

AMB2002-11

October 28, 2002

New RAID Subsystems Announced *Higher Performance, Flexibility AND Lower Pricing*

Dear Alpha Micro Dealer:

Announcing an exciting new family of RAID subsystems that offer higher capacity, flexibility, performance and lower pricing! Now you have a perfect solution for those demanding customer environments with limited budgets.

These sophisticated RAID systems come complete with many new options and replace the AM-447 series. Our powerful new subsystems are compatible with all systems containing a wide SCSI bus, and are configured with high performance 40GB and larger disk drives.

AM-448 HIGHLIGHTS

Two versions are available—A low cost 4 drive (maximum) version (*Mini-RAID*) and a higher capacity 8 drive (maximum) version (*Standard RAID*) are available, **both at lower pricing than the previous AM-447 units.** This flexibility allows you to configure smaller systems with RAID capabilities at much lower prices. Both units are desktop tower configurations, perfect companions to the Eagle and AM-7000 systems.

High capacity—RAID configurations start with RAID level 1 (mirroring) with 40GB of usable storage. They are field upgradeable for a total capacity of up to 120 GB of RAID 5 storage for the Mini-RAID subsystem, and 280 GB of RAID 5 storage for the Standard RAID subsystem.

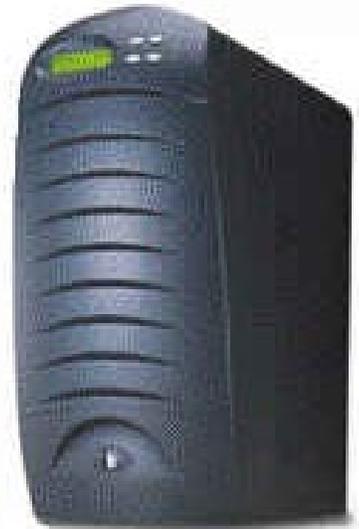
Dependable storage—Select the RAID level best suited to the application: RAID 0, 1, 0+1, 3, or 5.

Configure a hot spare disk—as appropriate to RAID level. Power supplies for the Standard RAID subsystem offer redundant operation and are also hot-swappable.

Superior performance—A high performance SCSI controller, built around the Intel® 64-bit 80303 100 MHz I/O Processor, plus a minimum of 64MB of on-board cache memory, make these subsystems top-level performers.



AM-448 *Mini-RAID*



AM-448 *Standard RAID*

Add modern high performance ATA/100 disk drives to the mix and you've got a disk subsystem that will add great value to new and existing Alpha Micro environments. **Our qualification testing shows that these new RAID subsystems are 30 to 40 percent faster than the previous AM-447 systems.**

Compatible—Packaged in a deskside mini-tower enclosure, both versions of the AM-448 connect to the external Wide SCSI port on the host system. We support the AM-448, under AMOS 2.3A, in any system that contains a wide SCSI bus.

Visual and audible alarms—The AM-448 subsystems contain a front panel LCD readout, disk drive status indicators on each disk drive tray, and an audible alarm to warn the system administrator of drive faults, power supply faults, and other subsystem faults.

Automatic disk rebuild—The AM-448 subsystems provide an automatic data rebuild when a disk drive is replaced or a hot spare is activated. This action is totally transparent to the host computer.

Turnkey installation—Complete the attached *AM-448 Configurator* and we'll ship your AM-448 ready for plug and play installation. We'll install a bootable AMOS on request.

PRODUCT DESCRIPTION

Equipment

The AM-448 RAID Subsystem series consists of a RAID Controller and up to eight (four on the small subsystem) high performance ATA/100 disk drives, mounted in a deskside mini-tower enclosure. Two power supply modules are also included in the Standard RAID subsystem to provide redundant power supplies, and both subsystem versions contain a hot-swappable removable fan assembly. A cable connects the AM-448 to the external SCSI connector on the Alpha Micro host system. Key product characteristics are as follows:

Modular enclosure—The AM-448 is housed in an attractively styled enclosure. Dimensions for the two AM-448 RAID subsystems are as follows:

Mini-RAID subsystem	6.5" wide	11" high	11.6" deep
Standard RAID subsystem	8.5" wide	17.1" high	14.1" deep

Low-noise fans provide cool, quiet operation. Plan on mounting the AM-448 immediately adjacent to the host system. See "Equipment Location" on page 6 for recommendations.

Advanced RAID controller—The RAID controller is built around an Intel 64-bit 100 MHz I/O processor. The controller acts as the interface between the host system and the disk drives in the RAID array. The AM-448 appears to the host as a single ultra-wide disk drive, with a single SCSI ID, regardless of the number of physical disks in the array.

Cache memory—The RAID controller comes equipped with 64 MB of cache memory, upgradeable to a maximum of 512 MB.

Disk drives—Presently, the highest speed, lowest capacity ATA disk drives are offered for use in the AM-448. Drive size is currently 40 GB, but will continue to grow as disk technology continues

to make dramatic gains in performance and capacity. At least two disk drives must be included in any RAID subsystem (three for RAID 5 configurations), with a maximum of either 4 drives (Mini-RAID subsystem) or 8 drives (Standard RAID subsystem). Each disk drive is housed in a slide-out module (drive tray), with three indicator LEDs for power, disk access, and disk failure.

Disk Drive hot swapping—AM-448 disk drives are hot-swappable from the front of the unit. If a disk should require replacement, the user can slide out the complete disk/tray module and slide in a spare without disturbing the other disks in the AM-448. The price list in the attached Reseller Supplement includes spare disk drives (RAID Disk Modules) for installation into empty disk trays.

Power Supply module hot swapping (Standard RAID subsystem only)—Two redundant power supplies, each contained in hot-swappable modules, are provided. These modules are replaceable from the rear of the unit. Status indicators on the rear panel indicate proper operation and fault conditions.

RAID Operations

RAID Levels—The AM-448 is capable of operation in six different RAID modes, or levels. The levels are designated 0, 1, 0+1, 3 and 5, and JBOD (Just a Bunch of Drives). In practice, Alpha Micro users generally select either RAID 1 or RAID 5.

- **RAID Level 1 (Mirroring)**—The subsystem is equipped with two drives. As data is received from the host, the RAID controller in the AM-448 writes everything twice—once on each disk. If either disk should fail, the host will still have access to all the data.

In summary, RAID 1 offers the lowest in-the-door cost for fault-tolerant storage.

- **RAID Level 5**—As it receives data from the host, the RAID controller breaks the data into chunks, calculates parity for each chunk, and writes the result in stripes across all the disks in the array. The parity calculation scheme and the chunk-to-disk allocation scheme are such that if any one disk should fail, the RAID controller can automatically reconstruct the entire contents of the failed disk, on the fly.

RAID 5 takes advantage of parallel processing, by spreading the operation over multiple drives, offering the highest fault tolerant disk performance.

Spare drives—A RAID system continues to service the host even if one drive fails. The system continues to operate normally. System users are totally unaware there has been a disk failure and system productivity is unaffected. That's the beauty of RAID technology!

In the unlikely event that a second drive should fail, disk service to the host will cease and data may be lost. To protect against this, RAID systems are usually configured with an on-line hot spare disk.

The spare is used only if one of the other disks in the array should fail. If that happens, the AM-448 runs in a degraded mode for a short period. During this period the RAID controller automatically rebuilds the contents of the failed disk onto the spare disk. The RAID subsystem then resumes providing full RAID protection. Meanwhile an alarm signals the need to replace the defective disk.

Replacement can be performed 'hot,' as noted above, without disturbing the users on the host system.

Usable disk storage—Redundancy is the essence of RAID. Some portion of the physical disk storage is taken up by duplicated data (in RAID 1) or parity information (in RAID 5). What remains is usable storage as seen by the host system. The rule of thumb for figuring usable disk storage is:

- **Useable storage with RAID 1 (Mirroring)**—Of the disk storage physically installed in the AM-448, half will be usable, and therefore visible to the host.
- **Useable storage with RAID 5**—The equivalent of one physical disk drive will be taken up by RAID 5 parity. The rule applies regardless of the number of drives in the array. If there are three drives—the smallest possible RAID 5 configuration—parity will consume the equivalent of one drive. The same applies if there are 4, 5, or 6 drives: one will be taken up by parity.

HOW TO PLAN AN AM-448 RAID SUBSYSTEM

There are two steps to planning an AM-448 configuration. First, use Table 1 on the following page to specify the hardware components. Second, use the *AM-448 RAID Subsystem Configurator* form, later in this bulletin, to specify the software aspects of the system. With this information, Alpha Micro's manufacturing department can assemble the equipment, load software, designate SCSI parameters, and take other steps to ship you an integrated RAID subsystem, ready for turnkey installation. If you have any questions, feel free to call us.

How to Use Table 1: *AM-448 RAID Subsystem Hardware*

- A. Under *RAID Subsystems*, Table 1 defines both the Mini-RAID (four drive maximum) and Standard RAID (eight drive maximum) subsystem configurations. All versions of each configuration are listed with their own PDB-00448-xx part numbers. Note the Usable Capacity figures at the right. These are typical configurations, most likely to be ordered for an Alpha Micro site. Many others are possible.
- B. Determine the type of RAID desired: RAID 1 or RAID 5. Determine whether a hot spare disk is to be configured (we recommend yes, do configure a spare).
- C. Based on the type and quantity of RAID storage required, select one of the RAID subsystems. In making the selection you may wish to review prices, shown in the Reseller Supplement to this bulletin.
- D. Determine if you need more than 64MB of cache in the RAID subsystem. If so, specify the total amount of cache needed.

Table 1. AM-448 Raid Subsystem Hardware

- Select the RAID Subsystem basic physical size (Mini or Standard)
- AMOS host system must be Wide SCSI, and contain a high speed twisted pair internal SCSI cable. Systems already in the field as of the date of this announcement will require the purchase of a new high speed cable.

Part No.	Product Description	Usable Capacity (Approx.)	
		Without a Spare Disk	With Spare Configured
	Mini-RAID RAID Subsystems		
PDB-00448-42	RAID Level 1 Subsystem, 2 x 40GB drives	40GB	not applicable
PDB-00448-43	RAID Level 5* Subsystem, 3 x 40GB drives	80GB	not applicable
PDB-00448-44	RAID Level 5 Subsystem, 4 x 40GB drives	120GB	80GB
	Standard RAID Subsystems		
PDB-00448-82	RAID Level 5 Subsystem, 2 x 40GB drives	40GB	not applicable
PDB-00448-83	RAID Level 5 Subsystem, 3 x 40GB drives	80GB	not applicable
PDB-00448-84	RAID Level 1 Subsystem, 4 x 40GB drives	120GB	80GB
PDB-00448-85	RAID Level 5* Subsystem, 5 x 40GB drives	160GB	120GB
PDB-00448-86	RAID Level 5 Subsystem, 6 x 40GB drives	200GB	160GB
PDB-00448-87	RAID Level 5 Subsystem, 7 x 40GB drives	240GB	200GB
PDB-00448-88	RAID Level 5 Subsystem, 8 x 40GB drives	280GB	240GB
	RAID Disk Modules		
	<ul style="list-style-type: none"> • Order for use as shelf-stocked, off-line spare disks when mounted into disk trays. Hot-swap into the AM-448 as required. • Order when required to construct an AM-448 configuration other than those shown above, or when expanding an existing AM-448 RAID subsystem. 		
PDB-00448-00	RAID Disk Drive, 40GB		
	RAID Cache Memory Modules		
	<ul style="list-style-type: none"> • Order only if you need larger than 64MB cache, only one cache memory slot in the RAID controller 		
PFB-00718-C8	RAID Cache Memory, 128MB SIMM		
PFB-00718-D6	RAID Cache Memory, 256MB SIMM		
PFB-00718-E2	RAID Cache Memory, 512MB SIMM		
	High speed internal SCSI cable for main system		
	<ul style="list-style-type: none"> • Order the style you need based on your system type. Systems ordered with AM-448 RAID subsystems will already contain this cable. 		
DWB-10319-40	Cable for Eagle, AM-6000 or AM-7000 deskside enclosure.		
DWB-10319-01	Cable for AM-990 Single Wide or Double Wide Chassis		

* Three drives can also be configured as a RAID 1 subsystem with a hot spare. Order the PDB-00448-xx part number shown here, then specify *RAID 1* on the Subsystem Configurator form contained in this document.

SYSTEM IMPLEMENTATION CONSIDERATIONS

Equipment Location

The disk data channel between the AM-448 and its host system is an external SCSI cable. The connection is straightforward: from the external SCSI port on the system to the HOST I/O IN connector on the AM-448 rear panel.

A high quality ultra SCSI cable, 3 feet in length, is provided for the RAID connection to the host. We recommend that you locate the equipment as follows:

- **When the host system is a desktide mini-chassis**—Install the AM-448 and the desktide chassis on a desktop, side by side.
- **When the host system is an AM-990 chassis**—Position the AM-448 enclosure immediately to either side of the AM-990 chassis and 8 to 12 inches off the floor. See Figure 1. This is the most convenient setup for using the standard 3-foot cable, which is essential for proper operation.

If you need a longer SCSI cable, contact Order Administration for information on longer SCSI cables and SCSI repeaters (see below).

Possible Requirement for AM-441 Wide SCSI Repeater

The AM-448 is a Wide SCSI device. For satisfactory operation, any system that includes Wide SCSI devices must be configured according to rules that limit the number of SCSI device and the length of any external SCSI cabling. Installation of an AM-441 Wide SCSI Repeater allows more devices and longer external cabling. Without an AM-441, a system mounted in the Eagle desktide mini-chassis or an AM-990 chassis supports up to five internal SCSI devices and an external SCSI cable up to 3 feet long.

To configure more devices, and for information about other chassis types, see “Wide SCSI Configuration Rules” in the *AMOS Hardware Products* price list, or consult Marketing Bulletin AMB98-04, or call us.

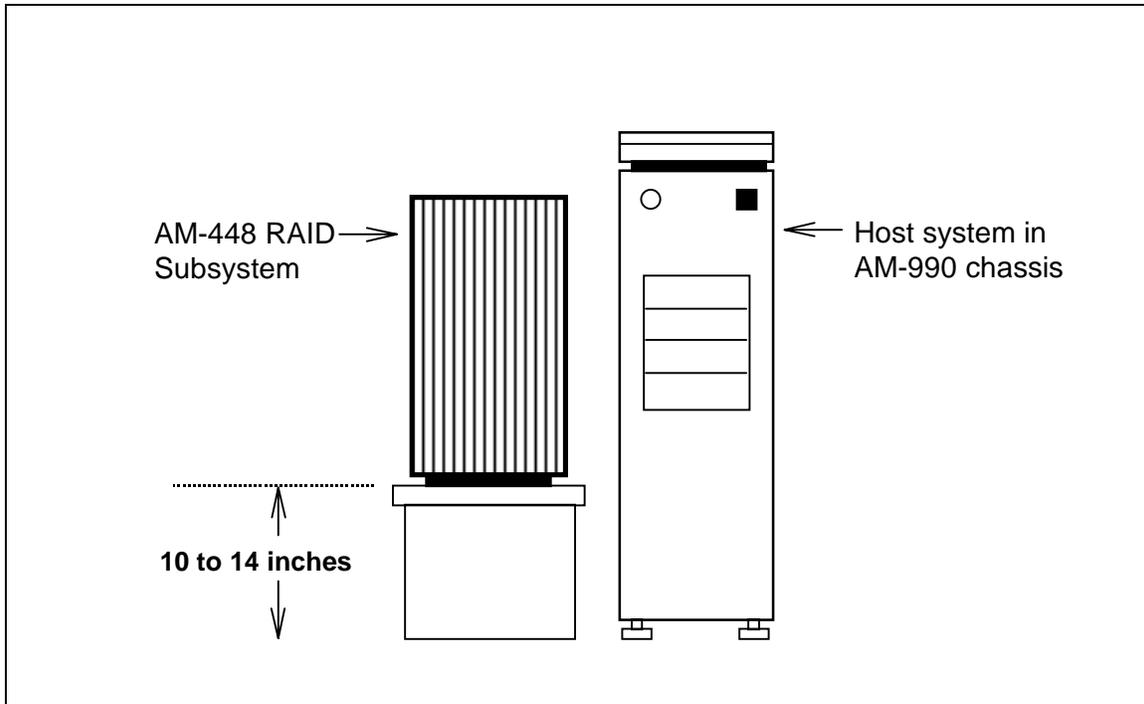


Figure 1. Installing an AM-448 with Host System in AM-990 Chassis (front view)

Tape Backup

Since the AM-448 subsystem appears to the AMOS host as one large disk, tape backup operations work in the normal manner. It's important to note that RAID technology does not eliminate the need for backup. Backup media—archived off-site—remain the indispensable protection against fire or other disaster.

Booting From the AM-448

We can load a bootable copy of AMOS on the AM-448 before shipment. Specify details on the *AM-448 RAID Subsystem Configurator* form. To boot from the AM-448, you must set your computer's boot ID correctly using the CMOS configuration menu.

AM-448 RAID Subsystem Configurator Form

A blank *AM-448 RAID Subsystem Configurator* form is provided in this document. Use the form to specify installation parameters; we will then configure the AM-448 for you prior to shipment. Instructions are shown on the form.

BOTTOM LINE

In today's ever demanding environments, the necessity of fault tolerant disk systems is more important than ever.

Few companies today can afford down time. The lost productivity is too great, the competition too keen and the profit margins too tight. Our new AM-448 Product line delivers the perfect answer to these concerns and adds important value to all AMOS environments.

We look forward to hearing from you.

Sincerely,



Rod Everett

Director of Marketing and Sales

For each RAID order, please fill out a AM-448 RAID Subsystem Configurator Form and fax it to Order Administration at (949) 250-5870.





AM-448 RAID Subsystem Configurator

Using This Configurator

This configurator is designed to help you spec out an AM-448 RAID Subsystem and to plan the software setup. Send us the completed form and we'll perform setup at Alpha Micro. Your AM-448 will then be delivered ready for turnkey installation. Fax the form to Order Administration at (949) 250-5870.

☛ Need technical assistance? Call Technical Support at (800) 487-7877.

Dealership Name _____ Dealer No. _____

Your Name _____ Date _____

Phone _____ Fax _____

Email _____

Your reference to this RAID Subsystem (your P.O. No., or your customer's name, etc.) _____

Specify the RAID Subsystem

- Host System chassis style *Deskside Mini-chassis* *AM-990* *Other*
- RAID subsystem style *Mini-RAID (4 drive max)* or *Standard (8 drive max)*
(no redundant power supplies) (2 redundant power supplies)
- RAID type desired *Level 1 (Mirroring)* or *Level 5*
- Cache Memory Upgrade for RAID .. 128 MB 256 MB 512 MB
(64MB is standard in all RAID configurations - it will be replaced with the upgrade selected)
- New High Speed Internal SCSI Cable required for host system Yes or No
- List the PDB-00448-XX RAID part number(s) ordered for this subsystem:

Part Numbers:

- Total number of physical drives: _____ = active drives _____ + drives configured as spares _____ .
- Desired RAID SCSI ID: _____

Specify the AMOS Configuration

- Number of AMOS logicals: _____ **OR** Logical size in MB: _____ **OR** BITMAP size in words: _____
- EXTENDED directories? Yes No
- Should we load bootable AMOS before we ship? .. Yes No
- If you checked Yes for item 10, please specify the following:

AMOS Version: 2.3A	Booting .DVR:	Booting .IDV:	Boot Port:	Booting BAUD:	Booting .TDV:
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- Special instructions: _____