SPARCstorage Library Installation and User's Guide

Sun

FCC Notice

This equipment has been tested and found to comply with the limits for either a Class A or a Class B digital device, pursuant to Part 15 of the FCC Rules. Refer to the FCC plate on the back panel of your device to determine its specific qualification.

FCC Class A Notice — United States

Note – This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded Cables

Connections between the workstation and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits.

Modifications

Modifications to this device, not approved by Sun Microsystems, Inc., may void the authority granted to the user by the FCC to operate this equipment.

FCC Class B Notice — United States

Note – This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

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Contents

Preface

This manual describes how to install and use the tower and table-top versions of the SPARCstorage™ Library.

First read the "Safety Agency Compliance" section at the end of this *Preface.* Then refer to the specific chapters to find the information you need.

Who Should Use This Book

This manual is designed to aid nontechnical users to set up the tape library and connect it to their supported desktop system to use the tape library's data storage capabilities. The manual also contains some maintenance information regarding the use, care, and cleaning of certain components. Finally, it contains procedures on how to install various components within the tape library. Refer to the following documents for detailed software information:

- On-line *AnswerBook* (contains the complete set of documentation supporting the Solaris™ 2.x software environment).

- Software documentation that you received with your desktop system.

What Typographic Changes Mean

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 `.login` file. Use `ls -a` to list all files. `machine_name% You have mail.`
`AaBbCc123`	What you type, contrasted with on-screen computer output	`machine_name%` **`su`** `Password:`
AaBbCc123	Command-line placeholder: replace with a real name or value	To delete a file, type `rm` *filename*.
AaBbCc123	Book titles, new words or terms, or words to be emphasized	Read Chapter 6 in *User's Guide*. These are called *class* options. You *must* 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	`#`

Safety Agency Compliance

Before beginning any procedure, read the instructions and cautions in this section. They explain how to work safely with the internal components of your system. The equivalent information, translated into French, German, and Spanish, can be found in Appendix A.

Safety Precautions

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all warnings and instructions marked on the equipment.

- Ensure that the voltage and frequency of your power source matches the voltage and frequency inscribed on the equipment's electrical rating label.

- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Symbols

The following symbols, which appear in this book, mean:

Caution – Risk of personal injury and equipment damage. Follow the instructions.

Warning – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

ON – The principal on/off switch is in the *on* positio

Off – The principal on/off switch is in the *off* position

Modification to Equipment

Do not make mechanical or electrical modifications to the equipment. Sun Microsystems, Inc. is not responsible for regulatory compliance of a modified Sun product.

Placement of a Sun Product

Caution – To ensure reliable operation of your Sun product and to protect it from overheating, openings in the equipment must not be blocked or covered. A Sun product should never be placed near a radiator or heat register.

Power Cord Connection

Warning – Sun products are designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electrical shock, do not plug Sun products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

Warning – Not all power cords have the same current ratings. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords.

Warning – Your Sun product is shipped with a grounding type (3-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet.

Panels and Cover

Caution – It is not safe to operate Sun products without the panels and cover in place. Failure to take this precaution may result in personal injury and system damage.

SPARCstorage Library Product Description 1≡

This manual covers the table-top and the tower versions of the SPARCstorage Library; shown in Figure 1-1. In this manual, either version may be referred to as the tape library. Each type of tape library enclosure contains the following main components:

- A robotic handler, referred to as the *Cartridge Handling Mechanism* (CHM)
- One or two 8mm tape drives
- 8mm tape cartridges in a removable cartridge holder
- A fixed cartridge holder for a cleaning cartridge or an additional data cartridge

Assuming an average data compression ratio of 2:1, the tape library can store up to 154 Gbytes of information on eleven tape cartridges. The tape library has a four-line, liquid crystal display (LCD), called a display panel, and a keypad on the front panel called the Operator Panel. By using this panel, you can set options, check operating statistics, and diagnose errors.

Listed below are the electrical ratings and physical dimensions of the tape library:

Electrical Ratings

- Consumes 60 - 110 watts (true power)
- 100 to 240 VAC at 50-60 Hz

Dimensions

- Height: 558.8 mm (22 inches)
- Width: 240 mm (9.45 inches)

- Length: 543.6 mm (21.4 inches)
- Weight: 37.2 kg (82 pounds with two drives installed)

Caution – Due to the tape library's size and weight, you should take special care when you lift it to avoid injuring yourself.
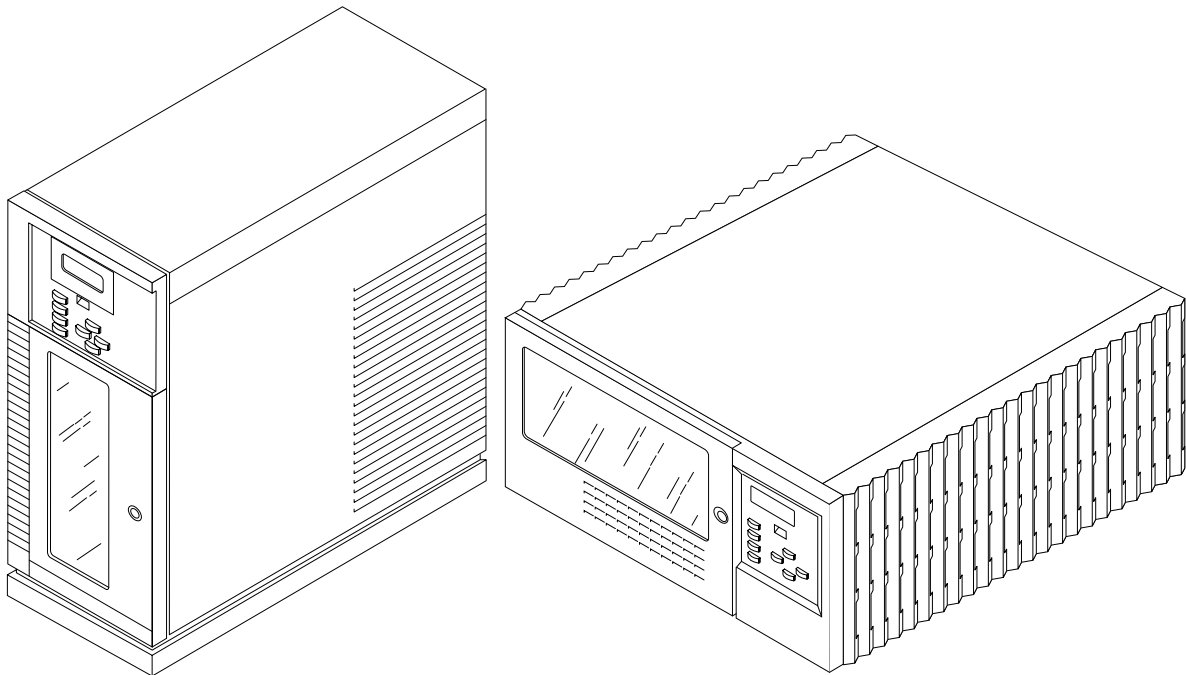
Tower Version   Table-top Version

Figure 1-1   The SPARCstorage Library

Note – The remaining illustrations in this manual show the Tower version. Internal components of both versions are identical; differences are in orientation only.

Now that you have unpacked the tape library, check the contents against the packing slip to make sure you have the following items:

- A SPARCstorage Library with at least one tape drive installed
- Two power cords
- SCSI cable (2 meters)
- Removable tape cartridge holder
  - data tape cartridges
  - cover for cartridge holder
- Cleaning cartridge
- Regulated SCSI terminator
- Accessory kit, containing:
  - SCSI bus jumper block
  - clean wipes
  - door key

Note – If the tape library is *not* installed in the United States or Canada, you may have to use a country-kit power cord. Consult your Sun sales representative for further information.
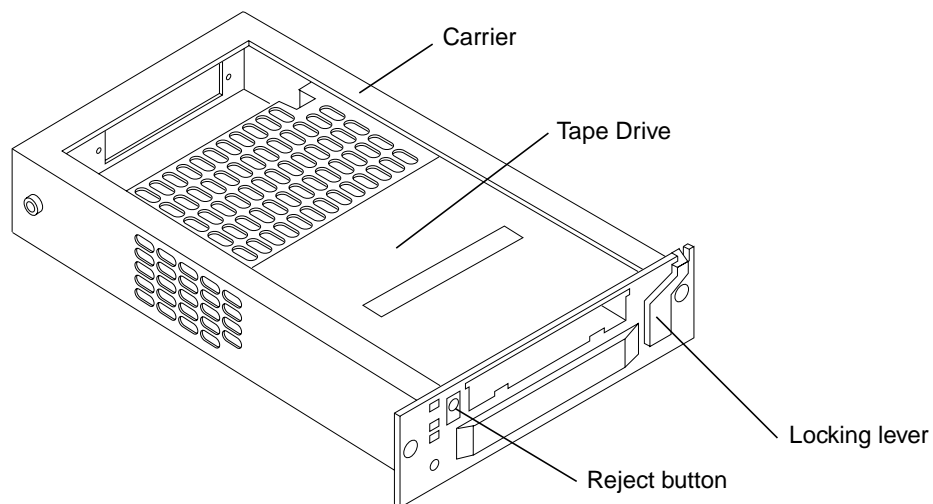
Figure 1-2   Tape Drive and Carrier

Main Components

The main components of the tape library are described below.

Internal Components

See Figure 1-3 for an illustration of the internal components of the tape library.

Removable tape cartridge holder	Holds 8mm tape cartridges (10 maximum) that can be inserted and removed from the back wall of the tape library. The cartridges don't need to be formatted or conditioned before using them.
Fixed cartridge holder	Stores a cleaning cartridge or an 11th data cartridge above the removable holder .
Cartridge Handling Mechanism (CHM)	This robotic assembly allows you to manipulate the cartridges within the tape library, moving them between the storage locations and the tape drives.
Tape drive(s) in carriers	One or two 14 GB 8mm tape drives can be installed in the tape library. Cartridges are placed in or removed from them by the CHM. See Figure 1-2.
Bar code scanner (optional)	Installed on the CHM, this scanner gathers specific information from bar code labels on the cartridges within the tape library.

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Caution – If you are operating the tape library with only one tape drive, the tape drive must be installed in the top slot. The bottom drive carrier slot should then contain an empty drive carrier.

Fixed cartridge holder

Removable tape
cartridge holder

Cartridge handling
mechanism (CHM)

Bar code
scanner location
(optional)

Tape
cartridges

Tape drive

Empty driver carrier
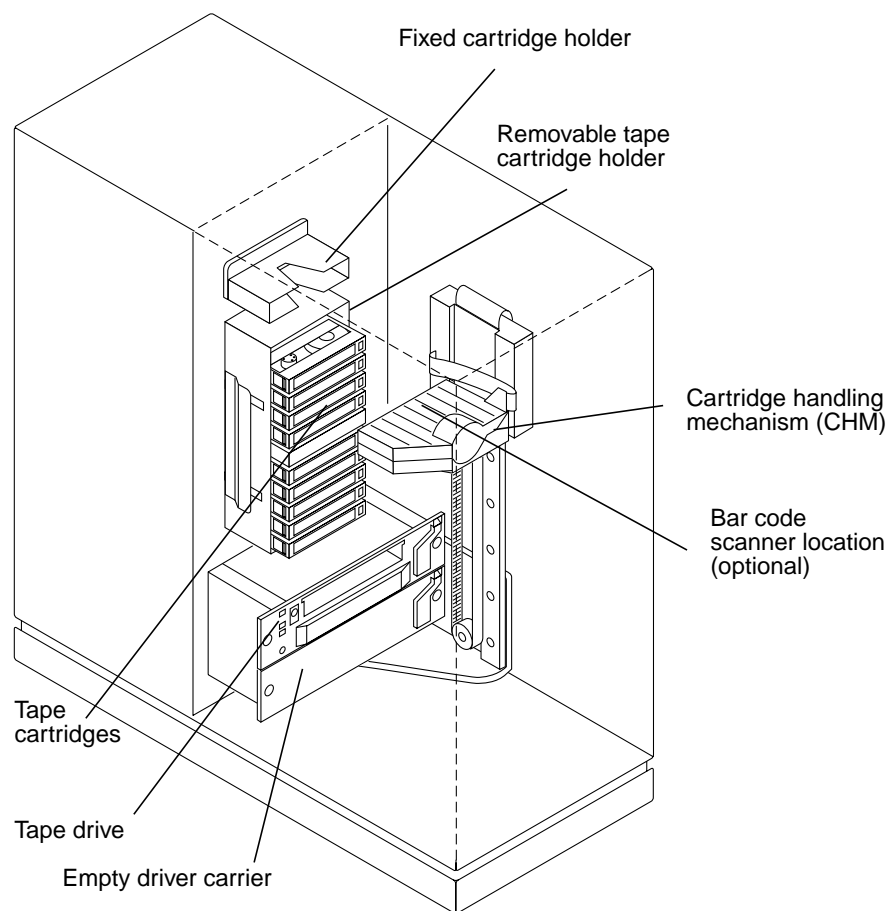
Figure 1-3   Internal Components of SPARCstorage Library

Front Panel Components

See Figure 1-4 for an illustration of the front panel of the tape library.

Front door	The door contains a clear, shatterproof and scratch resistant window that allows you to see the cartridges, the tape drives and the motions of the CHM.
Key lock	When the power is on, an electronically controlled lock (solenoid latch) acts as a redundant locking mechanism that engages automatically after the door is locked with the key. When you unlock the door with the key, the latch will not release the door until the CHM finishes performing the current command and moves to the park position .
Operator panel	Allows you to manually change control modes, set SCSI IDs, and perform diagnostics. A security option prevents users from making changes using the menus on the Operator Panel.
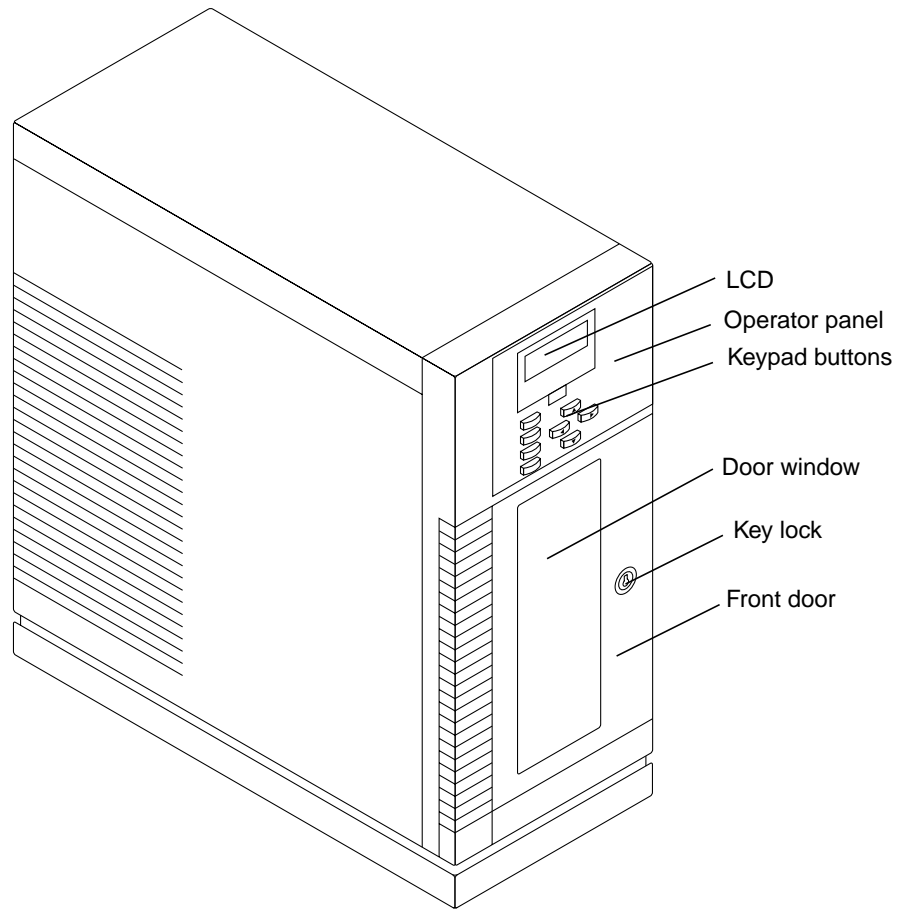
Figure 1-4   Front Panel of SPARCstorage Library

Back Panel Components

See Figure 1-5 for an illustration of the back panel of the tape library.

SMC card	Provides control for the CHM. The serial diagnostic ports, SCSI connectors, and the ESD shield are part of the card.
Power supply assembly	Includes a power entry module, fan, fuse, and power switch. The AC power connector, power switch, fuse, and cooling fan protrude through the back panel.
Remote hardware reset port	Allows you to perform a manual hardware reset of the tape library to clear hardware-related errors.
SCSI bus jumper block	Connects two internal portions of the SCSI bus together.
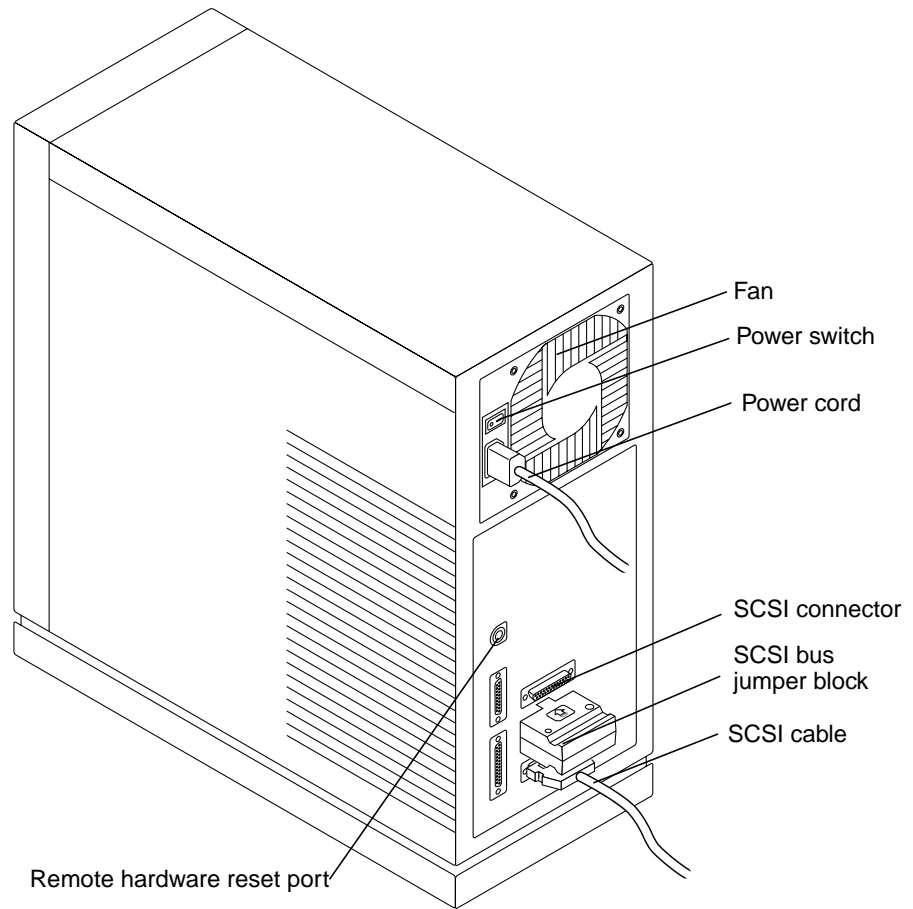
Figure 1-5   Back Panel of SPARCstorage Library

Fan

Power switch

Power cord

SCSI connector

SCSI bus
jumper block

SCSI cable

Remote hardware reset port

≡ 1

Installing the SPARCstorage Library   *2*≣

This chapter explains how to install a SPARCstorage Library with a desktop system in a direct connection, or in a daisy chain connection with other peripherals.

Before You Start

Before you perform any of the installation procedures:

- Read the "Safety Agency Compliance" section in the Preface.

- Protect the tape library from electrostatic discharge (ESD) by placing it on an antistatic work surface and by wearing an antistatic wrist band. If such a mat or wristband are unavailable, discharge static electricity from your body before handling the tape library or the tape drives by touching a known grounded surface, such as your workstation's metal chassis.

- Prepare the tape library for installation by determining SCSI bus length.

- Gather the following tools and equipment:
  - Antistatic wrist strap
  - ESD mat
  - Flatblade screwdriver
  - TORX screwdriver with T-20 and T-10 bits
  - Container to hold loose screws

Determining SCSI Bus Length

The total SCSI bus length of your system unit, the external SCSI cables, and the tape library must not exceed a maximum SCSI bus length of 20 feet (6 meters). To determine if the total SCSI bus length is 6 meters or less, see Appendix B, *Small Computer Systems Interface Information.*

For example, suppose you wish to connect a SPARCstorage Library to a SPARCstation 10 system. This configuration would have a total SCSI bus length of 3.4 meters (as indicated below).

- SPARCstorage Library (internal signal path)   0.50 meters
- SPARCstation 10 System (internal signal path)   0.90 meters
- SCSI Cable between them   2.0 meters

Since the total SCSI bus length is well below the maximum of 6 meters, this configuration is acceptable.

Installation Overview

The following general tasks must be performed to install a tape library. The procedures for these tasks are detailed on the following pages.

1. Verify the operating system version you have on your desktop system.

2. Shut down, then power off your desktop system.

3. Unpack the tape library and set it on a level surface.

4. Unlock and open the front door.

5. Remove the packing materials from within the tape library. Save it.

6. Affix bar code labels to the 8mm tape cartridges (if a bar code scanner is installed)

7. Place tape cartridges into the removable cartridge holder.

8. Install a cleaning cartridge or an additional tape cartridge in the fixed cartridge slot in the tape library.

9. Install the removable cartridge holder into the tape library.

10. If necessary, remove the blank drive carrier and install the second tape drive and carrier.

11. Connect the tape library to your desktop system (direct or daisy chain configuration).

12. Power on your desktop system, then the tape library.

13. Set the SCSI IDs for the tape library and the tape drive(s) through the Operator Panel.

14. Test the tape drives and the tape library.

Verifying the Operating System Version

Verify that you are using the Solaris 2.3 or higher level software environment on your desktop system.

To verify the software environment:

♦ **Type** `uname -rs` **and press Return.**
The following message should be displayed:

```
SunOS 5.3
```

Shutting Down Your System

Before you can install the tape library or upgrade your hardware, you must shut down the system. If a step is omitted, the system may fail to boot, or fail to correctly configure the tape drive.

Caution – The system will not recognize the new device unless you follow the shutdown procedures for your operating system. Specifically, only Solaris 2.x software uses the `touch /reconfigure` command to ensure autoconfiguration when the system is powered on.

1. **Become superuser by typing** `su` **and pressing Return.**
   .

```
% su
Password: superuser password
#
```

The root prompt (#) is then displayed.

2. Type `touch /reconfigure`**.**

```
# touch /reconfigure
```

This command ensures that the operating system checks for the presence of any newly installed devices when you power on or boot your system.

Note – If you omit this step, you can still automatically configure the new drive when the system boots by using the `boot -r` option**.**

Note – If your system is acting as a server, inform the mounted users that the system will be going down. If your system is a stand-alone system, you should use the `halt`, `shutdown` or `init0` commands.

3. Type `/usr/sbin/shutdown -y -g30 -i0` **and press Return.**

```
# /usr/sbin/shutdown -y -g30 -i0
.
.
.
.
ok
```

The **0** in `g30` and `i0` is a zero.

A message is sent notifying all users who are logged in that they have 30 seconds (`-g30`) before the system begins to shut down. The `ok` or > prompt is displayed once the operating environment is shut down.

4. At the > **or** `ok` **prompt, power off the system.**
See "Powering Off Your System" on the next page.

Powering Off Your System

To turn the on/off switch to the off (O) position for each device of your desktop system, do so in the following order:

1. Tape library

2. Any peripheral drive units

3. Desktop system

4. Monitor

Warning – After the power switches are turned to the off (O) position, the green light emitting diodes (LEDs) on all units should not be lit and the fans should not be running. All power cords should remain plugged into each unit and wall outlets to prevent damage to the equipment by static electricity from your body.

Caution – Always allow 10 seconds between turning off the power and turning it back on again. This pause prevents possible damage to power supply components.

Preparing the Tape Library

Warning – Before performing any of the following steps, be sure that the power switch is off. To avoid damaging the tape library, be sure that the work area is free of conditions that could cause electrostatic discharge (ESD).

To gain internal access to the tape library to prepare it for use:

1. Locate the key in your accessory kit.

2. Insert the key vertically into the lock and turn it clockwise 90 degrees.
See Figure 2-1.

Key
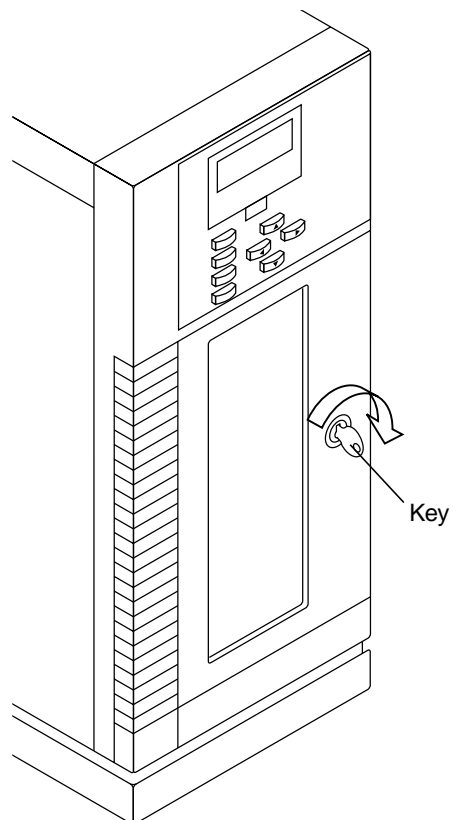
Figure 2-1   Turning the Key

3. Pull the front door open.

4. Attach wrist strap.

5. **Reach in through the open door and pull out the large piece of packing material.**
   See Figure 2-2.

6. **Pull the CHM towards you to free it from the second piece of packing material that is inserted in the removable cartridge holder.**

7. **Push the CHM up to the top of the tape library and remove the packing material that is in the holder.**
   Keep the packing material in case the tape library ever needs to be transported.

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STEP 1

STEP 2

Packing
materials

First piece

Cartridge
holder

STEP 3

STEP 4

CHM

Second piece
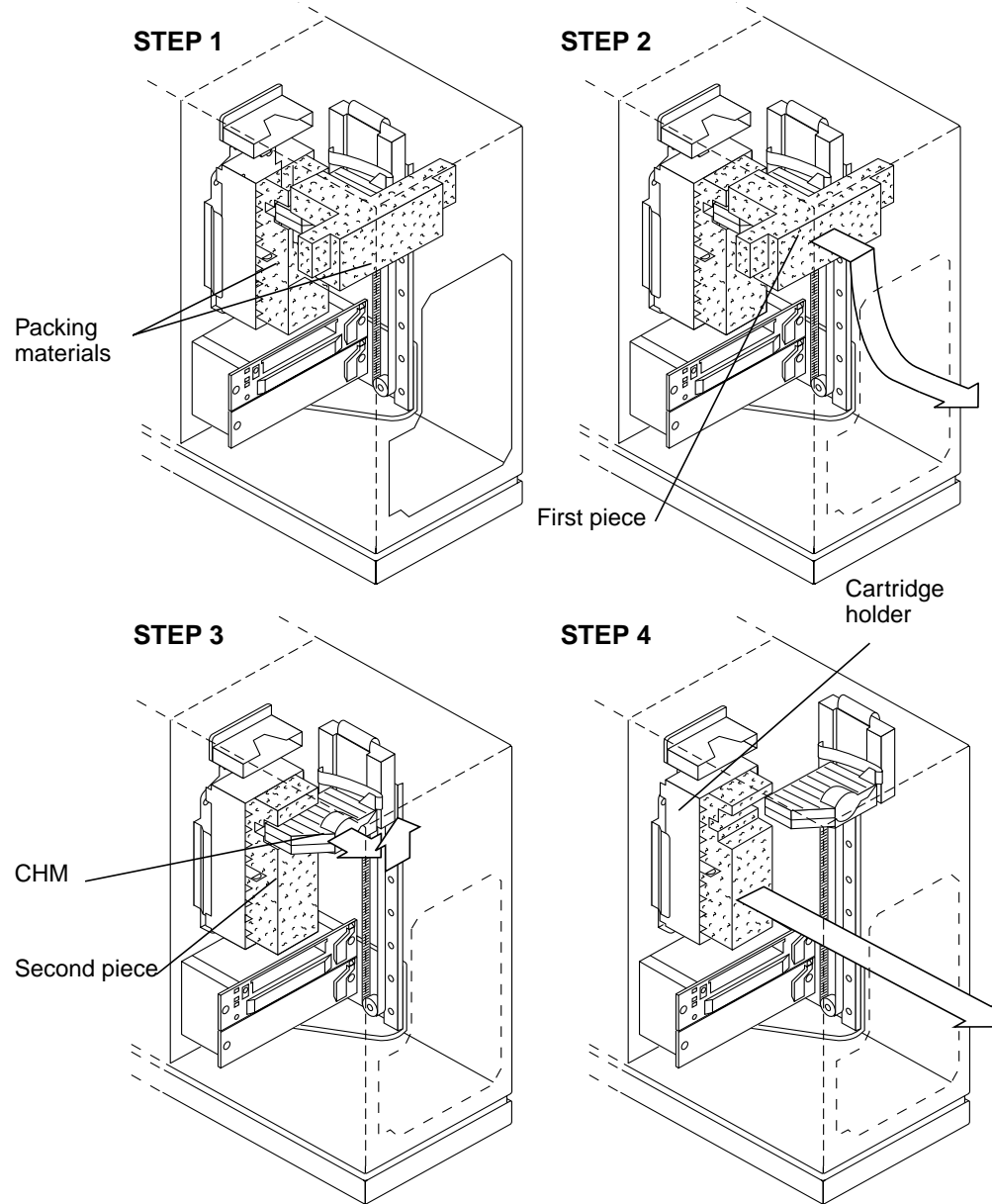
Figure 2-2   Removing Packing Material

8. Remove the tape cartridge holder by reaching in through the door and pulling the top of the holder towards you while lifting its bottom end slightly.
See Figure 2-3.

Removable cartridge holder
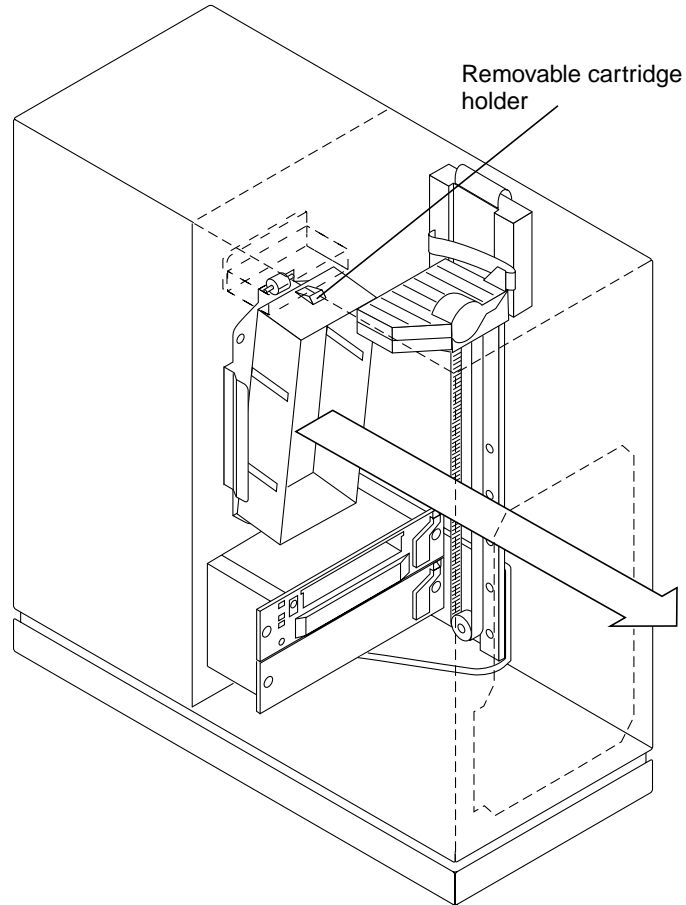
Figure 2-3   Removing the Cartridge Holder

9. Plug in the tape library.

Installing the Tape Cartridges

You now need to:

1. Prepare the tape cartridges

2. Place them in the removable and fixed cartridge holders

3. Install the removable cartridge holder into the tape library

Write-Protect Switch

Each 8mm data cartridge features a write-protect switch. This switch determines whether data can be written to the cartridge (*write enabled*) or whether data on the cartridge is protected from being erased or overwritten (*write protected*). You can use a ballpoint pen or similar instrument to set the write-protect switch.
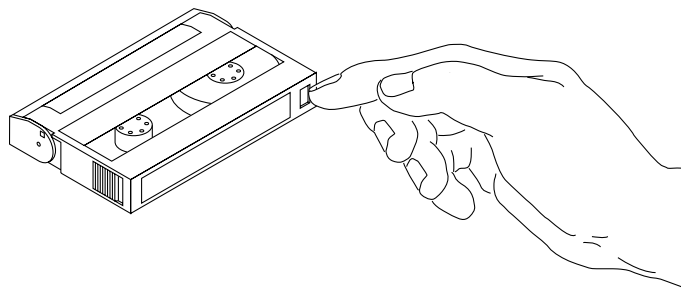
Figure 2-4   Setting the Write-Protect Switch

To Write Protect a Cartridge

♦ **Move the write-protect switch away from the edge of the tape cartridge, as shown in Figure 2-4.**
If the red tab is visible, the cartridge is write protected.

To Write Enable a Cartridge

♦ **Move the write-protect switch toward the edge of the tape cartridge.**
If the red tab is *not* visible, the cartridge is write enabled.

Bar Code Labels

If your tape library is equipped with a bar code scanner, you can use bar code labels on your 8mm cartridges. To affix bar code labels, center the label within the area on the edge of the cartridge, as shown in Figure 2-5.
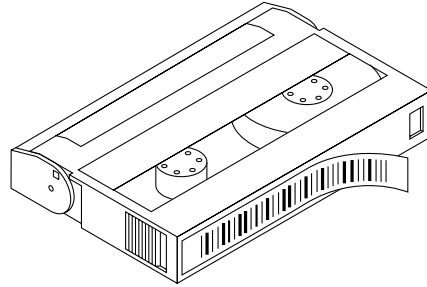
Figure 2-5   Placing Bar Code Labels

Tape Cartridge Placement in the Removable Holder

To place the tape cartridges in the removable cartridge holder:

1. **Make sure the write-protect switch is write-enabled (switch is to the right) on the tape cartridges.**

2. **Using the holder's single mounting guide for orientation, insert a cartridge into the holder, as shown in Figure 2-6.**
   Very little force is needed to install a cartridge into the cartridge holder. If the cartridge does not snap into place easily, check the orientation of the cartridge.

The holder can contain up to ten cartridges.

Caution – Only use a holder designed for 8mm tape cartridges.
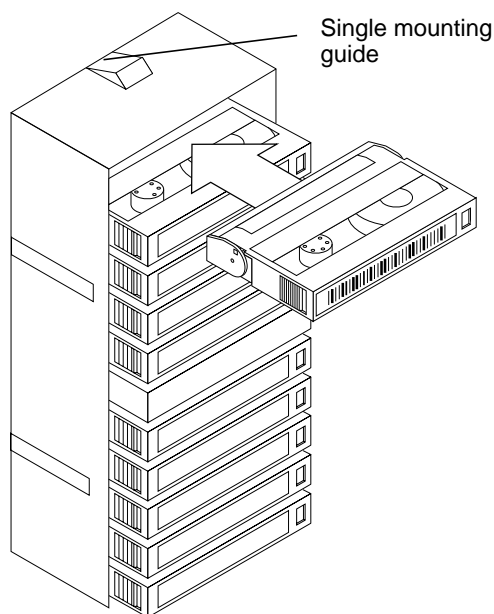
Figure 2-6   Inserting a Tape Cartridge

Removable Cartridge Holder

To install the removable cartridge holder:

1. **Locate the roller on the top end of the holder's mounting plate on the interior back wall of the tape library.**
   See Figure 2-7.

2. **Position the cartridge holder near the mounting plate so that the single mounting guide on the top of the holder is oriented upwards.**

3. **Place the holder's two mounting guides on its bottom end into the matching holes in the bottom of the mounting plate.**

4. **Snap the cartridge holder into place by pressing against the top of the holder.**
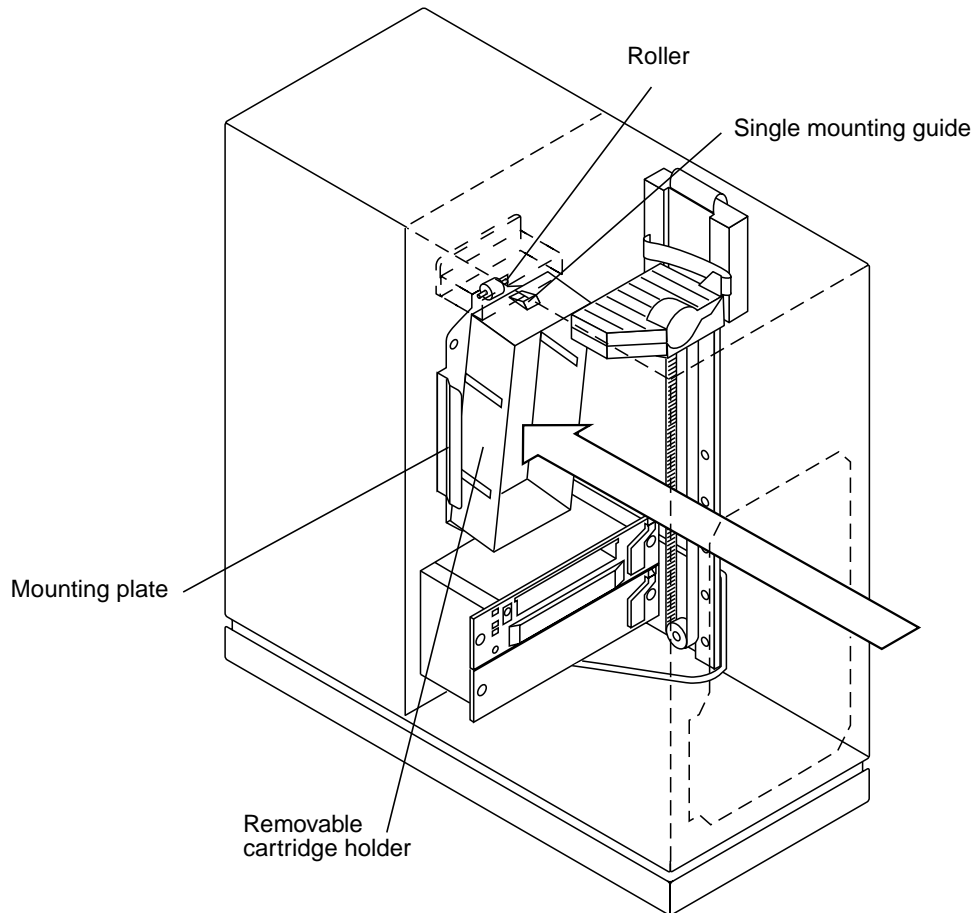
Figure 2-7 Installing the Removable Cartridge Holder

Cartridge in a Fixed Holder

Note – The 8mm cleaning tape cartridge contains a shed-free fabric tape that traps and removes debris from the tape drive heads and tape paths. Its regular use helps maintain data integrity and improves the reliability of the tape drive.

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Caution – Never use video cleaning cartridges as they may damage the tape drives.

To place another tape or a cleaning cartridge into the fixed cartridge holder.

♦ **Insert the cartridge into the fixed cartridge holder until it snaps into place.**
   See Figure 2-8. Close the door and lock it by turning the key counterclockwise 90 degrees.

Fixed cartridge holder

Removable cartridge holder
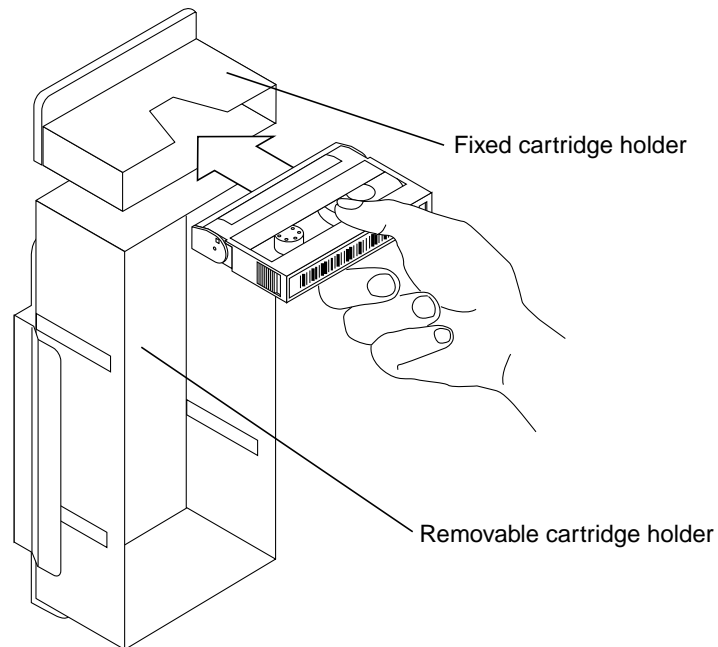
Figure 2-8   Inserting a Cartridge in the Fixed Holder

Connecting the Tape Library

The following procedures explain how to install a tape library in a direct connection to a desktop system, and how to install a tape library in a daisy chain connection with other external peripherals and a desktop system.

Note – The tape library only uses single-ended SCSI cables and not the differential SCSI cables commonly used with disk drives.

There are four SCSI ports on the back panel of the tape library. Use these connectors to enable multiple devices to be connected in a series for daisy chained configurations.

If the tape library is not the last physical device on the SCSI bus, plug a SCSI cable into each connector. If the tape library is the last physical device on the SCSI bus, plug a SCSI cable into one of the connectors and the appropriate SCSI external terminator into the other connector.

If you are connecting the tape library to a single SCSI bus, you must install the SCSI bus jumper block into the middle two connectors. If you are installing the tape library on two SCSI buses, the SCSI bus jumper block is not needed.

Dual SCSI Busses

In the tape library, you can separate the internal SCSI bus into two busses. One drive and the robotic arm are on one bus, the second drive is on the other bus.

You can put the entire unit on one bus by installing the provided jumper block across the middle SCSI connectors on the tape library rear panel.

For most installations, the single bus is preferred. Other than some fault tolerance there is no significant advantage to the dual bus configuration. There is no throughput advantage to having the internal drives on two busses except in the extreme case of very non-compressible data when using data compression on the drives. And, with the dual bus configuration, control and access by the applications software can be an issue. You must verify that the your software can support separating the second drive onto a separate SCSI bus or separate host system.

If you configure your tape library for two SCSI busses, you must order and install a second SCSI terminator and a second SCSI cable and a SCSI bus host adapter card if one is not available.

Direct Connection

To install the tape library with a direct connection:

1. **Be sure the power switches are** *off* **(with the O side of the power switch pushed down) on your desktop system and on the tape library.**

2. **Be sure each power cord is plugged into an AC power outlet.**

3. **Connect the SCSI cable to a SCSI port on the back panel of your desktop system and the other end to the tape library.**
   If you need to disconnect a SCSI cable, press in on the clips on the sides of the connector and pull the connector out of the SCSI port.

Note – If the system you are connecting to the tape library does not have an available SCSI port, you must install the appropriate SCSI host adaptor into the system and connect the SCSI cable to the host adaptor. Refer to the manual that came with the host adaptor for installation instructions.

4. **Install the SCSI bus jumper block to the middle two SCSI ports on the back panel of the tape library.**
   See Figure 2-9 for a close-up of the jumper block.
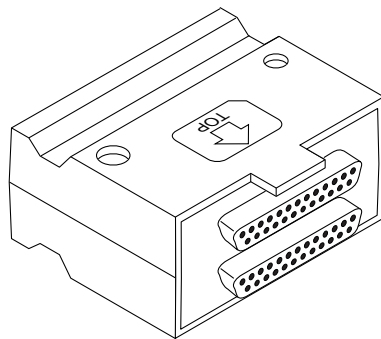
Figure 2-9   SCSI Bus Jumper Block

5. **Install the SCSI regulated terminator if the tape library is the last unit of your configuration.**

6. **Connect the three-hole end of the power cord to the power receptacle on the rear panel of the tape library, then connect the three-prong end of the power cord to the nearest power source outlet.**

7. **Power on your system in the following manner:**
   See "Powering On the Tape Library" on page 22.

   a. **Power on the tape library.**

   b. **Power on the desktop system.**

   c. **Power on the monitor.**

Daisy Chain Connection

To create a daisy chain with one or more tape libraries and other SCSI devices, perform the following procedure. Be sure that each device on the SCSI bus has a different target address before you finish.

1. **Be sure the power switches are** *off* **(with the O side of the power switch pushed down) on your desktop system and all of the peripherals connected to it.**
Be sure each power cord is plugged into a separate AC power outlet.

2. **Connect the SCSI cable to a SCSI port on the back panel of your desktop system.**
If you need to disconnect a SCSI cable, press in on the clips on the sides of the connector and pull the connector out of the SCSI port.

Note – If the system you are connecting to the tape library does not have an available SCSI port, you must install the appropriate SCSI host adaptor into the system and connect the SCSI cable to the host adaptor. Refer to the manual that came with the host adaptor for installation instructions.

3. **Connect the other end of the SCSI cable to one of single SCSI ports on the back panel of the tape library.**

4. **Connect one end of another SCSI cable to the other single SCSI port on the back panel of the tape library.**

5. **Connect the other end of the SCSI cable to the SCSI port on the back panel of the next peripheral unit in the stack.**
Repeat this step until you reach the last SCSI device.

6. **Install the SCSI bus jumper block to the middle two SCSI ports on the back panel of the tape library.**
   See Figure 2-9 for a close-up of the jumper block..

7. **Connect the power cords of the desktop system and all of the peripherals to separate power outlets.**

Caution – Sun products have been designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electric shock, do not plug Sun products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

8. **Turn the power switches** *on* **(push down on the | symbol on each power switch) in the following order:**
   See page 22.

   a. **The tape library**

   b. **Devices in the middle of the daisy chain**

   c. **Devices directly connected to the desktop system**

   d. **The monitor**

Note – Failure to turn power *on* in the sequence described above may result in the system unit not recognizing the tape library.

Powering On the Tape Library

This section describes how to power on the tape library. The power switch and connector for the power cord are located on the back panel of the tape library, as shown in Figure 2-10.
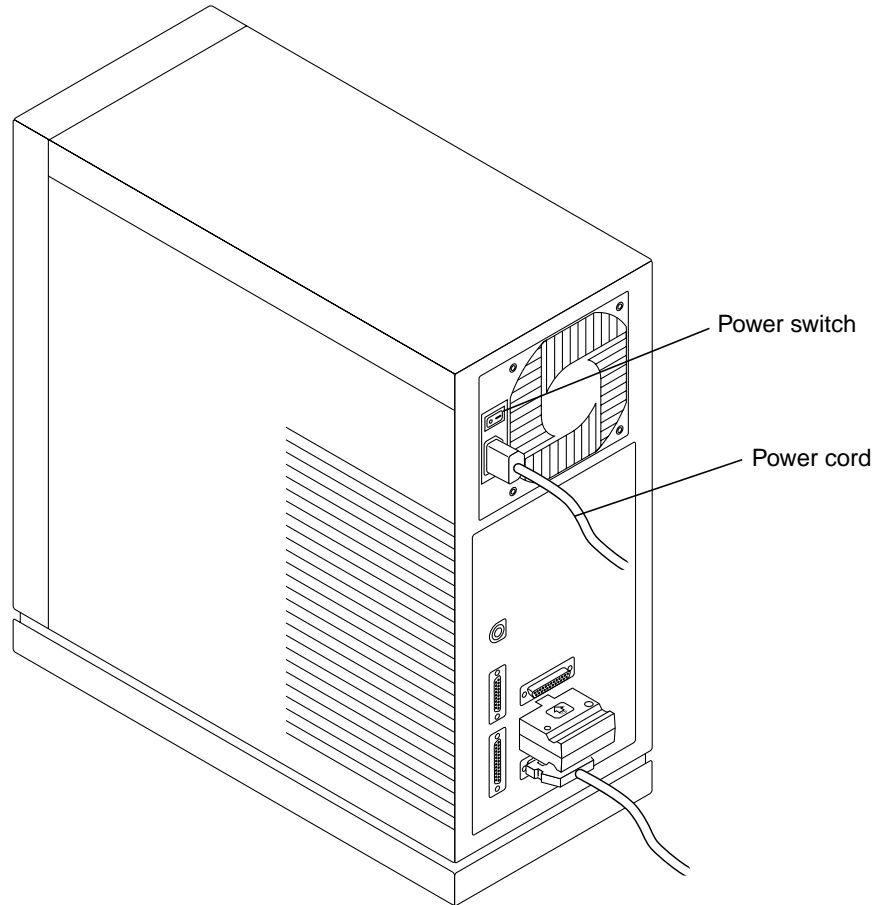
Figure 2-10 SPARCstorage Library Back Panel

Note – Power cords are supplied with the tape library for 120-volt use in the United States and Canada.

With the power switch in the off (0) position, the power cord attached to the wall outlet, and the door closed and locked:

♦ **Press the power switch to the on position.**
See Figure 2-10.

When you power on the tape library, the following events occur:

- The cooling fan begins to rotate.
- The Main Screen appears on the LCD.
- The tape drives perform their initiation tests.
- The tape library performs a 40-second, initiation test.

During this test, the tape library first engages the locking solenoid in the front door, then the CHM does the following tests:

- Verifies its full range of motion by moving along the long axis.
- Verifies the presence of the cartridge holder by touching it.
- Reseats all cartridges by touching each of them.
- Moves to the park position.

Note – The tape library has autoranging voltage selection, so you do not need to change the voltage setting.

If the tape library does not power on as described, check the following:

- If the LCD is not illuminated:
  - Is the power switch in the on position?
  - Is the power cord inserted correctly?
  - Is the fuse good?

- If the LCD is illuminated:
  - Is there an error message or error code on the LCD?
  - Is the door closed and locked?

Setting SCSI IDs

The tape library is configured with default SCSI IDs for the CHM and for each tape drive. This section describes how to view the default settings and change them, if necessary. SCSI IDs can be viewed and changed from the Operator Panel, shown in Figure 3-1.

Note – Use `probe-scsi-all` at the `ok` prompt to determine the SCSI IDs that are currently set.

You can use the Configuration Menu to change the SCSI IDs of the tape library (LIB) and the cartridge tape subsystems (CTSs). Each device (the library and the two CTSs) must have separate SCSI IDs. If the tape library contains only one drive, the SCSI ID for the blank drive displays a "B" for blank.

Table 2-1 shows the default SCSI IDs for the SPARCstorage Library, the tape drives, and the host.

Table 2-1   Default SCSI IDs for the SPARCstorage Library, the Tape Drives, and the Host

Device/Unit	SCSI ID	Description
SPARCstorage Library	2	Includes the cartridge handling mechanism (CHM), the removable cartridge holder, and the fixed cartridge slot.
Tape drive (first)	4	The top 14 Gbyte 8 mm tape drive.
Tape drive (second)	5	The bottom 14 Gbyte 8 mm tape drive
Computer system (host) or SCSI host adapter SBus card	7	Allows the host to act as the initiator of commands on the SCSI bus.

Under the Solaris 2.x software environment, you can set the SCSI IDs of the tape drives and of the tape library to any SCSI ID available from 0 to 6. SCSI IDs 4 and 5 are most commonly used for tape drives. SCSI ID 7 is reserved for the host or the SCSI host adaptor card.

Caution – The tape library and each installed tape drive must have an unique SCSI ID.

To view or change the SCSI IDs, perform the following procedures:

1. **Locate the LCD and keypad on the front panel.**
   See Figure 3-1.

2. **Press Escape until the Primary Menu is displayed.**
   See Chapter 4.

3. **Select the Configuration Menu by pressing ↑ or ↓, then pressing Enter.**

4. **Select Set SCSI IDs by pressing ↑ or ↓, then pressing Enter.**

5. **Set the SCSI IDs for Drive 1 (the top tape drive), Drive 2 (the bottom tape drive), and the tape library (LIB).**
   - Press either ↑ or ↓ to increase or decrease the SCSI ID value.
   - Press ← or → to select a drive or the tape library.
   - Press Enter to make the selection active, or Escape to not change anything.

Operating the SPARCstorage Library   *3*≣

This chapter describes how to use your SPARCstorage Library. The basic operations of the tape library include:

- Understanding the Operator Panel
- Using the Control Modes
- Stopping/Restarting the Tape Library's operation
- Resetting the Tape Library
- Security Options for the Tape Library
- Testing the Drives and the Tape Library
- Media Movement Control Methods
  - Sequential
  - Random Access Mode
  - Manual Modes
- How to Setup Solstice Backup

Understanding the Operator Panel

The tape library's Operator Panel includes a four-line LCD screen and a keypad. You can tilt the LCD for better visibility.

The Main Screen

By default, when you turn on the power, the tape library's Main Screen displays:

- First line - name of the product (programmable)

- Second line - firmware version and current time
- Third and fourth lines - status of tape library's operation

If you want to change the default display, use the MODE SELECT command and modify the LCD Display Mode page. For more information on changing the default display, see Chapter 4.
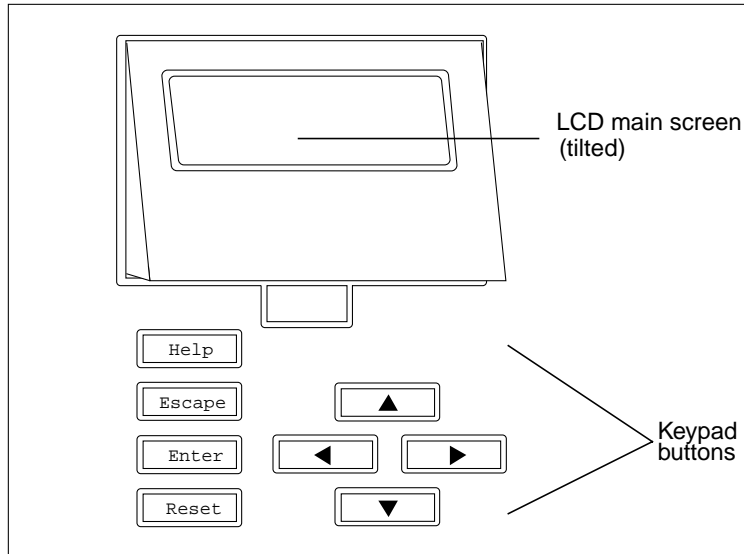
Figure 3-1   Operator Panel

Keypad Buttons on the Operator Panel

↑	Scrolls up
↓	Scrolls down
→	Scrolls right
←	Scrolls left
Help	Goes to the Help screen
Escape	No action
Enter	Selects the item next to the arrow
Reset	Goes to the reset screen

Using the Operator Panel

The Operator Panel enables you to do the following:

- Monitor CHM functions, including cartridge movement and placement while the tape library is operating in SCSI mode

- Access a menu of operations for performing such tasks as setting the CHM control mode and performing setup operations

- Enable or disable LCD password security

- Set SCSI IDs for the tape library and the two tape drives

- View error messages for the tape library

- Reset the tape library

Monitoring CHM Functions

The two bottom lines on the Main Screen of the LCD show an operational status of the tape library. These status messages describe the CHM's movements and placement procedures.

Accessing Menu Options

The Main Menu of the LCD includes 12 menu options.

To access the Main Menu:

♦ **Press Escape repeatedly from any other menu until this screen appears.**

To see the other menu options:

♦ **Scroll down by pressing ↓ and scroll up by pressing ↑.**

To select an option:

♦ **Press Enter.**

Enabling and Disabling LCD Password Security

Using the LCD password security feature, you can prevent a user from inadvertently changing settings or interrupting library operations. When security is enabled, you cannot:

- Change the control mode
- Change SCSI IDs
- Change the SCSI parity checking
- Perform LCD diagnostics
- Use the LCD options for cleaning the CTSs
- Open the front door

If a user attempts to perform any of these operations while security is enabled, the LCD displays a message stating that security is active.

Security remains in effect even after you reset the tape library, or power the tape library off and back on. You can disable security by entering your password in the Security submenu.

Viewing Errors

If an error occurs, the tape library displays an error message on the bottom two lines of the LCD. The upper line includes the error number, and the lower line gives a brief description. Refer to Appendix C for error code descriptions.

Using the Control Modes

The tape library's *cartridge handling mechanism* (CHM) can operate in the control modes listed below. To switch between these modes, use the Operator Panel.

- SCSI Interface mode
- Sequential 1 mode and Sequential 2 mode
- Dual Sequential mode
- LCD Interface mode
- 25-Pin or 9-Pin Serial Port mode (not supported)

SCSI Interface Mode

With the SCSI Interface mode, CHM motion is controlled by a SCSI driver that allows the CHM to retrieve and replace cartridges as specified by the host through the SCSI-2 command set.

Note – When you switch the tape library from SCSI Interface mode to another mode, CHM operations are temporarily halted. However, tape drive operations can still continue.

Sequential 1 Mode and Sequential 2 Mode

When the tape library is operating in the Sequential 1 mode, the CHM picks cartridges from the removable cartridge holder sequentially and places them in Drive 1 for processing. When the tape library is operating in the Sequential 2 mode, the CHM places cartridges in Drive 2 for processing.

Dual Sequential Mode

For tape libraries with two tape drives, dual sequential allows you to use the top five tape cartridges in the removable cartridge holder in Drive 1 and the bottom five tape cartridges in Drive 2.

LCD Interface Mode

When the tape library is operating in LCD Interface mode, the user can instruct it to perform CHM motion commands, such as picking and placing cartridges, and performing diagnostics, from the Operator Panel without communicating across a SCSI bus.

You do not have to operate the tape library in LCD Interface mode to use most of the features available through the LCD. For example, you can use the LCD to check system statistics when it is operating in any of the control modes.

Note – LCD Interface mode is required only when you want to control the motions of the CHM through the Operator Panel.

Changing the Control Mode

1. **If you have not already done so, power on the tape library.**

2. **Press Escape on the Operator Panel to display the Main Menu.**

3. **Select the Interface Menu.**

4. **From the Interface Menu, press Enter to select the Control Mode Menu.**
   An asterisk next to a selection indicates the current active mode.

5. **Using ↓ and ↑ on the Operator Panel, scroll through the choices until the arrow is next to the mode you want.**
   Scroll down to view the other options.

6. **Press Enter to select the mode.**

7. **When the system status message at the bottom of the display indicates that the change is complete, press Escape to return to the Control Mode Menu.**

Interrupting the Tape Library's Operation

You can temporarily stop the tape library's operation without turning off power and without disturbing the cartridge processing order to:

- Remove and replace individual cartridges
- Remove and replace the cartridge holder

To stop the tape library's operation:

1. **Turn the key in the door lock to unlock it.**
   When the CHM finishes the current operation and moves to the park position, the door's interlock mechanism will release the door.

2. **Open the front door.**
   When you stop the tape library's operation:

   - The CHM moves to the park position and stops.
   - Current to all of the motors is turned off.
   - A Not Ready status is returned to the host.

3. **Remove or replace a cartridge or the removable cartridge holder.**
   See Chapter 2.

Resuming the Tape Library's Operation

1. **Close the tape library's door.**

2. **Turn the key counterclock wise in the door lock to lock it.**
   After the door is closed, Unit Attention status is returned to the host. The tape library then performs its initiation procedure.

Note – You will get a Status: error 91 operator abort message.

Resetting the Tape Library

Reset the tape library after you have finished correcting a hardware error. Hardware errors can include problems in picking and placing a cartridge, or difficulties in moving the CHM. When a hardware error occurs, a message appears on the LCD describing the error.

To reset the tape library:

♦ **Press Reset, then Enter on the Operator Panel.**
A reset causes the tape library and the drives to perform their initiation tests. After the tape library is reset, the Main Screen appears on the LCD.

To continue a reset:

♦ **Press Enter.**

To cancel a reset:

♦ **Press Escape.**

⚠ **Caution** – Never press Reset while a tape cartridge is in a tape drive. If this should happen, manually eject the cartridge.

Security Options for the Tape Library

The SPARCstorage Library features a security option that prevents users from inadvertently changing important settings and operations. When security is enabled, access to the following LCD activities is prevented:

- Changing the control mode
- Changing the SCSI IDs
- Changing the library serial number
- Changing SCSI parity checking
- Using the Diagnostics Menu and the Demo Menu
- Using the Clean Drives Menu
- Opening the front door (LCD security only)
- Communicating with a tape drive across a serial port

If a user attempts to perform any of the above operations when security is enabled, the Main Screen displays a message that states security is active. The message also states whether security was enabled through the LCD or SCSI.

Note – Security remains in effect even after you reset the tape library.

Enabling or Disabling Security

1. **Select the Configuration Menu by pressing ↓ or ↑, then Enter.**

2. **Select Set Security On/Off (depending whether security is already on or off) by pressing ↓ or ↑, then Enter.**

3. **Select a three digit password.**
   To disable security, enter the same password used to turn security on.

   a. **Move from column to column by pressing ← or →.**

   b. **Change the password (default password is 000) by pressing ↑ or ↓.**

   c. **Press Enter to make the password active.**

Note – If you forgot the password, try entering the default password - 000.

Tape Drive LEDs

The two tape drives in the tape library use three LEDs to indicate diagnostic and operating states (see Table 3-1.)

Table 3-1   Tape Drive LED Description

Mode	LED Indicators			Status
	Amber (Top/right)	Green/ Amber (Middle)	Green (Bottom /left)	
Diagnostic	Warnings	Access/ Compression	Activity	
	On	Off	On	Self-test in progress; no tape in drive
	Off	Off	Off	Self-test successful; no tape in drive
	Off	Off	Slow/Fast	Self-test in progress; tape in drive
	Off	Off	On	Self-test successful; tape in drive
	Fast[*]	Off	Off	Hardware error or detection failure
Operation				
Normal Operation	Off	Off	Off	No tape loaded
	Off	Off	On	Tape loaded, drive ready
	Off	Blinking[#]	Slow[†]	SCSI or tape activity
	Off	Blinking or Off	Fast	High-speed tape motion
Errors/Warnings	Slow	Off	Off	Error
Unload Operation	Fast	Off	Slow	Unload in progress
	Off	Off	Off	Tape ejection; followed by self-test cycle and a no tape loaded status
Cleaning Operation	Slow	Off	Slow	Time to clean
	Off/Fast	Off	Slow	Cleaning in progress

† A slow flash is approximately one flash per second.
* A fast flash is approximately four flashes per second.
# The blinking rate depends on the SCSI activity.
NOTE: When the middle LED is *green*, the drive is in a uncompressed mode. When it is *amber*, the drive is in a compressed mode.

Testing

The following tests check the operation of the overall tape library, the disk drives, and the cartridge handling mechanism. For more information on running the tape library diagnostics from the Operator Panel, see Chaptor 4.

Testing the Tape Library

1. **Load tapes into the magazine and close the door.**

2. **Use the front panel controls to select one of the sequential modes**

3. **Use the front panel controls to select Restart On.**

4. **Run Sundiag or SunVTS (whichever came with your operating system). Choose the "Library" option.**

Caution – Do not run more than 200 passes or tape damage due to overuse may occur.

Testing the Internal Tape Drives

1. **Press the eject button on the drive carrier faceplate, if you need to manually eject a cartridge from the top tape drive.**

2. **Insert a non-vital tape cartridge into the top tape drive.**
   Make sure the cartridge is not write-protected.

3. **Close and lock the door.**
   The tape drive loads the tape and positions it at the logical beginning of tape (LBOT) in about 35 seconds. All three LEDs will be off for the first eight seconds, then the bottom LED will flash. When the bottom LED stays lit, the drive is ready.If the top amber LED remains on or flashing, an error has occurred.

4. **Run Sundiag or SunVTS (whichever came with your operating system). Choose the "Tape" option.**

Caution – Do not run more than 200 passes or tape damage due to overuse may occur.

Testing the Cartridge Handling Mechanism

To test the robotic CHM, run the Slot Demo function from the tape library Operator Panel. No host interaction is required for this test. Make sure there is at least one tape cartridge in the tape library.

1. **Disable security, if enabled.**

2. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

3. **Insert a tape magazine with at least one empty slot into the tape library.**

4. **Select Demo Menu by pressing ↓ or ↑, then Enter.**

5. **Select Slot Demo by pressing ↓ or ↑, then Enter.**
   The system begins the demo and displays this screen:

```
SLOT DEMO:
 Total Cycles: N
 Status: Move NN – NN
Moving to Slot N
```

Where:

N	Indicates the number of cycles that have run so far.
NN- NN	Indicates the source and destination element indexes of the current move.

To stop the demo, press `Escape` and `Enter`.

Media Movement Control Methods

The library offers four methods to move media inside the unit.

Sequential mode offers the functionality of moving from one tape cartridge to the next cartridge in a serial fashion. Sequential mode is supported with the standard utilities offered in the Solaris environment.

Random access mode allows you to select any of the tapes in the magazine in any order. Random access mode requires the use of a specialized applications package such as the Solstice Backup product.

There are two manual methods as well.

Sequential Mode

Sequential mode allows the tape cartridges to be accessed serially. This is the most advanced mode supported by the Sun operating system without use of Networker/Solstice Backup or similar application. When a tape is ejected from the drive the next tape in the magazine is placed in the drive. In a two drive library, one half of the tapes in the magazine are used in one drive and one half in the other drive. This effectively creates a unit that appears like one very long tape. This is useful for simple backup and restore operations such as ufsdump.

1. **To automatically load the first tape into the drive, use the Operator Panel to select the Restart option.**
   Restart 1 loads the tape into the first drive. Restart 2 loads into the second drive.

2. **To enable the unit to move to the next tape after ejecting a tape, use the Operator Panel to select one of the sequential modes.**
   • Sequential 1 for the first drive.
   • Sequential 2 for second drive.
   • Dual Sequential for use of two drives simultaneously. One half the magazine is used with the first drive; the second half is used with the second drive.

3. **To enable the unit to eject a tape from the drive, use :**
   • `mt -f /dev/rmt/x offline` [replace 'x' with the drive number] or
   • use the `l` flag with `ufsdump`.

   Access to the on-line man(ual) page is via `man ufsdump`.

4. **To load the first tape after ejecting the last, use the front panel controls to select the Loop option.**
   There is both a loop 1 for the first drive and a loop 2 for the second drive.

Random Access Mode

The random access method allows access to any tape in the library. Sun does not provide a driver in the standard OS to provide this functionality. A random access driver and a full backup application utility is offered in the Solstice Backup program. This is a version of the the Legato Networker utility. This

multi-function utility provides various capabilities, including backup operations while the system is running. It does not require the system to be shut down like some other utilities.

Manual Modes

The third method is to place the tapes manually into an internal drive using commands from the front panel.

1. **Select the LCD interface mode.**

2. **Select Maintenance Menu, press enter.**

3. **Scroll to Diagnostics, press enter.**

4. **Scroll to Position to Element, press enter.**

5. **Select a number, press enter.**
   Cartridge slot numbers are 1 through 10.

6. **Scroll to Move Cartridge.**
   Drive numbers are 82 and 83.

The fourth method is the manual mode. The manual method involves opening the front door of the unit and placing tapes directly into the internal drives by hand. This is recommended in the event of a failure of the robotic unit.

How to Setup Solstice Backup

The options of Solstice Backup (formerly Networker) are fairly complicated. To run this library effectively you need the Turbo version of Solstice and a jukebox module and enabler. Consult your sales representative for the complete list of the options.

The tape library offered by Sun is based on the Exabyte EXB-210 product. Select the "EXB-210" device in the Solstice Backup device menu.

The software allows use of either a software or hardware data compression scheme. You should never use the two compression methods at the same time. If you use the Networker software command you must specify non-data compression format to the drive (`/dev/rmt/0l` or `0m`). Alternately, you can not use the Networker data compression and specify the drive's data

compression mode (`/dev/rmt/0h`). One disadvantage of this approach is the data format on the tape is not readable by the earlier 8500 or 8200 drives because they do not incorporate data compression.

≡ *3*

SPARCstorage Library Menu Functions 4≡

Note – In this section, there are several references to the "long axis". The long axis in the Tower unit is the vertical axis, the long axis in the Table Top unit is the horizontal axis.

Primary Menu

The SPARCstorage Library has a primary menu on the display panel from which you can access several menus. The menus you can choose are displayed by the LCD as follows:

```
 Main Screen
 Interface Menu
 Configuration Menu
 Maintenance Menu
 Library Info Menu
```

To access the Primary Menu:

♦ **Press Escape until the Primary Menu is displayed.**
   See Figure 4-1.

Main Screen	Interface Menu	Configuration Menu	Maintenance Menu	Library Information Menu
Displays main screen	**Control Mode Menu** LCD interface SCSI interface Sequential 1 Sequential 2 Dual Sequential 25-pin 9-pin 4-pin **Configure 25-pin Port Menu** (Not supported) **Configure 9-pin Port Menu** (Not supported) **Configure 4-pin Port Menu** (Not supported)	**Set SCSI IDs** **Set Parity On/Off** **Sequential Options** Restart 1 Restart 2 Loop 1 Loop 2 **Adjust Contrast** **Backlight On/Off** **Set Date** **Set Time** **Set Security On/Off** **Set Serial Number**	**Clean drive Menu** Clean drive 1 Clean drive 2 **Demo Menu** Slot Demo Drive Demo **Diagnostics Menu** Self Test Position to Element Park Move Cartridge Scan Scan With Range Home Gripper Home CHM Cycle Pick/Place Cycle Gripper Cycle S Axis Cycle L Axis Cycle Solenoid	**SCSI Menu** SCSI Mode Params SCSI Reservations SCSI Sense Data **Statistics** **System Sensors** **Command History** **Drive Info Menu** Drive 1 Status Drive 2 Status **Inventory Menu** Label Info Occupied Info Position Info

Figure 4-1   Primary Menu

When the Primary Menu is displayed, use the keys on the keypad to perform the following functions.

↑	Scrolls up, often increases a value.
↓	Scrolls down, often decreases a value.
→	Scrolls right.
←	Scrolls left.
Help	Goes to the Help screen.
Escape	Goes forward/backward through menus.
Enter	Selects the item next to the arrow.
Reset	Goes to the reset screen.

Interface Menu

The Interface Menu allows you to put the tape library into various modes from which you can control the tape library.

The Interface Menu consists of the following submenus:

- Control mode
- Configure 25-Pin Port (not supported)
- Configure 9-Pin Port (not supported)
- Configure 4-Pin Port (not supported)

Control Mode

The Control Mode Menu determines what controls the motions of the CHM. The SPARCstorage Library must be in one of the three sequential modes in order to use the SunDiag™ system exerciser. The tape library has the following control modes:

- LCD Interface
- SCSI Interface
- Sequential 1
- Sequential 2
- Dual Sequential
- 25-Pin Serial Port (not supported)
- 9-Pin Serial Port   (not supported)
- 4-Pin Serial Port   (not supported)

Use ↑ to scroll up through the control mode functions and ↓ to scroll down.

LCD Interface

LCD Interface Mode is required when you want to control the motions of the CHM though the display panel. For example, diagnostics can be performed that test individual motions, such as picking and placing cartridges from specific locations.

Note – You must be in LCD interface mode to run certain tests in the Maintenance Menu.

---

1. **Disable security.**

2. **Select the Interface Menu by pressing ↓ or ↑, then Enter.**

3. **Select the Control Mode Menu by pressing ↓ or ↑, then Enter.**

4. **Select LCD Interface mode by pressing ↓ or ↑, then Enter.**

You can now execute commands in the the Maintenance Menu.

SCSI Interface Mode

In the SCSI Interface mode, the host computer system issues SCSI commands to the tape library to specify how cartridges are loaded and unloaded from the removable cartridge holder and to access the tape drives.

To get the tape library to SCSI Interface mode:

1. **Disable security.**

2. **Select the Interface Menu by pressing ↓ or ↑, then Enter.**

3. **Select the Control Mode Menu by pressing ↓ or ↑, then Enter.**

4. **Select SCSI Interface by pressing ↓ or ↑, then Enter.**

Sequential 1, Sequential 2, or Dual Sequential Modes

Set the tape library to Sequential 1, Sequential 2, or Dual Sequential mode in order to run the SunDiag system exerciser. If only one tape drive is installed, only `Sequential 1` mode is displayed.

1. **Check to see if there are any tapes in the tape drives by checking if the bottom LED is steadily flashing or on steadily.**
   If there are tapes in the tape drives, you must remove them.

   If the bottom LED is flashing:

   a. **Open the door.**

   b. **Push the square-shaped Eject button to the right of the LEDs on the tape drive.**
   The tape unloads from the tape drive. The tape library ignores the fixed slot in all sequential modes.

   c. **Close the door.**

   The following chart explains what each sequential mode does.

Sequential 1	CHM picks cartridges from the holder sequentially and processes them in Drive 1 (the top drive)
Sequential 2	CHM picks cartridges from the holder sequentially and processes them in Drive 2 (the bottom drive)
Dual Sequential	CHM picks the top five cartridges for Drive 1 and the bottom five cartridges for Drive 2.

2. **Press Escape until the Primary Menu is displayed.**

3. **Select the Interface Menu by pressing ↓ or ↑, then Enter.**

4. **Select the Control Mode Menu by pressing ↓ or ↑, then Enter.**

5. **Select Sequential 1, Sequential 2, or Dual Sequential mode by pressing ↓ or ↑, then Enter.**

The tape library performs the following actions when processing a cartridge:

1. Picks the first cartridge from the cartridge holder (the top cartridge). If the CHM encounters an empty cartridge slot, it moves to the next cartridge in the holder and picks it.

2. Places the cartridge in CTS 1 or CTS 2 (depending on the mode) and waits until the CTS ejects the cartridge.

3. Retrieves the cartridge from the CTS and returns it to its original slot in the holder.

4. Repeats the process with the next cartridge.

Running the SunDiag System Exerciser

See the *SunDiag User's Guide* for instructions on how to use SunDiag.

1. **Select the Interface Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Control Mode Menu by pressing ↓ or ↑, then Enter.**

3. **Select Sequential CTS1, Sequential CTS2, or Dual Sequential (for two drive models) mode by pressing ↓ or ↑, then Enter.**

   a. **Set the Restart option to ON by pressing ← or →.**

   b. **Set the Loop option to ON by pressing ← or →.**

4. **Open and close the tape library.**
   This action causes the tape library to inventory cartridge locations and place a tape cartridge in each tape drive.

5. **Press Escape until you get to the Primary Menu.**

6. **Select the Main Screen by pressing** `Enter`**.**
   Leave the tape library in Main Screen mode for normal operation.

7. **Start the SunDiag system exerciser.**

25-Pin, 9-Pin, and 4-Pin Serial Port Modes

The 25-pin, 9-pin and 4-pin serial port modes are not supported on Sun systems.

Configuration Menu

The Configuration Menu consists of the following submenus:

- Set SCSI IDs
- Set SCSI parity checking
- Sequential options
- Adjust contrast
- Backlight
- Set date
- Set time
- Set security
- Set serial number

Set SCSI IDs

See Chapter 2, "Installing a SPARCstorage Library," for a description of this menu function.

Set SCSI Parity Checking

Use the SCSI parity option to turn parity checking on the SCSI bus *on* or *off*. When parity is on (default), the tape library checks all data coming across the SCSI bus for parity. When you change SCSI parity, it changes both the current and the saved Mode Select parity parameters to the new value.

To set parity checking:

1. **Select the** Configuration Menu **by pressing ↓ or ↑, then Enter.**

2. **Select SCSI Parity by pressing ↓ or ↑.**

3. **Turn parity checking on or off by pressing → to turn parity checking ON or ← to turn parity checking OFF.**

Sequential Options

With the Sequential Options, you can perform the following actions to control how the cartridges are processed.

Restart option	Determines whether the tape library restarts at the first cartridge or restarts where it left off after a power-on or reset.
On	Starts at the first cartridge
Off	Restarts operation where it left off.
Loop option	Determines if the tape library should stop after processing all of the cartridges in the holder or loop back to the first cartridge and continue processing.
On	Loops back to the first cartridge.
Off	Stops processing cartridges after processing the last cartridge.

Note – The loop and restart options are application specific.

Restart Option

1. **Select the Configuration Menu by pressing ↓ or ↑, then Enter.**

2. **Select Sequential Options by pressing ↓ or ↑, then Enter.**
   The following screen is displayed.

```
→ Loop:              OFF  →
   Restart:          ON
   Loop2:            OFF
   Restart2:         ON
```

3. **Select Restart for tape drive 1 or Restart2 for tape drive 2 by pressing ↑ or ↓.**

4. **Set Restart on or off by pressing ← or →.**

Loop Option

1. **Select the Configuration Menu by pressing ↓ or ↑, then Enter.**

2. **Select Sequential Options by pressing ↓ or ↑, then Enter.**
   The following screen is displayed.

```
→ Loop:                    OFF →
   Restart:                ON
   Loop2:                  OFF
   Restart2:               ON
```

3. **Select Loop for Drive 1 or Loop2 for Drive 2 by pressing ↑ or ↓.**

4. **Set the Loop option on or off by pressing ← or →.**

Adjust Contrast

1. **Select the Configuration Menu by pressing ↓ or ↑, then Enter.**

2. **Select Adjust Contrast by pressing ↓ or ↑, then Enter.**

3. **Raise the contrast by pressing → or lower the contrast by pressing ←.**

Back Light

The Back Light feature turns the light in back of the display panel on or off.

1. **Select the Configuration Menu by pressing ↓ or ↑, then Enter.**

2. **Select Back Light by pressing ↓ or ↑, then Enter.**

3. **Turn** Back Light **on by pressing → or turn Back Light off by pressing ←.**

Set Date

Use the Set Date screen to set the date shown on the diagnostic listings and the command history screen

1. Select the Configuration Menu by pressing ↓ or ↑, then Enter.

2. Select Set Date by pressing ↓ or ↑, then Enter.

3. Set the date using these keys.

    ↑   Increases the day, month, or year.
    ↓   Decreases the day, month, or year.
    →   Moves to the column on the right.
    ←   Moves to the column on the left.

Set Time

Use the Set Time screen to set the time shown on the Main Screen and the command history screen.

1. Select the Configuration Menu from the Primary Menu by pressing ↓ or ↑, then Enter.

2. Select Set Time by pressing ↓ or ↑, then Enter.

3. Set the time using these keys.

    ↑   Increases the hours, minutes, or seconds.
    ↓   Decreases the hours, minutes, or seconds.
    →   Moves to the column on the right.
    ←   Moves to the column on the left.

Set Security

The security option allows you to prevent a user from inadvertently changing important settings and operations.

Note – Security remains in effect after resetting the tape library.

When security is enabled, a user cannot access the following activities:

- Changing the control mode
- Changing the SCSI IDs
- Changing the library serial number
- Changing SCSI parity checking
- Using the Diagnostics Menu and the Demo Menu
- Using the Clean Drives Menu
- Opening the front door (LCD security only)

If a user attempts to perform any of the these operations when security is enabled, the tape library displays a message stating security is active.

To enable or disable security:

1. **Select the Configuration Menu by pressing ↓ or ↑, then Enter.**

2. **Select Set Security On/Off by pressing ↓ or ↑, then Enter.**

3. **Select a three digit password.**
   To disable security, enter the same password used to turn security on.

   a. **Move from column to column by pressing ← or →.**

   b. **Change the password (default password is `000`) by pressing ↑ or ↓.**

   c. **Press `Enter` to make the password active.**

Note – If you forgot the password, enter the default password, `000`.

Set Serial Number

A label on the back of the unit displays the serial number. To enter the serial number in the tape library firmware, use the Set Serial Number option.

1. **Select the Configuration Menu by pressing ↓ or ↑, then Enter.**

2. **Select Set Serial Number by pressing ↓ or ↑, then Enter.**

3. **Change each digit by pressing ↑ or ↓. Move from column to column by pressing ← or →.**
   The following screen displays:

```
The serial number is
NNNNNN.  Press
ENTER to accept or
ESC to cancel.
```

4. **Press Enter to save the changes or Escape to cancel the changes.**

Maintenance Menu

The Maintenance Menu consists of the following submenus:

- Clean drive menu
- Demo menu
- Diagnostics menu

Clean Drive Menu

To clean the tape drives, see Chapter 5.

Demo Menu

The Demo Menu includes:

Drive Demo — Causes the CHM to move randomly between slots in the removable cartridge holder, the fixed cartridge slot, and the tape drives.

Slot Demo — Causes the CHM to move cartridges randomly between slots in the removable cartridge holder and the fixed cartridge holder.

To run the Drive Demo:

1. **Open the door and make sure there is a tape cartridge and one empty slot in the tape library.**

2. **Disable security, if enabled.**

3. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

4. **Select Demo Menu by pressing ↓ or ↑, then Enter.**

5. **Select Drive Demo by pressing ↓ or ↑, then Enter.**
   The screen displays:

```
Should cartridges
be loaded into
the drives?                    YES→
```

6. Select YES if you want to include the tape drive in the demo. Select NO if you do not want to include the tape drive in the demo.
Use → or ←.

- If you select YES, the CHM pushes the cartridge all the way into the drive.
- If you select NO, the CHM inserts the cartridge into the drive slot, but does not push the cartridge all the way into the drive.

The tape will not automatically eject the cartridge.

7. The system begins the demo and displays this screen:

```
DRIVE DEMO:
 Total Cycles: N
Status: Move NN - NN
```

N	Indicates the number of cycles that have run so far.
NN- NN	Indicates the source and destination element indexes of the current move.

To stop the demo, press Escape and Enter.

Note – If you cannot press the Escape or Reset keys, power cycle the tape library.

To run the Slot Demo:

1. **Disable security, if enabled.**

2. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

3. **Insert a tape cartridge into the tape library.**

4. **Select Demo Menu by pressing ↓ or ↑, then Enter.**

5. **Select Slot Demo by pressing ↓ or ↑, then Enter.**
   The system begins the demo and displays this screen:

```
SLOT DEMO:
 Total Cycles: N
 Status: Move NN – NN
Moving to Slot N
```

Where:

N   Indicates the number of cycles that have run so far.

NN- NN   Indicates the source and destination element indexes of
                           the current move.

To stop the demo, press Escape and Enter.

Diagnostics Menu

The Diagnostics Menu enables you to perform a variety of diagnostic functions. Use ↑ to scroll up or ↓ to scroll down.

Before you perform diagnostics, make certain you know the element indexes for the components you will exercise. See Table 4-1.

Table 4-1   Element Indexes for the Tape Library Parts

Library Part	Element Index
Fixed cartridge slot	0
Cartridge slots	1 to 10*
Tape drive 1	82
Tape drive 2	83
CHM	86

* Starting from the top

The following chart describes the diagnostics available and a brief description of each diagnostic.

Self Test	Performs the following tests: - Moves the gripper to the home position (bottom or left sideof the tape library) - Moves the CHM along the short axis once - Moves the CHM along the long axis once - Moves the CHM to the home position
Position to Elem	Moves the CHM to the tape drive or to one of the cartridge slots. You must specify an element address for the destination.
Park	Moves the CHM to the park position at the top of the tape library).
Move Cartridge	Moves a cartridge from one location to another. You must specify an element address for the source and destination. See Table 4-1.
Scan	Scans all elements .
Scan with Range	Scans a range of elements.
Home Gripper	Moves the gripper to the park position (open).
Home CHM	Moves the CHM to the park position, then to the opposite end of the long axis.
Cycle Pick/Place	Causes the CHM to take a cartridge from a specified slot or CTS and replace it in the same slot. You must specify the source slot (see Table 4-1) and the number of pick/place cycles that the CHM should perform in increments of 10 (up to 250).
Cycle Gripper	Causes the gripper to open and close. You must specify the number of cycles in increments of 10 (up to 250).

Cycle S Axis	Causes the CHM to move end to end along the short axis (the axis where the CHM moves in and out). You must specify the number of cycles the CHM must perform in increments of 10 (up to 250).
Cycle L Axis	Causes the CHM to move end to end along the long axis. You must specify the number of cycles the CHM must perform in increments of 10 (up to 250).
Cycle Solenoid	Cycles the door solenoid, used to lock the front door. You must specify the number of cycles the CHM must perform in increments of 10 (up to 250).

Self Test

The following actions occur during the Self Test diagnostic:

- The gripper fingers of the CHM move to the home position.
- The CHM cycles the long and short axes once, then moves to the home position at the bottom of the long axis.

1. **Select the Maintenance Menu by pressing ↓ or ↑,then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Self Test by pressing ↓ or ↑, then Enter.**

To abort the Self Test diagnostic, press Escape and Enter.

Position to Element Test

This diagnostic positions the CHM in front of a tape drive, cleaning cartridge slot, or a particular slot in the cartridge holder.

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Position to Element by pressing ↓ or ↑, then Enter.**
   The following screen is displayed:

```
Set Destination            0
  ↑ Increase
  ↓ Decrease
                    ↓
```

4. **Select the element address where you want to position the CHM by pressing ↑ or ↓, then Enter.**
   The CHM moves in front of the element index you indicate. The system displays a message similar to the following when the move is complete.

```
POSITION TO 3:

Status:  Complete
                    ↓
```

5. **To run the test again with a different element index, press Escape to return to the Diagnostics Menu, then repeat steps 4 and 5.**

To abort the Position to Element diagnostic, press Escape and Enter.

Park Test

The Park test moves the CHM to the top of the long axis, called the park position.

1. **Select the Maintenance Men**u **by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Park by pressing ↓ or ↑, then Enter.**

To abort this diagnostic, press Escape and Enter.

Move Cartridge Test

The Move Cartridge test picks a cartridge from one element index and moves it to another.

Note – If you insert a tape cartridge into a drive, the drive does not automatically eject the cartridge. The system displays an error message if there is no cartridge in the source element slot or if the destination element slot is full.

---

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Move Cartridge by pressing ↓ or ↑, then Enter.**
   The system displays the following screen:

```
Set Source                    0
   ↑ Increase
   ↓ Decrease
```

4. **Select the element index of the cartridge slot from which you want the CHM to pick the cartridge by pressing ↑ or ↓, then Enter.**
   The system displays the following screen:

```
Set Destination
   ↑ Increase
   ↓ Decrease
```

5. **Select the element index of the cartridge slot from which you want the CHM to place the cartridge by pressing ↑ or ↓, then Enter.**
   The CHM moves the cartridge from the source to the destination.

Scan Test

The Scan test scans all the elementsl. The information is stored in the cartridge inventory. Scan errors and the contents of labels are displayed on the Label Information screen.

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Scan by pressing ↓ or ↑, then Enter.**
   The bar code scanner scans all the elements.

To abort this diagnostic, press Escape and Enter.

Scan With Range Test

The Scan With Range test scans a range of elements and stores the information in the cartridge inventory. Scan errors and the contents of labels are displayed on the Label Information screen.

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Scan With Range by pressing ↓ or ↑, then Enter.**
   The system displays the following screen:

```
Set Scan Start                 0
  ↑ Increase
  ↓ Decrease
```

4. **Select the element index where you want the bar code scanner to begin scanning by pressing ↑ or   ↓, then Enter.**
   The system displays the following screen:

```
Set Scan Stop                  0
  ↑ Increase
  ↓ Decrease
```

5. **Select the element index (shown in the upper right corner) where you want the bar code scanner to end scanning by pressing ↑ or ↓, then Enter.**
    The test scans a range of bar code labels and stores the information in the cartridge inventory.

To abort this diagnostic, press Escape and Enter.

Home Gripper Test

The Home Gripper test closes and opens the gripper on the CHM.

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Home Gripper by pressing ↓ or ↑, then Enter.**
    The gripper on the CHM closes and opens.

To abort this diagnostic, press Escape and Enter.

Home CHM Test

The following actions occur during the Home CHM test:

- CHM moves in and out on the short axis
- CHM moves on the long axis
- Gripper of the CHM closes and opens

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Home CHM by pressing ↓ or ↑, then Enter.**

To abort this diagnostic, press Escape and Enter.

Cycle Pick/Place Test

The Cycle Pick ⁄ Place test picks a cartridge from the element you specify and places it back in the same element. You can specify the number of times you want this test repeated.

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Cycle Pick/Place by pressing ↓ or ↑, then Enter.**
   The system displays the following screen:

```
Set Source                 0
    ↑ Increase
    ↓ Decrease
```

4. **Select the element index of the cartridge slot from which you want the CHM to pick and place the cartridge by pressing ↑ or   ↓, then Enter.**
   The system displays this screen:

```
Set Cycles                10
    ↑ Increase
    ↓ Decrease
```

5. **Select the number of cycles (in increments of ten) you want the Cycle Pick/Place to run by pressing ↑ or ↓, then Enter.**
The test picks a cartridge from the element you specify and places it back in the same element.

To abort this diagnostic, press Escape and Enter.

Cycle Gripper Test

The Cycle Gripper test opens and closes the gripper the number of times you specify.

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing Escape.**

3. **Select Cycle Gripper by pressing ↓ or ↑, then Enter.**
The system displays the following screen:

```
Set Cycles                10
   ↑ Increase
   ↓ Decrease
```

4. **Select the number of cycles (in increments of ten) you want the Cycle Gripper test to run by pressing ↑ or ↓, then Enter.**
The test closes and opens the gripper the number of times you specify.

To abort this diagnostic, press Escape and Enter.

Cycle S Axis Test

The Cycle S Axis test positions the CHM in front of the fixed cartridge slot and moves the CHM back and forth on the short axis the number of times you specify.

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Cycle S Axis by pressing ↓ or ↑, then Enter.**
   The system displays this screen:

```
Set Cycles              10
   ↑ Increase
   ↓ Decrease
```

4. **Select the number of cycles (in increments of ten) you want the Cycle S Axis test to run by pressing ↑ or ↓, then Enter.**
   The test positions the CHM in front of the fixed cartridge slot and moves the CHM back and forth on the short axis the number of times you specify.

To abort this diagnostic, press Escape and Enter.

Cycle L Axis Test

The Cycle L Axis test moves the CHM back and forth on the long axis the number of times you specify.

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Cycle L Axis by pressing ↓ or ↑, then Enter.**
   The system displays this screen:

```
Set Cycles                10
   ↑ Increase
   ↓ Decrease
```

4. **Select the number of cycles (in increments of ten) you want the Cycle L Axis test to run. Press ↑ or ↓, then Enter.**
   The test positions the CHM in front of the fixed cartridge slot and moves the CHM back and forth on the long axis the number of times you specify.

To abort this diagnostic, press Escape and Enter.

Cycle Solenoid Test

The `Cycle Solenoid` test exercises the solenoid that controls the locking mechanism on the front door.

1. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Diagnostics Menu by pressing ↓ or ↑, then Enter.**

3. **Select Cycle Solenoid by pressing ↓ or ↑, then Enter.**
   The system displays the following screen:

```
Set Cycles                  10
   ↑ Increase
   ↓ Decrease
```

4. **Select the number of cycles, in increments of ten, (up to 250) you want the Cycle Solenoid test to run by pressing ↑ or ↓, then Enter.**
   You will hear a clicking sound.

To abort this diagnostic, press Escape and Enter.

Library Information Menu

The Library Information Menu consists of the following submenus:

SCSI Menu	Contains SCSI mode parameters, reservations, and sense data.
Statistics	Contains data about CHM operations and elements.
System Sensors	Contains information about the mechanical sensors.
Command History	Displays the contents of the history buffer.
Inventory Menu	Contains information about bar code labels and elements.
Drive Info Menu	Displays the drive status.

SCSI Menu

The SCSI Menu consists of the following submenus:

SCSI Mode Parameters	Displays data the library reports in response to a mode sense command.
SCSI Reservations	SCSI reservations is not supported on Sun systems.
SCSI Sense Data	SCSI sense data is not supported on Sun systems.

To check or set the SCSI Mode Parameters:

1. **Select the Library Info Menu by pressing ↓ or ↑, then Enter.**

2. **Select the SCSI Menu by pressing ↓ or ↑, then Enter.**

3. Check the settings of the various operating mode parameters. Scroll up by pressing ↑ or scroll down by pressing ↓.

The SCSI mode parameters screen provides the current (Cur), default (Def), and saved (Sav) values for the following parameters.

Current (Cur)   The value currently active (either the power-on default or a temporary value set by the latest MODE SELECT command.

Default (Def)   The original value set at the factory.

Saved (Sav)   The value specified as the power-on default by a MODE SELECT command. After specifying a value with the MODE SELECT command, this value takes effect each time you power on the tape library.

The mode parameters for this menu are:

CHM Addr   The element address of the cartridge handling mechanism.

Stor Addr   The element address of the fixed slot. The remaining cartridge slots are numbered consecutively—starting from the top cartridge.

CTS Addr   The element address of the first cartridge tape subsystem (CTS). The remaining CTS is numbered sequentially.

CTS Num   The number of CTSs installed.

Parity   Parity checking on the SCSI bus. When the parity option is on (the default), the tape library checks all data coming across the SCSI bus for parity.

Pty Retry   The number of retries when a parity error is detected.

Security   Indicates whether the SCSI security feature is on or off.

Write Line 1 - 4   Indicates whether the text displayed on each of the four lines on the main menu is defined for the LCD Mode page.

Figure 4-2 shows the default element addresses for the tape library.

83	82

CTS CTS
2   1

10	9	8	7	6	5	4	3	2	1

Cartridge slots

0

Fixed
slot

86

CHM
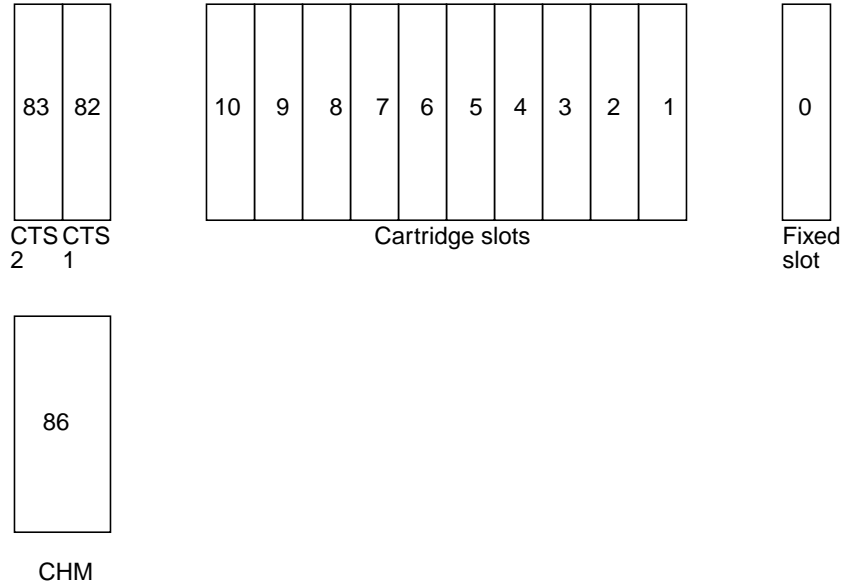
Figure 4-2   Default Element Addresses for the SPARCstorage Library

SCSI Reservations

The SCSI Reservations command is not supported on Sun systems.

SCSI Sense Data

The SCSI Sense Data command is not supported on Sun systems. However, SCSI Sense Data is displayed in the console window on the Sun system.

Statistics

The statistics menus enables you to review the statistics for the tape library and
for each element.

1. **Select the Library Info Menu by pressing ↓ or ↑, then Enter.**

2. **Select Statistics by pressing ↓ or ↑, then Enter.**
   The system displays the System Stat screen followed by the Element Stat
   screen.

3. **Press: ↓ or ↑ to scroll though the screens.**

```
SYSTEM STAT TOTALS:
Moves           7107
Pick Retry         0
Put Retry          0  ↓
```

```
ELEM STATS, INX=0    ↑
Total Puts         0
Retries: Pick      0
Put    0  Scan     0
```

The system statistics displayed are:

Moves	Number of times the CHM has picked a cartridge and placed it in a slot or tape drive.
Pick Retry	Number of times the CHM retried picking a cartridge.
Put Retry	Number of times the CHM retried placing a cartridge.
Scans	Number of times the tape library scanned a bar code label.
Scan Retry	Number of times the tape library retried scanning a bar code label.
Scan Fail	Number of times the tape library failed to scan a bar code (tries six times before logging a failure).

The element statistics displayed are:

Total Puts	Number of times a cartridge was placed in that element since the library was turned on.
Retries: Pick	Number of times the library retried picking from that element.
Retries: Put	Number of times the library retried placing a cartridge in that element.
Retries: Scan	Number of times the library retried scanning that element.

System Sensors

The System Sensors display lets you check the current status of the internal mechanical sensors.

1. **Select the Library Info Menu by pressing ↓ or ↑, then Enter.**

2. **Select System Sensors by pressing ↓ or ↑, then Enter.**
   The system displays the Digital Sensors screen followed by the Analog Sensors screen. Use ↓ and ↑ to scroll though the screens:

```
DIGITAL SENSORS
 Door Closed              1
 Key Lock                 1
 Gripper Home             0 ↓
```

```
ANALOG SENSORS                   ↑
  Temperature:  23C
 +12V:      11816 mV
 –12V:      12233 mV
```

Digital System Sensors

Table 4-2 lists the digital system sensor descriptions.

Table 4-2   Digital System Sensor Descriptions

Sensor	Sensor Position 1	Sensor Position 0
Door Closed	Door is closed.	Door is open.
Key lock	Door locked.	Door is unlocked.
Gripper Home	Gripper is located in the home position.	Gripper is not located in the home position.
Cart seated	Cartridge is correctly seated.	Cartridge is not correctly seated.
Vertical Mode	Tower unit	Rack-mounted unit

Analog System Sensors

Table 4-3 lists the analog system sensor descriptions.

Table 4-3   Analog System Sensor Descriptions

Sensor	Description
Temperature	Indicates the temperature of the tape library in degrees C.
+12V	Indicates the output of the 12-volt power supply in milliVolts.
-12V	Indicates the output of the negative 12-volt power supply in milliVolts.
+24V	Indicates the output of the 24-volt power supply in milliVolts.

Command History

Use the Command History command to display the 300 most recent history events (000 - 299).

1. **Select the Library Info Menu by pressing ↓ or ↑, then Enter.**

2. **Select Command History by pressing ↓ or ↑, then Enter.**
   The system displays a screen similar to the following:

```
000      MOVE    19:37:45
   Move from 8 to 82
complete
1861    9-29-94 04441
```

3. **Press ↑ and ↓ to scroll through the entries.**
   The most recent event in the history buffer is displayed first.

4. **To exit Command History, press Escape.**

See Table 4-4 to understand what the Command History information means.

Table 4-4   Field Descriptions of Command History

Shown in sample	Field Name	Description
000	IDX (Index)	Line number of this event within the history buffer (000 - 299). 000 - most recent event
MOVE	From	Process name that caused this event.
19:37:45	Time	Time, according to the internal clock, the event took place.
Move from 8 to 82 complete	Description	Event description.
1861	Line	Line number of the source code that caused this event.
9-29-94	Date	The date, according to the internal calendar, the event took place.
04441	Seq	Sequence number of this event across all system buffers.

Inventory Menu

The library maintains a cartridge inventory in NVRAM containing information about these element locations:

- CHM (medium transportation element)
- Tape cartridge elements (storage elements)
- CTSs (tape drives or data storage elements)

Use the Inventory Menu to display:

Bar code label information	Includes data about whether the bar code scanner could accurately scan the label.
Element occupied information	Includes data about whether the element contains a cartridge and whether the holder or tape drive is installed.
Element position information	Includes data about the exact position of each element.

Bar Code Label Information

The Label Info command displays bar code label information.

1. **Select the Library Info Menu by pressing ↓ or ↑, then Enter.**

2. **Select Inventory Menu by pressing ↓ or ↑, then Enter.**

3. **Select Label Information by pressing ↓ or ↑, then Enter.**

4. **Display information for each element index by pressing ↑ or ↓.**
   The system displays this screen:

```
ELEM LABEL, INX= 0:
 Label:
 Valid/Error: 0/0
 Send Vol Match: 0 ↓
```

Part of the Select Label Information screen is shown and described below:

```
Label:
 Valid/Error: 0/0
```
               Label   Label
               Valid   Error
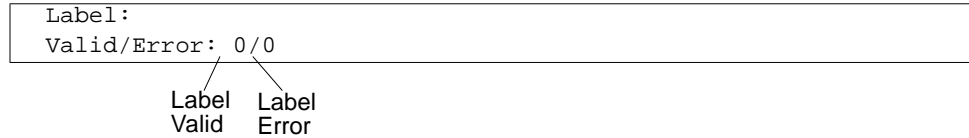
The following chart explains the information on the Label Information screen.

INX   Element index for which information is being displayed.

Label   If the element location contains a bar code that has been scanned, the
                   Label field contains the cartridge label.

Label Valid   Indicates whether the field is accurate:
1   Label field is accurate.
0   Label field is not accurate.

The Label Error field indicates whether the bar code was unable to read the
cartridge label.

Table 4-5   Label Error Field Error Messages

Error Code	Description
0	Bar code scan was successful, a reset condition occurred, or the door was open.
60	The bar code scanner could not read the bar code label because there was no label on the cartridge.
61	The bar code scanner could not read the bar code label because the label was unreadable.
62	The bar code scanner could not read the bar code label because the cartridge holder or tape drive was not installed.
65	The bar code scanner could not read the bar code label because a Direct Memory Access (DMA) overrun occurred.
69	The bar code scanner could not read the bar code label because the label was upside down or misplaced.

The Send Volume Match flag indicates whether the cartridge label matched the template sent with the last SEND VOLUME MATCH (B8h) command:

0	Label did not match the template.
1	Label matched the template.

Element Occupied Information

The Occupied Info command displays information for each element index. To display element occupied information:

1. Select the Library Info Menu by pressing ↓ or ↑, then Enter.

2. Select the Inventory Menu by pressing ↓ or ↑, then Enter.

3. Select Occupied Info by pressing ↓ or ↑, then Enter.
   This screen is displayed:

```
ELEM OCCUP, INX = 0:
 Addr/Src:      0/255
 O/V/P/A:  o/1/1/1
 CTS/Warning: 0/0     ↓
```

4. Display information for each element index by pressing ↑ or ↓.

The following chart explains the element index information.

INX	Displays the element index.
Addr (Address)	Shows the SCSI address of this element.
Src (Source Element Index)	Shows the index of the last storage element from which the cartridge was moved.
O (Occupied)	Indicates whether the tape library considers the specified element location to contain a tape cartridge, as follows:
0	Element location does not contain a tape cartridge.
1	Element location contains a tape cartridge.
V (Occupied Valid)	Indicates whether the Occupied flag is accurate.
0	Occupied flag is questionable (may not be accurate).
1	Occupied flag is accurate.
P (Cartridge Holder or Tape Drive Present)	Indicates if a cartridge holder or tape drive is installed. If the element index references a storage element, this flag indicates whether the holder is installed. If the element index references a tape drive, this flag indicates whether that particular drive is installed. The values for this flag are:
0	Not installed
1	Installed
A (Tape Drive Accessible)	Indicates whether a drive is empty, a cartridge is loaded in the drive, or the cartridge is ejected:
0	Cartridge may be loaded in the drive.
1	Drive is empty or the cartridge is ejected and ready to be picked.

Element Position Information

The Position Info command displays information about each element position. To display element position information:

1. **Select the Library Info Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Inventory Menu by pressing ↓ or ↑, then Enter.**

3. **Select Position Info by pressing by pressing ↓ or ↑, then Enter.**
   The following screen is displayed:

```
 ELEM POS,    INX= 0:
  Long Axis:     104
  Depth           0
                       ↓
```

4. **Display the following information for each element index by pressing ↓ or ↑.**

The following chart displays the information for each index:

INX   Displays the element index.

Long Axis   Indicates the distance the CHM has to move along the long axis from its home position to the specified element location.

Depth   For storage elements the Depth field indicates the distance the CHM has to move along the short axis from its home position to touch the holder or a tape cartridge in the holder (not used for the tape drives or the CHM).

☰ *4*

Drive Info Menu

Tape drive information available from the Drive Info Menu includes:

- Tape drive type
- Tape cartridge present or not
- Cleaning status (if it needs cleaning or not)

To display information from the Drive Info Menu:

1. **Select the Library Info Menu by pressing ↓ or ↑, then Enter.**

2. **Select the Drive Info Menu by pressing ↓ or ↑, then Enter.**
   The system displays this screen:

```
Drive 1 Status              ↑
Drive 2 Status              ↓
```

3. **Display information about the selected tape drive by pressing ↑ or ↓.**
   For each tape drive present, the system displays this screen:

```
CTS 1 STATUS
 Type              8505XL
 Present           1
 Accessible        1                    ↓
```

The following chart describes the tape drive information displayed on the previous screen:

CTS 1   Top tape drive (Drive 1)

CTS 2   Bottom tape drive (Drive 2)

Type 8505XL   Model number (8505XL) of the tape drive
                Displays 8mm if a drive is not present.

Present   Indicates if a tape drive is installed.

1   Tape drive present.
0   Tape drive not present.

Accessible   Indicates if the tape drive is accessible to the CHM.

1   A cartridge is protruding from the tape drive or the drive is empty.
0   A cartridge is loaded in the tape drive or the drive status is unknown.

Clean   Cleaning status.

1   Drive needs to be cleaned or the cleaning tape is used up.
0   Drive is clean.

Warning   Not currently used.

Occupied   Indicates if a cartridge is installed.

1   Cartridge loaded in the tape drive.
0   No cartridge loaded in the tape drive.

Occupied Valid Indicates if the occupied status is reliable or not.

1   The occupied information is reliable.
0   The door has been opened or another interruption has occurred so the occupied information may not be reliable.

Tape Drive LEDs:

♦ **See Chapter 2.**

Cleaning Tape Drives

Tape drives need to be cleaned once every 30 motion hours.

Note – When cleaning the tape drive, use a Sun approved 8mm cleaning cartridge.

Each drive keeps track of tape motion hours internally. When 30 tape motion hours have elapsed, the following activities occur:

• The top and bottom LEDs on the tape drive flash slowly. Depending on the SCSI bus activity, the middle LED may also be flashing.

• The tape drive informs the library that it needs cleaning. The library displays "CTS needs cleaning" on the LCD main screen.

• Indicators or flags in the tape drive are set. The application program can look at the indicators and determine if cleaning is required.

You can clean a tape drive two ways:

• By installing a cleaning cartridge in the fixed cartridge slot and using the `Clean Drive 1` or `Clean Drive 2` options.

• By opening the front door and manually inserting a cleaning cartridge into the tape drive.

To clean the tape drive through the display panel:

1. **Make sure a cleaning cartridge is in the fixed cartridge slot.**

2. **Disable the security option.**

3. **Select the Maintenance Menu by pressing ↓ or ↑, then Enter.**

4. **Select Clean Drive Menu and press Enter.**

   a. **Select Clean Drive 1 to clean Drive 1 (the top drive).**

   OR

   b. **Select Clean Drive 2 to clean Drive 2 (the bottom drive).**

   The following activities occur:
   - The CHM picks the cleaning cartridge from the fixed cartridge slot and inserts it into the specified tape drive.
   - The tape drive automatically performs the cleaning process. The cleaning cartridge is ejected after 3 to 4 minutes when the cleaning process is complete.
   - After ejecting the cleaning cartridge, the CHM automatically picks the cartridge from the tape drive and replaces it in the fixed cartridge slot.

Note – Replace the cleaning cartridge if the tape drive ejects the cleaning cartridge within a minute.

---

5. **Confirm that cleaning was completed. Look at the LEDs at the left front of the tape drive. The top and bottom LEDs should be off.**
   If the top and bottom LEDs are still flashing, replace the cleaning cartridge and clean the tape drive again.

   If the LEDs are still flashing after the second cleaning, there is a problem with the tape drive.

To manually clean a tape drive:

1. **Open the front door.**

2. **Eject a tape from the drive, if necessary, by pressing the** `Unload` **button (to the right of the LEDs at the left of the tape drive).**

3. **Manually insert a cleaning cartridge into the appropriate tape drive.**
   The tape drive automatically ejects the cleaning cartridge when cleaning is complete. This takes 3 to 4 minutes.

Maintaining the SPARCstorage Library 5≡

This chapter describes how to clean and service various components of the tape library. To help the tape library perform at a optimum level, you should perform the preventive maintenance procedures described in this chapter.

Be sure to read through this chapter and the "Safety Agency Compliance" section in the Preface before starting any of the procedures.

Cleaning the Front Door

♦ **Use the wet-wipe and dry-wipe cleaning packets provided with the tape library.**

⚠ **Caution** – To avoid scratching or marring the window, do not use abrasive cleaners, abrasive cleaning implements, or harsh chemicals or solvents (for example, alcohol, kerosene, or petroleum spirits) to clean the door.

Cleaning Tape Drives

Clean the tape drive heads and tape paths after every 30 tape-motion hours with an approved 8mm cleaning cartridge. Depending on the operating environment, you may need to clean the tape drive (CTS) more often.

To clean a drive using the Maintenance Menu on the LCD:

1. **Make sure a cleaning cartridge is installed in the fixed cartridge slot.** If not, install one.

2. **Select Clean Drive 1 from the Utilities Menu if you plan to clean the top drive, or Select Clean Drive 2 if you plan to clean bottom drive.**
   - The CHM picks the cleaning cartridge from the fixed slot and places it in the tape drive.
   - The CTS automatically performs the cleaning cycle and ejects the cartridge when it is finished.
   - The CHM picks the cartridge from the tape drive and places it back in the fixed slot.

You can clean a tape drive inside the tape library in one of several ways:

- As described above, by installing a cleaning cartridge in the fixed cartridge slot and using the Clean Drive 1 or Clean Drive 2 options from the Maintenance Menu on the LCD.

- By installing a cleaning cartridge in the removable cartridge holder (preferably the fixed slot) and using SCSI commands to automate the cleaning process.

- By opening the front door and manually inserting a cleaning cartridge into the tape drive. The CTS automatically ejects the cleaning cartridge when finished.

Note – It may take two minutes for a cleaning cartridge to complete its function.

Caring for Tape Cartridges

When handling and storing tape cartridges:

- Keep them away from anything magnetic.

- Store them in a clean, dust-free environment.

- When not in use, store them by putting them on their edge.

- Keep them out of direct sunlight and away from sources of extreme heat, cold, or humidity.

- Make sure the cartridge is at the same temperature as the drive before using it.

- Never open the tape access door on the cartridge and touch the surface of the tape.
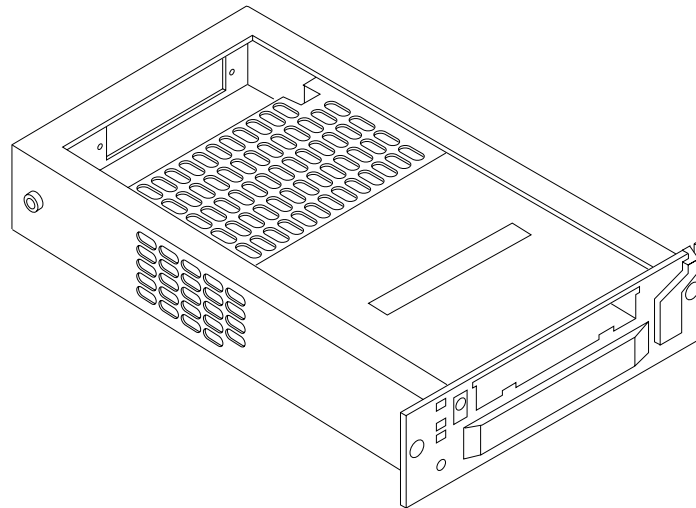
5

Hardware Upgrades for the SPARCstorage Library 6≡

This chapter describes how to remove the empty drive carrier and install a second 8mm tape drive into a SPARCstorage Library.

Figure 6-1   8mm Tape Drive and Carrier

Adding a Second Tape Drive

Refer to the *Tape Drive Quick Installation Card* that came with your second drive for graphical instructions.

Removing the Empty Drive Carrier

1. **Follow the ESD guidelines.**

2. **Obtain a flatblade screwdriver.**

3. **Halt the tape library's operations.**

4. **Turn off the power, then unlock and open the door.**

5. **Push against the base of the CHM to move it out of the way.**

6. **Loosen the two captive screws on the drive carrier faceplate with the screwdriver.**

7. **Pull out the lever on the faceplate using your finger.**
   See Figure 6-2.

⚠ **Caution** – Do not try to pull out the lever without first loosening the screws.

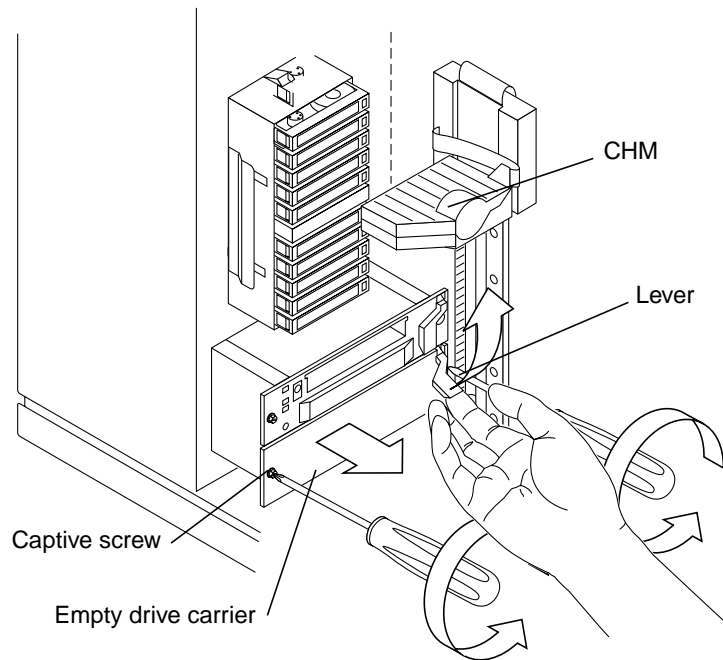8. **Pull the empty drive carrier out of the slot.**

Figure 6-2   Removing the Empty Drive Carrier

⚠️ **Caution** – If you operate the tape library with only one tape drive, you must have an *empty drive carrier* installed in the bottom drive carrier slot. Failure to have a carrier installed will interrupt the SCSI bus and disrupt air flow within the tape library.

Installing the Second Tape Drive

1. **Insert the drive carrier through the open door into the empty slot with the lever on your right-hand side.**
   See Figure 6-3.

2. **Push the drive carrier into the slot until the alignment pin goes into the alignment hole.**

3. **Push down on the lever until it closes all the way.**

4. **Push on the front plate of the drive to completely seat the connector.**
   You may have to push strongly until you feel the connection.

5. **Tighten the two captive screws on each end of the drive carrier faceplate using the screwdriver.**

6. **Close and lock the front door.**

7. **Power on the tape library and resume operation.**

Lever

Captive screw
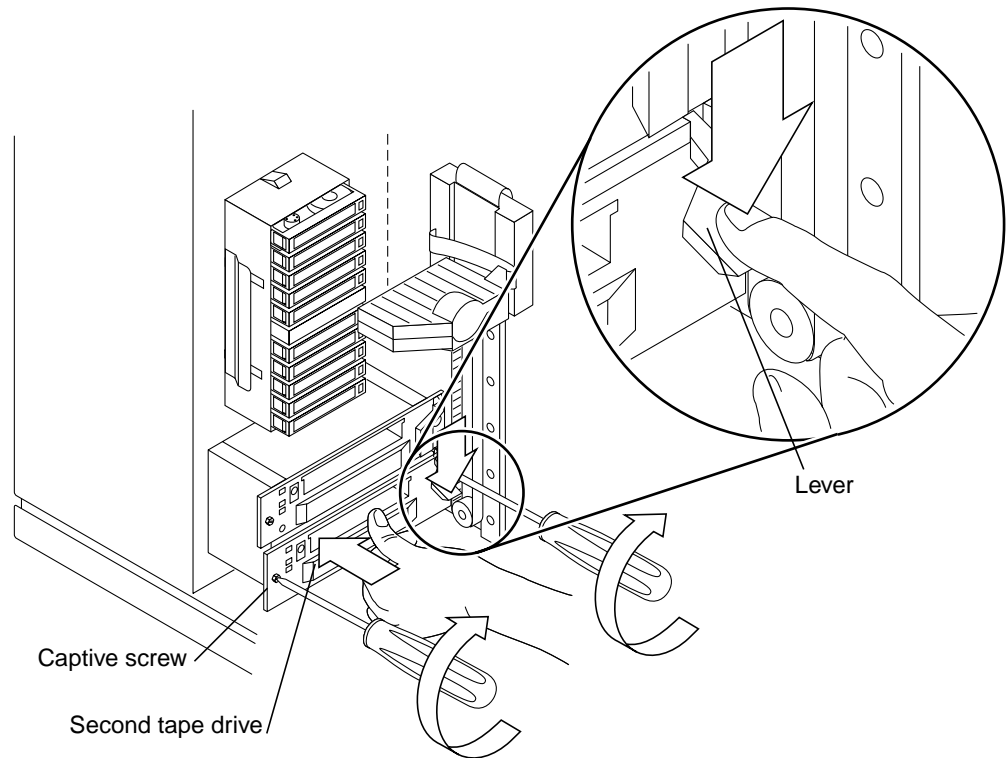
Second tape drive

Figure 6-3   Installing the Second Tape Drive and Carrier

Compliance Statements *A* ≡

This appendix contains the Safety Compliance Statements translated into French, German, and Spanish. For the English version, refer to the *Preface.* These instructions explain how to work safely with the internal components of your system.

Conformité aux Normes de Sécurité

Cette préface traite des mesures de sécurité qu'il convient de suivre pour l'installation d'un produit Sun Microsystems, Inc.

Mesures de Sécurité

Pour votre protection, veuillez prendre les précautions suivantes pendant l'installation du matériel:

- Suivre tous les avertissements et toutes les instructions inscrites sur le matériel.

- Vérifier que la tension et la fréquence de la source d'alimentation électrique correspondent à la tension et à la fréquence indiquées sur l'étiquette de classification de l'appareil.

- Ne jamais introduire d'objet quel qu'il soit dans une des ouvertures de l'appareil. Vous pourriez vous trouver en présence d'éléments haute tension. Tout objet conducteur introduit de la sorte pourrait produire un court-circuit qui entraînerait des flammes, des risques d'électrocution ou des dégâts matériels.

Symboles

Vous trouverez ci-dessous la signification des différents symboles utilisés:

Avertissement – Présence de tensions dangereuses. Pour éviter les risques d'électrocution et de danger pour la santé physique, veuillez suivre les instructions.

Attention – Risques de blessures corporelles et de dégâts matériels. Veuillez suivre les instructions.

Marche – Le commutateur marche/arrêt principal est en position de *marche.*

Arrêt – Le commutateur marche/arrêt principal est en position *d'arrêt.*

Modification du Matériel

Ne pas apporter de modification mécanique ou électrique au matériel. Sun Microsystems, Inc., n'est pas responsable de la conformité réglementaire d'un produit Sun qui a été modifié.

Positionnement d'un Produit Sun

Attention – Pour assurer le bon fonctionnement de votre produit Sun et pour l'empêcher de surchauffer, il convient de ne pas obstruer ni recouvrir les ouvertures prévues dans l'appareil. Un produit Sun ne doit jamais être placé à proximité d'un radiateur ou d'une source de chaleur.

Connexion du Cordon d'Alimentation

Avertissement – Les produits Sun sont conçus pour fonctionner avec des alimentations monophasées munies d'un conducteur neutre mis à la terre. Pour écarter les risques d'électrocution, ne pas brancher de produit Sun dans un autre type d'alimentation secteur. En cas de doute quant au type d'alimentation électrique du local, veuillez vous adresser au directeur de l'exploitation ou à un électricien qualifié.

Avertissement – Tous les cordons d'alimentation n'ont pas forcément la même puissance nominale en matière de courant. Les rallonges d'usage domestique n'offrent pas de protection contre les surcharges et ne sont pas prévues pour les systèmes d'ordinateurs. Ne pas utiliser de rallonge d'usage domestique avec votre produit Sun.

Avertissement – Votre produit Sun a été livré équipé d'un cordon d'alimentation à trois fils du type avec prise de terre. Pour écarter les risques d'électrocution, toujours brancher ce cordon dans une prise mise à la terre.

Couvercle

Attention – Il est dangereux de faire fonctionner un produit Sun sans le couvercle en place. Si l'on néglige cette précaution, on encourt des risques de blessures corporelles et de dégâts matériels.

Sicherheitsbehördliche Vorschriften

In diesem Anhang werden die Sicherheitsmaßnahmen beschrieben, die bei der Installation eines Produkts von Sun Microsystems, Inc., zu befolgen sind.

Sicherheitsmaßnahmen

Beachten Sie zu Ihrem eigenen Schutz die folgenden Sicherheitsmaßnahmen, wenn Sie Ihre Geräte aufbauen:

- Beachten Sie alle auf den Geräten angebrachten Warnungen und Anweisungen.

- Vergewissern Sie sich, daß Spannung und Frequenz Ihrer Stromquelle mit der Spannung und Frequenz übereinstimmen, die auf dem Etikett mit den elektrischen Nennwerten des Geräts angegeben sind.

Stecken Sie niemals irgendwelche Gegenstände in Öffnungen in den Geräten. Es können gefährliche Spannungen vorliegen. Leitfähige fremde Gegenstände könnten einen Kurzschluß verursachen, der zu Feuer, Elektroschock oder einer Beschädigung Ihrer Geräte führen könnte.

Symbole

Die verwendeten Symbole haben die folgende Bedeutung:

Warnung – Gefährliche Spannungen. Zur Reduzierung des Elektroschockrisikos und der Gesundheitsgefährdung die Anweisungen befolgen.

Vorsicht – Gefahr von Personenverletzung und Geräteschaden. Anweisungen befolgen.

Ein – Der Hauptschalter steht auf *Ein.*

Aus – Der Hauptschalter steht auf *Aus.*

Änderung der Geräte

Nehmen Sie keine mechanischen oder elektrischen Änderungen an den Geräten vor. Sun Microsystems, Inc., ist nicht verantwortlich für die Einhaltung behördlicher Vorschriften, wenn an einem Sun-Produkt Änderungen vorgenommen wurden.

Aufstellungsort eines Sun-Produkts

Vorsicht – Um einen zuverlässigen Betrieb Ihres Sun-Produkts zu gewährleisten und es vor Überhitzung zu schützen, dürfen die Öffnungen im Gerät nicht blockiert oder bedeckt werden. Ein Sun-Produkt sollte niemals in der Nähe eines Heizkörpers oder einer Heizluftklappe aufgestellt werden.

Anschluß des Stromkabels

Warnung– Sun-Produkte sind für den Betrieb mit Einphasen-Stromsystemen mit einem geerdeten Mittelleiter vorgesehen. Um die Elektroschockgefahr zu reduzieren, schließen Sie Sun-Produkte nicht an andere Arten von Stromsystemen an. Wenden Sie sich an Ihren Anlagenleiter oder einen qualifizierten Elektriker, wenn Sie sich nicht sicher sind, welche Art von Strom Ihr Gebäude erhält.

Warnung– Nicht alle Stromkabel besitzen die gleichen Stromnennwerte. Haushaltsverlängerungsschnuren haben keinen Überlastungsschutz und sind nicht zum Gebrauch mit Computersystemen bestimmt. Benutzen Sie keine Haushaltsverlängerungsschnuren für Ihr Sun-Produkt.

Warnung – Ihr Sun-Produkt wird mit einem Erdungs-Netzkabel (3-Leiter) geliefert. Um die Elektroschockgefahr zu reduzieren, schließen Sie das Kabel nur an eine geerdete Steckdose an.

Obere Abdeckung

Vorsicht – Der Betrieb von Sun-Produkten ohne obere Abdeckung ist nicht sicher. Bei Nichteinhalten dieser Vorsichtsmaßregel kann es zu Personenverletzung und Systemschäden kommen.

Conformidad Con La Agencia de Seguridad

Este prólogo presenta las precauciones de seguridad a seguir cuando se instala un producto de Sun Microsystems, Inc.

Precauciones de Seguridad

Para su protección, observe las siguientes preocupaciones de seguridad al instalar su equipo:

- Siga todos los avisos e instrucciones marcados en el equipo.

- Asegúrese de que el voltaje y la frecuencia de su fuente de alimentación sean iguales al voltaje y frecuencia indicados en la etiqueta de la capacidad eléctrica nominal del equipo.

No introduzca jamás objetos de ninguna clase por las aberturas del equipo porque pueden estar presentes voltajes peligrosos. Cualquier objeto conductor extraño puede producir cortocircuito que podría causar incendio, electrochoque o daños a su equipo.

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Símbolos

Los siguientes símbolos significan:

Aviso – Hay presentes voltajes peligrosos. Siga las instrucciones para reducir el riesgo de electrochoque y los peligros contra la salud.

Precaución– Peligro de lesión personal y daño al equipo. Siga las instrucciones.

Encendido – El interruptor principal de encendido/apagado está en la posición de *encendido.*

Apagado – El interruptor principal de encendido/apagado está en la posición de *apagado.*

Modificaciones al Equipo

No haga modificaciones mecánicas o eléctricas al equipo. Sun Microsystems, Inc., no se hace responsable del cumplimiento de las regulaciones de un producto Sun si ha sido modificado.

Colocación de un Producto Sun

Precaución – Para lograr un funcionamiento seguro de su producto Sun y protegerlo contra el calentamiento excesivo, no se deben bloquear o cubrir las aberturas del aparato. Ningún producto Sun se debe colocar jamás cerca de un radiador o una fuente térmica.

Conexión del Cable de Alimentación

Aviso – Los productos Sun han sido diseñados para funcionar con sistemas de alimentación monofásicos que tengan un conductor neutro a tierra. Para reducir el riesgo de electrochoque, no enchufe los productos Sun a ningún otro tipo de sistema de alimentación. Si no está seguro del tipo de alimentación eléctrica que se suministra a su edificio, consulte al administrador de la propiedad o a un electricista profesional.

Aviso– No todos los cables de alimentación tienen la misma capacidad nominal de corriente. Las extensiones tipo casero no tienen protección contra sobrecargas y no están destinadas a usarse con sistemas de computasion. No use extensiones caseras con su producto Sun.

Aviso – Su producto Sun se le provee con un cable de alimentación con salida a tierra (trifilar). Para reducir el riesgo de electrochoque, enchufe siempre el cable a un tomacorriente con conexión a tierra.

Cubierta Superior

Precaución– Los productos Sun no pueden funcionar sin riesgo si la cubierta superior no está colocada en su sitio. Si no toma esta precaución, correrá el riesgo de lesionarse personalmente y dañar el equipo.

Small Computer Systems Interface Information *B*≣

This appendix describes the Small Computer Systems Interface (SCSI). Topics covered in this appendix include:

- SCSI ports and connections
- SCSI bus length
- SCSI bus termination information

SCSI Ports and Connections

If fast SCSI devices and old-style connectors must be used in the same system, the old-style connectors should be connected to a separate SCSI port that doesn't contain fast SCSI devices. Do not connect fast SCSI devices and old-style connectors in the same daisy chain.

Old-style connectors can be identified by:

- 3-row 50-pin D connector

- 50-pin ribbon style connector

- 50-pin "Centronics style" of a connector (1/2-inch Front Load Tape (FCT) drive)

There are four microminiature SCSI ports on the back panel of a tape library. The SCSI connectors have 50 pins divided into two rows. You can connect the tape library to your system in two ways—*direct connection* or a *daisy chain.*

Direct Connection

Use a direct connection when you are connecting the first SCSI device in the SCSI bus to the desktop system by connecting one end of the SCSI cable to one of the SCSI ports of the tape library, and the other end of the SCSI cable to the SCSI port of the desktop system. You must connect a regulated SCSI terminator to the other SCSI port of the tape library.

Note – If you install a SBus card with an additional SCSI port in the desktop system, you can connect the tape library to the SCSI port of the SCSI card.

Daisy Chain Connection

A daisy chain connection is a means of connecting a maximum of seven SCSI peripherals to a host system. It allows a single port on the desktop system to connect to more than one SCSI peripheral. If you want more than one SCSI peripheral on a bus, you need to daisy chain.

Note – For best performance, connect no more than four tape drives to the same SCSI bus. If another drive is already connected to it, add no more than two tape drives.

If you connect SCSI devices to your system in this manner, connect a regulated terminator to the unused SCSI port on the back panel of the last device in the daisy-chain.

Note – Devices with the old-style connectors (3-row 50-pin D connectors or 50-pin ribbon connectors) should not be used on the same bus (daisy-chained) with fast SCSI devices.

SCSI Bus Length

A *bus* is a signal route to which several parts of a computer system may be connected so that signals can pass between them. The total length of a SCSI bus includes:

- The length of the external SCSI cable *plus*
- The length of the internal SCSI buses for the device and the system

Your desktop system performance is reliable with a maximum SCSI bus length of 20 feet (6 meters), shown in Figure B-1. The internal signal path of your system unit and the external SCSI cables must not exceed this maximum length. If this length is exceeded, the system will not run in a reliable manner.
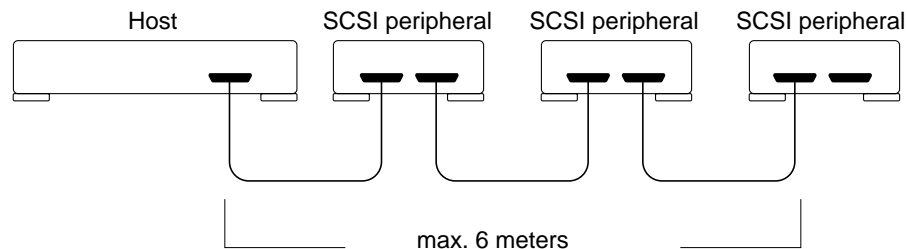

Figure B-1 Maximum SCSI Bus Length

Computing SCSI Bus Lengths

When connecting the tape library to your system, find the total SCSI bus length for your configuration. To do this, add the length of the internal bus lengths of each device of the system to the length of the external SCSI cable, which can measure either 0.8, 2, or 4 meters in length. The total length must be less than 20 feet (6 meters).

Table B-1 lists the internal and external cable lengths for the tape library and most of the supported desktop systems and servers.

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Table B-1   SCSI Internal Cable (Bus) Lengths

Devices and Cables	SCSI CABLE LENGTH	
	Meters	Inches
SPARCstorage Library	0.5	19.7
Desktop Storage Module (disk unit)	0.3	11.9
Desktop Storage Module (tape unit)	0.4	15.7
SPARCstation™ 2, IPC and IPX	0.5	19.7
SPARCstation 1, 1+	0.6	23.6
SPARCstation 10, LX, SPARCclassic	0.9	35.4
SPARCstation SLC™ and ELC™	0.2	7.8
SBus cards (SBE/S, FSBE/S, SBus SCSI Host Adaptor)	0.1	3.9
SPARCstation 5	1.6	62.6
SPARCstation 20	1.6	62.6
SPARCstation Voyage™r	0.4	15.7
SPARCserver™ 1000*	1.8	70.2
SPARCcenter™ 2000**	0.1	3.9

_____

* Only for first system board. For any other system board, add 0.9

** Does not contain an on-board SCSI interface

Additional SCSI Buses

If the SCSI bus length exceeds 6 meters or you have to install more than six SCSI devices, you can install some of the devices on additional SCSI buses by installing an SBus SCSI Host Adapter card (SSHA) or a FSBE/S with desktop systems or an SBE/S SBus card with deskside systems. The SBus SCSI Host Adapter card provides an additional SCSI port (SCSI bus) for your system. The SBE/S or FSBE/S SBus card provides an additional SCSI port and an Ethernet port.

When you insert an SBus SCSI Host Adapter card into your system, the SCSI bus length total does not include the internal cable length of the system, listed in Table B-2. Additional SCSI buses, SCSI bus 1, 2, 3, and 4 are named based on the order they are found by the OpenBoot™ PROM when probing SBus slots. SBus slots are probed in this order: on-board, slot 0, slot 1, slot 2, slot 3.

For example, if the first FSBE/S SBus card is in slot 2, when the system probes the SBus slots, it begins probing the on-board SCSI bus, then SBus slot 1, then SBus slot 2, and so on. Because slot 2 contains the first FSBE/S SBus card, this is SCSI bus 1. As Table B-2 illustrates, SCSI bus 1 supports disk, tape, and CD-ROM.

Table B-2   Devices Supported With Additional Single-ended SCSI Buses (SunOS 4.1.x)

SCSI Bus Number	Device
SCSI bus 1, first FSBE/S SBus card	Disk
	Tape
	CD-ROM
SCSI bus 2, second FSBE/S SBus card	Disk
SCSI bus 3, third FSBE/S SBus card	Disk
	Tape
	CD-ROM
SCSI bus 4, fourth FSBE/S SBus card	Disk

Note – For the Solaris 2.x operating system, tape, disk and CD-ROM devices are supported on all SCSI buses

Terminating SCSI Devices

You must attach a regulated SCSI terminator to the SCSI port at the end of the SCSI bus. A terminator holds the bus at a predetermined signal level when the bus is not active and maintains impedance matching.

All SCSI daisy chains must be terminated at the last unit attached to the SCSI bus. Also, a terminator is built in to all SBus SCSI cards and to all host systems to terminate that end of the bus. The regulated terminators must be used for all 50-pin SCSI busses having fast SCSI drives on a fast SCSI host.
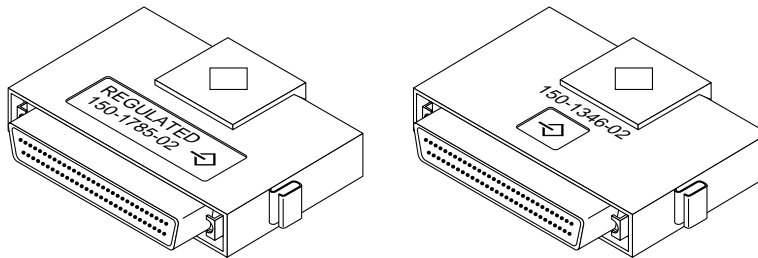

Figure B-2   Regulated and Nonregulated Terminators

SCSI Termination Guidelines

- The SCSI device at the end of a daisy chain *must* be electrically terminated.

- Only the last device in a SCSI daisy chain is terminated.

- Any fast SCSI device or a daisy chain of fast SCSI devices must be terminated with a regulated terminator.

- Any configuration of the tape library with an External Expansion Module (EEM) or an External Storage Module (ESM) must have a tape library as the last device to provide regulated term power.

50-pin Ribbon Connectors

Devices with the 3-row 50-pin D connector or the 50-pin ribbon connector (old-style connectors) should not be used on the same bus with fast SCSI devices.

Note – The mixing of fast SCSI devices and old-style connectors in the same daisy chain is not recommended since errors may be created and performance may be degraded.

If fast SCSI devices and old-style connectors must be used in the same system, the old-style connectors should be connected to a separate SCSI port that doesn't contain fast SCSI devices.

Error Codes $C\equiv$

This appendix contains the error codes that may appear on the main screen. The tables in this appendix contain the following information:

ASC   Additional Sense Code. Corresponds to byte 12 of the sense data returned in response to the REQUEST SENSE command.

ASCQ   Additional Sense Code Qualifier. Corresponds to byte 13 of the sense data returned in response to the REQUEST SENSE command.

LCD Number   For hardware error conditions (see Table C-4) this is the numerical code that appears in the console window of the Sun system when the error occurs.

Description   Provides an explanation of the error.

Hardware Errors

Table C-1 presents the hardware error conditions in numerical order. The error code number appears on the display panel during either normal operation or diagnostic operation.

Table C-1   Hardware Errors by Error Code

Error Number	Description	Corrective Action
10	CHM dropped a cartridge.	Put the cartridge back in the data cartridge magazine. Do not try to put the cartridge back in the gripper. The tape library will not start if there is a cartridge in the gripper. Reset the tape library.
11	Source empty. There is no cartridge in the source location.	Install a cartridge in the source location or redirect the CHM to another location.
12	Destination full. A cartridge already exists in the destination location.	Remove the cartridge from the destination or redirect the CHM to another location.
13	Put mechanical failure. The CHM could not place a cartridge due to mechanical problems.	Reset the tape library. If this error still occurs, replace the tape library.
14	Pick mechanical failure. The CHM could not pick a cartridge due to mechanical problems.	Reset the tape library. If this error still occurs, replace the tape library.
15	No source element.	A data cartridge was not installed at the selected location.
16	No destination element.	A data cartridge was not installed at the selected location.
17	CHM full before move. A cartridge was in the gripper in one of these circumstances: - at power-on - when reset - before a move operation	Remove the cartridge. Put the cartridge back in the data cartridge magazine. Make sure the tape library and the tape drives are not being used by the host computer then reset the tape library.
18	The CHM could not pick the tape because it was still in the drive.	Reset the tape library. If this error still occurs, replace the tape library
19	Pick mechanical failure. The CHM could not successfully pick from a full cartridge slot.	Reset the tape library. If this error still occurs, replace the tape library.
21	Gripper error.	Reset the tape library. If this error still occurs, replace the tape library.

Table C-1 Hardware Errors by Error Code *(Continued)*

Error Number	Description	Corrective Action
22	Gripper motion timeout. The gripper motion took longer than the maximum allocated time. Because of this, the current to the servo motors is shut off.	Reset the tape library. If this error still occurs, replace the tape library.
25	Pick stall. The CHM stalled while trying to pick a cartridge from the tape drive.	Remove the cartridge from the tape drive by pressing the eject button on the drive carrier faceplate. Reset the tape library.
26	Cannot open gripper. The gripper could not open.	Open the door and look for anything that might be obstructing the CHM gripper. Make sure the tape library and the tape drives are not being used by the host computer then reset the tape library. If this error still occurs, replace the tape library.
30	S axis does not move. The CHM could not move along the short axis.	Reset the tape library. If this error still occurs, replace the tape library.
31	S axis failed home. The CHM could not return to the home position along the short axis.	Reset the tape library. If this error still occurs, replace the tape library.
36	S LM629 Failure. The tape library could not reset the servo chip for the short axis.	Make sure the tape library and the tape drives are not being used by the host computer then reset the tape library. If this error still occurs, replace the SMC controller card.
40	L axis does not move. The CHM could not move along the long axis.	Open the door. Look for anything that might be obstructing the path of the CHM along the long axis. Make sure that the axis belt is intact. If there are no obstructions and the belt is intact, you may need to replace the SMC controller card. If replacing the SMC controller card does not help, replace the tape library.
41	L axis failed home. The CHM could not return to the home position on the long axis.	Open the door. Look for anything that might be obstructing the path of the CHM along the long axis. Make sure that the axis belt is intact. If there are no obstructions and the belt is intact, you may need to replace the SMC controller card. If replacing the SMC controller card does not help, replace the tape library.
46	L LM629 reset fail. The tape library could not reset the servo chip on the long axis.	Make sure the tape library and the tape drives are not being used by the host computer then reset the tape library. If this error still occurs, replace the SMC controller card.

Table C-1 Hardware Errors by Error Code *(Continued)*

Error Number	Description	Corrective Action
60	No label. The bar code scanner could not read the bar code label because there was no label on the cartridge.	If the cartridge does not have a bar code label, place a label on the cartridge. If there is a bar code label and it is correctly placed on the cartridge, you may need to replace the bar code scanner.
61	Read error. The bar code scanner could not read the bar code label because the label was unreadable.	If the cartridge does not have a bar code label, place a label on the cartridge. If there is a bar code label and it is correctly placed on the cartridge, you may need to replace the bar code scanner.
62	Not present. The bar code scanner could not read the bar code labels because there was no data cartridge magazine present.	Install a data cartridge magazine. If installing a data cartridge magazine does not remedy the problem, you may need to replace the bar code scanner.
65	DMA overrun. The bar code scanner could not read the bar code label because a Direct Memory Access (DMA) overrun occurred.	Make sure the tape library and the tape drives are not being used by the host computer then reset the tape library. If this error still occurs, replace the SMC controller card.
67	DMA CH.2 Timeout. Controller board error.	Make sure the tape library and the tape drives are not being used by the host computer then reset the tape library. If this error still occurs, replace the SMC controller card.
69	Label upside down. The bar code scanner could not read the bar code label because the label is upside down.	Replace the bar code label correctly.
70	L servo timeout. The CHM could not reach its destination along the long axis.	Open the door. Look for anything that might be obstructing the path of the CHM along the long axis. Make sure that the axis belt is intact. If there are no obstructions and the belt is intact, you may need to replace the SMC controller card. If replacing the SMC controller card does not help, replace the tape library.
71	Parameter > limit. Firmware error.	Make sure the tape library and the tape drives are not being used by the host computer then reset the tape library. If the error still occurs, replace the SMC controller card.
72	Front door open. The front door is open or the door solenoid is malfunctioning.	If the door is open, close the door. Lock the front door to resume the tape library's operation. If the door is securely locked, replace the front panel.

Table C-1 Hardware Errors by Error Code *(Continued)*

Error Number	Description	Corrective Action
73	S servo timeout. The CHM could not reach its destination along the short axis.	Open the door. Look for anything that might be obstructing the path of the CHM along the short axis. If there are no obstructions, you may need to replace the tape library.
75	Internal S/W error. Firmware error.	Make sure the tape library and the tape drives are not being used by the host computer then reset the tape library. If the error still occurs, replace the SMC controller card.
76	POS error timeout. The CHM could not reach its destination along the long axis.	Open the door. Look for anything that might be obstructing the path of the CHM along the long axis. Make sure that the axis belt is intact. If there are no obstructions and the belt is intact, you may need to replace the SMC controller card. If replacing the SMC controller card does not help, replace the tape library.
77	Interface disabled. The tape library was not in correct control mode when a command was sent.	Make certain that the port you are sending commands through is also the port that has control through the Control Mode Menu.
90	Invalid blank config. Empty drive slot. The drive blank configuration is invalid.	If you operate the tape library with only one drive, you must have a drive blank installed in the left or bottom drive carrier slot. Install a drive blank in the left or bottom carrier slot.
91	Operator aborted. A diagnostic, in progress, was aborted.	No corrective action required.
104	CTS did not eject. The CHM timed out waiting for a tape drive to eject the cartridge.	There may be a problem with the tape drive. Try replacing the tape drive.
108	Incompatible boot ROM. The installed boot ROM is not compatible with the flash EEPROM code.	Try replacing the SMC controller card.
109	Check cleaner. The cleaning cartridge was ejected immediately after being loaded into the tape drive.	Replace the cleaning cartridge.
130-137	FAS216 error; SCSI unexpected int; SCSI int stuck error. There is SCSI chip failure.	Make sure the tape library and the tape drives are not being used by the host computer then reset the tape library. If the error still appears, replace either the host adapter card or the SMC controller card. Lastly, replace the tape library.

SCSI Sense Key Errors

The SCSI sense key error messages, listed in Table C-2, appear in the console window on the computer system. Further descriptions of each SCSI Sense Key Error are presented on the following pages.

Table C-2   SCSI Sense Key Error Messages

SCSI Sense Error Messages	Description	Action
0h - No sense	There is no specific sense key information to report.	N/A
2h - Not Ready	The tape library cannot accept any tape motion commands.	Perform one or more of the following actions: - Close the door. - Insert a data cartridge in the tape drive. - Put the tape library under SCSI control. To do so, select SCSI Interface under the Control Mode Menu.
4h - Hardware Error	The tape library detected a nonrecoverable hardware failure during a selftest or while performing a command.	Try the command again. If the error message persists, replace the tape drive.
5h - Illegal Request	The unit detected an illegal operation request. For example, an illegal parameter was sent with a command or the tape library was in the wrong mode to execute the command.	Retry the operation.
6h - Unit Attention	Something happened that may have changed the state of the unit. For example, the unit was powered on, a tape was loaded into the tape drive, or the SCSI bus was reset.	N/A
Bh - Aborted Command	The tape library aborted a command (typically operator aborted).	Retry the operation.

Not Ready—Sense Key 2h

During a Not Ready condition, the tape library returns a Check Condition status in response to each motion command until the Not Ready condition is removed. During this time, the sense key is set to Not Ready and the ASC and ASCQ are set to codes specifying that the tape library is not ready. All commands except tape motion commands, perform normally.

Table C-3 lists Not Ready sense key (2h) error conditions.

Table C-3   Not Ready Sense Key (2h) ASC and ASCQ Values

ASC Byte 12	ASCQ Byte 13	Description
	01h	The tape library is performing an initialization after a reset or the door was closed.
	83h	The front door is open.
04h	84h	The tape library is executing ROM boot code and cannot execute the command
	89h	The tape library is in 25-pin, 9-pin, or 4-pin serial port mode.
	8Dh	The tape library is in LCD Interface mode.
	8Eh	The tape library is in Sequential CTS1, Sequential CTS2, or Dual Sequential modes.

Hardware Error—Sense Key 4h

The tape library returns a sense key of Hardware Error (4h) when a hardware-related error occurs. After Hardware Error occurs, the tape library will not accept motion commands. For each additional motion command, the tape library returns the same Hardware Error. The tape library executes all other commands normally.

Table C-4 lists Hardware Error (4h) conditions. To determine the corrective actions for the display panel numbers, see Table C-1.

Table C-4   Hardware Error Sense Key (4h) ASC and ASCQ Values

ASC Byte 12	ASCQ Byte 13	Display Panel Number	Description
15h	80h	10	The CHM dropped a cartridge.
15h	81h	14	The CHM could not successfully pick a cartridge.
15h	83h	13	The CHM could not successfully place a cartridge.
15h	84h	25	The CHM stalled while trying to pick a cartridge from the tape drive.
15h	85h	26	The gripper could not open.
3Bh	81h	71	Firmware error.
3Fh	80h	N/A	The tape library is unable to erase the flash EEPROM 1.
3Fh	81h	N/A	The tape library is unable to erase the flash EEPROM 2.
3Fh	82h	N/A	The tape library is unable to write zeros to the flash EEPROM 1.
3Fh	83h	N/A	The tape library is unable to write zeros to the flash EEPROM 2.
3Fh	84h	N/A	The tape library is unable to program the flash EEPROM 1.
3Fh	85h	N/A	The tape library is unable to program the flash EEPROM 2.
3Fh	86h	N/A	The flash EEPROM checksum was bad.
40h	80h	01	Internal clock failure.
40h	81h	02	Internal RAM failure.
40h	82h	03	Internal ROM failure.
40h	83h	04	+24-volt power supply failure.
40h	85h	06	+12-volt power supply failure.
40h	86h	07	-12-volt power supply failure.
40h	87h	08	Digital/analog converter failure.
40h	88h	72	The front door is open or the door solenoid is malfunctioning.

Table C-4 Hardware Error Sense Key (4h) ASC and ASCQ Values *(Continued)*

ASC Byte 12	ASCQ Byte 13	Display Panel Number	Description
40h	89h	77	The tape library was not in the correct control mode when the command was executed. To invoke commands from the Maintenance Menu, the tape library must be in LCD Interface mode. To run the SunDiag system exerciser, the tape library must be in one of the Sequential modes (Sequential CTS1, Sequential CTS2, or Dual Sequential). Under normal operation, the tape library must be set to SCSI Interface mode.
40h	90h	20	The gripper home sensor did not clear.
40h	91h	21	A gripper error occurred.
40h	92h	22	A gripper motion took longer than the maximum time allocated for it. When motion functions do not complete in the allocated time, current to the servo motors is cut off.
40h	A0h	30	The CHM could not move along the short axis.
40h	A2h	32	The motor on the short axis failed.
40h	A3h	36	The tape library could not reset the servo chip for the short axis.
40h	A4h	37	The servo busy bit on the short axis failed.
40h	A5h	73	The CHM could not reach its destination on the short axis.
40h	B0h	40	The CHM could not move on the long axis.
40h	B1h	41	The CHM could not return to home position on the long axis.
40h	B2h	42	The motor on the long axis failed.
40h	B3h	46	The tape library could not reset the servo chip for the long axis.
40h	B4h	47	The servo busy bit on the long axis failed.
40h	B5h	70	The CHM could not reach its destination on the long axis.
40h	E4h	99	One of the motors is stalled. The tape library must wait for it to cool down before operations can resume.

Table C-4 Hardware Error Sense Key (4h) ASC and ASCQ Values *(Continued)*

ASC Byte 12	ASCQ Byte 13	Display Panel Number	Description
40h	E5h	76	The CHM could not reach its destination on the long axis.
40h	01h	17	There was a cartridge in the grab base during power up, before a cartridge move, or before a diagnostic test.
840h	00h	75	Firmware error.

Illegal Request—Sense Key 5h

Table C-5 lists the Illegal Request (5h) error conditions.

Note – In Table C-5, the Command Descriptor Block (CDB) is the structure used to communicate commands from an initiator to a target.

Table C-5 Illegal Request Sense Key (5h) ASC and ASCQ Values

ASC Byte 12	ASCQ Byte 13	Description
1Ah	00h	The parameter list length was not valid.
20h	00h	The operation code (OP code) for the Command Descriptor Block (CDB) was invalid.
21h	01h	An invalid element address was specified for the CDB.
24h	00h	There were invalid fields in the CDB.
25h	00h	The logical unit number specified in the Identify message or in the CDB is not zero.
26h	02h	There was an invalid field in the parameter list.
3Bh	0Dh	The destination element was occupied for a MOVE MEDIUM command.
3Bh	0Eh	The source element was empty for a MOVE MEDIUM command.

Table C-5 Illegal Request Sense Key (5h) ASC and ASCQ Values *(Continued)*

ASC Byte 12	ASCQ Byte 13	Description
3Bh	85h	The destination for the MOVE MEDIUM command cannot be the CHM.
3Bh	86h	The source for the MOVE MEDIUM command cannot be the CHM.
3Bh	87h	A cartridge is stuck in the tape drive.
3Bh	90h	The source cartridge is loaded inside the tape drive and is not accessible.
3Dh	00h	There were invalid bits in the identify message. Either one of the reserved bits was nonzero or the LUNTAR field was nonzero.
3Fh	87h	The tape library cannot execute a read or write firmware command. The write firmware operation is in progress.
3Fh	88h	The tape library cannot execute a read or write firmware command. The read firmware operation is in progress.
53h	02h	A media load or unload operation was prevented with a PREVENT/ALLOW MEDIUM REMOVAL command.
80h	01h	There was a cartridge in the grab base during power up, before a cartridge move, or before a diagnostic test.
80h	03h	The source cartridge magazine is not installed.
80h	04h	The destination cartridge magazine is not installed.
80h	05h	The source tape drive is not installed.
80h	06h	The destination tape drive is not installed.
85h	01h	The bar code scanner is not installed.

Unit Attention—Sense Key 6h

The tape library does not stack Unit Attention conditions. The tape library reports only the last Unit Attention condition when there are two or more Unit Attention conditions. A Unit Attention condition remains in effect for a particular initiator until that initiator clears it.

Table C-6 lists combinations of ASC and ASCQ values for the Unit Attention sense key (6h).

Table C-6   Unit Attention Sense Key (6h) ASC and ASCQ Values

ASC Byte 12	ASCQ Byte 13	Description
28h	00h	The door was opened then closed.
28h	89h	The tape library was placed in SCSI Interface mode after operating in one of the serial port modes.
28h	8Dh	The tape library was placed in SCSI Interface mode after operating in LCD mode.
28h	8Eh	The tape library was placed in SCSI Interface mode after operating in one of the sequential modes (Sequential CTS1, Sequential CTS2, or Dual Sequential).
29h	00h	A power-on, SCSI bus reset, or device reset message occurred.
2Ah	01h	Mode parameters have been changed. Issue a MODE SENSE (1Ah) command to determine what the new mode parameters are.
3Fh	01h	New microcode was loaded.

Aborted Command—Sense Key Bh

Table C-7 lists the combinations of ASC and ASCQ values for the Aborted Command sense key (Bh).

Table C-7   Aborted Command Sense Key (Bh) ASC and ASCQ Values

ASC Byte 12	ASCQ Byte 13	Description
43h	00h	The tape library received a message at an invalid time.
45h	00h	A reselect failure occurred. The host system rejected the Identify message sent by the tape library after the tape library reselected the host.
57h	00h	One of the following conditions occurred: The message system was disabled and the tape library discovered a parity error on the SCSI bus. The message system was enabled and the initiator rejected a Restore Data Pointers message that the tape library sent to recover from a parity error. All parity error retries were exhausted.
48h	00h	One of the following conditions occurred: The tape library received an Initiator Detected Error message at an inappropriate time. The initiator rejected a Restore Data Pointers message that the tape library sent in response to the Initiator Detected Error message.

General 8mm Tape Drive Information D≡

Tape Drives

The drives currently used in the tape library are model 8505XL drives. These 8mm devices incorporate internal data compression and can use the longer 160 meter length tapes.

Tape Formats and Capacities

The tape drives in the library can write and read in three basic formats: 8200, 8500, and 8500c (compressed). Capacity of the tape will vary depending on format and tape length. See Table D-1.

Table D-1 Tape Capacities

Solaris 2.x Format[1]	Tape Format	Capacity per Tape Length		
		15 meter	112 meter	160 meter[2]
/dev/rmt/0l	8200	0.3 Gbyte	2.3 Gbyte	n/a
/dev/rmt/0m	8500	0.6 Gbyte	5 Gbyte	7 Gbyte
/dev/rmt/0h	8500compress	1.2 Gbyte[3]	10 Gbyte[3]	14 Gbyte[3]
/dev/rmt/0c	8500compress	1.2 Gbyte[3]	10 Gbyte[3]	14 Gbyte[3]

[1] use /dev/rmt/1 for second drive, /dev/rmt/2 for third. etc.

[2] The 160m tapes are only usable in the tape library version of the drives and the standalone 14 Gbyte drives

[3] Capacity assumes a 2:1 compression ratio.

Data Format Compatibility with Older Drives:

Sun has offered four different capacity 8mm tape drives. These encompass three different data formats (densities) and one drive that can use longer tapes.

At each capacity point a drive model can write and read lower and equal densities and not operate with higher density formats.

Table D-2 Tape Compatibility

Data Format	Capacity with 112 meter tape	Compatibility with each drive model		
		2.3Gbyte	5.0Gbyte	10Gbyte
8200	2.3Gbyte	write/read	write/read	write/read
8500	5.0Gbyte	None	write/read	write/read
8500c	10Gbyte (2:1 compression)	None	None	write/read

The 14Gbyte 8mm drive (8505XL) drive has the same format capability as the 8505 and allows use the longer 160 meter tape for a nominal capacity of 14Gbyte.

Choosing a Data Cartridge

Cartridges of up to 112 meters are supported in any Sun 8mm tape drive. Only the 14GB drive can support the 160 meter tapes. 160 meter tapes should never be used in the lower capacity drives.

Use only data grade cartridges in the tape library. Video grade cartridges are not as durable and exhibit higher error rates. Video cartridges tend to cause problems with long term usage. Many brands have low quality plastic shells that can lead to media handling problems.

Choosing a cleaning cartridge

Use only dry fabric technology cleaning cartridges in the tape library. Cleaners designed for video use are very abrasive and can damage the tape head and mechanism. Cleaners that require a cleaning fluid are not recommended.

Data Capacity with Data Compression

The data capacity of drives with data compression is dependent on the redundancy of the stored data. Sun specifies capacity figures that assume a compression ratio of two to one (2:1). This ratio is typical of data stored on a computer system. The compressibility of data can vary. Text and binary files tend to compress at about a three to one (3:1) ratio. Image files are typically not redundant and do not compress well. Typical overall compression ratios are near 2:1.

Hardware Data Compression

Data compression can be done by the drive's internal hardware-based data compression. This is specified by the format/device identifier as shown in Table D-1. One disadvantage of this approach is that this data format is not readable by the earlier 8500 or 8200 drives because they do not incorporate hardware data compression.

Note – Never use two compression methods on the same data. The use of a second compression method rarely compresses the data further; double compressed data can actually expand in size.

Software Data Compression

Data compression can be done via software. The compress and restore commands are used for writing and reading, respectively. The Solstice Backup package incorporates the capability to do software-based data compression. Software data compression results in a better compression ratio than the drive's internal data compression but takes significantly longer.

Note – Never use two compression methods on the same data. The use of a second compression method rarely compresses the data further; double compressed data can actually expand in size.

D

Choosing a Blocking Factor or a Block Size

You must use the proper block size in the data transfers to the tape drive. The block size determines the amount of data sent to the drive in one command and, more importantly, determines the amount of data on each logical block on the drive.

You get the best performance and throughput when you use the largest block size (blocking factor) supported. Typically, this is 63k bytes which is specified as a blocking factor of 126. The b parameter and a numerical parameter are specified in the command to the drive. A block size must be specified on both the write and the read operation. If one is not selected, a default is used that may not be the largest or best choice. Be aware that the read operation must always specify an equal or larger block size than the write operation. There is no penalty for choosing a larger block size on read. Thus, you should always choose the largest block size for any read operation.

Tape Utilities

Note – Loss of data can occur if the commands described in the following paragraphs are used inappropriately. This information is provided as a guide for experienced system administrators.
Refer to the *System Administrators Handbook* for more detailed information about using these commands.

mt

A very useful set of capabilities is incorporated in the `mt` command. The basic format of this command is to type `mt -f /dev/rmt/0` subcommand. The most relevant subcommands supported are: status, rewind, and offline. To access the on-line man page, type `man mt`.

The mt status command tells you if a drive is installed at a particular device number (`/dev/rmt/0 through /dev/rmt/7`). Table D-3 lists the possible responses and their meaning.

Table D-3 `mt` Responses

response	meaning
No such file or directory	No drive or drive powered off or the system was not booted with the -r after drive installation
no tape loaded or drive offline	Drive available but no media installed or media load in process
sense key(0x6)= Unit Attention	tape was just loaded into drive
sense key(0x0)= No Additional Sense	Drive is ready. No pending errors.
sense key(0x0)= [anything else]	Recent drive error.

Typically, rewinds are issued as part of the basic write or read commands to the drive. The device identifier specifies rewind unless the no rewind case is documented. For example, when you use the `/dev/rmt/0n` identifier, you are specifying to not rewind the tape after the operation. If the `n` is not present, a rewind is implied and will be done after the operation.

The `mt rewind` command is used to issue rewind commands.

The `mt offline` command ejects media from the tape drive. This is used for sequential mode operation as detailed above. If the robotic mechanism is in sequential mode, it will automatically load the next tape.

tar

The tar command is a basic utility for writing to and reading from the tape drives. Single files, multiple files, or entire directories can be specified. To access the on-line man page, type `man tar`.

For writing, type `tar cvbf 126 /dev/rmt0?` {file or directory name}. Replace the ? with the desired density.

For reading, type `tar xvbf 126 /dev/rmt/0` {or a file or directory name}.

To read the list of files stored on the tape, `type tar tvbf 126 /dev/rm/0`.

`ufsdump`

The `ufsdump` command provides a number of capabilities including incremental backup and restore operations. Foremost for the tape library, the l parameter fills each tape and then loads the next tape using of the library sequential mode. To access the on-line man page, type `man ufsdump`.

The `ufsdump` command replaced the dump command. The `dump` command does not offer the l parameter and so it is not very useful for the tape library. With the `dump` command, you must provide a complex set of parameters that specify how much capacity is to be stored on each tape. This is very difficult to use with the data compression capable drives because the compressibility, and thus the data capacity, can not be determined with any degree of certainty. Use the `ufsdump` command instead of the `dump` command.

Glossary

bus

The SCSI cable that serves as a link for passing signals between the computer system and the SPARCstorage Library.

CDB

Command descriptor block. The structure used to communicate commands from an initiator to a target.

CHM

Cartridge handling mechanism. The robotic assembly that retrieves and replaces cartridges.

CTS

Cartridge Tape Subsystem.

element

An element can be either the CHM, a slot in the removable cartridge holder, the fixed cartridge slot, or a tape drive. Each element has a unique address so the initiator can identify it.

element address

Enables the SPARCstorage Library to identify the elements and move cartridges between them.

host

The computer system that acts as the initiator of an operation.

initiator

A host computer system that requests an operation to be performed by the target.

power-on selftest (POST)

The process that occurs when the SPARCstorage Library performs its initial power-on diagnostics.

removable cartridge holder

Holds up to ten tape cartridges.

small computer systems interface (SCSI)

An industry standard bus used to connect disk and tape devices to a workstation.

SCSI address

See SCSI ID.

SCSI bus

See bus.

SCSI ID

A unique identifier assigned to each device or subsystem on the SCSI bus. Also referred to as SCSI *address*.

target

A bus device (usually a controller) that performs an operation requested by an initiator. The SPARCstorage Library is a target.

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Numerics

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Reader Comments

We welcome your comments and suggestions to help improve this manual. Please let us know what you think about the *SPARCstorage Library Installation and User's Guide,* part number *802-2145-11*.

■ The procedures were well documented.

Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
❏	❏	❏	❏	❏

Comments _____

■ The tasks were easy to follow.

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❏	❏	❏	❏	❏

Comments _____

■ The illustrations were clear.

Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
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Comments _____

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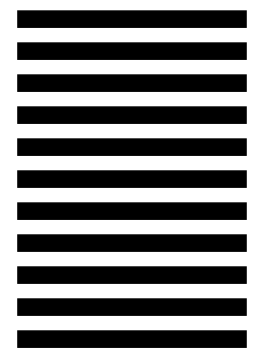
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