HP SureStore DLT Autoloader Models 418 & 718

Service Manual

Edition 1

Part Number C6280-90031

July, 1998

Printed in: Greeley, CO USA

Notice

See Appendix C for important safety and regulatory information.

Printing History

New editions of this manual incorporate all material updated since the previous edition. The manual printing date and part number indicate the current edition. The printing date changes when a new edition is printed. (Minor corrections and updates incorporated at reprint do not change this date.)

Edition 1: July 1998: Initial printing

Typographical Conventions

The following typographical conventions are used in this manual:

Italic font: Denotes important information.

Keycap : Buttons on the Autoloader.

`Computer Output`: Information displayed in the display window and screen menu items that you can select.

`Menu Path`: Series of menus that you need to enter to access the menu currently being described.

WARNING **Warnings call attention to a procedure or practice that could result in personal injury if not correctly performed. Do not proceed until you fully understand and meet the required conditions.**

CAUTION Cautions call attention to an operating procedure or practice that could damage the product if not correctly performed. Do not proceed until understanding and meeting these required conditions.

NOTE Notes provide information that can be helpful in understanding the operation of the product.

In This Manual

In this manual, the following areas are described:

Chapter 1	Getting Started: Describes how to install, connect, power on, and move the Autoloader.
Chapter 2	Theory of Operation: Describes the product design, firmware, and electronic connections.
Chapter 3	Operating the Autoloader: Describes how to load tapes, operate the control panel, set administrative options, run internal tests, and configure the Autoloader.
Chapter 4	Troubleshooting: Describes how to troubleshoot, understand error messages, and remove and replace parts.
Appendix A	Installing an Autoloader Into a Non-HP Rack: Describes how to install the Autoloader into a non-HP rack.
Appendix B	Support and Service: Describes the support and service strategy.
Appendix C	Safety and Regulatory: Describes safety and regulatory information for the Autoloader.

Contents

Contents

Contents

Contents

Figures

Figures

Tables

Tables

1 Getting Started

Chapter Overview

This chapter explains the following:

- Identifying product components
- Understanding technical specifications
- Choosing a location
- Installing the Autoloader
- Connecting the Autoloader
- Installing the SCSI bus adapter
- Powering on the system
- Moving or shipping the Autoloader

Product Components

Table 1-1 describes the parts that are needed with the Autoloader.

Table 1-1 **Required Components**

Product Name	Description	Part Number
Autoloader	Models 418 or 718 singled-ended DLT drive Autoloader with six tape storage slots in a removable magazine and two internal storage slots.	418: C6280F 718: C6280J
SCSI cables	Cable length is 2.5 meters.	C6282-61606
SCSI card	Adaptec SCSI adapter card.	C5172-82700
SCSI terminator	Included in the accessories kit.	5183-2408
Jumper cable	Connects the drive and SCSI controller board and is included in the accessories kit.	C6282-61600
Power cord	Localized power cord included in the accessories kit.	US: 8120-6812 Europe: 8120-6811 UK: 8120-6809 Australia: 8120-6810 Swiss: 8120-6815 Denmark: 8120-6814 Japan: 8120-4754 S. Africa: 8120-6813
Rackmount kit	Used with rackmounted Autoloaders.	Kit for HP rack: C6287-67901 Kit for non-HP rack: C6287-67910
Data cartridges	Five type IV tape cartridges included with the Autoloader.	C5141-85701
Cleaning cartridge	Included with the Autoloader.	C5142-85700

Table 1-2 describes the additional components provided for installation and operation.

Table 1-2 Additional Components Provided

Product Name	Description	Part Number
Installation poster	Included with the rackmount and accessories kit.	For HP racks: C6280-90005 For non-HP racks:C6280-90007
Template	Included with the rackmount kit and used for clipnut placement in a rack.	For HP racks: C6287-90001/90002 For non-HP racks: C6282-90003
Live trial software	One shrink-wrapped package included in the accessories kit.	418: C6280-67920 718: C6280-67922
CDROM	Localized user’s guide on CDROM.	C6280-90401

Technical Specifications

This section contains information about the following:

- Physical specifications
- Autoloader/Drive characteristics
- Environmental specifications

Physical Specifications

Table 1-3 details the physical specifications of the Autoloader.

Table 1-3 **Physical Specifications of the Autoloader**

Description	Autoloader
Height	7.35 inches (187 mm)
Width	8.9 inches (226 mm)
Depth	22.0 inches (559 mm)
Weight	41 lbs. (18.6 kg)
Interface	SCSI-2 68-pin single-ended wide connector

Autoloader/Drive Specifications

Table 1-4 details the performance of the Autoloader and Drive.

Table 1-4 Autoloader/Drive Characteristics

Description	418 Performance	718 Performance
Autoloader characteristics		
Average tape access time	11 seconds	11 seconds
Average tape exchange time	22 seconds	22 seconds
Drive characteristics		
Sustained transfer rate	1.5 MB/s (3.0 MB/s with data compression, software dependent)	5 MB/s (10 MB/s with data compression, assuming 2/1 compression)
Peak transfer rate	10 MB/s	10 MB/s
Average access time	68 seconds	60 seconds
Tape load time	48 seconds	37 seconds
Tape unload time	17 seconds	17 seconds
Repositioning time	1.3 seconds	1.3 seconds
Hard error rate	1 x 10^{17} bytes read	1 x 10^{17} bytes read
Undetected error rate	1 x 10^{30} bytes read	1 x 10^{27} bytes read
Reliability	80,000 hours MTBF (mean time between failures)	200,000 hours MTBF (mean time between failures)

NOTE The operating system and applications impact data transfer rates.

Environmental Specifications

Table 1-5 Environmental Specifications

Characteristic	Autoloader
Temperature	
Operating	10° to 40°C
Non-operating	-40° to 66° C
Operating wet-bulb temperature	25°C max
Non-operating wet-bulb temperature	46°C max
Gradient	10°C per hour
Humidity	
Operating	20% to 80% RH
Non-operating	10% to 95% RH
Shock	
Non-operating trapezoidal	28 g/ 253 in/s
Vibration (5 500 Hz)	
Operating	0.21 g rms (random)
Non-operating	2.1 g rms (random)
Non-operating	0.5 g (0 to peak, swept-sine wave)
Product certification	
Safety	UL 1950, CSA 950, TUV IEC 950
Emissions	FCC Class “B” CISPR 22, Class “B”

Installation Overview

Before installing the Autoloader, make sure you have the components listed in Table 1-1 on page 1-3 and Table 1-2 on page 1-4.

Installing the Autoloader requires:

1. Choosing a suitable location.
2. Mounting the Autoloader in a rack (rackmount configuration only).
3. Connecting the Autoloader.
4. Powering on the system.

NOTE These steps are explained in this chapter.

Choosing a Location

Choose a location that meets the following criteria:

Table 1-6 Location Criteria

Room temperature	50–104° F (10–40° C)
Power source	AC power voltage: 100–127V or 200–240V Auto Ranging Current Rating: 100–127V, 1.8A, 50/60 HZ, 220–240V, .9A, 50/60 HZ Auto Ranging Maximum Watts: 100 Watts, 100-127V (60 HZ) Maximum Watts: 90 Watts, 200-240V (50 HZ)
Air quality	Minimal particulate contamination. Avoid areas near frequently used doors and walkways, stacks of supplies that collect dust, smoke-filled rooms, large or high-speed printers. Do not use filters. *Caution*: Excessive dust and debris can damage the tapes and tape drive.
Adequate clearance	Desktop configuration—free standing: • Back 6 inches/ 15 cm • Front 8 inches/ 20 cm • Sides 1 inch/ 2.5 cm Rackmount configuration—requires 5 EIA units in a rack (1 EIA = 1.75 inches or 4.5 cm)

Mounting the Autoloader in a Rack

For instructions on installing the Autoloader into a non-HP rack, see Appendix A.

Tools and Components

Before you begin, make sure you have the following:

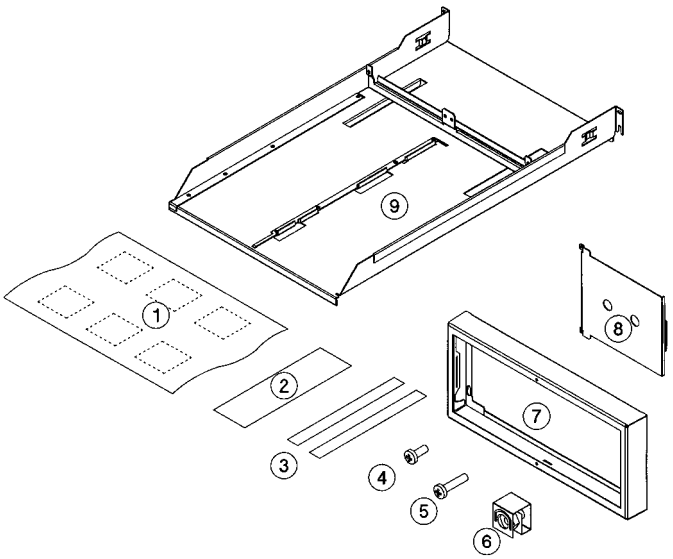
Tools:
#2 Phillips screwdriver

Rack Kit Components (parts are labeled for easy identification):

1. Instruction poster (Qty 1)
2. Template (Qty 2)
3. Cable ties (Qty 4)
4. M4 x 10 mm pan phillips (Qty 6)
5. 10-32 x 5/8 pan phillips (Qty 10)
6. 10-32 clipnuts (Qty 10)
7. Support bezel (Qty 1)
8. Filler panel (Qty 1)
9. Shelf (Qty 1)

NOTE The rack kit may contain extra parts.

Figure 1-1 **Rack Kit Parts**



Mounting the Autoloader

1. Facing the front of the rack and using the template as a guide, install four clipnuts (two in each rail) above any existing products (Figure 1-2).

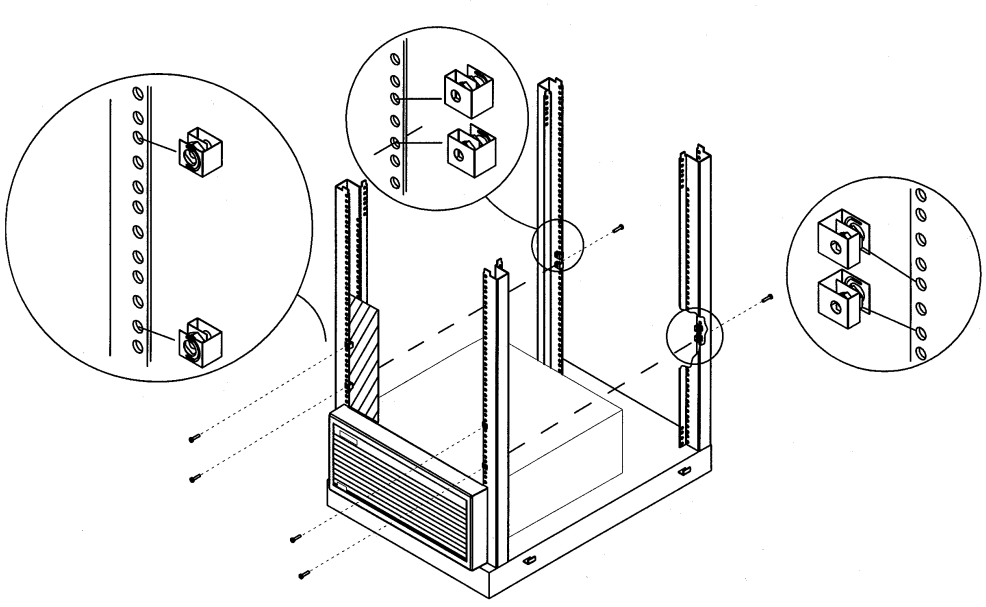
TIP For a level shelf, ensure that the screws are in the same position on the right and left rail.

NOTE Your rack might look different from the illustrations.

2. Using the template as a guide, install two clipnuts into each back rail of the rack. The back lower clipnuts should be located in the same position as the lower clipnuts in the front of the rack (Figure 1-2).
3. Using six 10-32 screws (four in the front and two in the back lower clipnuts), start a screw into each clipnut and turn 2-3 times.

NOTE If you are installing the unit at the top of the rack, do not install screws into the front rails at this time. Instead, proceed to the next step.

Figure 1-2 Clipnut and Screw Installation



4. Position the holes on the support bezel over the screws on the clipnut, and slide downward, securing the bezel into place (Figure 1-3). If you are installing the Autoloader flushed to the top of the rack, hold the bezel in place, then install the screws (Figure 1-4). Tighten all screws when complete.

Figure 1-3 Installation With Space Above Bezel

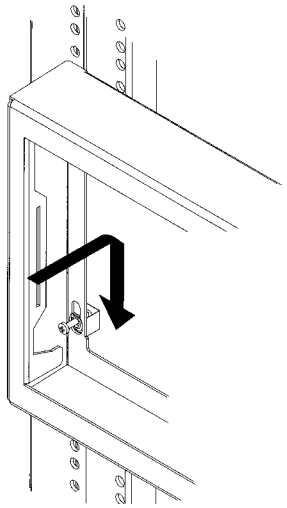
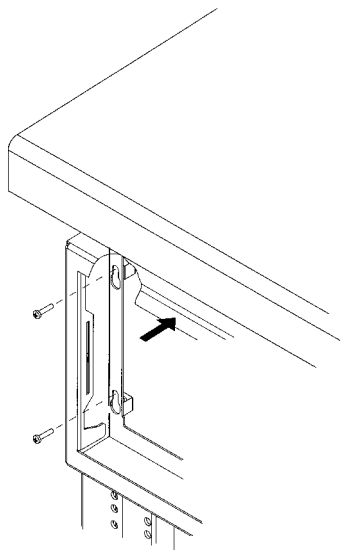


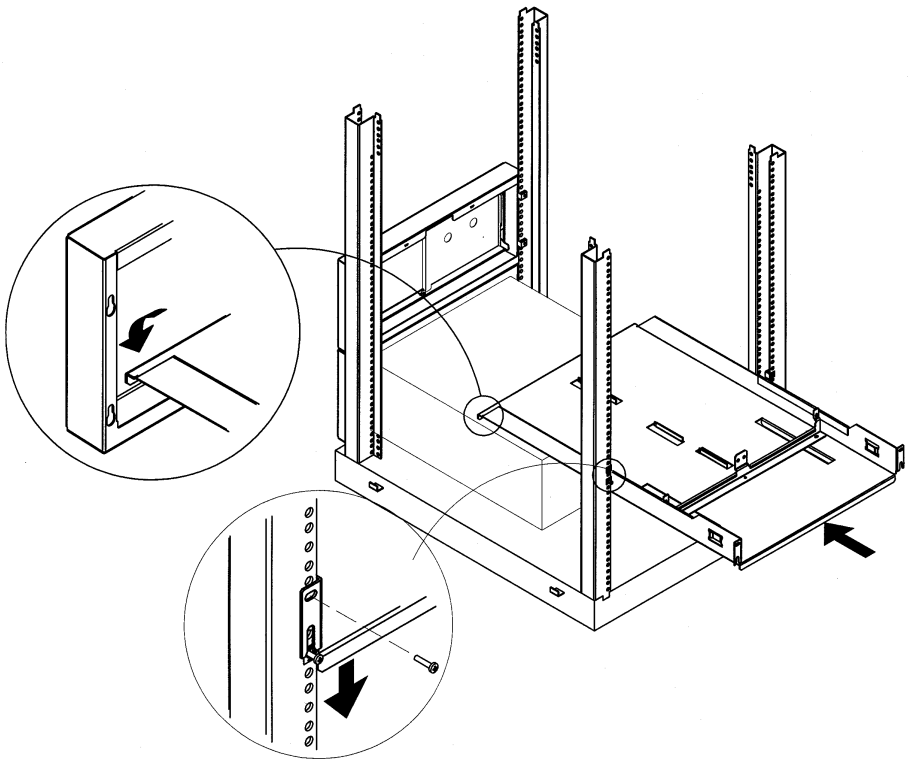
Figure 1-4 Installation Without Space Above Bezel



5. Slide the shelf through the back of the rack until the front lip is over the back edge of the bezel and the rear portion of the shelf slides over the back screws (Figure 1-5).
   a. Lower the shelf into place, and tighten the screws in the bottom clipnuts.
   b. Insert and tighten two additional screws into the top clipnuts to secure the shelf.

NOTE Have a second person stand at the front of the rack to help guide the front lip of the shelf between the slots on the bezel.

Figure 1-5 Shelf Installation



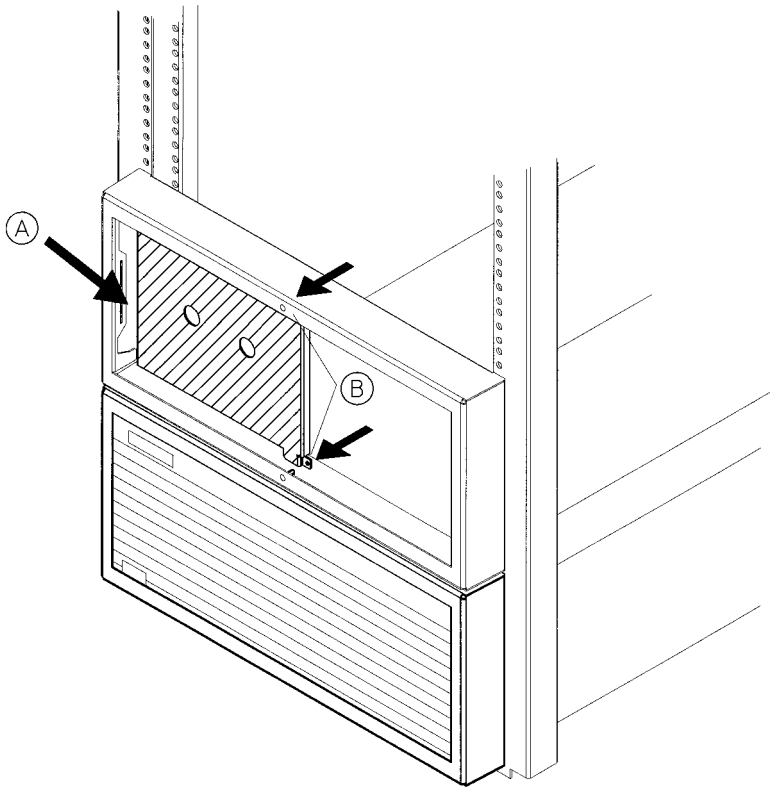
CAUTION Ensure that installation in your rack cabinet does not create an unstable condition.

6. Decide on the location for the Autoloader. The filler panel will be installed on the other side if you are only installing one unit (Figure 1-6).

   a. Reach inside the bezel and insert the filler panel into the side slot on the bezel.

   b. Pull the filler panel forward to the inside edge of the bezel until it snaps into position.

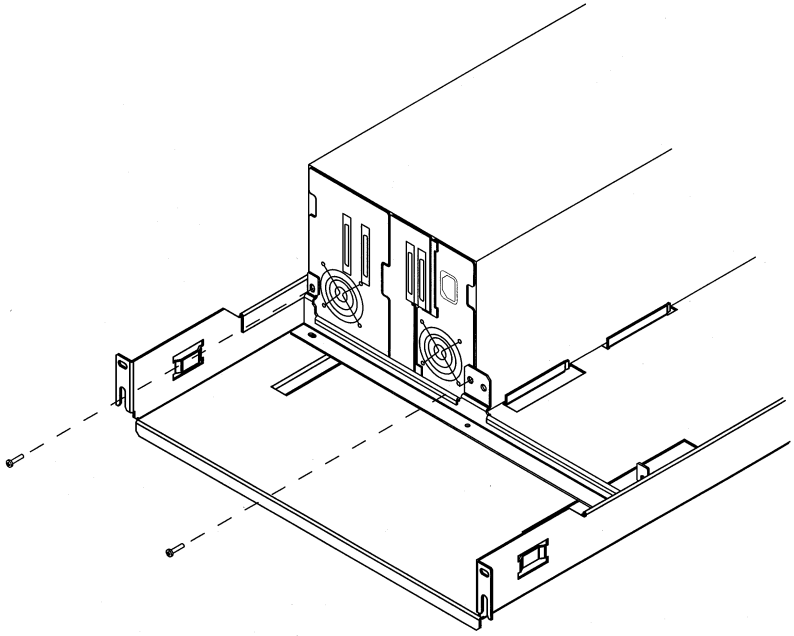
Figure 1-6 Filler Panel Installation



7. Remove the cover and feet on the Autoloader. See “Removing the Cover and Feet” on page 1-17.
8. From the front of the rack, slide the Autoloader onto the shelf until it rests firmly against the support bracket.
9. Secure the unit by installing two M4x10 mm screws through the support bracket and into the rear panel (Figure 1-7).
10. After connecting the external cables, secure the cables to the side of the rack by following the steps in “Cable Management” on page 1-16.

NOTE Save remaining screws for a possible second Autoloader installation.

Figure 1-7 Securing the Autoloader



CAUTION Be certain that the ambient of the rack cabinet does not exceed the maximum room ambient of 104^{o}F or 40C.

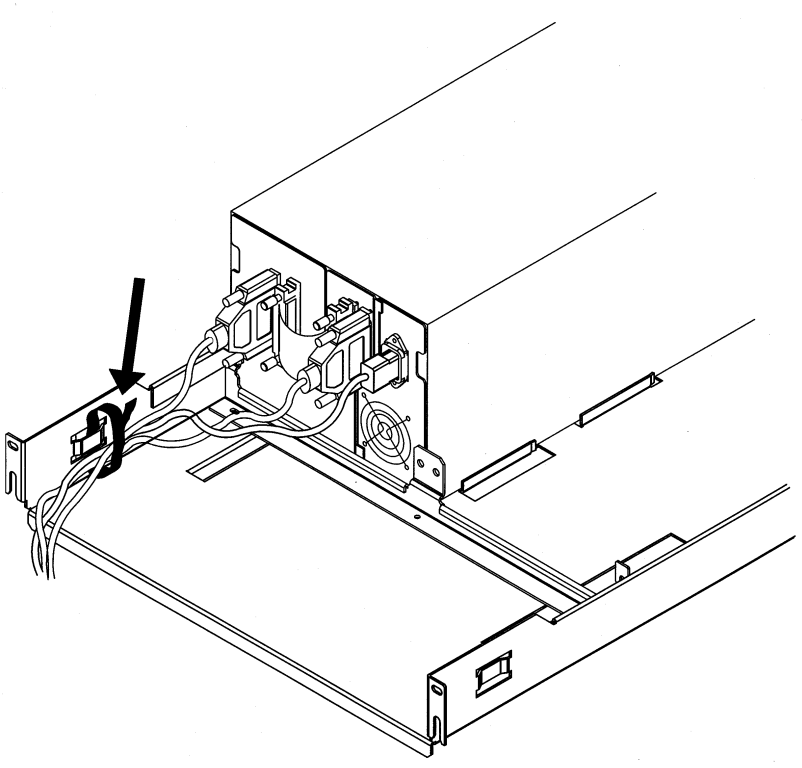
Cable Management

CAUTION

Ensure that the SCSI and power cables are properly routed and secured on rackmounted Autoloaders so that they do not interfere with other moveable rackmounted products. Failure to properly route cables could damage them.

1. After connecting external cables described in “Connecting the Autoloader” on page 1-18, thread one cable tie through the cable tie mount on the shelf (Figure 1-8).
2. Gently pull the cables toward the cable tie to secure them to the back of the shelf.
3. Route the cables through the rack so that they do not interfere with other rackmounted products.

Figure 1-8 Cable Management



Removing the Cover and Feet

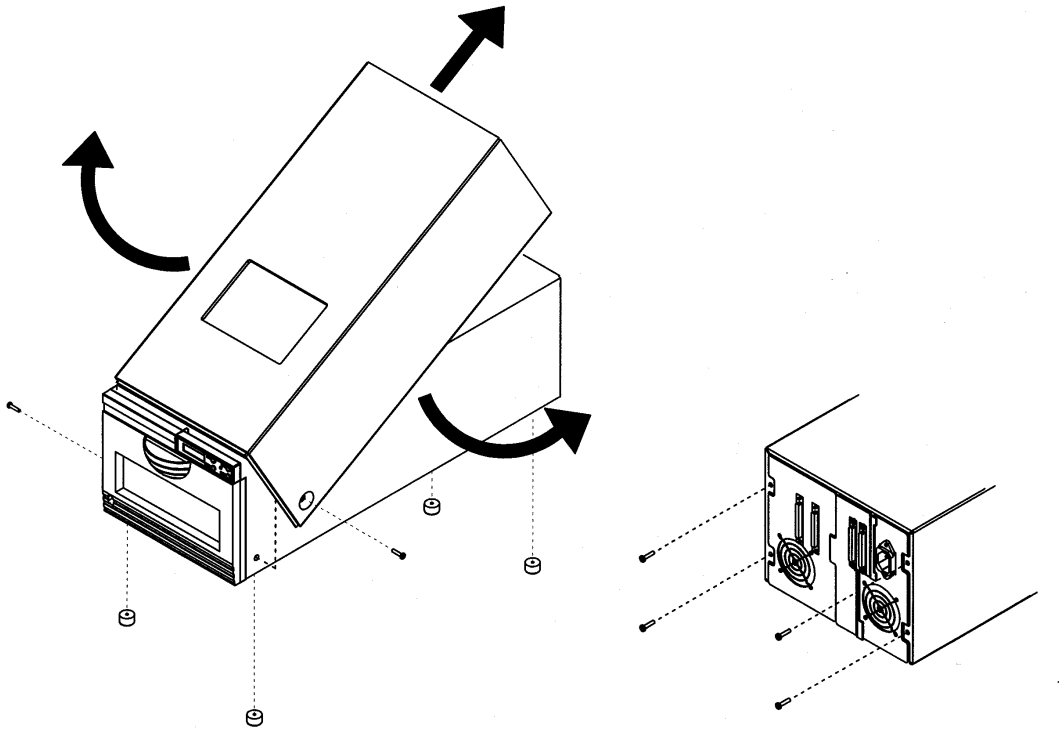
1. Remove the four screws on the back of the cover and the two screws on the side of the cover (Figure 1-9).
2. Remove the cover by pulling the sides of the cover out and lifting it up.

NOTE

The cover may fit tightly near the control panel. If the cover is not easily removed, pull the sides out near the control panel while lifting up on the back end of the cover.

3. Unscrew and remove the four feet. You may lay the unit on its side to remove the feet.

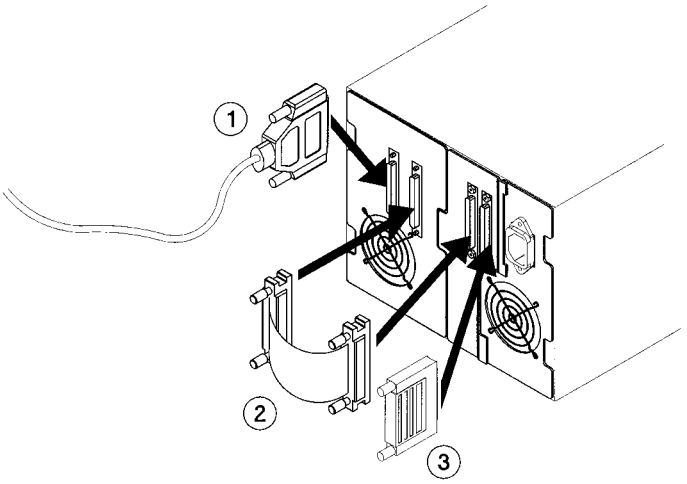
Figure 1-9 **Removing the Cover and Feet**



Connecting the Autoloader

Autoloader Rear Panel

Figure 1-10 **Rear Panel Features**



1	SCSI cable connector to host SCSI port
2	SCSI jumper cable
3	SCSI terminator

The Autoloader can be connected to the host system in one of two configurations:

Standard configuration: Connects the drive and the Autoloader with an external jumper cable on one SCSI bus, as shown in Figure 1-10.

Advanced configuration: Connects the drive and autoloader controller to the host using separate SCSI buses.

NOTE The advanced configuration requires an additional terminator that is not provided.

Cable Connections

1. Properly shut down all peripheral devices connected to the host computer.

   If the host computer is connected to a network, check with the system administrator before switching off power.

2. Shut down the host.

   If the host does not have a 68-pin, single-ended SCSI port available, install a SCSI bus adapter. See “Installing the SCSI Bus Adapter” on page 1-22 for more information.

3. Connect the long SCSI cable from the Autoloader to the host.

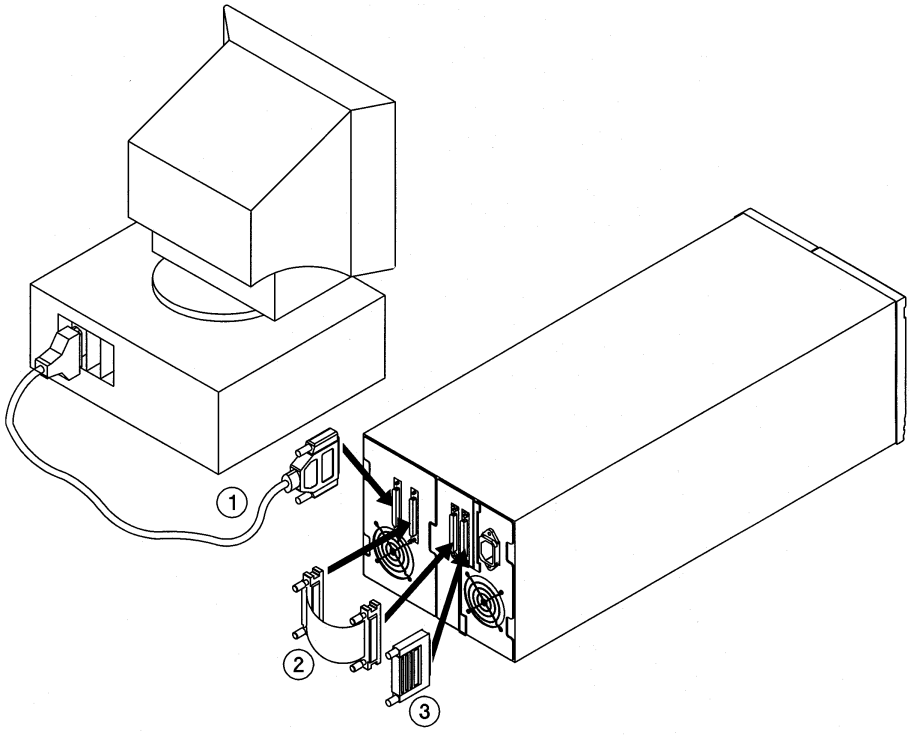
NOTE For maximum performance, do not connect to the same SCSI bus as the hard drive or another tape drive.

4. For a standard configuration, connect the SCSI jumper cable to the two inside connectors on the Autoloader or connect a second SCSI cable from the second SCSI bus adapter to the Autoloader.
5. Install the SCSI terminator as shown in Figure 1-11 on page 1-20 or Figure 1-12 on page 1-21.

NOTE If your host does not support single-ended devices, and you are connecting the Autoloader to a differential host, you must use a single-ended to wide differential converter, such as HP part number C4316A converter. To install, connect a wide SCSI cable from the host differential SCSI port to the differential fast/wide input of the converter. Connect the single-ended output of the converter to the Autoloader.

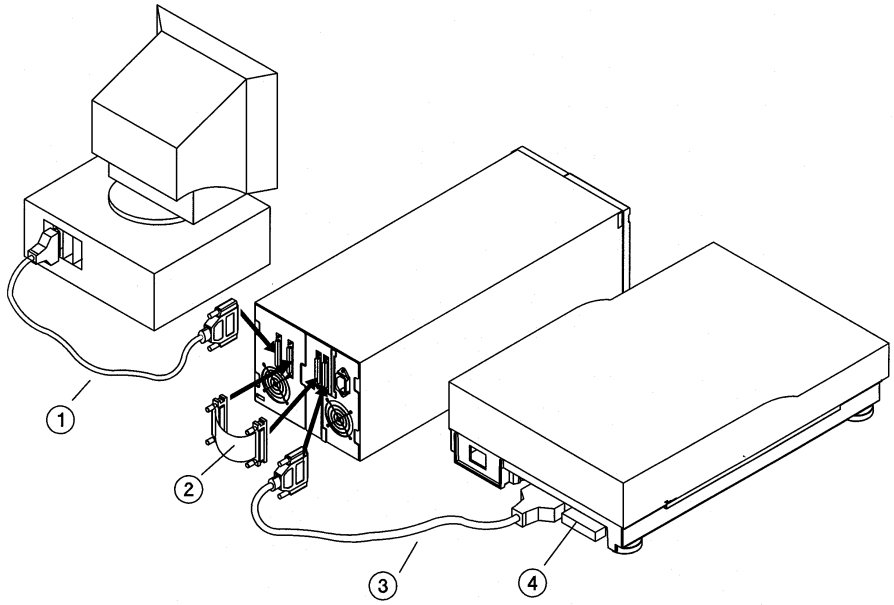
Any converter used must be fully SCSI compliant.

Figure 1-11 Autoloader as the Only Peripheral



1	SCSI cable to host SCSI port
2	SCSI jumper cable
3	SCSI single-ended terminator

Figure 1-12 Autoloader with Other Peripherals



1	SCSI cable to host SCSI port
2	SCSI jumper cable
3	SCSI cable to SCSI port
4	SCSI single-ended terminator

6. Connect the socket end of the power cord into the power port on the autoloader rear panel.
7. If you are mounting the unit in a rack, secure the cables to the side of the rack by following the steps in “Cable Management” on page 1-16.
8. To power on the unit, refer to “Powering on the System” on page 1-23.

Installing the SCSI Bus Adapter

Refer to the host computer user's manual and the card installation instructions for information on installing the SCSI bus adapter.

Follow these guidelines:

- Make sure that the host has a PCI expansion slot available.
- Power off the host before installation.
- For maximum performance, do not connect other peripherals to the same SCSI bus as the hard drive.
- If you are using a SCSI bus adapter other than the one provided, ensure that it is 68-pin single-ended.

Powering on the System

CAUTION To disconnect primary power, pull the power cord from the wall receptacle. The switch on the front of the unit shuts down secondary circuits only.

CAUTION Make certain that reliable earth grounding of the rackmounted equipment and the power tap is maintained.

CAUTION Be certain that the total current of the rack components does not exceed the current rating of the power tap or outlet receptacle.

1. Connect the power cord into a grounded outlet.
2. Using a pencil eraser or similar tool, power on by pushing the power switch, located on the bottom of the front access door.

   Initially the messages `NOT READY/SELF TEST`, `NOT READY/INVENTORY CHECK`, and `NOT READY/CHECK DRIVE` will alternately display on the control panel. After the power-on test completes (approximately 30 seconds), the drive status information appears in the display window.

NOTE If you have problems powering on the unit see “Troubleshooting” on page 4-26.

3. Turn on any other peripherals.
4. Turn on the host.

Moving or Shipping the Autoloader

Moving the Autoloader

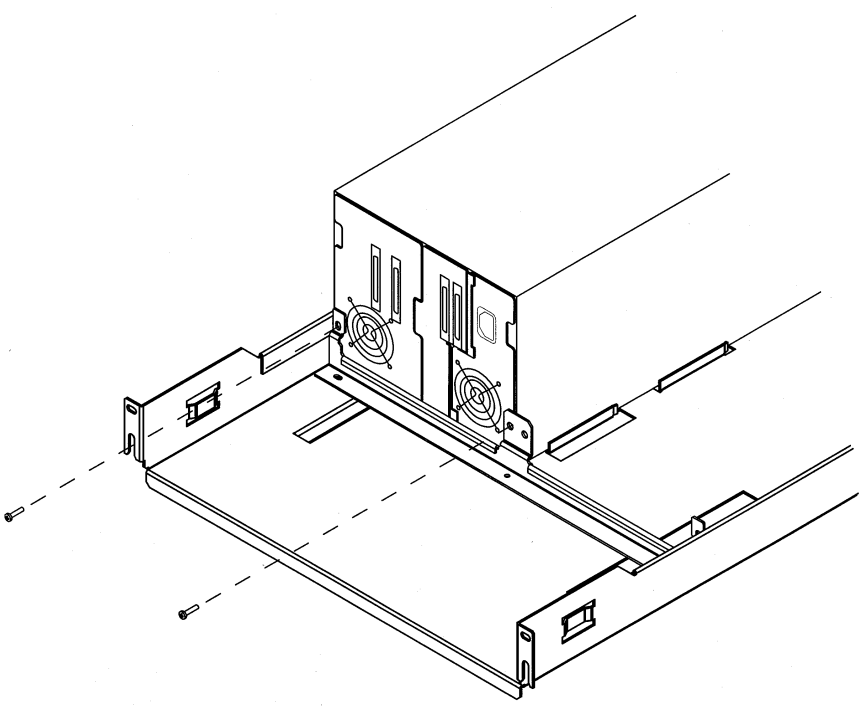
1. Verify that a tape is not in the drive.
   - If the drive contains a tape, unload it before moving the Autoloader. Refer to the backup software documentation, or use the UNLOAD menu option (see "Top-Level Menu Options" on page 3-10).
2. Shut down the host if necessary.

CAUTION Notify the system administrator before shutting down the host.

3. Remove the power cord and the host SCSI cable from the autoloader rear panel.
   - If the Autoloader is a desktop unit, place it onto a cart and wheel it to its new location. Go to step 5.
   - If the Autoloader is rackmounted, follow these steps:
     a. Remove the two screws that secure the back of the Autoloader to the shelf (Figure 1-13).
     b. Remove the filler panel (if necessary), and slide the Autoloader out of the rack.
     c. Move the Autoloader to its new destination.
4. Reinstall the Autoloader into the rack using the instructions in "Mounting the Autoloader" on page 1-11.

NOTE You will need the rack kit equipment to reinstall the unit into another rack (Figure 1-1 on page 1-10).

Figure 1-13 Unbolting the Autoloader



5. Reconnect the power cord and SCSI cables. See “Connecting the Autoloader” on page 1-18.

Shipping the Autoloader

1. Verify that a tape is not in the drive.
   - If the drive contains a tape, unload it before moving the Autoloader. Refer to the backup software documentation, or use the UNLOAD menu option. See "Top-Level Menu Options" on page 3-10.
2. Remove all tape cartridges from the magazine and internal slots, and return the magazine to the Autoloader.
3. Shut down the host if necessary.

CAUTION Notify the system administrator before shutting down the host.

4. Remove the power cord and the host SCSI cable from the rear panel.
   - If the Autoloader is a desktop unit, go to step 5.
   - If the Autoloader is rackmounted, follow these steps:
     a. Remove the two screws that attach the Autoloader to the shelf (Figure 1-13 on page 1-25).
     b. Remove the filler panel (if necessary), and slide the Autoloader out of a rack.

NOTE You will need the rack kit equipment to reinstall the unit into another rack (Figure 1-1 on page 1-10).

5. Repackage the Autoloader in the original packing materials. If you no longer have original packaging, contact your service representative for packaging materials.

CAUTION The Autoloader can be seriously damaged if it is not shipped using appropriate shipping materials.

2 Theory of Operation

Chapter Overview

In this chapter, we will describe the following:

- Autoloader design
- Autoloader components
- Control panel
- Back panel
- Reliability
- Stacker and Autoloader functionality
- Firmware interaction
- Electronic connections

Design Overview

The DLT Autoloader is designed for automated backup of servers or systems requiring maximum data backups up to 160 Gbytes native capacity or 320 Gbytes compressed capacity for the Model 418 Autoloader and 280 Gbytes native capacity or 560 Gbytes compressed for the 718 Autoloader. The Autoloader comes with one DLT drive with a single-ended SCSI interface and eight storage slots for tape cartridges. Six of these slots are in a removable magazine and two are in fixed slots to the rear of the transport, which are accessible by removing the magazine. These internal slots are not intended for primary storage.

Desktop Design

The desktop unit is 7.75 inches high x 8.87 inches wide x 22.0 inches deep, and includes a cosmetic enclosure that covers the top and sides of the unit. There are also four black plastic feet, which are used to protect the desktop surfaces. These feet are installed with Phillips screws. The top of the unit has a viewing window that is 3.0 inches x 4.25 inches.

Rackmount Design

The autoloader is rackmountable. The rackmount design requires 5 Electronic Industries Association (EIA) standard units and is designed so that two Autoloaders can be positioned side-by-side in a rack.

NOTE 1 EIA unit = 1.75 inches

Autoloader Components

Door

The door opens to allow access to the magazine. This door is locked by a solenoid during normal operation and unlocked either from a control panel menu selection or by holding the **CANCEL** button five seconds. The door can also be opened when the unit is powered down.

NOTE If a security feature is enabled, you may not be able to release the door.

Shelf

The shelf supports the Autoloader when it is rackmounted and comes with the rackmount kit. The shelf in the non-HP rack kit provides incremental rack configuration flexibility to accommodate many rack sizes while the shelf in the HP rack kit is a fixed size.

Bezel

The bezel holds up the front of the shelf when the Autoloader is rackmounted. The bezel comes with the rackmount kit.

Cosmetic Covering

The cosmetic covering protects the Autoloader during operation and shipment and should be removed for rackmounting.

Standby (Power) Switch

The standby (power) switch is recessed behind a hole in the bottom left-hand corner of the door. You can access this switch with a pencil eraser or when the door is open. When open, a sheetmetal guard by the switch prevents accidental switching during magazine insertion or removal. This switch turns off power to the drive, fans, autoloader controller board, and display. See Figure 2-2 on page 2-10 for more information.

CAUTION Power is not turned off to the transport controller and the transport.

Removable Magazine

The magazine holds six tapes that are held in place with a latching mechanism. Pushing the tape in causes the mechanism to latch and lock the tape in place. A second push on the tape releases the tape. The magazine also has a handle for carrying. The tape slots are numbered from left to right (1-6). There are two spaces on the magazine for labels: one .4 inch x 1.9 inch (10 mm x 49 mm) on the front of the magazine and one on the handle that is 2.2 inch x .8 inch (56 mm x 21 mm) to hold an adhesive-backed label

Control Panel Display

The control panel display is a backlit LCD display with two lines of 16 characters per line. The panel has four buttons labeled **NEXT**, **PREV**, **CANCEL**, and **ENTER** (see “Autoloader Control Panel” on page 3-7).

There is a status LED in the center of the group of four buttons that indicates the following:

- Steady Green: Power on
- Flashing Green: Drive activity
- Amber: Device Failed (see “Understanding Error Messages” on page 4-5 or “Troubleshooting” on page 4-26)

The two-line display enables the current menu title to be shown while the user scrolls through the next level of menu choices. See “Autoloader Display Menu Tree” on page 3-13.

Back Panel

The back panel has the following features:

- Four fast/wide SCSI connectors, 68-pin high density: two for the drive and two for the autoloader controller. A short external SCSI jumper cable is included to connect the drive and the controller on a single line.
- One power connector socket. Refer to Table 1-6 on page 1-9 for more information on power requirements.
- Two fans: one to cool the drive and one to cool the power supply.
- Three subassemblies:

  Drive with its alignment bracket, fan, and SCSI cable connections

  SCSI Interface board with its rear faceplate and SCSI connectors

  Power supply

Reliability

Part	Probable Life Span
Autoloader MSBF	200,000 Swaps
Magazine life	45,000 Swaps
Tape cartridge	10,000 Swaps
Drive	50,000 Load/Unload Cycles

Stacker and Autoloader Functionality

The Autoloader has three modes of operation. See “Password-Protected Functions” on page 3-12 for more information.

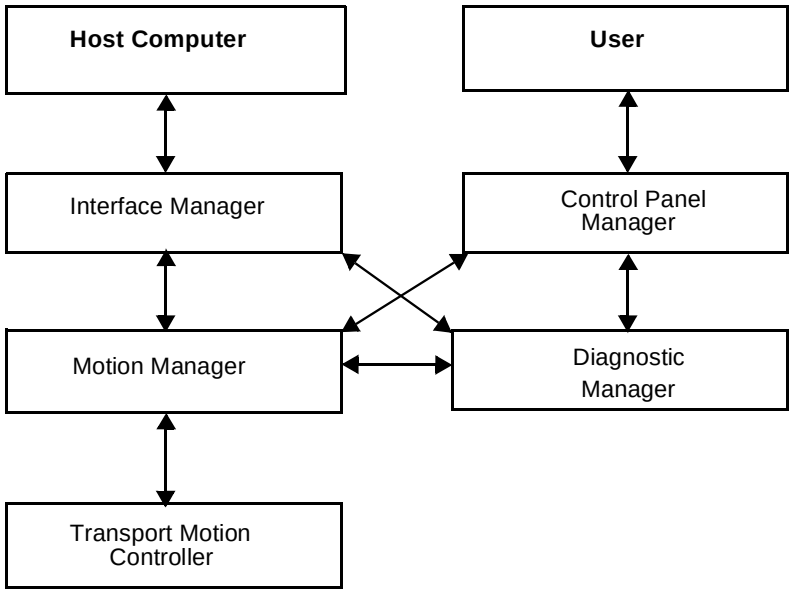
- Autodetect mode: Defaults to Stacker mode until the Autoloader receives a changer command, which changes it to Random mode until it is power cycled.
- Stacker mode: Loads each tape sequentially after each drive unload request.
- Random mode: Allows random access to tapes per command of the Autoloader.

Autoloader Firmware

The autoloader firmware consists of the following five modules (Figure 2-1):

- Interface manager
- Control panel manager
- Diagnostics manager
- Motion manager
- Transport motion controller

Figure 2-1 **How Autoloader Firmware Interacts**



Interface Manager

The interface manager is responsible for handling all commands sent from the host computer to the Autoloader. The commands are sent using a single-ended SCSI interface, which conforms to the SCSI-2 specifications.

NOTE The interface manager is disabled when the product is in Stacker mode.

Control Panel Manager

The control panel is the user's direct interface to the Autoloader. Most of the functions that can be done through the SCSI interface can be accessed manually through the control panel including full drive load/unload capability. See "Top-Level Menu Options" on page 3-10. The control panel interface is also described in more detail in Chapter 3.

Diagnostic Manager

The diagnostic manager controls all self testing of the Autoloader. Most of its functionality is executed automatically at power-up without user interaction. The user can access some of the functionality of the diagnostic manager through the control panel or the SCSI send diagnostic command. See “Running an Internal Test” on page 3-21.

Motion Manager

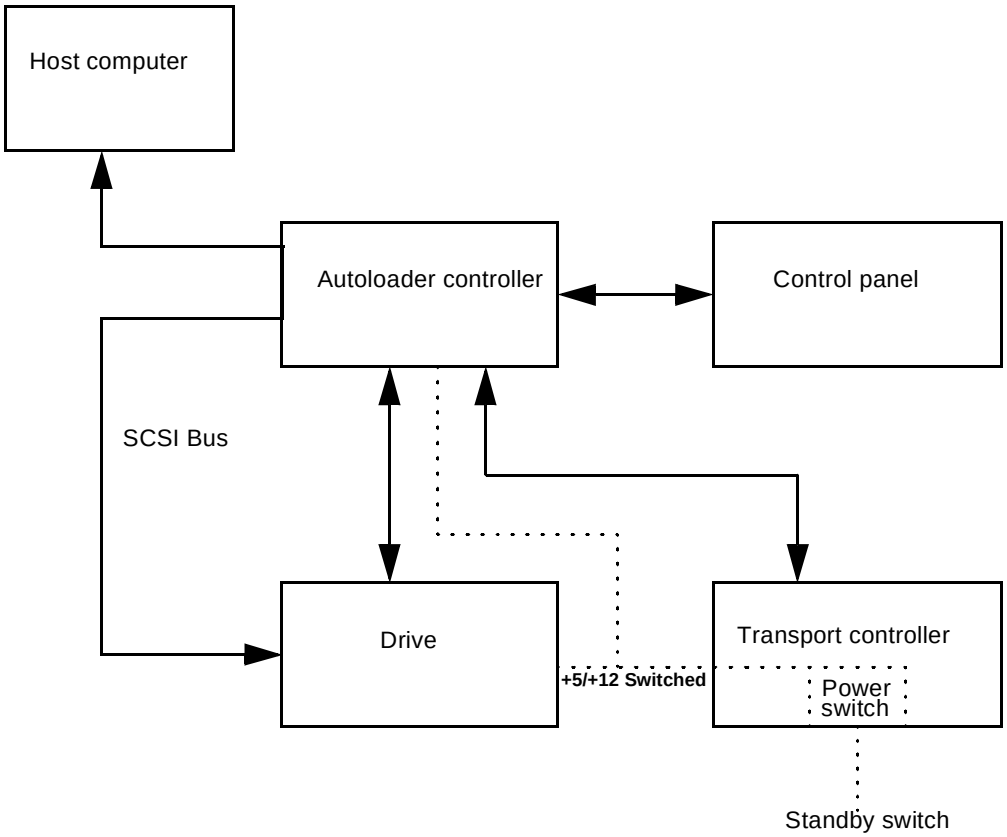
The motion manager communicates with the drive as necessary and receives all motion command requests, breaking them into move steps. The motion manager then issues commands to the transport motor controller. The motion manager is also responsible for any error recovery attempts and reports the results to the control panel, diagnostic, and interface managers.

Transport Motion Controller

The transport motion controller controls the loader, which performs the individual move steps generated by the motion manager.

Autoloader Electronic Connections

Figure 2-2 **Interface Overview**



3 Operating the Autoloader

Chapter Overview

This chapter explains how to:

- Load and remove tapes
- Load and remove the magazine
- Operate the control panel
- Interpret control panel messages
- Enter and change an administration menu password
- View and set SCSI IDs
- Configure the Autoloader
- Retrieve Autoloader information
- Run internal tests

Loading/Unloading

Opening the Door

1. Press the **NEXT** button until RELEASE DOOR is displayed in the control panel.
2. Press **ENTER**.
   - If the drive is empty, the door will release.
   - If a tape is loaded in the drive, EMPTY DRIVE NO is displayed. If the Autoloader is controlled with host software, press **ENTER** or **CANCEL** to abort. Use the host software to unload the drive.
   - Otherwise, press **NEXT** or **PREV** until EMPTY DRIVE YES is displayed, and then press **ENTER**.

     UNLOADING DRIVE will be displayed for up to two minutes, followed by DOOR RELEASED.
3. Gently open the access door by pulling down the door handle.

Alternate Door Open Method

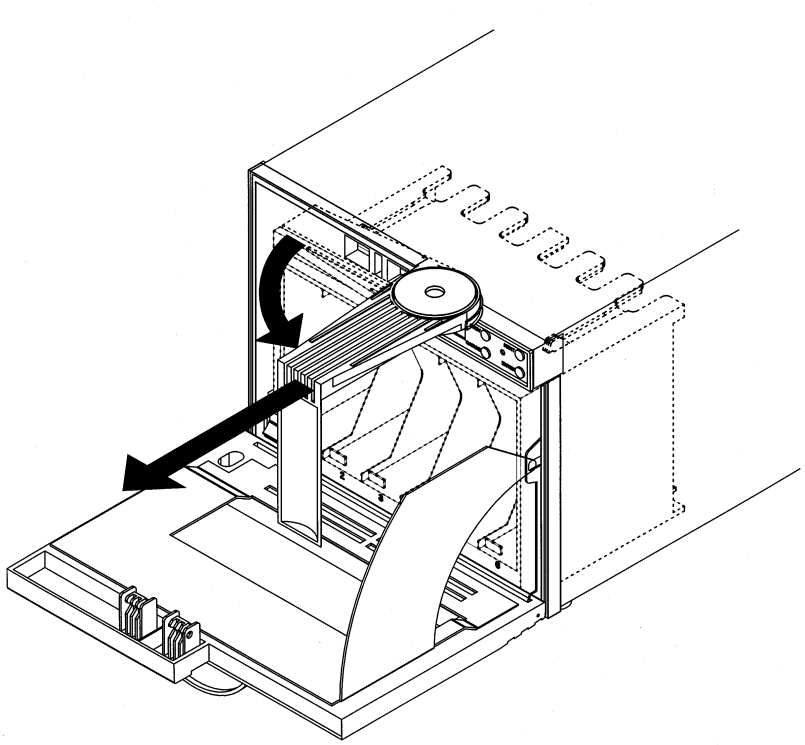
1. Press and hold the **CANCEL** button for five seconds.
2. After hearing a “click,” gently pull on the door handle to open.

NOTE This method of opening the door is most effective when the drive is empty and the Autoloader is idle. If the Autoloader is performing a function, it will abort the function then release the door.

Inserting or Removing the Magazine

1. Swing the magazine handle forward until it is perpendicular with the magazine.
2. Pull the magazine straight out (Figure 3-1).

Figure 3-1 Removing the Magazine



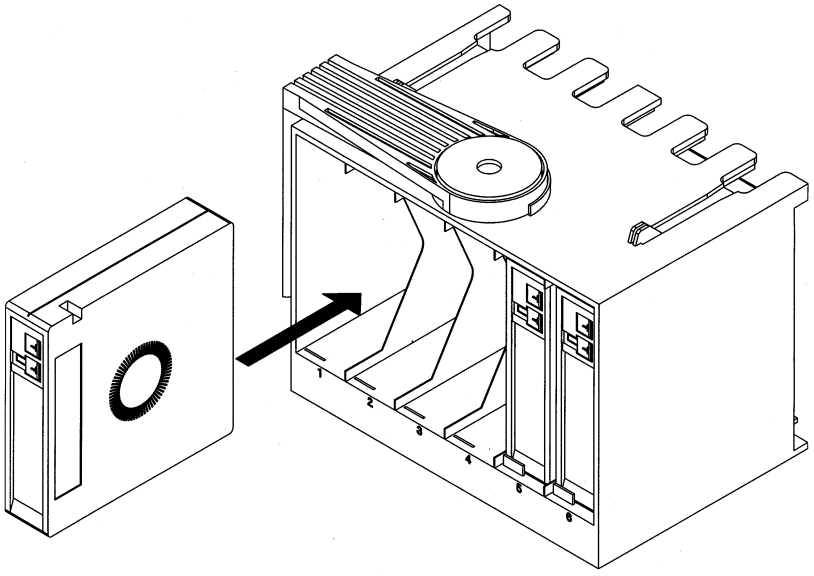
Loading Tapes

NOTE If you are using a software application to manage tapes in the Autoloader, check the software documentation for instructions on inserting and removing them.

The Autoloader has two internal storage slots behind the magazine (slot numbers 7 and 8) and six slots in the removable magazine (slot numbers 1-6).

1. With the write-protect switch facing out and at the top, load tapes into the magazine by pushing the tape in and holding it in until it “clicks.” A metal tab will release and lock it into place (Figure 3-2).

Figure 3-2 Loading Tapes into the Magazine



CAUTION Since this is a static-sensitive area, touch the sheet-metal panel on the left side of the unit for electrostatic discharge. Take care not to touch internal electronics.

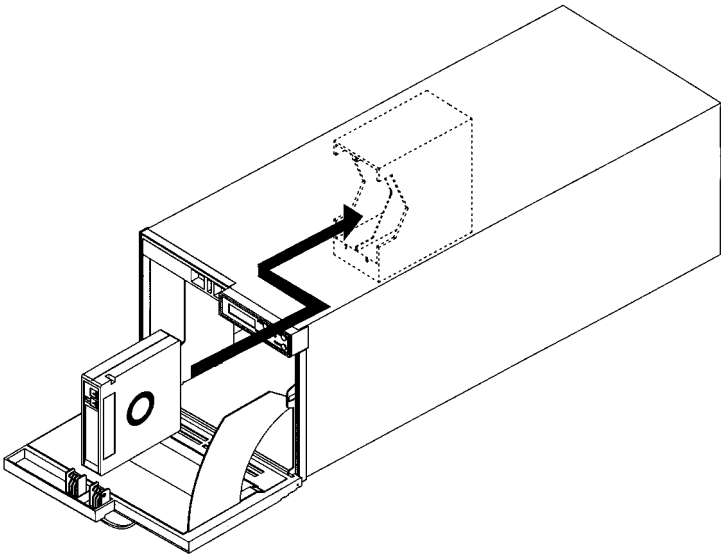
NOTE If the metal tab is stuck in the “Up” position, place the corner of the tape on the tab, and slide the tape into the storage slot. The latching mechanism will not click since the tab is already engaged. When tapes are “locked” into the magazine, the tapes will not fall out if the magazine is turned.

Unload tapes by pressing the tape in until it clicks and partially ejects. Remove tape.

2. With the write-protect switch facing out of the Autoloader and at the top, load internal slots by pushing the tape in until it “clicks.”

NOTE The magazine must be removed to load the internal slots (Figure 3-3).

Figure 3-3 Loading Internal Slots



3. With the magazine handle facing out the front of the Autoloader, slide the magazine into the Autoloader until it “clicks” into place (Figure 3-1 on page 3-4).
4. Swing the magazine handle to the left to store.
5. Gently shut the access door.

NOTE The `INVENTORY CHECK` runs when the access door closes so that an inventory of storage slot locations can be stored into the autoloader memory. This process takes approximately thirty seconds. The inventory check will not run if the door is not completely shut.

Unloading Tapes

1. Remove the magazine by following the steps under “Opening the Door” on page 3-3 and “Inserting or Removing the Magazine” on page 3-4.
2. Push the tape in until it clicks. The tape will partially eject.

Autoloader Control Panel

Figure 3-4 **Autoloader Control Panel**

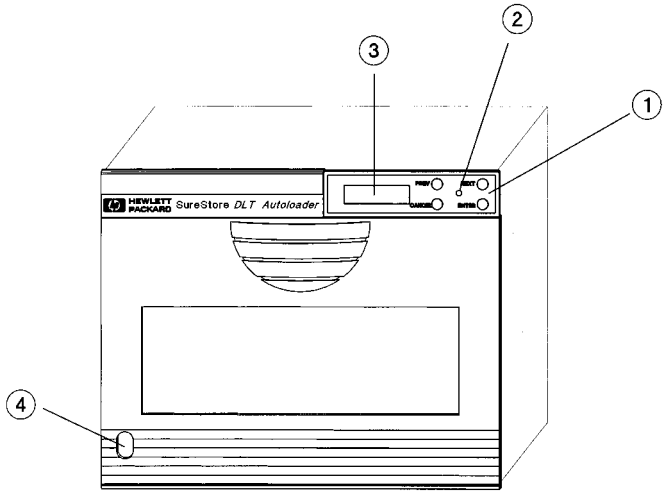


Table 3-1 **Control Panel**

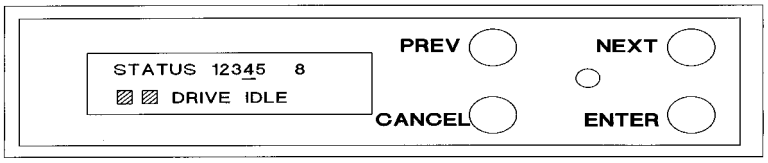
1	Control panel keys	**PREV**: Scrolls the control panel choice backward by one. **NEXT**: Scrolls the control panel choice forward by one. **ENTER**: Selects the option currently being displayed. **CANCEL**: Cancels the current selection or steps you back to the previous menu.
2	Activity light	Steady green: Power is on. Flashing green: A tape is being accessed. Amber: An error occurred (see “Troubleshooting” on page 4-26).
3	Two line, 16-character display	Displays the current operation or drive status. An asterisk (*) indicates a submenu for that task. Press **ENTER** on the control panel to access that menu.
4	Power (standby) switch	Located in the bottom corner of the front access door and puts the unit’s power in standby mode.

Understanding Display Messages

The control panel is a two-line display with 16 characters per line that shows the status of the Autoloader or the current function.

Tape Status

The following example shows the display when the Autoloader is in the ready state.



The numbers on the top line show that slots 1, 2, 3, 5, and 8 have tapes in them, tape 4 is in the drive, and slots 6 and 7 are empty.

- A blinking number indicates that the tape is being moved from a slot or the drive.
- If a tape is in the drive, the number remains lit and is underlined (tape 4 in the figure above).
- If the storage slots or Autoloader is empty, the top line reads `STATUS EMPTY`. On the bottom line, the display will read `LOADER READY` or a drive activity message and can include one of these indicators (represented by the shaded boxes above):
  - ❏ `C` is displayed if the drive needs cleaning. If the drive is not active, `CLEAN DRIVE` will also display.
  - ❏ `WP` is displayed if a tape is write protected.

NOTE In a menu option (other than a test menu), the Autoloader defaults to the drive status display when there has been no user interaction for three minutes.

Drive/Autoloader Status

The top display line normally shows the slot status or the current menu.

The bottom display line shows the drive/loader activity unless a control panel menu has been selected. See “Top-Level Menu Options” on page 3-10.

The status of the drive and Autoloader is indicated by the following:

- `LOADER READY`
- `LOADER ACTIVE`
- `DRIVE IDLE`
- `CLEANING`
- `WRITING`
- `READING`
- `REWINDING`
- `SEEKING`
- `ERASING`
- `LOADING`
- `UNLOADING`
- `NO DRIVE` (Displays if the drive isn’t functioning properly)

Top-Level Menu Options

NOTE

To move through the menu, use the control panel keys. If a menu selection is flashing, press **ENTER** to select that option. An asterisk (*) indicates sub-level menus.

The top-level menu contains the following functions. Press **PREV** or **NEXT** while the Autoloader is in the ready state to view these options:

Table 3-2 Top-Level Menu Options

Option	Function
RELEASE DOOR *	Unlocks the access door. See “Opening the Door” on page 3-3.
LOAD TAPE *	Moves a tape from a slot to the drive. • The second line displays FROM SLOT with the slot number. • Press **NEXT** until the desired slot number displays. • Press **ENTER** to select the slot number. The first full slot is the default slot. If one slot is loaded, only this slot can be selected.
UNLOAD TAPE *	Unloads a tape from the drive to the slot it came from.
ADMIN *	All functions under this menu option are password protected. See “Password-Protected Functions” on page 3-12.
OPERATING MODE *	There are three operating modes, which are described below and in more detail on the following page: • Autodetect mode: Operates in Stacker mode until receiving a SCSI changer command. It then operates in Random mode until power cycled. • Stacker mode: Loads each tape sequentially after each drive unload request. • Random mode: Allows random access to tapes.

Autodetect	This is the default mode for the Autoloader. The drive and Autoloader are both accessible via the SCSI bus. The Autoloader operates as if in Stacker mode until it receives a SCSI changer command. Changer commands are: `INITIALIZE ELEMENT STATUS`, `READ ELEMENT STATUS`, `POSITION TO ELEMENT`, `MOVE MEDIA`, and `EXCHANGE MEDIA`. After receiving one of these commands, the Autoloader operates as if in Random mode.
Stacker	*Mode*: When in Stacker mode, the autoloader controller will not use an ID and cannot be accessed from the SCSI bus. Only the drive ID is available. In this mode, the jumper cable may be removed from the back of the Autoloader, but it will not impact the system to leave it connected. *Operation*: An autoload option is available under the `CONFIG` menu. If selected, the first available tape loads into an empty drive at power up. By default, autoload is off so that the user must use the control-panel `LOAD` command to load tape cartridges. When the host issues a SCSI unload command, the Autoloader removes and inserts tape cartridges until the last tape has been unloaded. If the Circular mode option has been selected in `CONFIG`, the Autoloader will reload the first tape cartridge. If Circular is disabled and the last tape cartridge has been unloaded, the Autoloader stops operating until the user loads more tape cartridges. If the Autoloader encounters a cleaning cartridge during the cycle, it will be loaded into the drive as normal, but will be automatically unloaded after the cleaning cycle. If the user indicates which slot contains the cleaning cartridge via the clean drive menu, the Autoloader will skip that slot.
Random	*Mode*: In Random mode, the drive and the autoloader controller can be accessed via the SCSI bus. All stacker features are disabled after selecting random mode. Tape cartridges can only be moved by using host SCSI commands to the Autoloader or by using the `LOAD/UNLOAD` front panel menu. *Operation*: The SCSI interface for the Autoloader in Random mode conforms to the SCSI-2 command specification for tape changer devices.

Password-Protected Functions

All ADMIN * functions are password protected.

1. Before accessing the following options, enter the password. See “Entering the Administration Menu Password” on page 3-14 or “Changing the Administration Menu Password” on page 3-15 for more information.

   A default password of 000-000-000 is set at the factory. Change this password when first using the Autoloader if it is in an unsecured location. Ensure that you document this new password.

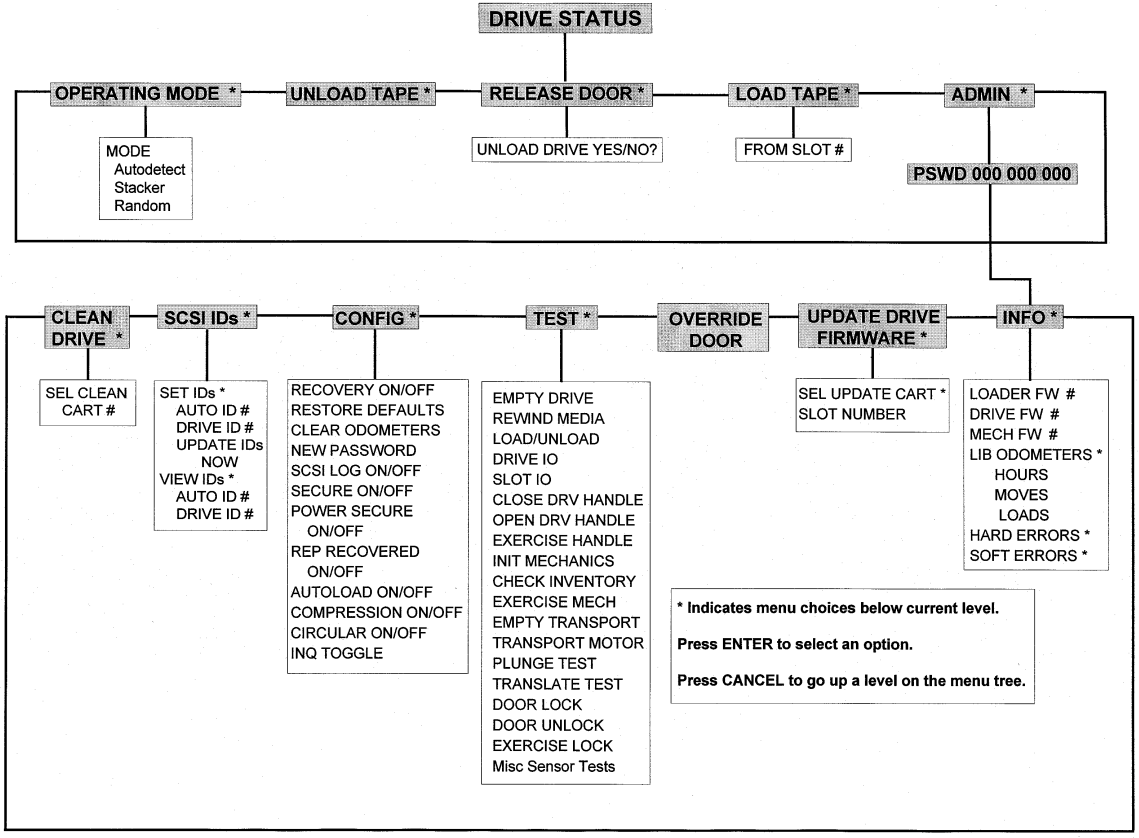
Table 3-3 Admin Menu Options

Option	Function
INFO *	Retrieves performance information stored in the Autoloader.
CLEAN DRIVE	Allows the user to clean the drive.
SCSI IDs *	Sets the SCSI addresses for the autoloader controller and drive.
CONFIG *	Customizes the autoloader functions. See “Configuring the Autoloader” on page 3-18.
UPDATE DRIVE FW *	Allows the user to update the firmware in the drive.
TEST *	Runs internal autoloader tests. See “Running an Internal Test” on page 3-21.
OVERRIDE DOOR	Emergency door release that does not check the internal state of the Autoloader.

2. When a changeable menu selection is flashing, press **ENTER** to select the option, or press **PREV** or **NEXT** to display other available options.
3. Press **ENTER** to select the flashing item.

   “Autoloader Display Menu Tree” on page 3-13 shows the autoloader menu options available throughout the control panel.

Autoloader Display Menu Tree



Entering the Administration Menu Password

A numeric password is required to access functions within the ADMIN * menu. A default password of 000-000-000 is set at the factory, which can be used when the Autoloader is powered on for the first time.

1. Starting at the top-level menu, press **NEXT** until ADMIN * is in the display window.
2. Press **ENTER**.

   The password displays, and the first set of zeros flashes.
3. Press **ENTER** to accept the first set of flashing zeros or **NEXT**/**PREV** to change the values.
4. Press **ENTER** to accept the second set of flashing zeros or **NEXT**/**PREV** to change the values.
5. Press **ENTER** to accept the last set of flashing zeros or **NEXT**/**PREV** to change the values.

   INFO * displays.
6. Press **PREV** or **NEXT** until the desired function displays, then press **ENTER**.

Changing the Administration Menu Password

```
ADMIN * / CONFIG * / NEW PASSWORD
```

NOTE

Be sure you document the new password and keep it safe. If you forget the password, only a service representative can restore the default password.

1. Complete steps 1 through 6 in "Entering the Administration Menu Password" on page 3-14.
2. Press **NEXT** until CONFIG * displays, and press **ENTER**.
3. Press **NEXT** or **PREV** until NEW PASSWORD displays, and press **ENTER**.

   NEW 000 000 000 displays, and the first set of zeros flashes.
4. Press **NEXT** or **PREV** until the new numbers for the first part of the password display, then press **ENTER** to select.

   The second set of zeros flashes.
5. Press **NEXT** or **PREV** until the new numbers for the second part of the password display, then press **ENTER** to select.

   The last set of zeros flashes.
6. Press **NEXT** or **PREV** until the new numbers you wish to assign to the third part of the password display, and press **ENTER** to select.

   PASSWORD CHANGED displays, which indicates that the password has been saved to non-volatile RAM.
7. Press **CANCEL** three times to return to the ready state.

NOTE

After changing the password, you can save the new password to flash ROM by power cycling the Autoloader, which allows the password to be recovered if the Autoloader is powered off for more than ten days. If this step is not completed, the password changes may be lost.

Consult your system administrator before power cycling.

Setting or Viewing SCSI IDs

```
ADMIN * / SCSI IDs *
```

NOTE Before setting SCSI IDs, check to see which IDs are available.

When you choose SCSI IDs, you have two options:

- SET IDs * assigns a SCSI ID to the drive and a SCSI ID to the autoloader controller.
- VIEW IDs * displays the autoloader controller and drive settings.

Table 3-4 shows the default settings.

Table 3-4 Default SCSI IDs

Device	SCSI ID
Autoloader ID	1
Drive ID	0

Setting SCSI IDs

```
ADMIN * / SCSI IDS * / SET IDS *
```

1. When SET IDs * is displayed, press **ENTER**.
   - AUTOLOADER ID #, DRIVE ID #, or UPDATE IDS NOW (use this last function after changing IDs to save) is displayed.
   - AUTOLOADER ID # stands for the current SCSI ID of the autoloader controller. DRIVE ID # is the current SCSI ID of the drive.
2. Press **NEXT** until the setting you want to change is displayed, and then press **ENTER**. The current SCSI address flashes.

3. Press **NEXT** or **PREV** until the new SCSI address is displayed, and then press **ENTER**.
4. Press **NEXT** until `UPDATE IDs NOW` is displayed, and press **ENTER**.

   One of the following messages is displayed:

   - If the new settings are accepted, `IDs SAVED` then `SCSI IDs *` is displayed.
   - If the drive and controller are set to the same ID, `CONFLICT-ABORTED` displays, followed by `SET IDs *`.
   - If a drive serial communications error is detected while trying to set the `SCSI IDs`, `DRV CONNECT ERR` displays, followed by `IDs NOT CHANGED`. Any changes entered are lost, returning you to the `SCSI IDs *` menu.
5. Press **CANCEL** three times to return to the ready state.

NOTE

After changing an address, reboot the host for it to recognize the new SCSI IDs. Refer to the operating system documentation before rebooting. Consult the system administrator before power cycling.

After changing the settings, you can save the new settings to flash ROM by power cycling the Autoloader, which allows the settings to be recovered if the Autoloader is powered off for more than ten days. If this step is not completed and the Autoloader is turned off for more than 10 days, the new settings may be lost.

Viewing SCSI IDs

ADMIN * / SCSI IDS * / VIEW IDS *

1. Enter the `SCSI IDs` menu, which is under the `ADMIN *` menu.
2. Press **NEXT** until `VIEW IDs *` is displayed. Press **ENTER**.
3. `AUTOLOADER ID #` or `DRIVE ID #` is displayed. (`AUTOLOADER ID #` stands for the current SCSI ID of the autoloader controller, and `DRIVE ID #` is the current SCSI ID setting for the drive.)
4. Press **NEXT** or **PREV** to view the other ID.
5. Press **CANCEL** three times to return to the ready state.

Configuring the Autoloader

```
ADMIN * / CONFIG *
```

1. In the CONFIG * menu, press **NEXT** or **PREV** until the name of the operation is displayed, then press **ENTER**.

   If the option has multiple settings, the current setting flashes.

2. Press **NEXT** or **PREV** until the desired setting is displayed.
3. Press **ENTER** to select the setting. OPTION SAVED is displayed.
4. Press **CANCEL** two times to return to the ready state.

Table 3-5 describes the available configuration options.

Table 3-5 Configuration Options

Config Name	Description	Default
RECOVERY ON/OFF	If set to ON, the Autoloader attempts to recover from errors. If set to OFF the Autoloader stops moving if an error occurs. Recovery should remain ON under normal conditions.	ON
RESTORE DEFAULTS	Sets all autoloader configuration options to their default settings.	—
CLEAR ODOMETERS	Sets all autoloader odometers to zero.	—
NEW PASSWORD	Allows the password to be changed.	—
SCSI LOG ON/OFF	Tracks internal SCSI states and saves the information to a log.	OFF
SECURE ON/OFF	When set to ON, the RELEASE DOOR option will not unlock the door. When set to OFF, the door will unlock.	OFF

Config Name	Description	Default
POWER SECURE ON/OFF	When set to ON, the SECURE ON/OFF setting is retained in the event of a power outage. When set to OFF, the autoloader returns to its default setting of SECURE OFF when power is restored.	OFF
REP RECOVERED ON/OFF	When set to ON, recovered errors are reported. When set to OFF, the recovered errors are not reported.	ON
AUTOLOAD ON/OFF	When set to OFF in the Stacker mode, a tape must be loaded into the drive using the control panel. When set to ON, the first available tape is loaded when the unit is powered on and the drive is empty. This option is only used when the operation mode is set to Stacker.	OFF
COMPRESSION ON/OFF	Displays the current setting of drive compression. When set to ON, the drive will compress data unless the host turns it off. When set to OFF, the drive will not compress data, unless the host requests it. *Note*: When the drive is empty, the display will read that compression is OFF.	ON
CIRCULAR ON/OFF	When set to ON, the first tape is reloaded after the last tape unloads. This option only functions in Stacker or Autodetect mode. *Caution*: Data overwrite can occur if this option is not carefully used.	OFF
INQ TOGGLE	When set to ON, the inquiry string for the product family is reported to the SCSI bus. When set to OFF, the inquiry string for this autoloader model is reported to the SCSI bus. *Note*: In most cases, the product family and model inquiry string will be the same.	OFF

Retrieving Autoloader Information

```
ADMIN * / INFO *
```

Information logs describe the autoloader operations and are displayed in the INFO * menu. The information logs are described in Table 3-6.

1. When INFO * displays, press **ENTER**.
2. Press **NEXT** until the desired log displays, and then press **ENTER**.
3. Press **CANCEL** two times to return to the ready state.

Table 3-6 Information Logs

Description	Log Name
LOADER FW #	Displays the autoloader's firmware revision number.
DRIVE FW #	Displays the drive's firmware revision number.The drive firmware number will look similar to this: DRV FW (183C) 60 where 18 is the build code, 3C is the hex value, and 60 is the decimal value
MECH FW #	Displays the loader mechanism's firmware revision number.
LIB ODOMETERS *	Press **ENTER** to select the odometer logs for power-on hours, moves, and drive loads.
HARD ERRORS * (see "Understanding Error Messages" on page 4-5)	Displays a log of commands with unrecoverable errors. Returns either NO HARD ENTRIES or ENTRY #. Press **ENTER** to view the log for the currently displayed error. Press **NEXT** to view the next error.
SOFT ERRORS * (see "Understanding Error Messages" on page 4-5)	Displays a log of commands with recoverable errors. After an error, returns either NO SOFT ENTRIES or ENTRY #. Press **ENTER** to view the log for the currently displayed error. Press **NEXT** to select the next error.

Running an Internal Test

```
ADMIN * / TEST *
```

1. When TEST * is displayed, press **ENTER**.
2. Press **NEXT** until the desired test is displayed, and press **ENTER**.

   NUM LOOPS 1 is displayed, where the 1 is flashing.
3. Press **NEXT** until the number of the desired test loop displays (1, 10, 100, 1000, or forever) then press **ENTER**.

NOTE

Press **CANCEL** at any time to abort a test. The last test cycle will complete before cancelling. TEST CANCEL - WAIT is displayed while the last test cycle completes.

Descriptions of the internal tests available from the control panel are in Table 3-7.

Table 3-7 Tests Available from the Control Panel

Test Name	Description
EMPTY DRIVE	*Do not run this test if the drive contains a tape cartridge with data.* Moves a tape out of the drive mechanism and returns it to its original storage slot if the locations are known, otherwise a tape is placed into the first available storage slot.
REWIND MEDIA	*Do not run this test if the drive contains a tape cartridge with data.* Rewinds the tape in the drive and opens the solenoid in the drive handle. Go to OPEN DRV HANDLE to open the drive and remove the tape.
LOAD/UNLOAD	Selects a random full slot and moves the tape to the drive. After the tape loads, the transport moves to another slot and then returns to the drive, unloading the tape to its original location.

Test Name	Description
DRIVE IO	Moves a tape from the drive to the transport or from the storage slot to the transport. This tape is then moved from the transport to the drive and then back to the transport the selected number of test loops. When complete, the tape is returned to the original location.
SLOT IO	Moves a tape from a random full slot to the transport. The tape is then moved back to its original location.
CLOSE DRV HANDLE	Closes the drive handle. Only one operation is performed, regardless of the loop count chosen.
OPEN DRV HANDLE	Use this test after performing the REWIND MEDIA test to manually remove tapes. Opens the drive handle. Only one operation is performed, regardless of the loop count chosen.
EXERCISE HANDLE	Closes then opens the drive handle.
INIT MECHANICS	Performs the power-up self-tests. Each test is run one time per test loop.
CHECK INVENTORY	Functions the same as the SCSI Initialize Element Status command. This test physically scans the entire unit to determine which storage slots contain tape cartridges and if the drive contains a tape. *Note*: This test will be displayed as ISTAT TEST in all control panel error messages.
EXERCISE MECH	Runs the TRANSLATE TEST, IO MAGAZINE, and IO DRIVE tests. Each test is run one time per test loop.
EMPTY TRANSPORT	Moves the media in the transport back to the original slot. The test passes if the transport is empty.
TRANSPORT MOTOR	Moves the transport motor four seconds in each direction.
PLUNGE TEST	Runs the tape pusher back and forth.
TRANSLATE TEST	Translates from side to side. No tape cartridge is required.

Test Name	Description
DOOR LOCK	Locks the door.
DOOR UNLOCK	Unlocks the door.
EXERCISE LOCK	Locks then unlocks the door.
DOOR SENSOR	Is displayed if the door is open or not.
PUSH SENSOR 1	Displays the value of picker sensor 1.
PUSH SENSOR 2	Displays the value of picker sensor 2.
DOOR LOCK SENSOR	Displays if the door is locked or unlocked.
DRV HNDL OPEN SENSOR	Displays the current value of the drive handle open sensor.
DRV HNDLE CLOSE SENSOR	Displays the current value of the drive handle close sensor.
T MAG SENSOR	Displays the current value of the magazine side transport sensor.
T DRIVE SENSOR	Displays the current value of the drive side transport sensor.
MAG PRESENT SENSOR	Displays the current value of the magazine present sensor.
CaPUSH SENSOR	Displays the current value of the cartridge push sensor.
DRIVE SENSOR	Displays the current value of the drive side transport position sensor.

4 Troubleshooting, Removal, and Replacement

Chapter Overview

This chapter explains how to:

- Clean the drive
- Interpret drive cleaning errors
- Recover from error messages
- Troubleshoot
- Replace the unit
- Remove stuck tapes

Cleaning the Autoloader Tape Drive

ADMIN * / CLEAN DRIVE *

NOTE

Use a cleaning cartridge to clean the drive. The drive mechanism should only be cleaned if the clean drive indicator displays (see "Understanding Display Messages" on page 3-8). Replace the cleaning cartridge after 20 cleaning cycles.

CAUTION

Excessive use of the cleaning cartridge can cause unnecessary wear on the drive head.

1. Starting at the top-level menu, press **NEXT** until ADMIN * appears in the control panel. Press **ENTER**.
2. Enter the password. INFO * displays.
3. Press **NEXT** until CLEAN DRIVE * displays, and press **ENTER**.
   - If power has been turned off or the access door has been opened since a cleaning cartridge location has been selected, SET CLEAN CART * is displayed. Press **ENTER** and select the cleaning cartridge location.
   - If power has not been turned off or the access door has not been opened since a cleaning cartridge location has been selected, CLN CART LOC # displays. (The number that flashes indicates the storage location of the cleaning cartridge.) If the storage slot location is correct, press **ENTER** and go to step 4. To select a different slot location, press **NEXT** or **PREV** until the correct slot location is displayed, press **ENTER**, and go to step 4.
4. If a tape is in the drive, the tape status will display to indicate that the drive must be emptied before cleaning.
   - If the slot location chosen in step 3 did not contain a cleaning cartridge, NOT CLEAN CART displays briefly and then CLEAN FAIL # displays. Press **CANCEL** twice to return to the ready state. Locate the cleaning cartridge, and insert one into an available slot.
   - In the event of a drive error, FAILED displays and then the CLEAN DRIVE * menu appears.
5. Press **CANCEL** two times to return to the ready state.

Drive Cleaning Errors

Table 4-1 describes situations that can cause the drive cleaning message, `CLEAN DRIVE` to display.

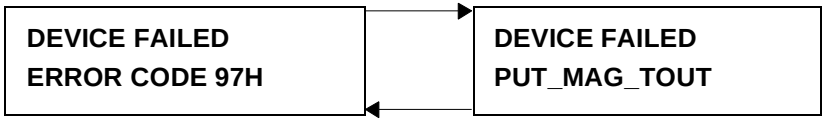
For drive cleaning instructions, refer to “Cleaning the Autoloader Tape Drive” on page 4-3.

Table 4-1 Drive Cleaning Troubleshooting

If this happens . . .	The reason is . . .	So you need to . . .
A brand new tape is used and a drive cleaning message is received.	Debris from the tape manufacturing process was deposited on the drive head.	• Clean the drive using the tape drive cleaning procedure on “Cleaning the Autoloader Tape Drive” on page 4-3. • If the message is displayed again within a short amount of time, replace the tape.
An older, frequently used tape is loaded and a drive cleaning message is received.	Dust from frequent tape loads and unloads has probably built up on the tape cartridge and deposited on the drive head.	• Clean the outside of the tape cartridge using a damp cloth. • Clean the tape drive using the tape drive cleaning procedure found in “Cleaning the Autoloader Tape Drive” on page 4-3.
An older, frequently used tape causes a cleaning message to be displayed for the second time.	The cleaning cartridge needs to be replaced or the tape is probably damaged.	• Verify the tape is readable by clearing the error message. • Try reading the tape again. • If the tape can be read, back up data from the damaged tape to another tape cartridge, and discard the damaged one. • Replace the cleaning cartridge if the cleaning message continues to display.

Understanding Error Messages

When receiving an error code, the control panel will alternately display messages similar to the following:



NOTE All hex error codes (like 97H in the example above) can be decoded to a text string by pressing **ENTER**.

To understand an error code:

1. Press **ENTER** to get a brief description about the error code.
2. Press **NEXT** to get the following information:
   - Field Replaceable Units (FRUs)
   - Motion Type
   - Source
   - Destination 1
   - Destination 2
   - Odometer
   - Error Listing (last 5 transport errors)
   - Error Count (Number of errors on this move)

NOTE The same error code information is available in the error logs, which you can access through this menu path: `ADMIN * / INFO * / HARD ERRORS *`

FRUs

When an error occurs, press **ENTER** then **NEXT** to obtain information about the following FRU messages.The table below describes what each FRU display messages means and the recommended replacement procedure.

FRU Number displayed	Probable Cause of Failure	Recommended Replacement
FRU #1	SCSI controller	Unit replacement
FRU #7	Drive	Unit replacement
FRU #28	Loader mechanics	Unit replacement

Recovery

Table 4-2 Error Codes

Hex Error	Description	Recovery
00H	Drive command timed out.	Power cycle the unit.
01H	ROM checksum error.	Set `RESTORE DEFAULT` and if error reoccurs, replace unit.
02H	Register error.	Set `RESTORE DEFAULT` and if error reoccurs, replace unit.
03H	Microprocessor error.	Set `RESTORE DEFAULT` and if error reoccurs, replace unit.
04H	Controlled area of RAM checksum error.	Set `RESTORE DEFAULT` and if error reoccurs, replace unit.
05H	RAM test error.	Set `RESTORE DEFAULT` and if error reoccurs, replace unit.
06H	SCSI chip error.	Set `RESTORE DEFAULT` and if error reoccurs, replace unit.

Hex Error	Description	Recovery
07H	Autoloader controller chip error.	Set `RESTORE DEFAULT` and if error reoccurs, replace unit.
2DH	Door is open.	Ensure the door is closed and power cycle the unit.
33H	Invalid configuration, attempting to run a control-panel test without tapes in the correct place.	Ensure the tapes are in the storage slots and no tapes are in the transport or drive.
34H	Need to run `INVENTORY CHECK` test.	Run the `INVENTORY CHECK` test and power cycle the unit.
35H	A control-panel test failed for an unknown reason.	Power cycle the unit.
36H	Elements reserved.	Check host software for reserved elements. Set `RESTORE DEFAULTS` to clear reservations.
5FH	Power failed, restore tapes.	Power cycle the unit.
62H	Overfull.	Remove tapes from internal storage slots, and power cycle the unit.
63H	Loader command timed out.	Power cycle the unit.
80H	No error.	Power cycle the unit.
81H	Invalid motion command error. This error indicates that the loader received an undefined or invalid parameter to a command.	Ensure all tapes are correctly inserted in the indicated slots.
84H	Tape in transit after a reset or power-on. This error occurs after a power cycle and when a tape is in the transport.	Ensure the transport is empty, and power cycle the unit.

Hex Error	Description	Recovery
85H	Unable to initialize transport.	Verify the magazine and tapes are correctly installed, and power cycle the unit.
86H	Did not find PUSHPOS 1 during mechanical initalization.	Transport may be damaged. Power cycle the unit and then run 10 loops of SLOT IO.
87H	Timed out moving a tape onto or off of the transport during mechanical initialization.	Ensure the tapes move in and out of the storage slots and reinstall them. Power cycle the unit when complete.
88H	Timed out finding the transport home position during mechanical initialization.	Ensure that tapes are not blocking transport motion, and power cycle the unit.
89H	Timed out finding PUSHPOS 2 during mechanical initialization.	Transport may be damaged. Power cycle the unit and then run 10 loops of SLOT IO.
8AH	Did not leave DRIVPOS during mechanical initialization.	Check for obstructions in the transport path.
8BH	Timed out closing drive handle during mechanical initialization.	Check for tape stuck in drive.
8CH	Timed out during TRANSPORT MOTOR test. Did not leave home position.	Check for obstructions and retry test.
8DH	Timed out during PLUNGE test finding pusher home position.	Check for obstructions and retry test.

Hex Error	Description	Recovery
8EH	Timed out during TRANSPORT MOTOR test or during PLUNGE test moving from pusher home position toward PUSHPOS 2.	Check for obstructions and retry test.
90H	No tape in drive during tape unload.	Check position of tape in drive.
91H	Timed out finding PUSHPOS 1 (position in front of the drive before unloading a tape from the drive onto the transport).	Check for obstructions and retry.
92H	Timed out opening the drive handle during a tape unload.	Reissue unload command.
93H	Timed out finding the pusher home position during a tape unload.	Power cycle the unit and retry.
94H	Timed out moving tape from the drive onto the transport. If this error occurs, the loader controller will try to move the tape back into the drive.	Power cycle the unit and retry command.
95H	Timed out moving the transport from the drive load position to the slot position during a tape unload.	Verify that the transport is not obstructed, and power cycle the unit.
96H	Timed out finding PUSHPOS 1 during a tape unload.	Power cycle the unit and retry.

Hex Error	Description	Recovery
97H	Timed out unloading a tape into the slot during tape unload.	If failure occurred when moving a tape to the magazine, ensure the silver tab is in the “Up” position. If not, load tape backwards and remove to leave the tab “Up.” If error occurs in internal slot, ensure silver tab is not in the “Up” position. Load tape backwards to retract tab.
98H	Timed out finding the pusher home position during a tape unload. This error occurs after the tape was successfully placed back into the magazine so the move is effectively completed.	Power cycle unit and retry.
99H	Timed out moving the transport to `DRIVPOS` during a tape unload.	Power cycle unit and retry.
9AH	Timed out finding `PUSHPOS 2` during a `CARTRIDGE UNLOAD` command.	Power cycle unit and retry.
9BH	Could not unlock the door during an `UNLOCK DOOR` command.	Unplug and then plug back in.
9CH	Did not find all of the valid slot positions during a `SCAN MAGAZINE` command.	Remove the magazine and check for obstructions along the small inside rail holes. Reinstall magazine.
9DH	Timed out (did not leave a tape type window during a `SCAN MAGAZINE` command).	Unplug unit and remove magazine. Move transport either direction, reload magazine, and retry.

Hex Error	Description	Recovery
9EH	Timed out leaving `DRIVPOS` during a `SCAN MAGAZINE` command.	Unplug unit and remove magazine. Move transport either direction, reload magazine, and retry.
9FH	Could not lock the door during a door lock command or during a scan command if the door is unlocked.	Unplug and plug back in.
A0H	Tape is already in the drive during a `LOAD CARTRIDGE` command.	Check to see that all tapes are loaded correctly.
A1H	No tape in the selected slot during a `LOAD CARTRIDGE` command.	Check to see that all tapes are loaded correctly.
A2H	Timed out moving the transport to the slot position during a `LOAD CARTRIDGE` command.	Unplug unit and remove magazine. Move transport either direction, reload magazine, and retry.
A3H	Timed out finding `PUSHPOS 1` during a `LOAD CARTRIDGE` command.	Power cycle unit and retry.
A4H	Timed out moving a tape from the slot onto the transport during a `LOAD CARTRIDGE` command.	Ensure the tapes move in and out of the storage slots and reinstall them. Power cycle when complete.
A5H	Timed out finding the pusher home position during a `LOAD CARTRIDGE` command.	Power cycle unit and retry.

Hex Error	Description	Recovery
A6H	Timed out moving the transport to the drive-load position during a `LOAD CARTRIDGE` command.	Unplug unit and remove magazine. Move transport either direction, reload magazine, and retry.
A7H	Timed out opening the drive handle during a `LOAD CARTRIDGE` command.	Power cycle the unit and retry.
A8H	Timed out moving a tape from the transport into the drive during a `LOAD CARTRIDGE` command.	Drive has probably failed. Exchange unit.
A9H	Timed out finding `PUSHPOS 2` to push tape completely into the drive during a `LOAD CARTRIDGE` command.	Power cycle the unit and retry.
ABH	Timed out finding `PUSHPOS 1.`	Power cycle the unit and retry.
ACH	Timed out closing the drive handle.	If the drive is empty, run the `EXERCISE HANDLE` test 10 loops. Power cycle the unit when complete. If a tape is in the drive, power cycle and unload tape via the `UNLOAD TAPES` front panel menu. Once tape is removed, run `EXERCISE HANDLE` test.
ADH	Timed out leaving the drive load position to move to the drive park position.	Power cycle the unit.

Hex Error	Description	Recovery
AEH	Timed out moving the tape back into a slot after error A4H.	Remove magazine and tapes, check for obstructions, then reload and retry.
B2H	Door open without receiving a command. After power is turned on, this command can occur as the loader remembers the state of the door.	Usually indicates door latch is broken. If door is closed and error reoccurs, replace unit.
B3H	Unit was reset or powered on.	Indicates power fluctuations on internal circuitry. If error reoccurs, replace unit.
B4H	Timed out prepositioning the transport during a prepositioning command.	Remove magazine and tapes, check for obstructions, then reload and retry.
B5H	Did not find all expected slots during transport movements.	Ensure locator slots on magazine are clean, and retry command.
B6H	Timed out opening the drive handle.	Retry command.
B7H	UART test failure.	Replace unit.
B8H	Unable to open the drive handle.	Retry command.
BBH	Ram error.	Fatal error. Replace unit.
BCH	ROM error.	Fatal error. Replace unit.
BDH	CTC error.	Fatal error. Replace unit.
BEH	Control panel power switch turned off during move.	Will only display during power up.

TapeAlert Error Messages

Tables 4-8 and 4-9 defines error flags and messages in the TapeAlert specification for tape/autoloader and library devices. “Type” lists what level of severity the message is. The displayed message section lists the TapeAlert message as it will appear on the host computer’s terminal. “Additional Action Information” provides more detail on how to respond to the TapeAlert message.

Table 4-3 TapeAlert Tape Error Messages

No.	Flag	Type	Displayed Message	Additional Action Information
1	Read Warning	W	The tape is having problems reading data. No data has been lost, but there has been a reduction in the performance of the tape.	Back up information on to another tape and discard the defective tape.
2	Write Warning	W	The tape drive is having problems writing data. No data has been lost, but there has been a reduction in the capacity of the tape.	Back up information on to another tape and discard the defective tape.
3	Hard Error	W	The operation has stopped because an error has occurred while reading or writing data which the drive cannot correct.	Back up information on to another tape and try the operation again.
5	Read Failure	C	The tape is damaged or the drive is faulty. Call the tape drive supplier helpline.	Eject the tape and inspect for damage. Insert a new tape and try operation again.
6	Write Failure	C	The tape is from a faulty batch or the tape drive is faulty: 1. Use a good tape to test the drive. 2. If the problem persists, call the tape drive supplier helpline.	Eject the tape and inspect for damage. Insert a new tape and try operation again.
9	Write Protect	C	You are trying to write to a write-protected cartridge. Remove the write-protection or use another tape.	Insert a new tape and try operation again.

No.	Flag	Type	Displayed Message	Additional Action Information
10	No Removal	I	You cannot eject the cartridge because the tape is in use. Wait until the operation is complete before ejecting the cartridge.	
11	Cleaning Media	I	The tape in the drive is a cleaning cartridge. If you want to back up or restore, insert a data-grade tape.	
20	Clean Now	C	The tape drive needs cleaning: 1. If the operation has stopped, eject the tape and clean the drive. 2. If the operation has not stopped, wait for it to finish and then clean the drive. Check the tape drive users manual for device specific cleaning instructions.	
22	Expired Cleaning Media	C	The last cleaning cartridge used in the tape drive has worn out: 1. Discard the worn out cleaning cartridge. 2. Wait for the current operation to finish. 3. Then use a new cleaning cartridge.	Wait for the current operation to finish before discarding the cleaning cartridge.

No.	Flag	Type	Displayed Message	Additional Action Information
31	Hardware B	C	The tape drive has a hardware fault: 1. Turn the tape drive off and then on again. 2. Restart the operation. 3. If the problem persists, call the tape drive supplier helpline. Check the tape drive users manual for device specific instructions on turning the device power on and off.	Power off the tape drive and attempt the operation again.
32	Interface	W	The tape drive has a problem with the host interface: 1. Check the cables and cable connections. 2. Restart the operation.	
34	Download Fail	W	The firmware has failed because you have tried to use the incorrect firmware for this tape drive. Obtain the correct firmware and try again.	

Table 4-4 TapeAlert Tape Error Messages

No.	Flag	Type	Displayed Message	Additional Action Information
1	Hardware A	C	The library mechanism is having difficulty communicating with the drive. 1. Turn the library off then on. 2. Restart the operation. 3. If the problem persists, call the library supplier helpline.	Inspect the library to make sure all cable and power connections are secure and tapes inserted correctly.
2	Hardware B	W	Inspect the library to make sure all connections are secure and tapes inserted correctly.	There is a problem with the library mechanism. If the problem persists, call the library supplier helpline.
3	Hardware C	C	The library has a hardware fault: 1. Reset the library. 2. Restart the operation. Check the library users manual for device specific instructions on resetting the device.	If the problem persists, call the library supplier helpline.

No.	Flag	Type	Displayed Message	Additional Action Information
4	Hardware D	C	The library has a hardware fault: 1. Turn the library off and then on again. 2. Restart the operation. 3. If the problem persists, call the library supplier helpline. Check the library users manual for device specific instructions on turning the device power on and off.	Inspect the library to make sure all connections are secure and tapes inserted correctly.
6	Library Interface	C	The library has a problem with the host interface: 1. Check the cables and cable connections. 2. Restart the operation.	If the problem persists, call the library supplier helpline.
14	Library Place Retry	W	There is a potential problem with the library mechanism placing a cartridge into a slot. This warning is for information purposes only. No action needs to be taken at this time. If the problem persists, call the tape drive supplier helpline.	Inspect the library to see if any visible problems exist. Insert a cartridge and try the operation again.

No.	Flag	Type	Displayed Message	Additional Action Information
13	Library Pick Retry	W	There is a potential problem with a drive ejecting cartridges short or with the library mechanism picking a cartridge from a slot. This warning is for information purposes only. No action needs to be taken at this time. If the problem persists, call the tape drive supplier helpline.	Inspect the library to see if any visible problems exist. Insert a cartridge and try the operation again.
15	Library Load Retry	W	There is a potential problem with a drive or the library mechanism loading cartridges, or an incompatible cartridge.	Inspect the library to see if any visible problems exist. Insert a cartridge and try the operation again. Inspect the cartridge to verify compatibility. Call the library supplier helpline if problems persist.
16	Library Door	C	The operation has failed because the library door is open: 1. Clear any obstructions from the library door. 2. Eject any magazine and then insert it again. 3. If the fault does not clear, turn the library off and then on again. 4. If the problem persists, call the library supplier helpline.	Inspect the library to see if any visible problems exist. Insert a cartridge and try the operation again.

No.	Flag	Type	Displayed Message	Additional Action Information
17	Library Mailslot	C	There is a mechanical problem with the library media import/export mailslot.	Inspect the library to see if any visible problems exist. Insert a cartridge and try the operation again. Call the library supplier helpline.
18	Library Magazine	C	The library cannot operate without the magazine. 1. Insert the magazine into the library. 2. Restart the operation.	Refer to user's manual for library operation instructions about inserting magazines. Call the library supplier helpline.
20	Library Security Mode	I	The security mode of the library has been changed. The library has either been put into secure mode, or the library has exited the secure mode. This is for information purposes only. No action is required.	Check the user's manual to verify library configuration.
21	Library Offline	I	The library has been manually turned offline and is unavailable for use.	Power the library on to use.
22	Library Drive Offline	I	A drive inside the library has been taken offline. This is for information purposes only. No action is required.	If drive is desired for use, power the library on.

No.	Flag	Type	Displayed Message	Additional Action Information
23	Library Scan Retry	I	There is a potential problem with the barcode label or the scanner hardware in the library mechanism.	Eject the tape and verify that the barcode label is in place and undamaged. Insert the tape and retry the operation. Call the library supplier helpline.
24	Library Inventory	C	The library has detected an inconsistency in its inventory. 1. Redo the library inventory to correct inconsistency. 2. Restart the operation. Check the applications users manual or the hardware users manual for specific instructions on redoing the library inventory.	Call the library supplier helpline if problems persist.
25	Library Illegal Operation	W	A library operation has been attempted that is invalid at this time.	Call the library supplier helpline if problems persist.

TapeAlert Library Error Mapping

The following table lists the hexadecimal code and messages that appear on the display panel of the autoloader when a message occurs. The table cross-references this information with the TapeAlert message that appears on the host computer's terminal. Use the following key:

- S: Soft error (recoverable)
- H: Hard error (non-recoverable)
- B: both Soft and Hard error

Table 4-5 Troubleshooting Table

Hex	Description	1 Library Hardware A	2 Library Hardware B	3 Library Hardware C	4 Library Hardware D	6 Library Interface	13 Library Pick Retry	14 Library Place Retry	15 Library Load Retry	16 Library Door	17 Library Mailslot	18 Library Magazine	20 Library Security Mode	21 Library Offline	22 Library Drive Offline	23 Library Scan Retry	24 Library Inventory	25 Library Illegal Operation
1	ROM_ERR				H													
2	REGISTER_ERR				H													
3	UP_ERR				H													
4	CNTL_RAM_ERR				H													
5	RAM_TEST_ERR				H													
6	SCSI_CHIP_ERR				H													
7	AC_CHIP_ERR				H													
a	DRV1_CONNECT_ERR	B			H													
b	DRV2_CONNECT_ERR	B			H													
c	DRV3_CONNECT_ERR	B			H													
d	DRV4_CONNECT_ERR	B			H													

Hex	Description	1 Library Hardware A	2 Library Hardware B	3 Library Hardware C	4 Library Hardware D	6 Library Interface	13 Library Pick Retry	14 Library Place Retry	15 Library Load Retry	16 Library Door	17 Library Mailslot	18 Library Magazine	20 Library Security Mode	21 Library Offline	22 Library Drive Offline	23 Library Scan Retry	24 Library Inventory	25 Library Illegal Operation
e	DRV_FAN_FAILURE	B			H													
1e	T_MOTOR_FAILURE				H													
1f	Y_MOTOR_FAILURE				H													
20	Z_MOTOR_FAILURE				H													
2d	DOOR_OPEN			B						B								
2e	MAG1_SENSE_ERR			H						B								
2f	MAG2_SENSE_ERR			H						B								
30	MAG3_SENSE_ERR			H						B								
31	BARCODE_ERR		S		H											B		
32	INVALID_TEST_NO																	S
33	INVALID_CONFIG																	S
34	NEEDS_INVENTORY			H													B	
35	EXERCISE_TEST_FAILED			H														
36	ELEMS_RESERVED																	S
3e	TRANSLATE		S	H														
3f	PUT_MAG		S	H				B										
40	GET_MAG		S	H			B											
41	TEST_MAG				H													

Hex	Description	1 Library Hardware A	2 Library Hardware B	3 Library Hardware C	4 Library Hardware D	6 Library Interface	13 Library Pick Retry	14 Library Place Retry	15 Library Load Retry	16 Library Door	17 Library Mailslot	18 Library Magazine	20 Library Security Mode	21 Library Offline	22 Library Drive Offline	23 Library Scan Retry	24 Library Inventory	25 Library Illegal Operation
42	PUT_DRIVE		S	H				B										
43	GET_DRIVE		S	H			B											
44	TEST_DRIVE	H			H													
45	PUT_MAIL		S	H				B			B							
46	GET_MAIL		S	H			B				B							
47	TEST_MAIL				H						B							
48	ROTATE_MAIL_IN		S	H							B							
49	ROTATE_MAIL_OUT		S	H							B							
4a	TEST_PICKER				H													
4c	RESTORE_PICKER		S	H														
4d	FIND_T_HOME		S		H													
4e	FIND_Y_HOME		S		H													
4f	FIND_Z_HOME		S		H													
51	CLEAR_MAG_PATH		S	H								B						
52	CLEAR_DRV_PATH		S	H														
53	CLEAR_MAIL_PATH		S	H							B							
58	PICKER_DIST			H														
5c	WAIT_PLUNGE		S		H													

Hex	Description	1 Library Hardware A	2 Library Hardware B	3 Library Hardware C	4 Library Hardware D	6 Library Interface	13 Library Pick Retry	14 Library Place Retry	15 Library Load Retry	16 Library Door	17 Library Mailslot	18 Library Magazine	20 Library Security Mode	21 Library Offline	22 Library Drive Offline	23 Library Scan Retry	24 Library Inventory	25 Library Illegal Operation
5d	WAIT_VERT		S		H													
5e	PF_CLEAR_PATH				H													
5f	PF_RESTORE-CARTS				H													
60	REPEATER_CONTRL				H	H												
61	EXTRN_SCSI_CABLES				H	H												

Troubleshooting

Table 4-6 describes how to troubleshoot operation problems. For problems that may be related to the host or application software, refer to the host system documentation or to the application software instructions.

CAUTION Consult the system administrator before cycling power. Never cycle power when active devices are connected to the SCSI bus. Cycling power when the SCSI system is active can cause data loss and/or problems with the SCSI interface.

Table 4-6 Troubleshooting Table

Problem	What to do
Autoloader will not power on.	• Check the power cord connections. • Make sure the power switch is on. • Make sure there is power to the outlet. • Replace the power cord.
Power on self-test failed. `DEVICE FAILED` is displayed in the display window with an error code on the next line.	• Verify that all tapes are fully inserted in the magazine and that the magazine is securely locked into position inside the Autoloader. • Remove all tapes and the magazine, then power cycle. If self-test passes, reload tapes and magazine. • If the power-on test fails again, look at the error code and refer to “Understanding Error Messages” on page 4-5 for more information.
The Autoloader’s power failed while a tape was in the drive and did not return to the ready state after the power came on.	• Press the power switch off and then on again to run the power-on test. • Unload the magazine and tapes, except for the ones in the drive, and power cycle. If successful, reload tapes.

Problem	What to do
No display messages appear.	• Make sure the power cord is connected. • Make sure the power switch is on. • Power cycle the unit.
An error message appears after inserting the magazine or loading tapes.	• Verify that tapes are inserted correctly in the magazine. (See “Loading/Unloading” on page 3-3.) • Verify that the correct tape type is used (Type IIIXT or IV). • If the activity light on the control panel is amber, power cycle the Autoloader. Try to load the magazine again when the drive and status indicators display. • If `SECURITY ENABLED` is displayed, a security option has been set that prevents tapes from being loaded into or removed from the Autoloader.
Changed drive SCSI ID but the new ID is not recognized.	• Use the `VIEW ID` option to verify that the new ID was saved after selecting `UPDATE IDs`. • Power cycle the unit, and reboot the host.
Cannot remember the administration menu password.	• Try the default password (000-000-000). • Download new code from www.gr.hp.com/site/ssdtech/current/index.html
Need to abort internal test.	Press **CANCEL**. The current test loop completes, then the test stops.
`DO INVENTORY TEST` is displayed.	Power cycle the Autoloader, or run the `INVENTORY CHECK` test under the `TEST` * menu.

Problem	What to do
Attempted to open the front access door, but a RESERVED message is displayed.	• The host may have reserved an element (slot or drive) and must unreserve it. Refer to the host system documentation to unreserve a tape. • If unable to unreserve the element, go to the SET DEFAULTS option under CONFIG * to clear the reservation. • A security configuration was set to prevent tape removal. See SECURE ON/OFF in the list of configuration options found in "Configuring the Autoloader" on page 3-18.
Cannot write to the tape.	• Check the host device file system access permissions. • Verify that you are using the correct tape type (Type IIIXT or IV). • Check the write-protect tab on the tape to assure write-enabled status. • Check the application software documentation.
Error code 62H, OVERFULL is displayed.	• Power the unit off. • Remove the magazine. • Remove a tape from the rear slot. • Close the door and power on.
Cannot read the tape.	• Check the host file system access permissions. • Verify that you are using the correct tape type (Type IIIXT or IV). • Check the application software documentation.
Tape stuck in transport.	• Run the EMPTY TRANSPORT TEST under the TEST * menu. • If unsuccessful, power off, and follow the steps in "Tape Stuck in Transport" on page 4-33.

Problem	What to do
Tape stuck in magazine slot.	• Turn off the Autoloader. • Remove the magazine and any obstruction. • Remove the magazine, and gently remove the tape. • Push down on the silver tab at the bottom of the stuck tape, and pull the tape out.
Tape stuck in permanent storage slot.	• Turn off the Autoloader. • Remove the magazine. • Push down on the silver tab at the bottom of the stuck tape, and pull the tape out. • If unsuccessful, follow the steps in "Tape Stuck in Internal Slots or Magazine" on page 4-33.
Slot blocked (magazine or permanent).	• Open the door, and remove the magazine. • Check for and remove any obstruction. Power cycle the unit.
Magazine will not go in.	• Verify that the magazine is inserted correctly. See "Inserting or Removing the Magazine" on page 3-4. • Open the door. Check for and remove obstruction. • Check for damage to the magazine rails (bottom and top of Autoloader), magazine slots, and outside of magazine for wear. Replace the magazine if necessary.
Magazine will not come out.	• Open the door. Check for and remove obstruction.
Transport is misaligned Transport won't pick. Tape/drive/transport is misaligned.	• Replace the unit.

Problem	What to do
Recurrent cleaning light on.	• Replace existing tape with a new tape. See “Drive Cleaning Errors” on page 4-4. • If the light continues after cleaning the drive, replace the cleaning cartridge.
Transport won’t access the two permanent storage slots.	• Open door. Check for and remove any obstruction.
Could not find all slot positions in a `SCAN MAGAZINE` command.	• Verify that all small holes at the bottom inside edge of the magazine are clean.

Replacing a Unit

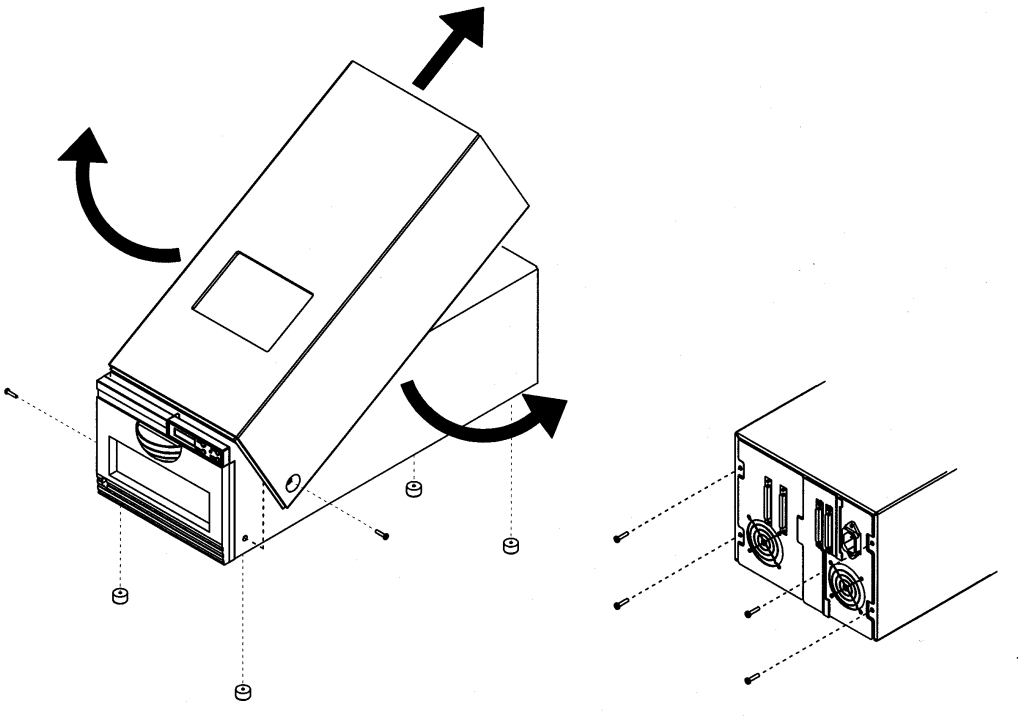
When replacing a unit, you must power the failed unit down, remove and reinstall the cabling onto the new unit, and power on the new unit. These procedures are described below.

NOTE If you are replacing a rackmounted unit, unscrew the unit from the shelf, slide the unit out, and follow the steps below. See “Mounting the Autoloader in a Rack” on page 1-10 for more details.

1. Remove all tapes from the failed unit. See “Loading/Unloading” on page 3-3.
2. If the failed unit is still powered on, turn the standby (power) switch off, located in the bottom left-hand corner when you are facing the unit, and unplug the power cord.
3. Remove the cabling and terminator from the back of the failed unit.
4. If you are replacing a rackmount unit, remove the cover and feet from the replacement unit and install them on the failed unit to be returned.
   a. On the replacement unit, remove the four screws on the back of the cover and the two screws on the side of the cover (Figure 4-1 on page 32).
   b. Remove the cover by pulling the sides slightly out and lifting the cover up and toward the back of the unit.
   c. Unscrew and remove the four feet. You can lay the unit on its side to remove the feet.
   d. Reinstall the cover and feet on the failed unit to be returned.

TIP If the cover fits tightly near the display and is not easily removed, pull the sides out near the display panel while rotating the cover up.

Figure 4-1 Removing the Feet



5. Connect the cabling and terminator on the new unit. See “Connecting the Autoloader” on page 1-18 for this procedure.
6. Power on the new unit. See “Powering on the System” on page 1-23.
7. Load tapes into the new unit. See “Loading/Unloading” on page 3-3.

Removing Stuck Tapes

Tape Stuck in Transport

1. Run the `EMPTY TRANSPORT TEST` under the `TEST` * menu.

   If this fails, go to step 2.
2. Power down the unit by unplugging the power cord from the back of the unit.
3. Open the door, and remove the magazine.
4. Try to remove the tape by grasping it with your fingers.
5. Turn the upper aluminum slotted shaft clockwise to eject the tape.

   If you cannot turn this shaft or if the tape does not eject, rotate the lower shaft to release the tape.
6. Gently remove the tape.

Tape Stuck Between Magazine and Transport

1. Power down the unit by unplugging the power cord from the back of the unit.
2. Take out the magazine.
3. Remove the tape.

Tape Stuck in Internal Slots or Magazine

1. Try to remove the tape by releasing the door and removing the tape with your fingers. If you are unsuccessful, continue with the next step.
2. Power down the unit by unplugging the power cord from the back of the unit.
3. Gently ease the transport out of the way.
4. Gently press the silver tab that is at the bottom of the stuck tape. Once depressed, the tape should eject.
5. Remove the tape with your fingers.

NOTE

Tapes can become stuck in internal slots because of tape cartridge wear. If the tape cartridge shows signs of wear, recover data and replace the tape.

Tape Stuck in Drive

CAUTION

If a tape is stuck in the drive and the customer will not allow the tape to leave the facilities, you must remove the drive to extract the stuck tape.

Only manually unload the tape if it is imperative that the customer retain the tape. If not, keep the tape in the drive to help with failure analysis.

1. Run the `TRANSLATE TEST` to move the transport out of the way.
2. Run the `REWIND MEDIA` test to rewind the tape. If you are unable to rewind the tape, go to step 6.
3. Use the `OPEN DRV HANDLE` internal test to release the tape.
4. Run the `UNLOCK DOOR` test to release the front door.

CAUTION

Do not use the `RELEASE DOOR` option because this will move the transport with the stuck tape and cause further damage.

5. If steps 1-4 are successful, the transport is damaged. Open the door, remove the tape, and replace the unit. If you are still unable to remove the tape, proceed to the next step.

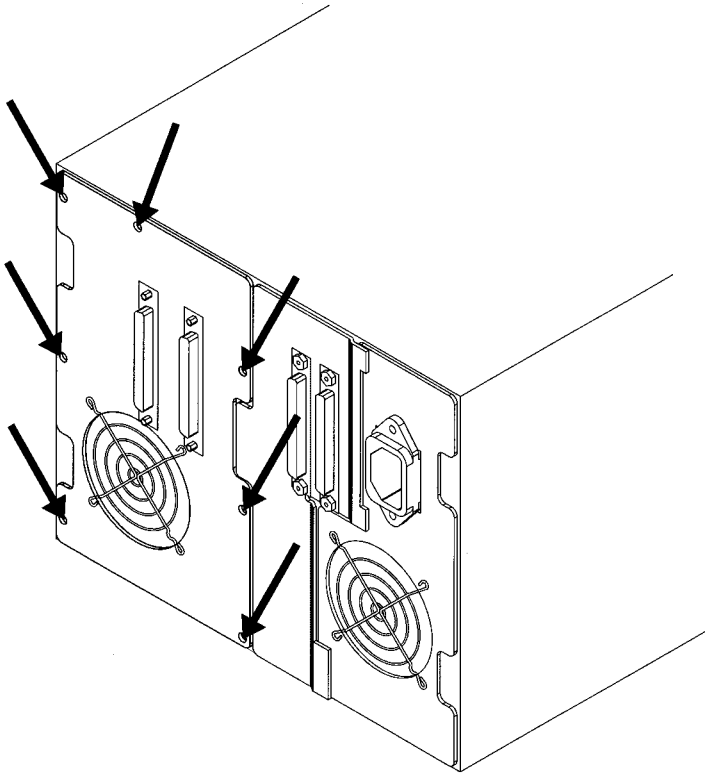
NOTE

If you are removing the drive on a rackmounted unit, unscrew the unit from the shelf, slide the unit out, and follow the steps below. See “Mounting the Autoloader in a Rack” on page 1-10 for more details.

6. Power down the unit by unplugging the power cord from the back of the unit.
7. Disconnect remaining external cables.

8. Remove the seven screws on the drive's rear plate. See Figure 4-2 for screw locations.

Figure 4-2 **Screw Locations**

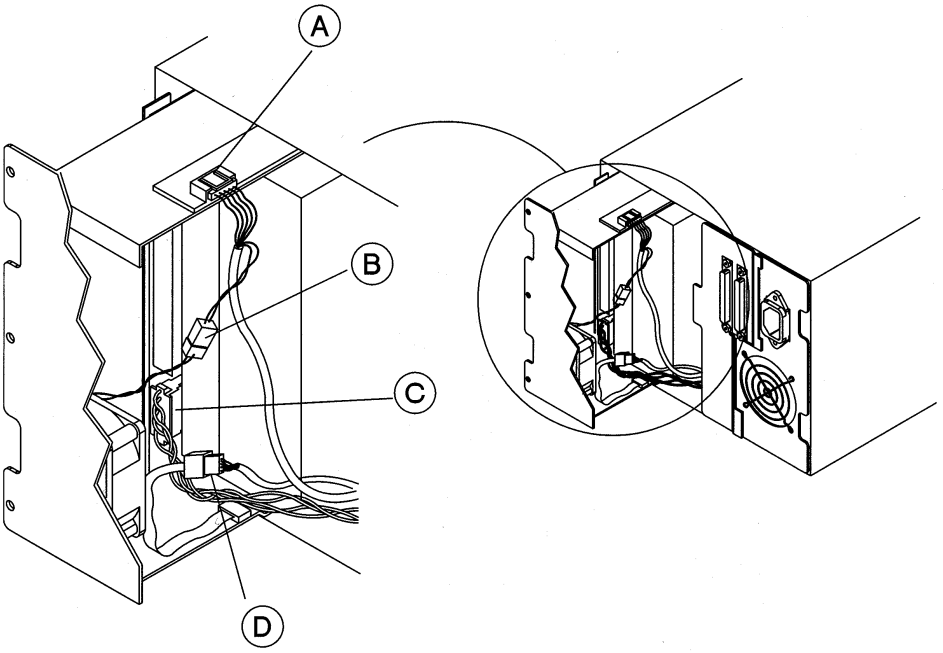


9. Gently pull out the drive partially, taking care not to damage the cables.

10. Disconnect the following four cable connectors, which are labeled in Figure 4-3.

NOTE It is unnecessary to remove the internal SCSI ribbon cable from the back of the drive.

Figure 4-3 Drive Cables Connections

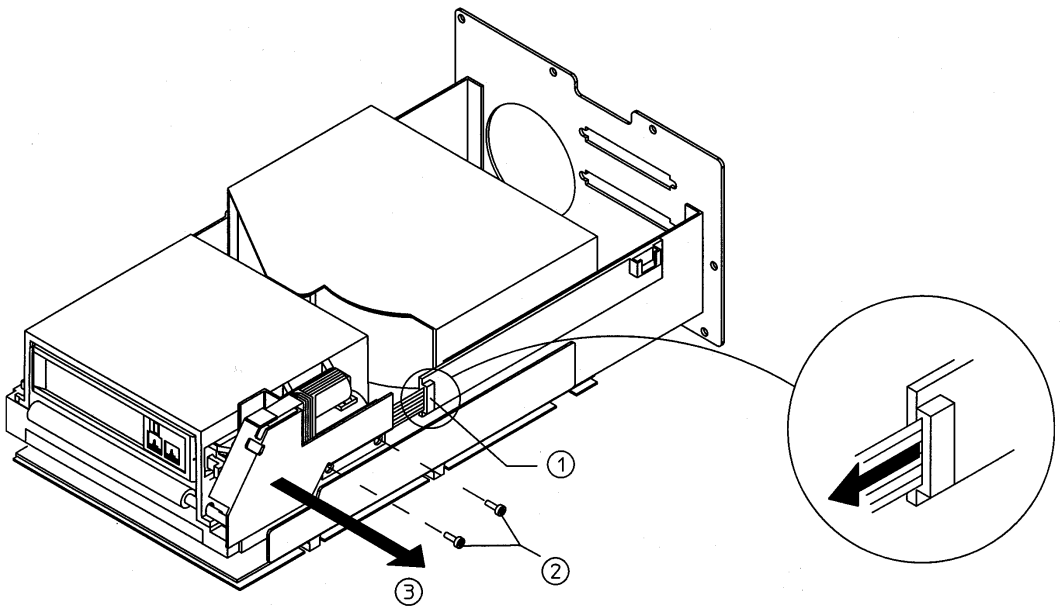


A	Drive handle motor
B	Fan
C	Power
D	Drive to loader

11. Hold the four cable connectors to the right side of the unit, and remove the drive.
12. Inspect the drive to see if any tape is on the take-up wheel. If so, see “Manually Rewinding Tapes” on page 4-39. If not, continue with the next step.
13. Remove the drive handle motor assembly (on the right side of the drive). See Figure 4-4.

A	Disconnect the flex cable by gently pulling it out of the connector.
B	Remove the two screws.
C	Slide the assembly straight out and set it aside.

Figure 4-4 Drive Motor Assembly

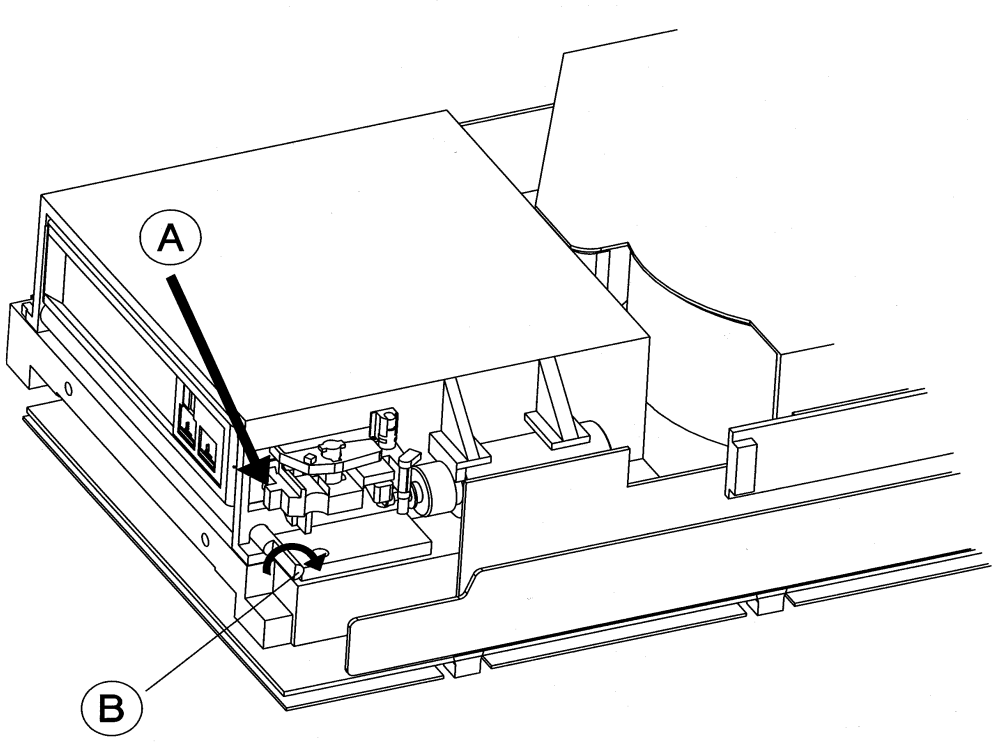


14. Pull out the solenoid mechanism while gently turning the D-shaft clockwise with pliers to eject the tape (Figure 4-5).

A	Solenoid mechanism
B	D-Shaft

NOTE Ensure that both the top and bottom tabs of the solenoid are pulled out.

Figure 4-5 Ejecting the Tape



15. If you are able to eject the tape and the leader is retracted, restore and save the tape data, then discontinue using that tape.

Manually Rewinding Tapes

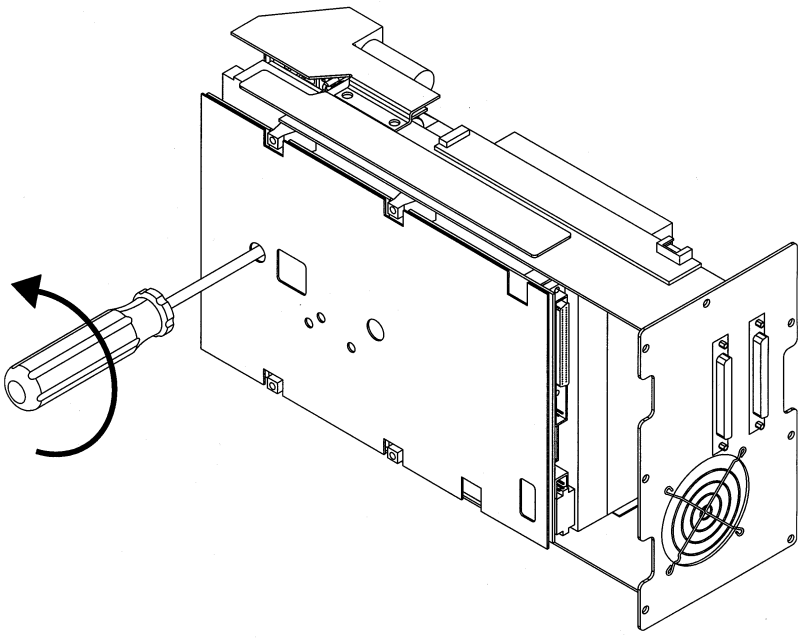
1. When the drive is removed, lay it on its side, as shown Figure 4-6.
2. Insert a Phillips screwdriver into the rewind hole on the bottom of the drive.
3. Turn the screwdriver counterclockwise to rewind the tape (Figure 4-6).

   Continue rewinding until the leader is seated in the tape.
4. To ensure that the tape is fully rewound, check that no tape is dangling from the tape cartridge.

CAUTION

If the tape leader is not seated and you are unable to manually rewind the tape, an obstruction or broken tape reel lock is the likely cause. If either of these conditions exist, it may not be possible to remove the tape without damaging it. Refer the customer to data restoration facilities.

Figure 4-6 **Rewinding a Stuck Tape**



Drive Reassembly

1. Partially slide in the drive. Reconnect the four cable connectors. See Figure 4-3 on page 36.
2. Taking care not to damage the cables, insert the drive into the unit.
3. Install the seven screws on the drive's rear plate. See Figure 4-2 on page 35 for screw locations.
4. Connect the external cables, connecting the power cable last. See "Connecting the Autoloader" on page 1-18 for the procedure.
5. Power the unit on. See "Powering on the System" on page 1-23 for the procedure.

A Installing an Autoloader into a Non-HP Rack

Mounting the Autoloader in a Non-HP Rack

This rackmount kit fits all standard 19-inch racks that have a depth between 25 - 34 inches.

Tools and Components

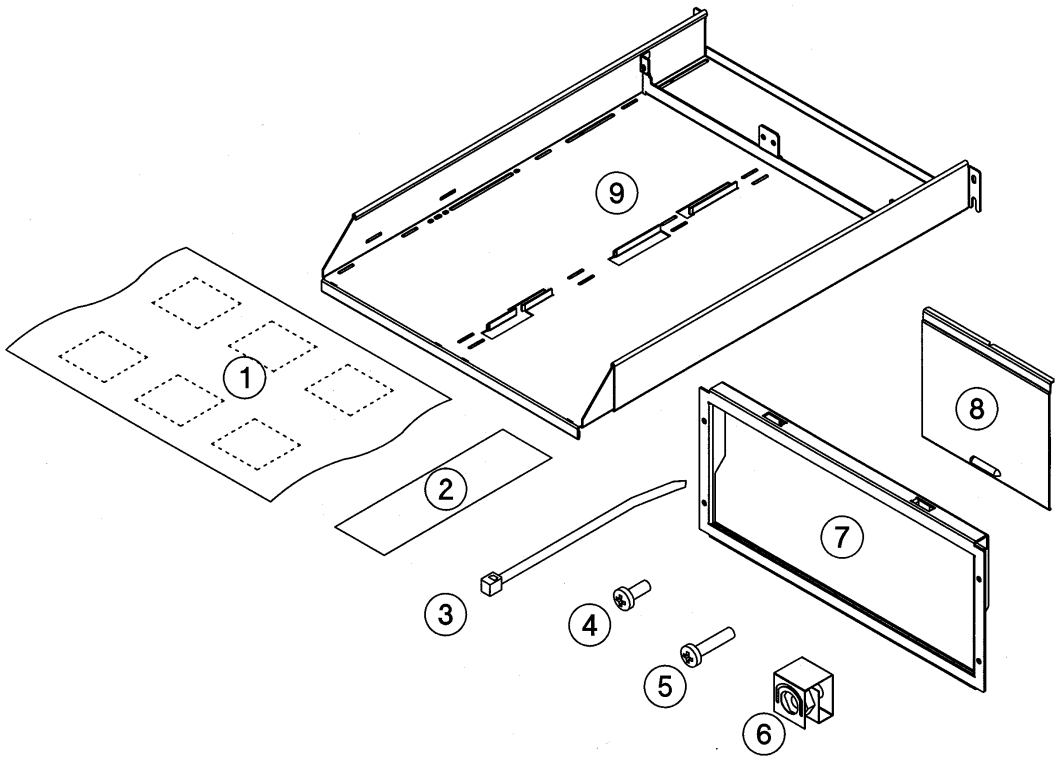
Before you begin, make sure you have the following:

Tools:
#2 Phillips screwdriver

Kit Components (parts are labeled for easy identification):	
1. Installation poster (Qty 1)	6. 10-32 clipnuts (Qty 10)
2. Template (Qty 1)	7. Support bezel (Qty 1)
3. Cable ties (Qty 4)	8. Filler panel (Qty 1)
4. M4 x 10 mm pan phillips (Qty 6)	9. Shelf and rail assembly (Qty 1)
5. 10-32 x 5/8 pan phillips (Qty 10)	

NOTE The rack kit may contain extra parts.

Figure A-1 Rack Kit Parts



Mounting the Autoloader

1. Facing the front of the rack and using the template as a guide, install four clipnuts (two in each rail) above any existing products (Figure A-2).

TIP

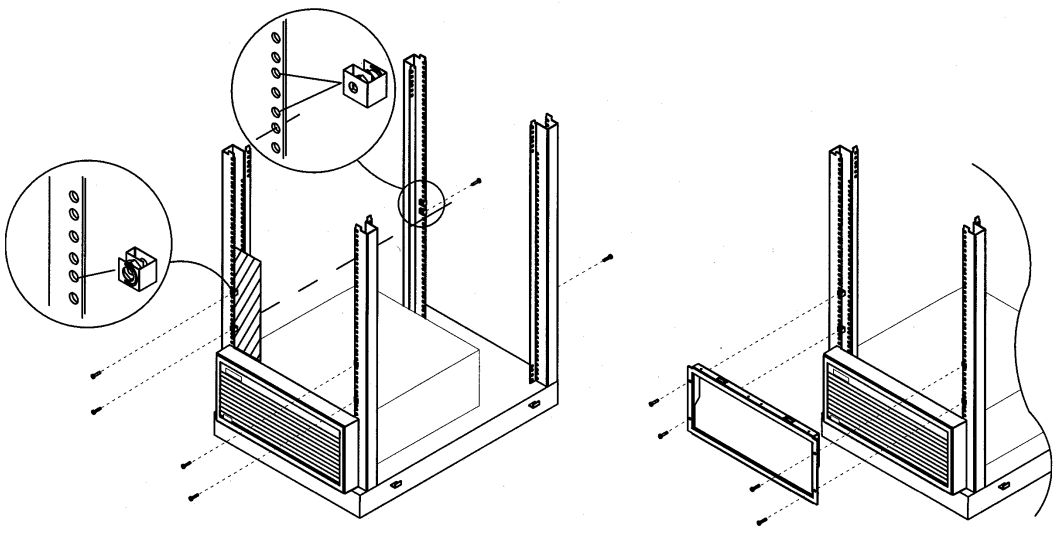
For a level shelf, ensure that the screws are in the same position on the right and left rail.

NOTE

Your rack might look different from the illustrations.

2. Using the template as a guide, install two clipnuts into each back rail on the rack. The back lower clipnuts should be located one hole above the front lower clipnuts (Figure A-2).
3. Position the holes on the support bezel over the front clipnuts, then install and tighten four 10-32 screws.
4. Loosely install two 10-32 screws into the back lower clipnuts.

Figure A-2 Clipnut and Screw Installation



5. Before installing the shelf, adjust the shelf depth to fit your rack (Figure A-3). The shelf can be adjusted for 25- to 34- inch racks. To customize the fit, measure the rack depth from the front rail to the back rail.

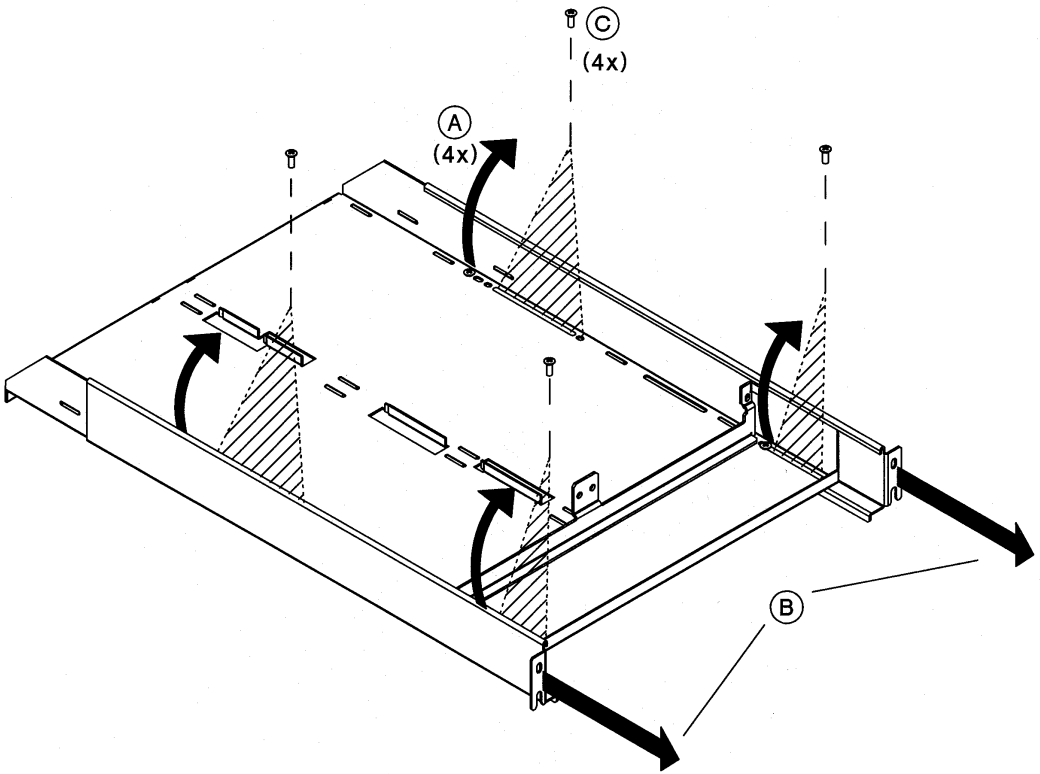
   a. Remove the four preset screws from the shelf.

   b. Slide the side rails back until the shelf depth is the same measurement as the rack depth.

   c. Loosely thread a screw into the corresponding hole or slot, as well as the holes near the shelf backstop.

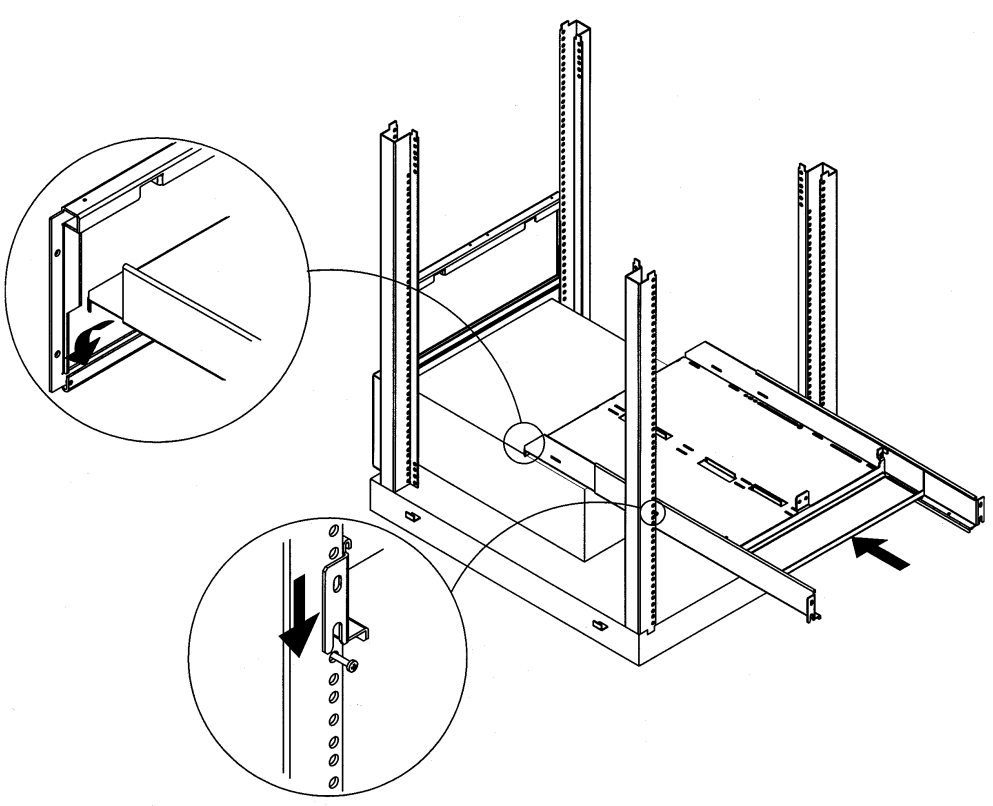
      Do not tighten the screws until you install the shelf (Figure A-3).

Figure A-3 Customizing the Shelf Depth



6. Slide the shelf through the back of the rack until the front lip fits between the front and back slots on the bezel and the rear portion of the shelf slides over the back screws (Figure A-4).

Figure A-4 Shelf Installation



NOTE Have a second person stand at the front of the rack to help guide the front lip of the shelf between the slots on the bezel.

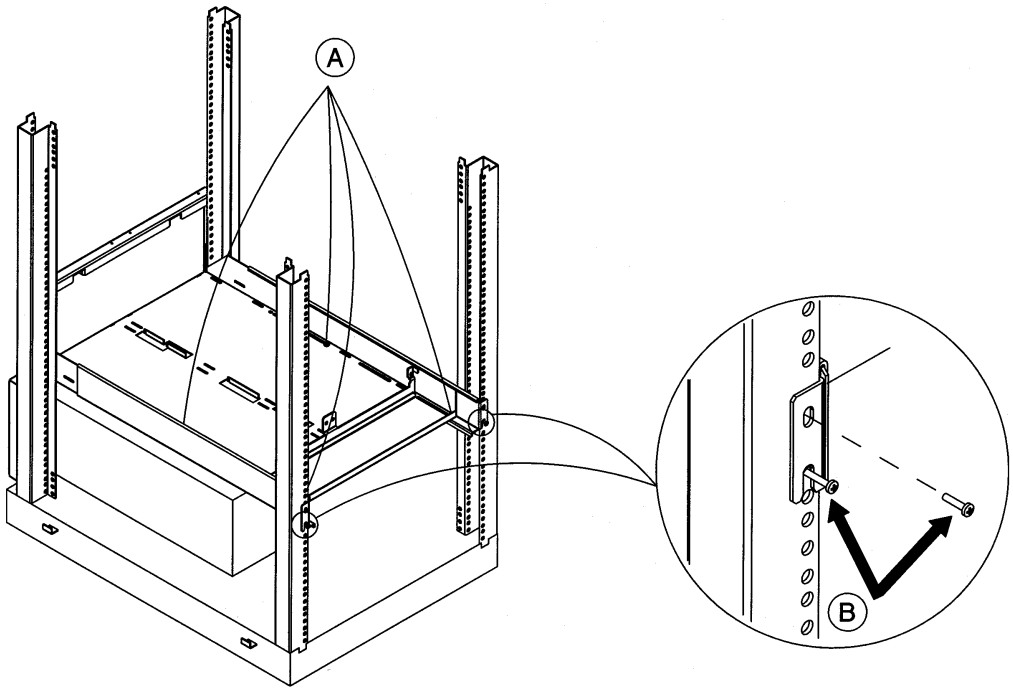
CAUTION Ensure that installation in your rack cabinet does not create an unstable condition.

7. To secure the shelf to the rack, install and tighten two screws (one on each side) into the upper clipnuts on the back of the shelf (Figure A-5).

   a. Tighten the four screws on the shelf.

   b. Tighten the four screws on the back of the rack.

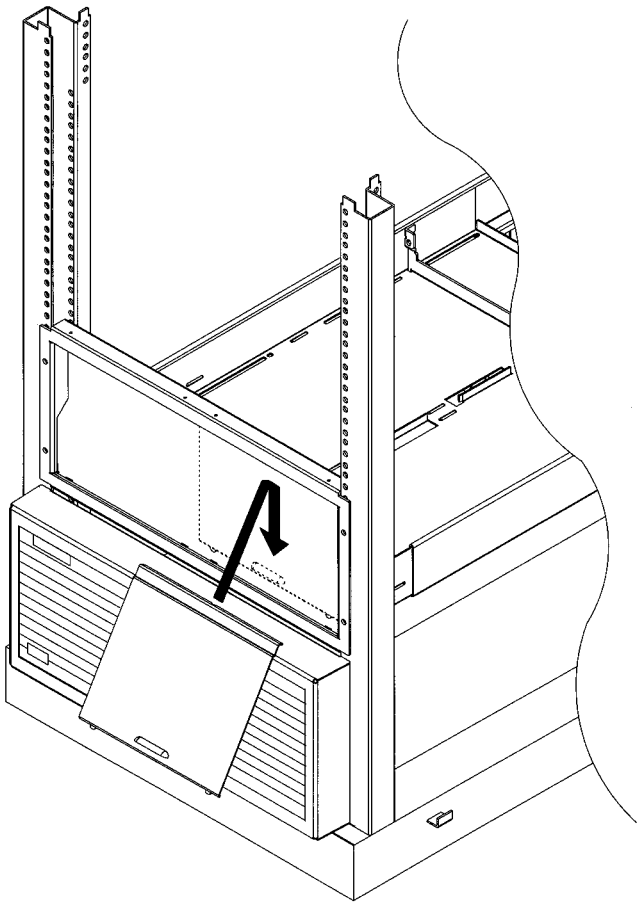
Figure A-5 Tighten the Screws



8. Decide on the location for the Autoloader. The filler panel will be installed on the other side if you are installing one Autoloader (Figure A-6).
9. Align the filler panel to the edge of the support bezel and insert it up into the track.

   The tabs on the bottom of the filler panel should fit into the corresponding holes on the shelf. The tab in the top of the filler panel will hold the filler panel in place. If the panel is not correctly installed, it will not load.

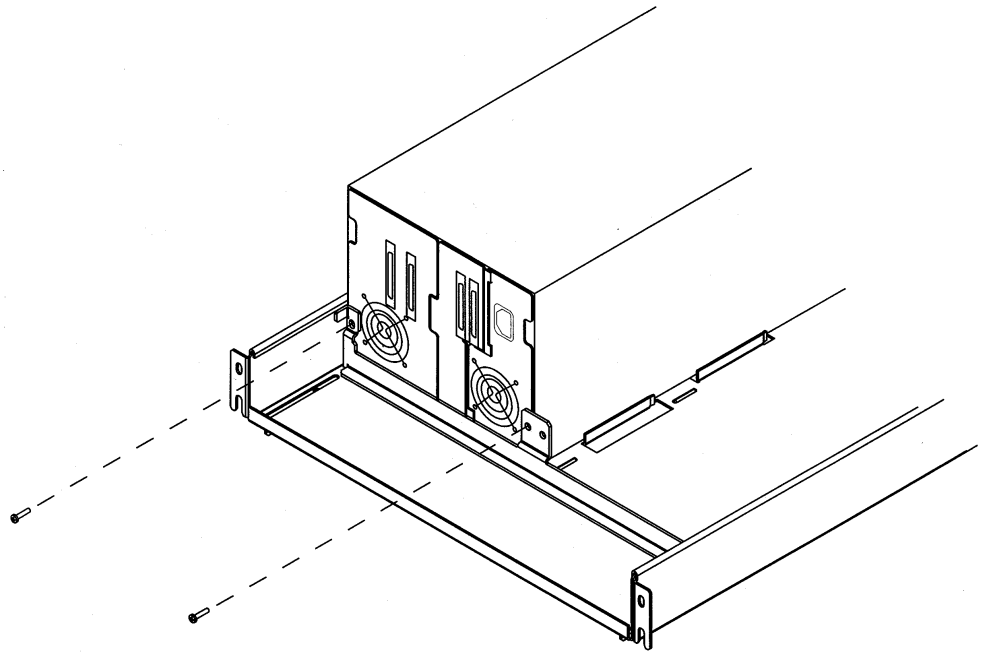
Figure A-6 Filler Panel Installation



10. Remove the unit's cover and feet. See "Removing the Cover and Feet" on page 1-17 for the procedure.
11. From the front of the bezel, slide the Autoloader into the shelf until it rests firmly against the support bracket.
12. Secure the unit by installing two M4x10 mm screws through the support bracket and into the rear panel (Figure A-7).
13. After connecting the external cables, secure the cables to the side of the rack by following the steps in "Cable Management" on page 1-16.

NOTE Save the remaining screws for a possible second Autoloader installation.

Figure A-7 Securing the Autoloader



CAUTION Be certain that the ambient of the rack cabinet does not exceed the maximum room ambient of 104^{o}F or 40C.

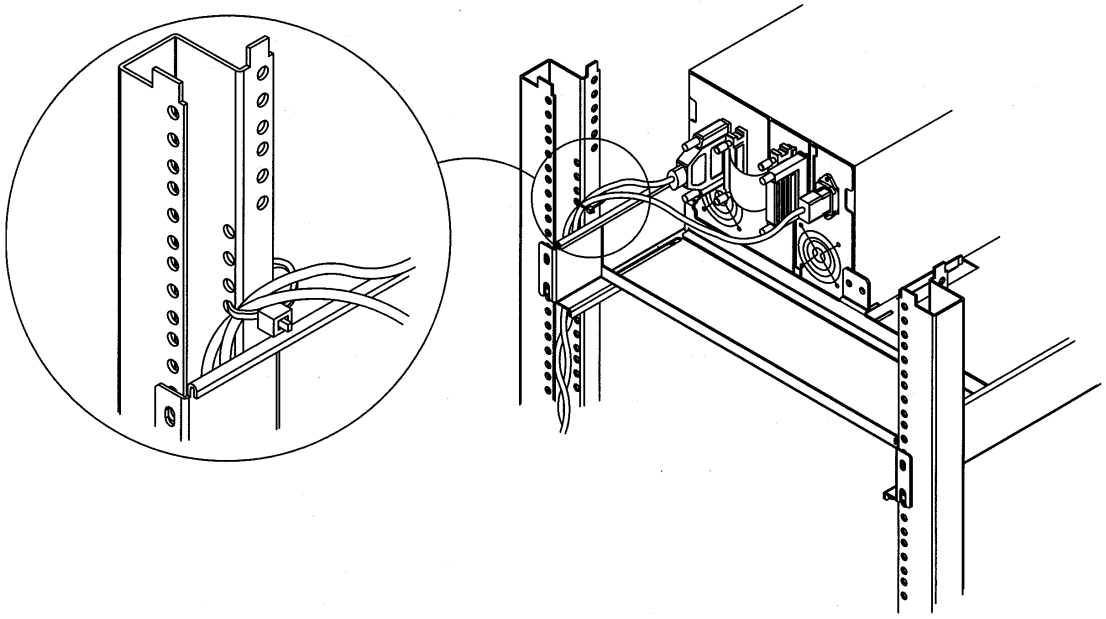
Cable Management

CAUTION

Ensure that the SCSI and power cables are properly routed and secured on rackmounted Autoloaders so that they do not interfere with other moveable rackmounted products. Failure to properly route cables could damage them.

1. After connecting the external cables in "Connecting the Autoloader" on page 1-18, thread a cable tie through the metal rail inside the rack (Figure A-8).
2. Gently pull the cables toward the nearest cable tie to secure them to the rack.
3. Route the cables through the rack so that they do not interfere with other rackmounted products.

Figure A-8 Cable Management



B Support and Exchange Process

Support Flow Overview

For units sold with the standard Express Exchange Warranty, the product will follow the standard Express Exchange Model, with one exception. If a tape is stuck in the unit and the CSC is unable to talk the customer through removing the tape, the CSC will dispatch a CE who will follow the standard Response Center support model. See Figure B-2 or Figure B-2.

Figure B-1 **USA Repair Strategy**

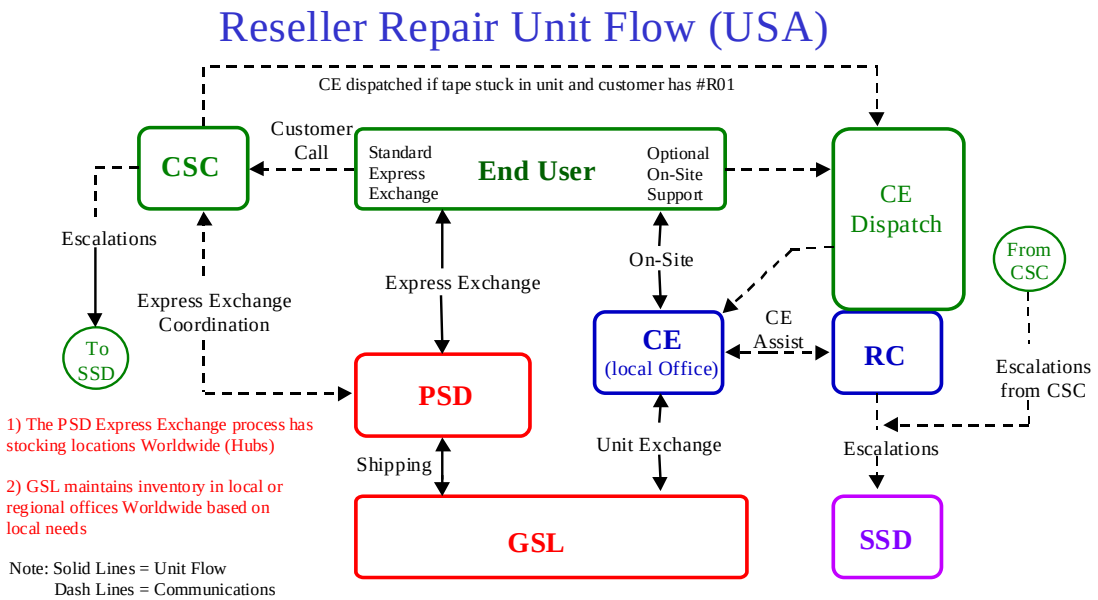
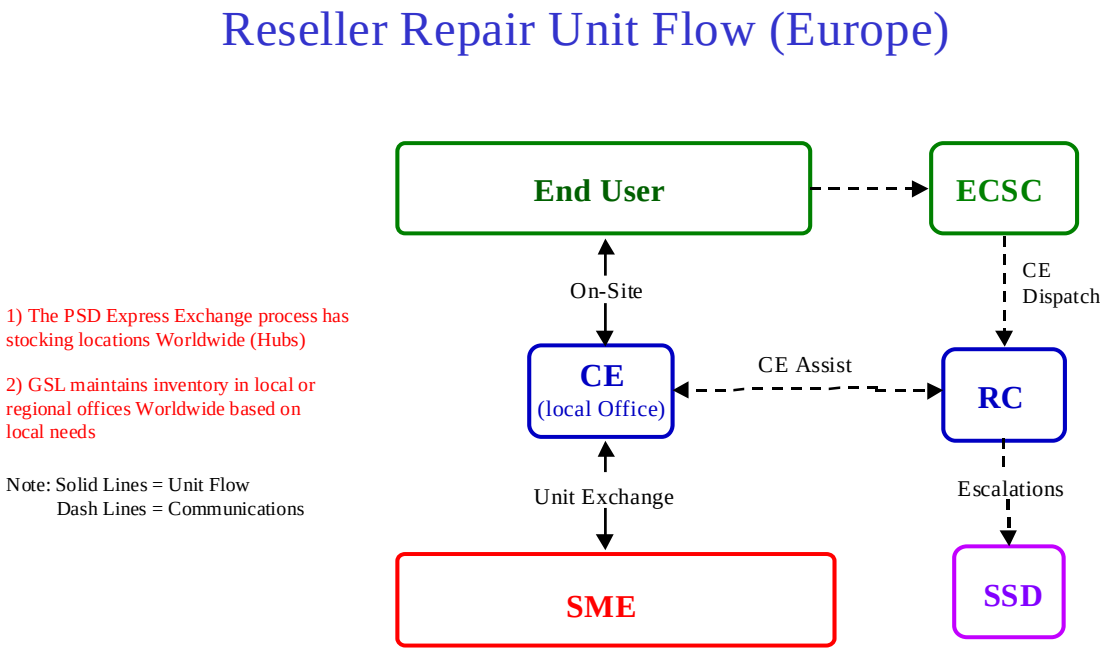


Figure B-2 Europe Repair Strategy



Express Exchange Process

The field process can be a unit exchange by the Customer Engineer or an Express Exchange by the end user. In some situations and regions, the CE is required on-site for unit replacement.

1. When a customer experiences a problem with a product, the customer will call the Customer Support Center.
2. The Support Center obtains a credit card number from the customer and places a charge for the unit on the credit card or purchase order. The Support Center then contacts the stocking facility and orders a shipment of the replacement product.
3. Once the customer receives the replacement product, the customer has a certain time to ship the defective product back to HP in the packaging of the new unit.
4. Once the stocking facility receives the defective product, it credits the customer's credit card. If it is not received within that time frame, the customer is charged full price.

Warranty

The standard warranty for the Autoloader is a three-year Express Exchange with next day service. All users receive support from the CSCs, and a CE can be dispatched if the customer gets a tape stuck in the unit and the customer requires that the data stay on-site.

NOTE Some regions use a CE on-site to exchange the unit rather than Express Exchange.

The user can upgrade the support level by purchasing 07x or 02x support products, which provides on-site support conversion and is available by calling the local response center or local HP sales office.

If the product is under warranty, the repair facility ships a unit immediately after receiving a call from the Customer Support Organization. If the product is out of warranty, the defective unit must be returned before the Support Center ships a replacement unit.

Diagnostic Information

Diagnostic capabilities come with this product. Diagnostics are available in two ways: the PC SCSI tools and the Front Panel diagnostics. The PC tools are used as an offline troubleshooting tool, which enables the CE to troubleshoot the hardware and obtain SCSI command information. The Front Panel diagnostics enable the CE to run robotics tests, drive tests, and obtain log information from the DLT Autochanger Robotics. There are two options for external diagnostics:

- PTI: SCSI Toolbox
  http://www.scsitools.com
- CoComp: SCSI Pro
  http://www.cocomp.com

To obtain ordering information, contact your DM or manager. The PTI SCSI Toolbox is supplied with the CE TOOLS (Omnibook). The CoComp SCSI Pro product is ordered separately. Support providers may purchase the CoComp SCSI Pro by calling:

US (800) 859-7274

Support for SCSI Pro

Support Phone Number: (800) 873-0247

Fax Number: (970) 482-2913

Support Hours: 8am - 5pm U.S. Mountain Time

Worldwide Support

Internet Address: www.cocomp.com

Email Address: techsupport@cocomp.com

Expected Resolution Time: 1 day

Please provide the following information when calling CoComp:

- Product Serial #: Located in Help screen and also under FILE/ABOUT SCSI Pro
- Operating System/Layout (Win95, WinNT, HP-UX, etc)
- Host Adapter Type
- Error Codes
- Description of the problem

Autoloader Firmware

Autoloader firmware (DLT drive and SCSI board firmware) may be obtained from the Technical Support Web Page.

Web Pages

www.gr.hp.com/site/ssdtech/current/index.html

http://dodger.gr.hp.com/isgsupport/optical/fw/firmware.html

http://www.hp.com/isgsupport/optical/fw/firmware.html

C Safety and Regulatory

Regulatory Information

Declaration of Conformity

according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: **Hewlett Packard**

Manufacturer's Address: Storage Systems Division
700 71st Avenue
Greeley, Colorado 80634

declares, that the product

Product Name: DLT Library

Model Numbers: **C6280X**
(where X= A-Z)

Product Options: All Options

conforms to the following Product Specifications:

Safety: EN 60950: 1992+A1+A2:1993+A3:1995/IEC950(1991)+A1+A2+A3

EMC: EN 55022 (1994) / CISPR 22 (1993), Class B
EN 50082-1 (1992)
prEN 55024-2 (1992) / IEC 1000-4-2 (1995), 4 kV CD, 8 kV AD
prEN 55024-3 (1991) / IEC 1000-4-3 (1995), 3 V/m
prEN 55024-4 (1993) / IEC 801-4-4 (1988), 1 kV Peak Power Lines
0,5 kV Signal Lines
EN 61000-3-2 (1995) / IEC 1000-3-2 (1995), Harmonics
EN 61000-3-3 (1995) / IEC 1000-3-3 (1994), Flicker

Supplementary Information:

The product herewith complies with the requirements of the following Directives and carries the CE marking accordingly: the EMC Directive 89/336/EEC -the Low Voltage Directive 73/23/EEC (including 93/68EEC)

The Manufacturer listed above declares that this product has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: a) Reorient or relocate the receiving antenna, b) Increase the separation between the equipment and receiver, c) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected, or d) Consult the dealer or an experienced radio/TV technician for help.

Change or modification of this equipment not expressly approved by Hewlett Packard Co. could void the user's authority to operate this equipment. Only use the cables, connectors, power cords, and accessories supplied with this equipment or expressly approved by Hewlett Packard Co. Test Report on File: #97.5800.012-I

Hewlett Packard Co. April, 1998 Greeley, Colorado, USA

_____/S/_____
Quality Manager

For Regulatory Compliance Information ONLY, contact:

Australian: Product Regulations Manager, Hewlett Packard Co.

European: Your local Hewlett Packard Co. Sales and Service Office or

USA: Product Regulations Manager, Hewlett Packard, Storage Systems Division , 700 71st Avenue, Greeley, Co. 80634 Phone: (970) 350-4000

United Kingdom Telecommunications Act 1984

The digital linear tape libraries are approved under Approval Number NS/G/1234/J/100003 for indirect connection to Public Telecommunication Systems within the United Kingdom.

Japanese Harmonics Statement

高調波ガイドライン適合品

Herstellerbescheinigung

Diese Information steht im Zusammenhang mit den Anforderungen der Maschinen-lärn Information sverordnung vom 18 Januar 1991.

Schalldruckpegel Lp < 70 dB(A)

- am Arbeitsplatz
- Normaler betrieb
- Nach ISO 7779: 1988/EN 27779:1991 (Typprüfung)

English Translation of German Sound Emission Directive

This statement is provided to comply with the requirements of the German Sound Emission Directive, from January 18, 1991.

Sound pressure Lp < 70 dB(A)

- At operator position
- Normal operation
- According to ISO 7779: 1988/EN 27779: 1991 (type test)

Japanese VCCI Class B Statement

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

English Translation

This equipment is in the Class B category information technology equipment based on the rules of Voluntary Control Council For Interference by Information Technology Equipment (VCCI). Although aimed for residential area operation, radio interference may be caused when used near a radio or TV receiver. Read the instructions for correct operation.

Index