INSTALLATION INSTRUCTION

AM-120

PDI-00120-XX

alpha micro

DWG. NO. PDI-00120-XX | SH. 1 | REV. A00

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	REV.	DESCRIPTION	DATE	APPROVED
		A00	Released per EN 00244	8-7-80	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±	CONTRACT NO.	alpha micro IRVINE CA 92714	
MATERIAL	APPROVALS / DRAWN J. Glade / CHECKED / ISSUED	DATE: 4.2.80	INSTALLATION INSTRUCTIONS AM-120
FINISH		SIZE A / FSCM NO. / DWG. NO. PDI-00120-XX	REV. A00
DO NOT SCALE DRAWING		SCALE	SHEET 1 of 12

I. BASIC FEATURES AND CAPABILITIES

The AM-120 Auxiliary I/O board has been designed to be compatible with the proposed standard S-100 bus, providing the following system capabilities:

A. Power Fail Restart Capability

B. Programmable Interval Timer

C. 3 -8 Bit Parallel Output Latches

D. 2 -8 Bit Parallel Input Latches

E. 2 RS-232 Compatible Serial I/O Ports

F. Time of day clock with battery back-up.

G. Remote Manual Reset Capability

The AM-120 has been designed to provide AM-100 system users those additional features found on the AM-100/T CPU. However, the AM-120 may be configured to operate with either CPU, allowing hardware time of day clock feature for both systems.

II. INSTALLATION INSTRUCTIONS

A. Unpack the PC board and cables and thoroughly read this document.

B. Several on-board jumper blocks are provided to facilitate configuration changes. These are described below. Check each jumper to insure that it is properly set for your particular system requirements.

1. Power Fail Input Jumpering. (Set to 1 of the 4 positions.)

JUMPER	COMMENTS
16V	16 volt power supply is used to determine power fail status.
8V	8 volt power supply is used to determine power fail status. This signal should be used if the system includes an Alpha Micro AM-100/T CPU.

PF	Power fail signal from AM-900 CPU power supply. This signal should be used if an Alpha Micro mainframe is used with an AM-100 CPU.
DIS	Power fail circuit is disabled.

2. Interrupt Enable Jumpers

An on-board priority interrupt circuit is utilized to handle the interrupts generated by the on-board I/O ports. In addition, the following interrupts may be selectively enabled:

JUMPER	FUNCTION
TI	Enables interrupts from the programmable timer. This is normally left out. See Section III.
ME	Enables interrupts from bus pin 98. This is used by the ECC memory system to identify memory errors.

3. Alternate I/O Address Jumper

The standard I/O address block used by the AM-120 is :00 through :0F. If two boards are used in one system, or if an AM-120 is utilized with an AM-100/T CPU, then jumper "AD" must be removed on one AM-120 board. This positions the I/O address block at :20 through :2F.

4. Jumpering has been provided to support synchronous device's clock signals, TxC and RxC, at each RS-232 port. These signals operate differently for various devices. In the case of asynchronous terminals and modems, clocks are not necessary. However, synchronous modems require that the device attached to them use the clocks the modem produces for synchronization. This being the case, it is necessary also to generate clocks whenever a synchronous terminal is attached to the Alpha Micro. To determine the correct clock jumpering you will need, consult the following table:

CHANNEL #	ASYNC. DEVICE JUMPERS	SYNCH. TERMINAL JUMPERS	SYNCH MODEM JUMPERS
0 (J3)	NONE	W8, W9	W7, W10
1 (J4)	NONE	W3, W4	W1, W2

C. Parallel Port Configuration

If you are planning to utilize the on-board parallel port, configure the header at U3 according to your system requirements. This port is configured exactly like that on the AM-100/T. See Section III.C for further details.

D. Install the AM-120 into the CPU chassis. A location towards the rear of the unit will facilitate cable installation.

E. Install the appropriate cables (serial port cables and/or parallel port cable) at the AM-120. Attach the serial cable connectors to the chassis rear panel with the hardware provided.

F. CPU Jumper Modifications

1. AM-100 CPU

Install the V7 interrupt jumper, located to the left of Z42 on AM-100 CPU board #2.

2. AM-100/T CPU

No modifications required. Insure that step II.B.3 has been correctly set up.

III. TECHNICAL CAPABILITY SUMMARY

A. Power Fail Option

As described in Section II.B.1, one of several inputs may be selected to detect a power fail condition. When powerfail occurs, the AM-120 will impress a RESET condition immediately upon the bus. If the power returns, the CPU will be reset, as if the hardware reset button had been depressed. This feature minimizes the potential hazard of disks being damaged by a power fail condition. The threshold setting for this circuit has been set to 7.05V +/- 50mv at the factory. See Section V if adjustment is necessary.

B. Interval Timer

The on-board interval timer may be programmed to count from 1 to 255. Timing resolution for each count is jumper selectable from .4 usec to 12.9 msec. The standard resolution is 0.81 msec. Different time resolutions may be selected by cutting the etch from Time Interval Select pad 9 to Time Interval Select pad 4. Table I lists the time interval selection values by jumper pad number.

C. Parallel Port Options

The parallel I/O port consists of 24 output lines (3 -8 bit bytes) and 16 input lines (2 -8 bit bytes). A header, IC 3, is provided to control the clocking in and out of data. Basically, input data may either be latched by an external signal or simply read statically. Also, output data may be gated out or output continuously. The interface to this port is via a 50 pin, 3M type flat cable connector. Table II lists the I/O pin-outs for the 50 pin connector. Table III summarizes the jumper options for IC 3.

D. Serial I/O Ports (J3 and J4)

These ports are full RS-232 ports capable of supporting asynchronous or synchronous communication. Option jumpers are provided to determine the source of transmit and receive clocks for synchronous operation. The interface to this port is via a 26 pin 3M type flat cable connector. Port 1 (J4) also provides a remote reset capability via shorting pins 11 and 18 together at the 25 pin connector.

E. Baud Rate Programming

The baud rate programming for the serial ports in the AM-120 is done in the same manner as the AM-300 in that the baud rate is programmed at system start-up via the TRMDEF statement in the SYSTEM.INI file. The TRMDEF statement format is also identical to that of the AM-300 with the exception of the baud rate codes, which are as follows:

BAUD RATE	CODE
19,200	37716
9,600	37316
7,200	36716
4,800	36316
3,600	35716
2,400	35316
2,000	34716
1,800	34316
1,200	33716
600	33316
300	32716
150	32316
134.5	31716
110	31316
75	30716
50	30316

Note: If no baud rate code is specified, a default of 19,200 is used.

F. Time of Day Clock

The time of day clock uses the MSM5832 real time clock/calendar. The chip has battery back-up capability using a 3.6 volt nickle cadmium battery with trickle charge circuitry to insure full battery charging. The time of day clock maintains year, month, day, time, and day of the week.

G. I/O Port Definitions

Table IV illustrates the standard I/O ports and their functions.

IV. TIME OF DAY CLOCK CALIBRATION PROCEDURE

Normally, no calibration should be required on the time of day clock. If it is desired to re-calibrate the clock, the following procedure should be followed:

A. Connect a frequency counter to "CAL" test pad at the right hand top edge of the AM-120 board.

B. Run the clock calibration program "CAL120" provided in the software.

C. Adjust the capacitor trimmer at the right hand edge of

the board until the frequency counter reads 1024 Hz. Note that the AM-120 board must be positioned in the chassis such that the trimmer is accessible from the side.

V. POWER FAIL THRESHOLD ADJUSTMENT PROCEDURE

The Power Fail Threshold has been adjusted at the factory to 7.05 volts +/- .05 volts. If it is desired to re-adjust the threshold, the following procedure should be followed:

A. Put the AM-120 board on an extender so that R16 may be adjusted. R16 is located just below U30 at the lower left side of the board.

B. Turn on system AC power.

C. Using a Digital Voltmeter, monitor TPI, just to the right of R16. Use J1 pin 50 as the ground reference for the Digital Voltmeter.

D. Adjust R16 until the desired threshold has been obtained.

E. Turn off system AC power and re-install the AM-120 into the chassis.

TABLE I. Time Interval Selection Option

Jumper Pad	Timer Resolution
1	0.1 msec
2	0.2 msec
3	0.4 msec
4	0.81 msec *
6	3.23 msec
7	6.46 msec
8	12.93 msec

* Standard Value

TABLE II. Parallel Port I/O Pinouts

Pin #	Signal	Pin #	Signal
1	GND	36	1 OUT 7
2	GND	37	1 OUT 5
3	3 OUT 0	38	2 OUT 2
4	2 IN 0	39	2 OUT 5
5	~~N/C~~ PARLRD	40	2 OUT 4
6	N/C	41	1 OUT 0
7	2 IN 1	42	2 OUT 6
8	3 OUT 1	43	1 OUT 2
9	1 IN 2	44	1 OUT 1
10	1 IN 3	45	1 OUT 4
11	1 IN 4	46	1 OUT 3
12	1 IN 5	47	2 IN 6
13	2 IN 2	48	2 IN 7
14	1 IN 6	49	GND
15	3 OUT 2	50	GND
16	1 IN 7		
17	2 IN 3		
18	3 OUT 3		
19	N/C		
20	N/C		
21	3 OUT 4		
22	3 OUT 5		
23	N/C		
24	~~N/C~~ PARICLK		
25	3 OUT 6		
26	2 IN 4		
27	1 IN 0		
28	1 IN 1		
29	2 OUT 0		
30	2 OUT 7		
31	2 OUT 1		
32	3 OUT 7		
33	2 IN 5		
34	1 OUT 6		
35	2 OUT 3		

5 & 24 ADDED FOR 6250 STREAMER TAPE

TABLE III. Parallel I/O Port Jumper Options

IC HEADER (U-3) PIN #	FUNCTION	COMMENTS
1 2 3 4 5 6 7	2 IN 1- 2 IN 1- 2 IN 6- 2 IN 5- 2 IN 4- 2 IN 3- 2 IN 2-	Inputs from J2 which may be utilized to generate interrupts, clock input data, or gate output data. (Pins 1-7, 9).
8	GND	
9	2 IN 7-	
10	Output Latch 3 Enable	GND to enable output on Latch 3.
11	Output Latch 2 Enable	GND to enable output on Latch 2.
12	Vectored Interrupt Line	To enable interrupts operation, strap to one of the input lines (pins 1-7, 9). Otherwise, no connections.
13 14	Input Latch 1 Clock Input Latch 2 Clock	For static input data, jumper to ground. For clocked input data, strap to one of pins 1-7, 9.
15	Output Latch 1 Enable	GND to enable output on Latch 1.
16	+5 Volts	

TABLE IV. On-Board I/O Port Definitions

ADDRESS	INPUT	OUTPUT	COMMENTS
:00-:03	- unused presently -		
:04	Receiver Holding Register	Transmitter Holding Register	Serial I/O Port #0 Registers.
:05	Status Register	SYN1/SYN2/DLE Registers	
:06	Mode Register 1 & 2	Mode Register 1 & 2	See Appendix I 2651 spec.
:07	Command Register	Command Register	
:08-:0B	Same as :04-:07 above		Serial I/O Port #1.
:0C	N/U	Parallel Output Latch #1	
:0D	Parallel Input Register #1	Parallel Output Latch #2	Parallel I/O port.
:0E	Parallel Input Register #2	Parallel Output Latch #3	
:0F	N/U	Set Interval Timer	
:02	Time of Day Clock Data In Port	Time of Day Clock Command Port	See Table V.
:03		Time of Day Clock Data Out Port	See Table V.

TRMSL
AM300
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Table V. Time of Day Clock Programming

PORT :02

READ

Bit	Function
0	4 bit data output
1	4 bit data output
2	4 bit data output
3	4 bit data output
4-7	Not used

WRITE

Bit	Function
0,1	IA0-IA3; addresses the
1	various registers on
2	the MSM5832.
3	
4	READ; puts MSM5832 into read mode.
5	WRITE; write command to addressed register.
6	HOLD; enables read or write to take place.
7	Not used.

PORT :03

READ

Not Used

WRITE

Bit	Function
0,1	4 bit data input
2	4 bit data input
3	4 bit data input
4-7	Not used