HP StorageWorks MSL Library Extender user guide

This document provides information about installing, configuring, operating, troubleshooting, and servicing an HP StorageWorks MSL Library Extender. This document is intended for system administrators who plan to install, operate, or service a Library Extender. It is helpful to have experience administering an HP StorageWorks MSL2024, MSL4048, or MSL8096 Tape Library. This document is a supplement to the HP StorageWorks MSL2024, MSL4048, and MSL8096 Tape Libraries user and service guide.

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<td>Japanese laser notice</td>
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<tr>
<td>Spanish laser notice</td>
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<td>Recycling notices</td>
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<td>English notice</td>
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<td>Danish notice</td>
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<td>87</td>
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<td>French battery notice</td>
<td>88</td>
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<tr>
<td>German battery notice</td>
<td>88</td>
</tr>
<tr>
<td>Italian battery notice</td>
<td>89</td>
</tr>
<tr>
<td>Japanese battery notice</td>
<td>89</td>
</tr>
<tr>
<td>Spanish battery notice</td>
<td>90</td>
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1 Features and overview

The Library Extender combines two HP StorageWorks MSL Tape Libraries to create a single extended library. Before installing the Extender, the Libraries must be installed in the rack rails supplied with the Libraries in adjacent rack locations, one Library above the other. See the example shown in Figure 1.

![Library Extender installed with two MSL4048 Tape Libraries](image)

**Figure 1 Library Extender installed with two MSL4048 Tape Libraries**

The Extender occupies the lower half-height drive bay of the upper Library and the top half-height drive bay of the lower Library.

The upper Library controls the extended library and is called the *master Library*. The extended library uses only the master Library OCP, USB port, and Ethernet connection.

The lower Library is controlled by the master Library. The lower Library OCP, USB port, and Ethernet connection are not used by the extended library.

**Table 1 Supported configurations**

<table>
<thead>
<tr>
<th>Master Library</th>
<th>Lower Library</th>
<th>Total slots</th>
<th>Total half-height drive bays</th>
<th>Total full-height drive bays</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSL4048</td>
<td>MSL2024</td>
<td>72</td>
<td>3+1</td>
<td>1+0</td>
</tr>
<tr>
<td>MSL4048</td>
<td>MSL4048</td>
<td>96</td>
<td>3+3</td>
<td>1+1</td>
</tr>
<tr>
<td>MSL8096</td>
<td>MSL2024</td>
<td>120</td>
<td>3+1</td>
<td>3+0</td>
</tr>
<tr>
<td>MSL8096</td>
<td>MSL4048</td>
<td>144</td>
<td>3+3</td>
<td>3+1</td>
</tr>
</tbody>
</table>
Slot numbering and mailslot configurations

Magazine and mailslot numbering begins with the lower Library and continues with the master Library. For storage slot numbering, see Table 2.

Table 2 Storage slot numbering

<table>
<thead>
<tr>
<th>Extended library configuration</th>
<th>Slot numbers (without mailslots enabled)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Library</td>
<td>Master Library</td>
</tr>
<tr>
<td>MSL2024</td>
<td>MSL4048</td>
</tr>
<tr>
<td>MSL4048</td>
<td>MSL4048</td>
</tr>
<tr>
<td>MSL2024</td>
<td>MSL8096</td>
</tr>
<tr>
<td>MSL4048</td>
<td>MSL8096</td>
</tr>
</tbody>
</table>

The mailslots in both Libraries can be configured for use in the extended library. For mailslot numbering, see Table 3.

Table 3 Mailslot numbering

<table>
<thead>
<tr>
<th>Extended library configuration</th>
<th>Mailslot numbers (with all mailslots enabled)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Library</td>
<td>Master Library</td>
</tr>
<tr>
<td>MSL2024</td>
<td>MSL4048</td>
</tr>
<tr>
<td>MSL4048</td>
<td>MSL4048</td>
</tr>
<tr>
<td>MSL2024</td>
<td>MSL8096</td>
</tr>
<tr>
<td>MSL4048</td>
<td>MSL8096</td>
</tr>
</tbody>
</table>

Tape drives

Tape drives are numbered starting with the lower Library and continuing with the master Library. Any tape drive in the extended library can host the SCSI Library interface. The default is the lowest tape drive in the lower Library.

Power supply redundancy

Both Libraries must have a working power supply for the extended library to operate. To have total power supply redundancy, both Libraries must have working redundant power supplies. In an extended library, if only one Library has redundant power supplies installed, the extended library will continue to operate in case of a power supply failure in that Library. An extended library containing an MSL2024 cannot have total power supply redundancy because the MSL2024 only has one power supply.
Using the Extender with the Encryption Kit

The HP StorageWorks 1/8 G2 & MSL LTO-4 Encryption Kit provides secure generation and storage of encryption keys.

An extended library will only access the key server token in the master Library.

**NOTE:**
The USB port in the lower Library is not active.

The extended library must contain at least one LTO-4 tape drive to use the Encryption Kit. LTO-4 tape drives can be in any valid drive location in the extended library.

If combining two Libraries that were both using the Encryption Kit, you can copy the keys from one of the tokens onto the other so the token that will be used in the extended library has the keys to read tapes from both Libraries. See the section on combining keys from multiple key server tokens in the *HP StorageWorks 1/8 G2 and MSL Encryption Kit user guide* for instructions. To download the user guide from the HP website, see Related documentation, page 67.

If you separate an extended library that uses the Encryption Kit and will have at least one LTO-4 tape drive in each of the Libraries, you can copy the encryption keys on the token from the extended library to a new token so both Libraries have access to all of the keys. See the *HP StorageWorks 1/8 G2 and MSL Encryption Kit user guide* for instructions. To download the user guide from the HP website, see Related documentation, page 67.

Extended libraries and logical libraries

When the Extender is installed, the extended library is configured as a single logical library. An extended library cannot be partitioned into multiple logical libraries.

If the Libraries are ever separated, each individual Library will become a single logical library until reconfigured.

Installation overview

Successful installation of the Extender requires performing key steps in the order specified in Chapter 3, page 27.

1. Obtain the latest firmware for each Library from the HP website and download it into each Library separately.
2. Enable extended mode on each Library.
3. Power off both Libraries.
4. Position the Libraries in the rack on their own rack rails.
5. Align the two Libraries using the alignment gauge.
6. Move the tape drives, if necessary, to open the drive bays that will be used by the Extender.

**NOTE:**

In an MSL4048, a full-height tape drive will only operate in the two upper or two lower half-height drive locations. Do not install a full height tape drive in the middle half-height drive bays of an MSL4048 Tape Library.

7. Install the Extender.

8. Tighten the captive rack attachment screws on the front of the Libraries.

9. Power on both Libraries and verify that the three Extender LEDs are illuminated.

### Rack stability

Rack stability protects personnel and equipment.

⚠️ **WARNING!**

To reduce the risk of personal injury or damage to equipment:

- Extend leveling jacks to the floor.
- Ensure that the full weight of the rack rests on the leveling jacks.
- Install stabilizing feet on the rack.
- In multiple-rack installations, fasten racks together securely.
- Extend only one rack component at a time. Racks can become unstable if more than one component is extended.
This chapter provides information about extended library configuration and operation tasks that are different from a single Tape Library.

If you are installing the Extender for the first time, read this chapter for reference after installing the Extender following the instructions in Chapter 3, page 27.

**TIP:**

Check the Help screens in the RMI for additional information. The help pages are updated with most firmware updates and often contain technical details that are not contained in this document. To access RMI help, click Help on the right side of the Web page banner, as shown in Figure 2 on page 15.

![Figure 2 Help available from the RMI](image)

**Powering on the extended library**

To power on the extended library, power on each of the Tape Libraries from their OCPs. The Libraries can be powered on in either order. The initialization sequence is faster if the lower Library is powered on first.
Figure 3 Press the power buttons on both Libraries to power on the extended library

If the master Library is powered on first, it will prompt the user to power on the lower Library. If the lower Library is powered on first, it will remain in an uninitialized state until it receives an initialization command from the master Library.

Powering off the extended library

To power off the extended library, power off the master Library. The master Library will power the lower Library off. If the master Library is powered off with the emergency power off procedure or the power cord is removed, the lower Library will lose communication with the master Library and must be powered off by depressing its power button and holding it for at least 10 seconds.
Viewing identity information

To view detailed information about both Tape Libraries and the Extender, use the RMI Identity > Library page or the master Library Info > Identity OCP screen.

<table>
<thead>
<tr>
<th>Library Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td>DEC716067E_X84</td>
</tr>
<tr>
<td>Product ID</td>
<td>MSL G3 Series</td>
</tr>
<tr>
<td>Currently Installed Library Firmware</td>
<td>0.20 / 2.70e</td>
</tr>
<tr>
<td>Bootcode Firmware Revision</td>
<td>0.60</td>
</tr>
<tr>
<td>Library Node</td>
<td>Automatic, Random</td>
</tr>
<tr>
<td>WWN Drive Node Name</td>
<td>5001104000089F285</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Library Extender Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware Revision</td>
<td>0.36</td>
</tr>
<tr>
<td>Serial Number</td>
<td>DEI1600023</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lower Library Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td>DEC83708TA</td>
</tr>
<tr>
<td>Product ID</td>
<td>MSL G3 Series</td>
</tr>
<tr>
<td>Currently Installed Library Firmware</td>
<td>6.00 / 2.70e</td>
</tr>
<tr>
<td>Library Height</td>
<td>4U</td>
</tr>
</tbody>
</table>

**Figure 5 Identity > Library page**

The Library Information pane displays information about the master Library and the extended library.

- **Serial Number** — the electronic serial number for the master Library. The part of the serial number before the '_' character, should match the serial number printed on the Library label, located on the pull out tab on the back of the Library. The part of serial number after the '_' character encodes the extended library components as follows:
  - X — signifies that the master Library is in extended mode
  - ml — shows the height of the master and lower Libraries, respectively
    - 2 is an MSL2024
    - 4 is an MSL4048
    - 8 is an MSL8096

In the example shown in **Figure 5**, page 17, with the serial number DEC716067E_X84, the master Library serial number is DEC716067E, the master Library is an MSL8096 and the lower Library is an MSL4048.

- **Product ID** — how the device identifies itself to the host computer. This will always be **MSL G3 Series**.

- **Currently Installed Library Firmware x.xx / y.yy**.
  - x.xx is the version of the Library controller firmware. This number is used to reference firmware versions when downloading new firmware from the HP website.
  - y.yy is the version of the robotics firmware.
• Bootcode Firmware Revision.
• Library Mode.
  • Automatic — the device will switch from Sequential to Random mode if it receives media changer SCSI commands.
  • Manual — the device will stay in the current mode until another mode is configured by a user.
  • Random — the device will not automatically load and unload tapes. Instead, it will wait for commands from the backup software or the OCP to load and unload tapes.
  • Sequential — the device will automatically unload the tape in the drive when the host software sends an unload command to the drive and then automatically load the tape from the next highest sequentially numbered full slot.
  • Loop — in Loop mode, the Library will load the tape from the lowest numbered full slot after the tape from the highest numbered full slot is unloaded. If Loop is not listed, the Library will stop automatically loading and unloading tapes after the tape from the last full slot is unloaded.

\[\text{CAUTION:}\]
Since loop mode will endlessly cycle through the tapes, it is possible to overwrite old data. Make sure that there are enough tapes in the Library or that the tapes are regularly rotated in and out to ensure that data you want to save is not overwritten.

• Autoload — the device will automatically load the tape from the lowest numbered full slot on power up.
• WWide Node Name — a world wide unique identifier that the Library reports over SCSI and may be used by operating systems or software applications to identify and track the Library.

The Library Extender pane displays information about the Library Extender.
• Firmware revision — the version of Library Extender firmware.
• Serial Number — the electronic serial number for the Library Extender.

The Lower Library Information pane displays information about the lower Library.
• Serial Number — the electronic serial number for the lower Library. This serial number should match the serial number printed on the Library label, located on the pull out tab under the drive or lowest drive bay cover on the back of the Library.
• Product ID — how the device identifies itself to the host computer. This will always be MSL G3 Series.
• Currently Installed Library Firmware x.xx / y.yy
  • x.xx is the version of the Library controller firmware. This number is used to reference firmware versions when downloading new firmware from the HP website.
  • y.yy is the version of the robotics firmware.
• Library Height
  • 2U is an MSL2024
  • 4U is an MSL4048

**Viewing Library status**

To view a summary of the extended library status, use the RMI **System Status** pane.
Figure 6 Example of the System Status pane from an extended library with an MSL8096 master Library and MSL4048 lower Library

- **Updated** — the day, date, and time of the most recent status view. This timestamp comes from your computer and may be different from the Library time lower in the pane. Click your browser's refresh button to update the system status.

- **Status of the Library and tape drives**

  - The green **Status Ok** icon indicates that the device is fully operational and that no user intervention is required.
  
  - The blue exclamation point **Status Warning** icon indicates that user intervention is necessary, but that the device can still perform most operations.
  
  - The red X **Status Error** icon indicates that user intervention is required and that the device is not capable of performing some operations.

- **Slots (Free/Total)** — The number of free and total storage slots.
  - **Free** is the number of empty storage slots.
  - **Total** is the number of storage slots available to the host software, which does NOT include reserved slots.

- **Mailslot** — shows whether the mailslot is open, closed, or disabled.

- **Library Time** — the date and time from the Library, which can be set from the OCP or RMI. The Library Time is updated when the system status is refreshed. The time of the most recent refresh is the Updated time at the top of the pane. If you call HP Service and are requested to provide the Library time, refresh the system status with your browser refresh button and then give the service engineer this Library Time.

- **Power Supply Status (MSL4048 and MSL8096)**
  - **MSL4048** — Online — The power supply is installed.
  - **MSL8096** — Good — The power supply is functioning correctly.
• MSL8096 — Functional, fan failure — The power supply is supplying power to the Library, but the fan has failed so the power supply could fail soon. The power supply should be replaced.
• Installed, failed — The power supply installed in the unit is not working and the Library no longer has redundant power. The power supply should be replaced.

**NOTE:**

If the MSL4048 has two power supplies and one fails, after a power cycle the Library will not recognize the failed power supply as installed in the Library.

The number of power supplies installed in the Library is displayed next to the icon.

• MSL8096 — Removed — A power supply was installed in this location before but has been removed. Power Supply 1 will always show Removed when it is missing. Power Supply 2 will show Removed until the Library is rebooted.

For detailed status information, use the RMI Status > Library page or OCP Info > Status screen.

<table>
<thead>
<tr>
<th>Library Status At 13:51:58 Library Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status  Ready</td>
</tr>
<tr>
<td>Lower Library Status  Ready</td>
</tr>
<tr>
<td>Library Extender Status  Enabled (Master Library)</td>
</tr>
<tr>
<td>Cartridge In Transport  None</td>
</tr>
<tr>
<td>Odometer  17469</td>
</tr>
<tr>
<td>Lower Library Odometer  17062</td>
</tr>
<tr>
<td>Total Power On Time  1024 5h 56min</td>
</tr>
<tr>
<td>Lower Library Total Power On Time 924 20h 50min</td>
</tr>
<tr>
<td>Robotic Status  Ready</td>
</tr>
<tr>
<td>Lower Library Robotic Status  Ready</td>
</tr>
<tr>
<td>Internal Temperature 27.9 °C</td>
</tr>
<tr>
<td>Lower Library Internal Temperature 26.4 °C</td>
</tr>
<tr>
<td>Power Supply Status 2 Online</td>
</tr>
<tr>
<td>Media Removal  Allowed</td>
</tr>
<tr>
<td>Master Library - Level 1 - Left Magazine Present</td>
</tr>
<tr>
<td>Master Library - Level 1 - Right Magazine Present</td>
</tr>
<tr>
<td>Master Library - Level 2 - Left Magazine Present</td>
</tr>
<tr>
<td>Master Library - Level 2 - Right Magazine Present</td>
</tr>
<tr>
<td>Lower Library - Level 1 - Left Magazine Present</td>
</tr>
<tr>
<td>Lower Library - Level 1 - Right Magazine Present</td>
</tr>
</tbody>
</table>

**Figure 7** Status > Library RMI page for an extended library with an MSL4048 master Library and an MSL2024 lower Library

• Status, Lower Library Status — The status of the master and lower Libraries.

  The green Status Ok icon indicates that the device is fully operational and that no user intervention is required.
The blue exclamation point Status Warning icon indicates that user intervention is necessary, but that the device can still perform most operations.

The red X Status Error icon indicates that user intervention is required and that the device is not capable of performing some operations.

- Library Extender Status — The status of the Library Extender and extended mode. If the Extender is installed but extended mode not enabled or if extended mode is enabled but the Extender is not enabled, the Library Extender Status will include instructions for addressing the inconsistency.
- Cartridge in Transport — The slot number where the tape currently in the robot originated. None if there is not a tape in the robotic.
- Odometer, Lower Library Odometer — The total number of moves the master Library and lower Library have performed since their manufacture. A cartridge transfer between Libraries will increment both odometers. A cartridge move within a single Library will only increment the odometer in that Library.
- Total Power On Time, Lower Library Total Power On Time — The number of days, hours, and minutes master Library and lower Library have been powered on since their manufacture.
- Robotic Status, Lower Library Robotic Status — The current status of the master Library and lower Library robotics, and a description of the operation the robots are currently performing.
- Internal Temperature, Lower Library Internal Temperature — The internal temperature reported by the master Library and lower Library.
- Power Supply Status — The current status of each of the installed power supplies. (MSL4048 and MSL8096). See Power Supply Status values, page 19.
- Media Removal — Prevented, if the backup software is preventing media removal from the Library. When media removal is prevented, mailslot user access and magazine removal are disabled.
- Level n. Left Magazine — The state of the left magazine at level n. The magazine levels are numbered from the bottom of the Library to the top. For example, Level 1. Left Magazine is the bottom magazine on the left side looking at the Library from the front.
  - Present, if the Library senses the presence of a fully inserted magazine.
  - Removed, if the magazine is not fully inserted into the Library.
- Level n. Right Magazine — the state of the right magazine at level n.
  - Present, if the Library senses the presence of a fully inserted magazine.
  - Removed, if the magazine is not fully inserted into the Library.

Configuring the extended library

Configure the extended library from the RMI Configuration > System page or from the master Library OCP Configuration menu.

NOTE:

In extended mode, the only functions available through the lower Library OCP are disabling extended mode and adjusting the display contrast (MSL4048 or MSL8096 only).
Figure 8 Configuration > System RMI page for an extended library with an MSL8096 master Library and an MSL4048 lower Library

- **Library LUN Hosted By Drive** — Specifies the master tape drive for the extended library through which the host system controls the extended library. The default is the lowest numbered tape drive in the extended library. If an extended library has only one tape drive, it is the master drive for the extended library. If an extended library has more than one tape drive, you may specify the master. The number is the physical drive number.

- **Library Mode** — Specifies the library mode for the extended library. The default mode is **Automatic**. The extended library supports three behavior modes: Random, Sequential, and Automatic. The extended library automatically detects the required mode from the series of SCSI commands it receives; however, you can also change the mode. Select the operating mode based on the capabilities of the software controlling the tape cartridges.
  
  **Random mode** — In Random mode, the device does not automatically load tapes into the tape drives; it waits for commands from the software or operator to load and unload tapes. Random mode is used with a full featured or a robotics-aware backup application and is the most common mode of operation. Your backup software must support robotics, which may require an additional software module.

  **Sequential mode** — In Sequential mode, the device automatically loads and unloads tapes from the drive. Sequential mode is used when the backup software is NOT robotics-aware or was designed for standalone drives only.

  When Extended mode is enabled, the extended library will only use the lowest-numbered tape drive in the extended library.

  The operator begins the sequence by loading the desired tape into the tape drive. When a tape is unloaded, the device automatically removes the tape from the drive, returns it to its original slot, then loads the tape from the next available higher numbered slot.

  To further determine how tapes are loaded into the tape drive while in Sequential mode, you can set the **Loop** and **Autoload** options.
• When **Autoload** mode is set, the device automatically loads the cartridge from the lowest-numbered full slot into the tape drive. It then follows standard sequential operation.

• When **Loop** mode is on, the original first cartridge in the sequence is reloaded after the device has cycled through all available cartridges. If Loop mode is off and the last cartridge has been unloaded, the device stops loading cartridges until you load another manually.

⚠ **CAUTION:**

Use caution when choosing Loop mode because it makes it possible to overwrite data on previously written cartridges.

---

**Automatic mode**: In Automatic mode, the device switches from Sequential mode into Random mode when it receives certain SCSI commands. Automatic mode is the default setting.

• **Reserved Slots** — The number of slots in the extended library that are not available to the backup software. You can store cleaning cartridges in reserved slots, or leave reserved slots empty. The slots are reserved from the highest slot number down. The default is 0 reserved slots so the maximum number of slots are available to the host. The extended library must have at least two slots that are not reserved.

• **Mailslot Configuration for the master Library and lower Library**
  - **MSL2024 and MSL4048** — configures the mailslot in the lower left magazine as a mailslot or storage slots. The MSL2024 mailslot has one slot; the MSL4048 mailslot has three slots. Enabling the mailslot will reduce the total number of storage slots. The default is disabled.
  - **MSL8096** — configures the mailslot in the lower-left magazine and upper-right magazine as mailslots or storage slots. Enabling a mailslot will reduce the number of storage slots. The default is 0 mailslots enabled.

You can enable either or both of the mailslots by selecting the number of mailslot slots in the **Mailslot Configuration** drop down list.

- **0** disables both mailslots.
- **3** enables the lower-left mailslot only.
- **12** enables the upper-right mailslot only.
- **15** enables both mailslots.

⚠ **CAUTION:**

Enabling or disabling a mailslot will re-number the storage slots in one or both of the Libraries. After enabling or disabling any mailslots, update the backup software inventory. You may also need to re-configure the backup software to adjust the number of storage slots and presence of the mailslot.

---

• **Auto Clean Enabled** — When auto clean is enabled, the device automatically loads a cleaning cartridge when a tape drive needs to be cleaned. The device identifies a tape cartridge as a cleaning cartridge if it has a bar code label that starts with CLN or after an unlabeled cleaning tape has been loaded into the tape drive.

The Library can use a cleaning cartridge from any slot, even if the slot is reserved. The Library keeps track of the usage count for each of the cleaning cartridges. When multiple cleaning cartridges are available, the Library will first select a cleaning cartridge with an unknown usage count so the Library can start tracking the cartridge’s usage count. If the Library knows the usage count for all of the cleaning cartridges, the Library will select the one with the highest usage count.
Auto cleaning is disabled by default. You can enable automatic cleaning even if there are no cleaning cartridges in the device. In this case, the device will display a warning message.

⚠️ **CAUTION:**

Only enable automatic cleaning in either the backup application or the Library, not both.

- **Barcode Label Length Reported to Host** — the number of bar code characters reported to the host application. This option provides compatibility with libraries and software with more limited bar code reading capabilities. The default is 8.

- **Barcode Label Alignment Reported to Host** — configures the end of the bar code label characters to report to the host application when reporting fewer than the maximum number of characters. For example, when reporting only six characters of the bar code label 12345678, if the alignment is left, the Library will report 123456. If the alignment is right, the Library will report 345678. The default is left, which is used by most software applications.

- **Ignore Barcode Media ID** — when disabled (default), the barcode Media ID on the tape cartridges will be checked by the Library. The Library will only allow appropriate tape cartridges to be loaded into tape drives. The barcode Media ID is the last two characters of the barcode. For example, an LTO-4 labeled cartridge will not be allowed to move into an LTO-3 tape drive. When Ignore Barcode Media ID is enabled, the Library will move any tape to any tape drive. If the cartridge is incompatible with the tape drive, a message will be displayed. HP strongly recommends that all tape cartridges have barcodes with the correct Media ID.

- **Magazine access using front panel - Admin password required** — when enabled (default), the Administrator password is required to remove the magazines from the OCP. When disabled, the magazines may be removed using the OCP without entering a password. Robotic motion is prevented when magazines are removed. Allowing unauthorized removal of magazines can leave the Library in a state where backup operations cannot continue if all magazines are not properly replaced in the Library. The default is to require the Administrator password.

- **Extended mode enabled** — select the box to enable extended mode; clear the box to disable extended mode. The configuration will take effect when the Library power is cycled. Extended mode must be enabled or disabled in both Libraries.

Extended mode can only be disabled in the lower Library from the OCP.

System configuration changes are only applied after the **Apply Selections** or the **Submit** button is selected. After making the selection, a warning page informs you of the impact of the proposed change. In some cases a pop-up screen asks you to confirm the change. Many changes also require the device to reboot. You may need to click **Refresh** to see the changes.
Default settings for the extended library

<table>
<thead>
<tr>
<th>Setting</th>
<th>Default for the extended library</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator password</td>
<td>Retained from the master Library</td>
</tr>
<tr>
<td>Mailslot configuration</td>
<td>All mailslots are disabled</td>
</tr>
<tr>
<td>Network settings</td>
<td>Retained from the master Library</td>
</tr>
<tr>
<td>Barcode format reporting</td>
<td>Retained from the master Library</td>
</tr>
<tr>
<td>Reserved slots</td>
<td>Reserved slots are set to 0</td>
</tr>
<tr>
<td>SCSI master drive</td>
<td>Lowest physical drive in the master Library</td>
</tr>
<tr>
<td>SCSI tape drive addresses</td>
<td>Retained by both Libraries.</td>
</tr>
<tr>
<td>Contrast setting (MSL4048 and MSL8096)</td>
<td>Retained by both Libraries.</td>
</tr>
<tr>
<td>Library mode</td>
<td>Automatic</td>
</tr>
<tr>
<td>Autoload</td>
<td>No</td>
</tr>
<tr>
<td>Loop</td>
<td>No</td>
</tr>
<tr>
<td>Date and time</td>
<td>Retained from the master Library. The lower Library is synchronized with the master Library with every command in the extended library.</td>
</tr>
<tr>
<td>Drive power</td>
<td>All tape drives are powered on.</td>
</tr>
<tr>
<td>Auto clean</td>
<td>Retained from master Library</td>
</tr>
<tr>
<td>SNMP</td>
<td>Retained from the master Library. If SNMP is not configured for the master Library but is configured for the lower Library, the extended library takes the settings from the lower Library.</td>
</tr>
<tr>
<td>Allow magazine access without a password</td>
<td>Retained from the master Library</td>
</tr>
<tr>
<td>Ignore barcode media ID</td>
<td>Retained from the master Library</td>
</tr>
<tr>
<td>Encryption</td>
<td>Enabled if encryption is enabled in either Library otherwise disabled.</td>
</tr>
<tr>
<td>Logical libraries (partitioning)</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

Updating firmware

Both Libraries must have a firmware version that supports the Library Extender and the firmware versions must be compatible with each other for the extended library to operate. When installing and configuring the extended library the first time, you must update both Libraries to the most recent available firmware versions to ensure that the firmware versions are compatible. For instructions on installing firmware, see Upgrading the Library firmware, page 29.

To find Library firmware that supports the Library Extender:

2. Select and download the newest firmware version for your Library without _LX_ in the filename.

**NOTE:**

The first time you install the Extender you must update the firmware in each Library individually. For future firmware updates, when extended mode is enabled you can update the firmware for both Libraries at the same time with the Extender firmware package. Updating with the firmware package is not only faster and easier, but ensures that the Libraries have compatible firmware versions. When updating firmware for the extended library, select the file with _LX_ in the filename.

The library extender firmware package can be installed from the RMI Support > Firmware page, from the OCP Support > FW Upgrade > By USB screen, or by using HP Library & Tape Tools version 4.8 or newer.

Tape drive firmware is updated through the master Library for all tape drives in the extended library. See the HP StorageWorks MSL2024, MSL4048, and MSL8096 Tape Libraries user and service guide for instructions on updating tape drive firmware.

**NOTE:**

Before downgrading the Library firmware to a version that does not support the Extender, disable extended mode in both Libraries and remove the Extender.

### Running diagnostic tests

**Diagnostic tests for the extended library**

- **Demo** — moves cartridges from the slots to the drives and back. At the end of the test the cartridges are returned to their original slots. The demo is executed from the RMI or OCP.
- **Slot to slot** — shuffles the cartridges between slots to exercise the robot. At the end of the test the cartridges are NOT returned to their original slots. The slot test is executed from the RMI or OCP.
- **Library Extender cycle test** — moves the first available cartridge in the master Library to the lower Library and back, exercising the robotics in both Libraries and the Extender, with cartridge exchanges in both directions. At the end of the test the cartridge is returned to its original slot. The Library Extender cycle test is executed from the RMI or OCP.
- **Wellness test** — exercises all extended library functionality except the external interfaces. The wellness test is executed from the OCP. For instructions on setting and running the wellness test, see The wellness test, page 44.

The demo and slot to slot tests are intended to show the device operating. For Library Extender service and diagnostics, execute the Library Extender cycle test. To verify installation and repairs, execute the wellness test.
3 Installing the Library Extender

This chapter provides instructions for installing the Library Extender.

⚠️ WARNING!

The MSL2024 Tape Library weighs up to 15.6 kg (34.3 lb) without media and up to 20.4 kg (44.9 lb) with media (24 cartridges). The MSL4048 Tape Library weighs up to 24.6 kg (54.1 lb) without media and up to 34.2 kg (75.2 lb) with media (48 cartridges). The MSL8096 Tape Library weighs up to 46.6 kg (102.7 lb) without media and up to 68.8 kg (151.7 lb) with media (96 cartridges).

- Observe local health and safety requirements and guidelines for manual material handling.
- Remove all tapes to reduce the overall weight of the device and prevent cartridges from falling into the robotic path and damaging the Library.
- Obtain adequate assistance to lift and stabilize the device during installation or removal.

⚠️ WARNING!

When placing the Library into or removing the Library from a rack, to reduce the risk of personal injury or damage to equipment:

- Extend the rack’s leveling jacks to the floor.
- Ensure that the full weight of the rack rests on the leveling jacks.
- Install stabilizing feet on the rack.
- Extend only one rack component at a time. Racks may become unstable if more than one component is extended.
Identifying product components

Figure 9 Library Extender product contents

Verify that you received the following:

1. Library Extender
2. Packet containing two half-height drive bay covers, four screws, and the alignment gauge.
3. Getting started guide

Downloading product documentation

This document contains information about configuring and operating the extended library. For information about and instructions for installing, configuring, and operating the Tape Libraries, download the HP StorageWorks MSL2024, MSL4048, and MSL8096 user and service guide from the HP website:

2. In the Tape Storage and Media section, select Tape Libraries.
3. Select HP StorageWorks MSL4048 Tape Library.

**NOTE:**
The same user guide is used for the MSL2024, MSL4048, and MSL8096 Tape Libraries.

4. In the Resources for HP StorageWorks MSL4048 Tape Library section, select Manuals.
5. In the User guide section, download the following documents:
   • HP StorageWorks MSL2024, MSL4048, and MSL8096 user and service guide
   • HP StorageWorks 1/8 G2 and MSL Encryption Kit user guide, if the Libraries use the Encryption Kit
Determining the master and lower Library

The Library Extender is installed with two HP StorageWorks MSL Tape Libraries to combine the cartridge and tape drive slots into a single extended library, as shown in the example in Figure 10, page 29.

Figure 10 Library Extender installed with two MSL4048 Tape Libraries

The upper Library controls the extended library and is called the *master* Library. The extended library uses the master Library OCP, USB port, and Ethernet connection.

The lower Library is operated by the master Library. Its OCP, USB port, and Ethernet connection are not used in the extended library configuration.

The upper Library must be an MSL4048 or MSL8096. The lower Library can be an MSL2024 or MSL4048.

<table>
<thead>
<tr>
<th>Master (upper)</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSL4048 or MSL8096</td>
<td>MSL2024 or MSL4048</td>
</tr>
</tbody>
</table>

Saving the Library configurations

When the extended Library is configured, many of the individual Library configuration settings are not retained. If you might ever want to recover their individual configurations, for example to separate the Libraries in the future, save the Library configuration for each Library to a file. See the *HP StorageWorks MSL2024, MSL4048, and MSL8096 user and service guide* for instructions on saving the Library configuration.

Upgrading the Library firmware

Each Library must have a firmware version that supports the Library Extender, and the firmware versions for the two Libraries must be compatible with each other for the extended library to operate.
Verify that each Library has the latest released version of firmware. Update to the latest firmware if necessary.

To find the version of firmware installed on the Library, see the RMI Support: Firmware screen.

From the MSL4048 or MSL8096 operator control panel (OCP), navigate to the Info > Identity > Library screen. The Library Controller FW Revision field shows the Library firmware revision.

From the MSL2024 OCP:
1. From the Home screen, press Next until the display shows Status/Information. Press Enter.
2. Press Next until the display shows Library Information. Press Enter.
3. Press Next until the display shows the Firmware Rev.

To download Library firmware that supports the Library Extender from the HP website:
2. Select and download the newest firmware version for your Library without _LX_ in the filename.

**NOTE:**
The first time you install the Extender you must update the firmware in each Library individually. For future firmware updates, when extended mode is enabled you can update the firmware for both Libraries at the same time with the Extender firmware package. Updating with the firmware package is not only faster and easier, but ensures that the Libraries have compatible firmware versions. When updating firmware for the extended library, select the file with _LX_ in the filename.

---

### Enabling extended mode

Enable Extended Mode from the RMI Configuration > System screen or OCP Configuration > Library menu in both Libraries before installing the Library Extender.

**NOTE:**
Extended mode will be enabled but not active until the Library is powered off and then powered on.

---

### Removing the cartridges from the Libraries

Before installing the Extender, the Libraries must be installed in the rack rails supplied with the Libraries in adjacent rack locations, one Library directly above the other.

Skip this section if you do not need to move a Library.

**WARNING!**

When the Library is moved, any cartridges in the Library can become dislodged from the magazines and damage the cartridges and Library robotics. To avoid damaging the Library, remove the cartridges before moving the Library.
Use the OCP or RMI to open the magazines and remove the tapes from the Library. The magazines with the tapes in them may also be removed from the Library. See the HP StorageWorks MSL2024, MSL4048, and MSL8096 user and service guide for instructions on opening or removing the magazines.

Powering off the Libraries

Press the power button on the front panel to power off each Library as shown in Figure 11, page 31.

![Figure 11 Library power button](image)

Positioning the Libraries in a rack

Before installing the Library Extender, the two Libraries must be installed in a rack in the rack rails supplied with the Libraries in adjacent rack locations. If you do not need to move either of the Libraries, skip to Relocating tape drives, page 35.
If either Library is mounted in a tabletop conversion cover, remove the cover and install the Library in the rack in the rack rails supplied with the Library. If either Library needs to be moved, remove the Library and its rack rails from the rack and install the rails and Library in the necessary rack location.

**NOTE:**

If the Library Extender is near the rear rack door latch, you might need to move the Libraries to a different rack location to close and latch the rack doors.

---

### Removing a Library from a rack or tabletop conversion cover

Unplug the power cord from the wall outlet. Remove the power cord from the Library. Remove all other cables from the Library. Obtain adequate assistance to lift and stabilize the Library during removal and replacement.

From the front of the Library 1) completely loosen the screws inside the left and right front bezel (these are captive screws and cannot be removed), then 2) slide the Library out of the rack or cover using assistance as shown in Figure 13, page 32.

![Figure 13 Removing an MSL4048 from a rack](image)

**CAUTION:**

Always lift the Library from the side edges. Lifting the Library from the magazine or drive openings, or from the drive handles can damage the Library.
Moving the rack rails and clip nuts

Using a #3 Phillips screwdriver, remove the rails from the rack. For an MSL4048 or MSL8096 also remove the clip nuts.

Secure one rail to each side of the rack in the new location. Secure the front and the back of each rail to the rack. The front of the rails is straight and the back is angled as shown in Figure 14.

![Figure 14 Installing the MSL2024 and MSL4048 rack rails](image-url)
Moving the clip nuts

For the MSL4048 and MSL8096, replace the clip nuts in the locations shown in Figure 15, page 34.

MSL4048

MSL8096

Figure 15 Clip nut locations

1. Clip nut location 2. Rail screw location
3. Library bottom 4. U marker

Installing the Library in the rack rails

With assistance, slide the Library onto the metal rails as shown in Figure 16, page 35. Secure the front bezel to the rack using a #2 Phillips screwdriver placed through the small holes in the mounting bracket to tighten the captive screws on each side of the Library.

⚠️ CAUTION:

To avoid personal injury and damage to equipment, obtain adequate assistance to set the Library on the rails.
Replace tape cartridges and magazines in the Library.

Relocating tape drives

The Extender is installed in the bottom half-height drive bay of the upper Library and the top half-height drive bay in the lower Library. If a tape drive is installed in either of these drive bays, relocate the tape drive to another drive bay.

1. Verify that the Library is powered off.
2. Loosen the blue captive thumbscrews on the tape drive as shown in Figure 17, page 35.
3. Pull straight back on the tape drive handle while supporting the bottom of the tape drive to remove it from the Library as shown in Figure 18, page 36.

![Figure 18 Removing a tape drive](image)

4. If necessary, remove one or two drive bay covers from the destination drive bay.

5. Slide the tape drive into its new drive bay. Tighten the blue thumbscrews with your fingers to secure the tape drive in the Library.

   If you removed a tape drive and are not reinstalling it in a Library, store it in an anti-static bag.

**Removing and replacing drive bay covers**

If necessary, use a #1 Phillips screwdriver to remove the bottom half-height drive bay cover from the upper Library and the top half-height drive bay cover from the lower Library to create a space for the Library Extender as shown in Figure 19.

![Figure 19 Removing drive bay covers to create space for the Extender](image)

Install drive bay covers over any drive bays that are not used by a tape drive or the Library Extender as shown in Figure 20, page 37. Two half-height drive bay covers are supplied with the Library Extender for this purpose if needed.
Removing the USB device and Ethernet cable from the lower Library

Remove the Ethernet cable and USB device from the lower Library as shown in Figure 21, page 37. When the Library Extender is installed, only the Ethernet and USB ports in the upper Library are active.

Extending the pull-out tab

On the upper Library, fully extend the pull-out tab containing product information. If the tab has a plastic extension on both sides, clip the left extension, as shown in Figure 22, page 38, without removing the product information. Leave the tab pulled out while installing the Extender.
Aligning the Libraries

Before installing the Extender, the Libraries must be aligned horizontally.

Loosen each of the captive screws inside the left and right front bezels in the locations shown in Figure 23, page 38 that attach the Libraries to the front of the rack 1/2 turn. Loosening the screws in this manner allows the Libraries to be aligned horizontally while retaining the necessary reference to the front of the rack. (These screws will be retightened later in the procedure.)

Secure the alignment gauge to the top half-height drive bay in the lower Library by tightening the two thumbscrews with your fingers.

Adjust the horizontal alignment of one or both Libraries until the edge of the chassis tab is aligned with the center of the V in the notch of the alignment gauge as shown in Figure 24, page 39.
Gently remove the alignment gauge without moving either of the Libraries. Save the alignment gauge for future use if the Libraries are moved or the Extender is installed with other Libraries.

Installing the Extender

⚠️ **WARNING!**

To avoid damage to the Libraries and Extender, verify that both Libraries are powered off before installing the Extender.

To install the Extender:

1. Align the upper tab on the side of the Extender with the slot in the upper drive bay and slide the Extender into the Libraries as shown in Figure 25, page 39.
2. When the Extender reaches the pull-out tab, thread the pull-out tab through the slit in the Extender attachment plate so the plastic extension of the pull-out tab is outside of the Extender. This will allow the Extender to seat completely and allow the information on the tab to be viewed after the Extender is installed. Slide the Extender the rest of the way into the Libraries and then slide the pull-out tab into the Library as shown in Figure 26, page 40.

![Figure 26 Sliding the pull-out tab into the Library](image)

3. Tighten the two thumbscrews on each side of the Extender with your fingers or a #1 Phillips screwdriver to secure the Extender to the Libraries as shown in Figure 27.

![Figure 27 Tightening the Extender thumbscrews](image)

4. From the front of the Libraries, tighten the captive screws inside the right and left front bezels that were loosened earlier in the procedure.

5. Connect an Ethernet cable to a working LAN connection and to the Ethernet connector on the back of the master Library.

6. Attach a power cable to each power connector on the back panels of the Libraries. Plug the power cables into the nearest properly grounded power outlet.

**Powering on the extended library**

Power on both Libraries with the power buttons on the front panel as shown in Figure 28, page 41. The Libraries can be powered on in either order. The initialization sequence is faster when the lower Library is powered on first.
NOTE: The Library Extender receives power from the Libraries; it does not have its own power cord or power button.

Allow the extended library to come to the Ready state. This may take several minutes.

Checking the Extender LEDs

All three Extender LEDs will be green when the Extender is installed correctly and functional. Check the LEDs on the Extender in the locations shown in Figure 29, page 41 to verify that the Extender is operating correctly.

1. Master Library connection status Green when the master Library is powered on and the Extender is installed correctly.
Verifying the installation

To verify the installation, run the wellness test from the OCP Support > Run Tests screen. The wellness test will exercise all Library and drive functionality for the extended library. Access to this test requires the administrator password and will request mailslot interaction. For instructions on running the wellness test, see The wellness test, page 44.
4 Using diagnostic tools and troubleshooting

This chapter provides information for verifying that the Extender is properly installed and troubleshooting the Library Extender.

If you are installing the Extender for the first time, read this chapter for reference after installing the Extender following the instructions in Chapter 3, page 27.

Extender status LEDs

The Library Extender has three LEDs that display the Extender's connection and power status.

1. Master Library connection status
   Green when the master Library is powered on and the Extender is installed correctly.

2. Library Extender status
   Green when the Extender is operating correctly. Flashing when the Extender is initializing or has failed with a hard error and is no longer functional. Initialization can take up to 15 minutes.

3. Lower Library connection status
   Green when the lower library is powered on and the Extender is installed correctly.

All three LEDs will be green when the Extender is installed correctly and functional.

If the master Library connection status LED (1) is not green, verify the following:

- The master Library is powered on.
- The power supply status in the master Library is Good.
- Extended mode is enabled in the master Library.
- The two Libraries are properly aligned as described in Aligning the Libraries, page 38.
The tab on the Extender must be inserted in the slot on the master Library, as shown in Figure 31, for the Extender to seat properly in the connector in the master Library. If the tab is under or to the left of the bracket, the electrical connection will not be completed.

• The master and lower Libraries have the current firmware versions.

If Library Extender status LED (2), is flashing:
• The Library Extender may be initializing. Check the OCP for status messages and wait a few minutes for the initialization process to complete. Initialization can take up to 15 minutes.
• The Library Extender has failed with a hard error. See the master Library log to find the error code.

If the lower Library connection status LED (3), is not green, verify the following:
• The lower Library is powered on.
• If the lower Library is an MSL4048, its power supply status is Good.
• Extended mode is enabled in the lower Library.
• The rack rails are straight and the front bezel screws attaching both Libraries to the rack are secure. The back planes of the two Libraries should be aligned in the same plane. If the master Library is set further back the plug on the Extender might not reach the connector on the lower Library.
• The master and lower Libraries have the current firmware versions.

The Library Extender cycle test

The Library Extender cycle test verifies that the Library Extender can transfer cartridges between Libraries. The Library Extender cycle test moves the first available cartridge in the master Library to the lower Library and back, exercising the robotics in both Libraries and the Extender, with cartridge exchanges in both directions. When the test is complete, the cartridge is returned to its original slot. The Library Extender cycle test is executed from the RMI or OCP.

The wellness test

The wellness test exercises all Library and tape drive hardware, except the external connections, and is useful for verifying that a device is working correctly. The wellness test requires operator interaction with the mailslot so cannot be initiated from the RMI.
For complete testing, enable a mailslot and ensure that at least one of the top-row corner slots in one of the Libraries contains a tape cartridge.

**Table 4 Top-row corner slot positions**

<table>
<thead>
<tr>
<th>MSL2024 top-row corner slots with mailslot disabled: 9, 12, 21, 24</th>
</tr>
</thead>
</table>
MSL4048 top-row corner slots with mailslot disabled: 21, 24, 45, 48

Using diagnostic tools and troubleshooting
**IMPORTANT:**

The Library will remove any tape cartridges from the tape drives and go offline when running the wellness test. Verify that any applications using the Library have completed before starting the wellness test.

You can have the Library run up to 10 cycles of the wellness test. The wellness test exercises all enabled tape drives in the extended library.

The wellness test requires operator interaction and can only be run from the OCP. During the wellness test:

1. The operator starts the wellness test from the master Library OCP. The administrator password is required.
2. The master Library performs a self test, verifies that it can communicate with the tape drives and the Extender, and then the lower Library performs a self test.
3. The Library returns any tape cartridges from the tape drives to their home slots. If the home slot for a cartridge is not known, the Library will move the cartridge to the mailslot and prompt the operator to remove it.
4. The Library prompts the operator to enter the number of cycles to run the test.
5. The Library opens the lowest-numbered mailslot in the extended library, which will generally be in the lower Library, and prompts the operator to insert a scratch cartridge.

**NOTE:**

In the MSL8096, the 12-slot mailslot does not pop out; the operator must open it.

6. The operator inserts a scratch cartridge into the lowest-numbered mailslot. If no mailslots are enabled or the operator closes the mailslot without inserting a cartridge into the lowest-numbered mailslot, the Library will perform a shortened version of the wellness test, skipping Step 7.
7. The Library loads the scratch cartridge into the first tape drive, unloads the scratch cartridge from
the tape drive, and returns the scratch cartridge to the mailslot. If the operator selected to test all
of the tape drives, the Library will load the scratch cartridge into each tape drive before returning
it to the mailslot.

8. The Library moves the tape cartridge from the four top-row corner slots of both Libraries to the
tape drive load point and then returns the tape cartridge to its slot. If none of the top-row corner
slot positions of either Library contains a tape cartridge, the test stops and the Library displays
an error message.

9. If additional cycles remain to be run, the test will return to Step 7 if there is a tape cartridge in
the mailslot or Step 8 if there is not a cartridge in the mailslot.

10. At the conclusion of the test, the Library pops open the mailslot and waits for the operator to
remove the scratch tape. In the MSL8096, if only the 12-slot mailslot is configured, the Library
will prompt the operator to open the mailslot and remove the scratch tape cartridge.

11. The Library displays the test completion status, including any recoveries or errors that may have
occurred.

Using HP Library & Tape Tools
With HP Library & Tape Tools installed on the host server you can:
• Identify all Fibre Channel, SAS, and parallel SCSI devices connected to your system.
• View detailed configuration, identification, inventory, and drive information for the device.
• Easily update device and drive firmware, including the Library Extender firmware bundles, which
include firmware for both Libraries.
• Run advanced diagnostic tests, including connectivity, read/write, media validation, and testing
the functionality of the device.
• View device and drive error logs.
• Generate a detailed support ticket that can be emailed or faxed to your HP support representative
for analysis.

The HP Library & Tape Tools diagnostic provides an intuitive GUI with integrated context-sensitive
help. It can be downloaded free of charge from

To diagnose problems with L&TT:
1. Run L&TT on the host server. You can install L&TT on the host server, or run it from a CD-ROM or
USB flash drive on the host server.
2. Pull a support ticket for the device.
3. Look at the device analysis results for additional information about the device's operation.

Library Extender error codes
The error code and sub-error code tables include a list of possible solutions, starting with the most
likely. After performing the solution, retry the operation to see whether the problem continues or the
error code changes.
NOTE:
See the HP StorageWorks MSL2024, MSL4048, and MSL8096 Tape Libraries user and service guide for additional Library error codes.

### Table 5 Error codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
</table>
| B8   | Library Extender missing. | See Table 6, page 50 for details. | • If this is a new installation, verify that the Extender is installed properly and that both Libraries are powered on.  
• Power cycle both Libraries. |
| B9   | Communication error on the I²C bus between the master Library and the Extender. | See Table 7, page 50 for details. | • If this is a new installation, verify that the Extender is installed properly and that both Libraries are powered on.  
• Power cycle both Libraries. |
| BA   | Communication error on the serial connection between the master and lower Libraries. | The master Library cannot communicate with the lower Library. | • If this is a new installation, verify that the Extender is installed properly and that both Libraries are powered on.  
• Power cycle both Libraries. |
| BB   | Stack link not established due to communication issues between the master and lower Libraries. | The master Library has some communication with the lower Library, but not enough to function. | • If this is a new installation, verify that the Extender is installed properly and that both Libraries are powered on.  
• Power cycle both Libraries. |
| BC   | Power of lower Library not detected in time. | The lower Library did not respond to the master Library within the specified time. | • Verify that the lower Library is powered on.  
• Verify that extended mode is enabled in the lower Library.  
• Power cycle both Libraries.  
• If the lower Library is an MSL4048, verify that its power supply status is **Good**.  
• Verify that the master and lower Libraries have the most recent firmware versions. |
Solution

• Power cycle both Libraries.
• Run the Library Extender cycle test.

Table 8, page 50.

Library Extender has reported an error condition.

The Extender is incompatible with the Libraries, or the firmware versions on the Libraries and Extender are incompatible with each other. See Table 9, page 52.

• Download the current library extender firmware bundle to update the Libraries to compatible firmware versions.
• Retry the operation.

Extender or library stack incompatibility.

The Extender robotic cannot locate its home position within the master Library.

Sensor master home not found.01

• Power cycle the master Library.
• Run the Library Extender cycle test.
• Retry the operation.

The Extender robotic cannot locate its home position within the lower Library.

Sensor lower home not found.02

• Power cycle the lower Library.
• Run the Library Extender cycle test.
• Retry the operation.

Table 6 Sub-codes for error B8

<table>
<thead>
<tr>
<th>Sub-code</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>Library Extender expected</td>
</tr>
<tr>
<td>41</td>
<td>Lower Library expected</td>
</tr>
<tr>
<td>42</td>
<td>Master Library expected</td>
</tr>
</tbody>
</table>

Table 7 Sub-codes for error B9

<table>
<thead>
<tr>
<th>Sub-code</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>No device present</td>
</tr>
<tr>
<td>32</td>
<td>I²C write error</td>
</tr>
<tr>
<td>33</td>
<td>I²C read error</td>
</tr>
</tbody>
</table>

Table 8 Sub-codes for error BD

<table>
<thead>
<tr>
<th>Sub-code</th>
<th>Message</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
</table>
| 01       | Sensor master home not found. | The Extender robotic cannot locate its home position within the master Library. | • Power cycle the master Library.  
• Run the Library Extender cycle test.  
• Retry the operation. |
| 02       | Sensor lower home not found.  | The Extender robotic cannot locate its home position within the lower Library.  | • Power cycle the lower Library.  
• Run the Library Extender cycle test.  
• Retry the operation. |
<table>
<thead>
<tr>
<th>Sub-code</th>
<th>Message</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
</table>
| 03       | Motor blocked in master home position. | The Extender robotic is stuck in its home position within the master Library. | • Power cycle the master Library and run the Library Extender cycle test.  
• Retry the operation. If the motor is still blocked, remove the Extender from the Libraries, and then inspect the Extender and master Library for a physical blockage. Re-install the Extender. |
| 04       | Motor blocked in lower home position. | The Extender robotic is stuck in its home position within the lower Library. | • Power cycle the lower Library and run the Library Extender cycle test.  
• Retry the operation. If the motor is still blocked, remove the Extender from the Libraries, and then inspect the Extender and lower Library for a physical blockage. Re-install the Extender.  
• Retry the operation. |
| 05       | Motor blocked between master and lower home position. | The Extender robotic is stuck between its two home positions. | • Power cycle both Libraries and run the Library Extender cycle test.  
• Retry the operation. If the motor is still blocked, remove the Extender from the Libraries, and inspect the Extender and master Library for a physical blockage. Re-install the Extender.  
• Retry the operation. |
| 06       | Motor blocked and hot. | The Extender robotic is stuck and the motor is hot. | • Power cycle both Libraries and run the Library Extender cycle test.  
• Retry the operation. If the motor is still blocked, remove the Extender from the Libraries, and then inspect the Extender and master Library for a physical blockage. Re-install the Extender. |
<table>
<thead>
<tr>
<th>Sub-code</th>
<th>Message</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
</table>
| 10       | Motor error. | The library controller could not start the motor in the Extender robot. | • Power cycle both Libraries.  
• If this is a new installation or the Libraries have been moved, verify that the Extender is installed properly and that both Libraries are powered on. |
| 11       | Motor block in extender path. | Debris is keeping the Extender robotic from moving. | • Power cycle both Libraries and run the Library Extender cycle test.  
• Retry the operation. If the motor is still blocked, remove the Extender from the Libraries, and then inspect the Extender and master Library for a physical blockage. Re-install the Extender. |
| 12       | Motor position not valid. | The Extender robotic does not know where it is positioned. | • Power cycle both Libraries and run the Library Extender cycle test.  
• Retry the operation. |
| 13       | Extender has not been initialized yet. | The library controller issued a move command to the Extender, but the Extender was not initialized. | • Power cycle both Libraries and run the Library Extender cycle test.  
• If this is a new installation or the Libraries have been moved, verify that the Extender is installed properly and that both Libraries are powered on. |
| 14       | Motor is hot. | The motor that moves the Extender robotic has exceeded its thermal limit. | • Verify that airflow to the Extender has not been blocked. |
| 21       | Timeout while waiting for extender becoming ready. | The Extender did not respond to the master Library within the specified time. | • Verify that the Extender is installed properly and that both Libraries are powered on. |

Table 9 Sub-codes for error BE

<table>
<thead>
<tr>
<th>Sub-code</th>
<th>Message</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>Extender personality not matching.</td>
<td>The Extender is not an HP StorageWorks MSL Library Extender.</td>
<td>• Verify that the Extender is an HP StorageWorks MSL Library Extender.</td>
</tr>
<tr>
<td>Sub-code</td>
<td>Message</td>
<td>Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------</td>
<td>------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>52</td>
<td>Lower Library personality not matching.</td>
<td>The lower Library is not an HP StorageWorks MSL2024 or MSL4048 Tape Library.</td>
<td>• Verify that the lower Library is an HP StorageWorks MSL2024 or MSL4048 Tape Library.</td>
</tr>
<tr>
<td>53</td>
<td>Extender firmware not matching.</td>
<td>The firmware version of the Extender is not compatible with the firmware version of the master Library.</td>
<td>• Update the extended library firmware with the current firmware bundle, which will update both Libraries and the Extender with compatible firmware versions.</td>
</tr>
<tr>
<td>54</td>
<td>Lower Library firmware level not matching.</td>
<td>The firmware versions of the master Library and lower Library are not compatible with each other.</td>
<td>• Disable extended mode, update both Libraries to the most recent released versions, and then re-enable extended mode.</td>
</tr>
<tr>
<td>55</td>
<td>Incompatible height form factor for master Library.</td>
<td>The master Library is not an MSL4048 or MSL8096.</td>
<td>• Verify that the master (top) Library is an MSL4048 or MSL8096.</td>
</tr>
<tr>
<td>56</td>
<td>Incompatible height form factor for lower Library.</td>
<td>The lower Library is not an MSL2024 or MSL4048.</td>
<td>• Verify that the lower Library is an MSL2024 or MSL4048.</td>
</tr>
<tr>
<td>57</td>
<td>Extender firmware corrupted</td>
<td>The firmware upgrade failed, possibly because of a power failure during the upgrade operation.</td>
<td>• Power cycle the master Library. (The master Library will attempt to download the Extender firmware to the Extender when the master Library is powered on.)</td>
</tr>
</tbody>
</table>

Additional robotic error sub-codes

The following sub-codes are associated with robotics errors (error 0x80 to 0xA6), which are described in the HP StorageWorks MSL2024, MSL4048, and MSL8096 Tape Libraries user and service guide. See Table 10.

Table 10 Sub-codes related to Library robotics errors during movement to extender position

<table>
<thead>
<tr>
<th>Sub-code</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>F0</td>
<td>Invalid stack configuration (1/8 G2 Tape Autoloader cannot be part of an extended library.)</td>
</tr>
<tr>
<td>F1</td>
<td>Error during elevator home movement</td>
</tr>
<tr>
<td>F2</td>
<td>Error during sled movement to home sensor</td>
</tr>
<tr>
<td>F3</td>
<td>Error during sled movement to extender position</td>
</tr>
<tr>
<td>F4</td>
<td>Error during rotation movement to extender position</td>
</tr>
<tr>
<td>Sub-code</td>
<td>Message</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>F5</td>
<td>Error during elevator movement to extender position</td>
</tr>
<tr>
<td>F6</td>
<td>Error during sled movement to rotate position</td>
</tr>
<tr>
<td>F7</td>
<td>Error during rotational movement</td>
</tr>
<tr>
<td>F8</td>
<td>Error cartridge present sensor during cartridge transfer from robotics to extender carrier (and reverse)</td>
</tr>
<tr>
<td>F9</td>
<td>Cartridge present sensor deviates from expected parameter</td>
</tr>
<tr>
<td>FA</td>
<td>Error during first slider movement (movement with opened gripper) from/to extender position</td>
</tr>
<tr>
<td>FB</td>
<td>Error during first gripper movement (open gripper) from/to extender position</td>
</tr>
<tr>
<td>FC</td>
<td>Error during second gripper movement (close gripper) from/to extender position</td>
</tr>
<tr>
<td>FD</td>
<td>Error during third slider movement (move to block) from/to extender position</td>
</tr>
<tr>
<td>FE</td>
<td>Error during third gripper movement (close gripper) from extender position</td>
</tr>
<tr>
<td>FF</td>
<td>Error during fourth slider movement (pull back) from/to extender position</td>
</tr>
</tbody>
</table>
5 Servicing the Library Extender

This chapter provides instructions for servicing the Library Extender, including replacing the Extender, removing the Extender, removing a cartridge from the Extender, and releasing magazines manually.

Replacing the Library Extender

Use this procedure to replace the Library Extender with another Library Extender.

Powering off the Libraries

Press the power button on the master Library to power off the extended library as shown in Figure 32, page 55. The master Library will park the Extender robotic and power off the lower Library.

![Figure 32 Extended Library power off button](image)

If the lower Library does not power off after five minutes, depress the power button on the lower Library and hold it for at least 10 seconds.
Removing the Library Extender

To remove the Library Extender:

1. Using a #1 Phillips screwdriver, 1) loosen the four screws that secure the Extender to the Tape Libraries, as shown in Figure 33, page 56.

2. Pull the Extender straight out of the Libraries.

To store or ship the Library Extender, repackage it in the original packaging materials as shown in Repackaging the Library Extender, page 61.

Installing the new Extender

To install the new Extender, follow the instructions starting with Aligning the Libraries, page 38.

Removing the Library Extender

Use this procedure if you are removing the Library Extender to reconfigure the two Libraries as independent Libraries.

Disabling extended mode and powering off the Libraries

The procedure for disabling extended mode and powering off the Libraries varies depending on whether the extended library is operational or not. Select the procedure that fits your situation.

If the extended library is operational:

1. Disable extended mode from the master Library Configuration > System menu.
2. Press the power button on the master Library to power off the extended library.

If the extended library is in an error condition or the Extender has been removed:

1. Disable extended mode from the master Library Configuration > System menu.
2. Press the power button on the master Library to power off the master Library. If the Library does not respond to the power button, depress the power button and hold it for at least 10 seconds.

3. Disable extended mode from the lower Library Configuration > System menu.

4. Press the power button on the lower Library to power off the lower Library. If the Library does not respond to the power button, depress the power button and hold it for at least 10 seconds.

Removing the Library Extender

To remove the Library Extender:

1. Using a #1 Phillips screwdriver, 1) loosen the four screws that secure the Extender to the Tape Libraries, as shown in Figure 34, page 57.

![Figure 34 Removing the Extender](image)

2. Pull the Extender straight out of the Libraries.

To store or ship the Library Extender, repackage it in the original packaging materials as shown in Repackaging the Library Extender, page 61.

Preparing the Libraries to operate as separate Libraries

Each Library must have at least one tape drive. Skip this procedure if you do not need to relocate a tape drive from one Library to the other.

**IMPORTANT:**

To avoid damage to the Library, ensure that the tape drive is powered off before removing it from a Library.
1. To remove a tape drive from its current location, loosen the blue captive thumbscrews on the tape drive.

![Image of tape drive with thumbscrews highlighted]

2. Pull straight back on the tape drive handle while supporting the bottom of the tape drive to remove it from the Library.

![Image of tape drive being removed]

3. If necessary, remove one or two drive bay covers.
4. Slide the tape drive into its new drive bay. Tighten the blue thumbscrews with your fingers to secure the tape drive in the Library.

**Replacing drive bay covers**

Use a #1 Phillips screwdriver to secure drive bay covers over any open tape drive bays.

**Connecting the Ethernet cable**

To use the RMI with the lower Library, insert one end of an Ethernet cable into the Ethernet port on the back of the Library. Plug the other end into an Ethernet LAN port.

**Powering on the Libraries**

Power on each Library from its OCP. They no longer communicate with each other and must be configured and operated separately.

**Copying the key server token**

Skip this section if the extended library is not using the HP StorageWorks 1/8 G2 and MSL Encryption Kit.

The encryption keys used to read and write encrypted data are stored on a USB key server token. In the extended library, encryption keys are stored in the key server token installed in the master Library.
When the Libraries are separated, each Library will need its own key server token with the keys to read tapes that were written by the extended Library.

To create a second key server token with the keys used by the extended library, follow the instructions for backing up the key server token data in the *HP StorageWorks 1/8 G2 and MSL Encryption Kit user guide*.

Insert the key server token into the USB port on the master Library.

**Reconfiguring the Libraries**

When extended mode is disabled, each Library will have a mix of settings from the extended library, default values, previous values, and new values. Use the OCP or RMI to check the settings for each Library and reconfigure them if necessary. See the *HP StorageWorks MSL2024, MSL4048, and MSL8096 Tape Libraries user and service guide* for more information about the settings and configuring the Libraries.

**Settings retained from the extended library**

The following settings are retained by both Libraries from the extended library:

- Administrator password
- SCSI tape drive addresses
- Fibre Channel drive settings
- Date and time
- Email notification
- Encryption — remains On if LTO3 or LTO4 tape drives are installed

**Settings that are set to default values**

The following settings are set to default values:

- Mailslot configuration — all mailslots disabled
- Reserved slots — no reserved slots
- Library mode — Automatic
- Autoload — No
- Loop — No
- Logical libraries (partitioning) — Off
- SCSI master drive — the lowest tape drive in each Library

**Settings where the lower Library reverts to earlier values**

For the following settings, the upper Library retains the settings from the extended Library and the lower Library reverts to the settings it had before extended mode was enabled:

- Network settings
- Barcode format reporting
- Auto clean
- SNMP
- Log tracing configuration
- Allow magazine access without the Administrator password
- Ignore barcode media ID
Special cases

- OCP contrast setting (MSL4048 and MSL8096) — each Library retains the setting it had before extended mode was enabled.

- Drive power — In the extended library, one of the tape drives is configured as the SCSI master drive. The SCSI master drive can be in either Library.

When extended mode is disabled, the Library that hosts the tape drive that was configured as the SCSI master drive in the extended library retains the drive power settings from the extended library. Thus, if any tape drives in this Library were powered off, they will continue to be powered off.

In the other Library, all tape drives are powered on.

Removing a cartridge from the Extender

If the extended library cannot return a tape to one of the Tape Libraries, you may need to remove it manually.

1. Remove the Extender from the tape Libraries.
   a. Using a #1 Phillips screwdriver, loosen the four thumbscrews that secure the Extender to the Tape Libraries.
   b. Pull the Extender straight out of the Libraries as shown in Figure 35, page 60.

2. If the tape cartridge is near the front of the Extender, grasp the cartridge with your hand and pull it straight out of the Extender.

Figure 35 Removing the Extender
3. **CAUTION:**

Removing the top of the Extender will require its replacement. Only remove the top of the Extender to retrieve a cartridge when all other removal attempts have failed.

To remove a cartridge that is stuck in the back of the Extender:

a. Using a #2 Phillips screwdriver, loosen the six screws marked with arrows on the sheet metal on top of the Extender.

b. Remove the top sheet metal.

c. Remove the cartridge.

d. Replace the sheet metal and tighten the screws.

**Repackaging the Library Extender**

**IMPORTANT:**

Shipping the Extender without properly repackaging it can damage the Extender.

Follow these steps to package the removed Library Extender for storage or shipment.

To package the removed Library Extender for storage or shipment:

1. Insert the cardboard support in the space between the top and bottom of the extender.

2. Place the extender on the base position of the cardboard wrapper.
3. Fold the tab on the cardboard support piece down, and then fold the ends of the wrapper over the front and back of the Extender.

4. Wrap the sides of the wrapper around the sides of the Extender.

5. Secure the wrapper with packaging tape.

6. Place the foam caps around the front and back of the Extender.
7. Attach a foam side support on each side of the Extender.

8. Place the protected Extender in the shipping box.
9. Secure the box with packaging tape.

Releasing the magazines manually

If you cannot remove the magazines via the OCP or RMI, do the following:

1. Power off both Libraries.
2. Unplug the power cord from the Library with the magazines to be removed.
3. From the back of the device, find the access hole for the magazine to be released. See Figure 36, Figure 37, and Figure 38.

Figure 36 Access to release lever for the right magazines in the master Library

Figure 37 Access to release lever for the left magazines in the master Library

Figure 38 Access holes for the right and left magazines in the lower Library
4. To manually release a magazine, push the end of a small metal pin or straightened paper clip until you feel some resistance, about 1.5 cm (0.6 inch), into the magazine access hole to depress the magazine release tab. While holding in the release tab, have a second person attempt to pull the magazine out of the front of the unit. For the MSL4048 and MSL8096, all magazines on a side are released and may be removed at the same time. See Figure 39.

![Figure 39 Releasing the magazine](image)

1. Push a metal pin or paper clip into the access hole.
2. Pull the magazine out of the front of the unit.

**IMPORTANT:**
Do not force the pin once you encounter resistance. Doing so can damage the Library.

5. Repeat Step 4 for the other magazine if necessary.
6. If other tapes are still in the device, or if you were unable to manually remove the magazines, contact HP customer service for assistance.
6 Support and other resources

Contacting HP

Before you contact HP

Be sure to have the following information available before you contact HP:

• Product model names and numbers
• Technical support registration number (if applicable)
• Product serial numbers
• Error messages
• Operating system type and revision level
• Detailed questions

HP contact information

For worldwide technical support information, see the HP support website:

http://www.hp.com/support

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website:

http://www.hp.com/go/e-updates

After registering, you will receive e-mail notification of product enhancements, new driver versions, firmware updates, and other product resources.

Documentation feedback

HP welcomes your feedback.

To make comments and suggestions about product documentation, please send a message to storagedocsfeedback@hp.com. All submissions become the property of HP.

Related information

Documents

• HP StorageWorks MSL2024, MSL4048, and MSL8096 Tape Libraries user and service guide
• HP StorageWorks MSL Library Extender getting started guide and replacement instructions
• HP StorageWorks 1/8 G2 and MSL Encryption Kit user guide
You can find these documents from the Manuals page of the HP Business Support Center website:

http://www.hp.com/support/manuals

In the Storage section, click Tape Storage and Media and then select your product.

Websites

- http://www.hp.com
- http://www.hp.com/go/storage
- http://www.hp.com/support/manuals
- http://www.hp.com/support/downloads
- http://www.hp.com/support/msl_extender

Document conventions and symbols

Table 11 Document conventions

<table>
<thead>
<tr>
<th>Convention</th>
<th>Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue text: Table 11</td>
<td>Cross-reference links and e-mail addresses</td>
</tr>
<tr>
<td>Blue, underlined text: <a href="http://www.hp.com">http://www.hp.com</a></td>
<td>Website addresses</td>
</tr>
</tbody>
</table>
| **Bold text** | • Keys that are pressed  
• Text typed into a GUI element, such as a box  
• GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes |
| *Italic text* | Text emphasis |
| **Monospace text** | • File and directory names  
• System output  
• Code  
• Commands, their arguments, and argument values |
| **Monospace, italic text** | • Code variables  
• Command variables |
| **Monospace, bold text** | Emphasized monospace text |

⚠️ **WARNING!**
Indicates that failure to follow directions could result in bodily harm or death.

⚠️ **CAUTION:**
Indicates that failure to follow directions could result in damage to equipment or data.
Customer self repair

HP CSR programs allow you to repair your StorageWorks product. If a CSR part needs replacing, HP ships the part directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your HP-authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider, or see the CSR website:

http://www.hp.com/go/selfrepair


## A Technical specifications

### Table 12 Physical specifications

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Product alone</th>
<th>Packaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>88 mm (3.46 inch)</td>
<td>290 mm (11.42 inch)</td>
</tr>
<tr>
<td>Width</td>
<td>225 mm (8.86 inch)</td>
<td>410 mm (16.14 inch)</td>
</tr>
<tr>
<td>Extender depth</td>
<td>375 mm (14.76 inch)</td>
<td>560 mm (22.05 inch)</td>
</tr>
<tr>
<td>Library depth with Extender installed</td>
<td>908 mm (35.75 inch)</td>
<td>N/A</td>
</tr>
<tr>
<td>Extender overhang beyond drive fan and handle</td>
<td>103 mm (4.06 inch)</td>
<td>N/A</td>
</tr>
<tr>
<td>Weight</td>
<td>2.7 kg (5.95 lb)</td>
<td>4.5 kg (9.92 lb)</td>
</tr>
</tbody>
</table>

### Table 13 Environmental specifications

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>10° to 35° C operating&lt;br&gt;-40° to 60° C non-operating</td>
</tr>
<tr>
<td>Recommended operating temperature</td>
<td>10° to 35° C</td>
</tr>
<tr>
<td>Temperature shock immunity - maximum rate of change</td>
<td>10° C per hour operating&lt;br&gt;20° C per hour non-operating</td>
</tr>
<tr>
<td>Dust concentration</td>
<td>less than 200 microgram/cubic meter</td>
</tr>
<tr>
<td>Altitude</td>
<td>0 to 4,200 m (13,000 ft) at 25° C ambient operating&lt;br&gt;-7 m to 10,668 m (22 to 35,000 ft) non-operating</td>
</tr>
<tr>
<td>Humidity</td>
<td>15% to 80% RH non-condensing operating&lt;br&gt;5% to 90% RH non-condensing non-operating</td>
</tr>
</tbody>
</table>
B Electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

Preventing electrostatic damage

To prevent electrostatic damage, observe the following precautions:

• Avoid hand contact by transporting and storing products in static-safe containers.
• Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
• Place parts on a grounded surface before removing them from their containers.
• Avoid touching pins, leads, or circuitry.
• Always be properly grounded when touching a static-sensitive component or assembly. See Grounding methods.

Grounding methods

Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

• Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm (±10 percent) resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
• Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
• Use conductive field service tools.
• Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an HP authorized reseller install the part.

NOTE:

For more information on static electricity, or assistance with product installation, contact your HP authorized reseller.
C Regulatory compliance notices

This section contains regulatory notices for the HP StorageWorks MSL Library Extender.

Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

Product specific information:

HP StorageWorks MSL Library Extender
Regulatory model number: LVLDC-0501
FCC and CISPR classification: Class A

These products contain laser components. See Class 1 laser statement in the Laser compliance notices section.

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 (for example, 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.

FCC rating label

The FCC rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or ID on the label. Class A devices do not have an FCC logo or ID on the label. After you determine the class of the device, refer to the 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 that is different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

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 this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company P.O. Box 692000, Mail Stop 510101 Houston, Texas 77269-2000
- Or call 1-281-514-3333

Modification

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

When provided, 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.

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 class 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 class 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.

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 (IEC60950)—Product Safety

Japanese notices

Japanese VCCI-A notice

Japanese VCCI-B notice

Japanese power cord statement

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。
Korean notices

Class A equipment

Class B equipment

Taiwanese notices

BSMI Class A notice

Taiwan battery recycle statement

<table>
<thead>
<tr>
<th>Recovery mark:</th>
<th>Recovery text:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four-in-one recycling symbol</td>
<td>“Please recycle waste batteries”</td>
</tr>
</tbody>
</table>

廢電池請回收
Laser compliance notices

English laser notice

This device may contain a laser that is classified as a Class 1 Laser Product in accordance with U.S. FDA regulations and the IEC 60825-1. The product does not emit hazardous laser radiation.

⚠️ WARNING!

Use of controls or adjustments or performance of procedures other than those specified herein or in the laser product’s installation guide may result in hazardous radiation exposure. To reduce the risk of exposure to hazardous radiation:

- Do not try to open the module enclosure. There are no user-serviceable components inside.
- Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
- Allow only HP Authorized Service technicians to repair the unit.

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

Dutch laser notice

⚠️ WAARSCHUWING: dit apparaat bevat mogelijk een laser die is geclassificeerd als een laserproduct van Klasse 1 overeenkomstig de bepalingen van de Amerikaanse FDA en de richtlijn IEC 60825-1. Dit product geeft geen gevaarlijke laserstraling af.

Als u bedieningsinformatie gebruikt, installaties aanpast of procedures uitvoert op een andere manier dan in deze publicatie of in de installatiehandleiding van het laserproduct wordt aangegeven, loopt u het risico te worden blootgesteld aan gevaarlijke straling.

Het risico van blootstelling aan gevaarlijke straling beperkt u als volgt:

- Probeer de behuizing van de module niet te openen. U nóg zelf geen onderdelen repareren.
- Gebruik voor de laserapparatuur geen andere inloggen of installaties en voor geen andere aanpassingen of procedures uit dan die in deze handleiding worden beschreven.
- Alleen door HP geautoriseerde technici mogen het apparaat repareren.
French laser notice

**AVERTISSEMENT**: cet appareil peut être équipé d'un laser classé en tant que Produit laser de classe 1 et conforme à la réglementation de la FDA américaine et à la norme 60825-1 de l'IEC. Ce produit n'émet pas de rayonnement dangereux.

L'utilisation de commandes, de réglages ou de procédures autres que ceux qui sont indiqués ici ou dans le manuel d'installation du produit laser peut exposer l'utilisateur à des rayonnements dangereux. Pour réduire le risque d'exposition à des rayonnements dangereux :

- Ne tentez pas d'ouvrir le boîtier renfermant l'appareil laser. Il ne contient aucune pièce dont la maintenance puisse être effectuée par l'utilisateur.
- Tout contrôle, réglage ou procédure autre que ceux décrits dans ce chapitre ne doivent pas être effectués par l'utilisateur.
- Seuls les Maintenance Agréés HP sont habilités à réparer l'appareil laser.

German laser notice


Die Anleitungen in diesem Dokument müssen befolgt werden. Bei Einstellungen oder Durchführung sonstiger Verfahren, die über die Anleitungen in diesem Dokument bzw. im Installationshandbuch des Lasergeräts hinausgehen, kann es zum Austritt gefährlicher Strahlung kommen. Zur Vermeidung der Freisetzung gefährlicher Strahlungen sind die folgenden Punkte zu beachten:

- Versuchen Sie nicht, die Abdeckung des Lasermoduls zu öffnen. Im Inneren befinden sich keine Komponenten, die vom Benutzer gewartet werden können.
- Benutzen Sie das Lasergerät ausschließlich gemäß den Anleitungen und Hinweisen in diesem Dokument.
- Lassen Sie das Gerät nur von einem HP Servicepartner reparieren.

Italian laser notice

**AVVERTENZA**: AVVERTENZA Questo dispositivo può contenere un laser classificato come prodotto laser di Classe 1 in conformità alle normative US FDA e IEC 60825-1. Questo prodotto non emette radiazioni laser pericolose.

L'eventuale esecuzione di comandi, regolazioni o procedure differenti a quanto specificato nella presente documentazione o nella guida di installazione del prodotto può causare l'esposizione a radiazioni nocive. Per ridurre i rischi di esposizione a radiazioni pericolose, attenersi alle seguenti precauzioni:

- Non cercare di aprire il contenitore del modulo. All'interno non vi sono componenti soggetti a manutenzione da parte dell'utente.
- Non eseguire operazioni di controllo, regolazione o di altro genere su un dispositivo laser ad eccezione di quelle specificate da queste istruzioni.
- Affidare gli interventi di riparazione dell'unità esclusivamente ai tecnici dell'Assistenza autorizzata HP.
Japanese laser notice

警告：本製品には、US FDA規則およびIEC 60825-1に基づくClass 1レーザー製品が含まれている場合があります。本製品は人体に危険なレーザー光は発しません。

本書およびレーザー製品のインストール・ガイドに示されている以外の方法で制御、調整、使用した場合、人体に危険な光線にさらされる場合があります。人体に危険な光線にさらされないため、以下の項目を守ってください。

- モジュール・エンクロージャを開けないでください。ユーザーが取り扱えるコンポーネントは含まれていません。
- 本書に示されている以外の方法で、レーザー・デバイスを制御、調整、使用しないでください。
- HPの正規サービス技術者のみが本ユニットの修理を許可されています。

Spanish laser notice

ADVERTENCIA: Este dispositivo podría contener un láser clasificado como producto de láser de Clase 1 de acuerdo con la normativa de la FDA de EE.UU. e IEC 60825-1. El producto no emite radiaciones láser peligrosas.

El uso de controles, ajustes o manipulaciones distintos de los especificados aquí o en la guía de instalación del producto de láser puede producir una exposición peligrosa a las radiaciones. Para evitar el riesgo de exposición a radiaciones peligrosas:

- No intente abrir la cubierta del módulo. Dentro no hay componentes que el usuario pueda reparar.
- No realice más operaciones de control, ajustes o manipulaciones en el dispositivo láser que los aquí especificados.
- Sólo permita reparar la unidad a los agentes del servicio técnico autorizado HP.

Recycling notices

English notice

Disposal of Waste Equipment by Users in Private Households in the European Union

This symbol means do not dispose of your product with your other household waste. Instead, you should protect human health and the environment by handing over your waste equipment to a designated collection point for the recycling of waste electrical and electronic equipment. For more information, please contact your household waste disposal service.
Bulgarian notice

Изхвърляне на отпадъчно оборудване от потребители в частни домакинства в Европейския съюз
Този символ върху продукта или опаковката му означава, че продуктът не трябва да се изхвърля заедно с другите битови отпадъци. Вместо това, трябва да предадете човешкото здраве и околната среда, като предадете отпадъчното оборудване в предназначения за събирането му пункт за рециклиране на неизползвано електрическо и електронно оборудване. За допълнителна информация се свържете с фирмата по чистота, която услугата използва.

Czech notice

Likvidace zařízení v domácnostech v Evropské unii
Tento symbol znamená, že nesmíte tento produkt likvidovat spolu s jiným domovním odpadem. Místo toho byste měli chránit lidské zdraví a životní prostředí tím, že jej předáte na k tomu určené sběrné pracoviště, kde se zabývají recyklací elektrického a elektronického vybavení. Pro více informací kontaktujte společnost zabývající se sběrem a svozem domovního odpadu.

Danish notice

Bortskaffelse af brugt udstyr hos brugere i private hjem i EU
Dette symbol betyder, at produktet ikke må bortskaffes sammen med andet husholdningsaffald. Du skal i stedet den menneskelige sundhed og miljøet ved at aflive dit brugte udstyr på et dertil beregnet indsamlingssted for af brugt elektrisk og elektronisk udstyr. Kontakt nærmeste renovationsafdeling for yderligere oplysninger.

Dutch notice

Inzameling van afgedankte apparatuur van particuliere huishoudens in de Europese Unie
Dit symbool betekent dat het product niet mag worden gedeporteerd bij het overige huishoudelijke afval. Bescherm de gezondheid en het milieu door afgedankte apparatuur in te leveren bij een hiervoor bestemd inzamelpunt voor recycling van afgedankte elektrische en elektronische apparatuur. Neem voor meer informatie contact op met uw gemeentereliningdienst.
Estonian notice

Äravisatatave seadmete likvideerimine Euroopa Lidu eramajapidamistes

Finnish notice

Kottalousteiden hävittäminen Euroopan unionin alueella
Tämä symboli merkitsee, että laitetta ei saa hävittää muiden kottalousteiden mukana. Sen sijaan sinun on suojattava ihmisten terveyttä ja ympäristöä toimittamalla käytöstä poistettu laite sähkö- tai elektroniikkajätteen kierrätyspisteeseen. Lisätietoja saat jättehuoltoyhtiötä.

French notice

Mise au rebut d’équipement par les utilisateurs privés dans l’Union Européenne
Ce symbole indique que vous ne devez pas jeter votre produit avec les ordures ménagères. Il est de votre responsabilité de protéger la santé et l'environnement et de vous débarrasser de votre équipement en le remettant à une déchetterie effectuant le recyclage des équipements électriques et électroniques. Pour de plus amples informations, prenez contact avec votre service d'élimination des ordures ménagères.

German notice

Entsorgung von Altgeräten von Benutzern in privaten Haushalten in der EU
Greek notice

Απόρριψη άρηστου εξοπλισμού από ιδιώτες χρήστες στην 
Ευρωπαϊκή Ένωση

Αυτό το σύμβολο σημαίνει ότι δεν πρέπει να απορρίψετε το προϊόν με τα 
λοιπά οικιακά απορρίμματα. Αντίθετα, πρέπει να προστατέψετε την 
ανθρώπινη υγεία και το περιβάλλον παραδίδοντας τον άρηστο εξοπλισμό 
σας σε εξουσιοδοτημένο σημείο συλλογής για την ανακύκλωση άρηστου 
ηλεκτρικού και ηλεκτρονικού εξοπλισμού. Για περισσότερες πληροφορίες, 
επικοινωνήστε με την υπηρεσία απόρριψης απορριμμάτων της περιοχής σας.

Hungarian notice

A hulladék anyagok megsemmisítése az Európai Unió háztartásaiiban

Ez a szimbolum azt jelzi, hogy a készüléket nem szabad a háztartási 
hulladékkal együtt kidobni. Ehelyett a 
leseljeztett berendezéseknak az elektromos vagy elektronikus hulladék 
átvételére kijelölt helyen történő 
beszolgáltatásával megóvja az emberi egészséget és a környezetet. További 
információt a helyi köztisztasági 
állalattól kaphat.

Italian notice

Smaltimento di apparecchiature usate da parte di utenti privati 
nell’Unione Europea

Questo simbolo avvisa di non smaltire il prodotto con i normali rifi uti 
domesticì. Rispettare la salute umana e l’ambiente conferendo 
l'apparecchiatura dismessa a un centro di raccolta designato per il riciclo di 
apparecchiature elettroniche ed elettriche. Per ulteriori informazioni, rivolgersi 
ai servizio per lo smaltimento dei rifi uti domestici.

Latvian notice

Europos Sajungos namų įkilo vartotojų įrangos atliekų šalinimas

Šis simbolis nurodo, kad gaminio negalima išmesti kartu su kitomis buitinėmis 
atliekomis. Kad apsaugotumėte žmonių sveikatą ir aplinką, pasenusią 
nenaudojama įrangą turite nuvesti į elektrinių ir elektroninių atliekų surinkimo 
punktą. Daugiau informacijos teiraukitės buitinėj atliekų surinkimo tarnybos.
Slovak notice

Likvidácia vyradených zariadení používaných v domácnostiach v Európskej únii
Tento symbol znamená, že tento produkt sa nemá likvidovať s ostatným domovým odpadom. Namiesto toho by ste mali chrániť ľudské zdravie a životné prostredie odovzdaním odpadového zariadenia na zbernom mieste, ktoré je určené na recykláciu odpadových elektrických a elektronických zariadení. Ďalšie informácie získate od spoločnosti zaoberajúcej sa likvidáciou domového odpadu.

Spanish notice

Eliminación de los equipos que ya no se utilizan en entornos domésticos de la Unión Europea
Este símbolo indica que este producto no debe eliminarse con los residuos domésticos. En lugar de ello, debe evitar causar daños a la salud de las personas y al medio ambiente llevando los equipos que no utilice a un punto de recogida designado para el reciclaje de equipos eléctricos y electrónicos que ya no se utilizan. Para obtener más información, póngase en contacto con el servicio de recogida de residuos domésticos.

Swedish notice

Hantering av elektroniskt avfall för hemanvändare inom EU

Turkish notice

Türkiye Cumhuriyeti: EEE Yönetmeli ine Uygundur
Battery replacement notices

Dutch battery notice

Verklaring betreffende de batterij

⚠️ WAARSCHUWING: dit apparaat bevat mogelijk een batterij.

- Probeer de batterijen na het verwijderen niet op te laden.
- Stel de batterijen niet bloot aan water of temperaturen boven 60° C.
- De batterijen mogen niet worden beschadigd, gedemonteerd, geplet of doorboord.
- Zorg dat u geen kortsluiting veroorzaakt tussen de externe contactpunten en laat de batterijen niet in aanraking komen met water of vuur.
- Gebruik ter vervanging alleen door HP goedgekeurde batterijen.

Batterijen, accu’s en accumulators mogen niet worden gedeponeerd bij het normale huishoudelijke afval. Als u de batterijen/accu’s wilt inleveren voor hergebruik of op de juiste manier wilt vernietigen, kunt u gebruik maken van het openbare inzamelingssysteem voor klein chemisch afval of ze terugsturen naar HP of een geautoriseerde HP Business of Service Partner.

Neem contact op met een geautoriseerde leverancier of een Business of Service Partner voor meer informatie over het vervangen of op de juiste manier vernietigen van accu’s.
French battery notice

Avis relatif aux piles

⚠️ AVERTISSEMENT : cet appareil peut contenir des piles.

- N’essayez pas de recharger les piles après les avoir retirées.
- Évitez de les mettre en contact avec de l’eau ou de les soumettre à des températures supérieures à 60°C.
- N’essayez pas de démonter, d’écraser ou de percer les piles.
- N’essayez pas de court-circuiter les bornes de la pile ou de jeter cette dernière dans le feu ou l’eau.
- Remplacez les piles exclusivement par des pièces de rechange HP prévues pour ce produit.

Les piles, modules de batteries et accumulateurs ne doivent pas être jetés avec les déchets ménagers. Pour permettre leur recyclage ou leur élimination, veuillez utiliser les systèmes de collecte publique ou renvoyez-les à HP, à votre Partenaire Agréé HP ou aux agents agréés.

Contactez un Revendeur Agréé ou Mainteneur Agréé pour savoir comment remplacer et jeter vos piles.

German battery notice

Hinweise zu Batterien und Akkus

⚠️ VORSICHT: Dieses Produkt enthält unter Umständen eine Batterie oder einen Akku.

- Versuchen Sie nicht, Batterien und Akkus außerhalb des Gerätes wieder aufzuladen.
- Schützen Sie Batterien und Akkus vor Feuchtigkeit und Temperaturen über 60°.
- Verwenden Sie Batterien und Akkus nicht missbräuchlich, nehmen Sie sie nicht auseinander und vermeiden Sie mechanische Beschädigungen jeglicher Art.
- Vermeiden Sie Kurzschlüsse, und setzen Sie Batterien und Akkus weder Wasser noch Feuer aus.
- Ersetzen Sie Batterien und Akkus nur durch die von HP vorgesehenen Ersatzteile.

Batterien und Akkus dürfen nicht über den normalen Hausmüll entsorgt werden. Um sie der Wiederverwertung oder dem Sondermüll zuzuführen, nutzen Sie die öffentlichen Sammelstellen, oder setzen Sie sich bezüglich der Entsorgung mit einem HP Partner in Verbindung.

Weitere Informationen zum Austausch von Batterien und Akkus oder zur sachgemäßen Entsorgung erhalten Sie bei Ihrem HP Partner oder Servicepartner.
Italian battery notice

Istruzioni per la batteria

⚠️ AVVERTENZA: Questo dispositivo può contenere una batteria.

- Non tentare di ricaricare le batterie se rimosse.
- Evitare che la batteria entri in contatto con l’acqua o sia esposta a temperature superiori a 60°C.
- Non smontare, schiacciare, forare o utilizzare in modo improprio la batteria.
- Non accostare i contatti esterni o gettare in acqua o sul fuoco la batteria.
- Sostituire la batteria solo con i ricambi HP previsti a questo scopo.

Le batterie e gli accumulatori non devono essere smaltiti insieme ai rifiuti domestici. Per procedere al riciclaggio o al corretto smaltimento, utilizzare il sistema di raccolta pubblico dei rifiuti o restituirli a HP, ai Partner Ufficiali HP o ai relativi rappresentanti.

Per ulteriori informazioni sulla sostituzione e sullo smaltimento delle batterie, contattare un Partner Ufficiale o un Centro di assistenza autorizzato.

Japanese battery notice

バッテリに関する注意

⚠️ 警告: 本製品はバッテリを内蔵している場合があります。

- バッテリを取り外している場合は、充電しないでください。
- バッテリを水にさらしたり、60℃（140°F）以上の温度にさらさないようにください。
- バッテリを誤用、分解、破壊したり、穴をあけたりしないでください。
- 外部極を短絡させたり、火や水に役しないでください。
- バッテリを交換する際は、HP指定の製品と交換してください。

バッテリ、バッテリバック、蓄電池は一般的な家庭廃棄物と一緒に廃棄しないでください。リサイクルまたは適切に廃棄するため、公共の収集システム、HP、HPパートナー、またはHPパートナーの代理店にお送りください。

バッテリ交換および適切な廃棄方法についての情報は、HPのサポート窓口にお問い合わせください。

HP StorageWorks MSL Library Extender user guide 89
Declaración sobre las baterías

⚠️ **ADVERTENCIA:** Este dispositivo podría contener una batería.

- No intente recargar las baterías si las extrae.
- Evite el contacto de las baterías con agua y no las exponga a temperaturas superiores a los 60 ºC (140 ºF).
- No utilice incorrectamente, ni desmonte, aplaste o pinche las baterías.
- No cortocircuite los contactos externos ni la arroje al fuego o al agua.
- Sustituya las baterías sólo por el repuesto designado por HP.

Las baterías, los paquetes de baterías y los acumuladores no se deben eliminar junto con los desperdicios generales de la casa. Con el fin de tirarlos al contenedor de reciclaje adecuado, utilice los sistemas públicos de recogida o devuélvalas a HP, un distribuidor autorizado de HP o sus agentes.

Para obtener más información sobre la sustitución de la batería o su eliminación correcta, consulte con su distribuidor o servicio técnico autorizado.
### Glossary

**CSR**  
Customer self repair. An HP program that allows you to repair your StorageWorks product by shipping the repair part directly to you.

**GUI**  
Graphical user interface.

**IPC**  
The internal communication bus used by the Library to communicate with the tape drives.

**L&TT**  

**OCP**  
Operator control panel. The LCD panel and buttons on the front panel of the Tape Library.

**RMI**  
Remote Management Interface. A web-based interface used to monitor and control the Library.
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