

*20-40 Gbyte SPARCstorage™
DLT™ 4000 Tape Drive Manual*



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Sun Microsystems Computer Company

A Sun Microsystems, Inc. Business
2550 Garcia Avenue
Mountain View, CA 94043 USA
415 960-1300 fax 415 969-9131

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Preface

The 20-40 Gbyte SPARCstorage™ DLT™4000 Tape Drive Manual provides installation instructions and user information for the DLT 4000 Tape Drive. These instructions are designed for a system administrator.

How This Book Is Organized

Chapter 1, “Installation in a Multi-Tape Backup Tray,” provides instructions on how to install the tape drive into a Multi-Tape Backup Tray. The steps in this chapter should be performed in conjunction with installation instructions specific to the system or enclosure the tape drive will be installed into.

Chapter 2, “Installation in Other Devices,” provides instructions on how to install the tape drive into devices other than a Multi-Tape Backup Tray. The steps in this chapter should be performed in conjunction with installation instructions specific to the system or enclosure the tape drive will be installed into.

Appendix A, “Modifying the `st.conf` File,” provides instructions on how to modify the `st.conf` file for tape drives that are being connected to workstations using SunOS™ 5.4, 5.5, and 5.5.1 operating systems.

Appendix B, “Specifications,” provides specifications for the tape drive and tape cartridge.

Software Commands

Brief descriptions of some software commands commonly used with tape drives are in the following table. Refer to the *Solaris 2.x Handbook for SMCC Peripherals*, man pages or the AnswerBook™ online documentation for more information.

Table 1

Command	Description
ufsdump	Creates incremental or full backups
ufsrestore	Retrieves data backed up using ufsdump
tar	Creates tape archives and adds or extracts files
mt	Sends commands to magnetic tape devices
st	Acts as a device driver and interface to SCSI tape devices
tapetool	OpenWindows™ tool that reads files from tape or archives files to tape
cpio	Copies file archives in and out

For information on:

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

See one or more of the following:

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

Shell Prompts

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

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

Typographic Conventions

The following table describes the typographic changes used in this book.

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

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France	0800-90-61-57	0800-90-61-58
Belgium	02-720-09-09	02-725-88-50
Luxembourg	32-2-720-09-09	32-2-725-88-50
Germany	01-30-81-61-91	01-30-81-61-92
The Netherlands	06-022-34-45	06-022-34-46
Sweden	020-79-57-26	020-79-57-27
Switzerland	0800-55-19-26	0800-55-19-27
Japan	0120-33-9096	0120-33-9097

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Installation in a Multi-Tape Backup Tray

1 

Follow the instructions in this chapter to configure and install the DLT4000 tape drive in a Multi-Tape Backup Tray.

Installation



1. Determine your operating system using the `uname -rs` command.

Caution – For SunOS 5.4, 5.5, or 5.5.1 operating systems, you must perform the procedures in Appendix A, "Modifying the `st.conf` File," before proceeding.

2. Shut down the operating system.

Use either the `init` or `shutdown` command. See the man pages for these commands or the Solaris AnswerBook online documentation.

3. Determine the SCSI device identifier (SCSI ID) for the tape drive.

To check for an available SCSI ID, enter `probe-scsi-all` at the `ok` prompt. Use a SCSI ID that is not returned by this command. Tape drives are usually set to a SCSI ID of 4 or 5. Write down the SCSI ID (and SCSI host adapter identifier) for future use.

Note – Do not use SCSI ID 7; it is reserved for the host adapter.

4. Turn off the power to your system and then to your peripherals.

5. Prepare your system or enclosure for servicing.

Follow the procedures in the service manual for your system or enclosure.

6. Install the tape drive.

Refer to the procedures in your system or enclosure service manual. Install this drive as you would any full-height device.

Connect the cables as shown in Figure 1-1

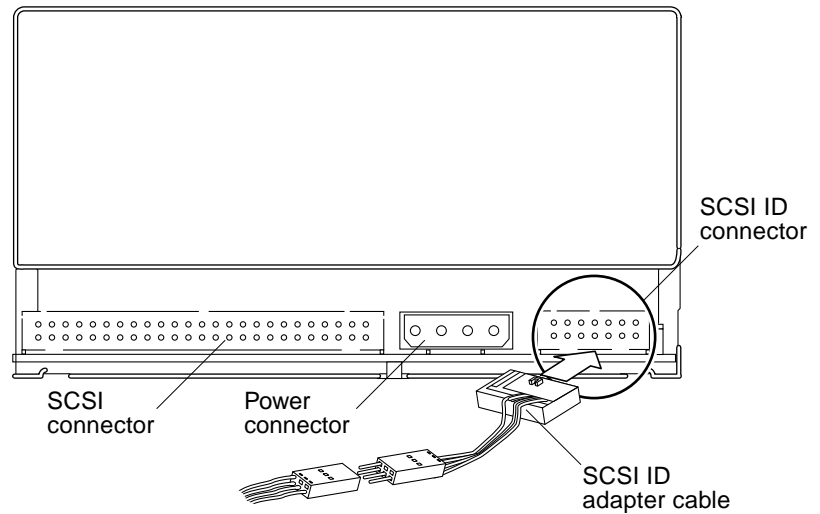


Figure 1-1 Back of DLT4000 Tape Drive

Note – Although there are other switches and connectors on the tape drive, they are inactive in Sun™ configurations.

7. **Install new locking brackets and spacers if you are installing the tape drive in a Multi-Tape Backup Tray that is in a Data Center Expansion Cabinet.**
 - a. **Install new locking brackets on the Multi-Tape Backup Tray.**

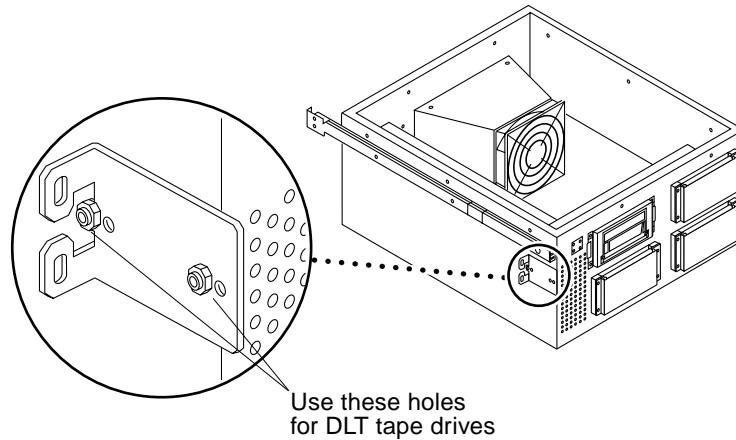


Figure 1-2 Installing New Locking Brackets on a Multi-Tape Backup Tray

- b. **Install spacers and screws on the other tape devices and filler panels to make them flush with the DLT4000 tape drive.**

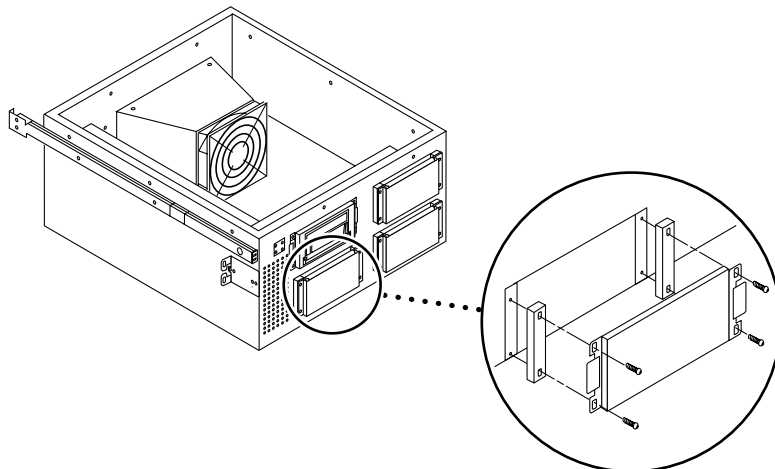


Figure 1-3 Installing spacers and screws behind other devices and filler panels

8. Power on your peripherals and then your system.

Note – If your system starts to reboot, interrupt the reboot proces by pressing the ‘Stop’ and ‘A’ keys together.

9. Reboot your system using the `boot -r` command.

10. Load a tape cartridge into the tape drive (see "Loading a Tape Cartridge" on page 19).

Wait for the tape drive to fully load the tape cartridge.

Note – If all the LEDs on the right or left side of the tape drive front panel are blinking, then the tape drive has failed its power-on self-test (POST). Go to “Troubleshooting” on page 6.

11. Determine which remote number the tape drive has been mapped to.

a. Process the remote numbers in the `/dev/rmt` directory.

```
# ls -l /dev/rmt/? | sed 's/. *rmt\\///'
```

For example, a system with two tape drives (one connected to an internal SCSI host adapter and one to an external host adapter) might look like:

```
# ls -l /dev/rmt/? | sed 's/. *rmt\\///'
0 -> ../../devices/iommu@f,e0000000/sbus@f,e0001000/dma@f,81000/esp@f,80000/st@4,0:
1 -> ../../devices/iommu@f,e0000000/sbus@f,e0001000/QLGC,isp@2,10000/st@5,0:
```

0
1

Remote number

dma@f,81000/esp@f,80000/st@4,0:
QLGC,isp@2,10000/st@5,0:

SCSI host adapter

SCSI ID

b. Find the remote number that contains the controller and SCSI ID (st) number for the tape drive you installed.

In the previous example, the remote number 0 would be used for a tape drive connected to SCSI ID 4 on SCSI host adapter at `dma@f,81000/esp@f,80000`.

12. Verify that the system recognizes the tape drive.

```
#mt -f /dev/rmt/remote_number status
```

- **A correct response would resemble:**

```
#mt -f /dev/rmt/3 status
Other tape drive:
  sense key(0x0)= No Additional Sense   residual= 0   retries= 0
  file no= 0   block no= 0
#
```

Other tape drive on the first line of the output indicates that the tape drive is correctly recognized. The rest of the output does not matter.

- **Incorrect responses include:**

- No tape loaded or drive offline indicates there is no cartridge in the drive or that the cartridge is not yet loaded. Install a cartridge or wait for the cartridge load to complete and retry the `mt status` command.
- No such file or directory indicates there is no tape drive attached to that `rmt` (remote) number. Try another remote number.
- SCSI tape drive indicates the `st.conf` entry is incorrect. You must edit the `st.conf` file and reboot until you no longer see SCSI tape drive.

The Tape In Use LED should be lit, signifying that the drive is ready for use. Go to Chapter 3, "Operation."

Note – If the tape drive does not complete POST, or if all the right- or left-side LEDs blink repeatedly, go to “Troubleshooting” on page 6.

Troubleshooting

If the DLT4000 tape drive fails during POST or operation, use Table 1-1 to determine the problem and the action to take.

Table 1-1 Troubleshooting

Symptom:	Your system does not recognize the DLT4000 tape drive.
Action:	Make sure that: <ul style="list-style-type: none">• The SCSI ID is unique.• The SCSI data cable is not loose.• The SCSI bus is correctly terminated.• You have rebooted the system using the <code>boot -r</code> command.
Symptom:	All LEDs on the right- or left-side of the tape drive front panel blink.
Action:	Try to unload the tape and reinitialize the drive by pressing the Unload button, or turn the drive power off and then on again. The right- or left-side LEDs stop blinking and the drive tries to reinitialize. The LEDs should turn on steady again and go off if the test succeeds. If all right- or left-side LEDs still blink, the drive has a hardware failure.

Installation in Other Devices

2 

Follow the instructions in this chapter to configure and install a DLT4000 tape drive in systems or enclosures other than a Multi-Tape Backup Tray.



Caution – Do not install a SPARCstorage DLT4000 tape drive in a SPARCserver™ 2000 system rack.

Installation



1. Determine your operating system using the `uname -rs` command.

Caution – For SunOS 5.4, 5.5, or 5.5.1 operating systems, you must perform the procedures in Appendix A, "Modifying the `st.conf` File," before proceeding.

2. Shut down the operating system.

Use either the `init` or `shutdown` command. See the man pages for these commands or the Solaris AnswerBook online documentation.

3. Determine the SCSI device identifier (SCSI ID) for the tape drive.

To check for an available SCSI ID, enter `probe-scsi-all` at the `ok` prompt. Use a SCSI ID that is not returned by this command. Tape drives are usually set to a SCSI ID of 4 or 5. Write down the SCSI ID (and SCSI host adapter identifier) for future use.

Note – Do not use SCSI address 7; it is reserved for the host adapter.

- 4. Turn off the power to your system and then to your peripherals.**
- 5. Prepare your system or enclosure for servicing.**
Follow the procedures in the service manual for your system or enclosure.
- 6. Install the tape drive.**
Refer to the procedures in your system or enclosure service manual. Install this drive as you would any full-height device.
 - a. Connect the SCSI and power cables to the connectors on the back of the tape drive (Figure 2-1).**

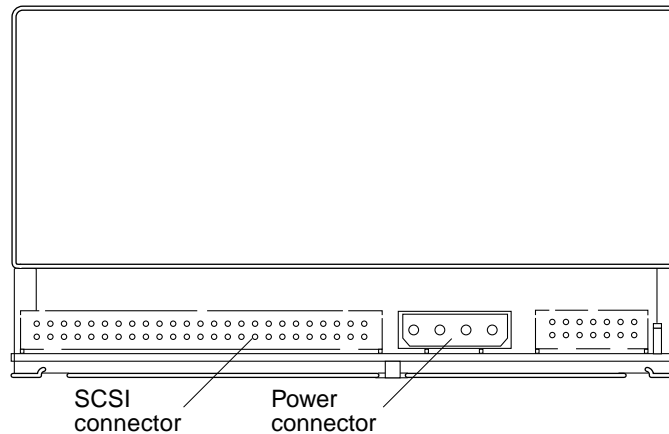


Figure 2-1 Back of DLT4000 tape drive

a. Set the SCSI ID.

For systems or enclosures with a SCSI ID cable, install the SCSI ID cable as shown in Figure 2-2 and set the SCSI ID for the tape drive using the SCSI ID switch on the system or enclosure.

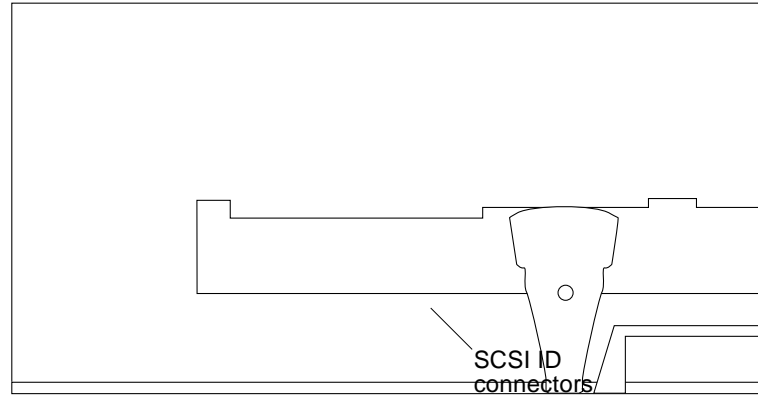


Figure 2-2 SCSI ID connectors

For systems or enclosures that do not have a SCSI ID cable, connect the jumpers as shown in Figure 2-3.

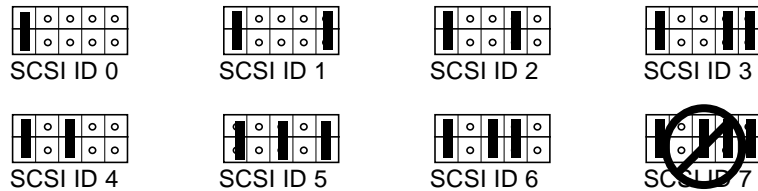


Figure 2-3 Setting SCSI ID Jumpers

Note – Although there are other switches and connectors on the tape drive, they are inactive in Sun configurations.

7. Power on your peripherals and then your system.

Note – If your system starts to reboot, interrupt the reboot process by pressing the ‘Stop’ and ‘A’ keys together.

8. Reboot your system using the `boot -r` command.

9. Load a tape cartridge into the tape drive (see "Loading a Tape Cartridge" on page 19).

Wait for the tape drive to fully load the tape cartridge.

Note – If all of the LEDs on the right or left side of the tape drive front panel are blinking, then the tape drive has failed its power-on self-test (POST). Go to “Troubleshooting” on page 12.

10. Determine which remote number the tape drive has been mapped to.

a. Process the remote numbers in the `/dev/rmt` directory.

```
# ls -l /dev/rmt/? | sed 's/. *rmt\\///'
```

For example, a system with two tape drives (one connected to an internal SCSI host adapter and one to an external host adapter) might return:

```
# ls -l /dev/rmt/? | sed 's/. *rmt\\///'
0 -> ../../devices/iommu@f,e0000000/sbus@f,e0001000/dma@f,81000/esp@f,80000/st@4,0:
1 -> ../../devices/iommu@f,e0000000/sbus@f,e0001000/QLGC,isp@2,10000/st@5,0:
```

Remote number

SCSI host adapter

SCSI ID

b. Find the remote number that contains the controller and SCSI ID (st) number for the tape drive you installed.

In the previous example, the remote number 0 would be used for a tape drive connected to SCSI ID 4 on SCSI host adapter at `dma@f,81000/esp@f,80000`.

11. Verify that the system recognizes the tape drive.

```
#mt -f /dev/rmt/remote_number status
```

- **A correct response would resemble:**

```
#mt -f /dev/rmt/3 status
Other tape drive:
  sense key(0x0)= No Additional Sense   residual= 0   retries= 0
  file no= 0   block no= 0
#
```

Other tape drive on the first line of the output indicates that the tape drive is correctly recognized. The rest of the output does not matter.

- **Incorrect responses include:**

- No tape loaded or drive offline indicates there is no cartridge in the drive or that the cartridge is not yet loaded. Install a cartridge or wait for the cartridge load to complete and retry the `mt status` command.
- No such file or directory indicates there is no tape drive attached to that `rmt` (remote) number. Try another remote number.
- SCSI tape drive indicates the `st.conf` entry is incorrect. You must edit the `st.conf` file and reboot until you no longer see SCSI tape drive.

The Tape In Use LED should be lit, signifying that the drive is ready for use. Go to Chapter 3, "Operation."

Note – If the tape drive does not complete POST, or if all the right- or left-side LEDs blink repeatedly, go to “Troubleshooting” on page 12.

Troubleshooting

If the DLT4000 tape drive fails during POST or operation, use Table 2-1 to determine the problem and the action to take.

Table 2-1 Troubleshooting

Symptom:	Your system does not recognize the DLT4000 tape drive.
Action:	<p>Make sure that:</p> <ul style="list-style-type: none"> • The SCSI ID is unique. • The SCSI data cable is not loose. • The SCSI bus is correctly terminated. • You have rebooted the system using the <code>boot -r</code> command.
Symptom:	All LEDs on the right- or left-side of the tape drive front panel blink.
Action:	<p>Try to unload the tape and reinitialize the drive by pressing the Unload button, or turn the drive power off and then on again. The right or left side LEDs stop blinking and the drive tries to reinitialize. The LEDs should turn on steady again and go off if the test succeeds.</p> <p>If all right or left side LEDs still blink, the drive has a hardware failure.</p>

This chapter gives details of the basic operation of the DLT4000 tape drive, and the meanings of the front panel displays.

For information about software commands, refer to the *Solaris Handbook for SMCC Peripherals* or the AnswerBook documentation for your operating system.

Front Panel Controls and Indicators

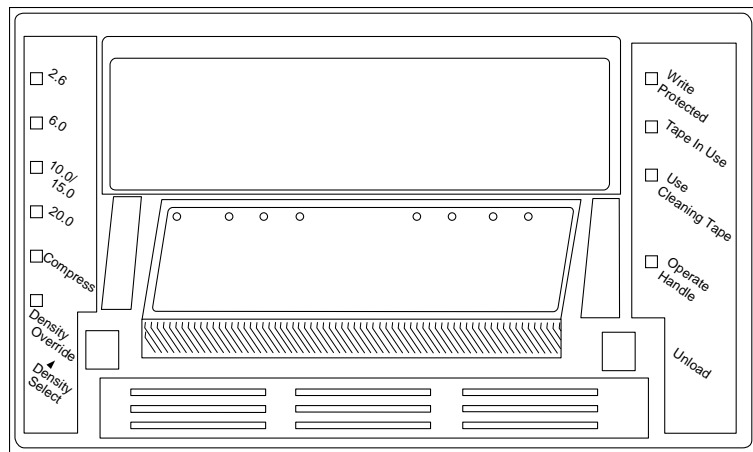


Figure 3-1 DLT4000 Front Panel

Left Front Panel LEDs

The tape drive has seven left front panel LEDs (Figure 3-1). The LEDs are described in Table 3-1.

Table 3-1 Left Front Panel LEDs

LED	State	Operating Condition
2.6	On/Blinking ¹	Tape is recorded in 2.6 Gbyte format
6.0	On/Blinking ¹	Tape is recorded in 6.0 Gbyte format
10.0/15.0	On/Blinking ¹	Tape is recorded in 10.0 or 15.0 Gbyte format
20.0	On/Blinking ¹	Tape is recorded in 20.0 Gbyte format
Compress ²	On	Compression mode is enabled.
	Off	Compression mode is disabled.
Density Override	On	You selected a density from the front panel.
	Off	Density will be selected by the host.
	Blinking	The tape drive is in density selection mode.
All LEDs	On	POST is starting.
	Blinking	A POST error occurred.

1. A blinking LED signifies that you have used the Select button to choose a density other than the tape cartridge's default or pre-recorded density.

2. Compression can be done in 10,15,20, and 35 Gbyte densities only.

Select Button

The Select button is used to select the record density of the tape cartridge. See "Selecting Density" for more information.

Cartridge Insert/Release Handle

Operate the cartridge insert/release handle to load a cartridge or to eject a cartridge only when the Operate Handle LED is on, and after the beeper sounds. The handle lifts to the open position and lowers to the closed position.

Right Front Panel LEDs

The tape drive has four right front panel LEDs (Figure 3-1). The LEDs are described in Table 3-2.

Table 3-2 Right Front Panel LEDs

LED	State	Operating Condition
Write Protected	On	Tape is write-protected.
	Off	Tape is write-enabled.
Tape In Use	On	Tape is loaded and ready for use.
	Blinking	Tape is in use.
Use Cleaning Tape	On	Drive head needs cleaning, or the tape is bad. See "Using a Cleaning Tape Cartridge" on page 23.
	Off	Cleaning is complete, or cleaning is unnecessary.
Operate Handle	On	Okay to operate the cartridge insert/release handle.
	Off	Do not operate the cartridge insert/release handle.
All LEDs	On	POST is starting.
	Blinking	An error has occurred. See Table 2-1.

Unload Button

The Unload button is used primarily to unload the tape. When you push the Unload button, the DLT4000 drive waits until an active write to tape is completed before beginning the unload sequence. See "Unloading a Tape Cartridge" on page 22.

If the drive is in an error state, pushing the Unload button causes the drive to reset and unload the tape if possible. See "Troubleshooting" on page 12.

Beeper

A beeper sound indicates you can operate the cartridge insert/release handle. When the drive “beeps”, the Operate Handle LED should be on. To prevent damage to the drive, wait for the sound of the beep before opening the door.

Tape Cartridge

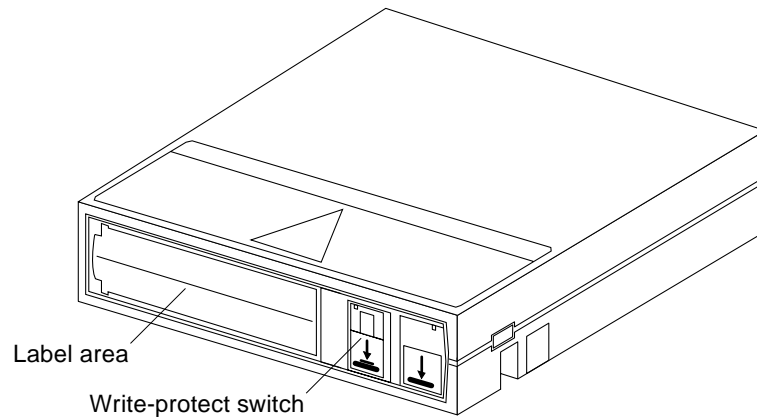


Figure 3-2 DLT Tape Cartridge

Description

The DLT4000 tape drive uses type III, IIIxt, and IV DLT tape cartridges. These tape cartridges contain 1/2 inch magnetic metal particle tape.

The color of the tape cartridge is used to distinguish its type:

- Type III tape cartridges are gray/brown.
- Type IIIxt tape cartridges are white.
- Type IV tape cartridges are black.

For more information about tape cartridges, see Table 3-3.

Table 3-3 Tape Cartridge Specifications

Type	Length	Native Capacity	Compressed Capacity ¹
III	356m (1167 ft)	10 Gbytes	20 Gbytes
IIIxt	541m (1778 ft)	15 Gbytes	30 Gbytes
IV	541m (1778 ft)	20 Gbytes	40 Gbytes

1. Assumes a typical compression ratio of 2:1. The compression ratio will vary depending upon the type of data being compressed.

Write-Protect

The tape cartridge has a write-protect switch (Figure 3-2) to prevent accidental erasure of data. This switch can be set prior to or after inserting the tape cartridge into the tape drive.

- To write protect a cartridge, move the switch to the left so that a small rectangle is visible.
- To write enable a cartridge, move the switch to the right so that the rectangle is not visible.

If the write-protect switch is changed while the tape cartridge is being written to by the tape drive, the change does not take effect until the current write operation completes.

Handling and Storage



Caution – Do not drop or bang the tape cartridge. This can displace the tape leader, making the tape cartridge unusable and possibly damaging the drive.

Follow these guidelines when handling tape cartridges:

- Do not forcibly remove a tape cartridge from the drive. If a cartridge is difficult to remove, reinsert the tape cartridge, wait for the tape cartridge to load, and then try to unload the tape cartridge again.
- Do not use adhesive labels on the tape cartridge. Use only the labels that fit into the tape cartridge label area. Using other labels may cause the tape cartridge to jam in the tape drive.
- Do not move a DLT4000 tape drive with a tape cartridge loaded; doing so can damage the tape cartridge.

When not in use, return a tape cartridge to the plastic enclosure it was shipped in and store it in a clean, dust-free environment. In addition:

- Store tape cartridges in temperatures between 20°C and 30°C (68°F to 86°F). For longer tape cartridge life, store it at a stable temperature and as close 22°C (72°F) as possible.
- Store tape cartridges where the relative humidity is between 30% and 50%. For longer tape cartridge life, store it at a stable relative humidity and as close to 40% relative humidity as possible.
- Keep tape cartridges out of direct sunlight and away from heaters and other heat sources.
- Keep tape cartridges away from electromagnetic interference sources, such as terminals, motors, and video or X-ray equipment. Data on the tape can be altered.

Note – If a tape cartridge has been exposed to extreme heat or cold, stabilize the cartridge at room temperature for the same amount of time it was exposed (up to 24 hours).

Loading a Tape Cartridge

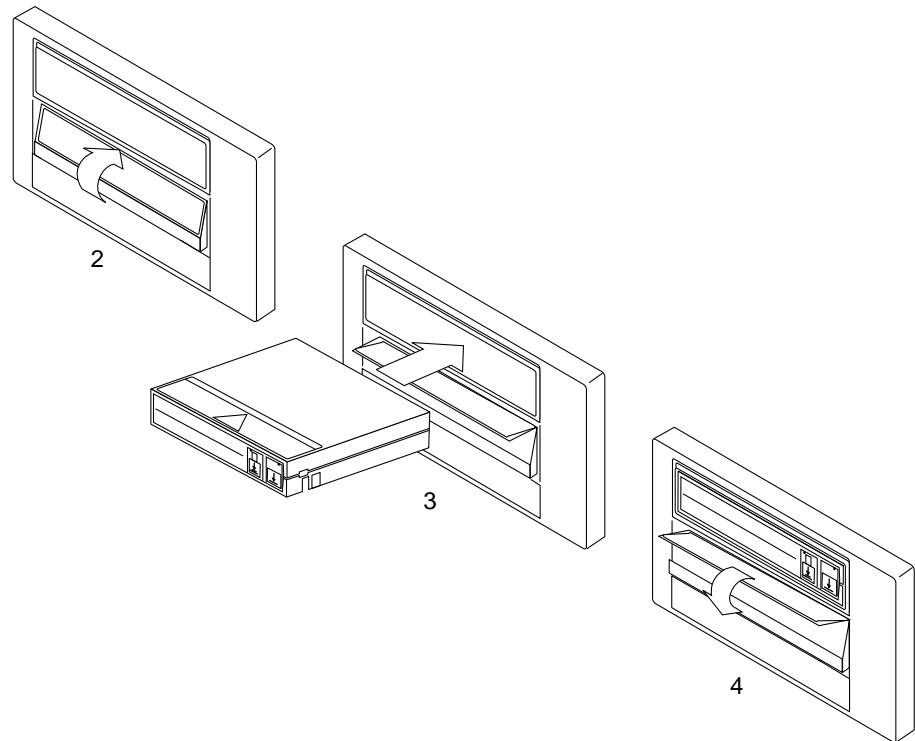


Figure 3-3 Loading a Tape Cartridge

To load a tape cartridge into the tape drive:

1. **Make sure that the Operate Handle LED is on (Figure 3-1).**
2. **Lift the cartridge insert/release handle (Figure 3-3).**
3. **Insert the cartridge into the tape drive.**
4. **Push the handle closed.**

Note – To prevent handle failures, do not flip the handle closed.

The Operate Handle LED turns off and the Tape In Use LED blinks to show the tape is loading. When the tape is at the BOT marker, the Tape In Use LED turns on steady. The tape is now ready for use.

Selecting Density

You can select the density that the tape cartridge will record data by using the front-panel Select button or by using a software command. In either case, the new density does not take effect until a write from beginning of tape (BOT) is executed. Until then, the recorded density (for prerecorded tape cartridges) or the default density (for blank tape cartridges) will be used.

Valid Densities

Table 3-4 shows the densities that can be selected for the DLT4000 tape drive.

Table 3-4 Selectable Densities

Tape Type	Default Density	Selectable Densities
III	10.0 Gbyte native	2.6 Gbyte, 6.0 Gbyte, 10.0 Gbyte native or 10.0 Gbyte compressed
IIIxt	15.0 Gbyte native	15.0 Gbyte native or 15.0 Gbyte compressed
IV	20.0 Gbyte native	20.0 Gbyte native or 20.0 Gbyte compressed

Selecting Density Using the Front Panel

To select density using the front panel:

1. Load the tape cartridge into the drive.

The Tape in Use LED blinks while the tape loads and calibrates. After calibration completes, the Tape in Use LED remains lit. The LEDs on the left side of the drive show the tape cartridge's prerecorded density.

2. Press the Select button until the LED(s) specifying the desired density light.

The original density LED(s) will go out. The selected density LED(s) will be on steady and the Density Override LED will blink. Then the selected density will blink and the LED(s) for the original density and the Density Override LED will be steady.

3. When a write from BOT occurs, the selected density will be used.

The selected density and the Density Override LEDs are on steady.

Selecting Density Using Software Commands.

To select the recording density by using software commands:

1. Choose a density specifier from Table 3-5.

Table 3-5 Density Specifiers

Density Specifiers	Cartridge Types and Capacities		
	Type IV	Type IIIxt	Type III
l, h	20 Gbytes	15 Gbytes	10 Gbytes
m, c	40 Gbytes ¹	30 Gbytes ¹	20 Gbytes ¹

¹Assumes a typical compression ratio of 2:1. The compression ratio will vary depending upon the type of data being compressed.

2. Type the `mt` command with the appropriate density specifier (Table 3-5).

For example:

```
#mt -f /dev/rmt/3u rewind
```

See the `st` and `mt` man pages for more information.

Unloading a Tape Cartridge

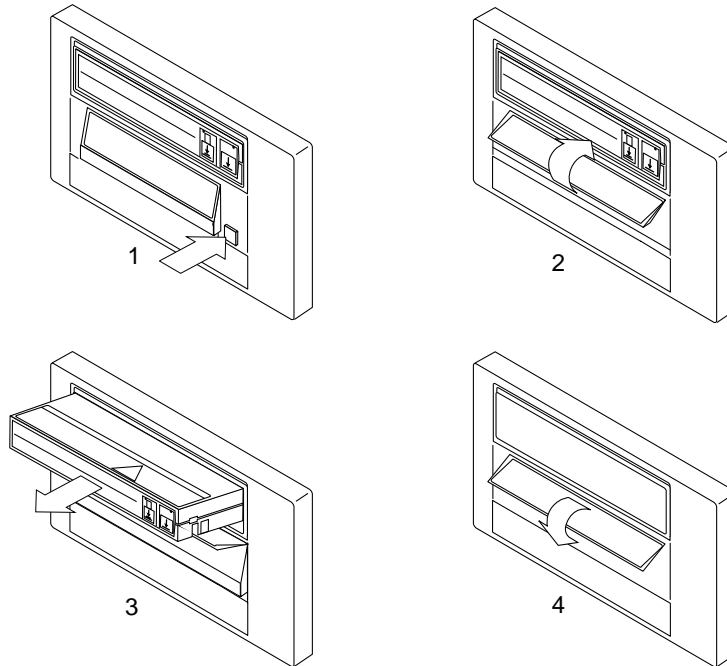


Figure 3-4 Unloading a Tape Cartridge



Caution – Remove a tape cartridge from the drive before turning off the host system power. Failure to remove a tape cartridge can result in cartridge and drive damage.

To unload a cartridge from the tape drive:

1. **Press the Unload button (Figure 3-4).**
The Tape in Use LED blinks as the tape rewinds. This may take between 17 seconds and two minutes.
2. **When the Operate Handle LED turns on and the beeper sounds, pull the cartridge insert/release handle open to eject the cartridge.**
3. **Remove the cartridge.**
4. **Push the handle closed.**

Using a Cleaning Tape Cartridge



Caution – Use only a DLT Type III cleaning cartridge to clean the tape drive.

When the Use Cleaning Tape LED lights:

1. **Load cleaning tape cartridge into the tape drive. See “Loading a Tape Cartridge”.**

Note – If the Use Cleaning Tape LED lights after you load the cleaning tape cartridge, cleaning has not been done because the cleaning tape cartridge is expired. Replace the cleaning tape cartridge. A cleaning tape usually lasts about 20 cleanings.

2. **Wait for the cleaning process to complete.**

The Tape In Use LED stops blinking. The beeper sounds and the Operate Handle LED lights.

3. **Unload the cleaning tape cartridge. See “Unloading a Tape Cartridge”.**

4. **Record the date of the cleaning on the cartridge label.**

Note – If A data cartridge causes the Use Cleaning Tape LED to blink or the Use Cleaning Tape LED still lights after you clean the drive head, then the data cartridge may be damaged. Try another data tape cartridge. If the second tape cartridge works, then backup your original tape cartridge onto another tape cartridge. Discard the old tape cartridge.

System Diagnostic Support

SunVTS™ 1.0 diagnostic software, which was distributed with the Solaris 2.5 software environment, requires that you apply patch number 103097-01 to your system. SunVTS™ 2.0 diagnostic software and later versions do not require a patch. You can obtain any need patches through your normal service channels.

This tape drive is not supported by the SunDiag™ diagnostic software.

Modifying the `st.conf` File



The Solaris software environment recognizes all tape drives and autoloaders that were supported by Sun when your operating system was released. If your system uses SunOS releases 5.4, 5.5, or 5.5.1, which were released before the DLT4000 tape drive, you need to modify the `/kernel/drv/st.conf` file so that your Solaris software will recognize the DLT4000 tape drive.

If you are familiar with this procedure, go to “Modifying the `st.conf` file” on page 28. For more information on this procedure, go to “Understanding the `st.conf` file” on page 26.

Understanding the st.conf file

The beginning of the `st.conf` file contains possible values that you might use to configure third-party or other unsupported tape drives. These values are divided into three sections:

- `tape-config-list`
- Tape device identifiers
- Configuration values

`tape-config-list`

The line:

```
#tape-config-list=
```

indicates the start of values that the operating system will use to configure previously unsupported tape devices.

Note – There can only be one active (uncommented) `'tape-config-list='` line in the `st.conf` file.

Tape Device Identifiers

The next section, which includes lines like:

```
# "ARCHIVE Python 28454", "Archive Python 4mm Helical Scan", "ARCH_Python",  
# "ARCHIVE Python 29279", "Archive Python 4mm DAT Stacker", "ARCH_Python",
```

and ends with a line like:

```
# "\076\000", "Fujitsu 1/2\" Cartridge", "Fujitsu_half";
```

1

2

3

contains:

1. The information about the tape device that the operating system sees when it 'looks at' a tape device.
2. The information the operating system outputs when queried about the tape device (by programs such as SunVTS diagnostic software).
3. A string which acts as a pointer to values that will be used to configure the tape device.

Note – The first two lines of the example end in commas. The last line in the example ends with a semi-colon. You must follow this format when adding multiple tape devices to the `st.conf` file.

Configuration Values

The third section contains the values that will be used to configure the tape devices. It has lines like:

```
#ARCH_Python = 1,0x2c,0,0xde39,4,0x00,0x8c,0x8c,0x8c,3;
```

The part of the line before the equal sign (=) is the string that is linked to the values that will be used to configure a tape device. The second part of the line contains the configuration values. These values are well defined in the `st` man page.

If you look at the first two examples in the “Tape Device Identifiers” section, you will see that both the "ARCHIVE Python 28454" and the "ARCHIVE Python 29279" lines end with the string "ARCH_Python". This means that the operating system will configure both tape devices according to the parameters set in the `ARCH_Python` line.

Note – Each line in the configuration section must start with a unique string. Also, each line in this section ends in a semi-colon(;).

Modifying the `st.conf` file

Read this entire procedure before editing the `st.conf` file.

Note – The syntax is critical. Verify the placement of commas, semicolons, and beginning and ending quotation marks.

1. Become superuser.

```
% su
Password:
#
```

2. Make a copy of the original `st.conf` file as a backup (`st.conf.old`).

```
#cp /kernel/drv/st.conf /kernel/drv/st.conf.old
```

3. Edit the `st.conf` file.

Using an editor, scroll through the `st.conf` file to the following line:

```
#tape-config-list=
```

a. Delete the `#` character that begins the line, if it hasn't already been removed.

b. Using the editor, continue to scroll until you come to the end of the “Tape Device Identifiers” section.

The line will look something like:

```
# "\076\000", "Fujitsu 1/2\" Cartridge", "Fujitsu_half";
```

c. On the next line, add the following entry exactly as shown:

```
"SUN      DLT4000", "Quantum DLT 4000", "QDLT";
```

5 spaces

Note – If multiple devices are enabled (lines uncommented) only the last uncommented line with this format needs to end with a semi-colon. All previous lines with this format must end with a comma.

d. Using the editor, continue to scroll until you come to the end of the “Configuration Values” section.

The line will look something like:

```
#WtQIC = 1,0x32,512,0x0624,1,0x00,0;
```

e. On the next line, add the following entry exactly as shown:

```
QDLT =1,0x36,0,0xD639,4,0x80,0x81,0x82,0x83,2;
```

Note – All lines in this section end with semi-colons.

f. Save and exit the file.

4. Continue the installation procedure.

For installations in a Multi-Tape Backup Tray, return to Step 2 on page 1.

For installations in other devices, return to Step 2 on page 7.

Specifications



This chapter contains the specifications for the DLT4000 tape drive.

Physical

Table B-1 Physical Specifications

Form Factor	Width	Depth	Height	Weight
5.25 inches	5.84 inches	9.6 inches	3.4 inches	6.7 pounds
133.35 mm	148.3 mm	243.8 mm	86.3 mm	2.9 kg

Electrical

Table B-2 Electrical Specifications

Specification	5V ($\pm 5\%$)	12V ($\pm 10\%$)
Steady state	3.6A	1.6A
Maximum ¹	3.8A	2.6A

1. Maximum values are for about 300 ms duration.

Interface and Performance

Table B-3 Interface and Performance Specifications

Specification	Value
Buffer size	2 Mbytes
Transfer Rates (<i>maximum</i>)	
User native:	5.2 Mbytes/sec
Raw native:	3 Mbytes/sec
User compressed:	10 Mbytes/sec

Timing

Table B-4 Timing Specifications

Specification	Value
Read/Write tape speed	160 in/sec
Rewind tape speed	175 in/sec
Linear search tape speed	175 in/sec
Rewind times	
Average	1 min
Maximum	2 min
Access times (from BOT)	
Average	1 min
Maximum	2 min
Load to BOT (previously written)	48 sec ¹
Unload from BOT	17 sec

1. The time is slightly longer if you are using a blank tape.

Tape Cartridge

Table B-5 Tape Cartridge Specifications

Type	Length	Native Capacity	Compressed Capacity ¹
III	356m (1167 ft)	10 Gbytes	20 Gbytes
IIIxt	541m (1778 ft)	15 Gbytes	30 Gbytes
IV	541m (1778 ft)	20 Gbytes	40 Gbytes

1. Assumes a typical compression ratio of 2:1. The compression ratio will vary depending upon the type of data being compressed.

Quality

Table B-6 Quality Specifications

Specification	Value
MTBF	200,000 hrs ¹
Head life	30,000 tape motion hours
Error rates	
Recoverable	1 in 10 ¹⁷
Undetectable	1 in 10 ²⁷
Tape life	500,000 passes

1. Sun Microsystems, Inc. does not warrant that the predicted MTBF is representative of any particular unit installed for customer use. Actual figures vary from unit to unit.

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