



INSTALLATION INSTRUCTIONS

**AM-1004**

**MEMORY EXPANSION UPGRADE**

**AM-1000 SERIES SYSTEMS**

PDI-01004-00 REV. B01



**alpha micro**

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## INSTALLATION INSTRUCTION: AM-1004 MEMORY EXPANSION UPGRADE

The AM-1004 Memory Expansion Upgrade with Byte Parity is a low-cost add-on memory expansion upgrade for Revision B or later AM-1000 CPU boards. The AM-1004 can add from 256K bytes to 3M bytes of memory to the AM-1000, depending on the number and type of DRAM memory chips installed on the AM-1004. Since the AM-1000 itself may be equipped from the factory with 128K, 256K, or 512K bytes of memory, the total memory capacity, including that added by the AM-1004, may be as much as 3.5 Megabyte.

**NOTE:** References in this document to the AM-1000 also refer to the AM-1000E, AM-1000X, as well as the AM-1100 Series of UNIMOS based systems.)

**NOTE:** Check the availability of the various capacities of memory on the AM-1004 as discussed in this document with your Alpha Micro dealer, who can provide you with up-to-date information. Not all variations of the AM-1004 may be available as you read this.

**CAUTION:** If your AM-1004 Memory Expansion Board is a Revision A00-A03 and you are attempting to add it to an AM-1000 with 512K byte of base memory, you must first update your AM-1004 board using the AM-1004 Upgrade Kit (PDB-01004-10). Contact your Alpha Micro Dealer for details.

Installation of the AM-1004 is straightforward and uncomplicated. No software modifications need to be made. Furthermore, testing the system for correct installation of the AM-1004 memory is simple. Using the memory provided by the AM-1004 in your AM-1000 system is also straightforward; Further information is available in the **AMOS/L System Operator's Guide, DSS-10002-00.**

### 1.0 PRODUCT DESCRIPTION

The AM-1004 Product package you purchased consists of:

1. An integrated circuit board with components, including an array of integrated circuit memory chips.
2. A vertical stiffening bar for older AM-1000 CPU boards.
3. A hardware assembly kit consisting of:
  - a. Two (2) #6x1.500 Phillips-head screws and external lock washers (to mount the vertical stiffener bar).
  - b. Two (2) #6x7/16 nylon screws
  - c. Three (3) #4x.250 nylon screws (to mount the AM-1004 to the AM-1000 CPU board).
  - d. TEFLON insulated 30AWG wire.
  - e. Four (4) shorting (jumper) blocks.

1.1 AM-1004 Integrated Circuit Memory Chips

The AM-1004 memory configurations provide six different memory capacities. Since the AM-1000 itself has one of three different capacities of memory, there is a total of 18 combinations of AM-1000/AM-1004 memory capacity.

Listed in the left column of the chart below are the six optional memory expansion configurations that may be on the AM-1004. In the middle column is the memory capacity the AM-1000 may already have onboard. In the right column is the total memory capacity that the AM-1000 will have when that AM-1004 configuration is added.

AM-1004 EXPANSION	ONBOARD THE AM-1000	TOTAL MEMORY
-	128K	128K
-	256K	256K
-	512K	512K
256K	128K	384K
256K	256K	512K
256K	512K	768K
512K	128K	640K
512K	256K	768K
512K	512K	1024K
768K	128K	896K
768K	256K	1024K
768K	512K	1280K
1M	128K	1128K
1M	256K	1256K
1M	512K	1512K
2M	128K	2128K
2M	256K	2256K
2M	512K	2512K
3M	128K	3128K
3M	256K	3256K
3M	512K	3512K

2.0 TOOLS REQUIRED

The only tools required to install the AM-1004 upgrade are:

1. A standard screwdriver;
2. A #2 Phillips (cross-tip) screwdriver;
3. A 5/64" Allen wrench;
4. 26AWG wire stripper/cutter;
5. A solder iron (60 watt), and solder.

### 3.0 OVERVIEW OF INSTALLATION

Be sure to read these installation instructions thoroughly before beginning. The following procedures will be discussed in detail in Section 4.0 of this document.

1. Opening the top of the AM-1000 cabinet.
2. Unfastening and lifting the AM-1000 CPU board up for ease of installation.
3. Removing the horizontal metal stiffener laying over the AM-1000 CPU board and replacing it with a vertically mounted, double-width stiffener (if applicable).
4. Dismounting the AM-1002 Memory Expansion Board (if applicable).
5. Adding wires to AM-1000 CPU board (if you have ordered PDB-01004-03 through -06 and your CPU board is Revision D17 or less).
6. Locating and removing U196 PROM on CPU board.
7. Configuring the jumper block on the AM-1000 CPU board to indicate the starting address of the memory on the AM-1004.
8. Locating the serial number, part number and revision level on the AM-1004 for later recording on the system history label.
9. Connecting the AM-1004's five receptacles and PROM DIP plug to the corresponding five single-line connectors and PROM DIP socket on the CPU board.
10. Fastening the AM-1004 to the underside of the CPU board.
11. Securing the CPU board and closing the AM-1000 cabinet.
12. Check system memory status.

### 4.0 STEP BY STEP INSTALLATION OF THE AM-1004

Before starting the installation of the AM-1004 Memory Expansion Upgrade, shut off the power to the AM-1000. If your AM-1000 contains a Winchester drive, use the MOUNT/U command to unmount the drive BEFORE powering down the system.

TYPE: MOUNT DSKn:/U **RET**

(Unmount each logical, STARTING w/ the highest number; i.e., DSK2: or DSK1:)

If your AM-1000 is equipped with floppy disk drives, and if you'll have to maneuver the computer to get to the cabinet and CPU board fasteners at its sides and back, you will need to reinstall the original cardboard packing material into the drives to protect them.

#### 4.1 Unpacking

**CAUTION:** Prior to handling the AM-1004 Circuit Board, or any of the AM-1000 based computer system boards, GROUND YOURSELF. Static electricity will damage their components. The best ground is the chassis cabinet that houses the boards. Touch the cabinet prior to picking up, installing or removing them. Do not unplug the computer cabinet, but insure that the power switch is turned OFF. If you unplug the computer cabinet you will have isolated it from the common earth ground, leaving it vulnerable to static discharge.

Unpack the AM-1004 Circuit Board. Save the packing material and carton in case you ever need to transport the board.

#### 4.2 Opening the AM-1000

The AM-1000 cabinet top is fastened by six Phillips-head (or Allen-head) screws located on the sides of the cabinet and four Phillips-head screws located on the back panel. Figure 1 also shows the (back panel) location of four additional Phillips head screws which fasten the CPU board holding frame to the chassis.

1. Unfasten the six Phillips-head (or Allen-head) screws on the sides of the cabinet.
2. Now remove the four Phillips head screws that fasten the top cover to the back panel of the AM-1000.
3. Remove the AM-1000 top cover and carefully set it aside.
4. Unscrew the four Phillips head screws that hold the CPU board holding frame to the chassis and set them aside as well.
5. Lift the AM-1000 CPU Holding Frame, pivoting on its hinges to full extension of the Holding Arm. Make sure the elbow on the Holding Arm is locked in place. (See Fig. 6)

#### 4.3 Removing and Replacing the Stiffener Bar

**NOTE:** This portion of the Installation Procedure may have already been performed on your system.

1. The horizontal stiffener is secured to the holding frame side rails and printed circuit board (PCB). Remove as follows:



- a. Remove the two (2) Phillips-head screws from the side rails. SAVE THEM to mount the vertical stiffener.
  - b. The horizontal stiffener is secured to the CPU board by a nylon screw from the underside of the CPU board (J1 side). Remove and SAVE it. If there is a Serial I/O board mounted next to the CPU, remove and SAVE the inboard nylon screw, next to the one you just removed.
2. Remove the nylon screw from the component side of the CPU board (rear left corner).
  3. Remove the 5/8" nylon screw from the underside of the CPU board at the front corner (near J1). Replace it with a 7/16" nylon screw from the kit. If another board resides next to the CPU board, there is a similar, adjacent spacer, that must also have its 5/8" nylon screw replaced with a 7/16" screw from the kit.
  4. Cut the TYRAP that bundles the two power supply cables together onto the Holding Frame front rail (i.e., where the vertical stiffener will secure to the front rail). Let the cables run off of the rail.
  5. Add the vertical, double-width, stiffener bar over the left side (as you face the raised board) of the AM-1000 CPU. It will mount over position J1. The front portion of the bar will be bent downward, to fit over the lip of the holding frame's front rail. This bend is then flared, to secure the bar over the front rail spacers with the two (2) Phillips-head screws that formerly secured the horizontal stiffener to the side rails.
  6. Referring to step 1.b above, Add the nylon screw(s) that formerly secured the horizontal stiffener, to the middle Hex Spacer position(s) of the vertical stiffener.
  7. At the rear Hex Spacer position, use two #6x1.500 Phillips-head screws, from the kit, to secure the stiffener to the frame.

#### 4.4 Removal of AM-1002 Memory Expansion Board (if applicable)

1. The PCB designated AM-705 (on component side) must be removed. Refer to Figure 7 and remove the three (3) nylon screws that secure the board to the AM-1000 CPU board.
2. Gently lift the board off of the five (5) single-line connectors which are mounted to the CPU board.
3. This completes removal of the AM-1002 memory expansion board.

## 4.5 Upgrade of AM-167 Board (Rev's. B and D) For AM-1004 Using 256K DRAM

**NOTE:** The following modifications are to be performed on the DWB-00167-00, -01, -02, and -03 board configurations ONLY!! The System History Label on the underside of the system will tell you its configuration status. Later configurations (-04 and -05) include these changes.

\*\*\* No change to the AM-167 CPU board is required when using the AM-1004 -00, -01, or -02 \*\*\*

**NOTE:** ALL UNIX based systems (DWB-00167-02) or AM-1000's that have 1MB or more of memory may already have one of the two wires, listed in the instructions below, installed (U81-48 to W21). It was added according to the "Add Wire" paragraph, Revision A00 of this document. Obviously, this wire should remain and be omitted from the instructions below.

1. Cut trace on the solder side between U196, pins 13 and 14.
2. Add jumpers on solder side between: U81, pin 48 to W21; U81, pin 50 to U196, pin 14. To add, use the wire included in the upgrade kit and perform the following:
  - a. As you perform this modification, observe Figure 4, which is a view of the solder side of the AM-1000 CPU board.
  - b. Strip one end of the wire, approximately 1/4 inch. Make a U shape of the bare wire.
  - c. Solder the stripped wire to U81-pin 48.
  - d. Extend the wire to W21. Cut to length PLUS 1/4 inch. Strip the 1/4 inch and make it U-shaped.
  - e. Solder to W21.
  - f. Repeat the procedure to add a wire between U81, pin 50 and U196, pin 14.
  - g. Be sure that enough heat has been applied to the connections to create a good bond. DO NOT OVERHEAT!!
  - h. Remove any solder shorts to adjacent pins.

## 4.6 PROM Removal

Your AM-1004 memory expansion upgrade requires the removal of the PROM located in position U196 of your AM-1000 CPU board.

1. PROM Location and Removal

- a. Refer to Figure 2 to locate position U196 on your AM-1000 CPU board. PROM DWB-00168-03 must be removed.
- b. Since this PROM is in a socket, no heating or soldering is required to remove it. To remove it, carefully pry it out by inserting the blade of a small screwdriver between the socket and the PROM, alternating at each end of the PROM (Figure 3). BE EXTREMELY CAREFUL NOT TO DAMAGE THE SOCKET.

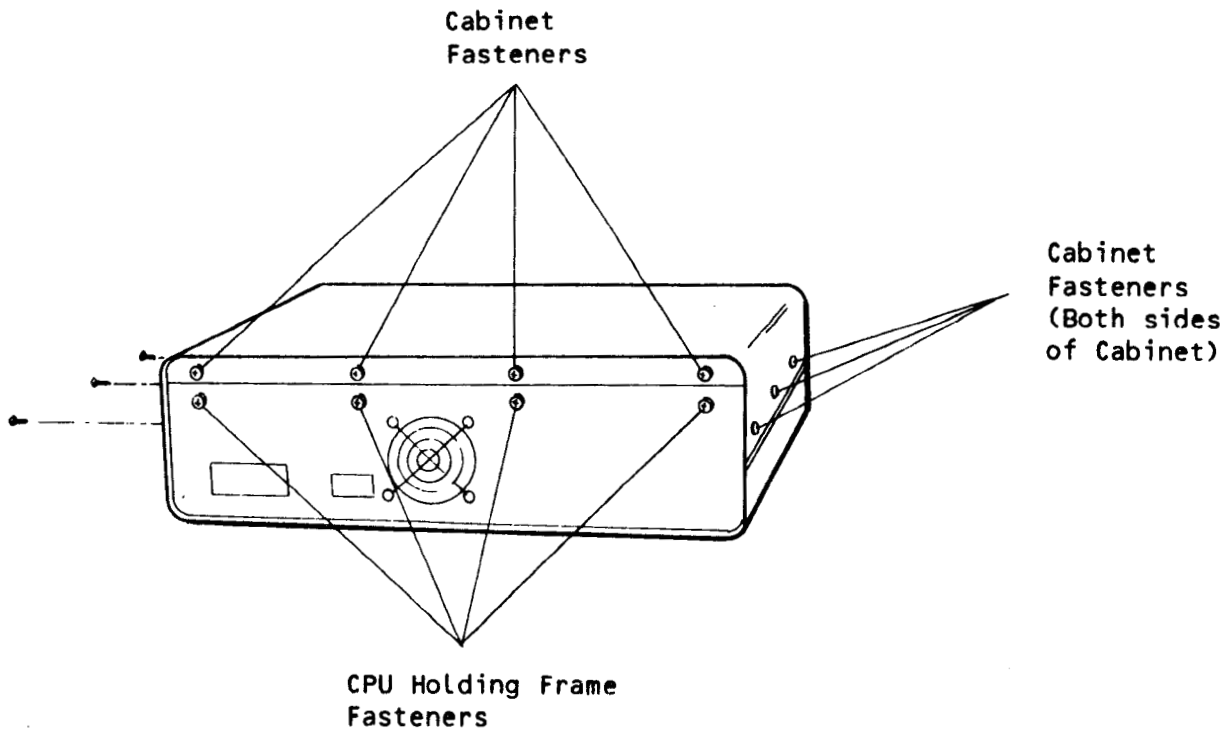


FIGURE 1. Fastener Locations



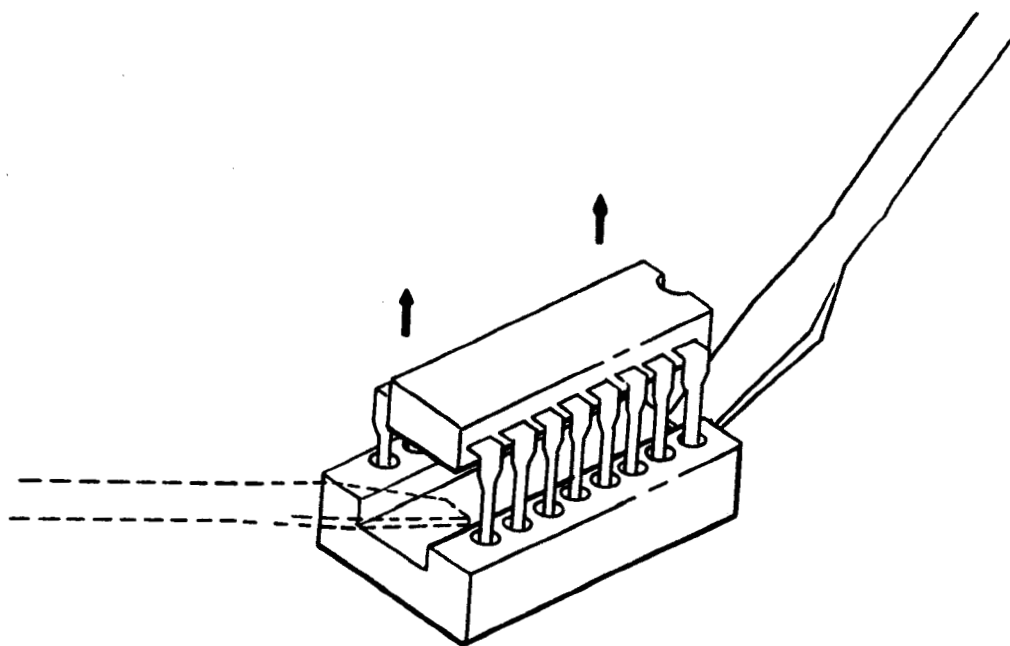
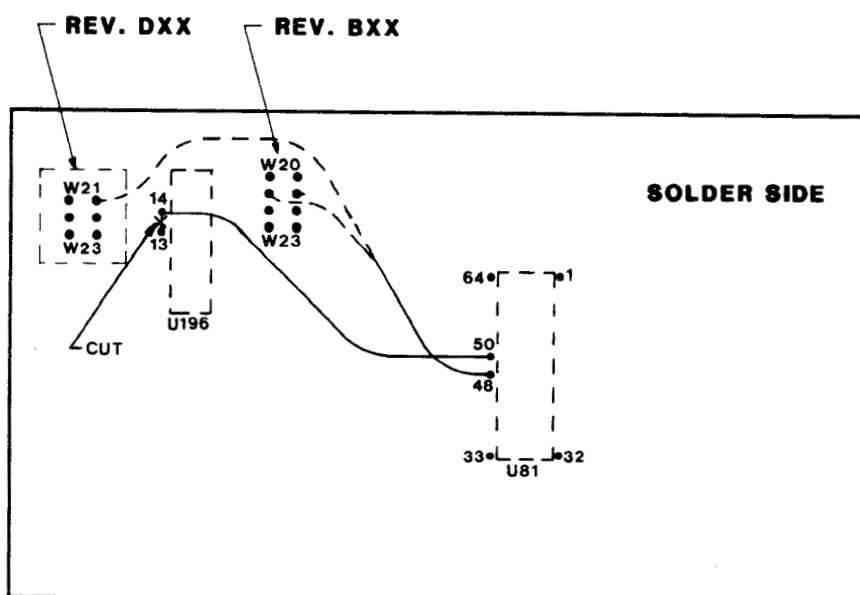


FIGURE 3. Removing the PROM



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FIGURE 4. Add Wires

4.7 CPU Board RAM Memory Configuration Jumpers (W20-W23)

With the top cover off of the AM-1000, you can see the green CPU board. Standing so that you face the front panel of the AM-1000, the RAM Memory configuration jumpers (W20-W23) are located in the upper right portion of the CPU board (Figure 2). These shorting blocks identify the amount of memory on the CPU board, and subsequently, the starting AM-1004 memory address.

The following chart shows you the arrangement of the shorting blocks for the three CPU board memory configurations. You should not need to move the shorting blocks unless you have modified the CPU board memory size.

(Note that if for some reason you have to remove the AM-1004, effectively adding 0 Kilobytes to the AM-1000, the jumpers will not have to be moved.)

ON THE AM-1004      ONBOARD THE AM-1000      PLACE SHORTING BLOCKS AT

*	128KB	W20,W22,W23
*	256KB	W20,W22
*	512KB	W20,W23

\*=irrelevant

NOTE: Jumper location W20 exists only on CPU boards previous to revision D00. If you have a D00 or later revision, ignore references to W20 as this jumper has been hard wired into the system.

Configure the shorting blocks for your AM-1000 according to the chart above. Store away any extra shorting blocks.

4.8 Installing the AM-1004 on the AM-1000 CPU Board

1. On the AM-1004 printed circuit board is a stick-on label with the board's serial number. In one corner of the board on its component side are the Company name, Alpha Micro, and the AM- part number of the AM-1004. On an adjacent corner is the revision level of the AM-1004. Before you install the AM-1004, record the serial number, part number and revision level on a piece of paper. You will want to record this information on the system history label on the bottom of the AM-1000 after you have closed it up with the AM-1004 inside.
2. In the upper right hand portion of the CPU board, are five rows of single-line connectors (Figure 2). Location U196 is also in this area.

3. On the solder side of the AM-1004 PCB, under position U1, a 16-pin Utility DIP socket is mounted. Be sure all U1 pins are plugged into the DIP. Also be careful to not bend any pins on the DIP socket, as it must plug into position U196 of the AM-1000.
4. To install the AM-1004 printed circuit board, orient the receptacles on the bottom of it to align with the five single-line connectors, and U196, on the CPU board (Figure 5).
5. Now carefully press the AM-1004 straight down onto the AM-1000 CPU board. Do not allow the AM-1004 to flex or turn.
6. The AM-1004 is electrically installed. It must now be mechanically fastened to the AM-1000 CPU board.
7. Gently lift the CPU holding frame and CPU board from the rear of the AM-1000. It will pivot upward and forward on its hinges. Engage the holding arm to keep the frame up (Figure 6).
8. The AM-1004 has three hex spacers fastened to the underside of it which position over three mounting holes in the CPU board (located near U18, U64 and U68). Insert the three #4x.250 nylon screws (included in the kit) from underneath the CPU board and screw them into the hex spacers on the AM-1004 board (Figure 7).
9. Using the flat bladed screwdriver, tighten the nylon screws in the hex spacers. Do not overtighten these screws.
10. Release the frame holding arm. Set the CPU board and frame down. The AM-1004 is completely installed.

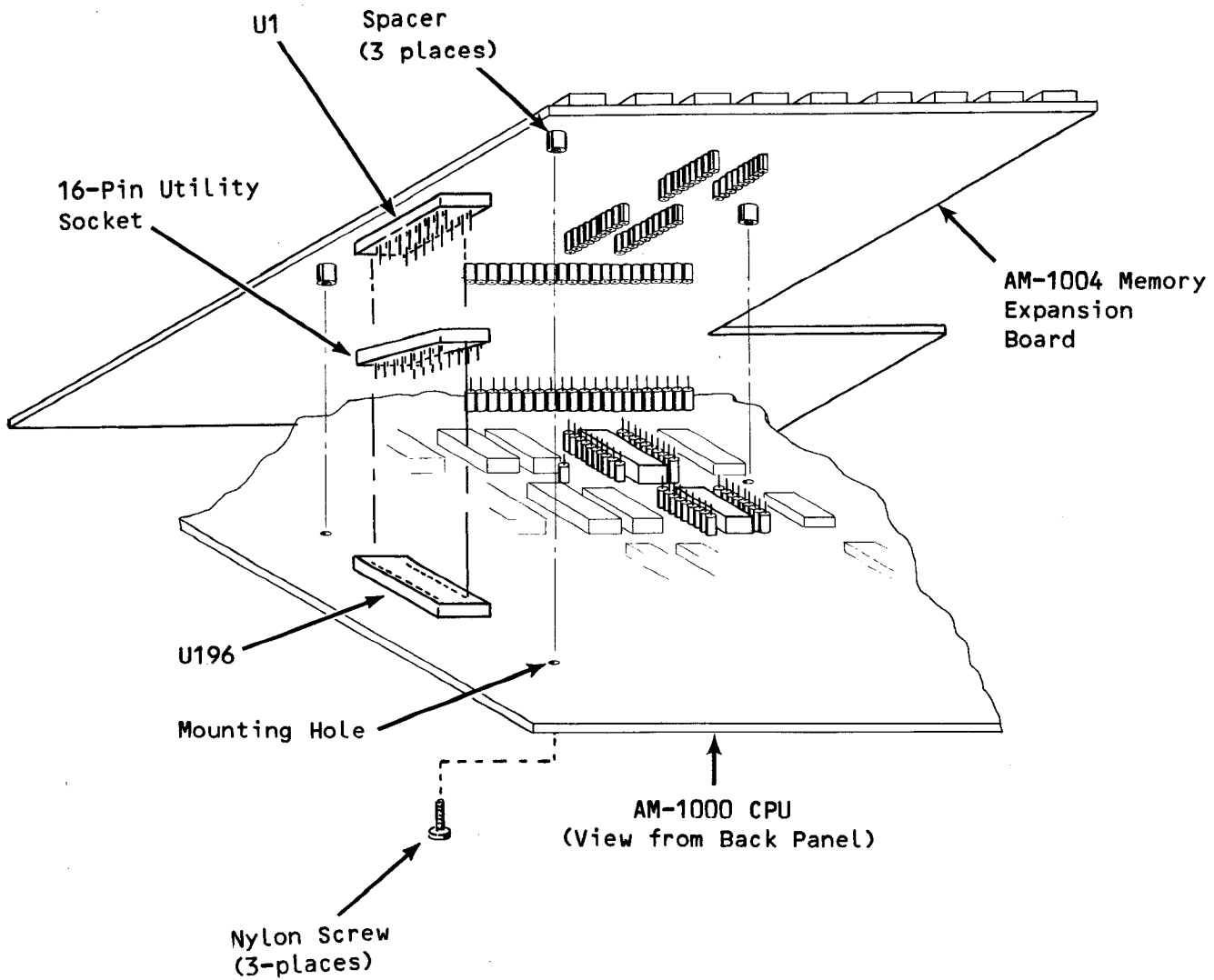


FIGURE 5. AM-1004 Connector Alignment



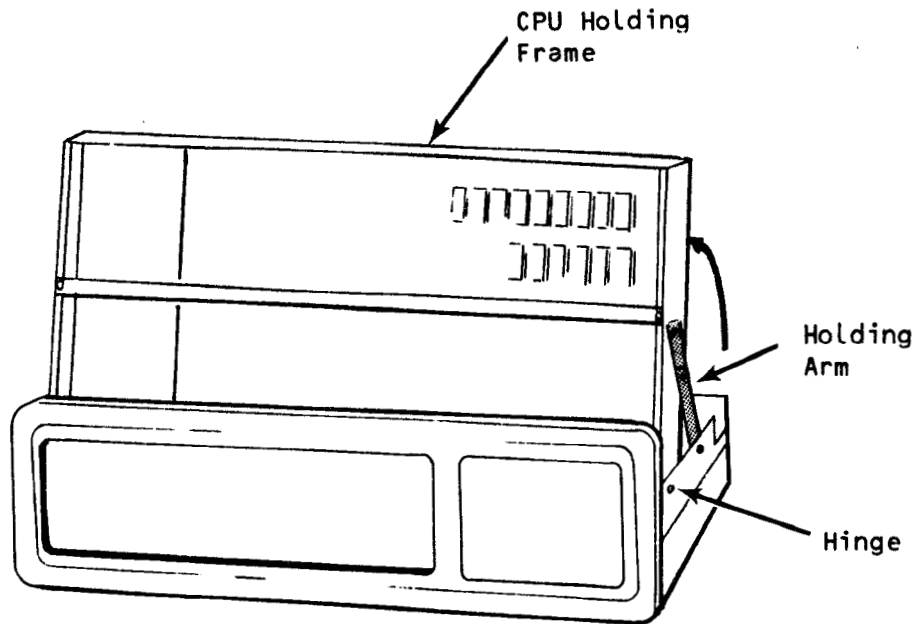


FIGURE 6. Raising the CPU board

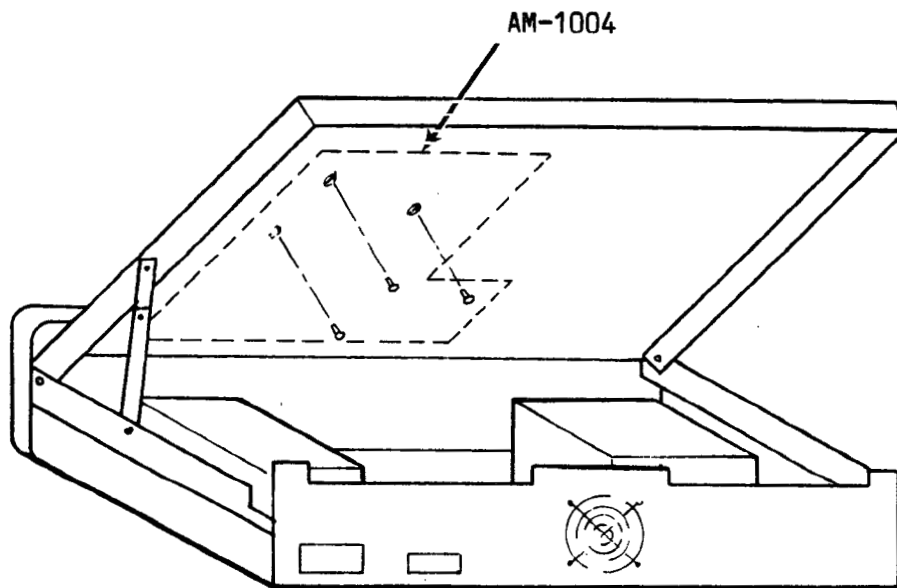


FIGURE 7. Fastening the AM-1004 to the CPU Board

4.9 Closing the AM-1000

1. Replace the four Phillips-head screws on the back panel to fasten the CPU holding frame to the chassis.
2. Place the top cover of the AM-1000 onto the bottom until it fits snugly.
3. Replace the four Phillips-head screws on the top of the back panel to fasten the top cover. DO NOT TIGHTEN.
4. Replace the six Phillips-head (or Allen-head) screws on the sides of the AM-1000.
5. NOW, tighten ALL screws.
6. On the bottom of the AM-1000 cabinet is a printed System History Label (see Figure 8). This label has columns on it to record the history of the AM-1000. One column is for the addition of memory. Carefully, so you do not damage the drive within the AM-1000, maneuver the AM-1000 so you can write on the System History Label. Enter the serial number, part number and revision of the AM-1004, which you recorded earlier, in the appropriate columns.

ALPHA MICROSYSTEMS AM-1000 CHANGE HISTORY SUMMARY							
NOTE ALL PART NUMBER, SERIAL NUMBER OR REVISION LEVEL CHANGES							
ITEM	PART NO	SERIAL NO	REV.	SERIAL NO	REV.	SERIAL NO	REV.
SYSTEM							
POWER SUPPLY							
MAIN LOGIC							
DRIVE 1							
DRIVE 1 I/F							
DRIVE 2							
DRIVE 2 I/F							
SOFTWARE SECURITY DEV							
MEMORY EXP							
1)							
2)							
3)							
4)							

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FIGURE 8. System History Label

7. If you performed the 'Upgrade of AM-167 Board' modification of Paragraph 4.5, a deviation number (which is the EN number that released the modification at the factory) must be recorded on the System History Label after the 'MAIN LOGIC' heading. If your CPU board is either Revision Level B14, or D18 (or later), or the CPU board has a dash number -04 or -05, this modification was unnecessary and need not be recorded. With this modification, a Revision D17 board would become a D18, or a B13 board would become a B14.

Any CPU board at less than the above revision levels (or dash numbers) must have the modification recorded per the examples below.

The CPU board revision level remains the same, followed by the deviation number:

Deviation number: DI-02259A

For example, if your AM-1000 CPU board is Revision Level B09, add the following to the System History Label:

B09 DI-02259A

or, if your AM-1000 CPU board is Revision Level D10:

D10 DI-02259

8. The system is ready to turn power on.

## 5.0 TESTING THE AM-1004

No software change is necessary for the system to recognize the additional memory provided by the AM-1004.

To be sure that the AM-1004 is working correctly, and is providing the additional memory, perform the two steps below.

1. At the AMOS/L Operating System command level, use the **SYSTAT** command to see the total system memory. The second to the last line of the **SYSTAT** display says:

Total memory on system is nnnnK bytes

where nnnnK is the memory capacity previously on the AM-1000 plus the memory you just added via the AM-1004. This indicates the AM-1004 is functioning properly.

2. Run the self test according to Chapter 6 of the AM-1000 Owner's Manual (DSS-01000-00) to make sure that the entire AM-1000, with AM-1004 installed, is operating correctly. The terminal message for the Memory Test will tell you the memory size that Self-Test "sees."

With the installation of the wiring modification of Paragraph 4.5 of this document, and the factory configuration of your AM-1000, self test mode has a 1M byte limitation in sizing your total memory.

**This does not inhibit normal system operation of your memory.**

You may wish to install new boot PROMs that have enhanced self test mode features that include reading 256K DRAMs up to 4M bytes, and diagnostic looping when error conditions are present. These PROMs may be purchased through Alpha Micro's Service Division (AMSD). For more information, call AMSD at (714) 957-6076.

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