Compaq StorageWorks™

MSL5026 Library Pass-Through Mechanism (PTM)

Reference Guide

First Edition (June 2001)
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Compaq Computer Corporation

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About This Guide

This guide is designed to be used as step-by-step instructions for installing and configuring a Compaq StorageWorks™ MSL5026 Library Pass-Through Mechanism (PTM).

Document Structure

This guide contains the following information:

Chapter 1: Introduction

- Preparing for the PTM Installation
- PTM Components
- PTM Required Tools

Chapter 2: Installing the PTM

- Planning the Installation
- Positioning the Libraries
- Installing the Router
- PTM Base Unit Description
- Installing a Single PTM Base Unit
- Adding Extensions to a PTM Base Unit

- Installing a Longer Belt to an Extended PTM
- Installing the Extended PTM
- Cabling the PTM and Router

Chapter 3: Configuring the PTM

- Configuring the Master Library
- Configuring the Slave Libraries

Text Conventions

This document uses the following conventions to distinguish elements of text:

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
FILENAMES	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in uppercase.
Type	When you are instructed to *type* information, type the information without pressing the **Enter** key.
Enter	When you are instructed to enter information, type the information and then press the **Enter** key.

Symbols in Text

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

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

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

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

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

Symbols on Equipment

The following icons may be located on equipment in areas where hazardous conditions may exist.

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

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

Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection (NIC).

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

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

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

Power supplies or systems marked with these symbols indicate the equipment is supplied by multiple sources of power.

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

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

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

Cabinet Stability

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the cabinet rests on the leveling jacks.
- The stabilizing feet are attached to the cabinet if it is a single cabinet installation.
- The cabinets are coupled together in multiple cabinet installations.
- Only one component is extended at a time. A cabinet may become unstable if more than one component is extended for any reason.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Compaq Technical Support

In North America, call the Compaq Technical Phone Support Center at 1-800-OKCOMPAQ. For continuous quality improvement, calls may be monitored or recorded. This service is available 24 hours a day, 7 days a week.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the Compaq website. Visit the Compaq website at www.compaq.com.

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

Compaq Website

The Compaq website has information on this product as well as the latest drivers and Flash ROM images. You can visit the Compaq website at www.compaq.com.

Compaq Authorized Reseller

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, you can visit the Compaq website for locations and telephone numbers.

Chapter 1

Introduction

The Compaq StorageWorks Pass-Through Mechanism (PTM) enables the transfer of tape cartridges between Compaq StorageWorks MSL5026 Libraries. A single PTM system can be used to connect up to seven libraries, creating a multi-unit tape library configuration.

The PTM installation procedure consists of the following steps:

- Preparing for the PTM installation
- Installing the PTM
- Cabling the PTM
- Configuring the PTM

NOTE: An MSL series PTM is not compatible with either a TL series or SSL series PTM.

Preparing for the PTM Installation

Before beginning the installation procedure:

1. Using the packing slip, verify the components that came with the PTM Upgrade Kit.
2. Make sure that you have the required tools.
3. Make sure the library is functional. Refer to Chapter 4 of the Compaq *StorageWorks MSL5026 Library User Guide*.

PTM Components

The following components typically ship with a PTM Upgrade Kit:

- PTM (base unit)
- Router/hub and bracket
- Primary motor cable
- AC power cord
- Ethernet cable(s)
- 5U extension(s)
- 10U extension(s)
- Firmware upgrade

PTM Required Tools

The following tools are required to perform a PTM installation:

- #2 Phillips screwdriver (Stubby or right-angle)
- #1 Phillips screwdriver
- Flat-blade screwdriver
- 0.050-inch Allen wrench (recommended)
- Scissors or knife

Chapter 2

Installing the PTM

This chapter describes how to install a Pass-Through Mechanism (PTM) for a Compaq StorageWorks MSL5026 Library. Sections in this chapter include:

- Planning the Installation
- Positioning the Libraries
- Installing the Router
- PTM Base Unit Description
- Installing a Single PTM Base Unit
- Adding Extensions to a PTM Base Unit
- Installing a Longer Belt to an Extended PTM
- Installing the Extended PTM
- Cabling the PTM and Router

Planning the Installation

A PTM can be mounted in a Compaq storage cabinet. Two PTM variations are available:

- A factory-assembled PTM (base unit) that can be used to connect two MSL5026 libraries (one master and one slave).
- The PTM base unit plus extensions with a combined length equal to the number of MSL5026 libraries installed in a Compaq storage cabinet (one master and up to six additional slaves).

NOTE: Two unique extension sizes are available: 5 Unit (5U) and 10 Unit (10U).

If PTM extensions are required, first assemble the entire PTM system before installing it in a multi-unit library configuration.

IMPORTANT: Prepare each library in a multi-unit library configuration for PTM installation by removing the PTM cover plates, drive shoe assembly 1, and/or blank drive shoe covers while they are outside of the Compaq storage cabinet. This simplifies the installation process.

CAUTION: Do not apply power to any library. Attempting to connect or disconnect a PTM to a library that has power applied can damage the library and the PTM base unit PCB.

Positioning the Libraries

The PTM must be attached to the top two libraries in a multi-unit library configuration. Additional slave libraries can be installed anywhere below the first two libraries, in any order. Note that additional standalone libraries may be installed above the multi-unit library configuration.

The top library in the multi-library configuration (primary master) senses the position of each library during initialization at power-up. If the primary master library ever fails, a fail-over library (secondary master) can assume control of the remaining libraries in the multi-unit library configuration. Note that this feature is planned for a future release and will require a hardware and firmware upgrade.

If you plan on leaving gaps between libraries, make sure each gap does not exceed the width of one extension. All libraries must be positioned in multiples of 5 Units (5U) for proper vertical alignment.

> **IMPORTANT:** It is recommended that all MSL5026 libraries in a multi-unit library configuration use the same drive types. Check with your application software vendor if you want to mix drive types in a multi-unit library configuration to manage partitioning by tape technology.

Installing the Router

An eight-port router [seven port connectors and one Wide Area Network (WAN) connector] is included in the PTM Upgrade Kit. It comes pre-assembled in its own bracket for installation at the side of a Compaq storage cabinet. The router is used to connect each installed library to a WAN via the 10-BaseT connector on the library controller board for coordinating PTM operation and communication.

To install the router in a Compaq storage cabinet:

1. Carefully install the router into a Compaq storage cabinet. Make sure both tabs at the bottom of the bracket slide into their mating holes in the Compaq storage cabinet (see Figure 2–1).

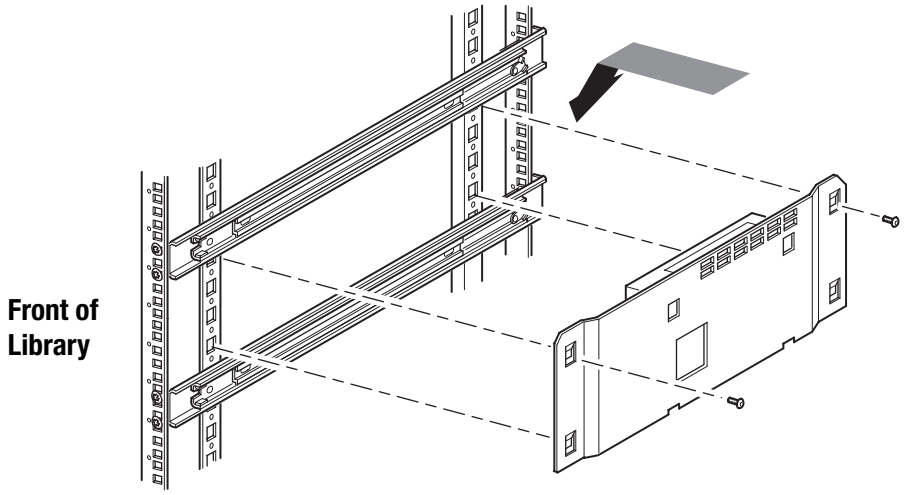
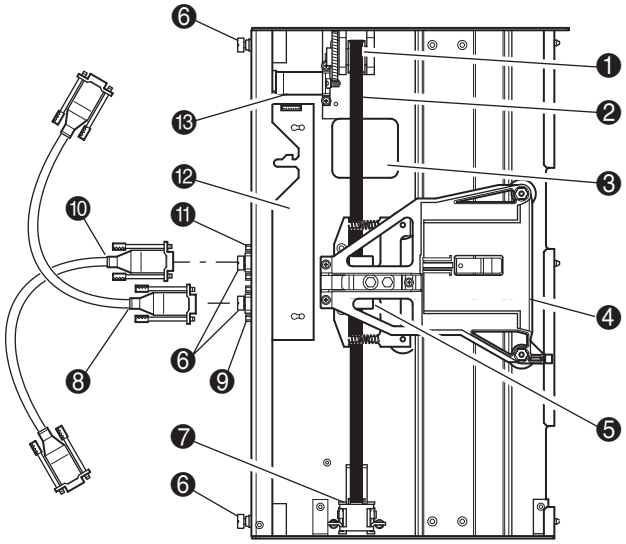


Figure 2–1. Installing the router into a Compaq storage cabinet

2. Secure the router to the Compaq storage cabinet using the two supplied screws (see Figure 2–1).
3. Connect the supplied AC power cable to the router and to the Compaq storage cabinet's AC power outlet. Do not turn the router on at this time.
4. Attach the 10-BaseT cables to the router for each library. See the section on "Cabling the PTM and Router," for connecting instructions.
5. Attach a network cable to the router. See the section on "Cabling the PTM and Router," for connecting instructions.

PTM Base Unit Description

The PTM base unit comes factory assembled and contains the following components (see Figure 2–2). Note that the PTM base unit only supports two libraries in a multi-unit library configuration.



❶ Drive Motor Pulley
❷ Drive Belt
❸ Belt Block Bracket Access Cutout
❹ Media Elevator Car
❺ Belt Block and Brackets
❻ Thumbscrews (Top, Middle, and Bottom)
❼ Belt Tensioner Ramp and Idler Pulley
❽ Primary Motor Cable
❾ Primary Motor Cable Connector
❿ Fail-Over Motor Cable (Planned for Future Release)
⓫ Fail-Over Motor Cable Connector
⓬ Printed Circuit Board (PCB), Motor Controller
⓭ Drive Motor

Figure 2–2. PTM base unit

Installing a Single PTM Base Unit

To install a single PTM base unit:

1. Install two libraries, as shown in Figure 2–3, following the instructions in the Compaq *StorageWorks MSL5026 Library Overview and Installation or Rackmount Conversion Kit*.

IMPORTANT: If PTM cover plate(s) are not removed, do not secure any library front bezel to the Compaq storage cabinet until the PTM installation is complete.

CAUTION: Do not apply power to either library. Attempting to connect or disconnect a PTM base unit to a library that has power applied can damage the library and the PTM base unit PCB.

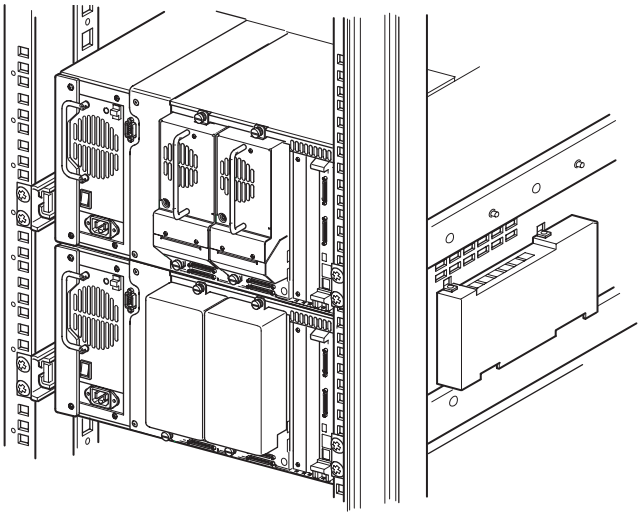


Figure 2–3. Library installation

NOTE: After installing the PTM base unit, secure each slave library to the Compaq storage cabinet using its front bezel thumbscrews.

2. Remove the blank panel or drive shoe assembly 1 from the bay adjacent to the PTM cover plate opening (see Figure 2–4).
   a. Loosen the captive retaining screws at the top and bottom of the blank panel or drive shoe assembly 1.
   b. Remove the blank panel or pull straight back on the drive shoe assembly 1 handle to unplug it. Note that some effort might be required to overcome the initial resistance of unplugging the drive shoe assembly from the hot-plug connector. A gentle wiggling motion may aid removal.
   c. Fully disengage drive shoe assembly 1. Continue to slide drive shoe assembly 1 out while supporting it until the tape drive hardware clears the back of the library hot-plug connector.

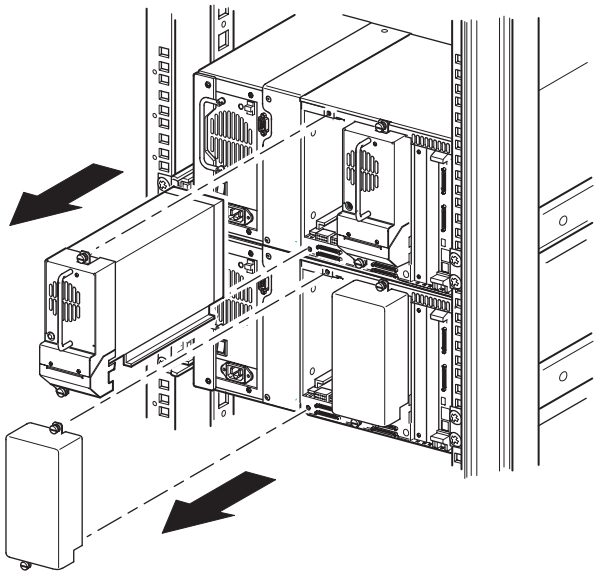


Figure 2–4. Accessing the drive shoe assembly 1 bay

3. Using a #2 Phillips screwdriver, remove the screws that secure the PTM cover plate to each library chassis (see Figure 2–5).

NOTE: If you purchased a PTM with your libraries, remove the PTM cover plate on each library prior to installing them into a Compaq storage cabinet. Otherwise, each library needs to be pulled out sequentially from the front of the Compaq storage cabinet so you can gain access to the top PTM cover plate screw on a lower library.

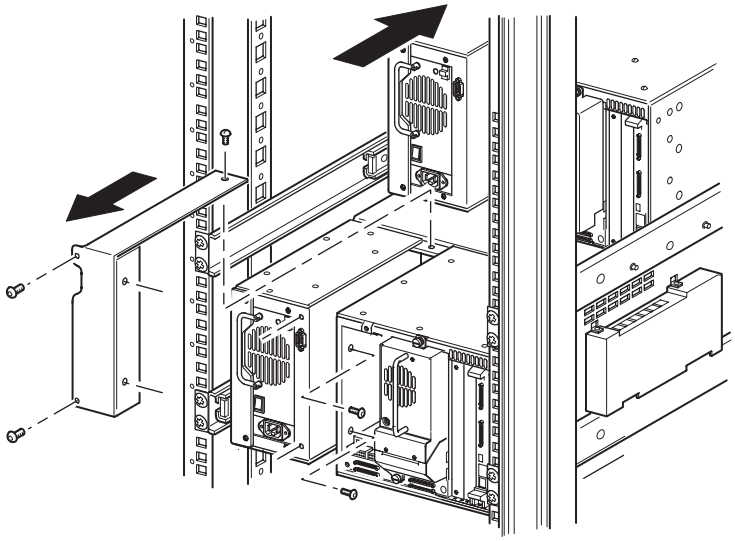


Figure 2–5. Removing the PTM cover plate

4. Install the PTM base unit (see Figure 2–6).
   a. Support the PTM base unit from the bottom.
   b. Carefully insert the PTM base unit into the top library making sure the top pins are fully engaged.
   c. Using the PTM base unit top and top-middle thumbscrews, secure the PTM base unit to the top library.

   NOTE: If the lower pins are difficult to align to the bottom (slave) library, push the slave library slightly forward. Afterwards, engage it by pulling it toward the PTM base unit before tightening the lower thumbscrews.

   d. Using the PTM base unit bottom-middle and bottom thumbscrews, secure the PTM base unit to the bottom library.

   NOTE: If you still cannot align the bottom library to the PTM base unit, slightly loosen the rear rail bracket screws for the bottom library, reposition it, and then secure it to the PTM base unit. Afterwards, re-tighten the rear rail bracket screws.

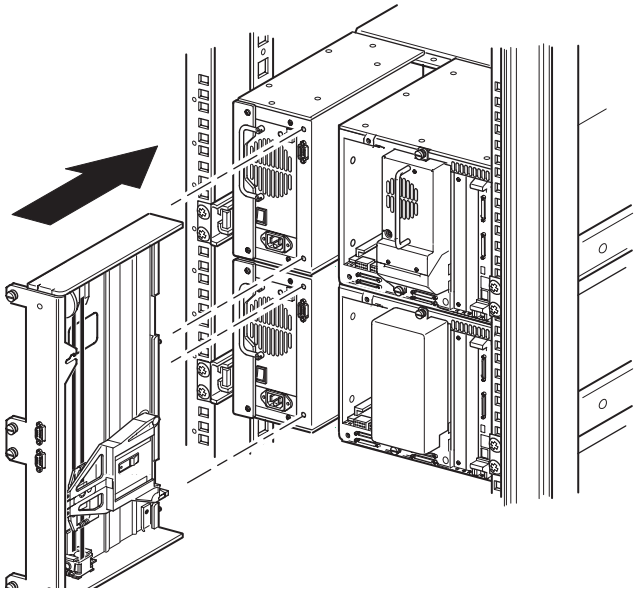


Figure 2–6. Installing the PTM base unit

5. Connect the PTM base unit following the instructions in "Cabling the PTM and Router," described later in this chapter.
6. If required, install any previously removed drive assemblies and covers.

Adding Extensions to a PTM Base Unit

To add extensions to a PTM base unit, you will need a clean, flat work area such as a table or work bench. The surface should be long enough to support the full length of the PTM base unit and all extensions. Use the following procedure to add extensions to a PTM base unit.

NOTE: During this procedure, make sure you save all screws, the PTM base unit bottom bracket, and the belt tensioner ramp/idler pulley springs and associated hardware. These items must be reused when adding extensions.

1. Remove the bottom plate from the PTM base unit (see Figure 2–7).

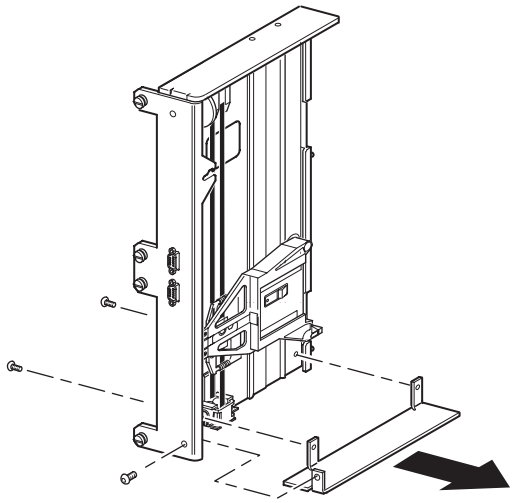


Figure 2–7. Removing the bottom plate from the PTM base unit

2. Slide the media elevator car to the top of the PTM base unit (see Figure 2–8). Note that the top of the PTM base unit has the drive motor on it.

NOTE: The media elevator car should now be positioned over the belt block bracket access cutout next to the PCB and drive motor.

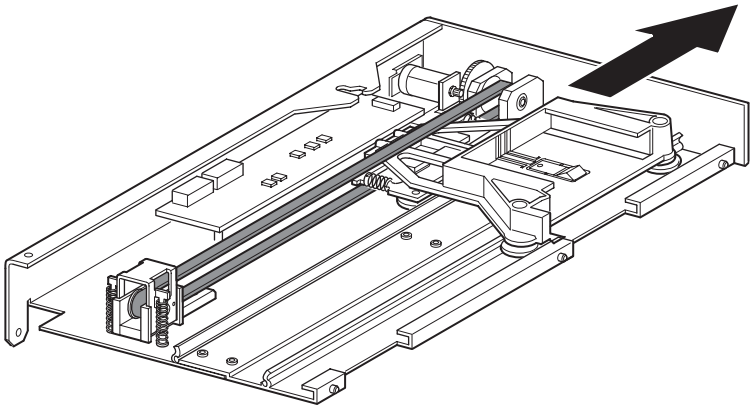


Figure 2–8. Media elevator car location

3. Turn the PTM over to access to the belt block bracket access cutout (see Figure 2–9).
4. Remove the four mounting screws from the two belt block brackets (see Figure 2–9).

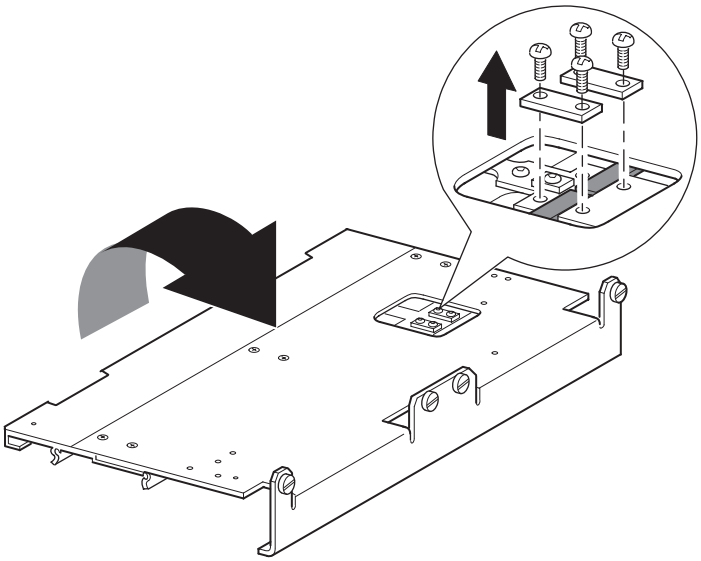


Figure 2–9. Belt block bracket access cutout

5. Turn the PTM base unit over and then remove the drive belt from the media elevator car, the belt tensioner ramp, and the idler pulley (see Figure 2–2).
6. Discard the belt.

7. Remove the belt tensioner ramp and idler pulley components as follows (see Figure 2–10):
   a. Remove the two screws and springs from the belt tensioner ramp and idler pulley.
   b. Remove the two screws that secure the belt tensioner ramp and idler pulley to the PTM base unit.
   c. Remove the belt tensioner ramp and idler pulley.

   IMPORTANT: Retain the belt tensioner ramp/idler pulley springs and associated hardware for use in the subsequent installation steps.

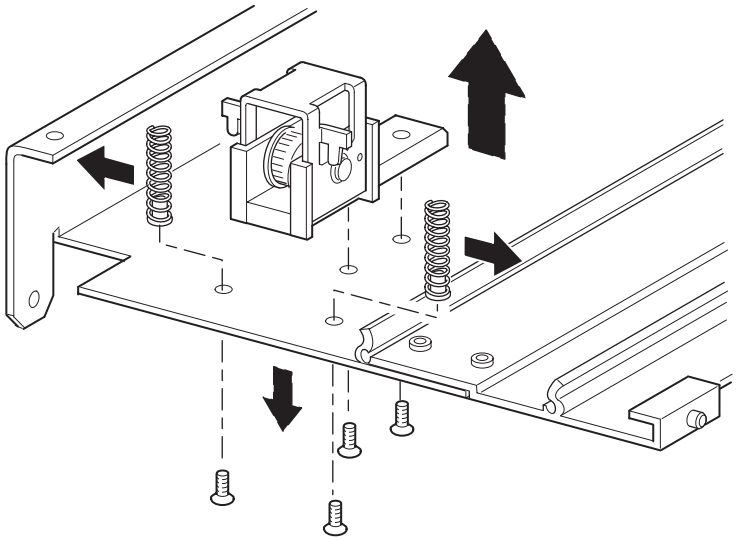


Figure 2–10. Removing the belt tensioner ramp and idler pulley

8. Mount a 5U or 10U extension as follows (see Figure 2–11):
   a. Insert the alignment pins of the extension into the corresponding slots at the bottom of the PTM base unit.

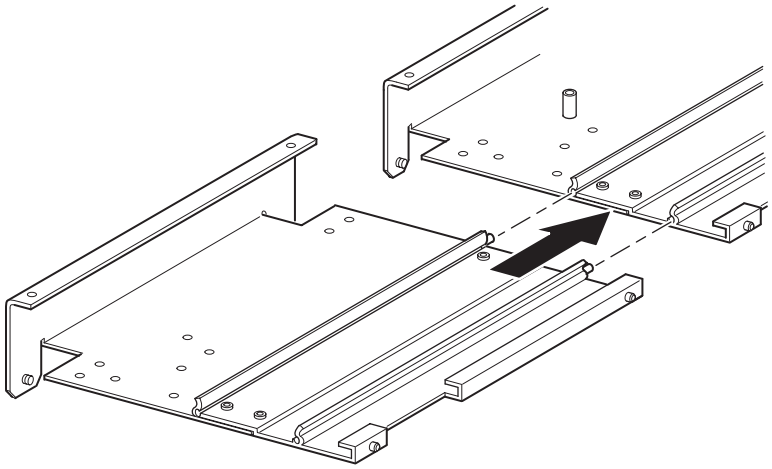


Figure 2–11. Mounting a 5U or 10U extension

b. Align the pins of the two narrow tie bars with the holes in the extension and PTM base unit (see Figure 2–12) and then attach them using four mounting screws (two screws for each narrow tie bar).

c. Attach the large tie bar (beveled edge to the inside corner of the PTM base unit and extension) using four mounting screws (see Figure 2–12).

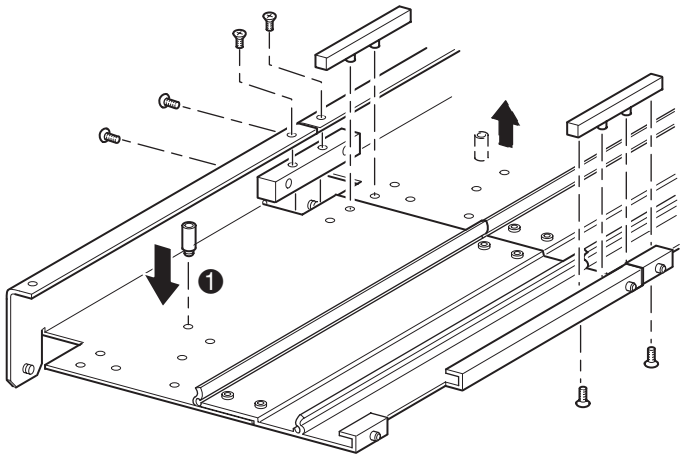


Figure 2–12. Installing tie bars

9. Remove the bottom stop standoff from the PTM base unit and then attach it to the extension in the corresponding mounting hole (❶, Figure 2–12).
10. Secure the belt tensioner ramp and idler pulley to the extension using the two previously removed screws (see Figure 2–10).
11. Secure the belt tensioner ramp and idler pulley springs using the two previously removed screws (see Figure 2–10).

Installing a Longer Belt to an Extended PTM

To install an extended belt:

1. On the extension belt tensioner ramp and idler pulley base, compress the springs until the holes in the tensioner ramp are aligned with the holes in the base of the tensioner.
2. Insert a 0.050-inch Allen wrench through the holes. This sets the idler pulley to the zero position (see Figure 2–13).

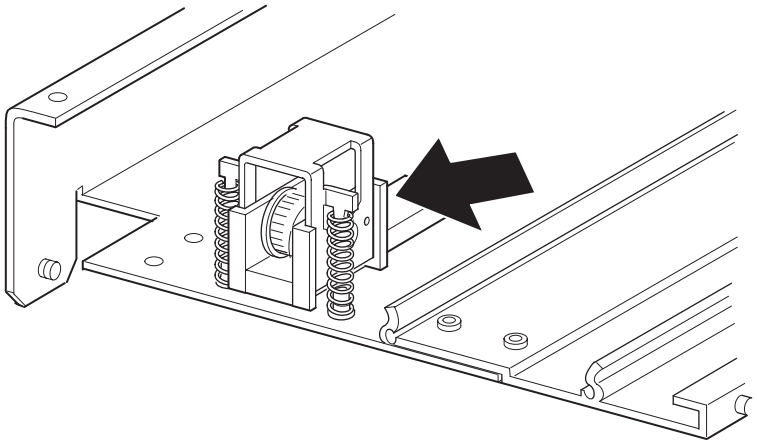


Figure 2–13. Tensioner ramp/idler pulley zero point

3. Cut (between the teeth) the new timing belt supplied with the PTM Upgrade Kit to the appropriate size for the total number of installed libraries (see Table 2–1).

IMPORTANT: The timing belt supplied with the PTM Upgrade Kit is marked and numbered at the appropriate cut points.

Table 2–1 Timing Belt Lengths

Number of Libraries	Length of Belt (Centimeters)	Length of Belt (Inches)
2	85.8	33.8
3	130.6	51.4
4	174.8	68.8
5	219.5	86.4
6	263.6	103.8
7	308.4	121.4

4. Thread the timing belt through the top of the belt tensioner ramp and idler pulley and then through the motor drive pulley. Make sure the belt teeth engage both pulleys (see Figure 2–14 and Figure 2–15).

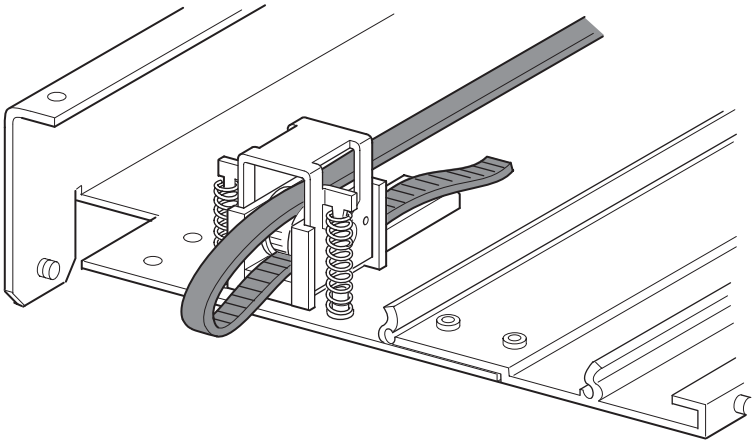


Figure 2–14. Installing the timing belt on the extension

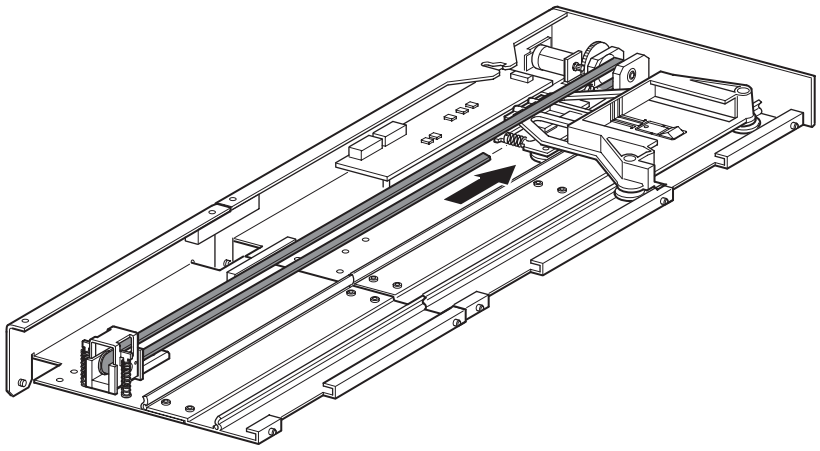


Figure 2–15. Installing the timing belt

5. Position the media elevator car over the belt block access cutout (see Figure 2–8).
6. Position the ends of the timing belt under the media elevator car at the midpoint of the belt block access cutout.
7. Turn the PTM over.
8. Place the timing belt ends on the belt block (see Figure 2–16).

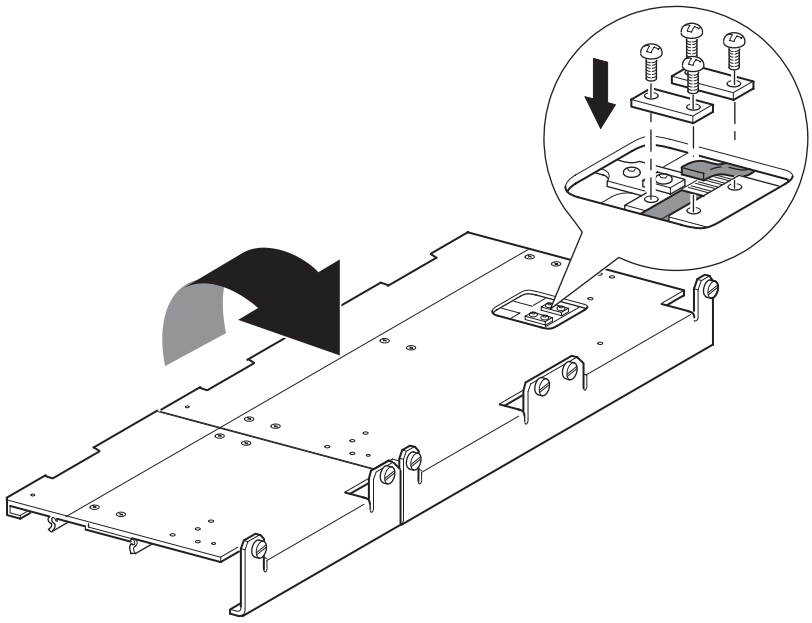


Figure 2–16. Timing belt at the belt block

9. Secure the timing belt with the two belt brackets and four retaining screws. If the belt was sized properly, a small space between the belt ends should be visible (see Figure 2–16).

10. Remove the previously inserted 0.050-inch Allen wrench to automatically set initial belt tension.
11. Install the bottom plate that was previously removed from the PTM base unit using the previously removed retaining screws (see Figure 2–17).

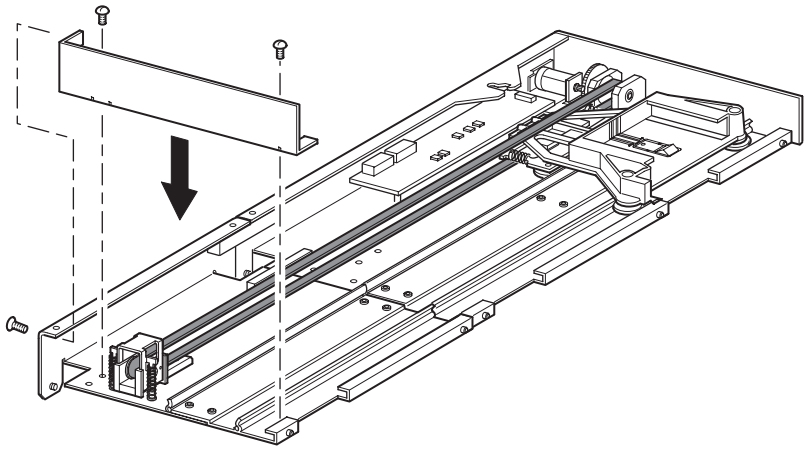


Figure 2–17. Installing the bottom plate

Installing the Extended PTM

To install the extended PTM:

1. Support the extended PTM from the bottom (see Figure 2–6).
2. Carefully insert the extended PTM into the top library making sure the top pins are fully engaged.
3. Using the extended PTM top and top-middle thumbscrews, secure the extended PTM to the top library.

   NOTE: If the lower pins are difficult to align to the bottom (slave) libraries, push the slave libraries slightly forward. Afterwards, engage each one by pulling them (one at a time) toward the extended PTM and then tighten the appropriate thumbscrews.

4. Using the extended PTM bottom-middle and bottom thumbscrews, secure the extended PTM to the second library.
5. Using the PTM extension thumbscrews, secure the extended PTM to the remaining libraries (in sequence) for the multi-unit library configuration.

   NOTE: If you still cannot align a bottom (slave) library to the extended PTM, slightly loosen the rear rail bracket screws for that library, reposition it, and then secure it to the extended PTM. Afterwards, re-tighten all rear rail bracket screws.

6. You can now attach the data cables to the extended PTM. See the section on "Cabling the PTM and Router," described later in this chapter.

Cabling the PTM and Router

This section describes how to connect the data cables to the PTM and router. The following configurations are shown:

- A multi-unit library configuration (single master and slave)
- A multi-unit library configuration (single master, fail-over master, and slave)

CAUTION: Do not apply power to any library. Attempting to connect or disconnect a PTM to a library that has power applied can damage the library and the PTM PCB.

NOTE: Positioning of the master(s) and slave(s) are limited by cable lengths and Graphical User Interface (GUI) viewing preferences.

NOTE: The primary master library (top) has a fully functional GUI. Slave libraries only have partial GUI capabilities.

After connecting all the appropriate data cables, see Chapter 3, "Configuring the PTM," for detailed information about configuring the PTM using the GUI touch screen.

Multi-Unit Library Configuration (Single Master and Slave)

Figure 2–18 shows how to connect a multi-unit library configuration using a single master and a slave library configuration.

IMPORTANT: All libraries must be powered off.

NOTE: Refer to the Compaq *StorageWorks MSL5026 Library Overview and Installation* poster for information on how to connect SCSI cables and SCSI terminators to fit your specific needs.

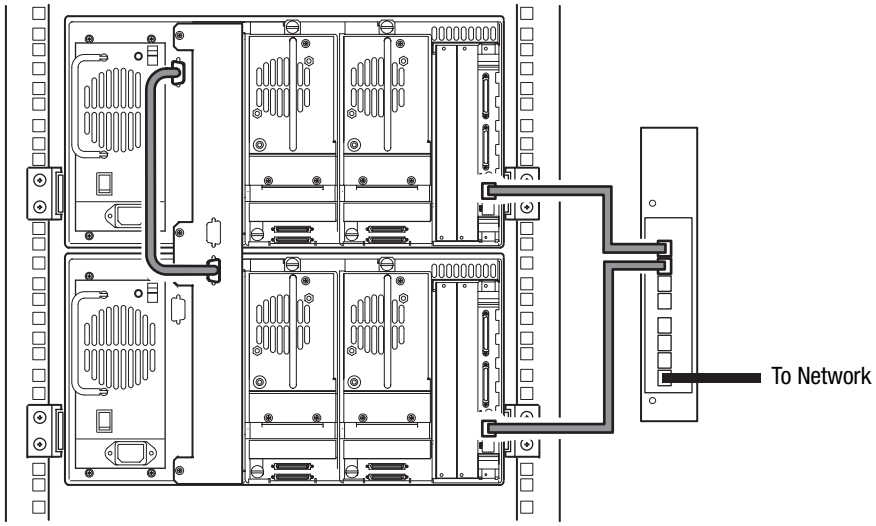


Figure 2–18. Multi-unit library configuration (single master and slave)

IMPORTANT: Additional slaves require an extended PTM system. See the sections on "Adding Extensions to a PTM Base Unit," "Installing a Longer Belt to an Extended PTM," and "Installing the Extended PTM."

Multi-Unit Library Configuration (Single Master, Fail-Over Master, and Slave)

Figure 2–19 shows how to connect a multi-unit library configuration using a single master, fail-over master, and slave library configuration.

IMPORTANT: All libraries must be powered off.

NOTE: Refer to the Compaq *StorageWorks MSL5026 Library Overview and Installation* poster for information on how to connect SCSI cables and SCSI terminators to fit your specific needs.

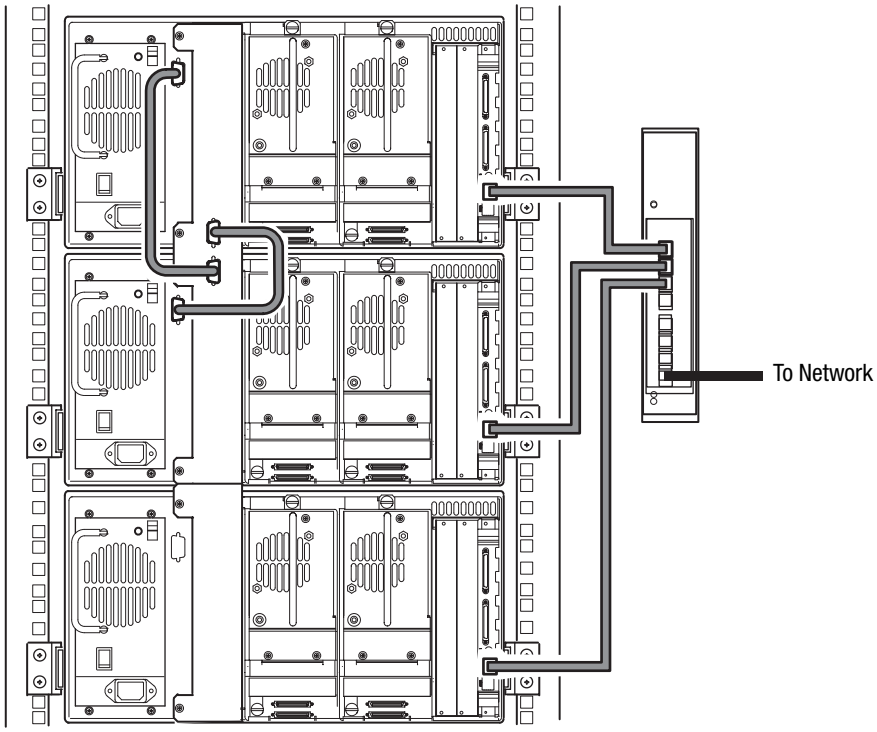


Figure 2–19. Multi-unit library configuration (single master, fail-over master, and slave)

Chapter 3

Configuring the PTM

After the Pass-Through Mechanism (PTM) has been successfully installed, the libraries must be configured to operate correctly as a multi-unit library configuration.

To configure the libraries:

1. Make sure the libraries are connected as described in the Compaq *StorageWorks MSL5026 Library Overview and Installation* poster.
2. Turn the libraries on and wait until the Power-On Self Test (POST) completes and the Compaq Initialization or Status screen appears on the display. Refer to the Compaq *StorageWorks MSL5026 Library Overview and Installation* poster for detailed instructions on power-up procedures.
3. Turn the router on.
4. Update the firmware for each library to the appropriate level for PTM functionality.

Configuring the Master Library

1. Using the Graphical User Interface (GUI) touch screen on the master library, select the Menu button from the Status screen (see Figure 3–1). Refer to the Compaq *StorageWorks MSL5026 Library User Guide* for instructions on how to operate the GUI touch screen.

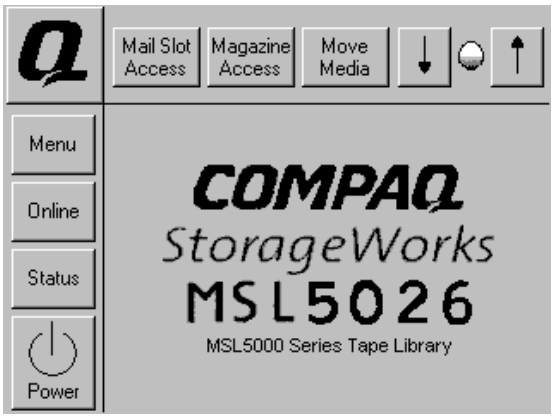


Figure 3–1. Library status screen

2. Select the Library button from the Edit Options area of the GUI (see Figure 3–2).

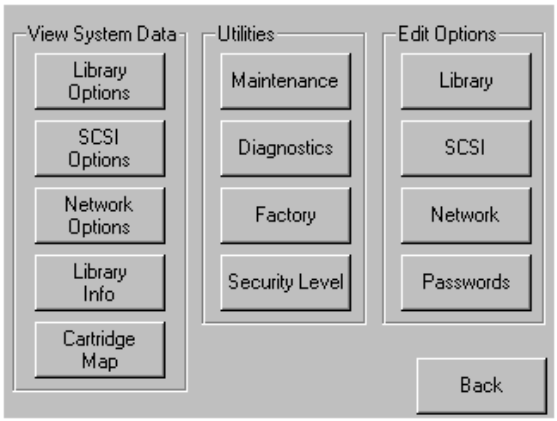


Figure 3–2. Menu screen

IMPORTANT: The library status LED indicator flashes green to indicate that a change is being made on the GUI that interrupts the current library operation.

3. Enter the appropriate Service password and then press the Validate button. Refer to the Compaq *StorageWorks MSL5026 Library User Guide* for additional information on setting passwords.
4. Press the down arrow (▼) until the Module Configuration menu option appears on the bottom of the display (see Figure 3–3).

NOTE: You can move to the next sequential Library options screen by selecting the down arrow (▼). To return to the previous Library options screen, select the up arrow (▲) or Back button to return to the Menu screen.

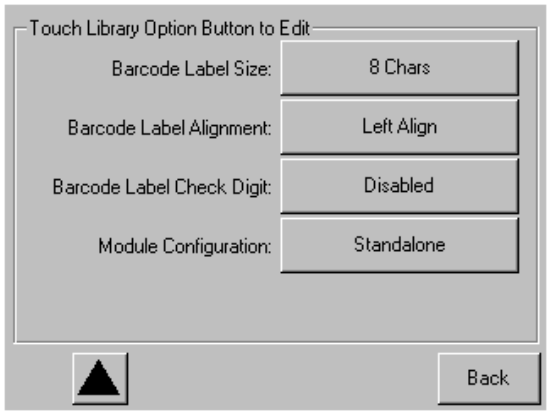


Figure 3–3. Module Configuration select screen

5. Select the button next to the Module Configuration menu option and then select the Master button (see Figure 3–4).

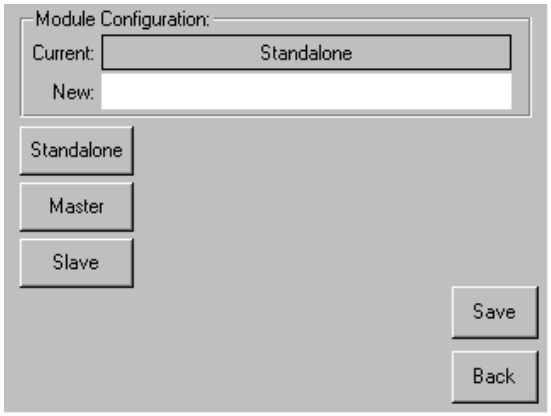


Figure 3–4. Module Configuration screen

6. Touch the Save button to confirm your request.
7. Select OK to save the new option. Afterwards, the library will automatically reboot and be configured for the new option (see Figure 3–5).

NOTE: After the library reboots, the library status LED indicator lights solid green indicating that the library is now fully operational.

Figure 3–5. Module Configuration Confirmation screen

Configuring the Slave Libraries

To configure the remaining libraries as slaves:

1. Using the GUI touch screen on a slave library in the Compaq storage cabinet, select the Menu button from the Status screen (see Figure 3–1).
2. Select the Library button from the Edit Options area of the GUI (see Figure 3–2).

   IMPORTANT: The library status LED indicator flashes green to indicate that a change is being made on the GUI that interrupts the current library operation.

3. Enter the appropriate Service password and then press the Validate button. Refer to the Compaq *StorageWorks MSL5026 Library User Guide* for additional information on setting passwords.
4. Press the down arrow (▼) until the Module Configuration menu option appears on the bottom of the display (see Figure 3–3).

   NOTE: You can move to the next sequential Library options screen by selecting the down arrow (▼). To return to the previous Library options screen, select the up arrow (▲) or Back button to return to the Menu screen.

5. Select the button next to the Module Configuration menu option and then select the Slave button (see Figure 3–4).
6. Touch the Save button to confirm your request.
7. Select OK to save the new option. Afterwards, the library will automatically reboot and be configured for the new option (see Figure 3–5).

   NOTE: After the library reboots, the library status LED indicator lights solid green indicating that the library is now fully operational.

8. Repeat this procedure to configure the remaining libraries as slaves.

The multi-unit library configuration is now ready for use. Refer to the Compaq *StorageWorks MSL5026 Library User Guide* for operating instructions.