

## *2.1-Gbyte Disk Card Installation Manual*

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**Warning** – Procedures contained in this manual must be performed by qualified service-trained maintenance providers.

Refer to the section entitled “Notes, Cautions, and Warnings” found in the Preface of this manual.

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## *Preface*

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This manual provides installation and removal procedures for the 2.1-Gbyte disk card for the SPARCserver™ 1000 system.

When you finish using this manual, put it in SPARCserver 1000 system manual binder.

### *When You Need Help with UNIX Commands*

This manual does not include all of the specific software commands or procedures required to complete the installation. Instead, this manual names software tasks and refers 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
- Configuring devices
- Other basic software procedures

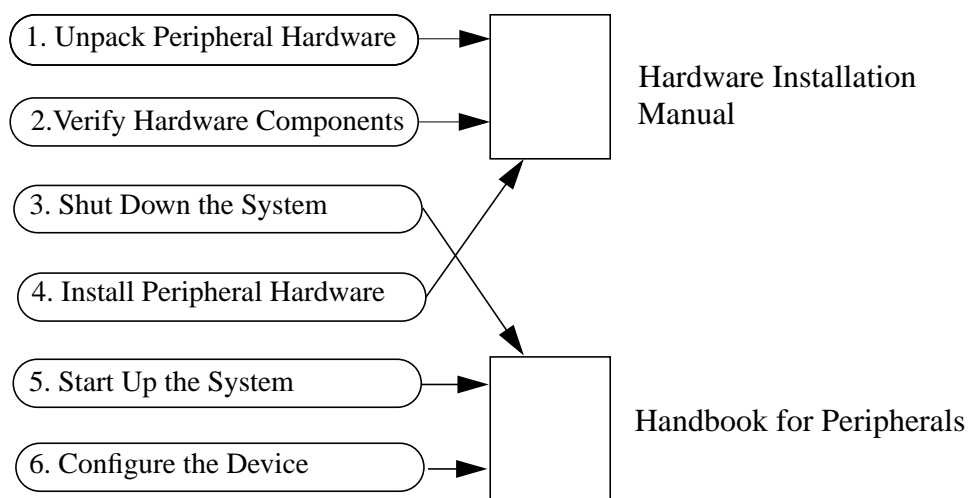
Depending on the operating system you are using, you can find descriptions of commands and procedures in the following documents:

- *Solaris 1.x (SunOS 4.x) Handbook for SMCC Peripherals*, P/N 801-2424-xx. (Contains SunOS™ 4.x software commands.)
- *Solaris 2.x Handbook for SMCC Peripherals*, P/N 801-2425-xx. (Contains Solaris™ 2.x software commands.)

- 
- On-line *AnswerBook*. (Contains the complete set of documentation supporting SunOS 4.x or Solaris 2.x.)
  - Other software documentation that you received with your system.

## *Task Map for Getting Your System Running*

The diagram below outlines the tasks you can perform to successfully install a new peripheral. Each numbered item in the diagram represents a procedure and the arrows point to manuals in which these procedures are detailed.



After you perform these tasks, you will be ready to use the new hardware with your system.



---

## Definitions of Typefaces and Symbols

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

Table P-1 Typographic Conventions

Typeface or Symbol	Meaning	Example
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. system% You have mail.
<b>AaBbCc123</b>	What you type, contrasted with on-screen computer output	system% <b>su</b> password:
<i>AaBbCc123</i>	Command-line placeholder: replace with a real name or value	To delete a file, type <code>rm filename</code> .
<i>AaBbCc123</i>	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.

Code samples are included in boxes and may display the following:

%	UNIX C shell prompt	system%
\$	UNIX Bourne shell prompt	system\$
#	Superuser prompt, either shell	system#

---

---

## Related Documents

Refer to the following manuals for more information:

- *SPARCserver 1000 System Installation Manual* (P/N 801-2893-xx), for server configuration purposes:
  - Chapter 3, “Powering the System On and Off”
  - Appendix A, “Recommended Slot Priorities and Slot Assignments”
- *SPARCserver 1000 System Service Manual System Board* (P/N 801-2900-xx), for SBus card installation instructions:
  - Chapter 2, “Removing and Replacing System Boards and Assemblies”
  - Appendix D, “General Rules for System Configuration”
- *SPARCserver Boot PROM User’s Guide* (P/N 800-4852-xx), for testing the server configuration.
- *SPARCserver 1000 System POST User’s Guide* (P/N 801-2916-xx), for troubleshooting your system.

## Notes, Cautions, and Warnings



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**Warning** – This equipment contains lethal voltage. Contact with this voltage 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 to access this equipment must observe all safety precautions and ensure compliance with skill level requirements, certification, and all applicable local and national laws.

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

---

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

---

# *Preparing to Install a 2.1-Gbyte Disk Card*

---



This chapter describes system requirements, the tools required for servicing the board, and safety handling instructions, followed by a description of the 2.1-Gbyte disk card.

## *1.1 System Requirements*

For each 2.1-Gbyte disk card you install, the following is required:

- SCSI slot on a System board (other than Board 0), or an FSBE card in an SBus slot on a System board.
- 50-pin data cable to connect the SCSI IN port of the 2.1-Gbyte disk card to either:
  - SCSI port of the System board
  - FSBE Sbus card on the System board

## *1.2 Tools Required*

- ESD mat and grounding wrist strap
- #1 Phillips screwdriver
- Flat-blade screwdriver

## 1.3 Safety Precautions

To protect yourself and the equipment, observe the precautions shown in Table 1-1 when working on or in the server.

Table 1-1 Safety Precautions

Item	Problem	Precaution
AC cord	ESD (Electrostatic discharge)	Ensure that the AC cord connects the server to a grounded electrical outlet. The power cord provides a ground path for the unit to bleed off electrostatic voltages.
Wrist strap or Foot strap	ESD	Wear a conductive wrist strap or foot strap when you handle printed circuit boards. Proper use of a conductive strap reduces the risk of damage to the boards by discharging static electricity to ground.
ESD mat	ESD	Use an ESD kit when working on a printed circuit board. The mat provides ESD protection when used with a wrist strap or foot strap. The mat also cushions the board to prevent breakage of any small parts that contact the bench surface.
PC boards	ESD	Handle the printed circuit (PC) board by the edges only. Store the board in an anti-static bag.
Cover panels	System damage and overheating	Install all cover panels after performing any service work on the system. The panels keep out foreign objects to prevent physical damage to internal parts and guide airflow to prevent overheating.
Airflow restrictor boards (filler panels)	System damage and overheating	Install airflow restrictor boards in all unused card cage slots. Unused, open slots severely reduce the cooling capability of the system and can lead to equipment damage from overheating.

## 1.4 2.1-Gbyte Disk Card Description

The 2.1-Gbyte disk card supports four SCSI disk drives. The backplane connector (J0200) connects to the system bus and provides power to the 2.1-Gbyte disk card. The 2.1-Gbyte disk card handles data and control sequentially through disks 0, 1, 2, and 3, and through the J0500 connector to the System board. The J0501 connector terminates the SCSI bus (and requires a SCSI bus terminator attachment). The J0600 connector is reserved.

The DC-DC converter supplies 5V and 12V to the disk drives.

The 2.1-Gbyte disk card controls SCSI addressing for each disk drive. The individual disk drive, the drive controller card, and the 2.1-Gbyte disk card do not require configuration.

Each disk drive has a controller board with an 80-pin connector that fits into an 80-pin SCSI Expansion connector. The joining of these two connectors, the drive guides, and the ejector drive retainer secure the drive to the 2.1-Gbyte disk card. Refer to Figure 1-1.

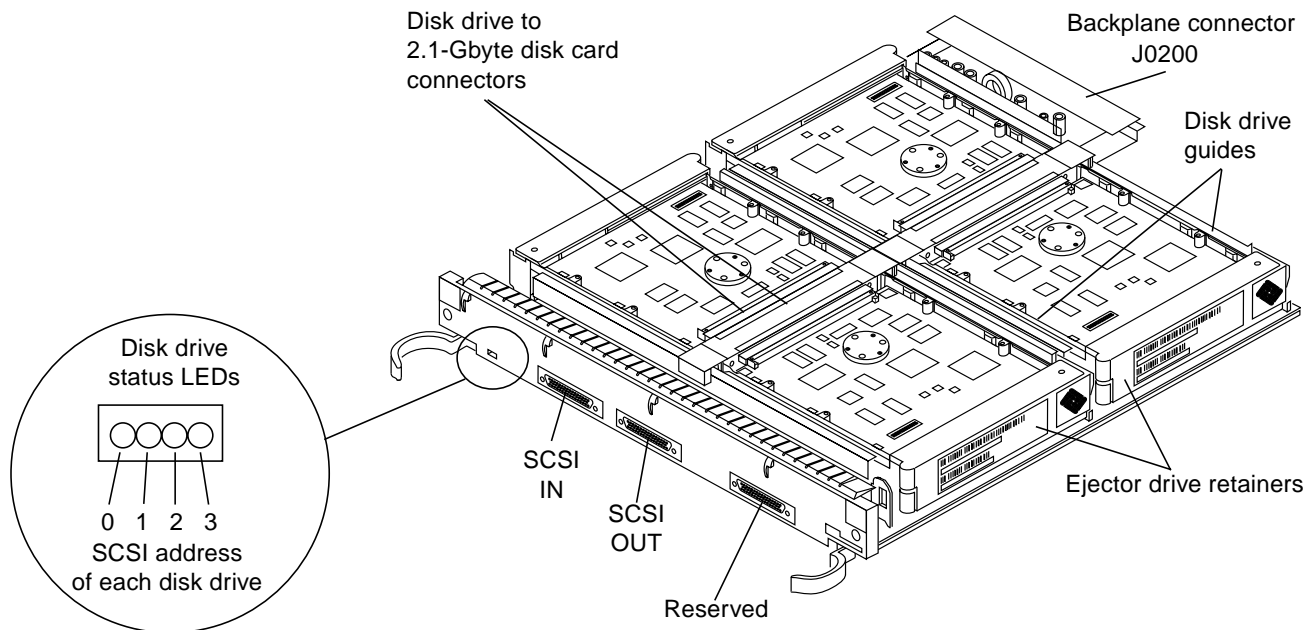


Figure 1-1 Component Locations on the 2.1-Gbyte Disk Card

## 1.5 Slot Assignments

For slot assignment and configuration rules, refer to Appendix A.



## Installing a 2.1-Gbyte Disk Card

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Installing a 2.1-Gbyte disk card requires:

- Checking the packaging.
- Verifying that the 2.1-Gbyte disk card and its components are not damaged, and that the drives are secure.
- Selecting the slot on the SPARCserver 1000 system.
- Installing the 2.1-Gbyte disk card in that slot.

### 2.1 Handling the 2.1-Gbyte Disk Card



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**Caution** – The system chassis power must be turned off, and the AC power cord must remain plugged in to ensure a proper ground.

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**Caution** – Handle the 2.1-Gbyte disk card and its disk drives gently. Sudden vibration or shock can damage one or more of the disk drives.

---

To minimize the amount of board flexing, observe the following precautions:

- Hold the 2.1-Gbyte disk card only by the edges near the middle of the board. Do not hold the board *only* at the ends.
- When removing the board from an antistatic bag, keep the board vertical until you lay it on the ESD mat.

- Do not place the board on a hard surface. Use only a cushioned antistatic mat. The board connectors and components have very thin pins that bend easily.
- Transport the board only in an antistatic bag, and in its original packaging.



---

**Caution** – Printed circuit boards and disk drives contain components sensitive to damage from electrostatic discharge (ESD) that may occur (for example, when you walk across a carpet and then touch the board).

Before handling the board, use an ESD strap and mat, or place your hand on a conductive surface that is grounded to a common earth ground (such as the metal card cage of the SPARCserver 1000 system) to discharge the static electricity from your body.

---

## 2.2 Unpacking the 2.1-Gbyte Disk Card

To unpack the 2.1-Gbyte disk card:

**1. Inspect the shipping container *immediately* upon receipt of your board and look for evidence of damage.**

If the carrier's agent is not present when the container is opened, and the contents are found to be damaged, keep all contents and packing materials for the agent's inspection.

**2. If there is no evidence of damage, carefully remove the board from the shipping container.**

Save the carton and the packing material for possible later use.



## 2.3 Inspecting the 2.1-Gbyte Disk Card

To inspect the 2.1-Gbyte disk card:

1. **Place the antistatic mat on a table or work surface.**
2. **Wrap the grounding strap with the conductive adhesive tape twice around your wrist.**

Make sure the adhesive side is against your skin. Refer to Figure 2-1.

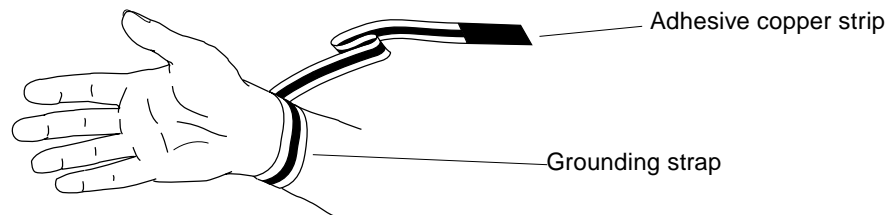


Figure 2-1 Attaching the Wrist Strap

3. **Attach the end with the adhesive copper strip to a non-painted area on the card cage.**
4. **Remove the 2.1-Gbyte disk card from its protective packaging.**
5. **Place it on the antistatic mat with the component side of the disk drive controller cards facing up.**

6. Check that the ejector drive retainers on all four disk drives are closed and do not extend past the edge of the board. Refer to Figure 2-2.

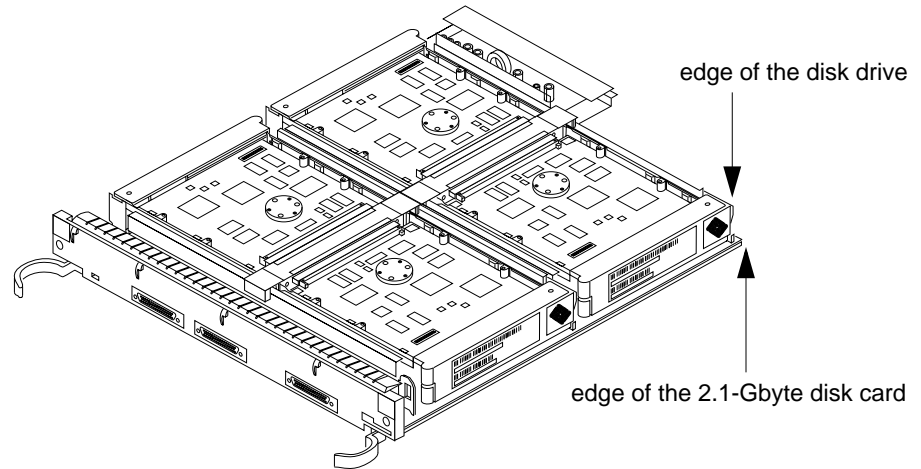


Figure 2-2 2.1-Gbyte Disk Card

If an ejector drive retainer extends past the edge of the 2.1-Gbyte disk card, or is not fully closed, the disk drive connector is not joined with the 2.1-Gbyte disk card connector. Do the following:

- a. **Carefully open the ejector drive retainer.**  
The drive should slide out from the connector.

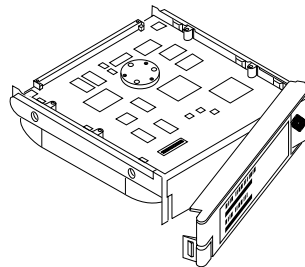


Figure 2-3 Disk Drive with Ejector Drive Retainer in the Open Position

**b. Do not remove the drive, but slide it out an inch or two.**

Check that the connectors are not broken and that nothing blocks the joining of these two connectors. If there is a problem, put the 2.1-Gbyte disk card back into its protective packaging, and contact your Sun sales or service representative.

**7. If the connectors are okay, gently slide the drive in, and close the ejector drive retainer.**

As the ejector drive retainer closes, it forces the connectors together. You will feel a resistance and then the joining of the two connectors.

## 2.4 Installing the 2.1-Gbyte Disk Card

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**Note** – The system might not recognize the new device unless you follow the shut down procedures in the handbook for SMCC peripherals.

---

Before turning off the system power, you must halt the operating system:

- 1. Go to the appropriate handbook for your operating system.**  
Refer to the *Handbook for SMCC Peripherals* that came with the *SPARCserver 1000 System*.
- 2. See the section about shutting down the system, and return to this book after you perform the procedure.**

---

**Note** – Do not remove the power cord from the wall outlet, or the SPARCserver 1000 system. The power cord provides a correct ground.

---

- 3. Face the rear of the SPARCserver 1000 system and identify the slot you are installing the new 2.1-Gbyte disk card into.**
- 4. Remove the two screws from the filler panel that covers that slot.**  
Save the screws, you will use them to secure the 2.1-Gbyte disk card.
- 5. Hold the board with the component side up, as shown in Figure 2-4.**  
This hand position provides the safest balancing grip on the board.

---

**Note** – The component side of the board must face up. Be careful, the 2.1-Gbyte disk card is heavy. Note the hand locations for safely installing the 2.1-Gbyte disk card. Refer to Figure 2-4.

---

- 6. Carefully insert the 2.1-Gbyte disk card in the slot in the SPARCserver 1000 system.**  
Ensure that the board does not slip out of the left or right card guides.

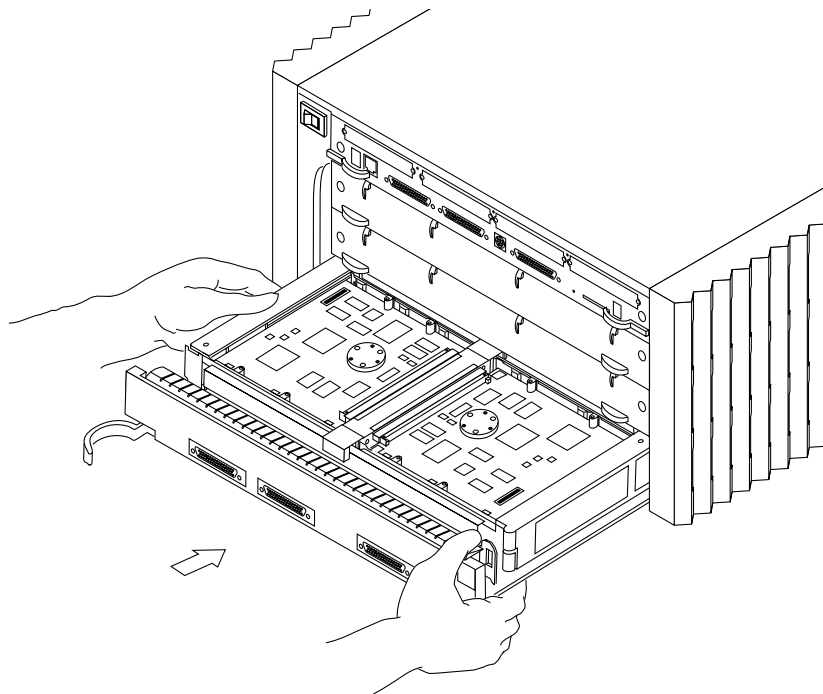


Figure 2-4 Inserting the 2.1-Gbyte Disk Card into the SPARCserver 1000 System

**7. Ensure that the extraction levers are in the outward position as you slide the board toward the backplane connectors.**

The board will not seat fully unless the levers are in this open (unlocked) position.



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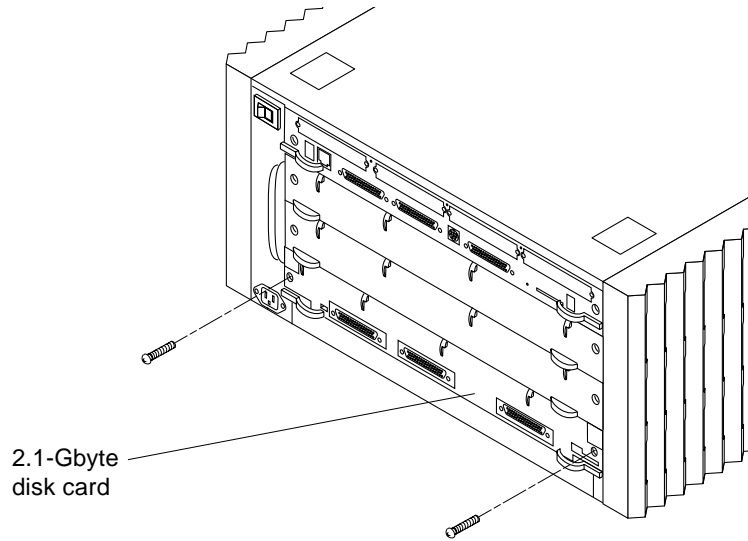
**Caution** – DO NOT FORCE a board into a slot—you may damage it. The board should insert and seat smoothly. If it binds, remove it and inspect the card cage slot for any obvious obstructions. Also inspect both the board and the backplane connector for bent pins or other damage.

---

**8. Press firmly on the rear panel of the board to seat the board into the backplane connectors.**

The extraction levers will swing into the locked position when the backplane connectors are fully seated.

**9. Install the two screws to secure the board to the card cage.**



*Figure 2-5* Securing the 2.1-Gbyte Disk Card

**10. Go to the next section to connect the SCSI data cable and the SCSI terminator.**

Repeat steps 1 through 9 for each 2.1-Gbyte disk card that you install.

## 2.5 Connecting the SCSI Data Cable and Terminator

The J0500 connector is the data and control bus connection from the 2.1-Gbyte disk card through the SCSI port, or FSBE SBus card of the System board. For each disk card you install, you need one data cable and one terminator (refer to *Appendix A, SCSI Expansion Configurations*).

---

**Note** – The on-board SCSI port of each System board requires either a cable connection to a 2.1-Gbyte disk card, or a terminator. Refer to the SPARCserver 1000 System Service Manual

If you do not connect terminators correctly, and you start the system, the SCSI devices will not work.

Always turn the server off before attaching or reconnecting any cable or terminator.

---

To connect the SCSI data cable and terminator (refer to Figure 2-6):

- 1. Connect the SCSI data cable from the SCSI IN port on the 2.1-Gbyte disk card to the SCSI port of the System board (other than the Master) or the FSBE SBus card connector.**

In a single System board configuration (one System board in slot 0), you must install and use an FSBE SBus card. In a system configuration of two or more System boards, you can use the on-board SCSI port of the second or third System board (refer to Appendix A).

- 2. Connect a SCSI terminator to the SCSI OUT port on each 2.1-Gbyte disk card.**

This terminates the SCSI daisy-chain. Every 2.1-Gbyte disk card must have a terminator connected to the SCSI OUT port.

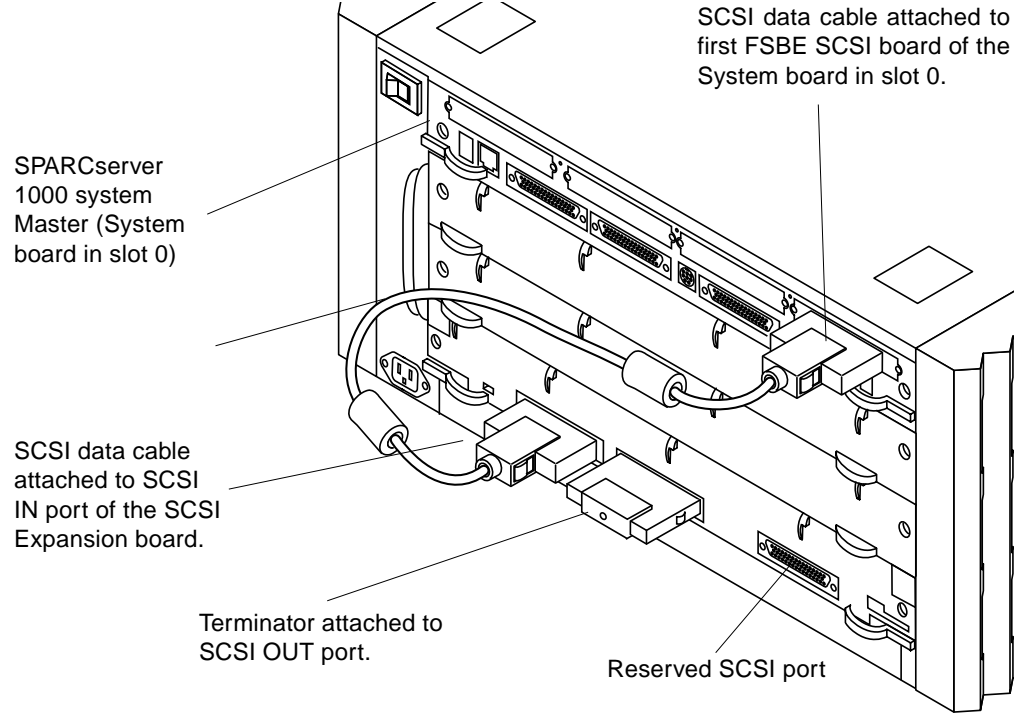


Figure 2-6 Connecting the SCSI Data Cable and Terminator



## 2.6 Before Restarting the System

Before booting your SPARCserver 1000 system:

- Check that SCSI terminators are attached:
  - To the SCSI OUT port of the System board in slot 0
  - To the SCSI OUT port of all 2.1-Gbyte disk cards
- Check each board to see if the board extraction levers are fully closed. Use your thumbs and press in on each board near the extraction levers.
- Check that all cables are connected and secure. Even connections you didn't change may have come loose during the installation or removal process.

## 2.7 Verify Disk Drive Installation

Refer to the chapter that discusses powering the server on and off in the *SPARCserver 1000 System Service Manual*, part number 801-2895-xx.

Verify that the newly-installed disk drives are operating:

**1. Turn on power to the monitor.**

If the system does not have a monitor, refer to the *SPARCserver 1000 System Service Manual* for information on attaching an RS232C terminal.

**2. Turn the key switch, located on the front panel of the SPARCserver 1000 system, to the 1 position. Allow the system to boot.**

**3. Refer to the *Handbook for SMCC Peripherals* that came with your SPARCserver 1000 system for the appropriate command to display the OpenBoot™ prompt (ok).**

**4. At the ok prompt, type this command:**

```
ok probe-scsi-all
```

The OpenBoot firmware provides the `probe-scsi-all` command to check all available SCSI devices. Watch the monitor and verify that the diagnostic shows the newly-added SCSI Tray disk drives.

---

**Note** – If the SPARCserver 1000 system does not recognize one or more disk drives (new or old), contact your Sun representative.

---

**5. When the system displays the `ok` prompt, type:**

```
ok boot
```

When the system finishes booting, it should display the login prompt (`hostname%`). At this point, you may log in and continue operation.

## 2.1-Gbyte Disk Card Configurations

---



This appendix describes SPARCserver 1000 system configurations for as many as three 2.1-Gbyte disk cards.

With the SPARCserver 1000 system, slot 0 is the top slot and slot 3 is the bottom slot. The server Master is the System board in slot 0 (also referred to as board 0). Slots 1, 2, and 3 can support System or 2.1-Gbyte disk cards.

Standard configuration from the factory is with the System board in slot 0, and the 2.1-Gbyte disk card, if present, in slot 3. Slots 1 and 2 have airflow restriction panels (filler panels) for cooling purposes.

### A.1 System Board-2.1-Gbyte Disk Card Relationship

Each System board has its own SCSI port and can support three SBus cards. The System board in slot 0 uses its SCSI port to support the *SCSI Tray* (the SCSI devices in the front of the SPARCserver 1000 system: a CD-ROM, a DAT, and two to four disk drives).

Each 2.1-Gbyte disk card requires a data and control cable connection to a SCSI port on a System board. The 2.1-Gbyte disk card can use either an FSBE SBus card, or the SCSI port on the *second* System board (since the SCSI Tray uses the SCSI port of the first System board).

The SCSI target addresses are hard-wired on the 2.1-Gbyte disk card, so that drive 0 is always drive 0 on the SCSI bus (another reason you can't use the on-board SCSI port of the first System board -- SCSI address contention).

## A.2 Performance Recommendations

These are suggestions to allow your SPARCserver 1000 system to operate at optimum performance.

The first SCSI port has priority over the first SBus card on the System board, which has priority over the second SBus card, which has priority over the third SBus card. For better performance with a server that uses two or more System boards, use the SCSI port on the second System board for priority service to the 2.1-Gbyte disk card.

Generally, the best performance you can get from your SPARCserver 1000 system is to give the disk drive group(s) first access on the interrupt bus. This is the primary reason the SCSI Tray uses the Master SCSI port, since it is first on the interrupt bus.

For example, a server configured to support four internal SCSI devices, two System boards (a Master and a System board) and two 2.1-Gbyte disk cards (also shown in Figure A-1, Example B):

- The first SBus slot of the first System board (Master) connects from an FSBE SBus card to the first 2.1-Gbyte disk card.
- The SCSI port of the second System board connects to the second 2.1-Gbyte disk card.

In this configuration, the interrupt bus allows access to the disk drives first. Refer to Figure A-1 and to Table A-1.

*Table A-1* Interrupt Priorities (1 is highest priority) with Three System Boards

System Board	FSBE SCSI Port	FSBE SCSI Port	FSBE SCSI Port	On-board SCSI Port
Slot 0	10	7	4	1
Slot 1	11	8	5	2
Slot 2	12	9	6	3

### A.3 2.1-Gbyte Disk Card Slot Selection

Use the following examples as guidelines when configuring your server for optimum performance. Note that example C is used in this manual.

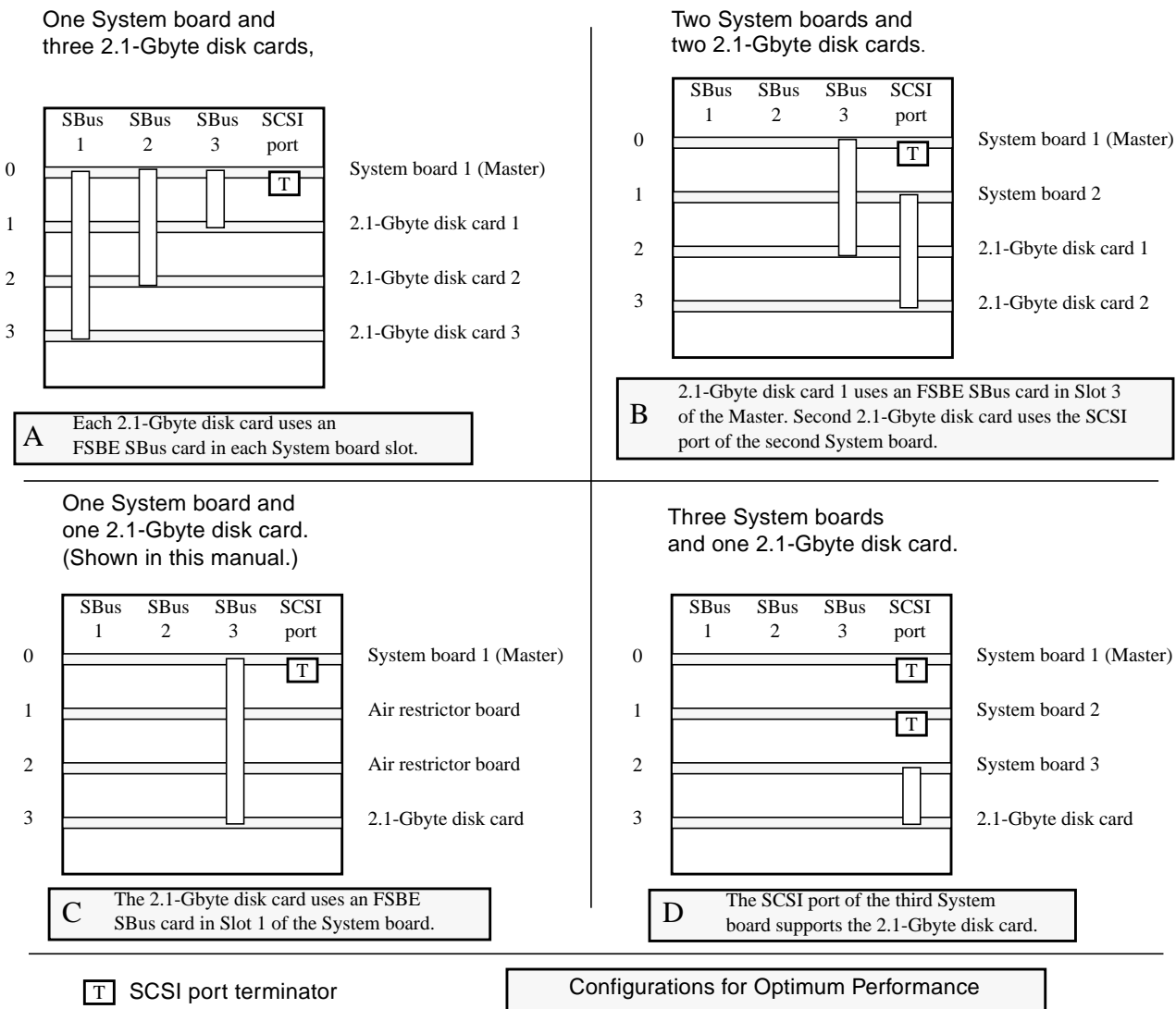


Figure A-1 Cabling Configurations (rear view)



## Removing a 2.1-Gbyte Disk Card



To remove a 2.1-Gbyte disk card:

**1. Use an ESD strap.**

Connect the strap to your wrist and to a ground point (the bare metal of the card cage, for instance).

**2. Remove the two screws that hold the 2.1-Gbyte disk card to the card cage.**

Refer to Figure B-1. Set the screws aside for later reinstallation.

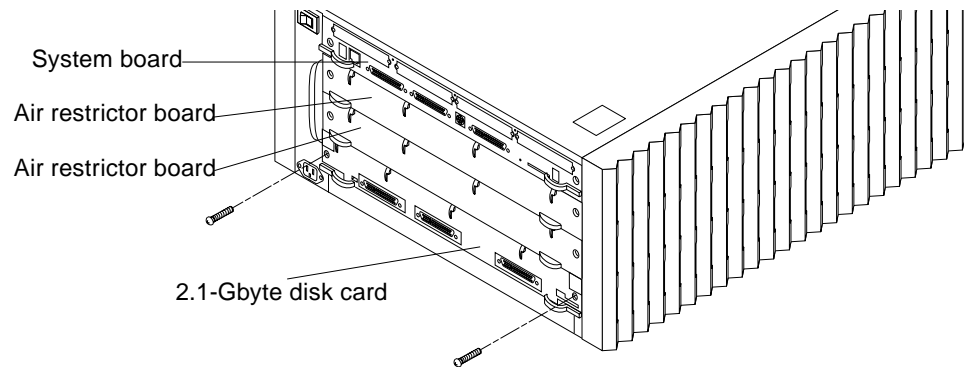


Figure B-1 Removing the 2.1-Gbyte Disk Card Retaining Screws

**3. Pull the curved ends of the extraction levers outward to release the board from the backplane connector. Refer to Figure B-2.**

4. Hold the board by the extraction levers, and gently slide the board half way out of the card cage.
5. Hold the board as shown in Figure B-2 and remove the 2.1-Gbyte disk card from the card cage.

This hand position provides the safest balancing grip on the board.

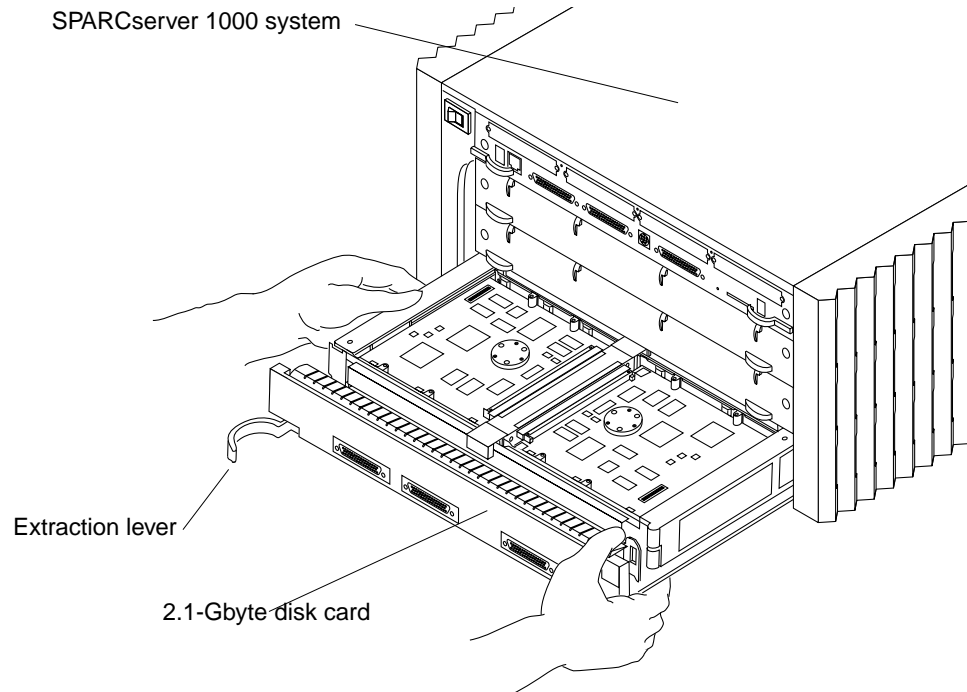


Figure B-2 Removing the 2.1-Gbyte Disk Card from the SPARCserver 1000 System



**Caution** – The 2.1-Gbyte disk card is heavy. Place your hands as shown in Figure B-2 and remove the 2.1-Gbyte disk card slowly. Be careful.

6. Place the 2.1-Gbyte disk card on an ESD mat or in an antistatic bag.



- 
- 7. If you do not plan to fill the slot on the server with another board, get an air restrictor board, and secure it to the empty slot.**

Cooling efficiency is drastically reduced if the slots of the server are not filled.

- 8.**



# Removing and Replacing a Disk Drive in a 2.1-Gbyte Disk Card

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Removing and replacing a disk drive in a 2.1-Gbyte disk card requires:

- Removing the 2.1-Gbyte disk card that contains the faulty disk
- Removing the faulty disk drive from the 2.1-Gbyte disk card
- Installing the new disk drive in the 2.1-Gbyte disk card
- Re-installing the 2.1-Gbyte disk card

## C.1 Handling the 2.1-Gbyte Disk Card



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**Caution** – The system chassis power must be turned off, and the AC power cord must remain plugged in to ensure a proper ground.

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**Caution** – Handle the 2.1-Gbyte disk card and its disk drives gently. Sudden vibration or shock can damage one or more of the disk drives.

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To minimize the amount of board flexing, observe the following precautions:

- Hold the 2.1-Gbyte disk card only by the edges near the middle of the board. Do not hold the board *only* at the ends.
- When removing the board from an antistatic bag, keep the board vertical.
- Do not place the board on a hard surface, place it on the ESD mat provided. The board connectors and components have very thin pins that bend easily.

- Transport the board only in an antistatic bag, and in its original packaging.



---

**Caution** – Printed circuit boards and disk drives contain components sensitive to damage from electrostatic discharge (ESD) that may occur (for example, when you walk across a carpet and then touch the board).

Before handling the board, use an ESD strap and mat, or place your hand on a conductive surface that is grounded to a common earth ground (such as the metal card cage of the SPARCserver 1000 system) to discharge the static electricity from your body.

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## C.2 Removing the 2.1-Gbyte Disk Card

Perform the steps listed in *Appendix B, Removing a 2.1-Gbyte Disk Card*.

## C.3 Removing and Replacing a Disk Drive

To unpack the disk drive:

- 1. Inspect the shipping container *immediately* upon receipt of your disk drive and look for evidence of damage.**

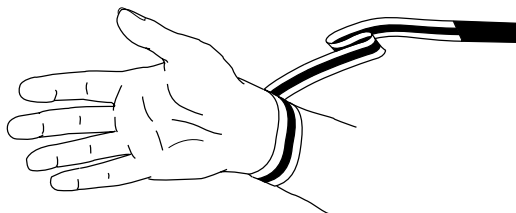
If the carrier's agent is not present when the container is opened, and the contents are found to be damaged, keep all contents and packing materials for the agent's inspection.

- 2. If there is no evidence of damage, carefully remove the disk drive from the shipping container.**

Save the carton and the packing material for possible later use.

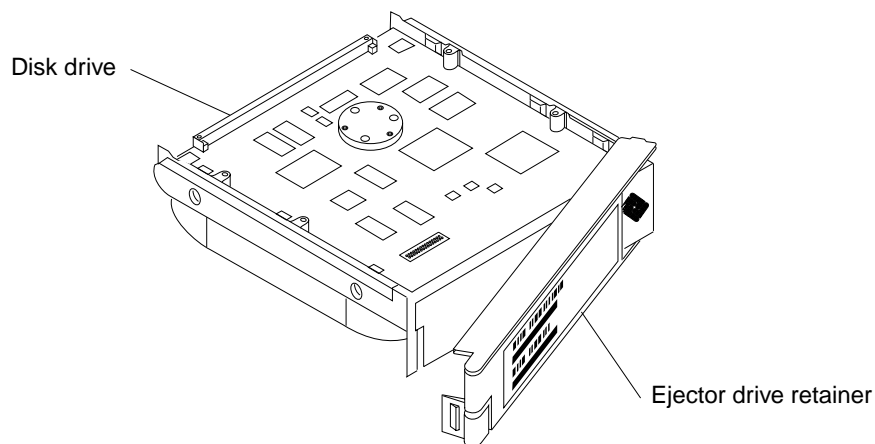
- 3. Place the antistatic mat on a table or work surface.**

4. **Wrap the grounding strap with the conductive adhesive tape twice around your wrist. Make sure the adhesive side is against your skin. Refer to Figure C-1.**



*Figure C-1* Attaching the Wrist Strap

5. **Attach the end with the adhesive copper strip to a non-painted area on the card cage.**
6. **Open the protective packaging, take out the disk drive, and place it on the antistatic mat.**



*Figure C-2* Disk Drive and Ejector Drive Retainer

7. **Carefully open the ejector drive retainer.**  
The drive should slide out from the connector.
8. **Slide the old drive out and place it on the antistatic mat.**

- 9. While holding the ejector drive retainer in the open position (not locked), gently slide the new drive in then close the ejector drive retainer.**  
As the ejector drive retainer closes, it forces the connectors together. You will feel a resistance and then the joining of the two connectors.

#### *C.4 Re-installing the 2.1-Gbyte Disk Card*

Perform the steps listed in paragraph 2.4, *Installing a 2.1-Gbyte Disk Card*, in this manual.

## *Revision History*

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<b>Revision</b>	<b>Date</b>	<b>Comments</b>
801-2196-10	May 1993	First customer shipment





### Reader Comments

We welcome your comments and suggestions to help improve the *2.1-Gbyte Disk Card Installation Manual*, part number 801-2196-10. Please take time to let us know what you think about this manual.

- The tasks were well documented and easy to follow.

Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments \_\_\_\_\_

- The information provided in *2.1-Gbyte Disk Card Installation Manual* was complete.

Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
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Comments \_\_\_\_\_

- The information I needed was easy to find.

Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
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Comments \_\_\_\_\_

- The manual was useful to me.

Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
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Comments \_\_\_\_\_

- Do you have additional comments about the *2.1-Gbyte Disk Card Installation Manual*?

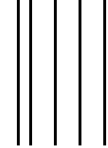
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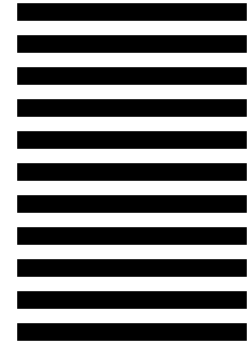
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