DECCA

SERVICE NOTES

TRANSISTOR RECEIVER
TP22 TT33

DECCA RADIO AND TELEVISION

branch of The Decca Record Co., Ltd.

INGATE PLACE,
QUEENSTOWN ROAD, LONDON, S.W.8.

MACaulay 6677

S P E C I F I C A T I O N

Models TP.22 and TT.33.

AERIALS:	Internal aerials for Medium and Long Wave bands. Provision for external aerial.
WAVEBANDS:	Medium 200-500 metres Long Waves 1800-1100 metres Intermediate frequency 472 kc/s
LOUDSPEAKER:	7" x 4" elliptical speaker - 35 ohms Part No. 47D/AY90
TRANSISTORS:	PXA 102 Frequency Changer PXA 101 1st I.F. Amplifier PXA 101 2nd I.F. Amplifier PXB 103 Audio Amplifier (2) PXC 101 Output 6E AGC Diode 12E Detector Diode
BATTERIES	2 Ever Ready Lantern Batteries - 6 volt Type 996

GENERAL NOTES - TRANSISTOR SERVICING.

1) Siemens Edison Swan Ltd. supply transistors in two packages (A) One R.F.1. package containing one PXA.102 and two PXA.101 transistors - the latter are suitable for either of the I.F. stages. (B) One L.F.1. package containing one PXB.103 and a pair of PXC.101 transistors.

The transistors must be used as a trio and should it become necessary to replace a transistor, we therefore recommend that the three transistors in the packet are inserted in the receiver. The appropriate package (i.e. R.F.1. or L.F.1) should, therefore be ordered from our Spares Department.

2) Take great care not to scratch or chip the paint covering on glass-cased transistors. If light is admitted, the transistors will act as a photo electric device (i.e. light will modulate the transistor current) and this may produce hum etc.

3) When soldering transistor connections, it is essential to use a heat sink (preferably a reasonably sized pair of pliers). If excessive heat is transmitted to the transistors, it could easily cause serious damage and transistors should not be subjected to a temperature above 60°F. It is also important to realize that the electric soldering iron should be earthed, irons often have a very slight leak when hot and the resultant current can often damage a new transistor.

5) In the later service notes we have quoted only current readings, these can be checked only by unsoldering the appropriate collector and placing the

meter in circuit. We have preferred not to quote voltage readings for general service information. Use of a meter with an internal resistance lower than 10,000 ohms per volt can give misleading information, also wrong connection of a meter can easily cause damage to transistors when undertaking a quick service operation. It must be emphasized that the receiver must be switched off to make a connection for a current reading despite the low voltages operative in the set.

6) Great care must be taken when replacing the batteries to insert the right way round, otherwise transistors may be damaged and the battery life greatly reduced. The following sketch shows an Ever Ready 996 battery being placed in position.

The batteries are removed by tilting slightly and pulling gently out of the cabinet. Attach clip to new battery, depress spring with the index finger and slide battery into position so that the spring makes contact with contact strip.

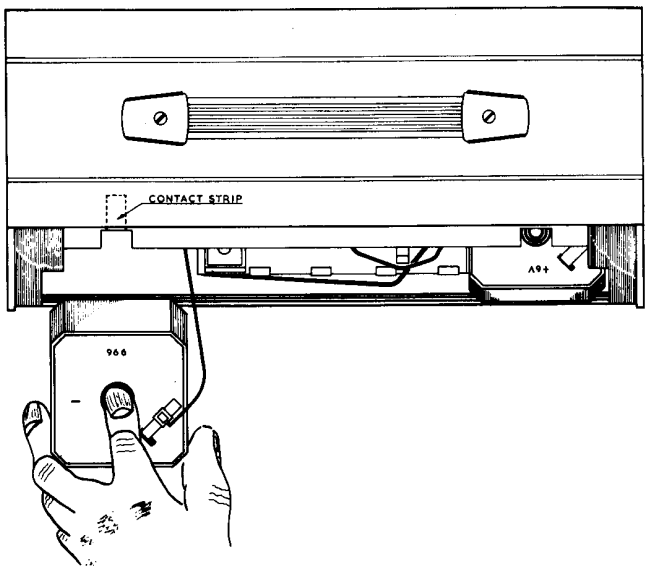


FIG.1.

Many service engineers have found the booklet "Transistors-Circuits and Servicing" of great assistance. This is published by Trader Publishing Co. Ltd., Dorset House, Stamford Street, S.E.1. at the price of 2/6d.

CIRCUIT DESCRIPTION

The first stage consists of an XA102 transistor operating in a self-oscillating mixer circuit. Coupling to the 1st I.F. stage is by a double tuned transformer 56500. The CG6E point contact diode provides variable damping across 56500. At high signal levels, the diode conducts and thus effectively decreases the impedance across 56500 thus reducing gain with small loss of selectivity.

T2 (XA101) is a gain controlled 1st I.F. stage, the base bias is partly established by the D.C. component of the rectified signal at the detector diode (CG12E), an increase in signal level thus decreases the collector current of the stage and also decreases the reverse bias on the damping diode (via R6). The 2nd I.F. transformer (56501) couples into a 2nd amplifying XA101 stage (TR3). The 3rd I.F. transformer (56502) has a detector diode across its secondary, the logarithmic volume control (VR1) being the detector D.C. load.

TR4 (XB103) is the driver stage and is loaded by the phase splitter transformer (56492) which drives the matched pair TR5 and TR6 (XC101's) which operate as a class B push pull output stage.

A 15 ohm high impedance speech coil is used, obviating the need for an output transformer. A degree of negative feedback is applied from the speaker to the base circuits of TR4.

TRANSISTOR ALIGNMENT INSTRUCTIONS

Readings taken with meter across loudspeaker coil on low A.C. range.

I.F. ALIGNMENT.

Set signal generator to 472 kc/s.
Turn main tuning condenser until gang closed.
Switch to medium waveband.
Connect signal generator to point 'A' and 'B' on medium wave coil (L1), 'B' being R.F. earthy lead.
Feed in modulated signal to give low output indication.
Peak T2, T3 and T4 for max. output, adjusting input level when necessary.

R.F. ALIGNMENT.

Medium Wave.

Set pointer to cursor at high frequency end of scale.
Tune receiver to 600 kc/s.
Set signal generator to 600 kc/s.
Loosely couple signal to aerial rod.
Adjust oscillator coil (T1) for maximum output.

Tune receiver to 1500 kc/s
Re-set generator to 1500 kc/s and adjust oscillator trimmer (C11) for maximum output.
Adjust aerial trimmer (C2) for maximum output.
Re-tune receiver to 600 kc/s.
Set generator to 600 kc/s.
Adjust for maximum by moving medium wave aerial coil (L1) along rod.
If considerable adjustment is required, repeat alignment.

Long Wave

Tune receiver to 250 kc/s.
Set signal generator to 250 kc/s.
Loosely couple signal to aerial rod.
Adjust oscillator trimmer (C6) for maximum output. (There may be a degree of oscillator pulling when tuning C6, care should be taken to adjust C4 and C6 for maximum signal at the correct tracking point).
Re-tune receiver to 170 kc/s
Feed signal at 170 kc/s
Move long wave aerial coil (L2) on rod for maximum output.
Repeat alignment if considerable movement necessary.

MAIN PARTS LIST.

QUANTITY.	CIR. REF.	DESCRIPTION	PART NO.
1	L1/L2	Aerial rod assembly	56490
1	T1	Oscillator coil assembly	56503
1	T2	1st I.F. transformer assembly	56500
1	T3	2nd I.F. transformer assembly	56501
** 1	T4	3rd I.F. transformer assembly	56502
1	T5	Driver transformer assembly	56492
1		35ohm speaker	47D/AY90
1		Aerial panel assembly	51582
1	VR1	5K Potentiometer	59710
1	C1/C10	Ganged condenser (410PF)	58057
1	C4/C6	Two bank trimmer (25/50PF)	58055
1		Tuning Dial	59559
1		Pointer	51814
1		Drive cord spring	52125
1		Cabinet back	64396
1		Tuning knob	59722
1		Wave change switch knob	59723
1		Volume control knob	59723
2		Battery clips	52123
1	S1/S2	Wafer switch	59771
1		Tuner drum and bush assembly	59698
1		Tuning Drive spindle	53504

** Supplied with BTH diode 12E.

CONDENSERS.

CIR.REF.	VALUE	VOLTAGE WORKING	TOLERANCE	NOTES.
1/10	410PF			(Pt. No. 58507
2/11	TRIMMERS TO MAIN GANG			(Pt. No. 58507
3	85PF	-	+ - 5%	Suflex HS/12/E
4/6	25-50PF	-	-	Pt. No. 58055
5	325PF	-	+ - 5%	Suflex HS/15/D
7	.04MF	150v.	-	Hunts W99
8	.02MF	150v.	-	Hunts W99
9	480PF	-	+ - 1%	Suflex HS/15/D
12	400PF	-	-	Inside 56500
13	400PF	-	-	Inside 56500
14	400PF	-	-	Inside 56501
15	480PF	-	+ - 5%	Suflex HS/12/D
16	.04MF	150v.	-	Hunts W99
17	10MF	12v.	-	Daly H5-5/2
18	.04MF	150v.	-	Hunts W99
19	.04MF	150v.	-	Hunts W99
20	100MF	12v.	-	Daly E549/2
21	.04MF	150v.	-	Hunts W99
22	.04MF	150v.	-	Hunts W99
23	100MF	12v.	-	Daly E549/2
24	.02MF	150v.	-	Hunts W99
25	10MF	12v.	-	Daly H5-5/2
26	10MF	12v.	-	Daly H5-5/2
27	400PF	-	-	Inside 56501
28	.02MF	150v.	-	Hunts W99 Inside 56502
29	250PF	-	-	Inside 56502
30	25PF	-	-	Inside 56502

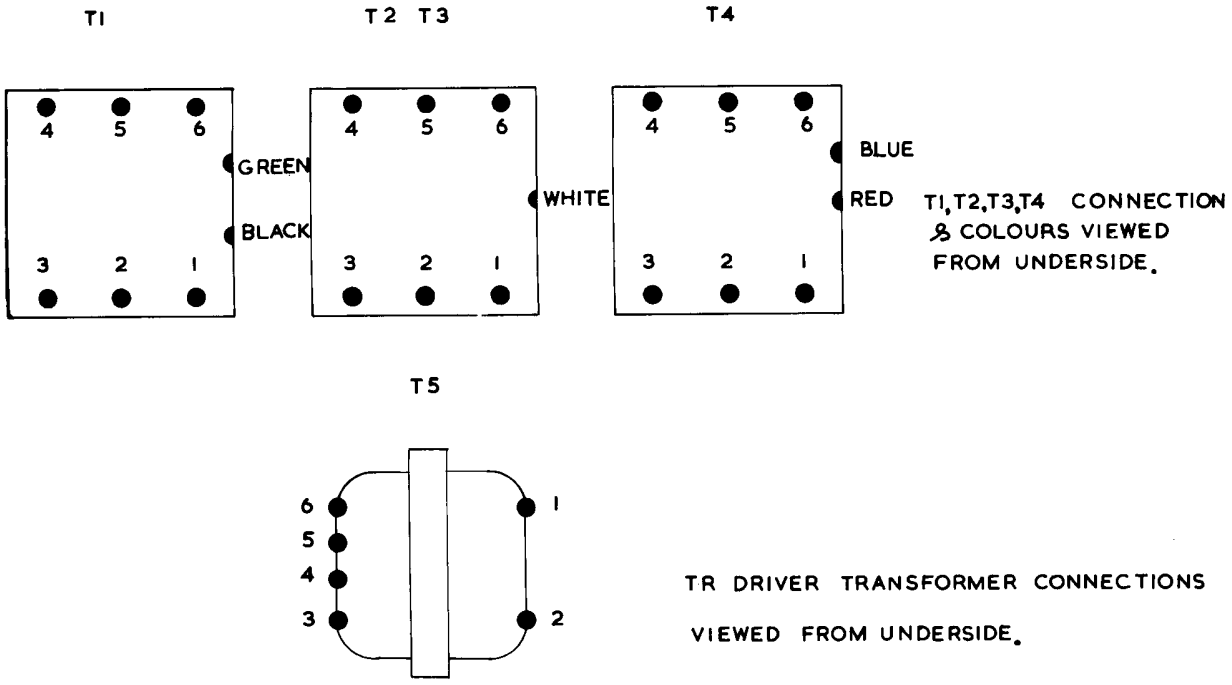
RESISTORS.

CIR. REF.	VALUE	WATTAGE	TOLERANCE
1	33K	¼W	10%
2	390Ω	¼W	10%
3	56K	¼W	10%
4	8.2K	¼W	10%
5	3.3K	¼W	10%
6	1K	¼W	10%
7	8.2K	¼W	10%
8	680Ω	¼W	10%
9	3.3K	¼W	10%
10	2.2K	¼W	10%
11	470Ω	¼W	10%
12	330Ω	¼W	10%
13	1K	¼W	10%
14	18K	¼W	10%
15	18K	¼W	10%
16	1K	¼W	10%
17	3K	¼W	5%
18	100Ω	¼W	5%
19	100Ω	¼W	5%
20	3K	¼W	5%
21	6.8Ω	¼W	5%
22	6.8Ω	¼W	5%
23	470Ω	¼W	10%
24	10Ω	¼W	10%
25	3.3K	¼W	10%
26	15K	¼W	10%
27	1K	¼W	10%

CURRENT READINGS

Measurements taken under low signal conditions.

TRANSISTOR	COLLECTOR CURRENT.
TR1	.3 Ma.
TR2	1.2
TR3	1.2
TR4	2.8
TR5	2.1
TR6	2.1



COIL CONNECTIONS

FIG.2.

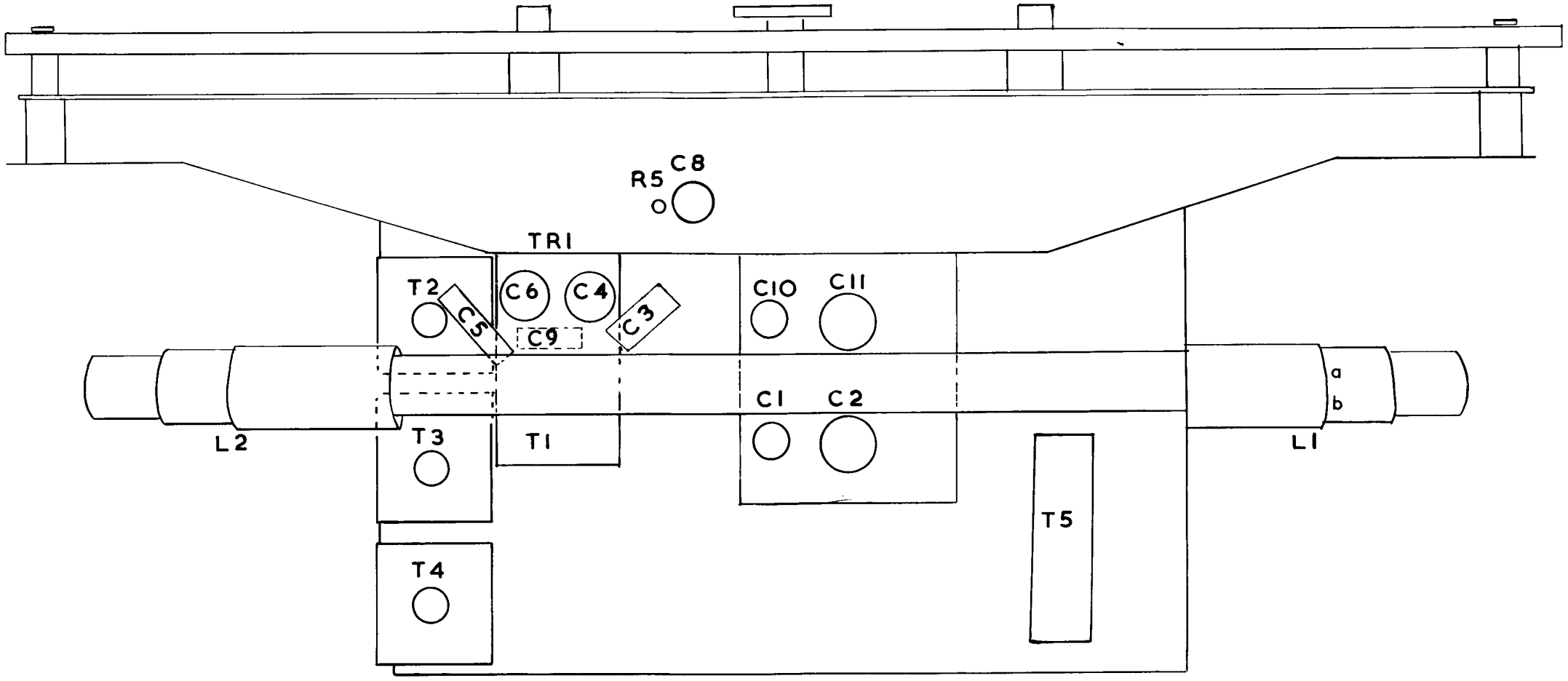


FIG. 3.

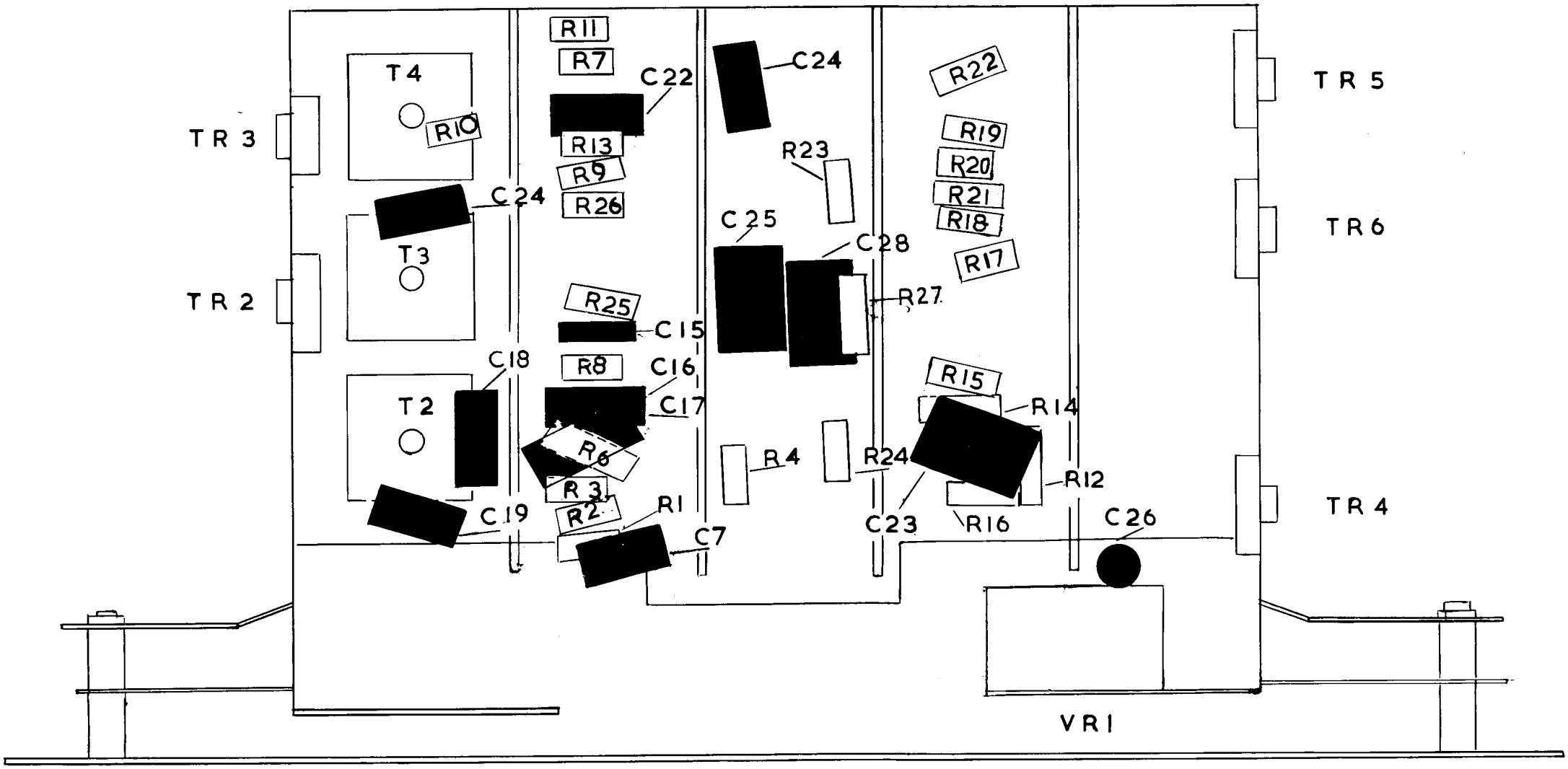
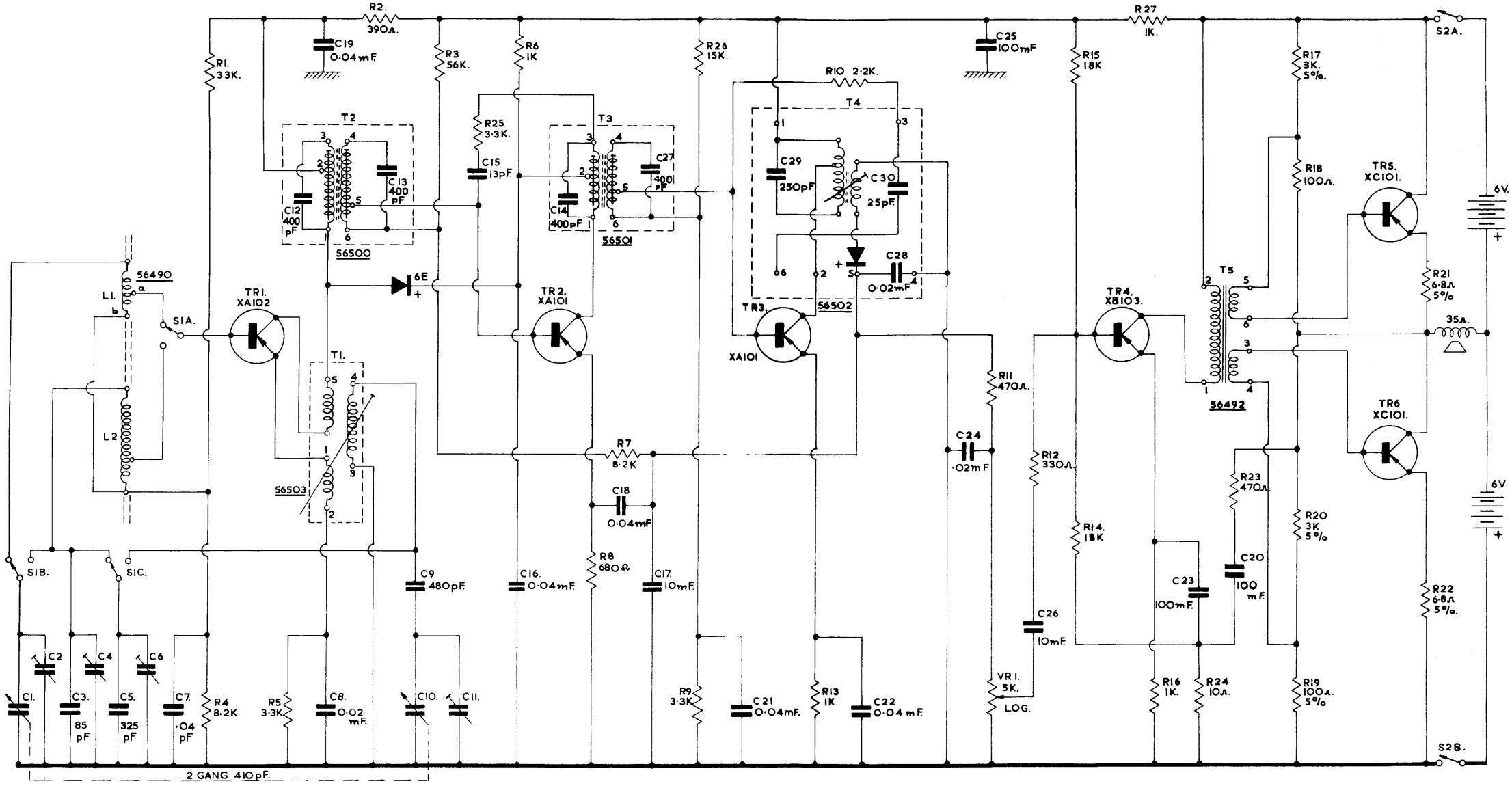
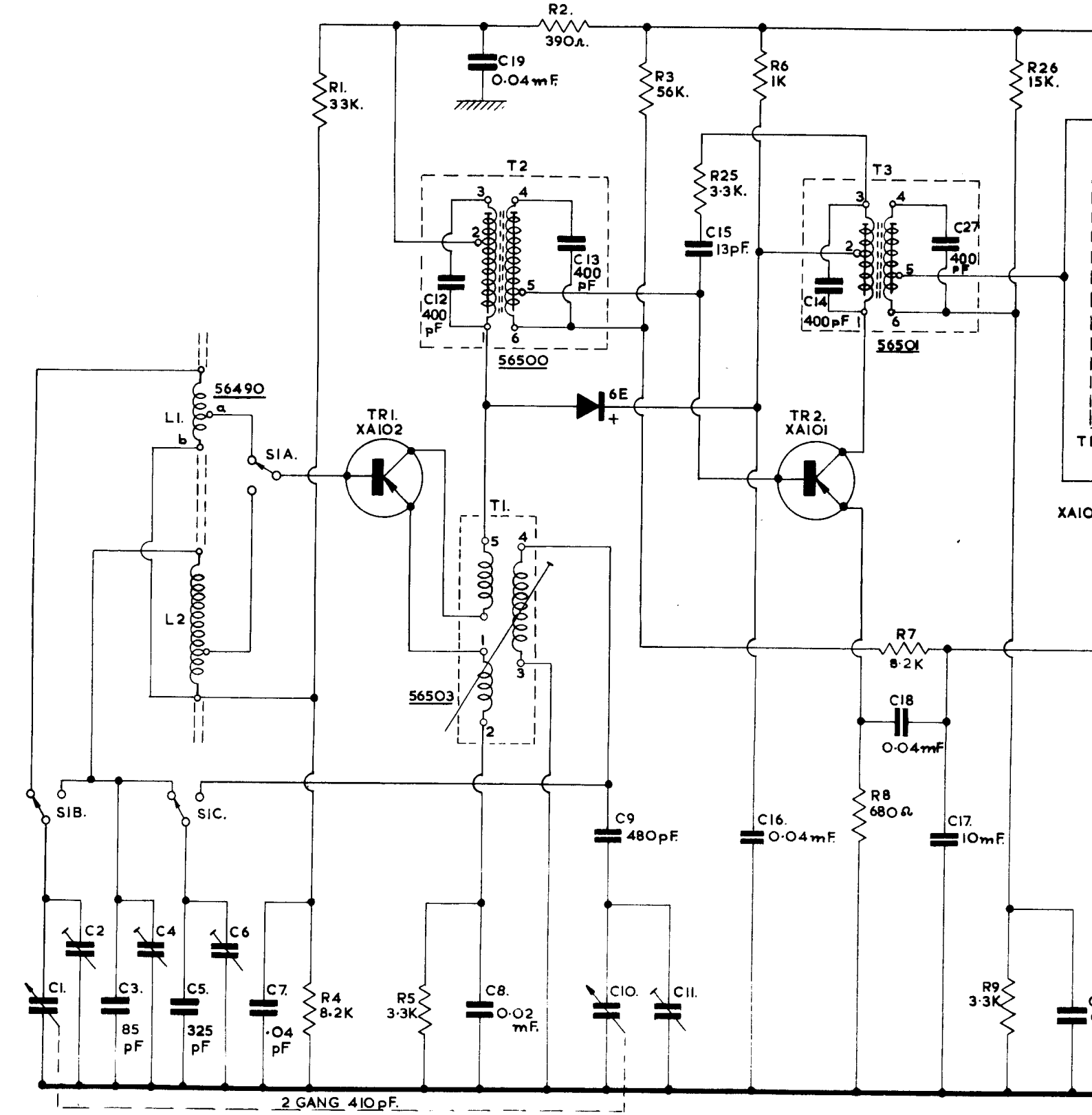
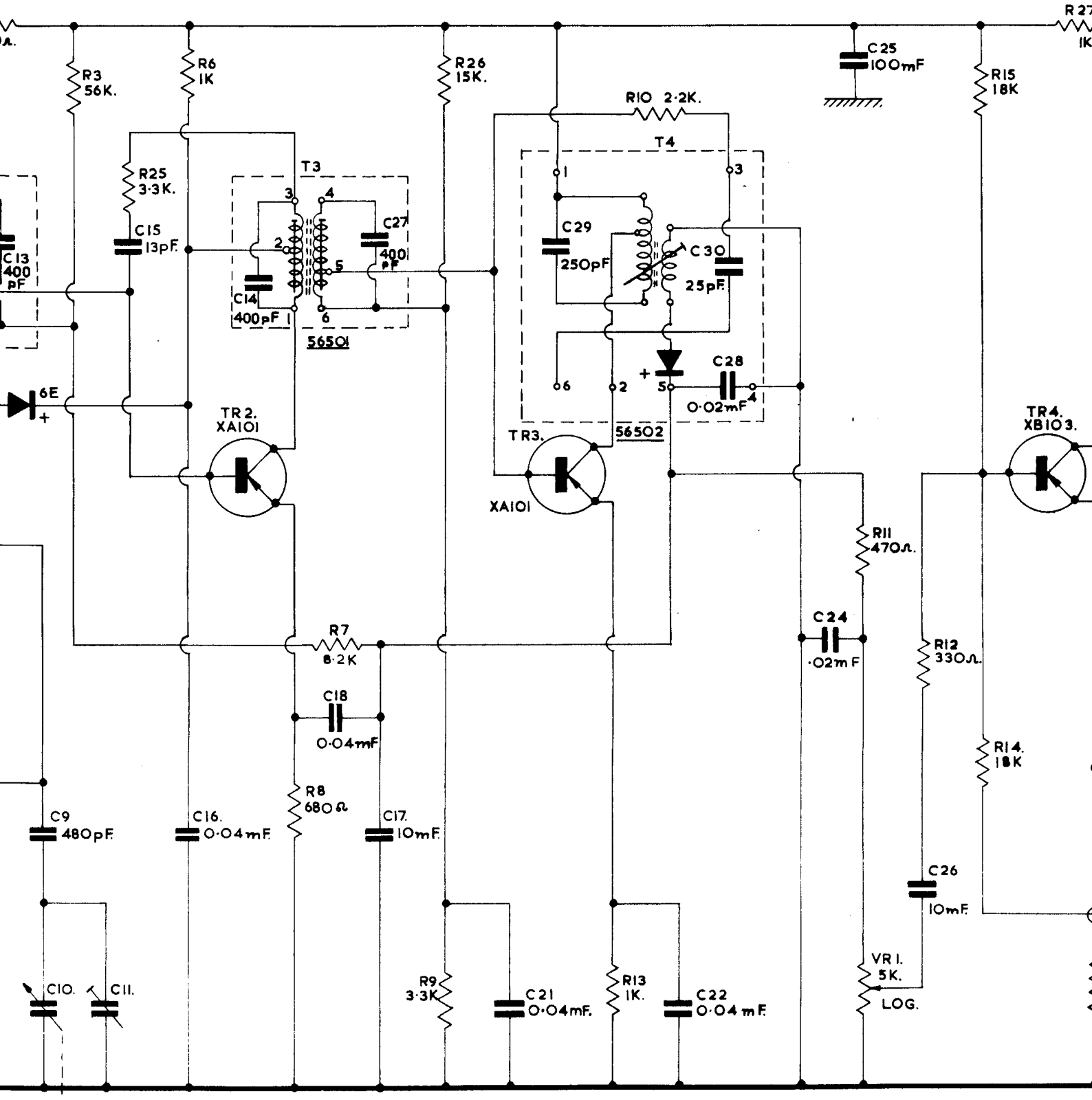
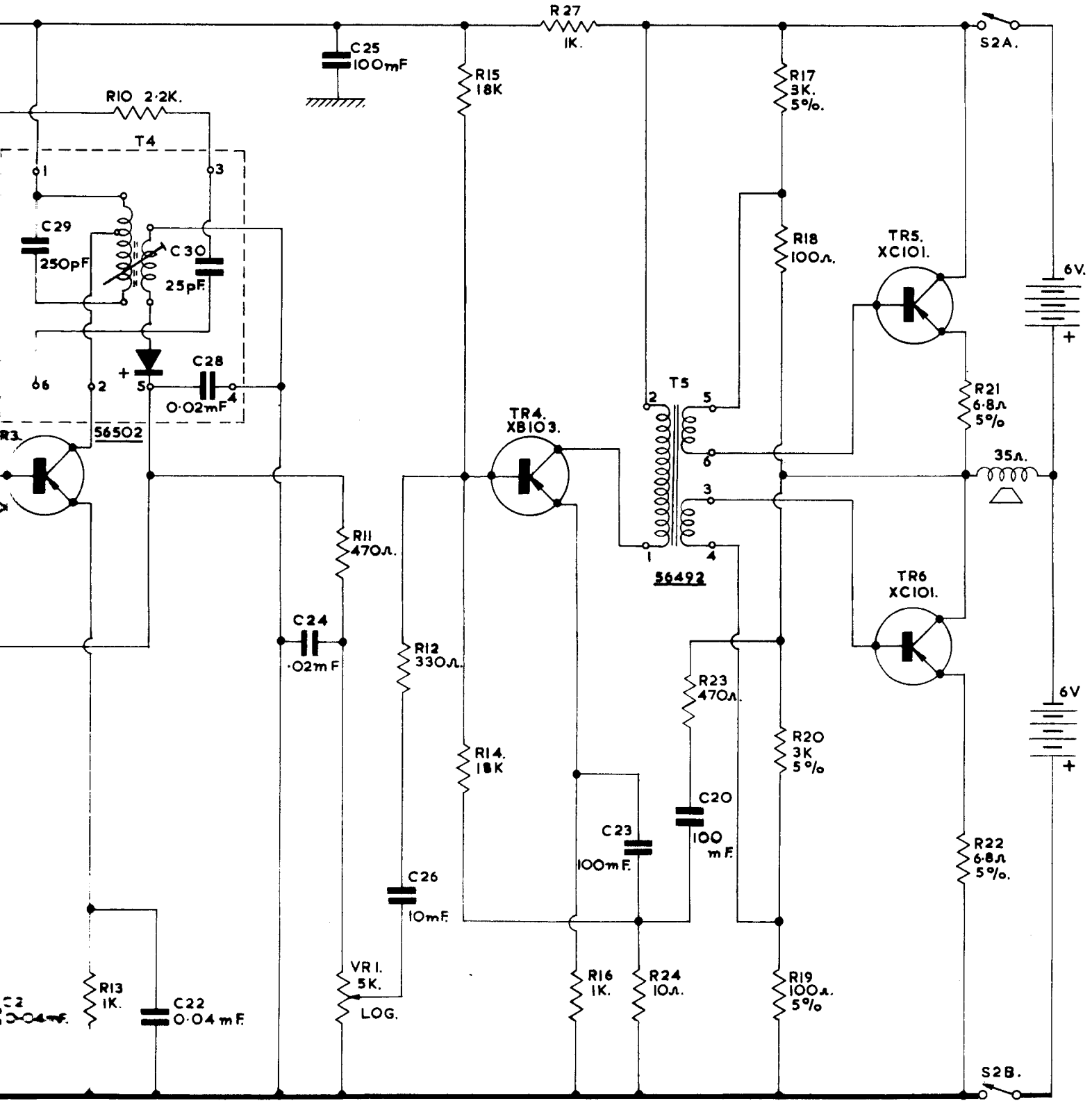

R11
R7
C22
C24
R22
T4
R10
R13
R9
R26
R23
R19
R20
R21
R18
R17
TR 5
TR 3
C24
T3
C25
C28
R27
TR 6
TR 2
R25
C15
C18
R8
C16
C17
R15
R14
T2
R6
R4
R24
R12
R3
R2
R1
C19
C23
R16
C26
TR 4
C7
VR1

FIG. 4.


R2. 390Ω.
C19 0·04mF.
R1. 33K.
R3 56K.
R6 1K
R26 15K.
C25 100mF
R27 1K.
S2A.
R15 18K
R17 3K. 5%.
R18 100Ω.
TR5. XC101.
6V.
T2
T3
T4
R25 3·3K.
C15 13pF.
C12 400 pF
C13 400 pF
C14 400pF
C27 400 pF
56500
56501
C29 250pF
C30 25pF.
R10 2·2K.
C28 0·02mF
56502
6E
TR1. XA102
TR2. XA101
TR3. XA101
TR4. XB103.
T5
56492
R21 6·8Ω 5%
35Ω.
TR6 XC101.
56490
L1.
L2
S1A.
T1.
56503
R7 8·2K
C18 0·04mF
R8 680Ω
C16. 0·04mF.
C17. 10mF.
C24 ·02mF
R11 470Ω.
R12 330Ω.
R14. 18K
C26 10mF.
VR1. 5K. LOG.
R23 470Ω.
C20 100 mF.
C23 100mF.
R20 3K 5%
R22 6·8Ω 5%.
R16 1K.
R24 10Ω.
R19 100Ω. 5%
S2B.
S1B.
S1C.
C9 480pF.
C1. C2 C3. 85 pF C4 C5. 325 pF C6 C7. ·04 pF
R4 8·2K
R5 3·3K.
C8. 0·02 mF.
C10. C11.
R9. 3·3K.
C21 0·04mF.
R13 1K.
C22 0·04mF.
2 GANG 410pF.


R2.
390Ω.
C19
0·04mF.
R1.
33K.
R3
56K.
R6
1K
R26
15K.
T2
R25
3·3K.
C15
13pF.
T3
C13
400
pF
C12
400
pF
56500
C27
400
pF
C14
400pF
56501
56490
L1.
a
b
S1A.
TR1.
XA102
6E
+
TR2.
XA101
XAIO
T1.
L2
56503
R7
8·2K
C18
0·04mF
S1B.
S1C.
C9
480pF.
C16.
0·04mF.
R8
680Ω
C17.
10mF.
C2
C4
C6
C1.
C3.
85
pF
C5.
325
pF
C7.
·04
pF
R4
8·2K
R5
3·3K
C8.
0·02
mF.
C10.
C11.
R9
3·3K
2 GANG 410pF.


R3 56K.
R6 1K
R26 15K.
C25 100mF
R15 18K
R27 1K
R10 2·2K.
T4
T3
R25 3·3K.
C15 13pF.
C13 400 pF
C14 400pF
C27 400 pF
56501
C29 250pF
C30 25pF.
C28 0·02mF
56502
6E
TR2. XA101
TR3. XA101
TR4. XB103.
R11 470Ω.
C24 ·02mF
R12 330Ω.
R14. 18K
R7 8·2K
C18 0·04mF
R8 680Ω
C9 480pF.
C16. 0·04mF.
C17. 10mF.
C26 10mF.
VR1. 5K. LOG.
C10. C11.
R9 3·3K
C21 0·04mF.
R13 1K.
C22 0·04mF.


R27
1K.
S2A.
C25
100mF
R15
18K
R17
3K.
5%.
R10 2·2K.
T4
1
3
C29
250pF
C30
25pF.
R18
100Ω.
TR5.
XC101.
6V.
+
C28
0·02mF
2
5
4
56502
T5
2
5
6
3
1
4
56492
TR4.
XB103.
R21
6·8Ω
5%
35Ω.
R11
470Ω.
C24
·02mF
R12
330Ω.
TR6
XC101.
6V
R23
470Ω.
R14.
18K
R20
3K
5%
C20
100
mF.
C23
100mF.
C26
10mF.
R22
6·8Ω
5%.
VR1.
5K.
LOG.
R16
1K.
R24
10Ω.
R19
100Ω.
5%
R13
1K.
C22
0·04mF.
S2B.