

*Handwritten: J. K. H. D.W.C.*

## PUT A 6800 MPU IN YOUR ALTAIR

We have developed a high quality Microcomputer card primarily designed for an Altair 8800 or IMSAI 8080 Microcomputer.

The addition of an AM6800 Microprocessor Card to an Altair 8800 or IMSAI 8080 gives both unbeatable flexibility and computing power.

There are three main reasons that this product is of great interest: 1. For the first time you can have two Microprocessors in the same computer. This furnishes you with the educational advantage to learn about both of the leading Microprocessors with a minimal cost increase. 2. For those thousands of customers who really want an AMI or Motorola 6800 Microprocessor based computer, they can now convert without buying an additional computer. 3. This addition will give you the ability to take advantage of the best features of each Microprocessor to optimize your software development, and increase your total computing power.

It is a one board pin compatible card for an Altair 8800 or IMSAI 8080. No modifications are required and it will not interfere with normal execution of 8080 programs. The MC6800 gains control via software command, one instruction. You can return control by either the front panel stop switch or through software, one instruction. It will operate with either fast or slow, static or dynamic memories. The MC6800 MPU status signals are brought out on unused bus lines (jumper option), ie.  $\emptyset 1$  &  $\emptyset 2$  clocks, VMA and R/W lines for system development. The 8080 processor card remains in the computer to handle all front panel controls. All data and address lines are three-state buffered.

### PRICES AND TERMS

AM6800 CKT	COMPLETE KIT WITH 6800MPU, ASSEMBLED AND TESTED	\$180.00
AM6800 CK	COMPLETE KIT WITH 6800MPU	\$130.00
AM6800	COMPLETE KIT EXCEPT 6800MPU	\$97.75
SCHEMATICS	AVAILABLE ON REQUEST FOR AND REFUNDABLE UPON PURCHASE	\$2.00

CALIF. RESIDENTS ADD 6% SALES TAX, 25% DEPOSIT REQUIRED WITH ALL C.O.D.  
PLEASE ALLOW UP TO 30 DAYS FOR DELIVERY  
INQUIRE AS TO QUANTITY DISCOUNTS  
POSTAGE PAID

**M. R. S.**

**P. O. BOX 1220**

**HAWTHORNE, CALIF. 90250**

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## AM6800 PROCESSOR BOARD

- \* MC6800 Microprocessor Based
- \* Altair 8800 Pin Compatible
- \* Two Micro Second MPU Cycle Time (2 Cycles/Instruction - Min.)
- \* Static and Dynamic Memory Compatible
- \* Alternate Processing Between 8080 and 6800 During One Program
- \* Transfer of Processor Control is Via Software
- \* Transfer Time Does Not Exceed One MPU Cycle Time
- \* 6800 Processor Restart Accomplished Via "Reset" or "External Clear"  
(Jumper Option)
- \* NMI and IRQ Brought Out to Altair Bus
- \* Current Drain Less Than One Ampere
- \* LED On AM6800 Board Indicates 6800 Selected
- \* MC6800 MPU Status Brought Out To Altair Bus (Jumper Option)
- \* 8080 Device Code Instruction to Select AM6800 is 323,367 - Octal **D3 F7**
- \* MC6800 Instruction to Select 8080 is F7,FFF7 - Hex
- \* Uses Clock Off Altair Bus
- \* Edge Connector Gold Plated
- \* Socket For 40-Pin Microprocessor
- \* Complete Assembly and Schematics Included
- \* All Data and Address Lines Are Three-State Buffered
- \* Spare 14-Pin I.C. Etched Holes For Custom Changes

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## AM6800 Options

The AM6800 has provisions for several jumper options which must be implemented.

### OPTION 1

The first option depends on how you wish to restart the MC6800 MPU. You are offered the choice between using the "reset" switch or the "external clear" switch. If you are using dynamic memories you should use the "external clear". Connect a one thousand ohm resistor between points A and B for the "external clear" option. Connect the resistor between B and C for the "reset" switch option.

### OPTION 2

The second option is concerned with the control of MC6800 MPU input and output devices. It is normally recommended that you use the 8080 for I/O, since the MC6800 MPU uses memory locations for I/O. Connecting a jumper wire between J and L will allow using all address for memory. Putting a jumper wire between J and H will reserve the top 256 bytes of memory for I/O less the very top 8 bytes, which are interrupt vectores for the MC6800 MPU.

### OPTION 3

We provide the user of our board with the option of bring out some of the MC6800 MPU signals to the bus on unused pins. The following signals are brought out to the bus with this option.

MC6800 $\emptyset$ 1 clock	Pin #14
MC6800 $\emptyset$ 2 clock	Pin #15
MC6800 R/W	Pin #16
MC6800 VMA	Pin #17

If you wish these signals brought out on your bus you must connect a jumper wire between F and G.

### OPTION 4

The last option offered is concerned with the signal called PDBIN on pin #78 on your bus. Normally, a jumper should be soldered from P to N. This will allow the data lights on the front panel to be active while the MC6800 MPU is running. If option 2 was selected for I/O operation, then this jumper should be connected from N to M. This will sync PBIN to the MC6800 MPU  $\emptyset$ 2 clock.

### *\*NOTE*

*CONTACTS ON ALL BOARDS SHOULD BE CLEANED PERIODICALLY. THIS CAN BE DONE BY THE USE OF AN ERASER. BOARDS SHOULD BE PLACED AS CLOSE AS POSSIBLE TO EACH OTHER AND THE CONTROL PANEL WHEN IN USE TO REDUCE SYSTEM NOISE.*

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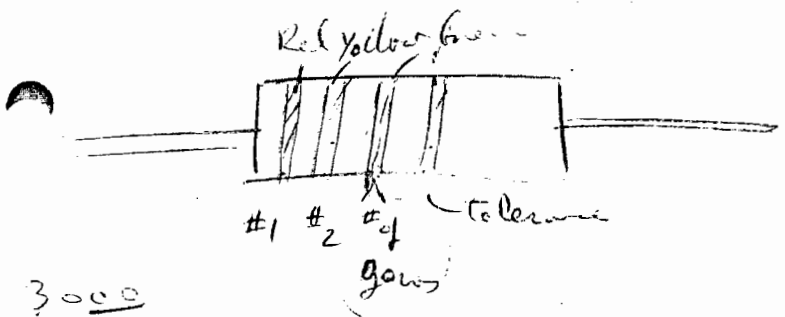
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## PARTS LIST

ITEM	PART DESCRIPTION	QUANTITY	PART DESIGNATION
1	SN7400	1	U17
2	SN7402	1	U20
3	SN74LS04	3	U3,U8,U10
4	SN7405	1	U19
5	SN7408	1	U2
6	SN74LS08	1	U16
7	SN7409	1	U15
8	SN74LS20	1	U4
9	SN7428	1	U6
10	SN74LS30	1	U21
11	SN7432	1	U12
12	SN74LS74	2	U1,U11
13	SN74123	1	U9
14	SN74132	1	U18
15	SN74193	1	U7
16	SN74365	5	U13,U22,U23,U25,U26
17	DM8833	2	U14,U24
18	LM340T-5 or MC7805CP	1	
19	MC6800		U5
20	CAP., <sup>2.2uf</sup> 1uf, 25V, Electrolytic	2	C6,C7
21	CAP., .01uf, 100V, Ceramic .1uf, 50V, May be substituted	13	C1,C3,C4,C5,C8,C9,C10 C11,C12,C13,C18,C20,C21
22	CAP., 100pf, 100V, Ceramic	7	C14,C15,C16,C17,C19
23	CAP., .1uf, 50V, Ceramic	1	C2
24	RES., 110, 1/4W, +5%	2	R8,R9
25	RES., 330, 1/4W, +5%	1	R1
26	RES., 1K, 1/4W, +5%	19	R2,R3,R4,R5,R11,R12,R13,R14,R15,R16 R17,R18,R19,R20,R21,R22,R23,R24
27	RES., 3K, 1/4W, +5%	2	R6,R7
28	RES., 47K, 1/4W, +5%	1	R10
29	LED	1	
30	40-Pin Socket	1	
31	Heat Sink	1	
32	AM6800 Board	1	
33	Screw & Nut	1	
34	Jumper Wire	1	

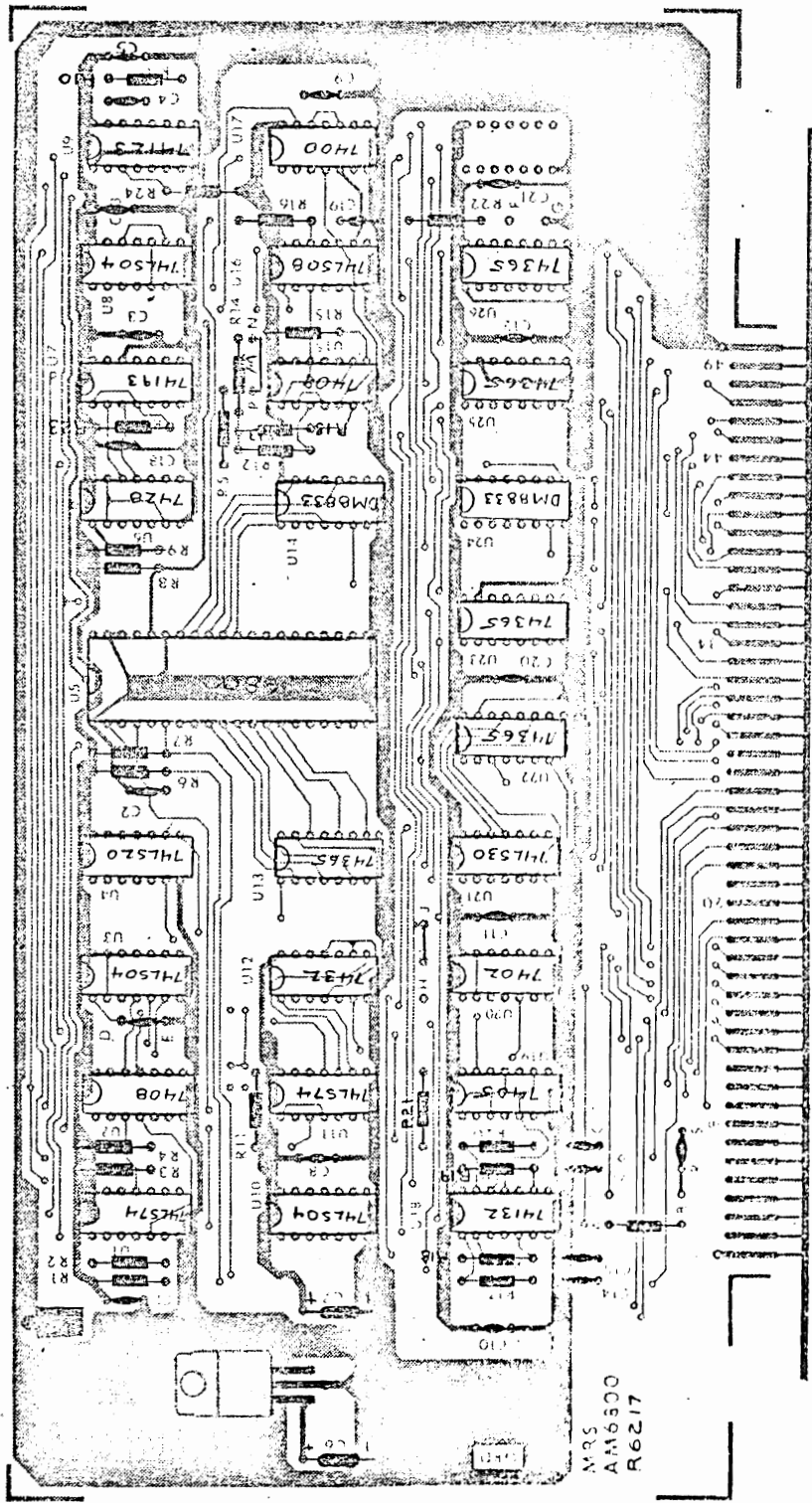
1000

- 0 Black
- 1 Brown
- 2 Red
- 3 Orange
- 4 Yellow
- 5 Green
- 6 Blue
- 7 Violet
- 8 Gray
- 9 White



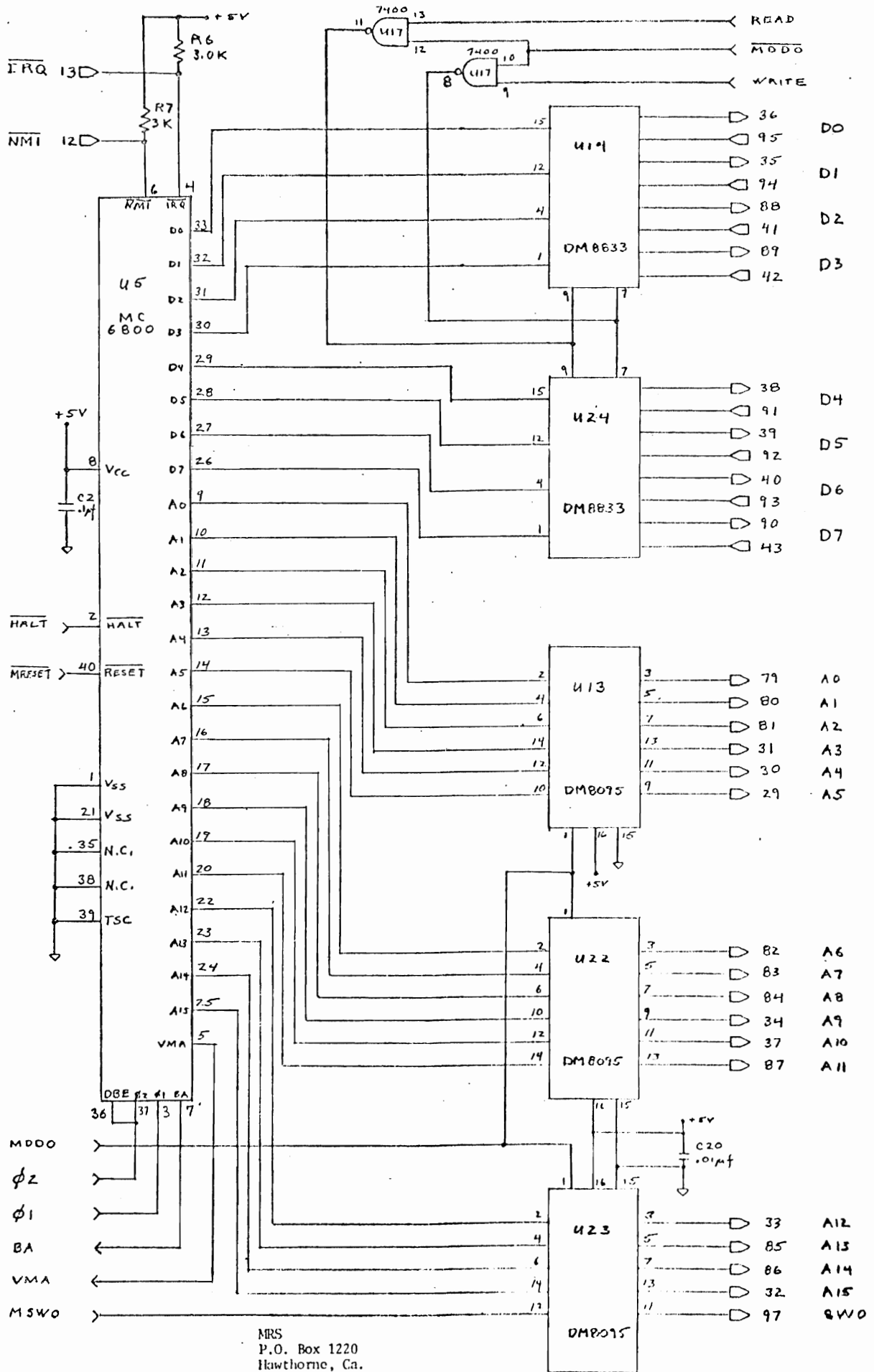
REDUCE TO 11.000 ± .005

REDUCE TO 6.000 ± .005



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AM6600  
R6217

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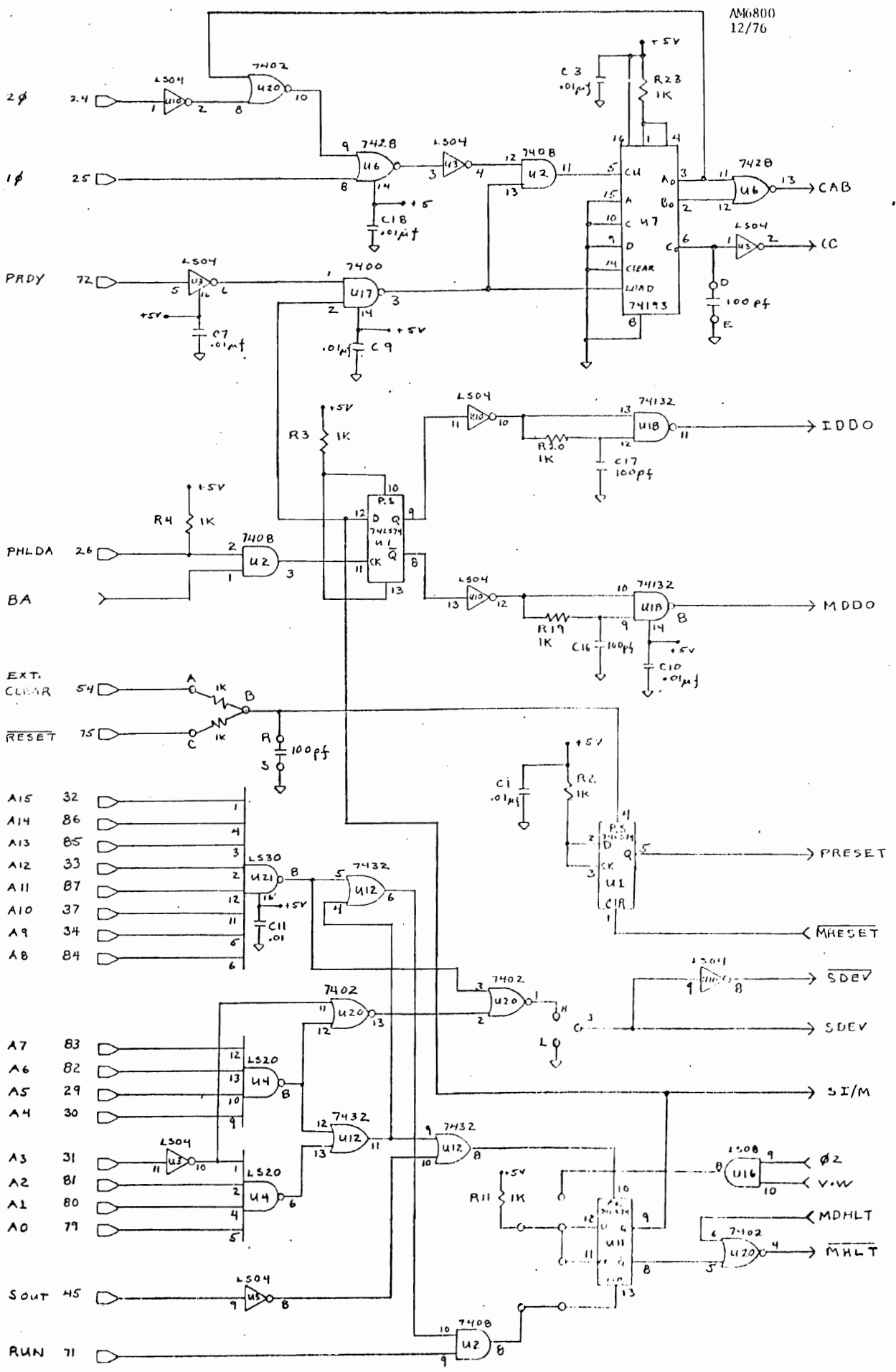


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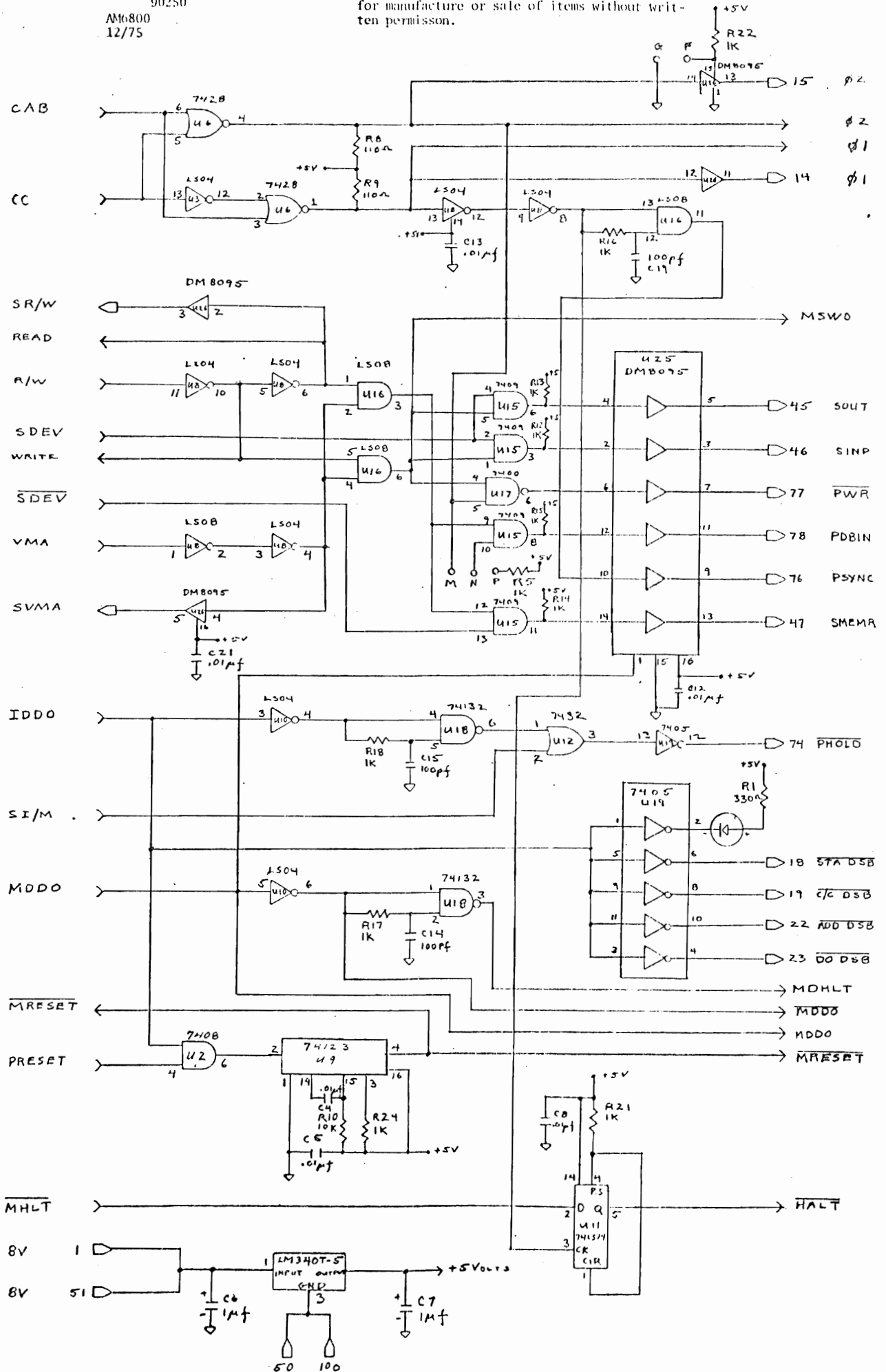
AM6800

12/75



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The following is a sample software program to test the AM 6800 board. This program first selects the 6800 MPU and puts it in a tight loop.

Load the following hex program:

ADDRESS	DATA	EXPLANATION
FFFE	00	Restart Vector For 6800
FFFF	00	
0000	7E	Extended Jump For The 6800
0001	00	
0002	00	
0080	D3	8080 Instruction To Select 6800
0081	F7	

Having loaded the program toggle either the reset or external clear depending on your jumper option. Examine hex address 0080 and hit the run switch.

The front panel should show the HLDA led on indicating that the 8080 is no longer controlling the bus. Address leds A0 and A1 should be on indicating that the 6800 is looping in that section of memory. The led on the AM 6800 board should be on. To return control back to the 8080 hit the stop switch. \*

\* For IMSAI users the examine switch must be hit after the stop switch.

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This sample program demonstrates the ability of your new board to modify memory and return control back to the 8080 automatically.

Load the following hex program:

ADDRESS	DATA	EXPLANATION
FFFE	00	Restart Vector For 6800
FFFF	00	
0000	73	CMP Mem. Extended
0001	00	MSB
0002	40	LSB
0003	F7	STA. B Extended
0004	FF	MSB
0005	F7	LSB
0080	D3	8080 Instruction To Select 6800
0081	F7	
0082	76	HALT

Having loaded the program, deposit some arbitrary data word in hex address location 0040.

Toggle either the reset or external clear depending on your jumper option. Examine hex address 0080 and hit the run switch.

The front panel should show the HLTA led on and all address and data leds should be on. While holding the stop switch down hit the reset switch momentarily, then release the stop switch. The data word in there now should be the compliment of what you originally deposited.