

CHAPTER 8  
SUPPORT INFORMATION

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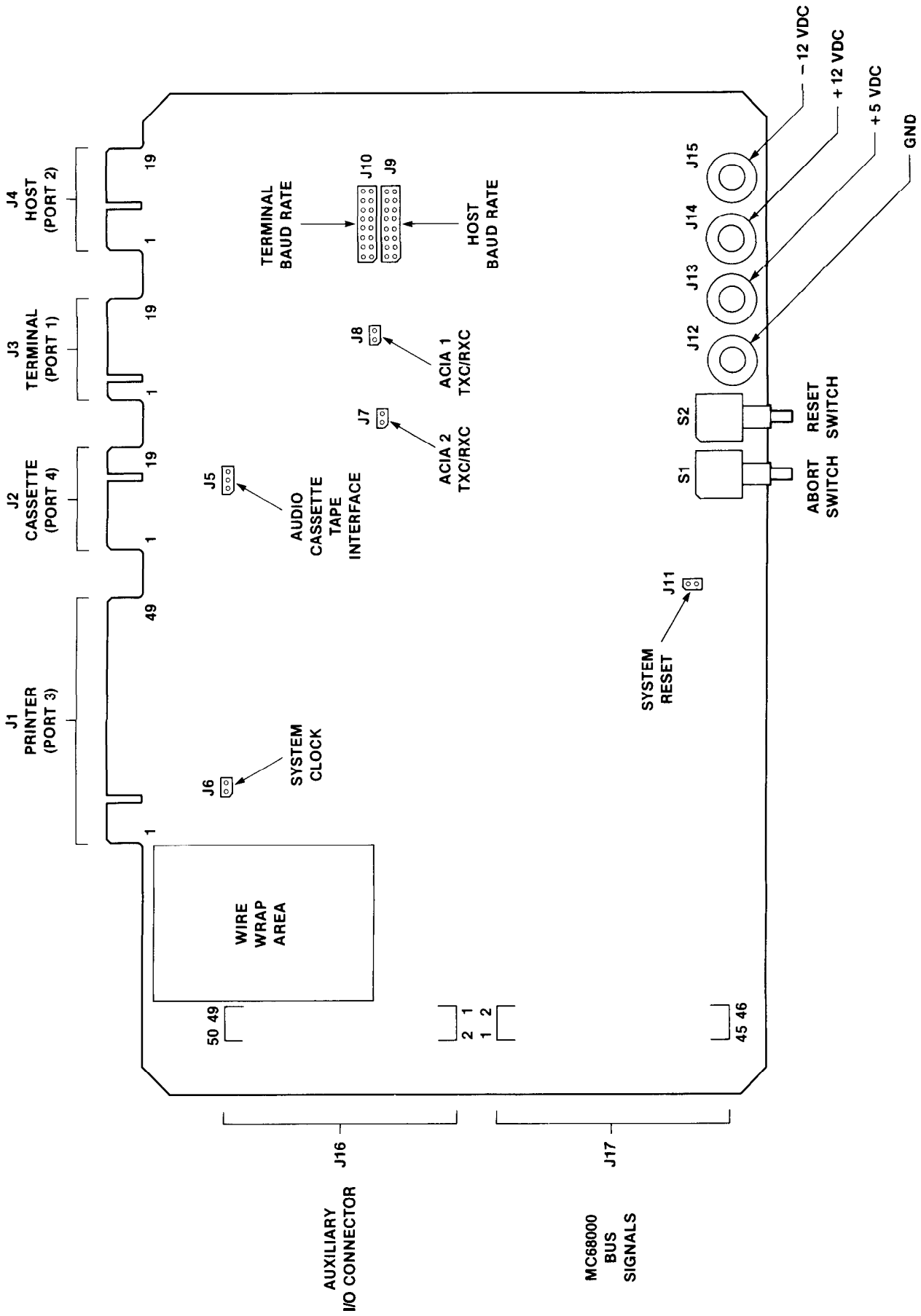


FIGURE 8-1. MEX68KECB Header, Connector, and Switch Locations

## CHAPTER 8

### SUPPORT INFORMATION

#### 8.1 INTRODUCTION

This chapter provides the interconnection signals, parts list, and schematic diagrams for the MC68000 Educational Computer Board.

#### 8.2 CONNECTOR SIGNAL DESCRIPTIONS

Tables 8-1 through 8-4 give pin numbers, signal mnemonics, and signal names and descriptions for connectors J1 through J4.

#### 8.3 JUMPER HEADER, CONNECTOR, AND SWITCH LOCATIONS

Figure 8-1 shows the MEX68KECB jumper header, connector, and switch locations. Table 8-5 lists the connection "J" numbers and gives the appropriate manual paragraph where each is described. The only jumper not discussed elsewhere in the manual is SYSTEM RESET header J11. If pins 1 and 2 of the header are jumpered together, a total system reset occurs (HALT\*, POR\*, and RESET\* are activated). This is normally used only for test purposes.

#### 8.4 PARTS LIST

Table 8-6 lists the components of the MEX68KECB. Figure 8-2 illustrates part locations. The parts list reflects the latest issue of hardware at the time of printing.

#### 8.5 DIAGRAMS

Figure 8-3 shows the schematic diagram for the MEX68KECB MC68000 Educational Computer Board.

TABLE 8-1. Connector J1 Printer Port 3 Pin Assignments

PIN NUMBER	SIGNAL MNEMONIC	SIGNAL NAME AND DESCRIPTION
9	PB7	Port B, bit 7 - Unbuffered data line for PI/T Port B
11	PB6	Port B, bit 6 - Unbuffered data line for PI/T Port B
13	PB5	Port B, bit 5 - Unbuffered data line for PI/T Port B
15	PB4	Port B, bit 4 - Unbuffered data line for PI/T Port B
17	PB3	Port B, bit 3 - Unbuffered data line for PI/T Port B
19	BUSY (PB2)	BUSY - Signal from printer when high indicates that printer is busy (connected to PB2).
21	PAPER OUT (PB1)	PAPER OUT - Signal from printer when high indicates that printer is out of paper (connected to PB1).
23	SELECT (PB0)	SELECT - Signal from printer when low indicates printer is deselected (connected to PB0).
1	INPUT PRIME*	INPUT PRIME - Buffered output to printer when low causes printer input buffer to be cleared and printer logic to be initialized.
5	FAULT*	FAULT - Signal from printer when low indicates fault condition.
43	DATA STROBE*	DATA STROBE - Buffered output to printer when low indicates valid data on PD0-PD7.
47	ACKNOWLEDGE*	ACKNOWLEDGE - Signal from printer when low indicates printer has accepted data on PD0-PD7.
25	PD7	Printer data, bit 7 - Buffered data output to printer (connected to PI/T Port A)
27	PD6	Printer data, bit 6 - Buffered data output to printer (connected to PI/T Port A)
29	PD5	Printer data, bit 5 - Buffered data output to printer (connected to PI/T Port A)
31	PD4	Printer data, bit 4 - Buffered data output to printer (connected to PI/T Port A)
33	PD3	Printer data, bit 3 - Buffered data output to printer (connected to PI/T Port A)

TABLE 8-1. Connector J1 Printer Port 3 Pin Assignments (cont'd)

PIN NUMBER	SIGNAL MNEMONIC	SIGNAL NAME AND DESCRIPTION
35	PD2	Printer data, bit 2 - Buffered data output to printer (connected to PI/T Port A)
37	PD1	Printer data, bit 1 - Buffered data output to printer (connected to PI/T Port A)
39	PD0	Printer data, bit 0 - Buffered data output to printer (connected to PI/T Port A)
All even pins plus 3,7,41, 45,49	GND	GROUND

TABLE 8-2. Connector J2 Audio Cassette Tape Interface Port 4 Pin Assignments

PIN NUMBER	SIGNAL MNEMONIC	SIGNAL NAME AND DESCRIPTION
1	DATA IN	DATA IN - Data input to tape interface logic. Connected to tape recorder output for data playback.
3	DATA OUT	DATA OUT - Data output from tape interface logic. Connected to tape recorder microphone or auxiliary input to record data.
5	TIN	TIMER IN - Input to PI/T timer that can be used as external clock source or clock enable.
7	PC4	PI/T Port C, bit 4
9,11, 13,15, 17,19	NC	Not connected
2,4,6, 8,10,12, 14,16, 18,20	GND	GROUND

TABLE 8-3. Connector J3 Serial Communications Port 1  
(To Terminal) Pin Assignments

PIN NUMBER	SIGNAL MNEMONIC	SIGNAL NAME AND DESCRIPTION
3	TX DATA	TRANSMITTED DATA - Serial data signal from terminal to educational board.
5	RX DATA	RECEIVED DATA - Serial data signal to terminal from educational board.
9	CTS	CLEAR TO SEND - Control signal to terminal. Activated by DTR on educational computer.
11	DSR	DATA SET READY - Control signal to terminal. Activated by DTR on educational computer.
14	DTR	DATA TERMINAL READY - Control signal from terminal indicating terminal is on-line.
15	DCD	SIGNAL DETECT - Control signal to terminal. Activated by DTR on educational computer.
13	GND	Signal ground.
1,2,4,6,7,8, 10,12,16,17, 18,19,20	NC	Not connected.

TABLE 8-4. Connector J4 Serial Communications Port 2  
(To Host/Modem) Pin Assignments

PIN NUMBER	SIGNAL MNEMONIC	SIGNAL NAME AND DESCRIPTION
3	TX DATA	TRANSMITTED DATA - Serial data signal to host/modem from educational board.
5	RX DATA	RECEIVED DATA - Serial data signal from host/modem to educational board.
7	RTS	REQUEST TO SEND - Control signal to host/modem. Always high level.
9	CTS	CLEAR TO SEND - Control signal from host/modem. Indicates host/modem can accept transmitted data.
14	DTR	DATA TERMINAL READY - Control signal to host/modem. Indicates educational board is on-line and ready.
13	GND	Signal ground.
1,2,4,6,8, 10,11,12, 15,16,17, 18,19,20	NC	Not connected.

TABLE 8-5. MEX68KECB Connector and Header Manual References

DESIGNATION	NAME	REFERENCE PARAGRAPH
J1	Printer connector - Port 3	2.5.1
J2	Cassette tape connector - Port 4	2.5.3
J3	Terminal connector - Port 1	2.3.1
J4	Host connector - Port 2	2.5.2.2
J5	Audio cassette tape interface	6.4.3
J6	System clock	2.2.3
J7	ACIA2 TXC/RXC	2.5.2.1
J8	ACIA1 TXC/RXC	2.2.4.2
J9	Host baud rate	2.5.2.1
J10	Terminal baud rate	2.2.4.1
J11	System reset	8.3
J12	Ground	2.2.2.2
J13	+5 Vdc	
J14	+12 Vdc	
J15	-12 Vdc	
J16	Auxiliary I/O connector	7.3.2
J17	MC68000 bus signals	7.3.3

TABLE 8-6. MEX68KECB Parts List

REFERENCE DESIGNATION	MOTOROLA PART NUMBER	DESCRIPTION
	84-W8111B01	Printed wiring board, MEX68KECB
C1-C20, C22-C24,C26	21SW992C025	Capacitor, ceramic, .100 uF @ 50 Vdc
C21	21SW992C014	Capacitor, ceramic, .010 uF @ 50 Vdc
C25	21NW9604A60	Capacitor, ceramic, 1000 pF @ 50 Vdc
C27	21NW9604A11	Capacitor, ceramic, .47 uF @ 50 Vdc
C28-C58	21NW9702A09	Capacitor, ceramic, .1 uF @ 50 Vdc
C59	23NW9704A23	Capacitor, tantalum, .33 uF @ 35 Vdc
C60,C62	23NW9618A33	Capacitor, electrolytic, 22 uF @ 25 Vdc
C61	23NW9618A09	Capacitor, electrolytic, 100 uF @ 16 Vdc
CR1,CR2	48NW9616A03	Diode, silicon, 1N4148/1N914
CR3	48NW9612A24	Diode, light emitting, red
J5	28NW9802D86	Header, single row, 3-pin
J6-J8,J11	28NW9802D01	Header, double row, 2-pin
J9,J10	28NW9802B34	Header, double row, 16-pin
R1,R17	06SW-124A65	Resistor, film, 4.7k ohm, 5%, 1/4 W
R2	06SW-124A41	Resistor, film, 470 ohm, 5%, 1/4 W
R3	06SW-124A89	Resistor, film, 47k ohm, 5%, 1/4 W
R4,R7,R8	06SW-124A73	Resistor, film, 10k ohm, 5%, 1/4 W
R5,R6	06SW-124A43	Resistor, film, 560 ohm, 5%, 1/4 W
R9,R11	06SW-124A57	Resistor, film, 2.2k ohm, 5%, 1/4 W
R10	06SW-124A97	Resistor, film, 100k ohm, 5%, 1/4 W
R12	51NW9626A51	Resistor SIP, five 27k ohm
R13,R16,R30,R36	51NW9626A47	Resistor SIP, seven 4.7k ohm
R14,R15,R29,R35	51NW9626A41	Resistor SIP, nine 4.7k ohm



TABLE 8-6. MEX68KECB Parts List (cont'd)

REFERENCE DESIGNATION	MOTOROLA PART NUMBER	DESCRIPTION
R18-R28	06SW-124A17	Resistor, film, 47 ohm, 5%, 1/4 W
R31	06SW-124A92	Resistor, film, 62k ohm, 5%, 1/4 W
R32	06SW-124A74	Resistor, film, 11k ohm, 5%, 1/4 W
R33,R34	06SW-124B22	Resistor, film, 1.0M ohm, 5%, 1/4 W
R37	06SW-124A29	Resistor, film, 150 ohm, 5%, 1/4 W
R38	06SW-124B50	Resistor, film, 15M ohm, 5%, 1/4 W
S1,S2	40NW9801A54	Switch, push, SPDT, momentary contact
S1	38NW9404B96	Switch cap, red, medium
S2	38NW9404A56	Switch cap, black, medium
U1	51NW9615D27	I.C. SN74S32N
U2,U3,U34	51NW9615C24	I.C. SN74LS32N
U4	51NW9615B75	I.C. MC3302
U5,U7	51NW9615B29	I.C. MC1488L
U6	51NW9615B30	I.C. MC1489AL
U8,U25,U44	51NW9615E91	I.C. SN74LS00N
U9	51NW9615H45	I.C. MC68230L8
U10	51AW4129B09	Programmable I.C., U10, TUTOR
U11	51AW4129B10	Programmable I.C., U11, TUTOR
U12,U13	51NW9615B94	I.C. MC6850P
U14	51NW9615B54	I.C. MC14411P
U15	51NW9615H47	I.C. SN74LS93N
U16	48AW1068B04	Crystal oscillator, 8.0 MHz, 1%
U17	51NW9615F05	I.C. SN74LS20N
U18,U32	51NW9615C21	I.C. SN74LS04N
U19	51NW9615F35	I.C. SN74LS21N

TABLE 8-6. MEX68KECB Parts List (cont'd)

REFERENCE DESIGNATION	MOTOROLA PART NUMBER	DESCRIPTION
U20	51NW9615H81	I.C. SC88011L (MC68000L4)
U21,U22,U39	51NW9615F16	I.C. SN74LS175N
U23	51NW9615C22	I.C. SN74LS08N
U24,U45	51NW9615F76	I.C. SN74LS11N
U26	51NW9615F38	I.C. SN74LS393N
U27,U28,U35,U36	51NW9615E84	I.C. SN74LS153N
U29,U37	51NW9615E89	I.C. SN74LS260N
U30	51NW9615C69	I.C. SN74LS138N
U31	51NW9615E77	I.C. SN74LS27N
U33	51NW9615C20	I.C. SN74LS02N
U38	51NW9615E88	I.C. SN74LS10N
U40	51NW9615G10	I.C. SN74LS148N
U41	51NW9615F52	I.C. SN74LS273N
U42	51NW9615C60	I.C. MC3456P
U43	51NW9615A90	I.C. MC7405P
U46	51NW9615C25	I.C. SN74LS74N
U47-U61	51NW9615H86	I.C. MCM4116BP-30
VR1	51NW9615H08	I.C. MC79L05ACP
Y1	48BW1357X01	Crystal 1.8432 MHz
	09NW9811A04	Socket, I.C., D.I.L., 16-pin
	09NW9811A02	Socket, I.C., D.I.L., 14-pin
	09NW9811A15	Socket, I.C., D.I.L., 24-pin
	09NW9811A30	Socket, I.C., D.I.L., 64-pin
	29NW9805B17	Jumper, shorting insulated
	28NW9802E35	Banana jack, .250" mounting hole
	04SW995A014	Washer, interlocking, .250"

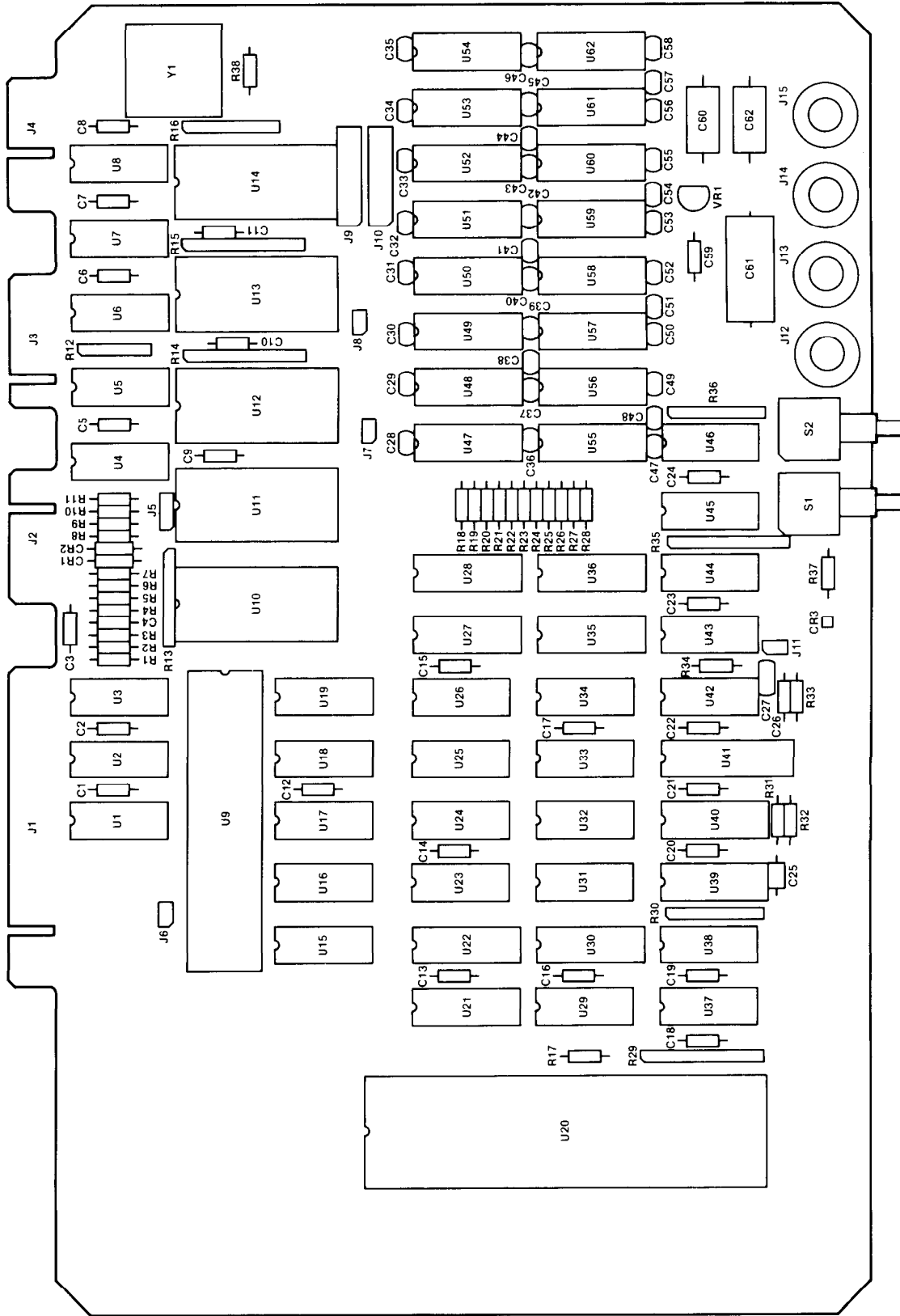


FIGURE 8-2. MEX68KECB Parts Location Diagram



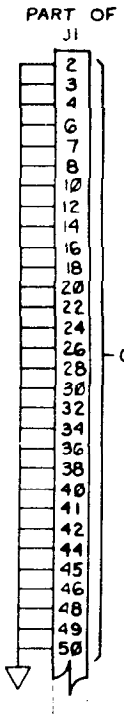
**NOTES:**

1. FOR REFERENCE DRAWINGS REFER TO BILL OF MATERIAL 01-W3111B01
2. UNLESS OTHERWISE SPECIFIED:  
ALL RESISTORS ARE IN OHMS,  $\pm$  PCT,  
1/4 WATT.  
ALL CAPACITORS ARE IN UF.  
ALL VOLTAGES ARE DC.
3. INTERRUPTED LINES CODED WITH THE SAME LETTER OR LETTER COMBINATIONS ARE ELECTRICALLY CONNECTED.
4. DEVICE TYPE NUMBER IS FOR REFERENCE ONLY. THE NUMBER VARIES WITH THE MANUFACTURER.
5. J16 CUSTOMER USE OPTION (50 PINS).  
DEVICE TYPE NUMBERS AND CONNECTIONS NOT SHOWN ON SYMBOL ARE LISTED BELOW. UNDERLINED PORTION OF TYPE NUMBER IS USED AS A CODE TO IDENTIFY DEVICES ON DIAGRAM.

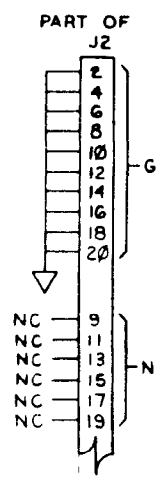
**POWER /GROUND TABLE CONT'D**

REF DES	TYPE <sup>4</sup>	GND	+5V	-5V	+12V	-12V
U47	MCM4116	16	9	1	8	
U48	MCM4116	16	9	1	8	
U49	MCM4116	16	9	1	8	
U50	MCM4116	16	9	1	8	
U51	MCM4116	16	9	1	8	
U52	MCM4116	16	9	1	8	
U53	MCM4116	16	9	1	8	
U54	MCM4116	16	9	1	8	
U55	MCM4116	16	9	1	8	
U56	MCM4116	16	9	1	8	
U57	MCM4116	16	9	1	8	
U58	MCM4116	16	9	1	8	
U59	MCM4116	16	9	1	8	
U60	MCM4116	16	9	1	8	
U61	MCM4116	16	9	1	8	
U62	MCM4116	16	9	1	8	

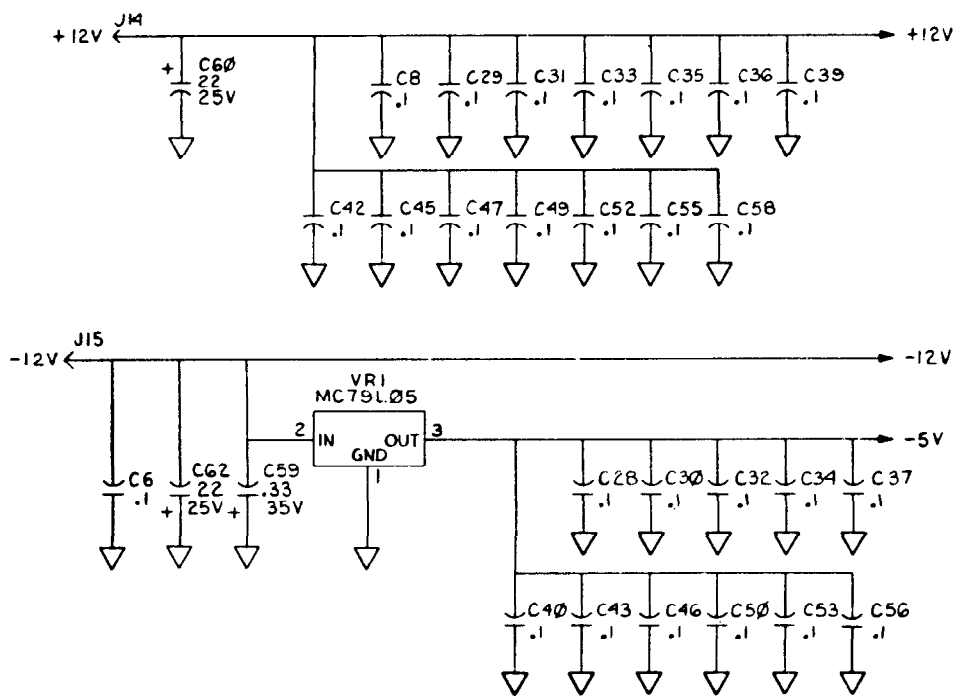
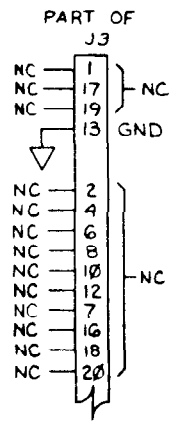
REF DES	TYPE <sup>4</sup>	GND	+5V	-5V	+12V	-12V
U1	74LS32	7	14			
U2	74LS32	7	14			
U3	74LS32	7	14			
U4	MC3302	12	3			
U5	MC1488	7		14	1	
U6	MC1489A	7	14			
U7	MC1488	7		14	1	
U8	74LS00	7	14			
U9	MC68230	38	12			
U10	MCM68764	12	24			
U11	MCM68764	12	24			
U12	MC6850	1	12			
U13	MC6850	1	12			
U14	MC14411	12	24			
U15	74LS93	10	5			
U16		7	14			
U17	74LS20	7	14			
U18	74LS04	7	14			
U19	74LS21	7	14			
U20	MC6800L4	16,53	14,49			
U21	74LS175	8	16			
U22	74LS175	8	16			
U23	74LS08	7	14			
U24	74LS11	7	14			
U25	74LS00	7	14			
U26	74LS393	7	14			
U27	74LS153	8	16			
U28	74LS153	8	16			
U29	74LS260	7	14			
U30	74LS138	8	16			
U31	74LS27	7	14			
U32	74LS04	7	14			
U33	74LS02	7	14			
U34	74LS32	7	14			
U35	74LS153	8	16			
U36	74LS153	8	16			
U37	74LS260	7	14			
U38	74LS10	7	14			
U39	74LS175	8	16			
U40	74LS148	8	16			
U41	74LS273	10	20			
U42	MC3456	7	14			
U43	MC7405	7	14			
U44	74LS00	7	14			
U45	74LS11	7	14			
U46	74LS74	7	14			



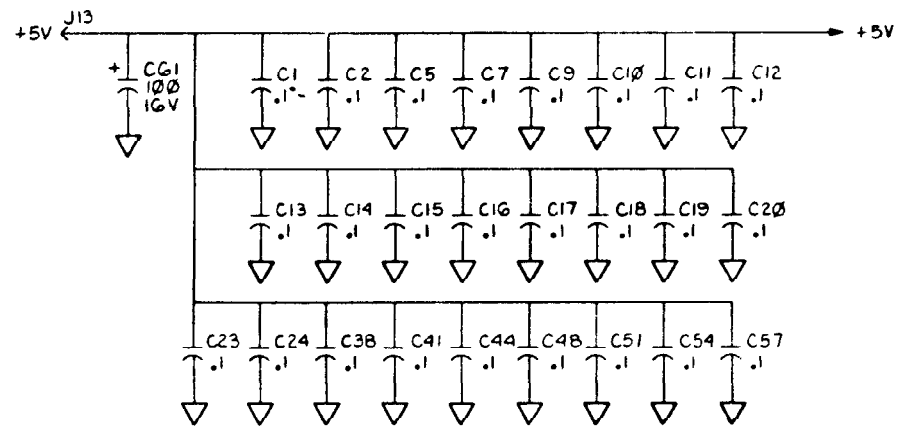
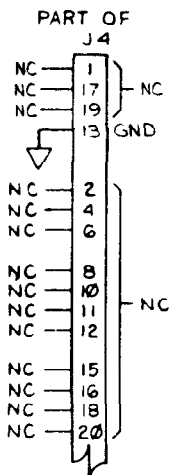
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U62	
S2	
R38	
J17	
E7	
CR3	
CG2	
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REFERENCE DESIGNATIONS	



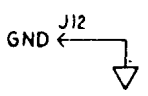
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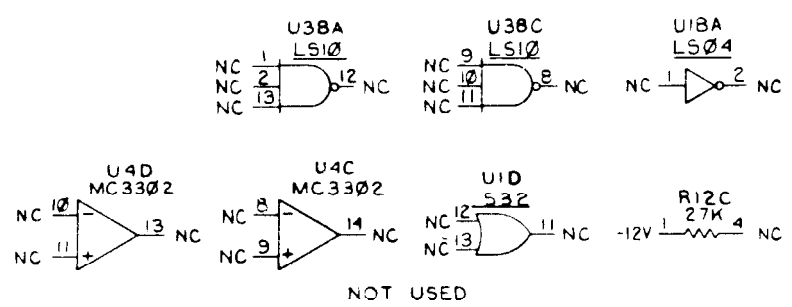
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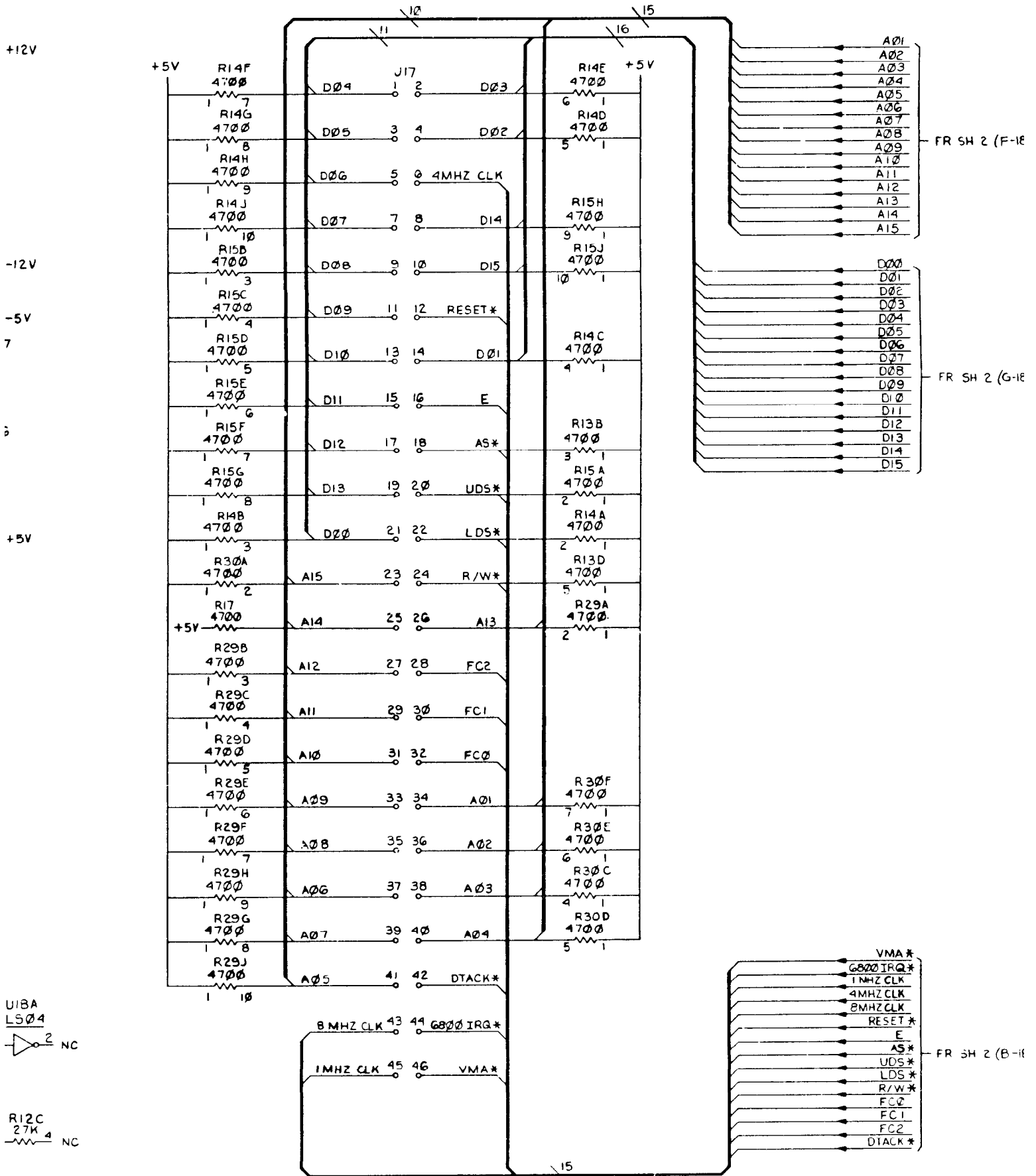


-GND



-NC

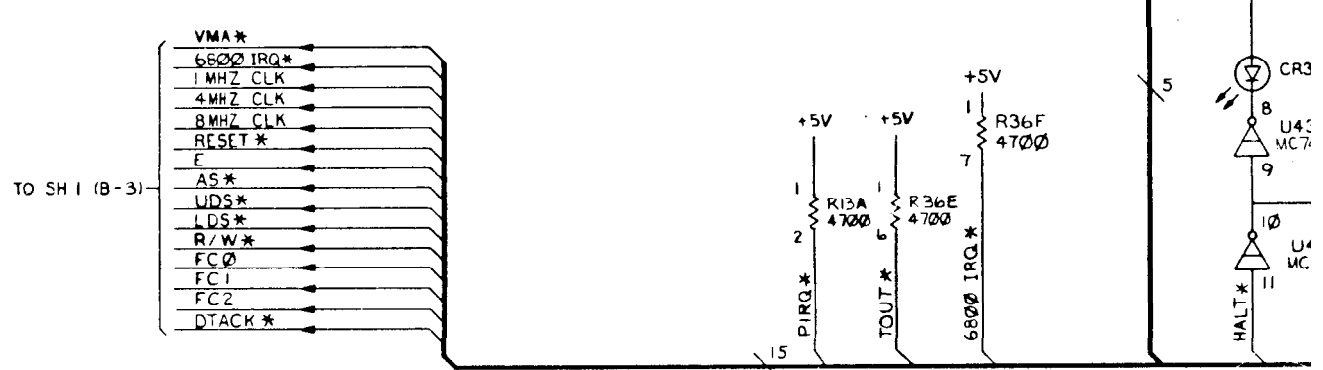
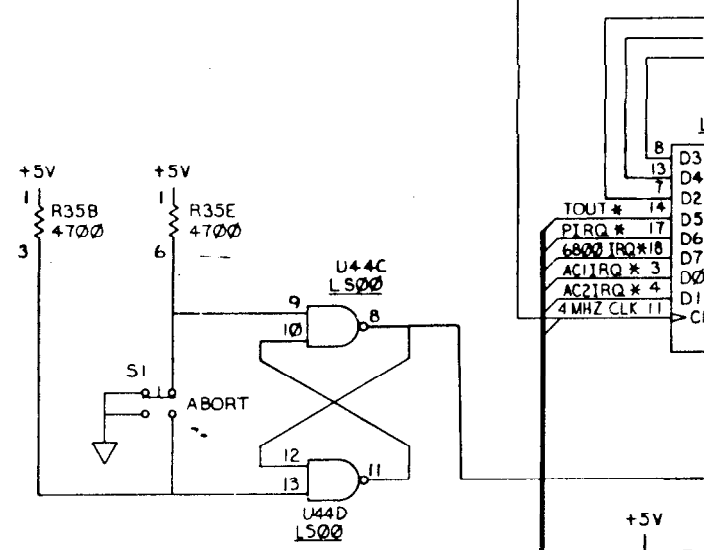
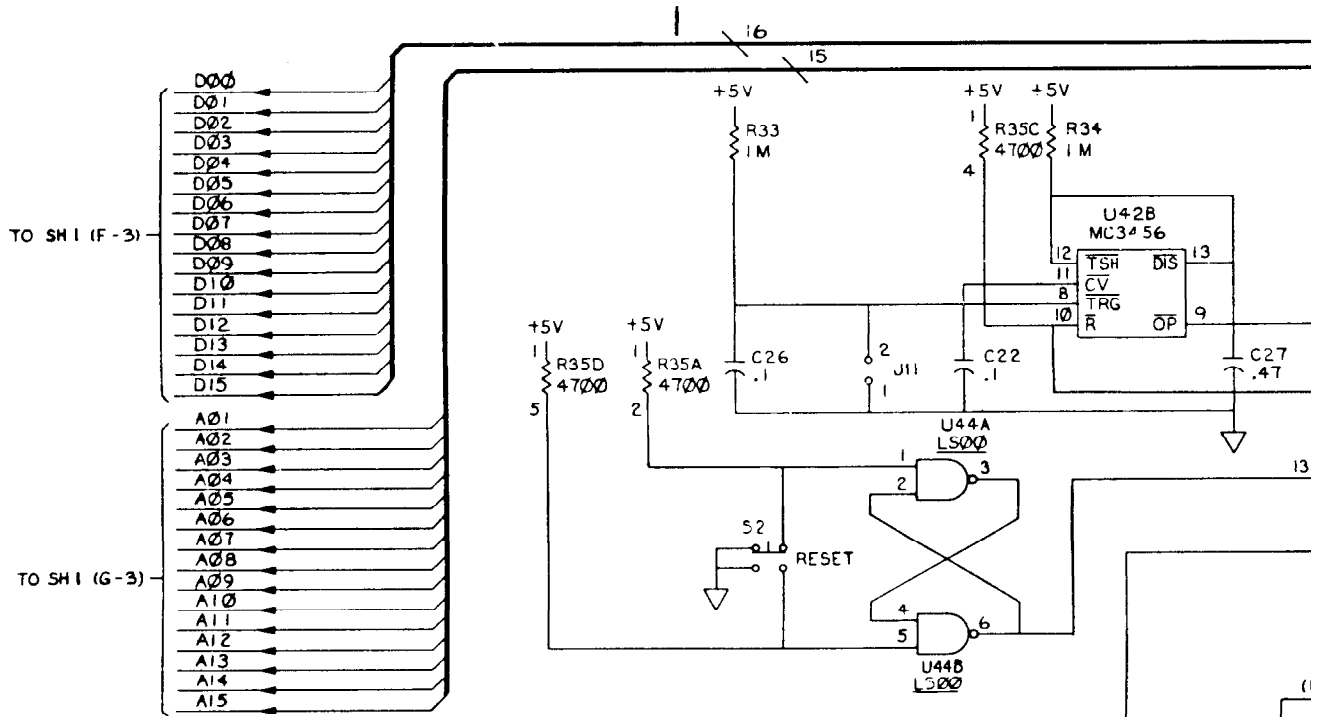




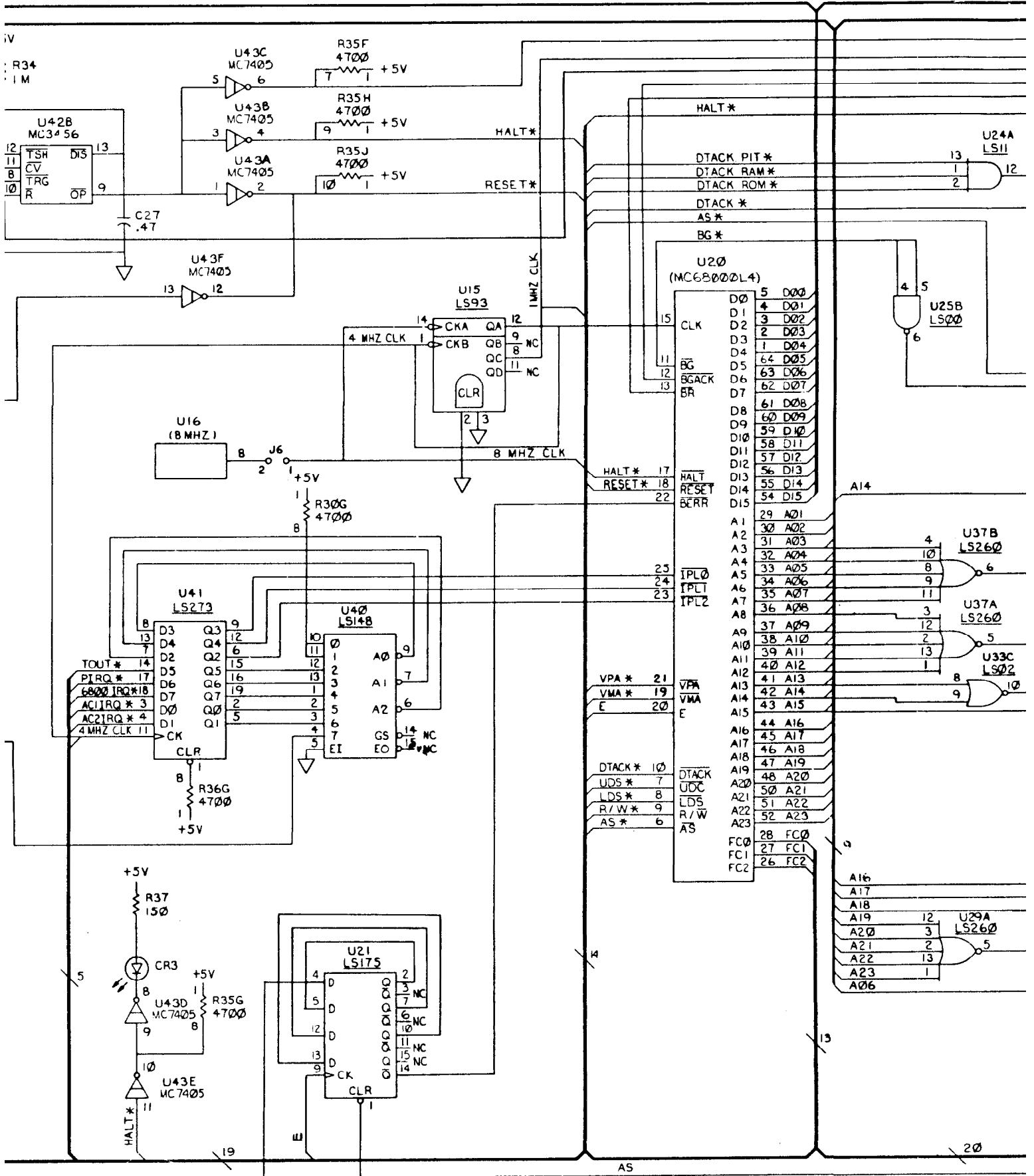
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FIGURE 8-3. MEX68KECB MC68000 Educational Computer Board Schematic Diagram (Sheet 1 of 3)

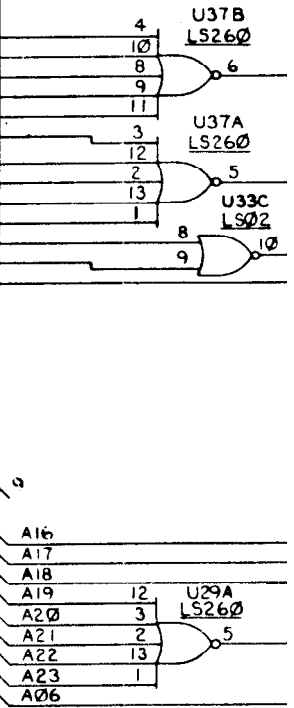
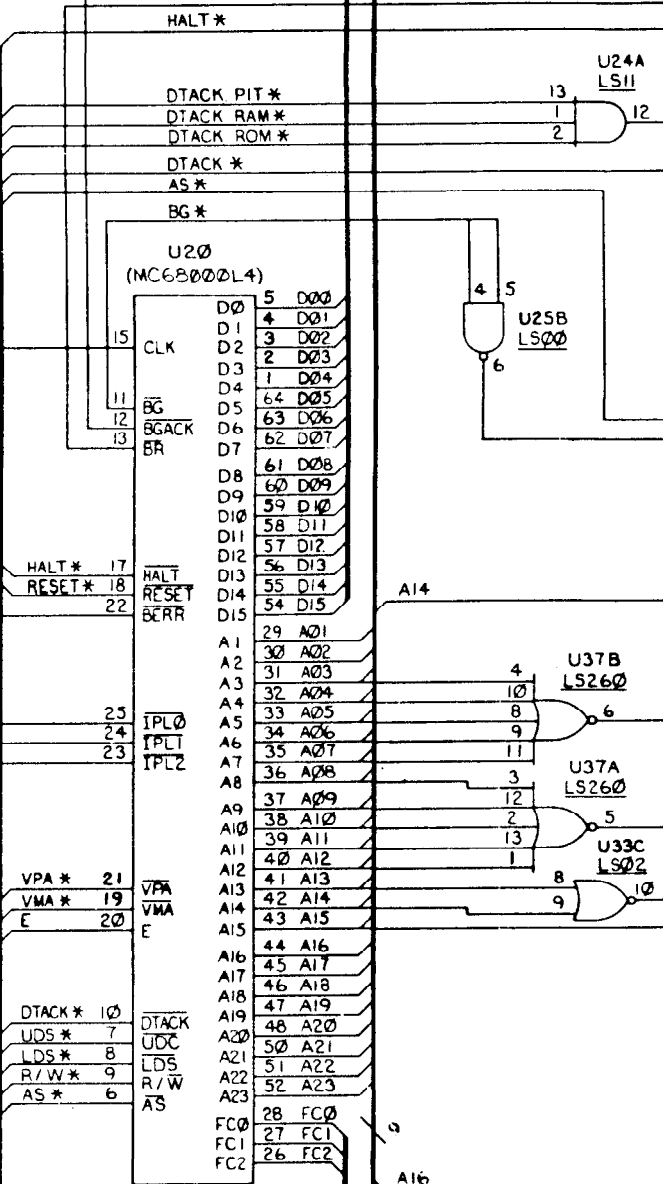
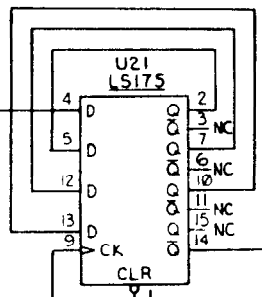
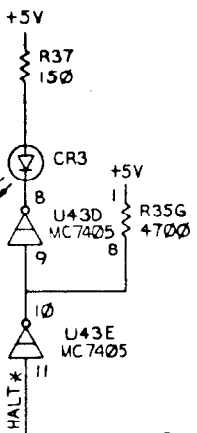
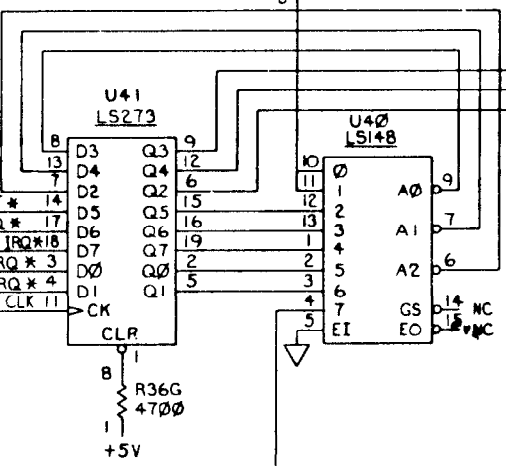
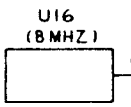
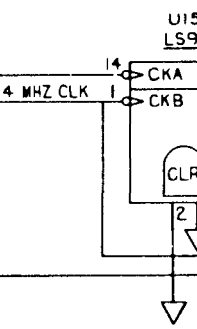
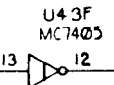
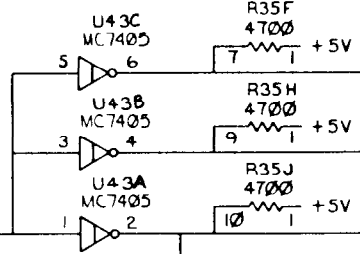
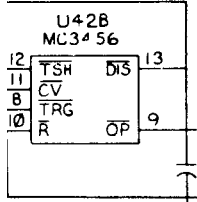
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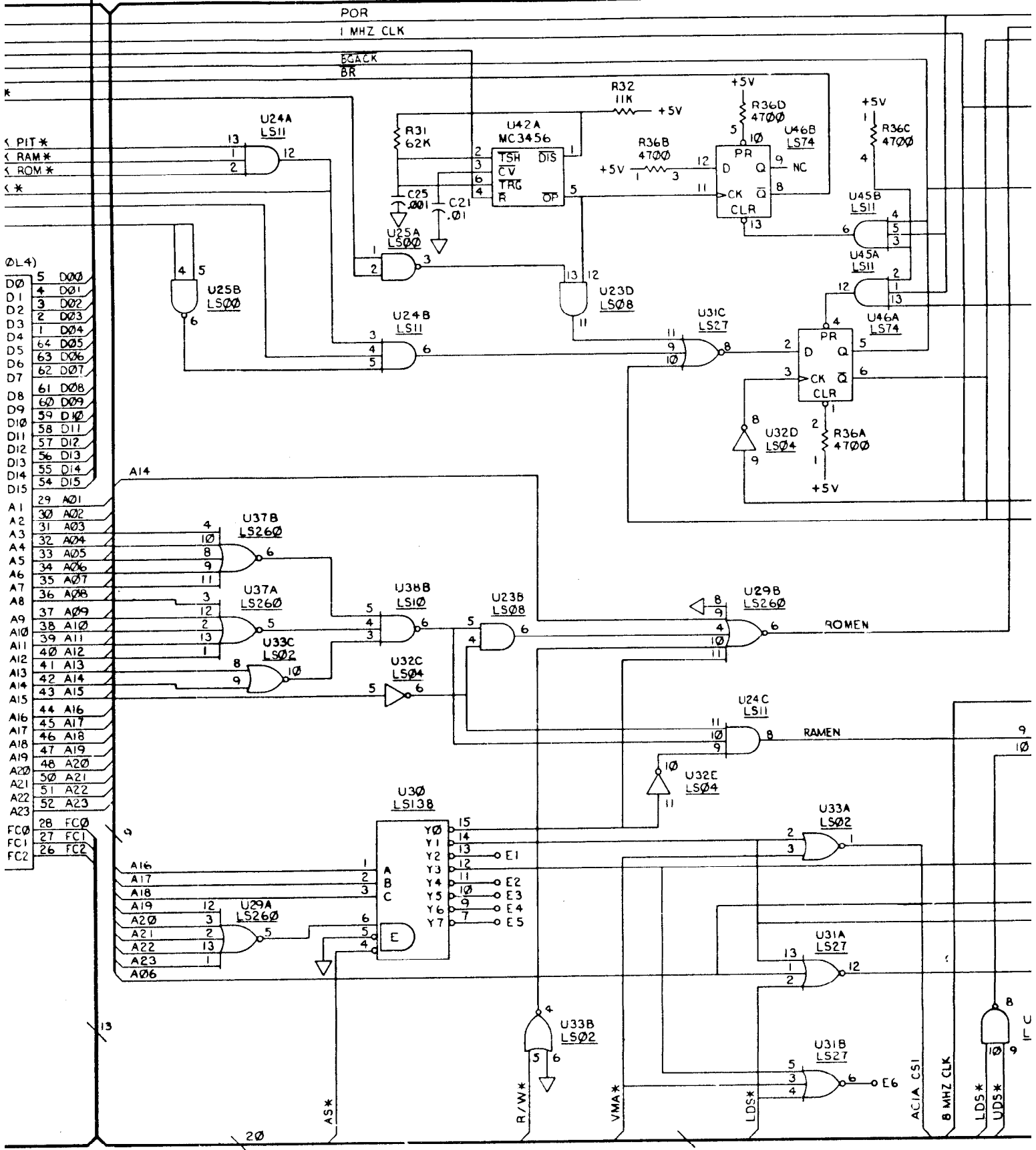




IV  
: R34  
: IM



AS



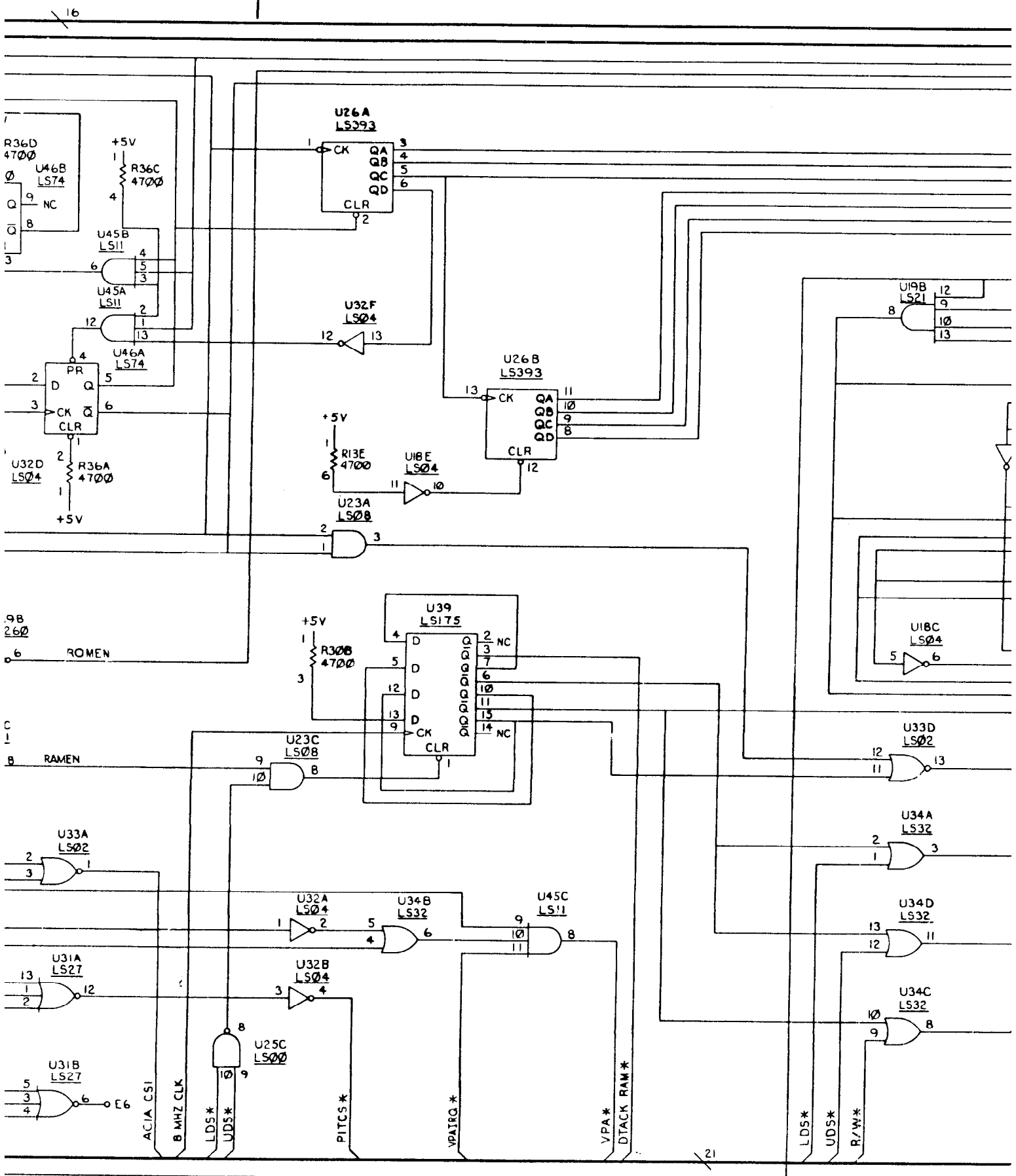


FIGURE 8-3. MEX68KECB MC68000 Educational (Sheet 2)

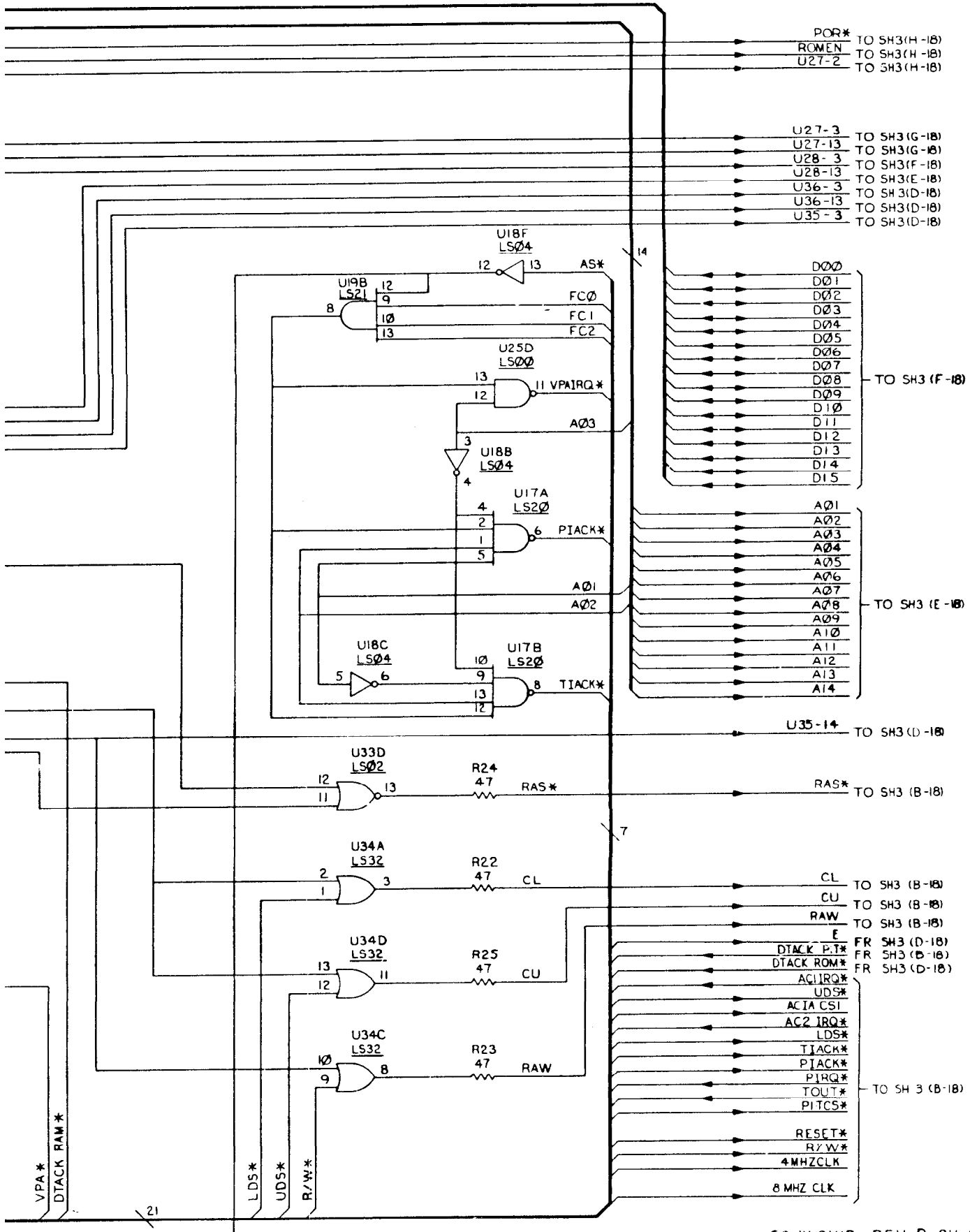
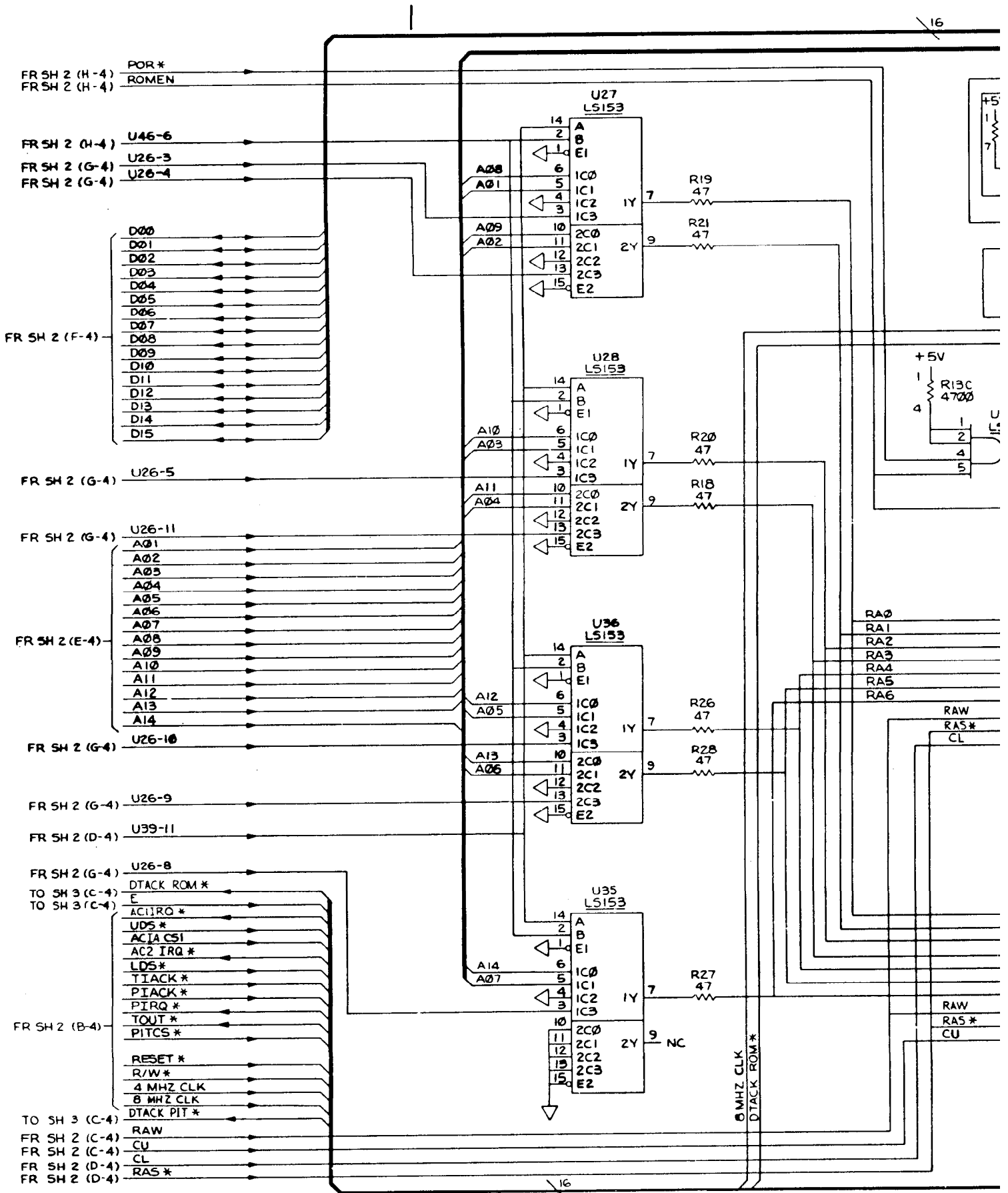
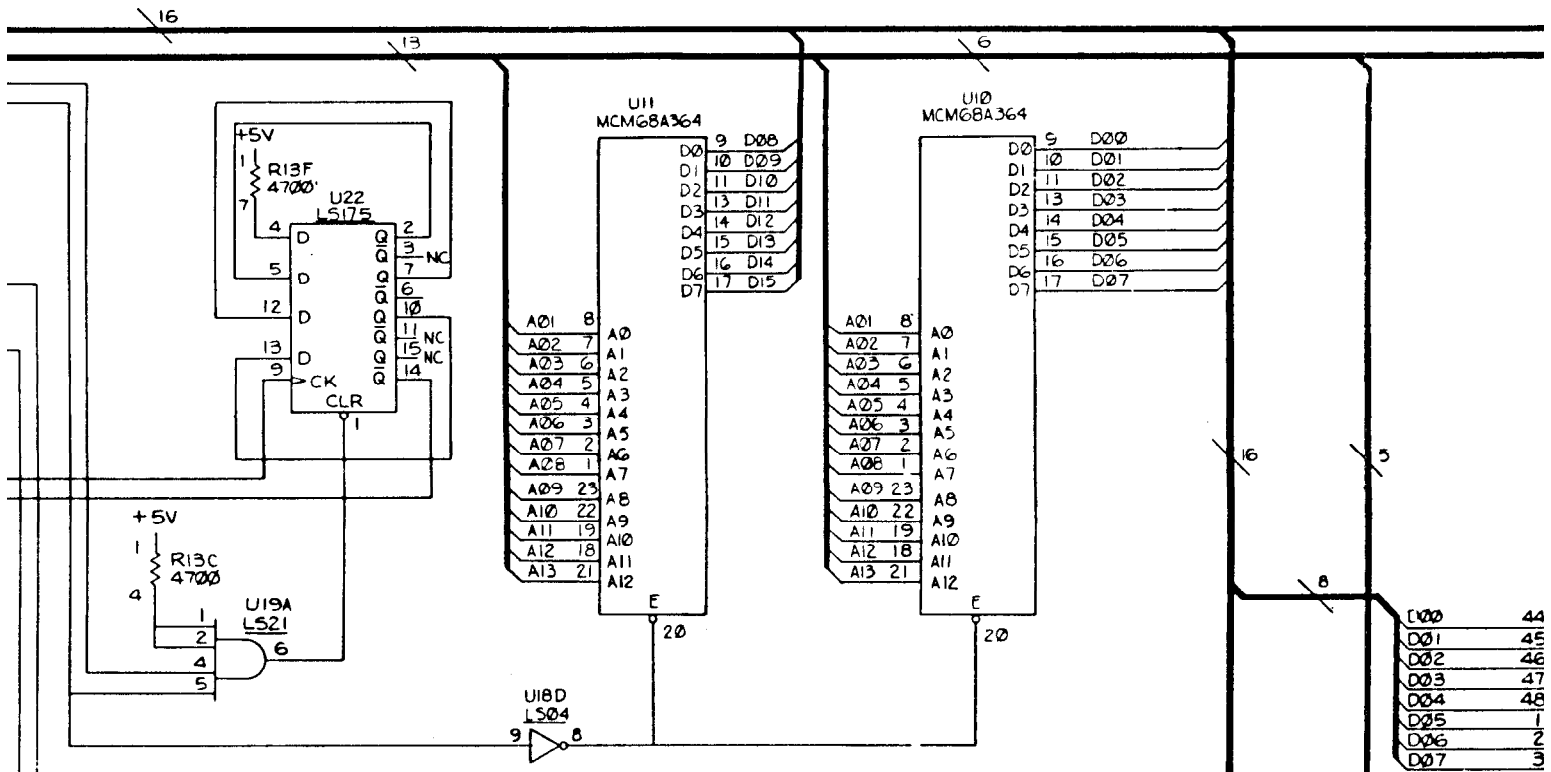
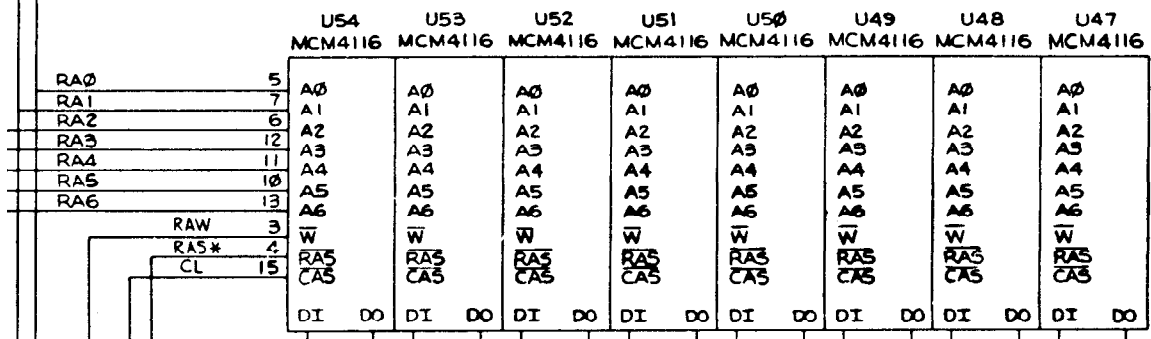


FIGURE 8-3. MEX68KECB MC68000 Educational Computer Board Schematic Diagram (Sheet 2 of 3)

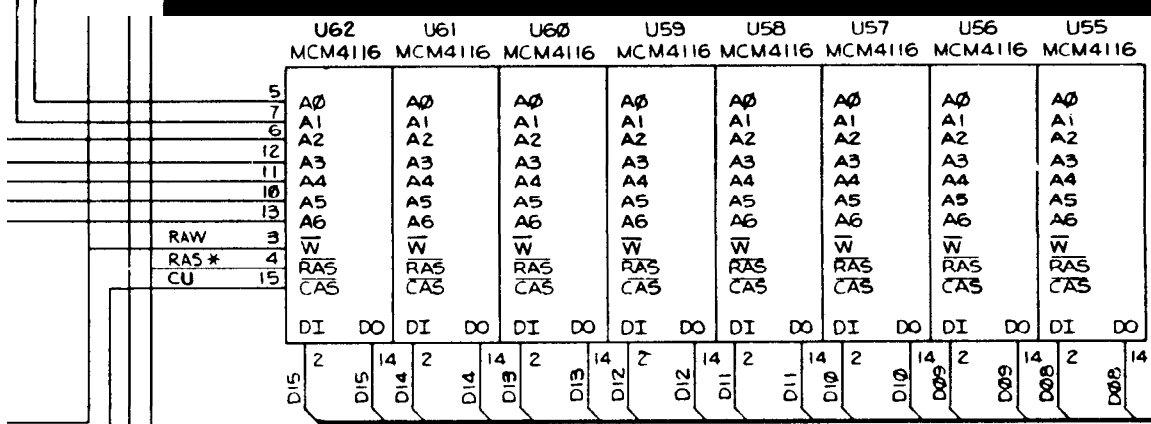




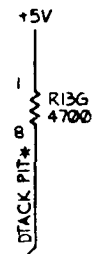
D00	44
D01	45
D02	46
D03	47
D04	48
D05	1
D06	2
D07	3
A01	29
A02	28
A03	27
A04	26
A05	25

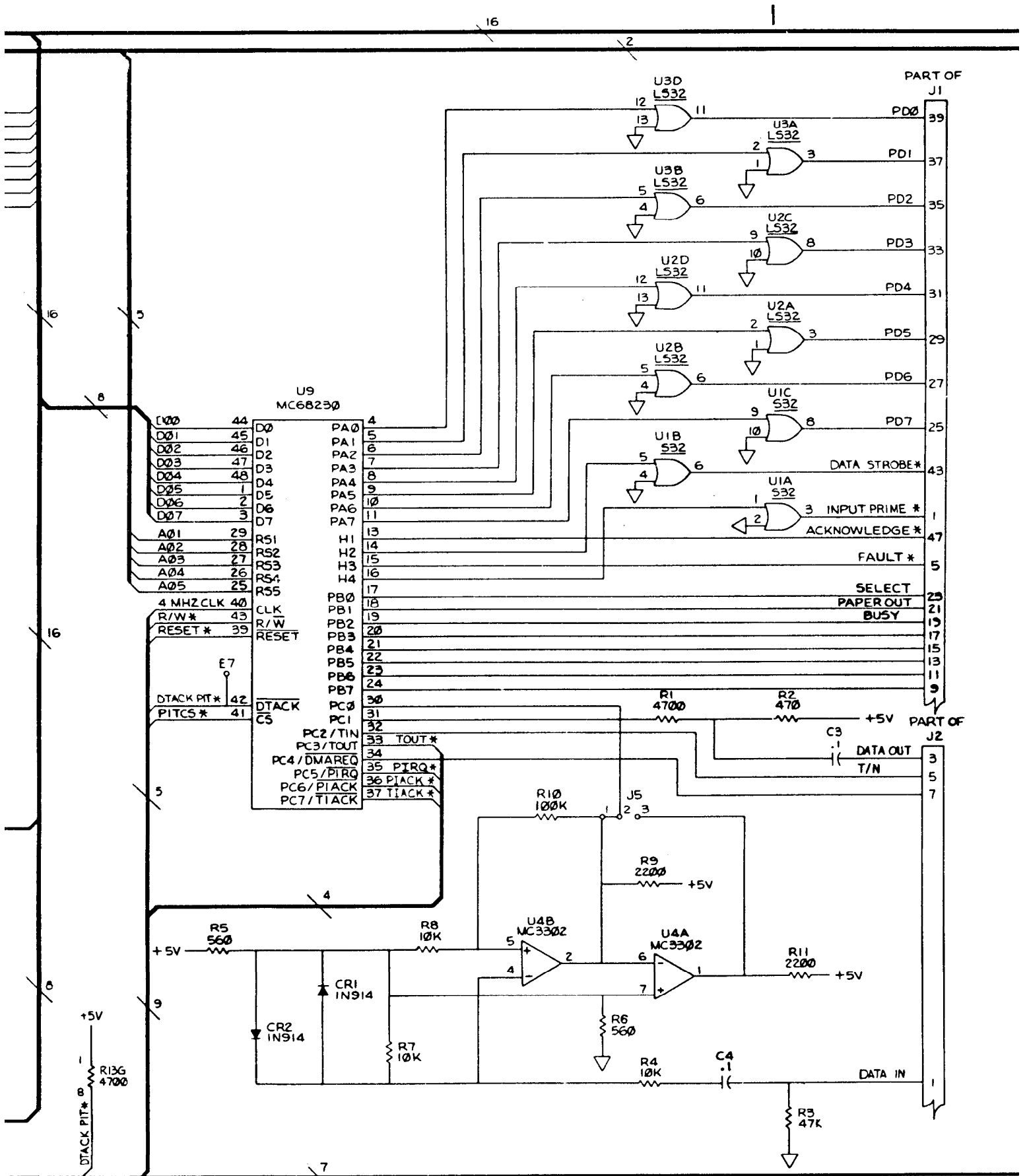


4 MHZ CLK	40
R/W*	43
RESET*	39
E7	
DTACK PIT*	42
PITCS*	41



R5	560
----	-----





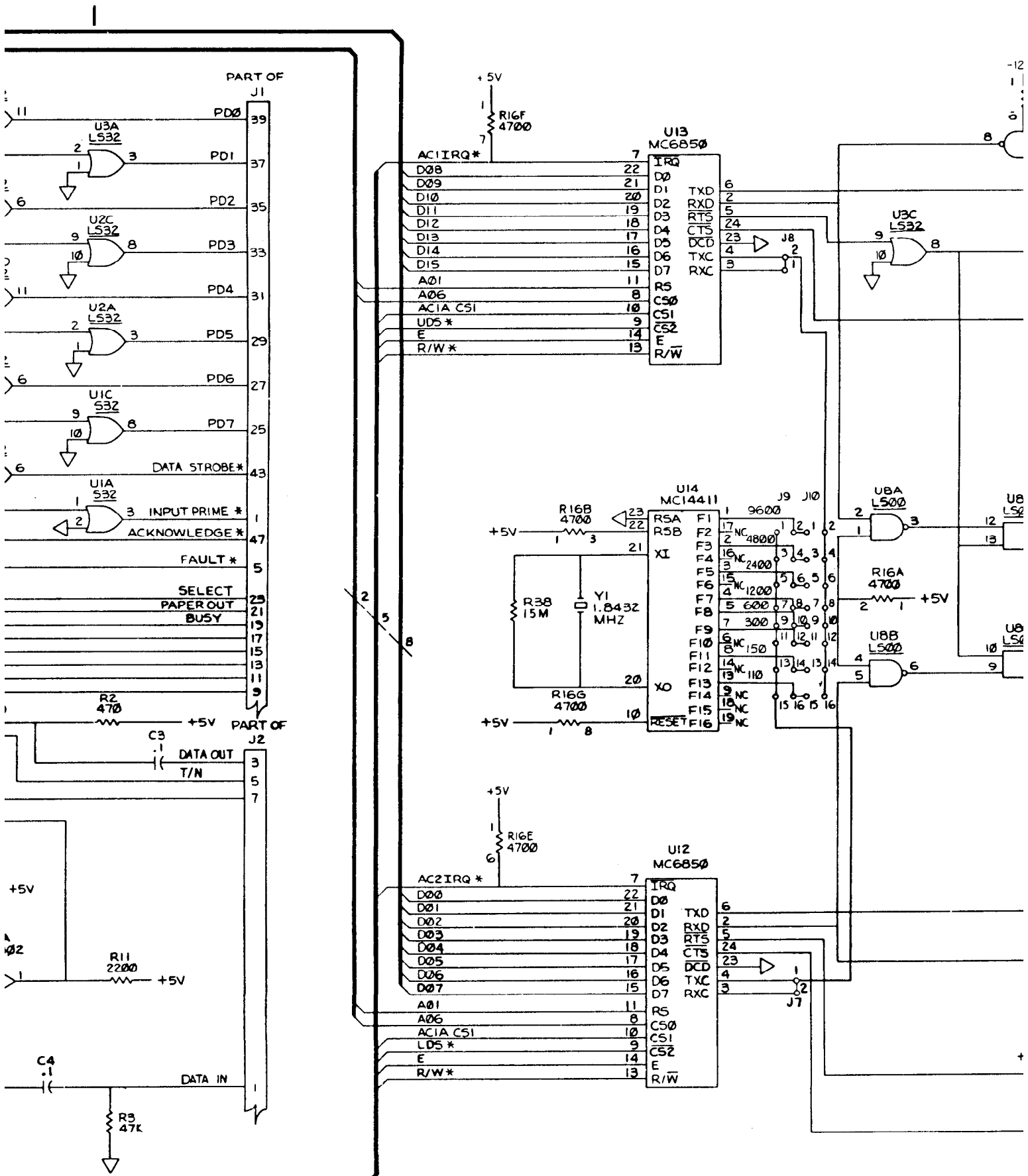
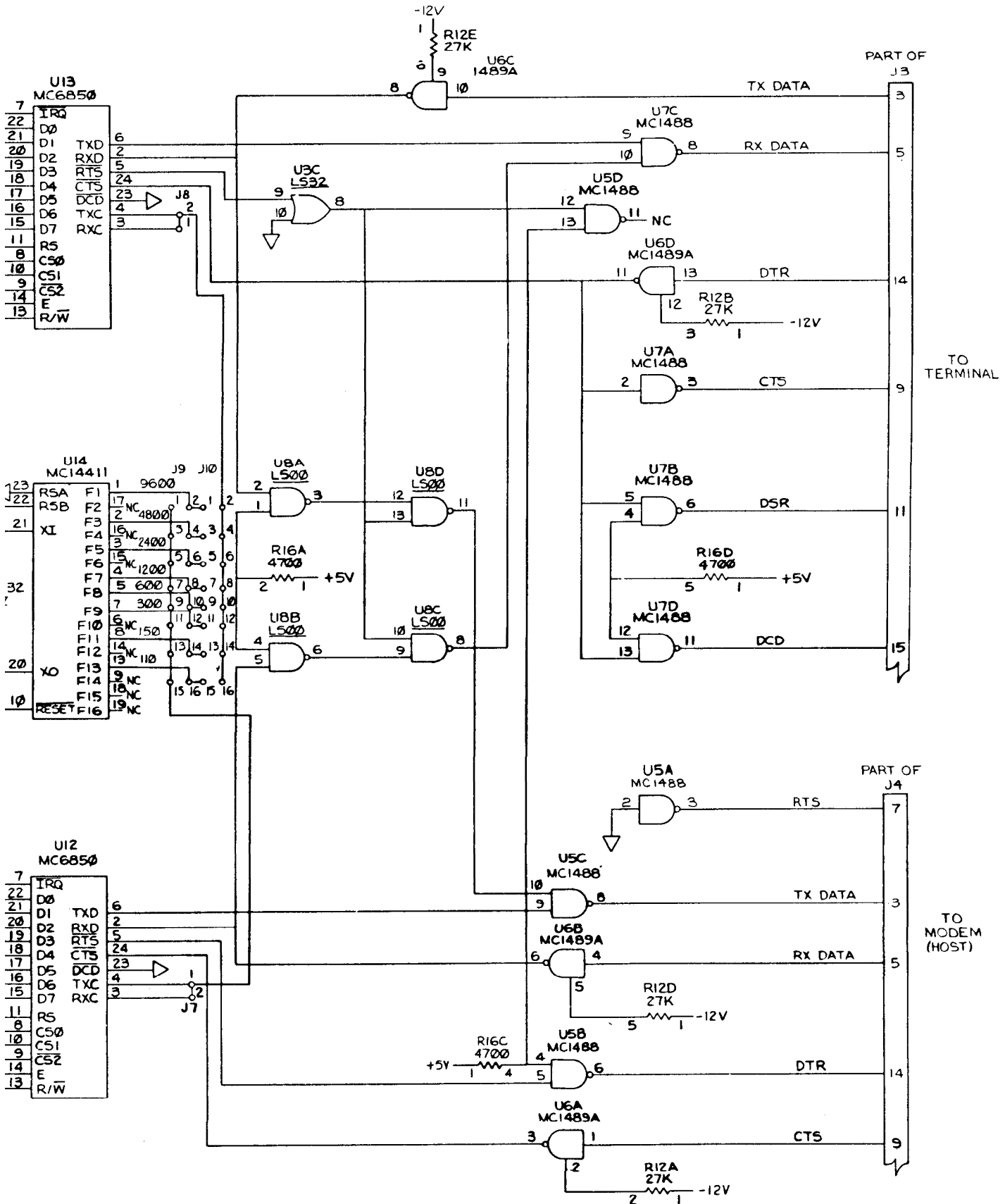


FIGURE 8-3. MEX68KECB MC68000 Educational  
 (Sheet 3  
 R-17/R





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JRE 8-3. MEX68KECB MC68000 Educational Computer Board Schematic Diagram  
(Sheet 3 of 3)

