

Installation and Integration of the Arraid AEM-6C Disk Emulation System on HP-1000 Computers with the HP-13037 (MAC) Disk Controllers Replacing HP-7906 Disk Drives.

PREPERATION

The AEM-6C is fully plug compatible with the HP-13037 controller and existing cables. It is NOT however plug-and-play, as no such term exists in computer systems of this generation. Please review this Application Note carefully before attempting to install the AEM. The required tasks are simple but necessary and all cautions should be observed.

The most important part of preparation is determining the best method for copying operating system, application and data from the original drive to the AEM. Since the AEM cannot physically load and read the 7906 cartridge, there must be a software means to do this. If you have a tape drive on the computer system, then the preferred method is to perform a full backup to tape, which can be restored to the AEM after installation. Perform the backup now before installing the AEM.

In many cases the AEM will be installed on an existing HP-1000 computer system in addition to an existing 7906 disk drive. The AEM will appear, to the Customer's computer and controller, exactly like a 7906. A disk copy utility can be used to copy information from the original drive to the AEM.

To complete the installation you must have the ability, both the software utilities and knowledge of their use, to format blank disks and copy information from one 7906 to another, either directly or via tape.

You should have and be familiar with the use of software utilities such as:

12962-16001 HP79XX/13037 Disc Memory Diagnostic

92067-16340 !DSKUP Off-Line Copy Utility

92067-16348 !DISK Off-Line Copy Utility

HARDWARE INSTALLATION

Inspect the shipment for damage. Notify your freight carrier of any damage and contact Arraid to determine the possible severity of damage. After inventorying the shipment, unpack the box(es). Be sure to find and set aside the AEM User Reference Manual. One is included inside the box with each AEM. This is an important document and will be referred to by this Application Note.

The majority of AEMs come in enclosures (chassis) designed for rack mounting, which require 5.25" of rack space.

Determine the mounting location of the AEM in the equipment rack. It must be located close enough to the HP-1000 so that the Customer supplied (usually the existing) data and control cables will reach from the AEM to the MAC Chassis. The AEM is not compatible with HP's slide rails, but can be supported by HP's shelf kit. Arraid has an optional shelf kit available as well. No additional cooling is required.

The AEM is delivered with a standard US power cord. The power supply accepts 50/60 HZ and is switchable between 115 VAC and 230VAC. Be sure to check the voltage before plugging in the AEM as many HP cabinets only provide 230VAC.

Once the AEM is installed in the rack, connect the data and control cables. The control cable is the 50 wire flat ribbon cable ending in a card edge connector. Pin one on the control cable is on the top of the connector. The data cable is the small round cable. The data cable connector is keyed. Line up the key with the missing pin of the AEM's data connector and attach. Secure the cable clamp.

Once the AEM is connected and plugged in to AC Power, turn on the AC Power switch that is located at the rear of the AEM. The AEM has an internal Power On Self Test (POST). After a short delay, all of the AEM control panel LED's should illuminate briefly then go out. This indicates the successful completion of POST. Consult the USERS manual if any LEDs other than an address LED stay on. Contact your ARRAID representative.

Use the ADDR button on the AEM to set the disk address, if an address of other than zero (all address LEDs out) is required. If another 7906 is attached to the computer, the AEM disk address must be set to something other than at the 7906 address.

Putting the AEM On Line:

Insert MO media in both of the MO drives. Press and hold the Start button on the AEM until the Ready LED starts to blink. Release the Start button and the Ready LED will continue to blink as the contents of the two MO drives are read into the AEMs cache memory. The activity LED on the MO drives will blink during the load sequence. When finished loading, the Ready LED and the Select LED will remain on, not blinking. The AEM is now on line and ready.

Note: the CompactFlash (CF) media in the Arraid Flash Drive (AFD) should be treated exactly the same as the MO media. All drive data is stored on the CF media as if were the original MO media. Media rotation procedures can be maintained. Where Magneto-Optical (MO) media is referred to in this guide, procedures and media usage can be interchanged with Arraid supplied and approved CompactFlash (CF) media.

Arraid will only support media & hardware issues where CF media has been supplied directly by Arraid. Please contact Arraid for CF media pricing and availability.

FORMATTING & DUPLICATION

Most AEMs replacing HP-7900 drives will be equipped with two Magneto-Optical (MO) SCSI drives as the output devices (or alternatively two Arraid Flash Drives (AFD) configured as MO drives). One set of pre-formatted MO media (or alternatively Arraid supplied and approved CF media) will be supplied with each AEM. The format can be copied to additional MO media via the built in COPY/BACKUP function as described in the AEM User Reference Manual, Section 17. This off-line capability is built into every HP-7906 replacement. Using BACKUP, you copy from media in the upper MO drive to media in the lower MO drive. Unlike copy using an Operating System utility, everything is copied: format, data if any and blank space. You have a cloned image of the original. Take the pre-formatted MO cartridges, set their write protect switches to protected, and copy them to new MO media. Set the "Master" pre-formatted cartridges aside. Unless you accidentally over-write the Master, you will never have to format an MO cartridge using the Operating System.

Caution:

When operating on-line, the upper MO drive stores the “fixed” platter emulation and the lower MO drive contains the removable cartridge emulation. This is opposite from the layout in the HP 7906, but necessary for proper AEM functioning. When off-line, there is no distinction and the BACKUP process may be used to copy either “fixed” or “removable” MOs. (Caution: to avoid mix up, you should label your MO cartridges either “Fixed” or “Removable” as they are formatted or copied.)

Just In Case:

Realizing that accidents do happen, we include the following just in case a format using the HP Diagnostic needs to be performed.

Make sure that the AEM is off line. Insert blank or scratch MO media in both of the MO drives. Use the START switch to bring the AEM on line. Start the diagnostic and select the drive to be formatted. In the AEM, the Format switch is defaulted to ON. See Caution 3 under OPERATION, below. Using the diagnostic, format the disk. Make sure that you format all four heads.

DIAGNOSTICS

Caution:

The HP-1000 disk diagnostic will report failures despite proper functioning of the AEM. The 7906 disk drive, when new, was state of the art. Today, in relative terms, the HP-7906 is less reliable and slower than SCSI devices. The HP diagnostics for the 7906 were written to test a complex electro-mechanical device. Many of the diagnostic tests were designed to check the timing of electro-mechanical functions that do not exist in fully cached, SCSI based emulators, and will fail. Other tests check original drive functions such as track offsets to produce data errors that can not be duplicated in fully cached, SCSI based emulators. These tests also will fail.

If you run the diagnostic, ignore all error reports from tests that check anything other than basic head track positioning and read/write capability.

INSTALLING OPERATING AND APPLICATION SOFTWARE

Once you have formatted MO cartridges, you will need to transfer data from the 7906 over to the AEM. If you have made a backup tape, you may now restore it to the AEM. Otherwise, use one of the copy utilities listed on the first page for direct disk to disk transfer. Both methods work, use whichever you are more comfortable with.

Once the data transfer has been completed, the AEM is ready for use.

OPERATION

Cautions:

1. Place the AEM off-line when changing the disk address. The address cannot be changed when on-line.
2. Do not use the write protect tab on the MO except for the “Master” copies that are only intended to be used for making copies. The HP Operating System writes to both media as a normal course of operation. Protected media will cause the AEM to FAULT and the Operating System to report an error.
3. The original 7900 has a format “on/off” switch. When on, this switch sets a status line that allows a drive to be formatted. This status is interrogated by the format and some copy utilities. The AEM does not have a format switch but has the format status line set to ON as the default in order to be able to work with these programs. This has no effect on any other portion of the Operating System.

4. If procuring MO media from a source other than Arraid, be certain that the media is SCSI formatted for 512 bytes per block. 1024 byte media is available but will NOT work in the AEM.