VIDOR LIMITED

WEST STREET - ERITH - KENT

Service Manual

Model C.N. 426

A.C. Mains/Battery Superheterodyne

2 Band Attache Portable Receiver

SPECIFICATION

VALVES
Mullard:
DK 92 (V1) Frequency changer.
DF 91 (V2) I.F. Amplifier.
DAF 91 (V3) Det. and L.F. Amplifier.
DL 94 (V4) Power Output.

WAVEBANDS
L.W. 1052 to 2000 metres. (285 to 150 Kc/s.)
M.W. 187 to 571 metres. (1605 to 525 Kc/s.)
Intermediate frequency 475 Kc/s.

LOUDSPEAKER
5 inch diameter permanent magnet, moving coil type.
Impedance at 1000 c/s—3 ohms.

CONTROLS
Front left: Volume.
Rear left: BATT-OFF-MAINS Switch.
Front right: Tuning.
Rear right: MED-LONG Wavechange Switch.

PHYSICAL
Height: $4\frac{3}{8}$ inches.
Width: $13\frac{3}{4}$ inches.
Depth: $9\frac{3}{8}$ inches.
Weight: $12\frac{3}{4}$ lb. including batteries.

POWER SUPPLY
Batteries:
H.T. 90 volt. VIDOR Type L.5536.
L.T. 7.5 volt. VIDOR Type L.5060.

Mains:
A.C. 200-250 volts; 40-100 cycles.

CONSUMPTION
Batteries:
L.T. 55mA.
H.T. 10.0mA.
Mains:
Approx 13 volt-amps.

CIRCUIT DESCRIPTION

Aerial Circuit

This receiver uses two high impedance frame aerials: the long and medium wave frames are situated on a card retained in position against the lid of the receiver. The frame aerials are connected to the receiver by four leads contained in a sleeve which carries the leads through the front panel. Each frame aerial has an iron-cored coil in series to facilitate inductance adjustment; note that the long wave circuit has the loading coil in the earthy end and that the medium wave circuit has the frame aerial at the earthy end. The long wave circuit is grounded when not in use. The received signal is fed into grid 3 of the frequency changer valve through a capacitor C2.

Frequency Changer

A heptode type of mixer is used (DK 92—V1). The oscillatory voltage is produced by L5 L6 on medium wave and L7 L8 on long wave in conjunction with grids 1 and 2 of the DK 92. Both oscillator coils have iron dust cores for inductance adjustment, the padding capacitors are C6 and C8. Intermediate frequency is 475 Kc/s. A.G.C. is shunt fed to grid 3 via resistor R1.

I.F. Amplifier

The first iron-cored I.F. transformer (L9 C4, L10 C5) in the anode of V1, couples V1 to the grid of the I.F. amplifier valve V2 (DF 91). This valve has the second I.F. transformer (L11 C12, L12 C13) in its anode coupling it to the detector diode.

Detector and L.F. Amplifier

The tuned secondary of the second I.F. transformer feeds the diode of V3 (DAF 91) which has a load resistance R6 and VR1. The voltage developed by diode current across R6 and VR1 is used for A.G.C. and is applied to V1 and V2 through decoupling resistor R5. The bias for the pentode section of V3 is obtained from R7, the signal being fed to the grid via capacitor C16.

Output Stage

Resistance capacity coupling (R8 C19) is employed between V3 and the output valve V4 (DL 94). This valve has a transformer (T1) in its anode circuit feeding the loudspeaker. Negative feedback is provided by resistor R10 between the anodes of V3 and V4. To economise in H.T. battery consumption extra negative bias is applied to grid 1 of V4 when receiver is used on batteries only. This bias is developed across resistor R12 and is fed to the grid via resistor R11.

Power Supply

The power selector switch S2, the rear left control on front panel, is used for Battery or A.C. Mains operation. In the battery position, fully anti-clockwise, this switch connects the 7.5 volt L.T. battery to the series connected filaments and also connects the 90 volt H.T. battery to the receiver. For mains operation the switch disconnects the batteries and energises the mains transformer which supplies the full wave metal rectifier (MR1). The H.T. required is obtained from the reservoir capacitor C21 via the smoothing resistor R13. The L.T. voltage for the valve filaments is also supplied from C21 via the dropping resistors R14 and R15, additional smoothing being provided by capacitor C22. This switch in the mains position also brings into circuit resistor R17 which increases the bias to the correct value on V4. This is because in the mains position no bias voltage is developed across resistor R12.

Mains voltage adjustment is accomplished by a selector panel which provides a shorting plug. The taps provided are 200-210, 220-230 and 240-250. NOTE: When the front panel of the receiver is opened the double pole mains connecting link is broken and the chassis is completely isolated from the mains.

The receiver is also fitted with a warning device: should the lid be closed whilst the set is still switched on, the lid stay, by shorting two springs, connects a capacitor C25 from the anode of V4 to grid 2 of V3, thus causing the audio stages to oscillate.

INSTALLING

Open the front panel of the receiver by unscrewing the two coin slot screws, and ascertain that both valves and batteries are in their correct positions. A diagram showing these positions can be found on the inside of the cabinet.

This receiver is also designed for use on A.C. Mains having a periodicity of 40-100 cycles, the voltages covered by the selector panel being 200-210, 220-230 and 240-250. The mains voltage is best ascertained by actual measurement on the customer's premises.

DISMANTLING

Normally it will be found that this receiver can be serviced without removing the chassis from the front panel. Should, however, it become necessary to remove same, proceed as follows:

Pull off knobs from four controls on front panel.
Unscrew the two captive screws retaining front panel and open.
Remove wood screw and cable cleat at left hand end of cabinet.
Unsolder four frame aerial leads from tag panel on chassis.
Unsolder three output transformer leads.
Remove clips from springs of warning device in left hand corner of cabinet.
Remove one small self tapping screw in aerial lead paxolin panel.
Remove five large self tapping screws retaining chassis to front panel.
The chassis can now be removed.

CAPACITOR AND POINTER DRIVE

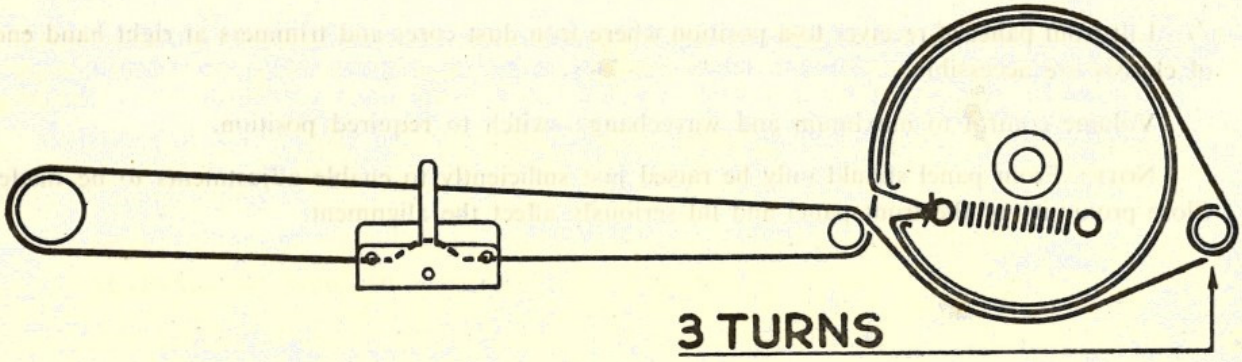


Diagram of cord drive assembly

Use only Python Flax, Braided No. 20; approximately 30 inches are required.

Rotate gang to maximum capacity position. Secure one end of drive cord to spring.

Anchor other end of spring to the lug projecting from drive drum.

Keeping spring under tension take cord through slot in periphery of drum and make three complete turns around drive spindle.

Continue round drum in a clockwise direction and over the spacer supporting the end of the reflector plate.

Take the cord round the pulley in an anti-clockwise direction and back to the spacer.

Wind on approximately 1¼ turns round the drum in a clockwise direction.

Pass end of cord through hole in periphery of drum and under tension knot end of cord to loop on spring.

Attach pointer to cord as shown in the diagram.

H.F. TESTS AND ALIGNMENTS

General

If the I.F. circuits have been disturbed, complete I.F. and R.F. alignment must follow. Whilst ganging, output from the test oscillator must be progressively reduced as the circuits are brought into line, so that the output does not exceed 50mW. An A.C. voltmeter across the loudspeaker speech coil may be used as an output meter.

No dismantling is required for any of the following adjustments.

When alignment of the oscillator or aerial circuits is required, the adjustments must be carried out with the receiver complete with batteries in their correct position. Due to the necessity of having the front panel open to align both I.F. and R.F. circuits, and consequently breaking the mains link, the receiver must be battery operated.

I.F. Ganging

Lift front panel of receiver to a vertical position (the four adjustable dust cores are accessible in this position).

Set wavechange switch to MED, volume control to maximum, gang capacitor to minimum capacity position.

Inject a modulated signal of 475 Kc/s between front section of gang capacitor and chassis.

Adjust iron dust cores of L9, L10, L11 and L12 for maximum output.

Repeat for optimum results.

Pointer Alignment

Rotate gang capacitor to maximum capacity position.

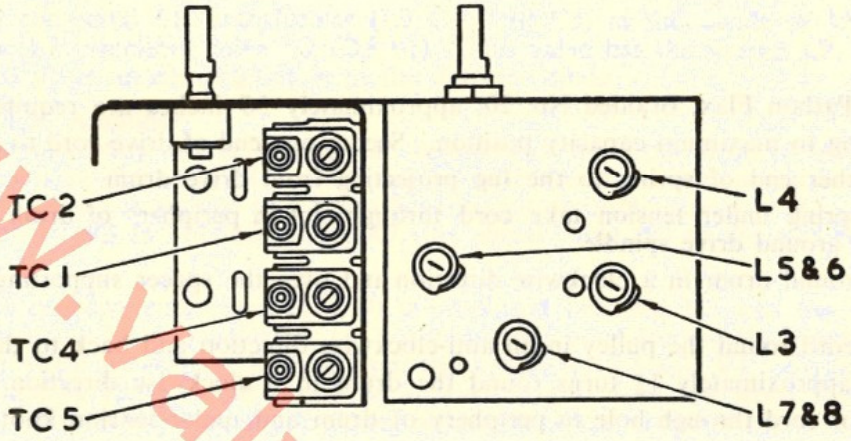
Pointer carriage should then be moved along drive cord to align pointer to 2000 metres at extreme right end of scale.

R.F. Alignment

Lift front panel of receiver to a position where iron dust cores and trimmers at right hand end of chassis are accessible.

Volume control to maximum and wavechange switch to required position.

NOTE: Front panel should only be raised just sufficiently to enable adjustments to be made. Close proximity of the front panel and lid seriously affect the alignment.



End view of chassis showing location of trimmers and coils

Medium Wave

Operation No.	Pointer Setting on scale	Tune test oscillator to metres	frequency	Adjust for maximum output
1	500 metres	500	600 Kc/s	L5
2	500 „	500	600 „	L3
3	200 „	200	1500 „	TC4
4	200 „	200	1500 „	TC2
5	Repeat operations 1, 2, 3 and 4 for maximum output.			

Long Wave

Operation No.	Pointer Setting on scale	Tune test oscillator to metres	frequency	Adjust for maximum output
1	1900 metres	1900	158 Kc/s	L7
2	1900 „	1900	158 „	L4
3	1100 „	1100	273 „	TC5
4	1100 „	1100	273 „	TC1
5	Repeat operations 1, 2, 3 and 4 for maximum output.			

VALVE TABLE

The following table indicates the approximate voltages and currents obtainable on each valve; voltages stated were taken using a 500 ohm per volt meter, wavechange switch to MED and no signal.

Variations of ±15% may be anticipated between models, higher or lower mains voltages will naturally produce a corresponding variation in meter readings in approximate proportion to the change in mains supply.

The two conditions shown below, i.e., MAINS OR BATTERY, are as follows:—

MAINS — 245 volts, 50 cycles A.C. into 240-250 tap.

BATTERY — H.T. 90 volts. L.T. 7.5 volts.

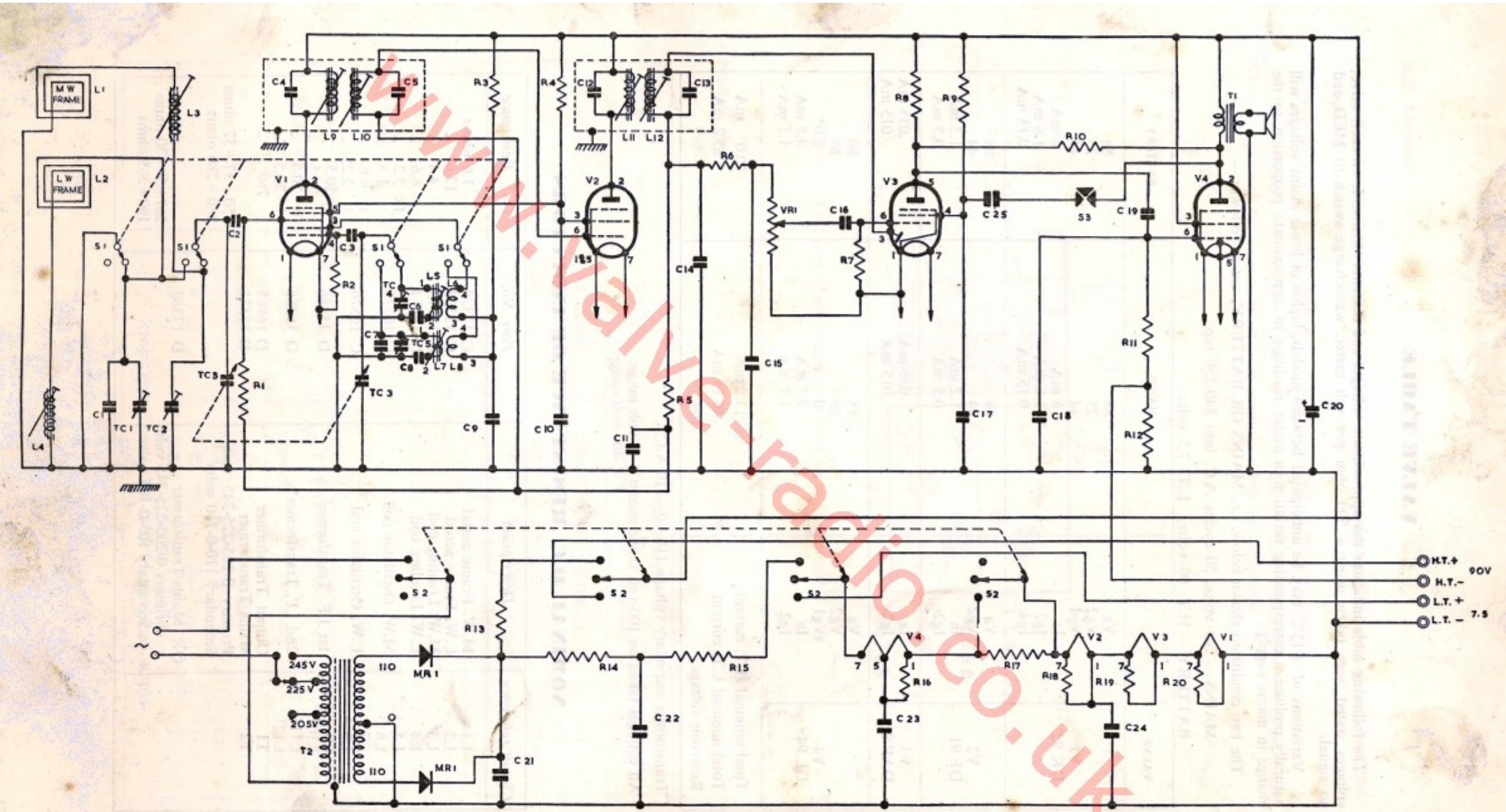
VALVE		MAINS	BATTERY
V1 DK 92	Va	88	88
	Vg2	25	25
	Vg4	44	44
	Ia	6 mA	6 mA
	Ig2	1.6 mA	1.6 mA
	Ig4	0.15 mA	0.15 mA
V2 DF 91	Va	88	88
	Vg2	44	44
	Ia	1.2 mA	1.2 mA
	Ig2	0.5 mA	0.5 mA
V3 DAF 91	Ia	.035 mA	.035 mA
	Ig2	.015 mA	.015 mA
V4 DL 94	Va	85	86
	Vg2	88	88
	Vg1	0	— 2.0*
	Ia	7.7 mA	4.8 mA
	Ig2	1.7 mA	1.1 mA
Total nominal H.T. current		13.5 mA	10.0 mA
Total nominal L.T. current		46.15 mA	55.2 mA
Reservoir voltage		104	—†

Transformer secondary voltage 110—0—110 A.C.

All voltages taken on 100-volt range except * 10-volt range.
† 400-volt range.

NOMINAL D.C. RESISTANCE OF INDUCTORS

Circuit reference	*Description*	*Part No.*	*D.C. Resistance*
L1	M.W. Frame aerial	C 17324	1.6 ohms
L2	L.W. Frame aerial	C 17323	12.6 „
L3	M.W. Loading coil	C 16875	4.4 „
L4	L.W. Loading coil	C 16874	6.6 „
L5 / L6	M.W. Oscillator coil	C 16575	3.2 „ / 1.3 „
L7 / L8	L.W. Oscillator coil	C 16576	6.6 „ / 2.25 „
L9 / L10	1st I.F. Transformer	D 15286	20.5 „ / 20.5 „
L11 / L12	2nd I.F. Transformer	D 15286	20.5 „ / 20.5 „
T1	Output Transformer	D 16865	760 „
T2	Mains Transformer Primary 0-205-225-245 volts Secondary 110-0-110 volts	D 17321	 350+37+37 ohms 280+280 ohms
	OR Mains Transformer Primary 0-205-225-245 volts Secondary 105-0-105 volts	D 17380	 267+30+30 ohms 190+205 ohms



CIRCUIT DIAGRAM

COMPONENT VALUES

RESISTORS

Circuit Ref. No.	Ohms	Tolerance %	Wattage	Part No.
R1	4.7 M	20	¼	70071
R2	27 K	20	¼	71977
R3	33 K	20	¼	70058
R4	39 K	20	¼	72543
R5	2.2 M	20	¼	70069
R6	47 K	20	¼	70059
R7	4.7 M	20	¼	70071
R8	1 M	20	¼	70067
R9	4.7 M	20	¼	70071
R10	8.2 M	20	¼	71902
R11	2.2 M	20	¼	70069
R12	220	10	¼	70389
R13	1.2 K	10	¼	70544
R14	1.4 K	5	½	72560
R15	700	5	3	72562
R16	330	10	¼	70391
R17	10	10	¼	70373
R18	150	10	¼	70387
R19	120	10	¼	70386
R20	120	10	¼	70386
VR1	1 M	Pot. Log Law		16545

VALVES

V1	DK 92	16580
V2	DF 91	14320
V3	DAF 91	14321
V4	DL 94	15243

CAPACITORS

Circuit Ref. No.	Value	Tolerance %	Voltage Rating	Type	Part No.
C1	100pf	5	350V	S.M.	16843
C2	100pf	20	350V	S.M.	15998
C3	100pf	20	350V	S.M.	15998
C4	65pf	3	350V	S.M.	16108
C5	65pf	3	350V	S.M.	16108
C6	532pf	2	350V	S.M.	15738
C7	200pf	5	350V	S.M.	16359
C8	280pf	2	350V	S.M.	16329
C9	0.1uf	20	350V	T.P.	14838
C10	0.1uf	20	350V	T.P.	14838
C11	.05uf	20	350V	T.P.	15933
C12	65pf	3	350V	S.M.	16108
C13	65pf	3	350V	S.M.	16108
C14	100pf	20	350V	S.M.	15998
C15	100pf	20	350V	S.M.	15998
C16	.001uf	25	350V	T.P.	17017
C17	.05uf	20	350V	T.P.	15933
C18	200pf	20	350V	S.M.	15983
C19	.01uf	25	350V	T.P.	16937
C20	32uf		275V	Electrolytic	16833
C21	32uf		275V	Electrolytic	16833
C22	25uf		50V	Electrolytic	14825
C23	100uf		12V	Electrolytic	16731
C24	.05uf	20	350V	T.P.	15933
C25	.005uf	25	350V	T.P.	17372

VARIABLE CAPACITORS

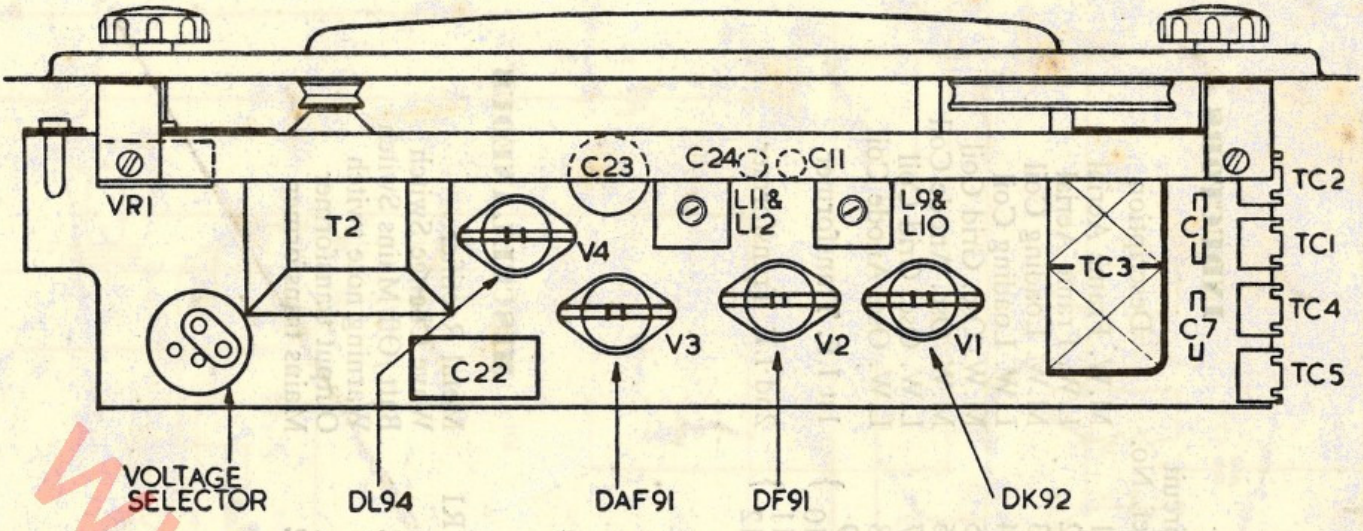
Circuit Ref. No.	Description	Part No.
TC1, TC2, TC4, TC5	4-70 pf Squashplate trimmers (one bank)	16201
TC3	523 pf Swing 2-gang	17310

INDUCTORS

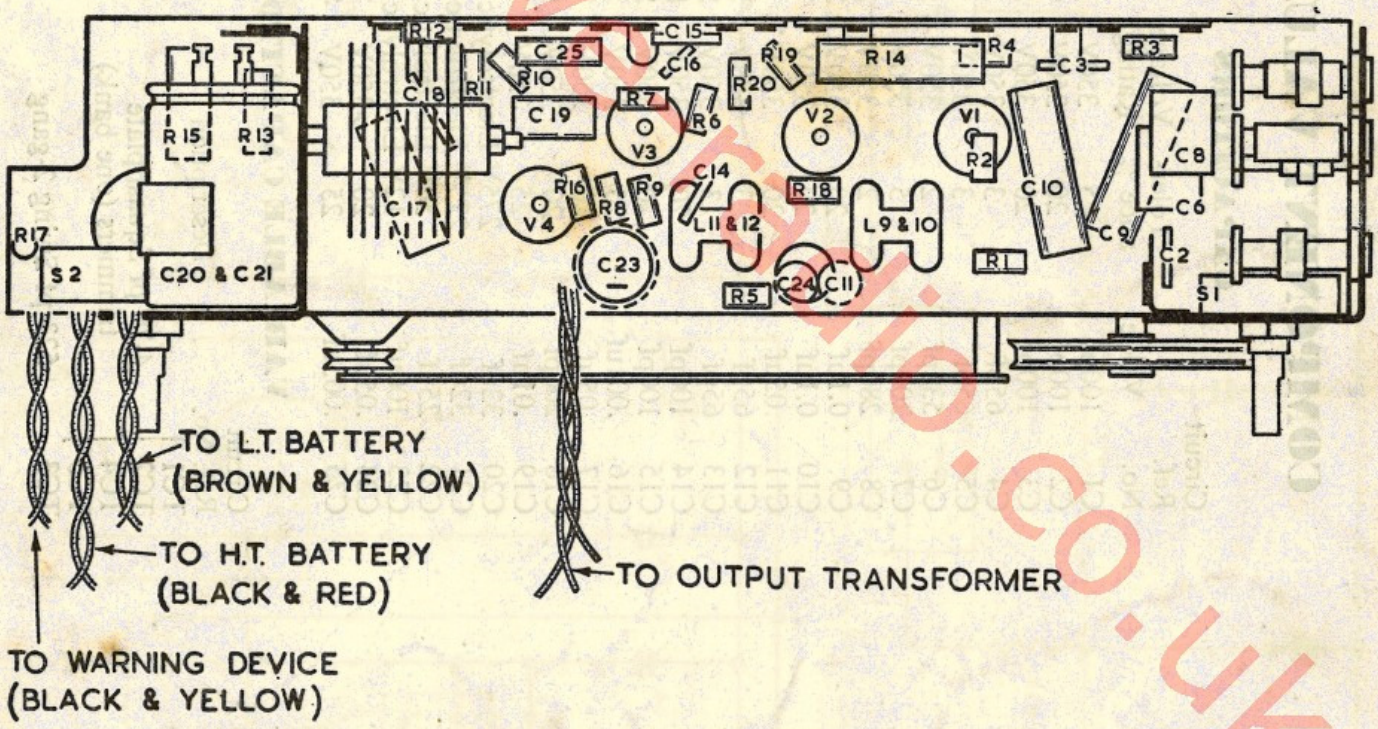
Circuit Ref. No.	Description	Part No.
L1	M.W. Frame Aerial	17324
L2	L.W. Frame Aerial	17323
L3	M.W. Loading Coil	16875
L4	L.W. Loading Coil	16874
L5	M.W. Osc. Grid Coil	16575
L6	M.W. Osc. Anode Coil	
L7	L.W. Osc. Grid Coil	16576
L8	L.W. Osc. Anode Coil	
L9, L10	1st I.F. Transformer	15286
L11, L12	2nd I.F. Transformer	15286

MISCELLANEOUS

MR1	Metal Rectifier	16908
S1	Wave Change Switch	17314
S2	Batt./Off/Mains Switch	17317
S3	Warning note switch	
T1	Output transformer	16865
T2	Mains transformer	17321



TOP VIEW OF CHASSIS.



UNDER VIEW OF CHASSIS.

Should it be necessary to write to the makers, the serial number and Catalogue number must be quoted.

VIDOR LIMITED - ERITH - KENT - ENGLAND