bcc	title	prefix/class-number.revision
	ROM TESTER Description and Operation	ROMT/M-9

checked	authors	approval date	revision date
C. Thacker	Larry Sweeney	9-10-69	
checked		classification: Manual	
approved: Jerre D. Noe	L. Sweeney	distribution: Company private	paaes: 15

ABSTRACT and CONTENTS

The ROM Card Tester is described functionally and construction is detailed.

Purpose:

The ROM tester has two primary functions, verification of matrix diode loading and observation of propagation delays. Figure I illustrates the ROM circuitry.

Controls:

(1) Power - Primary power is fused on both sides of the line and controlled by a toggle switch. Each low voltage power supply has an associated monitor lamp included in a momentary action push button reset switch.

(2) Logic - The operating modes of the tester are selected via three slide switch and two banks of eight pushbuttons each.

The slide switch labelled 'CS' simulates the card select line to the ROM card.

The slide switch labelled 'AUTO-MAN' selects either cyclic or manual addressing of the 64 words of the ROM. The clock input for cycling is nominally 100 nsec. long pulses at a repetition rate of 5 MHz. A word is addressed for 100 nsec then there is a pause of 100 nsec before the next word is addressed.

ROM SELECTOR TREE

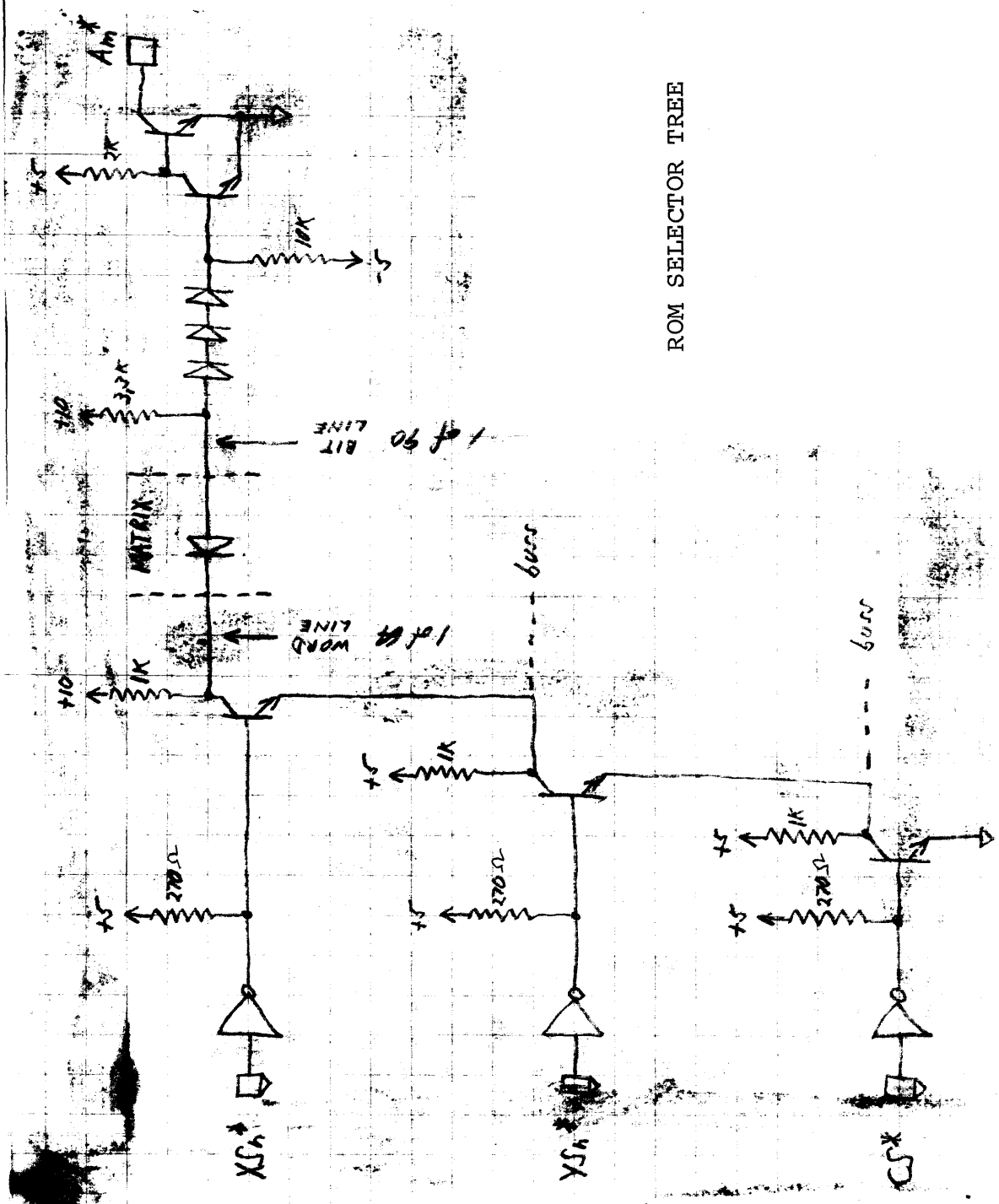


Figure 1

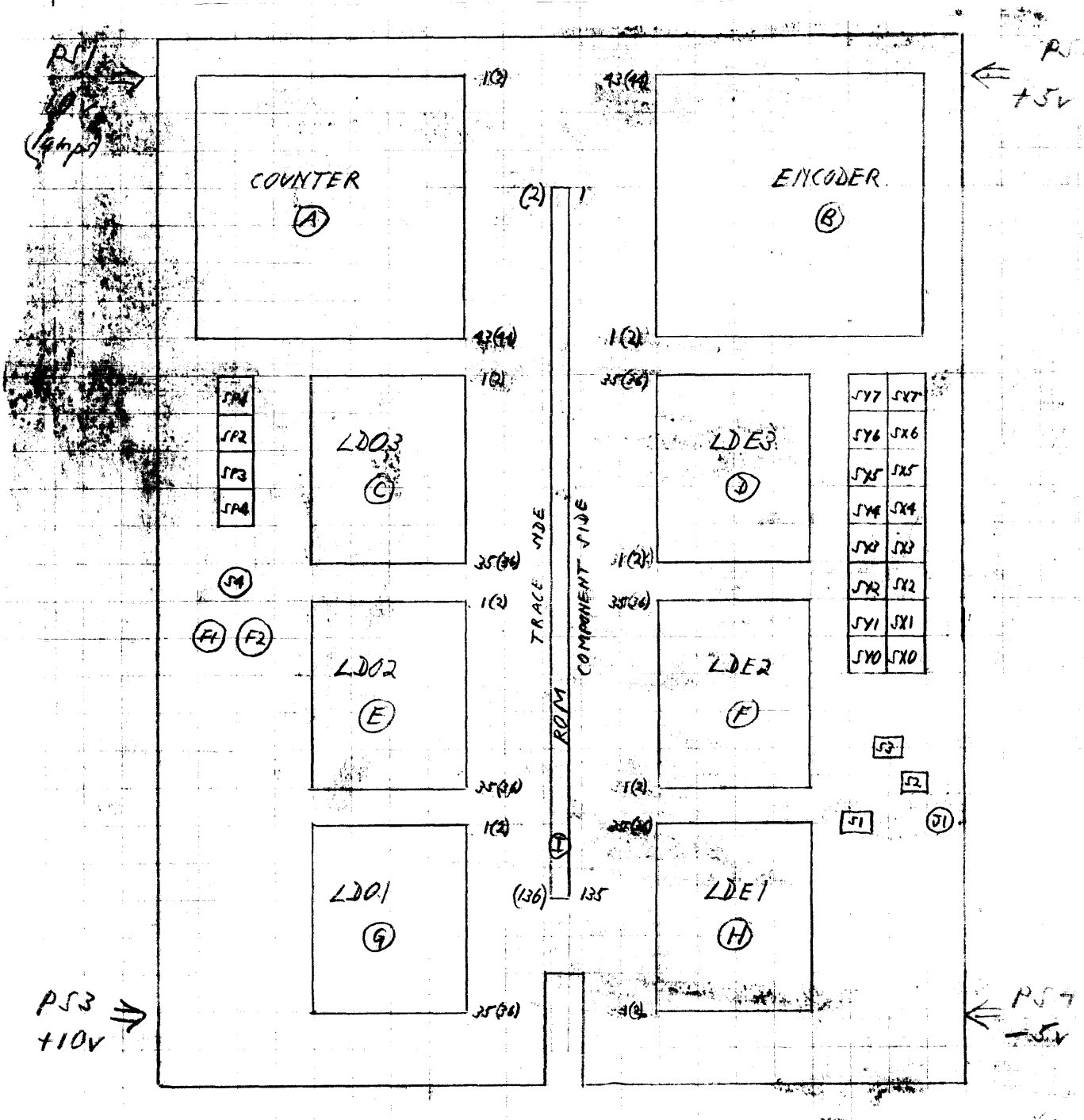
When manual addressing is selected, the XS and YS push-button switches are enabled. The selected word may be addressed statically or strobed by the clock as determined by the slide switch labelled 'STATIC-STROBE'. This switch has no effect when the tester is operating in the cyclic mode.

Layout:

The six cards identified as LD -- on Figure 2 are lamp drivers having fifteen circuits per card. Cards for even bits are on the component side of the ROM card, those for odd bits on the trace side. Bits are in sequence on odd pins 1 through 29 on each card. Each card has fifteen test points at the ROM interface, plus test points for Vcc and Ground. Grounding any bit test point is a true signal for that bit and will light the associated readout lamp. Lamp driver circuitry is shown in Figure 3.

Schematics for the Counter and the Encoder cards are as in Figures 4 and 5.

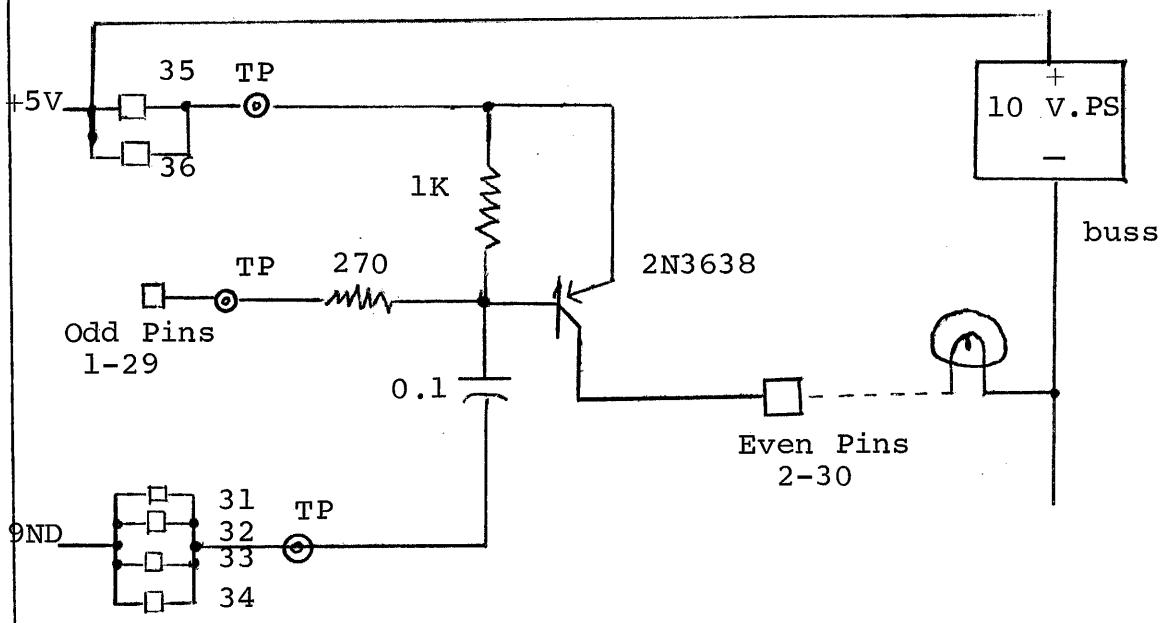
Readout lamps are spaced at intervals of one-tenth inch with a double space between each group of five bulbs. This format is that of the line printer tally of matrix loading so that the lamps in the readout bar may be used to transilluminate the



ROM TESTER Top View

Card and Component Locator

Figure 2



LAMP DRIVER

Figure 3

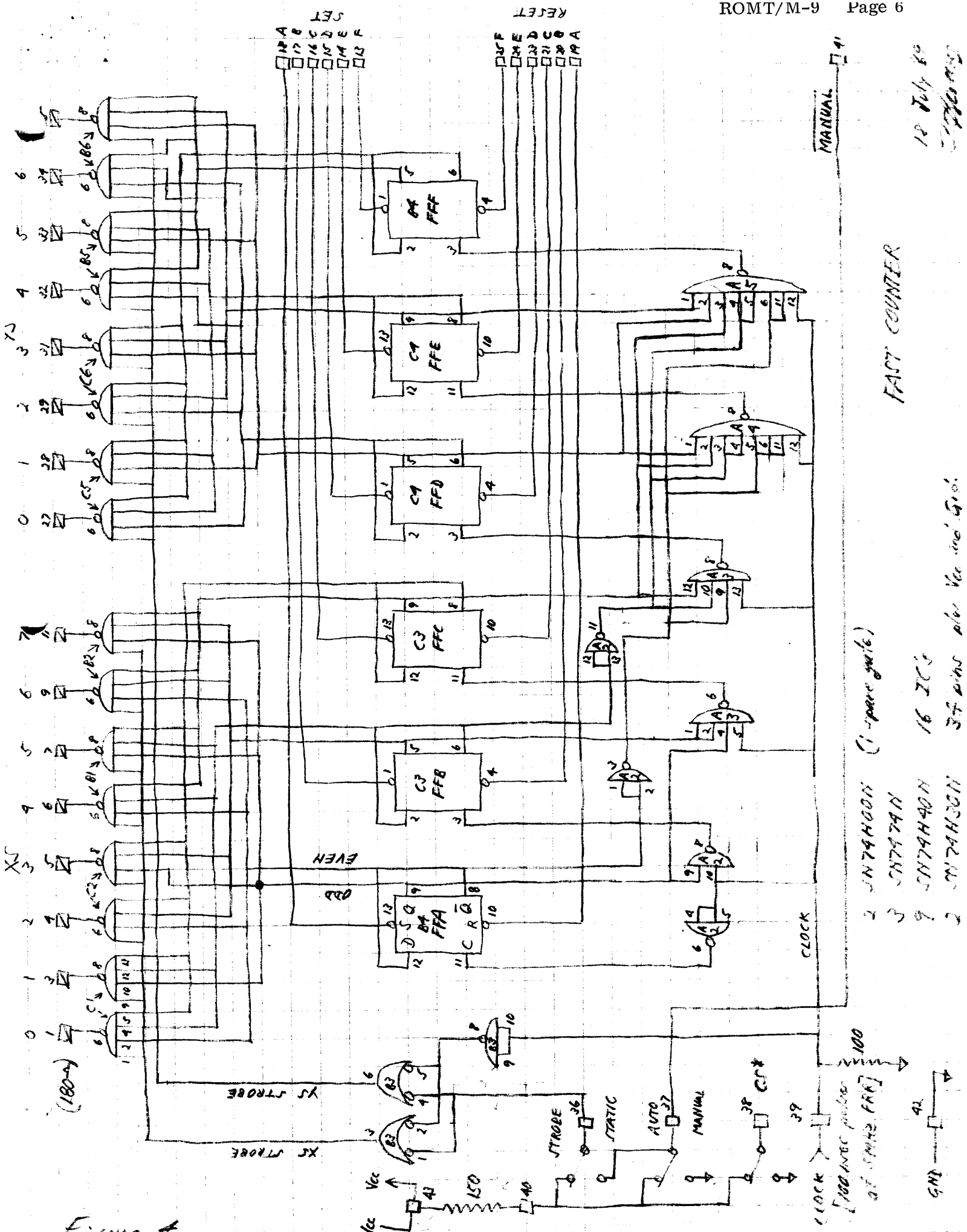
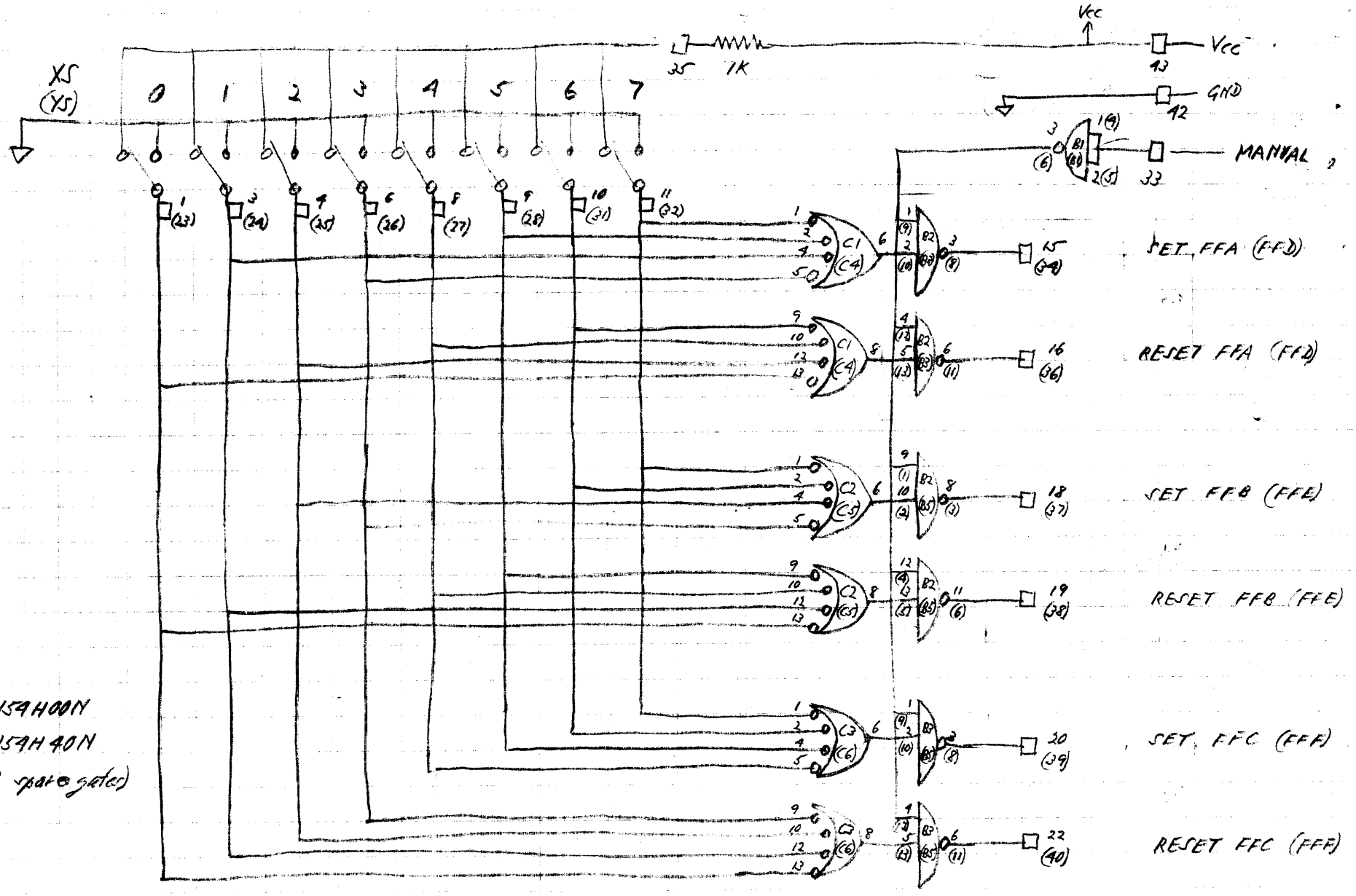

SET
RESET
MANUAL
C4 FFE
C4 FFD
C3 FFC
C3 FFB
FFA
EVEN
CLOCK
YS STROBE
XS STROBE
STROBE
STATIC
AUTO
MANUAL
Vcc
GND
100

Figure 4



ENCODER

18 July 1969

Printout. Bit Ø is at the left end of the readout bar.

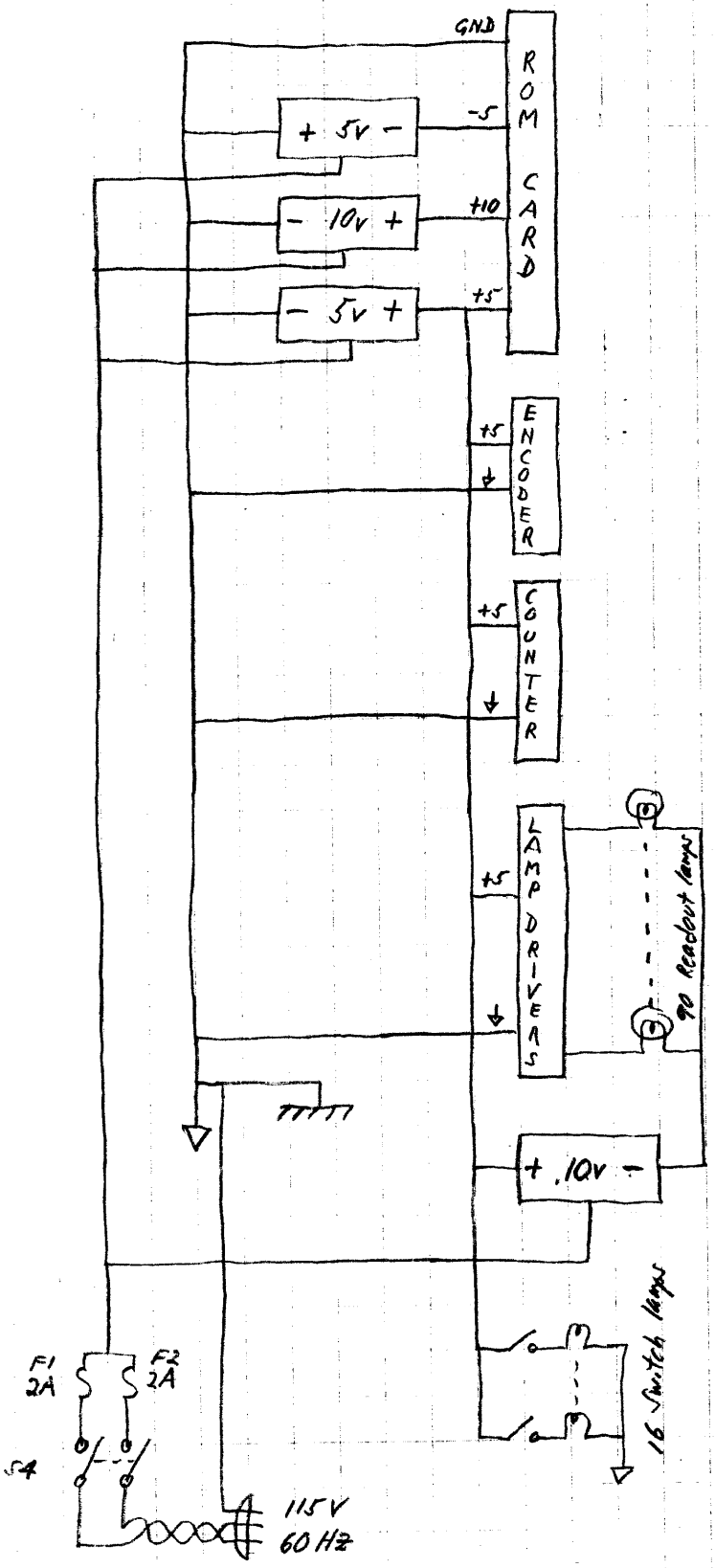
Wiring:

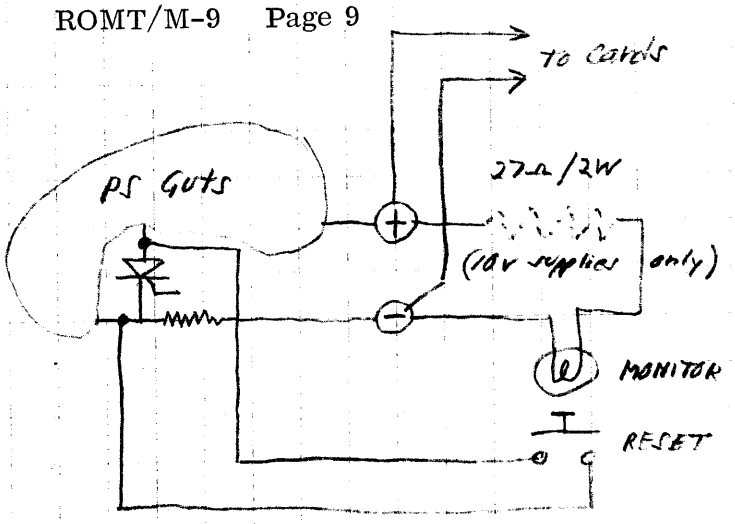
Interconnection of the Power Supplies is shown schematically in Figure 6. All supplies are Wanlass type 30-OEM except the readout lamp supply which is type 60-OEM.

Readout lamps are mounted on a vector board within the lamp bar, odd on one side, even on the other. Each group of fifteen lamps is connected by a 16 conductor ribbon cable directly to the associated lamp driver card. Light is ducted from each lamp to the display panel by a length of lucite rod. Cross-coupling is eliminated by a sleeve of aluminum foil around each bulb.

Intercard wire lists are given in Tables 1, 2 and 3. All leads are as short as possible to minimize coupling and stray capacity.

Wiring of the logic controls is given in Table 4. NC terminals on slide switches are defined as being nearest the edge of the base plate.





Typical of four supplies

Intercard Wiring

-5v : I125 thru 128

+10v : I129 thru 136

+5v : I19 thru 24, A43, B43, C35-36, D35-36, E35-36, F35-36, G35-36, H35-36

GND : I25 thru 34, B42, C42, D31 thru 34, E31 thru 34, F31 thru 34, G31 thru 34, H31 thru 34, 16 address selector lamps.

ROM TESTER

POWER SUPPLIES

Figure 6

TABLE 1 ROM CARD HEADER WIRING

FROM	TO	FUNCTION	FROM	TO	FUNCTION
I 1	A11	XS7*	I 35	C29	A89
2	A38	CS*	36	D27	86
3	A9	XS6*	37	D29	88
4	A35	YS7*	38	C27	87
5	A7	XS5*	39	C25	85
6	A34	YS6*	40	D23	82
7	A6	XS4*	41	D25	84
8	A33	YS5*	42	C23	83
9	A5	XS3*	43	C21	81
10	A32	YS4*	44	D19	78
11	A4	XS2*	45	D21	80
12	A31	YS3*	46	C19	79
13	A3	XS1*	47	C17	77
14	A29	YS2*	48	D15	74
15	A1	XS0*	49	D17	76
16	A28	YS1*	50	C15	75
17			51	C13	73
18	A27	YS0*	52	D11	70
19		+5	53	D13	72
20		+5	54	C11	71
21		+5	55	C9	69
22		+5	56	D7	66
23		+5	57	D9	68
24		+5	58	C7	67

TABLE 1 (CON'D)

FROM	TO	FUNCTION	FROM	TO	FUNCTION
25		↓	59	C5	65
26		↓	60	D3	62
27		↓	61	D5	64
28		↓	62	C3	63
29		↓	63	C1	61
30		↓	64	F29	58
31		↓	65	D1	60
32		↓	66	E29	59
33		↓	67	E27	57
34		↓	68	F25	A54
69	F27	A56	103	G21	A21
70	E25	55	104	H19	18
71	E23	53	105	H21	20
72	F21	50	106	G19	19
73	F23	52	107	G17	17
74	E21	51	108	H15	14
75	E19	49	109	H17	16
76	F17	46	110	G15	15
77	F19	48	111	G13	13
78	E17	47	112	H11	10
79	E15	45	113	H13	12
80	F13	42	114	G11	11
81	F15	44	115	G9	9
82	E13	43	116	H7	6
83	E11	41	117	H9	8

TABLE 1 (CON'D)

FROM	TO	FUNCTION
84	F9	38
85	F11	40
86	E9	39
87	E7	37
88	F5	34
89	F7	36
90	E5	35
91	E3	33
92	F1	30
93	F3	32
94	E1	31
95	G29	29
96	H27	26
97	H29	28
98	G27	27
99	G25	25
100	H23	22
101	H25	24
102	G23	A23

FROM	TO	FUNCTION
118	G7	7
119	G5	5
120	H3	2
121	H5	4
122	G3	3
123	H1	0
124	G1	A1
125		-5
126		-5
127		-5
128		-5
129		+10
130		+10
131		+10
132		+10
133		+10
134		+10
135		+10
136		+10

TABLE 2 COUNTER CARD HEADER WIRING

FROM	TO	FUNCTION	FROM	TO	FUNCTION
A1	I15	XS0*	A23	B36	RESET D*
2			24	B38	RESET E*
3	I13	XS1*	25	B40	RESET F*
4	I11	XS2*	26		
5	I9	XS3*	27	I18	YS0*
6	I7	XS4*	28	I16	YS1*
7	I5	XS5*	29	I14	YS2*
8			30		
9	I3	XS6*	31	I12	YS3*
10			32	I10	YS4*
11	I1	XS7*	33	I8	YS5*
12			34	I6	YS6*
13	B39	SET F*	35	I4	YS7*
14	B37	SET E*	36	S3A	STATIC-STROBE
15	B34	SET D*	37	S2A	AUTO-MANUAL
16	B20	SET C*	38	SIA, I2	CS* TIE POINT
17	B18	SET B*	39	JI	CLOCK
18	B15	SET A*	40	SINC, S2ND, S3NC	PULL-UP
19	B16	RESET A*	41	B33	MANUAL*
20	B19	RESET B*	42	SINO, S2NO	↓
21	B22	RESET C*	43		+5
22			44		

TABLE 3 ENCODER CARD HEADER WIRING

FROM	TO	FUNCTION	FROM	TO	FUNCTION
B1	SXOA	SXO*	B23	SYOA	SYO*
2			24	SY1A	SY1*
3	SXIA	SX1*	25	SY2A	SY2*
4	SC2A	SX2*	26	SY3A	SY3*
5			27	SY4A	SY4*
6	SX3A	SX3*	28	SY5A	SY5*
7			29		
8	SX4A	SX4*	30		
9	SX5A	SX5*	31	SY6A	SY6*
10	SX6A	SX7*	32	SY7A	SY7*
11	SX7A	SX7*	33	A41	MANUAL*
12			34	A15	SET D*
13			35	ALL SXNC, SYNC	PULL-UP
14			36	A23	RESET D*
15	A18	SET A*	37	A14	SET E*
16	A19	RESET A*	38	A24	RESET E*
17			39	A13	SET F*
18	A17	SET B*	40	A25	RESET F*
19	A20	RESET B*	41		
20	A16	SET C*	42	ALL SXNO, SYNO	↓
21			43		+5
22	A21	RESET C*	44		

TABLE 4 LOGIC CONTROL SWITCHES WIRING