SPARCserver™ 1000E

Just the Facts

Copyrights

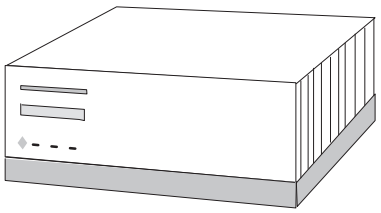
© 1996 Sun Microsystems, Inc. All Rights Reserved. Sun, Sun Microsystems, Sun Microsystems Computer Company, the Sun Microsystems Computer Company logo, SunService, Solaris, SunATM, SunFastEthernet, SunIPC, SunNetworks, SunPC, Solstice, SolarNet, SuperCache, Network Terminal Server, NeWSprinter, NeWSprinter CL+, NFS, ONC+, TurboGX, TurboGXplus, VideoPix, Sun-3, SunCD, SunCD 2Plus, SolarNet PC-Admin, Solstice AutoClient, Solstice Enterprise Manager, Solstice Cooperative Consoles, Solstice SunNet Manager, Solstice DiskSuite, MAE, Wabi, Solstice JumpStart, Solstice Admin Tools, Solstice Backup, Networker for Solaris and SunSolve are trademarks, registered trademarks, or service marks of Sun Microsystems, Inc. in the United States of America and other countries.

All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. in the United States of America and other countries. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc.

UNIX is a registered trademark in the United States and other countries, exclusively licensed through X/Open Company, Ltd.

The SPARCserver™ 1000E System: The New Metric for Departmental Computing

The Industry's Most Compact, Scalable, and Affordable Departmental Server



The SPARCserver™ 1000E system's powerhouse performance, modular design, exceptional expandability, and integrated packaging are unmatched by any other departmental computing system in the industry.

- Compact: Designed to suit almost any office environment
  - Tabletop or tower; stacked or rack mounted; no special wiring or cooling required
- Scalable: Remarkable application performance scalability for departmental solutions
  - Supports up to eight 60-MHz or 85-MHz SuperSPARC™ processors in one system. No other vendor offers a departmental class UNIX® server that provides an-eight fold performance increase in one system.
- Reliability, availability, serviceability (RAS)
  - ECC memory and parity checking on the system bus ensure system and data reliability.
  - Automatic System Recovery (ASR) reduces server downtime, and redundant system components (CPUs, memory, disk drives, I/O cards, etc.) provide availability if a component fails.
  - Modular design of the system allows direct access to all components for faster servicing.
  - Optional SPARCstorage™ Array disk subsystems provide additional reliability and high availability.
- Growth with investment protection: Innovative modular design provides for exceptional expandability and upgradability.
  - Expandability: The SPARCserver 1000E system is ready to grow as the network does. It offers higher memory capacity and more expansion slots than the competition. The SPARCserver 1000E handles the expansion needs of the most demanding departmental applications.
  - Upgradability: Modular CPU, SIMMs, and I/O cards protect against obsolescence. The entire system will keep pace with the latest technology while protecting customers' investments. Faster processors, higher density memory, and new networking cards can all be added to the SPARCserver 1000E whenever needed.
- Popularity: The SPARCserver 1000E system is one of the most popular UNIX servers in the industry.
  - Awarded three Best Product of the Year awards from *Open Systems* and *Advanced Systems* publications.
  - Shipped in high volume, helping Sun to establish the largest multiprocessing UNIX server installed base.

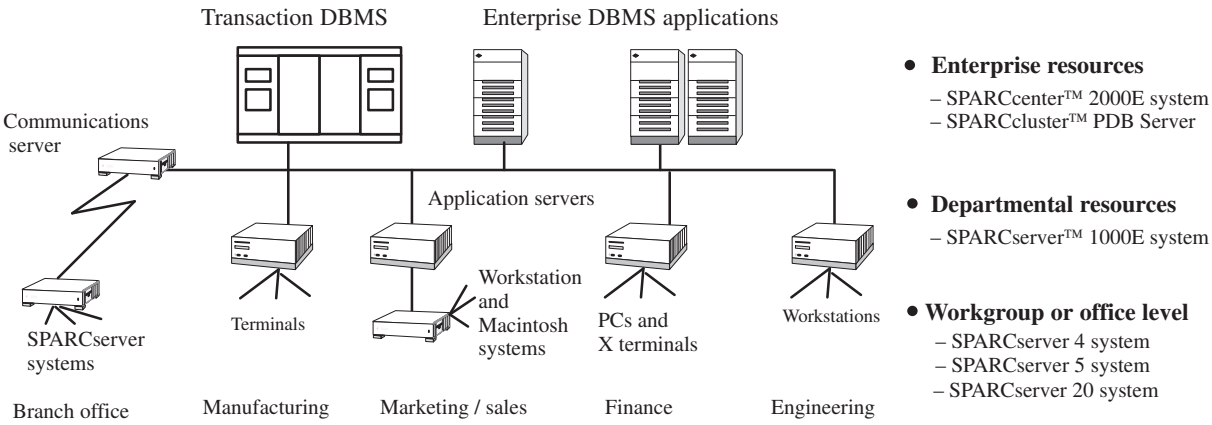
The SPARCserver 1000E System: The New Metric for Departmental Computing *(cont.)*

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	–	Two-business days on–site service	Four-hour on-site service

*Warranty may vary by country.

SPARCserver™ 1000E Product Placement Strategy



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-a-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

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-a-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

SPARCserver 1000E Product Placement Strategy *(cont.)*

Target Users – SPARCcluster™ HA Servers

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 services availability

Target Users – SPARCcluster PDB Servers

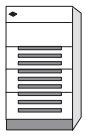
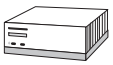
The SPARCcluster PDB (parallel database) Server is Sun's commercial clustering solution for mission-critical, enterprise-wide, Oracle database applications. Initially, the product supports only the ORACLE Parallel Server from Oracle Systems.

Key differentiators compared to the SPARCcluster HA Servers:

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

SPARCserver 1000E Product Placement Strategy *(cont.)*

Product Positioning Chart

Server	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

SPARCserver 1000E SPOC Information

SPOC Ordering Information

SPOC is not able to verify a system configuration with multiple rack-mounted S1000ER5 systems as a single configuration. Follow the steps below to verify a multiple rack–mounted S1000ER5 system:

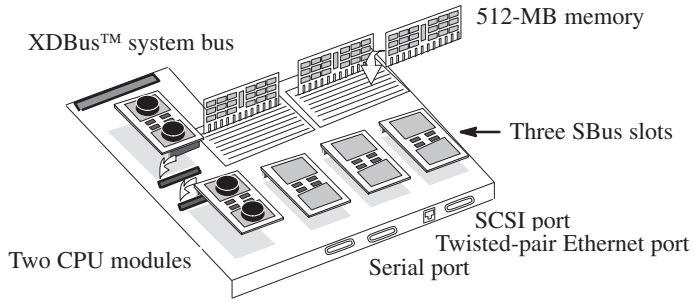
- Check configuration of one S1000ER5 with one expansion Cabinet loaded with optional peripherals (SPARCstorage Array 210, SPARCstorage Array 112, Tape tray, Disk tray, etc.).
- Manually verify that there is enough space in the cabinet for additional S1000ER5:
  - Expansion cabinets have eight slots
  - Each Disk Tray requires one slot (783A, 784A, 785A, 786A)
  - Each SPARCserver 1000E requires two slots (S1000ER5)
  - Each SPARCstorage Array Model 112 requires two slots (790A, 791A, 792A)
  - Each SPARCstorage Array Model 210 controller requires two slots (780A)
  - Each tape unit requires two slots (685A, 846A, 826A, 848A, 868A)
- For each additional S1000ER5 to be installed in the Expansion Rack, check each system individually as a tabletop S1000E. Note that a no-charge power cord is required to be ordered only with the tabletop version. The power cord comes bundled with S1000ER5.
- Additional optional Expansion Cabinet with peripherals are to be checked after the above step.

SPARCserver™ 1000E Expansion: Pay as You Grow Flexibility

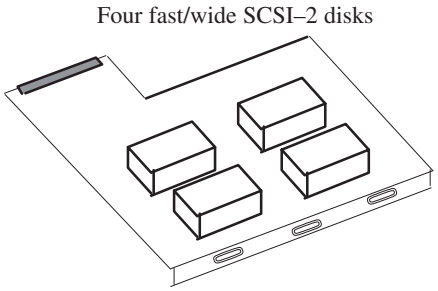
Expansion

The SPARCserver™ 1000E 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 SPARCserver 1000E feature is designed for easy plug-in expansion. This revolutionary design allows for quick expandability in multiple dimensions.

The SPARCserver 1000E system board allows memory, processors, or SBus connectivity to be added as needed. The Disk Card is an innovative solution for adding internal disk capacity to a SPARCserver 1000E system. It has four fast/wide SCSI-2 disk drives and can be installed in any of the up to three available system board slots of the SPARCserver 1000E system.



System Board



Disk Card

Key Facts

- System board
  - Up to 512-MB memory, using 32-MB SIMMs or up to 128-MB memory, using 8-MB SIMMs
  - Two XBus slots accommodate two SPARC™ module expansion cards, each with a single SuperSPARC™ processor and 1-MB of SuperCache™
  - Three open SBus slots provide network and peripheral connections
  - Built-in twisted-pair Ethernet and fast, single-ended SCSI-2 port
  - Two RS-232C connectors, and a keyboard and mouse connection
  - Single XDBus system bus connection
- Maximum system expansion
  - Up to four system boards in the SPARCserver 1000E package
  - Up to eight SuperSPARC processors, each with 1-MB of SuperCache
  - Up to 2 GB of main memory
  - Up to 12 SBus slots
  - Up to four built-in 3.5-inch single-ended fast SCSI-2 disks for a maximum of 8.4 GB of storage
  - Three 8.4-GB Disk Cards for a total maximum of 33.6 GB of internal storage

SPARCserver 1000E Expansion: Pay as You Grow Flexibility *(cont.)*

Key Facts *(cont.)*

  - Up to 432 GB of external disk storage with 48 5.25-inch DSCSI disks (9-GB formatted capacity) in a Data Center Expansion Cabinet
  - Up to 756-GB of external disk storage with 12 SPARCstorage™ Array Model 112 disk subsystems
- Maximum system expansion
  - Up to 648 GB of external disk storage with two SPARCstorage Array Model 210 disk subsystems
  - Up to 764 GB of total disk storage with disk subsystems and 8-GB internal disks
  - Up to 20 twisted-pair Ethernet connections with five Quad Ethernet SBus cards
  - One internal CD-ROM drive standard
  - One optional internal 5-GB 4-mm tape drive or one 14-GB 8-mm tape drive
  - One optional external 0.25-inch tape drive

Configuration Guidelines

- Each system must be ordered with a minimum of one system board, two SPARC modules and 32 MB of memory. Each system board can be configured with zero, one, or two SPARC processor modules and up to 512 MB of memory.
- Each system must be ordered with a minimum of two internal disks (2.1-GB fast SCSI-2 disks) or one bootable SPARCstorage Array. The configuration guidelines for bootable SPARCstorage Array subsystems are in the "Disk Storage Solutions" section of this document.
- The SPARCserver 1000E has a total of four XDBus slots on the backplane. The initial system board must be plugged into slot #0 to connect to the internal 3.5-inch disks, CD-ROM, and optional 4-mm or 8-mm tape drives. The remaining slots can be used for additional system boards or additional internal storage through the Disk Card.
- Each Disk Card requires a fast/wide SCSI connection using a single-ended, wide, intelligent SCSI SBus (SWIS/S) expansion card or daisy cable to another Disk Card. Each Disk Card uses only one XDBus slot.
- Only 50-MHz system boards are compatible with the SPARCserver 1000E system (50-MHz XDBus).
- Only 40-MHz system boards are compatible with the SPARCserver 1000 system (40-MHz XDBus).
- The SPARCserver 1000E systems require 60-MHz or faster SPARC modules. The 50-MHz SPARC module is not supported on SPARCserver 1000E.
- The 60-MHz and 85-MHz SPARC modules are supported on both SPARCserver 1000 and 1000E.
- All SPARC modules in a SPARCserver 1000E system must run at the same frequency. Mixed speed modules are not supported.
- The SPARCserver 1000E with 60-MHz SPARC modules requires Solaris™ 2.3 or later operating environment.

SPARCserver 1000E Expansion: Pay as You Grow Flexibility *(cont.)*

Configuration Guidelines (cont.)

- The SPARCserver 1000E 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.
- Rack-mounted SPARCserver 1000 or 1000E system with 85-MHz SPARC modules require one or two Blower Assemblies. The Exhaust Fan cannot provide sufficient cooling and is therefore not supported with rack–mounted SPARCserver 1000 or 1000E systems that include 85-MHz SPARC modules. Refer to the Data Center Expansion Cabinet section for more detailed information.
- As of January 30, 1996, JumpStart will no longer be preinstalled on factory-configured SPARCserver 1000 systems. Customers who want JumpStart preinstalled at the factory need to order ”JUMPSTART” as a separate (no charge) line item.

SPARCserver™ 1000E Bus and I/O Architecture

SPARCserver™ 1000E Buses

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

Tech Facts

- The XDBus system bus uses packet-switched technology and is capable of 400-MB/sec. peak and 312.5-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 introduce 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.
- 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 on-board, 8-bit, single-ended, fast SCSI-2 interface supports 10-MB/sec. synchronous transfers and the slower synchronous and asynchronous SCSI common to prior-generation disk and tape drives.
- The SWIS/S host adapter supports the 16-bit fast/wide SCSI-2 interface of the Disk Card with 20-MB/sec. synchronous transfers.

SPARCserver 1000E Memory

Memory

- **Features**
  - Expands to 2 GB
  - Memory can be added in increments of 32 and 128 MB
  - Accommodates up to 8 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 four memory banks, each consisting of four SIMM slots. Each memory bank 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.
- 80-ns 1 Mbit x 4 or 4-Mbit x 4 DRAMs are used, corresponding to 8-MB or 32-MB of memory per SIMM, respectively. The 32-MB memory expansion configuration uses 8-MB SIMMs. The 128-MB memory expansion configuration uses 32-MB SIMMs.
- The NVRAM memory expansion uses 1-MB SIMMs that consists of 1-Mbit 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 to improve overall performance.
- Memory is interleaved in multiples of 64 bytes. This permits an entire 256-byte disk sector to be transferred with no memory cycle delay.

SPARCserver 1000E 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

Availability

• Features	• Benefits
– Automatic System Recovery (ASR) detects and isolates failures and automatically configures around the failed components on reboot	– Reduces server downtime in event of component failure
– Optional SPARCstorage™ Array disk subsystem	– All disk capacity, including the boot disk, can be located in the SPARCstorage Array

Serviceability

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

Tech Facts

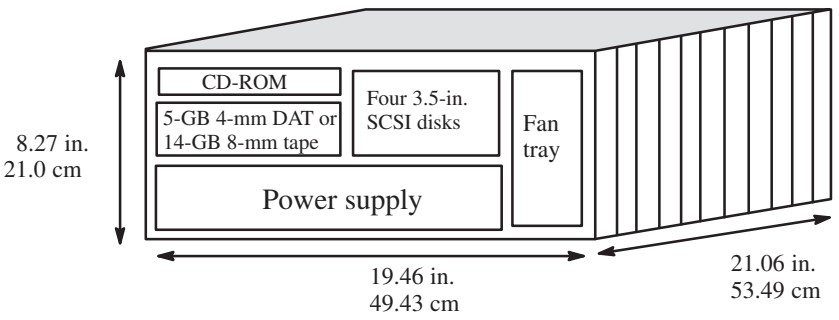
- SPARCserver™ 1000E systems have a highly integrated design, using only five large ASICs per system board: two Bus Watchers, a memory queue handler, an SBus interface, and an I/O cache. This allows for higher system reliability.
- A temperature sensor is located on each system board. If the temperature 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.
- If the fan speed drops by more than 30 percent and the maximum allowable temperature is exceeded, a fan failure shutdown is triggered. A system administrator can cancel this shutdown.

SPARCserver 1000E RAS Features Maximize Server Availability *(cont.)*

Tech Facts *(cont.)*

- Power supply 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, DC power will continue for five milliseconds to flush memory to disk.
- 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 an .8V swing to distinguish a 1 signal from a 0 signal rather than the 5V swing used in ordinary TTL logic—leading to faster switching times, increased integration, and higher CMOS reliability.

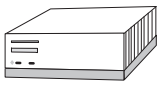
SPARCserver™ 1000E
Innovative, Modular Package Design



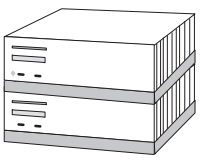
Packaging

- **Features**
  - Compact office packaging
  - Integrated single-box solution
  - No special cooling or wiring required
  - Variable-rate fans
  - All system components directly accessible
  - Innovative modular package
- **Benefits**
  - Offers perfect size for departments or small businesses
  - Increases ease of deployment and reliability
  - Avoids need for costly computer rooms
  - Reduces noise level
  - Gets system back on line fast with easy serviceability
  - Fits all types of environments

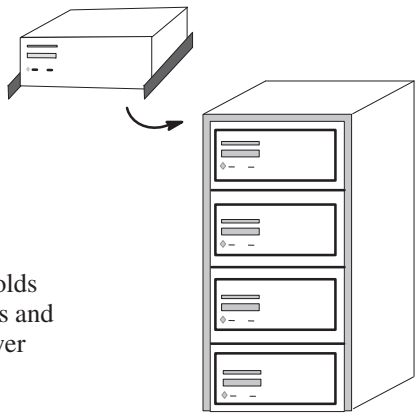
Single box in a tabletop enclosure



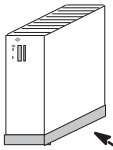
Locking Module to stack two units



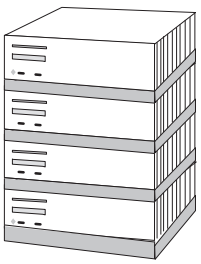
Factory installed, rack-mounted units are available. The Expansion Cabinet can hold up to four units.



Customers use the Tower Stand for deskside orientation.



Tower Stand



Stacker unit holds up to four units and includes a power sequencer.

System Architecture

SPARCserver 1000E
Innovative, Modular Package Design *(cont.)*

Tech Facts

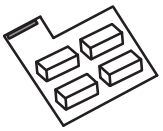
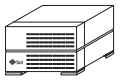
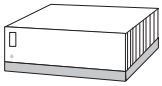
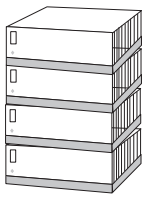
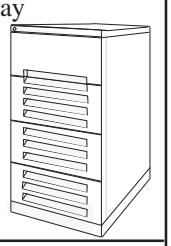
- The SPARCserver 1000E system has an auto-ranging power supply that provides 650 watts and operates at 100–240 VAC, maximum 9.5A and 47–63 Hz.
- SPARCserver 1000E internal trays consist of one SCSI device tray for the CD-ROM drive and 4-mm or 8-mm tape drive, and a second SCSI device tray for two or four 3.5-inch half-height disk drives.
- The Tower Stand (X962A) allows a SPARCserver 1000 or 1000E tabletop enclosure to be mounted in a vertical position.
- The Locking Module (X963A) can be used to stack a maximum of two SPARCserver 1000E, SPARCstorage™ Array Model 112 Series, and/or SPARCstorage Library Model 8/140 enclosures. Only one of the enclosures (top one) can be a SPARCstorage Library. Use the Stacker Unit to stack three or four enclosures.
- The stacker unit (X964A) supports up to four SPARCserver 1000E, SPARCstorage Array Model 112 Series, and/or SPARCstorage Library Model 8/140 enclosures. Only one of the enclosures (top one) can be a SPARCstorage Library.
- Up to five of the six configurable outlets in the Stacker Unit can be used at one time. The power distribution unit operates on 200–240V and enables the power to the devices in the Stacker Unit to be controlled by the on/off switch of the master device. Multiple enclosures may require special wiring for operation on the same branch circuit.

Note: *Refer to Data Center Expansion Cabinet Section for detailed information on rack-mounted devices and accessories.*

SPARCserver™ 1000E Disk Storage Solutions

Recommended Storage Options

SPARCserver™ 1000E disk drives are the highest performance 3.5-inch, low-profile, fast/wide, and fast/narrow SCSI-2 drives available, providing rapid, low-cost data access in a wide variety of server applications.

 Disk Card  Multidisk pack	SPARCstorage™ Array Model 112 Series   Stacker unit with SPARCstorage Array Model 112 Series Expansion Cabinet with 5.25-in. disks or SPARCstorage Array Model 112 or 210 
Less than 30 GB	20 to more than 500 GB

Tech Facts

- SCSI-2 Tagged Command Queueing in the Solaris™ 2.x environment maximizes throughput by supporting multiple simultaneous commands to disk, allowing the embedded drive controller to optimize disk usage.
- I/O clustering in the Solaris 2.x operating environment combines small sequential I/O requests into one large request, delivering more efficient disk access.
- The SPARCserver 1000E can accommodate up to four built-in 2.1-GB fast/narrow (10 MB/sec.) SCSI-2 disks, for a maximum of 8.4 GB of storage.
- The fast/wide (20 MB/sec.) Disk Cards use a single connector that combines power, SCSI, and device ID to improve serviceability and reliability. The 8.2-GB Disk Card uses four 2.1-GB disk drives.
- The 7200 RPM 2.1-GB disks have an average of 8 ms read and 9 ms write seek time and an internal data rate of 5.8 to 8.8 MB/sec.
- On a par with the fastest 5.25-inch disks, multiple 3.5-inch disks deliver more IOPS at departmental capacities than 5.25-inch disks, improving throughput for most server applications.
- The single-ended fast/wide SCSI host adapter improves system performance by supporting a full 20 MB/sec. SCSI burst rate and by off-loading most of the I/O load from the CPU.

SPARCserver 1000E Disk Storage Solutions *(cont.)*

Configuration Guidelines

- The internal disks required in the minimum order configuration can be replaced by a properly configured SPARCstorage™ Array subsystem. Any of the following SPARCstorage Array configurations can be used in such cases:
  - A SPARCstorage Array Model 112 Series disk subsystem in tabletop enclosure (for example, X790A)
  - A factory-installed, rack-mounted SPARCstorage Array Model 112 Series in a stand-alone Expansion Cabinet (for example, X955AV3, 790AR5, and 967AR5). The SPARCserver 1000E can be rack-mounted in the same cabinet (S1000ER5).
  - A SPARCstorage Array Model 210 including a stand-alone Expansion Cabinet with factory installed controller and minimum of one factory installed disk tray (for example, X955AV3, 780AR5, and 783AR5). The SPARCserver 1000E cannot be rack-mounted in the SPARCstorage Array cabinet.
- A factory-installed Fibre Channel/SBus Host Adapter (1057A) is always required when a bootable SPARCstorage Array is replacing the internal disk drives of the SPARCserver 1000E.
- Bootable SPARCstorage Array disk subsystems require 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 or later.
- The 8.4-GB Disk Card requires a SCSI connection through the single-ended, wide, intelligent SCSI SBus (SWIS/S) expansion card or daisy cable to another Disk Card. Up to three Disk Cards can be daisy-chained together as long as the total SCSI bus length is less than 6 meters. If in doubt, use the following formula to calculate the SCSI bus length:
  (# of Disk Cards x 1.4 meters) + 0.1 meter + length of host SCSI cable
  + (# of daisy chain cables x 0.25) = < 6 meters
- The Disk Cards that are factory installed in the SPARCserver 1000E system ship with 0.8-meter cables. All other Disk Card options ship with a 2.0-meter cable. These cables are used to connect the Disk Cards in the system or Disk Tower 1000 directly to the SWIS/S host adapters. These cables are not used for daisy-chaining Disk Cards. A separate 0.25-meter cable must be ordered for daisy-chaining Disk Cards.
- The 8.4-GB Disk Card is supported in the Disk Tower 1000.
- The SWIS/S host adapter is supported only with the fast/wide SCSI 8.4-GB Disk Cards; requires Solaris 2.3 or later operating software.

SPARCserver 1000E Backup Solutions

Backup Solutions

The SPARCserver 1000E system has an optional 5-GB 4-mm tape, 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 to simplify storage management across a network of heterogeneous systems.

Tape Backup

• Features	• Benefits
– 5-GB 4-mm tape backup drive features 900-KB/sec. transfer rate and a 5-GB typical capacity in compression mode (native: 366 KB/sec. and 2 GB, internal or external option)	– Best for smaller sites, lower cost media. Very reliable with more than 80,000 hours MTBF
– 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 external 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 external option)	– Can provide backup for 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
– Includes 70 140-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 which 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

Following are the supported configurations of rack-mounted devices in the Expansion Cabinet.

- Disk Trays only

  Up to eight Differential SCSI Disk Trays can be placed in a Data Center Expansion Cabinet.

- System Units only
  - Up to four system units are supported in a Data Center Expansion Cabinet.
- 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. No Blower Assemblies or Exhaust Fans are required. The following combinations are supported:
  - One Tape Unit and up to six Disk Trays
  - Two Tape Units and up to four Disk Trays
- SPARCstorage Array Model 210
  - One SPARCstorage Array 210 Controller and one to six Disk Trays.
  - One SPARCstorage Array 210 Controller, one Tape Unit, and one to four Disk Trays.
  - One SPARCstorage Array 210 Controller, one SPARCserver 1000 or 1000E server, and one to four Disk Trays.
- Combinations
  - 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

Cooling Requirements

Two Blower Assemblies are required when any System Unit is rack-mounted in a Data Center Expansion Cabinet. If no System Unit is rack-mounted in the Data Center Expansion Cabinet, no Blower Assembly is required.

Two Blower Assemblies can be replaced by two Exhaust Fans as long as no 85-MHz SPARC modules are installed and only System Units are rack-mounted in the Data Center Expansion Cabinet. If the rack-mounted SPARCserver 1000(E) includes 85-MHz SPARC modules or if System Units and Disk/Tape trays are installed, only Blower Assemblies can be used because Exhaust Fans do not provide sufficient cooling.

Data Center Expansion Cabinet *(cont.)*

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 100 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 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).
- 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.

Data Center Expansion Cabinet *(cont.)*

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 immediately 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	– Easy-to-use suite of tools helps users manage local and remote printers, add new users and logins, manage diskless and dataless clients, and update entries in configuration files or name service
– Solstice™ JumpStart™ tool for automatic and remote software installation	– Automatic software installation for departments or workgroups, reduces 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 run in binary-compatibility mode
  - Many more applications available under Wabi™ and MAE
- **Benefits**
  - Enables enterprise solutions
  - Leverages customer's Solaris 1 investment
  - Preserves customer's 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(E) and SPARCcenter™ 2000(E) systems.
- **Standards:** Has 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).

SPARCserver™ 1000E High Availability Solutions

High Availability

Sun offers a number of software options to increase the availability of SPARCserver 1000E systems. Volume management software, journaling file systems, and clustering options can all be used to ensure the availability of application services based on the SPARCserver 1000E. With the exception of the clustering products, software options to improve availability can be used in single system or clustered environments.

Logical Volume Manager

• Features	• Benefits
– Logical volume management	– Improved storage management flexibility to accommodate larger files (up to 2 GB), and offer higher performance and better availability
– Support for RAID levels 0, 1, and 5	– RAID 0 (disk striping) improves performance – RAID 1 (disk mirroring) offers better data availability and integrity – RAID 5 provides data availability and integrity advantages at a lower cost than RAID 1 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	– Improves storage administration productivity – Eases administration of very large storage environments
– A choice of two Logical Volume Managers (LVMs)	– Solstice™ DiskSuite™ is co-packaged 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.

SPARCserver 1000E 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)

Solstice™ JumpStart™: Included with Solaris™—An automatic installation capability that allows system administrators to install machines from a default install configuration or from customized configuration templates.

Solstice Asset Management: Future—Facility that allows system administrators to conduct inventory management across the network from a single site.

SPARCserver™ 1000E Options Support Matrix

Part number	Option description	Maximum number supported	Comments
Processors			
(X) 1177A	SM61 SPARC module with 85-MHz SuperSPARC-II processor and 1 MB of SuperCache™ for SPARCserver™ 1000 and 1000E systems	8	Two per system board
(X) 1171A	SM61 SPARC module with 60-MHz SuperSPARC+™ processor and 1 MB of SuperCache for SPARCserver 1000 and 1000E systems	8	Two per system board
System boards	For SPARCserver 1000E systems		
(X) 1215A	System board—two 85-MHz CPUs, 0-MB memory	4	Not supported on
(X) 1205A	System board—two 60-MHz CPUs, 0-MB memory	4	SPARCserver 1000
(X) 1200A	System board—no CPUs, no memory	4	with 40-MHz XDBus™
Memory			
(X) 162A	32-MB ECC memory expansion (8-MB SIMMs)	16	Uses one memory bank
(X) 170A	64-MB ECC memory expansion (8-MB SIMMs)	8	Uses two memory banks
(X) 163A	128-MB ECC memory expansion (32-MB SIMMs)	16	Uses one memory bank
(X) 177A	4-MB Prestoserve™ NVRAM/SIMM	2	Uses one memory bank
SBus products			
(X) 1052A	Differential SCSI-2/Buffered Ethernet (DSBE/S)	12	
(X) 1053A	Fast SCSI-2/Buffered Ethernet Card (FSBE/S)	12	
(X) 1054A	SCSI/Buffered Ethernet Card (SBE/S)	4	
(X) 1057A	Fibre Channel SBus Host Adapter	12	
(X) 1058A	SBus Quad Ethernet Controller (SQEC)	5	
(X) 1062A	Differential Fast/Wide Intelligent SCSI-2 (DWIS/S)	12	
(X) 1063A	Single-ended Fast/Wide Intelligent SCSI-2 (SWIS/S)	12	
X1018A	SunSwift™ SBus Adapter	5	
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
X1061A	SunATM/155UTP5 SBus Adapter 2.0	*	system board
X1012A	SunISDN™ Expansion Kit, SunISDN Card, Certification Labels, and SunISDN Enabling Kit 1.0.2	5	
X1019A	High-speed serial interface (HSI/S)	4	
X1014A	Token-ring interface (TRI/S)	4	
(X) 1008A	Serial parallel controller (SPC/S)	4	

SPARCserver 1000E Options Support Matrix (cont.)

Part number	Option description	Maximum number supported	Comments
Mass storage	Removable media		Recommendation: Maximum of four
(X) 823A	5-GB 4-mm internal tape drive	1	SunCD™ and/or tape
(X) 843A	14-GB 8-mm internal tape drive	1	drives per SCSI Host Adapter; no other devices.
X579A	644-MB SunCD 2Plus™ Desktop Storage Pack	4	
X6101A	2.5-GB QIC Tape Drive UniPack with 50-to-68 pin SCSI Cable	1	First UniPak
X6102A	2.5-GB QIC Tape Drive UniPack with 68-to-68 pin SCSI Cable	1	Second UniPak
X822A	5-GB 4-mm Tape Desktop Backup Pack	6	
X844A	14-GB 8-mm Tape Desktop Storage Pack	6	
X827A	20-GB 4-mm autoloader Desktop Storage Module	6	
X680A	Front-load .5-inch tape drive in tabletop package	1	
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) 846A	14-GB 8-mm tape drive with Multi-Tape Tray for Expansion Cabinet	8	
X841A	14-GB 8-mm tape drive for Expansion Cabinet		
(X) 826A	20-GB 4-mm autoloader with Multi-Tape Tray for Expansion Cabinet	2	
X825A	20-GB 4-mm autoloader for Expansion Cabinet	8	
(X) 685A	Front-Load .5-inch tape drive for Expansion Cabinet	2	
(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	

SPARCserver 1000E Options Support Matrix (cont.)

Part number	Option description	Maximum number supported	Comments
Mass storage	Disk storage		
(X) 774A	Two internal 7200 RPM fast 2.1-GB SCSI-2 disk drives	2	8-bit SCSI (not wide)
(X) 775A	8.4-GB Disk Card—Four 7200 RPM 2.1-GB fast/wide SCSI-2 disk drives on an expansion board	3	8-bit SCSI (not wide)
X737A	7200 RPM 2.1-GB fast SCSI-2 Desktop Disk Pack	6	
X738A	7200 RPM 4.2-GB Multi-Disk Pack (two 2.1-GB disks)	6	
X739A	7200 RPM 8.4-GB Multi-Disk Pack (four 2.1-GB disks)	6	

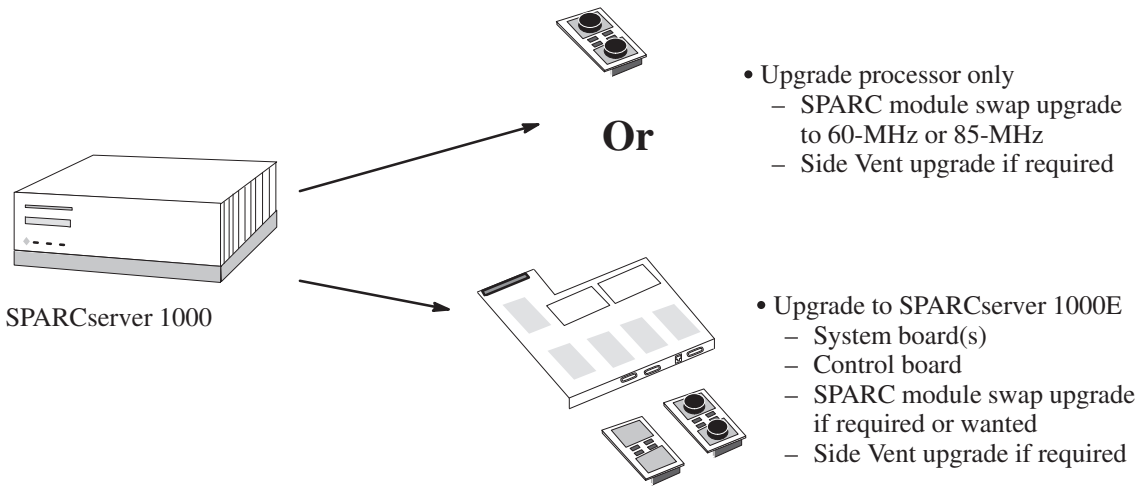
SPARCserver 1000E Options Support Matrix *(cont.)*

Part number	Option description	Maximum number supported	Comments
Mass storage	Disk storage (cont.)		
(X) 785A	9-GB Differential SCSI-2 disk for Expansion Cabinet	NA	Max. six disks per tray
(X) 783A	Two 9-GB disks with Tray for Expansion Cabinet	8	
X784A	Four 9-GB disks with Tray for Expansion Cabinet	8	
X786A	Six 9-GB disks with Tray for Expansion Cabinet	8	
Mass storage	Disk subsystems		
(X) 790A	SPARCstorage Array Model 112 (12.6 GB)	12	
(X) 791A	SPARCstorage Array Model 112 (37.8 GB)	12	
(X) 792A	SPARCstorage Array Model 112 (63 GB)	12	Max. 30 disks per
X765A	7200 RPM 2.1-GB disks for SPARCstorage Array	NA	array subsystem
X766A	Six 7200 RPM 2.1-GB disks for SPARCstorage Array	NA	
(X) 780A	SPARCstorage Array Model 210 Controller	2	Requires an Expansion Cabinet and Disk Trays
Packaging			
X955A	56-inch Expansion Cabinet	2	
X962A	Tower stand for SPARCserver 1000E systems or SPARCstorage Array Model 112 Series	1	
X963A	Locking module for SPARCserver 1000E systems or SPARCstorage Array Model 112 Series	1	
X964A	Stacker unit for SPARCserver 1000E systems or SPARCstorage Array Model 112 Series	1	Four systems can be installed in the stacker
X965A	Rack-Mount Kit for SPARCserver 1000E systems or SPARCstorage Array Model 112 Series	1	
(X)966A	Blower Assembly for the Expansion Cabinet	NA	Max. 2 per Cabinet
Graphics			
X322A	17-in. color monitor and TurboGX™ frame buffer	4	
(X) 359A	20-in. color monitor and TurboGX frame buffer	4	
X367A	20-in. color monitor and TurboGXplus™ frame buffer	4	
(X)1094A	ZX frame buffer	4	
Other			
X2064A	Network Terminal Server™	1	

SPARCserver™ 1000E Upgrades Continue the Tradition of Investment Protection

Upgrading a SPARCserver 1000 System

The unique, modular design of the SPARCserver™ 1000 system means customers can easily upgrade their systems while protecting their capital investment. Customers can simply upgrade a SPARCserver 1000 with faster processors or they can upgrade to a SPARCserver 1000E system.



Configuration Guidelines

- SPARCserver 1000E systems require 50-MHz system boards, a 50-MHz control board, and 60-MHz or 85-MHz SPARC™ modules.
- Customers with 60-MHz or 85-MHz SPARC modules in their SPARCserver 1000 system may upgrade to a SPARCserver 1000E system by purchasing only the system board upgrade and the control board upgrade.
- Upgrades to the SPARCserver 1000E with 60-MHz SPARC modules require Solaris™ 2.3 operating environment or later.
- Upgrades to the SPARCserver 1000E 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 (UGS1000–M61–M81). A separate Boot PROM Kit (UG–SERV–PROM) is available if additional Boot PROMs are needed.

SPARCserver™ 1000E Upgrades Continue the Tradition of Investment Protection

Configuration Guidelines (cont.)

- The 85-MHz SPARC module requires that the side vents (plastic panels on each side of the system enclosure) of the SPARCserver 1000(E) are of the new type that allows greater airflow and better cooling. The new Side Vent has been used in production since late July, 1995—since then, all SPARCserver 1000(E) systems include them. Side vents can be identified by the manufacturing part number:

Part #	Type of Side Vent
330–1470–01	Old
330–1869–01	New

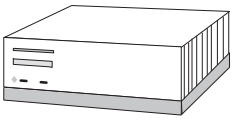
  A Side Vent Upgrade Kit (UG-SVENT-1000) is offered for customers upgrading existing systems that have old type of side vents. No tools are needed to change the side vents.

- Rack-mounted SPARCserver 1000(E) systems do not use Side Vents. Therefore, no Side Vent Upgrade Kit is needed when upgrading SPARC modules to 85 MHz in a rack-mounted SPARCserver 1000(E).
- All processors in a system must be upgraded at the same time. Mixed speed modules are not supported.
- SPARCserver 1000E systems with 85-MHz CPUs and a SunFastEthernet card running Solaris 2.4 requires patch #102001–09.

SPARCserver 1000E Upgrades Continue the Tradition of Investment Protection *(cont.)*

Upgrading from a Previous Generation Sun Server

Sun also offers customers cost-effective system upgrades from previous generation Sun servers to the SPARCserver 1000E system.

From	Receive	Return
 SPARCserver 630MP or SPARCserver 670MP UG-6X0-S1102E UG-6X0-S1102E–8	 SPARCserver 1000E system Two SuperSPARC™ processors, CD-ROM drive, plus (as separate line items) at least 32 MB of memory and any additional configured options desired	 SPARCserver 630MP or SPARCserver 670MP enclosure with memory and system board
 SPARCserver 400 Series UG-3X0-S1102E UG-3X0-S1102E–8		 SPARCserver 470 or SPARCserver 490 enclosure with memory, CPU, and system board
 SPARCserver 300 Series UG-3X0-S1102E UG-3X0-S1102E–8		 SPARCserver 300 Series with enclosure, CPU, system board, and memory
 Sun-3™ desksides and servers UG-3X0-S1102E UG-3X0-S1102E–8		 Sun-3 desksides and servers with CPU, system board, memory, and backplane
 SPARCserver 10 or 20 system UG-S10S-S1102E UG-S10S-S1102E–8		 SPARCserver 10 or 20 with chassis, CPU, system board, and memory

SPARCserver 1000E Upgrades Continue the Tradition of Investment Protection *(cont.)*

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 SPARCserver 1000(E) or the SPARCcenter™ 2000(E) systems
- 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

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	Semiannual	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			

SPARCserver™ 1000E 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	An ASIC used in the SPARCserver™ 1000E processor unit to connect the processor's external cache to the XDBus™ system bus on the system backplane.
Cache coherency protocol	The communication among multiple caches that ensures that updates to blocks shared among caches are consistent among all the caches.
Circuit-switched bus	A bus in which a transaction is normally implemented in an automatic fashion. Although 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 SPARCserver 1000E system's SBus implementation to connect the SBus to one XDBus system bus on the system backplane.
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, 125-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, which 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.

SPARCserver 1000E Glossary *(cont.)*

NVRAM	Nonvolatile random access memory. Memory whose contents persist unless explicitly overwritten; in particular, memory that can survive a power failure.
Packet-switched bus	A bus in which information is transmitted in small, fixed-size 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 SPARCserver 1000E 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 SPARCserver 1000E 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. The SuperSPARC CPU is a 3.1-million transistor, fully custom design implemented in 0.6-micron BiCMOS.
SWIS/S	Single-ended, wide, intelligent SCSI SBus host adaptor for the Disk Card.
XBus	A packet-switched bus closely related to the XDBus system bus. Used in the SPARCserver 1000E 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 SPARCserver 1000E system. Maximum bandwidth at 50 MHz is 400-MB/sec. burst, 312-MB/sec. sustained.

SPARCserver™ 1000E Materials Abstract

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

Collateral	Description	Purpose	Distribution	Token # or Hibbert order #
Power Pack				
– *SPARCserver™ 1000E Product Details* customer presentation	SPARCserver 1000E overview, including I/O and server software; slide notes for presentation	Sales tool	SunWIN, Reseller Resource CD	37085 37087
– *SPARCserver Systems Product Line Overview* customer presentation	SPARCserver product line overview; 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
– *SPARCserver 1000E Technical Overview* presentation	SPARCserver 1000E technical details; slide notes for presentation	Training, technical sales tool	SunWIN, Reseller Resource CD	24662 37462
– *SPARCserver1000E Just the Facts*	Reference guide for the SPARCserver 1000E system	Training	SunWIN, Reseller Resource CD	24480
– *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

SPARCcenter 1000E Materials Abstract *(cont.)*

Collateral	Description	Purpose	Distribution	Token # or Hibbert order #
Guides				
– *SPARCserver 1000E Product Book*	Reference guide to technical and environmental specifications and configuration	Technical information	SunWIN, Reseller Resource CD	24599 24601 24603 25605 24607 24609 24611 24613 24615 24617 24619 24621
– *SPARCserver Technology and Performance Tuning*	Discusses SPARCserver and Solaris™ 2.x architecture and performance tuning	Technical information	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 paper				
– *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 the SPARCserver 1000E and SPARCcenter 2000E for database applications	Sales tool	SunWIN, Reseller Resource CD	24487
– *Compute Application Servers*	Highlights advantages of the SPARCserver 1000E and SPARCcenter 2000E for computer applications	Sales tool	SunWIN, Reseller Resource CD	24489
– *System Availability*	Information on basic issues related to system availability	Sales tool	SunWIN, Reseller Resource CD	34016

SPARCcenter 1000E Materials Abstract *(cont.)*

Collateral	Description	Purpose	Distribution	Token # or Hibbert order #
White paper *(cont.)*				
– *Evaluation Data Service Availability*	Defines RAS and discusses related features	Sales tool	SunWIN, Reseller Resource CD	45001
– *System Availability Report for SPARCserver 1000E and SPARCcluster2000E*	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

SPARCcenter 1000E Materials Abstract *(cont.)*

Collateral	Description	Purpose	Distribution	Token # or Hibbert order #
Reference *(cont.)*				
– *SPARCstorage™ Product Line Overview*	Quick reference card	Sales tool	SunWIN, Reseller Resource CD	32118
– *Sun Intro – SPARCserver1000E and SPARCcluster 2000E systems and upgrades, 10/94*	Product pricing and ordering information for SPARCserver 1000E and SPARCcenter 2000E systems	Training	SunWIN, Reseller Resource CD	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	31647
– *Sun Intro – SPARCcenter 1000, 5/93*	Product pricing and ordering information for the original SPARCcenter 1000	Training	SunWIN, Reseller Resource CD	24519
– *SPARCserver 1000 Technical Q & A, 5/93*	Detailed technical questions and answers for the original SPARCserver 1000	Training	SunWIN, Reseller Resource CD	24521
Product literature				
– *SPARCserver 1000E*	Datasheet, glossy color brochure	Sales tool	Hibbert Order	DE562-0
– *SPARCserver 1000E*	Product brief	Sales tool	SunWIN, Reseller Resource CD	37889
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

SPARCserver 1000E Materials Abstract *(cont.)*

Collateral	Description	Purpose	Distribution	Token # or Hibbert order #
Competitive analysis				
– HP	HP Industry Battlebook HP Product Statistics Book HP Sales Battlebook	Training	SunWIN	40453 35567 32356 32888
– IBM	IBM Industry Battlebook IBM Product Statistics Book IBM Sales Battlebook	Training	SunWIN	40456 40459 41019 41022 41025
– *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 DEC servers SGI servers	Training	SunWIN	40400 39238 39241
– Competitive Edge	HP: HP 9000 K–Class 3/95 HP: HP–UX 10.0 3/95 IBM: RS/6000 2/95 IBM: SP2 2/95 SGI: Servers 11/94 DEC: AlphaServer 400 2/95 DEC: AlphaServer 8000/2000 4/95	Training	SunWIN	42778 41147 41580 42284 41333 40611 39480 39225 43404