

hp StorageWorks

ESL9000 series tape library
reference guide

Part Number: 243491-005

Fifth Edition (August 2002)



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About this Guide

Document Conventions

The conventions included in Table 1 apply in most cases.

Table 1: Document Conventions

Element	Convention
Key names, menu items, buttons, and dialog box titles	Bold
File names and application names	<i>Italics</i>
User input, command names, system responses (output and messages)	Monospace font COMMAND NAMES are uppercase unless they are case sensitive
Variables	<i>Monospace, italic font</i>
Website addresses	Sans serif font (http://www.compaq.com)

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Symbols on Equipment



Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

WARNING: To reduce the risk of injury from electrical shock hazards, do not open this enclosure.



Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.



Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.

WARNING: To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the power supplies and systems.



Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.

Getting Help

If you still have a question after reading this guide, contact service representatives or visit our website.

Technical Support

In North America, call technical support at 1-800-OK-COMPAQ, available 24 hours a day, 7 days a week.

NOTE: For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call technical support at the nearest location. Telephone numbers for worldwide technical support are listed on the HP website: <http://www.compaq.com>.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions.

Product Website

The HP website has the latest information on this product, as well as the latest drivers. Access the HP website at: http://www.compaq.com/storage/tape_index.html. From this website, select the appropriate product or solution.

Authorized Reseller

For the name of your nearest authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the HP website for locations and telephone numbers.

Library Description

This chapter describes the HP StorageWorks ESL9000 Series Tape Library and its components. Sections include:

- Library models
- Features and benefits
- Library components:
 - Cabinet
 - Control panel
 - IntelligripTM Cartridge Handling Mechanism (CHM)/Gripper
 - Tape drives
 - Load port

Library Models

The HP StorageWorks ESL9000 Series Tape Library is an automated storage and retrieval library. It contains up to 8 tape drives and 198 cartridges for the ESL9198 Series, up to 8 drives and 322 cartridges for the ESL9322 Series, up to 16 tape drives and 326 cartridges for the ESL9326 Series, and up to 16 tape drives and 595 cartridges for the ESL9595 Series.

Table 1–1: Library Capacity when fully populated with drives and cartridges

Library	# Cartridges	Drive Type	Native Capacity	2:1 Compression Enabled
ESL9198	198 cartridges at 40 GB each	DLT	7.9 TB (7,920 GB)	15.8 TB (15,840 GB)
ESL9198	198 cartridges at 110 GB each	SDLT 220	21.8 TB (21,800 GB)	43.6 TB (43,600 GB)
ESL9198	198 cartridges at 160 GB each	SDLT 320	31.68 TB (31,680 GB)	63.36 TB (63,360 GB)
ESL9322	322 cartridges at 160 GB each	SDLT 320	51.52 TB (51,520 GB)	103.04 TB (103,040 GB)
ESL9322	322 cartridges at 100 GB each	LTO Ultrium 1	32.2 TB (32,200 GB)	64.4 TB (64,400 GB)
ESL9326	326 cartridges at 40 GB each	DLT	13.04 TB (13,040 GB)	26.08 TB (26,080 GB)
ESL9326	326 cartridges at 110 GB each	SDLT 220	35.9 TB (35,860 GB)	71.8 TB (71,720 GB)
ESL9326	326 cartridges at 160 GB each	SDLT 320	52.16 TB (52,160 GB)	104.32 TB (104,320 GB)
ESL9595	595 cartridges at 110 GB each	SDLT 220	65.45 TB (65,450 GB)	130.9 TB (130,900 GB)
ESL9595	595 cartridges at 160 GB each	SDLT 320	95.2 TB (95,200 GB)	190.40 TB (190,400 GB)
ESL9595	595 cartridges at 100 GB each	LTO Ultrium 1	59.5 TB (59,500 GB)	119 TB (119,000 GB)

NOTE: Some libraries support more than one type of media at a hardware level, however your ability to use more than one type of media is dependent on your application software.

The following ESL9000 Series library models support a wide range of storage and performance requirements (see Tables 1-2 through Table 1-6).

Table 1–2: Library Model Numbers for ESL9198 Series

Model Number	Model Name	Displayed Name	Product ID	Number of Drives	Storage Bins	Drive Type	SCSI Interface
6318280 (def)	ESL9198DLX	ESL9198	ESL9000 SERIES	8	198	DLT8000	LVD
6318281	ESL9198DLX	ESL9198	P2000 6318281	8	198	DLT8000	LVD
6318285 (def)	ESL9198SL	ESL9198	ESL9000 SERIES	8	198	SDLT	LVD
6318286	ESL9198SL	ESL9198	P2000 6318286	8	198	SDLT	LVD

Table 1–3: Library Model Numbers for ESL9322 Series

Model Number	Model Name	Displayed Name	Product ID	Number of Drives	Storage Bins	Drive Type	SCSI Interface
6437080 (def)	ESL9322	ESL9322	ESL9000 SERIES	8	322	SDLT/LTO Ultrium 1	LVD
6437085	ESL9322	ESL9322	P4000 6437085	8	322	SDLT/LTO Ultrium 1	LVD

Table 1–4: Library Model Numbers for ESL9326 Series

Model Number	Model Name	Displayed Name	Product ID	Number of Drives	Storage Bins	Drive Type	SCSI Interface
6310080 (def)	ESL9326D	ESL9326	ESL9000 SERIES	16	326	DLT7000	HVD
6310081	ESL9326D	ESL9326	ESL9000 SERIES	16	170	DLT7000	HVD
6310082	ESL9326D	ESL9326	P3000 6310082	16	326	DLT7000	HVD
6310085 (def)	ESL9326DX	ESL9326	ESL9000 SERIES	16	326	DLT8000	HVD
6313080	ESL9326S	ESL9326	ESL9000 SERIES	16	326	SDLT	HVD

**Table 1–5: Model Numbers for
ESL9326 Series Libraries with Mixed Media Capability**

Model Number	Model Name	Displayed Name	Product ID	Number of Drives	Storage Bins	Drive Type	SCSI Interface
6313080 (def)	ESL9326SL	ESL9326	ESL9000 SERIES	16	326	SDLT	LVD
6313081	ESL9326SL	ESL9326	ESL9000 SERIES	16	170	SDLT	LVD
6313082	ESL9326SL	ESL9326	P3000 6313082	16	326	SDLT	LVD

Table 1–6: Library Model Numbers for ESL9595 Series

Model Number	Model Name	Displayed Name	Product ID	Number of Drives	Storage Bins	Drive Type	SCSI Interface
6438280 (def)	ESL9595	ESL9595	ESL9000 SERIES	16	595	SDLT/LTO Ultrium 1	LVD
6438081	ESL9595	ESL9595	ESL9000 SERIES	16	399	SDLT/LTO Ultrium 1	LVD
6438285	ESL9595	ESL9595	P7000 6438285	16	595	SDLT/LTO Ultrium 1	LVD

The model number defines:

- The standard inquiry string
- The default number of bins
- The drive type in ESL9198, ESL9326, and older ESL9595 libraries

The model number is set at the factory and does not need to be changed under normal circumstances.

Features and Benefits

The library provides the following features and benefits:

- High-capacity, high-performance data storage and retrieval.
- Expandable library configurations:
 - Up to five ESL9000 Series libraries can be joined together into one multi-unit library system. Tape cartridges can be shared between libraries using Pass Through Mechanisms (PTMs).

NOTE: As of the release date of this guide, multi-unit scalability is not supported on the ESL9322 or ESL9595. Check the HP website at www.compaq.com/storage/tapelibrarymatrix.html for updates regarding this support.

- Access to future expansion and technology upgrades through Prism™ architecture:
 - Prism architecture employs standard PCI bus technology to provide greater upgrade flexibility at reduced costs.
 - This technology ensures compatibility with future on-board technologies such as tape drive controllers, high-speed host and network interfaces, as well as server and tape RAID.
- Optional fibre channel upgrade kit.
- Reliable, versatile 120-240 volt AC auto-switching power supplies.
- Hot-pluggable, redundant DC power supplies ensure library operations against power supply failure.
- Advanced cooling system to prevent failures from overheating.
- On-line cartridge exchanges: load port with two removable 6-cartridge or two 4-cartridge stationary magazines for easy insertion of cartridges without interrupting library operations.
- Easy serviceability and manageability:
 - Hot-pluggable DLT, SDLT, and LTO Ultrium 1 tape drives, DC power supplies, and fans enable field service engineers to make repairs without taking the library off-line.
 - Easy access and replacement of critical components.
 - A control panel provides a wide range of configuration and service-related functions.

Library Components

The library consists of the following major components:

- Cabinet
- Control panel
- Mixed Media Intelligrip CHM/Gripper
- DLT, SDLT, and LTO Ultrium 1 tape drives
- Load port
- Optional PTM

Cabinet

The cabinet houses all library components including:

- Cartridge handling mechanism
- Storage bins
- Control electronics
- Power supply and distribution equipment
- Fans
- Tape drives
- Optional fibre channel upgrade kit

You can access these components through the front and back doors of the library cabinet.

Cabinet (Front)

The front of the library cabinet provides access to the following (see Figures 1-1 to Figure 1-4):

- The front door(s) provide easy access to the CHM and the storage array.
- The viewing windows makes it possible to visually monitor library operations.
- A control panel on the right side of the cabinet lets you monitor and control library operations.
- One load port provides easy insertion of additional tape cartridges while the library is in operation:
 - ESL9322 and later model ESL9595 libraries: 8 shelf bins - two stationary LTO Ultrium 1 load port shelf bin modules (4 shelf bins each) are built into the load port assembly.

NOTE: These bins can also accommodate DLT cartridges.
 - ESL9198, ESL9326, and older model ESL9595 libraries: 12 shelf bins - DLT and SDLT tape cartridges use two removable 6-cartridge magazines.
- The power switch for the library is located behind a sliding panel on the front door for the ESL9198 and ESL9322 and on the right front door on the ESL9326 and ESL9595.

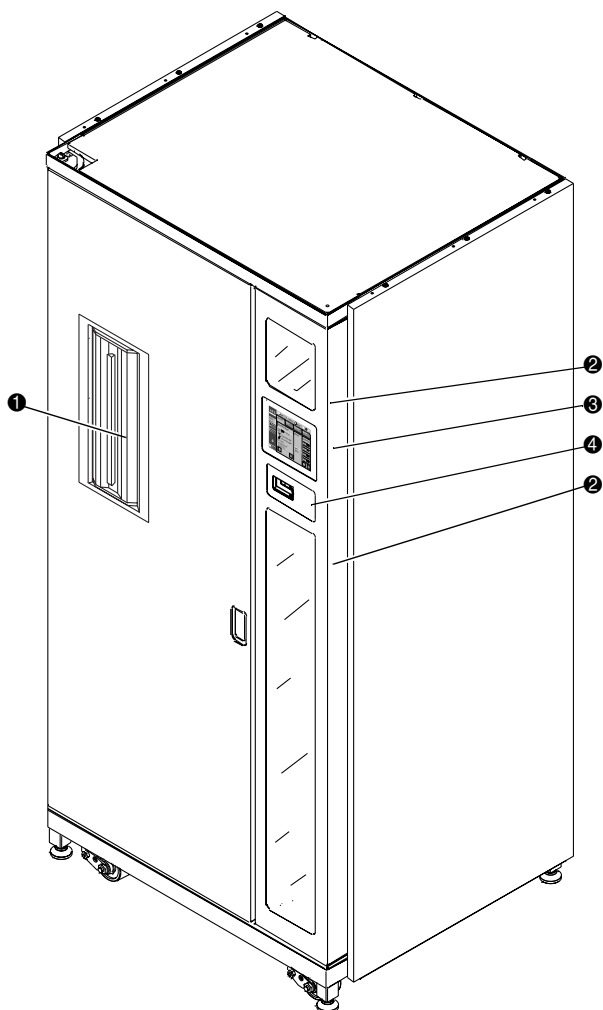


Figure 1-1: Cabinet ESL9198 (front panel)

- | | | |
|---|---------------------------------|----------------|
| ❶ Load port with two
6-cartridge magazines | ❷ Viewing windows | ❹ Power switch |
| | ❸ Control panel touch
screen | |

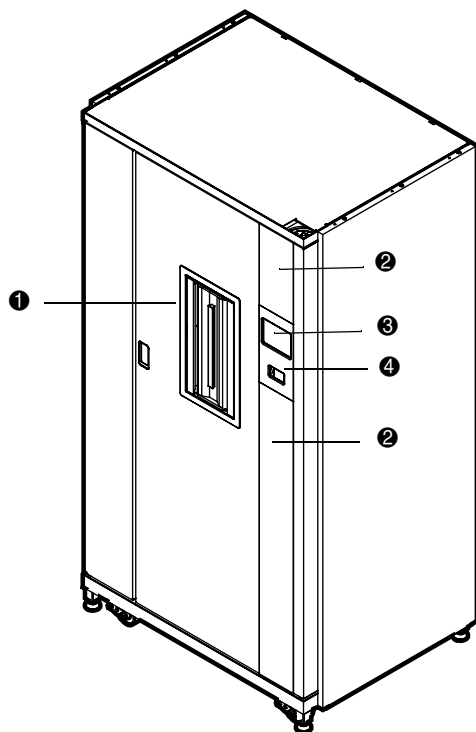


Figure 1–2: Cabinet ESL9322 (front panel)

- ❶ Load port with two 4-cartridge magazines
- ❷ Viewing windows
- ❸ Control panel touch screen
- ❹ Power switch

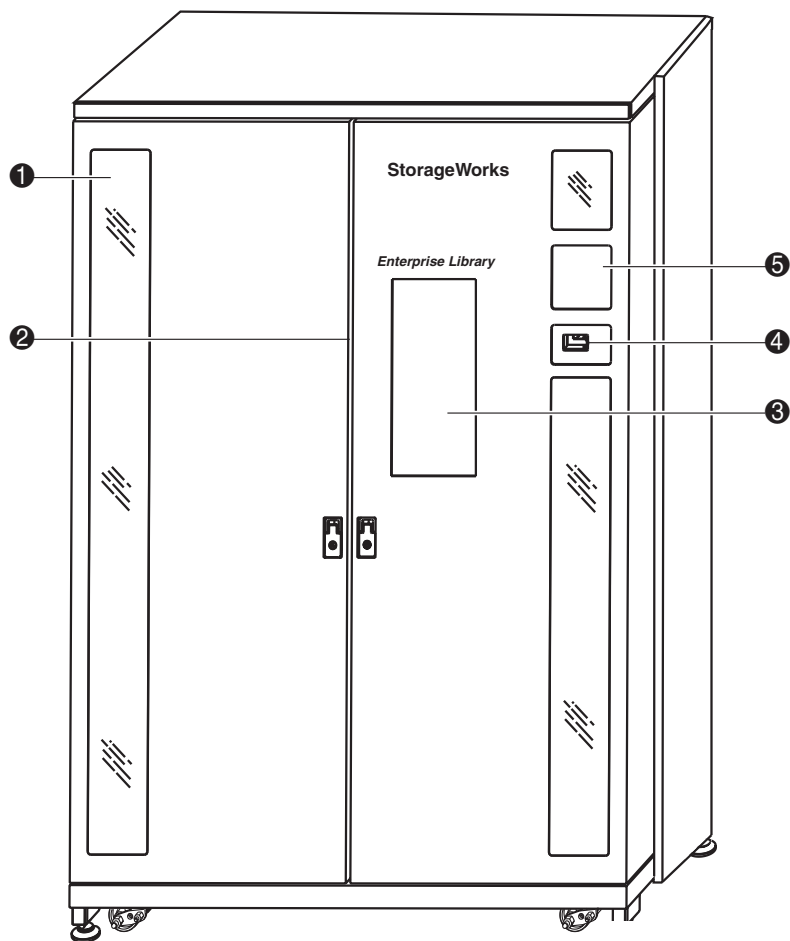


Figure 1-3: Cabinet ESL9326 (front panel)

- | | | |
|------------------|--|---------------------------------|
| ❶ Viewing window | ❸ Load port with two
6-cartridges magazines | ❹ Power switch |
| ❷ Dual doors | | ❺ Touch screen control
panel |

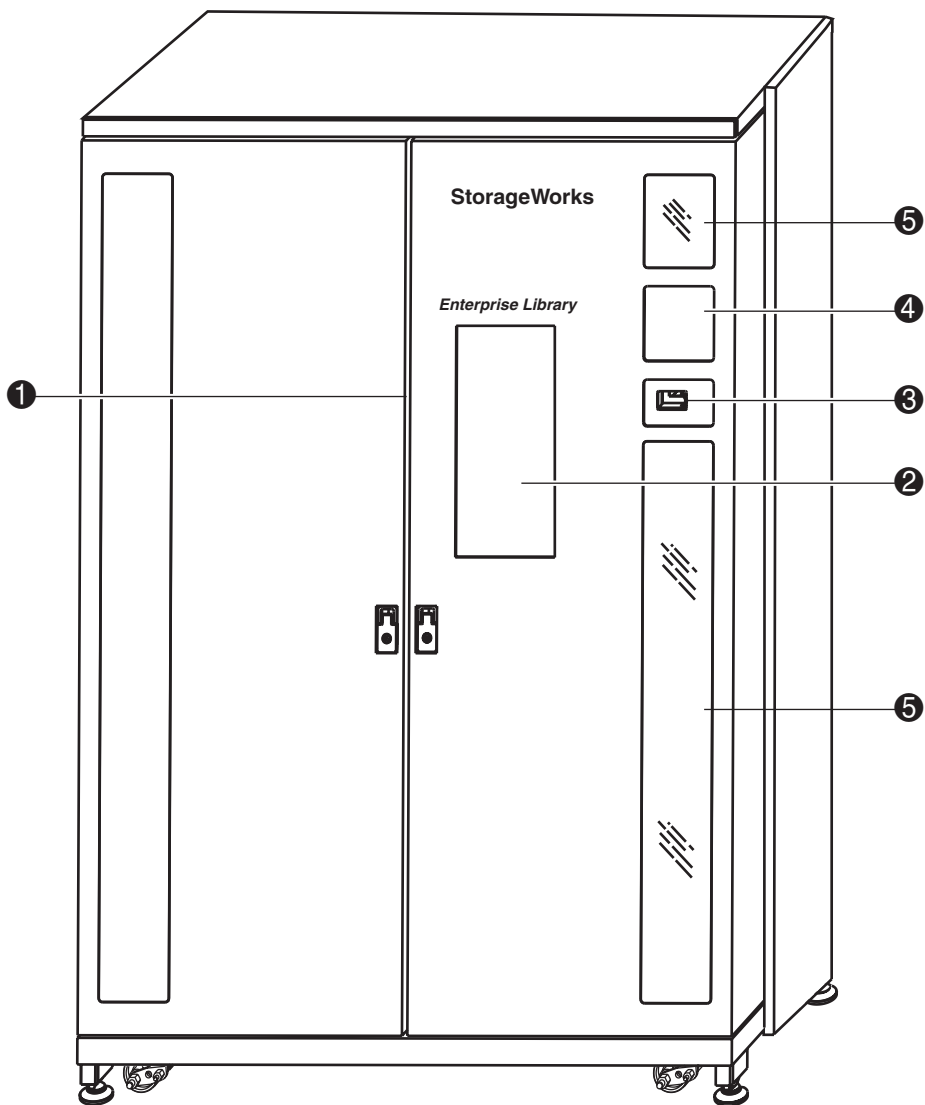


Figure 1–4: Cabinet ESL9595 (front panel)

- | | | |
|--|------------------------------|-------------------|
| ❶ Dual doors | ❸ Power switch | ❺ Viewing windows |
| ❷ Load port with two 4- or 6-cartridge magazines | ❹ Touch screen control panel | |

Cabinet (Rear)

The rear of the cabinet (see Figure 1-5 through Figure 1-7) provides easy accessibility to:

- Cooling fans
- Power, control, and data interfaces
- Tape drives

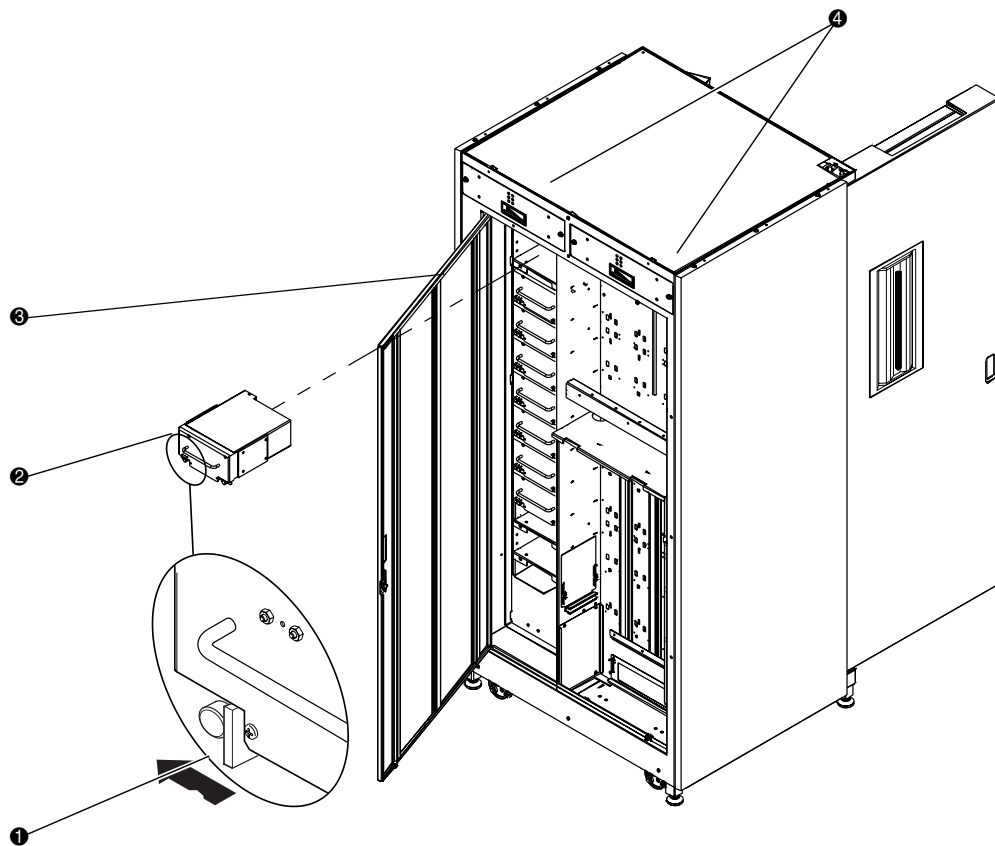


Figure 1-5: Cabinet ESL9198 (rear panel)

- | | |
|--|---------------------------------|
| ❶ Quick release thumbscrew on each bottom corner | ❸ Easy-access rear panel corner |
| ❷ Hot-pluggable drives in removable canisters | ❹ Hot-pluggable removable fans |

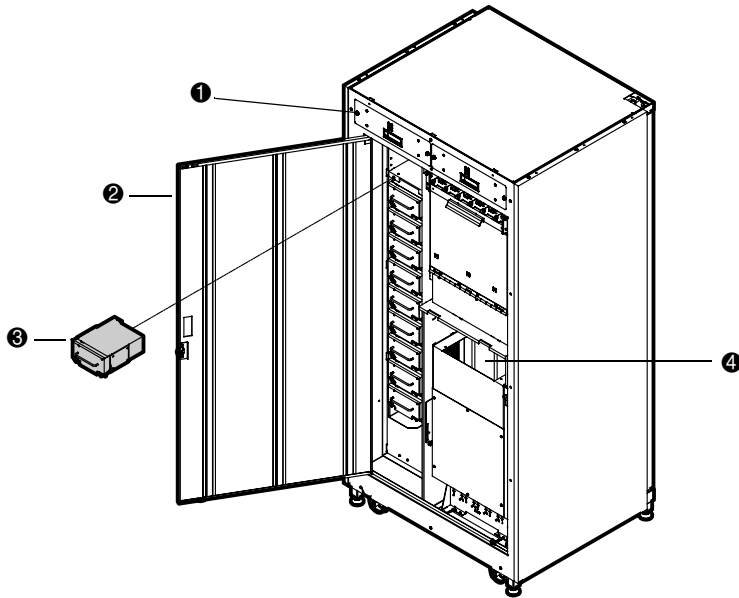


Figure 1–6: Cabinet ESL9322 (rear panel)

- ❶ Hot-pluggable removable fans
- ❷ Easy-access rear panel
- ❸ Hot-pluggable drives in removable canisters
- ❹ Location of optional fibre channel upgrade kit

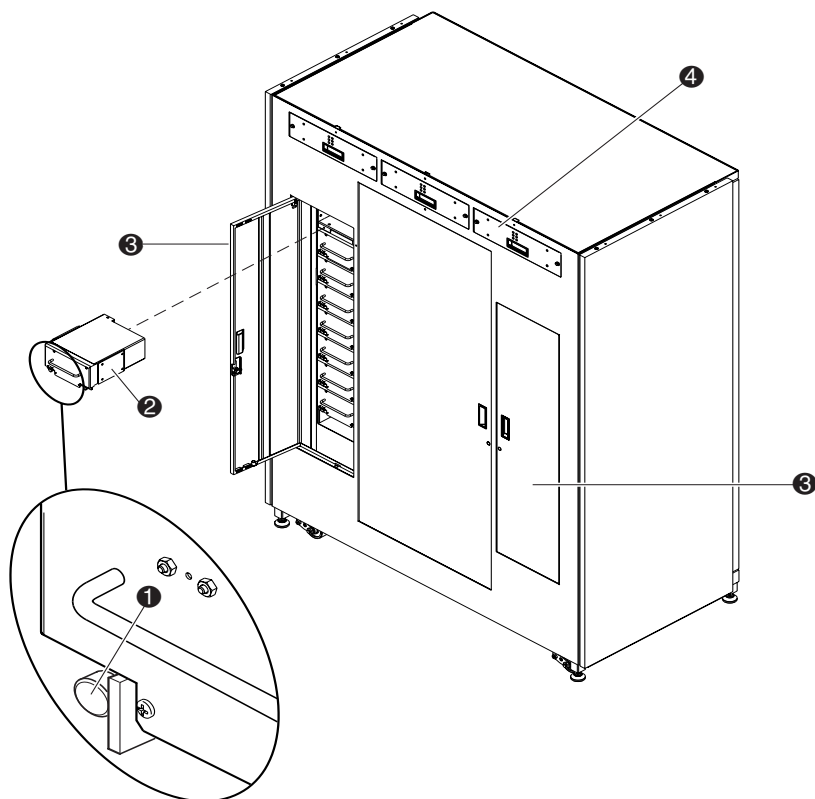


Figure 1–7: Cabinet ESL9326/ESL9595 (rear panel)

- ❶ Quick release thumbscrew on each bottom corner
- ❷ Hot-pluggable drives in removable canisters
- ❸ Easy-access rear panel
- ❹ Hot-pluggable removable fans

Storage Bins (ESL9198)

The ESL9198 stores tape cartridges in the following locations:

- Up to 106 storage bins on the back wall
 - NOTE:** Some bins are removed if a PTM is installed.
- 92 storage bins on the inside of the front door
- One load port consisting of two 6-cartridge magazines
- Up to 8 tape drives

Figure 1-6 shows the storage bin, load port bin, and tape drive numbering conventions. These conventions are used by the library control panel and the diagnostic software program.

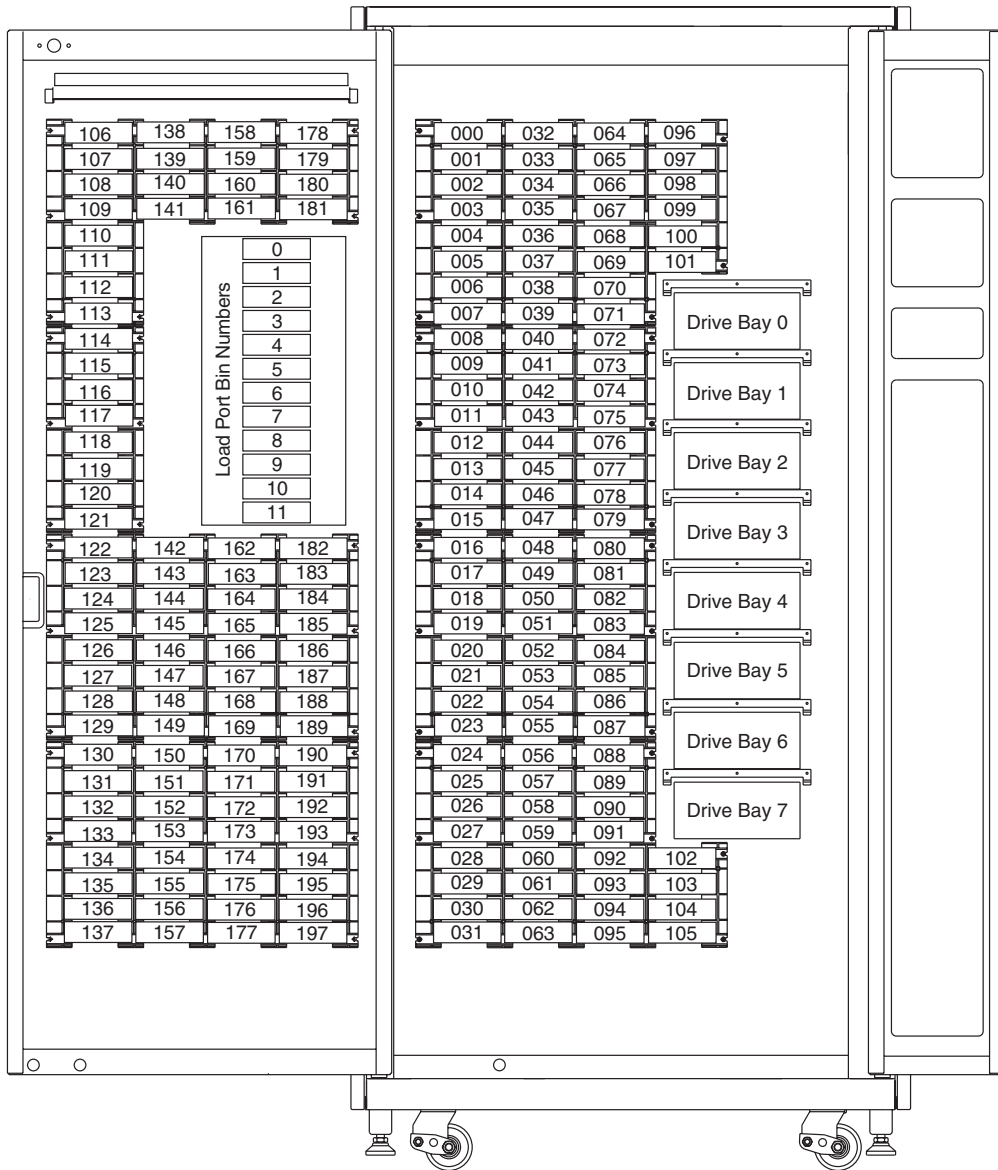


Figure 1–8: Storage bin numbering conventions (ESL9198)

Storage Bins (ESL9322)

The ESL9322 stores tape cartridges in the following locations:

- Up to 171 storage bins on the back wall
- **NOTE:** Some bins are removed if a PTM is installed.
- 111 shelf bins on the inside of the right front door
- 40 shelf bins on the inside of the left front door
- One load port consisting of two 4-cartridge stationary shelf bins
- Up to 8 tape drives

Figure 1–9 shows the storage bin, load port bin, and tape drive numbering conventions. These conventions are used by the library control panel and the diagnostic software program.

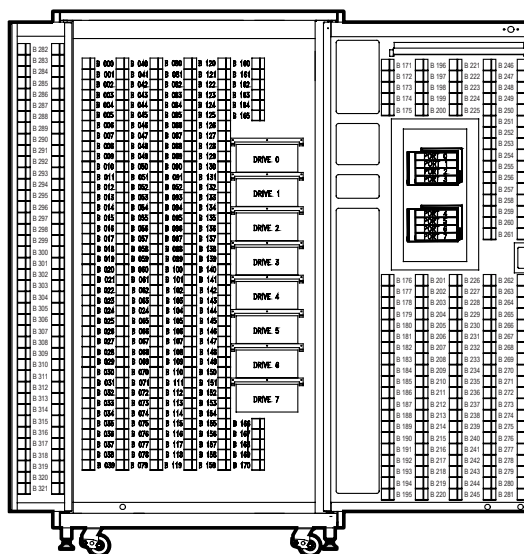


Figure 1–9: Storage bin numbering conventions (ESL9322)

Storage Bins (ESL9326)

- The ESL9326 stores tape cartridges in the following locations:
- 170 storage bins on the back wall
- 96 storage bins on the inside of the left door
- 60 storage bins on the inside of the right door
- One load port consisting of two 6-cartridge magazines
- Up to 16 tape drives

Figure 1-7 shows the storage bin, load port bin, and tape drive numbering conventions. The tape library touch screen control panel and the diagnostic software program use these conventions.

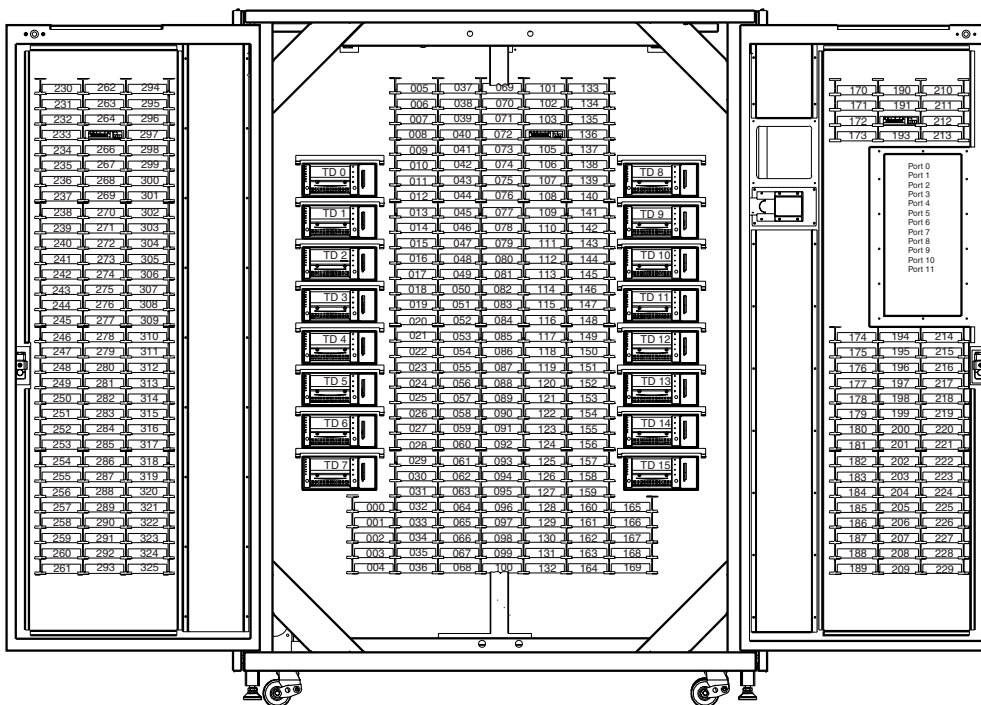


Figure 1-10: Storage bin numbering conventions (ESL9326)

Storage Bins (ESL9595)

- The ESL9595 stores tape cartridges in the following locations:
- 288 storage bins on the back wall
- 196 storage bins on the inside of the left door
- 111 storage bins on the inside of the right door
- One load port consisting of two 6-cartridge magazines or two stationary 4-cartridge load port shelf bin modules
- Up to 16 tape drives

Figure 1-11 shows the storage bin, load port bin, and tape drive numbering conventions. The tape library touch screen control panel and the diagnostic software program use these conventions.

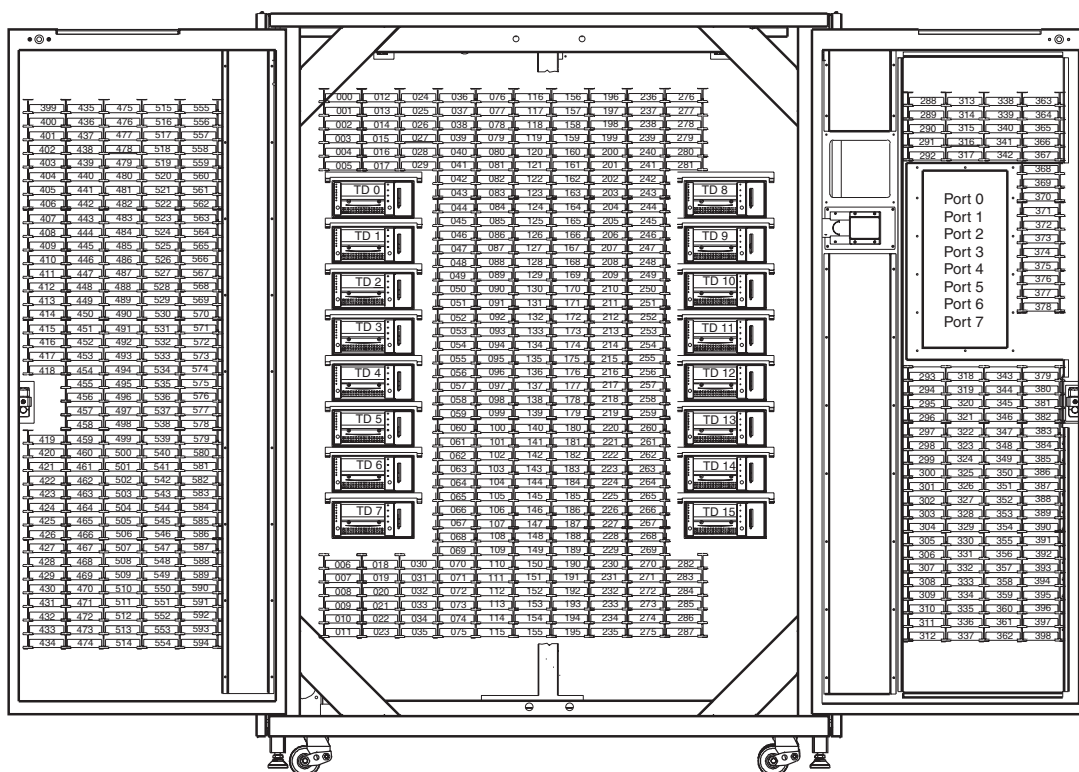


Figure 1-11: Storage bin numbering conventions (ESL9595)

NOTE: The ESL9322 and ESL9595 ship with the maximum number of physical storage bins, however access to these bins is dependent on the model that you ordered and is controlled by the library software. See Appendix E, “Capacity on Demand,” for additional information.

Control Panel

The control panel features a menu system for determining library status, configuring the library, and performing certain diagnostic functions (see Figure 1–12).

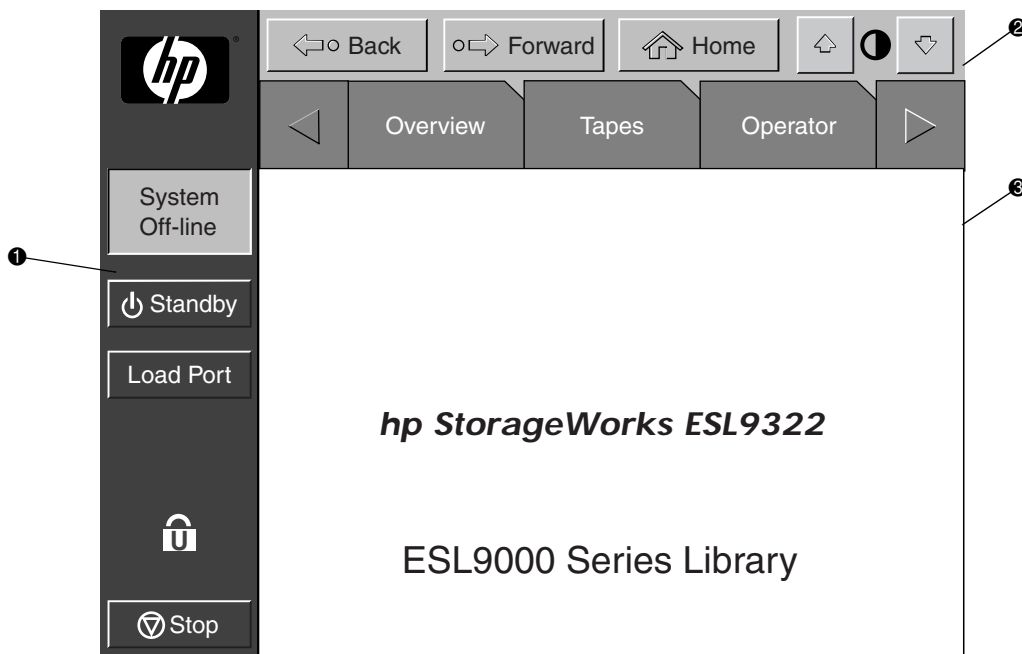


Figure 1–12: Control panel initial screen (ESL9322 shown)

- ❶ Vertical taskbar
- ❷ Horizontal taskbar
- ❸ Main display area

The horizontal taskbar ❷ provides left and right arrow buttons to scroll through the tabs for overview, tapes, operator, service and multi-unit options.

The vertical taskbar ❶ provides various library controls such as system state display, standby, **Load Port** button, security level indicator, and **Stop** button. The **Stop** button immediately removes power from library robotics.

For further information about the library control panel, see “Using the Control Panel” in Chapter 3.

IntelliGrip CHM

Figure 1–13 shows the library IntelliGrip CHM.

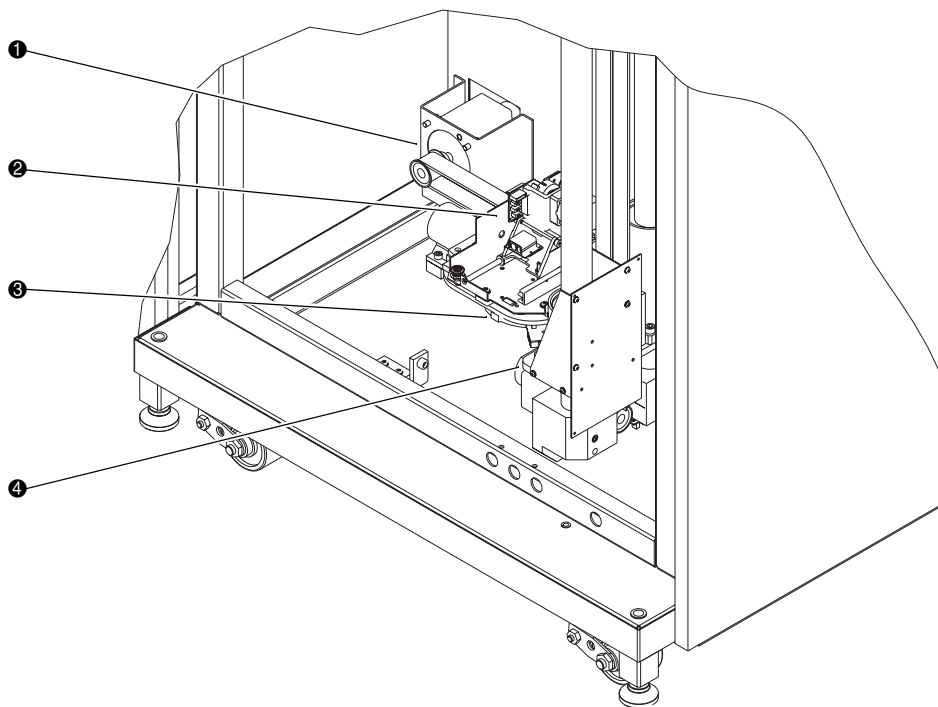


Figure 1–13: Advanced robotics system

- | | |
|--------------------------------|------------------------------|
| ❶ Horizontal drive motor | ❸ Extension axis assembly |
| ❷ Mixed media gripper assembly | ❹ Vertical carriage assembly |

The Intelligrip CHM vertical and horizontal actuators move the gripper into position to pick and place tape cartridges. The rotary actuator rotates the gripper 180 degrees, allowing the gripper to pass cartridges between the front storage bins and the back storage bins or tape drives. The extension actuator extends the gripper forward to make contact with the desired cartridge and then retracts the gripper to remove the cartridge from a bin or drive.

The gripper includes a Class II laser barcode scanner that reads up to 12 character, 3 of 9 format barcode labels. The scanner is used to maintain an inventory of the tape cartridges within the library. An inventory occurs automatically each time the library is turned on or after the bulk load door has been closed. An inventory can also be initiated from the host computer.

Although the library does not require tape cartridges to have barcode labels, properly labeled tape cartridges and full storage bins speed up the inventory process.

DLT Tape Drives

The ESL9198 holds up to 8 Digital Linear Tape (DLT) tape drives. The ESL9326 holds up to 16 DLT tape drives. A DLT is an advanced half-inch tape device capable of storing up to 40 GB of non-compressed data per cartridge. Refer to the *Compaq DLT 8000 Drive Reference Guide* for more information about its features and capabilities.

NOTE: ESL9198: When fewer than 8 DLT tape drives are installed, the tape drives must occupy consecutive drive bays, beginning with drive bay 0.

ESL9326: When fewer than 16 DLT tape drives are installed, the tape drives must occupy consecutive drive bays, beginning with drive bay 0.

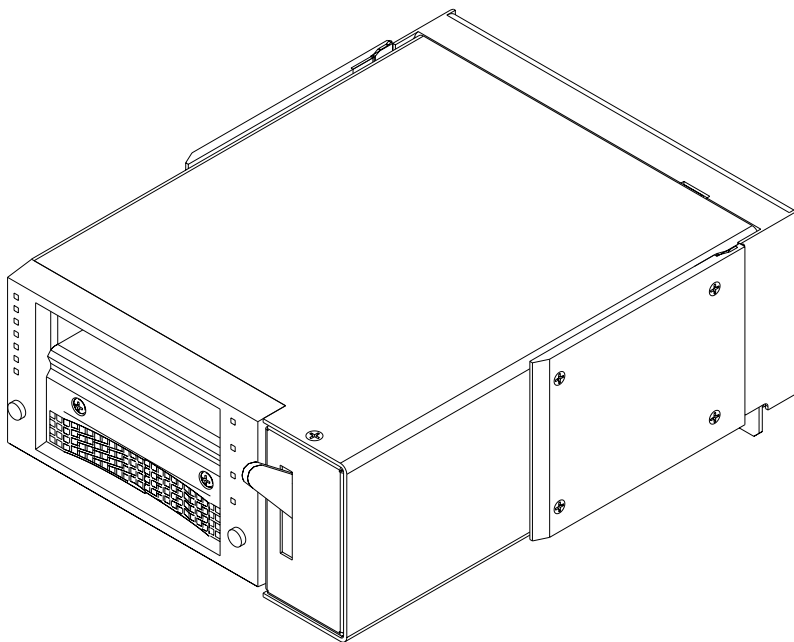


Figure 1–14: DLT tape drive

Table 1–7: DLT Tape Drive Capacity and Data Transfer Rate

Drive Model	Data Capacity (C-1V Media)	Sustained Data Transfer Rate
DLT7000	35 GB (native)	5 Mb/sec (18Gb/hr)
DLT8000	40 GB (native)	6 Mb/sec (21.6Gb/hr)

DLT Tape Cartridges

The library supports DLT Tape III, DLT Tape IIIXT, and DLT Tape IV cartridges.



CAUTION: Do not use DLT Tape I, DLT Tape II, SDLT, or LTO Ultrium 1 cartridges in this DLT tape drive.

SDLT Tape Drives

The SDLT tape drive is a high-capacity, high-performance streaming tape drive that uses Laser Guided Magnetic Recording (LGMR) technology to maximize the amount of data that can be stored on a tape. An SDLT tape drive is capable of storing up to 160 GB of non-compressed data per cartridge. Refer to the *StorageWorks by Compaq SDLT Tape Drive Reference Guide* for more information about its features and capabilities.

The ESL9198 and ESL9322 hold up to 8 SDLT tape drives. The ESL9326 and ESL9595 hold up to 16 SDLT tape drives.

NOTE: ESL9198/ESL9322: When fewer than 8 SDLT tape drives are installed, the tape drives must occupy consecutive drive bays, beginning with drive bay 0.

ESL9326/ESL9595: When fewer than 16 SDLT tape drives are installed, the tape drives must occupy consecutive drive bays, beginning with drive bay 0.

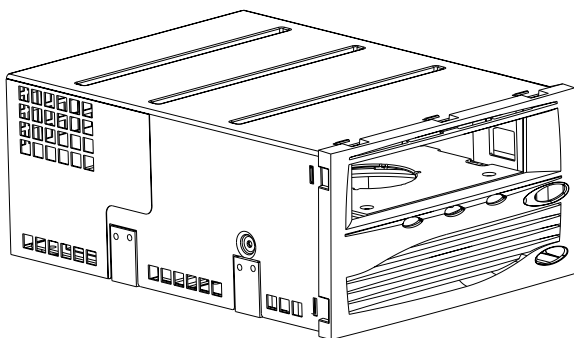


Figure 1–15: SDLT tape drive

Table 1–8: SDLT Tape Drive Capacity and Data Transfer Rate

Drive Model	Data Capacity	Sustained Data Transfer Rate
SDLT 110/220	110 GB (native)	11 Mb/sec (39.6 Gb/hr)
SDLT 110/220	220 GB (compressed*)	22 Mb/sec (79.2 Gb/hr)
SDLT 160/320	160 GB (native)	16 Mb/sec (57.6 Gb/hr)
SDLT 160/320	320 GB (compressed*)	32 Mb/sec (115.2 Gb/hr)

NOTE: *Compressed capacity assumes a 2:1 compression ratio.

SDLT Tape Cartridges

The library supports DLT Tape IV cartridges (read only) and SDLT cartridges (read/write).



CAUTION: Do not use DLT Tape I, DLT Tape II, DLT Tape III, DLT Tape IIIXT, or DLT cleaning cartridges with SDLT drives.

LTO Ultrium 1 Tape Drives

The LTO Ultrium 1 tape drive is a high-performance streaming tape drive that uses Linear Tape-Open (LTO) technology. An LTO Ultrium 1 tape drive is capable of storing up to 100 GB of non-compressed data per cartridge. Refer to the *hp ultrium tape drive user's guide* for more information about its features and capabilities.

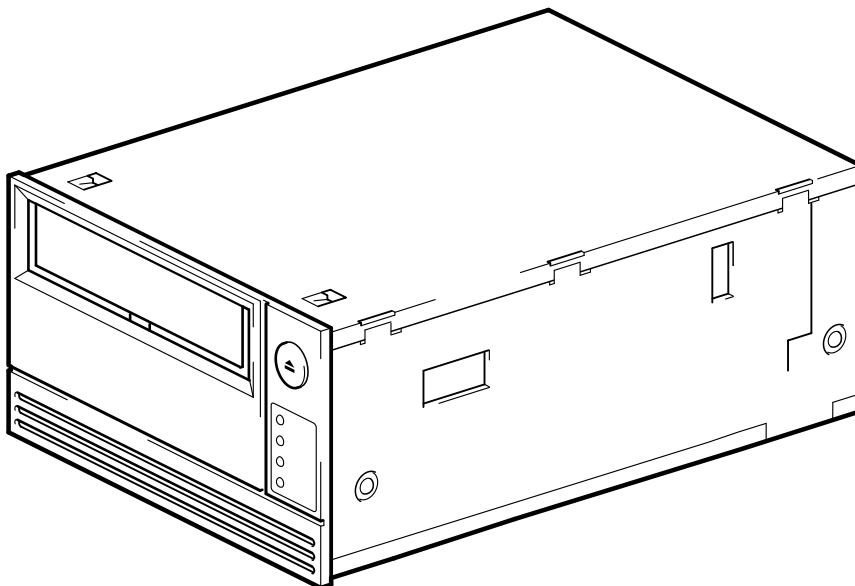


Figure 1–16: LTO Ultrium 1 tape drive

The ESL9322 holds up to 8 LTO Ultrium 1 tape drives. The ESL9595 holds up to 16 LTO Ultrium 1 tape drives.

NOTE: ESL9322: When fewer than 8 LTO Ultrium 1 tape drives are installed, the tape drives must occupy consecutive drive bays, beginning with drive bay 0.

ESL9595: When fewer than 16 LTO Ultrium 1 tape drives are installed, the tape drives must occupy consecutive drive bays, beginning with drive bay 0.

Load Port

The load port is a mechanical device in the front panel of the library that lets you insert or export tape cartridges without interrupting library operations. See Chapter 2, “Inserting Tape Cartridges Using the Load Port.”

Optional PTM

An optional PTM enables the transfer of a single tape cartridge between two HP StorageWorks ESL9000 Series Tape Libraries. The PTM can be used to connect up to five tape libraries increasing the storage capacity of the entire tape library system.

NOTE: As of the release date of this guide, multi-unit scalability is not supported on the ESL9322/ESL9595. Check the HP website at www.compaq.com/storage/tapelibrarymatrix.html for updates regarding this support.

Refer to the *StorageWorks by Compaq ESL9000 Series Tape Library Pass-Through Mechanism (PTM) Installation Guide* for information about attaching libraries as well as installing, cabling, and calibrating the PTM.

Preparing the Library for Operation

This chapter explains how to prepare the HP StorageWorks ESL9000 Series Tape Library for operation. Sections in this chapter include:

- SCSI cable configurations
- Multi-unit library system configuration
- Inserting and removing a tape cartridge from a tape drive
- Placing tape cartridges in fixed storage bins
- Inserting tape cartridges using the load port
- Removing and replacing the load pack
- Closing the library doors and access panels
- Turning the library on and off

SCSI Cable Configurations

This section describes the supported SCSI cable configurations for the ESL9000 Series libraries.

Connecting SCSI Cables (ESL9198/ESL9322)

Looking from the rear of the ESL9198/ESL9322 library, connect the SCSI cables and jumpers as shown in Figure 2-1.

NOTE: ESL9198 and ESL9322 series libraries are equipped with internal SCSI cables and terminators in place for a two drive per SCSI bus configuration. Additional SCSI jumper cables and terminators are supplied in the library accessory kit to allow up to four drives per SCSI bus.

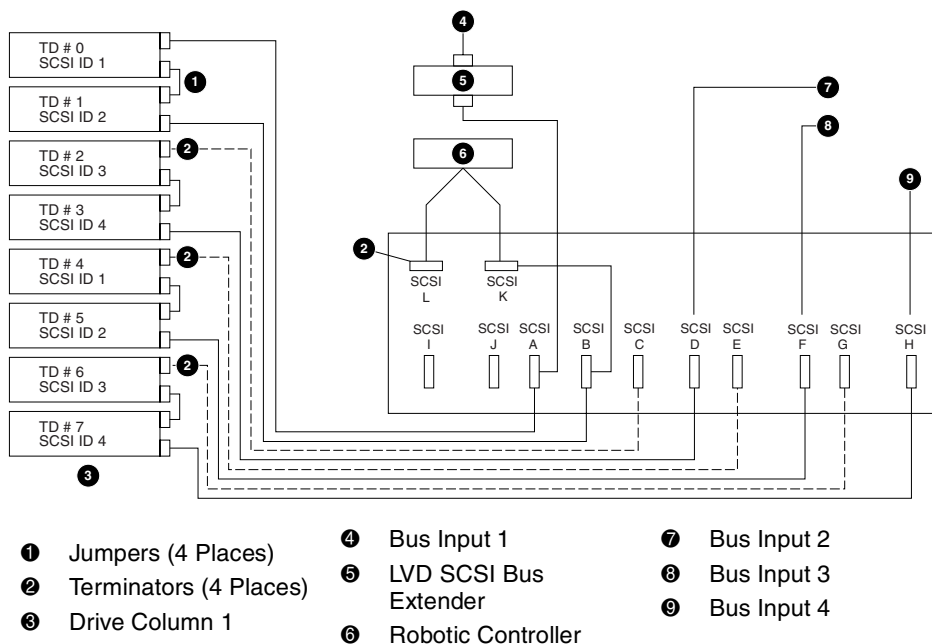


Figure 2-1: Cabling configuration, 8-drive library, ESL9198/ESL9322 (viewed from back)

SCSI Bus Termination (ESL9198/ESL9322)

Table 2-1 lists the recommended SCSI bus termination for the ESL9198/ESL9322 library.

Table 2–1: SCSI Bus Termination

SCSI Port Identifier	SCSI Bus Number	Function	Device Connection
A	1	SCSI extender (device side)	Drive 0
B	1	Jumper to K	Drive 1
C	2	Not Used	Drive 2
D	2	Bus 2 SCSI Input	Drive 3
E	3	Not Used	Drive 4
F	3	Bus 3 SCSI Input	Drive 5
G	4	Not Used	Drive 6
H	4	Bus 4 SCSI Input	Drive 7
K	1	Jumper to B	Robot
L	1	Terminator	Robot
SCSI Extender in	1	Bus 1 SCSI Input	

NOTE:

Bus 1 is terminated at connector L on the SCSI bulkhead.

Bus 2 is terminated at drive 2 on the drive tray PWA.

Bus 3 is terminated at drive 4 on the drive tray PWA.

Bus 4 is terminated at drive 6 on the drive tray PWA.

SCSI Breakouts (ESL9198/ESL9322)

Figure 2-2 shows the SCSI breakouts as viewed from the rear of the ESL9198 library.

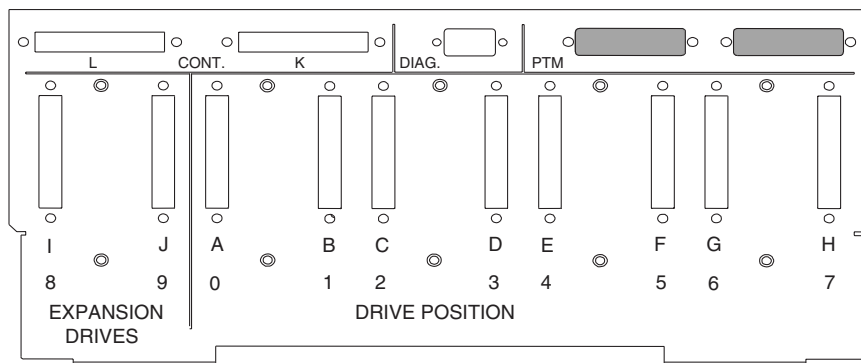


Figure 2-2: SCSI Breakouts (ESL9198/ESL9322)

Connecting SCSI Cables (ESL9326D and ESL9326DX)

Looking from the rear of the library, connect the SCSI cables and jumpers as shown in Figure 2-3. The recommended cabling configurations are for a 16-drive library.

NOTE: ESL9326 Series libraries are equipped with internal SCSI cables and terminators in place for a two drive per SCSI bus configuration. Additional SCSI jumper cables and terminators are supplied in the library Accessory Kit to allow up to four drives per SCSI bus.

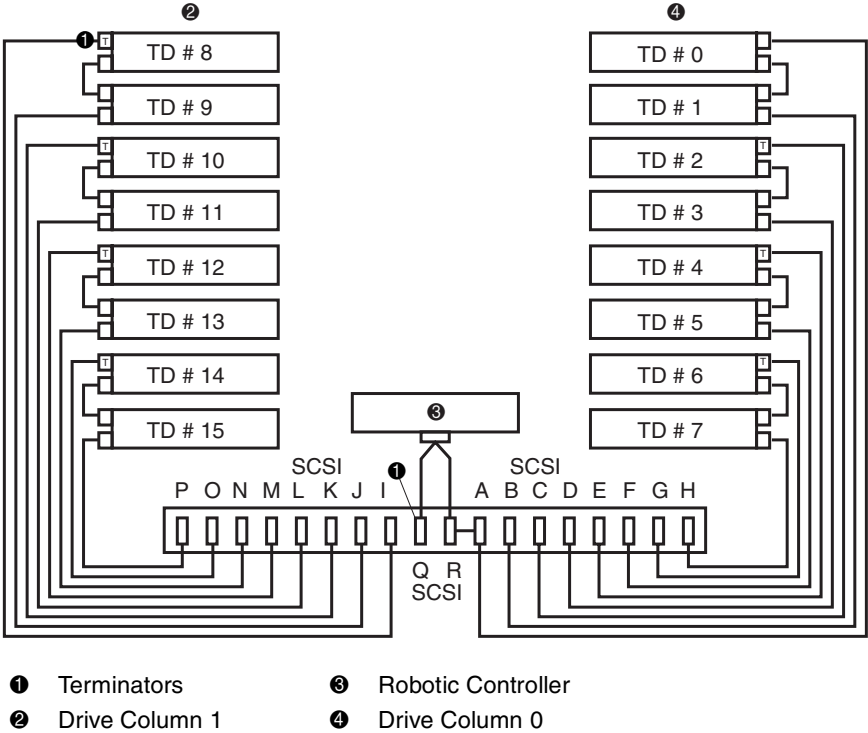


Figure 2-3: Cabling configuration, 16-drive HVD library (ESL9326D/DX)

SCSI Bus Termination (ESL9326D/DX)

Table 2-2 lists the recommended SCSI bus termination for the ESL9326D/DX library.

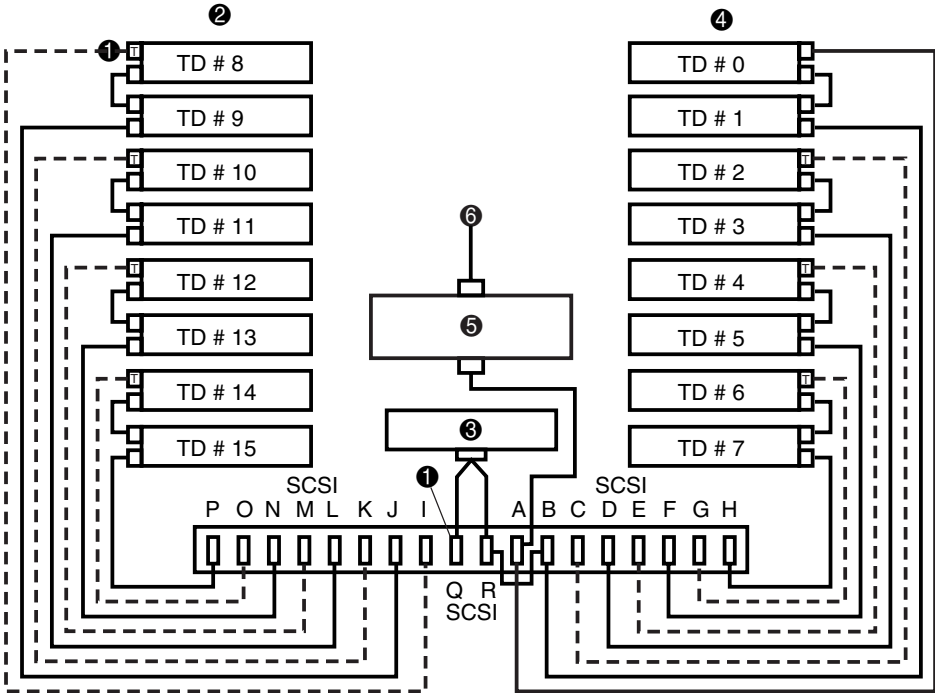
Table 2–2: SCSI Bus Termination (ESL9326D/DX)

SCSI Port	SCSI Bus Number	Function	Device Connection
Q	1	Terminator	Robot
R	1	Jumper to A	Robot
A	1	Jumper to R	Drive 0
B	1	Bus 1 SCSI Input	Drive 1
C	2	Terminator	Drive 2
D	2	Bus 2 SCSI Input	Drive 3
E	3	Terminator	Drive 4
F	3	Bus 3 SCSI Input	Drive 5
G	4	Terminator	Drive 6
H	4	Bus 4 SCSI Input	Drive 7
I	5	Terminator	Drive 8
J	5	Bus 5 SCSI Input	Drive 9
K	6	Terminator	Drive 10
L	6	Bus SCSI Input	Drive 11
M	7	Terminator	Drive 12
N	7	Bus 7 SCSI Input	Drive 13
O	8	Terminator	Drive 14
P	8	Bus 8 SCSI Input	Drive 15

Connecting SCSI Cables (ESL9326SL and ESL9595)

Looking from the rear of the library, connect the SCSI cables and jumpers as shown in Figure 2-4. The recommended cabling configurations are for a 16-drive library.

NOTE: ESL9326 and ESL9595 Series libraries are equipped with internal SCSI cables and terminators in place for a two drive per SCSI bus configuration. Additional SCSI jumper cables and terminators are supplied in the library accessory kit to allow up to four drives per SCSI bus.



- ① Terminators (8 Places)
- ② Drive Column 1
- ③ Robotic Controller
- ④ Drive Column 0
- ⑤ LVD SCSI Bus Extender
- ⑥ Bus Input 1

Figure 2-4: Cabling configuration, 16-drive LVD library (ESL9326SL, ESL9595SL, and ESL9595L1)

SCSI Bus Termination (ESL9326SL/ESL9595)

Table 2-3 lists the recommended SCSI bus termination for the ESL9326 and ESL9595 libraries.

Table 2-3: SCSI Bus Termination (ESL9326SL/ESL9595SL)

SCSI Port	SCSI Bus Number	Function	Device Connection
Q	1	Terminator	Robot
R	1	Jumper to B	Robot
A	1	SCSI Extender (device side) Bus 1 SCSI Input	Drive 0
B	1	Jumper to R	Drive 1
C	2	Not used	Drive 2
D	2	Bus 2 SCSI Input	Drive 3
E	3	Not used	Drive 4
F	3	Bus 3 SCSI Input	Drive 5
G	4	Not used	Drive 6
H	4	Bus 4 SCSI Input	Drive 7
I	5	Not used	Drive 8
J	5	Bus 5 SCSI Input	Drive 9
K	6	Not used	Drive 10
L	6	Bus 6 SCSI Input	Drive 11
M	7	Not used	Drive 12
N	7	Bus 7 SCSI Input	Drive 13
O	8	Not used	Drive 14
P	8	Bus 8 SCSI Input	Drive 15

NOTE:

Bus 1 is terminated at connector Q on the SCSI bulkhead.
 Bus 2 is terminated at drive 2 on the drive tray PWA.
 Bus 3 is terminated at drive 4 on the drive tray PWA.
 Bus 4 is terminated at drive 6 on the drive tray PWA.
 Bus 5 is terminated at drive 8 on the drive tray PWA.
 Bus 6 is terminated at drive 10 on the drive tray PWA.
 Bus 7 is terminated at drive 12 on the drive tray PWA.
 Bus 8 is terminated at drive 14 on the drive tray PWA.

SCSI Breakouts (ESL9326/ESL9595)

Figure 2-5 shows the SCSI breakouts as viewed from the rear of the ESL9326 and ESL9595 libraries.

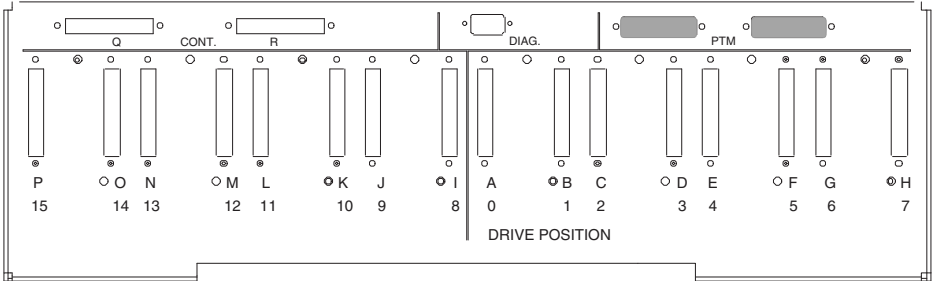


Figure 2-5: SCSI breakouts (ESL9326/ESL9595)

Default SCSI IDs

Table 2-4 lists the default SCSI IDs for the ESL9000 Series Tape Library.

NOTE: The ESL9198 and ESL9322 hold a maximum of 8 tape drives, with tape drive 7 being the highest-numbered tape drive.

Table 2-4: Default SCSI IDs

Drive #	Default SCSI ID
Tape Library	0
Drive 0	1
Drive 1	2
Drive 2	3
Drive 3	4
Drive 4	1
Drive 5	2
Drive 6	3
Drive 7	4
ESL9326/ESL9595 Only	
Drive 8	1
Drive 9	2
Drive 10	3
Drive 11	4
Drive 12	1
Drive 13	2
Drive 14	3
Drive 15	4

Multi-Unit Library System Configuration

A Multi-Unit Single LUN (MUSL) configuration establishes a library set of two or more cabinets as a single library system (see Figure 2-6). As a result, all cabinets share the same Logical Unit Number (LUN). Addresses for each element type, gripper, storage bins, and so on are consecutive from the first library to the last. Note that a single `MOVE MEDIUM` command can be used to move a cartridge between any two elements in a multi-unit library system.

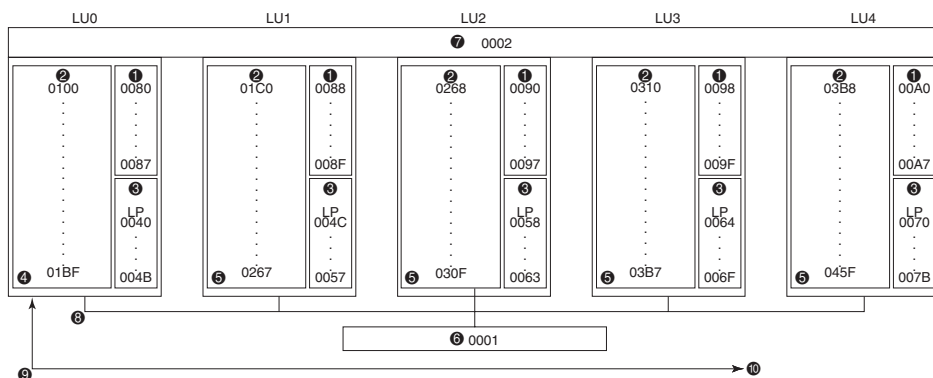
NOTE: Element addresses are hexadecimal and are provided for reference only. Although the addresses are accurate at the time of printing this guide, they are subject to change. It is recommended that the Mode Sense Data listed in Appendix D be used to determine the address of the entire multi-unit library system configuration.

The physical and logical setup of a multi-unit library system requires that the Pass-Through Mechanism (PTM) is aligned and that the multi-unit controller ports are cabled correctly. The LUN setup must reflect the library's physical position in the set.

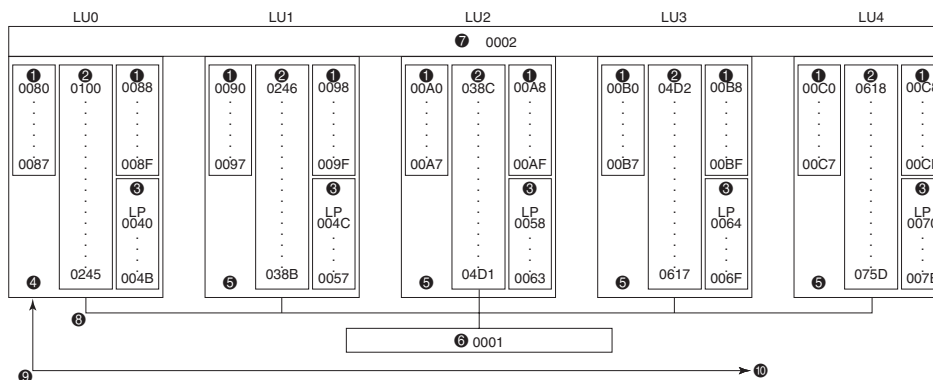
Refer to the *StorageWorks by Compaq ESL9000 Series Tape Library Pass-Through Mechanism (PTM) Installation Guide* for information about attaching libraries as well as installing, cabling, configuring and calibrating the PTM.

NOTE: It is not necessary for the first library in the set to be the master library. The master library can be located anywhere in the library set.

NOTE: As of the release date of this guide, multi-unit scalability is not supported on ESL9322 and ESL9595 libraries or on ESL9198 and ESL9326 libraries using 3.xx firmware. Check the HP website at www.compaq.com/storage/tapelibrarymatrix.html for updates regarding this support.



ESL9198



ESL9326

Figure 2–6: ESL9000 series multi-unit library system configuration

- ① Tape drives
- ② Storage bins
- ③ Load port
- ④ Master tape library (LU0)
- ⑤ Slave tape libraries (LU1 through LU4)
- ⑥ Gripper
- ⑦ PTM
- ⑧ QSPI interconnect cable
- ⑨ SCSI bus
- ⑩ To/from host computer

Inserting Tape Cartridges

To insert tape cartridges into tape drives, make sure you:

- Apply or insert a barcode label on each tape cartridge
- Set the write-protect switch as desired
- Place tape cartridges in the fixed storage bins



CAUTION: Handle tape cartridges with care. Do not drop or bang them, or place them near sources of electromagnetic interference. Rough handling can displace the tape leader, making the cartridge unusable and potentially hazardous to the tape drives.



CAUTION: If reusing a pre-recorded tape cartridge and writing from BOT, pre-recorded data is lost.

Labeling Tape Cartridges

Attaching a barcode label to each tape cartridge enables the library to identify the cartridge quickly, thereby speeding up inventory time.

For DLT and SDLT cartridges, place the label in the slide-in slot (❶ Figure 2-7) on the front of the tape cartridge.

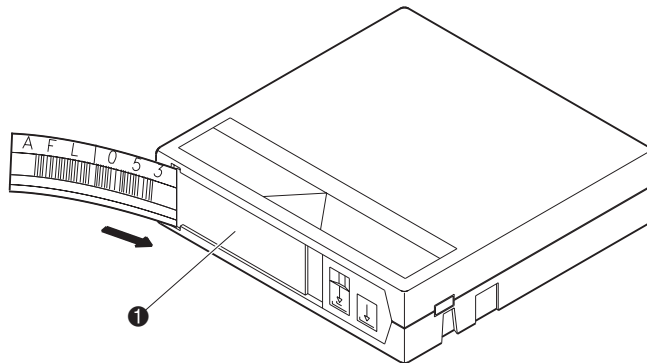


Figure 2-7: Inserting a barcode label (DLT cartridge shown)

NOTE: Only use barcode labels that have been designed for HP or Compaq tape cartridges. Do not adhere labels to a tape cartridge anywhere except the slide-in slot.

For LTO Ultrium 1 cartridges, adhesive backed barcode labels are used. See Figure 2-10 for proper placement.

Be sure to use the proper barcode label. Table 2-5 lists the identifier that is found at the end of 7- or 8-character SDLT and LTO Ultrium 1 barcode labels.

Table 2-5: Media Label Identifiers

Cartridge Type	Density	Label Identifier
SDLT	110/220 GB	S or S1
SDLT	160/320 GB	S or S2
LTO Ultrium 1	100/200 GB	L1
LTO Ultrium 2	Future use	L2

Setting the Write-Protect Switch

Each tape cartridge has a write-protect switch. This switch determines whether new data can be written to the tape cartridge (write-enabled) or whether data on the tape cartridge is protected from being erased or overwritten (write-protected).

DLT Tape cartridges

To write-protect the tape cartridge, move the switch to the left (❷ Figure 2-8). To write-enable the tape cartridge, leave the switch in default position (to the right). An orange indicator appears above the switch when the tape cartridge is write-protected (❶ Figure 2-8).

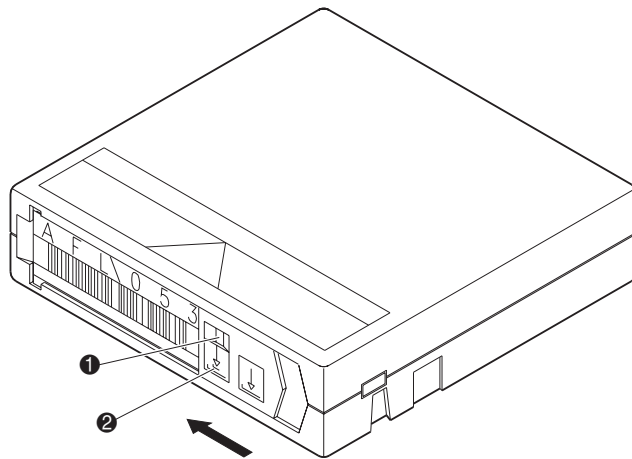


Figure 2-8: Write-protecting DLT tape cartridges

SDLT Tape Cartridges

By moving the switch to the left **1**, the tape cartridge is write-protected. By moving the switch to the right **2**, the tape cartridge is write-enabled.

Moving the tape cartridge write-protect switch to the left while the tape cartridge is in the SDLT tape drive causes the red indicator to immediately light. If the tape drive is writing data to the tape cartridge, write-protect does not begin until the current write command completes.

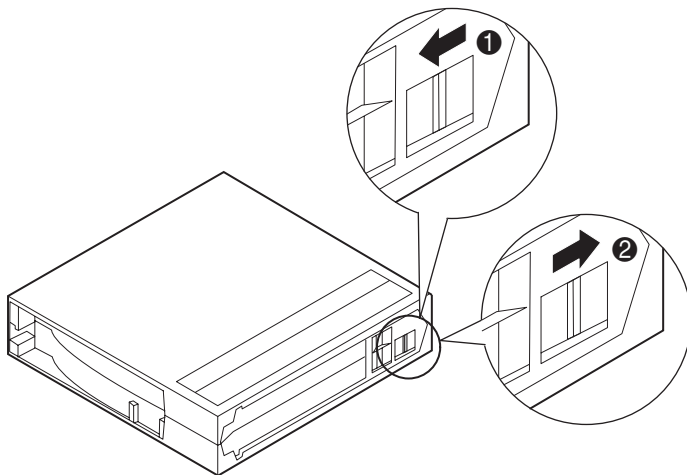


Figure 2–9: Write-protecting SDLT tape cartridges

LTO Ultrium 1 Tape Cartridges

By moving the switch to the left ❷, the tape cartridge is write-enabled. By moving the switch to the right ❸, the tape cartridge is write-protected.

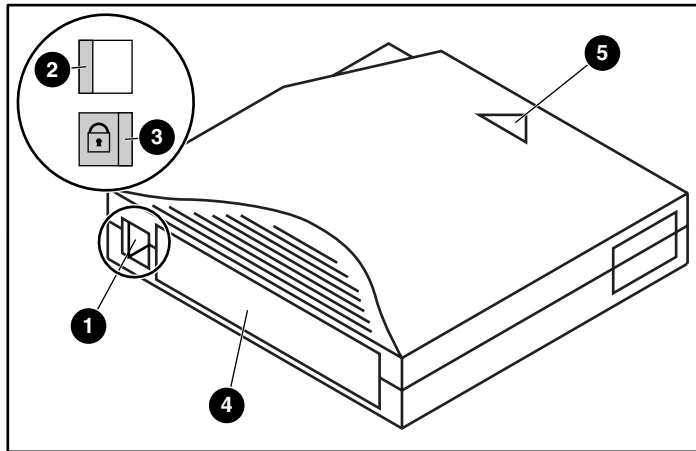


Figure 2–10: Write-protecting LTO Ultrium 1 tape cartridges

- ❶ Write protect switch
- ❷ Write-enabled
- ❸ Write-protected
- ❹ Barcode label
- ❺ Insertion arrow

Manually Ejecting a Tape Cartridge

It is recommended that you unload and move tape cartridges using the robotics (from the host, control panel, or diagnostics). There might be times when it is desirable to manually unload tape cartridges.

After closing the doors, a POST and inventory is performed. This takes approximately nine minutes.

To manually eject a DLT tape cartridge from one of the DLT tape drives:

1. Unlock and open the appropriate library front door:
 - a. Press the **Standby** button on the control panel. This places the library off-line.

- b. Verify that the display state display reads System Off-line and that the robotics has stopped moving. The off-line state does not take effect until current commands are completed.
 - c. Make sure you are properly grounded and free from electrostatic discharge.
 - d. Using the key from the accessory kit, unlock the front door.
 - e. Lift the door handle straight up and then turn the handle counterclockwise to unlatch the door.
 - f. Gently pull the door handle to open the door.
2. Press the **Unload** button on the tape drive (❶ Figure 2-11). When you press the **Unload** button, the tape cartridge rewinds. This takes between 10 to 120 seconds. When the rewind process completes, the Operate Handle indicator comes on.

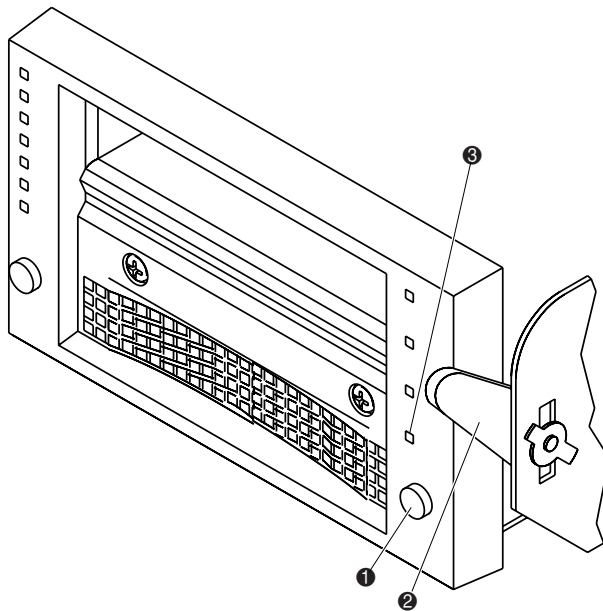


Figure 2–11: DLT tape drive front bezel

3. When the Operate Handle indicator (❸ Figure 2-11) comes on, with one hand, place your thumb approximately one-half inch from the tape and then slowly raise the insert/release handle (❷ Figure 2-11) to eject the tape cartridge.

4. Pause for five seconds, then grasp the tape cartridge and slowly pull it half way out of the drive.

NOTE: If the tape cartridge leader failed to detach from the take-up leader, push the tape cartridge all the way back into the tape drive, press down on the insert/release handle, and return to step 3. Otherwise, continue to step 5.

5. Pull the tape cartridge completely out of the tape drive.
6. Close and lock the library door.

To manually remove a tape cartridge from an SDLT or LTO Ultrium 1 drive, press the **Eject** button or issue a `MOVE MEDIA` command using your software application.

NOTE: On LTO Ultrium 1 drives, you may have to hold down the eject button for several seconds.

Placing Tape Cartridges in Fixed Storage Bins

Place a tape cartridge in each fixed storage bin (❶ Figure 2-12) along the back wall of the library and on the inside the front door(s). Be sure all cartridges are properly oriented and seated in the bins.

Each cartridge should slide into place with very little force. If a cartridge does not slide into place easily, check the cartridge for correct orientation and structural integrity.

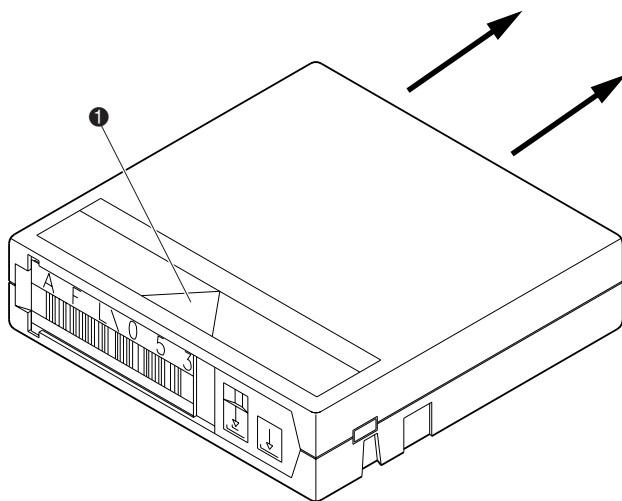


Figure 2–12: Installing tape cartridges (DLT cartridge shown)



CAUTION: Handle tape cartridges with care. Do not drop or mishandle tape cartridges. Rough handling can displace the tape leader, making the tape cartridge unusable and potentially hazardous to the tape drives.

Inserting Tape Cartridges Using the Load Port

This section explains how to insert tape cartridges using the load port mechanism.



CAUTION: Do not use DLT Tape I, DLT Tape II, or SDLT cartridges in D or DX libraries.

Do not use DLT Tape I, II, III, IIIXT, or DLT cleaning cartridges in S or SL libraries.



CAUTION: Opening or closing the load port door presents mechanical hazards. Do not insert hands or fingers into the load port opening at any time.

NOTE: To move cartridges to the load port for removal, see “Moving Cartridges” in Chapter 4.

To insert a tape cartridge:

1. Prepare the tape cartridges to be inserted by affixing a barcode label and write-protecting or write-enabling each tape cartridge as desired.
2. Press the **Load Port** button on the control panel. The library unlocks the load port.
3. Pull the load port handle toward you. It will move outward about 1 inch (2.54 cm) and enable the load port to be rotated 180 degrees.
4. With the load port door open, place the tape cartridge in an available shelf bin or load port magazine slot. See Figures 2-14 through 2-18.
NOTE: Only certain DLT/SDLT model libraries feature removable 12-cartridge magazines.
5. After loading the shelf bins or magazines, rotate the load port back 180 degrees and push the load port handle to lock the load port in position.

If Auto Load is enabled, the library automatically moves the cartridges to the available storage bins.

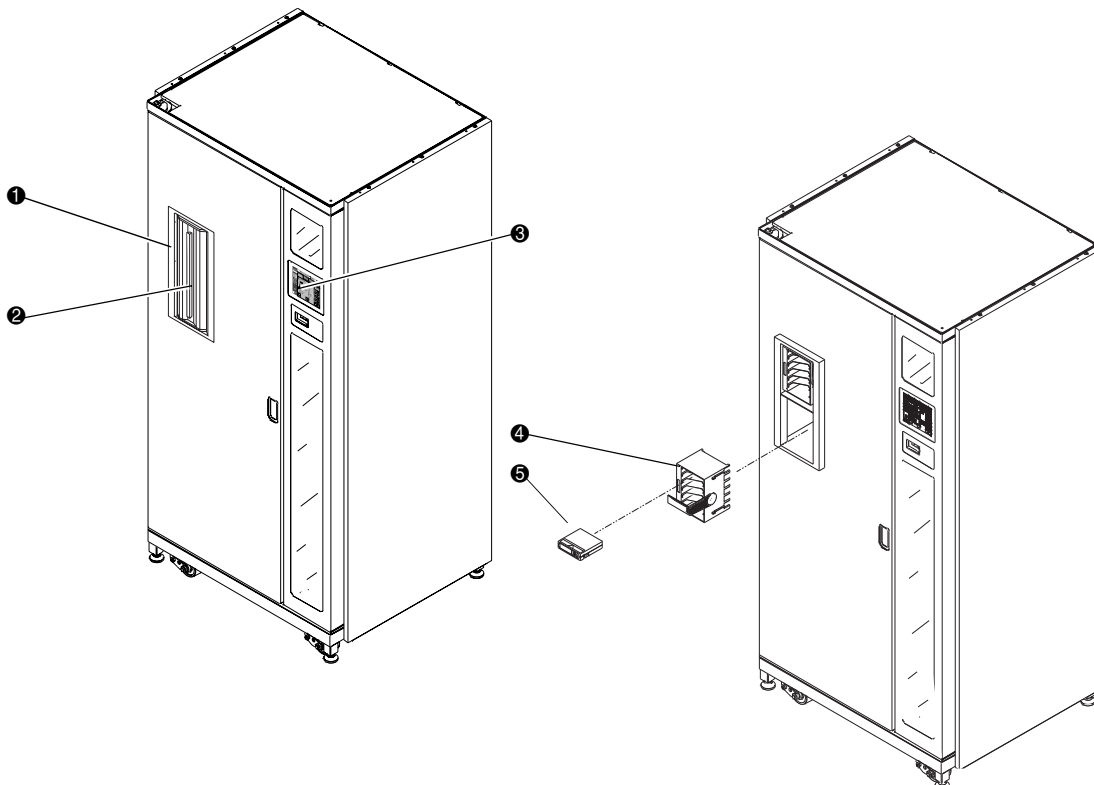


Figure 2–13: Load port (ESL9198 shown)

- | | | |
|--------------------|------------------------------------|------------------|
| ❶ Load port | ❸ Load port button (control panel) | ❺ Tape cartridge |
| ❷ Load port handle | ❹ 6-cartridge magazine | |

Tape Cartridge and Load Pack Installation and Removal

This section describes how to install and remove a tape cartridge and a load pack. To install a tape cartridge:

1. Insert a tape cartridge into a load pack (❶ Figure 2-14).
2. Push the tape cartridge in until you hear it snap into place (❷ Figure 2-14).

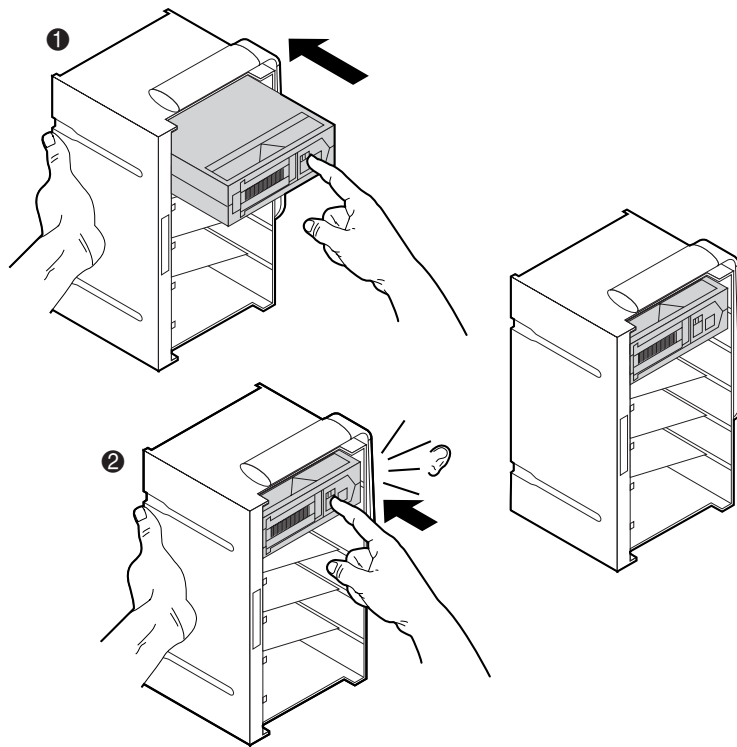


Figure 2-14: Installing a tape cartridge (6-cartridge magazine)

To remove a tape cartridge:

1. Push the tape cartridge in until you hear a snap (❶ Figure 2-15).
2. Eject the tape cartridge (❷ Figure 2-15.)
3. Remove the tape cartridge (❸ Figure 2-15).

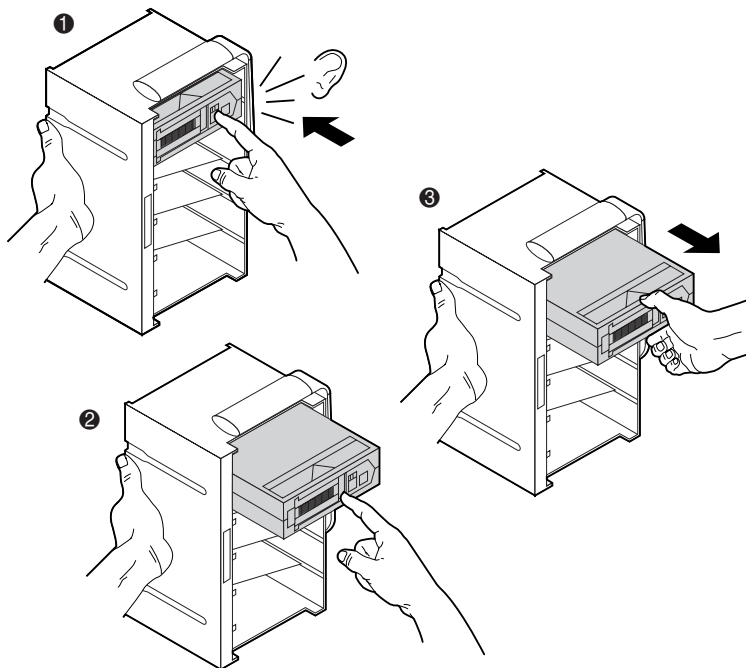


Figure 2–15: Removing a tape cartridge (6-cartridge magazine)

To install a load pack:

1. Insert the load pack into the library (❶ Figure 2-16).
2. Push the load pack in until you hear it snap into place (❷ Figure 2-16).

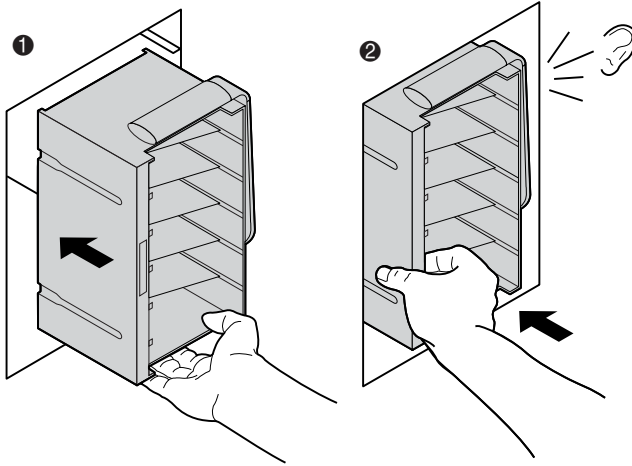


Figure 2–16: Installing a load pack (6-cartridge magazine)

To remove a load pack:

1. Release the handle on the load pack (❶ Figure 2-17).
2. While holding the handle release, pull the load pack handle down (❷ Figure 2-17).
3. While holding the handle release, remove the load pack (❸ Figure 2-17).

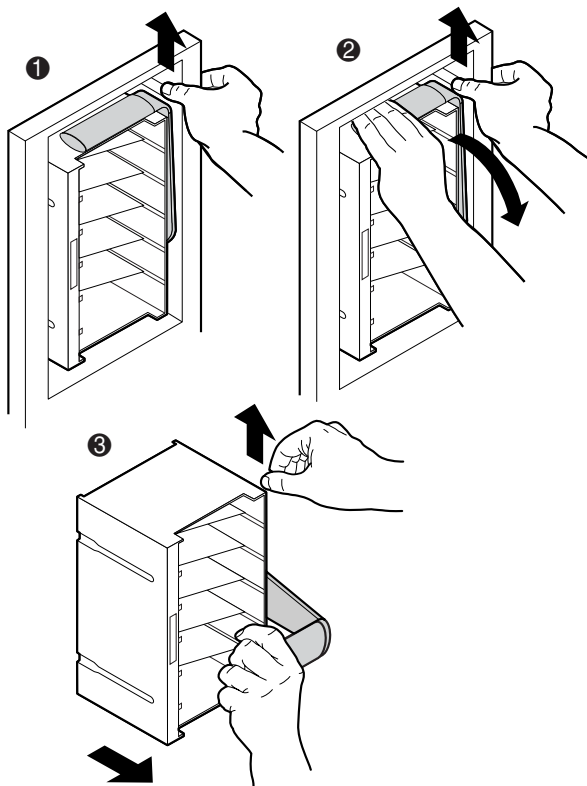


Figure 2-17: Removing a load pack (6-cartridge magazine)

The 4-cartridge magazines are stationary and built into the load port. Simply place cartridges into the bins with the barcodes facing out (see Figure 2-18).

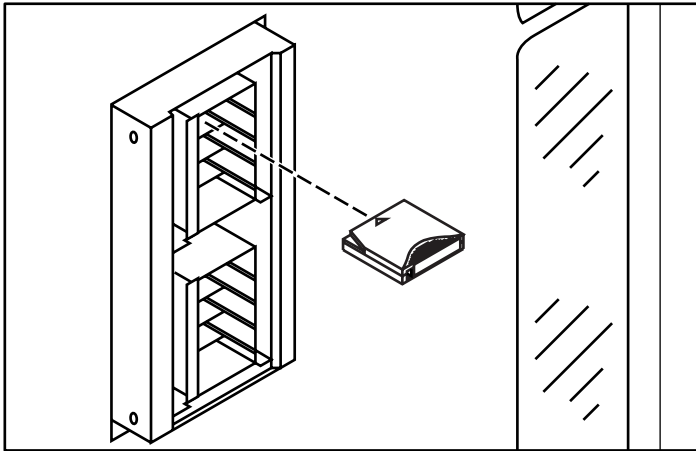


Figure 2–18: Inserting a tape cartridge (4-cartridge magazine)

Closing the Library Doors and Access Panels

The library has one or two front doors and one or three rear access panels. To close and lock any front door and rear access panel:

1. Turn the door latch to secure the door to the library frame.
2. Lower the latch over the door lock.
3. Using the key from the accessory kit, lock the latch in place.
4. Close and lock any rear access panel using a 5/32 hex wrench.

NOTE: Rear access panels must be closed during normal operation for proper cooling and proper operation of the barcode scanner.

Turning the Library On and Off

Turning the Library On

To turn the library on:

1. Verify that:
 - a. All doors and access panels are closed.
 - b. All back panel cable connections are firmly in place.

NOTE: If there are two AC power distribution assemblies, there will be two main circuit breakers.
2. Turn on CB1 on the AC distribution assembly located in the base of the cabinet behind the rear access panel. If two AC distribution assemblies are present, turn on CB1 on both assemblies.
3. Turn on the power switch located below the control panel.
4. After several seconds, the control panel becomes active and the Home screen appears. The POST routine and inventory routine also runs. These routines can take up to nine minutes to complete.

Placing the Library On-line or Off-line

With library turned on, press the **Standby** button on the control panel. Pressing the **Standby** button toggles the library between on-line and off-line states.

Turning the Library Off

To turn the library off:

1. Place the library off-line by pressing the **Standby** button. The library robotics completes any current commands and then stops.
2. Verify that the control panel display shows “System Off-line.”
3. Verify that the CHM is empty by checking the Overview screen on the control panel (see Chapter 3). If there is a tape cartridge in the transport-gripper, perform a MOVE command to place the cartridge in an available storage bin.
4. Turn off the power switch located below the control panel.
5. Turn off both circuit breakers on the AC power distribution assembly.

NOTE: Wait 10 seconds before turning on the power switch again.

Testing the Installation

After installing the library, perform the following operations to set up and test the library:

- CALIBRATE LIBRARY
- Inventory Library
- Issue SCSI commands from each of the host computers

For more information about the CALIBRATE LIBRARY command, see Chapter 3. For more information about issuing SCSI commands from the host computer, refer to the host computer operating system/application software documentation.

Operating the Control Panel

This chapter provides an overview of the control panel and describes the following basic library operating procedures:

- Using the control panel
- Obtaining library status
- Changing the control panel security level

Using the Control Panel

The control panel is activated by touching the screen, and is located at the front of the library. The menus displayed on the control panel let you obtain information about the library, execute library commands, and test library functions (see Figure 3-1). The control panel functions are grouped into the following (see Table 3-1):

- *Overview screen*—displays current tape drive, CHM, and load port content and activities.
- *Tapes screen*—displays tape drive, storage bin, load port, and gripper inventories.
- *Operator screen*—contains library configuration and control functions (password protected).
- *Service screen*—contains reporting functions, system tests, and service commands (password protected).
- *Multi-Unit*—contains multi-unit configuration and calibration commands.
- *License*—(ESL9322 and ESL9595 only) lets you enter an upgrade key to access additional bins.

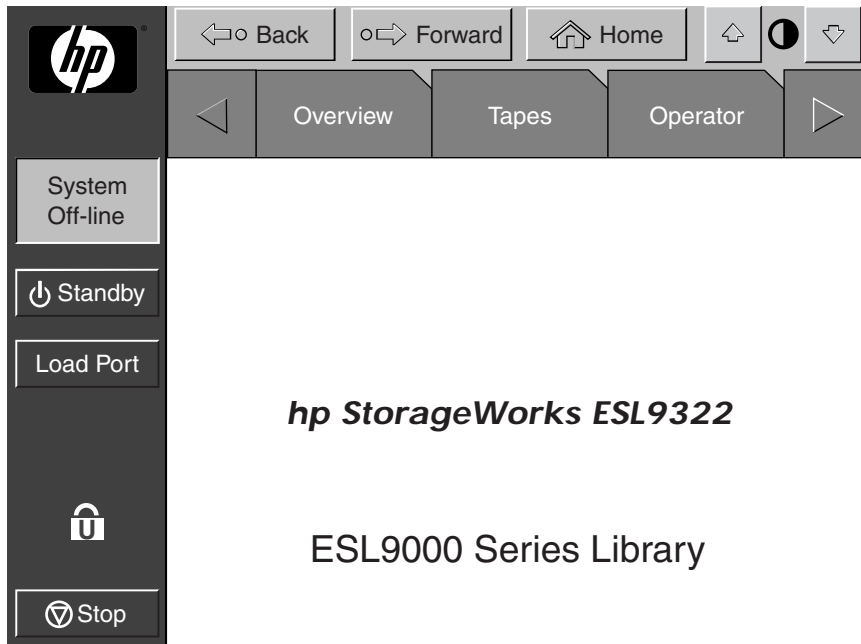


Figure 3-1: Control panel initial screen (ESL9322 shown)

Table 3–1: Control Panel Functions

Overview Screen	Tapes Screen	Operator Screen¹	Service Screen¹	Multi-Unit Screen¹	License (ESL9322 and ESL9595 only)
Status display	Inventory display	Configure	Reports	Configure/Calibrate	Configure
<ul style="list-style-type: none"> • Tape drives • Activity • Load port 	<ul style="list-style-type: none"> • Tape drives • Storage bins • Load port • Transport (CHM) 	<ul style="list-style-type: none"> • Configure library • Configure options Control <ul style="list-style-type: none"> • Move cartridges • Inventory tapes • Calibrate library • Unload drive • Unload imp/exp 	<ul style="list-style-type: none"> • Statistics • Actuator • SysTest Library results • Auto clean • System monitor • Operate axes Miscellaneous <ul style="list-style-type: none"> • SysTest Library • Enable/Disable COD (ESL9322 and ESL9595 only) • Initialize nonvol stats • Initialize nonvol config • Change password 	<ul style="list-style-type: none"> • Configure Multi-Unit • Calibrate all PTMs 	<ul style="list-style-type: none"> • License

¹ The Operator, Service and Multi-Unit screens are password protected.

Table 3–2: Control Panel Features Not Specific to Operator Tab


Component	Name	Function
Horizontal bar	Back button	Moves you backwards screen-by-screen through previous menu selections.
	Forward button	Moves you forward screen-by-screen through previous menu selections.
	Home button	Returns you to the initial control panel screen.
	Contrast button	Lets you adjust the contrast of the control panel screen.
Vertical bar	Status window	Displays service information, and Robotic Firmware level.
	Standby button	Switches the library between on-line and off-line.
	Load Port button	<ul style="list-style-type: none"> • In the closed position, unlocks the load port so you can open it. • In the open position, unlocks the load port so you can push it all the way to the left to close and lock it.
	Security level indicator 	Shows the security level in use at the control panel. ESL 9000 series library control panels have five levels of security.
	Stop button	<ul style="list-style-type: none"> • When pressed once, halts all library activity by cutting off power to the library robotics. • When pressed a second time, restores power to the library robotics.
	Display area	Overview screen

Table 3–2: Control Panel Features Not Specific to Operator Tab (Continued)

Component	Name	Function
	Tapes screen	Displays tape drive, storage bin, load port, gripper inventories, and PTM.
	Operator screen	Contains library configuration and control functions. To use this screen, you must have either operator or service-level access privileges.
	Service screen	Contains reporting functions, system tests, and service commands. To use this screen, you must have service-level access privileges.
	Multi-unit screen	Lets you set the library unit, library unit number, number tape libraries, and Calibrate PTM.
	License	Lets you enter a software key to access additional bins (ESL9322 and ESL9595 only).

Basic Operation

Touching the screen activates the control panel. Once activated, the four control panel screens are available for use.

Opening a Screen

To open one of the main screens, touch the desired tab at the top of the control panel. The Overview and Tapes screens are accessible by anyone. The Operator, Service, and Multi-Unit screens require a password.

Once the desired screen appears on the control panel, you can view information or press buttons to execute commands and open other screens.

Navigating from Screen to Screen

Three buttons let you move backward and forward through screens you have already opened (see Figure 3-1).

- *Back button*—moves backward screen by screen through previous selections.
- *Forward button*—moves forward screen by screen through previous selections.
- *Home button*—returns to the home (initial) screen.

Exiting a Screen

To exit any screen, press the **Back** or **Home** button.

While the command is executing, the control panel displays a Command In Progress dialog box with an **Abort** button. Pressing **Abort** cancels the command and stops the ongoing operation.

After pressing **Abort**, it is still necessary to press the **Back** button to exit the screen associated with the aborted command.

Library Controls

Library controls are located along the top and left side of the control panel in the horizontal and vertical bars (see Figure 3-2).

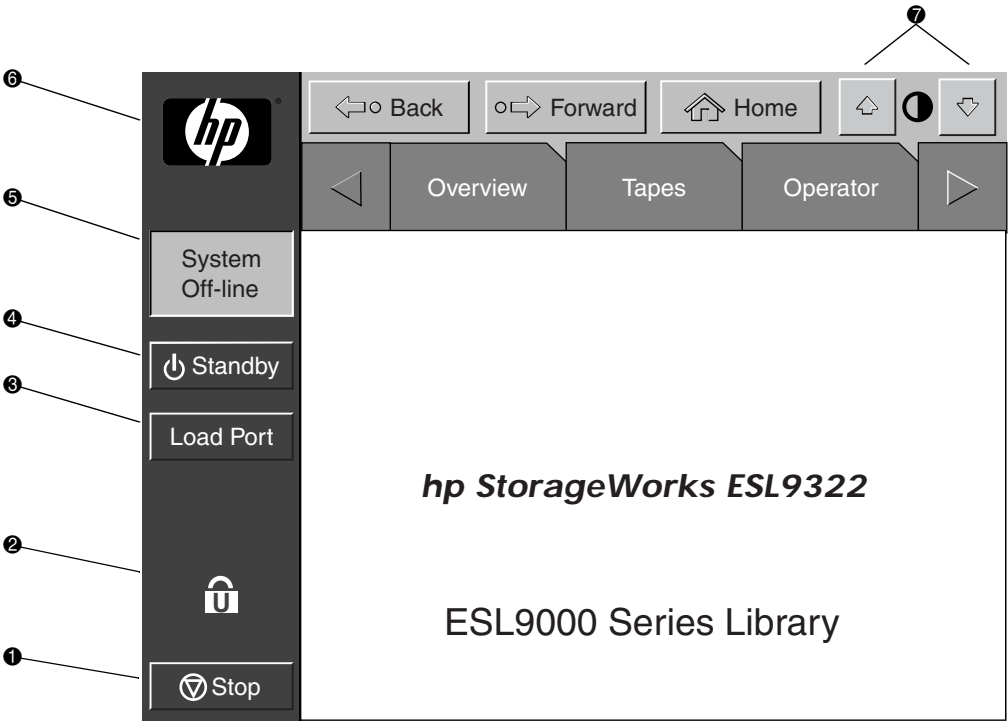


Figure 3-2: Library controls (ESL9322 shown)

- ❶ Stop button Halts library activity immediately by cutting power to the library robotics. Pressing the **Stop** button a second time restores power to the library robotics.
- ❷ Lock icon Shows the current security level at the touch screen GUI. Five security levels are available: service (S), operator (O), user (U), import only (I), and locked (L). Table 3-3 lists the attributes of each security level.
- ❸ Load port button Releases and locks the load port door. If the load port is locked in the closed position, pressing this button releases the load port and then locks the door. If the load port is locked in the open position, pressing this button unlocks the load port, letting you rotate the load port to the closed position where it automatically locks.
- ❹ Standby button Toggles the library between on-line and off-line states.
- ❺ System state display Shows the current state of the library (system on-line, system off-line, system stopped, door open, and so on).
- ❻ HP logo Displays an information screen and the library firmware level.
- ❼ Contrast buttons Adjusts the contrast of the control panel.

Table 3–3: Security Levels, Highest to Lowest

Level	Password Protected	Overview Screen Access	Tapes Screen Access	Operator Screen Access	Service Screen Access	Load Port Access	Stop and Standby Access
Service	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Operator	Yes	Yes	Yes	Yes	No	Yes	Yes
User	Yes	Yes	Yes	No	No	Yes	Yes
Multi-unit	Yes	No	No	No	No	No	No
Import only	Yes	Yes	Yes	No	No	Yes	No
Locked	No	Yes	Yes	No	No	No	No

NOTE: The default passwords are: Operator “1234”, Service “5678”, User “2222”, Multi-unit “1234,” and Import only “1111.”

For more information on password and security levels see “Changing the Control Panel Security Levels” described later in this chapter.

Obtaining Library Status

The Overview and Tapes screens on the control panel provide library status. The Overview screen displays a “snapshot” of the tape drive, robot activity, and load port inventory (see Figure 3-3). The Tapes screen displays the inventory of all elements in the library (see Figure 3-4).

To display the Overview or Tapes screen, press the appropriate option on the control panel. Note that these functions operate in On-line or Off-line mode.

Overview Screen

The Overview screen provides the following information:

- Drive status
- Activity
- Load port content and status

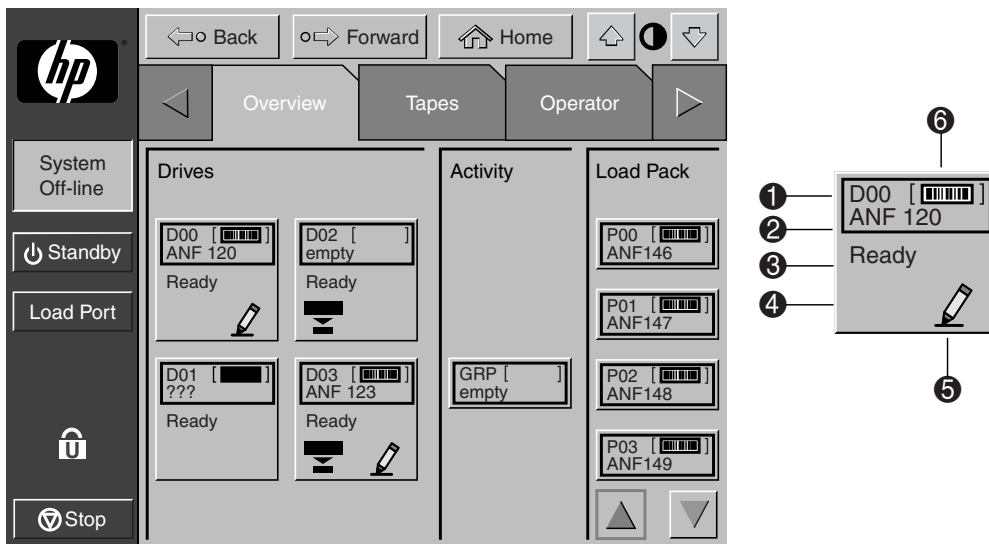


Figure 3–3: Overview screen

- ❶ Element number
- ❷ Barcode number
- ❸ Element status
- ❹ Compressed enabled
- ❺ Write enabled
- ❻ Cartridge present

Drive Status

The Drives area reports whether or not:

- A tape drive has a cartridge
- The cartridge is write-enabled or write-protected
- Compression is enabled

It also provides status for:

- Barcode labels
- Drive states
- Drive types
- Media types
- Drive serial numbers
- Drive firmware level
- SCSI IDs
- Drive cleaning

It also displays the barcode number of the cartridge.

For a more detailed view of drive status, press the screen anywhere in the Drives area to display the Tape Drive Status box (see Figure 3-4). Use the arrow buttons at the bottom of the box to scroll to the desired drive. To return to the Overview screen, press the screen anywhere in the Tape Drive Status box (see Figure 3-4).



Figure 3-4: Tape Drive Status box (DLT8000 shown)

Activity Status

The Activity area shows the source element, the transport medium, and the destination element involved in the activity; it also shows the current location of the tape cartridge and the progress of the activity.

Load Port Status

The Load Port area identifies tape cartridges currently stored in either magazine in the load port. Use the Arrow button to view contents not currently displayed.

Tapes Screen

The Tapes screen identifies the tape cartridges residing in the following elements (see Figure 3-5):

- Tape drives
- Storage (fixed storage bins)
- Transport (CHM/gripper), and PTM
- Load port

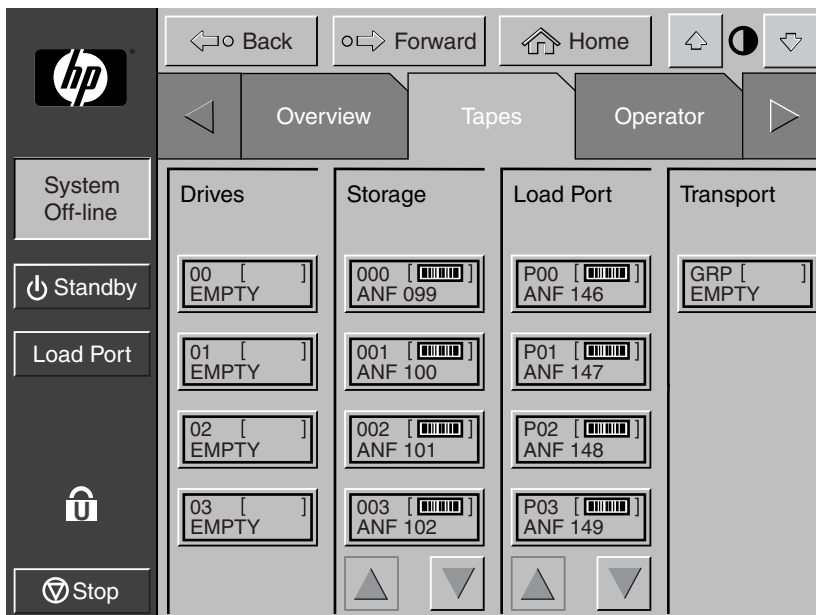


Figure 3-5: Tapes screen

Viewing Storage and Load Port Elements


The Drives, Storage, and Load Port categories might contain too many elements to display at once. To scroll through these elements, use the Arrow buttons at the bottom of each category.

You can also expand the Drives, Storage, or Load Port list to fill the screen by touching the desired category anywhere above the scrolling arrows. To return to the start of the Tapes screen, press the **Back** button.

Changing the Control Panel Security Levels

ESL 9000 series library control panels have five levels of security:

- *Operator (O)*—provides access to the Operator set of screens and all functions on the system bar.
- *Service (S)*—provides access to both the Operator and Service set of screens and all functions on the system bar.
- *User (U)*—provides access to screens that are not password-protected (Overview and Tapes screens) and all functions on the status bar.
- *Import Only (I)*—provides access to Overview and Tapes screens and the **Load Port** button on the system bar (no **Stop** or **Standby**).
- *Locked (L)*—provides access to Overview and Tapes screens only.

The security level indicator (lock icon ) at the lower left corner of the control panel indicates the current security level (O, S, U, I, or L).

Securing the Control Panel

When the User security level is set, access is restricted to the Operator and Service screens. Since these screens control library configuration, testing, and initializing functions, the User security level is the appropriate default condition for routine library operation.

For more information about changing to a higher security level to access the Operator or Service screens, see “Opening the Operator Screen” in Chapter 4 or “Opening the Service Screen” in Chapter 5.

Changing Security Levels

To change security levels:

1. Press the **Lock** icon. The Password screen appears (see Figure 3-6).

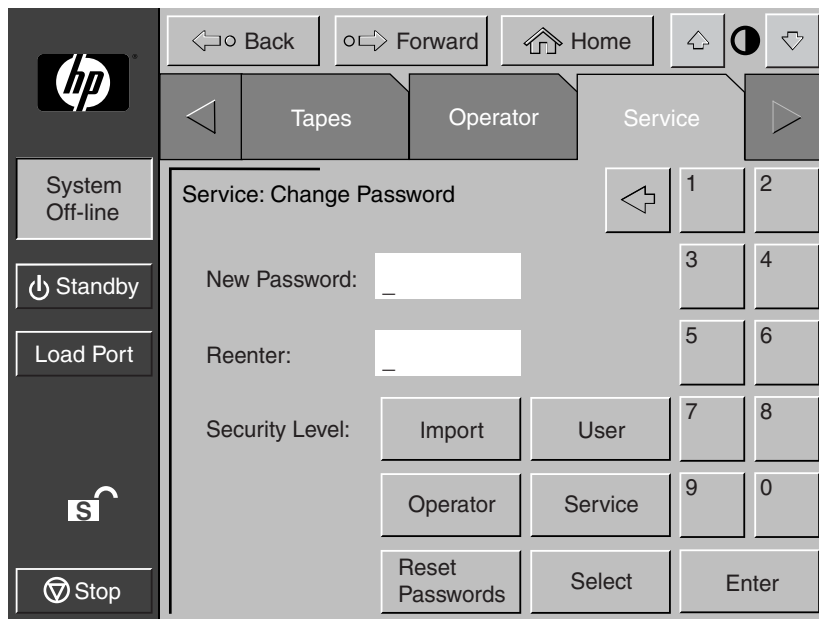


Figure 3-6: Change Password screen

2. Press the security level button for the desired level of security (**Operator**, **Service**, **User**, **Import Only**, or **Locked**).
3. Enter a password if necessary. A password is required to enter a higher security level than the current level.
4. Press the **Select** button. A screen appears indicating that the new security level has been set successfully.
5. Press OK. The lock icon displays the new security level (O, S, U, I, or L).

NOTE: This procedure is especially useful to change from the Operator or Service levels to the User level after executing an Operator or Service level command.

If the control panel is accessed from the Operator (O) or Service (S) level, and no activity has occurred for 15 minutes, the control panel will return to the initial screen (Figure 3-1).

Operator Commands

This chapter describes the commands found on the Operator screen of the library control panel. The Operator screen commands initiate the following actions:

- Opening the Operator screen
- Configuring the library
- Configuring library options
- Calibrating the library
- Performing an inventory
- Moving cartridges
- Unloading a drive
- Unloading the load port

NOTE: The library must be off-line to perform any of the functions listed above.

Opening the Operator Screen

To open the Operator screen:

1. Press the **Operator** tab. The control panel displays the password screen (see Figure 4-1).
2. Enter the correct operator or service password to gain access to the Operator screen (see Figure 4-2). The default operator password is 1234.

NOTE: To change passwords, see “Changing Passwords” in Chapter 5.

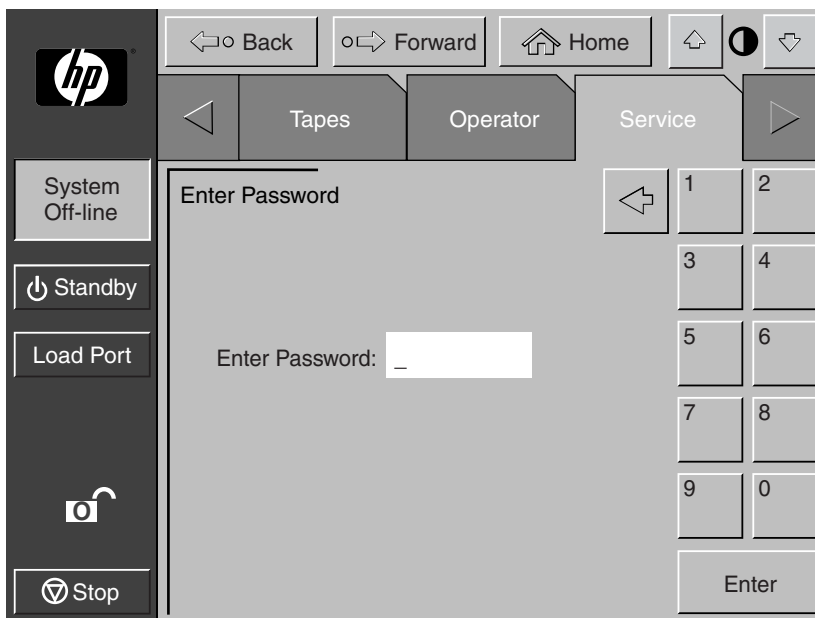


Figure 4-1: Password screen

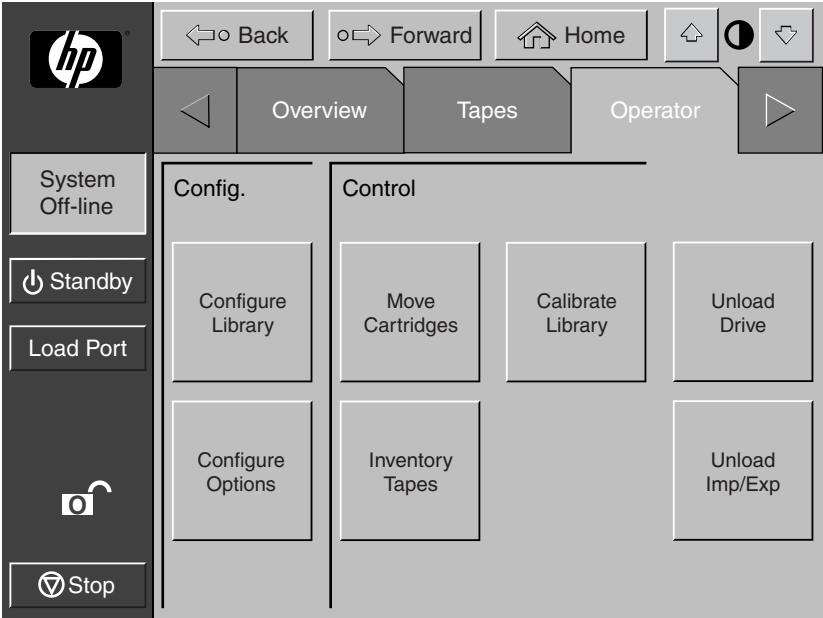


Figure 4-2: Operator screen

Configuring the Library

The `CONFIGURE LIBRARY` command lets you assign the following:

- Library model number
- Number of storage bins
- Number of drives
- Library SCSI ID
- Tape drive SCSI ID
- PTM configuration

NOTE: The serial number and IEEE ID fields are set automatically via the library firmware.

To configure any of these attributes:

1. In the Operator screen, press the **Configure Library** button. The control panel displays the Configure: Library screen (see Figure 4-3).

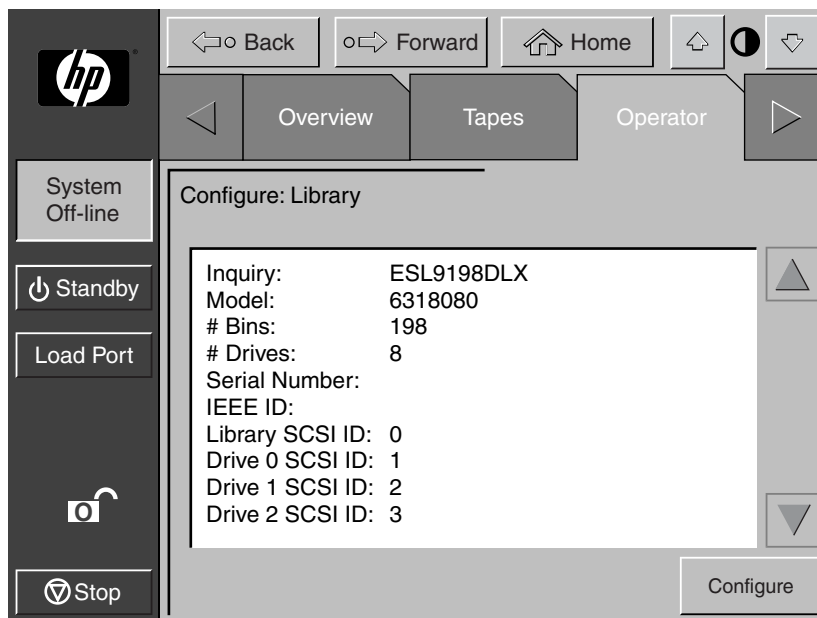


Figure 4-3: Configure: Library screen (ESL9198 shown)

2. Press the **Configure** button. The control panel displays the Configure: Library Settings screen (see Figure 4-4). Make sure that the library is off-line.

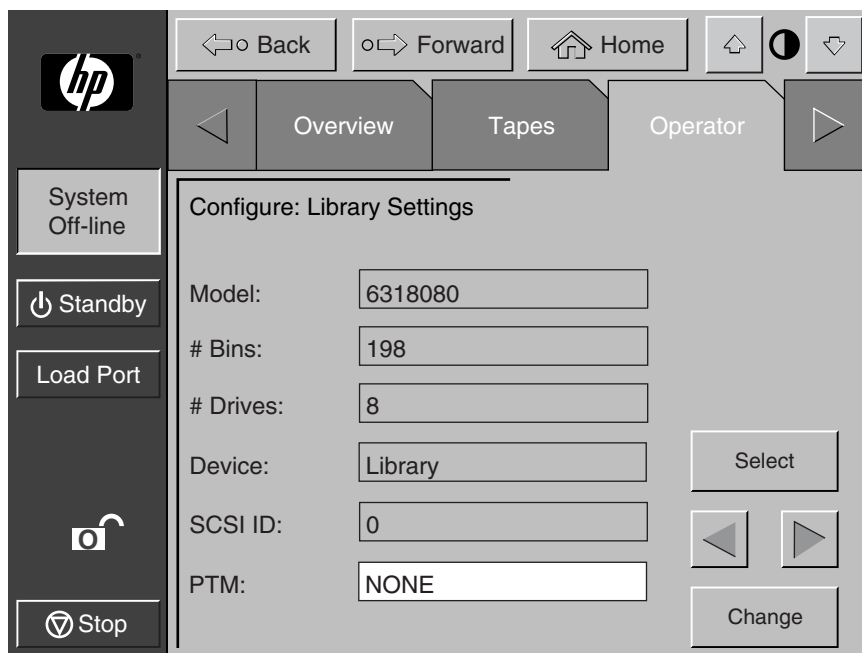


Figure 4-4: Configure: Library Settings screen (ESL9198 shown)

3. Press the **Select** button until you highlight the setting you want to change.
4. Using the arrow buttons, scroll through the available values for the setting.
5. Press the **Change** button to accept the new value.
6. Repeat steps 3 through 5 to make other changes.
7. Press the **Back** button to return to the Configure: Library screen.

The options you selected are now part of the library configuration.

NOTE: Not all model numbers are available from the GUI. If you are unable to find the desired model number, refer to the configuration menu in the *hp ESL9000/TL800 Series Tape Library Diagnostic Software Guide*. The LibDiag utility must be used to set the model number.



CAUTION: The model number is set at the factory and should only be changed at the direction of an authorized service representative.

SCSI ID Assignment Guidelines

When selecting SCSI ID numbers, each SCSI device on the same bus must have a unique number from 0 to 15. SCSI devices include the library robotics, the host computer, the library tape drives, internal and external hard disk drives, and so on.

If you set up the library with multiple SCSI buses, you can assign the same number to two or more devices, provided each device is on a different SCSI bus.

NOTE: Power must be cycled for the new SCSI ID number to become effective.

PTM Configuration

To configure the PTM, set the PTM option to either None, Right, Left, or Both (see Figure 4-4). This automatically adjusts the number of bins in the library.

Configuring Library Options

The `CONFIGURE OPTIONS` command lets you set the following:

- *Power-On State*—determines whether the library is on-line or in standby mode when powered up (default is On-Line).
- *Auto Clean*—allows the library to perform drive cleaning tasks automatically as needed (default is Disabled). This option is not currently supported for LTO Ultrium 1 drives.
IMPORTANT: Cleaning should be done via the backup application software. Backup application software must be compatible with the library auto clean feature to avoid robot command conflicts. HP does not support preventive autocleaning operation.
- *Retries*—causes the library to retry a failed command automatically before issuing an error message (default is Enabled).
- *Barcode Labels*—turns barcode scanning on or off during inventory. This option should be disabled when the library contains cartridges that are not labeled (default is Enabled).
- *Auto Inventory*—causes the library to perform an inventory whenever the library is powered up (default is Enabled).
- *Auto Load*—causes the library to automatically move cartridges in the load port to empty storage bins as soon as the load port door closes (default is Disabled).
- *Temp. Detection*—enables or disables the over-temperature detection warning and shutdown features of the library (default is Enabled).

- *Power-On Security*—determines the library security level when powered up (default is User).
- *Auto Drive Unload*—causes the drive to unload a tape when a `MOVE MEDIUM` command is received (default in Enabled).
- *Barcode Retries*—lets you set a number of attempts to read a barcode label before giving up (default is 8).
- *Set StorageWorks Default*—Returns all configure options to factory default states.

Configuring a Library Option

To configure a library option:

1. On the Operator screen, press the **Configure Options** button. The control panel displays the Configure: Options screen (see Figure 4-5).
2. Press the button for the desired option.
3. Using the arrow buttons, scroll through available values for the selected option.
4. When the New Value box displays the desired value, press the **Execute** button to apply the new value. The Current Value box displays the new value.
5. Repeat steps 2 through 4 to change other configuration options.
6. When you have finished making changes to library options, press the **Back** button until you return to the initial Operator screen.

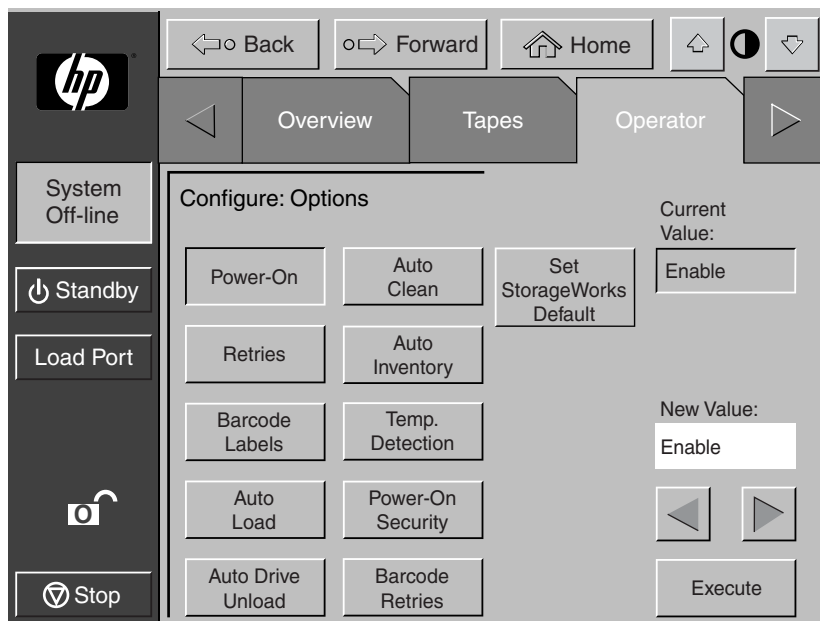


Figure 4–5: Configure: Options screen

To return the library to the default values press the **Set StorageWorks Default** button.

Calibrating the Library

The `CALIBRATE LIBRARY` command lets you calibrate the storage bins, the tape drives, the load port, or the entire library. Calibrate the library during initial installation and after any maintenance procedure.

To calibrate library elements:

1. On the Operator page, press the **Calibrate Library** button. The control panel displays the Calibrate Library screen (see Figure 4-6).
2. Press the button with the desired calibration option.

NOTE: Pressing the **Calibrate All** button causes the drives, bins, and the load port to be calibrated. This operation takes approximately 20 minutes.

The control panel displays a “Command In Progress” screen while the calibration process is in progress. Calibrate All takes approximately 20 minutes.

- When the calibration process completes, repeat step 2 to perform another calibration, if desired.

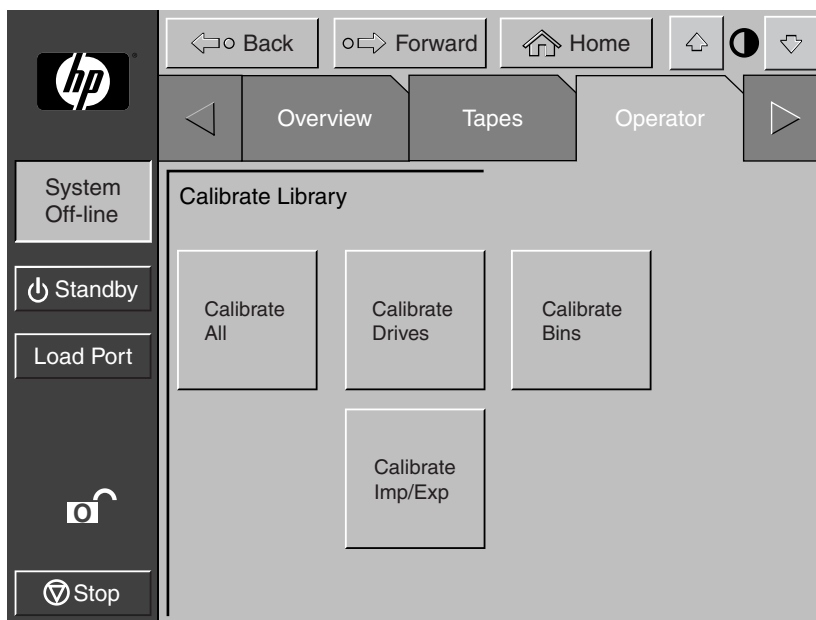


Figure 4–6: Calibrate Library screen

Performing an Inventory

The `INVENTORY TAPES` command reads the barcode labels of the cartridges in the tape drives, fixed storage bins, and the load port bins. All elements that contain cartridges without labels are marked as full with no label.

To perform an inventory:

- Press the **Inventory Tapes** button in the Operator screen. The control panel displays a “Command In Progress” screen.
- Press the **Abort** button to stop continuous running of the inventory process, otherwise, the process will continue until all storage elements have been inventoried.

NOTE: The inventory process is also stopped if an error is detected or if the rear door is open. In this case, the control panel displays an error message.

Moving Cartridges

The `MOVE CARTRIDGE` command lets you move any tape cartridge in the library to the destination you specify. This destination can be a storage bin, a tape drive, the load port, the gripper, or the PTM.

NOTE: To move a cartridge from a tape drive if auto-drive unload is disabled, issue an `UNLOAD DRIVE` command. See “Unloading a Drive,” described later in this chapter.

To move a cartridge:

1. On the Operator screen, press the **Move Cartridge** button. The control panel displays the Control: Move Cartridge screen, with the Source input field active (see Figure 4-7).

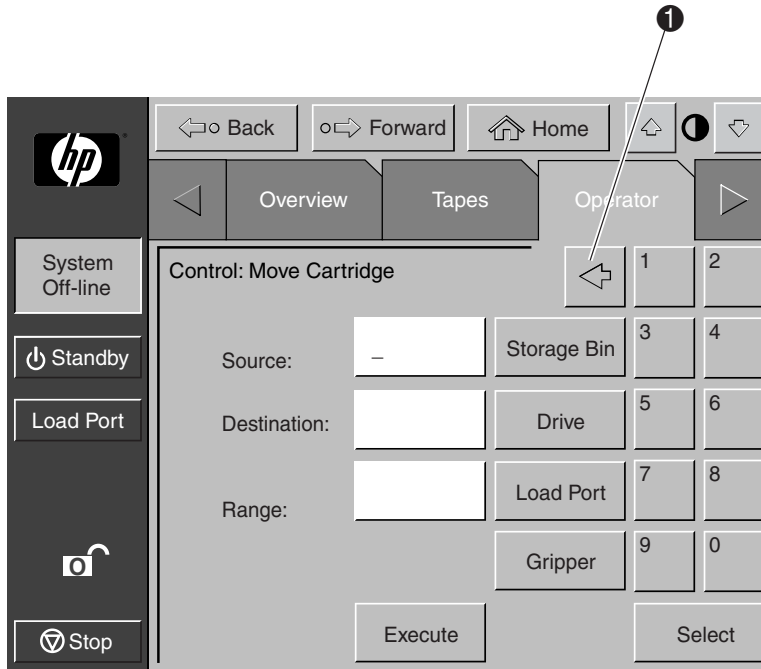


Figure 4-7: Control: Move Cartridge screen

NOTE: Use the **Backspace** button to erase a partial entry character-by-character (1 Figure 4-7).

2. Identify the source element of the cartridge:
 - a. Press the appropriate source element button (**Storage Bin, Drive, Load Port, Gripper, or PTM**). When you press an element type, the Range box (below the Destination box) displays the range of addresses.
 - b. Using the keypad, enter the address of the source element and then press the **Select** button. The Source information is displayed in the Source box and the Destination box becomes active.
3. Identify the destination for the cartridge:
 - a. Press the appropriate destination element button (**Storage Bin, Drive, Load Port, Gripper, or PTM**).
 - b. Using the keypad, enter the address of the destination element and then press the **Execute** button. The Destination box displays the destination information and the move is initiated.

The control panel displays a Command In Progress dialog box with an **Abort** button.

The MOVE CARTRIDGE command continues until completed unless you press the Abort button to stop the operation.

Unloading a Drive

The UNLOAD DRIVE command prepares a tape cartridge to be removed from a drive by rewinding and ejecting the cartridge. After unloading the drive, remove the tape cartridge using the MOVE CARTRIDGE command.

To unload a drive:

1. On the Operator screen, press the **Unload Drive** button. The control panel displays the Control: Unload Drive screen (see Figure 4-8).

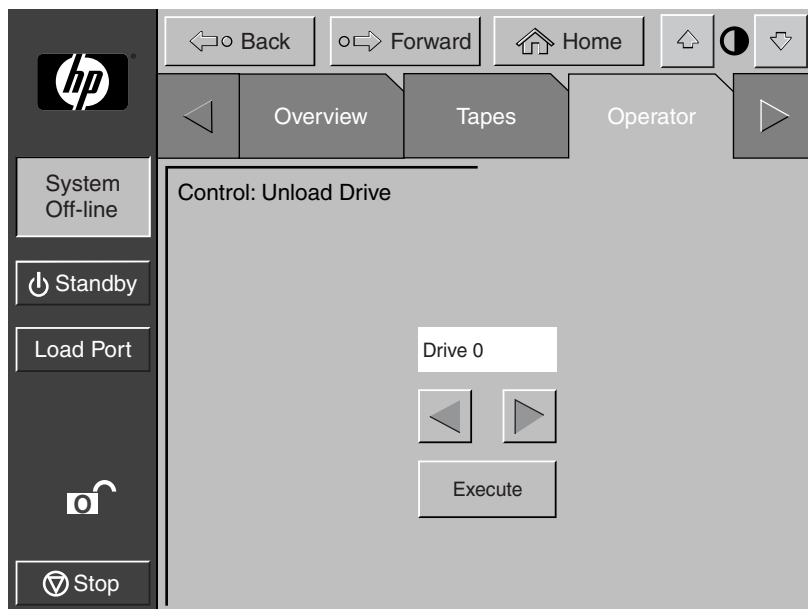


Figure 4-8: Control: Unload Drive screen

2. Use the arrow buttons to highlight the desired drive and then press **Execute**.

The control panel displays a Command In Progress dialog box.

The UNLOAD DRIVE command continues until completed unless you press the **Abort** button to stop the operation.

Unloading the Load Port

The UNLOAD IMP/EXP command moves a tape cartridge from the load port to an available storage bin. This option must be invoked after inserting a tape into the load port whenever the library Auto Load feature is disabled. See “Configuring Library Options,” described earlier in this chapter.

NOTE: You can also use the MOVE CARTRIDGE command to unload the load port. The MOVE CARTRIDGE command is especially useful if the destination of the move is important. For more information about the MOVE CARTRIDGE command, see “Moving Cartridges” described earlier in this chapter.

To unload the load port:

1. On the Operator screen, press the **Unload Imp/Exp** button. The control panel displays a Command In Progress dialog box.
2. If it becomes necessary to stop the UNLOAD command, press the **Abort** button.

Service Commands

This chapter describes the commands found on the Service screen of the library control panel. The Service screen commands initiate the following actions:

- Opening the Service screen
- Generating reports
- Changing passwords



WARNING: Serious operational problems and data loss may occur if you do not fully understand the consequences of these commands. The following service tasks are shown here for explanation only and should not be carried out by anyone other than HP authorized service personnel.

- Testing the library
- Initializing nonvolatile information

Opening the Service Screen

To open the Service screen:

1. Press the Service tab. The control panel displays the password screen (see Figure 5-1).
- NOTE:** The Service screen is restricted to individuals with service-level access privileges.
2. Enter the correct service password to gain access to the Service screen (see Figure 5-2). The default service password is 5678.

NOTE: To change passwords, see “Changing Passwords,” described later in this chapter.

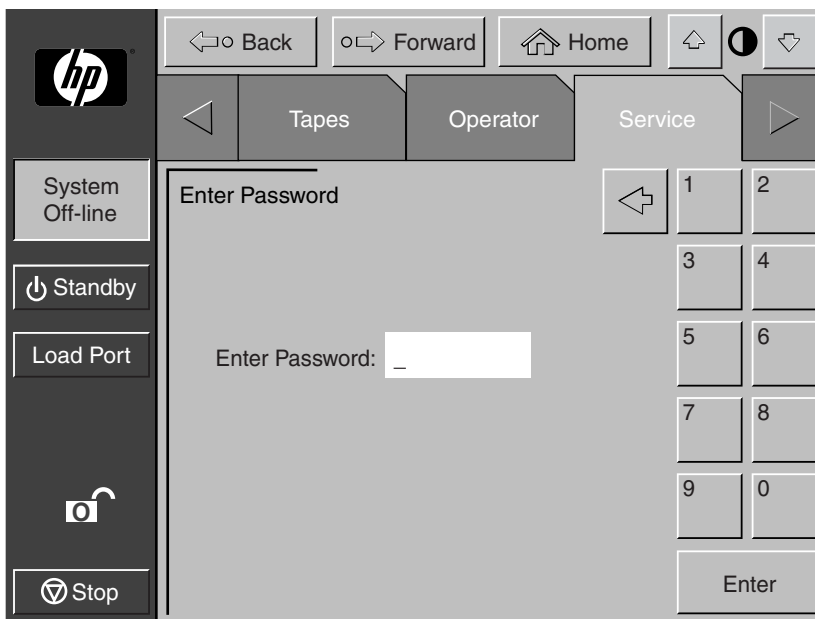


Figure 5–1: Enter Password screen

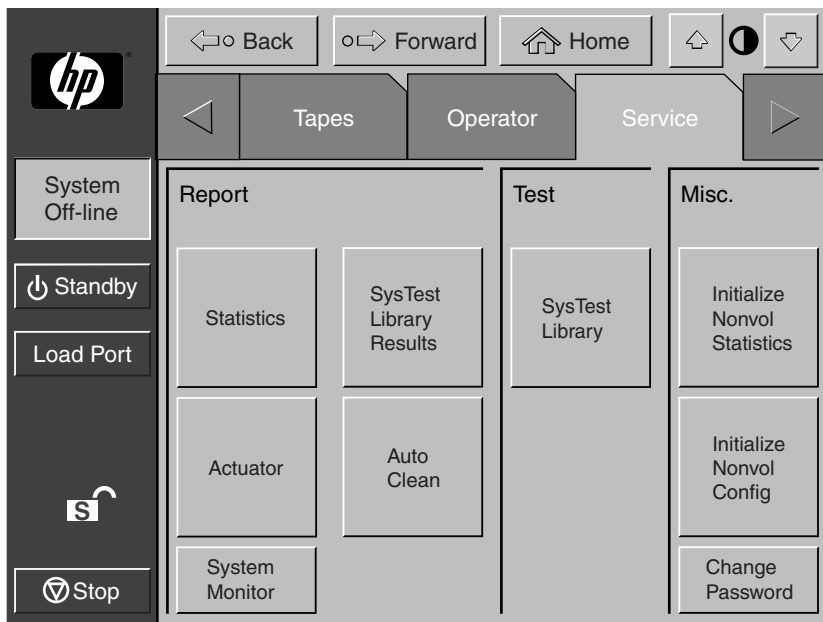


Figure 5–2: Service screen

NOTE: The ESL9322 and ESL9595 libraries include the Enable/Disable COD button under Test. This button allows service personnel to fully test an off-line library.

Figure 5-3 and Figure 5-4 show an overview of the Service screen.

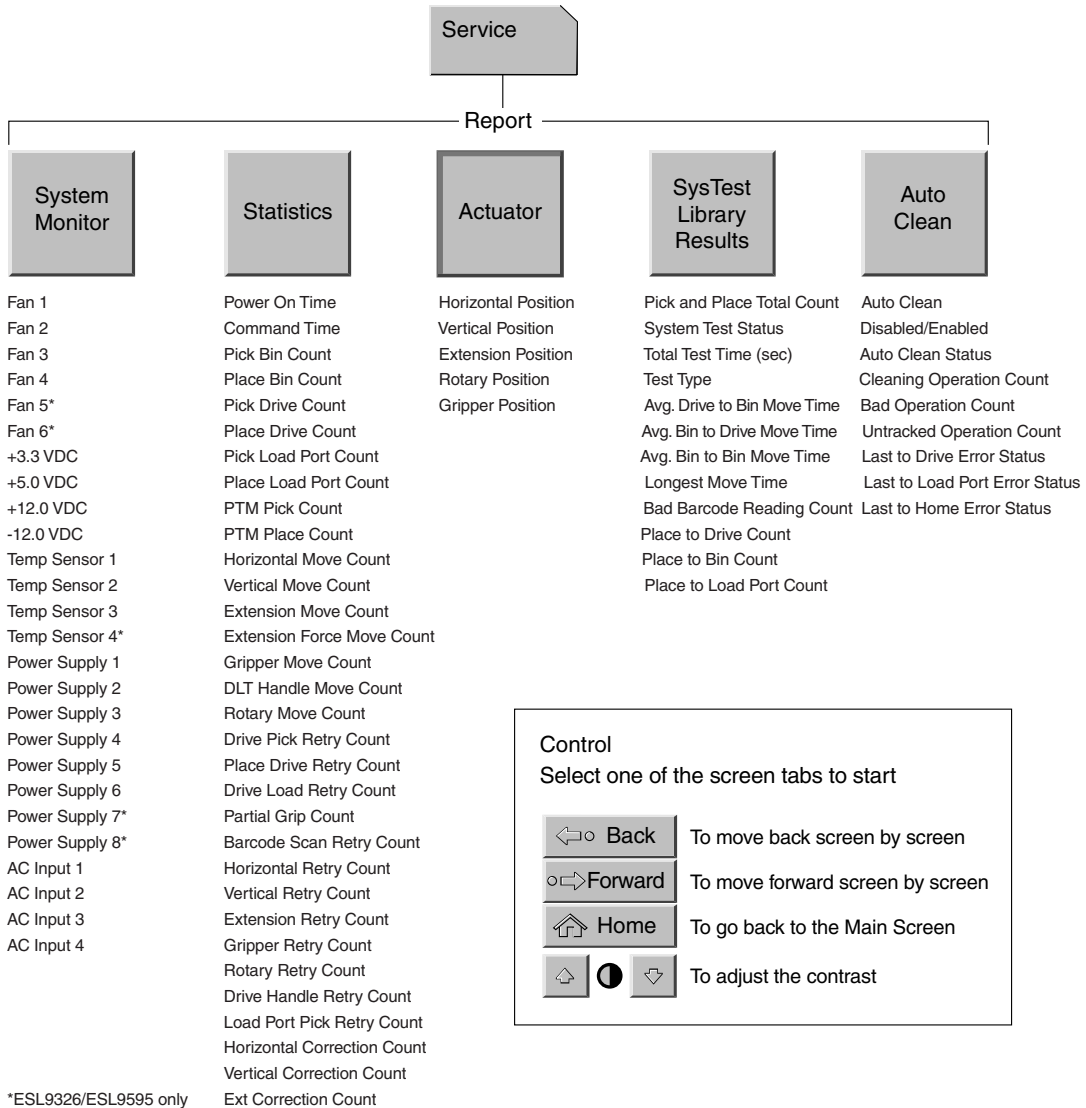


Figure 5-3: Control panel service screen (1 of 2)

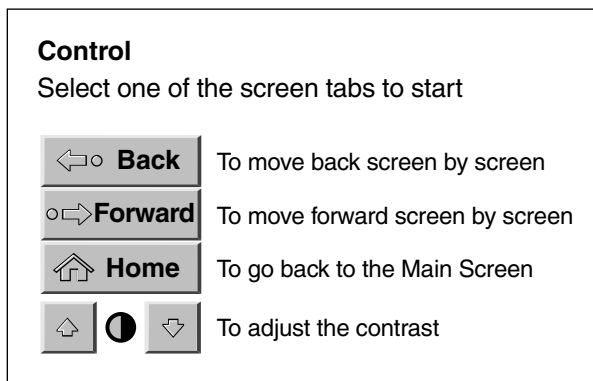
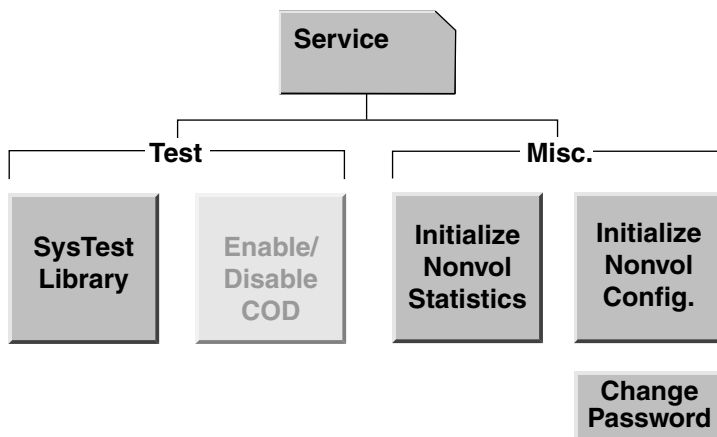


Figure 5–4: Control panel service screen (2 of 2)

NOTE: The ESL9322 and ESL9595 libraries include the Enable/Disable COD button under Test. This button allows service personnel to fully test an off-line library.

Generating Reports

The Service screen lets you generate on-screen reports about the following:

- Library operation statistics
- Actuator positions and status
- System test results
- Auto clean status and tracking information

Generating Service Reports

Press the appropriate button on the Service screen. Within a few seconds, the control panel will display the requested report.

Statistics Report

Figure 5-5 shows a sample statistics report.

Press the **Update** button to update the report (otherwise the report will update periodically).

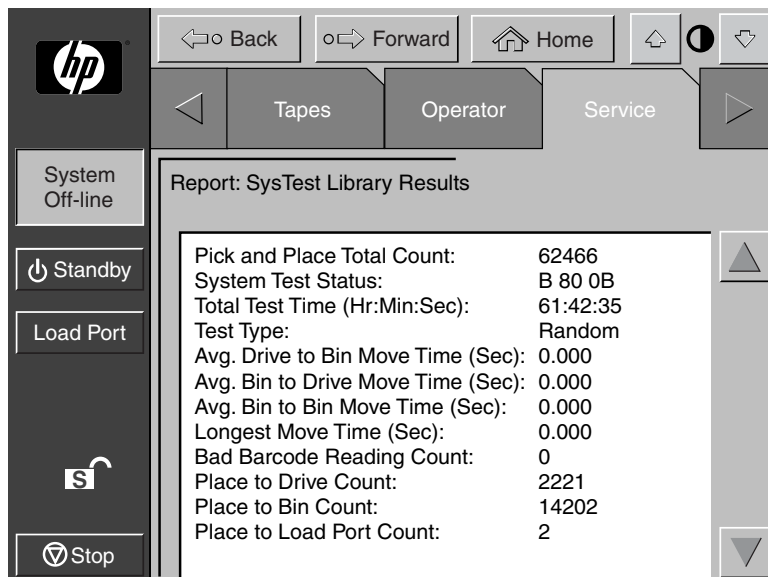


Figure 5-5: Report: SysTest Library Results screen

Actuator Report

Figure 5-6 shows a sample actuator status report.

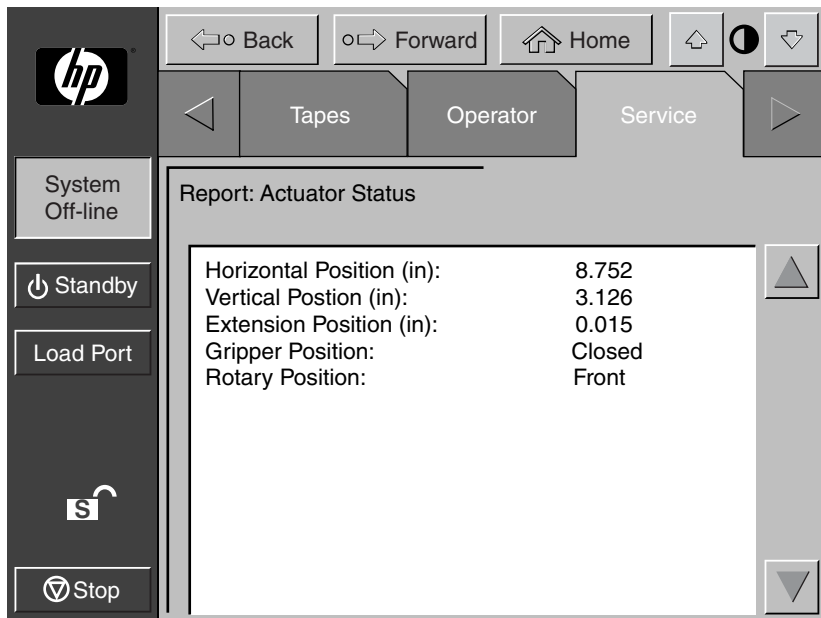


Figure 5-6: Report: Actuator Status screen

SysTest Report

Figure 5-7 shows a sample system test report.

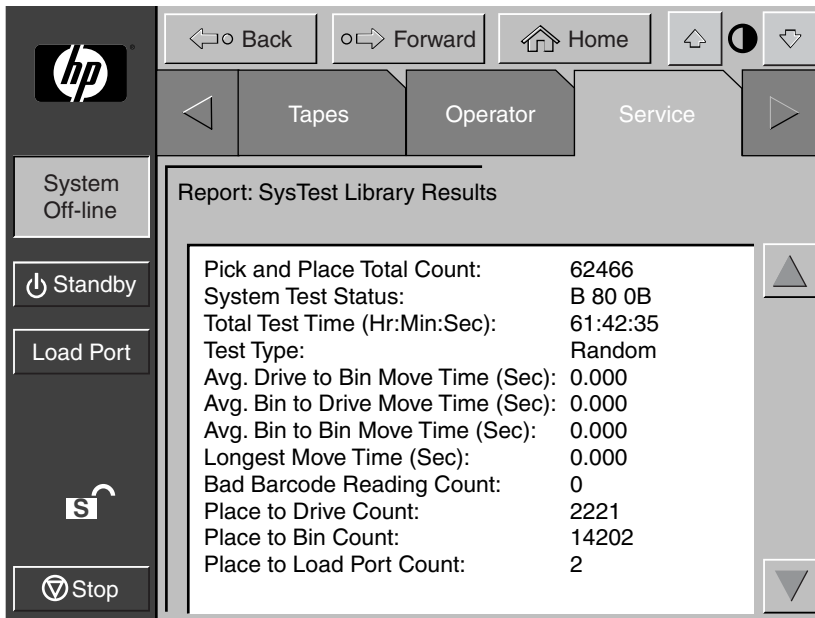


Figure 5-7: Report: SysTest Library Results screen

Auto Clean Report

Figure 5-8 shows a sample of the auto clean report.

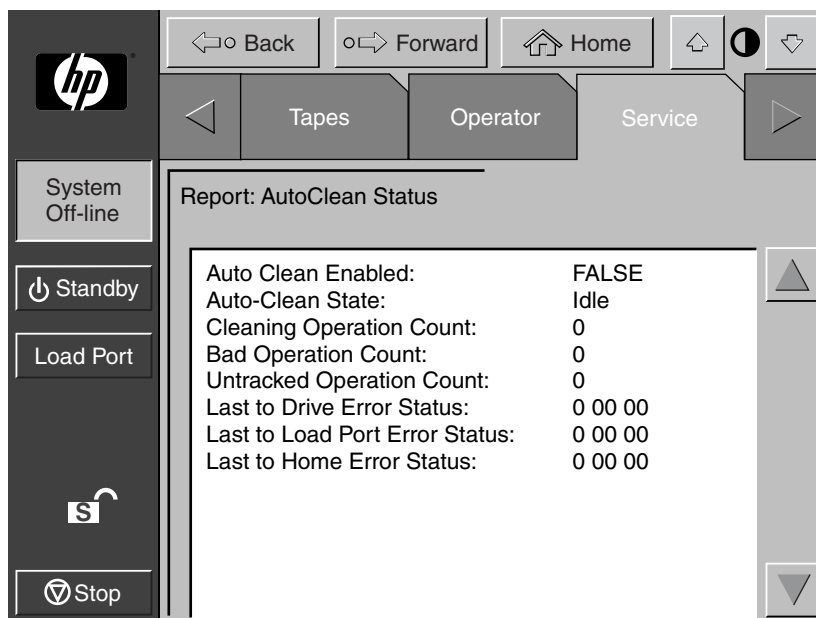


Figure 5–8: Report: Autoclean Status screen

When you have finished reviewing the report, press the **Back** button to return to the Service screen.

Testing the Library

The Service screen provides the following testing command:

SYS TEST LIBRARY—This command lets you test library operation by swapping tape cartridges between storage bins, drives, and load port. No writing or reading is performed.



CAUTION: This screen is meant to be used only by qualified, HP authorized service personnel. It is presented here for explanation only. SysTest will alter inventory information.

NOTE: Do not perform this test if the cartridge position within the library is important. Cartridges are not returned to their original positions during this test.

Performing a System Test

To perform a system test:

1. On the Service screen, press the **SysTest Library** button. The control panel displays the Test: SysTest Library screen (see Figure 5-9).



Figure 5–9: Test: SysTest Library screen

2. Select one of the following system test options:
 - a. Swap Bins - test storage bins only
 - b. Swap Drives - test drives only
 - c. Swap Bins and Drives - test bins and drives
3. Select all desired test options as follows:
 - a. Random - swap cartridges at random
 - b. Barcode - read barcode as cartridges are swapped
 - c. Continuous - repeat test until aborted

NOTE: The **Continuous** button must be deselected to enter # of Runs.

4. When you have selected the type of test and all test options, press the **Execute** button. The control panel displays the Command In Progress dialog box. The system test continues until completed unless you press the **Abort** button. If you pressed the **Continuous** button in step 3, you must press the **Abort** button to stop the test.

Initializing Nonvolatile Information

The Service screen contains two commands involving information stored in non-volatile RAM (NVRAM):



WARNING: Serious operational problems and data loss may occur if you do not fully understand the consequences of these commands. The following service tasks are shown here for explanation only and should not be carried out by anyone other than HP authorized service personnel.

- INITIALIZE NONVOLATILE MEMORY CONFIGURATION—returns the library configuration to its factory-default condition, eliminating any changes made using the Configure Library and Configure Options commands in the Service screen and invalidates the calibration data.
- INITIALIZE NONVOLATILE MEMORY STATISTICS—purges nonvolatile memory of all statistical information about library operation. This information is used to generate the statistical report described in “Generating Service Reports” earlier in this chapter.

Executing Either Command

To execute either command:

1. On the Service screen, press the button that corresponds to the command you want to execute. The control panel displays a dialog box prompting you to Continue or Cancel the command.
2. Press Continue. A “Command in Progress” dialog screen is displayed.

NOTE: If it becomes necessary to abort the command, press **Abort**.

Enable/Disable COD

This function is used by service personnel to enable all bins for testing purposes. This command only works in the off-line mode.

Changing Passwords

This command lets you change a password. Valid passwords consist of four to eight numeric characters entered using the keypad in the Change Password screen.

To change a password:

1. On the Service screen, press the **Change Password** button. The control panel displays the Service: Change Password screen (see Figure 5-10).

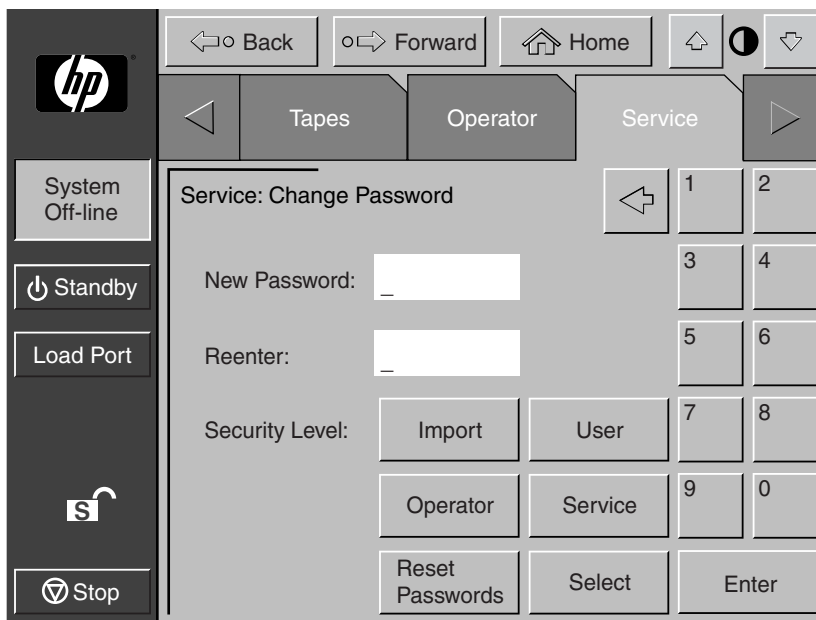


Figure 5–10: Service: Change Password screen

2. Press the security level button that corresponds to the password you want to change.
3. Using the keypad, enter a new password and press the **Select** button. Asterisks representing password characters appear in the New Password text box.
4. Re-enter the password and press the **Select** button. Asterisks representing the password appear in the Reenter text box.

If you Lose a Password

If you lose the Operator, Import Only, or User password, you can replace the password by:

1. Opening the Service screen and following the steps to change the password.
2. Pressing the **Reset Passwords** button on the Change Password screen. This resets all passwords to their default values.

The default values are:

- Operator “1234”
- Multi Unit “1234”
- Service “5678”
- User “2222”
- Import Only “1111”

If you lose the Service password (and cannot access the Change Password screen), contact your HP service representative for assistance.

Maintenance and Troubleshooting

This chapter provides troubleshooting and maintenance information for the HP StorageWorks ESL9000 Series Tape Library. Sections in this chapter include:

- Common problems and solutions
- Tape Cartridge Storage and Handling
- Cleaning Tape Drive Heads

Common Problems and Solutions

This section describes problems you might encounter during the setup and operation of the HP StorageWorks ESL9000 Series Tape Library. Corrective information is provided to help you resolve the problems.

Several of these problems produce error messages on the control panel called *sense data values*. Sense data value messages consist of a number and a description of the error. For a complete list of sense data values, see Appendix D, “Sense Data Values.”

The troubleshooting information in this section contains the following topics:

- Start-up problems
- Control panel problems
- Robotics problems
- Operating problems
- Tape drive problems

Start-Up Problems

Table 6-1 lists corrective actions for problems that occur during start-up.

Table 6–1: Start-Up Problems

Problem	Corrective Action
The library does not power on.	Make sure the power cord is connected to a grounded electrical outlet, the power distribution assembly (left rear corner of cabinet) circuit breaker is on, and the power switch behind the slide panel just below the control panel is on.
The library or tape drives do not respond on the SCSI bus.	Make sure each SCSI device on the same SCSI bus has a unique address and the last device is properly terminated.
During initialization, the library reports “Not Ready.”	Determine the failure type by checking any previous error codes returned to the host computer. Correct the cause of the error.
One or more tape drives fail to spin up during start-up.	<ul style="list-style-type: none">• With the tape drive powered off, check all power connections. Make sure the correct number of drives is specified in the library’s configuration.• If the problem persists, contact your HP service representative.
The library starts up in standby mode.	Press the Standby button to verify that the library switches to on-line mode. You can use the control panel to select either on-line or standby mode at power up.

Control Panel Problems

Table 6-2 lists corrective actions for control panel problems.

Table 6–2: Control Panel Problems

Problem	Corrective Action
The control panel is blank.	Confirm that power is on, then contact your HP service representative.
The control panel does not respond to touch.	Contact your HP service representative.

Table 6–2: Control Panel Problems

Problem	Corrective Action
An error message appears.	<ul style="list-style-type: none"> • Write down the details of the error message, including the SK, ASC, and ASCQ numeric values. • Press OK to clear the message. • See Appendix A, “Characteristics and Specifications,” for instructions about resolving the error.

Robotics Problems

Table 6-3 lists corrective actions for robotics problems.

Table 6–3: Robotics Problems

Problem	Corrective Action
The robot does not move at power up.	<ul style="list-style-type: none"> • Make sure that all internal packing materials (foam pads and tie wraps) have been removed. • Check the Stop and Standby buttons; make sure the library is on-line and the Stop button is disabled.
The gripper partially grips a tape cartridge.	Issue a <code>MOVE CARTRIDGE</code> command to move the cartridge from the gripper to an empty storage bin.
The barcode reader on the gripper fails.	<ul style="list-style-type: none"> • Verify that nothing obstructs the reader. • Restart the library. If the problem continues, contact your HP service representative.
The robot times out or fails during an operation.	<ul style="list-style-type: none"> • Check that the tape cartridge involved in the operation is properly positioned in the bin or drive and ready to be picked. • Check that the robot is not obstructed in any way. • Retry the operation. If it still fails, contact your HP service representative.

Table 6–3: Robotics Problems

Problem	Corrective Action
The robot drops a cartridge.	<ul style="list-style-type: none"> • Open the front door. • Retrieve the cartridge, orient it properly, and place the cartridge in an empty storage bin. (Do not try to place the cartridge in the gripper.) • Perform an inventory following the instructions in Chapter 4, “Operator Commands.” • If a cartridge is manually placed in an empty bin, make sure you run an inventory so the library records the position of the manually placed cartridge.
A cartridge is in the gripper at start-up, when a MOVE command is requested, or after a PLACE command is executed.	<ul style="list-style-type: none"> • Open the front door. • Manually remove the cartridge from the gripper and place it in an empty bin. • Perform an inventory following the instructions in Chapter 4, “Operator Commands.” • If a cartridge is manually placed in an empty bin, make sure you run an inventory so the library records the position of the manually placed cartridge.
The gripper does not have a cartridge after completing a pick command.	<ul style="list-style-type: none"> • Make sure there is a cartridge in the source location. • Retry the command. If the pick operation fails again, contact your HP service representative.

Operating Problems

Table 6-4 lists corrective actions for problems that occur during library operation.

Table 6-4: Operating Problems

Problem	Corrective Action
The host computer cannot communicate with the library.	<ul style="list-style-type: none"> • This might be a SCSI bus time-out or a premature disconnect problem. • Check cable connections, cable length, SCSI addresses, and termination. • Restart the host and the library. • If the host and library still are not communicating, contact your HP service representative.
A cable or terminator is disconnected from the SCSI bulkhead.	Reconnect the cable or terminator according to the guidelines found in Chapter 2, "SCSI Cable Configurations."
A tape cartridge (medium) is reported not present.	<ul style="list-style-type: none"> • This indicates that the gripper could not sense a tape cartridge in a particular storage bin even though the inventory reports that it is present. • Check to see if the designated cartridge is present. If it is, make sure it is properly seated. (For a tape drive, make sure the cartridge is completely unloaded.) Then retry the command. • If the error persists, contact your HP service representative.
A <code>MOVE</code> command failed.	<ul style="list-style-type: none"> • Check the source and destination bins. The source bin should hold the cartridge to be moved; the destination bin should be empty. • Make sure the gripper is empty and all actuators are free of obstruction. • Also, make sure the library is on-line and the Stop button is released. • Retry the command.
A flash memory error is reported.	Contact your HP service representative.

Table 6–4: Operating Problems

Problem	Corrective Action
A maximum temperature exceeded warning appears.	<ul style="list-style-type: none"> • Make sure the three fan units are operational; the Normal LEDs should be lit. Also check temperatures and fan speed using the control panel System Monitor functions. • Ensure that there are no obstructions to the air flow at the fan inlet or exhaust. Also make sure that the rear doors are closed. • Turn off the library and allow it to cool down. Lower the room temperature, if possible, and increase ventilation around the library. <p>(If the operating temperature is too high, the library will automatically shut down until the temperature drops.)</p>

DLT Tape Drive Problems

Table 6-5 lists corrective actions for DLT tape drive problems.

Table 6–5: DLT Tape Drive Problems

Problem	Corrective Action
The library is unable to communicate with a drive.	This is indicated by a Drive Communication Time-out error. Contact your HP service representative.
The tape drive does not eject a cartridge.	<ul style="list-style-type: none"> • Reset the tape drive using the Diagnostic Software’s Align/ Calibrate menu and retry the UNLOAD command. • Refer to the <i>hp StorageWorks ESL9000 Series Tape Library Maintenance and Service Guide</i> for further instructions. • If the tape still does not unload, stop the library, open the front door, and manually unload and eject the cartridge. See Chapter 3 “Basic Library Operations” for further instructions. • Contact your HP service representative.
A drive handle error occurs.	Contact your HP service representative.

SDLT Tape Drive Problems

Table 6-6 lists corrective actions for SDLT tape drive problems.

Table 6–6: SDLT Tape Drive Problems

Problem	Corrective Action
The library does not recognize the SDLT tape drive.	<ul style="list-style-type: none"> • Make sure all SCSI cabling is properly connected. • Make sure the SCSI ID is correct. • If the problem persists, contact your HP service representative.
The SDLT tape drive does not power up.	<ul style="list-style-type: none"> • With the SDLT tape drive powered off, check all power connections. Make sure the correct number of drives is specified in the library's configuration. • If the problem persists, contact your HP service representative.
The amber LED is on.	<ul style="list-style-type: none"> • Try to unload the tape cartridge and then reinitialize the tape drive by turning the drive power off and then back on. The green LED should flash. If reinitializing is successful, the LEDs light steadily again and then go off. • If the problem persists, contact your HP service representative.
Fatal or nonfatal errors occur. The cause cannot be determined.	<ul style="list-style-type: none"> • Make sure all SCSI cabling is properly connected. • Make sure the SCSI ID is correct. • If the problem persists, contact your HP service representative.

Tape Drive Interface LED Problems

Table 6-7 lists the corrective actions for tape drive interface LED problems. Refer to Figure 1-9 for LED locations.

Table 6–7: Tape Drive Interface LED Problems

Red Led	Green Led	Condition	Action Required
ON	ON	Reserved condition.	Contact your HP service representative.
ON	Flashing	Reserved condition.	Contact your HP service representative.
ON	OFF	Drive power fail.	Toggle the hot-plug tape drive switch to clear the condition. If this is unsuccessful, contact your HP service representative.
OFF	ON	GOOD	None required
OFF	Flashing	SCSI bus incompatible components.	This indicates a LVD/HVD incompatibility. Make sure all components are LVD.
OFF	OFF	No power to tape drive interface.	Make sure the hot-plug tape drive switch is on. Reset the tape drive. Make sure the library is powered on and the correct number of tape drives are configured.
Flashing	ON	Drive unhealthy.	Make sure the drive leader is in place and then reseat the tape drive. If problem persists, contact your HP service representative.
Flashing	Flashing	Drive inserted, in the process of becoming ready.	This is normal after the library or tape drive power is turned on for a short period of time. If the problem persists, contact your HP service representative.
Flashing	OFF	Microbridge incompatibility.	Contact your HP service representative.

Tape Cartridge Handling and Storage

For longer life of recorded or unrecorded tape cartridges:

- Store tape cartridges in a clean environment.
- Use tape cartridges in temperatures between 50°F to 104°F (10°C and 40°C).
- If a tape cartridge has been exposed to extreme heat or cold, stabilize the tape cartridge at room temperature for the same amount of time it was exposed for up to 24 hours.
- Keep cartridges out of direct sunlight and do not place tape cartridges near electromagnetic interference sources, such as terminals, motors, and video or X-ray equipment. Doing so may cause data on the tape cartridge to be altered.
- Store tape cartridges in a dust-free environment where the relative humidity is between 20 percent and 80 percent. For longer tape cartridge life, store the tape cartridge at 40 percent to 60 percent relative humidity.
- Follow guidelines provided by the tape cartridge manufacturer.

If a tape cartridge is dropped or damage is suspected, gently shake the tape cartridge:

- If it rattles, it is damaged. Restore the data on the tape cartridge by some means other than by using the tape drive, and discard the damaged tape cartridge.
- If it doesn't rattle, check the tape leader inside the cartridge. To do this, open the door on the rear of the tape cartridge by releasing the door lock. The tape leader should be visible at the top-left of the tape cartridge.

Refer to the *Compaq DLT Drive Reference Guide*, *StorageWorks by Compaq SDLT Tape Drive Reference Guide* and *hp ultrium tape drive user's guide* for more information.

DLT Tape Drive Cleaning

Follow these guidelines for instructions on using the cleaning cartridge to clean the DLT tape drive heads (see Table 6-8).

- Under normal conditions, the cleaning cartridge is effective for about 20 cleanings. If the cleaning cartridge has been overused, the Use Cleaning Tape LED will remain lit after you load the cleaning cartridge and no cleaning action will take place. When this happens, use another cleaning tape.
- DLT tapes do not usually need regular cleaning, as their design allows for minimal head contamination. The action of loading and using any tape tends to clean the heads of the tape drive.
- Use the cleaning tape no more than once every two weeks (or after 50 hours of continuous tape use).
- When the Use Cleaning Tape LED lights, take note of the tape in use at the time. This tape may be causing head contamination. Try another tape before using the cleaning tape to see whether the Use Cleaning Tape LED stays on.
- Use the cleaning tape more than once if a tape has severely contaminated the drive heads. If the problem persists after two cleanings, contact your HP service representative.

IMPORTANT: Do not use a DLT cleaning tape in an SDLT drive.

Table 6–8: DLT Tape Cartridge Cleaning Guidelines

Problem	Cause	Solution
The Use Cleaning Tape LED lights.	The drive heads need cleaning or the tape is defective.	Use the cleaning cartridge. The cleaning operation begins automatically as soon as the cartridge insert/release handle is closed. When cleaning completes, the tape automatically unloads and the Operate Handle LED lights.
A particular cartridge causes the Use Cleaning Tape LED to turn on frequently.	The data cartridge may be defective.	Back up this data to another cartridge, then discard the old cartridge. A damaged cartridge may cause unnecessary use of the cleaning cartridge.
The Use Cleaning Tape LED turns on after you clean the drive heads and reload your data cartridge.	Your data cartridge may be the problem.	Try a different cartridge.
The Use Cleaning Tape LED is still on after approximately five minutes and the Tape In Use LED is lit.	Cleaning has not been done and the cleaning cartridge has expired.	Replace the cleaning cartridge with a new one.

Cleaning the DLT Tape Drive Heads

The DLT tape drive heads physically read and write data to and from the tape cartridge. Under normal conditions, the heads require cleaning only when the Use Cleaning Tape LED indicates that it is required.

IMPORTANT: Never attempt to clean the heads in a manner other than described in the following procedure. Doing so can void the product warranty.

To clean the heads:

1. Apply power to the tape drive and wait for the green Operate Handle LED to light.
2. Raise the cartridge insert/release handle and insert the cleaning cartridge into the drive, then lower the handle.
3. The drive automatically executes the head-cleaning operation, which takes anywhere from one to five minutes depending on the number of times the tape has been used. When the cleaning cartridge completes this task, the green Operate Handle LED lights.
4. Remove the cleaning cartridge.
5. Mark the frequency-of-use label on the cleaning cartridge, placing a check mark in the next available square on the card each time you use the cleaning cartridge.



CAUTION: Remove the cleaning cartridge as soon as possible following completion of the cleaning operation. Leaving a cleaning cartridge in the drive can result in redundant cleaning operations each time power to the tape drive is turned off and on, resulting in unnecessary wear on the tape drive's read/write heads.

SDLT Tape Drive Cleaning

Follow these guidelines to clean the SDLT tape drive heads.

- Under normal conditions, the cleaning cartridge is effective for about 20 cleanings.
- SDLT tape drives do not usually need regular cleaning, as their design allows for minimal head contamination.
- Use the cleaning tape only after 1000 Tape Motion Hours or if the cleaning Alert light is on.
- Use the cleaning tape more than once if a tape has severely contaminated the drive heads. If the problem persists after two cleanings, contact your HP service representative.

IMPORTANT: Do not use a DLT cleaning tape in an SDLT drive. SDLT cleaning tapes use a 7- or 8-character barcode label, CLNxxxS or CLNxxxS1.

To clean the tape heads:

1. Insert a cleaning cartridge into the drive. The tape drive automatically loads the cartridge and cleans the heads.

During the cleaning cycle the green Ready LED flashes. At the end of the cleaning cycle the drive ejects the cartridge.

2. Remove the cleaning cartridge from the drive.

NOTE: When the cleaning cartridge has expired it will not automatically eject. Use the eject button on the front of the drive to eject the expired cleaning cartridge and dispose of it.

LTO Ultrium 1 Tape Drive Cleaning

LTO Ultrium 1 tape drives have been developed to have a minimal cleaning requirement. The Use Cleaning Cartridge orange LED on the drive flashes when the drive needs cleaning.

IMPORTANT: Only use Ultrium cleaning cartridges.

A cleaning cartridge can be used up to 15 times. If the cleaning cartridge is ejected immediately the is has expired or is not an Ultrium cleaning cartridge. Discard it and use a new one.

To clean the tape heads:

1. Insert a cleaning cartridge into the drive. The tape drive automatically loads the cartridge and cleans the heads.

During the cleaning cycle the orange Use Cleaning Cartridge LED is on and the green Ready LED flashes. At the end of the cleaning cycle the drive ejects the cartridge. The cleaning cycle can take up to five minutes.

2. Remove the cleaning cartridge from the drive.

A

Specifications

This appendix lists characteristics and specifications of the HP StorageWorks ESL9000 Series Tape Library. These characteristics and specifications are categorized as follows:

- Physical characteristics
- Performance characteristics
- Environmental specifications

NOTE: For tape drive specifications see the appropriate tape drive product manual.

Physical Characteristics

Table A-1 lists dimensions and other physical characteristics of the ESL9198 and ESL9322 library.

Table A-1: Physical Characteristics ESL9198/ESL9322

Description	Specifications ESL9198	Specifications ESL9322
Width	36 in (91.4 cm)	40 in (101.6 cm)
Depth	29 in (74 cm)	29 in (74 cm)
Height	75 in (191 cm)	75 in (191 cm)
Weight	986 lb (447 kg) 8 drive configuration without cartridges Crated: 1220 lb (553 kg)	1072 lb (487 kg) 8 drive configuration without cartridges Crated: 1307 lb (593 kg)
Maximum tape drives	8	8
Maximum tape cartridges	198	322
Drive type	DLT 8000 (ESL9198DLX) SDLT 110/220 and 160/320 (ESL9198SL)	SDLT 110/220 and 160/320 LTO Ultrium 1
Host to library interface software	SCSI-2 medium changer command set	SCSI-2 medium changer command set
Power cord	2 standard, US, IEC 320 C19 female connector rated at 125 VAC (NEMA 5-20P connector included)	2 standard, US, IEC 320 C19 female connector rated at 125 VAC (NEMA 5-20P connector included)
Host to tape drive interface software	SCSI-2	SCSI-2
Library diagnostics	RS-232C service port for connecting to a field service computer.	RS-232C service port for connecting to a field service computer.

Table A-2 lists dimensions and other physical characteristics of the ESL9326 and ESL9595 library.

Table A-2: Physical Characteristics ESL9326/ESL9595

Description	Specifications ESL9326	Specifications ESL9595
Width	57 in (145 cm)	60 in (152 cm)
Depth	29 in (74 cm)	29 in (74 cm)
Height	75 in (191 cm)	75 in (191 cm)
Weight	1300 lb (589 kg) 16 drive configuration without cartridges Crated: 1650 lb (748 kg)	1444 lb (655 kg) 16 drive configuration without cartridges Crated: 1822 lb (827 kg)
Maximum tape drives	16	16
Maximum tape cartridges	326	595
Drive type	DLT7000 (ESL9326D) DLT8000 (ESL9326DX) SDLT 110/220 and 160/320 (ESL9326SL)	SDLT 110/220 and 160/320 (ESL9595SL) LTO Ultrium 1 (ESL9595L1)
Host to library interface software	SCSI-2 medium changer command set	SCSI-2 medium changer command set
Power cord	2 standard, US, IEC 320 C19 female connector rated at 125 VAC (NEMA 5-20P connector included)	2 standard, US, IEC 320 C19 female connector rated at 125 VAC (NEMA 5-20P connector included)
Host to tape drive interface software	SCSI-2	SCSI-2
Library diagnostics	RS-232C service port for connecting to a field service computer.	RS-232C service port for connecting to a field service computer.

Performance Characteristics

Table A-2 lists the performance characteristics of the library.

Table A-3: Performance Characteristics

Description	Specification
Average swap time	22 seconds, consisting of two MOVE MEDIUM commands
Inventory (fully loaded with cartridges)	Less than 5 minutes (ESL9198/ESL9322/ESL9595), Less than 6 minutes (ESL9326)

Environmental Specifications

Table A-3 lists the power-environmental and mechanical-environmental specifications of the library.

Table A-4: Environmental Specifications

Description	Specification	
Electrical inputs	Voltage	90 VAC to 264 VAC
	Frequency	47 Hz to 63 Hz
	Power consumption	VA max 1600 W, 1200W (ESL9198 and ESL9322))
	Electrical connection to power	IEC 320 C19 female connector inside rear door
Operating temperature	Dry bulb	59° to 90° F (15° to 32° C)
	Wet bulb	77° F (25° C) max
	Thermal transition	18° F (11° C) per hour
Shipping and storage temperature	Dry bulb	-40° to 151° F (-40° to 66° C)
	Wet bulb	115° F (46° C) max
	Thermal transition	54° F (30° C) per hour
Relative humidity	Operating	20% to 80%
	Shipping and storage	non-condensing 5% to 95% non-condensing
Altitude	Operating	Sea level to 10,000 ft (3,048 m)
	Shipping and storage	Sea level to 12,000 ft (3,657 m)

Table A-4: Environmental Specifications (Continued)

Description	Specification	
Heat dissipation	Operating	5500 BTU/hr (1400 KCal/hr or 1600 W) for ESL9326 and ESL9595 4125 BTU/hr (1050 KCal or 1200 W) for ESL9198 and ESL9322
Direct Electrostatic Discharge (ESD)	Contact discharge	@ 2.0, 4.0, 6.0, 8.0 kV to all external metal panels and doors
	Air discharge	@ 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 15.0 kV to the front control panel display
RF radiated emissions (per CISPR 22: 1993 + A1: 1995 + A2: 1996)	30 MHz to 230 MHz @ 40 dBuV/m (quasi-peak limit)	
	230 MHz to 1000 MHz @ 47 dBuV/m (quasi-peak limit)	
RF conductive emissions (per CISPR 22: 1993 + A1: 1995 + A2: 1996)	0.15 MHz to 0.50 MHz @ 66 dBuV/m (quasi-peak limit)	
	0.50 MHz to 30 MHz @ 60 dBuV/m (quasi-peak limit)	
Harmonic current emissions (per EN 61000-3-2: 1995)	Class A	
Voltage fluctuations and flicker (per EN 61000-3-3: 1994)	Conforms to EN standard	
Direct ESD (per EN 61000-4-2: 1995)	Contact discharge	@ +/- 2.0, 4.0 kV to conductive surfaces
	Air discharge	@ 2.0, 4.0, 8.0 kV to non-conductive surfaces
Radiated fields (per EN 61000-4-3: 1995)	80% AM modulation	1 kHz from 80 MHz to 1000 MHz
Radiated fields (per ENV50204: 1996)	Pulse modulation	200 MHz from 895 MHz to 905 MHz
Electric fast transients (per EN 61000-4-4: 1994)	Data cables	+/- 0.5 kV
	Power cables	+/- 0.5, 1.0, kV
Power line surge (per EN 61000-4-5: 1994)	Common mode coupling	+/- 0.5, 1.0, 1.5, 2.0 kV
	Differential mode coupling	+/- 0.5, 1.0, kV
Conductive fields	Data cables and power lines	80% AM modulation, 1 kHz from 0.15 MHz to 80 MHz

Table A-4: Environmental Specifications (Continued)

Description	Specification	
Power frequency magnetic field (per EN 61000-4-8: 1993)	3 A/m @ 50 Hz	
Voltage dips and interruptions (per EN 61000-4-11: 1994)	30% power line reduction, 60% power line reduction, 100% power line reduction	
Acoustical noise (sound power level)	Operating Idle	8.10 Bel 7.63 Bel
Acoustical noise (pressure @ bystander)	Operating	63 dB

Regulatory Compliance Notices

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (that is, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A Equipment

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

Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Declaration of Conformity for products marked with the FCC logo - United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000

Or, call

1-800- 652-6672

For questions regarding this FCC declaration, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000

Or, call

(281) 514-3333

To identify this product, refer to the Part, Series, or Model number found on the product.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B Equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice



Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN 55022 (CISPR 22) - Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) - Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) - Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) - Power Line Flicker
- EN 60950 (IEC 60950) - Product Safety

Taiwanese Notice

警告使用者：

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

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

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

VCCIマークが付いていない場合には、次の点にご注意下さい。

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

Laser Regulation Labels

Product Conformation Label

The product conformation label is on the rear panel of the library (see Figure B-1).



Figure B-1: Product conformation label

Laser Warning Label

The laser light warning label is near the laser (see Figure B-2).

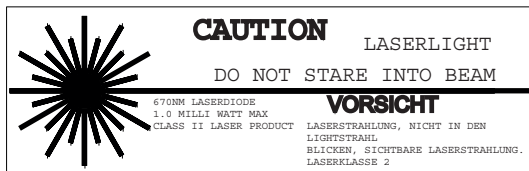


Figure B-2: Laser light warning label

Exposure Warning Label

The exposure warning label is on the laser (see Figure B-3).



Figure B-3: Exposure warning label

Tape Drive Upgrade

This appendix provides instructions for adding a tape drive to an HP StorageWorks ESL9000 Series Tape Library.

Required Tools

The following tools are required:

- Flat-blade screwdriver
- Hex key (5/32-inch) to open door

Accessories

The following accessories are required for non-default SCSI bus configuration:

- Terminator (1)
- SCSI jumper cable (1)

Installing a Tape Drive

This section explains how to install a tape drive in a drive bay. You need one of the following Tape Drive Upgrade Kits to complete the installation. Contact your sales representative for more information.

- DLT8000 tape drive (LVD): 221248-B21
- SDLT 110/220 tape drive (LVD): 234617-B21
- SDLT 160/320 tape drive (LVD): 293414-B21
- DLT8000 tape drive (HVD): 161267-B21
- SDLT 110/220 tape drive (HVD): 234616-B23
- SDLT 160/320 tape drive (HVD): 293415-B21
- LTO Ultrium 1 tape drive (LVD): 301930-B21

NOTE: The library is in the powered-on state during installation, however, the library robotics is unavailable for host-initiated operations during portions of this upgrade procedure.

Tape drives must be installed in sequential order from the lowest number to the highest (no gaps are allowed).

To install a tape drive (see Figure C-1 and Figure C-2):

See Chapter 1 for the tape drive numbering scheme used by the ESL9000 Series Tape Libraries.

1. Open the easy access rear panel ④.
2. Carefully insert the tape drive ③ into the drive bay ⑤.



CAUTION: To avoid loss of data and damage to the equipment, be sure that the tape drive hot-plug sensor lever is set to the right (OFF) position. See Figure C-1.

3. Secure the tape drive in the drive bay by tightening the two captive screws ①. These quick-release screws are located at the lower left and lower right corners of the tape drive.
4. Move the hot-plug sensor lever ② to the left.
5. Connect the appropriate SCSI cables. See “SCSI Cable Configurations” in Chapter 2 for more information.
6. Configure the library for any new tape drive. See “Configuring the Library” in Chapter 4 for more information.

NOTE: The drive position is automatically calibrated once the lever is lowered and the drive has been configured. During this time, the library robotics is unavailable to perform normal operation. If a library time-out or error message is returned as a result of issuing a robotic command from the library, re-issue the command after the tape drive Calibration completes. See “Configuring the Library” in Chapter 4 for more information.

The tape drive remains in the powered-off state until Configure completes.

The library comes pre-cabled from the factory for a two-drive-per-SCSI-bus configuration.

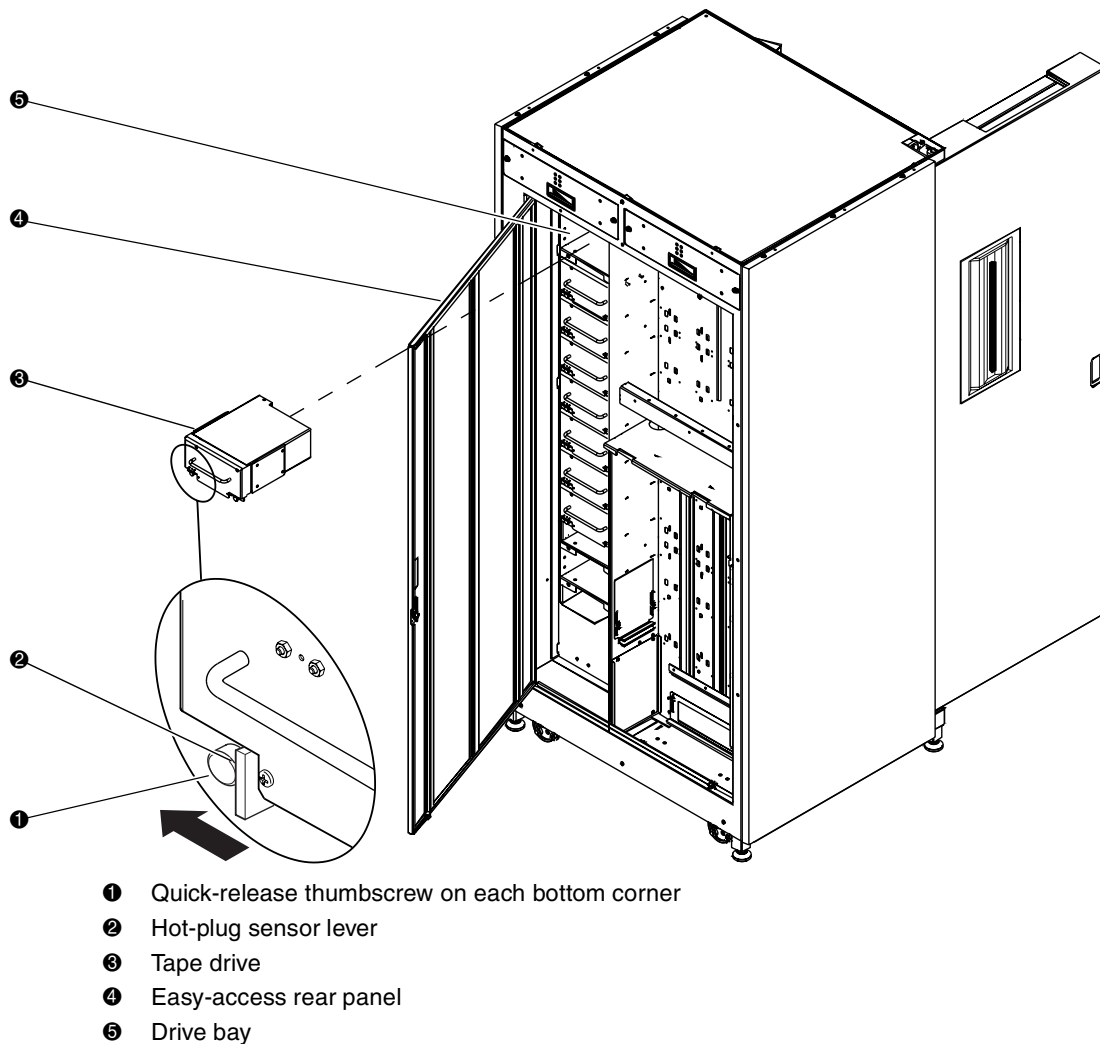
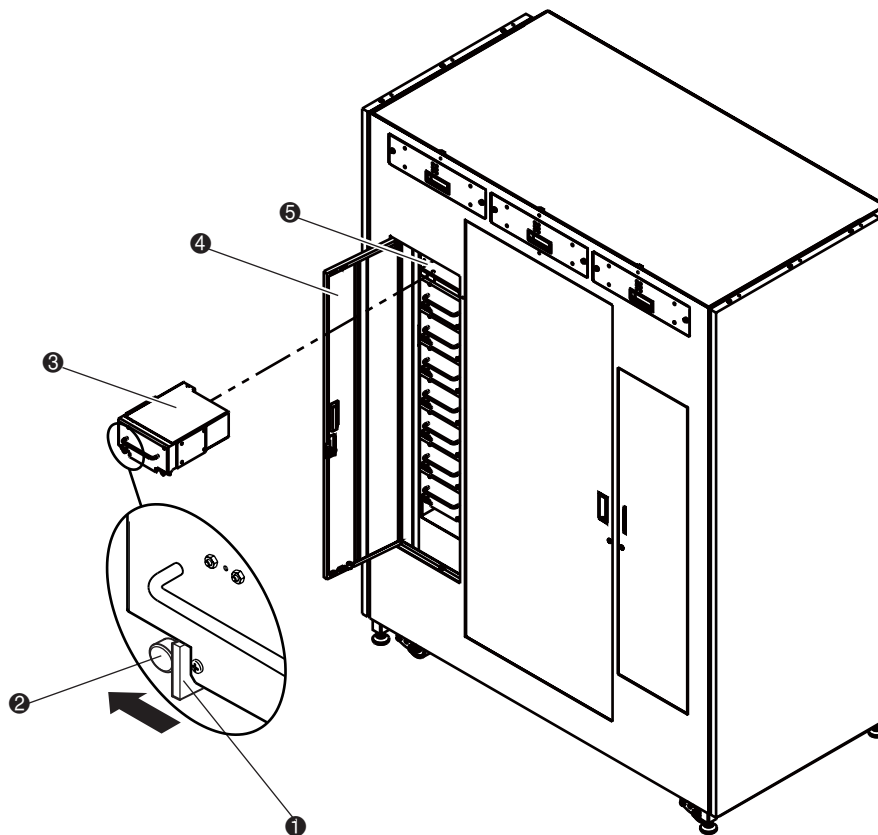


Figure C–1: Installing a tape drive (ESL9198/ESL9322)



- ❶ Hot-plug sensor lever
- ❷ Quick-release thumbscrew on each bottom corner
- ❸ Tape drive
- ❹ Easy-access rear panel
- ❺ Drive bay

Figure C-2: Installing a tape drive (ESL9326/ESL9595)

Sense Data Values

Sense Data Values

Table D-1 lists message information that can be sent from the library to a host computer. The table is sorted by the data in the Additional Sense Code (ASC) column and lists the following information:

- Sense key
- ASC
- Additional Sense Code Qualifier (ASCQ)
- Message name, description, and (potential) recovery action
- Valid interfaces
 - SCSI (host computer)
 - DIAG (diagnostic port/computer)
 - Both = SCSI and DIAG port

The message name and description might contain abbreviations as follows:

- Logical Unit (LU)
- Required (REQ'D)
- Device (DEV)
- Diagnostics (DIAG)
- Nonvolatile RAM (NVRAM)
- Analog-to-Digital (A/D)

Table D–1: Sense Data Values (Hexadecimal)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
0	00	00	NO ADDITIONAL SENSE INFORMATION No recovery necessary.	Both
B	00	00	SCSI ABORT Command aborted because host sent SCSI Abort Message.	SCSI
2	04	00	LU IS NOT READY, CAUSE NOT REPORTABLE Check library power. Retry command.	Both
2	04	01	LOGICAL UNIT IN PROCESS OF BECOMING READY Wait for library to complete initialization.	Both
2	04	02	LOGICAL UNIT INIT REQUIRED Element status or calibration unknown. Perform INITIALIZE ELEMENT STATUS command (SCSI) or INITIALIZE INVENTORY command (DIAG)	Both
2	04	03	LU IS NOT READY, MANUAL INTERVENTION REQ'D Initialization failed. Determine failure type by checking any previous error code returned to host. Correct the cause of the failure and toggle Standby button.	Both
0B	08	00	LOGICAL UNIT COMMUNICATION FAILURE Check cables. Ensure library is turned on. Retry command.	SCSI
0B	08	01	LIBRARY COMMUNICATION TIME-OUT ER_LU_COM_TO QSPI communications not responding. Retry command.	Both
5	1A	00	PARAMETER LIST LENGTH ERROR Invalid parameter list length field specified by command.	SCSI
5	20	00	INVALID COMMAND OPERATION CODE Verify the host command format.	SCSI

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
5	21	01	INVALID ELEMENT ADDRESS Check Mode Sense data for correct element addresses.	SCSI
5	24	00	INVALID FIELD IN COMMAND DATA BLOCK Ensure all reserve fields are set to zero.	SCSI
5	25	00	LOGICAL UNIT IS NOT SUPPORTED Verify the logical unit field specified in the command contains a legitimate logical unit number. Check cabling to logical unit.	SCSI
5	26	00	INVALID FIELD IN PARAMETER LIST Verify Mode Select page fields. Verify that fields comply with the command format described in this guide.	SCSI
5	26	02	PARAMETER VALUE INVALID Verify Mode Select page fields. Verify that fields comply with the command format described in this guide. This response will also be returned for commands issued to the diagnostic interface of the library if an invalid parameter is sent.	Both
6	28	01	IMPORT OR EXPORT ELEMENT ACCESSED Load port door has been closed.	Both
6	29	00	POWER-ON, OR BUS DEVICE RESET OCCURRED Informational message. If power on occurs, the host user should assume the inventory might have been corrupted, and should ask the library for that information again.	Both
6	29	01	POWER-ON OCCURRED Informational message	Both
6	29	02	SCSI BUS RESET OCCURRED Informational message	Both
6	29	03	BUS DEVICE RESET OCCURRED Informational message	Both

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
6	29	04	INTERNAL DEVICE RESET OCCURRED Informational message	Both
6	2A	01	MODE PARAMETERS CHANGED Mode parameters might have changed due to another host issuing a MODE SELECT command.	Both
0B	30	00	INCOMPATIBLE MEDIA An attempt was made to move media to a destination element that is incapable of receiving it.	Both
-none- OR 5	30	03	CLEANING CARTRIDGE INSTALLED Indicates that the element contains a cleaning cartridge that is not used-up. This is returned with the element status data, which has no sense key. CLEANING CARTRIDGE INSTALLED A cleaning cartridge cannot be removed from a drive because it is being used in a cleaning operation. A cartridge cannot be placed into the drive because the drive is being cleaned. A cartridge cannot be placed into an empty storage element because it is reserved for a cleaning cartridge that is currently in use in a drive cleaning operation.	SCSI Both
5	39	00	SAVING PARAMETERS NOT SUPPORTED Verify Save Parameter field in the MODE SENSE command complies with the command format described in this guide.	SCSI

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
5	3A	00	MEDIUM NOT PRESENT The inventory indicated that a cartridge was in this bin but no cartridge was sensed by the gripper when it attempted to pick it. Retry the command. Check for proper seating of the cartridge. It might also indicate that the tape is not ready to be picked from the drive because the tape is not fully unloaded. Retry the command. If the problem persists, check the function of the tape drive handle assembly. Manually unload the tape.	Both
5	3B	0D	MEDIUM DESTINATION ELEMENT FULL Destination element address already contains a cartridge. Issue a READ ELEMENT STATUS command and retry MOVE command. If the problem recurs, issue an INITIALIZE ELEMENT STATUS command followed by a READ ELEMENT STATUS command and retry MOVE MEDIUM command.	Both
5	3B	0E	MEDIUM SOURCE ELEMENT EMPTY Source element address does not contain a cartridge. Issue a READ ELEMENT STATUS command and retry MOVE command. If the problem recurs, issue an INITIALIZE ELEMENT STATUS command followed by a READ ELEMENT STATUS command and retry the MOVE MEDIUM command.	Both
B	43	00	SCSI MESSAGE ERROR Detected message error in message processing on the SCSI bus.	SCSI
B	45	00	SELECT OR RE-SELECT FAILURE Library timed out trying to reselect host. Make sure host is running.	SCSI
B	47	00	SCSI PARITY ERROR SCSI Parity Error detected. Check cable connections and cable length.	SCSI

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
B	48	00	INITIATOR DETECTED ERROR Initiator Detected Error Message was received from the host.	SCSI
5	4E	00	OVERLAPPED COMMANDS ATTEMPTED Due to a second command being sent from the same host before a previous command has completed, the previous command has been aborted. This can also occur when executing off-line commands via the control panel and DIAG port simultaneously.	Both
5	53	02	MEDIUM REMOVAL PREVENTED PREVENT MEDIUM REMOVAL command was executed and command was received to export cartridge. Execute ALLOW MEDIUM REMOVAL command and retry MOVE MEDIUM command.	SCSI
6	54	00	SCSI TO HOST SYSTEM INTERFACE FAILURE Possible SCSI bus time-out or premature disconnect. Check cable connections and cable length.	Both
2	5A	01	OPERATOR MEDIUM REMOVAL REQUEST Indicates that the element contains a cleaning cartridge that is used-up and the library is unable to export the cleaning cartridge. Manually unload the tape. The load port door is open, so import/export elements can not be accessed.	Both
2	80	00	DOOR IS OPENED INVENTORY MAY HAVE BEEN CORRUPTED Close door and retry command. If the library is on-line, it executes its initialization procedure.	Both
6	80	00	DOOR WAS OPENED INVENTORY MAY HAVE BEEN CORRUPTED Close door and retry command.	Both

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
-none-	80	01	DRIVE REQUIRES CLEANING Tape drive indicates that drive needs cleaning. Clean the tape drive. This is returned with element status data, which has no sense key.	SCSI
5	80	01	TRANSFER FULL - COMMAND CANNOT BE EXECUTED Gripper has cartridge in it. Move cartridge to empty storage element using MOVE MEDIUM command. Retry command.	Both
B	80	01	TRANSFER FULL - AT END OF PLACE Gripper has cartridge in it at end of a place operation (Move Medium with a target other than the Transfer). Move cartridge to empty storage element using MOVE MEDIUM command. Retry command.	Both
B	80	06	TRANSFER EMPTY - COMMAND ABORTED Gripper does not contain cartridge at end of pick portion of MOVE MEDIUM command.	Both
2	80	07	SYSTEM IS STOPPED (BUTTON IS CURRENTLY PUSHED) The Stop button on the control panel was pressed. Press the Stop button.	Both
6	80	07	SYSTEM STOP BUTTON WAS PRESSED (MAY CURRENTLY BE PRESSED) The Stop button on the control panel was pressed. Press the Stop button. Retry command.	Both
6	80	08	LOGICAL UNIT TURNED ON-LINE The library is ready to communicate with the host computer. Press the Standby button on the control panel to take the library off-line.	DIAG
2	80	09	LOGICAL UNIT IS TURNED OFF-LINE The library is ready to communicate with the diagnostic PC. Press the Standby button on the control panel to place the library on-line.	SCSI

Table D–1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
6	80	09	LOGICAL UNIT STANDBY BUTTON WAS PRESSED Retry command.	Both
4	80	0A	NVRAM CHECKSUM FAILURE Nonvolatile RAM contents are corrupted. Use the diagnostic software to initialize nonvolatile RAM and calibrate library.	Both
B	80	0B	COMMAND ABORTED BY USER Informational message. No action is necessary.	Both
B	80	0D	CARTRIDGE IS ONLY PARTIALLY GRIPPED (ONLY SEEN IN THE FRONT SENSOR) Issue a MOVE MEDIUM command to move the cartridge from the transfer element to an empty storage element.	Both
6	80	0E	DATA TRANSFER CHANGED A drive has been inserted into the library. Use Read Element Status to determine status of drives.	Both
4	80	0F	LOW POWER ERROR Check power connections.	Both
B	80	10	LOAD RETRY FAILED Library was unable to successfully load the drive, even after retries. Check drive alignment. If the problem continues, drive might need servicing.	Both
4	80	11	MOTOR POWER FAILURE Indicates motor power turned off for a reason not otherwise reported. Toggle of the Stop button should clear.	Both
5	80	22	ELEMENT CONTENTS UNKNOWN The contents of an element address are unknown. Issue a READ ELEMENT STATUS command for the element address. If contents are still unknown issue an INITIALIZE ELEMENT STATUS command.	Both

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
4	80	23	BARCODE DECODER COMMUNICATION FAILURE Unable to initialize decoder. Verify that the decoder is powered on. Cycle power and/or check cable connections.	Both
4	81	00	GRIPPER AXIS INTERNAL FAIL Gripper axis code internal failure. Contact your HP service representative.	Both
B	81	01	GRIPPER TIMEOUT Gripper did not reach desired position. Issue a REZERO UNIT command.	Both
B	81	04	GRIPPER OPEN FAILURE Gripper did not reach open position. Issue a REZERO UNIT command.	Both
B	81	05	GRIPPER CLOSE FAILURE Gripper did not reach close position. Issue a REZERO UNIT command.	Both
B	81	51	UNABLE TO PICK CARTRIDGE Cartridge was sensed in front gripper sensor, but was unable to seat cartridge in the rear gripper sensor. Check that gripper sensors are working and/or that tape was ejected far enough.	Both
4	81	54	GRIPPER TPU REGISTER FAILURE Replace robotic controller board.	Both
4	81	55	GRIPPER TPU RAM FAILURE Replace robotic controller board.	Both
4	82	00	ROTARY AXIS INTERNAL FAIL Rotary axis code internal failure. Contact your HP service representative.	Both
4	82	01	ROTARY TIMEOUT The rotary axis did not reach the desired position within the time limit. Retry the command. If the failure recurs, issue a SELF-TEST command.	Both

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
B	82	04	ROTARY FRONT FAILED The rotary move to the front position failed. Retry the command. If the failure recurs, issue a SELF-TEST command.	Both
B	82	05	ROTARY BACK FAILURE The rotary move to the back position failed. Retry the command. If the failure recurs, issue a SELF-TEST command.	Both
4	82	08	ROTARY HOME NOT FOUND The home flag was not found. Issue REZERO UNIT to retry command. If the failure recurs, issue a SELF-TEST command.	Both
4	82	10	ROTARY INVALID START The rotary axis has not been homed yet. Issue a REZERO UNIT command.	Both
5	82	11	ROTARY INVALID COMMAND Rotary axis was commanded to a position out of its legal range. This is an internal code failure.	Both
4	82	20	ROTARY TEST FAILURE The rotary motor or sensor failed. Check the motor/sensor connections. Make sure that the flags extend into the sensor without contact. Check that the extension axis operates properly, since it must be safely positioned before the rotary axis moves. If the failure recurs, contact your HP service representative.	Both
4	82	23	ROTARY POSITION OVERFLOW The position step counter overflowed. Issue a REZERO UNIT command.	Both
4	83	00	EXTENSION INTERNAL FAILURE Extension axis code internal failure. Contact your HP service representative.	Both
B	83	01	EXTENSION TIMEOUT Extension axis did not reach desired position. Retry command. If the failure recurs, use the diagnostic software to run extension self-test.	Both

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
4	83	02	EXTENSION CURRENT FEEDBACK FAILURE The extension axis is obstructed. Determine the cause of the obstruction. Calibrate the library. Lubricate the rail.	Both
4	83	03	EXTENSION MECHANICAL POSITION ERROR The extension axis was unable to move to commanded position. Retry command. If the failure recurs, run extension self-test.	Both
4	83	08	EXTENSION HOME NOT FOUND The extension axis did not reach the home position. Issue REZERO UNIT to retry the command. If the failure recurs, then issue the SELF-TEST command.	Both
B	83	10	EXTENSION INVALID ACTUATOR START POSITION Extension axis position is unknown. Issue a REZERO UNIT command.	Both
5	83	11	EXTENSION INVALID COMMAND Extension axis was commanded to a position out of the libraries mechanical limits.	Both
4	83	20	EXTENSION TEST FAILURE The value of the extension encoder did not change during the self-test. Check the motor/encoder connector.	Both
4	83	22	EXTENSION ENCODER FAILURE The value of the extension encoder did not change during the self-test. Check the motor/encoder connector.	Both
4	83	40	EXTENSION FORCE NOT REACHED During calibration or pushing in a drive, the extension never reached its intended force. If the failure recurs, run extension self-test.	Both
4	83	41	EXTENSION FORCE OBJECT MISSING During calibration or pushing in a drive, the extension never made contact with any object.	Both

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
4	83	50	EXTENSION SENSOR FAIL The CIG sensor was occluded unexpectedly during calibration, inventory or pick/place. Retry the command. If the failure recurs, contact your HP service representative.	Both
4	84	00	VERTICAL INTERNAL FAILURE Vertical axis code internal failure. Contact your HP service representative.	Both
B	84	01	VERTICAL TIMEOUT Vertical axis did not reach desired position within the time limits. Retry command. If the failure recurs, run vertical self-test.	Both
4	84	03	VERTICAL MECHANICAL POSITION ERROR Vertical axis did not reach desired position. Retry command. If the failure recurs, run vertical self-test.	Both
4	84	08	VERTICAL HOME NOT FOUND Vertical axis did not reach the home position. Issue REZERO UNIT and retry command. If the failure recurs, run vertical self-test.	Both
B	84	10	VERTICAL INVALID ACTUATOR START POSITION Position of vertical axis is unknown. Issue a REZERO UNIT command.	Both
5	84	11	VERTICAL INVALID COMMAND Vertical axis commanded to position out of library mechanical limits. Issue a REZERO UNIT command. If the problem persists, calibrate the library.	Both
4	84	20	VERTICAL TEST FAILURE The value of the vertical encoder did not change during the self-test. Check the motor/encoder connector.	Both

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
4	84	22	VERTICAL ENCODER FAILURE The value of the vertical encoder did not change during the self-test. Check the motor/encoder connector.	Both
4	84	23	VERTICAL POSITION OVERFLOW The position step counter overflowed. Issue a REZERO UNIT command.	Both
4	84	30	VERTICAL MAPPING FAILURE Scanner was unable to detect vertical target during calibration.	Both
4	85	00	HORIZONTAL INTERNAL FAILURE Horizontal axis code internal failure. Contact your HP service representative.	Both
B	85	01	HORIZONTAL TIMEOUT Horizontal axis did not reach desired position within the time limits. Retry command. If the failure recurs, use the diagnostic software to run horizontal self-test.	Both
4	85	03	HORIZONTAL MECHANICAL POSITION ERROR Horizontal axis did not reach desired position. Retry command. If the failure recurs, use the diagnostic software to run horizontal self-test.	Both
4	85	08	HORIZONTAL HOME NOT FOUND Horizontal axis did not reach the home position. Issue REZERO UNIT and retry command. If the failure recurs, run horizontal self-test.	Both
B	85	10	HORIZONTAL INVALID ACTUATOR START POSITION Position of horizontal axis is unknown. Issue a REZERO UNIT command.	Both
5	85	11	HORIZONTAL INVALID COMMAND Horizontal axis commanded to position out of library mechanical limits. Issue a REZERO UNIT command. If the problem persists, calibrate the library.	Both

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
4	85	20	HORIZONTAL TEST FAILURE The value of the horizontal encoder did not change during the self-test. Check the motor/encoder connector.	Both
4	85	22	HORIZONTAL ENCODER FAILURE The value of the horizontal encoder did not change during the self-test. Check the motor/encoder connector.	Both
4	85	23	HORIZONTAL POSITION OVERFLOW The position step counter overflowed. Issue a REZERO UNIT command.	Both
4	85	30	HORIZONTAL MAPPING FAILURE Scanner was unable to detect horizontal target during calibration.	Both
6	88	00	WARNING SAFE TEMPERATURE EXCEEDED This is only a warning that the temperature in the library exceeds the normal operational temperature 96.8°F (36°C).	Both
4	88	01	MAXIMUM TEMPERATURE EXCEEDED Library turns off and remains off until the temperature returns to an acceptable level 59 to 90°F (15 to 32°C).	Both
5	8A	02	UNCALIBRATED POSITION Library requires calibration.	Both
4	8B	00	PASSTHRU INTERNAL FAILURE Pass-through axis code internal failure. Contact your HP service representative.	Both
B	8B	01	PASSTHRU TIMEOUT Pass-through axis did not reach desired position. Retry command. If the failure recurs, use the diagnostic software to run extension self-test.	Both
4	8B	02	PASSTHRU CURRENT FEEDBACK FAILURE The pass-through axis is obstructed. Determine the cause of the obstruction. Calibrate the library. Lubricate the rail.	Both

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
4	8B	03	PASSTHRU MECHANICAL POSITION ERROR The pass-through axis was unable to move to commanded position. Retry command. If the failure recurs, run extension self-test.	Both
4	8B	08	PASSTHRU HOME NOT FOUND The pass-through axis did not reach the home position. Issue REZERO UNIT to retry the command. If the failure recurs, then issue the SELF-TEST command.	Both
B	8B	10	PASSTHRU INVALID ACTUATOR START POSITION Pass-through axis position is unknown. Issue a REZERO UNIT command.	Both
5	8B	11	PASSTHRU INVALID COMMAND Pass-through axis was commanded to a position out of the libraries mechanical limits.	Both
4	8B	20	PASSTHRU TEST FAILURE The value of the pass-through encoder did not change during the self-test. Check the motor/encoder connector.	Both
4	8B	22	PASSTHRU ENCODER FAILURE The value of the pass-through encoder did not change during the self-test. Check the motor/encoder connector.	Both
4	8B	51	PTM ELECTRONICS NOT PRESENT The library backplane needs to be upgraded to VPN 6310520-04 to support the PTM	Both
B	8B	60	PTM FULL The PTM contains a cartridge. Issue a command to retrieve the cartridge from the PTM and place it in either a bin or a tape drive.	Both

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
B	8C	01	LOAD PORT TIMEOUT The load port door was unlocked, but did not leave its current position before time-out (30 seconds). This might be due to the door being stuck, or in the case of a close operation, the operator not moving the door.	Both
4	8C	06	LOAD PORT DOOR OPEN Load port door unlocked but failed to open	Both
B	8C	09	LOAD PACK DETENT FAILURE The load pack bin detention spring is unable to hold or release the cartridge. This is detected during a place if the tape does not stay seated in the pack or during a pick if the tape does not eject from the pack.	Both
B	8D	01	DRIVE HANDLE TIMEOUT Drive handle did not reach commanded position within time limits. Retry the command. If the failure recurs, issue a SELF-TEST command.	Both
4	8D	24	HANDLE HARDWARE Stepper was unable to reach destination (open or close). Retry command. If the failure recurs, run drive handle Self-test.	Both
4	8E	01	FLASH MEMORY UNABLE TO IDENTIFY Flash is soldered onto the board. Contact your HP service representative.	DIAG
4	8E	02	FLASH MEMORY UNABLE TO ERASE Flash is soldered onto the board. Contact your HP service representative.	DIAG
4	8E	03	FLASH MEMORY UNABLE TO PROGRAM Flash is soldered onto the board. Contact your HP service representative.	DIAG
B	8F	00	LIBRARY UNIT COMMAND TIMED OUT Verify that communications to the library still exists by issuing another command	SCSI

Table D-1: Sense Data Values (Hexadecimal) (Continued)

Sense Key	ASC	ASC Q	Message Name/Description	Interface
5	F0	01	RESERVATION CONFLICT Internal firmware error. Report this occurrence and previous command (if known) to your HP service representative.	Both
5	F1	00	COMMAND UNSPECIFIED Internal firmware error. Report this occurrence and previous command (if known) to your HP service representative.	Both
5	F1	01	COMMAND HEAP OVERFLOW Internal firmware error. Report this occurrence and previous command (if known) to your HP service representative.	Both
5	F1	02	UNRECOGNIZED COMMAND Internal firmware error. Report this occurrence and previous command (if known) to your HP service representative.	Both
5	F1	03	COMMAND REGISTER ERROR Internal firmware error. Report this occurrence and previous command (if known) to your HP service representative.	Both
5	F3	00	COMMUNICATION INTERNAL FAILURE Internal drive communication port code or hardware failure.	Both
4	F3	02	DRIVE COMMUNICATION TIMEOUT The library is unable to communicate with a drive.	Both
4	F3	11	DRIVE HANDLE NOT OK The tape drive is reporting that the handle cannot open. (This might indicate that a cartridge is present that has not been unloaded.)	Both

Capacity on Demand

The ESL9322 and ESL9595 libraries ship with the maximum number of physical storage bins, however access to these bins is dependent on the model that you ordered and is controlled by the library software.

There are two options offered for the ESL9322:

- 222 bin
- 322 bin upgrade

There are three options offered for the ESL9595:

- 400 bin
- 500 bin upgrade
- 595 bin upgrade

Contact your HP authorized reseller for information on obtaining an upgrade key.

Upgrading Your Capacity

To upgrade the capacity:

1. Make sure all jobs running on the library have been stopped, then place the library into Standby mode.
2. Obtain the upgrade key from your HP authorized reseller.
3. Touch the License tab on the control panel.

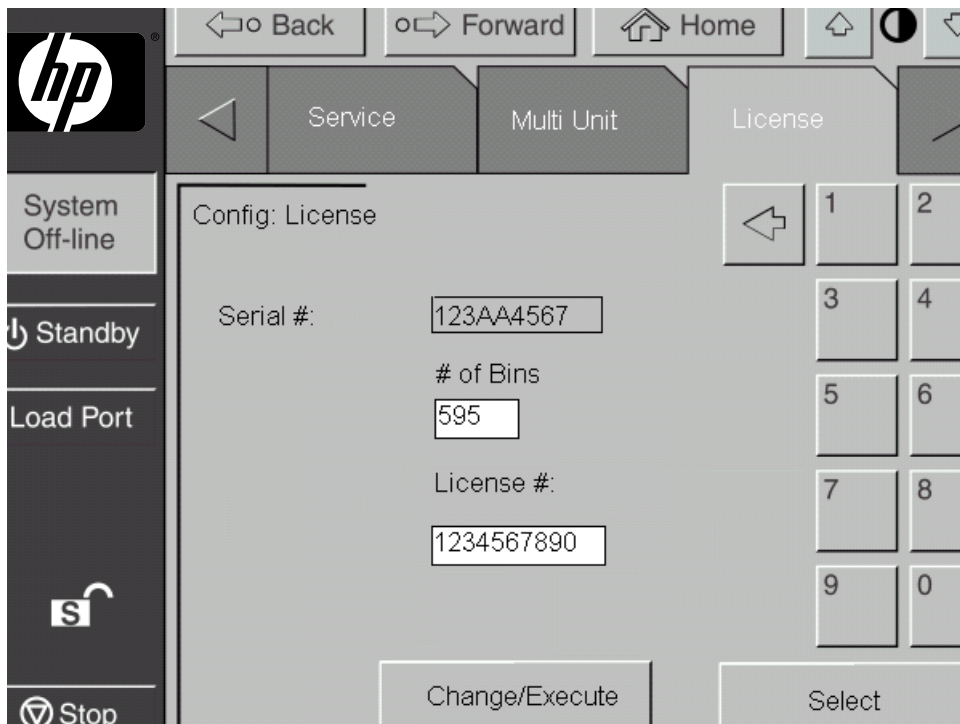


Figure E-1: License screen (ESL9595 shown)

4. Enter the number of bins you are upgrading to and then press Select.
5. Enter the license number provided to you by your HP authorized reseller.
6. Press Change/Execute.

The library automatically updates the configuration to the number of bins provided by the license key. If you receive an error message:

1. Verify that the license number you entered is correct and enter it again.
2. Contact your HP authorized reseller.

NOTE: The application software may need to be closed and restarted to work properly with the newly enabled bins.

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