

FERRANTI PEGASUS COMPUTER

VOLUME 5a

PACKAGES

(Diagrams)

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C O N T E N T S

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PIN No. ↓	TWIN DELAY	SINGLE DELAY	INVERTER	AND GATE	OR GATE	NICKEL LINE	CATHODE FOLLOWER	NUMBER GENERATOR	OUTPUT ONE		OUTPUT TWO	THYRATRON OUTPUT	PIN No. ↓	CRYSTAL OSC.	SHAPER		WFM OUTPUT		CLOCK AMP	DISCRIMINATOR	WRITE SW. CONT.		READ STROBE	W-R SWITCH (a) PINS	WRITE DRIVE	READ AMP	READ SW. CONT.		PIN No. ↓	
	1	2	3	4	5	6	8	7	9	9	10	26		11	12	12	13	13	20	21	14	14	15	16	17	18	19	19		
1													1																1	
2													2																2	
3													3																3	
4	1 x	1 ip	1 ip	1 ip	1 ip	-	1 ip	1 ip	-	1 SET	-	-	4	-	-	-	-	-	SHEATH	DRUM ip	ROW SEL.	-	HEATER 1 ip	-	WSC 2	HEATER +100V	SHEATH ip 2	-	4	
5	1 x	1 ip	1 ip	1 ip	1 ip	-	1 dop	1 dop	-	1 SET	1 ip	1 CATH	5	-	-	-	-	-	-	OSC. ip	SUPPRESS	-	+200V	WSC 3	+200V	+200V	-	+100V	5	
6	1 x	1 ip	1 ip	1 dop	1 dop	-	2 ip	2 x*	1 ip	3	-	1 ANODE	6	-	ip	ip	-	-	HEAD	-	-	+13V	-	WSC 4	+300V	ip	ip 3	-	6	
7	1 y	b	b	c	c	-	2 dop	2 x	-	3	-	-	7	op	-	-	ip	ip	-	-	-	-	1 DRIVE	1 ANODE	+300V	EARTH	-3.5V	7		
8	1 y	1 mop	1 mop	2 mop	2 mop	-20V	3 ip	2 y*	2 ip	3	-	-	8	-	-	-	-	-	HEAD	-	-	-	-	-20V	SHEATH	ip 4	-	8		
9	1 y	1 dop	1 dop	a	a	-	3 dop	2 y	1 ANODE	3	1 ANODE	-	9	-	-	-	-	-	-	-	-20V	-20V	-	2 DRIVE	2 ANODE	-	+4.5V	+1.5V	9	
10	d	d	d	2 dop	2 dop	-	a	2 mop	2 ANODE	3	-	-	10	-	+13V	-20V	-	-	SHEATH	B	-	-	d	-150V	INHIBIT	-20V	ip 5	-	10	
11	-150V	-150V	-150V	-150V	-150V	-150V	-150V	-150V	-150V	-150V	-150V	-	11	-150V	-150V	-150V	-150V	-150V	-150V	-150V	-150V	-150V	-150V	-	WSC 6	-	-150V	-150V	11	
12	RESET	RESET	+13V	2 ip	2 ip	RESET	4 mop	3 ip	-	1 HOLD	-	-	12	-	-	-	-	-	+13V	-	-	-	RESET	EARTH	-	ip 6	-	12		
13	1 mop	2 ip	2 ip	2 ip	2 ip	-	MON 4	2 x*	-	1 RETURN	-	1 ip	13	-	-	-	-	-	-	-	-	-	1 mop	WSC 7	ip 1	-	-	-	13	
14	1 dop	2 ip	2 ip	2 ip	2 ip	-	4 dop	2 z	-	1 op	-	1 ip	14	-	-	-	-	-	-	-	-	-	1 dop	COL. SEL.	ip 2	-	-	-	14	
15	b	2 ip	2 ip	3 ip	3 ip	x	c	c	-	2 RETURN	2 ip	1 ip	15	-	-	-	-	-	-	-	-	EARTH	b	WSC 8	EARTH	ip 7	-	-	15	
16													16																16	
17	b	b	b	3 ip	3 ip	x	4 ip	3 dop	-	2 HOLD	-	-	17	-	-	-	-	-	MON X	EARTH†	HEATER	b	HEAD 1	1 RSC	-	-	-	ip 1	17	
18	2 mop	2 mop	2 mop	3 ip	3 ip	x	5 ip	4 ip	3 ip	3	-	2 ip	18	-	-	-	-	-	-	-	← H.C.T. →	2 mop	HEAD 1	-	-	op 1	op 1	18		
19	2 dop	2 dop	2 dop	3 mop	3 mop	dop	5 mop	4 dop	-	3	2 ANODE	2 ip	19	-	-	EARTH	-	-	-	-	HEATER	2 dop	HEAD 2	2 RSC	-	-	ip 2	ip 2	19	
20	c	c	c	c	c	c	c	c	4 ip	3	-	2 ip	20	-	-	-	-	-	-20V	-	-	-	-	-	-	op 2	op 2	20		
21	CLOCK	CLOCK	d	a	a	CLOCK	MON 5	5 x*	3 ANODE	3	-	CLOCK	21	-	-	-	op 1	op 1	-	-	-	-	-	HEAD 3	3 RSC	-	-	ip 3	21	
22	-10V	-10V	-10V	-10V	-10V	-10V	-10V	-10V	-	3	-	-	22	-	-10V	-10V	-	-	-	-	-	-	-10V	HEAD 3	-	-	op 3	op 3	22	
23	d	3 ip	3 ip	3 dop	3 dop	y	5 dop	5 x	4 ANODE	3	3 ip	-	23	-	-	-	-	-	-	-	-	-	d	HEAD 4	4 RSC	-	-	ip 4	23	
24	2 x	3 ip	3 ip	4 mop	4 mop	y	a	5 mop	-	2 SET	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	op 4	op 4	24		
25	2 x	3 ip	3 ip	d	d	y	-	5 y*	-	2 SET	-	-	25	-	-	-	-	-	-	-	-	-	-	HEAD 5	5 RSC	-	-	ip 5	25	
26	2 x	b	b	4 dop	4 dop	INV op	6 dop	5 y	5 ip	5 ip	-	-	26	-	-	-	-	-	-	-	-	-	-	HEAD 5	-	-	op 5	op 5	26	
27	2 y	3 mop	3 mop	4 ip	4 ip	INV ip	6 ip	5 z*	5 ANODE	5 ANODE	-	2 CATH	27	-	-	-	op 2	op 2	-	-	-	-	-	HEAD 6	6 RSC	-	-	-	27	
28	2 y	3 dop	3 dop	4 ip	4 ip	INV ip	6 ip	5 z	6 ip	6 ip	3 ANODE	-	28	-	-	-	-	-	-	NEON	-	-	2 ip	HEAD 6	-	-	op 6	-	28	
29	2 y	d	d	4 ip	4 ip	CLOCK	6 ip	6 ip	6 ANODE	6 ANODE	-	-	29	-	op	op	-	-	op	op	op	op	-	HEAD 7	7 RSC	-	op	-	29	
30	-20V	-20V	-	4 ip	4 ip	-	6 ip	6 dop	-	-	-	2 ANODE	30	-	-	-	-	-	-	NEON	+100V	-	-	-	HEAD 7	-	-	op 7	-	30
31	+200V	+200V	+200V	+200V	+200V	+200V	+200V	+200V	+200V	+200V	+200V	+200V	31	-	-	-	-	-	-	-	+200V	+200V	+200V	-	HEAD 8	8 RSC	-	-	-	31
32	-	-	+300V	-	-	+300V	-	-	-	-	-	-	32	+300V	+300V	+300V	+300V	+300V	+300V	+300V	+300V	+200V	+200V	-	HEAD 8	-	-	op 8	-	32

LEGEND: ip = input
op = output
mop = 'mix' output
dop = direct output
x,y,z = multiple input gates
a,b,c,d = loose loads

* = Control input

op 1 = Coax Inner
op 2 = Coax Outer
† or -10V for drum with high-R rotor

‡ Earth to increase delay

FRONTISPIECE

PIN ALLOCATION

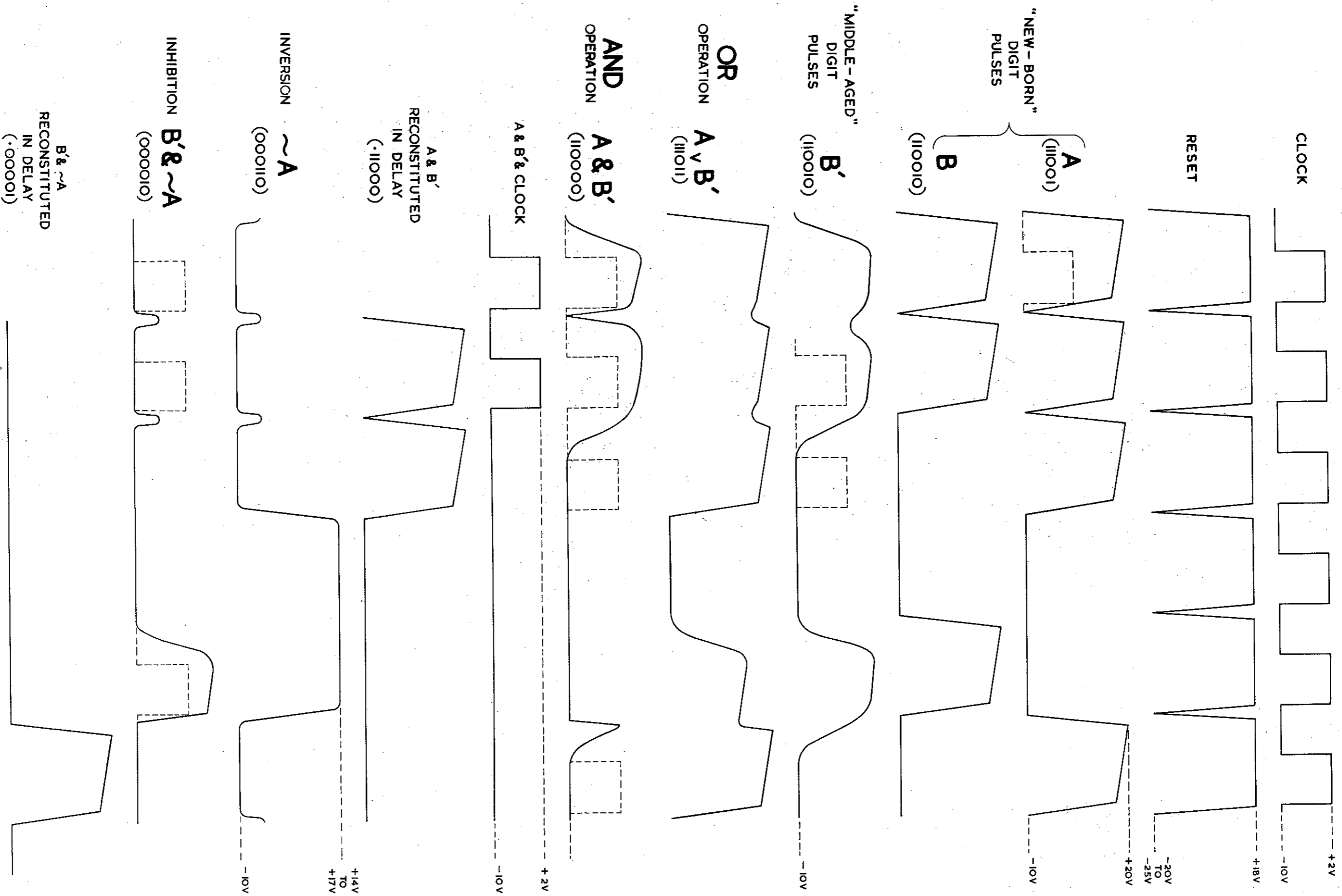
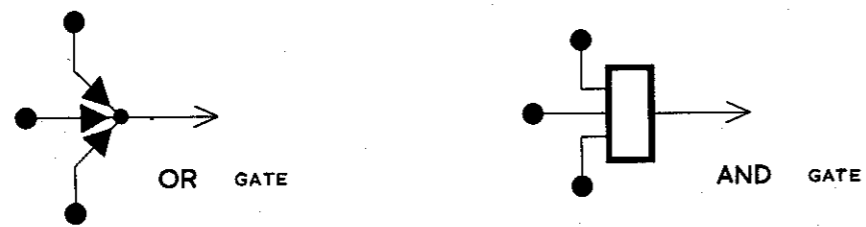
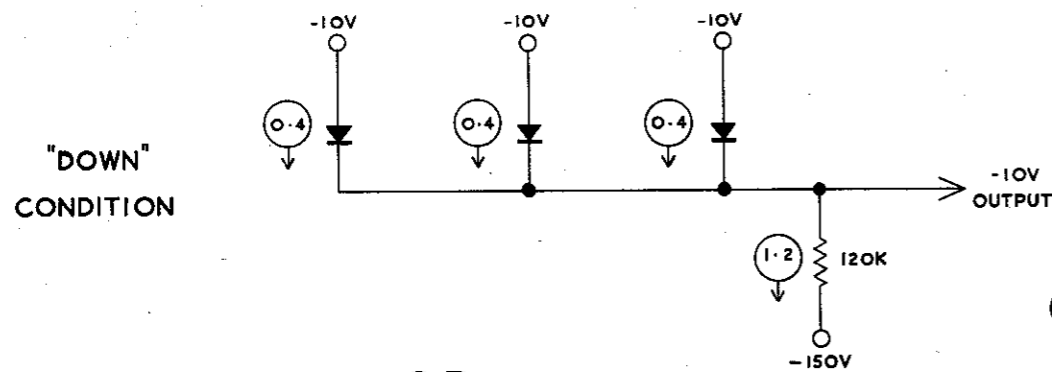
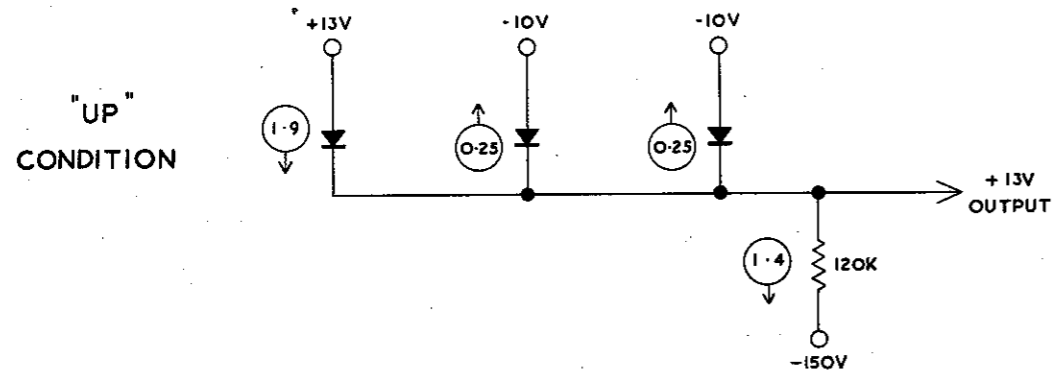


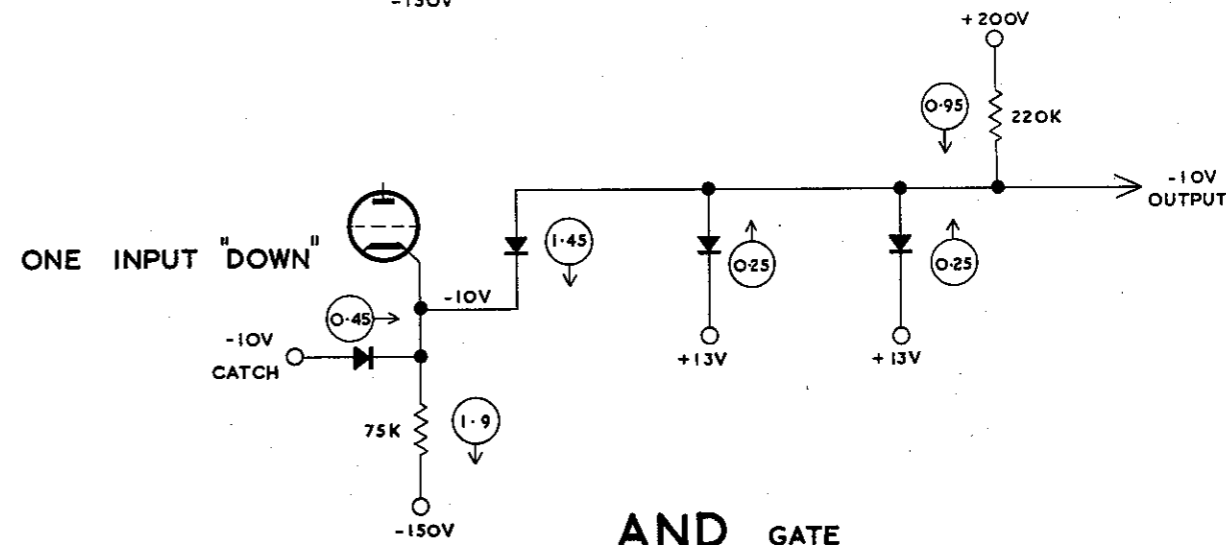
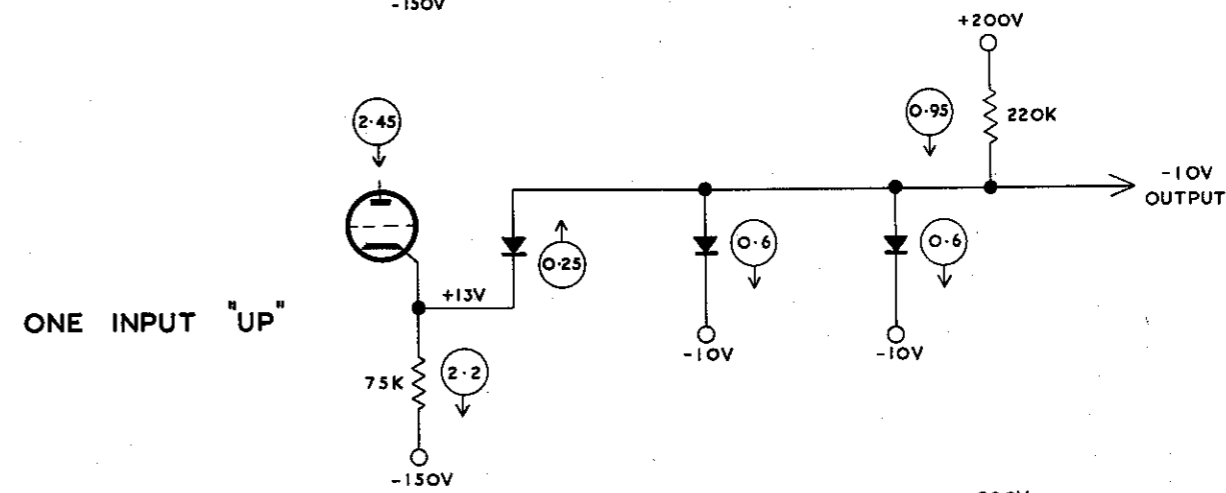
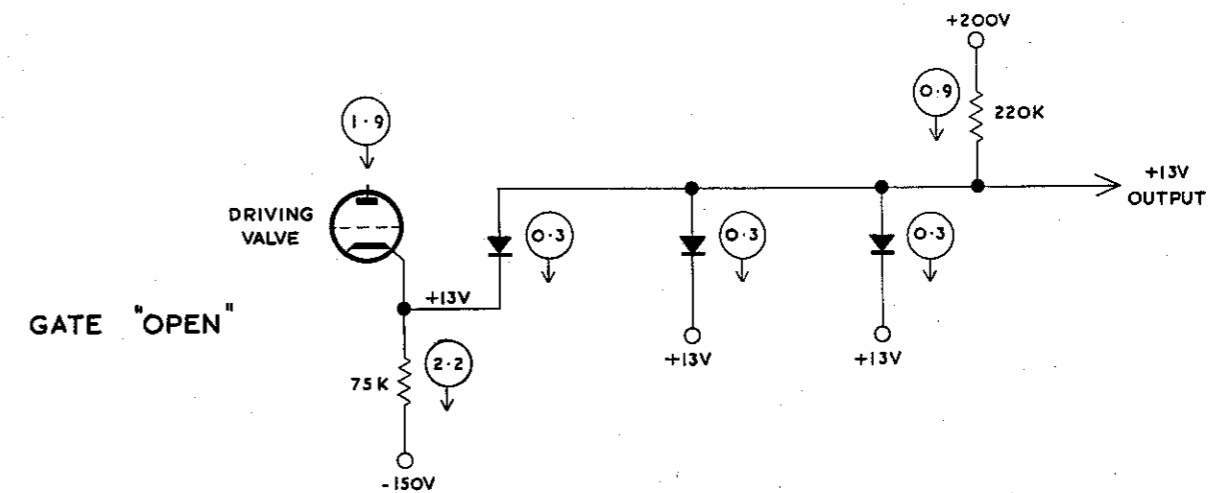
FIG. 1.1 IDEALISED WAVEFORMS



LOGICAL SYMBOLS



OR GATE

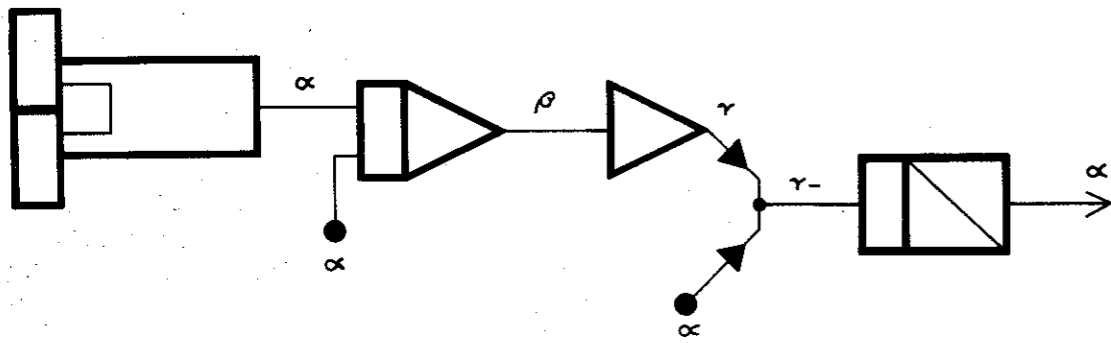


AND GATE

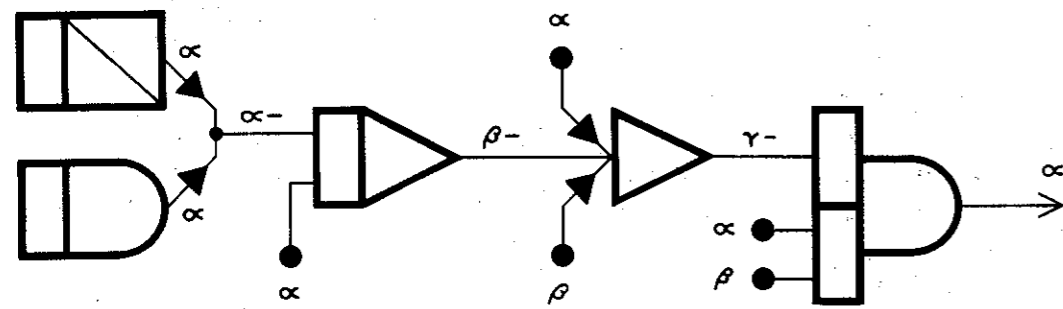
INDICATES CURRENT IN MILLIAMPS

FIG. 1.2

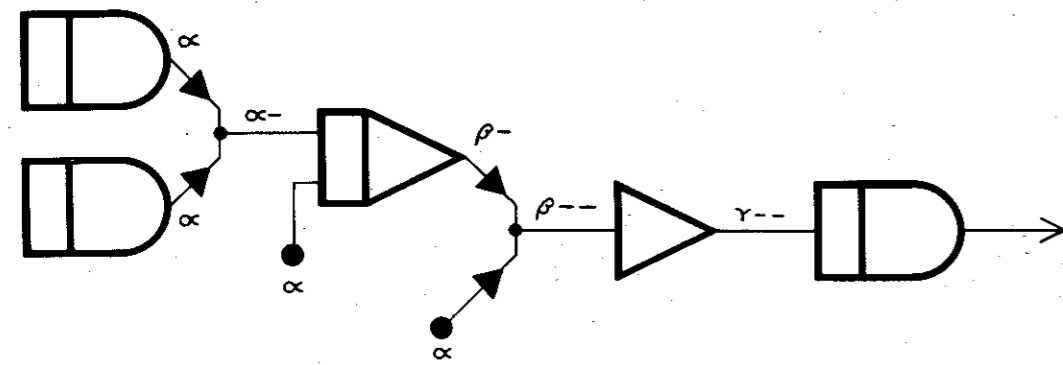
TYPICAL CRYSTAL GATES.



PERMISSIBLE

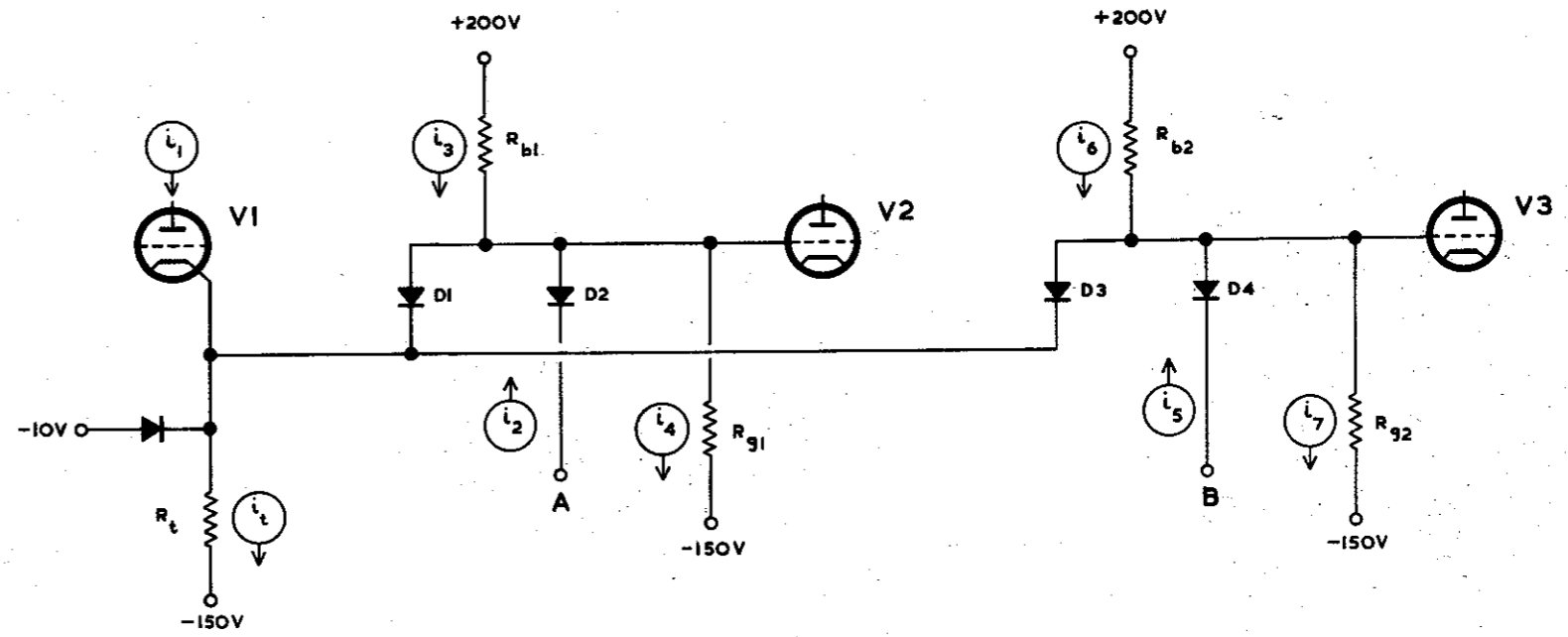


PERMISSIBLE



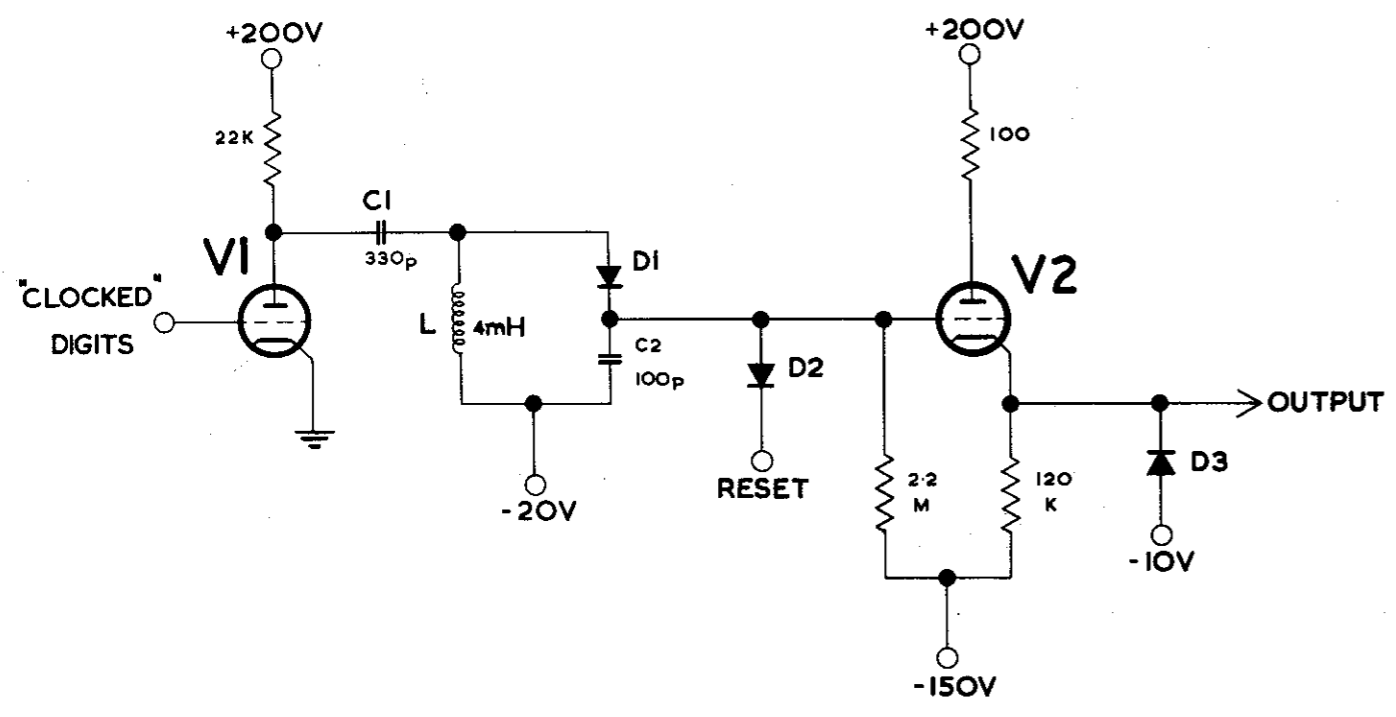
NOT PERMISSIBLE

LEVELS

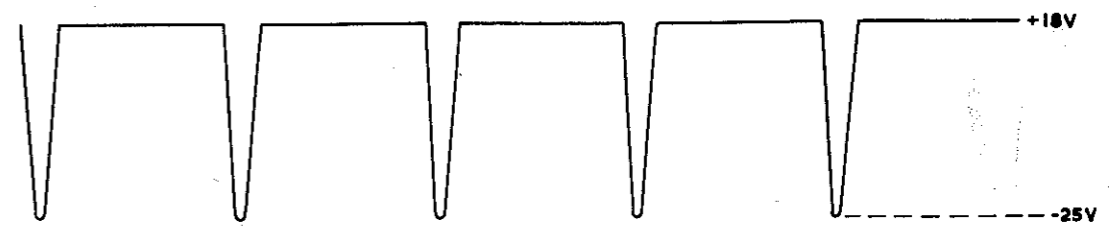


LOADING

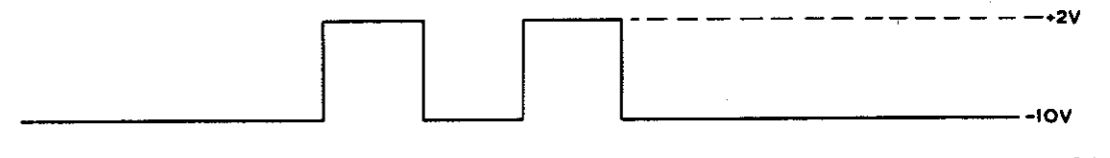
FIG. 1.3 LOGICAL-DESIGN CONSIDERATIONS



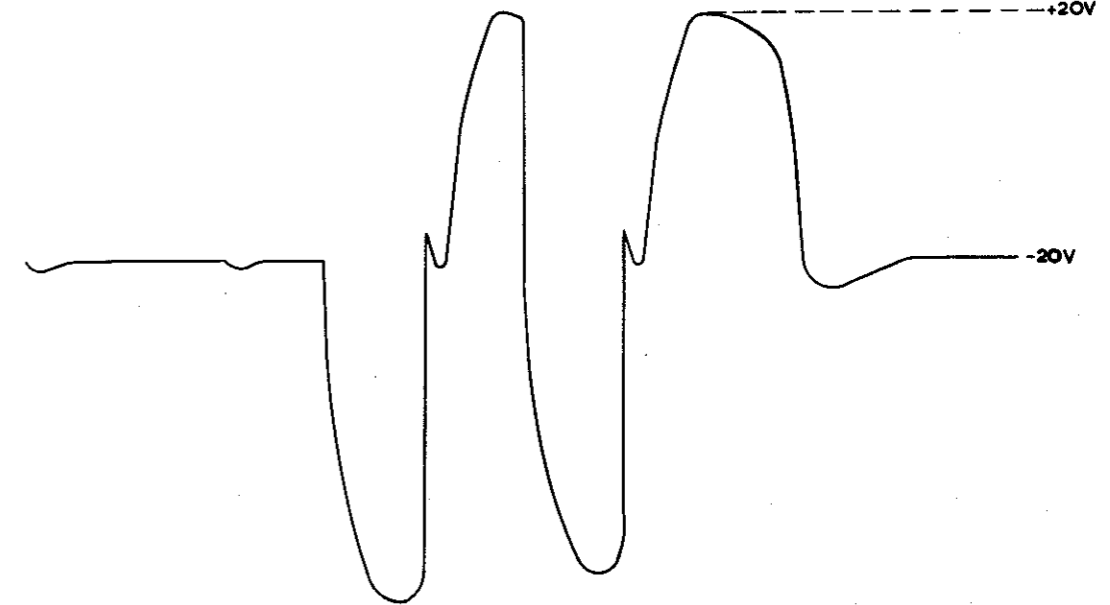
RESET



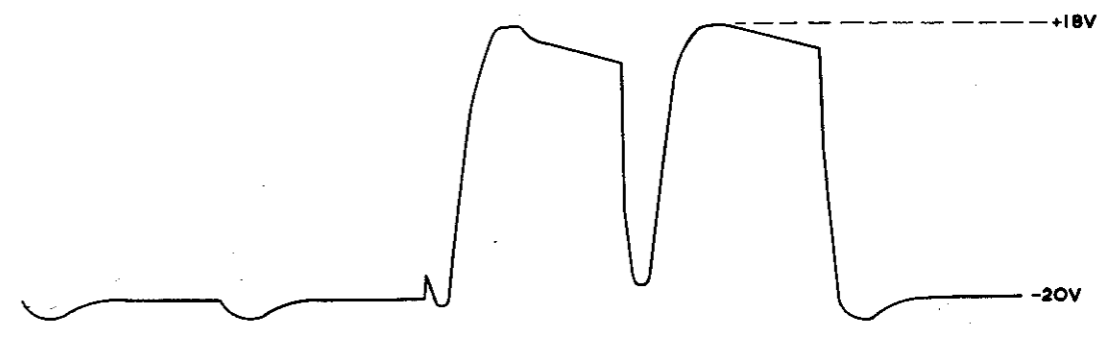
'CLOCKED' INPUT (01100)



JUNCTION OF L AND C1



V2 GRID



OUTPUT (00110)

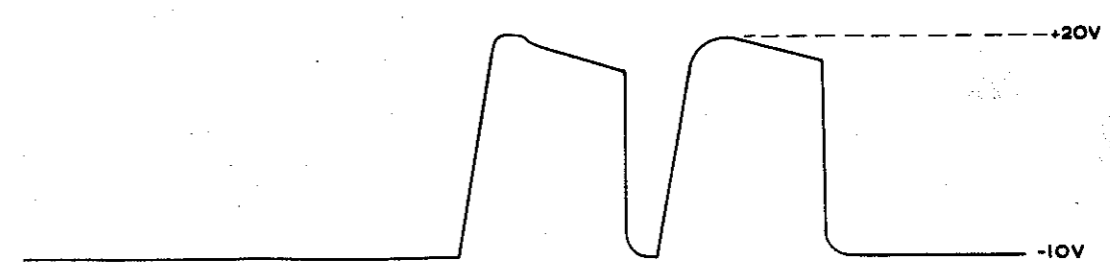


FIG. I.4 BASIC DELAY
CIRCUIT AND
WAVEFORMS

R	1 (14)	3 (12)	2 (13)	4 (15)	5 (16)	1 (3)	6	2 (4)	6 (17)	8 (19)	9 (20)	7	7 (18)	10 (21)	11 (22)	(23)	5
C																	
MR	1 (24)	2 (23)	3 (22)	7 (18)	8 (17)	9 (16)	4 (21)	6 (19)	5 (20)								
MISC																	
RESISTOR TYPES AND TOLERANCES			CAPACITOR TYPES AND TOLERANCES			SPECIAL COMPONENTS											
108 ± 5%	R 7	10 11 18 21 22 23	S635 (DUBILIER)	± 10%	C 1 3	COIL 4MH 65/20333		L 1 2									
109 ± 5%	R 1	3 9 12 14 20	N750L (ERIE)	± 10%	C 2 4												
8 ± 10%	R 5	16	CP32N (TCC)		C 5 6 7 8												
9 ± 10%	R 2	4 6 8 13 15 17 19															

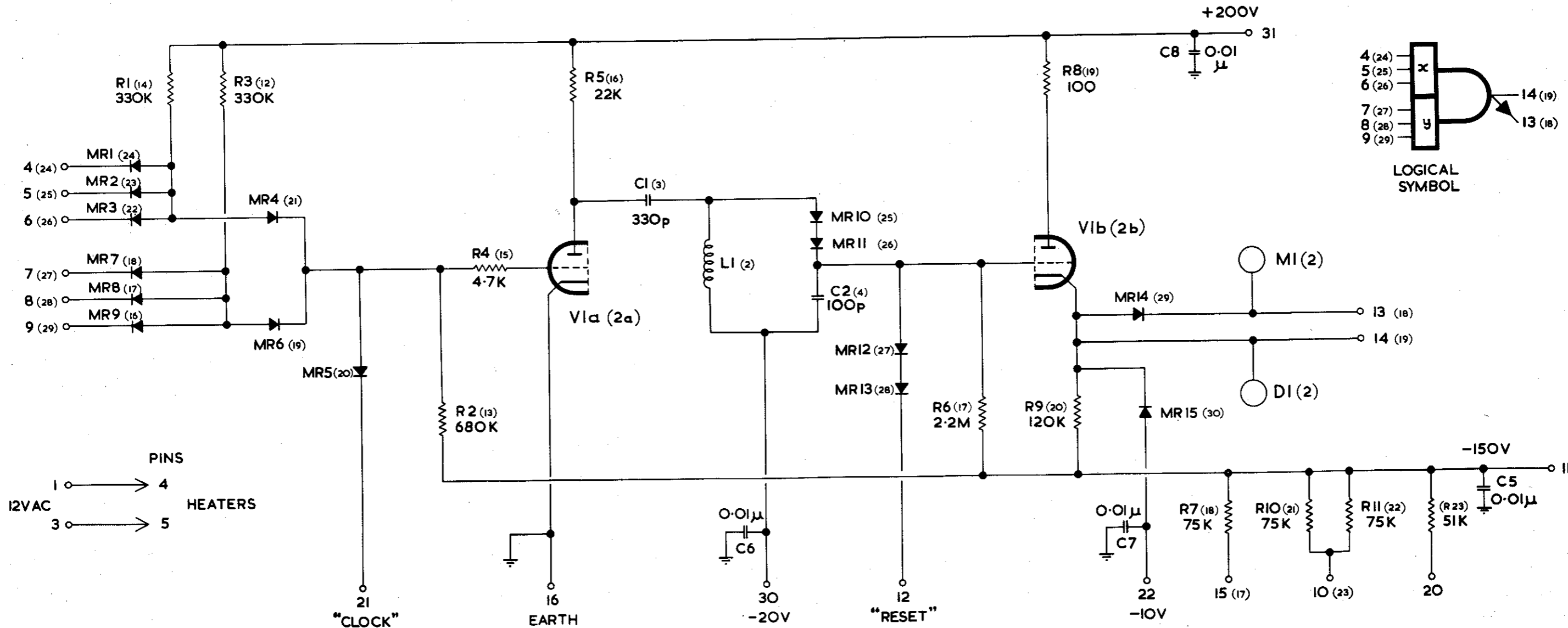
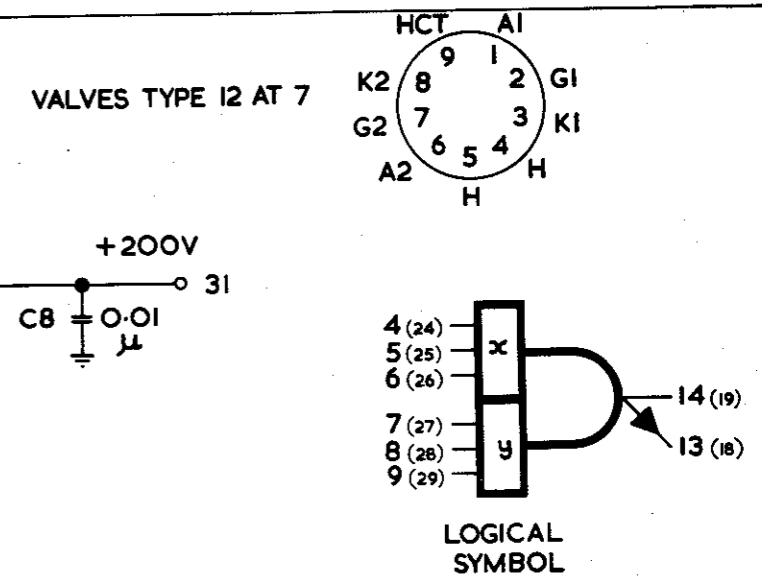
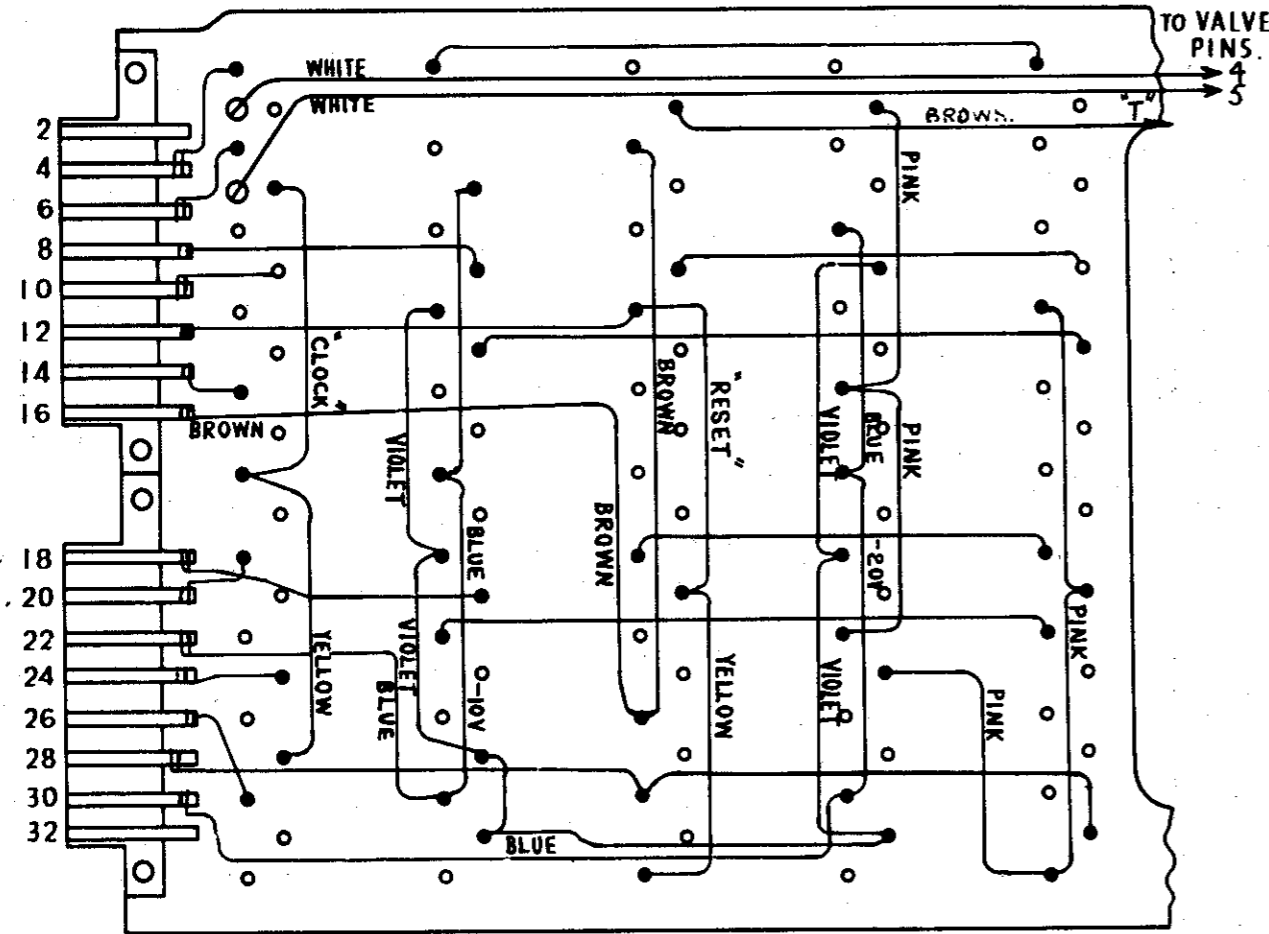
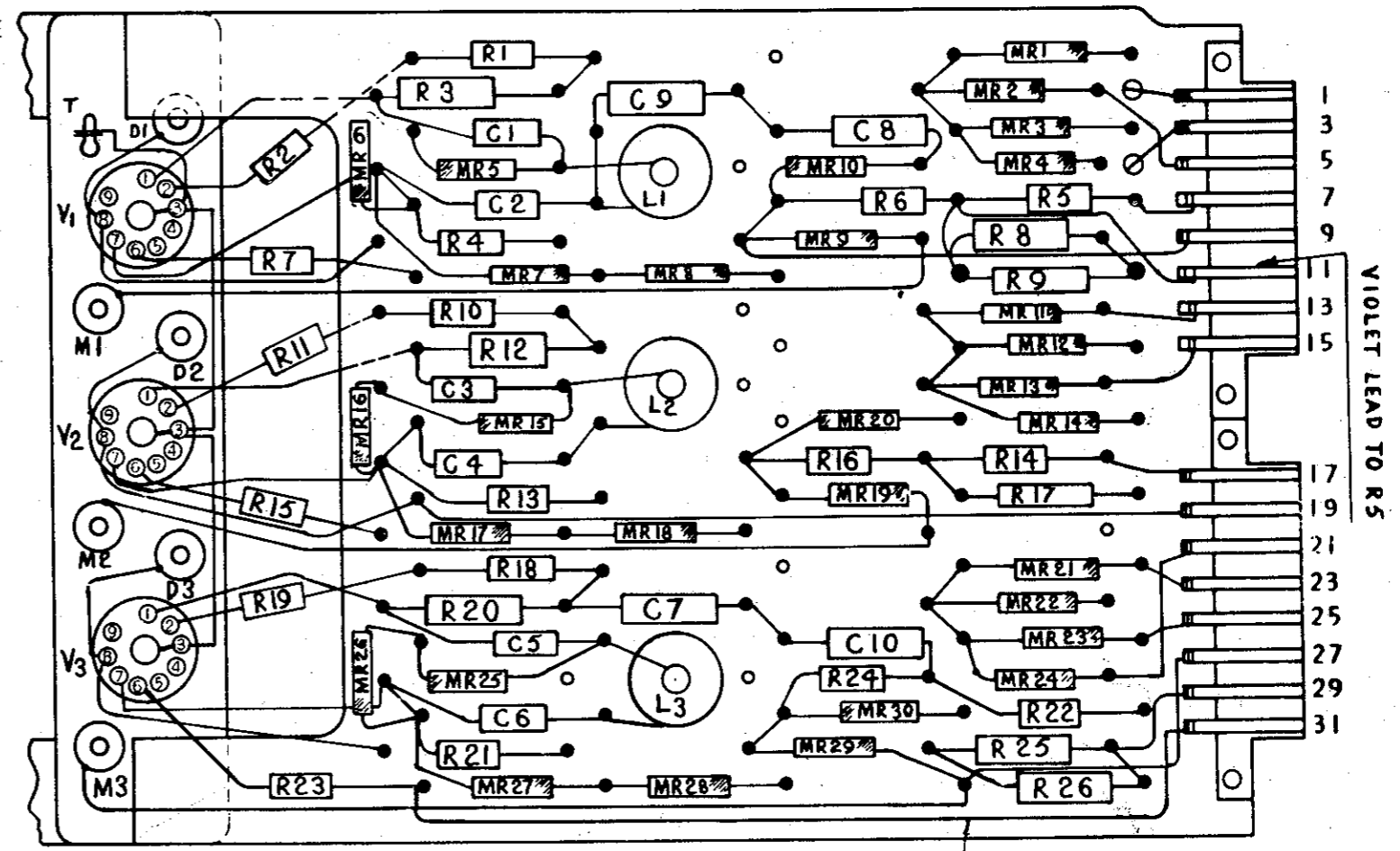


FIG. 1.5 TWIN DELAY, TYPE I (CIRCUIT)

VIEW :- LEFT HAND SIDE FROM FRONT.



VIEW: RIGHT HAND SIDE FROM FRONT.



UNDERSIDE VIEW OF VALVE PLATFORM.

FIG. I.8 SINGLE DELAY, TYPE 2 (LAYOUT)

R	1 (13) [25]	2 (14) [26]	3 (15) [27]	4 (16) [28]	5 (17) [29]	6 (18) [30]	7 (19) [31]	9 (21) [33]	10 (22) [34]	7	8 (20) [32]	11 (23) [35]	12 (24) [36]	37	8
C			5	1 (2) [3]							4				
MR															

RESISTOR TYPES AND TOLERANCES				CAPACITOR TYPES AND TOLERANCES			
IO9	2%	5 6 17 18 29 30		N 750K (ERIE)	1 2 3		
IO9	5%	1 7 10 13 19 22 25 31 34		CP 32N	4 5 6 7 8		
IO8	5%	3 4 8 11 12 15 16 20 23 24 27 28 32 35 36 37					
		2 9 14 21 26 33					

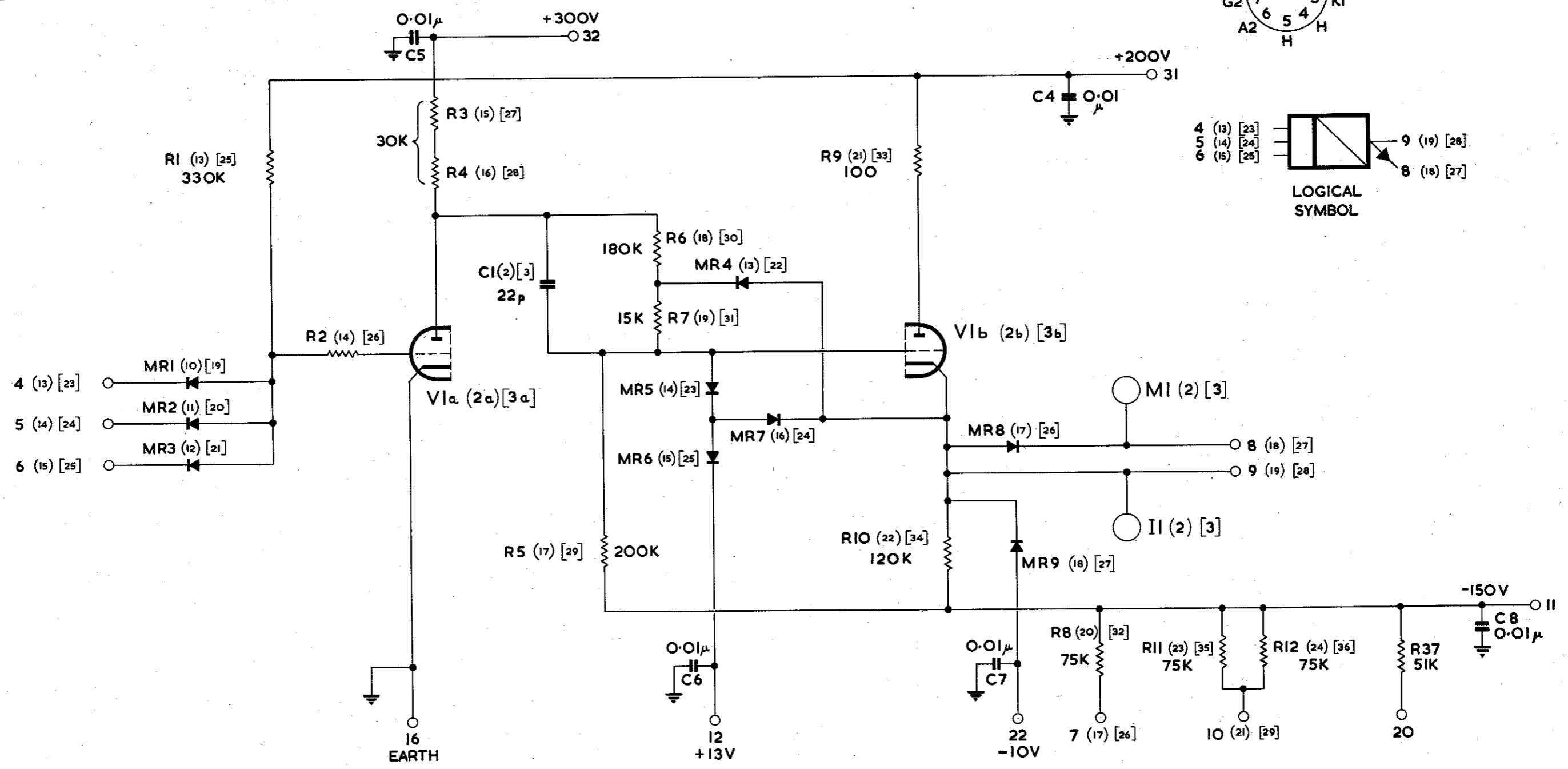
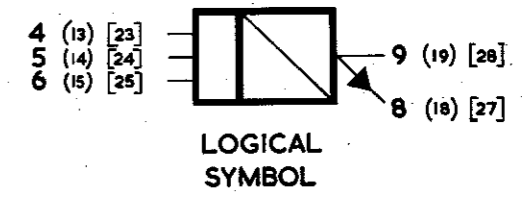
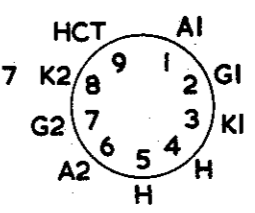


FIG. I. 9 INVERTER, TYPE 3 (CIRCUIT)

VIEW :- LEFT HAND SIDE FROM FRONT.

VIEW: RIGHT HAND SIDE FROM FRONT.

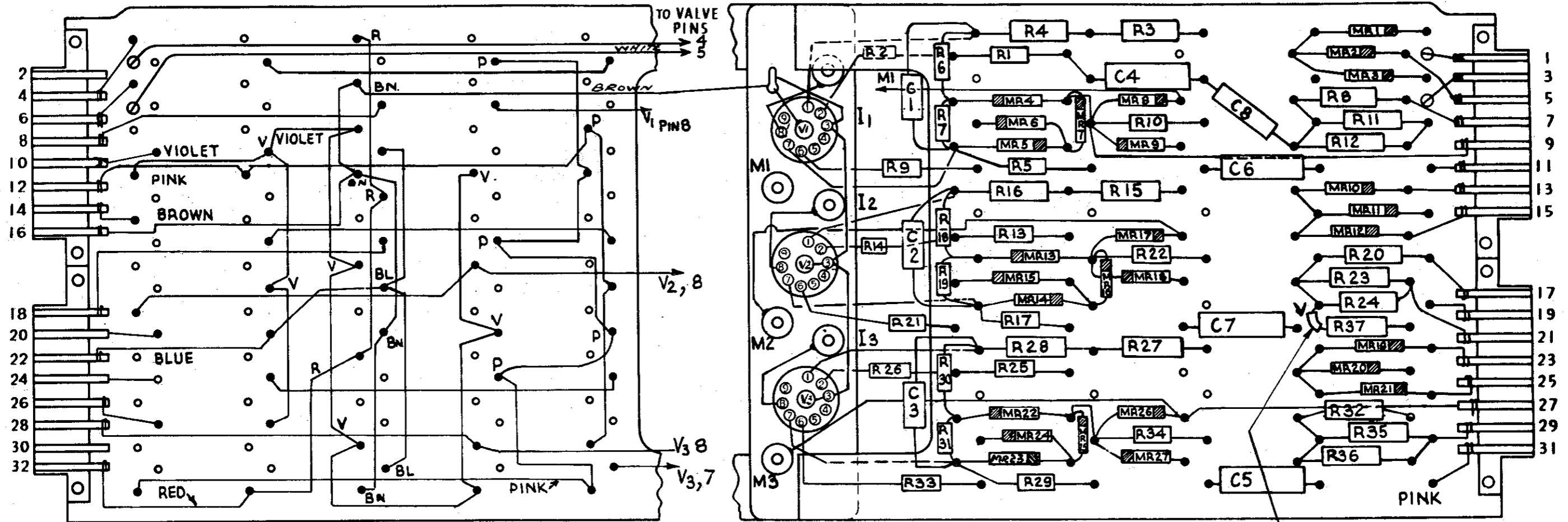


FIG. 1.10 INVERTER, TYPE 3 (LAYOUT)

R	R1	R2	R3	R4	R5,6,7	R8	R9	R10,11	R12,13,14	R15	R16	R17,18,19,20,21	R22	R23,24,25	R26	R27,28		
C																C1	C2	C3
MR	1	2	3	4,5,6	7	8	9	10	11	12	13	14,15,16,17	18	19				

RESISTOR TYPES & TOLERANCE.

109 2%	109 5%	108 5%	9 10%
R2 3 9 10 16 17 23 24	1 8 15 22	5 6 7 11 13 14 18 20 21 26 27 28	4 12 19 25

VALVES - TYPE 6060

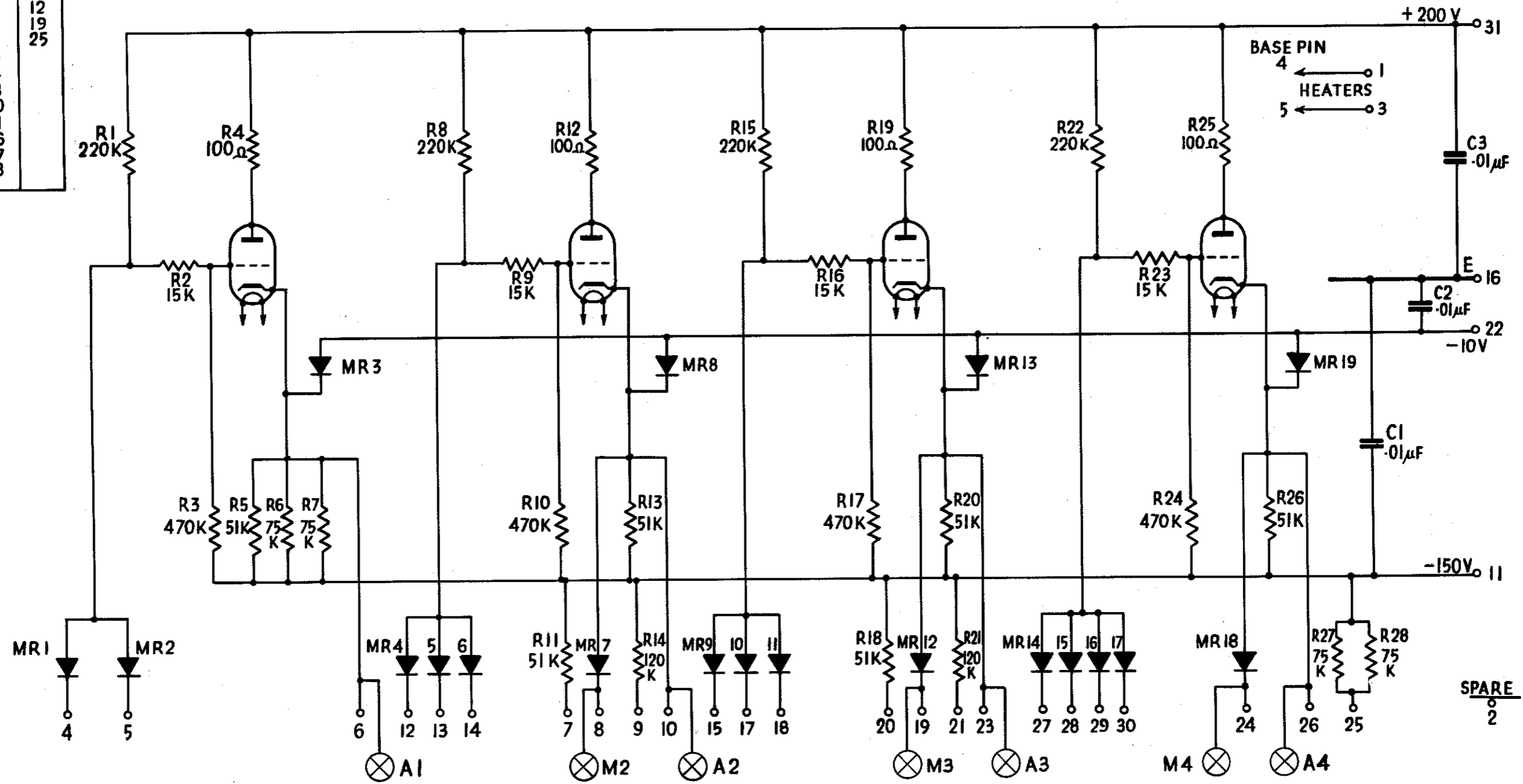
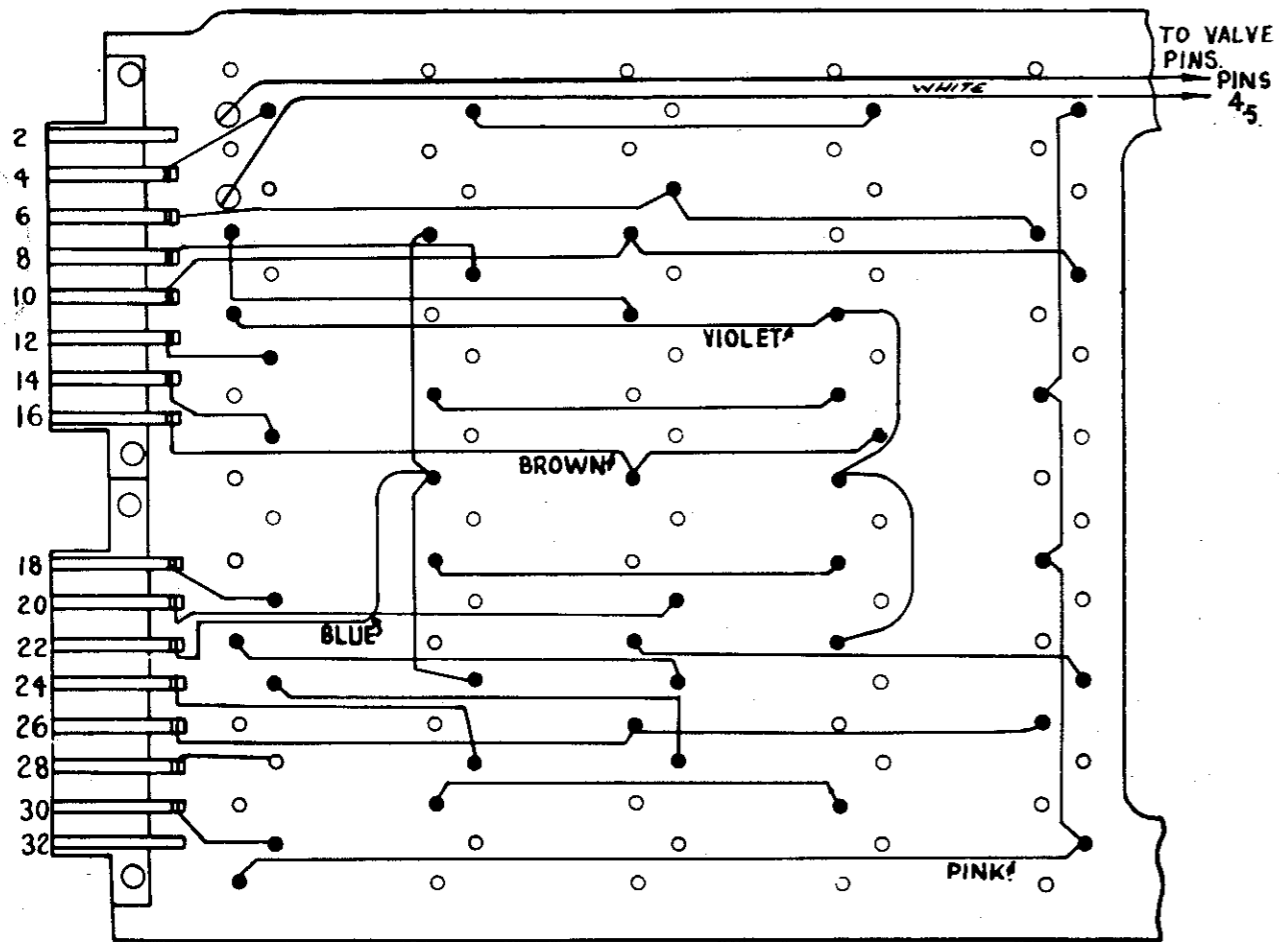
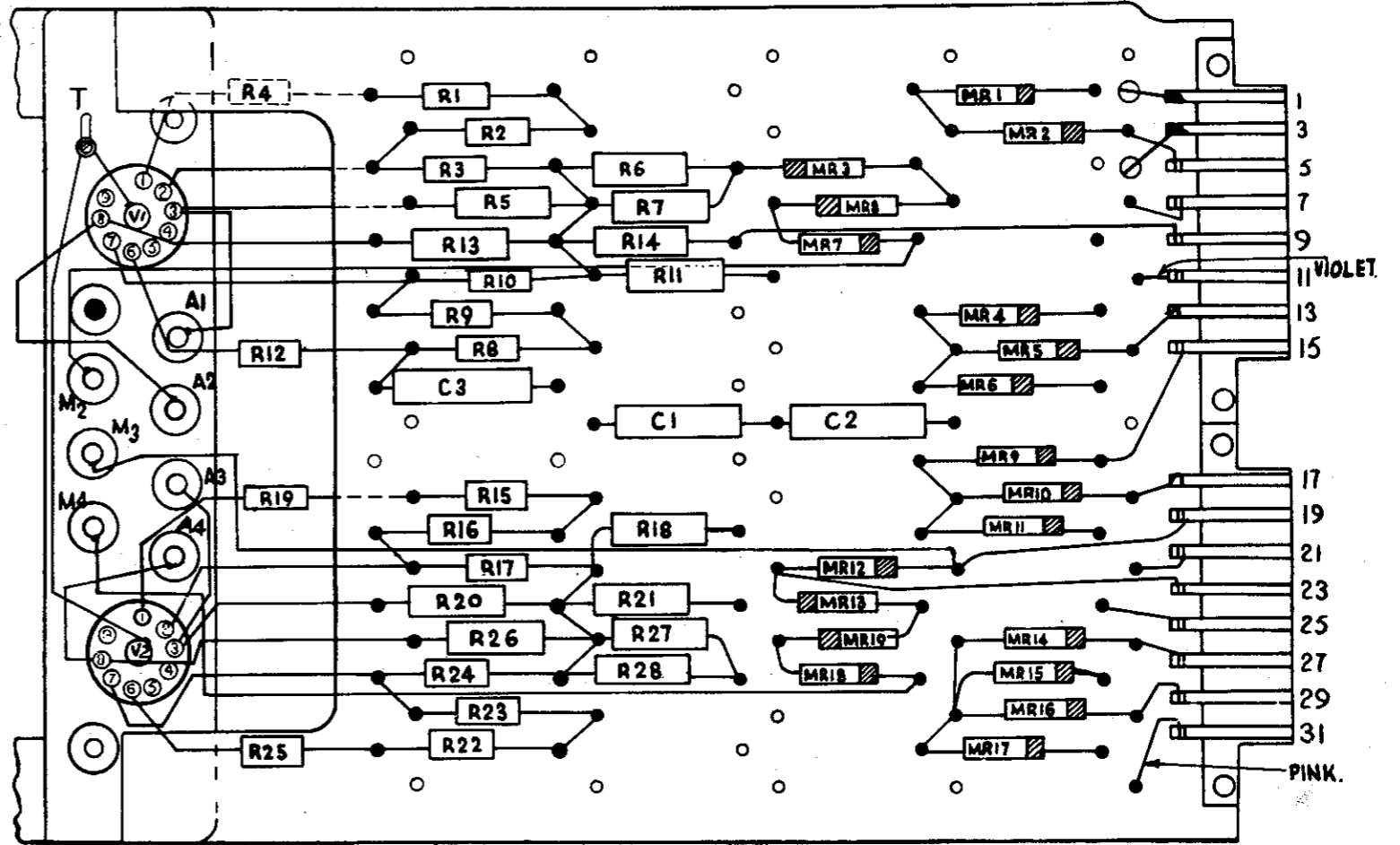


FIG. I.II AND GATES, TYPE 4 (CIRCUIT)

LEFT HAND SIDE
VIEWED FROM FRONT

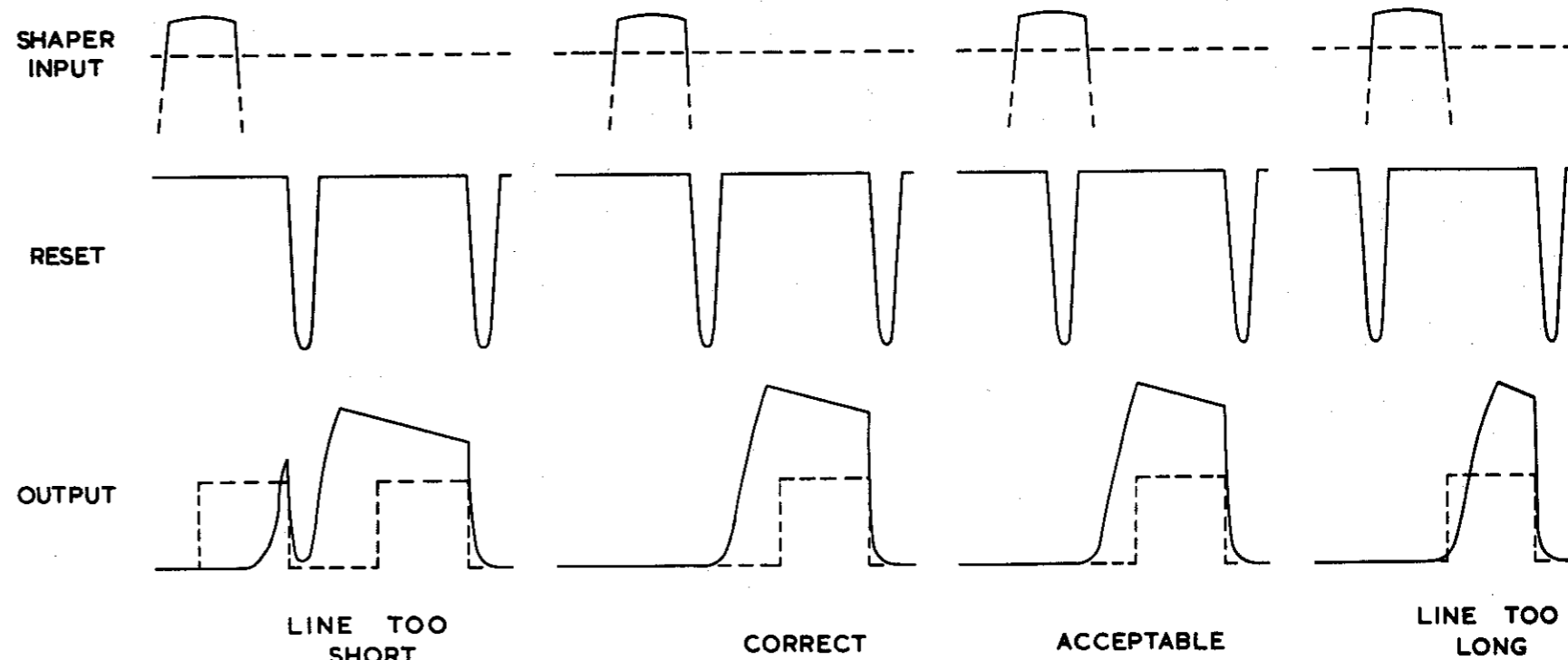
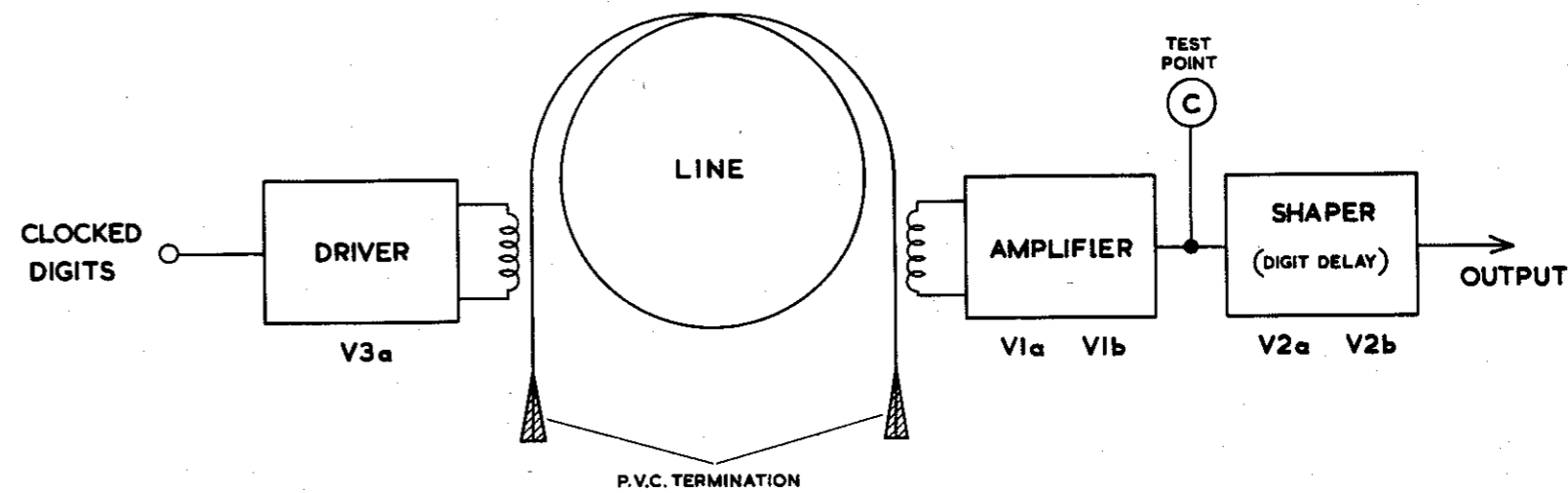
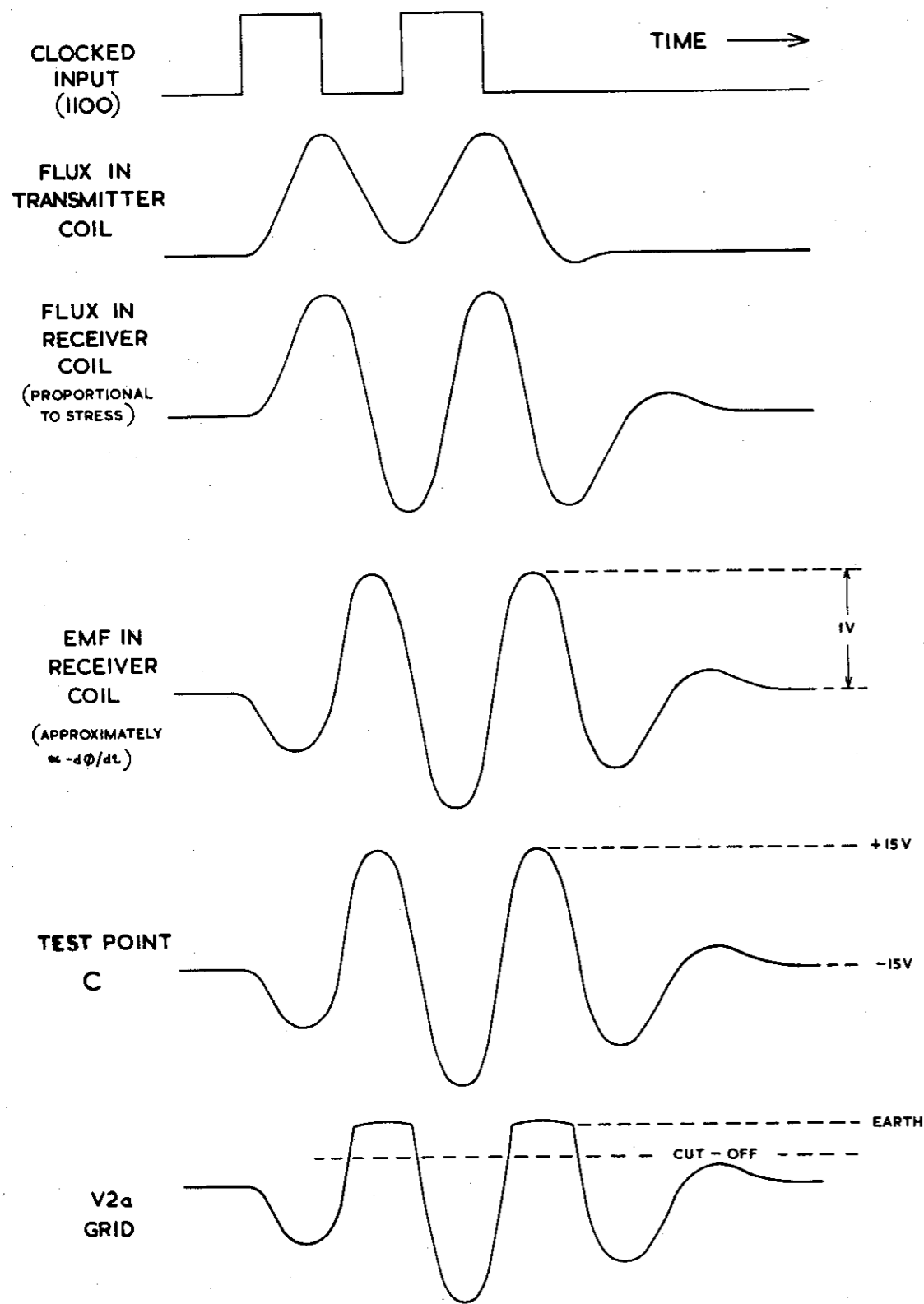


R.H.S. V.F.F.



UNDERSIDE VIEW
OF VALVE P'FORM

FIG. I.12 AND GATES, TYPE 4 (LAYOUT)



EFFECTS OF VARYING LINE LENGTH

FIG. 1.13 TYPICAL NICKEL - LINE WAVEFORMS

R	6	7	8	9	11	10	34	12	14	17	15	16	18	19	13	20	21	22	23	24	25	26	27	28	8	11	29	31	30	32	10	14				
C																																				
MR	6	7	8	12	13	14	9	10	11																											
MISC																																				
RESISTOR TYPES AND TOLERANCES		CAPACITOR TYPES AND TOLERANCES				SPECIAL COMPONENTS																														
108	± 5%	6	7	20	21	30	32	33	S 635 (DUBILIER) ± 10%	8	COIL 9mH 65/20344		L1	L2																						
109	± 5%	8	10	11	12	16	17	23	N 750 (ERIE) ± 10%	9	COIL 4mH 65/20333		L3																							
8	± 10%	28																																		
9	± 10%	9	13	14	15	18	19	22	CP36H (TCC) ± 20%	4	3	6																								
									CP32N	10	11	12	13	14																						
									CP305	2	5	7																								

VALVES TYPE 12 AT 7

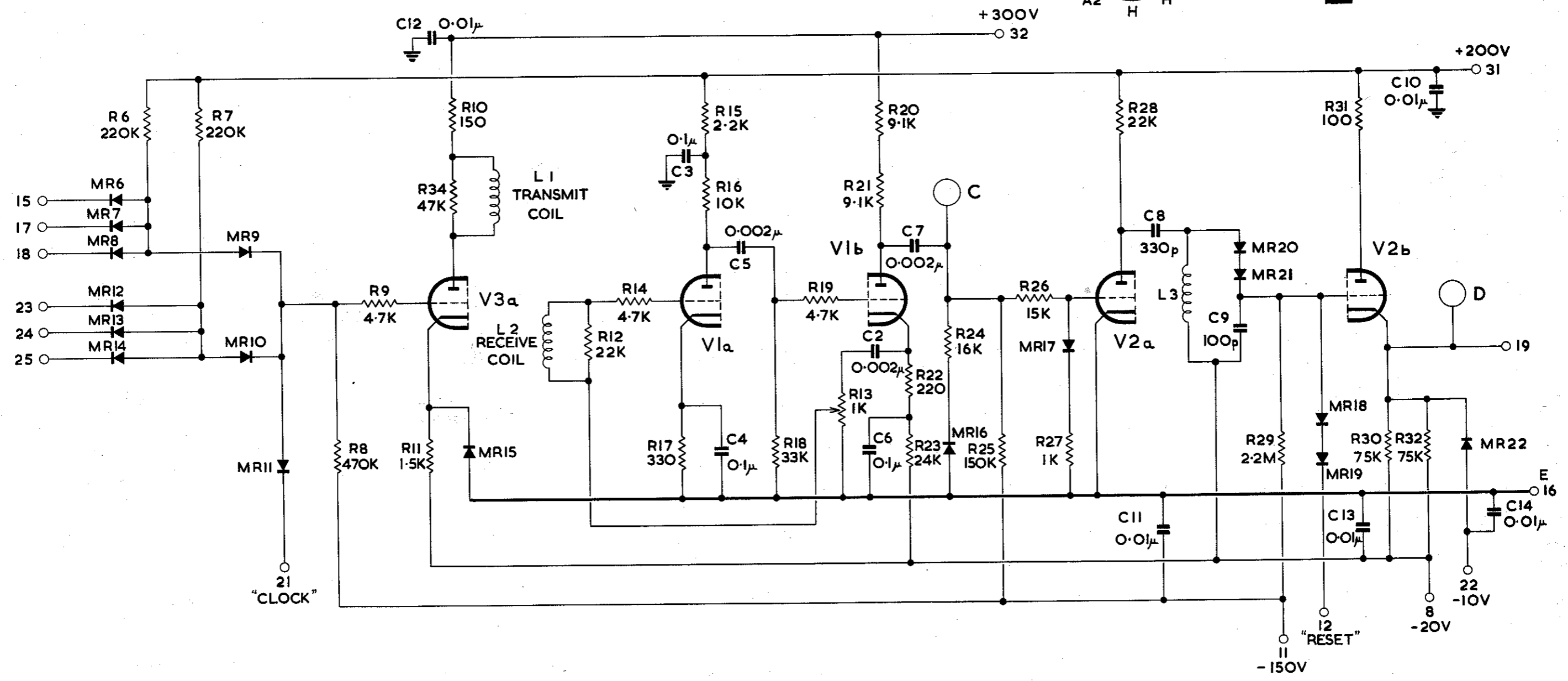
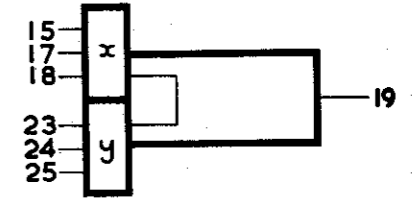
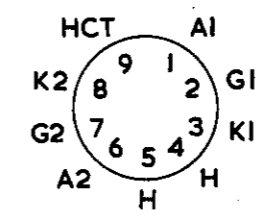


FIG. I. 14 NICKEL - LINE CIRCUIT

M R	RESISTOR TYPES AND TOLERANCES			CAPACITOR TYPES AND TOLERANCES		
	1	2	3	1	4	5
10	8	± 5%	1	4	CP 32 N (TCC)	± 20%
9	± 10%	2	5	S635 (DUBILIER)	± 10%	10 14
8	± 10%	3				1

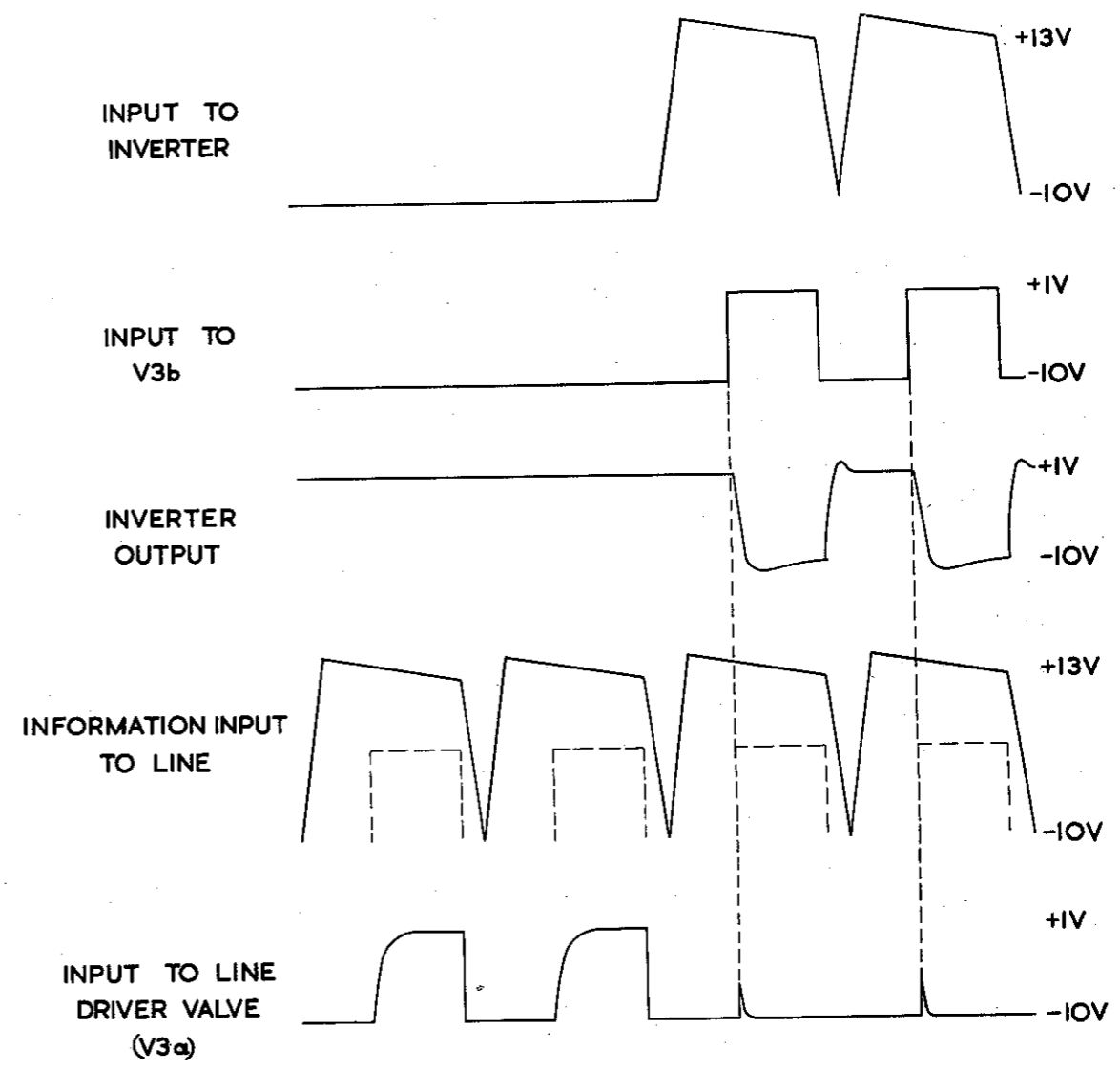
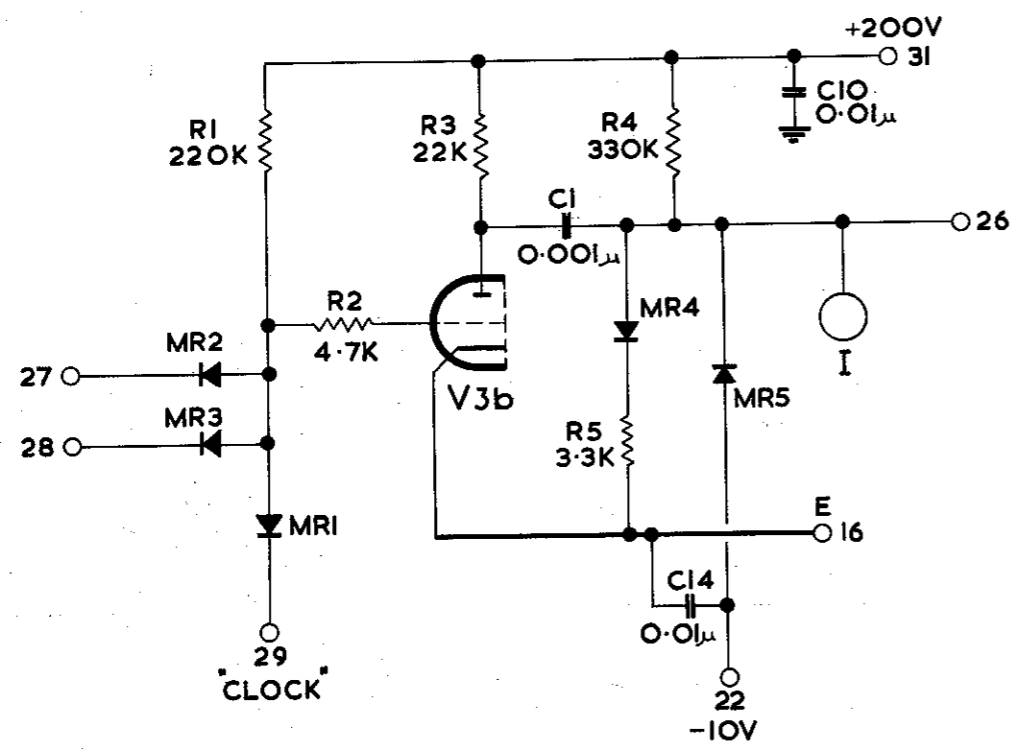


FIG. 1.15 SPECIAL INVERTER AND WAVEFORMS

VIEW :- LEFT HAND SIDE FROM FRONT.

VIEW: RIGHT HAND SIDE FROM FRONT.

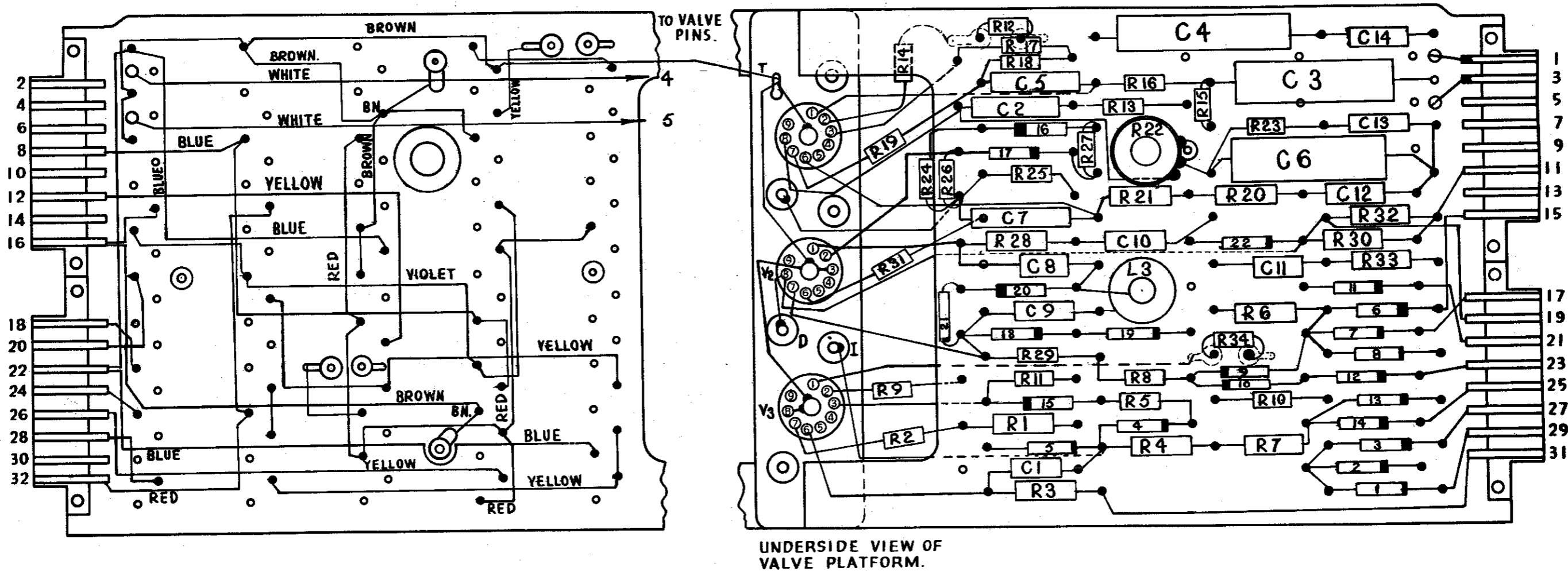


FIG. I.16 NICKEL LINE PACKAGE, TYPE 6 (LAYOUT)

R	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																								
C																																																												
MR	1					2					3					4					5					6					7					8					9					10					11					12				

RESISTOR TYPES & TOLERANCE		
9	10%	R3, 9, 15, 22, 28, 33
109	2%	R1, 2, 7, 8, 13, 14, 19, 20, 25, 26, 32, 31
109	5%	R24, 30
108	5%	R4, 5, 6, 10, 11, 12, 16, 17, 18, 21, 23, 27, 29, 34, 35, 36
CAPACITOR TYPES & TOLERANCE		
CP32 N	C1, 2, 3	
CRYSTAL DIODES - BTH CG10E		

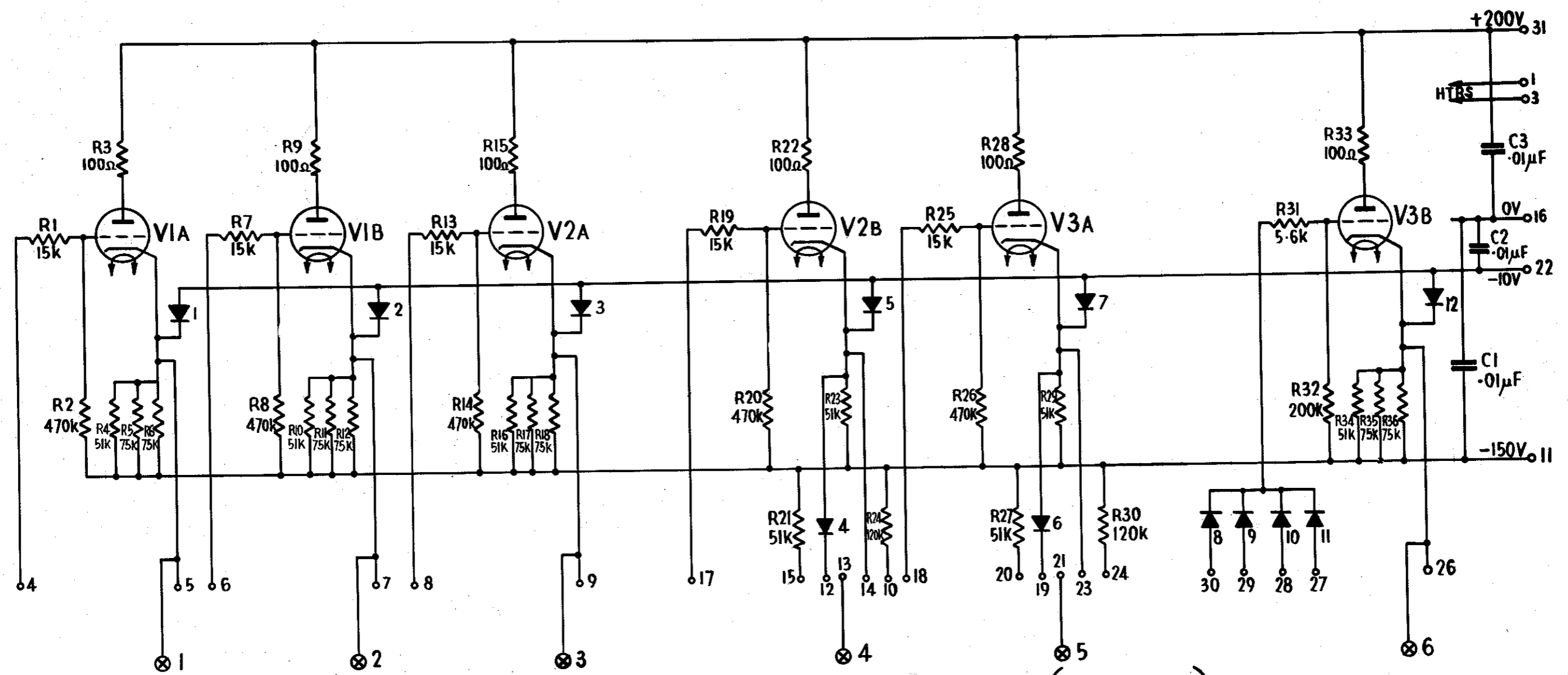
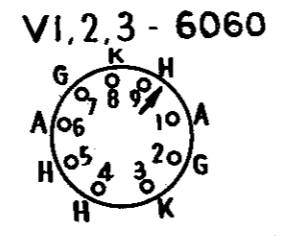


FIG. I.17 CATHODE FOLLOWERS, TYPE 8 (CIRCUIT)

VIEW :- LEFT HAND SIDE FROM FRONT.

VIEW: RIGHT HAND SIDE FROM FRONT.

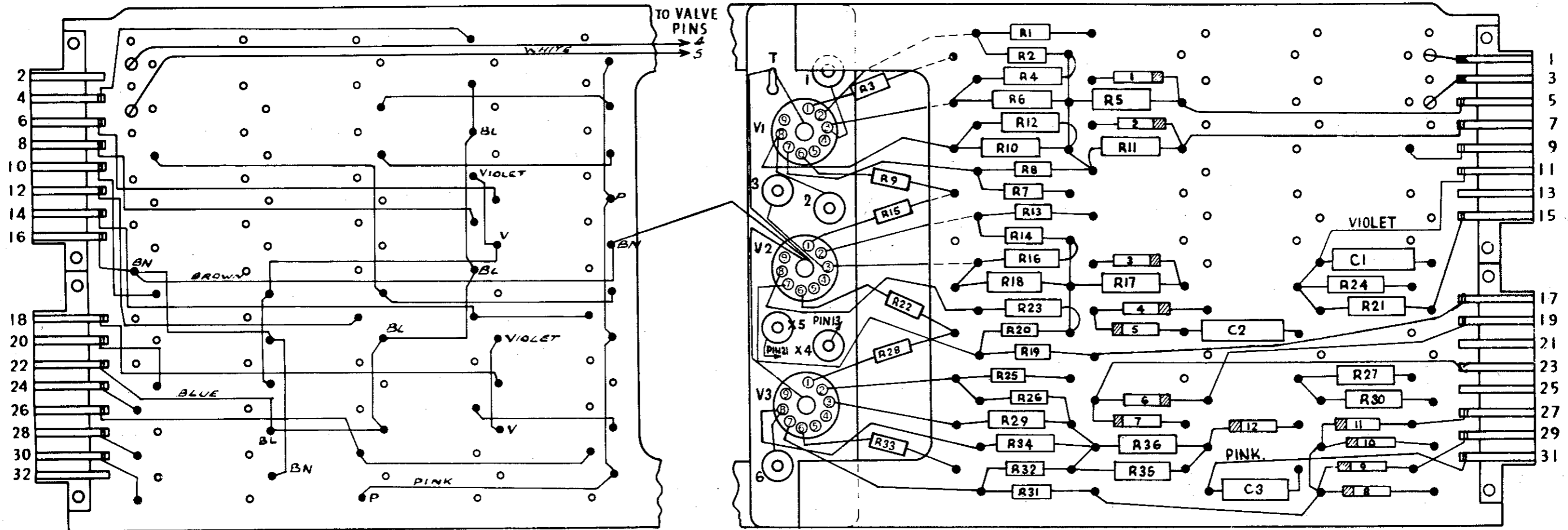


FIG. I.18 CATHODE FOLLOWERS, TYPE 8 (LAYOUT)

R	1 2 3 4 5	6 7	8 9	10 11	12 13 14 15	16 17 18 19 20	21
C	1		2		3		
MR	1		2 3 4		5 6 7		8 9 10
R	22 23 24 25 26	27 28	29 30	31 32	33 34 35 36	37 38 39 40 41	42
C	4		5		6		
MR	14		15 16 17		18 19 20		21 22 23
					24 25		26

RESISTOR TYPES & TOLERANCE.		CAPACITOR TYPES & TOLERANCE.	
9±10%	3 6 8 10 14 18	TCC. CP. 33N ± 20%	C1-6.
"	24 27 29 31 35 39	TCC. CP. 32N ± 20%	C7-9.
109±2%	1 2 12 13 16 17		
"	22 23 33 34 37 38		
109±5%	7 9 11 28 30 32		
108±5%	4 5 15 19 20 21		
	25 26 36 40 41 42		

ALL VALVES - 6060

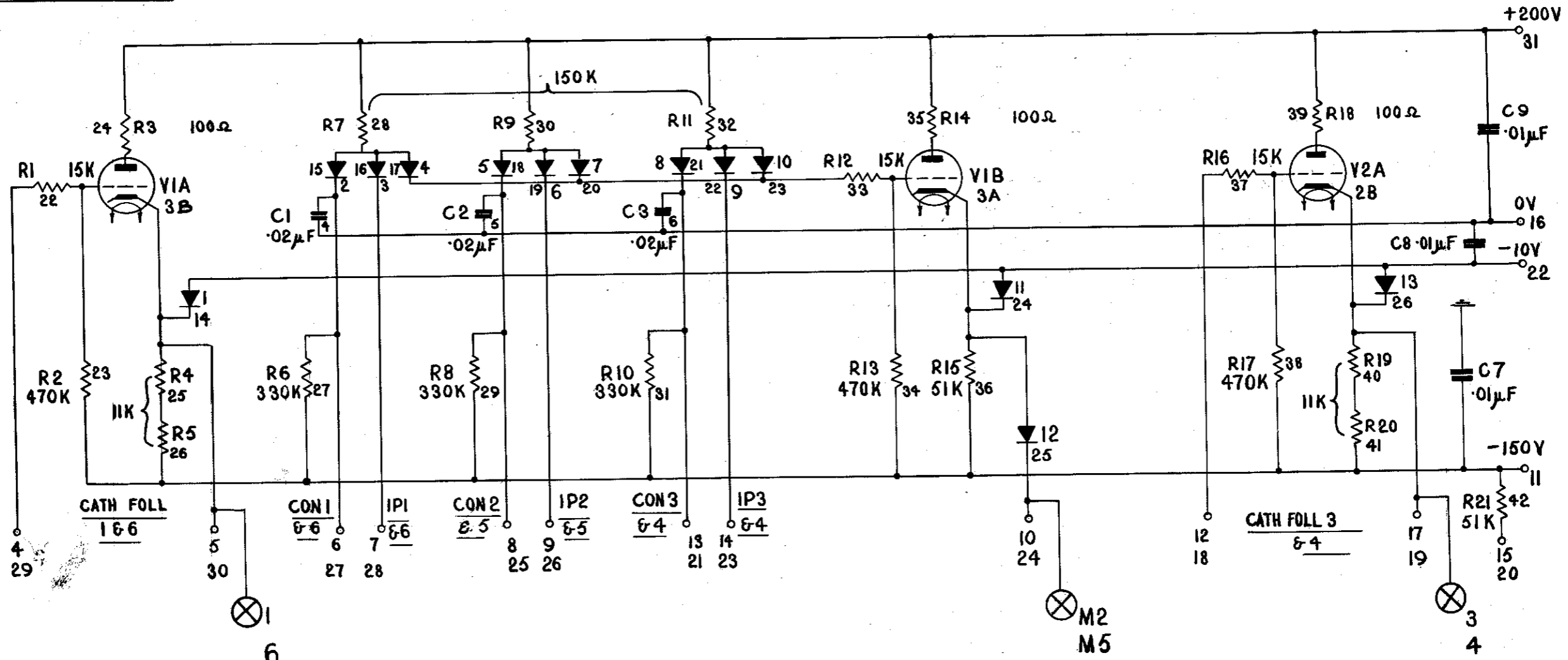
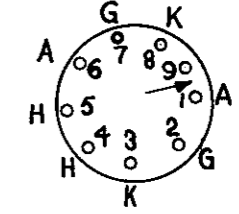
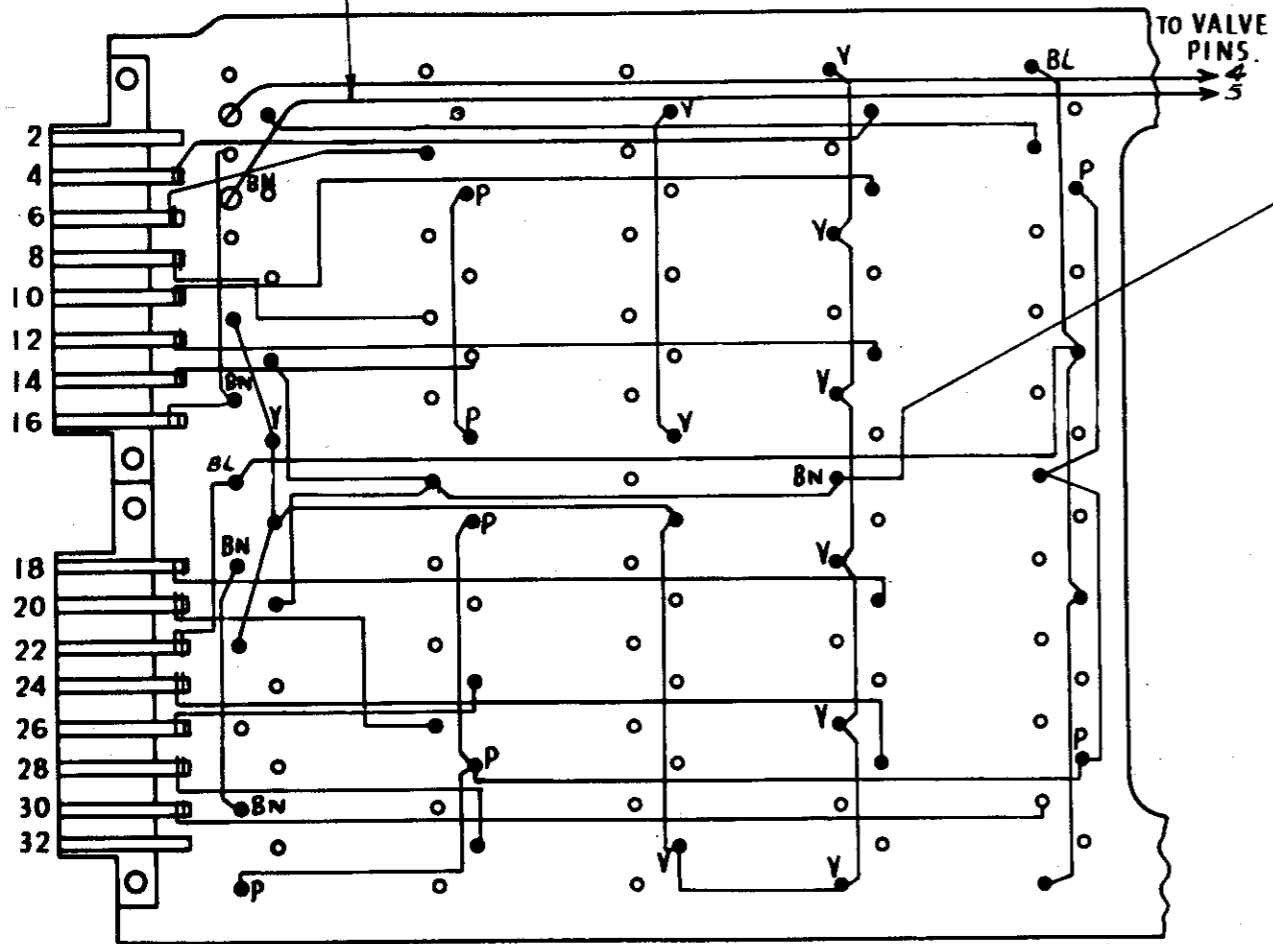
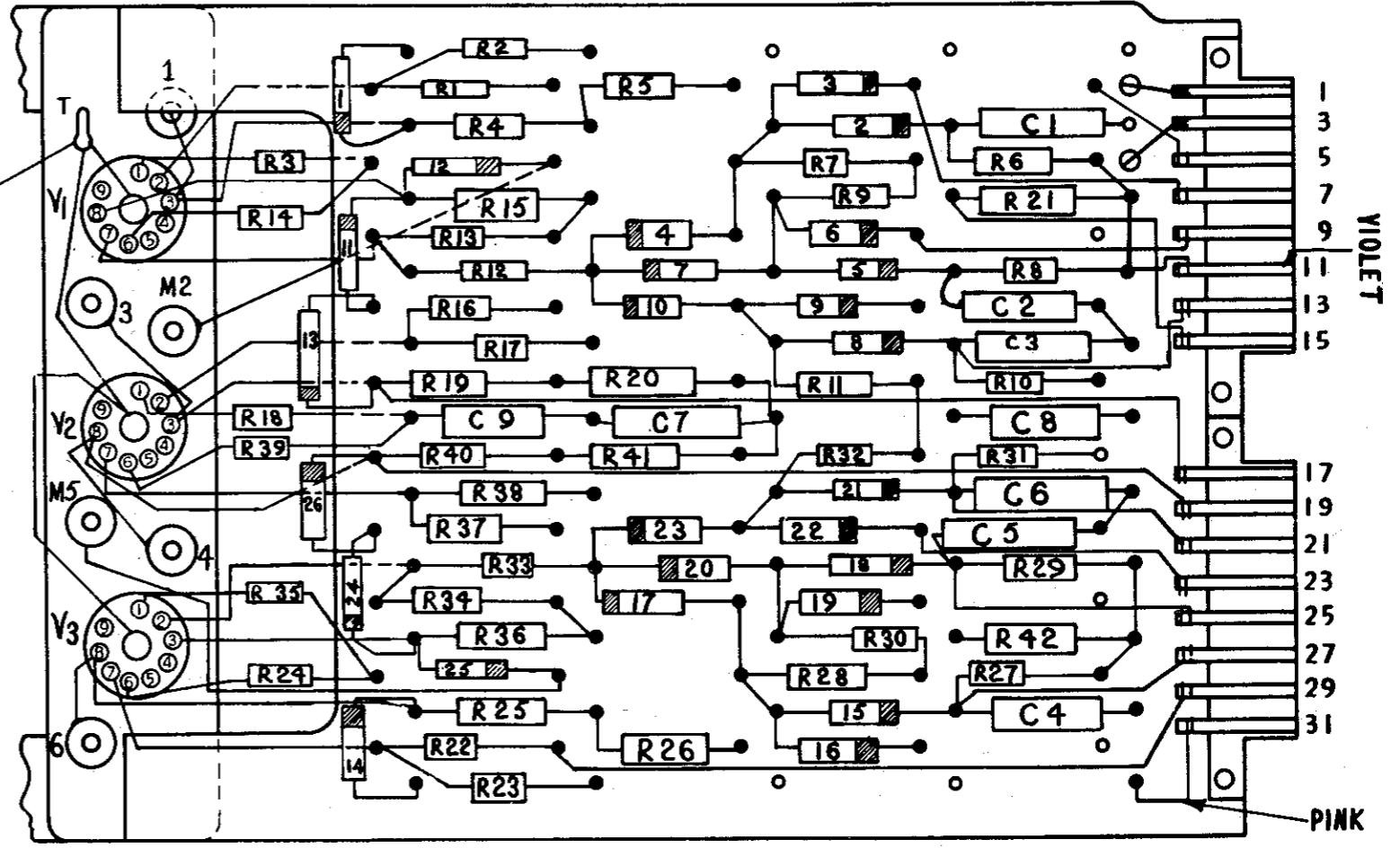


FIG. 2.1 NUMBER GENERATOR, TYPE 7 (CIRCUIT)

VIEW :- LEFT HAND SIDE FROM FRONT.
HEATERS - TO PINS 4&5 WHITE.



VIEW: RIGHT HAND SIDE FROM FRONT.



UNDERSIDE VIEW OF VALVE PLATFORM.

FIG. 2.2 NUMBER GENERATOR, TYPE 7 (LAYOUT)

R	R1 R2	R3,4,5,6	R7,8	R9 R10	R11,12,13,14	R15,16	R17,18,19,20	
C	C1			C2			C3 C4	
MR	1,2,3	4,5		6,7,8	9,10			

RESISTOR TYPES & TOLERANCE

9 ± 10% R1-6, 9-14, 17-20

8 ± 10% R7, 8, 15, 16

CAPACITOR TYPES & TOLERANCE

TCC, CP 35N ± 20% C1, 2

TCC, CP 32N ± 20% C3, 4

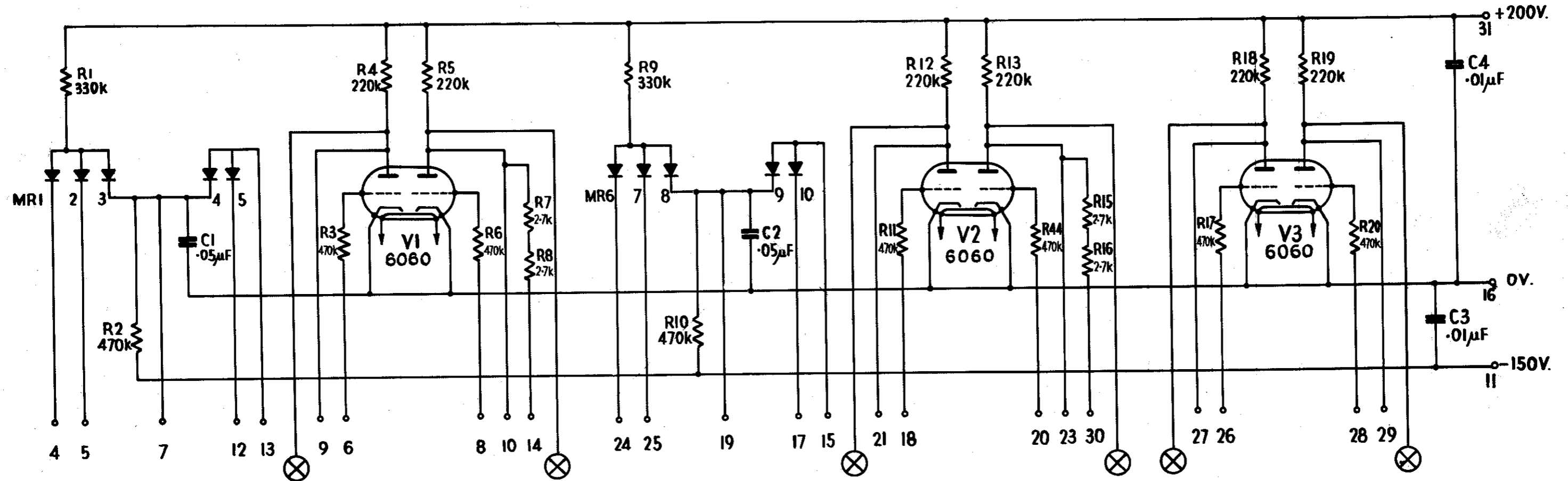


FIG. 2.3 OUTPUT ONE, TYPE 9 (CIRCUIT)

VIEW -- LEFT HAND SIDE FROM FRONT.

VIEW: RIGHT HAND SIDE FROM FRONT.

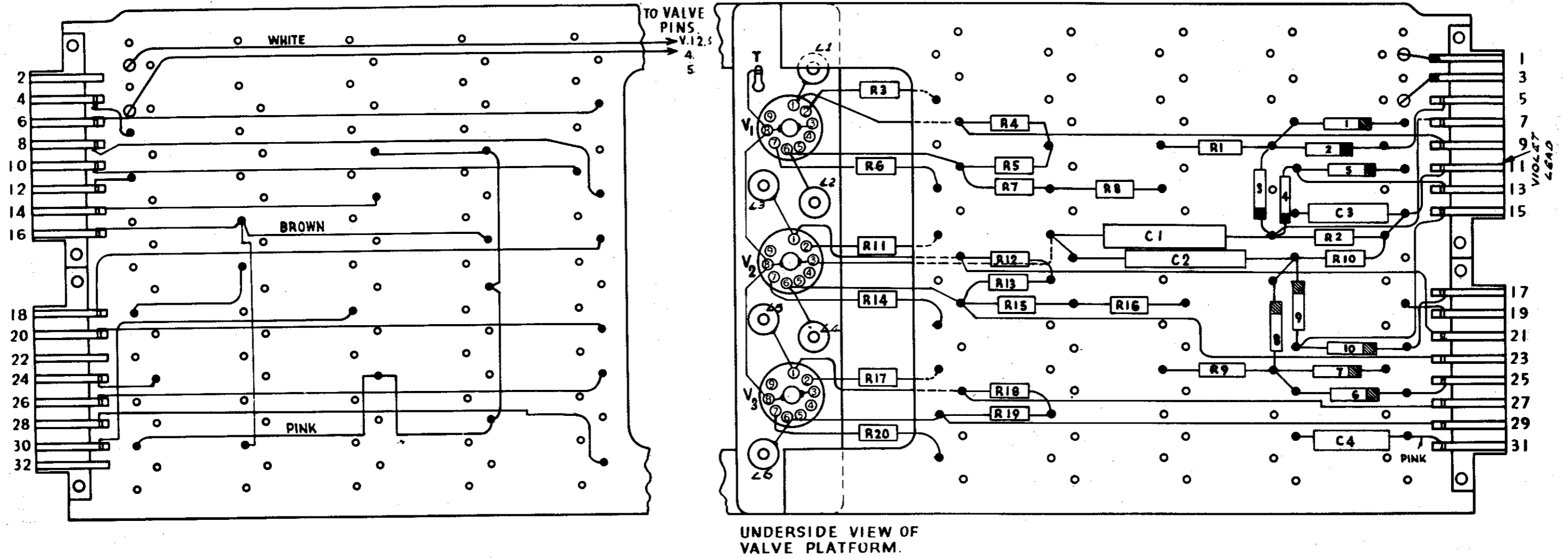


FIG. 2.4 OUTPUT ONE, TYPE 9 (LAYOUT)

RESISTOR TYPES & TOLERANCE

TYPE. $9 \pm 10\%$ R1, 3, 5, 7, 9, 11.

" $8 \pm 10\%$ R4, 8, 12.

WIREWOUND - WELWYN AW3111 $\pm 5\%$ R2, 6, 10.

CAPACITORS

T.C.C. TYPE CP.37S. $\pm 20\%$ C1, 2, 3.

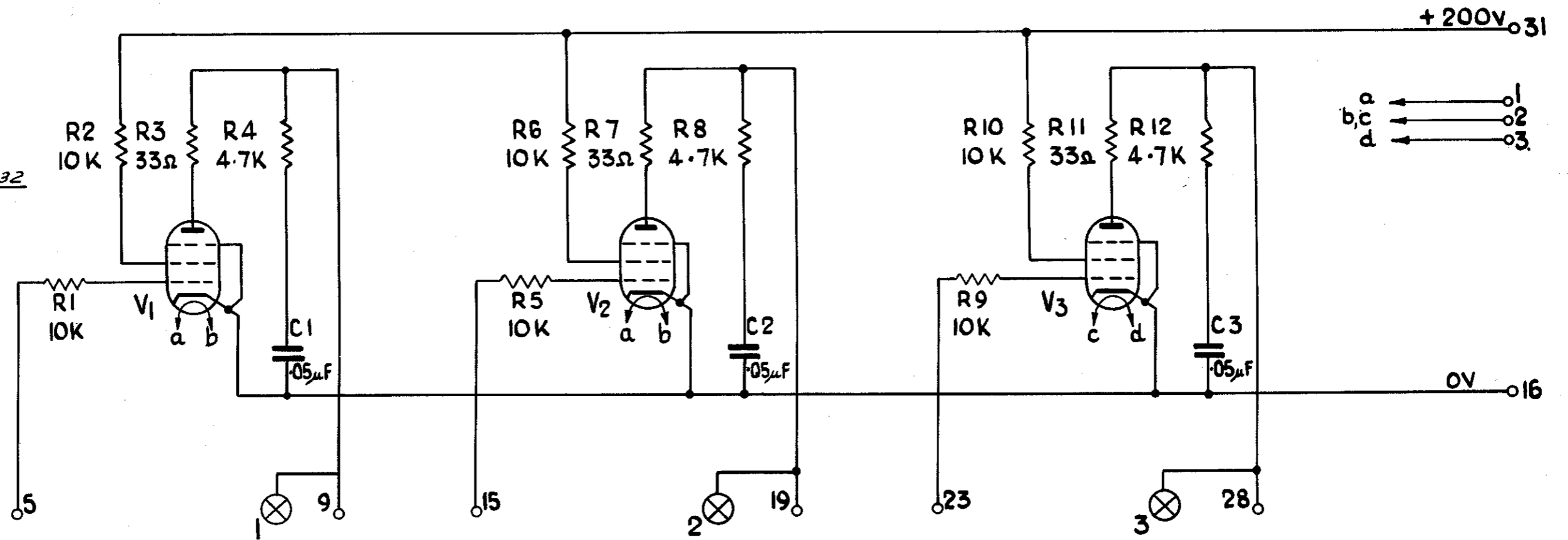
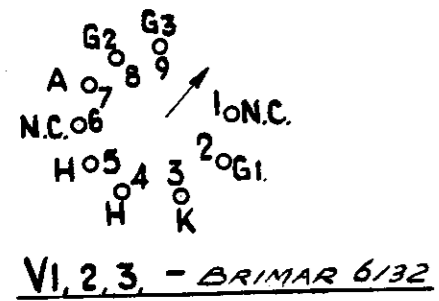


FIG. 2.5 OUTPUT TWO, TYPE 10 (CIRCUIT)

VIEW :- LEFT HAND SIDE FROM FRONT.

VIEW: RIGHT HAND SIDE FROM FRONT.

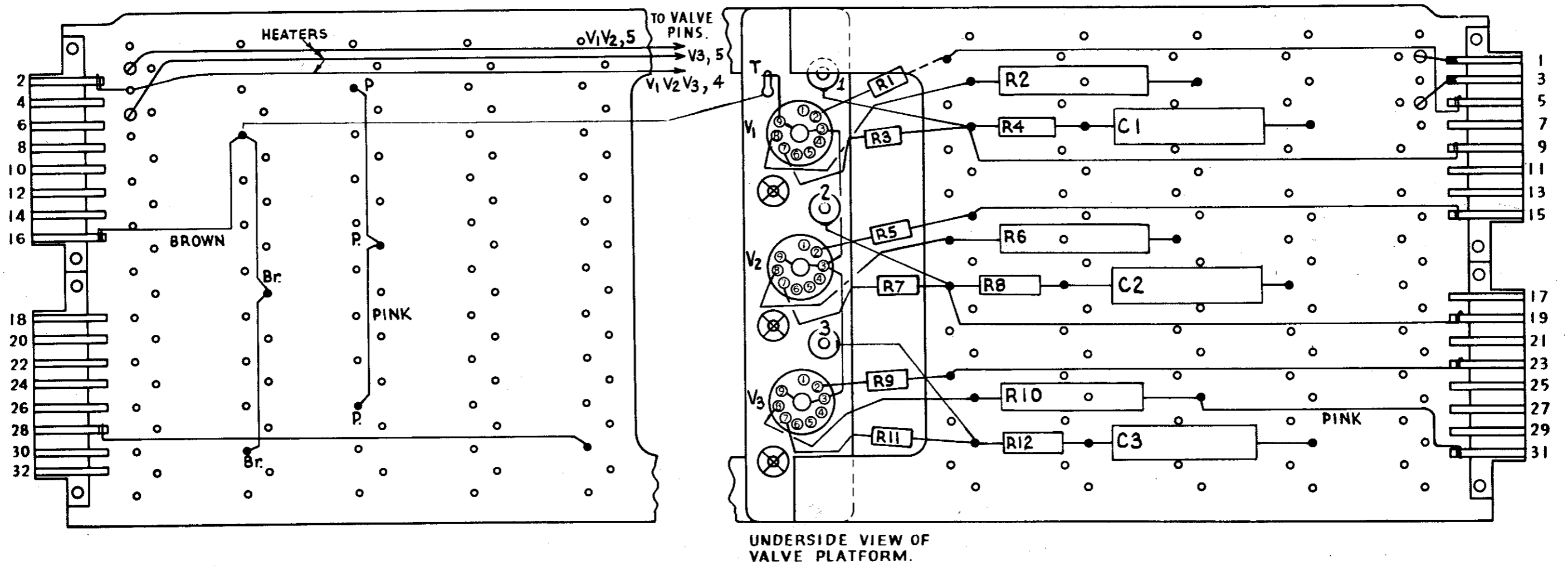


FIG. 2.6 OUTPUT TWO, TYPE IO (LAYOUT)

R	1	2	3	4	5	6	7	8	9	10	11	12	
C					1	2				3		4	5
MR	1	2	3	4	5	6	7	8	9	10	11	12	
MISC	V2A				V1		V2B				V3		

CIRCUIT REF	VALUE	TOL %	RATING	TYPE
R2, R8	4.7K	± 10	1/4 W	ERIE 9
R4, R10	470K	± 10	1/4 W	ERIE 9
R5, R11	100K	± 10	1/4 W	ERIE 9
R1, R7	330K	± 5	1/4 W	ERIE 109
R3, R9	47K	± 10	1/2 W	ERIE 8
R6, R12	270Ω	± 5	3 W	WELWYN AW 3115
C1, C3	100pf			ERIE N750L
C2, C4, C5	0.1μF			T.C.C. CP37N
C6	0.01μF			T.C.C. CP32N
MR 1-12				B.T.H. CG-10-E
V1, V3				MULLARD EN91
V2				BRIMAR 6060

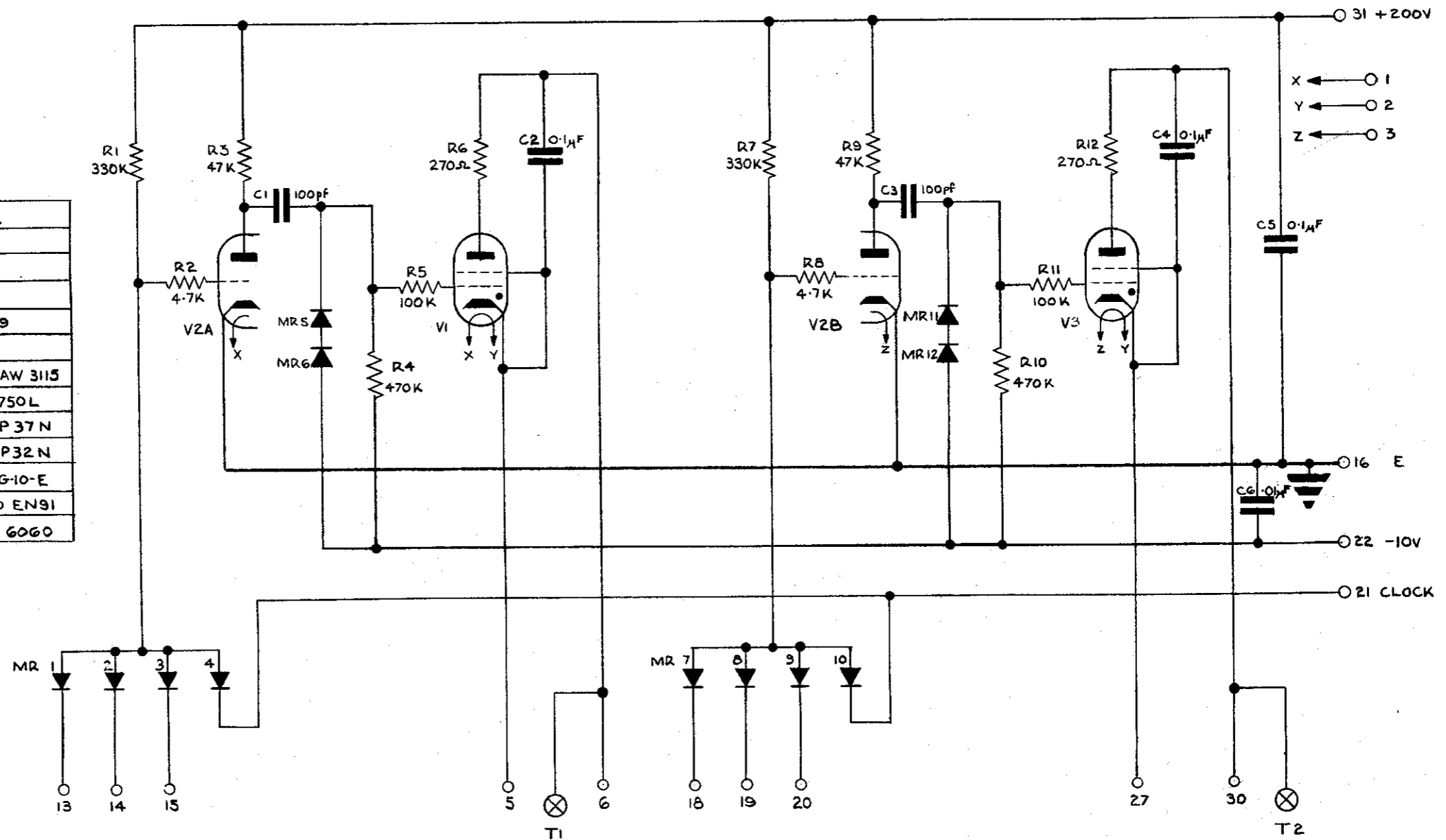


FIG. 2.7 THYRATRON OUTPUT, TYPE 26 (CIRCUIT)

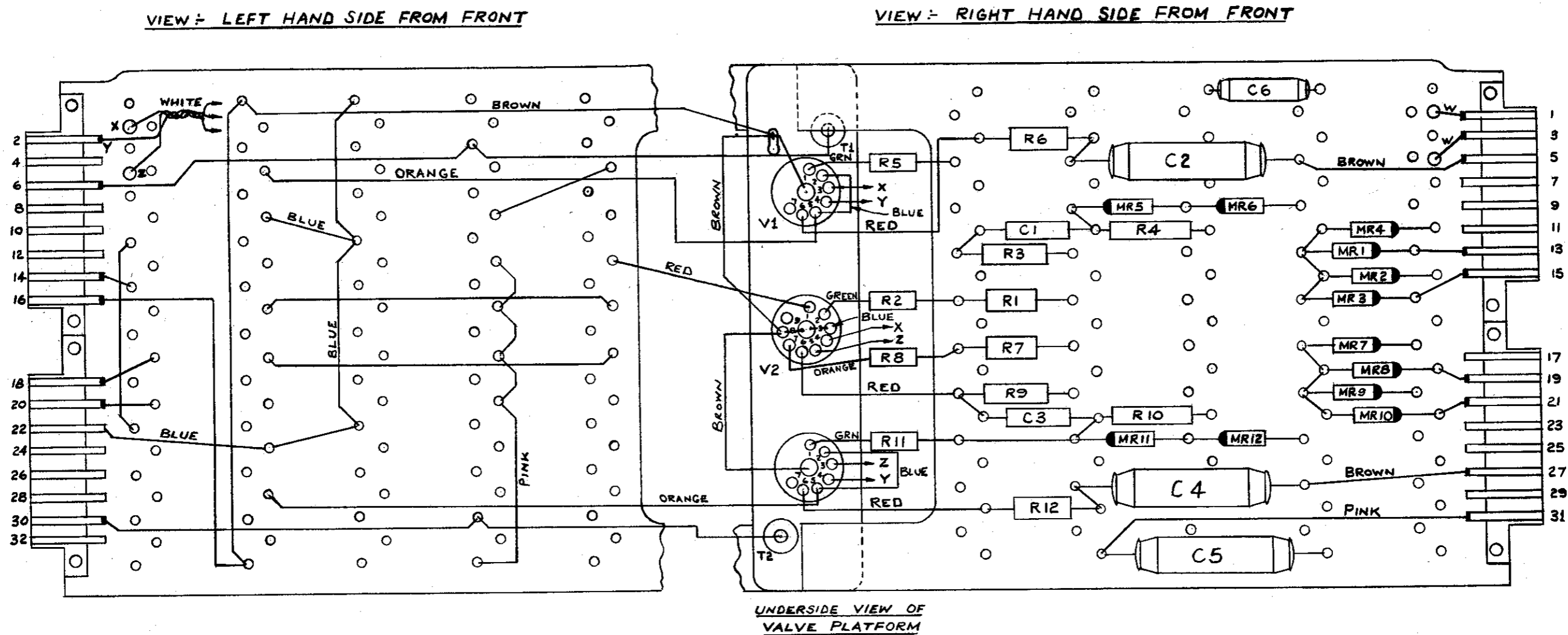


FIG. 2.8 THYRATRON OUTPUT, TYPE 26 (LAYOUT)

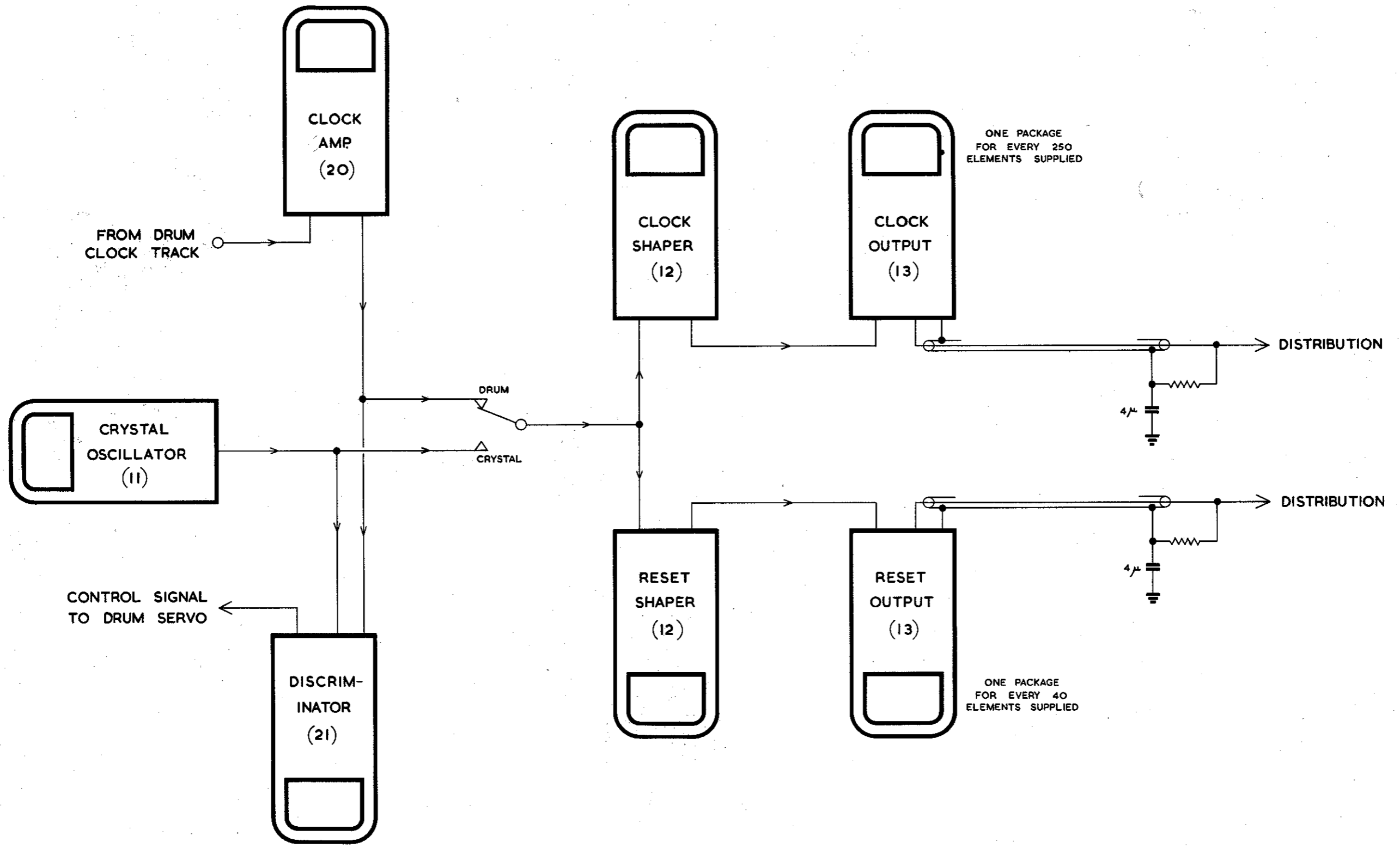


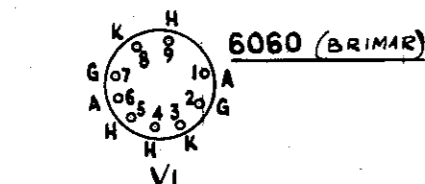
FIG. 3. I GENERATION OF "CLOCK" AND "RESET"

R	R1	R2	R3	R4,R5	R6	R7	R8 R9	R10 R11	R12 R13	R14 R15	R16	
C	C1	C2	C3	C4	C5	C6	C7					
MR												

RESISTOR TYPES & TOLERANCE.	
9 ± 10%	R1, 2, 6, 7, 11, 12, 13.
8 ± 10%	R3, 4, 5, 8, 9, 10, 16.
WIRE WOUND	WELWYN. AW. 3101 ± 5% R14. " " 3111 ± 5% R15.
CAPACITOR TYPES & TOLERANCE.	
DUBILIER 8635 ± 10%	C2
TCC CP 32N ± 20%	C1, 5, 4, 5, 6, 9
TCC CP 87N ± 20%	C7, C8

VALVE TYPES.
V1a, V1b, BRIMAR 6060
V2 BRIMAR 6132

CRYSTAL DIODES
B.T.H. TYPE. CG10E



QUARTZ CRYSTAL
G.E.C. TYPE. H.A.193.

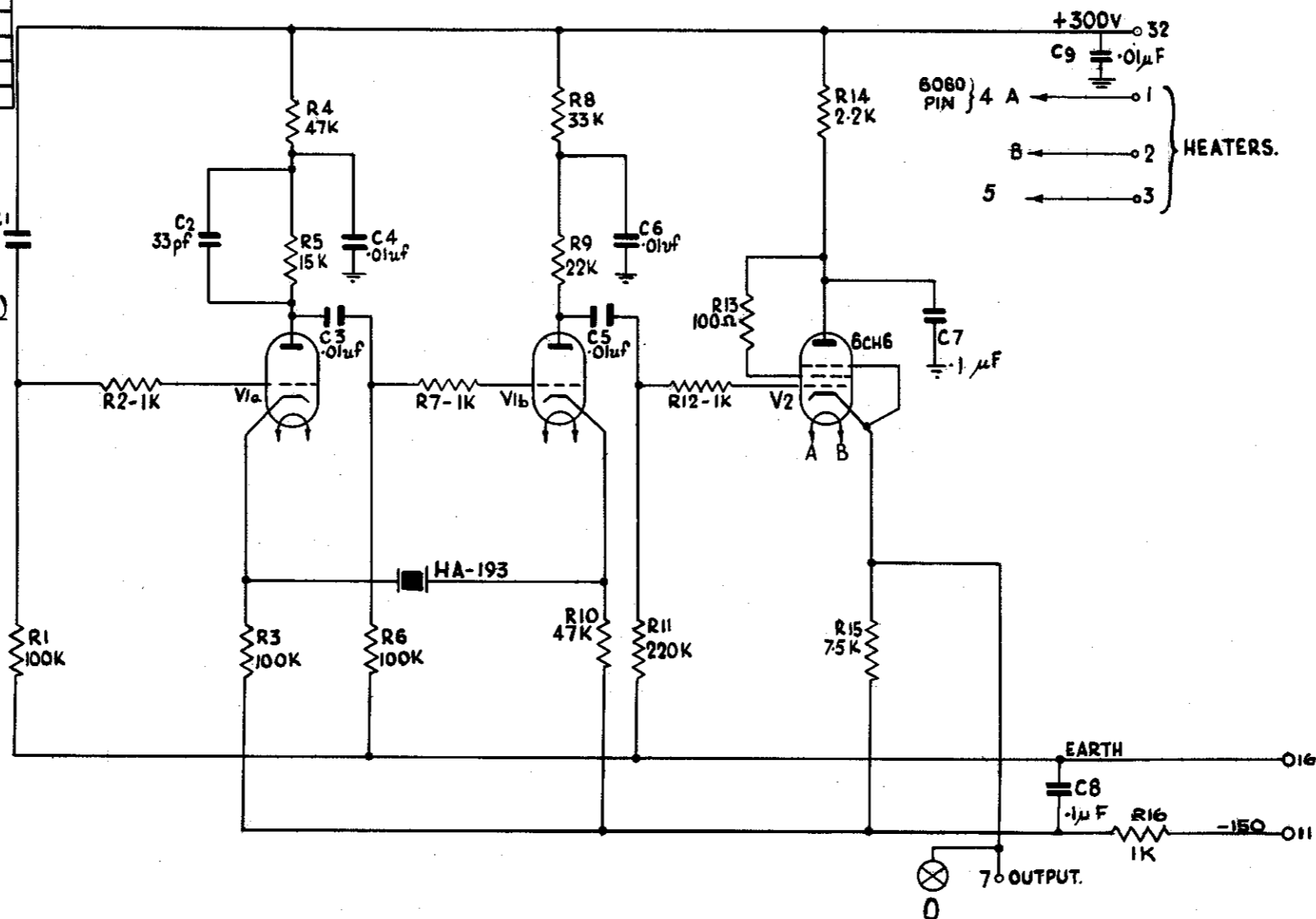
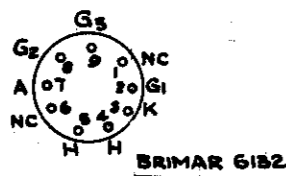


FIG. 3.2 CRYSTAL OSCILLATOR, TYPE II (CIRCUIT)

VIEW :- LEFT HAND SIDE FROM FRONT.

VIEW: RIGHT HAND SIDE FROM FRONT.

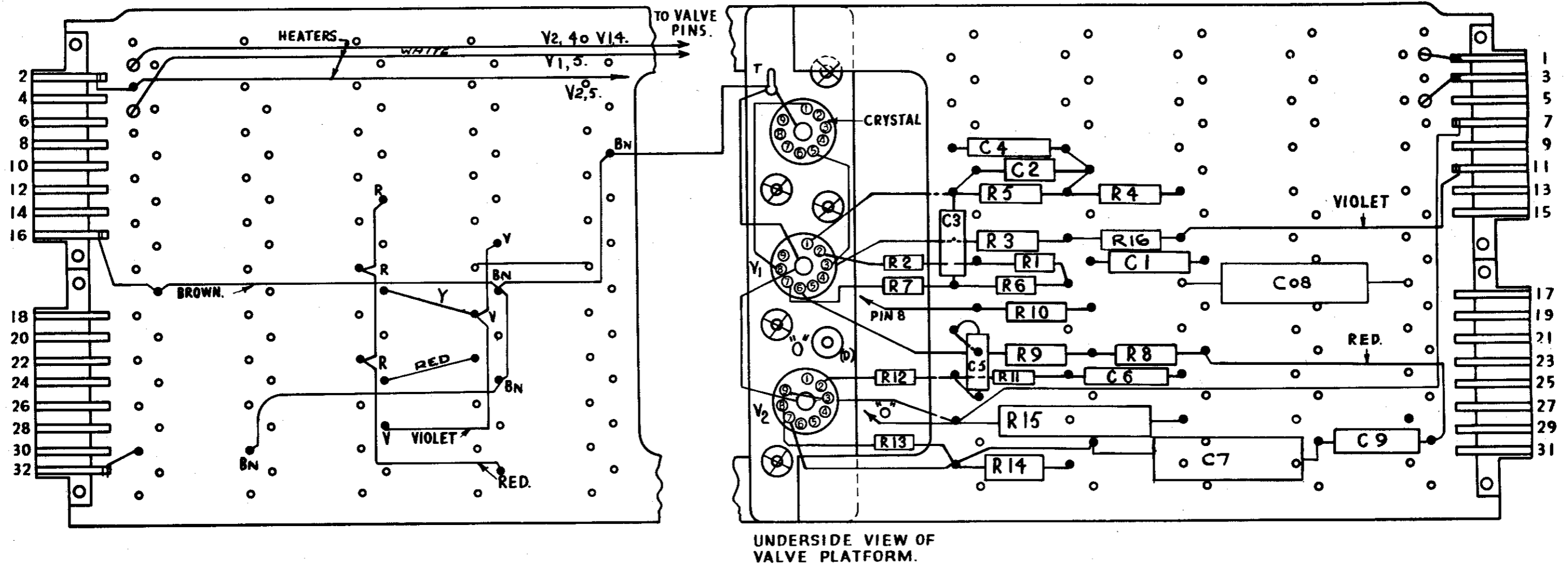


FIG. 3.3 CRYSTAL OSCILLATOR, TYPE II (LAYOUT)

R	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R13, R12, R14, R15, R17, R16, R18,	R19, R20, R21,	R22,				
C	C1	C2			C3	C4	C5		C6	C8		C7	C9		C10			
MR	2		3		4			5					6		7, 8, 9, 10, 11, 12, 13, 14, 15,		16, 17,	
MISC.	L. 1.																	

RESISTOR TYPES & TOLERANCE		CAPACITOR TYPES & TOLERANCE		V1, 2 & 3
9, ± 10%	R3, R4, R5, R9, R10, R11, R13	DUBILIER TYPE S635	± 10%	C1, C8.
108 ± 5%	R7, R8.	ERIE TYPE N. 750L.	± 10%	C3.
109 ± 5%	R1, R2, R6,	T.C.C. TYPE CP 32 N.	± 25%	C2, C5, C10
AW 3111 ± 5%	R12, R22	TCC TYPE CP. 37 N.	± 20%	C4, C7, C9.
AW 3/92 ± 5%	R16	ERIE TYPE N 750K	± 10%	C6.

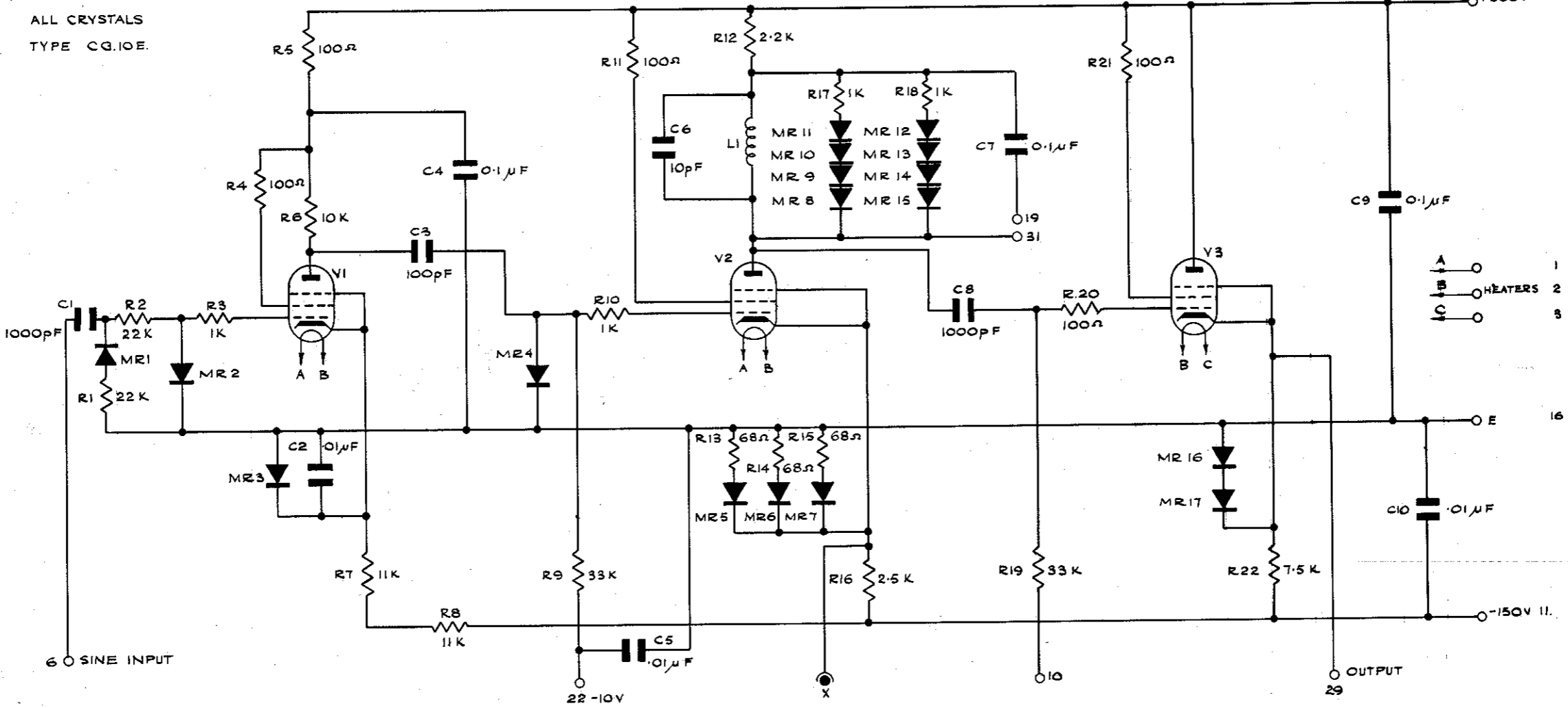
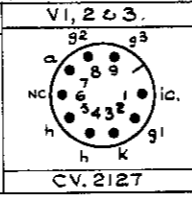
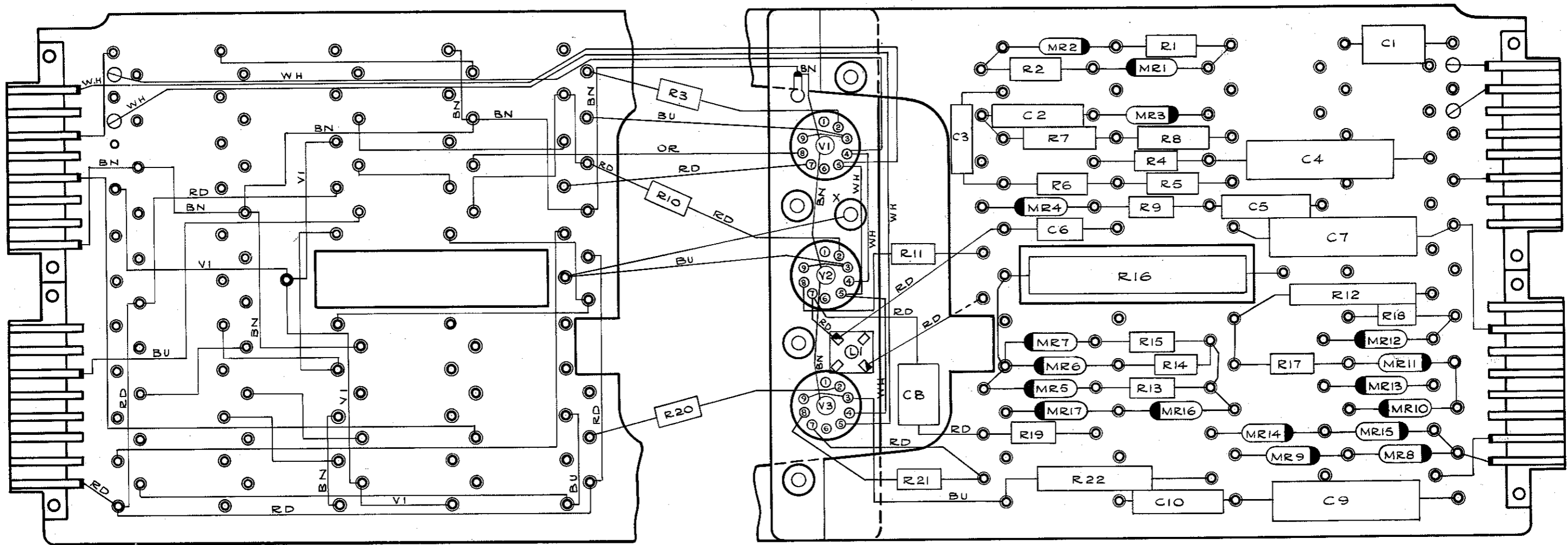


FIG. 3.4 SHAPER, TYPE 12 (CIRCUIT)

VIEW : — LEFT HAND SIDE FROM FRONT

VIEW : — RIGHT HAND SIDE FROM FRONT



UNDERSIDE VIEW OF VALVE PLATFORM

HEATER WIRING [COLOUR WHITE]

- 1 ○ —→ V1, PIN 4 - V2, PIN 4
- 2 ○ —→ V1, PIN 5 - V2, PIN 5 - V3, PIN 4.
- 3 ○ —→ V3, PIN 5

FIG. 3.5 SHAPER, TYPE 12 (LAYOUT)

R	R1	R2	R3, R4	R5	R6, R7	R8	R9, R10		
C					C1		C2		C3 C4
MISC							T1		L1

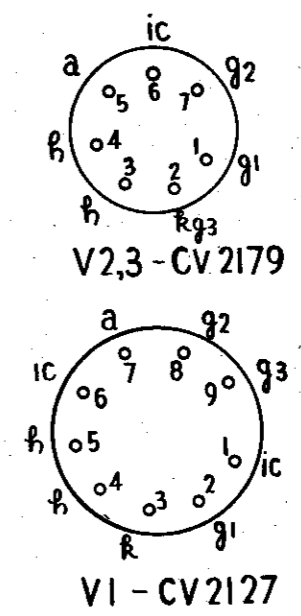
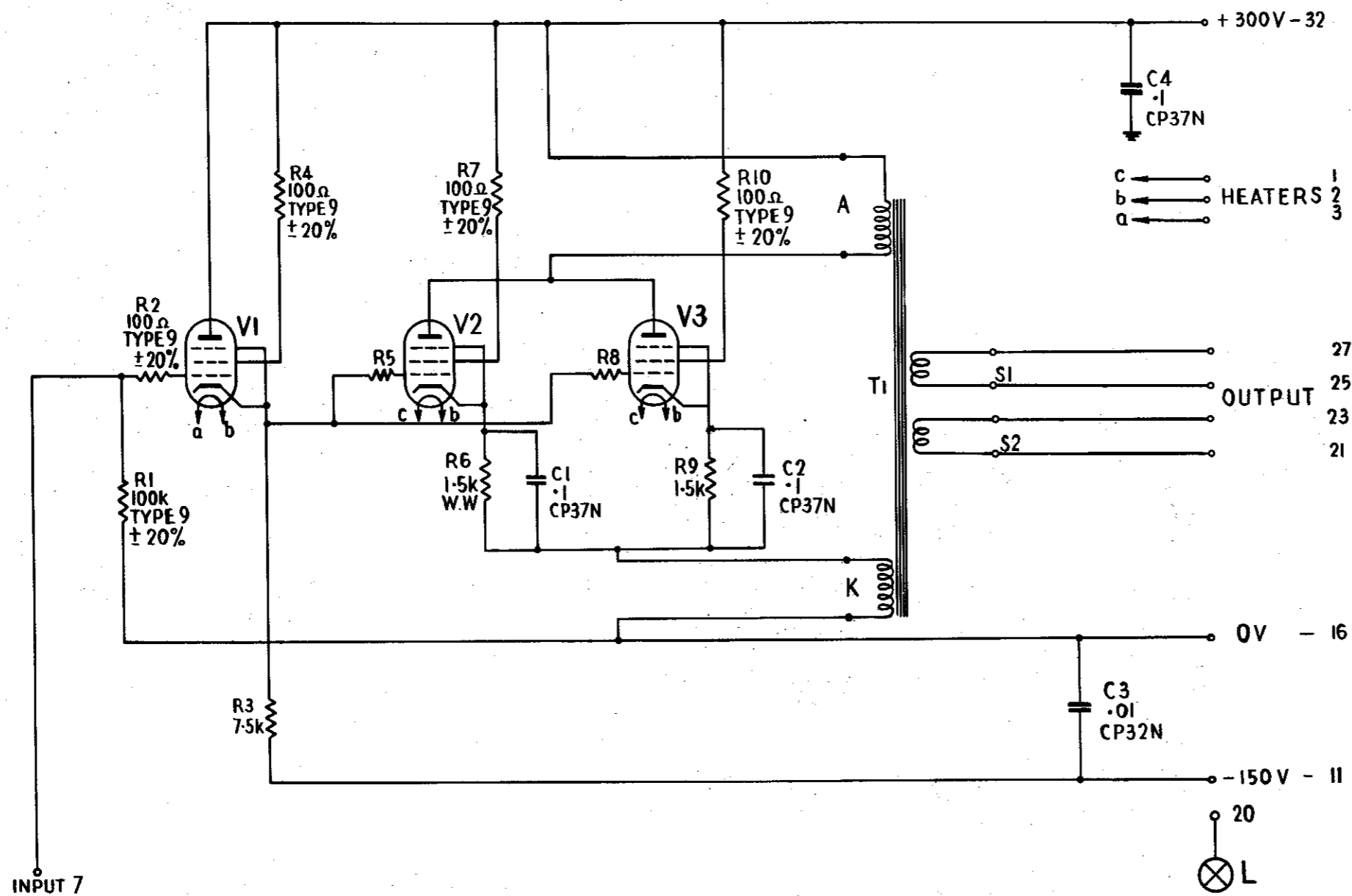
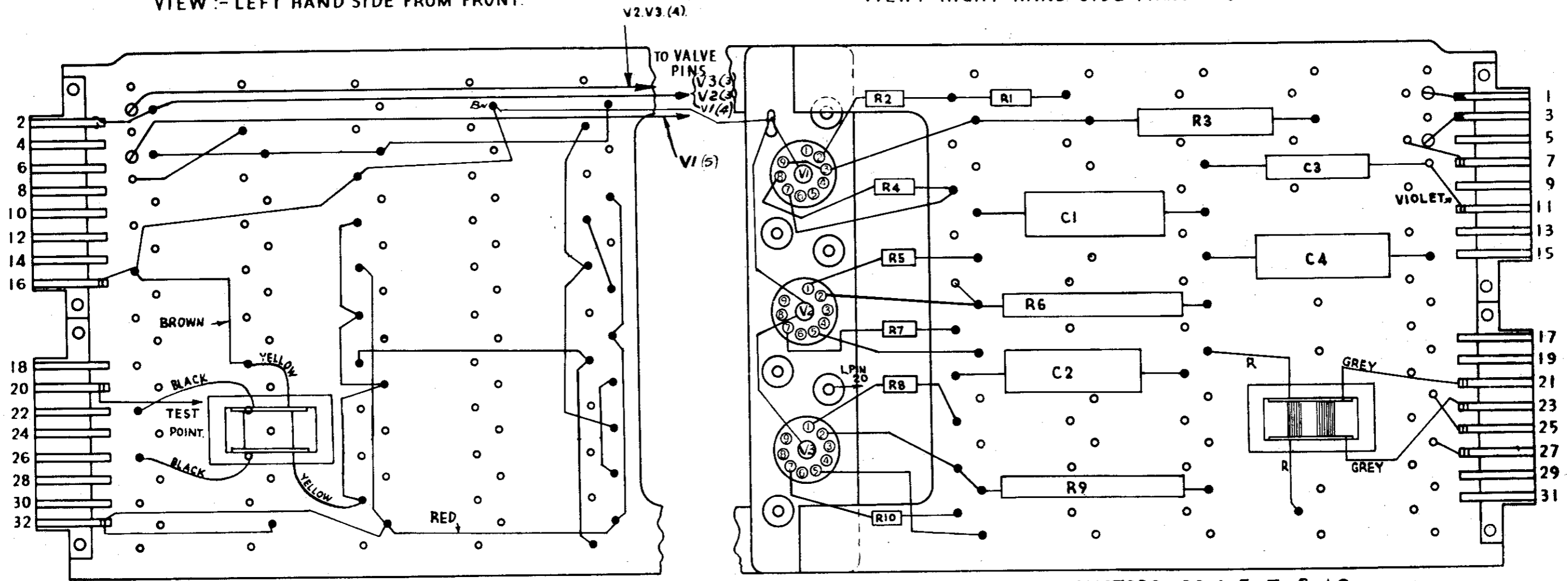


FIG. 3.6 WAVEFORM OUTPUT, TYPE 13 (CIRCUIT)

VIEW :- LEFT HAND SIDE FROM FRONT.

VIEW: RIGHT HAND SIDE FROM FRONT.



UNDERSIDE VIEW OF VALVE PLATFORM.

NOTE:- RESISTORS R2, 4, 5, 7, 8, 10. TO BE WIRED AS CLOSE TO VALVE PINS AS POSSIBLE.

FIG. 3.7 WAVEFORM OUTPUT, TYPE 13 (LAYOUT)

R	R1,	2, 3, 4, 5,	6, 7,	8,	10, 11,	12,	13, 14, 15, 16.	R
C	C1,	2,	3, 4, 5, 6, 7,	8, 9, 10, 11, 12,	13,	14,		C
MR					1, 2,			MR
MISC	TRI	LI						MISC
RESISTOR TYPES & TOLERANCE			CAPACITOR TYPES & TOLERANCE		CAPACITOR TYPES & TOL. CONT.			
8 ± 10% R2, 8.			CP32N ± 25% C1, 2, 3, 7, 5		P100K ± 10% C12.			
9 ± 10% R1, 4, 5, 6, 7, 10, 12, 13, 14			CP33N ± 10% C.6.		TCK 0330 C.9. C8.			
AW3111 5% R.11, 16			CP37N ± 20% C11, 13, 14.					
AW3115 5% R.3, 15.			HI-K.K ± 20% C.4, 10.					

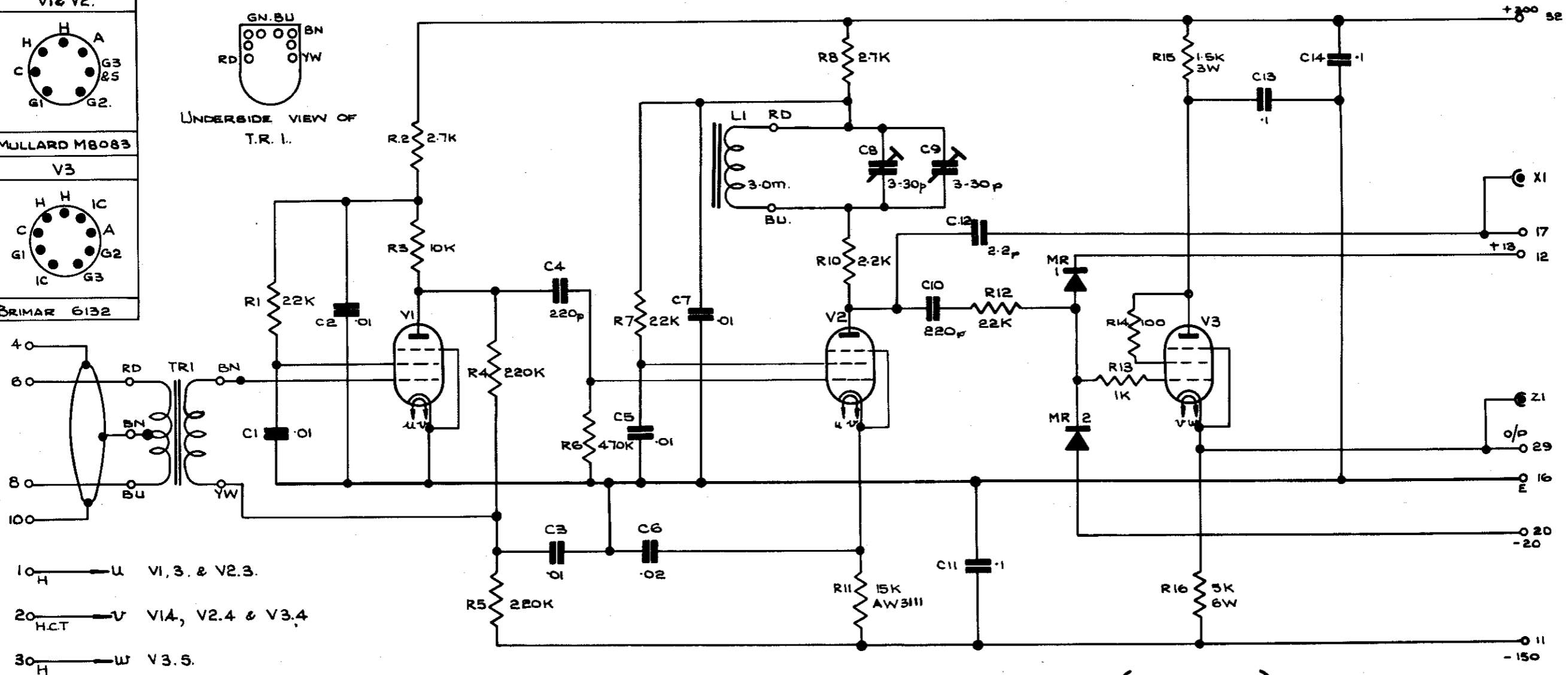
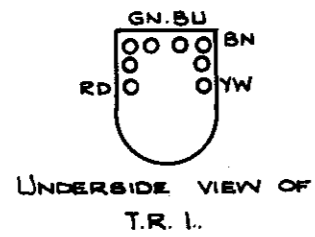
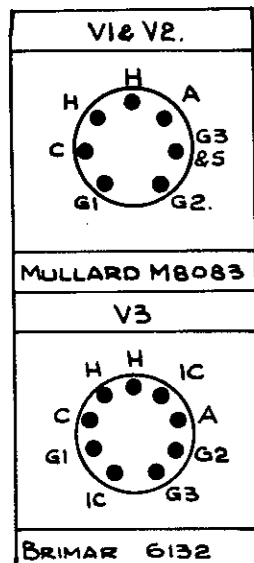


FIG. 3.8 CLOCK AMPLIFIER, TYPE 20 (CIRCUIT)

VIEW :- LEFT HAND SIDE FROM FRONT.

VIEW: RIGHT HAND SIDE FROM FRONT.

WIRES TWISTED TOGETHER-COLOUR WHITE. BROKEN FOR CLARITY & CONTINUED AT VALVE BASE.

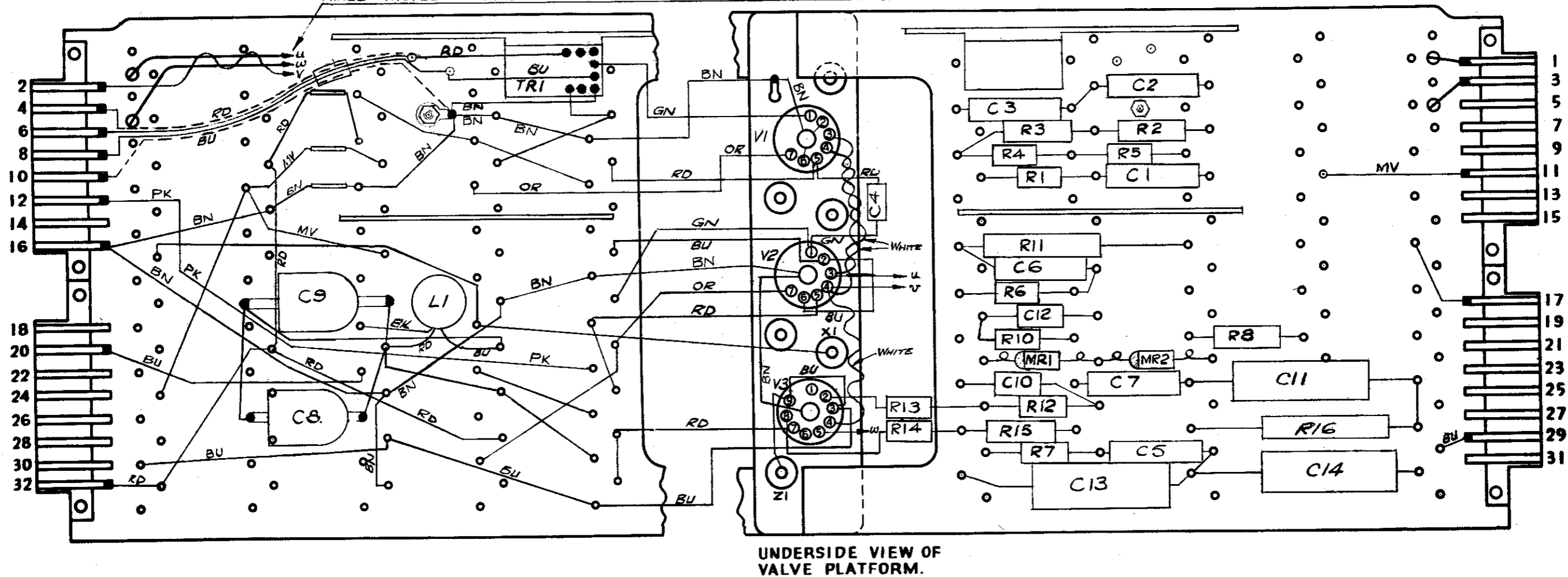


FIG. 3.9 CLOCK AMPLIFIER, TYPE 20 (LAYOUT)

R	1,	2,	3, 4,	5,	6,	7,	8,	9,	10, 11,	12,	13, 14,	15,	16, 17,	18,	19,	20,	21, 22,	23,	24,	25,	R	
C	1,	2, 3,	4,	5, 6,	7,																	C
MR	1,	2,	3, 4,	5, 6,	7,																	MR
RESISTOR TYPES & TOLERANCE			CAPACITOR TYPES & TOLERANCE			V1 & V3			V2													
ERIE TYPE 9 ± 10%			R. 1, 2, 5, 9, 10, 13, 18, 4, 24			T.C.C. CP 37N ± 20%			C. 1, 2, 4, 6													
ERIE TYPE 8 ± 10%			R. 3, 4, 6, 11, 16, 17, 19 & 25			T.C.C. CP 35N ± 20%			C. 5, 7.													
ERIE TYPE 109 ± 2%			R. 8, 12, 15, 20, 22			SUFLEX H.S.A. 2310 / 500V			C3.													
ERIE TYPE 108 ± 2%			R. 7, 21, 23																			
WELWYN AW 3111			R. 14,																			
						MULLARD M8083			BRIMAR 6060													

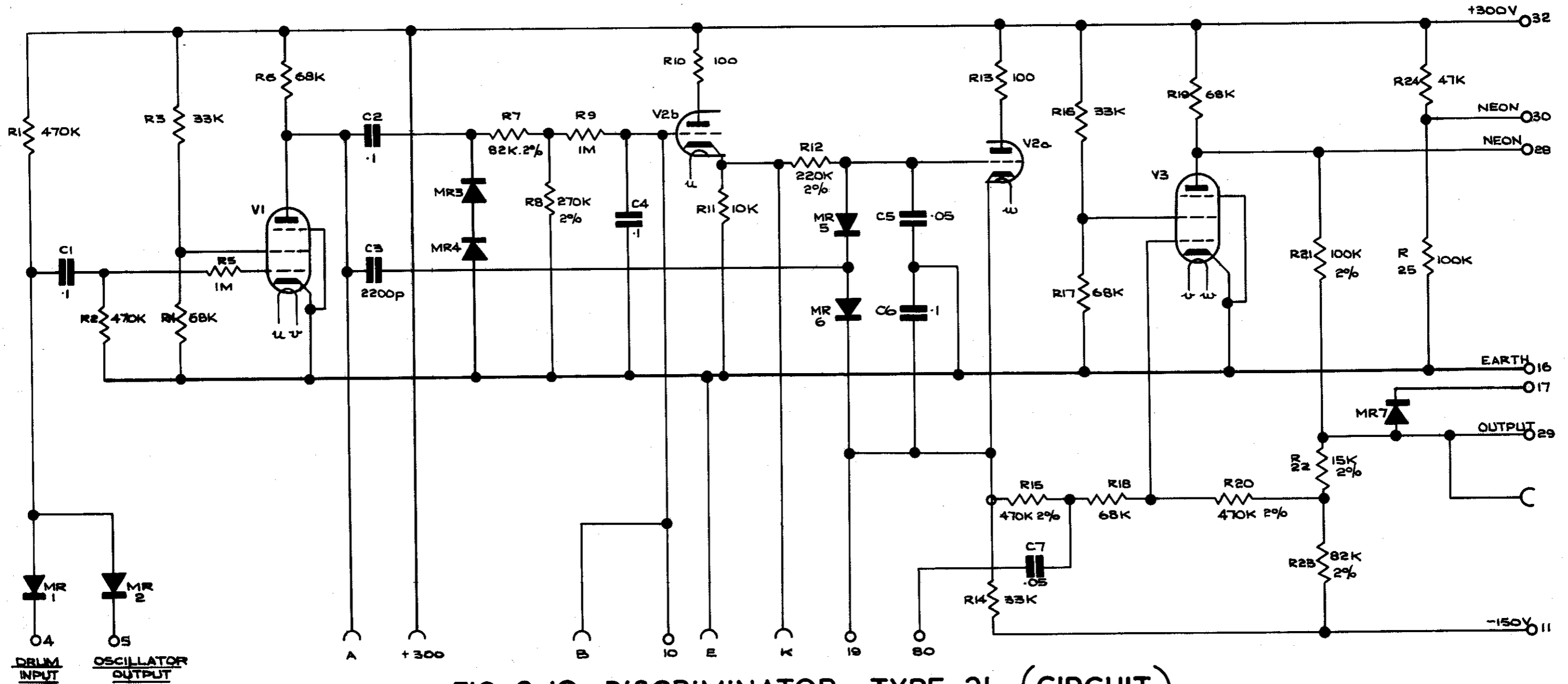


FIG. 3.10 DISCRIMINATOR, TYPE 21 (CIRCUIT)

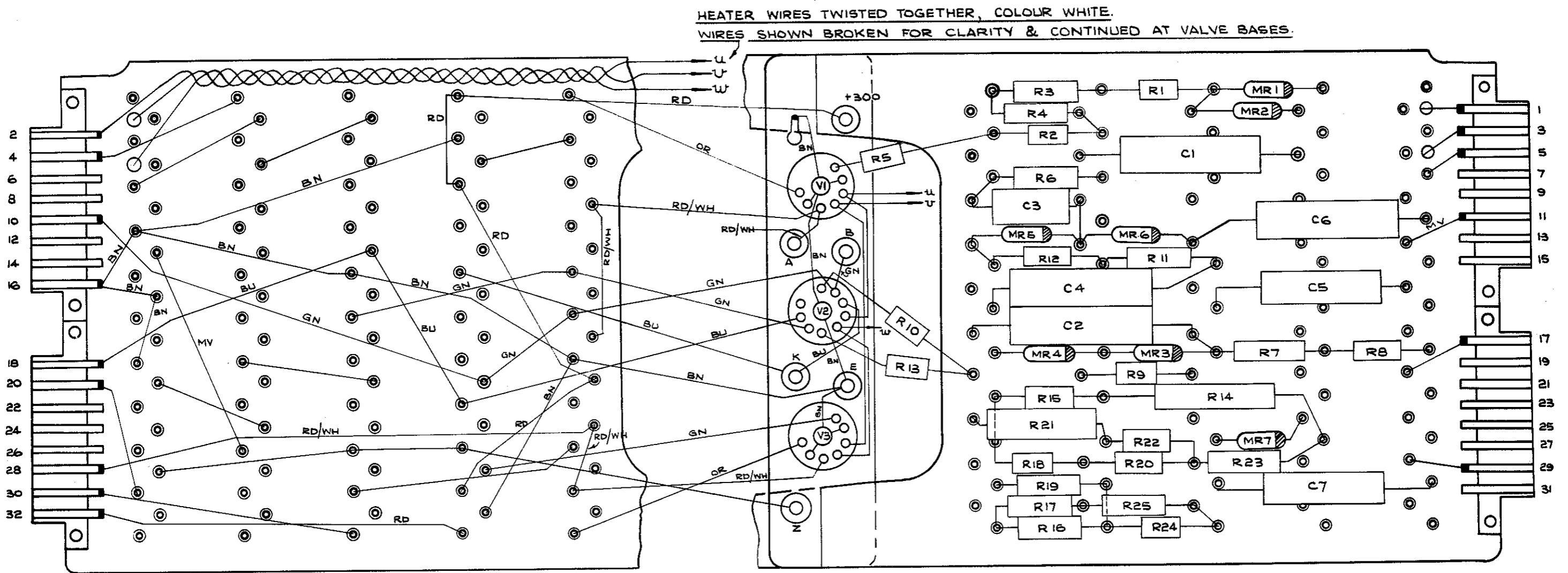


FIG. 3.II DISCRIMINATOR, TYPE 21 (LAYOUT)

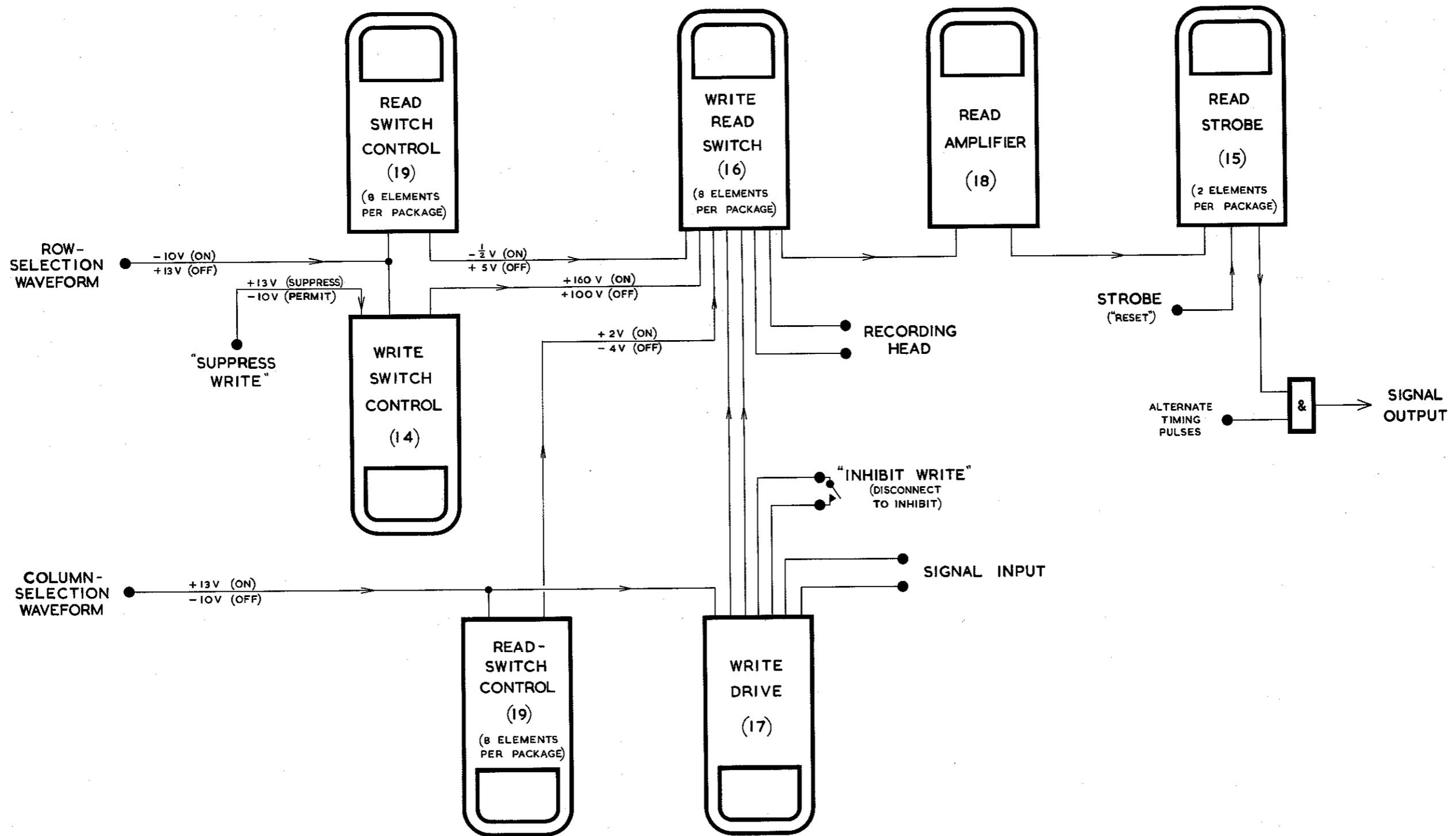


FIG. 4. 1 RECORDING AND PICK-OFF SYSTEM FOR ONE TRACK

R	1,	2,	3,	4, 5, 6, 18,	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17.	R				
C	2,					3, 4,	5,	6,	7, 8, 9, 10.	C
MR	1,	2,	3,					4,	5	MR
MISC										MISC

RESISTOR TYPES & TOLERANCE		CAPACITOR TYPES & TOLERANCE	
ERIE TYPE 109 ± 2%	R1, 7, 8 and 9	ERIE TYPE N.750K ± 10%	C2
ERIE TYPE 9 ± 10%	R2, 3, 5, 10, 14, 11, 15,	T.C.C. TYPE CP110N ± 25%	C3
ERIE TYPE 8 ± 5%	R4 and 6	T.C.C. TYPE CP 32N ± 20%	C4, 6, 7, 8, 9, 10
WELWYN TYPE AW315 ± 5%	R12, 13, 16 and 17.	TCC TYPE CP 33N ± 20%	C5.
ERIE TYPE 108 ± 5%	R18		

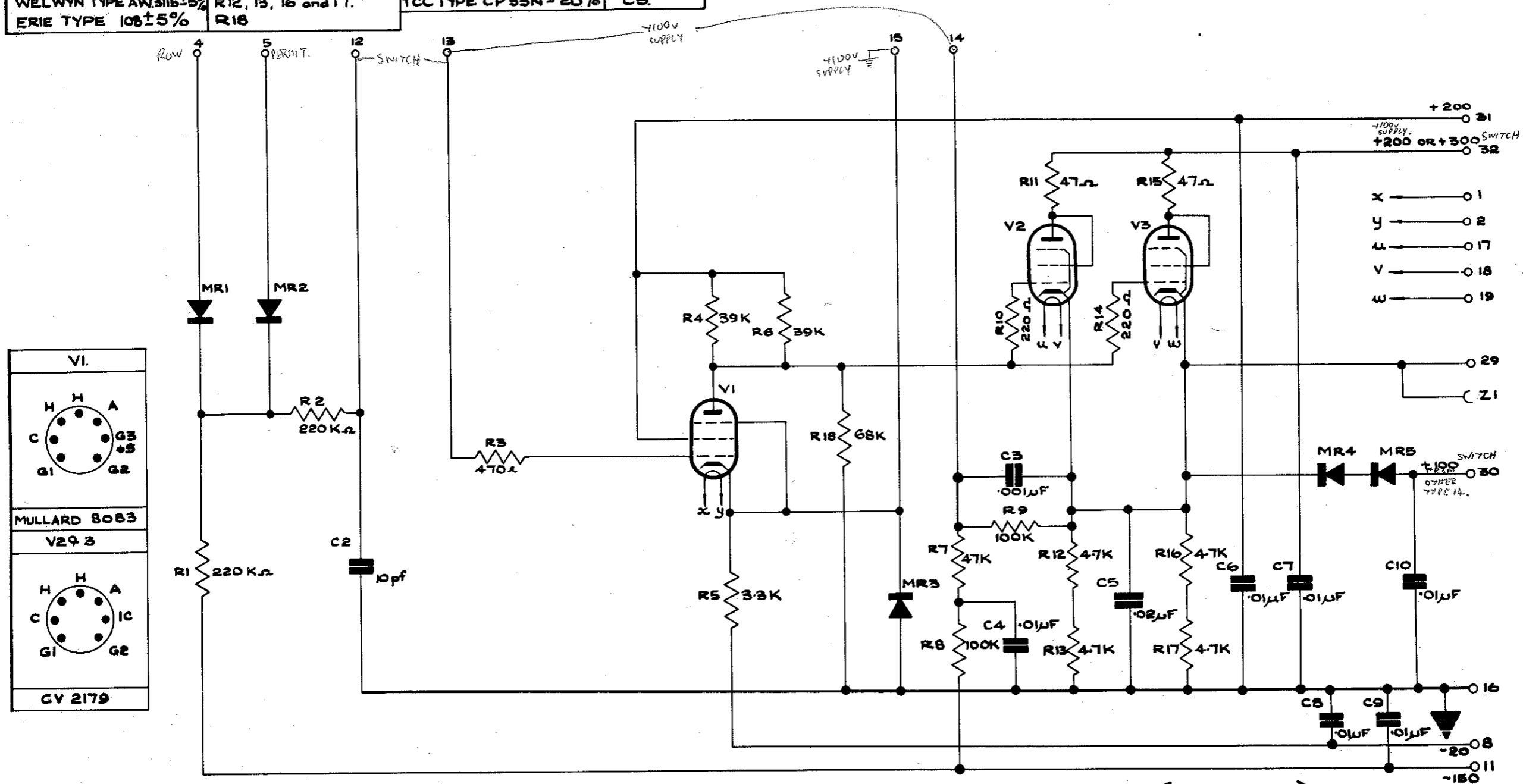
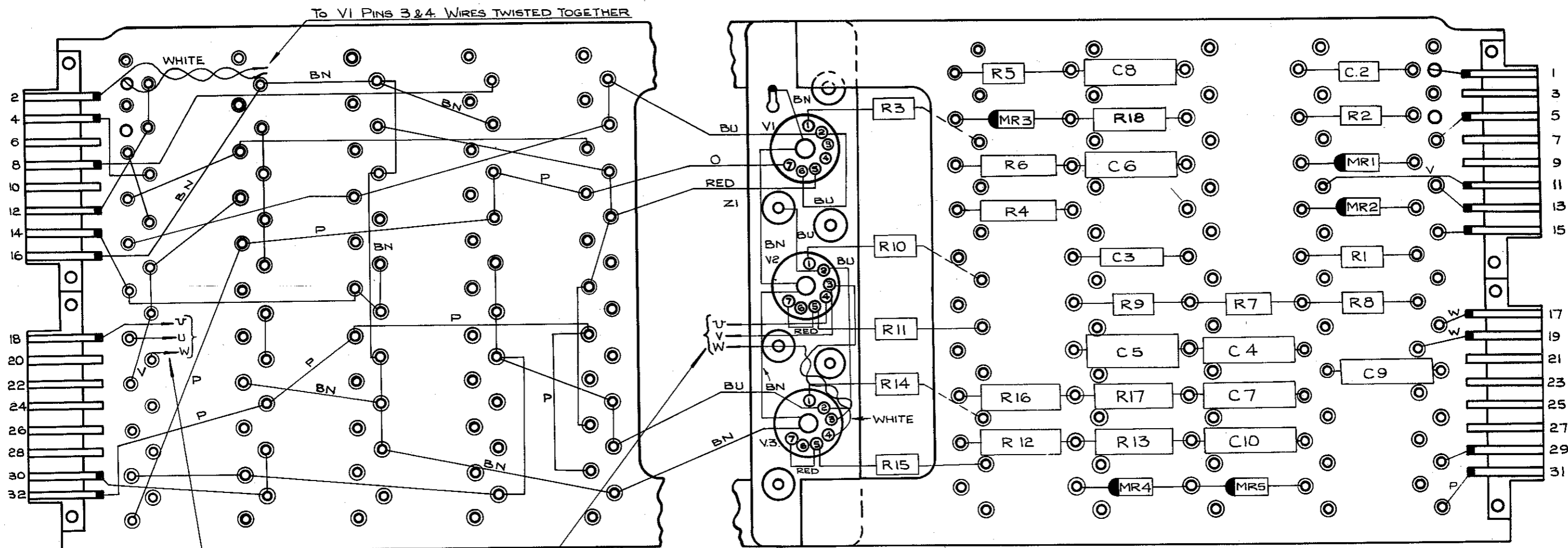


FIG. 4.2 WRITE-SWITCH CONTROL, TYPE 14 (CIRCUIT)

VIEW:- LEFT HAND SIDE FROM FRONT

VIEW: RIGHT HAND SIDE FROM FRONT.



HEATER WIRING BROKEN FOR CLARITY.
 WIRES TO BE TWISTED TOGETHER AND CONNECTED
 AS FOLLOWS:-
 PLUG PIN 17 TO V2 PIN 4(U)
 PLUG PIN 18 TO V2 PIN 3(V) LINK V2 PIN 3 TO V3 PIN 3
 PLUG PIN 19 TO V3 PIN 4(W) WIRE COLOUR WHITE

FIG. 4.3 WRITE - SWITCH CONTROL, TYPE 14 (LAYOUT)

COMPONENT SPECIFICATION.						
RESISTOR TYPES AND TOLERANCE.		CAPACITOR TYPE & TOLERANCE		VALVES		
WELWYN AW3111	±5%	R 3, 4, 5, 16, 17, 18.	N750L(ERIE) ±10%	C1, 2.	V1, 3	6CH6
ERIE TYPE 9	±10%	R 1, 2, 6, 15, 19, 20.			V2.	6060
ERIE 108	±5%	R 8, 9, 10, 11, 12, 13.				
ERIE 109	±5%	R 7, 14.				

ALL METAL RECTIFIERS TYPE CG10E.

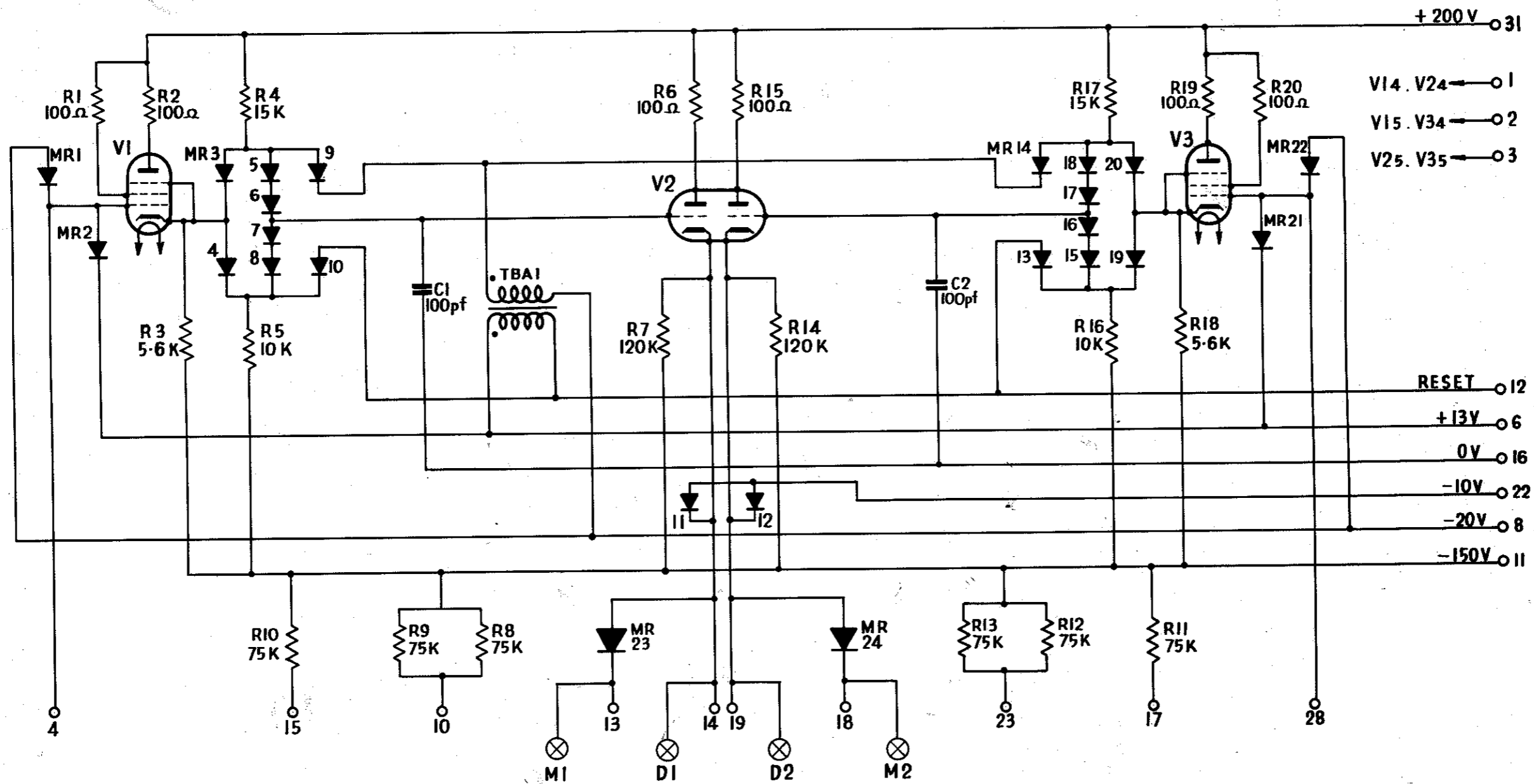
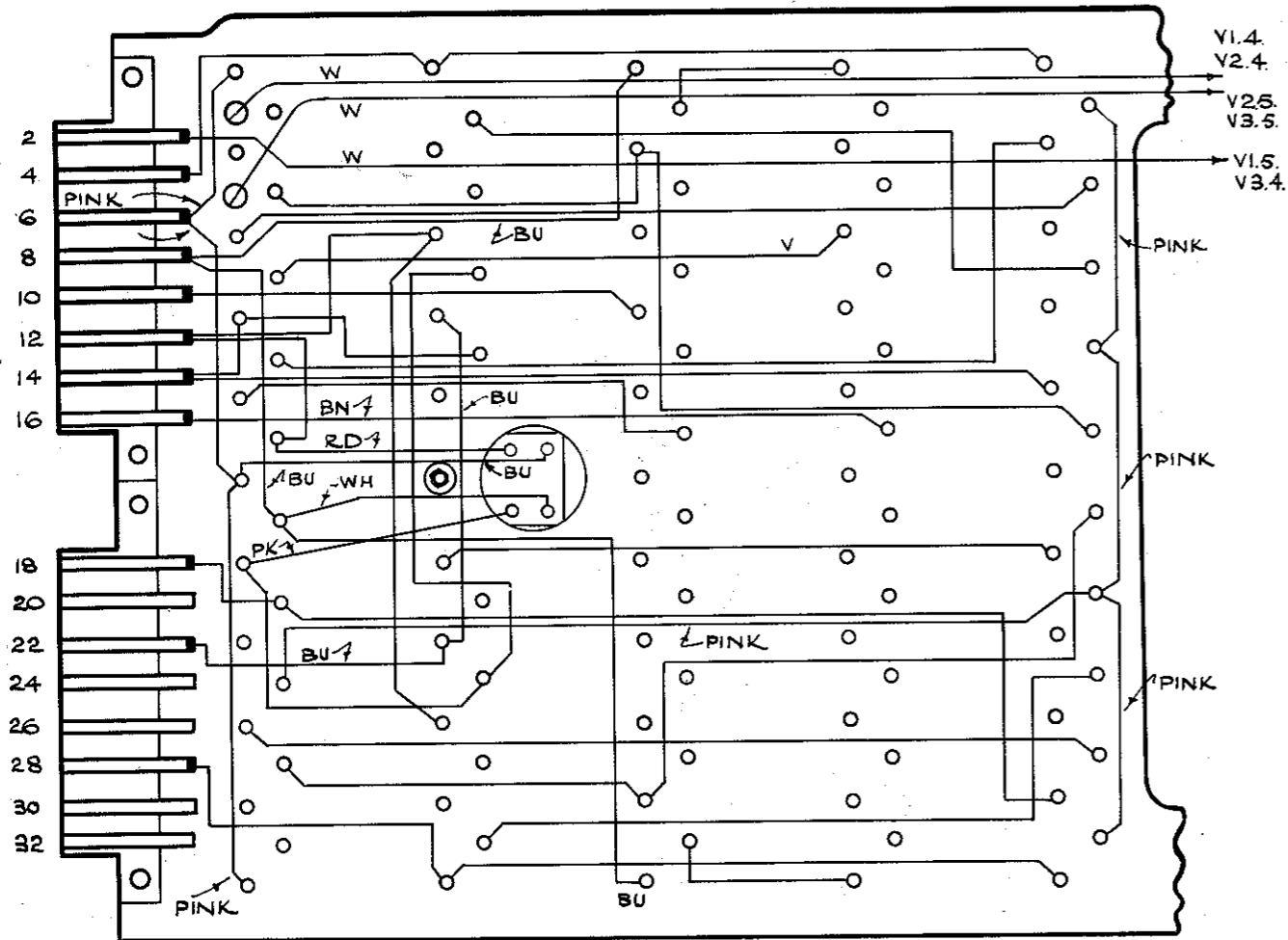
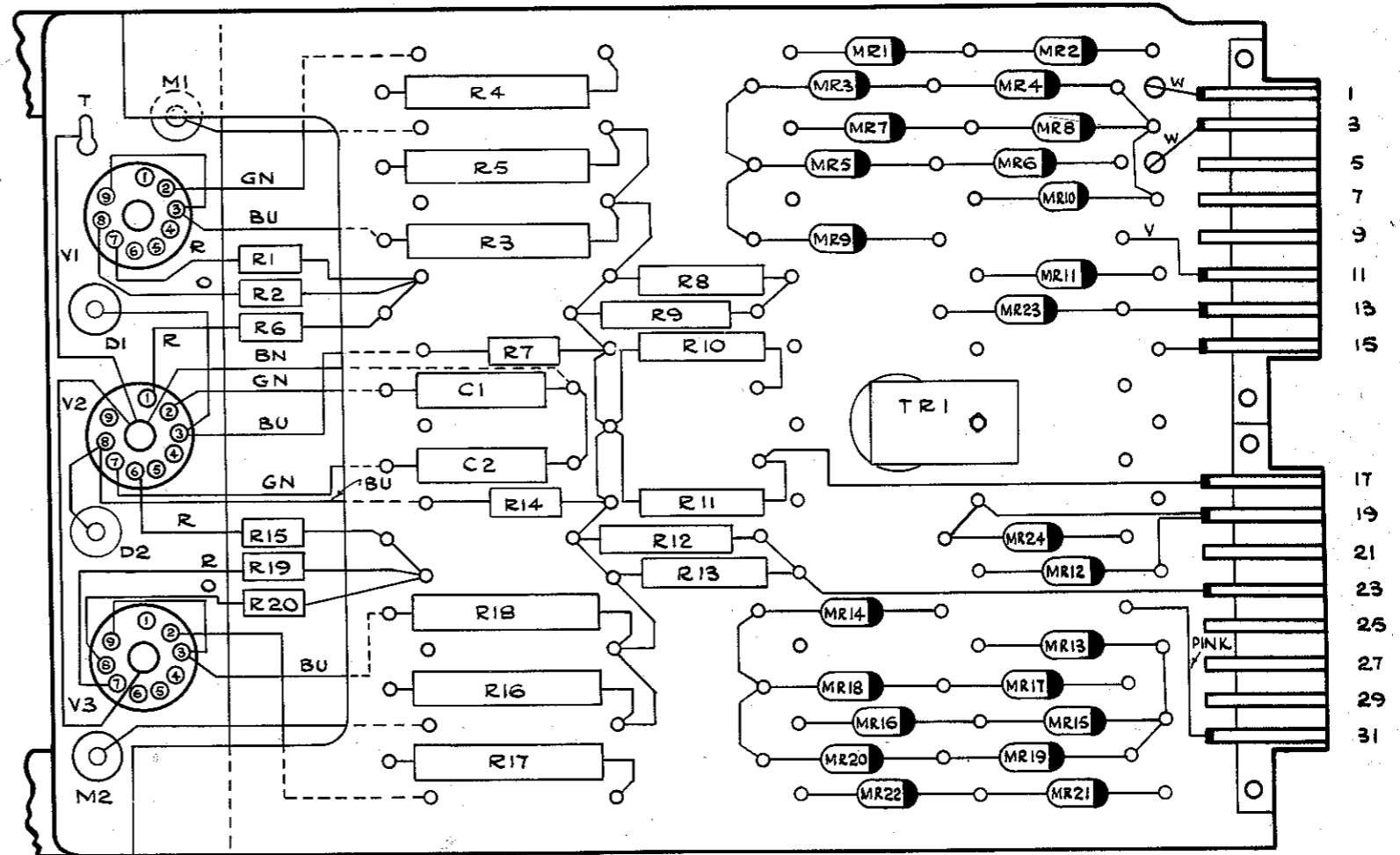


FIG. 4.4 READ STROBE, TYPE 15 (CIRCUIT)

VIEW :— LEFT HAND SIDE FROM FRONT



VIEW :— RIGHT HAND SIDE FROM FRONT

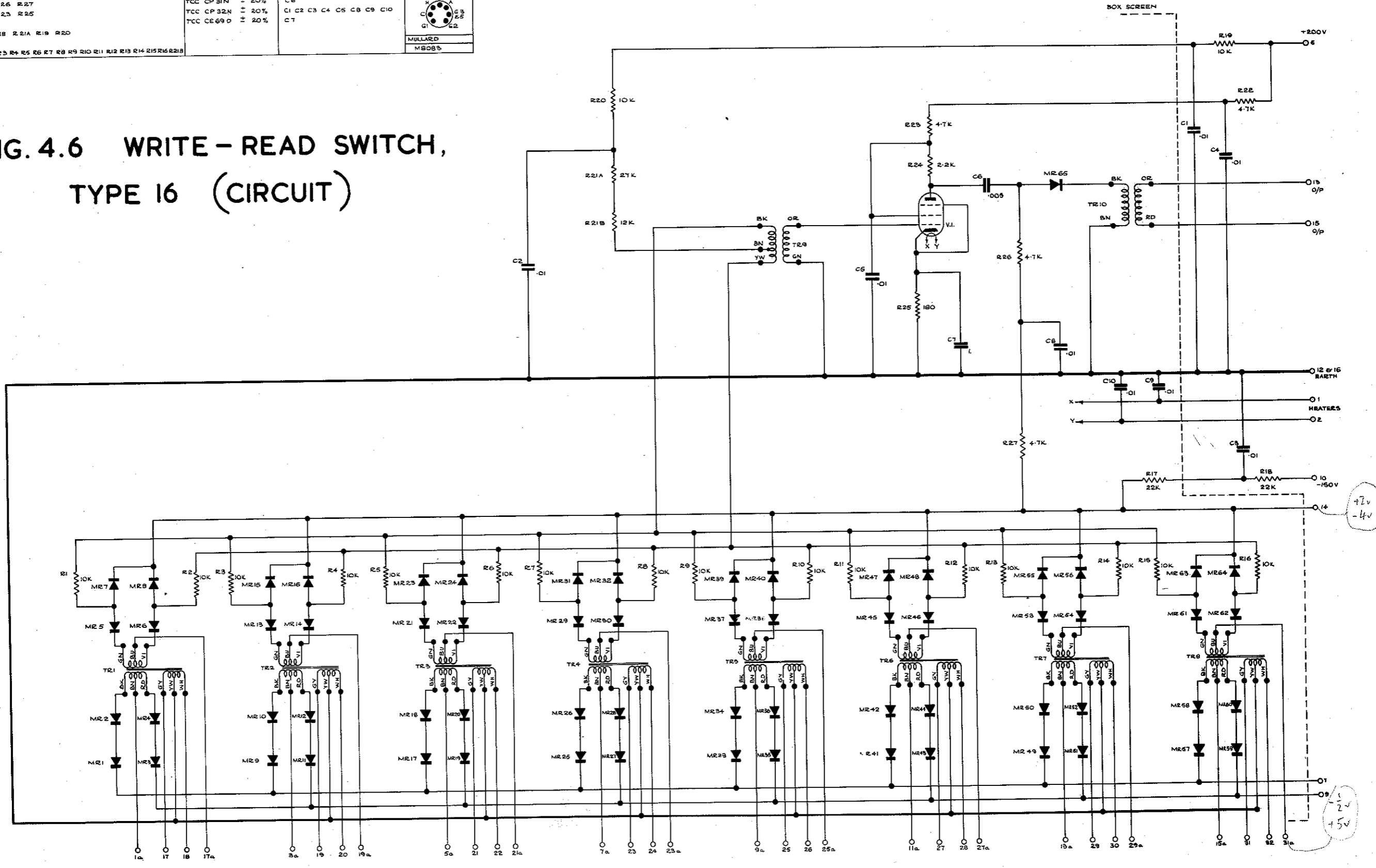


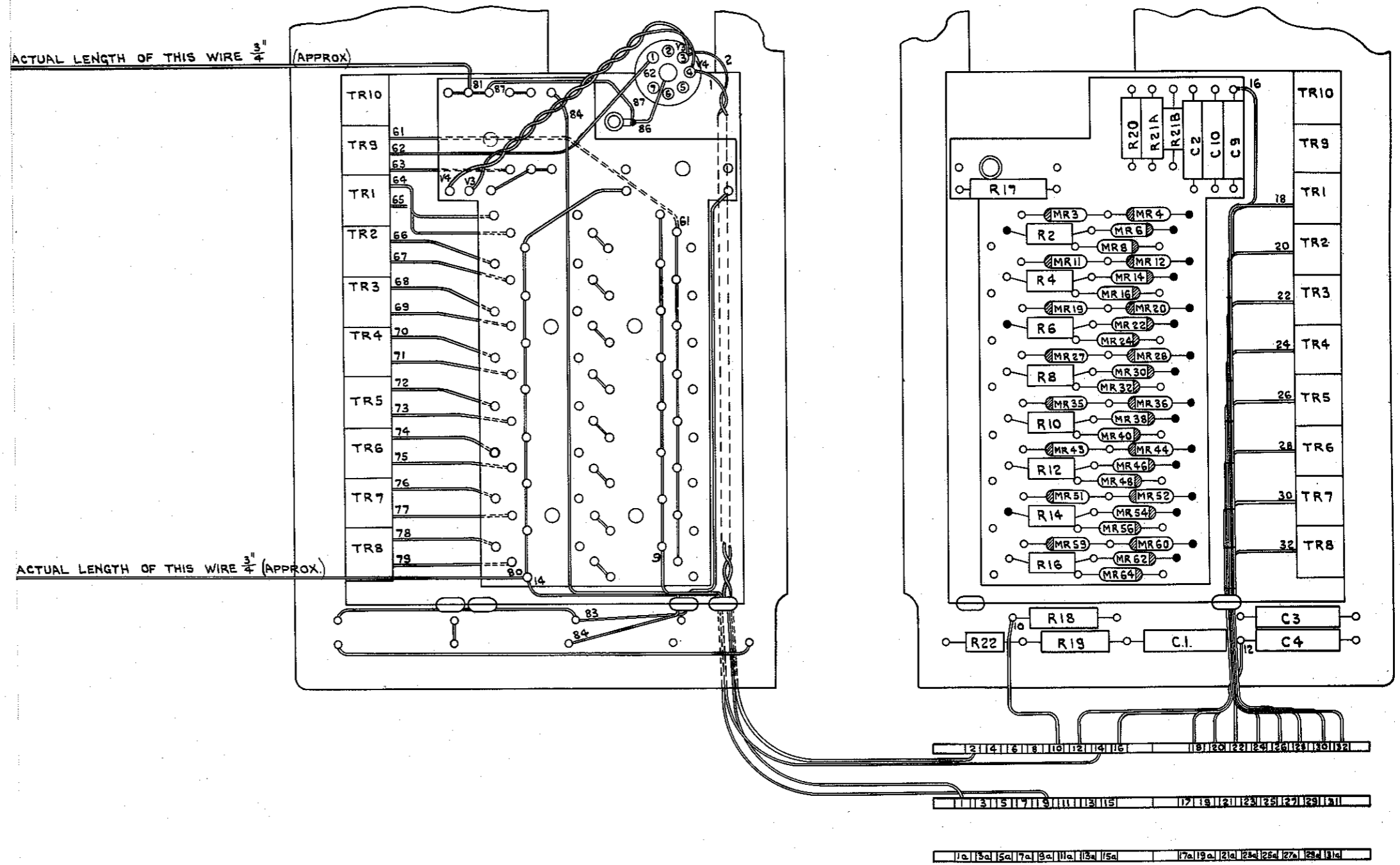
UNDERSIDE VIEW OF VALVE PLATFORM

FIG. 4.5 READ STROBE, TYPE 15 (LAYOUT)

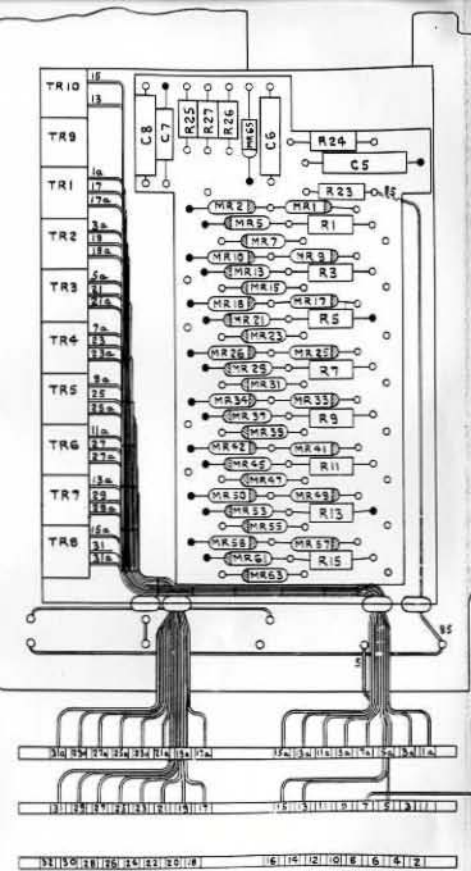
R	R1	R2	R3	R4	R5	R6	R7	R20, R21A, R21B, R6	R9	R10	R11	R25, R23, R24, R12	R13	R26	R27	R14	R17	R15	R18	R19	R22												
C	C2			C5			C7			C6			C8			C9			C10			C3											
MR	1, 2, 5, 7, 3, 4, 6, 8,			9, 10, 13, 15, 11, 12, 14, 16,			17, 18, 21, 23, 19, 20, 22, 24,			25, 26, 29, 31, 27, 28, 30, 32,			33, 34, 37, 39, 35, 36, 38, 40,			41, 42, 45, 47, 43, 44, 46, 48,			49, 50, 53, 55, 51, 52, 54, 56,			57, 58, 61, 63, 59, 60, 62, 64,											
MISC	TR1			TR2			TR3			TR4			TR5			TR9			TR6			VI			TR7			TR10			TR8		
RESISTOR TYPES & TOLERANCE										CAPACITOR TYPES & TOLERANCE										VI													
9 ± 10% R24 R26 R27										TCC CP 31N ± 20% C8										G													
9 ± 5% R22 R23 R25										TCC CP 32N ± 20% C1 C2 C3 C4 C5 C8 C9 C10										H													
100 ± 2% R17 R18 R21A R19 R20										TCC CE 69 D ± 20% C7										I													
100 ± 2% R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R21B																				J													
																				K													
																				L													
																				M													
																				N													
																				O													
																				P													
																				Q													
																				R													
																				S													
																				T													
																				U													
																				V													
																				W													
																				X													
																				Y													
																				Z													

FIG. 4.6 WRITE - READ SWITCH, TYPE 16 (CIRCUIT)

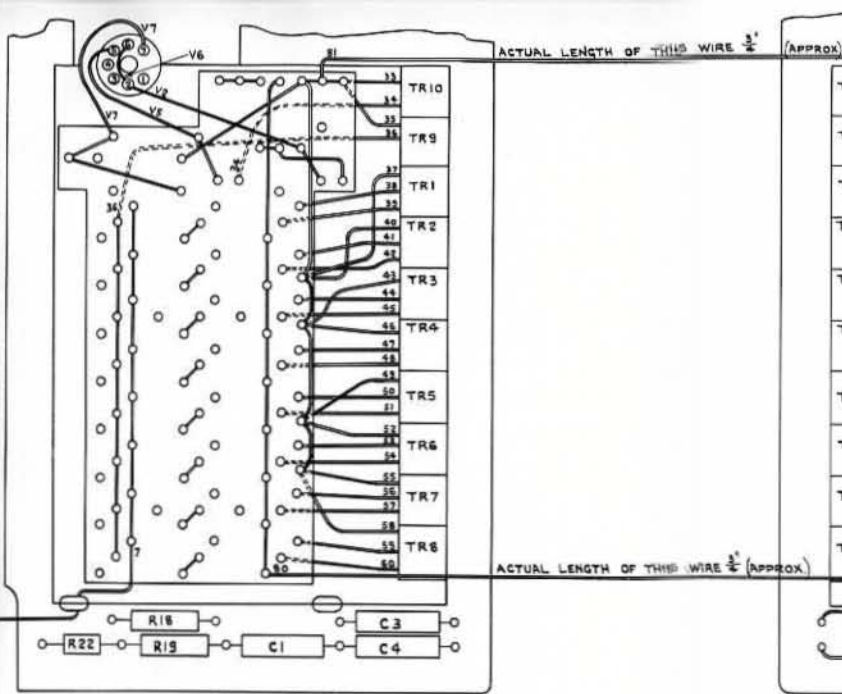




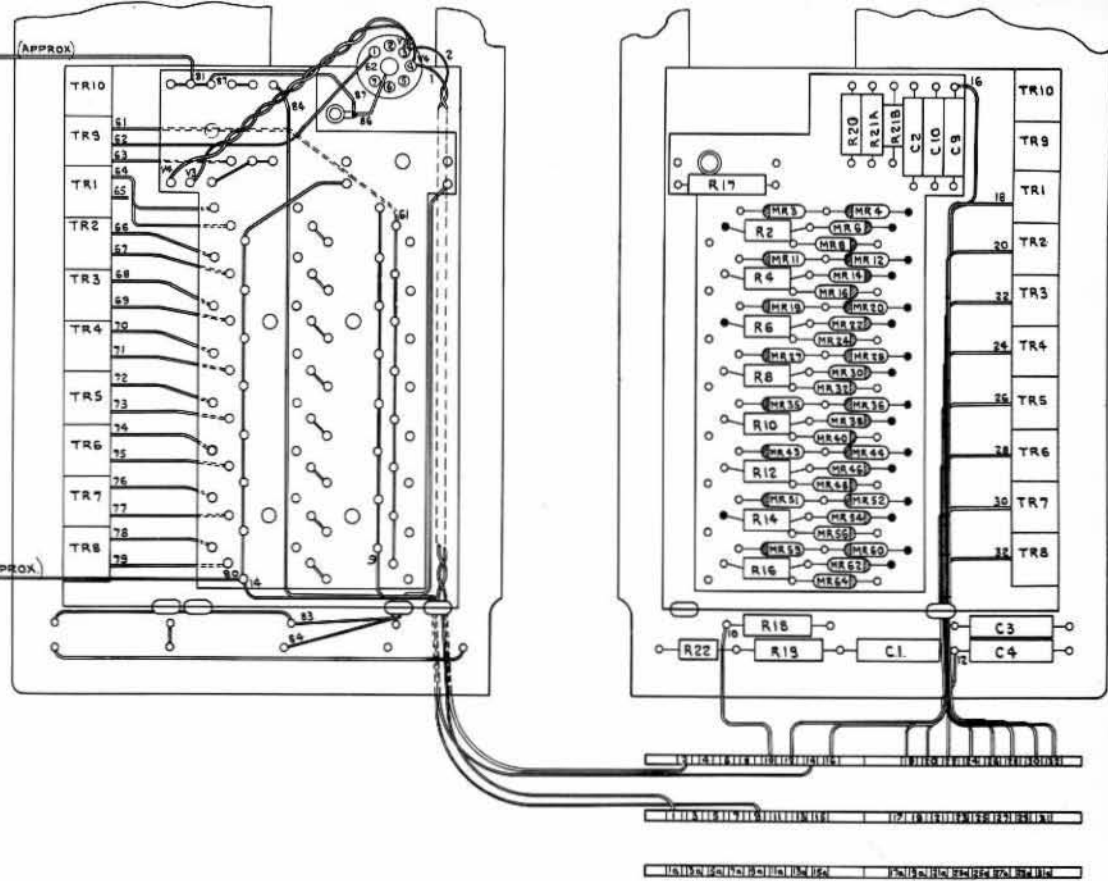
HEAD SWITCH, TYPE 16 (LAYOUT)



PLAN VIEW



UNDERNEATH PLAN VIEW WITH
R.H. TAGBOARD OMITTED



PLAN VIEW WITH L.H. TAGBOARD
OMITTED

UNDERNEATH PLAN VIEW

R	R1	2, 3,	4,	5,	6, 7,	9, 8, 10, 13, 11,	14,	12, 15.	R
C								1, 2, 3, 4.	C
MR	1, 2, 3,	4,	5, 6, 7, 8,	9,	10, 11,	12, 13, 14,	15		MR
MISC.	TRI.								Misc
RESISTOR TYPES & TOLERANCE				CAPACITOR TYPES & TOLERANCE					
8 ± 10%	R1, 2, 4, 7, 13.			CP. 32N (TCC.) ± 20%		C1, 2, 3, 4			
9 ± 10%	R 3, 5, 6, 8, 9, 10, 11, 12, 14, 15.								

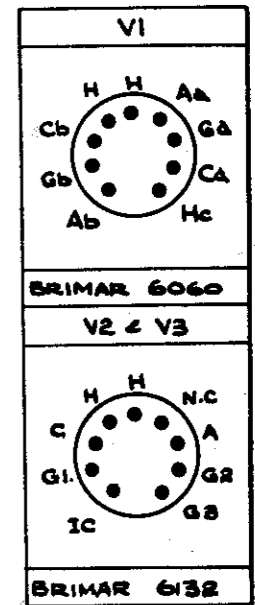
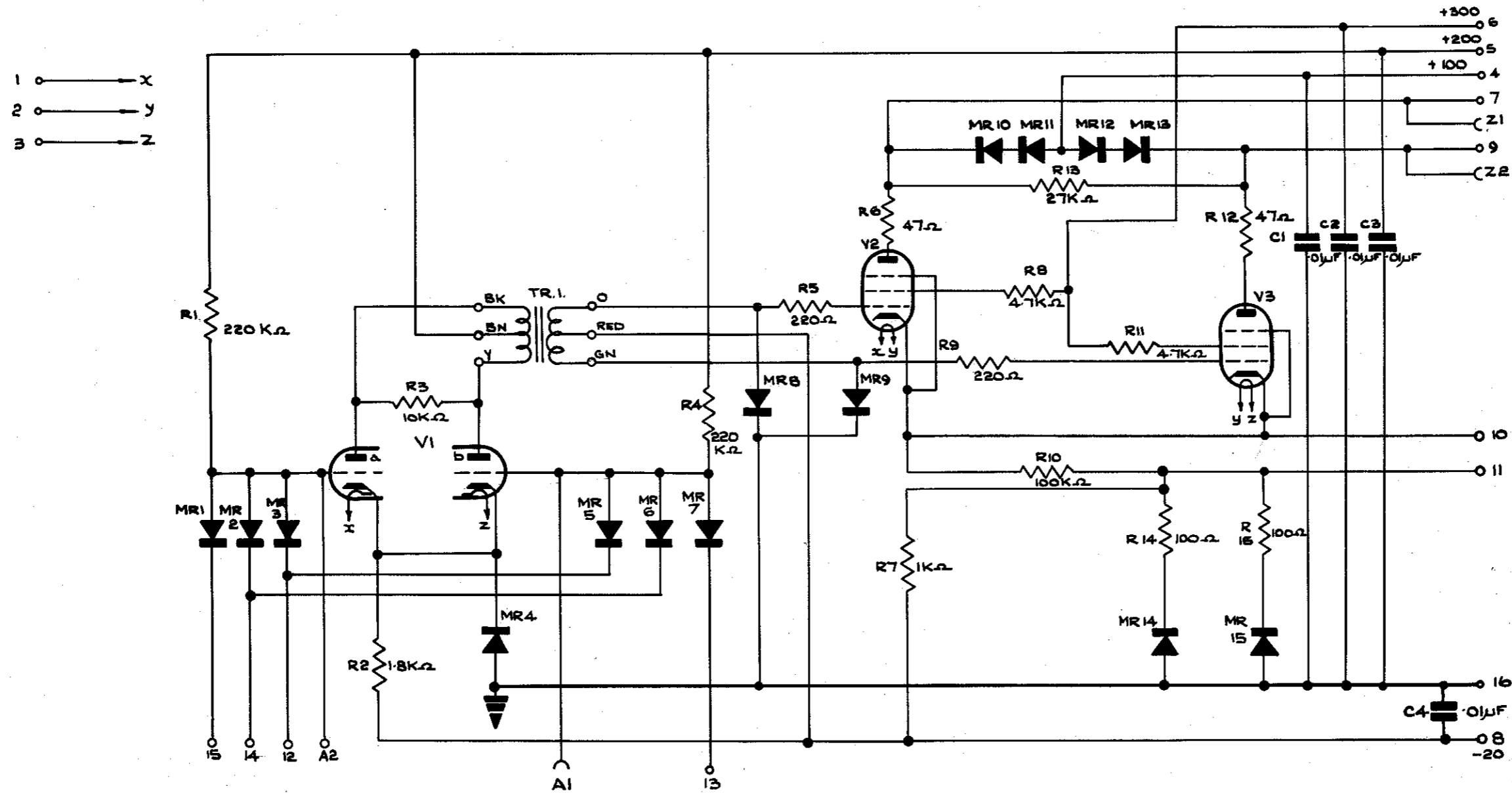
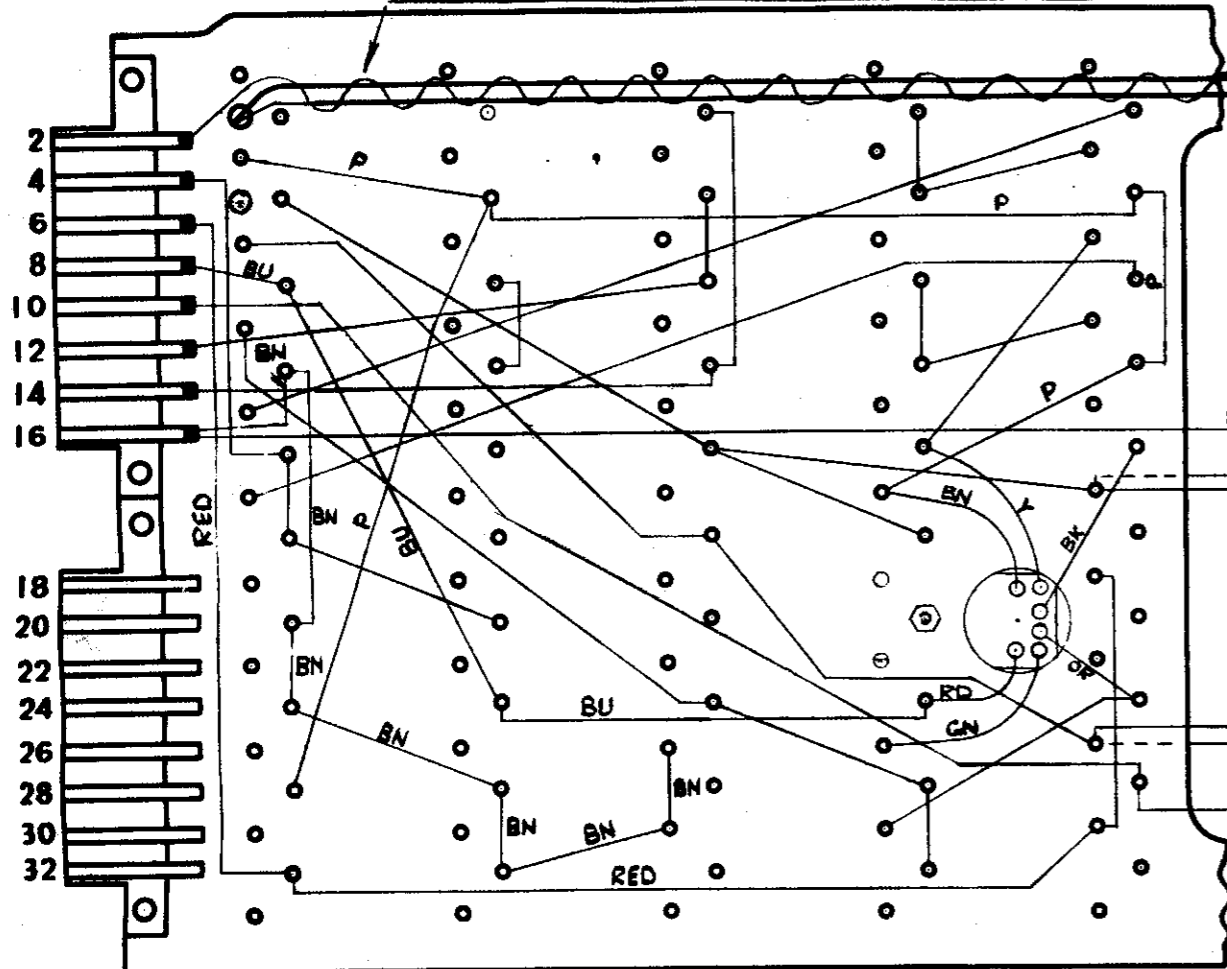


FIG. 4.8 WRITE DRIVE, TYPE 17 (CIRCUIT)

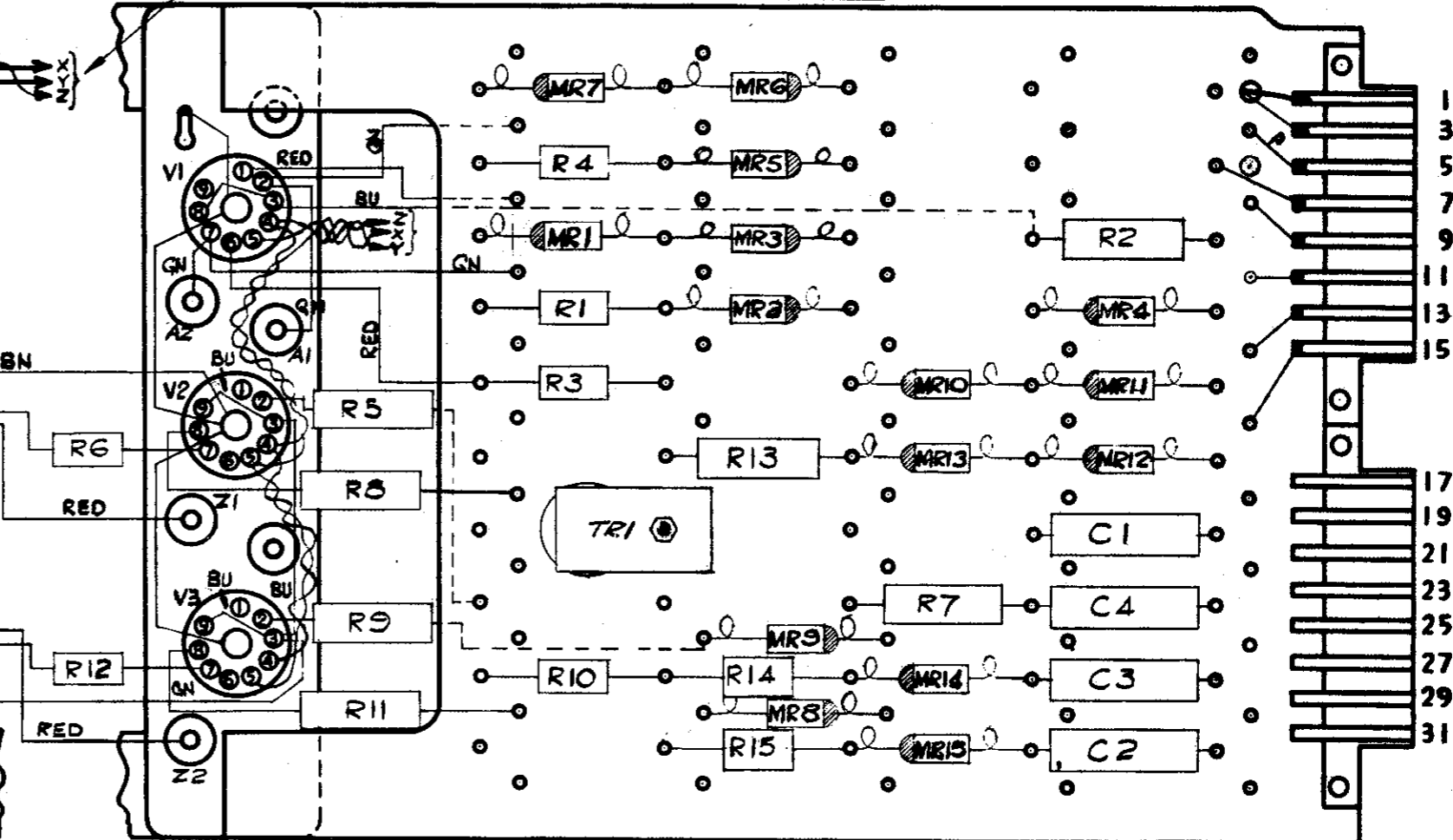
VIEW :- LEFT HAND SIDE FROM FRONT.

WIRES TWISTED TOGETHER. COLOUR WHITE.



VIEW: RIGHT HAND SIDE FROM FRONT.

HEATER WIRING BROKEN FOR CLARITY CONTINUED AT CORRESPONDING POINTS AT BASE OF V1



CONNECT HEATER WIRING THIS:-

X- PLUG PIN 1 TO V1 PIN 4. V1 PIN 4 TO V2 PIN 4

Y- PLUG PIN 2 TO V2 PIN 5. V2 PIN 5 TO V3 PIN 5

Z- PLUG PIN 3 TO V1 PIN 5. V1 PIN 5 TO V3 PIN 4

UNDERSIDE VIEW OF VALVE PLATFORM.

FIG. 4.9 WRITE DRIVE, TYPE 17 (LAYOUT)

R	R1, 21, 2, 3, 4, 5, 6, 7.	8, 9	10, 22	11	12, 13, 14, 15,	16.	17,	18, 19, 20	R
C	C1, 2.	3, 4,	5,	6, 7, 8.	9	A,	B	10, 11,	C
MR.		6, 7,	2, 3,					4, 5,	MR
MISC.	TRI,				LA	LB			Misc.
RESISTOR TYPES & TOLERANCE		CAPACITOR TYPES & TOLERANCE			V1, 2, & 3				
$8 \pm 10\%$ R 4, 19 $9 \pm 10\%$ R 1, 2, 3, 5, 6, 8, 9, 10, 12, 14, 17, 18, 20, 21, 22. $8 \pm 5\%$ R 15, 16. $108 \pm 5\%$ R 7 AW 3111 $\pm 5\%$ R 13. AW 3115 $\pm 5\%$ R 11		ERIE TYPE HIK-K $\pm 20\%$ C 4 TCC TYPE 101 SMP $\pm 2\%$ C A, B. TCC TYPE CP32N $\pm 20\%$ C 9, 12 T.C.C. TYPE CP35N $\pm 20\%$ C 1, 2. TCC TYPE CP35N $\pm 20\%$ C 5, 6, 8, 10. T.C.C. TYPE CE 30CR $\pm 50\%$ $\pm 20\%$ C 7, 11. TCC TYPE CE69D $\pm 50\%$ -20% C. 3			 CV4014		Y — HEATER — O1 X — HEATER — O2 + 300V — O7 + 200V — O5 EARTH — O16 O15 -20V — O10 C 21 O 29 OUTPUT 32V p-p.		
FIRST USED ON									

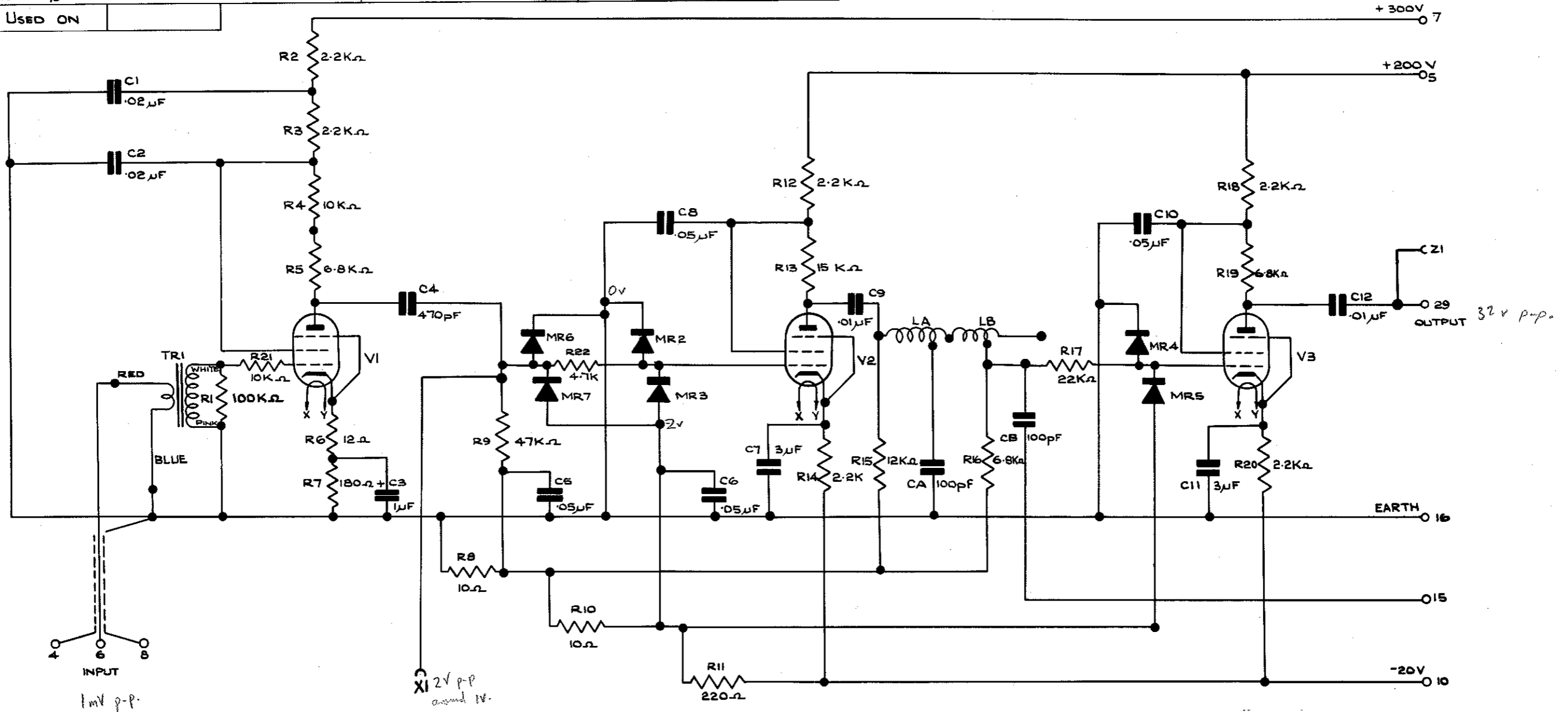


FIG. 4.10 READ AMPLIFIER, TYPE 18 (CIRCUIT)

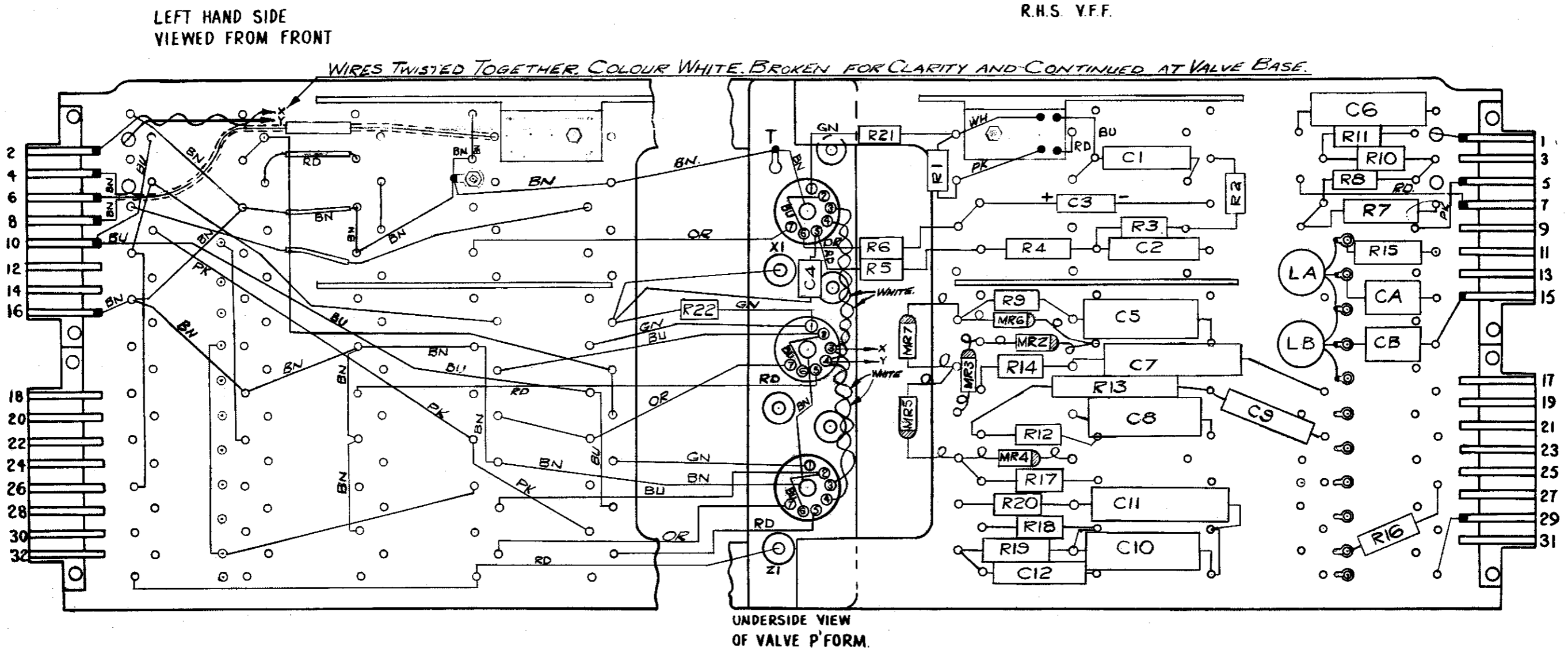


FIG. 4.II READ AMPLIFIER, TYPE 18 (LAYOUT)

R	3, 7, 11, 15, 2, 6, 10, 14, 1, 5, 9, 13	4, 8, 12, 16	19, 22, 25, 28, 18, 21, 24, 27, 17.	20, 23, 26, 29.	R		
C	1, 4, 7, 10	2, 5, 8, 11	3, 6, 9, 12.	13, 16, 19, 22	14, 17, 20, 23	15, 18, 21, 24	C
MR	1, 5, 9, 13.	2, 6, 10, 14.	3, 4, 7, 8, 11, 12, 15, 16.	17, 21, 25, 29.	18, 22, 26, 30, 19, 20, 23, 24, 27, 28, 31, 32.	MR	
RESISTOR TYPES & TOLERANCE		CAPACITOR TYPES & TOLERANCE					
9 ± 10% R2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 21, 23, 24, 26, 27, 29.		± 25% .002 MFD TCC CP111N					
10B ± 2% R1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 22, 25, 28.		± 20% .05 MFD TCC CP35N					

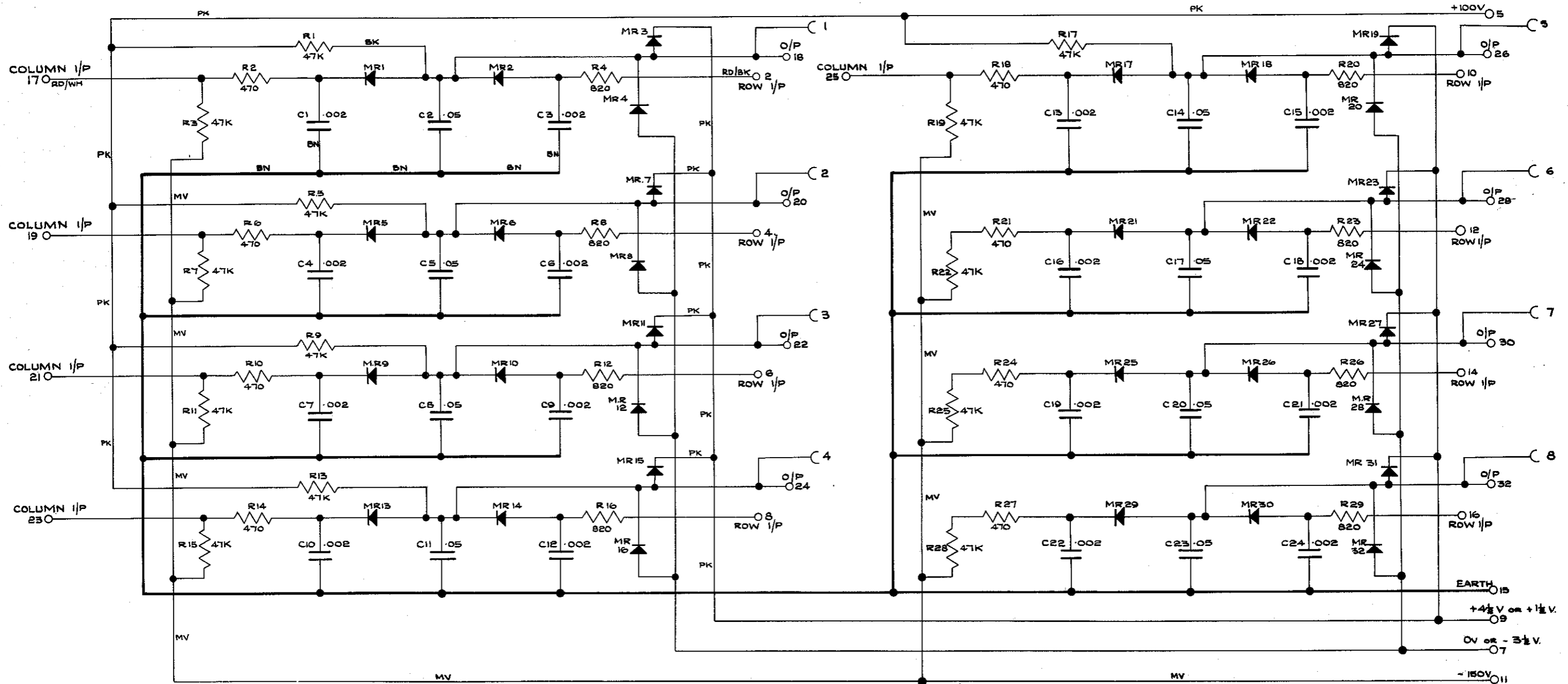


FIG. 4.12 READ - SWITCH CONTROL, TYPE 19 (CIRCUIT)

VIEW:- L.H. SIDE FROM FRONT.

VIEW:- R.H. SIDE FROM FRONT.

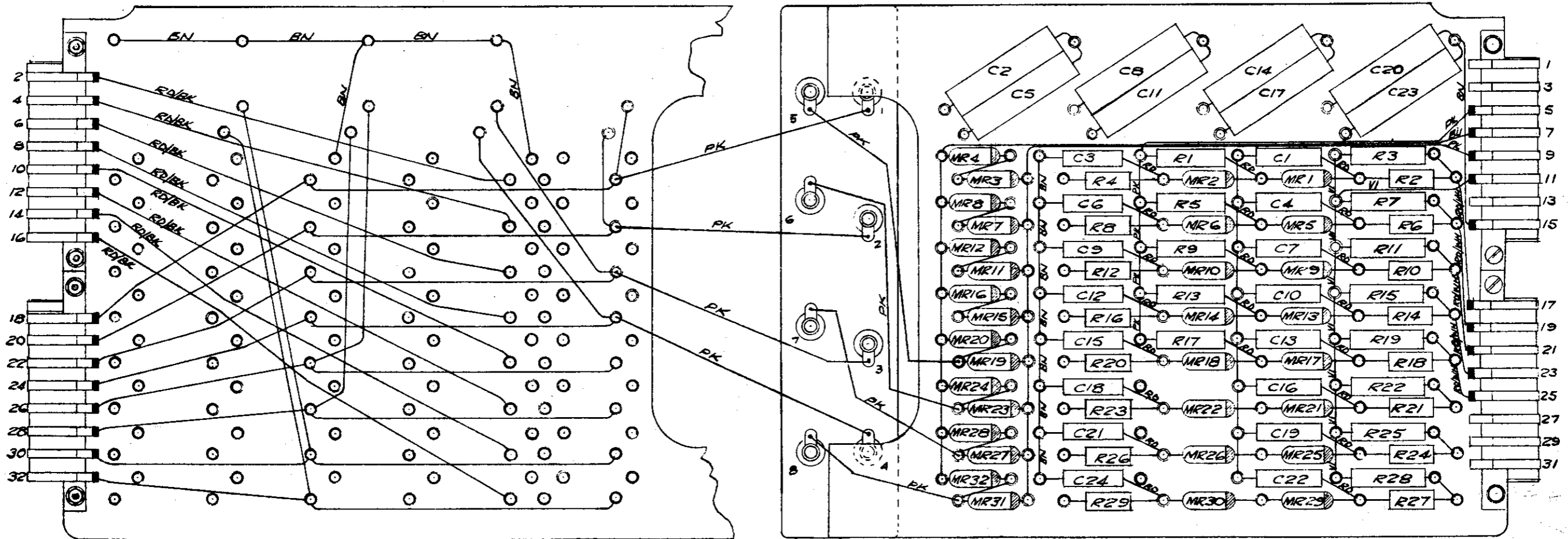


FIG. 4.13 READ - SWITCH CONTROL, TYPE 19 (LAYOUT)