

# *SPARCcluster™ High Availability Server Hardware Planning and Installation Manual*



The Network Is the Computer™

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## *Preface*

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This manual provides installation instructions for SPARCcluster™ High Availability™ systems, including factory-assembled and customer-assembled models.

These instructions are designed for a qualified service-trained service provider and/or system administrator with networking knowledge.

### *How This Book Is Organized*

#### *Part 1 — Planning*

**Chapter 1, “Checklist,”** provides checklists to verify that you have all the items that are necessary to complete the installation.

**Chapter 2, “Product Description,”** defines what a SPARCcluster High Availability system is, and presents details of several example configurations.

**Chapter 3, “Specifications,”** provides system specifications.

**Chapter 4, “Site Preparation and Planning,”** provides guidelines and information for preparing the site.

**Chapter 5 and Chapter 6** provide configuration information for the SPARCcluster 1000 High Availability and SPARCcluster 2000 High Availability systems, respectively.

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## *Part 2 — Hardware Installation*

**Chapter 7, “Powering Off and On”** provides procedures for powering the systems off and on.

**Chapter 8, “Access”** explains how to remove all relevant cover panels.

**Chapter 9 and Chapter 10** provide procedures for installing the SPARCcluster 1000 High Availability and SPARCcluster 2000 High Availability systems respectively.

## *Part 3 — Software Installation*

**Chapter 11, “Installing the Software,”** has instructions for configuring the terminal concentrator. It additionally points to related documentation for installing the operating system and other software.

## *Part 4 — Appendix and Index*

**Appendix A, “Air Baffle, Rack Mount Rail and Blower Assembly Installation”** gives procedures for installing rails in the cabinets and installing SPARCstorage™ Array 100 and SPARCserver™ 1000 chassis on the rails.

For information on troubleshooting installation problems, refer to the *SPARCcluster High Availability System Service Manual*.

## *When You Need Help with UNIX Commands*

This manual may not include specific software commands or procedures. Instead, it may name software tasks and refer you to operating system documentation or the handbook that was shipped with your new hardware.

The type of information that you might need to use references for includes:

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

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See one or more of the following:

- *Solaris 2.x Handbook for SMCC Peripherals* contains Solaris™ 2.x software commands.
- On-line *AnswerBook* for the complete set of documentation supporting the Solaris 2.x software environment.
- Other software documentation that you received with your system.

## Typographic Conventions

The following table describes the typographic changes 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. machine_name% You have mail.
AaBbCc123	What you type, contrasted with on-screen computer output	<pre>machine_name% su Password:</pre>
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.

---

## Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

Table P-2 Shell Prompts

Shell	Prompt
C shell prompt	machine_name%
C shell superuser prompt	machine_name#
Bourne shell and Korn shell prompt	\$
Bourne shell and Korn shell superuser prompt	#

## Related Documentation

The following documents contain information that may be helpful to the system administrator and service provider.

Table P-3 Related Documents

Product Family	Title	Part Number
<b>SPARCcenter 2000</b>	<b>SPARCcenter 2000 Binder Set</b>	<b>825-1509</b>
	<i>SPARCcenter 2000 Installation Manual</i>	800-6975
	<i>SPARCcenter 2000 Service Manual</i>	801-2007
	<i>SPARCcenter 2000 Storage Device User's Guide</i>	800-7009
	<i>SPARCcenter 2000 Regulatory Compliance Manual</i>	801-3051
<b>SPARCserver 1000</b>	<b>SPARCserver 1000 Binder Set</b>	<b>825-1725</b>
	<i>SPARCserver 1000 System Installation Manual</i>	801-2893
	<i>SPARCserver 1000 System Service Manual</i>	801-2895
	<i>SPARCserver 1000 Storage Device User's Guide</i>	801-2198
	<i>SPARCserver 1000 Regulatory Compliance Manual</i>	801-2892
<b>SPARCstorage Array 100</b>	<b>SPARCstorage Array 100 Installation and Service Set</b>	<b>825-2513</b>
	<i>SPARCstorage Array Model 100 Series Installation Manual</i>	801-2205
	<i>SPARCstorage Array Model 100 Series Service Manual</i>	801-2206

Table P-3 Related Documents (Continued)

<b>Product Family</b>	<b>Title</b>	<b>Part Number</b>
	<i>SPARCstorage Array Regulatory Compliance Manual</i>	801-7103
<b>SPARCcluster 1000 and SPARCcluster 2000 High Availability</b>	<b>SPARCcluster High Availability Planning and Installation Binder Set</b>	<b>825-2741</b>
	<i>Getting Started (roadmap document)</i>	802-3513
	<i>SPARCcluster High Availability Server Software Planning and Installation Manual</i>	802-3509
	<i>SPARCcluster High Availability Server Hardware Planning and Installation Manual</i>	802-3510
	<i>SunVTS Version 0.8 User's Guide</i>	802-3686
	<b>SPARCcluster High Availability Administration and Service Binder Set</b>	<b>825-3065</b>
	<i>Getting Started (roadmap document)</i>	802-3513
	<i>SPARCcluster High Availability Server Software Administration Guide</i>	802-3511
	<i>SPARCcluster High Availability Server Service Manual</i>	802-3512
	<i>SPARCcluster High Availability Release Notes</i>	802-4760
<b>Terminal Concentrator</b>	<b>Terminal Concentrator Binder Set</b>	<b>825-2227</b>
	<i>Terminal Concentrator Installation Notes</i>	801-6127
	<i>Terminal Concentrator General Reference Guide</i>	801-5972
<b>Solstice Disksuite</b>	<b>Solstice Disksuite Binder Set</b>	<b>825-3065</b>
	<i>Solstice Disksuite 4.0 Administration Guide</i>	802-2422
	<i>Solstice Disksuite Tool 4.0 User's Guide</i>	802-1724
<b>Oracle7™</b>	<i>Oracle Documents per Oracle</i>	
<b>Other Referenced Manuals</b>	<i>Disk Drive Installation Manual for the SPARCstorage Array Model 100 Series</i>	801-2207
	<i>SunFastEthernet Adapter User's Guide</i>	801-6109
	<i>Fibre Channel SBus Card Installation Manual</i>	801-6313
	<i>Fibre Channel Optical Module Installation Manual</i>	801-6326
	<i>FSBE/S SBus Card Manual</i>	800-7508
	<i>Multi-Disk-Pack Installation and Service Guide</i>	801-6119

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## Notes, Cautions, and Warnings



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

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**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.

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Individuals who remove any outer panels or open covers 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.

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**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.

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## *Part 1 — Site Preparation and Planning*

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# Checklist



This chapter gives specific information and checklists to use when inventorying each type of SPARCcluster High Availability system.

<i>SPARCcluster 1000 High Availability System— Factory-Assembled</i>	<i>page 1-2</i>
<i>SPARCcluster 1000 High Availability System— Customer-Assembled</i>	<i>page 1-3</i>
<i>SPARCcluster 2000 High Availability System — Factory-Assembled</i>	<i>page 1-5</i>
<i>SPARCcluster 2000 High Availability System — Customer-Assembled</i>	<i>page 1-7</i>

## 1.1 SPARCcluster 1000 High Availability System— Factory-Assembled

### 1.1.1 General Description

Table 1-1 Requirements for SPARCcluster 1000 Configuration

Device	Minimum	Maximum	Comment
SPARCserver 1000 systems (nodes)	2	2	
System boards	4 (2/chassis)	8 (4/chassis)	
Memory	256 Mbyte (128 Mbyte/chassis)	1.0 Gbyte (512 Mbyte /chassis)	Each node is equipped with an identical amount of memory.
SunFastEthernet™ SBus cards	4 (2 per node)	4 (2 per node)	
SPARCstorage Array 100 units	3	3	Each equipped with 2 FC/OM optical modules.
FC/S cards	6 (3 per node)	16 (8 per node)	
FC/OM optical modules	3	8	One additional for each SPARCstorage array.
Terminal concentrator	1	1	
Cable set	1		
Expansion cabinet		1	To house 4th through 8th SPARCstorage array.

### 1.1.2 Checklist

Table 1-2 Checklist for SPARCcluster 1000 High Availability Model

Category	Item	Quantity Planned	Quantity On Hand
Systems	SPARCserver 1000 systems		
	System boards		
	Memory		
SBus cards	SunFastEthernet (SFE card)		
	FC/S card		
Chassis	SPARCstorage Array 100 units		

Table 1-2 Checklist for SPARCcluster 1000 High Availability Model (Continued)

Category	Item	Quantity Planned	Quantity On Hand
Cables	Terminal concentrator		
	RS-232 serial cable, PN 530-2152		
	Ethernet cable, standard		
	Sun private net cable, 1 meter, PN 530-2149		
	Sun private net cable, 5 meter, PN 530-2150		
	Optional fiber optic cable, 2 meter, PN 537-1004		
	Optional fiber optic cable, 15 meter, PN 537-1006		
Expansion cabinet			

## 1.2 SPARCcluster 1000 High Availability System— Customer-Assembled

### 1.2.1 General Description

Table 1-3 Requirements for SPARCcluster 1000 High Availability Configuration

Device	Minimum	Maximum	Comment
SPARCserver 1000 systems (nodes)	2	2	
System boards	4 (2/chassis)	8 (4/chassis)	
Memory	256 Mbyte (128 Mbyte/chassis)	1.0 Gbyte (512 Mbyte /chassis)	Each node is equipped with an identical amount of memory.
SunFastEthernet SBus cards	4 (2 per node)	4 (2 per node)	
SPARCstorage Array 100 units	3	8	Each equipped with 2 FC/OM optical modules.
FC/S cards	6 (3 per node)	16 (8 per node)	
FC/OM optical modules	3	8	One additional for each SPARCstorage array.
Terminal concentrator	1	1	

Table 1-3 Requirements for SPARCcluster 1000 High Availability Configuration

Device	Minimum	Maximum	Comment
Cable set	1		
Rail set, consisting of a left and a right side rail and one base plate to mount one chassis — plus associated mounting hardware, a label, power cords and documentation	5 (1 set per chassis)	10 (1 set per chassis)	
Expansion cabinet		1	To house 4th through 8th SPARCstorage array.

### 1.2.2 Checklist

Table 1-4 Checklist for SPARCcluster 1000 High Availability Model

Category	Item	Quantity Planned	Quantity On Hand
Systems	SPARCserver 1000 systems		
	System boards		
	Memory		
SBus cards	FC/S card		
	SunFastEthernet (SFE card)		
Chassis	SPARCstorage Array 100 units		
	Terminal concentrator		
Cables	RS-232 serial cable		
	Ethernet cable, standard		
	Sun private net cable, 1 meter, PN 530-2149		
	Sun private net cable, 5 meter, PN 530-2150		
	Optional fiber optic cable, 2 meter, PN 537-1004		
	Optional fiber optic cable, 15 meter, PN 537-1006		
Rail kit	Rail set, consisting of a left and a right side rail and one base plate to mount one chassis — plus associated mounting hardware, a label, power cords, and documentation		
Expansion cabinet			

## 1.3 SPARCcluster 2000 High Availability System — Factory-Assembled

### 1.3.1 General Description

Table 1-5 Requirements for SPARCcenter 2000 Configuration

Device	Minimum	Maximum	Comment
System boards	6 (3/cabinet)	20 (10/cabinet)	
Memory	768 Mbyte (384 Mbyte/cabinet)	10.0 Gbyte (5.0 Gbyte /cabinet)	Each node is equipped with an identical amount of memory.
FSBE/S cards	4 (2/cabinet)	4 (2/cabinet)	In each node, one supports the the boot disks and one supports the SCSI panel.
SunFastEthernet SBus cards	4 (2/cabinet)	4 (2/cabinet)	
SPARCstorage Array 100 units	3	20	Each equipped with 2 FC/OM optical modules.
FC/S card	6 (3 per node)	40 (20 per node)	
FC/OM optical modules	3	40 (20 per node)	One additional for each SPARCstorage array.
Disks (for booting)e	2	2	
Terminal concentrator	1	1	
Cable set	1		
SCSI II cables	2		One connects to the boot disks, one connects to the SCSI tray.
SCSI II terminator	2		One each on the boot disk and SCSI tray SCSI OUT connector.
Expansion cabinet		4	To house 5th through 20th SPARCstorage array as appropriate.

### 1.3.2 Checklist

Table 1-6 Checklist for SPARCcluster 2000 High Availability Model

Category	Item	Quantity Planned	Quantity On Hand
Systems	SPARCcenter 2000 systems		
	System boards		
	Memory		
SBus cards	FC/S card		
	SunFastEthernet (SFE card)		
	FSBE/S card		
Chassis	SPARCstorage Array 100 units		
	Disks (for booting)		
	Terminal concentrator		
Cables	SCSI II cables		
	SCSI II terminator		
	RS-232 serial cable		
	Ethernet cable, standard		
	Sun private net cable, 1 meter, PN 530-2149		
	Sun private net cable, 5 meter, PN 530-2150		
	Optional fiber optic cable, 2 meter, PN 537-1004		
Optional fiber optic cable, 15 meter, PN 537-1006			
Expansion cabinets			

## 1.4 SPARCcluster 2000 High Availability System — Customer-Assembled

### 1.4.1 General Description

Table 1-7 Requirements for SPARCcluster 2000 High Availability Configuration

Device	Minimum	Maximum	Comment
System boards	6 (3/cabinet)	20 (10/cabinet)	
FSBE/S cards	4 (2/cabinet)	4 (2/cabinet)	In each node, one supports the the boot disks and one supports the SCSI panel.
SunFastEthernet SBus cards	4 (2/cabinet)	4 (2/cabinet)	
SPARCstorage Array 100 units	3	20	Each equipped with 2 FC/OM optical modules.
FC/S card	6 (3 per node)	40 (20 per node)	
FC/OM optical modules	3	40 (20 per node)	One additional for each SPARCstorage array.
Disks (for booting), 1 GByte	2	2	
Terminal concentrator	1	1	
Cable set	1		
SCSI II cable	4 (2/node)	4 (2/node)	To connect boot disks and the SCSI panel.
SCSI II terminator	4 (2/node)	4 (2/node)	To terminate boot disks and the SCSI panel.
Rail set, consisting of a left and a right side rail and one base plate to mount one SPARCstorage array (chassis) — plus associated mounting hardware, a label, power cords and documentation	3 sets (1/chassis)	20 sets (1/chassis)	
Expansion cabinet		4	To house 5th through 20th SPARCstorage array as appropriate.

## 1.4.2 Checklist

Table 1-8 Checklist for SPARCcluster 2000 High Availability Model

Category	Item	Quantity Planned	Quantity On Hand
Systems	SPARCcenter 2000 systems		
	System boards		
	Memory		
SBus cards	FC/S card		
	SunFastEthernet (SFE card)		
	FSBE/S card		
Chassis	SPARCstorage Array 100 units		
	Disks (for booting)		
	Terminal concentrator		
Cables	SCSI II cables		
	SCSI II terminator		
	RS-232 serial cable		
	Ethernet cable, standard		
	Sun private net cable, 1 meter, PN 530-2149		
	Sun private net cable, 5 meter, PN 530-2150		
	Optional fiber optic cable, 2 meter, PN 537-1004		
Optional fiber optic cable, 15 meter, PN 537-1006			
Expansion cabinets			

## *Product Description*

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Solstice™ High Availability 1.0 (Solstice HA) is a software product that provides fault-tolerant support and automatic data service failover for specific dual-server hardware configurations. The configurations will recover from server, disk, and network failures, as well as software failures.

Solstice HA uses Solstice DiskSuite 4.0 software to provide the diskset, mirroring, concatenation, striping, hot spare disks, file system growing, and UNIX file system logging capabilities.

Solstice HA allows configurations to be either symmetric or asymmetric. In the asymmetric configuration, one of the systems acts as a hot standby for the other system. In symmetric configurations both servers can actively offer data services.

The data services provided by Solstice High Availability are:

- Highly available NFS®, Sun's distributed computing file system (Solstice High Availability/HA-NFS)
- Highly available ORACLE® database management system (Solstice High Availability/HA-ORACLE)

---

**Note** – A cluster is comprised of two identical compute nodes.

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The SPARCcluster High Availability server family consists of two products, the SPARCcluster 1000 and SPARCcluster 2000 High Availability systems. The systems are implemented on SPARCserver™ 1000 or SPARCcenter™ 2000 server platforms using redundant SPARCstorage™ array 100 systems.

## 2.1 Features

The key features of the Solstice HA software package include:

- Tolerance of single-point software failures or crashes
- Tolerance of single-point hardware faults
- Appearance of continuous availability of data service (NFS clients will only see “Server Not Responding” messages during a takeover)
- Automatic detection of system and data service failure
- Automatic takeover, recovery, and service restoration
- Automatic post-takeover redirection of HA-NFS clients
- Automatic restart of fault monitoring on a server after it is repaired

Additionally, Solstice HA provides on-line serviceability which enables administrators to take an appropriately configured server off-line for repair or routine maintenance while the data services remain available from the other server in the configuration.

Figure 2-1 and Figure 2-2 depict functional block diagrams of SPARCcluster High Availability servers based on the SPARCserver 1000 and SPARCcenter 2000, respectively.

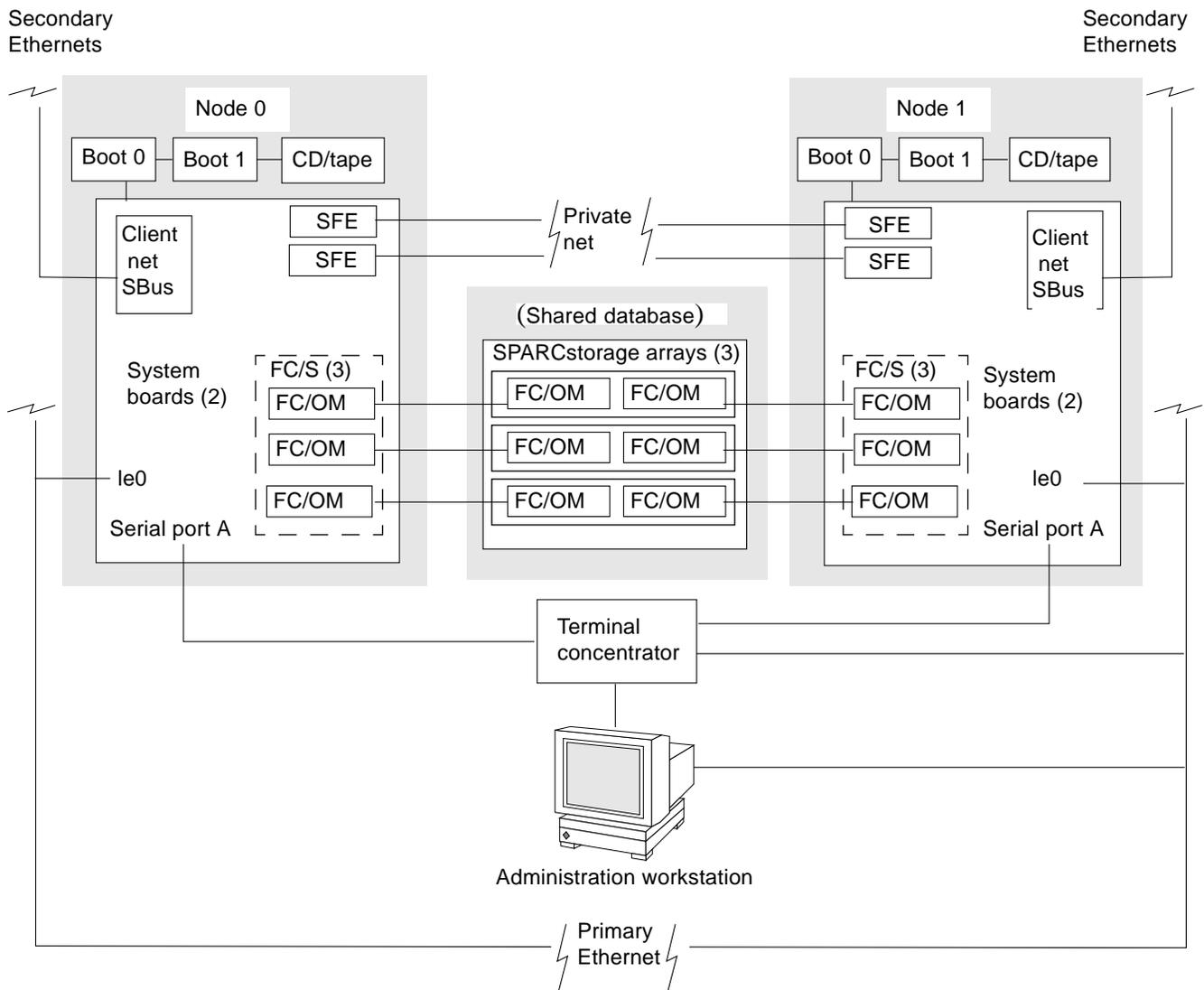


Figure 2-1 SPARCcluster High Availability Server Block Diagram Based on SPARCserver 1000

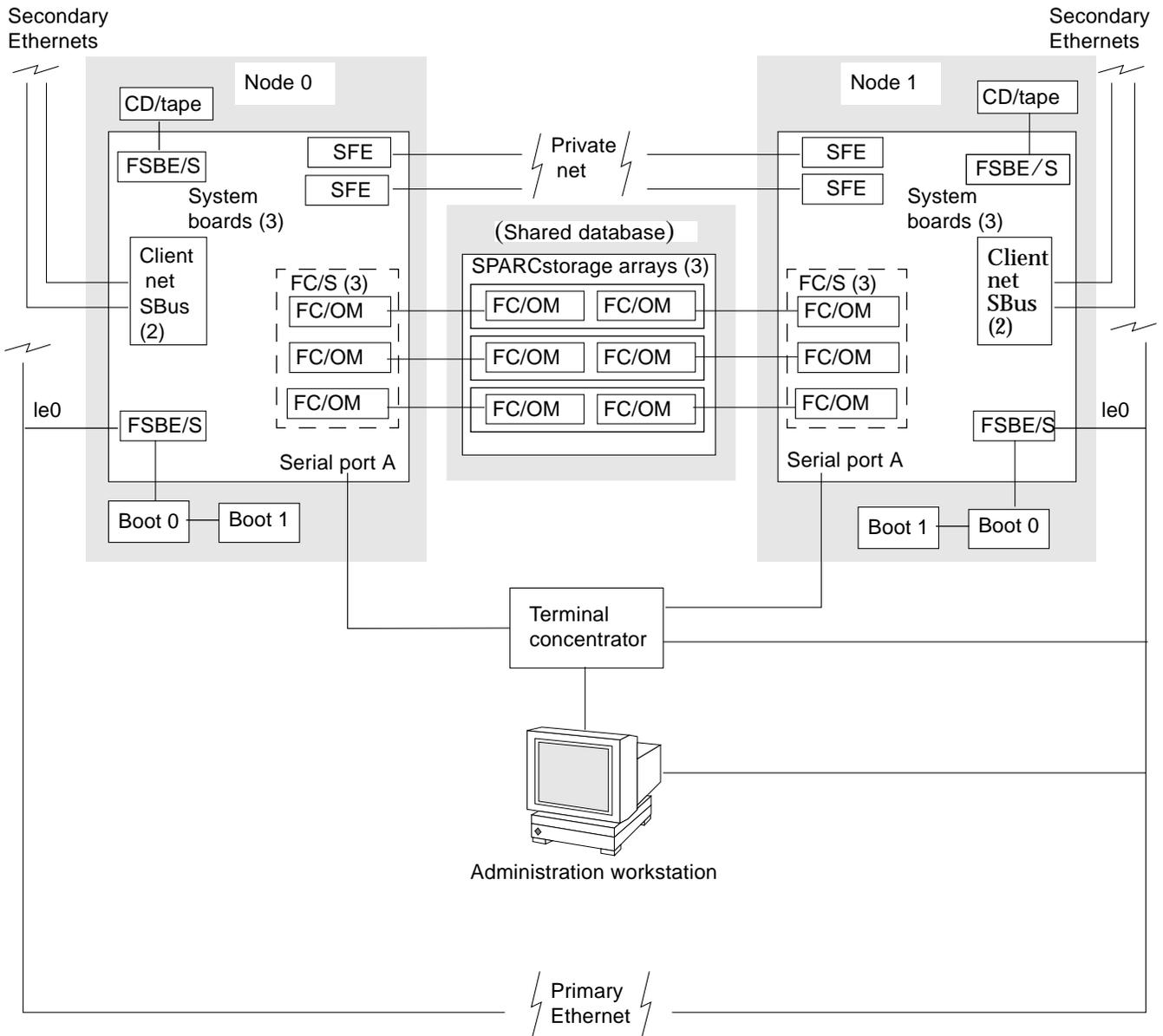


Figure 2-2 SPARCcluster High Availability Server Block Diagram Based on SPARCcenter 2000

## 2.2 SPARCcluster 1000 High Availability Server Configuration

Figure 2-3 shows the SPARCserver 1000 hardware configuration required to support the SolsticeServer™ High Availability software. The minimum configuration is:

- One 56-inch expansion rack
- Two SPARCserver 1000s each containing:
  - Two system boards
  - Four processor modules (2/system board)
  - 128 Mbyte RAM
  - Two internal disk drives
- Three SPARCstorage arrays
- Six fiber optic cables
- Six FC/S SBus cards, each equipped with a FC/OM optical module
- Terminal concentrator
- Four SunFastEthernet cards with Sun private net cables
- Administration workstation with CD-ROM drive
- Two client net SBus cards

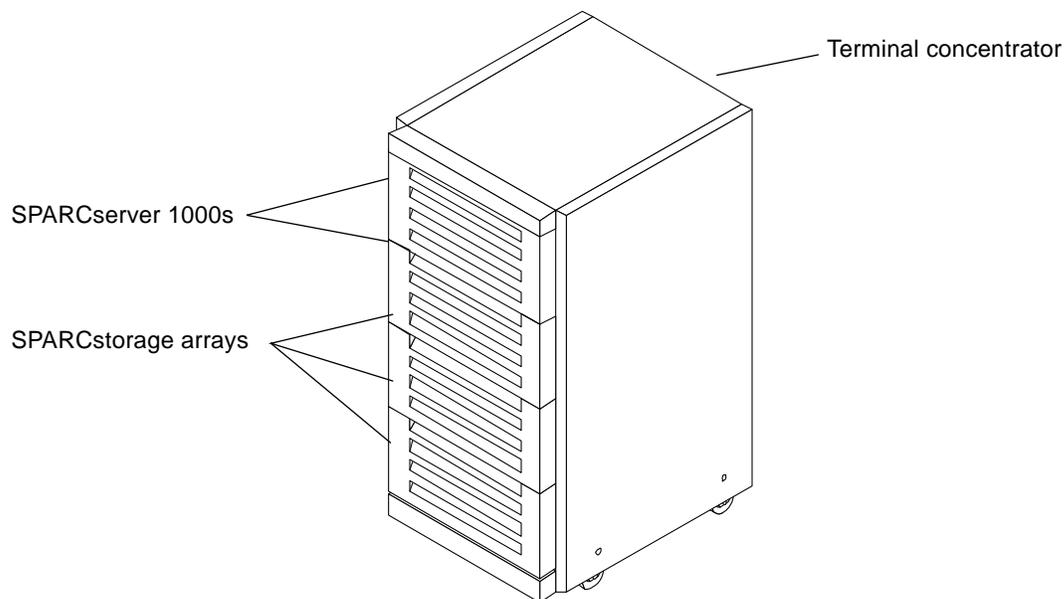


Figure 2-3 Rack-mounted SPARCcluster 1000 High Availability Server Cabinet

### 2.3 SPARCcluster 2000 High Availability Server Configuration

Figure 2-4 shows the SPARCcenter 2000 server hardware configuration required to support the Solstice High Availability software. The minimum configuration is:

- Two SPARCcenter 2000s, each equipped with:
  - Three system boards
  - Six processor modules
  - 256 Mbyte RAM
  - Three SPARCstorage arrays
  - Six FC/S SBus cards, each equipped with a FC/OM optical module
  - Terminal concentrator
  - Six fiber optic cables
  - Four SunFastEthernet cards with Sun private net cables
  - Four boot disks
  - Four client net SBus cards (SQEC or similar)
  - Administration workstation with CD-ROM drive

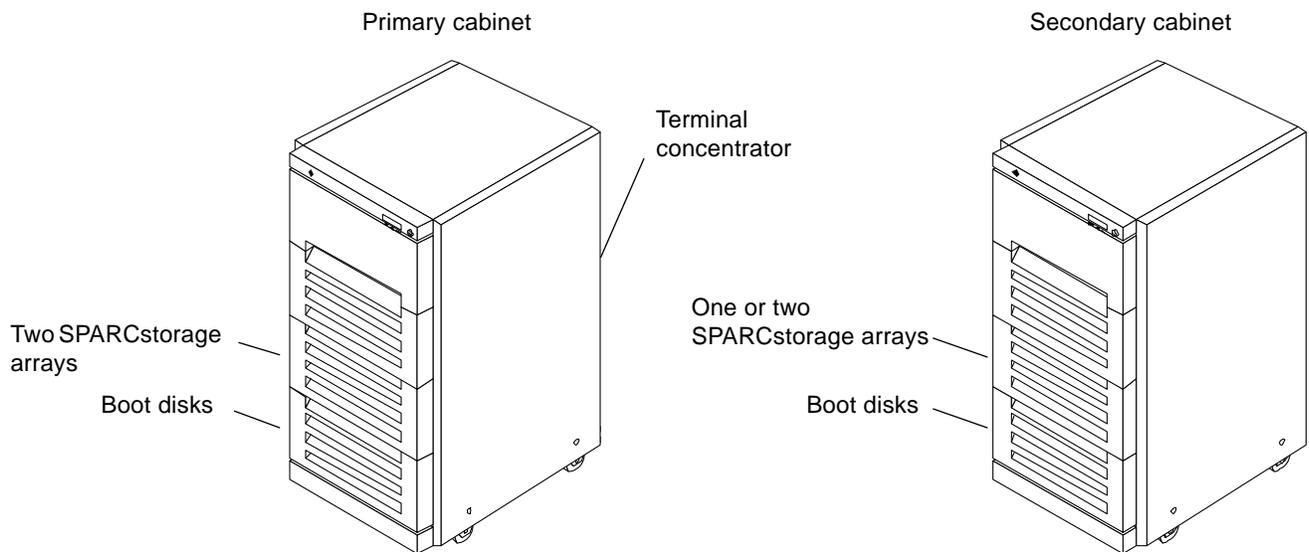


Figure 2-4 SPARCcluster 2000 High Availability Cabinets

# *Specifications*

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This section provides the environmental, physical, and electrical specifications for the SPARCcluster 1000 High Availability and SPARCcluster 2000 High Availability Servers.



---

**Caution** – Make no mechanical or electrical modifications to the cabinets. Sun is not responsible for the regulatory compliance if a cabinet is modified.

---

## *3.1 Physical Specifications*

Physical specifications are presented in the tables which follow.

### 3.1.1 SPARCcluster 1000 High Availability



**Caution** – Make no mechanical or electrical modifications to the cabinets. Sun is not responsible for the regulatory compliance if a cabinet is modified.

Table 3-1 SPARCcluster 1000 High Availability Server Physical Specifications

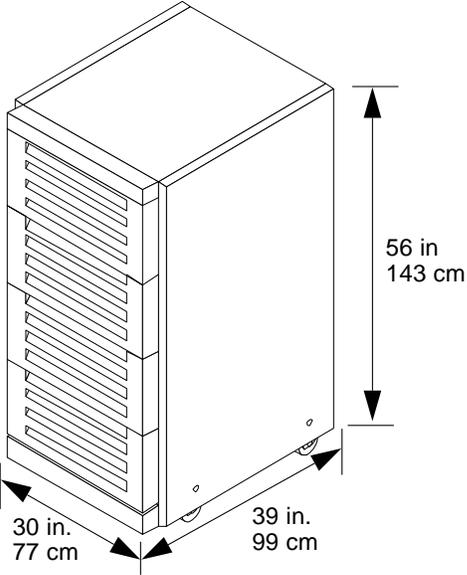
	U.S.	Metric	Comments
Height	56 in	143 cm	
Width	30 in	77 cm	
Depth	39 in	99 cm	
Weight	650 lb	300 kg	Approximate weight — depending upon configuration
Power cord	15 ft	4.6m	

Table 3-2 SPARCcluster 1000 High Availability Server Clearance and Service Access

	U.S.	Metric
Front	36 in	92 cm
Rear	36 in	92 cm
Left	36 in	92 cm
Right	36 in	92 cm

### 3.1.2 SPARCcluster 2000 High Availability



**Caution** – Make no mechanical or electrical modifications to the cabinets. Sun is not responsible for the regulatory compliance if a cabinet is modified.

Table 3-3 SPARCcluster 2000 High Availability Server Physical Specifications

	U.S.	Metric	Comments
Height	56 in	143 cm	
Width	30 in	77 cm	
Depth	39 in	99 cm	
Weight	900 lb	360 kg	Approximate weight — depending upon configuration
Power cord	15 ft	4.6m	

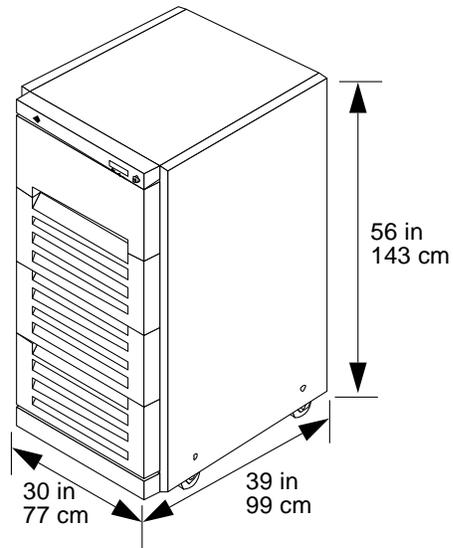


Table 3-4 SPARCcluster 2000 High Availability Server Clearance and Service Access

	U.S.	Metric
Front	36 in	92 cm
Rear	36 in	92 cm
Left	36 in	92 cm
Right	36 in	92 cm

### 3.1.3 Expansion Cabinet



**Caution** – Make no mechanical or electrical modifications to the cabinets. Sun is not responsible for the regulatory compliance if a cabinet is modified.

Table 3-5 Expansion Cabinet Physical Specifications

	U.S.	Metric	Comments
Height	56 in	143 cm	
Width	30 in	77 cm	
Depth	39 in	99 cm	
Weight	1000 lb	455 kg	Approximate weight — depending upon configuration
Power cord	15 ft	4.6m	

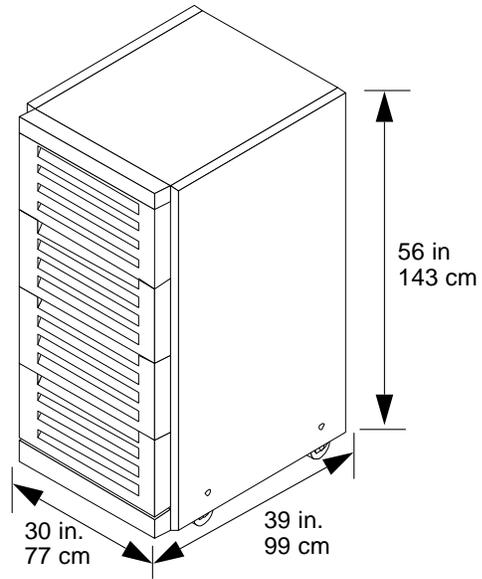


Table 3-6 Expansion Cabinet Clearance and Service Access

	U.S.	Metric
Front	36 in	92 cm
Rear	36 in	92 cm
Left	36 in	92 cm
Right	36 in	92 cm

## 3.2 Electrical Specifications

### 3.2.1 SPARCcluster 1000 High Availability Server

Table 3-7 provides specifications for the system cabinet equipped with two SPARCserver 1000E systems and three SPARCstorage arrays.

Table 3-7 SPARCcluster 1000 High Availability Server Electrical Specifications

Parameter		Value
<b>Input current</b>	<b>Voltage range</b>	200-240 VAC
	Current, maximum	17A at 220 VAC input
	Current frequency range	47-63 Hz
Input power rating	Total continuous power	3480W
Volt-Ampere rating		3740 VA
BTU rating		11,850 BTU
Power factor		0.91-0.96
Plug type	U.S.	NEMA L6-30P for 200-240 VAC
	International	32A, single phase IEC 309, connected for 220-240 VAC

### 3.2.2 SPARCcluster 2000 High Availability Server

Table 3-8 provides specifications for one server cabinet equipped with two SPARCstorage arrays.

Table 3-8 SPARCcluster 2000 High Availability Server Electrical Specifications

Parameter		Value
<b>Input current</b>	<b>Voltage range</b>	200-240 VAC
	Current, maximum	24.7A at 220VAC input
	Current frequency range	47-66 Hz
Input power rating	Total continuous power	5100 W
Volt-Ampere rating		5430 VA
BTU rating		17,390 BTU

*Table 3-8* SPARCcluster 2000 High Availability Server Electrical Specifications

<b>Parameter</b>		<b>Value</b>
Power factor		0.91-0.96
Plug type	U.S.	NEMA L6-30P for 200-240 VAC
	International	32A, single phase IEC 309, connected for 220-240 VAC

*Table 3-9* Electrical Specifications for the Expansion Cabinet Housing Five SPARCstorage arrays

<b>Parameter</b>		<b>Value</b>
<b>Input current</b>	<b>Voltage range</b>	200-240 VAC
	Current, maximum	24A at 220 VAC input
	Current frequency range	47-63 Hz
Input power rating	Total continuous power	5016W
Volt-Ampere rating		5280 VA
BTU rating		17,104 BTU
Power factor		0.91-0.96
Plug type	U.S.	NEMA L6-30P for 200-240 VAC
	International	32A, single phase IEC 309, connected for 220-240 VAC

### 3.3 *Environmental Specifications*

The environmental specifications presented in Table 3-10 apply to the SPARCcluster 1000- and SPARCcluster 2000 High Availability servers. Avoid temperature extremes and keep the work area clean. Maintain the operating conditions shown in Table 3-10.

*Table 3-10* Environmental Limits

Specification	Operating		Nonoperating	
	U.S.	Metric	U.S.	Metric
Temperature	50° to 86°F	10° to 30°C	-4° to 140°F	-20° to 60°C
Altitude	10,000 ft	3,048m	40,000 ft	12,192m
Humidity	20% to 80% RH	5% to 95% RH	20% to 80% RH	5% to 95% RH

Sun suggests installing the SPARCcluster High Availability Server in a computer room environment. A computer room installation makes it possible to ensure secure access to computers and stored information. In addition, it can fulfill the requirements for a controlled environment, especially with regard to temperature, humidity, and airborne dust. A computer room installation usually provides improved protection against damage by fire, flood, or other danger originating in the building.



## *Site Preparation and Planning*

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### *4.1 Planning Floor Space*

Floor space and other requirements are:

- The cabinets require approximately three feet of space in the front and three feet of space at the back for access by service personnel.
- Power and interface cables should be kept out of the way of foot traffic. Cables can be routed inside walls, under the floor, through the ceiling, or in protective channels. Interface cables should be routed away from motors and other sources of magnetic or radio frequency interference.
- SPARCstorage arrays can be located up to 2 kilometers (1.24 miles) from the system cabinets.
- System cabinets can be located up to 100 meters (330 feet) from each other.

#### *4.1.1 SPARCcluster 1000 High Availability System*

Determine the floor plan layout for your installation.

Figure 4-1 and Figure 4-2 are examples of floor plans for the minimum and maximum configurations respectively.

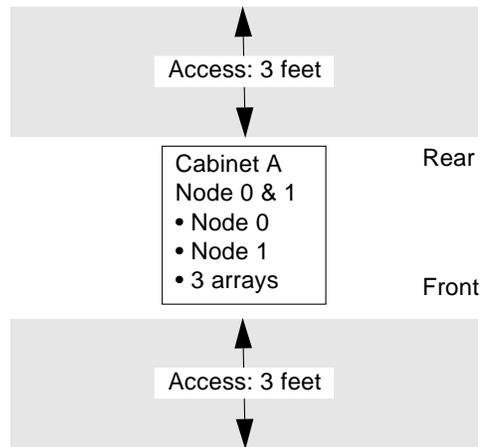


Figure 4-1 SPARCcluster 1000 High Availability System Floor Plan Example — Minimum Configuration (Top View)

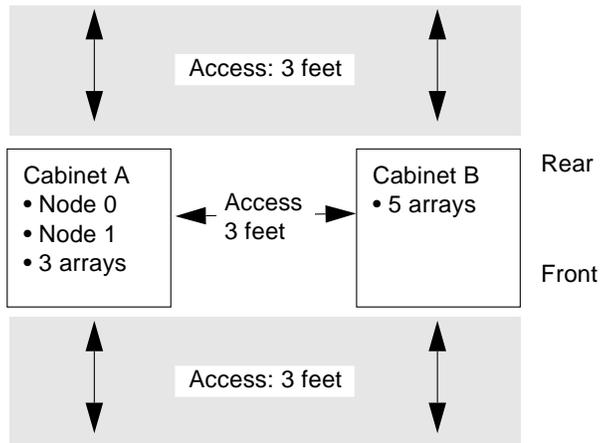


Figure 4-2 SPARCcluster 1000 High Availability System Floor Plan Example — Maximum Configuration (Top View)

### 4.1.2 SPARCcluster 2000 High Availability System

Determine the floor plan layout for your installation.

Figure 4-3 and Figure 4-4 are examples of floor plans for minimum and maximum configurations respectively.

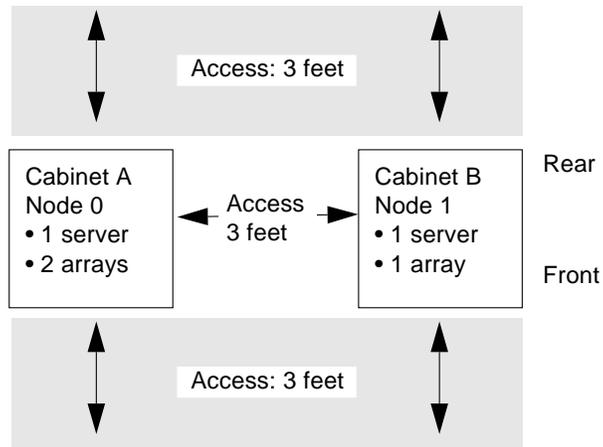


Figure 4-3 SPARCcluster 2000 High Availability System Floor Plan Example — Minimum Configuration (Top View)

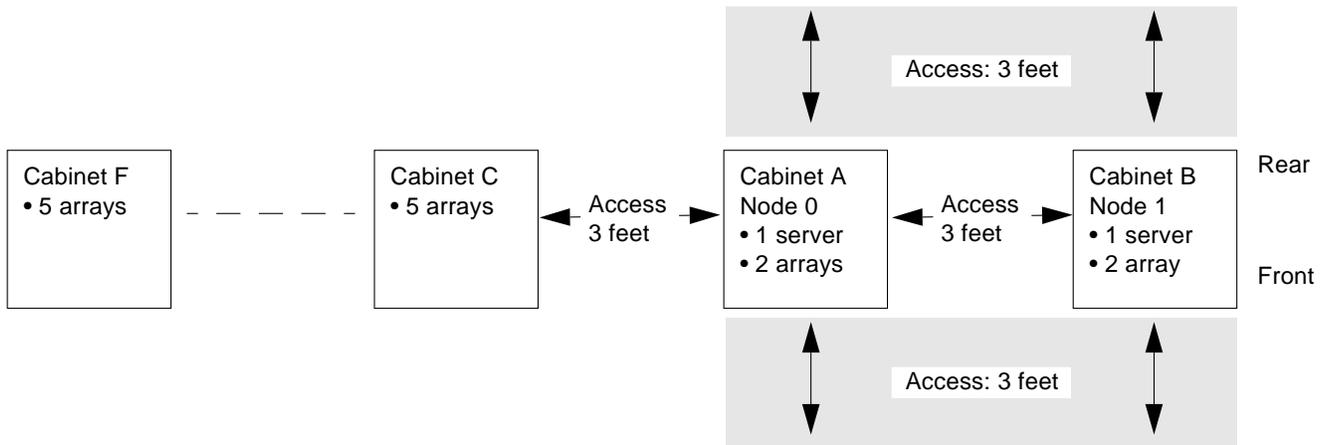


Figure 4-4 SPARCcluster 2000 High Availability System Floor Plan Example — Maximum Configuration (Top View)

## 4.2 Power Requirements and Options

Each cabinet should have a dedicated AC breaker panel. The cabinets should not share this breaker panel with unrelated equipment. Each cabinet has a single power cord that supplies AC power to the internal power distribution unit. Internal components (terminal concentrator, boot disks, server chassis and SPARCstorage arrays — as appropriate) are plugged into the power distribution unit in factory-configured systems.

All rack-mounted components in the cabinets can be connected to appropriate power outlets external to the cabinets to increase high availability.

### 4.2.1 Electrical Circuits Required

The following requirements apply to the:

- SPARCcluster 1000 Server cabinet — housing two servers and three SPARCstorage arrays
- SPARCcluster 2000 Server cabinet (one of two) — each cabinet housing one server and one or two SPARCstorage arrays
- Expansion cabinet — housing up to five SPARCstorage arrays



**Caution** – Do not power other electrical equipment from the cabinet AC power distribution unit; system reliability may be adversely affected.

Each cabinet requires a 30A circuit. Two AC connector plug types are available. The NEMA L6-30P connector is used for 200-240V North American operation. Refer to Figure 4-5. The 32A, single-phase, IEC 309 connector is available for 220-240V international operation. Refer to Figure 4-6.



Figure 4-5 NEMA L6-30P Electrical Connector



Figure 4-6 IEC 309 Electrical Connector

## 4.3 Ethernet Networks

### 4.3.1 Public Client Network

This network is per customer choice. The mode of network communication is Ethernet at time of publication.

### 4.3.2 Private Node-to-Node Network

SPARCcluster High Availability systems follow the IEEE standard for 100BASE-X Ethernet.

### 4.3.3 RS-232C/RS-423A

This section addresses asynchronous cables used to connect your Sun™ servers and Workstation™ to the terminal concentrator.

Most systems allow you to select between two EIA interface standards, RS-232C or RS-423A.

Differences between the two standards are noted in Table 4-1, but an overlap in values of certain parameters exists. When interconnecting RS-423A with RS-232C circuits, remember that performance is limited to that of RS-232C.

Table 4-1 Open-Circuit Voltages

Recommended Standard	Open Circuit Voltages		
	Minimum	Maximum	Without Damage
RS-232C	3.0V	25.0V	25.0V
RS-423A	4.0V	6.0V	12.0V

Table 4-1 shows a common operating area between  $\pm 4.0$  and  $\pm 6.0$  Volts. However, there are differences between the two standards involving rise time, data rate, and cable length specifications.

RS-232C specifies that the rise time through the  $\pm 3$  Volt transition should not exceed 4% of the signal element duration.

RS-423 generally requires much slower rise times which are specified from 10%-90% of the total signal amplitude to reduce cross talk for operation over longer distances.

### **4.3.4 Cable Requirements**

Evaluate the routing of cables to all equipment. Keep cable runs short to increase interface reliability. Other considerations include:

- Make cable runs to equipment outside the computer room as direct as possible.
- Place equipment in the computer room in a way to minimize cable run length to units outside the room.
- Where necessary, allow extra cable length to:
  - allow cables to be routed clear of strong radio frequency interference (RFI) fields.
  - permit system expansion or relocation.

#### **4.3.4.1 Cable Length**

Where possible, use short serial-interface cables for 9600 baud. Longer cables are allowed, provided the resulting load capacitance, measured at the interface point and including the signal terminator, does not exceed 2500 picofarads.

For further information see “EIA STANDARD RS-232C” and “EIA STANDARD RS-423-A”. EIA RS-232C cabling specification is available from:

Electronics Industries Association  
2001 I Street N.W.  
Washington, D.C. 20006 USA  
Phone: (202) 457-4900

#### **4.3.4.2 Shield Ground (Drain)**

Some interface applications require use of shielded cable to minimize radio frequency interference (RFI) or for other reasons. When used, connect the shield to frame ground at one or both ends depending on the specific application.

---

**Note** – On Sun Microsystems DB-25 connectors, the shield ground lead can be connected to Pin 1 at the Sun system end (Protective Ground).

---

#### 4.3.4.3 Generic Pinouts

Table 4-2 provides a cross reference of pinouts for Sun Workstations to standard EIA RS-232C and CCITT designations.

*Table 4-2* Generic Pinouts for Sun System Boards and Communication Products

Pin # (25 pin)	Signal Description	Designation	
		EIA	CCITT
1	Protective Ground	AA	101
2	Transmitted Data	BA	103
3	Received Data	BB	104
4	Request To Send	CA	105
5	Clear To Send	CB	106
6	Data Set Ready	CC	107
7	Signal Ground	AB	102
8	Data Carrier Detect	CF	109
15	Transmit Clock In (DCE Source)	DB	114
17	Receive Clock In (DCE Source)	DD	115
20	Data Terminal Ready	CD	108.2
24	Transmit Clock Out (DTE Source)	DA	113

---

**Note** – Sun Microsystems cannot guarantee proper system operation when maximum specified cable lengths are exceeded.

---

## 4.4 Coaxial Ethernet Cabling

For small Ethernet installations, you can purchase 15-meter lengths of Ethernet cable from Sun Microsystems. Use these 15-meter lengths only as single pieces, not as extensions with other cables. These branch cables come with two transceiver types:

- Vampire tap
- N-type in-line

Workstations can serve as gateways between physically separate Ethernet links. When a gateway is in place, users perceive a single logical network, and have transparent access to all the systems on both physical networks.

A gateway workstation simply has one Ethernet connection to each separate Ethernet cable. The software that performs the inter-network routing is included in the standard Solaris software release.

### 4.4.1 Ethernet Design Considerations

Note the following details when designing your Ethernet network:

- Use standard 802.3, 50-ohm Ethernet cable, capable of a 10-megabit/second transmission rate.
- Cable purchased in bulk should have marks on the casing every 2.5 meters.
- Attach transceivers, taps, and/or repeaters *only* at the 2.5 meter intervals on the cable.
- The maximum length of any standard Ethernet cable segment is 500 meters. This may consist of one continuous piece of cable or segments, but the segments must be in factors of 2.5 meters. (Spacing taps closer or farther apart disrupts cable impedance characteristics.) Cut the Ethernet cable only at 2.5-meter marks.
- The minimum length of any segment is approximately 24 meters.
- Connect the cable sheath conductor to earth ground.
- The distance between transceivers and/or taps must be in increments of 2.5 meters, and no closer than 2.5 meters from each other, and no farther apart than 500 meters.
- The path between two transceivers and/or taps cannot have more than one repeater.
- Install 50-ohm terminators on all ends of the Ethernet cable. Install them in a transceiver outlet or at the end of the cable. (for example, in the last transceiver at the end of the cable).

- The transceiver cable between the transceiver and workstation or terminal should be no longer than 50 meters.

If planning a large network (more than 40 workstations), you may improve local performance by grouping and connecting workstation-client clusters in small physical networks with gateway workstations to create your larger logical network.

Arranging workstation-client clusters according to work function, like engineering, accounting, and so on, is one possible scheme. Smaller networks (fewer than 40 workstations) may not benefit from this scheme. Figure 4-7 shows the elements used in the installation process.

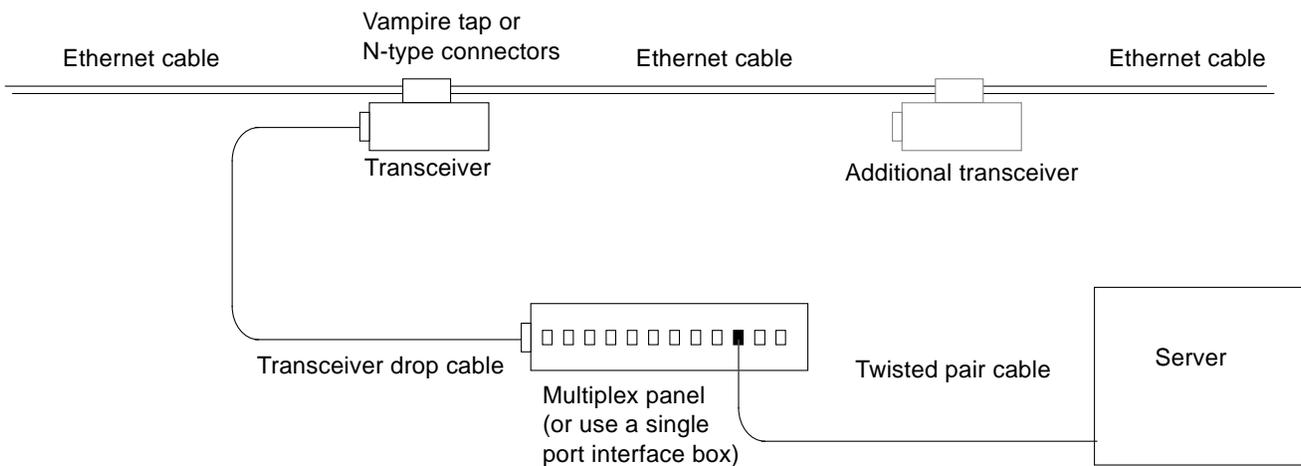


Figure 4-7 Connecting Twisted Pair Ethernet to N-type Coaxial Cable

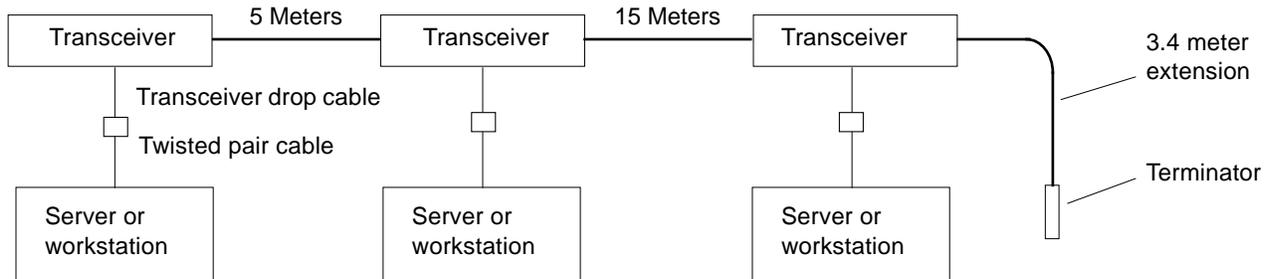
Determine whether to install a terminator. Refer to Table 4-3, which lists the cabling limitations for Ethernet.

Table 4-3 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, and 500.0 <sup>1</sup>
Distance between transceivers (multiples-of)	2.5 <sup>2</sup>
Minimum length of coaxial cable segments	23.4
Maximum length of transceiver “drop” cable	50.0

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 4-8 shows an example of a typical network setup. The server system can be any one of the systems in this figure.



Note: 5 meters + 15 meters + 3.4 meter extension = 23.4 meters minimum length allowed.

Figure 4-8 Ethernet Cabling Length — Example Using N-type Cable

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

---

**Note** – Sun equipment conforms to the Ethernet 10BASE-T standard, which states that the link test function should always be enabled on both the node and the hub. If you have problems verifying the connection between your Sun equipment and your hub, you need to verify that your hub also has the link test function enabled. Refer to the Troubleshooting chapter in the applicable server system service manual and the manual provided with your hub for more information about the link test function.

---

#### 4.4.2 Preparing the Ethernet Network

Sun Microsystems follows the IEEE standard for 10BASE-T Ethernet, also known as twisted-pair Ethernet.

---

For 10BASE-T, two pairs of unshielded wires connect to each workstation or a server. One pair transmits and the other receives. The 10BASE-T cable is made up of twisted pairs. These cables use RJ-45 connectors.

The cable connects the computer to a hardware interface called a hub. A coaxial or optical fiber cable connects the hub to the network. Single- and multiple-connection hubs are available commercially.

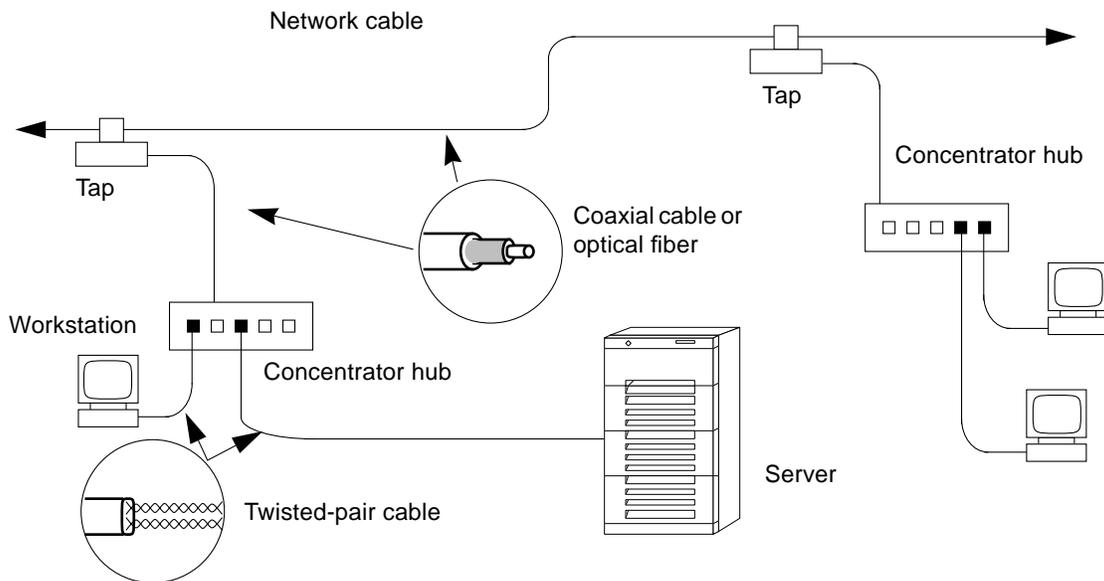
The maximum length of twisted-pair cables is 100 meters (330 feet). If cables connect together through a wall socket, the combined length should not exceed 100 meters. Figure 4-9 summarizes implementation of twisted-pair Ethernet.

---

**Note** – Multiplexer boxes require a transceiver when used with the Ethernet applications described here. Although these transceivers are compatible with Sun equipment, Sun Microsystems does not guarantee the performance of any component 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 using the manufacturer’s instructions.



*Figure 4-9* Example of 10BASE-T (Twisted-Pair) Ethernet

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

# *SPARCcluster 1000 High Availability Configurations*

This chapter details configuration requirements and presents interface and cabling information for possible configurations. Configurations shown are minimum and maximum configuration systems. The basic system is shown in Figure 5-1.

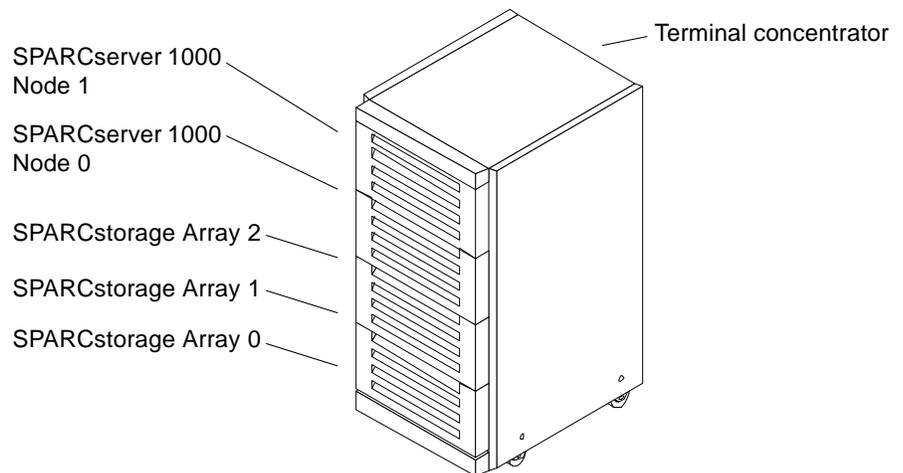


Figure 5-1 SPARCcluster 1000 High Availability Model

Use these configurations as a guide to assembling your system. Omit those elements which will be absent from your particular site installation. To install a system, use the appropriate sections listed below.

<i>Minimum Configuration</i>	<i>page 5-2</i>
<i>Expansion</i>	<i>page 5-3</i>
<i>Maximum Configuration</i>	<i>page 5-3</i>

## 5.1 Minimum Configuration

Minimum configuration consists of two nodes supporting three SPARCstorage arrays.

### 5.1.1 System Board Population

The card cages in the node 0 and node 1 servers are configured identically. Figure 5-2 shows a minimally populated card cage and identifies:

- System board slot numbers
- SBus card slot positions and SBus population by type

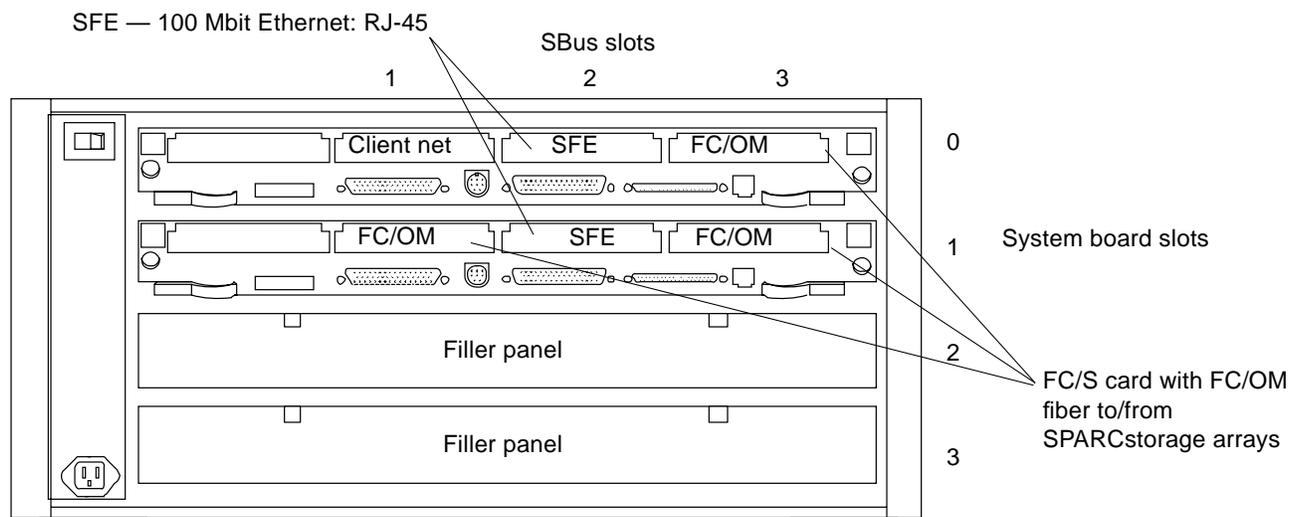


Figure 5-2 Minimum Population — System Boards and SBus Cards

### 5.1.2 SBus Card Population

Install the quantity and types of SBus cards that are appropriate for your system.

## 5.2 Expansion

See the note below regarding adding SPARCstorage arrays.

---

**Note** – Beyond minimum configuration it is recommended that FC/S cards be installed in the first available empty SBus slot, following all other boards in the system. This will ensure that the controller numbering is preserved if the Solaris Operating Environment is reinstalled. Refer to Section 2 of the *SPARCcluster High Availability Software Administration Guide* for a discussion of problems that can arise if this recommendation is ignored.

---

## 5.3 Maximum Configuration

The maximum configuration consists of two cabinets containing:

- 2 nodes
- 8 SPARCstorage arrays

See the note under Section 5.2 regarding adding SPARCstorage arrays.

### 5.3.1 System Board Population

The card cages in the node 0 and node 1 servers are configured identically. Figure 5-3 shows a fully populated card cage and identifies:

- System board slot numbers
- SBus card slot positions and identifies SBus population by type

System boards 2 and 3 are configured alike.

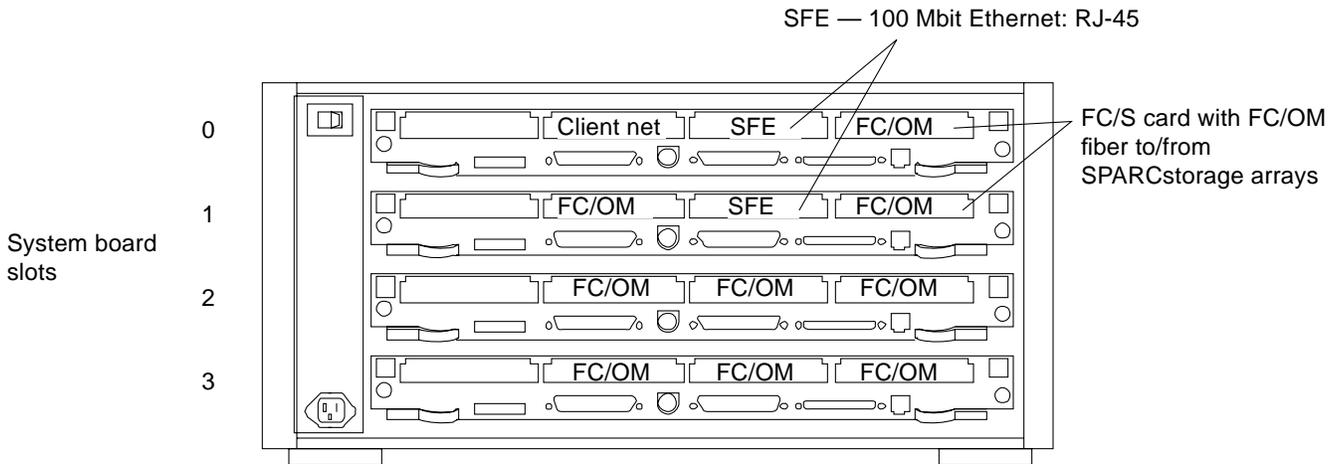


Figure 5-3 Maximum Population — System Boards

### 5.3.2 SBus Card Population

Install the quantity and types of SBus cards that are appropriate for your system.

## 5.4 System Component Cabling

Cabling is illustrated in Chapter 9, “SPARCcluster 1000 High Availability Hardware Installation.”

### 5.4.1 Administration Workstation

This unit connects to:

- the terminal concentrator directly through a serial adapter cable
- public Ethernet

---

### 5.4.2 Terminal Concentrator

This unit connects to:

- node 0 and node 1 through a serial adapter cable connected to Serial A port on the system boards in slot 0 in both nodes
- public Ethernet

### 5.4.3 Public Net Ethernet

Connection to the public or client network is through the terminal concentrator and administration workstation (see bulleted items in Section 5.4.1 and Section 5.4.2).

### 5.4.4 Private Network Connecting Node 0 to Node 1

The two SPARCcluster 1000 High Availability nodes are connected over two 100 Mbit fast Ethernet (twisted pair) links. Two links are used to eliminate the possibility of a single point of failure. Sun private net cables (short or long) are used.

---

**Note** – Use short or long Sun private net cables of the appropriate length, part numbers: 530-2149 (short) or 530-2150 (long).

---

In each node, communication is hosted by a SunFastEthernet 100 Mbit fast Ethernet card for each link. Thus, four such cards are required to support the two links for the High Availability system.

The two cables connect the two nodes directly — no hubs are used.

### 5.4.5 SPARCstorage Arrays

---

**Note** – Determine your fiber optic cable requirements. Read the appropriate sections to determine the quantity, length, and type of cables you will require. Apply labels to both ends of all cables before you begin cabling. For cable labeling procedures, refer to Chapter 9, “Labeling Fiber Optic Cables” under Section 9.2.7.4.

---

Each SPARCstorage array incorporates two FC/OM optical modules. One module connects to node 0 and one to node 1. These are identified by A and B on the SPARCstorage array chassis back panel. See Figure 5-4. for an example of SPARCstorage array-to-node communication fiber optic cable.

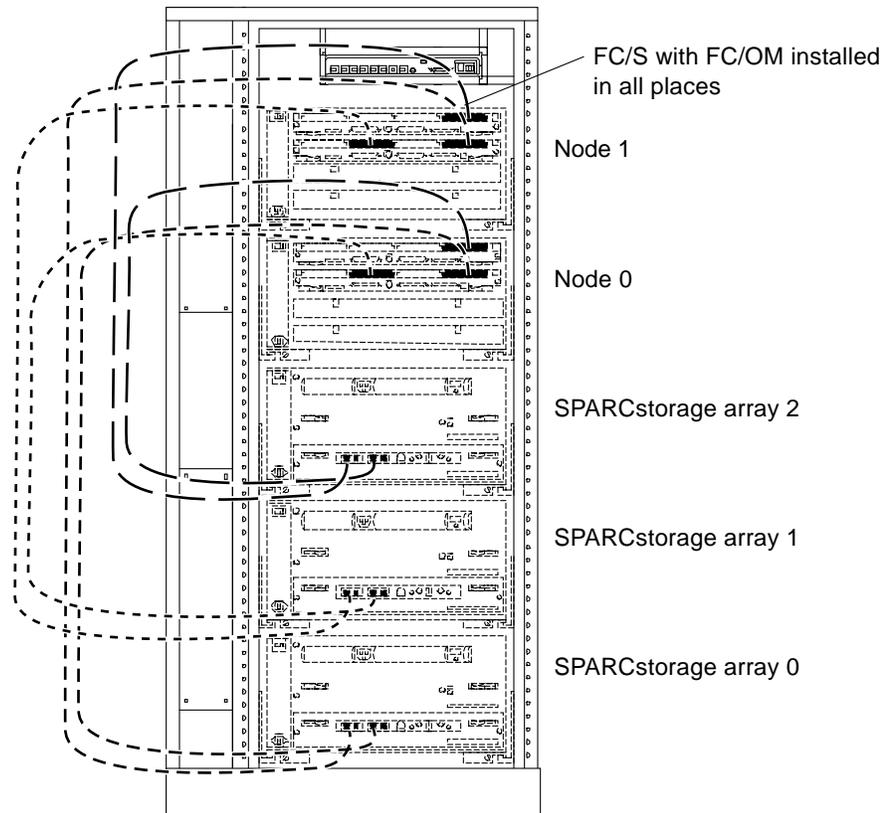


Figure 5-4 SPARCstorage Array Connection Example

Cabinets are identified by letters A and B. Cabinet A houses the nodes and three SPARCstorage arrays. Cabinet B houses up to five additional SPARCstorage arrays. Figure 5-5 shows a maximum configuration system.

**Note** – Figure 5-5 does not show cabling. For maximum configuration cabling detail, refer to Chapter 9.

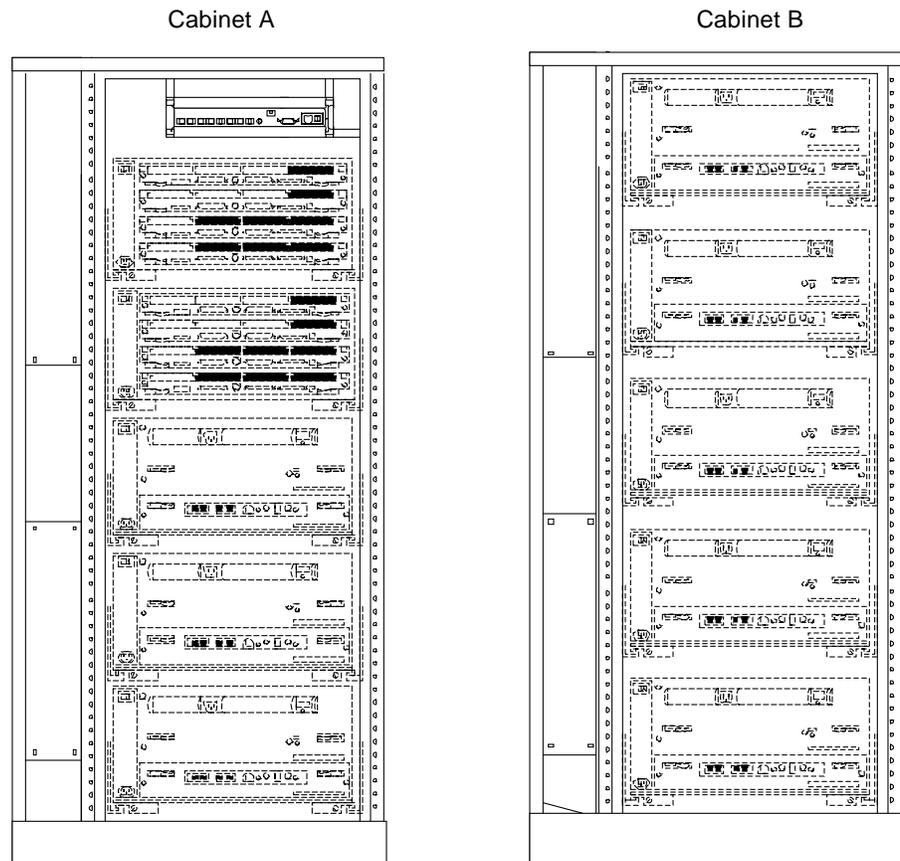


Figure 5-5 SPARCcluster 1000 High Availability SPARCstorage Array, Maximum Configuration



# SPARCcluster 2000 High Availability Configurations

This chapter covers configuration requirements and interface and cabling for possible configurations. Included here are configurations for minimum and maximum configuration systems. The basic system is shown in Figure 6-1.

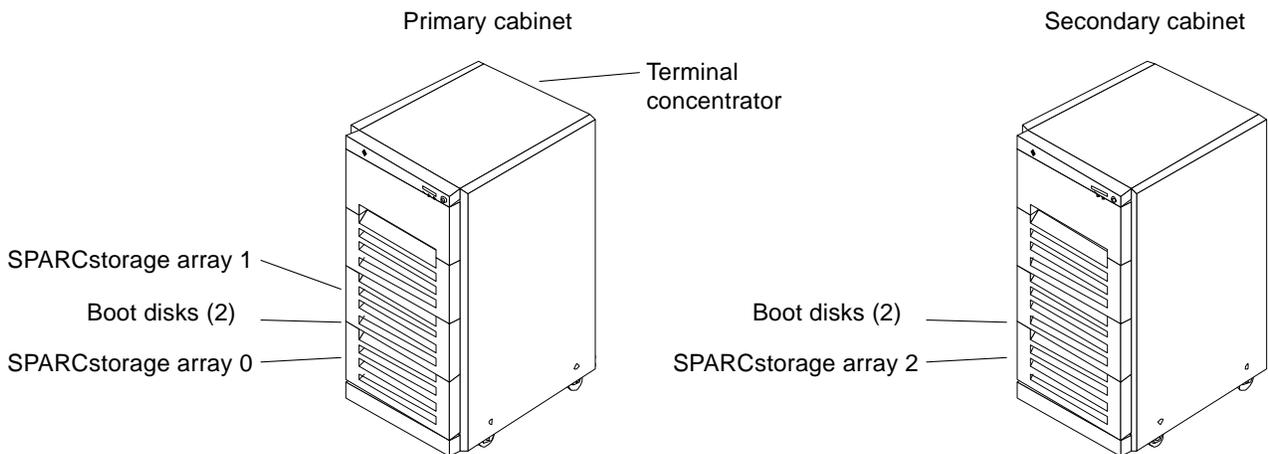


Figure 6-1 Basic SPARCcluster 2000 High Availability System

Use these example installations as a guide to assembling any size system. Omit those elements which will be absent from your particular site installation.

<i>Minimum Configuration</i>	<i>page 6-2</i>
<i>Expansion</i>	<i>page 6-3</i>
<i>Maximum Configuration</i>	<i>page 6-4</i>

## **6.1 Minimum Configuration**

Minimum configuration is two nodes supporting three SPARCstorage Arrays.

### **6.1.1 System Board Population in the Card Cage**

Node 0 and node 1 card cages are configured identically. Figure 6-2 shows a minimally populated card cage and identifies:

- System board slot numbers
- SBus card slot positions and SBus population by type

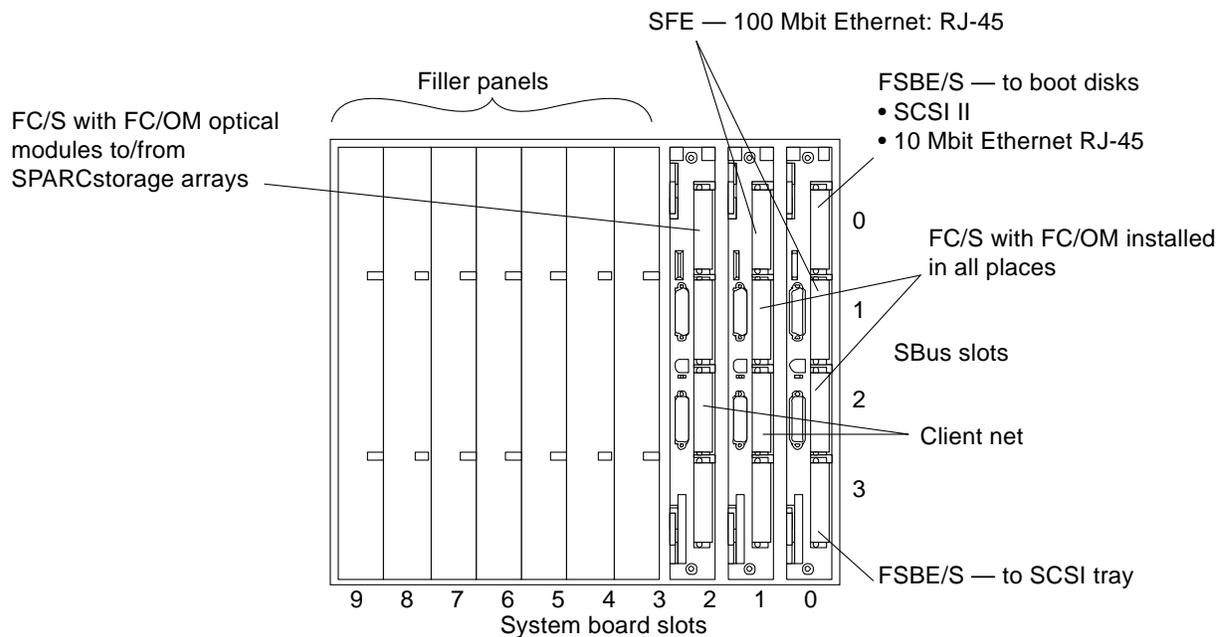


Figure 6-2 Card Cage: Minimum Population

### 6.1.2 SBus Card Population

Install the quantity and types of SBus cards that are appropriate for your system. Figure 6-2 shows the SBus card configuration for a minimum-configuration system.

## 6.2 Expansion

See the note below regarding adding SPARCstorage arrays.

---

**Note** – Beyond minimum configuration it is recommended that FC/S cards be installed in the first available empty SBus slot, following all other boards in the system. This will ensure that the controller numbering is preserved if the Solaris Operating Environment is reinstalled. Refer to Section 2 of the *SPARCcluster High Availability Software Administration Guide* for a discussion of problems that can arise if this recommendation is ignored.

---

## 6.3 Maximum Configuration

The maximum configuration consists of six cabinets containing:

- 2 nodes — each housed in its own cabinet
- 20 SPARCstorage Arrays — housed in six cabinets (node and array cabinets)

### 6.3.1 System Board Population

Node 0 and node 1 card cages are configured identically. Figure 6-3 shows a fully populated card cage and identifies:

- System board slot numbers
- SBus card slot positions and identifies SBus population by type

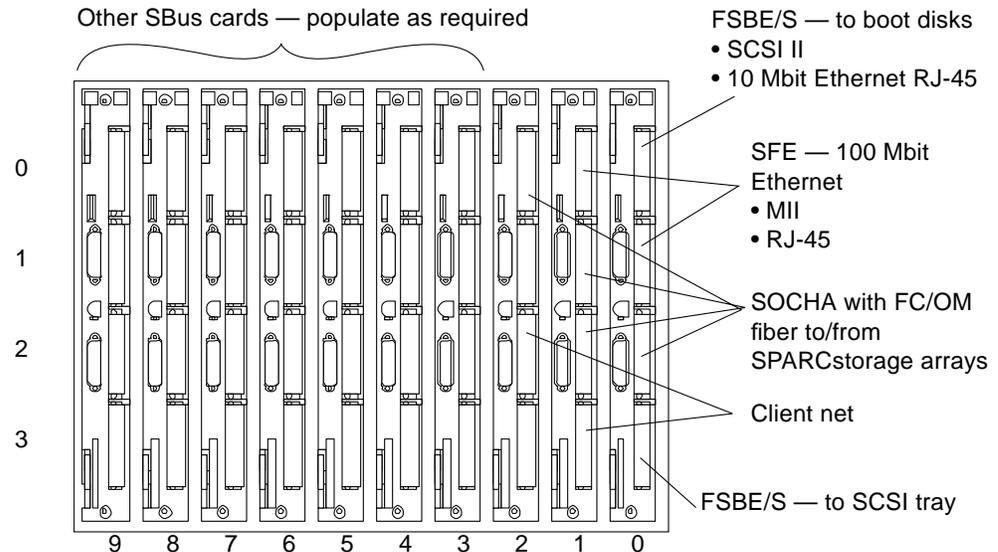


Figure 6-3 Maximum Population — System Boards

### 6.3.2 SBus Card Population

Install the quantity and types of SBus cards that are appropriate for your system. Figure 6-3 shows the SBus card configuration for a fully populated, maximum-configuration system.

---

## 6.4 System Component Cabling

Interface cabling is illustrated in Chapter 10, “SPARCcluster 2000 High Availability Server Hardware Installation.”

### 6.4.1 Administration Workstation

This unit connects to:

- the terminal concentrator directly through a serial adapter cable
- public Ethernet

### 6.4.2 Terminal Concentrator

This unit connects to:

- node 0 and node 1 through a serial adapter cable connected to Serial A port on the system boards in slot 0 in both nodes
- public Ethernet

### 6.4.3 Public Net Ethernet

Connection to the public or client network is through the terminal concentrator and administration workstation (see bulleted items in Section 6.4.1 and Section 6.4.2).

### 6.4.4 Private Network Connecting Node 0 to Node 1

The two SPARCcluster 1000 High Availability nodes are connected over two 100 Mbit fast Ethernet (twisted pair) links. Two links are used to eliminate the possibility of a single point of failure. Sun private net cables (short or long) are used.

---

**Note** – Use short or long Sun private net cables of the appropriate length, part numbers: 530-2149 (short) or 530-2150 (long).

---

In each node, communication is hosted by a SunFastEthernet 100 Mbit fast Ethernet card for each link. Thus, four such cards are required to support the two links for the High Availability system.

The two cables connect the two nodes directly — no hubs are used.

### 6.4.5 Boot Disks

Boot disks are hosted by a SCSI II host adapter installed in system board 0.

### 6.4.6 SPARCstorage Arrays

**Note** – Determine your fiber optic cable requirements. Read the appropriate sections to determine the quantity, length, and type of cables you will require. Apply labels to both ends of all cables before you begin cabling. For cable labeling procedures, refer to Chapter 9, “Labeling Fiber Optic Cables” under Section 9.2.7.4.

Each SPARCstorage array incorporates two FC/OM optical modules. One module connects to node 0 and one to node 1. These are identified by **A** and **B** on the SPARCstorage array chassis back panel. See Figure 6-4. for an example of SPARCstorage array-to-node communication fiber optic cable.

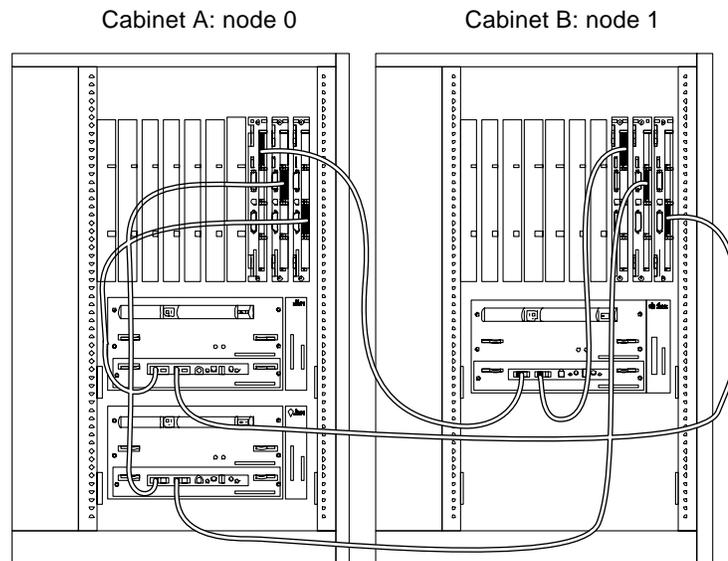


Figure 6-4 SPARCstorage Array Connection Example

## *Part 2 — Hardware Installation*

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## Powering Off and On

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**Caution** – Use these power off/on procedures **only** for servers that are:

- newly installed or in process of being installed
- **NOT** running real data services

Performing these procedures on a server serving as a node in an “on-line” cluster poses great threat of irrecoverable data loss and a system crash. For procedures on turning off or on a server which is operating as a node in a live cluster, refer to the *SPARCcluster High Availability Software Administration Guide*, Sun part number 802-3511.

---

**Note** – These power off and on procedures are for an entire cabinet (server). To power selected components off or on, including servers or other chassis, refer to the *SPARCcluster High Availability System Service Manual*, Part No. 802-3512.

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**Note** – For panel removal procedures, refer to Chapter 8, “Access.”

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### 7.1 SPARCcluster 1000 High Availability Server

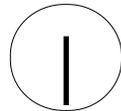
For these procedures, the administration workstation may need to be installed (see the caution above). Refer to Chapter 9 Section 9.2.7.1, “Connecting the Administration Workstation” and to Table 9-3 for this procedure.

### 7.1.1 Powering Off a Server (Node)

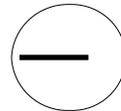
**Note** – It is understood that the server in question is in the process of hardware installation. This system has no users nor data files to be concerned with. If this is not true, halt the system using the procedure found in the *SPARCcluster High Availability Software Administration Guide*, Sun part number 802-3511.

**1. Turn the front panel key switch to  (the standby position).**

This switch is behind the top vented panel. See Figure 7-1.



STANDBY Position



ON Position

Figure 7-1 Key Switch Positions

**2. Turn the AC distribution unit power switch to OFF.**

The unit is at the rear of the cabinet. See Figure 7-2.



**Caution** – Turn off the power at the AC distribution unit power switch on the rear of the system before attempting to access the system cabinet.



**Warning** – Some users may elect to power internal cabinet components, like SPARCstorage arrays, the terminal concentrator, etc., from an external power source (a power circuit other than from the cabinet internal AC power distribution unit). These components, if plugged into an external power source will remain powered even after the cabinet AC distribution unit is turned OFF. Examine the system to verify that no component is externally powered before proceeding. If any component is externally powered, turn the component OFF using the ON/OFF switch at the rear of the component in question. Failure to turn off externally powered components poses a risk of equipment damage and/or personnel hazard from electrical shock.

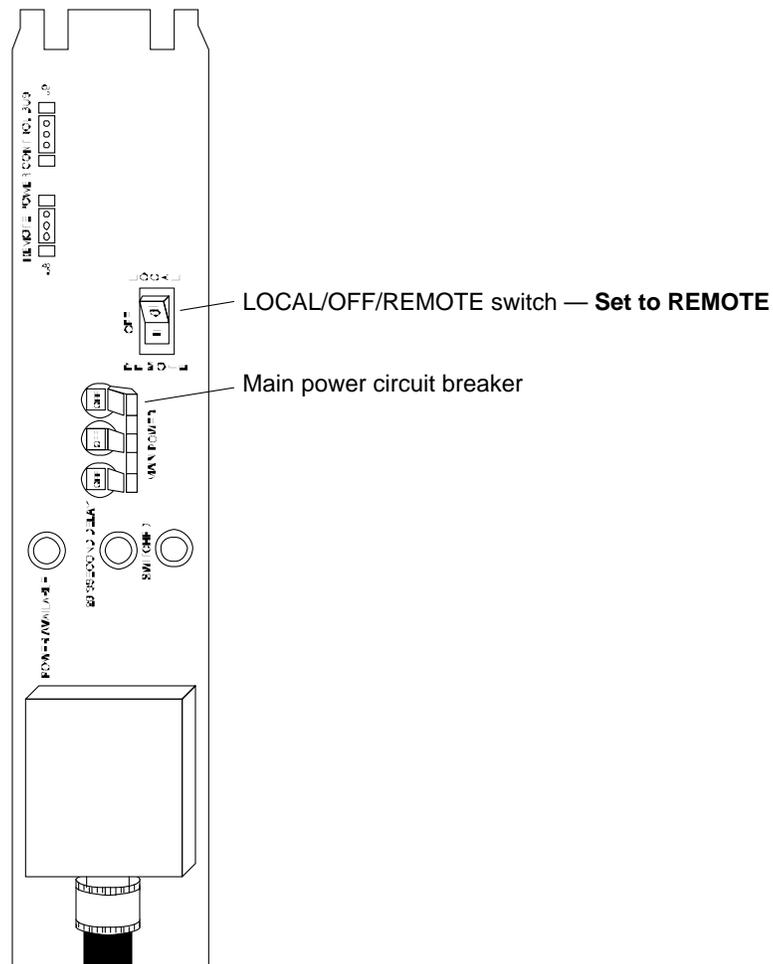


Figure 7-2 AC Distribution Unit Power Switch

### 7.1.2 Powering On a Server (Node)

1. **Begin with a safety inspection.**
  - a. **Ensure the AC power switch ON the cabinet rear is off.**
  - b. **Verify the power cord is plugged into the correct facilities outlet.**

2. **Ensure the LOCAL/OFF/REMOTE switch is in the REMOTE position.**  
Refer to Figure 7-2.
3. **Ensure the key switch is in the  $\circ$  (standby position).**  
See Figure 7-3.
4. **Turn the AC power switch on the rear of the cabinet to ON.**  
Refer to Figure 7-2.
5. **Turn the key switch to | (the power-on position).**  
See Figure 7-1. You will hear the fans spinning up.



---

**Caution** – Never move the system cabinet or the expansion cabinets when system power is on. Excessive movement can cause catastrophic disk drive failure. Always power the server OFF before moving cabinets.

---

## 7.2 *SPARCcluster 2000 High Availability Server*

For these procedures, the administration workstation may need to be installed (see the caution at the beginning of this chapter). Refer to Chapter 10 Section 10.2.8.1, “Connecting the Administration workstation” and to Table 10-3 for this procedure.

### 7.2.1 *Powering Off a Server (Node)*

---

**Note** – It is understood that the server in question is in the process of hardware installation. This system has no users nor data files to be concerned with. If this is not true, halt the system using the procedure found in the *SPARCcluster High Availability Software Administration Guide*, Sun part number 802-3511.

---

1. **Turn the front panel key switch to  $\circ$  (the standby position).**  
See Figure 7-3.
2. **Turn the AC distribution unit power switch to OFF.**  
The unit is at the rear of the cabinet. See Figure 7-4.



---

**Caution** – Turn off the power at the AC distribution unit power switch on the rear of the system before attempting to access the system cabinet.

---



**Warning** – Some users may elect to power internal cabinet components, like disk arrays, or the terminal concentrator, from an external power source (a power circuit other than from the cabinet internal AC power distribution unit). These components, if plugged into an external power source will remain powered even after the cabinet AC distribution unit is turned off. Examine the system to verify that no component is externally powered before proceeding. If any component is externally powered, turn the component OFF using the ON/OFF switch at the rear of the component in question. Failure to turn off externally powered components poses a risk of equipment damage and/or personnel hazard from electrical shock.

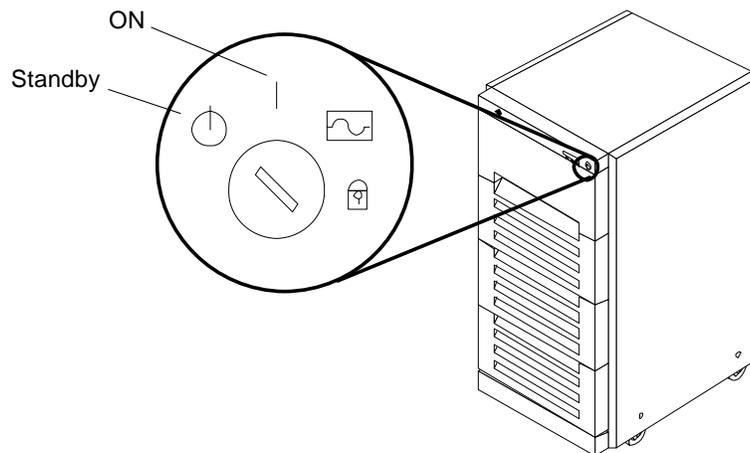


Figure 7-3 Key Switch Positions — System Cabinet Front Panel

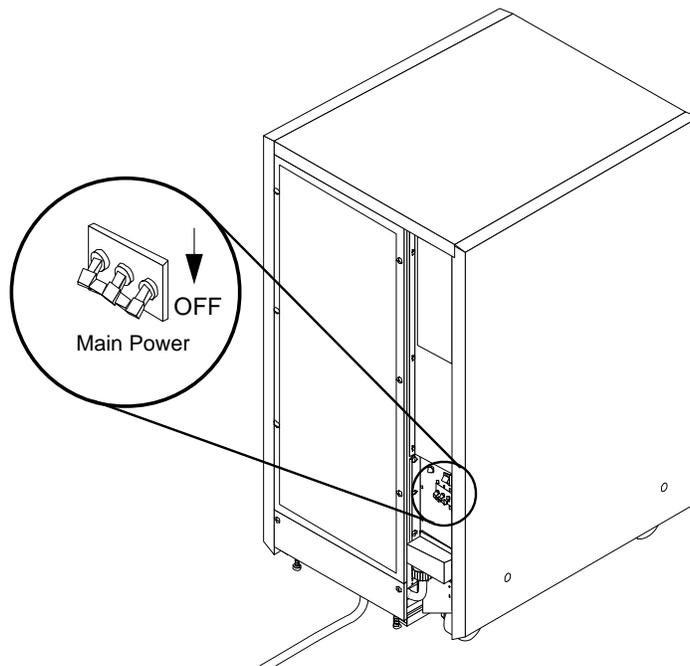


Figure 7-4 AC Distribution Unit Power Switch — Rear of System Cabinet

### 7.2.2 Powering On a Server (Node)

1. **Begin with a safety inspection.**
  - a. **Ensure the AC power switch on the cabinet rear is OFF.**
  - b. **Verify the power cord is plugged into the correct facilities outlet.**
2. **Ensure the Local/Remote switch is in the Remote position.**  
Refer to Figure 7-5.
3. **Ensure the key switch is in the  $\circlearrowright$  (standby position).**  
See Figure 7-3.
4. **Turn the AC power switch on the rear of the cabinet to ON.**  
Refer to Figure 7-4.

5. Turn the key switch to | (the power-on position). See Figure 7-3. You will hear the fans spinning up.

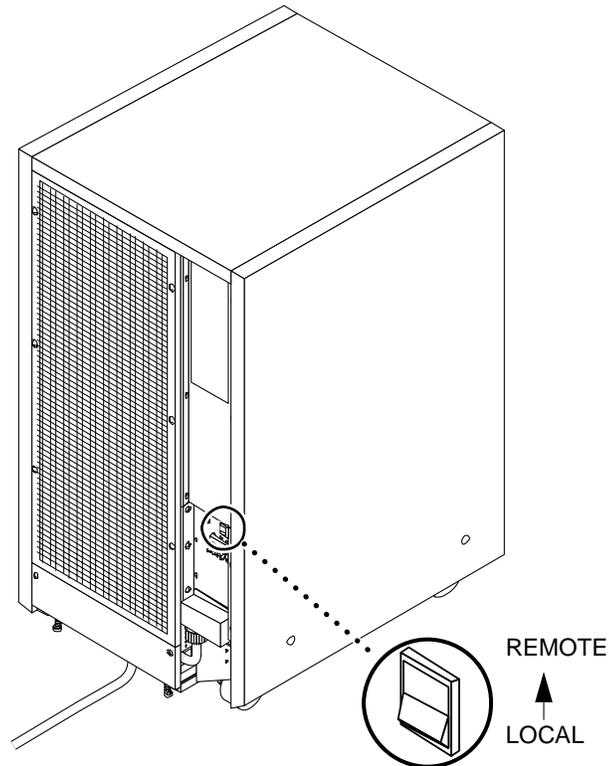


Figure 7-5 Local/Remote Switch Location



**Caution** – Never move the system cabinet or the expansion cabinets when system power is on. Excessive movement can cause catastrophic disk drive failure. Always power the system OFF before moving cabinets.

### 7.3 Powering On the Server/Storage Chassis

For proper power-on procedures for each chassis installed in the cabinet, refer to the appropriate installation and/or service manual for that chassis.

## 7.4 *Reading POST Messages and Boot Messages*

For each server system installed in the expansion cabinet, refer to the appropriate installation and/or service manual. Read the section covering Power-On Self-Test (POST) messages and Boot messages to interpret messages for that server.

Likewise, for each storage chassis installed in the expansion cabinet, refer to the installation and/or service manual for the server acting as node to that storage chassis. Messages presented by this server will encompass power-on and boot behavior of the storage chassis in question. In addition, refer to the installation and/or service manual for the storage chassis itself for any additional clarification.

# Access

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This chapter provides procedures for

- Removing panels from the two cabinet types
- Leveling the cabinets

## *8.1 Removing System and Expansion Cabinet Panels*

---

**Note** – Power must be turned off before removing panels. For powering off and on procedures, refer to Chapter 7, “Powering Off and On.”

---

Cabinet outer panels are shown in Figure 8-1 through Figure 8-4.

---

**Note** – The front panels on all cabinets remove in the same way with the following exception: the hinged front panel is absent on the expansion cabinet or SPARCcluster 1000 High Availability cabinet. Instead, there is a vented front panel.

---

### 8.1.1 Opening the Hinged Door (SPARCcluster 2000 High Availability)

- ◆ **Grasp the door at the upper-right corner and pull towards you firmly.** See Figure 8-1. The door is secured by clips and ball-studs at the side opposite of the hinge. The door is released and swings open if pulled firmly.

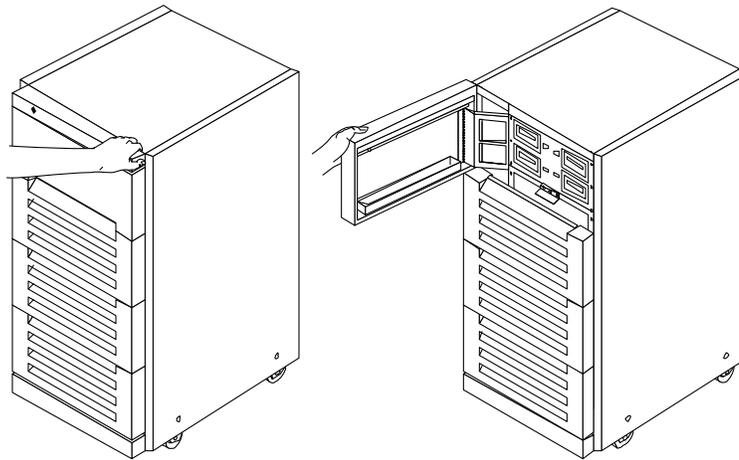


Figure 8-1 Opening the Hinged Door — System Cabinet

### 8.1.2 Vented Front Panels (SPARCcluster 2000 High Availability or SPARCcluster 1000 High Availability)

The three vented front panels remove in the same manner. They are retained by chassis-mounted ball studs that mate with catches on the back side of the panel.

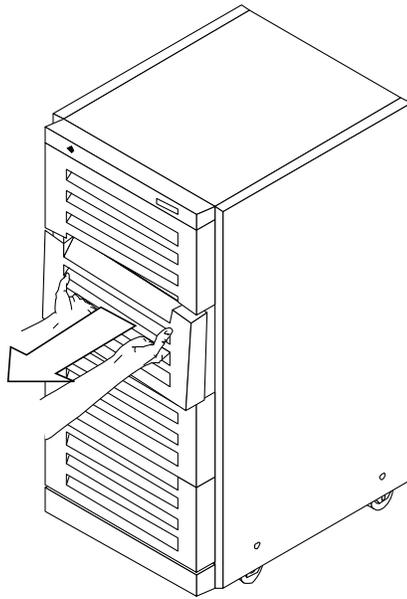


**Caution** – Do not remove the vented front panels by twisting off. Such action may break the panel or fasteners. Always support the panels during removal and replacement.

To remove the panels:

1. **Grasp the panel under the vent on one side and pull out far enough to just disengage the ball studs.**  
See Figure 8-2.

2. Repeat this procedure on the other side of the vent to disengage and remove the panel. Set the panel aside.



*Figure 8-2* Removing the Vented Panels

To replace a panel:

1. Place the panel against the chassis with ball studs aligned with the catches on the panel.
2. Tap or press both sides of the panel into place.

### 8.1.3 Rear Screen Panel

To remove the rear screen panel:

1. Remove the two #10 Phillips screws securing the panel to the frame. See Figure 8-3.
2. Tilt the panel top out and lift it free of the chassis. Set the panel aside. There is a flange on the bottom of the rear screen.

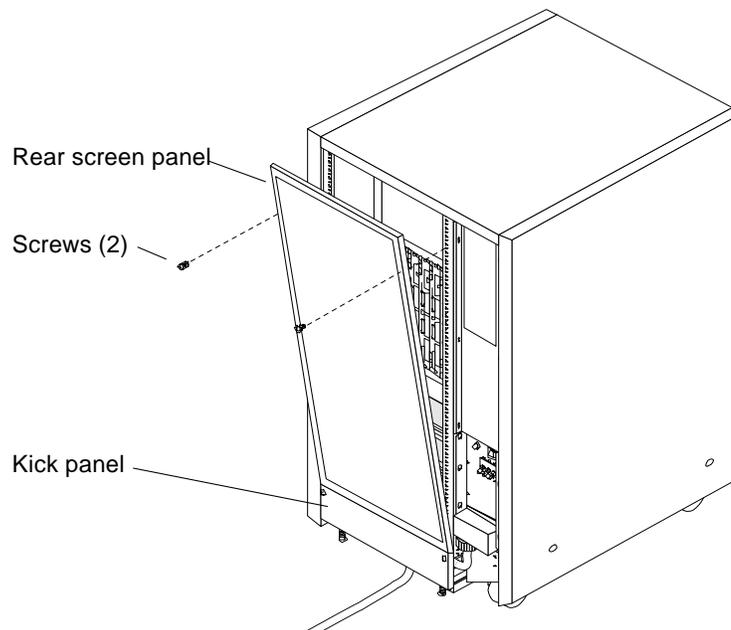


Figure 8-3 Rear Screen Panel Removal

To replace the rear screen panel:

1. Insert the panel so the bottom flange engages behind the top of the kick panel.
2. Tilt the panel flush against the frame and secure using Phillips screws.

### 8.1.4 Kick Panel

To remove the kick panel:

- ◆ Loosen the two captive screws. See Figure 8-4.

To replace the kick panel:

- ◆ Arrange cables (if applicable) neatly behind the kick panel, then fasten the two captive screws to secure the panel in place.

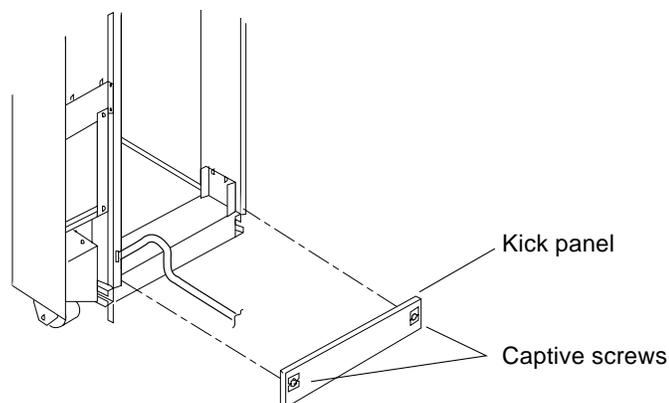


Figure 8-4 Removing the Kick Panel

### 8.1.5 Stabilizer Bar



**Warning** – Always extend the stabilizer bar before pulling the disk drive trays out for servicing.

The cabinet has six leveling pads. Four pads on the cabinet frame are lowered to touch the floor and prevent the cabinet from rocking. Two leveling pads are part of the stabilizer bar and should not touch the floor.

1. **Grasp the stabilizer bar under the front edge and pull it out to its fully extended position.**  
See Figure 8-5.
2. **Screw the two stabilizer bar leveling pads down until they are 3 to 6 mm (1/8 to 1/4 inch) above the floor.**  
Ensure both pads are at equal heights. This clearance allows the stabilizer bar to slide in and out easily, yet catch the cabinet if it should begin to tilt.

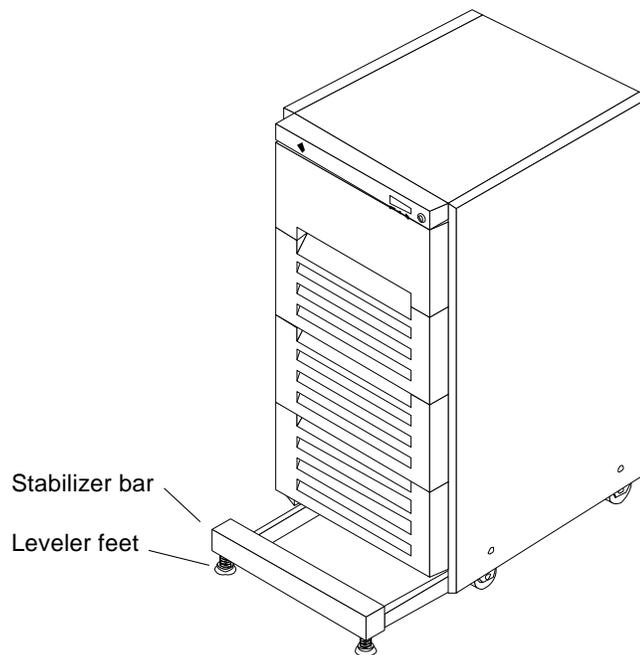


Figure 8-5 Stabilizer Bar

## 8.2 Leveling the Cabinets

This procedure requires that the screen panel and kick panel be removed. Refer to Section 8.1.3, “Rear Screen Panel,” and Section 8.1.4, “Kick Panel.”

1. **Remove the leveling wrench, located inside the cabinet:**  
Locate the leveling wrench in the upper part of the rack. Unlock the tie wrap and remove the wrench. Press the tie wrap tabs together to loosen the strap.

**2. Remove the kick panel.**

The kick panel is held by two captive screws.

**3. Use the wrench to lower the four main leveling pads (not the pads on the stabilizer bar).**

See Figure 8-6. The four main leveling pads are located near the corners of the cabinet. Lower the pads until all four wheels are off the floor.

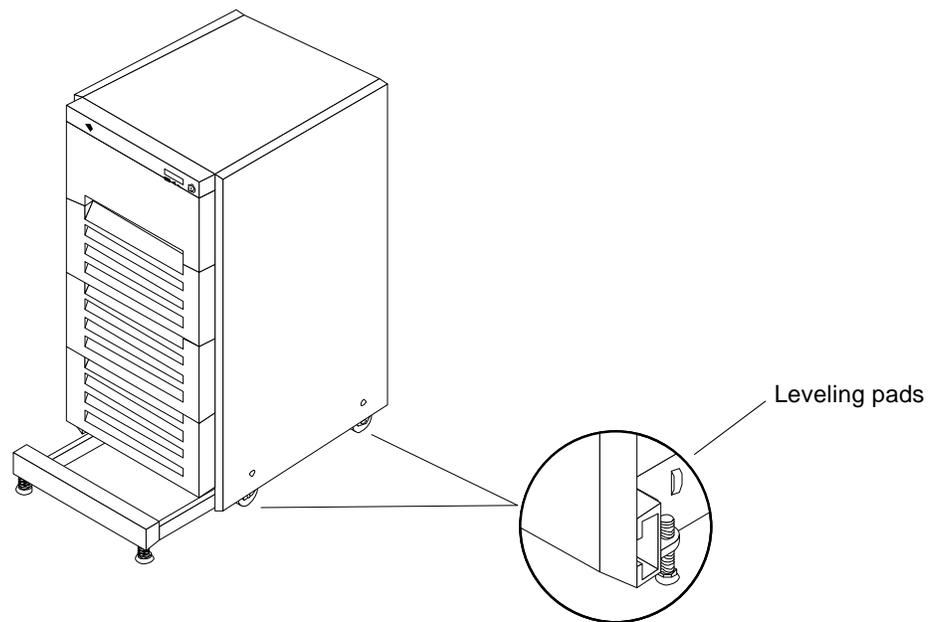


Figure 8-6 Main Leveling Pads

**4. Adjust the two pads on the stabilizer bar:****a. Fully extend the stabilizer bar.**

See Figure 8-7.

**b. Screw the pads down until they almost touch the floor.**

Leave approximately 6 mm (1/4 inch) clearance between the pads and floor. This clearance will prevent tilting of the cabinet, and yet allow you to easily extend or retract the stabilizer bar.

**c. Slide the stabilizer bar back into the cabinet.****5. Restore the wrench to its storage place in the rack.**

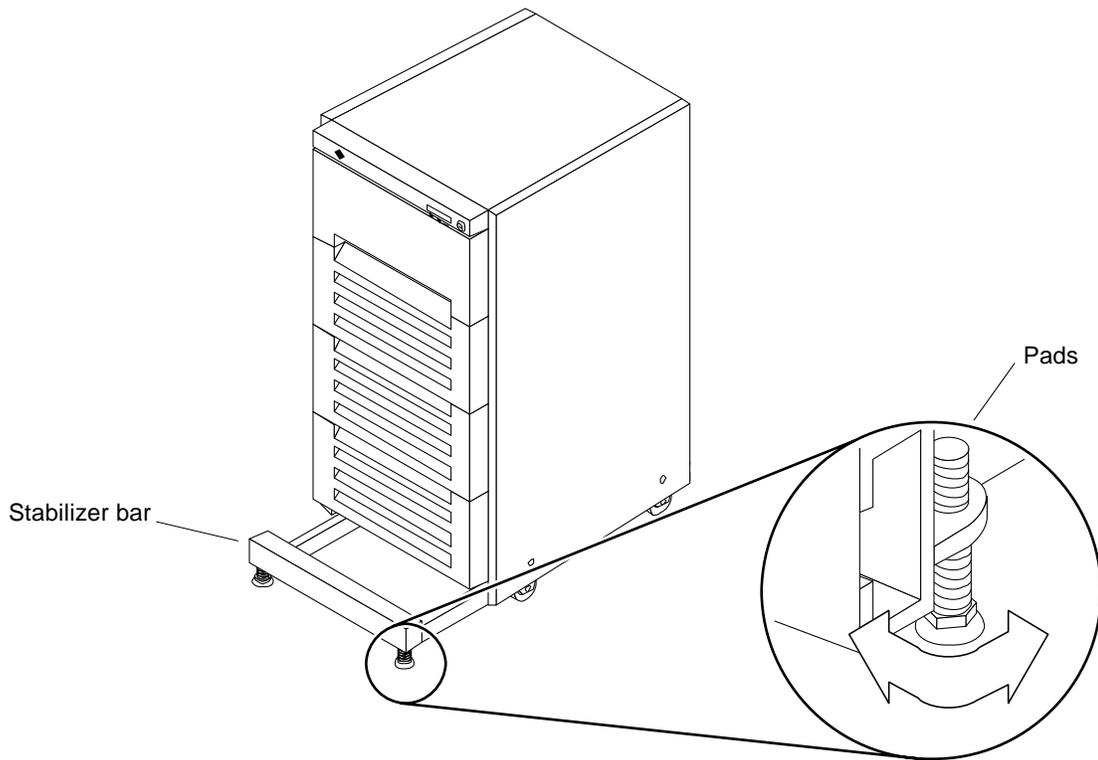


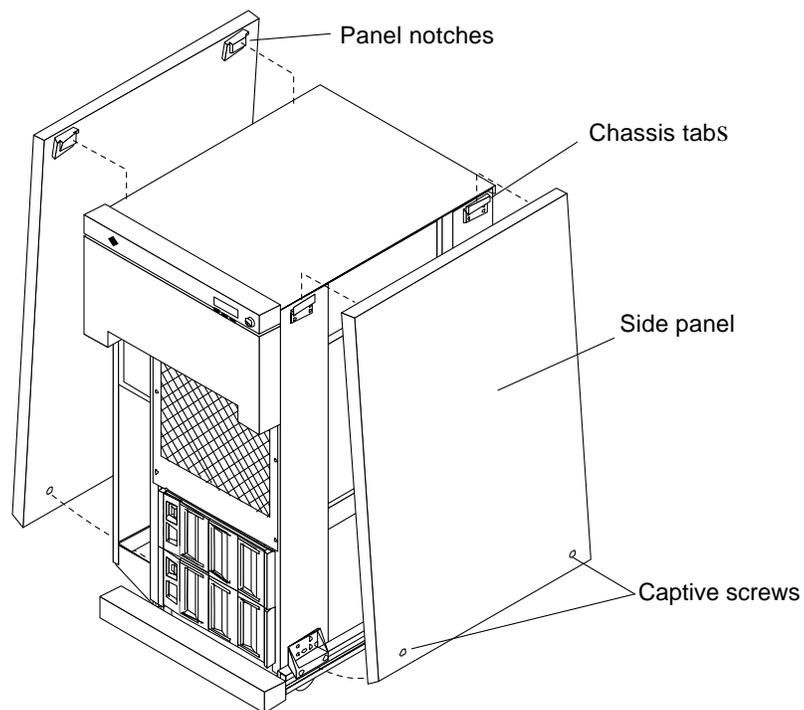
Figure 8-7 Stabilizer Bar Leveling Pads

### 8.3 Side Panel Removal

**Note** – Remove the side panels to afford access to the power distribution unit.

To remove the side panel:

1. **Loosen two slot-head captive screws near the panel base.**  
See Figure 8-8.
2. **Tilt the panel bottom out.**
3. **Lift the panel up until it is free of the tabs at the top of the chassis.**  
Set the panel aside.



*Figure 8-8* Removing the Side Panels

To replace a side panel:

- 1. Place the panel against the cabinet so the notches on the panel inside align with tabs at the chassis top.**
- 2. Lower the panel into place and allow it to hang flush against the chassis.**
- 3. Tighten the two captive screws at the panel base.**



# *SPARCcluster 1000 High Availability Hardware Installation*

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## *9.1 Factory-Assembled SPARCcluster 1000 High Availability Hardware*

The basic configuration is completely pre-assembled in a single cabinet.

---

**Note** – If you are installing a customer-assembled system, see Section 9.2, “Customer-Assembled SPARCcluster 1000 High Availability Hardware.”

---

### *9.1.1 Preparing the Cabinets*

- 1. Unpack and inventory the equipment, if you have not already done so.**  
See Chapter 2 for a list of equipment.
- 2. Move the cabinets to their designated installation locations.**  
For site planning guidelines, refer to Chapter 5, “SPARCcluster 1000 High Availability Configurations.”
- 3. Ensure the front panel key switch (Figure 9-1) is in the standby position.**



Figure 9-1 Key Switch Positions

### 9.1.2 Connecting the Power Cords

1. **Remove the cabinet panels to access the power switches and cables.**  
See Section 8.1, "Removing System and Expansion Cabinet Panels."
2. **Level the cabinet.**  
See Section 8.2, "Leveling the Cabinets."
3. **Turn the AC distribution unit power switch to OFF.**  
The switch is at the rear of the cabinet. See Figure 9-2.

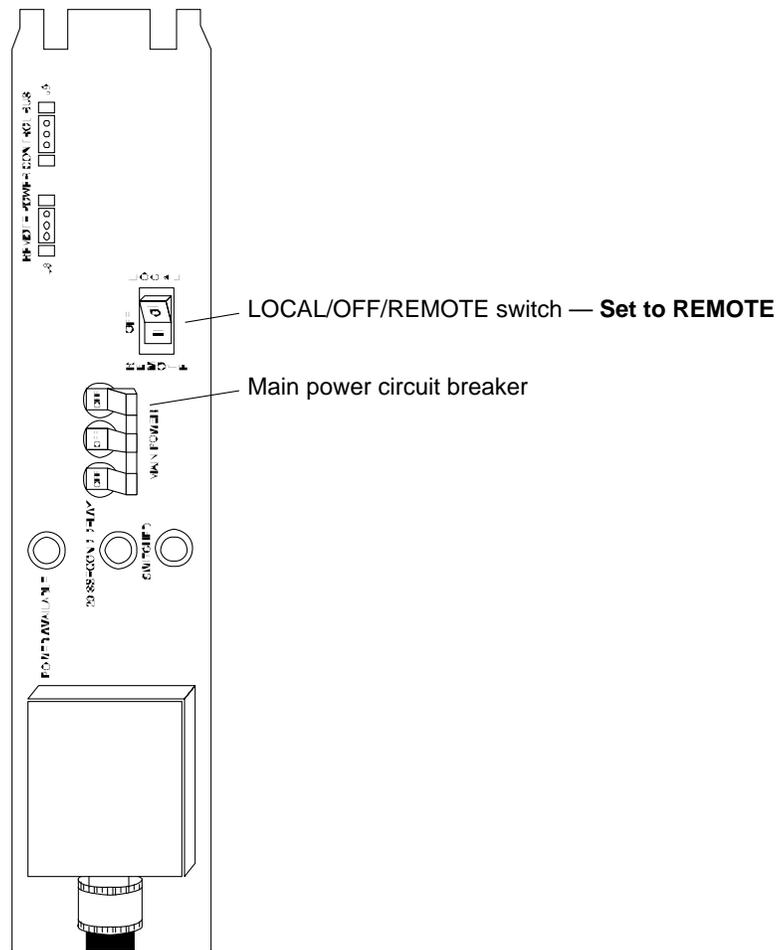


Figure 9-2 AC Distribution Unit Power Switch



**Warning** – The power must be turned off at the AC distribution unit or risk of electrical shock to personnel exists.

**4. Uncoil the AC power cord and connect it to an AC outlet.**

As noted in Chapter 1, the AC outlet should be part of a circuit dedicated to this system. Do not connect electrical motors or heaters to this circuit.



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

**5. Plug in AC cords for any chassis within the cabinet to provide grounding for static electricity.**

## 9.2 Customer-Assembled SPARCcluster 1000 High Availability Hardware

<b>Do tasks in the order listed</b>	
<i>Preparing the Cabinet</i>	<i>page 9-3</i>
<i>Installing the Cabinet</i>	<i>page 9-4</i>
<i>Connecting the Main AC Cord</i>	<i>page 9-4</i>
<i>Installing the SPARCserver 1000 and SPARCstorage Array Systems</i>	<i>page 9-6</i>
<i>Installing the Terminal Concentrator</i>	<i>page 9-9</i>
<i>Configuring the Card Cages</i>	<i>page 9-13</i>
<i>Cabling the System Components</i>	<i>page 9-14</i>

### 9.2.1 Preparing the Cabinet

#### 9.2.1.1 Powering Off the Cabinet

Halt the operating system and power off the system and expansion cabinets. See Chapter 7, Section 7.1, “SPARCcluster 1000 High Availability Server.”

### 9.2.1.2 Accessing the Cabinet — Removing the Panels

Remove the cabinet panels to access the power switches and cables. See Chapter 8, “Access.”

### 9.2.2 Installing the Cabinet

1. **Unplug AC cords and all cabling to allow repositioning of the cabinets (if required).**
2. **Move the cabinets to their designated installation locations. See Chapter 4 for site planning guidelines.**

---

**Note** – When moving the cabinets, it is advisable to replace all panels to protect inner components during transport.

---

3. **Level the cabinet(s). See Section 8.2, “Leveling the Cabinets.”**
4. **Plug in AC cords to provide grounding for static electricity.**
5. **If the panels are on, remove them. See Chapter 8, “Access.”**

### 9.2.3 Connecting the Main AC Cord

1. **If necessary, plug in AC cords for all AC powered components in the cabinet to provide grounding for static electricity.**



---

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

---

2. **Turn front panel key switch (Figure 9-3) to the standby position.**



Figure 9-3 Key Switch Positions



## 9.2.4 Installing the SPARCserver 1000 and SPARCstorage Array Systems

Three or more SPARCstorage arrays are installed in the cluster. These devices provide storage for the high availability data — NFS file systems and HA DBMS databases.

The cluster contains two identically-configured SPARCserver 1000 systems.

### 9.2.4.1 Mounting in the Cabinet

- ◆ **Install the rails in the cabinets and install the SPARCstorage arrays and the servers on the rails. In addition to this, install the air baffles and one or two blower assemblies in the cabinet.**

For these procedures, See Appendix A, “Air Baffle, Rack Mount Rail and Blower Assembly Installation.”

### 9.2.4.2 Preparing the SPARCstorage Arrays

1. **Locate the DIAG switch on the array rear panel.**

See Figure 9-5.

2. **Ensure that the DIAG switch is set to DIAG and not to DIAG EXT.**

Do not use the DIAG EXT position as it will invoke extended diagnostics and prevent the SPARCstorage array from booting. Use DIAG only for normal operation.

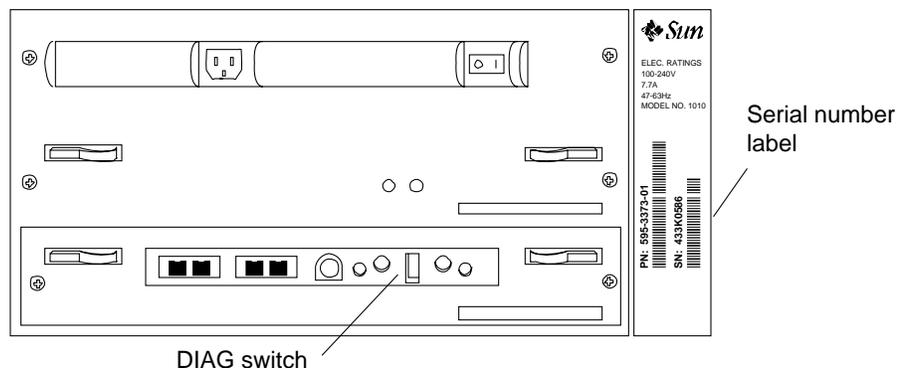


Figure 9-5 SPARCstorage Array Voltage Rating on the Serial Number Label

**3. Locate the serial number label on the rear panel of the chassis.**

See Figure 9-5.

**4. Check the electrical ratings label on the serial number label. Verify that the stated rating matches your AC input voltage.**

Table 9-1 provides maximum system operating voltage and frequency ranges.

*Table 9-1* Power Requirements

Configuration	Nominal AC Input Voltage Range - Single Phase	Operating Range	Operating Frequency Range
North American	100-120 VAC	90-264 VAC	47-63 Hz
International	220-240 VAC	90-264 VAC	47-63 Hz

Table 9-2 lists current requirements at nominal line voltage for a cabinet in maximum configuration.

*Table 9-2* Current Requirements

Configuration	Maximum Current Requirement	Power Supply Output
North American, Japan, and International	6.5A	460W

***Connecting the Power*****1. Connect the server and SPARCstorage array power cords:****a. Connect a power cord at rear of each chassis.**

See Figure 9-6.

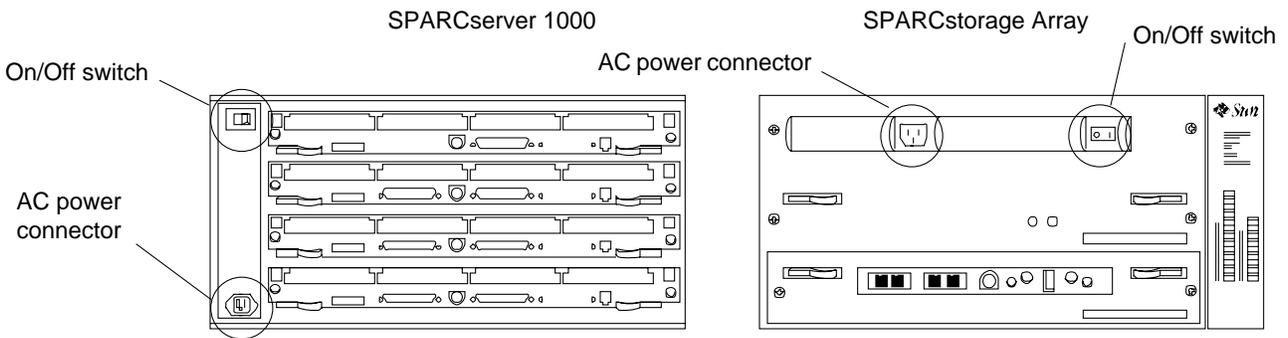


Figure 9-6 SPARCserver 1000 and SPARCstorage Array AC Power Connector and Power Switch

**b. Route the power cords to the power sequencer:**

Dress the power cords down the left side of the rack. Roll any excess cord and tuck it into the space under the power sequencer at the bottom of the cabinet. Secure in place using cable ties.

**2. Connect the chassis to power.**

Plug the power cords from the chassis into the power sequencer. Use the switched outlets identified in Figure 9-7 for the SPARCserver 1000 and SPARCstorage arrays 0 and 1, as appropriate.

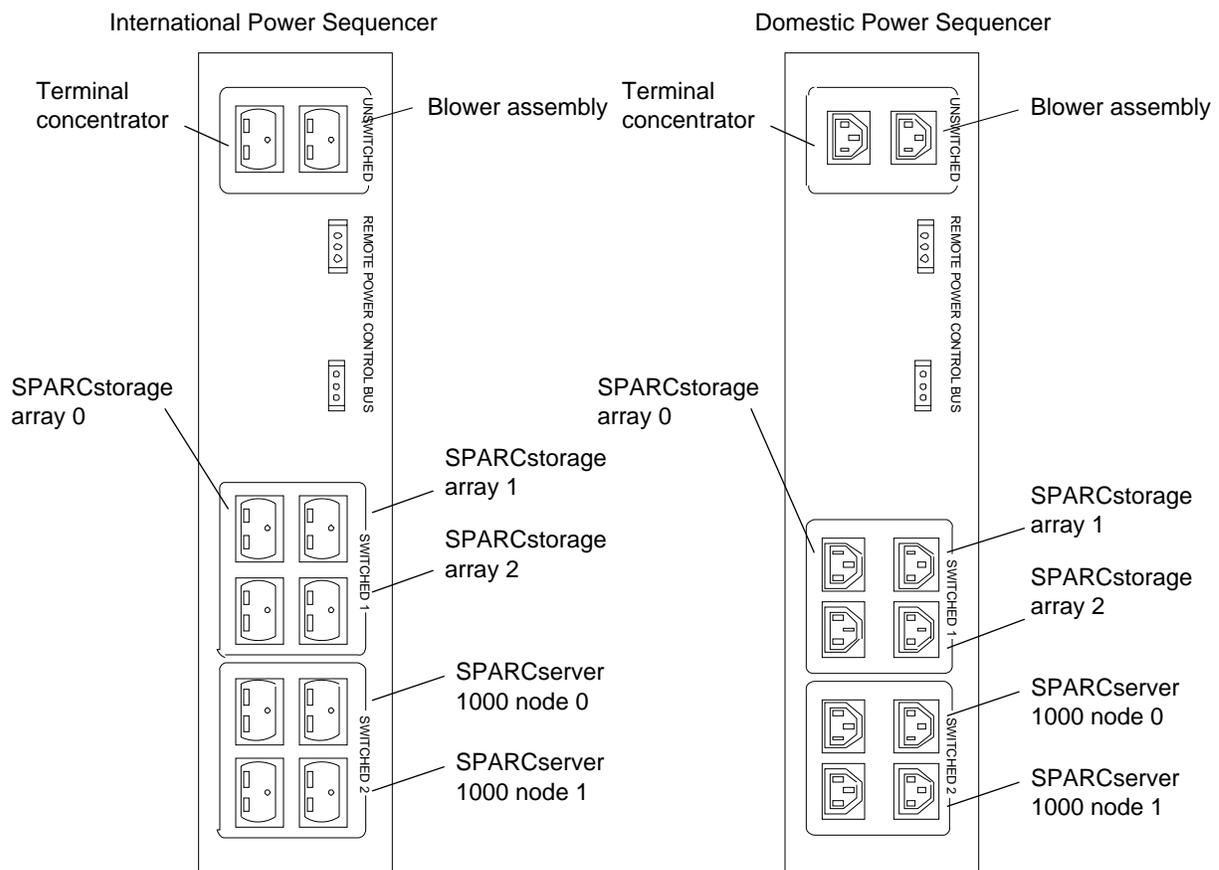


Figure 9-7 Plugging SPARCstorage Arrays/Terminal Concentrator into the Power Sequencer

3. Turn the AC power switch to ON on all SPARCstorage arrays and servers. See Figure 9-6.

### 9.2.5 Installing the Terminal Concentrator

At the rear of the cabinet, install the bayonet hinge portion of the terminal concentrator bracket.

1. Install the hinge in the rear of the primary cabinet. See Figure 9-8.

- a. Remove the screw in hole 79 on the inside securing the rear portion of the side air baffle.
- b. Orient the bayonet hinge as shown in Figure 9-8 and thread screws through the hinge into hole numbers 78 and 83 on the outside edge — do not tighten.

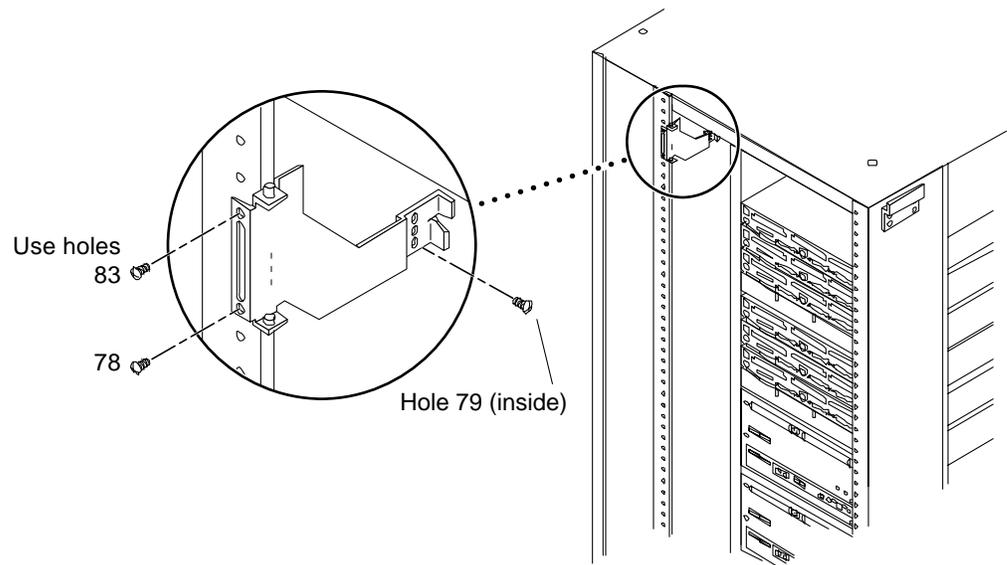


Figure 9-8 Installing the Terminal Concentrator Hinge

- c. Replace the screw in hole 79 removed in step a above. Now, the tail of the bayonet hinge overlays the air baffle, so the screw must penetrate through the hinge and air baffle and thread into the rack.
  - d. Tighten all screws to secure the hinge and air baffle in place.
2. Assemble the terminal concentrator unit into the bracket.
    - a. Place the terminal concentrator on the bracket as shown in Figure 9-9.
    - b. Shove the terminal concentrator to the left — snug against the left side of the bracket.
    - c. Install the clamp piece to secure the unit to the bracket.  
Place the clamp piece on the right side of the terminal concentrator. Align holes in the clamp piece with holes in the bracket. See Figure 9-9.



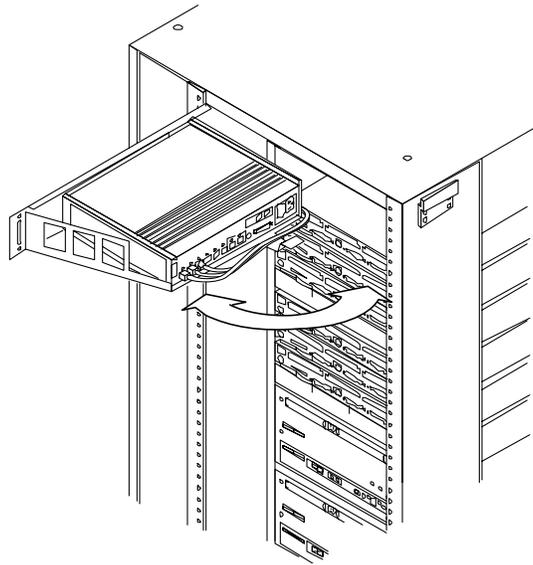


Figure 9-10 Terminal Concentrator Bracket Installed and Open

4. **Connect the power cord at the rear of the terminal concentrator.**  
See Figure 9-11.

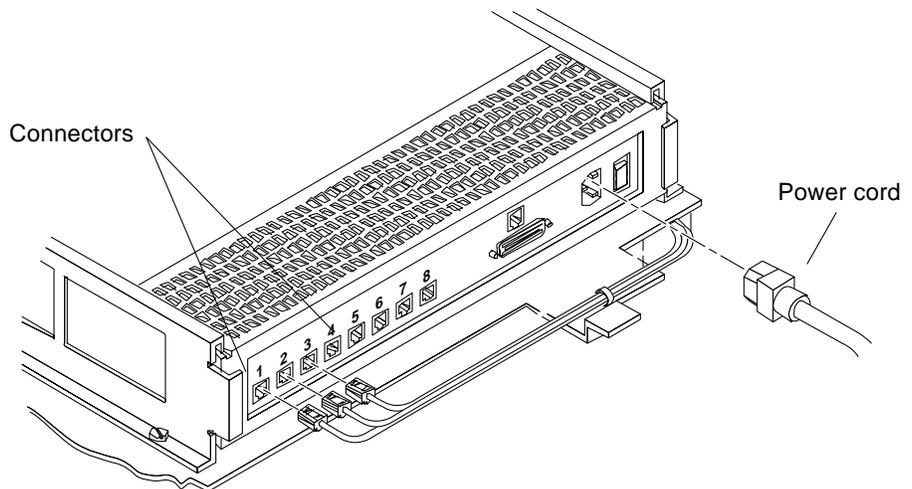


Figure 9-11 Terminal Concentrator Cable Locations

#### 5. Connect the power cord.

Plug the terminal concentrator cord into the power sequencer. Refer to Figure 9-7 for the correct connector location.

---

**Note** – The terminal concentrator data cabling has not yet been performed. However, swing the terminal concentrator bracket closed so it does not protrude and present a hazard to personnel working around the cabinet.

---

### 9.2.6 Configuring the Card Cages

For instructions on removing system boards, refer to documentation supplied with the system boards or the *SPARCserver 1000 System Service Manual*.

#### 9.2.6.1 SBus Cards

If SBus cards or other devices are to be installed, do it now.

♦ **Load the system boards 0 through 3 as appropriate with the intended SBus card complement.**

For SBus card installation procedures, refer to documentation supplied with the card(s) in question or to the *SPARCserver 1000 System Service Manual*.

---

**Note** – Load the respective system boards for both servers identically.

---

---

**Note** – Beyond minimum configuration it is recommended that FC/S cards be installed in the first available empty SBus slot, following all other boards in the system. This will ensure that the controller numbering is preserved if the Solaris Operating Environment is reinstalled. Refer to Section 2 of the *SPARCcluster High Availability Software Administration Guide* for a discussion of problems that can arise if this recommendation is ignored.

---

#### 9.2.6.2 System Boards

**1. Install the system boards loaded with SBus cards into the card cage.**

For system board installation procedures, refer to documentation supplied with the system boards or the *SPARCserver 1000 System Service Manual*.

2. Fill all unused slots with a filler panel. See Figure 9-12.

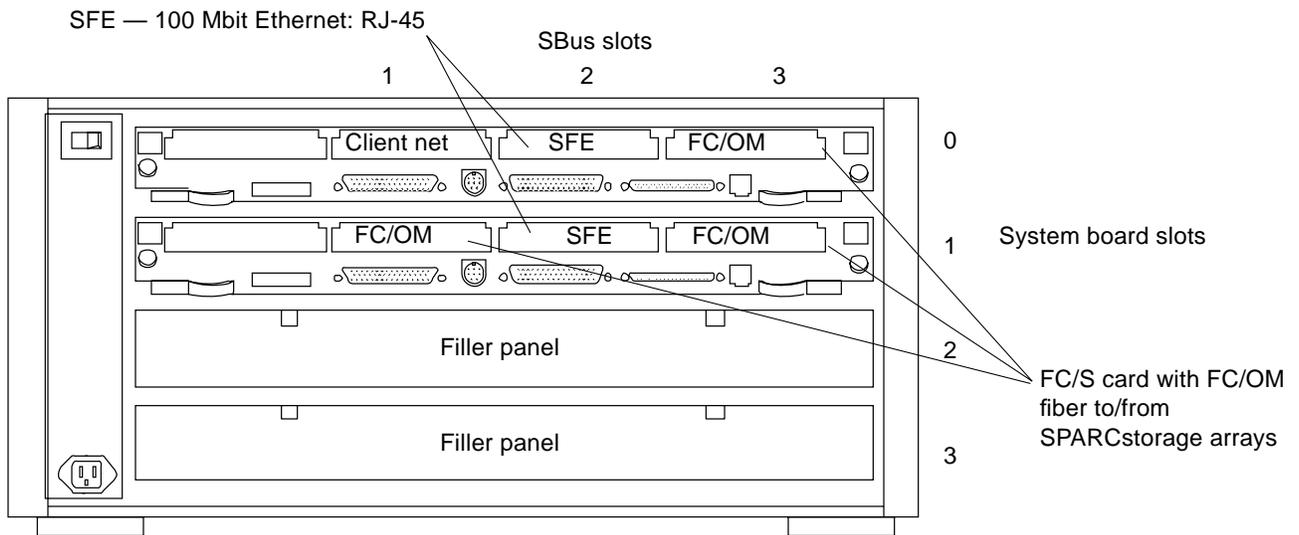


Figure 9-12 Minimum Configuration: System Boards Loaded with SBus Cards

### 9.2.7 Cabling the System Components

Network cabling is presented in Table 9-3. Procedures for connecting each cable follow the table.

---

**Note** – For fiber optic cable connections, refer to Table 9-4.

---

Table 9-3 Cable Connections (Except Fiber Optic)

System Board	From Server <sup>1</sup> (Cabinet A)		To	Interface/cable
	Node 0 SBus Slot # or ...	Node 1 SBus Slot # or ...	Cabinet A or ... Board #/Slot # Other	Type
0	1 Client net  le0 connector (onboard)	1 Client net  le0 connector (onboard)	Secondary Ethernet	AUI or RJ-45 <sup>3</sup>
			Secondary Ethernet	AUI or RJ-45 <sup>3</sup>
	Serial A (onboard)	Serial A (onboard)	Primary Ethernet network	RJ-45 <sup>3</sup>
			Primary Ethernet network	RJ-45 <sup>3</sup>
	2 SFE	2 SFE	Terminal concentrator port 2	Serial
			Terminal concentrator port 3	Serial
3 <sup>2</sup>	3 <sup>2</sup>	Connect node 0 to node 1	Private net <sup>4</sup>	
1	1 <sup>2</sup>	1 <sup>2</sup>		
	2 SFE	2 SFE	Connect node 0 to node 1	Private net <sup>4</sup>
	3 <sup>2</sup>	3 <sup>2</sup>	1 slot A 1 slot B	
2 <sup>2</sup>				
3 <sup>2</sup>				
Other	Admin. workstation Serial A		Terminal concentrator port 1	Serial
	Admin. work'stn Ethernet port		Primary Ethernet network	AUI or RJ-45 <sup>3</sup>

1. All connections are made by using optical fiber cable Part No. 537-1004, 2 meter or Part No. 537-1006, 15 meter as appropriate.

2. See Table 9-3.

3. Category 5 twisted-pair.

4. Category 5 twisted-pair, Sun Part Number 530-2149 (1 meter) or 530-2150 (5 meter).

### 9.2.7.1 Connecting the Administration Workstation



**Warning** – DO NOT plug a keyboard directly to a node system board. If a keyboard is plugged into a system board, it then becomes the default for console input, thus preventing input from the system administration workstation/terminal concentrator serial port. In addition, plugging a keyboard directly into a node system board while power is applied to the node sends a break signal to the Solaris operating system, just as if you had typed a L1-A on the console.

**1. Plug one end of cable PN 530-2152 into the terminal concentrator, Port 1 (RJ-45). See Figure 9-13.**

Swing the terminal concentrator bracket open to expose connectors, if necessary.

**2. Plug the other end into the administration workstation Serial A socket.**

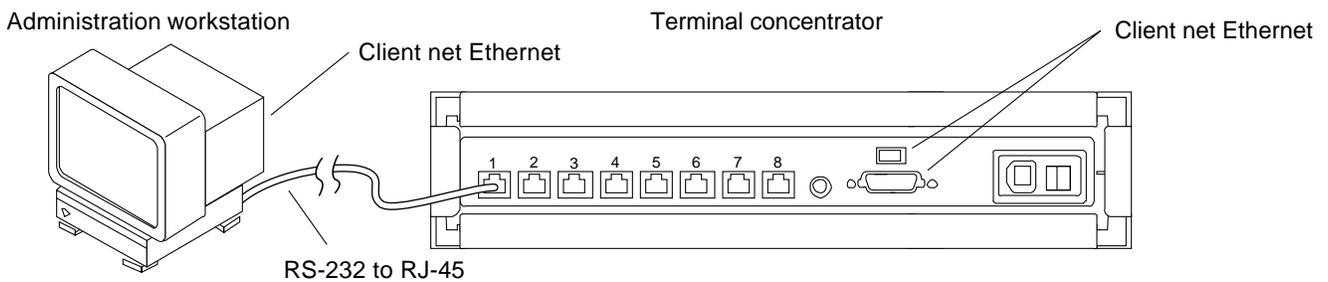


Figure 9-13 Connecting the Administration Workstation

**3. Plug the client network Ethernet cable into the administration workstation Ethernet socket.**

---

### 9.2.7.2 *Connecting the Terminal Concentrator*

---

**Note** – For this procedure, use two serial cables, each with an RJ-45 connector on one end and a DB25 connector on the other.

---

**1. Node 0:**

- a. **Plug one end of the serial cable into the Serial A port on the system board in slot 0 in node 0. See Figure 9-14.**
- b. **Plug the other end of this cable into the terminal concentrator, port 2.**

**2. Node 1:**

- a. **Plug one end of the serial cable into the Serial A port on the system board in slot 0 in node 1. See Figure 9-14.**
- b. **Plug the other end of this cable into the terminal concentrator, port 3.**

**3. Public net Ethernet.**

Plug the public net Ethernet cable into the right side connector on the terminal concentrator. See Figure 9-14.

**4. Close the terminal concentrator bracket and secure.**

- a. **Swing the bracket closed and flush against the cabinet.**
- b. **Install two screws to secure the bracket in place.**  
See Figure 9-15.

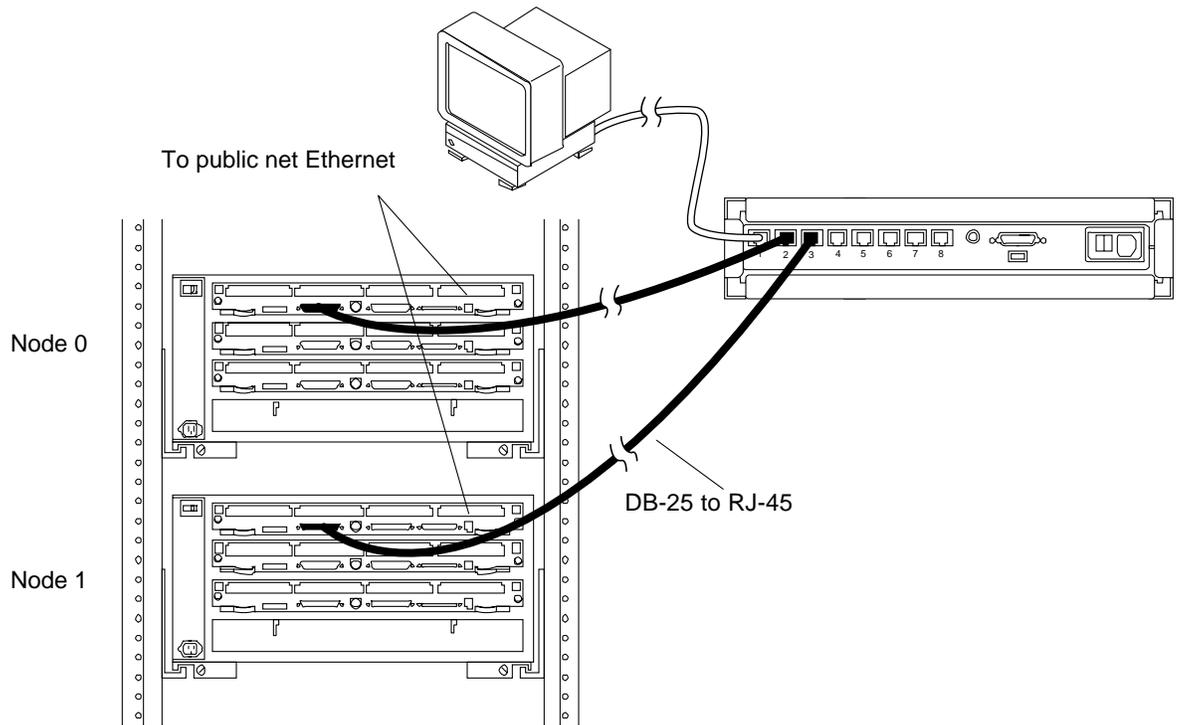


Figure 9-14 Connecting the Terminal Concentrator and Public Ethernet

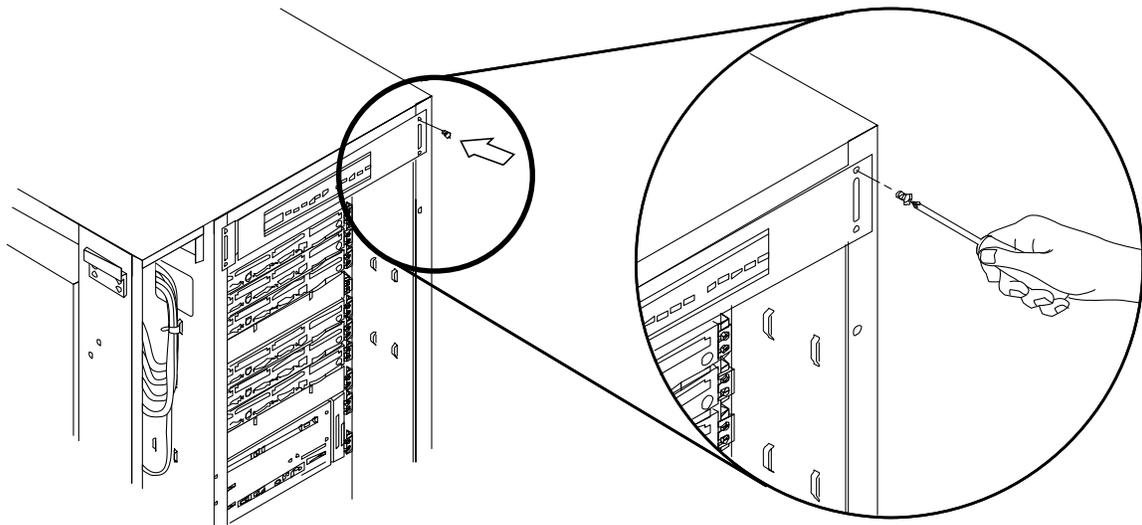


Figure 9-15 Closing the Terminal Concentrator Bracket

---

**Note** – You may need to lift up on the terminal concentrator mounting bracket to align the screws.

---

### 9.2.7.3 Connecting Node 0 to Node 1

With two Sun private net cables (short or long), connect one SPARCcluster 1000 High Availability node to the other.

Use short (Part No. 530-2149) or long (Part No. 530-2150) Sun private net cables as appropriate.

---

**Note** – These Sun private net cables are not interchangeable with standard Ethernet cables.

---

#### 1. First cable (see Figure 9-16):

- a. Connect one end of the Sun private net cable to the SFE 100 Mbit Ethernet card in system board slot 0, SBus position 1.

- b. Connect the other end to the identical system board and SBus card in the other node.

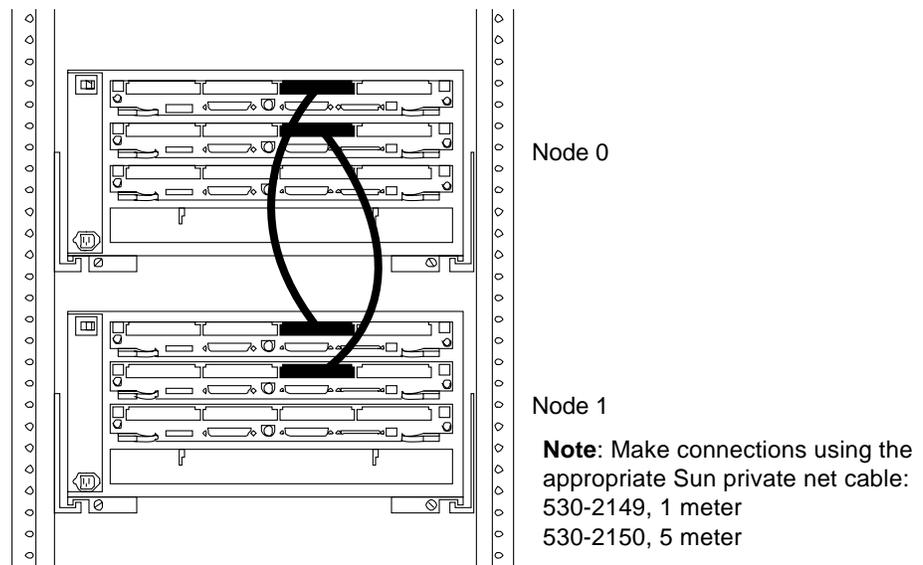


Figure 9-16 Node-to-Node Sun private net Cable Connections

**2. Second cable (see to Figure 9-16):**

- a. Connect one end of the Sun private net cable to the SFE 100 Mbit Ethernet card in system board slot 1, SBus position 2.
- b. Connect the other end to the identical system board and SBus card in the other node.

**3. Connect any remaining cables.**

For your reference, Table 9-3 summarizes cables that can be connected at this time. Your system may have more network cables than are listed in this table.

### 9.2.7.4 Connecting the SPARCstorage Arrays

#### ***Installing the Second FC/OM Optical Modules in all SPARCstorage Arrays.***

The arrays are delivered with one FC/OM optical module installed. Install the second module in the array using instructions provided with the module.

#### ***Labeling Fiber Optic Cables***

Fiber optic cables must be labeled prior to installation. Labeling ensures accurate installation and eases system reconfiguration and expansion later.

The suggested fiber optic cable labeling scheme for any given cable is:

- one end connects to an FC/OM module in node 0 or 1 (cabinet A)
- the other end connects to a FC/OM module in the SPARCstorage array of a given elevation in cabinet A or B (elevations are denoted by color from top to bottom, blue, red, orange, yellow, and white).

Affix labels to each cable, both ends, with the node, cabinet, and elevation information imprinted on it. Use Figure 9-17 through Figure 9-20 as a guide.

#### ***Cabling***

**1. Plug one end of the fiber cable into the FC/OM on the SBus card.**  
See Figure 9-21 for cable type and connection details.

**2. Plug the other end of the fiber cable into the FC/OM connector on the SPARCstorage array rear panel.**

Plug node 0 into connector A and node 1 into connector B. Repeat to connect both nodes to both SPARCstorage arrays. Refer to Table 9-4 for a listing of all cable connections.

**3. Repeat steps 1 and 2 for all FC/OM cables to be connected.**

**4. Dress and secure all cables using cable ties as required.**

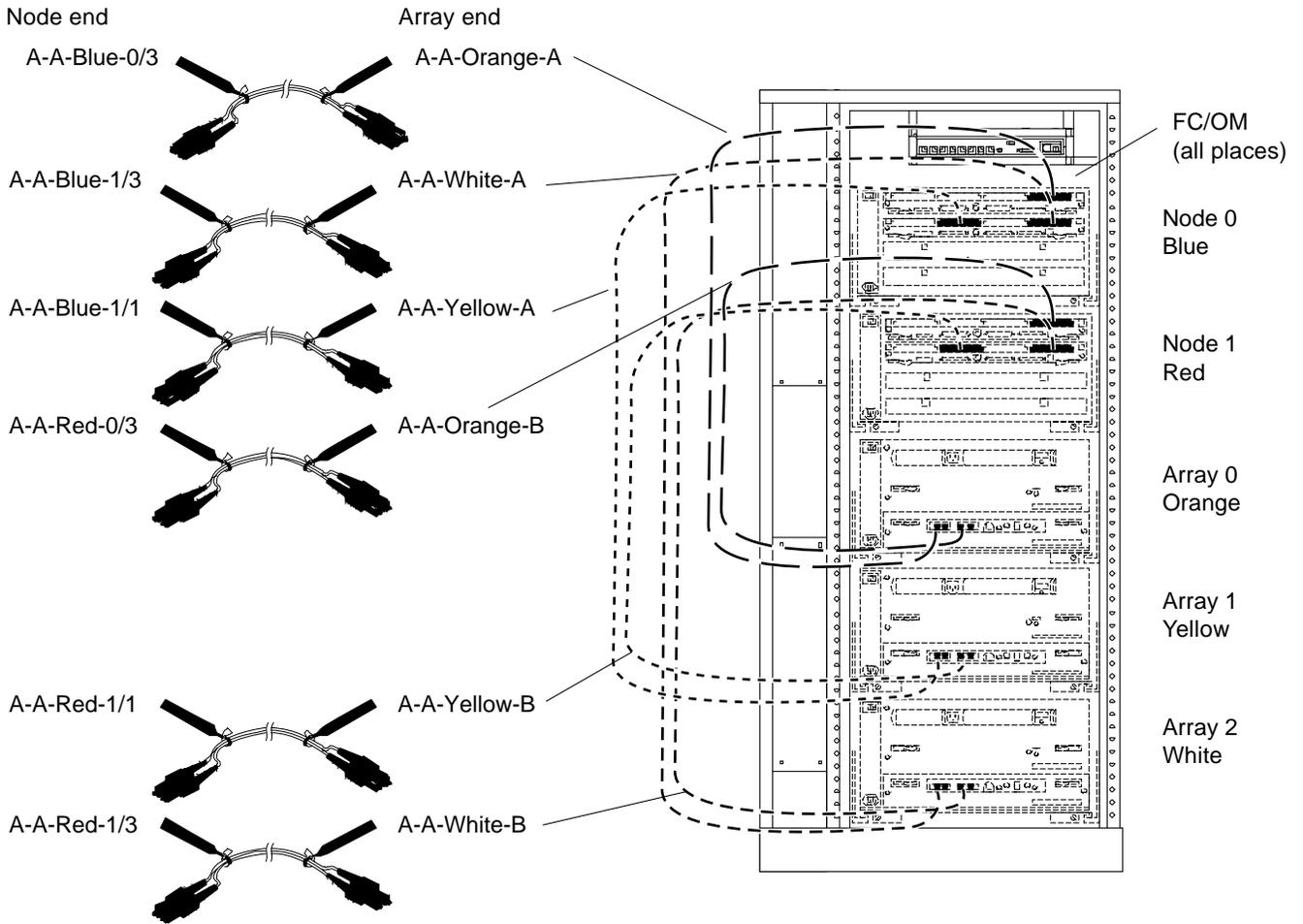


Figure 9-17 SPARCstorage Array 0, 1 and 2 Connection and Labeling Detail



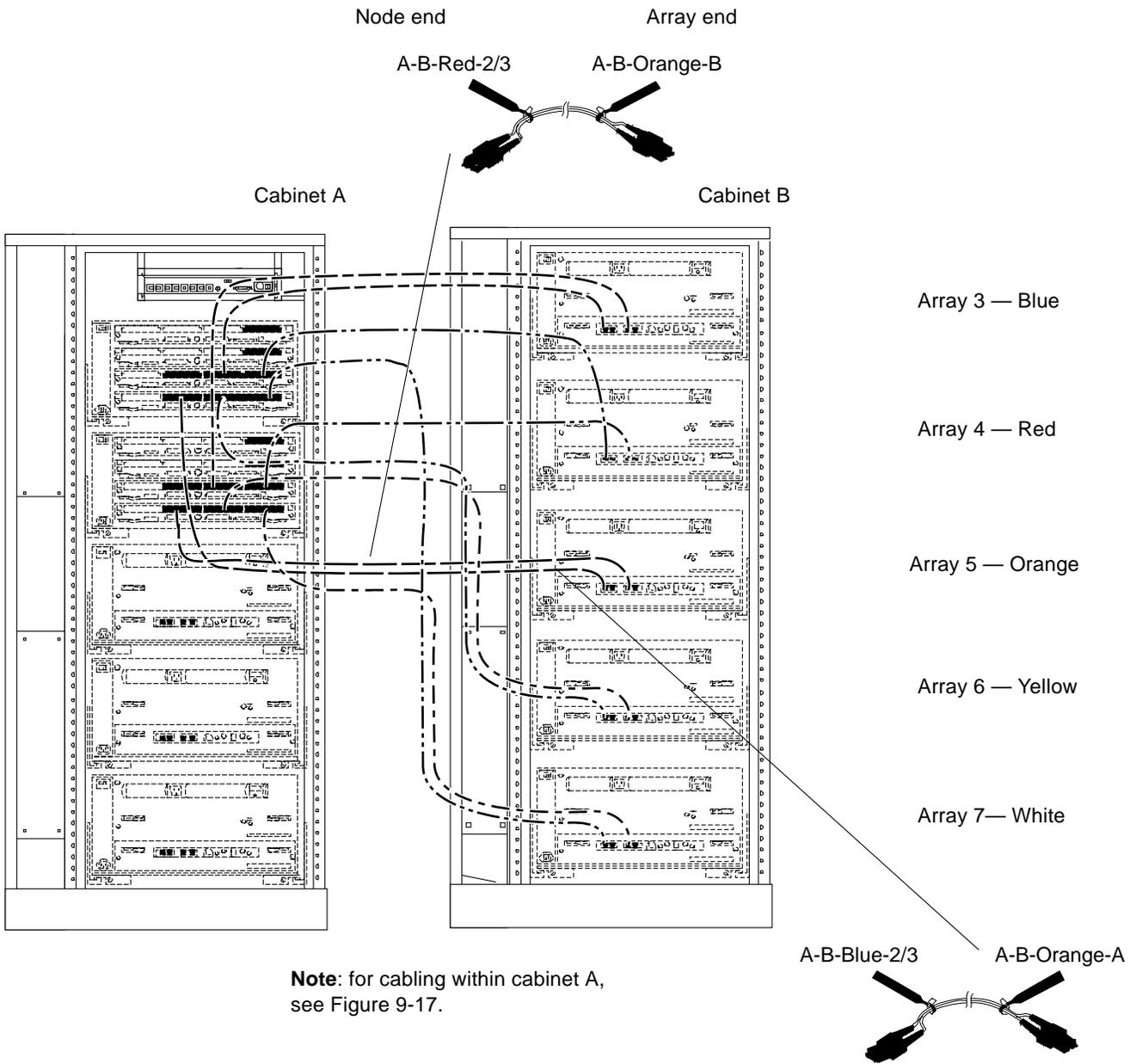


Figure 9-19 SPARCstorage Array 5 Connection Detail

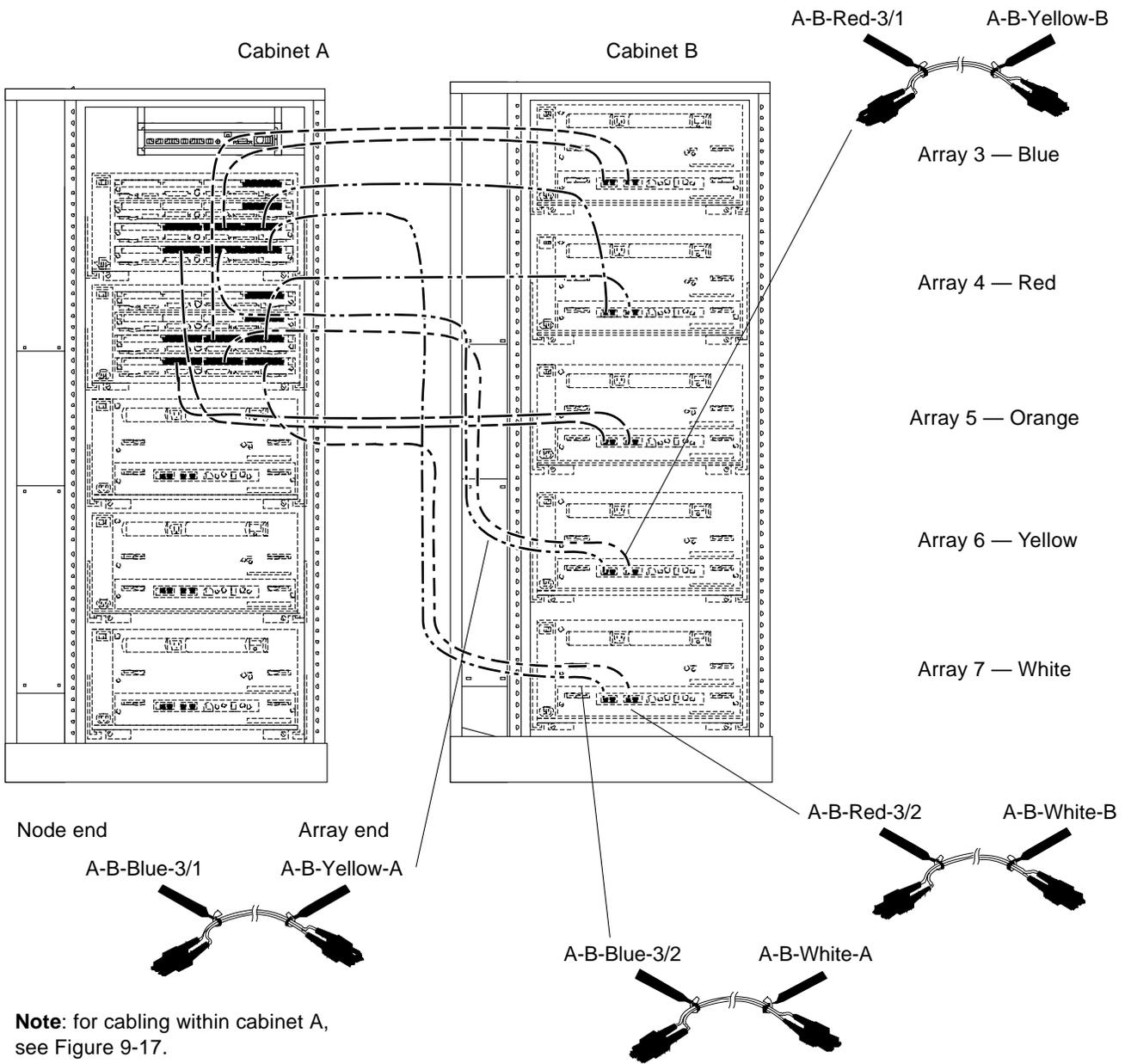


Figure 9-20 SPARCstorage Array 6 and 7 Connection Detail

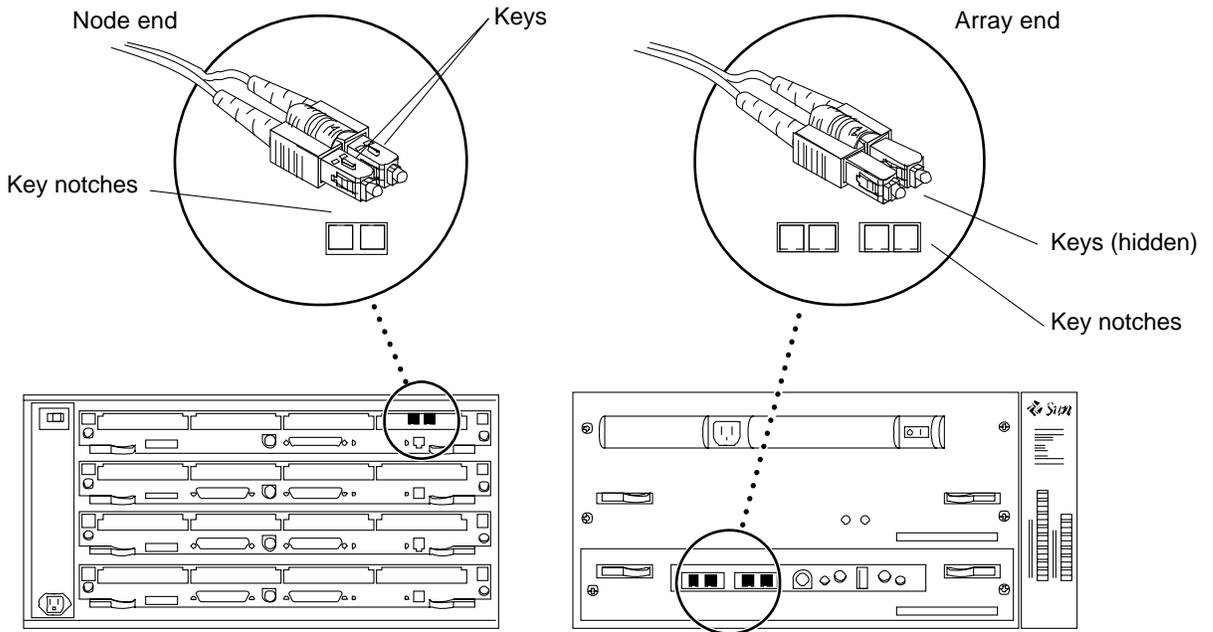


Figure 9-21 SPARCstorage Array Fiber Cable Connection

Table 9-4 Node to SPARCstorage Array Optical Fiber Cable Connections

System Board #	From Server <sup>1</sup> (Cabinet A)		To SPARCstorage Array		
	Node 0 SBus Slot #	Node 1 SBus Slot #	Cabinet A Array #/Slot #	Cabinets B Array #/Slot #	Elevation (Color)
0	1 <sup>2</sup>	1 <sup>2</sup>			
	2 <sup>2</sup> A	2 <sup>2</sup>			
	3	3	0 slot A 0 slot B		Orange Orange
1	1		1 slot A 1 slot B		Yellow Yellow
	2 <sup>2</sup>	2 <sup>2</sup>			
	3	3	2 slot A 2 slot B		White White
2	1	1		3 slot A 3 slot B	Blue Blue
	2	2		4 slot A 4 slot B	Red Red
	3	3		5 slot A 5 slot B	Orange Orange
3	1	1		6 slot A 6 slot B	Yellow Yellow
	2	2		7 slot A 7 slot B	White White
	3 Optional	3 Optional			

1. All connections are made by using optical fiber cable Part No. 537-1004, 2 meter or Part No. 537-1006, 15 meter as appropriate.

2. See Table 9-3.

### 9.3 *Closing the Cabinet*

◆ **Replace all panels on the cabinet.**

See Chapter 8, “Access” for procedures.

Proceed to Chapter 11 for terminal concentrator configuration procedures.

For other software installation, refer to the

- *SPARCcluster High Availability Software Planning and Installation Guide*, or the
- *SPARCcluster High Availability Server Administration Guide*

# *SPARCcluster 2000 High Availability Server Hardware Installation*

10 

## *10.1 Factory-Assembled SPARCcluster 2000 High Availability Hardware*

The basic configuration is completely pre-assembled in two cabinets.

---

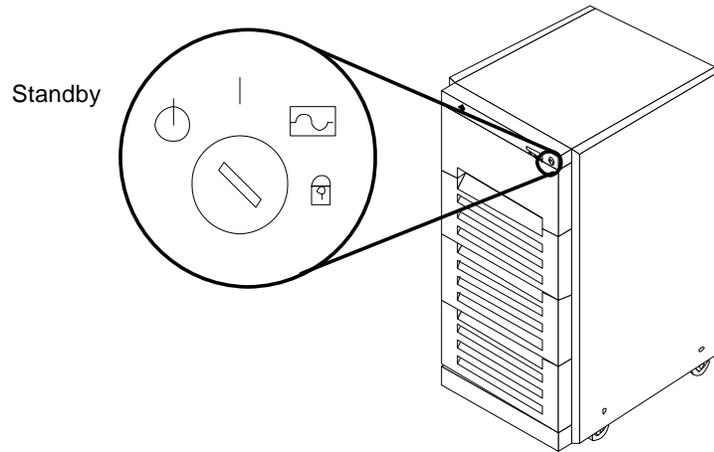
**Note** – If you are installing a customer-assembled system, see Section 10.2, “Customer-Assembled SPARCcluster 2000 High Availability Hardware.”

---

### *10.1.1 Preparing the Cabinets*

- 1. Unpack and inventory the equipment, if you have not already done so.**  
See Chapter 1, “Checklist” for a list of equipment.
- 2. Move the cabinets to their designated installation locations.**  
For site planning guidelines, Refer to Chapter 6, “SPARCcluster 2000 High Availability Configurations.”

**3. Turn front panel key switch to the standby position.**



*Figure 10-1* Key Switch in the Standby Position

4. Set the LOCAL/REMOTE switch to REMOTE. See Figure 10-2.

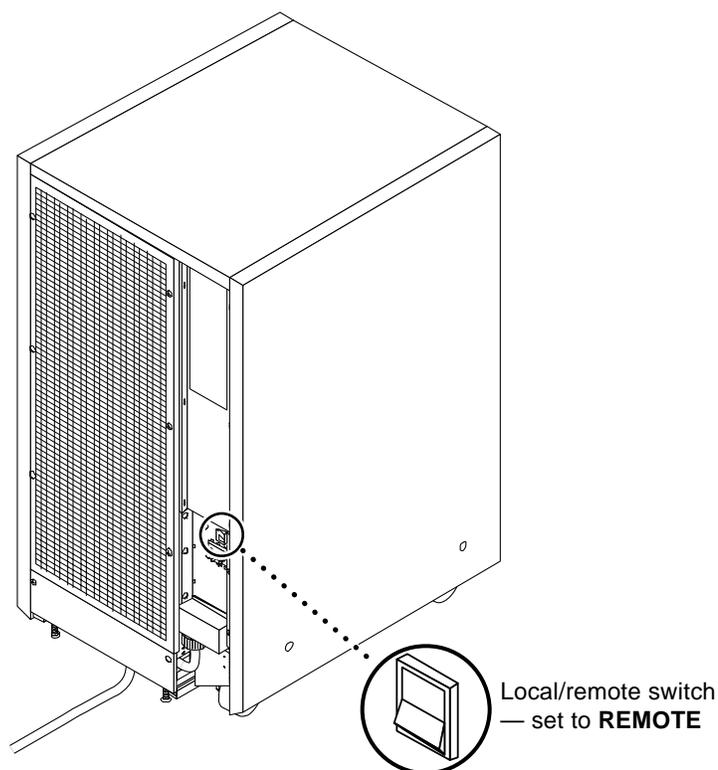


Figure 10-2 Local/Remote Switch

### 10.1.2 Connecting the Power Cords

1. **Remove the cabinet panels to access the power switches and cables.**  
See Section 8.1, “Removing System and Expansion Cabinet Panels”
2. **Level the cabinet.**  
See Section 8.2, “Leveling the Cabinets”
3. **Turn the AC distribution unit power switch to Off.**  
The switch is at the rear of the cabinet. See Figure 10-3.



**Warning** – The power must be turned off at the AC distribution unit or risk of electrical shock to personnel exists.

---



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

---

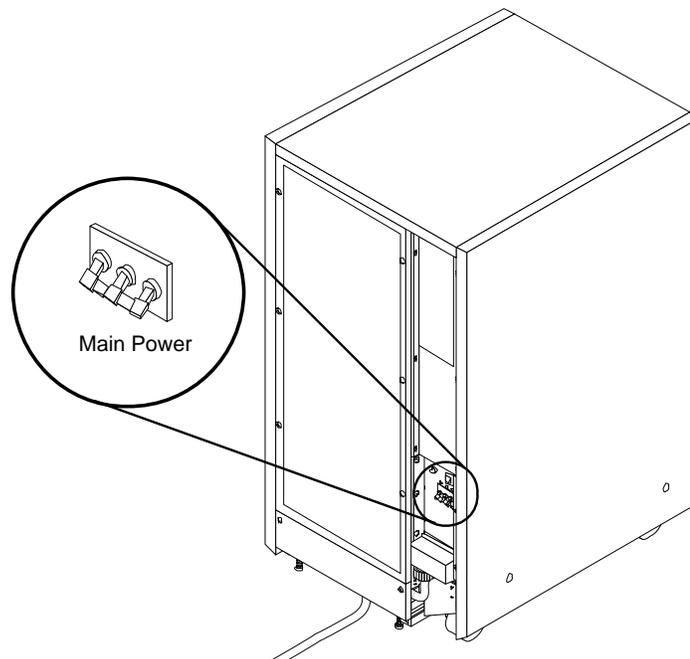


Figure 10-3 AC Distribution Unit Power Switch

- 4. Uncoil the AC power cord and connect it to an AC outlet.**  
As noted in Chapter 4, “Site Preparation and Planning,” the AC outlet should be part of a circuit dedicated to this system. Do not connect electrical motors or heaters to this circuit.
- 5. Plug in AC cords to provide grounding for static electricity.**

## 10.2 Customer-Assembled SPARCcluster 2000 High Availability Hardware

<b>Do tasks in the order listed</b>	
<i>Preparing the Cabinet</i>	<i>page 10-5</i>
<i>Accessing the Cabinets — Removing the Panels</i>	<i>page 10-5</i>
<i>Installing the Cabinets</i>	<i>page 10-5</i>
<i>Connecting the Main AC Cord</i>	<i>page 10-6</i>
<i>Installing SPARCstorage Arrays</i>	<i>page 10-6</i>
<i>Installing the Terminal Concentrator</i>	<i>page 10-9</i>
<i>Installing the Boot Disks</i>	<i>page 10-14</i>
<i>Configuring the Card Cages</i>	<i>page 10-18</i>
<i>Cabling System Components</i>	<i>page 10-19</i>

### 10.2.1 Preparing the Cabinet

#### 10.2.1.1 Powering Off the Cabinets

If the SPARCcenter 2000 cabinets are powered and operating, halt the operating systems and power off the system and expansion cabinets. See Section 7.2, “SPARCcluster 2000 High Availability Server.”

#### 10.2.1.2 Accessing the Cabinets — Removing the Panels

Remove the cabinet panels to access the power switches and cables. See Chapter 8, “Access.”

### 10.2.2 Installing the Cabinets

- 1. Unplug AC cords and all cabling to allow repositioning of the cabinets.**
- 2. Move the cabinets to their designated installation locations.**  
See Chapter 4 for site planning guidelines.

---

**Note** – When moving the cabinets, it is advisable to replace all panels to protect inner components during transport.

---

3. **Level the cabinet(s).**  
See Chapter 8, Section 8.2, “Leveling the Cabinets.”

### 10.2.3 Connecting the Main AC Cord

1. **For all AC-powered internal components, plug in AC cords to provide grounding for static electricity.**



---

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

---

2. **Turn front panel key switch (Figure 10-1) to the standby position.**
3. **Turn the AC distribution unit power switch to Off.**  
The switch is at the rear of the cabinet. See Figure 10-3.



---

**Warning** – The switch must be turned off at the cabinet AC distribution unit or risk of electrical shock to personnel exists.

---

4. **Uncoil the AC power cord and connect it to an AC outlet.**  
The AC outlet should be part of a circuit dedicated to this system. Do not connect electrical motors or heaters to this circuit.

### 10.2.4 Installing SPARCstorage Arrays

Three or more SPARCstorage arrays are installed in the cluster. These devices provide storage for the high availability data — NFS file systems and HA DBMS databases.

The cluster contains two identically-configured SPARCcenter 2000E systems.

#### 10.2.4.1 Mounting in the Cabinet

- ◆ **Install the rails in the cabinets and install the SPARCstorage arrays on the rails.**  
For these procedures, See Appendix A, “Air Baffle, Rack Mount Rail and Blower Assembly Installation.”

### 10.2.4.2 Preparing the SPARCstorage Arrays

1. **Locate the DIAG switch on the array rear panel.**  
See Figure 10-4.
2. **Ensure that the DIAG switch is set to DIAG and not to DIAG EXT.**  
Do not use the DIAG EXT position as it will invoke extended diagnostics and prevent the SPARCstorage array from booting. Leave the switch only in the DIAG position for normal operation.

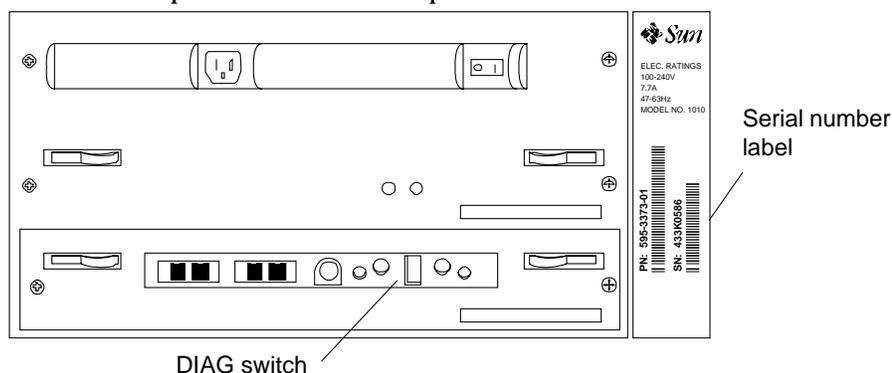


Figure 10-4 SPARCstorage Array Voltage Rating on the Serial Number Label

3. **Locate the serial number label on the rear panel of the chassis.**  
See Figure 10-4.
4. **Check the electrical ratings label on the serial number label. Verify that the stated rating matches your AC input voltage.**

Table 10-1 provides maximum system operating voltage and frequency ranges.

Table 10-1 Power Requirements

Configuration	Nominal AC Input Voltage Range - Single Phase	Operating Range	Operating Frequency Range
North American	100-120 VAC	90-264 VAC	47-63 Hz
International	220-240 VAC	90-264 VAC	47-63 Hz

Table 10-2 lists current requirements at nominal line voltage for a SPARCstorage array.

Table 10-2 Current Requirements

Configuration	Maximum Current Requirement	Power Supply Output
North American, Japan, and International	6.5A	460W

**5. Connect SPARCstorage array power cords.**

- a. Plug a power cord into the connector at rear of each array.**  
See Figure 10-5.

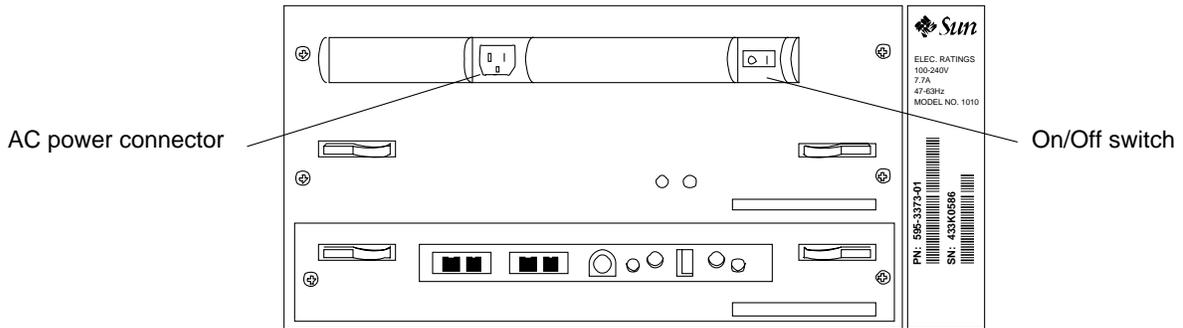


Figure 10-5 SPARCstorage Array AC Power Connector

- b. Route the power cords to the power distribution unit:**

Dress the power cords down the left side of the rack. Roll any excess cord and tuck it into the space under the power distribution unit at the bottom of the cabinet. Secure in place using cable ties.

**6. Plug in the SPARCstorage arrays.**

Plug the power cords from the chassis into the power distribution unit. Use the switched outlets identified in Figure 10-6 for SPARCstorage array 0 and 1.

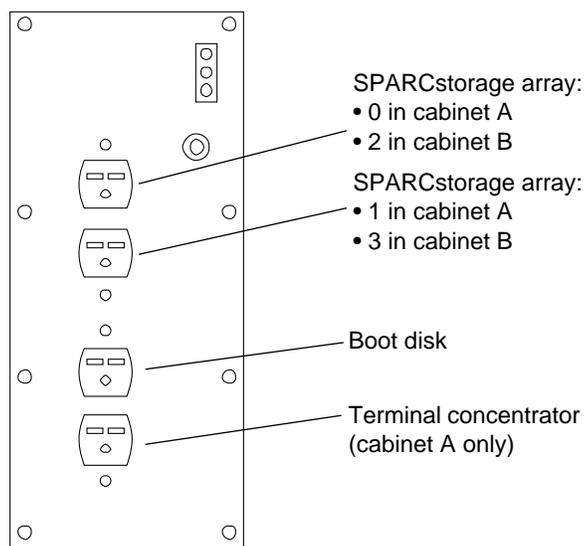


Figure 10-6 Plugging SPARCstorage Arrays into the Power Distribution Unit

7. Turn the AC power switch to ON on all SPARCstorage arrays and servers. See Figure 10-5.

### 10.2.5 Installing the Terminal Concentrator

Install the terminal concentrator mounting bracket in the primary cabinet.

1. Install the terminal concentrator bracket hinge:
  - a. Locate the hinge portion of the terminal concentrator bracket assembly.
  - b. Install the locator screws.

Loosely install two locator screws in the right-hand rail in the rear of the cabinet. Thread them into holes 8 and 30 as shown in Figure 10-7.

---

**Note** - The locator screws will accept the slotted holes in the hinge piece.

---

- c. Place slotted holes of the hinge over the locator screws and allow it to drop into place.

**d. Install screws in holes 9 and 29.**

Tighten these screws as well as those in holes 8 and 30. See Figure 10-7.

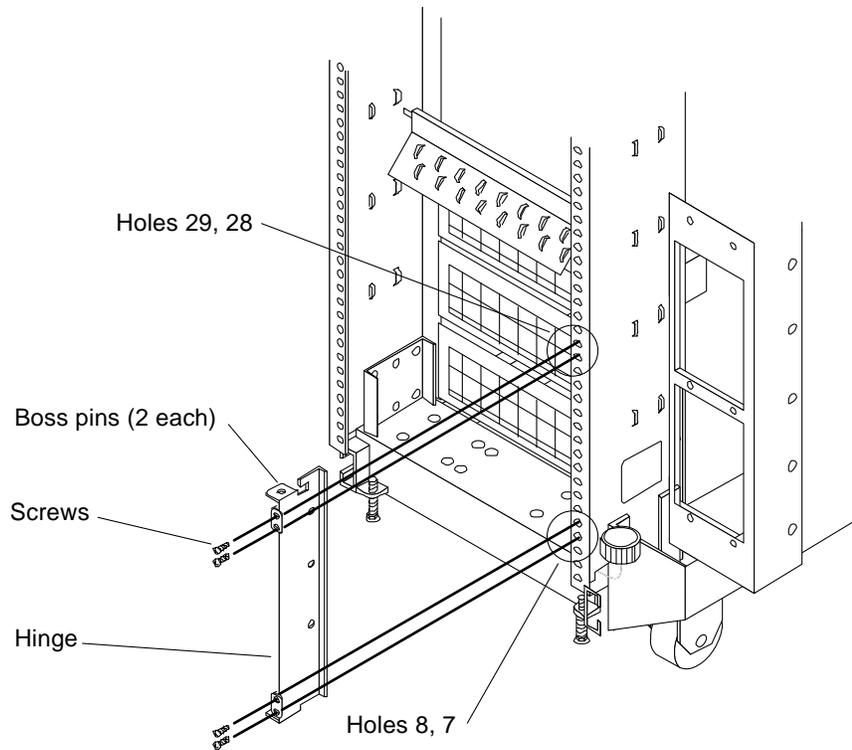
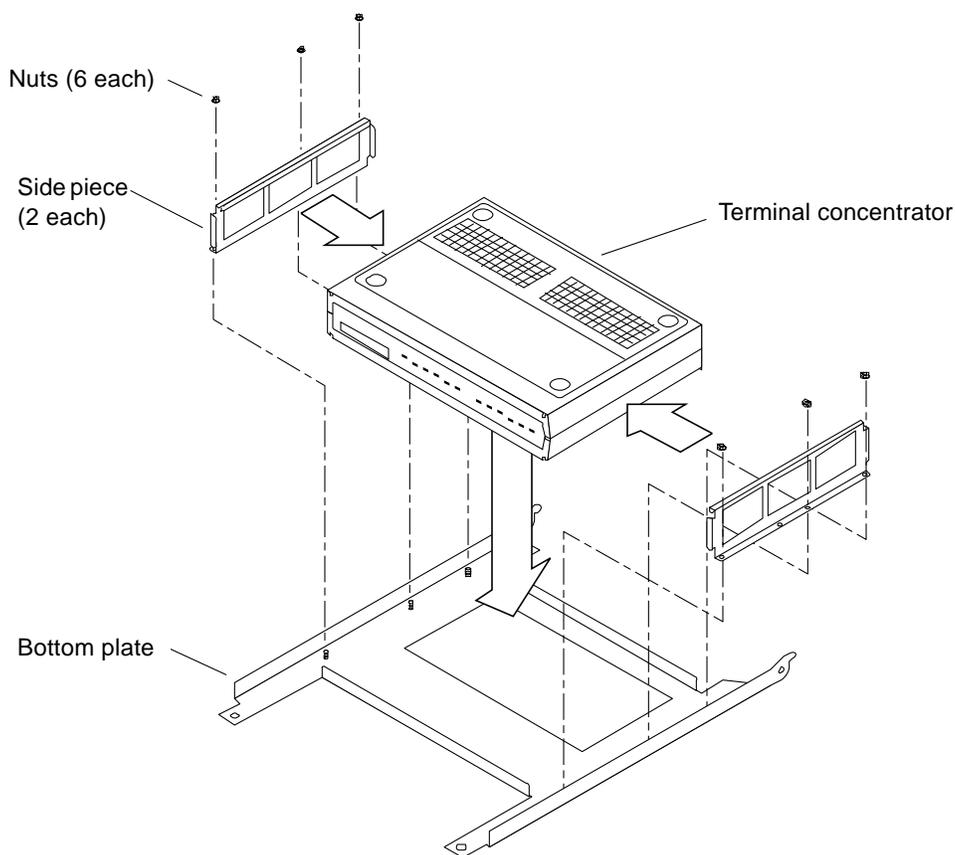


Figure 10-7 Installing the Terminal Concentrator Hinge

**2. Install the terminal concentrator in the bracket and assemble the bracket.**

- a. Place the side pieces of the bracket against the terminal concentrator as shown in Figure 10-8.**

**b. Lower the terminal concentrator (with side pieces) onto the bottom plate. Align holes in the side pieces with those in the bottom plate.**



*Figure 10-8* Assembling the Terminal Concentrator Bracket

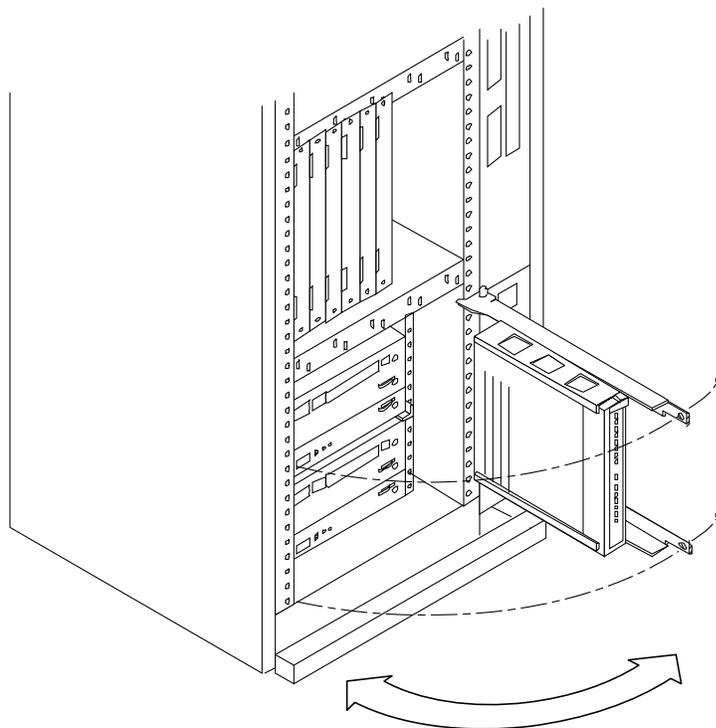
**c. Install three nuts on threaded studs penetrating through each side plate. Tighten the nuts.**

This completes assembly of the bracket assembly.

**3. Install the terminal concentrator bracket onto the hinge in the chassis.** Turn the terminal concentrator bracket on its side so the hinge-holes and cable connectors face right. Align bracket holes with boss pins in the hinge assembly and drop the bracket onto the hinge. See Figure 10-9.

**4. Install the keeper screw in the shorter boss pin.**

This ensures the assembly will not be accidentally knocked off the hinge.



*Figure 10-9 Terminal Concentrator Installed on the Hinge*

**5. Connect the power cord:**

- a. At the rear of the terminal concentrator, install the power cord.**  
See Figure 10-10.
- b. Plug the other end into the AC power distribution unit.**  
See Figure 10-11.

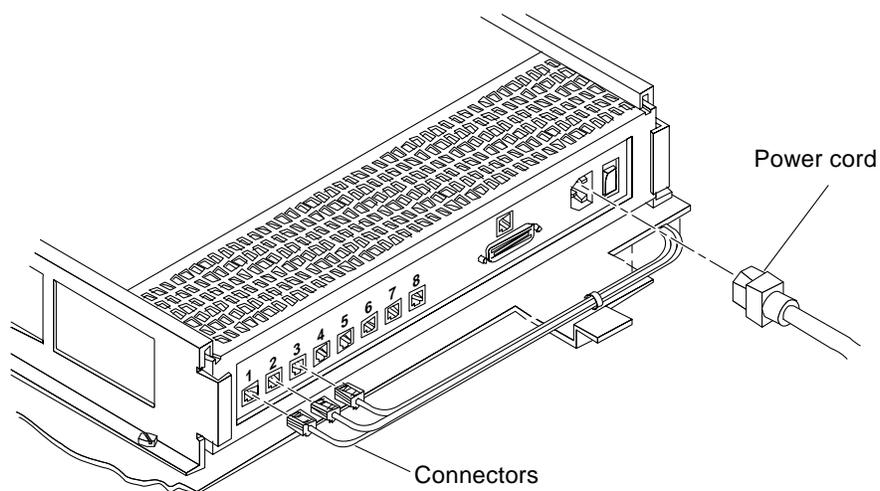


Figure 10-10 Terminal Concentrator Cable Locations

**6. Close the terminal concentrator bracket.**

Swing the bracket assembly closed and install screws in holes 8 and 30 on the left side rail.

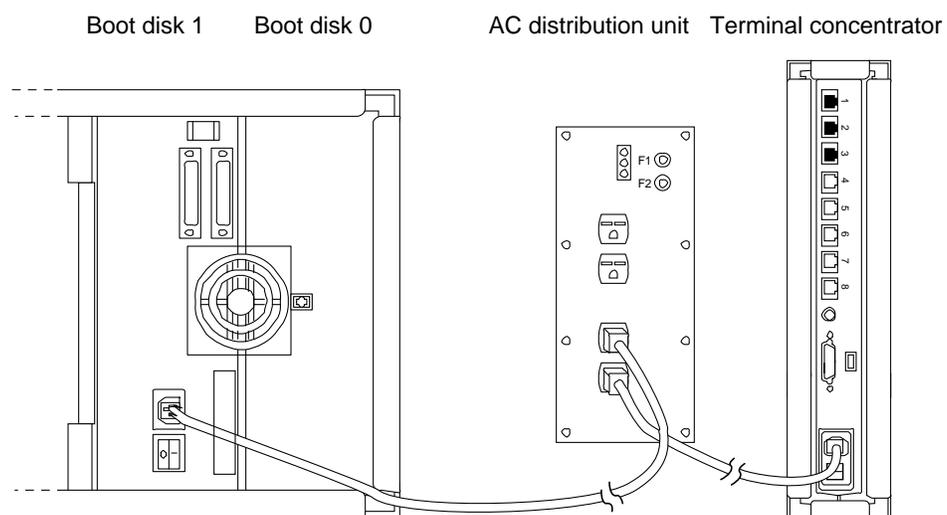


Figure 10-11 Plugging the Terminal Concentrator and Boot Disk into the AC Power Distribution Unit

## 10.2.6 Installing the Boot Disks

Install the boot disk bracket in the front of the cabinets.

### 10.2.6.1 Node 0 Cabinet

1. Locate the hinge portion of the boot disk bracket assembly.
2. Thread screws in a few turns in holes 27 and 11 on the side of the rail on the left side.  
These screws will be used to hang the hinge on. See Figure 10-12.
3. Hang the hinge on the two screws installed in step 2.
4. Install the remaining four screws:
  - Holes 24 and 12 on the side
  - Holes 26 and 10 from the front
 Tighten all screws. See Figure 10-12.

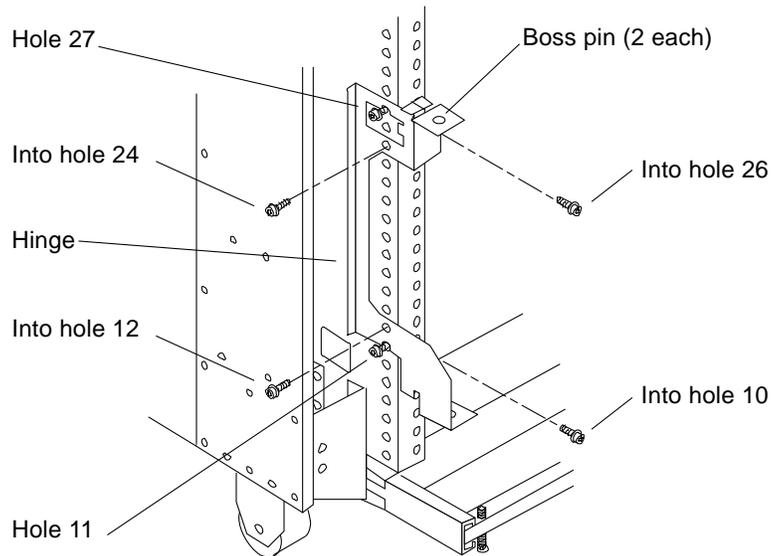


Figure 10-12 Installing the Boot Disk Hinge

**5. Determine if the SCSI addresses for the devices within the Multi-Disk Pack are correct.**

Since the Multi-Disk Pack can be ordered in a four or two disk drive version, the default factory-set addressing for devices within the unit differs between the two versions. Determine which version you have:

**a. Find the part number on the Multi-Disk Pack.**

- Part Number X739A denotes the 4 disk drive version. SCSI addressing is factory set to 0 through 3. This is correct. Proceed to step 6.
- Part Number X738A denotes the 2 disk drive version. SCSI addressing is factory set to 1 and 3. This is incorrect. Proceed with step b.

**b. Set the SCSI addresses for the two drives to 0 and 1 for boot disks 0 and 1 respectively.**

For this procedure, refer to the *Multi-Disk-Pack Installation and Service Guide*, Part Number 801-6119, for SCSI address switch access and locations within the unit, and address setting information. Then, proceed to step 6.

**6. Install the boot disk enclosure in the bracket and assemble the bracket.**

**a. Lay the bottom plate on a surface as shown in Figure 10-13.**

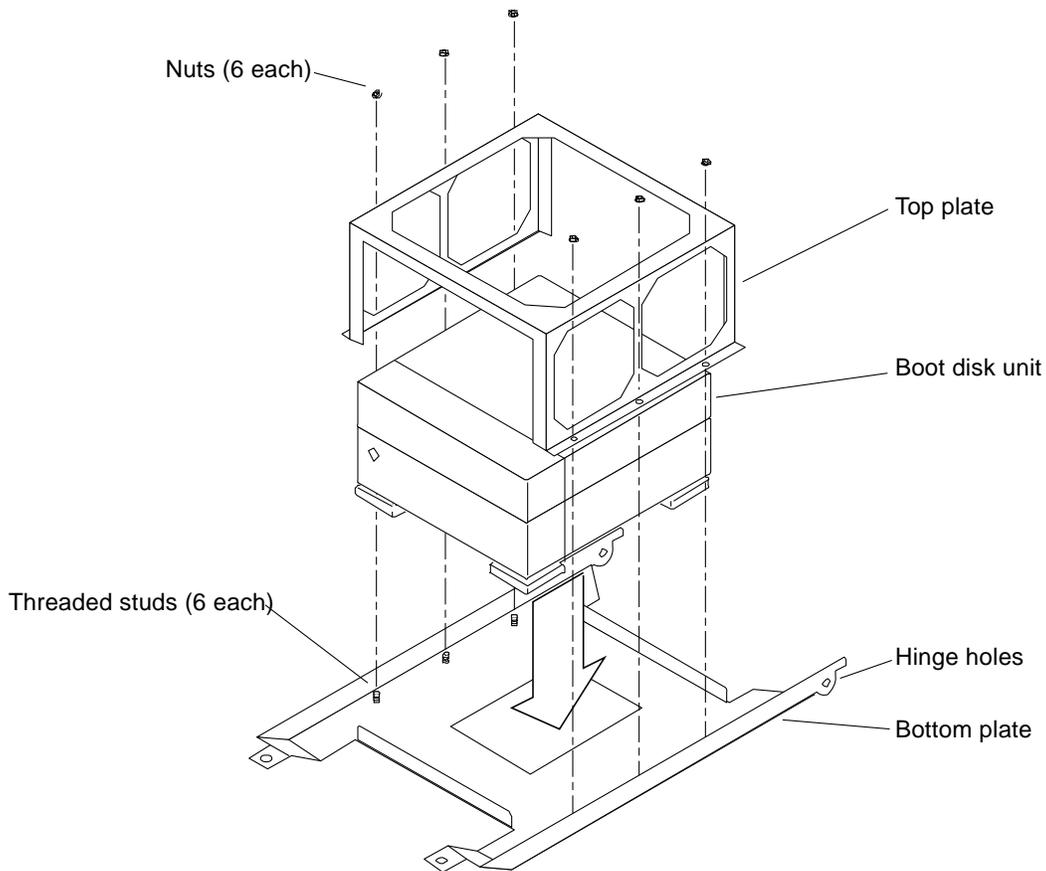


Figure 10-13 Assembling the Boot Disk Bracket

**b. Place the boot disk on the bottom plate.**

Orient the unit as shown in Figure 10-13.

**c. Place the top plate over the enclosure and lower it so it contacts the bottom plate. Align holes with threaded studs in the bottom plate.**

**d. Assemble the top and bottom plates.**

Install four nuts (two on each side) on threaded studs which penetrate through holes in the top plate. Tighten the nuts.

This completes assembly of the bracket assembly.

**7. Install the boot disk bracket onto the hinge in the chassis.**

Turn the boot disk bracket on its side so the hinge-holes and boot disk cable connectors face left. Align bracket holes with boss pins in the hinge assembly and drop the bracket onto the hinge. See Figure 10-14.

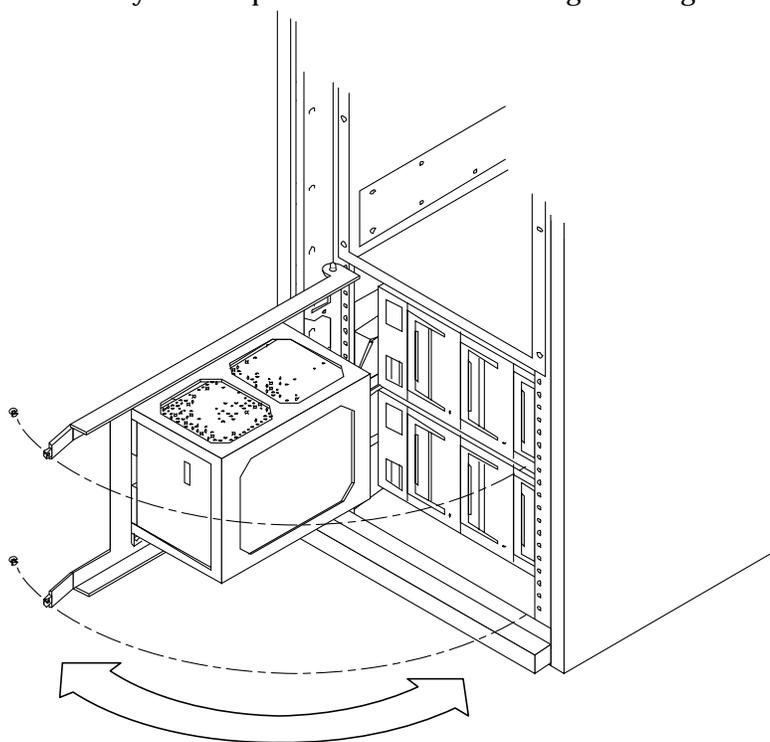


Figure 10-14 Boot Disk Bracket Installed on the Hinge

**8. Install the keeper screw in the shorter boss pin.**

This ensures the assembly will not be accidentally knocked off the hinge.

**9. Connect the power cord.**

Plug the cord female end into boot disk power connector on the rear panel. Plug the male end into the AC power distribution unit. See Figure 10-11.

---

**Note** – The power cord may be a Y-block type cord with two female connectors. If it is, leave the second female connector unused, and secure it out of the way using cable ties as necessary.

---

**10. Close the boot disk bracket.**

Swing the boot disk bracket assembly closed and install screws in holes 26 and 10 on the right-side rail.

**10.2.6.2 Node 1 Cabinet**

Repeat Section 10.2.6.1, “Node 0 Cabinet,” for the node 1 cabinet.

**10.2.7 Configuring the Card Cages**

For instructions on removing the system board, refer to documentation supplied with the system boards or the *SPARCcenter 2000 Service Manual*.

**10.2.7.1 SBus Cards**

If SBus cards or other devices are to be installed, do it now.

**1. Load the system boards 0 through 9 as appropriate with the intended SBus card complement.**

For SBus card installation procedures, refer to documentation supplied with the card(s) in question or the *SPARCcenter 2000 Service Manual*.

**2. Configure card cages in both cabinets.**

**3. Once the system capacity is determined**

**a. Install system boards in all indicated slots in both nodes**

**b. Install the appropriate SBus cards to support the SPARCstorage arrays and other required functions in both nodes**

---

**Note** – Load the respective system boards for both servers identically.

---

---

**Note** – Beyond minimum configuration it is recommended that FC/S cards be installed in the first available empty SBus slot, following all other boards in the system. This will ensure that the controller numbering is preserved if the Solaris Operating Environment is reinstalled. Refer to Section 2 of the *SPARCcluster High Availability Software Administration Guide* for a discussion of problems that can arise if this recommendation is ignored.

---

### 10.2.7.2 System Boards

1. **Install the system boards loaded with SBus cards into the card cage.**  
For system board installation procedures, refer to documentation supplied with the system boards or the *SPARCcenter 2000 Service Manual*.
2. **Fill all unused slots with a filler panel. See Figure 10-15.**

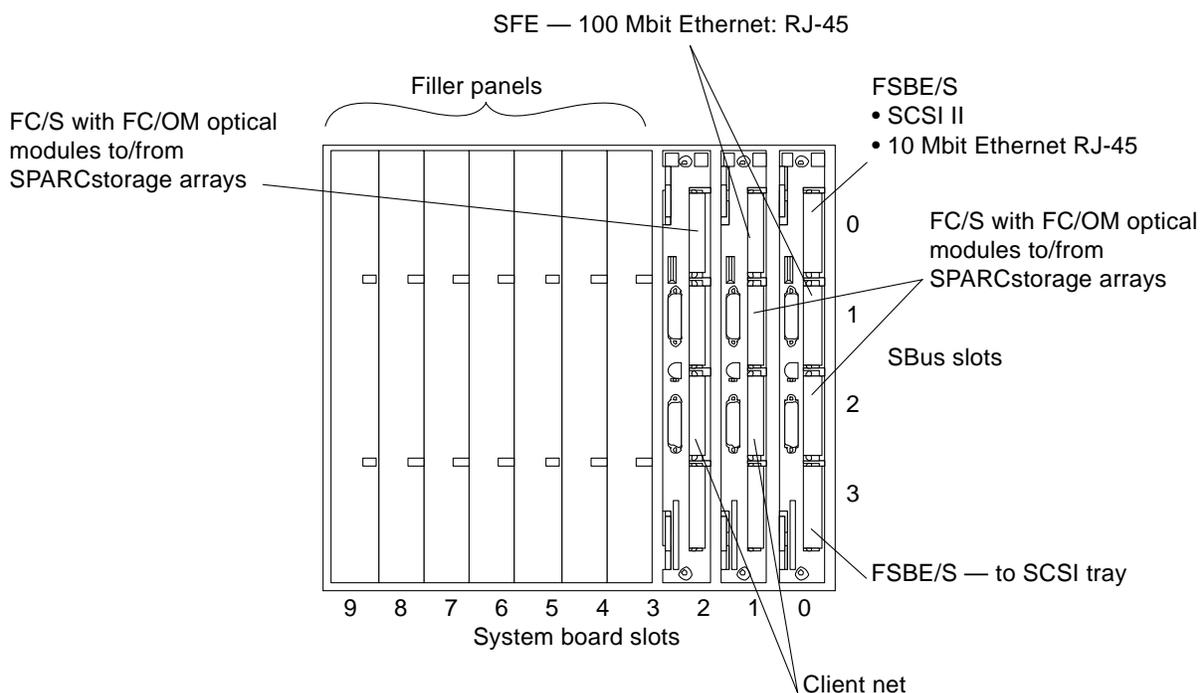


Figure 10-15 Minimum Configuration: System Boards Loaded with SBus Cards

### 10.2.8 Cabling System Components

Ethernet and SCSI II cabling is presented in Table 10-3. Procedures for connecting each cable follow the table.

**Note** – For fiber optic cable connections, refer to Table 10-4 and Table 10-5.

*Table 10-3 Cable Connections (Except Fiber Optic)*

Category	Step	Interface type	Cable type	Part No.	From	To
<b>Terminal Concentrator</b>					Terminal concentrator	
	1.	Serial	RS-232 and serial		Port 1	Admin. workstn. Serial A
	2.	Serial	RS-232 and serial		Port 2	Node 0, board 0, Serial A
	3.	Serial	RS-232 and serial		Port 3	Node 1, board 0, Serial A
<b>Admin. Workstation</b>	4.	Ethernet	AUI or TPE		Ethernet	Client network
	5.	Ethernet	AUI or TPE		Admin. workstation	Client network
<b>Node-to-node</b>	6.	SFE 100 Mbit Ethernet	TPE	530-2149 (short) 530-2150 (long)	Node 0, board 0, slot 1	Node 1, board 0, slot 1
	7.	Same		Same	Node 0, board 1, slot 0	Node 1, board 1, slot 0
<b>Node-to-main network</b>	8.	Ethernet	AUI or TPE		Node 0, board 0, slot 0 FSBE/S card — le0	Main Ethernet network
	9.	Same	Same		Node 1, board 0, slot 0 FSBE/S card — le0	Main Ethernet network
<b>Client Net</b>	10.	Client net Ethernet	TPE		Node 0, board 1, slot 2	Client network
	11.				Node 0, board 2, slot 2	Client network
	12.				Node 1, board 1, slot 2	Client network
	13.				Node 1, board 2, slot 2	Client network
<b>SCSI Tray</b>	14.	FSBE/S	SCSI II		Node 0, board 0, slot 3	SCSI II IN connector on bulkhead below cardcage

Table 10-3 Cable Connections (Except Fiber Optic) (Continued)

Category	Step	Interface type	Cable type	Part No.	From	To
	15.					Install terminator on SCSI II OUT connect. on bulkhead below cardcage
	16.	FSBE/S	SCSI II		Node 1, board 0, slot 3	SCSI II IN connector on bulkhead below cardcage
	17.					Install terminator on SCSI II OUT connect. on bulkhead below cardcage
<b>Boot Disks</b>	18.	FSBE/S	SCSI II		Node 0, board 0, slot 0	Boot disk IN
	19.					Install terminator on boot disk OUT
	20.	FSBE/S	SCSI II		Node 1, board 0, slot 0	Boot disk IN
	21.					Install terminator on boot disk OUT

### 10.2.8.1 Connecting the Administration workstation



**Warning** – DO NOT plug a keyboard directly to a node system board. If a keyboard is plugged into a system board, it then becomes the default for console input, thus preventing input from the system administration workstation/terminal concentrator serial port. In addition, plugging a keyboard directly into a node system board while power is applied to the node sends a break signal to the Solaris operating system, just as if you had typed a L1-A on the console.

1. Plug one end of cable PN 530-2152 into the terminal concentrator, Port 1. See Figure 10-16.

**2. Plug the other end into the administration workstation RS-232 connector.**

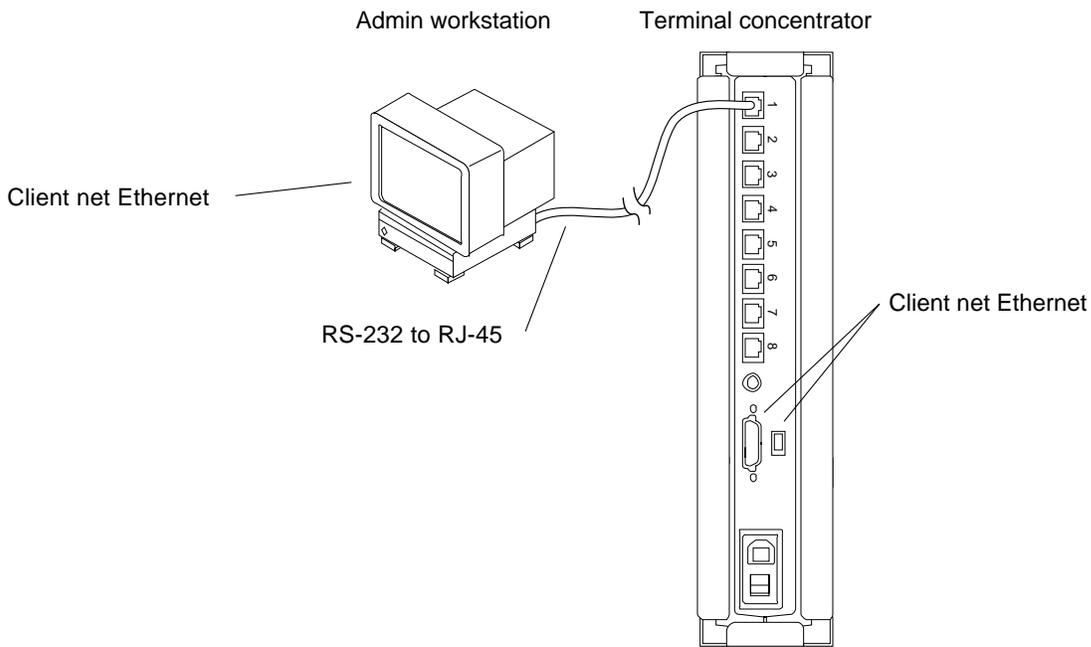


Figure 10-16 Connecting the Administration Workstation

**3. Plug the client network Ethernet cable into the administration workstation Ethernet socket.**

**10.2.8.2 Connecting the Terminal Concentrator**

**1. Node 0:**

- a. Plug one end of the RJ-45 cable into the Serial A port on the system board in slot 0 in node 0. See Figure 10-16.
- b. Plug the other end of this cable into the terminal concentrator, port 2.

**2. Node 1:**

- a. Plug one end of the RJ-45 cable into the Serial A port on the system board in slot 0 in node 1. See Figure 10-17.
- b. Plug the other end of this cable into the terminal concentrator, port 3.

### 3. Public net Ethernet.

Plug the public net Ethernet cable into the AUI or RJ-45 connector on the terminal concentrator. See Figure 10-17.

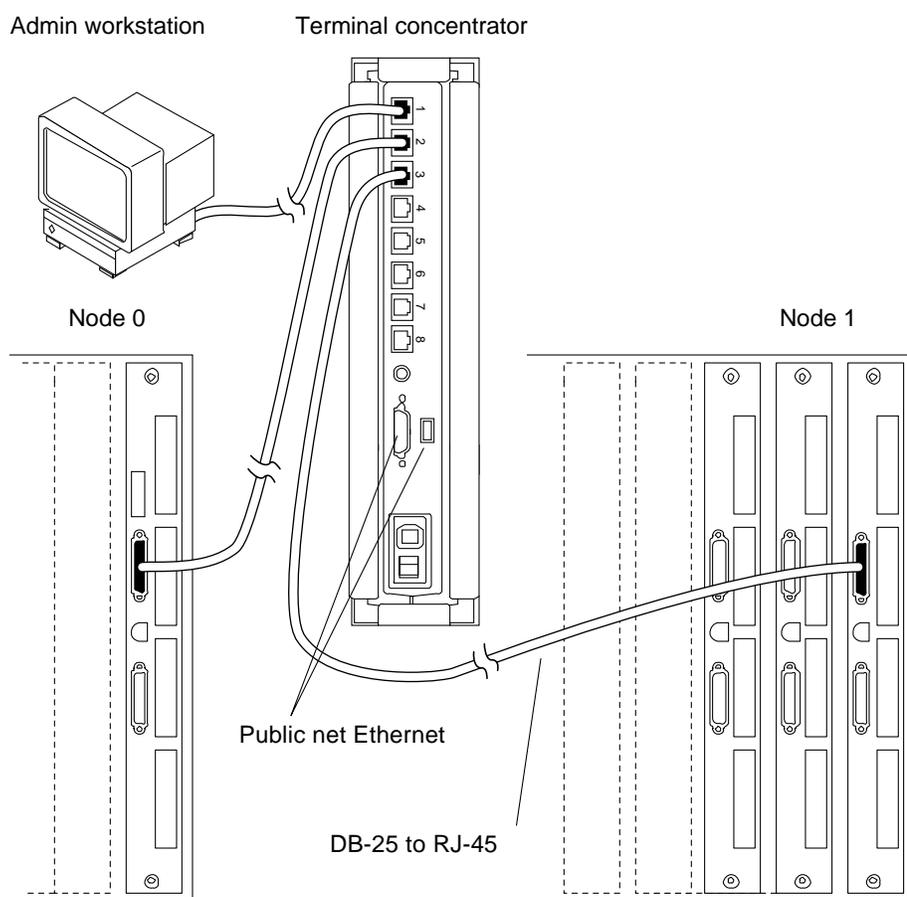


Figure 10-17 Node Interface to the Terminal Concentrator

#### 10.2.8.3 Connecting Node 0 to Node 1 — Private Net Ethernet

With two Sun private net cables (short or long), connect one SPARCcluster 2000 High Availability node to the other.

**Note** – Use short and long Sun private net cables as appropriate:  
530-2149 (short) 530-2150 (long).

**1. First cable (see Figure 10-18):**

- a. Connect one end of the Sun private net cable to the SFE 100 Mbit Ethernet card in system board slot 0, SBus position 1.
- b. Connect the other end to the identical system board and SBus card in the other node.

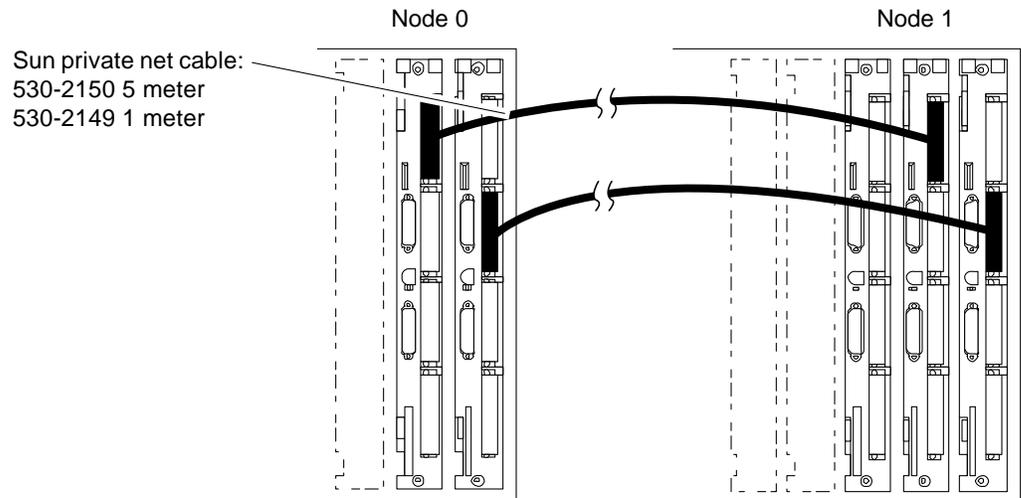


Figure 10-18 Node-to-Node Sun private net Cable Connections

**2. Second cable (refer to Figure 10-18):**

- a. Connect one end of the Sun private net cable to the SFE 100 Mbit Ethernet card in system board slot 1, SBus position 0.
- b. Connect the other end to the identical system board and SBus card in the other node.

**3. Connect any remaining cables.**

For your reference, Table 10-3 summarizes the cables that can be connected at this time. Your system may have more network cables listed in this table.

### 10.2.8.4 Boot Disks (in the Node 0 Cabinet)

Using one cable and a regulated terminator, connect the boot disk (see Figure 10-19 and Table 10-3).

#### 1. Node 0 Cabinet:

- a. Plug one end of the SCSI cable into the FSBE/S card in board 0, slot 0.
- b. Plug the other end into the IN connector of the boot disk enclosure.

#### 2. Install a regulated terminator on the OUT connector of the boot disk enclosure.

#### Node 1

- ♦ Repeat steps 1 and 2 on node 1.

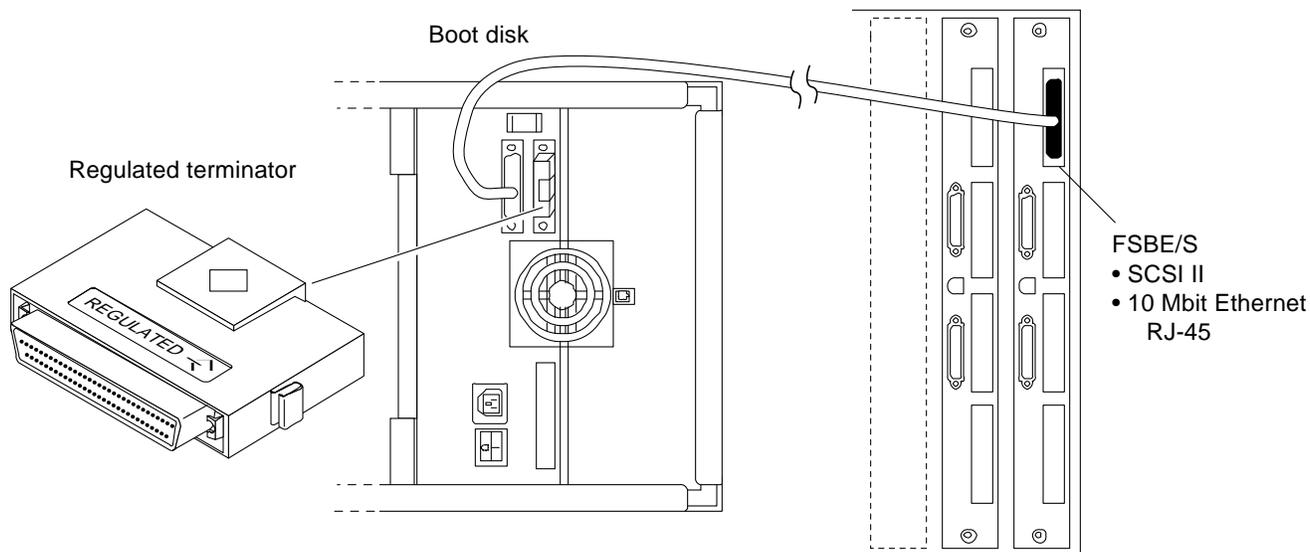


Figure 10-19 Connecting the Boot Disks

### 10.2.8.5 Internal SCSI Tray

1. Plug one end of a cable into the FSBE/S card in board 0, slot 4. See Figure 10-20 and Table 10-3.

2. Plug the other end into the IN connector of the bulkhead SCSI II panel. This panel is located below the card cage and to the left.
3. Install a terminator on the OUT connector of the bulkhead SCSI II panel.

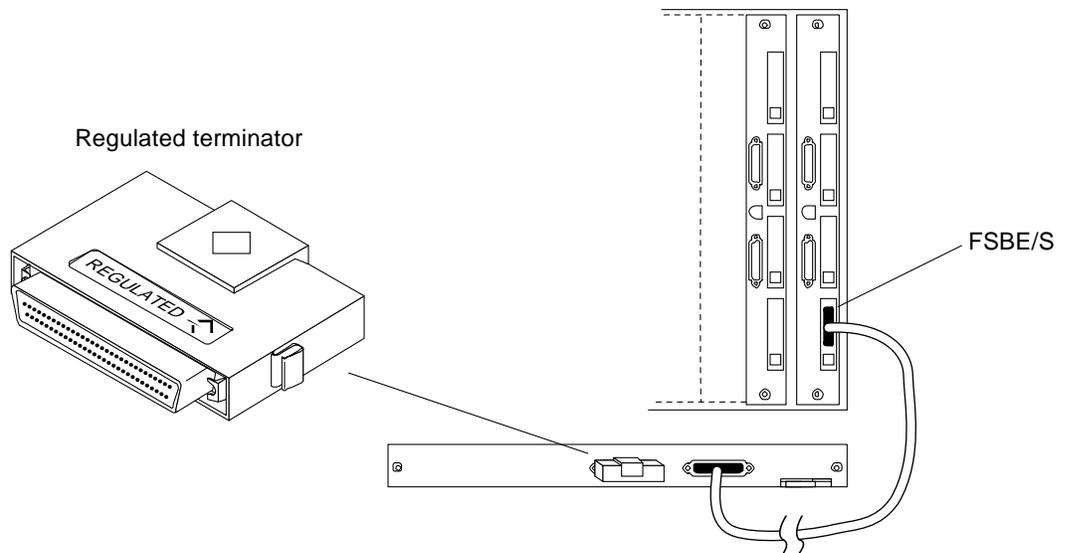


Figure 10-20 Connecting the Internal SCSI Tray

### 10.2.8.6 Connecting the SPARCstorage Arrays

#### **Installing the Second FC/OM Optical Module in all SPARCstorage Arrays.**

Install a second optical module in each SPARCstorage array using instructions provided with the FC/OM optical module.

#### **Labeling Fiber Optic Cables**

Fiber optic cables must be labeled prior to installation. Labeling ensures accurate installation and eases system reconfiguration and expansion later.

The suggested fiber optic cable labeling scheme for any given cable is:

- one end connects to an FC/OM module in node 0 or 1 (cabinet A or B)

- the other end connects to a FC/OM module in the SPARCstorage array of a given elevation in cabinet A through F (elevations are denoted by color from bottom to top, white, yellow, orange, red, and blue).

Affix labels to each cable, both ends, with the node, cabinet and elevation information imprinted on it. Use Figure 10-21 as a guide.

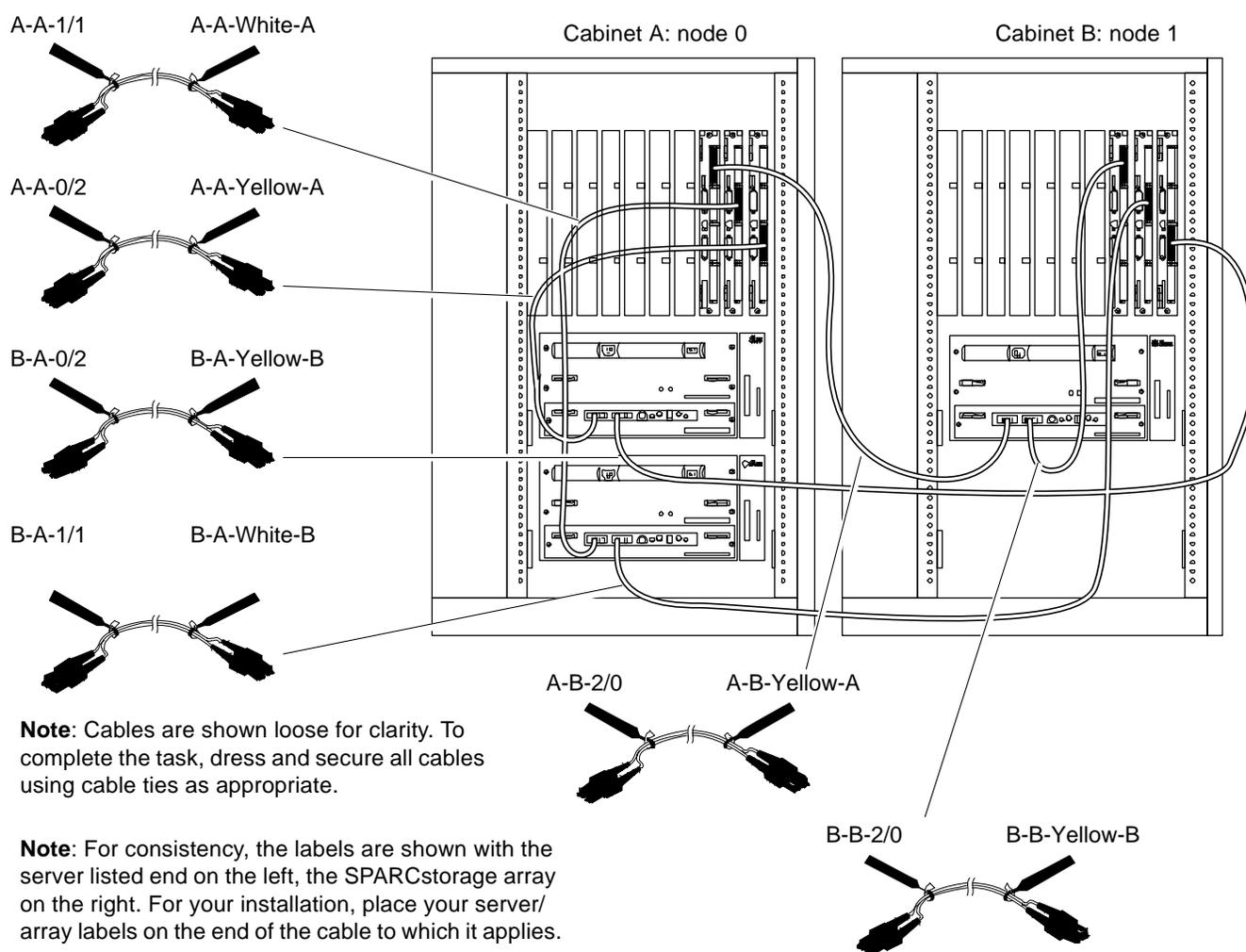


Figure 10-21 SPARCstorage Array 0, 1 and 2 Connection and Labeling Detail

**Cabling**

- 1. Plug one end of the fiber cable into the FC/OM on the SBus card.**  
See Figure 10-22.

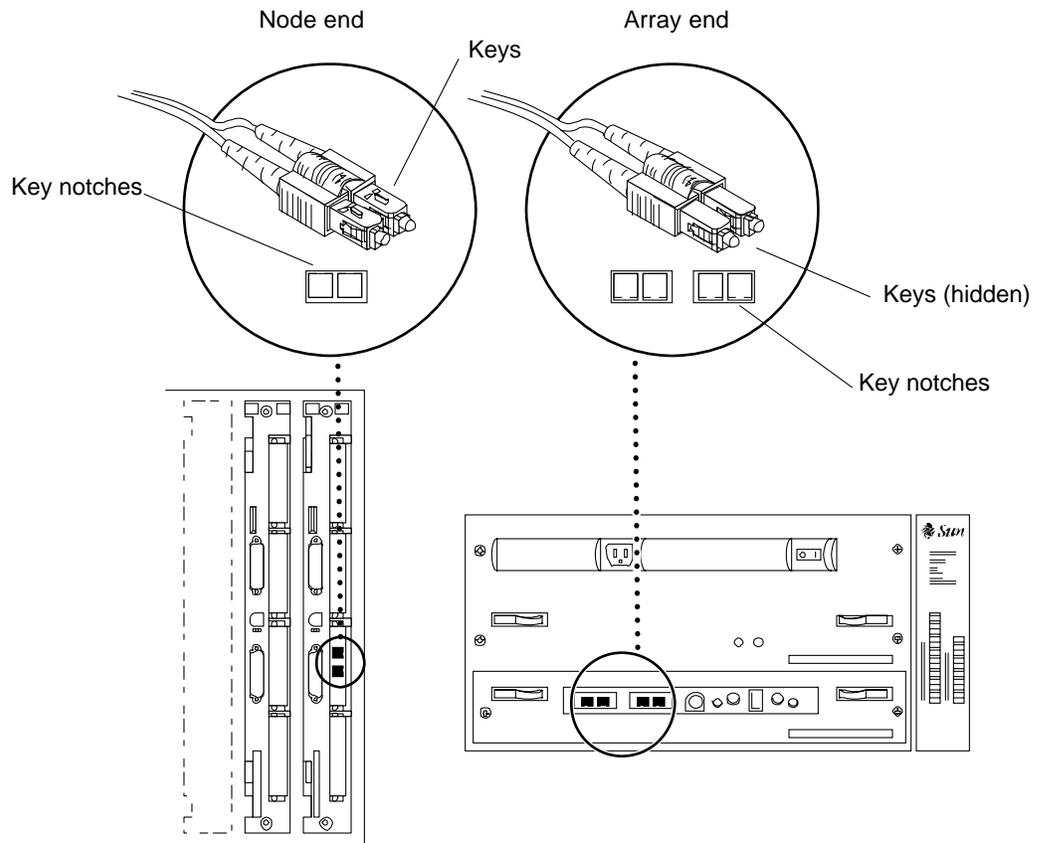
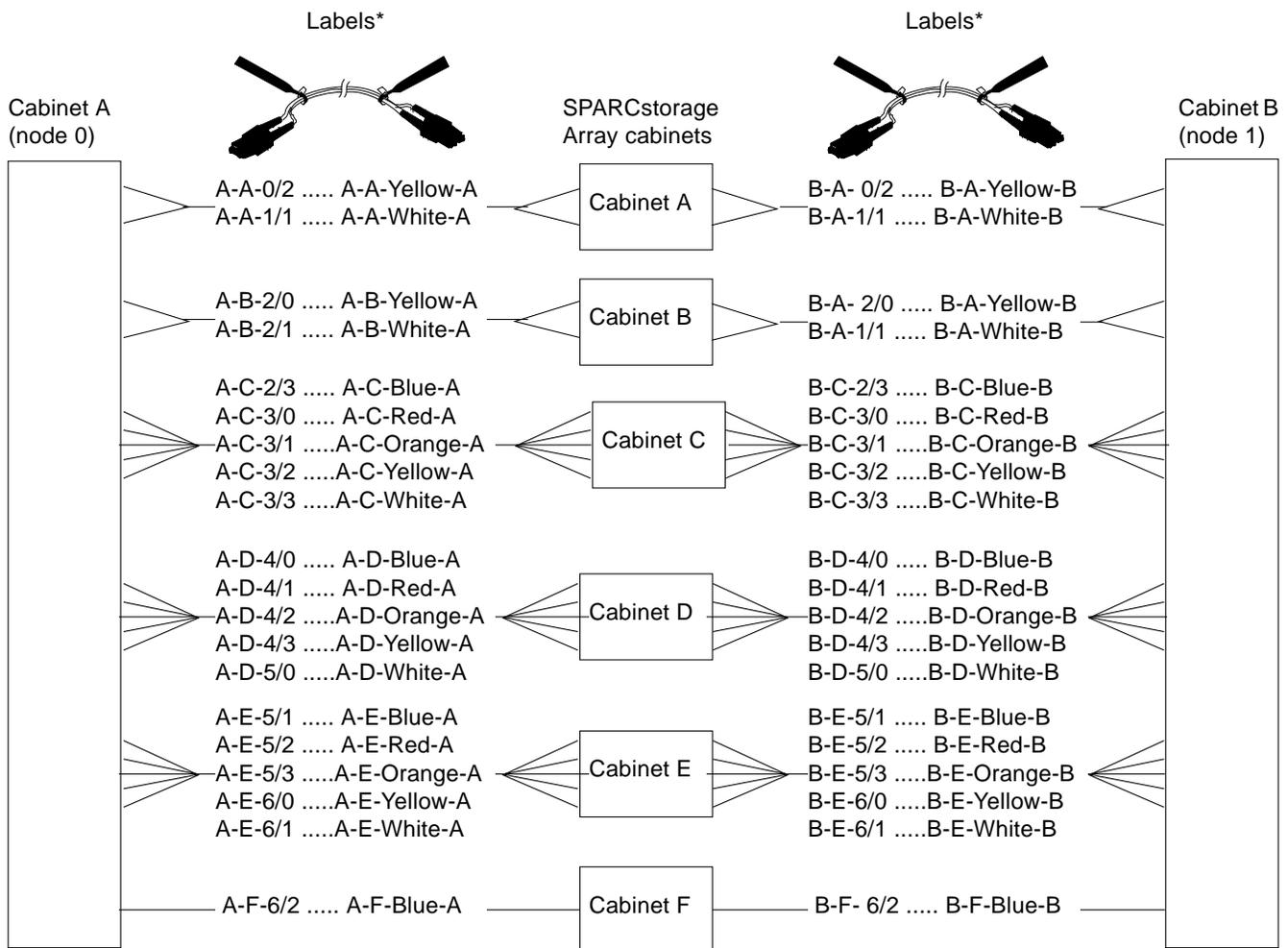


Figure 10-22 SPARCstorage Array Fiber Cable Connection

- 2. Plug the other end of the fiber cable into the FC/OM connector or the SPARCstorage array rear panel.**  
Plug node 0 into connector A and node 1 into connector B. Repeat to connect both nodes to all SPARCstorage arrays. See Figure 10-22. See Table 10-4 and Table 10-5 for list of all fiber optic cable connections. See Figure 10-23 for all point-to-point connections in a maximum configuration.

3. Repeat steps 1 and 2 for all FC/OM cables to be connected.

4. Dress and secure all cables using cable ties as required.



\* **Note:** Place one label on each end of the cable.

Figure 10-23 Suggested Labeling Scheme for Fiber Optic Cables

Table 10-4 Node to SPARCstorage Array Cable Connections

System Bd.	From Server <sup>1</sup>		To SPARCstorage Array 100					Elevation (Color)
	Node 0 <sup>2</sup> SBus Slot	Node 1 <sup>4</sup> SBus Slot	Cabinet A Array/Slot	Cabinet B Array/Slot	Cabinet C Array/Slot	Cabinet D Array/Slot	Cabinet E Array/Slot	
0	0 <sup>3</sup>	0 <sup>3</sup>						
	1 <sup>3</sup>	1 <sup>3</sup>						
	2		0 slot A					Yellow
		2	0 slot B					Yellow
	3 <sup>3</sup>	3 <sup>3</sup>						
1	0 <sup>3</sup>	0 <sup>3</sup>						
	1		1 slot A					White
		1	1 slot B					White
	2 <sup>3</sup>	2 <sup>3</sup>						
	3 <sup>3</sup>	3 <sup>3</sup>						
2	0			2 slot A				Yellow
		0		2 slot B				Yellow
	1			3 slot A				White
		1		3 slot B				White
	2 <sup>3</sup>							
		2 <sup>3</sup>						
	3				4 slot A			Blue
		3			4 slot B			Blue
3	0				5 slot A			Red
		0			5 slot B			Red
	1				6 slot A			Orange
		1			6 slot B			Orange
	2				7 slot A			Yellow
		2			7 slot B			Yellow

Table 10-4 Node to SPARCstorage Array Cable Connections (Continued)

System Bd.	From Server <sup>1</sup>		To SPARCstorage Array 100					Elevation (Color)
	Node 0 <sup>2</sup> SBus Slot	Node 1 <sup>4</sup> SBus Slot	Cabinet A Array/Slot	Cabinet B Array/Slot	Cabinet C Array/Slot	Cabinet D Array/Slot	Cabinet E Array/Slot	
	3				8 slot A			White
		3			8 slot A			White
4	0					9 slot A		Blue
		0				9 slot B		Blue
	1					10 slot A		Red
		1				10 slot B		Red
	2					11 slot A		Orange
		2				11 slot B		Orange
5	3					12 slot A		Yellow
		3				12 slot B		Yellow
	0					13 slot A		White
		0				13 slot A		White
5	1						14 slot A	Blue
		1					14 slot B	Blue
	2						15 slot A	Red
		2					15 slot B	Red
	3						16 slot A	Orange
		3					16 slot B	Orange
6	0						17 slot A	Yellow
		0					17 slot B	Yellow
	1						18 slot A	White
		1					18 slot B	White

1. All connections are made by using optical fiber cable Part No. 537-1004, 2 meter or Part No. 537-1006, 15 meter as appropriate.

2. Cabinet A.

3. See Table 10-3.

4. Cabinet B.

Table 10-5 Node to SPARCstorage Array Cable Connections (Part 2)

System Bd.	From Server <sup>1</sup>		To SPARCstorage Array 100				Elevation (Color)
	Node 0 <sup>2</sup> SBus Slot	Node 1 <sup>3</sup> SBus Slot	Cabinet F Array #/Slot #				
6	2		19 slot A				Blue
		2	19 slot B				Blue

1. All connections are made by using optical fiber cable Part No. 537-1004, 2 meter or Part No. 537-1006, 15 meter as appropriate.

2. Cabinet A.

3. Cabinet B.

## 10.3 Closing the Cabinet

◆ **Replace all panels on the cabinet.**

See Chapter 8, “Access” for procedures.

Proceed to Chapter 11 for terminal concentrator configuration procedures.

For other software installation, refer to the

- *SPARCcluster High Availability Software Planning and Installation Guide*, or the
- *SPARCcluster High Availability Server Administration Guide*

## *Part 3 — Software Installation*

---



# Installing the Software

# 11

The terminal concentrator configuration procedure is presented in this chapter. To perform the software installation procedures listed below, refer to the *SPARCcluster High Availability Software Planning and Installation Guide*, Part Number 802-3509:

- Planning software installation and system configuration
- Installing Solaris 2.x software on the administration workstation and nodes, and installing SunVTS

---

**Note** – In the midst of this process, the installer

- returns to this chapter to perform the acceptance test, which includes running SunVTS
- goes back to the *SPARCcluster High Availability Software Planning and Installation Guide* to complete bulleted items below.

- 
- Installing SPARCcluster High Availability software
  - Configuring your system
  - Verifying your system and implementing security

## 11.1 Configuring the Terminal Concentrator

1. **Edit the contents of the `/etc/remote` file on the administration workstation, and create the following line.**

```
a:dv=/dev/term/a:br#9600:el=^C^S^Q^U^D:ie=%$:oe=^D:
```

2. From the administration workstation, type the following command to connect the workstation serial port, TTYA to terminal concentrator port 1:

```
# tip a
```

**Note** – Your administration workstation may have a combined serial port labeled SERIAL A/B. In this case, you cannot use the TTYB port without the appropriate splitter cable. See the documentation supplied with your workstation for more information.

3. Verify the server is powered on and the cabinet key switch is in the ON position.
4. Reset the terminal concentrator.  
Depress the Test button for three or more seconds until the Power LED blinks rapidly. Release the button. See Figure 11-1.

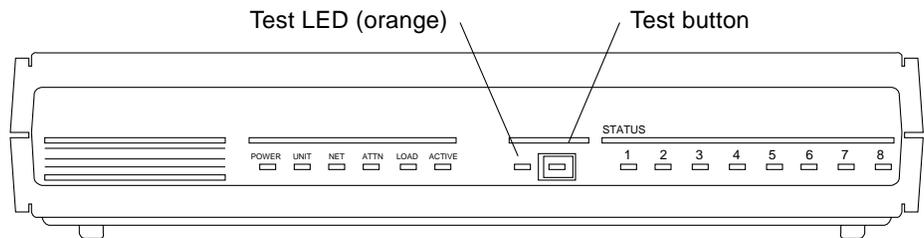


Figure 11-1 Terminal Concentrator Test Button

5. Within 30 seconds, press the Test button (again) on the unit front panel.

**Note** – Verify that the orange test LED lights to ensure the unit is in test mode.

The terminal concentrator performs a self-test, which lasts about 30 seconds. Messages are displayed on the terminal screen. If a message denotes the network connection is not found, press the  $\text{q}$  key to stop the message. This message appears because you have not yet connected a network cable. Check connection to the public Ethernet to verify that it is connected correctly.

When terminal concentrator boot completes successfully, the front panel LEDs light as shown:

Power (Green)	Unit (Green)	Net (Green)	Attn (Amber)	Load (Green)	Active (Green)
ON	ON	ON	OFF	OFF	Intermittent blinking

If boot fails, the LEDs on the front panel may light in one of these modes:

Mode	Power (Green)	Unit (Green)	Net (Green)	Attn (Amber)	Load (Green)	Active (Green)
Hardware failure	ON	Blinking	OFF	Blinking	OFF	OFF
Network test failure	ON	ON	Blinking	OFF	OFF	Intermittent blinking
Network test aborted, or net command failed	ON	ON	OFF	Blinking	OFF	Intermittent blinking
Booted wrong image	ON	ON	ON	Blinking	OFF	OFF
Other failure	One or more Status LEDs (1-8) are ON					

If the LEDs denote another mode of failure, refer to the *SPARCcluster High Availability Service Manual*.

**6. Upon successful power-on, the `monitor::` prompt appears. Use the `addr` command to assign an IP address, subnet mask, and network address to the terminal concentrator.**

In the prompt which follows, the broadcast address is the administration workstation address with the host portion set to 255 or all ones.

```
monitor:: addr

Enter Internet address [192.5.101.10]:IP address of terminal concentrator

Enter Subnet mask [255.255.255.255]:: subnet mask

Enter preferred load host Internet address [<any host>]:: <return>

Enter Broadcast address [192.5.101.0]:: your network broadcast address

Enter preferred dump address [192.5.101.10]::

Select type of IP packet encapsulation (ieee802/ethernet)
[<ethernet>]:: <return>

Type of IP packet encapsulation: <ethernet>

    Load Broadcast Y/N [Y]::

monitor::
```

**7. Verify that the terminal concentrator boots from itself instead of the network.**

To do this, type the commands at the `monitor::` prompt and press Return after verifying the correct settings, shown below:

```
monitor:: seq

Enter a list of 1 to 4 interfaces to attempt to use for downloading code or
upline dumping. Enter them in the order they should be tried, separated by
commas or spaces. Possible interfaces are:

    Ethernet: net

    SELF: self

Enter Interface sequence [net]:: self

Interface sequence: self

monitor:: image

    Enter Image name ["oper.52.enet"]:: <return>

    Enter TFTP Load directory ["[]" ]:: <return>

    Enter TFTP Dump path/filename ["dump.192.5.101.10"]::<return>

monitor::
```

**8. If you are using `tip`, quit the program by pressing Return and typing:**

```
monitor:: <return>
monitor:: ~.
```

**9. Use the power switch on the back of the terminal concentrator to turn the terminal concentrator off momentarily, and then on again.**

A power cycle will reboot the terminal concentrator. The terminal concentrator is ready when the Load light on the front panel goes off.

---

**Note** – For more information about commands available on the terminal concentrator, see the Xylogics® manuals that came with your server.

---

**10. Disconnect the serial cable from the administration workstation.**

The cable is no longer needed. Store it under the terminal concentrator using the reusable tie wrap. Leave one end connected to Port 1 on the terminal concentrator.



---

**Caution** – Do not connect outside devices, other than those described in this manual, to the terminal concentrator. Significant performance problems can occur if external devices are connected.

---

## 11.2 Checkpoint to Verify Terminal Concentrator Setup

Verify your installation up to this point. If any verification procedure fails, refer to the *SPARCcluster High Availability Server Service Manual*.

♦ **Ping the terminal concentrator over the network by typing:**

```
# ping name of terminal concentrator
```

## 11.3 Setting the Port Parameters

The type variable for each port must be set to `dial_in`. If it is set to `hardwired`, cluster console may be unable to detect when a port is already in use. The next section explains how to determine if the port type variable must be set.

### 11.3.1 Determining if the Port Type Variable Must Be set.

Perform this procedure to see if you must set the port variable.

- 1. Find the Sun label on top of the terminal concentrator.**  
It is on the top panel of the unit. See Figure 11-2.
- 2. Examine the serial number to see if it is in the lower serial number range.**  
The serial number consists of seven digits, followed by a dash and ten more digits.

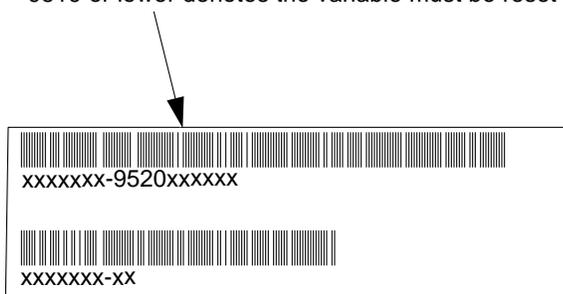
If the numbers after the dash start with 9520 or higher, the port type variable is set correctly — no action required.

If the numbers after the dash start with 9519 or lower, the port type variable must be changed.

- 3. If you must change the port type variable, do so using the procedure found in Section 11.3, “Setting the Port Parameters.”**

Sun label:

- 9520 or higher denotes the type variable is correct
- 9519 or lower denotes the variable must be reset



Sun label showing Serial Number.

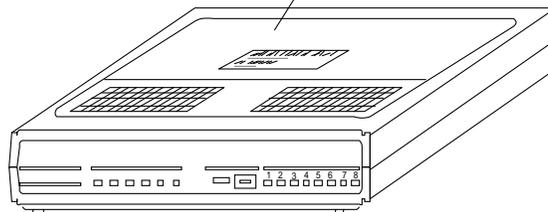


Figure 11-2 Determining the Terminal Concentrator Version

### 11.3.2 Port Parameters Procedure

Using an administration workstation, perform these steps to set the port parameters.

---

**Note** – Make sure that the terminal concentrator is powered on and has completed boot-up.

---

```
admin-ws# telnet planets-tc
Trying 192.5.101.10
Connected to planets-tc.
Escape character is '^]'.

Rotaries Defined:
  cli          -

Enter Annex port name or number: cli

Annex Command Line Interpreter * Copyright 1991 Xylogics, Inc.

annex: su
Password:                type the password
annex# admin
Annex administration MICRO-XL-UX R7.0.1, 8 ports
admin : set port=1-8 type dial_in
  You may need to reset the appropriate port, Annex subsystem or
  reboot the Annex for changes to take effect.
admin : quit
annex# boot
bootfile: <return>
warning:  <return>
```

---

**Note** – This will cause the terminal concentrator to reboot. Thus, the terminal concentrator will be unavailable for about a minute.

---

## 11.4 SPARCcluster Acceptance Test

At this point, establish an important installation milestone. Completion and sign-off of this acceptance test by both the installer and the site client is a mutual declaration that *operational acceptance of all nodes of the cluster hardware with associated components, cabling and installation is completed, checked, and approved.*

Perform the acceptance test after

- All hardware is installed and cabling complete
- The Solaris operating system is installed, including
  - Installation of the system administration workstation
  - Configuration of the terminal concentrator

Perform the acceptance test using the procedures presented in the following sections.

### 11.4.1 SunVTS

SunVTS is one of the on-line diagnostics tool for SPARCcluster High Availability servers. Refer to Section 11.4.1.2, “Running SunVTS.”

A utility within SunVTS, `vtsprobe`, is used to verify installation of system hardware, SPARCstorage Arrays, private net devices, network and interfaces. See Section 11.4.1.1, “Verifying Hardware Installation.”



---

**Caution** – Run SunVTS only while no high availability software is running. Use SunVTS at this stage only to verify that the hardware configuration is correct. Do not attempt to use SunVTS to validate software configuration. If you run SunVTS while high availability software is running, unpredictable results will occur.

---

---

**Note** – SunVTS must be run separately on each node. There is no provision for running SunVTS on both nodes at the same time. When you are done running SunVTS on one node, you must then repeat the process on the other node.

---

### 11.4.1.1 Verifying Hardware Installation

To verify hardware configuration, the following three prerequisites must be satisfied. Both nodes must have:

1. Solaris 2.4 Hardware: 3/95 installed.
2. SPARCstorage Array package installed.
3. SUNWvts package installed.

Perform the following steps on a selected node, then return to this point and repeat this procedure on the other node:

- 1. Become superuser and then change directories as follows:**

```
# cd /opt/SUNWvts/bin
```

- 2. Set the following environment variables:**

For a Bourne shell:

```
# BYPASS_FS_PROBE=1;export BYPASS_FS_PROBE
```

For a C shell:

```
% setenv BYPASS_FS_PROBE 1
```

- 3. Become superuser and then enter the following command:**

```
# ./vtsk
```

Executing the `./vtsk` command starts the SunVTS kernel. The SunVTS kernel then probes system devices and awaits commands from an interface.

---

**Note** – The following error message may be displayed if you are executing the `./vtsk` command for the second time, such as when directed to in the final step of this procedure.

---

```
# vtsk: SunVTS kernel is already running
```

If this error message occurs, enter the following:

```
# ps -ef|grep vtsk (find process id of vtsk)
# kill -INT <vtsk pid>
# ./vtsk
```

- 4. Wait a few minutes to allow `vtsk` to finish probing the system and then initiate a `probe_map` file using the `vtsprobe` command.**

As shown in the following example, the output, which can be lengthy, is redirected to a file for later viewing. The `vtsprobe` command without modifiers will produce a console screen output.

```
# ./vtsprobe > /tmp/probe_map
```

- 5. Verify that the response to the `vtsprobe` command is similar to the following for the private net devices:**

**Note** – The data listed in the following example is obtained before the private net is configured.

---

```
Network
  beo(nettest)
    Port Address: Unknown
    Host ID: 80500419
    Domain Name : nn.nn.nn.com
  be1(nettest)
    Port Address: Unknown
    Host ID: 80500419
    Domain Name : nn.nn.nn.com
```

If the data listed for the private net devices does not match the build configuration, check and correct any cabling errors and then repeat steps 1 through 5.

- 6. Verify that there is a response (under the Network heading) to the `vtsprobe` command for any network interface devices that you have installed.**

For example, if you have installed an SBus Quad Ethernet Controller there should be corresponding `qe` entries. Consult documentation supplied with your network interface card to determine the correct entry for your device.

**7. Verify that the response to the `vtsp probe` command is similar to the following for the SPARCstorage Arrays:**

```
pln0(plntest)
Worldwide Name: 08002018375f
Disks Attached: c1t0d0 c1t0d1 c1t1d0 c1t1d1 c1t2d0
: c1t2d1 c1t3d0 c1t3d1 c1t4d0 c1t4d1
: c1t5d0 c1t5d1

    pln1(plntest)
Worldwide Name: 0800201cad8e
Disks Attached: c2t0d0 c2t0d1 c2t1d0 c2t1d1 c2t2d0
: c2t2d1 c2t3d0 c2t3d1 c2t4d0 c2t4d1
: c2t5d0 c2t5d1
```

If the data listed for the SPARCstorage Arrays does not match the build configuration, check and correct any cabling errors and then repeat steps 1 through 7.

**8. Verify that the response to the `vtsp` command is similar to the following for each disk listed under a SPARCstorage Array:**

```
SparcStorageArray(pln0)
  clt0d0(rawtest)<--- logical name(test name)
    Logical Name: clt0d0
    Capacity: 1002.09MB
    Controller: pln0

  clt0d1(rawtest)<--- logical name(test name)
    Logical Name: clt0d1
    Capacity: 1002.09MB
    Controller: pln0

  clt1d0(rawtest)<--- logical name(test name)
    Logical Name: clt1d0
    Capacity: 1002.09MB
    Controller: pln0
```

If the data listed for the disks does not match that shown under the corresponding SPARCstorage array entry, check and correct the cabling and then repeat steps 1 through 8.

- 9. Compare the `probe_maps` generated by each node. Check and verify WWN of each SPARCstorage array. Check and compare disk logical name and capacity for all disks under corresponding SPARCstorage array.** If there is not an identical match, replace the SPARCstorage array controller and/or disks if necessary.
- 10. To run a final system functional check, run SunVTS using the procedure in Section 11.4.1.2, “Running SunVTS.”**

### 11.4.1.2 *Running SunVTS*

To run a final functional test of the system using SunVTS:

- 1. Become superuser and then change directories as shown in the following example:**

```
# cd /opt/SUNWvts/bin
```

**2. Enter:**

```
# ./sunvts
```

If the system does not have a frame buffer, a TTY base SunVTS control panel will be displayed. After the TTY interface comes up, direct the cursor to the “start” button and use RETURN to start SunVTS system testing. Allow for one system pass of the SunVTS run. For details of how to run SunVTS, refer to *SunVTS User’s Guide*, Part Number 801-7271.

### *11.4.2 Acceptance Test Criteria*

This acceptance test has completed successfully if the data listed for all hardware components match the corresponding build configurations.

If this statements are not true, the system has failed acceptance test.

## *11.5 What’s Next*

Hardware and basic software installation are complete. Return to the SPARCcluster High Availability Server Software Planning and Installation Guide, 802-3509, Chapter 6 and finish loading software packages.



## *Part 4 — Appendix and Index*

---



# *Air Baffle, Rack Mount Rail and Blower Assembly Installation*

---



This appendix provides procedures to install the

- air baffles
- rack mount rails
- blower assemblies

## *A.1 Installing the Air Baffles*

This section provides procedures for installing the two-piece air baffle into the

- SPARCcluster 1000 node cabinet housing the servers and SPARCstorage arrays (cabinet A)
- expansion cabinet housing SPARCstorage arrays

### *A.1.1 Side Baffle*

- 1. Loosely thread screws into hole 79 at the front and rear of the cabinet.**  
These will accept the slotted holes in the side baffle. See Figure A-1.
- 2. Orient the side baffle as shown in Figure A-1 and slip the slotted holes over the screw heads installed in hole 79 (2 places).**
- 3. Tighten both screws to secure the side baffle in place.**

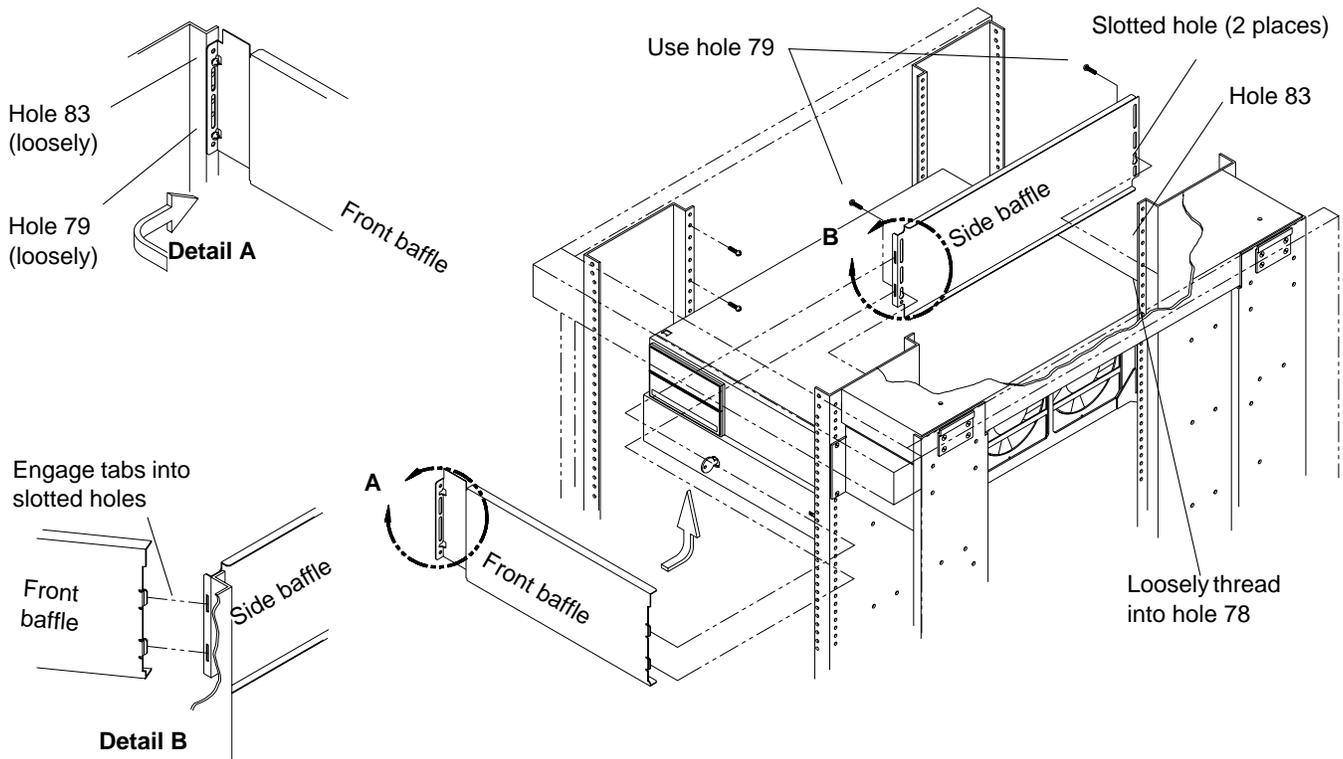


Figure A-1 Installing the Air Baffle Assembly

### A.1.2 Front Baffle

1. **Loosely thread screws into holes 78 and 83 at the front of the cabinet.**  
These screws will accept the slotted holes in the front baffle. See Figure A-1.
2. **Engage the front baffle to the side baffle.**  
Orient the side baffle as shown in Figure A-1 and slip the tabs into the slotted holes in the side baffle. Hold the front baffle on a slight angle to allow the tabs to slip in.
3. **Swing the front baffle flush against the cabinet and slip the slotted holes in the baffle over the screws installed in step 1.**
4. **Tighten both screws to secure the front baffle in place.**

## A.2 Rack Mount Rail Installation

The rack mount rails are required when installing

- SPARCstorage array chassis into the SPARCcenter 2000E cabinet, or
- SPARCstorage array and SPARCserver 1000E chassis into the expansion cabinet

The kit consists of the side rails and base plate (identified in Figure A-2) along with fasteners and certain other items. Rail installation consists of

- Installing the side rails in the cabinet to accept the chassis
- Installing the base plate on the storage or server chassis
- Installing the chassis (with base plate attached) on side rails in the cabinet
- Reconfiguring the fan assemblies to provide correct cooling

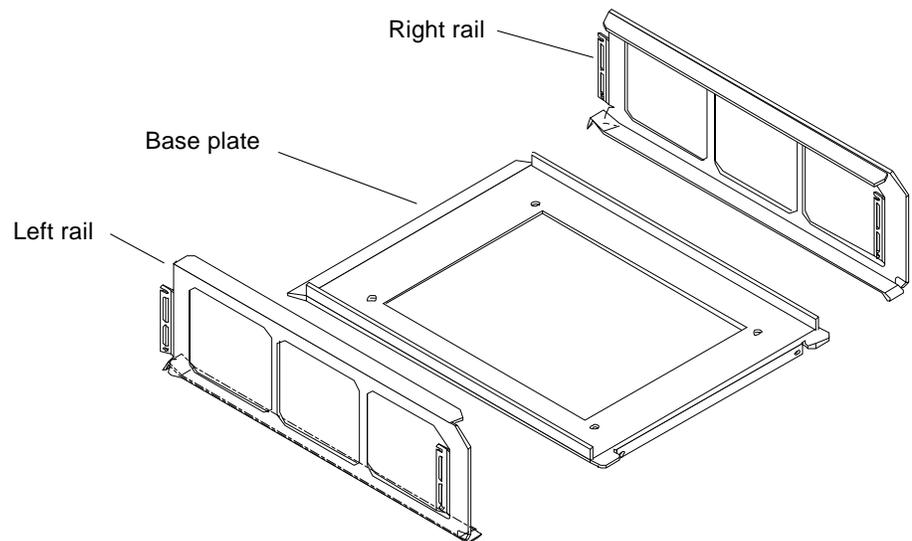


Figure A-2 Rack Mount Kit Side Rails and Base Plate

### A.3 Chassis Installation Positions

**Note** – Cabinet cooling is an important factor. Install only SPARCstorage array and SPARCserver 1000E type chassis in the SPARCcluster 1000 or 2000 High Availability or expansion cabinets.  
 Use only the hole numbers specified for installing side rails. These hole numbers determine chassis spacing for proper ventilation and cooling.

#### A.3.1 SPARCcluster 1000 High Availability Node Cabinets

SPARCstorage Array chassis are installed in the bottom three positions. The server chassis are installed above these in the top two positions. A typical installation is shown in Figure A-3. Side rails are installed using screw hole positions identified in Figure A-3.

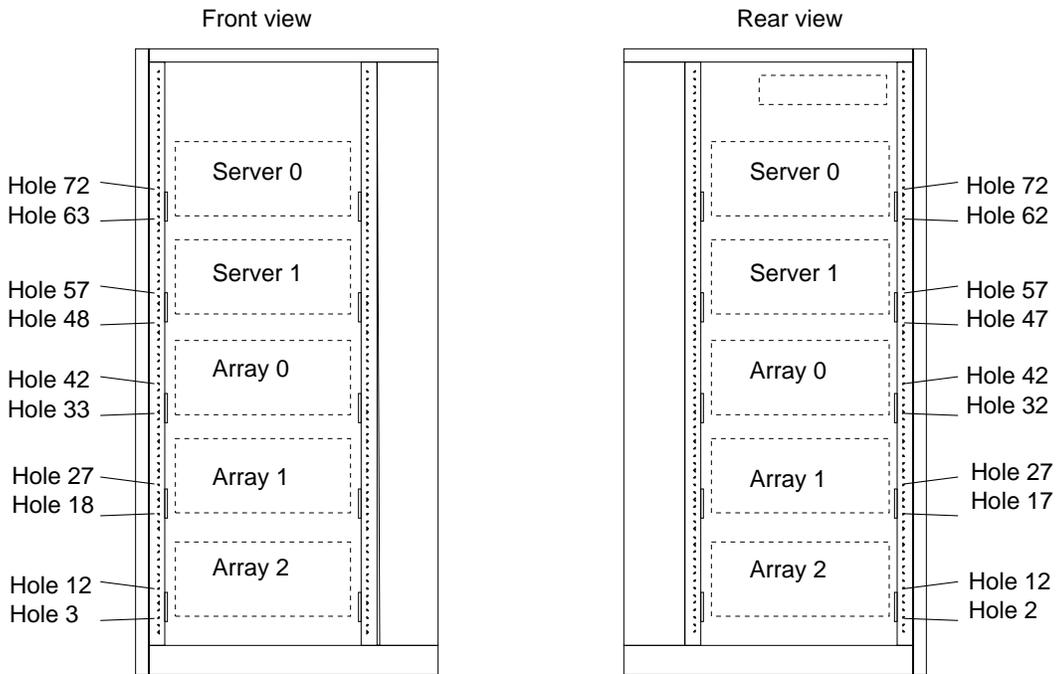


Figure A-3 Side Rail Installation Locations and Hole Numbers in the SPARCcluster 1000 High Availability Node Cabinet

**Note** – SPARCstorage array positions in the expansion cabinet are shown in Figure A-6.

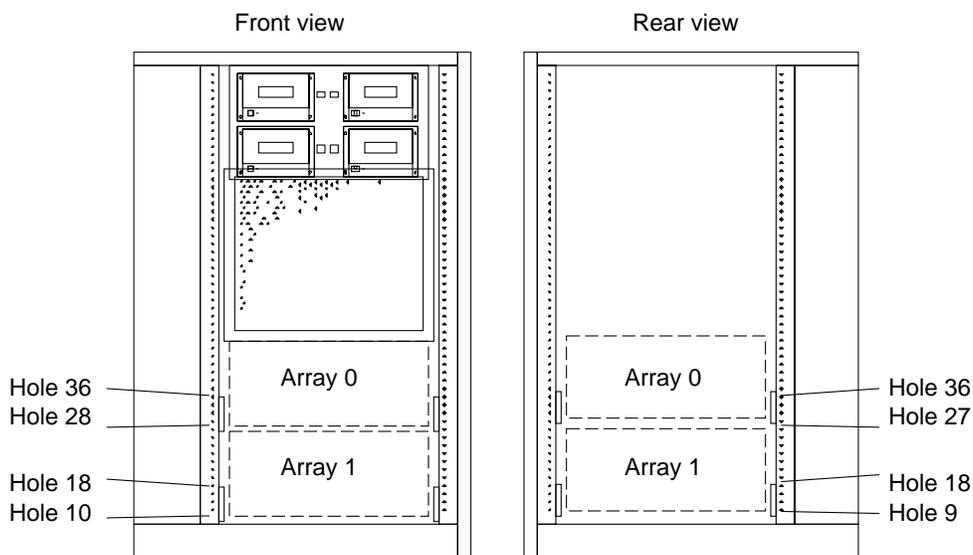
### A.3.2 SPARCcluster 2000 High Availability Node Cabinets

SPARCstorage arrays are installed in following positions:

- Primary cabinet: the bottom two positions, Figure A-4
- Secondary cabinet:
  - minimum-configuration: the third SPARCstorage array occupies the top position, Figure A-5
  - four or more SPARCstorage arrays, the bottom two positions, Figure A-4

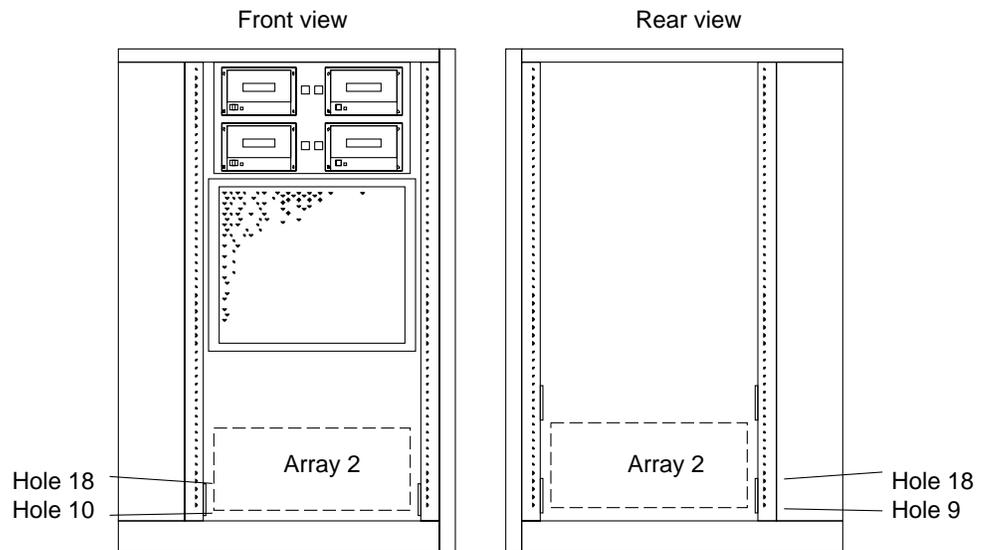
**Note** – Any additional SPARCstorage arrays are installed in one or more expansion cabinets.

A typical installation is shown in Figure A-4. Side rails hole numbers are identified here.



**Figure A-4** Side Rail Installation Locations and Hole Numbers in the SPARCcluster 2000 High Availability Primary Cabinet

**Note** – The rails are asymmetrical front-to-rear with respect to the lower hole position used. So, the hole used in the rear is one lower than that in the front



*Figure A-5* Side Rail Installation Locations and Hole Numbers in the SPARCcluster 2000 High Availability Secondary Cabinet

**Note** – SPARCstorage array positions in the expansion cabinet are shown in Figure A-6.

### A.3.3 Expansion Cabinets

SPARCstorage Array chassis are installed in all five positions. A typical installation is shown in Figure A-6. Side rails are installed using screw hole positions identified in Figure A-6.

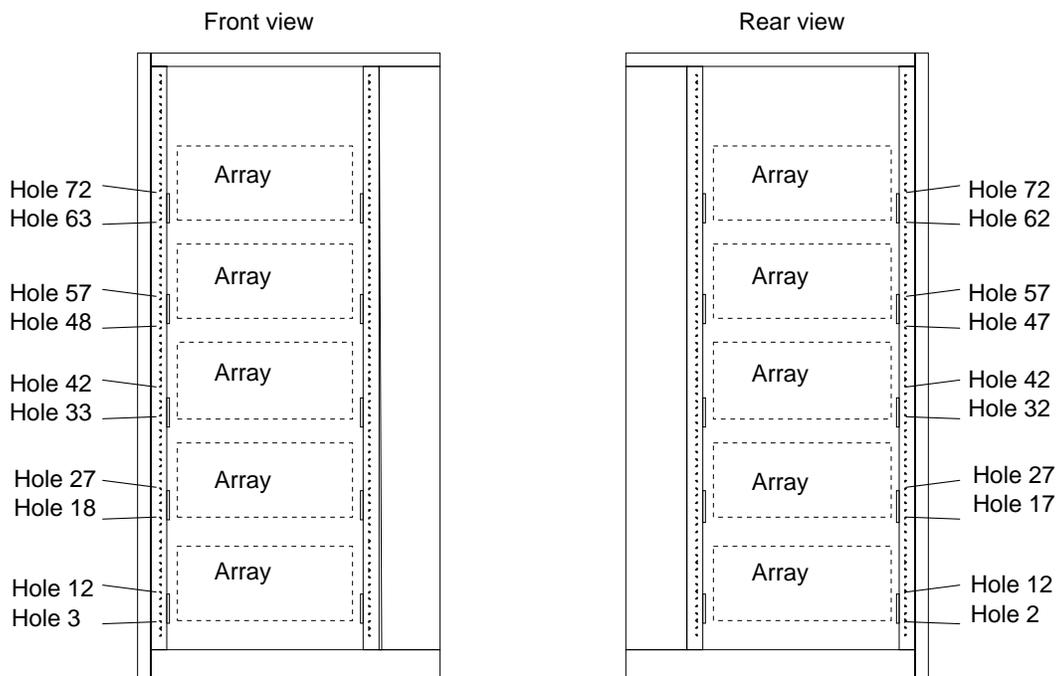


Figure A-6 Side Rail Installation Locations and Hole Numbers in the Expansion Cabinet

## A.4 Installing the Side Rails

1. Loosely thread in two screws on the right side of the rack:
  - a. At the rear of the rack, thread a screw a few turns into hole 18.
  - b. Thread a screw into hole 18 at the front of the rack.  
Do not tighten. See Figure A-7.

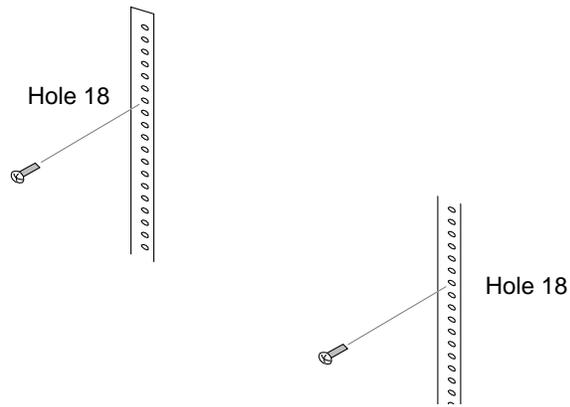


Figure A-7 Threading Screws into the Rack — Right Side Rail

2. Place the right side rail in the rack. Align the open-slotted holes at the top of the rail with the screws installed in step 1.
3. Slide the rail to the rear so the holes seat on the shafts of the screws.
4. Install screws in the bottom rail holes front and rear. In the rear, it is hole 9, in the front it is hole 10. See Figure A-8.

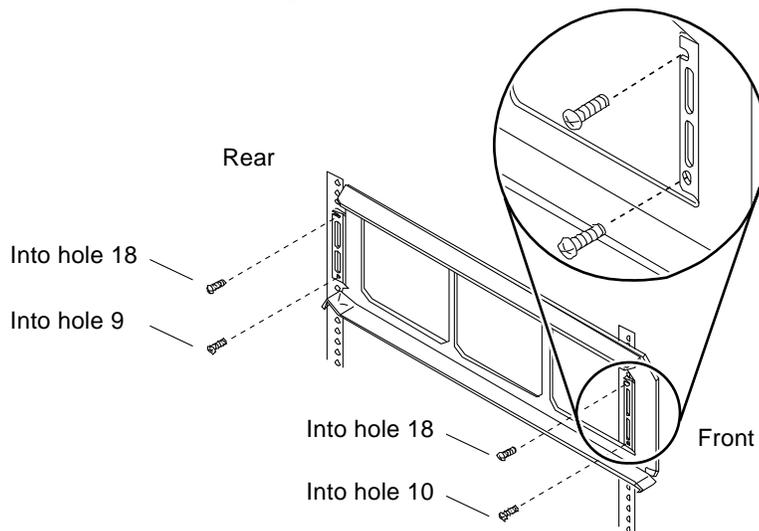


Figure A-8 Securing the Right Side Rail to the Rack

5. **Tighten all four screws, top and bottom.**
6. **Repeat steps 1 through 4 above for the left side rail.**  
See Figure A-9.
7. **Install all remaining pairs of side rails at the hole numbers specified in Figure A-3, Figure A-4, or Figure A-5.**

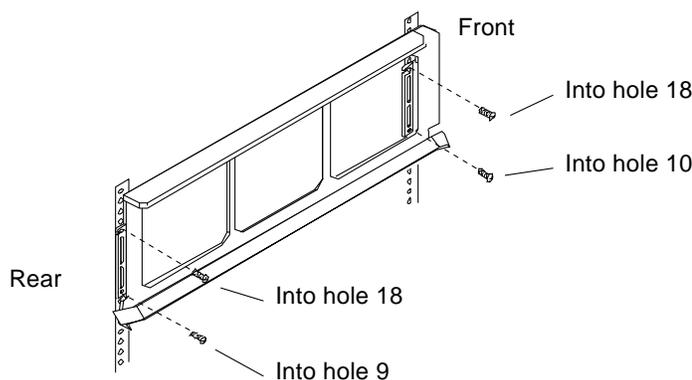


Figure A-9 Securing the Left Side Rail to the Rack

## A.5 Preparing the Server and SPARCstorage Array Chassis

**Note** – Illustrations in this section show a server chassis. A SPARCstorage array chassis looks somewhat different, but the procedures apply to both chassis types.

Part of chassis preparation involves removing all plastic panels from each chassis to be installed.

### A.5.1 Removing the Front Panel

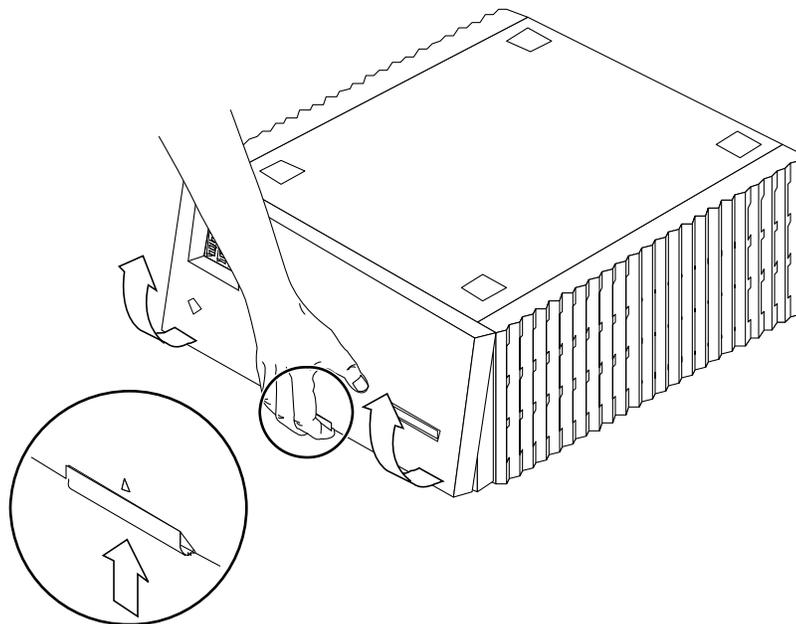
The front panel rests in a groove along the top edge of the panel.

1. **If a key switch is present, remove the key from the key switch.**
2. **Place your fingers under the arrow embossed on the front panel and press up on the latch to release the panel.**  
See Figure A-10.

**Note** – If the panel resists becoming unlatched, press down on the top of the panel with one hand while pressing up on the latch with the other. This should release the latch.

---

3. With the panel released, gently swing the panel bottom away from the chassis and lift it clear.  
Set the panel aside.



Note: Server chassis shown, but applies to SPARCstorage array chassis too.

Figure A-10 Removing the Front Panel

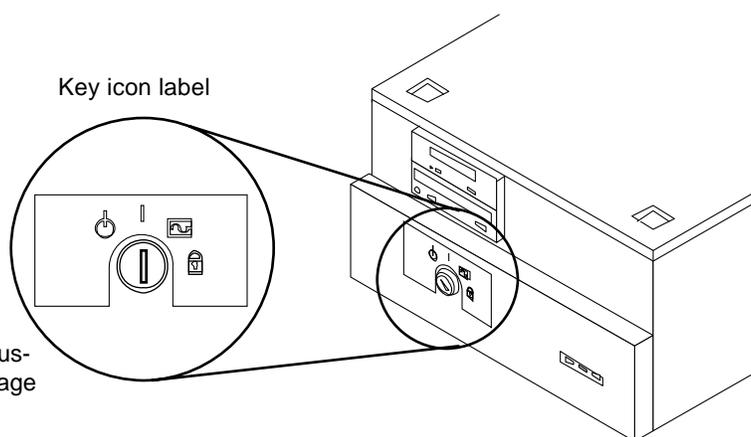
### A.5.2 Installing the Key Switch Position Label

**Note** – This procedure applies only to server chassis. This switch is found on the EMI panel. For SPARCstorage array chassis, skip this procedure and proceed to Section A.5.3 (SPARCstorage array chassis do not have key switches).

---

Key position icons embossed on the front panel are removed when the front panel is removed. To restore the key position information to the front of the chassis, install the icon label (supplied in the kit) to the EMI panel.

1. Find the key icon label in the rack kit.
2. Remove the label backing.
3. Orient the label over the EMI panel so that the semicircular cutout straddles the key switch as shown in Figure A-11.
4. Apply the label to the EMI panel.



**Note:** Server chassis shown. This illustration does not apply to SPARCstorage array chassis.

Figure A-11 Installing the Key Icon Label on the Server Chassis EMI Panel

5. Place the key(s) in a secure place so they can be found later.

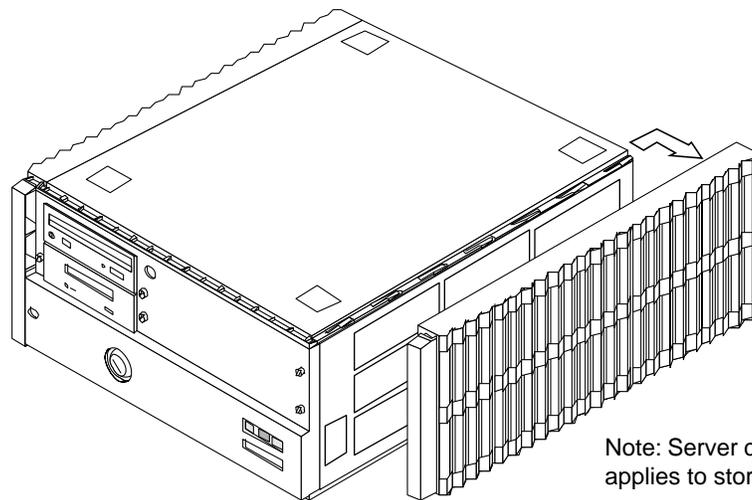
**Note** – It is suggested you **not** insert the key in the switch at this time because the necessary handling of the chassis may inadvertently break off the key.

### A.5.3 Removing the Side Panels

The side panels are self-attached slide and lock panels.

1. First remove the front panel as described in the previous section.
2. Remove the side panel:

- a. **Grasp the panel with both hands, and slide it toward the rear of the chassis about 2.5 centimeters (about one inch).**  
Tap the front edge of the panel with the heel of your hand if necessary to slide the panel toward the rear of the chassis. See Figure A-12.
  - b. **Pull the panel away, free of the chassis, and set it aside.**
3. **Repeat step 2 to remove the remaining side panel.**



Note: Server chassis shown, but applies to storage chassis too.

Figure A-12 Removing the Side Panels

## A.5.4 Removing the Top Panel

The top panel slides to the rear to a release point, then lifts off.

### A.5.4.1 Removing the Popouts

There are four popouts on the top panel:

1. **On the panel, find the location where the two dots are adjacent to each other: one dot on the popout, one on the top panel. See Figure A-13.**
2. **Press down on the popout at the small dot.**
3. **This action rocks the popout on a hinge-point, unlatching it.**

4. Slide the popout back, away from the dots and lift it free as shown in Figure A-13. Set the popout aside.
5. Repeat step 1 through 3 to remove the remaining three popouts from the top panel.

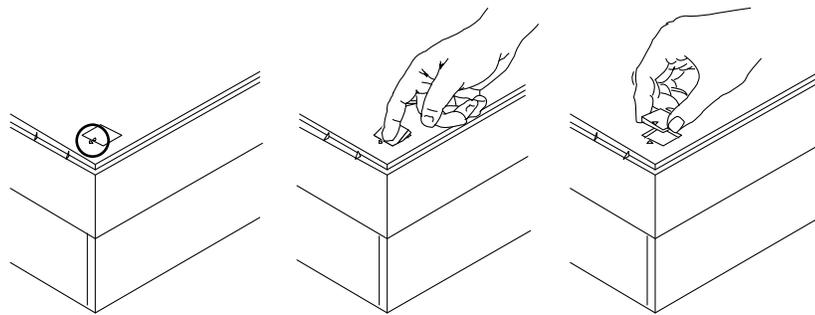


Figure A-13 Removing the Popouts from the Top Panel

#### A.5.4.2 Removing the Top Panel

For the steps below refer to Figure A-14.

1. **Place your fingers under the panel rear lip and lift.**  
Lift with enough force to bow the panel rear up at the center. This action causes three small raised features on the panel underside to clear cutouts in the chassis sheet metal.
2. **While lifting the panel rear, tap the front with your hand to slide the panel to the rear.**  
Slide the panel a few inches only. This is enough to disengage it from the chassis.

---

**Note** – If necessary, slide your lifting hand side-to-side under the rear lip while tapping the front to free each of the three raised areas on the panel underside of sheet metal cutouts beneath.

---

3. **Lift the top panel straight up, clear of the chassis, and set it aside.**

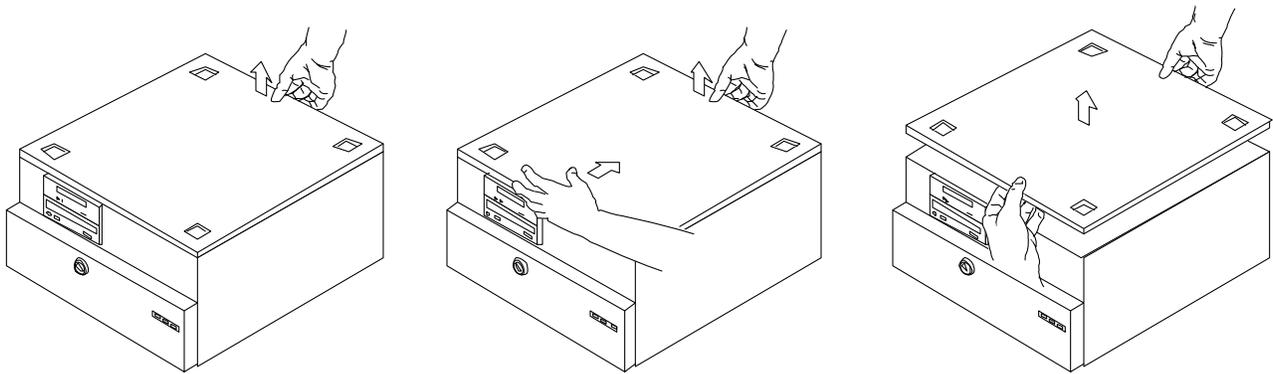


Figure A-14 Removing the Top Panel

### A.5.4.3 Replacing the Popouts

To prevent losing the popouts:

1. Orient the popout so the dots are nearest each other (see Figure A-15).
2. Slide the popout in until it is centered in the hole.
3. Press down on the side opposite the dot to secure the popout in place.
4. Install the remaining three popouts in the same manner.

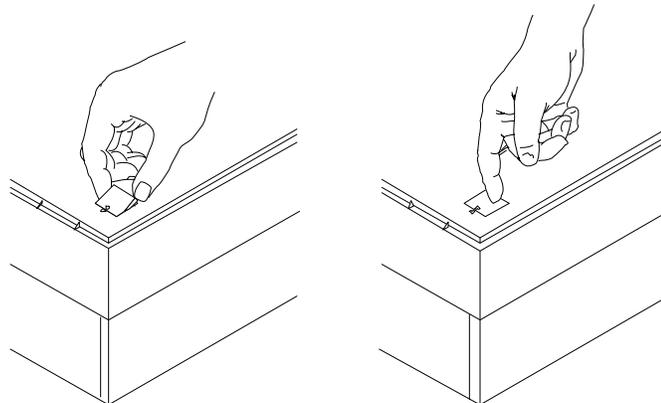


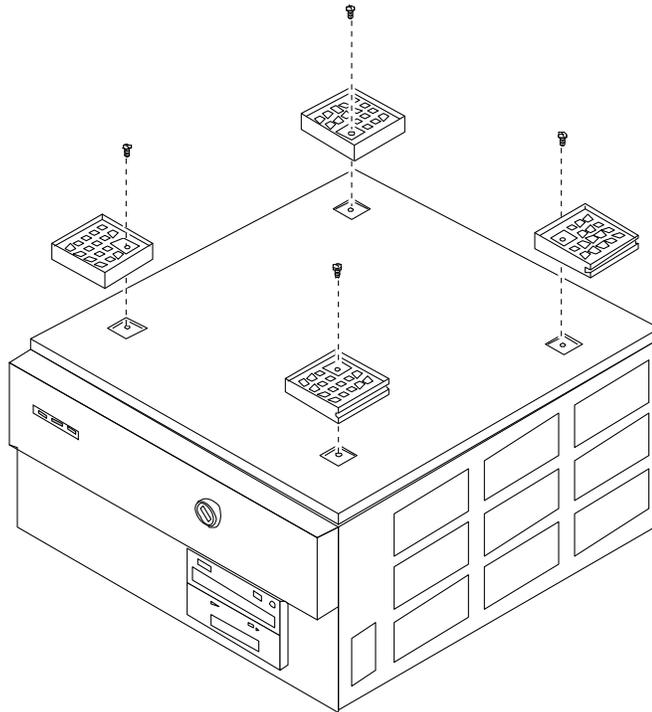
Figure A-15 Replacing the Popouts in the Top Panel

#### A.5.4.4 Removing the Feet

1. Invert the chassis. See Figure A-16.

2. Unscrew all four feet.

The feet and screws are not used in this configuration.



Note: Server chassis shown, but applies to storage chassis too.

Figure A-16 Removing the Feet

#### A.5.4.5 Removing the Bottom Panel

The bottom panel is identical to the top panel and is removed in the same manner.

- ◆ With the chassis inverted and the front facing you, repeat Section A.5.4.2, “Removing the Top Panel” and refer to Figure A-14.

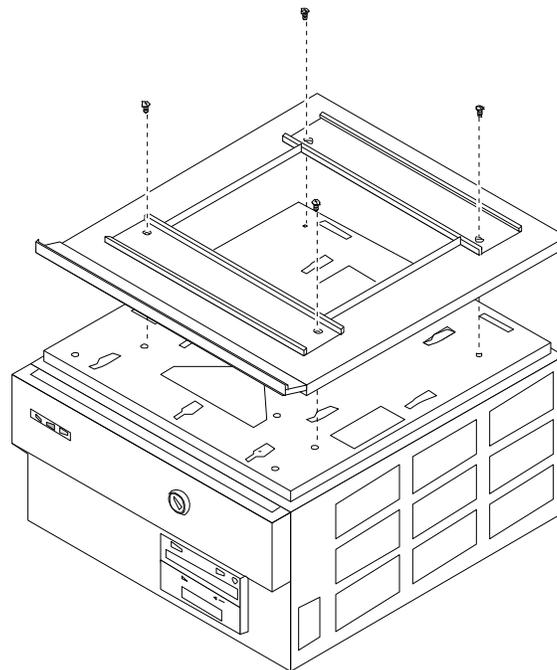
## A.6 *Installing the Base Plate on the Server or Disk Array Chassis*

The base plate mounts to the chassis underside.



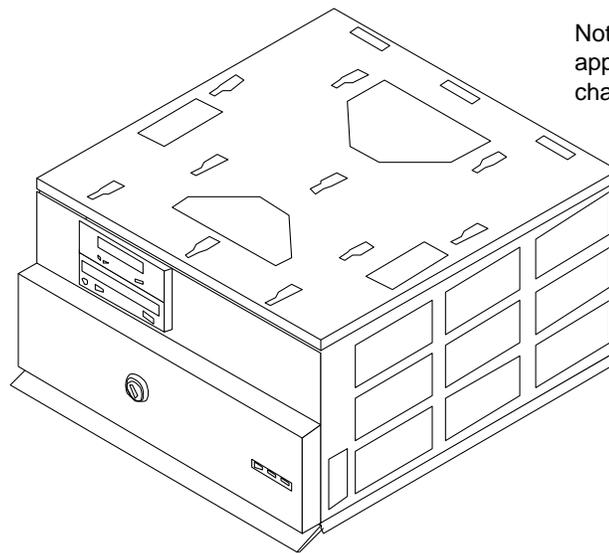
**Caution** – For this procedure, use only the four short screws provided in the kit for this purpose. The screws originally used for the feet are too long and will damage the chassis.

- 1. Invert the chassis with the front facing you as shown in Figure A-17.**
- 2. Place the base plate on the chassis as shown in Figure A-17.**
- 3. Loosely thread four short screws from the kit in all four holes.**  
When all screws are started, tighten them.
- 4. Restore the chassis to the upright position — front of chassis facing you.**  
See Figure A-18.



Note: Server chassis shown, but applies to SPARCstorage array chassis too.

Figure A-17 Installing the Base Plate on the Chassis



Note: Server chassis shown, but applies to SPARCstorage array chassis too.

Figure A-18 Base Plate Installed

## A.7 Installing the Chassis in the Cabinet

Install the chassis from the bottom-up in the order shown in Figure A-3.

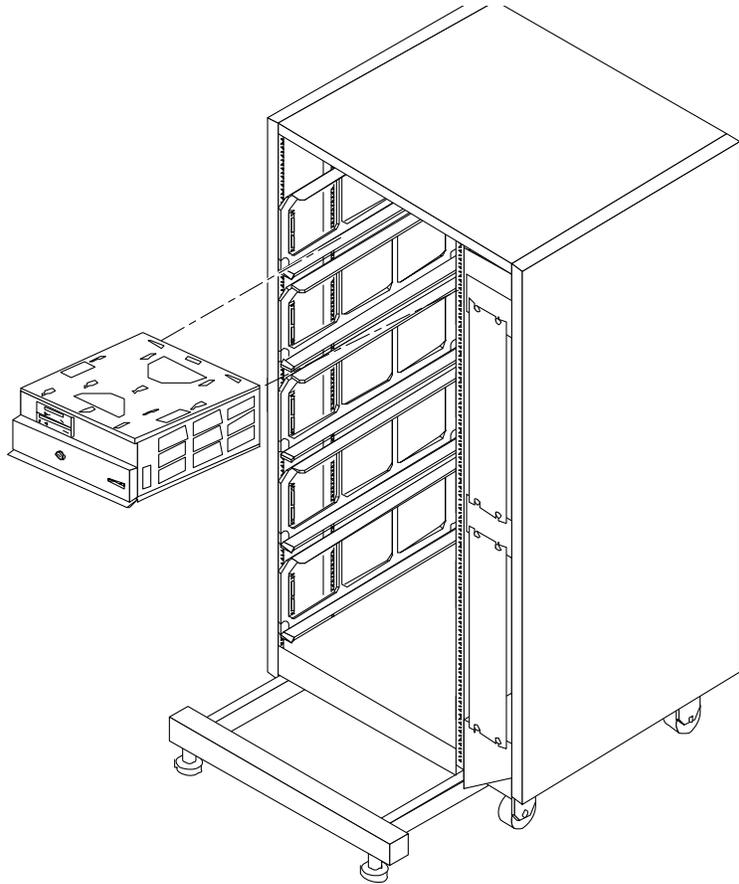


**Warning** – The cabinet can become front-heavy while installing chassis. Ensure that the stabilizer bar is extended before proceeding. Failure to extend this bar can result in the cabinet tipping forward and injuring personnel.



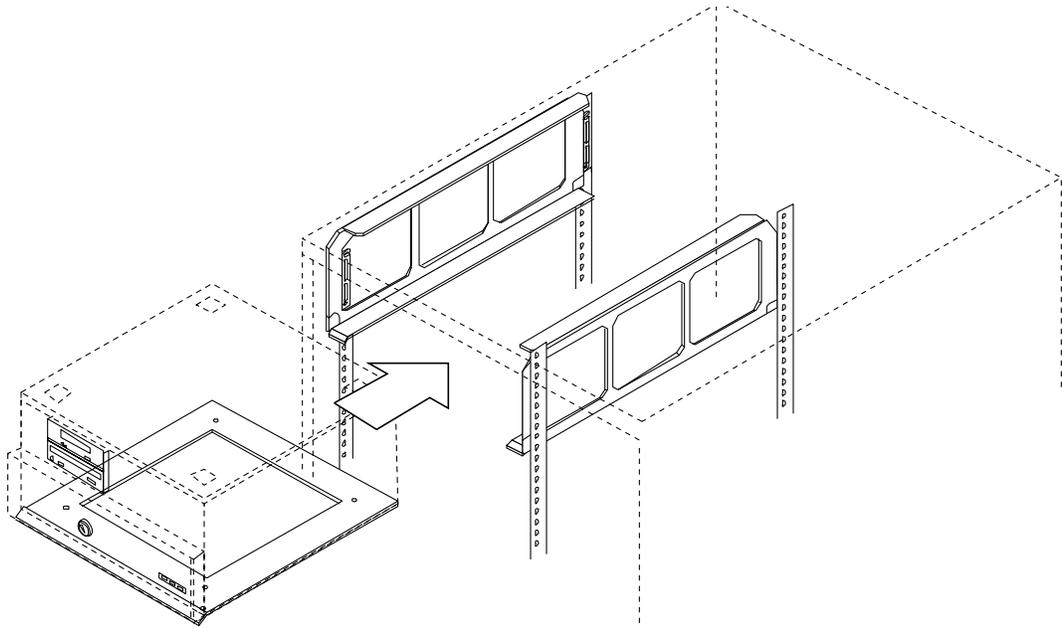
**Warning** – Server and SPARCstorage array chassis are heavy. Obtain the aid of an assistant to help lift the chassis. Attempting to lift the chassis alone can result in injury to personnel.

1. **With the aid of an assistant, lift the chassis (one person on each side) and approach the expansion cabinet with the chassis facing end first.**  
See Figure A-19.



*Figure A-19* Installing the Chassis in the Cabinet

- 2. Line up the chassis base plate with mating side rails in the cabinet.**  
See Figure A-20.



*Figure A-20* Aligning the Chassis/Base Plate with the Side Rails

- 3. Rest the chassis on the side rails, then slide the chassis in.**
- 4. Thread in a screw through the slotted hole in the front of the base plate, into the left and right side rail.**
- 5. At the cabinet rear, insert screws through the holes in the rear of the side rails and screw them into threaded holes in the base plate.**  
See Figure A-21.

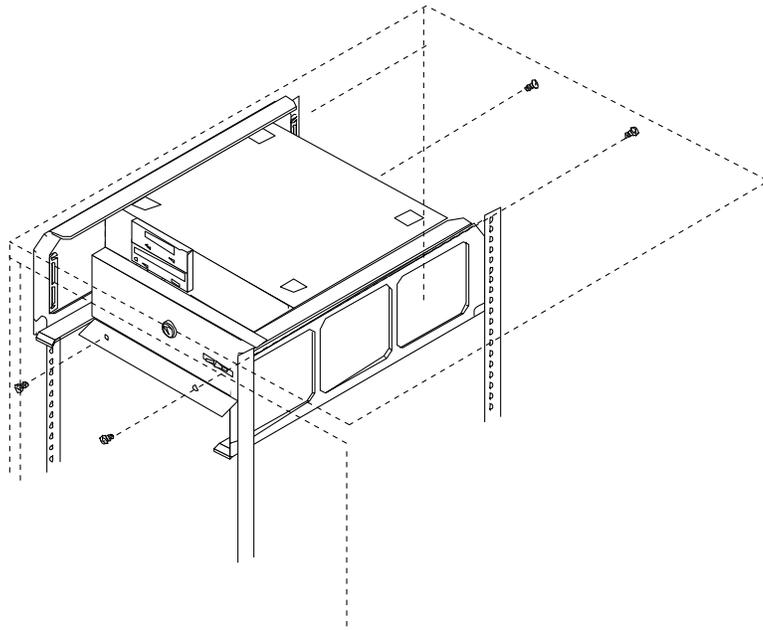


Figure A-21 Installing Screws to Secure the Base Plate to the Side Brackets

**6. Alternately tighten the screws at the front and rear of the of the base plate/side rails until the chassis/base plate is firmly clamped in the side rails. Do this on both sides of the Cabinet.**

**7. Repeat steps 1 through 6 for all remaining chassis to be installed.**

---

**Note** – At this time, you may decide to

- Insert the keys in the server chassis key switches for ready use.
  - Store the keys for use only when needed.
- 

## A.8 *Installing the Blower Assemblies*

Install two blower assemblies in the front of all SPARCcluster 1000 High Availability and SPARCstorage array cabinets.

**1. Remove the top two vented front panels.**

**2. Remove two small EMI panels in the upper and lower right areas of the cabinet.**

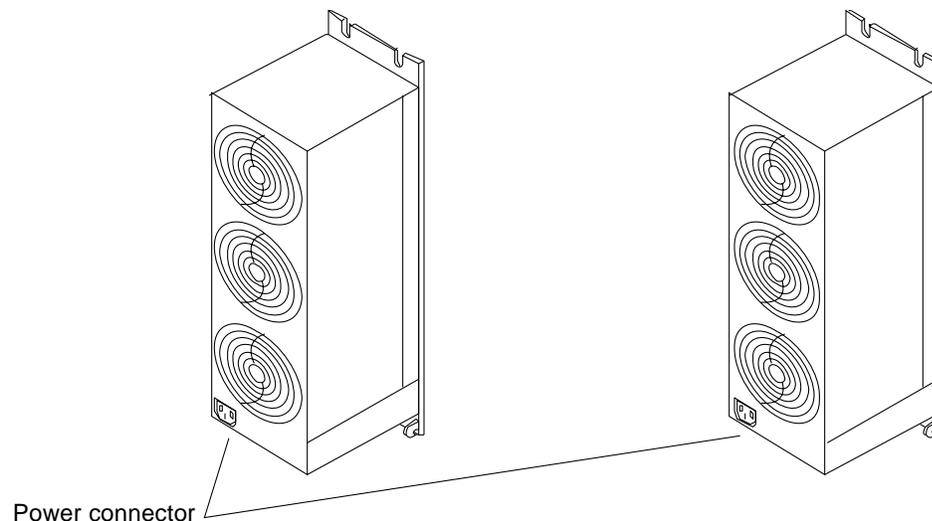
Discard these panels. They will not be reused.

**3. Locate the blower assemblies.**

See Figure A-22.

**4. Plug the female end of the power cords into the back of the blower assemblies.**

The power connector is identified in Figure A-22.



*Figure A-22 Blower Assemblies — Rear View*

**5. Install the upper blower assembly:**

**a. Lead the power cord through the opening.**

Allow it to collect inside the cabinet for the moment.

**b. Place the blower assembly in the opening in the cabinet sheet metal.**

Tilt the unit and insert the bottom of the blower through the opening so that retainer features at the bottom of the blower assembly engage the sheet metal at the bottom of the opening. See Figure A-23.

**c. Secure the blower assembly to the cabinet.**

Tilt the unit up flush against the cabinet.

**d. Install four screws, two at the top and two at the bottom and tighten.**

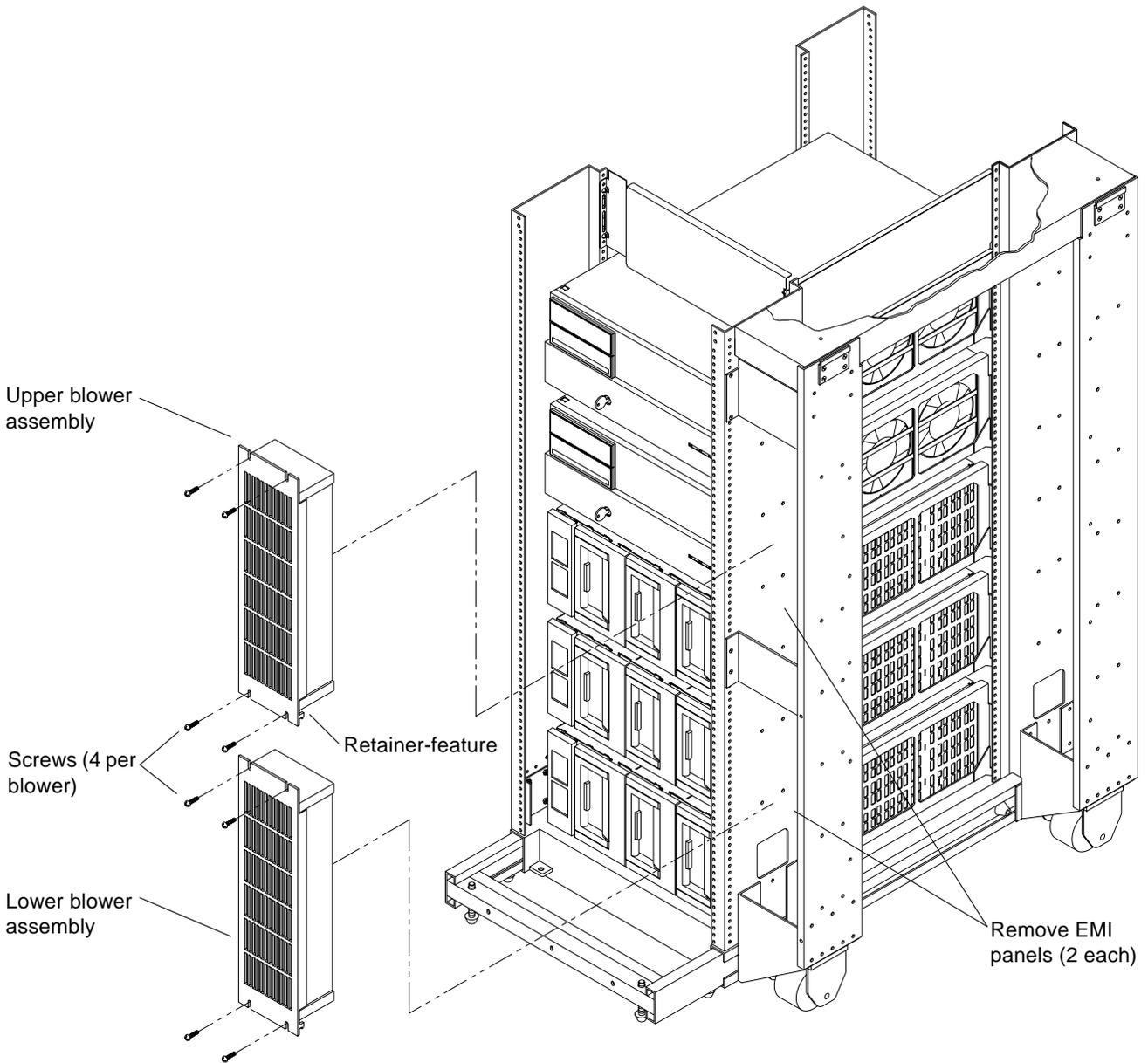


Figure A-23 Installing the Blower Assembly in the SPARCcluster 1000 High Availability and Expansion Cabinet

---

**Note** – The blower assembly may encounter mechanical interference from a screw securing the plate holding the cabinet key switch. If this occurs, remove the screw causing the interference, secure the blower to the cabinet using all four screws, then reinstall the screw in the key switch plate.

---

**6. Install the lower blower assembly.**

Repeat step 5 above, but for the lower blower assembly.

**7. Secure the power cords inside the cabinet.**

Dress the power cords down the inside of the rack to the vicinity of the AC power sequencer and secure them using cable ties. Roll any excess cord and tuck it into the space under the power sequencer and secure using cable ties.

**8. Plug in the blower assemblies.**

Plug the power cords into the rear of the power sequencer. Use the unswitched outlets identified in Figure A-24.

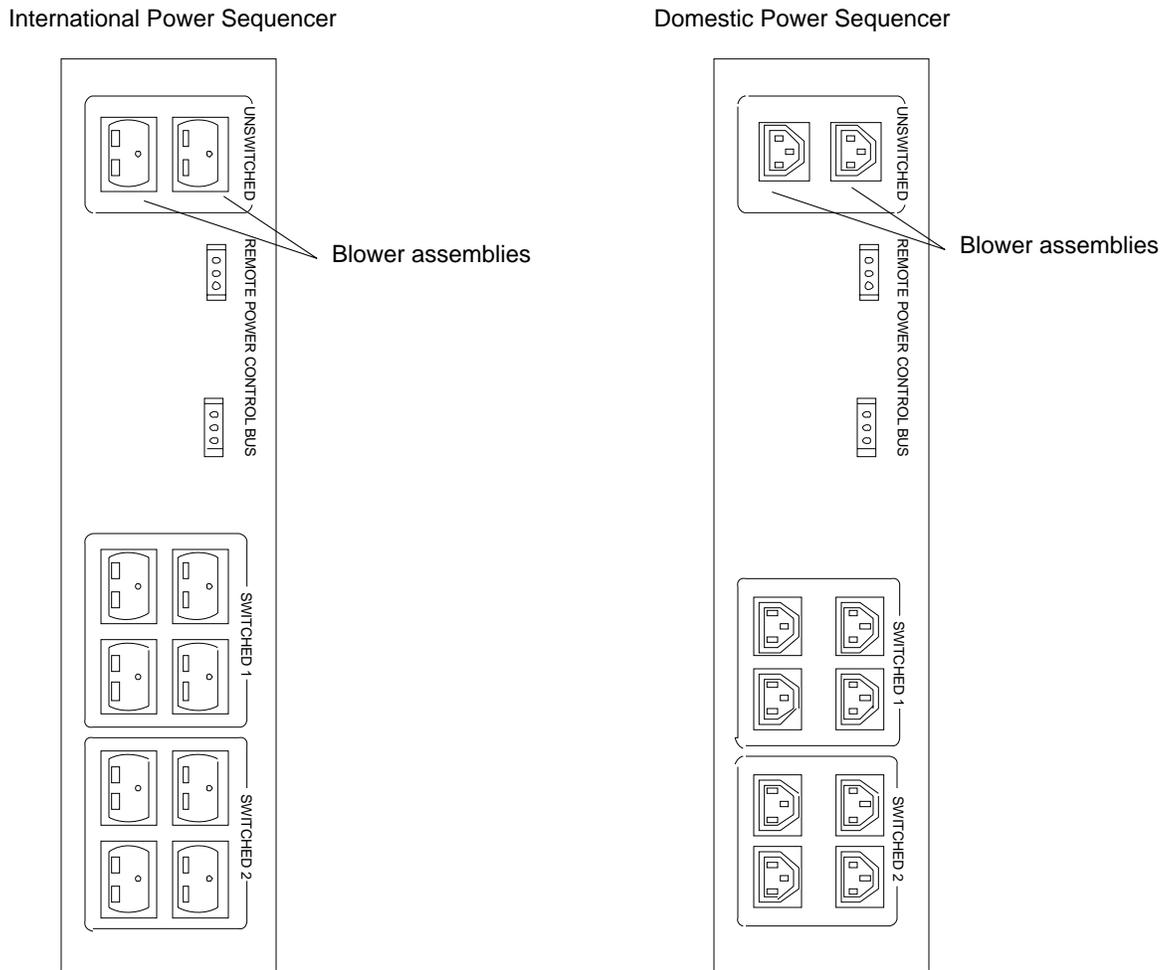


Figure A-24 Plugging the Blower Assembly into the Power Sequencer

Air baffle, rack mount rail and blower assembly installation are complete.

Return to the appropriate location in the server hardware installation chapters:

SPARCcluster 1000: Section 9.2.4.2, "Preparing the SPARCstorage Arrays"

SPARCcluster 2000: Section 10.2.4.2, "Preparing the SPARCstorage Arrays"

## *Glossary*

---

The terminology used in this manual includes the following:

### **Asymmetric configuration**

A configuration that contains a single diskset. In an asymmetric configuration, one server acts as the default master of the diskset and the other server acts as a hot standby.

### **Concatenation**

A metadvice created by sequentially mapping blocks on several physical slices (partitions) to a logical device. Two or more physical components can be concatenated. The slices are accessed sequentially rather than interlaced (as with stripes).

### **Data service**

A network service that implements read-write access to disk-based data from clients on a network. Examples of data services include NFS and ORACLE\*SERVER. The data service may be composed of multiple processes that work together.

### **Default master**

The server that is master of a diskset if both servers rebooted simultaneously. The default master is specified when the system is initially configured.

### **Diskset**

A group of disks that move as a unit between the two servers in a Solstice HA configuration.

---

**DiskSuite**

See Solstice DiskSuite.

**Fault detection**

Solstice HA programs that detect two types of failures. The first type includes low-level failures such as system panics and hardware faults (that is, failures that cause the entire server to be inoperable). These failures can be detected quickly. The second type of failures are related to data service, such as HA-ORACLE or HA-NFS. These types of failures take longer to detect.

**HA-NFS**

Highly available NFS. HA-NFS provides highly available remote mount service, status monitor service, and network locking service.

**HA-ORACLE**

HA-DBMS for ORACLE\*SERVER.

**Heartbeat**

A periodic message sent between the two membership monitors to each other. Lack of a heartbeat after a specified interval and number of retries may trigger a takeover.

**Highly available data service**

A data service that appears to remain continuously available, despite single-point failures of server hardware or software components.

**Hot standby**

In an asymmetric (single diskset) configuration, the machine that is not the current master of the diskset. If both servers reboot simultaneously, the hot standby will not master the diskset and thus will not be running any Solstice HA data services.

**Local disks**

Disks attached to a Solstice HA server but not included in a diskset. The local disks contain the Solaris 2.4 distribution and the Solstice HA and DiskSuite software packages. Local disks must not contain data exported by the Solstice HA data service.

---

**Logical host**

A diskset and its collection of logical host names and their associated IP addresses. Each logical host is mastered by one physical host at a time.

**Logical host name**

The name assigned to one of the logical network interfaces. A logical host name is used by clients on the network to refer to the location of data and data services. The logical host name is the name for a path to the logical host. Because a host may be on multiple networks, there may be multiple logical host names for a single logical host.

**Logical network interfac**

In the Internet architecture, a host may have one or more IP addresses. Solstice HA configures up additional logical network interfaces to establish a mapping between several logical network interfaces and a single physical network interface. This allows a single physical network interface to respond to multiple logical network interfaces. This also enables the IP address to move from one Solstice HA server to the other in the event of a takeover or haswitch(1M), without requiring additional hardware interfaces.

**Master**

The server with exclusive read and write access to a diskset. The current master host for the diskset runs the data service and has the logical IP addresses mapped to its Ethernet address.

**Membership monitor**

A process running on both Solstice HA servers that monitors the servers. The membership monitor sends and receives heartbeats to its sibling host. The monitor can initiate a takeover if the heartbeat stops. It also keeps track of which servers are active.

**Metadevice**

A group of components accessed as a single logical device by concatenating, striping, mirroring, or logging the physical devices. Metadevices are sometimes called pseudo devices.

**Metadevice state database**

Information kept in nonvolatile storage (on disk) for preserving the state and configuration of metadevices.

---

**Metadevice state database replica**

A copy of the state database. Keeping multiple copies of the state database protects against the loss of state and configuration information. This information is critical to all metadevice operations.

**Mirroring**

Replicating all writes made to a single logical device (the mirror) to multiple devices (the submirrors), while distributing read operations. This provides data redundancy in the event of a failure.

**Multi-host disk**

A disk configured for potential accessibility from multiple servers. Solstice HA software enables data on a multi-host disk to be exported to network clients via a highly available data service.

**Sibling host**

One of the two physical servers in a Solstice HA configuration.

**Solstice HA**

See Solstice High Availability.

**Solstice High Availability**

A software package that enables two machines to act as read-write data servers while acting as backups for each other.

**Solstice DiskSuite**

A software product that provides data reliability through disk striping, concatenation, mirroring, UFS logging, dynamic growth of metadevices and file systems, and metadevice state database replicas.

**Stripe**

Similar to concatenation, except the addressing of the component blocks is interlaced on the slices (partitions), rather than placed sequentially. Striping is used to gain performance. By striping data across disks on separate controllers, multiple controllers can access data simultaneously.

**Submirror**

A metadevice that is part of a mirror. See also mirroring.

---

**Switchover**

The coordinated moving of a logical host (diskset) from one operational Solstice HA server to the other. A switchover is initiated by an administrator using the `haswitch(1M)` command.

**Symmetric configuration**

A Solstice HA configuration that contains two disksets. In a symmetric configuration, each server is the default master for one diskset.

**Takeover**

The automatic moving of a logical host from one Solstice HA server to the other after a failure has been detected. The Solstice HA server that has the failure is forced to give up mastery of the logical host.

**Trans device**

A pseudo device responsible for managing the contents of a UFS log.

**UFS**

An acronym for the UNIX file system.

**UFS logging**

Recording UFS updates to a log (the logging device) before the updates are applied to the UFS (the master device).

**UFS logging device**

The component of a trans device that contains the UFS log.

**UFS master device**

The component of a trans device that contains the UFS file system.



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## *Revision History*

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<b>Revision</b>	<b>Dash</b>	<b>Date</b>	<b>Comments</b>
802-3510-10	-A	October 1995	First Customer Ship (FCS)

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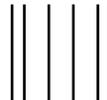
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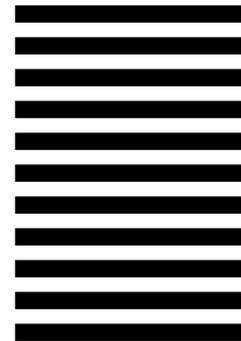
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