COMPAQ

SDLT 110/220 Drive

Reference Guide

About This Guide

This guide is designed to be used as a reference tool for operation, troubleshooting, and future upgrades.

Document Structure

This guide contains the following information:

Chapter 1: Introducing the SDLT 110/220

Overview

Software included in the kit

System requirements

Data compression

Chapter 2: Installing Software Drivers

Where to find the device drivers for Intel-based systems.

Microsoft Windows NT, Windows 2000, Novell NetWare, Compaq Tru64 UNIX, and OpenVMS software driver information

Chapter 3: Operating the SDLT 110/220 Drive

Power On Self-Test

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Operating the SDLT 110/220 drive

Appendix D: Manually Removing a Cartridge

Tools

Preparing the SDLT-100 drive

Disassembling the SDLT-100 drive

Assembling the SDLT-100 drive

Related Documents

In addition to this guide, the following documentation may be useful:

Table 1 Related Documents	
Document Title	**Order Number**
Compaq Super DLT-100 Internal Drive Installation Instructions	201413-021
Compaq Super DLT-100 External Drive Installation Instructions	201414-021

Intended Audience

This guide is intended for key users who will install, operate, and maintain the tape drive.

Visit our Web Site for the Latest Information

For the latest technical tips and documentation, check out our web page at:
http://www.compaq.com

Text Conventions

This document uses the following conventions to distinguish elements of text:

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in uppercase and a different typeface.
Filenames	File names appear in italic, initial capital letters. [NOTE: UNIX filenames are in lowercase.]
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in upper case. [NOTE: UNIX commands are in lowercase.]
Type	When you are instructed to *type* information, type the information **without** pressing the **Enter** key.
Enter	When you are instructed to enter information, type the information and then press the **Enter** key.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Symbols on Equipment

These icons may be located on equipment in areas where hazardous conditions may exist.

Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.
WARNING: To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.
WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.
WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.
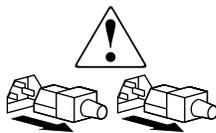
Power Supplies or Systems marked with these symbols indicate the equipment is supplied by multiple sources of power.
WARNING: To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the system.

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.
WARNING: To reduce the risk of personal INJURY or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Rack Stability

> ⚠️ **WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:
>
> ■ The leveling jacks are extended to the floor.
>
> ■ The full weight of the rack rests on the leveling jacks.
>
> ■ The stabilizing feet are attached to the rack if it is a single rack installations.
>
> ■ The racks are coupled together in multiple rack installations.
>
> ■ A rack may become unstable if more than one component is extended at a time.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Compaq Technical Support

You are entitled to free hardware technical telephone support for your product for as long you own the product. A technical support specialist will help you diagnose the problem or guide you to the next step in the warranty process.

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ. This service is available 24 hours a day, 7 days a week.

> **NOTE:** For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for world wide Technical Support Centers are listed on the Compaq website. Access the Compaq website by logging on to the Internet at http://www.compaq.com.

Be sure to have the following information available before you call Compaq:

■ Technical support registration number (if applicable)

■ Product serial numbers

■ Product model names and numbers

■ Applicable error messages

- Add-on boards or hardware

- Third-party hardware or software

- Operating system type and revision level

- Detailed, specific questions

Compaq Website

The Compaq website has latest information on this product as well as the latest drivers. You can access the Compaq website by logging on to the Internet at http://www.compaq.com/storage.

Compaq Authorized Reseller

For the name of your nearest Compaq Authorized Reseller:

- In the United States, call 1-800-345-1518.

- In Canada, call 1-800-263-5868.

- Elsewhere, see the Compaq website for locations and telephone numbers.

Revision Record

This revision record provides a concise publication history of this manual and it lists the manual revision levels, release dates, and summary of changes.

The following revision history lists all revisions of this publication and their effective dates. The publication part number is included in the Revision Level column, with the last entry denoting the latest revision.

Revision Level	Release Date	Summary of Changes
Revision A	January 2001	Original Release

Contents

Chapter **1**

Introducing the SDLT 110/220 Drive

This chapter covers the following topics:

- Overview
- Software included in the kit:
  - ❑ Live trial backup software CDs
  - ❑ Compaq Tape Drive Supplemental Driver CD
  - ❑ Compaq SmartStart™ and Support Software CD
  - ❑ Compaq Tape Storage Management Console CD
  - ❑ Compaq Insight Manager™ CD
- System requirements
- Data compression

Overview

The Compaq SDLT 110/220 tape drive is a high-capacity, high-performance streaming tape drive designed for use with Compaq *ProLiant*™ servers, Compaq *AlphaServers*™ and OpenSAN™ storage systems. The tape drive uses Laser Guided Magnetic Recording (LGMR) technology to maximize the amount of data that can be stored on a tape.

The SDLT 110/220 uses a clustered magnetic-resistive (MR) head technology to improve data density, uses Partial Response Maximum Likelihood (PRML) technology to provide increased performance, and has a robust tape buckling system for reliability.
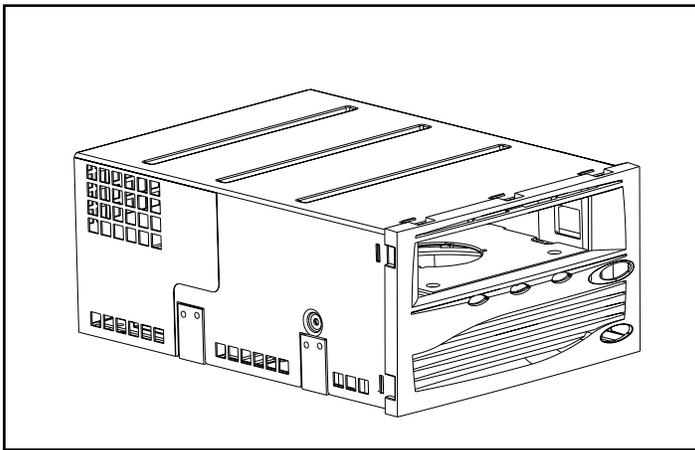
Figure 1–1. Compaq SDLT 110/220 drive

Software Included in the Kit

The following CD-ROMs are included in the SDLT 110/220 drive kit:

■ Live trial backup software CDs

■ A Storage Utility Software (SUS) kit which contains:

❏ Compaq Tape Drive Supplemental Driver CD

❏ Compaq SmartStart and Support Software CD

❏ Compaq Tape Storage Management Console CD

❏ Compaq Insight Manager CD

Live Trial Backup Software CDs

Live trial tape backup software is provided in the kit. After evaluating the software, a software key can be purchased by following the instructions on the product CD.

> **NOTE:** All software configurations and backup tapes will be retained even after the 60-day evaluation period has elapsed.

Compaq Tape Drive Supplemental Driver CD

The Compaq Tape Drive Supplemental Driver CD contains the latest Compaq drivers for Compaq tape drives.

Compaq SmartStart and Support Software CD

The SmartStart and Support Software CD contains several products that simplify server configuration and maintenance. SmartStart ensures a fully manageable server. It configures Compaq Server Management Agents and other system software.

Compaq Tape Storage Management Console (TSMC) CD

The TSMC CD provides easy management and maintenance of Compaq tape drives. TSMC performs diagnostic tests on the SDLT 110/220 drive to diagnose and resolve problems. TSMC also performs firmware upgrades to the SDLT 110/220 drive and provides a firmware version control database. The firmware version control database contains information about new firmware available for all Compaq tape drives. TSMC compares the current firmware version of the SDLT 110/220 drive and searches the firmware version control database for a newer firmware version. You have the option to download the firmware image from Compaq's FTP site and then directly into the tape drive. You also have the option to download a firmware image file directly from a local or network drive.

Compaq Insight Manager CD

Compaq Insight Manager is an application that helps you easily manage network devices. Compaq Insight Manager provides extensive fault, configuration, performance, and asset management information, as well as visual control of Compaq devices.

System Requirements

See Table 1–1 for the recommended controller interfaces that can be used with the SDLT 110/220 drive. Install and configure the controller before beginning the drive installation, using the documentation included with the controller.

Table 1–1 shows the categories of controllers that support the SDLT 110/220 drive and which ones are recommended.

Table 1–1 Supported Controllers

Controller Categories	Recommended
Fast SCSI-2 (Narrow)	No
Fast SCSI-2 (Wide)	No
Wide-Ultra SCSI	Yes
Ultra-2 SCSI	Yes
Ultra-3 SCSI	No

NOTE: Equipping the server with a least a Wide-Ultra SCSI Controller is recommended.

For a list of specific controllers and adapters that support the SDLT 110/220 drive refer to: www.compaq.com

Data Compression

The SDLT 110/220 drive reads and writes both uncompressed (native) and compressed data. The SDLT 110/220 drive features a native formatted capacity of 110 GB and a sustained native data transfer rate of 11 MB/s.

When operating in compressed mode, data capacity is affected by how much the data can be compressed. Most data can be compressed at an approximate 2:1 ratio. This would provide the SDLT 110/220 drive with a compressed capacity of 220 GB and a compressed data transfer rate of 22 MB/s.

The SDLT 110/220 drive ships from the factory with data compression enabled for writing. In this mode, data is always compressed when writing to the tape, but the drive is capable of reading both compressed and native tapes. For the drive to write native data, the data compression setting must be changed through the software. To change the setting, consult the backup application software documentation for the data compression enabling and disabling procedure.

> **IMPORTANT:** Capacity may vary based upon actual stored data. Data transfer rates can vary depending on actual data, media condition, and system and controller capabilities.

Chapter **2**

Operating System Device Drivers

The following operating systems support the Compaq SDLT 110/220 drive:

■ Microsoft Windows NT

■ Microsoft Windows 2000

■ Novell NetWare

■ Compaq *Tru64^{TM} UNIX*

■ OpenVMS

For an updated list of supported operating systems refer to: www.compaq.com

Device Drivers

Device drivers for Intel-based systems are located on the Compaq SmartStart and Support Software CD and the Tape Drive Supplemental Driver CD in the Storage Utility Software (SUS) kit that came with the tape drive. Use SmartStart to create Support Software Diskettes for specific operating systems.

Microsoft Windows NT

Drivers for SCSI controllers and tape drive hardware are located on CDs in the Storage SUS kit accompanying the tape drive. If a SCSI controller is being installed at the same time as the tape drive, the SCSI controller driver should be installed before installing the tape device driver. SCSI controller drivers are located on the Compaq SmartStart and Support Software CD in the SUS kit while tape device drivers are located on the Tape Drive Supplemental Driver CD or with the operating system. The Compaq SmartStart and Support Software CD is also shipped with all Compaq ProLiant servers. The Support Software can also be downloaded from the Compaq website. Refer to the backup application installation guide for more information regarding additional software that might be needed.

To install SCSI controller drivers:

1. Log on as Administrator.

2. Insert the Compaq SmartStart and Support Software CD, version 4.9 or greater into the CD-ROM drive.

3. When the license agreement screen appears, click I Agree, and then OK to continue. The System Utilities screen appears.

4. Click the Install Compaq Server Support Paq icon once to highlight, then click OK. The Compaq Server Support Setup for Windows NT screen appears.

5. Use the scroll bar to locate line items pertaining to SCSI controllers. Click on the icon appropriate for the SCSI controller driver being installed. Click on the Help button if further descriptive information regarding the selected controller driver is needed. Then click on the Update button.

6. Note that the appropriate controller driver is updated and exit from this utility.

7. A reboot of the system may be required for the modifications to take place.

Microsoft Windows 2000

Drivers for SCSI controllers and tape drive hardware are located on CDs in the Storage SUS kit accompanying the tape drive. If a SCSI controller is being installed at the same time as the tape drive, the SCSI controller driver should be installed before installing the tape device driver. SCSI controller drivers are located on the Compaq SmartStart and Support Software CD in the SUS kit while tape device drivers are located on the Tape Drive Supplemental Driver CD or with the operating system. The Compaq SmartStart and Support Software CD is also shipped with all Compaq ProLiant servers. The Support Software can also be downloaded from the Compaq website. Refer to the backup application installation guide for more information regarding additional software that might be needed.

To install the controller drivers:

1. Log on as Administrator.

2. Insert the Compaq SmartStart and Support Software CD, version 4.9 or greater into the CD-ROM drive.

3. When the license agreement screen appears, click I Agree, and then OK to continue. The System Utilities screen appears.

4. Click the Install Compaq Support Paq icon once to highlight, then click OK. The Compaq Remote Deployment Utility appears.

5. Select the check boxes appropriate for the SCSI controller driver being installed. Clear any check boxes that are not appropriate, then click Install on the tool bar.

6. The Installation Results screen appears showing the SCSI controller driver was successfully installed.

7. Close the Installation Results screen and exit the Compaq Remote Deployment Utility.

Novell NetWare

Drivers for the SCSI controllers and tape drive hardware are located on the Compaq SmartStart and Support Software CD included in the SUS kit. The Compaq SmartStart and Support Software CD is also shipped with all Compaq ProLiant servers. The Support Software can also be downloaded from the Compaq website. The tape device driver is located on the Tape Drive Supplemental Driver CD or with the operating system. Refer to the backup application installation guide for more information regarding additional software that might be needed.

Table 2–1 provides a list of supported controllers and where to get information about the software driver:

<table>
<tr><th colspan="2">Table 2–1 Novell NetWare</th></tr>
<tr><th>Controller</th><th>Software Driver Information</th></tr>
<tr><td>Wide-Ultra SCSI
Ultra-2 SCSI</td><td>Run the *Readme.com* file on any of the Novell Software Support Diskettes (NSSD) for driver installation instructions.</td></tr>
</table>

Be sure to load the appropriate drivers in accordance with the Compaq controller being used. There are additional driver considerations if you want to use applications requiring the Advanced SCSI Programming Interface (ASPI) support. For more information, see the "ASPI Support" section.

ASPI Support

The *Readme.com* file on the Novell Software Support Diskette (NSSD) outlines the specific drivers you need to support ASPI tape backup applications.

If you are using a tape backup application that uses ASPI, such as ARCserve provided by Computer Associates or Veritas BackupExec, refer to the information provided with the application NLM to determine whether it uses ASPI.

The Compaq ASPI drivers, *Cpqsaspi.nlm* Device Driver Functional Specification (DDFS) and *Nwaspi.nlm* NetWare Peripheral Architecture (NWPA), provide ASPI support for the Compaq SCSI architecture for applications that require this interface.

All required drivers for ASPI tape support are provided on the NSSD. The NSSD ships with each server or can be downloaded from the Compaq website at www.compaq.com.

The *Scsi.rdm* file on the NSSD gives complete instructions on how to load these drivers and troubleshoot any problems.

Compaq Tru64 UNIX

The Compaq Tru64 UNIX operating system uses Dynamic Device Recognition (DDR) which allows the operating system to recognize the SDLT 110/220 drive.

If the Tru64 UNIX system does not have a DDR entry to identify the SDLT 110/220 drive, the system defaults to a generic SCSI device and to the default settings of the tape drive.

DDR Recognition

> **NOTE:** Starting with UNIX 5.1, the DDR tables will be changed. The syntax for tape related commands will also change. The examples included below show the new syntax.

The SDLT 110/220 drive provides compression so that the storage capability for tapes can be effectively doubled when the tape drive has been instructed to turn on compression. This is known as hardware compression. Hardware compression is controlled by the drive firmware and should be used instead of the software compression that is sometimes provided by software products. Check the software application manual to understand the interaction of the application with regard to hardware compression. The drive is instructed by the user to turn on hardware compression through use of switches in utilities such as tar. (Additional information is available online. See the man pages for tz, file, tar, dump and cpio. Additionally the man page for ddr.dbase can be useful. It is the derivation for the integers associated with compression below).

Turning Compression On

The following sections give 2 examples of turning on compression using the tar command.

Example 1

An example to turn on compression using a tar command is:

    $tar cvf /dev/tape/tape5_d? filename.txt

Where:

- tape5 = the tape device as known by the system (shown in the file command, in this case, tape unit 5).

- ? = 0, 2, 4 or 6 will turn hardware compression off (see the SDLT 110/220 description in the ddr.dbase file online).

- ? = 1, 3, 5 or 7 will turn hardware compression on.

See Example 2

Another example to turn on compression using a tar command is:

    $tar cvf /dev/tape/tape5c filename.txt

Where:

■ tape5 = the tape device as known by the system (shown in the file command, in this case, tape unit 5).

■ c = compression on.

Turning Compression Off

The following command turns hardware compression off:

    $tar cvf /dev/tape/tape5 filename.txt

For the latest UNIX patches refer to: www.support.compaq.com/patches/

OpenVMS

The OpenVMS operating system uses DDR for locally attached SCSI drives, which allows the operating system to recognize the SDLT 110/220 drive. Recognition of the SDLT 110/220 drive allows non-default settings, such as the density setting, to be used.

DDR for the SDLT 110/220 is not supported for SCSI drives on any client node in an OpenVMS cluster that is running version 7.2-1 or earlier. If the SDLT 110/220 drive is served to such a client that client system defaults to a generic SCSI device and the default settings are used.

The SDLT 110/220 drive provides compression (called compaction in OpenVMS terminology) so that the storage capability for tapes can be effectively doubled when the SDLT 110/220 drive has been instructed to turn on compaction. This is known as hardware compaction and should be used instead of the software compaction that is sometimes provided by software products. The SDLT 110/220 drive is instructed by the user to turn on hardware compaction through use of the OpenVMS INITIALIZE and MOUNT commands. (See these two commands using Open VMS help from the $ prompt).

The format for the INITIALIZE command is:

INITIALIZE

    /MEDIA_FORMAT

    /MEDIA_FORMAT=[NO]COMPACTION

The INITIALIZE command controls whether data records are automatically compacted and blocked together on any device that supports data compaction. Data compaction and record blocking increase the amount of data that can be stored on a single tape cartridge.

> **NOTE:** Once data compaction or non-compaction has been selected for a given cartridge, that same status applies to the entire cartridge.

The format for the MOUNT command is:

MOUNT

    /MEDIA_FORMAT

    COMPACTION

Example 1

```
$ MOUNT/FOREIGN/MEDIA_FORMAT=COMPACTION MKA400: BOOKS
```

This command performs a foreign mount of a tape with data compaction and record blocking enabled and assigns the logical name BOOKS to the tape.

Example 2

```
$ INIT/MEDIA_FORMAT=NOCOMPACTION MKA400: BOOKS
$ MOUNT/MEDIA_FORMAT=COMPACTION MKA400: BOOKS
```

This MOUNT command attempts a Files-11 mount of a tape labeled BOOKS with data compaction and record blocking enabled. Because the tape was initialized with compaction disabled, the MOUNT qualifier /MEDIA_FORMAT=COMPACTION has no effect.

Chapter **3**

Operating the SDLT 110/220 Drive

This chapter covers the following topics:

■ Power On-Self-Test

■ Compaq-approved cartridges

■ Operating the SDLT 110/220 tape drive

■ Front panel indicators and buttons

■ Write-protecting a cartridge

■ Cartridge handling and storage

Power On Self-Test

When power is initially applied, the SDLT 110/220 tape drive performs a Power On Self-Test (POST). After the user powers up the drive, the green indicator flashes while POST is performing. When the green indicator is illuminated, the drive is ready for operation.

> **NOTE:** If the amber indicator is illuminated, a problem has been detected. See Chapter 4, "Troubleshooting."

Compaq-approved Cartridges

Table 3–1 lists Compaq-approved cartridges:

Table 3–1 Cartridge Types and Formats		
Type	**Format**	**Read/Write Support**
Compaq SDLT Cartridge	110 GB	Read/Write
Compaq DLT Cartridge IV	20 GB, 35 GB, 40 GB	Read only
IMPORTANT: The block size must be 4 byte records or greater.		

Table 3–2 lists media kit part numbers:

Table 3–2 Media Kit Part Numbers	
Media Kit	**Part Number**
SDLT 20-Pack	188527-B26
SDLT 10-Pack	188527-B22
SDLT 5-Pack	188527-B21

Operating the SDLT 110/220 Drive

Loading a Cartridge

Push the cartridge completely into the drive, as shown in Figure 3-1.
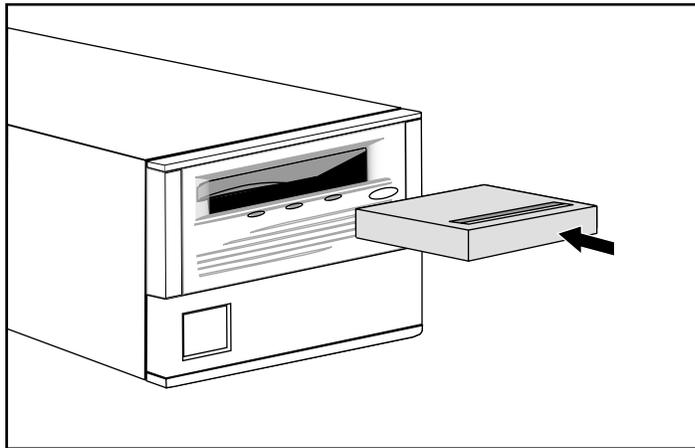
Figure 3–1. Loading a cartridge sequence

After a cartridge is inserted, the cartridge initialization process begins and the green indicator flashes. When the cartridge is at the beginning of tape (BOT) marker, the green indicator is illuminated. The cartridge is now ready for use.

> **CAUTION:** If reusing a prerecorded cartridge and writing from BOT, all prerecorded data is lost.

Unloading a Cartridge

To unload a cartridge, press the **Eject** button or issue an eject command in the software application.

Front Panel Indicators and Buttons
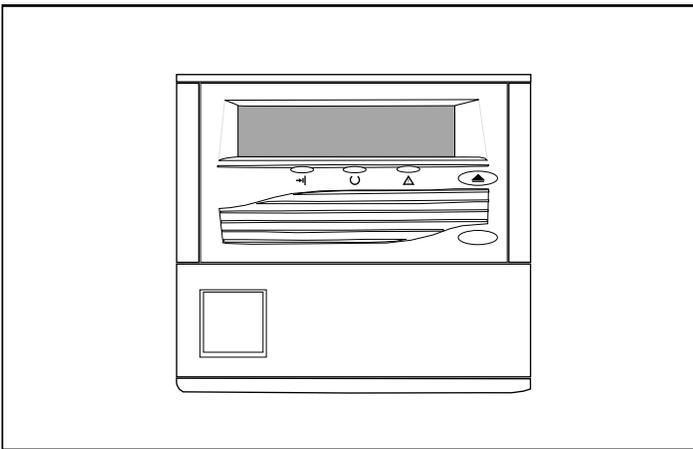
Figure 3–2. Identifying the front panel

Table 3–1 lists the front panel indicators.

Table 3–1 Front Panel Indicators

Indicator Icon	Color	Action	Explanation
➜❚	Red	ON	Cartridge is write-protected
⟲	Green	Blinking	Drive is becoming ready
		ON	Drive is ready
⚠	Amber	ON	Drive needs attention

Table 3–2 shows the front panel button.

Table 3–2 Front Panel Button

Control Button	Description
⏏	Eject button

Write-Protecting a Cartridge

The cartridge has a write-protect switch to prevent accidental erasure of data. Before loading the cartridge into the drive, position the write-protect switch on the front of the cartridge. Figure 3-3 illustrates using the write-protect switch. By moving the switch to the left ❶, the cartridge is write-protected, and by moving the switch to the right ❷, the cartridge is write-enabled.

Moving the cartridge write-protect switch to the left while the cartridge is in the SDLT 110/220 drive, illuminates the red indicator immediately. If the drive is writing to the cartridge, write-protect does not begin until the current write command completes.
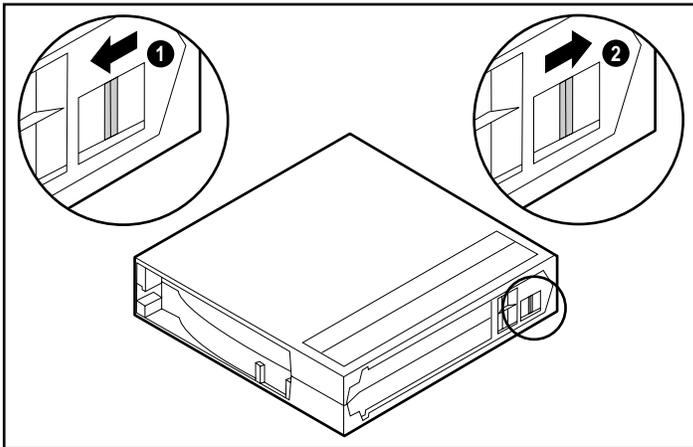

Figure 3–3. Cartridge write-protect switch

Cartridge Handling and Storage

For longer life of recorded or unrecorded cartridges,

■ Store cartridges in a clean environment.

■ Use cartridges in temperatures between 10°C and 40°C (50°F to 104°F).

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

■ Do not place cartridges near electromagnetic interference sources, such as terminals, motors, and video or X-ray equipment. Doing so may cause data on the cartridge to be altered.

■ Store cartridges in a dust-free environment where the relative humidity is between 20 percent and 80 percent. For longer cartridge life, store the cartridge at 40 percent to 60 percent relative humidity.

■ If a cartridge is dropped or damage is suspected, gently shake the cartridge:

❏ If it rattles, it is damaged. Restore the data on the cartridge by some means other than by using the SDLT 110/220 tape drive, and discard the damaged cartridge.

❏ If it doesn't rattle, check the tape leader ❷ inside the cartridge. To do this, open the door on the rear of the cartridge by releasing the door lock ❶. The tape leader should be in the position shown in Figure 3-4.
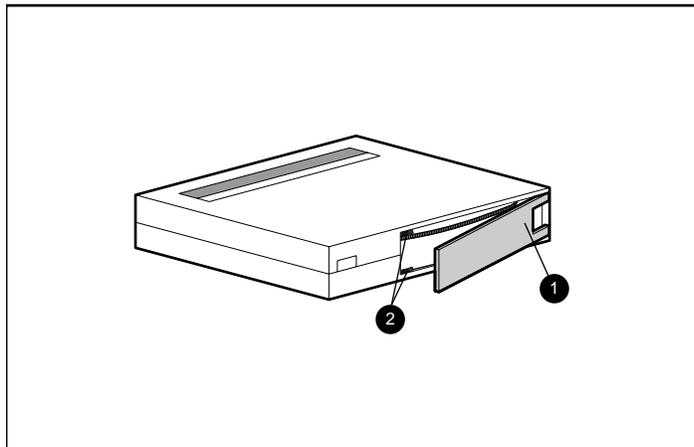

Figure 3–4. Checking the tape leader

■ Cartridges should always be stored in their polypropylene case and positioned on their edge so that the axis of the tape supply reel is parallel to the surface upon which the cartridge rests.

Chapter **4**

Troubleshooting the SDLT 110/220 Drive

The chapter covers the following topics:

■ What to do if there is a problem

■ Upgrading firmware

What to do if there is a Problem

If the SDLT 110/220 drive fails during POST or operation, use Table 4–1 to determine the problem and the action to take. Power down the SDLT 110/220 drive before performing a corrective action.

Table 4–1 Troubleshooting Chart

If	Then	Action
The system does not recognize the SDLT 110/220 drive	The system might not be configured to see the SCSI ID.	Configure the system to see the ID.
	The SCSI ID might not be unique.	Change the SCSI ID and reconfigure the system. The new ID is effective at the next power-on.
	The parameters for the SCSI adapter might be incorrect.	Check the SCSI adapter installation and ID assignment.
	The SCSI signal cable might be loose.	Make sure the connector on each end of the cable is seated.

Table 4–1 Troubleshooting Chart

If	Then	Action
The system does not recognize the SDLT 110/220 drive	The SCSI bus might not be correctly terminated.	1. If the SDLT 110/220 drive is the last or only device on the bus, make sure the terminator is installed on the drive.
		2. If the SDLT 110/220 drive is not the last or only device on the bus, check the cable connections and make sure that the terminator is installed at the end of the bus.
	The SCSI terminator might not be at the end of the bus, or more than two terminators might be present.	Be sure to install a terminator at each end of the bus. One terminator is usually installed on the system.
	The SCSI bus might be too long.	Limit the bus length to the ANSI SCSI standard of 3 m (9.8 ft) for a single ended (SE) cable.
	Too many devices might be on the bus.	Limit the number of devices on the bus to eight (sixteen for a wide bus), including the SCSI controller.
The SDLT 110/220 drive does not power up	The SDLT 110/220 drive has no power.	With the SDLT 110/220 power switch off, check the SDLT power connections.
The amber indicator is on	A drive fault has occurred.	Try to unload the cartridge and re-initialize the drive by turning the drive power off and then on again. The green light will flash. If re-initializing is successful, the lights illuminate steadily again and go off.

Table 4–1 Troubleshooting Chart		
If	**Then**	**Action**
Fatal or nonfatal errors occur for which a cause cannot be determined	The bus termination or SCSI signal cable connections might be incorrect.	Ensure the SCSI bus is correctly terminated. (External drives only)
	The AC main power source grounding might be incorrect.	Plug the SDLT 110/220 drive into a grounded AC main power outlet on the same line powering the server.

After taking the action listed in Table 4–1, power on the SDLT 110/220 drive to rerun POST.

Upgrading Firmware on the SDLT 110/220 Drive

The firmware on a SDLT 110/220 drive can be upgraded by the following methods:

■ Using the TSMC

■ Using UNIX scu Utility

■ Using a Field Upgrade Tape

■ Using a Cartridge

Upgrading Firmware using the TSMC

The SDLT 110/220 drive allows the firmware to be upgraded by using the TSMC on Intel based systems running Windows NT or Windows 2000. The TSMC is available in the Compaq Storage Utility Software (SUS) kit included with the SDLT 110/220 drive or on the Compaq website. Once the TSMC has been installed on your server, follow these steps to upgrade the tape drive firmware:

1. Launch the TSMC and select the SDLT 110/220 in the TSMC Device Listing to display the Device Qualifier screen for the SDLT 110/220.

2. Click Download on the SDLT 110/220 Device Qualifier screen.

3. You will be asked if you want to use the firmware version control database. The firmware version control database determines if your SDLT 110/220 drive is running with the most current firmware. Click Yes to use the firmware version control database or No if you have a copy of the firmware image file that you want to use for the update.

   ❑ If you chose Yes, a window will display the available firmware versions for the SDLT 110/220. If you have internet access, you can download the firmware image file from the Compaq website by selecting the firmware image version that you want to use then click OK. If you do not have internet access, click the Use Local Media button then click OK and then select Browse in the Download window to search for the location of the image file from a local source. It is recommended that firmware image files be downloaded from the Web or a local or network hard drive rather than a floppy.

   ❑ If you chose No, a Download window appears. You can choose the firmware image file to download from a local source, such as a local or network hard drive.

4. Once the firmware image file has been selected, click Download.

   > **IMPORTANT:** Do not interrupt the download process or cycle power on the SDLT 110/220 or your server. TSMC will notify you with a message box when the download is complete.

5. Close and re-open the TSMC application and select the SDLT 110/220 in the TSMC Device Listing to verify that the firmware version is correctly updated in the Revision Level field.

Upgrading Firmware using UNIX scu Utility

The native Tru64 UNIX scu utility is the most convenient method for upgrading the SDLT 110/220 drive firmware when the tape drive is connected to a Tru64 UNIX system.

> ⚠ **CAUTION:** When performing a firmware update, take reasonable precautions to prevent a power failure. During the firmware update, when the new image is actually being programmed into the FLASH EEPROMs, a power failure (but not BUS RESET) causes the tape drive to be unusable.

1. Check the Compaq website at www.compaq.com for the current firmware revision and copy the code image from the website or ftp.compaq.com website to the working directory on the UNIX host. Make a note of the image filename.

2. Wait for pending activity on the tape drive to complete then unload the cartridge from the drive.

3. Determine the Bus, Target, and LUN of the drive from site configuration records and verify by using scu to probe the buses:

   scu> scan edt

   scu> show edt

4. The show edt command shows all the SCSI devices, including device product names and firmware revisions. For example, an SDLT 110/220 drive will show as a "SuperDLT1," manufactured by COMPAQ, with a four digit hexadecimal number similar to "0105" in the right hand column. This number is the firmware revision.

5. When you identify the SDLT 110/220 drive requiring the update, note the tape drive's Bus, Target, and LUN assignments from the show edt display.

6. Connect scu logically to the tape drive using the Bus/Target/LUN information:

   scu> set nexus bus 1 target 5 LUN 0 (for example)

   scu responds with an identifying line:

   scu> device:SuperDLT1, bus 1, Target 5, LUN 0, Type:Sequential Access.

   Subsequent scu commands are directed to the device designated with the "set nexus" command.

7. Enter the following scu command to perform the upgrade:

   scu>download [IMAGE_NAME] save

   The utility returns the following message:

   Downloading and saving firmware file 'IMAGE_NAME' of nnnnnn bytes. Delaying for 120 sec while firmware is saved. Please be patient.

   There is a time during the upgrade when communication with the host is interrupted and the tape drive's LED display is the only indication of progress. When the scu> prompt returns the procedure is complete.

8. Verify that the desired code has been loaded by scu> scan edt and scu> show edt commands. The firmware revision in the right-most column will change.

Upgrading Firmware using a Field Upgrade Tape

At the time this guide was written, the Field Upgrade Tape (FUP) method was the most practical way to upgrade the firmware in any SDLT 110/220 drive when connected to an OpenVMS system.

To upgrade one or more SDLT 110/220 drives at an OpenVMS site, go to the Compaq website at: www.compaq.com for the latest upgrade recommendations.

If you prefer to load new firmware through a FUP, the Compaq website has the part number and procedure to obtain the latest version. Once you have the FUP, see the "Upgrading Firmware with a Cartridge" section for the procedure.

Upgrading Firmware using a Cartridge

> **IMPORTANT:** For a firmware upgrade cartridge, contact a Compaq authorized service provider.

The SDLT 110/220 drive allows the firmware to be upgraded by using a firmware upgrade cartridge. Complete the following steps to upgrade firmware using a cartridge:

> ⚠ **CAUTION:** When performing a firmware update, take reasonable precautions to prevent a power failure. During the firmware update, when the new image is actually being programmed into the FLASH EEPROMs, a power failure (but not BUS RESET) causes the tape drive to be unusable.

1. Exit all cartridge applications before proceeding with a firmware upgrade.

2. Put the SDLT 110/220 subsystem into the firmware update mode:

    a. Unload any cartridge that is in the target SDLT 110/220 drive.

    b. Press and hold the **Eject** button on the SDLT 110/220 drive's front panel, for approximately 6 seconds, until the red indicator blinks to indicate that the drive's subsystem has recognized the request for firmware update mode and is ready to proceed.

    c. As the red indicator blinks, release the **Eject** button. Within 4 seconds of releasing the **Eject** button, press the button a second time and release it within one second.

    d. The red indicator blinks to indicate that the cartridge subsystem recognizes that the firmware update mode was selected.

3. Insert the firmware cartridge into the drive, after the firmware update mode has been selected,. This action:

    ❏ Automatically reads the cartridge

    ❏ Examines the data

    ❏ Verifies the data is a valid SDLT 110/220 firmware image

    If the firmware is valid, the update proceeds automatically.

    ❏ If the drive code is the same as the cartridge to be updated, the drive code does not go through an update.

❏ If the drive code is different, the drive code goes through an update, taking 2 to 3 minutes. While the drive code goes through the update, the red indicator flashes.

When the drive code update is complete, the drive resets and goes through initialization. The initialization process waits until the cartridge is rewound to the beginning of the tape.

The tape drive's flash EEPROM memory is also automatically updated with the new firmware image. The red indicator flashes again during the controller firmware update.

4. Wait until the green indicator is illuminated.

5. Remove the firmware cartridge.

Appendix A

Regulatory Agency Notices

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your Compaq SDLT 110/220 tape drive is assigned a Compaq Series Number 3306. The Compaq Series Number for this product can be found on the product label, along with the required approval markings and information. When requesting certification information for this product, always refer to this Series Number. This number should not be confused with the marketing name or model number for your SDLT 110/220 tape drive.

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (that is, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have an FCClogo or FCCID on the label. Class A devices do not have an FCClogo or FCCID on the label. After the class of the device is determined, refer to the following corresponding statement.

Class B Equipment

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 or television technician for help.

Declaration of Conformity for Products Marked with the FCC logo - United States Only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, contact:

Compaq Computer Corporation
P. O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000

or call 1-800-652-6672 (1-800-OK-COMPAQ). (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact:

Compaq Computer Corporation
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000

or call (281) 514-3333.

To identify this product, refer to the Part, Series, or Model number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Compaq Computer Corporation may void the user's authority to operate the equipment.

Cables

Connections to external device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

Class B Equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards):

■ EN55022 (CISPR 22) - Electromagnetic Interference

■ EN50082-1 (IEC801-2, IEC801-3, IEC801-4) - Electromagnetic Immunity

■ EN60950 (IEC950) - Product Safety

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文を
お読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準
に基づくクラスB情報技術装置です。この装置は、家庭環境で使用すること
を目的としていますが、この装置がラジオやテレビジョン受信機に近接して
使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に
基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るよう要求されることがあります。

Taiwanese Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能
會造成射頻干擾，在這種情況下，使用者會被要求採
取某些適當的對策。

German Notice

Acoustic Emissions

Schallemissionswerte - Werteangaben nach ISO9296 und ISO7779/DINEN27779:

Table A–1
Acoustic Noise Declaration for German Noise Declaration Law

Gerät	Schalleistungspegel $L_{wAd,}$ B		Schalldruckpegel $L_{pAm,}$ dBA (Zuschauerpositionen)	
	Leerlauf	Betrieb (streaming)	Leerlauf	Betrieb (streaming)
Internes Laufwerk	-	5,9	-	47,0
Externes Laufwerk	5,4	5,9	42,0	46,0

Acoustics - Preliminary declared values per ISO9296 and ISO 7779/EN27779:

Table A–2
Acoustic Noise Emissions, Nominal

Product	Noise Power Emission Level (LNPEc)		Sound Pressure level (LPAc)	
	Idle	Streaming	Idle	Streaming
Internal Drive	-	5.9	-	47.0
External Drive	5.4	5.9	42.0	46.0

Appendix **B**

Electrostatic Discharge

To prevent damage to the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

■   Avoid hand contact by transporting and storing products in static-safe containers.

■   Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.

■   Place parts on a grounded surface before removing them from their containers.

■   Avoid touching pins, leads, or circuitry.

■   Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

■   Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm +/- 10 percent resistance in the ground cords. To provide proper grounding, wear the strap snug against the skin.

■   Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.

■   Use conductive field service tools.

■   Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized Compaq reseller install the part.

> **NOTE:** For more information on static electricity, or for assistance with product installation, contact your authorized Compaq reseller.

Appendix C

Specifications

This appendix covers the following topics:

- Dimensions and weight

- Altitude

- Acoustic emissions

- Temperature and humidity ranges

- Power requirements

- Air-Cooling requirement

Dimensions and Weight

Table C–1
Dimensions and Weight

Dimensions	Internal Drive without rails		External Drive	
Height	86.4 mm	3.40 in	160.02 mm	6.3 in
Width	148.3 mm	5.84 in	175.26 mm	6.9 in
Depth	212.1 mm	8.35 in	325.12 mm	12.8 in
Weight	2.4 kg	5.25 lbs	6.35 kg	14.0 lbs

Altitude

<table>
<tr><td colspan="2" align="center">**Table C–2**
Altitude</td></tr>
<tr><td align="center">**Action**</td><td align="center">**Feet**</td></tr>
<tr><td align="center">Operating</td><td align="center">-500 to 30,000 feet</td></tr>
</table>

Acoustic Emissions

Acoustics - Preliminary declared values per ISO9296 and ISO 7779/EN27779:

<table>
<tr><td colspan="5" align="center">**Table C–3**
Acoustic Noise Emissions, Nominal</td></tr>
<tr><td></td><td colspan="2" align="center">**Noise Power Emission Level**
(LNPEc)</td><td colspan="2" align="center">**Sound Pressure level**
(LPAc)</td></tr>
<tr><td>**Product**</td><td align="center">**Idle**</td><td align="center">**Streaming**</td><td align="center">**Idle**</td><td align="center">**Streaming**</td></tr>
<tr><td>Internal Drive</td><td align="center">-</td><td align="center">5.9</td><td align="center">-</td><td align="center">47.0</td></tr>
<tr><td>External Drive</td><td align="center">5.4</td><td align="center">5.9</td><td align="center">42.0</td><td align="center">46.0</td></tr>
</table>

Temperature and Humidity Ranges

Table C–4
Temperature and Humidity Ranges

Actions	Temperature	Humidity
Storage with Data Cartridge	18°C to 28°C 64°F to 82°F	40 to 60% RH, non-condensing
Storage without Data Cartridge	-40°C to 66°C -40°F to 150°F	10 to 95% RH, non-condensing Maximum wet bulb temperature = 46°C
Operation	10°C to 40°C 50°F to 104°F	20 to 80% RH, non-condensing Maximum wet bulb temperature = 25°C

Power Requirements

Table C–5
Power Requirements - Internal Drive

	Current	
Voltage	**Typical**	**Maximum**
+5 V (+/-5%) bus*	3.73 A	4.25 A
+12 V (+/-5%) bus*	1.3 A	3.13 A

NOTE: Voltage is measured at the power bus connector pins.

Table C–6
Power Requirements - External Drive

Voltage	Maximum Power
100 to 240 VAC	46 W

Air-Cooling Requirement

Table C–7
Air-Cooling Requirement

Ambient temperature	Air flow velocity of 125 linear feet per minute

NOTE: Air flow is measured directly in front of the bezel.

Appendix **D**

Removing a Cartridge Manually

When the normal cartridge unload process is not possible, manually removing a cartridge from the SDLT 110/220 drive is required.

This appendix covers the following topics:

■ Tools

■ Preparing the SDLT 110/220 drive

■ Disassembling the SDLT 110/220 drive

❏ Removing the bezel

❏ Removing the cover

❏ Rewinding the tape into the cartridge

❏ Removing the left guide

❏ Disconnecting the leader pin from the cartridge buckle

❏ Removing the cartridge

■ Assembling the SDLT 110/220 drive

Tools

■ Torx T8 screwdriver (combination electric/manual optional)

■ Tweezers

Preparing the SDLT 110/220 Drive

1. Make sure the SDLT 110/220 drive is powered off.

2. If the SDLT 110/220 is:

   ❑ An internal drive, remove it from its enclosure (server, library, and so on) and disconnect the power and SCSI cables.

   ❑ An external drive, remove the AC power cord and SCSI cables.

3. The bezel, cover, and left guide must be removed in order to extract the cartridge. It is also necessary to fully rewind all the tape into the cartridge. See the following sections for procedures on removing these parts and rewinding the cartridge.

Disassembling the SDLT 110/220 Drive

The following procedures describe how to remove components of the drive to access the cartridge when it is inside the drive.

Removing the Bezel

The bezel is removed by simultaneously pulling on the bezel ❸ and depressing the locking tabs ❷ which secure it to the drive cover ❶ (see Figure D–1). There are seven locking tabs which secure the bezel to the drive cover.
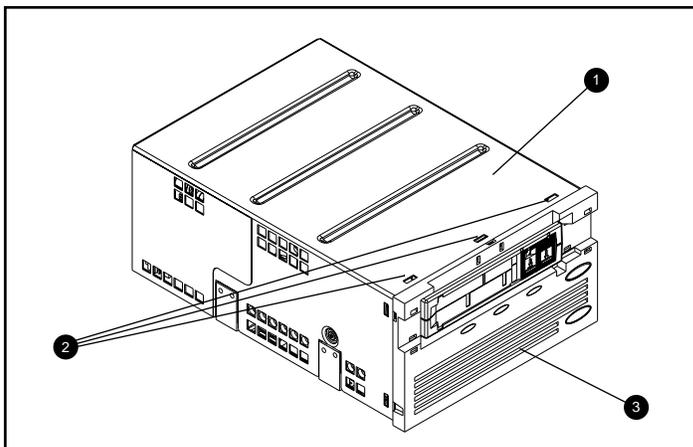
Figure D–1. Removing the bezel

Removing the Cover

The SDLT 110/220 cover is secured to the drive with three screws. Two screws are located on either side of the drive and the third is located at the back of the drive. To remove the cover, remove all the screws ❶ with a Torx T8 screwdriver and lift the cover upward (see Figure D–2).
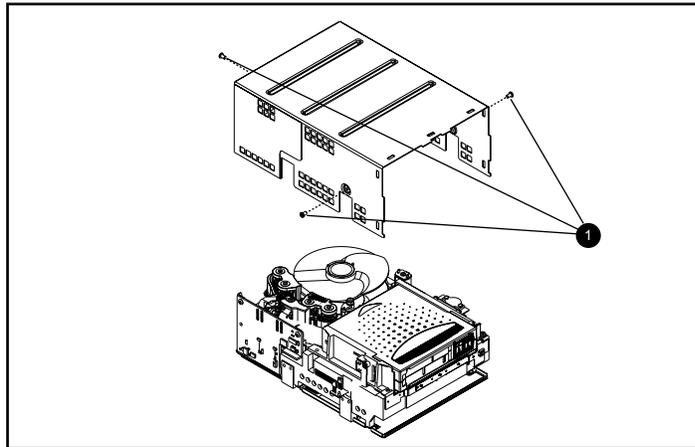
Figure D–2. Removing the cover

Rewinding the Tape into the Cartridge

The magnetic recording tape must be fully rewound into the cartridge before removing the cartridge from the drive.
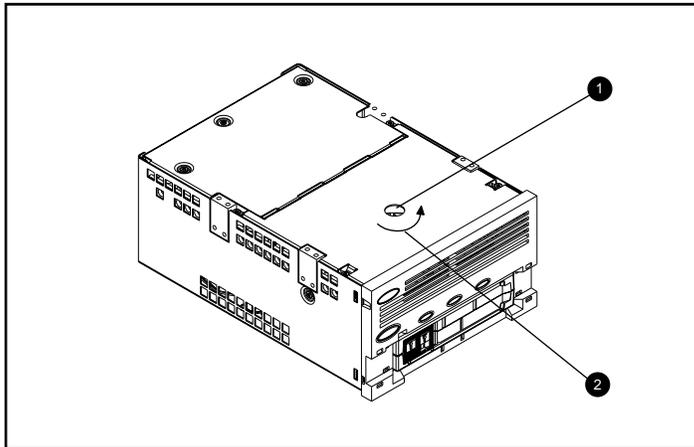
Figure D–3. Rewinding the tape into the cartridge

The tape is rewound by accessing the motor spindle through the access hole located at the bottom of the drive (see Figure D–3).

To rewind the tape into the cartridge:

1. Turn the drive upside down and lay flat on a hard surface.

2. Insert a T8 Torx screwdriver into the motor spindle access hole ❶.

3. Turn the screwdriver counterclockwise ❷ until the cartridge leader buckle is fully seated within the cartridge.

The linear tape speed when the tape is almost fully rewound into the cartridge should be approximately6 inches/second. The motor spindle revolutions per minute (RPM) are approximately 30 RPM. If most of the tape is wound on the cartridge reel, which can be seen with the cover removed, it is possible to rewind at a much higher tape speed, decreasing the speed near the end.

> ⚠ **CAUTION:** Don't place the SDLT 110/220 drive upside down when the cover is removed.

Removing the Left Guide

To remove the left guide:

1. Remove the two T8 Torx screws ❶ (see Figure D–4).

2. Pull the sheet metal panel ❷ towards the front of the drive so that the left guide ❸ may be lifted upward.

3. The left guide has a flex circuit attached which goes below the tape deck. Lay the left guide ❸ flat (as shown in Figure D–4), leaving the cartridge in the drive.
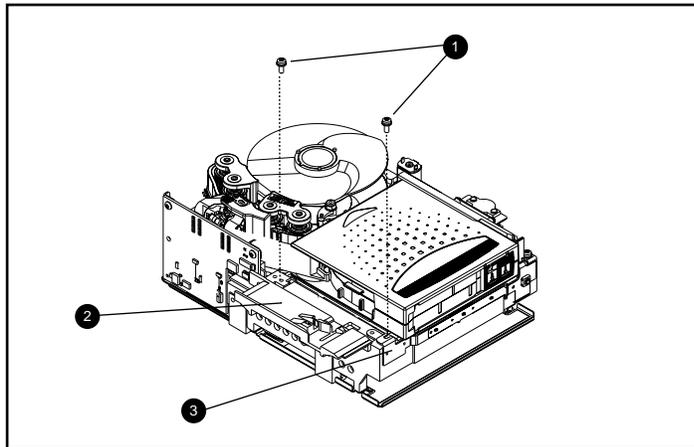
Figure D–4. Removing the left guide

Disconnecting the Leader Pin from Cartridge Buckle

To disconnect the leader pin from the cartridge buckle ❶, use a pair of tweezers. Then place the leader pin in the hooks of the buckler (see for Figure D–5 for the buckler location).
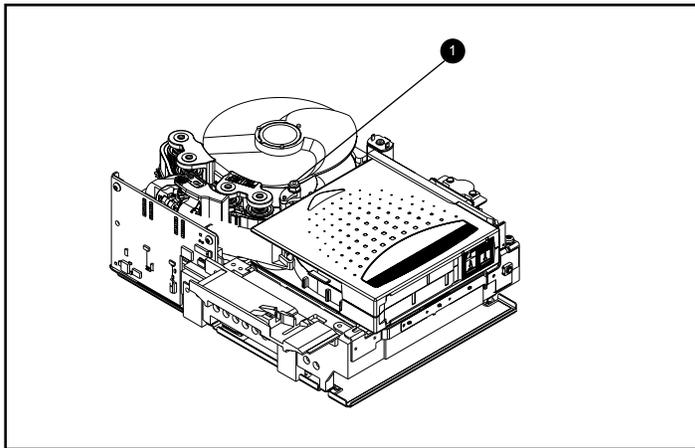
Figure D–5. Disconnecting the leader pin from the cartridge buckle

Removing the Cartridge

The cartridge can be removed from the drive by lifting up towards the left guide and back (see Figure D–6).
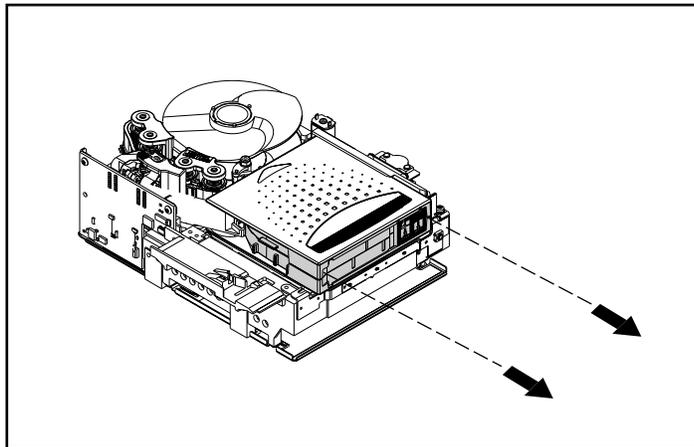
Figure D–6. Removing the cartridge

> **NOTE:** There may be some noise when removing the cartridge due to the drive components interfaced with cartridge. This is normal and should not cause damage to either the cartridge or drive.

Assembling the SDLT 110/220 Drive

When the cartridge is removed from the SDLT 110/220 drive, assemble the drive in the reverse order, torquing the screws to 5 in-lbs.

> **NOTE:** Document the original defect symptoms and be sure to note that the drive has been disassembled in the field to recover a tape.

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