

IBM TotalStorage Ultrium Tape Library 3582



Setup, Operator, and Service Guide

IBM TotalStorage Ultrium Tape Library 3582



Setup, Operator, and Service Guide

Note

Before using this information and the product it supports, read the information in “Safety and Environmental Notices” on page xvi and Appendix I, “Notices”, on page 267. To ensure that you have the latest publications, visit the Web site at: www.ibm.com/storage/ltc.

First Edition (May 2003)

This edition applies to the *IBM TotalStorage Ultrium Tape Library 3582 Setup, Operator, and Service Guide* and to all subsequent releases and modifications until otherwise indicated in new editions.

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About This Guide

This Setup, Operator, and Service Guide is intended to provide information for operators, system administrators, installers, and service personnel. Go to <http://www.ibm.com> for the latest version of this manual.

This guide describes how to install and use the IBM® 3582 Ultrium Tape Library. It contains the following chapters:

“Safety and Environmental Notices” on page xvi describes the hazard symbols, messages, safety features, and operational considerations for the safe operation of the Library.

Chapter 1, “Description”, on page 1 provides general information about the Library and its components.

Chapter 2, “Getting Started”, on page 17 describes the basic set-up procedures for your Library, including sections on installing optional hardware.

Chapter 3, “Operation”, on page 37 describes normal operating procedures of the Library.

Chapter 4, “Using the Media”, on page 59 describes how to handle tape cartridges, and the types of media the 3582 Ultrium Tape Library uses.

Chapter 5, “Using the Menus”, on page 81 describes the visual menus and commands executed by the Library.

Chapter 6, “Using the Fibre Channel Interface”, on page 171 describes the requirements of the Fibre Channel interface, discusses the address scheme for the Fibre Channel tape drives, discusses the role of World Wide Names, and provides information about connectors and adapters.

Chapter 7, “Using the SCSI Interface”, on page 177 describes the requirements of the Small Computer Systems Interface (SCSI), and provides information about SCSI cables, connectors, interposers, and adapters.

Chapter 8, “Troubleshooting and Diagnostics”, on page 183 describes message processing and troubleshooting hints.

Chapter 9, “Removal and Replacement Procedures”, on page 199 describes procedures for the removal and replacement of customer replaceable units..

Chapter 10, “Specifications”, on page 213 provides specification information for the Library.

Safety and Environmental Notices

Read all safety and operating instructions before operating this product. Keep this guide for future reference. This unit is engineered and manufactured to assure your personal safety. Improper use can result in potential electrical shock or fire hazards.

Note: In addition to the safety instructions in this guide, local and professional safety rules apply.

WARNING: Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. **Wash hands after handling.**

When using this product, observe the danger, caution, and attention notices contained in this guide. The notices are accompanied by symbols that represent the severity of the safety condition.

The sections that follow define each type of safety notice and give examples.

Danger Notice

A danger notice calls attention to a situation that is potentially lethal or extremely hazardous to people. A lightning bolt symbol always accompanies a danger notice to represent a dangerous electrical condition. A sample danger notice follows:






DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the products that attach to the system. It is the customer's responsibility to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (RSFTD201)

Caution Notice

A caution notice calls attention to a situation that is potentially hazardous to people because of some existing condition. A caution notice can be accompanied by one of several symbols:

If the symbol is...	It means....
	A hazardous electrical condition with less severity than electrical danger.
	A generally hazardous condition not represented by other safety symbols.

If the symbol is...	It means....
 <p>Class II</p>	<p>A hazardous condition due to the use of a laser in the product. Laser symbols are always accompanied by the classification of the laser as defined by the U. S. Department of Health and Human Services (for example, Class I, Class II, and so forth).</p>
	<p>A hazardous condition due to mechanical movement in or around the product.</p>
 <p>> 18 kg (40 lb)</p>	<p>A hazardous condition due to the weight of the unit. Weight symbols are accompanied by an approximation of the product's weight.</p>

Sample caution notices follow:



CAUTION:

The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. (RSFTC228)



CAUTION:

Do not attempt to use the handle on the module to lift the entire device (module and enclosure) as a unit. First remove the module; then, use two hands to lift the enclosure. (72XXC356)



Class II

CAUTION:

This product complies with the performance standards set by the U.S. Food and Drug Administration for a Class II and IEC825 Laser Product. Avoid prolonged staring into the laser beam.



> 18 kg
(40 lb)

CAUTION:

The weight of this part or unit is between 18 and 32 kilograms (39.7 and 70.5 pounds). It takes two persons to safely lift this part or unit. (RSFTC204)



CAUTION:

This assembly contains mechanical moving parts. Use care when servicing this assembly.

Attention Notice

An attention notice indicates the possibility of damage to a program, device, or system, or to data. An exclamation point symbol may accompany an attention notice, but is not required. Sample attention notices follow:



Attention: If you use a power screwdriver to perform this procedure it could destroy the tape.

Attention: Do not operate the 3582 Tape Library in a poor air-quality environment.

Laser Safety and Compliance

Before using the IBM TotalStorage Ultrium Tape Library 3582, review the following laser safety information.

Class I Laser Product

The IBM TotalStorage Ultrium Tape Library 3582 may contain a laser assembly that complies with the performance standards set by the U.S. Food and Drug Administration for a Class I laser product. Class I laser products do not emit hazardous laser radiation. The library has the necessary protective housing and scanning safeguards to ensure that laser radiation is inaccessible during operation or is within Class I limits. External safety agencies have reviewed the library and have obtained approvals to the latest standards as they apply.

Intended Use

This equipment is designed for processing magnetic tape cartridges. Any other application is not considered the intended use. IBM shall not be held liable for damage arising from unauthorized use of the library. The user assumes all risk in this aspect.

Safeguards

To maintain the safeguards, observe the following basic rules for installation, use, and servicing of the Library:

- **Follow Warnings** - Adhere to all warnings on the product and in the operating instructions.
- **Read Instructions** - Read and follow all installation and operating instructions.
- **Ventilation** - Situate the Library so that its location or position provides adequate front and rear ventilation (at least two inches).
- **Heat** - Situate the product away from heat sources such as radiators, heat registers, furnaces, or other heat-producing appliances.
- **Power Sources** - Connect the Library to a power source only of the type directed in these operating instructions or as marked on the product label.
- **Power Cord Protection** - Route the AC line cord so that it is not likely to be walked on or pinched by items placed upon or against it, paying particular attention to the cord at the wall receptacle, and the point where the cord exits from the product.
- **Object and Liquid Entry** - Take care to ensure that objects do not fall and liquids are not spilled into the product's enclosure through openings.

- **Servicing** - Do not attempt to service the product beyond that described in the operating and installation instructions. All other servicing should be referred to qualified service personnel.

Precautions

Use these precautions when using or choosing an environment for the unit:

- Do not use oil, solvents, gasoline, paint thinners, or insecticides on the unit or near the unit. Vapors from these types of chemicals can damage the tape media components.
- Do not expose the unit to moisture or store unit in temperatures higher than 60 °C (140 °F), or to extreme low temperatures. See Chapter 10, "Specifications", on page 213 for operating temperatures.
- Keep the unit away from direct strong magnetic fields, excessive dust, and electronic or electrical equipment that generates electrical noise.
- Hold the AC power plug by the head when removing it from the AC source outlet; pulling the cord can damage the internal wires.
- Use the unit on a firm, level surface free from vibration. The unit is designed for other Libraries to be stacked on top of it (up to three). It is not recommended that you place any other objects on top of the unit.

Protective Devices

The Library is equipped with the following protective devices:


- Mechanical Lock
- Front Power Switch

Mechanical Lock

The library media access door can only be opened with a key from the outside. Authorized personnel are responsible for the security of the key.

Front Power Switch

Switching off the Front Power Switch removes power from the electronics which causes the picker to stop immediately. This switch also removes power from the drives.

 **CAUTION:** The front power switch functions as a power interrupt only. To completely remove all power, disconnect the AC line cord from the electrical source.

Performing the Safety Inspection Procedure

Before you service the 3582 Tape Library, perform the following safety inspection procedure:

1. Stop all activity on the SCSI bus.
2. Turn off the power to the 3582.
3. Disconnect the SCSI cable and check the SCSI bus terminator for damage.
4. Unplug the 3582 power cord from the electrical outlet.
5. Check the 3582 power cord for damage, such as a pinched, cut, or frayed cord.
6. Check the 3582 SCSI bus (signal) cable for damage.
7. Check the cover of the 3582 for sharp edges, damage, or alterations that expose its internal parts.
8. Check the cover of the 3582 for correct fit. It should be in place and secure.

9. Check the product label on the bottom of the 3582 to make sure it matches the voltage at your outlet.

End of Life (EOL) Plan

This box is a purchased unit. Therefore, it is the sole responsibility of the purchaser to dispose of it in accordance with local laws and regulations at the time of disposal.

This unit contains recyclable materials. The materials should be recycled where facilities are available and according to local regulations. In some areas IBM may provide a product take-back program that ensures proper handling of the product. For more information, contact your IBM representative.

Store this guide with your product's materials.

Related Publications

Refer to the following publications for additional information. To ensure that you have the latest publications, visit the web at <http://www.ibm.com/storage/1to>.

- *IBM TotalStorage™ Ultrium Tape Library 3582 SCSI Reference*, GA32-0459, gives information about the supported SCSI commands and protocols that govern the behavior of the SCSI interface for the 3582 Tape Library.
- *IBM Ultrium Device Drivers Installation and User's Guide*, GA32-0430, provides instructions for attaching IBM-supported hardware to open-systems operating systems. It indicates what devices and levels of operating systems are supported, gives the requirements for adapter cards, and tells how to configure servers to use the device driver with the Ultrium family of devices.
- *IBM Ultrium Device Drivers Programming Reference*, GC35-0483, supplies information to application owners who want to integrate their open-systems applications with IBM-supported Ultrium hardware. The reference contains information about the application programming interfaces (APIs) for each of the various supported operating-system environments. To order by using File Transfer Protocol (FTP), visit <ftp://ftp.software.ibm.com/storage/devdvr>.
- *IBM Externally Attached Devices Safety Information*, SA26-2004, provides translation of danger and caution notices.

Chapter 1. Description

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The IBM TotalStorage Ultrium Tape Library 3582 is an entry tape library that incorporates high-performance IBM TotalStorage LTO Ultrium 2 Tape Drives for the midrange open systems environment.

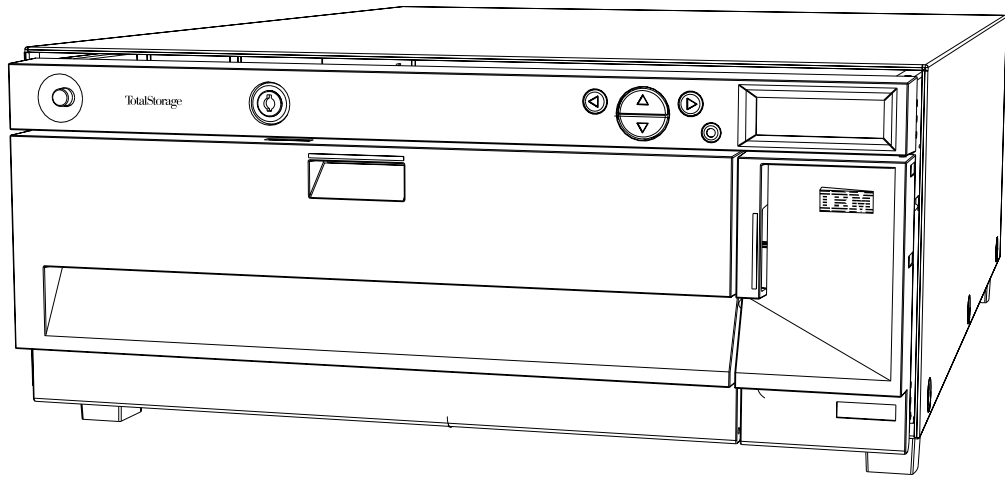


Figure 1. IBM 3582 Ultrium Tape Library

The 3582 Ultrium Tape Library can accommodate one or two Ultrium 2 Tape Drives and comes standard with a one-cartridge I/O (Input/Output; may also be referred to as Import/Export) station and 23 data cartridge slots giving a native library capacity of 4.8 TB uncompressed data storage (9.6 TB with 2:1 compression). Tape cartridge capacity is up to 200 GB native capacity (400 GB with 2:1 compression) with the IBM TotalStorage LTO Ultrium 200 GB Data Cartridge, and drive performance is up to 35 MB/sec native data transfer rate (70 MB/sec with 2:1 compression) with the IBM LTO Ultrium 2 Tape Drives. The Ultrium 2 Tape Drives come in 2 Gb switched fabric Fibre Channel, LVD Ultra160 SCSI, or HVD Ultra SCSI interfaces to attach to a wide spectrum of open system servers.

The Ultrium Tape Library 3582 has two 7-cartridge removable cartridge magazines, a bar code scanner, and IBM's patented Multi-Path architecture to partition the library into two logical libraries. The library can be configured as a stand-alone desktop unit or can be mounted in an industry-standard 19-inch rack. Optional features include Control Path Failover and a Remote Management Unit/Specialist for remote library management.

The 3582 tape library can be used in network-attached storage implementations, including backups and mass storage archives where multi-terabyte capacities are required. IBM LTO Ultrium technology is designed for the heavy demands of automated tape systems. This proven tape technology has enhanced digital speed matching, power management, channel calibration, servo technology, track layout, head design, error correction codes, and data compression resulting in increased capacity, performance, and reliability in an entry-level, automated tape system.

For the remainder of this guide, the IBM TotalStorage Ultrium Tape Library 3582 will be referred to as the 3582 Ultrium Tape Library. You can visit the 3582 Ultrium Tape Library's Web site at <http://www.ibm.com/storage/1> for additional information not included in this manual.

Features

This section describes the features of the 3582 Ultrium Tape Library.

Standard Features

The following features are standard with your library:

- **Multi-function Operator Panel.** The Operator Panel, located on the right above the I/O slot, provides an easy-to-read bitmap display and a five-button keypad to permit you to monitor and control the operations of your library. The liquid crystal display (LCD) provides access to library status, commands, setup, and tools. See “Front Panel Components” on page 5 for more information. The Operator Panel is described in more detail in “Operator Panel Keyboard” on page 38.
- **Robotic system.** The robotic system is the media cartridge handling mechanism that responds to commands from the application software to move the cartridges between the storage slots, tape drives, and the I/O slot.
- **Partitioning.** Partitioning enables you to create logical libraries within a single library. Separate host applications can be run for each logical library.
- **I/O slot.** The I/O slot enables you to import and export tapes to any slot or drive without unlocking the media access door. See “Interior Components” on page 6 for more information. You can also configure the I/O slot to act as a data storage slot.
- **Magazines.** Removable cartridge magazines allow you to easily insert and remove tape cartridges.
- **System integrity.** The cartridge storage slots and robotic system are protected by a door that is lockable by key. Your library can also be configured for password access.
- **Cartridge inventory.** Whenever you power up your library, it will perform a physical inventory of slots.
- **Bar Code scanner.** The bar code scanner reads bar code labels and presents label IDs to the LCD and the host without losing storage capacity.
- **Manual cartridge use.** Individual cartridges can easily be transported to the library by manually opening the I/O door and inserting the cartridge into the I/O slot. The Operator Panel is then used to load the cartridge into another slot.
- **Reverse cartridge protection.** The magazines, I/O slot, and rear storage slots employ a design that prevents the cartridges from being inserted incorrectly.
- **Built-in diagnostics.** Your library includes diagnostic firmware that reports diagnostic results and drive operating status. Your library also includes real-time monitoring of data locations and several types of diagnostic tests.
- **Autoclean.** Autoclean enables the library to automatically clean the drives when cleaning is required.
- **Error diagnosis.** Your library includes an Error Log that is accessible from the Operator Panel. An output log, available through the serial port, contains errors, diagnostic messages, and events.
- **Power Management.** Ultrium 2 tape drives enter sleep mode when neither reading or writing data.

Optional Features

The following features are optional. Instructions for installing these features can be found in “Installing Optional Hardware” on page 27.

- **Additional drive.** You can add an additional drive to your library, increasing data access throughput.

- **Control path failover.** Control path failover enables the host device driver to resend a command to an alternate control path for a logical library either to overcome a command failure or to circumvent timeouts that would otherwise interrupt processing.
- **Magazine and dust cover.** Extra magazine and snap-on dust cover and interlocked stacking for offline media storage.
- **Native Fibre Channel interface.** Fibre Channel technology combines the best features of traditional input/output (I/O) interfaces (such as the throughput and reliability of SCSI and Programmed Control Interrupt) with the best features of networking interfaces (such as the connectivity and scalability of Ethernet and Token Ring). The technology offers a transport mechanism for delivering commands, and provides high performance by allowing processing to be done in the hardware.
- **Rackmount kit.** Your library can be easily converted to a rackmount configuration. The available rackmount kit can be installed on any library.
- **Remote management unit (RMU).** Your library may be equipped for a RMU, which provides remote host operation through a Web browser.

Front Panel Components

Figure 2 shows the components located on the front panel of your library.

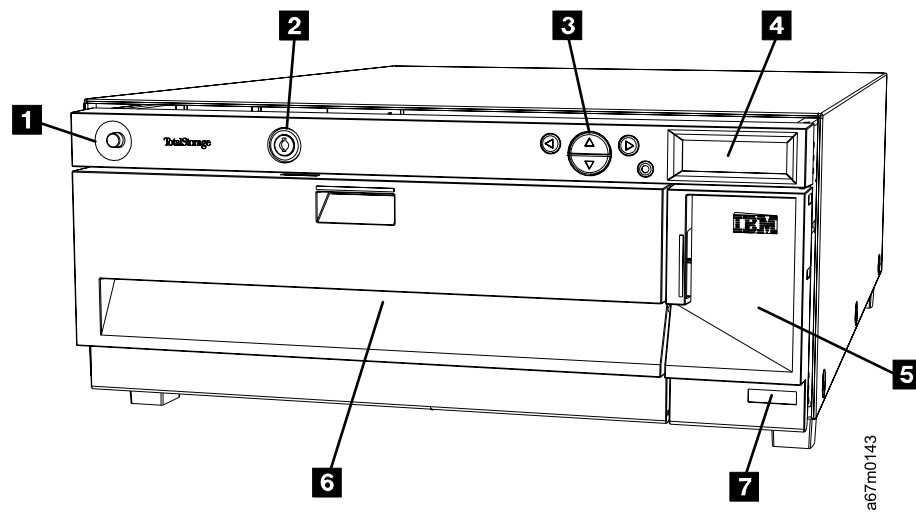


Figure 2. Front view

Power switch 1

Two-position switch that controls power to your library.

Key lock 2

Lock that prevents unauthorized media insertion and removal.

Keypad 3

The keypad enables you to view the operational status of the library, perform system configuration, and execute commands.

LCD 4

The LCD provides an easy-to-read bitmap display with backlighting.

I/O door 5

Door for access to the I/O slot. The I/O feature enables you to import or export tape cartridges with the media access door locked.

Media access door 6

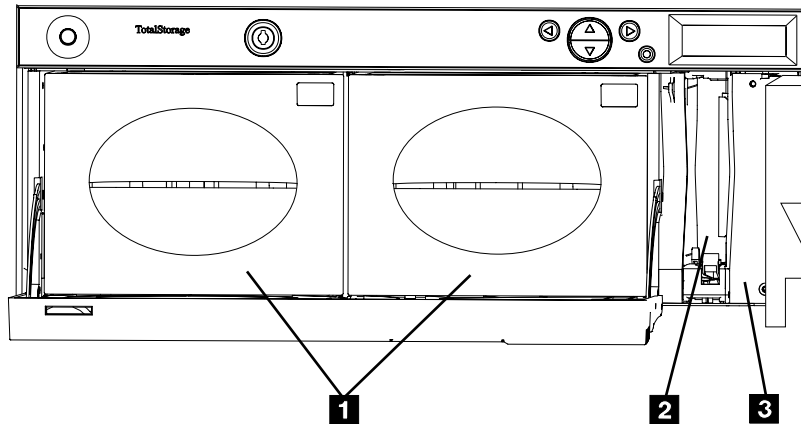
Door for loading and removing tape magazines. Door can be locked to prevent media insertion and removal.

Serial Number 7

Identification number for your library.

Interior Components

Figure 3 shows the components located behind the media access and I/O doors of your library:



a67m0126

Figure 3. Interior view

Magazines **1**

Removable cartridge magazines allow for the easy insertion and removal of tape cartridges. The magazines include transparent windows that enable you to view media easily. The magazine handle is designed to allow for single-handed magazine installation and removal. When not in use, magazines can be stacked for easy storage.

I/O slot **2**

Enables insertion and ejection of cartridges without interrupting the normal operation of the library.

Bar Code scanner **3**

Bar code scanner that reads bar code labels and presents label IDs to the LCD and the host.

Note: Nine fixed data slots are behind the magazines.

Rear Panel Components

Figure 4 and Figure 5 show the components located on the rear panel of your library:

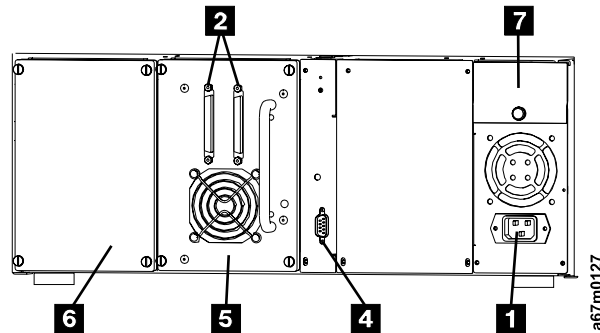


Figure 4. Rear view with a SCSI drive

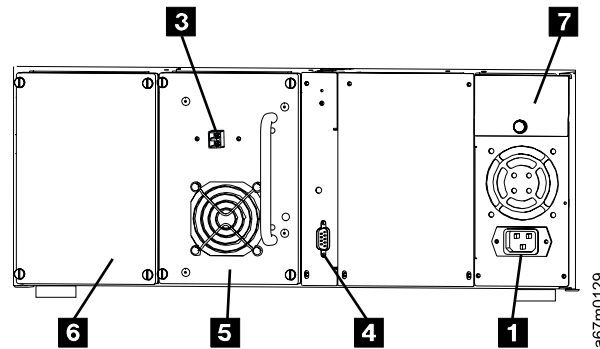


Figure 5. Rear view with a Fibre Channel drive

AC power connector **1**

Receptacle for AC power cord.

SCSI connectors **2**

Connections for the interface cable that connect the unit with the host computer or other devices on the SCSI channel (including other library units). The interface cable can be attached to either connector.

Fibre Channel connector **3**

Connection for the Fibre Channel interface cable that connects the unit with the host computer.

Serial connector **4**

Bidirectional RS-232 port for diagnostic purposes and firmware upgrades.

Drive **5**

The 3582 Ultrium Tape Library comes equipped with one Ultrium 2 Tape Drive unless you order an additional drive.

Tape Drive Bay **6**

Tape drive bay for adding a second Ultrium 2 Tape Drive.

RMU slot **7**

Slot for optional, user-installable RMU that enables remote access to the library using a Web browser.

Media

The removable data cassettes support the Linear Tape-Open (LTO) format. LTO tapes offer up to 400 GB of compressed (2:1) data storage.

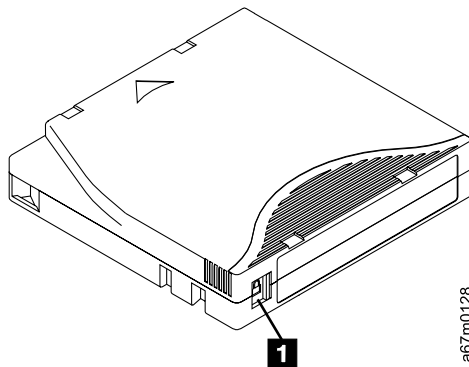



Figure 6. LTO data cartridge

The write-protect switch **1** is used to prevent recording over existing data. To prevent recording or deleting, place the write-protect switch to the closed position. The drive senses the position of the switch and will not allow writing in this position. When inserting cartridges in the library, place the switch in the open position, unless you do not want to record on a specific cartridge.

Note: Store data cartridges in a dry, cool environment.

 **CAUTION:** Never reset or power down your computer or library while a function is in process or a tape is moving.

Tape Drive Interfaces

The 3582 Ultrium Tape Library supports the Ultrium 2 Tape Drive with the following interfaces:

- Fibre Channel
- Low Voltage Differential (LVD) Ultra160 SCSI
- High Voltage Differential (HVD) Ultra SCSI

Server Attachment

You can attach the 3582 Ultrium Tape Library to servers by using:

- SCSI interface
- Native Fibre Channel interface

The sections that follow describe each type of interface.

SCSI Interface

The 3582 Ultrium Tape Library operates as a set of SCSI-3 devices. For drives that use a SCSI interface, the following conditions apply:

- The Ultrium 2 Tape Drive can attach to a server through a Low Voltage Differential (LVD) Ultra160 SCSI interface or a High Voltage Differential (HVD) Ultra SCSI interface

Each SCSI drive sled uses shielded HD68 connectors and can attach directly to a 2-byte-wide SCSI cable.

Any combination of up to two initiators (servers) and up to four targets (devices) is allowed on a single SCSI bus if the following conditions are met:

- The SCSI bus is terminated properly at each end
- Cable restrictions are followed according to SCSI-3 standards

Under the SCSI-3 protocol, this type of attachment allows cable lengths of up to 25 m (81 ft) with the appropriate cable and terminator.

For more information about the SCSI interface, see Chapter 7, “Using the SCSI Interface”, on page 177.

Fibre Channel Attachment



Class I

Attention: This product contains an assembly that complies with the performance standards set by the U.S. Food and Drug Administration for a Class I Laser Product. This laser assembly is registered with the Department of Health and Human Services and is in compliance with IEC825.

The 2-Gb interface is a 200-MB-per-second, full-duplex, serial-communications technology capable of interconnecting Ultrium 2 Tape Drives that are separated by as much as 10 kilometers (7 miles).

Fibre Channel technology combines the best features of traditional input/output (I/O) interfaces (such as the throughput and reliability of SCSI and Programmed Control Interrupt) with the best features of networking interfaces (such as the connectivity and scalability of Ethernet and Token Ring). The technology offers a transport mechanism for delivering commands, and provides high performance by allowing processing to be done in the hardware.

You can establish Fibre Channel connections between Fibre Channel ports that reside in the 3582 Ultrium Tape Library, one or more servers, and the network interconnecting them. The network can consist of such elements as switches, hubs, bridges, and repeaters used in the interconnection.

For more information about the Fibre Channel interface, see Chapter 6, “Using the Fibre Channel Interface”, on page 171.

Drive Performance

If you run applications that are highly dependent on tape-processing speed, you can take advantage of the significant performance improvements provided by the IBM 3582 Ultrium Tape Library.

IBM Ultrium 2 Tape Drive

The IBM 3582 Ultrium Tape Library contains the IBM Ultrium 2 Tape Drive. The IBM Ultrium 2 Tape Drive supports Fibre Channel, LVD Ultra160, or HVD Ultra SCSI interfaces. It features two HD68 connectors or one LC Fibre Channel connector. Table 1 on page 10 lists the performance characteristics of the Ultrium 2 Tape Drive.

Table 1. Performance characteristics of the Ultrium 2 Tape Drive

Performance Characteristic	Tape Drive
	Ultrium 2 Tape Drive
Native sustained data rate	35 MB/s (with Ultrium 2 media)
	20 MB/s (with Ultrium 1 media)
Compressed data rate (at 2:1 compression)	70 MB/s (with Ultrium 2 media)
	40 MB/s (with Ultrium 1 media)
Maximum sustained data rate (at maximum compression)	107 MB/s (Ultra160)
Burst data rate for Low Voltage Differential (LVD) SCSI drives	160 MB/s (Ultra160)
Burst data rate for High Voltage Differential (HVD) SCSI drives	40 MB/s (Ultra)
Burst data rate for Fibre Channel drives	200 MB/s
Nominal load-to-ready time	15 seconds
Nominal unload time	15 seconds
Average search time to first byte of data	49 seconds
Note: All sustained data rates are dependent on the capabilities of the interconnect (for example, an UltraSCSI bus is limited to less than 40MB/sec).	

By using the built-in data-compression capability of the tape drives, you can achieve greater data rates than the native data transfer rate. However, the actual throughput is a function of many components, such as the host system processor, disk data rate, block size, data compression ratio, SCSI bus capabilities, and system or application software.

Speed Matching

To improve system performance, the Ultrium 2 Tape Drive uses a technique called *speed matching* to dynamically adjust its native (uncompressed) data rate to the slower data rate of a server.

Multi-Path Architecture

The 3582 Ultrium Tape Library features the Storage Area Network (SAN)-ready Multi-Path Architecture, which allows homogeneous or heterogeneous open systems applications to share the library's robotics without middleware or a dedicated server (host) acting as a library manager. The SAN-ready Multi-Path Architecture makes sharing possible by letting you partition the library's storage slots and tape drives into logical libraries. Servers can then run separate applications for each logical library. This partitioning capability extends the potential centralization of storage that the SAN enables. The Multi-Path Architecture is compliant with the following attachment interfaces:

- Small Computer Systems Interface (SCSI)
- Fibre Channel

Whether partitioned or not, the 3582 Ultrium Tape Library is certified for SAN solutions (such as LAN-free backup).

The Multi-Path Architecture also lets you configure an additional control path when the library is not partitioned. A control path is a logical path into the library through which a server sends standard SCSI Medium Changer commands to control the library. An additional control path reduces the possibility that failure in one control path will cause the entire library to be unavailable. Use of the control path failover feature further reduces that possibility (see “Using Multiple Control Paths for Control Path Failover” on page 14).

For details about configuring the library to share robotics, see “Library Sharing” in the next section.

Library Sharing

The 3582 Ultrium Tape Library’s default configuration allows a single application to operate the library through a single control path. Often, however, it is advantageous to be able to share a single library between heterogeneous (dissimilar) or homogeneous (similar) applications. Some applications (and some servers) do not allow for sharing a library between systems. With the 3582 Ultrium Tape Library, however, you can create configurations that enable the library to process commands from multiple heterogeneous applications (such as an IBM @server pSeries™ application and a Windows NT® application) and multiple homogeneous applications (for example, the same application run by several pSeries servers).

From the library’s web interface or operator panel, you can perform the following actions:

- Configure the library so that is partitioned into separate logical libraries that independently communicate with separate applications through separate control paths. This configuration (see example **1** in Figure 7 on page 12) requires no special capabilities from the server or application. (For more information, see “Using Multiple Logical Libraries” on page 13.)
- Configure any single logical library (including the entire physical library) so that it is shared by two or more servers that are running the same application. Depending on the capabilities of the server and application, there are several ways to set up this type of configuration. Three typical ways include:
 - Configuring one server (host) to communicate with the library through a single control path; all other servers send requests to that server through a network (see example **2** in Figure 7 on page 12). This configuration is used by Tivoli® Storage Manager (TSM).
 - Configuring all of the servers to communicate with the library through a single, common control path (see example **3** in Figure 7 on page 12). This configuration is used in high-availability environments such as IBM’s High Availability Clustered Microprocessing (HACMP) and Microsoft®’s Systems Management Server (SMS) and Clustered Server Environments. Multi-initiator configurations are only supported by certain adapters and ISVs. Check with your ISV.
 - Configuring a single logical library to communicate with multiple servers through multiple control paths. This configuration (see example **4** in Figure 7 on page 12) requires that you add control paths (see “Using Multiple Control Paths” on page 13). It is used by Backup Recovery and Media Services (BRMS).

Your library configuration is not limited to the examples shown in “Example Configurations” on page 12. Many configurations are possible, and you can design them according to your business needs.

Example Configurations

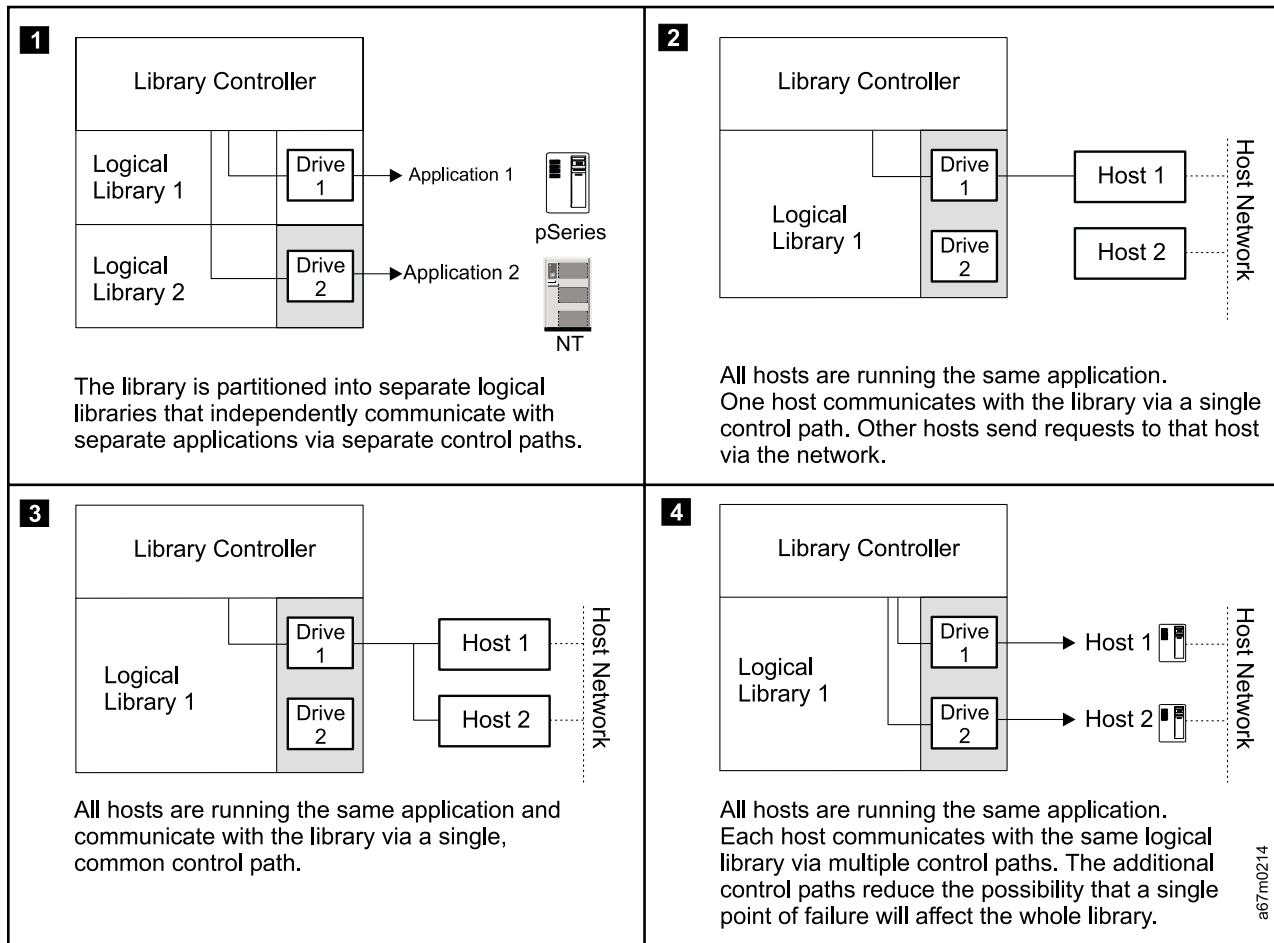


Figure 7. Examples of configurations for a 3582 Ultrium Tape Library. Lines from one or more drives to the library controller represent control paths.

Using Multiple Logical Libraries

To maximize your investment, you can use multiple logical libraries to share the physical library between applications or to support mixed drive types for any application.

You can partition the 3582 Ultrium Tape Library into two logical libraries. Each logical library consists of:

- A tape drive
- Storage slots
- Input/output (I/O) slots
- Cartridge accessor

Each logical library has its own control path (a logical path into the library through which a server sends standard SCSI Medium Changer commands to control the logical library). Each logical library control path is available to servers through logical unit number 1 (LUN 1) of the first drive that is defined within that logical library. A logical unit number is a number used by a server to identify a drive.

A logical library cannot share another logical library's tape drives and storage slots. However, it does share the I/O slots and the cartridge accessor on a first-come, first-served basis.

The sections that follow describe these uses for multiple logical libraries. To create or change multiple logical libraries within your library, refer to "Configure Partitions" on page 105.

When automatic cleaning is enabled, any appropriate cleaning cartridge may be used to clean a drive in any configured logical library. For additional details, see "Configure Autoclean" on page 120.

Using Multiple Logical Libraries for Library Sharing

Multiple logical libraries are an effective way for the 3582 Ultrium Tape Library to simultaneously back up and restore data from heterogeneous applications. For example, you can partition the library so that it processes commands from Application 1 (about Department X) in Logical Library A and commands from Application 2 (about Department Y) in Logical Library B. In this configuration, the storage slots and drives in each logical library are dedicated to that library and are not shared among other libraries. Commands issued by the applications travel to the library through two unique control paths. Thus, the data processing for Department X is confined to the storage slots and drives in Logical Library A and processing for Department Y is confined to the storage slots and drives in Logical Library B.

Using Multiple Control Paths

In addition to creating multiple logical libraries, you can also configure any logical library to have more than one control path. When you configure additional control paths, additional library sharing configurations and availability options are made possible. Access to the logical library is on a first-come, first-served basis and each control path for a logical library can accept commands while the library is in use by another control path. By default, a logical library can communicate with the server only through the first LUN-1-enabled drive that is installed in the partition.

Note: Microsoft Windows® 2000 Removable Storage Manager (RSM) does not support multiple control paths within a logical library. IBM recommends that you disable RSM to use this feature.

To add or remove additional control paths, refer to “Access Mode” on page 111.

The sections that follow describe two potential uses for multiple control paths.

Using Multiple Control Paths for iSeries™ and AS/400® Attachment

The use of control paths for the iSeries and AS/400 servers is unique. In general, every iSeries adapter must “see” the control path that is associated with the drives to which it is connected. Table 2 lists the quantity of drives that are supported by a particular adapter and operating system (OS/400® 5.1 or OS/400 5.2).

Table 2. Quantity of drives that are supported per adapter and operating system for iSeries and AS/400 servers

Type of Adapter	Quantity of Ultrium 2 Tape Drives	
	OS/400 5.1	OS/400 5.2
HVD	1 to 2	1 to 2
LVD	1 to 2	1 to 2
Fibre Channel	1 to 2	1 to 2
Note: N/A = not applicable		

Using Multiple Control Paths for Control Path Failover

Command failures and timeouts are costly. Customers want their libraries to run smoothly and efficiently. To ensure continued processing, the 3582 Ultrium Tape Library offers an optional control path failover feature that enables the host device driver to resend the command to an alternate control path for the same logical library. With control path failover installed, the alternate control path can include another HBA, SAN, or library control path drive. The device driver initiates error recovery and continues the operation on the alternate control path without interrupting the application. Only the IBM AIX® device driver currently supports this feature.

The control path failover feature can be enabled at the factory, or it can be ordered as feature code #1680 and installed later. To order the feature, contact your IBM Sales Representative or any authorized IBM Business Partner. The library serial number is required to order this feature (see “Display Serial Number” on page 154).

Note: The control path failover feature is activated by a license key. For additional information, see “Access Mode” on page 105.

For more information about using the control path failover feature, see the *IBM Ultrium Device Drivers Installation and User's Guide*.

Supported Servers, Operating Systems, and Software

The 3582 Ultrium Tape Library is supported by a wide variety of servers (hosts) and operating systems, as well as adapters. These attachments can change throughout the product's life cycle. To determine the latest supported attachments, visit the web at <http://www.ibm.com/storage/1to> and click on Technical Support or LTO Support.

To get a comprehensive list of compatible software, visit the web at <http://www.storage.ibm.com/tape/lto/compatibility.html>.

Note:

1. IBM does not provide backup application software with the 3582 Ultrium Tape Library. To order software, contact your IBM marketing representative, IBM Business Partner, or an independent software provider.
2. If you attach your library to a non-IBM platform with non-IBM software, IBM recommends that you contact your software vendor to obtain a matrix of compatible hardware, software, firmware revisions, and adapter cards.

Supported Device Drivers

IBM offers device drivers for the 3582 Ultrium Tape Library. Device drivers enable the drive to interact with a variety of servers. To properly install an IBM device driver (if required), refer to the *IBM Ultrium Device Drivers Installation and User's Guide*, GA32-0430. For applications that use other device drivers, see the application's documentation to determine which drivers to use.

IBM maintains the latest levels of device drivers and driver documentation for the IBM TotalStorage Ultrium 2 tape products on the Internet. You can access this material from your browser or through the IBM FTP site by performing one of the following procedures. **(Note: If you do not have Internet access and you need information about device drivers, contact your Marketing Representative.)**

- Using a browser, type one of the following:
 - <http://www.ibm.com/storage/lto> (select either Technical Support or LTO Support)
 - <ftp://ftp.software.ibm.com/storage/devdrv>
 - <ftp://207.25.253.26/storage/devdrv>
- Using an IBM FTP site, enter the following specifications:
 - FTP site: [ftp.software.ibm.com](ftp://ftp.software.ibm.com)
 - IP Addr: 207.25.253.26
 - Userid: anonymous
 - Password: (use your current e-mail address)
 - Directory: /storage/devdrv

IBM provides PostScript- and PDF-formatted versions of its documentation in the /storage/devdrv/Doc directory:

- IBM_ultrium_tape_IUG.ps and IBM_ultrium_tape_IUG.pdf contain the current version of the *IBM Ultrium Device Drivers Installation and User's Guide*
- IBM_ultrium_tape_PROGREF.ps and IBM_ultrium_tape_PROGREF.pdf contain the current version of the *IBM Ultrium Device Drivers Programming Reference*

Device drivers and utilities for each supported server are beneath /storage/devdrv/ in the following directories (the device driver for the iSeries or AS/400 server is included in the OS/400 operating system):

- AIX
- HPUX
- Linux

- Solaris
- Windows

Chapter 2. Getting Started

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Attention:

1. The 3582 Ultrium Tape Library is a customer setup unit. It is the customer's responsibility to install this product.
2. The 3582 Ultrium Tape Library is supported by Customer Replaceable Unit (CRU), Courier, or on-site service. Warranty service may vary by countries/regions. Refer to the warranty documentation to determine the type of warranty service offered in your countries/regions.

As with all devices, it is recommended that you download the latest level of firmware for both the 3582 Ultrium Tape Library and the 3580 Ultrium 2 Tape Drive by visiting <http://www.ibm.com/storage/1to> and clicking on Technical Support or LTO Support. Be sure to verify that you have the latest firmware installed on your machine before you contact IBM for any necessary technical support.

If you choose not to install this product yourself, IBM will install it for a fee. You can purchase installation services by contacting your local IBM Service office or your IBM Business Partner.

To install the 3582 Ultrium Tape Library, complete the following steps.

The steps involved in installation include:

- Unpacking and inspecting
- Installing library hardware
- Setting up your library
- Preparing the host computer

**DANGER**

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the products that attach to the system. It is the customer's responsibility to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (RSFTD201)

Unpacking and Inspecting

Unpack all items from the carton. Save the packing materials in case you need to move or ship the system in the future.

Attention: You must ship the library in the original or equivalent packing materials or your warranty may be invalidated.

Environmental Considerations

For best performance of your library, and to minimize the chance of condensation, observe the following guidelines:

- Install your library on a level surface. Do not place the library on a carpeted surface.
- If you expose cartridges to temperatures outside the operating limits, (see Chapter 10, "Specifications", on page 213), stabilize them by leaving the cartridges in the operating temperature for a minimum of two hours before you use them.

- Avoid temperature problems by ensuring that the library front and rear panels are not obstructed so that the drive has adequate ventilation.
- Position the library where the temperature is relatively stable (that is, away from open windows, fan heaters, and doors).
- Avoid leaving cartridges in severe temperature conditions, for example, in a car standing in bright sunlight.
- Avoid transferring data (reading from and writing to cartridges) when the temperature is changing by more than 10° C (15° F) per hour.

Inventory Checklist

First verify that your shipment contains the parts common to every 3582 Ultrium Tape Library.

Every 3582 Ultrium Tape Library ships with the following:

- *IBM TotalStorage Ultrium Tape Library 3582 Setup, Operator, and Service Guide*, GA32–0458
- *IBM TotalStorage Ultrium Tape Library 3582 Quick Reference*, GX35–5067
- IBM TotalStorage LTO Ultrium 200 GB Data Cartridge
- IBM TotalStorage Cleaning Cartridge

Next verify that your shipment contains the parts particular to your 3582 Ultrium Tape Library.

- If you ordered a library with one or two LVD drives (part number 18P7489), verify that you received the following:
 - LVD SCSI wrap tool (Part Number: 19P0481)
 - LVD multi-mode terminator (Part Number: 19P0874)
- If you ordered a library with one or two HVD drives (part number 18P7487), verify that you received the following:
 - HVD SCSI wrap tool (Part Number: 19P1213)
 - HVD terminator (Part Number: 61G8324)
- If you ordered a library with one or two Fibre drives (part number 18P7491), verify that you received the following:
 - Fibre Channel wrap plug (Part Number: 11P3847)

Rack or Stand-Alone Install

The 3582 Ultrium Tape Library ships either with FC 2200, Stand-Alone Kit, for installation as a stand-alone unit, or with FC 7003, Rack Mount Kit, for installation as a rack unit. To install the 3582 Ultrium Tape Library as a stand-alone unit, see “Installing the Library as a Stand-Alone Unit”. To install the 3582 Ultrium Tape Library as a rack unit, see “Installing the Library in a Rack” on page 21.

Installing the Library as a Stand-Alone Unit

If you ordered FC 2200, Stand-Alone Kit, follow the procedure below.

Tools required: #1 Phillips screwdriver

1. Remove the stand-alone unit assembly from the packaging.

2. Remove the four screws (**1** in Figure 8) located in the corners of the front plate on top of the base unit. Do not remove the plate itself. The heavy-gauge protective plate will be installed on top of the existing plate.

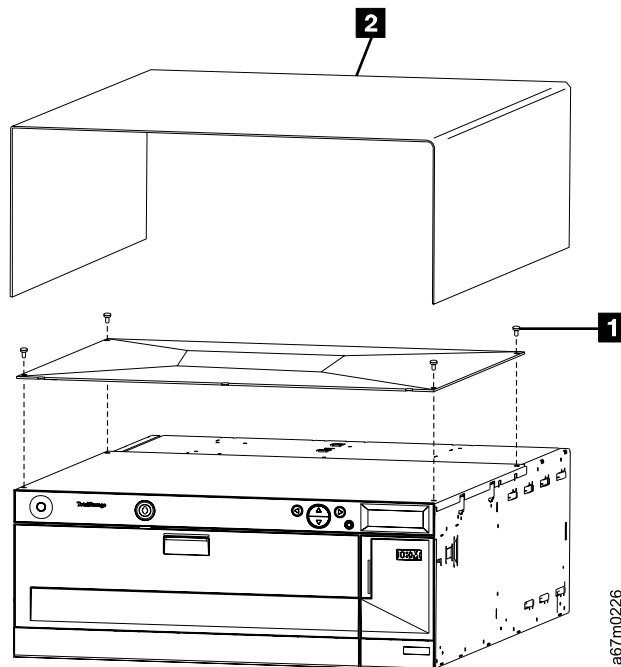


Figure 8. Attachment of protective plate and cover

3. Place the protective plate on top of the base unit's front plate with the three semi-circular cut-outs toward the front of the base unit to reveal the three screws located there. Align protective plate's screw holes with those on the base unit.
4. Attach the screws through the protective plate into the base unit (**1** in Figure 8).
5. Flip the base unit over.
6. Using a #1 Phillips screwdriver, attach the feet by using two longer screws into the pair of round, threaded holes located approximately 1 1/2 inches (30 mm) from each corner of the base unit. Be sure the edge of the base unit fits into the notches in the feet. See Figure 9 on page 21.

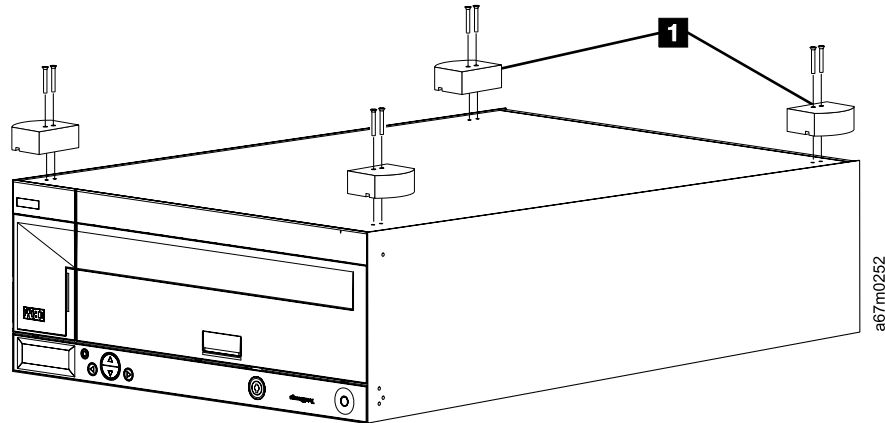


Figure 9. Attachment of Feet

7. Flip the unit back over into an upright position.
8. Lower the cosmetic cover down onto the library. Slightly spread the sides and lower the cover onto the library. Using a #1 Phillips screwdriver, attach the cover by starting the six, small, black screws (3 per side) into the cover. Adjust the cover, if necessary, then tighten screws.

Installing the Library in a Rack

Your library can be installed into a standard 19-inch rack.

Important: Follow these guidelines when installing in a rack:

- Refer to “Safeguards” on page xviii.
- For continued safe operation, the maximum internal ambient temperature of the rack should not exceed 104°F (40°C).
- While installing a rack-mounted unit, do not block or otherwise restrict airflow to the front or rear vents.
- To maintain rack stability, consider the mechanical loading of the rack to ensure a low center of gravity. It is recommended that you install the library in the lowest possible position. The top of the unit should not exceed 30 EIAs in height. Figure 11 on page 24 shows the EIA unit of measurement.
- Because of the weight of the library, it is recommended that at least two people install the library into a rack.
- Do not extend rail extenders more than 254 mm (10 inches).
- Before installing a unit into a rack, consider the overall loading of the branch circuit supplying power to the rack.
- Because this unit is intended to be attached to an earth ground, ensure that a reliable path to earth ground is maintained within the rack.
- The Rack Mount Kit can be used in racks with round or square holes.

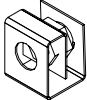


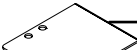

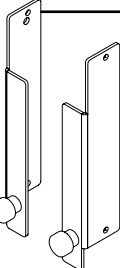
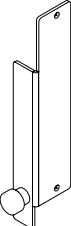
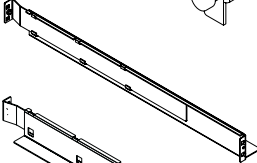
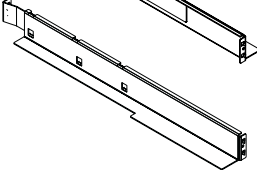

Unpacking the Rackmount Kit

1. Open the shipping carton and remove the components of the kit.
2. Verify that you received all the parts listed in your kit's Parts List. See Figure 10 on page 23.

Table 3. Components of Rackmount Kit

Part Number	Description	Quantity
00N8709	M6 Cage Nut (Round Hole)	2
12J5288	M6 Cage Nut (Square Hole)	2
18P7708	Right Library Stop	1
18P7709	Left Library Stop	1
18P7710	Left Mounting Bracket (Library to Rack)	1
18P7709	Right Mounting Bracket (Library to Rack)	1
18P8002	Left Rack Rail Assembly	1
18P8003	Right Rack Rail Assembly	1
19P0415	M3 x 8 Flat Head Phillips Screws	10

3582 Rack Mount Kit

	PART #	QUANTITY
	00N8709	2
	12J5288	2
	12J5289	4
	18P7708	1
	18P7709	1
	18P7710	1
	18P7712	1
	18P8002	1
	18P8003	1
	19P4261	10 (8 needed, 2 extra)

a67m0228

Figure 10. Rack mount kit parts list

Rack Installation

Tools required: #1 Phillips screwdriver, flat blade screwdriver

To install your library into a rack:

1. The library requires 4 EIAs of space in a standard 19-inch rack. Ensure that this amount of space is available in the rack. Measure and mark the holes to simplify the subsequent steps.
2. Remove the rackmount assembly from packaging.
3. Each rail is labeled with either 'Front Right' or 'Front Left' relative to your right and left as you face the front of the rack. To extend the rails' extenders, you must remove the piece of tape which prevents the rails' extenders from extending unexpectedly.
4. Select the EIA on which you want to rest your library. You must select the top most hole (see **1** in Figure 11) for the rails to align evenly with your rack's holes. Insert the front edge of the rail into your rack. Using a #1 Phillips screwdriver, screw the rail to the rack using one M6 X 16 Black Combo/Flange HD Screw (part number 12J5289).

CAUTION: Support the rail until both ends are secured with screws.

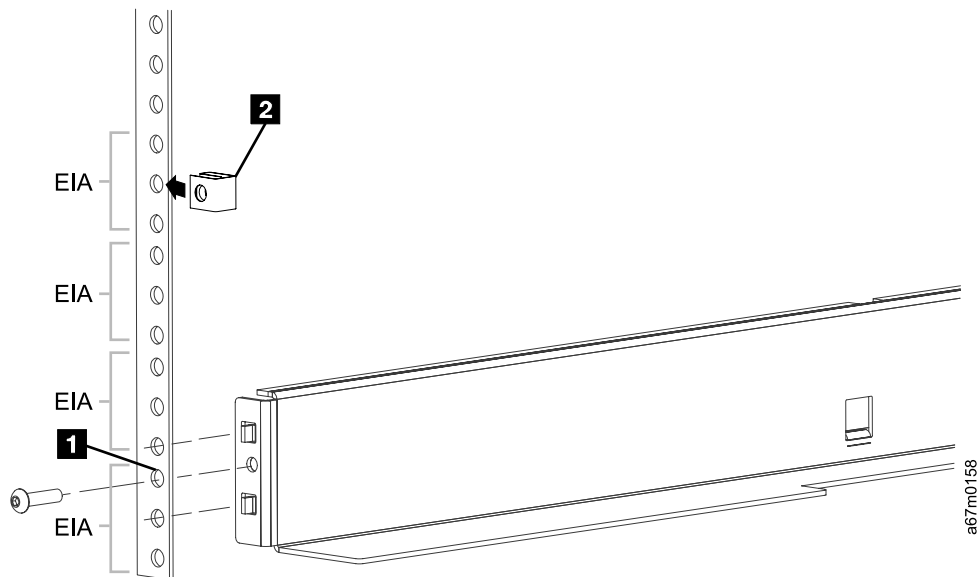


Figure 11. Attaching rails to the front of the rack

5. Now screw the rear of the rail to the rack (again using a #1 Phillips screwdriver and a M6X 16 Black Combo/Flange HD screw). See Figure 12 on page 25. If the rails fail to reach the back of the rack, extend the rails to the required length.



CAUTION:
Do not exceed the 254 mm (10 inch) extension of rail extenders!

6. Repeat the previous two steps to install the other rail.

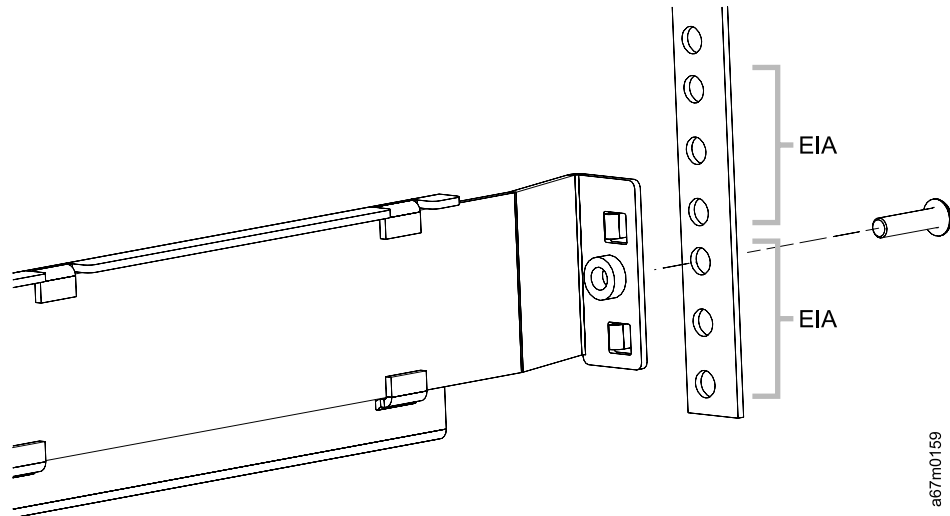


Figure 12. Attaching rails to the rear of the rack

7. Tighten all four screws since they support the weight of your library, and compare your rail installation to Figure 13.

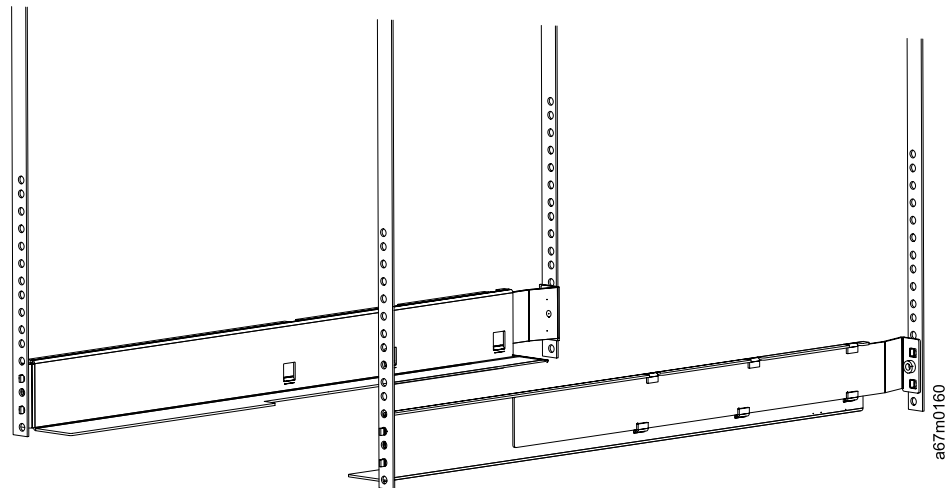


Figure 13. Fully assembled rackmount hardware

8. Attach a cage nut (either square or round depending on the shape of your rack's holes) into the hole **2** which is **eight** holes above hole **1** in Figure 11 on page 24. A flathead screwdriver may assist you in snapping the cage nuts to your rack. The M6 Cage Nut (Round Hole) has part number 00N8709; the M6 Cage Nut (Square Hole) has part number 12J5288.

Note: The threaded nut must be on the rear surface of the rack rail to prevent it from being pulled out.

9. Repeat step 8 to install a cage nut on the other side of the rack.
10. To prevent your library from sliding out the front of your rack, you must first install two stop plates on the rear-underside of your library. To install the two stop plates, turn the library upside down on a sturdy table (see Figure 14 on page 26). Position your Right Library Stop (part number 18P7708) and your Left Library Stop (part number 1807709) so that each plate fits snugly into the library's rear groove of the library's underside and so that the stop plates'

tongues point toward the front of the library. You must also align each stop plate with the two threaded holes in the library's underside. Screw two M3 X 6 flat head Phillips screws into each stop plate. Tighten the screws to secure the plates. See **1** in Figure 14 for the locations to install the stop plates.

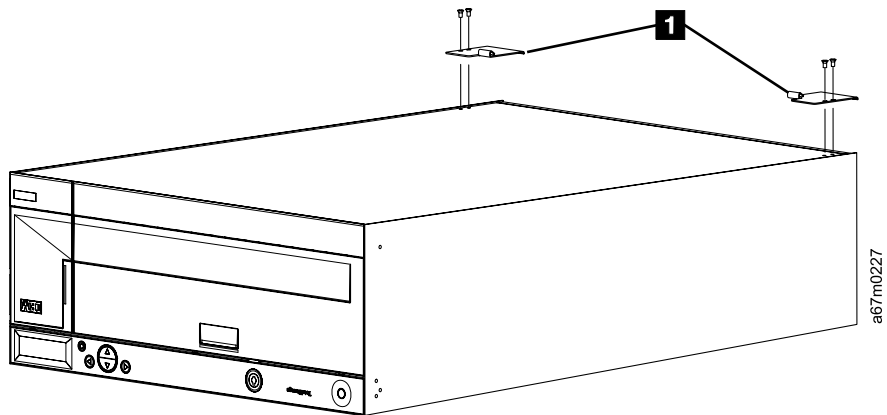


Figure 14. Installing the library stop plates

11. Turn your library right-side up. Align the library's Right Mounting Bracket (part number 18P7712) at the right front corner of the library, aligning the holes with the second hole from the top of the library and the second hole from the bottom of the library. Attach the bracket using two M3 X 6 flat head Phillips screws (see **1** in Figure 15). Repeat for the Left Mounting Bracket (part number 18P7710), attaching it to the left front corner (this bracket has three holes, one of which is a clearance hole for a screwhead).

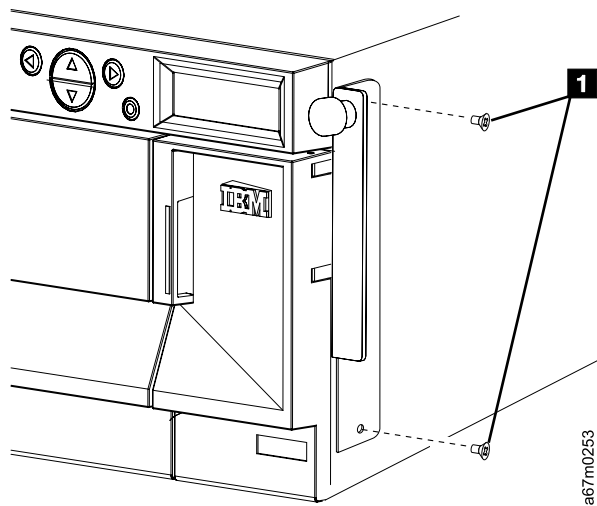


Figure 15. Installing the mounting brackets

12. Two or more people should then slide the library onto the rackmount hardware until it stops. To avoid damage to doors on the front of the library, support the bottom of the library when sliding it into and out of the rack.
13. Attach the securing brackets on the front of the library to both sides of the rack by tightening the thumbscrews on the securing brackets. Figure 16 on page 27 shows library installed in a rack.

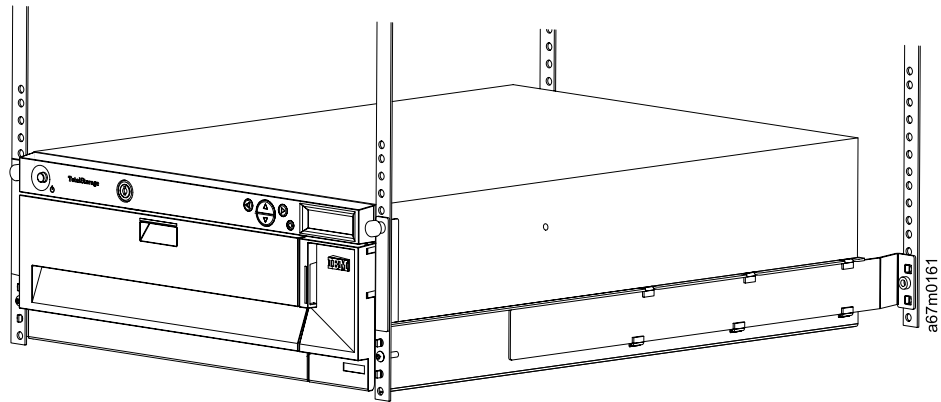


Figure 16. Library in the rack

Installing Optional Hardware

This section describes how to install the optional hardware. Follow the steps for each optional item you want to install and skip the sections that do not apply to your installation. The optional hardware includes:

- Additional drive
- Remote management unit

Installing an Additional Drive

Your library comes with either one or two drives. If you have one drive, you can install an additional drive by following the procedure below. Your library can contain up to two drives.

Note: This procedure applies for both SCSI and Fibre Channel drives. SCSI drives are shown in Figure 17 on page 28 and Figure 18 on page 28.

1. Remove the drive module from the packaging.
2. Power off the library and disconnect the AC line cord from the AC source outlet.
3. From the rear of the library, locate the available drive slot. Loosen the four thumbscrews on the cover plate and remove the cover plate. Store the cover plate (see **1** in Figure 17 on page 28) in a convenient place; it is required for proper operation and cooling of the library if you remove the optional drive.

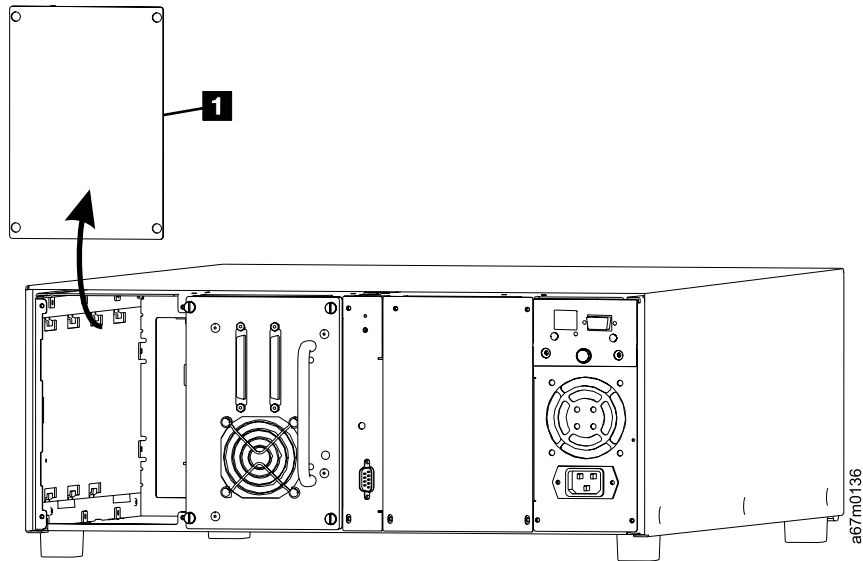


Figure 17. Drive module cover plate removal

4. Slide the drive module into position, being careful to ensure that the metal rails on the drive module are inserted into the plastic guides on the left side of the drive bay. If the drive does not slide fully into the bay, withdraw the drive completely and realign it so that the rails align with the slots in the plastic guides.

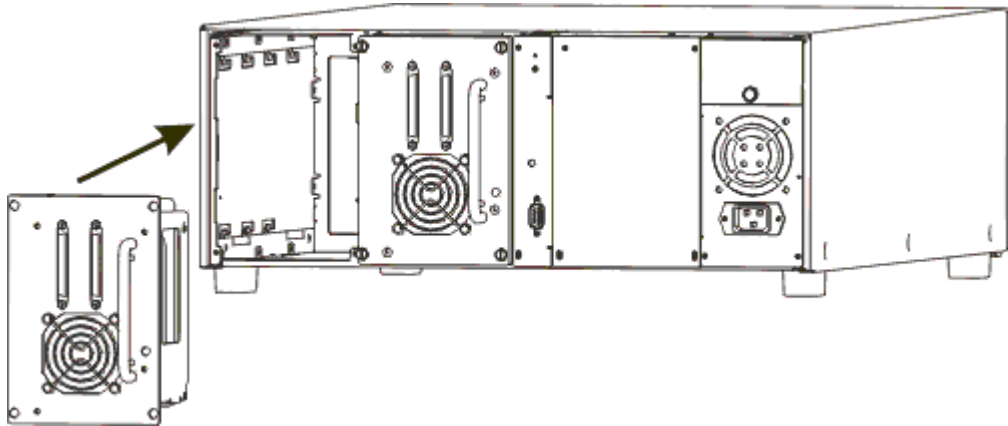


Figure 18. Drive module installation

5. Partially tighten the four thumbscrews. Do not fully tighten a thumbscrew before beginning to tighten the other three thumbscrews. Make sure the rear plate is flush with the chassis, then fully tighten all four screws.

Installing the Remote Management Unit

The remote management unit (RMU) allows you to access your library through a Web browser. Follow the procedure below to install the RMU.

1. Remove the RMU from the packaging.
2. Power off your library and disconnect the AC line cord from the AC source outlet.
3. From the rear of the library, locate the available RMU slot. Loosen the thumbscrew on the cover plate and remove the cover plate. Store the cover

plate (see **1** in Figure 19) in a convenient place; it is required for proper operation and cooling of the library if you later remove the RMU.

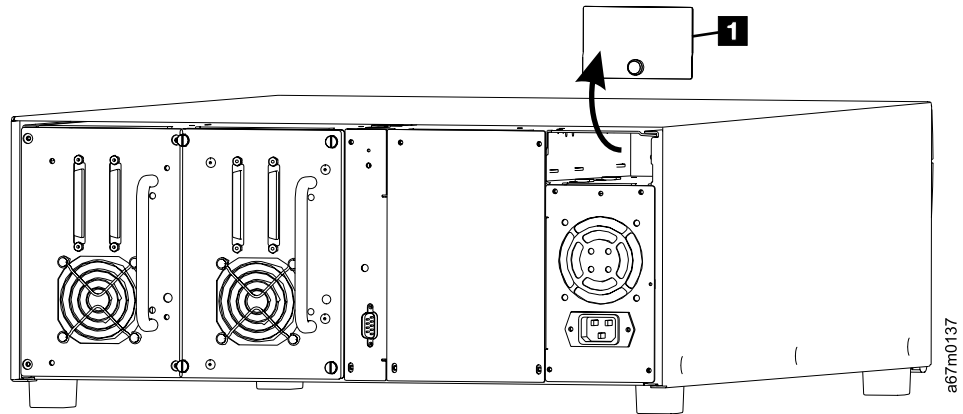


Figure 19. RMU cover plate removal

4. Slide the RMU (see **1** in Figure 20) into position and tighten the thumbscrew.

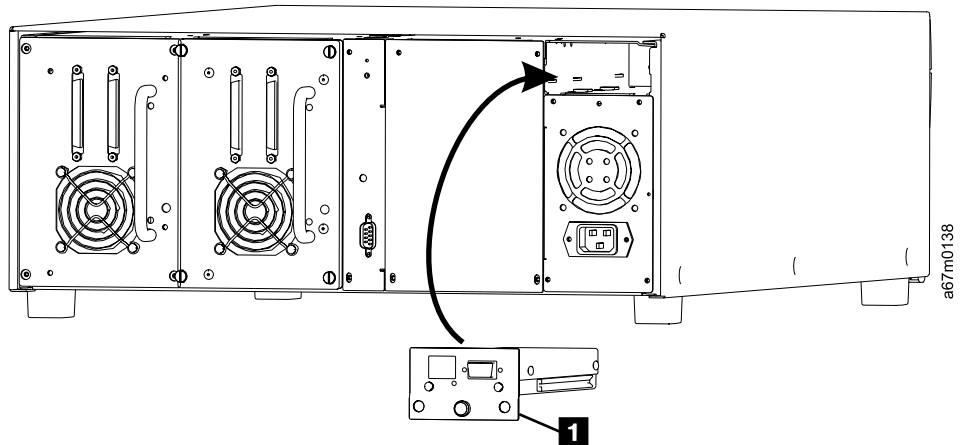


Figure 20. RMU module installation

Installing Your Library

This section provides step-by-step instructions for installing the standard library hardware. Standard hardware installation includes:

- Connecting the power cord
- Inserting tape cartridges in magazines
- Setting up (configuring) the library.
- Connecting to a SCSI bus
- Connecting to a Fibre Channel

For instructions on installing optional hardware, see “Installing Optional Hardware” on page 27.

Connecting the Power Cord

Follow the procedure below to connect the power cord to your library.

1. Make sure the power switch on the front of the library is off (the  is pressed).

2. Plug the power cord (see **1** in Figure 21) into your library.

CAUTION: Use caution when plugging the power cord into an electrical outlet. Hazardous voltages are present in the sockets of the outlet.

3. Plug the power cord from the library into a grounded electrical socket (see **2** in Figure 21).

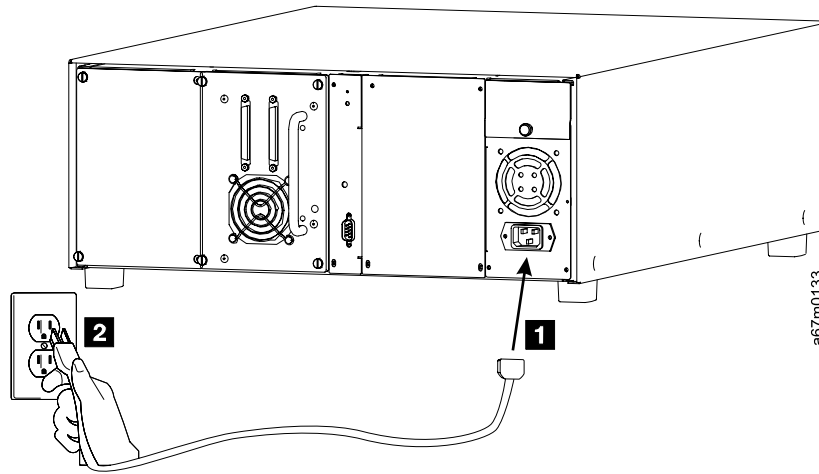


Figure 21. Connecting the power cord (US power outlet shown)

Attention: Ensure that the AC line cord from the library is plugged directly into the socket. Extension cords should not be used.

Inserting Tape Cartridges

Inspect the cartridges for any shipping damage, such as leader pins out of position (see “Perform a Thorough Inspection” on page 68). Make sure that the write-protect switch is set appropriately on each cartridge. Slide the switch to the appropriate position by pushing it with your finger. For more information, see “Setting the Write-Protect Switch” on page 65.

Follow the procedure below to insert data cartridges.

1. Unlock and open the media access door.

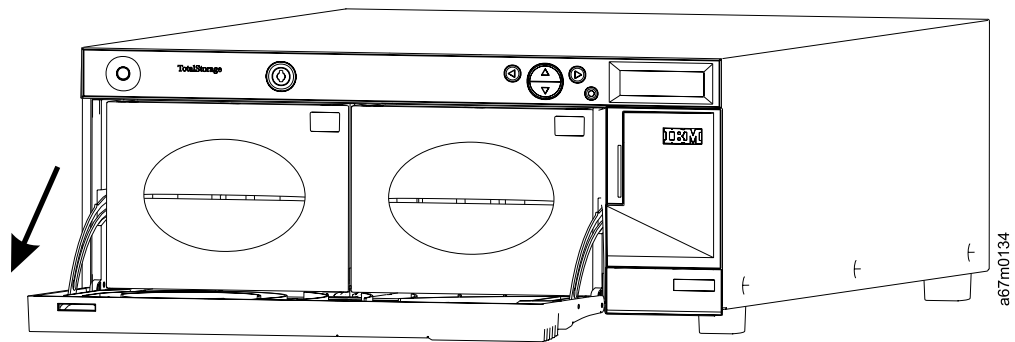


Figure 22. Media access door open

2. Grasp the magazine handle and slide out the magazines.

Note: You might need to pull firmly to remove the magazines.

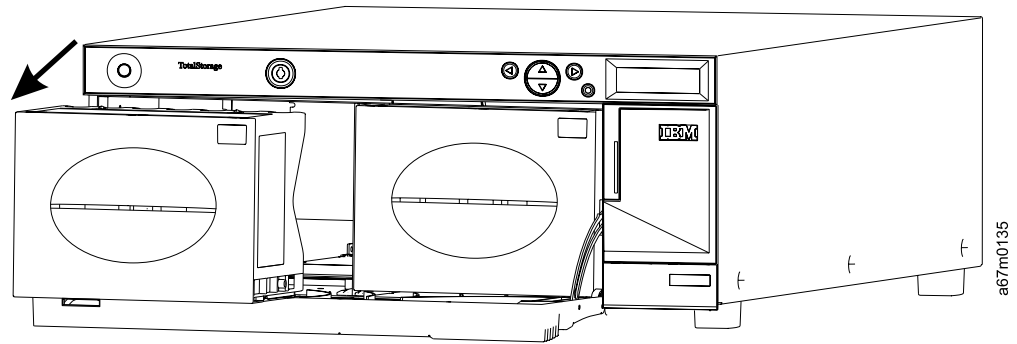


Figure 23. Sliding out the magazines

3. Fill the magazines with cartridges. Ensure that the orientation is correct. The magazine is designed to protect against improper insertion. If the cartridges do not insert easily, do not force them; the orientation is probably incorrect. For more information on proper media insertion and removal, see “Inserting and Removing Media” on page 41.

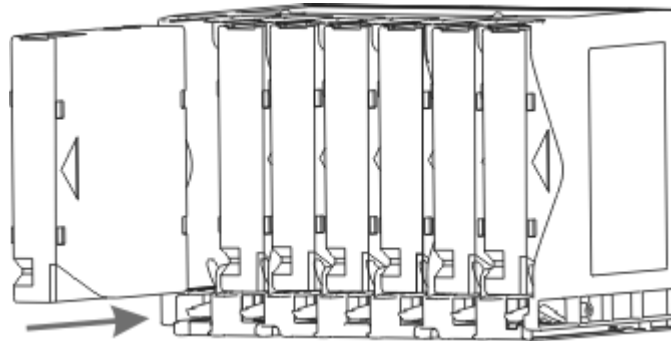


Figure 24. Filling the magazines

4. Reinstall the magazines into the library.

Note: You will need to push firmly to fully insert the magazines.

5. Close the media access door.

Refer to “Bulk Load” on page 137 for instructions on loading cartridges from the magazines into the rear slots.

Attention: Prior to power up, the library should be free of any obstruction. Ensure that all tapes are fully inserted into the storage slots and do not extend out of drives. Remove any tapes not engaged with the drive.

6. Power up the library.

Setting up Your Library

Your library provides you with the unique ability to set up the library using a Setup Wizard. The Setup Wizard guides you step-by-step through the setup process ensuring that all elements are configured in the proper order. Refer to “Setup Wizard” on page 88 to use the Setup Wizard.

Attention: Record all settings as you proceed through the Setup Wizard for future reference.

Your library is shipped with a default configuration that you can use. Table 4 shows the default settings.

Table 4. Default settings

Option	Setting	Description
I/O Slot	Input/Output	The host detects one Input/Output (also known as Import/Export) slot and 23 data slots.
Partitioning	Disabled	The host detects the entire library.
AutoClean	Disabled	The library will not clean the drives automatically when cleaning is required.
SCSI Mode	RND	The host has access to any tape cartridge randomly. Most host software uses this mode.
Drive 1 SCSI ID	1	
Drive 2 SCSI ID	2	
Drive 1 Fibre Channel Loop ID	17	
Drive 2 Fibre Channel Loop ID	18	
Inquiry	ULT3582-TL	The inquiry string returned to the host in a SCSI inquiry command is "ULT3582-TL".
Timeout Interval	9 minutes	After 9 minutes of inactivity on a submenu, the library will return to the Main menu. If a password is set, it must be reentered to access the library.
Password	Disabled	A password is not required to access your library.
Key Click	Disabled	An audible tone is not heard when buttons on the keypad are pressed.
Scanner	Enabled	The bar code scanner scans bar code labels.

Attention: The RMU stores the VPD settings during the configuration of the library. If the library does not have the RMU, it is important that you write down the configuration settings and store in a safe place. If for any reason this library is replaced, you will need the original setting to avoid reconfiguring the host application.

If you want to change any of these configuration settings, you can either use the Setup Wizard or change them manually using the **Setup** menu. For more information on any of these options or to change the default settings, refer to "Setup Wizard" on page 88 or "Setup Menu" on page 88.

Connecting to a SCSI Bus

If your host computer system does not have native SCSI capability and the host adapter you are using is not installed, install it. Refer to the manual that came with your host adapter for specific directions. When the host adapter card is installed, return to this point in the manual.

Check to ensure that the interface cable that you are using has the appropriate connectors on each end. The drives use HD68 connectors on the rear panel.

- If your host computer's SCSI connector is different from the one on the drives, you will need to obtain an adapter or a different cable.
- The interface cable must be shielded.

Follow the procedure below to connect the SCSI cable and terminator:

1. Connect the SCSI cable to either of the SCSI connectors on the rear panel of the drive (see **1** in Figure 25).
2. Connect the free end of the SCSI cable to the connector on the host computer's SCSI adapter.

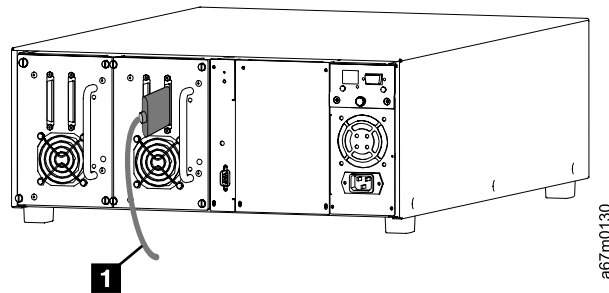


Figure 25. SCSI cable connected to library

3. If you want to connect another drive to the bus, connect an appropriate cable between the remaining SCSI connector on the rear panel of the drive and the next drive.

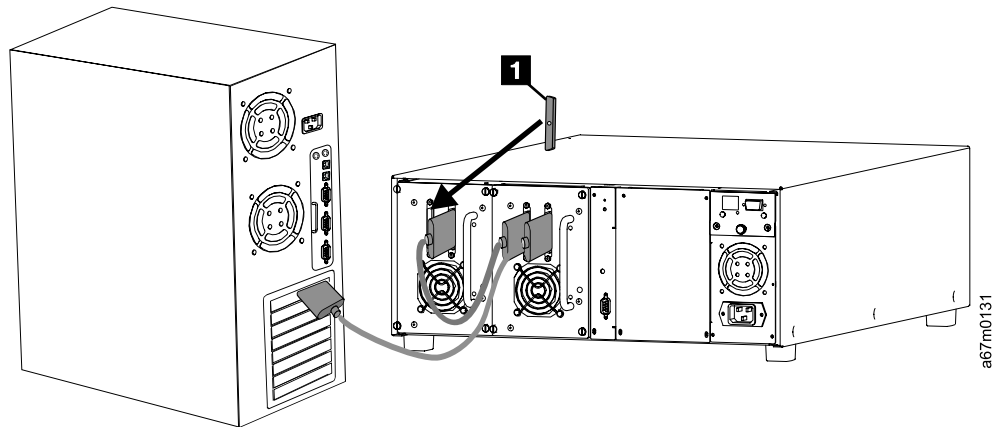


Figure 26. SCSI cable connected to host computer (two-drive library)

4. Terminate the last device in the chain.
Attention: Ensure that you are using the proper terminator (see **1** in Figure 26) for your type of SCSI device.
5. Make sure that the SCSI cable between the host adapter and the library is secure and the connections are fastened correctly.

Connecting to More than One Library

If you are connecting more than one library on the same SCSI bus, connect each unit to the previous unit with an additional shielded interface cable (see Figure 27 on page 34). It does not matter which SCSI connector on each library you connect

2. Connect the free end of the Fibre Channel cable to the connector on the Fibre Channel switch or the host computer's Fibre Channel adapter.

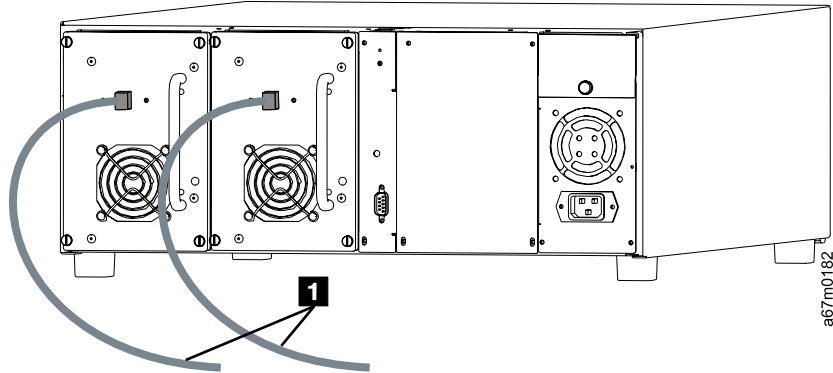


Figure 29. Fibre Channel cable connected to host computer (two-drive library)

3. If you want to connect two drives to the switch or the host computer, repeat steps 1 and 2 for the second drive.

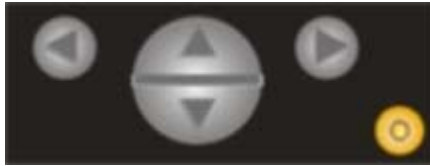
Chapter 3. Operation





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This chapter provides information on operating your library.

Operator Panel Keyboard

The library includes an easy-to-read bitmap LCD and a five-button keypad, called the Operator Panel, which lets you control library operations interactively. Using the Operator Panel, you can set library options, check operating statistics, and diagnose errors. The buttons on the keypad are described in more detail below.



Selection	Button	Description
	Left arrow	Navigate menu left
	Right arrow	Navigate menu right
	Up arrow	Scroll value up
	Down arrow	Scroll value down
	Action button	Execute menu option

Icon Definitions

The LCD on the library uses icons to provide graphical representations of menu items. From the Main menu, you can view menu icons as well as drive and tape status icons.

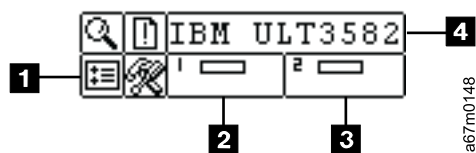






Figure 30. Main menu icons


1	Menu icons	3	Drive 2 status
2	Drive 1 status	4	Library status

Menu Icons

A list of the menu icons and their descriptions are provided in the table below.

Icon	Description	Icon	Description
	STATUS menu		SETUP menu
	Display firmware version		Setup Wizard

Icon		Description	Icon		Description
		Display inventory			Configure slots
		Display motion counts			SCSI/FIBRE
		Display retry counts			Drive SCSI ID
		Display sensor status			Set Inquiry
		Errors			Access mode
		Serial number			Fibre Channel Loop ID
		WW Name			Configure user interface
		COMMAND menu			Timeout
		Import media			Password
		Import data media			Key click
		Import cleaning media			Configure RMU
		Export media			Configure autoclean
		Export data media			Configure scanner
		Export cleaning media			Reset configuration
		Dismount drive			Enter license
		Move media			TOOLS menu
		Bulk load media			Clean drive
		Bulk unload media			Load firmware
		Sequential mode			Demo test
		Start loop			Self test
		Start single			Drive maintenance
		Stop			Manufacturing test
		Resume			Position picker
					Output logs

Icon	Description	Icon	Description
			Replace drive

Drive Status Icons

The following shows the icons that are displayed on the LCD indicating drive status.

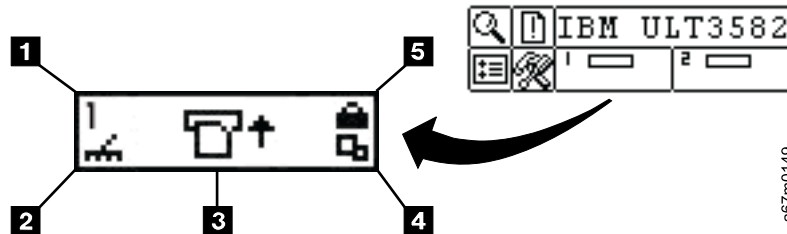















Figure 31. Drive status icons

Icon	Description
1 1 or 2	A tape drive is present in drive slot 1 or 2.
2 	Drive cleaning is required.
3 	Tape activity. See “Tape Activity Icons”.
3 !6	Drive error message. The character after the ! represents the error indicator on the drive LCD. See “Drive Error Codes” on page 189.
4 	The tape drive is compressing data on tape.
5 	The tape is write protected.

Tape Activity Icons

The following shows the icons that are displayed on the LCD indicating tape activity (see **3** in Figure 31).

Icon	Description
	A tape drive is loading a cartridge.
	A tape drive has a cartridge loaded.
	A tape drive is rewinding a cartridge.
	A tape drive is unloading a cartridge.

Icon	Description
	A tape drive has unloaded a cartridge.
	A tape drive is reading data from a cartridge.
	A tape drive is writing data to a cartridge.
	A tape drive is erasing data from a cartridge.
	A tape drive is locating data on a cartridge.

Online and Offline Modes

Your library can operate in an online or offline mode. The library goes offline if you select some of the Operator Panel's menu items. The following screen prompts you to confirm that you are ready to go offline:

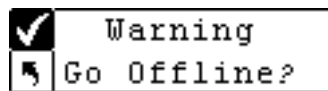


Figure 32. Go Offline?

If you press the action button, the library will automatically go into the offline mode. When the library is offline, the SCSI host has limited access to the library. The host can retrieve information from the library but cannot execute any new commands that change the state of the library, such as writing data or moving media. Commands in progress will be completed before the library goes offline. Entering the Main menu automatically returns the library to the online mode. All status information is available in offline mode.

Inserting and Removing Media

Your library has been designed to make media insertion a simple and accurate process. There are three ways to insert and remove media from the library:

- Remove the magazines and load them with tapes. To assist in loading tapes to the rear slot from the front magazines, the Bulk Load feature in the Command menu can be utilized.
- Load the magazines with tapes and use the Bulk Load feature in the Command menu. For more information, see “Bulk Load” on page 137. To remove media, you can unload the tapes from the rear slots to the magazines by using the Bulk Unload feature in the Command menu. For more information, see “Bulk Unload” on page 139.
- Use the Import/Export features in the Command menu to load tapes from the I/O slot. For more information, see “Import Media” on page 127 and “Export Media” on page 131.

Attention: It is not recommended that you manually insert or remove media to or from the rear slots. If you choose to insert or remove media directly to or from the rear slots and the picker is blocking the slots, use the Position Picker tool menu to move the picker. Do not move the picker manually or you might damage it.

The magazines and rear storage slots are designed to prevent the cartridges from being inserted incorrectly. The magazines and rear storage slots also include cartridge locks that prevent media from falling out of the slots when the magazines are inverted or the library is transported. To remove the tapes from the rear slots and the magazine, lift up on the green lever to release the locking mechanism.

The rear storage slots contain sensors that detect the presence of cartridges and automatically update library inventory when cartridges are inserted or removed. Sensors also detect the presence or absence of the magazines, and the inventory is updated when the magazines are inserted or removed.

Note: If you remove and then reinsert the magazines very rapidly, the sensors might not be able to detect the presence of the magazines. Ensure that you fully insert the magazines and do not remove and reinsert them rapidly.

Attention: Do not directly insert media into the picker. If media is inserted into the picker incorrectly, it might damage the picker.

Menu Navigation

Tab and scroll to navigate between menus and within a particular menu item. Tabbing and scrolling are described in more detail in “Main Menu Navigation”.

Main Menu Navigation

You can tab between the four icons in the Main menu (see **1** in Figure 33) by pressing the left and right arrow keys (◀ and ▶). When you have highlighted the menu item that you want to select, press the Action key (⊙) to select it.



Figure 33. Main Menu Navigation

Submenu Navigation

There are two levels of submenu navigation. The first level enables movement between the various submenu items (see **1** in Figure 34). This type of tabbing works the same as the Main menu tabbing, using the left and right arrow keys (◀ and ▶) to move between items, and using the Action key (⊙) to select items.

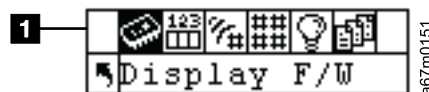


Figure 34. Submenu Navigation

After you have selected an item in a submenu, there might be several options for that item. This is the second level of submenu navigation called scrolling. When

scrolling within a submenu item is available, a set of arrows will be present on the left side of the LCD (see **1** in Figure 35).

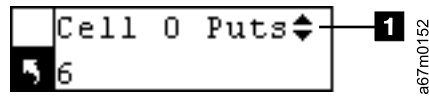


Figure 35. Scroll Arrows

These arrows indicate that more items are available to view or change. You use the up and down arrow keys on the keypad (▲ and ▼) to scroll up and down through the list or to change the value.

On some screens, there is more than one item to view or change. Each of the items will have a set of scrolling arrows (see **1** and **2** in Figure 36). Highlight the field, and then use the up and down arrow keys on the keypad (▲ and ▼) to scroll up and down through the list or to change the value. Use the left and right arrow keys (◀ and ▶) to move (tab) between items.

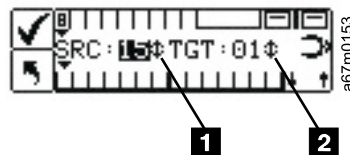


Figure 36. Scrolling Arrows

If you want to exit a submenu and go up a menu level, you use the back-to-previous icon (see **1** in Figure 37), indicated by **1** on the bottom left of the LCD. You need to press the left arrow key to select **1**, and then press Action (

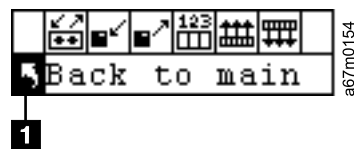



Figure 37. Moving up one menu level

Normal Operations

After your library and your choice of application software are installed and configured, you can automatically perform backup and restore operations through the application software. You do not need to intervene unless you need to replace cartridges. Clean the drive whenever the  icon is displayed (signifying a cleaning request).

Firmware Upgrades

Attention: To ensure optimum performance from the 3582 Ultrium Tape Library, use the latest level of firmware. It is the customer's responsibility to obtain and install all firmware.

Note: Before updating firmware on the drives, the library, or the RMU, use your server/application to set the library and drives OFFLINE for all attached servers.

You can update firmware for the drives, the library, or the RMU by using the following methods:

- RMU
- SCSI bus
- FMR tape (drive firmware only)
- Library serial port (library firmware only)

Table 5. Firmware Download Times by Method

Method	Library Firmware	Drive Firmware Per Drive
RMU	20 minutes	1 hour 40 minutes
SCSI	approx. 50 minutes	2 minutes*
FMR tape	N/A	approx. 5 minutes
Library Serial Port	approx. 10 minutes**	N/A

Notes:

1. N/A = not applicable.
2. * For upgrading drive firmware, SCSI is recommended.
3. ** For upgrading library firmware, serial port is recommended.

To upgrade firmware via the RMU, refer to “Updating Firmware via the RMU” on page 51. To upgrade firmware using an FMR tape via the Operator Panel, refer to “Display Firmware Version” on page 146 and “Load Firmware” on page 157. To upgrade firmware via SCSI bus, refer to “Updating Library and Drive Firmware by Using the SCSI Bus” on page 45. To upgrade firmware via serial port, refer to “Updating Library Firmware by Using the Library’s Serial Port” on page 46. For information regarding connecting via a serial port, refer to Appendix D, “Connecting to the Serial Port”, on page 245.

Updating Library and Drive Firmware by Using the SCSI Bus

Note: For libraries with the Multi-Path feature, the update could take as long as 2 hours when using the SCSI path.

You can update library and drive firmware over your server's SCSI bus by using the device drivers and utilities that are supplied by IBM. Before updating library or drive firmware, you must:

1. Obtain the new firmware file
2. Install the proper IBM device drivers
3. Install the proper IBM utility (NTUTIL or TAPEUTIL)

To obtain the new firmware, download it from the web to the server by visiting <http://www.ibm.com/storage/1to> and selecting **Technical Support**. If the library contains a drive that is already loaded with the new firmware, you may obtain the firmware by creating a field microcode replacement (FMR) tape cartridge from that drive (see "Creating or Erasing an FMR Tape" on page 46).

For instructions about installing and using the appropriate IBM device drivers and utilities (such as NTUTIL or TAPEUTIL), refer to the *IBM Ultrium Device Drivers Installation and User's Guide* that was shipped with the library. Or, for the latest version of the user's guide visit the web at <http://www.ibm.com/storage/1to> and select **Technical Support**. To obtain instructions about using NTUTIL or TAPEUTIL, visit the web at <http://www.ibm.com/storage/1to> and perform the following:

1. At **Need More Information?**, select **Technical Support**.
2. At **Products**, select **Appropriate Product**.
3. At **Downloads**, select **Firmware**.
4. At **Downloadable Files**, select **How to Update IBM Ultrium Tape Device Firmware (FMR)**, then select the appropriate device and utility.

Note: It may be necessary to disable or remove any device driver that was supplied with a commercial backup application before using the device driver supplied by IBM. Refer to the *IBM Ultrium Device Drivers Installation and User's Guide* and the documentation provided with your backup application software to determine if there are conflicts.

After you have obtained the new drive firmware file, loaded the appropriate IBM device drivers (if necessary), and installed the proper utility, refer to the instructions for updating library or drive firmware in the *IBM Ultrium Device Drivers Installation and User's Guide*.

Updating Library Firmware by Using the Library's Serial Port

Go to the web at <http://www.ibm.com/storage/1to> (see the **Technical Support** section), download `appcode.exe` to a temporary directory on your PC, and execute it. The downloaded file, `appcode.exe`, creates two files: the latest library firmware (for example, `V2.11.001.lif`) and an executable file (`3582d1.exe`).

1. Power-off the library.
2. Open a command prompt window and change the current directory to the temporary directory where `appcode.exe` was extracted.
3. Connect the serial cable P/N 19P1945 between the PC and the serial port located on the SCSI host interface board.
4. From the command prompt, type the following command and press Enter:

```
3582d1 -cn -fxxxxx.lif
```

Where:

download	Firmware Download Command
-c	Required characters that precede the Communication Port Number
-n	Communication Port Number
-f	Required characters that precede the file name
xxxxxx.lif	File name (<code>v2.00.00.lif</code> for libraries without the Multi-Path feature; <code>v5.00.00.lif</code> for libraries with the Multi-Path feature)

The message `Waiting for ALIVE message displays`

Note: For help enter the command:

```
3582d1 -h
```

5. After the message `Waiting for ALIVE message displays`, power-on the library.

After downloading firmware, verify the installation by using the inquiry command available on the utilities menu of your server, or from the library operator panel select **Main Menu (initial screen) → Status → Display F/W**.

Note: Some backup application software packages will not reflect the firmware change until the registry is refreshed by rebooting the server.

Creating or Erasing an FMR Tape

Before you can create a field microcode replacement (FMR) tape, you must have previously obtained the new firmware file by downloading it from the web, ordering it on a CD or diskette, or copying it from a drive that is already loaded with the new firmware.

To download the new firmware file from the web, visit <http://www.ibm.com/storage/1to> and select **Technical Support**.

Attention: For this operation, insert only a scratch (blank) data cartridge or a cartridge that may be overwritten. During the test, the drive overwrites the data on the cartridge.

To copy an FMR tape from a drive that is already loaded with the new firmware, refer to the steps in this procedure.

Path:

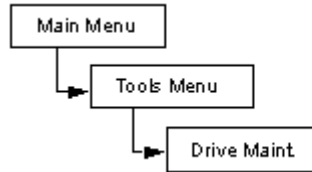


Figure 38. Drive Maint.

1. Verify that the I/O slot is empty.
2. From the Main Menu, select Tools, then press the Action button.
3. From the Tools menu, select Drive Maint (see Figure 38). Press the Action button.
4. Select a drive in the next screen, then press the right arrow button to select the POST submenu item.
5. Using the up arrow button or the down arrow button, scroll to 'Create FMR' or 'Clear FMR' option.
6. Use the right arrow button to select the execute option.. You will be prompted to "Insert Test media."
7. Open the I/O door and insert tape in the I/O slot.
8. Use the right arrow button to select the execute option.
9. A warning message, "Warning: Writes Tape" will appear. Press the Action button to complete the process.

RMU with IBM TotalStorage Specialist

The Remote Management Unit (RMU) provides remote access to the 3582 Ultrium Tape Library over a network. You can attach the library to the network through a 10/100 Ethernet port on the RMU. Any server on the network can access the library if it has a web browser installed. All available functions are accessible without the need of a dedicated server or separate software. With the RMU and the IBM TotalStorage Specialist software application you can access many of the functions that are described in Chapter 3, "Operation", on page 37.

The operator panel page of the IBM TotalStorage Specialist web interface is protected by a password and is a direct interface to the operator panel of the attached library. It allows you to monitor the activity of the library. Any action that you perform (for example, pressing a button) is shown both on the web page and on the attached library.

RMU Requirements

The RMU requires a network address that consists of an Internet Protocol (IP) address, subnet mask, and gateway IP Address.

Setting up the RMU



Attention: It is recommended that you set up your RMU using steps 40, 41, 42, and 43 in the Setup Wizard. Go to step 40 on page 99.

Path: **Main menu > Setup > RMU**

To configure the RMU, do the following:

1. From the Main menu, select **Setup** and then select **RMU**.
2. Using the **Up**, **Down**, and **Next** buttons, enter the IP address, subnet mask, gateway IP address.
3. When complete, press the left arrow to highlight the check icon. Press the action button.

Starting the RMU

Before you begin using the RMU, make certain you have configured your RMU with the correct network address.

To start the RMU

1. Open a Web browser.
2. Enter the RMU IP address in your browser, excluding any leading zeros. For example, if your IP address is 182.073.056.205 on the Operator Panel, go to the following address: <http://182.73.56.205>. The RMU user interface displays.

Checking Status and General Information

To check status and obtain general information

Click the **Status** tab. The following information is displayed:

- **Library Status** — indicates whether the library is online and offline.
- **Drive Status** — indicates the type and quantity of tape drives in the library.
- **RMU User** — indicates the name and location of the user.
- **Hostname** — indicates the hostname used for the RMU connection.
- **IP Address** — indicates the IP address for the RMU connection.
- **MAC Address** — indicates the Media Access Control (MAC) address of the RMU. This is also the serial number of the RMU.
- **Library Serial #** — indicates the library serial number.
- **SNMP** — indicates whether the SNMP feature is on or off.
- **SNMP Alerts** — indicates whether the SNMP alert notification feature is on or off.
- **Library Firmware** — indicates the current level of library firmware.
- **RMU Firmware** — indicates the current level of RMU firmware.

Configuring Network Parameters

You can reconfigure the hostname, IP address, subnet mask, and gateway address through the RMU.

To configure the network parameters.

1. Click the **Configuration** tab.
2. In the **Network Configuration** area, enter the new hostname, IP address, subnet mask, and gateway address:
3. Click **Submit** and review your changes (indicated in red).
4. Enter your password and click **Confirm** to complete the procedure. The new values are saved. Note that you may need to redirect your Web browser.

Configuring SNMP

Simple Network Management Protocol (SNMP) is a set of protocols used to manage nodes on an IP network. You can configure the RMU to run a SNMP management application.

To configure SNMP

1. Click the **Configuration** tab.
2. In the **SNMP Configuration** area, do the following:
 - To enable or disable the feature, select **ON** or **OFF** in the **SNMP Enabled** drop-down.
 - To enable or disable SNMP alerts, select **ON** or **OFF** in the **Alerts Enabled** drop-down.
 - In **Manager**, enter the SNMP server address.
 - In **Public Name**, enter the name of the read-only SNMP community.
 - In **Private Name**, enter the name of the read/write SNMP community.
3. Click **Submit** and review your changes (indicated in red).
4. Enter your password and click **Confirm** to complete the procedure. The new values are saved. Note that you may need to redirect your Web Browser.
5. You will be instructed to reboot the RMU. Click **Done** to reboot.

Downloading the SNMP MIB File

The SNMP Management Information Base (MIB) file will allow an SNMP management application to understand the SNMP traps generated by the RMU. If you are running an SNMP management application and need the library MIB, you can download it via the RMU.

To download the SNMP MIB file

1. Click the **SNMP MIB** in the left pane of the RMU interface.
2. Right-click **Download SNMP MIB** and click **Save Target As**.
3. Browse to your SNMP management server and click **Save**. You will need to load the MIB file into the SNMP management application.

Configuring RMU User Accounts

You can add unique users to the RMU. Only one administrator account is allowed, which maintains the login of admin.

Adding/Removing Users

Only the admin account can add or remove users.

To add or remove a user

1. Click the **Configuration** tab.
2. In the **User Configuration** area, do one of the following:

- If you are adding a user:
 - a. In the **Management Action** drop-down, click **Create User**.
 - b. In **Edit New**, enter the user name.
 - c. In **Password**, enter the login password and then confirm it in **Re-enter Password**.
- If you are deleting a user:
 - a. In the **Management Action** drop-down, click **Delete User**.
 - b. In **Select One**, select the user you want to remove.
- 3. Click **Submit** and review your changes (indicated in red).
- 4. Enter your password and click **Confirm** to complete the procedure.

Changing a Password

At any time, you can change your RMU password. If you are the admin, you can change users' passwords.

To change a password

1. Click the **Configuration** tab.
2. In the **User Configuration** area, select **Change User Password** from the **Management Action** drop-down.
3. If not already selected, select the appropriate user account from the **Select One** drop-down.

Note: Only the admin can modify another user's password.

4. Click **Submit** and review your changes (indicated in red).
5. Enter your password and click **Confirm** to complete the procedure.

Configuring the Time and Date

You can configure the date and time for the RMU. The date and time will be used in the RMU log file to report when events occurred.

To configure the date and time

1. Click the **Configuration** tab.
2. Enter the date and time in the **Date and Time** area.
3. Click **Submit** and review your changes (indicated in red).
4. Enter your password and click **Confirm** to complete the procedure.

Synchronizing with an NTP server: You can connect the RMU to a network time (NTP) server to automatically set the time.

To synchronize with an NTP server

1. Click the **Configuration** tab.
2. In the **Date and Time** area, select **ON** from the **Synchronization with NTP server** drop-down menu.
3. In the **NTP Server IP Address** field, enter the IP address of the NTP server.
4. In the **Timezone** field, enter the time zone deviation for the NTP server. To get a list of time zone variants, click list of **time zones**.
5. Click **Submit** and review your changes (indicated in red).
6. Enter your password and click **Confirm** to complete the procedure.

Updating Firmware via the RMU

You can update firmware for the RMU, library, and drives. Before you update firmware, you need to have the firmware file in a location that is accessible from the RMU interface. Firmware updates can be found at <http://www.ibm.com/storage/lto> and clicking on Technical Support or LTO Support.

To update firmware

1. Click the **Firmware** tab.
2. Select the firmware you would like to update.
3. Click **Browse** and browse to the location of the firmware update file.

Note: Downloading firmware can take several minutes. For details on how long it will take to download firmware, click **some time** above the **Update Firmware** button.

4. Click **Update Firmware**.

The firmware will be updated. If the library was selected for a firmware update, it will automatically reboot when the update is complete. If the RMU was selected, you will be prompted for a reboot when the update is complete.

Viewing Diagnostic Files

From the RMU, you can view the diagnostic information for the attached library and RMU. This information can assist technical support personnel when diagnosing problems.

To view diagnostic files

1. Click the **Diagnostics file** tab.
2. Select the file you would like to view. The available options are:
 - Library Inventory Report — Provides a physical inventory of the library including drive and slot count.
 - Library Log Report — Provides command, support, and error logs for the library and RMU.
 - Complete Log Report — Provides library inventory information and command, support, and error logs for the library, RMU, and drives.
3. Click **Retrieve selected file**. The file will be loaded.
4. Click **Display File** to view the file in a separate browser window.

Using the Operator Panel (via the RMU)

The RMU provides access to the library via a virtual Operator Panel.

To use the Operator Panel

- Click the **Operator Panel** tab.

A graphical representation of the Operator Panel will be displayed. You can click the softkeys and control the library the same way that you would from the front of the library.

Viewing Logs

You can view the most current entries in the library command log without having to download the entire log file.

To view the log

- Click the **Logs** tab.

The command log is displayed with the most recent entry at the top of the list.

Getting Help

The RMU provides access to help for the following items:

- Contents — Provides a description of each of the tabs on the RMU interface.
- Documentation — Provides a link to the user documentation for the library.
- SNMP MIB — Provides information on the SNMP MIB file.
- Support — Provides information on contacting technical support.
- Version — Provides the current revision level of the RMU firmware.

To get help

- Click on the item in the left pane of the RMU interface.

The information will be displayed in a separate browser window.

IBM TotalStorage Specialist Menu Description

The IBM TotalStorage Specialist Home page is divided into three areas, the left navigation frame **1**, the center navigation frame **2**, and the top information frame **3** (see Figure 39).



Figure 39. IBM TotalStorage Specialist home page

Left Navigation Frame

The left navigation frame (**1** in Figure 39) contains hyperlinks that are described in the following list:

Logout

Logs out the current user and returns to the Status page.

Contents

Opens a page that displays a brief description of the tabs for Status, Configuration, Firmware, Diagnostic files, Operator panel, and Logs.

Documentation	Opens a page that contains links to the library's online documentation.
SNMP MIB	Opens a page that displays an explanation of the Simple Network Management Protocol (SNMP) management information base (MIB). This page also contains an option to download the SNMP MIB.
Support	Opens a page that displays contact information for technical support.
Version	Opens a page that displays the current version of the RMU's firmware.
www.ibm.com	Opens the Home page for the IBM web site.

Center Navigation Frame

The center navigation frame (**2** in Figure 39 on page 52) has the following tab-style hyperlinks:

- Status
- Configuration
- Firmware
- Diagnostics file
- Operator panel
- Logs

If you select a tab other than the Status tab, a login page displays (see Figure 40). The initial login name is admin and the initial password is secure.

Note: Only one user can be logged into the RMU at a time. The 'admin' user automatically logs off any other user. If a user is currently logged in, that user's name is displayed on the Specialist's login page.



Figure 40. Login Page

The following sections describe each tab-style hyperlink.

Status

The Status page displays the current status of the library. From this page you can easily see if there are problems with the system (see Figure 41).

The screenshot shows the 'Status' page of the IBM Ultrium Tape Library Specialist. The page title is 'Ultrium Tape Library Specialist' with the name 'Name: RMU (IBM ULT3582-TL)'. The 'Status' tab is selected, showing the library is 'Online'. A table lists various system details:

Library Status	
Drive Status	LTO: 2 drives
RMU User	admin from 192.1.1.100
Hostname	RMU
IP Address	192.1.1.101
MAC Address	00:30:8C:01:09:BF
Library Serial #	IBM9161327
SNMP Alerts	SNMP Off
Library Firmware	211B.GY001
RMU Firmware	173c

The page also includes a navigation menu on the left with options like Logout, Help, Contents, Documentation, SNMP MIB, Support, and Version. A copyright notice for 2003 is visible at the bottom.

Figure 41. Status page

The Status page is not protected by a password and is active even when you are not logged into the RMU. If you select any tab other than the Status tab, a login page displays (see Figure 42). The initial login name is admin and the initial password is secure.

The screenshot shows the 'Login' page of the IBM Ultrium Tape Library Specialist. The page title is 'Ultrium Tape Library Specialist' with the name 'Name: RMU (IBM ULT3582-TL)'. The page displays a login form with the following fields:

- Enter Login Name
- Enter your password
- Submit

The page also includes a navigation menu on the left with options like Logout, Help, Contents, Documentation, SNMP MIB, Support, and Version. A copyright notice for 2003 is visible at the bottom.

Figure 42. Login Page

Configuration

The Configuration page is protected by a password and allows you to configure the remote management unit. Network configuration (including SNMP), user configuration (adding users, setting passwords), and date and time setup are all entered on this page (see Figure 43). The initial RMU network configuration is done through the library operator panel during library installation and setup (see “RMU with IBM TotalStorage Specialist” on page 47).

IBM TotalStorage™		Ultrium Tape Library Specialist		Name: RMU (IBM ULT3582-TL)	
Logout		Status		Configuration	
		Firmware		Diagnostics file	
		Operator panel		Logs	
Help		Network Configuration			
Contents		Hostname		RMU	
Documentation		IP Address		9.11.216.34	
SNMP MIB		Subnet Mask		255.255.254.0	
Support		Gateway		9.11.216.1	
Version		SNMP Configuration			
www.ibm.com		SNMP Enabled		OFF	
Copyright 2003		Alerts Enabled		OFF	
		Manager		0.0.0.0	
		Public Name		public	
		Private Name		private	
		Reboot			
		Click here to reboot the RMU			
		User Configuration		Management Action	
				No Action	
		User Name		Edit New	
				Select one	
				admin	
		Password			
		Re-enter Password			
		Date and Time			
		Date (mm/dd/yy)		00:00:00	
		Time (hh:mm)		00:00	
		Synchronization with NTP Server		OFF	
		NTP Server IP Address		0.0.0.0	
		TimeZone		+00:00	
				list of timezones	
		Submit		Reset	

ae7m0208

Figure 43. Configuration page

Firmware

The Firmware page (see Figure 44) is protected by a password and allows you to update the firmware of the attached library, the RMU, or the drives in the library. For instructions about updating firmware, see “Updating Firmware via the RMU” on page 51.



Figure 44. Firmware page

Diagnostics File

The Diagnostics file page is protected by a password and allows you to upload (to a local computer) the diagnostic information from the attached library. The diagnostic information may be useful to service personnel in diagnosing problems. Information from the library (command and error logs) and information from the RMU (error log) can be retrieved in text form. The system snapshot is a machine-decodable file which can only be used by service personnel (see Figure 45).



Figure 45. Diagnostics file page

Operator Panel

The Operator panel page is protected by a password and is a direct interface to the operator panel of the attached library. It allows you to monitor the activity of the library. Any action that you perform (for example, pressing a button) is shown both on this page and on the attached library (see Figure 46).



a67/c339

Figure 46. Operator panel page

Logs

The Logs page is protected by a password and shows the last few entries of the library command log (see Figure 47). To view the entire log, download it from the Diagnostics file page (see Figure 45 on page 56).



a67m0212

Figure 47. Logs page

Top Information Frame

The top information frame (**3** in Figure 39 on page 52) contains information for you to identify the tape library that you are remotely managing. The frame shows the URL identifier and library type. The URL identifier is the hostname given to the library during initial configuration. The library type is the ID string of the library and is taken from standard inquiry data.

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Attention: IBM LTO Ultrium Tape Cartridges are delicate components and require care in handling. Before using the media, be sure to read “Handling the Cartridges” on page 66.

The IBM TotalStorage Ultrium Tape Library 3582 uses the following cartridge types:

- IBM TotalStorage LTO Ultrium 200 GB Data Cartridge (Ultrium 2)
- IBM LTO Ultrium Data Cartridge (Ultrium 1)
- IBM TotalStorage LTO Ultrium Cleaning Cartridge
- LTO Ultrium Cleaning Cartridge

The Ultrium 2 Tape Drive is compatible with the cartridges of its predecessor, the Ultrium 1 Tape Drive. When labeled according to proper IBM bar code label specifications (see “Bar Code Label” on page 62), the last character of the cartridge’s volume serial number (VOLSER) indicates the generation of the media. For example, a cartridge with a VOLSER of 000764L2 is an Ultrium 2 cartridge; a cartridge with a VOLSER of 003995L1 is an Ultrium 1 cartridge. Cartridge compatibility for the Ultrium 2 Tape Drive is as follows:

- Reads and writes Ultrium 2 format on Ultrium 2 cartridges
- Reads and writes Ultrium 1 format on Ultrium 1 cartridges
- Does not write Ultrium 2 format on Ultrium 1 cartridges
- Does not write Ultrium 1 format on Ultrium 2 cartridges

Figure 48 shows the TotalStorage LTO Ultrium 200 GB Data Cartridge and its components.

- | | | | |
|----------|----------------------|----------|----------------------|
| 1 | LTO cartridge memory | 4 | Write-protect switch |
| 2 | Cartridge door | 5 | Label area |
| 3 | Leader pin | 6 | Insertion guide |

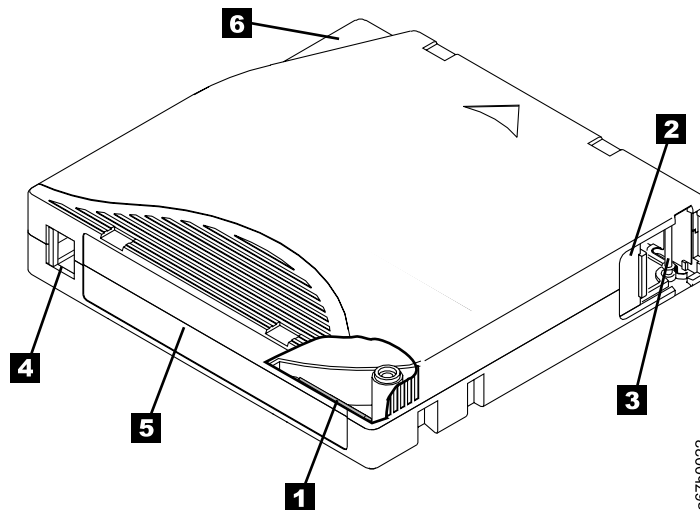


Figure 48. The IBM TotalStorage LTO Ultrium 200 GB Data Cartridge

In addition to using LTO Ultrium 2 Tape Cartridges with up to 200 GB capacity, the tape drive reads and writes to certified LTO Ultrium Tape Cartridges that have capacities of 100 GB. If you want to control the capacity of the cartridge (for

example, if you want to limit the capacity to obtain a faster seek time) you can do so by issuing the SCSI command SET™ CAPACITY. For information about this command, refer to the *IBM TotalStorage Ultrium Tape Library 3580 SCSI Reference*.

To ensure that your tape library conforms to IBM's specifications for reliability, use only IBM LTO Ultrium Tape Cartridges. You may use other LTO-certified data cartridges, but they may not meet the standards of reliability established by IBM. The IBM TotalStorage LTO Ultrium 200 GB Data Cartridge cannot be interchanged with the media used in other IBM non-LTO Ultrium tape products.

Data Cartridge

The IBM Ultrium 2 Data Cartridge is purple, and the Ultrium 1 Data Cartridge is black. Both generations contain 1/2-inch, dual-coat, metal-particle tape. The Ultrium 1 cartridge has a native data capacity of 100 GB (200 GB at 2:1 compression); the Ultrium 2 cartridge has a native data capacity of 200 GB (400 GB at 2:1 compression).

When processing tape in the cartridges, the Ultrium Tape Drives use a linear, serpentine recording format. The Ultrium 1 drive reads and writes data on 384 tracks, eight tracks at a time; the Ultrium 2 drive reads and writes data on 512 tracks, eight tracks at a time. The first set of eight tracks is written from near the beginning of the tape to near the end of the tape. The head then repositions to the next set of eight tracks for the return pass. This process continues until all tracks are written and the tape is full, or until all data is written.

Both generations of the IBM LTO Ultrium Data Cartridge includes a Linear Tape-Open Cartridge Memory (LTO-CM) chip (**1** in Figure 48 on page 60), which contains information about the cartridge and the tape (such as the name of the manufacturer that created the tape), as well as statistical information about the cartridge's use. Whenever you unload a tape cartridge, the 3582 Ultrium Tape Library writes any pertinent information to the cartridge memory.

The cartridge door (**2** in Figure 48 on page 60) protects the tape from contamination when the cartridge is out of the drive. Behind the door, the tape is attached to a leader pin **3**. When you insert the cartridge into the drive, a threading mechanism pulls the pin (and tape) out of the cartridge, across the drive head, and onto a non-removable takeup reel. The head can then read or write data from or to the tape.

The write-protect switch **4** prevents data from being written to the tape cartridge. The label area **5** provides a location for you to place a label. Affix only a bar code label or a human-writable label. When affixing a label, place it only in the recessed label area. A label that extends outside of the recessed area can cause loading problems in the internal drive or in the 3582 Ultrium Tape Library. The VOLSER on a cleaning cartridge's bar code label must begin with **CLN** or the library treats the cleaning cartridge as a data cartridge during an inventory. The insertion guide **6** is a large, notched area that prevents you from inserting the cartridge incorrectly.

You can order tape cartridges with the bar code labels included, or you can order custom labels. To obtain tape cartridges and bar code labels, see "Ordering Media Supplies" on page 77. The bar code and bar code label must meet predefined specifications. To determine the specifications, visit the web at <http://ssddom02.storage.ibm.com/tape/lto/documentation/labelspec.pdf> or contact your IBM Marketing Representative.

Both generations of the LTO Ultrium Data Cartridge have a nominal cartridge life of 5000 load and unload cycles.

Cleaning Cartridge

Each drive determines when it needs to be cleaned and alerts the library and the server's application software. Depending on which cleaning method you choose, the drive uses the cleaning cartridge to automatically clean the drive, or you are required to select menus to initiate cleaning.

Note: The VOLSER on the cartridge's bar code label must begin with **CLN** or the library treats the cleaning cartridge as a data cartridge during an inventory.

The IBM TotalStorage LTO Ultrium Cleaning Cartridge and the LTO Ultrium Cleaning Cartridge are downward-compatible with the Ultrium 1 drive. To enable your Ultrium 1 drive to use the cartridge, simply download and install the latest drive firmware.

Both generations of the LTO Ultrium Cleaning Cartridge are valid for 50 uses. A cartridge's LTO-CM chip tracks the number of times that the cartridge is used.

Bar Code Label

Each data and cleaning cartridge that is processed by the 3582 Ultrium Tape Library must bear a bar code label. The label contains:

- A volume serial number (VOLSER) that you can read
- A bar code that the library can read

When read by the library's bar code scanner, the bar code identifies the cartridge's VOLSER to the library. The bar code tells the library whether the cartridge is a data, cleaning, or diagnostic cartridge. If a cartridge in a storage or I/O station slot does not contain a label, the bar code scanner will treat that slot as empty. In addition, the bar code includes the two-character media-type identifier Lx, where x equals 1 or 2. L identifies the cartridge as an LTO cartridge. 1 indicates that the cartridge is the first generation of its type; 2 indicates that the cartridge is the second generation of its type. Figure 49 on page 63 shows a sample bar code label for the LTO Ultrium Tape Cartridge.

You can order tape cartridges with the labels included, or you can order custom labels. To order tape cartridges and bar code labels, see "Ordering Media Supplies" on page 77. The bar code must meet predefined specifications. To determine the specifications of the bar code and the bar code label, visit the web at <http://ssddom02.storage.ibm.com/tape/lto/documentation/labelspec.pdf> or contact your IBM Marketing Representative.

When attaching a bar code label to a tape cartridge, place the label only in the recessed label area (see **5** in Figure 48 on page 60). A label that extends outside of the recessed area can cause loading problems in the drive or the library.

Attention: Do not place any type of mark on the white space at either end of the bar code. A mark in this area may prevent the 3582 Ultrium Tape Library from reading the label.

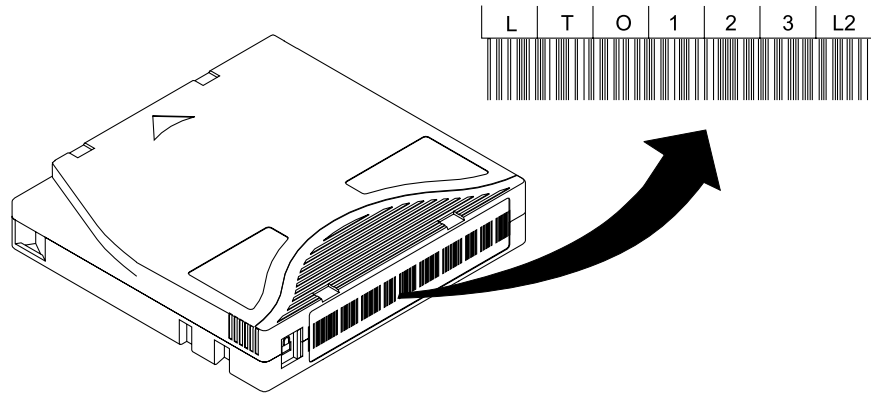


Figure 49. Sample bar code label on the LTO Ultrium Tape Cartridge. The volume serial number (LTO123) and bar code are printed on the label.


Guidelines for Using Bar Code Labels

Apply the following guidelines whenever you use bar code labels:

- Use only IBM-approved bar code labels.
- Do not reuse a label or reapply a used label over an existing label.
- Before you apply a new label, remove the old label by slowly pulling it at a right angle to the cartridge case.
- Use peel-clean labels that do not leave a residue after they are removed. If there is glue residue on the cartridge, remove it by gently rubbing it with your finger; do not use a sharp object, water, or other chemical to clean the label area.
- Examine the label before you apply it to the cartridge. Do not use the label if it has voids or smears in the printed characters or bar code (an application software's inventory operation will take much longer if the bar code label is not readable).
- Remove the label from the label sheet carefully. Do not stretch the label or cause the edges to curl.
- Position the label within the recessed label area (see **5** in Figure 48 on page 60).
- With light finger pressure, smooth the label so that no wrinkles or bubbles exist on its surface.
- Verify that the label is smooth and parallel, and has no roll-up or roll-over. The label must be flat to within 0.5 mm (0.02 in.) over the length of the label and have no folds, missing pieces, or smudges.
- Do not place other machine-readable labels on other surfaces of the cartridge. They may interfere with the ability of the bar code scanner to read the bar code.

Setting the Write-Protect Switch

The position of the write-protect switch on the tape cartridge (see **1** in Figure 50) determines whether you can write to the tape:

- If the switch is set to  , data cannot be written to the tape.
- If the switch is set to unlocked, data can be written to the tape.

If possible, use your server's application software to write-protect your cartridges (rather than manually setting the write-protect switch). This allows the server's software to identify a cartridge that no longer contains current data and is eligible to become a scratch cartridge. Do not write-protect scratch (blank) cartridges; the tape drive will not be able to write new data to them.

If you must manually set the switch, slide it left or right to the desired position.

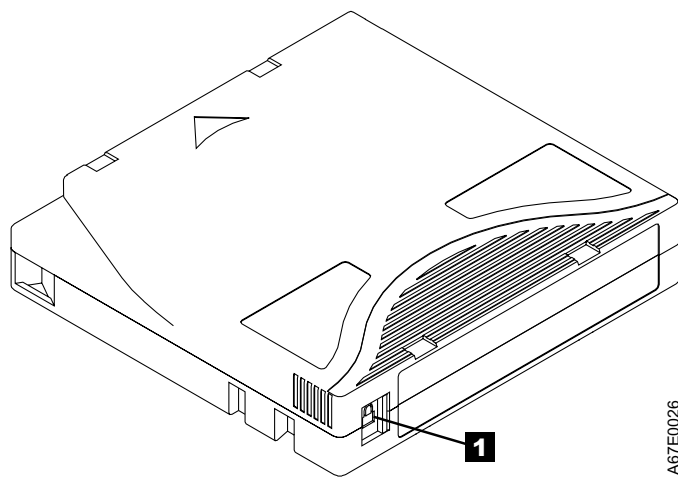


Figure 50. Setting the write-protect switch

Handling the Cartridges



Attention: Do not insert a damaged tape cartridge into your 3582 Ultrium Tape Library. A damaged cartridge can interfere with the reliability of a drive and may void the warranties of the drive and the cartridge. Before inserting a tape cartridge, inspect the cartridge case, cartridge door, and write-protect switch for breaks.

Incorrect handling or an incorrect environment can damage the IBM LTO Ultrium Tape Cartridges or their magnetic tape. To avoid damage to your tape cartridges and to ensure the continued high reliability of your IBM LTO Ultrium Tape Drives, use the following guidelines:

Provide Training

- Post procedures that describe proper media handling in places where people gather.
- Ensure that anyone who handles tape has been properly trained in handling and shipping procedures. This includes operators, users, programmers, archival services, and shipping personnel.
- Ensure that any service or contract personnel who perform archiving are properly trained in media-handling procedures.
- Include media-handling procedures as part of any services contract.
- Define and make personnel aware of data recovery procedures.

Ensure Proper Packaging

- When you ship a cartridge, ship it in its original or better packaging.
- Always ship or store a cartridge in a jewel case.
- Use only a recommended shipping container that securely holds the cartridge in its jewel case during transportation. Ultrium Turtlecases (by Perm-A-Store) have been tested and found to be satisfactory (see Figure 51 on page 67). They are available at www.turtlecase.com.



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Figure 51. Tape cartridges in a Turtlecase

- Never ship a cartridge in a commercial shipping envelope. Always place it in a box or package.
- If you ship the cartridge in a cardboard box or a box of a sturdy material, ensure the following:
 - Place the cartridge in polyethylene plastic wrap or bags to protect it from dust, moisture, and other contaminants.
 - Pack the cartridge snugly; do not allow it to move around.
 - Double-box the cartridge (place it inside a box, then place that box inside the shipping box) and add padding between the two boxes (see Figure 52).



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Figure 52. Double-boxing tape cartridges for shipping

Provide Proper Acclimation and Environmental Conditions

- Before you use a cartridge, let it acclimate to the normal operating environment for 1 hour. If you see condensation on the cartridge, wait an additional hour.
- Ensure that all surfaces of a cartridge are dry before inserting it.
- Do not expose the cartridge to moisture or direct sunlight.
- Do not expose recorded or blank cartridges to stray magnetic fields of greater than 100 oersteds (for example, terminals, motors, video equipment, X-ray equipment, or fields that exist near high-current cables or power supplies). Such exposure can cause the loss of recorded data or make the blank cartridge unusable.
- Maintain the conditions that are described in “Environmental and Shipping Specifications for Tape Cartridges” on page 69.

Perform a Thorough Inspection

After purchasing a cartridge and before using it, perform the following steps:

- Inspect the cartridge’s packaging to determine potential rough handling.
- When inspecting a cartridge, open only the cartridge door. Do not open any other part of the cartridge case. The upper and lower parts of the case are held together with screws; separating them destroys the usefulness of the cartridge.
- Inspect the cartridge for damage before using or storing it.
- Inspect the rear of the cartridge (the part that you load first into the tape load compartment) and ensure that there are no gaps in the seam of the cartridge case (see **1** in Figure 53 and **4** in Figure 55 on page 72). If there are gaps in the seam (see Figure 53), the leader pin may be dislodged. Go to “Repositioning or Reattaching a Leader Pin” on page 70.

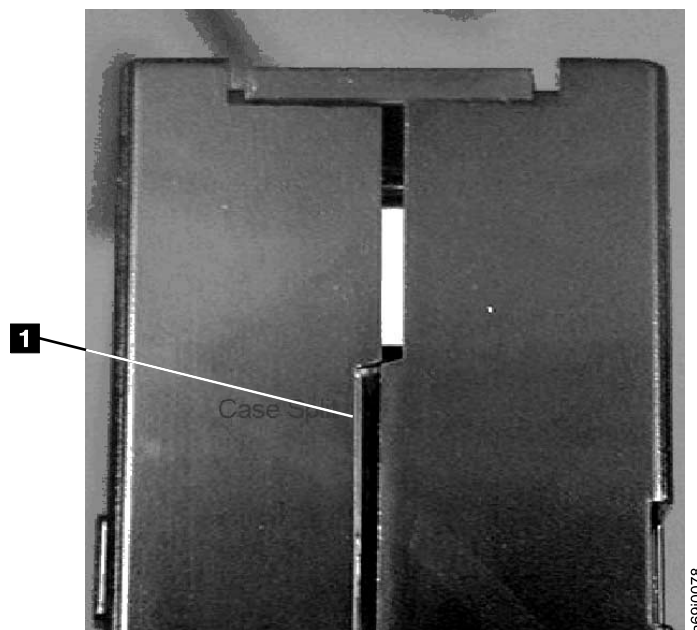


Figure 53. Checking for gaps in the seams of a cartridge

- Check that the leader pin is properly seated.
- If you suspect that the cartridge has been mishandled but it appears useable, copy any data onto a good cartridge immediately for possible data recovery. Discard the mishandled cartridge.

Handle the Cartridge Carefully

- Do not drop the cartridge. If the cartridge drops, slide the cartridge door back and ensure that the leader pin is properly seated in the pin-retaining spring clips (see **2** in Figure 54 on page 71). If the leader pin has become dislodged, go to “Repositioning or Reattaching a Leader Pin” on page 70.
- Do not handle tape that is outside the cartridge. Handling the tape can damage the tape’s surface or edges, which may interfere with read or write reliability. Pulling on tape that is outside the cartridge can damage the tape and the brake mechanism in the cartridge.
- Do not stack more than six cartridges.
- Do not degauss a cartridge that you intend to reuse. Degaussing makes the tape unusable.

Examples of Cartridge Problems

Example: Improper Placement of Leader Pin

The leader pin is misaligned. Perform the following steps:

1. Look for cartridge damage.
2. Use the IBM Leader Pin Reattachment Kit (part number 08L9129) to correctly seat the pin (see “Repositioning a Leader Pin” on page 70). Then, immediately use data recovery procedures to minimize chances of data loss.

Example: Split Cartridge Case

The cartridge’s case is damaged. There is a high possibility of media damage and potential loss. Perform the following steps:

1. Look for cartridge mishandling.
2. Use the IBM Leader Pin Reattachment Kit (part number 08L9129) to correctly seat the pin (see “Repositioning a Leader Pin” on page 70). Then, immediately use data recovery procedures to minimize chances of data loss.
3. Review media-handling procedures.

Environmental and Shipping Specifications for Tape Cartridges

Before you use a tape cartridge, acclimate it to the operating environment for 24 hours or the time necessary to prevent condensation in the drive (the time will vary, depending on the environmental extremes to which the drive was exposed).

The best storage container for the cartridges (until they are opened) is the original shipping container. The plastic wrapping prevents dirt from accumulating on the cartridges and partially protects them from humidity changes.

When you ship a cartridge, place it in its jewel case or in a sealed, moisture-proof bag to protect it from moisture, contaminants, and physical damage. Ship the cartridge in a shipping container that has enough packing material to cushion the cartridge and prevent it from moving within the container.

Table 6 on page 70 gives the environment for operating, storing, and shipping IBM LTO Ultrium Tape Cartridges.

Table 6. Environment for operating, storing, and shipping the IBM LTO Ultrium Tape Cartridge

Environmental Specifications				
Environmental Factor	Operating	Operational Storage	Archival Storage	Shipping
Temperature	10 to 45°C (50 to 113°F)	16 to 32°C (61 to 90°F)	16 to 25°C (61 to 77°F)	-23 to 49°C (-9 to 120°F)
Relative humidity (noncondensing)	10 to 80%	20 to 80%	20 to 50%	5 to 80%
Wet bulb temperature	26°C (79°F)	26°C (79°F)	26°C (79°F)	26°C (79°F)

Notes:

- Operational storage equals less than 1 year.
- Archival storage equals 1 to 10 years.

Repositioning or Reattaching a Leader Pin



Attention: Use a repaired tape cartridge only to recover data and move it to another cartridge. Continued use of a repaired cartridge may void the warranties of the drive and the cartridge.

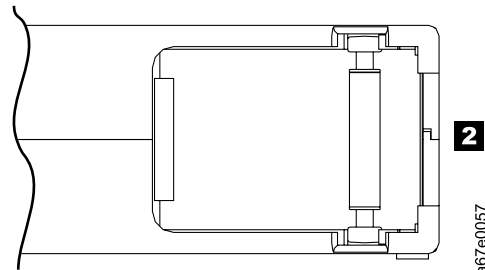
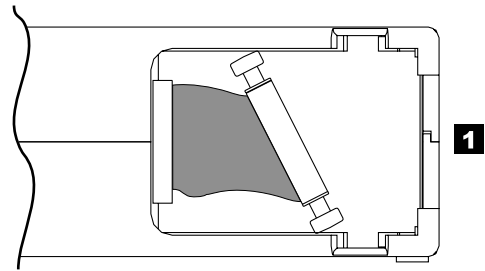
If the leader pin in your cartridge becomes dislodged from its pin-retaining spring clips or detaches from the tape, you must use the IBM Leader Pin Reattachment Kit (part number 08L9129) to reposition or reattach it. (Do not reattach the pin if you must remove more than 7 meters (23 feet) of leader tape.) The sections that follow describe each procedure.

Repositioning a Leader Pin

A leader pin that is improperly seated inside a cartridge can interfere with the operation of the drive. Figure 54 on page 71 shows a leader pin in the incorrect **1** and correct **2** positions.

To place the leader pin in its proper position, you will need the following tools:

- Plastic or blunt-end tweezers
- Cartridge manual rewind tool (from Leader Pin Reattachment Kit, part number 08L9129)



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Figure 54. Leader pin in the incorrect and correct positions. The cartridge door is open and the leader pin is visible inside the cartridge.

To reposition the leader pin, perform the following steps.

1. Slide open the cartridge door (**1** in Figure 55) and locate the leader pin **2** (you may need to shake the cartridge gently to roll the pin toward the door).
2. With plastic or blunt-end tweezers, grasp the leader pin and position it in the pin-retaining spring clips **3** .
3. Press the leader pin gently into the clips until it snaps into place and is firmly seated. Ensure that there are no gaps in the seam of the cartridge **4** .
Attention: If gaps exist, do not continue with this procedure and do not use the cartridge.
4. Close the cartridge door.

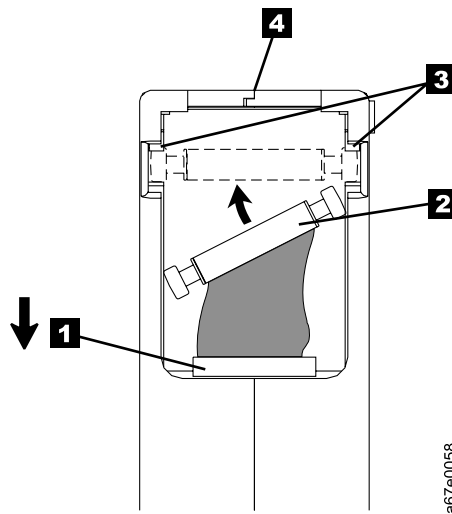


Figure 55. Placing the dislodged leader pin into the correct position. The cartridge door is open to show the leader pin.

5. To rewind the tape, insert the cartridge manual rewind tool (**1** in Figure 56) into the cartridge's hub **2** and turn it clockwise until the tape becomes taut.

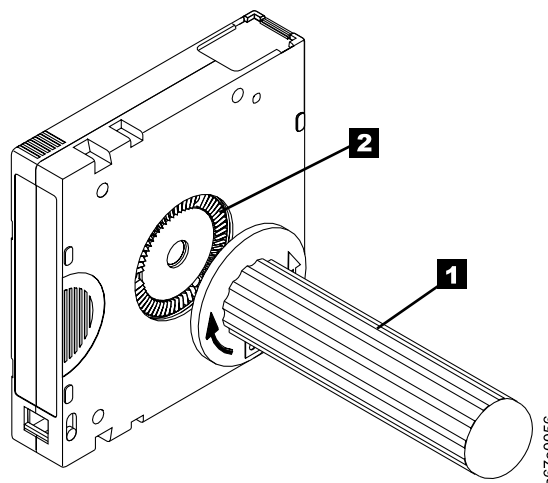


Figure 56. Rewinding the tape into the cartridge

6. Remove the rewind tool by pulling it away from the cartridge.

Reattaching a Leader Pin

The first meter of tape in a cartridge is leader tape. Once the leader tape has been removed there is a possibility of tape breakage. After reattaching the leader pin, transfer data from the defective tape cartridge. **Do not reuse the defective tape cartridge.**

The Leader Pin Reattachment Kit contains three parts:

- **Leader pin attach tool** (see **1** in Figure 57). A plastic brace that holds the cartridge door open.
- **Cartridge manual rewind tool** (see **2** in Figure 57). A device that fits into the cartridge's hub and lets you wind the tape into and out of the cartridge.
- **Pin supplies** (see **3** in Figure 57). Leader pins and C-clips.

Attention:

- Use only the IBM Leader Pin Reattachment Kit to reattach the leader pin to the tape. Other methods of reattaching the pin will damage the tape, the drive, or both.
- Use this procedure on your tape cartridge only when the leader pin detaches from the magnetic tape and you must copy the cartridge's data onto another cartridge. Destroy the damaged cartridge after you copy the data. This procedure may affect the performance of the leader pin during threading and unloading operations.
- Touch only the end of the tape. Touching the tape in an area other than the end can damage the tape's surface or edges, which may interfere with read or write reliability.

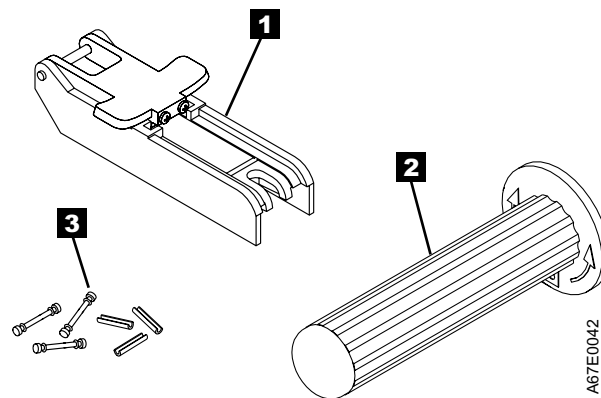


Figure 57. Leader Pin Reattachment Kit

The following procedure describes how to reattach a leader pin.

To reattach a leader pin by using the IBM Leader Pin Reattachment Kit:

1. Attach the leader pin attach tool (**1** in Figure 58) to the cartridge (**2**) so that the tool's hook (**3**) latches into the cartridge's door (**4**). Pull the tool back to hold the door open, then slide the tool onto the cartridge. Open the tool's pivot arm (**5**).

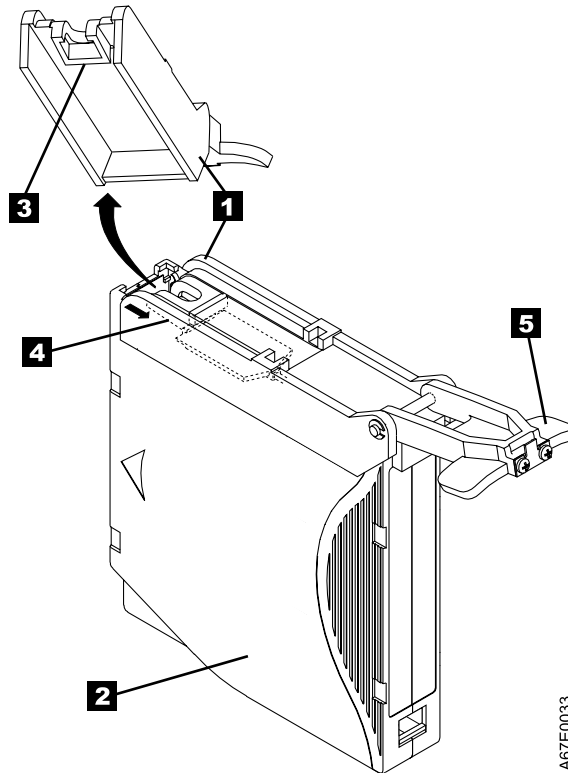


Figure 58. Attaching the leader pin attach tool to the cartridge. To hold the cartridge door open, hook the tool into the door and pull the tool back.

2. To find the end of the tape inside the cartridge, attach the cartridge manual rewind tool (**1** in Figure 59 on page 75) to the cartridge's hub (**2**) by fitting the tool's teeth between the teeth of the hub. Turn the tool clockwise until you see the end of the tape inside the cartridge. Then, slowly turn the rewind tool counterclockwise to bring the tape edge toward the cartridge door (**3**).
3. Continue to turn the rewind tool counterclockwise until approximately 13 cm (5 in.) of tape hangs from the cartridge door. If necessary, grasp the tape and pull gently to unwind it from the cartridge.
4. Remove the rewind tool by pulling it away from the cartridge. Set the tool and the cartridge aside.

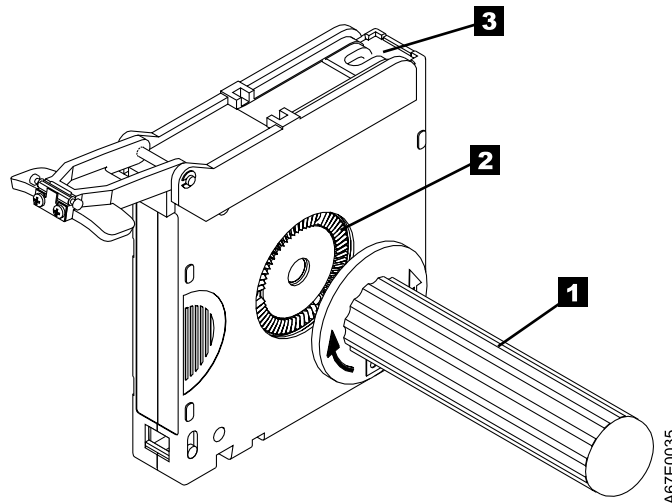


Figure 59. Winding the tape out of the cartridge. Turn the cartridge manual rewind tool clockwise to see the end of the tape, then turn it counterclockwise to bring the tape to the cartridge door.

5. On the leader pin (**1** in Figure 60), locate the open side of the C-clip **2** . The C-clip is a small black part that secures the tape **3** to the pin.
6. Remove the C-clip from the leader pin by using your fingers to push the clip away from the pin. Set the pin aside and discard the clip.

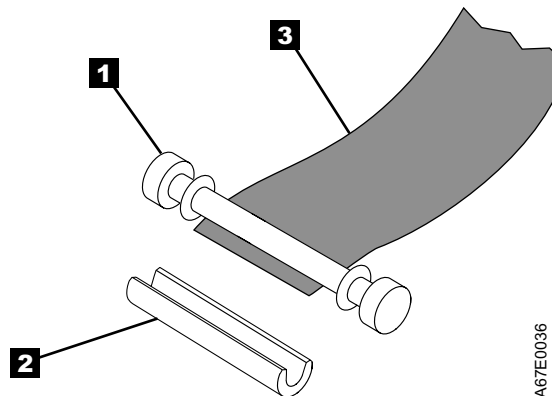


Figure 60. Removing the C-clip from the leader pin. Use your fingers to push the C-clip from the leader pin.

7. Position the tape in the alignment groove of the leader pin attach tool (see **1** in Figure 61 on page 76).
8. Place a new C-clip into the retention groove **2** (Figure 61 on page 76) on the leader pin attachment tool and make sure that the clip's open side faces up.
9. Place the leader pin (from step 6) into the cavity **3** (Figure 61 on page 76) of the leader pin attach tool.

Attention: To prevent the leader pin from rolling into the cartridge, in the following step use care when folding the tape over the pin.

10. Fold the tape over the leader pin and hold it with your fingers (see Figure 61 on page 76).

Note: Use care to ensure that the tape is centered over the leader pin. Failure to properly center the tape on the pin will cause the repaired cartridge to fail. When the tape is properly centered, a 0.25-mm (0.01-in.) gap exists on both sides of the pin.

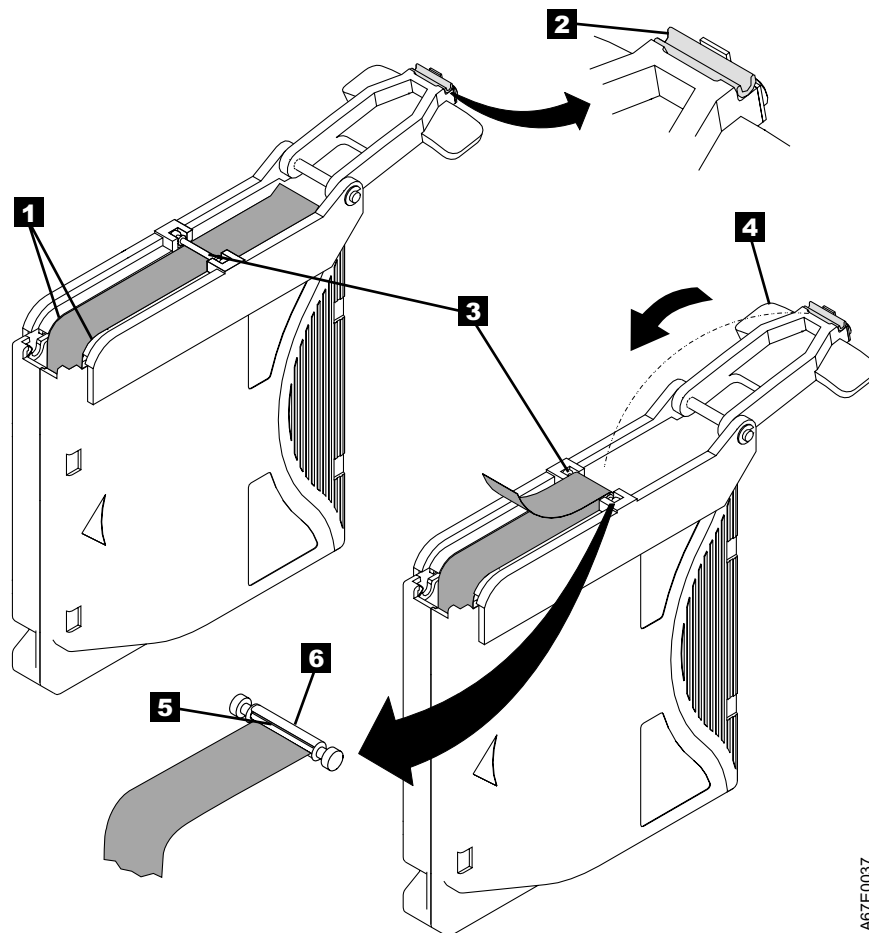


Figure 61. Attaching the leader pin to the tape

11. Close the pivot arm **4** of the leader pin attach tool by swinging it over the leader pin so that the C-clip snaps onto the pin and the tape.
12. Swing the pivot arm open and trim the excess tape **5** so that it is flush with the reattached leader pin **6**.
13. Use your fingers to remove the leader pin from the cavity **3** in the leader pin attach tool.
14. Use the cartridge manual rewind tool to wind the tape back into the cartridge (wind the tape clockwise). Ensure that the leader pin is latched by the pin-retaining spring clips on each end of the leader pin.
15. Remove the rewind tool.
16. Remove the leader pin attach tool by lifting its end up and away from the cartridge.



Attention: Use a repaired tape cartridge only to recover data and move it to another cartridge. Continued use of a repaired cartridge may void the warranties of the drive and the cartridge.

Disposing of Tape Cartridges

Under the current rules of the U.S. Environmental Protection Agency (EPA), regulation 40CFR261, the LTO Ultrium Tape Cartridge is classified as non-hazardous waste. As such, it may be disposed of in the same way as normal office trash. These regulations are amended from time to time, and you should review them at the time of disposal.

If your local, state, country (non-U.S.A.) or regional regulations are more restrictive than EPA 40CFR261, you must review them before you dispose of a cartridge. Contact your account representative for information about the materials that are in the cartridge.

If a tape cartridge must be disposed of in a secure manner, you can erase the data on the cartridge by using a high-energy ac degausser (use a minimum of 1200 oersted peak field over the entire space that the cartridge occupies). Degaussing makes the cartridge unusable.

If you burn the cartridge and tape, ensure that the incineration complies with all applicable regulations.

Ordering Media Supplies

Table 7 lists the data cartridges and media supplies that you can order for the 3582 Ultrium Tape Library.

Table 7. Ordering media supplies for the 3582 Ultrium Tape Library

Supply Item	Methods of Ordering
IBM TotalStorage LTO Ultrium 200 GB Data Cartridge Order VOLSER labels separately (see "Ordering Bar Code Labels" on page 78).	<ul style="list-style-type: none">• Order as part number 08L9870 through an IBM-authorized distributor (for the closest distributor, visit the web at http://www.ibm.com/storage/media), or• if you do not have Internet access, order the cartridge from any authorized IBM Business Partner or your IBM Sales Representative by specifying Machine Type 3589 Model 007 , or• call 1-888-IBM-MEDIA.
IBM TotalStorage LTO Ultrium 200 GB Data Cartridge Bar code labels are preapplied to cartridges.	<ul style="list-style-type: none">• Order as part number 19P5887 through an IBM-authorized distributor (for the closest distributor, visit the web at http://www.ibm.com/storage/media), or• if you do not have Internet access, order the cartridge from any authorized IBM Business Partner or your IBM Sales Representative by specifying Machine Type 3589 Model 006, or• call 1-888-IBM-MEDIA.

Table 7. Ordering media supplies for the 3582 Ultrium Tape Library (continued)

Supply Item	Methods of Ordering
<p>IBM LTO Ultrium 100 GB Data Cartridge</p> <p>Order VOLSER labels separately (see “Ordering Bar Code Labels”).</p>	<ul style="list-style-type: none"> • Order as part number 08L9120 through an IBM-authorized distributor (for the closest distributor, visit the web at http://www.ibm.com/storage/media), or • if you do not have Internet access, order the cartridge from any authorized IBM Business Partner or your IBM Sales Representative., or • call 1-888-IBM-MEDIA.
<p>IBM LTO Ultrium 100 GB Data Cartridge</p> <p>Bar code labels are preapplied to cartridges.</p>	<ul style="list-style-type: none"> • Order from an IBM-authorized distributor (for the closest distributor, visit the web at http://www.ibm.com/storage/media), or • if you do not have Internet access, order the cartridge from any authorized IBM Business Partner or your IBM Sales Representative by specifying Machine Type 3589 Model 002, or • call 1-888-IBM-MEDIA.
<p>IBM TotalStorage LTO Ultrium Cleaning Cartridge (universal cleaning cartridge for use with Ultrium 1 and Ultrium 2 drives)</p> <p>Order VOLSER labels separately (see “Ordering Bar Code Labels”).</p>	<ul style="list-style-type: none"> • Order as part number 35L2086 through an IBM-authorized distributor (for the closest distributor, visit the web at http://www.ibm.com/storage/media), or • if you do not have Internet access, order the cartridge from any authorized IBM Business Partner or your IBM Sales Representative by specifying Machine Type 3589 Model 004, or • call 1-888-IBM-MEDIA.
<p>IBM TotalStorage LTO Ultrium Cleaning Cartridge (universal cleaning cartridge for use with Ultrium 1 and Ultrium 2 drives)</p> <p>Bar code labels are preapplied to cartridges.</p>	<ul style="list-style-type: none"> • Order as part number 35L2087 through an IBM-authorized distributor (for the closest distributor, visit the web at http://www.ibm.com/storage/media), or • if you do not have Internet access, order the cartridge from any authorized IBM Business Partner or your IBM Sales Representative., or • call 1-888-IBM-MEDIA.
<p>Leader Pin Reattachment Kit</p>	<p>Order as part number 08L9129 through an IBM-authorized distributor (for the closest distributor, visit the web at http://www.ibm.com/storage/media).</p>

Ordering Bar Code Labels

Bar code labels with VOLSERS are required for cartridges that are read by the 3582 Ultrium Tape Library. You can order these labels separately from the IBM Data Cartridges and Cleaning Cartridges.

You can order bar code labels directly from the authorized label suppliers in Table 8 on page 79.

Table 8. Authorized suppliers of custom bar code labels

In the Americas	In Europe and Asia
<p>EDP/Colorflex 697 South Pierce Street Louisville, CO 80027 U. S. A. Telephone: 800-522-3528 http://www.colorflex.com/Ai/Home.asp</p>	<p>EDP Europe, Ltd. 43 Redhills Road South Woodham Ferrers Chelmsford, Essex CM3 5UL U. K. Telephone: 44 (0) 1245-322380 http://www.edpeurope.com/media_labelling.htm</p>
<p>Dataware 7570 Renwick Houston, TX 77081 U. S. A. Telephone: 800-426-4844 http://www.datawarelabels.com/</p>	<p>Dataware Labels Europe Heubergstrasse 9 D-83052 Bruckmuhl-Gotting Germany Telephone: 49 806-29455 http://www.datawarelabels.com/</p>
<p>NetC P. O. Box 320784 Fairfield, CT[®] 06432 U. S. A. Telephone: 203-372-6382 http://www.netc11c.com/</p>	<p>NetC Europe Ltd Town Farm Bungalow North Curry Taunton Somerset U. K. TA3 6LX Telephone: 44 (0) 1823 491439 http://www.netclabels.co.uk</p> <hr/> <p>NetC Asia Pacific Pty Ltd Locked Bag 14 Kenthurst NSW Australia 2156 Telephone: 61 (0) 2 9654 8272 http://www.netclabels.com.au</p>

Chapter 5. Using the Menus

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The Operator Panel provides a menu-driven operator interface to the library. The menus enable you to view and set the operating parameters of the library.

Summary of Menu Items

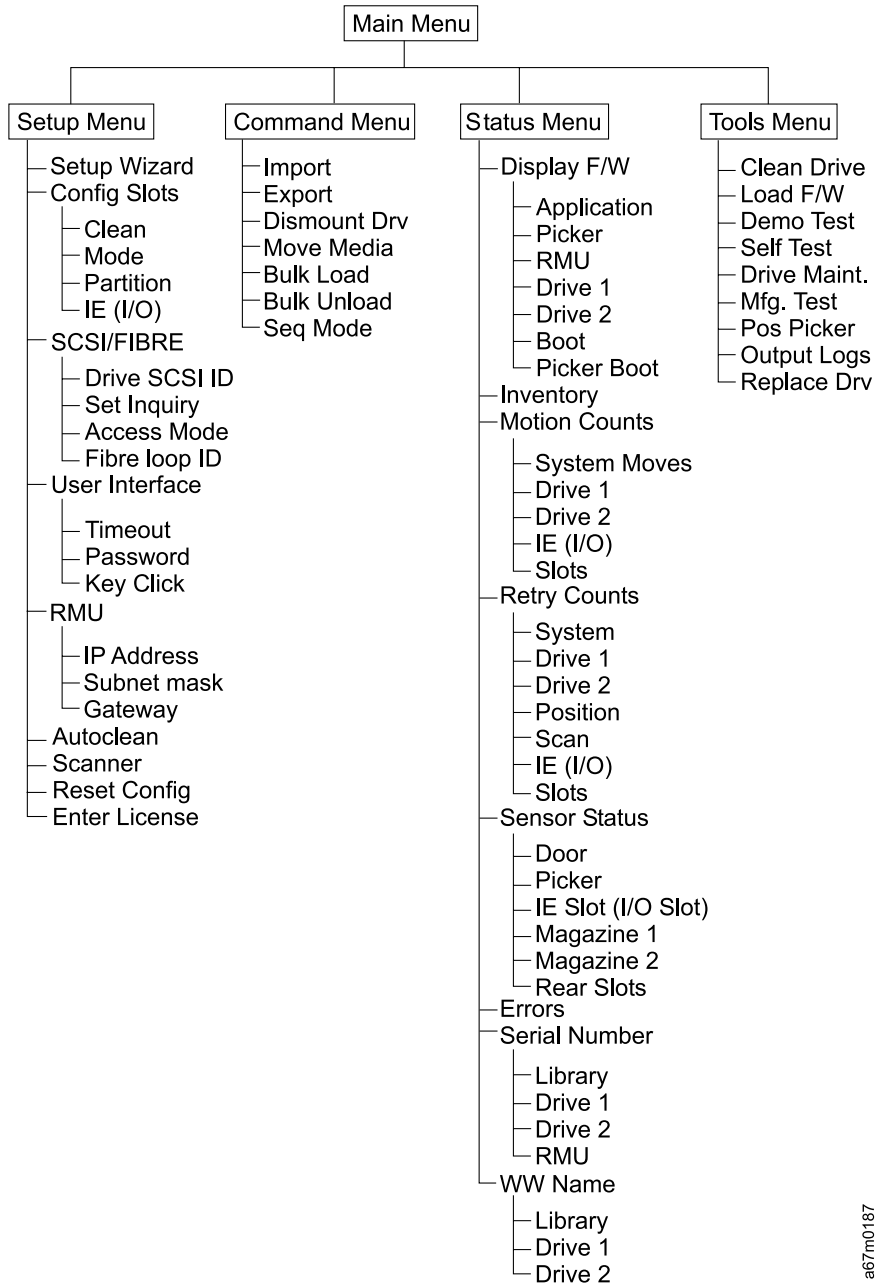
This section provides a summary of library operations, such as updating firmware, cleaning drives, and diagnostic operations. Use the following table to quickly locate operating procedures. The procedures listed below are available from the library's operator panel. Because the IBM TotalStorage Specialist web interface on the Remote Management Unit (RMU) has an operator panel tab selection, the same procedures are available remotely. The RMU, however, has additional tab selections, such as Firmware, which allows you to download library, drive and RMU firmware, and to upload library log information.

If You Want To Do This...	Go To Page...
Configure your Library with the Setup Wizard	89
Canceling the Setup Wizard	88
Configure Cleaning Slots	101
Configure Modes	103
Configure Partitions	105
Configure I/O Slot	107
Set Inquiry	109
Access Mode	111
Fibre Channel Loop ID	112
Set Timeout	114
Set Password	115
Set Key Clicks	117
Configure RMU	118
Configure Autoclean	120
Configure Bar Code Scanner	122
Reset Configuration	124
Enter License	125
Import Media	127
Export Media	131
Dismount Drive	134
Move Media	135
Bulk Load	137
Bulk Unload	139
Sequential	141
Display Firmware Version	146
Display Inventory Information	147
Display Motion Counts	149
Display Retry Counts	150
Display Sensor Status	151
Display Errors	152

If You Want To Do This...	Go To Page...
Display Serial Number	154
Display World Wide Name	155
Clean Drive	156
Load Firmware	157
Demo Test	159
Self Test	160
Drive Maintenance Test	161
Manufacturing Test	163
Position Picker	165
Output Logs	167
Replace a Drive	167

Each menu is accessible through the Operator Panel keypad. Refer to “Operator Panel Keyboard” on page 38 for an illustration and definition of the keypad. An illustration of the menu tree map is provided in Figure 62 on page 85.

Menu Tree Structure



a67m0187

Figure 62. Menu tree structure

Note: Partition will appear in the Configure Slots menu only if you have partitioned the library. For more information, see “Configure Modes” on page 103.

Go Offline?

Attention: The library goes offline if you select some of the Operator Panel's menu items. When the library is offline, the SCSI host has limited access to the library. The host can retrieve information from the library but cannot execute any new commands that change the state of the library, such as writing data or moving media. Commands in progress will be completed before the library goes offline. Entering the Main menu automatically returns the library to the online mode. All status information is available in offline mode.

The following screen prompts you to confirm that you are ready to go offline:

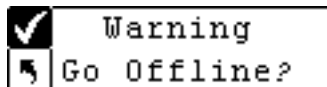


Figure 63. Go Offline?

Pressing



confirms that you are ready to go offline. If you do not want to go offline, highlight the



by pressing



or



, and then press



. The Operator Panel returns to the Main menu.

Main Menu

The Main menu is the initial screen that enables you to access the **Status**, **Command**, **Setup**, and **Tools** menus.

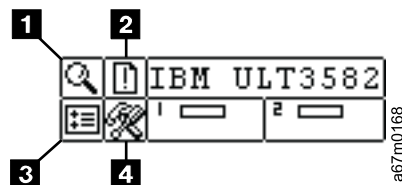
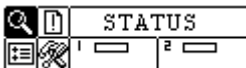





Figure 64. Main Menu

Menu	Description
 <p>The screenshot shows a menu titled "STATUS" with a search icon, a list icon, and a refresh icon. Below the title are two sub-menus labeled "1" and "2".</p>	<p>The "Status Menu" on page 145 (see 1 in Figure 64 on page 86) provides selections to:</p> <ul style="list-style-type: none"> • "Display Firmware Version" on page 146 • "Display Inventory Information" on page 147 • "Display Motion Counts" on page 149 • "Display Retry Counts" on page 150 • "Display Sensor Status" on page 151 • "Display Errors" on page 152 • "Display Serial Number" on page 154 • "Display World Wide Name" on page 155
 <p>The screenshot shows a menu titled "COMMAND" with a search icon, a list icon, and a refresh icon. Below the title are two sub-menus labeled "1" and "2".</p>	<p>The "Command Menu" on page 126 (see 2 in Figure 64 on page 86) provides selections to:</p> <ul style="list-style-type: none"> • "Import Media" on page 127 • "Export Media" on page 131 • "Dismount Drive" on page 134 • "Move Media" on page 135 • "Bulk Load" on page 137 • "Bulk Unload" on page 139 • "Sequential" on page 141
 <p>The screenshot shows a menu titled "SETUP" with a search icon, a list icon, and a refresh icon. Below the title are two sub-menus labeled "1" and "2".</p>	<p>The "Setup Menu" on page 88 (see 3 in Figure 64 on page 86) provides selections for:</p> <ul style="list-style-type: none"> • "Setup Wizard" on page 88 • "Configure Slots" on page 101 • "SCSI and Fibre Channel Loop ID Settings" on page 108 • "User Interface" on page 113 • "Configure RMU" on page 118 • "Configure Autoclean" on page 120 • "Configure Bar Code Scanner" on page 122 • "Reset Configuration" on page 124 • "Enter License" on page 125
 <p>The screenshot shows a menu titled "TOOLS" with a search icon, a list icon, and a refresh icon. Below the title are two sub-menus labeled "1" and "2".</p>	<p>The "Tools Menu" on page 156 (see 4 in Figure 64 on page 86) provides selections to:</p> <ul style="list-style-type: none"> • "Clean Drive" on page 156 • "Load Firmware" on page 157 • "Demo Test" on page 159 • "Self Test" on page 160 • "Drive Maintenance Test" on page 161 • "Manufacturing Test" on page 163 • "Position Picker" on page 165 • "Output Logs" on page 167 • "Replace a Drive" on page 167

The following sections provide descriptions of each menu and instructions on how to use the options in each menu. This information is presented in the order that you would want to access information and configure options when you first set up your library.

Setup Menu

The **Setup** menu enables you to make library system settings. From the **Setup** menu you can:

- Use the Setup Wizard (see **1** in Figure 65)
- Configure slots (see **2** in Figure 65)
- Set SCSI IDs (see **3** in Figure 65)
- Configure the user interface (see **4** in Figure 65)
- Configure the RMU (see **5** in Figure 65)
- Configure Autocleaning (see **6** in Figure 65)
- Configure the bar code scanner (see **7** in Figure 65)
- Reset configuration (see **8** in Figure 65)
- Enter license keys (see **9** in Figure 65)

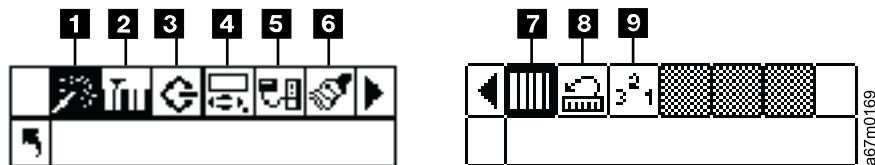
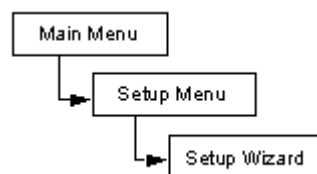


Figure 65. Setup menu

Setup Wizard

The Setup Wizard walks you through the process of configuring your library. Using the wizard, you can configure all of the settings that you want from one location in the menu instead of going to each individual item in the menu.

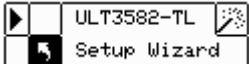



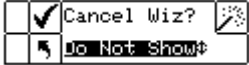




Path:



While the Setup Wizard simplifies the configuration of your library, you can choose to configure your library without it. See “Canceling the Setup Wizard” to bypass the Setup Wizard.

Canceling the Setup Wizard

If you do not use the Setup Wizard to configure your library and do not want to be prompted to use it each time you power up your library, you can cancel it by following the steps below.

Selection	Description/Result
 <p>Step 1 At the Setup Wizard prompt, Press  to select . Press .</p>	Cancels the Setup Wizard.
 <p>Step 2 You will be prompted to cancel the Setup Wizard. Press  to select Do Not Show.</p>	
<p>Step 3 Press  to highlight Execute () and then press .</p>	The Setup Wizard closes and will not be shown again at power up. To access the Setup Wizard, go to the Setup menu.






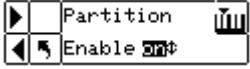



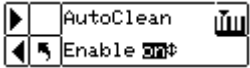


Configuring your Library with the Setup Wizard



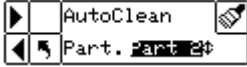




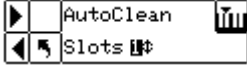




If you want to use partitioning, it is recommended that you complete the steps in “Configure Slots” on page 101 before starting the Setup Wizard.

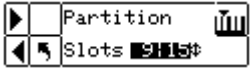



At any time, you can select

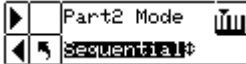


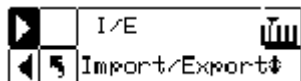



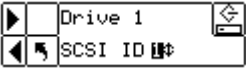

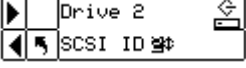

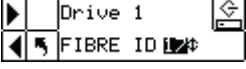
to exit the Setup Wizard and cancel changes.



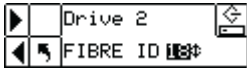









Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight</p>  <p>and press</p> 	<p>Runs the Setup Wizard.</p>
 <p>Step 2 Press</p>  <p>to begin using the wizard.</p>	
 <p>Step 3 Press</p>  <p>or</p>  <p>to enable or disable partitioning. After enabling or disabling partitioning, highlight the right arrow and then press the action button</p>  <p>to continue to Step 4.</p>	<p>Available options are:</p> <p>on Library is split into two partitions. The host will be affected (reduced slot) based on which partition it is attached to.</p> <p>off Host sees entire library.</p>
 <p>Step 4 Press</p>  <p>or</p>  <p>to enable or disable Autoclean. If you do not enable Autoclean, skip to Step 10.</p>	<p>Available options are:</p> <p>on The library automatically cleans the drives when cleaning is required. Overall slots available for data cartridges are reduced. Host software cleaning features must be turned off.</p> <p>off Autoclean is disabled.</p>

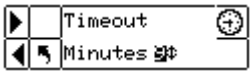



Selection	Description/Result
<p>Step 5 Press  and then  to accept the changes and move to the next option.</p>	
<p> Step 6 Press  or  to select the mode for Autoclean.</p>	<p>Available options are:</p> <p>Both Cleans both partitions.</p> <p>Part 1 Only cleans Partition 1.</p> <p>Part 2 Only cleans Partition 2.</p>
<p>Step 7 Press  and then  to accept the changes and move to the next option.</p>	
<p> Step 8 Press  or  to select the number of cleaning slots you want to configure.</p>	<p>You can allocate up to four slots to be used for cleaning.</p> <p>Slots 20 - 23 can be used as cleaning slots. For more information, see "Configure Cleaning Slots" on page 101.</p>
<p>Step 9 Press  and then  to accept the changes and move to the next option.</p> <p>If you did not enable partitioning, skip to Step 16.</p>	

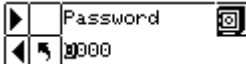

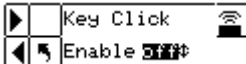

Selection	Description/Result
 <p>Step 10 If you enabled partitioning, press ▲ or ▼ to select the number of slots for Partition 1 and Partition 2.</p>	<p>The slots in the magazine on the left are always Partition 1 and the slots in the magazine on the right are always Partition 2.</p> <p>You can designate a minimum of 8 slots for each Partition (7 magazine slots and 1 rear slot).</p> <p>You can designate a maximum of 16 slots for Partition 1 (7 magazine slots, 8 rear slots, and the I/O slot, if configured as a data slot). You can designate a maximum of 15 slots for Partition 2 (7 magazine slots and 8 rear slots). If you configure cleaning slots, the total number of rear slots available will be reduced. See “Configure Cleaning Slots” on page 101 for more information.</p>
<p>Step 11 Press ▶ and then  to accept the changes and move to the next option.</p>	
 <p>Step 12 Press ▲ or ▼ to select the mode for Partition 1.</p>	<p>Available options are:</p> <p>Random It enables your host application software to access any tape cartridge randomly and permits you to logically divide the cartridge usage to satisfy particular storage needs.</p> <p>Sequential Requires the backup software to write the data to each of the tape cartridges sequentially, starting with the first one. This mode is used if your host only recognizes tape drives and not libraries.</p>
<p>Step 13 Press ▶ and then  to accept the changes and move to the next option.</p>	

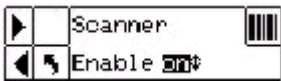



Selection	Description/Result
 <p>Step 14 Press ▲ or ▼ to select the Mode for Partition 2.</p>	<p>Available options are:</p> <p>Random It enables your host application software to access any tape cartridge randomly and permits you to logically divide the cartridge usage to satisfy particular storage needs.</p> <p>Sequential Requires the backup software to write the data to each of the tape cartridges sequentially, starting with the first one.</p>
<p>Step 15 Press ▶ and then  to accept the changes and move to the next option.</p>	
 <p>Step 16 Press ▲ or ▼ to select the configuration of the I/O slot.</p>	<p>Available options are:</p> <p>Import/Export Host will see one input/output slot and 23 data slots.</p> <p>Storage Appears as a valid storage location to the host application (host will see 24 data slots). Recommended: Import/Export</p> <p>Attention: If you have earlier selected to set partitioning to "on", steps 16 and 17 will not be available.</p>
 <p>Step 17 Press ▶ and then  to accept the changes and move to the next option.</p>	




Selection	Description/Result
 <p>Step 18 Press ▲ or ▼ to set the SCSI ID for Drive 1.</p>	<p>You must select a number between 0 and 15. Default: 1</p>
<p>Step 19 Press ▶ and then  to accept the changes and move to the next option.</p>	
 <p>Step 20 Press ▲ or ▼ to set the SCSI ID for Drive 2.</p>	<p>You must select a number between 0 and 15. Default: 2</p>
<p>Step 21 Press ▶ and then  to accept the changes and move to the next option.</p>	
 <p>Step 22 Press ▲ or ▼ to set the Fibre Channel Loop ID for Drive 1.</p>	<p>You must select a number between 0 and 126. Default: 17</p>












Selection	Description/Result
<p>Step 23</p> <p>Press </p> <p>and then </p> <p>to accept the changes and move to the next option.</p>	
 <p>Step 24</p> <p>Press </p> <p>or </p> <p>to set the Fibre Channel Loop ID for Drive 2.</p>	<p>You must select a number between 0 and 126.</p> <p>Default: 18</p>
<p>Step 25</p> <p>Press </p> <p>and then </p> <p>to accept the changes and move to the next option.</p>	
 <p>Step 26</p> <p>Press </p> <p>or </p> <p>to set the Inquiry mode.</p>	<p>Sets the inquiry string returned to the host in a SCSI inquiry command.</p> <p>Available options are:</p> <ul style="list-style-type: none"> • ULT3582-TL • ULT3583-TL • Scalar 24 • Scalar 100 <p>Recommended: ULT3582-TL</p>
<p>Step 27</p> <p>Press </p> <p>and then </p> <p>to accept the changes and move to the next option.</p>	





Selection	Description/Result
 <p>Step 28</p> <p>Press ▲</p> <p>or ▼</p> <p>to set the number of minutes for the timeout value.</p>	<p>Sets the duration of inactivity on a submenu, which will cause the menu to go back to the Main screen and online state.</p> <p>The timeout window is represented in minutes. You must specify a value between 1 and 9.</p> <p>The default setting is 9 minutes.</p> <p>If you have a password set, after the timeout window has expired, the password will need to be reentered to access the secure menu features.</p>
<p>Step 29</p> <p>Press ▶</p> <p>and then</p>  <p>to accept the changes and move to the next option.</p>	
 <p>Step 30</p> <p>Press ▲</p> <p>or ▼</p> <p>to enable or disable a password.</p>	<p>Available options are:</p> <p>on The password is required to enter any menu except Status.</p> <p>off Password is disabled.</p> <p>Note: If the password is enabled through the SCSI host, you cannot modify or disable the password using the LCD.</p>
<p>Step 31</p> <p>Press ▶</p> <p>and then</p>  <p>to accept the changes and move to the next option.</p>	

Selection	Description/Result
 <p>Step 32</p> <p>If you enabled a password, set the password by pressing</p> <p>▲</p> <p>or</p> <p>▼</p> <p>to change the value of the current field and</p> <p>▶</p> <p>or</p> <p>◀</p> <p>to move between fields. If you did not enable a password, skip to Step 34.</p>	<p>The current field is highlighted. You must select a numeric value between 0 and 9 for all four fields.</p>
<p>Step 33</p> <p>Press</p> <p>▶</p> <p>and then</p>  <p>to accept the changes and move to the next option.</p>	
 <p>Step 34</p> <p>Press</p> <p>▲</p> <p>or</p> <p>▼</p> <p>to enable or disable key clicks.</p>	<p>Available options are:</p> <p>on An audible tone is heard when buttons are pressed on the keypad.</p> <p>off Key clicks are disabled.</p> <p>Recommended: off</p>
<p>Step 35</p> <p>Press</p> <p>▶</p> <p>and then</p>  <p>to accept the changes and move to the next option.</p>	

Selection	Description/Result
 <p>Step 36 Press ▲ or ▼ to enable or disable the bar code scanner. If you disable the scanner, skip to Step 40.</p>	<p>Available options are:</p> <p>on All media is scanned for bar codes. Unlabeled or unreadable labeled media generates a user message.</p> <p>off Bar code scanner is disabled.</p> <p>Recommended: on</p>
<p>Step 37 Press ▶ and then  to accept the changes and move to the next option.</p>	
 <p>Step 38 Press ▲ or ▼ to select the bar code scanner mode.</p>	<p>Available options are:</p> <p>Default The scanner expects to read and reports to the host six characters. Optional one- or two-character media identifiers can be present but are not reported.</p> <p>Media ID The scanner expects to read and reports to the host seven or eight characters (six plus the media identifier).</p> <p>Extended The scanner reads and reports to the host between five and sixteen characters.</p> <p>Recommended: Extended</p>
<p>Step 39 Press ▶ and then  to accept the changes and move to the next option.</p>	

Selection	Description/Result
<p>Note: The IP Address, Subnet Mask, and Gateway options are present only if a RMU is installed. These items set up the network configuration of the RMU.</p>  <p>Step 40</p> <p>Set the IP Address by pressing</p> <p>▲</p> <p>or</p> <p>▼</p> <p>to change the value of the current field and</p> <p>▶</p> <p>or</p> <p>◀</p> <p>to move between fields. If an RMU is not installed, skip to step 44.</p>	<p>The current field is highlighted. Make sure that you enter a valid number for each field.</p>
<p>After the last digit is entered, select the right arrow, then press</p> <p>▶</p> <p>, and then press</p>  <p>to accept the changes and move to the next option.</p>	
 <p>Step 41</p> <p>Set the Subnet mask by pressing</p> <p>▲</p> <p>or</p> <p>▼</p> <p>to change the value of the current field and</p> <p>▶</p> <p>or</p> <p>◀</p> <p>to move between fields.</p>	<p>The current field is highlighted. Make sure that you enter a valid number for each field.</p>

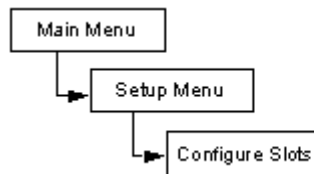
Selection	Description/Result
<p>After the last digit is entered, select the right arrow, then press </p> <p>, and then press </p> <p>to accept the changes and move to the next option.</p>	
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Gateway\$ <input type="checkbox"/> 000.000.000.000 </div> <p>Step 42</p> <p>Set the gateway by pressing </p> <p>or </p> <p>to change the value of the current field and </p> <p>or </p> <p>to move between fields.</p>	<p>The current field is highlighted. Make sure that you enter a valid number for each field.</p>
<p>After the last digit is entered, select the right arrow, then press </p> <p>, and then press </p> <p>to accept the changes and move to the next option.</p>	
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Gateway\$ <input type="checkbox"/> 000.000.000.000 </div> <p>Step 43</p> <p>From the last field of the gateway address, press </p> <p>to select the right arrow icon. Press </p> <p>, and then press </p> <p>to accept the changes.</p>	

Selection	Description/Result
<div> <input checked="" type="checkbox"/> Accept  <input type="checkbox"/> Wizard Values  </div> <p> Step 44 You have now completed the Setup Wizard. Press  to accept all values. </p>	
<div> <input checked="" type="checkbox"/> Setup Wizard Complete. </div> <p> Step 45 Press  to exit the wizard. </p>	<p>The display will return to the main menu, and the library will be returned to online.</p>

Configure Slots





Configure Slots enables you to set up specific slots of your library to be allocated for various functions, such as cleaning and partitioning.


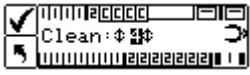
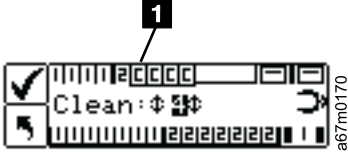
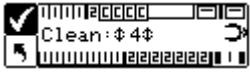
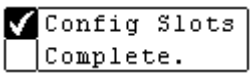
Path:



Configure Cleaning Slots

This option enables you to designate specific rear slots to be used as cleaning slots. If you want to enable autocleaning, you must configure at least one cleaning slot. For more information on autocleaning, see "Configure Autoclean" on page 120.

Selection	Description/Result
<div>  <input type="checkbox"/> Config Slots  </div> <p> Step 1 From the Setup menu, highlight  and press . </p>	<p>Configures cleaning slots.</p>

Selection	Description/Result
 <p>Step 2 Press ▲ or ▼ to select Clean.</p>	
<p>Step 3 Press ▶ to move to the next field.</p>	
 <p>Step 4 Press ▲ or ▼ to select the number of slots that you want to allocate as cleaning slots.</p>	<p>You can allocate up to four slots to be used for cleaning.</p> <p>Slots 20 - 23 can be used as cleaning slots. When a slot is configured for cleaning, a C appears in that slot (see 1 in Figure 66).</p>  <p><i>Figure 66. Cleaning Slot</i></p> <p>Note: If partitioning is configured, the number of rear slots may be limited to allow at least one slot in Partition 2.</p>
 <p>Step 5 Press ▶ to highlight Execute (<input checked="" type="checkbox"/>) and then press ⏺</p>	
 <p>Step 6 A confirmation screen is displayed. Press ⏺ to return to the Main menu.</p>	<p>The cleaning slots are now configured.</p>

Configure Modes

This option enables you to set up your library to run in Random or Sequential mode.

Random








This mode is used when you are connected to host application software that recognizes a library media changer device. It enables your host application software to access any tape cartridge randomly and permits you to logically divide the cartridge usage to satisfy particular storage needs. This is the default setting and the mode that most host software will use.




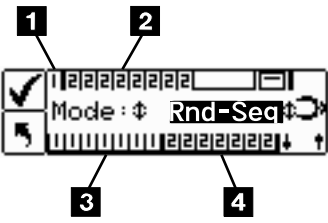
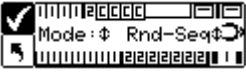



Sequential

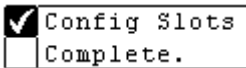

Sequential mode is used with host software applications that recognize tape drives, but do not recognize a library media changer. In this mode, the library (not the host application software) keeps track of the tape locations and manages the insertion and removal of tape media to the drives. When a backup is performed using Sequential mode, data is written to the tapes in the order in which they are stored in the library.

If you are operating in Sequential mode, your library is not recognized by a host. You must use the **Command** menu to start and stop this mode. If you set your mode to Sequential, you need to configure the sequential options. For more information on configuring sequential options, see “Sequential” on page 141.

Attention: You may overwrite data if you select this menu item. Ensure you have the proper amount of cartridges for performing the backup.

Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight</p>  <p>and press</p>  <p>.</p>	Configures library operational access modes.
 <p>Step 2 Press</p>  <p>or</p>  <p>to select Mode.</p>	
<p>Step 3 Press</p>  <p>to move to the next field.</p>	

Selection	Description/Result
 <p>Step 4 Press  or  to select the backup mode.</p>	<p>There are six mode settings:</p> <p>Rnd Sets the library to Random mode.</p> <p>Seq Sets the library to Sequential mode.</p> <p>Rnd-Seq Sets Partition 1 to Random mode and Partition 2 to Sequential mode.</p> <p>Seq-Rnd Sets Partition 1 to Sequential mode and sets Partition 2 to Random mode.</p> <p>Seq-Seq Sets both partitions to Sequential mode.</p> <p>Rnd-Rnd Sets both Partition 1 and Partition 2 to Random mode.</p> <p>If you partitioned the library, the LCD will show you which slots have been designated for Partition 1 and Partition 2 by placing numbers in the slots. See 1, 2, 3, 4 in Figure 67. You can change the partitioning setup using "Configure Partitions" on page 105.</p>  <p><i>Figure 67. Partitioning</i></p>
 <p>Step 5 Press  to highlight  and then press </p>	<p>The library is configured to the specified modes.</p>

Selection	Description/Result
 <p>Step 6 A confirmation screen is displayed. Press  to dismiss.</p>	








Configure Partitions




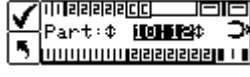
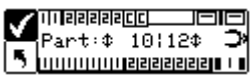



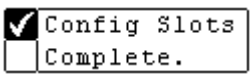

Note: Partition will appear in the Configure Slots menu only if you have partitioned the library. For more information, see “Configure Modes” on page 103.

You can logically partition your single library so that it will appear to a host as if it were two independent physical libraries. Each logical library (partition) can be independently controlled as if it were two different libraries.

Each partition can operate in one of two modes: random or sequential.




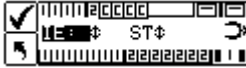



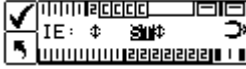


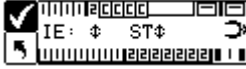



The partition size is configurable. Each partition is assigned one of the front magazines but can have a configurable number of rear slots assigned. The first drive module is assigned to the first partition and the second drive module is assigned to the second partition. If the library is not partitioned, all data slots and drive modules are assigned to a single partition. Follow the procedure below to configure partitions.


Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight  and press .</p>	Configures partitions.
 <p>Step 2 Press  or  to select Partition.</p>	
<p>Step 3 Press  to move to the next field.</p>	

Selection	Description/Result
 <p>Step 4 Press  or  to select the number of slots you want to designate for Partition 1 and Partition 2.</p>	<p>The slots in the magazine on the left are always Partition 1 and the slots in the magazine on the right are always Partition 2.</p> <p>You can designate a minimum of 8 slots for each Partition (7 magazine slots and 1 rear slot).</p> <p>You can designate a maximum of 16 slots for Partition 1 (7 magazine slots, 8 rear slots, and the I/O slot, if configured as a data slot). You can designate a maximum of 15 slots for Partition 2 (7 magazine slots and 8 rear slots). If you configure cleaning slots (Figure 68), the total number of slots available for both partitions is reduced. See “Configure Cleaning Slots” on page 101 for more information.</p> <p>As you scroll through the list of slots, the LCD will dynamically show you which slots are designated for Partition 1 and Partition 2 by placing numbers (1 or 2) in the slots. If you configure cleaning slots, they will be displayed with the letter 'C' in the Operator Panel (see Figure 68).</p>  <p><i>Figure 68. Mode Settings</i></p>
 <p>Step 5 Press  to highlight Execute (), then press .</p>	<p>The library is configured for the specified partitions.</p>
 <p>Step 6 A confirmation screen is displayed. Press  to dismiss.</p>	

Configure I/O Slot

This option enables you to configure the I/O slot as either a storage slot or an Import/Export slot. If it is configured as a storage slot, it will show up as a valid storage slot to the host application.

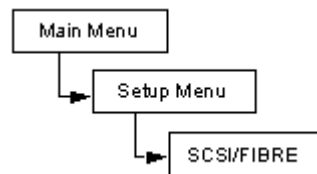
Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight</p>  <p>and press</p>  <p>.</p>	Configures I/O.
 <p>Step 2 Press</p>  <p>or</p>  <p>to select I/O.</p>	
<p>Step 3 Press</p>  <p>to move to the next field.</p>	
 <p>Step 4 Press</p>  <p>or</p>  <p>to select configuration option.</p>	<p>Available options are:</p> <p>ST Appears as a valid storage location to the host application (host will see 24 data slots). If partitioning is enabled, this slot is in Partition 1.</p> <p>I/O Server detects one import/export slot and 23 data slots.</p>
 <p>Step 5 Press</p>  <p>to highlight Execute (</p>  <p>), then press</p>  <p>.</p>	The I/O slot is configured.

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Config Slots <input type="checkbox"/> Complete. </div> <p>Step 6 A confirmation screen is displayed. Press  to dismiss.</p>	

SCSI and Fibre Channel Loop ID Settings


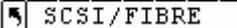



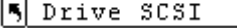


SCSI/FIBRE enables you to set the SCSI and Fibre Channel Loop ID for the library and drives. The IDs identify which ID the library and drives respond to when communicating with the server.















Path:



Set Drive SCSI IDs







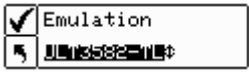


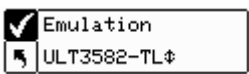



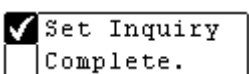

The SCSI IDs of the drives identify which IDs the drives use to communicate with the host.

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;">   </div> <p>Step 1 From the Setup menu, highlight  and press .</p>	Sets SCSI and Fibre Channel Loop IDs.
<div style="border: 1px solid black; padding: 2px;">   </div> <p>Step 2 Highlight  and press .</p>	Sets the drive SCSI IDs.

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Drive1: 1  <input type="checkbox"/> Drive2: 2  </div> <p>Step 3 Press  or  to select the ID that you want to set for the Drive 1.</p>	<p>You must select a number between 0 and 15. The default ID is 1.</p> <p>Note: SCSI ID 7 is typically for the host.</p>
<p>Step 4 If you have two drives installed, Press  to highlight Drive 2.</p>	
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Drive1: 1  <input type="checkbox"/> Drive2: 2  </div> <p>Step 5 Press  or  to select the ID that you want to set for the Drive 2.</p>	<p>You must select a number between 0 and 15. Ensure that this ID is different from the IDs that you set for Drive 1 and the library. The default is 2.</p> <p>Note: SCSI ID 7 is typically for the host.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Drive1: 1  <input type="checkbox"/> Drive2: 2  </div> <p>Step 6 Press  to highlight Execute (<input checked="" type="checkbox"/>) and then press  .</p>	<p>The SCSI IDs are set.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Set Drive ID <input type="checkbox"/> Complete. </div> <p>Step 7 A confirmation screen is displayed. Press  to dismiss.</p>	

Set Inquiry

Set Inquiry enables the server to detect your library as another existing IBM Tape Library product. This can be useful if the server software does not currently include drivers to communicate with the library.







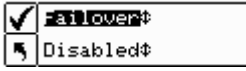





Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight  and press .</p>	Sets SCSI and fibre settings.
 <p>Step 2 Highlight  and press .</p>	Sets Inquiry string.
 <p>Step 3 Press  or  to select the product that you want your library provider to appear to the server as.</p>	Sets the inquiry string returned to the host in a SCSI inquiry command. Available options are: <ul style="list-style-type: none"> • ULT3582-TL • ULT3583-TL • Scalar 24 • Scalar 100
 <p>Step 4 Press  to highlight Execute () and then press .</p>	The inquiry string is set.
 <p>Step 5 A confirmation screen is displayed. Press  to dismiss.</p>	




Access Mode

Access Mode enables you to set control path failover and additional control paths.

The Control Path Failover feature enables the server to switch the control of the library from one drive to the other in the event of a communication failure. For additional details, see “Using Multiple Control Paths for Control Path Failover” on page 14.







Adding Control Paths will allow the library to be in control.










Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight</p>  <p>and press</p> 	Sets SCSI IDs.
 <p>Step 2 Highlight</p>  <p>and press</p> 	Sets access mode.
 <p>Step 3 Press</p>  <p>or</p>  <p>to select the control path.</p>	Sets Control Path Available options are: <ul style="list-style-type: none"> • Failover • Addl ctrl paths
 <p>Step 4 Press</p>  <p>or</p>  <p>to enable or disable the selected control path.</p>	Enables or disables the selected Control Path mode. Available options are: <ul style="list-style-type: none"> • Enabled • Disabled

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Addl ctrl paths† <input type="checkbox"/> Disabled† </div> <p>Step 5 Press  to highlight Execute (<input checked="" type="checkbox"/>), and then press  .</p>	The access mode is set.
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Set Access <input type="checkbox"/> Complete. </div> <p>Step 6 A confirmation screen is displayed. Press  to dismiss.</p>	

Fibre Channel Loop ID

The Fibre Channel Loop ID of the drives identifies which ID the drives use to communicate with the server.

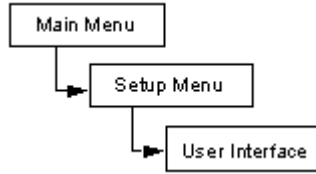
Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;">  <input type="checkbox"/> SCSI/FIBRE </div> <p>Step 1 From the Setup menu, highlight  and press  .</p>	Sets IDs.
<div style="border: 1px solid black; padding: 2px;">  <input type="checkbox"/> Fibre loop ID </div> <p>Step 2 Highlight  and press  .</p>	Sets Fibre Channel Loop IDs.

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> FC ID1: 17 <input type="checkbox"/> FC ID2: 2 </div> <p>Step 3 Press  or  to select the ID that you want to set for Drive 1.</p>	<p>You must select a number between 0 and 127. The default ID is 17.</p>
<p>Step 4 If you have two drives installed, press  to highlight Drive 2.</p>	
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> FC ID1: 1 <input type="checkbox"/> FC ID2: 2 </div> <p>Step 5 Press  or  to select the ID that you want to set for Drive 2.</p>	<p>You must select a number between 0 and 127. Ensure that this ID is different from the IDs you set for Drive 1 and the library. The default is 18.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> FC ID1: 1 <input type="checkbox"/> FC ID2: 2 </div> <p>Step 6 Press  to highlight Execute () and then press  .</p>	<p>The drive Fibre Channel Loop IDs are set.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Set Fibre ID <input type="checkbox"/> Complete. </div> <p>Step 7 A confirmation screen is displayed. Press  to dismiss.</p>	

User Interface

User Interface enables you to configure the LCD timeout, password, and key click settings.







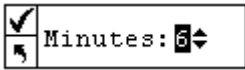


Path:






Set Timeout

Timeout selects how long the library is available for operator menu selections before it automatically returns to the Main menu due to screen inactivity. This feature is designed to provide you with security for your system.

Note: When the timeout period ends, the library returns to an online status, and it is again accessible by a SCSI host.




Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight</p>  <p>and press</p> 	
 <p>Step 2 Highlight</p>  <p>and press</p> 	Sets timeout window.
 <p>Step 3 Press</p>  <p>or</p>  <p>to select the value of the timeout window.</p>	<p>The timeout window is represented in minutes. You must specify a value between 1 and 9.</p> <p>The default setting is 9 minutes.</p> <p>If you have a password set, after the timeout window has expired, you need to reenter the password to access the library.</p>




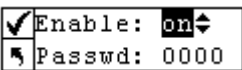



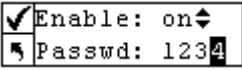




Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Minutes: 6 </div> <p>Step 4 Press  to highlight Execute (<input checked="" type="checkbox"/>) and then press </p>	
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Set Timeout Complete. </div> <p>Step 5 A confirmation screen is displayed. Press  to dismiss.</p>	The timeout value is set.

Set Password

Password enables you to enable or disable a password for access to the library. This enables you to prevent unauthorized personnel from disrupting the operation of the library. If a password is set, it is required to view or execute any of the options in the **Setup**, **Command**, or **Tools** menus. If you have set a timeout value, after the specified number of minutes of inactivity, you will automatically be logged out and you will have to reenter your password. By default, there is no password set on your library.

Note: If the password is enabled through the SCSI host, you cannot modify or disable the password using the LCD on the library.





Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;">  </div> <p>Step 1 From the Setup menu, highlight  and press </p>	

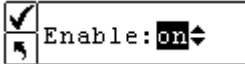
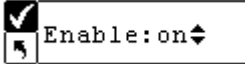


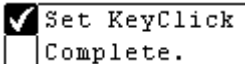

Selection	Description/Result
 <p>Step 2 Highlight  and press </p>	Sets password.
 <p>Step 3 Press  or  to enable or disable the password function.</p>	<p>Available options are:</p> <p>on Password is required to access secure menu features</p> <p>off Password disabled.</p> <p>Note: If the password is enabled through the SCSI host, you cannot modify or disable the password using the LCD.</p>
<p>Step 4 Select  to move to the Password field.</p>	
 <p>Step 5 Set a password by pressing  or  to change the value of the current field, and  or  to move between fields.</p>	The current field is highlighted. You must select a numeric value between 0 and 9 for all four fields.

Selection	Description/Result
<div> <input checked="" type="checkbox"/> Enable: On <input type="checkbox"/> Passwd: 1234 </div> <p>Step 6 From the last field of the password, press</p> <div>▶</div> <p>to highlight Execute (</p> <div> <input checked="" type="checkbox"/> </div> <p>), and then press</p> <div>●</div>	<p>The password is set.</p>
<div> <input checked="" type="checkbox"/> Set Password Complete. </div> <p>Step 7 A confirmation screen is displayed.</p> <p>Press</p> <div>●</div> <p>to dismiss.</p>	<p>After you have set a password, you can turn it on and off by following steps 1 - 3 above. You can change the password by following steps 1 - 7.</p>

Set Key Clicks

Key Click enables you to enable or disable an audible tone when the keys on the keypad are pressed.

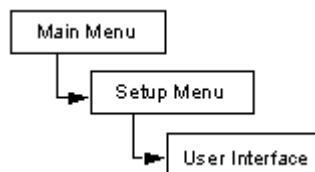
Selection	Description/Result
<div>  <input type="checkbox"/> UserInterface </div> <p>Step 1 From the Setup menu, highlight</p> <div>  </div> <p>and press</p> <div>●</div>	
<div>  <input type="checkbox"/> Key Click </div> <p>Step 2 Highlight</p> <div>  </div> <p>and press</p> <div>●</div>	<p>Sets key clicks.</p>

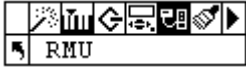


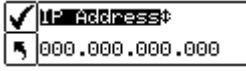









Selection	Description/Result
 <p>Step 3 Press ▲ or ▼ to enable or disable the key click function.</p>	<p>Available options are:</p> <p>on Turns on audible tone.</p> <p>off Disables key click function.</p>
 <p>Step 4 Press ▶ to highlight Execute () and then press .</p>	<p>Key clicks are set.</p>
 <p>Step 5 A confirmation screen is displayed. Press  to dismiss.</p>	

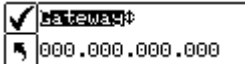
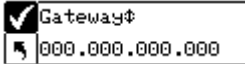

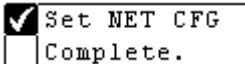

Configure RMU

The optional Remote Management Unit (RMU) provides remote host operation through a Web browser. After you have installed the RMU, you configure it using this menu option. For more information on installing or replacing the RMU, see “Replacing the Remote Management Unit” on page 208.

Path:



Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight</p>  <p>and press</p> 	<p>Configures the RMU.</p> <p>An error appears if an RMU is not installed or is not functioning properly.</p>
 <p>Step 2 Set the IP Address by pressing the</p>  <p>or</p>  <p>to change the value of the current field and</p>  <p>or</p>  <p>to move between fields.</p>	<p>The current field is highlighted. Make sure that you enter a valid number for each field.</p>
 <p>Step 3 Set the Subnet mask by pressing</p>  <p>or</p>  <p>to change the value of the current field and</p>  <p>or</p>  <p>to move between fields.</p>	<p>The current field is highlighted. Make sure that you enter a valid number for each field.</p>

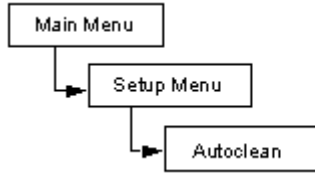
Selection	Description/Result
 <p>Step 4 Set the Gateway by pressing ▲ or ▼ to change the value of the current field and ◀ or ▶ to move between fields.</p>	<p>The current field is highlighted. Make sure that you enter a valid number for each field.</p>
 <p>Step 5 From the last field of the Gateway address, press ▶ to set the Gateway mask and highlight Execute ().</p>	
 <p>Step 6 A confirmation screen is displayed. Press  to accept the RMU settings.</p>	<p>Your RMU is configured and ready for use.</p>

Configure Autoclean




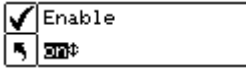


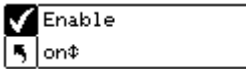



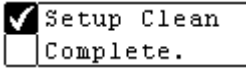

Autoclean is managed through the library and operates independently of the host application. Autoclean detects when a drive needs to be cleaned and automatically cleans it without requiring user intervention. To use the Autoclean feature, you must have at least one slot configured as a cleaning slot. For more information on configuring cleaning slots, see “Configure Cleaning Slots” on page 101. The library tracks the usage of the cleaning tape and posts an alert message on the LCD when the cleaning tape has expired and requires you to export the tape.

There are two methods for autocleaning: with a partitioned library and with an unpartitioned library.




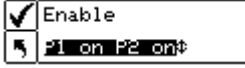


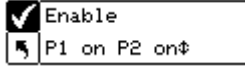



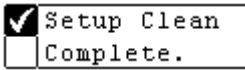

Path:



Autoclean Unpartitioned Library

Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight</p>  <p>and press</p>  <p>.</p>	<p>Configures automatic cleaning of drives.</p>
 <p>Step 2 Press</p>  <p>or</p>  <p>to enable or disable the Autoclean function.</p>	<p>Available options are:</p> <p>on The library automatically cleans the drives when cleaning is required. Overall slots available for data cartridges is reduced. Host software cleaning features MUST be turned off.</p> <p>off Autoclean function is disabled.</p>
 <p>Step 3 Press</p>  <p>to highlight Execute (</p>  <p>) and then press</p>  <p>.</p>	<p>Autoclean is configured.</p>
 <p>Step 4 A confirmation screen is displayed. Press</p>  <p>to dismiss.</p>	

Autoclean Partitioned Library

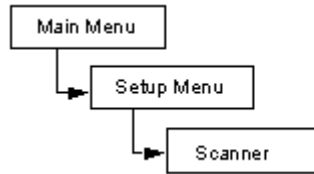
Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight</p>  <p>and press</p>  <p>.</p>	<p>Configures automatic cleaning of drives.</p>
 <p>Step 2 Press</p>  <p>or</p>  <p>to select one of the options.</p>	<p>Available options are:</p> <p>P1 on P2 on Autoclean is enabled for both partitions.</p> <p>P1 on P2 off Autoclean is enabled for partition 1 only.</p> <p>P1 off P2 on Autoclean is enabled for partition 2 only.</p> <p>P1 off P2 off Autoclean is disabled for both partitions.</p>
 <p>Step 3 Press</p>  <p>to highlight Execute (</p>  <p>) and then press</p>  <p>.</p>	<p>Autoclean is configured.</p>
 <p>Step 4 A confirmation screen is displayed. Press</p>  <p>to dismiss.</p>	




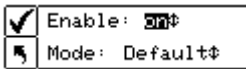



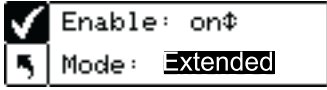


Configure Bar Code Scanner




Scanner enables or disables the bar code scanner. The bar code scanner reads and reports the information that it scans and displays this information on the Operator Panel. The library reports the bar code information to the host according

to the mode it is configured for and displays alert messages on the Operator Panel if the scanned bar code does not match the bar code length and media identifier requirements of the mode.

Path:



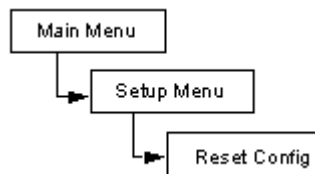
Selection	Description/Result
 <p>Step 1 From the Setup menu, select  and press .</p>	Configures the bar code scanner.
 <p>Step 2 Press  or  to enable or disable the bar code scanner.</p>	<p>Available options are:</p> <p>on All media is scanned for bar codes. Unlabeled or unreadable labeled media generates a user message.</p> <p>off Bar code scanner is disabled.</p>
<p>Step 3 Press  to move to the next field.</p>	
 <p>Step 4 Press  or  to select the scanner mode.</p>	<p>Available options are:</p> <p>Default The scanner expects to read and reports to the host six characters. Optional one- or two-character media identifiers can be present but are not reported.</p> <p>Media ID The scanner expects to read and reports to the host seven or eight characters (six plus the media identifier).</p> <p>Extended The scanner reads and reports to the host between five and sixteen characters.</p>

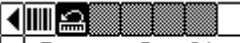


Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Enable: on <input type="checkbox"/> Mode: Extended </div> <p>Step 5 Press  to highlight Execute (<input checked="" type="checkbox"/>) and then press .</p>	Your bar code scanner is configured and ready for use.
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Set Scanner Complete. </div> <p>Step 6 A confirmation screen is displayed. Press  to dismiss.</p>	

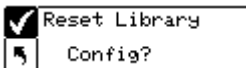

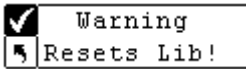

Reset Configuration

Reset Config enables you to reset your library to the default settings. For more information of the default values, see “Setting up Your Library” on page 31.

Path:



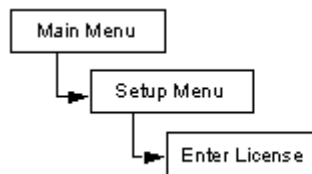
Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;">  Reset Config </div> <p>Step 1 From the Setup menu, select  and press .</p>	Resets the library configuration.




Selection	Description/Result
 <p>Step 2 A confirmation screen is displayed. Press  to continue.</p>	
 <p>Step 3 A warning screen prompts you to ensure that you want to reset the library configuration. Press  to continue.</p>	<p>The library reboots and is set to the default configuration.</p> <p>The Setup Wizard also starts to enable you to set a new configuration.</p>


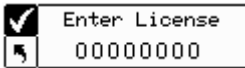

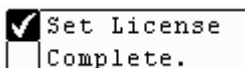

Enter License

Enter License enables a you to add a feature license key to enable additional features. Please call your IBM representative to purchase a feature license key.

Path:



Selection	Description/Result
 <p>Step 1 From the Setup menu, highlight  and press .</p>	<p>Enter feature license key.</p>

Selection	Description/Result
 <p>Step 2 Enter the license by pressing ▲ or ▼ to change the value of the current field and ◀ or ▶ to move between fields.</p>	<p>The current field is highlighted. You must select a value between 0 and 9 for all 8 fields.</p>
 <p>Step 3 Press ▶ to highlight Execute (<input checked="" type="checkbox"/>) and then press </p>	
 <p>Step 4 A confirmation screen is displayed. Press  to dismiss.</p>	

Command Menu

The **Command** menu provides access to commands that cause motion within the library. From the **Command** menu, you can:

- Import media (see **1** in Figure 69 on page 127)
- Export media (see **2** in Figure 69 on page 127)
- Dismount drives (see **3** in Figure 69 on page 127)
- Move media (see **4** in Figure 69 on page 127)
- Bulk Load media (see **5** in Figure 69 on page 127)
- Bulk Unload media (see **6** in Figure 69 on page 127)
- Set Sequential mode options (see **7** in Figure 69 on page 127)

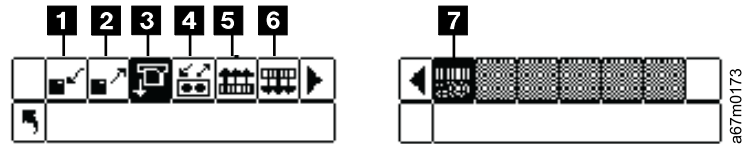


Figure 69. Command menu

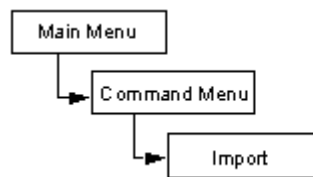
Import Media

The Import option enables you to move a data or cleaning tape cartridge from the I/O slot to other location in your library. This enables you to insert a tape into the library without opening the front door. If your I/O slot is configured as a storage slot, you will need to remove any present data cartridge before running this command. There are two import options:




- Import Data Cartridge
- Import Cleaning Cartridge




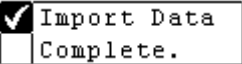

To import a cleaning cartridge, you must first configure a cleaning slot location. For more information on configuring cleaning slots, see “Configure Cleaning Slots” on page 101. There are two methods for importing a data cartridge: with a partitioned library and with an unpartitioned library.

Path:











Import Data Cartridge for Unpartitioned Library

Selection	Description/Result
<p>Step 1 Open the I/O door and insert a data cartridge into the I/O slot.</p>	
 <p>Step 2 From the Command menu, highlight</p>  <p>and press</p> 	Imports media from I/O slot.




Selection	Description/Result
<p>Step 3</p>  <p>Highlight</p>  <p>and press</p> 	Imports a data cartridge.
 <p>Step 4 A confirmation screen is displayed. Press</p>  <p>to dismiss.</p>	The data cartridge is imported to the first available slot starting with Slot 1.




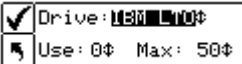



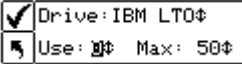



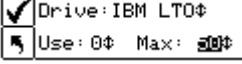


Import Data Cartridge for Partitioned Library




Selection	Description/Result
<p>Step 1 Open the I/O door and insert a data cartridge into the I/O slot.</p>	
 <p>Step 2 From the Command menu, highlight</p>  <p>and press</p> 	Imports media from I/O slot.
 <p>Step 3 Highlight</p>  <p>and press</p> 	Imports a data cartridge.

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Partition <input type="checkbox"/> 1 </div> <p>Step 4 Press ▲ or ▼ to select the partition that you want to import the cartridge into.</p>	
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Partition <input type="checkbox"/> 1 </div> <p>Step 5 Press ▶ to highlight Execute (<input checked="" type="checkbox"/>) and then press </p>	The data cartridge is imported to the first available slot in the specified partition.
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Import Data <input type="checkbox"/> Complete. </div> <p>Step 6 A confirmation screen is displayed. Press  to dismiss.</p>	

Import Cleaning Cartridge

Selection	Description/Result
<p>Step 1 Open the I/O door and insert a cleaning cartridge into the I/O slot.</p>	
<div style="border: 1px solid black; padding: 2px;">  <input type="checkbox"/> Import </div> <p>Step 2 From the Command menu, highlight  and press </p>	Imports media from I/O slot.

Selection	Description/Result
 <p>Step 3 Highlight  and press .</p>	Imports a cleaning cartridge. To use this feature, you must have a cleaning slot configured. See “Configure Cleaning Slots” on page 101 for more information.
 <p>Step 4 Press  or  to select the Drive type.</p>	
<p>Step 5 Press  to move to the next field.</p>	
 <p>Step 6 Press  or  to select how many times the cleaning tape has been used.</p>	You need to specify how many times this cartridge has been used, if any.
<p>Step 7 Press  to move to the next field.</p>	
 <p>Step 8 Press  or  to set the maximum number of times the cleaning tape can be used.</p>	For LTO media, the maximum number of uses is 50. You can specify a different number, if you want to restrict the number of times this cleaning cartridge is used.

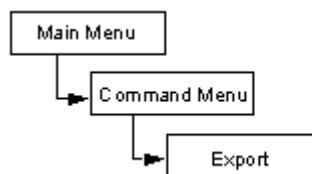
Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Drive: IBM LTO <input type="checkbox"/> Use: 0 Max: 50 </div> <p>Step 9 Press  to highlight Execute (<input checked="" type="checkbox"/>) and then press .</p>	<p>The cleaning cartridge is imported to the first available cleaning slot.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Import Clean <input type="checkbox"/> Complete. </div> <p>Step 10 A confirmation screen is displayed. Press  to dismiss.</p>	

Export Media

Export enables you to move a data or cleaning tape cartridge from the source slot you select to the I/O slot. This enables you to remove a tape from the library without opening the front door. If the I/O slot is configured as a storage slot, you will not be able to export data cartridges. For more information on configuring the I/O slot, see “Configure I/O Slot” on page 107.










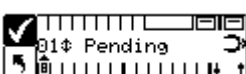



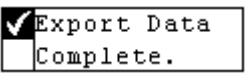

You can use the Move Media command to export data cartridges when the I/O slot is configured as a data slot. For more information, see “Move Media” on page 135.




Path:












Export Data Cartridge

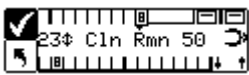



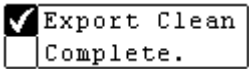




Selection	Description/Result
<p>Step 1 Open the I/O door and check the I/O slot to make sure that it is empty. If a tape is present, remove it.</p>	

Selection	Description/Result
 <p>Step 2 From the Command menu, highlight</p>  <p>and press</p>  <p>.</p>	Exports media to I/O slot.
 <p>Step 3 Highlight</p>  <p>and press</p>  <p>.</p>	Exports a data cartridge.
 <p>Step 4 Press</p>  <p>or</p>  <p>to select the slot that you want to export the media from.</p>	<p>SRC = source</p> <p>In this example, the tape cartridge in slot 01 is to be exported to the I/O slot.</p>
 <p>Step 5 Press</p>  <p>to highlight Execute (</p>  <p>) and then press</p>  <p>.</p>	The specified data cartridge is exported to the I/O slot.
 <p>Step 6 A confirmation screen is displayed. Press</p>  <p>to dismiss.</p>	

Selection	Description/Result
<p>Step 7 You can continue to export data cartridges, or you can exit to the Command menu. Press  twice to highlight  and then press  to return to the Command menu.</p>	

Export Cleaning Cartridge

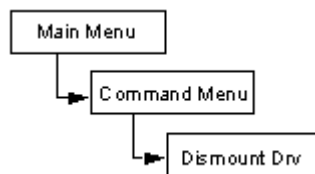
Selection	Description/Result
<p>Step 1 Open the I/O door and check the I/O slot to make sure that it is empty. If a tape is present, remove it.</p>	
 <p>Step 2 From the command menu, highlight  and press .</p>	Exports media to I/O slot.
 <p>Step 3 Highlight  and press .</p>	Exports a cleaning cartridge.
 <p>Step 4 Press  or  to select the slot that you want to export the media from.</p>	<p>SRC = source</p> <p>Cln Rmn = number of cleanings remaining on cartridge</p> <p>Cleaning cartridges can be stored in slots 20 - 23.</p> <p>In this example, the tape cartridge in slot 23 is to be exported to the I/O slot.</p>




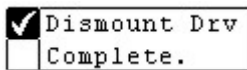

Selection	Description/Result
 <p>Step 5 Press  to highlight Execute () and then press .</p>	The specified cleaning cartridge is exported to the I/O slot.
 <p>Step 6 A confirmation screen is displayed. Press  to dismiss.</p>	
<p>Step 7 You can continue to export cleaning cartridges, or you can exit to the Command menu. Press  twice to highlight  and then press  to return to the Command menu.</p>	

Dismount Drive

Dismount Drive unloads all drives and returns cartridges to their source slots.

Path:

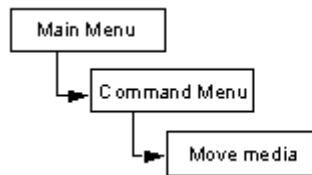





Selection	Description/Result
 <p>Step 1 From the Command menu, highlight  and press </p>	Moves media within your library.
<p>Step 2 The cartridges are unloaded from the drives and returned to their source slots.</p>	
 <p>Step 3 A confirmation screen is displayed. Press  to dismiss.</p>	


Move Media

Move Media enables you to move a tape cartridge from an existing position to a new position. You also use this function to manually insert a tape into a drive or remove a tape from a drive.

Path:



Selection	Description/Result
 <p>Step 1 From the Command menu, highlight  and press </p>	Moves media within your library.

Selection	Description/Result
 <p>Step 2 Press ▲ or ▼ to select the source slot.</p>	<p>SRC = Source Slot</p> <p>TGT = Target Slot</p> <p>The move media screen provides a visual representation of the storage slots in your library.</p> <ul style="list-style-type: none"> • Magazine slots <ul style="list-style-type: none"> – Shown on the bottom of the screen – Numbered sequentially from left to right 01 to 14 • Rear slots <ul style="list-style-type: none"> – Shown on the top of the screen – Numbered sequentially from left to right 15 to 23 • I/O slot <ul style="list-style-type: none"> – Shown on the bottom right of the screen – ↕↑ Indicate configured as I/O slot (represented by I/O in SRC/TGT fields) – <li style="text-align: center;">• • • Drives <ul style="list-style-type: none"> – Shown on top right of the screen – Indicated by D1 or D2 in the SRC/TGT field <p>Vertical bars indicate configured as data slot (represented by 00 in SRC/TGT fields)</p>

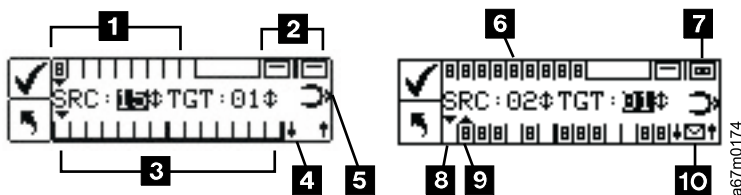








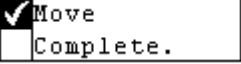




Figure 70. Move media icons

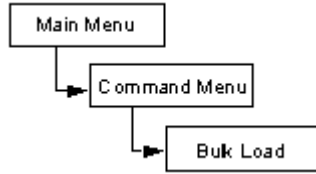
- | | |
|---|---|
| <p>1 Rear slots</p> <p>3 Magazine slots 1–14</p> <p>5 Picker</p> <p>7 Tape in drive</p> <p>9 Source slot</p> | <p>2 Drives</p> <p>4 I/O slot</p> <p>6 Tape in slot</p> <p>8 Target slot</p> <p>10 I/O slot full</p> |
|---|---|

Selection	Description/Result
<p>Step 3 Press  to move the cursor to the target field.</p>	
<p></p> <p>Step 4 Press  or  to select the target slot.</p>	<p>In this example, the cartridge in the source slot 15 is moved to the target slot I/O.</p>
<p></p> <p>Step 5 Press  to highlight Execute () and then press .</p>	<p>The media is moved from the specified source to the specified target location.</p>
<p></p> <p>Step 6 A confirmation screen is displayed. Press  to dismiss.</p>	
<p>Step 7 You can continue to move media, or you can exit to the Command menu. Press  twice to return to the Command menu.</p>	





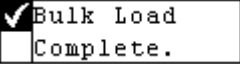

Bulk Load

Bulk Load enables you to move multiple tapes from the magazines to the rear slots with one command. For more information on partitioning, see “Configure Partitions” on page 105.




Path:









Unpartitioned Library Bulk Load

Selection	Description/Result
 <p>Step 1 From the Command menu, highlight  and press .</p>	Moves cartridges from magazines to rear slots.
<p>Step 2 The bulk load operation begins. The operation can be cancelled at any time by pressing .</p>	The library begins loading the rear slots by selecting the left-most-available cartridge in the front left magazine and placing it in the left-most-available rear slot. The Bulk Load continues until either there are no more tapes in the front magazines or there are no more available slots in the rear.
 <p>Step 3 When the bulk load is complete, a completion screen is displayed. Press  to dismiss the screen.</p>	

Partitioned Library Bulk Load

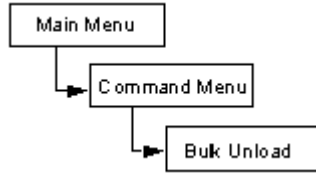
Selection	Description/Result
 <p>Step 1 From the Command menu, highlight  and press .</p>	Moves cartridges from magazines to partitioned rear slots.

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Partition <input type="checkbox"/> 1 </div> <p>Step 2 Press  or  to select the partition that you want to move cartridges to.</p>	<p>Available options are:</p> <p>Partition 1 Moves cartridges from the left magazine to the available rear Partition 1 slots.</p> <p>Partition 2 Moves cartridges from the right magazine to the available rear Partition 2 slots.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Partition <input type="checkbox"/> 1 </div> <p>Step 3 Press  to highlight Execute (<input checked="" type="checkbox"/>) and then press .</p>	
<p>Step 4 The bulk load operation begins. The operation can be cancelled at any time by pressing .</p>	<p>Bulk Load for Partition 1 - The library begins loading the rear slots by selecting the left-most-available cartridge in the front left magazine (Magazine 1) and placing it in the left-most-available rear slot for Partition 1. The Bulk Load continues until either there are no more tapes in the front magazine or there are no more available slots in the rear.</p> <p>Note: Rear slots identified as Partition 1 can only be bulk loaded from Magazine 1, and rear slots identified as Partition 2 can only be bulk loaded from Magazine 2 while partitioning is enabled.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Bulk Load <input type="checkbox"/> Complete. </div> <p>Step 5 When the bulk load is complete, a completion screen is displayed. Press  to dismiss the screen.</p>	




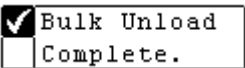

Bulk Unload

Bulk Unload enables you to move all of the tapes from the rear slots to the front magazines with one command. For more information on partitioning, see “Configure Partitions” on page 105.




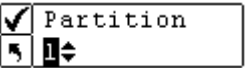


Path:







Unpartitioned Library Bulk Unload

Selection	Description/Result
 <p>Step 1 From the Command menu, highlight</p>  <p>and press</p>  <p>.</p>	<p>Moves cartridges from rear slots to magazines.</p>
 <p>Step 2 When the bulk unload is complete, a completion screen is displayed. Press</p>  <p>to dismiss the screen.</p>	<p>The library begins unloading the rear slots by selecting the left-most-available cartridge and placing it in the left-most-slot of the left magazine. The bulk unload continues until either there are no more tapes in the rear slots or there are no more available slots in the magazines.</p>

Partitioned Library Bulk Unload

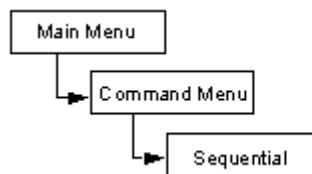
Selection	Description/Result
 <p>Step 1 From the Command menu, highlight</p>  <p>and press</p>  <p>.</p>	<p>Moves cartridges from rear slots to magazines.</p>
 <p>Step 2 Press</p>  <p>or</p>  <p>to select the partition you want to move cartridges from.</p>	<p>Available options are:</p> <p>Partition 1 Moves cartridges from the rear Partition 1 slots to the left magazine slots.</p> <p>Partition 2 Moves cartridges from the rear Partition 2 slots to the right magazine slots.</p>

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Partition <input type="checkbox"/> 1 </div> <p>Step 3 Press  to highlight Execute (<input checked="" type="checkbox"/>) and then press .</p>	
<p>Step 4 The bulk unload operation begins. The operation can be cancelled at any time by pressing .</p>	<p>Bulk Unload for Partition 1 - The library begins loading the left magazine by selecting the left-most-available cartridge in the rear slots of Partition 1 and placing it in the left-most slot in the left magazine. The Bulk Unload continues until either there are no more tapes in the rear slots or there are no more available slots in the magazine.</p> <p>Note: Rear slots identified as Partition 1 can only be bulk unloaded from Magazine 1, and rear slots identified as Partition 2 can only be bulk unloaded from Magazine 2 while partitioning is enabled.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Bulk Unload <input type="checkbox"/> Complete. </div> <p>Step 5 When the bulk unload is complete, a completion screen is displayed. press  to dismiss the screen.</p>	

Sequential

Sequential enables you to start, stop, and resume the sequential backup sequence. You can also set sequential loop mode. If your library is partitioned, you can control each partition independently.







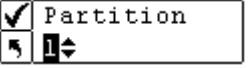


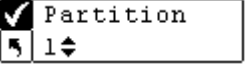



Path:



Start Loop







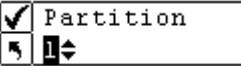


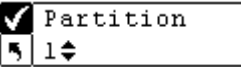



Start Loop enables you to operate in a continuous backup mode. When all tape cartridges have been filled with data, the library begins again with the first cartridge, overwriting tape cartridges upon reuse.

Attention: You may overwrite data if you select this menu item. Ensure you have the proper amount of cartridges for performing the backup.

Selection	Description/Result
 <p>Step 1 From the Command menu, highlight  and press .</p>	Sets the options for sequential backup.
 <p>Step 2 Highlight  and press .</p>	Starts looped sequential backup.
 <p>Step 3 Press  or  to select the partition that you want to set to sequential loop mode.</p>	
 <p>Step 4 press  to highlight Execute () and then press .</p>	Sequential loop backup begins.







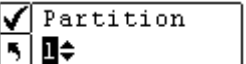


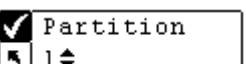



Start Single

Start Single mode enables you to begin backup with the first cartridge in a specified partition. When all tape cartridges have been filled, the backup operation will stop.

Selection	Description/Result
 <p>Step 1 From the Command menu, highlight</p>  <p>and press</p>  <p>.</p>	Sets the options for single sequential backup.
 <p>Step 2 Highlight</p>  <p>and press</p>  <p>.</p>	Starts single sequential backup.
 <p>Step 3 Press</p>  <p>or</p>  <p>to select the partition that you want to set to sequential single mode.</p>	
 <p>Step 4 Press</p>  <p>to highlight Execute (</p>  <p>) and then press</p>  <p>.</p>	A single sequential backup begins.







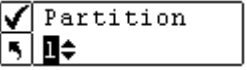


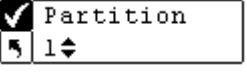



Stop Sequential Backup

Stop enables you to manually stop the backup process when in sequential mode.

Selection	Description/Result
 <p>Step 1 From the Command menu, highlight</p>  <p>and press</p>  <p>.</p>	Sets the options for sequential backup.
 <p>Step 2 Highlight</p>  <p>and press</p>  <p>.</p>	Stops sequential backup.
 <p>Step 3 Press</p>  <p>or</p>  <p>to select the partition that you want to stop the sequential backup on.</p>	
 <p>Step 4 Press</p>  <p>to highlight Execute (</p>  <p>) and then press</p>  <p>.</p>	The backup process is stopped.

Resume Sequential Backup

Resume enables you to continue a backup process when in sequential mode. The load operation continues with the next tape in the sequence rather than starting over.

Selection	Description/Result
 <p>Step 1 From the Command menu, highlight</p>  <p>and press</p>  <p>.</p>	Sets the options for sequential backup.
 <p>Step 2 Highlight</p>  <p>and press</p>  <p>.</p>	Continues sequential backup.
 <p>Step 3 Press</p>  <p>or</p>  <p>to select the partition on which you want to resume the sequential backup.</p>	
 <p>Step 4 Press</p>  <p>to highlight Execute (</p>  <p>) and then press</p>  <p>.</p>	The backup process is resumed.

Status Menu

The **Status** menu enables you to display operating statistics and system information. From the **Status** menu you can display:

- Firmware Revision Numbers (see **1** in Figure 71 on page 146)
- Inventory Information (see **2** in Figure 71 on page 146)
- Motion Counts (see **3** in Figure 71 on page 146)
- Retry Counts (see **4** in Figure 71 on page 146)

- Sensor Status (see **5** in Figure 71)
- Error Logs (see **6** in Figure 71)
- Serial Number (see **7** in Figure 71)
- World Wide Name (see **8** in Figure 71)

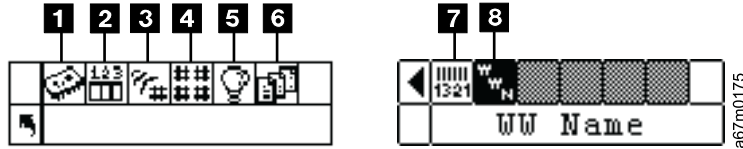
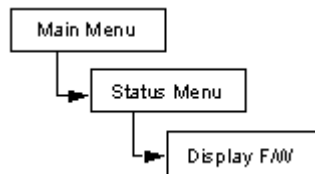


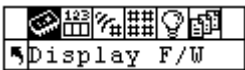





Figure 71. Status Menu

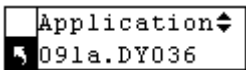



Display Firmware Version

Display Firmware displays the current level of firmware that you are running. This information is important for troubleshooting problems. You can also compare the version numbers with the latest level of firmware. You can download the latest level of firmware by visiting <http://www.ibm.com/storage/lto> and clicking on Technical Support or LTO Support.

Path:



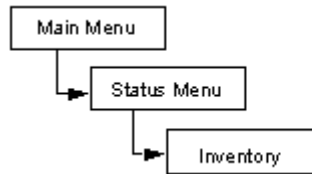
Selection	Description/Result
 <p>Step 1 From the Status menu, highlight</p>  <p>and press</p> 	<p>Display F/W displays the current level of library firmware.</p>
 <p>Step 2 Press</p>  <p>or</p>  <p>to view all of the firmware revision numbers.</p>	<p>The current version of library firmware is displayed. You can view firmware revision numbers for:</p> <p>Application Controls the library operations.</p> <p>Picker Operates the cartridge picker mechanism in your library.</p> <p>RMU RMU firmware.</p> <p>Drive1 Drive firmware.</p> <p>Drive2 Drive firmware.</p> <p>Boot Boots the library controller firmware.</p> <p>Picker Boot Boot code for picker.</p>

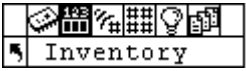


Selection	Description/Result
 <p>Step 3 To exit, press  to highlight  and then press </p>	You return to the Status menu.

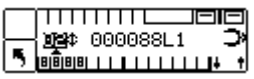
Display Inventory Information

Inventory displays the tape cartridges present in the rear slots and magazines. A physical inventory is also conducted each time you power on your library.

Path:



Selection	Description/Result
 <p>Step 1 From the Status menu, highlight  and press </p>	Displays the current library cartridge content.

Selection	Description/Result
 <p>Step 2 Press ▲ or ▼ to scroll through the various slots. An arrow in front of the slot indicates the slot selected.</p>	<p>The inventory screen provides a visual representation of the storage slots in your library.</p> <ul style="list-style-type: none"> • Magazine slots: <ul style="list-style-type: none"> – Shown on the bottom of the screen – Numbered sequentially from left to right 01 to 14 – The magazines slots will not be shown if the magazines are not installed • Rear slots: <ul style="list-style-type: none"> – Shown on the top of the screen – Numbered sequentially from left to right 15 to 23 – Double bar is shown in rear slots to show partition – A horizontal bar will close off slots reserved for cleaning • I/O slot: <ul style="list-style-type: none"> – Shown on the bottom right of the screen – ↓↑ Indicate configured as I/O slot (represented by I/O in slot field) – <p style="text-align: center;">■ ■</p> <p>Vertical bars indicate configured as data slot (represented by 00 in slot field)</p> • Bar Code Scanner results: <ul style="list-style-type: none"> – Shown on middle of screen and changes as various slots are selected – Blank: scanner: not installed – Scan Off: scanner: installed but turned off – No Label: no bar code label present or unable to read label – Number: displays entire bar code label regardless of what the scanner is set at – Number of cleaning slots remaining is shown instead of a bar code for full cleaning slots • Drives: <ul style="list-style-type: none"> – Shown on top right of the screen

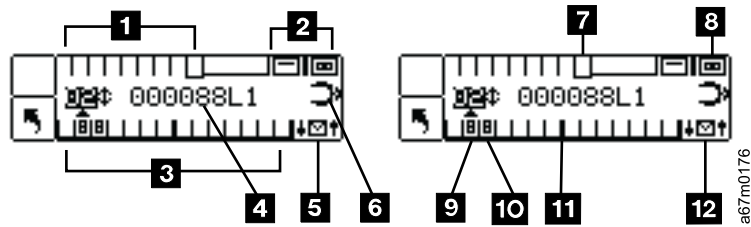



Figure 72. Move media icons

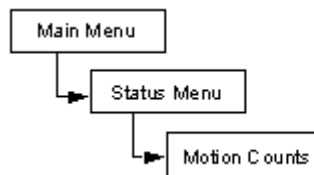
- | | | | |
|-----------|-----------------------|-----------|--------------------------|
| 1 | Rear slots (15–23) | 2 | Drives |
| 3 | Magazine slots 1–14 | 4 | Bar code scanner results |
| 5 | I/O slot | 6 | Picker |
| 7 | Cleaning slot (empty) | 8 | Tape in drive |
| 9 | Slot is selected | 10 | Tape in slot |
| 11 | Partition divider | 12 | Tape in I/O slot |




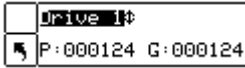


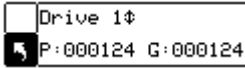



Selection	Description/Result
 <p>Step 3 To exit, press</p> <p>▶</p> <p>to highlight</p> <p>↶</p> <p>and then press</p> <p>⏪</p>	<p>You return to the Status menu.</p>

Display Motion Counts

Motion Counts displays how many times a slot or drive has had a cartridge placed in it or removed from it.

Path:

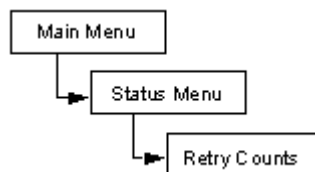





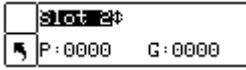


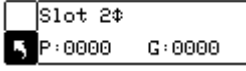



Selection	Description/Result
 <p>Step 1 From the Status menu, highlight</p>  <p>and press</p> 	<p>Displays slot usage information.</p>
 <p>Step 2 Press</p>  <p>or</p>  <p>to view the motion counts for each slot, drive, and I/O slot.</p>	<p>You can view motion counts for:</p> <p>System Moves Displays the total number of library moves. A move is described as a “get” from one location and a “put” to another location.</p> <p>Drive 1 Displays the number of Gets and Puts to and from Drive 1.</p> <p>Drive 2 Displays the number of Gets and Puts to and from Drive 2.</p> <p>I/O and Slots 1 - 23 Displays the total number of moves for a particular slot.</p> <p>The format of the entries is:</p> <p>P: Number of “puts” to a location.</p> <p>G: Number of “gets” from a location.</p>
 <p>Step 3 To exit, press</p>  <p>to highlight</p>  <p>and then press</p> 	<p>You return to the Status menu.</p>

Display Retry Counts

Retry Counts displays the number of retry operations the picker has attempted to put a cartridge to a specific location or get a cartridge from a particular location.

Path:

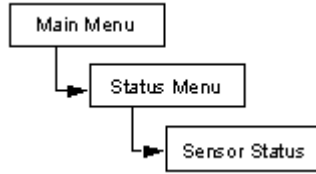


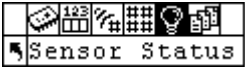


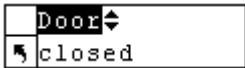


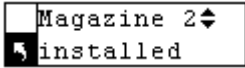



Selection	Description/Result
 <p>Step 1 From the Status menu, highlight  and press .</p>	<p>Displays the number of retry operations.</p>
 <p>Step 2 Press  or  to view all of the retry counts.</p>	<p>You can get retry counts on the number of:</p> <p>System Displays the total number of library retries.</p> <p>D1 Displays how many times a get or a put retry has occurred for Drive 1.</p> <p>D2 Displays how many times a get or a put retry has occurred for Drive 2.</p> <p>Position Displays how many times the picker has retried positioning.</p> <p>Scan Displays how many times the bar code scanner has scanned the tape cartridges.</p> <p>I/O and Slots 1- 23 Displays how many times a get or a put retry has occurred for a particular slot.</p> <p>The format of the entries is: P: Number of “puts” to a location. G: Number of “gets” from a location.</p>
 <p>Step 3 To exit, press  to highlight  and then press .</p>	<p>You are returned to the Status menu.</p>

Display Sensor Status

Sensor Status displays the results of the real-time sensors on your library.

Path:

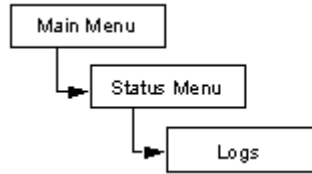





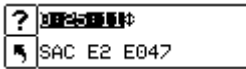


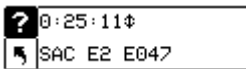



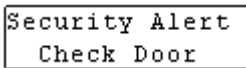

Selection	Description/Result
 <p>Step 1 From the Status menu, highlight  and press .</p>	<p>Displays the results of real-time sensors.</p>
 <p>Step 2 Press  or  to view all of the sensor statuses.</p>	<p>You can view sensor status for:</p> <ul style="list-style-type: none"> Door (Media Access) Opened or closed Picker Empty or full I/O Slot Empty or full Magazine 1 Installed or removed Magazine 2 Installed or removed Rear Slots Represented by a nine character string with "1"s and "-"s (-1-1-1-1-) where 1 means the slot is full, and - means the slot is empty.
 <p>Step 3 To exit, press  to highlight  and then press .</p>	<p>You are returned to the Status menu.</p>

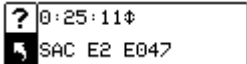



Display Errors

Errors provides a listing of errors that need to be addressed by the operator. The log can store up to 100 errors and is preserved through power cycles. The log is accessible through the LCD as well as the SCSI interface, the serial port, and the RMU interface. You will be asked to supply log information to IBM Technical Support for troubleshooting purposes if other problem resolution strategies do not work.

Path:



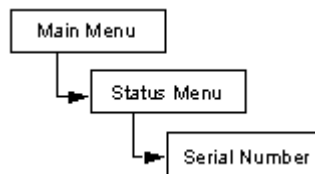
Selection	Description/Result
 <p>Step 1 From the Status menu, highlight</p>  <p>and press</p>  <p>.</p>	<p>Displays Error log.</p>
 <p>Step 2 Press</p>  <p>or</p>  <p>to scroll through the error messages.</p>	<p>The format of the entries is as follows:</p> <p><i>0:00:00</i> = <i>hours:minutes:seconds</i> of elapsed time since error occurred.</p> <p>SAC E2 E047 = Service Action Code of error message</p> <p>For more information on error codes, see “Library Error Messages” on page 186.</p>
 <p>Step 3 If you want to get more information, press</p>  <p>to highlight</p>  <p>and then press</p>  <p>.</p>	<p>The text version of the Error message is displayed.</p>
 <p>Step 4 Press</p>  <p>to dismiss the message and return to the Error log.</p>	




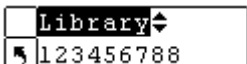


Selection	Description/Result
 <p>Step 5 To exit the Error log, press</p>  <p>to highlight</p>  <p>and then press</p> 	<p>You return to the Status menu.</p>

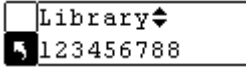



Display Serial Number

Serial Number displays the serial numbers of the library, drives, and the RMU. You need this information when ordering Feature Code #1680 (see “Using Multiple Control Paths for Control Path Failover” on page 14).

Path:



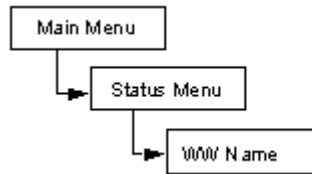
Selection	Description/Result
 <p>Step 1 From the Status menu, highlight</p>  <p>and press</p> 	<p>Displays serial numbers.</p>
 <p>Step 2 Press</p>  <p>or</p>  <p>to view all of the serial numbers.</p>	<p>Available options are:</p> <ul style="list-style-type: none"> • Library • Drive 1 • Drive 2 • RMU







Selection	Description/Result
 <p>Step 3 To exit, press  to highlight  and then press .</p>	You return to the Status menu.

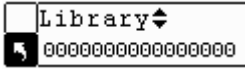



Display World Wide Name

WW Name displays the World Wide Names of the library and drives. You need this information when contacting IBM Technical Support.

Path:



Selection	Description/Result
 <p>Step 1 From the Status menu, highlight  and press .</p>	Displays World Wide Names.
 <p>Step 2 Press  or  to view all of the World Wide Names.</p>	Available options are: Library <ul style="list-style-type: none"> • Drive 1 • Drive 2

Selection	Description/Result
 <p>Step 3 To exit, press  to highlight  and then press .</p>	You return to the Status menu.

Tools Menu

The **Tools** menu provides access to library utilities. From the **Tools** menu you can:

- Manually clean a drive
- Load firmware
- Run Demo tests
- Run Self tests
- Run Drive Maintenance tests
- Run Manufacturing tests
- Position the picker
- Output logs
- Replace drive

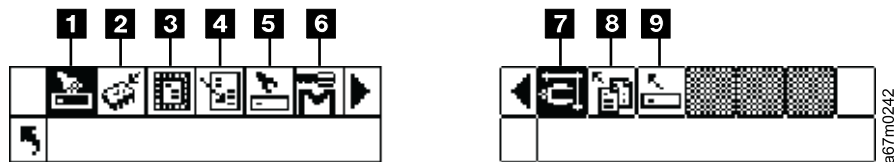


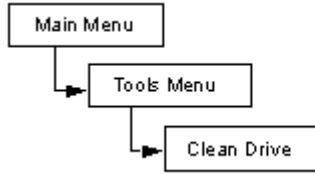
Figure 73. Tools Menu

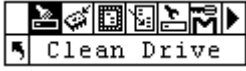


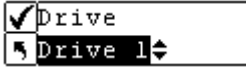


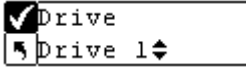




- | | |
|--|---|
| <p>1 Clean drive</p> <p>3 Demo test</p> <p>5 Drive maintenance</p> <p>7 Pos Picker</p> <p>9 Replace drive</p> | <p>2 Load F/W</p> <p>4 Self test</p> <p>6 Manufacturing test</p> <p>8 Output logs</p> |
|--|---|

Clean Drive

Clean Drive enables you to manually clean your drive components. To use this feature, you must have at least one slot configured as a cleaning slot and it must contain a cleaning cartridge. For more information on configuring cleaning slots, see “Configure Cleaning Slots” on page 101.

Path:

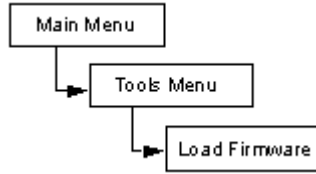





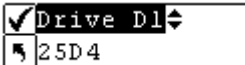


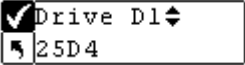




Selection	Description/Result
 <p>Step 1 From the Tools menu, highlight</p>  <p>and press</p>  <p>.</p>	Manually cleans a drive.
 <p>Step 2 Press</p>  <p>or</p>  <p>to select the drive to be cleaned.</p>	If you have two drives installed, you can clean Drive 1 or Drive 2.
 <p>Step 3 Press</p>  <p>to highlight Execute (</p>  <p>) and then press</p>  <p>.</p>	The drive is cleaned and the cleaning tape is returned to the cleaning slot.
<p>Step 4 A completion screen is displayed. Press</p>  <p>to dismiss.</p>	

Load Firmware

Load Firmware enables you to manually update Drive code using an FRM cartridge.

Path:



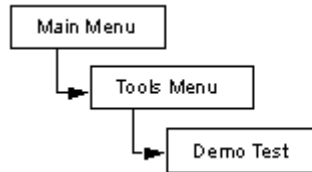
Selection	Description/Result
<p>Step 1 Open the I/O door and inset the firmware upgrade tape into the I/O slot.</p>	
 <p>Step 2 From the Tools menu, highlight  and press .</p>	Loads Firmware.
 <p>Step 3 Press  or  to select which firmware you want to upgrade.</p>	<p>Available options are:</p> <ul style="list-style-type: none"> Drive 1 Upgrades firmware for Drive 1 Drive 2 Upgrades firmware for Drive 2 Lib via D1 Upgrades the library firmware using Drive 1 Lib via D2 Upgrades the library firmware using Drive 2 All Drives Upgrades both drives with a single command
 <p>Step 4 Press  to highlight Execute () and then press .</p>	The new firmware is loaded and the upgrade tape is returned to the I/O slot.
<p>Step 5 A confirmation message is displayed. Press  to dismiss.</p>	
<p>Step 6 Remove the upgrade tape from the I/O slot.</p>	




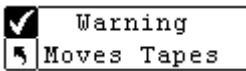

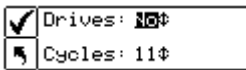



Demo Test




Demo Test randomly moves tapes within the library to demonstrate robotic motion.

Attention: This test moves cartridges throughout the library. If the library was configured with partitions enabled, you will not be able to run this test.

Path:



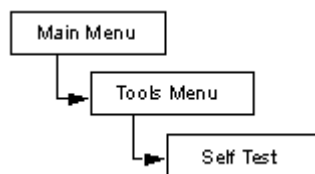
Selection	Description/Result
 <p>Step 1 From the Tools menu, highlight  and press .</p>	Runs Demo test.
 <p>Step 2 You will be prompted with a warning, press  to continue the test.</p>	Attention: This test will move your tapes and may change your inventory information by not returning tapes to the same locations.
 <p>Step 3 Press  or  to select/deselect the Drives.</p>	Available options are: yes Enables loads and unloads to the drives no Does not load or unload tapes to the drives
<p>Step 4 Press  to move to the next option.</p>	




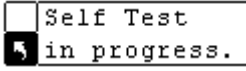


Selection	Description/Result
<div> <input checked="" type="checkbox"/> Drives: No\$ <input checked="" type="checkbox"/> Cycles: 10\$ </div> <p>Step 5 Press ▲ or ▼ to select the number of Cycles to include in the demo test.</p>	<p>You can select between 1 and 100 cycles.</p>
<div> <input checked="" type="checkbox"/> Drives: No\$ <input checked="" type="checkbox"/> Cycles: 10\$ </div> <p>Step 6 Press ▶ to highlight Execute (<input checked="" type="checkbox"/>) and then press </p>	<p>The demo test begins.</p>
<div> <input type="checkbox"/> Cycle 1 of 2 <input checked="" type="checkbox"/> Run Time 0:00 </div> <p>Step 7 A status screen will display the progress of the test. You can press  at any time to cancel the test.</p>	
<p>Step 8 When the test is complete, a completion message is displayed. Press  to dismiss.</p>	

Self Test

Self Test tests sensor input and robotic motion to make sure that the system is operational.

Path:



Selection	Description/Result
 <p>Step 1 From the Tools menu, highlight  and press .</p>	Runs self test.
 <p>Step 2 A status screen will display the progress of the test. You can press  at any time to cancel the test.</p>	The self test begins.
<p>Step 3 When the test is complete, a completion message is displayed. Press  to dismiss.</p>	If the Self Test fails, there is probably something obstructing motion of the picker. Open the door and pull out the magazines to verify that all the tapes are pushed into their slots. Look for anything that appears to be blocking the path of the picker. Retry the test. If it still fails, contact IBM Technical Support.

Drive Maintenance Test

Drive Maintenance enables you to perform several different drive diagnostic tests and maintenance functions.

A wrap is defined as a trip from logical BOT (Beginning of Tape) to logical EOT (End of Tape). A round trip would be 2 wraps.

Each option is described in more detail below.

Power on self test (POST)

Runs self diagnostics. This test takes approximately 1 minute.

Fast Read/Write

The drive reads and writes two wraps worth of data (a trip down and back) in each of the four data sections. Ten data patterns are used in this test. No more than 1.5% of the tape is used. This test takes approximately 3 minutes.

Normal Read/Write

The drive reads and writes 128 wraps worth of data (all the tracks) in each of the four data sections. This test takes approximately 20 minutes.

Media Read/Write

Since media damage usually comes from the edges of tape to the center of tape, the media test performs a read/write test by writing two wraps on each of the two outside data bands, closest to the edge of tape, on both edges of the tape, for the entire length of tape. This test takes approximately 10 minutes.

Head Read/Write

In this test the drive performs a resistance check on the recording head, then it does a read/ write test where it writes two wraps in each of the two center data bands of tape to verify the head is performing well. This test takes approximately 10 minutes.

Wrap Test

In this test the drive performs a check of the SCSI/Fibre circuitry from and to the SCSI/Fibre connector.

Note: For drives with SCSI connectors, the test requires that the drive be terminated by either the terminator on the connector or at the end of the bus. Before you select this function, disconnect the SCSI cable of the 3582 Ultrium Tape Library that is closest to the server. Then, attach the SCSI wrap plug to that SCSI connector.

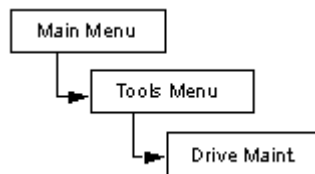
Create FMR


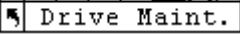





This option copies the specified drive's current field microcode replacement (FMR) data to a scratch data cartridge. See "Creating or Erasing an FMR Tape" on page 46.



Clear FMR

This option erases the FMR data, and converts the cartridge into a valid scratch (blank) data cartridge. See "Creating or Erasing an FMR Tape" on page 46.

Path:



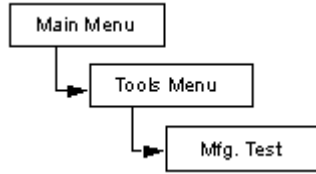
Selection	Description/Result
  Step 1 From the Tools menu, highlight  and press 	Runs Drive Maintenance test.
 Warning  Writes Tape Step 2 A warning message is displayed. Press  to continue with the test.	Attention: For all Read/Write tests, the content of the tape will be destroyed when running the test.




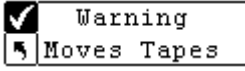

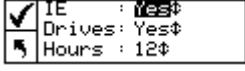



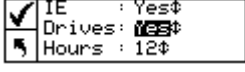



Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Drive D1↕ <input type="checkbox"/> POST↕ </div> <p>Step 3 Press ▲ or ▼ to select the drive that you want to run the test on.</p>	
<p>Step 4 Press ▶ to move to the next option.</p>	
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Drive D1↕ <input type="checkbox"/> POST↕ </div> <p>Step 5 Press ▲ or ▼ to select the test you want to run.</p>	<p>Available options are:</p> <p>POST</p> <ul style="list-style-type: none"> • Fast R/W • Normal R/W • Media R/W • Head R/W • Wrap • Create FMR • Clean FMR
<p>Step 6 Press ▶ to highlight Execute (<input checked="" type="checkbox"/>) and then press  . The test begins. You can press  at any time to cancel the test.</p>	




Manufacturing Test

Manufacturing Test operates the robotics by moving tape cartridges from slot to slot. This test verifies that the library is functioning correctly.

Path:



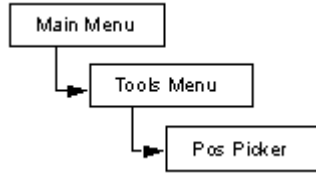
Selection	Description/Result
 <p>Step 1 From the Tools menu, highlight</p>  <p>and press</p> 	Runs Manufacturing test.
 <p>Step 2 You will be prompted with a warning. Press</p>  <p>to continue the test.</p>	Attention: This test will move your tapes and may change your inventory information by not placing tapes in the same locations.
 <p>Step 3 Press</p>  <p>or</p>  <p>to select or deselect the I/O slot.</p>	Available options are: yes Includes the I/O slot in the tape swap cycle no Does not load or unload a tape to the I/O slot
<p>Step 4 Press</p>  <p>to move to the next option.</p>	
 <p>Step 5 Press</p>  <p>or</p>  <p>to select or deselect the Drives slot.</p>	Available options are: yes Includes the I/O slot in the tape swap cycle no Does not load or unload a tape to the I/O slot
<p>Step 6 Press</p>  <p>to move to the next option.</p>	




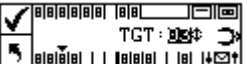






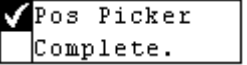

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> IE : Yes\$ <input checked="" type="checkbox"/> Drives: Yes\$ <input checked="" type="checkbox"/> Hours : 12\$ </div> <p>Step 7 Press ▲ or ▼ to select the number of hours to run the manufacturing test.</p>	<p>You can select between 0 and 72 hours.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> IE : Yes\$ <input checked="" type="checkbox"/> Drives: Yes\$ <input checked="" type="checkbox"/> Hours : 12\$ </div> <p>Step 8 Press ▶ to highlight Execute (<input checked="" type="checkbox"/>) and then press  .</p>	<p>The Manufacturing test begins.</p>
<div style="border: 1px solid black; padding: 2px;"> <input type="checkbox"/> Cycle 0001 <input checked="" type="checkbox"/> Time 0:00 / 1h </div> <p>Step 9 A status screen will display the progress of the test. You can press  at any time to cancel the test.</p>	
<p>Step 10 When the test is complete, a completion message is displayed. Press  to dismiss.</p>	

Position Picker

Position Picker enables you to move the picker inside the library to a specified location. If you need to remove a tape manually from the picker, you can position the picker to point to a slot in a magazine near the front door. If you need to remove a tape manually from the rear slots or drives, you can move the picker away from the slot you need to access.

Path:

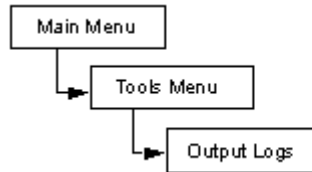





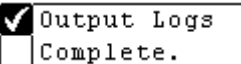

Selection	Description/Result
 <p>Step 1 From the Tools menu, highlight</p>  <p>and press</p>  <p>.</p>	
 <p>Step 2 Press</p>  <p>or</p>  <p>to select the target slot to move the picker to.</p>	TGT Target slot to position the picker in front of.
 <p>Step 3 Press</p>  <p>to highlight Execute (</p>  <p>) and then press</p>  <p>.</p>	The picker moves to the specified position.
 <p>Step 4 When the picker is positioned, a completion message is displayed. Press</p>  <p>to dismiss.</p>	

Output Logs

Output Logs exports the log files to the serial port. If you are having problems with your library, you may be asked to output the logs and send them to IBM Technical Support for analysis.

Path:

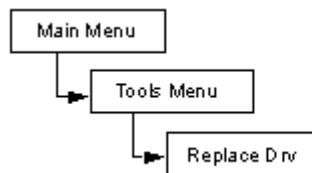


Selection	Description/Result
 <p>Step 1 From the Tools menu, highlight</p>  <p>and press</p>  <p>.</p>	<p>Outputs logs.</p>
 <p>Step 2 When the output is complete, a completion message is displayed. Press</p>  <p>to dismiss.</p>	

Replace a Drive







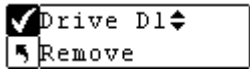


Replace Drive either prepares a drive to be removed or reactivates a drive once it is installed.

Path:






Removing a Drive







If you are removing a drive, the drive will be taken offline and will not be available for use.

Selection	Description/Result
 <p>Step 1 From the Tools menu, highlight</p>  <p>and press</p> 	Prepares a drive to be removed or replaced.
 <p>Step 2 Press</p>  <p>or</p>  <p>to select the drive you want to remove.</p>	
 <p>Step 3 Press to highlight Execute (</p>  <p>) and then press</p> 	The drive is ready to be removed.

Replacing a Drive

Replacing a drive will reinitialize the drive sled.

Selection	Description/Result
 <p>Step 1 From the Tools menu, highlight</p>  <p>and press</p> 	Prepares a drive to be removed or replaced.

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Drive D1  <input type="checkbox"/> Replace </div> <p>Step 2 Press  or  to select the drive you want to remove or replace.</p>	
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Drive D1  <input type="checkbox"/> Replace </div> <p>Step 3 Press to highlight Execute () and then press  .</p>	The new drive can be used.

Chapter 6. Using the Fibre Channel Interface

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Cables and Speeds

Ultrium 2 Tape Drives use LC duplex fiber optics cables.

The maximum distances that the 3582 Ultrium Tape Library supports on a Fibre Channel link is determined by the link speed, the type of fiber (50 micron or 62.5 micron), and the device to which the library is attached.

If the library attaches to an HBA, refer to the distances that are supported by the HBA. If the library attaches to a switch, the supported distances are:

- For a 50-micron cable:
 - 1-Gb link speed = up to 500 m (1640 ft)
 - 2-Gb link speed = up to 300 m (984 ft)
- For a 62.5-micron cable:
 - 1-Gb link speed = up to 175 m (574 ft)
 - 2-Gb link speed = up to 150 m (492 ft)

The 3582 Ultrium Tape Library uses 50-micron cables internally. Therefore, you must use a 50-micron cable to attach to the library's port. To attach to a 62.5-micron SAN, you must attach the 50-micron cable to an active port, such as a port on a switch.

Fibre Channel Addressing

Each Ultrium Tape Drive in an 3582 Ultrium Tape Library must have a Fibre Channel Loop ID and corresponding Arbitrated Loop Physical Address (AL_PA) to communicate in a Fibre Channel topology. Table 9 lists the default Fibre Channel Loop IDs and AL_PAs for each drive in the library.

Table 9. Default Fibre Channel Loop IDs and their associated AL_PAs for Ultrium Tape Drives in the 3582 Ultrium Tape Library

Drive	Fibre Channel Loop ID	AL_PA
1	17	X'CC'
2	18	X'CB'

Note: Fibre Channel Loop IDs are given in decimal format and AL_PA values are given in hexadecimal format.

You can change a Fibre Channel Loop ID by using the library's operator panel or IBM TotalStorage Specialist web interface (see "Fibre Channel Loop ID" on page 112). Using a method called hard addressing, the drive then automatically selects the corresponding AL_PA, which is the identifier that devices use to communicate. Valid Fibre Channel Loop ID values range between 0 and 125. The higher the number of the Fibre Channel Loop ID (and AL_PA), the lower the priority of the device in the loop.

You can also specify Fibre Channel Loop IDs that allow the drive to dynamically arbitrate the AL_PA with other Fibre Channel devices on the loop. This method avoids conflicts over the address and is called soft addressing. To dynamically arbitrate the AL_PA, specify a Fibre Channel Loop ID of 126 or 127.

LUN Assignments

With the Multi-Path architecture, the logical unit number (LUN) for the Sequential Access device is always LUN 0 of the drive, and the LUN for the Medium Changer device is always LUN 1 (all other LUNs are invalid addresses). These devices are compatible with the SCSI-2 or SCSI-3 standard. For information about the SCSI commands for the tape drive and the library, see the *IBM TotalStorage LTO Ultrium Tape Drive SCSI Reference* and the *IBM TotalStorage Ultrium Tape Library 3582 SCSI Reference*.

Note: The Medium Changer SCSI ID is the same as the SCSI ID for Drive 1. You can enable additional drives to optionally provide Medium Changer (LUN 1) addressing by configuring more than one logical library or by enabling additional control paths (see “Configure Partitions” on page 105 or “Access Mode” on page 111).

Using World Wide Names

Normally, blocks of World Wide Name (WWN) addresses are assigned to manufacturers by the IEEE Standards Committee, and are built into devices during manufacture. In the case of the 3582 Ultrium Tape Library, however, the library assigns World Wide Node Names and World Wide Port Names to the drives. This technique is referred to as “persistent world wide names.” Potential drive slots are each assigned a WWN which does not change when a drive is swapped or replaced.

The WWN of the drive is location-dependent and not device-dependent. That is, each time that the drive is reset or powered on, the library reestablishes the WWN so that a drive in Slot x always keeps the same WWN, even if the drive is replaced. The design of a WWN is such that if a drive needs service or replacement, host parameters do not need to be changed or reconfigured. The library’s configuration can also easily survive a reboot. The following sections describe methods that involve World Wide Names in resolving these issues.

Using Zoning to Isolate Devices and Enhance Security

For security reasons, it is important to limit the devices that a server or servers can recognize or access. Also, some performance configurations and SAN configurations can result in a device being seen multiple times from the same server. For example, if you have two HBAs from the same server connected to an Ultrium Tape Drive in the library, the drive will be detected and appear as two logical devices. That is, there will be two special files for one physical device. Zoning can address these issues.

Zoning allows you to partition your SAN into logical groupings of devices so that each group is isolated from the other and can only access the devices in its own group. Two types of zoning exist: hardware zoning and software zoning. Hardware zoning is based on physical fabric port number. Software zoning is defined with WWNN or WWPN. While zoning can be reconfigured without causing an outage, some zoning configurations can become complicated. The advantage of the library’s WWNN implementation is that you can avoid the exposure of introducing zoning errors because you do not have to change the zoning configuration if a drive needs service or replacement.

Using Persistent Binding to Ensure SCSI ID Assignment

When a server is booted, devices are discovered and assigned SCSI target and LUN IDs. It is possible for these SCSI assignments to change between boots. Some operating systems do not guarantee that devices will always be allocated the same SCSI target ID after rebooting. Also, some software depends on this association, so you do not want it to change. The issue of SCSI ID assignment is addressed by persistent binding.

Persistent binding is an HBA function that allows a subset of discovered targets to be bound between a server and device. Implemented by a WWNN or WWPN, persistent binding causes a tape drive's WWN to be bound to a specific SCSI target ID. After a configuration has been set, it survives reboots and any hardware configuration changes because the information is preserved. If a drive needs to be replaced, the new drive assumes the WWNN of the old drive because the WWNN for the drive is location-dependent within the library. Because the WWNN does not change, persistent binding does not need to be changed which would cause an outage.

Connectors and Adapters

The 3582 Ultrium Tape Library is supported by a wide variety of servers (hosts), operating systems, and adapters. These attachments can change throughout the product's life cycle. To determine the latest supported attachments, visit the web at <http://www.ibm.com/storage/lto>. Select LTO support, then Interoperability matrix and software (ISVs). Under Supported servers and operating systems, select IBM TotalStorage Ultrium Tape Library 3582. Or, contact your IBM Sales Representative.

Connecting to the iSeries Server

The iSeries does not require or allow you to set the Fibre Channel adapter settings. The adapter automatically detects the connection type and device addressing. OS/400 support is as follows:

- For V5R1, the adapter supports:
 - A single target with multiple LUNs
 - 1-Gb/s connection
 - For a Fibre Channel-Arbitrated Loop topology, connection through an L_ port to a device, hub or switch
 - For a point-to-point topology, connection through an N_port (directly to device only)
 - Does not support fabric
- For V5R2, the adapter supports:
 - Up to 16 devices, including multiple targets and multiple LUNs (each LUN on each target counts as a device)
 - 2-Gb/s connection (but will negotiate down to 1 Gb/s if necessary)
 - For a Fibre Channel-Arbitrated Loop topology, connection through an L_ port to a device, hub or switch
 - For a point-to-point topology, connection through an N_port to an F_port

The iSeries Fibre Channel adapter does not support D-mode Alternate IPL. The Alternate Installation function is used to restore a system from a Fibre Channel-attached device. With Alternate Installation support, the system is loaded from a CD and directed to the Fibre Channel-attached device for a restore from the

tape that contains the saved data. The code on the CD is only used to get the restore from tape started. All code and program temporary fixes (PTFs) are restored from the tape that contains the saved data.

Sharing on a Storage Area Network

With Storage Area Network (SAN) components, the possibilities for connecting multiple systems and multiple drives have increased. Not all software and systems are designed to share drives. Before you install a drive that would allow two systems to share it, check that the systems and their software support sharing. If your software does not support sharing, note that Fibre Channel switches have a zoning capability to form a SAN partition. For systems that do not cooperate, use zoning to prevent the systems from sharing the same drive. You can remove zoned partitions as you upgrade software and system levels.

Chapter 7. Using the SCSI Interface

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Physical Characteristics of the SCSI Interface

The 3582 Ultrium Tape Library operates as a set of SCSI-2 or SCSI-3 devices. Each SCSI drive sled uses shielded, HD68 connectors, and can attach directly to a 2-byte-wide SCSI cable. The 3582 Ultrium Tape Library's Ultrium 2 tape drive(s) uses either LVD Ultra160 SCSI or HVD Ultra SCSI interfaces.

Any combination of up to two initiators (servers) and up to four targets (devices) is allowed on a single SCSI bus if the following conditions are met:

- The SCSI bus is terminated properly at each end
- Cable restrictions are followed according to the SCSI-3 specification

Under the SCSI-3 protocol, this type of attachment allows cable lengths of up to 25 m (81 ft) with the appropriate cable and terminator. Table 10 gives the maximum bus length between terminators for the LVD and HVD interfaces. For information about cable connectors, see "SCSI Connectors and Adapters" on page 180.

Table 10. Maximum bus length between terminators

Type of Interconnection	Maximum Bus Length Between Terminators (in meters)
Point-to-point (1 server and 1 drive)	25
Multi-drop/daisy-chain (1 server and multiple drives)	12 (LVD)
	25 (HVD)

For maximum performance, multiple SCSI buses may be required (see "Using Multiple SCSI Buses" on page 179), and IBM Ultrium Tape Drives must be the only target devices that are active on the bus.

Note: For maximum performance, the quantity of tape drives that you can attach to one SCSI bus is limited, and is based on the type of bus that you have and the amount of data compression achieved. Ultra SCSI buses have a bandwidth of 40 MB per second; Ultra2 SCSI buses have a bandwidth of 80 MB per second; Ultra160 SCSI buses have a bandwidth of 160 MB per second. Table 11 on page 179 lists the types of SCSI buses and gives the recommended maximum quantity of drives that you can attach.

Table 11. Recommended maximum quantity of drives per SCSI bus

Type of Drive	Type of SCSI Bus			
	Fast/Wide	Ultra	Ultra2	Ultra160
HVD Ultrium 2	N/A (see Note 2)	1	N/A	N/A
LVD Ultrium 2	N/A	1	2 (1 drive at 2:1 compression)	4 (2 drives at 2:1 compression)

Notes:
1. N/A = not applicable.

Default SCSI ID Assignments

Based on its physical position in the frame, each tape drive is assigned a default SCSI ID. Table 12 lists the default SCSI IDs.

Table 12. Default SCSI ID for each drive in the 3582 Ultrium Tape Library

Position	SCSI ID
Drive 1	1
Drive 2	2

Note: You can change a SCSI ID by using the IBM TotalStorage Specialist web interface or the operator panel. For more information, see “Set Drive SCSI IDs” on page 108.

LUN Assignments for Ultrium Tape Drives

The logical unit number (LUN) for the Sequential Access device is always LUN 0 of the drive, and the LUN for the Medium Changer device is always LUN 1 (all other LUNs are invalid addresses). These devices are compatible with the SCSI-2 or SCSI-3 standard. For information about the SCSI commands for the tape drive and the library, see the *IBM TotalStorage LTO Ultrium Tape Drive SCSI Reference* and the *IBM TotalStorage Ultrium Tape Library 3582 SCSI Reference*.

Note: The Medium Changer SCSI ID is the same as the SCSI ID for Drive 1. You can enable additional drives to optionally provide Medium Changer (LUN 1) addressing by configuring more than one logical library or by enabling additional control paths (see “Configure Partitions” on page 105 or “Access Mode” on page 111).

Using Multiple SCSI Buses

The 3582 Ultrium Tape Library has two SCSI connectors for each tape drive in the library. The drives can be daisy-chained using a short SCSI cable.

Multiple SCSI buses may be required for maximum performance, depending on the application and data compression ratio. Note, however, that library (Medium Changer) control is required on at least one SCSI bus.

Any bus containing a Medium Changer device via LUN 1 of a drive is referred to as a control and data path. Any other bus is referred to as a data path. For information about control paths, see “Library Sharing” on page 11.

Terminating the Bus

The SCSI bus and all of the wires in the SCSI cable must be properly terminated according to the SCSI standard.

You can mount an external terminator into one of the SCSI connectors. A terminator must be installed on the last device on each end of a string of multiple devices. A terminator is included with each Ultrium Tape Drive.

SCSI Connectors and Adapters

The 3582 Ultrium Tape Library is supported by a wide variety of servers (hosts), operating systems, and adapters. These attachments can change throughout the product's life cycle. To determine the latest supported attachments, visit the web at <http://www.ibm.com/storage/lto>. Select LTO support, then Interoperability matrix and software (ISVs). Under Supported servers and operating systems, select IBM TotalStorage Ultrium Tape Library 3582. Or, contact your IBM Sales Representative.

Notes on Connecting to the AS/400 and iSeries Servers

The following conditions apply to the SCSI bus attachment of the 3582 Ultrium Tape Library to the IBM AS/400 and the IBM iSeries servers. (Feature codes in the following list are abbreviated as FC.)

- No interposers are required to connect the library's tape drives to the PCI Magnetic Media Controller (FC 2729), PCI Ultra Magnetic Media Controller (FC 2749), or Magnetic Media Controller (FC 6534).
- The PCI Magnetic Media Controller (FC 2729), PCI Ultra Magnetic Media Controller (FC 2749), and Magnetic Media Controller (FC 6534) provide one port.
- When the 3582 Ultrium Tape Library's tape drives are attached, no other devices can be supported on the ports for the PCI Magnetic Media Controller (FC 2729), PCI Ultra Magnetic Media Controller (FC 2749), or Magnetic Media Controller (FC 6534).
- An AS/400 or iSeries server cannot be interconnected with any other server (including another AS/400 or iSeries server) on the same SCSI bus.
- For the 3582 Ultrium Tape Library to be shared by an AS/400 or iSeries server and another type of server at the same time, the library must be configured with multiple logical libraries (see "Library Sharing" on page 11).
- For the 3582 Ultrium Tape Library to be shared by two or more AS/400 or iSeries servers at the same time, the library must be configured with multiple control paths (see "Using Multiple Control Paths" on page 13).
- If you plan to use the 3582 Ultrium Tape Library as an alternate IPL device, you must set one of the SCSI addresses on its tape drives to 0 when you attach it with the PCI Magnetic Media Controller (FC 2729), PCI Ultra Magnetic Media Controller (FC 2749), Magnetic Media Controller (FC 6534), or 5702 adapter.
- Maximum performance by the Ultrium Tape Drive cannot be achieved with HVD SCSI. No increase in performance is expected by replacing HVD Ultrium 1 Tape Drives with HVD Ultrium 2 Tape Drives. Maximum performance can only be achieved with LVD SCSI or Fibre Channel attachment.
- LVD SCSI is supported with OS/2® V5R2 and the 5702 adapter. The 5702 uses Ultra160 SCSI technology and VHDCI cable connectors. Multiple Ultrium Tape Drives can be attached to one 5702 adapter, but performance must be taken into consideration. Each iSeries adapter must have at least one control path configured with the attached drives.

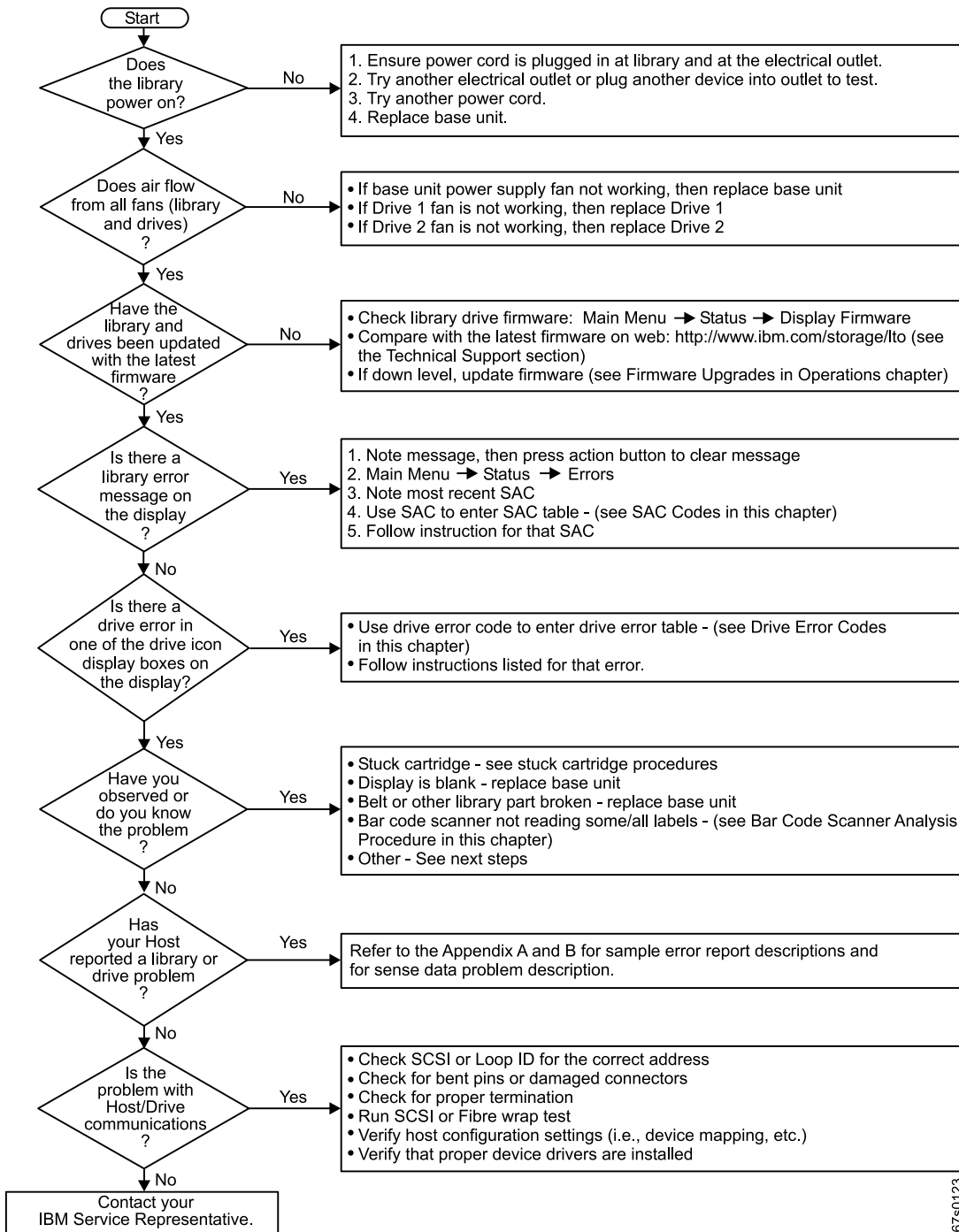
- Multiple HVD SCSI Ultrium Tape Drives can be attached to the Magnetic Media Controller (FC 6534), PCI Magnetic Media Controller (FC 2729), or PCI Ultra Magnetic Media Controller (FC 2749) adapters, but performance must be taken into consideration. Each iSeries adapter must have at least one control path configured with the attached drives.

Chapter 8. Troubleshooting and Diagnostics

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If you encounter problems when running the 3582 Library, refer to the flowchart in Figure 74. If the problem is not identified in the flowchart, visit the web at <http://www.ibm.com/storage/1to>. If the flowchart instructs you to replace a part, refer to “Contacting IBM Technical Support” on page 197.

Working With a Problem



a67s0123

Figure 74. Flowchart for analyzing maintenance problems

Installation Problems

Usually, problems encountered during the installation of your library are caused by improper SCSI bus configuration-application-software configuration or by an OS that has not been correctly configured. If the application software that you are attempting to use is not communicating with your library after installation, check the following:

SCSI IDs

Make sure that the IDs you selected for the 3582 robotics and tape drive are not the same as the ID used by any other SCSI device on that bus, including the host SCSI adapter card.

SCSI Cabling

Verify that all SCSI cables are securely connected at both ends and that the jack screws are secured. Also, check the length and integrity of your SCSI cabling. The total length of a SCSI bus must not exceed 12 meters (39.4 feet). Replace suspect cables with known good cables.

Note: The length of the internal SCSI cabling inside your library is one foot for each drive. This length must be included in any calculations of bus length.

Termination

Check that all SCSI buses are properly terminated.

Compatibility

Ensure that your library and its tape drives are compatible with the SCSI adapter card and application software that you plan to use.

SCSI Adapter Card Installation

Verify that you have installed your SCSI adapter card correctly. Refer to the documentation that came with your card for installation and troubleshooting instructions. Pay particular attention to any steps describing the settings of various jumpers or switches on the card. Check that the card is seated fully in the I/O connector.

Note: For a list of compatible SCSI adapters and application software, check with your application software vendor.

Application Software Installation

Refer to the documentation included with your software for instructions on how to verify installation.

Library Error Messages

If an error occurs during the operation of your library, an error message will be displayed on the operator's LCD. Table 13 lists library error messages; "Drive Error Codes" on page 189 lists drive error messages.

SAC Codes

Table 13. SAC Codes

SAC Code	Error Message	Description	Recommended Action
00h	Unknown Error	An unexpected error has occurred.	Capture the support and error logs and provide them to service.
01h	OS Error Reboot System	Operating System Error	Reboot the system.
02h 03h 04h	Z80 Error OCP Error XA Error	A robot controller, OCP controller board, or XA main controller board hardware problem exists and requires replacement.	
05h	SW Error	Application Software (firmware) Error	
10h 14h	SN Missing	The system serial number is missing in NVRAM. The system cannot go online if a serial number is not entered. This problem may occur if the main board has been exchanged or NVRAM has been corrupted due to a code problem or a bad NVRAM chip.	
15h	Scanner Error	The bar code scanner is not functioning properly.	
16h	Bar Code Error Check Tape	The scanned bar code is incorrect for your current configuration. This is most likely the result of a missing or unreadable bar code or a bar code length that does not match the mode you configured (such as Default, Media ID, or Extended).	Check bar code scanner configuration. See "Configure Bar Code Scanner" on page 122 for more information.
38h 39h	RMU Problem Check RMU	The RMU has reported an error to the library.	Make sure the RMU is configured correctly, is operational, and is accessible on the network.

Table 13. SAC Codes (continued)

SAC Code	Error Message	Description	Recommended Action
40h	CFG Mismatch	The firmware detects that the code configuration does not match the hardware configuration. This may happen when the wrong firmware is loaded (for example, an LTO code image is loaded to a DLT system).	Reboot the system..
70h 81h 82h	Picker Error Reset System	The picker was unable to perform a requested command.	Assure that the picker path is clear and that cartridges are properly inserted into storage and I/O slots, as well as drive locations. Reboot the system.
80h E0h	Obstruction Check Picker	The picker has reported a move failure, which may be caused by an obstruction of the picker, such as partially extended tapes into the picker path, an ejected tape from a drive, or a tape within the picker partially extending out of the picker.	Try to clear the obstruction.
81h 82h 70h	Picker Error Reset System	The picker was unable to perform a requested command.	Assure that the picker path is clear and that cartridges are properly inserted into storage and I/O slots, as well as drive locations. Reboot the system.
82h 81h 70h	Picker Error Reset System	The picker was unable to perform a requested command.	Assure that the picker path is clear and that cartridges are properly inserted into storage and I/O slots, as well as drive locations. Reboot the system.
90h	Drive Error Check Drive	Communication to a drive is not working, the drive is not initializing, or the drive is reporting a problem.	Reboot the system.
92H	DRV Invalid	Invalid Drive firmware	Reload drive firmware.

Table 13. SAC Codes (continued)

SAC Code	Error Message	Description	Recommended Action
A0h	RMU Com Error check RMU	The library firmware was able to communicate with the RMU, but did not detect any communication for more than 10 minutes. The RMU may have been removed or somehow has become nonoperational.	Reboot the system.
D0h	PS Failure	A library power supply failed or is not operating within specified ranges.	Reboot the system.
E0h 80h	Obstruction Check Picker	The picker has reported a move failure, which may be caused by an obstruction of the picker, such as partially extended tapes into the picker path, an ejected tape from a drive, or a tape within the picker partially extending out of the picker.	Try to clear the obstruction.
EAh	Sled Missing Check Sled	A drive sled has been removed or is not connected properly.	Reinsert the sled or check the connections.
E2h	Security alert Check Door	The system has detected operator interference, such as an open door and magazine removal, or a host has issued a PREVENT MEDIA REMOVAL and a tape has been inserted or removed from the I/O slot.	Check and ensure that magazines are installed, the door is closed, and that the I/O slot is empty.
E3h E4h E5h E6h	SCSI Error Check SCSI	A SCSI connection problem has been detected.	Make sure that the cables are connected correctly, the bus type, LVD/DR ID connected correctly, and the proper terminator is applied.
E7h E8h	Pick Failed Clear Picker Place Failed Clear Picker	The picker could not GET or PUT a tape. Typically this means a tape is still partially in the picker.	Remove the tape from the picker. For more information, see "Manual Removal of a Tape from the Picker" on page 196.

Table 13. SAC Codes (continued)

SAC Code	Error Message	Description	Recommended Action
E9h	Tape Recovered to Cell X	Informational message that indicates that a tape had been detected in the picker assembly and was placed in a lot location (X) to free the picker and make it operational.	Make sure that the tape belongs in the location it was placed. You might need to use the Move Media function to move the tape to the proper location.
F0h	Fan Failure	A library or drive fan failed.	Prevent the system from becoming too hot and either turn off the library or remove the drive with the bad fan.
F5h	Clean Needed Check drive X	A drive has been cleaned, but still requires cleaning. The cleaning tape might not function properly, might be expired, or the drive might be defective.	Retry the clean operation.
F6h	Tape Expired Eject Slot X	A cleaning tape is expired.	Export the cleaning tape and insert a new one.
F7h	No Clean Tape Insert Tape	A cleaning operation was attempted, but a cleaning tape is not configured, expired, or not available.	Insert a cleaning tape into the I/O slot or configure a cleaning slot and import a cleaning tape into that slot.
F8h	Tape Missing in Slot X	A previously configured cleaning tape is no longer found. It might have been removed manually, loaded in a drive, or recovered to a data slot.	Place the tape back to the slot.

Drive Error Codes

Errors and informational messages that pertain to the tape drive are shown in the drive status area of the operator panel. Table 14 describes the codes that display.

Note: In this table, *enclosure* refers to the 3582 Ultrium Tape Library.

Attention: If the tape drive detects a permanent error and displays an error code other than 0, it automatically performs a drive dump. If you force a drive dump, the existing dump will be overwritten and data will be lost. After you force a drive dump, do not turn off the power to the tape drive or library, or you may lose the dump data.

Attention: The operator panel displays an exclamation point before a drive error code. For example, '!6'.

Table 14. Drive error codes

Code	Cause and Action
0	<p>No error occurred and no action is required. This code displays:</p> <ul style="list-style-type: none"> • When power is cycled (turned off, then on) to the tape drive. • When diagnostics have finished running and no error occurred. <p>Note: The single-character display is blank during normal operation of the tape drive.</p>

Table 14. Drive error codes (continued)

Code	Cause and Action
1	<p>Cooling problem. The tape drive detected that the recommended operating temperature was exceeded. Perform the following action:</p> <ol style="list-style-type: none"> 1. If a fan is present in the enclosure, ensure that it is rotating and is quiet. If not, replace the fan (for instructions about replacing the fan, see your enclosure's documentation). 2. Remove any blockage that prevents air from flowing freely through the tape drive. 3. Ensure that the operating temperature and airflow is within the specified range (see Chapter 10, "Specifications", on page 213). 4. If the operating temperature is within the specified range and the problem persists, replace the tape drive. <p>The error code clears when you power-off the tape drive or place it in maintenance mode.</p>
2	<p>Power problem. The tape drive detected that the externally supplied power is either approaching the specified voltage limits (the drive is still operating) or is outside the specified voltage limits (the drive is not operating). Perform the following action:</p> <ol style="list-style-type: none"> 1. Ensure that the drive sled is properly seated. 2. If the problem persists, replace the tape drive. <p>The error code clears when you power-off the tape drive or place it in maintenance mode.</p>
3	<p>Firmware problem. The tape drive determined that a firmware error occurred. Perform the following action:</p> <ol style="list-style-type: none"> 1. Collect a drive dump from one of the following: <ul style="list-style-type: none"> • Note: Do not force a new dump; the tape drive has already created one. <ul style="list-style-type: none"> • Server's SCSI or Fibre Channel interface by using a device driver utility or system tool. To obtain a dump, determine whether your server is installed with a utility that can read files from the server's memory. If it is, use that utility to obtain the dump. For information about using IBM's utility programs to obtain drive dumps, see the <i>IBM Ultrium Device Drivers Installation and User's Guide</i>. To determine where to send a file that contains a drive dump to be analyzed, contact your IBM Technical Support Center. 2. Power the tape drive off and on, then retry the operation that produced the error. 3. If the problem persists, download new firmware and retry the operation. 4. If the problem persists, send the drive dump that you collected in step 1 to your IBM Technical Support Center. <p>The error code clears when you power-off the tape drive or place it in maintenance mode.</p>
4	<p>Firmware or tape drive problem. The tape drive determined that a firmware or tape drive hardware failure occurred. Perform the following action:</p> <ol style="list-style-type: none"> 1. Collect a drive dump from one of the following: <ul style="list-style-type: none"> • Note: Do not force a new dump; one already exists. <ul style="list-style-type: none"> • Server's SCSI or Fibre Channel interface by using a device driver utility or system tool. To obtain a dump, determine whether your server is installed with a utility that can read files from the server's memory. If it is, use that utility to obtain the dump. For information about using IBM's utility programs to obtain drive dumps, see the <i>IBM Ultrium Device Drivers Installation and User's Guide</i>. To determine where to send a file that contains a drive dump to be analyzed, contact your Support Center. • For Ultrium 2 Tape Drives, see the <i>IBM Ultrium Device Drivers Installation and User's Guide</i>. 2. Power the tape drive off and on, then retry the operation that produced the error. The error code clears when you power-off the tape drive or place it in maintenance mode. 3. If the problem persists, download new firmware and retry the operation; if new firmware is not available, replace the tape drive.

Table 14. Drive error codes (continued)

Code	Cause and Action
5	Tape drive hardware problem. The drive determined that a tape path or read/write error occurred. To prevent damage to the drive or tape, the drive will not allow you to insert a cartridge if the current cartridge was successfully ejected. The error code may clear when you cycle power to the tape drive or place it in maintenance mode. If the problem persists, replace the tape drive.

Table 14. Drive error codes (continued)

Code	Cause and Action
6	<p>Tape drive or media error. The drive determined that an error occurred, but it cannot isolate the error to faulty hardware or to the tape cartridge. Perform the following action:</p> <p><u>For Problems with Writing Data:</u></p> <p>If the problem occurred while the drive was writing data to the tape, and if you know the volume serial number (located on the cartridge label) of the tape cartridge loaded in the drive when the problem occurred, retry the operation with a different cartridge:</p> <ul style="list-style-type: none"> • If the operation succeeds, the original cartridge was defective. Copy data from the defective cartridge and discard it. • If the operation fails and another drive is available, insert the cartridge into the other drive and retry the operation. <ul style="list-style-type: none"> – If the operation fails, discard the defective cartridge. – If the operation succeeds, insert a scratch cartridge into the first drive and run drive diagnostics (See “Drive Maintenance Test” on page 161, and perform the Normal Read/Write test.). <ul style="list-style-type: none"> - If the diagnostics fail, replace the drive. - If the diagnostics succeed, the error was temporary. • If the operation fails and another drive is not available, insert a scratch cartridge into the drive and run the tape drive diagnostics (see “Drive Maintenance Test” on page 161). <ul style="list-style-type: none"> – If the diagnostics fail, replace the drive. – If the diagnostics succeed, discard the cartridge. <p>If the problem occurs with multiple tape cartridges or if you do not know the tape cartridge’s volume serial number, run the tape drive diagnostics (See “Drive Maintenance Test” on page 161, and perform the Normal Read/Write test.):</p> <ul style="list-style-type: none"> • If the diagnostics fail, replace the tape drive. • If the diagnostics succeed, run the Drive Maintenance Head Read/Write test (see “Drive Maintenance Test” on page 161, and perform the Head Read/Write test.). <ul style="list-style-type: none"> – If the Head Read/Write diagnostic fails, replace the tape drive. – If the Head Read/Write diagnostic succeeds, replace the cartridges that caused the problem. <p>The error code clears when you remove the tape cartridge or place the drive in maintenance mode.</p> <p><u>For Problems with Reading Data:</u></p> <p>If the problem occurred while the drive was reading data from the tape, and if you know the volume serial number of the tape cartridge, perform one of the following procedures:</p> <ul style="list-style-type: none"> • If another drive is available, insert the cartridge into the other drive and retry the operation: <ul style="list-style-type: none"> – If the operation fails, discard the defective cartridge. – If the operation succeeds, insert a scratch cartridge into the first drive and run the tape drive diagnostics (See “Drive Maintenance Test” on page 161, and perform the Normal Read/Write test.): <ul style="list-style-type: none"> - If the diagnostics fail, replace the drive. - If the diagnostics succeed, the error was temporary. • If another drive is not available, insert a scratch cartridge into the drive and run the tape drive diagnostics (see “Drive Maintenance Test” on page 161). <ul style="list-style-type: none"> – If the diagnostics fail, replace the drive. – If the diagnostics succeed, discard the cartridge. <p>If the problem occurs with multiple tape cartridges or if you do not know the tape cartridge’s volume serial number, run the tape drive diagnostics (see “Drive Maintenance Test” on page 161):</p> <ul style="list-style-type: none"> • If the diagnostics fail, replace the tape drive. • If the diagnostics succeed, run the Head Read/Write test (See “Drive Maintenance Test” on page 161, and perform the Head Read/Write test.): <ul style="list-style-type: none"> – If the Head Read/Write Test, replace the tape drive. – If the Head Read/Write diagnostic succeeds, replace the cartridges that caused the problem. <p>The error code clears when you remove the tape cartridge or place the drive in maintenance mode.</p>

Table 14. Drive error codes (continued)

Code	Cause and Action
7	<p>A high probability of media error. The tape drive determined that an error occurred because of a faulty tape cartridge, and expired cleaning cartridge, or the insertion of an FMR cartridge as a data cartridge.</p> <ul style="list-style-type: none"> • Try another tape cartridge. If the problem occurs with multiple tape cartridges, see “Drive Maintenance Test” on page 161. • Dispose of the current cleaning cartridge and insert a new cleaning cartridge. • If the FMR cartridge is no longer needed, go to the section about erasing an FMR tape. <p>The error code clears when you remove the tape cartridge or place the drive in maintenance mode.</p>
8	<p><u>For SCSI drive:</u></p> <p>Tape drive or SCSI bus failure. The tape drive determined that a failure occurred in the tape drive’s hardware or in the SCSI bus. See the section for fixing SCSI bus errors. The error code clears 10 seconds after the drive detected the error or when you place the drive in maintenance mode.</p> <p><u>For Fibre Channel drive:</u></p> <p>Tape drive or Fibre Channel failure. The tape drive determined that a failure occurred in the tape drive’s hardware or in the Fibre Channel. It detects light through the fiber cable but cannot perform data communication properly. Check that each Fibre Channel cable meets the requirements specified in Chapter 6, “Using the Fibre Channel Interface”, on page 171. The error code clears when the drive detects light and can communicate, or when you place the drive in maintenance mode.</p>
9	<p>Tape drive or LDI (RS-422) error. The tape drive determined that a failure occurred in the tape drive hardware or in the LDI (RS-422) connection.</p> <ul style="list-style-type: none"> • Power cycle the drive. If the power-on self test is successful, the problem is resolved. • If the problem persists, replace the tape drive sled. • If the problem persists after replacing the drive, the problem is with the cable between the drive sled and the main board. <p>The error code clears when you place the drive in maintenance mode.</p>
o, c, b, or h	<p>No error or message assigned. There may be a problem with the single-character display. Turn the power off, then on and determine whether all segments on the single-character display are lit. If so, you may have a down-level version of both your library’s firmware and documentation (the documentation may not describe all of the available error codes). Refer to the latest version of the firmware or documentation.</p>
A	<p>Tape drive hardware problem. The tape drive determined that a problem occurred which degraded the operation of the tape drive, but it did not restrict continued use. If the problem persists, replace the tape drive. The drive is usable, though the single-character display continues to indicate an error and the status light flashes amber.</p> <p>The error code may clear when you cycle power to the tape drive or place it in maintenance mode.</p>
B	<p>No error or message is assigned. See error code 8 in this table.</p>
C	<p>The tape drive needs to be cleaned. Clean the tape drive. See “Clean Drive” on page 156.</p> <p>The error code clears when you clean the tape drive or place it in maintenance mode.</p>
d	<p>Fibre Channel AL_PA conflict. More than one device has the same address. Each device must have its own unique AL_PA address. See “Fibre Channel Addressing” on page 172.</p>
D	<p>No error or message assigned. See error code 0 in this table.</p>

Table 14. Drive error codes (continued)

Code	Cause and Action
E	<p>Informational message. The tape drive's Fibre Channel port has been placed offline by another device or by an operator. This code is set when the Offline command is received from another device on the Fibre Channel interface. Determine why the device at the other end of the Fibre Channel (the server, switch, or other device) placed the drive offline.</p> <p>The drive is placed online when it receives the Online command from the Fibre Channel interface.</p> <p>After a reset, the drive comes online.</p>
F	<p>The tape drive determined that no light is being received over the Fibre Channel. See "Fixing Fibre Channel Errors" on page 226.</p> <p>The error code clears when the drive detects light or when you place the drive in maintenance mode.</p>

Resolving Media-Related Problems

- Test Cartridge & Media diagnostic that verifies whether a suspect cartridge and its magnetic tape are acceptable for use.
- A Statistical Analysis and Reporting System (SARS) to assist in isolating failures between media and hardware. To determine the cause of failure, SARS uses the cartridge performance history that is saved in the cartridge memory (CM) and the drive performance history that is kept in the drive's flash erasable programmable read-only memory (EPROM). Any failures that SARS detects are reported as TapeAlert flags on the host.

Attention: If you insert the IBM LTO Ultrium Data Cartridge into another manufacturer's tape drive, the SARS data in the cartridge memory may become lost or invalid.



If you encounter a media-related problem, use the following procedure:

Attention: When you run the Test Cartridge & Media diagnostic, data on the suspect tape is overwritten. Similarly, use only a scratch data cartridge when you run tape drive diagnostics; the test overwrites data on the cartridge.






1. If possible, run the tape cartridge in a different tape drive. If the operation in the other tape drive fails and 6 or 7 displays, replace the media. If the operation succeeds, run the Media Read/Write diagnostic (see "Drive Maintenance Test" on page 161).
2. If the Test Cartridge & Media diagnostic fails, replace the media. If it runs successfully, clean the tape drive and run the Normal Read/Write diagnostic (see "Drive Maintenance Test" on page 161).
3. If the tape drive diagnostics fail, replace the tape drive sled, see "Removing the Drive from the Drive Sled" on page 254. If the tape drive diagnostics run successfully, perform the operation that produced the initial media error.

Manual Removal of Tapes

You can remove a tape manually from a drive, the rear slots, the front magazines, and the picker. You can position the picker to move it out of your way to be able to reach the back interior of your library. You can also position the picker when you want to remove a tape from the picker by following the procedure below.

1. From the Tools menu, highlight  and press .



2. Press  and  to select the target slot in which to move the picker.
3. Press  to highlight Execute () and then press .

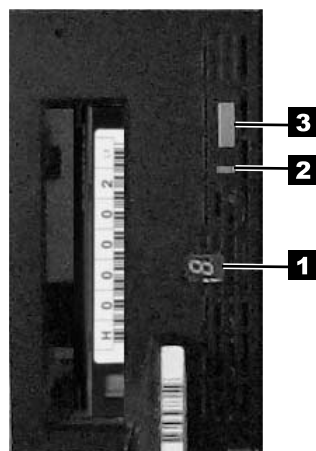
Manual Removal of a Tape from a Drive

If a tape cartridge fails to eject from the 3582 Ultrium Tape Library, you can perform the following steps to reset the drive and eject the cartridge.

1. Vary the library and drives offline to *all* attached hosts.
2. Remove the right-hand cartridge magazine.

Note: Ensure that you do not interchange magazines if you remove both.

3. Locate the drive that contains the stuck tape cartridge. If the picker is in front of the drive, use the Operator Panel to move the picker to target position 1 (Main Menu → Tools Menu → Position Picker). See “Position Picker” on page 165.
4. Carefully reach through the magazine slot, then press and release the eject button **3** (see Figure 75) on the front of the drive and wait for approximately two minutes. If the cartridge ejects the procedure was successful. If the cartridge does not eject continue with the next step.
5. Press and hold the eject button **3** (see Figure 75) for at least 10 seconds. The single character display **1** (see Figure 75) should change as the drive performs a power-on self test (POST). If this does not happen cycle power to the library (turn it off, then on again).
6. After a reset or power cycle, the drive should start a slow rewind. During the slow rewind the activity LED **2** (see Figure 75) will be flashing. You must wait for the LED to stop flashing, indicating that the slow rewind is complete. **This process may take up to 20 minutes.**
7. Press and release the eject button **3** (see Figure 75) on the front of the drive and wait for approximately two minutes. If the cartridge ejects the procedure was successful.



a67m0234

Figure 75. Resetting the Tape Drive

Manual Removal of a Tape from a Rear Slot

To manually remove a tape from one of the rear slots, use the following steps:

1. Position the picker to the far right. See “Manual Removal of Tapes” on page 194.
2. Power off the library.
3. Open the front door and remove the two magazines.

Note: Ensure that you do not interchange magazines when the magazines are placed back in the library.

4. Reach into the back of the library and press up on the green lever to release a tape from the rear slot.
5. Gently pull the tape out toward you.

Manual Removal of a Tape from the Picker

To manually remove a tape from the picker, use the following steps:

1. Position the picker to be accessible to you. See “Manual Removal of Tapes” on page 194.
2. Power off the library.
3. Open the front door and remove the two magazines.

Note: Ensure that you do not interchange magazines when the magazines are placed back in the library.

4. If the tape cartridge is toward you, grasp it and remove it gently. However, if the tape cartridge is away from you, gently push it into a rear slot with a long narrow object such as a ruler.

Note: If a cartridge is partially in the drive and partially in the picker, contact support for removal instructions.

Bar Code Scanner Analysis Procedure

If you are experiencing problems with the bar code scanner, run the procedure below.

1. Ensure that the bar code scanner has been configured properly. The bar code scanner must be configured for the Extended mode. See “Configure Bar Code Scanner” on page 122.
2. Ensure that you are using supported bar code labels. See Chapter 4, “Using the Media”, on page 59.
3. If bar code scanner problem is isolated to a single cartridge or to particular cartridges, check for damaged labels.
4. Clean the lens of the bar code scanner. See “Cleaning the Bar Code Scanner”.

Cleaning the Bar Code Scanner

If the bar code scanner is unable to read a bar code label, the window on the scanner may need to be cleaned. Refer to Figure 76 on page 197 for instructions on how to unscrew the bar code scanner. Refer to Figure 77 on page 197 for instructions on how to remove the bar code scanner for cleaning. After removing the bar code scanner for cleaning, wipe the bar code scanner window with a lint-free cloth and replace the bar code scanner by screwing it back into the library.

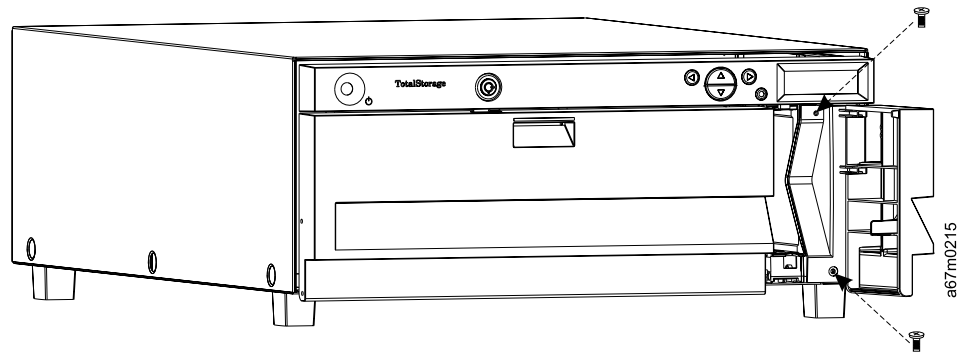


Figure 76. Unscrewing the bar code scanner

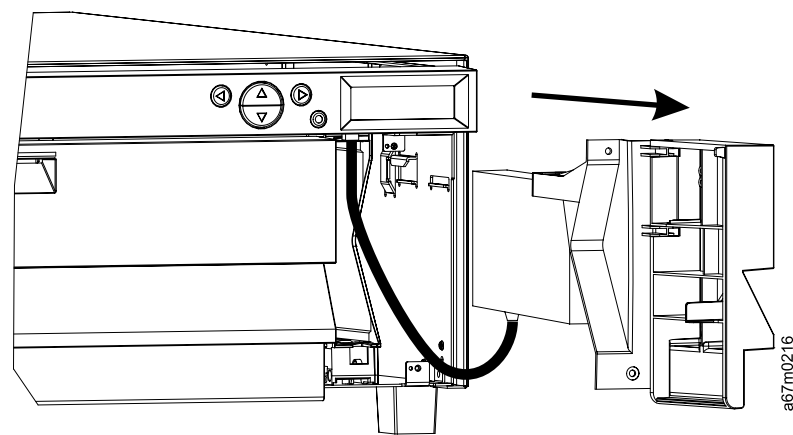


Figure 77. Removing the bar code scanner

Contacting IBM Technical Support

Prior to calling IBM Service, the customer is responsible for following IBM's published LTO diagnostic procedures including any needed update to the latest level of firmware. For details, refer to <http://ssddom02.storage.ibm.com/techsup/webnav.nsf/support/lto>.

The IBM support center will assist with problem determination and initiate shipment of a replacement part, if needed, to the customer's location. Transportation costs, both ways, are paid by IBM. The replacement part becomes the property of the customer in exchange for the failed part, which becomes the property of IBM. The customer must transfer the machine type, model, and serial number of the failing unit to the replacement unit. A Failure Analysis form is also included. The customer is responsible for packing the failed part into the shipping carton that contained the replacement part. The customer is responsible for contacting IBM to arrange for its collection in most major cities outside of PRC. Failure to return the failed part to IBM within 30 days will result in the customer being billed for the new list price. The customer is responsible for installing and setting up the replacement part. For PRC, the customers are required to bring the failed part to the nearest IBM authorized service center to obtain the replacement part.

Failure to use the carton in which the replacement part was received, or failure to otherwise properly pack the returned part, could result in charges being incurred by the customer for damage to the failed part during shipment. Failure to fill out and

affix the identification tag to the replacement unit with the machine type, model, and serial number of the failing unit could result in losing the warranty for the replacement unit.

Before calling support, follow these steps which will help you take full advantage of your call:

- Review all documentation carefully. (Experience has demonstrated that most questions are answered in your documentation.)
- Be prepared to explain whether the software or hardware has worked properly at anytime in the past. Have you changed anything recently?
- Pinpoint the exact location of your problem, if possible. Note the steps that led to the problem. Can you duplicate the problem or is it a one-time occurrence?
- Note any error messages displayed on your PC monitor or file server. Write down the exact error message.
- If at all possible, call while at your computer, with the library installed and turned on.
- If running on a network, have all relevant information available (that is, type, version number, network hardware, and so on).
- Be prepared to provide:
 - Your name and your company's name
 - Model number
 - Serial number of the library (front cover, lower right corner)
 - Software version numbers
 - Device driver information
 - Host application name and version
 - Hardware configuration, including firmware versions, date, and number
 - Type of host, operating system version, clock speed, RAM, network type, network version, and any special boards installed
 - A brief description of the problem

Having this information available when you call for customer assistance will enable support personnel to resolve your problem in the most efficient manner possible.

Chapter 9. Removal and Replacement Procedures

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<http://www.ibm.com/storage/lto>



Attention: Before removing and replacing parts, download the latest level of firmware by visiting the above website and clicking on Technical Support or LTO Support. Your failing part may function as designed after you install the latest level of firmware.

Before removing or replacing the 3582 Ultrium Tape Library and the bar code reader, perform the following general service procedures.

- Use Chapter 8, “Troubleshooting and Diagnostics”, on page 183 to isolate where the failure is occurring. There are several possible locations:
 - Tape drive and robotics
 - Media
 - SCSI cables and terminator
 - Server hardware
 - Application software
- Prior to cycling power to the 3582 Ultrium Tape Library:
 - Write down the error message or error code that appears on the message display.
 - If possible, and especially if the problem appears to be related to the tape drive, copy the existing microcode dump in the drive’s memory. For information about using IBM’s utility programs to obtain drive dumps, see the *IBM Ultrium Device Drivers Installation and User’s Guide*.

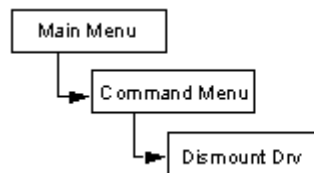
For a list of parts for the , see Appendix G, “Parts List”, on page 263 To replace parts under warranty, see Appendix G, “Parts List”, on page 263.

Removing a Drive

Follow the procedure below to remove a drive.

1. If the drive to be replaced has a tape cartridge mounted, use the drive dismount command to remove the tape.

Path:



If the tape cartridge is stuck in the drive, refer to “Manual Removal of a Tape from a Drive” on page 195 to attempt removal. If this process fails, leave the tape cartridge in the drive, and continue with the drive removal steps below.

2. Use the library’s Operator Panel to record the SCSI ID or Fibre Channel Loop ID of the broken drive. See “SCSI and Fibre Channel Loop ID Settings” on page 108. If you are unable to record these IDs, contact the administrator who recorded this information during the library’s installation.
3. Follow the procedure in “Removing a Drive” on page 167.

4. Disconnect the SCSI or fibre interface cable. For SCSI drives, disconnect the second SCSI cable or remove the SCSI terminator.
5. Loosen the drive's thumbscrews.
6. Pull the drive module out.

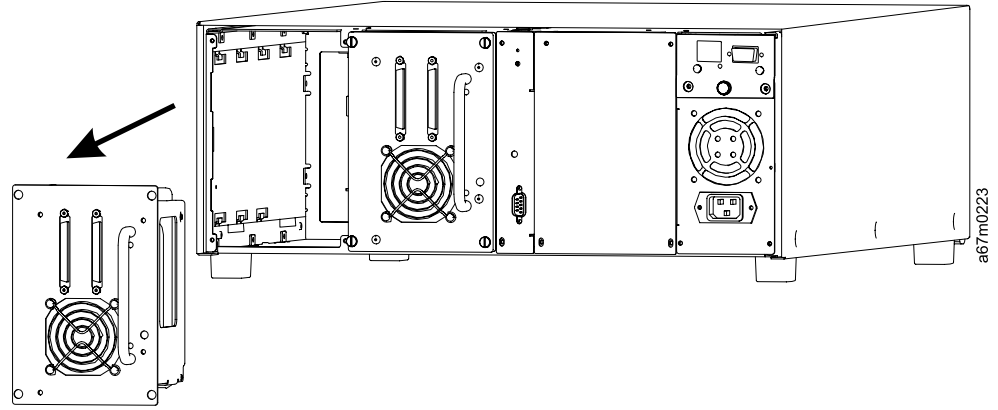


Figure 78. Removing a Drive

Replacing a Drive

Your library comes with either one or two drives.

Note: This procedure applies for both SCSI and Fibre Channel drives. SCSI drives are shown in Figure 79 and Figure 80 on page 202.

Note: A drive must always be present in the first slot (shown on the right in Figure 79).

1. Remove the drive module from the packaging.
2. From the rear of the library, locate the drive slot from which you removed the failing drive.

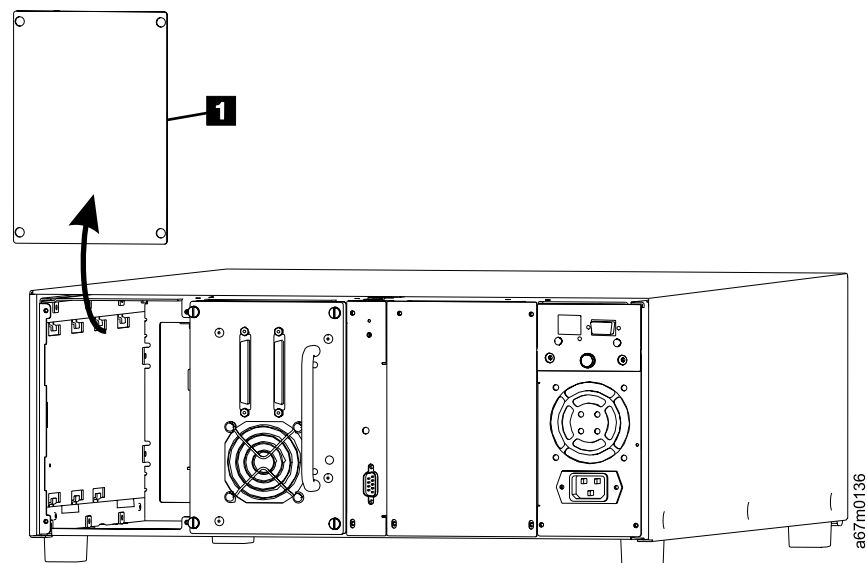


Figure 79. Drive module cover plate removal

- Slide the drive module into position, being careful to ensure that the metal edge on the drive module is inserted into the plastic guide on the left side of the drive bay. If the right side of the drive interferes with the right-fixed edge, withdraw the drive completely and realign it so that the edge guides align with the slots.

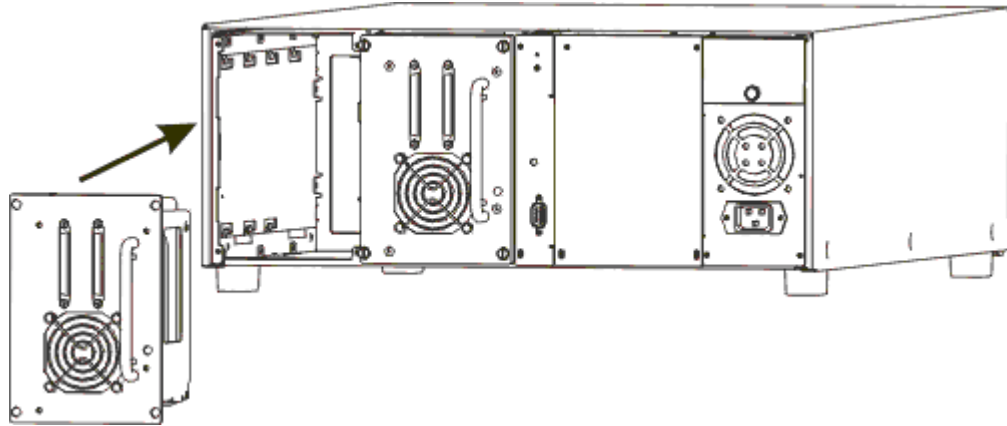
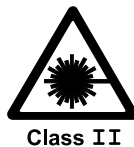


Figure 80. Drive module installation

- Tighten the four thumbscrews by tightening each thumbscrew at the same pace as every other thumbscrew. Do not fully tighten a thumbscrew before starting the other three thumbscrews. Make sure the rear plate is flush with the chassis and all screws are fully tightened.
- Connect the appropriate cable (SCSI and/or Fibre Channel) to the drive sled connector.
- If you are connecting SCSI drives, connect the second SCSI cable or SCSI terminator.
- Follow the procedure in “Replacing a Drive” on page 168.
- Verify the new drive has the original ID (see “SCSI and Fibre Channel Loop ID Settings” on page 108).

For information on setting up a specific SCSI address for the new drive, see “SCSI and Fibre Channel Loop ID Settings” on page 108. For information on setting up a specific Fibre Look ID for the new drive, see “Fibre Channel Loop ID” on page 112.

Removing and Replacing the Bar Code Scanner



CAUTION:
These products comply with the performance standards set by the U.S. Food and Drug Administration for a Class II and Hickey Laser Product.



CAUTION:
Use care when servicing the autoloader assembly.

Removing a Bar Code Scanner

Tools Required: #1 Phillips

1. Power down the library.
2. On the rear of the library, disconnect the AC line cord from the library.
3. On the front of the library, open the Input/Output (I/O) door, which is located to the right of the media access door.
4. Unscrew the top and bottom screws on the bracket inside the I/O door. Save the screws. You will need them to re-install the door.

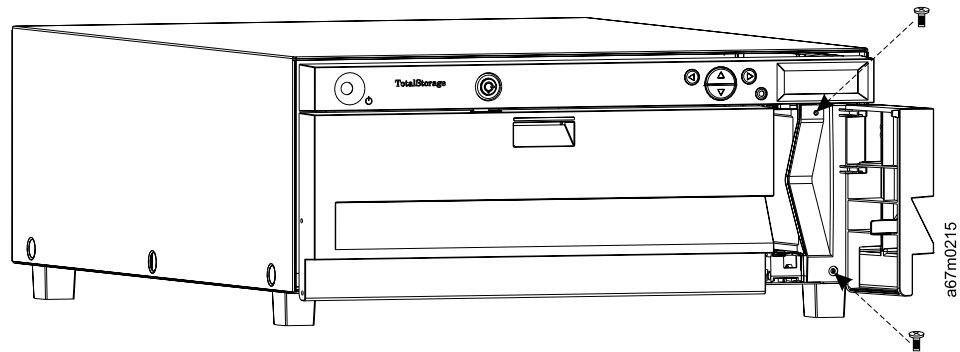


Figure 81. Unscrewing the I/O Door

5. Pull the door straight out to partially remove the door and bracket.

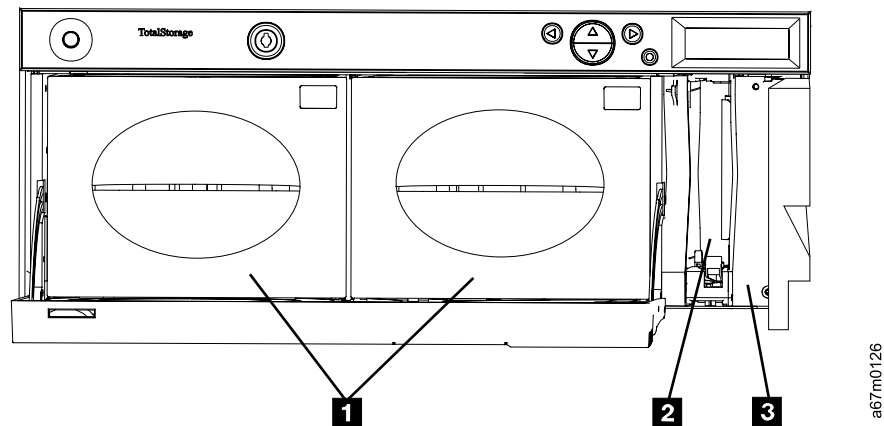


Figure 82. Removing the I/O Door

Note: You may need to pull firmly to remove the door. Do not pull the door out too far because the bar code scanner is still connected to the library.

6. Disconnect the bar code scanner cable connector from inside the library by pressing on the tab on the connector.

Note: The cable is plugged into the rear receptacle.

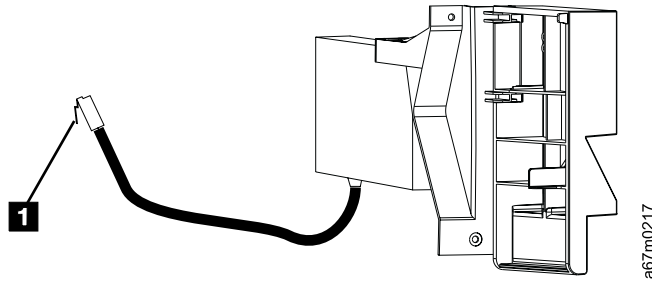


Figure 83. Disconnecting the Bar Code Scanner Cable

7. Remove the existing bar code scanner by loosening the two screws on the top of the I/O door bracket (see Figure 84) and detaching the scanner from the bracket.

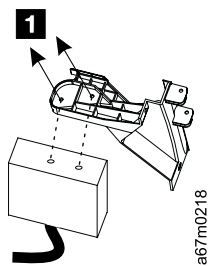


Figure 84. Removing the Bar Code Scanner

Replacing a Bar Code Scanner

Once you have removed the existing bar code scanner, follow the instructions below to install a new bar code scanner. Once the bar code scanner is installed, you must activate it through the **Setup** menu on the LCD. For more information, see “Activating the Bar Code Scanner” on page 206.

Tools Required: #1 Phillips

1. Remove the bar code scanner from its packaging.
2. Align the two screw holes on the top of the bar code scanner with the screw holes on the I/O door bracket.

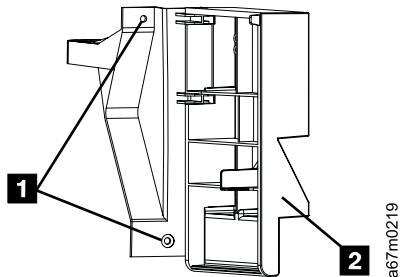


Figure 85. Aligning the Bar Code Scanner

3. Attach the bar code scanner to the bracket using the two screws that came with the bar code scanner. See Figure 86 on page 205.

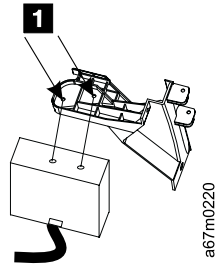


Figure 86. Attaching the Bar Code Scanner

4. Locate the two receptacles inside the 3582 Ultrium Tape Library underneath the LCD screen. Insert the connector on the bar code scanner into the **rear** receptacle.

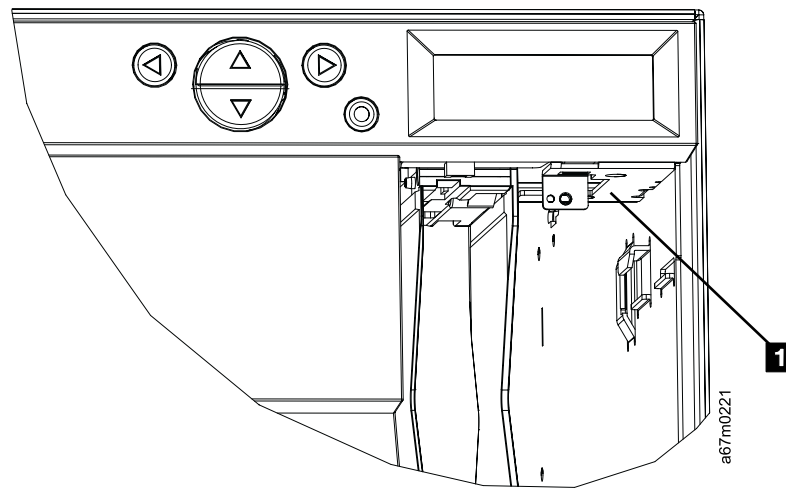


Figure 87. Connecting the Bar Code Scanner

5. Slide the plastic tab on the right side of the I/O door bracket (see Figure 88) into the metal guide inside the 3582 Ultrium Tape Library.

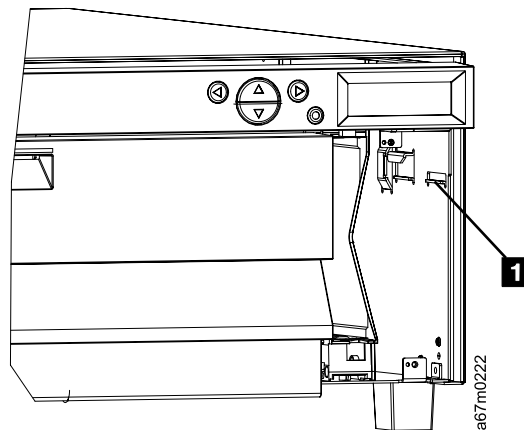


Figure 88. Bar Code Scanner Guide

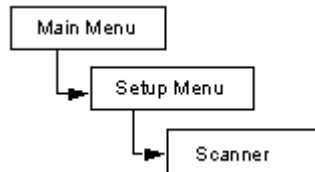
6. Reattach the I/O door/bar code scanner assembly to the 3582 Ultrium Tape Library using the two screws you removed from the bracket in Step 4.




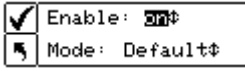



7. Power on the library.







Activating the Bar Code Scanner

Before you can use your bar code scanner, you must activate it. To verify the configuration of your bar code scanner, follow the procedures.. Alternatively, you can also enable the scanner through the Setup Wizard.

Path:



Selection	Description/Result
 <p>Step 1 From the Setup menu, select</p>  <p>and press</p> 	<p>Configures the bar code scanner.</p>
 <p>Step 2 Press</p>  <p>or</p>  <p>to enable or disable the bar code scanner.</p>	<p>Available options are:</p> <p>on All media is scanned for bar codes. Unlabeled or unreadable labeled media generates a user message.</p> <p>off Bar code scanner is disabled.</p>
<p>Step 3 Press</p>  <p>to move to the next field.</p>	

Selection	Description/Result
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Enable: on <input type="checkbox"/> Mode: Default </div> <p>Step 4 Press  or  to select the Extended scanner mode.</p>	<p>Available options are:</p> <p>Default The scanner expects to read and reports to the host six characters. Optional one- or two-character media identifiers can be present but are not reported.</p> <p>Media ID The scanner expects to read and reports to the host seven or eight characters (six plus the media identifier).</p> <p>Extended The scanner reads and reports to the host between five and sixteen characters.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Enable: on <input type="checkbox"/> Mode: Extended </div> <p>Step 5 Press  to highlight Execute () and then press .</p>	<p>Your bar code scanner is configured and ready for use.</p>
<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> Set Scanner Complete. </div> <p>Step 6 A confirmation screen is displayed. Press  to dismiss.</p>	

Remote Management Unit

The Remote Management Unit (RMU) allows you to access your 3582 Ultrium Tape Library via a web browser. Follow the procedures below to install or remove the RMU.

Removing a Remote Management Unit

Follow these steps to remove a Remote Management Unit.

1. Record the IP address, subnet mask, and gateway address. If you are unable to retrieve this information from the machine, request this information from your administrator.
2. Power down the library.
3. On the rear of the library, disconnect the AC line cord from the library.
4. Disconnect the network cable from the RMU.

5. Remove the RMU by loosening the thumbscrew and pulling out the RMU.
6. If you are not replacing this RMU, reinstall the cover plate you removed when you initially installed the RMU. The cover plate is required for proper operation and cooling of the library if you remove the RMU.

Replacing the Remote Management Unit

The remote management unit (RMU) allows you to access your library through a Web browser. Follow the procedure below to install the RMU.

1. Remove the RMU from the packaging.
2. From the rear of the library, locate the available RMU slot.

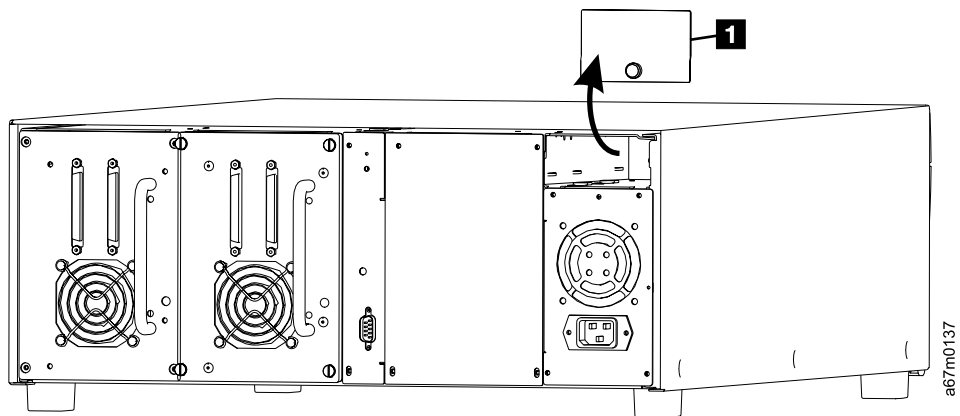


Figure 89. RMU cover plate removal

3. Slide the RMU (see **1** in Figure 90) into position and tighten the thumbscrew.

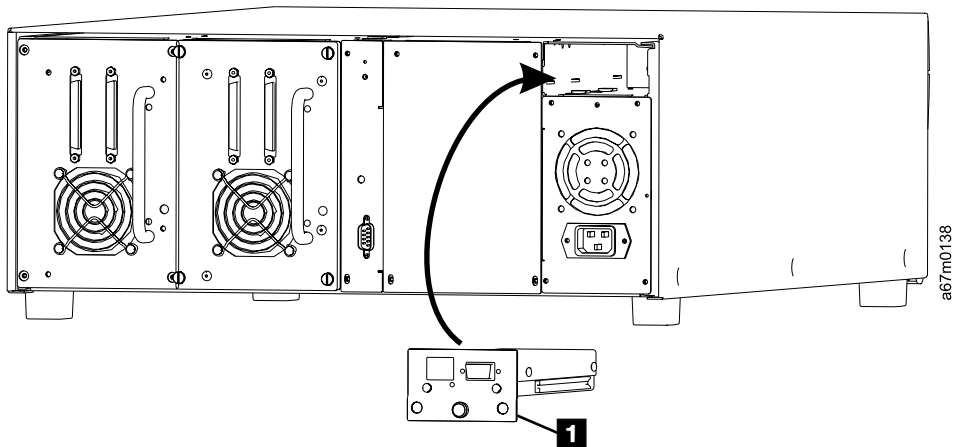


Figure 90. RMU module installation

4. Plug the power cord into a grounded electrical socket.
5. Power on the library.

The library will detect the presence of the RMU. You will need to set the IP address, subnet mask, and gateway address before the RMU will function. You can do this through the “Setup Wizard” on page 88 or “Configure RMU” on page 118.

Removing the Base Unit

If your 3582 Ultrium Tape Library is installed in a rack, refer to “Removing the Library from a Rack” on page 211.

Preparing to Remove the Base Unit

Before removing the base unit, you must record Vital Product Data (VPD). VPD is stored in two non-volatile locations: on the 3582 Ultrium Tape Library’s RMU, if installed, and on the 3582 Ultrium Tape Library’s main controller in the base unit. The RMU, if installed, will automatically upload the VPD information to your 3582 Ultrium Tape Library’s main controller upon startup of a new base unit. But if your 3582 Ultrium Tape Library does not have a RMU installed, you must either retrieve the VPD from the original base unit or you must retrieve the VPD from the administrator who recorded the library’s settings during installation (see “Setting up Your Library” on page 31). Even if you have a RMU installed, it is recommended that you record your library’s VPD settings and store them in a safe location.

1. For each drive:
 - Record the SCSI and/or Fibre Channel Loop ID.
 - Record exact location of each drive.

Note: Ensure that you place drive 1 into the same location in the replacement base unit.

2. For each partition:
 - Record each partition’s mode and slot configuration.
3. Record the exact location of each tape cartridge in each magazine and the exact location of each magazine in each drive.

Note: Both cartridge magazine (with the data cartridges in the original slots within the magazine) and the data and cleaning cartridges (if library has cleaning cartridges) in the rear slots must be moved to the corresponding magazine and rear cartridge locations and slots in the new base unit. See “Base Unit Removal Instructions” for the recommended procedure to perform this transfer.

4. Record your user interface settings.

Base Unit Removal Instructions

To remove the base machine, follow the steps below:

1. Power down the library and host.
2. Unplug the AC cord and SCSI or fibre interface cables, and note which cables connects to which drive.
3. To remove your library from a rack installation, see “Removing the Library from a Rack” on page 211.
4. Place the library on a suitable work surface.
5. Move the magazines, data cartridges, and cleaning cartridge to the corresponding slots in the new base unit.

Hint: To avoid misplacing magazines or rear slot cartridges, it is recommended to transfer the magazines and rear slot cartridges to the new base unit at this time. Place the new unit beside the original unit on the work surface. Pull the magazines (mark the location from which each was removed), and then transfer the rear slot cartridges, one by one, to the corresponding slot in the new base unit (see “Manual Removal of a Tape from a Rear Slot” on page 196). After the

rear slot transfer is complete, insert the magazines (with cartridges) into the corresponding locations in the new base unit.

6. Remove the drives. See “Removing a Drive” on page 200.
7. Remove the bar code scanner. See “Removing and Replacing the Bar Code Scanner” on page 202.
8. Remove the Remote Management Unit. See “Removing a Remote Management Unit” on page 207.
9. Copy and complete the Configuration Checklist at Appendix G, “Parts List”, on page 263.

Replacing the Base Unit

Complete the following steps to replace your base unit.

1. If magazines and cartridges have not already been transferred, replace each rear cartridge into the corresponding slot in the base unit, and then replace each magazine into each magazine’s corresponding location.
2. Replace the drives in their same locations. See “Replacing a Drive” on page 201.
3. Replace the bar code scanner. See “Removing a Bar Code Scanner” on page 203.
4. Replace the RMU. See “Replacing the Remote Management Unit” on page 208.
5. Attach the RIT tag to the new base unit (see “Attaching the RIT Tag”).
6. Position the library in its original location (stand alone or rack mount).
7. Replace the SCSI or fibre interface cables on their original connector locations.
8. With the power switch in the “off” position, plug in the AC cord and power up the machine.
9. Reconfigure your library.

Note: If your library contains an RMU, the library will be configured with data automatically transferred from the RMU. Use the Setup Wizard to verify that all settings are correct.

Attaching the RIT Tag

1. Locate the repair tag (included with the replacement library). See **3** in Figure 91 on page 211.
2. Write down the serial number of the failed library on the repair tag.
3. Affix the repair tag to the replacement library (near to, but not covering, the serial number on the library).

- 1** Machine type, model number, and serial number
- 2** IBM Repair Identification Tag Instructions
- 3** IBM Repair Identification Tag

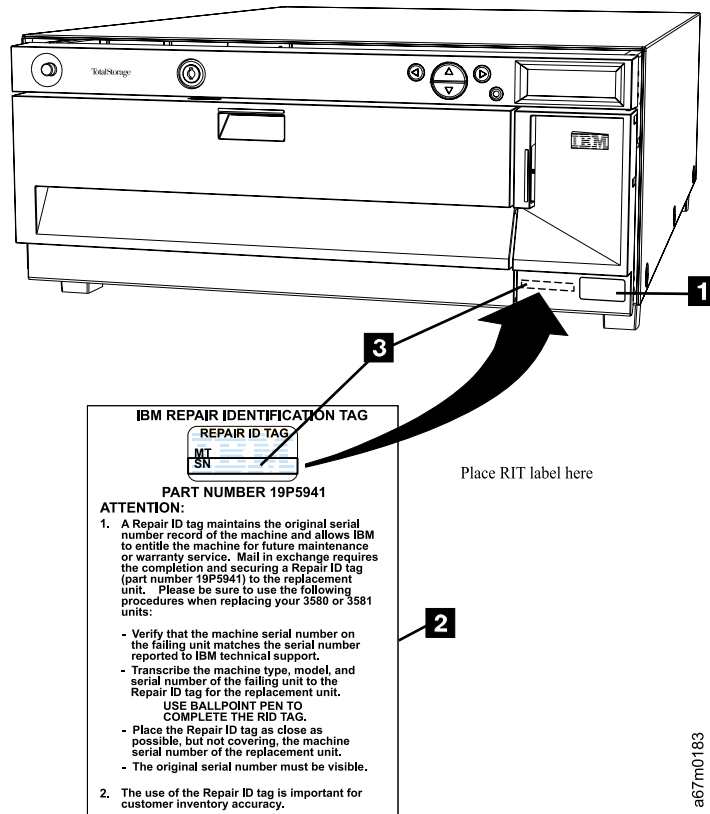


Figure 91. Repair Identification Tag

Removing the Library from a Rack

1. Power down the library.
2. Unplug the library.
3. Disconnect the cables to the library.
4. Loosen the thumbscrews which screw the front of the library to the rack.
5. Secure the library with hands both on the top and the bottom of the library as you and at least one other person pull the library out of the rack.
6. After the stop plates stop the library as you pull it out, tilt the library up as you slide it completely out of the rack.

Chapter 10. Specifications

The following tables provide specification information about the library.

Dimensions

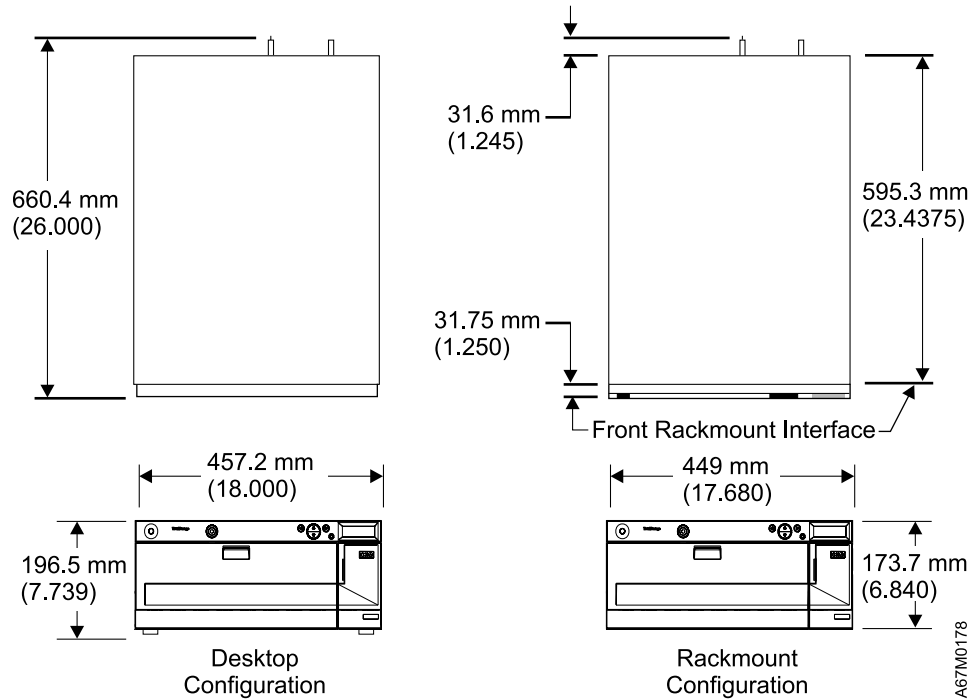


Figure 92. Measurements of library

Note: Measurements in inches.

Weight

Library with 1 drive	25.4 kg (56 lbs)
Library with 2 drives	29.9 kg (66 lbs)

Rackmount Library with 1 drive	20.8 kg (46 lbs)
Rackmount Library with 2 drives	25.4 kg (56 lbs)

Storage Slot Count

Rear Tape Slots	9
Magazine Slots	7
Magazines per Library	2
Import/Export Slot (configured as a data slot)	1
Total Tape slots	24

Library Storage Capacity

	Tape Capacity		Library Capacity	
	Uncompressed	Compressed	Uncompressed	Compressed
LTO Ultrium 1	100 GB	200 GB	2.4 TB	4.8 TB
LTO Ultrium 2	200 GB	400 GB	4.8 TB	9.6 TB

Operating Time

Average Cartridge Move Time	13.6 seconds
-----------------------------	--------------

Safety and EMC Standards

Safety	CSA Standard CAN/CSA-C22.2 no. 950–95 UL Standard 1950, Third Addition EN60950
Emissions	FCC #47, Part 15, Subpart B, Class A; ICES-003 (Canada); VCCI class A (Japan); BSMI CNS 13438 (Taiwan); EN55022:1994; EN6 1000-3-2:2001; EN61000-3-3;1998 (Europe) AS/NZS 3548:1995 (Australia/NZ)
Immunity	EN 55024:1998 ITE – Immunity Characteristics, Limits & Methods of Measurement; European Union CE Immunity Standards

Power

Input Power	1.5-0.6 amps (rms) at 100-240 VAC, 50/60 Hz (max. configuration)
-------------	--

Thermal Environment

	Power On	Power Off (1)	Storage (2)	Shipment (2)
Temperature (C)	+10C to +38C	+10C to 43C	1C to 60C	-40C to +60C
Temperature Variation	10C/Hr max	10C/Hr max	10C/Hr max	10C/Hr max
Relative Humidity	20% to 80%	10% to 90%	10% to 90%	10% to 90%
Max Temp wet bulb (C)	26C	27C	29C	29C
Altitude (Meters)	0 to 2500	0 to 2500	0 to 2500	0 to 12192

Acoustic

Notes:

1. Operating is defined as exercising both robotic and tape drive components.
2. Idle mode is defined as the unit being powered on with no robotic or tape drive action.

Designation	Base Library Two Drives, with RMU
Operating LwAu	6.5 Bels
Idling LwAu	6.3 Bels

Appendix A. Messages

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Obtaining Tape Drive or Library Error Information at the Host

IBM device drivers for the pSeries, RS/6000®, iSeries, and AS/400 systems log error information when an error occurs on a tape drive or library.

The error information includes the following:

1. Device VPD
2. SCSI command parameters
3. SCSI sense data (if available)

Obtaining Error Information from an RS/6000 or pSeries

The AIX Tape and Media Changer Device Driver for the pSeries or RS/6000 provides logging to the system error log for a variety of errors. You can view the error log by following this procedure.

1. At the AIX command line, type **errpt |pg** to display a summary report, or type **errpt -a |pg** to display a detailed report. Press **[Enter]**.

Note: In most cases you will use the summary report to find the date and time of any errors related to library devices, then use the detail report to obtain the sense data needed to identify the cause of the error.

2. Press **[Enter]** to scroll through the error log.
3. Type **q** and press **[Enter]**, to quit the error log at any time.

To correct a problem you noticed in the **errpt** report, determine the type of error by using the examples that follow:

- For library errors [Resource Name = **smcn** (for example, smc0) and Resource Type = 3582]), refer to Figure 93 on page 219 and locate the SCSI sense data.
- For drive errors [Resource Name = **rmtn** (for example, rmt0) and Resource Type = LTO], refer to Figure 94 on page 220 and locate the SCSI sense data.
- For SCSI bus errors (not SCSI adapter errors), refer to Figure 95 on page 221 and Figure 96 on page 222 to determine which host adapter, SCSI bus, and device or devices are affected. After you have determined which device or devices are affected, go to “Fixing SCSI Bus Errors” on page 228 to resolve the problem.
- For Fibre Channel errors (not Fibre Channel adapter errors), determine which host adapter and device are affected, and go to “Fixing Fibre Channel Errors” on page 226.
- For SCSI adapter errors (not SCSI bus errors), use the maintenance package for the host.

Note: See Appendix B, “Sense”, on page 231 for further details on sense data.

Library Error Log Example

```

LABEL:          TAPE_ERR2
IDENTIFIER:     476B351D

Date/Time:      Wed Oct 11 11:42:17
Sequence Number: 25265
Machine ID:     000D090D4C00
Node ID:        tsm
Error Class:    H
Error Type:     PERM
Resource Name:  smc0
Resource Class: tape
Resource Type:  3582
Location:       40-60-00-1,1
VPD:
    Manufacturer.....IBM
    Machine Type and Model.....ULT3582-TL
    Serial Number.....000009418431
    Device Specific . (FW) .....211B (Firmware Level)

Description
TAPE DRIVE FAILURE

Probable Causes
TAPE DRIVE

Failure Causes
TAPE
TAPE DRIVE

Recommended Actions
PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
SENSE DATA
0C01 0000 A520 0000 0100 0010 0000 0000 0000 0000 7000 0400 0000 0046 0000 0000
1501 8000 0000 0000 0000 0000 0000 0000 0001 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
    
```

Figure 93. AIX ERRPT Library Error Log Example

Table 15. AIX ERRPT Library Sense Data

Hex	Description
A5	SCSI Command
0000, 0100, 0010	Command Parameters
70	Byte 0 of Library Sense Data
04	Sense Key
1501	ASC/ASCQ (Additional Sense Code/Additional Sense Code Qualifier)
80	Library SAC (Service Action Code)

Drive Error Log Example

```

LABEL:          TAPE_ERR1
IDENTIFIER:     4865FA9B

Date/Time:     Wed Oct 10 11:39:43
Sequence Number: 25264
Machine ID:    000D090D4C00
Node ID:       tsm
Class:         H
Type:          PERM
Resource Name: rmt2
Resource Class: tape
Resource Type: LTO
Location:     40-60-00-1,0
VPD:
    Manufacturer.....IBM
    Machine Type and Model.....ULT3580-TD2
    Serial Number.....1300015078
    Device Specific.(FW).....3434 (Firmware Level)

Description
TAPE OPERATION ERROR

Probable Causes
TAPE

User Causes
MEDIA DEFECTIVE
DIRTY READ/WRITE HEAD

Recommended Actions
FOR REMOVABLE MEDIA, CHANGE MEDIA AND RETRY
PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
SENSE DATA
0602 0000 0100 0000 0200 0000 0000 0000 0000 0000 7000 0300 0000 001C 0000 0000
5200 0700 20B0 0000 0000 0000 0000 0000 0000 0000 058A 0212 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

```

Figure 94. AIX ERRPT Drive Error Log Example

Table 16. AIX ERRPT Drive Sense Data

Hex	Description
01	SCSI Command
0000, 0200, 0000	Command Parameters
70	Byte 0 of Tape Drive Sense Data
03	Sense key (Hardware error in this example)
5200	ASC/ASCQ (Additional Sense Code/Additional Sense Code Qualifier)
20B0	FSC (Fault Symptom Code)
058A	Relative LPOS
02	SCSI ID

SCSI Bus Error Example

```
LABEL:          SCSI_ERR10
IDENTIFIER:     0BA49C99

Date/Time:     Wed Oct 17 09:55:32
Sequence Number: 16140
Machine Id:    00003ABF4C00
Node Id:      ofgtsm
Class:        H
Type:         TEMP
Resource Name: scsi3
Resource Class: adapter
Resource Type: sym896
Location:     40-59
VPD:
    Product Specific.( ).....DUAL CHANNEL PCI TO ULTRA2 SCSI
                                ADAPTER
    Part Number.....03N3606
    EC Level.....F71335
    Manufacture ID.....A16592
    Serial Number.....0749

Description
SCSI BUS ERROR

Probable Causes
CABLE
CABLE TERMINATOR
DEVICE
ADAPTER

Failure Causes
CABLE LOOSE OR DEFECTIVE
DEVICE
ADAPTER

Recommended Actions
PERFORM PROBLEM DETERMINATION PROCEDURES
CHECK CABLE AND ITS CONNECTIONS

Detail Data
SENSE DATA
0001 0017 0000 0000 0000 0091 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 4304 0000 0000 0000 0000 2000 0003 0203 6760 9808 0000 F7FB E1B8
0000 0015 000B 0210 0678 C800 0000 8200 8277 1B20 00A2 ED00 0000 0002 FFFF FFFF
00FF 0000 111F F000 F3DF F110
```

Figure 95. Example of Error Suggesting SCSI Bus Problem, Which Takes Down Entire Bus

SCSI Bus Error Example

```
LABEL:          TAPE_ERR4
IDENTIFIER:     5537AC5F

Date/Time:      Wed Oct 17 09:00:41
Sequence Number: 16101
Machine Id:     00003ABF4C00
Node Id:        ofgtsm
Class:          H
Type:           PERM
Resource Name:  smc0
Resource Class: tape
Resource Type:  3582
Location:       40-58-00-0,1
VPD:
    Manufacturer.....IBM
    Machine Type and Model.....ULT3582-TL
    Serial Number.....000009418431
    Device Specific.(FW).....211B

Description
TAPE DRIVE FAILURE

Probable Causes
ADAPTER
TAPE DRIVE

Failure Causes
ADAPTER
TAPE DRIVE

Recommended Actions
PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
SENSE DATA
0600 0000 1200 0000 FF00 0000 0000 0000 0200 0800 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
```

Figure 96. SCSI Problem Points to Library Control Path as Possible Cause

Summary Report

1	2	3	4	5	6	7
FFE2F73A	1012150900	U H	rmt5		UNDETERMINED ERROR	
0BA49C99	1012150800	T H	scsi8		SCSI BUS ERROR	
C60BB505	1012141500	P S			SOFTWARE PROGRAM ABNORM TERMINATED	
C42F11D4	1012105200	U S	VSC:DE		SOFTWARE ERROR	
C42F11D4	1012105000	U S	VSC:DE		SOFTWARE ERROR	
FFFA352B	1012104900	U S	MS:CS		SOFTWARE ERROR	
FFFA352B	1012104900	U S	MS:CS		SOFTWARE ERROR	
5537AC5F	1012091700	P H	rmt9		TAPE DRIVE FAILURE	
5537AC5F	1012091700	P H	rmt9		TAPE DRIVE FAILURE	
5537AC5F	1012091700	P H	rmt9		TAPE DRIVE FAILURE	
5537AC5F	1012091600	P H	rmt8		TAPE DRIVE FAILURE	
5537AC5F	1012091600	P H	rmt8		TAPE DRIVE FAILURE	
5537AC5F	1012091600	P H	rmt8		TAPE DRIVE FAILURE	
C60BB505	1012082000	P S			SOFTWARE PROGRAM ABNORM TERMINATED	
C42F11D4	1011183600	U S	VSC:DE		SOFTWARE ERROR	
C42F11D4	1011183300	U S	VSC:DE		SOFTWARE ERROR	
C42F11D4	1011181800	U S	VSC:DE		SOFTWARE ERROR	
C42F11D4	1011174700	U S	VSC:DE		SOFTWARE ERROR	
FFFA352B	1011172900	U S	MS:CS		SOFTWARE ERROR	
FFFA352B	1011172900	U S	MS:CS		SOFTWARE ERROR	
C42F11D4	1011155300	U S	VSC:DE		SOFTWARE ERROR	
C42F11D4	1011153900	U S	VSC:DE		SOFTWARE ERROR	
C42F11D4	1011153800	U S	VSC:DE		SOFTWARE ERROR	
C42F11D4	1011150900	U S	VSC:DE		SOFTWARE ERROR	

Figure 97. AIX ERRPT Commands Error Log Example

NUMBER	DESCRIPTION
1	Error ID
2	Timestamp
3	Error Type
4	Error Class
5	Resource Name
6	Error Description
7	How SCSI Bus Error will Display in Log

ERROR CLASS	DESCRIPTION
H	Hardware
S	Software
O	Informational

ERROR TYPE	DESCRIPTION
PEND	The availability loss of a device or component is imminent.
PERF	The performance of a device or component has degraded to an unacceptable level.
PERM	A hardware or software condition that could not be recovered from.
TEMP	A hardware condition that was recovered from after several unsuccessful attempts.
UNKN	The severity of the condition could not be determined.

A69M0170

Obtaining Service Information Message from an iSeries or AS/400

To gain access to the iSeries or AS/400 problem logs and error logs, sign on at any available workstation using the QSRV logon and its security password (QSRV). After sign on, the proper access authorizations will be granted and the iSeries or AS/400 MAIN MENU displays.

iSeries or AS/400 System with RISC Processor

1. Type STRSST (Start System Service Tools) command on the command entry line on the iSeries or AS/400 Main Menu, and press **[Enter]**.
2. On the "System Service Tool (SST)" screen, select **Start a service tool**, and press **[Enter]**.
3. On the "Start a Service Tool" screen, select **Product activity log**, and press **[Enter]**.
4. On the "Product activity log" screen, select **Analyze log**, and press **[Enter]**.
5. On the "Select Subsystem Data" screen, select **Magnetic media**, enter the From and To time period for searching the error log, and press **[Enter]**.
6. On the "Select Analysis Report Options" screen, select the following, and press **[Enter]**.
 - a. Report type. 1
 - b. Optional entries to include
 - 1) Informational YES
 - 2) Statistic NO
 - c. Reference code selection
 - 1) Option 1
 - 2) Reference codes. *ALL
 - d. Device selection
 - 1) Option 1
 - 2) Device type or resource names . . *ALL
7. On the "Log Analysis Report" screen, enter a **5** on an error line that has a resource type of 3582 (library) or 3580 (drive), and press **[Enter]**.
8. On the "Display Detail Report for Resource" screen, press:
 - F4=Additional Information.
Pressing F4 will display the machine type and serial number of the device. It also will display SCSI sense data, if available.
 - F6=Hexadecimal report.
Pressing F6 will display the device hexadecimal data (for support use).
 - F9=Address Information.
Pressing F9 will display the SCSI address information.

Obtaining Error Information from a Sun System

System log files are generally used to provide a time sequenced order of system events. In addition, various daemons write the file with adapter information and other information. There is always a current file and backup file. Depending on local set up, there maybe other files. If a system has been running a long time, the file may not contain the information recorded at boot time. It is highly recommended that the customer save the file that has boot time information, but at this time it is probably too late. On UNIX[®] based systems, the logs are typically written to a central location. On Solaris the file is found in **/var/adm/messages**. Note that there are also **messages.#** files, where the # is a number. When a messages file reaches a system defined limit, the file is renamed and older files are subsequently renumbered upwards. The date on the messages file is the last time the file was modified with data. The file that is required is the one that was recording information at the time of the problem.

In addition, you may use error logs from the application (such as Tivoli Storage Manager), or the Device Error Log for problem determination.

The two following service aid programs are provided with the IBM SCSI Tape Device Driver for SunOS:

- Tape service program

A tape service program called **tapesrv.c** is provided and contains the following service aids:

- Query device serial number
- Format tape cartridge
- Force device error dump
- Save device error dump
- Download device code

The tape service program is invoked by using the **/opt/stdutil/tapesrv** command.

Note: You must have root authority to run the tape service program.

The program is menu driven. Use discretion when running this program because it opens the device in diagnostic mode.

- Sample program

A sample program called **tapetest.c** is provided, which gives a demonstration of the device driver interface usage.

The sample program is invoked by using the **/opt/stdutil/tapetest** command. The program is useful for verifying that the device driver and the device are functional. The program is menu driven.

Obtaining Error Information from an HP-UX System

System log files are generally used to provide a time sequenced order of system events. In addition, various daemons write the file with adapter information and other information. There is always a current file and backup file. Depending on local set up, there maybe other files. If a system has been running a long time, the file may not contain the information recorded at boot time. It is highly recommended that the customer save the file that has boot time information, but at this time it is probably too late. On UNIX based systems, the logs are typically written to a central

location. On HP the file is found in `/var/adm/syslog/syslog.log`. There is an older version of the `syslog.log` file called `OLDsyslog.log`. The file that is required is the one that was recording information at the time of the problem.

In addition, you may use error logs from the application (such as Tivoli Storage Manager), or the Device Error Log for problem determination.

Fixing Fibre Channel Errors

If you are connected to a Fibre Channel Storage Area Network (SAN) by using a SAN Data Gateway, use the *IBM Storage Area Network Gateway Module Setup, Operator, and Service Guide* to determine whether the problem is occurring between the drive and the SAN Data Gateway. If you are using a SCSI drive and are having SCSI problems, see “Fixing SCSI Bus Errors” on page 228.

Supported Topologies

The Ultrium 2 Tape Drive can be attached in a two-node configuration, either directly to a switch as a public device (switched fabric) or directly to a host bus adapter (HBA) as a private device. It can do so in a Point-to-Point topology (through an N_port or F_port) or Arbitrated Loop topology (through an L_port or FL_port).

The Ultrium 2 Tape Drive automatically configures to an L_port or an N_port when it boots. The type of port to which it configures depends on whether the drive recognizes the connection as a loop or a point-to-point connection:

- An L_port supports a Fibre Channel Arbitrated Loop connection to an NL_port or FL_port.
- An N_port supports direct connection to another N_port or to an F_port (for example, a director-class switch) in a point-to-point topology.

Regardless of the port to which you connect the drive, it automatically configures to a public device (through an F_port or FL_port to a switch) or to a private device (through an N_port or L_port by using direct attachment to a server).

Table 17 lists the topologies in which the Ultrium 2 Tape Drive can operate, the Fibre Channel server connections that are available, and the port (NL, N, FL, or F) through which communication must occur.

Table 17. Choosing the port for your topology and Fibre Channel connection

Type of Topology	Type of Fibre Channel Connection to Server	
	Direct Connection (Private)	Switched Fabric (Public)
Fibre Channel-Arbitrated Loop (can be Two-Node Arbitrated Loop or Two-Node Switched Fabric Loop; is limited to two nodes)	L_Port	FL_Port
Point-to-Point (two nodes)	N_Port	F_Port

Starting Problem Determination

Before starting the problem determination, perform the following steps:

1. Determine the type of Fibre Channel topology that you are using (see page 226). Ensure that the drive and the port to which it is attached are configured in compatible topologies.
2. Using this guide or the service guides of associated switch, hub, or fiber products, try to determine where the problem exists (whether in the drive, cable, or the device to which the drive and cable attach).
3. Ensure that the configuration and software levels are supported (to determine the latest supported attachments or to get a comprehensive list of compatible software, perform one of the following):
 - Visit the web at <http://www.ibm.com/storage/lto>. Select LTO support, then Interoperability matrix and software (ISVs). Under Supported servers and operating systems or Supported storage management software, select IBM TotalStorage Ultrium Tape Library 3582.
 - Contact your IBM Sales Representative.
4. Ensure that the Fibre Channel cables are installed correctly..
5. Go to one of the following procedures:
 - “Fixing Consistent Fibre Channel Errors”
 - “Fixing Intermittent Fibre Channel Errors” on page 228

Fixing Consistent Fibre Channel Errors

1. Ensure that the tape drive is powered on.
2. Verify that the tape drive's serial number is the same as the drive serial number that the server program is using.
3. Ensure that the drive's Fibre Channel AL_PA is set correctly, that it is on the loop, and that it is not being used by another device (see “SCSI and Fibre Channel Loop ID Settings” on page 108). The tape drive must be able to detect light and communicate with the server.
4. Run the Fibre Channel wrap test at the drive's Fibre Channel connector (see “Drive Maintenance Test” on page 161).
 - If the test fails, replace the tape drive.
 - If the test is successful, go to step 5.
5. Run the Fibre Channel wrap test at the end of the fiber cable (see “Drive Maintenance Test” on page 161).
 - If the test fails, replace the fiber cable.
 - If the test is successful, go to step 6.
6. Check the Fibre Channel cable connection at the server.
7. Using a device driver utility such as *ntutil* or *tapeutil*, verify that the drive is properly configured and available at the server.
8. If the problem persists, the fault may be with the server's hardware or software. Refer to your server's service manual.
9. When the problem is corrected (or determined to be a server problem), restore all of the fiber cables to their correct position.

Fixing Intermittent Fibre Channel Errors

1. Determine the type of Fibre Channel topology that you are using (see “Supported Topologies” on page 226).
2. Ensure that the configuration and software levels are supported (to determine the latest supported attachments or to get a comprehensive list of compatible software, perform one of the following):
 - Visit the web at <http://www.ibm.com/storage/lt0>. Select LT0 support, then Interoperability matrix and software (ISVs). Under Supported servers and operating systems or Supported storage management software, select IBM TotalStorage Ultrium Tape Library 3582.
 - Contact your IBM Sales Representative.
3. Check that each Fibre Channel cable meets the requirements specified in Chapter 6, “Using the Fibre Channel Interface”, on page 171.
4. Ensure that all Fibre Channel cables are installed correctly.
5. Using this guide or the service guides of associated switch, hub, or fiber products, determine that a problem exists between the drive, drive cable, and the device to which they attach. Try to isolate which part of the Storage Area Network (SAN) is experiencing problems.
6. Using this guide or the service guides of associated switch, hub, or fiber products, verify that the SAN configurations are correct (such as switch zoning for drive sharing).
7. Obtain all errors reported by the drive to the server (see “Using Host Sense Data” on page 241), then contact IBM Technical Support.

Fixing SCSI Bus Errors

Fixing a Consistent Error with a Single Drive on a SCSI Bus

1. Ensure that the power is on to the Ultrium 2 Tape Drive.
2. Ensure that the tape drive’s SCSI address is the same as the SCSI address assigned by the server.
3. See “Drive Maintenance Test” on page 161 and select the Wrap test.
 - If the test runs successfully, replace the SCSI terminator first, then the SCSI cable and the interposer (if installed). Repeat the operation that caused the error. If you replaced the SCSI terminator or SCSI cable and the problem persists, the fault is with the server’s hardware or software. To isolate the cause of the failure, refer to the server’s service documentation.
 - If the test fails, replace the tape drive (see Chapter 9, “Removal and Replacement Procedures”, on page 199).

Fixing a Consistent Error with Multiple Drives on a SCSI Bus

When a consistent error occurs in a configuration that has multiple tape drives on the SCSI bus, you must determine if the problem exists with more than one tape drive. If the problem is with all of the devices on the SCSI bus, the bus is stuck in a SCSI phase and cannot change to another phase, or the SCSI cable from the server to the first device is defective. Use the following steps to isolate and correct the error.

1. Ensure that the SCSI cable from the server to the first device is connected. If not, reconnect the cable, and determine if the problem still exists. If the cable was properly connected, go to step 2.
2. Stop all activity to the drives.

3. Disconnect all SCSI connections to drive 1, drive 2, and the host.
4. Connect the SCSI wrap tool to the SCSI connector of the first tape drive that was connected to the server. Connect the SCSI terminator to the other connector.
5. Run the SCSI wrap test on the first drive (See “Drive Maintenance Test” on page 161, Wrap Test). If the test fails, replace the first drive (see Chapter 9, “Removal and Replacement Procedures”, on page 199). If the test runs successfully, continue to step 6.
6. Disconnect the SCSI wrap tool from the first drive, and reconnect the SCSI connection from the host to the first drive. Keep the SCSI terminator on the other SCSI connector of the first drive. Run a device driver utility (such as IBM's *ntutil* or *tapeutil*). If the error occurs, the problem may be in the SCSI cable from the host, or in the host itself. If no error occurs, continue to step 7.
7. Using steps 3 and 4, run the wrap test on the second drive. If the test fails, replace the second drive (see Chapter 9, “Removal and Replacement Procedures”, on page 199). If the test passes, continue to step 8.
8. Remove the SCSI wrap tool from the second drive, and reconnect the first drive to the second drive with a SCSI cable. Keep the SCSI terminator on the other SCSI connector of the second drive.
9. Run a device driver utility (such as IBM's *ntutil* or *tapeutil*) to send data to the second drive. If the error occurs, replace the SCSI cable connecting the two drives. If the test passes, continue to step 10.
10. Run a device driver utility (such as IBM's *ntutil* or *tapeutil*) to send data to both drives. If there is no longer a problem, the problem was most likely with the connections on the SCSI bus.
11. If the problem persists, there is most likely a contention or protocol issue on the bus. Resolving this will involve host bus adapter and host software diagnostics. Contact those support organizations for assistance. Contact IBM technical support for additional assistance.

Fixing an Intermittent Error with a Single Drive on a SCSI Bus

1. Replace the SCSI terminator on the tape drive.
2. Run the operation that caused the error. If the problem persists, the problem may be with the cable.
3. Isolate which cable is causing the problem by replacing one cable at a time and running the operation that caused the error after each replacement. If the problem persists after all cables have been replaced, the problem may be with the Ultrium 2 Tape Drive.
4. Replace the tape drive (see Chapter 9, “Removal and Replacement Procedures”, on page 199). If the problem persists, the problem is with your server. Consult your server's documentation.

Fixing an Intermittent Error with Multiples Drives on a SCSI Bus

Refer to the server's error logs to determine which tape drive is the source of the problem:

- If only one tape drive is reporting a SCSI failure, replace that tape drive (see Chapter 9, “Removal and Replacement Procedures”, on page 199).
- If multiple tape drives are reporting SCSI failures, the problem may be with the terminator or the SCSI cables:
 - Replace the terminator and run the operation that caused the error. If the problem persists, the problem may be with the cables.

- Isolate which cable is causing the problem by replacing one cable at a time and run the operation that caused the error after each replacement.

Appendix B. Sense

Library Sense Data	232
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Library Sense Data

Table 18. Sense Information Format

Bytes	Bits	7	6	5	4	3	2	1	0
0	Valid	70 = Existing Error 71 = Deferred Error							
1	Reserved								
2	Reserved					Sense Key (see Table 19)			
3 : 6	MSB Information Bytes LSB								
7	Additional Sense Length (n-7) If the sense key is 4, the additional sense length is 70. For all other errors, the additional sense length is 10.								
8 : 11	MSB Command Specific Bytes LSB								
12	Additional Sense Code (ASC) (see Table 20 on page 233)								
13	Additional Sense Qualifier (ASCQ) (see Table 20 on page 233)								
14	Service Action Code								
15	SKSV	C/D	Reserved		BPV	Bit Pointer			
16 17	MSB Field Pointer LSB								

Table 19. Sense Keys

Sense Key	Description
0h	No Sense. No specific sense key information to report.
2h	Not Ready. The library is not ready to perform motion commands.
4h	Hardware Error. A hardware error was detected and operator intervention may be required.
5h	Illegal Request. The CDB or supplied parameter data contains an unsupported or illegal parameter.
6h	Unit Attention. The library operating status changed. The cartridge inventory may be invalid.
Bh	Command Aborted. The library aborted a command. The initiator may try the command again.

Table 20. Additional Sense Codes and Qualifiers (Bytes 12 & 13)

Sense Key	Condition	ASC	ASCQ	Description
00h	No Sense	00h	00h	No Additional Sense Code.
02h	Not Ready	04h	00h	The 3582 is not ready due to an unknown cause.
			01h	The 3582 is becoming ready.
			03h	The 3582 is not ready and a manual intervention is required.
			83h	A door is open and a magazine is missing.
			8Dh	Offline

Table 20. Additional Sense Codes and Qualifiers (Bytes 12 & 13) (continued)

04h	Hardware Error	15h	01h	A mechanical positioning error occurred.
			80h	The medium changer lost a cartridge.
			81h	The medium changer could not pick a cartridge.
			83h	The medium changer could not place a cartridge.
		3Bh	0Dh	The destination element is full.
			0Eh	The source element is empty.
		3Fh	80h	Could not erase EEPROM.
			84h	Could not program EEPROM.
		40h	01h	Cartridge in gripper at power-on.
			80h	Component (number - 80) failure.
			91h	Picker error.
			A0h	Could not move on the extend (Z) axis.
			A1h	Could not home the extend (Z) axis.
			B0h	Could not move on the horizontal (X) axis.
			B1h	Could not home the horizontal (X) axis.
			C0h	The medium changer could not move.
		E0h	The medium changer lost power.	
		44h	00h	Internal target failure.
		53h	00h	A drive did not load or unload a tape.
			82h	Cannot lock the I/E station.
			83h	Cannot unlock the I/E station.
		55h	00h	A system device is not available.
		83h	00h	The bar code label is questionable.
			01h	Label too short, too long or duplicate.
			03h	Cell status and bar code questionable.
			09h	The bar code label is missing.
		84h	00	Firmware error.

Table 20. Additional Sense Codes and Qualifiers (Bytes 12 & 13) (continued)

05h	Illegal Request	1Ah	00h	Parameter List length error.
		20h	00h	Illegal opcode in CDB.
		21h	01h	Invalid element address in CDB.
		24h	00h	Invalid field in CDB.
			80h	Attempt to write a read-only buffer.
		25h	00h	Illegal LUN.
		26h	00h	Invalid field in Parameter List.
			01h	A Parameter is not supported.
			02h	Invalid parameter in Parameter List.
			80h	Parameter data checksum failure.
		30h	00h	Incompatible media installed.
		3Bh	0Dh	Destination element full for MOVE MEDIUM command.
			0Eh	Source element empty for MOVE MEDIUM command.
			85h	Destination of MOVE MEDIUM command cannot be medium changer.
			86h	Source of MOVE MEDIUM command cannot be medium changer.
			87h	Cartridge stuck in tape drive.
			90h	Source cartridge loaded into tape drive and not accessible.
			A0h	Media type does not match destination media type.
		3Dh	00h	Invalid bit in "Identify" message.
		3Eh	00h	Incorrect LUN configuration.
		44h	00h	Firmware detected an internal logic failure.
		53h	01h	A drive did not unload a tape.
			80h	Cartridge rejected in the insert/eject station because it was not properly loaded.
				81h
		55h	00h	A system device is not available.
		83h	00h	Bar code label is questionable.
			01h	Label is too short, too long or duplicate.
			02h	Cartridge magazine not installed.
			03h	Cell status and bar code questionable.
			04h	Drive not installed.
			09h	The bar code label is missing.

Table 20. Additional Sense Codes and Qualifiers (Bytes 12 & 13) (continued)

06h	Unit Attention	28h	00h	Door or doors opened and closed.
			01h	Insert/eject station status changed.
		29h	00h	Power-on, SCSI bus reset, or Bus device reset occurred.
			80h	Reset for permanent error occurred.
			81h	Reset into degraded mode of operation.
		2Ah	01h	Mode parameters have been changed.
		3Fh	01h	New firmware loaded.
0Bh	Abort	43h	00h	Message received at inappropriate time.
		45h	00h	Host rejected "Identify" message sent for reselection.
		47h	00h	Message system was disabled during parity error detection on SCSI bus, message system enabled but initiator rejected "Restore Data Pointer," or all parity error retries exhausted.
		48h	00h	Received an "Initiator Detected Error" or initiator rejected "Restore Data Pointer" in response to an "Initiator Detected Error."
		4Eh	00h	Disconnect during command processing.

Drive Sense Data

Table 21. LTO Tape Drive Sense Data

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
0	Address valid When set to 1, the info byte field contains a valid logical block address.	Error Code						
1	Segment Number (0)							
2	Filemark	EOM (end of medium)	ILI (Incorrect length indicator)	Reserved	Sense Key	Description		
					0 ---	No sense		
					1 ---	Recovered error		
					2 ---	Not ready		
					3 ---	Media error		
					4 ---	Hardware error		
					5 ---	Illegal request		
					6 ---	Unit attention		
					7 ---	Data protect		
					8 ---	Blank Check		
					9 ---	Reserved		
					A ---	Reserved		
					B ---	Aborted command		
					C ---	Reserved		
					D ---	Volume overflow		
					E ---	Reserved		
					F ---	Reserved		
3	Information byte (most significant byte)							
4	Information byte							
5	Information byte							
6	Information byte (least significant byte)							
7	Additional Sense Length							
8–11	Command specific information							

Table 21. LTO Tape Drive Sense Data (continued)

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
12–13	Additional Sense Code (ASC) Additional Sense Code Qualifier (ASCQ)							
	Byte 12	Byte 13						
	ASC	ASCQ						
00	00	00 - No additional sense — The flags in the sense data indicate the reason for the command failure						
00	01	01 - Filemark detected — A Read or Space command terminated early due to an FM. The FM flag is set.						
00	02	02 - EOM — A Write or Write File Marks command failed because the physical end of tape was encountered, or a Read or Space command encountered EOM. The EOM flag is set						
00	04	04 - BOM — A space command ended at Beginning of Tape. The EOM bit is also set						
00	05	05 - EOD — Read or Space command terminated early because End of Data was encountered						
04	00	00 - Cause not reportable — A cartridge is present in the drive, but it is in the process of being unloaded						
04	01	01 - Becoming Ready — A media access command was received during a front panel initiated load or an immediate reported load command						
04	02	02 - Initializing Command Required — A cartridge is present in the drive, but is not logically loaded. A Load command is required						
04	03	03 - Manual Intervention Required — A cartridge is present in the drive but could not be loaded or unloaded without manual intervention						
0C	00	00 - Write Error — A Write operation has failed. This is probably due to bad media, but may be hardware related						
11	00	00 - Unrecovered Read Error — A Read operation failed. This is probably due to bad media, but may be hardware related						
14	00	00 - Recorded Entity Not Found — A space or Locate command failed because a format violation prevented the target from being found.						
14	03	03 - End Of Data not found — A Read type operation failed because a format violation related to a missing EOD data set						
1A	00	00 - Parameter list length error — The amount of parameter data sent is incorrect						
20	00	00 - Invalid Command Operation Code — The Operation Code in the command was not a valid Operation Code						
24	00	00 - Invalid field in CDB — An invalid field has been detected in a Command Descriptor Block						
25	00	00 - LUN not supported — The command was addressed to a non-existent logical unit number						
26	00	00 - Invalid Field in Parameter List — An invalid field has been detected in the data sent during the data phase						
27	00	00 - Write Protect — A Write type operation has been requested on a cartridge which has been write protected						
28	00	00 - Not Ready to Ready Transition — A cartridge has been loaded successfully into the drive and is now ready to be accessed						
29	00	00 - Reset — The drive has powered on, received a reset signal or a bus device reset signal since the initiator last accessed it						
2A	01	01 - Mode Parameters Changed — The Mode parameters for the drive have been changed by an initiator other than the one issuing the command						
30	00	00 - Incompatible Media Installed — A write type operation could not be executed because it is not supported on the cartridge type that is loaded.						
30	01	01 - Unknown Format — An operation could not be carried out because the cartridge in the drive is of a format not supported by the drive						
(Continued on next page)								

Table 21. LTO Tape Drive Sense Data (continued)

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
12–13	Additional Sense Code (ASC) — Additional Sense Code Qualifier (ASCQ) (Continued)							
	Byte 12				Byte 13			
	ASC				ASCQ			
30	02 - Incompatible Format — An operation could not be completed because the Logical Format is not correct							
30	03 - Cleaning Cartridge Installed — An operation could not be carried out because the cartridge in the drive is a cleaning cartridge							
30	07 - Cleaning Failure — A cleaning operation was attempted, but could not be completed for some reason							
31	00 - Media format corrupted — Data could not be read because the format on tape is not valid, but is a known format. A failure occurred attempting to write the FID							
37	00 - Rounded parameter — A Mode Select command parameter has been rounded because the drive can not store it with the accuracy of the command.							
3A	00 - Media Not Present — A media access command has been received when there is no cartridge loaded							
3B	00 - Sequential Positioning Error — A command has failed and left the logical position at an unexpected location							
3D	00 - Invalid bits in identify Message — An illegal Identify Message has been received at the drive at the start of a command							
3E	00 - Logical Unit has not Self-Configured — The drive has just powered on and has not completed its self test sequence and can not process commands							
3F	01 - Code Download — The firmware in the drive has just been changed by a Write Buffer command							
40	xx - Diagnostic failure — A diagnostic test has failed. The xx (ASCQ) is a vendor specific code indicating the failing component.							
43	00 - Message Error — A message could not be sent or received due to excessive transmission errors							
44	00 - Internal target failure — A hardware failure has been detected in the drive that has caused the command to fail							
45	00 - Select/Reset Failure — An attempt to reselect an initiator in order to complete the command has failed							
4B	00 - Data Phase Error — A command could not be completed because too many parity errors occurred during the Data phase							
4E	00 - Overlapped Commands — An initiator selected the drive even though it already had a command outstanding in the drive							
50	00 - Write Append Error — A write type command failed because the point at which to append data was unreadable							
51	00 - Erase failure — An Erase command failed to erase the required area on the media							
52	00 - Cartridge fault — A command could not be completed due to a fault in the tape cartridge							
53	00 - Media Load/Eject Failed — (Sense Key 03) An attempt to load or eject the cartridge failed due to a problem with the cartridge.							
53	00 - Media Load/Eject Failed — (Sense Key 04) An attempt to load or eject the cartridge failed due to a problem with the drive							
53	02 - Media Removal Prevented — An Unload command has failed to eject the cartridge because media removal has been prevented							
5D	00 - Failure Prediction Threshold — Failure Prediction thresholds have been exceeded indicating that a failure may occur soon							
5D	FF - Failure Prediction False — A Mode Select command has been used to test for Failure Prediction system.							
82	82 - Drive requires cleaning — The drive has detected that a cleaning operation is required to maintain good operation							
82	83 - Bad Code Detected — The data transferred to the drive during a firmware upgrade is corrupt or incompatible with drive hardware							

Table 21. LTO Tape Drive Sense Data (continued)

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
14	FRU code							
15	SKSV	C/D	Reserved		BPV	Bit pointer		
					When set to 1, the bit pointer is valid.			
16–17	SKSV = 0: First Error Fault Symptom Code (FSC). SKSV = 1: Field Pointer							
18–19	First Error Flag Data							
20	Reserved (0)							
21					CLN	Reserved	Reserved	VolValid
22–28	Volume Label							
29	Current® Wrap							
30–33	Relative LPOS							
34	SCSI Address							
35	Reserved				Reserved			

The descriptions below serve only as an overview of sense reporting in the tape drive. This tape drive conforms to all sense field reporting as specified in the SCSI standards.

Notes:

1. The Error Code field (Byte 0) is set to 70h to indicate a current error, that is one associated with the most recently received command. It is set to 71h to indicate a deferred error which is not associated with the current command.
2. The segment number (Byte 1) is zero since the Copy, Compare, and Copy and Verify commands are not supported.
3. The File Mark flag (Byte 2, bit 7) is set if a Space, Read, or Verify command did not complete because a file mark was read.
4. The End of Media (EOM) flag (Byte 2, bit 6) is set if a Write or Write File Marks command completed in the early warning area. Spacing into BOM also causes this flag to be set. It is also set on an attempt to read or space past EOD, or if an attempt is made to space into Beginning of Media.
5. The Illegal Length Indicator (ILI) flag (Byte 2, bit 5) is set if a Read or Verify ended because a block was read from tape that did not have the block length requested in the command.
6. The Information Bytes (Bytes 3–5) are only valid if the Valid flag is set. This occurs only for current errors and not for deferred errors.
7. The Field Replaceable Unit field (Byte 14) is set to either zero or to a non-zero, vendor-specific code indicating which part of the drive is suspected of causing the failure.
8. The Clean (CLN) flag (Byte 21, bit 3) is set if the drive needs cleaning and clear otherwise.
9. The Volume Label Fields Valid (VolValid) bit (Byte 21, bit 0) is set if the Volume Label being reported is valid.

10. The Volume Label field (Bytes 22–28) reports the volume label if a cartridge is loaded in the drive and Volume Label Fields Valid is set.
11. The Current Wrap field (Byte 29) reports the physical wrap of the tape. The least significant bit reflects the current physical direction. A 0 means that the current direction is away from the physical beginning of the tape. A 1 means that the current direction is towards the physical beginning of the tape.
12. Relative LPOS fields (Bytes 30–33) reports the current physical position on the tape.
13. SCSI Address field (Byte 34) reports the SCSI Bus Address for the drive. Values returned range from 00h to 0Fh.

Using Host Sense Data

Table 22 lists the hosts to which the Ultrium 2 Tape Drive attaches. It gives the operating system for each host and describes how the host records errors from the Ultrium 2 Tape Drive.

To determine the meaning of host sense data, refer to the *IBM Ultrium Device Drivers Installation and User's Guide*.

<http://www.ibm.com/storage/storagesmart/1to>

Table 22. Host Method of Recording Tape Drive Errors

Host	Operating System	Method of Recording Tape Drive Errors
IBM AS/400 or iSeries	OS/400	Records tape drive errors and associated sense data in the AS/400 problem and error logs. View the logs by using the System Service Tools application and the userid QSRV.
IBM RS/6000, RS/6000/SP, or pSeries	AIX	Uses the IBM Atape device driver (provided with the Ultrium 2 Tape Drive) to record tape drive errors and sense data in the host error log. View the host error log by using one or more of the following utilities: tapeutil, diag, smit, or errpt.
HP	HP-UX	Uses the IBM device driver for HP. Error and trace logging are proprietary to Hewlett-Packard.
Sun Microsystems	Solaris	Uses the IBM device driver for Solaris to post sense information to the Solaris host-wide messages file <i>/var/adm/messages</i> .
Intel-based PCs	Windows NT	Uses the NTUTIL device driver to log some sense data in the Event Viewer host log.

Appendix C. Element Addressing

A host initiator references a storage location with element addresses. The 3582 uses a default addressing scheme, as seen in Table 23 for a non-partitioned library, or Table 23 and Table 24 for a partitioned library. Storage slots are addressed left to right, front to back. Drives are addressed left to right. The I/O station contains a single slot.

All addresses are consecutive within their device type. Elements may not be installed, and will be indicated as such in Read Element Status requests.

Table 23. Default Addressing Scheme for Partition One

Cell Definition	Addressing Range
Storage Slot (Storage Elements)	4096 (0x1000) through 4118 (0x1016)
I/O Station (Input/Output Elements)	16 (0x10)
Tape Drive (Data Transport Elements)	256 (0x100)
Medium Changer (Media Transport Element)	1 (0x01)
Note: For a partitioned library, partition 1's upper slot number is limited to the number of slots configured.	

Table 24. Default Addressing Scheme for Partition Two (if applicable)

Cell Definition	Addressing Range
Storage Slot (Storage Elements)	8192 (0x2000) through as many slots as configured in each partition
I/O Station (Input/Output Elements)	16 (0x10)
Tape Drive (Data Transport Elements)	512 (0x200)
Medium Changer (Media Transport Element)	1 (0x01)
Note: The default addressing scheme for partition two is the same as partition one for release 211B.	

Appendix D. Connecting to the Serial Port

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The Library's serial port is an RS-232C DTE port, configured at 19 200 Baud, with 8 data bits, no parity, and no flow control. The optional RMU's serial port is an RS-232C DTE port, configured at 38 400 Baud, with 8 data bits, no parity, and no flow control. The 9-pin connector is compatible with serial ports on PCs. A PC can be used to connect to the service port using a 9-pin straight through cable. For connection to another system, such as a UNIX workstation, a different cable or an adapter might be required.

Serial Port Connections

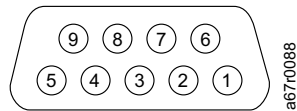


Figure 98. Serial Port Pin-Out

Table 25. DB-9 RS-232 Connector Pin Assignments

Pin Number	Signal Name	Abbreviation	Direction Relative to the Library/RMU
1	Carrier detect	CD	In
2	Receive data	RD	In
3	Transmit data	TD	Out
4	Data terminal ready	DTR	Out
5	Signal ground	SG	-
6	Data set ready	DSR	In
7	Request to send	RTS	Out
8	Clear to send	CTS	In
9	Ring indicator	RI	In

Connecting to the Serial Terminal

This section contains the hardware information needed to interconnect the serial terminal.

Hardware Required

- RS-232 DB9F-to-DB9F straight through cable
- Desktop computer or laptop computer, or a 232 DTE terminal, or a desktop or laptop computer that runs terminal emulation software
- RS-232 DB9M to DB25F adapter if the terminal uses a DB25M connector

Initial Setup of HyperTerminal

This section shows the steps to setup the HyperTerminal program. Other terminal emulation programs operate in a similar fashion.

1. Connect the straight through cable (and the 9– to 25–pin adapter if applicable) between the computer-serial (COM) port and the serial port.
2. Turn on the serial terminal.
3. On the serial terminal, select the HyperTerminal icon and double-click on it.
4. For **New Connection** enter **3582 Library** or **RMU** and click **OK**.
5. Select **Connect To->Connect using** and the number of the COM port you have chosen. Click **OK**.
6. In **COM properties** select:
 - Bits per second:19 200/38 400
 - Data bits:8
 - Parity:None
 - Stop bits:1
 - Flow Control:None
7. Click **OK**.

Verifying the Connection

If the Library/RMU is already on, then characters typed in the terminal should be visible to the operator. The simplest test is to press the Enter key. The Library will respond by displaying a command prompt like:

```
LIBCMD >
```

The RMU will respond by displaying a command prompt like:

```
RMU
```

When the device is rebooting, several messages are displayed on the terminal emulator.

Appendix E. Configuration Checklist

Photocopy this form, complete it during installation, and store it in a secure location in the event that you need to restore your installation settings. Bold is for recommended settings.

Machine Type and Model	3582-L23				
Serial Number					
Partition (circle one)	On	Off			
AutoClean (circle one)	On	Off			
Auto Clean Partition (circle one)	N/A	Both	Part 1	Part 2	
AutoClean Slots (circle one)	N/A	1	2	3	4
Partition Slots	Example: 9/15				
Mode (no partitions) (circle one)	Random	Sequential			
Mode (Partition 1) (circle one)	Random	Sequential			
Mode (Partition 2) (circle one)	Random	Sequential			
I/O Slot Configuration (circle one)	Storage	Input/Output			
Drive 1 SCSI ID (circle one)	0 1 2 3	4 5 6 8	9 10 11 12	13 14 15	
Drive 2 SCSI ID (circle one)	0 1 2 3	4 5 6 8	9 10 11 12	13 14 15	
Drive 1 Fibre ID					
Drive 2 Fibre ID					
Inquiry String	ULT3582-TL				
Menu Timeout (minutes)					
Password Function (circle one)	On	Off			
Password					
Key Click (circle one)	On	Off			
Bar Code Scanner (circle one)	On	Off			
Bar Code Scanner Mode (circle one)	Default	Media ID	Extended		
IP Address					
Subnet Mask					
Gateway Mask					
License Key					

Appendix F. Removing a Tape Cartridge

Resetting the Drive and Ejecting the Cartridge	250
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If a tape cartridge fails to eject from the 3582 Ultrium Tape Library there are two methods to remove the cartridge. The following sections describe the two procedures, resetting the drive and ejecting the cartridge, and manually removing the cartridge.

Resetting the Drive and Ejecting the Cartridge

If a tape cartridge fails to eject from the 3582 Ultrium Tape Library, you can perform the following steps to reset the drive and eject the cartridge.

1. Vary the library and drives offline to *all* attached hosts.
2. Remove the right-hand cartridge magazine.

Note: Ensure that you do not interchange magazines if you remove both.

3. Locate the drive that contains the stuck tape cartridge. If the picker is in front of the drive, use the Operator Panel to move the picker to target position 1 (Main Menu → Tools Menu → Position Picker). See “Position Picker” on page 165.
4. Carefully reach through the magazine slot, then press and release the eject button **3** on the front of the drive and wait for approximately two minutes. If the cartridge ejects the procedure was successful. If the cartridge does not eject continue with the next step.
5. Press and hold the eject button **3** for at least 10 seconds. The single character display **1** should change as the drive performs a power-on self test (POST). If this does not happen cycle power to the library (turn it off, then on again).
6. After a reset or power cycle, the drive should start a slow rewind. During the slow rewind the activity LED **2** will be flashing. You must wait for the LED to stop flashing, indicating that the slow rewind is complete. **This process may take up to 20 minutes.**
7. Press and release the eject button **3** on the front of the drive and wait for approximately two minutes. If the cartridge ejects the procedure was successful. If the cartridge does not eject continue with the following procedure.

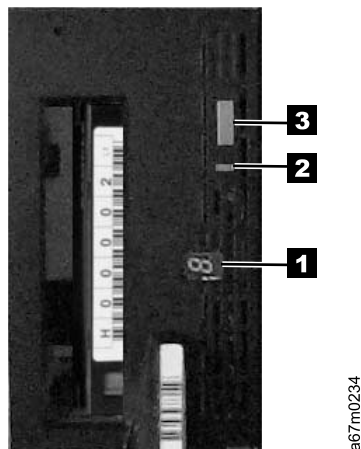


Figure 99. Resetting the Tape Drive

Manually Removing the Tape Cartridge

Attention:

If you are not a trained service person, do not attempt to open the drive for repairs. Attempting a repair other than the manual removal of a tape cartridge will void your warranty.

Removing the Cartridge

If a tape cartridge fails to eject from an 3582 Ultrium Tape Library, you can manually remove the cartridge. The following tools are required for the procedure:

- 2.5-mm allen wrench
- Small-blade screwdriver or potentiometer-setting tool
- 2-mm hex wrench
- #3 Phillips screwdriver or T10 Torx



Attention: Before performing this procedure, note the following:

- Ensure that you have attempted all normal methods of removing the tape cartridge from the drive. Refer to “Resetting the Drive and Ejecting the Cartridge” on page 250.
- This procedure may damage the stuck tape cartridge. If you use this procedure, copy the data from the stuck cartridge to another cartridge. If you choose to reuse the stuck cartridge, refer to the instructions in “Repositioning or Reattaching a Leader Pin” on page 70. If you believe the cartridge has been damaged, replace it.
- If you use a power screwdriver to perform this procedure it could destroy the tape.
- Never touch the head or electronic components within the drive. Touching may cause contamination or damage by electrostatic discharge.

To manually remove a tape cartridge, perform the following steps:

1. Vary the library Offline to ALL ATTACHED HOSTS.
2. Power off the library. The power switch is located on the front of the library.
3. Disconnect all cables to the drive sled that contains the stuck cartridge.
4. Loosen the four captive thumbscrews **1** (see Figure 100 on page 252) on the drive sled and slide the drive sled out using the handle **2** (see Figure 100 on page 252).

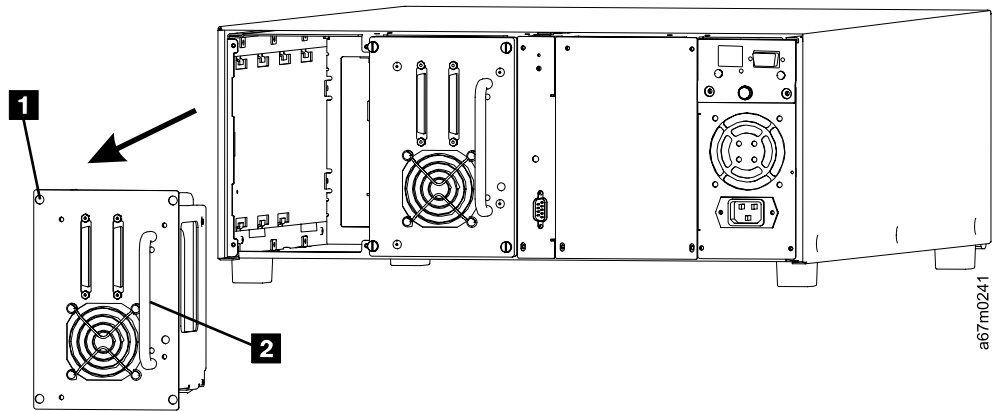


Figure 100. Removing the Drive Sled

5. Place the drive sled so the front of the drive faces you.
6. Locate the access hole at the bottom of the unit **1** in Figure 101.
7. Insert a 2.5-mm allen wrench into the access hole **1** in Figure 101 and position the wrench so it is seated in the screw of the supply reel motor (not visible).
8. Push open the door of the tape load compartment and locate the flag **2** in Figure 101 on the drive's takeup reel.

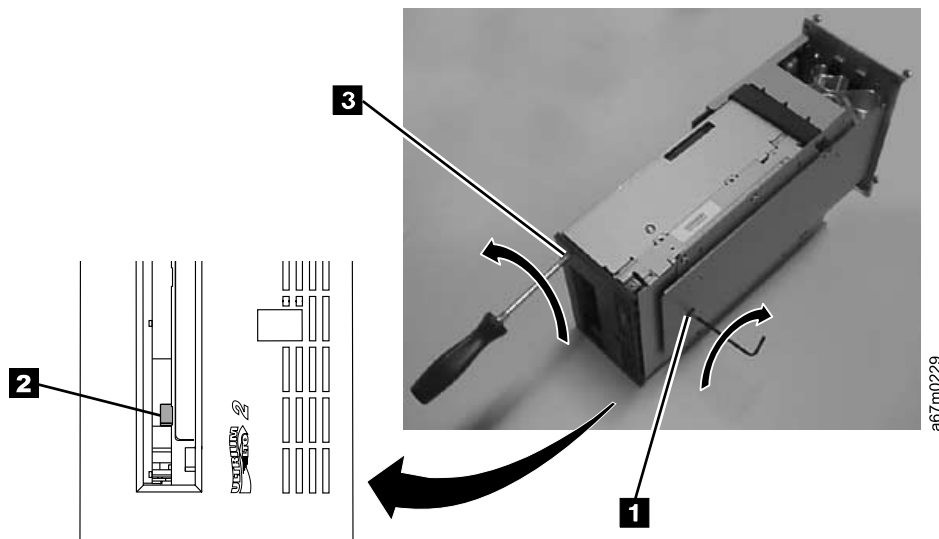


Figure 101. Determining whether the tape is broken. The view is from the front of the drive.



Attention: In the following step, rotate the allen wrench clockwise, not counterclockwise. A counterclockwise motion may damage the tape.

9. To determine whether the tape is broken, watch the flag **2** in Figure 101 on the drive's takeup reel while you rotate the allen wrench **1** in Figure 101 clockwise (do not let the wrench move counterclockwise):
 - If you feel resistance to the allen wrench while attempting to turn the supply reel motor screw clockwise, go to step 11 on page 253.

- If the takeup reel turns when you rotate the supply reel motor screw clockwise with the allen wrench, the tape is not broken. Go to step 10.
 - If the takeup reel does not turn when you rotate the supply reel motor screw clockwise with the allen wrench and if supply reel motor screw rotates freely, the tape is broken. You must determine the location of the leader block. To do so, insert a small-blade screwdriver or potentiometer-setting tool into the access hole for the loader motor gear **3** in Figure 101 on page 252. Rotate the screwdriver counterclockwise. You may have to rotate for a lengthy period:
 - If the cartridge moves up, the tape is completely in the cartridge and the leader block is in the home position. Continue rotating the screwdriver until the cartridge ejects. Remove the cartridge.
 - If you feel resistance and the cartridge does not move up, the leader block is not in the home position. Contact your IBM Service Representative to perform the procedure in “Fixing an Internal Jam” on page 254.
10. Continue to rotate the allen wrench until you feel resistance. The tape has been rewound as far as it can go without unthreading.

Note: The number of rotations required depends on where the beginning of the tape is on the take up reel. You may have to rotate the allen wrench for a lengthy period.

11. With the allen wrench still inserted into the bottom access hole, insert a small-blade screwdriver or potentiometer-setting tool into the access hole for the loader motor gear **3** (see Figure 101 on page 252).
12. While keeping torque on the supply reel motor screw and rotating the allen wrench **1** (see Figure 101 on page 252) clockwise, rotate the loader motor gear with the small-blade screwdriver **3** (see Figure 101 on page 252) counterclockwise (see arrow). As you rotate the screwdriver, the allen wrench moves slightly.
13. With the small-blade screwdriver continue to rotate the loader motor gear in the unload direction (counterclockwise).
- If you feel no resistance to the allen wrench and the cartridge slowly moves up and out of the tape load compartment, the procedure was successful. Go to step 14.
 - If you feel resistance to the allen wrench and the cartridge does not move, the loader mechanism is jammed or the leader block is not at the home position. Remove the small-blade screwdriver and contact your IBM Service Representative to perform the procedure in “Fixing an Internal Jam” on page 254.
14. Remove the tape cartridge. If the leader pin is not seated correctly in the cartridge, see “Repositioning or Reattaching a Leader Pin” on page 70.
15. Copy the data on the stuck tape cartridge to another cartridge. After you remove the stuck tape cartridge, set it aside and copy it at a later time. Discard the cartridge after you have recovered data from it.
16. Slide the drive sled into slot you removed it from using the handle **2** (see Figure 100 on page 252). Tighten the four captive thumbscrews **1** (see Figure 100 on page 252) on the drive sled. See “Replacing a Drive” on page 201.
17. Connect the SCSI cables that were disconnected in step 3 on page 251.
18. Power on the library.
19. Vary the library and drives online to ALL ATTACHED HOSTS.

Fixing an Internal Jam



Attention:
This procedure must be performed only by trained service personnel.

If problem-determination procedures identify the Ultrium Tape Drive as the source of a problem, replace the entire unit. If you are not a trained service person, do not attempt to open the drive for repairs. Attempting a repair other than the manual removal of a tape cartridge will void your warranty.

Before performing this procedure, ensure that you have completed the steps that begin on page “Manual Removal of Tapes” on page 194. Do not attempt this procedure until you have completed these steps.

Removing the Drive from the Drive Sled



CAUTION:
It is critical to maintain the alignment of the drive on the drive sled.

1. Carefully scribe a line on the drive sled on each side of the drive to mark the drive position on the sled. See Figure 102.



Figure 102. Scribing

2. Unplug the RS422 cable from the rear of the drive sled. See **1** in Figure 103.

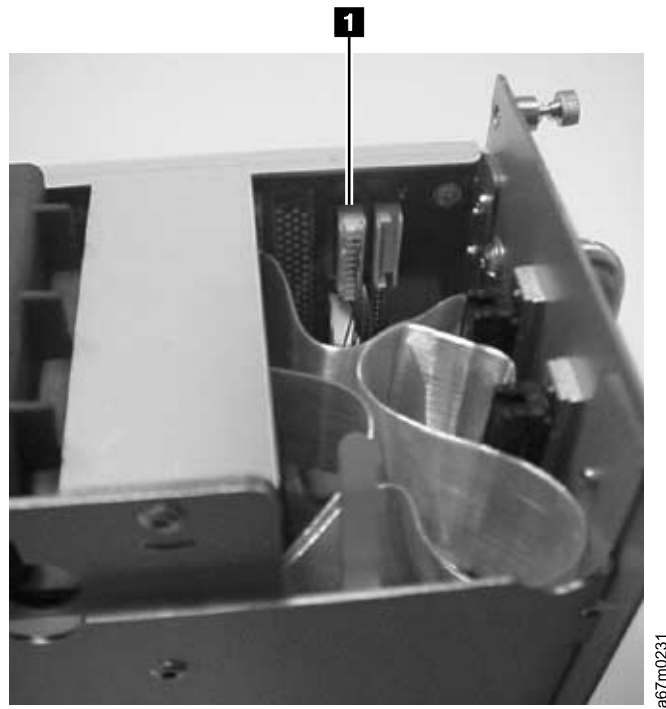


Figure 103. Unplugging the 422 Cable

3. Turn the drive sled upside down.
4. Remove the four screws (see **1** in Figure 104).

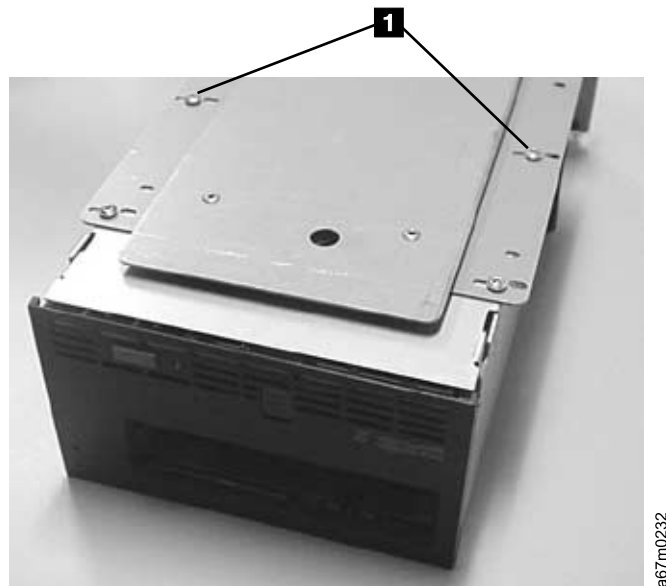


Figure 104. Removing the Four Screws

5. Holding both the drive and the drive sled, rotate them to an upright position.

6. Being careful to ensure that the 422 cable is guided over the rubber shroud, slowly pull out the drive far enough to disconnect the power **1** and SCSI cables **2** from the rear of the drive (see Figure 105).

Note: If you have a HVD drive you will need to unplug the SCSI cable from the converter card, which is located on the back of the drive.

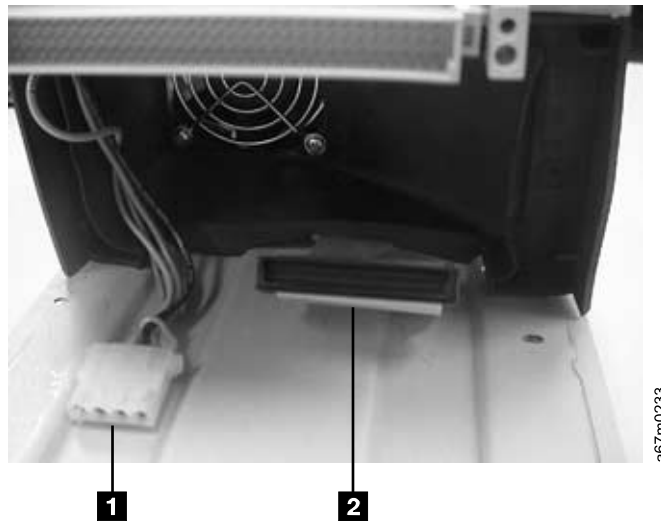


Figure 105. Unplugging Power and SCSI Cables

7. Continue sliding the drive forward, making sure that the 422 cable remains attached to the drive. The drive is now ready for the following procedure.

Reinstalling a Drive on the Drive Sled

In reverse order, perform the procedures in “Removing the Drive from the Drive Sled” on page 254.

Note: Ensure that you align the drive on the drive sled using the scribed lines shown in Figure 102 on page 254.

Fixing the Internal Jam

If you have reached this point, the tape is broken or the leader pin dropped (or looks like it dropped) from the leader block. To fix these conditions, perform the following procedure.

1. Tilt the drive so that its bottom rests on a nonslip surface.
2. Remove the cover of the drive by performing the following steps:
 - a. Use an appropriate tool to remove the three screws and washers (see **1** in Figure 106 on page 257) that secure the bezel **2**. Remove the bezel.
 - b. Use a screwdriver to remove the four cover-mounting screws and washers **3**.
 - c. Remove the cover by lifting it up. Set the cover aside.

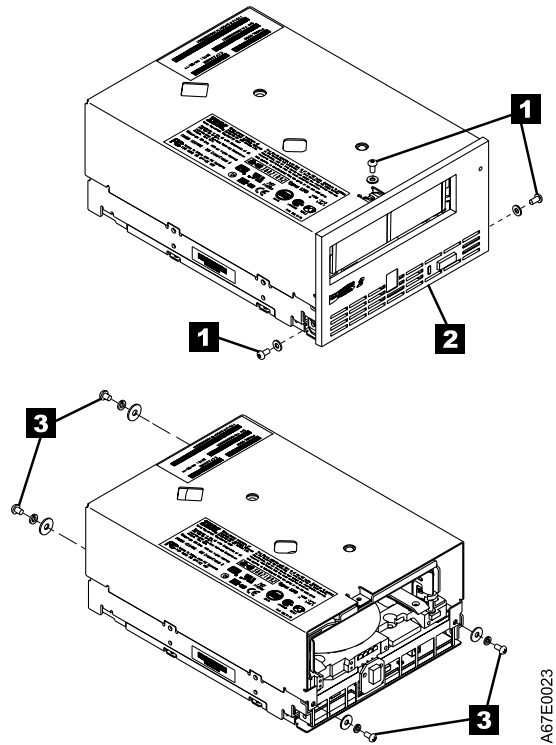


Figure 106. Removing the top cover of the drive

3. Examine the drive to determine the cause of the problem:
 - If the tape is broken, do not attempt repair. Return the drive and the stuck tape to your reseller for maintenance (note that your tape will be scrapped).
 - If the leader pin dropped from the leader block, go to step 4 on page 258 and continue this procedure.
 - If the leader block pulled the tape (but not the pin) from the spool so that it looks like the pin was dropped, go to step 4 on page 258 and continue this procedure.

4. Place the tape drive so that the front faces you, then tilt it on its left side (see Figure 107).
5. At the bottom of the drive, locate the access hole (**1** in Figure 107).



Attention: In the following steps, do not allow drive components to touch the head **2**. Damage may result to the head.

6. Insert a 2.5-mm allen wrench into the access hole and position the wrench so that it is seated in the screw of the supply reel motor.

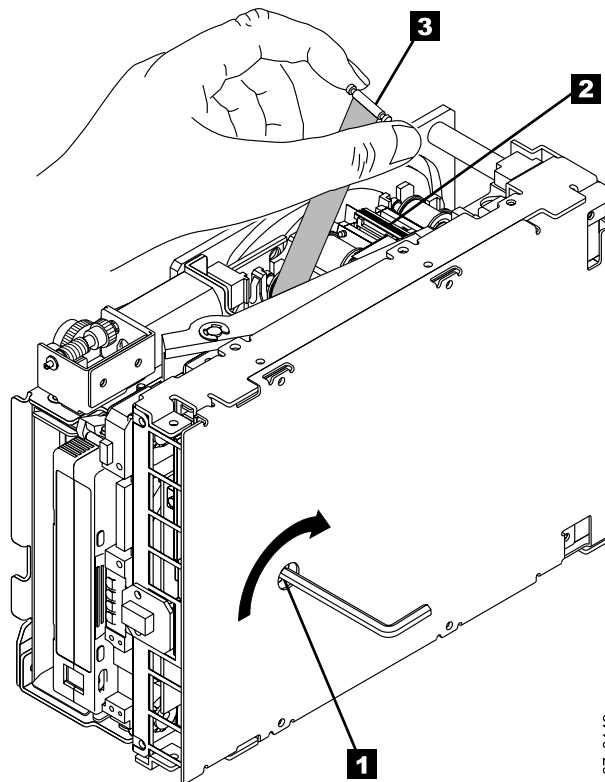


Figure 107. Rewinding the leader pin into the tape cartridge

7. With clean needle-nose pliers, grasp the end of the leader pin and pull it out of the cartridge so that you can grip it with your fingers (see **3** in Figure 107).

Note: If the leader pin is not connected to the tape, set the pin aside. After you remove the cartridge, reattach the pin (see “Repositioning or Reattaching a Leader Pin” on page 70).

8. While keeping the tape taut with your fingers, rotate the allen wrench clockwise **1** to wind the excess tape into the cartridge. Guide the leader pin toward the cartridge and drop it inside the cartridge door. Ensure that no tape is left outside of the cartridge. Remove the allen wrench.

Note: Do not attempt to seat the leader pin into the cartridge's clips; this will interfere with the motion of the leader block.

9. Manually rotate the loader motor gear (see **1** in Figure 108) in the unload direction (counterclockwise) until the leader block **2** reaches the last roller **3**.
10. While manually rotating the loader motor gear in the unload direction, guide the end of the leader block **2** into the white guide block **4**.

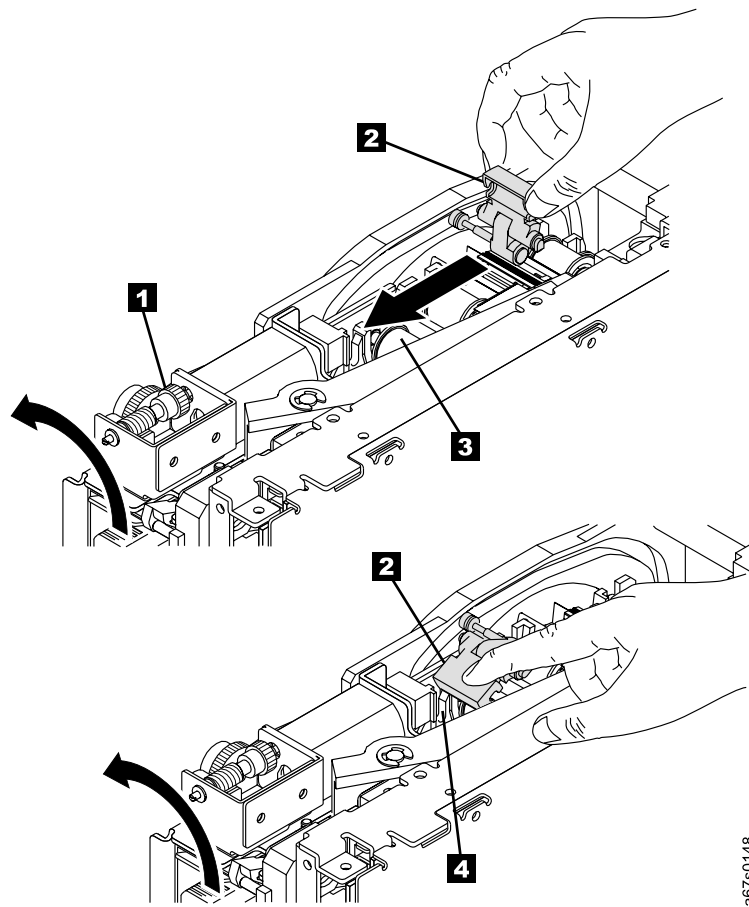


Figure 108. Guiding the leader block into the home position

a67s0148

11. Rotate the loader motor gear in the unload direction until the leader block is fully inside the drive (see **1** in Figure 109).

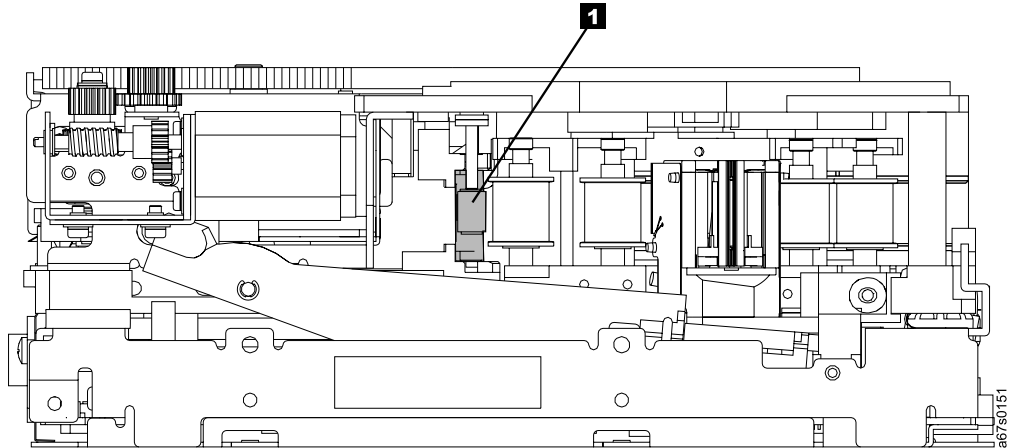


Figure 109. Rotating the loader motor gear until the leader block is fully inside the drive. The drive is shown on its side. The head is on the right and the arm of the head brush at the bottom of the figure.

12. Continue to rotate the loader motor gear counterclockwise. The leader block retracts and occupies the opening to the drive (see **1** in Figure 110).

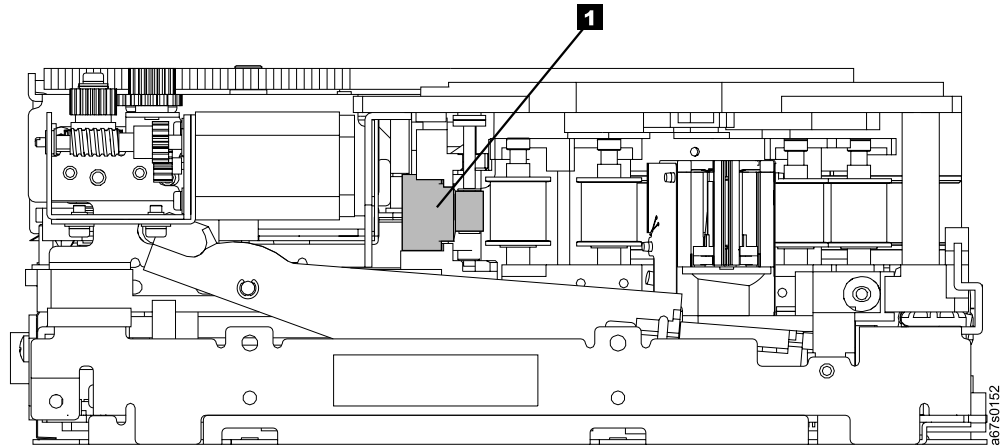


Figure 110. Rotating the loader motor gear so that the leader block retracts. The drive is shown on its side. The head is on the right and the arm of the head brush at the bottom of the figure.

13. Rotate the loader motor gear counterclockwise until you feel resistance and the cartridge rises and ejects (see Figure 111).

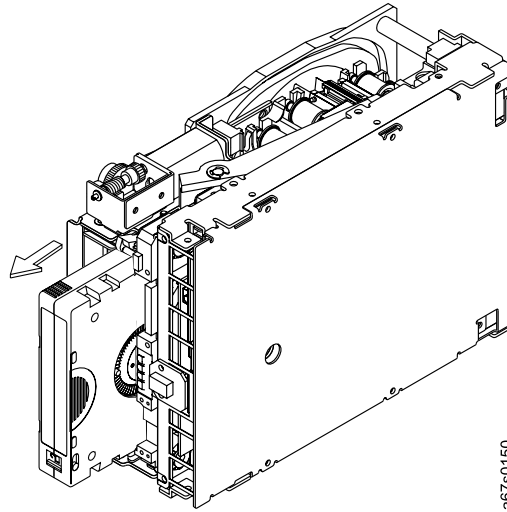


Figure 111. Rotating the loader motor gear until the cartridge ejects

14. Remove the tape cartridge. If the leader pin is not seated correctly in the cartridge, see “Repositioning or Reattaching a Leader Pin” on page 70.
15. Copy the data on the stuck tape cartridge to another cartridge. If appropriate, return the stuck tape cartridge for analysis in its original packaging or in the packaging from its replacement.
16. Reassemble the tape drive by reversing the preceding steps.
17. See “Reinstalling a Drive on the Drive Sled” on page 256.
18. Restore power to the tape library by setting the main power switch to |.
19. Ask the customer to vary the Library and Drives Online to *ALL ATTACHED HOSTS*.
20. To ensure that the drive operates properly, see “Drive Maintenance Test” on page 161 to run the Normal Read/Write test.

Appendix G. Parts List

<http://www.ibm.com/storage/1to>

Table 26 lists orderable models and features, as well as customer replaceable units (CRUs) for the 3582 Ultrium Tape Library. To order a part by feature code, contact your local IBM Marketing Representative or Business Partner. If the part has a customer replaceable unit (CRU) number, order it from your IBM Service Representative.

Parts for 3582 Ultrium Tape Library

Table 26. Parts for the 3582 Ultrium Tape Library

Feature Code (FC)	Product Description	Notes	CRU Part Numbers
N/A	3582 Ultrium Tape Library		18P8303
N/A	Bar Code Scanner		18P7843
N/A	Front Door Key		18P7845
N/A	Library Chassis		18P7848
N/A	Fibre Drive Sled		18P7849
N/A	LVD Drive Sled		18P7850
N/A	HVD Drive Sled		18P7852
1660	RMU/Specialist		18P7847
1680	Control Path Failover		
2200	Stand-Alone Kit		
5096	Interposer SC-LC Fibre		11P1373
5098	Inline HVD SCSI Terminator		19P0378
5099	VHDCI/HD68 Cable/Interposer		19P0482
5301	0.4 m HD68/HD68 SCSI Cable		19P0872
5302	2.5 m HD68/HD68 SCSI Cable		35L1307
5305	5 m HD68/HD68 SCSI Cable		19P0052
5310	10 m HD68/HD68 SCSI Cable		19P0053
5318	18 m HD68/HD68 SCSI Cable		19P0097
5325	25 m HD68/HD68 SCSI Cable		19P0054
5602	2.5 m VHDCI/HD68 SCSI Cable		19P0279
5604	4.5 m VHDCI/HD68 SCSI Cable		19P0050
5610	10 m VHDCI/HD68 SCSI Cable		19P0048
5620	20 m VHDCI/HD68 SCSI Cable		19P0049
5625	25 m VHDCI/HD68 SCSI Cable		35L1977
5907	7 M SC-LC Fibre Cable		11P1345
5913	13 M SC-LC Fibre Cable		11P1346
5922	22 M SC-LC Fibre Cable		11P1347
5961	61 M SC-LC Fibre Cable		11P1350
5907	7 M LC-SC Fibre Cable		11P3895
5913	13 M LC-SC Fibre Cable		11P3896

Table 26. Parts for the 3582 Ultrium Tape Library (continued)

Feature Code (FC)	Product Description	Notes	CRU Part Numbers
5922	22 M LC-SC Fibre Cable		11P3897
5961	61 M LC-SC Fibre Cable		11P3900
6005	5 M LC-LC Fibre Cable		19K1252
6013	13 M LC-LC Fibre Cable		11P3880
6025	25 M LC-LC Fibre Cable		19K1253
6061	61 M LC-LC Fibre Cable		11P3834
N/A	LVD single-connector SCSI wrap tool		19P0481
N/A	LVD multi-mode terminator		19P0874
7003	Rack Mount Kit		35L1559
8002	IBM TotalStorage Cleaning Cartridge		35L2087
8101	Five (5) IBM TotalStorage LTO Ultrium 200 GB Data Cartridges Note: The maximum number of FC 8101s that can be ordered at one time is four (4).		
8102	Magazine Kit w/ Dust Cover		
8103	LTO Ultrium 2 LVD Drive		18P7850
8104	LTO Ultrium 2 HVD Drive		18P7852
8105	LTO Ultrium 2 Fibre Drive		18P7849
8110	Twenty (20) IBM TotalStorage LTO Ultrium 200 GB Data Cartridges Note: The maximum number of FC 8110s that can be ordered at one time is four (4).		
8203	Add CSU Ultrium 2 LVD Drive		18P7850
8204	Add CSU Ultrium 2 HVD Drive		18P7852
8205	Add CSU Ultrium 2 Fibre Drive		18P7849
9800	2.7 m Power Cord 125 V, US/Canada		6952300
9820	2.7 m Power Cord 250 V, Fr/Germny		13F9979
9821	2.7 m Power Cord 250 V, Denmark		13F9997
9825	2.7 m Power Cord 250 V, UK		14F0033
9827	2.7 m Power Cord 250 V, Israel		14F0087
9828	2.7 m Power Cord 250 V, Switzerland		14F0051
9829	2.7 m Power Cord 250 V, South Africa		14F0015
9830	2.7 m Power Cord 250 V, Italy		14F0069
9831	2.7 m Power Cord 250 V, Australia		13F9940
9833	2.7 m Power Cord 250 V, US/Canada		1838574
9834	2.7 m Power Cord 250 V, Uruguay		35L8880
9840	2.7 m Power Cord 250 V, China (PRC)		02K0546
9860	Rack Power Cord — Single	FC 7003 required	05H8911
9986	Power Cord, 1.8 m, Chicago		6952301
			N/A = not applicable

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Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

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This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

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Properly shielded and grounded cables and connectors must be used in order to reduce the potential for causing interference to radio and TV communications and to other electrical or electronic equipment. Such cables and connectors are available from IBM authorized dealers. IBM cannot accept responsibility for any interference caused by using other than recommended cables and connectors.

Germany Electromagnetic Compatibility Directive

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 18. September 1998 (bzw. der EMC EG Richtlinie 89/336)

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die: IBM Deutschland Informationssysteme GmbH 70548 Stuttgart.

Informationen in Hinsicht EMVG Paragraph 4 Abs. (1) 4:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen."

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taiemi

Glossary

This glossary defines the special terms, abbreviations, and acronyms that are used in this publication.

Numbers

2:1 compression. The relationship between the quantity of data that can be stored with compression as compared to the quantity of data that can be stored without compression. In 2:1 compression, twice as much data can be stored with compression as can be stored without compression.

IBM TotalStorage Ultrium Tape Library 3582. A device that can be attached to a supported server and used to write data to and from magnetic tape.

A

A. Ampere.

AC. Alternating current.

AL_PA. Arbitrated Loop Physical Address

adapter card. A circuit board that adds function to a computer.

alphanumeric. Pertaining to a character set that contains letters, numerals, and usually other characters, such as punctuation marks.

alternating current (ac). An electric current that reverses its direction at regularly recurring intervals.

ambient temperature. The temperature of air or other media in a designated area, particularly the area surrounding equipment.

ampere (A). A unit of measure for electric current that is equivalent to a flow of one coulomb per second, or to the current produced by one volt applied across a resistance of one ohm.

arbitrated loop. See *Fibre Channel arbitrated loop (FC-AL)*.

archive. To collect and store files in a designated place.

ASCII. American Standard Code for Information Interchange.

automatic cleaning. Represented as Auto Clean on the library's operator panel, a function that lets you specify that the library automatically clean the tape drive head with a cleaning cartridge.

B

bar code. A code representing characters by sets of parallel bars of varying thickness and separation which are read optically by transverse scanning.

bar code label. A specially coded label that can be affixed to a tape cartridge and which enables a device to identify the cartridge and its volume serial number. The bar code label must be affixed to a tape cartridge to enable the library to identify the cartridge and its volume serial number.

bar code reader. In the tape library, a device specialized for scanning and reading bar codes and converting them into either the ASCII or EBCDIC digital character code.

bit. Either of the digits 0 or 1 when used in the binary numbering system.

browser. A client program that initiates requests to a web server and displays the information that the server returns.

bus. See *SCSI bus*.

byte. A string consisting of a certain number of bits (usually 8) that are treated as a unit and represent a character. A fundamental data unit.

C

capacity. The amount of data that can be contained on storage media and expressed in bytes of data.

cartridge. See *tape cartridge*.

cartridge door. On a tape cartridge, a spring—loaded door that can be opened to access or closed to protect the magnetic tape within the cartridge.

cartridge memory. See *LTO cartridge memory*.

cartridge manual rewind tool. A device that can be fitted into the reel of a cartridge and used to rewind tape into or out of the cartridge.

cartridge storage slot. Individual slot located within a magazine that is used to house tape cartridges.

CD. Compact disc.

centimeter (cm). One one-hundredth of a meter (0.01 m). Approximately 0.39 inch.

circuit breaker. A switch that automatically interrupts an electric circuit under an infrequent abnormal condition.

cleaning cartridge. A tape cartridge that is used to clean the heads of a tape drive. Contrast with *data cartridge*.

cm. Centimeter.

compact disc (CD). A disc, usually 4.75 inches in diameter, from which data is read optically by means of a laser.

compression. The process of eliminating gaps, empty fields, redundancies, and unnecessary data to shorten the length of records or blocks.

configure. To describe to a system the devices, optional features, and programs installed on the system.

current. The quantity of charge per unit time, measured in Amperes (Amps, A).

D

daisy-chain. A hardware configuration in which devices are connected one to another in a series.

data. Any representations such as characters or analog quantities to which meaning is, or might be, assigned.

data cartridge. A tape cartridge dedicated to storing data. Contrast with *cleaning cartridge*.

data compression. See *compression*.

data transfer rate. The average number of bits, characters, or blocks per unit time passing between corresponding equipment in a data transmission system. The rate is expressed in bits, characters, or blocks per second, minute, or hour.

DC. Direct current.

default setting. The value that is assumed when none is explicitly specified.

degauss. To make a magnetic tape nonmagnetic by means of electrical coils carrying currents that neutralize the magnetism of the tape.

degausser. A device that makes magnetic tape nonmagnetic.

device. Any hardware component or peripheral, such as a tape drive or tape library, that can receive and send data.

device driver. A file that contains the code needed to use an attached device.

DHCP. Dynamic host configuration protocol.

diagnostic. A software program that is designed to recognize, locate, and explain faults in equipment or errors in programs.

Diagnostic Menu. A collection of diagnostic and maintenance functions that the tape library can perform. Each function has a menu name that you can choose from the operator panel to activate the function.

differential . See *High Voltage Differential (HVD)*.

direct current (dc). An electrical current flowing in one direction only and substantially constant in value.

disable. To make nonfunctional.

download. To transfer programs or data from a computer to a connected device, typically a personal computer.

drive. See *IBM Ultrium Tape Drive*.

drive head. The component that records an electrical signal onto magnetic tape, or reads a signal from tape into an electrical signal.

Dynamic Host Configuration Protocol (DHCP). An agreed-upon format for assigning IP addresses to devices on a network at the moment they are needed rather than in advance.

E

eject. To remove or force out from within.

electronic mail. Correspondence in the form of messages transmitted between user terminals over a computer network.

e-mail. See *electronic mail*.

enable. To make functional.

erase. To remove recorded matter from a magnetic tape.

error code log. A repository within a tape drive's firmware that contains a history of errors experienced by the drive.

Ethernet. Local area network (LAN) technology that transmits information between computers at speeds of 10 and 100 million bits per second (Mbps).

export. Pertaining to the tape library, to remove media from the library using the I/O station.

F

failover. The routing of all transactions to a second device when the first device fails.

Fibre Channel. An optics cable utilizing filaments to transmit data.

Fibre Channel arbitrated loop (FC-AL). In this topology, two or more Fibre Channel end points are

interconnected through a looped interface. Information is routed through the loop to its destination.

Fibre Channel topologies. Shared loop host and storage controllers.

field microcode replacement (FMR) tape. A tape cartridge that contains new or revised firmware (microcode).

file. A named set of records stored or processed as a unit.

file transfer protocol (FTP). In the Internet suite of protocols, an application layer protocol that uses TCP and Telnet services to transfer bulk-data files between machines or hosts (servers).

firmware. Proprietary code that is usually delivered as firmware as part of an operating system. Firmware is more efficient than software loaded from an alterable medium and more adaptable to change than pure hardware circuitry. An example of firmware is the Basic Input/Output System (BIOS) in read-only memory (ROM) on a PC motherboard.

flange. A rib or rim used for strength, for guiding, or for attachment to another object.

FMR tape. See *field microcode replacement tape*.

FTP site. Any electronic repository of information that uses the File Transfer Protocol (FTP) for transferring files to and from servers. Use of an FTP site requires a user ID and possibly a password.

G

GB. gigabyte.

GBIC. Gigabit interface converter.

Gbit. gigabit

gigabit (Gbit). 1 000 000 000 bits.

gigabyte (GB). 1 000 000 000 bytes.

grounded. Having or making an electrical connection with the earth.

gigabit interface converter (GBIC). Converts data from electrical signals to optical signals.

H

head. See *drive head*.

hertz (Hz). A unit of frequency equal to the number of cycles per second.

High Voltage Differential (HVD/DIFF). A logic signaling system that enables data communication

between a supported server and another device, such as the tape library. HVD/DIFF signaling uses a paired plus and minus signal level to reduce the effects of noise on the SCSI bus. Any noise injected into the signal is present in both a plus and minus state, and is thereby canceled. Synonymous with *differential*.

host . The controlling or highest-level system in a data communication configuration. Synonymous with *server*.

host cleaning. A method of cleaning that enables the host (server) to detect the need to clean an Ultrium Tape Drive and to control the cleaning process.

HVD/DIFF. High voltage differential.

Hz. Hertz.

I

IBM Ultrium Tape Drive. Located within the tape library, a data-storage device that controls the movement of the magnetic tape in an IBM LTO Ultrium Tape Cartridge. The drive houses the mechanism (drive head) that reads and writes data to the tape.

ID. Identifier.

import. Pertaining to the tape library, to insert media into the library using the I/O station.

initialize. To format a magnetic tape, write a label (VOLSER) on the tape, and leave the tape empty except for the system files containing the structure information. All former contents of the tape are lost.

insert. Pertaining to the tape library, to place a tape cartridge into a cartridge storage slot in the library.

install. To set up for use or service. The act of adding a product, feature, or function to a system or device either by a singular change or by the addition of multiple components or devices.

Internet. The worldwide collection of interconnected networks that use the Internet suite of protocols and permit public access.

interposer. An adapter-like device that allows a connector of one size and style to connect to a mating connector of a different type and style.

inventory. A survey of tape cartridges in the library.

I/O. Input/Output.

K

KB. Kilobyte. 2 to the power of 10 or 1024 bytes.

kg. Kilogram.

kilogram (kg). One thousand grams (approximately 2.2 pounds).

L

LAN. Local area network.

label. See *bar code label*.

label area. On the LTO Ultrium tape cartridge, a recessed area next to the write-protect switch where a label must be affixed.

LCD. See *liquid crystal display*.

leader pin. With the LTO Ultrium Tape Cartridge, a small metal column attached to the end of the magnetic tape. During tape processing the leader pin is grasped by a threading mechanism, which pulls the pin and the tape out of the cartridge, across the drive head, and onto a takeup reel. The head can then read or write data from or to the tape.

legacy. {NEED DEFINITION, P. 15}

LED. Light-emitting diode.

light-emitting diode (LED). A semiconductor chip that gives off visible or infrared light when activated.

Linear Tape-Open (LTO). A type of tape storage technology developed by the IBM Corporation, Hewlett-Packard, and Seagate. LTO technology is an “open format” technology, which means that its users will have multiple sources of product and media. The “open” nature of LTO technology enables compatibility between different vendors’ offerings by ensuring that vendors comply with verification standards. The LTO technology is implemented in two formats: the Accelis format focuses on fast access; the Ultrium format focuses on high capacity. The Ultrium format is the preferred format when capacity (rather than fast access) is the key storage consideration. An Ultrium cartridge has a compressed data capacity of up to 200 GB (at 2:1 compression) and a native data capacity of up to 100 GB. The Ultrium format is designed with a 4-generation road map that provides for up to 1.6 TB per cartridge (at 2:1 compression) in Generation 4, with compressed transfer rate of up to 320 MB per second.

liquid crystal display (LCD). A low-power display technology used in computers and other I/O devices.

load. Pertaining to the tape library and following the insertion of a tape cartridge into a cartridge storage slot, the act (performed by the picker) of transferring the cartridge from the storage slot to the drive and of positioning the tape (performed by the tape drive) for reading or writing by the drive head.

load and unload cycle. The act of inserting a cartridge into a tape drive, loading the tape to load point, rewinding the tape into the cartridge, and ejecting the cartridge from the drive.

Local area network (LAN). A computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings.

Low Voltage Differential (LVD). A low-noise, low-power, and low-amplitude electrical signaling system that enables data communication between a supported server and another device such as the tape library. LVD signaling uses two wires to drive one signal over copper wire. The use of wire pairs reduces electrical noise and cross talk. This method of data transmission requires a cable that is no longer than 25 meters (82 ft.).

LTO. Linear Tape-Open.

LTO-CM. LTO cartridge memory.

LTO cartridge memory (LTO-CM). Within each LTO Ultrium data cartridge, an embedded electronics and interface module that can store and retrieve a cartridge’s historical usage and other information.

LVD. Low-voltage differential.

M

m. Meter.

magnetic tape. A tape with a magnetizable surface layer on which data can be stored by magnetic recording.

manual cleaning. A method of cleaning by which an operator selects a menu option from the tape library operator panel to perform cleaning on one or more of the Ultrium Tape Drives.

Management Information Base (MIB). A database of objects that can be monitored by a network management system.

MB. Megabyte.

media. The plural of *medium*.

media capacity. See *capacity*.

media-type identifier. Pertaining to the bar code on the bar code label of the IBM Ultrium Tape Cartridge, a 2-character code, L1, that represents information about the cartridge. L identifies the cartridge as one that can be read by devices which incorporate LTO technology; 1 indicates that it is the first generation of its type.

medium. A physical material in or on which data may be represented, such as magnetic tape.

megabyte (MB). 1 000 000 bytes.

metal particle tape. In the LTO Ultrium tape cartridge, tape that uses very small, pure metal particles (rather than oxide coatings) in the magnetic layer.

meter. In the Metric System, the basic unit of length; equal to approximately 39.37 inches.

MIB. Management Information Base.

N

native data capacity. The amount of data that can be stored without compression on a cartridge.

NVRAM. Non-Volatile Random Access Memory

Non-Volatile Random Access Memory. A type of memory that retains its contents when power is turned off.

O

oersted. The unit of magnetic field strength in the unrationalized centimeter-gram-second (cgs) electromagnetic system. The oersted is the magnetic field strength in the interior of an elongated, uniformly wound solenoid that is excited with a linear current density in its winding of one ampere per 4π centimeters of axial length.

operating environment. The temperature, relative humidity rate, and wet bulb temperature of the room in which the tape library routinely conducts processing.

operating system. The master computer control program that translates the user's commands and allows application programs to interact with the computer's hardware.

operator panel. Located on the front door of the tape library, the functional unit that contains buttons to control the tape library, and an LCD display that provides information about the operation of the library.

P

PDF. Portable Document Format.

PDU. Protocol Data Unit

pick. Pertaining to the tape library, to remove, by means of a robotic device, a tape cartridge from a storage slot, tape drive, or I/O station.

picker. An electromechanical device located on the picker assembly that moves cartridges between the cartridge storage slots, tape drives, or I/O station.

picker assembly. The mechanism in the Tape Library that moves cartridges between the storage slots, tape

drives, and the I/O station. The assembly includes the rotary axis motor, sensors, picker, and bar code reader.

Portable Document Format (PDF). A standard specified by Adobe Systems, Incorporated, for the electronic distribution of documents. PDF files are compact, can be distributed globally (via e-mail, the web, intranets, or CD-ROM), and can be viewed with the Acrobat Reader, which is software from Adobe Systems that can be downloaded at no cost from the Adobe Systems home page.

POST. Power-On Self Test.

PostScript. A standard specified by Adobe Systems, Incorporated, that defines how text and graphics are presented on printers and display devices.

power cord. A cable that connects a device to a source of electrical power.

power cord plug. On a power cord, the male fitting for making an electrical connection to a circuit by insertion into a receptacle.

power-off. To remove electrical power from a device.

power-on. (1) To apply electrical power to a device. (2) The state of a device when power has been applied to it.

Power-On Self Test (POST). A series of diagnostic tests that are run automatically by a device when the power to that device is turned on.

power receptacle. The mounted female electrical fitting that contains the live parts of the circuit.

power switch. Located on the back of the tape library, a toggle switch that lets you turn the power to the library on or off.

Protocol Data Unit (PDU). Messages sent over a network.

push buttons. Located below the operator panel of the tape library, 4 buttons that, when pressed, let you interact with the menus on the operator panel.

put. Pertaining to the tape library, to place, by means of a robotic device, a tape cartridge into a storage slot or drive.

R

rack. A unit that houses the components of a storage subsystem, such as the tape library.

rackmount kit. A packaged collection of articles used to install the rack-mounted version of the tape library.

read. To acquire or interpret data from a storage device, from a data medium, or from another source.

reinitialize. To reformat a magnetic tape, write a label (VOLSER) on the tape, and leave the tape empty except for the system files containing the structure information. All former contents of the tape are lost.

relative humidity. The ratio of the amount of water vapor actually present in the air to the greatest amount possible at the same temperature.

Remote Management Unit (RMU). Device that allows user access to the library using a web browser.

remove. Pertaining to the tape library, to take a tape cartridge from a cartridge storage slot.

retention screws. Pertaining to the connector on a cable, two screws on either side of the connector that secure it to its mating connector.

RMU. Remote Management Unit

robotics. The picker and any associated mechanisms that move a tape cartridge within the tape library.

S

SAC. Service Action Code

SAN. Storage area network

scratch cartridge. A data cartridge that contains no useful data, but can be written to with new data.

SCSI. Small computer systems interface.

SCSI-2. Small computer systems interface-2.

SCSI bus. (1) A collection of wires through which data is transmitted from one part of a computer to another. (2) A generic term that refers to the complete set of signals that define the activity of the Small Computer Systems Interface (SCSI).

SCSI bus cable. See *SCSI bus*.

SCSI cable. See *SCSI bus*.

SCSI commands. An operation performed by a target (tape drive) for an initiator (host). The command is initiated by the operator from the host console.

SCSI connector. One of the set of all female and male connectors on the SCSI bus.

SCSI device. Anything that can connect into the SCSI bus and actively participate in bus activity.

SCSI host adapter card. The logic card that connects a host (server) to the SCSI bus cable. Synonymous with *SCSI controller*.

SCSI ID. The hexadecimal representation of the unique address (0–F) which a user assigns to the tape library and which is used in SCSI protocols to identify or

select the drive. The user normally assigns and sets the SCSI ID when installing the drive.

SCSI wrap tool. A device that attaches to the SCSI connector on the tape library and enables internal tests on the SCSI interface.

seat, seated. (1) To fit to. (2) To ensure that one object is fitted to another object.

sequential access. An access technique for retrieving or storing data in which the data is read from, written to, or removed from a file based on the logical order (sequence) of the data in the file. When the tape library operates in sequential access mode, its firmware (not the server's application software) manages the cartridges (and thus the data).

server. A functional unit that provides services to one or more clients over a network. Examples include a file server, a print server, and a mail server. The pSeries, iSeries, HP, and Sun are servers. Synonymous with *host*.

ship group. The group of supplies, cords, or documentation that is shipped with the tape library.

shipping environment. The temperature, relative humidity rate, and wet bulb temperature of the environment to which the tape library is exposed when being transferred from one location to another.

Simple Network Management Protocol (SNMP). An agreed-upon format for managing complex networks. SNMP works by sending messages, called protocol data units (PDUs), to different parts of a network. SNMP-compliant devices, called agents, store data about themselves in Management Information Bases (MIBs) and return this data to the SNMP requesters.

sled. Pertaining to a tape library, the enclosure that contains the tape drive.

Small Computer Systems Interface (SCSI). A standard used by computer manufacturers for attaching peripheral devices (such as tape drives, hard disks, CD-ROM players, printers, and scanners) to computers (servers). Pronounced "scuzzy". Variations of the SCSI provide for faster data transmission rates than standard serial and parallel ports (up to 160 MB per second). The variations include:

- Fast/Wide SCSI: Uses a 16-bit bus, and supports data rates of up to 20 MBps.
- SCSI-1: Uses an 8-bit bus, and supports data rates of 4 MBps.
- SCSI-2: Same as SCSI-1, but uses a 50-pin connector instead of a 25-pin connector, and supports multiple devices.
- Ultra SCSI: Uses an 8- or 16-bit bus, and supports data rates of 20 or 40 MBps.

- **Ultra2 SCSI:** Uses an 8- or 16-bit bus and supports data rates of 40 or 80 MBps.
- **Ultra3 SCSI:** Uses a 16-bit bus and supports data rates of 80 or 160 MBps.

Small Computer Systems Interface-2 (SCSI-2). See *Small Computer Systems Interface (SCSI)*.

SNMP. Simple Network Management Protocol.

Storage Area Network (SAN). High-speed, open-standard scalable network of storage devices and servers providing accelerated data access.

storage environment. The temperature, relative humidity rate, and wet bulb temperature of the environment in which the tape library is nonoperational and being kept for future use.

storage slot. See *cartridge storage slot*.

T

TapeAlert. A patented technology from Hewlett-Packard that monitors the status of a tape device and media, and detects problems as they occur.

TapeAlert flags. Status and error messages that are generated by the TapeAlert utility and display on the host console. The messages indicate the type of problem and tell how to resolve it.

tape cartridge. A removable storage device that consists of a housing containing a belt-driven magnetic tape wound on a supply reel and a takeup reel.

tape drive. See *IBM Ultrium Tape Drive*.

TB. Terabyte.

teach. A process where the bar code scanner reads the fiducial labels to identify the types of storage and tape drives installed in the library.

terminate, termination. To prevent unwanted electrical signal reflections by applying a device (a terminator) that absorbs the energy from the transmission line.

terminator. (1) A part used to end a SCSI bus. (2) A single-port, 75- Ω device that is used to absorb energy from a transmission line. Terminators prevent energy from reflecting back into a cable plant by absorbing the radio frequency signals. A terminator is usually shielded, which prevents unwanted signals from entering or valid signals from leaving the cable system.

terabyte (TB). 1 000 000 000 000 bytes.

toggle. To alternate between two states.

track. A linear or angled pattern of data written on a tape surface.

transfer rate. See *data transfer rate*.

trap. An unprogrammed conditional jump to a specified address that is automatically activated by hardware.

U

Ultra SCSI. See *Small Computer Systems Interface (SCSI)*.

Ultra2 SCSI. See *Small Computer Systems Interface (SCSI)*.

Ultrium Tape Drive. See *IBM Ultrium Tape Drive*.

unattended backup. The act of copying files without operator assistance.

uniform resource locator (URL). The address of an item on the World Wide Web. It includes the protocol followed by the fully qualified domain name (sometimes called the host name) and the request. The web server typically maps the request portion of the URL to a path and file name. For example, if the URL is `http://www.networking.ibm.com/nsg/nsgmain.htm`, the protocol is `http`; the fully qualified domain name is `www.networking.ibm.com`; and the request is `/nsg/nsgmain.htm`.

unload. Pertaining to the tape library, the act (performed by the tape drive) of rewinding the tape into the cartridge and ejecting it from the drive and the act (performed by the picker) of transferring the cartridge to a cartridge storage slot.

URL. Uniform resource locator.

V

V dc. Volts of direct current.

VOLSER. Volume serial number.

volume serial number (VOLSER). A number that a computer assigns to a tape cartridge when it prepares (initializes) the cartridge for use.

volt. The SI (international) unit of potential difference and electromotive force, formally defined to be the difference of electric potential between two points of a conductor carrying a constant current of one ampere, when the power dissipated between these points is equal to one watt.

voltage. The electric potential or potential difference expressed in volts.

W

W. Watts.

watt. A metric unit of measure of power; the power required to keep a current of one ampere flowing under a potential drop of one volt; about 1/736 of one horsepower.

Web. See *World Wide Web*.

wet bulb temperature. The temperature at which pure water must be evaporated adiabatically at constant pressure into a given sample of air in order to saturate the air under steady-state conditions. Read from a wet-bulb thermometer.

World Wide Web. A network of servers that contain programs and files. Many of the files contain hypertext links to other documents available through the network.

write. To make a permanent or transient recording of data in a storage device or on a data medium.

write protected. A tape volume is write protected if some logical or physical mechanism causes the device processing the tape volume to prevent the program from writing on the volume.

write-protect switch. Located on the LTO Ultrium tape cartridge, a switch that prevents accidental erasure of data. Pictures of a locked and unlocked padlock appear on the switch. When you slide the switch to the locked padlock, data cannot be written to the tape. When you slide the switch to the unlocked padlock, data can be written to the tape.

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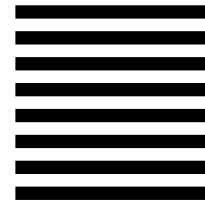
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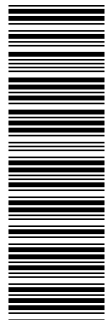
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