

**hp** surestore  
tape library  
model 20/700



**user's guide**





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**Edition 6:**      **May 2002:**  
Revised information for new library firmware.

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## 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.)

**Manufacturing part number:**  
**313811901 (Rev A)**

- Edition 1:**      **December 1999:**  
Initial printing.
- Edition 2:**      **August 2000:**  
Revised information for new library firmware and added information for the Web-Based Library Administrator.
- Edition 3:**      **November 2000:**  
Added information for HP Ultrium tape drives and cartridges.
- Edition 4:**      **October 2001:**  
Added information for supported drives and media, and customer support information.
- Edition 5:**      **January 2002:**  
General printing. Released manual to coincide with *10/180 User's Guide*.

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## Warranty

**Note** See Appendix C for more information about support and service.

HP Product: HP Surestore Tape Library Model 20/700

Duration of limited warranty: One Year

1. HP warrants HP hardware, accessories, and supplies against defects in materials and workmanship for the period specified above. If Hewlett-Packard receives notice of such defects during the warranty period, Hewlett-Packard will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.
2. HP warrants that HP software will not fail to execute its programming instructions, for the period specified above, due to defects in material and workmanship when properly installed and used. If HP receives notice of such defects during the warranty period, HP will replace software media that does not execute its programming instructions due to such defects.
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## Updates

For the most current version of this manual and other information regarding your tape library, visit the HP Customer Care Web site:

[www.hp.com/go/support](http://www.hp.com/go/support)

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## Typographical conventions and terms

<b>Bold:</b>	Menu choices and screens on the library.
<b>[Bold]:</b>	Buttons to press on the library.
<i>Emphasis:</i>	Draws attention to items within text.
<b>Note</b>	Notes explain significant concepts or operating instructions.
<b>Caution</b>	Cautions call attention to an operating procedure or practice that could damage the product if not correctly performed. Do not proceed until you understand and meet these required conditions.
<b>WARNING</b>	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.

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## In this manual

- Chapter 1**     **Getting started:** Describes tape library hardware, operating modes, the Auto Clean features, and the Web-Based Library Administrator.
- Chapter 2**     **Controls and Indicators:** Shows the locations of the power switch and operations panel, and describes the functions of the buttons, indicators, and display screens.
- Chapter 3**     **Configuration:** Describes how to power on and configure the library and drives through the operator panel.
- Chapter 4**     **Library Operation:** Describes the procedures for operating the library in automated and manual modes, and explains how to load cartridges through the CAP, power off the library, and manually load and unload tape cartridges.
- Appendix A**   **Drives and Media:** Describes drive and media specifications, using tape cartridges, and troubleshooting drives and tape cartridges for HP Ultrium LTO, DLT, and 9840 drive technologies.
- Appendix B**   **Library Elements and Diagrams:** Includes maps of all SCSI elements and panel, row, and column locations for library cells.
- Appendix C**   **Customer support:** Includes support information for the library.

- Appendix D**   **Safety and Regulatory Information:** Includes safety, regulatory and certification information for the library.
- Glossary**     **Glossary of terms:** Includes technical terms used in this manual.



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# Getting Started



This chapter describes the hardware components of the library, the cell locations for cartridge tapes, and the two library operating modes (automatic and manual). For software information and drive information, refer to the publications that pertain to these specific topics.

The library is a robotic system that mounts cartridges into a storage cell or into a drive for read/write operations. It also moves cartridges from the cartridge access port (CAP) to storage cell or from cell to cell. **Figure 1** on page 15 through **Figure 4** on page 22 show the major components of the library, described in the following pages.

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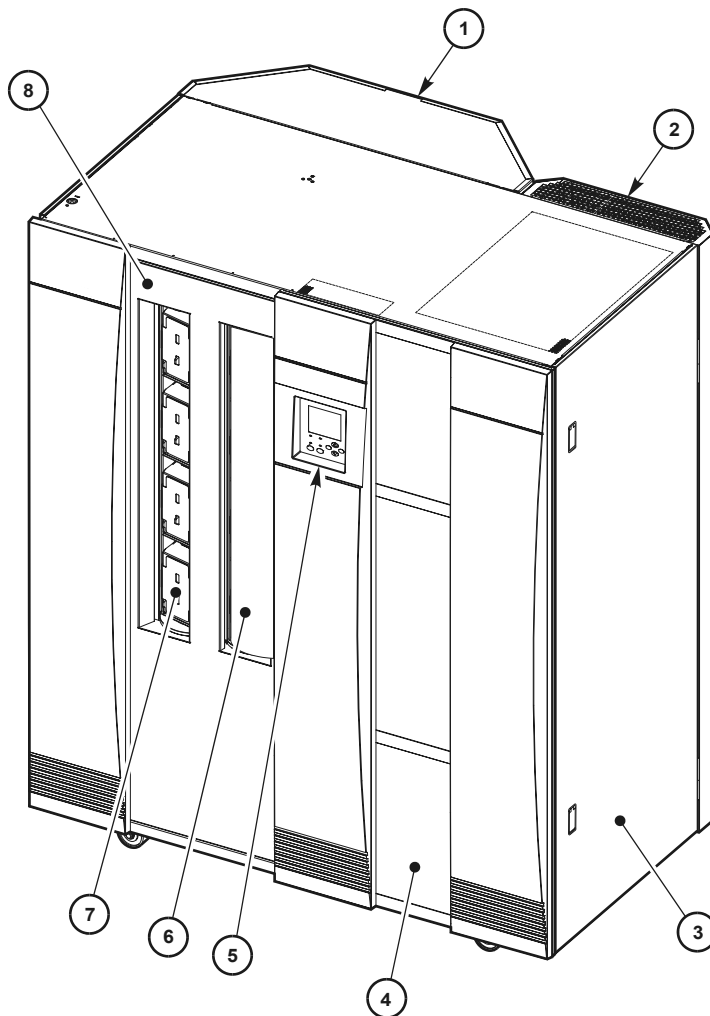
## Tape Library Components

The tape library has four major components:

- A robot, which mounts and dismounts cartridges
- Storage cells for 228 to 690 cartridges
- A CAP that holds up to 20 cartridges in four magazines, with an optional second CAP that holds the same number of cartridges
- Drives, which perform read/write operations

Figure 1

Library Major External Components



H\_65081

1	Optional expansion frame	5	Operator Panel
2	Rear door	6	Optional CAP B (shown closed)
3	Drive access door	7	Standard CAP A (shown open)
4	Right door	8	Left access door



## Robot

The robot moves cartridges between storage cells, between cells and tape drives, and between the CAP and cells. The robot consists of the Z-column assembly (vertical motion), the theta mechanism (lateral motion), and the hand-camera assembly. **Figure 2** on page 17 shows these robot components.

The Z-column assembly contains a Z-column and Z-carriage. The Z-column attaches to the floor and ceiling of the tape library. The Z-column can rotate almost 360 degrees to enable access to all the cells in the tape library.

The hand-camera assembly, which is attached to the Z-carriage, grasps and releases cartridges. The Z-carriage moves the hand up and down the Z-column to storage cells, drives, or the CAP.

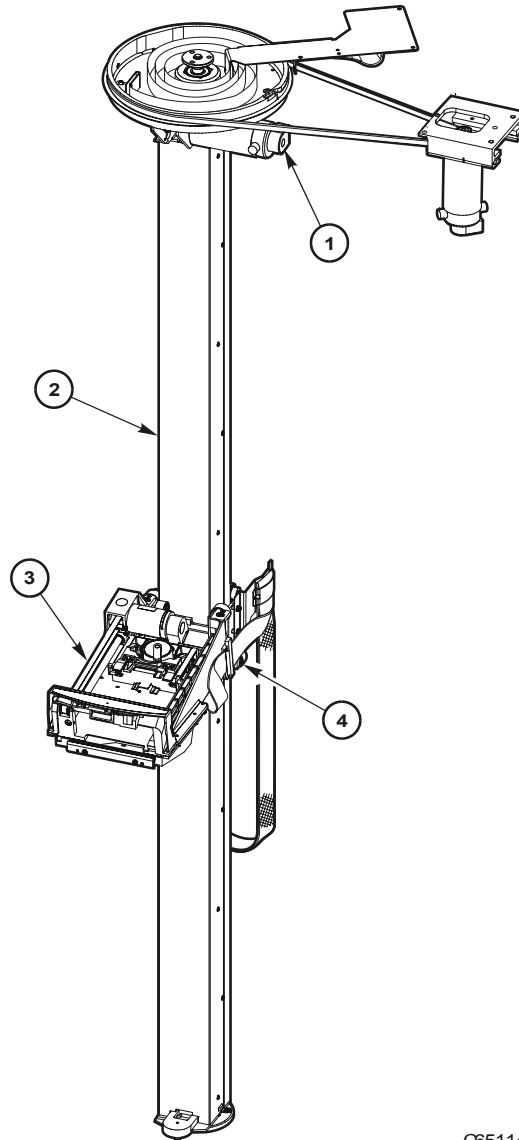
The camera, which is on the hand, is active only during a library audit. An audit occurs when you:

- Power-on the tape library.
- Open and close the left access library door.
- Make a request from your backup application software to audit the tape library.

During an audit, the camera reads the location and volume serial number (VOLSER) of each cartridge in the storage cells and reserved cells. Since this information is stored in the library's memory, the library does not rely on the camera to read cartridge locations or VOLSERS during mount and dismount operations.

Figure 2

## Robot Components



C65114

1	Z-motor	3	Hand-camera assembly
2	Z-column	4	Z-carriage

## Storage Cells

The library contains storage cells for 228 to 690 cartridges, excluding the CAP cells. The number of cells is determined by how many drives are installed and whether the tape library has the standard rear window panel or the expansion frame. The expansion frame provides additional storage cells for 294 cartridges.

### Cell Locations

Cartridges are stored in cell arrays that hold six cartridges. Cell arrays are stacked in columns and these columns are arranged in a circle around the robot assembly. Columns can hold up to 42 cartridges.

**Table 1** on page 20 lists tape library storage capacities. **Figure 3** on page 21 through **Figure 4** on page 22 show cell locations for the 20/700 tape library in its various configurations.

---

**Note**      The following statements apply to cell locations:

---

1. The library uses array targets for robotic calibration during an Initial Program Load (IPL).
2. Never put data cartridges in the reserved cells (refer to **Figure 3** on page 21 for more information). If you do not want to store diagnostic and/or cleaning tapes in these cells, you must leave them empty.
3. The library does *not* use the drive and CAP locations to store cartridges.
4. The robot uses the swap cell (the top-most cell in the reserved area) for in-transit cartridges, to place a cartridge that is left in the hand-camera assembly when a power failure occurs, or to perform a swap operation.

## Library Capacity

**Table 1** on page 20 lists the library storage capacities. Although library capacity is automatically configured when you bring the library online, check the operator panel to be sure that the capacity information is accurate.

---

**Note** HP is transitioning the HP Surestore Tape Library Model 20/700 (product number A5597A) to allow for a new feature. This feature will make it possible to couple two 20/700 libraries together, allowing tape cartridges to be exchanged between the libraries. As a result, we are transitioning to a new product number, A5597B. Until this feature is available and installed, the display on your library status screen will continue to identify the library as "A5597A". In the future, if you choose to use this feature, your library will then be identified as "A5597B".

To determine whether your library is an A5597A or A5597B, refer to the regulatory label on your unit.

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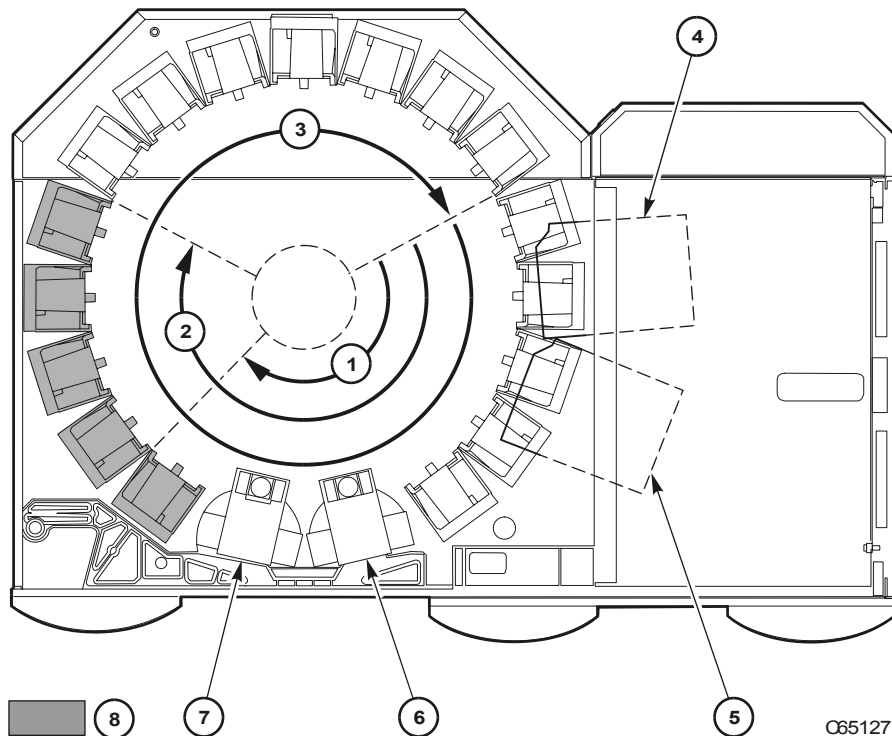
**Table 1 Tape Library Capacity**

Expansion Frame	Second Drive Column	Drives Installed (Maximum)	Panel 2 Access	Total Data Cartridge Cells <sup>1</sup> .	Reserved Cells <sup>2</sup> .
Yes (Full)	No	10 DLT/Ultrium or 6 9840 + 1 DLT or 1 Ultrium	Entire	690	12
	Yes	20 DLT/Ultrium or 12 9840 + 2 DLT or 2 Ultrium	Entire	630	12
No (2/3)	No	10 DLT/Ultrium or 6 9840 + 1 DLT or 1 Ultrium	Entire	396	12
	Yes	20 DLT/Ultrium or 12 9840 + 2 DLT or 2 Ultrium	Entire	336	12
No (1/3)	No	10 DLT/Ultrium or 6 9840 + 1 DLT or 1 Ultrium	Partial	228	12
	Yes	20 DLT/Ultrium or 12 9840 + 2 DLT or 2 Ultrium	Partial	168	12

<sup>1</sup> · These numbers do not include cells in the CAP or the reserved area.  
<sup>2</sup> · The reserved cells are composed of one swap cell and 11 cleaning and/or diagnostic cartridge slots. They are shown in Figure 5 on page 25.

Figure 3

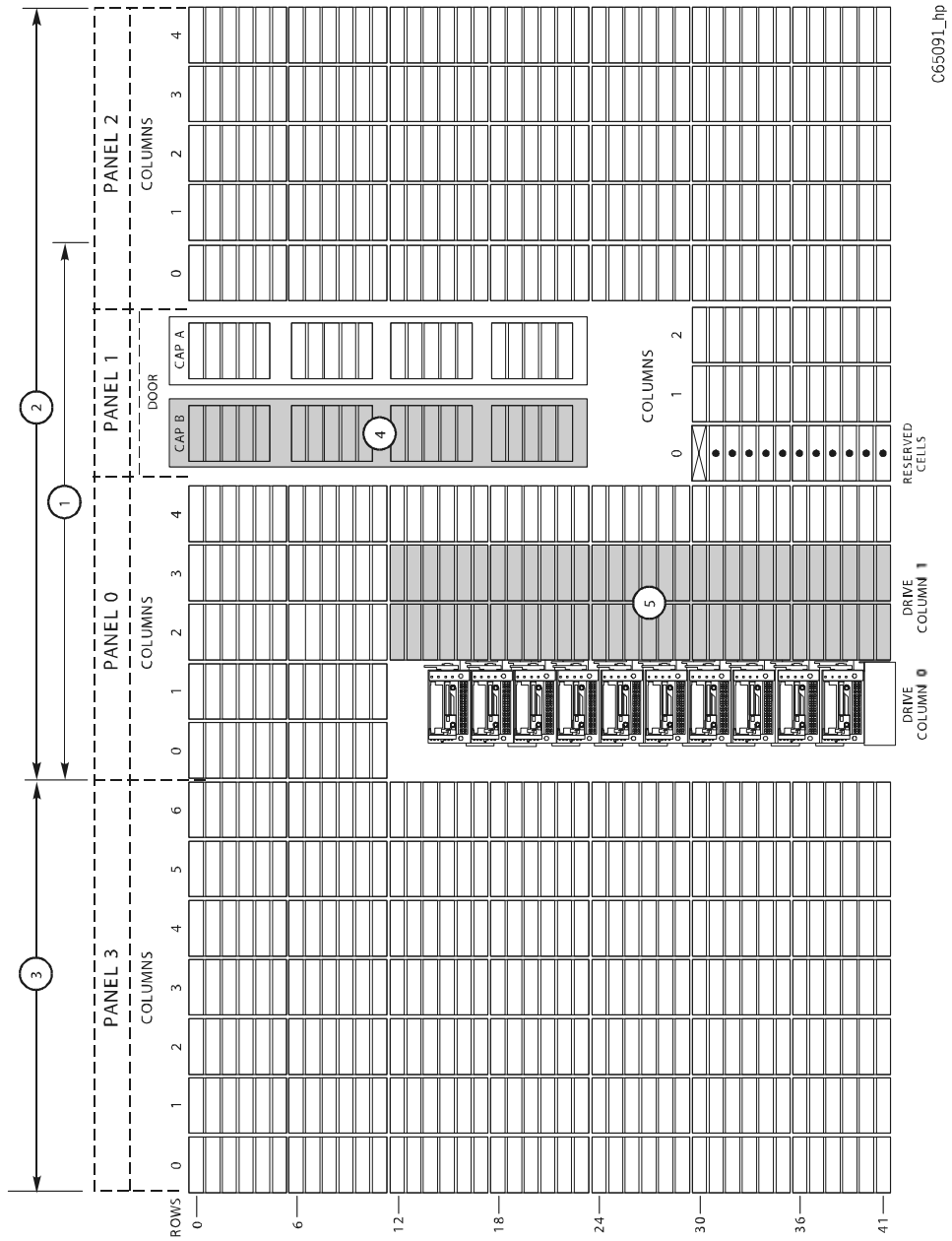
## Locating Cartridges - Top View



1	1/3 capacity (partial access to Panel 2)	5	Drive column 1 (optional)
2	2/3 capacity (entire access to Panel 2)	6	CAP B (optional)
3	Full capacity (with optional expansion frame)	7	CAP A
4	Drive column 0	8	Panel 12

Figure 4

Locating Cartridges - Panels, Cells, Rows



**Table 2**                      **Locating Cartridges - Panels, Cells, Rows** (continued from **Figure 4** on page 22)

1	228 cartridge cell configuration	4	Optional second CAP <b>Note:</b> The optional second CAP replaces the front window.
2	396 cartridge cell configuration	5	Optional second drive column <b>Note:</b> The optional second drive column replaces the 60 shaded cells.
3	Expansion frame <b>Note:</b> 690 cartridge cell configuration equals 396 cartridge cell configuration plus an expansion frame.		



## Reserved Cells

**Figure 5** on page 25 shows the cells reserved for swapping cartridges and for diagnostic and cleaning cartridges. The top cell is the swap cell, which is reserved for in-transit cartridges. Do *not* place any cartridges into this cell. You may place any type of cleaning or diagnostic cartridges into the other 11 cells.

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**Note** Loading cleaning cartridges into any of these 11 cells enables Auto Clean upon the next IPL.

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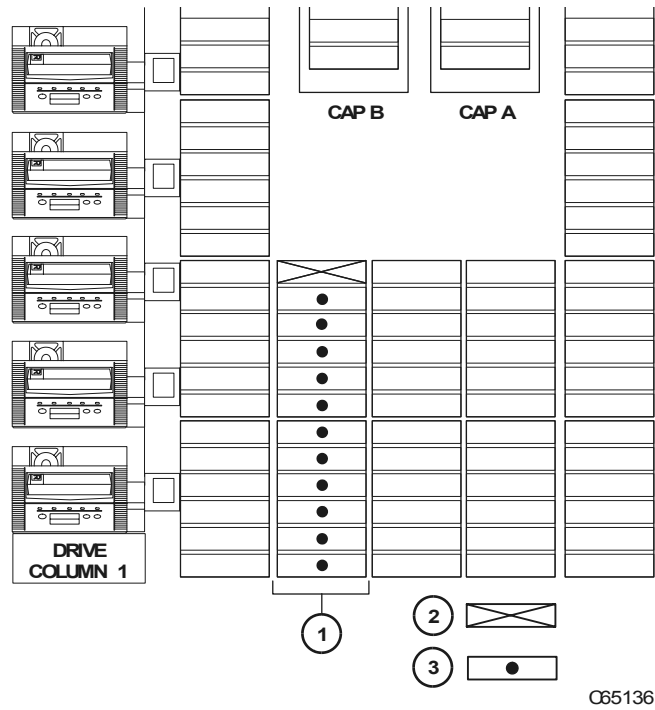
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**Caution** *System degradation:* Do not insert data cartridges into these reserved cells. The host software will not find these cartridges.

---

Figure 5

## Reserved Cell Locations



1	Location of reserved cells	3	Diagnostic and cleaning cartridges
2	Swap cell (leave empty)		

## Cartridge Access Port

A cartridge access port (CAP) is the location where you add cartridges to or remove cartridges from a library without interrupting normal cartridge mounts and dismounts by the robot. The library may have an optional, second CAP. Both CAPs are located on the left front door.

The CAP magazine is designed for easy loading. You can access the magazine by simply pulling down on the magazine handle and adding cartridges. Or, you can remove the magazine by lifting it out, load the cells, and place the magazine back into the CAP. Snap-on cartridge retention covers allow you to keep cartridges in place when transporting magazines.

For detailed procedures, refer to **Importing Data Cartridges through the CAP** on page 107 and **Library Operation** on page 93.

## Drives

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**Note** For drive and media information specific to your drive technology, refer to **Drives and Media** on page 143.

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The library can contain the following drive types:

- HP Ultrium
- Digital Linear Tape (DLT) 8000
- 9840

The maximum number of DLT or Ultrium drives is 20. The maximum number of 9840 drives is 12.

As an operator, you might have to:

- Configure a drive in a library; refer to **Drive Entries** on page 76.
- Check drive status information; refer to **Drive Status** on page 98.
- Manually mount a cartridge to a drive or dismount a cartridge from a drive; refer to **Loading/Unloading Cartridges Manually** on page 131.

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**Note** During typical operation (or automated mode), the library's robotic hand-camera assembly automatically places a cartridge into the drive or removes a cartridge from the drive when a command is sent from the host software.

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## Additional Components

### Web-Based Library Administrator (WBLA)

The Web-Based Library Administrator (WBLA) incorporates a web interface to the library. To use this feature, you will need a personal computer attached to the library's Ethernet port. This enables you to:

- "View" the library interior and visually check the status of tapes, drives, and CAP
- Initiate diagnostic tests on the library from the personal computer
- Make configuration changes or additions

Consult the Web-Based Library Administrator Online Help CD that shipped with your library for more information.

### Tape Library Safety Features

Safety features are incorporated into the tape library. If the left access door is opened, an electrical interlock removes power from the robot assembly.

Behind the right front door, covers are placed over the logic card, the AC power supply, and the DC power supply to prevent you from coming into contact with hazardous voltages and sensitive electronics.

### Controlling Software

Controlling software, within the client/server, requests tape read and write operations to the drives and robotic move operations for the tape library robotic components. Software determines where the cartridge is located by tracking the VOLSER and cell location during audits, then allocates which drive receives the cartridge. For specific information, refer to your software publications.

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## Library Operating Modes

An operating mode is the manner in which a tape library and the controlling software (also referred to as the customer's server software) interact. A library can operate in either automated mode or manual mode.

### Automated Mode

Automated mode is the normal operating mode of the tape library. The controlling software instructs the robot to move the cartridge among the storage cells, drives, and CAP without operator intervention. Your tasks may include:

- Monitoring the tape library operator display for messages
- Importing a cartridge through the CAP
- Exporting a cartridge through the CAP
- Replacing a cleaning cartridge

Refer to **Library Operation** on page 93 for the procedures.

### Manual Mode

Manual mode refers to the tape library being inactive. Your tasks may include:

- Opening the tape library doors
- Moving the robot
- Locating a cartridge
- Removing a cartridge from the hand
- Mounting a cartridge into a drive
- Dismounting a cartridge from a drive

Refer to **Library Operation** on page 93 for the procedures.

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## Auto Clean Feature

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**Note** Ensure your backup software supports this feature before enabling.

---

Drives occasionally need to be cleaned to prevent read/write errors.

The Auto Clean feature is enabled when your tape library is initializing and detects cleaning cartridges in the reserved cells. When a drive requires cleaning while Auto Clean is enabled, the robot will receive a software message telling it to retrieve a cleaning cartridge and place it into the drive.

If Auto Clean is not enabled, you must manually import a cleaning cartridge for the drive that requires cleaning. The **Clean Drive** request appears on the operator panel's display.

Refer to **For cleaning cartridge information specific to your drive type, see Drives and Media on page 135.** on page 88 for more information and procedures.

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**Note** For cleaning cartridge information specific to your drive technology, see **Drives and Media** on page 143.

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## Accessory Bin

You may use the internal 13U (0.57 m [22.75 in.] x 0.48 m [19 in.]) accessory bin, located in the rack behind the right front door, for additional equipment. Refer to **Rack Safety and Precautions** on page 199 for precautions you must follow before installing equipment in this area.

Power cable space is provided in the cutout area of the rear door.

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**Note**      *Heat within rack area:* Cooling considerations should be made based upon the power dissipation within the rack space, as well as the external library room ambient conditions. Cooling must be provided for moderate power dissipation within the rack space.

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# Controls and Indicators



This chapter describes the functions of the library operator panel, the library power switch, and provides samples of displays you could see on the operator panel display. It also lists tasks you can perform through the use of the operator panel.

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## Operator Panel

The operator panel, recessed into the library's rack door, contains buttons, indicators, and a graphic display. **Figure 6** on page 36 shows the panel and **Table 3** on page 37 describes each item.

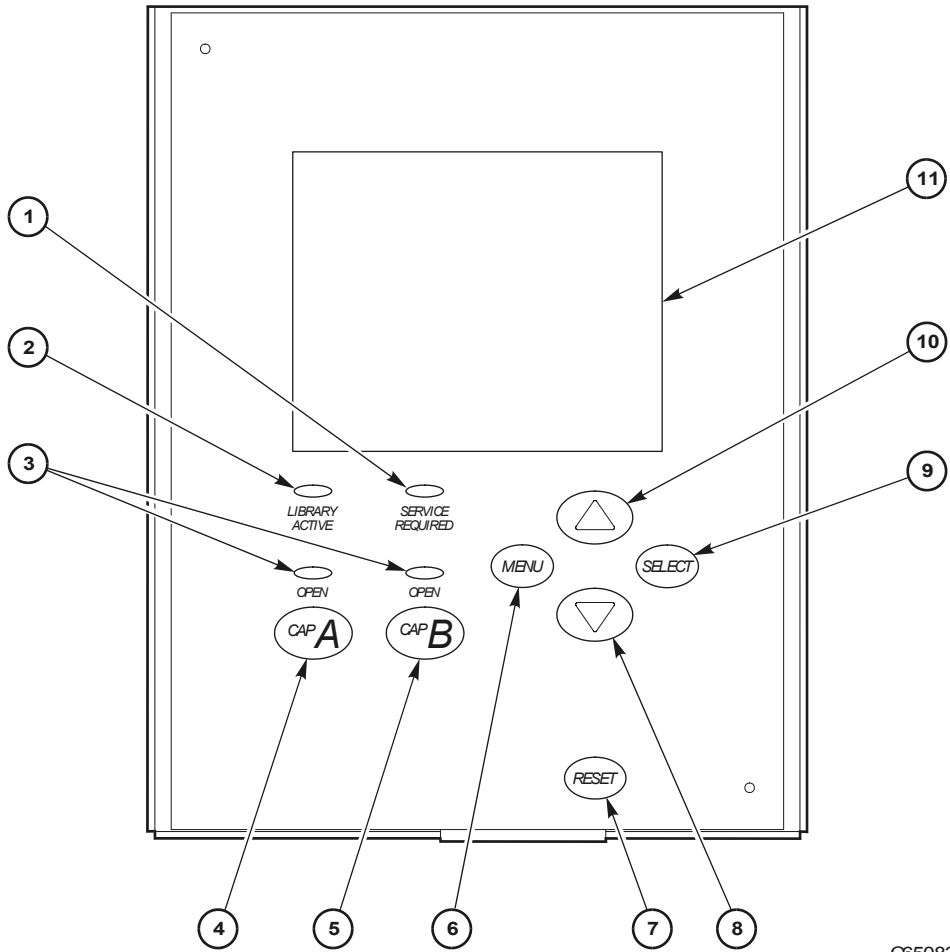
Use the operator panel to:

- Monitor current information about the CAPs, configuration, drives, doors, drive cleaning, hardware and software versions, personality, and library status
- Help resolve library problems
- If an error occurs, the display shows a fault symptom code (FSC), which you can give to a service representative to help resolve problems. Write down the FSC as soon as it is displayed.
- Set library, network, and drive configurations
- Rotate the CAPs
- Replace drive cleaning cartridges and set cleaning cartridge warning count
- Run library and drive tests
- Reset the library (start an initial program load [IPL])

For specific task instructions, refer to **Configuration** on page 65 and **Library Operation** on page 93.

Figure 6

Operator Panel Display, Controls, and Indicators



C65083

Table 3

**Operator Panel Display, Controls, and Indicators** (continued from  
Figure 6 on page 36)

1	<b>Service Required</b> indicator is steadily red when human intervention is required.	7	<b>[RESET]</b> button, located behind the right front door, starts an IPL.
2	<b>Library Active</b> indicator flashes green when the library is operational.	8	Arrow down button moves the cursor down the display screen or decrements an underscored value.
3	<b>Open</b> indicator is steadily amber when the CAP is open for you to import or remove cartridges.	9	<b>[SELECT]</b> button selects an item on a menu; it also saves the currently underscored value and moves the cursor to the next field.
4	<b>[CAP A]</b> open button rotates CAP A for you to access the magazines.	10	Arrow up button moves the cursor up the display screen; it also increments a value underscored on the screen.
5	<b>[CAP B]</b> open button rotates CAP B for you to access the magazines.	11	Graphic display screen shows current information, FSCs, and allows input from menus.
6	<b>[MENU]</b> button initially places you into the Main Menu screen; subsequently, it returns you to a previously selected screen.		

## Indicators

Three indicators provide basic status information: **Library Active**, **Service Required**, and **Open**. Refer to **Table 3** on page 37 for details about these indicators.

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<b>Note</b>	When the <b>Service Required</b> indicator is on, contact your service provider.
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## Buttons

Seven buttons are provided on the operator panel: **[CAP A]**, **[CAP B]**, **[RESET]**, **[MENU]**, **[SELECT]**, and the up and down arrows. The **[CAP]** and **[RESET]** buttons let you directly manipulate the library; the remaining four buttons let you manipulate the menus and underscored values on the graphic display. Refer to **Figure 6** on page 36 and **Table 3** on page 37 for the location and a description of each button.

---

<b>Note</b>	The up arrow, down arrow, <b>[MENU]</b> and <b>[SELECT]</b> buttons manipulate only values that are under operator control. As you scroll down or up a list of selections, the cursor underscores these values. (You cannot manipulate values that do not permit underscoring.)
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## Display Screens

Screens on the graphic display show current information and allow your input. Information includes:

- Drive status
- CAP and CAP magazine status
- Library status
- Library capacity
- Library personality
- Library features
- Hardware and software versions
- SCSI type (single-ended or differential)
- Cleaning cartridge and Auto Clean status
- Ethernet ID
- Error and FSC information

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**Note** HP is transitioning the HP Surestore Tape Library Model 20/700 (product number A5597A) to allow for a new feature. This feature will make it possible to couple two 20/700 libraries together, allowing tape cartridges to be exchanged between the libraries. As a result, we are transitioning to a new product number, A5597B. Until this feature is available and installed, the display on your library status screen will continue to identify the library as "A5597A". In the future, if you choose to use this feature, your library will then be identified as "A5597B".

To determine whether your library is an A5597A or A5597B, refer to the regulatory label on your unit.

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Except for CAP status and error or FSC information, these values are set through an automatic configuration process that occurs during an IPL.

Values requiring your input are:

- Cleaning cartridge warning count
- SCSI drive configuration:
  - SCSI ID
  - Bus status (on or off bus)
- Network configuration:
  - Library name
  - IP address
  - Subnet mask
  - Library gateway
- Library configuration information:
  - SCSI ID
  - Fast Load enable/disable
  - Date/time
- Display screen brightness and contrast

You can also use the menus to run diagnostic tests.

The following pages describe the library's primary menus. For instructions on working with specific configuration values, see **Operator Panel Entry** on page 70.

## Library Status

The **Library Status** screen is an information-only screen. It is the first screen to appear on the operator panel after an IPL.

<b>HP A5597A (CODE VERSION X.XX.XX)</b>	Library type and firmware version
<b>CAP (A) CLOSED</b>	CAP status
<b>LIBRARY READY</b>	Library status
<b>WEB ENABLED</b>	Remote access is available through the Web-Based Library Administrator (WBLA)
<b>COLUMN 0</b>	The status of each drive in a specified drive column

**Figure 7** on page 41 shows an example **Library Status** screen. (For a list of drive status messages, see **Drive Status** on page 98.)

**Figure 7**

### Library Initial Status Screen

```

HP A5597A (CODE VER X.XX.XX) *
CAP CLOSED

LIBRARY READY
WEB ENABLED
  COLUMN 0
00 BUSY
01 BUSY
02 LOADING
03 LOADING
04 EMPTY
05 EMPTY
06 EMPTY
07 ---
08 ---
09 ---

```

---

**Note** With 3.00 firmware and higher, an asterisk (\*) may appear on the operator panel display. For example, **HP A5597A (Code 3.00.xx)\***. The asterisk (\*) denotes the cleaning cartridge's life has expired. To determine which cartridge has expired and to eject the expired cartridge, see **For cleaning cartridge information specific to your drive type**, see **Drives and Media on page 135**. on page 88, and **Exporting Data Cartridges through the CAP** on page 112.

---

By pressing the **[MENU]** button from the **Library Status** screen, you can display the **Main Menu** (see **Figure 8** on page 42).

**Figure 8**

Main Menu Screen

A rounded rectangular box containing the text of the Main Menu screen.

MAIN MENU:  
FSC LOG  
CAP CONTENTS  
DRIVE INFO  
CLEANING INFO  
DIAGNOSTICS  
VERSION INFO  
CONFIGURATION

## FSC (Fault Symptom Code) Logs

The **FSC Logs** screen displays the last 20 fault symptom codes (FSCs), the number of occurrences, and the date and time of the last occurrence. The screen may be scrolled (if required) to view all FSCs. For more information, **Reviewing FSC Logs** on page 114.

---

**Note** Events listed in the log might not be failures. All events are recorded. FSCs are generated for both library and drive errors.

---

Figure 9

### FSC Log Screen

3329	03	DRIVE_00_00
03/01/2001		14:46:14
3304	09	DRIVE_01_00
03/01/2001		14:46:14
30BB	02	NONE
03/01/2001		14:44:01
30BA	02	NONE
03/01/2001		14:44:01
30B9	02	DRIVE_02_00
02/28/2001		09:22:23
30B8	02	NONE
02/28/2001		08:27:14
4487	02	NONE
02/27/2001		16:52:33
3329	03	NONE

## CAP Contents

The **CAP Contents** screen is an information-only screen. It displays either the VOLSER of a cartridge or status message for each slot in a CAP magazine. The CAP status screen is shown in **Figure 10** on page 44.

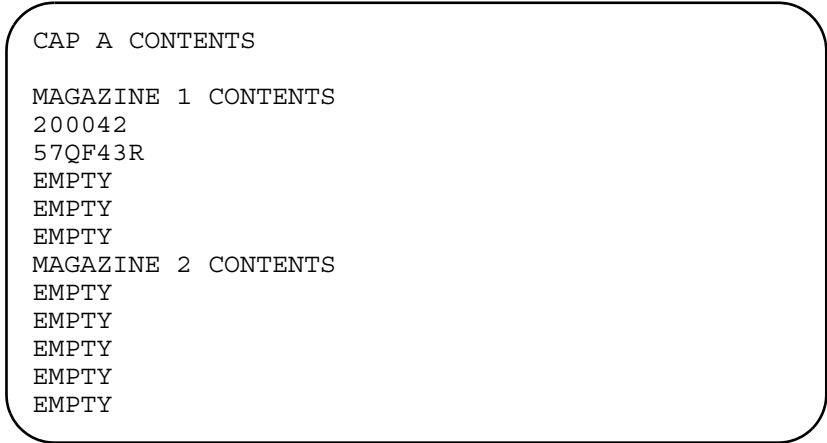
---

**Note** You must scroll down to view the contents of both CAPs.

---

**Figure 10**

### CAP Status Screen



```
CAP A CONTENTS  
  
MAGAZINE 1 CONTENTS  
200042  
57QF43R  
EMPTY  
EMPTY  
EMPTY  
MAGAZINE 2 CONTENTS  
EMPTY  
EMPTY  
EMPTY  
EMPTY  
EMPTY
```

## Drive Information

The **Drive Information** menu is an information-only screen that lists manufacturing and status information about the selected drive (see **Figure 11** on page 45):

<b>VENDOR</b>	The manufacturer of the drive
<b>TYPE</b>	The drive model
<b>STATUS</b>	The drive's local number and status (see <b>Drive Status</b> on page 98 for a list of status messages)
<b>SERIAL NUMBER</b>	The serial number assigned by the drive's manufacturer
<b>INTERFACE TYPE</b>	The type of client-to-drive interface (a SCSI interface)
<b>CODE VERSION</b>	The firmware version of the drive

---

**Note** See **Drive Information** on page 99 for instructions on how to access a drive. For information specific to your drive technology, including troubleshooting, see **Drives and Media** on page 143.

---

**Figure 11**

### Drive Information Menu

DRIVE INFORMATION MENU:

VENDOR: HP  
 TYPE: HP LTO  
 STATUS: 00 EMPTY

SERIAL NUMBER:  
 XXXXXXXXXXXX

INTERFACE TYPE:  
 SCSI I/F

CODE VERSION  
 X.XX.XX

## Cleaning Information

The **Cleaning Info** menu provides information about and control of the library's cleaning cartridges. It enables you to change the warning count for each type of cleaning cartridge. **Figure 12** on page 47 shows an example of the **Cleaning Info** menu:

<b>NUM CLEAN CARTRIDGES</b>	The total number of cleaning cartridges mounted in the reserved cells within the library
<b>DLT WARN COUNT</b>	The number times you want the DLT cleaning cartridge to be used before the library exports it through the CAP (20 uses)
<b>9840 WARN COUNT</b>	The number times you want the 9840 cleaning cartridge to be used before the library exports it through the CAP (100 uses)
<b>HP LTO WARN COUNT</b>	The number of times you want the Ultrium cleaning cartridge to be used before the library exports it through the CAP (15 uses) <b>Note:</b> The Ultrium universal cleaning cartridge has a maximum of 50 uses.
<b>EXPORT CARTRIDGES</b>	A procedure for moving cleaning cartridges from the reserved cells to the CAP
<b>IMPORT CARTRIDGES</b>	A procedure for moving cleaning cartridges from the CAP to the reserved cells
<b>CLEAN CARTRIDGE INFO</b>	A path to an information screen that lists all cleaning cartridges in the library

The **Cleaning Info** menu lets you change the warning count for each type of cleaning cartridge and import/export cleaning cartridges. It also lets you check the number of times a cleaning cartridge has been used. For procedures, see **Library Operation** on page 93.

Figure 12

## Cleaning Information Menu

```
CLEANING INFO MENU:  
  
NUM CLEAN CARTRIDGES: 00  
  
DLT WARN COUNT: 000  
9840 WARN COUNT: 000  
HP LTO WARN COUNT: 000  
  
EXPORT CARTRIDGES  
IMPORT CARTRIDGES  
  
CLEAN CARTIDGE INFO
```



## Diagnostic Tests

---

**Note** Additional diagnostics are available from HP Library & Tape Tools (see **HP Library & Tape Tools** on page 146 for more information). Also, for troubleshooting information specific to your drive technology, see **Drives and Media** on page 143.

---

All Diagnostic tests except for **Clean Drive** require the tape library and associated drive to be inactive. The **Main Diagnostics Menu** (see **Figure 13** on page 49) lets you perform the following tests:

■ **DRIVE DIAGNOSTICS:**

- **CLEAN DRIVE.** Enables you to clean tape drives.
- **MOUNT.** Loads test tapes to a drive.
- **DISMOUNT.** Unloads test tapes from a drive.
- **RUN DRIVE CHECK.** Determines that the drive is in working order.
- **MOUNT/DISMOUNT LOOP.** Loads and unloads test tapes from a drive. You may designate the number of times the tape library goes through the loop.

---

**Note** HP does not recommend looping tests excessively.

---

- **GET-PUT LOOP.** Gets a diagnostic tape and returns it to the same location. You may designate the number of times the tape library goes through the loop.
- **DEMO MODE.** Simulates tape library operation.

For more information on using these tests, see **Running Diagnostic Tests** on page 115.

Figure 13

## Main Diagnostics Menu

```
MAIN DIAGNOSTICS MENU:  
DRIVE DIAGNOSTICS  
GET/PUT LOOP  
DEMO MODE
```

## Version Information

The **Version Info Menu** is an information-only screen (see example in **Figure 14** on page 49). It displays the version level of the library's functional code, the date the code was completed, and the serial number of the logic card (also referred to as "the MPC card").

Figure 14

## Version Information Menu

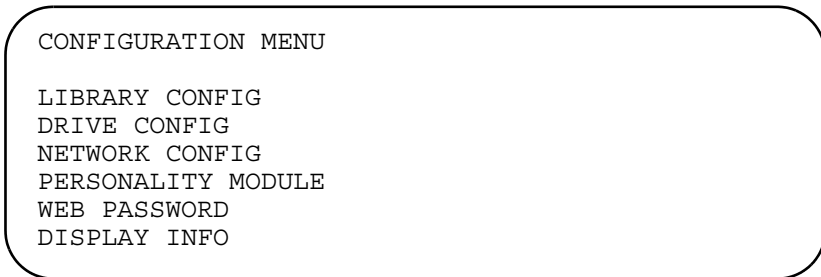
```
VERSION INFO MENU:  
HP A5997A  
  
CODE VERSION:  
X.XX.XX  
  
CODE BUILT ON:  
(MONTH DAY YEAR TIME)  
  
HARDWARE / VERSION  
MPC XXXXXXXX
```

## Configuration Menu

The **Main Configuration Menu** (see **Figure 15** on page 50) allows you access to the configuration menus (library, drive, network) and to the panel display controls. You can access screens that let you view the library personality, perform a feature upgrade, and input a password for a Web interface product.

**Figure 15**

### Configuration Menu



## Library Configuration

The **Lib Config Menu** displays library capacity information and lets you modify the library's configuration.

The screen displays:

<b>LIB SCSI I/F CONFIG</b>	Library interface identifier
<b>FAST LOAD</b>	Fast Load feature status (on or off)
<b>DATE</b>	Current date
<b>TIME</b>	Current time
<b>AUTO CLEAN</b>	Is Auto Clean enabled?
<b>USER CELLS</b>	Number of data storage cells in the library
<b>CAPS</b>	Number of CAPs installed
<b>DRIVE COLUMN</b>	Number of drive columns installed
<b>EXPANSION FRAME</b>	Is an expansion frame installed?

**Figure 16** on page 51 shows an example library configuration screen. From this menu, you may access editing menus for these library settings. See **Library Entries** on page 70 for procedures and additional information.

**Figure 16**

### Library Configuration Menu

```
LIB CONFIG MENU:

LIB SCSI I/F CONFIG
FAST LOAD: OFF
DATE: 03/01/2001
TIME: 23:59

AUTO CLEAN: OFF
USER CELLS: 336
CAPS: 2
DRIVE COLUMN: 2
EXPANSION FRAME: NO
```

## Library SCSI Interface Configuration

The **Lib SCSI I/F Config Menu** lets you view the library's SCSI type (differential or single-ended) and access an edit menu for the library's SCSI ID. **Figure 17** on page 52 shows an example of this menu.

**Figure 17**

### Library SCSI Interface Configuration Menu

```
LIB SCSI I/F CONFIG MENU:
```

```
SCSI ID: 00
```

```
SCSI TYPE: SE/LVD
```

## Drive Configuration

The **Drive Config Menu** lets you modify each drive's configuration. **Figure 18** on page 53 shows an example screen. For each drive, the menu displays:

- Drive position
- Drive type
- If the drive path is SCSI, the drive's SCSI ID and its SCSI bus relationship with the library.

Sub-menus let you change the SCSI ID and configure whether the drive is on the same SCSI bus as the library. For more information, see **Drive Entries** on page 76.

---

**Note** The cursor position is saved on all screens that list the library's drives.

The panel displays 16 lines of data per menu. If your library contains more than eight drives, you must use the down arrow button to scroll to drives 08 and above.

---

**Figure 18**

### Drive Configuration Menu

```
SET DRIVE SCSI ID MENU:  
01 HP LTO ID: 02  
VALID RANGE 0 - 15  
  
SCROLL UP TO INCR  
SCROLL DOWN TO DECR  
  
SELECT TO SAVE  
MENU TO EXIT
```

## Network Configuration

The **Network Config Menu** (see **Figure 19** on page 54) lets you modify the library's network configuration and view the library's Ethernet (web interface) address. (At the time of publication, you cannot change the DHCP status.) For procedures, see **Network Entries** on page 79.

**Figure 19**

### Network Configuration Menu

```
NETWORK CONFIG MENU:  
LIBRARY NAME:  
—  
  
IP ADDRESS:  
  000.000.000.000  
NETWORK GATEWAY:  
  000.000.000.000  
SUBNET MASK:  
  000.000.000.000  
  
DNS CONFIGURATION  
DMN  
SVR PRIMARY  
SVR SECONDARY  
DHCP: DISABLED  
  
ETHERNET ADDRESS:  
00:10:4F:00:05:76
```

## Personality Module

The **Personality Module** menu lets you view the library's personality (vendor) setting. The expanded screen in **Figure 20** on page 55 illustrates how you can check the Personality Module.

---

**Note** In the **Personality Module** menu, "HORIZON" refers to web access and indicates whether or not it is enabled.

---

**Figure 20**

### Personality Module Information

```
PERSONALITY MODULE INFO:
STATUS:
  PRESENT
TYPE:
  NORMAL
VERSION:
  0
LIBRARY VENDOR ID:
  1
LIBRARY VENDOR NAME:
  HP
LIBRARY PRODUCT TYPE:
  A5597A
HORIZON:
  ENABLED
SCSI VENDOR NAME:
  HP
SCSI PRODUCT NAME:
  A5597A
```



## Web Password

The **Web Password** menu item allows you to view or change your password. See **Figure 21** on page 56.

**Figure 21**

### Web Password

```
WEB PASSWORD:
XXXXXXXX

USE ARROWS TO CHANGE
EACH LETTER

SELECT TO MOVE RIGHT

SELECT ON SPACE TO
SAVE THE PASSWORD

MENU TO MOVE LEFT
OR TO EXIT
```

## Display Information

The **Display Info Menu** (see **Figure 22** on page 56) leads to menus that let you adjust the contrast and backlight on the graphic display screen. For more information, see **Screen Characteristics** on page 87.

**Figure 22**

### Display Information Menu

```
DISPLAY INFO MENU:

CONTRAST: 09

    DEFAULT = 16

BACKLIGHT: 128

    DEFAULT = 128

RESTORE DEFAULTS

MENU TO EXIT
```

## Operations Overview

**Table 4** on page 58 lists the tasks that you can perform through the operator panel menus. The right column refers you to another page in this manual for more information. The options from the **Main Menu** include:

- FSC LOGS
- CAP CONTENTS
- DRIVE INFO
- CLEANING INFO
- DIAGNOSTICS
- VERSION INFO
- CONFIGURATION

Table 4

## Operations Guide

Task	Page for Operator Panel Instructions
Understand CAP status messages	page 96
Understand library status messages	page 97
Understand drive status messages	page 98
Review FSC logs	page 114
Check CAP magazine	page 99
Manage cleaning cartridges	See list for individual tasks.
■ Import cleaning cartridges through CAP	page 105
■ Export cleaning cartridges to CAP	page 104
■ Check usage count	page 101
■ Check/set warning count	page 88
■ Manually clean a drive	page 112
■ Import data cartridges through CAP	page 107
■ Export data cartridges through CAP	page 112
Run diagnostic tests	page 115
■ Run get/put loop	page 117
■ Operate in demo mode	page 118
■ Run drive mount diagnostics	page 116
Check firmware version	page 49
Check library personality information	page 102
Set configuration	page 70
■ Set library SCSI ID	page 71
■ Enable/disable Fast Load	page 73

**Table 4**                      **Operations Guide**

Task	Page for Operator Panel Instructions
■ Set date and time	page 74
■ Set drive configuration	page 76
■ Set network configuration	page 79
■ Set screen characteristics	page 87

---

## Library Power Switch

---

**Note** Be aware that each PDU supplies power to the robotics and *half* of the drives. When the library has two PDUs (and a drive column with two power cords), each PDU is connected to separate branch AC circuit.

If you are installing multiple drives in the library (and the library is a newer model with two power cords to the drive column), HP recommends that you configure some drives in the upper five slots, and some drives in the lower five slots in the drive column. With this configuration, if one PDU loses power, some drives and the library robotics will remain operational.

---

The library power switch is a circuit breaker or breakers behind the right front door of the library. **Figure 23** on page 62 shows the power switch location. This switch, attached to the AC power distribution unit (PDU), controls the AC power to the library and drive column.

The power switch has two configurations:

- A single breaker on the AC power distribution unit controls the library and a single drive column.
- A second breaker, located on the second power distribution unit, powers the second drive column and an optional second library power supply.

---

**Note** Your library has two circuit breakers:

The second PDU must be connected to a separate electrical circuit.

If only one breaker is powered off, the second breaker will still be powered on.

---

To apply power to the library and drive column, lift the switch or switches.

To remove power from the library and drive column:

- Make sure all jobs are complete.
- Push down on the library power switch or switches.

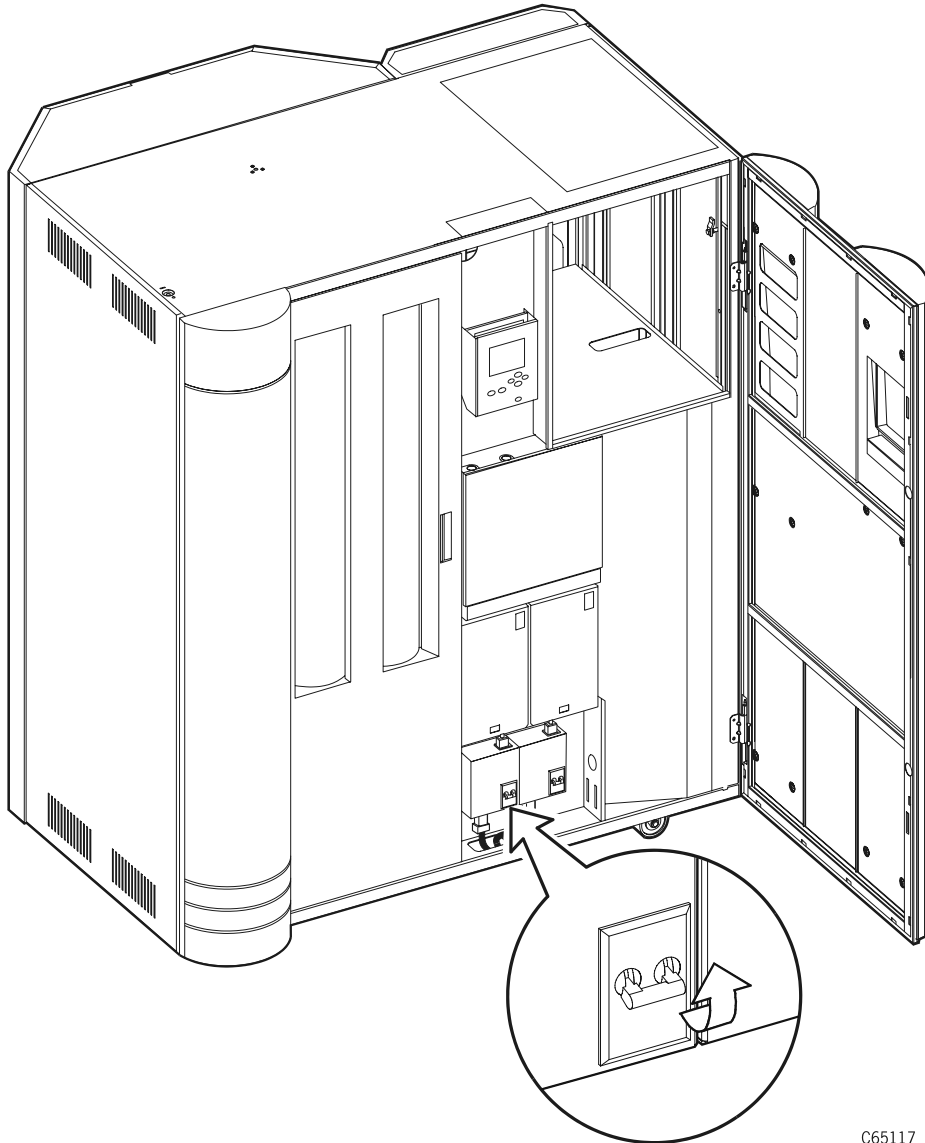
---

**Note**      The arrow in **Figure 23** on page 62 shows moving the power switch to the on position.

---

Figure 23

Library Power Switch Location



C65117

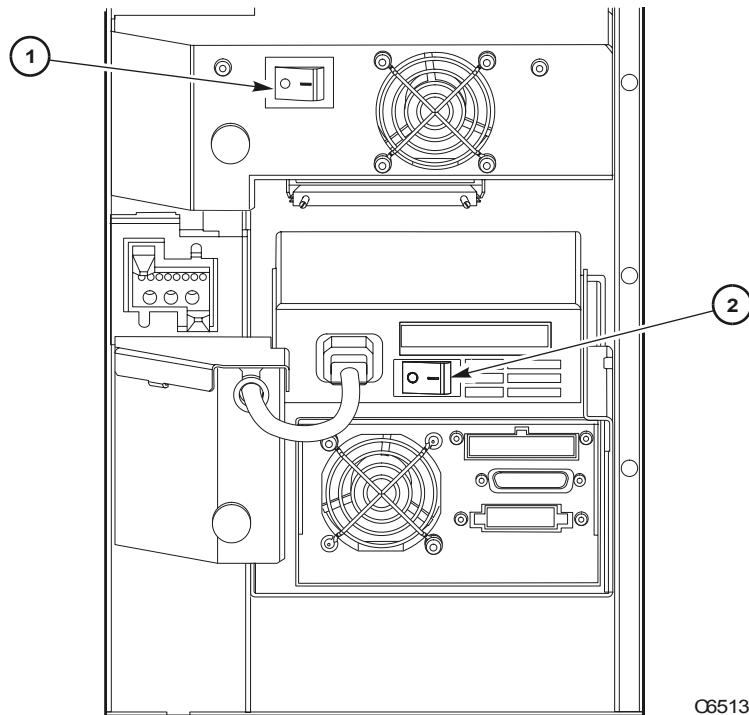
## Tape Drive Power Switches

The tape drives are behind the drive access door, inside the right side door of the library. Each drive has a power switch that controls the power to only that drive.

**Note** The library's main power switch controls the AC power to the library *and* the drive column.

- To remove power from a drive, push the drive switch to the "O" position.
- To supply power to a drive, push the drive switch to the "| " position

**Figure 24** Drive Power Switch Locations



C65131

1	DLT or Ultrium drive power switch	2	9840 drive power switch
---	-----------------------------------	---	-------------------------





# Configuration

## 3

This chapter describes how to configure the library and drives for operation. Configuration requires you to:

1. Enable Auto Clean (if desired) by installing cleaning cartridges
2. Power on or reset the library
3. Enter library and drive configuration information
4. Send a client command to load library audit information into client memory

After power-on, the library automatically verifies and loads some configuration values, such as drive locations, Auto Clean status, capacity, and drive types. Before the library is fully operational, however, someone must enter the remaining configuration values.

Typically, your service representative will configure your library during installation, during firmware upgrade, or after drives are added. If you must change the library's configuration, you may enter the values through the operator panel.

---

**Note** You may need to consult with your systems administrator for some information.

---

---

## Enabling Auto Clean

---

**Note** Ensure your backup software support this feature before installing. For cleaning cartridge information specific to your drive type, see **Drives and Media** on page 135.

---

You will need to clean the drives occasionally to prevent read and write errors. Enabling the Auto Clean feature allows the library to initiate drive cleaning without your intervention. (A drive is cleaned with a special cleaning cartridge.)

To enable Auto Clean, load valid cleaning cartridges into any of the 11 cells that are reserved for cleaning and diagnostic cartridges. For the locations of these cells, refer to **Reserved Cells** on page 24.

---

**Note** To be valid:

A cleaning cartridge must have “CLN” in its VOLSER label.

9840 cleaning cartridges must also have a “U” on their media ID labels.

HP Ultrium cartridges have unique bar code labels specific to HP as the drive manufacturer. For more information, see **Drives and Media** on page 143.

---

The Auto Clean feature is automatically enabled if you load even one cleaning cartridge into the reserved cell area and then reset the library.

For instructions on how to use the CAP to insert cleaning cartridges, see **Importing Cleaning Cartridges through the CAP** on page 105. For the location of the reserved cells, see **Reserved Cells** on page 24.

To install cleaning cartridges in the reserved cells:

1. Unlock and open the front doors (see **Opening the Library Front Doors** on page 122).
2. Verify that the cleaning cartridges are right side up (the VOLSER numbers should be closest to the top edge and facing outward).

---

**Caution** *Potential static electricity damage to electrical components.* Take precautions against electrostatic discharge by touching gray, unpainted metal (such as the library's frame) before reaching into the library. Avoid touching any electrical component.

---

3. Place a cartridge into any of the 11 designated cells.
4. Close and lock the front access door.

---

**Note** You may follow this same procedure to load diagnostic cartridges into the reserved cells. (Every diagnostic cartridge has "DG" as the first two letters of its VOLSER.) However, loading diagnostic cartridges alone does not enable Auto Clean.

---

---

## Powering on the Library

Powering on the library supplies power to the library electronics and to the drive column. If you have a second drive column, you must power on both supplies. Powering on also initiates an IPL of the library.

To power on the library, lift the switch (circuit breaker) or switches behind the right front door of the library. If you are not familiar with the location of the switches, refer to **Figure 23** on page 62.

---

<b>Note</b>	If the tape library does not power on, contact your service provider.
-------------	---

---

---

## Initializing and Resetting the Library

Powering on the library causes it to initialize components and perform an Initial Program Load (IPL). During initialization, the library prepares the robot for operation and audits any cartridges in the storage and reserved cells. During an IPL, the library loads the operating code and automatically verifies some configuration values, such as drive locations and drive types.

### Re-initializing the Library

You will have to re-initialize the library in the rare instance when a robotic component malfunctions. Before re-initializing the library, perform any necessary manual operation tasks (see **Manual Operation** on page 121).

To re-initialize the library, make sure that all drives are powered on and perform one of these actions:

- Power off and power on the library (also causes an IPL)
- Open and close the front door

### Resetting the Library

You will have to reset the library when:

- You are directed to do so by your system administrator or a service representative
- You have to change the library configuration (for example, when you have to change the library's SCSI ID)

To reset the library after it is already powered on, make sure that all the drives are powered on and press the **[RESET]** button on the operator panel.

---

## Entering Configuration Data

After the IPL is complete, the status screen will appear on the operator panel. At this point, you must make choices about your library, drives, and network and enter those choices into the library's memory.

---

**Note** You may need to consult with your systems administrator for some information.

---

You may enter all configuration data through the operator panel. See **Operator Panel Entry** (in the following section) for specific instructions. Using the Web-Based Library Administrator, you also can enter some configuration data through a workstation or a PC that is running a Netscape or Microsoft browser. For more information, access the online help files for the Web-Based Library Administrator. They are available from the CD-ROM that shipped with your product, or you can download them from [www.hp.com/go/support](http://www.hp.com/go/support).

## Operator Panel Entry

Entering configuration data through the operator panel prepares the library for operation. For a detailed description of the operator panel, see **Operator Panel** on page 34.

### Library Entries

Four entries are required for a library—other entries will vary with your options:

- Library SCSI ID
- Drive Fast Load enable/disable
- Date
- Time

---

**Note** The following procedures assume that you will make all entries during one operator panel entry session. Each item is saved as it is changed, *except* for the library's SCSI ID: to save a revised library SCSI ID, you must reset the library by pressing the **[RESET]** button.

---

### Setting the Library's SCSI ID

If the control path for the library is SCSI, you must enter the library's SCSI ID at the operator panel. Set the library SCSI ID from the **Lib SCSI I/F Config** menu.

---

**Note** The information below explains special circumstances for selecting a SCSI ID (address) for the library:

---

- When configuring the library to a Unix-based workstation, HP recommends that you use a dedicated SCSI client host bus adapter (HBA):
  - For wide SCSI adapters, you may assign any address from 0 to 14 for the library.
  - For narrow SCSI adapters, the range of addresses is 0 to 6.
- If you choose to use the embedded system bus on the SPARC station, select address 6, 5, 2, or 0 for the library; the remaining targets are reserved for Sun peripherals.
- For RISC System/6000 machines, available addresses on the embedded system bus are 6, 5, 3, and 2.

To set the library's SCSI ID:

1. From the online status screen, press the **[MENU]** button.  
The **Main Menu** will display.
2. Press the down arrow button until the cursor underscores **CONFIGURATION**.
3. Press the **[SELECT]** button.

The main **Configuration Menu** will appear and the cursor will line up with **LIBRARY CONFIG**.



4. Press the **[SELECT]** button .  
The **Lib Config Menu** will appear and the cursor will line up with **LIB SCSI I/F CONFIG**.
5. Press the **[SELECT]** button.  
The **Lib SCSI I/F Config Menu** will appear. (This menu also displays the type of SCSI interface: differential or single-ended.)
6. Press the arrow buttons until the cursor underscores **SCSI ID**.
7. Press the **[SELECT]** button.  
The **Set Lib SCSI ID Menu** will appear.
8. Press the up and down arrow buttons to select the correct ID.
9. Press the **[SELECT]** button to save the changes. (You may press the **[MENU]** button to abort.)
10. If the library SCSI ID is the only configuration value you wish to set at this time, press the **[RESET]** button. If you wish to set other configuration values before you reset the library, continue with the next section.

## Enabling/Disabling Fast Load

These two terms are defined as follows:

- Fast load on: The robot will mount a tape to a drive and then immediately report the move completed.
- Fast load off: The robot will mount a tape to a drive and wait at the drive location until the tape is completely loaded before reporting the move completed.

---

**Note** Some host software does not support the fast load enabled option.

---

Enable or disable the Fast Load feature from the **Lib Config Menu**. To set either feature:

1. At the **Lib Config Menu** screen, press the arrow button until the cursor underscores **FAST LOAD**.
2. Press the **[SELECT]** button.  
An editing screen appears.
3. Press the up and down arrow buttons to select either **ON** or **OFF**.
4. Press the **[SELECT]** button to save the changes. (You may press the **[MENU]** button to abort.)
5. If you have already changed the library's SCSI ID and are planning to exit the main **Configuration Menu** at this time, you must press the **[RESET]** button. If you want to set other configuration values, continue with the next section.

If you have not changed the library's SCSI ID and are not setting other configuration values, press the **[MENU]** button until you exit all menus.

### Setting the Date

Set the date and time from the **Lib Config Menu**:

1. At the **Lib Config Menu** screen, press the arrow button until the cursor underscores **DATE**.
2. Press the **[SELECT]** button.  
An editing screen appears.
3. On the editing screen:
  - a. Press the up and down arrow buttons to select a value for each portion (field) of the date.
  - b. Press the **[SELECT]** button to move right to the next field.
  - c. Press the **[MENU]** button to move left to the previous field.
4. When the screen displays your desired setting, press the **[SELECT]** button from the right-most field to save the changes. You may press the **[MENU]** button from the left-most field to abort.
5. If you have already changed the library's SCSI ID and are planning to exit the main **Configuration Menu** at this time, you must press the **[RESET]** button. If you wish to set other configuration values, continue with the next section.
6. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **[MENU]** button until you exit all menus.

### Setting the Time

Set the time from the **Lib Config Menu**. FSC log entries correspond to this time setting:

1. At the **Lib Config Menu** screen, press the arrow button until the cursor underscores **TIME**.
2. Press the **[SELECT]** button.  
An editing screen appears.
3. On the editing screen:
  - a. Press the up and down arrows to select a value for each portion (field) of the time.
  - b. Press the **[SELECT]** button to move right to the next field.
  - c. Press the **[MENU]** button to move left to the previous field.

4. When the screen displays your desired setting, press the **[SELECT]** button from the right-most field to save the changes. (You may press the **[MENU]** button from the left-most field to abort.)
5. If you have already changed the library's SCSI ID and are planning to exit the main **Configuration Menu** at this time, you must press the **[RESET]** button. If you wish to set other configuration values, continue with the next section.
6. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **[MENU]** button until you exit all menus.

### Setting the Web Password

If your library uses the Web-Based Library Administrator, you must set a Web password at the operator panel. For instructions on setting this value, see **Web Password** on page 56 and the Web-Based Library Administrator Online Help CD that shipped with your library.

## Drive Entries

---

**Note** For 9840 drives only:

The drive's SCSI ID and bus status can be entered from the library's operator panel if the drive has firmware version 1.24 or higher. Check the drive's firmware version, by selecting **DRIVE INFO** from the **Main Menu**.

Configuring a 9840 drive might involve more than setting the drive's SCSI ID and bus status. For more information about 9840 drive configuration options and instructions, refer to the *9840 Tape Drive Service Manual*.

---

Two entries complete the configuration options for each SCSI drive:

- SCSI ID
- Bus status (on or off bus)

---

**Note** "On Bus" means that the drive is on the same SCSI bus as the library. "Off Bus" means that the drive is *not* on the same SCSI bus as the library.

---

Set the drive SCSI IDs and bus status from the drive configuration menu. You can enter both values for each drive at the same time:

1. At the main **Configuration Menu**, press an arrow button until the cursor underscores **DRIVE CONFIG**.
2. Press the **[SELECT]** button.

The screen will list all installed drives, and the cursor will align with the first drive on the list.

An example of the format is:

**00 HP LTO ID: 01**  
**ON BUS: ON**

The first two digits are the drive's logical number (the number that the library has assigned the drive). The tape library sets this number during its automatic configuration sequence (at power-on or reset). It is an internal number *only* and is shown for information *only*.

---

**Note** The uppermost drive within the column is designated as "0," the next is "1," and so forth.

---

Next to the logical number is the drive type (DLT 8000 in this example). To the right of the drive type is the ID or SCSI address. On the next line is the drive's bus status.

Ultrium drives will display as:

— **HP LTO** for Hewlett Packard Ultrium drives

Drive information might also appear on the menu as:

— **INVALID** if the drive's SCSI ID is an invalid address

3. Press the arrow buttons to scroll to the drive you wish to change and press the **[SELECT]** button.

The **Set Drive SCSI ID Menu** will appear.

---

**Note** The operator panel displays only 16 lines per menu. If the library contains more than eight drives, you must use the down arrow button to scroll to drives 09 and above.

---

4. Press the up and down arrow buttons to change the ID.

5. Press **[SELECT]** to save your changes.

A message screen will appear to indicate that the library is saving the new ID. Then the **Drive Config Menu** will reappear.

---

**Note** The new SCSI ID for a 9840 drive might not appear right away.

---

6. Press the arrow down button to get to the drive's second line of information (the drive's bus status field).

7. Press the **[SELECT]** button.

The **Set Drive SCSI Bus Menu** will appear.

8. Press the up and down arrow buttons to change the bus status to **ON** or **OFF**.

9. Press the **[SELECT]** button to save the changes. (You may press the **[MENU]** button to abort.)

The drive configuration screen will reappear.

10. Continue these steps until all drives are configured.
11. If you have already changed the library's SCSI ID and are planning to exit the main **Configuration Menu** at this time, you must press the **[RESET]** button. If you wish to set other configuration values, continue with the next section.
12. If you have not changed the library's SCSI ID and are not setting other configuration values, press the **[MENU]** button until you exit all menus.

## Network Entries

You may set the library's network configuration, and view the library's Ethernet address from the **Network Config Menu**.

---

**Note** You may need to consult with the systems administrator for some information.

---

The following entries set the library's network configuration:

- Library name
- IP address
- Network gateway
- Subnet mask
- Domain Name Service (DNS) Configuration

---

**Note** *Domain Name Service (DNS) Configuration:* You must enter the (DNS) configuration only if your Simplified Network Management Protocol (SNMP) agent is set to collect ("trap") named recipients. If SNMP is set for numbered recipients, no entries are required (see **DNS Configuration** on page 85).

---

You also may view the library's Ethernet address.



## Viewing the Ethernet Address

This is a six-byte address, unique to each library. The address is written into the MPC card at the factory and cannot be changed. An example of an Ethernet address is 00:10:4f:00:05:01.

To view the Ethernet address:

1. At the **Main Configuration Menu**, press the arrow down button to line up the cursor with **NETWORK CONFIG**.
2. Press the **[SELECT]** button.

The **Network Config Menu** will appear and the library's Ethernet address appears at the bottom of the screen.

3. If you have already changed the library's SCSI ID and are planning to exit the main **Configuration Menu** at this time, you must press the **[RESET]** button. If you wish to set other configuration values, continue with the next section.

If you have not changed the library's SCSI ID and are not setting other configuration values, press the **[MENU]** button until you exit all menus.

### Setting the Library Name

The system administrator might assign the library a name. The name is mapped to the IP address but does not affect operation. To set the library name:

1. At the **Network Config** menu, press an arrow button until the cursor underscores **LIBRARY NAME**.
2. Press the **[SELECT]** button. An editing screen appears.
3. On the editing screen:
  - a. Use the up and down arrow buttons to select a value for each character (field) in the name.
  - b. Use the **[SELECT]** button to move right to the next field.
  - c. Use the **[MENU]** button to move left to the previous field.

---

**Note** Do not enter a library name longer than 30 characters.

---

4. When the screen displays your desired setting, press the **[SELECT]** button twice to save the changes. You may press the **[MENU]** button from the left-most field to abort.
5. If you have already changed the library's SCSI ID and are planning to exit the main **Configuration Menu** at this time, you must press the **[RESET]** button. If you wish to set other configuration values, continue with the next section.

If you have not changed the library's SCSI ID and are not setting other configuration values, press the **[MENU]** button until you exit all menus.

## Setting the IP Address

The system administrator might assign the library an IP address, which makes the library accessible through a network. This is a four-byte address that must be set with information obtained from the system administrator. The value set identifies the library and makes it accessible through a network.

An example of an IP address entry is 192.0.0.1

---

**Note** To use the Web-Based Library Administrator, you must set the library's IP address at the operator panel.

---

To set the IP address:

1. At the **Network Config Menu**, press an arrow button until the cursor underscores **LIBRARY NAME**.
2. Press the **[SELECT]** button. An editing screen appears.
3. On the editing screen:
  - a. Use the up and down arrow buttons to select a value for each three-digit field in the address.

---

**Note** Do *not* leave the first field equal to zero (000).

---

- b. Use the **[SELECT]** button to move right to the next field.
  - c. Use the **[MENU]** button to move left to the previous field.
4. When the screen displays your desired setting, press the **[SELECT]** button from the right-most field to save the changes. You may press the **[MENU]** button from the left-most field to abort.
5. If you have already changed the library's SCSI ID and are planning to exit the main **Configuration Menu** at this time, you must press the **[RESET]** button. If you wish to set other configuration values, continue with the next section.

If you have not changed the library's SCSI ID and are not setting other configuration values, press the **[MENU]** button until you exit all menus.

## Setting the Network Gateway Address

A network gateway in a large network allows devices on one subnet to interface with devices on another subnet (see **Setting the Subnet Mask Address** on page 84). This four-byte address must be specified by the system administrator.

---

**Note** Entering this address is optional. It sets up the gateway connection between subnets, but it is applicable only when such a connection exists and is necessary for library operation. Consult with your systems administrator for additional information.

---

To set the network gateway address:

1. At the **Network Config Menu**, press an arrow button until the cursor underscores **NETWORK GATEWAY**.
2. Press the **[SELECT]** button.  
An editing screen appears.
3. On the editing screen:
  - a. Press the up and down arrow buttons to select a value for each three-digit field in the address.
  - b. Press the **[SELECT]** button to move right to the next field.
  - c. Press the **[MENU]** button to move left to the previous field.
4. Press the **[SELECT]** button from the right-most field to when the screen displays your desired setting to save the changes. (You may press the **[MENU]** button from the left-most field to abort.)
5. If you have already changed the library's SCSI ID and are planning to exit the main **Configuration Menu** at this time, you must press the **[RESET]** button. If you wish to set other configuration values, continue with the next section.

If you have not changed the library's SCSI ID and are not setting other configuration values, press the **[MENU]** button until you exit all menus.

### Setting the Subnet Mask Address

This is a four-byte notation (specified by the system administrator) to resolve routing within your intranet. This address makes the library accessible through a subnet on a large network. An example of a subnet mask entry is 255.255.254.0.

To set the subnet mask address:

1. At the **Network Config Menu**, press an arrow button until the cursor underscores **SUBNET MASK**.
2. Press the **[SELECT]** button. An editing screen appears.
3. On the editing screen:
  - a. Press the up and down arrow buttons to select a value for each three-digit field in the address.
  - b. Press the **[SELECT]** button to move right to the next field.
  - c. Press the **[MENU]** button to move left to the previous field.
4. Press the **[SELECT]** button from the right-most field when the screen displays your desired setting to save the changes. (You may press the **[MENU]** button from the left-most field to abort.)
5. If you have already changed the library's SCSI ID and are planning to exit the main **Configuration Menu** at this time, you must press the **[RESET]** button. If you wish to set other configuration values, continue with the next section.

If you have not changed the library's SCSI ID and are not setting other configuration values, press the **[MENU]** button until you exit all menus.

## DNS Configuration

---

**Note** You must enter the Domain Name Service (DNS) configuration only if your Simplified Network Management Protocol (SNMP) agent is set to collect ("trap") named recipients. If SNMP is set for numbered recipients, no entries are required.

---

### *Setting the Domain Name (DMN) Field*

The first entry you must make for the DNS Configuration is the Domain Name (DMN) field.

1. Press the arrow button until the cursor underscores **DMN**.
2. Press the **[SELECT]** button. An editing screen appears.
3. On the editing screen:
  - a. Press the up and down arrow buttons to select a value for each letter in the domain server's name.
  - b. Press the **[SELECT]** button to move right to the next field.
  - c. Press the **[MENU]** button to move left to the previous field.
4. Enter the main server's name, being sure to append **.com** at the end.
5. When the screen displays your desired setting, press the **[SELECT]** button (from the right-most field) to save the changes.

---

**Note** You may press the **[MENU]** button from the left-most field to abort.

---

### *Setting the DNS Server's IP Address*

The second entry you must make is the primary DNS server's IP address.

1. Press the arrow button until the cursor underscores **SVR Primary**.
2. On the editing screen:
  - a. Press the up and down arrow buttons to select a value for each number in the primary domain server's IP address.
  - b. Press the **[SELECT]** button to move right to the next field.
  - c. Press the **[MENU]** button to move left to the previous field. Press the **[SELECT]** button. An editing screen appears.
3. When the screen displays your desired setting, press the **[SELECT]** button (from the right-most field) to save the changes.

*Setting the  
Secondary DNS  
Server's IP Address*

---

**Note** You may press the **[MENU]** button from the left-most field to abort.

---

The third entry you may make is the secondary DNS server's IP address.

---

**Note** The secondary DNS server's IP address is available for sites that have a secondary (or backup) server. If your site does not have a secondary server, this entry is not required.

---

1. Press the arrow button until the cursor underscores **SVR Secondary**.
2. On the editing screen:
  - a. Press the up and down arrow buttons to select a value for each number in the secondary domain server's IP address.
  - b. Press the **[SELECT]** button to move right to the next field.
  - c. Press the **[MENU]** button to move left to the previous field. Press the **[SELECT]** button. An editing screen appears.
3. When the screen displays your desired setting, press the **[SELECT]** button (from the right-most field) to save the changes.

---

**Note** You may press the **[MENU]** button from the left-most field to abort.

---

If you are planning to exit the **Main Configuration Menu** at this time, you must press the **[RESET]** button. If you wish to set other configuration values, continue with the next section.

If you have not changed the library's DNS configuration and are not setting other configuration values, press the **[MENU]** button until you exit all menus.

## Screen Characteristics

You also can change the operator panel's screen characteristics from the main **Configuration Menu**. The screen characteristics are saved in non-volatile memory.

To change the contrast and backlight (or brightness) of the operator panel screens:

1. At the **Main Configuration Menu**, press an arrow button until the cursor underscores **DISPLAY INFO**.
2. Press the **[SELECT]** button. The **Display Info Menu** will appear.
3. Press the arrow buttons to line up with the desired screen characteristic: **CONTRAST** or **BACKLIGHT**.

An editing screen will appear.

4. Press the up and down arrow buttons to change the count value.

---

**Note** To reset the screen characteristics to the default values, line up the cursor with **RESTORE DEFAULTS** and press the **[SELECT]** button.

---

5. Press the **[SELECT]** button to save the changes. (You may press the **[MENU]** button to abort.)
6. If you have already changed the library's SCSI ID and are planning to exit the main **Configuration Menu** at this time, you must press the **[RESET]** button. If you try to exit the main configuration menu, a message will appear requesting that you reset the library.

If you have not changed the library's SCSI ID, you may exit the configuration menu to do other tasks.



## Cleaning Cartridge Warning Count

---

**Note** For cleaning cartridge information specific to your drive type, see **Drives and Media** on page 135.

---

After a predetermined count, a cleaning cartridge must be replaced.

---

**Note** The Auto Clean feature is automatically enabled if you insert even one cleaning cartridge into the reserved cell area and then reset the library.

---

If the Auto Clean feature is enabled, use the operator panel to set the maximum number of times a cleaning cartridge can be used (see **Table 5** on page 88).

Table 5

### Cleaning Cartridge Warning Counts

Cleaning Cartridge Type	Recommended Warning Counts (maximum)
LP LTO Ultrium	15 uses
LP LTO Ultrium (universal)	50 uses
DLT 8000	20 uses
9840	100 uses

---

**Note** With 3.00 firmware and higher, an asterisk (\*) may appear on the operator panel display. For example, **HP A5597A (Code 3.00.xx)\***. The asterisk (\*) denotes the cleaning cartridge's life has expired. To determine which cartridge has expired and to eject the expired cartridge, see **For cleaning cartridge information specific to your drive type, see Drives and Media on page 135. on page 88, and Exporting Data Cartridges through the CAP on page 104.**

---

You set the cleaning cartridge warning count from the main menu screen. To set this number:

1. From the online status screen, press the **[MENU]** button. The main menu screen will appear.
2. Press the arrow button until the cursor lines up with **CLEANING INFO**.
3. Press the **[SELECT]** button.

The **CLEANING INFO** screen will appear. It displays the number of cleaning cartridges in the reserved area at initialization.

4. Press an arrow button until the cursor is at the appropriate drive's **WARN COUNT**.
5. Press the **[SELECT]** button for your choice.  
An editing screen will appear. The editing screen will display the current setting for the cartridge warning count. The maximum recommended warning count is shown below the current setting.
6. Press the arrow buttons to change the warning count.
7. Press the **[SELECT]** button to save the changes. (You may press the **[MENU]** button to abort.)
8. Press the **[MENU]** button to return to the library status screen.

## Web-Based Library Administrator (WBLA)

The Web-Based Library Administrator is a web-based interface to the library. Your service representative should install it for you. Before you can use the Web-Based Library Administrator to monitor the library or alter the library's configuration, your service representative must enter two values at the operator panel:

- The library's IP address
- The library's Web password

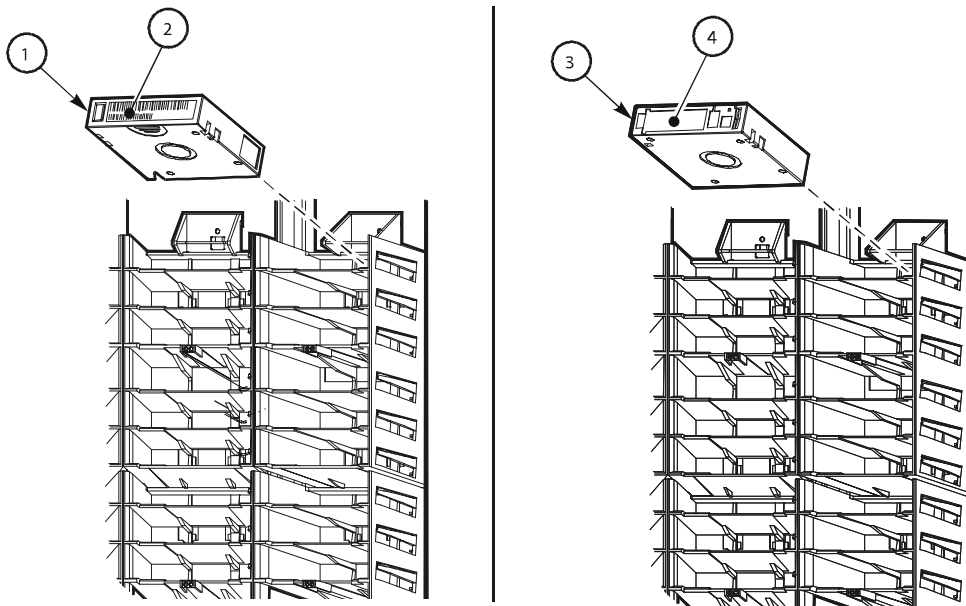
For instructions on how best to make these entries, see the documentation included in the Web-Based Library Administrator shipping package. For instructions on using the interface to alter the library's configuration or monitor library activity, access the online help files for the Web-Based Library Administrator. They are available from the CD that shipped with your product, or you can access them from **[www.hp.com/go/support](http://www.hp.com/go/support)**.

## Loading Tapes into the Library

When you are ready to place the library into production, you may load data cartridges inside the library. The most efficient way to load a great quantity of tapes into the library is to manually load them into the cells.

**Figure 25** on page 91 and **Figure 26** on page 92 illustrate how cartridges are placed into cells.

**Figure 25** Placing Tapes into Array Cells - Ultrium and DLT

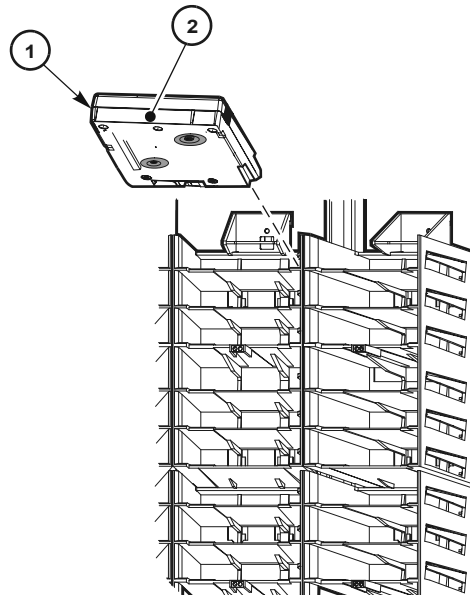


C65333\_hp

1	Ultrium cartridge	3	DLT cartridge
2	Ultrium cartridge label	4	DLT cartridge label

Figure 26

Placing Tapes into Array Cells - 9840



1	9840 cartridge	2	9840 cartridge label
---	----------------	---	----------------------

---

**Note** Use only cartridges designed for your type of tape drives.

---

You must first unlock and open the main access door. This procedure is explained in **Opening the Library Front Doors** on page 122.

You may also load cartridges into array cells by using the CAP(s). While this method is more time-consuming to fully populate the library, the procedure is explained in **Importing Data Cartridges through the CAP** on page 107.

After you have loaded all the cartridges, close and lock the main door. The robot will automatically audit the cartridges and their locations within the library.

# Library Operation



This chapter contains the procedures for operating the library in:

- Automated mode
- Manual mode

---

## Operating in Automated Mode

Automated mode is the normal operating mode of the library. When the library is active and the robot is mounting and dismounting cartridges, monitor your operator console and the library operator panel for messages and respond appropriately.

When a tape library is active, you also might need to:

- Monitor the operator panel for status messages
- Export cleaning cartridges
- Import cleaning cartridges
- Import cartridges into the library through CAP
- Export cartridges from the tape library through the CAP
- Replace a cleaning cartridge
- Manually clean a drive
- Review the FSC log
- Run diagnostic tests

The following section describes how to perform these activities.

### Monitoring Status Information

You can monitor CAP, library, remote user, and drive status information through the library status screen (see **Figure 27** on page 95). This is the main screen on the operator panel. It displays after initialization is complete and also when you press the **[MENU]** button while viewing the **Main Menu**.

You also can monitor drive information, CAP magazine status, the cleaning cartridge usage count, and the library's "personality" information through operator panel menus.

**Figure 27**

**Example Library Status Screen**

```
HP A5597A (CODE VER X.XX.XX)
CAP A CLOSED

LIBRARY READY
WEB ENABLED
  COLUMN 0
00 EMPTY
01 EMPTY
02 EMPTY
03 EMPTY
04 EMPTY
05 LOADED
06 LOADED
07 EMPTY
08 EMPTY
--
```



## CAP Status

The first line of status information on the library status screen indicates the condition of the CAP. **Table 6** on page 96 explains the messages that might appear on this line.

**Table 6**

**CAP Status Messages**

Message	Explanation
<b>OPEN</b>	The CAP door is currently open. (The <b>Open</b> indicator light also is on.) You may insert cartridges or remove the CAP magazines. But you cannot view the CAP magazine contents through the operator panel menus.
<b>CLOSED</b>	The CAP door is currently closed.
<b>CLOSED (LOCKED)</b>	The CAP door is currently closed and locked. Before you can open the CAP door, you must issue a command from your system console.
<b>TRANSITION</b>	The CAP door has stalled while attempting to open.
<b>UNKNOWN</b>	The library does not recognize the current state of the CAP door.

## Library Status

The library status line indicates the current state of the library. **Table 7** on page 97 explains the messages that might appear on this line.

Table 7

### Library Status Messages

Message	Explanation
<b>LIB MAIN DOOR OPEN</b>	The library's front door is open. When you close it, the library will reset (initialize).
<b>LIB INIT REQUIRED</b>	The library requires initialization. You must press the <b>[RESET]</b> button.
<b>LIBRARY NOT READY</b>	The library is not available to perform operator-requested actions. Some status information might be available through the network interfaces.
<b>LIBRARY READY</b>	The library has completed initialization and is ready to perform requested actions.
<b>LIB MAINTENANCE MODE</b>	The library is offline because it is performing diagnostic tests.
<b>INTERVENTION REQUIRED</b>	The library is experiencing a problem. You should note the FSC (if the library has issued one) and call your service representative.
<b>LIB UNKNOWN STATE</b>	The library does not recognize its current state. You should note the FSC (if the library has issued one) and call your service representative.

## Web Status

Following the library status line is a message indicating that the Web-Based Library Administrator (WBLA) is enabled. For more information on the WBLA, see **Web-Based Library Administrator (WBLA)** on page 28.

## Drive Status

Table 8 on page 98 summarizes drive status messages that might appear on the library status screen:

Table 8

### Drive Status Messages

Message	Explanation
<b>INIT REQUIRED</b>	You must initialize this drive.
<b>NOT CONNECTED</b>	This drive is not connected to a SCSI bus.
<b>UNKNOWN DRIVE</b>	The library does not recognize the type of drive in this location.
<b>NOT COMMUNICATE</b>	This drive is not communicating with the client or the drive power is off.
<b>NOT FUNCTIONAL</b>	This drive is not operating properly.
<b>NOT LOADABLE</b>	The library cannot load a cartridge into this drive.
<b>EMPTY</b>	This drive does not have a tape loaded.
<b>CARTRIDGE IN</b>	The drive contains a cartridge, but the cartridge is not loaded into the drive.
<b>CLEAN NEEDED</b>	This drive requires cleaning.
<b>CLEAN FAILED</b>	The attempt to clean this drive failed.
<b>LOADING</b>	The library is mounting a cartridge to this drive.
<b>REWOUND</b>	The cartridge in this drive has been rewound.
<b>UNLOADING</b>	The library is dismounting a cartridge from this drive.
<b>LOADED</b>	The library has loaded a cartridge into this drive.
<b>REWINDING</b>	The cartridge in this drive is being rewound.
<b>BUSY</b>	This drive is performing a read or write operation.
<b>CLEANING</b>	The drive is being cleaned.

---

**Note** The operator panel displays only 16 lines per screen. If the library contains more than eight drives, you must use the down arrow button to scroll to Drives 08 and above.

---

## Drive Information

To view details about an installed drive, including its serial number and firmware version:

1. Press the **[MENU]** button to display the Main Menu.
2. If necessary, press an arrow button until the cursor lines up with **DRIVE INFO**.
3. Press the **[SELECT]** button.  
A list of all installed drives will appear.
4. Use the arrow buttons until the cursor underscores the desired drive.
5. Press the **[SELECT]** button.

The Drive Information Menu will appear (see **Figure 11** on page 45). The screen lists the manufacturer, model, status, serial number, interface type, and firmware version of the selected drive. See **Table 8** on page 98 for a list of drive status messages.

## CAP Magazine Status

To check the status of a CAP magazine and its contents:

1. Press the **[MENU]** button to display the **Main Menu**.
2. If necessary, press an arrow button until the cursor lines up with **CAP CONTENTS**.
3. Press the **[SELECT]** button.

The **CAP Contents** menu will appear. The screen lists the VOLSER of each cartridge in an installed magazine or it lists a status message. See **Table 9** on page 100 for the status messages that appear on this list.

---

**Note** Each CAP has four magazines, numbered one through four, from the top location to the bottom.

---

Table 9

**CAP Magazine Slot Status Messages**

Message	Explanation
<b>EMPTY</b>	This magazine slot does not contain a cartridge.
<b>UNKNOWN</b>	This magazine slot contains a cartridge, but the library has not yet performed the necessary audit to identify the cartridge.
<b>UNREADABLE</b>	This magazine slot contains a cartridge, but the camera could not read the cartridge's VOLSER label.

**CAP States**

When exporting or importing cartridges through the CAPs, the following CAP states may be displayed:

Table 10

**CAP States**

State	Explanation
<b>CAP A (B) Open</b>	Specified CAP is open for exporting or importing of cartridges
<b>CAP A (B) Closed</b>	Specified CAP is closed and locked
<b>CAP A (B) Transition</b>	Specified CAP is stalled during an open or close transition. This message indicates a problem and an error is posted to the FSC log.
<b>CAP A (B) Unknown</b>	The specified CAP is in an unknown state. Consult the FSC logs.

## Cleaning Cartridge Usage Count

This procedure assumes that you have loaded cleaning cartridges into the reserved cells and have subsequently reset the library. (Taking these steps enables the Auto Clean function.) You then can check the usage count of cleaning cartridges in the reserved cells or in both the reserved cells and the CAP.

### Cartridges in the Reserved Cells

To check the number of times that the cleaning cartridges have been used since they were loaded into the reserved cells in the library:

1. Press the **[MENU]** button to return to the **Main Menu**.
2. Press the arrow buttons until the cursor underscores **CLEANING INFO**.
3. Press the **[SELECT]** button.

The panel displays the **Cleaning Info** menu (see **Figure 12** on page 47).

4. Press the arrow buttons until the cursor underscores **EXPORT CARTRIDGE**.
5. Press the **[SELECT]** button.

The **Export Clean Cartridges** screen appears, which lists all reserved cell cleaning cartridges by domain (or drive type), VOLSER, and usage count.

---

**Note** If the usage count for a cleaning cartridge has exceeded its warning count, the export screen will display **EXPIRED**. You must remove this cartridge from the library.

---

6. Press the **[MENU]** button to exit the **Export Clean Cartridges** screen.

### Cartridges in Reserved Cells and CAP

To check the usage count of all cleaning cartridges (those in the reserved cells and those in the CAP):

1. Press the **[MENU]** button to return to the **Main Menu**.
2. Press the arrow buttons until the cursor underscores **CLEANING INFO**.
3. Press the **[SELECT]** button.

The panel displays the **Cleaning Info** menu (see **Figure 12** on page 47).

4. Press the arrow buttons until the cursor underscores **CLEAN CARTRIDGE INFO**.

5. Press the **[SELECT]** button.

The **Clean Cartridges** screen appears, which lists all installed cleaning cartridges by domain (or drive type), VOLSER, and usage count.

---

**Note** If the usage count for a cleaning cartridge has exceeded its warning count, the export screen will display **EXPIRED**. You must remove this cartridge from the library.

---

6. Press the **[MENU]** button to exit the **Clean Cartridges** screen.

### Library Personality Information

Viewing library personality information lets you determine the library's vendor and whether the personality module for the Web-Based Library Administrator is present and enabled.

To view the library's personality information:

1. Press the **[MENU]** button to return to the **Main Menu**.
2. Press the arrow buttons until the cursor underscores **CONFIGURATION**.
3. Press the **[SELECT]** button.  
The panel displays the main **Configuration Menu**.
4. Press the arrow buttons until the cursor underscores **PERSONALITY MODULE**.
5. Press the **[SELECT]** button.  
The panel displays the **Personality Module Info** screen.
6. Press the down arrow to view a second screen of information.
7. To exit the **Personality Module Info** screen, press the **[MENU]** button.

The following status messages might appear on the Personality Module Info screen:

**Table 11**                      **Personality Module Status/Info Screen**

Message		Explanation
<b>Status</b>	<b>NOT PRESENT</b>	No personality module is attached to the logic card. <b>Note:</b> The personality module is not needed to enable WBLA.
<b>Type</b>	<b>NORMAL</b>	The factory-installed personality and vendor information are in effect.
	<b>VERSION</b>	The version number for the personality module. If a personality module is not present, this is the version of the vendor information (factory set at "0").
	<b>LIBRARY VENDOR ID</b>	The identity number for the library vendor (factory set at "1").
	<b>LIBRARY VENDOR NAME</b>	The name of the library vendor (factory set as "HP").
	<b>LIBRARY PRODUCT NAME</b>	If TYPE is <b>NORMAL</b> , this is the product name assigned by the library vendor (factory set as "A5597A").
	<b>SCSI VENDOR NAME</b>	The library vendor name reported on the SCSI interface (factory set as "HP").
	<b>SCSI PRODUCT NAME</b>	The library product name reported on the SCSI interface (factory set as "A5597A").
<b>Horizon</b>	<b>ENABLED</b>	The Web-Based Library Administrator product is enabled.



## Exporting Cleaning Cartridges through the CAP

---

**Note** This procedure assumes that you have enabled the Auto Clean function by:

---

- Loading cleaning cartridges into the reserved cells
- Resetting the library once the cleaning cartridges are loaded.

When one or more cleaning cartridges have expired, you can export them from the reserved cells to the CAP. To do export them:

1. Press the **[MENU]** button to return to the **Main Menu**.
2. Press the arrow buttons until the cursor underscores **CLEANING INFO**.
3. Press the **[SELECT]** button.

The panel displays the Cleaning Info menu (see **Figure 12** on page 47).

4. Press the arrow buttons until the cursor underscores **EXPORT CARTRIDGE**.
5. Press the **[SELECT]** button.

The **Export Clean Cartridges** screen appears, which lists all reserved cell cleaning cartridges by domain (or drive type), VOLSER, and usage count.

6. Select the cleaning cartridges you want to export by:
  - a. Moving the cursor to the desired cartridge entry on the list
  - b. Pressing the **[SELECT]** button.

A selected cleaning cartridge is then highlighted (in reverse video)
  - c. Repeating Steps a and b until you have selected all the cartridges you want to export.
7. Press the **[SELECT]** button to export the cartridges.

## Importing Cleaning Cartridges through the CAP

---

**Note** This procedure assumes that you have enabled the Auto Clean function by:

---

- Loading cleaning cartridges into the reserved cells
- Resetting the library once the cleaning cartridges are loaded

When you want to import cleaning cartridges through the CAP into the reserved cells:

1. Press the **[CAP]** button on the operator panel to open the CAP.  
The **Open** indicator will light.

---

**Caution** *Possible halt to operation or damage to components.* You must enter the cartridges properly, or else you might damage the robot or the drive or cause the library to stop operating. Use only cartridges designed for your type of drives.

---

2. Load cartridges into the magazine.  
You can do this one of two ways:
  - a. Pull out and down on the magazine handle.
  - b. Remove the magazine by lifting it out (see **Figure 28** on page 108).

---

**Note** You can use the snap-on retention cartridge cover to keep cartridges in place when carrying the magazine. Remove the clear cover from the back of the magazine by lifting the side edge. To protect the cartridges, place the slots on one edge of the cover into the grooves on the side of the magazine's top panel and snap the other edge into place.

---

3. Enter the cartridges into the magazine so that they lie flat, with the VOLSER label facing toward you, the customer label facing down, and the reel facing away from you. (See **Figure 29** on page 109 and **Figure 30** on page 110.)

---

**Caution**      *Possible damage to the hand assembly.* Remove the magazine's retention cover before loading the magazine into the CAP.

---

4. Return the magazine to its closed position.
5. Press the **[CAP]** button on the operator panel to close the CAP.
6. Press the **[MENU]** button to return the display to the **Main Menu**.
7. Press the arrow buttons until the cursor underscores **CLEANING INFO**.
8. Press the **[SELECT]** button.  
The panel displays the Cleaning Info menu (see **Figure 12** on page 47).
9. Press the arrow buttons until the cursor underscores **IMPORT CARTRIDGE**.
10. Press the **[SELECT]** button.  
The **Import Clean Cartridges** screen appears, which lists all reserved cell cleaning cartridges by domain (or drive type), and VOLSER.
11. Select the cleaning cartridges you want to import by:
  - a. Moving the cursor to the desired cartridge entry on the list
  - b. Pressing the **[SELECT]** button. A selected cleaning cartridge is then highlighted (in reverse video)
  - c. Repeating Steps a and b until you have selected all the cartridges you want to import

---

**Note**      There is no "undo" available on this menu. If you select a cartridge by mistake, you must exit the menu by pressing the **[MENU]** button. Then you must start again at Step 10.

---

12. Press the **[SELECT]** button to import the cartridges.

## Importing Data Cartridges through the CAP

To open the CAP and import data cartridges:

1. Press the **[CAP A]** or **[CAP B]** button on the operator panel to open the CAP.

The indicator will light.

---

**Caution** *Possible halt to operation or damage to components.* You must enter the cartridges properly or you might damage the robot or the drive, or cause the library to stop operating. Use only cartridges designed for your type of drives.

---

Refer to **Figure 29** on page 109 and **Figure 30** on page 110 while performing the following steps.

2. Load cartridges into the magazine by lifting up, then pulling out and down on the magazine handle to gain access to the slots. If desired, you can also remove the magazine from the CAP by lifting it out (see **Figure 28** on page 108).

---

**Note** You can use the snap-on retention cartridge cover to keep cartridges in place when carrying the magazine. Remove the clear cover from the back of the magazine by lifting the side edge. To protect the cartridges, place the slots on one edge of the cover into the grooves on the side of the magazine's top panel and snap the other edge into place.

---

3. Enter the cartridges into the magazine so that they lie flat, with the bar code up and the reel facing away from you.

---

**Caution** Remove the retention cover before loading the magazine into the CAP.

---

4. Return the magazine to its closed position.
5. Press the **[CAP A]** or **[CAP B]** button on the operator panel to close the CAP.

---

**Note**

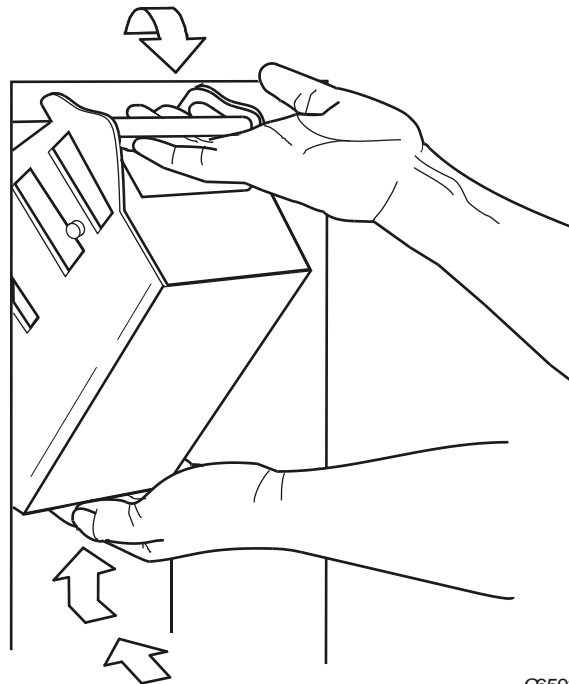
HP strongly advises that you do *not* enter unlabeled cartridges. Your client software determines what happens when you enter a cartridge with an unreadable label. Under ordinary conditions, the camera on the hand audits the CAP and recognizes that a cartridge is present, but the hand does not move it. You must remove the cartridge from the CAP.

In this situation, your software might direct the library to stop operating. Some software might prompt you to type in a label number when no VOLSER is read. Typing in a label number might cause a problem later during an audit because the camera still will not be able to read the unreadable VOLSER on the cartridge.

---

**Figure 28**

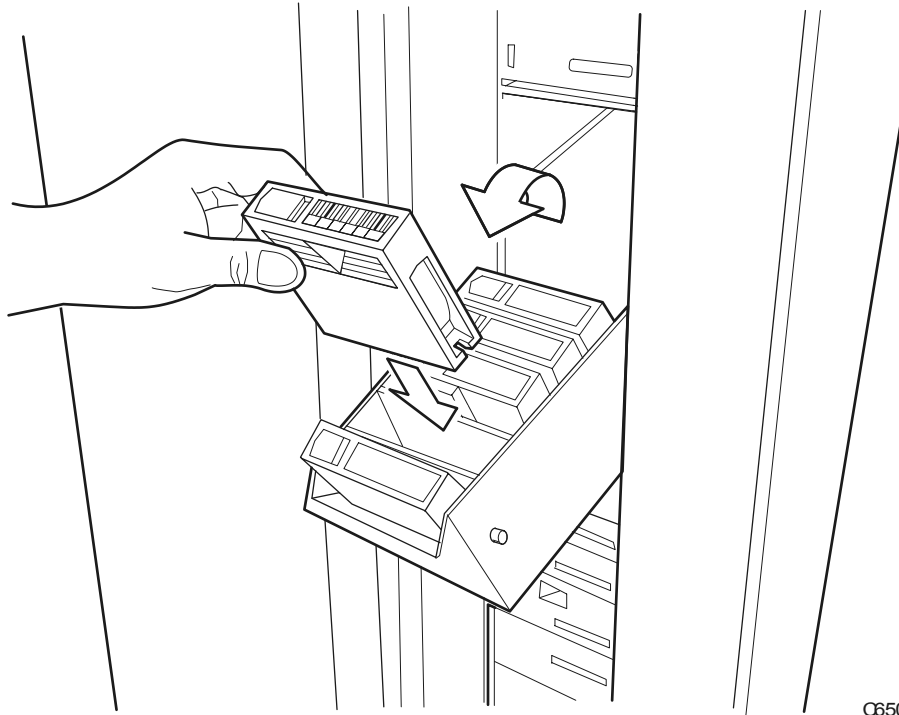
Removing the CAP Magazine



G65027

Figure 29

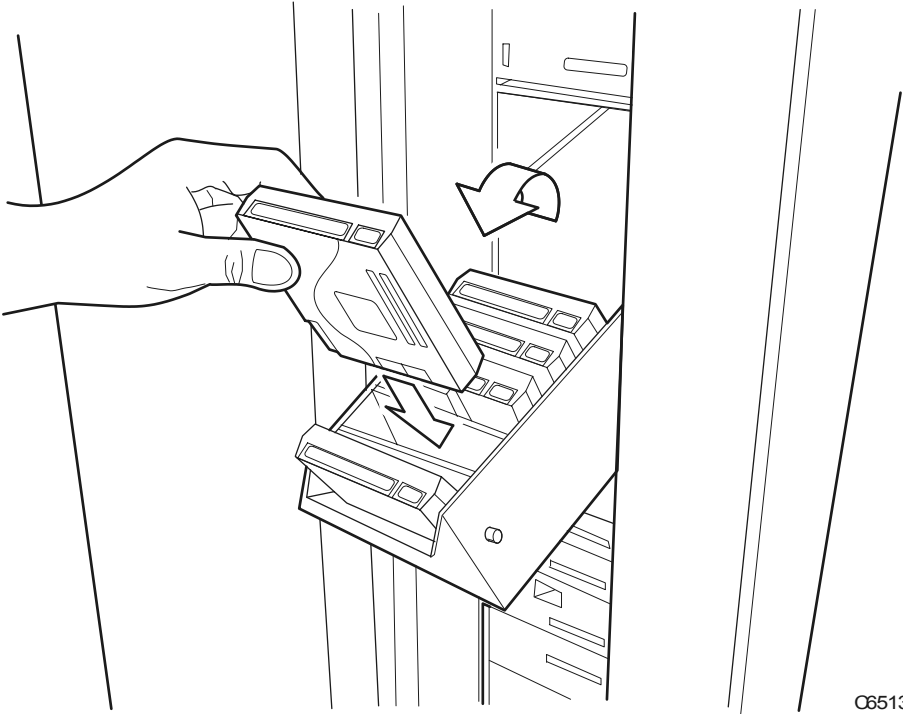
Entering DLT Cartridges into the CAP Magazine



C65052

**Figure 30**

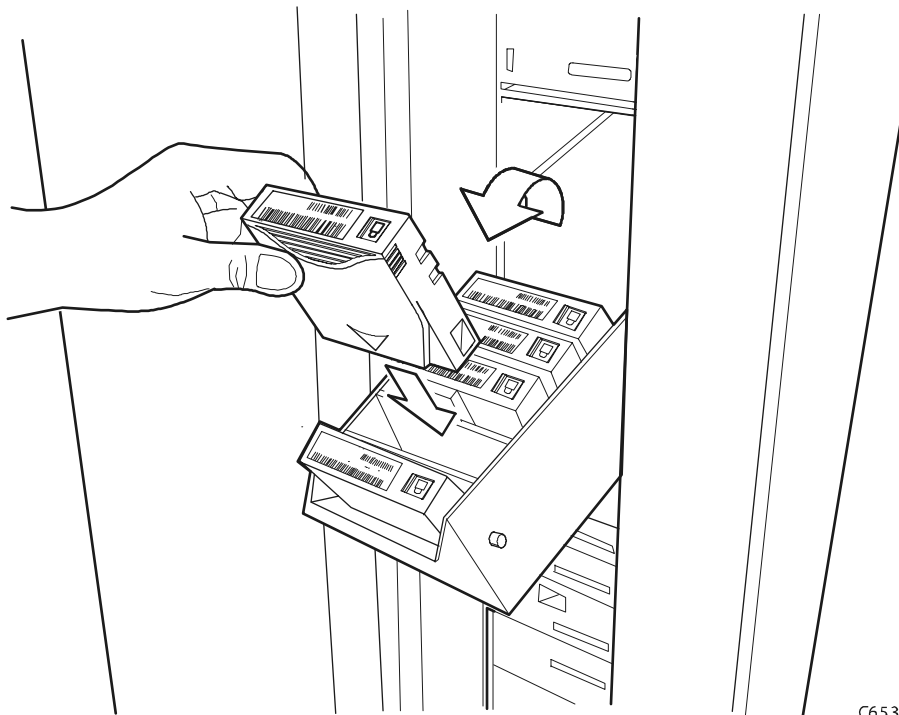
**Entering 9840 Cartridges into the CAP Magazine**



O65135

Figure 31

Entering Ultrium Cartridges into the CAP Magazine



C65302\_hp



## Exporting Data Cartridges through the CAP

To export data cartridges through the CAP:

1. Press the **[CAP A]** or **[CAP B]** button on the operator panel to open the CAP.
2. Remove or pull down the magazine and remove the cartridges and store them *outside* the tape library.
3. Repeat these steps until you have removed all the required cartridges.
4. Press the **[CAP]** button to close the CAP
5. Refer to your console and your software documentation for further instructions.

## Manually Cleaning a Drive

If you have not enabled the Auto Clean function on the library, then the library status screen will display **CLEAN NEEDED** whenever a drive requires cleaning.

To manually clean this drive:

1. Press the **[CAP]** button on the operator panel to open the CAP.
2. Insert the required cleaning cartridge into the CAP.
3. Press the **[CAP]** button to close the CAP.
4. Press the **[MENU]** button until the **Main Menu** displays.
5. Press the arrow buttons until the cursor underscores **DIAGNOSTICS**.
6. Press the **[SELECT]** button.

The panel displays the **Main Diagnostics Menu** (see **Figure 13** on page 49).

7. Press the arrow buttons until the cursor underscores DRIVE DIAGNOSTICS.
8. Press the **[SELECT]** button.

The screen will display a list of all installed drives.

9. Use the arrow buttons to highlight the desired drive.
10. Press the **[SELECT]** button.

The **Diagnostics Drive Menu** appears.

11. Press the arrow buttons until the cursor underscores **CLEAN DRIVE**.

12. Press the **[SELECT]** button.

A message screen will appear to inform you that the drive will be cleaned at the next opportunity.

When cleaning is completed, the robot will return the cleaning cartridge to the CAP.

If you want to clean another drive (of the same type), press the **[MENU]** button to return to the list of drives, and repeat Steps 10 through 13.

13. When drive cleaning is completed, press the **[CAP]** button to open the CAP.
14. Remove the cleaning cartridge and make a record of how many times it has been used.
15. Press the **[CAP]** button to close the CAP.

## Reviewing FSC Logs

A service representative might ask you to review the library's fault symptom code (FSC) log so that you can better analyze library-related problems. The FSC log records significant events and errors that the library has experienced during operation.

To review the FSC log:

1. Press the **[MENU]** button until the **Main Menu** displays.
2. If necessary, press the arrow buttons until the cursor underscores **FSC LOG**.
3. Press the **[SELECT]** button.  
The panel displays the FSC logs screen (see **Figure 9** on page 43).
4. Use the arrow buttons to scroll through the log.

Here is a sample entry on the FSC logs screen, followed by an explanation of the entries:

**3329 03 NONE**  
**03/01/2001 14:46:14**

<b>3329</b>	This four-character code is the FSC.
<b>03</b>	This value indicates the number of times this FSC has occurred.
<b>NONE</b>	This message indicates which, if any, mechanical device was involved.
<b>03/01/2001</b>	These digits indicate the date the FSC occurred. The fields from left to right are month, day, and year.
<b>14:46:14</b>	These digits indicate the time the FSC occurred. The fields from left to right are hour, minutes, and seconds.

## Running Diagnostic Tests

---

**Note** Diagnostics are also available from HP Library & Tape Tools (see **HP Library & Tape Tools** on page 146). For additional troubleshooting procedures specific to your drive technology, see **Drives and Media** on page 143.

---

Diagnostic tests let you exercise certain aspects of the library's operation. Tests are listed in **Table 12** on page 115.

Table 12

### 20/700 Library Drive Diagnostic Tests

Test	Description
<b>CLEAN DRIVE</b>	This function is not a test. It moves a specified cleaning cartridge from the CAP to a drive and initiates drive cleaning. When cleaning is completed, it will return the cleaning cartridge to the CAP. This routine does <i>not</i> require the library to be inactive.
<b>MOUNT</b>	Mounts a diagnostic tape to the selected drive.
<b>DISMOUNT</b>	Dismounts a diagnostic tape from the selected drive.
<b>RUN DRIVE CHECK</b>	Determines whether the specific drive is functioning. This test applies to DLT 8000 and 9840 drives only.
<b>MOUNT/ DISMOUNT LOOP</b>	Mounts and dismounts a diagnostic tape on the selected drive.
<b>Note:</b> 9840 drives must have firmware version 1.28 or higher.	

---

**Caution** *Potential system problem:* Diagnostic tests should be performed only by trained personnel. Before performing the diagnostic tests, be sure that the library and drives are inactive.

---

## Running Drive Diagnostic Tests

To run a diagnostic test on a drive:

1. Ensure the library is not in use.
2. Press the **[MENU]** button until the **Main Menu** displays.
3. Press the arrow buttons until the cursor underscores **DIAGNOSTICS**.
4. Press the **[SELECT]** button.

The panel displays the **Main Diagnostics Menu**.

5. Press the arrow buttons until the cursor underscores **DRIVE DIAGNOSTICS**.
6. Press the **[SELECT]** button.

The screen will display a list of installed drives.

7. Use the arrow buttons to highlight the desired drive.
8. Press the **[SELECT]** button.

The **Diagnostics Drive Menu** appears.

9. Press the arrow buttons until the cursor underscores the desired test. For a description of the available tests, see **Table 12** on page 115.
10. Press the **[SELECT]** button.

If you selected **MOUNT/DISMOUNT LOOP**, an editing screen will appear:

- a. Use the arrow buttons to enter the desired value. (The up arrow button increases the value; the down arrow button decreases the value.)
  - b. Press the **[SELECT]** button.
11. You will be prompted to confirm that you want the library in Maintenance Mode (offline) before beginning the test (**ARE YOU SURE?**). Confirm this by pressing the **[SELECT]** button. (You may press the **[MENU]** button to abort.)
  12. Wait until the test is completed; the screen will display a message that either the test completed successfully or, if a problem occurred, the screen will display an error message and, in some cases, an FSC code.

## Running a Get-Put Loop

During a Get-Put loop, the hand loads and unloads a cartridge from a storage cell. This tests the functionality of the hand assembly.

To run a Get-Put loop:

1. Ensure the library and drives are not in use.
2. Press the **[MENU]** button until the **Main Menu** displays.
3. Press the arrow buttons until the cursor underscores **DIAGNOSTICS**.
4. Press the **[SELECT]** button.

The panel displays the **Main Diagnostics Menu**.

5. Press the arrow buttons until the cursor underscores **GET PUT LOOP**.
6. Press the **[SELECT]** button.

The **Get-Put Mode** screen will appear.

7. You will be prompted to confirm that you want the library in Maintenance Mode (offline) before beginning the test (**ARE YOU SURE?**). Confirm this by pressing the **[SELECT]** button. You may press the **[MENU]** button to abort.
8. Wait until the test is completed; the screen will display **TEST COMPLETE** or, if a problem occurred, an FSC code.

## Operating in Demo Mode

With the library in Demo Mode (demonstration mode), the hand takes a data cartridge from a storage cell, moves the cartridge, and places the cartridge back into a different storage cell.

---

**Caution**     *Audit update required:* If DEMO MODE is interrupted, Get-Put Loop operations will become disrupted, and cartridges may not be returned to their original locations. When DEMO MODE completes, you must IPL to re-audit the library, and your backup software applications . You must then notify the customer to update the host cartridge database.

---

To operate in Demo Mode:

1. Ensure the library and drives are not in use.
2. Press the **[MENU]** button until the **Main Menu** displays.
3. Press the arrow buttons until the cursor underscores **DIAGNOSTICS**.
4. Press the **[SELECT]** button.

The panel displays the **Main Diagnostics menu**.

5. Press the arrow buttons until the cursor underscores **DEMO MODE**.
6. Press the **[SELECT]** button.

The **Demo Mode menu** appears.

7. Use the arrow buttons to enter the desired number of loops. The up arrow button increases the value by 100; the down arrow button decreases the value by 100.

---

**Note**     HP does not recommend looping tests excessively.

---

8. Press the **[SELECT]** button.
9. You will be prompted to confirm that you want the library in Maintenance Mode (offline) before beginning the test (**ARE YOU SURE?**). Confirm this by pressing the **[SELECT]** button. (You may press the **[MENU]** button to abort.)
10. Wait until the test completes. The screen will display **TEST COMPLETE** or, if a problem occurred, an FSC code.
11. Press the **[RESET]** button to reset the library.



---

## Powering off the Library

To power off the library:

1. Ensure that the library and drives are not in use.
2. Press down on the switch or switches (circuit breakers) behind the right front door of the tape library.

---

## Manual Operation

The following section describes operations you can perform manually when the tape library is not in use.

When the library is inactive, you might have to:

- Open the front door
- Move the robot
- Locate a cartridge in the storage cells
- Remove a cartridge from the hand
- Mount a cartridge in a drive
- Dismount a cartridge from a drive

Before starting any of these tasks, you must take precautions against electrostatic discharge (ESD).

---

**Caution**     *Potential static electricity damage to electrical components:* Take precaution against potential ESD damage by touching unpainted metal on the library frame *before* reaching into the library or touching any drives. Avoid touching any electrical components.

---

After you have opened a library door:

1. With your finger, touch a gray, unpainted metal surface, such as the library frame just inside the front door.
2. Keep your body movement to a minimum as you touch the drives or library components.

---

**Note**     Antistatic wrist straps with clip-on ends are commercially available.

---

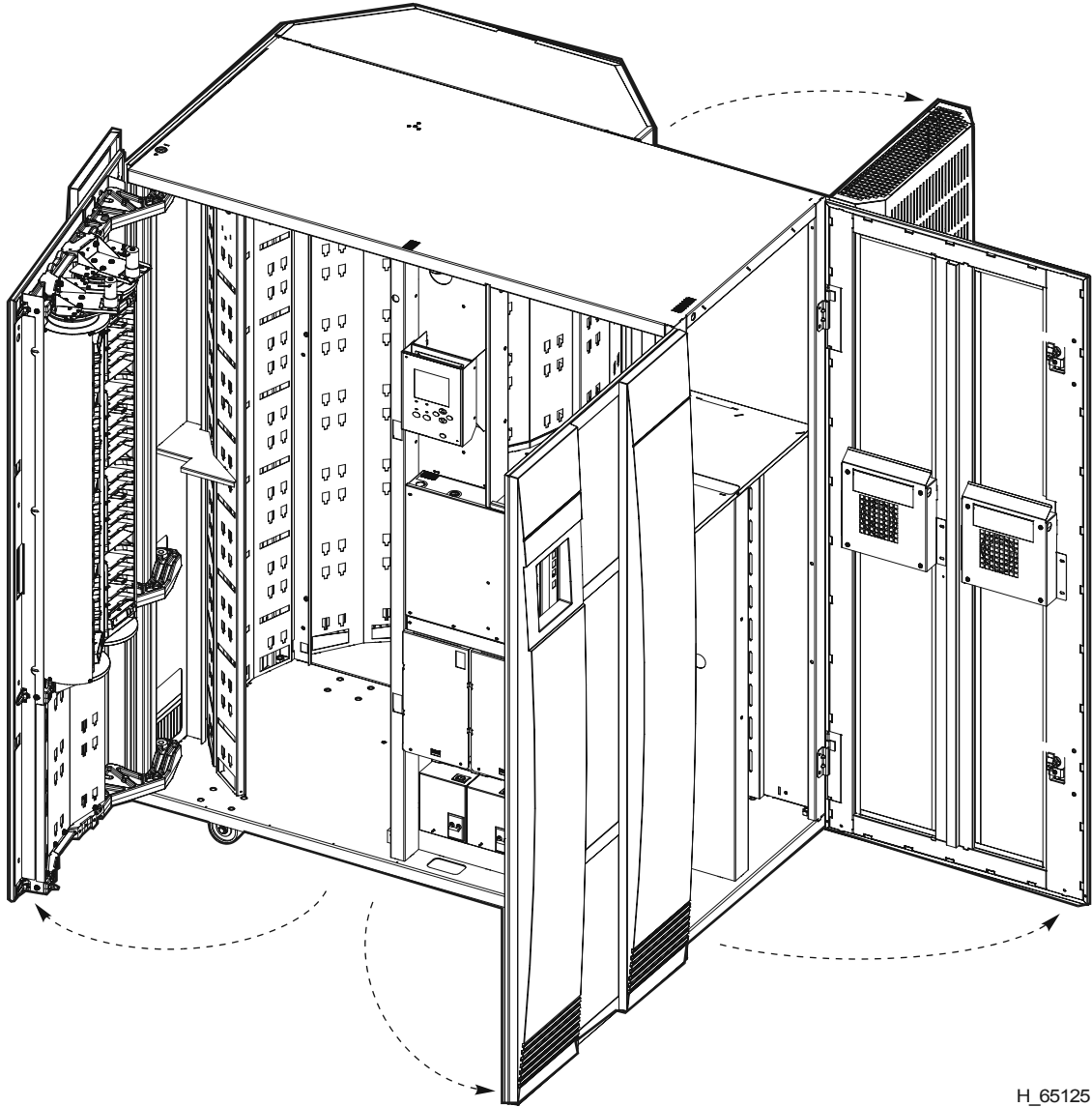
## Opening the Library Front Doors

You must open the front doors to perform manual operations. Refer to **Figure 32** on page 123 as you perform this procedure.

1. Make sure all jobs have ended and that the tape library is offline.
2. Open the tape library right front door by pulling on the left side of the door.
3. Open the tape library left front door by using a latch key to unlock both locks. Turn the key counter clockwise to unlock them, then pull open the door.

Figure 32

Opening the Access Doors



H\_65125

## Moving the Robot

After you open the tape library doors, you might need to move the robot to make it easier to access the cartridges or the drives.

Read and observe the following caution before you attempt to move any portion of the robot.

---

**Caution**     *Potential equipment damage:* To prevent damaging the hand or Z-carriage, make sure the reach mechanism on the hand is fully retracted before moving any part of the robot. Push the gripper mechanism into the retracted position. If the tape library goes offline due to a power failure, the reach mechanism might be extended into a storage cell or drive. If the robot is rotated when this condition exists, the hand could be damaged.

Move the Z-column and Z-carriage only as shown in **Figure 33** on page 125 and **Figure 34** on page 126.

Take precaution against potential ESD damage by touching gray, unpainted metal on the library frame before reaching into the library. Avoid touching any electrical components.

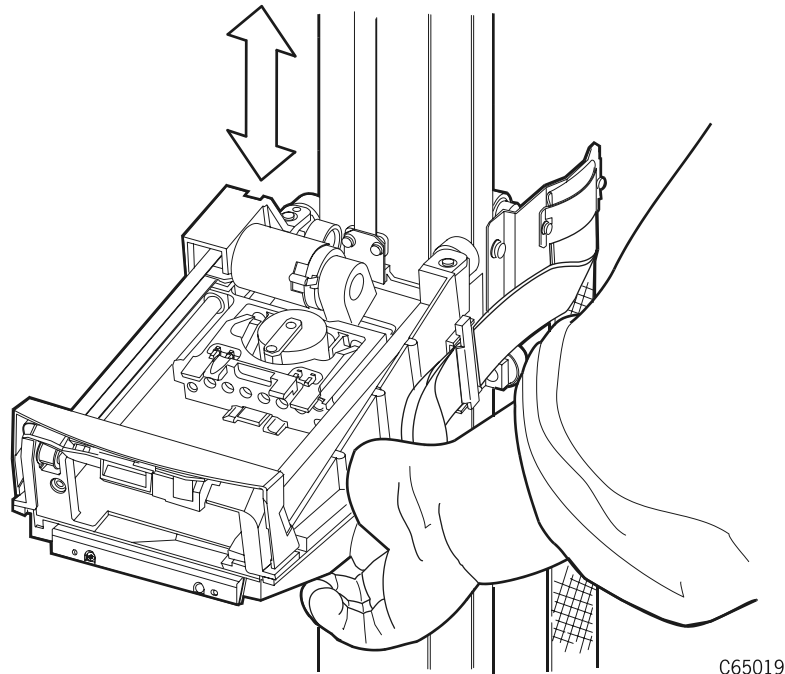
---

## Raising and Lowering the Hand-camera Assembly

If you need to raise or lower the hand, *slowly and carefully* move it by placing your fingers on the hand-camera assembly as shown in **Figure 33** on page 125.

**Figure 33**

Raising and Lowering the Hand-camera Assembly



C65019

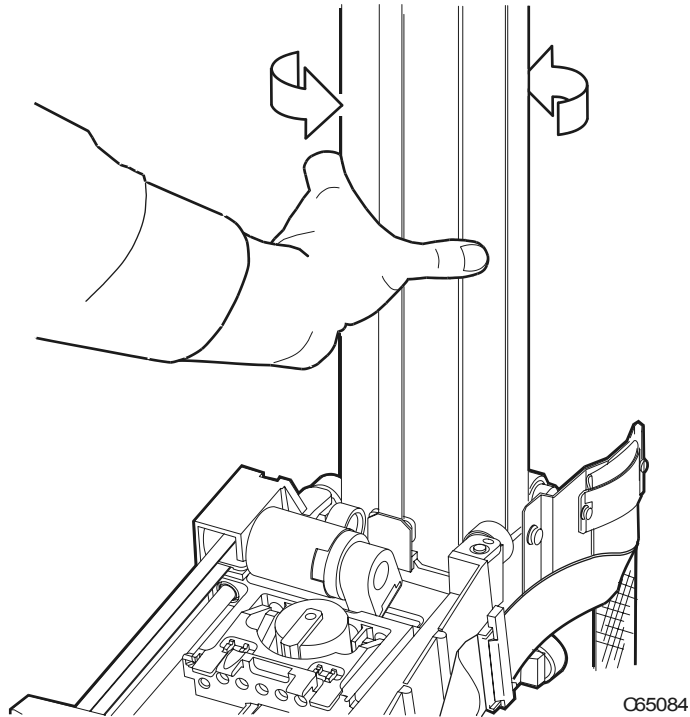
## Rotating the Z-column

If you need to rotate the Z-column, grasp it and *carefully* rotate it, as shown in **Figure 34** on page 126.

The Z-column does not rotate a full 360 degrees. If the column meets resistance and stops before reaching the desired position, it has contacted a stopping mechanism. Do *not* force it. Rather, rotate the column in the opposite direction.

**Figure 34**

Rotating the Z-column



## Locating a Cartridge in the Storage Cells

**Figure 3** on page 21 and **Figure 4** on page 22 show the locations of the panels, rows, and columns of the cartridge storage cells in the library. The decal at the top of each column also provides location information. To remove a cartridge from a storage cell, slide out the cartridge.

## Removing a Cartridge from the Hand

If the library loses power or goes offline, a cartridge might be left in the hand. You can remove it from the hand and manually mount it into a drive for a read/write operation.

---

**Caution**     *Possible equipment damage:* Follow the procedures described in **Moving the Robot** on page 124. Failing to do so could damage the hand.

Make sure you do not touch any electronic components on the hand assembly. The components could easily be damaged.

---

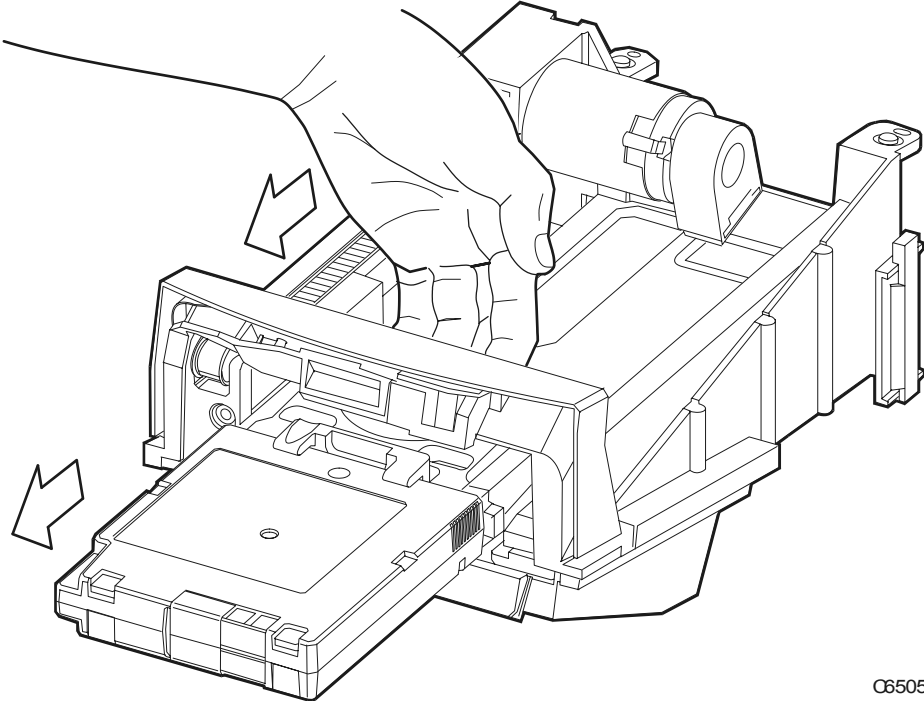
To remove a cartridge from the hand:

1. Rotate the Z-column; move the hand until it is facing the front door.
2. Push on the back of the reach mechanism (as shown in **Figure 35** on page 128) until the gripper is extended to its full position.



Figure 35

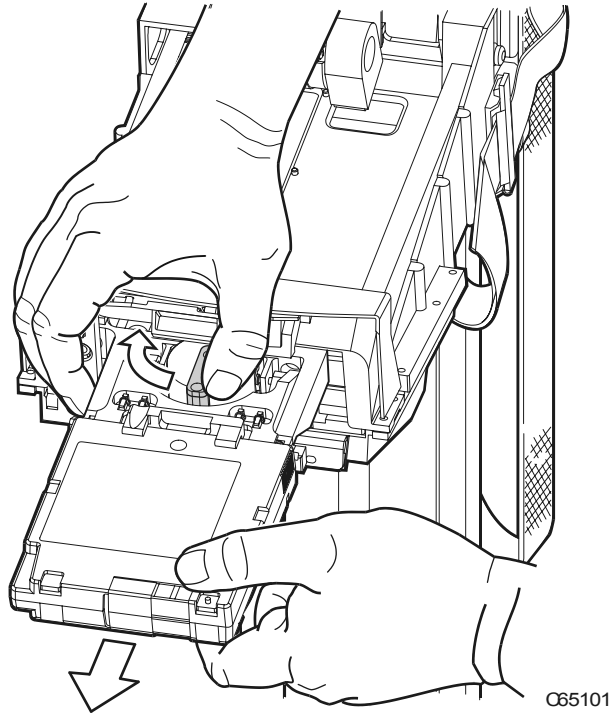
Extending the Gripper



C65054

Figure 36

Removing a Cartridge from the Hand



---

**Caution** *Heated components:* If the robot has been active, the solenoid switch might be hot to the touch. Wait for the solenoid to cool before touching it.

---

3. Hold the solenoid on top of the reach mechanism with one hand and grasp the cartridge with the other. Rotate the solenoid switch clockwise until the cartridge is released from the gripper, as shown in **Figure 36** on page 129.

---

**Caution**     *Potential equipment damage:* Make sure the gripper mechanism is fully retracted. If it is left extended and you turn the robot, the gripper mechanism will strike a storage cell. If it is left extended and the hand is facing the tape library door when it is closed, the door will strike the gripper mechanism.

---

4. Push the gripper mechanism back into the hand until the mechanism is fully retracted.

## Loading/Unloading Cartridges Manually

When the library is offline, you can—after taking adequate precautions—load a cartridge into a drive or unload a cartridge from a drive. The following pages provide manual load and unload procedures for DLT, Ultrium, and 9840 drives.

---

**Note** If you manually load any cartridges into a drive, you should manually unload them from the drive when the drive's operation is finished. Place them into a cell or remove them from the library.

---

### Loading a Cartridge into a DLT Drive

DLT drives contain load handle mechanisms to assist the drive in loading cartridges. The load lever can be seen on the front of these drives. Follow the directions below to manually load a DLT drive.

---

**Caution** *Potential equipment damage:* Before you load a cartridge into the drive, you must make sure power is on and the **Operate Handle** indicator is steadily on (not flashing).

---

To load a cartridge into a DLT drive:

1. Open the tape library right front door by pulling on the left side of the door.
2. Open the library left front door by using a latch key to unlock both locks. See **Figure 32** on page 123. Turn the key counter clockwise to unlock them, then pull open the door.
3. Locate the cartridge (see **Locating a Cartridge in the Storage Cells** on page 127).
4. Make sure the DLT handle is up (see **Figure 37** on page 133) and the **Operate Handle** indicator is steadily on.

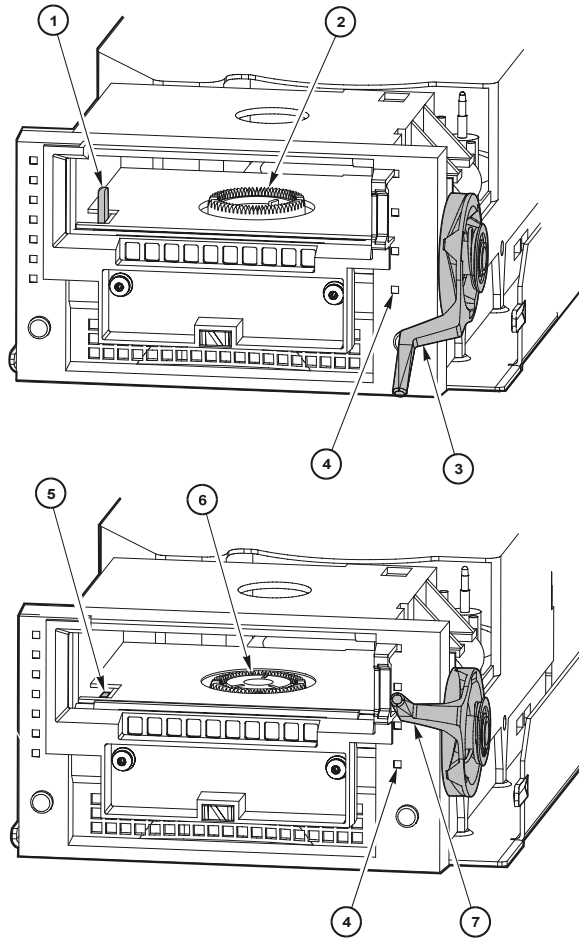
---

**Note** If the handle is in the down position, wait for the **Operate Handle** indicator to remain on steadily before moving it to the up position (see **Figure 37** on page 133). If the **Operate Handle** indicator is flashing while the handle is up, move the handle to the down position and wait for the **Operate Handle** indicator to remain on steadily. Then move the handle to the up position.

---

Figure 37

## DLT Drive with Load Handle



C65232

1	Cartridge hook (up)	5	Cartridge hook (down)
2	Hub (up)	6	Hub (down)
3	Handle (down)	7	Handle (up)
4	Operate handle indicator		

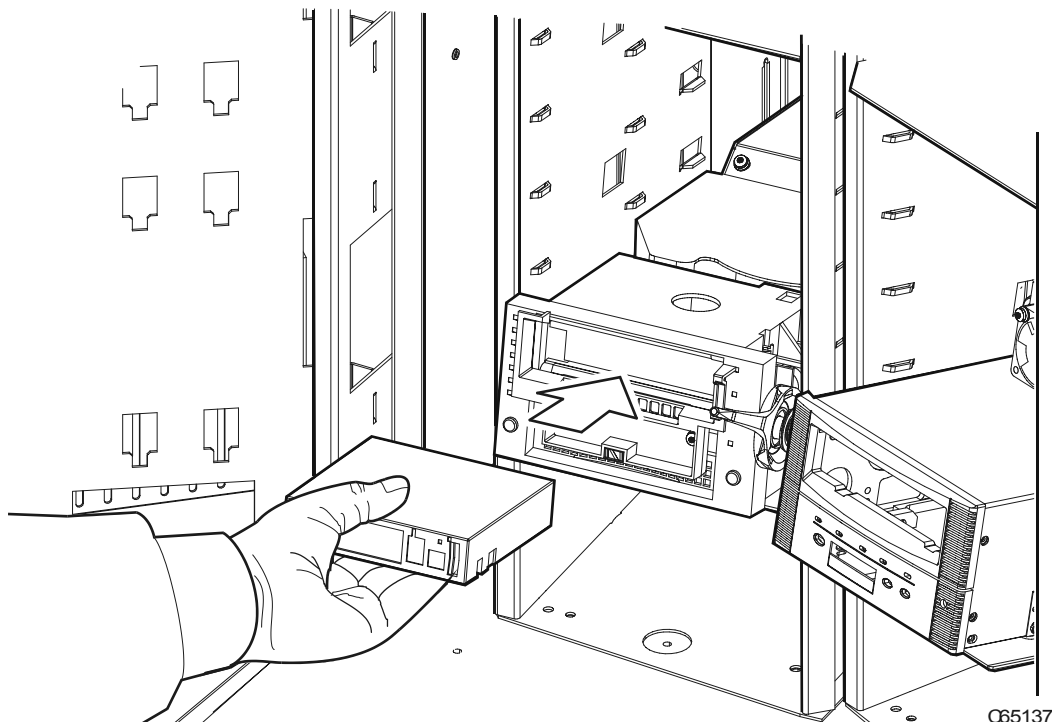
---

**Caution**     *Potential equipment damage:* You must insert the cartridge properly or you will damage the drive. Use only DLT cartridges for DLT drives. Make sure the cartridge has a readable VOLSER label.

---

5. Hold the cartridge so that the VOLSER label is facing you and the write protect switch is on the right side of the cartridge, as shown in **Figure 38** on page 134.
6. Insert the cartridge into the drive and push the cartridge into the back of the drive until it is firmly seated.
7. Lower the drive handle.

**Figure 38**                      Loading a Cartridge into a DLT Drive



## Unloading a Cartridge from a DLT Drive

To unload a cartridge from a DLT drive:

1. Ensure the drive is not in use.
2. Open the tape library right front door by pulling on the left side of the door.
3. Open the library left front door by using a latch key to unlock both locks. See **Figure 32** on page 123. Turn the key counter clockwise to unlock them, then pull open the door.
4. Locate the desired drive.
5. Press the **[Unload] button** on the drive.
6. Wait (about 12 seconds) for the **Operate Handle** indicator to remain steadily on.

---

**Caution**     *Potential tape or equipment damage:* Wait five seconds before pulling the cartridge out of the drive. Immediately removing the cartridge may damage the cartridge or drive leaders.

---

7. Raise the handle. The cartridge will eject about 4 cm (0.5 in.).
8. Gently pull the cartridge from the drive.

---

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

---

9. Store the cartridge *outside* the tape library.



## Loading a Cartridge into an Ultrium Drive

To load a cartridge into a Ultrium drive:

1. Ensure that the drive is not in use.

---

**Caution**     *Possible equipment problem:* You must open the library's front door before attempting to manually mount a cartridge to an Ultrium drive. A unique communication between the library and drive prepares the drive for manual operation.

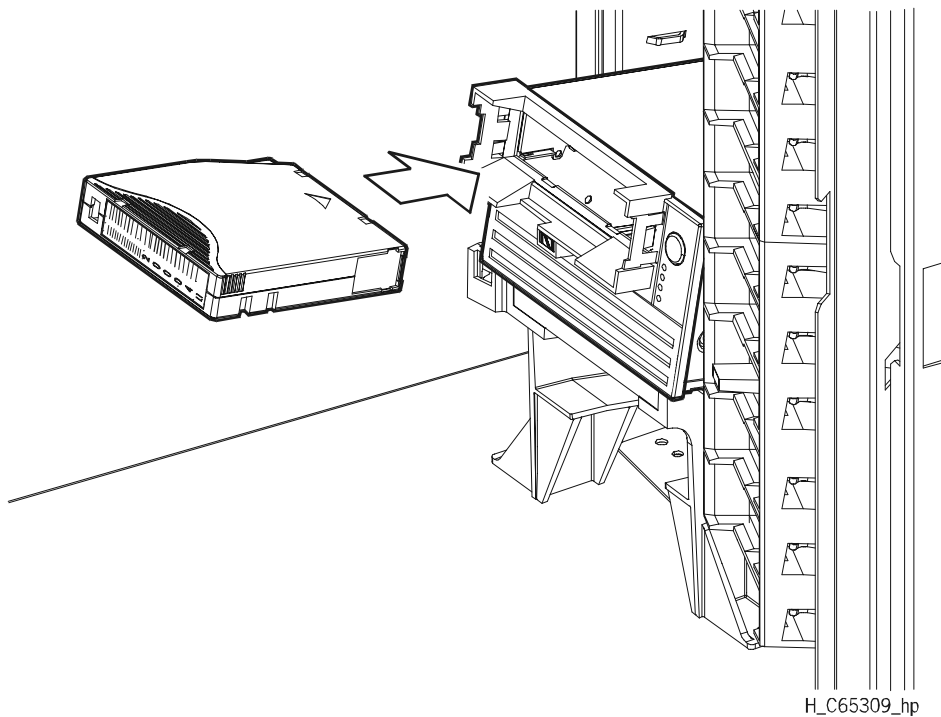
---

2. Open the tape library right front door by pulling on the left side of the door.
3. Open the library left front door by using a latch key to unlock both locks. See **Figure 32** on page 123. Turn the key counter clockwise to unlock them, then pull open the door.
4. Locate the cartridge (see **Locating a Cartridge in the Storage Cells** on page 127).

5. Insert the cartridge into the Ultrium drive using the direction shown in **Figure 39** on page 137.

**Figure 39**

Loading a Cartridge into an Ultrium Drive



## Unloading a Cartridge from an Ultrium Drive

To unload a cartridge from an Ultrium drive:

1. Ensure that the drive is not in use.
2. Open the tape library right front door by pulling on the left side of the door.
3. Open the tape library left front door by using a latch key to unlock both locks. See **Figure 32** on page 123. (Turn the key counter clockwise to unlock them, then pull open the door.)
4. Press the **[Unload]** button on the front panel of the drive.

One of the following conditions can occur:

- After the tape rewinds, the cartridge ejects from the drive. Remove the cartridge from the drive.
- The cartridge fails to eject after the tape rewinds. Hold the **[Unload]** button for 10 to 15 seconds to try to force an eject from the drive. If not successful, contact your service representative.

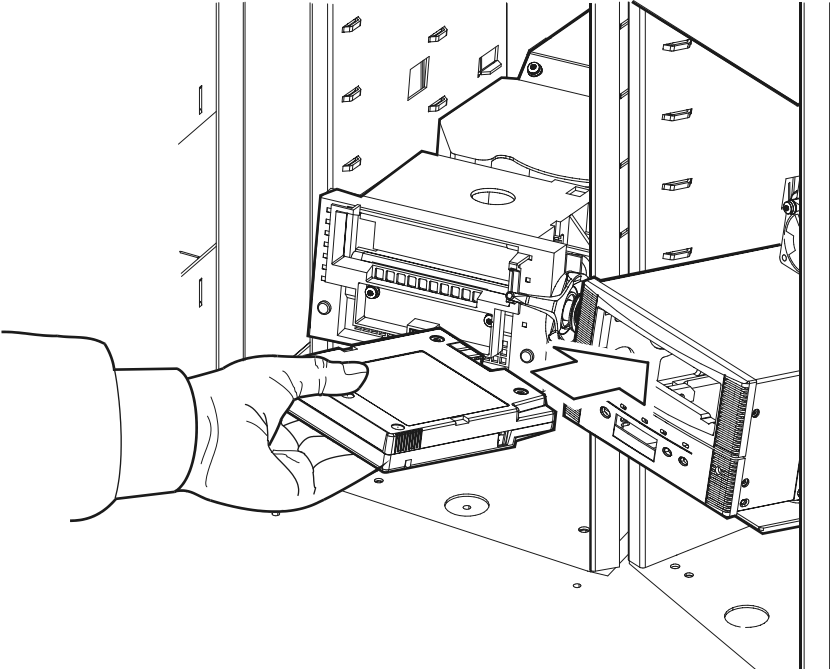
## Loading a Cartridge into a 9840 Drive

To load a cartridge in a 9840 drive:

1. Ensure that the drive is not in use.
2. Open the tape library right front door by pulling on the left side of the door.
3. Open the library left front door by using a latch key to unlock both locks. See **Figure 32** on page 123. Turn the key counter clockwise to unlock them, then pull open the door.
4. Locate the cartridge (see **Locating a Cartridge in the Storage Cells** on page 127).
5. Insert the cartridge into the 9840 drive using the direction shown in **Figure 40** on page 140.
6. Wait for one of the following messages to display on the drive's front panel and take the appropriate action, if necessary:
  - The **Ready F** (File Protected) message displays when a write-protected cartridge loads successfully.
  - The **Ready U** (File Unprotected) message displays when a cartridge that is not write-protected loads successfully.
  - The **Ready A** (VolSafe-enabled) message displays when a write-enabled VolSafe cartridge loads successfully.
  - The **NTReady** message displays when the tape in the cartridge has lost tension. Follow the instructions outlined in the *9840 Tape Drive User's Reference Manual* to correct this condition.
  - The **LOADxxxx** message displays when the cartridge unsuccessfully loads, where the **xxxx** is a fault symptom code. Follow the instructions outlined in the *9840 Tape Drive User's Reference Manual* to correct this condition.

Figure 40

Loading a Cartridge into the 9840 Drive



C65138

## Unloading a Cartridge from a 9840 Drive

To unload a cartridge from a 9840 drive:

1. Ensure that the drive is not in use.
2. Open the tape library right front door by pulling on the left side of the door.
3. Open the tape library left front door by using a latch key to unlock both locks. See **Figure 32** on page 123. (Turn the key counter clockwise to unlock them, then pull open the door.)
4. Press the **[Unload]** switch on the front panel of the drive.

One of the following conditions can occur:

- After the tape rewinds, the cartridge ejects from the 9840 drive. Remove the cartridge from the 9840 drive.
- The cartridge fails to eject after the tape rewinds. Refer to the *9840 Tape Drive User's Manual* to correct this condition.
- If the **[Unload]** switch is pressed during a write operation, the 9840 drive tries to write the remaining data before the cartridge unloads. If the **UnWrxxxx** (Unwritten Data) message displays, where **xxxx** is the fault symptom code, the attempt failed and some data remains unwritten to the tape.

For more information about recovering from an Unwritten Data condition, refer to the *9840 Tape Drive User's Manual*. Returning the Library to Online Status.

## Returning the Library to Online Status

To return the tape library online for automated operations:

1. Refer to your specific drive publications for instructions on making the drives ready. For a DLT drive, make sure the **Operate Handle** light is on and the handle is up.

---

**Note** If you manually load any cartridges, you must manually unload them and store them in a storage cell or remove them from the library.

---

2. Close and lock the tape library doors. The robot will perform an audit of the cells.
3. Refer to your specific software publications for instructions on replacing the cartridges you removed and on inserting the cartridges into the storage cells.

# Drives and Media



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## Appendix Overview

This appendix describes information about the following:

- **General Usage** on page 144
- **HP Ultrium Drives and Tape Cartridges** on page 149
- **DLT Drives and Tape Cartridges** on page 161
- **9840 Drives and Tape Cartridges** on page 175



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## General Usage

### Electrostatic Discharge (ESD) and Other Precautions

Tape drives contain very sensitive electrical components. It is important to follow the proper procedures to prevent electrostatic discharge (ESD), which could result in damage to the product. Failure to take proper precautions could lead to intermittent failures or premature hard failures.

*Use the following general precautions when handling tape drives:*

- Use a properly installed anti-static mat on your work surface.
- Use properly fitted wrist-grounding straps.
- Be careful not to touch any PC board components.
- If installing the tape drive, always leave it in its anti-static bag until you are ready to install it.
- Place the tape drive on a properly grounded anti-static work surface when it is out of its protective anti-static bag.
- Do not use the bag as a substitute for the work surface anti-static mat. The outside of the bag may not have the same anti-static properties as the inside.
- When removing or replacing the tape drive, never rest it on its front bezel (the side containing the drive door where tapes are inserted).
- Do not place hands or foreign objects inside the tape drive's door or drive bay, or touch internal components. Skin oils will damage the recording heads.

*Use the following general precautions when handling tape cartridges:*

- Do not carry cartridges loosely in a container that exposes them to unnecessary physical shock. Dropping or bumping cartridges may dislodge and damage internal components.
- Store each cartridge vertically in its protective case until needed. Choose a clean environment that duplicates the conditions of the room in which it is used.
- Make sure that the cartridge has been in its operating environment for at least 24 hours before use.
- Do not allow direct contact with the tape medium or open the tape door unnecessarily. Dust or skin oils can contaminate the tape and impact performance.
- Do not place cartridges on or near devices that may produce strong magnetic fields. Such exposure may alter or erase data on the tape.
- Do not expose the cartridge to moisture or direct sunlight.
- Apply labels only in the designated areas of the tape cartridge and do not apply more than one label at a time.

## Mixed Media

HP Tape Libraries have a mixed media feature that allows the use of different drive technologies within the same library.

Some considerations when using mixed media:

- Your backup software application needs to support mixed media in order to take advantage of this feature.
- HP Library & Tape Tools version 2.2 or greater is required for diagnostic support.

## Media Migration

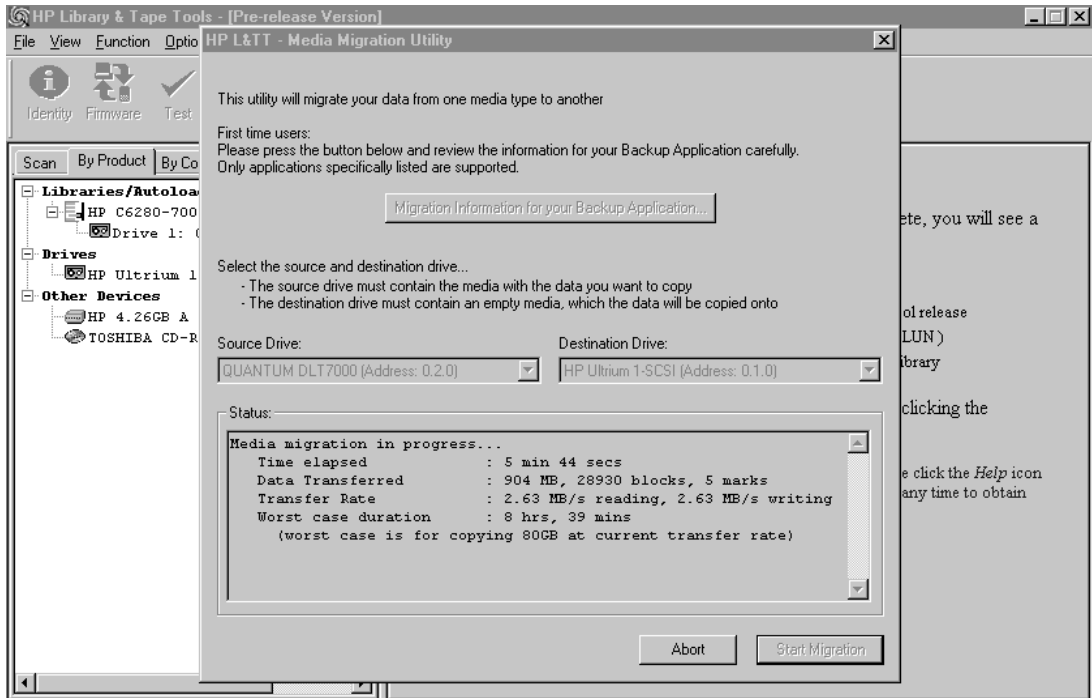
Utilities and services are available to assist you in migrating from one drive technology to another where possible.

### HP Library & Tape Tools

The HP Library & Tape Tools diagnostic assists you in installing and supporting your tape library. This tool provides an intuitive graphical user interface with integrated context-sensitive help. It can be downloaded free of charge from [www.hp.com/support/tapetools](http://www.hp.com/support/tapetools).

Among the many features is a Migrate Backup Media option available from the Utility menu. This utility will copy data from DLT drives to DLT or Ultrium drives. See **Figure 41** on page 147 for a screen shot from HP Library & Tape Tools.

Figure 41 HP L&TT Media Migration Utility



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**Note** Before using the media migration utility in HP Library & Tape Tools, ensure that the source media is write-protected. This utility does not provide any library control. You must manually load media into the selected drives, or by using the Web-Based Library Administrator or your backup software utility.

---

For more information on using HP Library & Tape Tools for media migration, refer to [www.hp.com/support/tapetools](http://www.hp.com/support/tapetools).

## Service Providers

Vogon International provides migration, recovery, and forensic services with offices in the United Kingdom, Germany, and the United States. Vogon offers a standard service and a fast track service that generally has a 50% quicker turnaround time from the standard service. Prices vary depending on the complexity of the service requested.

### Vogon International Ltd

Web address                    **[www.vogon-international.com](http://www.vogon-international.com)**

Mailing address:            Talisman Business Center  
Talisman Road  
Bicester, Oxfordshire  
OX6 OJX

Telephone:                    United States: (405)321-2585  
UK: 44 (0) 1869 355255  
Germany: 49 (0) 89 3235030

# HP Ultrium Drives and Tape Cartridges

## HP Ultrium Drive and Media Specifications

Table 3 Ultrium Drive Specifications

Description	HP Ultrium
<b>Performance</b>	
Read/write transfer rate: (maximum sustained)	<ul style="list-style-type: none"><li>■ Non-compressed mode: 15 MB/second</li><li>■ Compressed (2:1 typical): 30 MB/second</li></ul>
Burst transfer rate	80 MB/second
Average access time	90 seconds
Loading time	25 seconds (maximum)
Unloading time	13 seconds (maximum)
Interface type	<ul style="list-style-type: none"><li>■ Low-Voltage Differential (LVD) Ultra 2 Wide SCSI</li><li>■ High-Voltage Differential (HVD) Ultra SCSI</li></ul>
<b>Environmental</b>	
<i>Operating environment</i> Temperature Relative humidity Wet-bulb temperature	10° to 35°C (50° to 95°F) 20% to 80% 26°C (78.8°F) maximum

**Table 4** Ultrium Media Specifications

Characteristic	Ultrium Media
Formatted capacity	200 GB (2:1 typical compression)
Basic description	0.5 inch (metal particle)
Tape length	580 meters (1903 feet)
Cartridge dimensions	10.2 x 10.5 x 2.2. cm (4.02 x 4.15 x 0.85 in)
Shelf life	30 years
Cartridge life	1,000,000 passes 20,000 loads/unloads
Cleaning cartridge life	15 uses
<b>Environmental</b>	
<i>Cartridge storage environment (archive)</i> <sup>1</sup> . Temperature Relative humidity Wet-bulb temperature	16° to 32°C (61° to 90°F) 20% to 80% 26°C (78.8°F) maximum
<i>Cartridge storage environment (non-archive)</i> Temperature Relative humidity Wet-bulb temperature	16° to 32°C (61° to 90°F) 20% to 80% 26°C (78.8°F) maximum
<i>Cartridge shipping environment (unrecorded)</i> <sup>2</sup> . Temperature Relative humidity Wet-bulb temperature	-23° to 49°C (-10° to 120°F) 20% to 80% 26°C (78.8°F) maximum
<p><sup>1</sup> Archival storage is one to 10 years.</p> <p><sup>2</sup> The shipping environment must not exceed the limit of the storage environment, archive or non-archive, for longer than 10 days.</p>	

---

**Note** Only use approved Ultrium cleaning cartridges with HP Ultrium tape drives. For data cartridges, only use those specified as having met Ultrium standards. Approved media will have the Ultrium format trademark (see **Figure 42** on page 151), which indicates that the media has passed Ultrium format compliance testing. For best results, always use HP branded media.

---

**Figure 42** Ultrium Format Trademark





## Using HP Ultrium Cartridges

In addition to the information provided in this manual, refer to the documentation provided with your HP Ultrium media for more information.

---

**Caution** HP Ultrium tape drives require special cleaning cartridges and data cartridges formatted specifically for HP Ultrium. To avoid damage to your tape drive, it is critical to use appropriate cleaning cartridges and properly formatted data cartridges.

---

A unique feature of Ultrium tape cartridges is LTO-Cartridge Memory (LTO-CM). LTO-CM is an intelligent memory chip embedded into the cartridge. It uses a radio frequency interface that eliminates the need for a physical power or signal connection between the cartridge and drive. Information normally stored in the header at the beginning of the tape is contained in the LTO-CM, including identification and usage information such as the number of times the cartridge has been loaded and error logs.

### Maintaining Ultrium Cartridges

Make it a practice to visually inspect your tape cartridges when loading or removing them from your tape library. Taking a few minutes to check the condition of your cartridges will lower the risk of repeated failures and help ensure uninterrupted backup.

For general precautions when using tape cartridges, see **page 144**. In addition, do not apply more than one label onto Ultrium cartridges, as extra labels can cause the cartridges to jam in the tape drive.

---

**Caution** Do not bulk erase Ultrium formatted cartridges. This will destroy pre-recorded servo information and make the cartridge unusable.

---

## Write-Protecting Ultrium Cartridges

Each cartridge has a sliding write-protect switch. Using the write-protect switch ensures data safety for files that have been previously written to tape, preventing additional files from being written to that tape.

To change the write-protect setting, slide the red tab on the base of the cartridge (**Figure 43** on page 153):

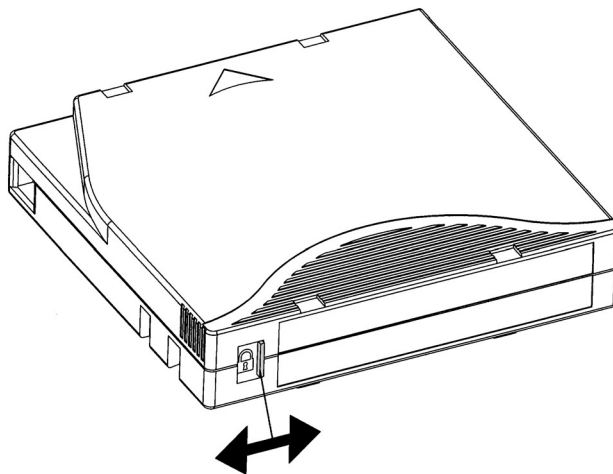
- **Right** to *prevent* data from being written to the cartridge. The red tab on the cartridge displays a padlock when the write-protect switch is in the "ON" position.
- **Left** to *allow* data to be written to the cartridge (unless the tape is write-protected electronically through your backup software). The padlock on the red tab cannot be seen and the hole is exposed when the write-protect switch is in the "OFF" position.

---

**Note** With the write-protect switch in either position, data can be read from the cartridge.

---

**Figure 43** Ultrium Write-Protect Button Settings



## Using Ultrium Cartridge Bar Code Labels

Make it a practice to use bar code labels on your tape cartridges. Your host software may need to keep track of the following information and the associated bar code:

- Date of format or initialization
- Cartridge owner (such as a group or department)
- Storage purpose

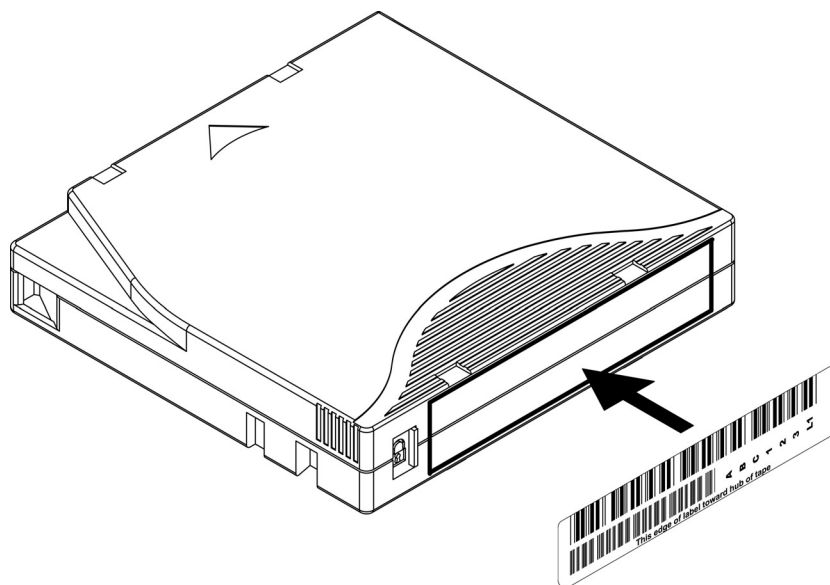
---

**Note**            If the host software does not keep track of this information, create a method for doing so.

---

Ultrium cartridges have a recessed area located on the face of the cartridge next to the write-protect switch. Use this area for attaching the bar code label (**Figure 44** on page 155). Do not apply labels onto the cartridge except in this designated area.

**Figure 44** Ultrium Cartridge Recessed Area



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**Caution** The bar code label should be applied with the alphanumeric portion facing the hub side of the tape cartridge (**Figure 44** on page 155).

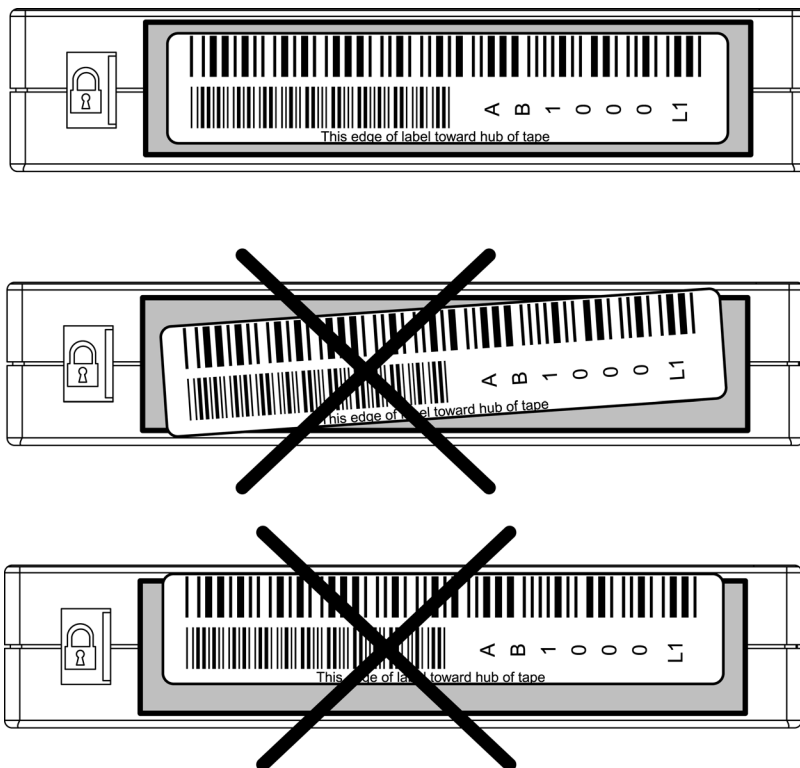
Never apply multiple labels onto a cartridge, as extra labels can cause the cartridge to jam in a tape drive.

Do not apply labels onto the top, bottom, sides, or back of the cartridge as this may cause damage to the tape drive or interfere with reliable operation.

---

To ensure successful operation of your tape library, place the bar code label *entirely* within this area, ensuring that no part of the label is outside of the recessed area (**Figure 45** on page 156).

**Figure 45** Proper Ultrium Label Position



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**Note** You can order additional bar code labels if needed. For bar code ordering information, see **Ordering Tape Cartridges** on page 193 as well as the information that came with your tape library.

---

## Using Ultrium Cleaning Cartridges

Only use appropriately formatted data cartridges and HP Ultrium cleaning cartridges. In general, replace cleaning cartridges after fifteen uses. Marking the label on the cleaning cartridge after each use will help you keep track of the number of uses.

---

**Caution** Excessive use of the cleaning cartridge can cause unnecessary wear on the drive head. The tape library operator panel will display a message when the cleaning cartridge needs to be replaced.

---

See **Ultrium Cleaning Issues** on page 159 for information on troubleshooting common cleaning problems.

## Troubleshooting HP Ultrium Drives

This section describes troubleshooting information for Ultrium drives, including:

- Rewinding/Removing a Stuck Tape
- Ultrium Cleaning Issues
- LTO-Cartridge Memory (LTO-CM) Issues

Refer to **Running Diagnostic Tests** on page 115 for information on troubleshooting library operation or other problems you may encounter. If you experience problems not covered by this manual, contact your support representative.

### Rewinding/Removing a Stuck Tape

If a tape gets stuck in the drive, attempt to eject the tape:

- Manually from the tape library
- By holding the **[UNLOAD]** button for 10 to 15 seconds to force an eject from the drive
- Remotely, using the Web-Based Library Administrator
- Using your host backup software

If these attempts are not successful, contact your support representative.

## Ultrium Cleaning Issues

**Table 5** on page 159 describes potential issues with cleaning cartridges and how to resolve them.

**Table 5 Ultrium Cleaning Issues**

Problem	Solution
A brand new data cartridge is used and the library's operator panel indicates to clean the drive.	<ul style="list-style-type: none"><li>■ Clean the outside of the data cartridge using a damp, clean, lint-free cloth.</li><li>■ Clean the drive using the drive cleaning procedure on <b>page 112</b>.</li><li>■ If the library's operator panel indicates to clean the drive again within a short amount of time, replace the data cartridge.</li></ul>
Cannot load the cleaning cartridge.	<ul style="list-style-type: none"><li>■ Ensure that you are using an approved Ultrium cleaning cartridge. Cleaning cartridges are unique for each drive technology.</li></ul>
Recurring cleaning message.	<ul style="list-style-type: none"><li>■ If the message reappears after cleaning the drive, the library will indicate the need to replace the cleaning cartridge.</li><li>■ Replace the existing cleaning cartridge with a new one.</li><li>■ If the message reappears when a particular data cartridge is used, verify that the data cartridge is readable by:<ul style="list-style-type: none"><li>— Clearing the error message.</li><li>— Reading the tape again.</li></ul></li><li>■ If the data cartridge can be read, backup data from the damaged cartridge to another cartridge, and discard the damaged one.</li></ul>



## LTO-Cartridge Memory (LTO-CM) Issues

The LTO-CM stores information that is normally stored in the header at the beginning of the tape, including identification and usage information such as the number of times the cartridge has been loaded, when it was last cleaned, and error logs. If the LTO-CM becomes damaged, you may experience difficulty with the cartridge.

**Table 6** LTO-CM Issues

Problem	Cause	Solution
A new data cartridge that is write-enabled is rejected by the drive.	LTO-CM has failed or is damaged.	Replace data cartridge.
A new data cartridge that is write-protected is rejected in multiple known good drives.	LTO-CM has failed and the drive has found no data to recover.	Replace data cartridge.
A cartridge that has data written to it and is write-enabled is rejected by the drive.	LTO-CM has failed or is damaged.	The data can still be recovered. Contact your support representative for more information. After data recovery, replace the cartridge.
A cartridge that has data written to it and is write-protected restores very slowly.	LTO-CM has failed and the drive cannot use the tape directory information to recover the data.	The data can still be recovered but may take longer than normal.

---

## DLT Drives and Tape Cartridges

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**Caution**     *Potential cartridge damage:* Tape temperatures above 49° C (120° F) might damage the tapes. If during storage or transportation a cartridge has been exposed to conditions exceeding the above values, before using the cartridge, keep the cartridge within those operating environment specifications for at least as long as the time that the cartridge exceeded the specifications, up to two hours. Make sure that the cartridge has no moisture on it.

When storing DLT cartridges, the stray magnetic field at any point on the tape shall not exceed 4000A/m. Make sure that the cartridge has no moisture on it.

---

## DLT Drive and Media Specifications

Table 7 DLT Drive Specifications

Description	DLT 8000
<b>Performance</b>	
Read/write transfer rate: (maximum sustained, DLT Type IV media)	<ul style="list-style-type: none"> <li>■ Non-compressed mode: 6.0 MB/second</li> <li>■ Compressed (2:1 typical): 12.0 MB/second</li> </ul>
Burst transfer rate	20 MB/second
Average access time	60 seconds
Loading time to BOT (for previously written tape)	37 seconds (average)
Unloading time from BOT	17 seconds (average)
Interface type	<ul style="list-style-type: none"> <li>■ Low-Voltage Differential (LVD) Fast wide SCSI</li> <li>■ High-Voltage Differential (HVD) Fast wide SCSI</li> </ul>
<b>Environmental</b>	
Operating environment	
Temperature	10° to 40° C (50° to 104° F)
Relative humidity	20% to 80% noncondensing
Wet-bulb temperature	25° C (77° F) maximum

Table 8 DLT Media Specifications

Characteristic	DLT Type IV Media
Formatted capacity	DLT 8000 format: <ul style="list-style-type: none"> <li>■ 40 GB (non-compressed)</li> <li>■ 80 GB (2:1 typical compression)</li> </ul>
Basic description	0.5 inch (metal particle)
Tape length	557 meters (1828 feet)
Cartridge dimensions	10.4 x 10.4 x 2.5 cm (4.1 x 4.1 x 1.0 in)
Shelf life	30 years (minimum) @ 20° C 40% RH (non-condensing)
Cartridge life	<ul style="list-style-type: none"> <li>■ 1,000,000 passes (any point on the tape passing the recording head in either direction)</li> <li>■ 2,000 loads/unloads</li> </ul>
Cleaning cartridge life	20 uses
<b>Environmental</b>	
Cartridge storage environment	
Temperature	16° to 32° C (61° to 90° F)
Relative humidity	20% to 80% non condensing
Wet-bulb temperature	26° C (79° F) maximum
Cartridge storage environment for cartridges intended for archiving data for one year or more	
Temperature	18° to 26° C (64° to 79° F)
Relative humidity	20% to 60%

---

**Note** You can also use DLT Type IIIXT media, though it has a significantly reduced capacity and performance compared to DLT Type IV media.

---

## Using DLT Tape Cartridges

In addition to the information provided in this manual, refer to the documentation provided with your DLT media for more information.

---

**Caution** DLT tape drives require special cleaning cartridges and data cartridges formatted specifically for DLT. To avoid damage to your tape drive, it is critical to use appropriate DLT cleaning cartridges and properly formatted DLT data cartridges.

---

## Inspecting DLT Cartridges

---

**Note** Make it a practice to visually inspect your tape cartridges when loading or removing them from your tape library. Taking a few minutes to check the condition of your cartridges will lower the risk of repeated failures and help ensure uninterrupted backup.

---

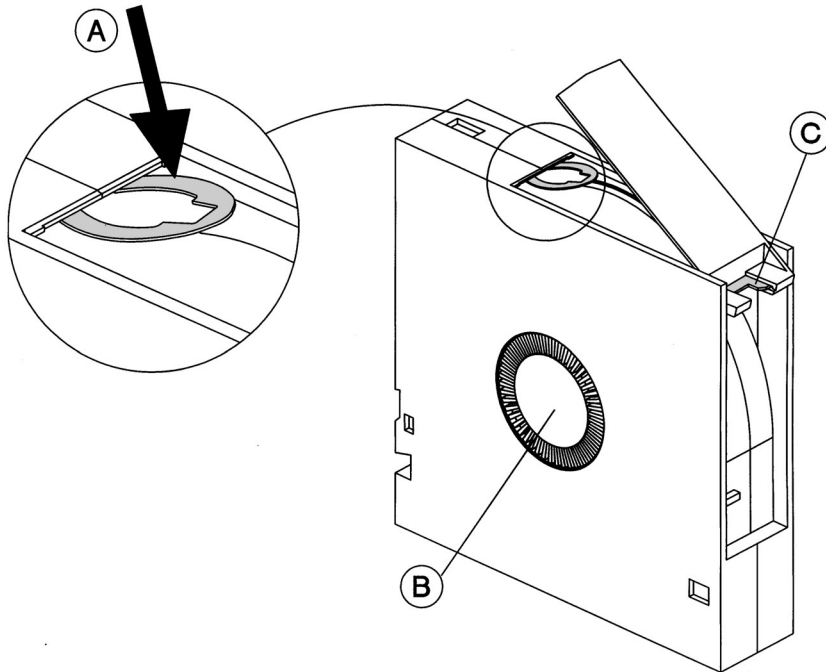
Repeated drive failures may indicate defective tapes. Tapes need to be inspected and replaced if they have been dropped, damaged, or used with a failed drive. To determine if the tapes have been damaged:

- Gently shake the tape cartridge to verify that no internal parts are rattling.
- Visually inspect the tape for a broken, unseated, or misaligned tape leader (item A in **Figure 46** on page 165).

To check the leader position:

1. Press in the door lock (item C in **Figure 46** on page 165) to release the cartridge door.
2. While pressing in the door lock, push the tab down to open the door. Be careful not to touch the tape after opening the door.
  - Verify that the spring-loaded hub (item B in **Figure 46** on page 165) is centered within the circular opening on the bottom of the tape cartridge. Gently press the hub and make sure that it springs back into place.

**Figure 46** Leader in Correct Position, Hub and Door Lock Tab



A	Tape leader	C	Door lock
B	Spring-loaded hub		

Do NOT Use DLT Cartridges with:

- Tape or leaders that have been touched with bare fingers (may transfer oils to the tape head).
- Labels used on the top, bottom, sides, or back of the cartridge. Use the label slot only.

---

**Caution** Always discard damaged tape cartridges. If a defective tape cartridge is loaded into a tape drive, it may in turn damage the drive, potentially requiring drive replacement.

---

## Write-Protecting DLT Cartridges

Each cartridge has a sliding write-protect switch. Using the write-protect switch ensures data safety for files that have been previously written to tape, preventing additional files from being written to that tape.

To change the write-protect setting, move the write-protect switch (**Figure 47** on page 167):

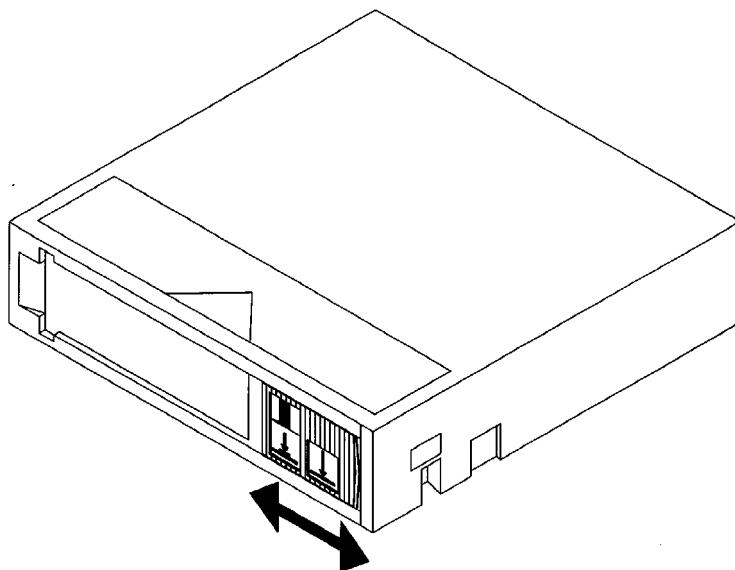
- **Left** to *prevent* data from being written to the cartridge. The orange indicator on the cartridge is visible when the write-protect switch is in the "ON" position.
- **Right** to *allow* data to be written to the cartridge. The orange indicator on the cartridge is not visible when the write-protect switch is in the "OFF" position.

---

**Note** With the write-protect switch in either position, data can be read from the cartridge.

---

**Figure 47** DLT Write-Protect Button Settings





## Using DLT Cartridge Bar Code Labels

Make it a practice to use bar code labels on your tape cartridges. Your host software may need to keep track of the following information and the associated bar code:

- Date of format or initialization
- Cartridge owner (such as a group or department)
- Storage purpose

---

**Note**            If the host software does not keep track of this information, create a method for doing so.

---

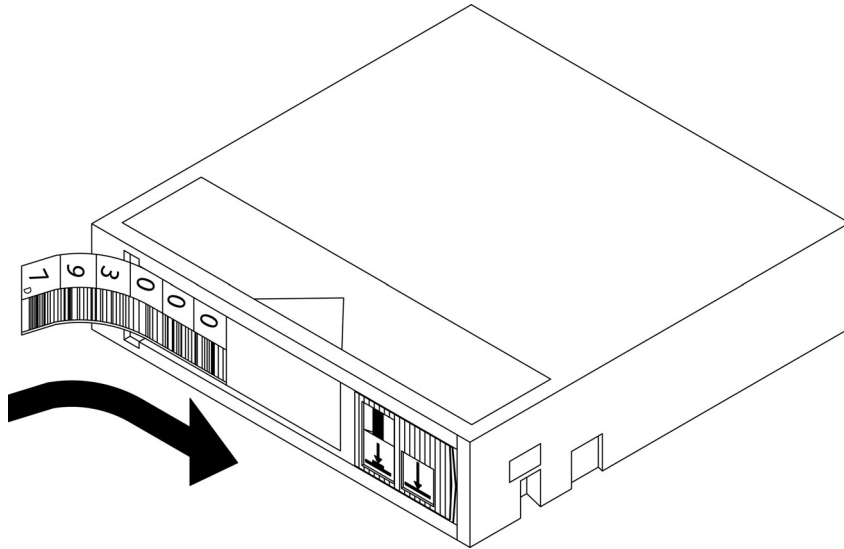
DLT cartridges have a front slide slot located on the face of the cartridge next to the write-protect switch. Use this slot for inserting the bar code label by sliding it into the slot (**Figure 48** on page 169).

---

**Caution** Do not apply labels onto the top, bottom, sides, or back of the cartridge as this may cause damage to the tape drive or interfere with reliable operation.

---

**Figure 48** Proper DLT Label Position



---

**Note** You can order additional bar code labels if needed. For bar code ordering information, see **Ordering Tape Cartridges** on page 193 as well as the information that came with your tape library.

---

## Using DLT Cleaning Cartridges

DLT drives should only be cleaned if CLEAN NEEDED displays on the tape library status screen. Only use the appropriate DLT cleaning cartridges. In general, replace DLT cleaning cartridges after twenty uses. Marking the label on the cleaning cartridge after each use will help you keep track of the number of uses.

---

**Caution** Excessive use of the cleaning cartridge can cause unnecessary wear on the drive head. The tape library operator panel will display a message when the cleaning cartridge needs to be replaced.

---

See **DLT Cleaning Issues** on page 172 for information on troubleshooting common cleaning problems.

## Troubleshooting DLT Drives

This section describes troubleshooting information for DLT drives, including:

- **Rewinding/Removing a Stuck Tape**
- **DLT Cleaning Issues**
- **Cleaning Light Issues**
- **Media Issues**

Refer to **Running Diagnostic Tests** on page 115 for information on troubleshooting library operation or other problems you may encounter. If you experience problems not covered by this manual, contact your support representative.

### Rewinding/Removing a Stuck Tape

If a tape gets stuck in the drive, attempt to eject the tape:

- Manually from the tape library
- By holding the **[UNLOAD]** button for 10 to 15 seconds to force an eject from the drive
- Remotely, using the Web-Based Library Administrator
- Using your host backup software

If these attempts are not successful, contact your support representative.

## DLT Cleaning Issues

**Table 9** on page 172 describes potential issues with cleaning cartridges and how to resolve them.

**Table 9** DLT Cleaning Issues

Problem	Solution
A brand new data cartridge is used and the library's operator panel indicates to clean the drive.	<ul style="list-style-type: none"> <li>■ Clean the outside of the data cartridge using a damp cloth.</li> <li>■ Clean the drive using the drive cleaning procedure on <b>page 112</b>.</li> <li>■ If the library's operator panel indicates to clean the drive again within a short amount of time, replace the data cartridge.</li> </ul>
Cannot load the cleaning cartridge.	<ul style="list-style-type: none"> <li>■ Ensure the cleaning cartridge matches your drive type. Cleaning cartridges are unique for each drive technology.</li> </ul>
Recurring cleaning message.	<ul style="list-style-type: none"> <li>■ If the message reappears after cleaning the drive, the library will indicate the need to replace the cleaning cartridge.</li> <li>■ Replace the existing cleaning cartridge with a new one.</li> <li>■ If the message reappears when a particular data cartridge is used, verify that the data cartridge is readable by:               <ul style="list-style-type: none"> <li>■ Clearing the error message.</li> <li>■ Reading the tape again.</li> </ul> </li> <li>■ If the data cartridge can be read, backup data from the damaged cartridge to another cartridge, and discard the damaged one.</li> </ul>

## Cleaning Light Issues

In addition to a drive just needing to be cleaned, cleaning lights can be a result of other factors. The following table describes common causes for cleaning lights and how to resolve them.

**Table 10 DLT Cleaning Light Issues**

Cause	Solution
Contamination by loose debris	Avoid by ensuring the drive is operated in a clean, contamination-free environment. Cartridges should be stored vertically in their plastic cases.
Contamination by head staining. (Caused by adhesion of chemicals that are present in the tape media to the head surface.)	One or two passes with a cleaning tape should resolve cleaning lights caused by normal head staining. If a cleaning tape is unsuccessful in resolving a cleaning light after 3 or more attempts, the cleaning tape may be contaminated, and should NOT be used in another drive
Temperature and humidity	Tapes should be stored and used in the middle of the temperature and humidity specifications range of 64-79° F, and 40-60% RH.
Non-acclimated media	A tape should be acclimated for a minimum of 24 hours before being used, particularly if it has been stored at a substantially different temperature or level of humidity than the tape library.
Wrong cleaning cartridge	Only use the cleaning cartridge specifically designated for each drive type (see <b>page 170</b> ).
Wrong tape format	Attempting to load, read, or write tapes that were written in other formats can cause cleaning lights.
Abnormal build up of head debris. (Frequent load/unload operations with minimal tape reading or writing can cause this condition.)	Do not perform frequent load/unloads without also doing tape operations.
Bad/defective/contaminated media	<p>If a cleaning light is cleared using a cleaning tape, and then immediately reappears when a particular cartridge is reloaded, that cartridge should be suspected as being contaminated.</p> <p>If this occurs, re-clean the drive, loading a known good tape. In rare cases, a tape cartridge can be worn out, have bad calibration tracks, or have a bad tape directory recorded by another drive.</p> <p>Any cartridge that is suspected of being defective or contaminated should NOT be reused in any drive.</p>
Expired cleaning cartridge	A cleaning cartridge is good for 20 uses. After that, the library status screen will display EXPIRED.
Cleaning requested/required and overuse of cleaning cartridges	Use of a cleaning cartridge should only be done when the library status screen states CLEAN NEEDED.
Old firmware revisions	If a cleaning tape does not resolve a cleaning light issue, make sure the latest drive firmware is being used.

## Media Issues

**Table 11** on page 174 describes potential issues with media and how to resolve them.

**Table 11** Media Issues

Problem	Solution
Cannot load tape into drive.	Ensure your media and format type matches your drive type. (See <b>Using DLT Tape Cartridges</b> on page 164.)
Tape has circular wear patterns around the hub.	The drive hub may not be engaging the tape hub properly. Discard the tape and contact your support representative.
Drive rejects tape load.	Retry the operation. If you continue to see this issue, replace the tape cartridge. If data recovery is needed, contact your support representative.
Tape stuck in drive.	<p>DLT tape drives are not customer installable or replaceable. Therefore, the removal or installation of tape drives in the library should only be carried out by a support representative.</p> <p>Attempt to eject the tape:</p> <ul style="list-style-type: none"><li>■ Manually from the tape library</li><li>■ Remotely, using the Web-Based Library Administrator</li><li>■ Using your host backup software</li></ul> <p>If these attempts are not successful, contact your support representative.</p>

---

## 9840 Drives and Tape Cartridges

### 9840 Drive and Media Specifications

Table 12 9840 Drive Specifications

Description	9840
<b>Performance</b>	
Read/write transfer rate:	10 MB/second
Burst transfer rate	40 MB/second
Average access time	11 seconds
Loading time	4 seconds
Unloading time	5 seconds (not including rewind time)
Interface type	Ultra SCSI
<b>Environmental</b>	
<i>Operating environment</i> <sup>1</sup>	
Temperature	15.6° to 32.2° C (60° to 90° F)
Relative humidity	20% to 80%
Wet-bulb temperature	26° C (78.8° F) maximum



**Table 13 9840 Media Specifications**

Characteristic	9840 Media
Capacity	<ul style="list-style-type: none"> <li>■ 20 GB uncompressed</li> <li>■ 40 to 80 compressed</li> </ul> <p><b>Note:</b> Compression ratio depends on many variables, including the environment, operating system, and data characteristics. Typical compression with Enhanced LZ-1 is 4:1.</p>
Basic description	0.5 inch (metal particle)
Tape length	271 meters (889 feet)
Cartridge dimensions	125 x 109 x 25.88 mm (4.92 x 4.29 x 1.00 in)
Shelf life	15 to 30 years
Cartridge life	<ul style="list-style-type: none"> <li>■ Short-length durability: 80,000 passes minimum</li> <li>■ Long-length durability: 6,500 passes minimum</li> <li>■ Loads/unloads: 10,000 minimum</li> </ul>
Cleaning cartridge life	100 uses
<b>Environmental</b>	
Cartridge storage environment (archive) Temperature Relative humidity Wet-bulb temperature	5° to 25.5° C (41° to 78° F) 40% to 60% 26° C (78.8° F) maximum
Cartridge storage environment (non-archive) Temperature Relative humidity Wet-bulb temperature	5° to 32.2° C (41° to 90° F) 5% to 80% 26° C (78.8° F) maximum

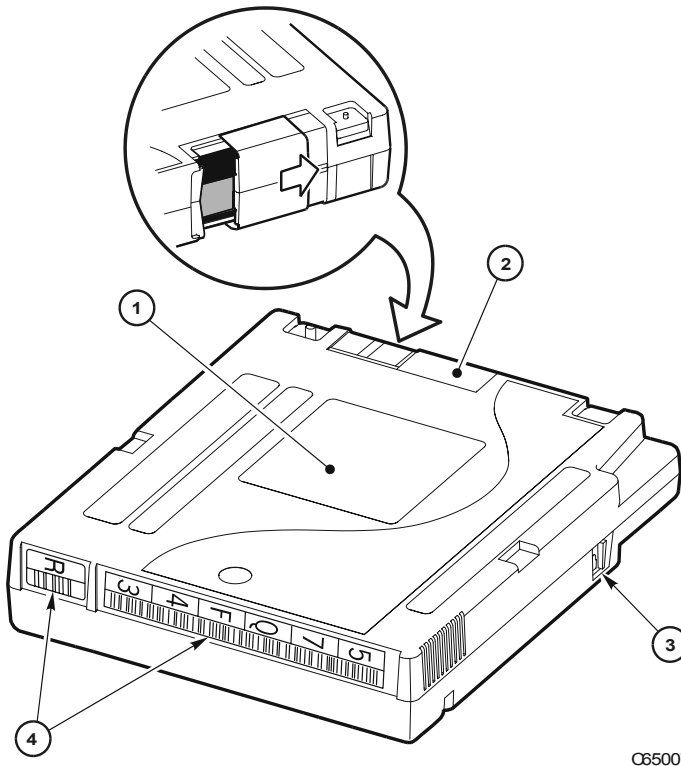
**Table 13 9840 Media Specifications**

Characteristic	9840 Media
<b>Environmental</b>	
<i>Cartridge shipping environment (unrecorded)</i> <sup>1</sup> Temperature Relative humidity Wet-bulb temperature	-23° to 49° C (-10° to 120° F) 5% to 80% 26° C (78.8° F) maximum
<i>Cartridge shipping environment (recorded)</i> <sup>1</sup> Temperature Relative humidity Wet-bulb temperature	4° to 40° C (40° to 104° F) 5% to 80% 26° C (78.8° F) maximum
<sup>1</sup> . The shipping environment must not exceed the limit of the storage environment, archive or non-archive, for longer than 10 days.	

## Using 9840 Tape Cartridges

In addition to the information provided in this manual, refer to the documentation provided with your 9840 media for more information.

Figure 49 9840 Cartridge Components



G65007

1	Customer label	3	Write-protect switch
2	Access door	4	Volume label and media type labels (Media: "R" = data, "U" = cleaning)

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**Caution** *Tape damage:* Do not degauss a 9840 tape cartridge. A servo track is written on the tape at the factory. Degaussing the tape erases this track and renders the tape unusable and unrecoverable.

---

## Maintaining 9840 Cartridges

Make it a practice to visually inspect your tape cartridges when loading or removing them from your tape library. Taking a few minutes to check the condition of your cartridges will lower the risk of repeated failures and help ensure uninterrupted backup.

For general precautions when using tape cartridges, see **page 144**. In addition, do not apply more than one label onto the tape cartridge, as extra labels may cause cartridges to jam in the tape drive.

## Write-Protecting 9840 Cartridges

You can set the write-protect switch so the cartridge is *write-enabled*. Slide the switch to the left to write-enable the tapes. In this position, the drive can write as well as read data. This setting is recommended when inserting cartridges into the tape library.

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

## Using 9840 Cartridge Bar Code Labels

Make it a practice to use bar code labels on your tape cartridges. Your host software may need to keep track of the following information and the associated bar code:

- Date of format or initialization
- Cartridge owner (such as group or department)
- Storage purpose

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**Note** If the host software does not keep track of this information, create a method for doing so.

---

To ensure successful operation of your tape library, place the bar code label entirely within the designated area, ensuring that no part of the label is outside of the designated area. Cartridge labels reflect the cartridge media and usage. The letter located next to the last number in the volume label reflects the media. Cleaning cartridges have “CLN” in the volume label, diagnostic cartridges have “DG” in the volume label.

---

**Note** You can order additional bar code labels if needed. For bar code ordering information, see **Ordering Tape Cartridges** on page 193 as well as the information that came with your tape library.

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## Using 9840 Cleaning Cartridges

9840 drives should only be cleaned if CLEAN NEEDED displays on the tape library status screen. Only use the 9840 cleaning cartridge in your 9840 tape drive. When the tape library status screen display EXPIRED, discard the cleaning cartridge and replace it with a new one.

For more information, refer to the documentation that came with your 9840 cleaning cartridge.

## Troubleshooting 9840 Drives

This section describes general troubleshooting information for 9840 tape drives and media.

Table 14 Troubleshooting 9840 Issues

Problem	Solution
<b>Cleaning Issues</b>	
Cleaning cartridge ejects immediately without performing a clean operation and the library status screen displays EXPIRED.	The cleaning cartridge has reached its end of life. Discard and replace with a new cleaning cartridge.
Clean operations failed.	<ul style="list-style-type: none"> <li>■ Retry the operation.</li> <li>■ Try a different cleaning cartridge.</li> <li>■ If unsuccessful, contact your service representative.</li> </ul>
<b>Drive Issues</b>	
The load/unload operation fails.	<ul style="list-style-type: none"> <li>■ Try the operation with another tape. If successful, the original tape is suspect and you may need to replace it.</li> <li>■ If this fails, perform an Initial Program Load (IPL). See <b>Initializing and Resetting the Library</b> on page 69.</li> <li>■ If the problem persists, the drive may be suspect - contact your service representative.</li> </ul>
A tape drive failed power on and cannot exit the IPL mode.	<ul style="list-style-type: none"> <li>■ Retry power and the IPL (see <b>Initializing and Resetting the Library</b> on page 69).</li> <li>■ If the problem persists, contact your service representative.</li> </ul>
The IPL failed.	<ul style="list-style-type: none"> <li>■ Initiate IPL again.</li> <li>■ If unsuccessful, contact your service representative.</li> </ul>
<b>Media Issues</b>	
Unable to write to a tape.	<ul style="list-style-type: none"> <li>■ Ensure the tape is write-enabled (see <b>Write-Protecting 9840 Cartridges</b> on page 180).</li> </ul>
A tape cartridge is stuck in the drive.	<ul style="list-style-type: none"> <li>■ Contact your service representative.</li> </ul>

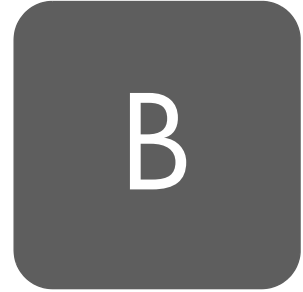
Table 14 Troubleshooting 9840 Issues

Problem	Solution
<b>Media Issues</b>	
Tape cartridges continue to get stuck in a specific drive.	<ul style="list-style-type: none"> <li>■ The drive is defective and must be replaced. Contact your service representative.</li> </ul>
A specific tape cartridge continues to fail most or all operations.	<ul style="list-style-type: none"> <li>■ Test the tape on another drive.            If the tape fails on a different drive, then the tape is most likely defective.            To ensure that the tape is the cause, try a different tape in the original drive using the same operation that previously failed.            If the operation does not fail with the new tape, you can conclude that the original tape is defective.</li> </ul>
A degaussed tape has lost its servo tracks and cannot be written or formatted.	<ul style="list-style-type: none"> <li>■ Degaussing a 9840 tape cartridge renders the tape unusable and unrecoverable. Discard the tape and replace with a new one.</li> </ul>





# Library Elements and Diagrams



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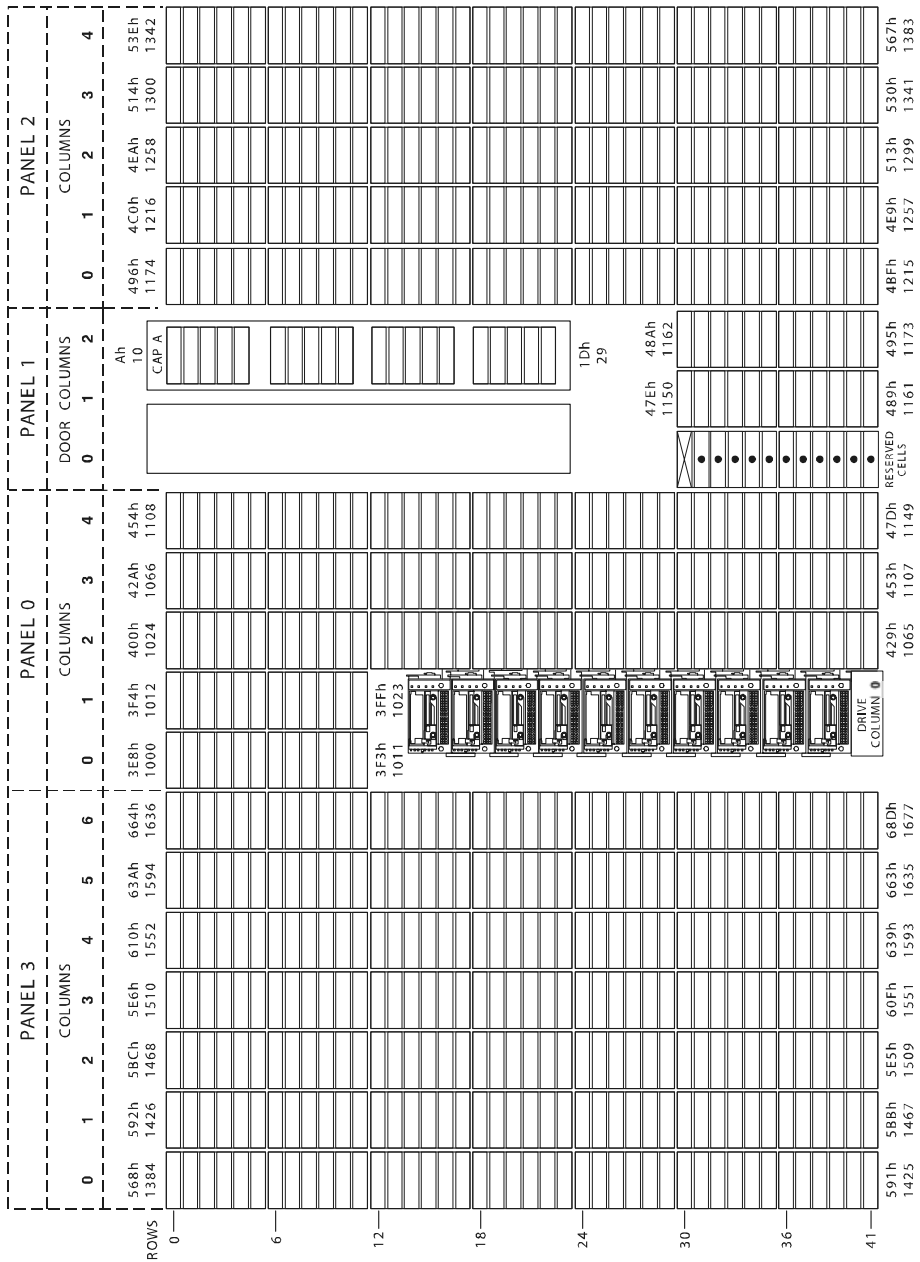
## Appendix Overview

This appendix provides wall diagrams of the tape library elements for model 20/700. It also contains an illustration of the MPC logic card and an overall diagram of the library.

The wall diagrams depict the SCSI element locations for all cell locations. The locations are noted at the top of the columns in hexadecimal (denoted by the "h" at the end of the number) and decimal.

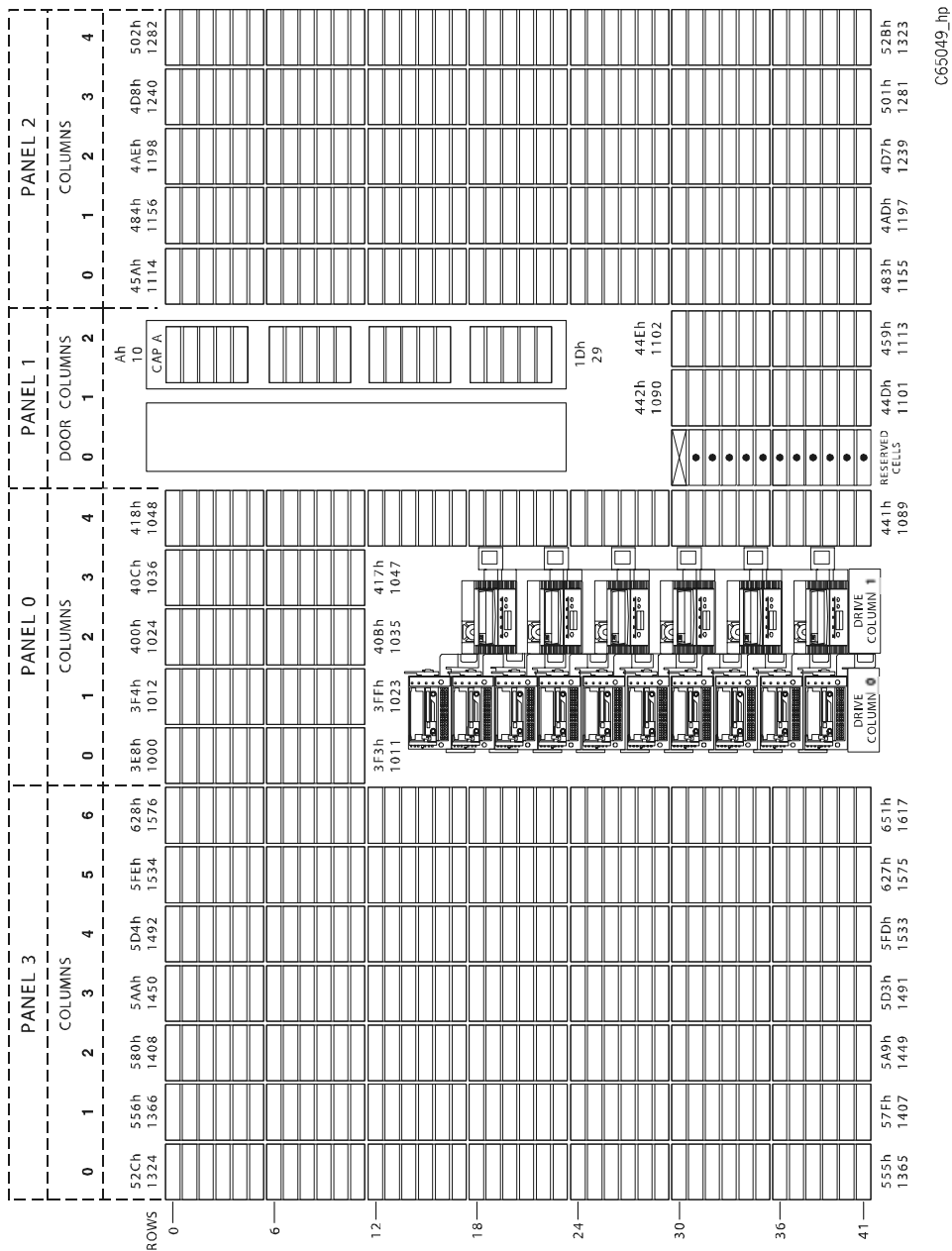
The drive types and locations will vary with your tape library options. Each drive column displaces 60 cell locations.

Figure 50 Tape Library Elements - 1 CAP, 1 Drive Column



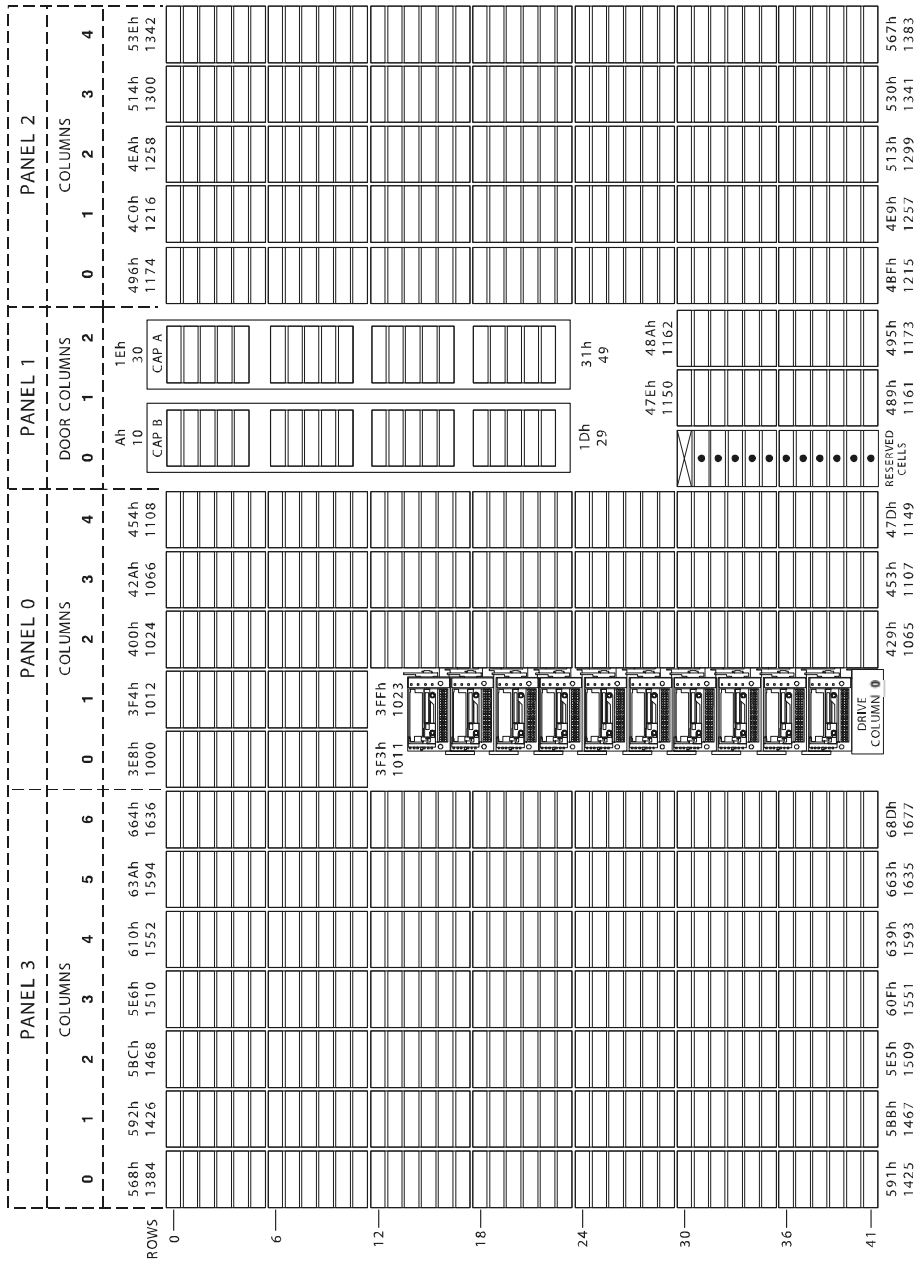
C65048.jpg

Figure 51 Tape Library Elements - 1 CAP, 2 Drive Columns



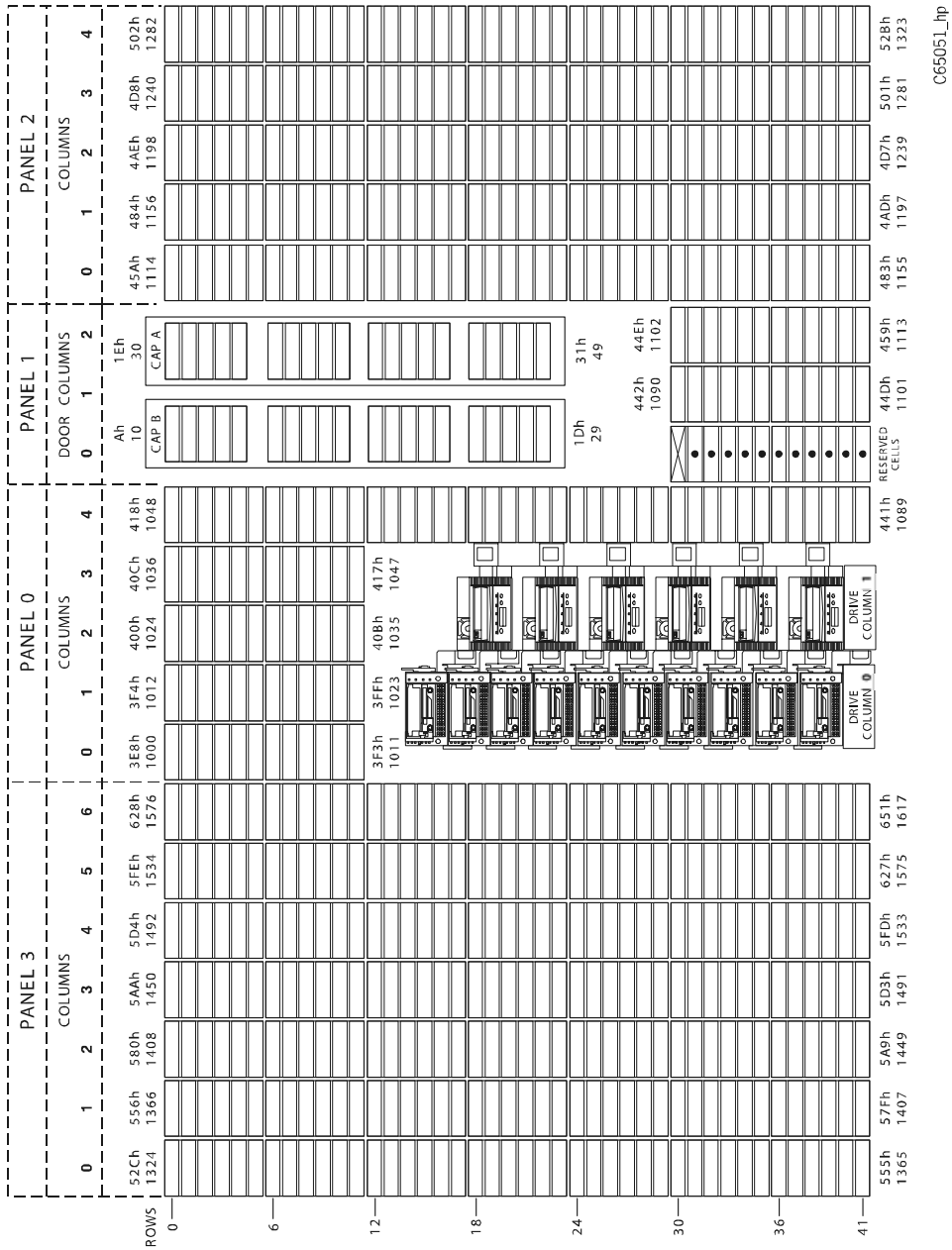
C65049\_rhp

Figure 52 Tape Library Elements - 2 CAPs, 1 Drive Column



C65050\_ip

Figure 53 Tape Library Elements - 2 CAPs, 2 Drive Columns





# Customer Support



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## Registering Your Product

Registering your product ensures fast and easy access to Hewlett-Packard Customer Support.

- HP registration web site:  
<http://www.register.hp.com>

HP customers who register join a select group who register to receive:

- Technical support updates
- Special Hewlett-Packard offers
- Direct-to-you details on:
  - Ideas and ways to use your new HP Surestore Tape Library
  - Other exciting HP products
  - News on emerging technologies



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## Supplies and Accessories

A full range of supplies may be ordered through a Hewlett-Packard authorized dealer or sales office, or through HP Parts Direct.

- Call 1-800-752-0900 (North America only) for the location of the nearest authorized Hewlett-Packard dealer.

To phone HP Direct, call 1-800-538-8787 (North America only) or write to HP Direct at the following address:

HP Direct  
Hewlett-Packard  
ATTN: Mail Order  
P.O. Box 1145  
Roseville, CA 95678

- Outside of North America, contact your nearest HP authorized dealer or sales office.

# Ordering Tape Cartridges

## Tape Cartridges

For a list of tape cartridges and their part numbers, see **Table 15** on page 194. It is recommended that you use HP Ultrium and HP DLT tape cartridges in your HP Surestore Tape Library. These can be purchased directly from HP as stated above. For 9840 tape cartridges, orders can be placed:

- Through the Imation website at **www.imation.com**
- By calling the appropriate StorageTek Media Services number for your location:
  - **Austria** 0800-20-1631
  - **Belgium** 0800-75-327
  - **Denmark** 8088-0744
  - **Finland** 08001-13361
  - **France** 0800-82-83-57
  - **Germany** 0800-181-6238
  - **Holland** 0800-022-8496
  - **Ireland** 1800-55-33-54
  - **Italy** 167-790-852
  - **Norway** 800-11-220
  - **South America** 0800-99-5820
  - **Spain** 900-99-33-66
  - **UK** 0800-731-8852
  - **US** 800-905-8502
  - **Canada** 905-602-5586
  - **Asia/Pacific** 61-2-9433-1700
  - **Japan** 81-3-3746-9711
  - **Latin America** 303-661-5398

**Table 15** Tape Cartridge Part Numbers

Drive Type	Part Number
<b>Ultrium</b>	
■ HP Data Cartridges	C7970A (100 GB) C7971A (200 GB)
■ HP Ultrium Universal Cleaning Cartridge	C7978A
<b>DLT</b>	
■ HP Data Cartridge	C5141F (40/70/80 GB)
■ HP Cleaning Cartridge	C5142A
<b>9840</b>	
■ Data Cartridge	(Dependent upon where you make your purchase.)
■ Cleaning Cartridge	A5602A

## Ordering Bar Code Labels

### Ultrium Bar Code Labels

Ensure that you use HP qualified bar code labels only. Contact an HP authorized dealer or sales representative for current compatibility and availability.

You can order Ultrium bar code labels through the following supplier:

■ Colorflex:

— Website: <http://www.colorflex.com>

— Phone: (800) 522-3528 (800-LABEL2U)

**Table 13** on page 195 lists part numbers for Colorflex bar code labels.

Table 13

**Colorflex Ultrium Bar Code Labels**

Part Number	Description
1700-LD	Data cartridge label
1700-DGH	Diagnostic cartridge label
1700-CNDH	Cleaning cartridge label
1700-CNDU	Universal cleaning cartridge label

## DLT Bar Code Labels

Ensure that you use HP qualified bar code labels only. Contact an HP authorized dealer or sales representative for current compatibility and availability.

You can order DLT bar code labels through the following supplier:

■ Colorflex:

— Website: <http://www.colorflex.com>

— Phone: (800) 522-3528 (800-LABEL2U)

**Table 14** on page 196 lists part numbers for Colorflex bar code labels.

Table 14

### Colorflex DLT Bar Code Labels

Part Number	Description
1703-0D	Data cartridge label
1703-DG	Diagnostic cartridge label
1703-CN	Cleaning cartridge label

## 9840 Bar Code Labels

Ensure that you use HP qualified bar code labels only. Contact an HP authorized dealer or sales representative for current compatibility and availability.

You can order 9840 bar code labels through the following supplier:

■ Colorflex:

— Website: <http://www.colorflex.com>

— Phone: (800) 522-3528 (800-LABEL2U)

**Table 15** on page 197 lists part numbers for Colorflex bar code labels.

Table 15

### Colorflex 9840 Bar Code Labels

Part Number	Description
1687-VC, 1687-06	Data cartridge label
-	Diagnostic cartridge label
1687-CN	Cleaning cartridge label

---

## Information Needed for Support

Before contacting your support representative, please have the following information ready:

- Model number of your library
- Serial number
- Drive type(s)
- Error codes and error code qualifiers
- Revision number for library and drive firmware
- Brand and model of your host computer
- Brand and model of your SCSI or host adapter
- Library drivers and backup application software that you are using and the version number(s)

## Backup Software Support

While the library product itself is supported by Hewlett-Packard, all software products are supported by individual software vendors. When contacting the software vendor for support, you will need the following information:

- Your name and telephone number
- Product name, release number, operating system, build, and serial number
- Detailed list of error messages reported
- Configuration files and log files related to the problem
- Screen dumps, if applicable
- Explanation of how to reproduce the problem, if possible
- Events that may have contributed to the problem, recent operator actions, recent events in the software or the system, and recent changes to the computer system, software, or network environment.

# Safety & Regulatory Information



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## Rack Safety and Precautions

**WARNING** Exercise caution when moving the library. Avoid rolling the library on rough or uneven surfaces. The library should be moved with at least two people.

**Soyez prudent lorsque vous déplacez la bibliothèque. Ne la faites pas rouler sur des surfaces non lisses ou irrégulières. La bibliothèque devrait être déplacée par au moins deux personnes.**

**Vorsicht beim Bewegen der Bibliothek. Die Bibliothek sollte nicht über unebene Oberflächen gerollt werden. Zum Bewegen der Bibliothek sind mindestens zwei Personen notwendig.**

**Tenga cuidado al mover la biblioteca. No la arrastre sobre superficies escabrosas o con desniveles. La biblioteca debería ser transportada por al menos dos personas.**

**Zachowaj uwagę przy przesuwaniu taśmoteki. Nie przesuwaj jej po chropowatej lub nierównej powierzchni. Taśmotekę powinny przesuwać przynajmniej dwie osoby.**

---

**Caution** *Potential equipment damage: Do not exceed the maximum allowable weight (136 kg [300 lb]) and U-height (13U) for equipment in the rack area of this library.*

---



Observe the following safety and handling precautions when you are installing equipment into the library's rack:

- Ensure that the equipment has UL listing (listing by Underwriters' Laboratories), CSA certification (certification by the Canadian Standards Association), and CE compliance (compliance with the European Council's directives and standards).
- Understand that the library does not supply power to the rack area. So ensure that the rack-mounted equipment has an adequate power source.

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**Note** If you remove power from the library by using the library's power switch, the rack-mounted equipment will remain powered on.

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- Follow the manufacturer's guidelines to position, to support, and to fasten the equipment in the rack.
- Locate the equipment so that it does not block or hinder any ventilation openings in the library's rack area. For example, do not block library or drive exhaust areas, the electronic module exhaust area, perforated metal, or other similar ventilation.
- Locate the equipment so that the library's doors adequately clear the equipment when you close them.
- Install the equipment from the bottom of the rack to the top of the rack; HP recommends that you place the heaviest items near the bottom of the rack.
- Ensure that any equipment that you place within the rack is adequately cooled. The library's internal ambient temperature should not exceed the recommended operating temperature. Base cooling considerations upon the power dissipation within the rack space as well as upon the ambient room conditions that are external to the library. You must provide cooling for moderate power dissipation within the rack space.
- Ensure that the equipment in the rack does not create an overcurrent condition, whether equipment is connected directly to the branch circuit or to a power distribution strip.
- Ensure that the equipment in the rack has reliable earth ground, whether equipment is connected directly to the branch circuit or to a power distribution strip.

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## Electrostatic Discharge Damage Prevention

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

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

---

Before you touch any internal components:

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

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

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## Regulatory Notices

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

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

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

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## FCC Compliance Statement

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

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**Note**     This equipment has been tested and found to comply to the limits for Class A digital devices pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

---

## CISPR 22 and EN55022 Warning

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

## Japanese Compliance Statement

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

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

**English translation:** This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

## Taiwan Warning Label Statement

The following warning label statement pertains to BSMI regulations in Taiwan.

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

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

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# Internal Code License Statement

## NOTICE

### INTERNAL CODE LICENSE

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

1. **Definitions:** The following terms are defined as followed:
  - a. "Derivative works" are defined as works based upon one or more preexisting works, such as a translation or a musical arrangement, or any other form in which a work may be recast, transformed, or adapted. A work consisting of editorial revision, annotations, elaboration, or other modifications which, as a whole, represent an original work of authorship, is a Derivative work.
  - b. "Internal Code" is Microcode that (i) is an integral part of Equipment, (ii) is required by such Equipment to perform its data storage and retrieval functions, and (iii) executes below the user interface of such Equipment. Internal code does not include other Microcode or software, including data files, which may reside or execute in or be used by or in connection with such Equipment, including, without limitation, Maintenance Code.
  - c. "Maintenance Code" is defined as Microcode and other software, including data files, which may reside or execute in or be used by or in connection with Equipment, and which detects, records, displays, and/or analyzes malfunctions in the Equipment.
  - d. "Microcode" is defined as a set of instructions (software) that is either imbedded into or is to be loaded into the Equipment and executes below the external user interface of such Equipment. Microcode includes both Internal Code and Maintenance Code, and may be in magnetic or other storage media, integrated circuitry, or other media.
5. The Equipment you have acquired by purchase or lease is manufactured by or for StorageTek and contains Microcode. By accepting and operating this Equipment, you acknowledge that StorageTek or its licensor(s) retain(s) ownership of all Microcode, as well as all copies thereof, that may execute in or be used in the operation or servicing of the Equipment and that such Microcode is copyrighted by StorageTek or its licensor(s).
6. StorageTek hereby grants you, the end user of the Equipment, a personal, nontransferable (except as permitted in the transfer terms in paragraph 7 below), nonexclusive license to use each copy of the Internal Code (or any replacement provided by StorageTek or your authorized StorageTek distributor or reseller) which license authorizes you, the end user, to execute the Internal Code solely to enable the specific unit of Equipment for which the copy of Internal Code is provided to perform its data storage and retrieval functions in accordance with StorageTek's (or its licensor's) official published specifications.
7. Your license is limited to the use of the Internal Code as set forth in paragraph 3 above. You may not use the Internal Code for any other purpose. You may not, for example, do any of the following:
  8. (i) access, copy, display, print, adapt, alter, modify, patch, prepare Derivative works of, transfer, or distribute (electronically or otherwise) or otherwise use the Internal Code;
  9. (ii) reverse assemble, decode, translate, decompile, or otherwise reverse engineer the Internal Code (except as decompilation may be expressly permitted under applicable European law solely for the purpose of gaining information that will allow

- interoperability when such information is not otherwise readily available); or (iii) sublicense, assign, or lease the Internal Code or permit another person to use such Internal Code, or any copy of it. If you need a backup or archival copy of the Internal Code, StorageTek, or your authorized StorageTek distributor or reseller, will make one available to you, it being acknowledged and agreed that you have no right to make such a copy.
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**A**

*audit* A part of the tape library IPL sequence that catalogs all tape cartridge locations. This data is retained in the MPC card memory.

Host audit—A host request to catalog the tape cartridges of a tape library by SCSI element or tape library number, panel, row, column.

*automatic mode* A relationship between a tape library and all attached hosts. Tape libraries operating in automatic mode handle cartridges without operator intervention. This is the normal operating mode of a tape library that has been placed online to all host CPUs.

**C**

*cartridge* The plastic housing around a cartridge tape. A plastic leader block is attached to the tape for automatic threading when loaded in a transport. The spine of the cartridge contains a Tri-Optic label listing the volume identification number.

*cartridge access port (CAP)* An assembly allowing an operator to enter or eject cartridges during automated operations.

*cartridge drive* A device that reads from or writes to a magnetic tape.

*catalog* The inventory of all tape cartridge storage locations in a 20/700 tape library; this inventory is by SCSI element or tape library number, panel, row, column.

*cell* A slot in the tape library that is used to store a tape cartridge.

*command line interface (CLI)* For firmware 2.20 and lower—the SER1 port on the MPC card. For firmware 3.00 or later, the CSE port on the MPC card. For MPB firmware only, the CSE port on the Master library's door frame.



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

*CPCI* Compact Peripheral Component Interconnect.

*CSE port* A port on the MPC card for loading 3.00 or later firmware.

## **D**

*DHCP* See dynamic host configuration protocol.

*diagnostic tests* Tests, accessible through the tape library Operator Panel or LibConnect interface, that allow a local user to run offline tests within the tape library.

*dynamic host configuration protocol (DHCP)* Server software that, when enabled, sets the library IP address, subnet mask, and name.

*DNS* Domain Name Server

## **E**

*electronically erasable programmable read-only memory (EEPROM)* A memory component that can be erased and programmed while the component is left in the machine.

*event examination* A file accessible through the operator panel, that contains events that occurred during the functional operation of the tape library. See fault symptom code.

## **F**

*fault symptom code (FSC)* Error or information code generated by functional or diagnostic software that may directly or indirectly be used to indicate the field replaceable unit (FRU) that is probably causing the error.

*field replaceable unit (FRU)* Assembly that is replaced in its entirety when any one of its components fails.

## I

*initial program load (IPL)* A process that activates a machine reset and loads system programs to prepare a computer system for operation. Processors having diagnostic programs activate these programs at IPL execution.

## L

*LTO* Linear Tape-Open, an open specification for tape storage devices.

## M

*manual mode* A relationship between an tape library and all attached hosts. Tape libraries operating in manual mode have been placed offline to all host CPUs and require human assistance to perform cartridge operations.

*media format* Format of data written on tape (36 track, compressed, etc.)

*MPC card* The central processing unit card for the tape library.

*MPF card* The DC power supply card for the tape library.

*MPV card* The CPCI expansion bus card for the tape library.

*MPW card* The LVDS-HVDS library controller MPW card for the tape library.

## O

*offline* Not available for functional use by the host CPU. Library and drives are not active.

*online* State of being controlled directly by or in direct communication with a computer. Available for functional use. Library and drives are active.

## R

*recoverable error* Error condition that can be automatically corrected (for example, by initiating a retry operation) and, when corrected, allows continuous processing of a job, program, or hardware function.

*reset button* This button will start a initial microprogram load to the library.

*robot* Electro-mechanical device for locating and moving cartridges.

## S

*SER1* For pre-3.00 firmware, the port on the MPC card used for command line interface—running diagnostic tests, clearing of FSC log—through a laptop at 38,400 baud rate. Unused for post-3.00 firmware.

*servo* Device that uses closed-loop feedback to govern physical positioning.

*small computer systems interface (SCSI)* A type of data or control interface between the tape library/ tape drives and host.

*SNMP* Simplified Network Management Protocol

## T

*tape cartridge* Magnetic tape enclosed in a plastic housing.

*theta motor* The motor responsible for the lateral movement of the hand mechanism in the tape library.

*Tri-Optic label* An external label attached to the spine of a cartridge that is both human and machine readable.

*TTI* Tape Transport Interface (a serial interface).

## U

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

*unrecoverable error* Error condition that cannot be automatically corrected and that requires external intervention for possible correction. It causes termination of a job, program, or hardware function.

## V

*volume serial label (VOLSER)* An alphanumeric label used by host software to identify a volume (sometimes used to indicate the contents of a tape).

*volume* Magnetic tape cartridge.

## **W**

*Web-Based Library Administrator* A web-based interface that monitors library activity and allows modification of the library configuration.

## **Z**

*Z-column* The column that allows the hand mechanism in the tape library to move vertically.



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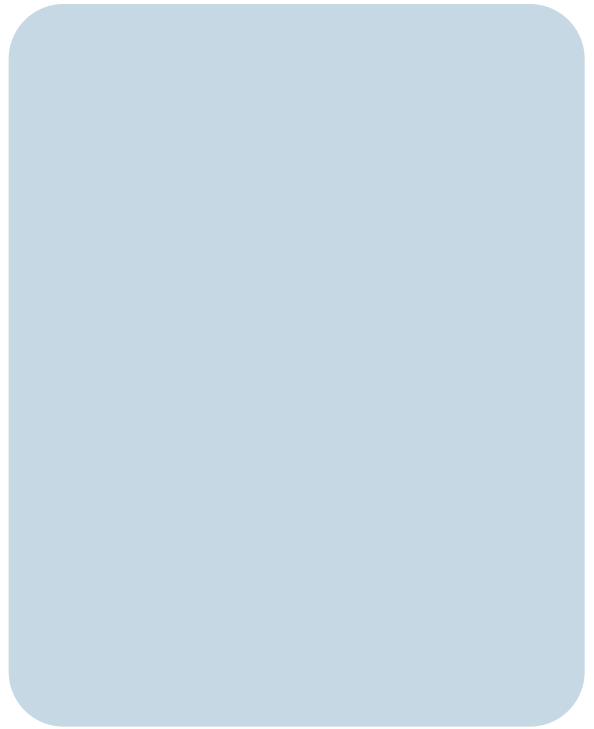
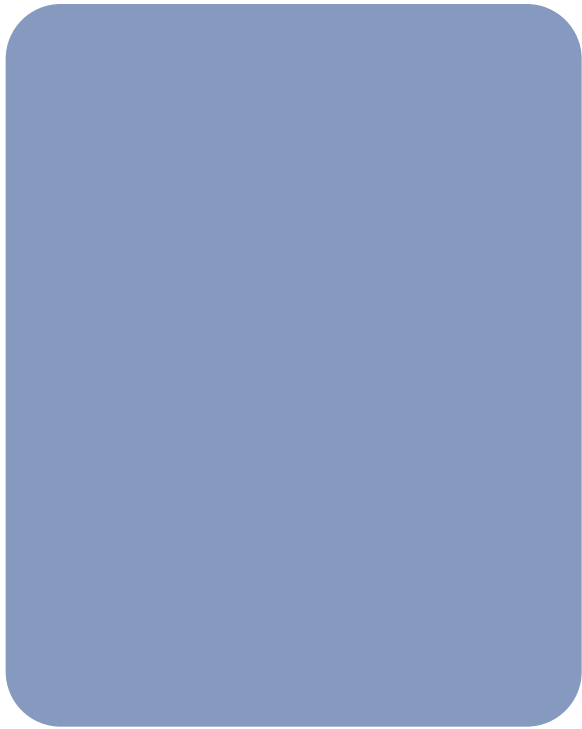
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Edition 05/2002

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