

## Subchapter 2.1—HP e3000 A-Class Servers

### System Specifications

Table 2.1.1 A-Class System Specifications

SPU Model Number	A400-100-110	A500-100-140	A500-200-140 <sup>1</sup>	A400-100-150	A500-100-200	A500-200-200
SPU Product Number	A6398B	A6399B	A6399B plus A6394A	A7018C	A7019C	A7019C plus A7020A
Perf. relative to HP e3000 Perf. Unit	2.2	3.2	5.4	4.8	6.4	11
Typical users	8–64	48–100	64–200	8–64	48–100	64–200
Max. connected workstations/terminal	3,300	3,300	3,300	3,300	3,300	3,300
Number of CPUs	1	1	2 <sup>1</sup>	1	1	2
Cache – Instruction/Data per CPU (KB)	512/1024	512/1024	512/1024	750/1500	750/1500	750/1500
PA-RISC processor	PA-8500	PA-8500	PA-8500	PA-8700	PA-8700	PA-8700
Clock speed (MHz)	110 <sup>2</sup>	140 <sup>2</sup>	140 <sup>2</sup>	150 <sup>2</sup>	200 <sup>2</sup>	200 <sup>2</sup>
Floating Point Coprocessor incl.	Yes	Yes	Yes	Yes	Yes	Yes
Max. chassis I/O slots (PCI)	2	4	4	2	4	4
Earliest MPE/iX version	7.0	7.0	7.0 Express 1	7.5	7.5	7.5
Software tier	1 (310)	1 (310)	1 (310)	1 (310)	1 (310)	1 (310)
User license level	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
<b>Standard Integrated I/O</b>						
Ultra2 LVD/SE SCSI Port	1	1	1	1	1	1
SE SCSI Port (narrow)	1	1	1	1	1	1
RS-232C Serial Port <sup>3</sup>	3	3	3	3	3	3
10/100Base-TX	1	1	1	1	1	1
<b>Internal Capacities (not including external peripherals)</b>						
Minimum quantity of memory DIMMs	1	1	1	1	1	1
Maximum quantity of memory DIMMs	8	8	8	8	8	8
Base RAM (MB)	128	512	512	128	512	512 <sup>4</sup>
Max. RAM capacity (MB)	2,048 <sup>5</sup>	8,192 <sup>5</sup>	8,192 <sup>5</sup>	2,048	8,192	8,192
Minimum internal disk drives	0	0	0	0	0	0
Maximum internal disk drives	2	2	2	2	2	2
Minimum internal disk capacity (GB)	0	0	0	0	0	0
Maximum internal disk capacity (GB)	146	146	146	146	146	146
Max. internal removable media drives	0	0	0	0	0	0
<b>Site Preparation</b>						
Site planning and installation incl.	Yes	Yes	Yes	Yes	Yes	Yes
Racked:						
Depth (mm/in)	710 mm/28 in	710 mm/28 in	710 mm/28 in	710 mm/28 in	710 mm/28 in	710 mm/28 in
Width (mm/in)	482 mm/19 in	482 mm/19 in	482 mm/19 in	482 mm/19 in	482 mm/19 in	482 mm/19 in
Height (mm/in/EIA units)	89 mm/3.5 in/ 2 units	89 mm/3.5 in/ 2 units	89 mm/3.5 in/ 2 units	89 mm/3.5 in/ 2 units	89 mm/3.5 in/ 2 units	89 mm/3.5 in/ 2 units
Weight (kg/lbs)	20 kg/45 lbs	20 kg/45 lbs	20 kg/45 lbs	20 kg/45 lbs	20 kg/45 lbs	20 kg/45 lbs
<b>Maximum Capacities (counting integrated peripherals)</b>						
Disk spindles	511	511	511	511	511	511
Disk array/disk capacity (TB)	6.5 <sup>6</sup>	6.5 <sup>6</sup>	6.5 <sup>6</sup>	6.5	6.5	6.5
Tape mechanisms	32	32	32	32	32	32
Maximum printers						
– SCSI-2	8	8	8	8	8	8
– RS-232 Serial	250	250	250	250	250	250
Maximum DTCs	120	120	120	120	120	120

<sup>1</sup> Multi-processor support requires MPE/iX Release 7.0 Express 1.

<sup>2</sup> Effective with software.

<sup>3</sup> Console, remote console (support modem), and UPS control.

<sup>4</sup> Additional 512 MB of memory required for second additional processor.

<sup>5</sup> MPE/iX Release 7.0 supports a maximum of 2 GB of memory. Release 7.0 Express 1 supports a maximum amount of memory of 2 GB (A400) and 8 GB (A500).

<sup>6</sup> As of MPE/iX 7.5

Table 2.1.1 A-Class System Specifications (continued)

SPU Model Number	A400-100-110	A500-100-140	A500-200-140 <sup>1</sup>	A400-100-150	A500-100-200	A500-200-200
SPU Product Number	A6398B	A6399B	A6399B plus A6394A	A7018C	A7019C	A7019C plus A7020A
<b>Maximum PCI I/O and Networking Cards in Chassis</b>						
PCI 2 Gb/s Fibre Channel Adapter <sup>11</sup>	2	4	4	2	4	4
Single Port, Ultra160 SCSI card <sup>11</sup>	1	3	3	1	3	3
Single Port, LVD/SE, Ultra2 SCSI card	1	3	3	1	3	3
Single Port, Ultra HVD, SCSI card	2	4	4	2	4	4
10/100Base-TX LAN card	2	4	4	2	4	4
8 channel ACC card <sup>7</sup>	1	3	3	1	3	3
FDDI <sup>8</sup>	0	0	0	0	0	0
802.5 Token Ring LAN card <sup>9</sup>	0	0	0	0	0	0
<b>Electrical Characteristics</b>						
AC input power	100-237 V, 200–240 V, 50/60 Hz					
Current requirements at 220V <sup>10</sup>	1.8 A	2.2 A	2.2 A	1.8 A	2.2 A	2.2 A
Typical Power dissipation (watts) <sup>10</sup>	350	450	450	350	450	450
Maximum Power dissipation (watts) <sup>10</sup>	400	600	600	400	600	600
kW rating for UPS loading <sup>10</sup>	0.4 kW	0.6 kW	0.6 kW	0.4 kW	0.6 kW	0.6 kW
Power Factor at full load	0.95 at 240 V, 0.98 at 120 V					
Heat dissipation, Max. (BTUs/hour) <sup>10</sup>	1,365	2,048	2,048	1,365	2,048	2,048
Typical (BTUs/hour) <sup>10</sup>	1,195	1,536	1,536	1,195	1,536	1,536
<b>Environmental Characteristics</b>						
Acoustics (operator/bystander) at 20°C	< 6.5 dB LwA					
Op. Temp. (up to 1.5 km/5,000 ft)	+5° to +35°C (41° to 95°F)					
Non-operating temperature	System: –40° to +65°C (–40° to 149°F)					
Maximum rate of temperature change	20°C per hour					
Operating relative humidity	15% to 80%, non-condensing, max. wet bulb = 26°C					
Non-operating relative humidity	5% to 90%, non-condensing					
Operating altitude	To 3.0 km (10,000 ft) above sea level					
Non-operating altitude	To 4.5 km (15,000 ft) above sea level					
<b>Regulatory Compliance</b>						
Electromagnetic interference	Complies with FCC rules and regulations, Part 15, Subpart J, as a Class A digital device. Manufacturer's Declaration to EN55022 Level A, VCCI Registered, Class 1, Korea RLL.					
Safety	UL Listed, CSA certified, TÜV GS Mark, compliant with EN 60950 and EN 41003					

<sup>1</sup> Multi-processor support requires MPE/iX Release 7.0 Express 1.

<sup>7</sup> ACC cards perform similarly to previous servers' PSI cards. ACC cards support NS point-to-point (LAP B) and SNA/SDLC. There is no support for Bi-Sync/RJE.

<sup>8</sup> For FDDI support, use 10/100Base-TX LAN adapter to connect to an FDDI switch.

<sup>9</sup> Token Ring is not supported on these servers.

<sup>10</sup> Power/heat dissipation and UPS kW rating may increase with future upgrades.

<sup>11</sup> Card available through field integration only for servers with product numbers A6398B and A6399B; card can be factory integrated for all other A-Class servers.

## Product Description

The HP e3000 A-Class Precision Architecture Servers are high performance, entry-level servers that take advantage of the HP Precision Architecture-RISC (PA-RISC) to provide mid-range and high performance solutions with competitive price/performance. They can be used on top of a bench, at the side of a desk, or racked in a cabinet. The HP e3000 A-Class Servers (see **Figure 2.1.1**), include at least one processor with on-chip floating point; a minimum amount of memory; one core I/O card; two or four PCI I/O slots; room for two integrated disk drives; an unlimited user license; and the MPE/iX operating system, IMAGE/SQL data base and any optionally ordered software loaded on a factory generated preload tape. This factory generated preload tape can be installed at the factory on integrated disks in the HP e3000 A-Class Server, on other disk drives ordered with the server, or on customer provided disk drives at the customer site.

**Figure 2.1.1. HP e3000 A-Class Server**



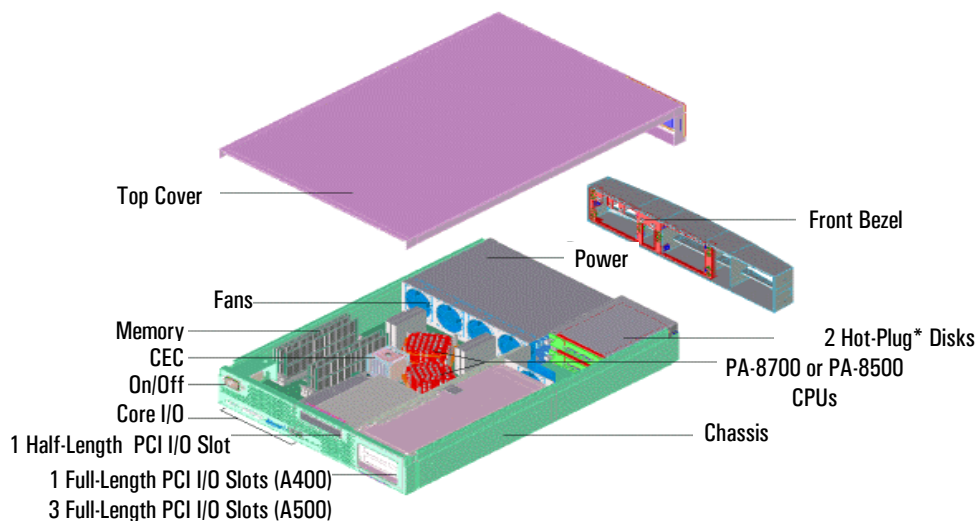
The HP e3000 A-Class Servers offer various performance points (see **Table 2.1.2**), which include multiprocessor configurations. The HP e3000 A-Class Servers have the ability to add additional processors, memory, I/O cards and integrated disk capacities via upgrades providing for economical growth as system performance and capacity requirements increase.

**Table 2.1.2. HP e3000 A-Class Servers**

Server	Product Number	Description	Relative Performance	Minimum Memory (MB)	Software Tier
A400-100-150	A7018C	A400 1-way server using a 150-MHz processor	4.8	128	1 (310)
A500-100-200	A7019C	A500 1-way server using a 200-MHz processor	6.4	512	1 (310)
A500-200-200	A7019C plus A7020A processor	A500 2-way server using 200-MHz processors	11	1024	1 (310)
A400-100-110	A6398B	A400 1-way server using a 110-MHz processor	2.2	128	1 (310)
A500-100-140	A6399B	A500 1-way server using a 140-MHz processor	3.2	512	1 (310)
A500-200-140	A6399B plus A6394A processor	A500 2-way server using 140-MHz processors	5.4	512	1 (310)

HP e3000 Servers are named using a three term naming convention (see **Table 2.1.2**). The first term identifies the family (i.e., A-Class) and the model (i.e., A500), the second term identifies how many processors are in the server (i.e., 200 indicates two processors), and the third term identifies the frequency of all processors in the server (i.e., 140 indicates 140 MHz). If the model strings stored in the server are not properly updated at factory creation time or when an HP field CE installs a chassis upgrade kit or adds additional processors, the HP e3000 A-Class Server may not boot properly.

Figure 2.1.2. HP e3000 A-Class Server Internals



\* Hotplug disks are not supported by MPE/iX at this time.

## Product Configuration Details

### Base Configuration

The HP e3000 A-Class Server base configuration contains the following hardware components (see **Figures 2.1.2 and 2.1.3**):

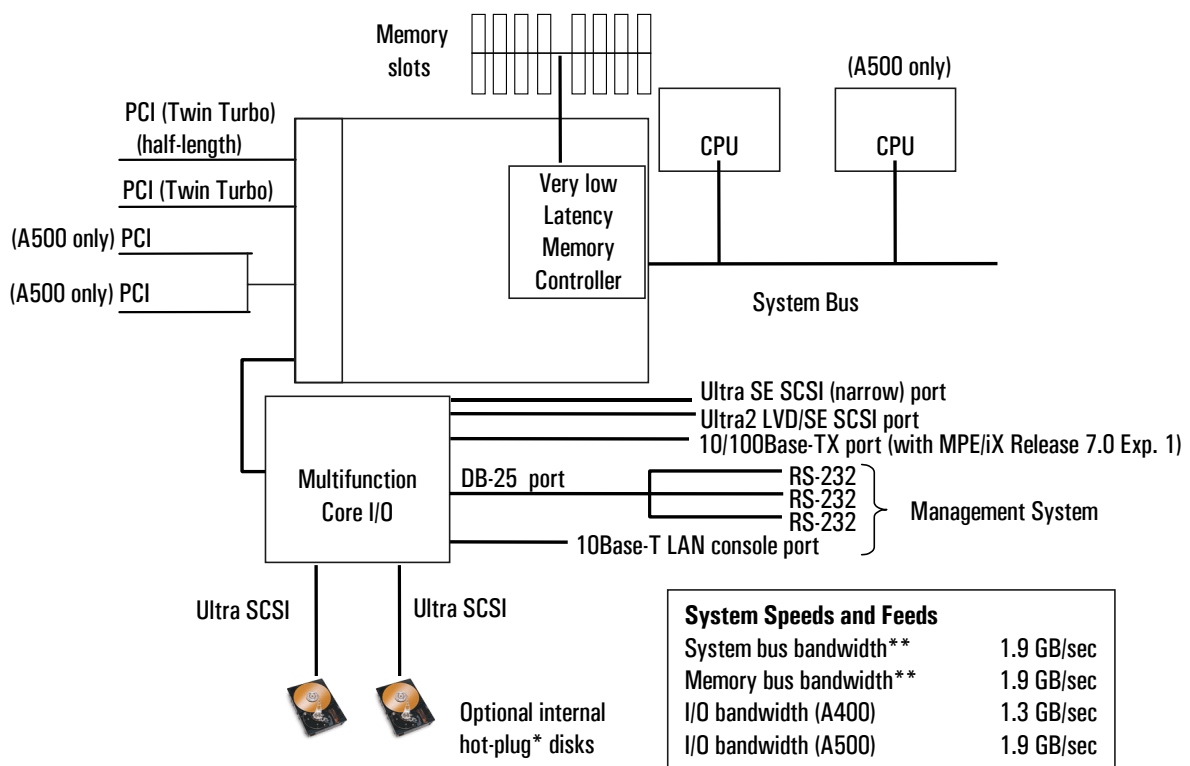
- One PA-8700 64-bit processor chip with 1500 KB data cache and 750 KB instruction cache (4-way set associative cache, single-bit cache error correction), and with 56 instruction reorder buffer per processor or one PA-8500 64-bit processor chip with 1024 KB data cache and 512 KB instruction cache (4-way set associative, single-bit error correction), and with 56 instruction reorder buffer per processor:
  - One 150-MHz PA-8700 processor (A400-100-150)
  - One 200-MHz PA-8700 processor (A500-100-200)
  - One 110-MHz PA-8500 processor (A400-100-110)
  - One 140-MHz PA-8500 processor (A500-100-140)
- Floating point coprocessor integrated on the processor chip
- SyncDRAM ECC memory modules with one memory carrier board:
  - 128-MB memory (A400-100-150, A400-100-110)
  - 512-MB memory (A500-100-200, A500-100-140)
- Double clocked system bus: 1.9-GB/sec (A400-100-150 and A500-x00-200), 1.8-GB/sec (A400-100-110 and A500-x00-140)
- Core I/O Card containing the following base I/O:
  - One Ultra, narrow SE SCSI port for connection of up to seven non-disk SE SCSI peripherals
  - One Ultra2 SCSI LVD/SE connection for up to 15 external LVD/SE SCSI peripherals
  - One Ultra LVD SCSI bus for connection of two integrated disks
  - One 10/100Base-TX LAN connection (supported with Release 7.0 Express 1) for use with DTCs, LAN devices, client/server connections and system-to-system connections
  - Three RS-232-C ports multiplexed over a “W-cable” for console, remote support and uninterruptible power supply (UPS) control
- Secure Web Console (integrated in core I/O for A400-100-150 and A500-x00-200)
- Two Twin-Turbo 4x PCI I/O slots with 500 MB/sec of bandwidth each (A400 and A500)
- Two Turbo 2x PCI I/O slots with 500 MB/sec of shared bandwidth (A500 only)
- MPE/iX Fundamental Operating System with IMAGE/SQL and a license for an unlimited number of users.
- Owners guide and general usage documentation set on CD-ROM

- Factory installation of processors, memory modules, disk drives and I/O cards
- Installation of MPE/iX Fundamental Operating System, IMAGE/SQL, and optional software when requested
- One-year on-site warranty with next day response.
- Site preparation, site verification and server installation included

In addition, the following must be purchased with each server:

- An additional 512-MB SyncDRAM ECC memory must be ordered when integrating a second processor for A500-200-200 servers.
- One or more disk or disk array of at least 18 GB, or customer provided disk
- One external SE SCSI-2 Digital Data Storage DDS-4 or DDS-3 cartridge tape drive or customer provided DDS-4 or DDS-3 cartridge tape drive
- One HP PowerTrust-II uninterruptible power supply (UPS) of at least 600-VA capacity, or customer provided power protection

**Figure 2.1.3. HP e3000 A-Class Server Bus Structure**



\* Hot-plug disks are not supported by MPE/iX at this time.

\*\* 1.8 GB/sec for A400-100-110 and A500-x00-140

## Multi-Processor Expansion

The HP e3000 A-Class Server currently comes in various configurations supporting from one to two processor modules (see **Tables 2.1.2 and 2.1.3**). Once a particular HP e3000 A-Class Server model is purchased, it can be easily upgraded through chassis upgrades or by adding additional processor modules. Although a minimum amount of memory is required for each processor (see **Table 2.1.2**), when an additional processor module is added to the server, it is recommended that enough memory and disk storage be included for the purpose of maintaining balanced system performance.

Processor modules are not intermixable. Each processor module in the server must be of the same type (i.e. a 110-MHz module cannot be used with a 140-MHz module).

Installation of HP e3000 A-Class processor modules requires installation and proper setting of HP e3000 A-Class model strings by HP field CEs. Improperly installed processor modules or model strings not matching the processors in an HP e3000 A-Class Server will cause the server to not properly boot. Processor modules from other HP e3000 Servers will not function in HP e3000 A-Class Servers. HP 9000 processor modules are not supported in HP e3000 A-Class Servers and will not work. At this time, HP e3000 A-Class Servers do not support processor modules of 440-, 550-, 650-, and 750-MHz.

**Table 2.1.3. HP e3000 A500 Add-on Processors**

Product Number	Description
A7020A	HP e3000 A500 200-MHz Processor Module
A6394A	HP e3000 A500 140-MHz Processor Module

**Table 2.1.4. HP e3000 A-Class Memory Products**

Product Number	ECC SyncDRAM in module	DIMM cards in module	MPE/iX Release Required
A5572A	128 MB	One cards (128 M)	Release 7.0 (C.70.00)
A5840A	512 MB	Two cards (256 MB each)	Release 7.0 (C.70.00)
A5841A	1,024 MB	Two cards (512 MB each)	Release 7.0 (C.70.00)
A6114A	2,048 MB	Two cards (1,024 MB each)	Release 7.0 Express 1 (C.70.01)

## Memory Subsystem

The HP e3000 A-Class Server supports SyncDRAM (Synchronous Dynamic Random Access Memory) DIMMs with full ECC protection (see **Table 2.1.4**) that plug directly into eight DIMM slots on the system board. Peak memory bandwidth is 1.9 GB/sec (1.8 GB/sec for A400-100-110 and A500-x00-140).

HP e3000 A400 Servers support a maximum of 2 GB of memory. If more than 2 GB of memory is configured in the HP e3000 A400 Server, it will not boot.

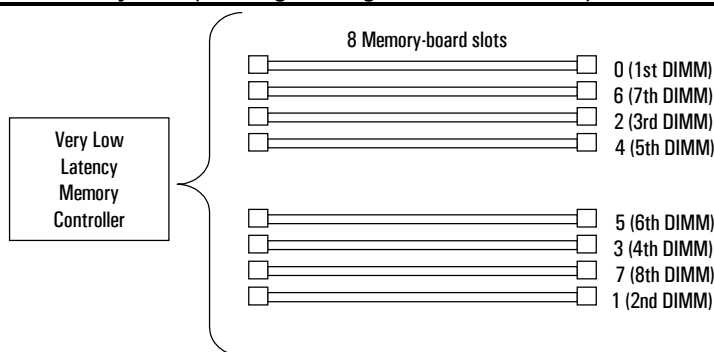
HP e3000 A500 Servers support a maximum of 2 GB of memory with MPE/iX Release 7.0 and 8 GB of memory with MPE/iX Release 7.0 Express 1. If more than 2 GB of memory is put into an HP e3000 A500 Server running MPE/iX Release 7.0 prior to Express 1, system failures may occur as the operating system tries to use this memory. This risk can be eliminated by not configuring more than 2 GB of memory until MPE/iX Release 7.0 Express 1 is installed.

Each HP e3000 A-Class Server comes with a minimum amount of memory (see **Table 2.1.2**). It is not possible to replace this memory at the time that the HP e3000 A-Class Server is ordered. In HP e3000 A500 Servers, 8 GB of memory is achieved by field replacing the original 512-MB memory module shipped with the server.

When loading memory modules other than the 128 MB module in HP e3000 A-Class Servers, the memory DIMMs must be loaded in pairs of equal density.

DIMMs must be loaded in the following slot position order (see **Figure 2.1.4**): 0, 1, 2, 3, 4, 5, 6, 7.

**Figure 2.1.4. HP e3000 A-Class Memory Slots (showing Loading Order of DIMM Pairs)**



## Memory Performance Tuning Guidelines

When initially ordering the HP e3000 A-Class Server, consideration should be given to the maximum amount of memory one might want to include in the server. Ordering too many 128-MB modules will quickly consume available DIMM slots and limit the maximum amount of memory that can be integrated.

On the other hand, when considering various combinations of modules that could make up a particular memory capacity, the combinations that use more DIMM cards will, in general, give better performance since this provides for more concurrent memory accesses.

Finally, consider how much memory may ultimately be needed in the HP e3000 A-Class server and whether an HP e3000 A400 (limited to 2 GB) might be upgraded to an HP e3000 A500 server (expandable to 8 GB) in the future.

**Note:** HP e3000 A-Class memory DIMMs are not compatible with other HP e3000 memory.

## Application Memory Requirements

Actual memory requirements will vary depending on the specific applications running on the HP e3000 A-Class Server. If there is no specific information available on the memory requirements of the server's applications, the following rule of thumb may be used:

*Memory = 32 MB + Application Requirements + [(1.0—1.5 MB) × the number of concurrent users]*

One MB per user should be used when considering low numbers of concurrent users on the HP e3000 A-Class Servers. Remember that HP e3000 A400 Servers come with 128 MB of memory while HP e3000 A500 Servers come with 512 MB of memory.

Several other memory usage situations ought to be reviewed critically. HP e3000 A400 Servers with a minimum of 128 MB of memory are very susceptible to memory shortages caused by quick changes in workload demands. Other situations to be reviewed include:

- OLTP mixed with batch
- Application development environments
- Heavy serial/batch-like access of data
- Environments with heterogeneous workloads

For these situations, performance may be improved by ordering additional memory.

## Input/Output Subsystem

The HP e3000 A400 Server contains five I/O channels, each providing 250 MB/sec of peak bandwidth. The channels are laid-out to support two “Twin-Turbo” PCI slots and the core I/O.

The HP e3000 A500 Server contains seven I/O channels, each providing 250 MB/sec of peak bandwidth. The channels are laid-out to support two “Twin-Turbo” PCI slots, two shared PCI slots, and the core I/O.

The term “Turbo” refers to a PCI I/O slot that has a dedicated I/O channel. The HP e3000 A400 and A500 Servers have two “Twin-Turbo” slots, each with *two* dedicated channels. The dedicated, independent channels provide both performance and availability advantages. The “Twin-Turbo” slots, labeled slots 1 and 2 on the chassis, each provide 500 MB/sec of peak bandwidth. These two slots should be reserved for the highest performing PCI I/O cards, such as multi-port cards. The independent design prevents slow cards from affecting the performance of a fast card. Note that slot 1 is limited to half-length PCI cards.



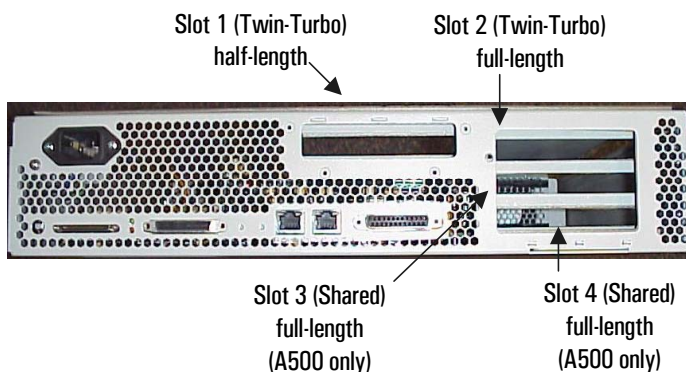
On the HP e3000 A500 Server, slots 3 and 4 share two I/O channels. If only one of these two slots is occupied, that slot will operate in “Twin-Turbo” mode, with 500 MB/sec of dedicated bandwidth. If both slots are occupied, the I/O controller arbitrates the activity between them, providing 500 MB/sec of shared bandwidth. The fifth (on the A400) and seventh (on the A500) I/O channel provides 250 MB/sec of dedicated bandwidth to the core I/O.

Only HP PCI I/O cards for which an MPE/iX driver has been developed function in HP e3000 A-Class Servers (see **Table 2.1.5**).

All PCI I/O slots in the HP e3000 A-Class Servers have their cables connect to the server's rear (see **Figure 2.1.5**) and support 32- and 64-bit PCI cards running at 33- and 66-MHz bus speeds. The I/O slots are keyed to accept 5-volt and Universal PCI cards. The HP e3000 A-Class Servers use HP-developed Adaptive Signaling technology to allow each slot to operate at the full speed of the PCI I/O card. If one 66-MHz card and one 33-MHz card are used in the two shared PCI I/O slots; however, both I/O slots will run at 33 MHz.

*Note: Although many PCI I/O cards are designed to be hot-pluggable, the HP e3000 A-Class Servers and MPE/iX do not support this feature.*

**Figure 2.1.5. HP e3000 A-Class Rear Bulkhead and PCI I/O Slots**



## Core I/O Card and Extended Fault Management System

The HP e3000 A-Class Server has integrated core I/O functionality (also known as the Multi-Function I/O [MFIO]), which also contains the HP e3000 A-Class Extended Fault Management System technology. It supports connections to a wide variety of disks; tapes; printers; 10/100Base-TX LAN (with Release 7.0 Express 1) for network, personal computer, terminal, and network printer connections; a C1099A system console; and control of an uninterruptible power supply for power protection. External connections for the core I/O are provided on the back of the server (see **Figure 2.1.6**).

The integrated core I/O provides:

- 10/100Base-TX LAN with RJ-45 connector
- External LVD Ultra2 SCSI (80 MB/s) port (Ultra2 is backward compatible with SE-SCSI)—Order the appropriate cable to connect to external peripherals
- External Single-Ended, Narrow-Ultra SCSI port—Order the appropriate cable to connect to external peripherals. Note that Wide SE SCSI devices will not work on this port. (All supported SE SCSI disk products will unconditionally run “wide” and therefore, cannot be supported with this port.
- A SCSI LVD terminator (A6714A) is included with all HP e3000 A-Class Servers to connect on to the port when no SCSI device is connected.
- Two internal SCSI controllers with dual Ultra SCSI (40 MB/s) channels. Each channel independently supports an internal disk drive (there is no external disk support from either controller).



Besides a maximum of two integrated Ultra2 LVD SCSI disks, the core I/O can support up to fifteen additional Ultra2 LVD/SE SCSI devices on its Ultra2 LVD/SE SCSI port (80 MB/sec) and up to seven additional Ultra SE non-disk SCSI devices on its SE, narrow-Ultra SCSI port (40 MB/sec). Consideration should be given to how many devices are actually connected to these ports in order to achieve acceptable server balance and optimal application performance.

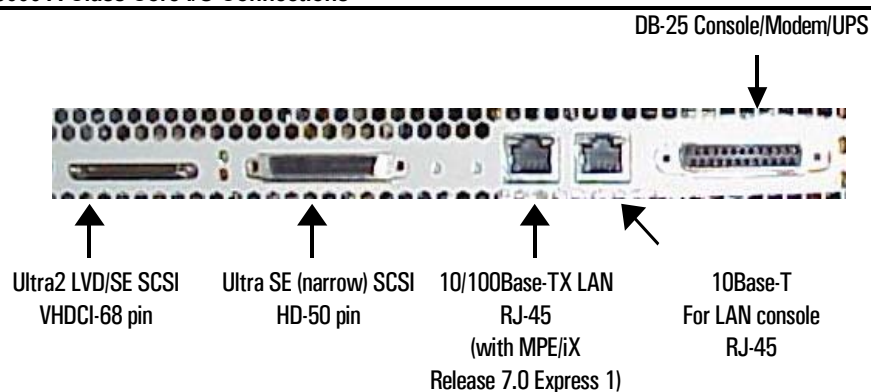
The core I/O also supports two internal Ultra2 LVD 40 MB/sec channels for the two internal disk drives.

The Extended Fault Management System of Core I/O supports:

- DB-25 serial port—multiplexed (using W-cable) into three .2-meter cables with RS-232 ports: local console, remote console, and UPS
- Web Console—A web console that provides a system console interface to any authorized web browser. The A400-100-150 and A500-x00-200 web console solution is integrated in core I/O. It does not require an I/O card or external peripheral. For the A400-100-110 and A500-x00-140 use either:
  - A5858A integrated Secure Web Console PCI card (which can be ordered for a nominal charge only with the initial server order), or
  - J3591A external Secure Web Console
- Integrated LAN console—Connection of console via industry standard telnet interface using 10Base-T LAN port
- Dedicated 10Base-T management LAN with RJ-45 connector—Provides connectivity for system management and access to LAN consoles
- Password protection on all console ports
- Console mirroring between local, remote (modem connected), LAN connected and Secure Web consoles
- Remote power up and power down control
- Configurable remote access control
- Event/alert notification to system console, email, pager and/or HP response centers
- Interface to system monitoring and diagnostic hardware via an internal I<sup>2</sup>C bus

The core I/O is built into the HP e3000 A-Class Server and cannot be ordered as a separate product. For additional Ultra2 LVD/SE SCSI and 10/100Base-TX LAN connections, add-on I/O cards may be purchased (see **Table 2.1.5**).

**Figure 2.1.6. HP e3000 A-Class Core I/O Connections**

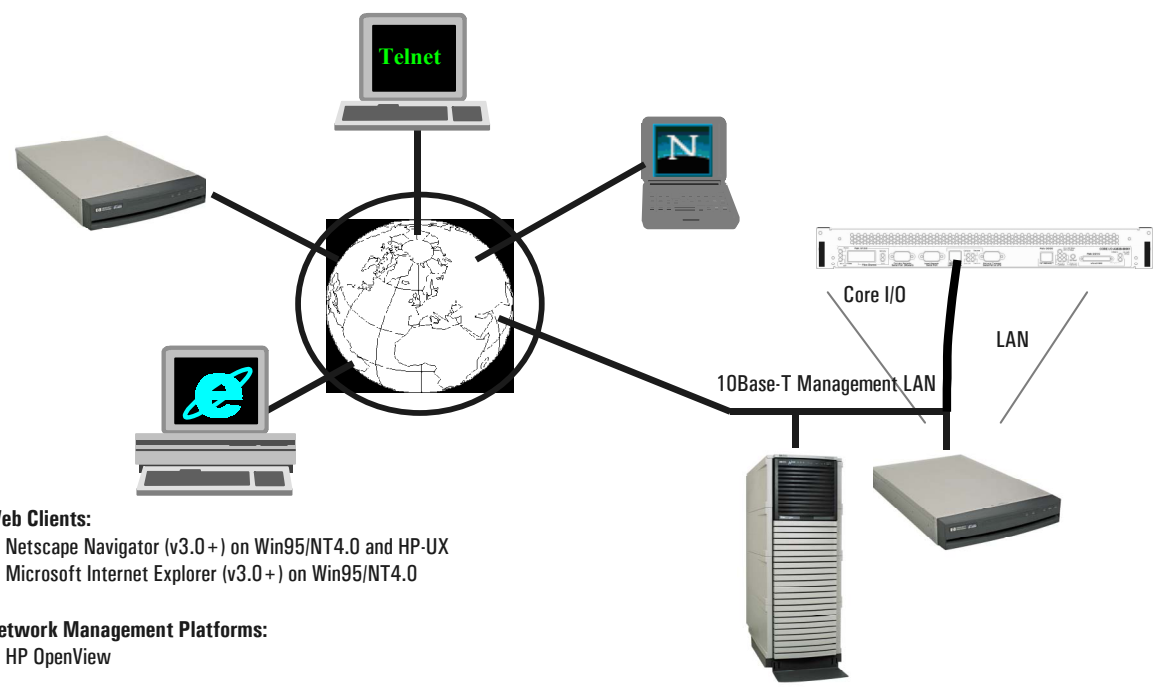
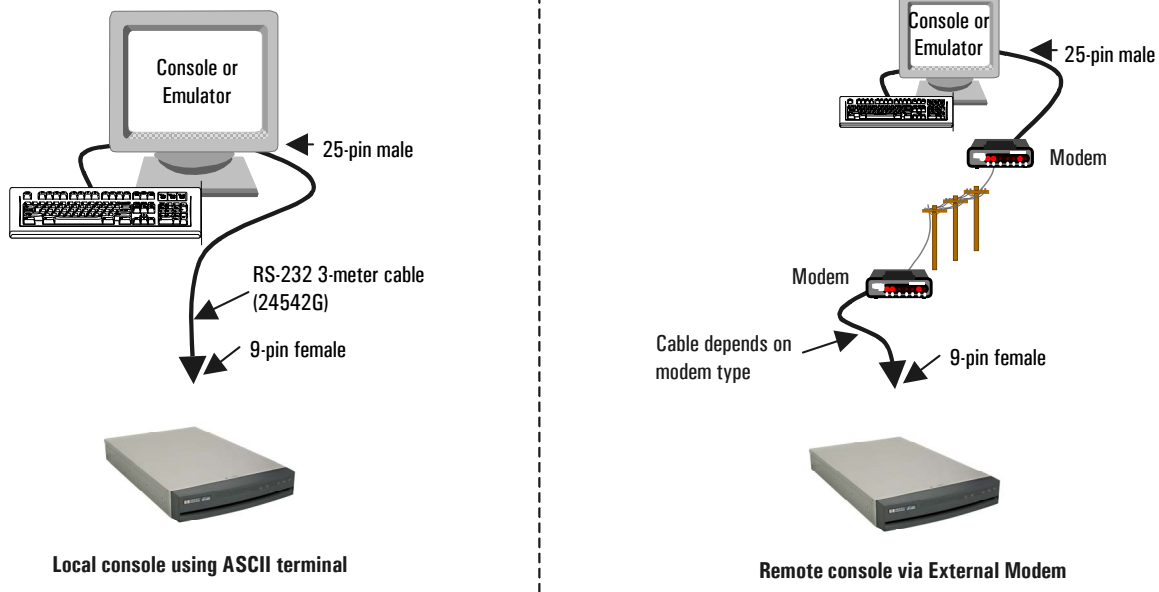


### HP e3000 A-Class System Console Configurations

The HP e3000 A-Class provides four methods for console connections (see **Figure 2.1.7**):

- Secure web console—accessible through the integrated 10Base-T console LAN (A400-100-150 and A500-x00-200) or additional hardware (A400-100-110 and A500-x00-140).
- Integrated LAN console. Supports standard telnet connections.
- Local terminal/console emulator via local RS-232 serial connection. A DB-25 port on core I/O provides three DB-9 male RS-232 connectors via a multiplexed “W-cable”.
- Remote terminal/console emulator via external modem

Figure 2.1.7 Console Connection Solutions



- Web Clients:**
- Netscape Navigator (v3.0+) on Win95/NT4.0 and HP-UX
  - Microsoft Internet Explorer (v3.0+) on Win95/NT4.0
- Network Management Platforms:**
- HP OpenView

## PCI I/O Cards

Additional peripherals and network connections may be made to HP e3000 A-Class Servers either through the ports provided by core I/O card or by using any of the two (A400) or four (A500) PCI I/O slots provided in the server. When ordering additional PCI I/O cards (see **Table 2.1.5**), care should be taken to insure that there is a proper match between the number of I/O cards expected to be used in the HP e3000 A-Class Server and the number of I/O slots available in the HP e3000 A-Class Server. Keep in mind that many peripherals may not require add-on I/O cards since they can be connected to core I/O. On the other hand, remember that by using PCI I/O cards, one can increase the I/O throughput of the HP e3000 A-Class Server. In addition, one should anticipate the server's future I/O growth needs by purchasing enough PCI I/O cards to accommodate the growth.

Also keep in mind that the first PCI I/O slot will only accept half-length PCI I/O cards.

HP e3000 A-Class Servers also do not support the multi-function PCI I/O cards supported by the HP e3000 N-Class Server. If placed in an HP e3000 A-Class Server, these cards will not function properly. If a Secure Web Console PCI I/O card is used in an HP e3000 A-Class Server, it will use one PCI I/O slot limiting I/O expandability. The external Secure Web Console (J3591A) may be a better fit for an HP e3000 A-Class Server where a large number of external I/O devices are required.

For upgrades from previous HP e3000 Servers, HP-PB (NIO) I/O cards are not supported in HP e3000 A-Class Servers. Also note that the HP e3000 A-Class Servers do not support some of the I/O card and peripheral functionality that was supported on older HP e3000 Servers. Contact your local reseller or HP Sales and Support office for guidance on how to replace this functionality.

**Note:** Although many PCI I/O cards are designed to be hot-pluggable, the HP e3000 A-Class Servers and MPE/iX do not support this feature.

**Table 2.1.5. Supported HP e3000 A-Class PCI I/O Cards**

I/O Card	Product Number	First MPE/iX Release	Full or Half Length Cards	Connector Type(s)	Hot-Plug Support in Software <sup>1</sup>	Factory Integration	A-Class Support	MPE/iX Boot Support	Max Cards Per A400 <sup>3</sup>	Max Cards Per A500 <sup>3</sup>
<b>Mass Storage Host Bus Adapters<sup>2</sup></b>										
PCI 2 Gb/s Fibre Channel Adapter	A6795A	7.5	Half	Duplex SC	No	Yes	Yes	Yes	2	4
Single-port, Ultra160 SCSI	A6828A	7.5	Full	VHDCI 68-pin	No	Yes	Yes	Yes	1	3
Single-port, Ultra2 LVD/SE SCSI <sup>5</sup>	A5149A	7.0	Full	VHDCI 68-pin	No	Yes	Yes	Yes	1	3
Single-port, FWD SCSI <sup>5</sup>	A4800A	7.0	Half	HD 68-pin	No	Yes	Yes	Yes	2	4
<b>Local Area Network Interface Cards</b>										
10/100Base-TX	A5230A	7.0	Half	RJ-45	No	Yes	Yes	No	2	4
FDDI	Use 10/100Base-TX to connect to an FDDI switch									
802.5 Token Ring	Not supported on HP e3000 A-Class Servers									
<b>Wide Area Network Interface Cards</b>										
8 Channel ACC Adapter <sup>4</sup>	Z7340A	7.0	Full	RS-232; V.35	No	No	Yes	No	1	3
NS Point-To-Point (LAPB)	Driver use 36922C, NS Services use 36920B									
SNA/SDLC	Driver use 30291C, SNA Services use 30292B									
Bi-Sync/RJE	Not supported on HP e3000 A-Class Servers									
X.25	Use DTC and X.25/iX System access, 36939B									
<b>Additional Interface Cards</b>										
Secure Web Console PCI Card	A5858A	7.00	Half	RJ-45	No	Yes	Yes <sup>3</sup>	No	1	1

<sup>1</sup> Although PCI I/O cards may be hot pluggable, A-Class Servers do not support hot plugging of PCI I/O cards. In addition, changes would have to be made to the MPE/iX Operating System to provide software to support the hot pluggability of PCI I/O cards.

<sup>2</sup> Multi-port PCI I/O cards will not function in HP e3000 A-Class Servers.

<sup>3</sup> The Secure Web Console PCI card must be purchased with the HP e3000 A-Class Server and cannot be added to an A-Class Server at a later date.

<sup>4</sup> See **Chapter 4** for details on ACC I/O distribution panels and cables.

<sup>5</sup> Discontinued product. Listed for reference purposes.

## Peripherals Support

### Internal Disk Drives and LDEV1

The HP e3000 A-Class Servers supports up to two internal low-profile LVD hot-plug disk drives. These disks may be of different capacities (See **Table 2.1.6**). Two UltraSCSI LVD controllers contained on core I/O provide each disk drive with an independent SCSI channel.

If only one internal disk drive is ordered, it will be loaded in the upper disk drive position, Position A (path 0/0/1/1.15.0).

Integrated peripherals from HP e3000 9x7, 9x8 and 9x9KS Servers are not supported as integrated peripherals on the HP e3000 A-Class Server.

Note that with MPE/iX releases prior to 7.5, MPE/iX limits the amount of usable disk space on LDEV1 (the system disk) to 4 GB. The physical LDEV1 disk may be larger than 4 GB, but only the first 4 GB will be used. This restriction has been removed in MPE/iX 7.5.

Note that although internal disks are designed to be hot pluggable, MPE/iX does not support this feature at this time.

**Table 2.1.6. Internal HP e3000 A-Class Disk Drive Specifications**

Product Number	Disk Capacity	Rotational speed	Average seek time (read/write)	Sustained Bandwidth
A5573A <sup>1</sup>	9 GB	10,000 RPM	5.2 msec (read); 6.0 msec (write)	18 MB/sec
A5574A <sup>1</sup>	18 GB	10,000 RPM	5.2 msec (read); 6.0 msec (write)	18 MB/sec
A6145A <sup>1</sup>	36 GB	10,000 RPM	5.2 msec (read); 6.0 msec (write)	18 MB/sec
A6741A <sup>1</sup>	18 GB	10,000 RPM	5.2 msec (read); 6.0 msec (write)	18 MB/sec
A6742A <sup>1</sup>	36 GB	10,000 RPM	5.2 msec (read); 6.0 msec (write)	18 MB/sec
A6804A <sup>1</sup>	73 GB	10,000 RPM	5.2 msec (read); 6.0 msec (write)	18 MB/sec
A6947A <sup>1</sup>	18 GB	15,000 RPM	3.6 msec (read); 4.2 msec (write)	53 MB/sec
A6948A	36 GB	15,000 RPM	3.6 msec (read); 4.2 msec (write)	53 MB/sec
A9759A	73 GB	15,000 RPM	3.6 msec (read); 4.2 msec (write)	53 MB/sec
A7075A	146 GB	10,000 RPM	5.2 msec (read); 6.0 msec (write)	18 MB/sec

<sup>1</sup> Discontinued product. Listed for reference purposes.

### Removable Media Devices

The HP e3000 A-Class does not contain any integrated removable media drive as have many older HP e3000 Servers. In order to load at the customer's site the MPE/iX preload tapes generated at the factory, either an external DDS-4 or DDS-3 drive must be ordered and optionally racked with the HP e3000 A-Class Server or a DDS-4 or DDS-3 drive must be provided by the customer.

### External Peripherals

See **Chapter 4** of this guide for a detailed list of all supported external Hewlett-Packard peripherals. For upgrades from previous HP e3000 Servers, note that the HP e3000 A-Class Servers do not support some of the I/O cards and peripherals that may have been supported on older HP e3000 Servers. Contact your local reseller or HP Sales and Support office for guidance on how to replace these I/O cards and peripherals.

Cables for connecting external peripherals to HP e3000 A-Class Servers should be acquired with the peripheral.

When planning for additional external peripherals, consideration should be given to whether power protection is required for these peripherals. See **Chapter 4** of this guide for details on how to plan for power protection for external peripherals.

## Datacommunications and Terminal Controllers

Datacommunications and Terminal Controllers (DTCs) are used to connect the HP e3000 A-Class 10/100Base-TX LANs to local terminals, remote terminals (via modems), serial printers; to provide access to X.25 and ARPA networks; and to control additional HP PowerTrust UPSs. The number of DTCs required will depend on the number of ports needed to connect users, printers, UPSs, etc. and the mode of network distribution.

DTCs will normally be connected to the LAN network either via a CAT 5 or a coaxial LAN cable. When a CAT 5 cable with RJ-45 connector is used, a 28685B Ethertwist Transceiver will need to be ordered for each DTC for connecting the CAT 5 cable.

A 4.2-meter CAT 5 LAN cable with RJ-45 connector is included with each HP e3000 A-Class Server for attaching the core I/O 10/100Base-TX port to the LAN. This cable cannot be used to directly connect the core I/O 10/100Base-TX port or an A5230A10/100Base-TX card to a DTC. If required, longer cables can be ordered from HP.

HP e3000 A-Class Servers do not have a BNC coaxial connector on the server for directly connecting DTCs.

For directly connecting the core I/O 10/100Base-TX port or an A5230A10/100Base-TX card to a DTC, one must separately purchase from Hewlett-Packard product number C7539A, a 7-foot (2.1-meter) CAT 5 cross over cable with RJ-45 connectors, or C7538A, a 25-foot (7.6-meter) CAT 5 cross over cable with RJ-45 connectors. If one of these twisted pair cross over LAN cables is used to connect a DTC to the server, an Ethertwist Transceiver (28685B) per DTC must also be ordered.

For further information on DTCs, X.25, Telnet connections, or LAN cabling, see **Chapters 4 and 8** of this guide.

## Power Protection

HP recommends the usage of some form of power protection to provide power conditioning, and protect against data or transaction loss during power outages. For customers who don't have site wide or room wide power protection, HP recommends a PowerTrust II-LR Uninterruptible Power System (UPS). Please see **Chapter 4** for information on these UPSs. Please ensure that any UPS utilized for this server(s) are rated at a minimum of 0.4 kW (A400) and 0.6 kW (A500). HP recommends the usage of A1353A/A1354A (1.4-kW/2.0-kVA). UPS units with larger capacities or multiple UPS units are recommended when external peripherals are also being protected.

The HP e3000 A-Class Servers provide integrated control ports for HP PowerTrust-II Uninterruptible Power Systems (UPS) to protect against loss of service due to computer room power outages. HP PowerTrust-II UPS units are orderable at the time of initial order, and can be integrated at the factory. With HP PowerTrust-II UPS protection the system will continue to operate until the UPS batteries are depleted or until the applications and the system are gracefully shut down. With HP PowerTrust-II UPS units, the minimum period of continued operation is 15 minutes.

## PowerTrust UPS Monitoring and Control

The MPE/iX Operating System includes the HP PowerTrust UPS Monitor/iX software which detects all incoming AC power failures on the HP e3000 A-Class Server and reports all power failure events to the HP e3000 system logs and to the system console (HP PowerTrust UPS Monitor/iX does not manage "non-HP UPSs"). The HP PowerTrust UPS Monitor/iX maintains communication with the first HP PowerTrust UPS via an RS-232-C connection on the back of the HP e3000 A-Class Server (see **Figure 2.1.6**). Additional HP PowerTrust UPSs can be supported by connecting their RS-232-C communication links via power protected DTCs. If all components of the HP e3000 A-Class Server are power protected, then normal operation and/or server shutdown can be accomplished during the 15 minutes of power protection.

For a cabinet to plug into the UPS that it houses, A Power Distribution Unit (PDU) must be ordered for the cabinet (see **Chapter 4**). This provides a rack with a PDU that can plug directly into the IEC style connector that is included with every UPS.

When planning power protection for HP e3000 A-Class Servers, refer to **Chapter 4** of this guide. See **Table 2.1.8** for the current and UPS requirements of HP e3000 A-Class Servers.

**Table 2.1.7. HP e3000 A-Class Server Racking, Current and VA Ratings**

	EIA Units	Required Mounting Hardware (with dark slate gray front bezel)		Current Consumption	kW Rating (for UPS sizing)
		Factory Installed	Field Installed	@ 200V	100-240V
HP e3000 A400 Servers	2	A6395A option OD1	A6395A	1.8 A	.4
HP e3000 A500 Servers	2	A6395A option OD1	A6395A	2.2 A	.6

## Server Racking, Cabinets, Physical Dimensions, and Front Bezel Colors

The HP e3000 A-Class Servers can either be factory-installed in Hewlett-Packard cabinets or field-installed in HP or third-party cabinets. The racking hardware kit includes slider rails, enabling the server to easily slide out of a cabinet for servicing. The slider takes no additional vertical space, thereby preserving the server's 2U height. Furthermore, the slider rails have adjustable mounting hardware, enabling the HP e3000 A-Class to mount in many third-party cabinets. See **Table 2.1.8** for required ordering information for mounting hardware.

HP e3000 A-Class Servers have slate gray (dark) front bezels that complement the HP standard quartz gray (light) cabinets and peripherals. When rackmounted, the HP e3000 A-Class rack mounting kit contains two Slate Gray side caps for attaching to the side of the Slate Gray HP e3000 A-Class front bezel.

See the server specifications tables at the beginning of this chapter for the physical dimensions for HP e3000 A-Class Servers.

## Cabinets

The HP e3000 A-Class was designed for and tested in Hewlett-Packard quartz gray System/E cabinets (see **Table 2.1.8**). HP cabinets are the best option for customers who want to ensure that their rack environment offers the utmost in safety, ease of service, factory integration, and HP field support. Unlike the HP e3000 N-Class Servers, the HP e3000 A-Class Servers do not require a cabinet depth extension kit. See **Chapter 4** for more details on Hewlett-Packard System/E cabinets.

**Table 2.1.8. HP e3000 A-Class Cabinet Information**

Cabinet Product Number	Description	Read Door (Required)
A5134A	1.25 meter Cabinet	A5216AZ
A5135A	1.6 meter Cabinet	A5217AZ
A5136A	1.96 meter Cabinet	A5218AZ

Adequate spacing should be provided on all sides of an HP e3000 A-Class Server for proper airflow and for ease of installation and service.

## Non-HP Cabinets

For customers who choose to use non-HP cabinets, the HP e3000 A-Class Servers provide simple options for installation and HP field support. The HP e3000 A-Class field rack kit (A6395A) contains an adjustable mounting bracket that fits onto the slider rails. This bracket telescopes to various lengths, allowing the server to be mounted in third-party cabinets that use the four-post EIA mounting system and have mounting depths of 28-31.25 inches.

Once the server is mounted in a non-HP cabinet, it must meet some simple criteria to ensure that HP field personnel can fully support the rack environment.

- **Anti-Tip**—The rack/cabinet must be anchored solidly to the floor both front and rear. This is usually accomplished by anti-tip feet or by direct bolting the rack/cabinet to the floor.
- **Airflow**—The A-Class uses front to back airflow to cool the unit. Thus a cabinet cannot have a solid front or rear door. Solid doors may have to be removed or changed to an open perforation pattern.
- **Cable Strain Relief**—A proper method of strain relief must be used. This may force the elimination of the rear door in some cases.
- **Front and Rear Access**—For proper cooling and ease of service access, HP recommends 32 inches of unobstructed floor space in the front and rear of rack installations. This recommendation applies to both HP and third-party racks and cabinets.

## Cabling

All required power cables for connecting the HP e3000 A-Class Server, first UPS, and power distribution units of the 1.25-, 1.6- or 1.96-meter cabinets are included. Cabling to the console and the LAN cabling to the network is included with the server. Other network cabling, cabling from the DTCs to the LAN network, and the cabling from devices to the DTCs will need to be ordered separately. For CAT 5 cabling with RJ-45 connectors from the network to DTCs, a 28685B Ethertwist Transceiver will be required for each DTC. See **Chapter 4** of this guide for detailed guidance.

## Factory Preloading of MPE/iX, Databases and Subsystem Software

The HP e3000 MPE/iX fundamental operating system (FOS), IMAGE/SQL database, and optionally ordered software are factory preloaded on a factory preload DDS tape. This preload tape can be factory installed on either the first A-Class integrated disk drive or an external AutoRAID or external disk. It can also be field installed on a customer provided disk drive.

If External Software Loading (A6821A option 001) is not ordered, then the preload tape will be installed on the integrated disk drive ordered with the HP e3000 server which is installed in the upper disk position, Position A (path 0/0/1/1.15.0).

If External Software Loading (A6821A option 001) is ordered, then the preload tape will be installed on the smallest AutoRAID disk drive ordered with the server. If no AutoRAID disk drive is ordered, then the preload tape will be installed on the smallest external FWD disk drive ordered with the server. The software preload tape is not installed by Hewlett-Packard on XP disk arrays at this time. If the System Integration Specification Plan (A6821A option 001) is ordered and no external disk arrays or drives are ordered, the preload tape will not be installed even if an integrated disk drive was ordered with the HP e3000 server. One FWD PCI I/O card must be ordered preloading to an external AutoRAID or FWD disk is desired. When preloading to an external AutoRAID or FWD disk, path 0/2/0/0.0.6 is used. No fax back forms are required or can be used with the SISP product when used with HP e3000 Servers.

The software preload tape is always shipped with the HP e3000 Server and can be field installed on a disk drive provided by the customer.

## MPE/iX User Licenses

HP e3000 A-Class Servers are supplied with a software class/concurrent license specifying a maximum of Unlimited Users that can concurrently use the server. The practical number of concurrent users is dependent on the application mix and their response time and throughput requirements. See the system specification tables at the beginning of this chapter for the typical number of users supported by each HP e3000 A-Class Server.



## **MPE/iX Software Subsystems, Tools, and Software Tiers**

Additional software subsystems and tools can be purchased from Hewlett-Packard and factory loaded on an HP e3000 A-Class Server. Each additional software subsystem or tool bought for the HP e3000 A-Class Server must specify a tier for the server it is being purchased (see **Table 2.1.2**). All software purchased with the HP e3000 A-Class Server will be preloaded on the software preload subsystem tape for installing on the server.

## **Warranty and Support**

The HP e3000 A-Class Server includes installation and a one-year on-site warranty with next day support. Additional Supplemental Support, Network Installation and Personalized System Support may be ordered for the HP e3000 A-Class Server, external peripherals and standalone software applications (refer to the *HP e3000 Business Servers Ordering Guide*). See **Chapter 11** of this guide for a detailed description of the various support options.

## **HP e3000 A-Class Field Upgrades and Return Credits**

The HP e3000 A-Class Server has a number of add-on products for upgrading the servers with more processors, additional memory and integrated peripherals. Refer to the *HP e3000 Business Servers Ordering Guide* for more information.