

# L700 Tape Library

Operator's Guide





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Operator's Guide



Information contained in this publication is subject to change. In the event of changes, the publication will be revised. Comments concerning its contents should be directed to:

Nearline Information Development  
 Storage Technology Corporation  
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 Louisville, CO 80028-2201  
 USA

Complete the following table in pencil (or make a copy) to record your configuration.

<b>L700 Tape Library Configuration Information</b>	
Serial Number _____	
Code Version _____	
Library SCSI ID _____	
Number of Drives Installed _____	
DLT7000	Single-ended <input type="checkbox"/> Differential <input type="checkbox"/> On bus <input type="checkbox"/> Off bus <input type="checkbox"/> Address: _____ _____ _____ _____
DLT8000	Single-ended <input type="checkbox"/> Differential <input type="checkbox"/> On bus <input type="checkbox"/> Off bus <input type="checkbox"/> Address: _____ _____ _____ _____
9840	Single-ended <input type="checkbox"/> Differential <input type="checkbox"/> On bus <input type="checkbox"/> Off bus <input type="checkbox"/> Fibre Channel <input type="checkbox"/> Address: _____ _____
Fast Load: Enabled <input type="checkbox"/> Disabled <input type="checkbox"/>	
Auto Clean: Enabled <input type="checkbox"/> Disabled <input type="checkbox"/>	

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## Summary of Changes

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EC Number	Date	Doc Kit Number	Type	Change
53897	August 1999		Initial Release	
53997	September 1999	14743	Reissue 1	<p><b>Notice:</b> Added Notice section</p> <p>Chapter 1: Revised Table 1-1 “Tape Library Capacity</p> <p>Chapter 4: Added Caution on page 4-9</p> <p>Appendix B: Added Appendix B “Library Elements and Diagrams”</p>
111220	September 1999	14757	Third Edition	<p>Chapter 3: Revised to reflect current firmware.</p> <p>Chapter 4: Revised to reflect current firmware.</p> <p>Added Figure 4-2, “CAP Magazine Slot Status Messages.”</p> <p>Added Figure 4-3, “L700 Library Drive Diagnostic Tests.”</p>
111277	November 1999	14790	Fourth Edition	<p>General: Replaced “customer services engineer” (CSE) with new title, “systems delivery engineers” (SDE).</p> <p>Chapters 2—4: Revised to reflect current firmware.</p>

# Notices

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# Preface

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This guide describes how to operate the L700 Tape Library (referred to in this manual as “the L700 library” or simply “the library”). Most of the information pertains to library hardware. For specific drive information and for host-generated software commands and console messages, refer to your drive or software documentation.

This guide is intended primarily for data center operators who operate the tape library. System programmers and computer system administrators might also find the information in this guide useful.

## ■ Organization

This guide has five chapters and one appendix:

- Chapter 1** “General Information” describes the tape library hardware. This chapter also describes the library’s two operating modes and its Auto Clean feature.
- Chapter 2** “Controls and Indicators” shows the locations of the power switch and operator 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 either through the operator panel or through the LibConnect interface.
- Chapter 4** “Library Operation” contains the procedures for operating the library in two modes: automated mode and manual mode. Procedures include loading cartridges through the CAP, powering off the library, and manually removing cartridges.
- Chapter 5** “StorageTek Maintenance Support” describes how to contact the Central Support Remote Center for assistance if the library has a hardware or software problem.
- Appendix A** “Cartridge Tape Information” describes how to prepare, inspect, store, clean, and repair cartridges. It also lists the criteria that colored cartridges must meet to be used in the tape library.
- Appendix B** “Library Elements and Diagrams” includes the maps for all SCSI elements and panel, row, column locations for the library cells.
- Glossary** The **Glossary** defines new or special L700 Tape Library terms and abbreviations used in this guide.
- Index** The **Index** assists in locating information in this guide.

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Alert messages in this guide signal the reader to attend to special information pertaining to a concept, a procedure, or other information.

**Note:** Provides additional information that might be of special interest. A note can point out exceptions to rules or procedures. A note usually, but not always, follows the information to which it relates.

**CAUTION:**

**Warns the user of conditions that might result in damage to hardware, corruption of customer data or application software, or long-term health problems in people. A caution always precedes the information to which it relates.**

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## ■ Conventions

This manual uses unique typographical conventions to highlight specialized words and phrases:

<b>Special Text</b>	<b>Example</b>	<b>Description</b>
Buttons	MENU	Softkeys and on-screen buttons appear in the Helvetica font in all capital letters.
Emphasized text	<i>not</i>	Important or emphasized words and phrases appear in italics.
Field names	Name	Screen messages appear in the Courier font with initial capital letters.
File names	fsc.txt	File names appear in the Courier font.
Hypertext links (referenced)	Online Forms	When this document instructs you to click on a hypertext link, the link name appears in the Courier font and is underlined.
Indicators/LEDs	<i>Open</i>	Indicators and LEDs appear with initial capital letters and in italics.
Keyboard keys	Enter	Personal computer keyboard keys appear with an initial capital letter.
Screen messages	downloading	Screen messages appear in the Courier font.
Screen names	“Library”	Screen names or on-screen file tabs appear with initial capitals and within quotation marks.
Positions for switches, jumpers, and breakers	ON	Switch, jumper, and breaker positions appear in all capital letters.
URLs	<a href="http://www.stortek.com">www.stortek.com</a>	Universal Resource Locator (URL) addresses appear in blue text (visible online only) and are underlined.

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This chapter describes the hardware components of the L700 Tape Library. For software information and drive information, refer to the publications that pertain to these specific topics.

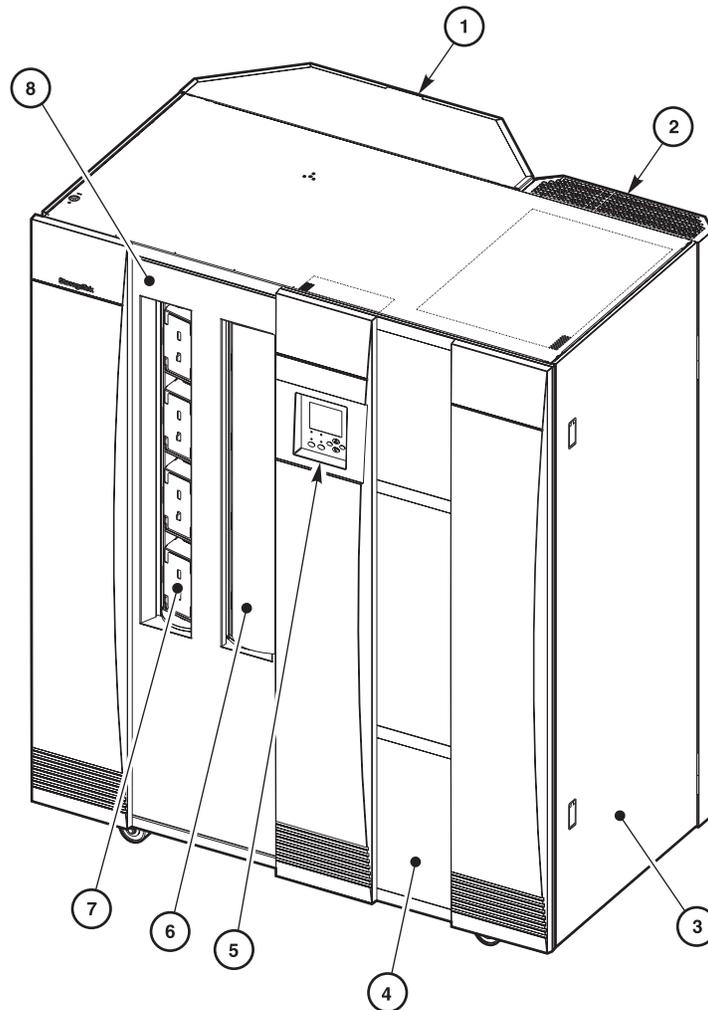
The tape library is the hardware component in an automated cartridge system. The tape library is a robotic system that mounts cartridges into a storage cell or into a drive for read/write operations. It also moves cartridges from the cartridge access port (CAP) to storage cell or from cell to cell. [Figure 1-1 on page 1-2](#) through [Figure 1-4 on page 1-8](#) show the major components of the tape library, described in the following pages.

## ■ Tape Library Components

The tape library has four major internal components:

- A robot, which mounts and dismounts cartridges
- Storage cells for 156 to 678 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 1-1. Tape Library Major External Components**



C65081

**Tape Library External Components (C65081)**

1. Expansion frame
2. Rear door
3. Drive access door
4. Right door
5. Operator panel
6. Optional CAP B (shown closed)
7. Standard CAP A (shown open)
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 mainly of the Z column assembly and the hand-camera assembly. [Figure 1-2 on page 1-4](#) shows the 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, which is on 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.
- Perform an initial program load (IPL) on the tape library by pressing the reset button.
- Make a request at the customer server console to audit the tape library.

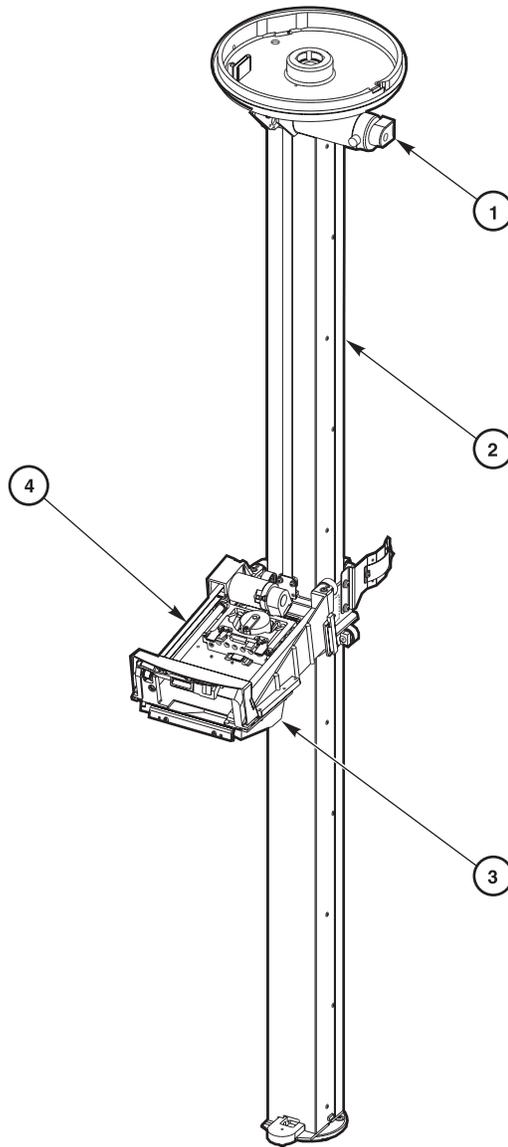
During an audit, the camera reads the location and volume identification number (VOLSER) of each cartridge in the storage cells and reserved cells. Because this information is stored in memory on the MPC, the library does not rely on the camera to locate cartridges during mount and dismount operations.

The storage of audit data has two implications for operation:

- Each time an audit occurs, you must use the system server console to request a host update. This procedure adds the library audit information to the host memory.

If you manually exchange a cartridge from a drive for one in storage, the host memory will continue to apply the VOLSER and location information from the first cartridge to the second cartridge. This might cause an error.

**Figure 1-2. Robot Components**



C65114

**Robot Components (C65114)**

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

## Storage Cells

The host software locates cartridges by panel, column, row and cell. The tape library contains storage cells for 156 to 678 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. The cell arrays are stacked in columns and the columns are arranged in a circle around the robot assembly. Columns can hold up to 42 cartridges.

[Table 1-1 on page 1-6](#) lists tape library storage capacities. [Figure 1-3 on page 1-7](#) through [Figure 1-4 on page 1-8](#) show cell locations for the L700 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 IPL.
- 2) Never put data cartridges in the reserved cells (refer to [“Reserved Cells” on page 1-9](#) 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

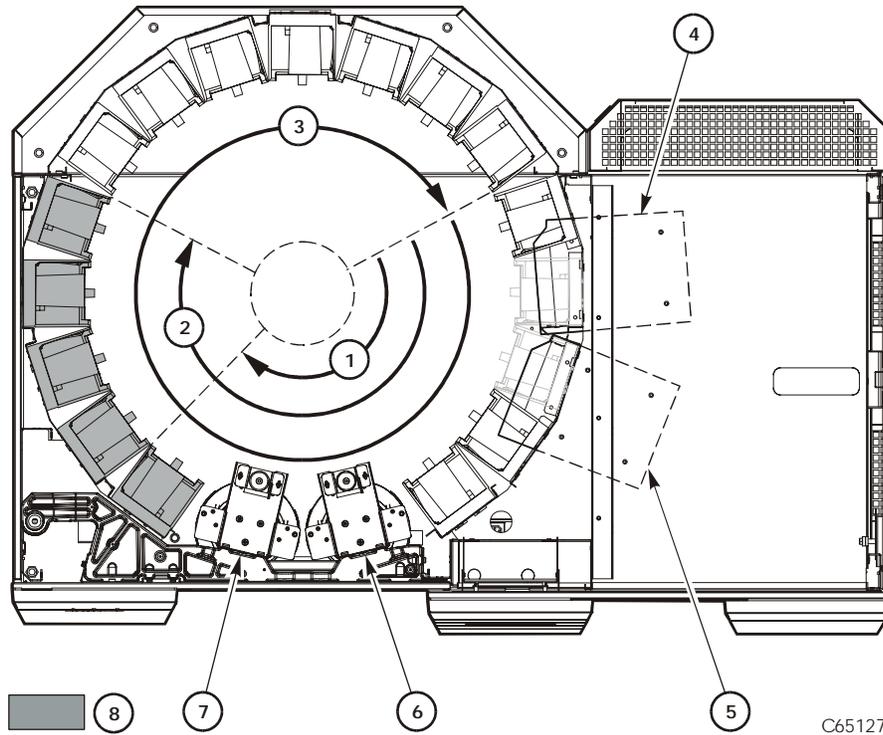
[Table 1-1 on page 1-6](#) lists tape library storage capacities (also shown in [Figure 1-3 on page 1-7](#)). Although library capacity is automatically configured when you bring the library online, check the operator panel to ensure that the capacity information is accurate.

**Table 1-1. Tape Library Capacity**

<b>Expansion Frame</b>	<b>2nd Drive Column</b>	<b>Drives Installed (Maximum)</b>	<b>Panel 2 Access</b>	<b>Total Data Cartridge Cells<sup>1</sup>.</b>	<b>Reserved Cells<sup>2</sup>.</b>
Yes (Full)	No	10 DLT or 6 9840 + 1 DLT	Entire	678	12
	Yes	20 DLT or 12 9840 + 2 DLT	Entire	618	12
No (2/3)	No	10 DLT or 6 9840 + 1 DLT	Entire	384	12
	Yes	20 DLT or 12 9840 + 2 DLT	Entire	324	12
No (1/3)	No	10 DLT or 6 9840 + 1 DLT	Partial	216	12
	Yes	20 DLT or 12 9840 + 2 DLT	Partial	156	12

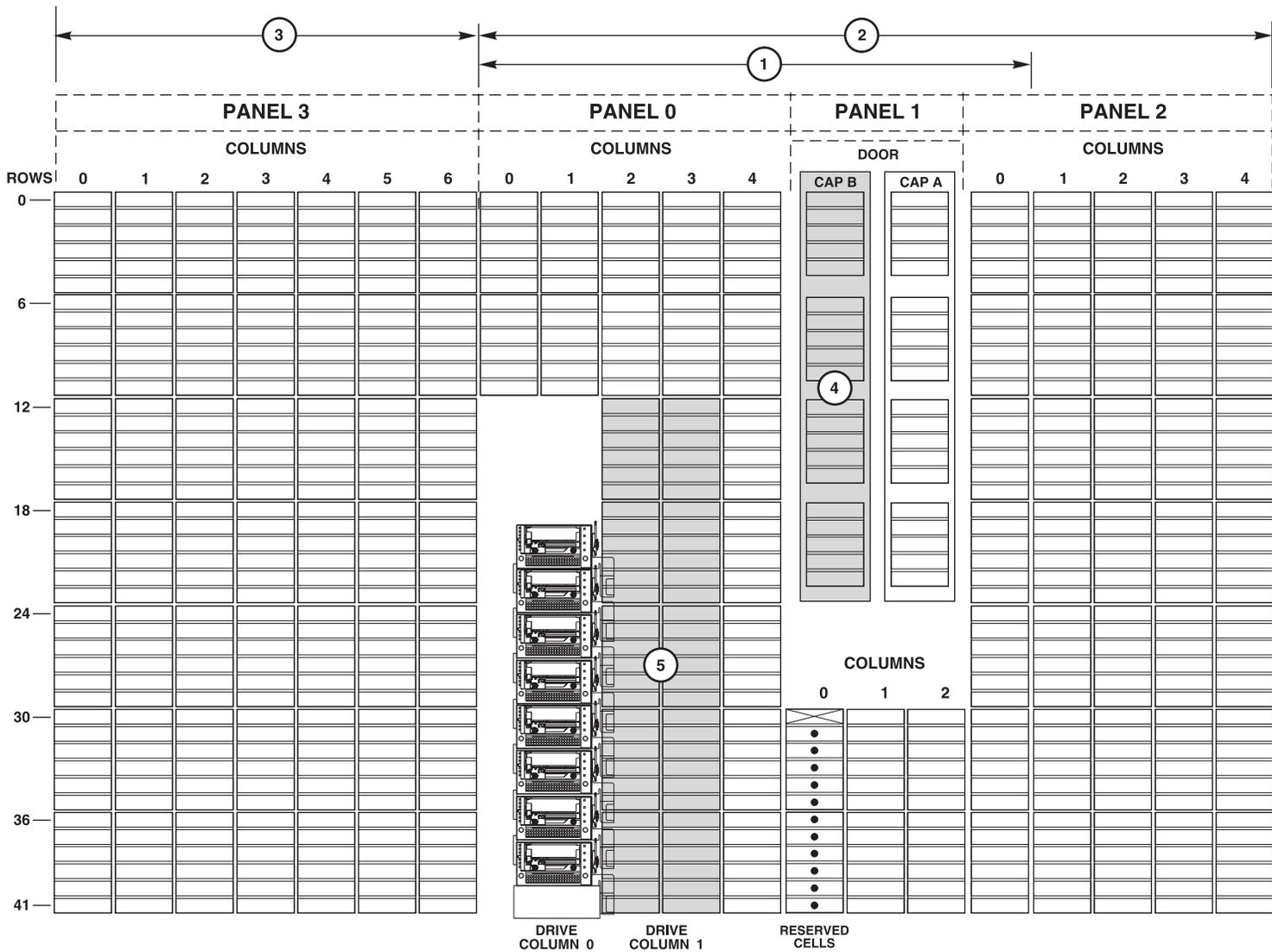
**Note:** 1. These numbers do not include cells in the CAP or the reserved area.

2. The reserved cells are composed of one swap cell and 11 cleaning and/or diagnostic cartridge slots. They are shown in [Figure 1-5 on page 1-10](#).

**Figure 1-3. Locating Cartridges—Top View****Locating Cartridges Components (C65127)**

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

Figure 1-4. Locating Cartridges—Panels, Cells, Rows



C65091

**Figure 1-4. Locating Cartridges—Panels, Cells, Rows**

---

**Locating Cartridges Components (C65091)**

1. 216-cartridge-cell configuration
2. 384-cartridge-cell configuration

**Note:** 678-cartridge-cell configuration equals 2 plus 3.

3. Expansion frame
4. Optional second CAP
5. Optional second drive column

**Note:** The optional second CAP replaces the front window. The optional second drive column replaces the 60 shaded cells.

---

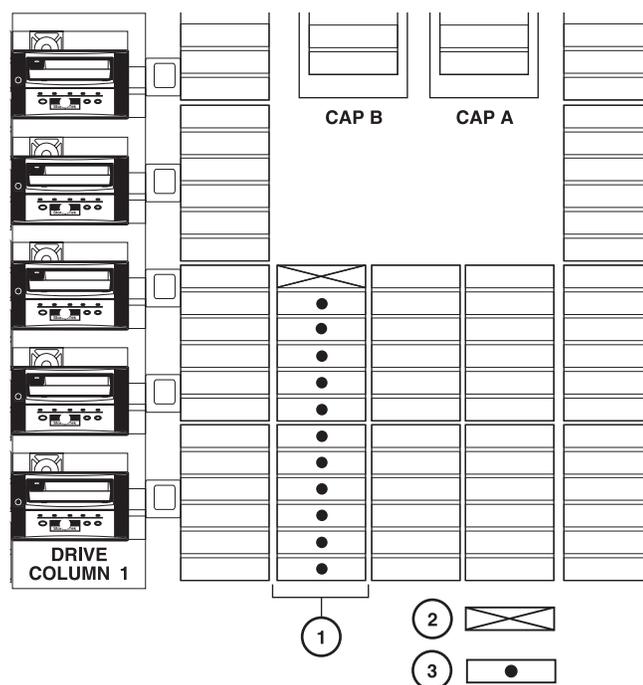
**Reserved Cells**

[Figure 1-5 on page 1-10](#) 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.

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

**CAUTION:**

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

**Figure 1-5. Reserved Cell Locations**

C65136

### Reserved Cell Locations Components (C65136)

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

## Cartridge Access Port

A cartridge access port (CAP) is the location where you add cartridges to or remove cartridges from a tape library without interrupting normal cartridge mounts and dismounts by the robot assembly. The tape library has the option of a second CAP. Both CAPs are located on the right front door.

The CAP magazine is designed for easy loading. You can access the magazine while leaving it in the CAP 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, [“Entering Cartridges through the CAP”](#) and [“Ejecting Cartridges through the CAP”](#) in Chapter 4, “Library Operation.”

## Drives

The tape library can contain three types of drives: Digital Linear Tape (DLT) 8000, DLT7000, and 9840. The maximum number of DLT 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 3-6](#).
- Check drive status information; refer to [“Monitoring Status Information” on page 4-1](#).
- Manually mount a cartridge to a drive or dismount a cartridge from a drive; refer to [“Loading/Unloading Cartridges Manually” on page 4-19](#).

**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.

For specific drive information, refer to your drive publications.

## ■ Tape Library Safety Features

Safety features are incorporated into the tape library. If the left access door to the tape library 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/write operations to the drives and robotic move operations for the tape library robotic components. The 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.

When the control path is a direct attachment, the software resides within the client central processing unit (CPU). When the control path is an indirect attachment, the software is divided between the server and the client CPUs. For specific information, refer to your software publications.

## ■ Library Operating Modes

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

### 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. The operator tasks include:

- Monitoring the tape library operator display for messages
- Entering a cartridge into the CAP
- Ejecting a cartridge from the CAP
- Replacing a cleaning cartridge

Refer to [Chapter 4, “Library Operation,”](#) for the procedures.

### Manual Mode

Manual mode occurs when the tape library is taken offline or loses power. The operator tasks 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
- Returning the tape library to online status

Refer to [Chapter 4, “Library Operation,”](#) for the procedures.

## ■ Auto Clean Feature

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 from a cleaning cell from the tape library and place it in the drive.

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

Refer to [“Cleaning Cartridge Warning Count”](#) in Chapter 3, [“Configuration,”](#) for more information and procedures.

## ■ 13U Rack Area

You may use the internal 13U rack area, located behind the right front door, for additional equipment. Requirements for this area are:

- Do not exceed the total maximum weight of 136 Kg (300 lbs) for installed equipment.
- Install equipment from the bottom to top, with the heaviest items on the bottom.
- Components must be UL listed, CSA certified, and properly grounded.
- You must supply power to these components.

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This chapter locates and describes the functions of the L700 Tape Library operator panel and the power switch. It also describes the relationship between the library's power switch and a drive's power switch. Refer to the drive publications for information about operating the drives.

## ■ Operator Panel

The operator panel, recessed into the library's rack door, contains buttons, indicators, and a graphic display. [Figure 2-1 on page 2-2](#) shows the panel and describes each item.

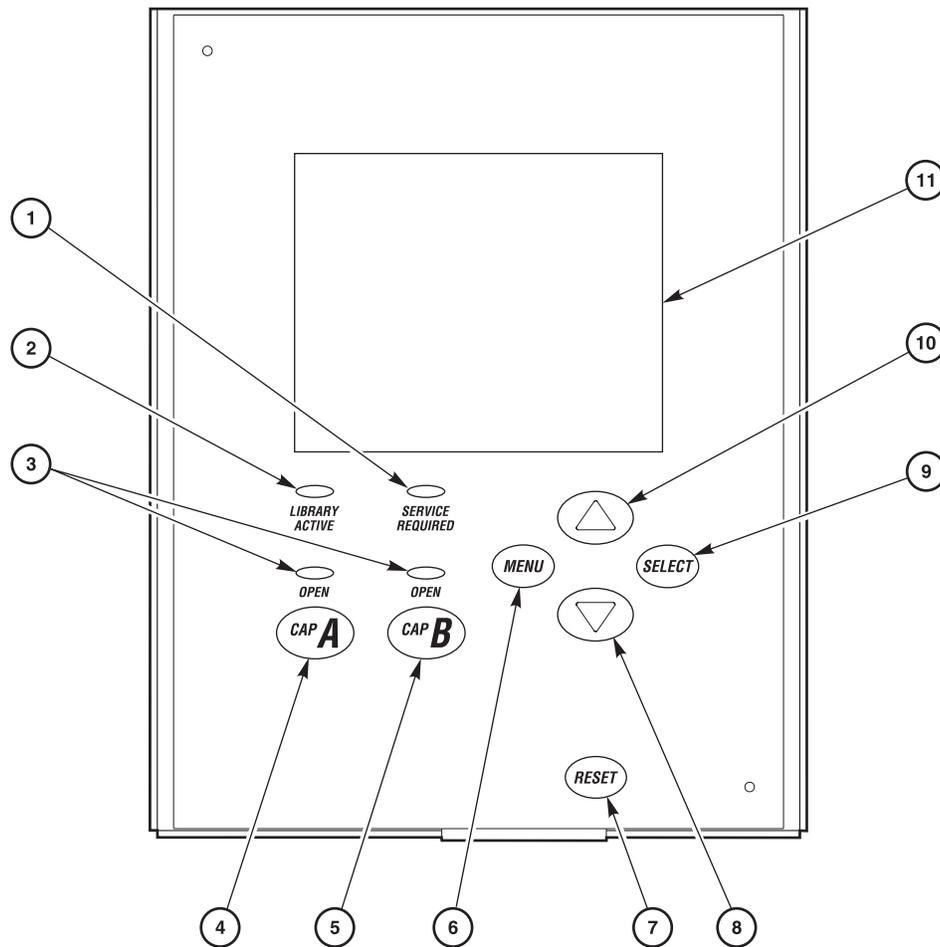
Use this panel to:

- Monitor current information about the CAPs, configuration, drives, doors, drive cleaning, hardware and software versions, 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 systems delivery engineer (SDE) or to your local service representative to help resolve problems. Write down the FSC as soon as it is displayed.

- Set library, network, and drive configurations
- Manipulate the CAPs
- Replace drive cleaning cartridges and set cleaning cartridge usage
- Run library and drive tests
- Reset (start an initial program load [IPL] on) the library

For specific task instructions, refer to [Chapter 3, "Configuration"](#) and [Chapter 4, "Library Operation."](#)

**Figure 2-1. Operator Panel Display, Controls, and Indicators**

C65083

**Operator Panel Components (C65083)**

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

## Indicators

Three indicators on the operator panel provide basic status information: *Library Active*, *Service Required*, and *Open*. Refer to [Figure 2-1 on page 2-2](#) for details about these indicators.

**Note:** When the *Service Required* indicator is on, we recommend that you contact your SDE.

## Buttons

Six buttons appear on the operator panel: CAP, RESET, MENU, SELECT, and the up and down arrows. The CAP and RESET 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 2-1 on page 2-2](#) for the location and a description of each button.

**Note:** The up arrow, down arrow, and SELECT buttons manipulate only values that are under operator control. As you “scroll” down a list of selections, the cursor underscores these values. (You cannot manipulate values that are not underscored.)

## Display Screens

Screens on the graphic display show current information and allow input. Information accessible on the screens includes: drive status, CAP status, library capacity and features, hardware and software versions, SCSI type (single-ended or differential), cleaning cartridge and Auto Clean status, Ethernet ID, DHCP status, and error and FSC information.

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

Other values require your input. These values include:

- Cleaning cartridge usage threshold
- Drive configuration: SCSI ID and bus status (on or off bus)
- Network configuration values: library name, IP address, subnet mask, and library gateway
- Library configuration information: SCSI ID, Fast Load enable/disable, date, time
- Display brightness and contrast

In addition, you must use the display screens to:

- Export cleaning cartridges through the CAPs
- Run diagnostic tests

The following pages describe the library's main screens. For instructions on working with specific configuration values, see [“Operator Panel Entry” in Chapter 3, “Configuration.”](#)

### 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. The screen displays the status of the CAPs, the activity of the library, the number of users logged on to the Web page, and the status of each of the installed drives. [Figure 2-2](#) shows an example “Library Status” screen. (For a list of drive status messages, see [“Monitoring Status Information” on page 4-1.](#))

**Figure 2-2. Library Status Screen**

```
STK L180 (CODE VER 1.50.00)
CAP CLOSED

LIBRARY ONLINE
NO REMOTE USERS
  COLUMN 0
00 BUSY
01 BUSY
02 ---
03 LOADING
04 EMPTY
05 EMPTY
06 EMPTY
07 ---
08 ---
09 ---
```

By pushing the MENU button from the “Library Status” screen, you can access the main menu (see [Figure 2-3](#)).

**Figure 2-3. Main Menu Screen**

```
MAIN MENU :

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

## FSC Logs

Accessible from the main menu, the “FSC Logs” screen displays all fault symptom codes (FSCs), the number of occurrences, and the date and time of the last occurrence. The screen may be scrolled to display the last 20 events. For more information, [“Reviewing FSC Logs” on page 4-9](#).

**Note:** The following statements apply to the event log screen:

- 1) Events listed in the log might not be failures. All events are recorded.
- 2) FSCs are generated for both library and drive errors.

**Figure 2-4. FSC Log Screen**

---

3329	03	NONE
03/01/2004		14:46:14
3304	09	NONE
03/01/2004		14:46:14
30BB	02	NONE
03/01/2004		14:44:01
30BA	02	NONE
03/01/2004		14:44:01
30B9	02	NONE
02/28/2004		09:22:23
30B8	02	NONE
02/28/2004		08:27:14
4487	02	NONE
02/27/2004		16:52:33
3329	03	NONE

---

## CAP Status

Accessible from the main menu, the “CAP Status” 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 2-5](#).

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

**Figure 2-5. CAP Status Screen**

---

```
CAP CONTENTS

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

---

## Drive Information

Accessible from the “Main Menu,” the “Drive Information Menu” is an information-only screen that lists manufacturing and status information about the selected drive (see [Figure 2-6](#)):

<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 “ <a href="#">Drive Status</a> ” on page 4-1 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 (this example shows a SCSI interface, but a drive with fibre channel capability would display FIBRE I/F)
<b>Code Version</b>	The firmware version of the drive

**Figure 2-6. Drive Information Menu**

---

```
DRIVE INFORMATION MENU:
```

```
VENDOR: QUANT  
TYPE: DLT7000  
STATUS: 00 EMPTY
```

```
SERIAL NUMBER:  
XXXXXXXXXX
```

```
INTERFACE TYPE:  
SCSI I/F
```

```
CODE VERSION  
50
```

---

## Cleaning Information

Accessible from the main menu, the “Cleaning Info” menu provides information about and control of the library’s cleaning cartridges. enables you to change the warning count for each type of cleaning cartridge. [Figure 2-7](#) shows an example “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 ejects it
<b>9840 Warn Count</b>	The number times you want the 9840 cleaning cartridge to be used before the library ejects it
<b>Export Clean Cartridges</b>	A procedure for using the CAP to remove cleaning cartridges from the reserved cells

The “Cleaning Info” menu enables you to change the warning count for each type of cleaning cartridge. The menu also lets you check the number of times a cleaning cartridge has been used. (See [“Cleaning Cartridge Usage Count”](#) on [page 4-3](#).)

**Figure 2-7. Cleaning Information Menu**

```
CLEANING INFO

NUM CLEAN CARTRIDGES: 00

DLT WARN COUNT: 000

9840 WARN COUNT: 000

EXPORT CLEAN CARTRIDGES
```

## Diagnostic Tests

Accessible from the main menu, the “Main Diagnostics Menu” (see [Figure 2-8](#)) lets you perform the following tests:

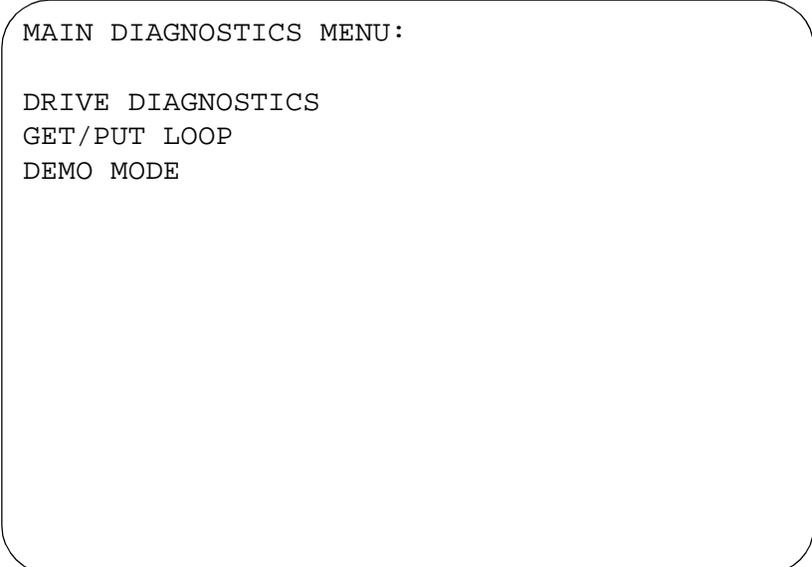
- **Drive-related tests:**
  - **Clean Drive.** Enables you to clean tape drives.
  - **Mount.** Loads test tapes to a drive.
  - **Dismount.** Unloads test tapes from a drive.
  - **Mount-Dismount Loop.** Loads and unloads test tapes from a drive. You may designate the number of times the tape library goes through the loop.
- **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, see [“Running Diagnostic Tests” on page 4-10](#).

**Note:** All Diagnostic tests except for Clean Drive require the tape library and associated drive to be offline.

**Figure 2-8. Main Diagnostics Menu**

---



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

---

## Version Information

Accessible from the “Main Menu,” the “Version Info Menu” is an information-only screen (see example in [Figure 2-9](#)). 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 2-9. Version Information Menu**

```
VERSION INFO MENU:  
  
CODE VERSION:  
  1.50.00  
  
CODE BUILT ON:  
  OCT 22 1999  16:38:19  
  
HARDWARE / VERSION  
  MPC 00000098
```

## Configuration Menu

Accessible from the “Main Menu,” the “Main Configuration Menu” (see [Figure 2-10](#)) routes you to the configuration menus (library, drive, network) and to the panel display controls.

**Figure 2-10. Configuration Menu**

```
MAIN CONFIGURATION MENU
```

```
LIBRARY CONFIG
DRIVE CONFIG
NETWORK CONFIG
DISPLAY INFO
```

## Library Configuration

Accessible from the “Main Configuration Menu,” the “Lib Config Menu” displays library capacity information and lets you modify the library’s configuration. [Figure 2-11](#) shows an example library configuration screen.

### The screen lets you set the:

<b>SCSI ID</b>	Library’s SCSI identification number
<b>Fast Load</b>	Fast Load feature on or off
<b>Date</b>	Current date
<b>Time</b>	Current time

See “[Library Entries](#)” on [page 3-4](#) for procedures and additional information.

The screen displays:

<b>SCSI Type</b>	What type of SCSI bus connects the library to the network (differential or single-ended)
<b>Auto Clean</b>	Whether Auto Clean is enabled

<b>CAPs</b>	The number of CAPs installed
<b>User Cells</b>	How many data storage cells the library contains
<b>Drive Column</b>	The number of drive columns installed
<b>Expansion Frame</b>	Whether an expansion frame is installed

**Figure 2-11. Library Configuration Menu**

---

```
LIB CONFIG MENU:

SCI ID: 00
FAST LOAD: OFF
DATE: 03/01/2004
TIME: 23:59

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

---

## Drive Configuration

Accessible from the “Main Configuration Menu,” the drive configuration menu lets you modify portions of each drive’s configuration. [Figure 2-12](#) shows an example screen. For each drive, the menu displays the drive position, drive type, SCSI ID, and the drive’s SCSI bus relationship with the library. Sub-menus let you change the SCSI ID and indicate whether the drive is on the same SCSI bus as the library.

The panel only displays 16 lines per screen. If your library contains more than eight drives, you must use the down arrow button to scroll to drives 09 and above. For more information, see [“Drive Entries” on page 3-6.](#)”

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

**Figure 2-12. Drive Configuration Menu**

```
00 DLT7000_ID:01
    ON BUS: OFF
01 DLT7000_ID:02
    ON BUS: OFF
02 DLT7000_ID:03
    ON BUS: OFF
03 DLT7000_ID:04
    ON BUS: OFF
04 DLT7000_ID:05
    ON BUS: OFF
05 DLT7000_ID:06
    ON BUS: OFF
06 DLT7000_ID:07
    ON BUS: OFF
```

## Network Configuration

**Note:** Some menu items were not available at the time of publication.

Accessible from the “Main Configuration Menu,” the “Network Config Menu” (see [Figure 2-13](#)) 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 3-8](#).

**Figure 2-13. Network Configuration Menu**

```
NETWORK CONFIG MENU:
LIBRARY NAME:
-

IP ADDRESS:
  000.000.000.000
NETWORK GATEWAY:
  NOT SET
SUBNET MASK:
  000.000.000.000

DHCP: DISABLED

ETHERNET ADDRESS:
00:10:4F:00:05:76
```

## Display Information

Accessible from the “Main Configuration Menu,” the “Display Info Menu” (see [Figure 2-14](#)) leads to menus that let you adjust the contrast and backlight on the graphic display screen. For more information, see “[Screen Characteristics](#)” on [page 3-11](#).

**Figure 2-14. Display Information Menu**

```
DISPLAY INFO MENU:

CONTRAST: 09

  DEFAULT = 16

BACKLIGHT: 128

  DEFAULT = 128

RESTORE DEFAULTS

MENU TO EXIT
```

## Operations Overview

The following table 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 tasks appear in the order you would find them on the operator panel main menu:

- FSC Logs
- CAP Status
- Cleaning Info.
- Diagnostics
- Version Info.
- Configuration

**Table 2-1. Operations Guide**

<b>Task</b>	<b>Page for Operator Panel Instructions</b>
<b>Review FSC logs</b>	<a href="#">page 4-9</a>
<b>Check CAP magazine</b>	<a href="#">page 4-3</a>
<b>Manage cleaning cartridges</b>	See list for individual tasks.
• Check usage count	<a href="#">page 4-3</a>
• Check/set warning count	<a href="#">page 3-12</a>
• Replace cleaning cartridges	<a href="#">page 4-9</a>
<b>Run diagnostic tests</b>	<a href="#">page 4-10</a>
• Run get/put loop	<a href="#">page 4-11</a>
• Operate in demo mode	<a href="#">page 4-11</a>
• Run drive mount diagnostics	<a href="#">page 4-10</a>
<b>Check firmware version</b>	<a href="#">page 2-11</a>
<b>Set configuration</b>	<a href="#">page 3-3</a>
• Set library SCSI ID	<a href="#">page 3-4</a>
• Enable/disable Fast Load	<a href="#">page 3-5</a>
• Set date and time	<a href="#">page 3-5</a>
• Set drive configuration	<a href="#">page 3-6</a>
• Set network configuration	<a href="#">page 3-13</a>
• Set screen characteristics	<a href="#">page 3-11</a>

## ■ Library Power Switch

The library power switch is a circuit breaker or breakers behind the right front door of the tape library. [Figure 2-15 on page 2-18](#) 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 tape library and a single drive column.
- An optional second breaker, located on the second power distribution unit powers the second drive column and an optional second library power supply.

**Note:** 1. For this configuration, the second breaker must be connected to a separate electrical circuit.

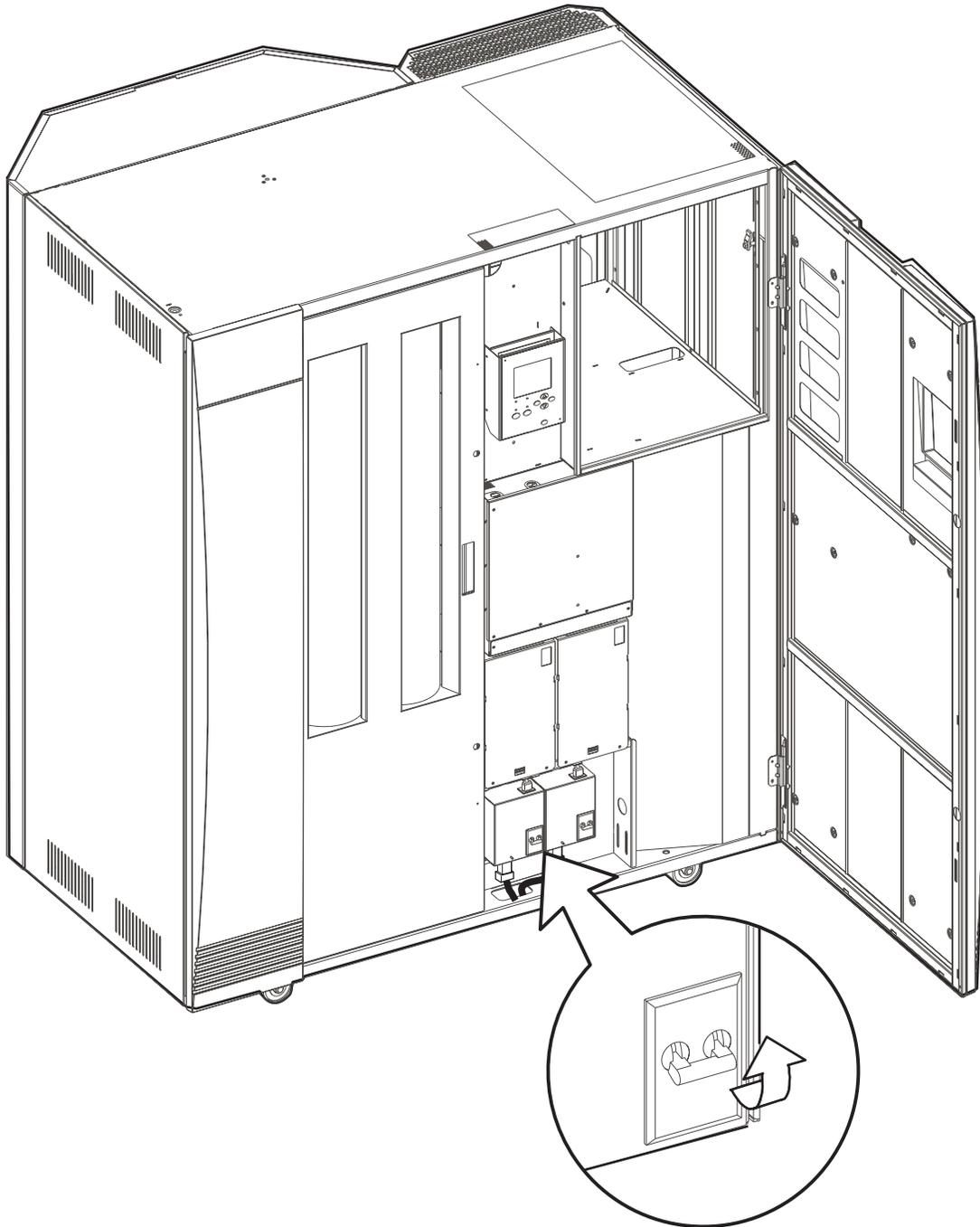
2. If only one breaker is powered off, the second breaker, if installed will still be powered on.

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.

**Figure 2-15. Library Power Switch Location**



C65117

## ■ Tape Drive Power Switches

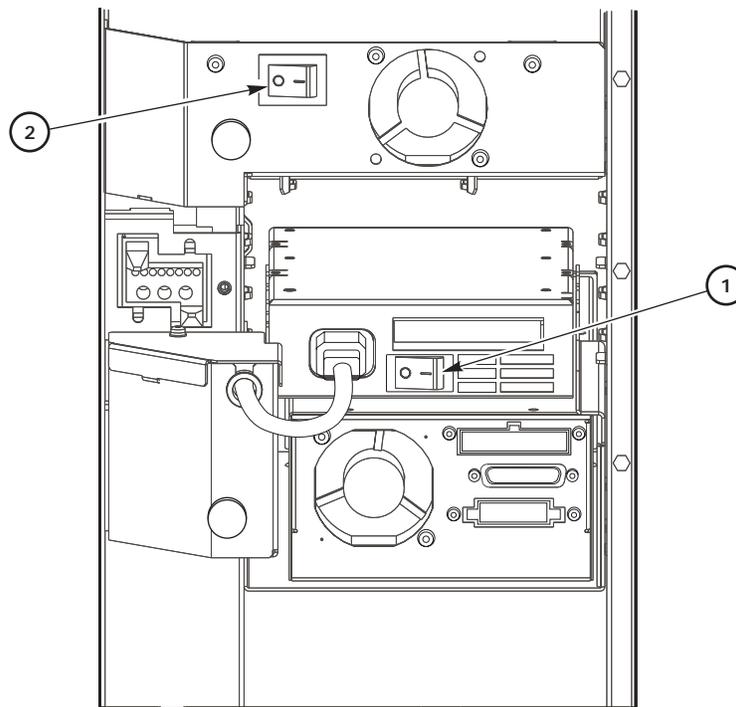
The tape drives are behind drive access door inside the right side door of the library. Each drive has a power switch that controls the supply of power to only that drive.

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

To remove power from a drive, turn the drive switch to the "O" position.

To supply power to a drive, turn the drive switch to the "I" position

**Figure 2-16. Drive Power Switch Locations**



C65131

### Tape Drive Power Switch Components (C65131)

1. 9840 drive power switch
2. DLT drive power switch

This page intentionally left blank.

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 IPL the library
3. Enter required configuration information
4. Place the library online
5. Send a client command to load library audit information into client memory

During an initialization (or IPL [initial program load]), 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, you must enter the remaining configuration values. You can enter the values through the operator panel.

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

## ■ Enabling Auto Clean

You will need to clean the drives occasionally to prevent read/write errors. Enabling the Auto Clean feature allows the library to initiate drive cleaning without operator 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.

**Note:** To be valid, a cleaning cartridge must have “CLN” in its VOLSER label. 9840 cleaning cartridges also must have a “U” on their media ID labels. For more information, see [Appendix A, “Cartridge Tape Information.”](#)

For the locations of these cells, refer to [“Reserved Cells” in Chapter 1, “General Information.”](#)

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

To install cleaning cartridges in the reserved cells:

1. Unlock and open the front doors (see “Opening the Library Front Doors” in Chapter 4, “Library Operation”)
2. Ensure 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 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. It 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.

**Note:** If the tape library does not power on, contact the Central Support Remote Center and report the problem.

## ■ IPLing the Library

Powering on the library causes it to perform an IPL. During IPL, the library initializes the robotic components, audits any cartridges in the storage and reserved cells, and automatically verifies some configuration values, such as drive locations and drive types.

You will have to re-IPL (reset) the library when you:

- Are directed to do so by your system administrator or remote diagnostic service engineer
- Must change the library configuration (for example, when you have to change the library’s SCSI ID)

To re-IPL the tape 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 done, the “Library Status” screen will appear on the operator panel, indicating that you may now complete the configuration process. 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 must enter all configuration data through the operator panel. See [“Operator Panel Entry” on page 3-4](#) for specific instructions.

### SCSI IDs

You cannot place the library online until you have configured SCSI identifications (IDs) for the library *and* for each of the installed drives. SCSI IDs, also called SCSI addresses, allow each piece of equipment on the SCSI bus to have a unique electronic label. By using this label, the client system can direct instructions to a specific piece of equipment.

**Note:** You must reset the library before the new library SCSI ID will take effect. Before pressing the library’s RESET button, make sure that all drives are powered on.

### The Library’s SCSI ID

You must enter the library’s SCSI ID through the library configuration screen on the operator’s panel. For specific instructions, see [“Setting the Library SCSI ID” on page 3-4](#).

**Note:** These notes explain special circumstances for selecting a SCSI ID (address) for the library:

- 1) When configuring the library to a Unix-based workstation, StorageTek 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.
- 2) If you choose to use the embedded system bus on the SPARC station, you should select address 6, 5, 2, or 0 for the library because the remaining targets are reserved for Sun peripherals.
- 3) For IBM RISC System/6000 machines, available addresses on the embedded system bus are 6, 5, 3, and 2.

## A Drive's SCSI ID

**Note:** Configure a 9840 drive by following the directions in the *9840 Tape Drive System Product Manual*, PN 95741 (configuration includes setting the SCSI ID). After you have configured the 9840 drives and reset the library, the SCSI ID for each 9840 drive appears on the drive configuration screen.

You must set each DLT drive's SCSI ID through the drive configuration screen on the operator's panel. For specific instructions, see ["Drive Entries" on page 3-6](#).

## Operator Panel Entry

This method of entering data will configure the tape library for basic operation. For a detailed description of the operator panel, see ["Operator Panel" in Chapter 2, "Controls and Indicators."](#)

### Library Entries

Four entries complete the configuration choices for the tape library:

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

**Note:** The sequence assumes that you will make all entries at one time. 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 SCSI ID*

You set the library SCSI ID from the library configuration screen. To set this value:

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.
4. The cursor will line up with LIBRARY CONFIG. Press the SELECT button. The "Lib Config Menu" will appear.
5. The cursor will line up with SCSI ID.
6. Press the SELECT button. The "Set Lib SCSI ID Menu" will appear.
7. Use the up and down arrow buttons to change the ID.

8. When the ID is correct, press the SELECT button to save the changes. You may press the MENU button to abort.
9. If the library SCSI ID is the only value you wish to set at this time, make sure that all drives are powered on and press the RESET button. If you wish to set other values before you reset the machine, continue with the next section.

**Note:** Be sure you have read the instructions in [“The Library’s SCSI ID” on page 3-3](#) before entering the library ID.

### ***Enabling/Disabling Fast Load***

The Fast Load feature adjusts the robot’s timing during cartridge mount operations.

- With the Fast Load feature *enabled*, the robot will mount a tape to a drive and then immediately perform its next task, not waiting for the tape drive to complete its loading cycle.
- With the Fast Load feature *disabled*, the robot will wait at the drive location until the tape is fully loaded before beginning its next task.

**Note:** Some client software does not support the Fast Load feature. Consult with your systems administrator before enabling this feature.

You enable/disable the Fast Load feature from the “Lib Config Menu” To set this value:

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. Use the up and down arrow buttons to select either ON or OFF.
4. When the screen displays your desired setting, press the SELECT button to save the changes. You may press the MENU button to abort.
5. If you wish to set other values, continue with the next section.

### ***Setting the Date***

You set the date and time from the “Library Configuration” screen. To set this value:

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. Use the up and down arrow buttons to select a value for each portion (field) of the date.
  - 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 wish to set other values, continue with the next section.

### ***Setting the Time***

You set the time from the library configuration screen. To set this value:

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. Use the up and down arrows to select a value for each portion (field) of the time.
  - 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. If you wish to set other values, continue with the next section.

## **Drive Entries**

**Note:** 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 System Product Manual*, PN 95741.

Two entries at the library operator panel complete the configuration choices for each drive installed in the library:

- 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.

You set the drive SCSI IDs and bus status choices from the drive configuration menu (see [Figure 2-6 on page 2-8](#).) 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. The format of the drive information appears in the following example:

```
00 DLT7000 ID: __
      ON BUS: ON
```

The first two digits are the drive’s logical number, that is, 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. The uppermost drive within the column is designated as “0,” the next is “1,” and so forth

Next in the example is the drive type (DLT7000 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.

**Note:** Due to the size of the 9840 drive, the operator panel will display dashed lines (- - -) between a 9840 drive and another drive; this is due to the empty (not connected) power and tape transport interface (TTI) connector displaced by the physical size of the 9840.

3. Use 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 screen. If the library contains more than eight drives, you must use the down arrow button to scroll to drives 09 and above.

4. Use the up and down arrow buttons to change the ID.
5. When the ID is correct, press SELECT to save your changes. A message screen will appear to indicate that the library is saving the new ID. Then the drive configuration menu will reappear.
6. Press the arrow down button to get to the drive’s second line of information (which is the drive’s bus status field).
7. Press the SELECT button. The “Set Drive SCSI ID Menu” will appear.
8. Use the up and down arrow buttons to change the bus status to ON or OFF.
9. When your choice is highlighted, 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.

## Network Entries

**Note:** Not all entry options from the "Network Config Menu" were available at the time of publication.

Four entries complete the library's network configuration:

- Library name
- IP address
- Network gateway
- Subnet mask

You also may view the library's Ethernet address.

You accomplish these tasks from the "Network Config Menu" (see [Figure 2-13 on page 2-15](#)).

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

### *Viewing the Ethernet Address*

**Note:** The library's Ethernet address is pre-set at the factory. You cannot change it.

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.
3. The library's Ethernet address appears at the bottom of the screen.
4. 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.

### *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.

### ***Setting the IP Address***

The system administrator might assign the library an IP address, which makes the library accessible through a network. 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 section (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.

### ***Setting the Network Gateway Address***

**Note:** Entering this address is optional. It serves to indicate the gateway connection between subnets, but it is applicable only when such a connection exists and is necessary to 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. Use the up and down arrow buttons to select a value for each three-digit section (field) in the address.
  - 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.

### ***Setting the Subnet Mask Address***

The system administrator might assign the library a subnet mask address if one is required. This address makes the library accessible through a subnet on a large network. 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. Use the up and down arrow buttons to select a value for each three-digit section (field) in the address.
  - 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.

## 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 information menu will appear.
3. Use the arrow buttons to line up with the desired screen characteristic: `CONTRAST` or `BACKLIGHT`. An editing screen will appear.
4. On the editing screen, use 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 `DEFAULT SCREEN CHARACTERISTICS` and press the **SELECT** button.

5. When the value is correct, 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. (In this case, 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

Cleaning cartridges have a limited life span. After multiple uses, a cleaning cartridge must be replaced and disposed of at your site.

If you have enabled the Auto Clean feature, you can use the operator panel to set the maximum number of times a cleaning cartridge can be used (or the “warning count”). The DLT tape drive product manual specifies that a DLT cleaning cartridge can be used a maximum of 20 times. For 9840 cartridges, refer to the *9840 Tape Drive System Users’ Reference Manual* PN 95739.

You set the cleaning cartridge warning count from the “Cleaning Info” menu. To set this value:

1. From the status screen, press the MENU button. The “Main Menu will appear.
2. Press an arrow button until the cursor underscores CLEANING INFO.
3. Press the SELECT button. The “Cleaning Info” screen will appear. This menu displays the number of cleaning cartridges in the reserved area.
4. Using an arrow button, line up the cursor with DLT WARNING COUNT or 9840 WARNING COUNT.
5. Press the SELECT button. An editing screen will appear.
6. The editing screen displays the current setting for the cartridge warning count. It displays the maximum recommended warning count below the current setting. On this screen, use the up and down arrow buttons to change the count value.
7. When the value is correct, press the SELECT button to save the changes. You may press the MENU button to abort.
8. When you are finished, press the MENU button twice to return to the library status screen.

## ■ Placing the Library Online

When you are ready to use the library for production, you must first:

- Enter the system command to place all drives online
- When all drives are online, enter the command to place the library online
- Enter the command to upload the library audit data to the client system memory (see the following paragraphs)

## ■ Sending Library Audit Data to Client

During an IPL, the library audits the location and VOLSER of all cartridges in the storage and reserve cells. The library also performs an audit when:

- You power on the tape library.
- You open and close the front library door.
- You perform an IPL on the tape library.
- You make a request at the customer server console to audit the tape library.

After the library is configured, you must follow every audit with a client command that loads the library audit data into client memory. For instructions on how to send this command, refer to your software and system publications.

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This chapter contains the procedures for operating the library in:

- Automated mode
- Manual mode

**Note:** When the client controls the library, refer to your software publications and enter the command at the server console to perform the desired activity. For some activities, you might have to ask your systems administrator for the required information.

## ■ Operating in Automated Mode

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

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

- Enter cartridges into the tape library through the cartridge access port (CAP).
- Eject 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 text describes how to perform these activities.

## Monitoring Status Information

You can monitor library, CAP, and drive status information through the library status screen (see [Figure 2-2 on page 2-5](#)). You also can monitor CAP magazine status and the cleaning cartridge usage count through operator panel menus.

### Drive Status

[Table 4-1 on page 4-2](#) summarizes drive status messages that might appear on the library status screen:

**Table 4-1. Drive Status Messages**

<b>Status Message</b>	<b>Explanation</b>
INIT REQUIRED	You must initialize this drive.
NOT CONNECTED	This drive is not connected to a SCSI bus.
UNKNOWN DRIVE	The library does not recognize the type of drive in this location.
NOT COMMUNICATE	This drive is not communicating with the client or the drive power is off.
NOT FUNCTIONAL	This drive is not operating properly.
NOT LOADABLE	The library cannot load a cartridge into this drive.
EMPTY	No cartridge is loaded in this drive.
CARTRIDGE IN	The drive contains a cartridge, but the cartridge is not loaded into the drive.
CLEAN NEEDED	This drive requires cleaning.
CLEAN FAILED	The attempt to clean this drive failed.
LOADING	The library is mounting a cartridge to this drive.
REWOUND	The cartridge in this drive has been rewound.
UNLOADING	The library is dismounting a cartridge from this drive.
LOADED	The library has loaded a cartridge into this drive.
REWINDING	The cartridge in this drive is being rewound.
BUSY	This drive is performing a read or write operation.
CLEANING	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 09 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 2-6 on page 2-8](#)). The screen lists the manufacturer, model, status, serial number, interface type, and firmware version of the selected drive. See [Table 4-1 on page 4-2](#) 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 STATUS.
3. Press the SELECT button. A blank screen will appear.
4. Press the SELECT button again. 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 4-2](#) 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 4-2. CAP Magazine Slot Status Messages**

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

## 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.) To check the number of times that the cleaning cartridges have been used since they were installed in the library:

1. Press the MENU button to return to the main menu.
2. Press the arrow buttons until the cursor underscores CLEANING INFORMATION.

3. Press the SELECT button. The panel displays the “Cleaning Info” menu.
4. Press the arrow buttons until the cursor highlights EXPORT CLEANING CARTRIDGE.
5. Press the SELECT button. The export screen appears, which lists all installed cleaning cartridges by domain (or cartridge 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 out of the export screen.

## Entering Cartridges through the CAP

To unlock the CAP, open it, and place cartridges into it:

1. Enter the console command to unlock the CAP.
2. Press the CAP A or CAP B button on the operator panel to open the CAP. The indicator will light.

### CAUTION:

**You must enter the cartridges properly or you might damage the robot or the drive, or cause the tape library to stop operating. Use only DLT cartridges for the DLT drives. Use only 9840 cartridges for 9840 drives.**

Refer to [Figure 4-2 on page 4-6](#) and [Figure 4-3 on page 4-7](#) while performing the following steps.

3. Load cartridges into the magazine. You can do this one of two ways: Pull out and down on the magazine handle or remove the magazine by lifting it out (see [Figure 4-1 on page 4-5](#)).

**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.

4. 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.**

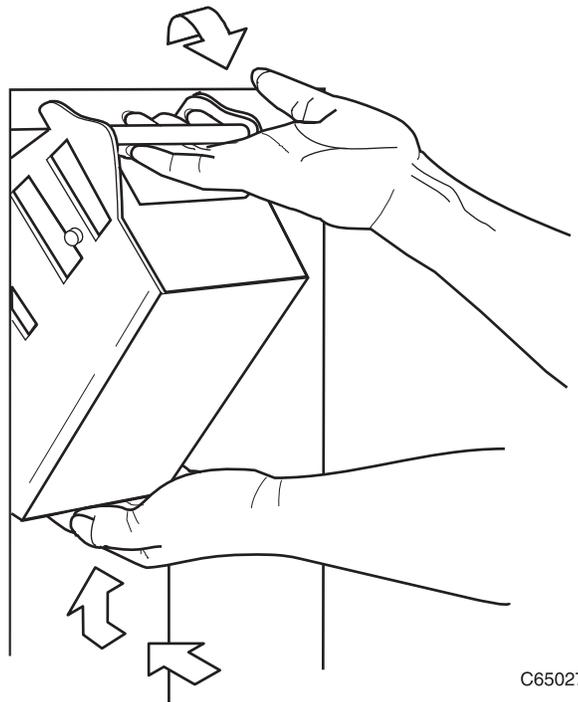
5. Return the magazine to its closed position. (If you have used a retention cover on the magazine, remove the cover before replacing the magazine.)
6. Press the CAP A or CAP B button on the operator panel to close the CAP.

**Note:** StorageTek strongly advises that you do not enter unlabeled cartridges. The 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, the client software might direct the tape library to stop operating. Other 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.

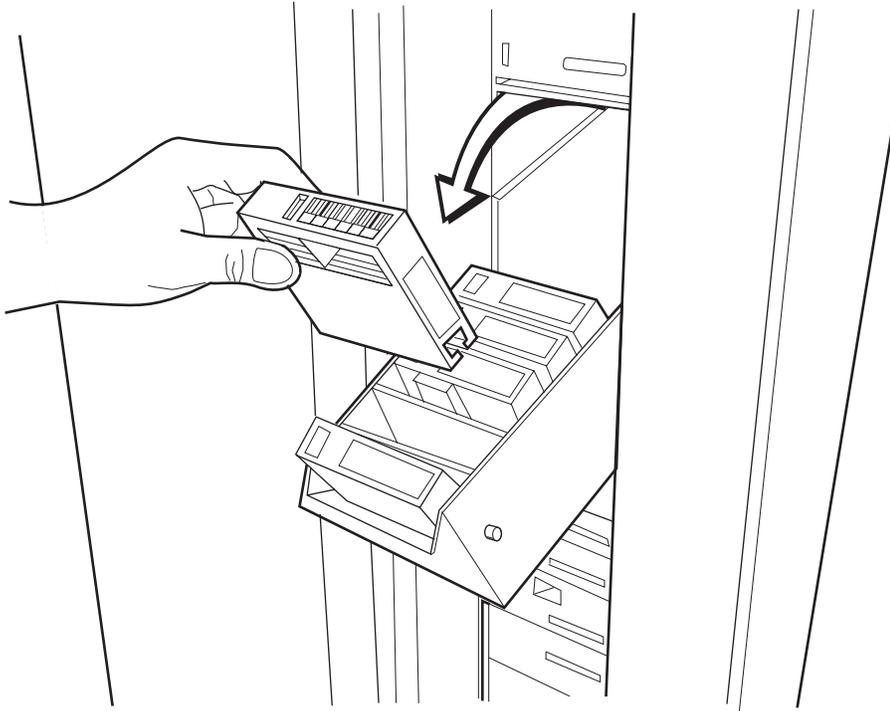
**Figure 4-1. Removing the CAP Magazine**

---

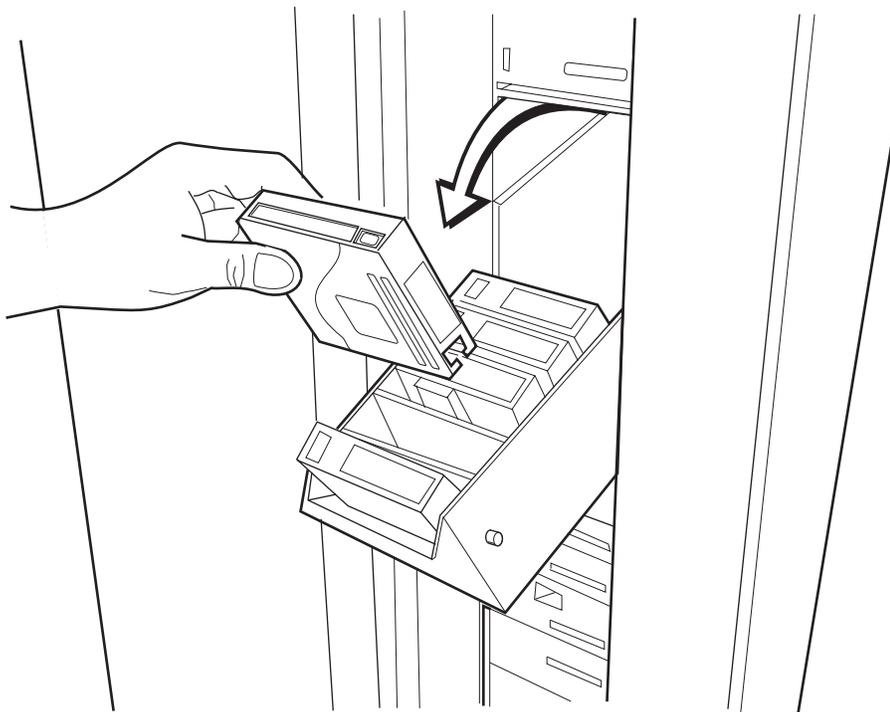


C65027

**Figure 4-2. Entering DLT Cartridges into the CAP Magazine**



C65052

**Figure 4-3. Entering 9840 Cartridges into the CAP Magazine**

C65135

## Ejecting Cartridges through the CAP

To unlock the CAP, open the CAP, and remove cartridges from it:

1. At the console, enter the VOLSERS of the cartridges you require. The robot will retrieve the cartridges and insert them into the CAP.
2. Enter the console command to open the CAP. This will unlock the CAP.
3. Press the CAP A or CAP B button on the operator panel to open the CAP.
4. Remove or pull down the magazine and remove the cartridges and store them *outside* the tape library (refer to [“Storing Cartridges” in Appendix A, “Cartridge Tape Information”](#)).
5. Repeat these steps until you have removed all the required cartridges.
6. Press the CAP button to close the CAP
7. 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 on the operator panel will display `CLEAN NEEDED` whenever a specific drive requires cleaning. To clean this drive:

1. Enter the console command to open the CAP. This will unlock the CAP.
2. Press the CAP button on the operator panel to open the CAP.
3. Insert the required cleaning cartridge into the CAP.
4. Press the CAP button to close the CAP.
5. Press the MENU button until the main menu displays.
6. Press the arrow buttons until the cursor highlights `DIAGNOSTICS`.
7. Press the SELECT button. The panel displays the “Main Diagnostics Menu” (see [Figure 2-8 on page 2-10](#)).
8. Press the arrow buttons until the cursor highlights `DRIVE DIAGNOSTICS`.
9. Press the SELECT button. The screen will display a list of all installed drives.
10. Use the arrow buttons to highlight the desired drive.
11. Press the SELECT button. The “Diagnostics for Drive” menu appears.
12. Press the arrow buttons until the cursor highlights `CLEAN DRIVE`.
13. Press the SELECT button. A message screen will appear to tell you that the drive will be cleaned at the next opportunity.
14. When cleaning is complete, the robot will return the cleaning cartridge to the CAP.
15. 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 14.
16. When drive cleaning is complete, press the CAP button to open the CAP.
17. Remove the cleaning cartridge, and make a record of how many times it has been used.
18. Press the CAP button to close the CAP.

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

## Reviewing FSC Logs

An SDE or other StorageTek 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, warnings and errors that the library has generated 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 highlights FSC LOGS.
3. Press the SELECT button. The panel displays the FSC logs screen (see [Figure 2-4 on page 2-6](#)).
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 entry's elements:

```
3329    03    NONE
03/01/2004  14:46:14
```

- 3329** This four-character code is the FSC.
- 03** This value indicates the number of times this FSC has occurred.
- NONE** This message indicates which, if any, mechanical device was involved.
- 03/01/2004** These digits indicate the date the FSC occurred. The fields from left to right are month, day, and year.
- 14:46:14** These digits indicate the time the FSC occurred. The fields from left to right are hour, minutes, and seconds.

## Running Diagnostic Tests

Diagnostic tests included in the library's firmware let you exercise certain aspects of the library's operation. You may also place the library in demonstration mode through the "Diagnostics" screen. Tests are listed in [Table 4-3](#)

**Table 4-3. L700 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 complete, it returns the cleaning cartridge to the CAP. This routine does <i>not</i> require the library to be offline.
<b>Mount</b>	This test mounts a diagnostic tape to the selected drive.
<b>Dismount</b>	This test dismounts a diagnostic tape from the selected drive.
<b>Mount-Dismount</b>	This test mounts and dismounts a diagnostic tape from the selected drive.

**CAUTION:**

**Diagnostic tests should be performed only by trained personnel.**

**Before performing the diagnostic tests, be sure that the library and drives are offline.**

### Running Drive Diagnostic Tests

To run a diagnostic test on a drive:

1. Place the library and drives offline.
2. Press the MENU button until the "Main Menu" displays.
3. Press the arrow buttons until the cursor highlights 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 "Diags for Drive" menu appears.
9. Press the arrow buttons until the cursor highlights the desired test. For a description of the available tests, see [Table 4-3 on page 4-10](#).

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 complete; the screen will display **TEST COMPLETE**.

## 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. Place the library and drives offline.
2. Press the **MENU** button until the “Main Menu” displays.
3. Press the arrow buttons until the cursor highlights **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 complete; the screen will display **TEST COMPLETE**.

## Operating in Demo Mode

### **CAUTION:**

***Potential for error.* Running the library in Demo Mode causes the data cartridges to be rearranged. After Demo Mode is complete, you must reset the library and give the client command to upload library audit data to the client.**

With the library in Demo Mode (demonstration mode), the hand unloads a cartridge from a storage cell, rotates around on the Z and theta axes, and loads the cartridge back to a different storage cell. This tests the functionality of the robot. To operate in Demo Mode:

1. Place the library and drives offline.
2. Remove all data cartridges from the library

3. Load a demonstration cartridge into the library.
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.”
7. Press the arrow buttons until the cursor underscores `DEMO MODE`.
8. Press the SELECT button. An edit screen appears.
9. 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. The maximum number of loops allowed is 2,000.
10. 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 complete; the screen will display `TEST COMPLETE`.
13. Press the RESET button to reset the library.

## ■ Powering off the Library

To power off the library:

1. Enter the command at the server console to remove the tape library and drives from online status.
2. Press down on the switch or switches (breakers) behind the right front door of the tape library.

## ■ Operating in Manual Mode

The following pages describe operations you can perform when the tape library is in manual mode. Manual mode occurs when the tape library is not online or loses power.

When the library is offline, 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:**

***Components are Sensitive to Static Electricity:*** Even a small electrostatic discharge could damage an electrical component inside the library. A damaged component might not fail immediately, but over time, it will become worse, possibly causing an “intermittent” problem. Be sure to touch gray, unpainted metal before reaching inside the library.

**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.

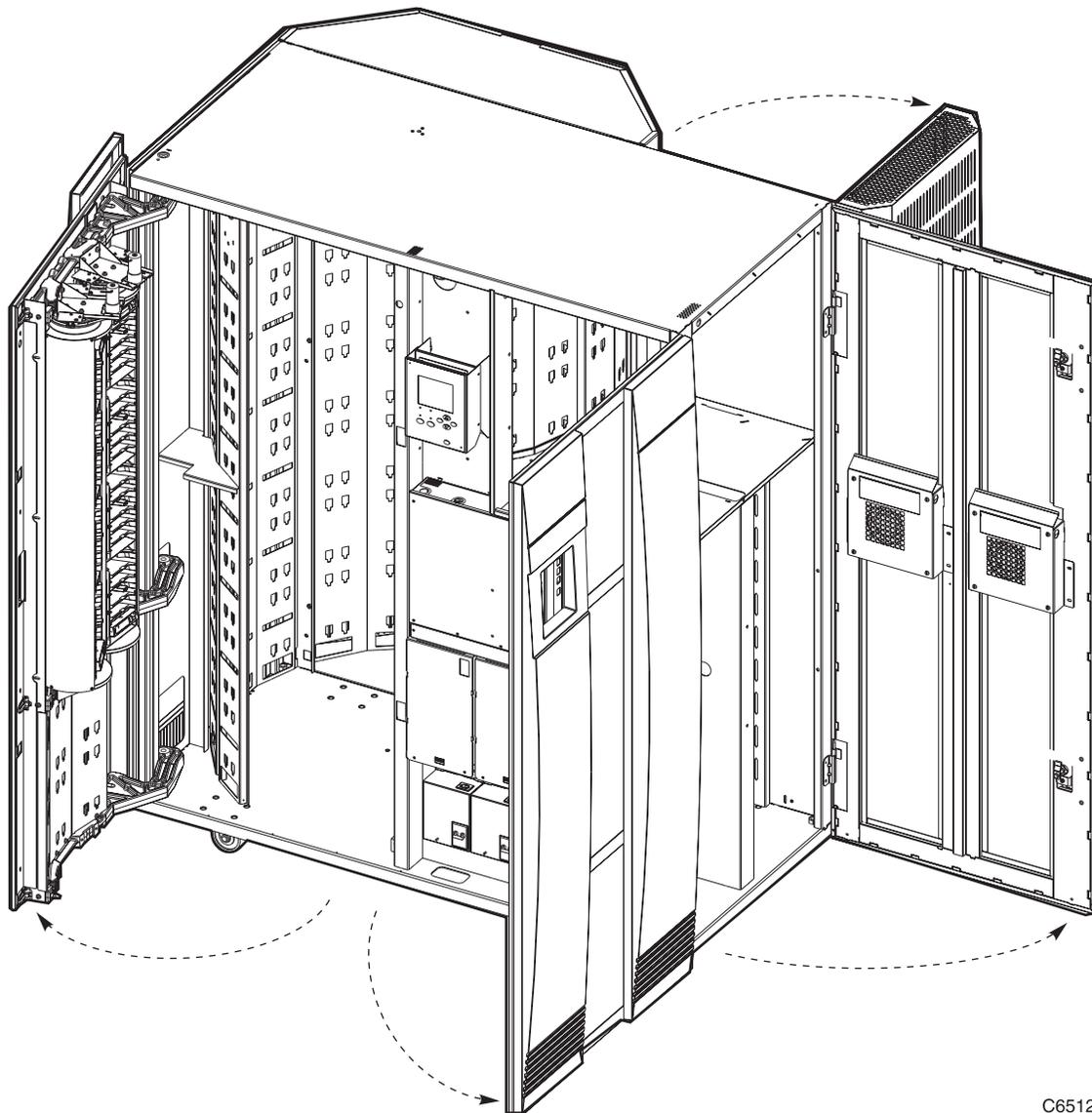
Antistatic wrist straps with clip-on ends are commercially available.

## Opening the Library Front Doors

You must open the front doors to perform manual operations. Refer to [Figure 4-4 on page 4-14](#) 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 counterclockwise to unlock them, then pull open the door.

**Figure 4-4. Opening Access Doors**



C65125

## Moving the Robot

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

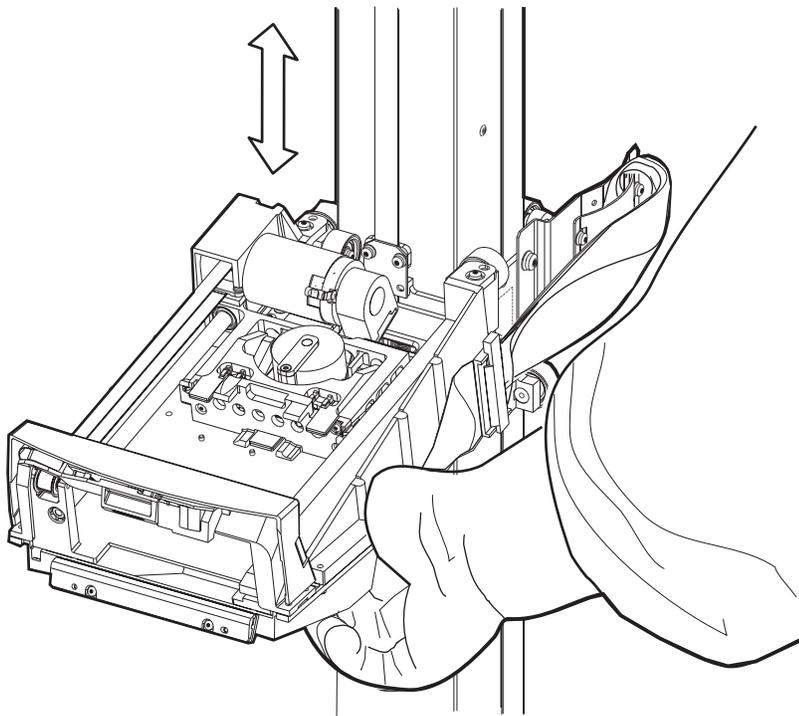
Move the Z column and Z carriage only as shown in [Figure 4-5](#) and [Figure 4-6](#) on page 4-16.

Take precaution against potential ESD damage by touching gray, unpainted metal before reaching into the library. Do not touch exposed electrical parts when moving any part of the robot.

## Raising and Lowering the Hand-camera

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 4-5](#).

**Figure 4-5. Raising and Lowering the Hand-camera**



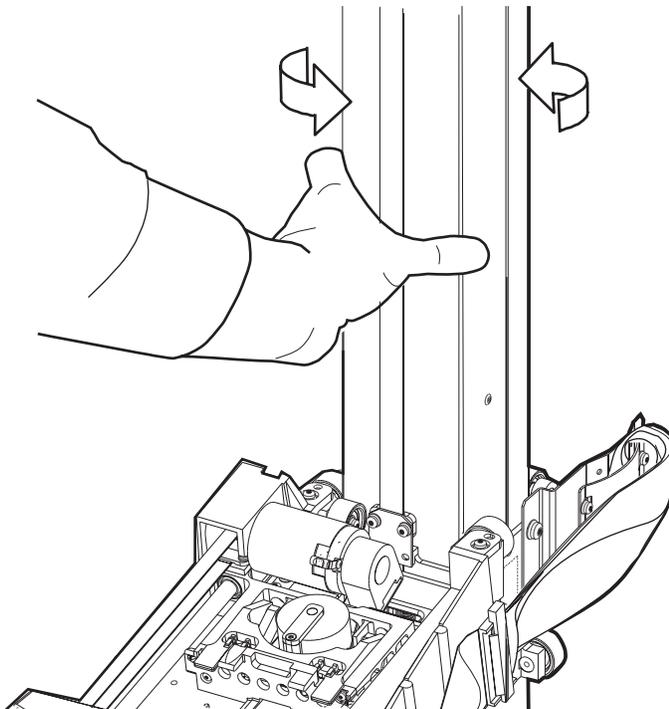
C65019

## Rotating the Z Column

If you need to rotate the Z column, grasp it and *carefully* rotate it, as shown in [Figure 4-6](#).

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. Rotate the column in the opposite direction.

**Figure 4-6. Rotating the Z Column**



C65084

## Locating a Cartridge in the Storage Cells

[Figure 1-3 on page 1-7](#) and [Figure 1-4 on page 1-8](#) 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 the cartridge out.

## Removing a Cartridge from the Hand

If the tape library loses power, 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:**

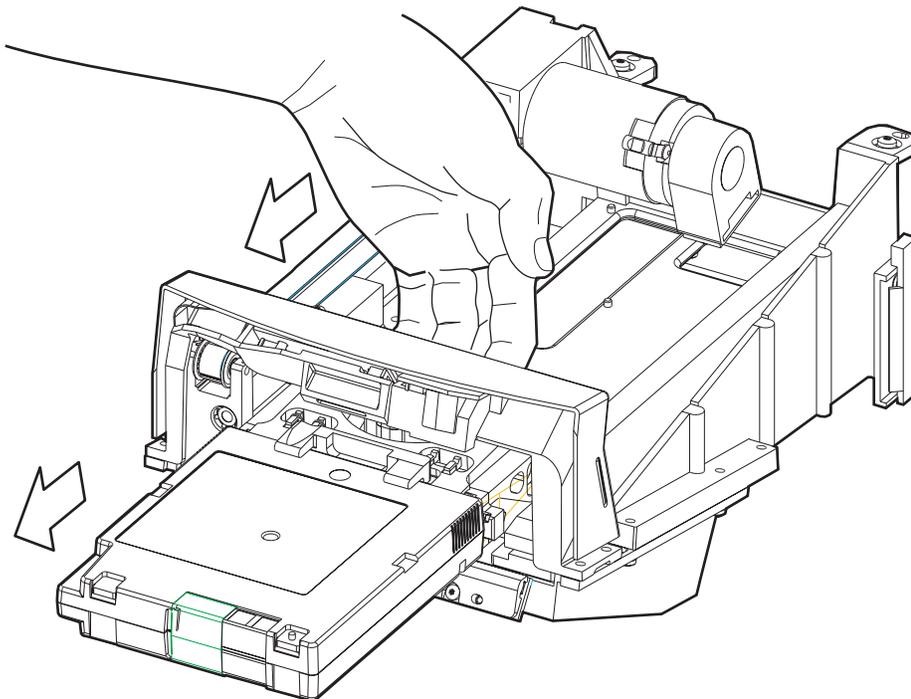
**Possible equipment damage:** Follow the procedures described in [“Moving the Robot”](#) on page 4-14. Failing to do so could damage the hand.

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

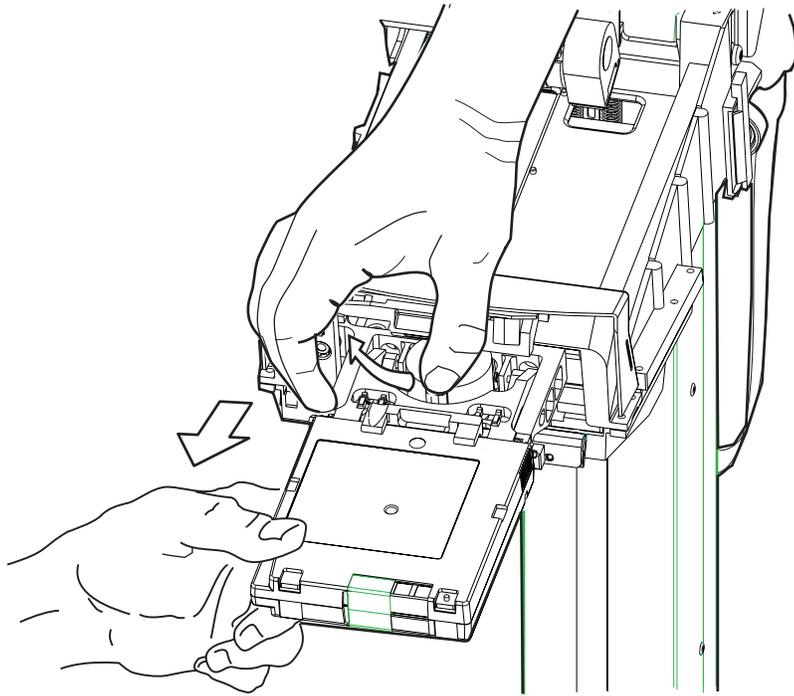
To remove a cartridge from the hand:

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 4-7](#)) until the gripper is extended to its full position, as shown in [Figure 4-8](#) on page 4-18.

**Figure 4-7. Extending the Gripper**



C65054

**Figure 4-8. Removing a Cartridge from the Hand**

C65101

**CAUTION:**

**Heated components:** If the robot has been active, the solenoid and 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 4-8](#).

**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 to a drive or unload a cartridge from a drive. The following pages provide manual load and unload procedures for DLT drives and 9840 drives.

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

### Loading a Cartridge into a DLT Drive

**CAUTION:**

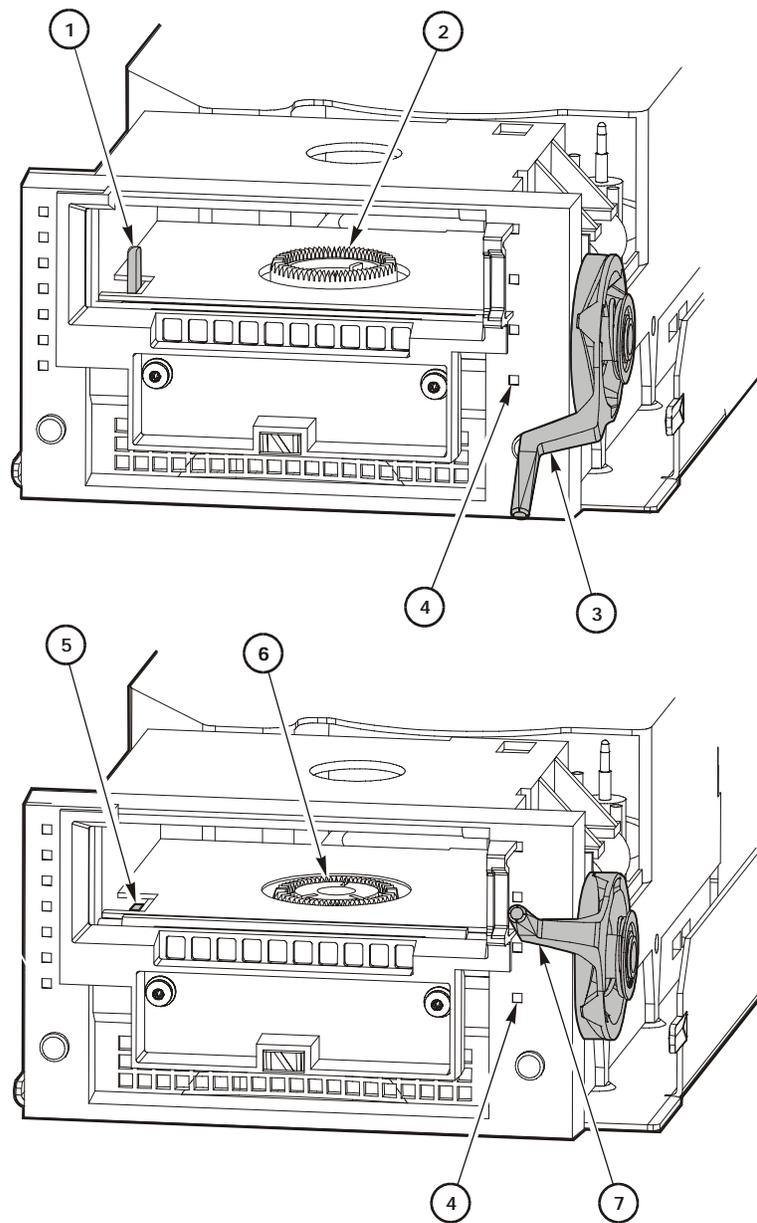
**Potential equipment damage:** Before you load a cartridge into the drive, you must make sure power is on, and the *Operate Handle* indicator is steadily on (not flashing).

To load a cartridge into a DLT drive:

1. Obtain the cartridge VOLSER, location, and drive number from the server console.
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 4-4 on page 4-14](#). Turn the key counterclockwise to unlock them, then pull open the door.
4. Locate the cartridge (see [“Locating a Cartridge in the Storage Cells” on page 4-16](#)).
5. Make sure the DLT handle is up 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 4-9 on page 4-20](#)). 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 4-9. Manually Loading DLT Drives**



C65232

**Manually Loading DLT Drives Components (C65232)**

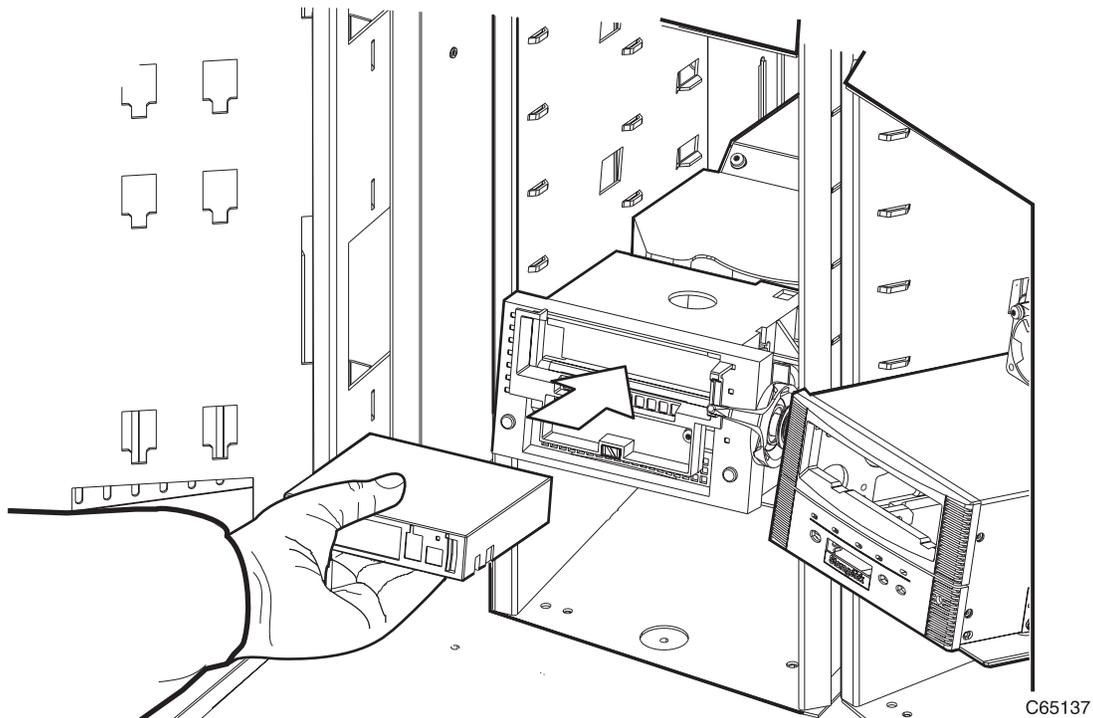
1. Cartridge hook (up)
2. Hub (up)
3. Handle (down)
4. Operate handle indicator
5. Cartridge hook (down)
6. Hub (down)
7. Handle (up)

**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.

6. 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 4-10 on page 4-21](#).
7. Insert the cartridge into the drive and push the cartridge into the back of the drive until it is firmly seated.
8. Lower the drive handle.

**Figure 4-10. Loading a Cartridge into the DLT Drive**



### Unloading a Cartridge from a DLT Drive

To unload a cartridge from a DLT drive:

1. Obtain the drive number from the server console and place the drive offline.
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 4-4 on page 4-14](#). Turn the key counterclockwise 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:**

**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 (refer to [“Storing Cartridges” in Appendix A, “Cartridge Tape Information”](#)).

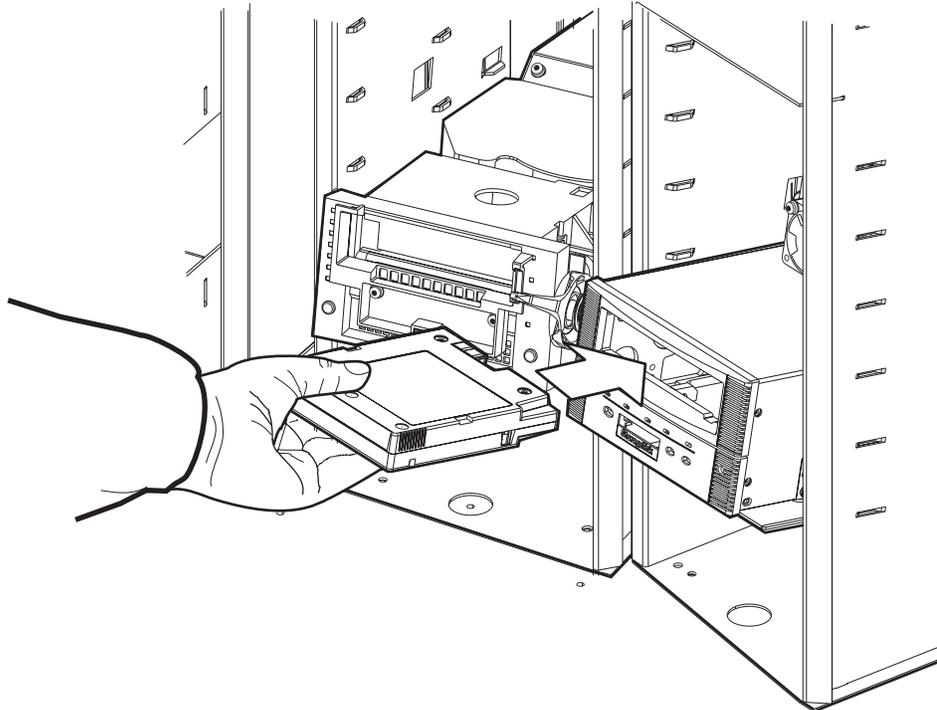
## Loading a Cartridge into a 9840 Drive

To load a cartridge in a 9840 drive:

1. Obtain the cartridge VOLSER, location, and drive number from the server console.
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 4-4 on page 4-14](#). Turn the key counterclockwise to unlock them, then pull open the door.
4. Locate the cartridge (see [“Locating a Cartridge in the Storage Cells” on page 4-16](#)).
5. Insert the cartridge into the 9840 drive using the direction shown in [Figure 4-11 on page 4-23](#).
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 NTReady message displays when the tape in the cartridge has lost tension. Follow the instructions outlined in the *9840 Tape Drive System User’s Reference Manual*, PN 95739 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 System User's Reference Manual*, PN 95739 to correct this condition.

**Figure 4-11. Loading a Cartridge into the 9840 Drive**



C65138

## Unloading a Cartridge from a 9840 Drive

To unload a cartridge from a 9840 drive:

1. Make sure that the 9840 drive is not selected by the client.
2. Obtain the drive number from the server console and place the drive offline.
3. Open the tape library right front door by pulling on the left side of the door.
4. Open the tape library left front door by using a latch key to unlock both locks. See [Figure 4-4 on page 4-14](#). (Turn the key counterclockwise to unlock them, then pull open the door.)
5. 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 Reference Manual*, PN 95739 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 Reference Manual*, PN 95739.

## 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. Place the tape library online by entering the command at the server operator console.
4. Give the client command to upload the audit data to the client.
5. Refer to your specific software publications for instructions on replacing the cartridges you removed and on inserting the cartridges into the storage cells.

This chapter describes what to do if problems occur with the tape library. In some cases, you might be able to correct the problem. In other cases, you must contact your service representative, as described in this chapter.

When the problem is caused by cartridge tapes, refer to [Appendix A, “Cartridge Tape Information.”](#) When the problem is caused by cartridge tape drives, refer to your drive unit operator’s guide.

Most of the time, a fault symptom code (FSC) will appear on the tape library operator panel display. Write down the display information, and give the information to your customer representative or to the staff at Central Support Remote Center (CSRC). Write down the FSC as soon as it appears.

## ■ Drive Replacement

If your contract provides for the StorageTek Interactive maintenance agreement, you may be able to replace tape drives. Contact your StorageTek representative for training information. Only trained and certified people may replace drives.

Once certified, you can order replacement drives. For instructions on how to replace drives, consult the book provided with the drive.

## ■ Central Support Remote Center (CSRC)

CSRC is available 24 hours a day, seven days a week, to customers with StorageTek maintenance contracts and to StorageTek systems delivery engineers (SDEs).

## ■ Customer Initiated Maintenance (CIM)

Customer Initiated Maintenance begins with a telephone call from a customer to the StorageTek CSRC. The customer receives immediate attention from StorageTek personnel to record problem information and send an SDE to correct the problem.

To contact the CSRC about a problem:

1. Use the telephone to call the StorageTek central dispatcher at:

 **1-800-525-0369.**

2. Tell the central dispatcher why you are calling. The central dispatcher will ask several questions and send an SDE. If you have answers to the following questions ready when placing a service call, the process will be smoother and faster:

Site location number \_\_\_\_\_

Account name \_\_\_\_\_

Equipment model number \_\_\_\_\_

Contact name \_\_\_\_\_

Telephone number \_\_\_\_\_

Problem description \_\_\_\_\_

Urgency of problem \_\_\_\_\_

# Cartridge Tape Information

# A

This appendix describes how to prepare, inspect, store, clean, and repair cartridges. It also lists cartridge specifications.

## ■ Basic Requirements for DLT Cartridges

DLT cartridges must meet specifications defined in, *American National Standard Magnetic Tape & Cartridge for Information Interchange, ACS X3B5*.

Cartridges must meet the following requirements:

- Cartridges
  - 10.16 cm x 12.7 cm x 2.54 cm (4 in. x 5 in. x 1 in.)
  - Integrated thumbwheel
- Media
  - Chromium dioxide
  - 1.27 cm (0.5 in.) wide
  - 165 m (541 ft.) long minimum
  - No beginning of tape/end of tape reflective markers
- Volume serial number (VOLSER) label
  - Valid characters are A-Z, 0-9, # (crosshatch), or trailing blanks. Leading blanks are not allowed.

## ■ Colored Cartridge Specifications

Colored cartridges are approved only if the measured reflection density is greater than 1.20 for DLT cartridges and 1.50 for 9840 cartridges, as measured by an X-Rite 404G color reflection densitometer. For more information about colored cartridges, contact your StorageTek marketing representative. Measurements are:

<b>Band width</b>	ANSI Status T Wideband (380 to 780 nanometers)
<b>Measuring range</b>	Density (0.00 to 2.50) D
<b>Accuracy</b>	± .02 D
<b>Repeatability</b>	± .01 D
<b>Aperture diameter</b>	3.4 mm

## ■ Preparing Cartridges

The following pages describe how to prepare a cartridge for use in the tape library.

### Handling a Cartridge

Improper handling of cartridges can result in a loss of data or damage to a library component.

To handle a cartridge correctly:

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

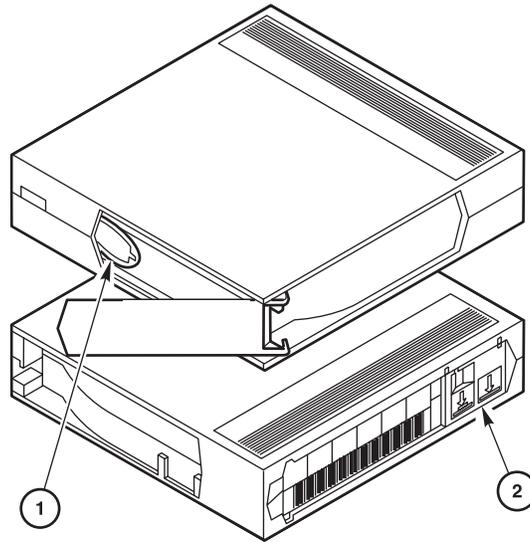
### Inspecting a Cartridge

A defective or dirty cartridge can damage a drive. Always inspect a cartridge before inserting it into a drive or inserting it into a tape library. Refer to [Figure A-1 on page A-3](#) or [Figure A-2 on page A-4](#). Look for:

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

**Figure A-1. Inspecting a DLT Cartridge**

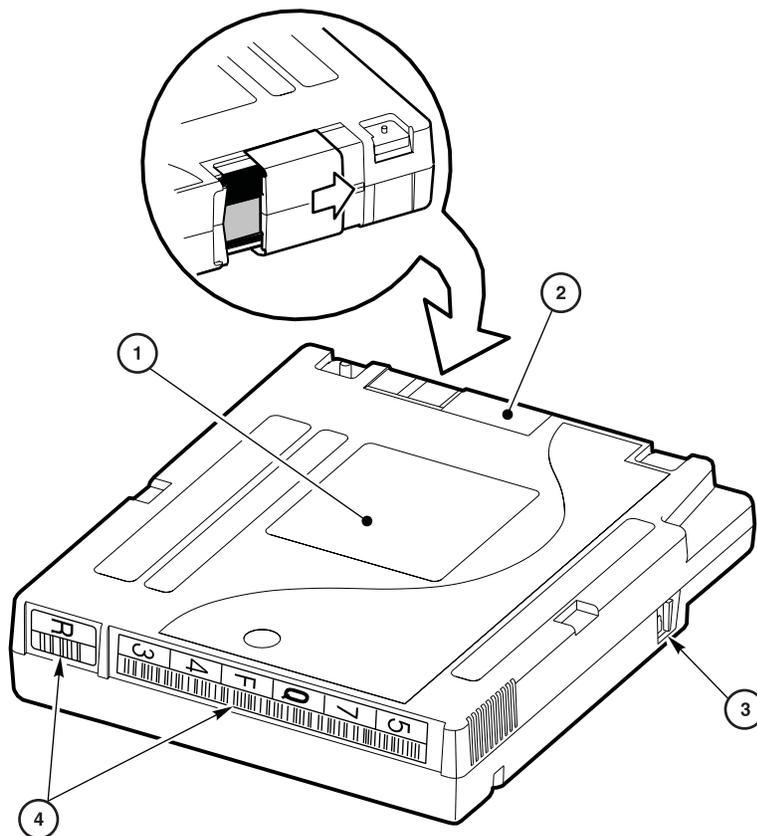
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C65004

DLT Cartridge Components (C65004)

1. Tape leader
  2. Write-protect switch
-

**Figure A-2. Inspecting a 9840 Cartridge**

C65007

**9840 Cartridge Components (C65007)**

1. Customer label
2. Access door
3. Write-protect switch
4. VOLSER and tape type labels

**■ Cartridge Tapes and Labels**

The Media Service Center in Atlanta handles orders for cartridge tapes and labels. To obtain additional information about cartridge tapes and labels call the Media Service Center at 1-800-905-8502, or fax 1-877-888-0609; from 8 a.m. to 8 p.m. United States Eastern Standard Time, Monday Through Friday.

Order cartridge tapes and labels by including the order on the sales entry form, if used; the media portion of the order will be routed to the appropriate department.

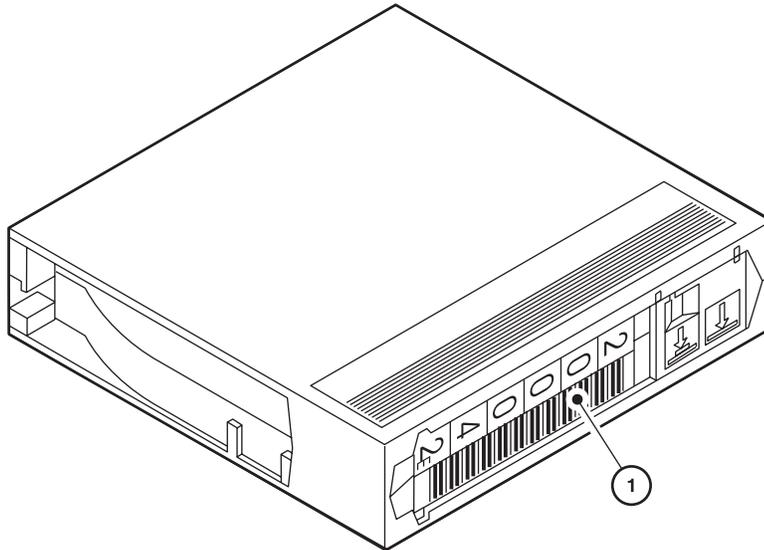
**Orders for domestic customers, value-added distributors (VADs), and value-added resellers (VARs):**

5390 Triangle Parkway, Suite 300  
 Norcross, GA 30092  
 Voice: 1-800-905-8502  
 Media Service Center  
 Fax: 1-877-888-0609

**Orders from distributors, original equipment manufacturers (OEMs),  
 and Canada, Japan, Australia, South Asia, or Mexico subsidiaries:**

Orders Management  
 Fax: 1-303-673-2640 for distributors or subsidiaries  
 Fax: 1-303-673-7654 for OEM  
 One StorageTek Drive  
 Louisville, CO 80028-4350  
 Voice: 1-303-673-5513:

**Figure A-3. Applying Cartridge Labels to DLT Cartridges**



C65005

DLT Cartridge Label Components (C65005)

1. VOLSER label

## Applying Cartridge Labels to DLT Cartridges

Cartridge labels reflect the cartridge media and usage. The CompacTape VOLSER letter located next to the last number in the VOLSER reflects the media. Cleaning cartridges have CLN in the VOLSER, diagnostic cartridges have DG in the VOLSER.

The kinds of cartridge labels you might need to apply are:

- CompactTape III VOLSER
- CompactTape IIIXT VOLSER
- CompactTape IV VOLSER
- Diagnostic cartridge VOLSER
- Cleaning cartridge VOLSER

Refer to [Figure A-3](#) and insert the label into the recessed area provided on each cartridge:

1. Make sure the cartridge has been at room temperature for at least 24 hours.
2. Clean the surface where the labels will be placed using a cleaning solution made for this purpose. Refer to [“Cleaning the Cartridge Exterior” on page A-12](#).
3. Locate the label that you require and refer to [Figure A-3](#):
  - CompactTape III has a “C” next to the far left number, bar code down.
  - CompactTape IIIXT has an “E” next to the far left number, bar code down.
  - CompactTape IV has a “D” next to the far left number, bar code down.
  - Diagnostic cartridge has “DG” at the beginning of the VOLSER.
  - Cleaning cartridge has “CLN” at the beginning of the VOLSER.
4. Hold the cartridge so the write-protect switch is toward you.
5. Refer to [Figure A-3 on page A-5](#) and slide the label under the slots in the recessed area. If you prefer, peel the backing from the label and then slide it under the slots, pressing it into place.

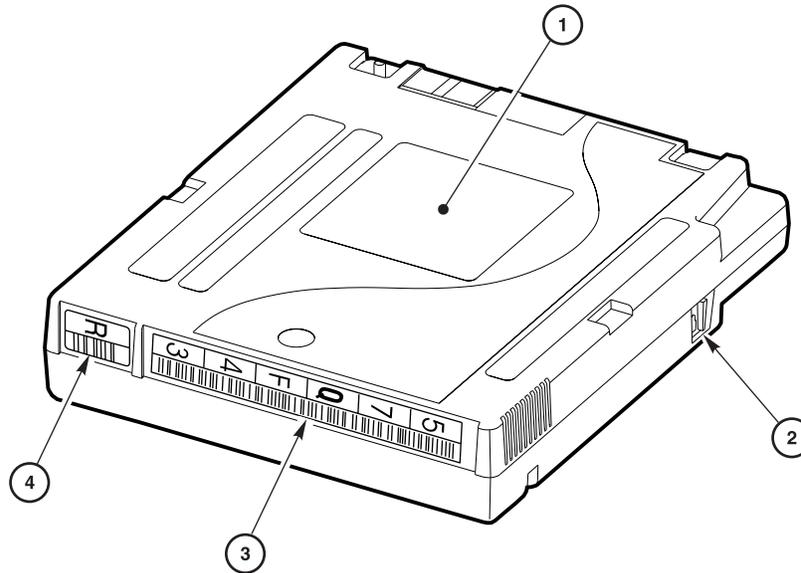
**Notes:**

1. Make sure the labels are not placed elsewhere on the cartridge surface.
2. Make sure the edges of the labels do not curl; curling causes the cartridge to stick in the drive loader and the robot will misread the VOLSER.
3. Use labels that do not leave a residue when removed.
4. Make sure the label contains a VOLSER and media letter.

## Applying Cartridge Labels to 9840 Cartridges

**Figure A-4. Applying Cartridge Labels to 9840 Cartridges**

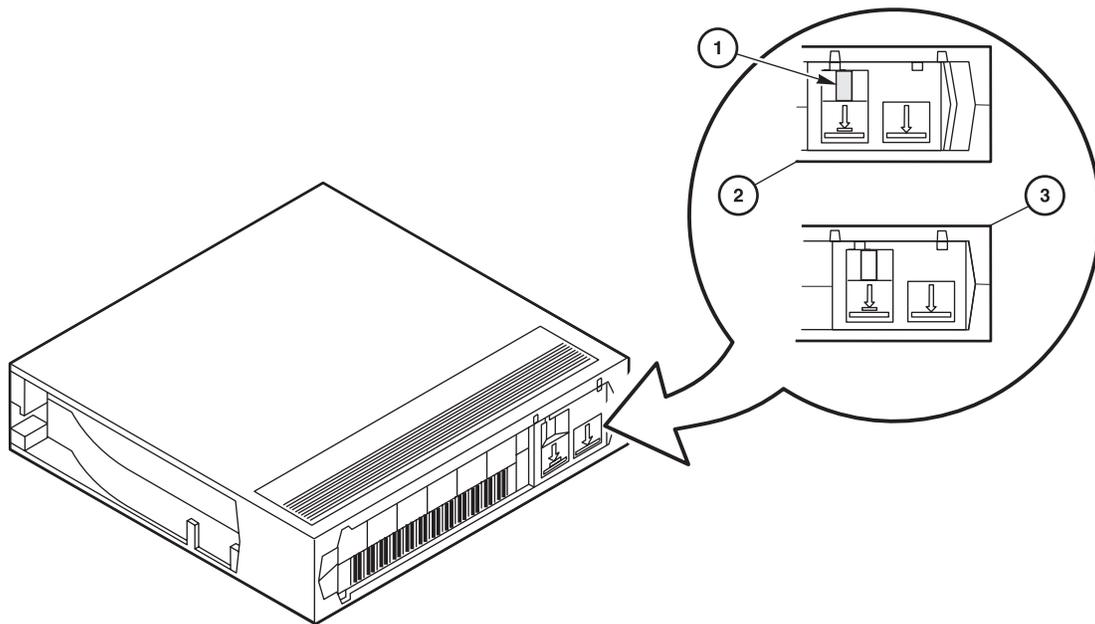
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C65008

### 9840 Cartridge Label Components (C65008)

1. Customer label
  2. Write-protect switch
  3. VOLSER label
  4. Media ID label ("R" = data, "U" = cleaning)
-

**Figure A-5. Setting the DLT Write-protect Switch**

C65006

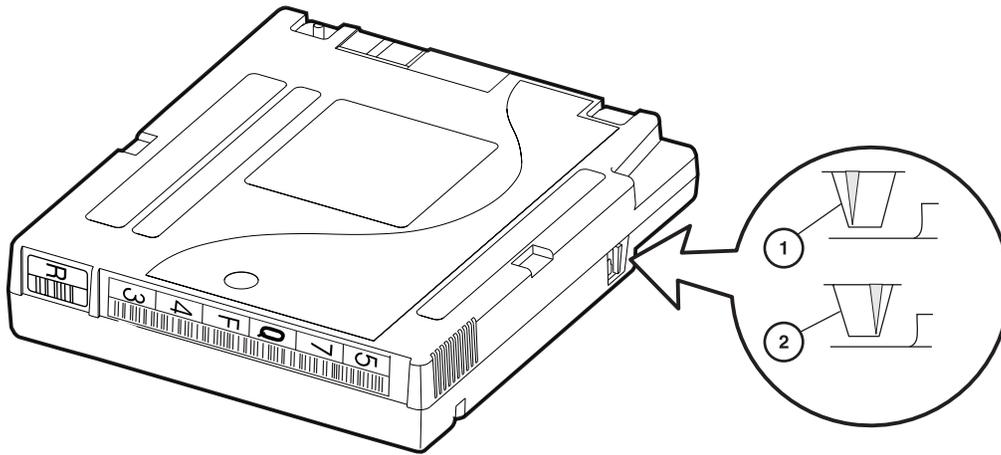
**DLT Write-protect Components (C65006)**

1. Orange indicator
2. Write-protect position
3. Write-enabled position

**Setting the DLT Write-protect Switch**

As shown in [Figure A-5](#), you can set the write-protect switch so the cartridge is *write-enabled*. Slide the switch to the right so the orange indicator is not visible. 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 left so that the orange indicator is visible. In this position, the drive can only read data from the tape, but cannot write data on it.

**Figure A-6. Setting the 9840 Write-protect Switch**

C65009

**9840 Write-protect Components (C65009)**

1. Write-enabled position
2. Write-protect position

**Setting the 9840 Write-protect Switch**

As shown in [Figure A-6](#), 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.

## ■ Maintaining Cartridges

The following pages list cartridge environmental specifications, describe how to store and clean cartridges, use cleaning cartridges, and repair a detached leader block.

**Table A-1. DLT Cartridge Environmental Specifications**

<i>Operating environment</i>	
Temperature	10° to 40°C (50° to 104°F)
<b>Relative humidity</b>	20% to 80% noncondensing
Wet-bulb temperature	25°C (77°F) maximum
<b>CAUTION:</b>	
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.	
<b>CAUTION:</b>	
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.	
<i>Cartridge storage environment</i>	
Temperature	16° to 32°C (61° to 90°F)
<b>Relative humidity</b>	20% to 80% non condensing
Wet-bulb temperature	26°C (79°F) maximum
<i>Cartridge storage environment for cartridges intended for archiving data for one year or more</i>	
Temperature	18° to 26°C (64° to 79°F)
<b>Relative humidity</b>	20% to 60%

## 9840 Cartridge Environmental Specifications

The following specifications refer to the operating and storage environments for 9840 cartridges.

**Table A-2. 9840 Cartridge Environmental Specifications**

<i>Operating environment*</i>	
Temperature	15.6° to 32.2°C (60° to 90°F)
<b>Relative humidity</b>	20% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge storage environment (archive)</i>	
Temperature	5° to 25.5°C (41° to 78°F)
<b>Relative humidity</b>	40% to 60%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge storage environment (non-archive)</i>	
Temperature	5° to 32.2°C (41° to 90°F)
<b>Relative humidity</b>	5% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge shipping environment (unrecorded)*</i>	
Temperature	-23° to 49°C (-10° to 120°F)
<b>Relative humidity</b>	5% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum
<i>Cartridge shipping environment (recorded)*</i>	
Temperature	4° to 40°C (40° to 104°F)
<b>Relative humidity</b>	5% to 80%
Wet-bulb temperature	26°C (78.8°F) maximum

\*The conditioning time before use is 24 hours.

\*\* The shipping environment must not exceed the limit of the storage environment, archive or non-archive, for longer than 10 days.

## Storing Cartridges

When you store a cartridge:

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

## **Cleaning the Cartridge Exterior**

**CAUTION:**

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

Wipe all dust, dirt, and moisture from the cartridge with a lint-free cloth.

Use StorageTek Tape Cleaner Wipes, PN 4046289-01, to clean the cartridges. These wipes are saturated with isopropyl alcohol. Do not let any solution touch the tape or get inside the cartridge.

## **Repairing a Detached Leader Block**

When a tape is damaged, use a backup tape. If a leader block is detached, there is no obvious damage to the cartridge or tape, and you have no backup tape, you may repair the leader block using a repair kit provided by your supplier. You can use the tape once to copy the data onto another tape.

# Library Elements and Diagrams

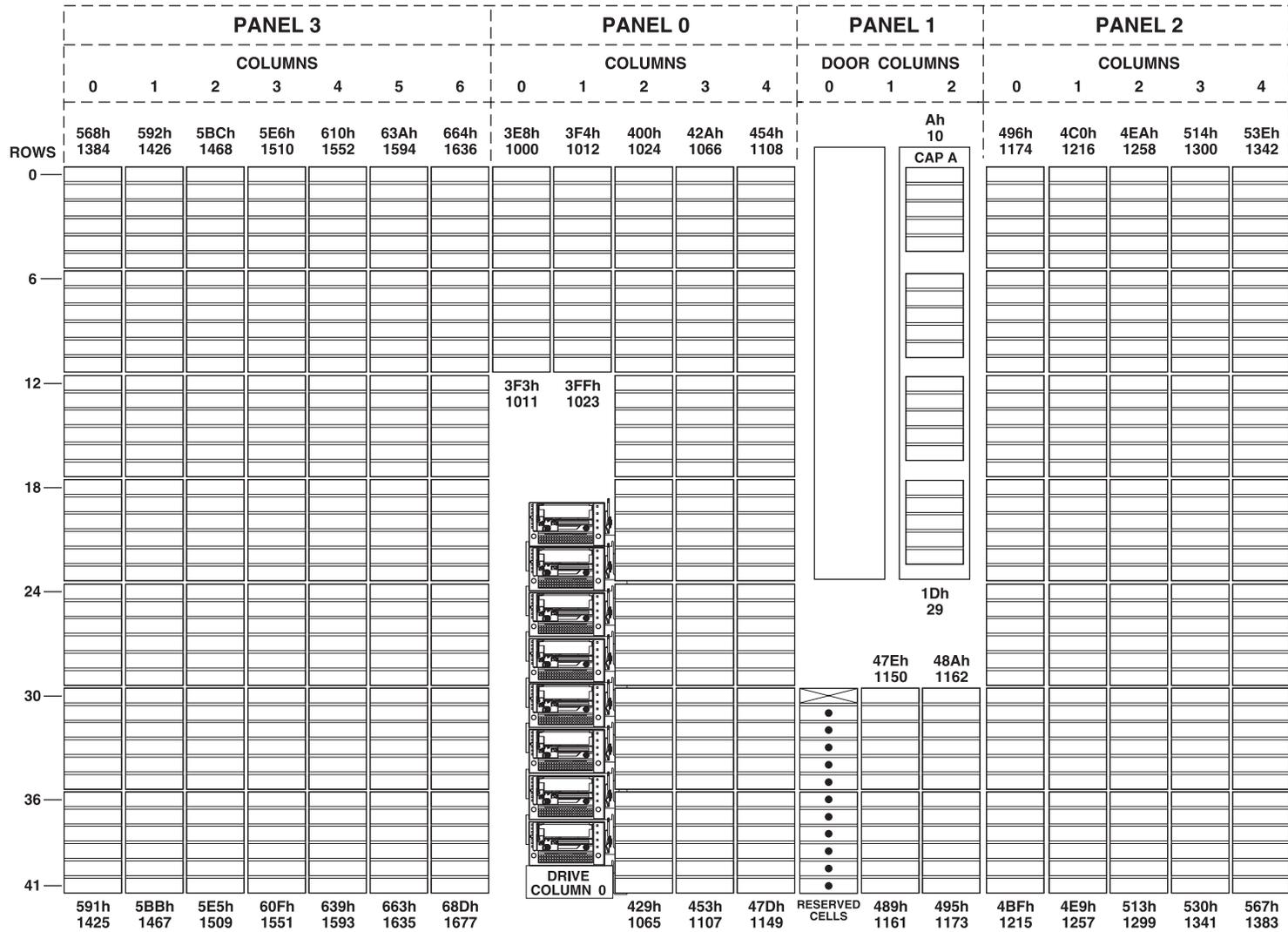
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## B

This appendix provides wall diagrams of the tape library elements for all L700 models. It also contains an illustration of the MPC logic card and an overall diagram of the library.

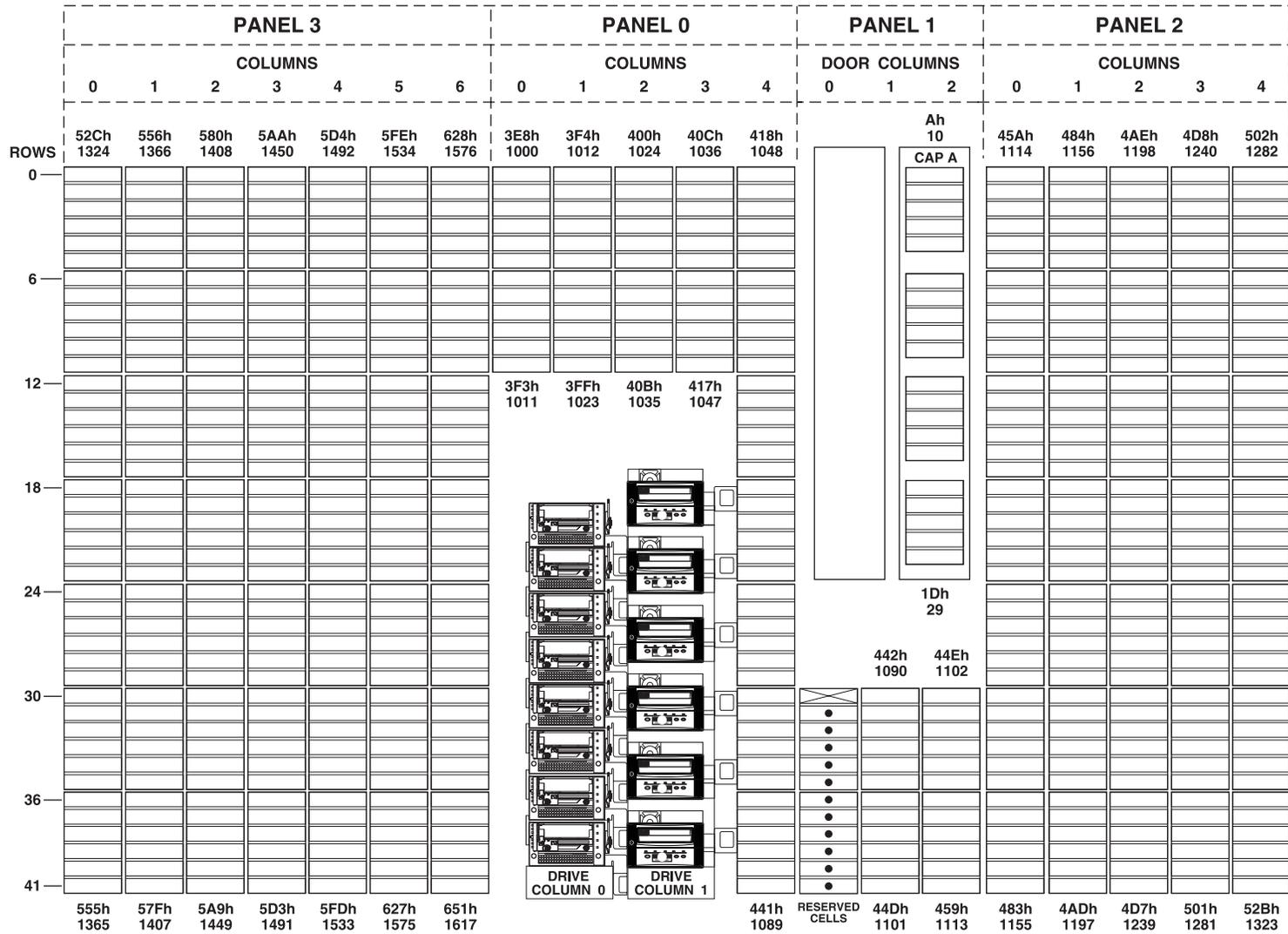
The wall diagrams depict the SCSI element locations for all cell locations. The locations are noted at the top of the columns in hexadecimal (denoted by the “h” at the end of the number) and decimal.

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



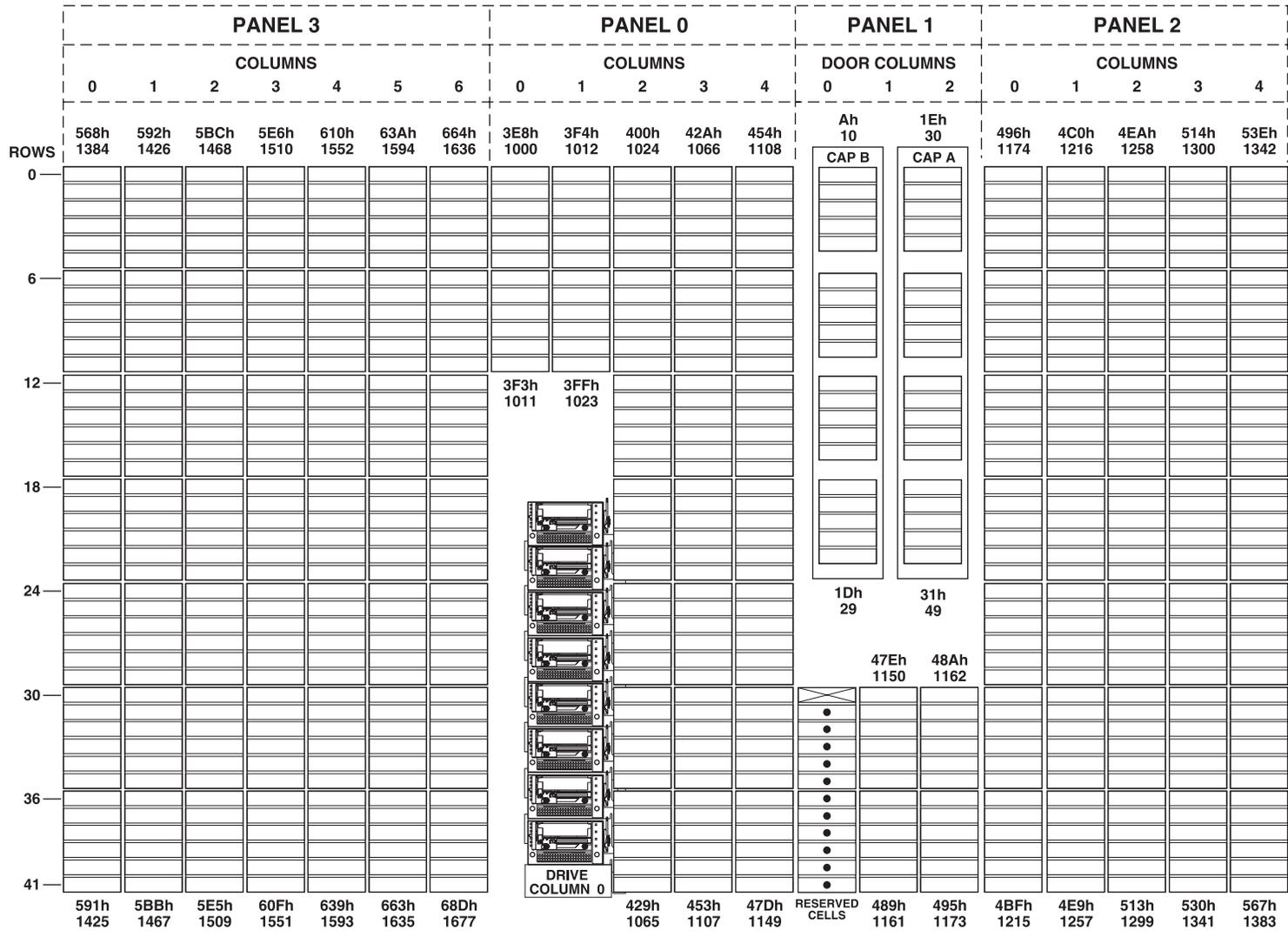
C65048

Figure B-1. Tape Library Elements—1 CAP, 1 Drive Column



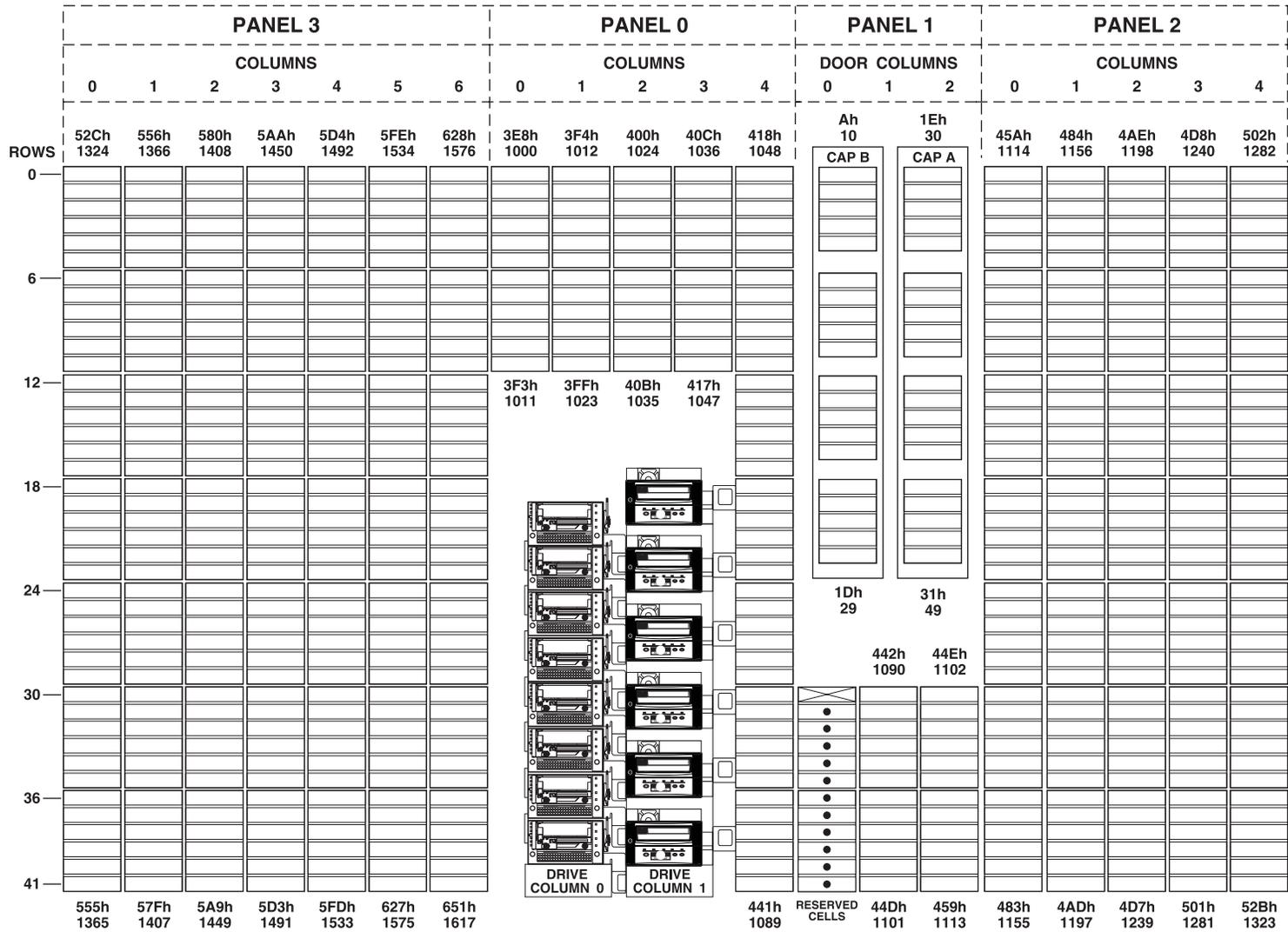
C65049

Figure B-2. Tape Library Elements—1 CAP, 2 Drive Columns



C65050

Figure B-3. Tape Library Elements—2 CAPs, 1 Drive Column



C65051

Figure B-4. Tape Library Elements—2 CAPs, 2 Drive Columns



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# Glossary

---

## A

### **Automated Cartridge System Library**

**Software (ACSL)** The software within a Unix-based server that interfaces the server and hosts; it also maintains a list of all tapes within a library.

### **Advanced Interactive Executive (AIX)**

The operating software for an IBM RISC System/6000.

**audit** • Tape library 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

**CAP** See “Cartridge Access Port.”

**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.

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

**catalog** The inventory of all tape cartridge storage locations in an L700 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.

### **Central Support Remote Center (CSRC)**

The remote diagnostic center at StorageTek headquarters.

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

**customer services engineer (CSE)** See systems delivery engineer.

## 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.

## 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 (*see* fault symptom code), accessible through the operator panel, that contains events that occurred during the functional operation of the tape library.

## 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. .

**in-transit cartridges** Cartridges that have been moved from their home cell by the robot. The host software must recover these cartridges to a known location to clear out the software in-transit record.

**in-transit record** A temporary record written by the host software, noting that a cartridge has been moved from its home cell. Once this cartridge is returned to its home cell, the record is erased.

## 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.)

**MPU Card** The Fibre (PCI) expansion card for the tape library).

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

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

**non-maskable interrupt (NMI)** An interrupt that cannot be shut off by executing a disable interrupt instruction on the microprocessor. These interrupts are principally reserved for fatal conditions (for example, parity errors, watchdog timer faults).

## O

**offline** Not available for functional use by the host CPU.

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

## 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

**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.

**systems delivery engineer (SDE)**

A StorageTek employee trained to install, maintain

**T**

**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.

**U**

**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

**Z**

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

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TO COMPLY WITH POSTAL REGULATIONS, FOLD EXACTLY ON DOTTED LINES AND TAPE (DO NOT STAPLE)



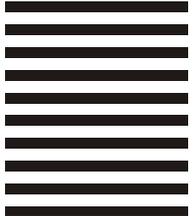
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STORAGE TECHNOLOGY CORPORATION  
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Company Name: \_\_\_\_\_ Department: \_\_\_\_\_  
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