SPARCcenter™ 2000E

Just the Facts

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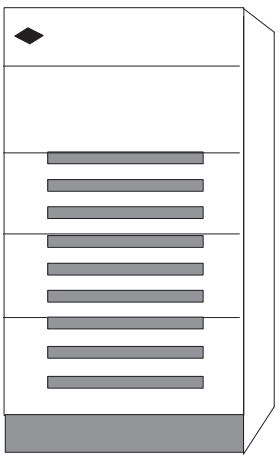
The SPARCcenter™ 2000E System: Delivering Enterprise Solutions for the Changing World

The Industry's Most Powerful, Scalable, Expandable Enterprise Server



SPARCcenter 2000E

The SPARCcenter™ 2000E system's powerhouse performance, modular design, exceptional expandability, and reliability are unmatched by any other enterprise computing system in the industry.

- Performance: Unmatched application performance scalability for enterprise solutions
  - The SPARCcenter 2000E uses up to twenty SuperSPARC™ processors in one system, giving it the power to run mainframe-class applications.
- Growth with investment protection: Unique ability to configure systems to meet application requirements. Innovative modular design protects against obsolescence
  - Custom configurations for compute- or I/O-intensive applications. Only Sun offers a server that enables users to add more of just what they need—power, I/O throughput, or expansion slots.
  - Modular CPUs, SIMMs, and I/O cards mean the entire system will keep pace with the latest technology while protecting customers' investments. Box swap upgrades just don't match up.
- Reliability, availability, serviceability (RAS): High availability for mission-critical applications
  - New SPARCcenter 2000E model with redundant cooling and power system provides even higher reliability and ensures data availability.
  - ECC and parity-protected system buses guard data. Integrated, long-life components improve system reliability as well.
  - Automatic System Recovery (ASR) feature enables the SPARCcenter 2000E to automatically reboot and reconfigure around failed components. The system is available again within ten minutes.
  - Easy access to all components means service personnel can add capacity or complete repairs quickly and easily.
- Popularity: Thousands of users are running their enterprises on the SPARCcenter 2000E system

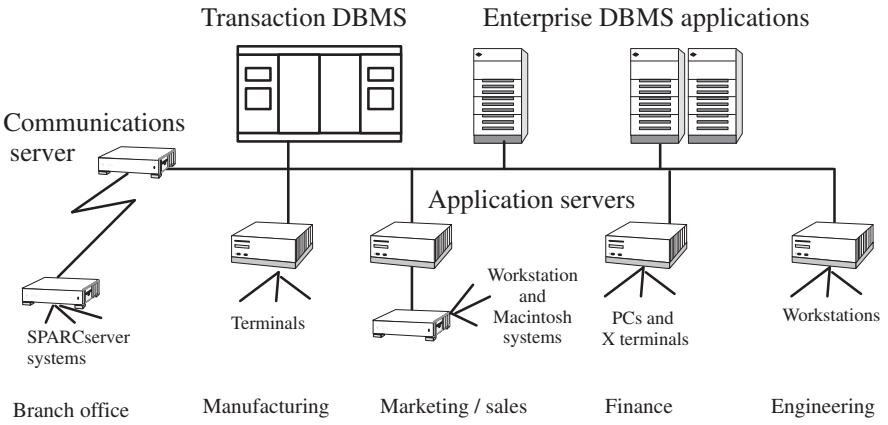
The SPARCcenter™ 2000E System: Delivering Enterprise Solutions for the Changing World

Comparison of SPARCserver Features

	SPARCserver™ 20	SPARCserver 1000E	SPARCcenter 2000E
Multiprocessing	4-way	8-way	20-way
Main memory	512 MB	2 GB	5 GB
Cache	0 to 1 MB Ecache/module	1 MB Ecache/module	2 MB Ecache/module
Disk capacity (internal/total)	4 GB / 339 GB	33.6 GB / 764 GB	162 GB / 4.86 TB
Internal backup device	None	One 5-GB 4-mm or one 14-GB 8-mm tape	One to four 14-GB 8-mm tapes or one to three 20-GB 4-mm tape autoloader
System bus, sustained rate	MBus system bus, 125 MB/sec.	XDBus™ system bus, 312.5 MB/sec.	Two XDBus system buses, 625 MB/sec.
I/O bus, sustained rate	1 SBus	1–4 SBuses, 66 MB/sec.	1–10 SBuses, 66 MB/sec.
Slots available	4	Up to 12	Up to 40
Operating system	Solaris™ 1.x or Solaris 2.3	Solaris 2.3 or later	Solaris 2.3 or later
Availability features	None	Fault recovery Single system bus	Fault recovery Dual system bus Dual power supply Redundant cooling
Warranty*	One-year return to factory	One-year on–site	One-year on-site
Service	–	2 business days on–site service	4–hour on-site service

*Warranty may vary by country.

SPARCcenter 2000E
Product Placement Strategy



- **Enterprise resources**
  - SPARCcenter 2000E system
  - SPARCcluster™ PDB Server
- **Departmental resources**
  - SPARCserver 1000E system
- **Workgroup or office level**
  - SPARCserver 4 system
  - SPARCserver 5 system
  - SPARCserver 20 system

Target Users – SPARCserver™ 20 System

Ideal server for workgroup or office applications. Integrates or enhances the functionality of PC-LANs and functions as the mainstream dedicated communications or NFS™ server.

Target Users – SPARCserver 1000E System

Best application server for departmental functions such as teleservices, manufacturing, engineering, or publishing, where powerful computers automate the business and integrate data, graphics, and images from multiple sources across the enterprise.

Key advantages over the SPARCserver 20 system:

- Twice the scalability, with eight CPUs and two-and-one-half to four times the throughput in memory and I/O bandwidth
- Much more expandable, with four times the memory, three times as many expansion slots, and more than three times the disk capacity
- Single integrated package for system, disk, backup, and CD-ROM

Target Users – SPARCcenter™ 2000E System

Premier data center rightsizing product where applications cross departmental boundaries serving the entire enterprise—such as customer, financial, or ERP/MRP databases.

Key advantages over the SPARCserver 1000E system:

- Twice the scalability, with 20 CPUs, double the memory bandwidth, and up to ten I/O buses
- Much more expandable, with two-and-one-half times the memory, three times as many expansion slots, and more than ten times the disk capacity
- Data center package accommodates richer configurations and higher capacity per footprint
- Dual system bus, redundant cooling, and optional second power supply offer more reliability and higher availability

SPARCcenter 2000E
Product Placement Strategy *(cont.)*

Target Users – SPARCcluster™ HA

The SPARCcluster HA (high availability) is targeted at technical and commercial customers who need a highly available data service. SPARCcluster HA Server comes with comprehensive fault management programs designed specifically for use with NFS, Informix, Oracle, or Sybase data services.

Key advantages over the SPARCserver 1000E and SPARCcenter 2000E systems:

- Fully automated fault detection and recovery from any single point of failure
- On-line administration and maintenance to maximize data service availability

Target Users – SPARCcluster™ PDB™ Server

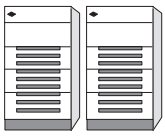
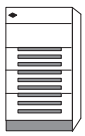
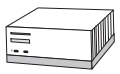
The SPARCcluster PDB (parallel database) Server is Sun's commercial clustering solution for mission-critical, enterprise-wide, Oracle database applications. Initially, the product supports only the ORACLE Parallel Server from Oracle Systems.

Key differentiators compared to the SPARCcluster HA Servers:

- Database available faster because no reload is needed
- Requires ORACLE Parallel Server. SPARCcluster HA Server supports off-the-shelf Oracle, Sybase and Informix products

SPARCcenter 2000E
Product Placement Strategy *(cont.)*

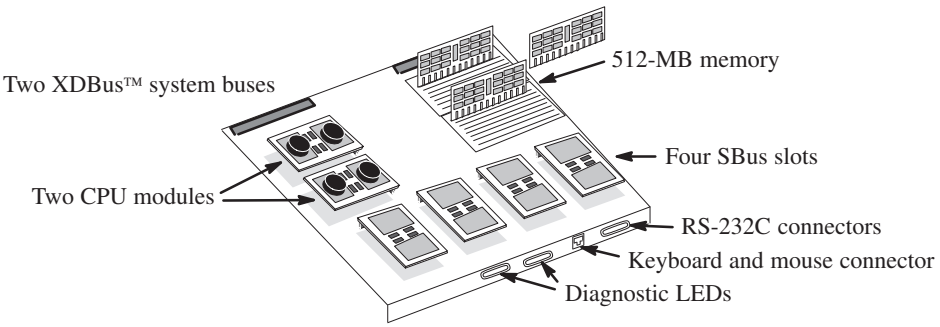
Product Positioning Chart

Servers	Primary positioning	Target buyers	Average configurations	Competition
SPARCcluster PDB	• High availability for ORACLE 7 databases • Database shared by all systems • Requires ORACLE Parallel Server	MIS CIO	100–400 users 100–600 GB	Sequent 5000 SE100, IBM SP2/HACMP, AT&T 34xx/35xx, DG AV Clusters, Pyramid Valence, HP SharePlex/iX, DEC Advantage-Clusters
 SPARCcluster HA	• High availability for Sybase, Informix, Oracle, or NFS • Database accessible by one system at a time	MIS CIO	100–400 users 100–600 GB	Sequent 5000 SE100, IBM SP2/HACMP, AT&T 34xx/35xx, DG AV Clusters, Pyramid Valence, HP SharePlex/iX, DEC Advantage-Clusters
 SPARCcenter 2000E	• Data center database and rightsizing • High reliability and availability • Super high-end compute server	MIS CIO	150–400 users 50–500 GB	Sequent 5000 SE70, HP 9000 T500, DEC 8200, 8400, IBM RS/6000 R30, SGI Challenge XL, NCR 3525 XP
 SPARCserver 1000E	• Departmental application server • Multipurpose NFS server • Small business enterprise system	Department managers, MIS	50–150 users 20–120 GB	HP K200, K400, IBM 990, J30, R30, SGI Challenge L, DEC 2100 5/250
SPARCserver 20	• Distributed NFS server • PC-LAN application server	Department managers, LAN managers	40–70 users 25–50 GB	IBM 390, G30, HP E45/E55, DEC 1000 4/200, 2000 4/200, SGI Challenge S/DM, Compaq Proliant 4500

SPARCcenter™ 2000E Expansion: Pay as You Grow Flexibility

Expansion

The SPARCcenter™ 2000E system is designed to meet present needs as well as to provide ample room for future growth. To fill customers' ever-changing computing needs, every major SPARCcenter 2000E feature is designed for easy plug-in expansion. This revolutionary design allows for quick expandability in multiple dimensions.



System board

Key Facts

- Expansion per system board:
  - One or two SuperSPARC™ processors
  - 512 MB of memory
  - Two XDBus™ connections
  - Four SBus slots for network and peripheral connections
  - Two RS-232C connectors and keyboard and mouse connection
- Maximum system expansion:
  - Ten system boards can be installed into the SPARCcenter 2000E package
  - 20 SuperSPARC processors, each with 2 MB of SuperCache™
  - 5 GB of main memory
  - 40 SBus slots
  - 162 GB of internal storage using three disk trays, each with six 9-GB disk drives
  - Additional 1.9 TB of external disk storage in disk Expansion Cabinets or a combination of tape/disk Expansion Cabinets. Maximum 2.1 TB of disk capacity with 9-GB DSCSI disk drives (39 disk trays)
  - 1.2 TB of disk storage with 20 SPARCstorage™ Array Model 112 disk subsystems
  - 4.86 TB of disk storage with 15 SPARCstorage Array Model 210 Series disk subsystems
  - Maximum supported combination of DSCSI disk drives and SPARCstorage Arrays is 120 disks (20 disk trays, 10 DWIS/S SBus cards) and 10 SPARCstorage Arrays (10 Fibre Channel Interface SBus cards)
  - Up to twenty 14-GB 8-mm tape drives; four in the System Cabinet
  - Up to nineteen 20-GB 4-mm tape autoloaders; three in the System Cabinet

SPARCcenter 2000E Expansion: Pay as You Grow Flexibility *(cont.)*

Key Facts *(cont.)*

- Up to four 140-GB SPARCstorage Libraries
- One internal CD-ROM drive, standard: Optional internal 0.25–inch tape drive
- Up to 20 twisted-pair Ethernet connections with 5 Quad Ethernet SBus cards

Configuration Guidelines

- Each system must be ordered with a minimum of one system board, two SPARC™ modules, and 64 MB of memory. Each system board can be configured with zero, one, or two SPARC processor modules and up to 512 MB of memory.
- Only 50-MHz system boards are compatible with the SPARCcenter 2000E system (50-MHz XDBus).
- Only 40-MHz system boards are compatible with the SPARCcenter 2000 system (40-MHz XDBus).
- The SPARCcenter 2000E systems require 60-MHz SPARC modules. The 40-MHz and 50-MHz SPARC modules are not supported on the SPARCcenter 2000E.
- The 60-MHz and 85-MHz SPARC modules are supported on both the SPARCcenter 2000 and 2000E.
- All SPARC modules in a SPARCcenter 2000E system must run at the same frequency. Mixed speed modules are not supported.
- The SPARCcenter 2000E with 60-MHz SPARC modules requires Solaris™ 2.3 or later operating environment.
- The SPARCcenter 2000E with 85-MHz SPARC modules requires Solaris 2.4 or later operating environment. Solaris 2.4 requires a patch #101945–36 to support the 85-MHz SPARC modules.
- Each system must be ordered with a minimum of one internal disk tray (two 9-GB DSCSI-2 disks) or one bootable SPARCstorage Array. The configuration guidelines for bootable SPARCstorage Arrays are in the "SPARCcenter 2000E Disk Storage Solutions" section.
- Each system supports up to three disk trays or up to two SPARCstorage Array Model 112 Series disk subsystems within the System Cabinet. Alternatively, a combination of one SPARCstorage Array Model 112 Series disk subsystem and one disk tray is supported within the System Cabinet.
- SPARCstorage Array Model 112 Series disk subsystems can be ordered and factory-installed in the System Cabinet or the Expansion Cabinet. Up to four SPARCstorage Array Model 112 Series disk subsystems are supported in each Expansion Cabinet.
- Note that the operating temperature for a rack-mounted SPARCstorage Array Model 112 is 10° to 30° C or 50° to 86° F.
- The SPARCstorage Array Model 210 Series disk subsystem requires an Expansion Cabinet and is not supported in the System Cabinet.
- The new redundant-capable SPARCcenter 2000E chassis has been modified to support dual power supplies. The old SPARCcenter 2000E chassis does not support a second power supply.
- The new redundant-capable SPARCcenter 2000E system includes a single power supply, redundant cooling unit, CD-ROM drive, FSBE/S SCSI Host Adapter, and Buffered Ethernet SBus card.
- As of January 30, 1996, JumpStart™ will no longer be preinstalled on factory configured SPARCcenter 2000E systems. Customers who want JumpStart preinstalled need to order "JUMPSTART" as a separate, no charge line item.

SPARCcenter 2000E Bus and I/O Architecture

SPARCcenter 2000E Buses

- **Features**
  - Two 50-MHz, 64-bit-wide, packet-switched XDBus system buses
  - 25-MHz, 32-bit-wide SBus, delivering 66-MB/sec. sustained write throughput
  - Up to ten independent SBuses
  - Fast and wide differential SCSI-2 interface, delivering up to 20-MB/sec. burst transfer rates and 12-MB/sec. sustained transfer rates
- **Benefits**
  - Maximizes processor performance and ensures scalability when adding more processors
  - Supports high-speed SBus expansion cards
  - Balances compute performance and I/O throughput for fast application performance
  - Enables fast sequential and random read and writes; maintains compatibility with SCSI-2 interface

Tech Facts

- The dual XDBus system bus uses packet-switched technology and is capable of 800-MB/sec. peak and 625-MB/sec. sustained bandwidth, providing substantially greater overall throughput than comparable circuit-switched buses.
- The XDBus system bus uses a write-broadcast protocol to maintain cache coherency in its multiple caches. The external cache directory of each processor is in both the cache controller and the Bus Watcher (BW), allowing the BW to snoop XDBus traffic and provide information to other caches without disturbing the processor's access to its own cache.
- The external CPU caches use copy-back to minimize bus traffic, reducing bus contention between the processors and improving the system's ability to handle multiple processors.
- The 85-MHz SPARC modules introduced a new version of the SuperCache chip which has a new mode called Multiple Commands (MC) mode. Enabling MC permits the SuperCache to parallelize CPU-to-memory transactions. Only the 85-MHz SPARC module supports the MC feature.
- Each of the functional units (CPU subsystem, memory subsystem, and I/O subsystem) is equally accessible on the XDBus system bus, resulting in no latency penalty for accessing one functional unit from another residing on a different system board.
- The SBus interface (SBI) can map up to 64 MB of DVMA™ address space. Each entry maps a 4-KB page. Since SBuses are completely independent, their DVMA spaces may be configured separately, potentially using more than 256 MB of DVMA space in a system.
- A fully associative, 256-byte write-back cache sits between the SBI and XDBus system bus. The cache is organized into four 64-byte lines, with one line dedicated to each SBus slot, eliminating a substantial amount of backplane traffic and providing simultaneous I/O access to the XDBus system bus for each SBus slot.
- The high-performance differential fast/wide intelligent SCSI-2 SBus (DWIS/S) host adapter dramatically reduces CPU overhead and is capable of a 20-MB/sec. burst rate in 16-bit-wide mode.

SPARCcenter 2000E Memory

Memory

- **Features**
  - Expands to 5 GB
  - Can be added in increments of 64 and 256 MB
  - Accommodates up to 16 MB of NVRAM
  - ECC memory detects and corrects single-bit memory errors
  - 64-bit wide memory data path has a sustained transfer rate of 290 MB/sec. non-interleaved and 426 MB/sec. interleaved
  - Includes interleaved memory design
- **Benefits**
  - Provides growth path for system memory
  - Offers flexibility to achieve a variety of memory capacities
  - Accelerates synchronous disk writes for better file server performance
  - Corrects memory errors without interrupting system operation
  - Provides a high-speed data path between system memory and SuperSPARC CPUs, improving performance in memory transfer operations
  - Supplies fast, efficient access to memory residing in multiple SIMMs

Tech Facts

- Each system board has two memory banks. Each memory bank consists of eight SIMM slots, which can be either empty or completely full. Different memory types cannot be mixed within a single memory bank, but each bank can have a different memory type.
- The 64- and 256-MB memory expansions are based on 4-MB DRAMs and 16-MB DRAMs, respectively, and occupy one memory bank.
- The NVRAM/SIMM consists of 1-MB SRAM. Maximum supported NVRAM is 16 MB, which occupies two memory banks.
- Memory access time consists of 14 cycles.
- Access to main memory is cached in blocks of 64 bytes to minimize memory accesses and improve overall performance.
- Memory is interleaved on multiples of 64 bytes. This permits an entire 256-byte disk sector to be transferred with no memory cycle delay.

SPARCcenter 2000E RAS Features Maximize Server Availability

Reliability

• Features	• Benefits
– ECC memory	– Ensures that single-bit memory errors are detected and corrected
– Parity-protected system bus signals	– Guarantees greater data integrity on system bus
– Leading-edge GTL technology used in XDBus and XBus implementations	– Reduces system bus noise susceptibility and decreases chance of erroneous signal
– Dual power supplies	– Increases the reliability of the power supply system because two supplies now share the load
– Redundant cooling	– Provides reliability with increased cooling capacity

Availability

• Features	• Benefits
– Automatic System Recovery (ASR)	– Reduces server downtime in the event of a component failure – Detects and isolates failures and automatically configures around the failed components on reboot
– Dual power supplies	– Prevents system crashes due to power supply failure. One power supply can sustain the load without system interruption if the other fails
– Redundant cooling	– Prevents system shutdowns due to single blower failure
– Integrated SPARCstorage Array disk subsystem	– All disk capacity, including the boot disk, is in SPARCstorage Array disk subsystems. (Solaris™ 2.4 Hardware: 3/95 and SPARCstorage Array software version 2.1 are required to support bootable SPARCstorage Array disk subsystems.)

Serviceability

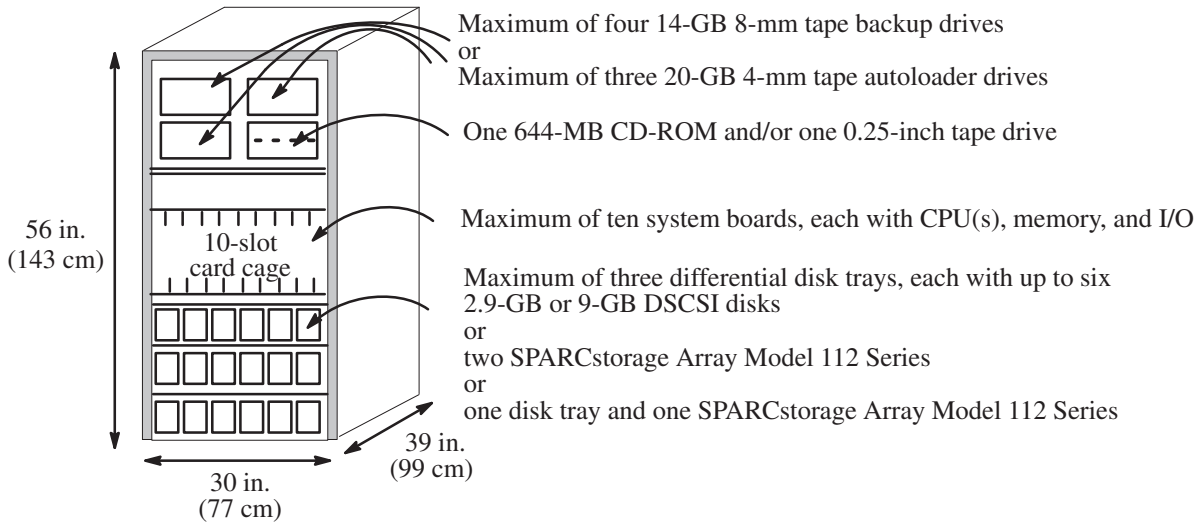
• Features	• Benefits
– Extensive error logging and reporting	– Easy to locate component failure
– Direct access to all components	– Lower mean time to recovery because all components are modular and easy to access

SPARCcenter 2000E RAS Features Maximize Server Availability *(cont.)*

Tech Facts

- SPARCcenter 2000E systems have a highly integrated design, using only nine large ASICs per system board: four Bus Watchers, two memory queue handlers, one SBus interface, and two I/O caches. This allows for higher system reliability.
- A temperature sensor is located on each system board. If the temperature rises above 53° C (127° F), the system will start its shutdown process with a one-minute warning. A system administrator can halt this process.
- In the nonredundant cooling system (old chassis), if the fan speed drops by more than 30 percent and the maximum allowable temperature is exceeded, an over-temperature shutdown is triggered. A system administrator can cancel this shutdown.
- The redundant cooling system has a blower unit with four blowers. If one blower fails, the remaining functional blowers will provide sufficient airflow. Three blowers will provide enough cooling for a fully configured system. If the maximum allowable temperature is exceeded, an over-temperature shutdown is triggered. A system administrator can cancel this shutdown.
- In a single power supply system, sensors detect irregularities in both AC and DC power. AC power can tolerate a brownout of 160 VAC for at least 15 minutes. The system also tolerates single-cycle dropouts without failures. If power failure is detected in a single power supply system, DC power will continue for five milliseconds to flush memory to disk.
- In the redundant power system with dual power supplies, the second power supply is connected in parallel to the first. If any DC power rail on either supply fails, the other will take over with no interruption. The failing power supply will assert a "DC fail" signal, causing two things to happen: a message appears on the console warning that one supply has failed, and one of the two LEDs is lit inside the chassis. These LEDs are inspected by the user to determine which supply failed, and a replacement of the bad one can then be scheduled at a convenient time.
- Redundant cooling and power systems are supported under Solaris 2.3 and 2.4, and additional patches are required. Solaris 2.3 requires patch #101318–59 or later. Solaris 2.4 requires patch #101945–04 or later.
- SPARCcenter 2000E with dual power supplies requires Boot PROM version-10 or later on all system boards. A Boot PROM upgrade kit is available separately.
- A bus timeout mechanism is used to reduce the probability of system hangs. Bus arbitration grant timeouts and packet reply timeouts are user-configurable in firmware. SBus timeouts are maintained by an SBus interface.
- Gunning transceiver logic (GTL) is used in the implementation of the logic circuits to provide maximum performance with minimum heat dissipation. GTL uses only a 0.8-V swing to distinguish a 1 signal from a 0 signal rather than the 5-V swing used in ordinary TTL logic, leading to faster switching times, increased integration, and higher CMOS reliability.

SPARCcenter 2000E
Expandable Package for the Data Center



SPARCcenter 2000E System Enclosure

The system cabinet of the SPARCcenter 2000E system allows customers flexibility in configuring a system to meet their needs. The system cabinet provides a CD-ROM drive and one to ten system boards; 0.25-inch, 8-mm, and/or 4-mm tape drives are optional.

Configuration Guidelines

- System cabinets come standard with a Fast SCSI-2 Buffered Ethernet SBus host adapter (FSBE/S) card for Ethernet connection, a CD-ROM drive, and a Solaris Enterprise Server license.
- Minimum system configuration includes two CPUs, 64 MB of memory, two 2.9-GB or 9-GB DSCSI disk drives in a data center tray, and one DWIS/S Host Adapter. The disk tray and DWIS/S Host Adapter can be replaced by a properly configured bootable SPARCstorage Array and a Fibre Channel Host Adapter. See the “SPARCcenter 2000E Disk Storage Solutions” section of this document for configuration guidelines.
- Up to four half-height 14-GB tape drives are supported in the three full-height tape bays. The fourth 14-GB 8-mm tape drive fits in either of the two bays on the left front of the System Cabinet. The fourth tape is not supported in the right-hand side tape bay due to cooling restrictions. Filler panels are provided when half-height drives are purchased.

Tech Facts

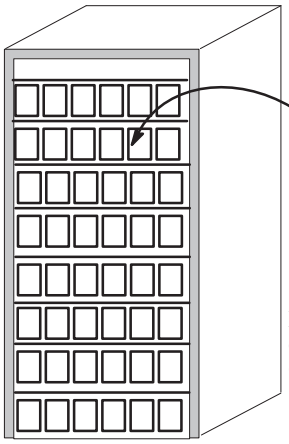
- The SPARCcenter 2000E system runs 200–240 V power and must be deployed in an air-conditioned environment (operating temperature 10° to 40° C or 50° to 104° F with 20 to 80 percent relative humidity, non-condensing). The operating temperature for a rack-mounted SPARCstorage Array Model 112 is 10° to 30 °C or 50° to 86° F.
- There are two versions of the SPARCcenter 2000E System Cabinet. The differences are in the AC power distribution units and their outlets for peripheral devices. The North American/Asian version (V3) has outlet type NEMA 6–15, and the International version (V4) has IEC 320 type of outlets.

SPARCcenter™ 2000E Disk Storage Solutions

Recommended Storage Options

SPARCcenter™ 2000E disk drives are the highest performance DSCSI drives available, providing rapid, low-cost data access in a wide variety of server applications. The SPARCcenter 2000E integrates the SPARCstorage™ Array disk subsystems in a modular and flexible fashion, letting customers configure the system to suit their individual needs.

Disks and Tape Drives in a Data Center Expansion Cabinet

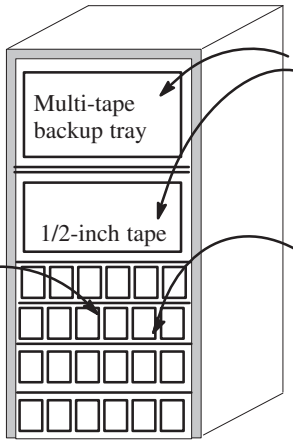


Maximum of eight disk trays, each with up to six 9-GB DSCSI disks, for a maximum total of 432 GB

or

Maximum of six disk trays, with either one multitape backup tray or one 0.5-inch tape drive

Disk Expansion Cabinet

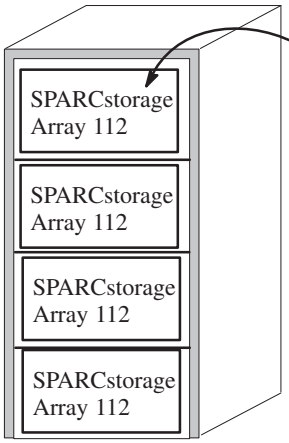


Maximum of two multi-tape backup trays, or two 0.5-inch tape drives, or one of each. Multi-tape backup trays each support a maximum of four 14-GB 8-mm tape drives or a maximum of four 20-GB 4-mm tape autoloader drives

Maximum of four disk trays, each with a up to six 9-GB DSCSI disks, with one multi-tape backup tray and one 0.5-inch tape drive

Disk and Tape Expansion Cabinet

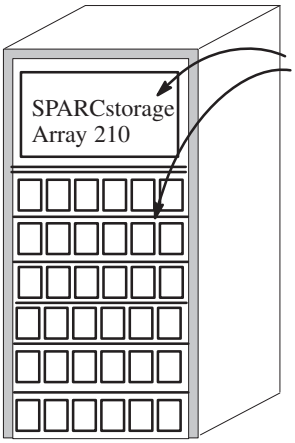
SPARCstorage™ Array in a Data Center Expansion Cabinet



Maximum of four SPARCstorage Array Model 112 disk subsystems, for a maximum total of 252 GB per Expansion Cabinet

Maximum of 20 SPARCstorage Array Model 112 disk subsystems per SPARCcenter 2000E system

Expansion Cabinet with SPARCstorage Array Model 112 Series disk subsystems



Maximum of one SPARCstorage Array Model 210 controller and up to six disk trays and 36 disk drives, for a maximum total of 324 GB per one SPARCstorage Array Model 210 disk subsystem

Maximum of 15 SPARCstorage Array Model 210 disk subsystems per SPARCcenter 2000E system

Expansion Cabinet with SPARCstorage Array 210 disk subsystem

SPARCcenter 2000E Disk Storage Solutions *(cont.)*

Configuration Guidelines

- The DWIS/S Host Adapter and the internal disk tray with two disk drives that are required in the minimum order configuration can be replaced by a properly configured SPARCstorage Array. Any of the following SPARCstorage Array configurations can be used in such cases:
  - A SPARCstorage Array Model 112 Series disk subsystem in tabletop enclosure (X790A).
  - A factory-installed, rack-mounted SPARCstorage Array Model 112 Series in the System Cabinet (for example 790AR4 and 967AR4) or in a standalone or factory-configured Expansion Cabinet (X955AV3, 790AR5 and 967AR5).
  - A SPARCstorage Array Model 210 including a factory configured (for example, 955AV3) or a standalone Expansion Cabinet (for example X955AV3) with factory installed controller and minimum of one factory-installed disk tray (for example 780AR5 and 783AR5).
- A factory-installed Fibre Channel Interface/SBus Host Adapter (1057A) is required when a bootable SPARCstorage Array is replacing the internal disk drives of the SPARCcenter 2000E.
- Bootable SPARCstorage Array requires Solaris 2.4 Hardware: 3/95 or later, and SPARCstorage Array Software version 2.1. All SPARCstorage Array disk subsystems include SPARCstorage Array Software version 2.1.
- Up to six Data Center Expansion Cabinets with DSCSI disk drives and tape drives can be connected to a SPARCcenter 2000E system. Two of the six Expansion Cabinets can contain tape and disk options. The cabinets with tape drives must be adjoining to the left and/or right of the System Cabinet so the single-ended 4-mm SCSI for tape cables can be connected to the System Cabinet.
- A total of 39 differential disk trays, each containing six disk drives, and a maximum of 20 DWIS/S cards are supported on a SPARCcenter 2000E system.
- Up to 15 Data Center Expansion Cabinets, each with one SPARCstorage Array Model 210 disk subsystem, can be connected to a SPARCcenter 2000E system.
- Up to 20 SPARCstorage Array Model 112 disk subsystems can be connected to a SPARCcenter 2000E system.
- The SPARCcenter 2000E system supports a combined maximum configuration of 120 DSCSI disk drives (20 disk trays, 10 DWIS/S cards) and 10 SPARCstorage Array disk subsystems (10 Fibre Channel SBus cards).
- Multi-Tape Backup Tray (MTBT) and Front-Load Tape Drive (FLT)
  - Each MTBT requires its own Fast SCSI-2 Buffered Ethernet SBus host adapter (FSBE/S). MTBTs in the same Expansion Cabinet cannot be daisy-chained together.
  - Each MTBT can support up to four drives.
  - Up to two FLTs are supported per Expansion Cabinet. Generally, each FLT requires its own FSBE/S, but if two FLTs are daisy-chained together in the same Expansion Cabinet, only one FSBE/S is needed.
  - If an FLT is installed, at least two trays full of disk drives or one ballast acting as counterweight is required at the bottom of the Expansion Cabinet. A second FLT requires an equivalent counterweight configuration.
  - Each disk tray requires a minimum of one DWIS/S; up to two DWIS/S cards can be used per tray. One DWIS/S card can support up to two disk trays. (A 0.25-mm DSCSI cable must be ordered to support the second disk tray.)

SPARCcenter 2000E Backup Solutions

Backup Solutions

The SPARCcenter 2000E system has an optional 14-GB 8-mm tape, 20-GB 4-mm tape autoloader drive, and/or 140-GB 8-mm SPARCstorage Library tape subsystem for backup, giving users a variety of high-speed backup options. Sun also provides Solstice™ Backup™ software (formerly NetWorker for Solaris™) to complete the backup solution and simplify storage management across a network of heterogeneous systems.

Tape Backup

• Features	• Benefits
– 14-GB 8-mm tape backup drive features 1-MB/sec. transfer rate and a 14-GB typical capacity in compression mode (native: 500 KB/sec. and 7-GB internal or Expansion Cabinet option)	– Excellent choice for mid-range and high-end configurations. Very high reliability with 160,000 hours MTBF
– 20-GB 4-mm tape autoloader drive features a data transfer rate of 900 KB/sec. and a 5-GB capacity per tape in compression mode (native 366 KB/sec. and 8-GB, internal or expansion cabinet option)	– Customers can back up more than 20 GB in a single 8-hour shift. Very reliable, with 80,000 hours MTBF and more than 50,000 cartridge insertions

SPARCstorage™ Library Model 8/140

• Features	• Benefits
– Seventy 140-GB robotic mechanism	– Unattended backup and recovery operation
– Includes ten 8-mm tape cartridges	– Centralized media management for 140 GB of data
– Supported with Solstice Backup: Turbo	– Complete storage management solution
– Available in one- or two-drive configurations	– Parallel operation for faster backup
	– Redundant drives for reliable access to data

Solstice™ Backup™

• Features	• Benefits
– Automatic, unattended network backups of live file systems across heterogeneous networks	– Reduces administrative cost and increases system availability
– Support for a broad range of third-party storage devices, including jukeboxes and autoloaders	– Enables enterprise-wide backup

Data Center Expansion Cabinet

Data Center Expansion Cabinet

The Data Center Expansion Cabinet supports several types of options that can be configured in a variety of combinations. The following devices can be installed in the Expansion Cabinet:

- SPARCserver™ 1000 and 1000E
- SPARCstorage Array Model 112 Series
- DiskTower 1000 (discontinued)
- SPARCstorage Library Model 8/140 (rack-mountable version only)
- Differential SCSI Disk Tray
- Multi-Tape Tray
- 1/2-inch Front-Load Tape Drive

All the supported configurations and cooling requirements that are described in this document apply only to current or previous system components and options. Future products may require different cooling arrangements.

Definitions

- Disk Tray can include up to six 5.25-inch 2.1-GB, 2.9-GB or 9-GB Differential SCSI-2 disk drives
- A System Unit can be one of the following:
  - SPARCserver 1000 or 1000E
  - SPARCstorage Array Model 112
  - DiskTower 1000

  All System Units have the same type of enclosure with an airflow from the right side to the left side.
- A tape Unit can be one of the following:
  - Multi-Tape Backup Tray
  - SPARCstorage Library
  - 1/2-inch Front-Load Tape Drive

  The enclosures of the various Tape Units are different, but the airflow is from front to back in all of them.
- The Blower Assembly is a fan tray that is mounted on the front, right hand side of the Expansion Cabinet. The Blower Assembly tray includes three fans that blow air into the right side of the Expansion Cabinet. The air flows through the devices in the cabinet and exits at the left side.
- The Exhaust Fan is mounted in the rear of the Expansion Cabinet. It creates an airflow away from the cabinet preventing the heated air from circulating back into the devices and cabinet.
- The Rack-Mount Kit includes mounting rails that allow one System Unit to be mounted in a SPARCcenter 2000 or 2000E System Cabinet or a Data Center Expansion Cabinet.

Data Center Expansion Cabinet *(cont.)*

Expansion Cabinet Configurations

Some rack-mounted devices require additional cooling in the cabinet. Following are listed the supported configurations of rack-mounted devices in the Expansion Cabinet. The specific cooling requirements are described for each configuration.

- Disk Trays only

  Up to eight Differential SCSI Disk Trays can be placed in a Data Center Expansion Cabinet. No Blower Assemblies or Exhaust Fans are required.

- System Units only

  Up to four System Units are supported in a Data Center Expansion Cabinet. Cooling requirements are listed below:

  – One System Unit: One Blower Assembly required

  – Two System Units mounted adjacent in either top or bottom two sections: One Blower Assembly required

  – Two System Units: Not mounted adjacent, two Blower Assemblies required

  – Three or four System Units: Two Blower Assemblies required

  Note that in the configurations listed above, the Blower Assemblies can be replaced by equal number of the older Exhaust Fans as long as no 85-MHz SPARC modules are included. If the rack-mounted SPARCserver 1000 or 1000E includes 85-MHz SPARC modules, only Blower Assemblies can be used because Exhaust Fans do not provide sufficient cooling.

- Disk Trays and Tape Units

  Up to two Tape Units are supported in a Data Center Expansion Cabinet. Rack-mounted Tape Units include a front panel that replaces the standard front panel of the Expansion Cabinet. The following combinations are supported:

  – One Tape Unit and up to six Disk Trays: No Blower Assemblies or Exhaust Fans are required

  – Two Tape Units and up to four Disk Trays: No Blower Assemblies or Exhaust Fans are required

- SPARCstorage Array Model 210

  The following combinations are supported:

  – One SPARCstorage Array 210 Controller and one to six Disk Trays: No Blower Assemblies or Exhaust Fans are required

  – One SPARCstorage Array 210 Controller, one Tape Unit, and one to four Disk Trays: No Blower Assemblies or Exhaust Fans are required

  – One SPARCstorage Array 210 Controller, one SPARCserver 1000(E) server, and one to four Disk Trays: Two Blower Assemblies are required

Data Center Expansion Cabinet *(cont.)*

Expansion Cabinet Configurations *(cont.)*

- Combinations

  All of the following configurations require two Blower Assemblies in a single Expansion Cabinet. Exhaust Fans cannot be used to support these configurations. The following are supported:

  – One System Unit and one to six Disk Trays
  – One System Unit, one Tape Unit, and zero to four Disk Trays
  – One System Unit, two Tape Units, and zero to two Disk Trays
  – Two System Units, one Tape Unit, and zero to two Disk Trays
  – Two System Units and two Tape Units
  – Three System Units and one to two Disk Trays
  – Three System Units and one Tape Unit

Operating Temperature

The operating temperature of the Data Center Expansion Cabinet is 10°C to 40°C (50°F to 104°F). However, the operating temperature is derated whenever one or more 2.1-GB 3.5-inch disk drives are included in the rack-mounted SPARCserver 1000(E) or SPARCstorage Array Model 112 Series. The derated operating temperature is 10°C to 35°C (50°F to 95°F) if Blower Assemblies are used. If Exhaust Fans are used, the operating temperature must be between 10°C to 30°C (50°F to 86°F).

Ordering Information

- Data Center Expansion Cabinet configurations can be factory built using the (X)955A(V3, V4) order number as a base package and adding appropriate options (append "R5" to the option number to specify factory installation).
- Factory installed, rack-mounted System Units include the mounting rails and do not require the Rack Mount Kit (X965A).
- Only System Units can be rack-mounted with the Rack Mount Kit. A tabletop or tower version of the SPARCstorage Library cannot be rack mounted.
- Rack-mounted System Units are connected to the power distribution unit in the System or Expansion Cabinet. The Power Distribution Unit operates on 200–240V and the power outlets are of types NEMA 6–15 (V3) and IEC 320 (V4). The regular power cords (such as X311L) that are used with the tabletop enclosures cannot be used. The Rack Mount Kit includes the necessary power cords (V3 and V4) required for the installation.
- The Blower Assembly operates in a different way than the Exhaust Fans (#540-1929 and #540-1930). The Exhaust Fan can not be used to replace the Blower Assembly unless it's specifically stated. Exhaust Fans and Blower Assemblies cannot be mixed in a single Expansion Cabinet.
- Blower Assembly has replaced the Exhaust Fan, which should not be ordered for new systems. It is recommended that existing Exhaust Fans be replaced by new Blower Assemblies whenever a system expansion is performed. Exhaust Fans can be ordered for existing systems that are using an Exhaust Fan and require additional cooling.
- The Blower Assembly can be ordered as a factory-installed option (966AR5) or a stand alone option (X966A).

Data Center Expansion Cabinet *(cont.)*

Ordering Information *(cont.)*

- The SPARCstorage Array Model 112 Series Rack Mount Accessories Kit for the Expansion Cabinet (967AR5) includes one Blower Assembly. The Rack Mount Accessories Kit for the System Cabinet (967AR4) does not include a Blower Assembly.
- If the ordered configuration allows, one factory installed Blower Assembly is automatically included with each factory installed, rack-mounted SPARCserver 1000E (S1000ER5). Up to two Blower Assemblies can be included per Expansion Cabinet.

Installation Guidelines

Tape Units can only be placed in the top two sections of the Data Center Expansion Cabinet. The factory installed, rack-mounted devices are mounted in a default order as follows:

- Tape Units are always mounted at the top.
- SPARCserver 1000E enclosures are mounted at the top or right, below any Tape Units.
- SPARCstorage Array Model 112 Series enclosures are mounted from the bottom up.
- Disk Trays are mounted from the bottom up. Disk Trays are mounted below any SPARCstorage Array Model 112 Series enclosures.

Solaris™ 2.4 System Software: The Winning Enterprise Computing Environment

Operating Environment

The scalable Solaris™ 2.4 operating environment improves system and application performance, simplifies development and delivery of global solutions, increases system availability, and extends software compatibility and portability.

Multiprocessing

• Features	• Benefits
– Symmetric multiprocessing (SMP)	– Accelerates application throughput for multiple CPU-intensive tasks
– Multithreading libraries	– Allows developers to create multithreaded applications to further enhance application throughput

Management Tools

• Features	• Benefits
– Solstice™ AdminTools™: Printer Manager, User Manager, Host Manager, Database Manager, Serial Port Manager	– Provides easy-to-use suite of tools for managing local and remote printers, adding new users and logins, managing diskless and dataless clients, and updating entries in configuration files or name service
– Solstice™ JumpStart™ tool for automatic and remote software installation	– Enables automatic installation for departments or workgroups, reducing installation time; allows customization and localization of software environments

Open Network Computing (ONC+™) Environment

• Features	• Benefits
– Communication services (TI-RPC), NFS™, and Naming Services (NIS+)	– Supplies transparent access to the enterprise
– Federated Services	– Extends ONC+™ environment to include transparent access to DCE, NetWare, and OSI-based network resources

Security

• Features	• Benefits
– Login and password control	– Controls login and file access; integrated with network logins
– Automated Security Enhancement Tool (ASET)	– Checks system file security settings and automatically sets permissions according to specified security levels
– C2-level auditing	– Offers improved security via extensive user and event auditing

Solaris 2.4 System Software: The Winning Enterprise Computing Environment *(cont.)*

Applications

- **Features**
  - More than 3,000 native Solaris 2 applications
  - Thousands more Solaris 1 applications can run in binary-compatibility mode
  - Many more applications available under Wabi™ and MAE
- **Benefits**
  - Enables enterprise solutions
  - Leverages customers' Solaris 1 investment
  - Preserves investment in popular personal productivity applications

Tech Facts

- **Administering SMP:** *Psradm*, *Psrinfo*, and *Pbind* commands provide for easy administration of processors. *Psradm* takes a processor on-line and off-line; *Psrinfo* displays status information on the configured processors; and *Pbind* binds all the lightweight processes off a process to a processor or removes or displaces the bindings.
- **Powerful diagnostics:** *Prtdiag* command displays system configuration and diagnostic information. The diagnostic information lists all field-replaceable units (FRUs) in the system. *Prtdiag* is supported only on SPARCserver™ 1000, SPARCserver 1000E, SPARCcenter™ 2000, and SPARCcenter 2000E systems.
- **Standards:** Solaris 2.4 offers expanded standards certification compatibility and portability with XPG4 base branding in addition to SVR4, ABI, SVID 3, POSIX 1003.2, and Energy Star (power management).

SPARCcenter 2000E High Availability Solutions

High Availability

Sun offers a number of software options to increase the availability of SPARCcenter 2000E systems. Volume management software, journaling file systems, and clustering options can all be used to ensure the availability of application services based on the SPARCcenter 2000E. With the exception of the clustering products, software options to improve availability can be used in single system or clustered environments.

Logical Volume Manager (LVM)

• Features	• Benefits
– Logical volume management	– Improve storage management flexibility to accommodate larger files (up to 2 GB) and provide higher performance and better availability
– Support for RAID levels 0, 1, and 5	– RAID 0 (disk striping) improves performance – RAID 1 (disk mirroring) enables better data availability and integrity – RAID 5 provides data availability and integrity advantages at a lower cost than RAID 1, but at the expense of write performance
– Hot sparing	– Automatic logical replacement of failed disks without operator intervention ensures a fully redundant environment despite failures
– Journaling file system	– File system recovery within seconds at boot – Up to eight times better performance for synchronous writes – Fully compatible with existing UNIX® File System format (no dump and restore to move to or from journaling)
– GUI-based storage management	– Improved storage administration productivity – Eases administration of very large storage environments
– A choice of two LVMs	– Solstice™ DiskSuite™ is copackaged with Solaris Workgroup and Enterprise Server products – SPARCstorage™ Volume Manager is bundled with all SPARCstorage Array shipments – Both LVMs can be used to manage all types of Sun disk hardware

Sun will eventually migrate to a single LVM, Solstice DiskSuite, but no date has been set for the migration. Solstice DiskSuite is required for all SPARCcluster™ HA Server configurations. SPARCstorage Volume Manager is required for all SPARCcluster™ PDB™ Server configurations.

SPARCcenter™ 2000E High Availability Solutions *(cont.)*

SPARCcluster™ HA Server

• Features	• Benefits
– Automated fault detection and recovery	– High availability data services for NFS™, Informix, Oracle, and Sybase – Recovery within minutes without operator intervention from any single point of failure
– Loosely coupled two-node SPARCcluster configurations	– Easy migration path for existing Sun customers

SPARCcluster™ PDB™ Server

• Features	• Benefits
– Automated fault detection and recovery	– High availability data services for parallel database environments
– Support for ORACLE Parallel Server only	– Sun's most highly available data service platform – Supports performance scalability across nodes for certain applications
– Distributed Lock Manager	– Manages shared access to the database, ensuring data integrity and lock recovery upon node failure
– Cluster Volume Manager	– Supports shared concurrent access to disk (required for ORACLE Parallel Server and provided only through the SPARCstorage Volume Manager)

SPARCcenter™ 2000E Options Support Matrix

Part number	Option description	Maximum number supported	Comments
Processors			
(X) 1178A	SM81-2 SPARC™ module expansion card with a 85-MHz SuperSPARC-II™ processor and 2-MB SuperCache™ for SPARCcenter™ 2000E systems	20	Two per system board
(X) 1167A	SM61-2 SPARC module expansion card with a 60-MHz SuperSPARC+™ processor and 2-MB SuperCache for SPARCcenter 2000E systems	20	Two per system board
System boards			
(X) 2322A	Two 85-MHz CPUs, no memory	10	Not supported on SPARCcenter 2000 with 40-MHz XDBus
(X) 2312A	Two 60-MHz CPUs, no memory	10	
(X) 2300A	No CPUs, no memory	10	
Memory			
(X) 170A	64-MB ECC memory expansion (8-MB SIMMs)	20	Memory expansion uses one memory bank (there are two on each system board)
(X) 173A	256-MB ECC memory expansion (32-MB SIMMs)	20	
(X) 172A	8-MB Prestoserve™ NVRAM/SIMM (1-MB SIMMs)	2	
SBus products			
(X) 1052A	Differential SCSI-2/Buffered Ethernet (DSBE/S)	39	
(X) 1053A	Fast SCSI-2/Buffered Ethernet Card (FSBE/S)	40	
(X) 1054A	SCSI/Buffered Ethernet Card (SBE/S)	5	
(X) 1057A	Fibre Channel Interface SBus Host Adapter	20	
(X) 1058A	SBus Quad Ethernet Controller (SQEC)	5	
(X) 1062A	Differential Fast/Wide Intelligent SCSI-2 (DWIS/S)	20	
X1063A	Single-ended Fast/Wide Intelligent SCSI-2 (SWIS/S)	10	
X1019A	High-speed serial interface (HSI/S)	4	
X1014A	Token-ring interface (TRI/S)	4	
(X) 1008A	Serial parallel controller (SPC/S)	8	
X1018A	SunSwift™ SBus Adapter	12	
X1023A	SunFDDI™ Single–Attach SBus Adapter (SAS)	4	
X1024A	SunFDDI Dual–Attach SBus Adapter (DAS)	4	
X1059A	SunFastEthernet™ 10/100 SBus Adapter 2.0 SBus Card, and Solaris™ 1.x Driver	10	
X1060A	SunATM™/155MFiber SBus Adapter 2.0	*	*Two SBus cards per system board
X1061A	SunATM/155UTP5 SBus Adapter 2.0	*	
X1012A	SunISDN™ Expansion Kit, SunISDN Card, Certification Labels, and SunISDN Enabling Kit 1.0.2	5	
Graphics			
X322A	17-inch color monitor and TurboGX™ frame buffer	1	
(X) 359A	20-inch color monitor and TurboGX frame buffer	1	

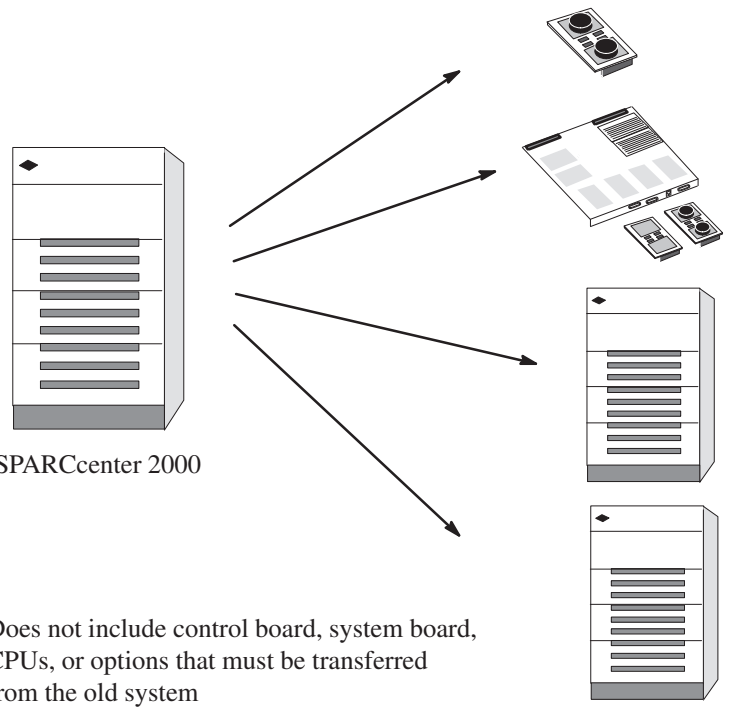
SPARCcenter 2000E Options Support Matrix *(cont.)*

Part number	Option description	Maximum number supported	Comments
Other			
(X) 909A	Second power supply	1	Supported only on the redundant-capable SPARCcenter 2000E (S2000E2V3/V4)
Mass storage			
(X) 783A	2 x 9-GB differential wide SCSI-2 disks with tray	39	Three in the System Cabinet
X784A	4 x 9-GB differential wide SCSI-2 disks with tray	39	
X785A	6 x 9-GB differential wide SCSI-2 disks with tray	39	Max. six disks per tray
(X) 785A	9-GB differential wide SCSI-2 expansion disk	N/A	Three in the System Cabinet
(X) 825A	20-GB 4mm tape autoloader drive	19	
(X) 826A	Multitape backup tray with one 20-GB 4mm tape autoloader drive for Expansion Cabinet	4	
(X) 841A	14-GB 8mm tape drive	20	
(X) 846A	Multitape backup tray with one 14-GB 8mm tape drive for Expansion Cabinet	4	
X847A	SPARCstorage™ Library Model 8/140 140-GB tape library, tower enclosure	4	
X867A	SPARCstorage Library Model 8/140 140-GB tape library, full configuration, tower enclosure	4	
X849A	SPARCstorage Library Model 8/140 140-GB tape library, stackable enclosure	4	
X869A	SPARCstorage Library Model 8/140 140-GB tape library, full configuration, stackable enclosure	4	
(X)848A	SPARCstorage Library Model 8/140 140-GB tape library, for Expansion Cabinet	4	
(X)868A	SPARCstorage Library Model 8/140 140-GB tape library, full configuration for Expansion Cabinet	4	
(X) 6103A	2.5-GB 0.25-inch internal SCSI tape drive	1	
(X) 685A	Front-load 0.5-inch tape drive for Expansion Cabinet	4	
Mass storage	Disk subsystems		
(X) 790A	SPARCstorage Array Model 112 (12.6 GB)	20	
(X) 791A	SPARCstorage Array Model 112 (37.8 GB)	20	
(X) 792A	SPARCstorage Array Model 112 (63 GB)	20	
X765A	7200 RPM 2.1-GB disks for SPARCstorage Array	N/A	Max. 30 disks per Model 112 Series
X766A	Six 7200 RPM 2.1-GB disks for SPARCstorage Array	N/A	
(X) 780A	SPARCstorage Array Model 210 Controller	15	Requires an Expansion Cabinet and Disks
Packaging			
X955A	56-inch Expansion Cabinet	15	
X965A	Rack Mount Kit for SPARCserver™ 1000E systems or SPARCstorage Array Model 112 Series	N/A	
(X)966A	Blower Assembly for the Expansion Cabinet	N/A	
(X) 969A	Ballast Kit	4	

SPARCcenter™ 2000E Upgrades Continue the Tradition of Investment Protection

Upgrading a SPARCcenter 2000 System

Because of the modular design of the SPARCcenter™ 2000 system, customers have several choices for upgrading their servers while protecting their investment. Customers can upgrade only processors to next-generation SuperSPARC™ technology. For maximum performance improvement, customers can upgrade a SPARCcenter 2000 to a SPARCcenter 2000E system.



- Upgrade processors only
  - Module swap upgrade to faster CPUs
- Upgrade to SPARCcenter 2000E
  - System board swap
  - Control board swap
  - CPU module swap
- Upgrade to redundant SPARCcenter 2000
  - Chassis swap*
  - Boot PROM upgrade if required
- Upgrade to redundant SPARCcenter 2000E
  - Chassis swap
  - System board, control board, and CPU module upgrades

* Does not include control board, system board, CPUs, or options that must be transferred from the old system

Configuration Guidelines

- The SPARCcenter 2000E system requires 50-MHz system boards, a 50-MHz control board, and 60-MHz or 85-MHz processors.
- Upgrades to the SPARCcenter 2000E with 60-MHz SPARC™ modules require Solaris™ 2.3 operating environment or later.
- Upgrades to the SPARCcenter 2000E with 85-MHz SPARC modules require Solaris 2.4 operating environment or later.
- Solaris 2.4 requires a patch #101945–36 to support the 85-MHz SPARC module.
- The 85-MHz SPARC module requires that the Boot PROM version on every system board is version -11 or higher. This requirement also applies to system boards with no SPARC Modules. A Boot PROM Kit for one system board is included with the 85-MHz SPARC Module Swap Upgrade (UGS2000-M61-M81-2). A separate Boot PROM Kit (UG-SERV-PROM) is available if additional Boot PROMs are needed.

SPARCcenter 2000E Upgrades Continue the Tradition of Investment Protection *(cont.)*

Configuration Guidelines *(cont.)*

- Customers with 60-MHz or 85-MHz processors in their SPARCcenter 2000 system can upgrade to a SPARCcenter 2000E system by purchasing only system board and control board upgrades.
- Upgrades from a nonredundant SPARCcenter 2000E system to a redundant system require a chassis swap. Current control and system boards, as well as internal options, must be reinstalled in the new chassis. Boot PROM version-10 or later is required on all system boards.
- All processors in a system must be upgraded at the same time. Mixed speed modules are not supported.

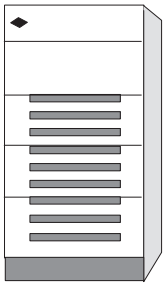
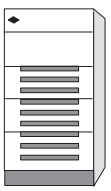
Installed Base Options Not Supported

- Disk: Internal 327-MB, 669-MB, 1.3-GB, 424-MB, and 207-MB SCSI disks; IPI or SMD drives
- Memory: Memory from any other SPARC system except the SPARCcenter 2000 Series
- Monitors: 19-inch monochrome; 19-inch high-resolution monochrome
- Graphics: P4 or VME monochrome or color frame buffers (MG3, MG4, CG3, CG5), GS, or GT
- Options: VME boards, SunPC™ Accelerator SX, SunPC Accelerator DX, SunIPC™, SBus Prestoserve™, SBus Ethernet Controller, or VideoPix™ accelerators

SPARCcenter 2000E Upgrades Continue the Tradition of Investment Protection *(cont.)*

Upgrading from a Previous-Generation Sun Server

Sun is committed to providing upgrade paths from previous-generation servers to current server technologies.

From	Customer Receives	Customer Returns
 SPARCserver x90 and SPARCserver 6x0 UG4/6X0-S2202E2 (V3,V4) UG4/6X0S2202E2-8 (V3,V4)	 SPARCcenter 2000E system, two SuperSPARC processors, FSBE/S SCSI Host Adapter, CD-ROM drive, plus (as separate line items) at least 64 MB of memory and any additional configured options desired	 SPARCserver x90 or 6x0 enclosure with the motherboard, one or two SPARC processors, primary memory board, and CD-ROM drive
 SPARCserver 690 with Differential SCSI disks UG-690D-S2202E2 (V3,V4) UG-690D-S2202E2-8 (V3,V4)		 SPARCserver 690 enclosure with the motherboard, one SPARC module, one group of SIMMs, two DSCSI disk drives, and CD-ROM drive
 SPARCserver 690 with IPI disks UG-690I-S2202E2 (V3,V4) UG-690I-S2202E2–8 (V3,V4)		 SPARCserver 690 enclosure with the motherboard, one SPARC module, one group of SIMMs, two IPI disk drives, and CD-ROM drive
 Non-redundant-capable SPARCcenter 2000 or 2000E UG-S2000-S2000C2 (V3,V4)	 Redundant-capable SPARCcenter 2000E chassis with dual power supplies and redundant blower	 SPARCcenter 2000E enclosure with single power supply and nonredundant blower

SunSpectrum℠ Customer Service Program

SunSpectrum℠ support programs are designed to meet customers' complete system needs, from total business support to self-maintenance and any level in-between. The SunSpectrum program supports a flexible range of services, allowing customers complete systems coverage for hardware, software, network applications, and network interoperability problems. A single fee covers the support for customers' entire systems—no matter what the configuration—making ordering and support administration easy. Customers should check with their local customer support representative for program/feature variance and availability in their area.

Services	SunSpectrum℠ Platinum℠ program	SunSpectrum℠ Gold℠ program	SunSpectrum℠ Silver℠ program	SunSpectrum℠ Bronze℠ program
Telephone assistance, unlimited	Seven day, 24 hour	Seven day, 24 hour	8AM-8PM, M-F	8AM-5PM, M-F
On-site response	Seven day, 24 hour	8AM-8PM, M-F	8AM-5PM, M-F	
Customer-defined priority	✓	✓	✓	
Urgent (phone/on–site)	Live/two hour	Live/four hour	Live/four hour	Four hour/NA
Serious (phone/on–site)	Two hour/four hour	Two hour/next day	Two hour/next day	Four hour/NA
Noncritical (phone/on–site)	Four hour/ customer convenience	Four hour/ customer convenience	Four hour/ customer convenience	Four hour/NA
Remote dial-in analysis	✓	✓	✓	✓
Replacement hardware parts	On-site technician	On-site technician	On-site technician	Courier, two business days
Solaris™ enhancement releases	✓	✓	✓	✓
Patches and maintenance releases	✓	✓	✓	✓
SunSolve℠ license	✓	✓	✓	✓
EarlyNotifier service	✓	✓	✓	✓
Seven-day, 24-hour telephone coverage	✓	✓	Option	
Seven-day, 24-hour on-site coverage	✓	Option	Option	
Two-hour on-site response	✓	Option	Option	
Self-paced education library	✓	✓	Option	
Personal technical acct. support	✓	✓	Option	
On-site technical support reviews	Quarterly	Semi-annual	Option	
Technical support plan	✓			
Coaching and training service	15 days per year			
Additional contacts	Option	Option	Option	Option
Unbundled software enhancement releases	Option	Option	Option	Option
On-site support (dedicated)	Option			

SPARCcenter™ 2000E Glossary

ASIC	Application-specific integrated circuit: ASICs are custom chips serving specialized purposes. Using arrays of standardized cells, they are easier and faster to design than custom chips and are smaller and more reliable than discrete parts.
Bus Watcher (BW)	An ASIC used in the SPARCcenter™ 2000E processor unit to connect the processor's external cache to the XDBus™ system bus.
Cache coherency protocol	The communication among multiple caches to ensure that updates to blocks shared among caches are made consistent among all caches.
Circuit-switched bus	A bus in which a transaction is normally implemented in an automatic fashion. Simple and easy to construct, a circuit-switched bus is often much less efficient than comparable packet-switched buses. MBus and SBus are circuit-switched buses.
DMA, DVMA™	Direct (virtual) memory access: A mechanism permitting transfers to or from memory without explicit intervention from the main processor(s). DVMA requires arrangements for virtual memory address translation.
Interleaved memory	Memory organization in which RAM chips are divided into banks; access is arranged so that a single typical access is serviced by all banks simultaneously.
I/O cache (IOC)	An ASIC used in the SPARCcenter 2000E system's SBus implementation to connect the SBus controller to one XDBus system bus.
MBus	A short circuit-switched multiprocessor bus standard developed by Sun Microsystems and SPARC International. MBus permits up to four processors and is the primary bus in the SPARCstation™ 20 system. Maximum bandwidth at 50 MHz is 400-MB/sec. burst, 100-MB/sec. sustained.
Multiple Commands	The 85-MHz SPARC™ module introduces a new version of the SuperCache™ chip which has a new mode called Multiple Commands (MC) mode. Enabling MC permits the SuperCache to parallelize CPU-to-memory transactions. For example, a processor might issue a store, followed by a load. With MC turned off, the SuperCache issues the store, waits for completion, and then issues the load – only a single command can be pending. When MC is turned on, the SuperCache issues the store, then issues the load, then waits for either of the two to return.
MXCC	The cache controller matched to the SuperSPARC™ processor. Interfaces the processor/cache pair to the XBus. Since it can also interface the processor to an MBus, it is known as the MBus-XBus-Cache Controller, or MXCC.
NVRAM	Nonvolatile random access memory. Memory whose contents persist unless explicitly overwritten; in particular, memory that can survive a power failure.

SPARCcenter 2000E Glossary *(cont.)*

Packet-switched bus	A bus in which information is transmitted in small, fixed-sized units. Often associated with the use of split transactions. The XDBus system bus is a packet-switched bus.
RAS	Reliability, availability, and serviceability. Reliability is a measure of the likelihood that problems will occur. While reliability aims to prevent failures, availability protects users when a failure occurs. Serviceability aims to minimize the average time between failure recognition and the system's return to full operation.
SBus interface (SBI)	An ASIC used in the SPARCcenter 2000E system's SBus implementation that implements the SBus itself, including arbitration, data transfer, and virtual memory translation. Includes a memory management unit dedicated to I/O.
SuperCache™	The SRAM external cache on the processor/MXCC daughtercard.
SuperSPARC processor	The highly integrated, superscalar CPU offered in the SPARCcenter 2000E system. Sometimes known as Viking in the trade press, the SuperSPARC processor has two integer units, one floating-point unit, a branch processor, a 64-entry TLB, and a highly associative Harvard-architecture 20-KB/16-KB cache.
XBus	A packet-switched bus closely related to the XDBus system bus. Used in the SPARCcenter 2000E system to connect the bus-interface—IOC connects to the SBI through the XBus, and the BW connects to the MXCC through the XBus.
XDBus system bus	A packet-switched multiprocessor bus developed by Sun Microsystems and Xerox. The XDBus system bus permits up to 255 independent devices and is the primary backplane bus in the SPARCcenter 2000E system. Maximum bandwidth at 50 MHz is 800 MB/sec. burst, 625-MB/sec. sustained.

SPARCcenter™ 2000E Materials Abstract

All materials are available on SunWIN, except where otherwise noted.

Collateral	Description	Purpose	Distribution	Token # or Hibbert order #
Power pack				
SPARCcenter™ 2000E Product Details customer presentation	SPARCcenter 2000E overview, including I/O and server software; slide notes for presentation	Sales tool	SunWIN, Reseller Resource CD	37094 37096
SPARCserver™ Systems Product Line Overview customer presentation	Overview of SPARCserver product line; slide notes for presentation	Sales tool	SunWIN, Reseller Resource CD	37089 37091
SPARCserver Systems: The Best Servers to Run Your Business customer presentation	Vision and strategy overview of SPARCserver systems in the enterprise; slide notes for presentation	Sales tool	SunWIN, Reseller Resource CD	32284 32287
SPARCcenter 2000E Just the Facts	Reference guide for the SPARCcenter 2000E system	Training	SunWIN, Reseller Resource CD	37102
Solstice™ Backup™ Just the Facts	Reference guide for the Solstice Backup and Archive	Training	SunWIN, Reseller Resource CD	35563
Solstice™ Enterprise Manager™ Just the Facts	Reference guide for the Solstice Enterprise Manager	Training	SunWIN, Reseller Resource CD	44706
Solstice™ DiskSuite™ Just the Facts	Reference guide for the Solstice DiskSuite	Training	SunWIN, Reseller Resource CD	43095
Solstice™ SunNet Manager™ and Cooperative Consoles™ Just the Facts	Reference guide for the Solstice SunNet Manager and Cooperative Consoles	Training	SunWIN, Reseller Resource CD	47539
Solstice™ AutoClient™ Just the Facts	Reference guide for the Solstice AutoClient	Training	SunWIN, Reseller Resource CD	40700
SPARCstorage Array Just the Facts	Reference guide for SPARCstorage Array	Training	SunWIN, Reseller Resource CD	31619 41547
Performance brief				
SPARCserver 1000E and SPARCcenter 2000E Performance Brief	Details SPARCserver 1000E and SPARCcenter 2000E performance on selected benchmarks	Sales tool	SunWIN, Reseller Resource CD	24492

SPARCcenter 2000E Materials Abstract *(cont.)*

Collateral	Description	Purpose	Distribution	Token # or Hibbert order #
Guides				
SPARCcenter 2000 Product Book	Reference guide to technical and environmental specifications and configurations	Training	SunWIN, Reseller Resource CD	25581 25584 25587 25590 25593 25596 25599 25602 25605
SPARCcenter 2000 Product Book Supplement 10/94	Reference guide to technical and environmental specifications and configurations	Training	SunWIN, Reseller Resource CD	38144
SPARCcenter 2000E Product Book Supplement 7/95	Reference guide to technical and environmental specifications and configurations	Training	SunWIN, Reseller Resource CD	46418
SPARCserver Technology and Performance Tuning	Discusses SPARCserver and Solaris™ 2.x architecture and performance tuning	Training	SunWIN, Reseller Resource CD	38145
Configuration and Capacity Planning Guide	Guide to technical configuration recommendations for various server application environments	Sales tool	Copy center–copyrequest @Sun	801-6876-01
Server Solution Guide	General reference guide to the SPARCserver family, peripherals, software, and value-added third-party vendors	Sales tool	Hibbert Order	ZE1012-0 (US) ZE1025-0 (Int'l)
White papers				
A Scalable Server Architecture	Technical SPARCserver 1000E and SPARCcenter 2000E architecture paper	Sales tool	SunWIN, Reseller Resource CD	24587
SPARCserver 1000E and SPARCcenter 2000E: What's New, 10/94	Comparison of SPARCserver 1000 and SPARCcenter 2000 systems to the new SPARCserver 1000E and SPARCcenter 2000E systems	Sales tool	SunWIN, Reseller Resource CD	37354
Database Application Servers	Highlights advantages of SPARCserver 1000E and SPARCcenter 2000E for database applications	Sales tool	SunWIN, Reseller Resource CD	24487
Compute Application Servers	Highlights advantages of SPARCserver 1000E and SPARCcenter 2000E for compute applications	Sales tool	SunWIN, Reseller Resource CD	24489

SPARCcenter 2000E Materials Abstract *(cont.)*

Collateral	Description	Purpose	Distribution	Token # or Hibbert order #
White papers *(cont.)*				
System Availability Report for SPARCserver 1000 and SPARCcenter 2000	A system availability report using the Monte Carlo simulation method	Sales tool	SunWIN, Reseller Resource CD	38145
RAS in the SPARCcenter 2000E and SPARCserver 1000E	Overview of the SPARCserver 1000E and SPARCcenter 2000E series RAS features	Sales tool	SunWIN, Reseller Resource CD	24485
Sun™ High Availability Solutions	Overview of how high-availability solutions are used in mission-critical commercial environments	Sales tool	SunWIN, Reseller Resource CD	32296
Data Management and Storage Solutions	Overview of storage management solutions and backup options for large data storage commercial environments	Sales tool	SunWIN, Reseller Resource CD	24573 25489
Rightsizing Technologies, System Management	Overview of enterprise-wide management tools and how they enhance commercial customers' business	Sales tool	SunWIN, Reseller Resource CD	31401 31403
Configuring SPARCserver Systems for Enterprise Computing	Summary of configuring servers	Sales tool	SunWIN, Reseller Resource CD	34537
Enterprises, Database Management, and Sun SPARCserver Systems	Discussion of why Sun servers are ideal for enterprises that need database solutions	Sales tool	SunWIN, Reseller Resource CD	34540
Multiprocessing SPARCservers for the Enterprise	Description of the server products and benefits of MP for the enterprise	Sales tool	SunWIN, Reseller Resource CD	34543
Reference				
Server Product Line Overview	Quick reference card	Sales tool	SunWIN, Reseller Resource CD, Mail	24517
Competitive Summary – Servers	Quick reference card	Sales tool	SunWIN, Reseller Resource CD	24515
Server Upgrade Paths	Quick reference card	Sales tool	SunWIN, Reseller Resource CD	24513
SPARCstorage™ Product Line Overview	Quick reference card	Sales tool	SunWIN, Reseller Resource CD	32118

SPARCcenter 2000E Materials Abstract *(cont.)*

Collateral	Description	Purpose	Distribution	Token # or Hibbert order #
Reference *(cont.)*				
System Availability	Information on basic issues related to system availability	Sales tool	SunWIN, Reseller Resource CD	34016
Evaluating Data Service Availability	Defines RAS and discusses related features	Sales tool	SunWIN, Reseller Resource CD	45001
Sun Intro – Redundant SPARCcenter 2000E 4/95	Product pricing and ordering information for redundant SPARCcenter 2000E systems	Training	SunWIN, Reseller Resource CD, E-mail	42338
Sun Intro – SPARCserver 1000E and SPARCcenter 2000E systems, 10/94	Product pricing and ordering information for SPARCserver 1000E and SPARCcenter 2000E systems	Training	SunWIN, Reseller Resource CD, E-mail	37098
SPARCserver 1000E and SPARCcenter 2000E Q & A, 10/94	Detailed questions and answers for SPARCserver 1000E and SPARCcenter 2000E systems	Training	SunWIN, Reseller Resource CD	37100
Sun Intro – Configure to Order Price List for High-End Servers, 2/94	Details on configure-to-order process for SPARCcenter 2000 and SPARCserver 1000 systems	Training	SunWIN, Reseller Resource CD, E-mail	31647
Sun Intro – SPARCcenter 2000, 5/93	Product pricing and ordering information for original SPARCcenter 2000	Training	SunWIN, Reseller Resource CD, E-mail	25205
Product literature				
SPARCcenter 2000E	Datasheet	Sales tool	Hibbert Order	DE563-0
SPARCcenter 2000E	Product brief	Sales tool	SunWIN, Reseller Resource CD	38337
Competitive analysis				
HP	HP Industry Battlebook, 1/95 HP Product Statistics Book, 1/95 HP Sales Battlebook, 4/94	Training Training Training	SunWIN SunWIN SunWIN	40453 35567 32356 32888
IBM	IBM Industry Battlebook IBM Product Statistics Book IBM Sales Battlebook	Training Training Training	SunWIN SunWIN SunWIN	40456 40459 41019 41022 41025

SPARCcenter 2000E Materials Abstract *(cont.)*

Collateral	Description	Purpose	Distribution	Token # or Hibbert order #
Competitive analysis *(cont.)*				
Competing Against HP and IBM	Competitive overview of HP and IBM	Training	SunWIN	35994 40439
Managing Networked Systems	A comparison of the Sun, HP, and IBM facilities for administering networks	Training	SunWIN	40472 40474 40476
Competitive briefs	Competitive analysis of:			
	Solaris Competition	Training	SunWIN	40400
	DEC servers	Training	SunWIN	39238
	SGI servers	Training	SunWIN	39241
Competitive Edge	HP: HP 9000 K–Class, 3/95	Training	SunWIN	42778
	HP: HP–UX 10.0, 3/95	Training	SunWIN	41147 41580 42284
	IBM: RS/6000, 2/95	Training	SunWIN	41333
	IBM: SP2, 2/95	Training	SunWIN	40611
	SGI: Servers, 11/94	Training	SunWIN	39480
	DEC: AlphaServer 400, 2/95	Training	SunWIN	39225
	DEC: AlphaServer 8000/2000, 4/95	Training	SunWIN	43404