MODEL 4

PROM PROGRAMMER

SERVICE MANUAL

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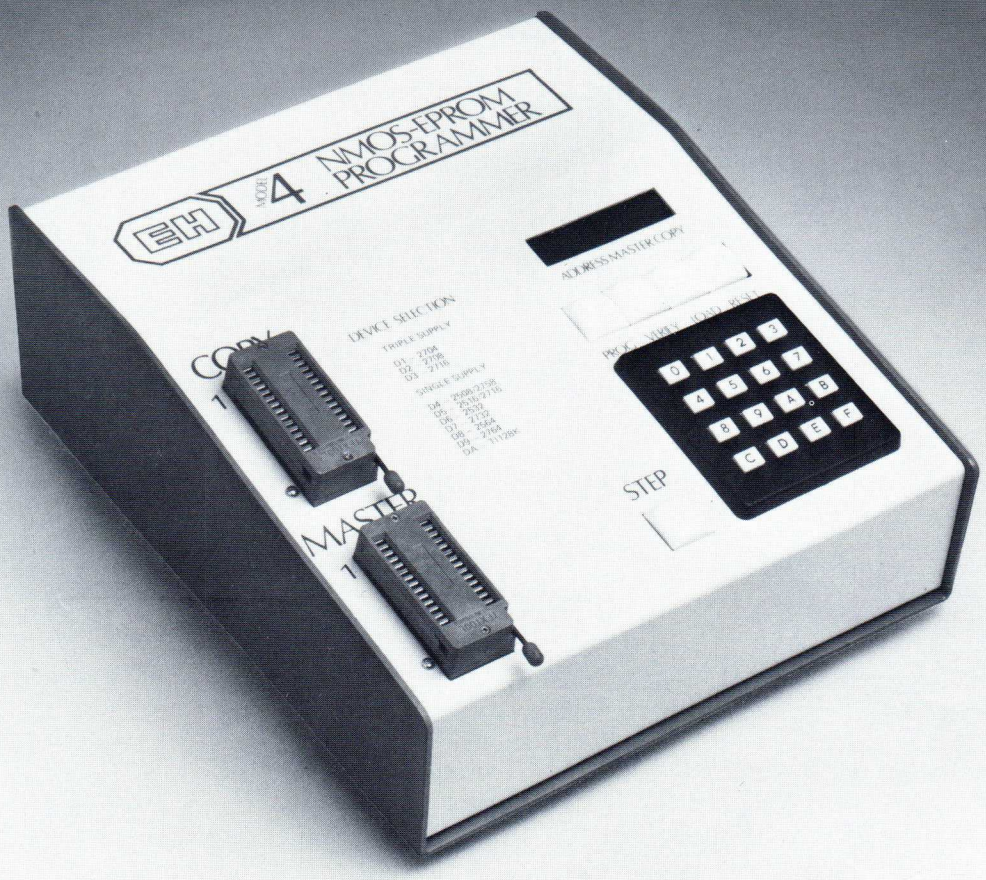
MODEL 4

NMOS-EPROM PROGRAMMER



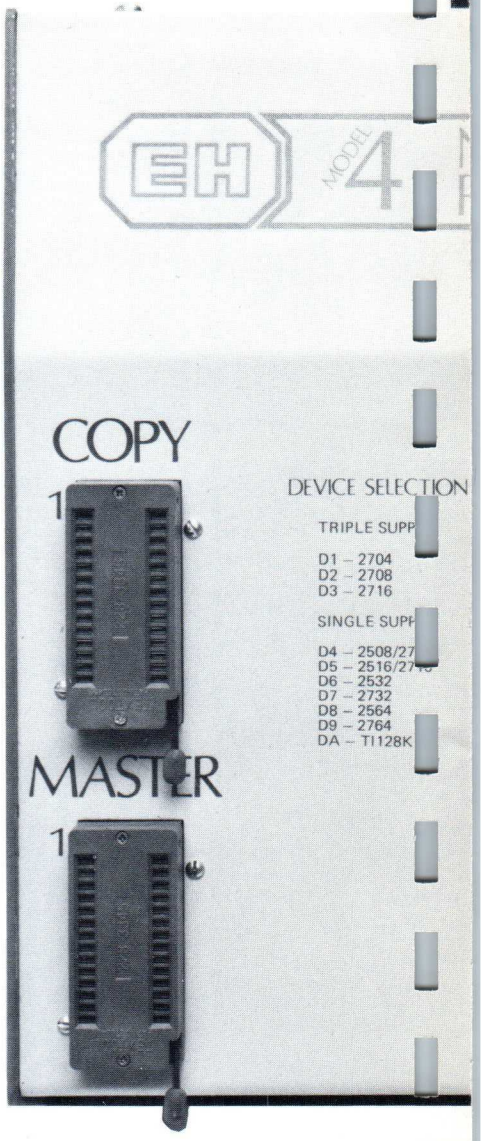
Features

- SOFTWARE PERSONALITY™ PROGRAMMING 2704 (4K) THROUGH TI 128K EPROM's
- NO MORE HARDWARE HASSLES
- 2K X 8 RAM BUFFER
- 2K X 8 PROM EMULATION
- INCLUDES RS232 & TTY SERIAL I/O INTERFACE
- PERFORMS CHECKSUM VERIFICATION
- EXECUTES MOVE & LIST COMMANDS
- FULLY BUFFERED & COLD SOCKETS
- HEX KEYPAD & HEX DISPLAY
- SMALL, LIGHT, & PORTABLE

The E-H MODEL 4 self-contained NMOS-EPROM PROGRAMMER is the most advanced programming system available. Utilizing *software personality*™ changes to select the device types is the programming method of the future. Simple keystroke entry will change the device type automatically from a 2704 (4K) through the TI 128K EPROM's. No more personality cards or hardware changes.

The beauty of the E-H Model 4 is that it can be easily run by any operator, but has an extensive software package to allow in-depth data manipulation using selected keyboard commands. This combined with the 2K X 8 RAM buffer, checksum verification, PROM emulation, and fully buffered and normally powered down sockets gives you the most complete, portable, and flexible EPROM programmer on the market today.

The **E-H MODEL 4** is a stand-alone, self-contained microprocessor-controller EPROM programmer.



Device Select

When the unit is first powered on, the display shows a "d" in the window requesting the device type. By depressing a "D" and then a "1" through "A" on the keypad the following devices can be selected:

Device Selection:
- Triple Supply . . . . .D1—2704
  D2—2708
  D3—2716
- Single Supply . . . . .D4—2508/2758
  D5—2516/2716
  D6—2532
  D7—2732
  D8—2564
  D9—2764
  DA—TI 128K

Keys

Reset . . . . . Initializes programmer to command mode.
Load . . . . . Moves data from Master to RAM.
Verify . . . . . Master to copy EPROM.
Program . . . . . Blank checks/programs/verifies the Master to the copy EPROM.
Step . . . . . Allows manual manipulation of programmer.
Keypad . . . . . For data entry and software commands.

Operating Modes

The letters in this section appear in the display as that operation is being executed:

A . . . . . Load From Master
B . . . . . Blank Check
C . . . . . Program Operation
D . . . . . Verify
E . . . . . Emulate
AA . . . . . Move Operation
BB . . . . . Dump/List to Serial Port
CC . . . . . Checksum
FF . . . . . Receive From Serial Port
— . . . . . Read/Alter Location
— . . . . . Select Device
— . . . . . Select Baud Rate

Emulate

1. Select device 2704, 2708, 2716 triple power supply, 2758, 2516, 2716 single supply.
2. Depress "E" "STEP."
3. Connect master socket on programmer to in-circuit device socket using 24-pin cable.
   Timing: Data will be valid within 650 ns after all the address and CE are valid.
   Inputs: CMOS loading and levels.
   Outputs: Will drive 1 TTL load.

Serial Data Interface

25 pin "D" connector set up for:
- Serial RS232C — Set up as an EIA modem using transmit data, receive data, clear to send, carrier detect, and data set ready; 300, 1200, 2400 bps.
- TTY — 20 milliamp current loop signals supplies; send, receive, and reader control, 110 bps.
- MODE — Asynchronous, half-duplex, 1 or 2 stop bits.

Sockets

28-pin zero insertion force, mounted on mother sockets. Sockets are fully buffered from microprocessor. No power is applied to the devices in the sockets until an operation is started.

LED Display

8-digit display that shows address, master data and copy data simultaneously. Normally displays the device type in operation or current operation mode.

Checksum

The checksum is calculated and displayed after every verify operation over the memory space selected. This ensures a reliable data transfer. The checksum is an addition of the binary data and is displayed in a 2-byte sum. To calculate the checksum of RAM or copy:

1. Checksum of RAM—Depress "C" then "1."
2. Checksum of Copy—Depress "C" then "3."

STEP-BY-STEP INSTRUCTIONS

SELECT THE DEVICE

A device must be selected before any operations can be performed.

DUPLICATE A MASTER

1. Load master and copy sockets.
2. Depress "program" key.

The Model 4 will automatically blank check the copy PROM, pass a good device and continue into program. Once the manufacturer's programming time is complete the unit automatically verifies the copy to master.

VERIFY ONE PART AGAINST ANOTHER

1. Load master and copy sockets.
2. Depress "verify" key.

Model 4 automatically compares the master PROM to the device to be tested. If the data does not compare the unit will display the address that failed, master data, and copy data. After a fail a simple press of the "step" key will continue verification.

ALTER DATA

1. Place master in master socket.
2. Depress "load." Master data is transferred to internal RAM.
3. Enter "A" and address to be altered on keypad. Unit will display address and RAM data.
4. Enter new data on keypad. As it is entered it will be displayed.
5. Depress "step." This enters the new data change and steps to next address.
6. Complete as many changes as needed.
7. RAM data can now be programmed into a copy PROM with a move routine or used in the Emulation mode. (See Emulate.)

EDITING

Move Routine: Block moves of data in RAM to copy device.

1. Depress "A" then depress "Program." This sets the programmer into the editing software.
2. Depress "B" to initiate the software to a block move and then a number "1" through "8." A "1" moves the 2K X 8 of RAM into the lower 2K of data in the copy device. A "2" command moves the RAM data into the next 2nd 2K section of the copy PROM and "3" into the 3rd section of the copy PROM, etc., until the complete copy device selected is programmed.

1 = 0000 –	07FF	16K	5 = 2000 –	27FF	80K
2 = 0800 –	0FFF	32K	6 = 2800 –	2FFF	96K
3 = 1000 –	17FF	48K	7 = 3000 –	37FF	112K
4 = 1800 –	1FFF	64K	8 = 3800 –	3FFF	128K

Generalized Moves:

1. Any number of bytes can be moved from copy, master, or RAM.
2. Depress "A" then "Program." This sets the programmer into the move routine.
3. Enter beginning address of the block to be moved, XXXX.
4. Enter ending address of the block to be moved, YYYY.
5. Enter the beginning address of the destination, ZZZZ.
6. After the last Hex key is depressed, the instrument automatically transfers the defined block of data to the address designated.
   If the block to be moved is in the master, add 2000 Hex to the address and enter that number. If the block is in the copy, add 4000 Hex to the address and enter that number.
   Example: Move address 0000 through 03FF of master into copy at address 0800.
   (a) Depress "A" then "Program."
   (b) Enter beginning address 2000 (2000 + 0000).
   (c) Enter ending address 23FF (2000 + 03FF).
   (d) Enter destination 4800 (4000 + 0800).
   (e) After the last hex entry the block of data outlined was programmed into the copy starting at copy address 0800.

List Routine: When Model 4 is dumping to a CRT or etc., it will list the contents of RAM, master or copy data over a specified field utilizing same sequence as generalized move routine.

Warranty

One year on parts and labor.

Miscellaneous

Transformer . . . . . Shielded to safety ground.
Power Cord & Receptacle . . . . . International standard CEE-22.
Fuseholder . . . . . Shock-safe, meets IEC Pub No. 65.
Operating Temperature . . . . . 0°C to 55°C; (32°F to 131°F).
Weight . . . . . 5 lbs. (2.3 kg).
Measurements:
Length. . . . . 9 in. (22.86 cm).
Width . . . . . 8 in. (20.32 cm).
Height . . . . . 4 in. (10.16 cm).

Power Requirements . . . . . 100, 115, 230 VAC ±10%, 50–60 Hz, approximately 30 VA.

SALES ORDER 3047

E-H International, Inc.

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This procedure is for the check-out of the Model 4 EProm Programmer. It has been broken down into five sections. These sections cover testing the two main assemblies separately and together as a complete unit. A thorough understanding of the Model 4's Instruction Manual and the Model 4's use is necessary when using this procedure.

There are also two forms that must be completed before the unit can be considered ready to ship. One is the Logic Board check-list that should be completed while performing section II of the check-out procedure. The second is the revision record that must be completed for each box.

SECTION I - MODEL 4 LOGIC BOARD POWER-UP

Before beginning the technician should understand the operation of the keypad and the display format. You should also know the physical layout of the CPU board.

1. The following equipment is needed for this procedure:
   - A. Real Time Scope
   - B. Dmm or VOM
   - C. Model 4P.S. - completely test

2. Logic Board Power-up - The board-set should be powered-up using a pre-checked Model 4 power supply. The CPU (A34), Proms-(A28-A30), Ram (A25-26 and A31-33) should not be installed.

   A. With power off check that none of the supplies are shorted together.

   B. Turn power on. Check that none of the supplies are shorted to ground or another supply.

   C. Adjust the clock to one MHZ. Turn-off the power.

   D. Install the CPU, Proms and Ram as listed below:

A25 - 2112 Ram

A26 - 2114 Ram

A27 - 2114 Ram

A28 - TI2716 Prom #1 - operating system

A29 - empty

A30 - TI2716 Prom #2 - operating system

A31 - 2114 Ram

A32 - 2114 Ram

A33 - 2112 Ram

E. Turn power on. A "d" should appear on the display and you should be able to enter a device code. If a "d" doesn't appear your CPU and/or operating system hardware isn't working. Before going on to section II, check the keyboard by pushing load and/or verify and check that the display gives the correct code.

SECTION II LOGIC BOARD SET CHECKOUT

1. The following equipment is needed to check-out the board sets.

   A. Real time scope. Accurate to 0.5% on the 0.1 MICR SEC range in order to set the 1MHZ clock.

   B. DVM

   C. Teletype and special cable for Model 4.

   D. Model 4 test tool.

   E. RS232 cable or special teletype cable.

   F. 24 conductor cable with 24DIP connectors on both ends.

   G. TTY test tape

   H. Model 4 power supply.

   I. 1 each of PROMS 2708, TI2716, TI2516 or Intel 2716, TI2532.

   J. Model 4 Manual

   K. Test loads for testing pins under load.

Logic Board sets should be checked using a pre-tested Model 4 Power Supply.

2. Cpu Clock - Frequency adjustment is by 5K pot. Duty cycle is by selecting resistor to A24P7 frequency should be 1MHZ ± 0.5% measured at A34P38.

3. Pin test - All AC signals are TTL signals except for the 24V program pulse on Pin 20. Using TableII-1, the read signals can be seen on the master socket during program and the Pgm signal on the copy socket during program.

A. ~~Using [redacted] Intel [redacted]~~ In D2 and program, test pins 26,23,22,21 & 20. Also, ~~test~~ with special prom, Test the add & data lines for proper levels.

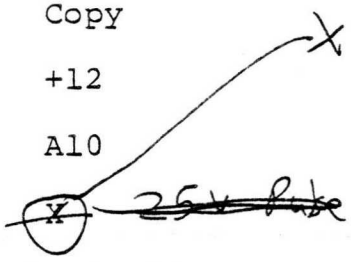
Pin	Master	Copy
26	+5	+5
23	-5	-5
22	CE	+1 2
21	+12	+12
20	OV	+25V (note 4, TableII-1)

In Verify mode check pins 22 & 20 of the copy socket.

Pin	Master	Copy
22	X	~~OV~~ CE
20	X	~~CE~~ OV

B. In D3 test pins 26,22 & 20 in program.

Pin	Master	Copy
26	X	+12
22	X	A10
20	CE	



In verify mode check pin 20 of the copy for CE.

C. In D5 test pin 23 and 20 of copy and master in program.

Pin	Master	Copy
23	+5	+25
20	X	$\overline{\text{PGM}}$

(Note 5, Table II-1)

Test pins 21 and 23 of copy and master in verify.

Pin	Master	Copy
23	X	+5
21	A10	A10

D. In D6 test pin 22 of master and copy in program.

Pin	Master	Copy
22	PD	PGM

(Note 5,Table II-1)

Test Pin 20 of master and copy in verify for A11.

E. In D7 test pins 22 & 20 of copy in program.

Pin	Master	Copy
22	X	+25
20	X	PGM (NOte 5,TableII-1)

Test Pins 23, 22 & 20 of master and copy in verify.

Pin	Master	Copy
23	$\overline{A11}$	$\overline{A11}$
22	$\overline{OE}$	$\overline{OE}$
20	Note 6 Table II-1	

F. In D8 test pins 28,27,23,2 and 1 of master and copy in verify.

Pin	Master	Copy
28	+5	+5
27	OV	OV
23	A12	A12
2	OV	OV
1	+5	+5

Test pin 1 of copy in program for +25V.

G. In D9 test pins 23 and 2 of master and copy in the verify mode.

Pin	Master	Copy
23	A11	A11
2	A12	A12

H. In DA test pin 2 of master and copy, in verify, for A13. You will see only a TTL DC. level.

I. In DB test pin 27 of master and copy, in verify, for A13. You will see only a TTL DC level.

4. Checks CPU and most of logic not checked in ~~section~~ step 3. To perform this ~~section~~ step you must know how to load master to ram and verify ram to copy.

A. Load D3 test prom into ram. Make sure check sum is correct.

B. Using test prom that was loaded into ram, verify copy socket against ram.

5. The following explanation refers to a bit and not a byte of a prom. When a prom

is new or erased all inputs are high. During programming when a high is required, no change is required at the input for the output to be a high. When a low is required during programming the input is pulled low. Becuase of this it is possible to change the programmed data, after the first programming, depending on the bit pattern originally programmed. A high can be changed to a low, but a low cannot be altered. In data bytes FF is all bits high and 00 is all bits low.

A. Load a 2708, programmed with all FF, into ram. Change ram address 0000 to FE. Load ram to copy. This should be done by allowing the prom to be programmed for about 5 seconds and then pushing reset. Now verify the copy to ram. The displayed checksum should be FbFF. If the part doesn't verify program it for another 5-6 seconds.

B. Do the same operation as A using a TI 2716. The checksum should be F7FF.

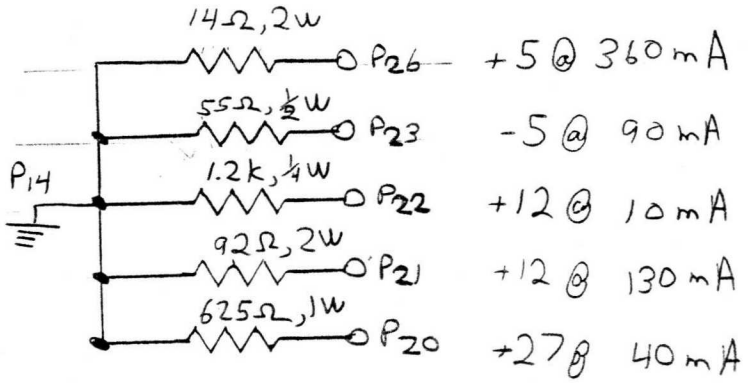
C. Do the same operation as in B using an Intel 2716 or TI2516.

D. Follow the same procedure as in C using a TI2532. The checksum should read 7FFF.

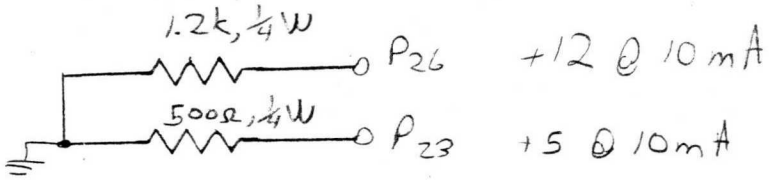
For the next machine to be checked use the same procedure and proms. The only diference will be to add one to the address to be altered. The checksum should also be reduced by one.

6. Loading pin drivers, use test loads below, with Model 4 P.S.

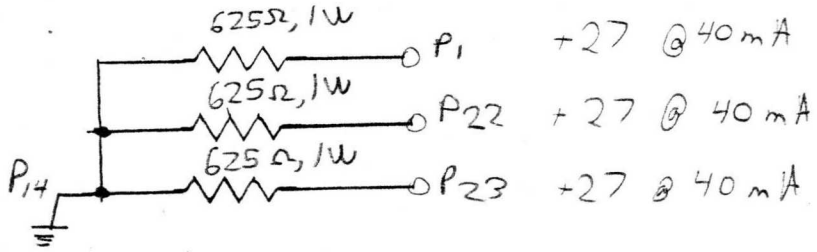
Test Load 4-1



Test load
4-2



Test Load
4-3



A. Use test load 4-1 with box in D2 and program. Test pin 26,23,22,21 & 20 of copy for voltages listed in table. Also check TR and Tf of 25V pulse at pin 20 under load.

B. Use test load 4-2 with box in D3 and program. Test P26 of copy for +12.6 To +11.8.

C. Use test load 4-2 with box in D5 and verify. Test pin 23 of master and copy for (Vcc-.6).

D. Use test load 4-3 with box in D5 and program. Test pin 23 of copy for +24V-26V.

E. Use test load 4-3 with box in D7 and program. Test pin 22 of copy

for +24-26V.

F. Use test load 4-3 with the box in D8 and program. Test pin 1 of the copy for +24-26V.

7. Display and keypad check. When checking display look for missing and weak segments as well as complete digits. The operator should understand the use of the Alter function and its display format. The box should be programmed to D3 or greater.

A. Enter -A078888, check all digits and segments, then hit step, then reset.

B. Enter - A0788, the data for this memory location should display 88.

C. Enter - D8, checking the 5 of the displayed 2564. Enter A0234, checking the 2.

8. Keypad check. Check for proper operation and positive feel and return of each key. Check that for each key entered the proper data is displayed in the correct location. Operator should understand the alter function and its display format.

A. Enter any device, A0123, 45, step, 6 7, step 8 9, step, A B, step, C D, step, EF

9. Teletype check. Use special cable built for TTY. Operator must understand the TTY as well as the I/O operation of the Model 4.

A. Select baud rate of 110.

B. Program Model 4 to receive information from the TTY.

C. Load test tap from teletype into Model 4.

D. Check the checksum displayed. It should be the checksum of the data transmitted by the teletype.

E. Select a baud rate of ~~1200~~ 110.

F. Program the Model 4 for a starting address of 0000 and a ending address of 000F.

G. The data printed out on the teletype should be the data transmitted from the paper tape to the Model 4 in step C.

10. RS232 Interface Checkout. A second Model 4 is needed for this test Connect the two Model 4"s together using the RS232 portion of the special TTY cable. The data stored in ram for test 9 will be used for this test.

A. Program both units for a baud rate of 1200.

B. Program one unit to receive.

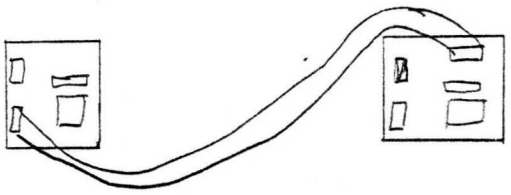
C. Enter a starting address of 0000 and a ending address of 000F into the second unit.

D. Check that the displayed checksum of both units is correct.

E. Follow the same procedure as in steps A-D except reverse the transmit and receive roles of the two units.

11. Emulate - The emulate function is to allow the ram in the Model 4 to replace a prom in another device for the purpose of software development and modification. The special Model 4 with 3 sockets should be used for this test.

A. Select D3 on the Model 4 under test and the test tool. Remove the prom from the third socket of the test tool and load it into the unit under test. Connect. The two units with a 24 conductor cable as shown below.



B. Program the Model 4 under with E, step. The test tool should now function properly. Check that a D3 is displayed and that the display format is correct when verify is pushed.

SECTION III POWER SUPPLY AND CHASSIS CHECK-OUT

1. The following equipment is needed to complete this section.

   1. Real Time Scope
   2. DMM
   3. Variac
   4. P.S. load

Pin	Voltage	@	Current	Tolerance
1	Grnd			
2	-5V		325mA	5.25V-4.75V
3	+40V		50mA	50V-32V
4	+27V		40mA	28V-26V
5	+12V		375MA	12.6V-11.8V
6	+5V		1.5A	5.25V-4.80V
7	-12V		50mA	12.6V-11.8V
8	Grnd			

2. No load check-out

Bring P.S. up using a variac. The P.S. should draw less than 0.1 Amps. Check that the correct voltages are present at the proper pin. Check for osc on the supplies.

3. P.S. under load.

A. Bring P.S. up on variac. The P.S. should draw about 0.36 Amps.

B. Check that all the supplies are within tolerances. There is a IN914B installed in the ground lead of the regulators for the +12 and +27 supplies. If the supplies are to high this diode can be replaced with a jumper.

C. Insert a current meter from +27V to ground. The supply should current limit at about 100MA. Remove meter.

D. Check supplies for osc.

E. Turn off power, the supply is now checked.

SECTION IV ASSEMBLED MODEL 4

This section is to verify the unit's operation before putting it in the heat room.

1. The following equipment is needed to check-out the assembled Model 4.
   - A. Copy of Section II
   - B. Proms-2708 and TI2716
   - C. Teletype and special cable
2. Program Proms
   - A. Turn on power. A "d" should be displayed. Enter a device code.
   - ~~B. Section II.5.A~~
   - C. Section II.5.B
3. TTY interface
   - A. ~~Section II.9.A~~ Repeat section II.9.A-D
   - ~~B. Section II.9.B~~
4. Heat - Put the Model 4 in the heat room for 4 days with a device code entered.

SECTION V FINAL CHECK-OUT

To complete this section you will need a copy of Section II and the equipment listed in it.

1. Pin drivers - repeat section II.6
2. Program Prom - repeat section II.5A Thru section II.5D
3. RS232 - repeat section II.9. and section II.10.

~~4. Be sure the check sheet and revision record are complete. If they are the Model 4 is now complete.~~

OK - leave in

DEVICE	P1		P2		P20 (P18)[1]		P21 (P19)[1]		P22 (P20)[1]		P23 (P21)[1]		P26 (P24)[1]		P27		P28	
	Read	Pgm	Read	Pgm	Read	Pgm	Read	Pgm	Read	Pgm	Read	Pgm	Read	Pgm	Read	Pgm	Read	Pgm
1 2704					0.8	27[4]	12.6	12.6		12.6	-4.75	-4.75	5.25	5.25				
					0.0	25	11.4	11.4	$\overline{CE}$	11.4	-5.25	-5.25	4.75	4.75	P1	1 28		P28
															P2	2 27		P27
2 2708					0.8	27[4]	12.6	12.6	$\overline{CE}$	12.6	-4.75	-4.75	5.25	5.25	A7-1	3 26		24-P26
					0.0	25	11.4	11.4		11.4	-5.25	-5.25	4.75	4.75	A6-2	4 25		23-A8
															A5-3	5 24		22-A9
3 2716						27[4]	12.6	12.6			-4.75	-4.75	5.25	12.6	A4-4	6 23		21-P23
					$\overline{CE}$	25	11.4	11.4	A10	A10	-5.25	-5.25	4.75	11.4	A3-5	7 22		20-P22
															A2-6	8 21		19-P21
4 2758						PGM[5]	L_0	L_0					5.6	26	5.25	5.25	A1-7	9 20		18-P20
2508					V_{IL}		~~A10~~	~~A10~~	$\overline{CE}$	$\overline{CE}$			4.4	24	4.75	4.75	A0-8	10 19		17-D7
																	DO-9	11 18		16-D6
5 2716						PGM[5]							5.6	26	5.25	5.25	D1-10	12 17		15-D5
2516					V_{IL}		A10	A10	$\overline{OE}$	$\overline{OE}$			4.4	24	4.75	4.75	D2-11	13 16		14-D4
																	gnd-12	14 15		13-D3
6 2532													5.6	26	5.25	5.25	(VSS)			
					A11	A11	A10	A10	PD	$\overline{PGM}$[5]			4.4	24	4.75	4.75				
										26					5.25	5.25				
7 2732					V_{IL}[6]	$\overline{PGM}$[5]	A10	A10	$\overline{OE}$	24	A11	A11			4.75	4.75				
8 2564	5.6	26													5.25	5.25				5.25 5.25
	4.4	24	V_{IL}	V_{IL}	A11	A11	A10	A10	$\overline{CE}$	$\overline{PGM}$[5]	A12	A12			4.75	4.75	V_{IL}	V_{IL}		4.75 4.75
9 2764										26					5.25	5.25				5.25 5.25
	NC	NC	A12	A12	V_{IL}	$\overline{PGM}$[5]	A10	A10	$\overline{OE}$	24	A11	A11			4.75	4.75	V_{IL}	V_{IL}		4.75 4.75
A TI 128K	5.6	26													5.25	5.25				5.25 5.25
	4.4	24	A13	A13	A11	A11	A10	A10	$\overline{CE}$	$\overline{PGM}$[5]	A12	A12			4.75	4.75	V_{IL}	V_{IL}		4.75 4.75
B INT 128K										26					5.25	5.25				5.25 5.25
	NC	NC	A12	A12	V_{IL}	$\overline{PGM}$[5]	A10	A10	$\overline{OE}$	24	A11	A11			4.75	4.75	A13	A13		4.75 4.75

NOTES:
1. 24 Pin devices are registered to bottom of sockets.
2. All pins are common except those called out in the ta le.
3. When a signal is noted, V_{IH}=3.0 and V_{IL}=0.65 apply.
4. Pulse width is .9 to 1.1 ms. Rise and fall time more than 500ns and less than 2 microseconds.
5. Pulse width ~~4.5~~ 45 to ~~5.5~~ 55 ms. V_{IH} and V_{IL} levels.
6. In read P_{20} in V_{IL} for master and TTL for copy

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 4

E.C.O.

DESCRIPTION NMCS-EPROM PROGRAMMER

FILLED BY _____ DATE _____ RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	146-44900	CPU & Pin Driver Assy	A201/202	1					
B									
C	255-44903	Chassis Assy		1					
D									
E	259-44907	Top Cover Assy		1					
F									
G	402-44800	Power Supply Regulator	A301	1					
H									
I	820-44913	Standard Accessories		1					
J									
K	821-44927	Optional Accessories		Opt					
L									
M	825-44914	Completion Materials		1					
N									
O	850-44928	Special Handling Assy-CPU		1					
P									
Q									
R									
S									
T									

DRWN NLE
CHKD _____
APPD _____

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 146-44900

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DESCRIPTION CPU AND PIN DRIVER ASSEMBLY

E.C.O.

FILLED BY _____ DATE / RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	146-44900	Assembly Drawing	Prod Ref						
B	141-44921	Master Schematic	Prod Ref						
C	060-44902	Alignment Fixture	Prod Ref						
D									
E	402-44916	CPU Board Assembly	A201	1					
F	402-44919	Pin Driver Board Assembly	A202	1					
G									
H	495-00089	Receptacle, 28 Pin Zero							
I		Insertion Socket	XJ201A,202A	2					
J	495-00090	Socket Housing, 8 Pos	XS206	1					
K	495-00092	Socket, 28 Pin IC	XJ201B,202B	2					
L									
M	496-00045	Contact	(XS206)	8					
N									
O	584-00042	Relay	K1-4	4					
P									
Q	635-00028	Pushbutton Sw, SPST Wht	S201-205	5					
R									
S	645-00015	Display	DS201	1					
T									

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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DESCRIPTION CPU AND PIN DRIVER ASSEMBLY

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E.C.O.

FILLED BY _____ DATE _____ RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A		-HARDWARE-							
B	202-00006	Screw 4-40x¼ BHMS (4)	Prod Ref						
C	475-00016	Standoff, 4-40x¼ Swage(2)	Prod Ref						
D									
E									
F									
G									
H									
I									
J									
K									
L									
M									
N									
O									
P									
Q									
R									
S									
T									

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 255-44903

E.C.O.

DESCRIPTION CHASSIS ASSEMBLY

FILLED BY _____ DATE _____ RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	254-44904	Chassis		1					
B									
C	258-13061	Cover, Barrier Strip	(TB301)	1					
D	144-13062	Silkscreen, Cover	Prod Ref						
E									
F	316-00128	Cap, E1 15Kμf 15V	C301	1					
G									
H	396-00009	Fuse Holder w/Hdw	XF101	1					
I	398-00009	Fuse, .5A S.B.	F101	1					
J									
K	484-00023	Jumper, Barrier Strip	(TB301)	2					
L	484-00027	Terminal, Barrier Strip	(TB301-1,						
M			TB301-3)	2					
N	484-00036	Barrier Strip	TB301	1					
O	484-00037	Marker, Barrier Strip	(TB301)	1					
P									
Q	630-00049	Rocker Switch, Power	S101/DS101	1					
R									
S	650-19631	Transformer	T301	1					
T									

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 255-44903

COPY DATE 12-5-78

DESCRIPTION CHASSIS ASSEMBLY

E.C.O.

FILLED BY _____ DATE _____ RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTENSION	SHORT
A	700-00204	Connector, AC Recept	J101	1					
B									
C	706-44905	Cable Assy, Prog Interface	J101/A201P1	1					
D									
E	702-44906	Wire List	Prod Ref						
F									
G		-HARDWARE-							
H	202-00325	Screw 4-40x3/8 Nylon BHMS (3)	Prod Ref						
I	202-00301	Screw 4-40x¼ S.S.PHMS (6)	Prod Ref						
J	202-00303	Screw 4-40x3/8S.S. PHMS (4)	Prod Ref						
K	202-00305	Screw 4-40x½ S.S PHMS (2)	Prod Ref						
L	203-00002	Screw 6-32x3/16 BHMS (2)	Prod Ref						
M	203-00303	Screw 6-32x½ S.S. PHMS (2)	Prod Ref						
N	204-00303	Screw 8-32x3/8 S.S.PHMS (4)	Prod Ref						
O	205-00001	Screw 10-32x¼ RHMS (2)	Prod Ref						
P	215-00004	Washer, #6 Int Tooth (2)	Prod Ref						
Q	215-00006	Washer, #10 Int Tooth (1)	Prod Ref						
R	240-00001	Kepnut 4-40 (3)	Prod Ref						
S	240-00003	Kepnut 8-32 (4)	Prod Ref						
T	240-00006	Nut, 4-40 (1)	Prod Ref						

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 255-44903

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DESCRIPTION CHASSIS ASSEMBLY

E.C.O.

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ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	410-00325	Clamp 1 3/8 (1)	Prod Ref						
B	460-00002	Lug, #4 (1)	Prod Ref						
C	460-00012	Spade Lug, 18-22AWG #6 (1)	Prod Ref						
D	460-00016	Lug, #4 Int Tooth (2)	Prod Ref						
E	460-00301	Lug, #10 (1)	Prod Ref						
F	460-00302	Lug, #10 Int Tooth (2)	Prod Ref						
G	475-00029	Standoff, 6-32x½ (2)	Prod Ref						
H	500-00017	Mica Washer, TO-220 (5)	Prod Ref						
I									
J									
K									
L									
M									
N									
O									
P									
Q									
R									
S									
T									

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 259-44907

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DESCRIPTION TOP COVER ASSEMBLY

E.C.O.

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ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	258-44908	Top Cover		1					
B	144-44909	Silkscreen, Top Cover Front	Prod Ref						
C	144-44910	Silkscreen, Top Cover Rear	Prod Ref						
D									
E	275-44911	Filter, Display	(DS201)	1					
F									
G	495-00088	Socket, 28 Pin Zero Insert	J201,202	2					
H	210-00300	Screw 0-80x5/8 82° SS							
I		Phillips FHMS	Prod Ref						
J									
K	635-00027	Keypad	S206	1					
L									
M									
N		-HARDWARE-							
O	200-00308	Screw 2-56x¼ SS PHMS (4)	Prod Ref						
P	202-00011	Screw 4-40x¼ 100° FHMS (2)	Prod Ref						
Q		Contact Cement (A/R)	Prod Ref						
R									
S									
T									

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 402-44800

E.C.O.

DESCRIPTION POWER SUPPLY REGULATOR BOARD ASSEMBLY

FILLED BY _____ DATE _____ RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	400-44799	PC Board		1					
B	402-44800	Assembly Drawing	Prod Ref						
C	141-44921	Master Schematic	Prod Ref						
D									
E	311-00038	Cap, Mono 1µf 50V	C7,8, 13,14	4					
F	311-00045	Cap, Cerm .33µf 50V	C5,10	2					
G	311-00074	Cap, Cerm .01µf 100V	C3	1					
H	311-00110	Cap, Cerm .1µf 16V	C6,11	2					
I									
J	316-00053	Cap, E1 Axial 150µf 50V	C1	1					
K	316-00129	Cap, E1 Axial 250µf 25V	C12	1					
L	316-00130	Cap, E1 Axial 1.5Kµf 25V	C9	1					
M	316-00131	Cap, E1 Axial 2.5Kµf 16V	C4	1					
N									
O	374-00111	Diode, 1N5250A	CR6	1					
P									
Q	376-00022	Diode, 1N4448 (1N914B)	CR5,19-21	4					
R	376-00034	Diode, 1N4005	CR1-4, 11-18	12					
S	376-00110	Diode, MR500	CR7-10	4					
T									

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 402-44800 COPY DATE 12-5-78

E.C.O.

DESCRIPTION POWER SUPPLY REGULATOR BOARD ASSEMBLY

FILLED BY _____ DATE / RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	QT. ASSEM	ISSUED	UNIT COST	UNIT	EXTENSION	SHORT
A	595-00056	Resistor 5.6Ω ¼W 5%	R1	1					
B	595-00102	Resistor 1K ¼W 5%	R3,4	2					
C	595-00223	Resistor 22K ¼W 5%	R2	1					
D									
E	663-00106	Transistor 2N4919	Q1	1					
F									
G	665-00467	IC 7805	IC2	1					
H	665-00479	IC 320-5.0	IC3	1					
I	665-00480	IC 320-12	IC5	1					
J	665-00481	IC 340-12	IC4	1					
K	665-00482	IC 341-5.0	IC1	1					
L									
M	706-44926	Cable Assembly, Power	A202P4	1					
N									
O									
P									
Q									
R									
S									
T									

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 820-44913

E.C.O.

DESCRIPTION STANDARD ACCESSORIES

FILLED BY _____ DATE / RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	148-07718	Manual		1					
B	800-00032	Envelope		1					
C									
D	786-00020	Power Cord		1					
E									
F	146-26341	Documentation List	Prod Ref						
G									
H									
I									
J									
K									
L									
M									
N									
O									
P									
Q									
R									
S									
T									

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 825-44914

E.C.O.

DESCRIPTION COMPLETION MATERIALS

FILLED BY _____ DATE _____ RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	276-16959	Label "117V"		1					
B	276-44929	Label, Test Socket Pin Mask		2					
C									
D	417-00015	Bail Kit, 6"		1		1.58			
E	417-00700	Foot		2		0.05			
F									
G	276-16960	Label "234V"	Prod Ref						
H	276-16998	Label "100V"	Prod Ref						
I	276-10098	Serial Tag	Prod Ref						
J	398-00018	Fuse,.25A S.B (234V)	Prod Ref						
K									
L									
M		-HARDWARE-							
N	203-00300	Screw 6-32x¼ S.S. PHMS (2)	Prod Ref						
O	203-00303	Screw 6-32x½ S.S. PHMS (6)	Prod Ref						
P									
Q									
R									
S									
T									

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 402-44916

E.C.O. 79-021

DESCRIPTION CPU BOARD ASSEMBLY

FILLED BY _____ DATE _____ RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	400-44915	PC Board		1					
B	402-44916	Assembly Drawing	Prod Ref						
C	141-44921	Master Schematic	Prod Ref						
D									
E	311-00041	Cap, Cerm .1µf 12V	C2-5,22	5					
F	311-00053	Cap, Cerm 56pf	C7	1					
G									
H	311-00074	Cap, Cerm .01µf 100V	C20,21	2					
I	311-00084	Cap, Mica 130pf	C18,19,24	3					
J									
K	318-00002	Cap Tant 4.7µf 20V	C6	1					
L	318-00305	Cap Tant 1µf 35V	C1	1					
M									
N	376-00022	Diode, 1N4448 (1N914B)	CR1,15,16	3					
O									
P	495-00091	IC Socket, 14 Pin	J1	1					
Q	495-00054	IC Socket, 16 Pin	XIC25,33	2					
R	495-00071	IC Socket 18 Pin	XIC26,27, 31,32	4					
S	495-00081	IC Socket, 24 Pin	XIC28,30	2					
T	495-00082	IC Socket, 40 Pin	XIC34	1					

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 402-44916

E.C.O. 79-021

DESCRIPTION CPU BOARD ASSEMBLY

FILLED BY _____ DATE _____ RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	551-00041	Potentiometer 5K	R39	1					
B									
C	595-00101	Resistor 100Ω ¼W 5%	R1	1					
D	595-00103	Resistor 10K ¼W 5%	R8-10,40, 41,44,52,						
E			53,57	9					
F	595-00104	Resistor 100K ¼W 5%	R2	1					
G	595-00114	Resistor 110K ¼W 5%	R43,55	2					
H									
I	595-00183	Resistor 18K ¼W 5%	R38	1					
J	595-00201	Resistor 200Ω ¼W 5%	R45-51	7					
K	595-00221	Resistor 220Ω ¼W 5%	R3	1					
L	595-00222	Resistor 2.2K ¼W 5%	R35,58,59	3					
M	595-00394	Resistor 390K ¼W 5%	R42	1					
N	595-00511	Resistor 510Ω ¼W 5%	R4	1					
O	595-00512	Resistor 5.1K ¼W 5%	R5-7	3					
P									
Q	596-00102	Resistor 1K ½W 5%	R11	1					
R									
S	611-00048	Res Ntwk 2.2K 10SIP Iso1	RP2,3	2					
T	611-00047	Res Ntwk 22K 10SIP Com	RP1	1					

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	MAT'L. REC. No.

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ASSEMBLY NO. 402-44916

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DESCRIPTION CPU BOARD ASSEMBLY

E.C.O.

FILLED BY _____ DATE _____ RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	665-00139	IC 74123	IC24	1					
B	665-00245	IC 7406	IC6,7	2					
C	665-00315	IC 555	IC5	1					
D	665-00332	IC 74LS00	IC18	1					
E	665-00341	IC 74LS175	IC45	1					
F	665-00369	IC 74LS138	IC20	1					
G	665-00371	IC 1488	IC8	1					
H	665-00395	IC 74LS157	IC1	1					
I	665-00420	IC 74LS01	IC16	1					
J	665-00422	IC 74LS139	IC21	1					
K	665-00452	IC 74LS14	IC14	1					
L	665-00477	IC 74LS75	IC15,23	2					
M	665-00478	IC 9368	IC22	1					
N									
O	666-00057	IC 74C02	IC3,11	2					
P	666-00061	IC 74C00	IC4,10	2					
Q	666-00062	IC 74C04	IC9	1					
R	666-00063	IC 74C157	IC2,17	2					
S	666-00066	IC 74C923	IC13	1					
T	666-00067	IC 80C97	IC12,37-40	5					

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	DATE

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ASSEMBLY NO. 402-44919

E.C.O.

DESCRIPTION PIN DRIVER BOARD ASSEMBLY

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ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	QT. ASSEM	ISSUED	UNIT COST	UNIT	EXTENSION	SHORT
A	400-44918	PC Board		1					
B	402-44919	Assembly Drawing	Prod Ref						
C	141-44921	Master Schematic	Prod Ref						
D									
E	311-00041	Cap, Cerm .1μf 12V	C14-17	4					
F	311-00053	Cap, Cerm 56pf	C13	1					
G									
H	318-00047	Cap, Tant 10μf 35V	C8-12	5					
I									
J	376-00022	Diode, 1N4448 (1N914B)	CR3,4,7,8 11,13,14	7					
K	376-00031	Diode 1N270	CR6,9,10	3					
L	376-00034	Diode 1N4005	CR2,5,12	3					
M									
N	595-00102	Resistor 1K ¼W 5%	R16,18,19, 61	4					
O	595-00103	Resistor 10K ¼W 5%	R12,13,15, 17,20,23,						
P			24,26,30, 32,34,36,						
Q			60	13					
R	595-00112	Resistor 1.1K ¼W 5%	R29	1					
S	595-00222	Resistor 2.2K ¼W 5%	R14,21,22, 25,27,31,						
T			33,62	8					

JOB NO.	ASSEMBLIES REQ'D	COST CENTER	DATE

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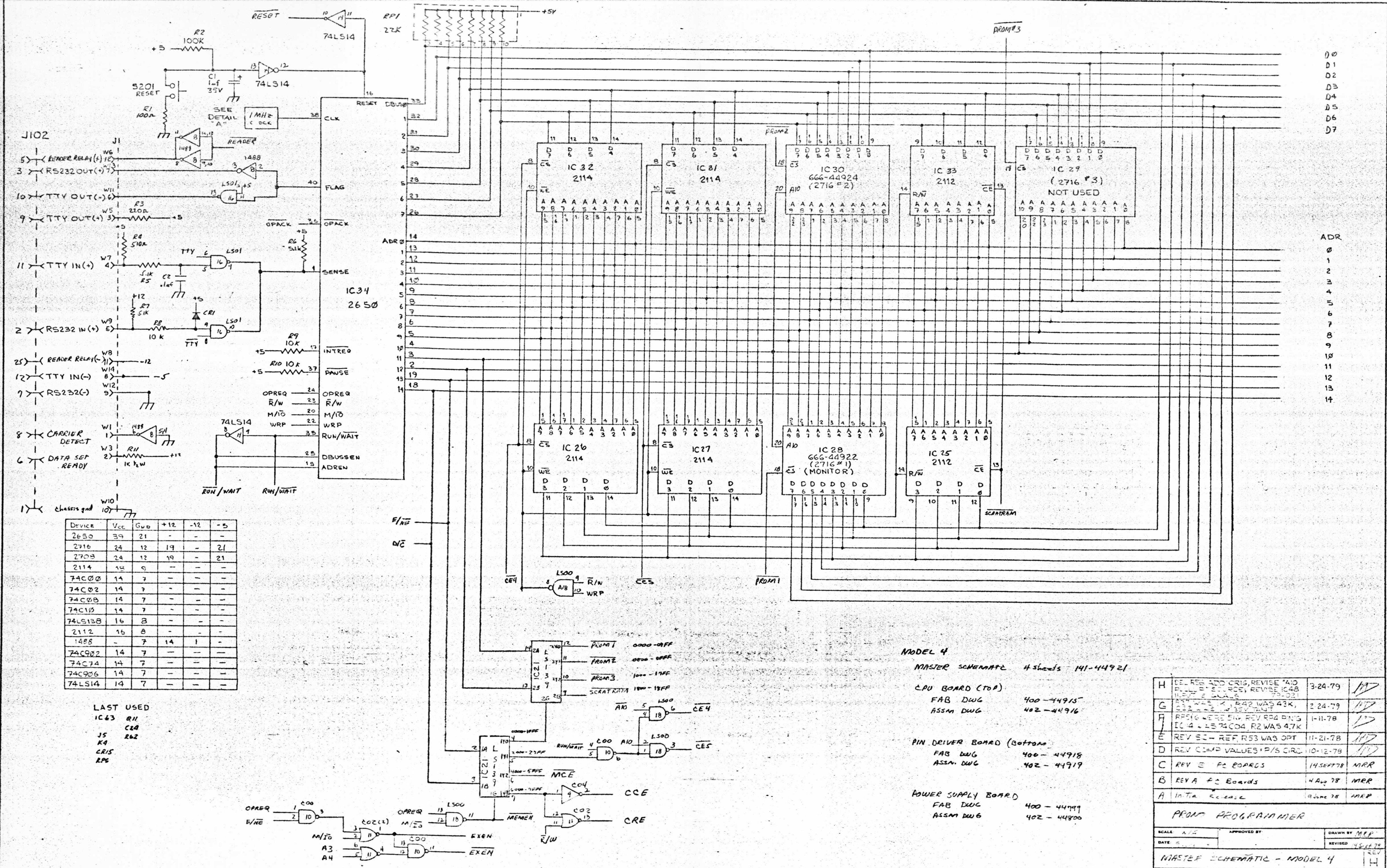
ASSEMBLY NO. 402-44919

E.C.O.

DESCRIPTION PIN DRIVER BOARD ASSEMBLY

FILLED BY _____ DATE _____ RELEASED TO _____ DATE _____

ITEM	ASSEMBLY OR PART NO.	DESCRIPTION	SCHEMATIC REF.	Q.T. ASSEM	ISSUED	UNIT COST	UNIT	EXTEN-SION	SHORT
A	595-00512	Resistor 5.1K ¼W 5%	R28	1					
B	595-00912	Resistor 9.1K ¼W 5%	R37	1					
C	611-00049	Res Ntwk 50Ω 10SIP Isol	RP5,6	2					
D	611-00047	Res Ntwk 22K 10SIP Com	RP4	1					
E									
F	663-00070	Transistor 2N3904	Q8	1					
G	663-00071	Transistor 2N3906	Q1-7, 9-11	10					
H									
I	665-00245	IC 7406	IC52,53	2					
J	665-00333	IC 74LS02	IC55	1					
K	665-00341	IC 74LS175	IC60	1					
L									
M	666-00057	IC 74C02	IC54	1					
N	666-00061	IC 74C00	IC48,51	2					
O	666-00064	IC 74C175	IC58,59,61	3					
P	666-00065	IC 74C906	IC56	1					
Q	666-00067	IC 80C97	IC57,62,63	3					
R									
S	700-00293	Conn. 8 Pin PC Mt	J4	1					
T	706-00002	Cable 40 Pin Jumper 2"		1					



DEVICE	Vcc	Gnd	+12	-12	-5
2650	39	21	-	-	-
2716	24	12	19	-	21
2708	24	12	19	-	21
2114	18	9	—	—	—
74C00	14	7	—	—	—
74C02	14	7	-	—	-
74C08	14	7	—	—	—
74C10	14	7	-	-	-
74LS138	16	8	-	-	-
2112	16	8	-	-	-
1488	-	7	14	1	-
74C902	14	7	—	—	—
74C74	14	7	—	—	—
74C906	14	7	—	—	—
74LS14	14	7	—	—	—

LAST USED
IC63 Q11
C24
J5 R62
K4
CR15
RP6

H	DEL R56, ADD CR16, REVISE "A10 PULL [illegible] SOURCE; REVISE IC48 INPUT [illegible] 79-021	3-24-79	[illegible]
G	[illegible] WAS [illegible] K, R42 WAS 43K, C22 WAS [illegible] 35V TANT	2-24-79	[illegible]
F	RP5,6 WERE 5K, REV. RP4 PIN'G IC14 WAS 74C04, R2 WAS 4.7K	1-11-78	[illegible]
E	REV SCH REF, R53 WAS OPT	11-21-78	[illegible]
D	REV COMP VALUES P/S CIRC.	10-12-78	[illegible]
C	REV B PC BOARDS	14 SEPT 78	MRR
B	REV A PC Boards	4 Aug 78	MRR
A	Initial Release	9 June 78	MRR

PROM PROGRAMMER

SCALE: N/A
DATE:
APPROVED BY:
DRAWN BY MRR
REVISED 14 Sept 78

MASTER SCHEMATIC - MODEL 4
REV H

PROCESSOR SEGMENT
DRAWING NUMBER 141-44921

SHEET 1 OF 4

LTR	DESCRIPTION	DATE	APPROVAL
A	Final Release	6 JUNE 78	MKR
B	REV A PC Boards	4 AUG 78	MKR
C	REV B PC Boards	14 SEP 78	MKR
—	SEE SHT 1	—	—

INTER-BOARD CONNECTIONS

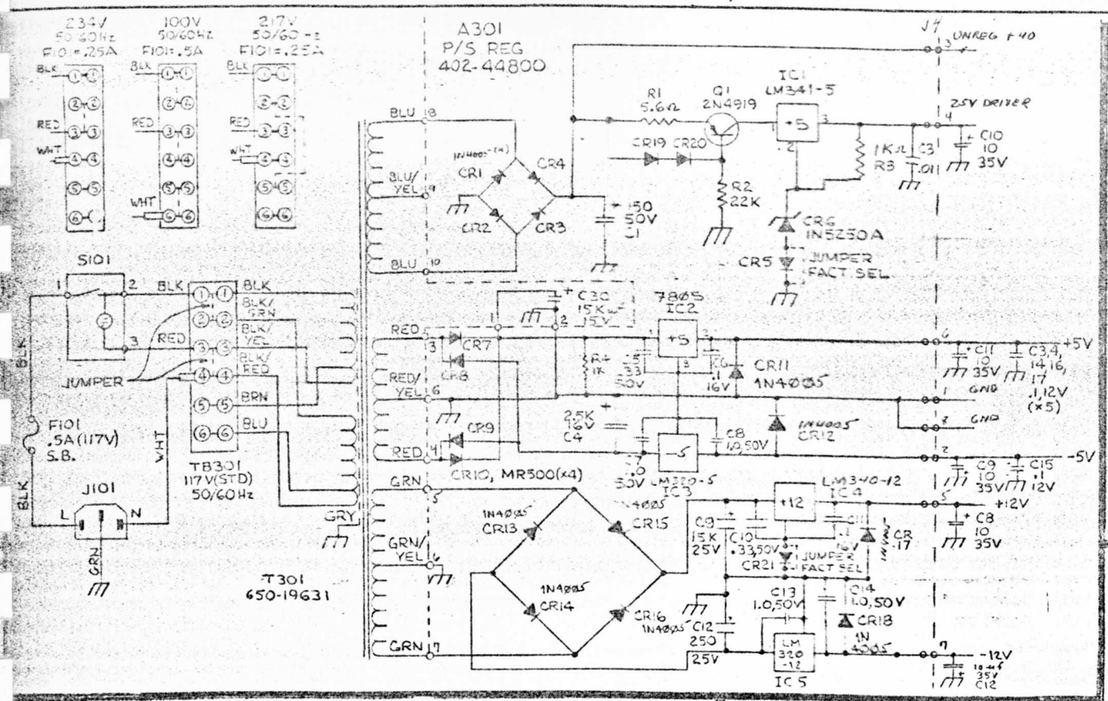
WIRE NO. / TERM	
1	SPARE
2	-12V
3	-12V
4	J
5	PD/PGM
6	PI8-A11
7	AA
8	A11
9	BB
10	PI8PGM
11	A12
12	SIMULATE (SPARE)
13	CCE
14	CC
15	DD
16	A10
17	RESET
18	A10 PULL UP
19	EE
20	W0
21	SIMULATE
22	TI2716
23	W6
24	GND
25	GND
26	+5
27	+5
28	+12
29	+12
30	-5
31	-5
32	D7
33	D6
34	D5
35	D4
36	D0
37	D1
38	D2
39	D3
40	A12EK

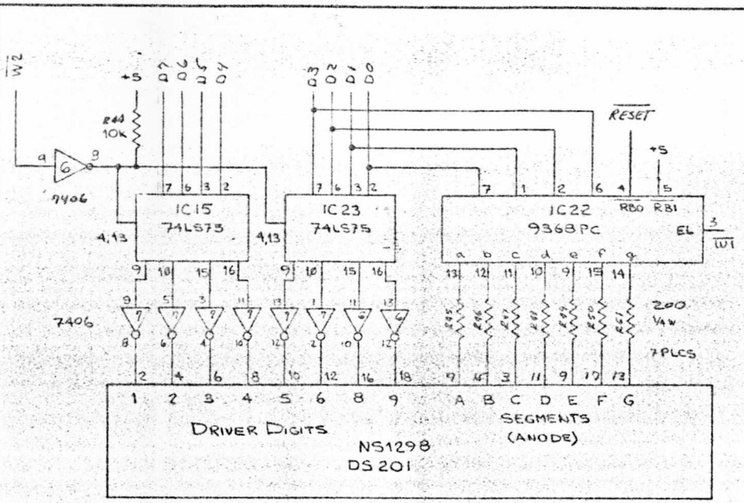
NOTES

1. Unmarked PNP transistors are 2N3906
2. Unmarked diodes are IN4448 (IN914B).
3. RESISTORS ARE Ω, 1/4W, 5%
4. CAPACITORS ARE μf

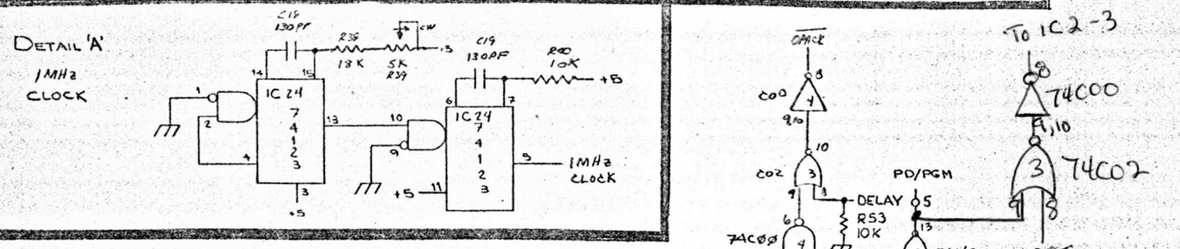
PROM PROGRAMMER

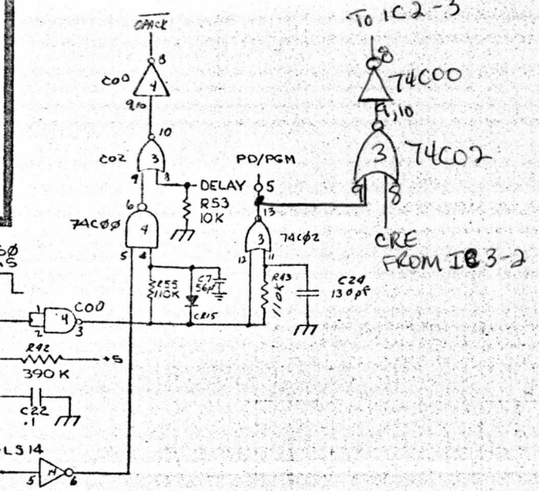
SCALE	APPROVED BY:
DATE	DRAWN BY: MAR
	REVISED 14 SEP 78
MASTER SCHEMATIC - MODEL 4	REV H
PIN DRIVERS	DRAWING NUMBER 141-44121

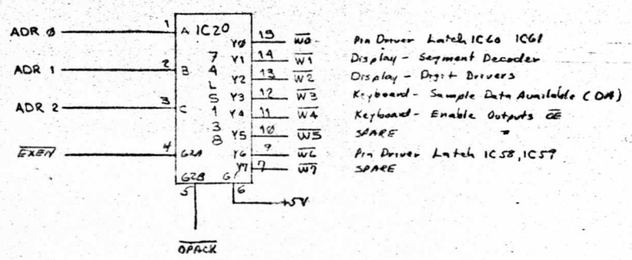


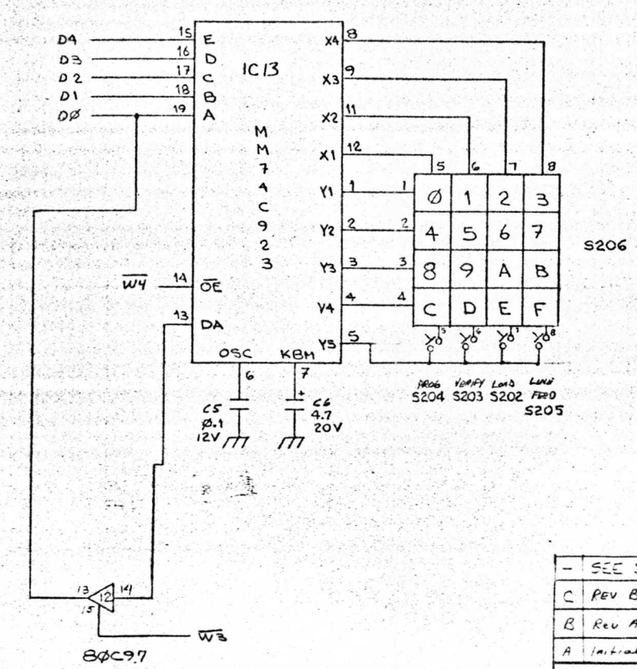


DEVICE	Vcc	GND
74C04	14	7
74C02	14	7
74C00	14	7
7416	14	7
74C74	14	7
74LS75	5	12
74123	16	8
9368	16	8
74LS193	16	8
MM74C923	20	10
74LS04	14	7
82C98	16	8
74C902	14	7









-	SEE SHT 1	—	—
C	REV B PC BOARDS	14 SEPT 78	MRR
B	Rev A PC Boards	4 Aug 78	MRR
A	Initial Release	26 June 78	MRR

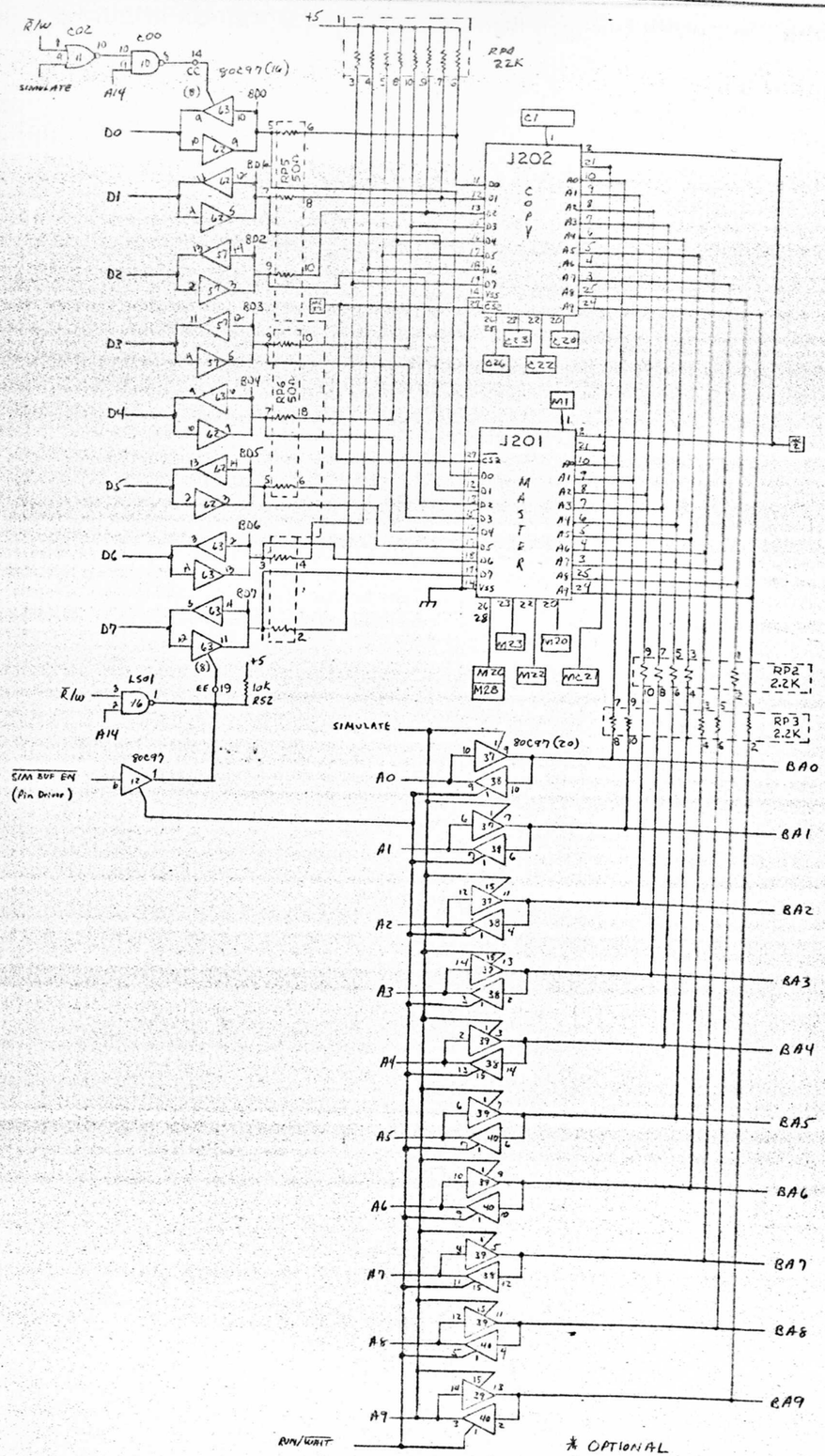
PROM PROGRAMMER

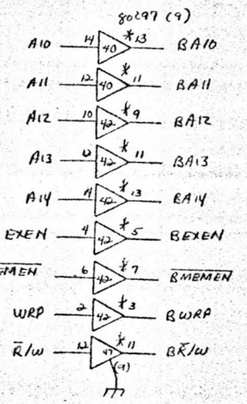
SCALE	APPROVED BY:	DRAWN BY	MRR
DATE 26 June 78		REVISED	14 Sept 78

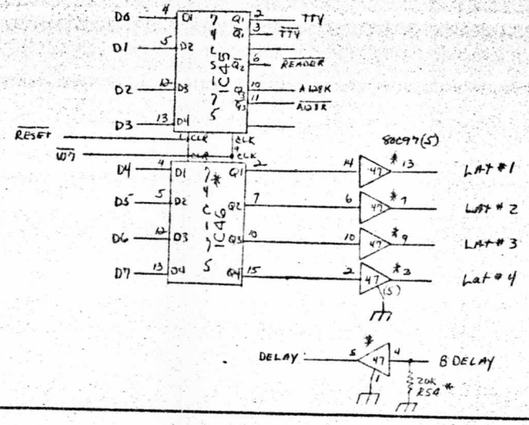
MASTER SCHEMATIC - MODEL 4 — REV H

SUPPLY, TIMING SEGMENTS — DRAWING NUMBER 141-44921

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Initial Release	9 June 78	MMR
B	Rev A PC Boards	4 Aug 78	MMR
C	Rev B PC Boards	14 SEP 78	MMR
—	SEE SHT 1	—	—







J2 - Top Board

1	ECHEN
2	BWRP
3	BA14
4	BA12
5	BA9
6	BA6
7	BA7
8	BA0
9	BA2
10	LAT#1
11	BR/W
12	LAT#3
13	GND
14	BA13
15	BA10
16	BMEMEN
17	BA11
18	BA8
19	BA5
20	BA4
21	BA1
22	BA3
23	LAT#4
24	BDELAY
25	LAT#2
26	GND

J5 - Bottom Board

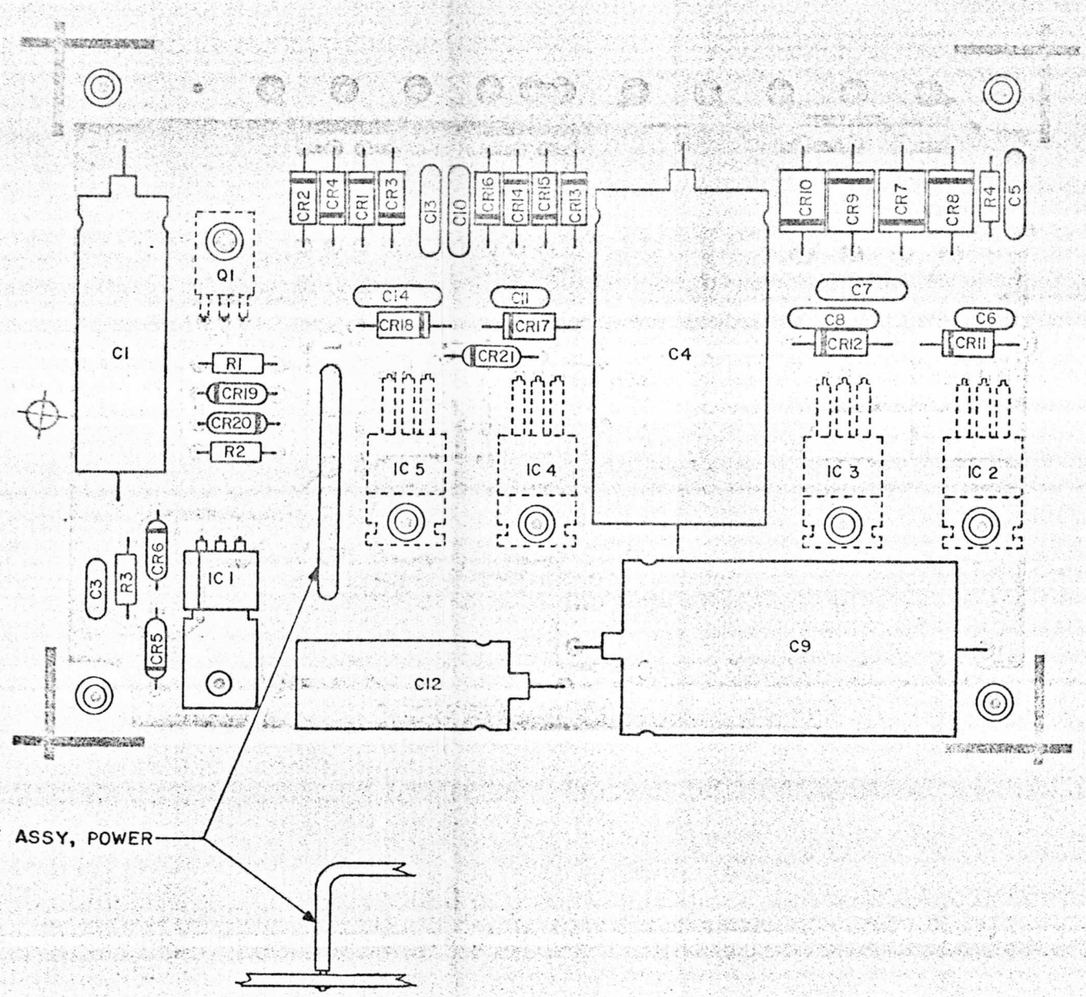
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	

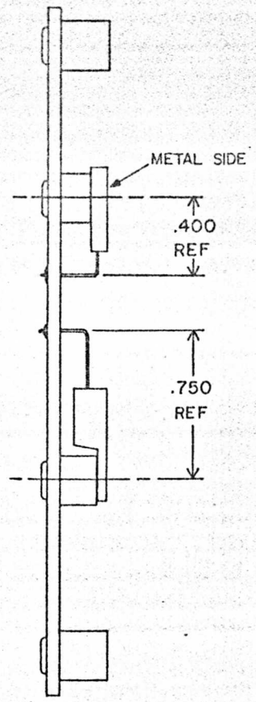
TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTIONS DEC ANGLES
APPROVALS DATE
DRAWN
CHECKED

PROM PROGRAMMER
MASTER SCHEMATIC - MODEL 4
INTERFACE SEGMENT

SCALE	SIZE	DRAWING NO	REV
N/A	D	141-44721	H

DO NOT SCALE DRAWING SHEET 1 OF 1





REF. DWG'S

1. BOARD OUTLINE:
2. FAB(SPEC) DWG: -400-44799
3. ASS'Y DWG: 402-44800
4. SCHEMATIC DWG: 141-44921

REVISIONS						
REV	DESCRIPTION					
A	ORIGINAL RELEASE	—	—	—	—	—
B	REVISED A/W					

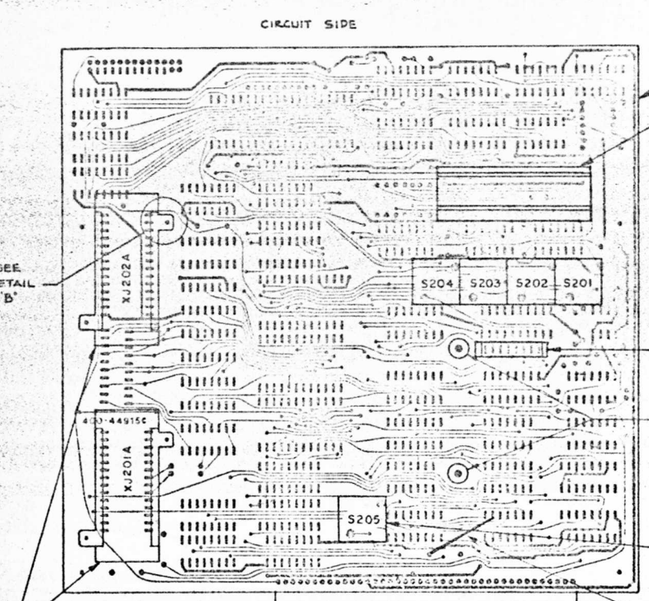
SCALE:		
USED ON	SPEC'D	NEXT ASS'Y
MODEL 4	1	402-44800

ASSEMBLY DRAWING
P.S. REGULATOR BOARD

MODEL NO. MODEL 4 — ISSUE

DRAWN			C-402-44800
CHECKED			B
APPROVED			SHEET NO. 1 OF 1

D-44900	ISSUE	REVISIONS	DATE	DRAWN	CHK'D	APP'D	ECO
B	A	ORIGINAL RELEASE.					
	B	CR16 WAS R56, ADDED CR16 TRACE MOD; ADDED IC48 TRACE MODS	3/24/79	SD			79-02



SEE DETAIL "B"

XJ201A, 202A [3]

402-44916 CPU BD. ASS'Y

D5201 [4]

22 AWG BUSS

DETAIL-"A" SCALE 1/1

XS204 SOCKET HOUSING CONTACT, 8 REQ'D

STANDOFF 4-40 X 1/4 SWAGE 2 PLACES [2]

CPU BD (CIRCUIT SIDE)

S201-205 5 PLACES [3]

26 AWG PVC JUMPER CR16 TO IC9-9

CABLE P/O 402-44919

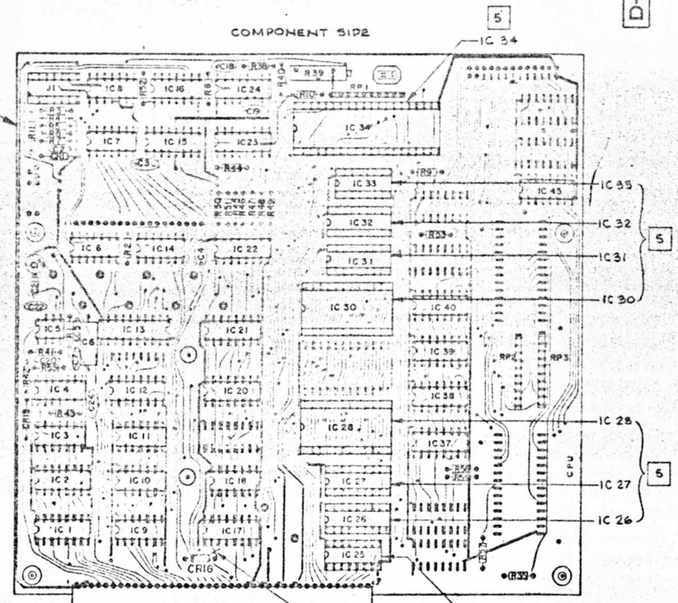
SOCKET TO BE MOUNTED IN THIS POSITION, NOTE TAB POSITION THIS END.

DETAIL-"B" SCALE 2/1

PIN DRIVER BD. IN MOUNTED POSITION.

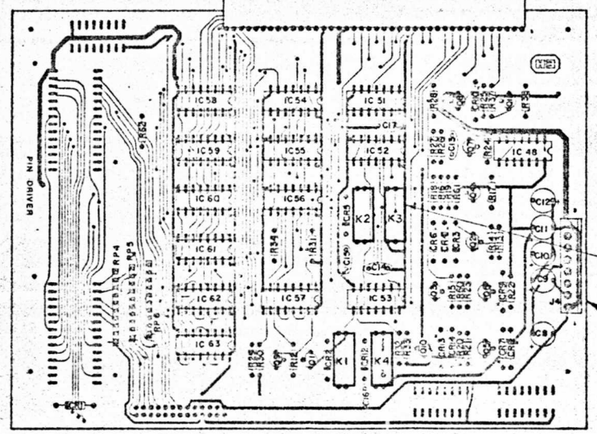
SCREW 4-40 X 1/4 PHMS 4 PLACES

CABLE (REF.)



[5]

CUT TRACE CR16 TO IC17-3



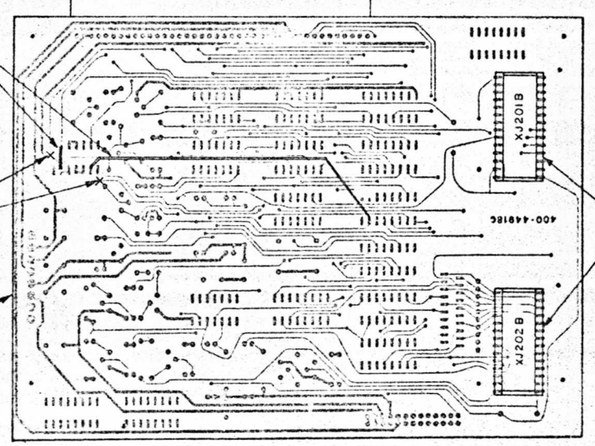
K1-4 4 PLACES

402-44919 PIN DRIVER BD. ASS'Y

26 AWG PVC JUMPERS
IC 48-2 TO IC 48-13
IC 48-9 TO IC 60-15

PIN DRIVER BD. (CIRCUIT SIDE)

CUT TRACES
IC 48-9 TO FEEDTHRU
IC 48-13 TO FEEDTHRU



XJ201B, 202B [1]

NOTES:

1. INSTALL ON PIN DRIVER BD ON CIRCUIT SIDE SOCKETS XJ201B & 202B. REMOVE COVERS AFTER INSTALLING.
2. INSTALL SWAGE STANDOFF ON CPU BD 2 PLACES AS SHOWN ON CIRCUIT SIDE.
3. INSTALL S201-205 & XJ201A & 202A ON CIRCUIT SIDE OF CPU BD. USING 060-44902 INSTALLMENT FIXTURE.
4. INSTALL D5201 ON CPU BD. CIRCUIT SIDE USING 22 AWG BUSS WIRE FEED THROUGH AS SHOWN IN DETAIL 'A'. CAUTION: DO NOT OVERHEAT DISPLAY.
5. IC'S 25-28 & 30-34 ARE PART OF 850-44928 INSTALLED AT LATER ASSEMBLY.
6. REF. DWGS:
   SCHEMATIC - 141-44921
   CPU ASS'Y - 402-44916
   PIN DRIVER ASS'Y - 402-44918

ITEM NO.	PART NO.	DESCRIPTION	QTY

MATERIAL LIST

UNLESS OTHERWISE SPECIFIED
SCALE: FULL
FRACTIONAL ± 1/64
DECIMALS: .XX ± .015, .XXX ± .010
ANGLES: ± 1°
DO NOT SCALE DRAWINGS
FINISH:

E-H RESEARCH LABORATORIES, INC.
OAKLAND, CALIFORNIA

TITLE: CPU AND PIN DRIVER ASSEMBLY

	INITIALS	DATE
DRAWN	KAF	1-8-79
CHK'D		2-24-79
APP'D		

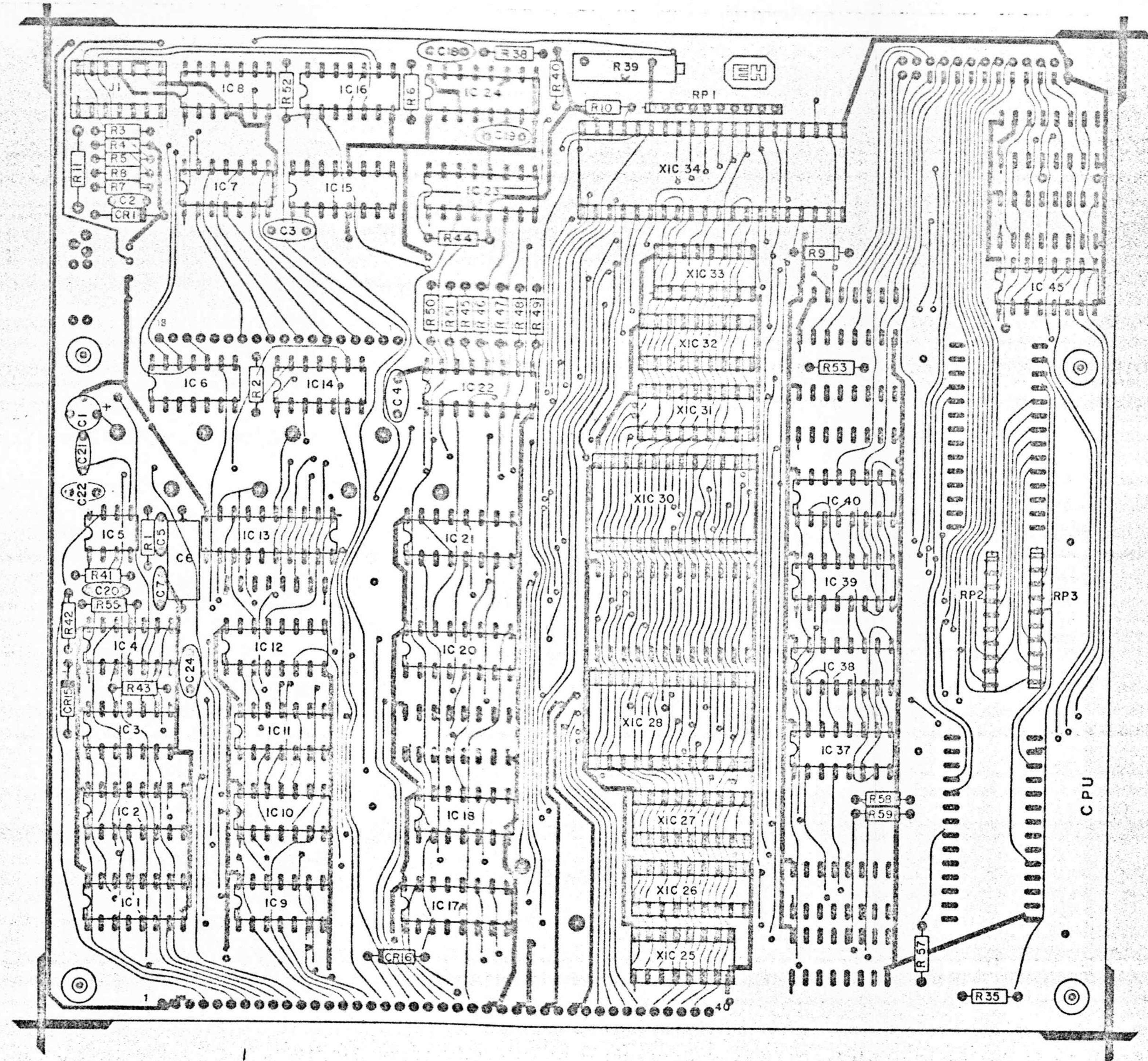
MODEL 4
SIZE B
D-146-44900
REV B
SHEET NO. 1 OF 1 SHEETS

USED ON — NEXT ASS'Y — REQ'D

D-44916 D

REVISIONS

ISSUE	REVISION	DATE	DRAWN	CHK'D	APPV'D	ECO
A	ORIGINAL RELEASE	—	—	—	—	—
C	A/W REVISED	1-3-79	KF		—	—
D	CRIG WAS R56	3-24-79	SD			79-02



NOTES:

1. XIC25-28,30-34 ARE SOCKETS; IC'S ARE P/O 850-44928 INSTALLED BY PRODUCTION TEST, J1 IS AN IC SOCKET.

2. REF. DWGS.
   PC FAB: 400-44915
   SCHEMATIC: 141-44921
   NEXT ASS'Y: 146-44900

ITEM NO.	PART NO.	DESCRIPTION	QTY

MATERIAL LIST

NEXT ASS'Y	REQ'D	USED ON
44900	1	4

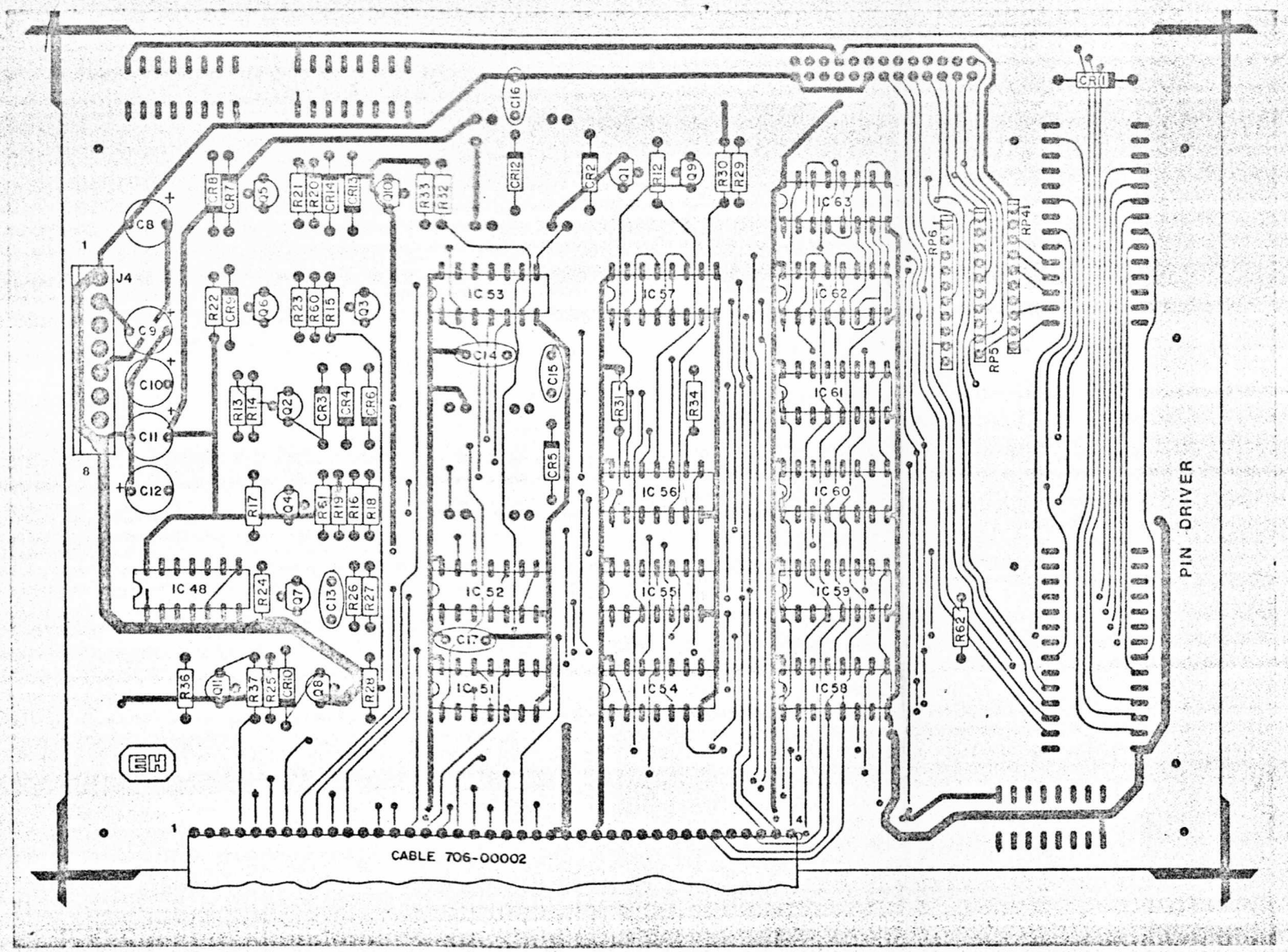
UNLESS OTHERWISE SPECIFIED
SCALE:
FRACTIONAL ± 1/64
DECIMALS: ± .XX ± .XXX
ANGLES: ± 1°
DO NOT SCALE DRAWING
FINISH:

E-H RESEARCH LABORATORIES, INC.
OAKLAND, CALIFORNIA

TITLE: ASSEMBLY DRAWING CPU

	INITIALS	DATE	MODEL: 4	ISSUE
DRAWN	C.A.	9-13-78	D-402-44916	D
CHK'D	M.R.R.	9-14-78		
APP'D			SHEET NO. 1 OF 1 SHEETS	

D-44919	C	REVISIONS					
		ISSUE	REVISION	DATE	DRAWN	CHK'D	APPV'D	ECO
		A	ORIG. RELEASE	—	—	—	—	—
		C	A/W REVISED	12/7/78	KF			



REF. DWGS.
1. FAB. (SPEC) DWG: 400-44918
2. NEXT ASS'Y: 146-44900
3. SCHEMATIC DWG: 141-44921

ITEM NO.	PART NO.	DESCRIPTION	QTY

MATERIAL LIST

UNLESS OTHERWISE SPECIFIED
SCALE: 2/1
FRACTIONAL ± 1/64
DECIMALS: ± .XX = .03
± .XXX = .010
ANGLES: ± 1°
DO NOT SCALE DRAWING
FINISH:

E-H RESEARCH LABORATORIES, INC.
OAKLAND, CALIFORNIA

TITLE:
ASSEMBLY DRAWING
PIN DRIVER

	INITIALS	DATE	MODEL 4	
DRAWN	C.A.	9-14-78	D-402-44919	C
CHK'D	S.R.D.	10-15-78		
APP'D			SHEET NO. 1 OF 1 SHEETS	

USED ON	REQ'D	NEXT ASS'Y
4	1	44900

Internet