

SPARCserver 1000 System Installation Manual



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Preface

This system installation manual is written for a trained service provider who intends to install the SPARCserver 1000™ system.

When You Need Help with UNIX Commands

This manual does not include specific software commands or procedures. In their place, a software task is named. Refer to the operating system documentation that was shipped with your system when you need help with commands or procedures such as:

- Shutting down the system
- Booting the system
- Configuring devices
- Other software procedures

Depending on the operating system you are using, complete descriptions of commands and procedures can be found in:

- On-line AnswerBook™ documentation that comes with Solaris
- Other software documentation you received with your system

Document Conventions and Symbols

The following table describes the typefaces and symbols used in this book.

Table P-1 Typographic Conventions

Typeface or Symbol	Meaning	Example
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. system% You have mail.
AaBbCc123	What you type, contrasted with on-screen computer output	system% su password:
AaBbCc123	Command-line placeholder: replace with a real name or value	To delete a file, type <code>rm filename</code> .
AaBbCc123	Book titles, new words or terms, or words to be emphasized	Read Chapter 6 in <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be root to do this.

Related Documentation

These documents give information about installing and using the server or related boards and peripherals.

Table P-2 Related Documents

Application	Name	Part Number
Installation	<i>SBus Installation Guide for Deskside and Data Center Systems</i>	801-2891-xx
Diagnostics	<i>Open Boot Command Reference</i>	800-6076-xx
	<i>Open Boot PROM 2.x User's Guide</i>	800-5674-xx
	<i>Sundiag 4.0 User's Guide</i>	800-5413-xx
	<i>SunVTS 2.0 Quick Reference Card</i>	802-5329-xx
	<i>SunVTS 2.0 Test Reference Manual</i>	802-5330-xx
User's Guides	<i>SunVTS 2.0 User's Guide</i>	802-5331-xx
	<i>SPARCserver 1000 Storage Device User's Guide</i>	801-2198-xx
	<i>POST User's Guide</i>	800-7487-xx

Table P-2 Related Documents (Continued)

Application	Name	Part Number
	<i>System and Network Administration for the Sun Workstation</i>	800-1323-xx
Service, System	<i>SPARCserver 1000 System Service Manual</i>	801-2895-xx
Service, Peripherals	<i>Memory Module Installation Manual</i>	801-2888-xx
	<i>disk card Installation Manual</i>	801-7671-xx
Safety, Other	<i>SPARCserver 1000 Cabinet Regulatory Compliance Manual</i>	801-2892-xx
	<i>Sun Site Preparation Guide Manual Set</i>	825-1392-xx

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Country	Telephone	Fax
United States	1-800-873-7869	1-800-944-0661
United Kingdom	0-800-89-88-88	0-800-89-88-87
France	05-90-61-57	05-90-61-58
Belgium	02-720-09-09	02-725-88-50
Luxembourg	32-2-720-09-09	32-2-725-88-50
Germany	01-30-81-61-91	01-30-81-61-92
The Netherlands	06-022-34-45	06-022-34-46
Sweden	020-79-57-26	020-79-57-27
Switzerland	155-19-26	155-19-27
Japan	0120-33-9096	0120-33-9097

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Notes, Cautions, and Warnings



Warning – This equipment contains lethal voltage. Accidental contact can result in serious injury or death.



Caution – Improper handling by unqualified personnel can cause serious damage to this equipment. Unqualified personnel who tamper with this equipment may be held liable for any resultant damage to the equipment.

Individuals who remove any outer panels to access this equipment must observe all safety precautions and ensure compliance with skill level requirements, certification, and all applicable local and national laws.

Procedures contained in this document must be performed by qualified service-trained maintenance providers.

Note – Before you begin, carefully read each of the procedures in this manual. If you have not performed similar operations on comparable equipment, *do not attempt* to perform these procedures.

Preparing for Installation



This chapter introduces the SPARCserver 1000 system, describes system options and specifications, and describes how to prepare your site for system installation.

1.1 Task Map

Table 1-1 lists, in order, the tasks that are required to install a SPARCserver 1000 system.

Table 1-1 Task Map

Task	Reference
Setting up the system	Chapter 2
Powering up	Chapter 3
SBus card installation	<i>SPARCserver 1000 System Service Manual</i>
Installing other options	Installation manual for each peripheral or option
Verification and diagnostics	<i>SPARCserver 1000 System Service Manual</i> and <i>POST Diagnostic Manual Set</i>

1.2 System Features

The SPARCserver 1000 system provides file service, database service, timeshare, or computing services to a network and attached devices. It is an expandable multiprocessor system that can include the following capabilities:

- Up to four modular system boards
- Up to eight SuperSPARC® modules
- Up to 2 Gbytes of memory with 16-Mbit DRAM SIMMs
- Up to 12 SBus slots, three per system board
- On-board 10Base-T Ethernet
- Up to four on-board SCSI-2 ports
- Up to four half-height 3.5-inch disk drives
- Up to three disk cards, featuring four half-height 3.5-inch disk drives per card
- CD-ROM drive
- Half-high 5-1/4-inch tape drive

The SPARCserver 1000 system features an architecture allowing incremental system expansion. The chassis is a stackable, tabletop unit featuring both front and rear component accessibility. See Figure 1-1.

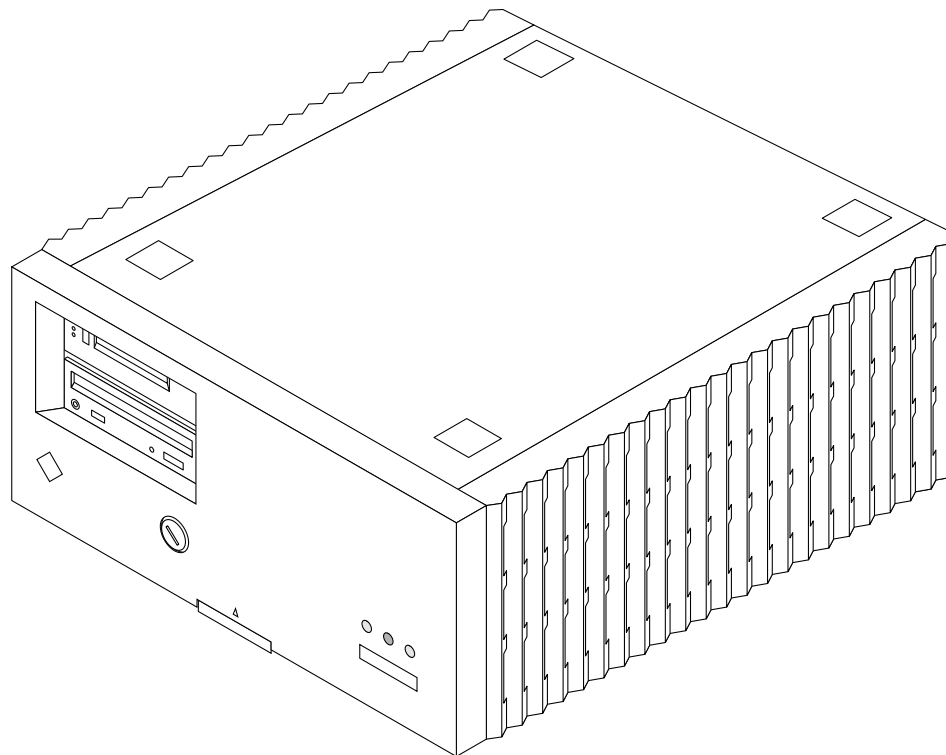


Figure 1-1 SPARCserver 1000 System

The internal components of the SPARCserver 1000 system are shown in Figure 1-1 and include the following:

- Power supply
- Fan tray
- SCSI tray assembly with control board
- System board

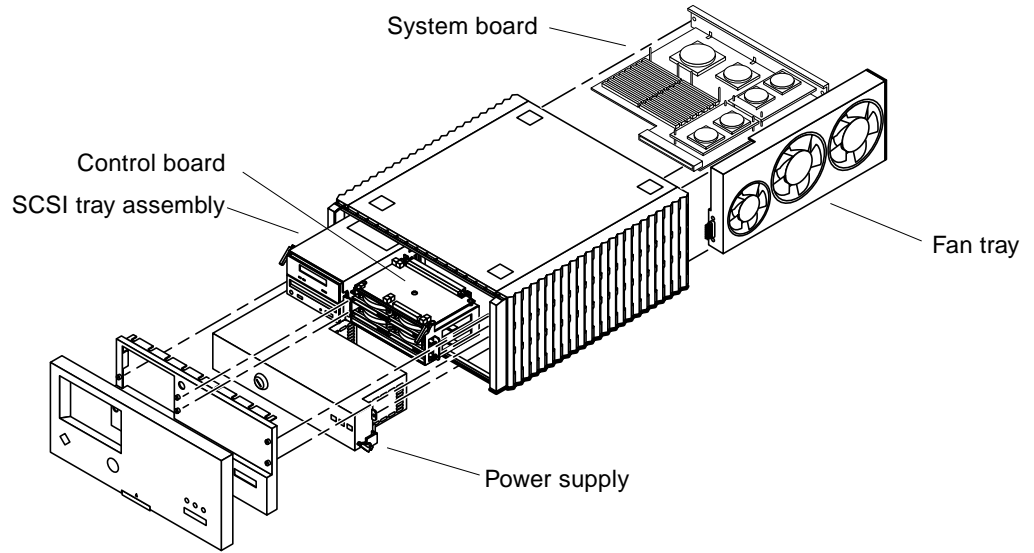


Figure 1-2 Internal Components

1.3 Chassis Assembly

The chassis assembly, shown in Figure 1-3, consists of:

- Chassis
- Backplane

The backplane is near the center of the system chassis. This allows for the insertion and removal of system components from both the front and rear of the system. Another advantage of this design is that component connections are made with a small physical backplane.

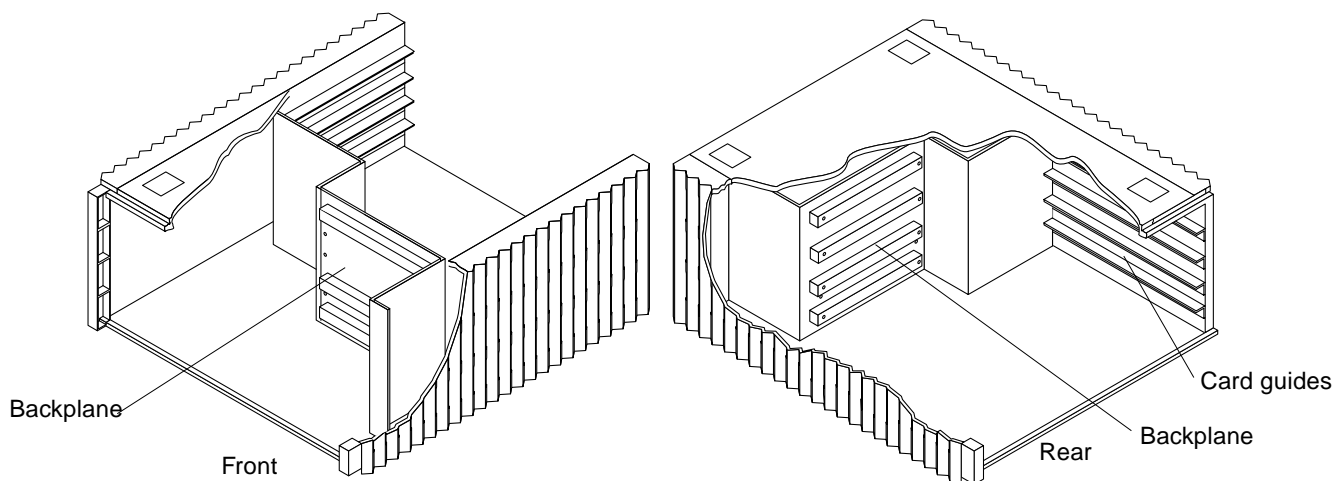


Figure 1-3 System Chassis Assembly

The SPARCserver 1000 backplane contains:

- 1 XDBus
- System monitoring bus
- System scan bus

The 72-bit wide XDBus (64-bit data and 8-bit parity) provides 230 Mbytes of usable data bandwidth.

1.3.1 Power Supply

The power supply, shown in Figure 1-4, provides 650 watts of power and includes a system maintenance panel with three status LEDs. The power supply plugs directly into the backplane through two 240-pin connectors. Connection to the fan tray is provided through a single connector located on the right rear side of the power supply. The connector routes AC power to the power supply and provides DC power for the fans and the fan fail signals.

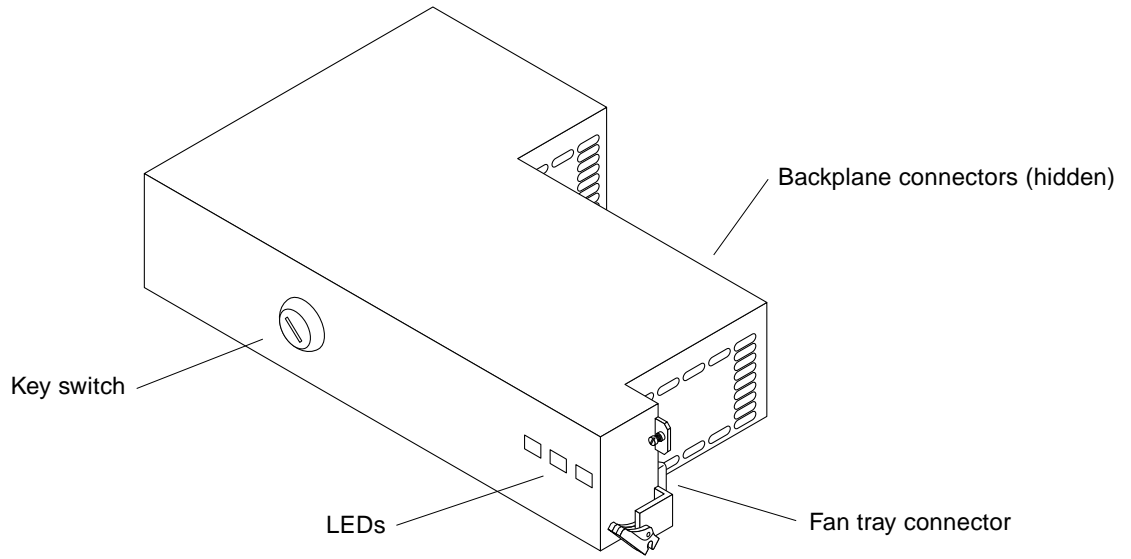


Figure 1-4 Power Supply

1.3.2 Fan Tray

The SPARCserver 1000 fan tray, shown in Figure 1-5, provides cooling for the power supply, system boards, and the SCSI tray assemblies. In addition, this module routes AC power from the rear of the chassis to the power supply. Each fan has a fail sensor to enable orderly system shutdown if a fan fails. (DC power for the fans is obtained from the power supply via a connector in the rear of the fan tray.) The AC power switch is on the fan tray.

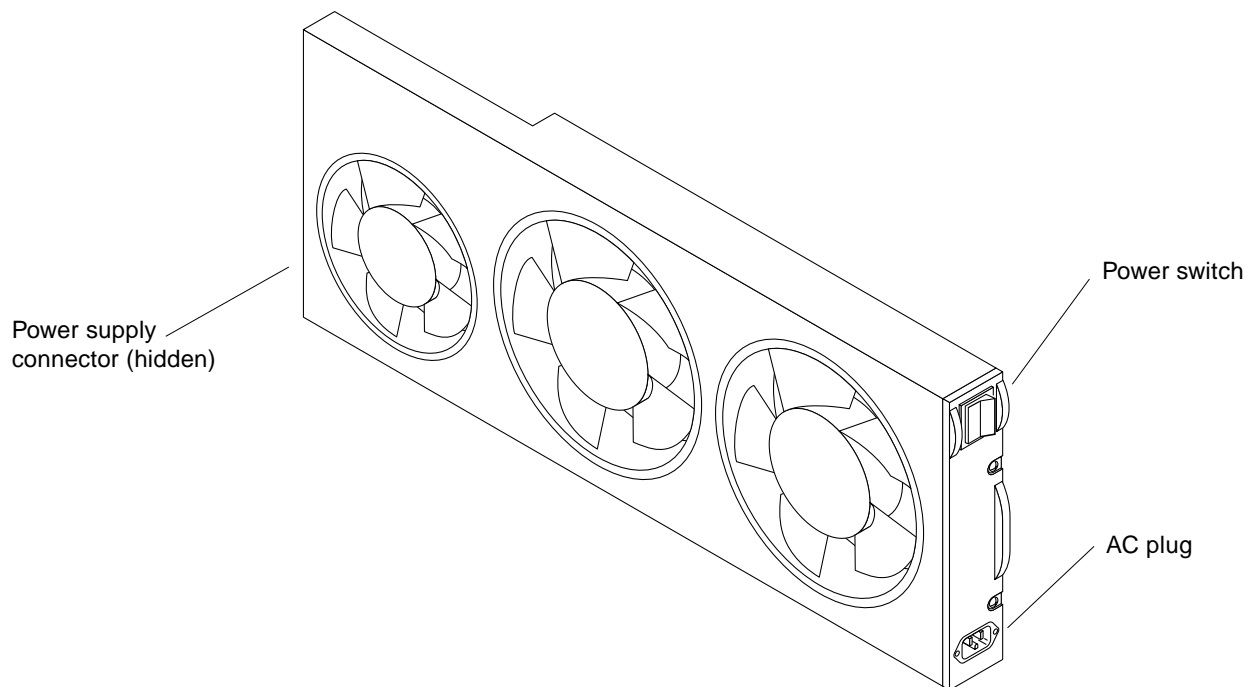


Figure 1-5 Fan Tray

1.3.3 *SCSI Tray Assembly*

The SCSI tray assembly, shown in Figure 1-6, consists of:

- Backup device tray on the left side
- SCSI disk drive tray on the right side
- control board on top of the SCSI disk drive tray

The SCSI tray assembly mounts above the power supply in the chassis front. The backup device tray, on the left, contains a SunCD Plus drive and may optionally contain a SCSI-2 tape device. The SCSI disk drive tray, on the right, contains two or four half-height disk drives. The control board mounts on top of the SCSI disk drive tray on the right and includes:

- Central arbiter (CARB)
- System clock
- Service port
- Reset switch

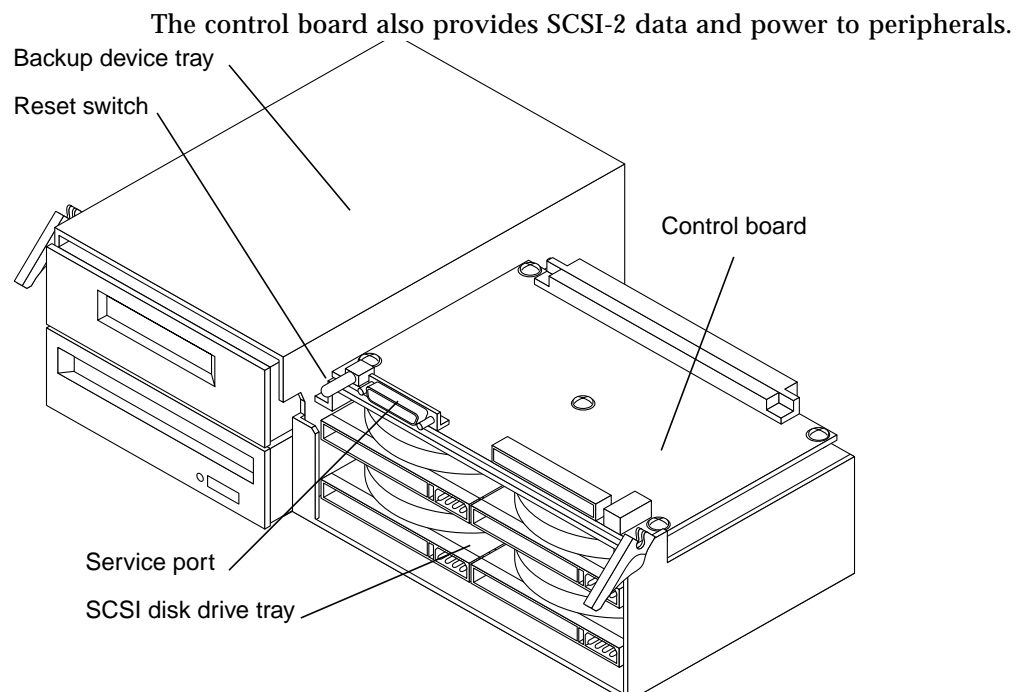


Figure 1-6 SCSI Tray Assembly

1.3.4 System Board

The SPARCserver 1000 system must have at least one system board installed in card cage slot 0. The system board (Figure 1-6) features:

- One single-ended narrow SCSI-2 port
- 10Base-T Ethernet port
- Two serial ports
- One or two SuperSPARC modules

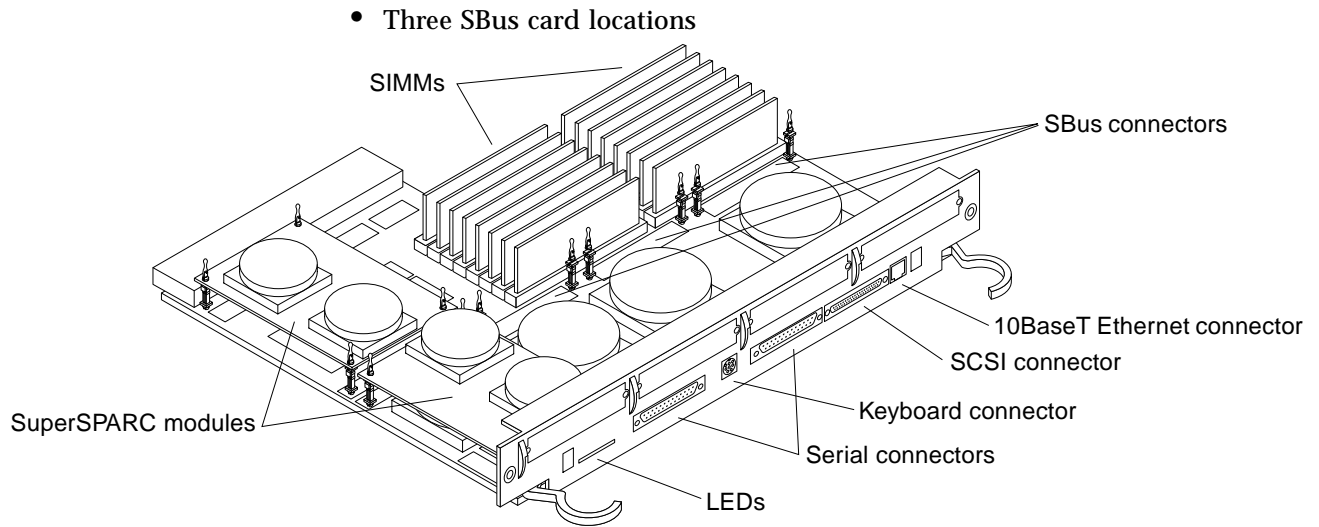


Figure 1-7 SPARCserver 1000 System Board

1.4 Options

Options are available to add compute power and mass storage capacity to a basic system. System options include:

- NVSIMMs
- ECC memory (DRAM SIMM) expansion
- SBus cards
- Disk drives
- Tape drive
- Disk card
- SuperSPARC modules
- System board with 0 CPU and 0 Mbyte memory
- System board with 2 CPU and 64 Mbyte memory
- System board with 2 CPUs and 128 Mbyte memory

1.4.1 External Options

External options usually require SBus interface cards. Each system board features three SBus slots for system expansion.

Note – An Ethernet controller is incorporated directly on the system board so an SBus card is not needed for this function.

A monitor is not necessary for normal server operation and many servers lack monitors. However, a TTY terminal or SPARCstation can be connected to the server to display system messages and power-on self-test diagnostic results. Once the server is running in auto-boot mode, the monitor can be removed.

1.4.2 Internal Options

The system contains a card cage with space for up to four system- or other type boards. Table 1-2 summarizes the internal options for the SPARCserver 1000 system.

Table 1-2 Internal Options

Option	Location	Quantity	Comments
System board	Chassis	1-4 per system	
SuperSPARC module	System board	1-8 per system	0-2 modules on each system board ¹ .
SIMMs	System board	0-16 per system board	System boards can have 0, 4, 8, 12, or 16 SIMMs installed. They are always installed in groups of 4. SIMMs sizes are 8 or 32 MB DRAM or 1 MB NVRAM.
SBus cards	System board	0-12	0-3 cards per system board.
Drives in SCSI tray	Chassis	Up to 4 half-height 3 1/2-inch disk drives plus 2 addit. 5 1/4-inch devices	Drives are numbered 0 to 3. One SunCD (standard equipment) per system. One tape drive optional.
Disk card	Chassis	0-3 per system	Each board contains 4 half-ht., 3 1/2-inch SCSI-2 disk drives.

1. A system board with zero SuperSPARC modules can be used for memory expansion and for additional SBus slots.

1.5 Specifications

Tables 1-4 through 1-6 list the specifications for the base server.

1.5.1 Physical Specifications

Table 1-3 Server Physical Specifications

	US	Metric	Comments
Height	8.3 in	21 cm	
Width	20 in	50 cm	
Depth	21 in	54 cm	
Weight	70 lb approx.	32 kg	Actual weight depends on the installed options
Power cord	6 ft	1.8 m	

Table 1-4 Server Clearance and Service Access

	US	Metric	Comments
Front	12 in	31 cm	Access to storage media, key switch, and reset switch
Rear	16 in	41 cm	Access to system board, fan tray, and cables
Left	6 in	16 cm	To maintain airflow
Right	6 in	16 cm	To maintain airflow

1.5.2 Electrical Specifications

Table 1-5 lists the specifications for the power supply.

Table 1-5 Power Supply Characteristics

Parameter		Value
Input	Voltage range	100-240 VAC
	Current	9.5A maximum at 100 VAC input with 650W load
	Frequency range	47-63 Hz
Output	+5 VDC	5 to 100A
	+1.2 VDC	0 to 40A

Table 1-5 Power Supply Characteristics

Parameter	Value
+12 VDC	0 to 2.5A
-12 VDC	0 to 0.6A
+12 VDC	1.5 to 8A For peripherals and fans
Output power rating	Total power not to exceed 650W

1.5.3 Environmental Requirements

The acceptable environmental ranges for the SPARCserver 1000 system are:

- Temperature between 32—104° Fahrenheit (0—40° Celsius)
 - With tape drive, the range is <> Fahrenheit (5 - 40)
- Humidity between 5- and 80 percent (relative noncondensing)
 - With tape drive, lower limit is 20%
- Altitude between 0- 10,000 feet (0 and 3048 meters) above sea level
- Well-ventilated or air-conditioned work area to avoid overheating
- Relatively dust-free (as in an office environment)

1.6 Site Preparation

1.6.1 Preparing Electrical Circuits

Your SPARCserver 1000 system uses nominal input voltages of 115 VAC or 230 VAC. Sun™ products are designed to work with single-phase power systems having a grounded neutral conductor.

To reduce the risk of electrical shock, do not plug Sun products into another type of power source. Contact your facilities manager or a qualified electrician if you are unsure what type of power is supplied to your building.

In planning where to place your equipment, remember that each item below requires access (by way of a separate power cord) to a power outlet:

- SPARCserver 1000 system

- External peripherals
- Monitor used for diagnostics

1.6.2 Preparing the Ethernet Network

The SPARCserver 1000 system follows the IEEE standard for 10Base-T Ethernet, which is also known as twisted-pair Ethernet.

Under this standard two pairs of unshielded wires connect to each node (a workstation or file server). One pair of wires transmits, and the other pair receives. Both wire-pairs are contained in a single flat cable that is approximately 50 percent wider than a modular telephone cable. Twisted-pair cables used with Sun Microsystems® products have RJ-45 connectors, which resemble the smaller RJ-11 connectors used for modular telephone cables.

A computer using twisted-pair cable does not connect directly to the network. The twisted-pair cable connects the computer to a hardware interface called a hub (also known as a repeater, concentrator, gateway, or bridge). The hub connects by a second cable (a coaxial or other cable) to the network. Single-connection and multiple-connection hubs are available commercially.

For twisted-pair cable length, refer to Chapter 2, Table 2-1.

Figure 1-8 summarizes the implementation of twisted-pair Ethernet.

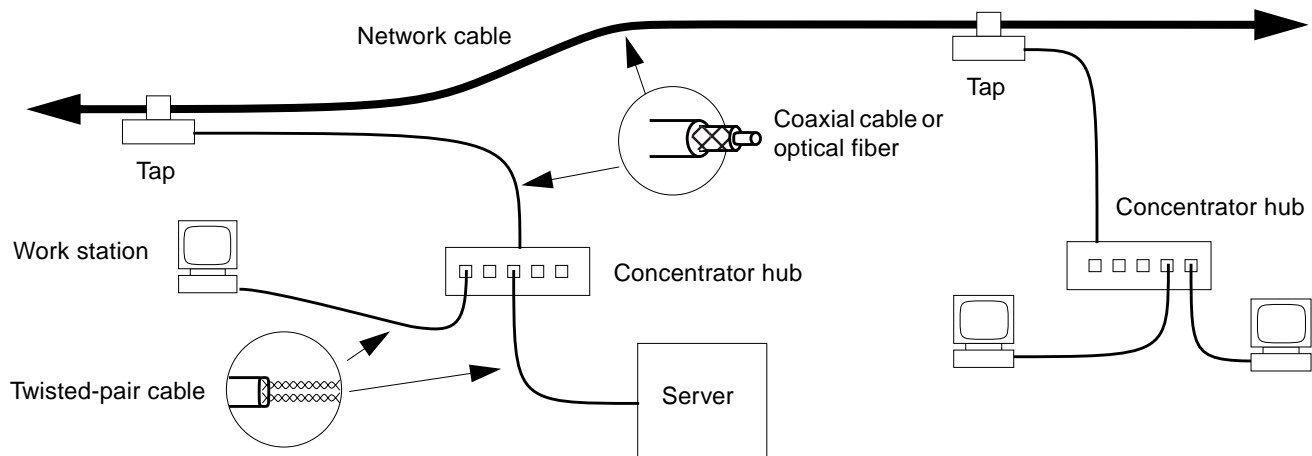


Figure 1-8 Example of 10Base-T (Twisted-Pair) Ethernet

Note – Multiplexer boxes require a transceiver when used with the Ethernet applications described in this manual. Although these transceivers are compatible with Sun equipment, Sun Microsystems does not guarantee the performance of any component that was not purchased from Sun.

Note – Many transceivers are compatible with both level-1 and level-2 Ethernet. To operate these transceivers with Sun equipment, set the device for level-2 operation following the manufacturer's instructions.

Set up Ethernet using Sun-supplied or third-party components. Read any applicable manufacturer instructions to obtain the best results.

Note – Sun equipment conforms to the Ethernet 10Base-T standard, which states that the 10BaseT Link Integrity Test function should always be enabled on both the host and the hub. If you have problems verifying connection between Sun equipment and your hub, verify that your hub also has the link test function enabled. Refer to the Troubleshooting chapter in the *SPARCserver 1000 System Service Manual* and the manual provided with your hub for more information about the 10BaseT Link Integrity Test function.

1.6.3 Preparing the Tabletop Area

The SPARCserver 1000 system is designed to sit on a desk or table. Use the following guidelines to prepare a location for your server.

- The server unit requires approximately 1 foot (31 cm) of space in front and 1.5 feet (47 cm) of space at the back for access by service personnel.
- A minimum space of 6 (16 cm) inches is required on both sides of the server to afford adequate air flow.
- Keep power and interface cables clear of foot traffic. Route cables inside walls, under the floor, through the ceiling, or in protective channels. Route interface cables away from motors and other sources of magnetic or radio frequency interference.

Setting Up the System



This chapter contains procedures for unpacking, connecting the power cord, and cabling the SPARCserver 1000 system.

2.1 Unpacking the System

Since you are reading this manual you have already opened the SPARCserver 1000 system shipping container and the box containing the manual set. Remove the key and power cord from their packing box and set them aside. These items are needed to power on the system. Follow graphic instructions on the shipping container to remove the server from the container.



Warning – Two people are required to lift the server because it weighs more than 70 lbs (32 kg) and personal injury could result.

2.1.1 Repacking for Shipment

Use the original shipping containers and packing materials to store or, if necessary to ship your server. Follow in reverse order the graphic unpacking instructions printed on the shipping container.

2.2 Preparing the System for Cabling

Ensure the server is placed on a surface affording access to both the front and the rear of the chassis. This site should conform to site preparation guidelines and specifications covered in Chapter 1, Section 1.6, “Site Preparation.”

2.3 Connecting the Power Cord

1. **Insert the key provided with your system into the front panel key switch. Turn it to the Standby position (fully counterclockwise).**
See Figure 2-1.

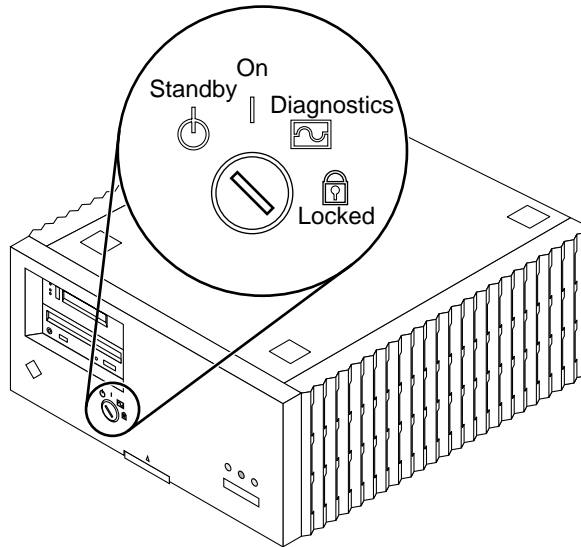


Figure 2-1 Key Switch Positions

2. **Turn the AC power switch to Off.**
This switch is in the upper left corner of the system rear. See Figure 2-2.
3. **Plug the female end of the power cord into the AC connector.**
This connector is in the lower left corner of the system rear. See Figure 2-2.
4. **Plug the male connector on the power cord into a grounded wall outlet.**
The outlet must be a 110-240 VAC 15A circuit.

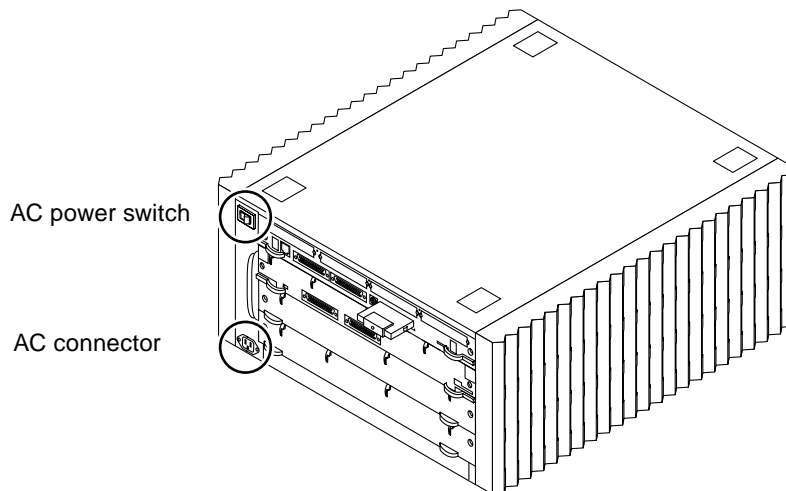


Figure 2-2 AC Power Switch and Power Receptacle



Caution – Do NOT turn on power to the unit yet. To do so could cause system damage to occur.

2.4 Connecting the Network Cable to the Server

The main network interface is incorporated directly on the system board installed in slot 0 (top slot). To connect the server side of the network cable:

1. **Locate a transceiver cable with two RJ-45 connectors.**

Figure 2-3 shows one style of Ethernet cable.

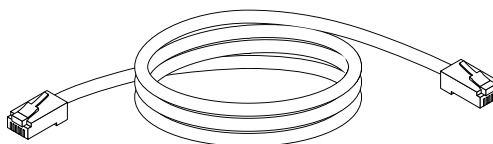


Figure 2-3 Transceiver Cable

2. **Plug one end of the transceiver cable into the Ethernet port.**

The Ethernet port is located on the lower right side of the system board in card cage slot 0. See Figure 2-4.

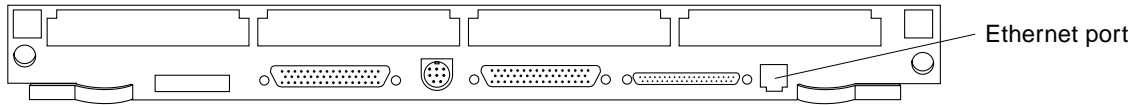


Figure 2-4 10Base-T Ethernet Connection

2.5 Connecting the Network Cable to the Transceiver

1. **Plug the free end of the network cable into the connector on the twisted-pair-to-transceiver cable interface box.**
2. **For Ethernet cables, determine if the cable has N-type screw-on connectors at the ends.**
 - If the Ethernet cable lacks N-type connectors at the ends, use a “vampire” tap to connect the cable to the transceiver. See Figure 2-5. To connect the cable to the transceiver, use instructions provided with the vampire tap.
 - If the Ethernet cable has N-type connectors, connect the Ethernet cable to the transceiver:
 - a. **Screw the Ethernet coaxial cable into one of the round screw-on type connectors on the transceiver.**
Use either one of the transceiver connectors.
 - b. **Screw the other Ethernet coaxial cable into the other round screw-on type connector on the transceiver.**

Figure 2-5 shows the elements used in the installation process.

Determine if a terminator should be installed. Table 2-1 lists the cabling limitations for Ethernet.

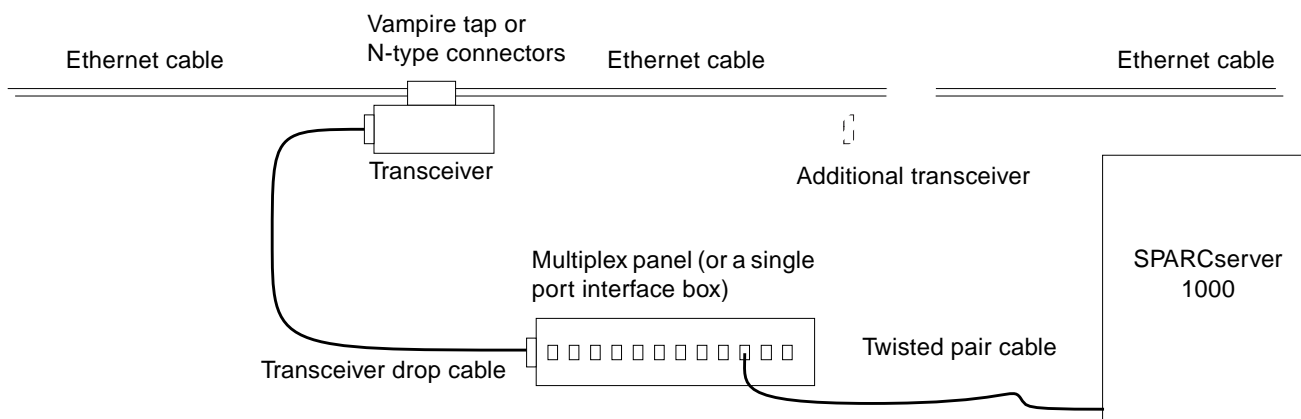


Figure 2-5 Connecting Twisted Pair Ethernet to N-type Coaxial Cable

Table 2-1 Ethernet Cabling Limitations for N-type Coaxial Cable

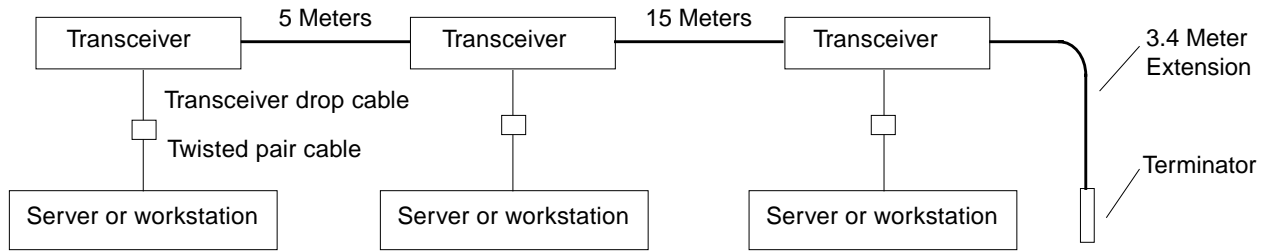
Cable Segment	Length in Meters
Allowed contiguous length of cable segments	23.4
	70.2
	117.0
	500.0 ¹
Distance between transceivers (multiples-of)	2.5 ²
Minimum length of Ethernet coaxial cable segments	23.4
Maximum length of transceiver “drop” cable	50.0
Minimum length of twisted pair cable	no minimum
Maximum length of twisted pair cable	110

1. Finite lengths (as constrained by transmission line phenomena). Minimum length = 23.4M; maximum = 500M. If cable falls shorter than one of these values, add cable to achieve next-highest value.

2. Transceivers are placed at intervals of 2.5 meters, or multiples of 2.5 meters along the Ethernet cable.
 Example: transceivers are connected 2.5 meters apart, not 2.0 meters.
 Example: transceivers are connected 15 meters apart (6 multiples of 2.5 meters), not 14.0 meters.

Figure 2-6 shows an example of a typical network setup. The SPARCserver 1000 system can be any server shown in this figure.

If termination is required, install a 50-ohm terminator in the unused transceiver N connector or the end of the coaxial cable. Use a female double N-type connector.



Note: 5 Meters + 15 Meters + 3.4 Meter Extension = 23.4 Meters minimum length allowed.

Figure 2-6 Ethernet Cabling Length — Example Using N-type Cable

Note – Sun equipment conforms to the Ethernet 10Base-T standard, which states that the 10BaseT Link Integrity Test function should always be enabled on both the host and the hub. If you have problems verifying connection between Sun equipment and your hub, verify that your hub also has the link test function enabled. Refer to the Troubleshooting chapter in the *SPARCserver 1000 System Service Manual* and the manual provided with your hub for more information about the 10BaseT Link Integrity Test function.

2.6 Connecting an ASCII Terminal

An ASCII terminal (or workstation) must be connected to the server to display diagnostic messages produced by the power-on self-test (POST) program. A terminal is not required for normal server operation. If necessary, find a terminal and connect it to the server. To connect an ASCII terminal:

1. **Plug the terminal cable into serial port A on the system board in slot 0.**
See Figure 2-7.

Note – Connect the terminal to the system board in card cage slot 0 ONLY!

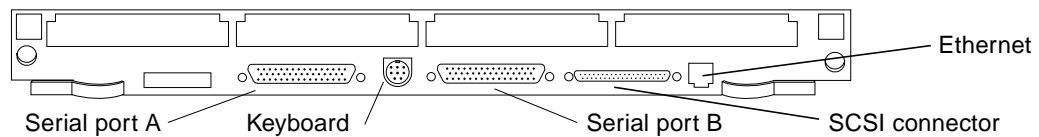


Figure 2-7 Serial Port Connection for an ASCII Terminal

2. Plug the terminal power cord to an AC wall outlet.

3. Configure the ASCII terminal as follows:

- 9600 baud
- 1 stop bit
- 8 data bits
- Parity off
- Full duplex

Refer to the instruction manual shipped with the terminal for specific configuration instructions.

Note – Setup parameters listed in Step 3 may differ from the setup at the customer site. These parameters can be changed in the NVRAM. See the `set-defaults` and `printenv` commands in the *Open Boot PROM 2.0 Command Reference* P/N 801-7076-xx.

2.7 Connecting External SCSI-2 Devices

Note – For information about connecting SCSI peripherals, refer to the *Solaris Handbook for SMCC Peripherals*.

External SCSI-2 devices connect to your system via the built-in single-ended SCSI-2 port on system boards 1 through 3, or via FSBE/S, SWIS or DWIS/S SBus cards installed in system boards 0-3.

Note – The on-board SCSI-2 bus on the system board in slot 0 controls internal SCSI tray devices. Therefore, the external SCSI connector on the system board in slot 0 must always have a terminator installed.

For information on device addressing, priorities, and slot assignments, See Appendix A, “General Rules for System Configuration.”



Caution – Do not assign the same SCSI address to two devices sharing the same bus or SBus card. To do so poses risk of Equipment Damage.

1. Connect a SCSI cable to the appropriate SCSI-2 host on the system board.

- For the system board in slot 0, this is an SBus card installed in an appropriate SBus slot.
- For system boards in slots 1 through 3, use the on-board SCSI-2 port or an SBus card installed in an appropriate SBus slot.

Figure 2-7 shows the location of the onboard SCSI connector on the system board.

2. Connect the other end of the SCSI cable to the external SCSI-2 device.

You can now power on the system and test your server. Follow instructions in the following chapters to configure your server.

2.8 Precautions for JumpStart Automatic Installation

This system is able to use the JumpStart™ automatic installation feature described in installation documents for Solaris® software. The software that enables this feature is present on a hard disk in your system.

JumpStart will run only when the system is powered on for the first time.



Caution – JumpStart may incorrectly install the system as a standalone workstation. You must prevent JumpStart automatic installation from proceeding if the appropriate server-specific configuration information is not in place. Information about the JumpStart feature is provided on a card, titled *JumpStart Installation Instructions*, provided with the system documentation set.

To prevent JumpStart installation from occurring unintentionally:

- Do not connect your system to a network when you power it on initially.
- Do not place a Solaris release CD-ROM in a drive when you first power on the machine.

Note – If JumpStart automatic installation does begin, interrupt it by pressing L1-A (Stop-A), and then perform a manual installation when you are ready.

If JumpStart completes the installation incorrectly, you would probably need to reinstall Solaris manually.

Powering the System On and Off

3.1 Powering On the System

Note – It is advisable to connect a TTY terminal to the system during installation (refer to Section 2.6, “Connecting an ASCII Terminal” to find instructions). Observe the yellow (middle) LED on the front panel. It should go off when boot completes. If it remains on, observe the terminal screen for boot messages produced by the POST diagnostic program during power-on.

1. **Begin with a safety inspection of the system.**
 - a. **Ensure the key switch on the front panel is in the Standby position (completely counterclockwise, see Figure 3-1).**
 - b. **Ensure the AC power switch on the system rear is off and the server power cord is plugged into the server and wall socket.**



Caution – Do not disconnect the power cord from the wall socket when working on the server. This connection provides a ground path that prevents damage from uncontrolled electrostatic discharge.

2. **Turn on the TTY terminal.**
3. **Turn on the AC power switch on the system rear.**
4. **Turn the key switch on the front panel to the on position.**
See Figure 3-2. You should see and hear several things happen:

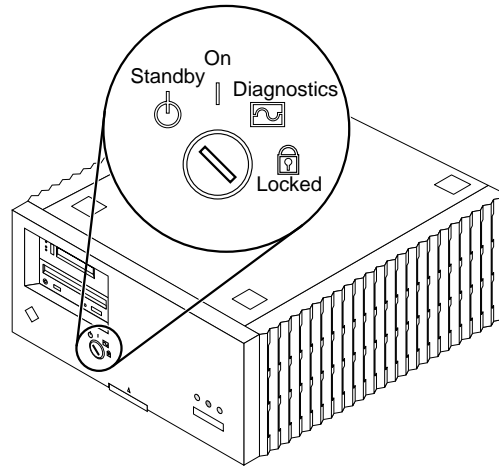


Figure 3-1 Key Switch in the Standby Position

- Cabinet fans begin turning.
- The left front panel LED (green) turns on immediately denoting the power supply is delivering DC power.
- The middle front panel LED (yellow) lights while POST runs for approximately 60 seconds. After 60 seconds, this LED turns off if the tests pass. If the LED remains lighted after 60 seconds, a test has failed.
- The right front panel LED (green) lights to show that booting is successful and the operating system is running. If this LED fails to turn on and the middle LED is on, a severe hardware fault exists.



Warning – Never move the system when the power is on. Failure to heed this warning may result in catastrophic disk drive failure. Always power the system off before moving it.

5. Watch the terminal screen for possible error messages from the POST diagnostic program.

POST tests subassemblies and some interface paths between subassemblies.

At the conclusion of testing, POST automatically attempts to reconfigure the system, omitting any parts of the system that have failed diagnostics.

If there are no faults, or if POST completes a successful reconfiguration in response to detected faults, the system boots up.

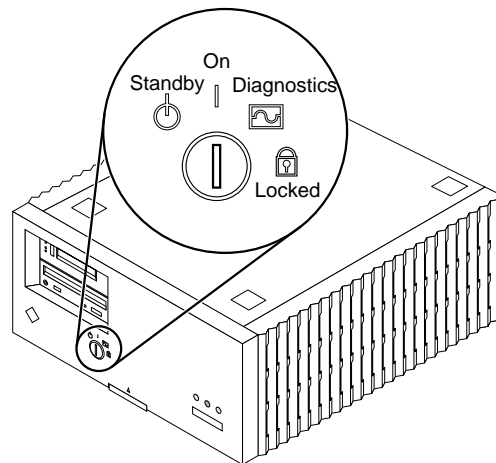


Figure 3-2 Key Switch in On Position

Note – If faulty parts are detected and configured out of the working system, you and the system manager must decide whether to operate the system until replacement parts arrive, or to halt operation. Also, if a faulty component cannot be replaced in the field, the entire subassembly (like the system board) must be replaced.

To run diagnostics again, or if the system hangs, press the reset switch behind the front panel. To reach the reset switch:

- 1. Remove the key from the key switch.**
- 2. Remove the plastic front panel. Push up on the latch at the bottom of the panel and gently pull the bottom of the panel towards you.**
The top of the front panel rests in a grooved channel on the system top front edge. Once the bottom latch is released, the front panel lifts off (Figure 3-3).
- 3. Insert the back of a pencil or other narrow object into the small opening in the center of the metal face plate and press the reset switch.**
See Figure 3-4.
- 4. After the system is reset, replace the front plastic panel.**
Rest the top of the front panel in the grooved channel on the top panel. Push in on the lower portion of the front panel until it snaps back into place.

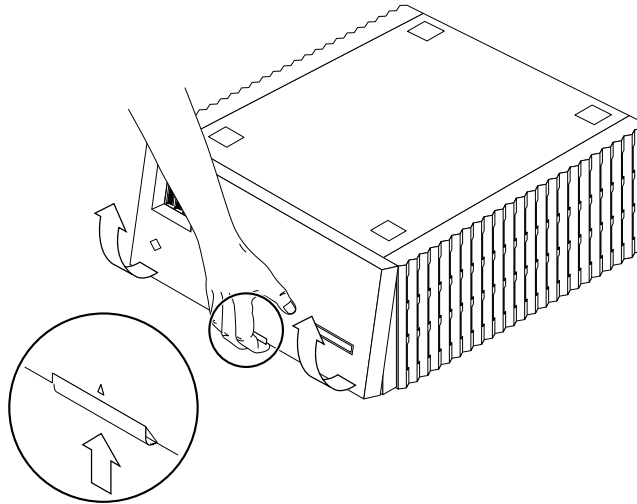


Figure 3-3 Removing the Front Panel

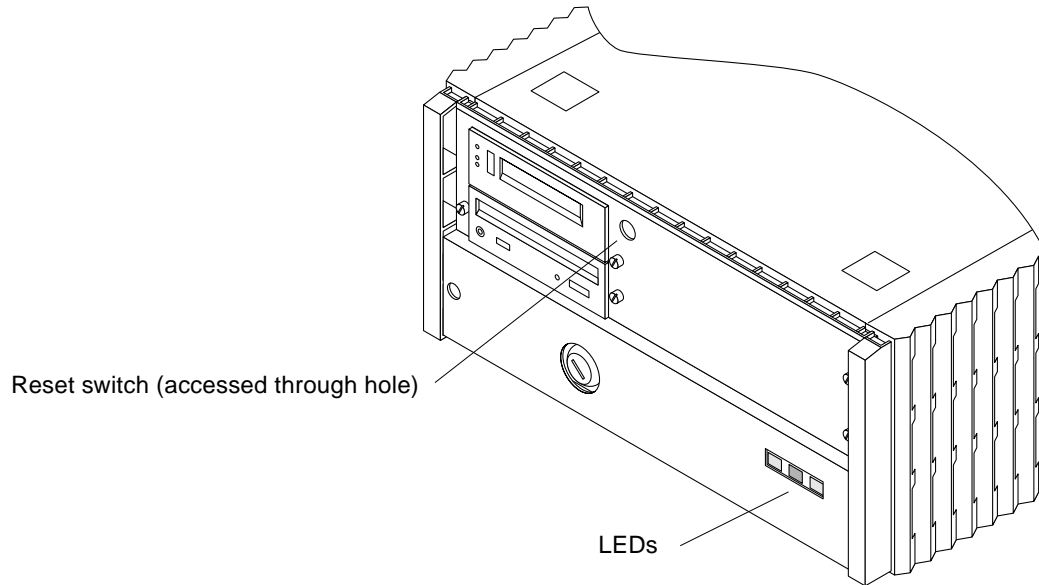


Figure 3-4 Reset Switch (Behind the Front Panel) and System Status LEDs

5. Return the key to the key switch.

3.1.1 Boot Messages

Use boot software messages to verify that all options are installed and recognized by the system. After POST completes self-test, a message like the following appears. It lists hardware components detected by the system.

```
<<<< SPARCserver 1000XX POST V4.1 >>>>
... (various test messages) ...
SPARCserver 1000 Series No Keyboard
ROM Rev. .-. , --- MB Memory installed, Serial #---.
Ethernet address -:-:---:--:---:-- , Host ID: -----.
```

Note – This screen display is an example only. The actual message displayed on the screen will depend on the software running on your system.

Boot the system using the procedure that is appropriate for your operating system. See the *Preface*, “When You Need Help with UNIX Commands” for a reference to documentation that describes this procedure.

After boot, check the status of the system by inspecting system status LEDs on the front panel. See Table 3-1 and Figure 3-4.

Table 3-1 Front Panel LED System Status

LED Position	Condition
Left	On — the power supply is delivering DC power
Middle	On — (first 60 seconds of AC power) self tests are running Off — (after self tests end) no hardware failures detected On — (after self tests end) hardware failure was detected
Right	Off — (first 60 seconds of AC power) self tests are running On — (after self tests end) system is running Off — (after self tests end) system cannot run; repair is needed

Ideally, when self-test completes, both left and right LEDs are on. Less ideal is if all LEDs are on (system needs service, but is able to run). The worst condition is if the left and middle LEDs are on (system cannot boot), or if no LED is on.

3.2 Powering Off the System

Once the diagnostics are completed, you can remove the TTY terminal. However, do not disconnect the terminal while the system is running.

Before turning off the system power, you must halt the operating system. See the Preface, “When You Need Help with UNIX Commands,” to find references to help with the following commands or system administration procedures.



Caution – To avoid damaging internal circuits, do not disconnect or plug in any cable while power is applied to the system.

To shut down the system and give users a shutdown warning:

- 1. Back up the system files and data to tape, if necessary.**
- 2. Notify users that the system is going down.**
- 3. Halt the system using the appropriate commands.**
- 4. Wait for the system-halted message and the boot monitor prompt.**
- 5. Turn the key switch on the front panel of the server to the Standby position (fully counterclockwise).**
- 6. Turn the AC power switch on the system rear off.**

For more information on system administration (such as methods for shutdown and backup) See the *Preface*, “When You Need Help with UNIX Commands” for references to documentation that describes these procedures.

General Rules for System Configuration



This appendix lists recommended priorities and locations for:

- System boards
- SuperSPARC modules
- SBus modules
- SIMMs
- Drive IDs
- SCSI cables
- Ethernet cables
- Video cables

A.1 Selecting Installation Locations

Each component described in this appendix has a specific recommended location. The following sections describe the locations for each component.

A.1.1 System Board Slots

System boards are installed at the factory from the lowest card cage slot number (0 - at the card cage top) to the highest slot number (3 - at the bottom). Air restrictor boards must be installed in all empty slots. Slot 0 is the system

master. If the system has an RS232 console or TTY terminal, it must be plugged into port A of the system board in slot 0. A console is not required if the system is in auto-boot mode.

A.1.2 SuperSPARC module

When installing or replacing a SuperSPARC module, use the following guidelines to verify that you have selected a valid location.



Warning – The heatsinks on the SuperSPARC module may be hot. Use caution when removing or installing SuperSPARC modules and avoid contact with the heatsinks. Hold SuperSPARC modules only by the edges.

Each system board has two SuperSPARC module connectors, designated A and B (location A is closest to the backplane connector). See Figure A-1. The modules mount above the system board on standoffs. Modules should first be installed in the A connectors on consecutive system boards starting with the system board in slot 0. After all of the A connectors are filled, begin filling the B connectors, starting with the system board in slot 0 and working down.

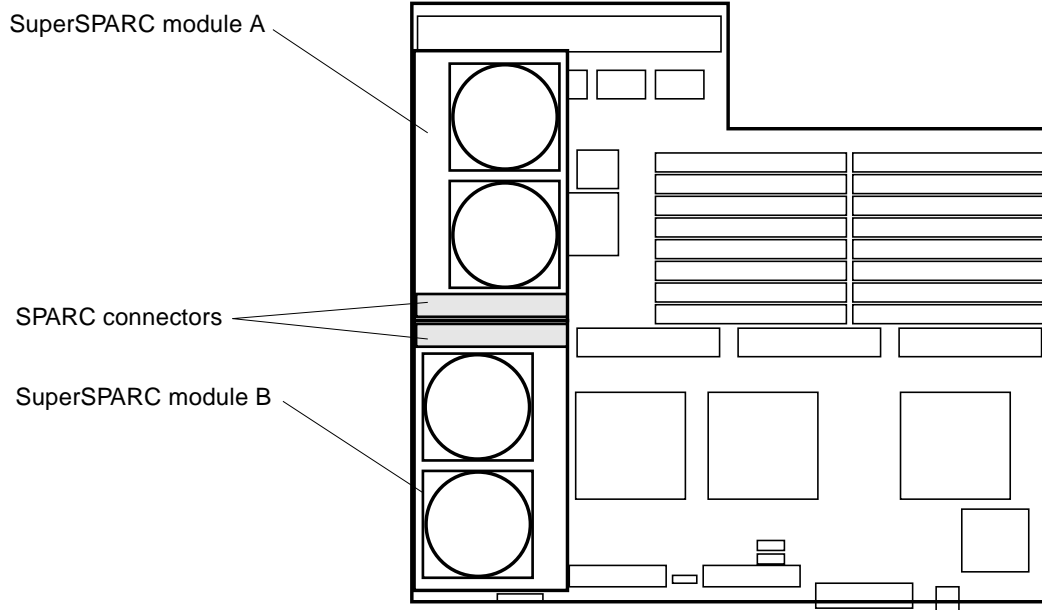


Figure A-1 Locations of SuperSPARC modules

The example in Table A-1 shows how to distribute four SuperSPARC modules on three system boards.

Table A-1 Example of Connector and Slot Priorities

	System Board Slot 0	System Board Slot 1	System Board Slot 2
Connector A	Full	Full	Full
Connector B	Full	-	-

A.1.3 SBus Cards

Each system board has three SBus slots. Each SBus card mounts on standoffs above the system board. See Figure A-2.

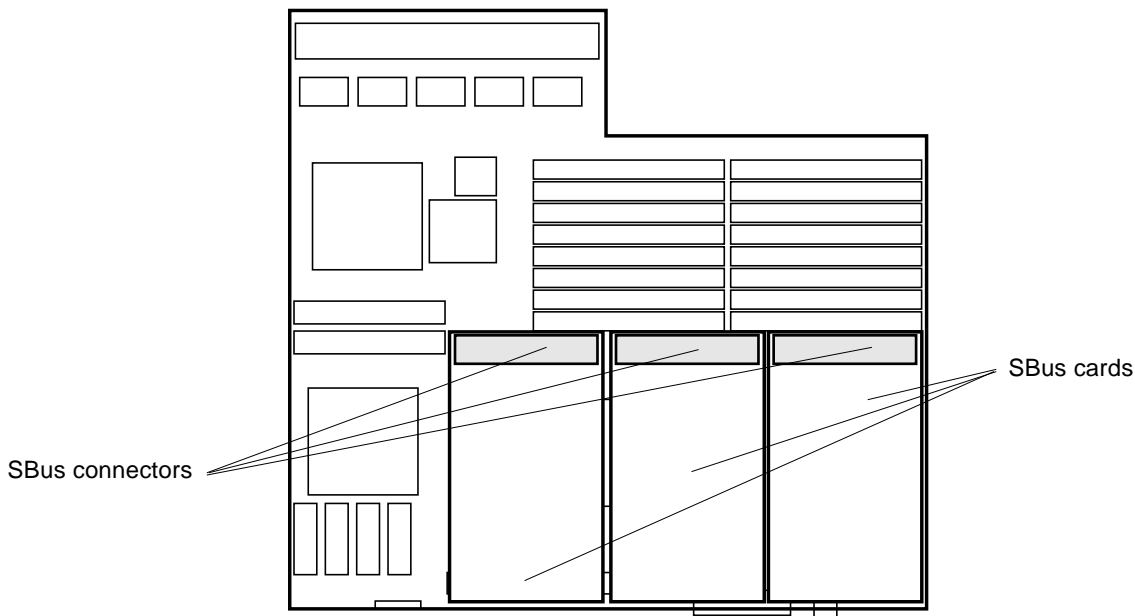


Figure A-2 SBus Card Locations

The system board in slot 0 must have the minimum required configuration. The on-board SCSI port on the system master board must be terminated. All SBus slots are available. Each type of SBus card should be distributed evenly among available system boards.

If video is required, install the CGSIX SBus card in slot 1 (first available) on the system board installed in slot 0.

The example in Table A-2 shows how to distribute five FSBE/S and two SPIFFs on three system boards.

Table A-2 Example of SBus Card Distribution

System Board Location	SBus Cards Installed
Slot 0	2 FSBE/S and 1 SPIFF
Slot 1	2 FSBE/S and 1 SPIFF
Slot 2	1 FSBE/S

A.1.4 SIMMs

The SPARCserver 1000 system has three SIMM options. Two types of DRAM, high-density and low-density, are available as well as nonvolatile NVSIMM.

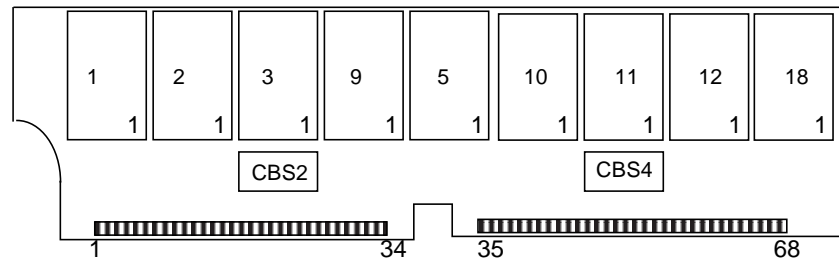
The 8 Mbyte (low-density) SIMM uses 1 Mbit by 4 bit DRAMs. Two vendors are used, so a slight variation exists in physical appearance between the two products. See Figure A-3.

The 32 Mbyte (high-density) SIMM uses 4 Mbit by 4 bit DRAMs. Each vendor uses the same printed circuit card for both the 8- and 32 Mbyte SIMMs, so no major difference in appearance exist between a given vendor's high- and low-density SIMMs.

Only one type of 1 Mbyte NVSIMM exists, which uses 128 Kbit by 8 bit DRAMs. See Figure A-3.

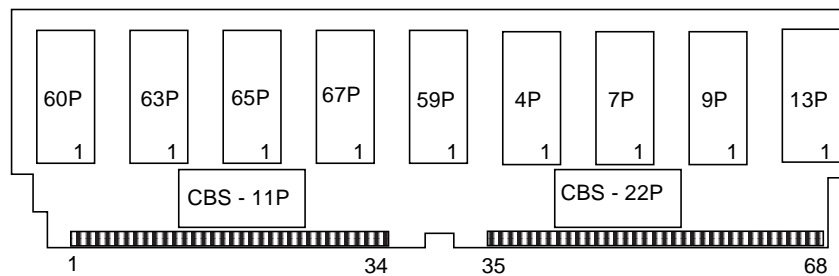
SIMM — Vendor 1

Capacity	Type	P/N
8 Mbyte	DRAM	501-1817
32 Mbyte	DRAM	501-2196



SIMM — Vendor 2

Capacity	Type	P/N
8 Mbyte	DRAM	501-1817
32 Mbyte	DRAM	501-2196



NVSIMM

Capacity	Type	P/N
1Mbyte	NVSIMM	501-2197

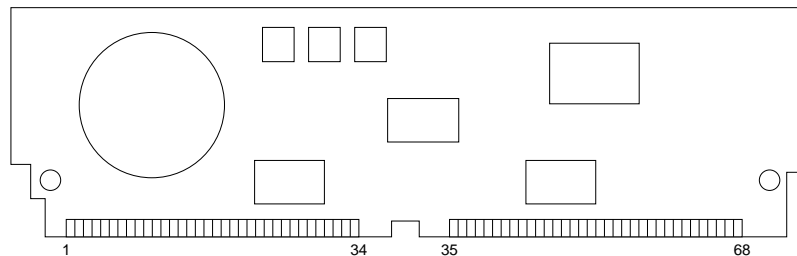


Figure A-3 SIMMs and NVSIMM

The system board has 16 SIMM sockets physically divided into two rows of eight. The SIMMs are also logically divided into four groups of four, known as group 0, 1, 2, and 3. Figure A-4 shows SIMM locations and identifies groups.

A system board can be installed with zero memory or from one to all four groups filled. For example, 0 SIMMs, 4 SIMMs, 8 SIMMs, 12 SIMMs or 16 SIMMs. When installing memory, first install all group 0 SIMMs on all system boards, from the lowest board slot number to the highest. Then, install group 1 SIMMs in the same order, followed by groups 2 and 3 if there for all remaining SIMMs.

The 8 Mbyte SIMMs of either vendor can be mixed in a group. Similarly, both vendor's 32 Mbyte SIMMs can be mixed in a group. However, all SIMMs of a group must be of identical capacity (all 8 Mbyte; all 32 Mbyte; or all NVSIMM within a group). Additionally, 8- and 32 Mbyte SIMMs can be used on the same board, provided they do not reside within the same group.

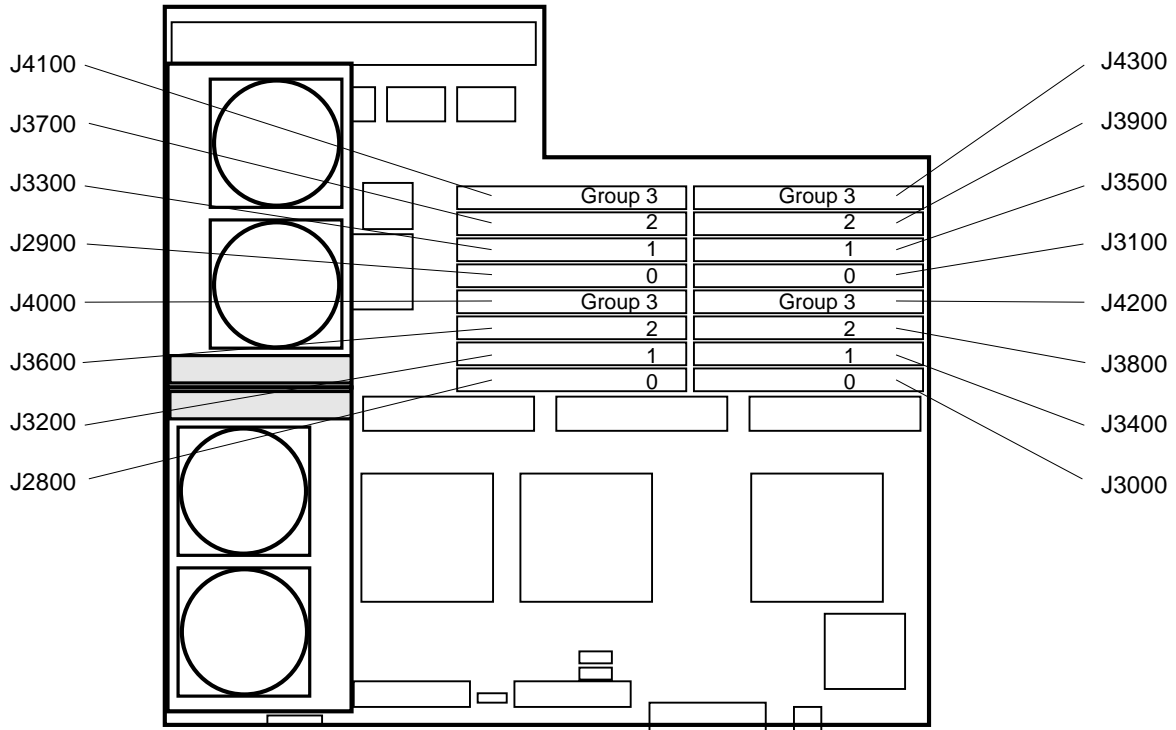


Figure A-4 SIMM Locations on the System Board

A.1.4.1 NVSIMM

Before installing NVSIMMs you must first activate the battery to insure data retention.

To activate the battery:

1. **Locate the jumper on the right side of the NVSIMM.**
See Figure A-5.

2. Move the jumper to the battery on position.

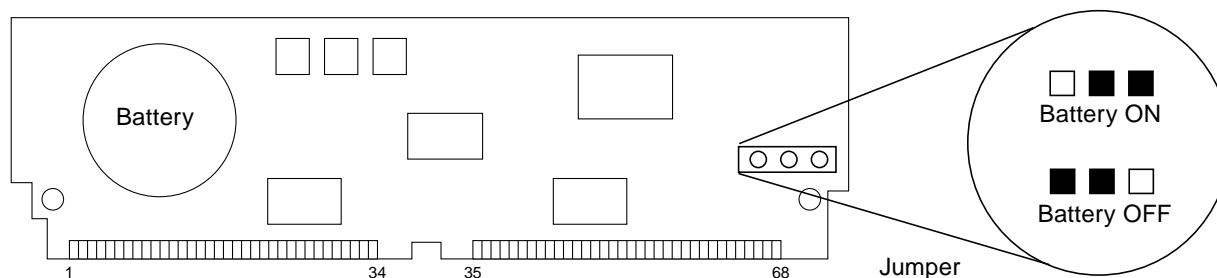


Figure A-5 NVSIMM Jumper Locations



Caution – Once you turn the battery on do not remove or reposition the jumper. To do so will cause data stored in the NVSIMM memory to be lost.

A.2 Selecting Drive ID Numbers in the SCSI Tray

The SCSI tray is mounted in the server front and provides locations for six devices and the device controller. The controller connects to the system board via the backplane. The SunCD Plus device, mounted in the lower left location in the SCSI tray, has a device ID of 6. The tape drive, if installed, mounts just above the SunCD Plus and has device ID 5. Your system can have from two to four disk drives mounted on the SCSI tray right side, behind a metal faceplate. The device IDs for these devices are 0, 1, 2, and 3. See Figure A-6.

Note – Refer to the *SPARCserver 1000 System Service Manual* for specific information about setting device addresses on SCSI-2 devices.

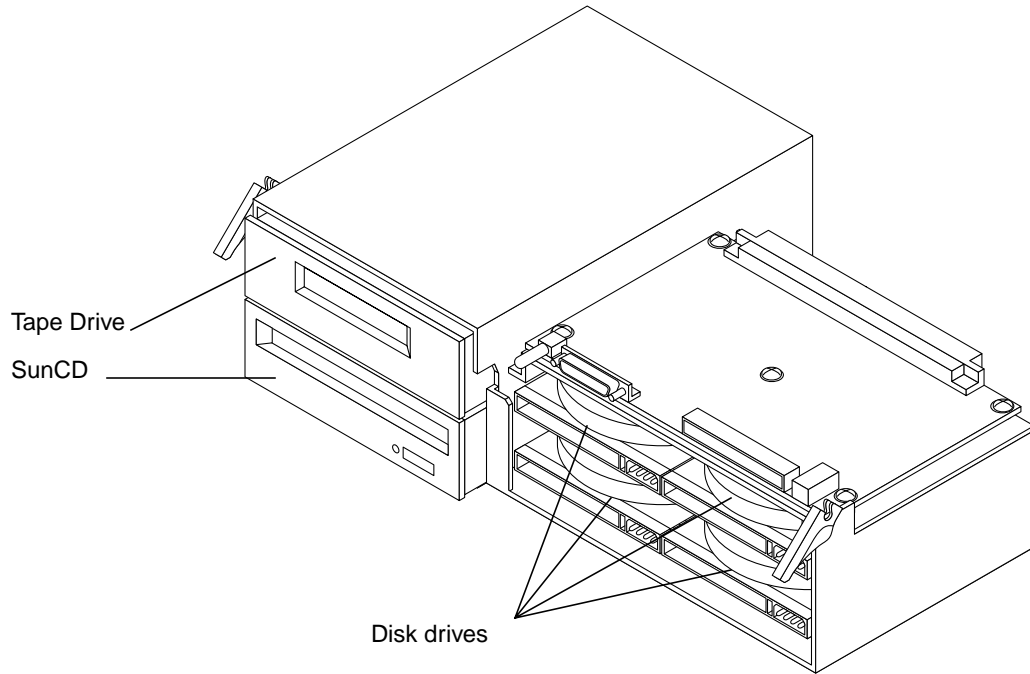


Figure A-6 SCSI Tray Assembly

Table A-3 lists the correct ID numbers for the six drives in the SCSI tray.

Table A-3 ID Numbering in a SCSI Tray

Device	ID
SunCD	6
Tape drive	5
Disk drive	3
Disk drive	2
Disk drive	1
Disk drive	0

A.3 Connecting Cables

A.3.1 SCSI Cables

The SCSI cables for the internal devices are connected at the factory. If you are installing additional devices in the device tray, refer to the device installation instructions that accompany the storage device.

A.3.2 Ethernet Cables

The main network cable must be connected to the on-board Ethernet connector on system board 0. Refer to Chapter 2 of this manual and to the instructions that come with your Ethernet transceivers for additional information.

The SPARCserver 1000 system supports twisted-pair Ethernet installations.

A.3.3 Video Cables

Only one CGSIX interface is allowed per system. It must be installed in SBus slot 1 of system board 0. The keyboard must be plugged into the keyboard connector of system board 0 and the video cable into the GCSIX card.

The diagnostic program requires a monitor or terminal. If the system lacks a monitor, an RS232 TTY terminal must be plugged into port A of the system board in slot 0.

Glossary

Air Restrictor Board

A blank board with a special air deflector fin to simulate the airflow pattern of an actual board. If air restrictor boards are not installed in blank slots, a condition called a “thermal short” is created. Thermal shorts severely reduce the cooling capability of the system, which can lead to equipment damage.

Bus Arbitration System

When there are at least two SuperSPARC modules in the system, a system of bus arbitration is required to govern which processor has control of the system resources at any moment. The SPARCserver 1000 arbitration system consists of one Central Arbiter (CARB) on the control board and one Board Arbiter (BARB) on every system board.

ASIC (Applications Specific Integrated Circuit)

Many circuits that formerly were composed of many ICs and other components are now implemented by single ASICs. Among these are: BARB, CARB, BBC, BIC, BW, MQH, IOC, and SBI. See individual ASIC names for details.

Backplane

The backplane is located near the center of the chassis. The control board and power supply connect on one side of the backplane and the system boards or other boards connect on the other side of the backplane.

BARB (Board Arbiter)

BARBs are part of the bus arbitration system. One BARB ASIC is located on each system board. See *Arbitration System*.

BBC (BootBus Controller)

The BBC is an ASIC on the control board. The BBC works with a BBC2 on each system board to control parts of the boot process. Among other functions, the BBC2 provides SuperSPARC modules access to diagnostic code contained in POST EPROMs on the system board. Other functions permit SuperSPARC modules to access system status registers and the time-of-day (TOD) clock.

BBC2 (BootBus Controller 2)

See *BBC*.

BIC (Bus Interface Chip)

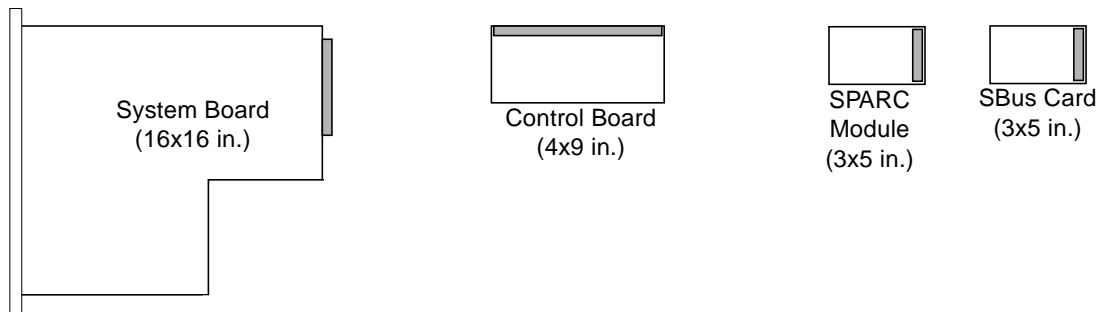
Four BICs on each system board connect the board to the backplane XDBus™.

Board

The term **board** refers to printed circuit boards larger than a certain size (for example, larger than 3x5-inch SBus **cards** and SPARC **modules**).

There are two types of boards in the SPARCserver 1000 system: system boards (maximum of four) and control board (one only). See also *Card* and *Module*.

Relative sizes of the system board, SPARC module, and SBus card are:



Note – The SPARCserver 1000 system board is not interchangeable with VME boards.

See also specific board types: *Control Board* and *System Board*. See also *SuperSPARC Module* and *SBus Card*.

Board ID

Slot identification codes are hardwired into the backplane. These codes functionally configure the board for the slot address it occupies. System boards can be installed in any slot without need for jumper (or other) configuration.

BootBus

The BootBus is located on the system board. This bus connects the OpenBoot EPROM set on system board to the SPARC module(s). See also Bus.

Bus

There are six basic types of busses in the SPARCserver 1000 system:

- XDBus—the card cage backplane bus.
- XBus—used for high bandwidth on system boards: between BW chips and SuperSPARC modules, and between IOC and SBI chips.
- SBus—services SBus cards on system boards.
- Processor bus—found only on the SuperSPARC module.
- BootBus—this system board bus connects the OpenBoot EPROM to the SuperSPARC module.
- JTAG—for factory use only.

BW (Bus Watcher)

The system board has two BWs (one for each processor). BWs convert XDBus signals to XBus signals and pass them to the cache controller (MXCC) on the processor module. Together, the BWs and MXCC control the flow of information between the XDBus and the processors (and their respective cache SRAMs).

Cache

The system design places a number of memory caches adjacent to various busses for more efficient data transfer.

CARB (Central Arbiter)

A system of central arbiters (one CARB on the control board) and a board arbiter (one BARB on every system board) determine which processor on which system board controls the system bus at any given time.

Card

In this manual, the term card refers to a 3x5-inch SBus card. See also *Board*, *Module*, and *SBus Card*. An exception is the disk card.

Card Cage

By convention, boards are installed in a card cage (not a board cage). The SPARCserver 1000 system card cage is accessed from the rear of the enclosure that contains up to four system or other boards. The card cage provides card guides to guide the board into the backplane.

Card Slot

Each system board has three card slots for SBus interface cards.

CC (Cache Controller)

See *MXCC*.

Clock Generation

System clocks are generated on the control board and are distributed to system boards by way of the card cage backplane.

Control Board

The control board is part of the XDBus arbitration system. A central arbiter ASIC (CARB) on the control board works in cooperation with board arbiter ASICS (BARBs) on system boards to determine which processor controls the bus structure at any instant. The control board mounts on top of the SCSI tray.

Disk card

An optional SCSI-2 disk expansion board featuring four 3 1/2-inch disk drives. The card cage can accommodate up to three, residing in slots 1-3.

Filler panel

See *Air Restrictor Board*.

ID

Identity code, number, or address. ID is required for each SCSI-2 device installed in the SCSI tray.

IOC (I/O Cache)

The IOC controls movement of data to and from the SBus card slots.

J-number

A J-number is the location on a schematic drawing or printed circuit board of a device socket. In this manual a J-number corresponds to a U-number, which is the SIMM or integrated circuit that occupies the device socket.

Jumper

A jumper is a small metal sleeve that slides over two adjacent pins in a 2- or 3-pin header jumper receptacle to provide an electrical connection.

Key Switch

The key switch on the system front panel has four positions: Standby, On, Diagnostics, and Locked (reset switch is disabled, L1-A is disabled).

LED Indicators*System Front Panel*

For an explanation of this display, refer to Table 3-1, “Front Panel LED System Status.”

System Board

The system board has ten LEDs on the board rear panel. Two green LEDs (left positions) denote the presence of zero, one or two SuperSPARC modules. The remaining eight yellow LEDs (right positions) display board activity and status.

Module

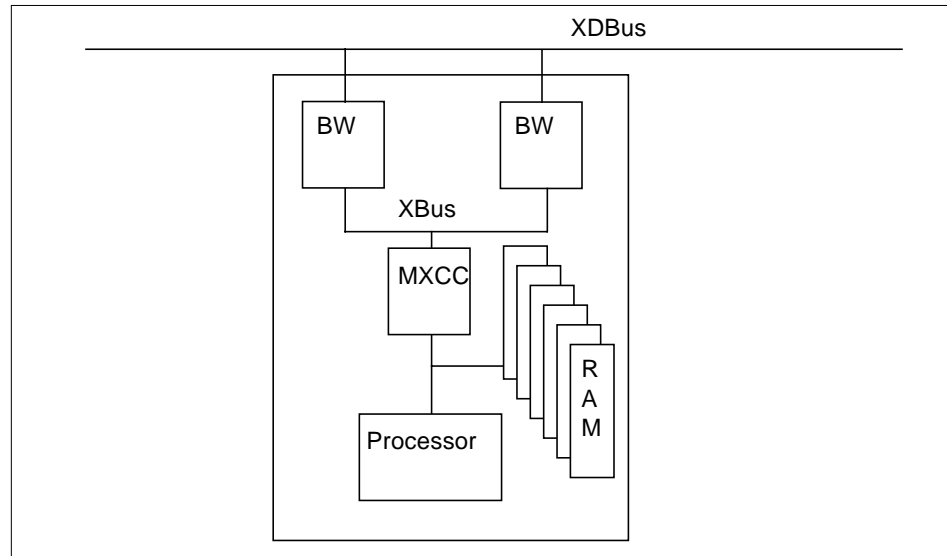
See *SuperSPARC Module*.

MQH (Memory Queue Handler)

The MQH on the system board provides the interface between the system board SIMMs and the backplane XDBus. There is one MQH on a system board.

MXCC (Module XBus Cache Controller)

The MXCC ASIC is located on the processor module and controls flow of data between the XBus and the module cache RAM and processor chip.



NVSIMM

The nonvolatile SIMM (NVSIMM) design incorporates a battery on the device to prevent data loss in the event of power failure. Battery current is shared among a group of NVSIMMs. This feature prevents memory failure should one battery fail.

Power-on Reset

Reset signals produced by reset circuitry on the control board. At power-on, reset is asserted for 200msec and is distributed to each system board to initialize all ASICs. The reset PAL maintains system reset until V_{tt} is ready.

Processor Bus

Found only on the SuperSPARC module. To compare bus types, see *Bus*.

Processor

See *SuperSPARC Module*.

Replaceable Unit

Replaceable units are server subassemblies which can be replaced at the customer site by trained, qualified service personnel.

Reset Switch

This switch is found behind the front panel. When pressed, it resets the system.

Root Disk

The root disk is the disk drive where the operating system resides. This drive is in the SCSI tray that is located behind the front panel.

SBI (SBus Interface)

The SBI implements the interface between the SBus and the XBus. There is one SBI on each system board.

SBus

Located on the system board, this bus connects up to three optional SBus cards to the SBus Interface controller (SBI), which connects (in turn) interfaces with other busses on the system board.

SBus card

Any of a large number of available cards providing optional features to the system. Three SBus connectors are present on every system board.

SBus clock

An oscillator driven timing means governing the speed at which SBus-based devices operate.

SCSI Tray

This tray can hold up to six SCSI-2 devices and the control card. The chassis accommodates one SCSI device tray.

SIMM (Single In-line Memory Module)

Sixteen SIMM sockets reside on the system board. A SIMM consists of control circuitry and numerous DRAMs. SIMMs are 8- or 32 Mbyte. See also *NVSIMM*.

SuperSPARC Module

This 3x5-inch card contains one SuperSPARC processor, cache memory, and a cache controller. Note that main memory (SIMM groups) reside elsewhere on the system board. A system board can have two SuperSPARC modules. A SPARCserver 1000 system can have up to four such boards equaling eight modules.

Status Registers

Three status registers reside on the system board. These registers monitor LEDs, reset status, fan-, temperature- and DC/AC power conditions. Board and processor ID are also monitored in these read-only registers.

System Board

A system board can contain two SuperSPARC modules and associated SIMMs. The board also has accommodates three optional SBus cards.

TODC (Time of Day Clock)

TODC contains the system date and time (year-month-day-hour-minutes). Every system board has a TODC, so at boot time the control board selects the TODC on one system board to be the master datekeeper for the entire system.

U-number

See *J-number*.

XBus

The XBus is a high-speed bus located on the SuperSPARC module. It connects the Bus Watchers (BWs), MXCC, IOC and SBI. See also *Bus*.

XDBus

This is the main card cage backplane bus.

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Revision History

Revision	Dash	Date	Comments
801-2893-13	-A	June 1996	2nd Revision to FCS
801-2893-11	-A	August 1993	1st Revision to FCS
801-2893-10	-A	May 1993	First Customer Ship (FCS)

Reader Comments

We welcome your comments and suggestions to help improve the *SPARCserver 1000 System Installation Manual*, part number 801-2893-13. Please take time to let us know what you think about this manual.

- The tasks were well documented and easy to follow.

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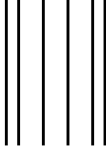
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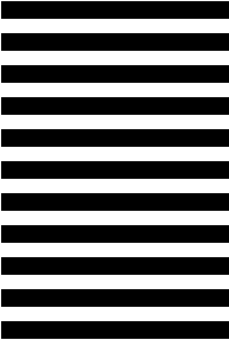
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