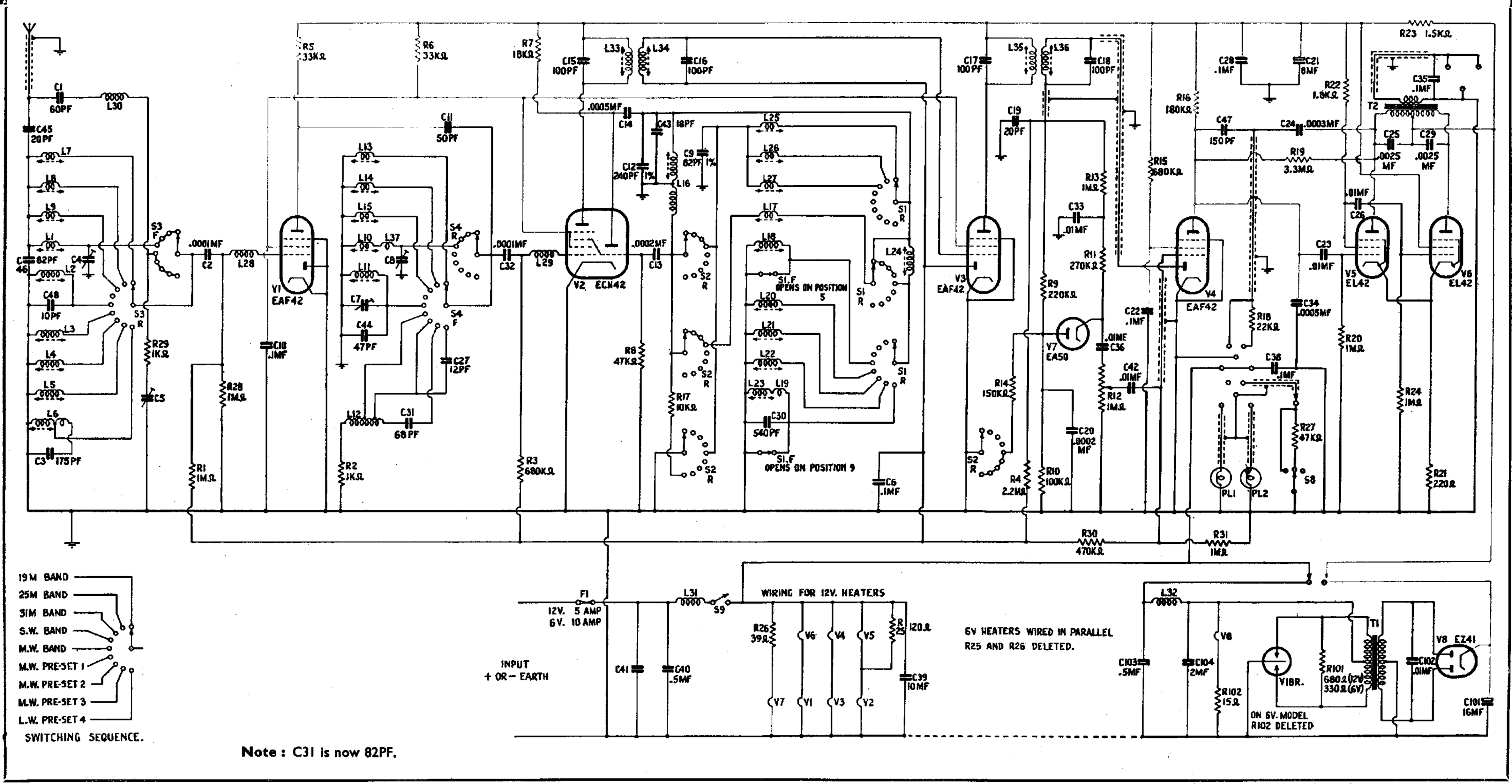
On the main circuit diagram the coils and their associated capacitors and resistors have been set out to correspond with the switching sequence of the 9-point selector.

As a quick reference and to give a better idea of continuity, etc., the basic tuned circuits have been re-drawn in detail with the switching deleted.

The basic tuned circuit for the four S.W. bands is as used in position S.W.

The coils shown, L1, L10, L17, are respectively the aerial, anode and oscillator sections of the S.W. variometer, which are mechanically coupled and operate in tandem. The trimmers C4 and C8 are the variable elements to compensate for stray capacity and tolerance in manufacture and enable the three sections to be aligned electrically. In series with L10 is added a small R.F. coil L37 to compensate for very low stray inductance in the anode section and improve the tracking in the region of 7.5 Mc/s.

For each of the three higher frequency bands (19M, 25M and 31M), each section of the S.W. variometer is shunted by an additional inductance to obtain the correct frequency coverage. As an example, L1 is shunted by L7, L8 and L9 respectively. *(Continued page 3)*



Note : C31 is now 82PF.

CIRCUIT DIAGRAM

On M.W. position, a separate variometer set L2, L11 and L18 is used, which, although mechanically coupled to the S.W. variometer, is not connected electrically at the same time. Across the aerial and anode sections, fixed and variable capacitors are shunted for alignment and frequency coverage.

The switch S1.F across the oscillator section is closed on all positions except M.W. (5) to prevent absorption.

On the three M.W. pre-set positions, individual aerial, anode and oscillator tuned circuits are used for each channel. In the anode section the three tuned circuits are provided by the tapped coil L12. The damping resistor R2 is added to this section, as a high gain is not required, to broaden the response of each self-tuned circuit over its allotted range.

On the L.W. pre-set position the anode section is purely R.C. coupled, as C27, L12, R2 form an image rejector. The oscillator coils L23, L19 are shunted by the switch S1.F, which is closed on all positions except 9 (L.W.). R17 is included to prevent the oscillator blocking on L.W. C31, in conjunction with L12, rejects I.F. on pre-set range 3.

CIRCUIT SEQUENCE: Signals from the aerial are bottom capacity coupled on S.W. to V1 input tuned circuit and top capacity coupled, via the interference filter L30, R29, on M.W. and L.W.

From the tuned circuit the signals pass through the coupling condenser C2 and the UHF filter, comprising L28 and valve capacities, to the grid of V1.

The anode output of V1 is R.C. coupled to V2 tuned grid circuit and then capacity coupled via another UHF filter L29 to the F.C. grid. Within the frequency changer, the aerial and oscillator frequencies beat together and reproduce the signal at the intermediate frequency in the anode circuit. The I.F. signal is coupled by the first I.F. transformer to V3, amplified and coupled by the second I.F. transformer to the signal diode of V4 for demodulation.

The rectified I.F. signal is now utilised as follows. A small part is filtered by R4, R3, R1 and C6 and used as A.V.C. voltage for V1, V2, V3 and V4.

A second part is used to develop cathode bias for V7 across R9 and applied via R13, R11, C33, while the A.F. signal passes via the filter C19, R9, C20, the series noise limiter V7 and the volume control R12 to V4 pentode grid.

From V4 anode the amplified A.F. signal is R.C. coupled to the grid of V5 the first of the push-pull amplifiers. The second, V6, is driven by the antiphase signal of V5 screen grid which is capacity coupled to V6 grid. The output of both these valves is transformer coupled to the loudspeaker(s) circuit.

A fixed feed-back is provided across R19 in the A.F. circuits to reduce harmonic distortion.

The tone control switch and resistors R27, R18 are connected into a second feed-back circuit comprising C24, C47, which operates at the higher frequencies.

By varying the switch position, resistance is added or subtracted to the circuit which alters the time constant and therefore the frequency at which it is effective, giving three distinct tone levels.

NOTE: In cases where increased top response is desirable, the lead from R27 in the control head should be disconnected inside the 5-pin plug and re-connected to the adjacent vacant pin. This automatically disconnects R18 from the circuit.

The series noise limiter, V7, anode is connected to the junction of the signal diode load R9, R10 and assumes a negative potential proportional to the total negative voltage across R9, R10.

On M.W. the circuit constants are chosen to limit the signal level to the equivalent of 90 per cent modulation. On S.W. R14 is disconnected from across R10 and the limiter becomes effective at about 55 per cent modulation.

At any constant signal level V7 anode potential is slightly less negative than the cathode making V7 conductive to carry the signal to the Volume Control, etc.

Signal peak increases, or noise pulses cause a rise in negative volts across R9, R10, and therefore a proportional negative increase on V7 anode. Due to the long time constant the cathode volts remain, in effect, steady and the valve ceases to conduct for the duration of the noise pulse, or signal peak.

For the 12-volts model, the valve heaters are wired in series/parallel across the filtered input, while on the 6-volts model all heaters are wired in parallel.

As the pilot lamps are of battery voltage in both models they are in parallel with the input in each case.

MECHANICAL DETAILS: With unit construction, servicing is simplified by the removal of a defective unit for examination.

Each unit is connected by a minimum of leads and is easily removed from the chassis.

This enables faulty components to be replaced without difficulty or where necessary the unit replaced as a whole.

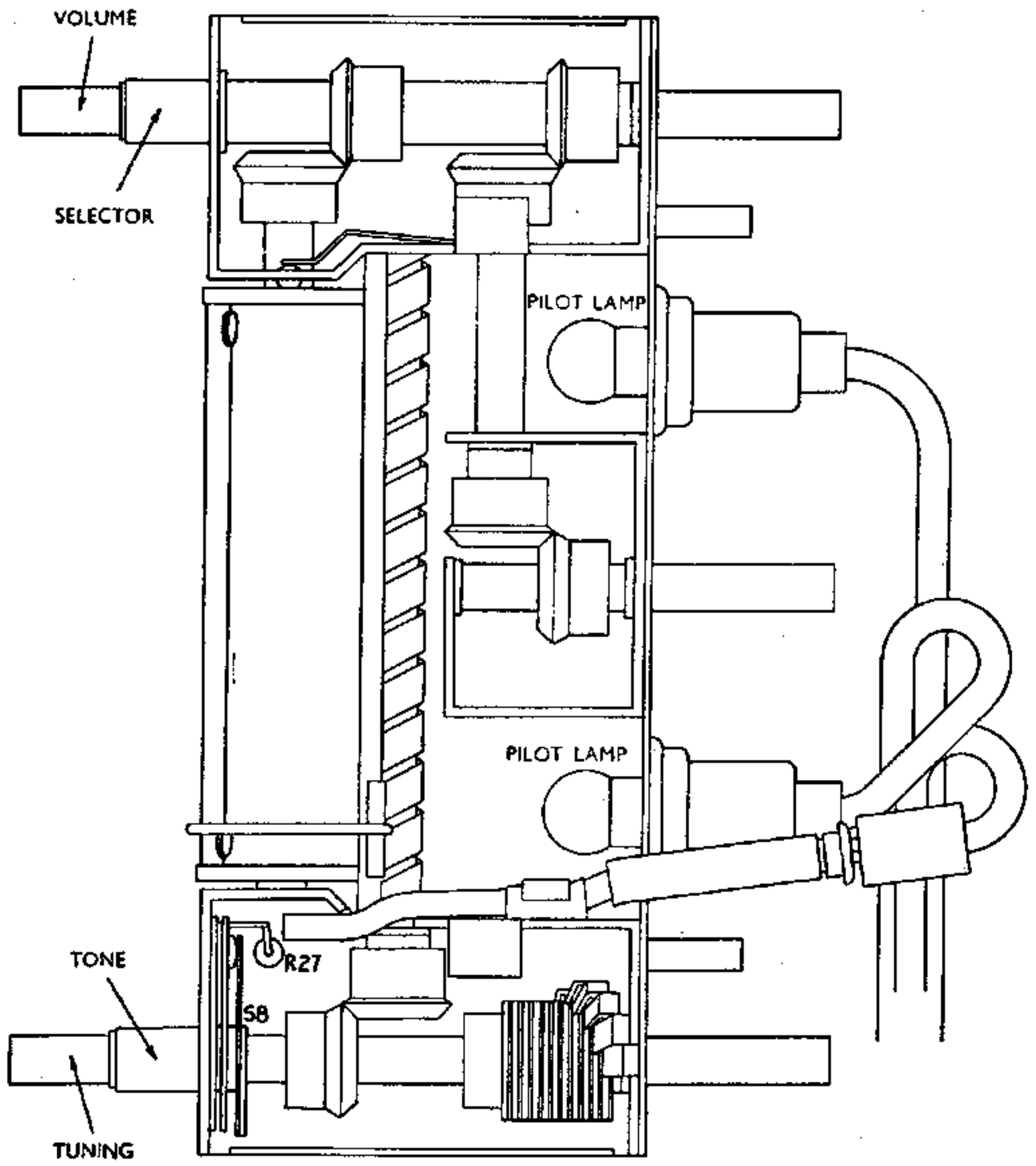
COIL AND SWITCH UNIT. Later versions of this unit have the terminal panels deleted and instead have self leads emerging from each section.

To cover both versions, the unit diagrams show both terminals and leads.

As examples: in the Aerial Section, terminal 1 is replaced with a screened lead connected internally. Terminal 2 is replaced by a red lead, and so on.

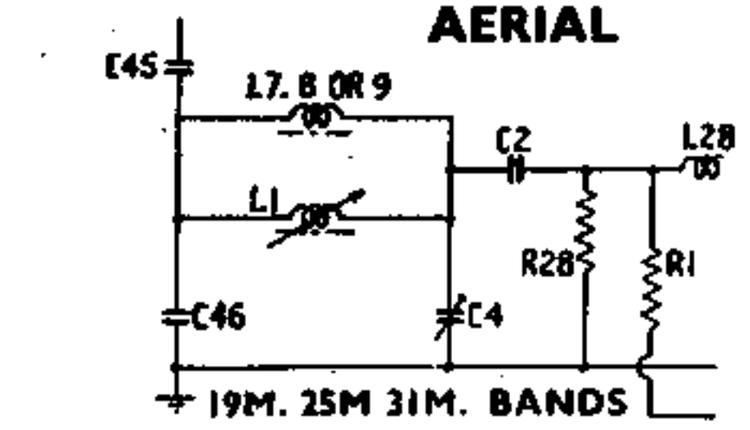
ALIGNMENT PROCEDURE: I.F. CHANNEL : Switch and tune receiver to low frequency end of the M.W. band. Set volume control to maximum.

(Continued page 5)

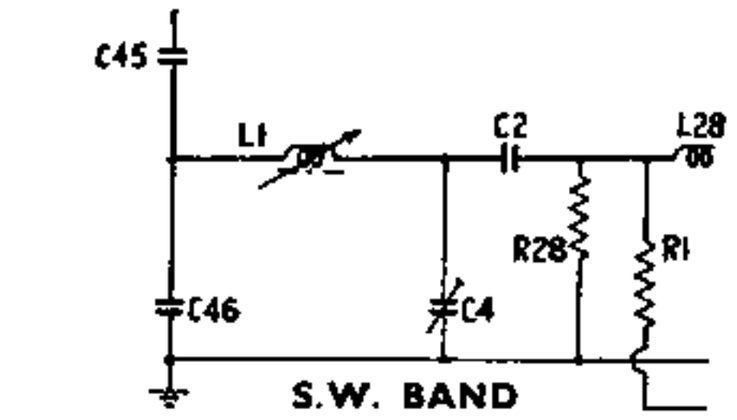


CONTROL HEAD

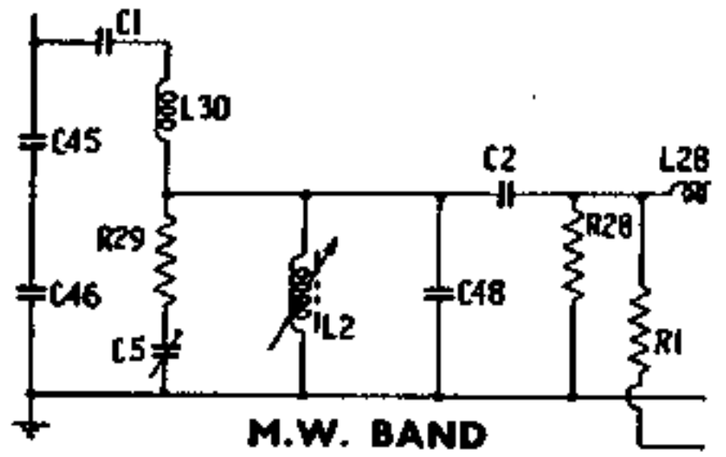
AERIAL



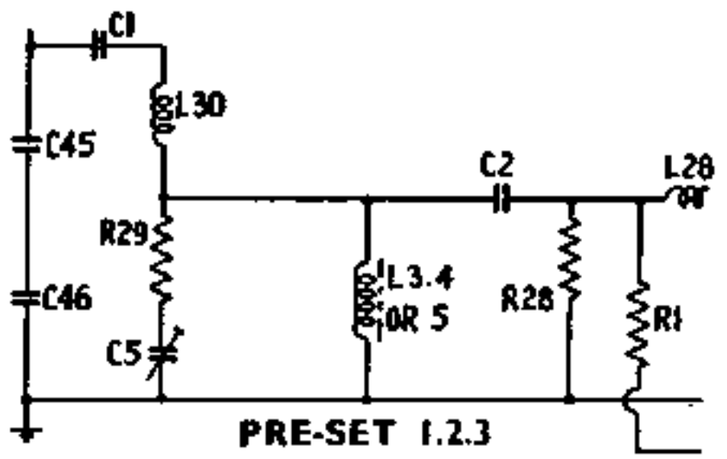
19M. 25M 31M. BANDS



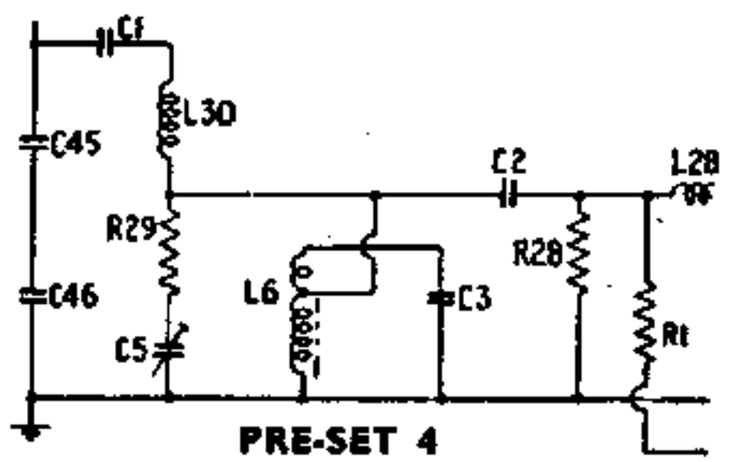
S.W. BAND



M.W. BAND

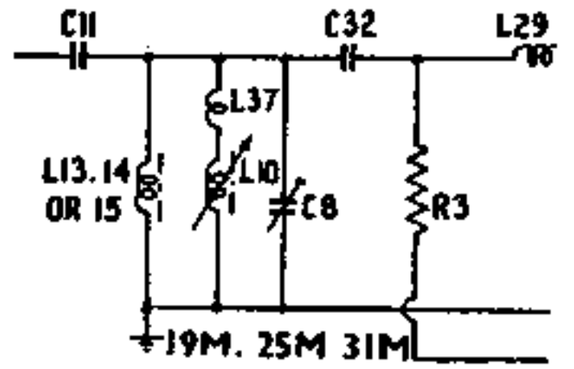


PRE-SET 1.2.3

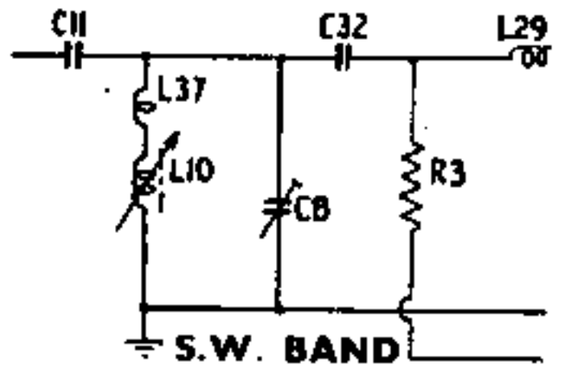


PRE-SET 4

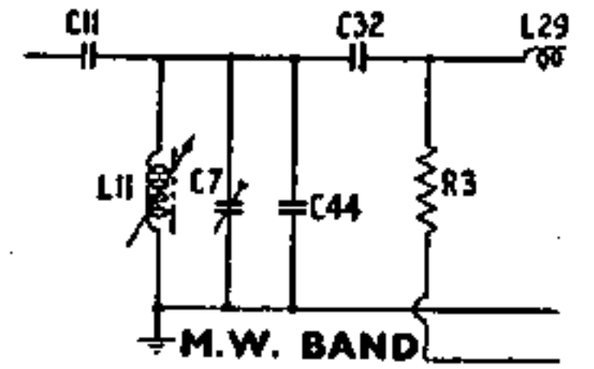
ANODE



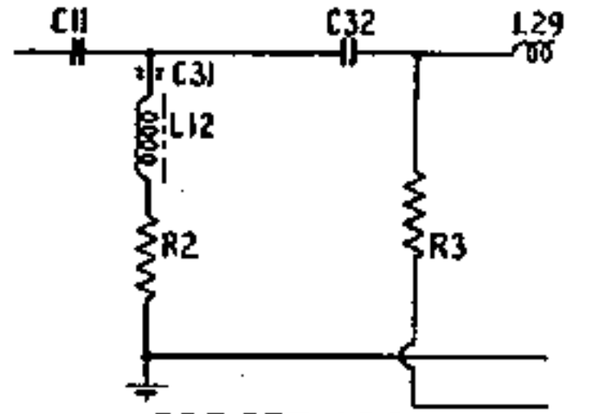
19M. 25M 31M. BANDS



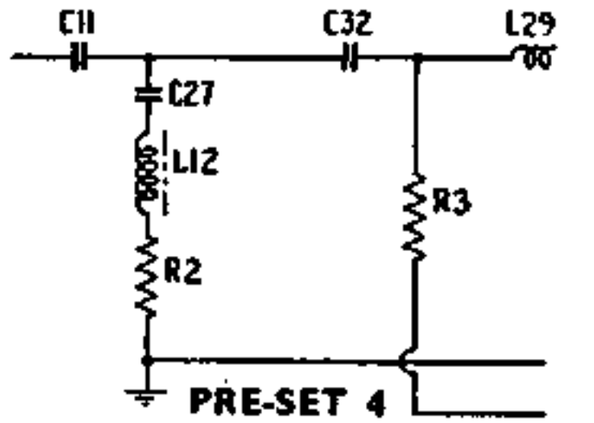
S.W. BAND



M.W. BAND

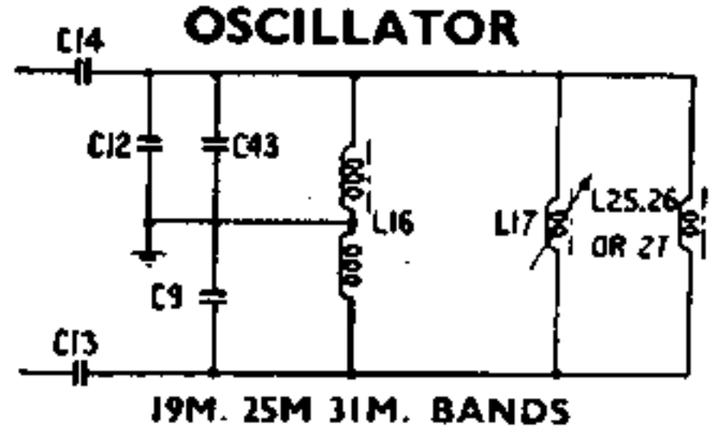


PRE-SET 1.2.3

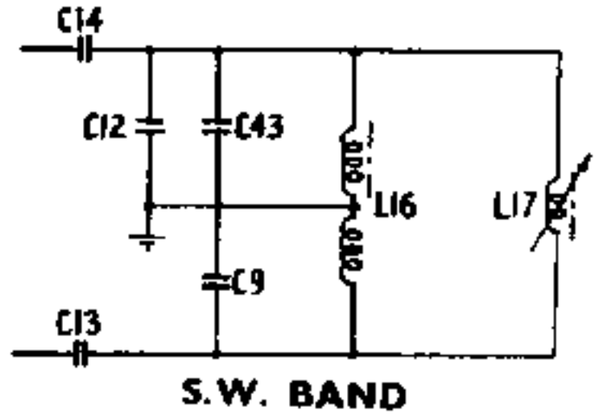


PRE-SET 4

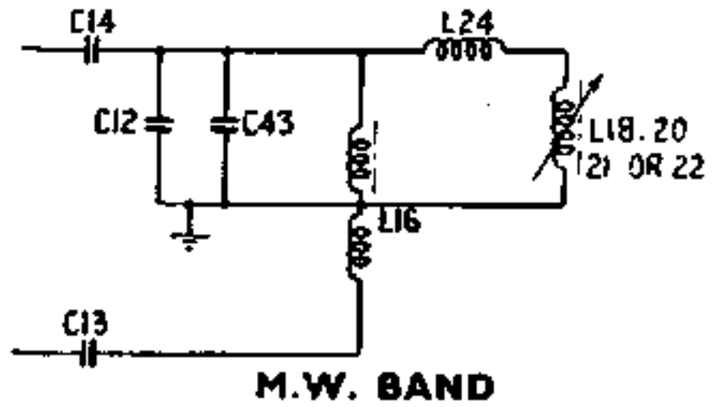
OSCILLATOR



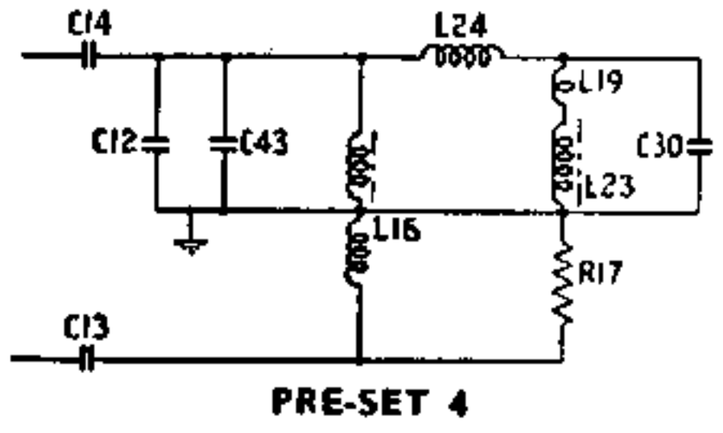
19M. 25M 31M. BANDS



S.W. BAND



M.W. BAND
PRE-SET 1.2.3



PRE-SET 4

SIMPLIFIED TUNED CIRCUITS

FOR EACH SWITCH POSITION

SWITCHING NOT SHOWN

VOLTAGE AND CURRENT DATA

		VOLTS	M.A.
HT at V8 CATHODE		268	71
HT SMOOTHED		221	26.5
V1	ANODE	69	4
	SCREEN	62	1.5
V2	ANODE	214	2
	OSC ANODE	159	4.5
	SCREEN	62	2.3
V3	ANODE	213	3
	SCREEN	62	1.5
V4	ANODE	30	0.8
	SCREEN	20	0.3
V5	ANODE	245	22
	SCREEN	204	3.2
V6	ANODE	245	22
	SCREEN	210	3.2
V5 V6 CATHODE		10	50.4
V8	ANODE 1	288 A.C.	39
	ANODE 2	285 A.C.	39

CONDITIONS: SET TUNED TO 550 METRES.

NO SIGNAL INPUT.

READINGS TAKEN WITH MODEL 40 AVO.

Inject a modulated 465 Kc/s signal via a 0.1 mfd. capacitor to the signal grid of the frequency changer valve.

Adjust the cores of the I.F.T.'s in the following order for maximum output, IFT2 lower and upper then IFT1 upper and lower.

M.W. TUNING: Switch to M.W. manual tuning.

(*a*) Check that the tuning cores in the variometer unit are at nominally correct position, i.e. $\frac{3}{8}$ in. from face of carrier.

(*b*) Set to 3 turns from fully clockwise position. Adjust L18 oscillator tuning core to receive 1050 Kc/s signal.

(*c*) Set to 9 turns: adjust L16 shunt padder core to receive 515 Kc/s.

(*d*) Set to 7 turns: adjust C5 aerial and C7 RF M.W. trimmers for maximum output from 585 Kc/s.

(*e*) Set to 3 turns: Adjust L18 oscillator tuning core to receive 1050 Kc/s, then adjust L2 aerial and L11 RF tuning cores for maximum output.

(*f*) Repeat (*c*) (*d*) and (*e*) until no further improvement is possible.

(*g*) Set to half a turn: Adjust L24 series padder core to receive 1625 Kc/s.

(*h*) Repeat (*b*) if necessary.

S.W. TUNING. Switch to S.W. manual tuning.

(*a*) Check the tuning cores as in M.W. tuning.

(*b*) Tune to a 3.4 Mc/s signal which should occur at approximately 8 turns from fully clockwise.

Adjust C4 aerial and C8 RF S.W. trimmers for maximum output.

(*c*) Set to 2 turns: Adjust L17 oscillator tuning core to receive 6.2 Mc/s then adjust L1 aerial and L10 RF tuning cores for maximum output.

(*d*) Repeat (*b*) and (*c*) until no further improvement is possible.

(*e*) Check calibration at half a turn—7.4 Mc/s approximate.

BANDSPREAD TUNING:

(*a*) Set to 6 turns.

(*b*) Switch to 31M. Adjust L27 oscillator core to receive 9.55 Mc/s, then adjust L9 aerial, and L15 RF cores for maximum output. Check image at 10.48 Mc/s.

(*c*) Switch to 25M. Adjust L26, L8 and L14 cores as in (*b*) but at 11.8 Mc/s. Check image at 12.73 Mc/s.

(*d*) Switch to 19M. Adjust L25, L7 and L13 cores as in (*b*) but at 15.15 Mc/s. Check image at 16.08 Mc/s.

PRE-SET TUNING:

(*a*) Position 4. Adjust core (top or bottom) to receive 210 Kc/s. Then adjust bottom section for maximum signal while preventing rotation of main core adjustment. (See diagram showing core assembly).

(*b*) Position 3. As in (*a*) but adjust to 700 Kc/s.

(*c*) Position 2. As in (*a*) but adjust to 1050 Kc/s.

(*d*) Position 1. As in (*a*) but adjust to 1250 Kc/s.

The above four frequencies are, of course, test frequencies and the frequencies actually used will be those of the four stations to which the pre-set positions are to be set.

NOTES ON ALIGNMENT: Providing the tuning cores are correctly positioned before alignment commences, and providing adjustments are done in the order stated, repetitions will be kept to a minimum and no adjustment should have to be repeated more than three times.

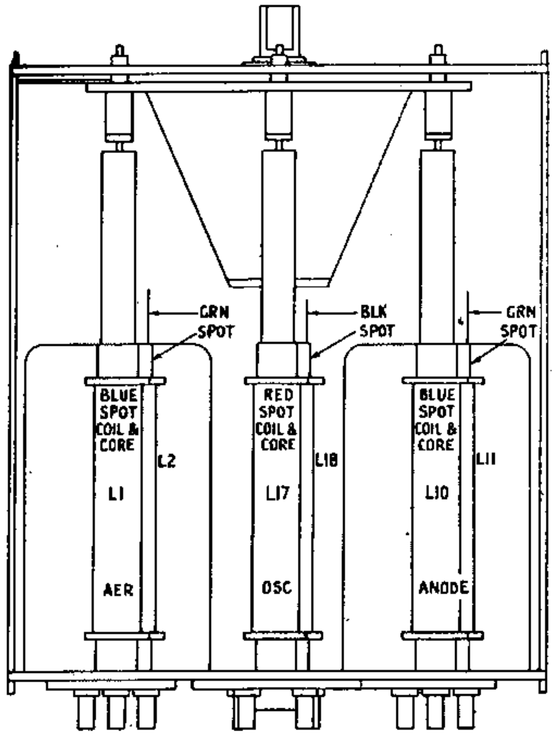
The alignment of the pre-set tuning circuits is entirely dependent upon the correct tracking of the M.W. tuning circuits.

Similarly, the alignment of the bandspread ranges depends upon correct tracking of the S.W. range. Furthermore, the M.W. aerial trimmer, besides providing circuit alignment on M.W., acts as aerial compensating trimmer on M.W. and pre-sets.

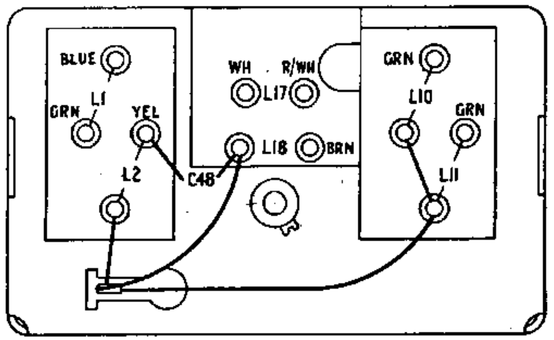
Thus M.W. must be aligned before any other range, and S.W. must be aligned before the bandspread ranges.

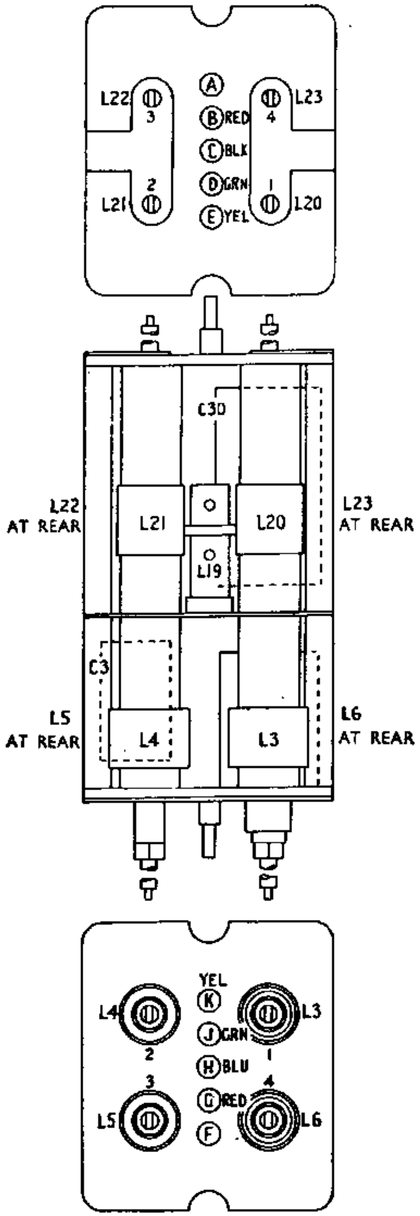
Tracking is accomplished on M.W. by using the anode winding of the master oscillator coil as a shunt padder—both this and the series padder are adjustable, but on the latter the adjustment is limited to barely cover the sum of all tolerances: it is therefore insufficient to affect any other adjustments.

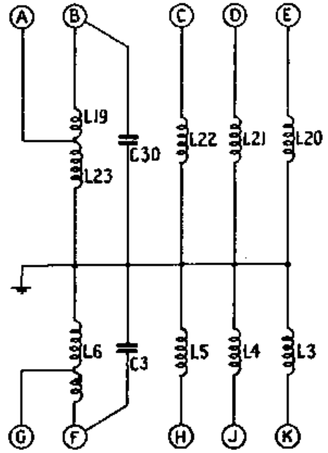
The same padding circuits are used to track the pre-set circuits, but on L.W. an additional series inductance and shunt capacity are used. S.W. tracking is obtained by using the grid winding of the master oscillator coil as a shunt padder, while the wiring inductance is sufficient to act as a series padder. Neither of these is adjustable and it is, therefore, important to run the wiring correctly, and to use the type of wire specified. This is also important in order to keep the oscillator stray capacities consistent, as in the interests of stability, trimmers are not used. The core *must* be tuned to the first peak from the stem end.



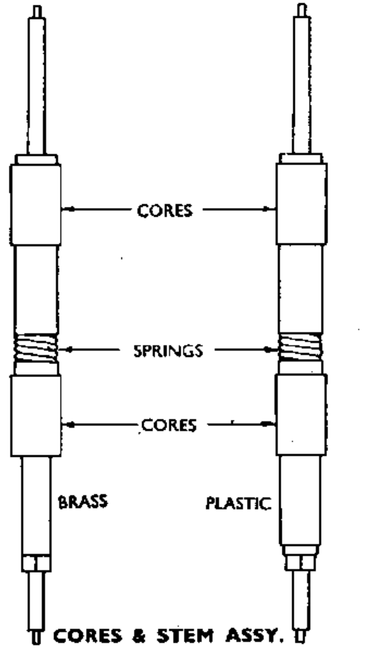
PERMEABILITY TUNING UNIT





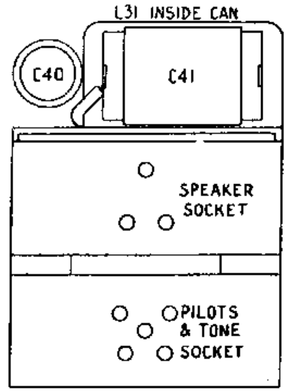


PRE-SET COIL UNIT

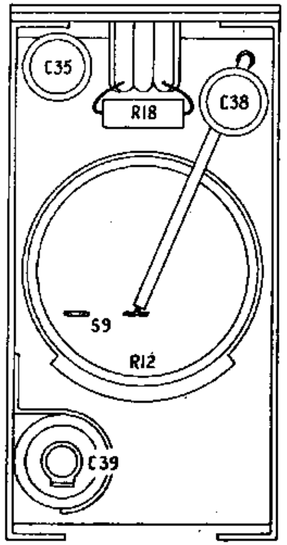


CORES & STEM ASSY.

POSITIONS 2 & 3 POSITIONS 1 & 4



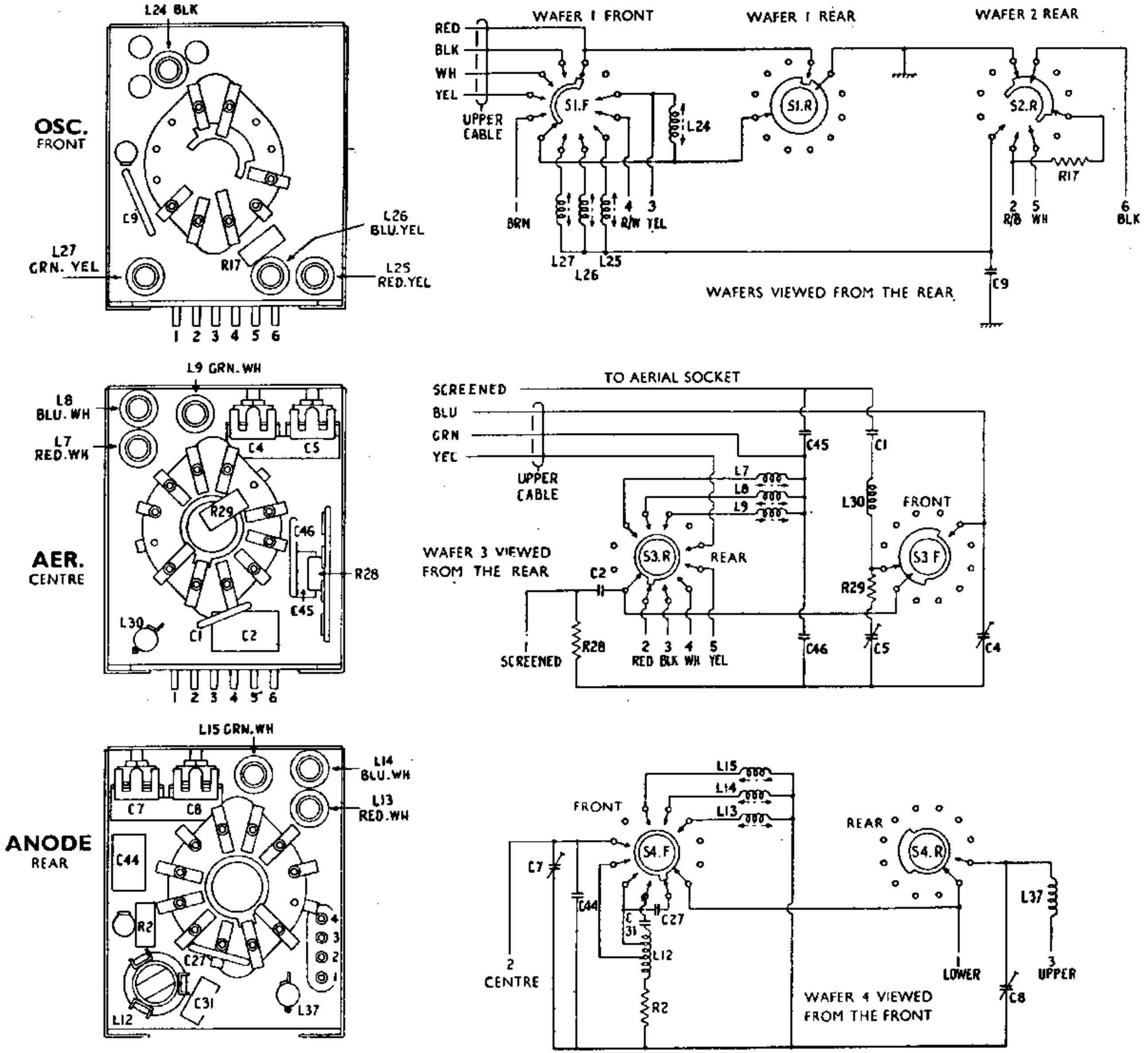
V/C & FILTER UNIT



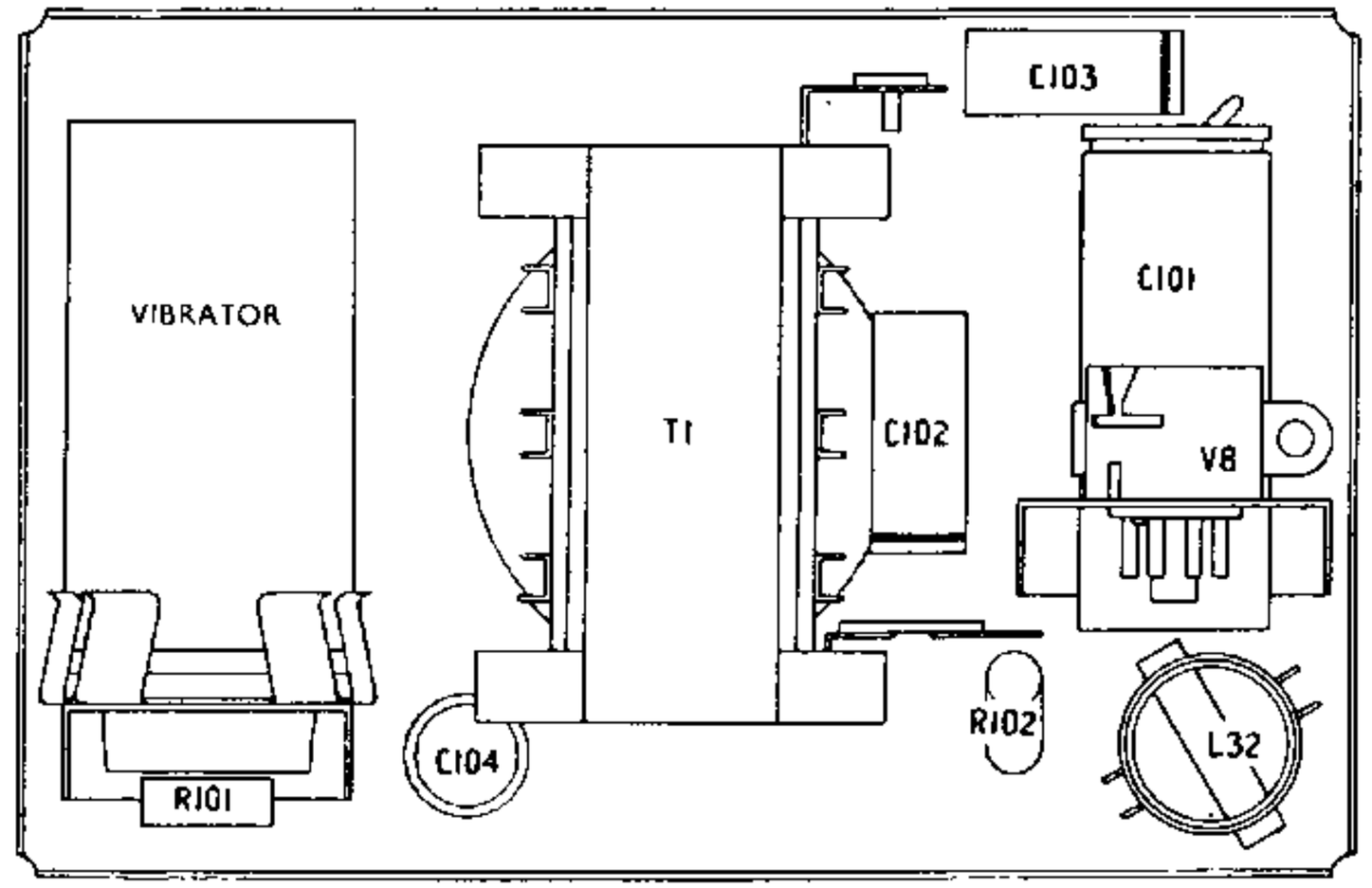
D.C. RESISTANCE OF WINDINGS

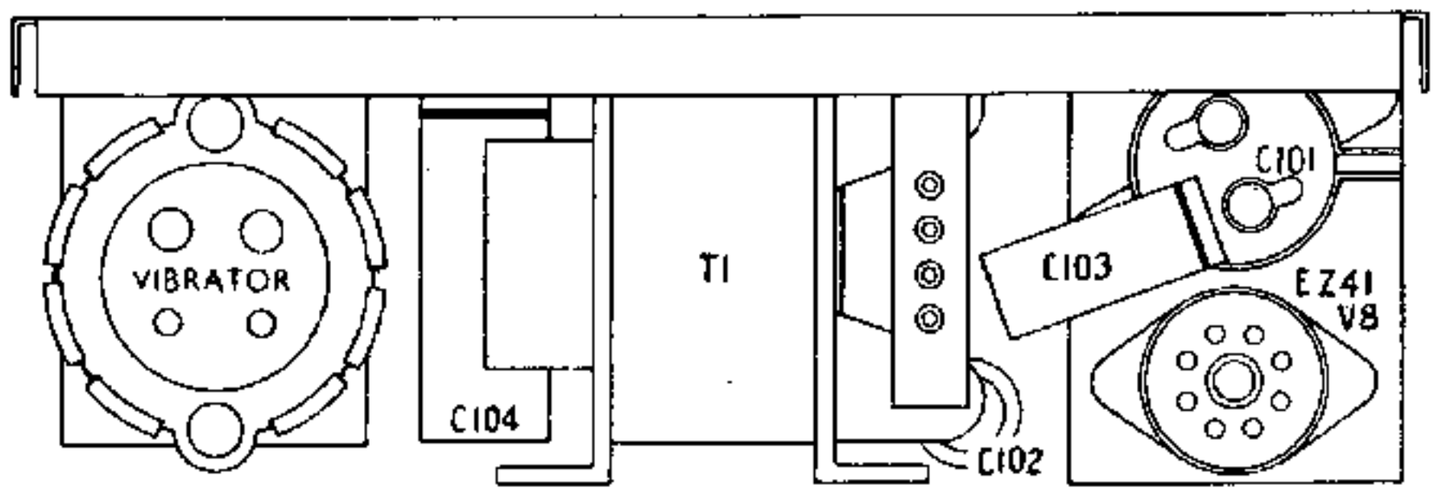
WINDING	OHMS	WINDING	OHMS
L1	1.4	L23	4.6
L2	12	L24	.738
L3	4	L25	.035
L4	6	L26	.073
L5	8	L27	.186
L6	7+37	L28	.75
L7	.105	L29	.75
L8	.142	L30	2.73
L9	.307	L31	.03
L10	1.4	L32	.07
L11	12	L33	14.65
L12	18+8+11	L34	14.65
L13	.105	L35	14.65
L14	.142	L36	14.65
L15	.307	L37	.3
L16	7.72+6.15	12V T1 PRI	.2+.2
L17	.9	12V T1 SEC	237+275
L18	1.5	6V T1 PRI	.076+.087
L19	4	6V T1 SEC	219+373
L20	3.8	T2 PRI	250+300
L21	4.5	T2 SEC	.17
L22	3		

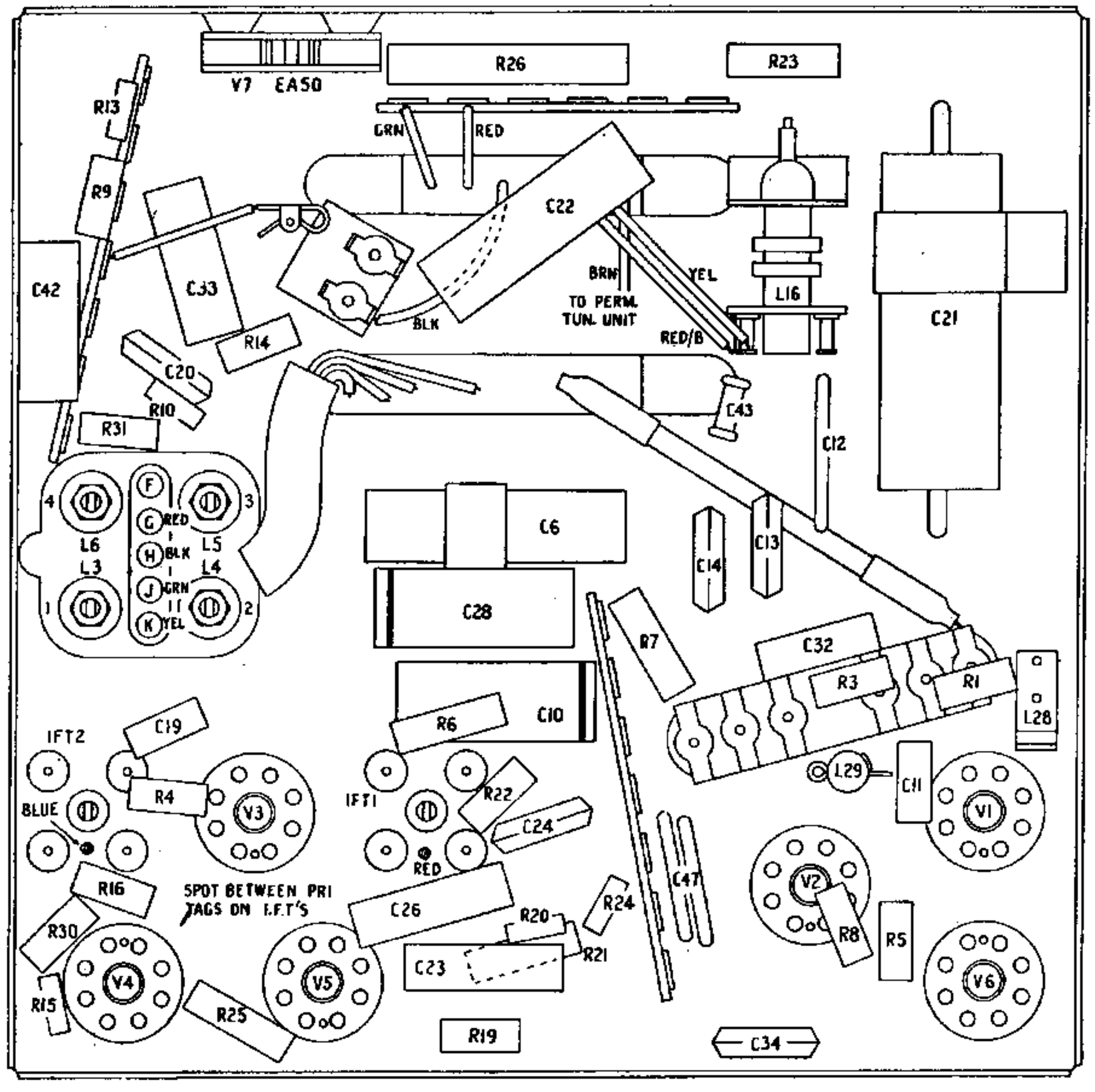
DETAILS OF COIL AND SWITCH UNIT

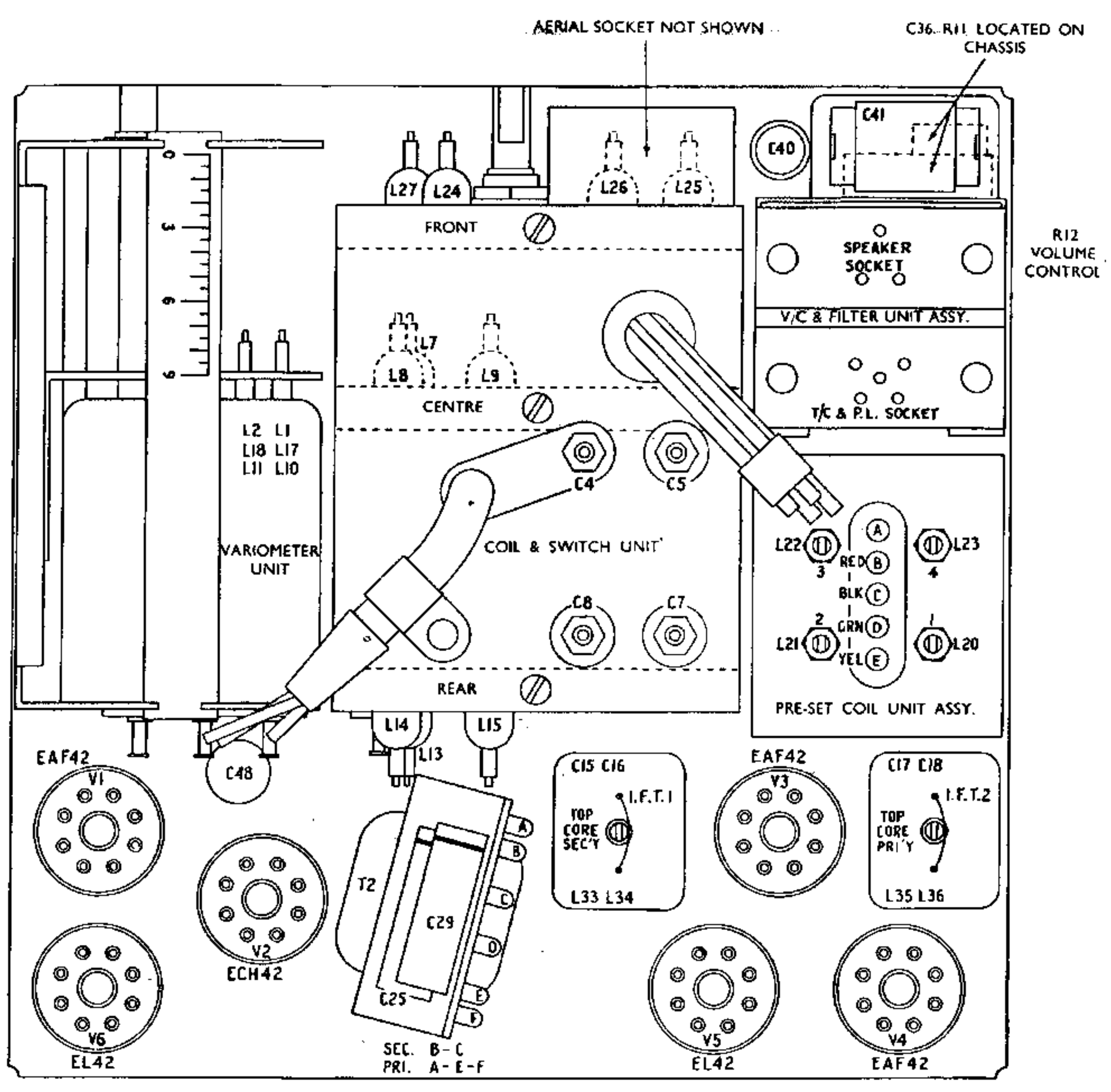


12 VOLT POWER PACK









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

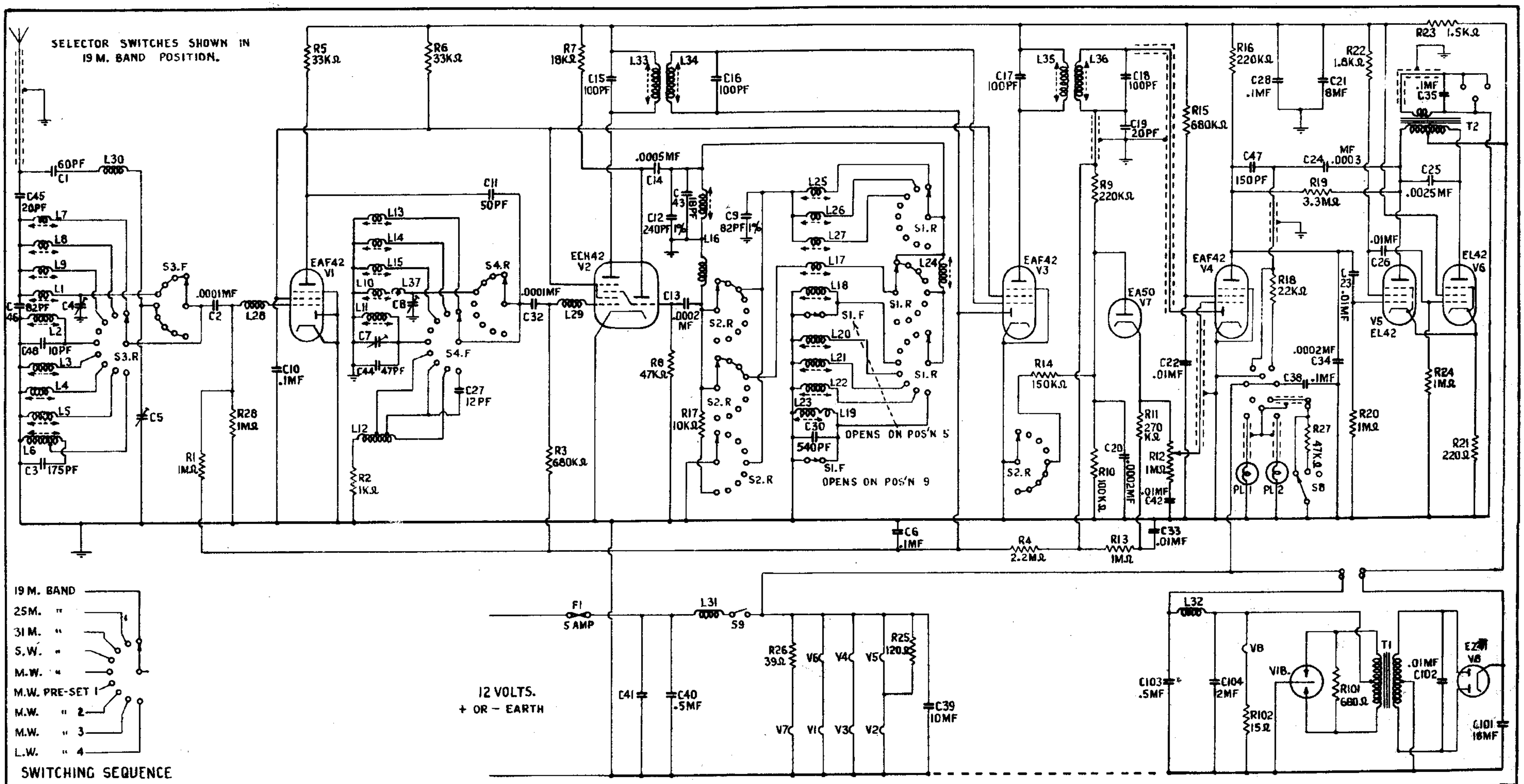
SCOTTISH SERVICE DEPOT:
26, India Street,
Glasgow, C.2.
'Phone: Central 2012

NORTHERN SERVICE DEPOT:
55, Whitworth Street,
Manchester, 1
'Phone: Central 6711/2

MIDLAND SERVICE DEPOT:
11, Brook Street,
Birmingham, 3
'Phone: Central 1723

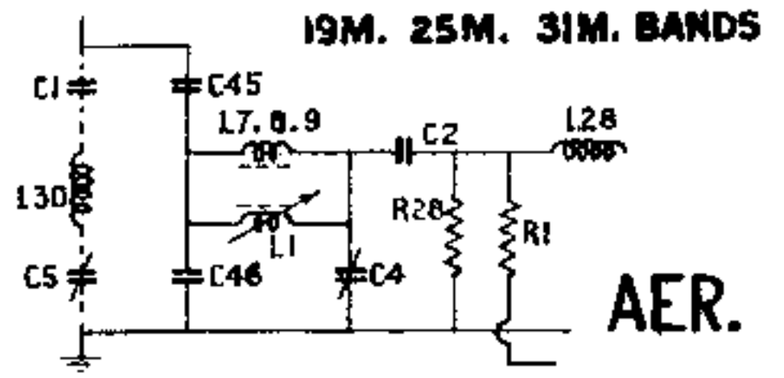
EKCO ADVANCE SERVICE INFORMATION

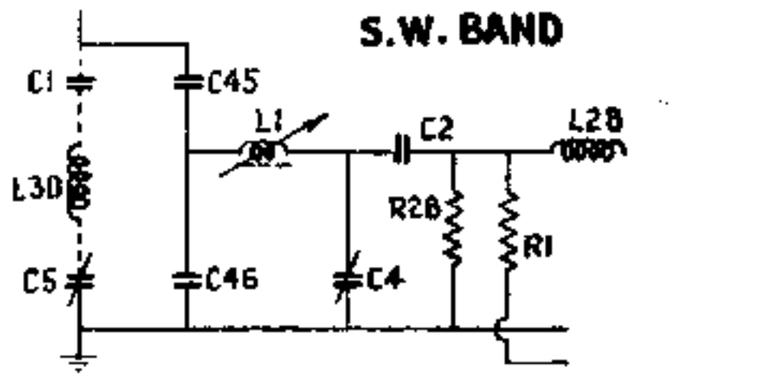
MODEL CR61

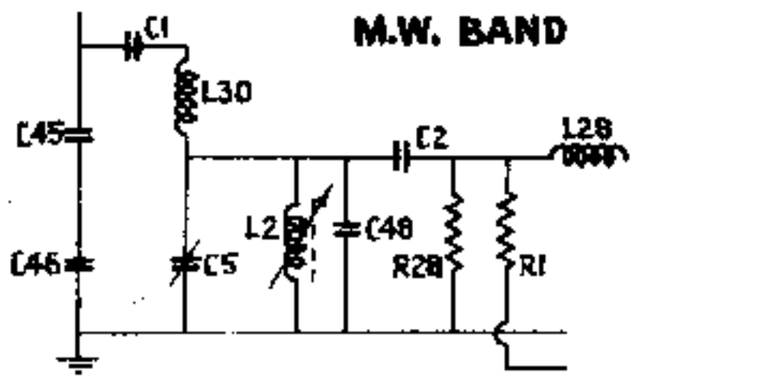


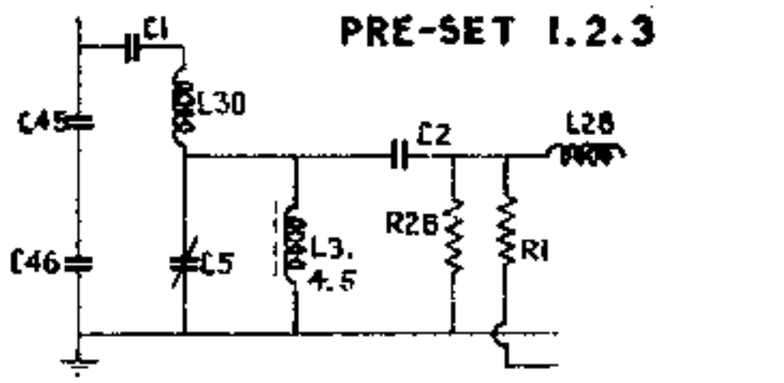
EKCO ADVANCE SERVICE INFORMATION

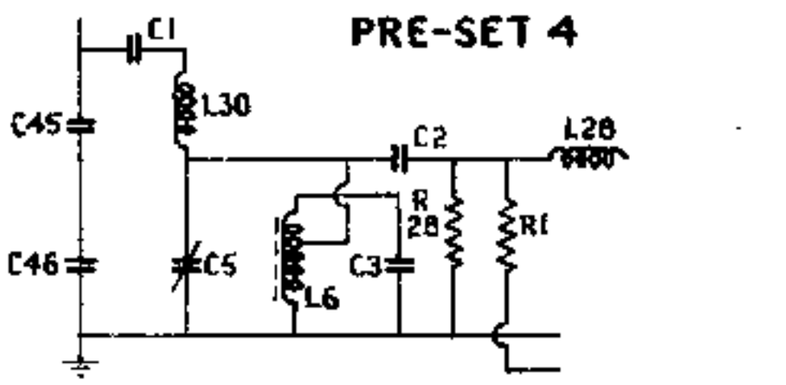
MODEL CR61

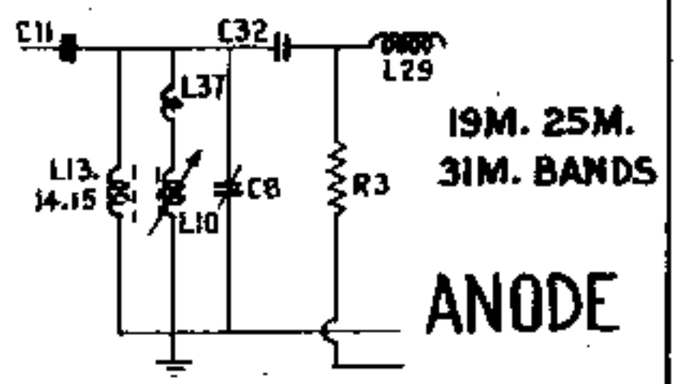


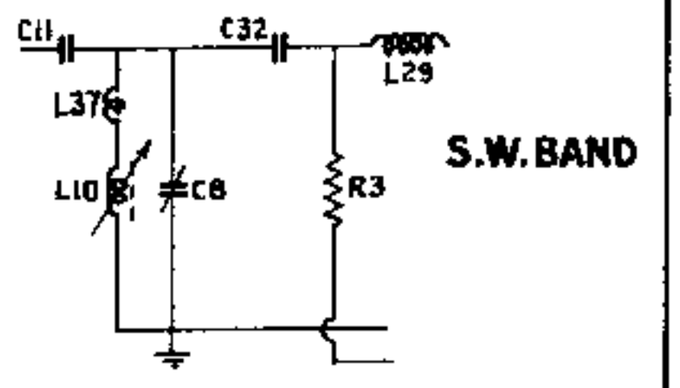


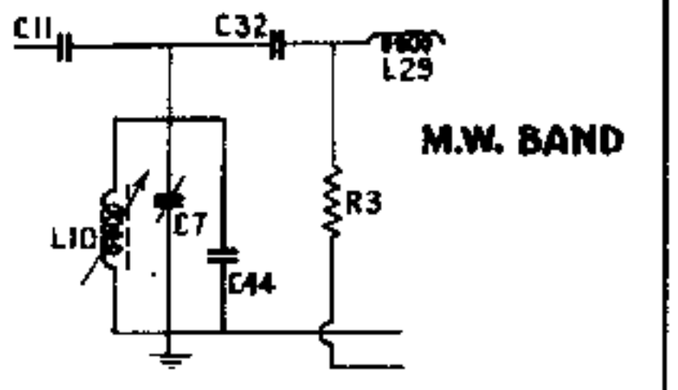


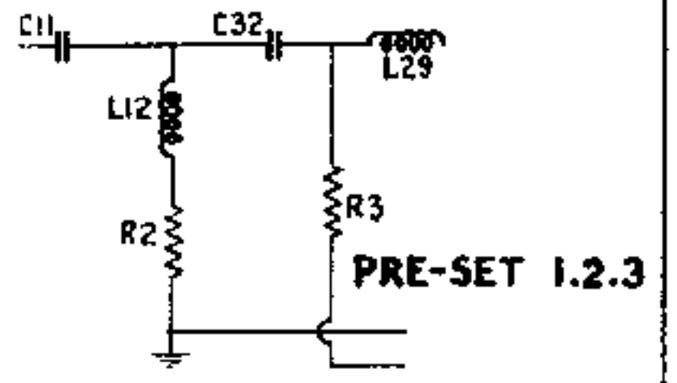


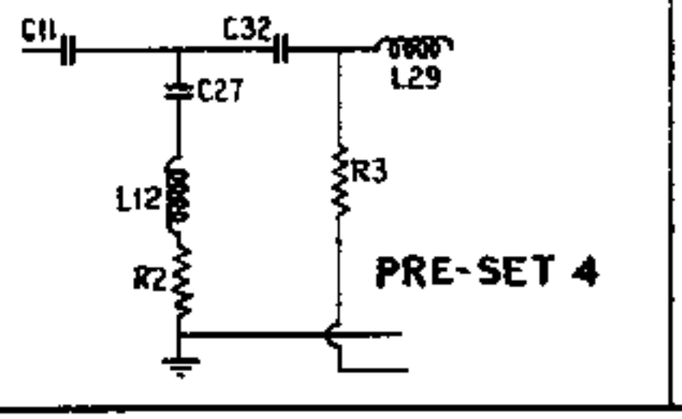


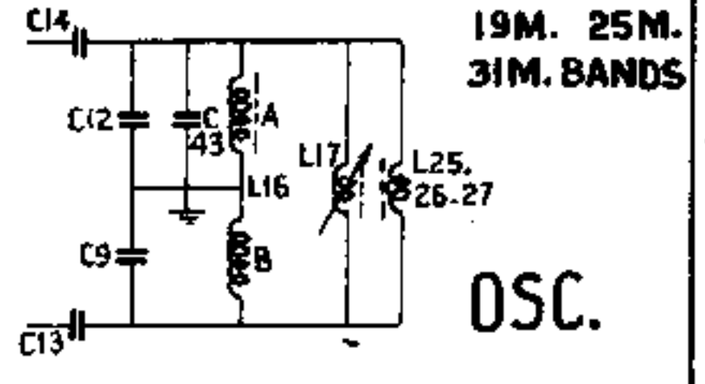


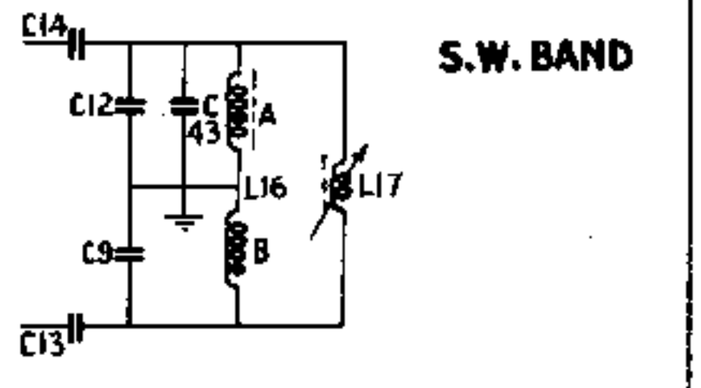


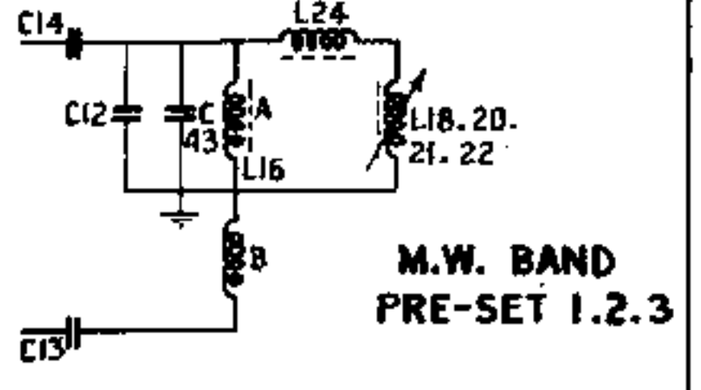


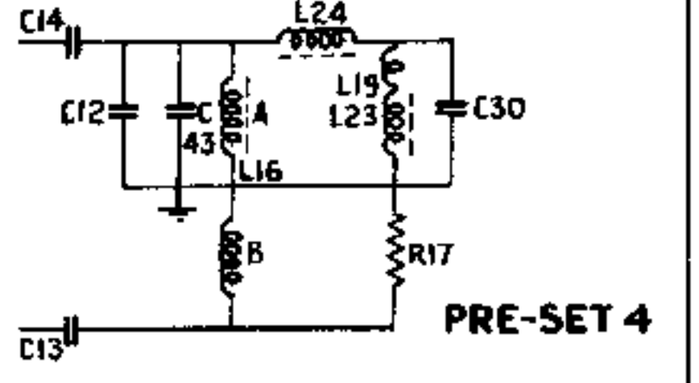












SIMPLIFIED TUNED CIRCUITS FOR EACH SWITCH POSITION. SWITCHING NOT SHOWN.

Model CR61 is a new departure in car radio receivers, incorporating the tuning features of modern domestic receivers.
It offers free tuning (permeability) of four S.W. and the M.W. bands in addition to four pre-set station positions (three M.W. and one L.W.).

This extremely compact receiver is built in three units, control head, receiver and power pack, to give maximum flexibility for installation under varying conditions.
The power pack may be fitted to either of the two sides, the back, underneath the receiver unit or separately as desired.
Flexible shafts between the control head and receiver add to the latitude in installation.

CONSUMPTION 3.4 amps (including pilot lamps).

VALVES		
	V1 - EAF42	R.F. amplifier.
	V2 - ECH42	Frequency changer.
	V3 - EAF42	I.F. amplifier.
	V4 - EAF42	Demodulator, L.F. ampl.
	V5 } V6 } - EL42	P.P. power amplifiers.
	V7 - EA50	Noise suppressor.
	V8 - EZ41	Full-wave rectifier.

PILOT LAMPS 12 volts 220 m.a.

INTERMEDIATE FREQUENCY. 465 Kc/s.

WAVEBANDS		
	19M.	15.0 - 15.6 Mc/s
	25M.	11.6 - 12.3 Mc/s
	31M.	9.3 - 10.1 Mc/s
	S.W.	3.3 - 7.4 Mc/s
	M.W.	515 - 1640 Kc/s
	Pre-set 1.	1000 - 1540 Kc/s
	2.	790 - 1220 Kc/s
	3.	550 - 880 Kc/s
	4.	167 - 245 Kc/s

LOUD-SPEAKER IMPEDANCE. 1.5 to 3 ohms.

WEIGHT.		
	Receiver	- 7 1/4 lb.
	Power pack	- 3 1/2 lb.
	Control unit	- 1 1/4 lb.
	Drives & leads	- 3/4 lb.
	5" loudspeaker	- 3/4 lb.

Issued by SERVICE DEPT: E. K. COLE LTD., SOMERTON WORKS, ARTERIAL ROAD, SOUTHEND-ON-SEA.