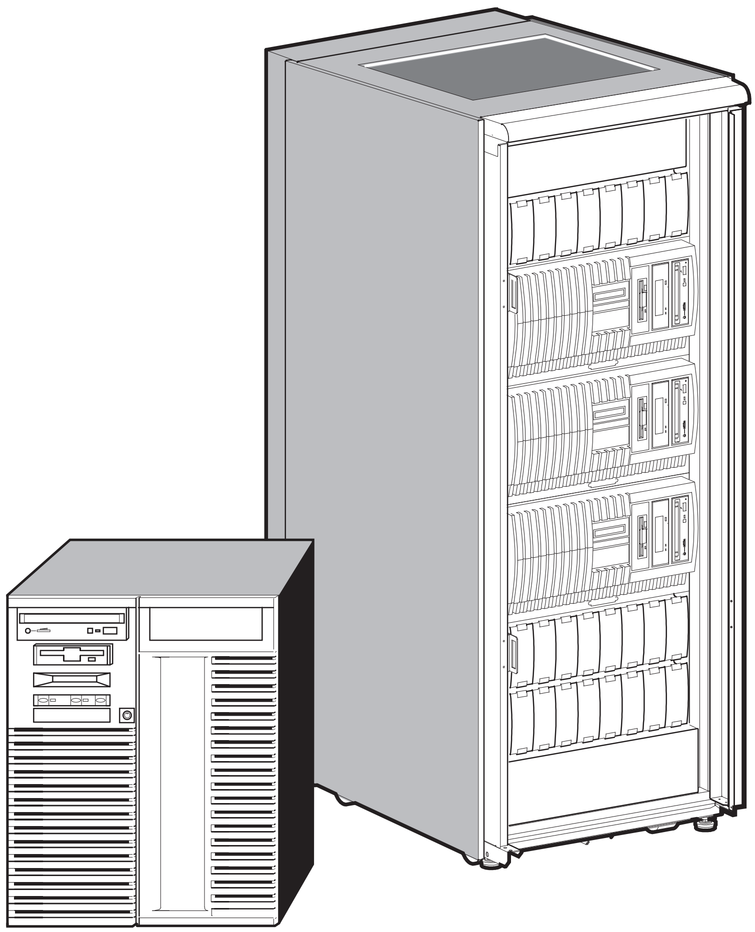
digital™

AlphaServer 1000A

Technical Summary



ALPHA GENERATION™

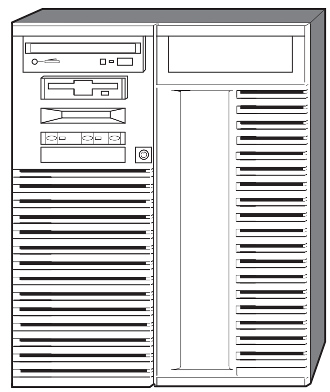
Contents

AlphaServer 1000A

The Digital AlphaServer 1000A system is a low-cost, single-processor, PCI/EISA-based server. It is suitable for general-purpose commercial, high-performance application and database, PC LAN, and Internet server environments. With the AlphaServer 1000A server, you can choose from three operating environments: Windows NT, Digital UNIX, and OpenVMS.

Guaranteed to provide high reliability and availability, the AlphaServer 1000A is ideally suited for organizations with little or no MIS support.

Figure 1 AlphaServer 1000A Pedestal System



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Investment Protection

Based on the 64-bit Alpha RISC architecture, the AlphaServer 1000A server provides investment protection you can count on. You can choose from three popular operating systems: Windows NT, Digital UNIX, and OpenVMS. These operating systems and thousands of applications benefit from the 64-bit Alpha chip performance. Designed to be compatible with higher performance microprocessors, the system is in-cabinet CPU upgradable.

Flexible System Packages

The AlphaServer 1000A system is available in three packages – pedestal, rackmount, and cabinet –to suit a range of computing needs.

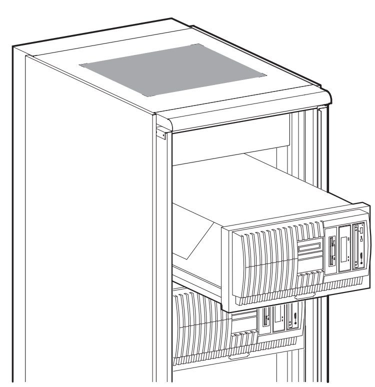
AlphaServer 1000A Pedestal System

The pedestal system is a deskside, low-noise unit designed for office space where a compact footprint and low to medium disk storage capacities are required. It supports PCI and EISA I/O, up to 1 Gbyte of main memory, and up to 30.1 Gbytes of in-cabinet storage.

AlphaServer 1000A Rackmount System

The rackmount system is a rackmountable box with the same hardware and features as the pedestal system. The rackmount box fits easily in a standard 19-inch rack. The box can have three internal disk drives; additional storage can also be mounted in the rack.

Figure 2 AlphaServer 1000A Rackmount System



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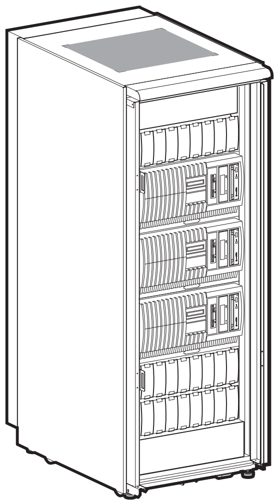
AlphaServer 1000A Cabinet System

The cabinet system integrates multiple rackmount boxes and StorageWorks shelves in a single cabinet. It is designed for offices or satellite equipment rooms where floor space is at a premium, large disk storage arrays are required, and high availability is imperative.

Figure 3 AlphaServer 1000A System Cabinet



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Features and Benefits

The AlphaServer 1000A provides the following features for fast application processing, high availability, and low maintenance.

- **System Performance**

The system design uses industry-standard SIMMs, disk drives, and PCI and EISA I/O buses to deliver maximum system performance.

- **Reliability and Availability**

Fan, power, and temperature sensors monitor the server; the LCD control panel indicates system status. The ECC memory allows recovery from most cache and memory errors. A dual SCSI backplane allows fully redundant disk subsystems. Fully redundant power supplies also increase system availability.

- **System Expansion**

System memory can be upgraded from 32 Mbytes to 1 Gbyte using SIMM options. Seven PCI and two EISA slots accommodate industry-standard options. An on-board fast, wide SCSI-2 controller allows direct connection to CD-ROM, tape, and disk drives. An on-board SVGA controller supports enhanced graphics without use of an expansion slot.

- **Reduced Service Costs**

Because of its high reliability, the system requires minimal MIS support. In most cases, it can be self-serviced by the customer. The system also comes with a warranty.

- **Warranty**

A three-year, on-site server hardware warranty is standard. The warranty provides on-site, next business day response.

CPU Cards

Three CPU cards are available for the AlphaServer 1000A: 266 MHz (Model 4/266), 333 MHz (Model 5/333), and 400 MHz (Model 5/400). Each card contains:

- the processor
- a chipset interfacing the CPU, 128-bit wide ECC-protected memory subsystem, and 32-bit PCI bus
- 8 Kbytes of serial ROM, providing the CPU with power-up code
- 2 Mbytes of direct-mapped, ECC-protected second-level cache

Model 4/266 utilizes the 21064A CPU. Model 5/333 and Model 5/400 utilize the 21164A CPU. These Alpha CPU chips have the following features:

- All instructions 32 bits long with a regular instruction format
- Floating-point unit, supports DEC and IEEE floating-point data types
- 32 integer registers, 64 bits wide
- 32 floating-point registers, 64 bits wide
- On-chip, direct-mapped, write-through physical data cache
- On-chip, direct-mapped, read-only virtual instruction cache
- On-chip I-stream translation buffer
- On-chip D-stream translation buffer

The 21164A CPU chip in the Model 5/333 and Model 5/400 CPU modules utilizes an on-chip second-level 96-Kbyte cache as well as additional stages of integer and floating-point instruction pipelining for enhanced performance.

SIMM Memory Modules

The Model 4/266 system supports 20 single in-line memory module (SIMM) connectors on the system board. System memory can be configured for up to 1 Gbyte. Memory in Model 4/266 is grouped in four memory banks consisting of five memory modules, including one for ECC (error correction code). The Model 5/333 and Model 5/400 systems support 16 single in-line memory module connectors; only four memory modules are needed for each bank (including ECC capability).

Memory modules are available in 4-Mbyte, 8-Mbyte, 16-Mbyte, 32-Mbyte, and 64-Mbyte sizes. With these, memory is configurable from 32 Mbytes to 1 Gbyte.

System Board

The AlphaServer 1000A server provides the following I/O functionality:

- SVGA controller supports high-resolution graphics and text display for a variety of color CRT monitors without using an expansion slot (Model 4/266 only.)
- DEC 21050 PCI-to-PCI bridge
- PCI-to-EISA Intel bridge chipset
- PCI-based SCSI controller provides a fast, wide SCSI-2 interface
- 1 Mbyte of flash ROM, which contains the diagnostics and firmware
- Bidirectional parallel port, two serial ports, and floppy disk controller

- Keyboard and mouse interface
- Time of year (TOY) clock
- 8 Kbytes of NVRAM to store system configuration
- PC-style speaker

I/O Buses

PCI and EISA I/O accommodate industry-standard option cards.

PCI Bus

The PCI (peripheral component interconnect) is the preferred I/O bus for high-performance I/O options. The PCI bus has the following characteristics:

- Fully compliant with *PCI Version 2 Specification*
- Operates at 33 MHz
- Supports seven PCI option slots
- Supports on-board fast, wide SCSI-2 controller

EISA Bus

The EISA used for several medium-performance options, such as modems and other peripherals. It also controls the Xbus interface. The EISA bus is backward-compatible with ISA bus options, provided the operating system supports the device.

The EISA bus has the following characteristics:

- Operates at 8.33 MHz
- Supports two EISA/ISA slots
- All slots are bus master slots

Xbus

The Xbus includes the real-time clock, NVRAM, flash ROM, and operator control panel interface.

Storage Architecture

The AlphaServer 1000A server storage architecture is designed for maximum performance and easy operation. All storage bays are accessible from the front of the system. If the system is configured with RAID, modules can be added or removed while the system is running (“hot swap”).

Removable Storage

The system supports a 3.5-inch floppy drive, 5.25-inch CD-ROM drive, and a number of optional tape drives for a 5.25-inch bay.

Disk Storage

The pedestal system has one internal StorageWorks shelf that holds seven 3.5-inch storage devices. This SCSI backplane can be configured to run as a single bus or a dual bus. The backplane can accommodate both wide SCSI and narrow SCSI drives. The system’s integral SCSI controller can provide the interface to the StorageWorks shelf. Or, you can use a PCI-based controller for an internal RAID array.

The rackmount box can have three internal disks, but no internal shelf or RAID capability. External RAID arrays can be configured in a rack or cabinet system.

SCSI Storage Expansion

The system supports optional external SCSI expansion. SCSI bus expansion ports on the rear of the system enable the bus to extend outside the system. StorageWorks modules add up to 440 Gbytes of storage.

RAID (Redundant Array of Independent Disks)

The system can be configured with optional RAID controllers to organize disk data cost effectively, improve performance, and provide high levels of storage integrity. Optional RAID controllers have the following features:

- Support for hot-swap drives
- Automatic rebuild after hot swap
- Optional write cache

Availability and Reliability

Power-Up Self-Test

At initialization, the system performs a self-test that verifies its functionality.

Power Control System

The power system uses several power conditioning functions to protect against high-voltage transients. The power system is capable of withstanding under-voltage conditions and power interruptions of any duration on one or more current phases without causing physical damage. The power system continuously monitors the AC input for AC line spikes, voltage fluctuations, and other voltage anomalies.

For further protection, an optional second power supply provides redundant power should the first power supply fail.

Dual SCSI Backplanes

Using additional SCSI controllers allows for fully redundant disk subsystems within a dual-SCSI backplane configuration.

Disk Hot Swap

In-cabinet disks support disk hot swap. Hot swap is the removal of the disk or disks from any one of the storage compartments while the rest of the system remains powered on and continues to operate.

This feature contributes significantly to system availability. Since many disk problems can be resolved without shutting down the entire system, users lose access only to the disks that are removed. The hot swap feature is available only within RAID configurations.

Thermal Management

The system’s thermal management is designed to maximize system reliability. Sensors monitor internal system temperature, fan failure, and power supply temperature and shut down the system if necessary.

Clustering

A cluster is a loosely coupled set of systems that behaves like a single system, but provides high levels of availability through redundant CPUs, storage, and data paths. Clustering allows multiple computer systems to communicate over a common interface, share disks, and spread the computing load across multiple CPUs. Cluster interconnects are available in all three operating systems:

- Digital UNIX cluster systems use SCSI buses (AdvantageCluster) to share disks among systems.
- OpenVMS cluster systems use SCSI, Ethernet, FDDI, and DSSI as the interconnect between disks and systems.
- Windows NT cluster systems use SCSI buses and Ethernet.

Server Management

The AlphaServer products support important operational and platform management requirements.

Operational Management

Server/Network Management. ServerWORKS Manager software is included with each system. This software utilizes the Simple Network Management Protocol (SNMP) environment to assist the network or server administrator by constantly monitoring the network for problems, thus avoiding expensive downtime. The software monitors vital server information, such as CPU and file system utilization, as well as the condition of the network supported by the management console.

Remote Server Management. An optional remote console monitor module (KCRCM-AA) lets the administrator perform several tasks from a serial console: monitor the power supplies, temperature, and fans, as well as reset, halt, and power the system on or off, regardless of the operating system or hardware state. Also, the remote console monitor aids in inventory support by giving access to serial numbers and revisions of hardware and firmware.

These systems support all the management tools and features provided by the operating systems to manipulate and monitor system resources such as disks, printers, networks, and backups. For example, system managers can use the POLYCENTER suite of tools to manage an enterprise-wide system. Under Windows NT, the AssetWorks product can be used to provide a powerful environment for software and operational management. All these tools are usable in a highly distributed environment.

Platform Management

These systems support platform management tasks such as manipulating and monitoring hardware performance, configuration, and errors. For example, the operating systems provide a number of tools to characterize system performance and display errors logged in the system error log file.

In addition, every AlphaServer system provides robust console firmware. Hardware configuration tools and diagnostics facilitate quick installation and troubleshooting. The system operator can use simple console commands to show the system configuration, devices, boot and operational parameters, and recorded errors. Most console firmware features can be accessed remotely using the POLYCENTER console manager product.

Maintenance

The system covers are designed to slide off, making components easy to access. To protect users, a power interlock switch automatically shuts down the system if the top cover is removed. The CPU, memory, PCI, and EISA options are plug-in cards that require no special switch or jumper settings for normal operation.

Performance

Digital evaluates the performance of the AlphaServer 1000A server in an ongoing program of performance engineering, using industry-standard benchmarks that allow comparisons across major vendors' systems. These benchmarks against competitive systems are based on comparable or close CPU performance, coupled with comparable memory and disk expandability.

Remember that system performance depends on application characteristics. Thus, benchmark information is one helpful "data point" to be used in conjunction with other purchase criteria such as features, service, and price.

Sources of Performance Information

You can access performance information from Digital using your fax machine as well as several online sources.

- *InstaFACTS*. The InstaFACTS fax service delivers information directly to your fax machine. Call 1-800-723-4431 (through a touch-tone phone in the U.S.A. and Canada) and 908-885-6426 (outside the U.S.A. and Canada). A catalog of documents is available from which you can order an abbreviated table of performance information, including Digital's performance briefs and flashes, TPC results, AIM results, and graphic results.
- *FTP*. Access performance documents from ftp://gatekeeper.dec.com. The directory is pub/DEC/DECinfo/performance/sys.
- *CompuServe*. Type GO VAXFORUM and look in the "hardware" library. For more information contact Doyle Myers at Internet address doyle@wrq.com or 76703.4403@compuserve.com.
- *World Wide Web*. The document URL (Uniform Resource Locator) is http://www.digital.com/info/performance.html.

Information for Digital Partners

Digital partners can access Digital's Integrated Repository from DECGenisys V1.2. *Digital Today*, *Business Partner Edition*, occasionally contains articles on performance of Alpha systems and announcements of available documents.

Internet Server

The AlphaServer 1000A system comes ready with all popular modes of connection to the Internet. It can also be preconfigured with the most commonly used Internet applications, allowing customers immediate access to Internet information, news groups, and electronic mail.

System Features at a Glance

Table 1 summarizes the AlphaServer 1000A system features and specifications.

Table 1 AlphaServer 1000A Server Features

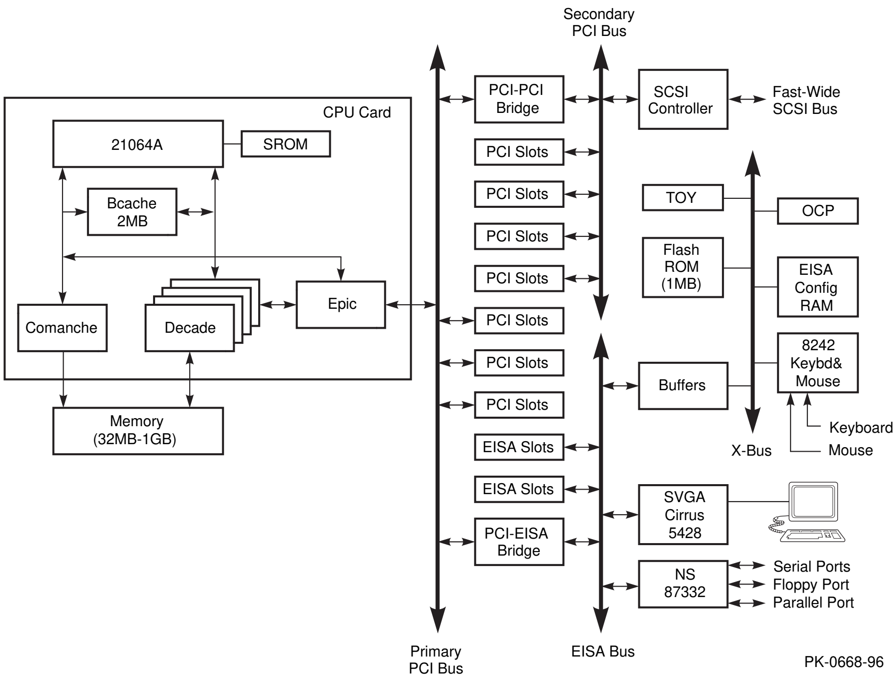
Hardware			
Environment	Office environment (Class B)		
Processors	One Alpha 21064A (266 MHz) One Alpha 21164A (333 MHz/400 MHz)		
Cache on chip			
I-cache/D-cache	16 Kbytes/16 Kbytes (4/266); 8 Kbytes/8 Kbytes (5/300)		
Secondary cache	96 Kbytes		
Upgrades	Memory, CPU, storage		
B-cache size	2 MB		
Memory (max.)	1 GB		
Floppy disk	1.44 MB		
CD-ROM	600 MB		
Performance	**Model 4/266**	**Model 5/333**	**Model 5/400**
SPECint95	4.34	10.1	11.5
SPECfp95	6.03	10.6	11.1
SPECint_rate95	39.0	90.7	104
SPECfp_rate95	54.3	95.7	99.6
Internal Storage			
Removable media	CD-ROM, floppy diskette (pedestal has space for optional drive)		
Maximum internal storage			
Pedestal	7 hot swap disks (30.1 GB)		
Cabinet	21 hot swap disks (90.3 GB)		
Total storage	440 GB		
I/O slots	7 PCI/ 2 EISA		
Maximum I/O throughput			
System throughput	528 MB/sec		
PCI	132 MB/sec		
EISA	33 MB/sec		
Availability Features			
System	System auto reboot, redundant power system (N+1), remote system management, disk hot swap, ECC cache, ECC memory, ECC system bus, SMP CPU failover, error logging, optional uninterruptible power supply, RAID 0, 1, 0+1, 5, memory failover thermal management, optional KCRCM-AA		
OpenVMS clusters	Ethernet, DSSI, FDDI, SCSI, CI		
Windows NT clusters	Ethernet, SCSI		
AdvantageClusters™(UNIX)	DECsafe™ ASE, SCSI		
UNIX TruClusters	MEMORY CHANNEL™		
Operating Systems	Microsoft Windows NT Server, OpenVMS, Digital UNIX		
Warranty			
Hardware	3-year, on site		
Software	90-day telephone advisory support		

System Architecture

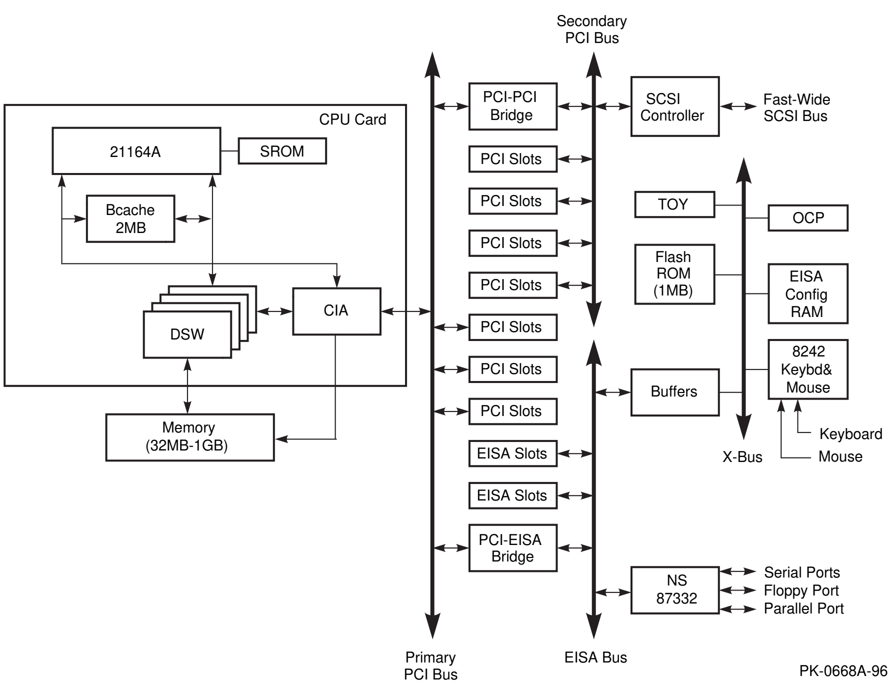
Figure 4 shows the AlphaServer 1000A system architecture.

Figure 4 System Architecture

266 MHz Processor



333/400 MHz Processor



Physical Characteristics and Operating Environment

Table 2 lists the physical characteristics and operating conditions for the AlphaServer 1000A pedestal system and AlphaServer 1000A rackmount and cabinet systems.

Table 2 AlphaServer 1000A Physical Characteristics

Characteristic	AlphaServer 1000A Pedestal Model	AlphaServer 1000A Rackmount/Cabinet
Width	35.8 cm (14.1 in.)	48.2 cm (19 in.)
Length	58.6 cm (23.1 in.)	63.5 cm (25 in.) system chassis only; 73.7 cm (29 in.) system chassis and rackmount assembly
Height	46 cm (18.1 in.)	26.7 cm (10.5 in.)
Weight	typical: 39 kg (86 lbs) maximum: 51 kg (113 lb)	29 kg (65 lbs) system and rackmount assembly
Operating environment	Class B	Class B
Operating temperature	5°C–40°C with 10°C rise inlet to outlet	5°C–40°C with 10°C rise inlet to outlet
Operating humidity	10% to 95% noncondensing at 304 m of altitude	10% to 95% noncondensing at 304 m of altitude
Nominal voltage	110–120 V 220–240 V	110–120 V 220–240 V
Frequency range	59–61 Hz 49–51 Hz	57–63 Hz
RMS current at nominal voltage (steady state)	8.0/4.0 Amps (one power supply); 4.6/2.2 Amps (two power supplies)	8.5/4.0 Amps (one power supply)

AlphaServer 1000A Pedestal System Components

Figures 5 to 9 show the main components of the AlphaServer 1000A pedestal system.

Figure 5 AlphaServer 1000A Pedestal System Front View

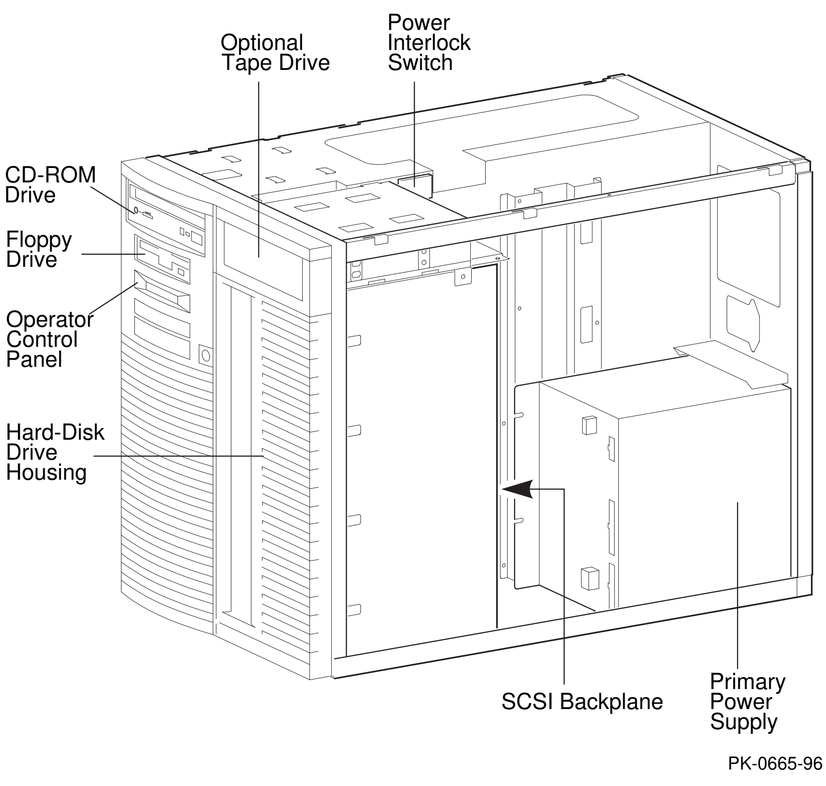


Figure 6 AlphaServer 1000A Pedestal System Side View

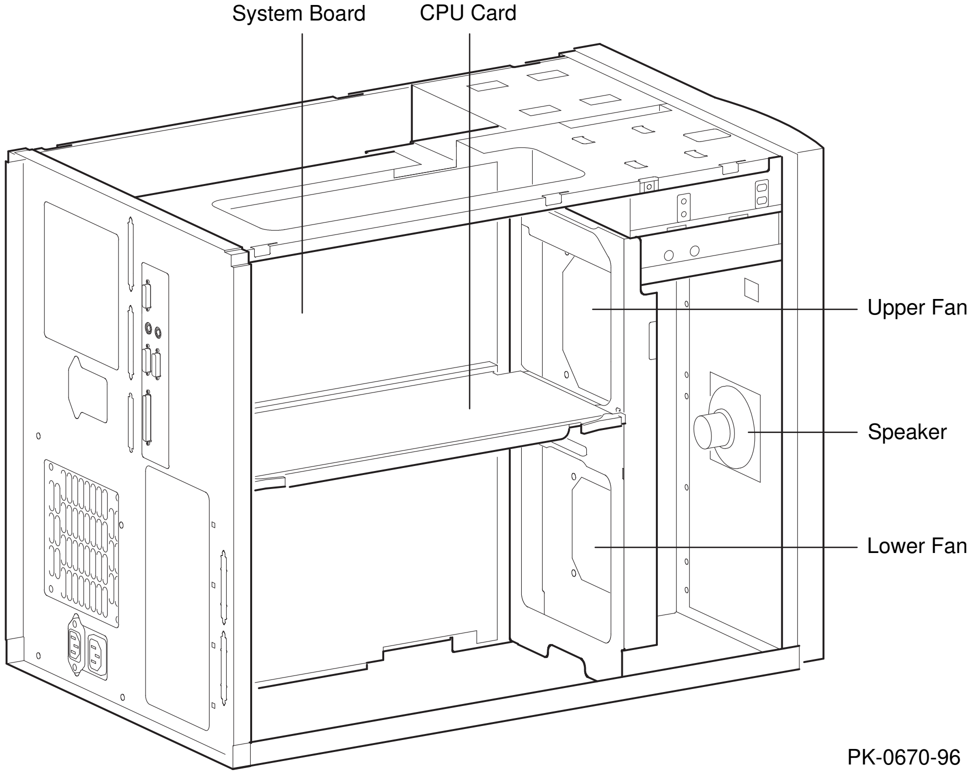
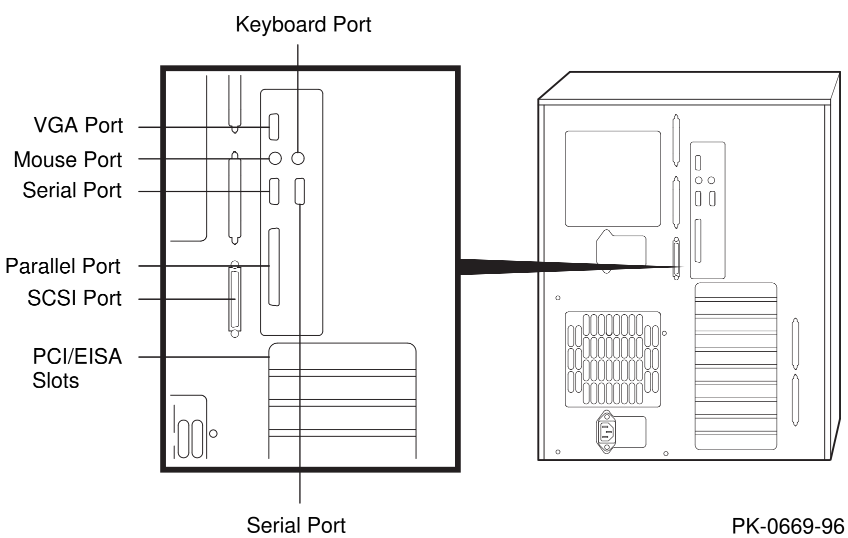


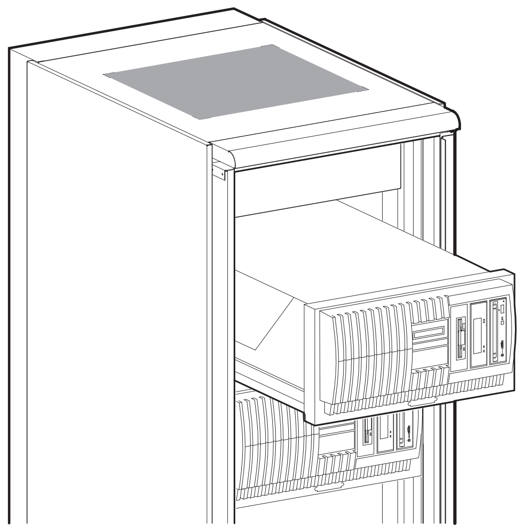
Figure 7 AlphaServer 1000A Pedestal System Rear View



AlphaServer 1000A Rackmount System

Figure 8 shows the AlphaServer 1000A rackmount system.

Figure 8 AlphaServer 1000A Rackmount System



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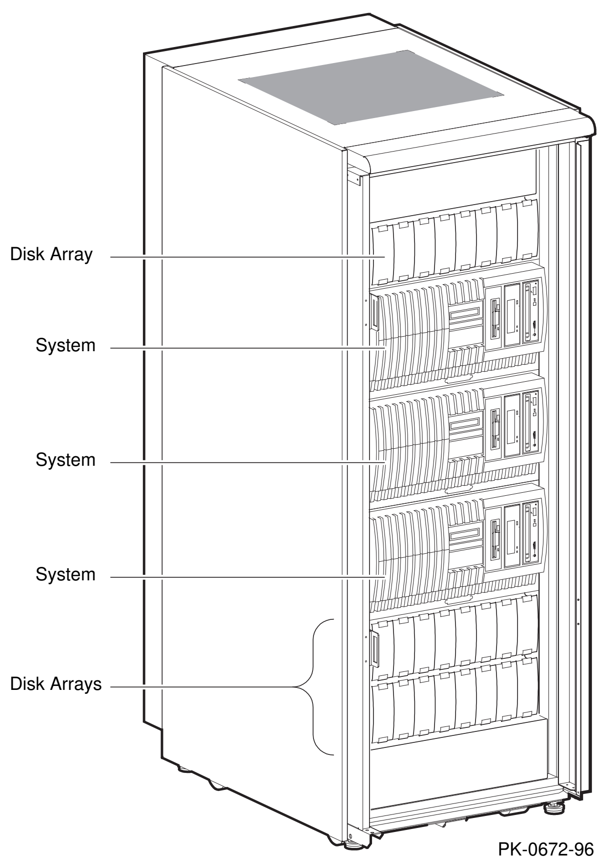
AlphaServer 1000A Cabinet System Components

Figure 9 shows the AlphaServer 1000A cabinet system.

Figure 9 AlphaServer 1000A Cabinet System Components



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