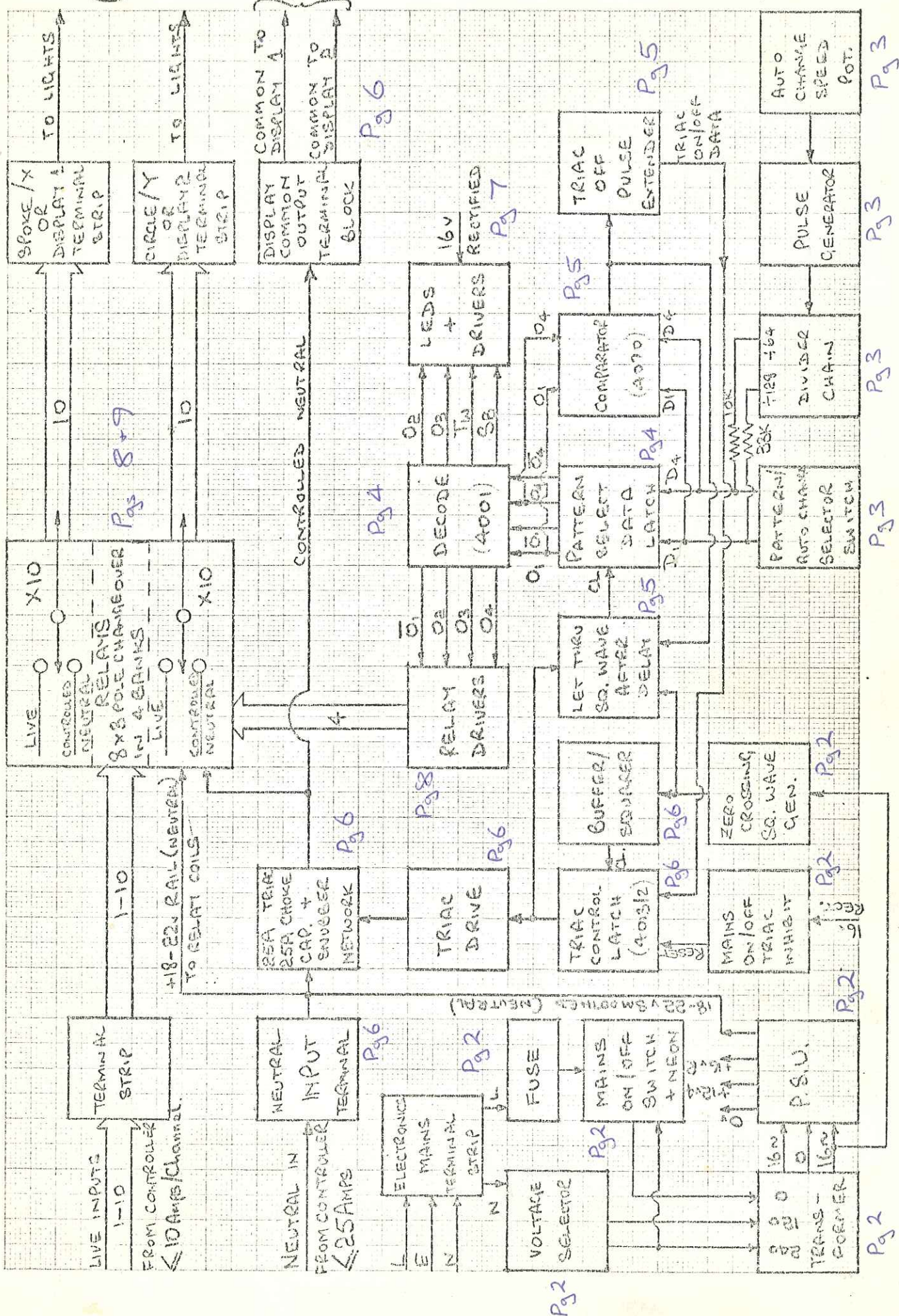


Pg 1



Pg 2

Pg 3

Pg 4

Pg 5

Pg 6

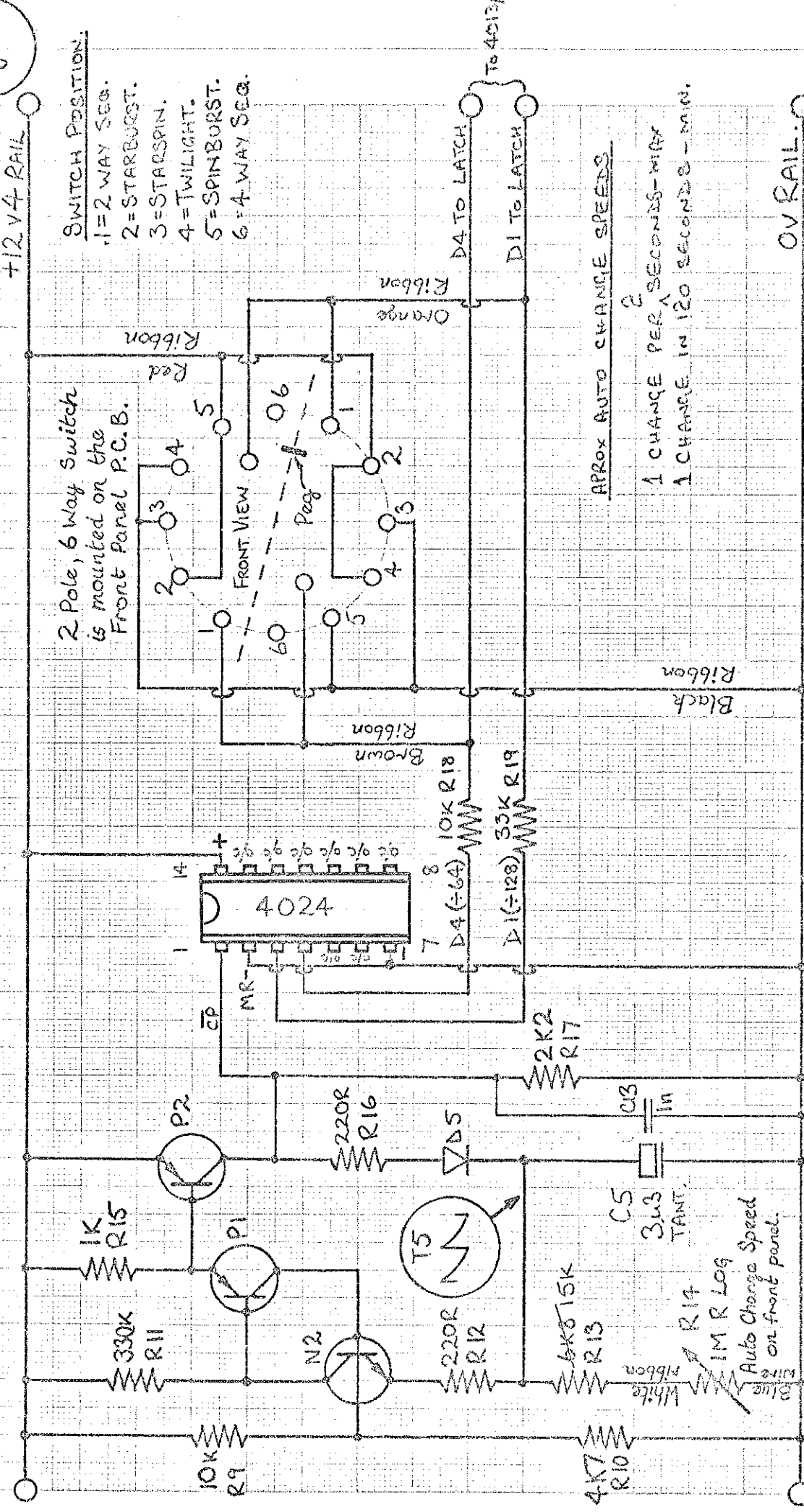
Pg 7

Pg 8

+12 V4 RAIL

2 Pole, 6 Way Switch
is mounted on the
Front Panel P.C.B.

SWITCH POSITION:
1=2 WAY SEQ.
2=STARBURST.
3=STARSPIN.
4=TWILIGHT.
5=SPINBURST.
6=4 WAY SEQ.



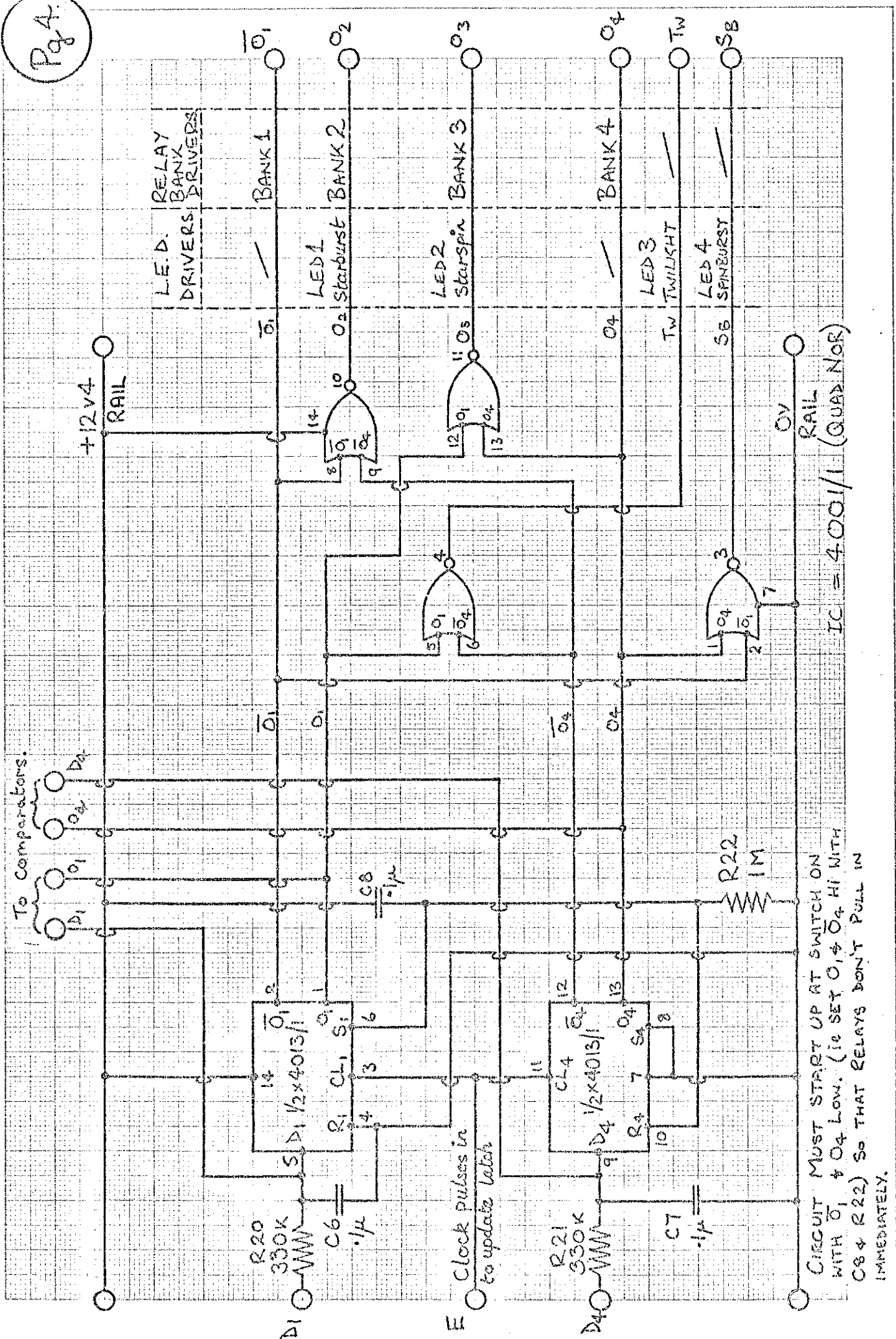
APPROX AUTO CHANGE SPEEDS

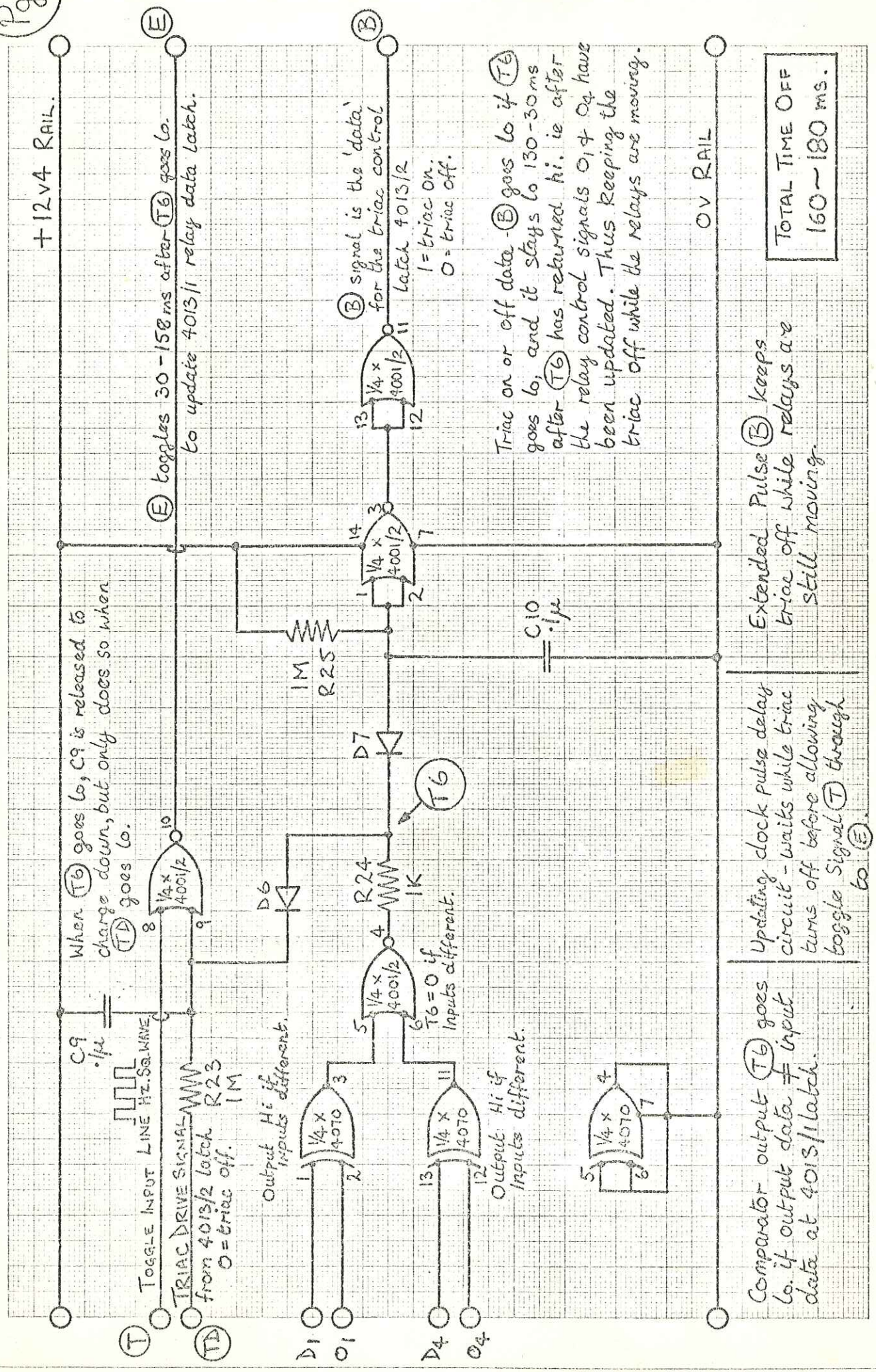
- 1 CHANGE PER 1 SECONDS - MAX
- 1 CHANGE IN 120 SECONDS - MIN.

0V RAIL

The selector switch generates a 2 bit address (in Positions 2-5) to choose one of the 4 patterns. It shorts D1 to D4 (in Position 1) to give 2x D4 from the counter, i.e. 2 way Auto change. The switch is 0/c (in Position 6) to let the counter run through a 4 way Auto sequence.

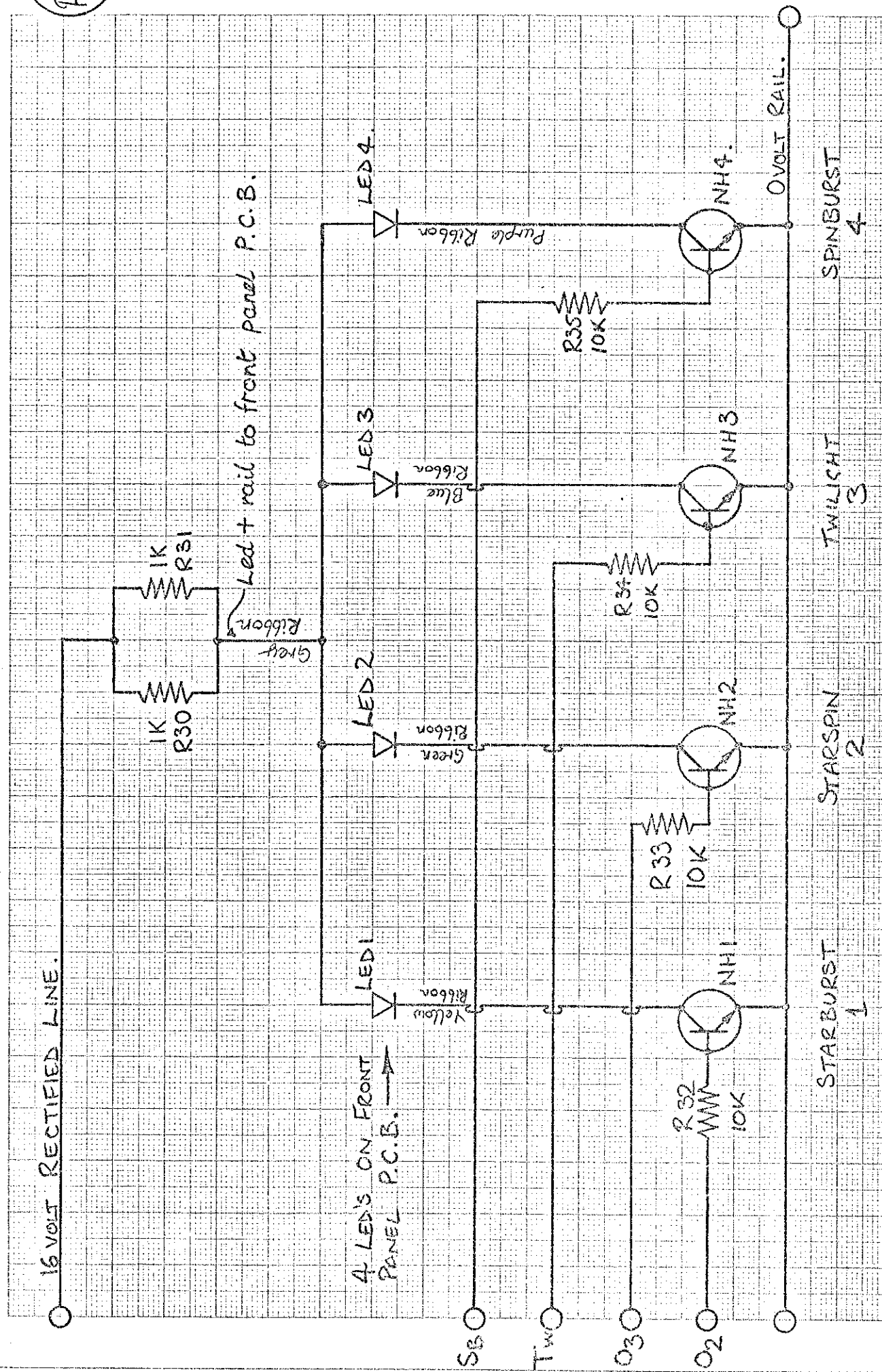
Pg 4.

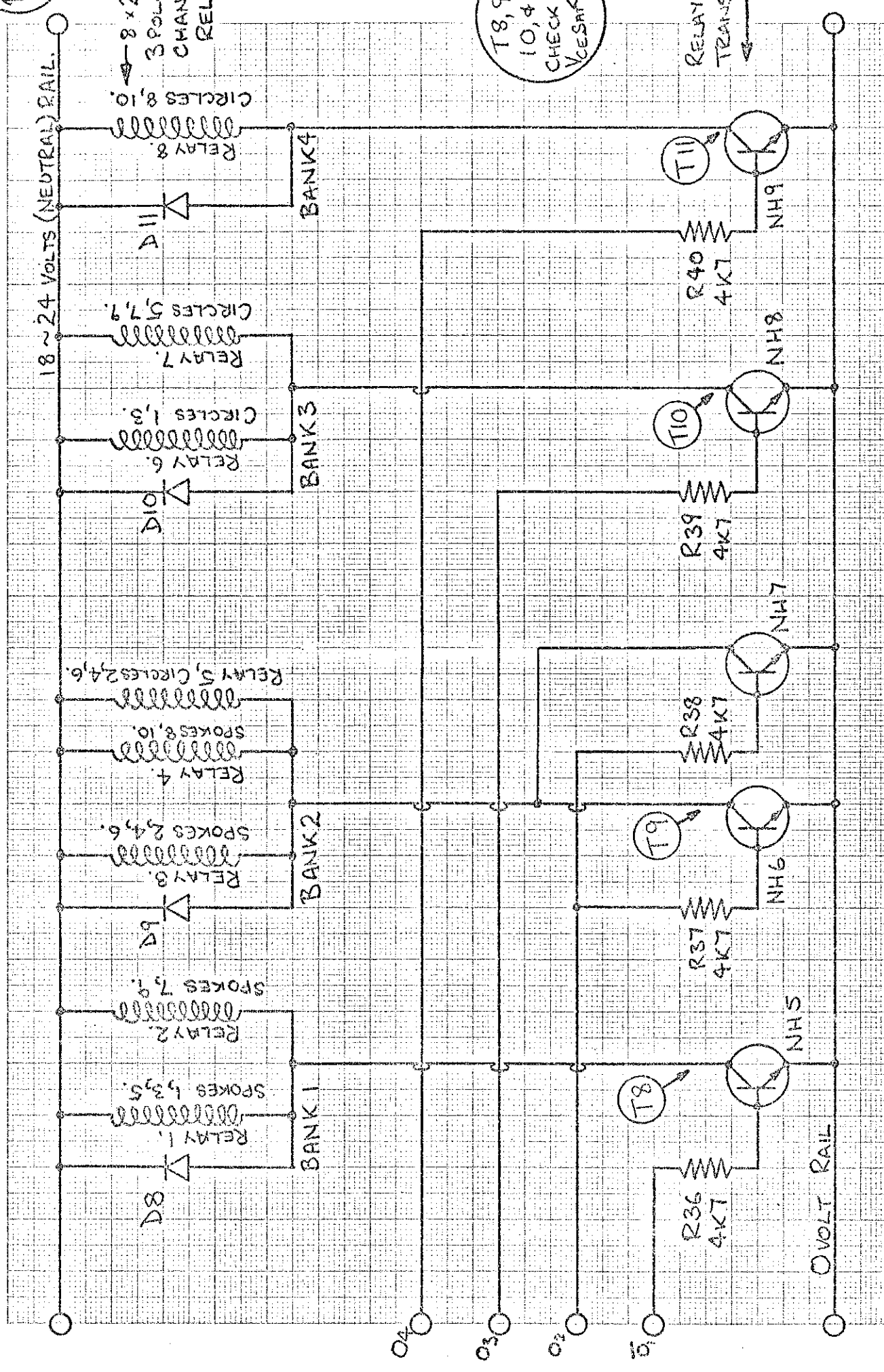




TOTAL TIME OFF
160-180 ms.







THESE ARE THE NORMALLY CLOSED (POWER OFF) CONNECTIONS.

RELAY WIPER OUTPUTS	SPOKES	RELAY NUMBER	RELAY NUMBER	4-EPIMBOEST	3-TWILIGHT	2-STARSPIN	1-STARBOOST
1	1	1	1	1	1	CH1	N
2	2	3	2	3	CH2	CH2	N
3	3	1	1	1	CH3	CH3	N
4	4	2	2	2	CH4	CH4	N
5	5	1	1	1	CH5	CH5	N
6	6	2	2	2	CH6	CH6	N
7	7	1	1	2	CH7	CH7	N
8	8	2	2	4	CH8	CH8	N
9	9	1	1	2	CH9	CH9	N
10	10	2	2	4	CH10	CH10	N
CIRCLES							
1	1	6	3	3	CH1	CH1	N
2	2	5	2	5	N	N	N
3	3	6	3	6	CH3	CH3	N
4	4	5	2	5	N	N	N
5	5	7	3	7	CH5	CH5	N
6	6	5	2	5	N	N	N
7	7	7	3	7	CH7	CH7	N
8	8	8	4	8	N	CH8	N
9	9	7	3	7	CH9	CH9	N
10	10	8	4	8	N	CH10	N

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KEY: eg. CH1 = Channel 1 line from controller
N = Controlled Neutral common line via triac

D ₁ D ₄ FUNCTION	RELAYS				0 = COIL NOT ENERGISED. 1 = COIL ENERGISED.		LED DRIVE.		1 = ON. 0 = OFF.	
	BANK 1 (2 RELAYS)	BANK 2 (3 RELAYS)	BANK 3 (2 RELAYS)	BANK 4 (1 RELAY)	TOTAL RELAYS ENERGISED.		STAR- BURST.	STAR- SPIN.	TWILIGHT.	SPIN- BURST.
1 1 STARBURST	0	1	0	1	4		1	0	0	0
0 0 STARS PIN	1	0	1	0	4		0	1	0	0
0 1 TWILIGHT	1	0	0	1	3		0	0	1	0
1 0 SPINBURST	0	0	0	0	0		0	0	0	1
DRIVE → REQUIRED	$\overline{O_1}$	O_2	O_3	O_4			O_2	O_3	TW	S_B

$O_1 = D_1$ } After data
 $O_4 = D_4$ } has been latched
 by 4013/1.

$$O_2 = \overline{O_1} + \overline{O_4}, \quad O_3 = \overline{O_1} + O_4, \quad TW = \overline{O_1} + \overline{O_4}, \quad S_B = \overline{O_1} + O_4$$

The 4001/1 QUAD NOR GATE IC is used to produce O_2, O_3, TW & S_B signals from the $O_1, \overline{O_1}, O_4$ and $\overline{O_4}$ signals available from the 4013/1 latch - See Page 4.

NO	VALUE	P _g	NOTES.
RESISTORS.			
R1	22K	2	N1 INPUT.
R2	22K	2	N1 LOAD.
R3	10K	2	PULL DOWN.
R4	100K	2	SMOOTH 16V. RECTIFIED RAIL.
R5	22K	2	C2 CHARGE DOWN.
R6	220R	2	C2 CHARGE UP.
R7	100K	2	C2 DISCHARGE.
R8	330R. 2W.	2	RAIL DROPPER.
R9	22K.	3	VREF DIVIDER.
R10	10K	3	
R11	470K	3	TURN OFF.
R12	220R	3	I LIMIT.
R13	6K8	3	MAX. SPEED.
R14	1M R LOG	3	AUTO CHANGE SPEED CONTROL
R15	6K8	3	P2 TURN OFF etc.
R16	220R	3	I LIMIT.
R17	10K	3	CP PULL DOWN.
R18	10K	3	D4 ROUT.
R19	33K	3	D1 ROUT.
R20	330K	4	INPUT DATA
R21	330K	4	
R22	1M	4	SMOOTHING.
R23	1M	4	C8 CHARGE DOWN.
R24	1K	5	C9 CHARGE DOWN.
R25	1M	5	I LIMIT.
R26	4K7	5	C10 CHARGE UP.
R27	1K	6	NH10 DRIVE.
R28	330R. 2W.	6	LEAKAGE BY-PASS.
R29	47R	6	TRIAC DRIVE.
R30	1K	7	SNUBBER RES.
			LED CURRENT SET.

NO	VALUE	P _g	NOTES.
R31	1K	7	LED CURRENT SET.
R32	10K	7	NH1-4 DRIVE.
R33	4K7	8	NH5-9 DRIVE.
CAPACITORS.			
C1	.1μ	2	SMOOTH 16V RECTIFIED.
C2	10μ	2	RESET TIMING.
C3	2200μ 25V	2	SMOOTHING.
C4	10μ	2	RAIL CAPACITOR.
C5	3μ3 tant.	3	TIMING.
C6	.1μ	4	INPUT DATA
C7	.1μ	4	
C8	.1μ	4	RESET AT SWITCH ON.
C9	.1μ	5	SEQUENCE
C10	.1μ	5	
C11	.047μ 250Vdc	6	SNUBBER CAP.
C12	22μ 250Vdc	6	SUPPRESSION.

SEMI-CONDUCTORS.			
Z142	6V2 ZENERS	2	12V4 RAIL.
D1	IN4005	2	RECTIFIERS.
D2	IN4005	2	
D3	IN4005	2	NON RETURN
D4	IN4148	2	C2 CHARGE UP.
D5	IN4148	3	P2 COLLECTOR ISOLATE
D6	IN4148	5	C9 PULL UP.
D7	IN4148	5	C10 PULL DOWN.
D8	IN4148	8	CLAMP INDUCTIVE LOAD
N1	NPN BC184.	2	E.V.C. DETECTOR.
N2	BC184.	3	CAP. RESET.
P1	PNP BC214	3	CAP. RESET.
P2	BC214	3	RESET TURN OFF

NO	VALUE	P _g	NOTES.
NH-1-4	NPN BC184	7	LED DRIVERS.
NH-5-9	"	8	RELAY DRIVERS.
NH10	"	6	TRIAC DRIVER.
	1/4 x 4070	2	INVERTER.
	4024	3	÷ 64 AND ÷ 128.
	4013/1	4	2 DATA LATCHES.
	4001/1	4	QUAD NOR FOR DECODING.
	1/4 x 4070	5	EXCLUSIVE OR USED AS COMPARATOR.
	1/4 x 4070	5	NOT USED.
	1/4 x 4001/2	5	ADD COMPARATOR SIGNAL.
	1/4 x 4001/2	5	TOGGLE SIGNAL.
	1/4 x 4001/2	5	DELAY GATE.
	1/4 x 4001/2	5	'OFF PULSE' EXTENDER.
	1/4 x 4001/2	5	MONOSTABLE.
	1/4 x 4001/2	5	INVERTER.
	1/2 x 4013/2	6	TOGGLE SIGNAL.
	1/2 x 4013/2	6	BUFFER/SQUAVER.
	1/2 x 4013/2	6	TRIAC CONTROL LATCH