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# SERVICE MANUAL

**COVERING**

***KB Model***

***WT 20***

A DIVISION OF **STC**

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COMBINED RADIO AND TELEVISION SERVICE LTD  
REGENT WORKS, SIDCUP, KENT. Tel: FOotscray 3333  
SERVICING ORGANISATION FOR K.B. REGENTONE. R.G.D.

ALSO PROVINCIAL DEPOT AT  
87 McALPINE STREET,  
GLASGOW  
CENtral 1779

# Service Manual

## WT.20

### GENERAL INFORMATION

The WT20 is a low priced tape recorder, suitable for recording from microphone (provided with recorder), radio or gramophone.

The recorder operates at a tape speed of  $3\frac{3}{4}$  ins. per second, and gives a playing time of  $1\frac{1}{2}$  hours on normal tape, and 2 hours 8 minutes on long play tape.

These times are achieved by recording two tracks on each tape.

POWER SUPPLY : 200 - 250 volts, 50 c/s.

POWER CONSUMPTION : 65 watts.

DIMENSIONS :

Height	Width	Depth	Weight
$6\frac{1}{4}$ ins.	$14\frac{3}{4}$ ins.	12.0 ins.	18 lbs. (approx.)

VALVE COMPLEMENT :

ECC83 — 1st and 2nd amplifiers.

ECL86 — 3rd amplifier, and output amplifier or erase oscillator.

DM70 — Recording level indicator.

SELENIUM RECTIFIERS :

STC — C3B H.T. Rectifier.

Westinghouse — Z33PC1 Recording level detector.

CONTROLS :

Play Back, Volume and Recording Level Control. On/Off, Play Back, Tone Control.

## CIRCUIT DESCRIPTION

When recording by means of a microphone the output is passed via switch S1 to the grid of V1A, and amplified. The output of V1A is coupled to the grid of V1B via capacitor C2 and the volume control R5, and further amplified. When recording from a radio or gramophone the input is passed through R4 to the volume control, and then to the grid of V1B.

The output of V1B is amplified in the triode section of V2, and then applied to the recording head via R14 together with the bias current derived via C11 from the oscillator V2B. Fixed tone correction circuits apply the necessary compensation for recording characteristics, treble lift being applied to the amplifier by means of the network R8, R13 and C5.

The output of V2A is rectified by MR1, and applied to the grid of the record-level indicator V3. The pentode section of V2 is operated as an oscillator, and when recording, coil L4 is coupled via C10 to the grid of the pentode, in order to provide feed-back for the oscillator. The erase head L2 is coupled to the oscillator coil by means of winding L3.

On play back, head L1 (which is also used for recording) is brought into operation by means of ganged switches S1 and S2 (the microphone is switched out of circuit). The output of the triode section of V2 is now coupled to the grid of the pentode section via switch S4. The output of the pentode is passed into the primary of the audio output transformer L5, across which is connected the variable tone control. Bass-boost is applied by means of C8, R13 and R8, compensation for head losses being made by C5.

The H.T. supply is provided by means of a mains transformer and contact cooled selenium bridge rectifier, connected to a resistance-capacitance smoothing network.

## COIL AND TRANSFORMER DATA

ERASE OSCILLATOR COIL										Approximate Ohms
Secondary (Pin 1 and 2) ...	...	...	...	...	...	...	...	...	...	2.75 ohm.
Part Primary (Pin 4 and 6) ...	...	...	...	...	...	...	...	...	...	15.0 ohm.
Part Primary (Pin 3 and 4) ...	...	...	...	...	...	...	...	...	...	5.0 ohm.
AUDIO OUTPUT TRANSFORMER										
Primary ...	...	...	...	...	...	...	...	...	...	420 ohm.
MAINS TRANSFORMER										
Common to 205 tap ...	...	...	...	...	...	...	...	...	...	50 ohm.
Common to 225 tap ...	...	...	...	...	...	...	...	...	...	55 ohm.
Common to 245 tap ...	...	...	...	...	...	...	...	...	...	60 ohm.
H.T. Winding ...	...	...	...	...	...	...	...	...	...	325 ohm.

ALL OTHER LESS THAN 1 OHM.

## Removal of Tape Deck and Amplifier :

1. Remove knobs from Volume and Tone Controls.
2. Remove locking nuts from Volume and Tone Controls.
3. Remove two large Phillips Head Screws retaining the tape deck.
4. Lift the rear edge of the tape deck, until the Volume and Tone Control shafts are clear of their holes; the complete assembly can then be withdrawn from the cabinet.

## Bias Oscillator Adjustment

Connect a 1 K ohm  $\pm 2\%$  resistor in series with the blue lead on the record/playback head. Adjust core of L4 to obtain a voltage of 280 mV. across the resistor, measured with a valve voltmeter.

The voltage across the erase head should be approximately 17V., also measured with a Valve voltmeter

## Replacement of Switch

If the switch is replaced it may be noticed that the magic eye tuning indicator is partially closed on the record position with no signal input. This will probably be due to stray coupling between the leads from the oscillator coil and switch. The leads in this instance should be dressed to obtain maximum opening of the tuning indicator. If a valve voltmeter is available a reading of less than 1.5V A.C. should be obtained at the anode of V2A for maximum opening. This symptom may also be experienced if the mic. jack fails to short to earth when the mike plug is removed.

## Magnetisation of Heads

A high noise level or hiss on recordings may be attributed to the head becoming magnetised.

To remedy this fault, a defluxer unit should be used.

### NOTE :

It is important that metal objects such as screwdrivers, etc., should be kept well away from the heads to prevent magnetisation.

On no account should continuity checks be made on the heads with an AVO or similar instrument, as this will magnetise the head.

## Checking of Heads

To check the function of a suspect head :

- (a) Replay a taped recording, known to be satisfactory.
- (b) A continuity check should be made by connecting a 1 K ohm resistor in series with the earthed end of the head, and check that a signal or bias voltage appears across the resistor using a valve voltmeter.

## Changing of Heads

If the erase head is changed it is essential that the azimuth and vertical alignment of the gap is set at right angles to the tape. If the Record/Playback head is changed the azimuth adjustment is far more critical than that required for the erase head and should only be carried out in conjunction with a high grade test tape, e.g. C.C.I.R. test tape or E.M.I. T.B.T.I.

This tape should be played at the 8 Kc/s frequency band and the head adjusted by means of the screw (without the spring washer) for maximum output.

SPARE PARTS LIST W.T.20



COMPONENT	CIRCUIT REF.	PART No.
Cabinet		823/4
Control Panel		28/55
<b>COILS :</b>		
Oscillator Coil Assembly	L.3, 4	32/83
<b>CAPACITORS :</b>		
32+32+32 mfd. 275V. Electrolytic	C7, 17, 18	KEM.93
25 mfd. 25V. Electrolytic	C.1	KEM.103
50 mfd. 12V. Electrolytic	C.15	KEM.88
1 mfd. 275V. Electrolytic	C.4	KEM.208
<b>HEADS :</b>		
Record/Playback Head	L.1	37/21
Erase Head	L.2	37/22
Record/Playback switch assembly	S1, 2, 3, 4, 5	823/15
<b>PLUGS, etc.:</b>		13/257
Wander Plug (Red)		13/258
Ext. Speaker Plug (Yellow)		35/176
Control Knob Assembly		13/259
Microphone Assembly		
<b>POTENTIOMETERS :</b>		
Off/On Tone Control	R.16	823/17
Volume Control	R.5	823/16
Rectifier S.T.C. C.3.B.		14/26
Rectifier M.R.1. Z33PCI.		14/25
Resistor 6.8K 1W.	R.22	R682 H.F.T.
Resistor 820 Ω 2W. 10%	R.25	R821 F.H.T.
<b>Speaker :</b>		11/125
<b>TAPE :</b>		
Reel with 600 feet standard type		636/218
Empty Reel		636/219
Tape Deck assembly (B.S.R. TD.2)		37/11
<b>TRANSFORMERS:</b>		
Mains Transformer	L7, 8, 9	39/S1/21
Audio Output Transformer	L5, 6	39/A0/22

V1A

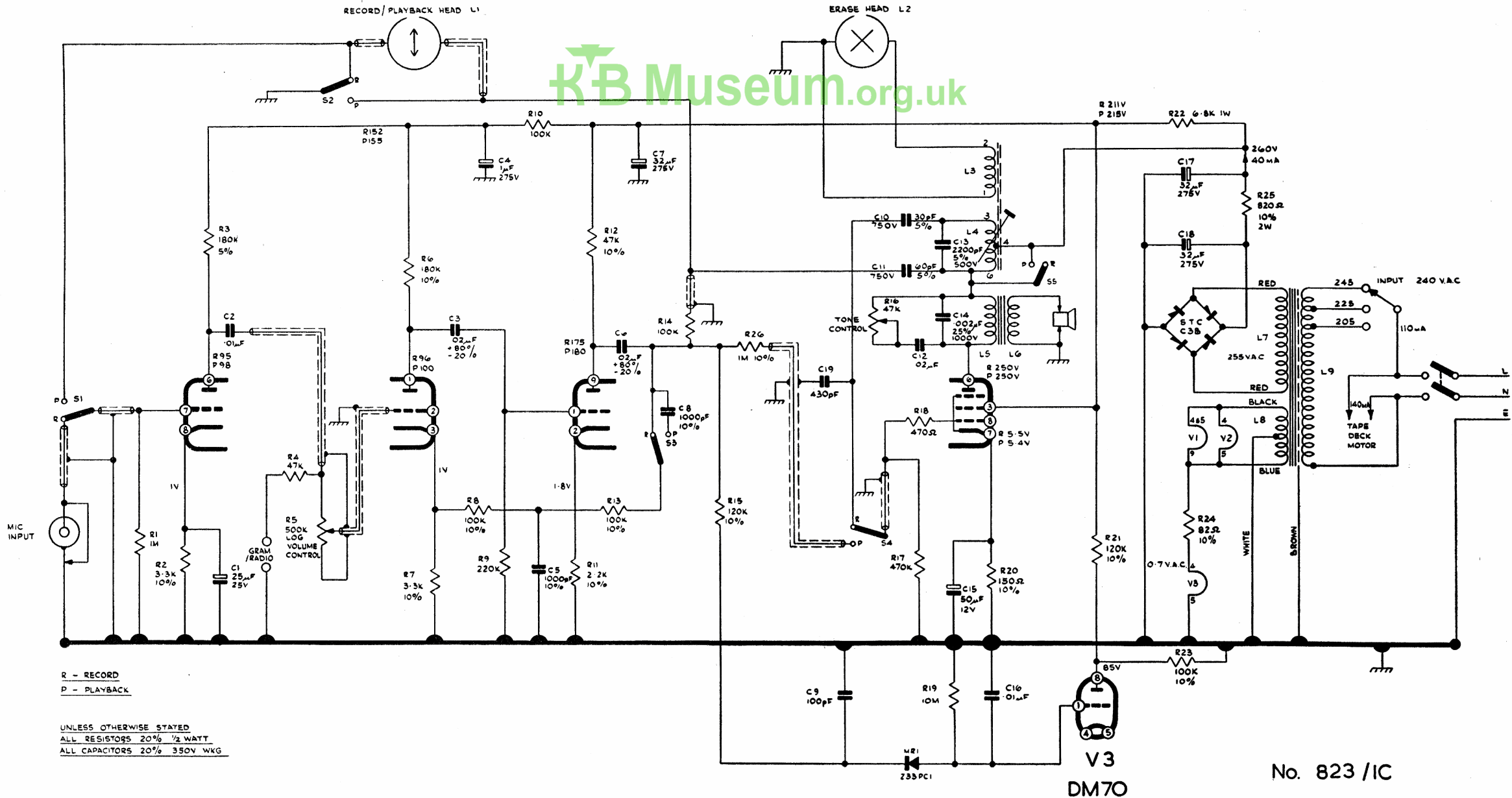
V1B

V2A

V2B

ECC83

ECL86



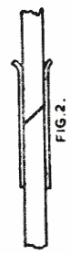
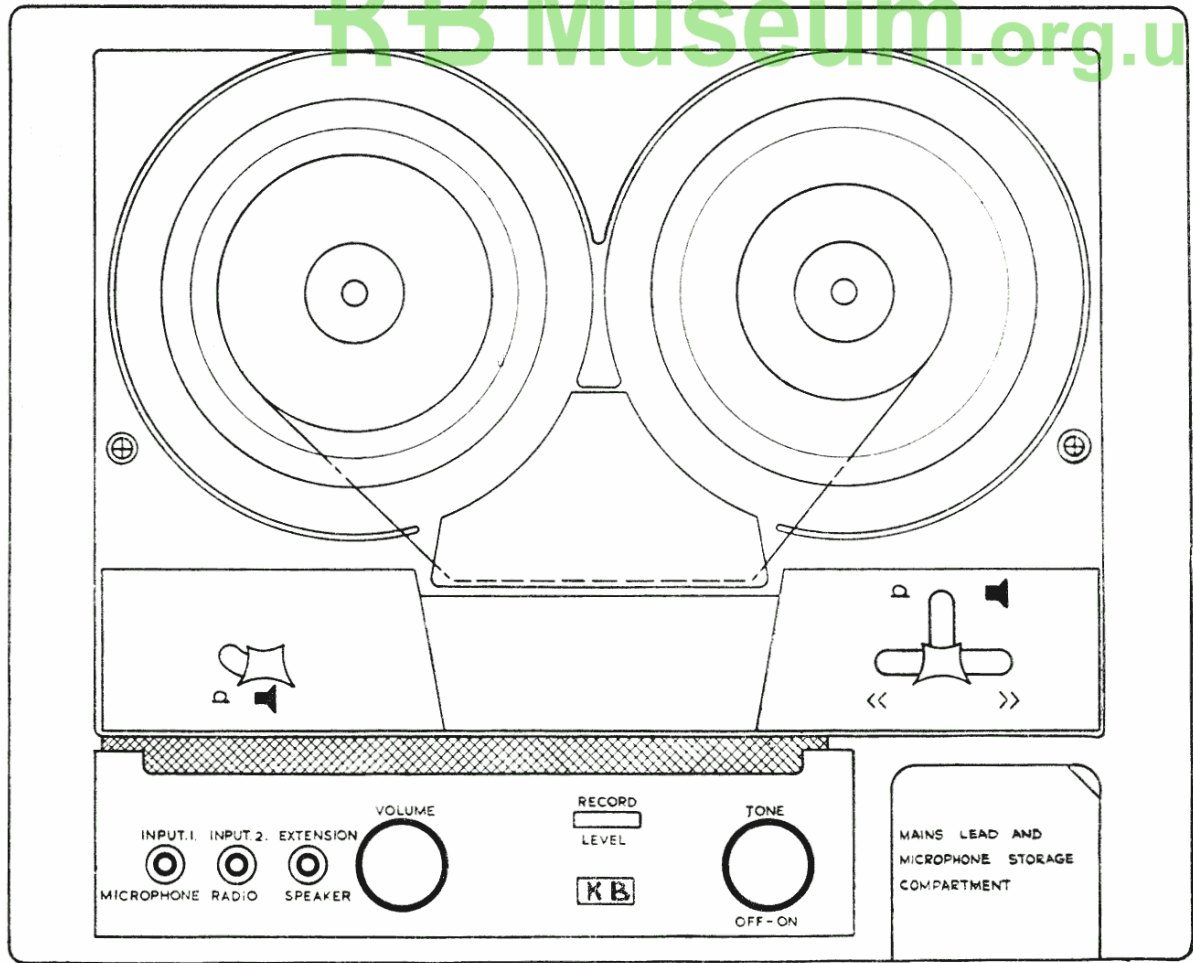
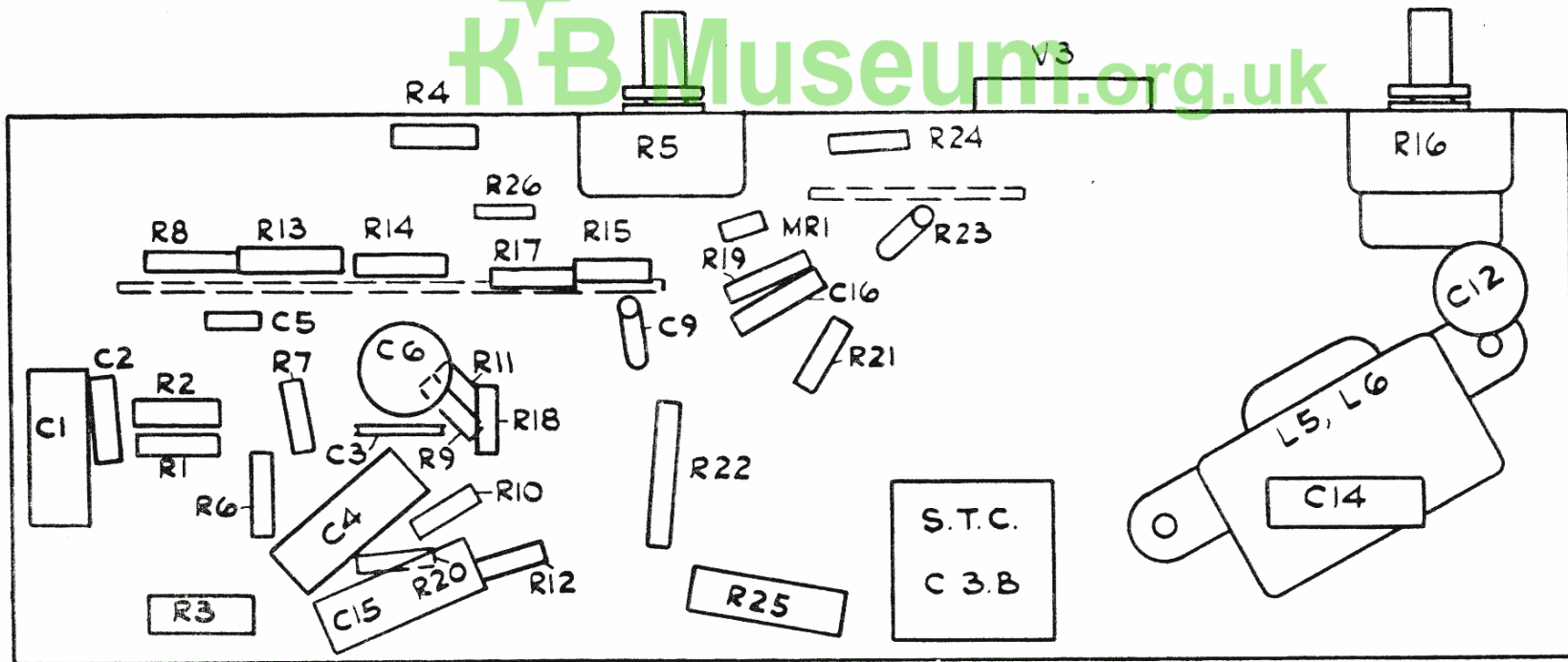
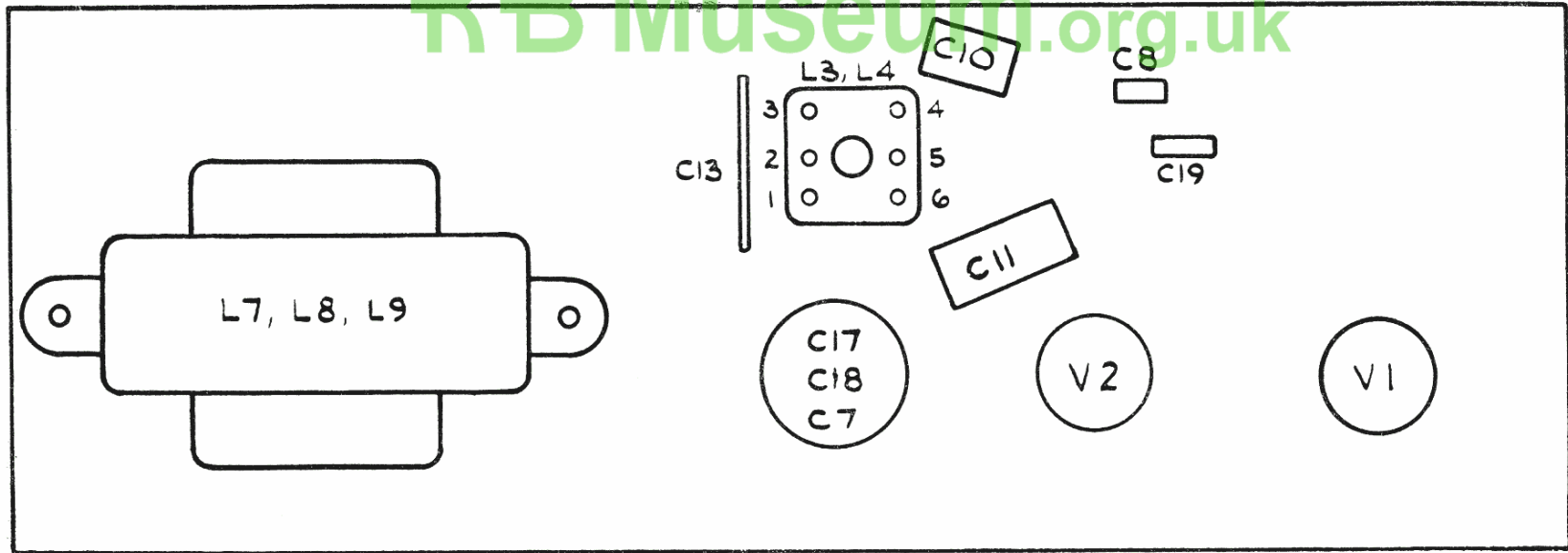


FIG. 1.



BOTTOM VIEW WT 20





TOP VIEW WT20