



StorageTek™

L20

Tape Library

User's Guide

95961
Revision: Y



L20 Tape Library

User's Guide

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Summary of Changes

EC	Date	Edition	Description
111512	August 2000	First	Initial release
111741	March 2002	Ninth	Refer to this edition for a description of the changes.
111763	June 2002	Tenth	Refer to this edition for a description of the changes.
111770	June 2002	Eleventh	Refer to this edition for a description of the changes.
111784	August 2002	Twelfth	Refer to this edition for a description of the changes.
111797	October 2002	Thirteenth	Refer to this edition for a description of the changes.
111828	February 2003	Fourteenth	Refer to this edition for a description of the changes.
111846	June 2003	Fifteenth	Refer to this edition for a description of the changes.
111880	December 2003	Sixteenth	Refer to this edition for a description of the changes.
111923	July 2004	Seventeenth	Refer to this edition for a description of the changes.
111948	January 2005	Eighteenth	Refer to this edition for a description of the changes.
111975	May 2005	S	Refer to this edition for a description of the changes.
114172	October 2006	Y	Cover, Copyright and Safety: Added the Sun boilerplate verbiage. Preface: Added the Sun boilerplate verbiage and removed Chapter 6 from “ Organization. ” Chapter 2: Updated “ Conversion Bill ” and “ Part Numbers. ” Chapters 5 and 6: Added the Chapter 6 information to Chapter 5 and deleted Chapter 6.

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Preface

This guide describes how to configure and operate the L20 tape library. While intended primarily for users of the library, it might also contain information that can be used by system administrators. For specific drive information or for client-generated software commands and console messages, refer to your drive or software documentation.

■ Organization

The organization of this guide is:

- Chapter 1** “General Information” describes the basic components and functions of the library.
- Chapter 2** “Configuration” describes the operator panel and tells you how to configure the library and drives. A configuration table is at the end of the chapter. The chapter also includes directions for downloading new firmware.
- Chapter 3** “Library Operation” describes the tasks you can perform while the library is operating in automated, manual, or autoloader mode.
- Chapter 4** “Troubleshooting and Diagnostic Tests” describes how you correct and diagnose problems with the library and drives. It also explains test procedures and event log examination.
- Chapter 5** “Customer Support” tells customers how to contact Customer Support Services.
- Appendix A** “Specifications” provides specifications for the library.
- Appendix B** “Cartridges” identifies how to label, use, and care for cartridges in the library.
- Glossary** The [Glossary](#) defines new or special terms and abbreviations used in this guide.
- Index** The [Index](#) helps you find information in this guide.

■ Alert Messages

Alert messages call your attention to information that is especially important or that has a unique relationship to the main text or graphic.

Note: A note provides additional information that is of special interest. A note might point out exceptions to rules or procedures. A note usually, but not always, follows the information to which it pertains.

CAUTION:

A caution informs you of conditions that might result in damage to hardware, corruption of data, or corruption of application software. A caution always precedes the information to which it pertains.

WARNING:

A warning alerts you to conditions that might result in long-term health problems, injury, or death. A warning always precedes the information to which it pertains.

■ Mensajes de alerta

Los mensajes de alerta llaman la atención hacia información de especial importancia o que tiene una relación específica con el texto principal o los gráficos.

Nota: Una nota expone información adicional que es de interés especial. Una nota puede señalar excepciones a las normas o procedimientos. Por lo general, aunque no siempre, las notas van después de la información a la que hacen referencia.

PRECAUCIÓN:

Una precaución informa sobre situaciones que podrían conllevar daños del hardware, de los datos o del software de aplicación. Las precauciones van siempre antes de la información a la que hacen referencia.

ADVERTENCIA:

Una advertencia llama la atención sobre condiciones que podrían conllevar problemas de salud crónicos, lesiones o muerte. Las advertencias van siempre antes de la información a la que hacen referencia.

■ Conventions

Typographical conventions highlight special words, phrases, and actions in this publication.

Item	Example	Description of Convention
Buttons	MENU	Font and capitalization follows label on product
Commands	Mode Select	Initial cap
Document titles	<i>System Assurance Guide</i>	Italic font
Emphasis	<i>not</i> or <i>must</i>	Italic font
File names	<code>esc.txt</code>	Monospace font
Hypertext links	Figure 2-1 on page 2-5	Blue (prints black in hardcopy publications)
Indicators	<i>Open</i>	Font and capitalization follows label on product
Jumper names	TERMPWR	All uppercase
Keyboard keys	<Y> <Enter> or <Ctrl+Alt+Delete>	Font and capitalization follows label on product; enclosed within angle brackets
Menu names	Configuration Menu	Capitalization follows label on product
Parameters and variables	Device = <i>xx</i>	Italic font
Path names	<code>c:/mydirectory</code>	Monospace font
Port or connector names	SER1	Font and capitalization follows label on product; otherwise, all uppercase
Positions for circuit breakers, jumpers, and switches	ON	Font and capitalization follows label on product; otherwise, all uppercase
Screen text (including screen captures, screen messages, and user input)	<code>downloading</code>	Monospace font
Switch names	Power	Font and capitalization follows label on product
URLs	http://www.sun.com	Blue (prints black in hardcopy publications)

■ Related Publications

You can find additional information in the following publications:

Library Documentation	Part Number
<i>L20 Customer Replaceable Unit (CRU) Instructions</i>	96002
<i>L20 Quick Start Card</i>	96011
<i>L20 Tape Library Installation Manual</i>	96052
<i>L20 Tape Library SCSI Reference Manual</i>	95971
<i>L20 Tape Library Service Manual</i>	96041
<i>L20/40/80 Series of Tape Libraries General Information Manual</i>	MT9104
<i>L20/40/80 Tape Library Warranty Agreement—Australia/ New Zealand</i>	31368450x
<i>L20/40/80 Tape Library Warranty Agreement—Europe</i>	31161830x
<i>L20/40/80 Tape Library Warranty Agreement—USA</i>	31368460x
Tape Drive Documentation	Part
<i>DLT 7000 Tape Drive Product Manual</i>	31313450x
<i>DLT 8000 Tape Drive Product Manual</i>	Quantum: 81-60118-0x
<i>DLT1 Installation and Operations Guide</i>	Benchmark: 000826-0x
<i>DLT1 Product Specification</i>	Benchmark: 000827-0x
<i>SDLT 220 and SDLT 320 Product Manual</i>	CD included with drive
<i>Hewlett Packard Ultrium Tape Drive Manual</i>	CD included with drive
<i>IBM Ultrium Tape Drive Manual</i>	CD included with drive
<i>Certance/Quantum LTO Tape Drive Product Manual</i>	CD included with drive
Other Publications	Part
<i>American National Standard Dictionary for Information Processing Systems</i>	ANSI X3/TR-1-82
<i>American National Standard Magnetic Tape and Cartridge for Information Interchange</i>	ANSI X3B5/87-009
<i>Crossroads Fibre Router User's Manual</i>	DS30110
<i>StorageNet 3300 Fibre Channel Router User Manual</i>	461273-01
<i>Fibre Optics User's Guide</i>	9433

Other Publications

Magnetic Tape Labels and File Structure for Information Interchange

SCSI-3 Parallel Interface (SPI)

Small Computer System Interface

Part

ANSI X3.27-1978

ANSI X3T9.2/91-010R7

ISO 9316:1989

■ Additional Information

Sun Microsystems, Inc. (Sun) offers several methods for you to obtain additional information.

Sun's External Web Site

Sun's external Web site provides marketing, product, event, corporate, and service information. The external Web site is accessible to anyone with a Web browser and an Internet connection.

The URL for the external Web site is: <http://www.sun.com>

The URL for StorageTek™ brand-specific information is:
<http://www.sun.com/storagetek/>

Customer Resource Center

The StorageTek product Customer Resource Center (CRC) is a Web site that enables members to resolve technical issues by searching code fixes and technical documentation for StorageTek brand products. CRC membership entitles you to other proactive services, such as HIPER subscriptions, technical tips, answers to frequently asked questions, addenda to product documentation books, and online product support contact information. Customers who have a current warranty or a current maintenance service agreement may apply for membership by clicking on the Request Password button on the CRC home page. employees may enter the CRC through the SunWeb PowerPort.

The URL for the CRC is <http://www.support.storagetek.com>

Partners Site

The StorageTek Partners site is a Web site for partners with a StorageTek Partner Agreement. This site provides information about products, services, customer support, upcoming events, training programs, and sales tools to support StorageTek Partners. Access to this site, beyond the Partners Login page, is restricted. On the Partners Login page, employees and current partners who do not have access can request a login ID and password and prospective partners can apply to become StorageTek resellers.

The URL for the StorageTek Partners site is:

<http://members.storagetek.com>

The URL for partners with a Sun Partner Agreement is:

<http://www.sun.com/partners/>

Hardcopy Publications

Contact a sales or marketing representative to order additional paper copies of this publication or to order other StorageTek brand product customer publications in paper format.

Safety

The following pages describe common practices concerning rack installation, fiber optics, and electrostatic discharge.

■ Rack Safety and Precautions

WARNING:

Possible personal injury:

- ***Lifting hazard:*** The library (with drives) weighs approximately 29 kg (64 lb). Use at least two people and a mechanical device to lift and position the library.
- Also consider the library's total weight when you are placing other equipment into the rack. To prevent an unbalanced situation, install the heaviest equipment on the bottom and the lightest equipment on the top. Failure to do so might cause the rack to become unstable and tip over.

Observe the following safety precautions when you are installing the library into a rack:

- If the rack has front or rear doors, do *not* allow the doors to interfere with the library's ventilation. The rack's internal ambient temperature should not exceed the recommended operating temperature range of the library. The maximum rack air ambient temperature is 40°C (104°F).
- Ensure that rack doors provide adequate clearance to the library.
- Ensure that the combination of the library with other equipment in the rack does not create an overcurrent condition, whether the equipment is connected directly to the branch circuit or to a power distribution strip.
- Ensure that all equipment in the rack has reliable earth ground, whether the equipment is connected directly to the branch circuit or to a power distribution strip.

Note: The library relies on the ground pin of the power cord for its earth ground.

■ Fiber-optic Safety

WARNING:

Eye hazard. Never look directly into a fiber-optic cable, a fiber-optic connector, or a laser transceiver module. Hazardous conditions might exist from laser power levels that are capable of causing injury to the eye.

Be especially careful when using optical instruments with this equipment. Such instruments might increase the likelihood of eye injury.

The laser transceivers in fiber-optic equipment can pose dangers to personal safety. Ensure that anyone who works with this Sun StorageTek equipment understands these dangers and follows safety procedures. Ensure that the optical ports of every laser transceiver module are terminated with an optical connector, a dust plug, or a cover.

Each fiber-optic interface in this Sun StorageTek Fibre Channel equipment contains a laser transceiver that is a Class 1 Laser Product. Each laser transceiver has an output of less than 70 mW and a wavelength of 850 nm. Sun StorageTek's Class 1 Laser Products comply with EN60825-1(+A-11) and with sections 21 CFR 1040.10 and 1040.11 of the Food and Drug Administration (FDA) regulations.

The following translations are for users in Finland and Sweden who wish to identify laser safety and classification:

CLASS 1 LASER
LUOKAN 1 LASERLAITE
KLASSE 1 LASER APPARAT

Laser Product Label

In accordance with safety regulations, a label on each Sun StorageTek Fibre Channel product identifies the laser class of the product and the place and date of the manufacturer. The label appears on top of a Fibre Channel tape drive and near the Fibre Channel connectors on a Fibre Channel tape library. A copy of the label is shown here:

CLASS 1 LASER PRODUCT
LASER KLASSE 1
APPAREIL A LASER DE CLASSE 1
COMPLIES WITH 21 CFR 1040.10 AND 1040.11

Fiber-optic Cable Installation

Follow these guidelines when you install fiber-optic cables:

1. Cable routing:

- **Raised floor:** You may install fiber-optic cables under a raised floor. Route them away from any obstruction, such as existing cables or other equipment.
- **Cable tray or raceway:** Place the cables in position; do not pull them through the cable tray. Route the cables away from sharp corners, ceiling hangers, pipes, and construction activity.
- **Vertical rise length:** Leave the cables on the shipping spool, and lower them from above; do not pull the cables up from below. Use proper cable ties to secure the cable.
- **General:** Do not install fiber-optic cables on top of smoke detectors.

2. Cable management:

- Leave at least 4.6 m (15 ft) of cable at each end for future growth.
- Use strain reliefs to prevent the weight of the cable from damaging the connector.
- Review all information in this manual and in any related manuals about safely handling fiber-optic cables.

3. Connector protection:

- Insert connectors carefully to prevent damage to the connector or fiber.
- Leave the connector's protective cover in place until you are ready to make connections.
- Replace the connector's protective cover when the connector is disconnected.
- Clean the connector before making a connection. Make sure that there are no obstructions and that keyways are aligned.

Fiber-optic Cable Handling

Observe these precautions when you handle fiber-optic cables:

- Do not coil the cable to less than 96 mm (3.75 in.) in diameter.
- Do not bend the cable to less than 12 mm (0.5 in.) in radius. It is most important that a cable's bend radius be no less than 20 times the diameter of the cable.
- Do not pull on the cables; carefully place them into position.
- Do not grasp the cables with pliers, grippers, or side cutters; do not attach pulling devices to the cables or connectors.

- Keep cables away from sharp edges or sharp protrusions that could cut or wear through the cable; make sure that cutouts in the equipment have protective edging.
- Protect the cable from extreme temperature conditions.
- Install the connector's protective cover whenever the connector is not connected.

■ Electrostatic Discharge Damage Prevention

Before you touch any internal components in the library, including drives, you must take precautions against electrostatic discharge (ESD).

CAUTION:

Components are sensitive to static electricity: Even a small electrostatic discharge can damage an electrical component that is inside the library. A damaged component might not fail immediately, but over time, it will become worse and might eventually cause an “intermittent” problem. Make sure that you touch an *unpainted* metal surface of the library before you reach inside the library or touch the drives or optional interface equipment.

Before you touch any internal components:

1. With your finger, touch an *unpainted* metal surface of the library. In some libraries, you can touch the library's frame. In other libraries, you might have to touch a bolt on the wall or on the door frame.
2. Keep your body movement to a minimum as you touch the drives or the library components.

Antistatic wrist straps that have clip-on ends are commercially available.

Seguridad

Las siguientes páginas describen prácticas habituales sobre instalación en bastidor, fibras ópticas y descargas electrostáticas.

■ Seguridad y precauciones del bastidor

ADVERTENCIA:

Posibilidad de lesiones físicas:

- ***Peligro de levantamiento:*** La biblioteca (conjuntamente con las unidades) pesa unos 29 kg (64 lb). Para levantar la biblioteca y colocarla en su posición se requieren como mínimo dos personas.
- **Al colocar otros equipos en el bastidor, considere también el peso total de la biblioteca. Para evitar un desequilibrio de la carga, coloque los equipos más pesados abajo y los más ligeros arriba. De lo contrario, el bastidor podría desestabilizarse y caerse.**

Al instalar la biblioteca en el bastidor, adopte las siguientes precauciones de seguridad:

- Si el bastidor tiene puertas delanteras o traseras, *no permita* que las puertas interfieran con la ventilación de la biblioteca. La temperatura ambiente en el interior del bastidor no debe ser superior a la temperatura de servicio recomendada de la biblioteca. La temperatura ambiente máxima del interior del bastidor es de 40 °C (104 °F).
- Asegúrese de que las puertas del bastidor permitan el acceso adecuado a la biblioteca.
- Asegúrese de que la combinación de la biblioteca con otros equipos instalados en el bastidor no provoque situaciones de sobretensión, tanto si el equipo está conectado directamente al circuito derivado o a una regleta de distribución.
- Asegúrese de que todos los equipos del bastidor dispongan de una puesta a tierra fiable, tanto si el equipo está directamente conectado al circuito derivado o a una regleta de distribución

Nota: La puesta a tierra de la biblioteca se conecta a través de la patilla de puesta a tierra del enchufe.

■ Seguridad de fibras ópticas

ADVERTENCIA:

Riesgo para la vista. Nunca mire directamente el interior de un cable de fibra óptica, un conector de fibra óptica o un módulo transceptor de láser. Los niveles de potencia del láser pueden conllevar situaciones de riesgo, susceptibles de lesionar la vista.

Tenga especial cuidado al utilizar instrumentos ópticos con estos equipos. Dichos instrumentos pueden incrementar las probabilidades de lesiones oculares.

Los transceptores de láser de los equipos de fibra óptica pueden suponer un peligro para la seguridad física. Asegúrese de que toda persona que trabaje con estos equipos de Sun StorageTek entienda los peligros y siga los procedimientos de seguridad. Asegúrese de que todos los puertos ópticos de los módulos transceptores de láser estén terminados con un conector óptico, una cubierta o un tapón de protección contra el polvo.

Todas las interfaces de fibra óptica de estos equipos de canal de fibra de Sun StorageTek contienen un transceptor de láser, categorizado como Producto láser de Clase 1. Cada transceptor láser tiene una salida de menos de 70 mW y una longitud de onda de 850 nm. Los productos de láser de clase 1 de Sun StorageTek cumplen las normas EN60825-1(+A-11) y las secciones 21 CFR 1040.10 y 1040.11 de las normas de la Administración para la Calidad de Alimentos y Medicamentos (FDA).

Las siguientes traducciones están dirigidas a usuarios de Finlandia y Suecia que deseen identificar la categoría y clasificación de seguridad de los dispositivos láser:

LÁSER DE CLASE 1
LUOKAN 1 LASERLAITE
KLASSE 1 LASER APPARAT

Etiqueta del producto láser

De conformidad con las normas de seguridad, cada producto de canal de fibra de Sun StorageTek lleva una etiqueta que identifica la clase de láser del producto, y el lugar y fecha de fabricación. Esta etiqueta aparece sobre la unidad de cinta de canal de fibra, así como en las proximidades de los conectores de las bibliotecas de cintas de canal de fibra. A continuación puede verse una copia de dicha etiqueta:

CLASS 1 LASER PRODUCT
LASER KLASSE 1
APPAREIL A LASER DE CLASSE 1
CUMPLE LAS NORMAS 21 CFR 1040.10 Y 1040.11

Instalación de cables de fibra óptica

Para instalar cables de fibra óptica, efectúe este procedimiento:

1. Tendido del cable:

- **Tarima:** Los cables de fibra óptica pueden instalarse debajo de tarimas. Al tenderlos, manténgalos apartados de cualquier obstrucción, como por ejemplo otros cables o equipos.
- **Escalerilla portacables o canaleta de cables:** Sitúe los cables en su posición. No tire de ellos a través de la escalerilla portacables. Al tender los cables, manténgalos apartados de esquinas afiladas, colgadores de techo, conductos, tuberías y actividades de construcción.
- **Longitud de elevación vertical:** Deje los cables en la bobina original y bájelos desde arriba. No tire de ellos desde abajo. Utilice los fijadores adecuados para inmovilizarlos.
- **General:** No instale cables de fibra óptica encima de detectores de humo:

2. Manejo de los cables:

- Deje como mínimo 4,6 m (15 pies) de cable en cada extremo, en previsión de futuras extensiones.
- Utilice protectores contra tirones para evitar que el peso del cable dañe el conector.
- Repase en el presente manual, así como de manuales afines, toda la información relativa a la manipulación segura de cables de fibra óptica.

3. Protección de los conectores:

- Inserte los conectores con todo cuidado para evitar dañar éstos o la fibra.
- No quite la cubierta de protección del conector hasta que esté preparado para realizar las conexiones.
- Al desconectar el conector, vuelva a colocar la cubierta de protección.
- Antes de realizar una conexión, limpie el conector. Asegúrese de que no haya obstrucciones y de que las ranuras de chavetas estén alineadas.

Manipulación de cables de fibra óptica

Al manipular cables de fibra óptica, tenga en cuenta las siguientes precauciones:

- No enrolle el cable a menos de 96 mm (3,75") de diámetro.
- No curve el cable a menos de 12 mm (0,5") de radio. Sun StorageTek recomienda que el radio de curvatura de un cable no sea inferior a 20 veces el diámetro del cable.
- No tire de los cables: colóquelos con cuidado en su posición.

- No aferre los cables con alicates, pinzas ni fresas. No una los cables ni los conectores a dispositivos de tracción.
- Mantenga los cables apartados de bordes y salientes afilados que pudieran cortarlos o desgastarlos. Asegúrese de que los orificios del equipo dispongan de bordes protectores.
- Proteja los cables contra temperaturas extremas.
- En toda ocasión en que el conector no esté conectado, colóquele su cubierta de protección.

■ Prevención de daños por descarga electrostática

Antes de tocar cualquier componente interno de la biblioteca, incluidas las unidades de cinta, debe tomar las precauciones adecuadas frente a descargas electrostáticas (DES).

PRECAUCIÓN:

Los componentes son sensibles a la electricidad estática: Incluso una pequeña descarga electrostática puede dañar un componente eléctrico del interior de la biblioteca. Un componente dañado puede no fallar inmediatamente pero, con el tiempo, se deteriora y puede causar un problema "intermitente". Asegúrese de tocar una superficie metálica *sin pintar* de la biblioteca antes de tocar el interior de la misma, las unidades de cinta o los equipo de interfaz opcionales.

Antes de tocar un componente interno:

1. Toque con el dedo una superficie metálica *sin pintar* de la biblioteca. En algunas bibliotecas se puede tocar el marco. En otras, puede tocar un tornillo de la pared o el marco de la puerta.
2. No mueva demasiado el cuerpo mientras toca las unidades de cinta o los componentes de la biblioteca.

Puede adquirir muñequeras antiestáticas con extremos de mordazas.

Notices

Please read the following compliance and warning statements for this product.

CAUTION:

***Potential equipment damage:* Cables that connect peripherals must be shielded and grounded; refer to descriptions in the cable instruction manuals. Operation of this equipment with cables that are not shielded and not correctly grounded might result in interference to radio and TV reception.**

Changes or modifications to this equipment that are not expressly approved in advance by Sun StorageTek will void the warranty. In addition, changes or modifications to this equipment might cause it to create harmful interference.

■ United States FCC Compliance Statement

The following compliance statement pertains to Federal Communications Commission Rules 47 CFR 15.105:

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 or her own expense.

■ CISPR 22 and EN55022 Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

■ Japanese Compliance Statement

The following compliance statement in Japanese pertains to VCCI EMI regulations:

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。

English translation: This is a Class A product based on the Technical Requirement of the Voluntary Control Council for Interference by Information Technology (VCCI). In a domestic environment, this product may cause radio interference, in which case the user may be required to take corrective actions.

■ Taiwan Warning Label Statement

The following warning label statement pertains to BSMI regulations in Taiwan, R.O.C.:

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

English translation: This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.

■ Internal Code License Statement

The following is the Internal Code License Agreement from Sun StorageTek:

NOTICE

INTERNAL CODE LICENSE

PLEASE READ THIS NOTICE CAREFULLY BEFORE INSTALLING AND OPERATING THIS EQUIPMENT. THIS NOTICE IS A LEGAL AGREEMENT BETWEEN YOU (EITHER AN INDIVIDUAL OR ENTITY), THE END USER, AND STORAGE TECHNOLOGY CORPORATION (“STORAGETEK”), THE MANUFACTURER OF THE EQUIPMENT. BY OPENING THE PACKAGE AND ACCEPTING AND USING ANY UNIT OF EQUIPMENT DESCRIBED IN THIS DOCUMENT, YOU AGREE TO BECOME BOUND BY THE TERMS OF THIS AGREEMENT. IF YOU DO NOT AGREE WITH THE TERMS OF THIS AGREEMENT, DO **NOT** OPEN THE PACKAGE AND USE THE EQUIPMENT. IF YOU DO NOT HAVE THE AUTHORITY TO BIND YOUR COMPANY, DO **NOT** OPEN THE PACKAGE AND USE THE EQUIPMENT. IF YOU HAVE ANY QUESTIONS, CONTACT THE AUTHORIZED STORAGETEK DISTRIBUTOR OR RESELLER FROM WHOM YOU ACQUIRED THIS EQUIPMENT. IF THE EQUIPMENT WAS OBTAINED BY YOU DIRECTLY FROM STORAGETEK, CONTACT YOUR STORAGETEK REPRESENTATIVE.

1. **Definitions:** The following terms are defined as followed:
 - a. “Derivative works” are defined as works based upon one or more preexisting works, such as a translation or a musical arrangement, or any other form in which a work may be recast, transformed, or adapted. A work consisting of editorial revision, annotations, elaboration, or other modifications which, as a whole, represent an original work of authorship, is a Derivative work.
 - b. “Internal Code” is Microcode that (i) is an integral part of Equipment, (ii) is required by such Equipment to perform its data storage and retrieval functions, and (iii) executes below the user interface of such Equipment. Internal code does not include other Microcode or software, including data files, which may reside or execute in or be used by or in connection with such Equipment, including, without limitation, Maintenance Code.
 - c. “Maintenance Code” is defined as Microcode and other software, including data files, which may reside or execute in or be used by or in connection with Equipment, and which detects, records, displays, and/or analyzes malfunctions in the Equipment.
 - d. “Microcode” is defined as a set of instructions (software) that is either imbedded into or is to be loaded into the Equipment and executes below the external user interface of such Equipment. Microcode includes both Internal Code and Maintenance Code, and may be in magnetic or other storage media, integrated circuitry, or other media.
2. The Equipment you have acquired by purchase or lease is manufactured by or for StorageTek and contains Microcode. By accepting and operating this Equipment, you acknowledge that StorageTek or its licensor(s) retain(s) ownership of all Microcode, as well as all copies thereof, that may execute in or be used in the operation or servicing of the Equipment and that such Microcode is copyrighted by StorageTek or its licensor(s).
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 - (ii) reverse assemble, decode, translate, decompile, or otherwise reverse engineer the Internal Code (except as decompilation may be expressly permitted under applicable European law solely for the purpose of gaining information that will allow interoperability when such

information is not otherwise readily available); or

(iii) sublicense, assign, or lease the Internal Code or permit another person to use such Internal Code, or any copy of it.

If you need a backup or archival copy of the Internal Code, StorageTek, or your authorized StorageTek distributor or reseller, will make one available to you, it being acknowledged and agreed that you have no right to make such a copy.

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6. You, the end user, agree to take all appropriate steps to ensure that all of your obligations set forth in this Notice are extended to any third party having access to the Equipment.
7. You may transfer possession of the Internal Code to another party only with the transfer of the Equipment on which its use is authorized, and your license to use the Internal Code is discontinued when you are no longer an owner or a rightful possessor of the Equipment. You must give such transferee all copies of the Internal Code for the transferred Equipment that are in your possession, along with a copy of all provisions of this Notice. Any such transfer by you is automatically (without further action on the part of either party) expressly

subject to all the terms and conditions of this Notice passing in full to the party to whom such Equipment is transferred, and such transferee accepts the provisions of this license by initial use of the Internal Code. You cannot pass to the transferee of the Equipment any greater rights than granted under this Notice, and shall hold StorageTek harmless from any claim to the contrary by your transferee or its successors or assigns. In addition, the terms and conditions of this Notice apply to any copies of Internal Code now in your possession or use or which you hereafter acquire from either StorageTek or another party.

8. You acknowledge that copies of both Internal Code and Maintenance Code may be installed on the Equipment before shipment or included with the Equipment and other material shipped to you, all for the convenience of StorageTek's service personnel or service providers licensed by StorageTek, and that during the warranty period, if any, associated with the Equipment, and during periods in which the Equipment is covered under a maintenance contract with StorageTek or service providers licensed by StorageTek, both Internal Code and Maintenance Code may reside and be executed in or used in connection with such Equipment, and you agree that no rights to Maintenance Code are conferred upon you by such facts. StorageTek or the licensed service provider may keep Maintenance Code and service tools and manuals on your premises but they are to be used only by StorageTek's customer service personnel or those of service providers licensed by StorageTek. You further agree that upon (i) any termination of such warranty period or maintenance contract period; or (ii) transfer of possession of the Equipment to another party, StorageTek and its authorized service providers shall have the right with respect to the affected Equipment to remove all service tools and manuals and to remove or disable all Maintenance Code and/or replace Microcode which includes both Internal Code and Maintenance Code with Microcode that consists only of Internal Code.

This chapter provides you with general information about the L20 tape library.

■ Library Overview

The library is a self-contained, fully automated cartridge tape storage system that contains either one or two drives.

The library is available as an upgradeable 10-cartridge version or a 20-cartridge version.

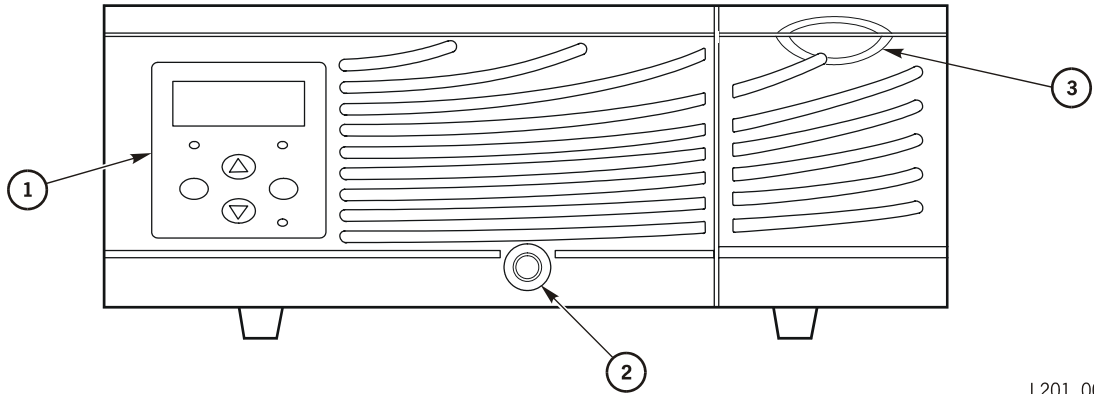
The library interface may be configured for single-ended, HVD, or LVD SCSI interfaces. The library may also interface directly with a Fibre Channel; the SCSI drive input/output is converted for Fibre Channel protocol through an optional internal or external Fibre Channel router.

Note: Make sure that you understand which type of SCSI interface on which you are operating. For example, native operation for DLT1 drives is an LVD interface. DLT1 drives are, however, also available to operate on an HVD interface.

■ Library Hardware Components

Figure 1-1 shows the library front panel.

Figure 1-1. Library Front View (L201_001)



L201_001

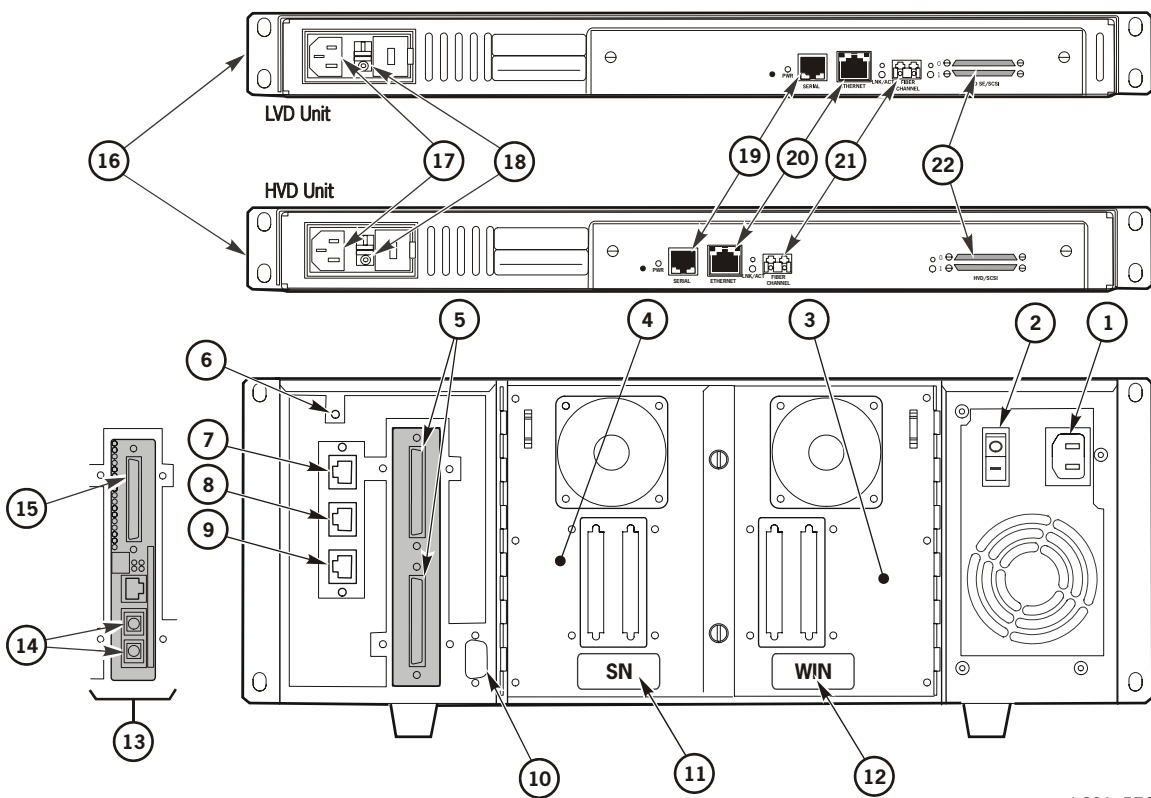
1. Operator panel (including status display)—used for configuration and diagnostic testing
2. Lock for slide-out cartridge drawer—when open, you may access all cartridges
3. Cartridge access port (CAP)—used for entering and removing cartridges without interrupting library operation

In addition, the library can be conveniently placed on a desktop (with optional cosmetic cover and rubber feet) or mounted in a standard 483-mm (19-in.) rack.

The library must be oriented horizontally, as shown in the figure.

Figure 1-2 shows the rear of the library.

Figure 1-2. Library Rear View (L201_576)



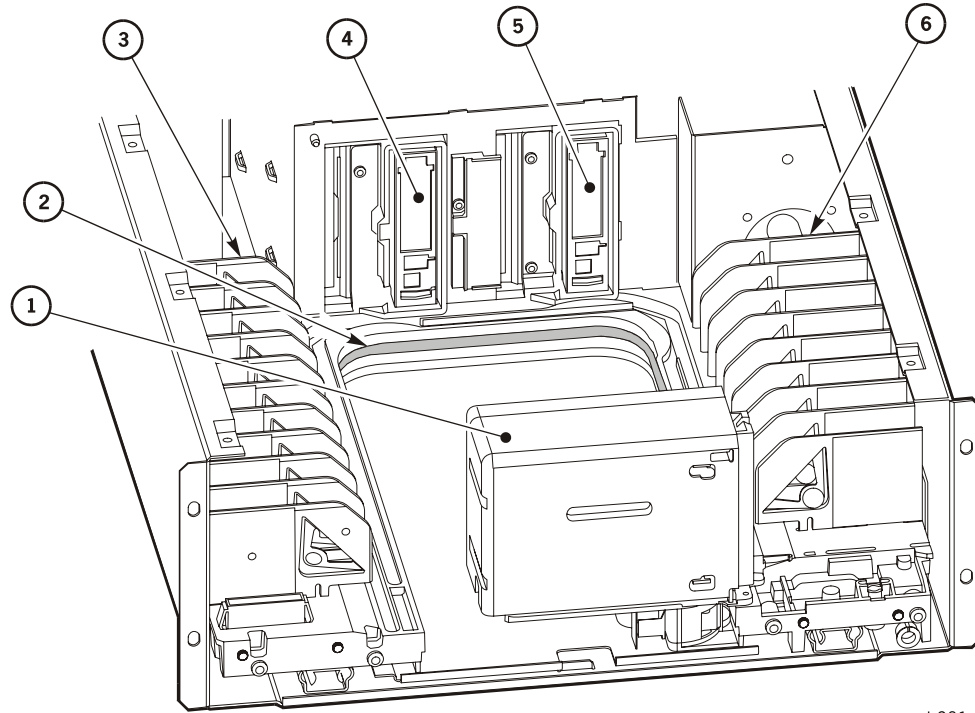
L201_576

- | | |
|---|--|
| <ul style="list-style-type: none"> 1. Power receptacle 2. Power-on/off switch 3. Drive SCSI ports (Drive 0) 4. Drive SCSI ports (Drive 1) 5. Library SCSI ports 6. Library RESET button 7. Ethernet/Web access 8. Reserved (manufacturing) 9. Reserved (service) 10. Personality module connector—specifies library size 11. Library serial number 12. Library warranty identification number | <ul style="list-style-type: none"> 13. Fibre Channel router card (optional) 14. Fibre Channel connectors 15. SCSI connector 16. External Fibre Channel Router (optional) 17. External Fibre Channel Router Power Receptacle 18. External Fibre Channel Router Power Switch 19. External Fibre Channel Router Serial Port 20. External Fibre Channel Router Ethernet port 21. External Fibre Channel Router Fibre Channel port 22. External Fibre Channel Router SCSI Bus ports |
|---|--|

If the library contains only one drive, it is designated Drive 0; if there are two drives, they are designated as noted in [Figure 1-2](#).

Figure 1-3 shows the library interior and identifies the functional components. More detailed information about the major components are on the following pages.

Figure 1-3. Library Internal View (L201_014)



L201_014

- | | |
|---|----------------------------|
| 1. Picker—moves along its U-shaped track and removes (“gets”) and places (“puts”) tapes into cartridge storage cells or drives. | 3. Cartridge storage cells |
| 2. U-shaped track (for robot movement) | 4. Drive 0 |
| | 5. Drive 1 |
| | 6. Cartridge storage cells |

Picker

The picker moves cartridges among the CAP, drives, and storage cells. The picker moves on a U-shaped track and contains a bar code scanner and camera.

The U-shaped track attaches to the floor of the library. The picker travels along the track and rotates 180 degrees to access all cells in the library. Tapes are tracked by their volume labels and associated cell locations. The cartridge locations are defined during the audit (see “[Audit](#)” on page 1-7) and stored in two places: the library’s memory and the tape management database (the host).

Cartridge Storage Cells

The tape management software locates cartridges by their cell numbers. The library may contain storage cells for 10, 15, 19, and 20 data and cleaning cartridges, depending on whether:

- A CAP is used
- The Auto Clean feature is on or off

The library capacity (total number of cells) is determined at the time the library is ordered.

If you choose to use the Auto Clean feature, you *must* insert a cleaning cartridge in the left-front cell, configure the library for Auto Clean, and reinitialize the library. Drives are automatically cleaned when required. For more information, see [“Auto Clean Feature” on page 2-5](#).

Note: Cartridges must be properly labeled. Directions are found in [“Applying Labels” on page B-5](#)

Drives

The library supports the following drives:

- Ultrium Linear Tape-Open (LTO) drives

LTO technology was developed by IBM, Hewlett-Packard, and Seagate to provide a clear and viable choice in an increasingly complex array of tape storage options. LTO is an “open format” technology, which means that users will have multiple sources of product and media. The open nature of LTO technology also provides a means of enabling compatibility among different vendor’s offerings.

- Quantum’s (Certance) LTO 3
- Hewlett-Packard’s LTO 1, LTO 2, and LTO 3
- IBM’s LTO 1, LTO 2, and LTO 3
- Seagate LTO 1 and LTO 2

See [Table 1-1 on page 1-6](#) for information on the LTO drives backward read compatibility.

- Digital Linear Tape (DLT) drives:
 - Quantum Corporation’s DLT 7000E, DLT 8000, and Super DLT
 - Benchmark Storage Innovations, Inc’s DLT1

You may mix drive types within a library, but please observe the cautions below.

CAUTION:

Possible data corruption: Do not mix DLT 7000 and DLT 8000 drives in the same library. If a DLT 7000 cartridge is inserted into a DLT 8000 drive, the tape can be read and written on in 7000 mode. If a DLT 8000 cartridge is inserted into a DLT 7000 drive and a read command is issued, the drive will indicate Medium Error/

Calibration Error (03/8000). If a write command is issued at load point, as with most drives, the drive will write over any data present.

CAUTION:

Data loss: Do not mount SDLT 320-formatted cartridges into SDLT 220 drives. An SDLT 220 drive will overwrite the 320 data. To avoid this, carefully manage the locations of the cartridges within your library, and designate the correct drive type for your read/write operations.

The following table details the LTO drives backward readability.

Table 1-1. LTO Drive Backward Readability

	LTO Gen 2 Drive	LTO Gen 3 Drive
LTO 1 media	Read and write	Read only
LTO 2 media	Read and write	Read and write
LTO 3 media	No action	Read and write

The drive interfaces (Table 1-2) are SCSI high voltage differential (HVD) or SCSI low voltage differential (LVD). The HVD interface allows longer cable lengths, but throughput is slower than with the LVD interface. The LVD interface restricts cable lengths, but provides faster throughput.

Table 1-2. Drive Interfaces

Drive Name	Interface	
	HVD ¹	LVD ²
DLT 7000E	Yes	No
DLT 8000	Yes	Yes
DLT1	No	Yes
Super DLT 320	Yes	Yes
Super DLT 600	No	Yes
Seagate Ultrium LTO 1	Yes	Yes
HP Ultrium LTO 1, LTO 2, and LTO 3	No	Yes
Certance Ultrium LTO 2 and LTO 3	No	Yes
IBM Ultrium LTO 1, LTO 2, and LTO 3	No	Yes

Notes:

1. The maximum speed of data transfer is at 40 MB/s
2. The maximum speed of data transfer is at 80 MB/s

Do *not* mix LVD and HVD operations on the same bus.

DLT1 drives use only DLTtape IV cartridges, and can read—but not write to—DLTtape IV cartridges formatted by DLT 4000 drives.

DLT1 drives use their own cleaning cartridge, part 100099401. Do *not* use this cartridge in DLT drives.

Likewise, each Ultrium drive type uses its own unique cleaning cartridges that cannot be used on any other drive type.

For specific drive information, refer to the drive publications; for cartridge information, refer to [Appendix B, “Cartridges.”](#)

■ Audit

An “audit” is the method by which the library keeps track of all cartridge locations within the library. Whenever the library is powered-off/on or the drawer is opened and closed, the camera reads the labels on the tapes and the firmware assigns their cell locations. This data is stored in the memory of the library.

Whenever an audit of the library is completed, the tape management database within the host must also be updated. *Both the library audit and the tape management software audit information must match for correct operation.*

The correct match of audit data has two implications for operation:

- Each time a library audit occurs, you must update the tape management database. This procedure assures a match of library audit information and tape management information.
- If you manually exchange a cartridge from a drive for one in storage, make sure you update the tape management database or an error will occur.

■ Personality Module

The personality module is a connector key and cable that stores the library cell capacity information. The library will not operate unless an authorized module is attached to the rear of the library (see [Figure 1-2 on page 1-3](#)). For proper initialization, you must first attach the module before turning on power to the library. You remove the personality module only to install an upgrade conversion bill (that includes a new module).

More information concerning the personality module can be found in [“Viewing Personality Module Status” on page 3-5](#).

■ Tape Management Software

The tape management software provides the instructions to perform tape read/write operations and robotic move operations. When the library is in automated mode (see [Chapter 3, Library Operation](#)), these operations occur without manual intervention. The software determines where the cartridge is located by accessing audit data uploaded from the library; the software then allocates the drive to receive the cartridge.

For command descriptions and instructions, refer to your system’s software publications.

■ Safety Features

Safety features are incorporated into the library. If you unlock and open the slide-out cartridge drawer, an electronic interlock removes power from the picker. In addition, covers over the logic card and the power supply in the electronics compartment prevent you from coming into contact with hazardous voltages and sensitive electronic components.

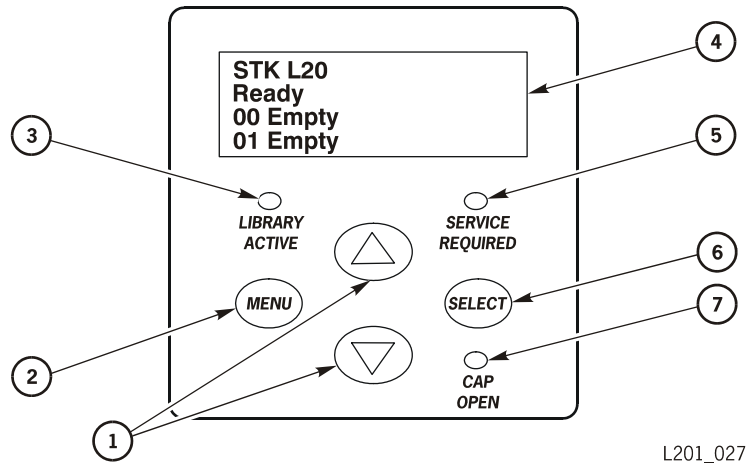
This chapter describes the operator panel and tells you how to configure the library and drives. When you have finished your configuration, record the information in [Table 2-8 on page 2-27](#).

■ Operator Panel

The library operator panel includes a four-line status display, four function buttons, and three indicators.

[Figure 2-1](#) and [Figure 2-2 on page 2-2](#) show the two types of operator panel status displays, depending on whether the CAP is configured. [Chapter 3, “Library Operation”](#) lists status messages and their meanings.

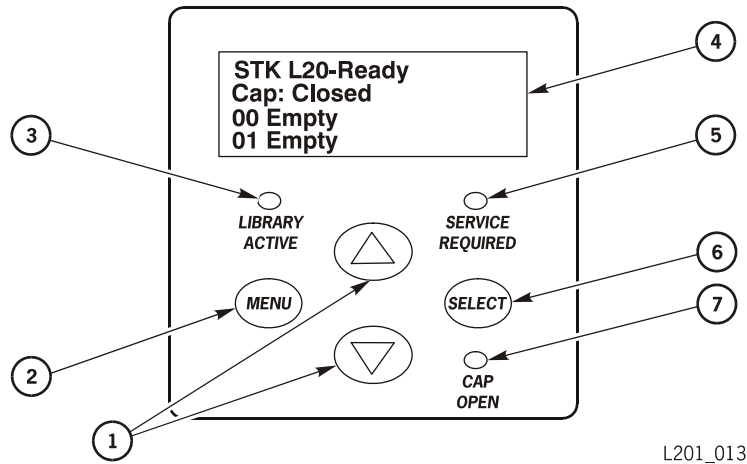
Figure 2-1. Operator Panel without CAP (201_027)



L201_027

- | | |
|------------------------------------|--------------------------------------|
| 1. Arrow buttons | 5. <i>SERVICE REQUIRED</i> indicator |
| 2. MENU button | 6. SELECT button |
| 3. <i>LIBRARY ACTIVE</i> indicator | 7. <i>CAP OPEN</i> indicator |
| 4. Operator panel display | |

Figure 2-2. Operator Panel with CAP (L201_013)



- | | |
|------------------------------------|--------------------------------------|
| 1. Arrow buttons | 5. <i>SERVICE REQUIRED</i> indicator |
| 2. MENU button | 6. SELECT button |
| 3. <i>LIBRARY ACTIVE</i> indicator | 7. <i>CAP OPEN</i> indicator |
| 4. Operator panel display | |

Function Buttons

The operator panel has four function buttons:

- | | |
|---------------|---|
| MENU | This button toggles operation between the Main menu and the initial status display. It also returns you to the previous (higher level) menu from a submenu. |
| SELECT | This button chooses the option indicated by the cursor (>) shown in the status display. In a data field, this button moves the cursor to the next character. You must press this button until you come to the end of the character line to move on to the next field. |
| ▲ | The ▲ (up) and ▼ (down) arrow buttons move the cursor to the selection you want in a menu screen. When the cursor is in a data field, the arrows increase and decrease the values shown in that field (numbers and letters). |
| ▼ | |

Indicators

The operator panel has three indicators:

LIBRARY ACTIVE This green indicator flashes when the processor card is active.

CAP OPEN This amber indicator is on when the CAP door is open.

SERVICE REQUIRED This red indicator is on when operator intervention is required. Check the operator panel display for messages.

If the indicator is lit solidly and not flashing, use the Diagnostics menu to see the fault symptom code (FSC).

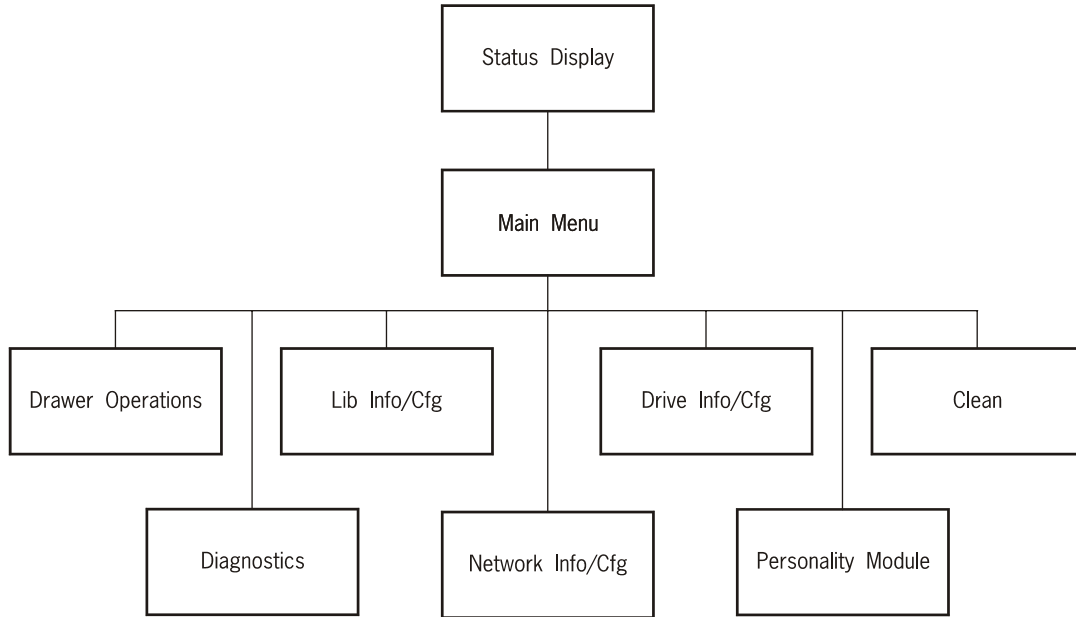
This indicator flashes if:

- One or more fans fail
- The temperature reaches the warning threshold
- A power supply fails

■ Operator Panel Menus

Using the function buttons on the operator panel, you can access the library menus shown in [Figure 2-3](#). Press the MENU button to view the Main menu. To view submenus, use the arrow (s t) buttons to move the cursor to any menu and press the SELECT button to view that menu. To scroll through the menus in the status display, use the arrow buttons.

Figure 2-3. Operator Panel Menus (L201_022)



L201_022

■ Configuration

After initialization is complete, you will use the operator panel to configure the library and drives. Check off the tasks in the list below as you complete them.

- “Configuring the Library” on page 2-7
- “Configuring the Network” on page 2-8
- “Configuring the Drives” on page 2-9
- “Configuring the Warning and Shutdown Temperatures” on page 2-9

Before you enter configuration information, record the desired library’s configuration in [Table 2-8](#).

Auto Clean Feature

The library supports two methods for cleaning drives: automatic cleaning (Auto Clean) and manual cleaning. You must clean the drives occasionally to prevent read and write errors.

Notes:

Your host software must also support Auto Cleaning if you want it enabled.

If you use the Autoloader. feature, Auto Cleaning *must* be set to OFF.

The Auto Clean feature is enabled when you have:

- Configured the library for Auto Clean
- Inserted a cleaning cartridge into the front, left cell
- Reinitialized the library

When a drive requires cleaning with Auto Clean enabled, the picker retrieves the required cleaning cartridge from the left-front cell, mounts the cartridge into the drive, and returns the cartridge to the left-front cell after cleaning is complete.

If you plan to use the Auto Clean function, set the Auto Clean field in the Lib Info/Cfg menu to On (see [Table 2-1 on page 2-7](#)), and make sure that you insert a cleaning cartridge in the left-front cell (see “[Valid Storage Cells with Auto Clean On](#)” on [page 2-17](#)).

CAUTION:

Possible drive damage: DLT1 drives use their own cleaning cartridge, part 100099401. Do *not* use this cartridge in DLT drives. The DLT1 cleaning cartridge media is composed of fabric and is only used to clean DLT1 drives.

Each Ultrium tape drive and SDLT drive uses its own, unique cleaning cartridge. Do *not* use it for any other drive types.

Note: The DLT 7000E and DLT 8000ECN drives share the same type of cleaning cartridge.

The type of cleaning cartridge in the cleaning cell determines which type of drives can be automatically cleaned. If you do not place a drive's specific cleaning cartridge into one of the cleaning cells, you must manually clean that type of drive.

If Auto Clean is enabled and you wish to clean a drive *before* the drive requests a cleaning, you can also manually clean the drive. See [“Cleaning a Drive” on page 3-23](#).

If Auto Clean is *not* enabled, a Clean Needed message appears on the operator panel status display when a drive requires cleaning. See [“Cleaning a Drive” on page 3-23](#).

Fast Load Feature

The Fast Load feature adjusts the timing of the picker during cartridge load operations:

- When the Fast Load feature is On, the picker mounts a cartridge into a drive and the picker immediately begins its next task; it does not wait for the drive to complete its loading cycle.
- When the Fast Load feature is Off (the default), the picker waits at the drive location until the tape is fully loaded before it begins its next task.

Note: Some tape management software does not support the Fast Load feature. Consult your system administrator before enabling this feature.

If you plan to use the Fast Load feature, set the Fast Load field in the Lib Info/Cfg menu ([Table 2-1 on page 2-7](#)) to On.

Configuring the Library

Access the Lib Info/Cfg menu and complete the fields shown in [Table 2-1](#).

Table 2-1. Lib Info/Cfg Menu

Data Field	Valid Values	Explanation
SCSI ID: (see Note 1)	00–15	Enter the SCSI ID that you have chosen for the library; for example, 00.
SCSI Type:	HVD LVD	Enter whether the library is operating on a high voltage differential (HVD) or low voltage differential (LVD) interface.
Date:	<i>mm/dd/yyyy</i>	Enter the current date, where <i>mm</i> is the month (01–12), <i>dd</i> is the day (01–31), and <i>yyyy</i> is the year (2000–2010); for example, 06/30/2001.
Time:	<i>hh:mm</i>	Enter the current time, where <i>hh</i> is the hour (00–23) and <i>mm</i> is the minutes (00–59); for example, 15:39.
Fast Load:	Off (default) On	Enter the Fast Load On choice (see “Fast Load Feature” on page 2-6).
Auto Clean: (see Note 1)	Off (default) On	Enter the Auto Clean choice (see “Auto Clean Feature” on page 2-5).
Number of Cells: (choose one, see Note 1)	10 + CAP 15 + CAP 19 + CAP 20 Cells	The default and only option for a 10-cartridge version. Choose this option for application software licensing reasons. The default for 20-cartridge library version. This option requires locking the CAP to gain a permanent storage cell (see Note 2).
Media Check	On (default) Off	Prevents improper orientation of cartridges. At initialization or power on, the robot attempts to pick up any unreadable, unlabeled, or improperly placed cartridges. If unretrievable, library status will be “not ready.”

Notes:

1. If the SCSI ID, Auto Clean, or # of Cells data fields are changed and you press the **MENU** button to exit the configuration menu, the status message displays **Needing Lib Reset: Select to RESET the Library** message. You can then reset the library by pressing the **SELECT** button.
2. If you configure the library for 20 cartridges, you must lock the CAP so that its slot is a permanent storage cell. See “Locking the CAP” on page 2-19.

Configuring the Network

To use the Library Status Web interface through the Ethernet port, you must configure the network. Access the Network Info/Cfg menu and complete the required fields as shown in [Table 2-2](#).

Table 2-2. Network Info/Cfg Menu

Data Field	Valid Values	Explanation
Library Name:	<i>name</i>	This optional name is one that you can select for the library in your network, where <i>name</i> is up to 11 alphanumeric characters; for example, <i>targetname</i> . This name has no effect on library operation. This name is also called the Domain Name.
IP Address:	<i>nnn.n.n.n</i>	This optional address is required only for network monitoring, where <i>n</i> is 0–9. Example: 192.0.0.1 Note: You cannot assign an address such as 255.255.255.255.
Network Gateway:	<i>nnn.nnn.nnn.n</i>	This optional field indicates the gateway connection between subnets, where <i>n</i> is 0–9 and is required only when such a connection exists and is necessary for library operation. Example: 254.255.254.0
Subnet Mask:	<i>nnn.nnn.nnn.nnn</i>	This optional field can be used to make the library accessible through a subnet on a larger network, where <i>n</i> is 0–9. This data is required only when applicable.
Ethernet Address:	<i>nn:nn:nn:nn:nn:nn</i>	This field displays the Ethernet address that is written into the controller card at the factory. It is only displayed and cannot be changed.
Note: If any of the Network configuration values are changed and you press the MENU button to exit the configuration menu, the status message displays Needing Lib Reset: Select to RESET the Library message. You can then reset the library by pressing the SELECT button.		

Configuring the Drives

Access the Drive Info/Cfg menu and complete the required fields as shown in [Table 2-3](#) for all drives. Make sure that you configure both Drive 0 and Drive 1 if you have two drives in your library. Valid SCSI IDs may vary depending on the type of drive. For more information, refer to your drive documentation.

Note: For more information about this menu, see [“Viewing Drive Status” on page 3-3](#).

Table 2-3. Drive Info/Cfg Menu

Data Field	Valid Values	Explanation
SCSI Id:	00–15	This field enables you to enter the SCSI ID you have chosen for this drive; for example, 00. This ID must not be the same as other devices on the SCSI bus. Valid IDs can vary depending on the type of drive.
On Bus Status:	On Off	On indicates that the drive is on the same SCSI bus as the library. Off indicates that the drive is connected to a different SCSI bus.
Code Ver:	nn	This field shows the firmware version of your drive and is loaded automatically during audit.
Status:	Loaded	This field shows the status of the drive. See Table 3-2 on page 3-4 for a list of the related messages.
Type:	DLT 7000 DLT 8000 BNHMK DLT1 SDLT 220 SDLT 320 SDLT 600 SGT LTO HP LTO IBM LTO	This field shows the type of the drive and is set automatically during audit. For more information see “Drives” on page 1-5 .
Vendor:		This field shows the vendor of the drive and is set automatically during audit.

Configuring the Warning and Shutdown Temperatures

This menu is used to protect media. Refer to the literature from the media manufacturer to determine what values to set. The high temperature is set automatically.

You are not required to set the warning and shutdown temperatures. However, if you do not, the display will *not* show fan or power supply failures.

Hardware Monitor Menu

Access the Hardware Monitor menu and complete the required fields as shown in [Table 2-4](#). For more information about this menu, see “[Viewing the Status of the Hardware Monitor](#)” on page 2-10.

Table 2-4. Hardware Monitor Menu

Data Field	Explanation
High Temp:	The display shows the highest <i>centigrade</i> temperature. If desired, press Select to clear the field and show the current temperature.
Warn Temp:	Use the arrows to set the desired <i>centigrade</i> temperature. When the library reaches that temperature, the <i>SERVICE REQUIRED</i> indicator blinks.
Shutdown Temp:	Use the arrows to set the desired <i>centigrade</i> temperature. When the library reaches that temperature, the <i>SERVICE REQUIRED</i> indicator remains lit and no additional move requests are accepted.

Note: The value for the shutdown temperature must be at least 2°C greater than the value for the warning temperature.

Viewing the Status of the Hardware Monitor

Viewing the information under Hardware Monitor lets you know:

- If the fans and power supplies are functioning. If a fan or power supply fails, refer to your maintenance contract for service procedures.
- The current centigrade temperature and highest centigrade temperature of the library.

The warning and shutdown temperatures are set during configuration to protect the tape media. If the temperature reaches the warning temperature, the *SERVICE REQUIRED* indicator blinks. If the temperature reaches the shutdown temperature, the indicator remains lit and no additional move requests are accepted. When the temperature drops 2°C below the warning temperature, the condition is cleared. If desired, you can press **Select** to clear the highest temperature value. The display will show the current temperature.

Note: If the warning and shutdown temperatures were not set during configuration, the screen displays only the current and high temperatures.

To view the Hardware Monitor information ([Table 2-5](#)):

1. Press the **MENU** button to return to the Main menu.
2. Press the arrow buttons until the **>** sign appears to the left of **HARDWARE MONITOR**.
3. Press the **SELECT** button. **HARDWARE MONITOR MENU** will be displayed.

- Use the arrow buttons to scroll through the information.

Table 2-5. Hardware Monitor Status Messages

Message	Meaning
Current Temp: 26	The current centigrade temperature of the library.
High Temp: 27	The highest centigrade temperature of the library since the last time this field was reset.
Fans: OK	The fans are functioning.
Fans: Fail !Drive Slot 0 Fan	The Drive Bay 0 fan is not functioning.
Power: OK	The power supply is functioning.
Warn Temp: 30	The warning centigrade value that was set during configuration.
Shutdown Temp: 32	The shutdown centigrade value that was set during configuration.

Configuring the Clean Settings

This menu is used to protect media by setting the life of cleaning cartridges for the drives. Regardless of whether you configure Auto Clean or not, the Clean menu displays the drive that requires cleaning, the warning and usage counts you set for the cleaning cartridge (if Auto Clean is enabled), and the number of drives installed within the library.

Notes: When using the Autoloader feature, the “Cleaning Required” message requires that you unload all cartridges left in that drive’s stack, load a single cleaning cartridge, and start the stack. See [“Cleaning a Drive in Autoloader Mode” on page 3-30](#).

[Table 2-6](#) lists the Clean menu messages.

Table 2-6. Clean Menu

Message	Meaning
No Drives Installed	No drives are installed in the library. You will not be able to set any cleaning cartridge parameters.
Drive to Clean:	The number of the drive that requires cleaning.

Table 2-6. Clean Menu (Continued)

Message	Meaning
Set Warn Counts:	<p>If Auto Clean is enabled, you must set the maximum number of cleaning cycles allowed for the cleaning tape; see your tape manufacturer's specification.</p> <ul style="list-style-type: none"> Libraries with only one media display only one warning count. Libraries with mixed media display according to the drives installed: DLT Warn: XX SDLT Warn: XX IBM LTO Warn: XX SGT LTO Warn: XX <p>Use the up/down arrows to edit the count.</p>
Usage Count:	The number of cleaning cycles used for the cleaning tape within the library.

To set the warning count for a cleaning cartridge:

1. Press the MENU button to display the Main Menu.
2. Press the arrow button until the > sign lines up with Clean.
3. Press the SELECT button. The Clean Menu appears.
4. Use the arrow button to line up the cursor with the appropriate drive's Set Warn Counts option.
5. Press the SELECT button. The screen turns into the edit mode and the cursor lines up with the selected drive's warning count.
6. Use the up and down arrow buttons to change the value of the warning count.
7. Press the SELECT button to save the changes. You may press the MENU button to abort.
8. Press the MENU button to return to the Clean Menu.

Note: When a cleaning cartridge in the reserved cell has exceeded the warning count, the operator panel displays an asterisk (*) in the library ready status line.

Viewing the Cleaning Cartridge Information

The Cleaning Cartridge Information Menu gives you details of the media type, cartridge code, and the usage count of the cleaning cartridge in the cleaning cell.

Below is sample display:

DLT CLN123 4

DLT is the media type.

CLN123 is the cartridge code.

4 is the number of times the cleaning cartridge has been used (usage count).

Note: If the usage count reaches the warning count set for the cleaning cartridge, EXP (expired) appears as the usage count.

CAUTION:

Take precautions with used cleaning cartridges. When you place a cleaning cartridge into the library for the first time, the library indicates a usage count of 0. When the usage count exceeds its limit, you must replace it with a new one.

To view the cleaning cartridge information:

1. Press the MENU button to display the Main Menu.
2. Press the arrow button until the > sign lines up with Clean.
3. Press the SELECT button. The Clean Menu appears.
4. Use the arrow button to line up the > sign with the appropriate drive's Clean Cart Info.
5. Press the SELECT button. The Clean Info Menu appears.
6. Press the MENU button to return to the Clean Menu.

Resetting the Library

To save the configuration information in the library's memory, you must reset the library. After entering all your configuration data, press the RESET button on the rear of the library (see [Figure 1-2 on page 1-3](#)) or cycle the power-on/off switch to reinitialize the library.

Note: Resetting the library by pressing the RESET button makes the library configuration active, *but it does not cause the library to perform an audit.*

Opening the Slide-out Cartridge Drawer

Before you unlock the slide-out cartridge drawer to insert cartridges, you must position the picker so that it does not interfere with cartridge insertion.

CAUTION:

Possible equipment or cartridge damage: If you open the slide-out cartridge drawer without performing this procedure, you risk possible equipment or cartridge damage.

To position the picker:

1. Press the MENU button to return to the Main menu. The arrow sign (>) appears to the left of Drawer Operations.
2. Press the SELECT button.

The status display shows the DRAWER MENU: Push Select to Prepare Library for Opening Drawer message.

3. Press the SELECT button.

The status display shows the Are you sure? message.

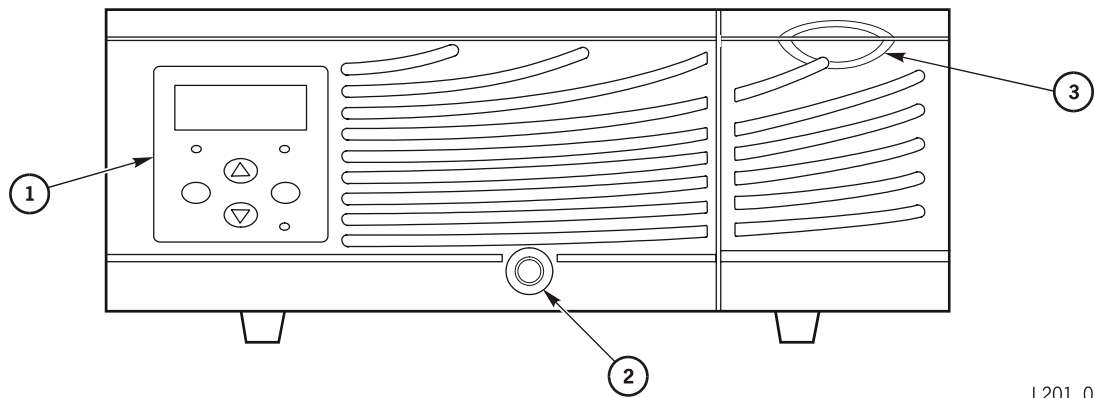
4. Press the SELECT button again.

The library stops all processes in an orderly way, ensures that any cartridge in the picker is fully seated, and safely retracts the picker. When the status display shows the OK to Open Drawer message, the library is ready for you to open the drawer.

CAUTION:

Possible picker damage: Always wait for the OK To Open Drawer message to be displayed on the operator panel before opening the drawer. This ensures that the picker is safely seated.

5. Insert the key into the lock on the drawer (see [Figure 2-4 on page 2-15](#)) and turn the key counterclockwise to open the drawer.

Figure 2-4. Opening the Slide-out Cartridge Drawer

L201_001

1. Operator panel
2. Lock for slide-out cartridge drawer
3. Cartridge access port (CAP)

For more information about the Drawer Operations menu, see [“Opening the Cartridge Drawer”](#) on page 3-17.

Closing the Slide-out Cartridge Drawer

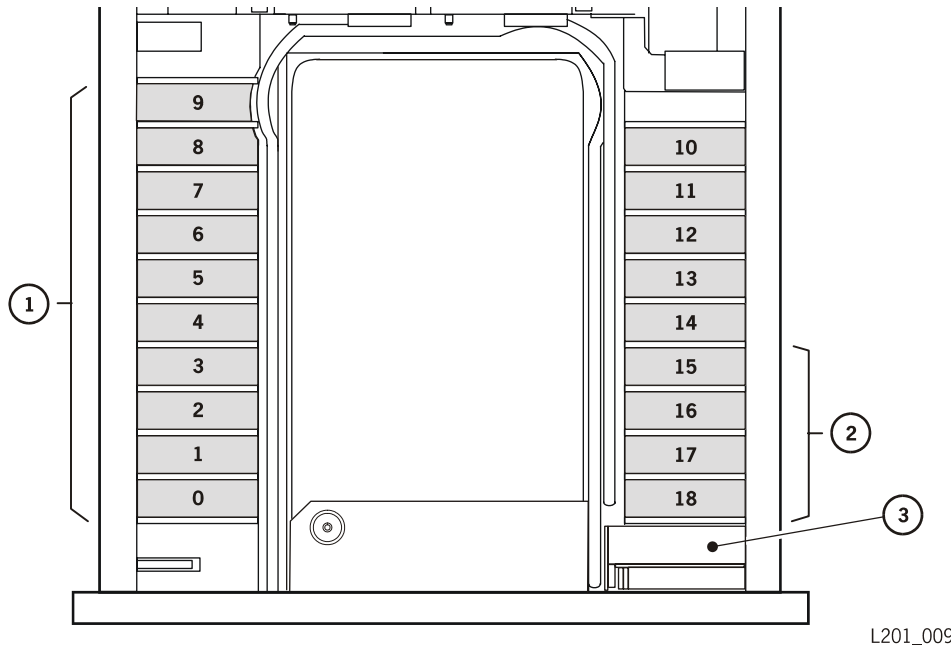
To close the slide-out cartridge drawer:

1. Place one hand on the front surface of the drawer (above the lock) and push the drawer all the way in.
2. With the other hand, lock the drawer by inserting the key into the lock and turning the key clockwise.

Valid Storage Cells with Auto Clean Off

Figure 2-5 shows cell locations for each of the possible library capacity configurations when Auto Clean is off.

Figure 2-5. Valid Storage Cells when Auto Clean Off (L201_009)



1. Cells used in 10-cartridge configuration
2. Cells unused in 15-cartridge configuration
3. CAP cell (In the 20-cartridge configuration, this becomes Cell 19 when the CAP is locked.)

Cartridge Locations: 10 + CAP, Auto Clean Off

Use only Cells 0–9 on the left side of the library. The CAP is available for use in this configuration, so set the CAP lever to the UNLOCKED position. (This is the default configuration for the 10-cartridge version of the library.)

Cartridge Locations: 15 + CAP, Auto Clean Off

Use only Cells 0–9 on the left side of the library and 10–14 on the right side. The CAP is available for use in this configuration, so set the CAP lever to the UNLOCKED position.

Cartridge Locations: 19 + CAP, Auto Clean Off

All storage cells can be used. The CAP is available for use in this configuration, so set the CAP lever to the UNLOCKED position. (This is the default configuration for the 20-cartridge version of the library.)

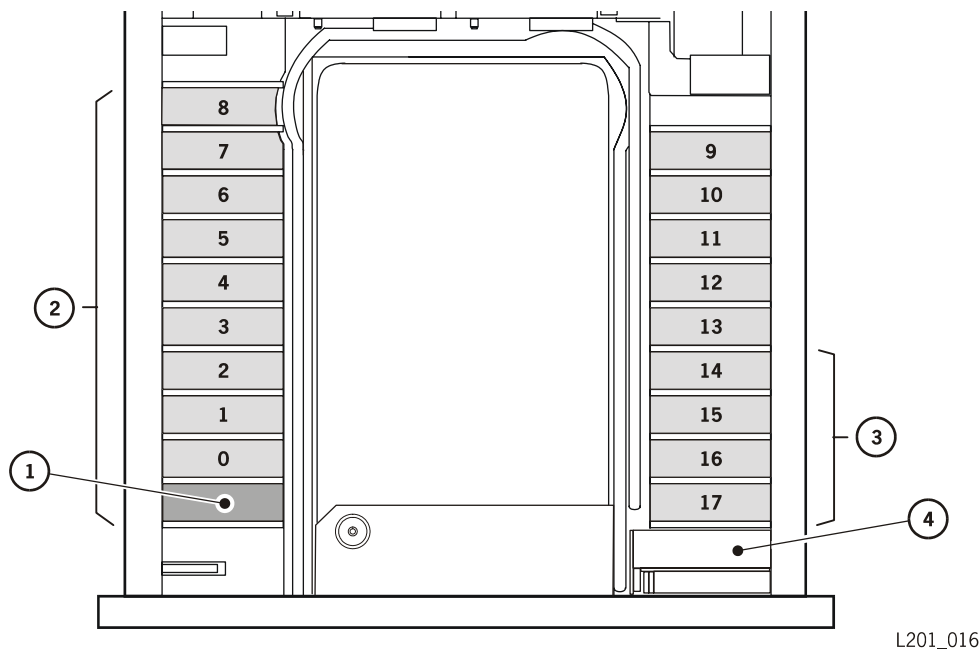
Cartridge Locations: 20 Cells, Auto Clean Off

All storage cells, including the CAP cell, can be used by the library. The CAP is not available for operator use in this configuration, so set the CAP lever to the LOCKED position; see “Locking the CAP” on page 2-19.

Valid Storage Cells with Auto Clean On

Figure 2-6 shows cell locations for each of the possible library capacity configurations when Auto Clean is on. You must keep a usable cleaning cartridge in the left-front storage cell, which shifts the remaining cell numbers by one.

Figure 2-6. Valid Storage Cells when Auto Clean On (L201_016)



1. Location of cleaning cartridge (required)
2. Cells used in 10-cartridge configuration
3. Cells unused in 15-cartridge configuration
4. CAP cell (In the 20-cartridge configuration, this becomes Cell 18 when the CAP is locked.)

Cartridge Locations: 9 + CAP, Auto Clean On

Place a cleaning cartridge in the left-front cell. Use Cells 0–8 on the left side of the library for data cartridges. The CAP is available for use in this configuration, so set the CAP lever to the UNLOCKED position. The total available data cartridges reported to the application software is 9.

Cartridge Locations: 14 + CAP, Auto Clean On

Place a cleaning cartridge in the left-front cell. Use Cells 0–8 on the left side of the library and 9–13 on the right side for data cartridges. The CAP is available for use in this configuration, so set the CAP lever to the UNLOCKED position. The total available data cartridges reported to the application software is 14.

Cartridge Locations: 18 + CAP, Auto Clean On

Place a cleaning cartridge in the left-front cell. All other storage cells can be used for data cartridges. The CAP is available for use in this configuration, so set the CAP lever to the UNLOCKED position. The total available data cartridges reported to the application software is 18.

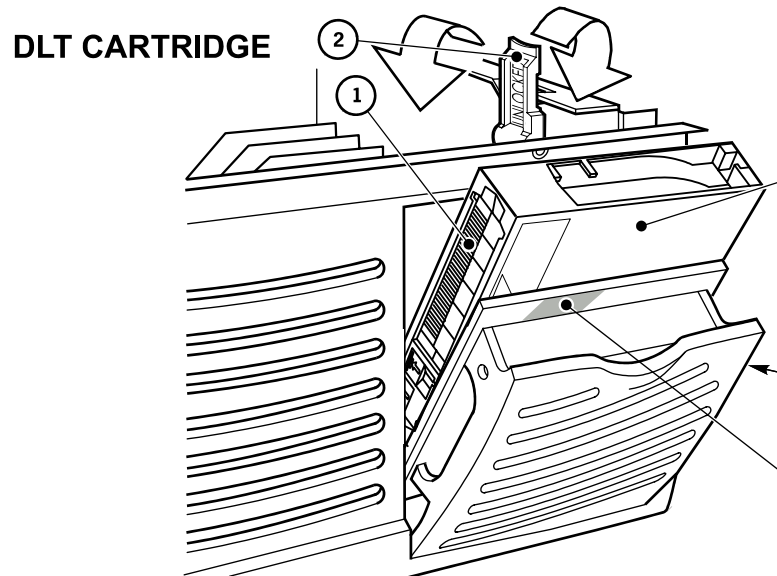
Cartridge Locations: 19 Cells, Auto Clean On

Place a cleaning cartridge in the left-front cell. All other storage cells, including the CAP cell, can be used for data cartridges. The CAP is not available for use in this configuration, so set the CAP lever to LOCKED; see [“Locking the CAP” on page 2-19](#). The total available data cartridges reported to the application software is 19.

■ Locking the CAP

If you choose to configure the library for 20 cartridges (without a CAP), you must lock the CAP. The CAP Lock/Unlock lever is shown in [Figure 2-7](#). When locked, the CAP slot is used as a permanent storage cell. To lock the CAP, turn the CAP lever to the LOCKED position.

Figure 2-7. CAP Lock/Unlock Lever (L201_012)



1. Cartridge volume label
 2. Lock/Unlock lever (210-degree movement)
 3. Cartridge
 4. CAP door
 5. Lock lever contact area
-

■ Inserting Cartridges

Make sure that you refer to the electrostatic discharge procedure in “[Electrostatic Discharge Damage Prevention](#)” on page xxii before proceeding.

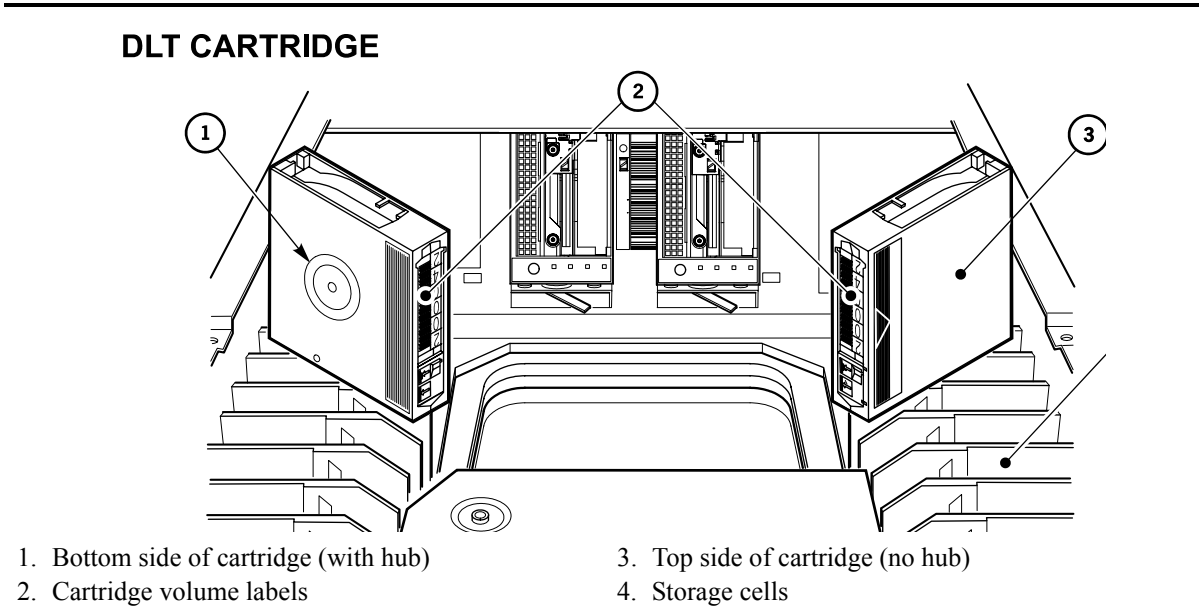
Inserting the cartridges correctly is critical for library operation. If the cartridges are not oriented correctly or not seated all the way into the storage cells, the library might fail on startup and display an error message on the operator panel.

The Media Check feature, when set to its default setting (on), ensures that all cartridges are retrievable by the robot. At initialization/power on, the picker attempts to pick up all unreadable, unlabeled, or improperly placed cartridges; if these cartridges cannot be retrieved, the library will not reach the “ready” status.

[Figure 2-8](#) shows the correct orientation of the cartridges.

Note: The following instructions assume you have correctly labeled all cartridges, as described in [Table B-1](#) on page B-5 and [Table B-4](#) on page B-9.

Figure 2-8. Correct Orientation of Cartridges (L201_005)



Depending on the version and configuration of your library, some storage cells cannot be used. In addition, the cell numbers change when the Auto Clean feature is turned on because a cleaning cartridge must be stored in the left, front cell. Using Auto Clean subtracts one cell from the total available data storage cells reported by the library to your application software.

To insert the cartridges (left and right are *as you face the front of the library*):

1. **Left side storage cells**—Place the cartridge volume label toward the center of the library, with the *bottom* of the cartridge (with the circular knurled hub showing) facing the front of the library.
2. **Right side storage cells**—Place the cartridge volume label toward the center of the library, with the *top* of the cartridge (with the hub *not* showing) facing the front of the library.

Make sure that you seat the cartridges all the way into the storage cells. See [“Valid Storage Cells with Auto Clean Off” on page 2-16](#) and [“Valid Storage Cells with Auto Clean On” on page 2-17](#) for the cells you can use.

Note: You do not have to insert a cartridge into every storage cell. The library automatically audits cartridges and empty cells as part of its initialization routine.

3. Place one hand on the front surface of the drawer (above the lock) and push the drawer all the way in.
4. With the other hand, lock the drawer by inserting the key into the lock and turning the key clockwise.
5. Put the key in a secure place.

■ Reconfiguring the Library

There might be situations in which you want to change the configuration of the library, such as those described below.

General

If you want to reconfigure the library later, you can use the same procedures presented in [“Configuration” on page 2-5](#). When the configuration is changed, pressing the MENU button to exit the configuration menu displays the Needing Lib Reset: Select to RESET the Library message. You can then reset the library by pressing the SELECT button.

Note: If you change configuration settings in the library, make sure that you also review the configuration of your tape management and application software to ensure that they match the library’s configuration.

Auto Clean

If you decide to enable the Auto Clean feature, you must set the Auto Clean field in the Lib Info/Cfg menu to On (see [Table 2-1 on page 2-7](#)), and make sure that you insert a cleaning cartridge in the left-front cell. For more information about configuring the library for Auto Clean, see:

- [“Auto Clean Feature” on page 2-5](#)
- [“Configuring the Library” on page 2-7](#)
- [“Valid Storage Cells with Auto Clean On” on page 2-17](#)

Adding Cell and Drive Capacity

If your storage needs have increased, you can increase your cell capacity and the number of drives in your library. You can do this with either a conversion bill or an ordering part number.

For either method:

- You retain your existing external SCSI cables, drives, and media.
- You might wish to order additional external SCSI cables, drives, and media to fill your new configuration.

Conversion Bill

By ordering conversion bill YXL20-20, you can increase the capacity of your library from 10 slots to 20 slots within the same library frame. With the conversion bill, you will receive an upgrade module and a set of instructions that will direct you through the upgrade process. You will use the operator panel to have the firmware update the personality module to reflect the increased cell capacity.

Part Numbers

If your storage needs grow beyond the maximum capacity of your current library, you can increase your capacity with a frame upgrade. You will receive a physically larger frame. You will use the external SCSI cables, drives and media from your old library, and might want to order more to fill the new library.

Use [Table 2-7](#) to order the desired part number.

Table 2-7. Part Numbers for Adding Cell and Drive Capacity

Description	Part Number
L20 10-cell to L40 40-cell HVD	YSL40-U10-HV
L20 10-cell to L40 40-cell LVD	YSL40-U10-LV
L20 20-cell to L40 40-cell HVD	YSL40-U20-HV
L20 20-cell to L40 40-cell LVD	YSL40-U20-LV
L40 40-cell to L80 80-cell HVD	YSL80-U40-HV
L40 40-cell to L80 80-cell LVD	YSL80-U40-LV

Note: If you no longer have the original packing material from your old library, you can use the packing material from the new library to return your old library.

■ Adding a Tape Drive

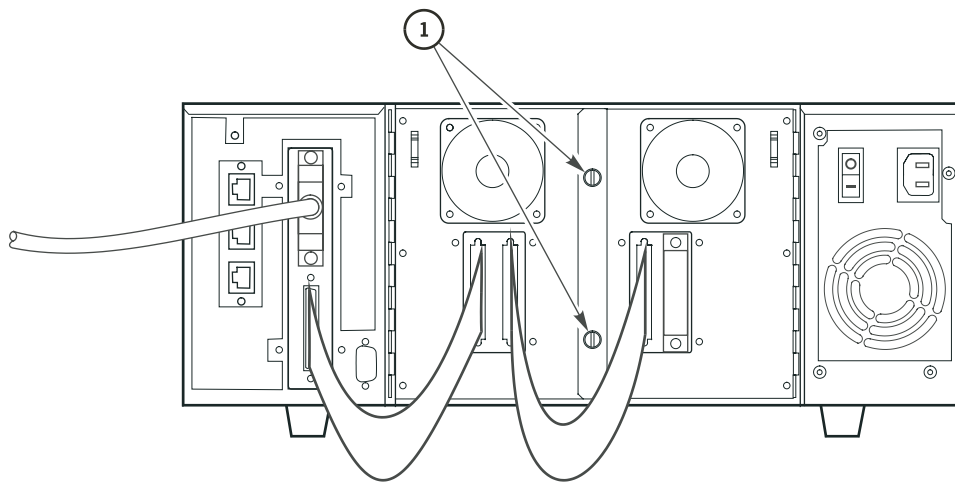
CAUTION:

System interruption: Stop all data processing on the SCSI bus that is being connected. Make sure that all signals are terminated at each end of the SCSI bus. Do not mix single-ended and differential terminators.

To add a tape drive:

1. Unlatch and open the door behind the Drive 1 slot (left of the standard drive position) by turning the drive door knobs until the door is free to open (Figure 2-9).

Figure 2-9. Drive Doors (L201_011)



L201_011

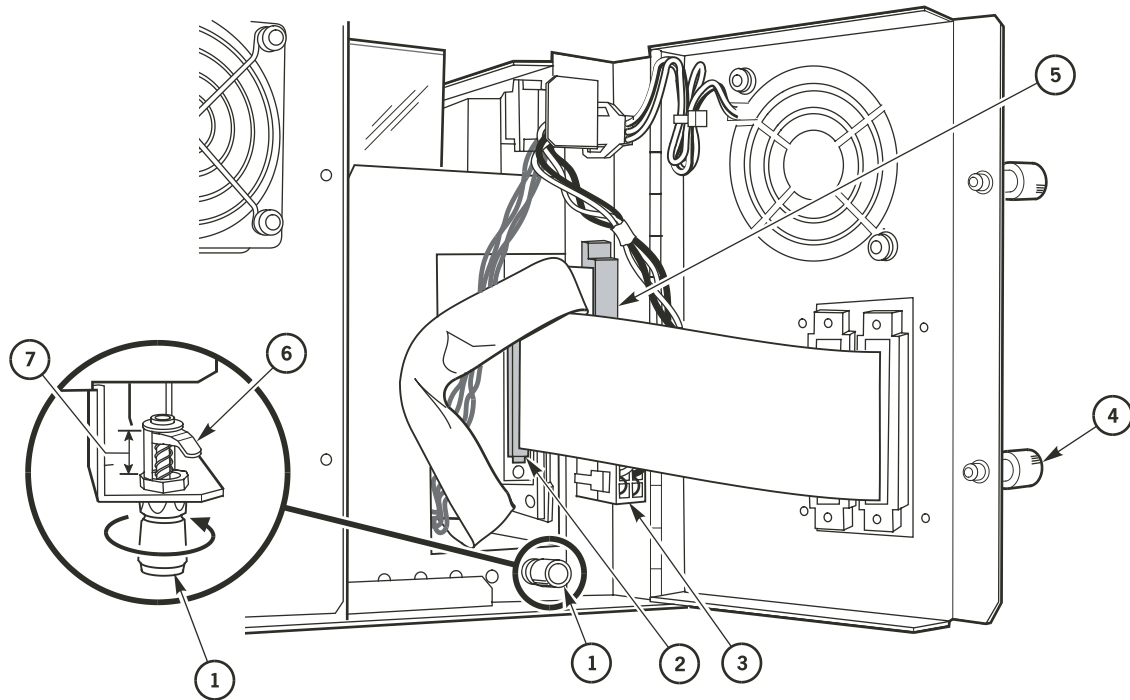
1. Drive door knobs
-

- Slide the new drive tray into the slot and tighten the drive tray latch knob (Figure 2-10); make sure that the latch is secure.

CAUTION:

Possible tape mounting failures: Make sure that the tray is securely latched by pulling back on the tray to make sure that it does not come loose.

Figure 2-10. Drive Connectors (L201_018)



L201_018

- | | |
|--------------------------|---|
| 1. Drive tray latch knob | 5. Library-to-drive interface connector |
| 2. SCSI connector | 6. Knob latch arm (shown disengaged) |
| 3. Drive power cable | 7. Range of motion |
| 4. Drive door knob (2x) | |

- Connect the library-to-drive interface connector and the drive power connector to the library.
- Connect the drive SCSI connector to the back of the drive and the drive door connector.
- Close the rear drive door.
- Push in the knobs and turn all the way to the right to secure the door.

7. *If the new drive is on the same bus as the other drive.*
 - a. Attach a SCSI daisy-chain cable to one SCSI port on the new drive's rear door (see [Figure 1-2 on page 1-3](#)).
 - b. Remove the terminator from the existing drive.
 - c. Attach the terminator to the second SCSI connector on the new drive's door.
8. *If the drive is on its own SCSI bus:*
 - a. Attach a new SCSI cable to one port on the rear of the new drive's door.
 - b. Attach the terminator to the second SCSI connector on the new drive's door.
9. Reset the library by either pressing the RESET button on the rear of the library ([Figure 1-2 on page 1-3](#)) or cycling the power off and on, and wait until initialization is complete.
10. At the operator panel, verify that the new drive appears on the status display.
11. Use the Drive Info/Cfg menu to configure the SCSI ID and On Bus Status data fields (see ["Configuring the Drives" on page 2-9](#)), and exit the Drive Info/Cfg menu.
12. Update your host software to include the new drive count for the library and the SCSI ID for the added drive.

■ Configuration Record

Record your library configuration in the table.

Table 2-8. L20 Tape Library Configuration Information

Library Serial Number _____	
Library Warranty Number _____	
Version: 10-cell <input type="checkbox"/> 20-cell <input type="checkbox"/>	
Library Capacity: 10 + CAP <input type="checkbox"/> 15 + CAP <input type="checkbox"/> 19 + CAP <input type="checkbox"/> 20 Cells <input type="checkbox"/>	
Firmware Version _____	
Library SCSI ID _____	
Library Interface: High Voltage Differential <input type="checkbox"/>	
Low Voltage Differential <input type="checkbox"/> Fibre Channel <input type="checkbox"/>	
Number of Drives Installed _____	
Drive 0 SCSI ID _____	Drive Type _____
	On Bus <input type="checkbox"/> Off Bus <input type="checkbox"/>
	HVD <input type="checkbox"/> LVD <input type="checkbox"/>
Drive 1 SCSI ID _____	Drive Type _____
	On Bus <input type="checkbox"/> Off Bus <input type="checkbox"/>
	HVD <input type="checkbox"/> LVD <input type="checkbox"/>
Fast Load: Off <input type="checkbox"/> On <input type="checkbox"/>	
Auto Clean: Off <input type="checkbox"/> On <input type="checkbox"/>	
Network: Library Name _____	
IP Address _____	Subnet Mask _____ Network
Gateway _____	

■ Upgrading Firmware

Firmware is factory-installed on all new libraries. The firmware resides within a Flash PROM chip on the LLC card.

You can upgrade your library by installing new firmware obtained from our StorageTek Customer Resource Center Web site, at

<http://www.support.storagetek.com>

You can update firmware by either:

- Following the download procedure described below
- After downloading the firmware to a file on your PC, download through the Library Status Tool (see “Loading Code” on page 3-14).

Requirements

Upgrading firmware requires that you have:

1. A personal computer (PC) that contains:
 - a. Software capable of performing a Z-modem transfer
 - b. An available serial port
 - c. Familiarity with Windows Hyperterminal and Procomm software
2. A cable for the PC's serial port. This cable is available by ordering an upgrade kit (part 313730701) or field bill 101502.

Procedure

You *must* observe the cautions below before proceeding:

CAUTION:

System problems: Always quiesce or stop the tape management software before starting the upgrade process.

Hardware damage: Do *not* manually reset or cycle power. Any interruption during this period will corrupt the library's memory and damage the LLC card. You must then order a new card.

To use the following procedure, the library must be fully initialized and the drawer must be closed.

Copying Firmware

1. Access the StorageTek Customer Resource Center Web site at:
<http://www.support.storagetek.com>
Login to the website. If you do not have a login, click Request a CRC password.
2. In the menu on the left, click Code Downloads.
3. Click L20 Tape Library under Tape Libraries.
4. Click on the desired code under Available Code.
5. Copy the zip file to a directory on your PC or to a floppy diskette.
6. Extract the release.prm file to a directory.

Downloading Firmware

Note: Please read through this procedure before starting; there is a *two minute time limit* after step 8.

1. Quiesce or stop the tape management software controlling the library.
2. Attach the PC's cable (see "[Requirements](#)" on [page 2-28](#)) to the connector marked CSE (the bottom connector) at the rear of the library.
3. Open a Hyperterminal session:
 - For older PCs, click on Start>Programs>Accessories>Hyperterminal and open a Hyperterminal session.
 - For WIN2000 PCs, click on Start>Programs>Accessories>Communications>Hyperterminal and open a Hyperterminal session.
4. New sessions will prompt you for a name and icon. Choose any name and any icon. A connection window will appear.
5. Change Connect Using ... to COM Port, typically Port 1.
6. Configure the connection within the file properties:

Table 2-9. Hyperterminal Connection

Older PCs	WIN2000 PCs
Baud rate = 38,400	Baud rate = 38,400
Data bits = 8	Data bits = 8
Parity bit = None	Parity bit = None
Stop bit = 1	Stop bit = 1
Direct to comm flow = none	Hardware flow control = on

7. Once configured, click on OK and press Enter.

The Command Line Interface (CLI) prompt will appear. (If it does not, you might have to disconnect/connect from the Call tab for new settings to become effective.)
8. At the CLI prompt, type download.

You will receive the following message:

This command results in a new image being loaded into PROM. Please download the image using Z-modem protocol (Transfer>Send file). You have two minutes to start the transfer.
9. From the Hyperterminal Transfer tab, click Transfer>Send file and a Send File window will appear.
10. With protocol set to Z-modem, browse to the location of the release.prm file you copied.
11. Click on SEND. A status window will appear for the transfer and supply the status of the download.

CAUTION:

Hardware damage: Do not manually reset or cycle power. Any interruption during this period will corrupt the library’s memory and damage the LLC card. You must then order a new card.

The library operator panel will display:

Download Started. Warning! Warning! Do not reset library until download done.

12. *Wait* for the following message:

DOWNLOAD COMPLETE. RESET LIBRARY OR MENU TO RETURN TO PREVIOUS MENU
13. Respond with ‘yes’ to reboot the machine and activate the firmware. Or, you may press the power switch to off (O), then to on (—).

Note: If you do not reboot or press the power switches, the old firmware version will remain active. When the next reboot or power cycle occurs, the new firmware will become active.

Verifying Firmware Edition

You can verify that the new firmware version is correctly loaded by either:

1. Typing version at the CLI prompt on your PC, or
2. Pressing the Menu button on the operator panel:
 - a. Arrow down to the LIB/CONFIG menu.
 - b. Press SELECT.

The library configuration will be displayed, including the firmware version currently operating.

This page intentionally left blank.

An operating mode is the manner in which a library and the controlling software interact. This chapter explains the three operating modes for the library—automated, manual, and autoloader—and the tasks you must perform for these modes.

■ Automated Mode

Automated mode is the normal operating mode of the library. The controlling software instructs the picker to move cartridges among the storage cells, drives, and cartridge access port (CAP) without operator intervention.

Operator tasks in automated mode include:

- [“Entering a Cartridge through the CAP”](#)
- [“Ejecting a Cartridge through the CAP” on page 3-2](#)
- [“Monitoring the Operator Panel for Messages” on page 3-2](#)
- [“Using Library Status Tool” on page 3-8](#)
- [“Powering-off the Library” on page 3-17](#)

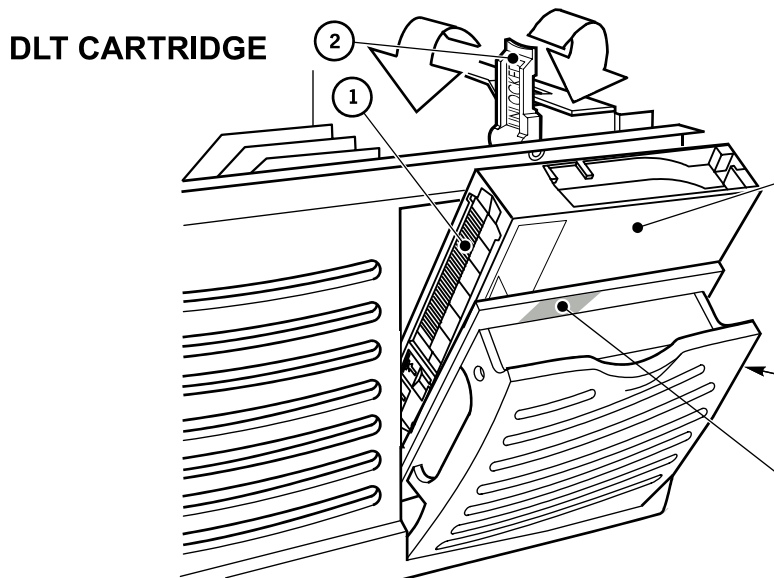
Entering a Cartridge through the CAP

Review [“Electrostatic Discharge Damage Prevention” on page xxii](#) before proceeding.

To enter a cartridge through the CAP:

1. Insert the cartridge using the orientation shown in [Figure 3-1 on page 3-2](#). Make sure that the tape label faces left, and the top of the cartridge (the side with no hub) faces the front of the library.
2. Close the CAP door.

Figure 3-1. Cartridge Orientation for the CAP (L201_012)



- | | |
|--|----------------------------|
| 1. Tape volume label | 4. CAP door |
| 2. Lock/Unlock lever (210 degree movement) | 5. Lock lever contact area |
| 3. Cartridge | |

Ejecting a Cartridge through the CAP

To eject a cartridge through the CAP:

1. Wait for the operator panel to display CAP:Closed.
2. Open the CAP door.
3. Remove the cartridge from the CAP.
4. Close the CAP door.

Monitoring the Operator Panel for Messages

At any time during library operation, you can monitor the status display on the operator panel for messages. In particular, the status display shows messages for the:

- Library
- Drives
- Personality module
- CAP (if configured)

Use the following procedures to view status information.

Viewing Library Status

To view the status information for the library, look at the first line in the status display (with CAP configuration) or the second line of the status display (without CAP configuration). [Table 3-1](#) lists the status messages that might appear.

Table 3-1. Library Status Messages

Status Message	Explanation
Lib Init Required	The library requires initialization. This message might appear momentarily after you close the drawer. If the message remains on the screen, open and close the drawer. The library then begins its initialization cycle.
Library Not Ready	The library is not available to perform SCSI-to-tape management actions. Some status information might be available through the network interfaces.
STK L20 - Ready	The library has completed initialization and is ready to perform tape management-to-library actions.
Lib Maintenance Mode	The library is not ready because it is performing diagnostic tests.
Library Requires User Intervention	The robot failed.

Viewing Drive Status

To view an explanation of the status information for the drives:

1. Press the MENU button to return to the Main menu.
2. Press the arrow buttons until the > sign appears to the left of Drive Info/Cfg.
3. Press the SELECT button.
4. Use the arrow buttons to scroll to the Status: field in the Drive Info/Cfg menu.
5. Select the drive, then scroll through the Drive Info including status.
6. To return to the Main menu, press the MENU button twice.

Table 3-2 lists the status messages that might appear in the Status: field.

Table 3-2. Drive Status Messages

Status Message	Explanation
Busy	This drive is performing a read or write operation.
Cartridge In	This drive contains a cartridge, but it is not loaded into the drive.
Clean Failed	The attempt to clean this drive failed. This message appears only if a cartridge is not loaded in the drive.
Cleaning	The drive is being cleaned.
Clean Needed	This drive requires cleaning. This message appears only when a cartridge is not loaded in the drive.
Empty	No cartridge is loaded in this drive.
Init Required	You must initialize this drive.
Inop	This drive is inoperable.
Loaded	A cartridge is loaded in this drive.
Loading	The drive is loading a cartridge.
Not Communicate	This drive is not communicating with the library. (This drive might be powered-off.)
Not Connected	This drive is not connected to the library.
Not Functional	This drive is not operating properly.
Rewinding	The cartridge in this drive is being rewound.
Rewound	The cartridge in this drive has been rewound.
Unknown Drive	The library does not recognize the type of drive in this location.
Unloading	The drive is unloading a cartridge.

Viewing Personality Module Status

Viewing library personality information lets you determine how the library's name and vendor name appear on a SCSI interface. There are two personality modules available: part 313603502 for the 10-cartridge version and part 313603002 for the 20-cartridge version.

The personality module resides within its connector on the processor component.

To view the library's Personality Module information:

1. Press the MENU button to return to the Main menu.
2. Press the arrow buttons until the > sign appears to the left of Personality Module.
3. Press the SELECT button. PERS MODULE MENU will be displayed.
4. Use the arrow buttons to line up the > sign with PERS MODULE INFO.
5. Press SELECT.
6. Use the arrow buttons to scroll through the information stored in the personality module.
7. To return to the Main menu, press the MENU button twice.

Note: The INSTALL UPGRADE portion of the PERS MODULE MENU is only used when upgrading your library. Instructions for this procedure are included when you order an upgrade.

[Table 3-3](#) lists the status messages that might appear in the Personality Module Info field.

Table 3-3. Personality Module Status Messages

Status Item	Status Message	Explanation
Status:		The validity of the personality module
	PRESENT	A valid personality module is attached to the LLC card.
	NOT PRESENT	A personality module is not attached to the LLC card.
	UNKNOWN	Valid vendor information has not been loaded into this library.

Table 3-3. Personality Module Status Messages (Continued)

Status Item	Status Message	Explanation
Type:		The vendor information and whether you can install a feature
	Normal	Normal operating data is available.
	Upgrade	You can use the personality module attached to the LLC card to install a feature. This type of personality module is an upgrade module, and is available through a conversion bill.
	Used Upgrade	The feature on the attached upgrade module has already been installed on a library.
	Write in Progress	The installation of the information from the personality module has been interrupted. The personality module is no longer valid.
Version:		The version number for the personality module
Lib Vendor ID:		The identity number for the library vendor
Lib Vendor Name:		The name of the library vendor; for example, STK for Storage Technology Corporation
Lib Product Name:	Normal type	The product name assigned by the library vendor; for example, L20
	Upgrade type	The product name for which the upgrade is valid
Lib Size:	Normal type	The maximum available cell capacity of the library
	Upgrade type	The number of cells that would be added
SCSI Vendor Name:		The library vendor name reported on the SCSI interface.
SCSI Product Name:		The library product name reported on the SCSI interface
Feature List	Library Status	The library has a free version of the Web-enabled software used for monitoring the library.
	Library Admin	The library has the upgrade version of the Library Status Tool.

Viewing CAP Status

To view the status information for a library configured with a CAP, look at the second line in the status display (with CAP configuration). [Table 3-4](#) lists the status messages that might appear.

Table 3-4. CAP Status Messages

Message	Meaning
CAP: Open	The CAP is open.
CAP: Closed	The CAP is closed and safe to open.
CAP: Busy	The CAP has a pending host operation to perform; a software lock is on. Do <i>not</i> open until the CAP: Closed message appears.

Viewing CAP Contents

To view the contents of the CAP, place the cursor at CAP Contents and press the SELECT button. The CAP contents field is an information-only display that will present one of the following messages:

- CAP is empty.
- CAP used as cell.
- The cartridge type and volume identifier (VOLID) for a cartridge within the CAP.
For example: DLT C12345

■ Using Library Status Tool

The Library Status Tool (Figure 3-2) is a proprietary embedded software that resides internal to the library and is activated using a Web browser. This software is available on every library at no charge. It uses Java-applets to send information using the Web.

Using the Library Status Tool you can:

- Load code
- Reboot the library
- Generate reports on library, drives, fault symptom codes (FSCs), and tape inventory

Figure 3-2. Library Status Tool Example (L201_512)

Library Status :: L20 :: greyhound.storitek.com

CELLS **DRIVES** **CELLS**

Element ID	Label	Media Type
1000	AB0	DLT IV
1001	AB1	DLT IV
1002	AB2	DLT IV
1003	AB3	DLT IV

CAP

Name greyhound.storitek.com
Hardware version MPC_01000027a
Software version 2.05.06
Build date Oct_30,_2001_10:35
Date on library 10/30/2001
Time on library 10:15:32
Library scsi id 10
Cartridge count 4
Drive count 2
Fastload on

Drive 500 **Drive 501**

SCSI ID 0
Model DLT
Vendor Quantum
Serial Number CX05500020
Firmware Version 10.2
State Not Communicating

Report **Code Load** **Reboot**

LIB STATUS: Maintenance **CAP: closed** **MONITOR: ok**

L201_512

Requirements

To use the Library Status Tool you must:

- Make sure that the library is powered-on and initialized.
- Set up the following network configuration using the operator panel on the library:
 - The IP address for the library name
 - The subnet mask
 - The network gateway

Note: See “Configuring the Network” on page 2-8 to set up the above values.

- Use Internet Explorer (5.0 or later) or Netscape (4.5 or later) as the Web browsers.
- Install the Java Runtime Environment (JRE) plug-in version 1.4 or later on the host computer. You can download the Java plug-in from:

<http://java.sun.com>

- Connect a standard 10baseT Ethernet cable to the library's Ethernet port. This enables the Library Status Tool to communicate with the library.

Setting up Java Policy Permissions

Before using the Library Status Tool to load code or save reports, you must use the policytool from Sun Microsystems to set appropriate permissions. Use of the policytool is required because the Library Status Tool, a Web interface, uses non-signed Java applets.

To set up permissions:

1. Create folders on your computer hard drive to save reports (for example, c:\reports) and load code (for example, c:\code).
2. To load code, download the appropriate code version from the following Web site on to your computer:

<http://www.support.storagetek.com>

3. From your computer, launch the Java policytool. The Java policytool is located in the Java installation directory (for example, C:\jdk1.3.0_02\bin).

The file is called policytool in UNIX and policytool.exe in Microsoft® Windows®.

4. If you have already set up a policy file for the library, the policy file name with the full path is displayed. Click Edit Policy Entry.

If you don't have a policy file for the library:

- a. An error window is displayed stating it Could not find policy file <path/ filename>. Write down the full path and filename mentioned in the error window and click OK. This filename is used to save the policy in a later step.
- b. Click Add Policy Entry.

- c. In the Policy Entry window type: `http://<library IP>/libconnect.jar` in the CodeBase field, where library IP is the 12-digit library IP address (for example, 129.80.58.95).
5. Click Add Permission.
6. From the Permissions pull down menu, select FilePermission.
7. Specify one of the following in the Target Name field:
 - To load code from the Library Status Tool, type the full path and the name of the firmware file you downloaded to the hard drive (for example, `C:/code/firmware.prm`).
 - To save a report to your hard drive from the Library Status Tool, type the full path and the name of the file you wish to save the report page to (for example, `C:/report/report.txt`).
- Note:** Independent of the operating system, use a forward slash when specifying the path for the filename. Write down this path and filename; you must enter this same path and filename when saving the report or loading code in the Library Status Tool.
8. From the Actions pull down, do one of the following:
 - a. Click Read for code download.
 - b. Click Write or write, read, write, delete, execute to save the report to a file.
 - c. Click OK.
9. Click Done.
10. Select File > Save to save the policy.

If an error was displayed when you launched the policytool:

 - a. From the File menu select Save As.
 - b. Type the name of the policy and the full path as noted in Step 4a.
11. Select File > Exit to close the Java policytool.

To start the Library Status Tool:

1. Open Internet Explorer (5.0 or later) or Netscape (4.5 or later).
2. Enter the IP address in the Address Bar.

The Element ID section lists the volume number and media type for each cartridge.

The Drive section lists such items as the SCSI ID, model, vendor, serial number, firmware version, and state (such as loaded or unloaded).

The Library section lists such items as the library name, LLC card version, software version, build date, current date and time, SCSI ID, cartridge count, drive count, and whether fastload is On or Off.

Generating Reports

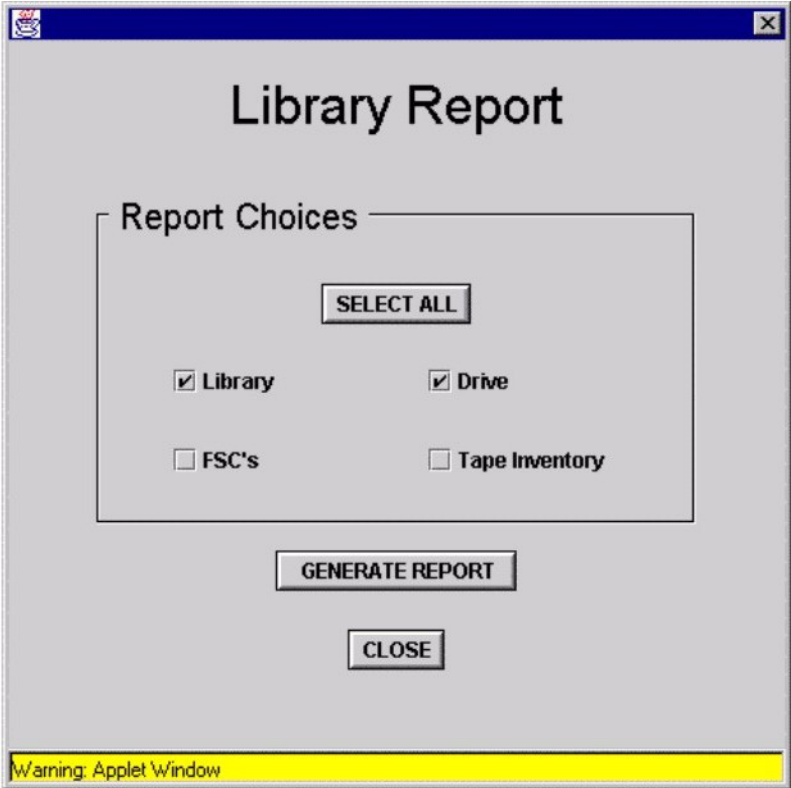
To generate a report:

1. Select Reports from the Library Status Tool initial screen.
2. Select from the following Report options:

Table 3-5. Report Options

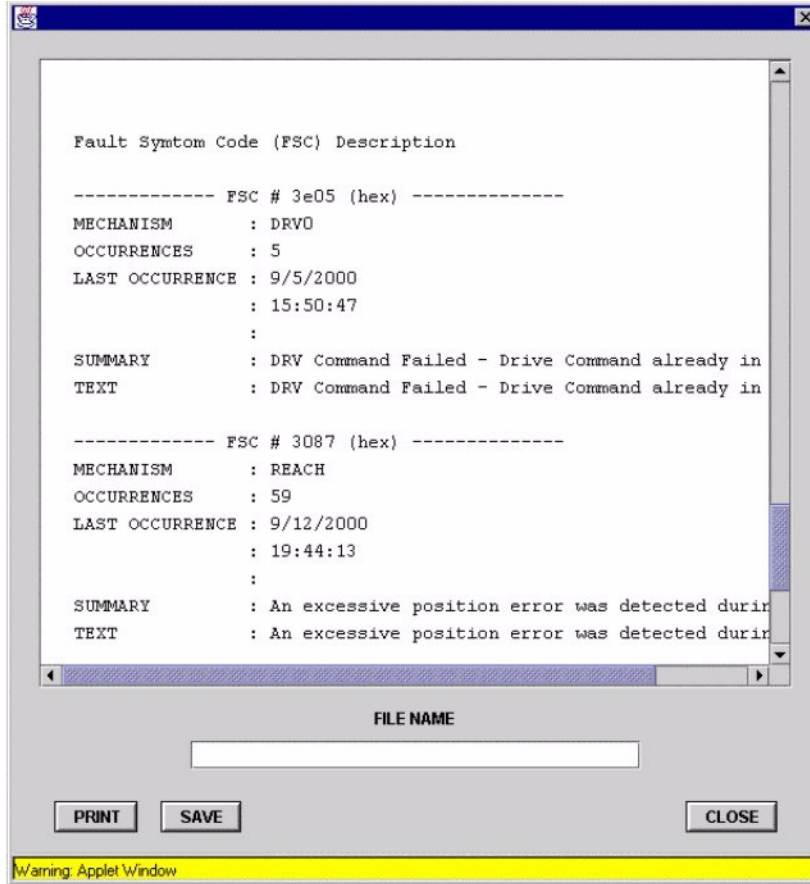
Click	For Information on...
Library	The library including the library name, ID, SCSI type, number of CAP cells
Drive	The drives installed in the library including their current state
FSCs	Fault symptom codes with their descriptions/ occurrences from the library's Event Log
Tape Inventory	The cartridges in the storage cells, the CAP, and the drives
Select All	All of the above

Figure 3-3. Report Selection Screen (L201_508)



L201_508

Figure 3-4. Sample Report (L201_511)



L201_511

Before saving the report to your computer hard drive, see [“Setting up Java Policy Permissions”](#) on page 3-9 to set up the appropriate permissions.

To save the report to a file, type the name of the report and click **Save**.

Note: This is the filename you entered in the Targetname field during the Java policy tool configuration. This filename is case sensitive.

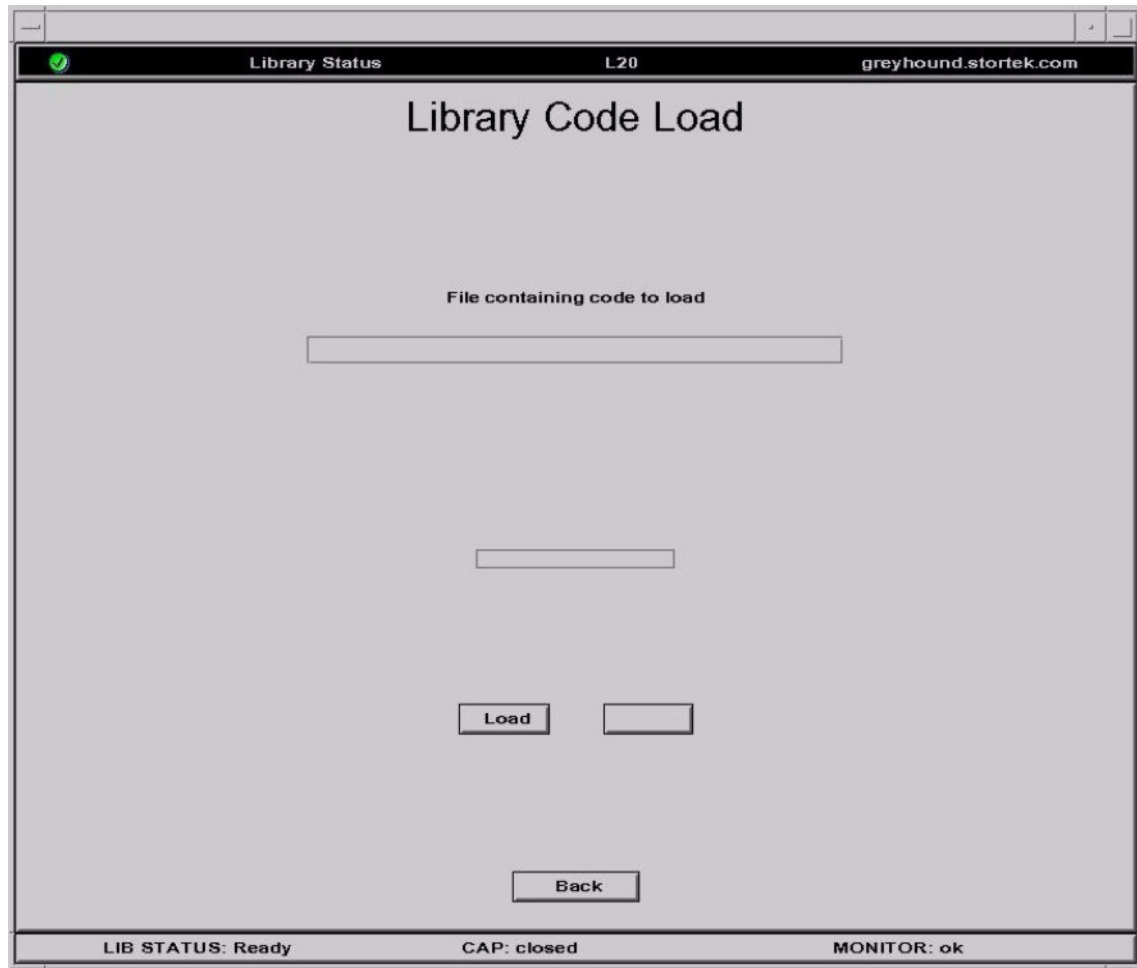
Loading Code

Before loading code to the library, see “Setting up Java Policy Permissions” on page 3-9 to set up the appropriate permissions.

To load code to the library:

1. Select Code Load from the Library Status Tool initial screen.

Figure 3-5. Code Load: Library Status Tool (L201_515)



L201_515

2. In the Code Load screen type the name of the file containing the code to load.

Note: This is the filename you entered in the Targetname field during the Java policy tool configuration. This filename is case sensitive.

CAUTION:

Do not interrupt the code load process as it might damage the LLC card.

It takes about 90 seconds to complete the code load.

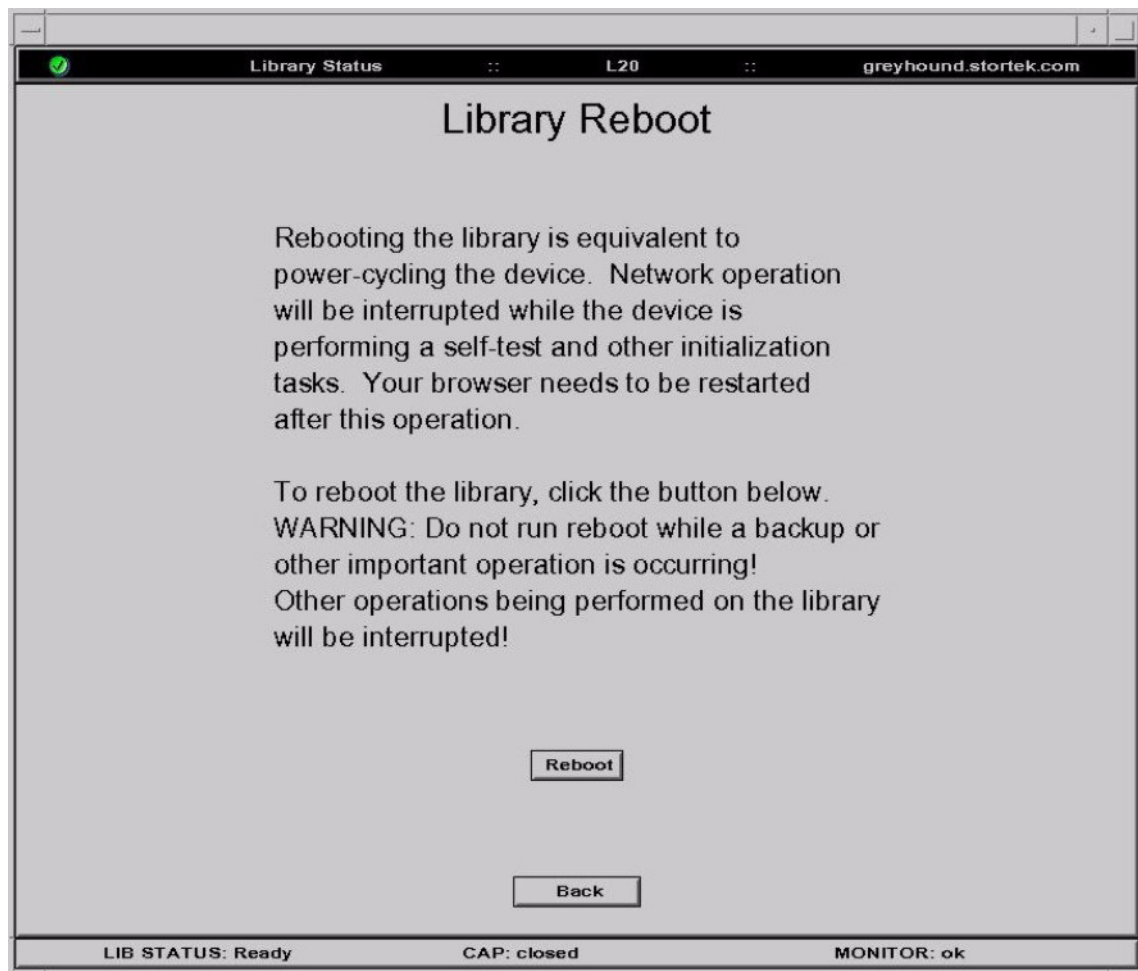
A library reboot is necessary when the code load is complete.

Rebooting the Library

To reboot the library:

1. Select Reboot from the Library Status Tool initial screen (Figure 3-6).

Figure 3-6. Reboot the Library: Library Status Tool (L201_516)



L201 516

2. Click Reboot.

SNMP

Sun StorageTek's L-series libraries support Version 1 of the simple network management protocol (SNMPv1). SNMP is an application layer protocol that performs network management operations over an Ethernet connection using a User Datagram Protocol (UDP/IP).

SNMP allows systems administrators to query the library for configuration, operation, and statistical information. SNMP also allows the library to inform the systems administrator of potential problems.

Systems administrators and network managers use SNMP to monitor and receive status from the library, such as:

- Operational state of the library (such as microcode level, serial number, online)
- Status of the cartridge access port (such as open, closed, number of cells)
- Library elements (number of hands, columns, panels, cells, CAPs)
- Number of storage cells and media types stored in the library
- Number and types of drives installed in the library
- Many other variables defined in the database

Refer to the *L20 Tape Library Installation Manual*, 96052, for information on SNMP setup and configuration.

Library Admin

The Sun StorageTek L-series Library Admin is now available for the L20 tape library. This is an upgraded version of the Library Status tool that has enhanced maintenance and diagnostic capabilities. So, in addition to the features of the Library Status tool, the Library Admin includes the ability to:

- Get a virtual view of the library's cells.
- Obtain valuable statistics on the library, drives, cells, and the cleaning cartridge.
- View and modify the configuration of the library, drives, network, and also set the cleaning cartridge threshold. Under the network configuration, you can add and modify the SNMP agents and recipients.
- Run diagnostic routines such as the demo mode and library self-test. You can also remotely clean a drive.

For instructions on using the L-Series Library Admin, access the online help provided within the software.

Note: When you order the Library Admin, you will receive a personality module and a set of upgrade instructions. The upgrade instructions contain some important procedures you need to follow to install and set up the Library Admin.

The conversion bill for upgrading to the Library Admin in an L20 tape library is 63039.

■ Powering-off the Library

CAUTION:

Possible equipment or cartridge damage or data loss. If you power-off the library without performing the following procedure, you risk possible equipment or cartridge damage or loss of data.

To power-off the library:

1. Make sure that all jobs have completed processing.
2. Make sure that the library and drives are offline.
3. Move the power-on/off switch to off (O).

■ Manual Mode

This section describes the operation of the library in manual mode. Manual mode occurs when the library is taken offline.

Operator tasks that are performed in manual mode include:

- “Opening the Cartridge Drawer”
- “Removing a Cartridge from the Picker” on page 3-18
- “Locating a Cartridge” on page 3-18
- “Inserting a Cartridge into a Load Handle Drive” on page 3-19
- “Removing a Cartridge from a Load Handle Drive” on page 3-21
- “Inserting a Cartridge into a Drive without a Load Handle” on page 3-21
- “Removing a Cartridge from a Drive without a Load Handle” on page 3-22
- “Replacing a Cleaning Cartridge” on page 3-23
- “Cleaning a Drive” on page 3-23
- “Replacing a Defective Drive” on page 3-25

Note: If you encounter any problems that might need resolution by a service representative, see [Chapter 5, “Customer Support”](#).

Opening the Cartridge Drawer

Before you perform *any* tasks inside the library, you must always select the “Drawer Operations” menu on the operator panel so that the library is prepared for manual mode.

CAUTION:

Possible picker damage: Always wait for the OK To Open Drawer message to be displayed on the operator panel before opening the drawer. This ensures that the picker is safely positioned.

Selecting the “Drawer Operations” menu stops library processes in an orderly way and safely retracts the picker.

Refer to [“Opening the Slide-out Cartridge Drawer” on page 2-14](#) for instructions.

Removing a Cartridge from the Picker

CAUTION:

ESD hazard: Refer to the electrostatic discharge procedures in **“Electrostatic Discharge Damage Prevention”** on page xxii before continuing.

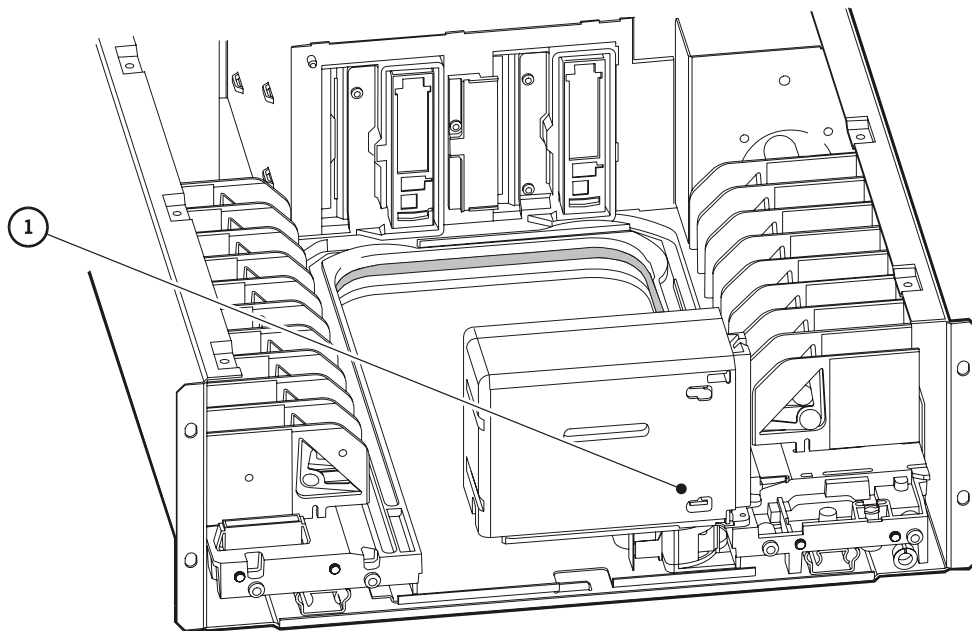
The picker is shown in [Figure 3-7](#). To remove a cartridge from the picker:

1. Open the slide-out cartridge drawer (see [“Opening the Slide-out Cartridge Drawer”](#) on page 2-14).
2. Grasp the cartridge at the top and move it into an empty cell.

Note: You must grasp the cartridge firmly to release it from the picker.

3. Return the library to online status (see [“Returning the Library to Ready Status”](#) on page 3-25).

Figure 3-7. Picker (L201_025)



L201_025

1. Picker (grasp here on both sides of the picker)

Note: Shown with cover removed and drawer closed. The picker should only be moved to correct an error condition.

Locating a Cartridge

To locate a particular cartridge inside the library:

1. Open the slide-out cartridge drawer (see [“Opening the Slide-out Cartridge Drawer” on page 2-14](#)).
2. Locate the particular cartridge by its tape volume label and cell.
3. Remove the cartridge from the storage cell by sliding the cartridge out.
4. Return the library to online status (see [“Returning the Library to Ready Status” on page 3-25](#)).

Inserting a Cartridge into a Load Handle Drive

Some DLT drives contain load handles that are required to load cartridges. This type of drive is illustrated in [Figure 3-8 on page 3-20](#).

To manually insert a cartridge into a load handle drive:

1. Obtain the cartridge volume label, location, and drive number from the host console.
2. Open the slide-out cartridge drawer (see [“Opening the Slide-out Cartridge Drawer” on page 2-14](#)).
3. Locate the cartridge (see [“Locating a Cartridge” on page 3-18](#)).
4. Make sure that the drive handle is in the correct position (as shown in [Figure 3-8 on page 3-20](#)) and the *Operate Handle* indicator (green LED) is steadily lit.

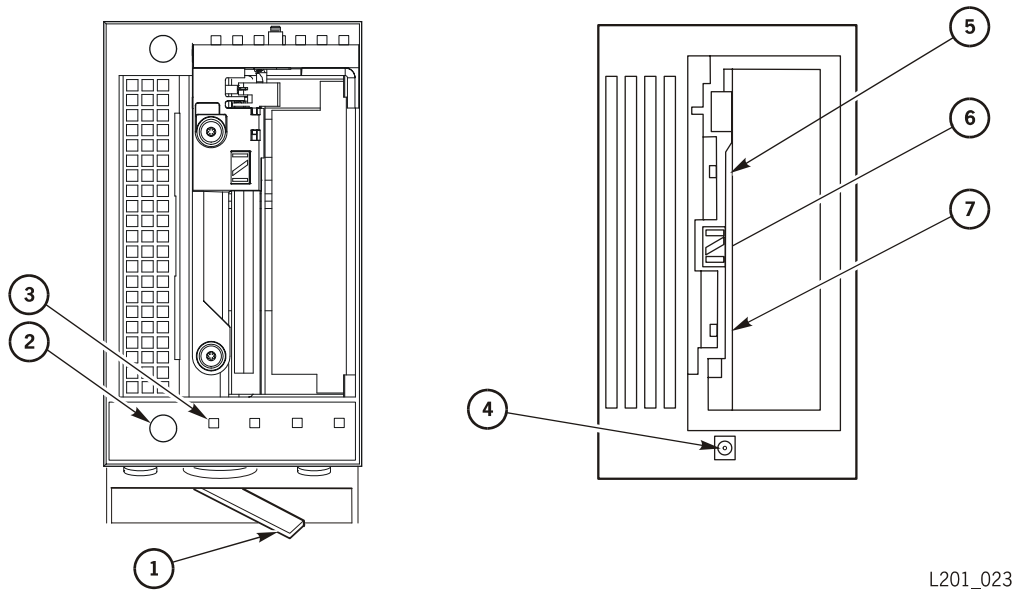
Note: If the handle is in the left position, wait until the *Operate Handle* LED comes on before moving it to the correct position ([Figure 3-8 on page 3-20](#)). If the *Operate Handle* LED is flashing while the handle is to the right, move the handle to the left position and wait for the *Operate Handle* indicator to be steadily lit. Then move the handle to the correct position.

CAUTION:

***Potential equipment damage.* You must insert the cartridge properly or you will damage the drive. Use only DLT cartridges for DLT drives.**

5. Hold the cartridge so that the label area is facing you and the write-protect switch is on the bottom of the cartridge as shown in [Figure 3-9 on page 3-20](#).
6. Insert the cartridge into the drive and push the cartridge back until it is firmly positioned within the drive. Hold the cartridge in place for three seconds.
7. Move the drive load handle to the left position.
8. Return the library to online status (see [“Returning the Library to Ready Status” on page 3-25](#)).

Figure 3-8. Load Handle and Non-Load Handle Drives (L201_023)

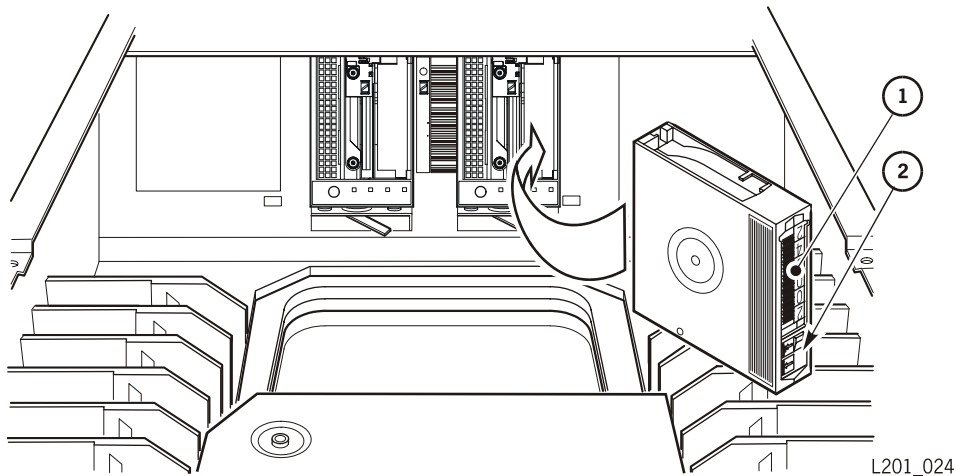


L201_023

- 1. DLT drive load handle
- 2. Unload button
- 3. *Operate handle* LED (Green)
- 4. DLT1 Unload button (See note below)
- 5. Write-protect LED (See note below)
- 6. In use LED (Behind drive target)
- 7. Alert LED (See note below)

Note: DLT and DLT1 drives shown. For indicators and buttons on Ultrium or SDLT drives, consult the manufacturer's manuals.

Figure 3-9. Inserting a Cartridge into a Load Handle Drive (L201_024)



L201_024

- 1. Tape label
- 2. Write-protect switch

Removing a Cartridge from a Load Handle Drive

To manually remove a cartridge from a load handle drive:

1. Obtain the drive number from the host console.
2. Open the slide-out cartridge drawer (see [“Opening the Slide-out Cartridge Drawer” on page 2-14](#)).
3. Locate the appropriate drive.

CAUTION:

Possible data loss. Failure to perform the next step could result in data loss.

4. Press the Unload button on the drive (the small circular button at the bottom of the drive, see [Figure 3-8 on page 3-20](#)), and wait approximately 12 seconds until the drive unloads.

When the operation is complete, the green *Operate Handle* LED remains steadily lit.

5. Move the drive load handle to the right.

The cartridge ejects about 12.7 mm (0.5 in.).

CAUTION:

Potential equipment damage. Wait at least three seconds before pulling the cartridge out of the drive. Immediately removing the cartridge could damage the cartridge, the tape leader, or the drive.

6. Gently pull the cartridge from the drive.

Note: If the cartridge does not come out of the drive, remount the cartridge and return to Step 5.

7. Store the cartridge in an empty cell or outside the library (see [“Handling Cartridges” on page B-1](#)).

Note: If you store the cartridge in an empty cell, you will have to reinitialize the library and update the tape management’s database.

8. Place the drive online.
9. Return the library to online status (see [“Returning the Library to Ready Status” on page 3-25](#)).

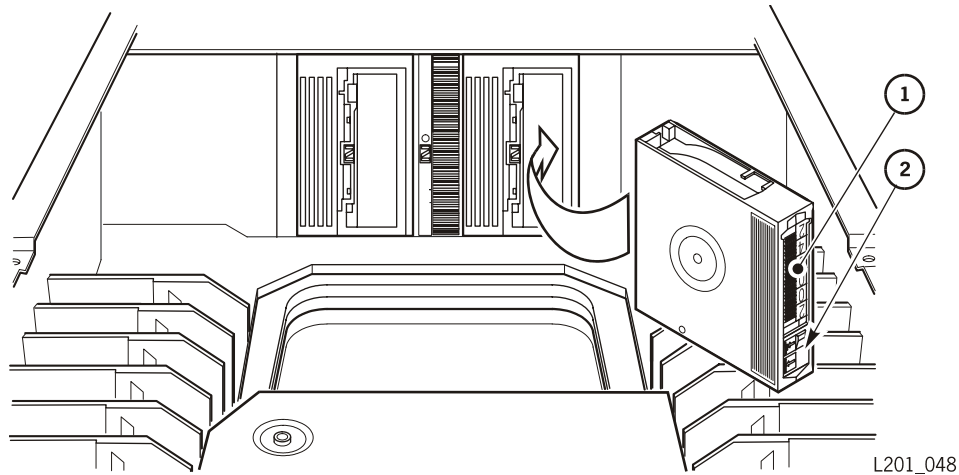
Inserting a Cartridge into a Drive without a Load Handle

To insert a cartridge into a drive without a load handle ([Figure 3-10](#)):

1. Obtain the cartridge volume label, location, and drive number from the host console.
2. Open the slide-out cartridge drawer (see [“Opening the Slide-out Cartridge Drawer” on page 2-14](#)).

3. Locate the cartridge (see [“Locating a Cartridge”](#) on page 3-18).
4. Insert the cartridge into the drive and push the cartridge into the back of the drive until it is firmly positioned. Hold the cartridge in place for three seconds.

Figure 3-10. Inserting a Cartridge into a Drive without Load Handle (L201_048)



1. Tape label
2. Write-protect switch

Removing a Cartridge from a Drive without a Load Handle

To remove a cartridge from a drive without a load handle.

1. Obtain the drive number from the host console.
2. Open the slide-out cartridge drawer (see [“Opening the Slide-out Cartridge Drawer”](#) on page 2-14).
3. Locate the appropriate drive.

CAUTION:

Possible data loss. Failure to perform the next step could result in data loss.

4. Press the Unload button on the drive and wait approximately 12 seconds until the operation is complete.

CAUTION:

Potential equipment damage. Wait at least three seconds before pulling the cartridge out of the drive. Immediately removing the cartridge could damage the cartridge, the tape leader, or the drive.

5. The cartridge is ejected enough for you to remove it. Gently pull the cartridge from the drive.

Note: If the cartridge is not ejected from the drive, remount the cartridge and return to Step 4.

6. Store the cartridge in an empty cell or outside the library (see [“Handling Cartridges” on page B-1](#)).

Note: If you store the cartridge in an empty cell, you will have to reinitialize the library and update the tape management’s database.

7. Place the drive online.
8. Return the library to online status (see [“Returning the Library to Ready Status” on page 3-25](#)).

Replacing a Cleaning Cartridge

Cleaning cartridges have a limited life. Refer to your drive publications for the recommended cartridge life. When the usage count exceeds its limit (see [“Generating Reports” on page 3-11](#)), you must replace it with a new one.

To replace a cleaning cartridge:

1. Open the slide-out cartridge drawer (see [“Opening the Slide-out Cartridge Drawer” on page 2-14](#)).
2. Go to the left, front cartridge slot.
3. Remove the expired cleaning cartridge.
4. Insert the new cleaning cartridge.
5. Close the slide-out cartridge drawer and reinitialize the library.

The status display shows that initialization tests are running.

6. Wait until the initialization tests are complete before performing another task.

Cleaning a Drive

The Clean menu ([Table 3-6](#)) is used to initiate the cleaning of drives.

Note: Even if Auto Clean is enabled, you may still manually clean a drive using the instructions below.

Table 3-6. Clean Menu

Drive to Clean:	The number of the drive to clean is always displayed. You can always edit this number, regardless of the state of Auto Clean.
Usage Count:	If Auto Clean is on, a usage count (the number of times the cartridge has been used to clean a drive) is displayed.
	Note: The cleaning cartridge must be used in a drive once for the correct usage to be displayed.

Library Configured to Use CAP

If your library is configured to use the CAP, enter the cleaning cartridge through the CAP.
At the operator panel menu:

1. Press the arrow buttons until the > sign appears to the left of Clean.
2. Press the SELECT button.
The status display shows the Drive to Clean: 00 message.
3. Press the SELECT button.
The underscore (_) appears under the right 0.
4. Use the arrow buttons to select the drive to clean, and then press the SELECT button.
The status display shows the Are you sure? and the Lib will be offline messages.
5. When the cleaning operation is complete, retrieve the cleaning cartridge from the CAP.

Library Configured to Not Use CAP

If your library is configured to not use the CAP:

1. Open the slide-out cartridge drawer (see [“Opening the Slide-out Cartridge Drawer” on page 2-14](#)).
 - a. If the front, left cartridge slot is *empty*, insert the cleaning cartridge into this slot.
 - b. If the front, left slot *contains a data cartridge*, remove the data cartridge and place the cleaning cartridge into the slot.
2. Close the slide-out cartridge drawer and the library will automatically reinitialize.
3. At the operator panel menu, press the arrow buttons until the > sign appears to the left of Clean.
4. Press the SELECT button.
The status display shows the Drive to Clean: 00 message.
5. Press the SELECT button.
The underscore (_) appears under the right 0.
6. Use the arrow buttons to select the drive to clean, and then press the SELECT button.
The status display shows the Are you sure? and the Lib will be off-line messages.
7. When the cleaning operation is completed, open the slide-out cartridge drawer, remove the cleaning cartridge and replace the data cartridge (if a data cartridge was removed).

8. Close the slide-out cartridge drawer and the library will automatically reinitialize.
9. Return the library to online status (see [“Returning the Library to Ready Status” on page 3-25](#)).

Replacing a Defective Drive

If a drive is defective and must be replaced, follow the directions in the *L20 CRU Instructions*, part 96002.

Returning the Library to Ready Status

To return the library to ready status:

1. Make sure that cartridges are inserted correctly in their cells or drives and that they do not block the path of the picker.
2. For DLT drives, make sure that the green *Operate Handle* LED is steadily lit and the drive handle is in the correct position (see [Figure 3-8 on page 3-20](#)).
3. Close the slide-out cartridge drawer and lock it by rotating the key counterclockwise; put the key in a safe place.
4. Make sure that the power-on/off switch is set to on (—).
5. Check the status display of the operator panel to make sure that the initialization tests are running.
6. Place the library and drives online by entering the appropriate commands at the host console.

Enter the command to upload the audit data to the tape management software.

■ Autoloader Mode

Autoloader mode sequentially mounts and dismounts cartridges, allowing you to automatically mount and dismount a series of cartridges. The operator panel controls the sequence and reports the status of the operation.

Any number of cells within a stack can be used. You may place cartridges into any or all of the cells of the stack.

Since the autoloader feature is controlled by the operator panel, the library's host interface will be disabled; the host interface to the drives will remain active. The Auto Clean feature must also be disabled.

The sequence for autoloader operation is:

1. A cartridge is retrieved from the first full cell and loaded into its corresponding drive.
2. The robot waits at the drive until the cartridge operation is completed.

3. The cartridge is returned to its original cell.
4. The next cartridge is loaded into its corresponding drive.

Autoloader mode divides the cells and drives of the library into two stacks:

- Stack 0 (cells 0 through 9, and corresponding Drive 0).
- Stack 1 (cells 10 through 19 and corresponding Drive 1).

Requirements

To use the autoloader feature, the requirements in [Table 3-7](#) must be met:

Table 3-7. Autoloader Requirements

Components	Stack 0	Stack 1
Cells	0—9	10—19
Drive	0	1
Online	No	No
Auto Clean	Off	Off
Media (see note)	Mixed—Permitted <i>only</i> with labeled cartridges	Mixed—Permitted <i>only</i> with labeled cartridges
	Unlabeled—Same type for <i>both</i> drives	Unlabeled—Same type for <i>both</i> drives
CAP operation	No	No

Note: All media in a stack must match their corresponding drive type.

Configuring the Library for Autoloader

Before entering autoloader mode, you must set the library's configuration:

1. From the Main menu, select the Lib/Cfg menu.
2. In the Lib/Cfg menu, set:
 - Auto Clean to OFF
 - Number of cells to 20 (disables CAP operation)

Note: If your library is a 10-cell configuration, the “number of cells” setting does not require changing.

3. Reboot the library to activate this configuration.

Starting Autoloader

To initiate autoloader mode:

1. From the MAIN MENU (Figure 3-11), select Autoload

Figure 3-11. Autoloader Initialization (1 of 5)

```

MAIN MENU
.Drawer Operations
.Diagnostics
>Autoload
  
```

You will see the following message:

Figure 3-12. Autoloader Initialization (2 of 5)

```

WARNING this is the
AUTOLOAD FEATURE.
If SELECTED the L20
is taken OFFLINE.

-----
Press MENU to Exit,
SELECT for Autoload
  
```

The library's configuration is checked that "20 cells" (no CAP) is set and that Auto Clean is set to OFF. If not, an error is displayed.

2. When you press SELECT, the operator panel displays:

Figure 3-13. Autoloader Initialization (3 of 5)

```

AUTOLOAD MENU
.STACK0-Inactive
.STACK1-Inactive
>Drawer Operations
  
```

3. Select Drawer Operations.

This option allows you to load the stacks or, if autoloader mode is active, postpone a stack operation to either reload more cartridges or perform a cleaning operation (see ["Canceling Autoloader Mode" on page 3-29](#)).

4. Follow the procedure to open the drawer (see [“Opening the Slide-out Cartridge Drawer” on page 2-14](#)).
5. Remove any unwanted cartridges from Stack 0 and/or Stack 1.
6. Place the new cartridges into the stacks.
7. Close the drawer (see [“Closing the Slide-out Cartridge Drawer” on page 2-15](#)).

When the library initializes, the operator panel will display the Autoload Menu.

8. In the Autoload Menu, select the Stack you wish to start by using the up/down arrow to line up with the stack and press SELECT.

The operator panel displays:

Figure 3-14. Autoloader Initialization (4 of 5)

```
AUTOLOAD MENU:  
>STACK0-Inactive  
.STACK1-Inactive  
.Drawer Operations
```

9. When you select the stack, the operator panel displays:

Figure 3-15. Autoloader Initialization (5 of 5)

```
STACK0-Inactive  
.Cell10:Queued  
.Drive:Empty  
>Start Menu
```

10. When you select Start, the operator panel displays:

Figure 3-16. Autoloader Start Display

```
STACK0 - Inactive  
>Start  
.Restart  
.Return Cart
```

These three options and their definitions are:

- Start—start autoloader on the stack

- Restart—restart a previous autoloader stack
 - Return Cart—forces a cartridge loaded into a drive to be unloaded and returned to its original cell (generally used when a drive operation abruptly stops due to a power failure or when a drive does not unload correctly).
11. Once started, the cell and drive status are shown on the operator panel.

The cursor will underline the cell number that is currently active and the cursor will remain under that cell until the cartridge is dismounted (rewound). You may use the up/down arrow button to view the status of any other particular cell in the stack.

Figure 3-17. Autoloader Active Display

```
STACK0-Cell14@Drive
.Cell14:Mounted
.Drive:Loaded
>Cancel Menu
```

The display also shows the cell status:

- Queued—the cartridge in the cell number shown is not yet loaded.
- Mounted—the cartridge from that cell number is mounted in a drive.
- No Cart—the cell number displayed is empty.
- Complete—the cartridge from that cell has been rewound, dismounted, and returned to its original cell.
- Not Used—the cartridge in this cell is not used due to a forced dismount.

CAUTION:

Data Corruption: If the operator panel displays **Unknown**, the data might be corrupt. Dismount any cartridge loaded in a drive.

- Unknown—the library has lost power, been IPLed during autoloader mode, or a Cancel Forced was entered from the operator panel. Since the data might be corrupt in these cases, remove the cartridge from the stack.

Canceling Autoloader Mode

When CANCEL is selected from the operator panel, the following options will display:

Figure 3-18. Canceling Autoloader

```
STACK0-Cell13@Drive
>Cancel Next
.Cancel Immediate
.Cancel Forced
```

These options are defined as:

- **Cancel Next**—the operation waits for the next cell retrieval from the drive to stop operations (all cartridges are returned to cells).
- **Cancel Immediate**—the operation stops immediately, regardless of any cartridges loaded into drives; *no* attempt is made to return a cartridge loaded into a drive.

This is generally the option you should select so that you will not have to wait for the current operation to complete.
- **Cancel Forced**—the library forces the drive to perform an immediate rewind and unload of any cartridge loaded into a drive and returns the cartridge to its cell.

When Cancel is selected, the operator panel returns to the Stack Menu while canceling the operation. When the cancel operation is completed, Canceled is displayed.

Cleaning a Drive in Autoloader Mode

If a drive requires cleaning when in autoloader mode, you can clean the drive without exiting autoloader mode:

1. Cancel the current stack operation that corresponds to the drive requiring cleaning (0 or 1).
2. For the cleaning operation, select either Cancel Next or Cancel Immediate to ensure that the drive to be cleaned is empty.
3. Open the drawer (see [“Opening the Slide-out Cartridge Drawer” on page 2-14](#)).
4. Follow the [“Starting Autoloader” on page 3-27](#).
5. Remove *all* data cartridges in the stack that corresponds to the drive requiring cleaning.
6. Place a *cleaning cartridge* in the stack.
7. Start the stack.

Restarting a Canceled Stack

You might need to open the drawer to refill one stack while the other stack is in autoloader sequence. To do this:

1. In the Stack menu, select Cancel.
2. From the Cancel menu, select Cancel Immediate.
3. Open the drawer (see [“Opening the Slide-out Cartridge Drawer”](#) on page 2-14) and refill the stack.
4. In the AUTOLOAD menu, select the Stack Menu.
5. From the Stack menu, select the Start menu.
6. In the Start menu, select Restart.

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Troubleshooting and Diagnostic Tests

4

If you encounter any problems with the library, you should take several steps before contacting Customer Support Services (CSS). These steps either help you resolve the problem or help identify the problem to CSS.

CAUTION:

Warranty caution: There are no customer replaceable parts inside the library. Do not remove the library cover as this may void your warranty.

Use the information in this chapter to diagnose and resolve the problem with the library. If you must contact CSS, see [Chapter 5, “Customer Support”](#).

■ Troubleshooting Table

Before running diagnostic tests, check the areas of the library using these troubleshooting tips ([Table 4-1](#)):

Table 4-1. Troubleshooting Table

Problem	What to do
The library does not power on. The operator panel does not display any messages.	<ol style="list-style-type: none">1. Make sure that the library power switch is in the on (—) position.2. Check all power cord connections.3. Replace the power cord.4. Make sure that there is power to the outlet.
Service Required (red) LED is constantly lit.	<p>Perform the following procedure:</p> <ol style="list-style-type: none">1. Check the operator panel for any displayed error messages. Note error messages reported.2. Make sure that the personality module is correctly installed and secured.3. Open the cartridge drawer (see “Opening the Slide-out Cartridge Drawer” on page 2-14). Observe and note the state of the cartridges, picker, and drives.<ol style="list-style-type: none">a. Make sure that all cartridges are fully seated and properly oriented in their cells (see Figure 2-8 on page 2-20).

Table 4-1. Troubleshooting Table (Continued)

Problem	What to do
	<ul style="list-style-type: none"> b. Make sure that all packing materials have been removed, and the shipping screw securing the picker has been released. c. Inspect the picker track and the library floor for any foreign objects or debris; remove them if found. d. Check the status of the drives. <ol style="list-style-type: none"> 4. Close and <i>fully</i> seat the drawer by turning the lock <i>clockwise</i>. 5. Open the drive doors and check the following: <ul style="list-style-type: none"> a. Make sure that the drives are fully seated and locked forward by pushing and pulling on the rear of the drive tray. Any motion of the tray indicates that it requires reseating and locking down. If the drives are not fully seated, continue through e). Otherwise, go to step f). b. Turn the drive tray latch all the way to your left. This loosens the latch to its fully unlocked position. c. Slide the drive tray properly into the slot. d. Turn the latch all the way to the right to engage the latch and clamp it firmly into the frame. e. Pull back on the tray to make sure that the tray is securely latched. It should not move. f. Make sure that all connectors are properly plugged into their respective connectors. 6. Close and secure the drive doors. 7. Power-on the library and, after the library initializes, perform the self-test function (see “Library Self-Test and Event Log” on page 4-4) from the operator panel.
<p>The client computer cannot communicate with the library or drives.</p>	<ol style="list-style-type: none"> 1. Make sure that all cables are securely attached to their connectors on the rear of the library, the drives, and the client computer. 2. Make sure that SCSI terminators are installed where required. 3. Make sure that each SCSI device on the same bus has a unique address and that the last device is properly terminated. 4. Make sure that the interfaces are matched for LVD or HVD operation.

Table 4-1. Troubleshooting Table (Continued)

Problem	What to do
<p>The library is unable to communicate with the drives.</p> <p>Drive status on the operator panel displays Not communicating.</p>	<p>Open the drive door and make sure that all cables are properly seated.</p>
<p>Repeated or excessive drive cleanings or cleaning messages occur.</p>	<ol style="list-style-type: none"> 1. Replace the cleaning cartridge with a new cleaning cartridge. 2. Run Library Self-Test (see “Library Self-Test and Event Log” on page 4-4) and note if errors are reported for the drive. 3. Run any client computer-based drive diagnostic tests.
<p>Cartridge is stuck in the drive or picker.</p>	<p>See “Replacing a Cleaning Cartridge” on page 3-23. or “Removing a Cartridge from the Picker” on page 3-18.</p>
<p>Drive is unable to eject a cartridge.</p>	<ol style="list-style-type: none"> 1. Open the cartridge drawer (see “Opening the Cartridge Drawer” on page 3-17). 2. Follow the “Removing a Cartridge from a Drive without a Load Handle” on page 3-22 or “Removing a Cartridge from a Load Handle Drive” on page 3-21.

■ Library Self-Test and Event Log

If you have used the troubleshooting tips to try to correct a problem and the problem is not corrected:

- Run the Library Self-Test, which tests all aspects of the library, such as the picker and bar-code scanner calibration.
- Display the Event log in which the last 20 events and errors are recorded.

Diagnostics Menu

This menu ([Table 4-2](#)) provides self-test routines and displays the Event Log.

Table 4-2. Diagnostics Menu

Library Self-Test	<p>The Library Self-Test:</p> <ul style="list-style-type: none"> • Performs the normal initialization tests. • Performs a “get” and “put” for each cartridge in the library • If a diagnostic cartridge is present, mounts and dismounts this cartridge on Drive 0, and then on Drive 1. <p>Problems with the library are shown in the status display.</p>
Event Log	<p>The Event Log displays the 20 most recent events and errors.</p>

With the information you obtain from messages generated by the diagnostic tests, you can contact Customer Support Services or initiate a maintenance request to resolve the problem. For more information, see [Chapter 5, “Customer Support”](#).

Library Self-Test

The Library Self-Test routine includes two default tests and an optional third test:

- Normal initialization of the library
- A “get” and “put” of each data cartridge from/to its cell location

If a diagnostic cartridge is within the library and at least one drive is installed:

- The diagnostic cartridge will be mounted and dismounted to each drive, starting with Drive 0

To run the Library Self-test:

1. Press the MENU button to return to the Main menu.
2. Press the arrow buttons until the > sign appears to the left of Diagnostics.

3. Press the SELECT button.

The status display shows the Diagnostics menu.

4. Press the arrow buttons until the > sign appears to the left of Library Self-Test.

5. Press the SELECT button.

The status display shows the Are you sure? message.

6. Press the SELECT button again.

The status display shows the Running Init Test message while the Library Self-Test runs. When the Library Self-Test is completed, the status display shows the Command Completed message.

Note: If the test did not complete successfully, make a note of the messages shown in the status display so that you can report them to Customer Support Services. For more information, see [Chapter 5, “Customer Support”](#).

7. When the Library Self-Test is complete, press the MENU button twice to return to the Main menu.

Event Log

The Event Log contains the 20 most recent events and errors. This will give you a history of library actions, equipment errors, and fault symptom codes (FSCs) that correlate to an event or problem. *Always write down the FSC*; this information is important to the technicians in maintenance support.

- When an FSC appears on the operator panel, line up the cursor with the FSC, press SELECT, and more information will be displayed.
- You can also display the entire Event Log by using the Reports button on the Library Status Monitor. This method provides a display of the *entire* contents of the Event Log. To use this method, see [“Using Library Status Tool” on page 3-8](#).

Demo Mode

Note: Demo Mode also appears in the Diagnostics Menu. Demo mode:

- Moves tapes without performing any host operations
- Is not intended for customer use
- Requires an update of the tape management database when finished

To run Demo mode:

1. Press the MENU button to return to the Main menu.
2. Press the arrow buttons until the > sign appears to the left of Diagnostics.
3. Press the SELECT button.

The status display shows the Diagnostics menu.

4. Press the arrow buttons until the > sign appears to the left of Demo: 001 loops.
5. Press the SELECT button.
6. Press the arrow buttons to set the test for 1, 10, 20 loops (one loop is equal to one “get” (getting a cartridge from a cell) and one “put” (putting a cartridge into a cell)).

Note: Looping this mode for more than 20 times is not recommended.

7. Press the SELECT button.

The status display shows the Are you sure? message.

8. Press the SELECT button again.

The status display shows the Command Started... message and the Demo mode runs. When Demo mode is complete, the status display shows the Command Completed message.

Note: If Demo mode did not complete successfully, make a note of the messages shown in the status display so that you can report them to Customer Support Services. For more information, see [Chapter 5, “Customer Support”](#).

9. When Demo mode finishes, press the MENU button twice to return to the Main menu.

This chapter describes how to contact Customer Support Services.

■ Customer Services Support Center

Customer support is available 24 hours a day, seven days a week, to customers with Sun or StorageTek maintenance contracts and to Sun employees. You can find additional information about customer support on the Customer Resource Center (CRC) Web site at:

<http://www.support.storagetek.com>

■ Customer-initiated Maintenance

Customer-initiated maintenance begins with a telephone call from you to Sun Microsystems StorageTek Support. You receive immediate attention from qualified Sun personnel, who record problem information and respond with the appropriate level of support.

To contact Sun Microsystems StorageTek Support about a problem:

1. Use a telephone to call the StorageTek Customer Services Support Center at:

☎ 1-800-525-0369 (from within the United States) or

☎ 303-673-4056 (from outside the United States) or

See “Sun’s Worldwide Offices” on page 5-2 for information about International customer support centers.

2. Describe the problem to the call taker. The call taker will ask several questions and will either route your call to a trained support technician or dispatch a service representative.

If you have the following information when placing a service call, the process will be much easier:

Account name	_____
Site location number	_____
Contact name	_____
Telephone number	_____
Equipment model number	_____
Device address	_____
Device serial number (if known)	_____
Urgency of problem	_____
Fault Symptom Code (FSC)	_____
Problem description	_____

■ Sun's Worldwide Offices

You may contact any of Sun's worldwide offices to discuss complete storage, service, and support solutions for your organization. You can find address and telephone number information on Sun's external Web site at:

<http://www.sun.com/worldwide/>

Specifications

A

This appendix provides specifications for the library.

For drive specifications, refer to your drive documentation. For cartridge tape specifications, see [Appendix B, “Cartridges.”](#)

■ Power Specifications

Table A-1. Power Specifications

Item	Measurement
Input voltage	100–240 VAC, single phase
Frequency	50/60 Hz
Maximum power consumption (library)	1.4 A at 120 V <i>or</i> 0.71 A at 240 V
Maximum heat output	560 Btu/hr
Voltage-amperes	170 VA

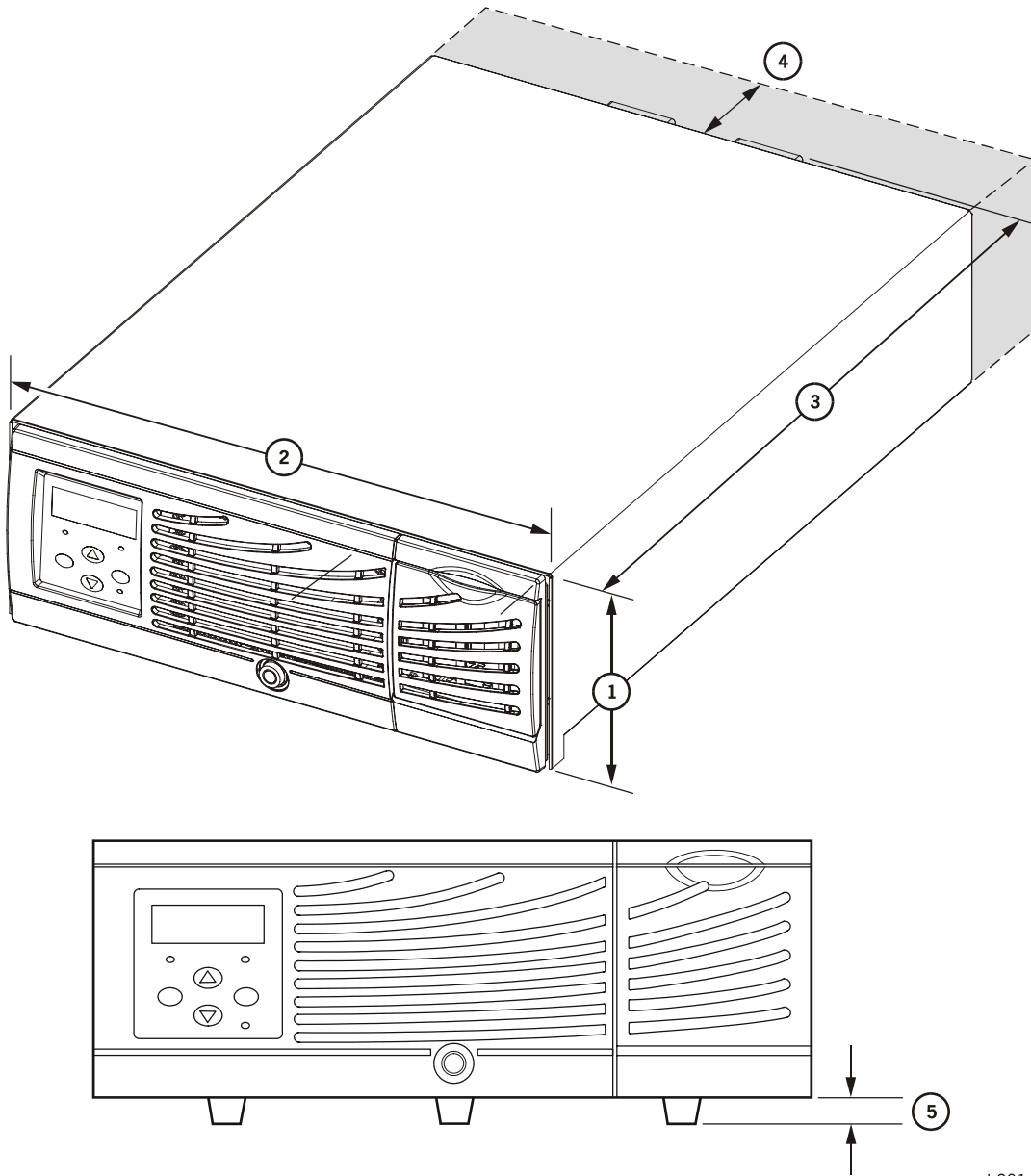
■ Environmental Specifications

Table A-2. Environment Specifications

Specifications	Operating	Storage	Transporting
Temperature	+10 to +40°C +50 to +104°F	+10 to +40°C +50 to +104°F	-40 to +60°C -40 to +140°F
Humidity	20 to 80%	10 to 95%	10 to 95%
Wet bulb (maximum, non-condensing)	+29.2°C +84.5°F	+35°C +95°F	+35°C +95°F
Altitude	-76 to 3,048 m (-250 to 10,000 ft)		

■ Physical Specifications

Figure A-1. Desktop Specifications (L201_345)

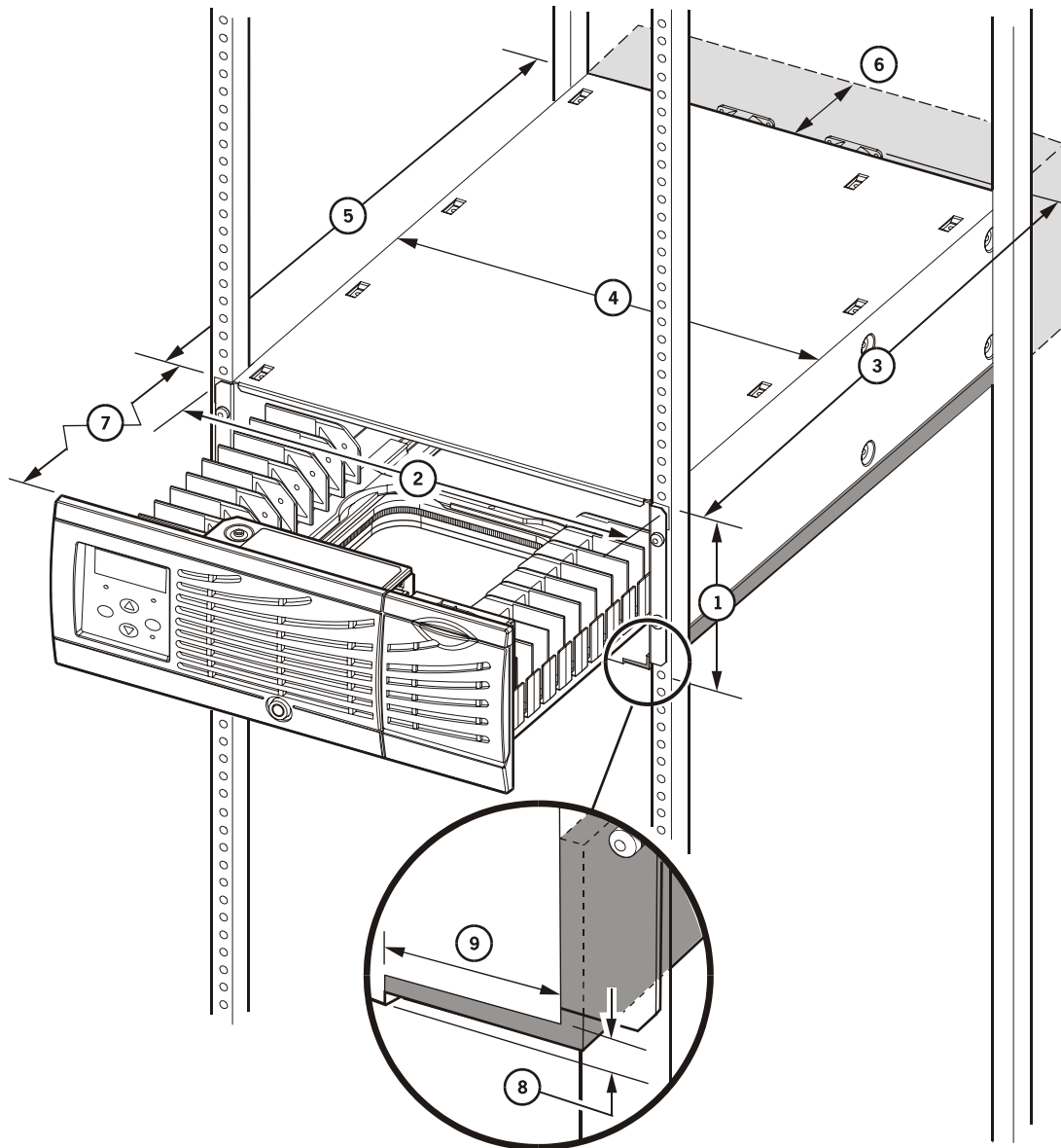


L201_345

- | | |
|--|--|
| 1. 178 mm (7.0 in.) height | 4. 102 mm (4.0 in.) dedicated fan exhaust clearance area |
| 2. 483 mm (19.0 in.) width | |
| 3. 706 mm (27.78 in.) depth without cables | 5. 16 mm (0.625 in.) foot height |

Weight: 23.4 kg (51.6 lb)—library only; 29 kg (64 lb)—with two drives

Figure A-2. Rack-mounted Specifications (L201_342)



L201_342

- | | |
|--|--|
| 1. 176 mm (6.94 in.) height | 7. 356 mm (14.0 in.) drawer travel distance |
| 2. 484 mm (19.05 in.) width of front with flange | 8. 2.3 mm (0.090 in.) shaded area represents optional rail support |
| 3. 706mm (27.78) depth with fan, no cables | 9. 37 mm (1.44 in.) |
| 4. 448 mm (17.65 in.) width | |
| 5. 680 mm (26.78 in.) depth, no fan or cables | |
| 6. 102 mm (4.0 in.) dedicated fan exhaust clearance area | |

Weight: 23.4 kg (51.6 lb)—library only; 29 kg (64 lb)—with two drives

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Cartridges

B

This appendix describes how to handle, inspect, maintain, and order cartridges. It also lists cartridge specifications.

■ Handling Cartridges

Improper handling of cartridges can cause loss of data or damage to a library component. To handle a cartridge correctly:

- Make sure that the leader is latched every time you pick up a cartridge.
- Keep cartridges *clean*.
- Inspect a cartridge before each use, and *never* put a damaged cartridge into a drive or library.
- Never pull tape from a cartridge.
- Never open a cartridge.
- Do not handle tape that is outside the cartridge; the tape edge might be damaged.
- Do not expose the tape or cartridge to direct sunlight or moisture.
- Do not expose a recorded cartridge to magnetic fields; this might destroy data on the tape.

■ Inspecting Cartridges

A defective or dirty cartridge can damage a drive. Always inspect a cartridge before inserting it into a drive or a library. Look for:

- Cracked or broken cartridge
- Broken leader
- Broken leader latch
- Damaged write-protect switch
- Liquid in the cartridge
- Labels not firmly or neatly attached or extending over the cartridge edge
- Any other obvious damage

■ Maintaining Cartridges

It is important to keep your cartridges in good condition. A defective or dirty cartridge can damage a drive. If you suspect a problem with a cartridge, inspect it for possible defects as listed in “[Inspecting Cartridges](#)” on page B-1.

When you store a cartridge:

- Leave it in its protective wrapping until you are ready to use it.
- Choose a clean environment that duplicates the conditions of the room in which it is used.
- Make sure that the cartridge has been in its operating environment for at least 24 hours.

CAUTION:

Potential damage to cartridges. Do not use certain solvents to remove labels or to clean cartridges because they can damage the cartridges. Do not use acetone, trichloroethane, toluene, xylene, benzene, ketone, methylethyl ketone, methylene chloride, ethyldichloride, esters, ethyl acetate, or similar chemicals.

When you clean a cartridge exterior:

- Wipe all dust, dirt, and moisture from the cartridge with a lint-free cloth.
- Use Tape Cleaner Wipes, part 4046289-01, to clean the cartridges. These wipes are saturated with isopropyl alcohol. Do *not* let any solution touch the tape or get inside the cartridge.

■ Cartridge Requirements

Cartridges must meet specifications defined in *American National Standard Magnetic Tape and Cartridge for Information Interchange*.

Cartridges must meet the following requirements:

- Cartridges
 - 105.6 mm wide x 105.3 mm long x 25.4 mm (4.16 in. x 4.15 in. x 1 in.)
 - Integrated write-protect switch and indicator
- Media
 - Chromium dioxide
 - 12.7 mm (0.5 in.) wide
 - 165 m (541 ft) long, minimum
 - No beginning of tape or end of tape reflective markers
- Volume label
 - Valid characters are A–Z, 0–9, # (crosshatch) or trailing blanks; leading blanks not allowed.

■ Colored Cartridge Specifications

Colored cartridges are approved only if the measured reflection density is greater than 0.10 for DLT cartridges as measured by an X-rite 404G color reflection densitometer. For more information about colored cartridges, contact your Sun marketing representative. Colored measurements are:

Bandwidth	ANSI Status T Wide band (380 to 780 nm)
Measuring range	Density (0.00 to 2.50) D
Accuracy	±0.02 D
Repeatability	±0.01 D
Aperture diameter	3.4 mm (0.13 in.)

■ Ordering Cartridges and Labels

Contact your authorized selling agent for Sun StorageTek-approved labeled cartridges.

Note:

- You must select the volume serial number (VOLSER) range and other label options when ordering cartridges.
- If you choose to order additional labels, order them from any standard media vendor (such as those listed above).

Labels used in StorageTek libraries can be made by any vendor that produces a label that meets the Sun StorageTek Label Specification. Some vendors (not all inclusive) are:

- EDP/Colorflex <http://www.colorflex.com>
- NetC <http://www.netcllc.com>
- WrightLine/American Eagle Systems <http://www.americaneaglesys.com>
- Dataware <http://www.datawarelabels.com>

These Web sites contain links to third party sites. These links are provided as a convenience to you and not as an endorsement by Sun Microsystems. Sun Microsystems is not responsible for the content of these linked Web sites and does not make any representations regarding the content or accuracy of any content on such Web sites.

For technical questions, contact the Sales Support at:

Telephone: 1.800.ask4stk (1.800.275.4785)

E-mail: sales_support@storagetek.com.

■ DLT/DLT1 Cartridges

Digital Linear Tape (DLT) 8000 and DLT 7000 drives from Quantum or Benchmark DLT1 drives most commonly use DLTtape IV cartridges.

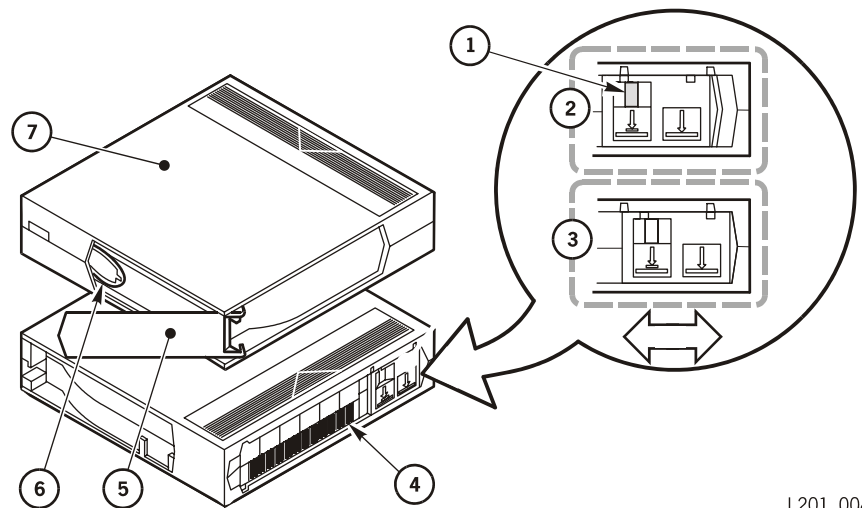
Note: DLT1 drives use only DLTtape IV cartridges. DLT1 drives can read—but not write to—DLTtape IV cartridges formatted by DLT 4000 drives.

DLT1 drives require a unique cleaning cartridge.

Some drives can also read and write data on Type III and III XT cartridges. Consult your sales representative or the drive documentation to determine the best tape to use in your library.

Components of the DLT and DLT1 cartridges are shown in [Figure B-1](#).

Figure B-1. DLT/DLT1 Cartridges (L201_004)



L201_004

1. Orange indicator denotes write-protection.
2. Write-protection is on (the orange indicator is visible): data can only be read from the tape.
3. Write-protection is off (the orange indicator is not visible): data can be written to the tape.
4. Volume label
5. Access door
6. Tape leader
7. Top side of the cartridge

Cartridge Label Codes

Cartridge labels include a volume label (serial number) and a code that indicates the type of cartridge. If your cartridges were not ordered with labels already applied, you must apply them yourself. You must correctly label all cartridges for library use.

Data cartridges have a small letter that indicates the cartridge type next to the last number in the volume label ([Table B-1](#)); cleaning and diagnostic cartridges have a two- or three-letter prefix in the volume label.

Note: The DLT1 cleaning cartridge is composed of fabric and is only to be used to clean DLT1 drives.

Table B-1. DLT/DLT1 Tape Volume Labels

Label	Type of Cartridge
D	DLTtape IV data cartridges
C	DLTtape III data cartridges
E	DLTtape IIIXT data cartridges
CLN	Cleaning cartridges
DG	Diagnostic characters (apply a DG label to a blank data cartridge to be used for diagnostic tests)

Applying Labels

Perform these steps before applying the label into the recessed area on the cartridge:

CAUTION:

Possible picker damage or misread of volume label: Make sure that the edges of the labels do not curl; curling causes the cartridges to stick in the drive loader and the robot will misread the volume label.

1. Make sure that the cartridge has been at room temperature for at least 24 hours.
2. Clean the surface where the labels will be placed using a cleaning solution made for this purpose.
3. Locate the type of label that you require (see [Table B-1](#)).
4. Hold the cartridge so that the write-protect switch is toward you.
5. Slide the label under the slots in the recessed area.

Setting the Write-protect Switch

You can set the write-protect switch so the cartridge is *write-enabled*. Slide the switch to the right so the orange indicator is not visible (see [Figure B-1 on page B-4](#)). In this position, the drive can write as well as read data. This setting is recommended when inserting cartridges into the library.

You can set the write-protect switch so that the cartridge is *read-only* (nothing can be written on the tape). Slide the switch to the left so that the orange indicator is visible. In this position, the drive can only read data from the tape, but cannot write data on it.

DLTtape Cartridge Environmental Specifications

Contact the manufacturer of your cartridges for the most current operating, storage, and other specifications ([Table B-2](#)).

Table B-2. DLT Cartridge Environmental Specifications

<i>Operating environment</i>	
Temperature	10°C to 40°C (50°F to 104°F)
Relative humidity	20% to 80% non-condensing
Wet-bulb temperature	25°C (77°F) maximum
CAUTION:	
<i>Potential damage to cartridges.</i> Temperatures above 49°C (120°F) might damage the tapes. If during storage or transportation a cartridge has been exposed to conditions exceeding the above values, before using the cartridge, keep the cartridge within those operating environment specifications for at least as long as the time that the cartridge exceeded the specifications, up to two hours. Make sure that the cartridge has no moisture on it.	
When storing DLT cartridges, the stray magnetic field at any point on the tape shall not exceed 4000A/m.	
<i>Cartridge storage environment</i>	
Temperature	16°C to 32°C (61°F to 90°F)
Relative humidity	20% to 80% non-condensing
Wet-bulb temperature	26°C (79°F) maximum
<i>Cartridge storage environment for cartridges intended for archiving data for one year or more</i>	
Temperature	18°C to 26°C (64°F to 79°F)
Relative humidity	20% to 60%

■ SDLT Cartridges

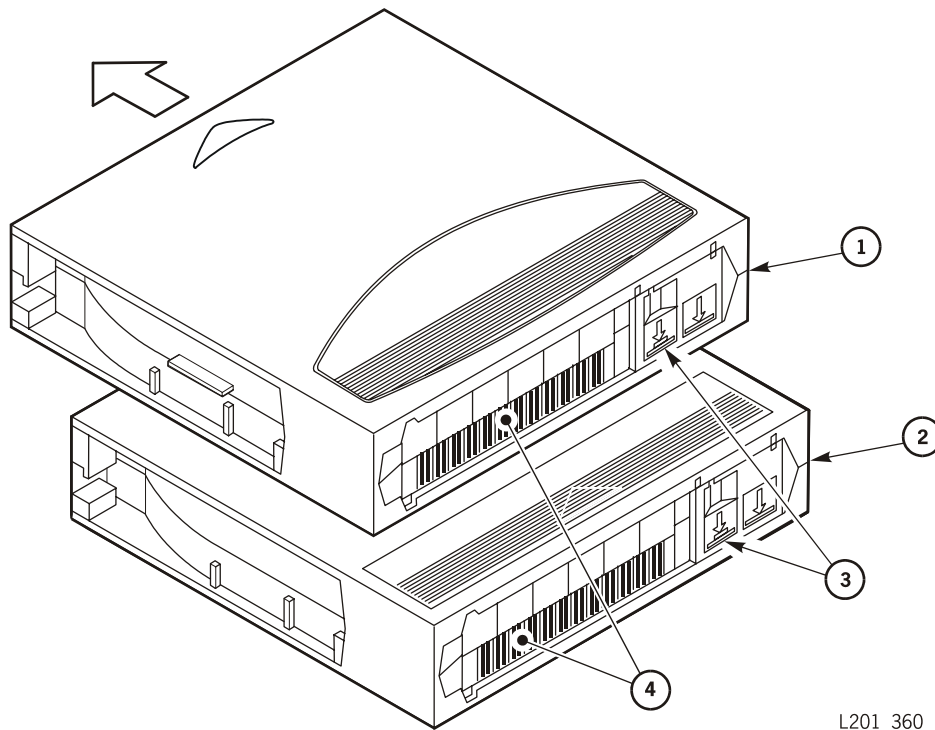
SDLT cartridge components are shown in the top cartridge of [Figure B-2](#).

SDLT drives use unique data and cleaning cartridges. Differences between the SDLT and standard DLT/DLT1 cartridges are shown in [Figure B-2](#).

CAUTION:

Data loss: Do not mount SDLT 320-formatted cartridges into SDLT 220 drives. An SDLT 220 drive will overwrite the 320 data. To avoid this, carefully manage the locations of the cartridges within your library, and designate the correct drive type for your read/write operations.

Figure B-2. DLT and SDLT Cartridge Differences (L201_360)



1. SDLT cartridge
2. DLT cartridge
3. Write-protect switches
4. Volume serial number (VOLSER) labels

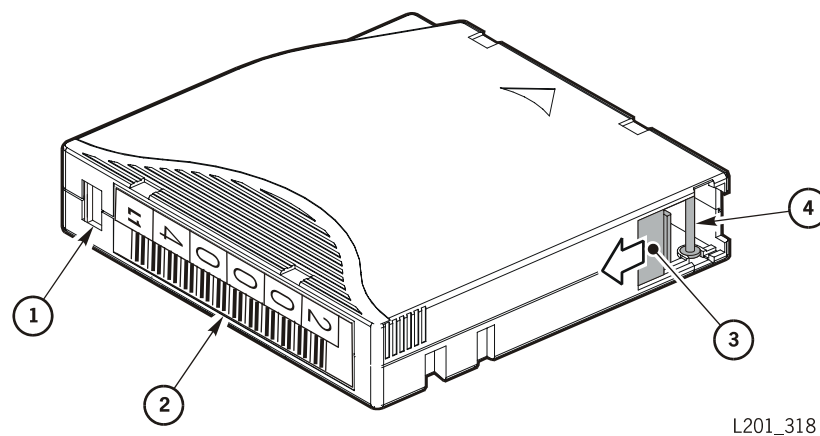
Table 2-3. SDLT Cartridge Tape Specifications

Performance	SDLT 600
Capacity, native (uncompressed)	300 GB
Archival life	30 years
Tape drive compatibility	SDLT600
Form factor	Half inch
Width	105.6 mm (4.16 in.)
Length	105.3 mm (4.15 in.)
Depth	25.4 mm (1.0 in.)
Weight	222.5 g (7.85 oz)
Humidity	20%-80%
Temperature (non-condensing)	10° to 40°C (50° to 104°F)
Wet bulb maximum	26°C (78°F)

■ Ultrium Cartridges

Ultrium cartridge components are shown in [Figure B-3](#).

Figure B-3. Ultrium Cartridge Components (L201_318)



1. Write-protect switch
2. Volume serial number (VOLSER)
3. Access door
4. Leader pin

Cartridge Label Codes

Cartridge labels reflect the cartridge media and usage (Table B-4). The letter located next to the last number in the volume label reflects the media. Cleaning cartridges must match the drive type.

Table B-4. Ultrium Cartridge Codes

Label	Type of Cartridge
L ₁	Gen1 data cartridge
L ₂	Gen2 data cartridge
L ₃	Gen3 data cartridge
C ₁ plus CLN	Cleaning cartridge for Hewlett-Packard
C ₂ plus CLN	Cleaning cartridge for IBM
C ₃ plus CLN	Cleaning cartridge for Seagate
L plus DG	Diagnostic cartridge (apply a DG label to a blank data cartridge to be used for diagnostic tests)

Applying Labels

Perform these steps before applying the label into the recessed area on the cartridge:

CAUTION:

Possible picker damage or misread of volume label: Make sure that the edges of the labels do not curl; curling causes the cartridges to stick in the drive loader and the robot will misread the volume label.

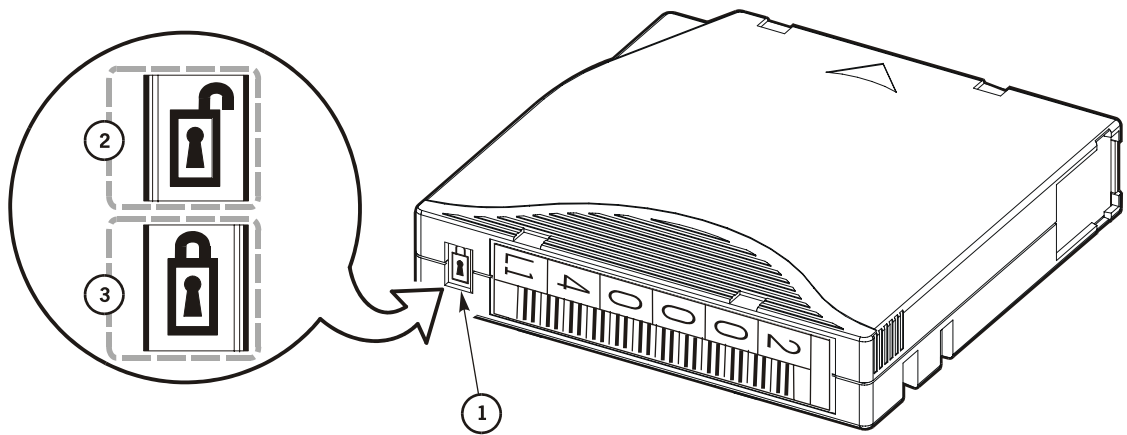
1. Make sure that the cartridge has been at room temperature for at least 24 hours.
2. Clean the surface where the labels will be placed using a cleaning solution made for this purpose.
3. Locate the type of label that you require (see [Table B-4 on page B-9](#)).
4. Hold the cartridge so that the write-protect switch is toward you.
5. Slide the label under the slots in the recessed area.

Setting the Write-protect Switch

As shown in [Figure B-4](#), you can set the write-protect switch so the cartridge is *write-enabled*. Slide the switch to reveal the “open lock” symbol to write-enable the tapes. In this position, the drive can write as well as read data. This setting is recommended when inserting cartridges into the library.

You can set the write-protect switch so that the cartridge is *read-only* (nothing can be written on the tape). Slide the switch to reveal the “closed lock” symbol. In this position, the drive can only read data from the tape, but cannot write data on it.

Figure B-4. Setting the Ultrium Write-protect Switch (L201_320)



L201_320

1. Write-protect switch
2. Write-enabled
3. Write-protected

Ultrium Cartridge Environment Specifications

The following tables list the LTO Gen 1, 2, and 3 specifications.

Table B-5. LTO Gen 2 and 3 Cartridge Tape Specifications

Specification	L2 Cartridge	L3 Cartridge
Capacity, native (uncompressed)	200 GB	400 GB
Capacity (compressed) **	400 GB	800 GB
Read and write tape speed	5.9 m/s	5.9 m/s
Search and rewind speed	7.0 m/s	7.0 m/s
Archival life	15–30 years	15–30 years
Number of tracks	512 tracks	704 tracks
Dimensions		
Width	107 mm (4.2 in.)	107 mm (4.2 in.)
Height	22.9 mm (0.9 in.)	22.9 mm (0.9 in.)
Depth	102 mm (4.0 in.)	102 mm (4.0 in.)
Weight	210.0 g (0.46 lb)	210.0 g (0.46 lb)
Temperature (non-condensing)		
Operating	10 to 40°C (50 to 104°F)	10 to 40°C (50 to 104°F)
Shipping	-23 to 49°C (-10 to 120°F)	-23 to 49°C (-10 to 120°F)
Wet bulb	26°C (78°F)	26°C (78°F)
Humidity	20–80%	20–80%
** Assuming a 2:1 compression ratio.		

Table B-6. LTO Gen 1 Cartridge Tape Specifications

Specification	L1 Cartridge
Capacity, native (uncompressed)	100 GB
Capacity (compressed) **	200 GB
Read and write tape speed	4.0 m/s
Search and rewind speed	7.0 m/s
Archival life	15–30 years
Number of tracks	384 tracks
Dimensions	
Width	107 mm (4.2 in.)
Length	22.9 mm (0.9 in.)
Depth	102 mm (4.0 in.)
Weight	210.0 g (0.46 lb)
Temperature (non-condensing)	
Operating	10 to 40°C (50 to 104°F)
Shipping	-23 to 49°C (-10 to 120°F)
Wet bulb	26°C (78°F)
Humidity	20–80%
** Assuming a 2:1 compression ratio.	

Glossary

This glossary defines terms and abbreviations in this and other product related publications.

Some of the definitions are taken from the *IBM Dictionary of Computing*. The letters in the parentheses that follow some definitions indicate the source of the definition:

(A) *The American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI).

(E) The ANSI/Electronic Industries Association (EIA) Standard-440-A, *Fiber Optic Terminology*.

(I) *The Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and International Electrotechnical Commission (ISO/IEC/JTC1/SC1).

(IBM) *The IBM Dictionary of Computing*, copyright 1994 by IBM.

(T) International standards committee drafts, and working papers being developed by the ISO/IEC/JTC1/SC1.

A

A Ampere.

AC Alternating current.

access time The time interval between the time data is requested and data is delivered.

adapter A card that provides the physical interface between the host system I/O bus and the SCSI or Fibre channel bus. *See also* host bus adapter.

application software Software that is specific to the solution of an application problem.

audit An operation to catalog or record the physical location of a cartridge tape in an automated library.

auto clean A feature of an automated library that allows a cleaning cartridge to automatically be inserted into a drive when a drive indicates that it requires cleaning. The host software must support the auto clean function.

automated mode A relationship between a library and the client. In automated mode, the robot moves the cartridges among the storage cells, CAP, and drives in response to client commands. This is the normal operating mode of a library that is communicating with the client.

B

B *See* byte.

backward read compatible (BRC) The ability of an SDLT 220 tape drive to read recorded data from an earlier version of DLT tape drive. *Contrast with* non-backward read compatible (NBRC).

baud The communications transfer rate for serial data.

bit (1) A unit of information equal to a 1 or a 0.

British thermal unit (Btu) A standard measure of a device's heat output. The amount of heat required to raise one pound of water one degree Fahrenheit.

Btu *See* British thermal unit.

bus A facility that transfers data between two devices with only one device having control at a time.

byte A number of bits, treated as a unit, and representing a character.

C

C (1) Celsius. (2) Centigrade.

camera A system that reads volume serial number labels on cartridges, instead of scanning the labels with a laser. A camera performs faster and more accurately than a laser scanner.

CAP *See* cartridge access port.

cartridge A storage device that consists of magnetic tape on supply and take-up reels, in a protective housing. (IBM)

cartridge access port (CAP) A device in the library that allows an operator to insert or remove cartridges during library operations.

cartridge drive The unit that houses the magnetic-tape transports and controllers that store and retrieve data for the host system in a cartridge subsystem.

cartridge tape A composite of the plastic housing and the magnetic tape.

catalog (1) The inventory of all cartridge tape storage locations in a library; this inventory is by library number, panel, row, column. (2) A stored list of backed up files and directories and the locations of the backup copies.

cell The location in the library in which a cartridge is stored.

cleaning cartridge A cartridge that contains special material to clean the tape path in a drive.

cleaning cells *See* reserved cells.

client server The primary computer on a network, with which other computers interact. A server is a processor, usually composed of a central processing unit and memory, that typically communicates with peripheral devices over channels or networks, to perform input/output operations such as network control. It also provides end users with computation services and database access. Also called host.

command line interface (CLI) The CSE port on the LLC card.

config *See* configuration.

configuration (config) The physical description of a library listing the panel types, cartridge capacity, type of host connection, and number of drives.

configuration error An error that results from incorrect configuration values.

controlling (host) software The logical interface between the host operating system and the library components.

CRU *See* customer replaceable unit.

CSE port A slot that enables a remote or laptop computer user to run diagnostic tests, examine the fault symptom code (FSC) log, download firmware, or connect the library to a remote modem.

customer replaceable unit (CRU) (1) An assembly that a customer is allowed to replace in its entirety when it fails.

Customer Resource Center (CRC) StorageTek's Web-based service that provides technical information to customers with StorageTek maintenance contracts. A log-in and password are required.

D

daisy chain (1) A method of device interconnection for determining interrupt priority by connecting the interrupt sources serially. (2) A device interconnection cable.

diagnostic cartridge A data cartridge with a "DG" label, which is used for diagnostic routines.

diagnostic tests Automated offline tests that a service representative uses to evaluate and troubleshoot equipment.

DC Direct current.

differential (diff) A SCSI bus alternative that provides better signal quality with less crosstalk and noise but requires more power to drive the signal. The maximum cable length is 25 m (82 ft.).

differential operation A SCSI bus alternative in which the signal from the SCSI chip passes through a set of differential drivers and receivers. This alternative provides better signal quality with less cross-talk and noise but requires more power to drive the signal. *Contrast with* single-ended operation.

Digital Linear Tape (DLT) (1) A trademarked name for Quantum cartridge tapes and drives. (2) A type of magnetic tape storage device marketed by several companies. DLT cartridges are 1/2-inch wide and come in several sizes ranging from 20 to over 80 GB.

dismount To remove a cartridge from a drive.

DLT *See* Digital Linear Tape.

DLT1 A low cost, high-capacity tape drive manufactured by Benchmark Storage Innovations and Quantum Corporation. It features a native capacity of 40 GB using DLTtape IV media with a sustained transfer rate up to 3 MB/s.

domain (1) A shared user authorization database which contains users, groups, and their security policies. (2) A set of interconnected network elements and addresses that are administered together and that may communicate.

Domain Name Service (DNS) A service that translates domain names into IP addresses. Because domain names are alphabetic, they are easier to remember than IP addresses. *See* library name.

door interlock switch A switch that disconnects power to the library when the front door is opened.

drive An electromechanical device that moves magnetic tape and includes the mechanisms for writing and reading data to and from the tape.

Dynamic Host Configuration Protocol (DHCP) (1) Server software that automatically sets the library IP address, subnet mask, and name. (2) Server software that automatically sets IP address, net mask, and gateway. (IBM)

E

electronics module A unit in the library consisting primarily of the internal LLC card, interface connections, and the personality module on the EM frame.

electrostatic discharge (ESD) An undesirable discharge of an accumulated electrical charge (static) that can severely damage delicate components and degrade electrical circuitry.

element An externally addressable component of a library, such as a drive, CAP, or storage cell.

enabled (1) Active. (2) On.

ESD *See* electrostatic discharge.

Ethernet A 10 Mb/s baseband local area network that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by using collision detection and transmission. Ethernet uses carrier sense multiple access with collision detection. (IBM)

Ethernet address A six-byte address that makes a library accessible to a network. *See also* Ethernet, Internet Protocol (IP) address, library name, and subnet mask.

Event log A file, accessible through the operator panel, that contains events that occurred during the functional operation of the library.

F

F Fahrenheit.

fast load A mode of library operation permitting the robot to retrieve another cartridge before receiving load confirmation from a drive.

fault symptom code (FSC) A four-character hexadecimal code generated in response to an error to help isolate failures within the device.

FC *See* Fibre Channel.

FRU *See* field replaceable unit.

fiber-optic cable A jacketed cable of thin strands of glass that carries pulses of light that transmit data for high-speed transmissions over medium to long distances. The cable can be single mode, which carries a single signal from a laser or light-emitting diode light source, or multimode, which carries multiple signals from either light source.

fiber optics The branch of optical technology concerned with the transmission of radiant power through fibers made of transparent materials such as glass, fused silica, and plastic. (E)

Fibre Channel (FC) The standard from the National Committee for Information Technology Standards that defines an ultra high-speed, content-independent, multilevel data transmission interface that supports multiple protocols simultaneously. Fibre Channel supports connectivity to millions of devices over copper and/or fiber-optic physical media and provides the best characteristics of both networks and channels over diverse topologies.

field replaceable unit (FRU) An assembly that is replaced in its entirety when any one of its components fails. (IBM)

file-protect To prevent the destruction or overwriting of data stored on cartridge tape. *See also* write-protect.

firmware An ordered set of instructions and data stored in a way that is functionally independent of main storage; for example, microprograms stored in a ROM. (T) Also known as “microcode.”

FSC *See* fault symptom code.

G

g gram.

Gateway A 32-bit, or 4-byte number, in dotted decimal format (typically written as four numbers separated by periods, such as 107.4.1.3 or 84.2.1.111) that is applied to an IP Address to identify router interface.

GB *See* gigabyte.

get An activity in which a robotic hand obtains a cartridge from a cell or drive.

gigabyte (GB) One billion (10^9) bytes. When referring to memory capacity, 1,073,741,824 in decimal notation. (IBM)

H

HBA *See* host bus adapter.

hand assembly A part of the library robot whose function is to grasp cartridges and move them between storage cells and drives. A camera on the hand assembly reads cartridge volume labels.

Hertz (Hz) A unit of frequency equal to one cycle per second. For example, in the United States, power line frequency is 60 Hz, or a change in voltage polarity 120 times per second.

high voltage differential (HVD) A type of SCSI interface. The HVD interface allows longer cable lengths of up to 25 m (82 ft), but throughput is slower in data transfer rates than LVD (low voltage differential).

host The primary computer on a network, with which other computers interact.

host bus adapter (HBA) A circuit installed in a multi-platform host or device that interfaces between the device and the bus.

host controlling software The logical interface between the host operating system and the library components.

hot swapping A method of component replacement in which the system containing the component remains online during removal of the failed component and insertion of a replacement.

Hz *See* Hertz.

I

in. *See* inch.

inch A unit of measure equal to 25.4 mm.

indicator A device that provides a visual or other indication of the existence of a defined state. (I)

initialization The operations required for setting a device to a starting state, before the use of a data medium, or before implementation of a process. (I)

initial program load (IPL) A process that activates a machine reset and loads system programs to prepare a computer system for operation. Processors having diagnostic programs activate these programs at initial program load execution. Devices running firmware usually reload the functional firmware from a diskette or disk drive at initial program load execution.

interface Hardware, software, or both, that links systems, programs, or devices. (IBM)

Internet Protocol (IP) A stacked set of protocols, developed by the United States Department of Defense, to facilitate communication between dissimilar computers over networks.

Internet Protocol (IP) address A four-byte value that identifies a library and makes it accessible through a network. IP addresses are logically divided into two parts: the network (similar to a telephone area code), and the system on the network (similar to a phone number). *See also* Ethernet address, library name, subnet mask.

intervention required Operator action is required (such as removing a cartridge from the drive).

K

kb *See* kilobit.

kB *See* kilobyte.

kilobit (kb) (1) One thousand bits (10^3 bits). (2) 1,024 bits (2^{10}) of storage.

kilobyte (kB) (1) One thousand bytes (10^3 bytes). (2) 1,024 bytes (2^{10}) of storage.

kilovolt-ampere (kVA) An electrical unit of power equal to one thousand volt-amperes.

kVA *See* kilovolt-ampere.

L

label An identifier associated with a removable media or cartridge. Labels may be humanly readable, machine readable, or both. *Synonymous with* VOLSER and volume serial number.

lb An abbreviation for pound.

leader block. The mechanism that loads the tape through the tape path of a drive.

Library Admin *See* StorageTek L-Series Library Admin.

library name An assigned name that maps to the Internet Protocol (IP) address for a library. *See also* Ethernet address, Internet Protocol (IP) address, subnet mask.

Library Status tool A proprietary software that resides internal to the library and is activated using a Web browser. It is used to monitor the library, load code, reboot library, and to generate reports on library, drives, fault symptom codes (FSCs), and tape inventory.

Linear Tape-Open (LTO) A technology developed jointly by HP, IBM, and Seagate for new tape storage options. LTO technology is an open format, which means that users have multiple sources of products and media. The open nature of LTO technology also provides a means of enabling compatibility between different vendors' offerings.

low voltage differential (LVD) A type of SCSI interface. LVD interface restricts cable lengths, 12 m (30.4 ft), but provides faster throughput.

M

m *See* meter.

mA Milliamperes or one one-thousandth (10^{-3}) of an ampere.

magazine A container that holds cartridges in the cells provided and is inserted into the CAP.

magnetic tape A tape with a magnetizable layer on which data can be stored. *Synonymous with tape.*

Main menu The top-level menu on the operator panel display.

manual mode A relationship between a library and all attached clients. Tape libraries operating in manual mode have been placed offline to all client CPUs and require human assistance to perform cartridge operations.

Mb *See* megabit.

MB *See* megabyte.

Mb/s Megabits per second.

MB/s *See* megabytes per second.

media type A type of removable media. For example, a DLT IV media type indicates that the cartridge is for use in a Quantum DLT drive.

megabit (Mb) (1) One million (10^6) bits. (2) 1,048,576 (20^{20}) bits of storage.

megabyte (MB) (1) One million (10^6) bytes. (2) 1,048,576 (20^{20}) bytes of storage.

megabytes per second (MB/s) A measurement that usually describes the speed of data transfer.

meter (m) A metric measurement of length equal to 1.0936 yards, 3.2808 feet, or 39.3696 inches.

micro (μ) A prefix that means one one-millionth (10^{-6}).

microcode *See* firmware.

millimeter (mm) A unit of measure equal to one-thousandth (10^{-3}) of a meter or 0.04 in.

millisecond (ms) One thousandth (10^{-3}) of a second.

milliwatt (mws) One thousandth (10^{-3}) of a watt.

mm *See* millimeter.

mount a cartridge The process by which the library robot retrieves a cartridge from a cell and places it into a drive.

ms *See* millisecond.

mV Millivolt or one one-thousandth (10^{-3}) of a volt.

mws *See* milliwatt.

N

network An arrangement of nodes and branches that connects data processing devices to one another through software and hardware links to facilitate information interchange.

network file system (NFS) A distributed file system and its associated network protocol.

network gateway A four-byte notation that makes the library accessible to a large network, which consists of two or more subnets, through a gateway connection.

non-backward read compatible (NBRC) The inability of an SDLT 220N tape drive to read recorded data from an earlier version of DLT tape drive. *Contrast with* backward read compatible (BRC).

O

offline Neither controlled by, nor communicating with, a computer.

online Pertaining to the operation of a functional unit when under the direct control of the computer.

open fiber control (OFC) Open Fiber Control (OFC) cables incorporate a safety mechanism that prevents damage to the human eye when the connection (link) is disconnected.

operator panel (1) A panel that enables a user to configure and diagnose the library or drive. (2) The user interface for libraries or drives.

operating system Software that controls the execution of program and that may provide services such as resource allocation, scheduling, input/output control, and data management. Although operating systems are predominately software, partial hardware implementations are possible. (I)

oz An abbreviation for ounce. A unit of weight equal to 28.35 grams.

P

peripheral device Any device that communicates with a particular host or computer. Peripheral devices include disk subsystems, tape subsystems, printers, scanners, CD-ROMs, optical devices, and communication devices.

personality module A connector key, which connects to the library through a DB9 connector. The personality module stores the library cell capacity information.

picker *See* hand assembly.

port (1) A specific communications end point within a host. A port is identified by a port number. (IBM) (2) A specific end-point for communications within a host or from a host to a peripheral device or vice versa. (3) In Fibre Channel, it is an access point in a device where a link attaches. Examples of this port are N_Port, NL_Port, F_Port, and FL_Port.

put An activity in which a robotic hand releases a cartridge into a cell or drive.

Q

quiesce (1) Allowing all activity to complete before any new activity is allowed to start. (2) To bring a device or an application to a state where all processing has been suspended and there are no tasks in progress.

R

redundant power supply This power supply shares the power load with the standard power supply so that if one component were to fail, the other supply could take over fully without interruption to the library operation.

reserved cells The cells in the library in which only cleaning cartridges, diagnostic cartridges, or swapped data cartridges may reside. Only one of these cells is a swap cell.

robot An electromechanical device that moves cartridges among the cartridge access ports, the storage cells, and the drives.

S

s Seconds.

safety interlock switch A switch that disconnects power to the library when the front door is opened.

SCSI bus The interface connecting peripheral devices to a host operating system.

SCSI device A host adapter or control unit attached to the SCSI bus. *Synonymous with* target.

SCSI ID The bit-significant representation of an address on the SCSI bus.

Simple Network Management Protocol (SNMP) A protocol for monitoring and managing systems and devices in a network.

single-ended operation A SCSI bus alternative in which the signal passes directly between SCSI chips on either end of the cable. *Contrast with* differential operation.

small computer systems interface (SCSI) A local interface operating over a wide range of transfer rates using a common command set for all devices attached to the interface. It connects host computer systems to a variety of peripheral devices.

SNMP *See* Simple Network Management Protocol.

storage cells The locations where cartridges are kept in the library.

StorageTek L-Series Library Admin An optional interface that simulates internet browser operation for the library. This is an upgrade of the Library Status tool.

submenu A menu related to and reached from a main menu. (IBM)

subnet mask A four-byte notation that resolves routing within a network. *See also* Ethernet address, Internet Protocol (IP) address, library name.

Super DLT The next generation of DLT (Digital Linear Tape) products, which remains a standard for mid-range operating systems.

swap cell The cell among the reserved cells into which the robot might temporarily place a cartridge.

T

tape *See* magnetic tape.

tape drive *See* drive.

tape transport interface (TTI) An interface to control/monitor tape movement.

target A machine-readable optical pattern used to determine robot position. *See also* SCSI device.

theta motor The motor responsible for the lateral movement of the hand assembly in the library.

thumbscrew The large, cylindrical, rough-edged handle on the rear of a drive tray that, when a person turns it, lets the person secure the drive to the drive column.

U

Ultrium The single hub implementation of the LTO specification for tape storage devices.

V

V Volts, usually expressed as VAC (volts alternating current) or VDC (volts direct current).

VAC Volts alternating current.

VDC Volts direct current.

VOLSER *See* volume serial number.

volume A data carrier that mounts and dismounts as a unit; for example, a reel of magnetic tape or a disk pack.

volume serial number (VOLSER) An alphanumeric label that the host software uses to identify a volume. It attaches to the spine of a cartridge and is both human- and machine-readable.

W

warning count A user-determined limit that indicates the number of times a cleaning cartridge will be used before it must be exported from the library.

write-enabled A setting on cartridge tapes that allows data to be written on the tape.

write-protect (WP) To set the switch on a cartridge tape to prevent data from being written on the tape. Reading data is still possible. *See also* file-protect.

Y

Y-cable A communications cable that has two connectors at one end and one connector at the other.

Z

Z carriage The portion of the robot on which the hand assembly rests.

Z motor The motor responsible for the vertical movement of the hand assembly in the library.

Z shafts The columns (or tubes) which allow the hand assembly in the library to move vertically.

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