

StorageWorks by Compaq

MSL5000 Series Library Maintenance and Service Guide

Part Number: 231911-002

Second Edition (February 2002)

This guide is to be used for troubleshooting and reference when servicing a *StorageWorks™* by Compaq MSL5000 Series Library.

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MSL5000 Series Library Maintenance and Service Guide
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A Vertical Axis Alignment

About this Guide

This maintenance and service guide is a troubleshooting guide that can be used for reference when servicing a *StorageWorks* by Compaq MSL5000 Series Library.

Symbols in Text

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



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



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

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

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

Symbols on Equipment



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

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



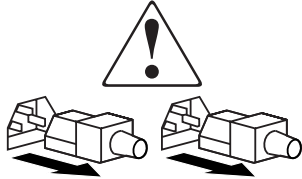
Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

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



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

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



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

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



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

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

Rack 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 rack rests on the leveling jacks.
 - In single rack installations, the stabilizing feet are attached to the rack.
 - In multiple rack installations, the racks are coupled.
 - Only one rack component is extended at any time. A rack may become unstable if more than one rack component is extended for any reason.
-

Getting Help

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

Compaq Technical Support

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

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

Outside North America, call Compaq technical support at the nearest location. Telephone numbers for worldwide technical support are listed on the Compaq website:

<http://www.compaq.com>.

Be sure to have the following information available before calling:

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

Compaq Website

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

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, see the Compaq website for locations and telephone numbers.

Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and a spare parts list for a *StorageWorks™* by Compaq MSL5000 Series Library. See the table following each illustration for the names and referenced spare parts.

Mechanical Parts Exploded View (MSL5026)

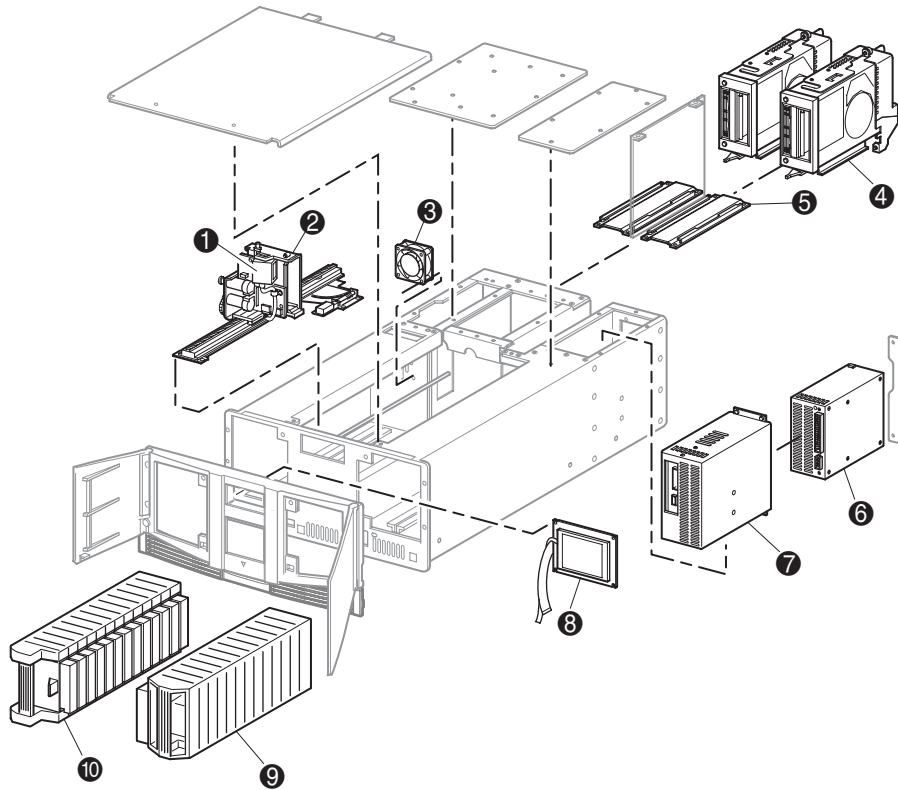


Table 1–1: Mechanical Spare Parts List (MSL5026)

Figure Legend	Description	Part Number
❶	SPS-BARCODE READER	231676-001
❷	SPS-ROBOT (shuttle assembly)	231675-001
❸	SPS-FAN, BACKPLANE	231670-001
❹	SPS-DRIVE, TAPE 40/80GB DLT W/FAN SPS-DRIVE, TAPE 110/220GB, SDLT	231669-001 233125-001
❺	SPS-GUIDE, DRV	231682-001
❻	SPS-POWER SUPPLY	231668-001
❼	SPS-BD, REC, PWR SPLY, W/BD 5026	231681-001
❽	SPS-DSPLY, LCDTOUCH, W/BD	231666-001
❾	SPS-MAGAZINE, RIGHT	231680-001
❿	SPS-MAGAZINE, LEFT	231679-001

Electrical Parts Exploded View (MSL5026)

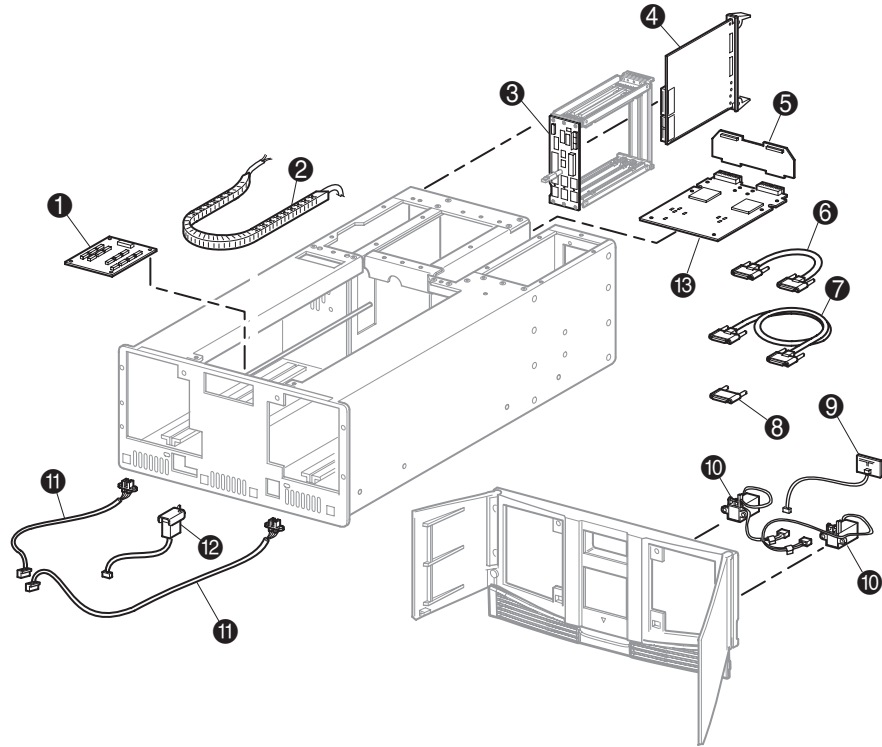


Table 1–2: Electrical Spare Parts List (MSL5026)

Figure Legend	Description	Part Number
①	SPS-BD, CONTROL PANEL	231685-001
②	SPS-CABLE, FLEX	231677-001
③	SPS-BD, BACKPLANE, 5026	231674-001
④	SPS-BD, CNTR, LIBR	231671-001
⑤	SPS-BD, HIGH DENSITY I/O SCSI	231673-001
⑥	SPS-CABLE, SCSI HIGH DENSITY .25M	231687-001
⑦	SPS-CA, SCSI HIGH DENSITY, .5M	231687-002
⑧	SPS-TERMINATOR, HD, SCSI	231683-001
⑨	SPS-BD, FRONT PANEL, LED	231678-001
⑩	SPS-LATCH SET, SOLENOID	231667-001
⑪	SPS-CABLE, OPTO SENSOR SET	231686-001
⑫	SPS-SOLENOIDS, MAIL SLOT	231684-001
⑬	SPS-BD, HOT-PLUG, LIBR	231672-001

Mechanical Parts Exploded View (MSL5052)

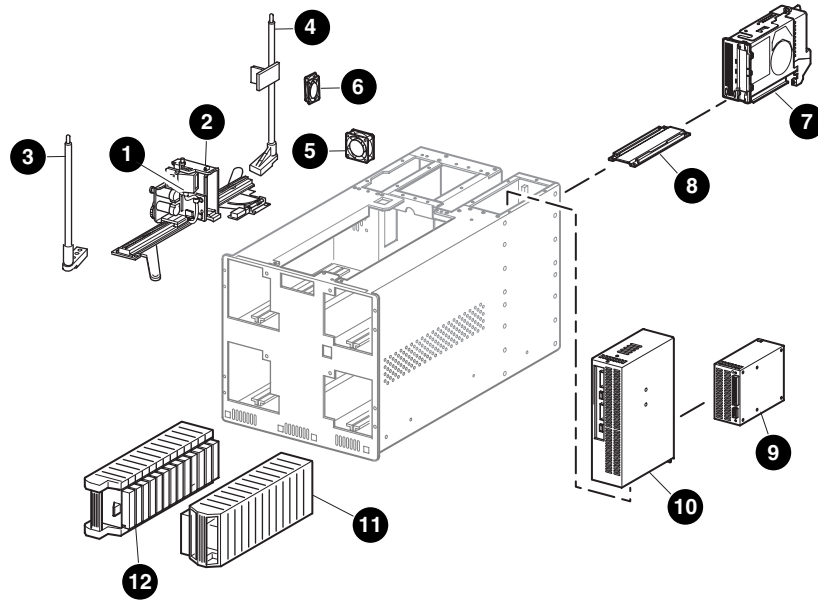


Table 1–3: Mechanical Spare Parts List (MSL5052)

Figure Legend	Description	Part Number
❶	SPS-ROBOT, W/BARCODE	263639-001
❷	SPS-BARCODE READER	231676-001
❸	SPS-SCREW RAIL, FRT	263637-001
❹	SPS-SCREW RAIL, REAR	263638-001
❺	SPS-FAN, BACKPLANE	231670-001
❻	SPS-FAN, CARD CAGE	263643-001
❼	SPS-DR, TAPE 40/80GB DLT W/FAN	231669-001
	SPS-DRV, TAPE, 110/220GB,SDLT	233125-001
❽	SPS-GUIDE, DRV	231682-001
❾	SPS-POWER SUPPLY	231668-001
❿	SPS-REC, PWR SPLY, W/BD, 5052	234892-001
⓫	SPS-MAGAZINE, RIGHT	231680-001
⓬	SPS-MAGAZINE, LEFT	231679-001

Electrical Parts Exploded View (MSL5052)

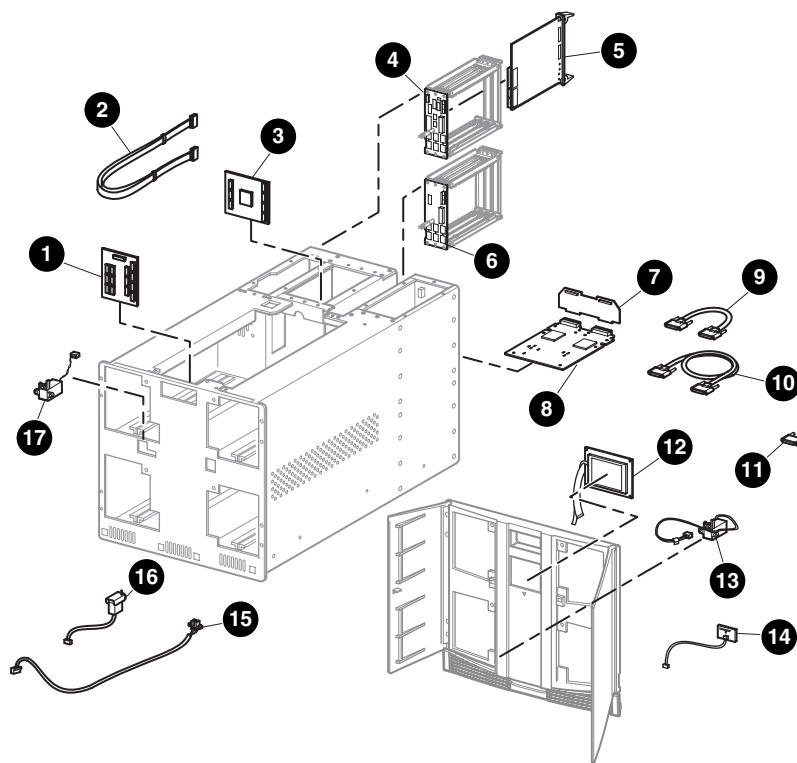


Table 1-4: Electrical Spare Parts List (MSL5052)

Figure Legend	Description	Part Number
①	SPS-BD, CONTROL PANEL 5052	263645-001
②	SPS-CABLE KIT, FLEX	263641-001
③	SPS-BD, CONTROLLER, VERTICAL	263640-001
④	SPS-BD, BACKPLANE	234893-001
⑤	SPS-BD, CONTR, LIBR	231671-001
⑥	SPS-BD, EXPANSION, 5052	263642-001
⑦	SPS-BD, HIGH DENSITY I/O SCSI	231673-001
⑧	SPS-BD, HOTPLUG, LIBR	231672-001
⑨	SPS-CABLE, SCSI HIGH DENSITY .25M	231687-001
⑩	SPS-CA, SCSI, HIGH DENSITY, .5M	231687-002
⑪	SPS-TERMINATOR, HD, SCSI	231683-001
⑫	SPS-DSPLY, LCDTOUCH,W/BD	231666-001
⑬	SPS-LATCH SET, SOLENOID	231667-001
⑭	SPS-BD, FRONT PANEL, LED	231678-001
⑮	SPS-CA, OPTO SENSOR SET, 5052	265363-001
⑯	SPS-SOLENOID, MAG, 5052	265362-001
⑰	SPS-SOLENOID, MAIL SLOT, 5052	279245-001

Removal and Replacement Procedures (MSL5026)

This chapter provides removal and replacement procedures for a Compaq *StorageWorks* MSL5026 Series Library. After completing all necessary removal and replacement procedures, run the appropriate Diagnostics software to verify that all components operate properly.

To service the library, you might need the following:

- Flat-blade screwdriver
- Phillips screwdriver (including stubby or right-angle, #1 and #2)
- Wire cutters (for removing cable ties)
- 0.50 Hex Key
- Needle nose pliers
- Ground strap
- From the Compaq Support Software CD:
 - Diagnostics software
 - Compaq Insight Manager

Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or micro-circuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover the library with approved static-dissipating material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and foam packing.
- Make sure you are always properly grounded when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Use conductive field service tools.

Preparation Procedures

System power in the library does not completely shut off using the Graphical User Interface (GUI) touch screen. You must turn off library power using the On/Off switch located at the rear of the power supply and then disconnect the AC power cord from each power supply to completely remove all power from the library.



WARNING: To reduce the risk of electric shock or damage to the equipment, disconnect power from the library by unplugging the power cord from either the electrical outlet or the power supply.

IMPORTANT: It is necessary to be knowledgeable of electrostatic discharge information before conducting the preparation procedures. For electrostatic discharge information, see "Electrostatic Discharge Information" described earlier in this chapter.

Weight Warning



WARNING: An MSL5000 Series library weighs either 60 pounds (27.1 kg) or 117 pounds (53 kg) when fully assembled. To reduce the risk of personal injury or damage to equipment:

- Observe local health and safety requirements and guidelines for manual material handling.
 - Obtain adequate assistance to lift and stabilize the library during installation or removal.
 - Remove all tape drives and power supplies to reduce the overall weight of the library.
-

Rack Warning



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

Library Warnings and Precautions



WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs could create hazardous conditions.



WARNING: To reduce the risk of personal injury from hazardous energy or damage to the equipment when working on energized libraries:

- Remove all watches, rings, and any other loose-fitting jewelry.
 - Do not use conductive tools inside the library that could bridge live parts.
-



WARNING: To reduce the risk of electric shock or damage to equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded electrical outlet that is easily accessible at all times.
 - Install the power supply before connecting the power cord to the power supply.
 - Unplug the power cord before removing the power supply from the library.
-

IMPORTANT: The installation of options and servicing of this product shall be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

Manually Opening the Magazine Doors

The magazine doors have both an electrical release, via the GUI touch screen, and a manual release. Compaq recommends that you open the magazine doors using the GUI touch screen. However, should the GUI touch screen fail, you can manually open the magazine doors by pushing a paper clip into the mechanical releases as shown in Figure 2-1.



CAUTION: To avoid data loss or damage to the equipment, the magazine doors should only be opened manually in an emergency.

1. Locate the door release access holes in the grill area below the magazine doors.
2. Using a thin, stiff metal rod (such as a 0.050 hex key, or a straightened paper clip), push the rod into the manual access door release until the door opens.

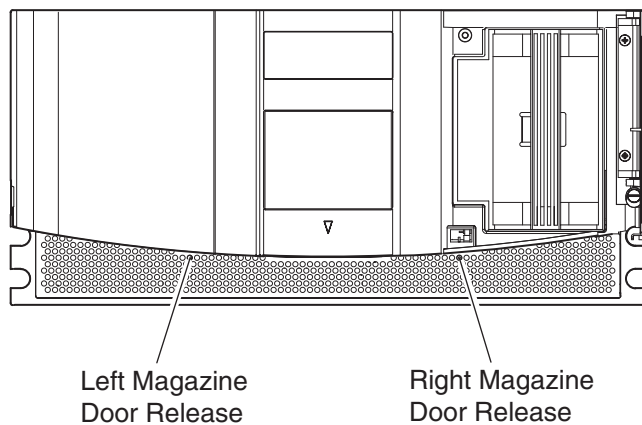


Figure 2-1: Manually opening the magazine doors

3. The magazine can now be removed. See Figure 2-2.

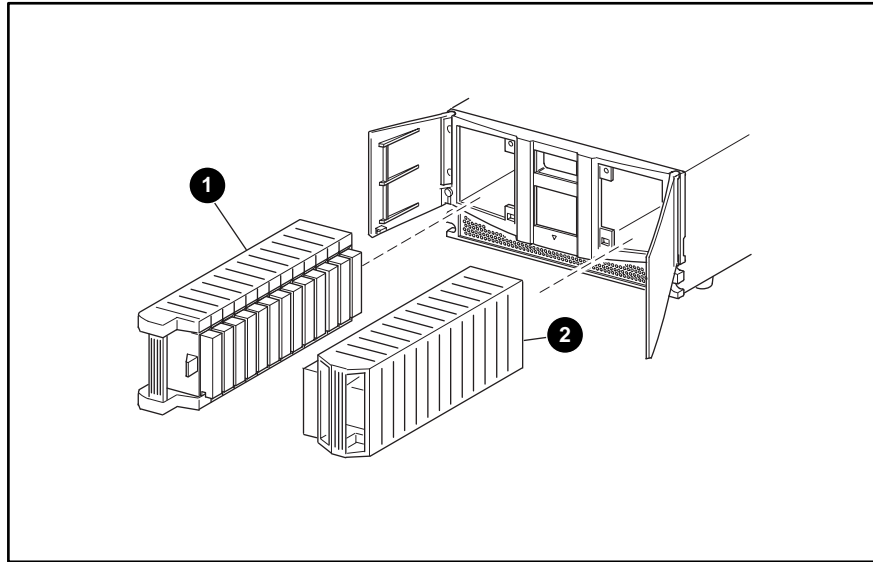


Figure 2-2: Magazine Removal

- ❶ Left Magazine
- ❷ Right Magazine

Parking the Shuttle Assembly for Service or Shipping

Many of the removal and replacement procedures require that the shuttle assembly be in the parked position to provide access to parts to be removed. When shipping the library, it is important that the shuttle assembly be in the parked position to prevent damage while being handled in transit.

Parking the Shuttle Assembly (Library Operational)

1. Turn off library power using the GUI touch screen. The controlled power off sequence automatically moves the shuttle assembly to the parked position.
2. Turn off the master power switch on the power supply at the rear of the library.
3. Remove the power cord from the receptacle.

It is now safe to proceed with service or shipment. Proceed to step 5 below.

Parking the Shuttle Assembly (Library Not Operational)

To park the shuttle while the library is not operational:

1. Turn off the master power switch on the power supply at the rear of the library. Unplug the power cord.
2. Look through the view port at the front of the library to determine if the shuttle assembly is in the parked position (see Figure 2-3 and 2-4).

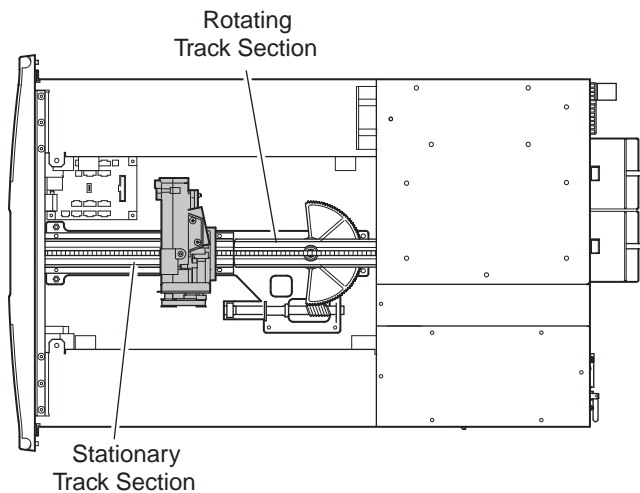


Figure 2-3: Shuttle assembly in the parked position

3. If the shuttle assembly is in the parked position or anywhere on the stationary track section, then it is safe to service or ship the library.
4. If the shuttle assembly is on the rotating track section, then it must be moved to the stationary section for shipment.

NOTE: Not all removal and replacement procedures require the shuttle assembly to be removed.

5. Remove the top front cover following the instructions in “Removing and Replacing the Library Covers.”
6. Turn the rotating track section counter-clockwise to align the track sections.
7. Release the brake by moving the brake release lever to the right (see arrow in Figure 2-4). Push the shuttle assembly at the base near the track until the shuttle assembly is completely on the stationary track section (see Figure 2-3).

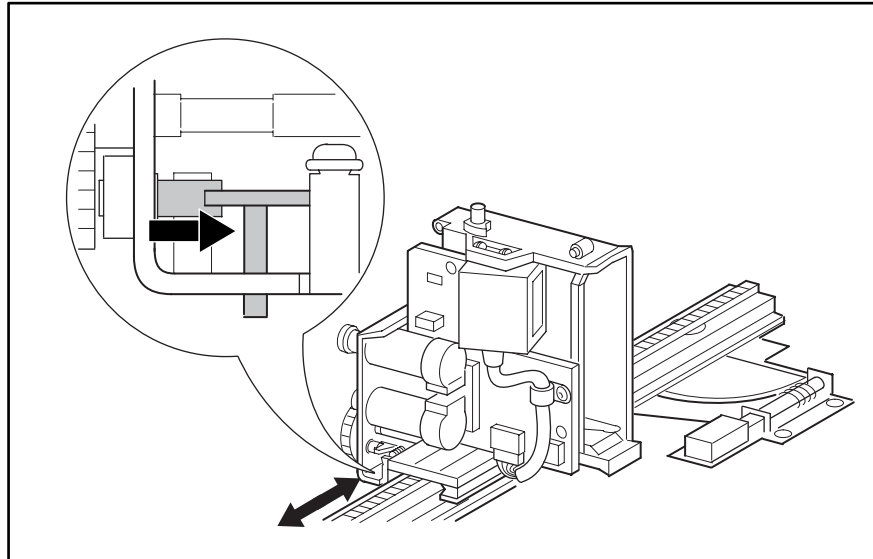


Figure 2-4: Shuttle assembly brake

8. Release the brake release lever and verify that it is locked. (The brake should be resting in an opening on the wheel and the shuttle assembly cannot be moved.)
9. Replace the top front cover following the instructions in “Removing and Replacing the Library Covers.”

The library can now be safely shipped or serviced.

Removing and Replacing the Library Covers

To remove the tabletop model outside cover:

1. Remove the four screws that secure the cover to the library chassis (see Figure 2-5).
2. Carefully slide the cover toward the rear of the library until it clears the front panel. Lift the cover up and away from the library chassis.
3. Replace the tabletop model outside cover by reversing these removal procedures.

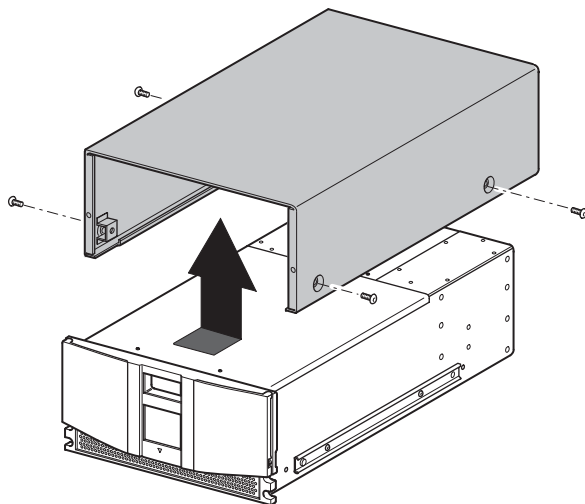


Figure 2-5: Removing the outside cover

The library has three inside covers (see Figure 2-6):

- The top front cover can be removed to gain access to the shuttle assembly, magazine solenoids, and control panel board.
- The left rear cover is used to prevent internal access to any installed power supply.
- The right rear cover is used to prevent internal access to the installed tape drives and card cage/backplane assemblies.

To remove the top front cover:

1. Remove the two screws that secure the cover to the library chassis (see Figure 2-6).
2. Carefully slide the cover toward the front of the library to release the two rear tabs. Lift the cover up and away from the library chassis.
3. Replace the top front cover by reversing the removal procedures.

To remove the left and right rear covers:

1. Remove the screws that secure the covers to the library chassis.
2. Lift the covers up and away from the library chassis.
3. Replace the left and right rear covers by reversing these removal procedures.

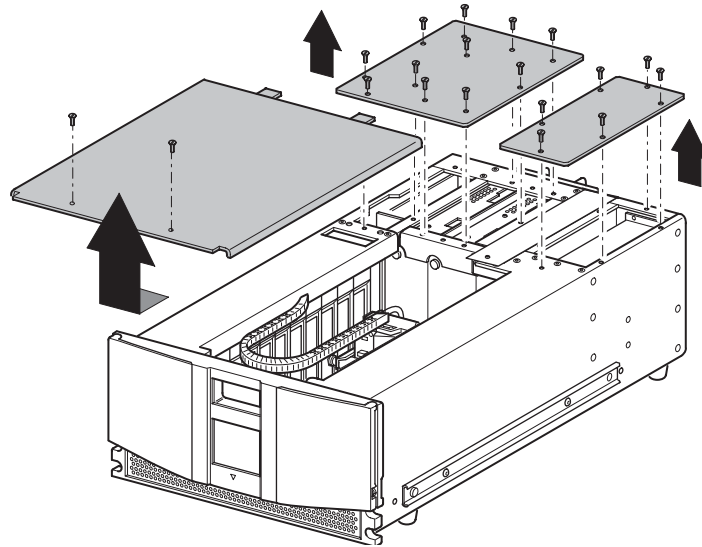


Figure 2-6: Removing the top front, left, and right rear covers

Removing and Replacing the Front Panel

The front panel assembly mounts on the front of the library chassis. It includes a replaceable GUI touch screen, front panel LED, and solenoids for the left and right magazine door lock mechanisms. The front panel must be removed to replace the GUI touch screen, front panel LED, and the magazine door latch solenoids.

To remove the front panel:

1. Using the GUI, open the magazine doors and remove the two magazines. If the library is not operable, see “Manually Opening the Magazine Doors.”
2. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

3. Remove the outside cover and the top front cover. See “Removing and Replacing the Library Covers.”
4. Locate the control panel board at the bottom of the library chassis behind the front panel (see Figure 2-7).

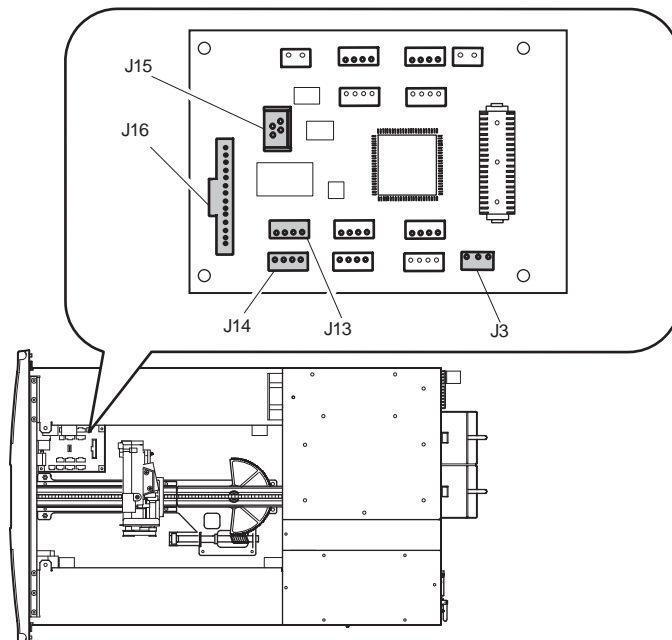


Figure 2-7: Control panel board

5. Disconnect cables J3, J13, J14, and J16. Disconnect the zero insertion force cable at J15 by sliding up the body of the connector to release the flex cable. Remove the flex cable from the connector.
6. While holding the front panel against the library chassis, remove the two screws that secure the front panel to the library chassis (see Figure 2-8).
7. Remove the two screws behind the chassis ears located at the top corners.

8. Carefully pivot the top of the front panel away from the library chassis approximately one inch. Lift up on the front panel so that the four tabs that secure it at the bottom clear the library chassis (see Figure 2-8).
9. Guide the cables out through the library chassis opening while removing the front panel (see Figure 2-8).

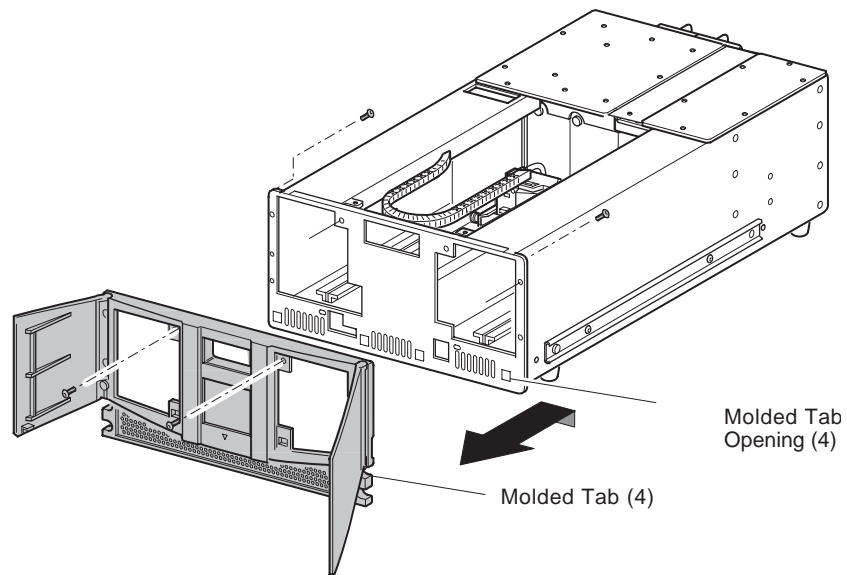


Figure 2-8: Removing the front panel

To replace the front panel:

1. Position the front panel near the library chassis and then guide the cables through the library chassis opening (see Figure 2-9). Make sure that the flex cable stays on top of the 15-pin flat cable and does not get twisted or folded as it goes through the library chassis.

NOTE: The cables must be routed through the lower right portion of the L-shaped opening close to the bottom of the library chassis.

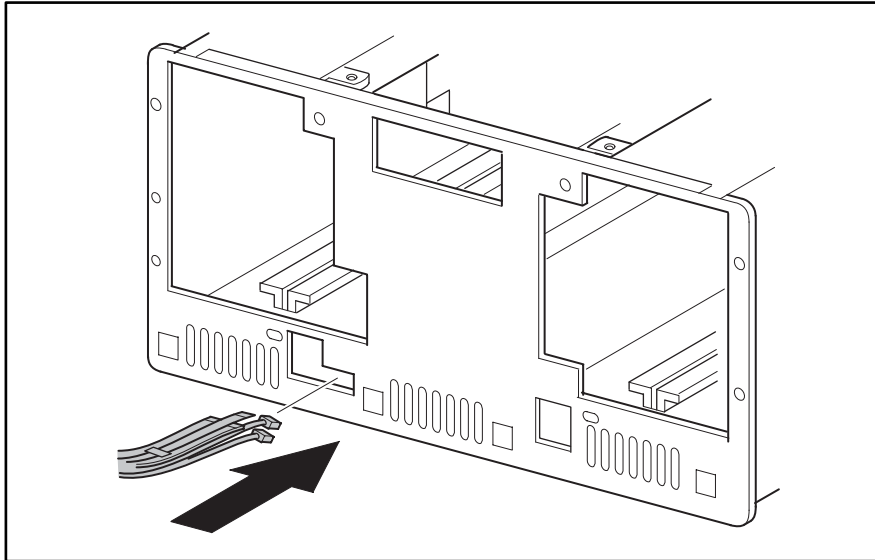


Figure 2-9: Routing the front panel cables

2. With the front panel pivoted at a slight angle, position the four tabs at the bottom of the front panel in the library chassis openings. Slip the tabs over the library chassis.
3. Pivot the top of the front panel against the library chassis.
4. Replace the four screws that secure the front panel to the library chassis.
5. Replace the cables at connectors J3, J13, J14, and J16. Carefully connect the zero insertion force cable at J15.
6. Replace the top front cover. See “Removing and Replacing the Library Covers.”
7. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the GUI Touch Screen

The GUI touch screen is mounted on the inside of the front panel.

NOTE: The front panel must be removed prior to removing the GUI touch screen.

To remove the GUI touch screen:

1. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the front panel. See “Removing and Replacing the Front Panel.”
3. Using a cushioning material to protect the finish of the front panel, place the front panel face down on a flat work surface.
4. Remove the four screws (with insulating washers) that secure the GUI touch screen to the front panel (see Figure 2-10).
5. Lift the GUI touch screen up and away from the front panel.

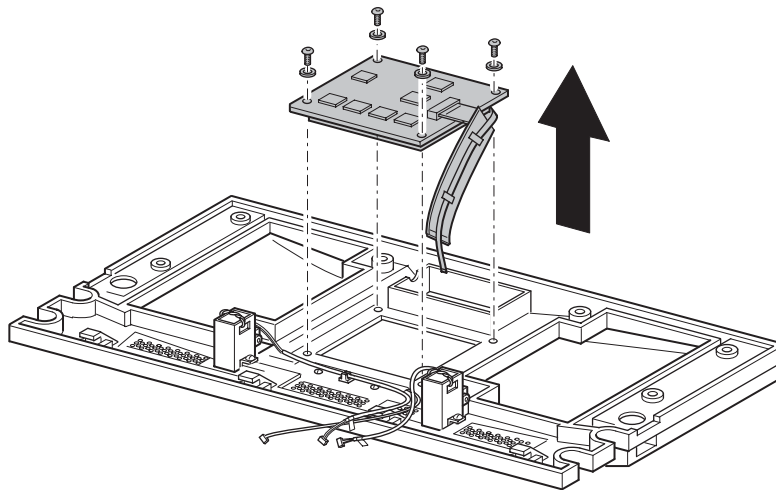


Figure 2–10: Removing the GUI touch screen

To replace the GUI touch screen:

1. With the magazine door lock solenoid wires properly routed, place the GUI touch screen on the mounting posts with the ribbon cable and flex cable to the right.
2. Replace the four mounting screws and insulating washers, with the insulating washers between the mounting screw washer and the board. (see Figure 2-10).

3. Replace the front panel. See “Removing and Replacing the Front Panel.”
4. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Front Panel LED

The front panel LED is mounted inside the front panel.

NOTE: The front panel GUI assembly must be removed to replace the front panel LED.

To remove the front panel LED:

1. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the front panel. See “Removing and Replacing the Front Panel.”
3. Remove the GUI Assembly. See “Removing and Replacing the GUI Touch Screen.”
4. Cut the cable tie that is near the left door solenoid that ties the two solenoid cables and the front panel LED to the front panel.
5. Remove the two screws that mount the LED to the front panel. (See Figure 2-11.)
6. Lift the front panel LED up and away from the front panel.

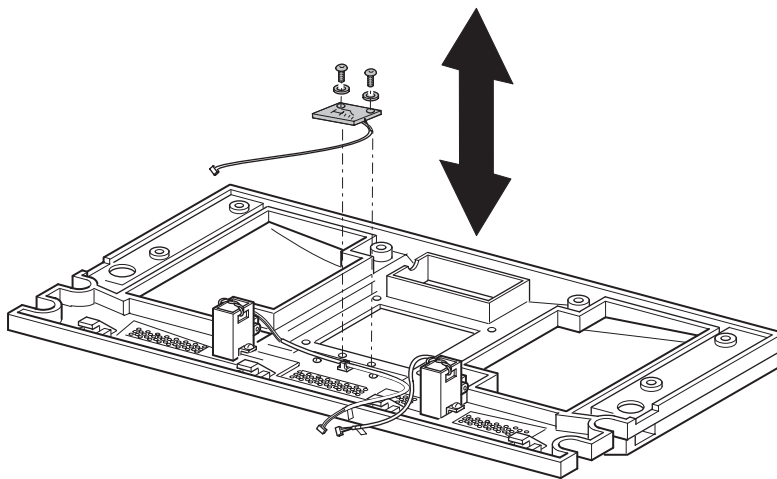


Figure 2–11: Front panel LED removal

To replace the front panel LED:

1. Position the front panel LED on the mounting posts with the cable to the right.
2. Replace the two mounting screws. (See Figure 2-11).
3. Replace the GUI assembly. See “Removing and Replacing the GUI Touch Screen.”
4. Replace the front panel. See “Removing and Replacing the Front Panel.”
5. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Magazine Door Latch Solenoids

The magazine door latch solenoids for the left and right magazine door lock mechanisms are mounted on the inside of the front panel.

NOTE: The front panel must be removed prior to removing the magazine door latch solenoids.

1. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the front panel. See “Removing and Replacing the Front Panel.”
3. For the right magazine door latch solenoid, remove the GUI touch screen. See “Removing and Replacing the GUI Touch Screen.”
4. Remove the cable tie that is near the left door solenoid that ties the two solenoid cables and the power LED cable together. Remove the cable tie (see Figure 2-12).

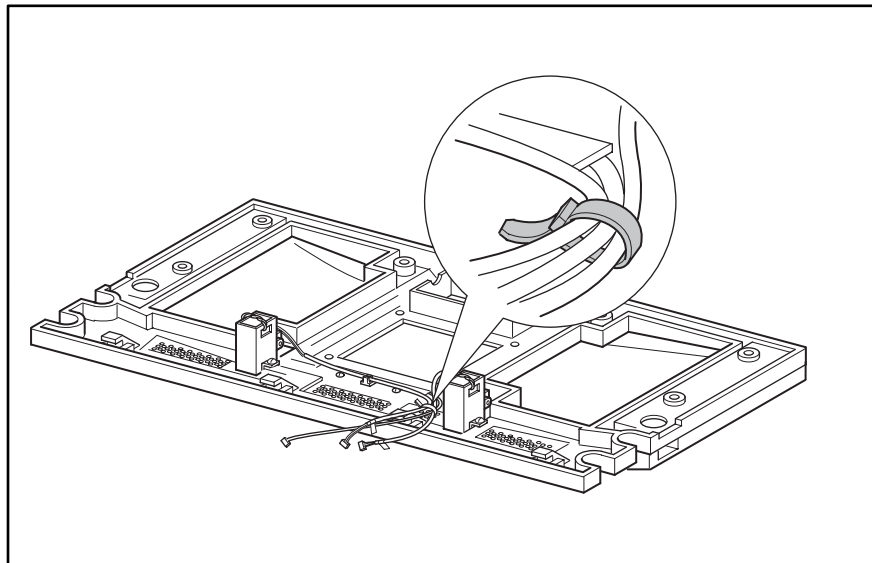


Figure 2-12: Magazine door latch solenoid cable tie

5. Remove the two screws that mount the solenoid to the front panel.

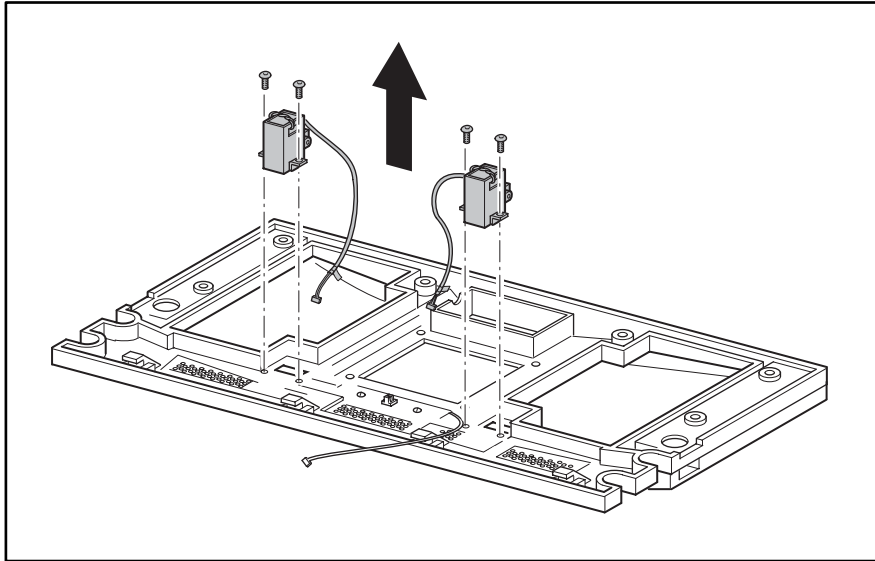


Figure 2–13: Removing the magazine door latch solenoids

To replace the magazine door latch solenoids:

1. With both magazine doors open, position the front panel solenoid in the front panel. Secure using the previously removed mounting screws (see Figure 2-13).
2. For the right solenoid, route the cables across the panel to the left solenoid.
3. Replace the cable tie in the location where you removed it.
4. Replace the front panel. See “Removing and Replacing the Front Panel.”
5. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing a Drive Shoe Assembly

Tape drives are mounted at the rear of the library in a hot swappable shoe that permits a tape drive to be removed and replaced while the other tape drive and the library robotics remain active. The SCSI connectors for the tape drives are part of a separate module and remain in the library when the tape drive is removed.

NOTE: The SCSI cables and/or terminator do not need to be removed.

To remove a drive shoe assembly:

1. If the library and the other tape drive are to remain active:
 - a. Unload any tape cartridge in the tape drive to be removed using application software or the GUI touch screen.
 - b. Deactivate the tape drive to be removed by selecting Menu > Maintenance > Replace Drive > Deactivate Drive *n*. The status will change to indicate that Drive *n* can be removed.
 - c. Press **Back** until you return to the default display.
 - d. Proceed to step 3.

NOTE: There will be a warning if there is a cartridge in the drive. Follow the instructions to try to move the tape to a slot and then deactivate the drive or to deactivate the drive without trying to move the tape.

2. If the library is not operational turn off the master power switch on the power supply at the rear of the library.
3. At the rear of the library, make sure that the power indicator on the tape drive that you want to remove is off.
4. Completely loosen the captive retaining screws at the top center and lower left of the drive shoe assembly (see Figure 2-14).

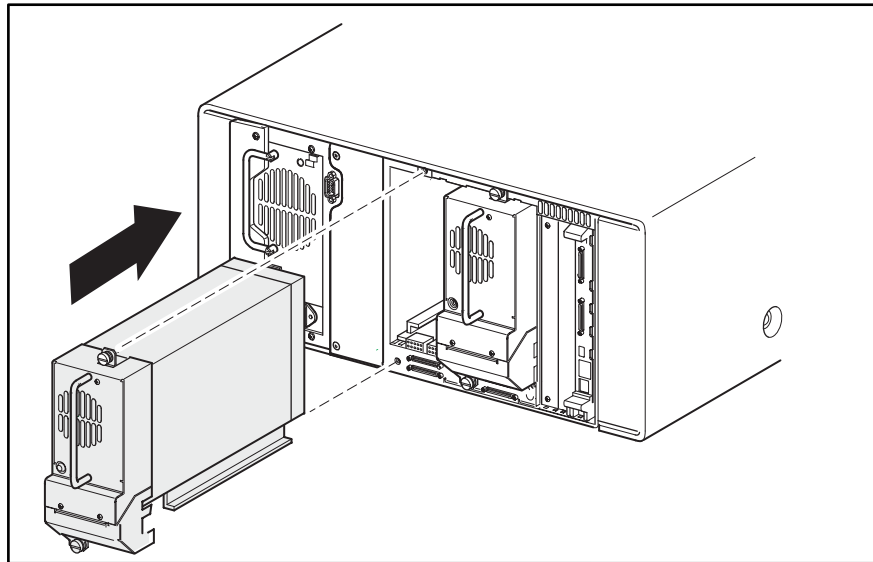


Figure 2-14: Removing a drive shoe assembly (with tape drive)

5. Pull straight back on the drive shoe assembly handle to remove the tape drive. Some effort is required to overcome the initial resistance of unplugging the drive shoe assembly from the receiver.
6. Continue to slide the tape drive out while fully supporting the drive shoe assembly until the tape drive load handle has cleared the back of the library.

To replace a drive shoe assembly:

1. Fully support the drive shoe assembly while starting it into the receiver being careful not to damage the tape drive load handle.
2. Push the drive shoe assembly slowly into the receiver until the drive shoe assembly seats itself against the back of the library.



CAUTION: When inserting the drive shoe assembly into the chassis, push evenly on both the handle and the SCSI board connector (bottom portion of the assembly) until it is seated. Damage to the connector pins and drive communication errors may occur if this procedure is not followed.

3. Tighten the two captive retaining screws to secure the drive shoe assembly to the library.

4. Turn the library on and restart the application software.

If power was off during the procedure the tape drive reactivates during the power-on initialization of the library.

Removing and Replacing the Pass-Through Opto Sensor

The pass-through opto sensor is mounted inside the chassis at the bottom of the pass-through opening.

To remove the pass-through opto sensor:

1. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the outside cover and the top front and right rear cover. See “Removing and Replacing the Library Covers.”
3. Remove the drive 0 shoe assembly. See “Removing and Replacing Drive Shoe Assemblies.”
4. Remove the screw from the card cage/back plane connector access plate and lift it out of the library (see Figure 2–15.)

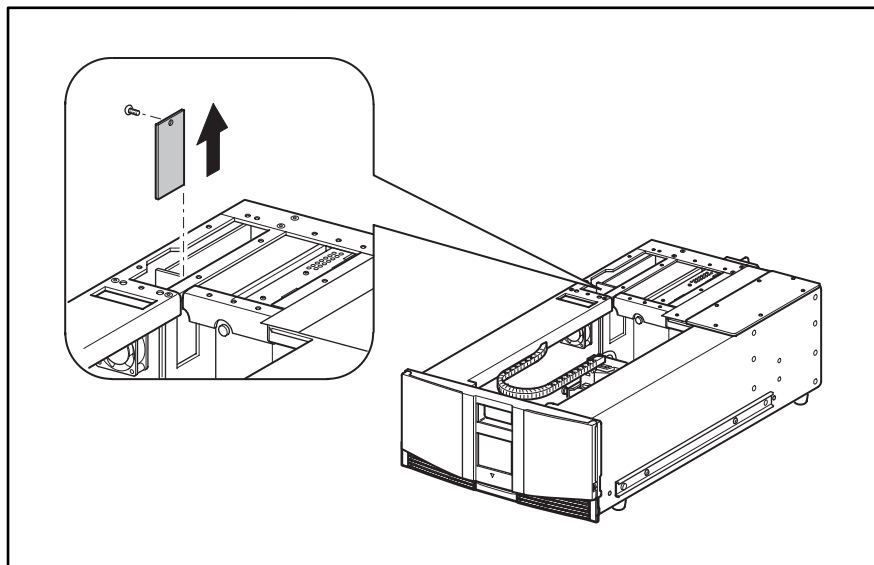


Figure 2–15: Backplane access cover

5. Remove the two screws that mount the pass-through sensor to the chassis (see Figure 2–16).

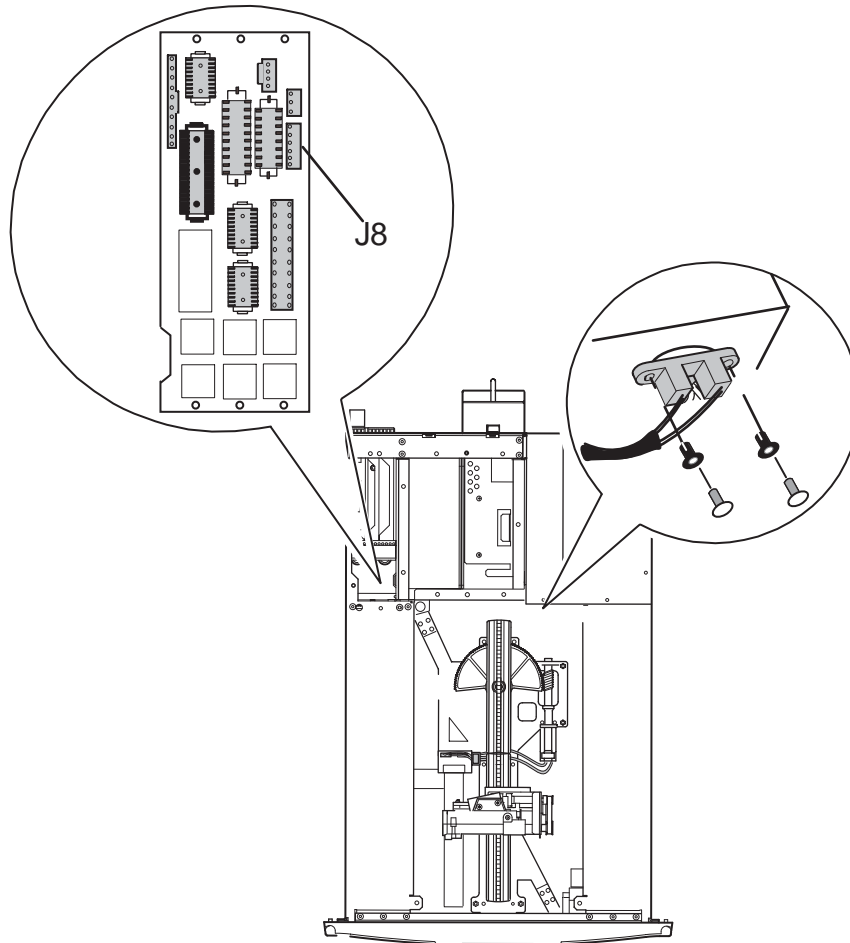


Figure 2–16: Pass-Through sensor removal

6. Remove the cable ties that secure the pass-through cable to the main wiring harness.
7. Disconnect the cable at J8 on the card cage/backplane board (see Figure 2–16).
8. Carefully work the cable through the opening under the card cage and into the main chassis area to remove the pass-through opto sensor.

To replace the pass-through opto sensor:

1. Position the pass-through opto sensor in the mounting hole with the cable routed along the main wiring harness to the left.
2. Replace the two mounting screws (see Figure 2–16).
3. Replace the cable ties in the locations they were removed from in step 6 of the removal instructions.
4. Carefully work the cable through the opening under the left magazine track and into the card cage/backplane area.

5. Feed the cable through and connect to J8 on the card cage/backplane board (see Figure 2–16).
6. Replace the card cage/backplane connector access plate and replace the screw (see Figure 2–15).
7. Replace the drive shoe assembly. See “Removing and Replacing Drive Shoe Assemblies.”
8. Replace the outside cover and the top front cover and right rear cover. See “Removing and Replacing the Library Covers.
9. Connect the power cord. Turn on the library.

Removing and Replacing the Control Panel Board

The control panel board is mounted in the bottom of the library chassis directly behind the front panel.

NOTE: The front panel must be removed prior to removing the front panel solenoids.

To remove the control panel board:

1. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the left magazine using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Remove the front panel. See “Removing and Replacing the Front Panel.”
5. Disconnect the remaining cables at J1, J9, J10 and J12 (see Figure 2-15).

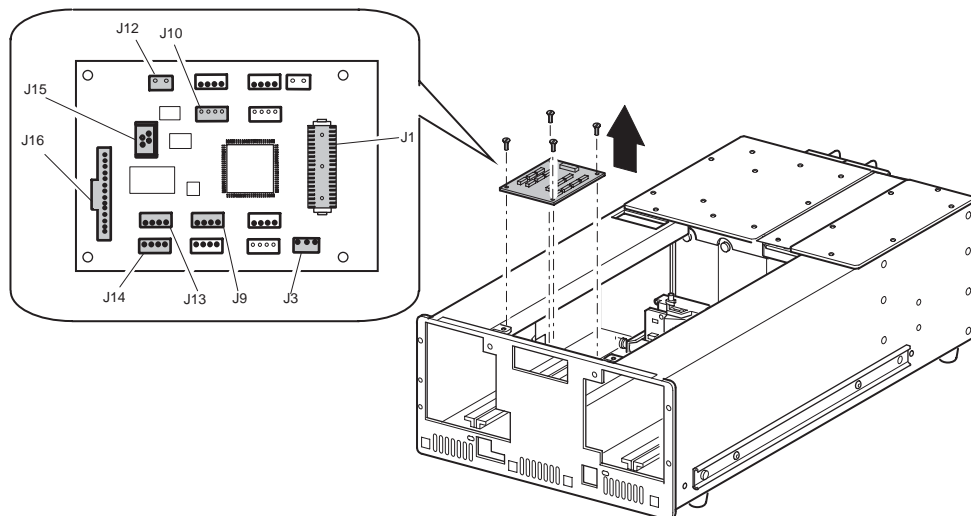


Figure 2–17: Removing the control panel board

6. Remove the four screws that secure the control panel board to the library chassis (see Figure 2-17).
7. Lift the control panel board up and away from the library chassis.

To replace the control panel board:

1. Position the control panel board over the mounting standoffs at the bottom of the library chassis with connector J1 facing the rear of the library.
2. Replace the four screws that secure the control panel board to the library chassis. (See Figure 2-17).

3. Connect the cables at J1, J9, J10 and J12 (see Figure 2-15).
4. Replace the front panel. See “Removing and Replacing the Front Panel.”
5. Replace the top front cover and library cover. See “Removing and Replacing the Library Covers.”
6. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Mail Slot Solenoid(s)

The mail slot solenoid is mounted on the underside of the left magazine track near the front of the library.

NOTE: The left magazine(s) must be removed prior to removing a mail slot magazine solenoid.

To remove a mail slot solenoid:

1. Remove the left magazine using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Disconnect the cable at J12 on the control panel board (see Figure 2-17).
5. While supporting the mail slot solenoid below the magazine track, remove the two flat-head mounting screws that face the center of the magazine track (see Figure 2-18).
6. Remove the mail slot solenoid from beneath the magazine track.

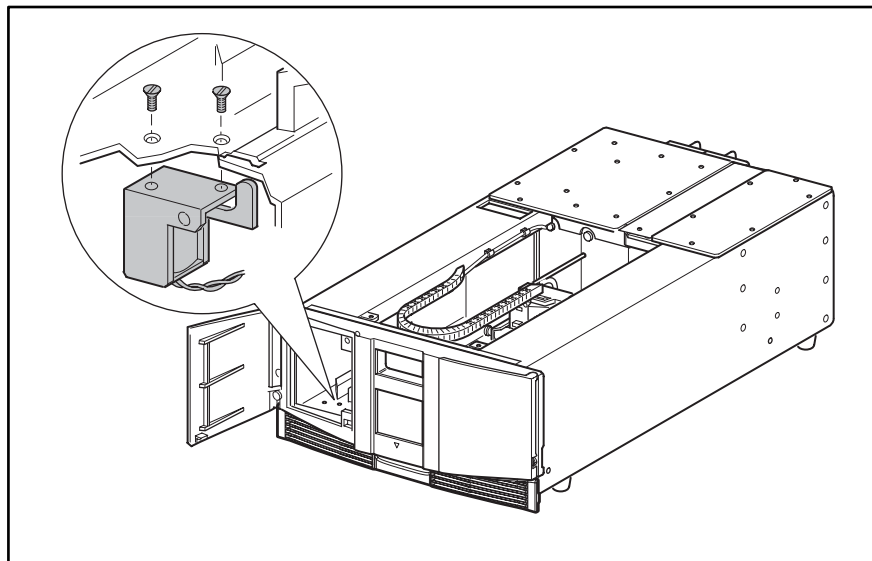


Figure 2–18: Removing the mail slot solenoid

To replace the mail slot solenoid:

1. Position the mail slot solenoid underneath the magazine track with the locking tab to the right (see Figure 2-18). The top of the tab must be in the slot.
2. Align the mounting holes and install the two previously removed flat-head screws (see Figure 2-18).
3. Connect the cable at J12 on the control panel board (see Figure 2-17).
4. Replace the left magazine and then close the door.
5. Replace the top front cover. See “Removing and Replacing the Library Covers.”
6. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Library Controller Board

The library controller board is installed in a card cage/backplane assembly on the right at the rear of the library. The library controller board must be installed in the right-most slot. It will not work in the other slots.

NOTE: The SCSI interface cable, SCSI terminator, 10 Base T cable and RS-232 cable must be removed prior to removing the library controller board.

To remove the library controller board:

1. If necessary, exit the application software and halt the operating system.
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord
3. Remove the SCSI interface cable(s), SCSI terminator, 10-BaseT cable, and RS-232 cable.
4. Completely loosen the two captive hold-down screws on the ejector handles (see Figure 2-19).

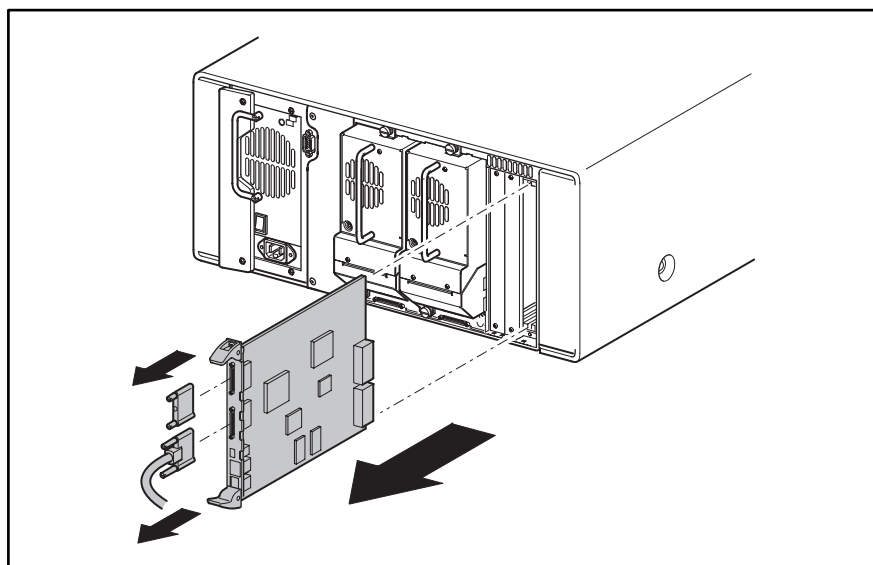


Figure 2-19: Removing the library controller board

5. Disconnect the library controller board by spreading the ejector handles (see Figure 2-19).
6. Pull the library controller board out of the card cage/backplane assembly.

To replace the library controller board:

1. Position the library controller board with the SCSI connectors toward the top and then align the edges of the board with the slots in the card cage (see Figure 2-19).
2. Push the library controller board into the card cage until the ejector handles pivot toward each other. Move the ejector handles toward each other to fully seat the library controller board.
3. Tighten the two captive hold-down screws on the ejector handles (see Figure 2-19).
4. Replace the SCSI interface cable, SCSI terminator, 10-BaseT cable, and RS-232 cable.
5. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Power Supply

The power supply is installed on the left side at the rear of the library in a quick-change receiver.

NOTE: No other FRUs need to be removed to remove a power supply.

To remove the power supply:

1. If necessary, exit the application software and halt the operating system.
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.



WARNING: The power supply is NOT to be removed by the operator. Hazardous voltage is present in the cavity if the power cord is not removed.

3. Remove the two mounting screws securing the power supply locking bracket. (see Figure 2-20).
4. Push down on the latch and then use the handle to pull the power supply out of the receiver (see Figure 2-20).

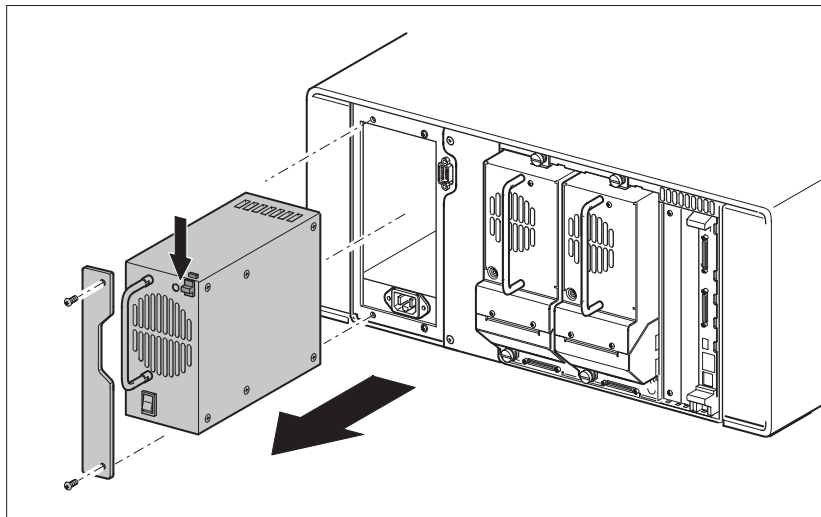


Figure 2–20: Removing the power supply

To replace the bracket and a power supply:

1. Position the power supply at the rear of the library with the latch at the top and the power switch at the bottom. (See Figure 2-20).
2. Push the power supply into the power supply receiver until the latch engages.
3. Replace the power supply locking bracket using the two mounting screws (see Figure 2-20).
4. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Power Supply Receiver

The power supply receiver is installed on the left side at the rear of the library and houses the power supply and the power cord receptacle.

NOTE: The bracket and power supply must be removed prior to removing the power supply receiver.

To remove the power supply receiver:

1. Remove the left magazine using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord
3. Remove the bracket and power supply. See “Removing and Replacing the Bracket and Power Supply.”
4. Remove the left rear cover and top front cover. See “Removing and Replacing the Library Covers.”
5. Working through the opening behind the right magazine track, remove the 22-pin main power harness connector. Remove the two 4-pin drive power connectors (see Figure 2-19).

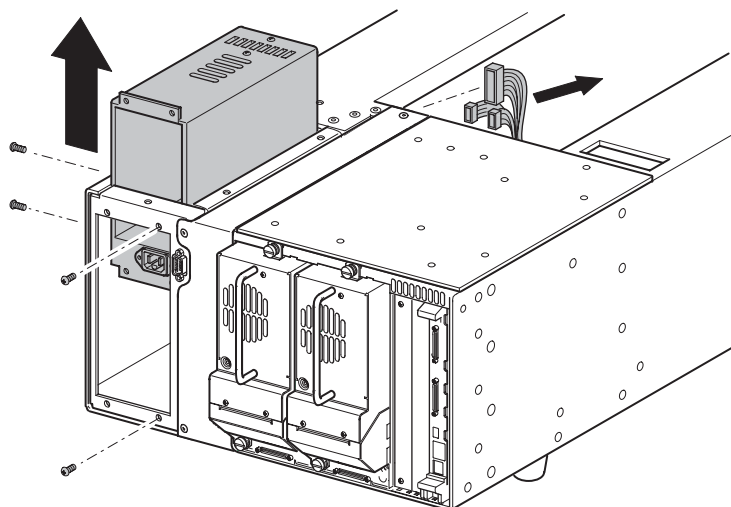


Figure 2–21: Removing the power supply receiver

6. On the outside of the library chassis, remove the two mounting screws (see Figure 2-21).
7. At the rear of the library, remove the four mounting screws while supporting the power supply receiver (see Figure 2-21).
8. Remove the power supply receiver through the opening in the top of the library.

To replace the power supply receiver:

1. Insert the power supply receiver into the opening in the top of the library with the power cord receptacle at the bottom facing the rear of the library.
2. At the rear of the library, install the two mounting screws on the right side of the power supply receiver bay (see Figure 2-21).

3. At the side of the library, install the two mounting screws (see Figure 2-21).
4. Working through the opening behind the right magazine track, replace the two 4-pin drive power connectors and the 22-pin main power harness connector (see Figure 2-21).
5. Replace the top front cover and left rear cover. See “Removing and Replacing the Library Covers.”
6. Replace the bracket and power supply. See “Removing and Replacing the Bracket and Power Supplies.”
7. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Backplane Fan

The backplane fan is mounted on two long standoffs inside the library directly behind the left magazine.

NOTE: The drive 0 shoe assembly might need to be removed prior to removing the backplane fan.

To remove the backplane fan:

1. Remove the left magazine using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord
3. Remove the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”
4. Disconnect the cable at J11 on the card cage/backplane assembly (see Figure 2-22).

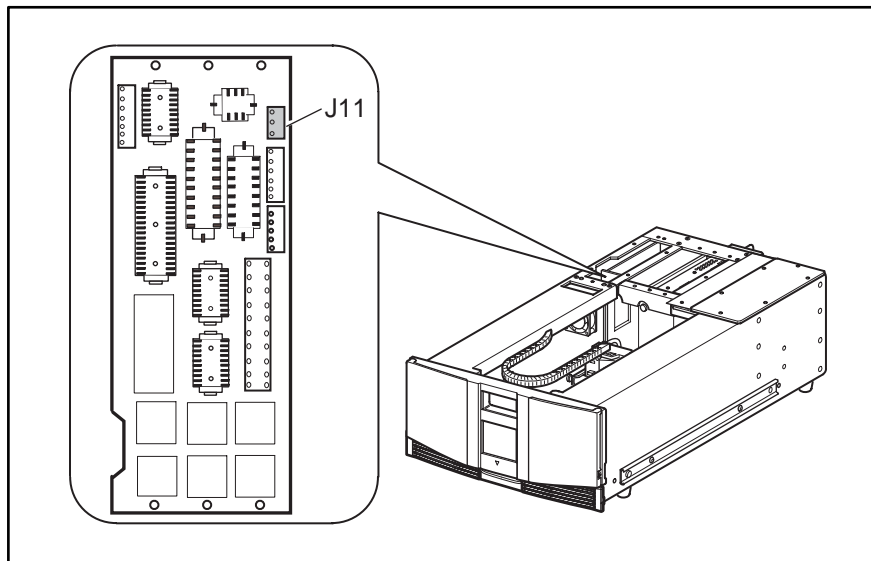


Figure 2-22: Card cage/backplane assembly

5. If necessary to access J11, remove the drive 0 shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”

6. Remove the screw from the card cage/backplane assembly connector access plate and then lift the access plate out of the library (see Figure 2-22).

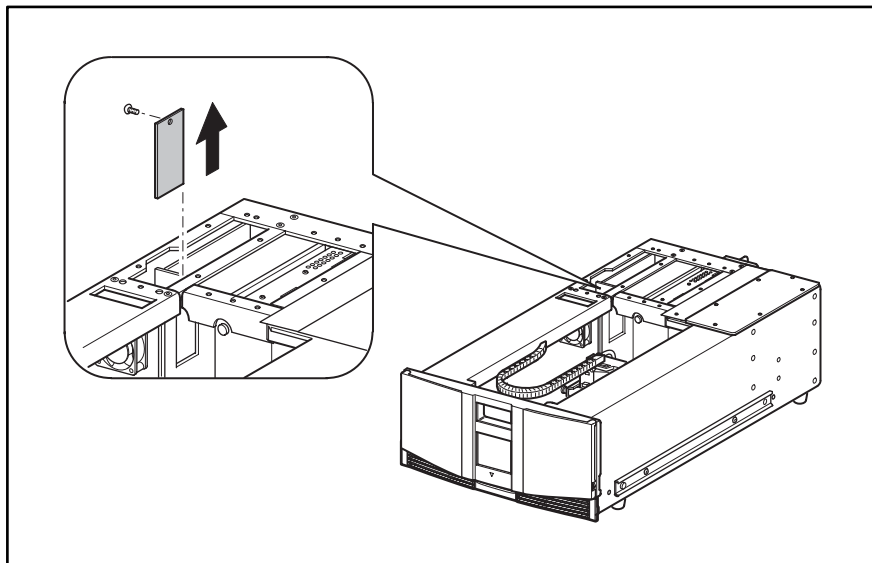


Figure 2-23: Removing the card cage/backplane assembly access plate

7. Remove the two screws that secure the backplane fan to the standoffs (see Figure 2-24).

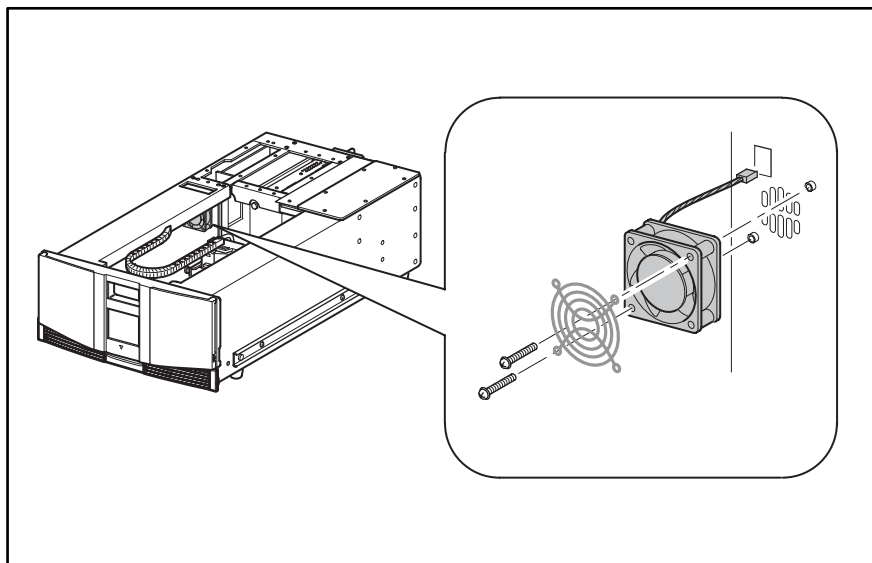


Figure 2-24: Removing the backplane fan

8. Pull the backplane fan straight off of the standoffs while guiding the fan cable out through the cable access hole (see Figure 2-24).
9. Remove the backplane fan from the library (see Figure 2-24).

To replace the backplane fan:

1. Position the backplane fan inside the left magazine area with the cable at the top left corner. The airflow direction is from the main chassis area into the card cage/backplane assembly connector area (see Figure 2-24).
2. Install the backplane fan over the two mounting standoffs while guiding the cable through the cable access hole into the card cage/backplane assembly area (see Figure 2-24).
3. Install the two screws that secure the backplane fan to the standoffs (see Figure 2-24).
4. Replace the cable at connector J11 on the card cage/backplane assembly (see Figure 2-24).
5. If removed, replace the card cage/backplane assembly connector access plate (see Figure 2-23).
6. If removed, replace the drive 0 shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”
7. Replace the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”
8. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Card Cage/Backplane Assembly

The card cage/backplane assembly is located on the right side at the rear of the library.

NOTE: The library controller board, drive 0 shoe assembly, tape drive guide, and the tape drive shield must be removed prior to removing the card cage/backplane assembly.

To remove the card cage/backplane assembly:

1. If the library is operational, remove any tape cartridges in the tape drives using the GUI touch screen or application software.
2. If necessary, exit the application software and halt the operating system.
3. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
4. Remove the library controller board. See “Removing and Replacing the Library Controller Board.”
5. Remove the drive 0 and drive 1 shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”
6. Remove the right rear cover. See “Removing and Replacing the Library Covers.”
7. Remove the flat-head screw from the card cage shield and then slide the shield toward the front of the library to remove it (see Figure 2-25).

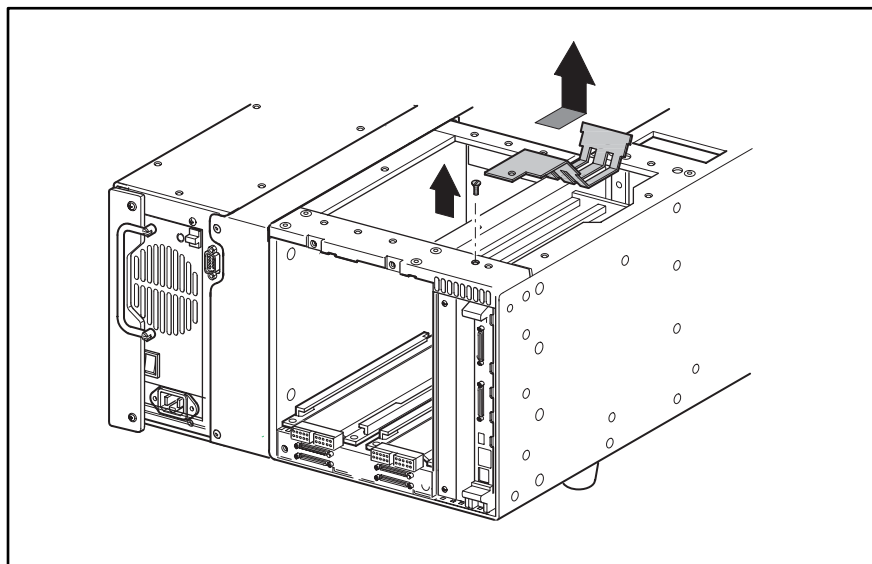


Figure 2–25: Removing the card cage shield

8. Remove the screw from the card cage/backplane assembly connector access plate and then lift the access plate out of the library (see Figure 2-23).
9. Remove the tape drive guides. See “Removing and Replacing a Tape Drive Guide.”
10. Remove the tape drive shield. See “Removing and Replacing a Tape Drive Shield.”

11. From outside the chassis remove the two flat-head screws at the top of the card cage/backplane assembly (see Figure 2-26).

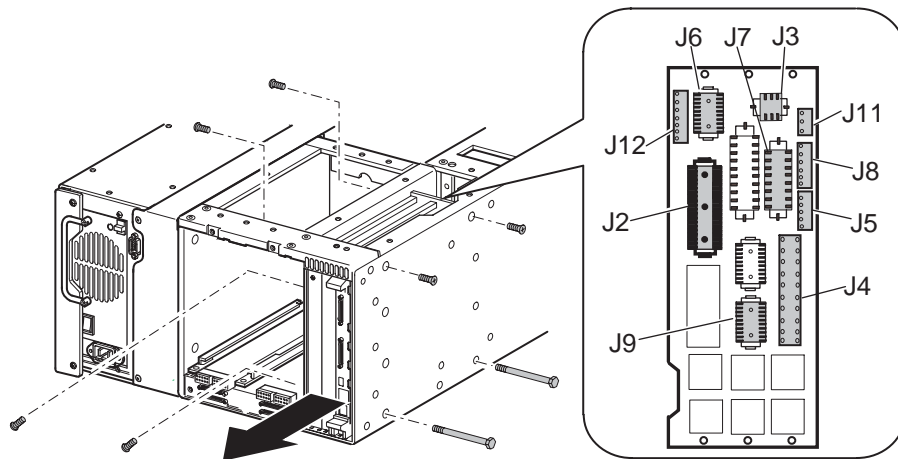


Figure 2-26: Removing the card cage/backplane assembly

12. From inside the drive bay remove the two flat-head screws at the top of the card cage (see Figure 2-26).
13. From outside the chassis remove the two flat-head through-bolts at the bottom of the card cage (see Figure 2-26)
14. Remove the screw that secures the card cage/backplane assembly board stiffener to the library chassis (see Figure 2-26).
15. With the card cage loose and working from inside the tape drive bay at the top, remove the cables from J2-J9 and J11 and J12 on the backplane (see Figure 2-26).
16. Slide the card cage/backplane assembly halfway out.
17. From inside the card cage, support the grounding strip plate and spacer and then remove the two flat-head mounting screws from inside the tape drive bay. Remove the grounding strip plate and spacer (see Figure 2-26).
18. Slide the card cage/backplane assembly the rest of the way out of the library.

To replace the card cage/backplane assembly:

1. Position the card cage/backplane assembly at the rear of the library with connectors J3 and J6 at the top facing the front of the library.
2. Slide the card cage/backplane assembly about halfway into the opening (see Figure 2-26).
3. From inside the card cage, position the grounding strip plate and spacer next to the tape drive bay.

NOTE: The grounding strip contacts should be facing the card cage side and the rear of the library chassis.

4. From inside the tape drive bay, replace the two flat-head mounting screws (see Figure 2-26).
5. Slide the card cage/backplane assembly the rest of the way into the opening.

NOTE: Lift the cables toward the top of the unit so as not to trap any cables beneath the card cage.

6. With the card cage/backplane assembly still loose, replace the cables J2-J9, and J11 and J12 on the backplane (see Figure 2-26).

NOTE: For ease of installation, replace the cables moving from left to right and bottom to top of the back plane assembly.

7. From inside the drive bay, replace the two flat-head screws at the top of the card cage (see Figure 2-26).
8. From outside the library chassis, replace the two flat-head screws at the top of the card cage/backplane assembly and the two flat-head through-bolts at the bottom of the card cage/backplane assembly (see Figure 2-26).
9. From inside the tape drive bay, replace the two flat-head screws at the top of the card cage (see Figure 2-26).
10. Replace the one screw from the backplane board stiffener.
11. Replacing the drive 0 drive guide. See “Removing and Replacing a Tape Drive Guide.”
12. Replace the card cage/backplane assembly connector access plate and mounting screw (see Figure 2-25).
13. Position the card cage shield near the backplane and then slide the shield into position on top of the card cage. Replace the flat-head mounting screw (see Figure 2-25).
14. Replace the right rear cover. See “Removing and Replacing the Library Covers.”
15. Replace the tape drive shield. See “Removing and Replacing the Tape Drive Shield.”
16. Replace the tape drive guides. See “Removing and Replacing a Tape Drive Guide.”
17. Replace the library controller board. See “Removing and Replacing the Library Controller Board.”
18. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing a High Density SCSI I/O Board/ Hot-Plug Library Board

The High Density SCSI I/O board and hot-plug library boards are located at the rear of the library directly under the tape drive bays. The two boards interconnect on the underside of the High Density SCSI I/O board with two 72-pin connectors in a daughterboard arrangement. Use this procedure to replace either board.

NOTE: Tape drive SCSI interface cables, SCSI terminators, and drive shoe assemblies must be removed prior to removing the High Density SCSI I/O board or the hot-plug library board.

To remove a High Density SCSI I/O board and hot-plug library board:

1. If the library is operational, remove any tape cartridges in the tape drives using the GUI touch screen or application software.
2. If necessary, exit the application software and halt the operating system.
3. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
4. Remove any SCSI interface cables and SCSI terminators that are attached to the tape drive SCSI connectors.
5. Remove the appropriate drive shoe assemblies. See “Removing and Replacing a Drive Shoe Assembly.”
6. Remove the right rear cover. See “Removing and Replacing the Library Covers.”
7. Remove the tape drive guides. See “Removing and Replacing a Tape Drive Guide.”
8. Remove the tape drive shield. See “Removing and Replacing the Tape Drive Shield.”
9. Remove eight jackscrews from the SCSI connectors.
10. Remove the six screws that secure the SCSI/IO board/hot-plug library board assembly to the library chassis.
11. Slide the SCSI/IO board/hot-plug library board assembly toward the front of the library until it is possible to pivot the rear of it up (toward the front of the library). This allows access to the bottom of the hot-plug library board.

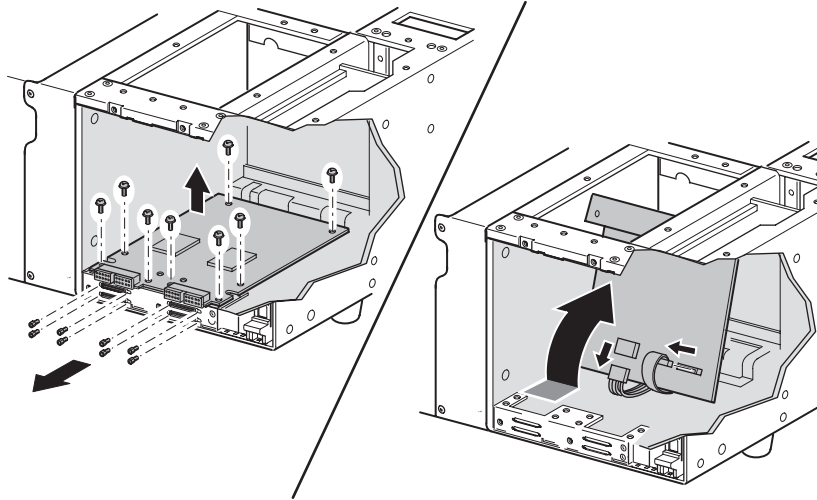


Figure 2–27: Removing the SCSI I/O board

12. Remove the cables at J1 and J5 (see Figure 2-27).
13. Remove the SCSI/IO board/hot-plug library board assembly from the library.
14. Remove the two screws that secure the hot-plug library board to the top of the bracket.
15. Lift up at the two SCSI connectors to remove the hot-plug library board from the SCSI I/O board.
16. Remove the two screws and the SCSI I/O board from the front of the bracket. (See Figure 2-28.)

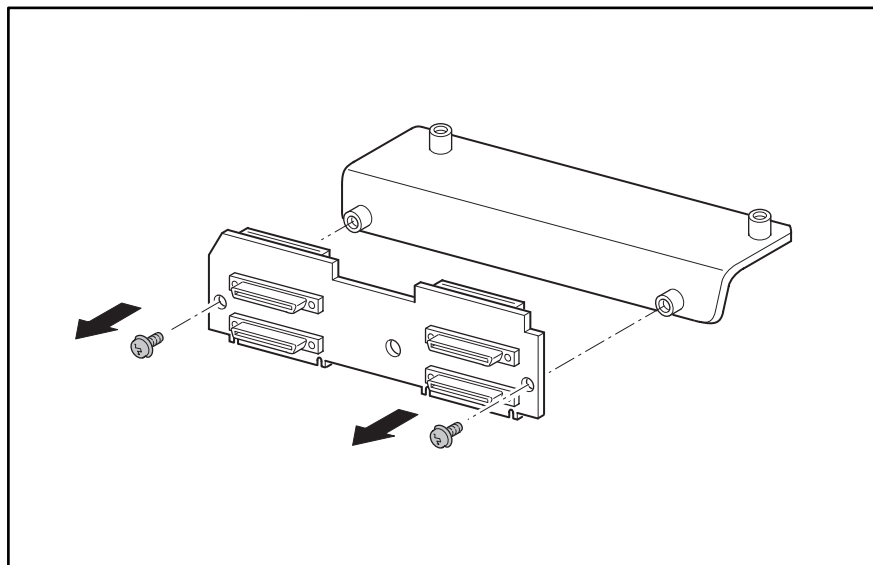


Figure 2–28: SCSI I/O board removal

To replace the SCSI I/O board and hot-plug library board:

1. Use the two screws to secure the SCSI I/O board to the bracket.
2. Carefully position the hot-plug library board on the bracket.
3. Press down on the two SCSI connectors and seat the hot-plug library board to the SCSI I/O board.
4. Replace the two screws that secure the hot-plug library board to the top of the bracket.
5. Position the SCSI I/O board in the drive bays with the SCSI connectors to the rear of the library.
6. Pivot the rear of the board up and toward the front of the library to access the bottom of the board.
7. Replace the cables at J1 and J5.
8. Guide the SCSI I/O board/hot-plug library board assembly into place, aligning it with the mounting holes.
9. Replace the eight jack screws that secure the SCSI I/O board/hot-plug library board assembly to the library chassis.
10. Replace the six screws that mount the board to the chassis.
11. Replace the tape drive shield. See “Removing and Replacing the Tape Drive Shield.”
12. Replace the drive guides. See “Removing and Replacing a Drive Guide.”
13. Replace the right rear cover. See “Removing and Replacing the Library Covers.”
14. Replace the appropriate drive shoe assemblies. See “Removing and Replacing a Drive Shoe Assembly.”
15. Replace the SCSI cables and SCSI terminators.
16. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Tape Drive Shield

A tape drive shield is installed between the drive 0 and drive 1 shoe assemblies.

NOTE: The drive shoe assemblies must be removed prior to removing the tape drive shield.

To remove a tape drive shield:

1. If the library is operational, remove any tape cartridges in the tape drives using the GUI touch screen or application software.
2. If necessary, exit the application software and halt the operating system.
3. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
4. Remove the right rear cover. See “Removing and Replacing the Library Covers.”
5. Remove the drive 0 and drive 1 shoe assemblies. See “Removing and Replacing a Drive Shoe Assembly.”
6. Remove the drive 0 guide. See “Removing and Replacing a Tape Drive Guide.”

7. Remove two flat-head screws that secure the tape drive shield to the library chassis (see Figure 2-29).
8. Gently push the bottom of the shield to the right to allow the top to clear the chassis lip.
9. Pull the tape drive shield out and away from the tape drive bay.

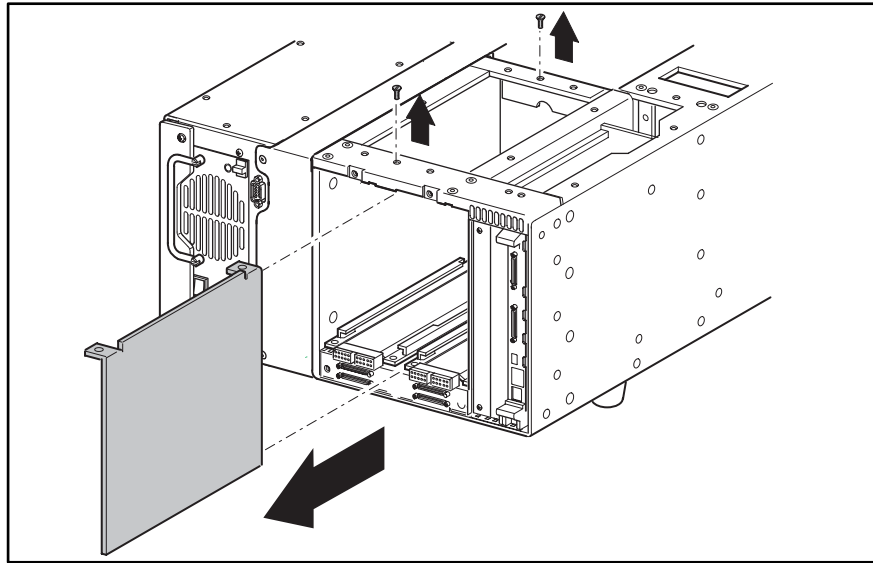


Figure 2-29: Removing the tape drive shield

To replace the tape drive shield:

1. Insert the tape drive shield into the tape drive bay (see Figure 2-29).
2. Secure the tape drive shield to the library chassis using the two previously removed flat-head screws (see Figure 2-29).
3. Replace the previously removed tape drive guide. See “Removing and Replacing a Tape Drive Guide.”
4. Replace the drive 0 and drive 1 shoe assemblies. See “Removing and Replacing a Drive Shoe Assembly.”
5. Replace the right rear cover. See “Removing and Replacing the Library Covers.”
6. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing a Tape Drive Guide

A tape drive guide is installed at the bottom of each tape drive bay. This procedure can be used to remove and replace any tape drive guide.

NOTE: The appropriate drive shoe assembly must be removed prior to removing a tape drive guide.

To remove a tape drive guide:

1. If the library is operational, remove any tape cartridges in the tape drives using the GUI touch screen or application software.
2. If necessary, exit the application software and halt the operating system.

3. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
4. Remove the appropriate drive shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”
5. Remove the right rear cover. See “Removing and Replacing the Library Covers.”
6. Remove the four flat-head screws that secure the tape drive guide in the library chassis (see Figure 2-30).
7. Remove the tape drive guide from the library.

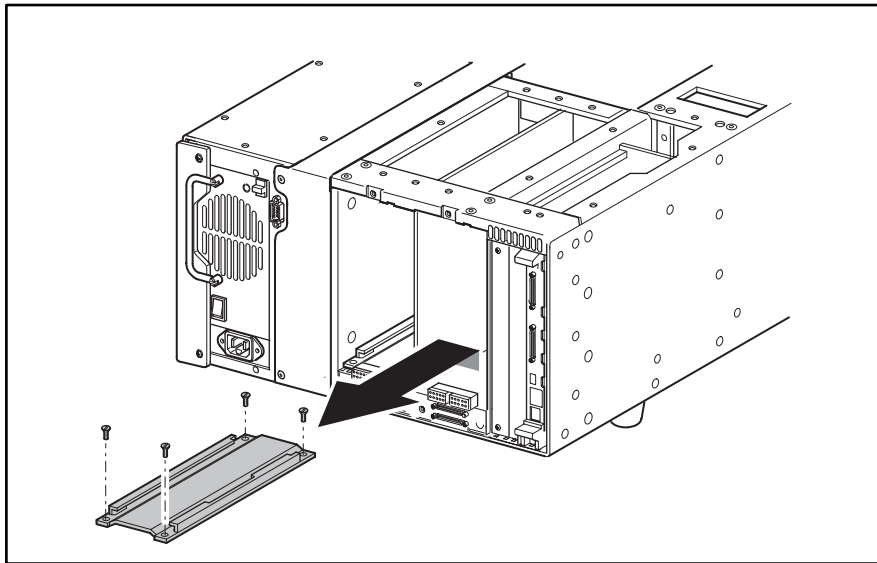


Figure 2–30: Removing a tape drive guide

To replace a tape drive guide:

1. Position the tape drive guide in the tape drive bay with the two straight-sided holes facing the rear of the library (see Figure 2-30).
2. Replace the four flat-head screws that secure the tape drive guide in the library chassis (see Figure 2-30).
3. Replace the right rear cover. See “Removing and Replacing the Library Covers.”
4. Replace the appropriate drive shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”

Removing and Replacing a Magazine Opto Sensor

There is an optical sensor located at the rear of the left and right magazine tracks. The cable for the left magazine sensor is 18 inches (45.7 cm); the cable for the right magazine sensor is 29 inches (73.6 cm) long. This procedure can be used to remove and replace either magazine opto sensor.

NOTE: The left or right magazine must be removed prior to removing a magazine opto sensor.

To remove a magazine opto sensor:

1. Remove the appropriate magazine for the opto sensor to be replaced using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Locate the control panel board in the library chassis bottom behind the front panel. Remove the cable at J10 for the left magazine opto sensor or J9 for the right magazine opto sensor.
5. Follow the cable to the rear of the library and then cut the cable ties to free it. For the right magazine opto sensor, continue at the rear of the library chassis bottom and cut the cable ties that are below the tape drive bays and Pass-Through Mechanism (PTM) opening.
6. Remove the two screws that secure the magazine opto sensor to the track. Note that the two front mounting holes are used (see Figure 2-31).
7. Lift the magazine opto sensor from the magazine track while guiding the cable through the opening in the magazine track (see Figure 2-31).

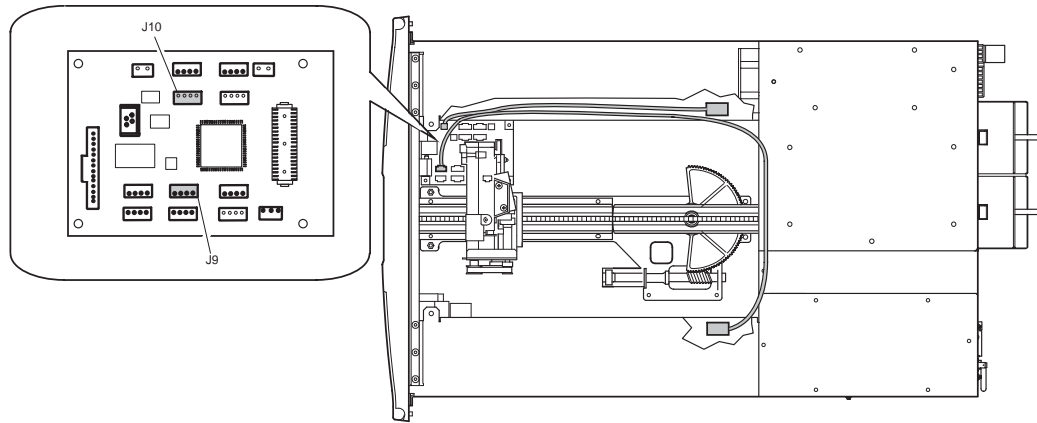


Figure 2–31: Removing a magazine opto sensor

To replace a magazine opto sensor:

1. Guide the connector end of the cable through the opening in the magazine track.
2. Replace the two screws that secure the magazine opto sensor to the magazine track. Use the front mounting holes.
3. Route the cable in the library chassis bottom along with the other cables. Replace the cable ties below the tape drive bays and PTM opening for the right magazine sensor and the cable ties leading to the control panel board for both magazine opto sensors.
4. Replace the cable at J9 for the left magazine opto sensor or J10 for the right magazine opto sensor.
5. Replace the top front cover. See “Removing and Replacing the Library Covers.”
6. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Shuttle Assembly Track Sensor

The shuttle assembly track sensor is located in the library chassis bottom beneath the point where the rotating track section meets the stationary track section.

NOTE: The stationary track section and the drive 0 shoe assembly must be removed prior to removing the shuttle track sensor.

To remove the shuttle assembly track sensor:

1. Using the GUI, remove both magazines from the library. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
3. Remove the top front and right rear covers. See “Removing and Replacing the Library Covers.”
4. Remove the screw from the card cage/back plane connector access plate and lift the access plate out of the library (see Figure 2-32).
5. Remove the drive 0 shoe assembly. See “Removing and Replacing Drive Shoe Assemblies.”
6. Move the shuttle assembly to the front of the library by releasing the brake and using it at the base near the track. See “Parking the Shuttle Assembly.”
7. Operate the worm gear drive link for the rotating track section and turn it perpendicular to the stationary track (see Figure 2-32.)

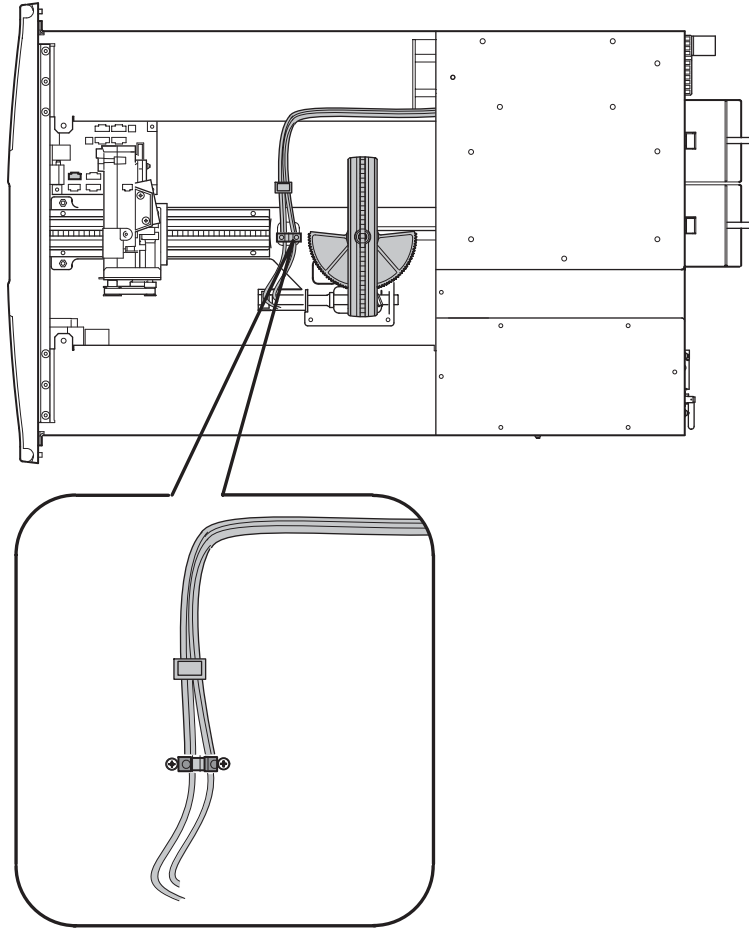


Figure 2-32: Removing the shuttle assembly track sensor

8. Remove the two screws that secure the sensor to the standoffs on the track base.
9. Follow the cable to the rear of the library and cut any cable ties to free the cable as it routes under the left magazine track.
10. Working from the top and inside the drive bay remove the cable at J5 on the card cage/back plane board. See “Removing and Replacing the Card Cage Back Plane Assembly.”
11. While pulling the cable from inside the chassis area, guide the cable from the card cage/back plane connector area through the opening underneath the left magazine track.
12. Remove the sensor from the library (see Figure 2-32.)

To replace the shuttle assembly track sensor:

1. From inside the library chassis area, position the shuttle assembly track sensor with the connector end toward the rear of the left magazine track. Guide the cable underneath the left magazine track and through the opening to the card cage/backplane assembly connector area.
2. Working from the top and inside the appropriate tape drive bay area, guide the cable into the card cage/backplane assembly connector area. Feed enough cable through the opening to make the connection to J5.

3. Inside the library chassis area, route the wires to the motor of the rotating track section between the sensor mounting standoffs.
4. Replace the two screws that mount the shuttle assembly track sensor to the standoffs on the track base, being careful that the motor wires are not trapped between the sensor and the mounting standoffs.
5. Route the cable along with the motor wires toward the left magazine track, removing the slack so that the cable and wires lay along the library chassis bottom. Continue routing the cable and motor wires with the other cables running towards the rear of the library.
6. Replace the cable ties where they were removed in step 8 of the removal instructions.
7. Replace the drive 0 shoe assembly. See “Removing and Replacing Drive Shoe Assemblies.”
8. Replace the card cage/backplane connector access plate.
9. Replace the top front and right rear covers. See “Removing and Replacing the Library Covers.”
10. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Shuttle Assembly

The shuttle assembly is mounted on a track at the bottom of the library chassis.

NOTE: The shuttle assembly track sensor must be removed from its mounting standoffs to remove the shuttle assembly. The barcode reader must also be removed and installed on the replacement shuttle assembly.

To remove the shuttle assembly:

1. Using the GUI, open both magazine doors. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. If the shuttle assembly is on the rotating track section, turn the track by hand so that the cartridge opening is to the left, with the pulley/gears to the right. Align the rotating and stationary track sections.
5. Move the shuttle assembly to the front of the library by releasing the brake and pushing it at the base near the track. See “Parking the Shuttle Assembly.”
6. Operate the worm gear by hand to turn the rotating track section 90 degrees so that it is perpendicular to the stationary track section.
7. Remove the two screws from the shuttle assembly track sensor.
8. Remove the cable from the rotating track section motor.
9. Remove the motor cable from the rotating track section motor.
10. Remove the motor cable and track sensor cable from the cable clamps and position them to the left of the robot base.

11. If necessary, remove the barcode reader. See “Removing and Replacing the Barcode Reader.”
12. Remove the cables at J3 and J9 on the shuttle assembly board (see Figure 2-33).



CAUTION: Pull connector J3 by the connector body only. The wires used are small and can be easily damaged.

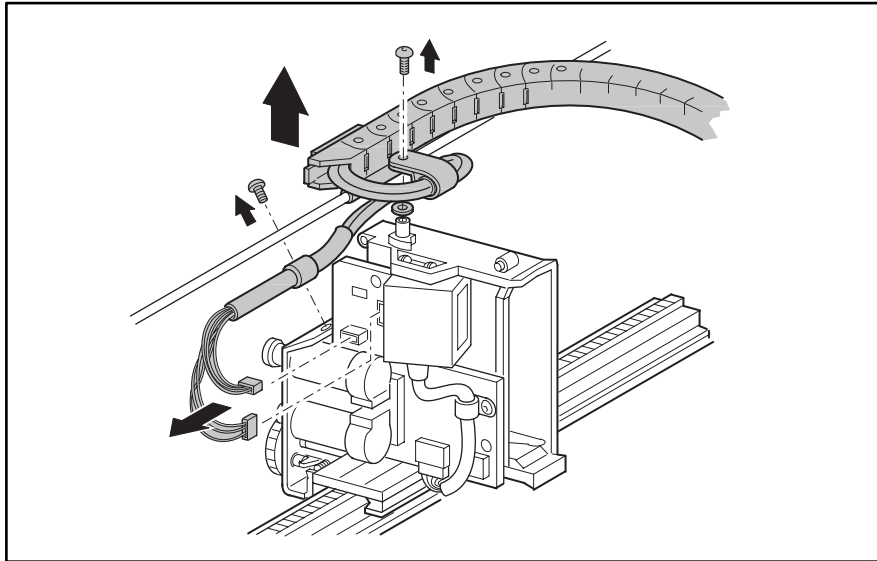


Figure 2-33: Removing the shuttle assembly

13. Remove the screw holding the cable clamp above the pulleys (see Figure 2-33).
14. Remove the retaining screw, cable clamp, and spacer where the flex cable/chain assembly pivots on top of the shuttle assembly (see Figure 2-33).
15. Carefully lift the flex cable/chain and cable support rod up and off the pivot point.
16. Remove the six self-locking hex nuts and washers that holds the robot assembly in the chassis bottom. Use the worm gear to move the rotating track section to access the nuts if necessary.
17. Remove the shuttle assembly from the library.

To replace the shuttle assembly:

1. Position the shuttle assembly inside the library chassis with the stationary track section to the front of the library and the rotating track section to the rear.
2. Place the shuttle assembly base over the mounting standoffs.
IMPORTANT: Ensure no cables or wires are caught under the shuttle assembly base.
3. Replace the six washers and self-locking hex nuts that hold the shuttle assembly in the chassis bottom. Torque to 5-6 in/lbs.
4. Lift the cable support rod and flex cable/chain pivot block up and onto the pivot point on the shuttle assembly.

5. See Figure 2-34. Where the cables exit the flex chain at the pivot point, bend the cables in a circle to the left (counter-clockwise) and back under the flex chain and cable support rod. Replace the cable clamp at the pivot point. Put the clamp on the cable with the flat side up and open side to the right. Replace the spacer, cable clamp, screw and washer on the pivot block, but do not tighten the screw at this time.

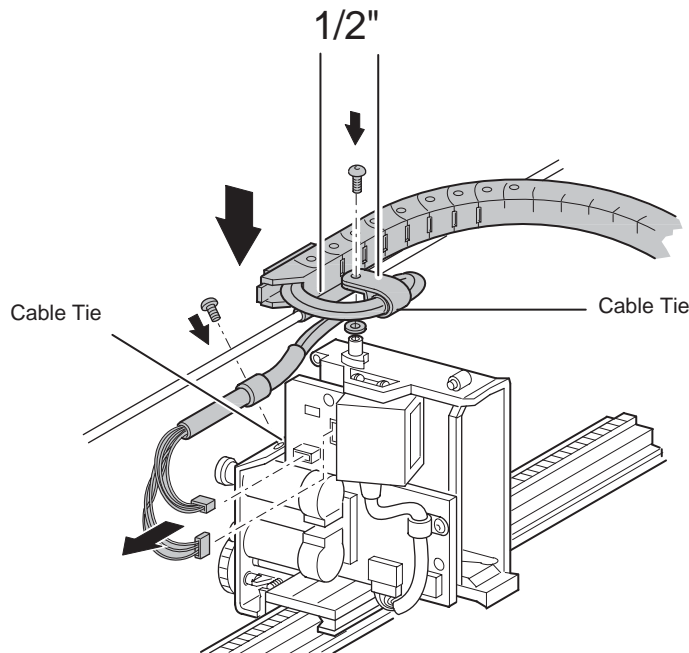


Figure 2–34: Installing flex chain on robot

6. Dress the cables between the flex and the cable clamp to align the cable tie on the cables with the rear edge of the cable clamp. The shrink tubing will be inside the clamp. The cables should exit the cable clamp side-by-side.
7. Tighten the screw against the spacer. Be sure the spacer is inside the screw mounting holes of the clamp. The cable clamp should be able to rotate after tightening the screw.
8. Continue routing the cables counter-clockwise down the shuttle assembly board. The cables should remain parallel and not be twisted around each other. Replace the cables at J9 and J3.
9. Replace the cable clamp above the pulleys. The flat side should be down with the cables about the mounting screw and shrink tubing inside the clamp. Do not tighten the screw at this time.
10. Align the end of the shrink tubing with the edge of the shuttle assembly board and tighten the screw.
11. Replace the top front cover. See “Removing and Replacing the Library Covers.”
12. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Barcode Reader

The barcode reader is mounted on the shuttle assembly. No other FRUs need to be removed to remove the barcode reader.

To remove the barcode reader:

1. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
2. Remove the top front cover. See “Removing and Replacing the Library Covers.”
3. Remove the cable restraint screw at the lower front of the barcode reader. The cable clamp secures the barcode reader cable to the shuttle assembly board.
4. Remove the cable at J5 on the shuttle assembly board (see Figure 2-35).

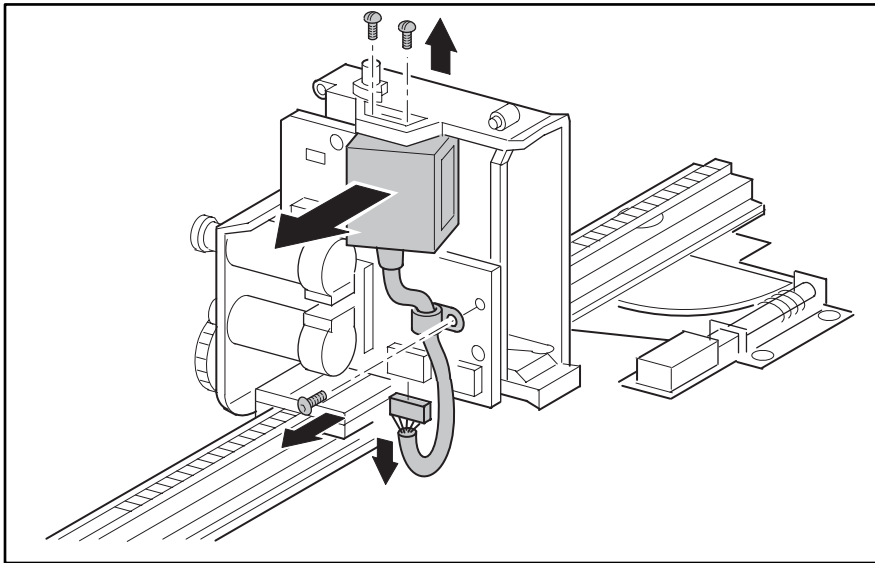


Figure 2–35: Removing the barcode reader

5. Remove the two screws at the top that secure the barcode reader to the shuttle assembly (see Figure 2-35).
6. Remove the barcode reader from the shuttle assembly.

To replace the barcode reader:

1. Position the barcode reader in the opening on the board side of the shuttle assembly, with the lens pointing through the cartridge opening, with the cable at the bottom. The barcode reader is mounted at a 10-degree angle to the shuttle assembly body.
2. Replace the two screws at the top that secure the barcode reader to the shuttle assembly (see Figure 2-35).
3. Replace the cable at J5 on the shuttle assembly board (see Figure 2-35).
4. Place the barcode cable in the restraint and replace the cable restraint screw at the lower front of the barcode reader so that the cable lies close to the board.

5. Replace the top front cover. See “Removing and Replacing the Library Covers.”
6. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Flex Cable/Chain Assembly

The flex cable/chain assembly is mounted inside the chassis above the left magazine and connects to the shuttle assembly. No other FRUs need to be removed to remove the flex cable/chain assembly.

Positioning the Shuttle Assembly

If the library is operational:

1. On the default display of a standalone model, press the Magazine Access button and select the left magazine. Remove and replace the magazine.
2. On a multi-module system, press the Magazine Access button on the default display of the Master module and select the module to be serviced. Select the left magazine. Remove and replace the magazine.
3. Close the magazine door. The shuttle assembly will move to the left magazine and inventory the slots. The shuttle assembly cartridge opening will now be on the correct side of the magazine for this procedure.
4. Using the front panel control, remove the magazines.
5. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
6. Proceed to step 1 under “Removing the Flex Cable.”

If the library is not operational:

1. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
2. Remove the two magazines. See “Manually Opening the Magazine Doors.”
3. Remove the top front and right rear covers. See “Removing and Replacing the Library Covers.”
4. If the shuttle assembly is positioned as shown in Figure 2-36, with the cartridge opening to the left and near the center of its front to back travel, it is in the correct position for this procedure. Continue with step 2 under, “Removing the Flex Cable.”
5. If it is pointing left but not at the center of travel, release the brake and push the shuttle assembly at the base near the track until it is centered. See “Parking the Shuttle Assembly (Library Not Operational).”
6. If it is pointing right, release the brake and push the shuttle assembly to the center of the rotating track section.
7. Operate the worm gear drive link to rotate the track section 180 degrees (see Figure 2-36).
8. Release the brake and move the shuttle assembly to the center of travel. It should now be positioned as shown in Figure 2-36.

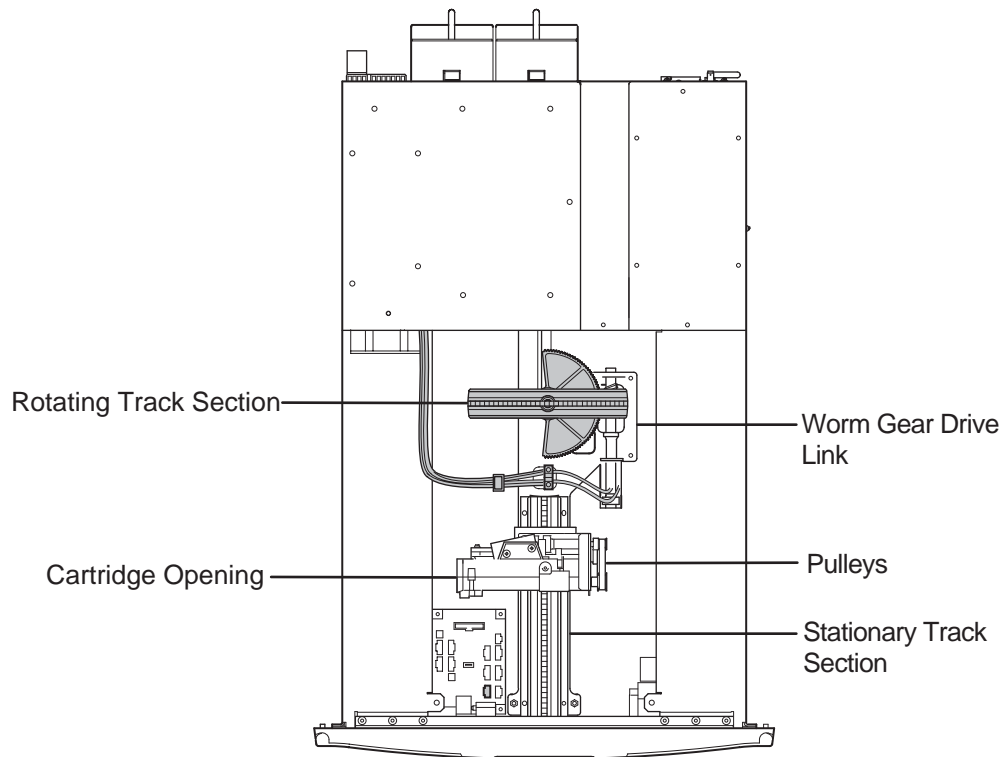


Figure 2–36: Shuttle assembly in parked position

Removing the Flex Cable

1. Remove the top front and right rear covers following the instructions in “Removing and Replacing the Library Covers.”
2. Remove the screw from the card cage/backplane assembly connector access plate and lift it out of the library.
3. Remove the cables at J6 and J3 on the card cage/backplane assembly (see Figure 2-37).
4. From inside the library chassis area, guide the cables through the library chassis opening and into the library chassis area.
5. Remove the cable ties that secure the cable onto the flange above the left magazine.
6. Move the cables at the flex chain-mounting block to gain access to the two flat-head mounting screws.
7. Remove the two flat-head screws that secure the mounting block to the library chassis flange.

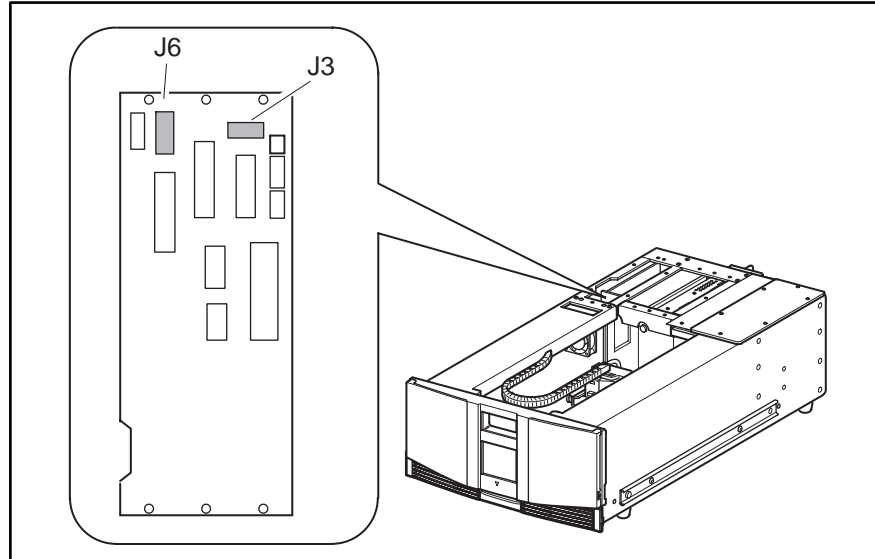


Figure 2-37: J6 and J3 Removal

8. Remove the screw holding the cable clamp above the pulleys on the shuttle assembly.
9. Cut the cable tie at the flex chain mounting block and move the cables to reveal two flat-head mounting screws (see Figure 2-38).

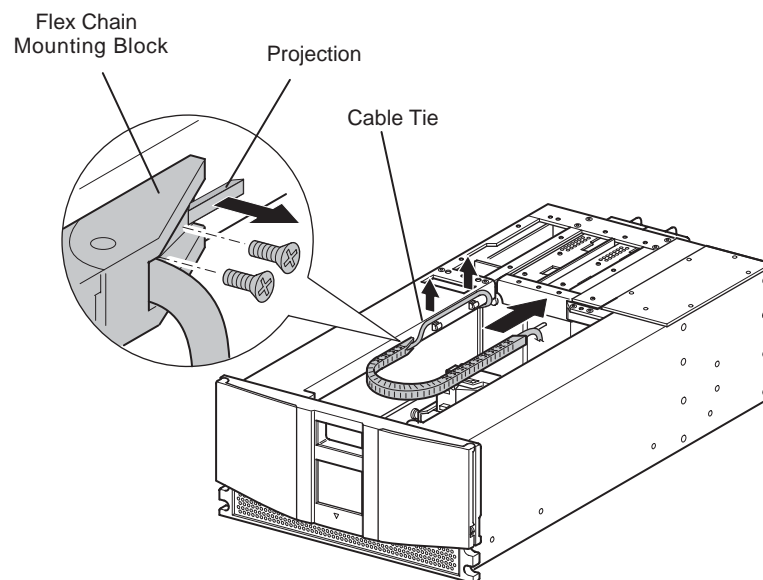


Figure 2-38: Removing the flex cable

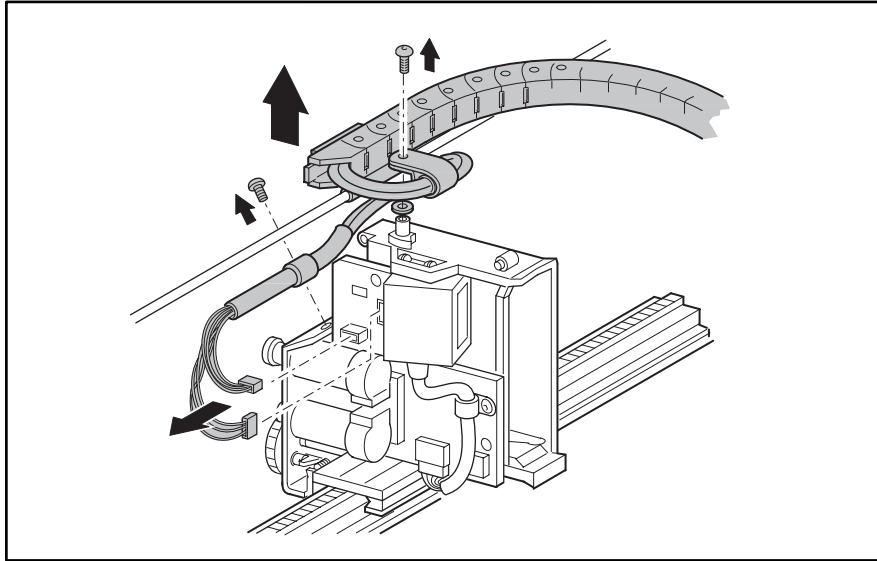


Figure 2–39: Removing the flex cable from the shuttle assembly

10. Remove the cables at J3 and J9 on the shuttle assembly board (see Figure 2-39).
11. Remove the screw, washer, spacer and cable clamp where the flex chain pivots on the top of the shuttle assembly (see Figure 2-39.)
12. Carefully lift the flex cable and cable support rod up and off the pivot point.
13. Slide the flex cable pivot block towards the rear of the library and off the end of the cable support rod.
14. Remove the flex cable from the library.

To replace the flex cable:

1. Position the flex cable inside the library chassis area with the flex chain straight along the right side of the cable support rod, with the pivot block facing the rear of the library.
2. Slide the pivot block over the end of the cable support rod and up to the pivot point on the shuttle assembly.
3. Lift the cable support rod and flex cable pivot block up and onto the pivot point on the shuttle assembly.
4. See Figure 2-40. Where the cables exit the flex chain at the pivot point, bend the cables in a circle to the left (counter-clockwise) and back under the flex chain and cable support rod.
5. With the cable clamp at the pivot point, replace the cable clamp on the cable with the flat side up and the open side to the right.
6. Replace the spacer, cable clamp, screw and washer on the pivot block but do not tighten the screw at this time.

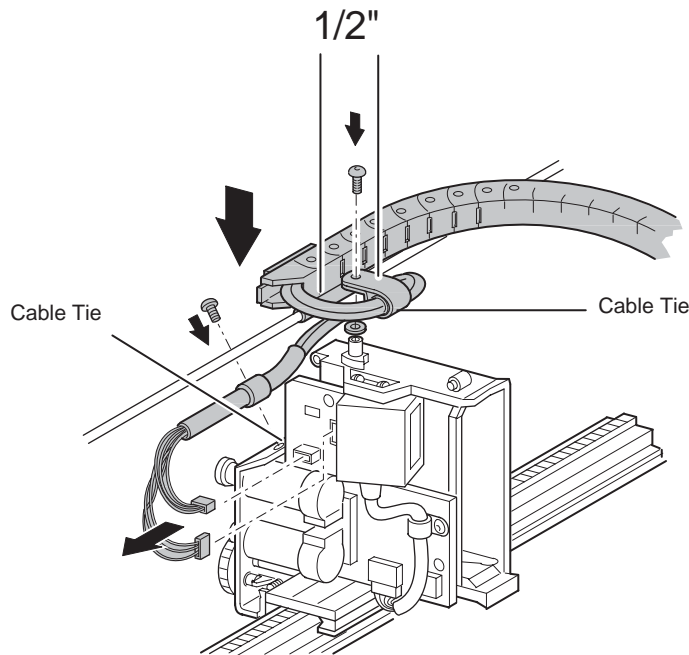


Figure 2-40: Installing the flex chain on the robot

7. Dress the cables between the flex chain and the cable clamp to align the cable tie on the cables with the rear edge of the cable clamp. The shrink tubing will be inside the clamp. The cable should exit the cable clamp side-by-side.
8. Tighten the screw against the spacer. Be sure the spacer is inside the screw mounting holes of the clamp. The cable clamp should be able to rotate after tightening the screw.
9. Continue routing the cables counter-clockwise down to the shuttle assembly board. The cables should remain parallel and not be twisted around each other. Replace the cables at J9 and J3 on the shuttle assembly board.
10. Loosely replace the cable clamp above the pulleys. The flat side should be down with the cables above the mounting screw and the shrink tubing inside the clamp. Do not tighten the screw at this time.
11. Align the end of the shrink tubing with the edge of the shuttle assembly board and tighten the screw.
12. With the flex chain still straight along the cable support rod, move the cables inside the flex chain so that the mid-point of the loop at the pivot point is one-half inch from the cable clamp.
13. Pivot the mounting block end of the flex cable to the left (clockwise) and position the mounting block over the mounting holes in the chassis flange.
14. Move the cables to gain access to the screw holes and replace the two flat-head mounting screws. Do not tighten at this time.
15. Release the brake and move the shuttle assembly as far to the front of the library as possible. The flex chain should be curved under the chassis lip at the front of the chassis. See “Parking the Shuttle Assembly (Library Not Operational).”

16. While holding the flex chain up against the bottom of the chassis lip, tighten the two screws at the mounting block.
17. Install a cable tie around the cables and the projection on the mounting block (see Figure 2-38.)
18. Replace the cables in the cable clamps above the magazine.
19. Guide the cables under the chassis flange, over the card cage fan, through the cable opening near the left side of the chassis and into the card cage/backplane area.
20. Replace the cables at J3 and J6 on the card cage/backplane assembly (see Figure 2-37).
21. Replace the card cage/backplane assembly connector access plate.
22. Replace the top front and right rear covers. See “Removing and Replacing the Library Covers.”
23. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Cable Support Rod

The cable support rod is mounted on a tab at the front of the library chassis behind the front panel viewing window.

NOTE: The front panel must be removed prior to removing the cable support rod.

To remove the cable support rod:

1. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the top front cover. See “Removing and Replacing the Library Covers.”
3. Remove the front panel. See “Removing and Replacing the Front Panel.”
4. Remove the screw and spacer that secures the cable support rod pivot block to the library chassis (see Figure 2-41).

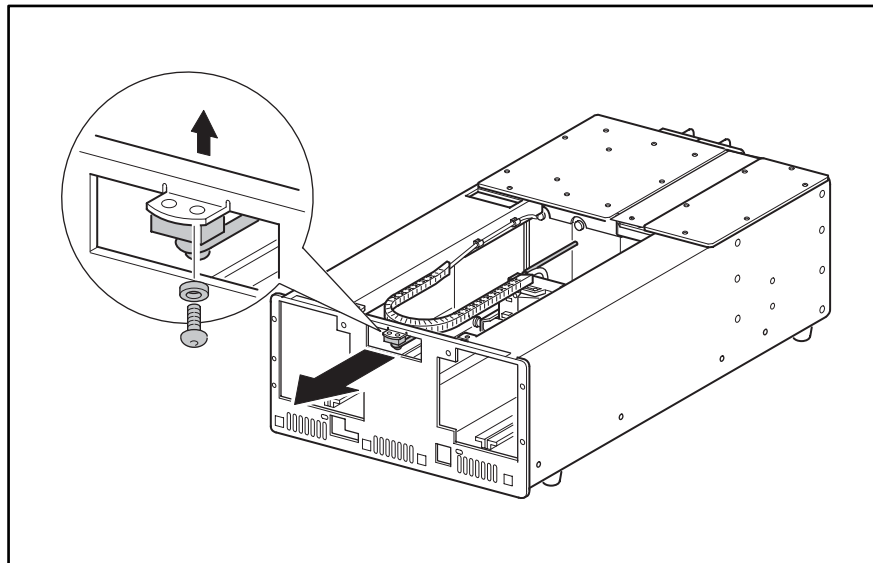


Figure 2-41: Removing the cable support rod

5. Pull the cable support rod out the front of the library, sliding the cable support rod out of the pivot block on the shuttle assembly.
6. Remove the cable support rod from the library.

To replace the cable support rod:

1. Position the plain end of the cable support rod at the front of the library. Guide the rod into the library and through the pivot block on the shuttle assembly.
2. Position the cable support rod pivot block at the library chassis mounting tab so that the mounting hole is to the left of the cable support rod (see Figure 2-41).
3. Replace the spacer and the screw that secures the cable support rod to the library chassis (see Figure 2-41).

4. Replace the front panel. See “Removing and Replacing the Front Panel.”
5. Replace the top front cover. See “Removing and Replacing the Library Covers.”
6. Connect the power cord. Turn the library on and restart the application software.

Removal and Replacement Procedures (MSL5052)

This chapter provides removal and replacement procedures for a Compaq *StorageWorks* MSL5052 Series Library. After completing all necessary removal and replacement procedures, run the appropriate Diagnostics software to verify that all components operate properly.

To service the library, you might need the following:

- Flat-blade screwdriver
- Phillips screwdriver (including stubby or right-angle, #1 and #2)
- Wire cutters (for removing cable ties)
- 0.50 Hex Key
- Needle nose pliers
- Ground strap
- From the Compaq Support Software CD:
 - Diagnostics software
 - *Compaq Insight Manager*

Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or micro-circuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover the library with approved static-dissipating material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and foam packing.
- Make sure you are always properly grounded when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Use conductive field service tools.

Preparation Procedures

System power in the library does not completely shut off using the Graphic User Interface (GUI) touch screen. You must turn off library power using the On/Off switch located at the rear of the power supply and then disconnect the AC power cord from each power supply to completely remove all power from the library.



WARNING: To reduce the risk of electric shock or damage to the equipment, disconnect power from the library by unplugging the power cord from either the electrical outlet or the power supply.

IMPORTANT: It is necessary to be knowledgeable of electrostatic discharge information before conducting the preparation procedures. For electrostatic discharge information, see "Electrostatic Discharge Information" described earlier in this chapter.

Weight Warning



WARNING: An MSL5000 Series library weighs either 60 pounds (27.1 kg) or 117 pounds (53 kg) when fully assembled. To reduce the risk of personal injury or damage to equipment:

- Observe local health and safety requirements and guidelines for manual material handling.
 - Obtain adequate assistance to lift and stabilize the library during installation or removal.
 - Remove all tape drives and power supplies to reduce the overall weight of the library.
-

Rack Warning



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

Library Warnings and Precautions



WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs could create hazardous conditions.



WARNING: To reduce the risk of personal injury from hazardous energy or damage to the equipment when working on energized libraries:

- Remove all watches, rings, and any other loose-fitting jewelry.
 - Do not use conductive tools inside the library that could bridge live parts.
-



WARNING: To reduce the risk of electric shock or damage to equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded electrical outlet that is easily accessible at all times.
 - Install the power supply before connecting the power cord to the power supply.
 - Unplug the power cord before removing the power supply from the library.
-

IMPORTANT: The installation of options and servicing of this product shall be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

Manually Opening the Magazine Doors

The magazine doors have both an electrical release, via the GUI touch screen, and a manual release. Compaq recommends that you open the magazine doors using the GUI touch screen. However, should the GUI touch screen fail, you can manually open the magazine doors by pushing a paper clip into the mechanical releases as shown in Figure 3-1.



CAUTION: To avoid data loss or damage to the equipment, the magazine doors should only be opened manually in an emergency.

1. Locate the door release access holes in the middle of the magazine doors.
2. Using a thin, stiff metal rod (such as a 0.050 hex key, or a straightened paper clip), push the rod into the manual access door release until the door opens.

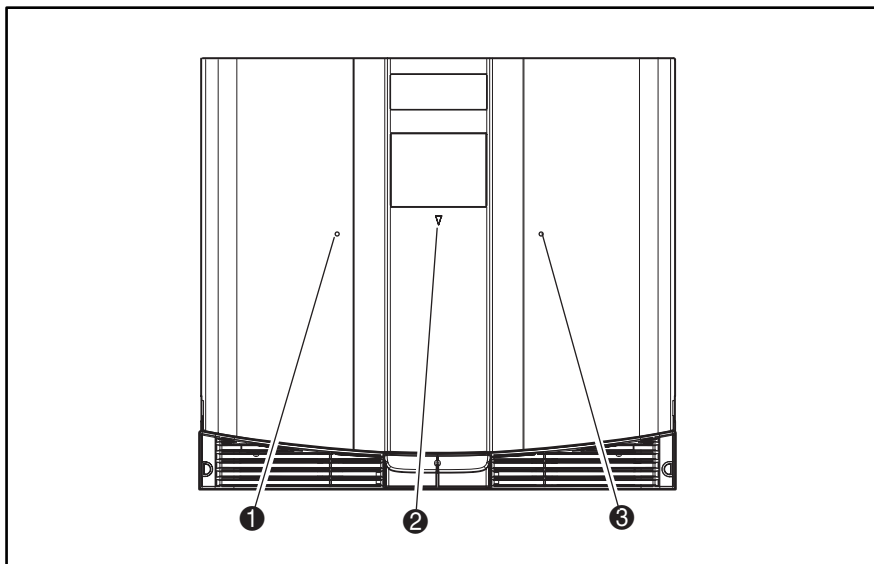


Figure 3-1: Manually opening the magazine doors

- ❶ Left magazine release
- ❷ Status LED
- ❸ Right magazine release

3. The magazine can now be removed. See Figur e3-2.

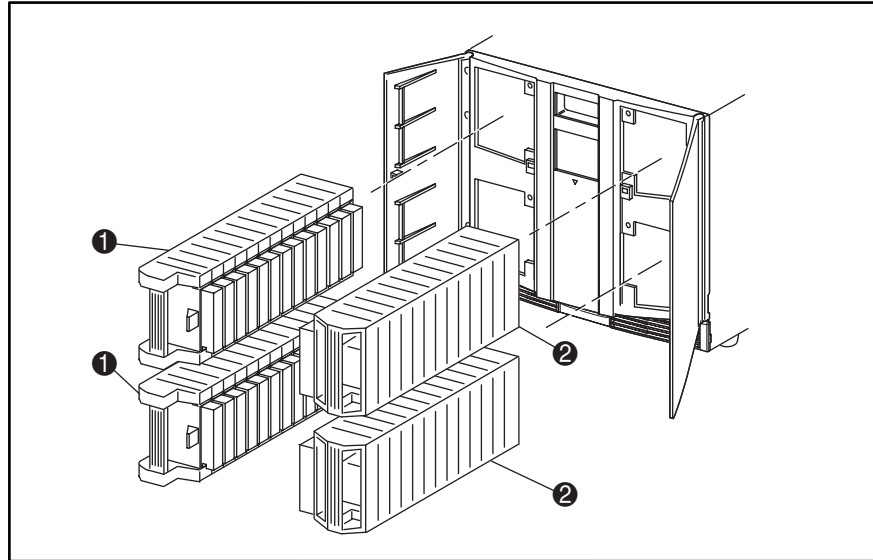


Figure 3-2: Magazine Removal

- ❶ Left Magazine
- ❷ Right Magazine

Parking the Shuttle Assembly for Service or Shipping

Many of the removal and replacement procedures require that the shuttle assembly be in the parked position to provide access to parts to be removed. When shipping the library, it is important that the shuttle assembly be in the parked position to prevent damage while being handled in transit.

Parking the Shuttle Assembly (Library Operational)

1. Turn off library power using the GUI touch screen. The controlled power off sequence automatically moves the shuttle assembly to the parked position.
2. Turn off the master power switch on the power supply at the rear of the library.
3. Remove the power cord from the receptacle.

It is now safe to proceed with service or shipment. Proceed to step 5 below.

Parking the Shuttle Assembly (Library Not Operational)

To park the shuttle while the library is not operational:

1. Turn off the master power switch on the power supply at the rear of the library. Unplug the power cord.
2. Look through the view port at the front of the library to determine if the shuttle assembly is in the parked position (see Figure 3–3 and Figure 3–4).

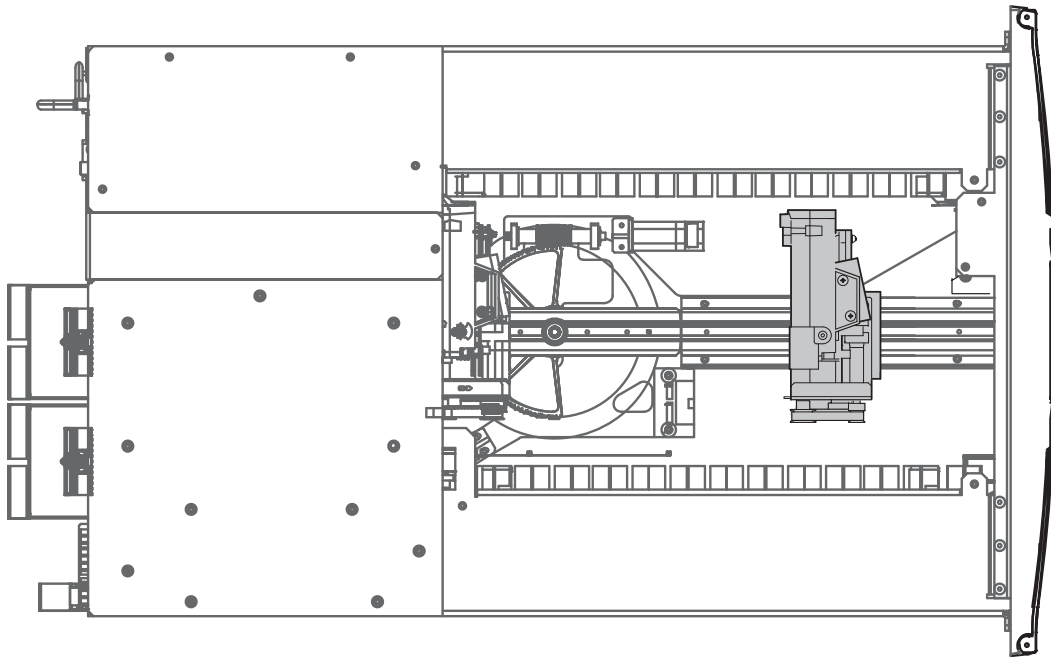


Figure 3–3: Shuttle assembly in the parked position

3. If the shuttle assembly is in the parked position or anywhere on the stationary track section, then it is safe to service or ship the library.
4. If the shuttle assembly is on the rotating track section, then it must be moved to the stationary section for shipment.

NOTE: Not all removal and replacement procedures require the shuttle assembly to be moved.

5. Remove the top front cover. See “Removing and Replacing the Library Covers.”
6. Turn the rotating track section counter-clockwise to align the track sections.
7. Release the brake by moving the brake release lever to the right (see arrow in Figure 3–4). Push the shuttle assembly at the base near the track until the shuttle assembly is completely on the stationary track section (see Figure 3–4).

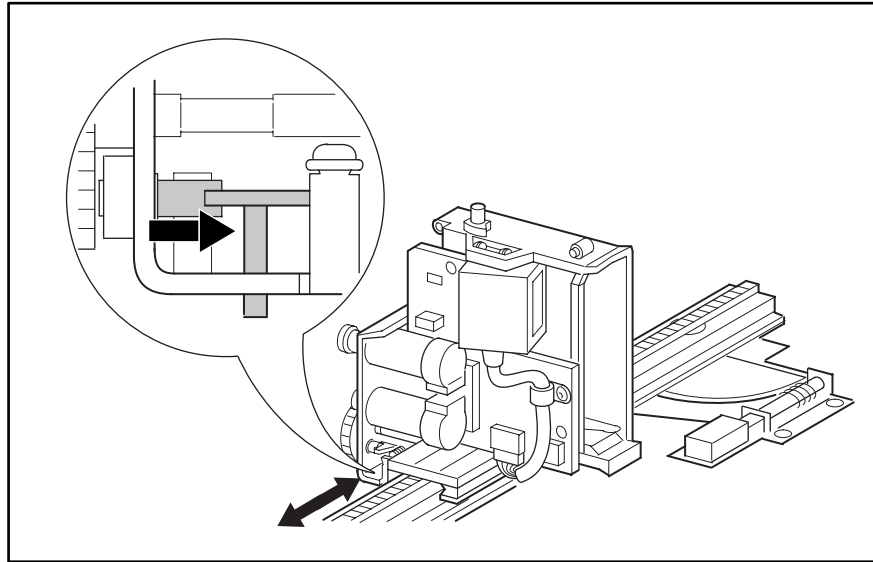


Figure 3–4: Shuttle assembly brake

8. Release the brake release lever and verify that it is locked. (The brake should be resting in an opening on the wheel and the shuttle assembly cannot be moved.)
 9. Replace the top front cover. See “Removing and Replacing the Library Covers.”
- The library can now be safely shipped or serviced.

Removing and Replacing the Library Covers

To remove the tabletop model outside cover:

1. Remove the four screws that secure the cover to the library chassis (see Figure 3–5).
2. Carefully slide the cover toward the rear of the library until it clears the front panel. Lift the cover up and away from the library chassis.
3. Replace the tabletop model outside cover by reversing these removal procedures.

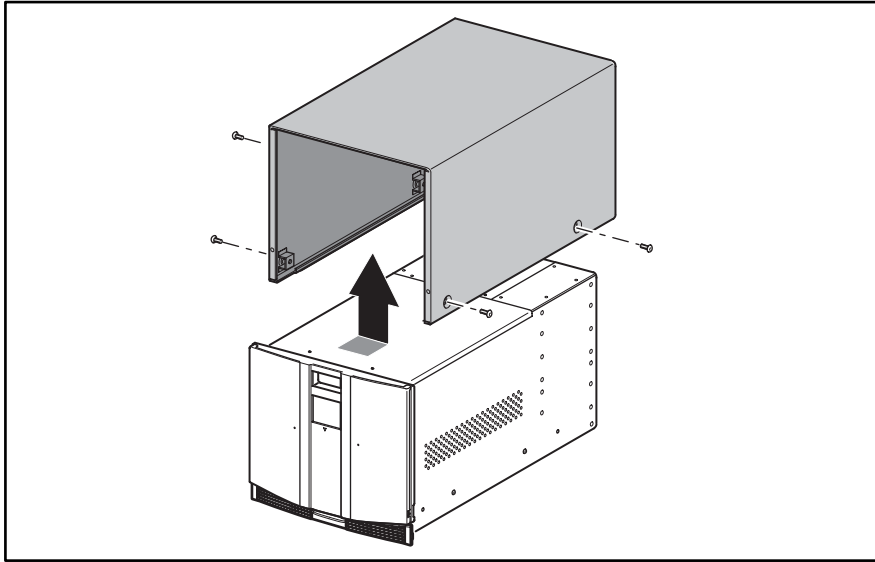


Figure 3–5: Removing the outside cover

The library has three inside covers (see Figure 3–6):

- The top front cover can be removed to gain access to the shuttle assembly, magazine solenoids, and control panel board.
- The left rear cover is used to prevent internal access to any installed power supply.
- The right rear cover is used to prevent internal access to the installed tape drives and card cage/backplane assemblies.

To remove the top front cover:

1. Remove the two screws that secure the cover to the library chassis (see Figure 3–6).
2. Carefully slide the cover toward the front of the library to release the two rear tabs. Lift the cover up and away from the library chassis.
3. Replace the top front cover by reversing the removal procedures.

To remove the left rear cover:

1. Remove the screws that secure the covers to the library chassis.
2. Lift the cover up and away from the library chassis.
3. Replace the left rear cover by reversing these removal procedures.

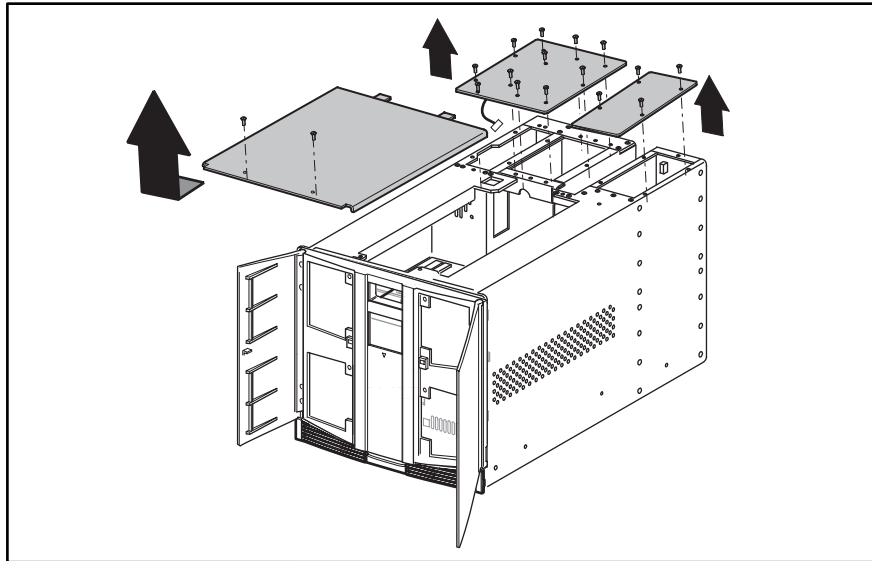


Figure 3–6: Removing the top front, left, and right rear covers

To remove the right rear cover:

1. Remove the screws that secure the covers to the library chassis.
2. Carefully tilt the cover up from the center of the library chassis and disconnect the cable from the card cage/backplane fan.
3. Lift the cover up and away from the library chassis.
4. Replace the right rear cover by reversing these removal procedures.

Removing and Replacing the Card Cage Fan

To remove the card cage fan:

1. Remove the right rear cover. See “Removing and Replacing the Library Covers.”
2. Release the fan cable from the two cable ties.
3. Remove the two screws securing the fan to the cover and lift the fan off and away from the cover.

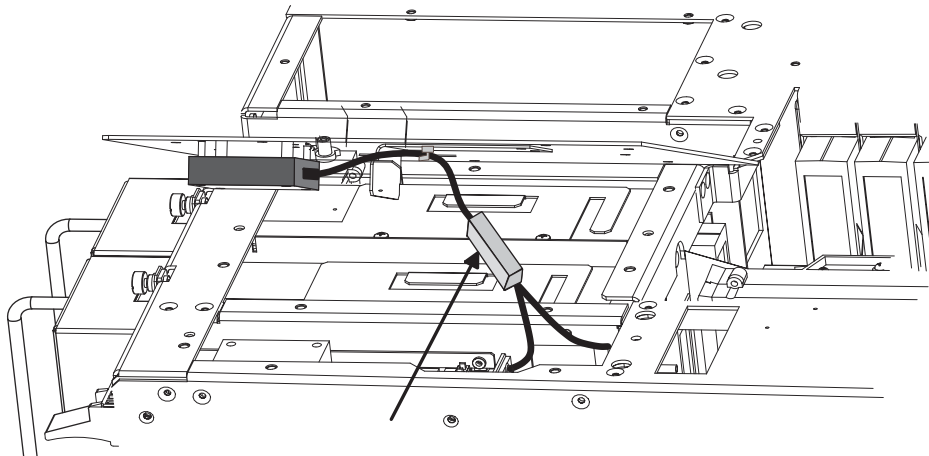


Figure 3–7: Card cage fan

4. Replace the card cage fan by reversing these procedures.

Removing and Replacing the Front Panel

The front panel assembly mounts on the front of the library chassis. It includes a replaceable GUI touch screen, front panel LED, and solenoids for the left and right magazine door lock mechanisms. The front panel must be removed to replace the GUI touch screen, front panel LED, and the front panel solenoids.

To remove the front panel:

1. Using the GUI, open the magazine doors and remove the four magazines. If the library is not operable, see “Manually Opening the Magazine Doors.”
2. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

3. Remove the outside cover and the top front cover. See “Removing and Replacing the Library Covers.”
4. Remove the four screws and washers (two on each side) that secure the front panel to the left and right side of the chassis (see Figure e3–8).
5. With the doors open and while holding the front panel against the library chassis, remove the four screws and washers that secure the front panel to the library chassis (see Figure 3–8).

IMPORTANT: As the front mounting screws are removed, support the front panel so as not to damage the cables connected to the front door solenoids and the GUI.

6. Lift the front panel up slightly and carefully pivot the top of the front panel away from the library chassis approximately two inches. Locate the control panel board at the bottom of the library chassis behind the front panel (see Figure 3–8).
7. While supporting the front panel disconnect the cables J14 and J10 (left and right door solenoids) and J5 (LED). Press the cable release to disconnect cable J16 (display). Disconnect the zero insertion force cable at J19 (touch screen stiffener) by sliding up the body of the connector to release the flex cable. Remove the flex cable from the connector.
8. Lift up on the front panel so that the four alignment tabs that hold the panel at the bottom clear the chassis.
9. Lay the front panel on a padded, flat surface.

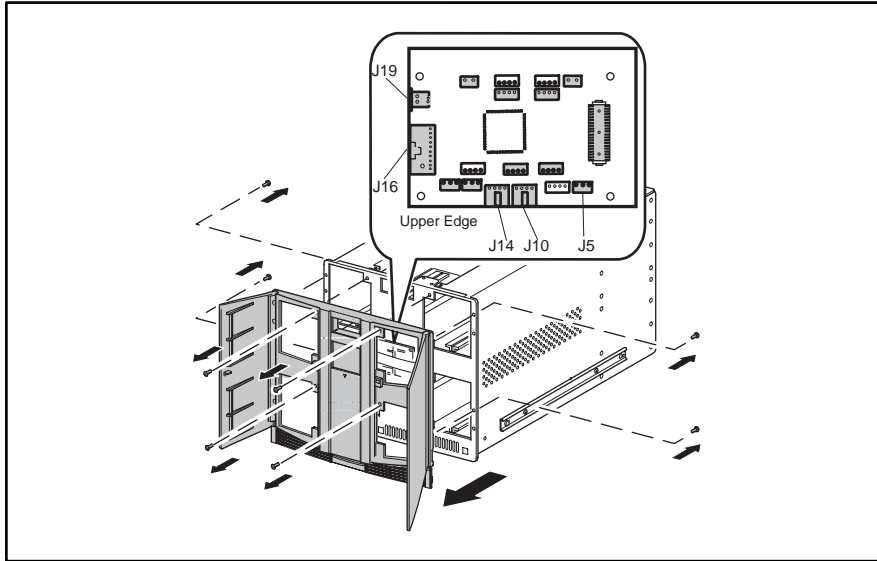


Figure 3–8: Removing the front panel

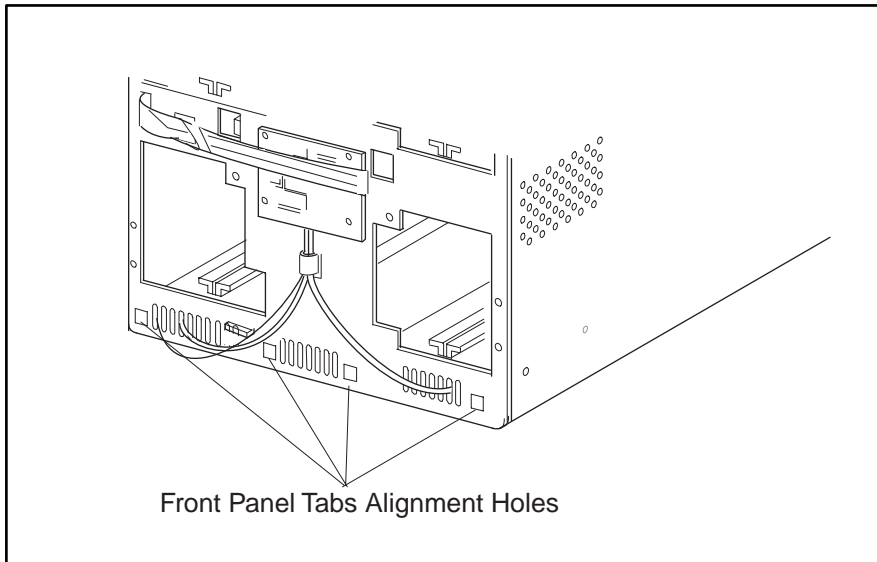


Figure 3–9: Front panel removed

To replace the front panel:

1. Tilt the front panel to the chassis to allow for GUI and door solenoid connections to be made to the board.
2. On the control panel board assembly located in between the chassis and the front panel, connect the cables at J14 and J10 (left and right solenoids), J16 (display), J19 (touch screen stiffener), and J5 (LED). Connect the zero insertion force cable at J19 by sliding up the body of the connector to insert the flex cable.
3. With the front panel pivoted at a slight angle, position the four tabs at the bottom of the front panel in the library chassis openings. Slip the tabs over the library chassis.
4. Pivot the top of the front panel against the library chassis.
NOTE: If components have been replaced (i.e. solenoids) be sure the cables do not obstruct replacement of the front panel.
5. Replace the eight screws and washers that secure the front panel to the library chassis.
NOTE: Do not fully tighten the mounting screws until all eight have been re-installed.
6. Replace the top front cover. See “Removing and Replacing the Library Covers.”
7. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the GUI Touch Screen

The GUI touch screen is mounted on the inside of the front panel.

NOTE: The front panel must be removed prior to removing the GUI touch screen.

To remove the GUI touch screen:

1. Using the GUI touch screen, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the front panel. See “Removing and Replacing the Front Panel.”
3. Using a cushioning material to protect the finish of the front panel, place the front panel face down on a flat work surface.
4. Remove the four screws (with insulating washers) that secure the GUI touch screen to the front panel (see Figure 3-10).
5. Lift the GUI touch screen up and away from the front panel.

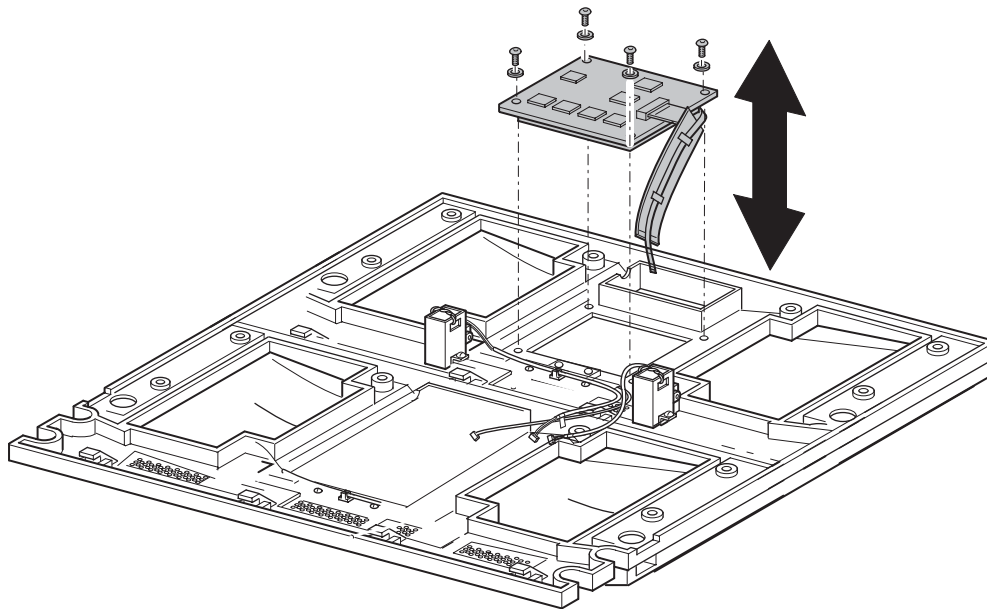


Figure 3–10: Removing the GUI touch screen

To replace the GUI touch screen:

1. Place the GUI assembly on the mounting posts with the ribbon cable and flex cable to the right (see Figure 3–10).
2. Replace the four mounting screws and insulating washers, with the insulating washers between the mounting screw washer and the GUI touch screen (see Figure e3–10).

3. Replace the front panel. See “Removing and Replacing the Front Panel.”
4. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Front Panel LED

The front panel LED is mounted inside the front panel. The front panel GUI assembly must be removed to replace the front panel LED.

To remove the front panel LED:

1. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the front panel. See “Removing and Replacing the Front Panel.”
3. Remove the GUI assembly. See “Removing and Replacing the GUI Touch Screen.”
4. Remove the two screws that mount the LED to the front panel.
5. Lift the LED up and away from the front panel.

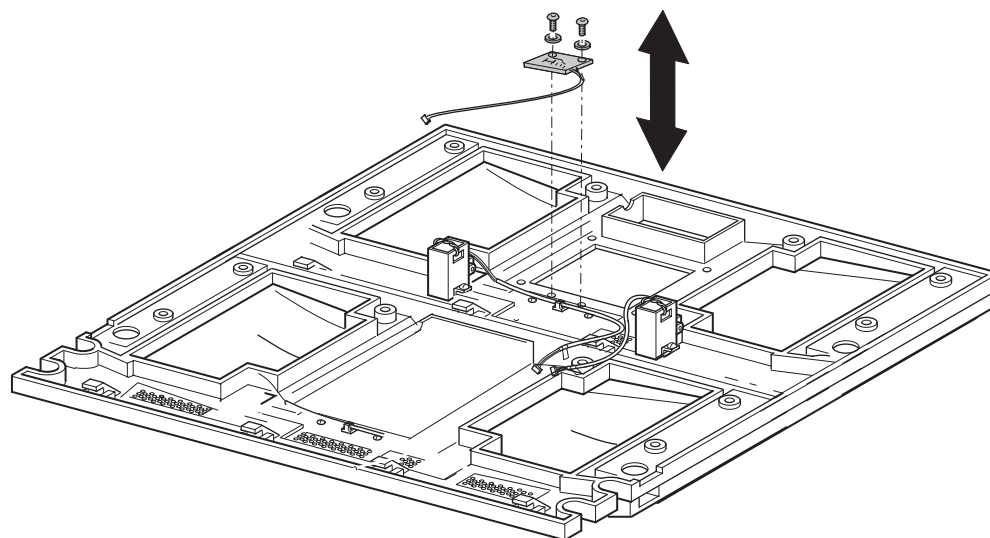


Figure 3–11: LED removal and replacement

To replace the front panel LED:

1. Position the front panel LED on the mounting posts with the cable to the right.
2. Replace the two mounting screws. (See Figure 3–11).
3. Replace the GUI assembly. See “Removing and Replacing the GUI Touch Screen.”

4. Replace the front panel. See “Removing and Replacing the Front Panel.”
5. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Magazine Door Latch Solenoids

The left and right magazine door latch solenoids are mounted on the inside of the front panel.

NOTE: The front panel must be removed to replace the magazine door latch solenoids.

To remove the magazine door latch solenoids:

1. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the front panel. See “Removing and Replacing the Front Panel.”
3. Remove the two screws that mount the latch solenoids to the front panel (see Figure 3-12).
4. Lift the solenoids up and away from the front panel.

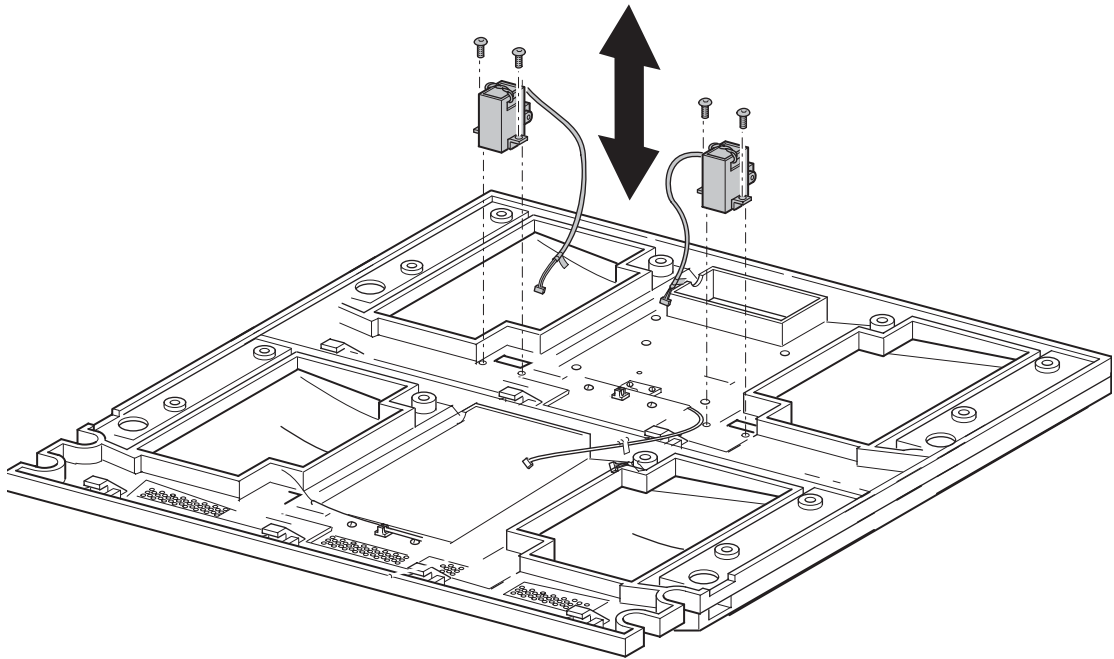


Figure 3–12: Magazine door latch solenoids

To replace the magazine door latch solenoids:

1. With the magazine door open, position each magazine door latch solenoid in the front panel and secure them using the previously removed mounting screws (see Figure 3-12).

NOTE: This step may require some adjustment to latch the door properly.

2. Replace the front panel. See “Removing and Replacing the Front Panel.”
3. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing a Drive Shoe Assembly

Tape drives are mounted at the rear of the library in a hot swappable shoe that permits a tape drive to be removed and replaced while the other tape drive and the library robotics remain active. The SCSI connectors for the tape drives are part of a separate module and remain in the library when the tape drive is removed.

NOTE: The SCSI cables and/or terminator do not need to be removed.

To remove a drive shoe assembly:

1. If the library and the other tape drive are to remain active:
 - a. Unload any tape cartridge in the tape drive to be removed using application software or the GUI touch screen.
 - b. Deactivate the tape drive to be removed by selecting Menu > Maintenance > Replace Drive > Deactivate Drive *n*. The status changes to indicate that Drive *n* can be removed.
 - c. Press **Back** until you return to the default display.
 - d. Proceed to step 3.

NOTE: There will be a warning if there is a cartridge in the drive. Follow the instructions to try to move the tape to a slot and then deactivate the drive or to deactivate the drive without trying to move the tape.

2. If the library is not operational, proceed to step 4.
3. At the rear of the library, make sure that the power indicator on the tape drive that you want to remove is off.
4. Completely loosen the captive retaining screws at the top center and lower left of the drive shoe assembly (see Figure 3–13).

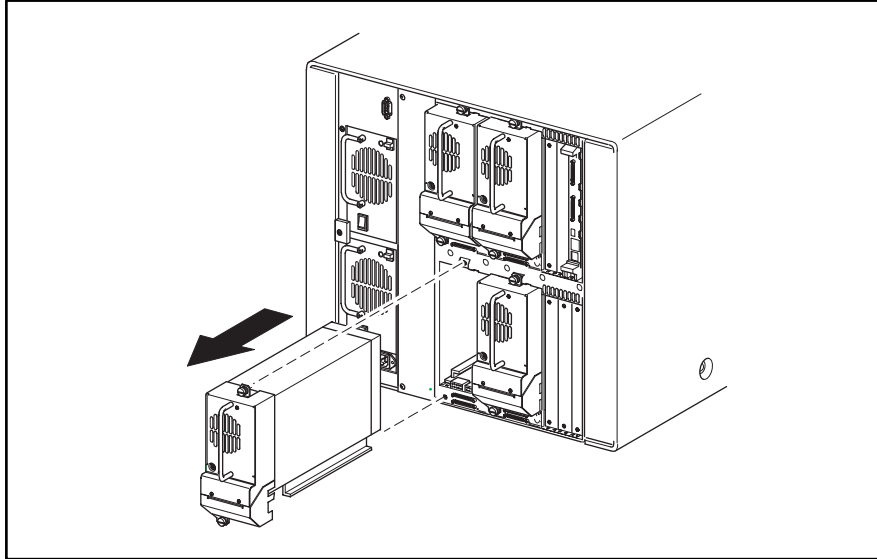


Figure 3–13: Removing a drive shoe assembly

5. Pull straight back on the drive shoe assembly handle to remove the tape drive. Some effort is required to overcome the initial resistance of unplugging the drive shoe assembly from the receiver.
6. Continue to slide the tape drive out while fully supporting the drive shoe assembly until the tape drive load handle has cleared the back of the library.

To replace a drive shoe assembly:

1. Fully support the drive shoe assembly while starting it into the receiver being careful not to damage the tape drive load handle.
2. Push the drive shoe assembly slowly into the receiver until the drive shoe assembly seats itself against the back of the library.



CAUTION: When inserting the drive shoe assembly into the chassis, push evenly on both the handle and the SCSI board connector (bottom portion of the assembly) until it is seated. Damage to the connector pins and drive communication errors may occur if this procedure is not followed.

3. Tighten the two captive retaining screws to secure the drive shoe assembly to the library.
4. Turn the library on and restart the application software.
5. If power was off during the procedure the tape drive reactivates during the power-on initialization of the library.

Removing and Replacing the Control Panel Board

The control panel board is mounted in the center of the library chassis directly behind the front panel.

NOTE: The front panel must be removed prior to removing the control panel board.

To remove the control panel board:

1. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the left magazine using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
3. Remove the front panel. See “Removing and Replacing the Front Panel.”
4. Verify the cables at J14, J10, J16, J19 and J5 were removed during front panel removal.
5. Remove the four mounting screws and washers that secure the control panel board to the library chassis (see Figure 3–14).

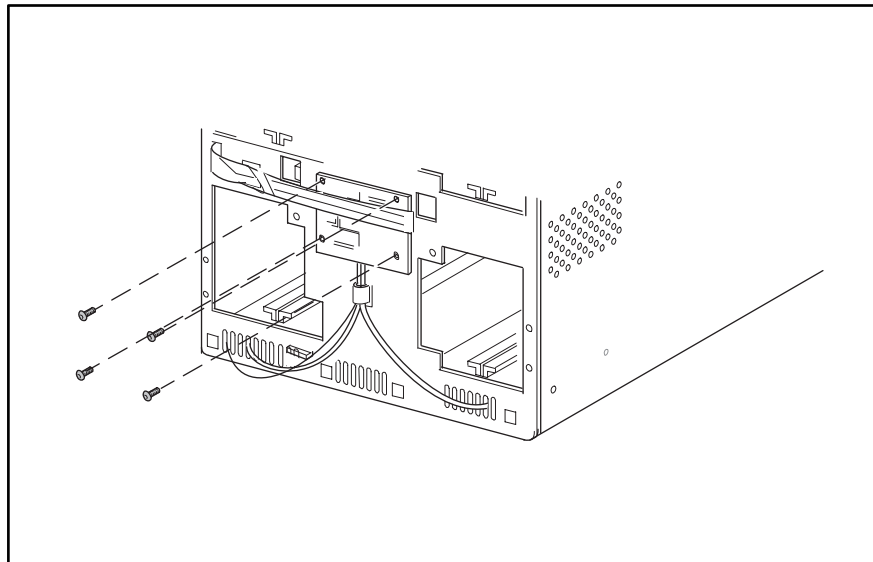


Figure 3–14: Control panel board mounting screws

6. Disconnect the cable at J9 and gently press in on the sides of the connector to remove the cable at J1. Tilt the upper edge of the board forward and disconnect the cables at J4, J2, J6, J12, J11, J18 and J15 (see Figure 3–15).

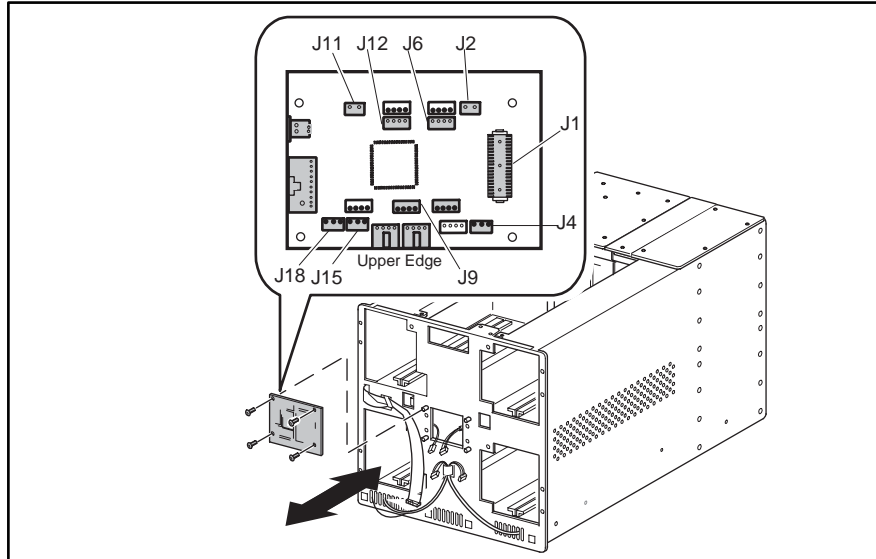


Figure 3–15: Control panel board connectors

7. Remove the control panel board from the chassis area.

To replace the control panel board:

1. Position the control panel board over and make the appropriate connections at the J4, J2, J6, J12, J11, J18, and J15 locations (see Figure 3–15).
2. Make the appropriate connections at the J1 and J9 locations (see Figure 3–15).
3. Replace the four mounting screws and washers from the board (see Figure 3–14).

NOTE: Be sure not to pinch any of the board cables when replacing the mounting screws.

4. Replace the front panel. See “Removing and Replacing the Front Panel.”
5. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Mail Slot Solenoid(s)

The mail slot solenoid is mounted on the underside of the upper and lower left magazine track near the front of the library.

NOTE: The upper and lower left magazine(s) must be removed prior to removing a mail slot solenoid.

To remove a mail slot solenoid:

1. Remove the left magazine using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Release the brake on the shuttle assembly and move it toward the rear of the library.
5. From inside the library, remove the four screws securing the control panel board cover plate and then remove the control panel board cover plate (see Figure 3–16).

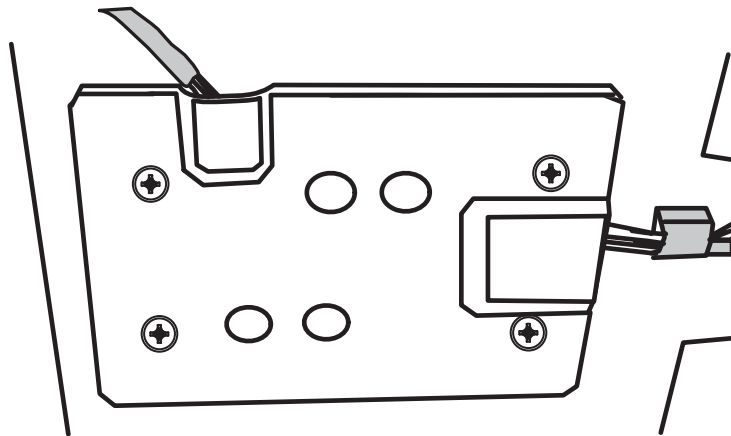


Figure 3–16: Control panel board cover plate

6. Disconnect the white cable(s) at J15 (upper) and/or J18 (lower) locations on the control panel board (see Figure 3–15).

NOTE: For easier cable accessibility the board may be removed from the mounts on the front side of the chassis. See “Removing and Replacing the Control Panel Board.”

7. While supporting the solenoid assembly below the magazine track, remove the two mounting screws that face the center of the magazine track (see Figure 3–17).

NOTE: Use a stubby or right-angle screwdriver for this procedure.

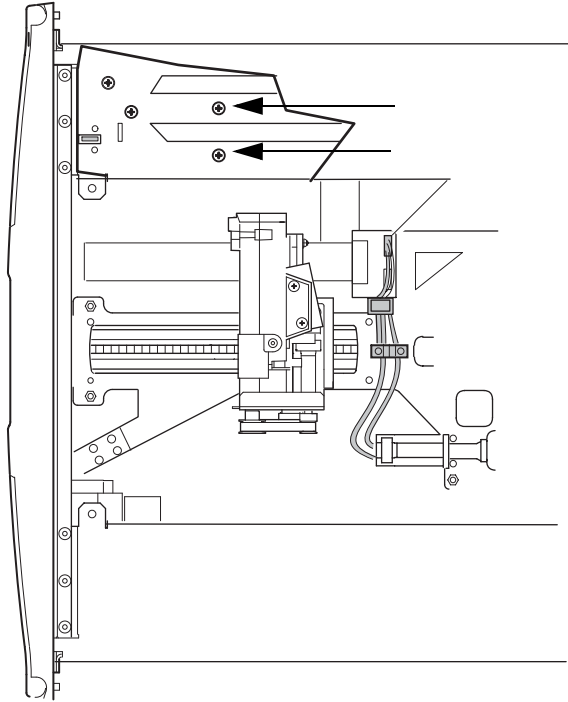


Figure 3–17: Mail slot solenoid mounting screws

8. Remove the solenoid assembly from beneath the magazine track.

To replace the mail slot solenoid:

1. Position the mail slot solenoid underneath the magazine track. The top of the tab should be in the black sleeve (see Figure 3–17).
2. Align the mounting holes and install the two previously removed screws (see Figure 3–17).
3. Dress the cable through the cable holder (upper) or through the library grill (lower) and connect the cable(s) at J15 (upper) and/or J18 (lower) locations on the control panel board.

NOTE: Replace the control panel board if it was removed. See “Removing and Replacing the Control Panel Board.”

4. Replace the control panel board cover plate (see Figure 3–16).
5. Replace the front panel. See “Removing and Replacing the Front Panel.”
6. Replace the top front cover. See “Removing and Replacing the Library Covers.”
7. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Magazine Solenoids

The magazine solenoid is mounted on the underside of the upper and lower left magazine track near the front of the library.

NOTE: The upper and lower left magazine(s) must be removed prior to removing a magazine solenoid.

To remove a magazine solenoid:

1. Remove the left magazine(s) using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Release the brake on the shuttle assembly and move it toward the rear of the library.
5. Remove the four screws securing the control panel board cover plate and then remove the control panel board cover plate (see Figure 3–18).

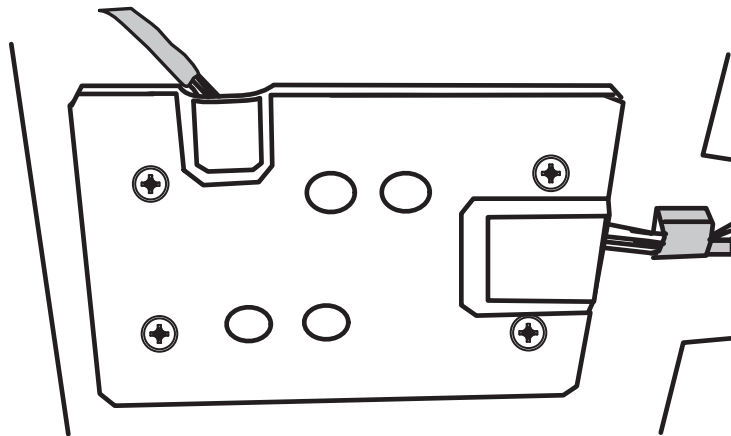


Figure 3–18: Control panel board cover plate

6. Disconnect the blue cable(s) at J2 (upper) and/or J11 (lower) locations on the control panel board (see Figure 3–19).

NOTE: For easier cable accessibility the board may be removed from the mounts on the front side of the chassis. See “Removing and Replacing the Control Panel Board.”

7. While supporting the solenoid assembly below the magazine track, remove the two mounting screws that face the center of the magazine track (see Figure 3–19).

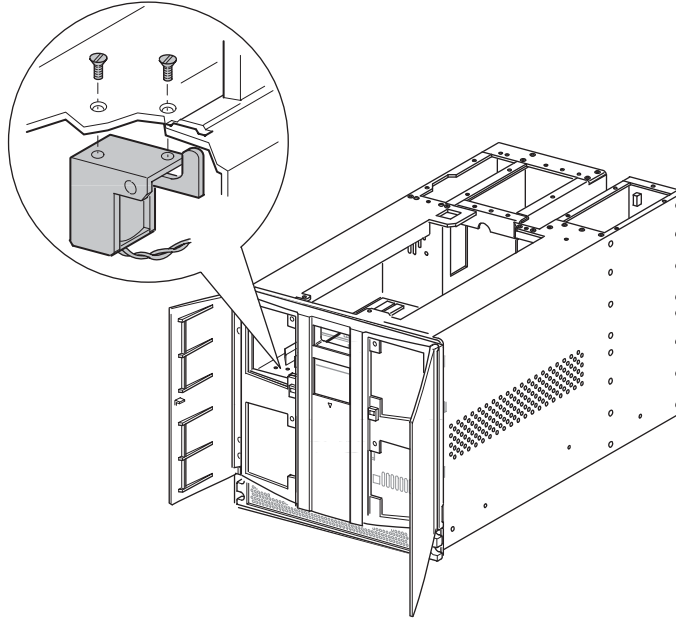


Figure 3–19: Interlock solenoid mounting screws

8. Remove the solenoid from beneath the magazine track.

To replace the magazine solenoid:

1. Position the magazine solenoid underneath the magazine track. The top of the tab should be in the slot (see Figure 3-18).
2. Align the mounting holes and install the two previously removed flat-head screws (see Figure 3-18).
3. Dress the cable through the cable holder (upper) or through the library grill (lower) and connect the cable(s) at J2 (upper) and/or J11 (lower) locations on the control panel board.

NOTE: Replace the control panel board if it was removed. See “Removing and Replacing the Control Panel Board.”

4. Replace the control panel board cover plate (see Figure 3-18).
5. Replace the top front cover. See “Removing and Replacing the Library Covers.”
6. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Library Controller Board

The library controller board is installed in a card cage/backplane assembly on the right at the rear of the library. The library controller board must be installed in the right-most slot. It will not work in the other slots.

NOTE: The SCSI interface cable, SCSI terminator, 10 Base T cable and RS-232 cable must be removed prior to removing the library controller board.

To remove the library controller board:

1. If necessary, exit the application software and halt the operating system.
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord
3. Remove the SCSI interface cable(s), SCSI terminator, 10-BaseT cable, and RS-232 cable.
4. Completely loosen the two captive hold-down screws on the ejector handles (see Figure 3–20).

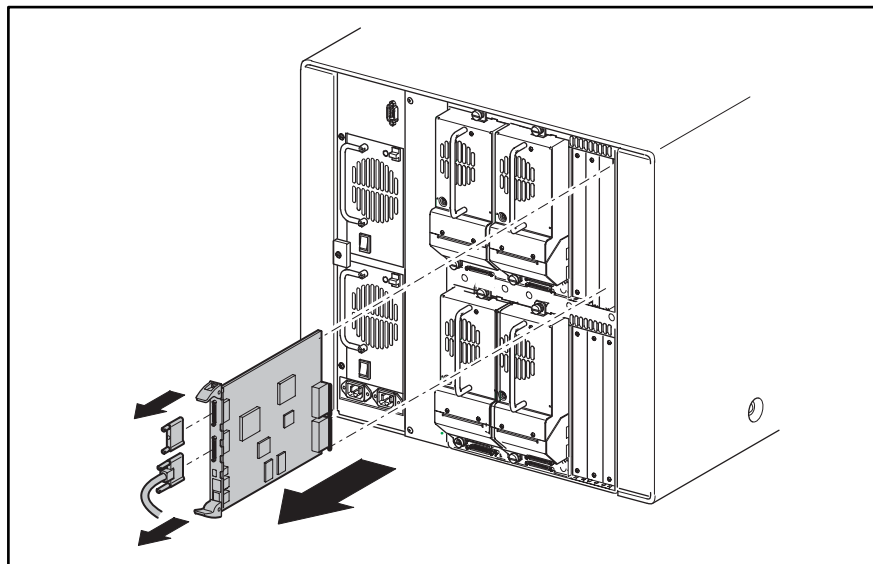


Figure 3–20: Library controller board removal

5. Disconnect the library controller board by spreading the ejector handles (see Figure 3–20).
6. Pull the library controller board out of the card cage/backplane assembly.

To replace the library controller board:

1. Position the library controller board with the SCSI connectors toward the top and then align the edges of the board with the slots in the card cage (see Figure 3–20).
2. Push the library controller board into the card cage until the ejector handles pivot toward each other. Move the ejector handles toward each other to fully seat the library controller board.
3. Tighten the two captive hold-down screws on the ejector handles (see Figure 3–20).
4. Replace the SCSI interface cable, SCSI terminator, 10-BaseT cable, and RS-232 cable.
5. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Bracket and Power Supplies

The power supplies are installed stacked on top of each other on the left side at the rear of the library in a quick-change receiver. The redundant power supplies and receiver are designed such that when one power supply fails the other resumes the flow of power uninterrupted.

NOTE: No other FRUs need to be removed to remove a power supply.

To remove the power supply:

1. If it is determined that a power supply has failed (power supply LED extinguished), turn off the master power switch on the power supply at the rear of the library.
2. Remove the power cord for the failed power supply. The right plug connects to the top power supply. The left plug connects to the bottom power supply.



WARNING: The power supply is NOT to be removed by the operator. Hazardous voltage is present in the cavity if the power cord is not removed.

3. Remove the mounting screw and washer securing the power supply locking bracket. (see Figure 3–21).
4. On the failed power supply, push down on the latch and then use the handle to pull the power supply out of the receiver (see Figure 3–21).

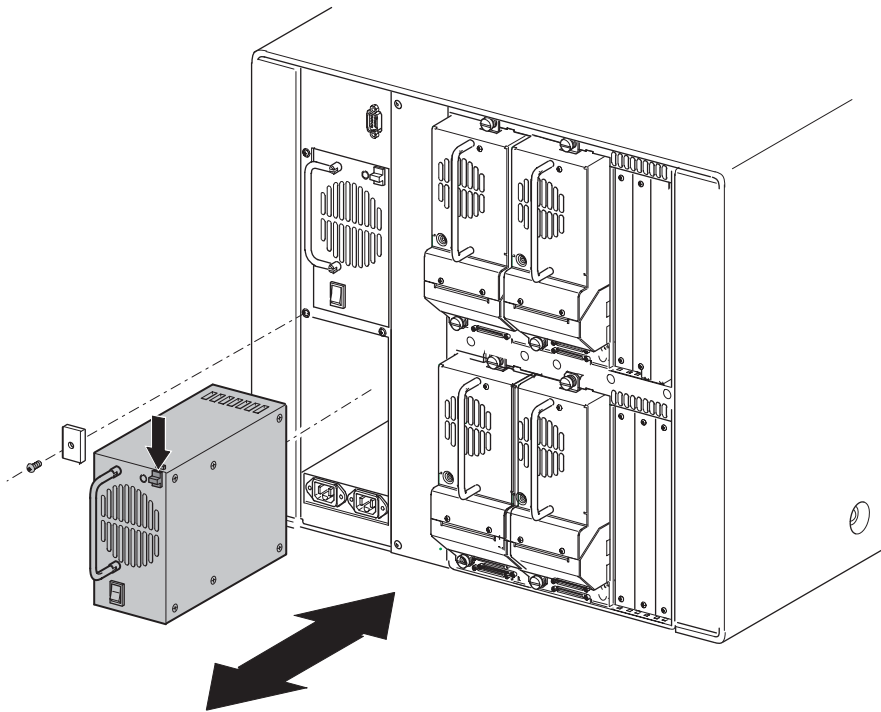


Figure 3–21: Power supply removal and replacement

To replace the bracket and a power supply:

1. Position the power supply at the rear of the library with the latch at the top and the power switch at the bottom. (See Figure 3–21).
2. Push the power supply into the power supply receiver until the latch engages.

3. Replace the power supply locking bracket using the mounting screw (see Figure 3–21).
4. Turn the library on and restart the application software.

Removing and Replacing the Power Supply Receiver

The power supply receiver is installed on the left side at the rear of the library and houses the power supply and the power cord receptacle.

NOTE: The power supplies, drives 1 and 3 (or blank covers), and PTM (or blank cover) must be removed prior to removing the power supply receiver.

To remove the power supply receiver:

1. Remove the right magazines using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord
3. Remove the bracket and power supply. See “Removing and Replacing the Bracket and Power Supply.”
4. Remove the left rear cover and top front cover. See “Removing and Replacing the Library Covers.”
5. Remove drive shoe assemblies 1 and 3. See “Removing and Replacing Drive Shoe Assemblies.”

NOTE: This allows access to the PTM/blank cover mounting screws. On older models it may be necessary to remove the PTM cover to access the receiver screws.

6. Remove the five screws (three outer and two inner) connecting the PTM blank to the chassis.

NOTE: For multiple library systems with a PTM installed, the entire PTM must be removed. Refer to the *Compaq StorageWorks Pass-Through Mechanism Reference Guide*.

7. Working through the opening behind the right magazine track, press the release latch to remove the two 22-pin main power harness connectors.

NOTE: Remove the connector closest to the drive bays first.

8. Remove the four 4-pin drive power connectors.

NOTE: There are five pin receptacles. The bottom four receptacles are used.

9. At the back of the library, remove the five mounting screws while supporting the receiver.
10. Remove the receiver through the top of the library being careful to move the wires from the PTM interface connector out of the way.

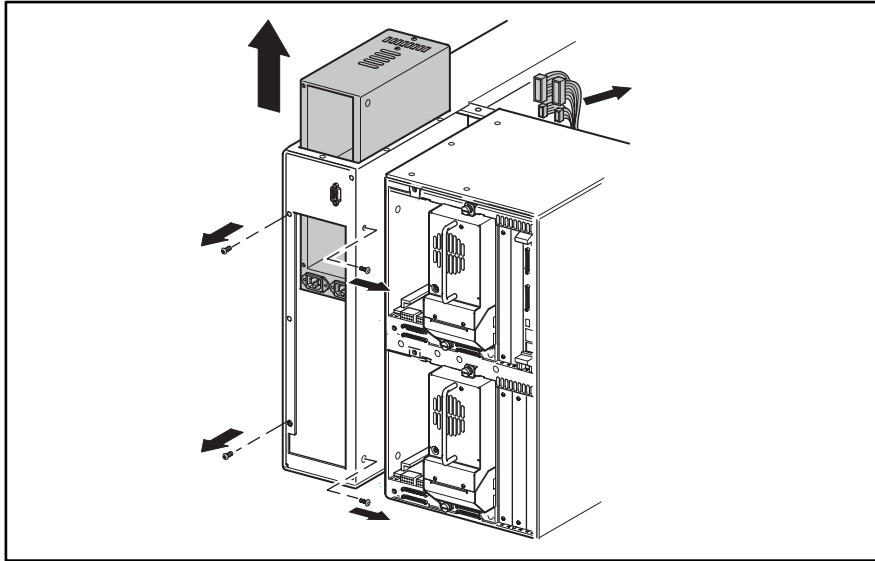


Figure 3–22: Power supply receiver removal

To replace the power supply receiver:

1. Insert the power supply receiver into the opening in the top of the library with the power cord receptacle at the bottom facing the rear of the library being careful to keep the cables from the PTM interface connector out of the way.

NOTE: Be sure the cables from the PTM interface connector are on top of the power supply receiver after it has been placed into the library chassis.

2. At the rear of the library, install the five mounting screws on the rear of the power supply receiver bay (see Figure 3–22).
3. At the side of the library, install the two mounting screws (see Figure 3–22).
4. Working through the opening behind the right magazine track, replace the four 4-pin drive power connectors and the two 22-pin main power harness connectors (see Figure 3–22).
5. Replace the top front cover and left rear cover. See “Removing and Replacing the Library Covers.”
6. Replace the bracket and power supply. See “Removing and Replacing the Bracket and Power Supplies.”
7. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Backplane Fan

The backplane fans are mounted on two long standoffs inside the library directly behind the left magazines.

NOTE: The left upper and lower magazines and the card cage backplane board access panel (if the lower fan is to be removed) must be removed to remove the backplane fans. The drive 0 shoe assembly and the card cage backplane access panel board may also be removed for easier access.

To remove the backplane fan:

1. Remove the left magazines using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord
3. Remove the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”
4. Proceed to “Upper Card Cage Removal and Replacement” or “Lower Card Cage Removal and Replacement.”

Upper Card Cage Removal and Replacement

NOTE: For easier to access J11, remove the drive 0 shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”

1. Remove the screw from the card cage/backplane connector access plate and lift it out of the library.

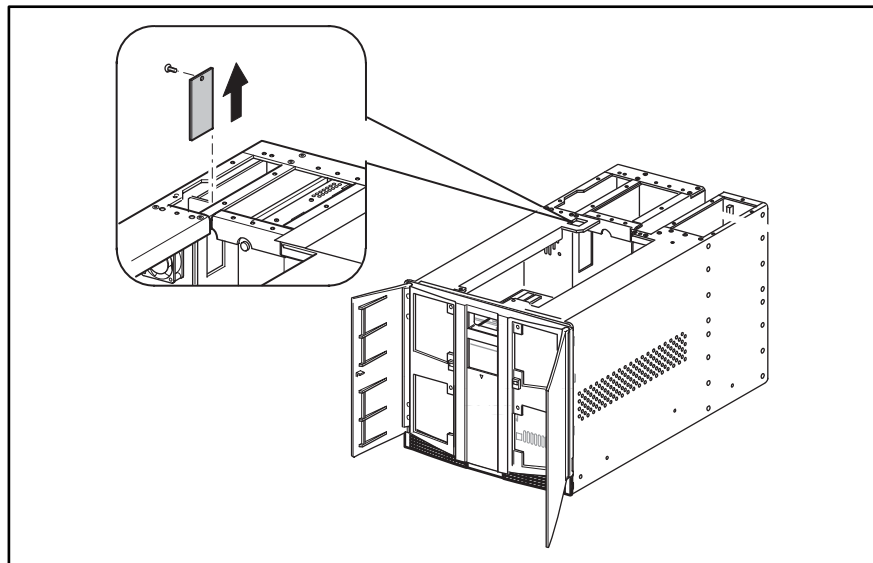


Figure 3–23: Card cage/backplane connector access plate removal

2. Disconnect the cable at J11 on the backplane board.

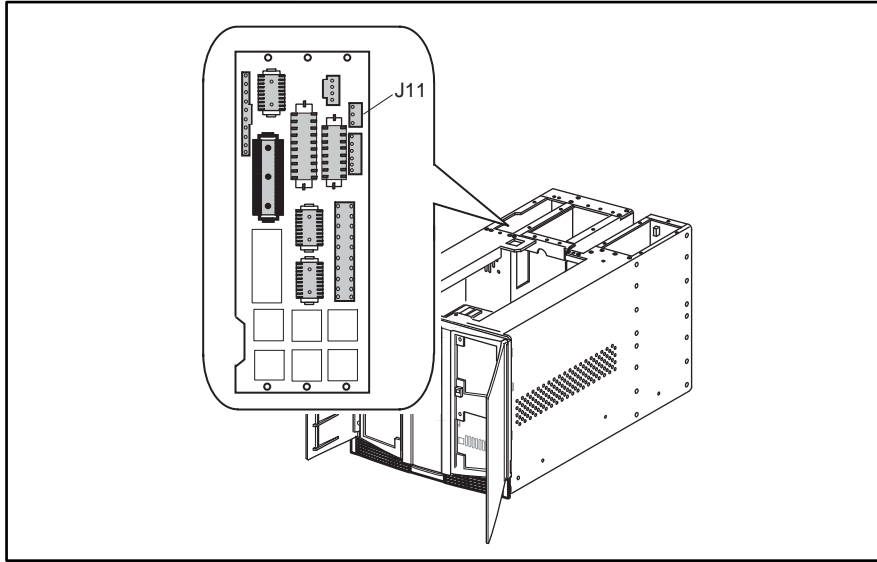


Figure 3–24: Card cage/backplane assembly

3. Remove the two screws and washers that secure the finger guard and fan to the standoffs.
4. Pull the fan straight off of the standoffs while guiding the fan cable out through the cable access hole.

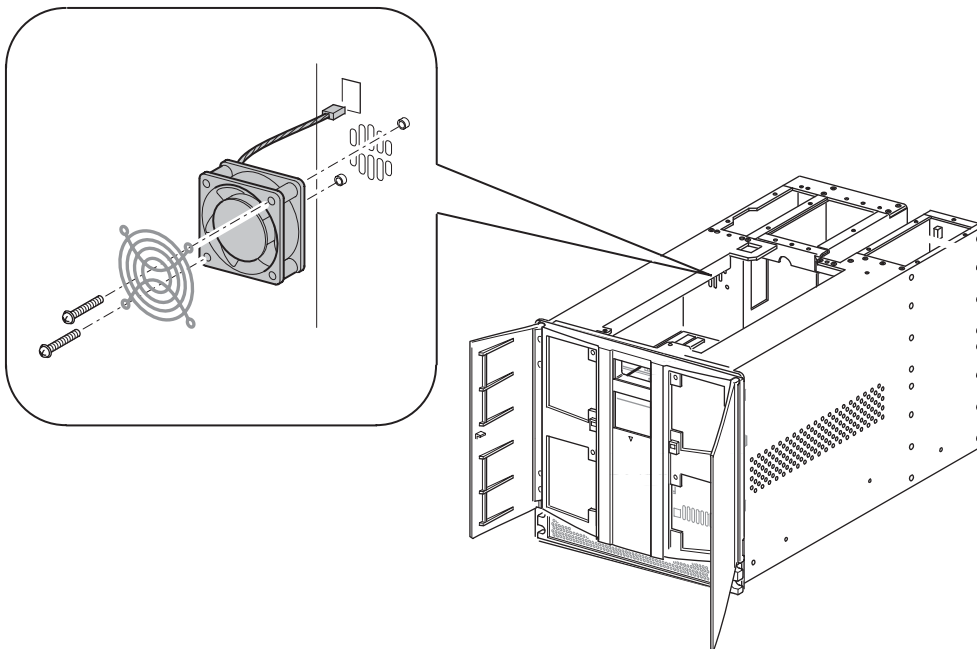


Figure 3–25: Upper card cage fan removal

5. Remove the backplane fan from the library.

To replace the upper backplane fan:

1. Position the backplane fan inside the upper left magazine area with the cable at the top left corner.

NOTE: The airflow direction is from the main chassis area into the card cage/backplane assembly connector area.
2. Place the fan over the two mounting standoffs.
3. Guide the fan cable through the cable access hole to the card cage backplane.
4. Install the two screws and washers that secure the backplane fan to the standoffs.
5. Replace the cable at connector J11 on the card cage/backplane assembly board.
6. If removed, replace the card cage/backplane assembly connector access plate.
7. If removed, replace the drive 0 shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”
8. Replace the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”
9. Connect the power cord. Turn the library on and restart the application software.

Lower Card Cage Removal and Replacement

1. Remove the lower access panel (two screws) located at the lower left of the right side of the chassis. This panel accesses the backplane expansion board.
2. Disconnect the cable at J11 on the backplane expansion board.

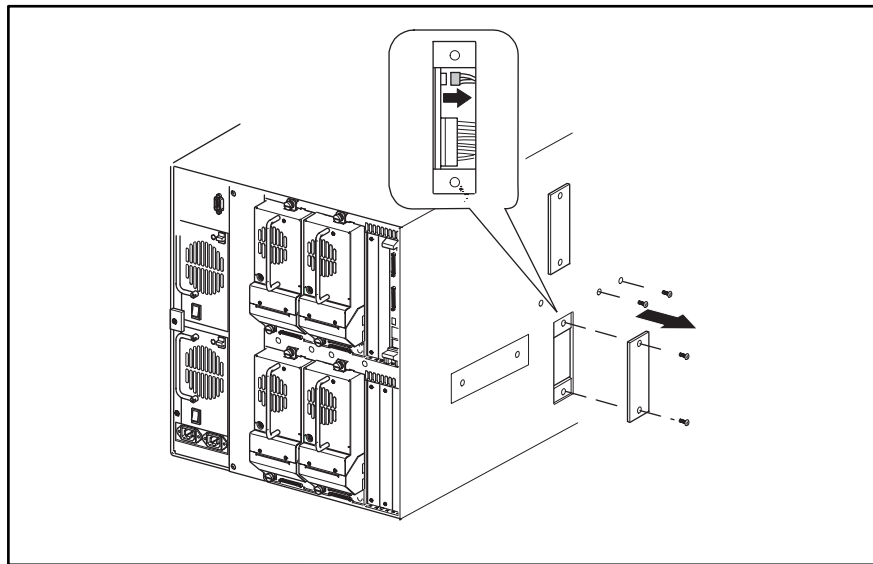


Figure 3–26: Backplane expansion board

3. Remove the two screws (outside of the unit to the right of the access panel) that secure the flex cable bracket.
4. From inside the chassis slide the bracket down the flex cable to allow removal of the fan (see Figure 3–27).

5. Remove the two screws and washers that secure the finger guard and fan to the standoffs.

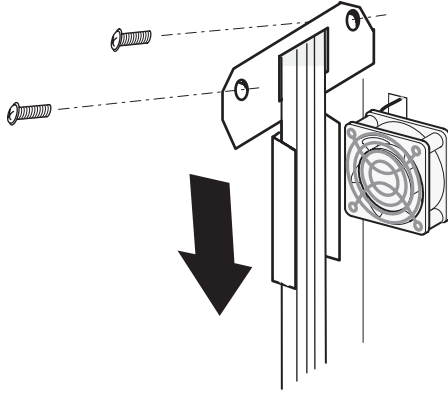


Figure 3–27: Flex cable bracket removal

6. Remove the backplane fan from the library.

To replace the lower backplane fan:

1. Position the lower backplane fan inside the lower-left magazine area with the cable at the top left corner. The airflow direction is from the main chassis area into the card cage/backplane assembly connector area.
2. Install the lower backplane fan over the two mounting standoffs while guiding the cable through the cable access hole into the lower card cage/backplane assembly area.
3. Install the two screws and washers that secure the backplane fan to the standoffs.
4. Slide the bracket up the flex cable and align to the mounting holes. Replace the two screws that secure the flex cable bracket. Ensure the flex cable is within the bracket.
5. Connect the cable at connector J11 on the backplane expansion board.
6. Replace the card cage/backplane connector access plate.
7. If removed, replace the drive 0 shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”
8. Replace the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”
9. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Upper Card Cage/Backplane Assembly

The card cage/backplane assembly is located on the top right side at the rear of the library.

NOTE: The library controller board, drive 0 and drive 1 shoe assembly, tape drive guide, and any expansion cards must be removed prior to removing the card cage/backplane assembly.

To remove the card cage/backplane assembly:

1. If the library is operational, remove any tape cartridges in the tape drives using the GUI touch screen or application software.
2. If necessary, exit the application software and halt the operating system.
3. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
4. Remove the library controller board. See “Removing and Replacing the Library Controller Board.”
5. Remove the drive 0 and drive 1 shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”
6. Remove the top front cover and right rear cover. See “Removing and Replacing the Library Covers.”
7. Remove the tape drive guides. See “Removing and Replacing the Tape Drive Guides.”
NOTE: This allows easier access to the card cage mounting screws.
8. Remove the upper tape drive shield. See “Removing and Replacing Tape Drive Shields.”
9. Remove the screw from the card cage/backplane assembly connector access plate and lift it out of the library.
10. Remove the cable access panel (two screws) from the side of the unit.
11. From outside the chassis, remove the two screws at the top of the card cage.
12. From inside the drive bay, remove two screws at the top of the card cage and one at the bottom rear of the card cage.

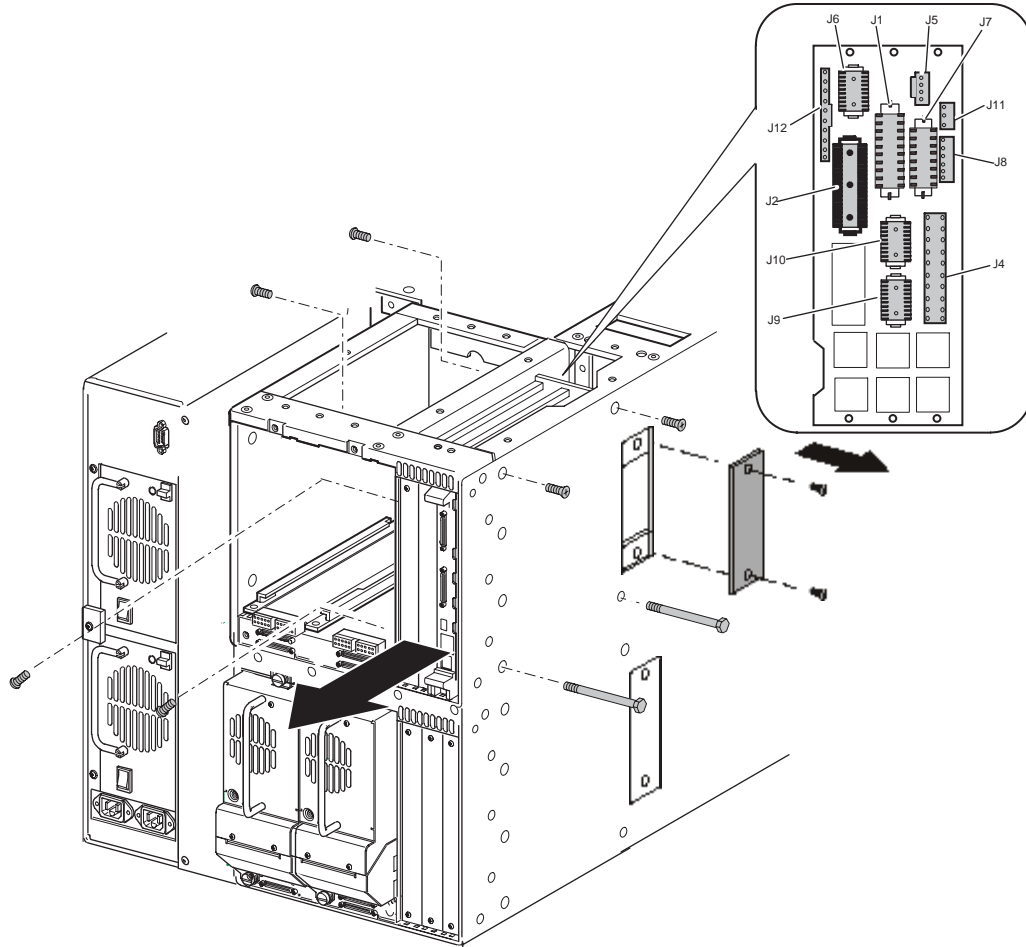


Figure 3–28: Card cage backplane assembly removal

13. From outside the chassis, remove two through-bolts at the bottom of the card cage.
14. Remove the blank panels on the front of the card cage.
15. Remove the screw that secures the card cage/backplane assembly board stiffener to the chassis.
16. From inside the card cage, remove the grounding strip plate and spacer by removing the two screws located in tape drive bay 0.
17. Slide the card cage half-way out.
18. With the card cage loose and working from inside the drive bay access the top, remove the cables from J5, J6, J12, J2, J1, J7, J11, J8, J10, J9, and J4.
19. Slide the card cage out of the library.

To replace the card cage/backplane:

1. Position the card cage at the rear of the library with connectors J6/J5 at the top and towards the front of the library.
2. Slide the card cage/backplane assembly about half way into the opening.

3. From inside the card cage, position the grounding strip plate with the spacer beneath it against the drive bay wall. The grounding strip contacts should be on the card cage side and toward the rear of the library. From inside the drive bay, replace the two mounting screws.
4. Slide the card cage the rest of the way in.
NOTE: Lift the cables toward the top of the unit so as not to trap any cables beneath the card cage.
5. With the card cage loose and working from inside the drive bay access and the top, connect the cables at J4, J9, J10, J8, J11, J7, J1, J2, J12, J6 and J5.
NOTE: For ease of installation, replace the cables moving from left to right and bottom to top of the back plane assembly.
6. Replace the one screw from the backplane board stiffener.
7. From outside the chassis, replace the two screws at the top of the card cage and the two through-bolts at the bottom of the card cage.
8. From inside the drive bay, replace the two screws at the top of the card cage and one at the bottom rear of the card cage.
9. Attach the cable access panel (two screws) on the side of the unit.
10. Replace the card cage/backplane connector access plate and mounting screw.
11. Replace the outside upper card cage/backplane connector access plate with the two screws.
12. Position the card cage shield near the backplane board and slide it into position on top of the card cage. Replace the mounting screw.
13. Replace the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”
14. Replace the upper tape drive shield. See “Removing and Replacing the Tape Drive Shields.”
15. Replace the drive shoe guides. See “Removing and Replacing the Tape Drive Guides.”
16. Replace the drive shoe assemblies. See “Removing and Replacing the Drive Shoe Assemblies.”
17. Replace the library controller card. See “Removing and Replacing the Library Controller Card.”
18. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Lower Card Cage/Backplane Assembly

The lower card cage/backplane assembly is located on the lower-right side at the rear of the library.

NOTE: The drive 2 and drive 3 shoe assembly or blank covers, lower tape drive shield, and the lower card cage fan bracket must be removed prior to removing the lower card cage/backplane assembly.

To remove the card cage/backplane assembly:

1. If the library is operational, remove any tape cartridges in the tape drives using the GUI touch screen or application software.
2. If necessary, exit the application software and halt the operating system.
3. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
4. Remove the top front cover and right rear cover. See “Removing and Replacing the Library Covers.”
5. Remove the drive 2, and drive 3 shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”
6. Remove the lower tape drive shield. See “Removing and Replacing the Tape Drive Shield.”
7. Remove the two screws from the lower-outside card cage/backplane connector access plate. Remove the access plate for better lighting into the card cage area.
8. From outside the chassis, remove the two screws at the top of the card cage (see Figure 3-29).
9. From inside the drive bay, remove the two screws at the top of the card cage and one at the bottom rear of the card cage.
10. From outside the chassis, remove the two through-bolts at the bottom of the card cage (see Figure 3-29).
11. Remove the blank cover plates from the front of the card cage.
12. From inside the card cage, remove the screw from the backplane board stiffener.
13. From inside the card cage/backplane assembly, remove the grounding strip plate and spacer (the two screws located in tape drive bay 3).
14. Slide the lower card cage about halfway out and remove the cable connection at J11.
15. Slide the lower card cage/backplane assembly out of the library.
16. Remove the connection at J4.

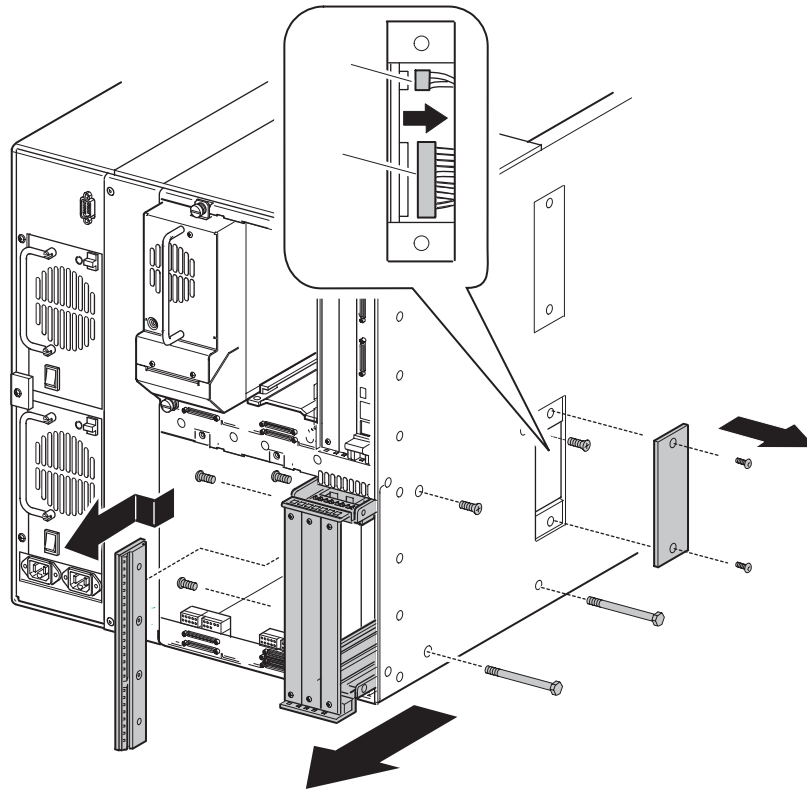


Figure 3–29: Expansion card cage/backplane

To replace the card cage/backplane assembly:

1. Connect the power cable on the expansion card cage/backplane at J4.
2. Slide the card cage/backplane assembly into the opening at the lower-rear of the library.
NOTE: Lift the cables toward the top of the unit so as not to trap any cables beneath the card cage.
3. From inside the card cage/backplane assembly, position the grounding strip plate with the spacer beneath it against the tape drive bay wall. The grounding strip contacts should be on the card cage side and towards the rear of the library.
4. With the card cage loose and working from inside the drive bay, connect the cable at J11.
5. Replace the screw that secures the backplane board stiffener.
6. Replace the blank cover plates in the card cage/backplane assembly.
7. From outside the chassis, loosely replace the two screws and the top and the two through-bolts at the bottom the of the card cage/backplane assembly.
NOTE: Tighten the top screws first.
8. From inside the tape drive bay, replace the two screws at the top of the card cage/backplane assembly.
9. Replace the card cage/backplane assembly access plate.

10. Replace the drive shoe assemblies. See “Removing and Replacing Drive Shoe Assemblies.”
11. Replace the lower tape drive shield. See “Removing and Replacing the Tape Drive Shield.”
12. Replace the library controller board. See “Removing and Replacing the Library Controller Board.”
13. Replace the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”
14. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing a High Density SCSI I/O Board/ Hot-Plug Library Board

The High Density SCSI I/O board and hot-plug library boards are located at the rear of the library directly under the tape drive bays. The two boards interconnect on the underside of the High Density SCSI I/O board with two 72-pin connectors in a daughterboard arrangement. Use this procedure to replace either board.

NOTE: Tape drive SCSI interface cables, SCSI terminators, and drive shoe assemblies must be removed prior to removing the High Density SCSI I/O board or the hot-plug library board.

To remove a High Density SCSI I/O board and hot-plug library board:

1. If the library is operational, remove any tape cartridges in the tape drives using the GUI touch screen or application software.
2. If necessary, exit the application software and halt the operating system.
3. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
4. Remove any SCSI interface cables and SCSI terminators that are attached to the tape drive SCSI connectors.
5. Remove the appropriate drive shoe assemblies. See “Removing and Replacing a Drive Shoe Assembly.”
6. Remove the right rear cover. See “Removing and Replacing the Library Covers.”
7. Remove the tape drive guides. See “Removing and Replacing a Tape Drive Guide.”
8. Remove the tape drive shield. See “Removing and Replacing the Tape Drive Shield.”
9. Remove eight jackscrews from the SCSI connectors.
10. Remove the six screws that secure the SCSI/IO board/hot-plug library board assembly to the library chassis.
11. Slide the SCSI/IO board/hot-plug library board assembly toward the front of the library until it is possible to pivot the rear of it up (toward the front of the library). This allows access to the bottom of the hot-plug library board.

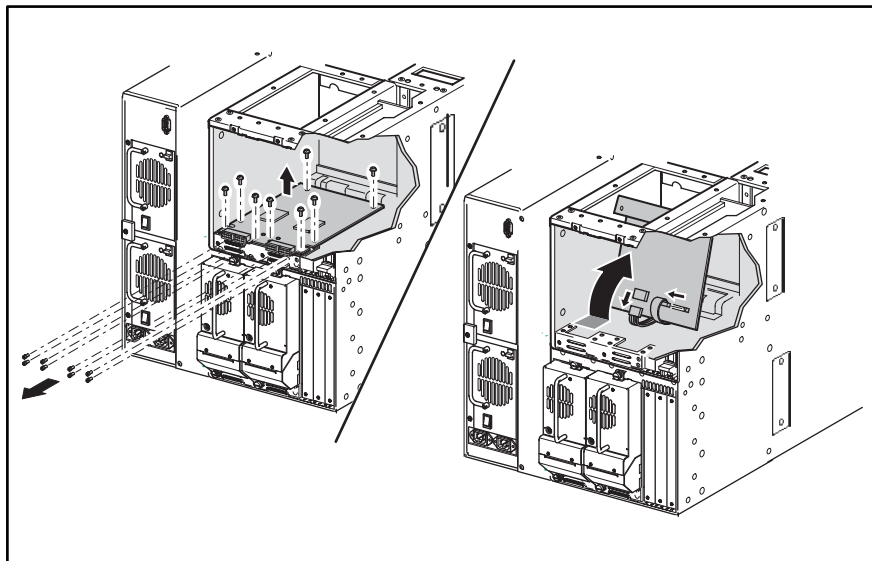


Figure 3–30: Removing the SCSI I/O board

12. Remove the cables at J3 and J4.
13. Remove the SCSI/IO board/hot-plug library board assembly from the library.
14. Remove the two screws that secure the hot-plug library board to the top of the bracket.
15. Lift up at the two SCSI connectors to remove the hot-plug library board from the SCSI I/O board.
16. Remove the two screws and the SCSI I/O board from the front of the bracket. (See Figure 3-31.)

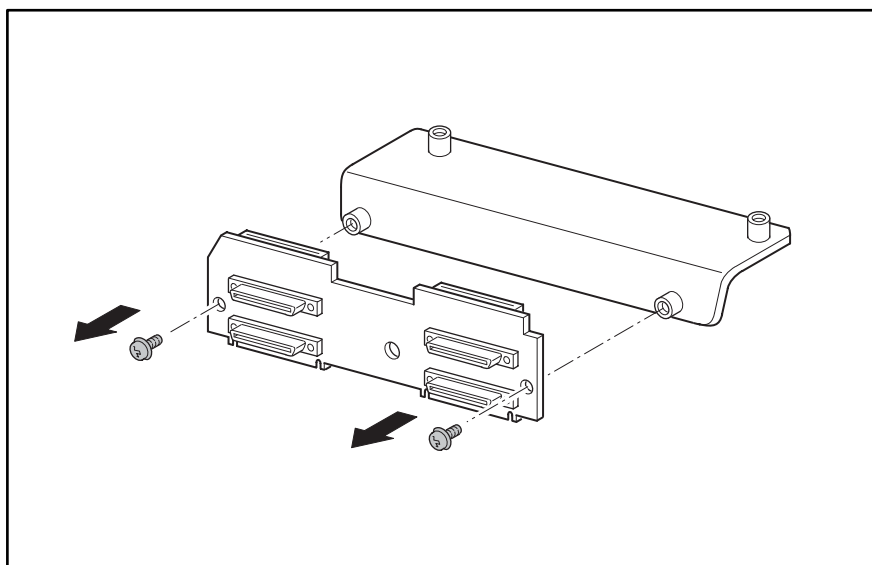


Figure 3–31: SCSI I/O board removal

To replace the SCSI I/O board and hot-plug library board:

1. Use the two screws to secure the SCSI I/O board to the bracket.
2. Carefully position the hot-plug library board on the bracket.
3. Press down on the two SCSI connectors and seat the hot-plug library board to the SCSI I/O board.
4. Replace the two screws that secure the hot-plug library board to the top of the bracket.
5. Position the SCSI I/O board in the drive bays with the SCSI connectors to the rear of the library.
6. Pivot the rear of the board up and toward the front of the library to access the bottom of the board.
7. Replace the cables at J3 and J4.
8. Guide the SCSI I/O board/hot-plug library board assembly into place, aligning it with the mounting holes.
9. Replace the eight jack screws that secure the SCSI I/O board/hot-plug library board assembly to the library chassis.
10. Replace the six screws that mount the board to the chassis.
11. Replace the tape drive shield. See “Removing and Replacing the Tape Drive Shield.”
12. Replace the drive guides. See “Removing and Replacing a Drive Guide.”
13. Replace the right rear cover. See “Removing and Replacing the Library Covers.”
14. Replace the appropriate drive shoe assemblies. See “Removing and Replacing a Drive Shoe Assembly.”
15. Replace the SCSI cables and SCSI terminators.
16. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Tape Drive Shields

The tape drive shields are installed between the drive 0 and drive 1 and drive 2 and drive 3 shoe assemblies.

NOTE: The drive shoe assemblies must be removed prior to removing the tape drive shield.

Upper Tape Drive Shield

To remove the upper tape drive shield:

1. If the library is operational, remove any tape cartridges in the tape drives using the GUI touch screen or application software.
2. If necessary, exit the application software and halt the operating system.
3. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
4. Remove the right rear cover. See “Removing and Replacing the Library Covers.”
5. Remove the applicable shoe assemblies. See “Removing and Replacing a Drive Shoe Assembly.”
6. Remove one of the tape drive guides. See “Removing and Replacing the Tape Drive Guides.”
7. Remove the two screws that secure the tape drive shield to the library chassis.
8. Gently push the bottom of the shield to the right.
NOTE: This allows the top to clear the chassis lip.
9. Pull the tape drive shield out and away from the tape drive bay.

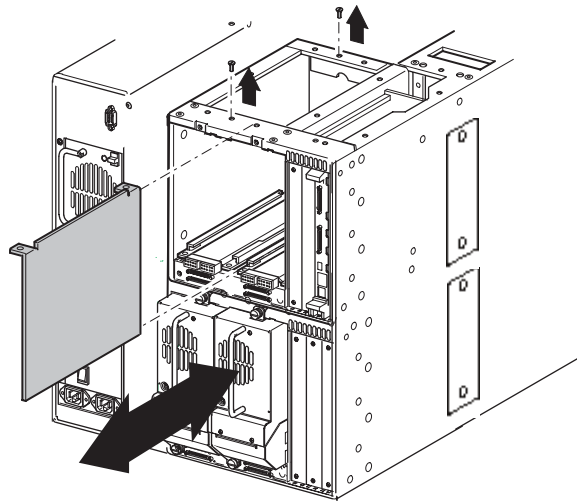


Figure 3–32: Removing the upper tape drive shield

To replace the upper tape drive shield:

1. Insert the tape drive shield into the tape drive bay.

2. Secure the tape drive shield to the library chassis using the two previously removed screws.
3. Replace the previously removed tape drive guides. See “Removing and Replacing a Tape Drive Guide.”
4. Replace the drive shoe assemblies. See “Removing and Replacing a Drive Shoe Assembly.”
5. Replace the right rear cover. See “Removing and Replacing the Library Covers.”
6. Connect the power cord. Turn the library on and restart the application software.

Lower Tape Drive Shield

To remove the lower tape drive shield:

1. If the library is operational, remove any tape cartridges in the tape drives using the GUI touch screen or application software.
2. If necessary, exit the application software and halt the operating system.
3. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
4. Remove the top front cover. See “Removing and Replacing the Library Covers.”
5. Remove the applicable shoe assemblies. See “Removing and Replacing a Drive Shoe Assembly.”
6. Remove both of the tape drive guides. See “Removing and Replacing the Tape Drive Guides.”
7. Remove the two screws that secure the tape drive shield to the library chassis.
8. Inside the chassis between the upper and lower drive bays, remove the shield inner mounting screw. (See Figure 3-33.)

NOTE: On some units it may be necessary to remove the two screws that secure the power cable wire harness cover plate to permit access to the lower tape drive shield inner mounting screw.

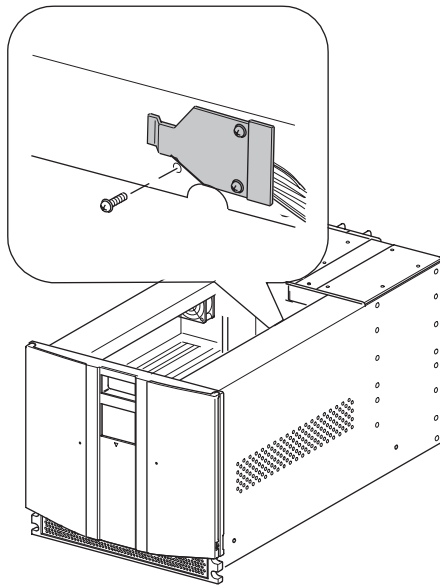


Figure 3–33: Removing the shield inner mounting screw

9. Pull the tape drive shield out and away from the tape drive bay.

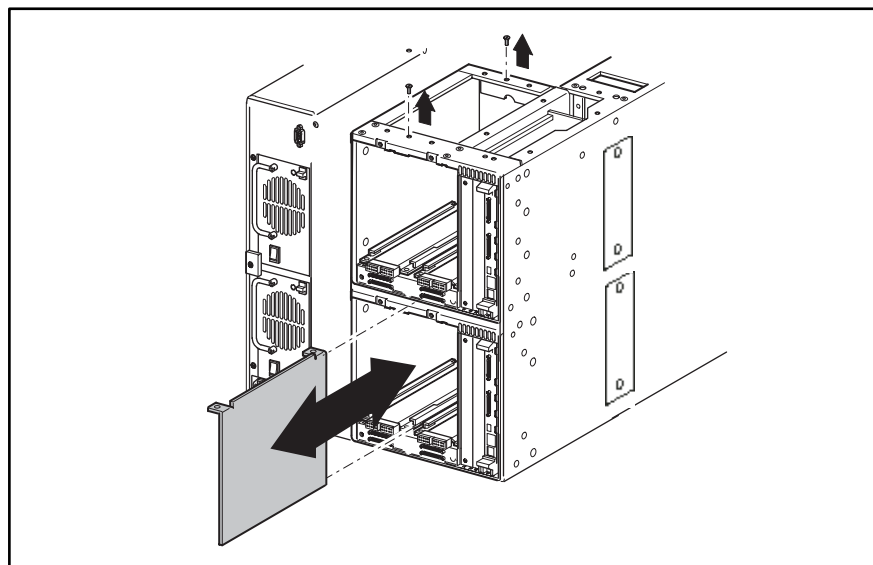


Figure 3–34: Removing the tape drive shield

To replace the tape drive shield:

1. Insert the tape drive shield into the tape drive bay.
2. Secure the tape drive shield to the library chassis using the two previously removed screws.

NOTE: If the lower tape drive guide was removed, replace the power cable wire harness cover plate located inside the chassis between the drive bays.

3. Replace the previously removed tape drive guides. See “Removing and Replacing a Tape Drive Guide.”
4. Replace the drive shoe assemblies. See “Removing and Replacing a Drive Shoe Assembly.”
5. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Tape Drive Guides

A tape drive guide is installed at the bottom of each tape drive bay. This procedure can be used to remove and replace any tape drive guide.

NOTE: The appropriate drive shoe assembly must be removed prior to removing a tape drive guide.

To remove a tape drive guide:

1. If the library is operational, remove any tape cartridges in the tape drives using the GUI touch screen or application software.
2. If necessary, exit the application software and halt the operating system.
3. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
4. Remove the appropriate drive shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”
5. Remove the right rear cover. See “Removing and Replacing the Library Covers.”
6. Remove the four screws that secure the tape drive guide in the library chassis.
7. Remove the tape drive guide from the library.

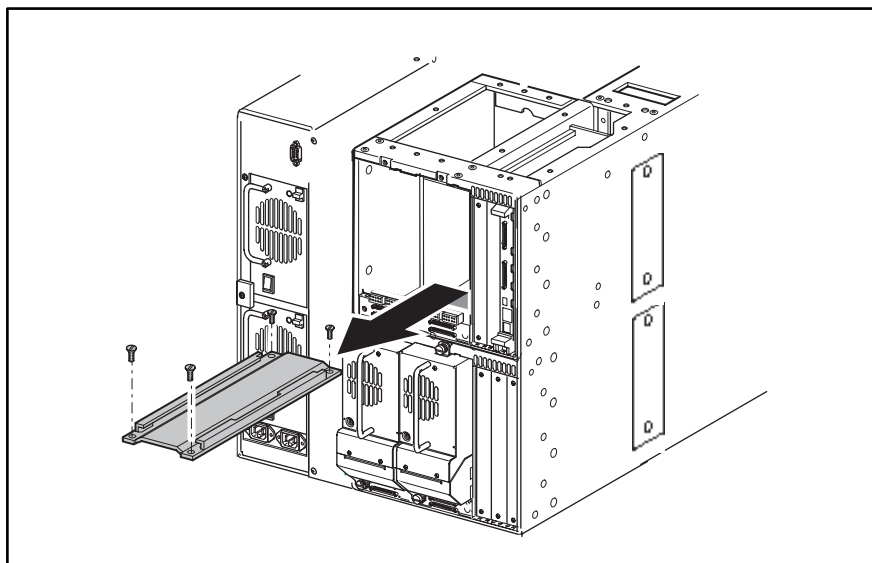


Figure 3–35: Removing a tape drive guide

To replace a tape drive guide:

1. Position the tape drive guide in the tape drive bay with the two straight-sided holes facing the rear of the library (see Figure 3–35).
2. Replace the four flat-head screws that secure the tape drive guide in the library chassis (see Figure 3–35).
3. Replace the right rear cover. See “Removing and Replacing the Library Covers.”
4. Replace the appropriate drive shoe assembly. See “Removing and Replacing a Drive Shoe Assembly.”
5. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing a Magazine Opto Sensor

There are optical sensors located at the rear of both the left and right magazine tracks.

NOTE: The appropriate left or right magazine must be removed prior to removing a magazine opto sensor.

Removing an Upper Magazine Opto Sensor

To remove an upper magazine opto sensor:

1. Remove the appropriate magazine using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Remove the control panel cover plate.

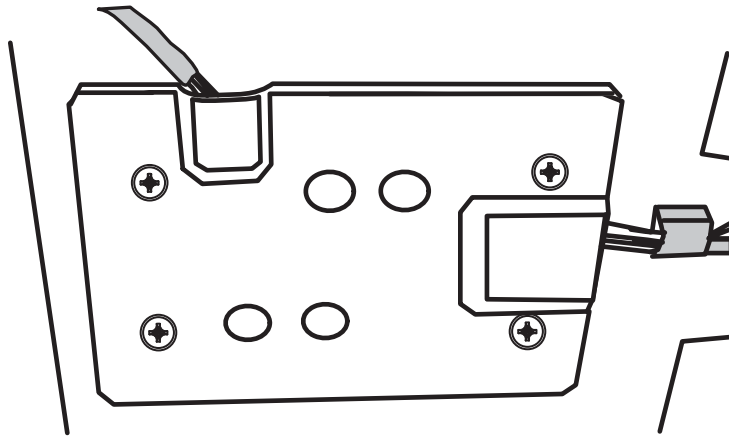


Figure 3-36: Control panel board cover plate

5. Remove the cable at J12 for the upper left magazine sensor or J9 for the upper right magazine sensor (see Figure 3-37):

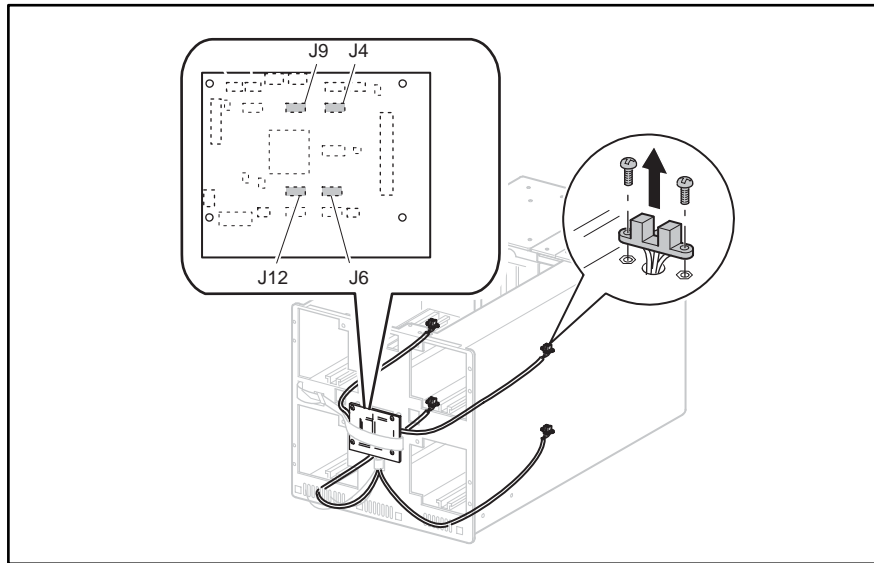


Figure 3-37: Removing a magazine opto sensor

6. Following the appropriate cable to the rear of the library, remove the cable clamps as required.
7. On the underside of the left magazine tray remove the large cable clamps and from the right magazine tray remove the sensor cable from the small cable clamps.
8. Remove the two screws that secure the magazine opto sensor to the track. Note that the two front mounting holes are used (see Figure e3-37).

NOTE: The upper left sensor is under the ribbon cable.
9. Lift the magazine opto sensor from the magazine track while guiding the cable through the opening in the magazine track (see Figure 3-37).

To replace an upper magazine opto sensor:

1. Guide the connector end of the cable through the opening in the magazine track (see Figure 3-37).
2. Replace the two screws that secure the magazine opto sensor to the magazine track. Use the front mounting holes (see Figure 3-37).
3. Route the cable along the magazine tray bottom with the flex cable (upper left sensor only). Replace the cable(s) in the two wide cable clamps (left side) or the two small cable clamps (right side) and continue routing, using cable clamps to the control panel board.
4. Replace the cable at J12 for the upper left magazine sensor or J9 for the upper right magazine sensor.
5. Replace the magazine for the sensor being replaced.
6. Replace the top front cover. See “Removing and Replacing the Library Covers.”
7. Connect the power cord. Turn the library on and restart the application software.

Removing a Lower Magazine Opto Sensor

To remove a lower magazine opto sensor:

1. Remove the appropriate magazine using the front panel control. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord
3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Remove the front panel. See “Removing and Replacing the Front Panel.”
5. Remove the control panel cover plate.

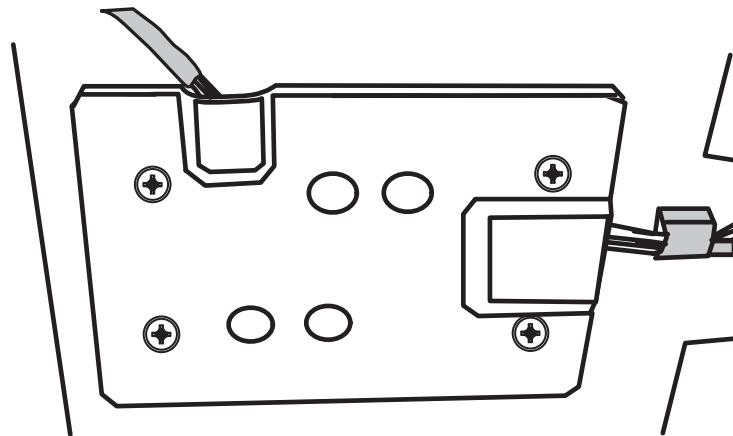


Figure 3–38: Control panel board cover plate

6. Remove the cable at J4 for the lower left magazine sensor or J6 for the lower right magazine sensor (see Figure 3–39):

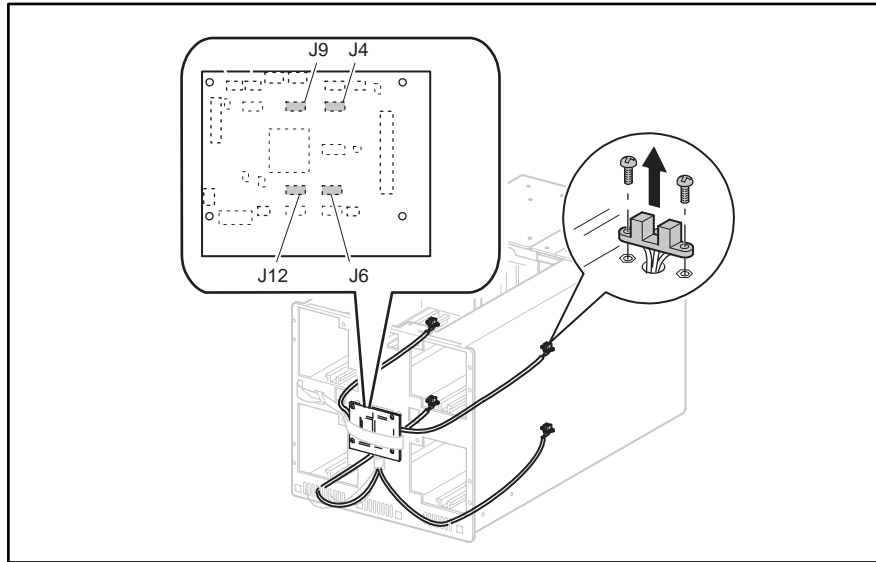


Figure 3–39: Removing a magazine opto sensor

7. Following the appropriate cable to the rear of the library, remove the cable clamps as required.
8. Remove the cable from the cable clamp below the control panel board, thread it through the front grill area and follow it to the rear of the library removing the cable from the cable clamps.
9. Remove the two screws that secure the magazine opto sensor to the track. Note that the two front mounting holes are used (see Figure 3–39).
10. Lift the magazine opto sensor from the magazine track while guiding the cable through the opening in the magazine track (see Figure 3–39).

To replace a lower magazine opto sensor:

1. Guide the connector end of the cable through the opening in the magazine track (see Figure 3–39).
2. Replace the two screws that secure the magazine opto sensor to the magazine track. Use the front mounting holes (see Figure 3–39).
3. Route the cable along the magazine tray bottom replacing the two small cable clamps. Continue routing through the front grill area using cable clamps to the control panel board.
4. Replace the cable at J4 for the lower left magazine sensor or J6 for the upper right magazine sensor.
5. Replace the front panel. See “Removing and Replacing the Front Panel.”
6. Replace the magazine for the sensor being replaced.
7. Replace the top front cover. See “Removing and Replacing the Library Covers.”
8. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Shuttle Assembly Track Sensor

The shuttle assembly track sensor is located in the library chassis bottom beneath the point where the rotating track section meets the stationary track section.

NOTE: The stationary track section must be removed prior to removing the shuttle track sensor.

To remove the shuttle assembly track sensor:

1. Using the GUI touch screen, open both magazine doors. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Verify the robot is on the stationary track section. If not, then release the shuttle brake and push it at the robot base to the center of the stationary track section.
5. Turn the rotating track section until the geared section poses no obstructions to the sensor.
6. Remove the two screws that mount the track sensor to the standoffs on the track base (see Figure 3-40).
7. Disconnect the track sensor cable at J3 on the monotrack interface board (see Figure 3-40).

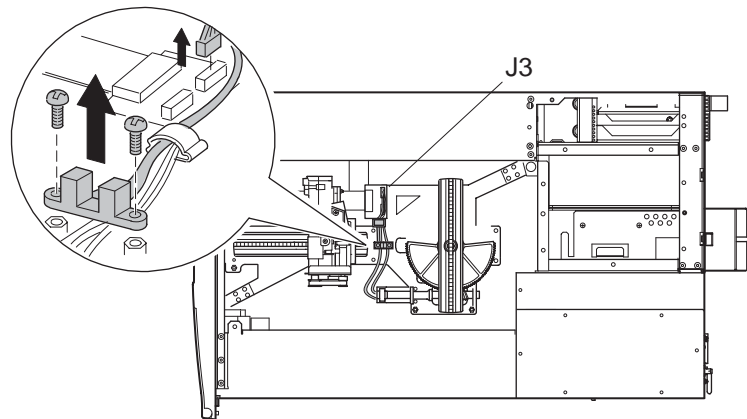


Figure 3–40: Removing the shuttle assembly track sensor

8. Remove the sensor from the library.

To replace the shuttle assembly track sensor:

1. Route the track sensor cable under the rotating track motor cable.
2. Connect the track sensor cable at J3 on the monotrack interface board (see Figure 3-40).
3. Align the track sensor over the mounting standoffs.
4. Replace the two screws that mount the sensor to the standoffs on the track base being careful that the motor wires are not trapped between the sensor and the mounting standoffs (see Figure 3-40).
5. Replace the top front and right rear covers. See “Removing and Replacing the Library Covers.”
6. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Pass-Through Opto Sensor

The pass-through opto sensor is mounted inside the chassis at the bottom of the pass-through opening.

To remove the pass-through opto sensor:

1. Using the GUI, park the shuttle assembly by turning the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.

NOTE: If the library is not operational, manually park the shuttle assembly following the instructions in “Parking the Shuttle Assembly (Library Not Operational).”

2. Remove the outside cover and the top front cover. See “Removing and Replacing the Library Covers.”
3. Remove the drive 0 shoe assembly. See “Removing and Replacing Drive Shoe Assemblies.”

4. Remove the screw from the card cage/back plane connector access plate and lift it out of the library (see Figure 3-41.)

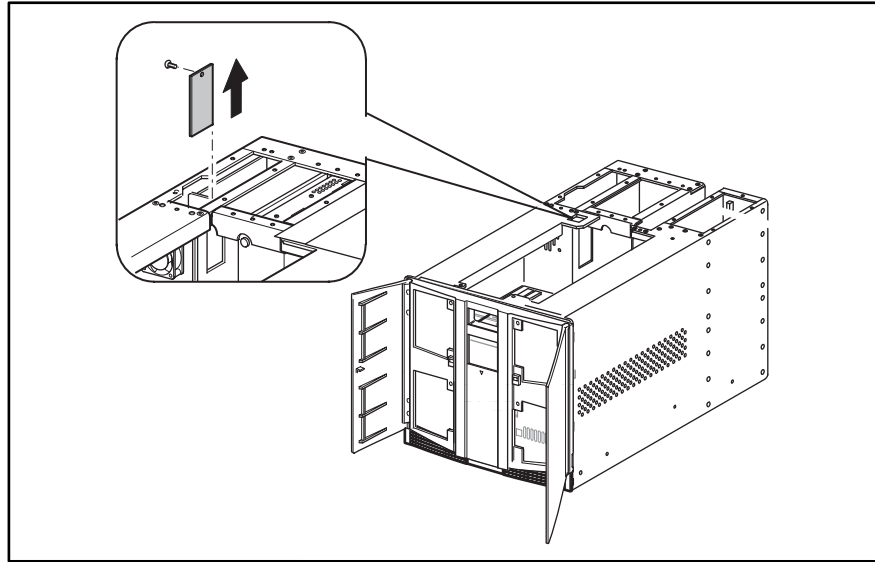


Figure 3-41: Backplane access cover

5. Remove the two snap rivets that mount the pass-through sensor to the chassis (see Figure 3–42).

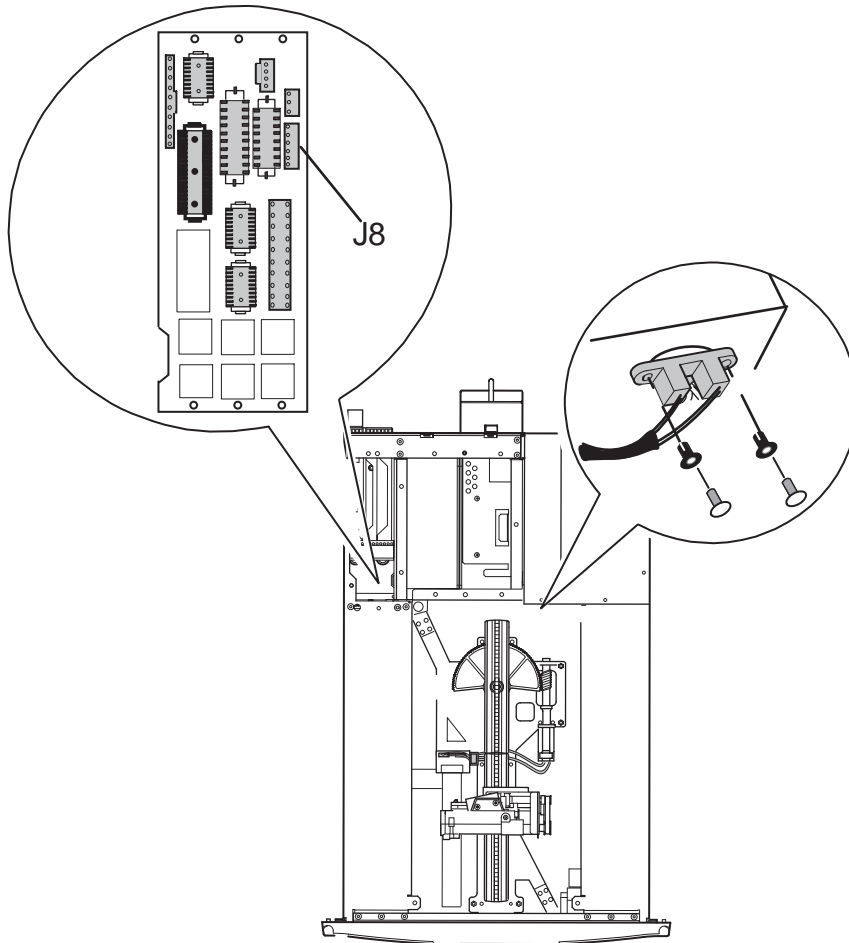


Figure 3–42: Pass-Through sensor removal

6. Remove the cable ties that secure the pass-through cable to the main wiring harness.
7. Disconnect the cable at J8 on the card cage/backplane board (see Figure 3–42).
8. Carefully work the cable through the opening under the card cage and into the main chassis area to remove the pass-through opto sensor.

To replace the pass-through opto sensor:

1. Position the pass-through opto sensor in the mounting hole with the cable routed along the main wiring harness to the left.
2. Replace the two snap rivets (see Figure 3–42).
3. Replace the cable ties in the locations they were removed from in step 6 of the removal instructions.
4. Carefully work the cable through the opening under the left magazine track and into the card cage/backplane area.

5. Feed the cable through and connect to J8 on the card cage/backplane board (see Figure 3–42).
6. Replace the card cage/backplane connector accessplate and replace the screw (see Figure 3–41).
7. Replace the drive shoe assembly. See “Removing and Replacing Drive Shoe Assemblies.”
8. Replace the outside cover and the top front cover. See “Removing and Replacing the Library Covers.
9. Connect the power cord. Turn on the library.

Removing and Replacing the Shuttle Assembly Robotics

The shuttle assembly robot is mounted on a track at the bottom of the library chassis. The robot track sensor must be removed from its mounting standoffs to remove the shuttle assembly. The barcode reader must also be removed and installed on the replacement robotic assembly.

IMPORTANT: Before completing removal and replacement of the shuttle assembly robotics you must perform the vertical axis alignment procedures in Appendix A, “Vertical Axis Alignment.”

To remove the shuttle assembly:

1. Using the GUI touch screen, open both magazine doors and remove the upper and lower magazines. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Press down on the release latch to remove the connections of the flex cable from J9 and J3 locations of the board on the robot shuttle (see Figure 3–43).

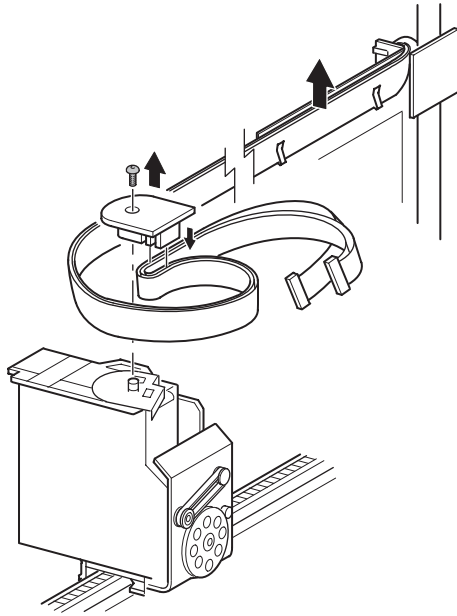


Figure 3–43: Removing the spool/flex cable from carrier and guide

5. Remove the spool attachment screw from the shuttle.
6. Remove the flex cable from the spool and reinstall spool to robot shuttle, being careful not to move the spool clocker (metal piece under the spool) out of position.
7. Remove the flex cable from the flex cable carrier and guide.
8. Store the flex cable in the left magazine bay with it hanging through the left magazine door.
9. Manually rotate the robot track by turning the motor/track coupler approximately 90 degrees to allow for removal of the robot shuttle.

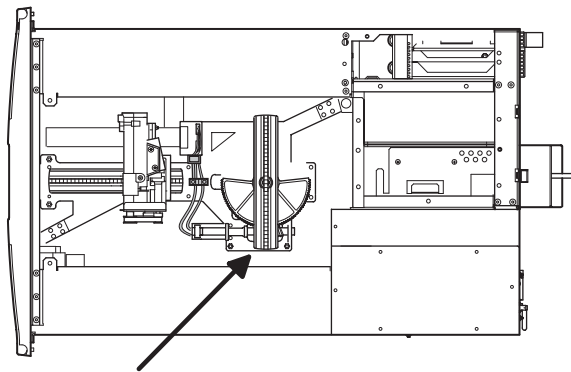


Figure 3–44: Rotating the track

10. Depress the shuttle brake lever on the bottom of the shuttle and remove the robot shuttle from the track.

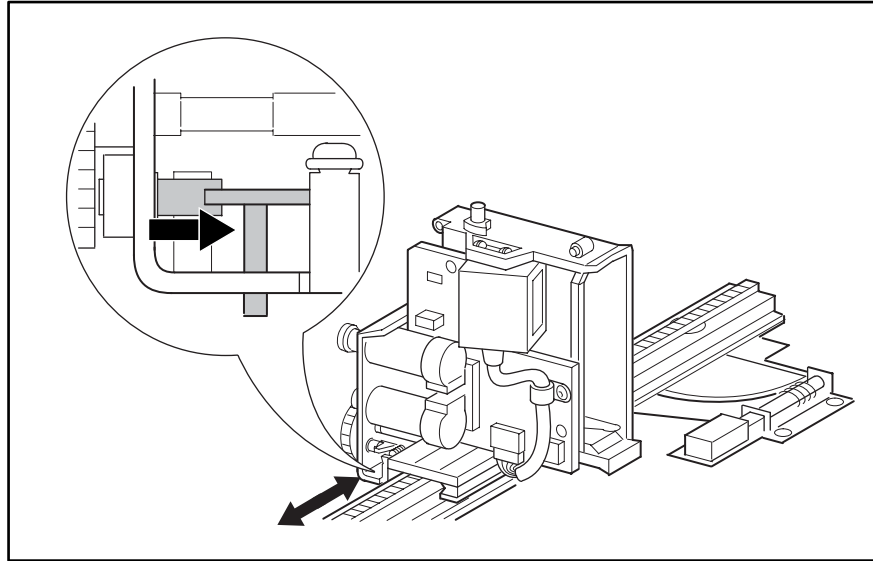


Figure 3-45: Shuttle Brake Release

11. Remove the rotating track motor power cable from the robotics board.
12. Remove the shuttle assembly track sensor. See “Removing and Replacing the Shuttle Assembly Track Sensor.”
13. Remove the four screws and washers that secure the rear vertical axis screw rail from the robotics base (see Figure 3-46).
14. Remove and retain the screw rail clamp.
15. Manually rotate the pulley at the top of the rear vertical axis screw rail clockwise, raise the shuttle base approximately ½ inch (13 mm), and then gently press the base plate down next to the screw rail nut to release it from the alignment pins.
16. Swing the vertical axis screw rail foot counter-clockwise to the rear of the library. The alignment pins on the robotics base should now be visible.
17. Remove the four screws that secure the front vertical axis screw rail from the robotics base (see Figure 3-46).
18. Manually rotate the flex coupling at the top of the front vertical axis screw rail at the Z-axis motor coupler clockwise and then raise the foot of the screw rail to relieve pressure on the robotics base.
19. Swing the front vertical axis screw rail foot clockwise to the front of the library. There are no alignment pins.
20. Carefully lift the robotics base from the chassis.
21. If present, remove the barcode reader from the robotics base. See “Removing and Replacing a Barcode Reader.”

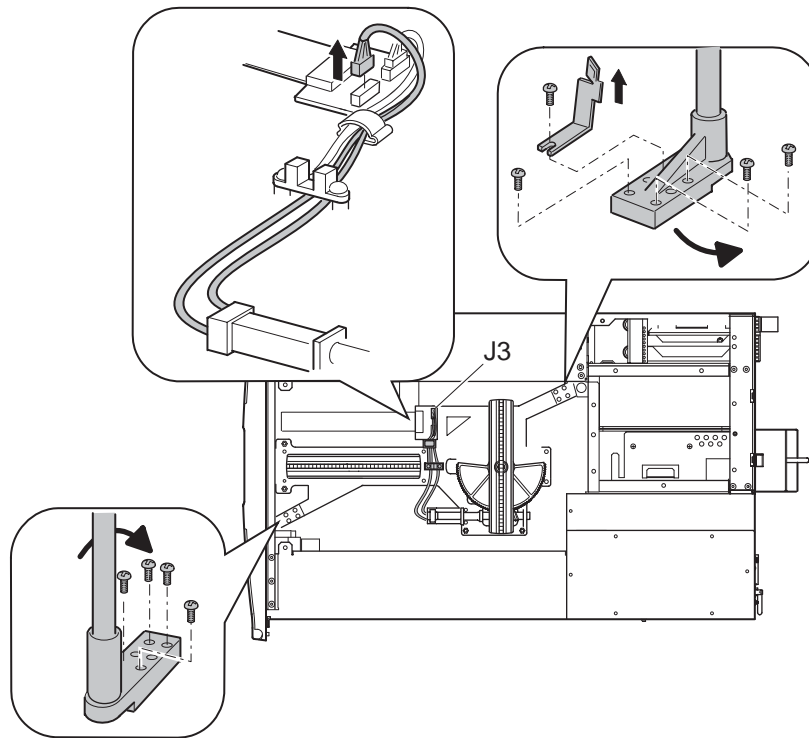


Figure 3-46: Removing the robotics base

To replace the shuttle assembly:

1. Carefully place the robotics base into the chassis (see Figure e3-46).
2. Swing the front vertical axis screw rail foot counter-clockwise and align the installation holes with the robot track base (see Figure 3-46).
3. Manually rotate the front vertical screw rail counter-clockwise at the Z-axis motor coupler until a slight pressure is felt on the robotics base.
4. Replace (finger tighten and loosen one turn) the four screws that secure the front vertical axis screw rail to the robotics base (see Figure3-46).

NOTE: These screws must remain loose until the Vertical Axis Alignment procedure in Appendix A is performed.
5. Swing the rear vertical axis screw rail foot clockwise and align it over the robot track base (see Figure 3-46).
6. Manually rotate the rear vertical screw rail clockwise to align the pins on the robotics base.
7. Replace (finger tighten and loosen one turn) the four screws that secure the rear vertical axis screw rail to the robotics base (see Figure3-46).
8. Replace the flex cable carrier clamp (see Figure 3-46).
9. Connect the rotating track motor power cable to the robotics board (see Figure 3-46).
10. Depress the shuttle brake lever on the bottom of the shuttle, place the shuttle on the edge of the track and slide it towards the front of the unit.

11. Manually rotate the robot track by turning the motor/track coupler approximately 90 degrees and align with the stationary track.
12. Replace the shuttle assembly track sensor. See “Removing and Replacing the Shuttle Assembly Track Sensor.”
13. Attach the flex cable to the flex cable clip guide and carrier.
NOTE: Make sure that the flex cable is not twisted.
14. Remove the spool from the shuttle assembly and then attach the flex cable. Ensure strain relief is in the proper position.
NOTE: When attaching the flex cable clip to the side of the flex cable guide, slide the top portion in first and then the bottom portion.
15. Connect the flex cable connections J3 and J9 on the shuttle assembly board.
16. Perform a friction test as described in Appendix A, “Vertical Axis Alignment.”
17. If necessary, replace the barcode reader following the instructions in “Removing and Replacing the Barcode Reader.”
18. Replace the top front cover. See “Removing and Replacing the Library Covers.”
19. Replace the upper-left and lower magazines and close the doors.
20. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Barcode Reader

The barcode reader is mounted on the shuttle assembly. No other FRUs need to be removed to remove the barcode reader.

To remove the barcode reader:

1. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
2. Remove the top front cover. See “Removing and Replacing the Library Covers.”
3. Remove the cable clamp at the lower front of the barcode reader. The cable clamp secures the barcode reader cable to the shuttle assembly board.
4. Remove the cable at J5 on the shuttle assembly board (see Figure 3–47).

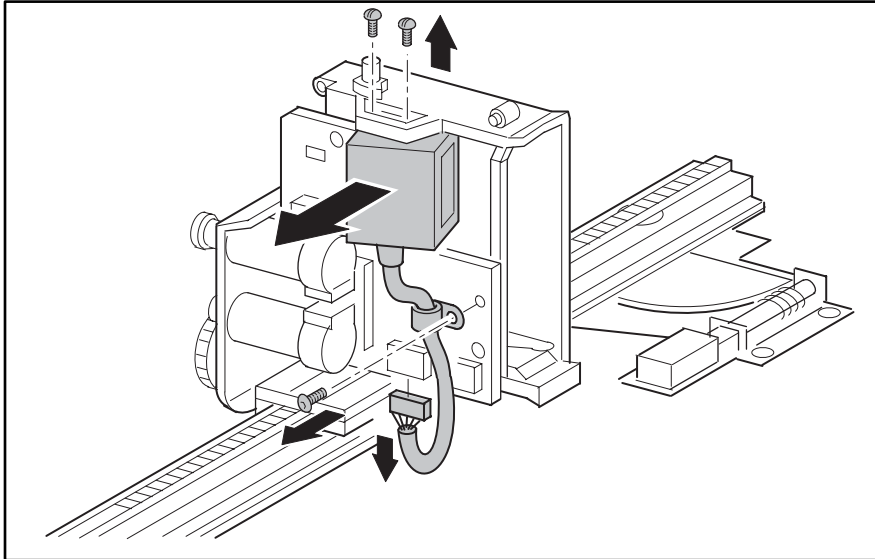


Figure 3–47: Removing the barcode reader

5. Remove the two screws at the top that secures the barcode reader to the shuttle assembly (see Figure 3–47).
6. Remove the barcode reader from the shuttle assembly.

To replace the barcode reader:

1. Position the barcode reader in the opening on the board side of the shuttle assembly, with the lens pointing through the cartridge opening, with the cable at the bottom. The barcode reader is mounted at a 10-degree angle to the shuttle assembly body.
2. Replace the two screws at the top that secure the barcode reader to the shuttle assembly (see Figure 3–47).
3. Replace the cable at J5 on the shuttle assembly board (see Figure 3–47).
4. Replace the cable and cable clamp at the lower front of the barcode with the flat side down.
5. Replace the top front cover. See “Removing and Replacing the Library Covers.”
6. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Front Vertical Axis Assembly

IMPORTANT: Before completing the front vertical axis assembly removal and replacement procedures you must align it using the procedures in Appendix A, “Vertical Axis Alignment.”

To remove the front vertical axis assembly (screw rail):

1. Using the GUI touch screen, open both magazine doors and remove the upper and lower magazines. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Manually rotate the robot track by turning the motor/track coupler approximately 90 degrees to allow for removal of the robot shuttle.

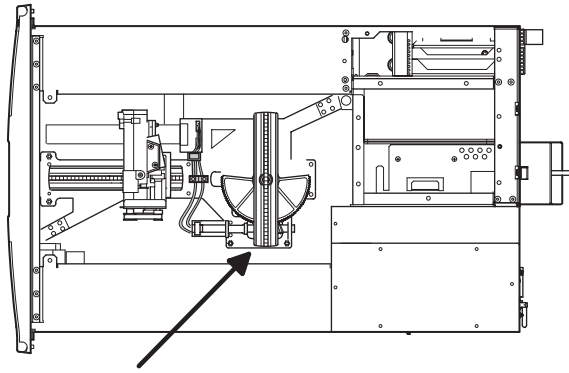


Figure 3–48: Rotating the track

5. Depress the shuttle brake lever on the bottom of the shuttle and slide the robot shuttle on the track towards the rear of the unit (see Figure 3–49). This step allows for easier vertical axis removal.

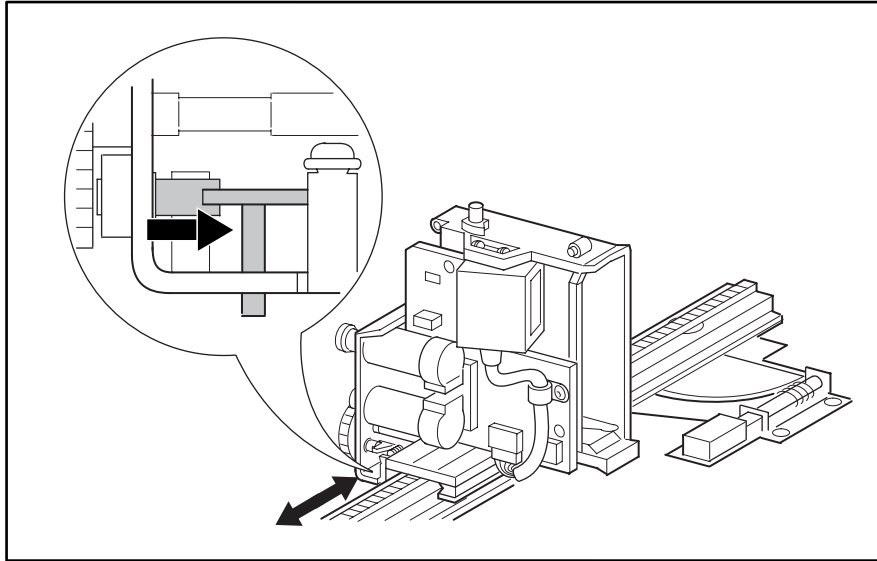


Figure 3–49: Shuttle brake release

6. Remove the two front screws located immediately below the vertical axis drive motor.

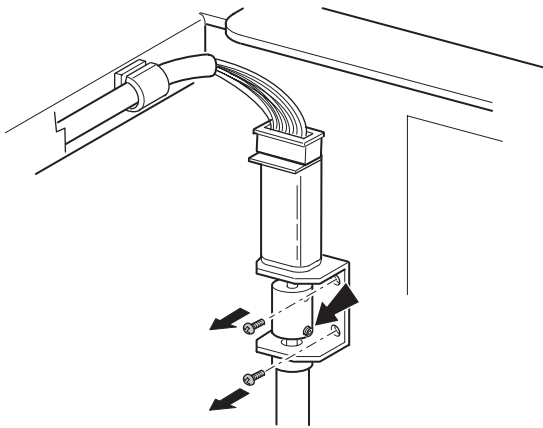


Figure 3–50: Front vertical axis assembly screws

7. Tilt the assembly inward and remove the 7-pin connector from the front vertical axis drive motor (see Figure e3-51).

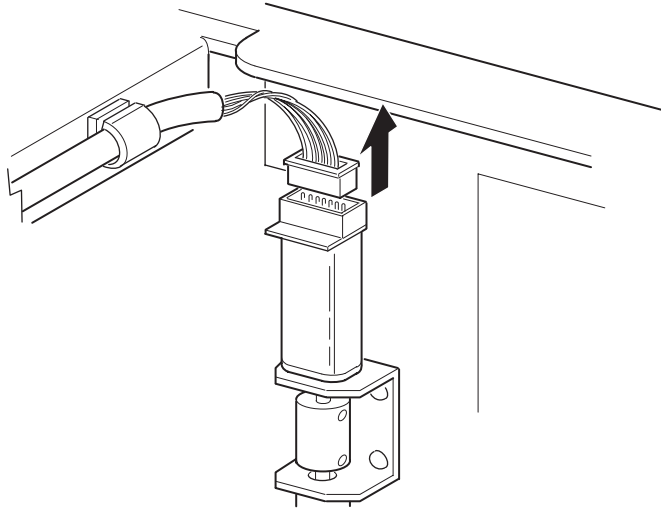


Figure 3-51: Front vertical axis motor cable

8. Remove the four screws that secure the front vertical axis assembly to the robotics base.

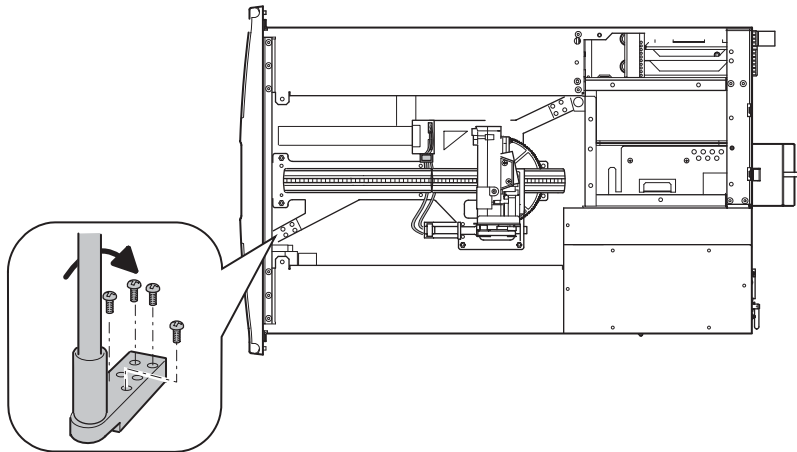


Figure 3-52: Front vertical axis screws

9. Manually rotate the front screw rail clockwise at the front flex shaft coupling and then raise the foot of the screw rail to relieve pressure on the robotics base.
10. Swing the front screw rail foot clockwise to the front of the library.
11. Lift axis assembly upwards to remove from chassis.

To replace the front vertical axis assembly:

1. Replace the assembled front vertical axis assembly into the bottom screw rail bracket.
2. Install the two front rail screw bracket screws and then tighten the lower flex coupler set screw.

3. Loosen the lower set screw on the flex coupling and push the screw rail down to seat it snugly and tighten the set screw.
4. Swing the front vertical axis screw rail foot counter-clockwise and then align the installation holes with the robot track base.
5. Replace the 7-pin connector on the front vertical axis drive motor.
6. Manually rotate the flex coupler front vertical screw rail counter-clockwise at the Z-axis motor coupler until slight pressure is felt on the robotics base.
7. Replace (finger tighten and loosen one turn) the four screws that secure the front vertical axis rail to the robotics base.
NOTE: This assembly remains loose until aligned using the vertical axis alignment procedure in Appendix A.
8. Depress the shuttle brake lever on the bottom of the shuttle and slide it toward the front of the unit on the track.
9. Power up the library and perform the friction test as described in Appendix A, “Vertical Axis Alignment.”
10. Replace the top front cover. See “Removing and Replacing the Library Covers.”
11. Replace the upper-left and lower-left magazines and then close the door.

Removing and Replacing the Rear Vertical Axis Assembly

IMPORTANT: After removing and replacing the rear vertical axis assembly you must align it using the procedures in Appendix A, “Vertical Axis Alignment.”

To remove the rear vertical axis assembly (screw rail):

1. Using the GUI touch screen, open the left magazine door and remove the upper and lower magazines. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
3. Remove the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”
4. Remove the flex cable from the flex cable carrier and guide, and retain the lower clip for reinstallation (see Figure 3-53).

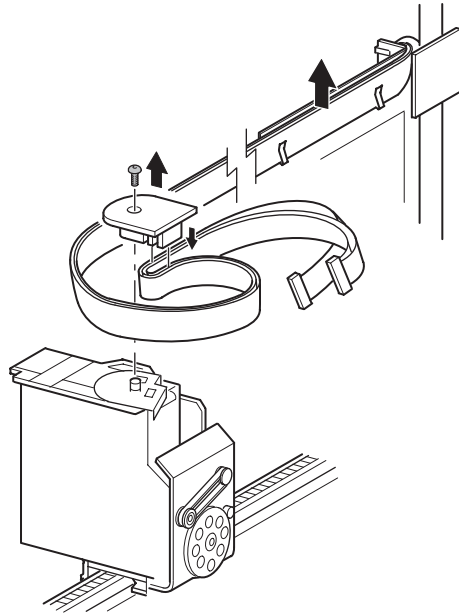


Figure 3–53: Removing the flex cable

5. Store the flex cable in the left magazine bay with it hanging through the left magazine door.
6. Remove the two upper mounting screws.
7. Tilt the unit inward and cut the cable tie from the drive motor.
8. Remove the 7-pin connector from the rear vertical axis drive motor (see Figure 3-54).

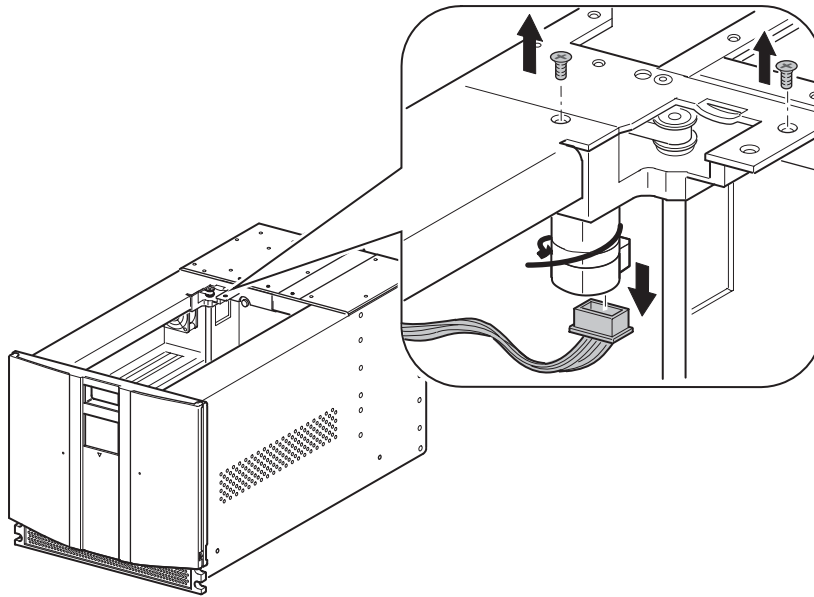


Figure 3-54: Motor cable

9. Remove the four screws that secure the rear vertical axis screw rail to the robotics base.
10. Remove and retain the rear screw rail bracket.

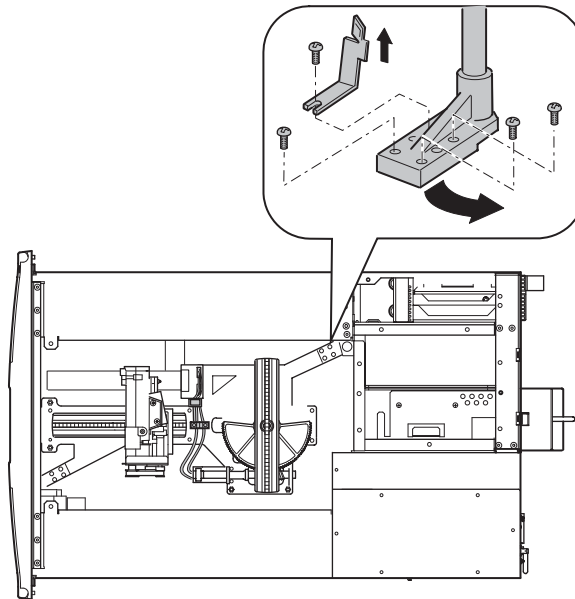


Figure 3-55: Rear vertical axis screws removed

11. Manually rotate the rear vertical axis screw rail clockwise at the Z-axis motor belt assembly and then raise the foot of the screw rail approximately ½ inch (13 mm) to clear the alignment pins on the robotics base.
12. Swing the vertical axis screw rail foot counter-clockwise to the rear of the library. The alignment pins on the robotics base should now be visible (see Figure3-54).

13. Remove the two rear vertical axis assembly top mounting screws (see Figure 3-56).

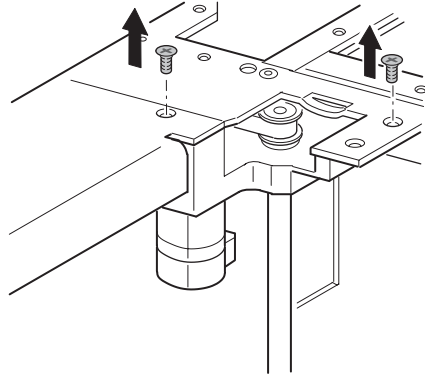


Figure 3-56: Rear vertical axis assembly mounting screw locations

14. Remove the rear vertical axis assembly from the chassis.

To replace the rear vertical axis motor:

1. Insert the bottom portion of the rear vertical axis assembly into the rail screw bracket.
2. Replace the 7-pin connector to the rear vertical axis drive motor.
3. Align the vertical axis assembly with the two mounting holes.
4. Insert the two screws into the mounting holes and tighten.
5. Swing the rear vertical axis screw rail foot clockwise and then align it over the robot track base and alignment pins (see Figure 3-55).
6. Manually rotate the rear screw rail clockwise to align the pins on the robotics base. Rotate until a slight pressure is felt on the robotics base.
7. Replace the screw rail bracket (see Figure 3-55).
8. Replace (finger tighten and loosen one turn) the four screws that secure the rear vertical axis screw rail to the robotics base (see Figure 3-55).

NOTE: This assembly remains loose until aligned using the vertical axis alignment procedure in Appendix A.
9. Attach the flex cable to the flex cable guide and carrier with the flex cable bracket (see Figure 3-54).

NOTE: Make sure that the flex cable is not twisted.
10. Replace the upper-left and lower-left magazines and then close the door.
11. Power up the library and perform the friction test as described in Appendix A, “Vertical Axis Alignment.”
12. Replace the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”

Removing and Replacing the Vertical Controller Board

To remove the vertical controller board:

1. Using the GUI touch screen, open the right magazine door and remove the upper right magazine. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
3. Remove the top front cover. See “Removing and Replacing the Library Covers.”
4. Remove the cables from the vertical controller board at locations J1, J2, and J3.
5. Remove the four mounting screws that secure the board to the library chassis.
6. Remove the vertical controller board from the library.

To replace the vertical controller board:

1. Place the vertical controller board in the library and replace the four mounting screws.
2. Replace the cables at locations J1, J2, and J3.
3. Replace the top front cover. See “Removing and Replacing the Library Covers.”
4. Replace the upper right magazine and then close the door.
5. Connect the power cord. Turn the library on and restart the application software.

Removing and Replacing the Rotating Track Flex Cable

The rotating track flex cable enables operation of the MSL5052 rotating track and opto sensor. There are several components that must be removed to install a replacement flex cable:

- Right rear cover
- Top front cover
- Lower left magazine
- Lower cooling fan
- Library front panel
- Magazine track
- Various cable connections and cable holders

To remove the rotating track flex cable:

1. Using the GUI touch screen, open the left magazine door and remove the upper and lower magazines. If the library is not operational see “Manually Opening the Magazine Doors.”
2. Using the GUI, turn the library off. Turn off the master power switch on the power supply at the rear of the library and then remove the AC power cord.
3. Remove the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”

4. Remove the upper card cage access panel.

NOTE: This allows removal of the old flex cable and installation of the replacement.

5. Remove the lower card cage cooling fan from its mounting.

NOTE: Removal of the lower card cage cooling fan enables access to the rear mounting screws of the lower left magazine track.

- a. Remove the two screws (outside of the unit to the right of the access panel) that secure the shuttle flex cable bracket. Slide the bracket down the flex cable to allow removal of the fan.

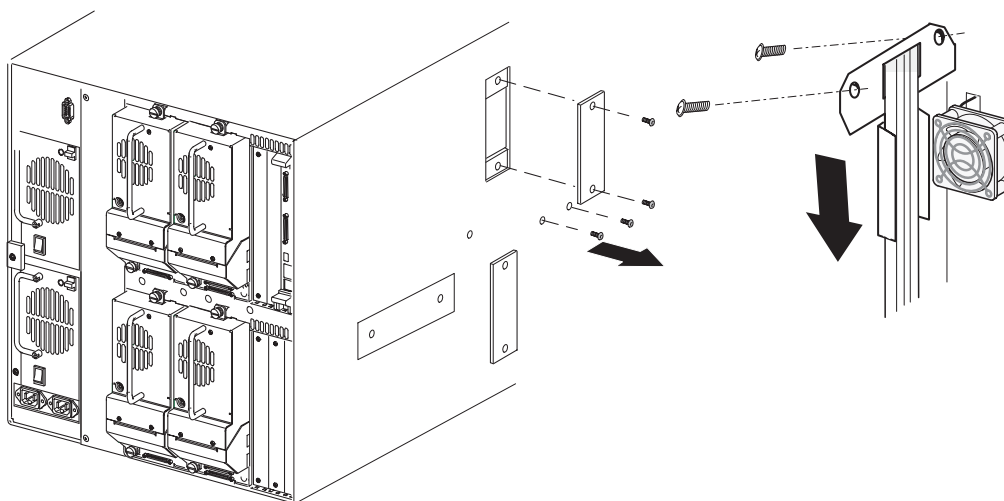
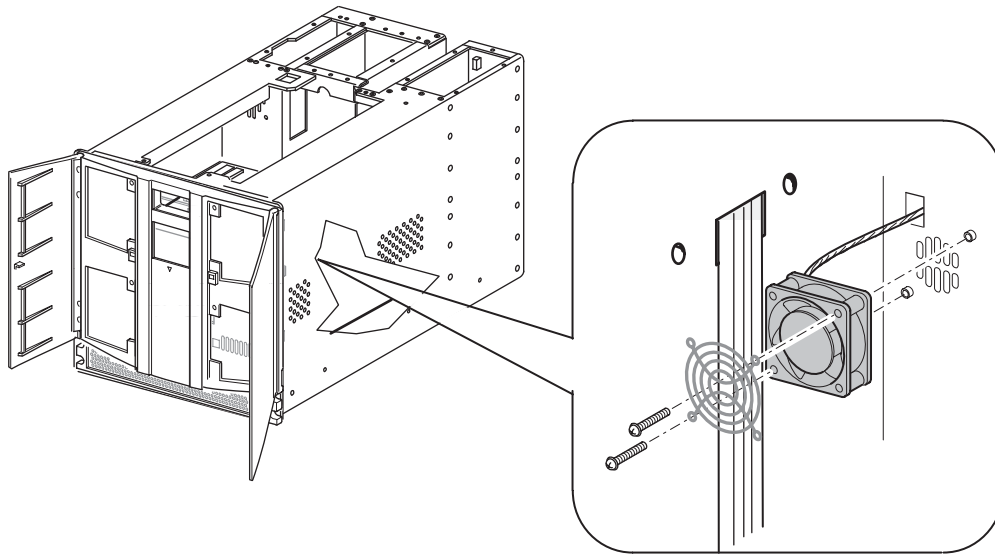


Figure 3–57: Access Panel/Flex Cable Bracket

- b. Remove the two screws that secure the finger guard and fan to the standoffs.
- c. Remove the card cage fan from the mounting standoffs.



- 6. Remove the library front panel. See “Removing and Replacing the Front Panel.”
- 7. Remove the lower left magazine track by removing the four screws (two front and two rear) that secure the lower left magazine track to the chassis and remove it from the library.

NOTE: Removing the magazine track allows access to the flex cable and the inner wall of the library.

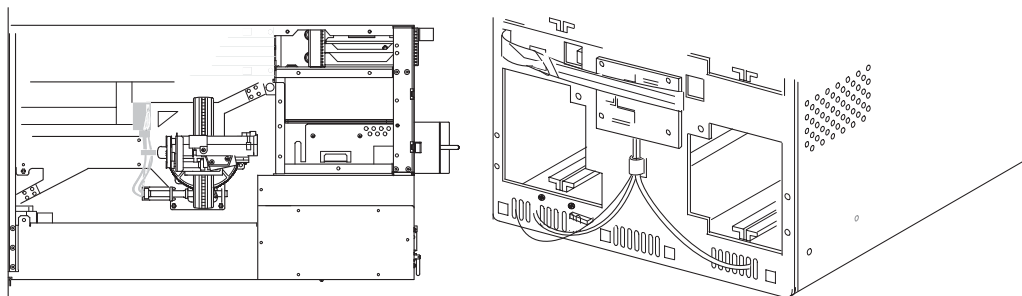


Figure 3–58: Track mounting screws

- 8. Remove the teflon cable clamps that secure the rotating track flex cable to the library floor.
- 9. Disconnect the flex cable from J1 at the shuttle base.

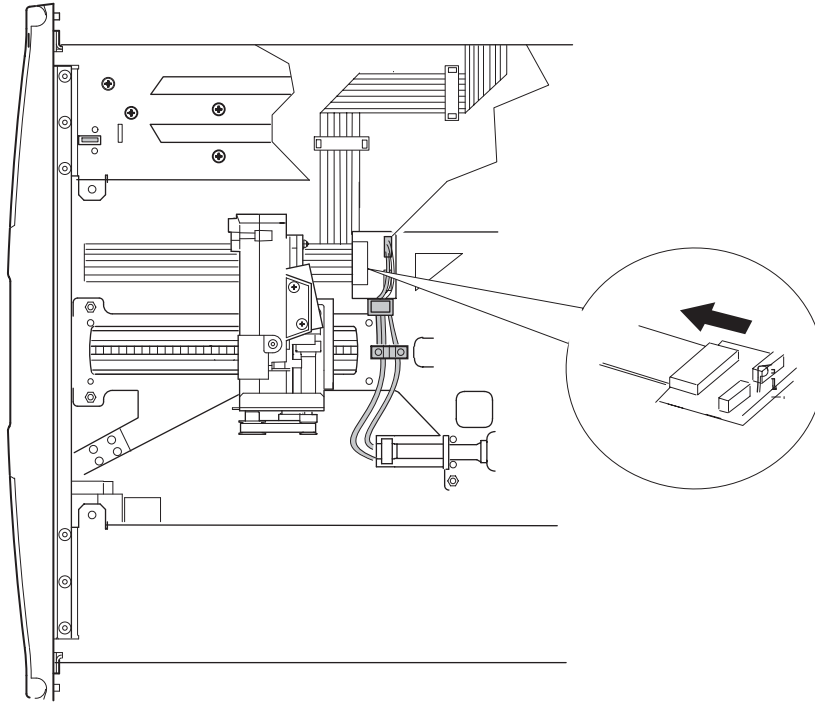


Figure 3-59: Disconnecting flex cable at J1

10. Remove the 2-inch Kapton tape covering the flex cable.
11. Disconnect the flex cable from the J12 connector on the upper card cage backplane board.

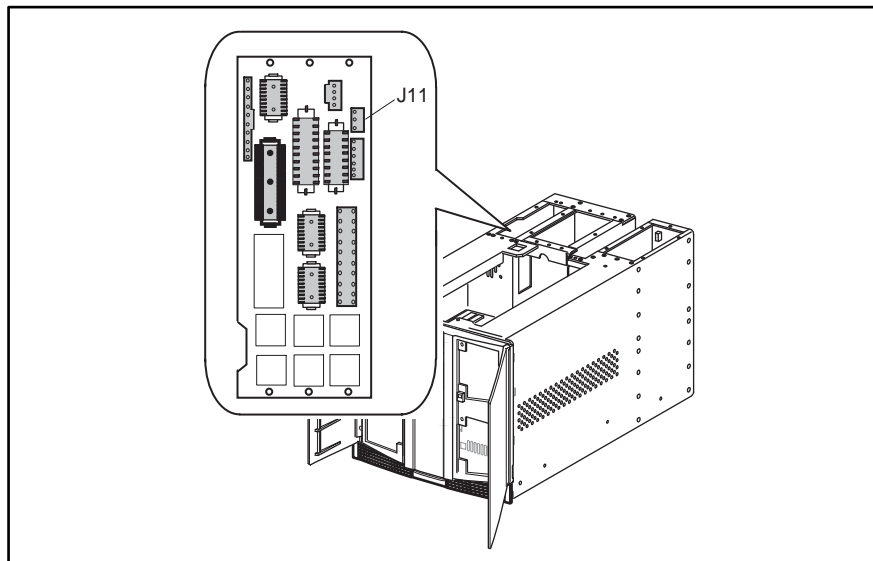


Figure 3-60: Disconnecting flex cable at J12 (need to modify J location)

12. Thread the flex cable carefully down the backplane board (so as not to damage other connections) through the opening near the midpoint of the library chassis where the lower cooling fan is mounted and remove it from the library.

To replace the rotating track flex cable:

1. Remove the tape used for shipping purposes from the folded areas of the replacement flex cable.
2. Thread the replacement cable through the opening near the midpoint of the library chassis where the lower card cage cooling fan is mounted.
3. Carefully work the flex cable up the backplane (using the side access panel) and connect it at the J12 connector on the upper card cage backplane board.
4. Clean both the chassis wall and the area of the flex cable with isopropyl alcohol where the double-sided tape will be affixed to the flex cable and attached to the side of the library chassis.
5. Attach the double stick tape to the back side of the flex cable.
6. Align the angled portion of the flex cable to the fourth row of holes (as shown in Figure 3-59) and apply to the chassis wall.
7. Replace the 2-inch Kapton tape with the piece supplied (spare included) in the flex cable kit. Be sure to smooth the tape to ensure against air bubbles and lifted edges.
NOTE: The Kapton tape is designed to hold the flex cable against the library chassis and prevent snagging of the flex cable when the lower left magazine is inserted.
8. Connect the flex cable at the J1 connector on the shuttle base.
9. Replace the two teflon cable holders that secure the flex cable to the library floor.
10. Replace the four screws (two front and two rear) that secure the lower left magazine track to the chassis.
11. Replace the front panel. See “Removing and Replacing the Front Panel.”
12. Replace the lower card cage cooling fan:
 - a. Slide the fan over the two mounting standoffs while guiding the excess cable through the cable access hole in the card cage backplane area.
 - b. Install the two screws that secure the fan to the standoffs.
 - c. Slide the bracket up the shuttle flex cable and align to the mounting holes. Replace the two screws that secure the flex cable bracket. Ensure the flex cable is within in the bracket.
13. Slide the lower left magazine onto the magazine track, ensuring that the magazine does not snag the Kapton tape.
14. Replace the top front cover and the right rear cover. See “Removing and Replacing the Library Covers.”
15. Connect the power cord. Turn the library on and restart the application software.

Diagnostic Tools

This chapter describes software and firmware diagnostic tools available for a Compaq *StorageWorks* MSL5000 Series Library. The sections in this chapter include:

- Power-On Self-Test (POST)
- Diagnostics software
- *Compaq Insight Manager*

POST

The POST is a series of diagnostic tests that run automatically when the library is turned on. POST checks the following assemblies to ensure that the library is functioning properly:

- System ROM
- Library controller board
- Tape drives
- Power supplies
- Shuttle assembly

POST Error Messages

If POST detects an error in the library, an error condition is indicated by a message on the Graphical User Interface (GUI) touch screen. If an error code appears on the GUI touch screen during POST or after restarting the library, follow the instructions in Table 4-1.

The recommended action column in Table 4-1 lists the steps necessary to correct each respective problem. After completing each step, run the Diagnostics software to verify whether the error condition has been corrected. If the error message reappears, perform the next step and then run the Diagnostics program again. Follow this procedure until the Diagnostics software no longer detects an error condition.

NOTE: Each library is supplied with an RS232 diagnostic cable and *MSL5000Util* diagnostic utility (on floppy). Usage is described in the *Compaq StorageWorks MSL5000 Series Library Maintenance and Service Guide*.

Platform Problems

An incorrect installation or configuration can cause platform problems. In this case, the library appears to be operating normally, but no data can be interchanged. You also might or might not get an error code on the Graphical User Interface (GUI) touch screen. To identify an error caused by this type of problem, check your installation and configuration setup. See Chapter 2, “Installation,” for information on how to correctly install and configure the library.

General drive errors usually result from a miscommunication between a library processor and a tape drive processor or a mechanical malfunction within the library. Both platform problems and general tape drive errors display an error message and a Fault Symptom Code (FSC) on the GUI touch screen. Use an FSC to report errors to your service provider, or in some cases, to determine a recovery procedure.

Errors that appear to be library and/or drive related may have another root cause. These can include operator error, improper HBA driver, incompatible application software, poor SCSI cabling, unsupported modes, and so on.

Error Recovery

[Figure 4–1](#) outlines the recommended steps for error recovery. You should follow this chart in all cases.

Error Recovery Procedures (ERPs) are listed in detail in [Table e4–1](#); FSCs are listed in [Table 4–2](#) along with their related ERPs.

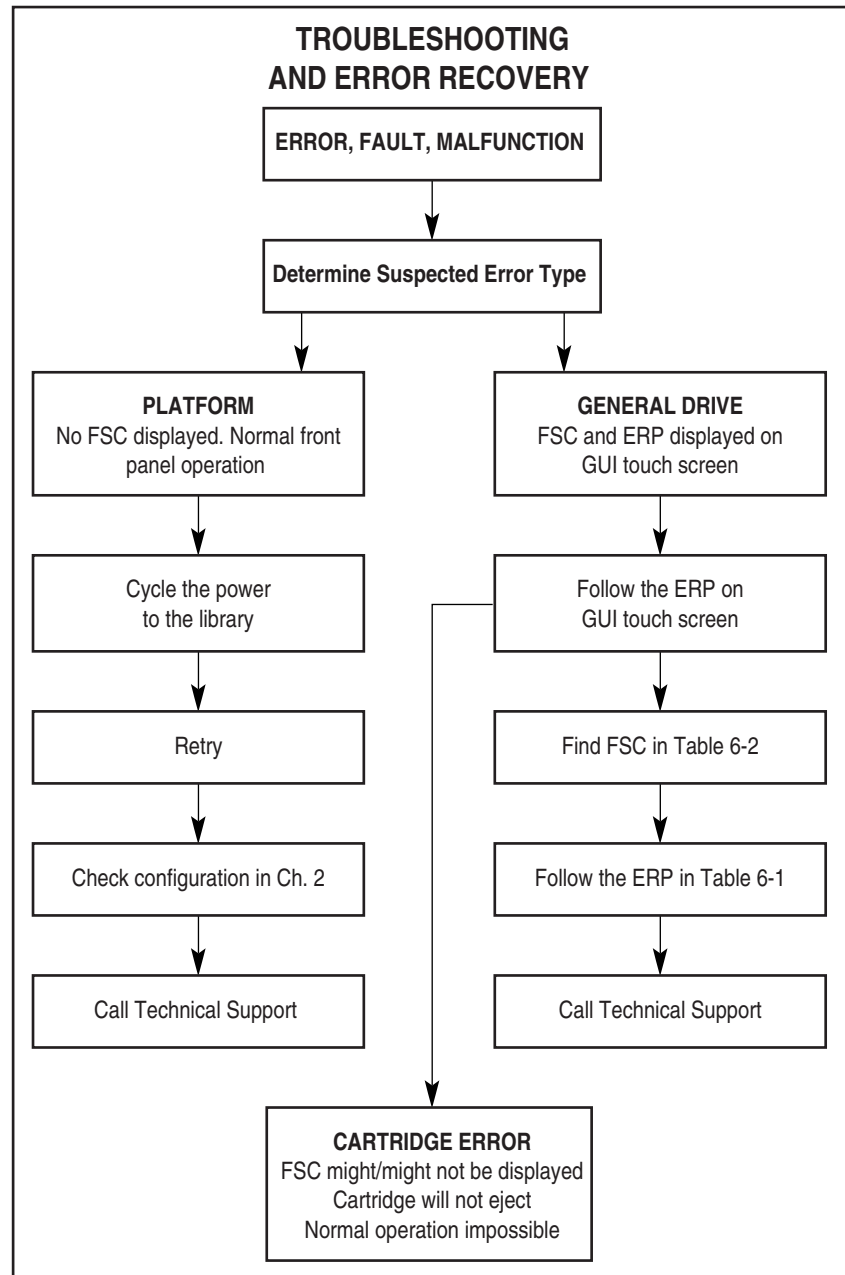


Figure 4-1: Troubleshooting flow chart

Error Recovery Procedures

Table 4–1 lists ERPs for errors reported on the GUI touch screen of the library.

Table 4–1: Error Recovery Procedures

ERP Code	Procedure/Description
C	Cycle power to the library using the Power option on the GUI touch screen. Wait 30 seconds to power up again.
D	Turn off power to the library and inspect connectors and cables.
F	Invalid operation. Select parameters correctly and try again.
G	Call Technical Support.

Fault Symptom Codes (FSCs)

FSCs that appear on the GUI touch screen are described in Chapter 4 of the *Compaq StorageWorks MSL5000 Series Library Reference Guide*. A descriptive message and instructions for clearing the fault accompany each FSC.

Table 4–2: Fault Symptom Codes

Message	FSC	ERP
OS Catastrophic Error	0901	G
OS Task Exit Error	0902	G
SCSI Firmware Error	1001	D,G
SCSI FIFO Empty	1002	D,G
SCSI FIFO Error	1003	D,G
SCSI Gross Error	1004	C,D,G
Illegal SCSI Cnt Cmd	1005	C,D,G
SCSI Message Error	1006	D,G
SCSI Invalid Element	1007	D,G
SCSI No Pending Int.	1008	D,G
SCSI Invalid Int.	1009	D,G
Illegal Move	2008	C,G
Door Open (status only)	2009	F
Menu Mode (status only)	200A	F
Cart Unaccessible	200C	F
Drive In Error	200D	C,G
No Magazine	200E	F
Removal Prevented	200F	F
Ctl. Firmware Error	2010	C,G
Drive Code Update Command Error	2080	C,G
Move Command Failure	2081	C,G
Open Mail Slot Fault	2090	C,G
Open Left Door Fault	2091	C,G
Open Right Door Fault	2092	C,G
Open Doors Fault	2093	C,G
Open DLT Handle Fault	2094	C,G
No IP Address Found	20a0	C,G
No IP Address Mode Fault	20a1	C,G
No Gateway Address Found	20a2	C,G
Unknown Exchange For The Async message	20b0	C,G
Drive In Error	20c0	C,G
Drive In Error	20c1	C,G
Motor Fault Condition	3000	C,G
Shuttle Tach Errors	3001	C,G
Picker Tach Errors	3002	C,G

Table 4–2: Fault Symptom Codes (Continued)

Message	FSC	ERP
Rotary Tach Errors	3003	C,G
Vertical Tach Errors	3004	C,G
Passthru Tach Errors	3005	C,G
Excessive Picker Friction Error	3006	C,G
Bin Fetch Failure	3011	C,G
Bin Stow Failure	3012	C,G
Drive Fetch Failure	3013	C,G
Drive Stow Failure	3014	C,G
Drive Timeout Failure	3015	C,D,G
Drive Status Failure	3016	C,D,G
Drive In Flux Timeout	3017	C,D,G
Drive Load Retry Failed	3018	C,G
Drive Open Door Failed	3019	C,G
Drive Close Door Failed	301A	C,G
Drive Communication Error	301B	C,D,G
Drive Get General Status Fail	301C	C,D,G
Drive Get Status 3 Fail	301D	C,D,G
Undefined Config	3020	C,G
Orphan Cartridge not flowed	3030	C,G
Chassis S/N Mismatch. Previous S/N retained	3031	G
Chassis S/N Character count is not correct	3032	G
Chassis S/N did not scan	3033	G
Chassis S/N save operation failed	3034	G
Motor Firmware Error	3040	C,G
Loader Received Invalid Command	3041	C,G
Motor Firmware Error	3042	C,G
Missing Magazine	3050	F
No Cartridges In Library	3051	F
Too Many Cartridges	3052	F
Need 3 Cartridges Minimum	3053	F
Need 1 Drive Minimum	3054	F
Need 5 Cartridge Minimum	3056	F
Invalid Magazine Type	3057	F
Magazine Type Change Not Handled	3058	F
Zone Sequence Error	3060	C,G
Drive Eject Fail	3070	C,G
Drive Eject Fail	3071	C,G
Drive Eject Fail	3072	C,D,G
Drive Eject Fail	3073	C,D,G
Soft Fetch Retry	3080	C,D,G

Table 4–2: Fault Symptom Codes (Continued)

Message	FSC	ERP
Soft Fetch Retry	3081	C,D,G
Drive Stow Failed, Media Returned to Source	3082	F
Drive Stow Failed, Media Remains in Drive	3083	F
UnSupported Drive For Requested Operation	3084	F
No Retry On Fetch/Stow	308F	F
Picker Jammed	3100	C,G
Picker Jammed 2	3102	C,G
Picker Jammed 3	3103	C,G
Picker Jammed 4	3104	C,G
Picker Jammed 5	3105	C,G
Picker Jammed 6	3106	C,G
Picker Jammed 7	3107	C,G
Picker Jammed 8	3108	C,G
Picker Jammed 9	3109	C,G
Picker Jammed 10	310A	C,G
Picker Jammed 11	310B	C,G
Picker Jammed on Stow	310F	C,G
Picker Retries Exceeded	3110	C,G
Picker Retries Exceeded 1	3111	C,G
Picker Retries Exceeded 2	3112	C,G
Picker Retries Exceeded 3	3113	C,G
Picker Retraction Error	3115	C,G
Shuttle Jammed	3200	C,G
Shuttle Jammed	3201	C,G
Shuttle Jammed	3202	C,G
Shuttle Jammed	3203	C,G
Shuttle Jammed	3204	C,G
Shuttle Jammed	3205	C,G
Rotary Jammed	3300	C,G
Shuttle on Wrong Side Of The Rotary	3301	C,G
Rotary Cannot find Zones	3302	C,G
Passthrough Elevator Jammed	3400	C,G
Vertical Elevator Jammed	3500	C,G
No DLTs Attached	5010	F
All Slots Empty	5011	F
DLT Already Loaded	5014	F
Expired Clean'g Cart	5015	F
Not a Clean'g Cart	5016	F
DLT Timeout Error	5035	C,D,G

Table 4–2: Fault Symptom Codes (Continued)

Message	FSC	ERP
Move Command Fail	503B	F
Clean Operation Timeout	503C	F
Drive Status Fail	503D	F
Command response from unexpected source	7001	D,G
Control command execution failed	7002	D,G
Control response not matched to a known command	7003	D,G
Loader response not matched to a known command	7004	D,G
Drive response not matched to a known command	7005	D,G
Flash response not matched to a known command	7006	D,G
Drive index on Update Status message was invalid	7007	C,D,G
The Drive response was not expected	7008	C,D,G
The opcode for a WORD message was unknown	7009	C,D,G
The opcode for a DWORD message was unknown	700A	C,D,G
The button causing library to go offline was unknown	700B	C,D,G
Destination Xchg was Null	700C	C,G
Sending of a cmd failed	700D	C,G
Deactivating a drive that is not attached	700E	C,G
Deactivation of a drive failed	700F	C,G
Drive removal failed	7010	C,G
HotPlug statue update failed	7011	C,G
Drive is Active failed	7012	C,G
Control Com Unidentified	7013	C,G
Drive status update failed	7014	C,G
Loader command execution failed	7015	C,G
Sequential command execution failed	7016	C,G
Destination Xchg for msg. was Null	7017	C,G
Bad src mod in peg msg	7018	C,G
Peg message wrapping a Null msg. ptr.	7019	C,G
Xchg conversion failed	701A	C,G
Invalid L-drive number to convert	701B	C,G
Invalid P-drive number to convert	701C	C,G
Invalid mod number to convert	701D	C,G
Cartridge reject recovery failed	8001	C,D,G

Table 4–2: Fault Symptom Codes (Continued)

Message	FSC	ERP
Drive Fan stalled	8002	C,D,G
Drive load did not complete	8003	C,D,G
Invalid drive was installed	8004	F
Orphan cartridge recovery failed	9001	C,D,G
Move operation failed	9002	C,D,G
SMX send error	A001	C,G
SMX receive error	A002	C,G
Comm free list empty	A003	C,G
Invalid comm. put attempt	A004	C,G
Invalid comm. get attempt	A005	C,G
Comm initialization error	A006	C,G
Put of a NULL comm.	A007	C,G
Msg contains no comm.	A008	C,G
Comm return address is unknown	A009	C,G

If an error message appears that is not included in Table 4–2, write down the fault code number and follow the recovery procedure.

Diagnostics Software

Tape Storage Management Console (TSMC) is a software-based management tool that is designed to aid in the installation and maintenance of Compaq tape drives, tape arrays, and tape automation products. TSMC includes multiple diagnostics, advanced tests, and system management functions designed to be used by both Compaq storage customers and trained service personnel.

For additional information, refer to the online Tape Storage Management Console (TSMC) User Guide on the Library Reference CD that came with the Compaq StorageWorks MSL5000 Series Library.

Compaq Insight Manager

Compaq Insight Manager is the Compaq application for easily managing network devices. Compaq Insight Manager delivers intelligent monitoring and alerting as well as visible control of servers and tape libraries.

For additional information, refer to the online Compaq Insight Manager User Guide on the Library Reference CD that came with the Compaq *StorageWorks* MSL5000 Series Library.

Connectors, Switches, and LED Indicators

Connectors

MSL5026

Library Controller Board

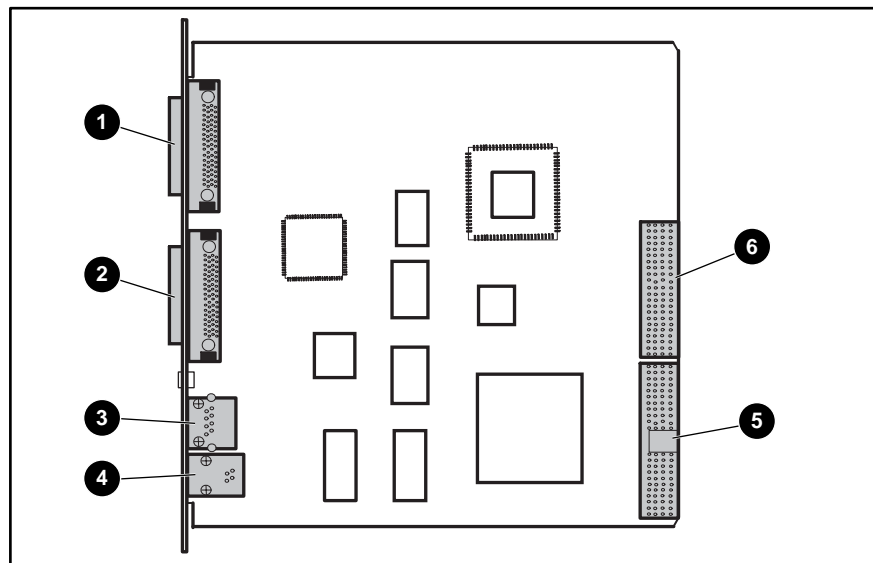


Figure 5–1: Library controller board

Table 5–1: Library Controller Board Connectors

Figure Legend	Description
①	J1 - VHDCI Library SCSI
②	J3 - VHDCI Library SCSI
③	J5 - 10BaseT Ethernet
④	J6 - RS232 Trace
⑤	J8 - Card Cage/Backplane
⑥	J4 - Card Cage/Backplane

Control Panel Board

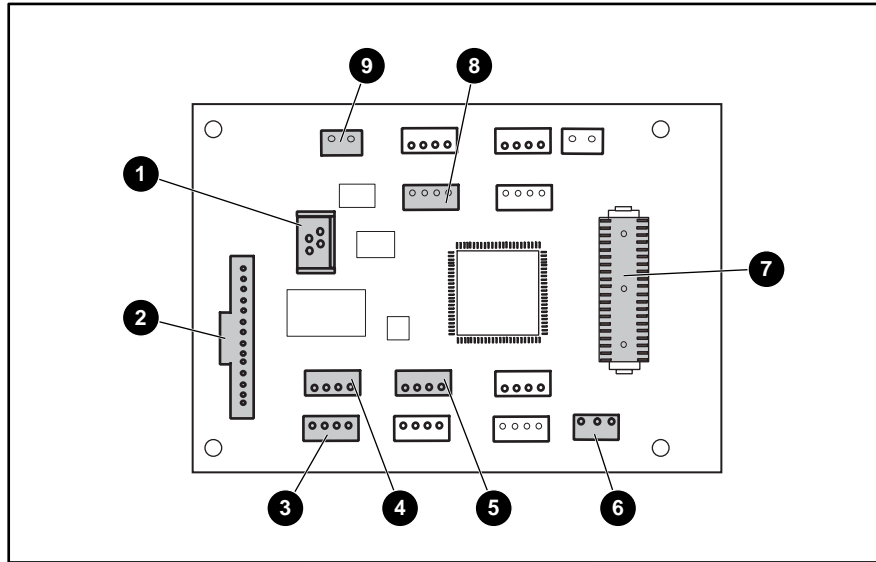


Figure 5–2: Control panel board

Table 5–2: Control Panel Board Connectors

Figure Legend	Description
①	J15 - Touchscreen
②	J16 - LCD
③	J14 - Right Magazine Door Solenoid
④	J13 - Left Magazine Door Solenoid
⑤	J9 - Right Magazine Opto Sensor
⑥	J3 - LED
⑦	J1 - Controller board
⑧	J10 - Left Magazine Opto Sensor
⑨	J12 - Magazine Interlock Solenoid

Card Cage/Backplane Assembly

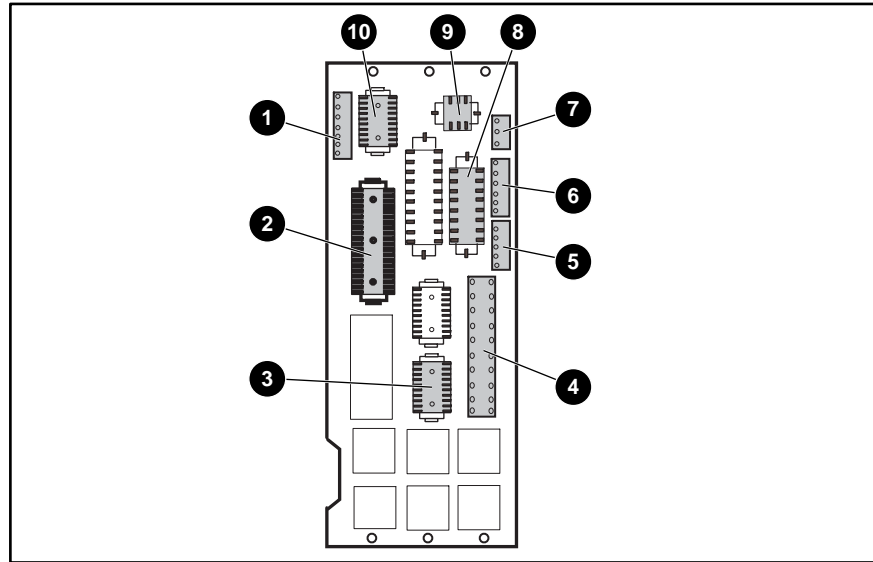


Figure 5–3: Card Cage/Backplane Assembly

Table 5–3: Card Cage/Backplane Assembly Connectors

Figure Legend	Description
①	J12 - Track Rotate Motor
②	J2 - Control Panel
③	J9 - Drive Transmit/Receive
④	J4 - Power Supply
⑤	J5 - Track Rotate Home Sensor
⑥	J8 - PTM Sensor
⑦	J11 - Card Cage Fan
⑧	J7 - PTM Motor
⑨	J3 - Shuttle Assembly Power
⑩	J6 - Shuttle Assembly

Shuttle Assembly Board

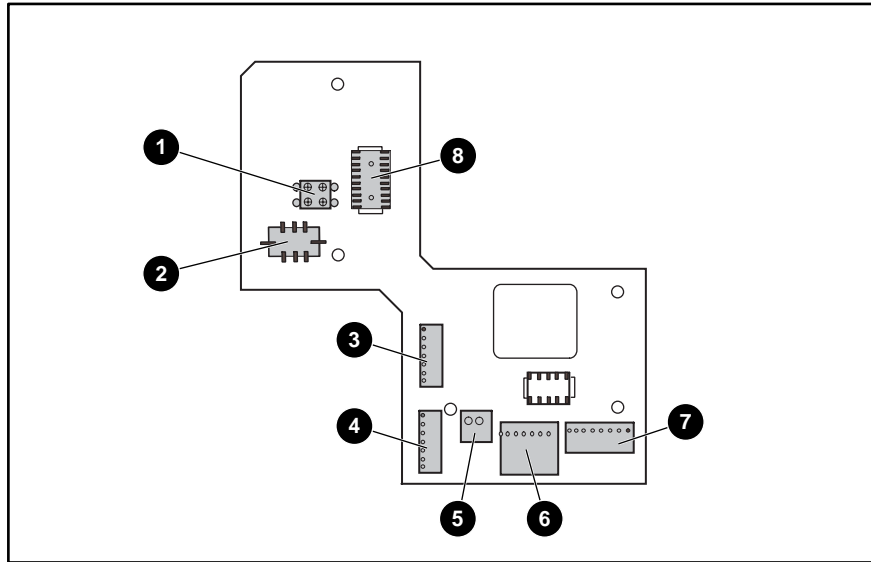


Figure 5–4: Shuttle Assembly Board

Table 5–4: Shuttle Assembly Board Connectors

Figure Legend	Description
①	J8 - Cartridge Sensor
②	J9 - Shuttle Power
③	J7 - Picker Motor
④	J6 - Shuttle Motor
⑤	J2 - Parking Brake Solenoid
⑥	J5 - Barcode Reader
⑦	J1 - Track Zone Sensor
⑧	J3 - Shuttle Control

SCSI I/O Board

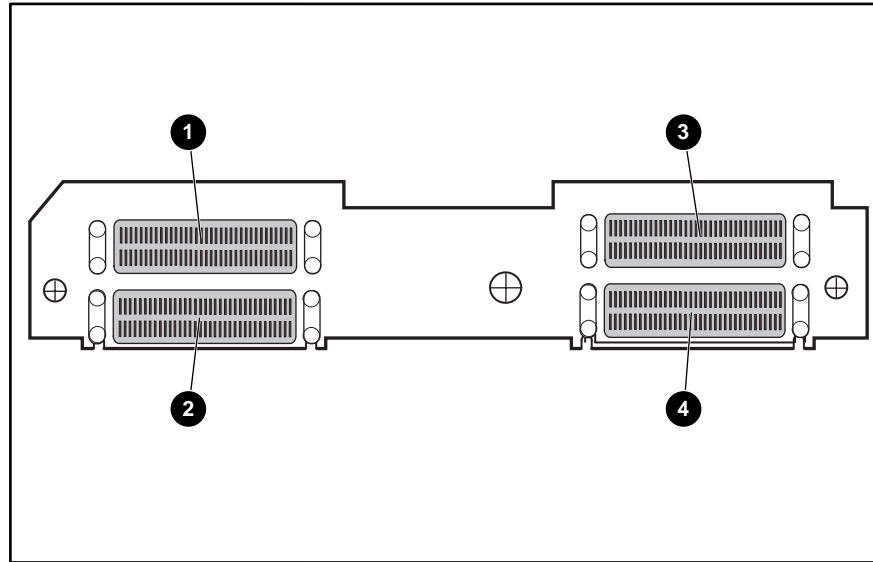


Figure 5-5: SCSI I/O Board (bottom side)

Table 5-5: SCSI I/O Board Connectors (bottom side)

Figure Legend	Description
❶	J2 - Drive 1 SCSI Data
❷	J1 - Drive 1 SCSI Data
❸	J4 - Drive 0 SCSI Data
❹	J5 - Drive 0 SCSI Data

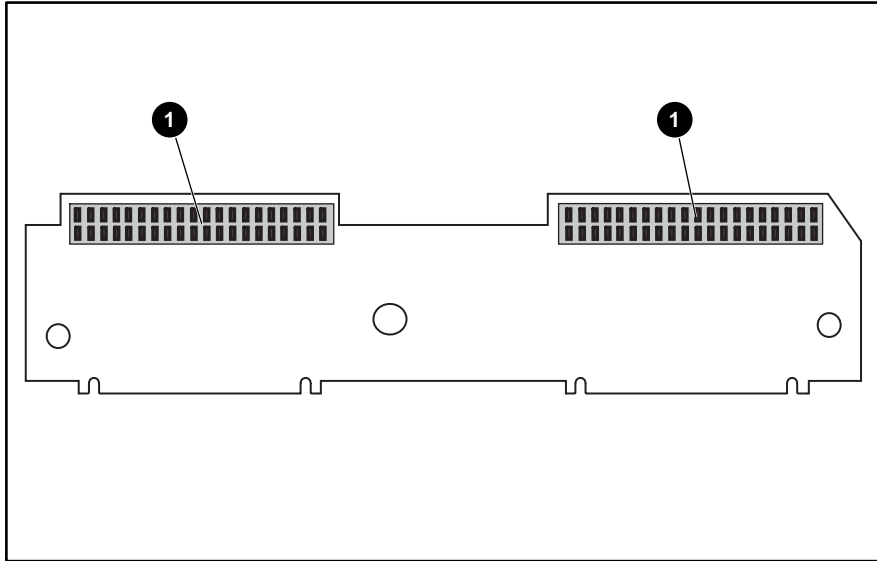


Figure 5–6: SCSI I/O Board (top side)

Table 5–6:

Figure Legend	Description
❶	J6 - Drive 0 to SCSI I/O Board
❷	J3 - Drive 1 SCSI I/O Board

Hot Swap Library Board

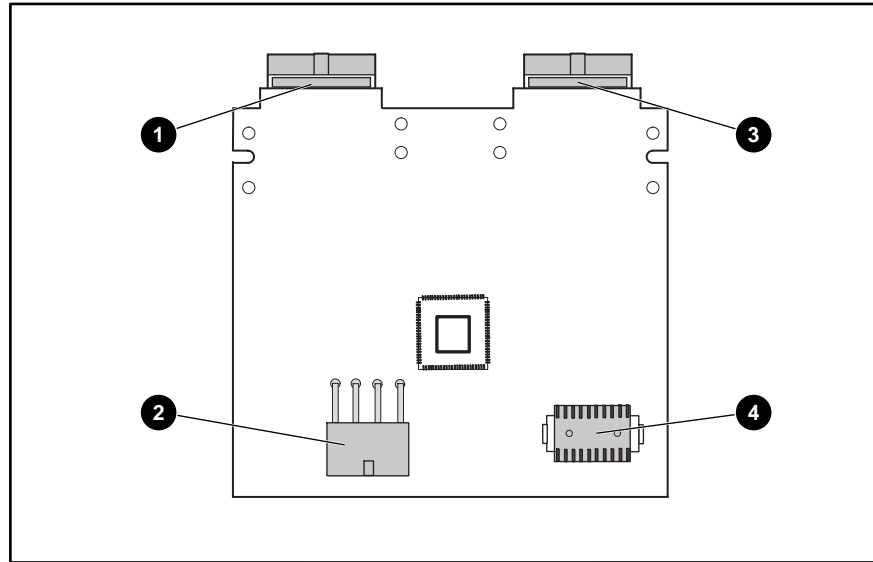


Figure 5-7: Hot Swap Library Board

Table 5-7: Hot Swap Library Board Connectors

Figure Legend	Description
①	J1 - Drive 0
②	J4 - Power
③	J2 - Drive 1
④	J3 - Drive Control

MSL 5052

Library Controller Board

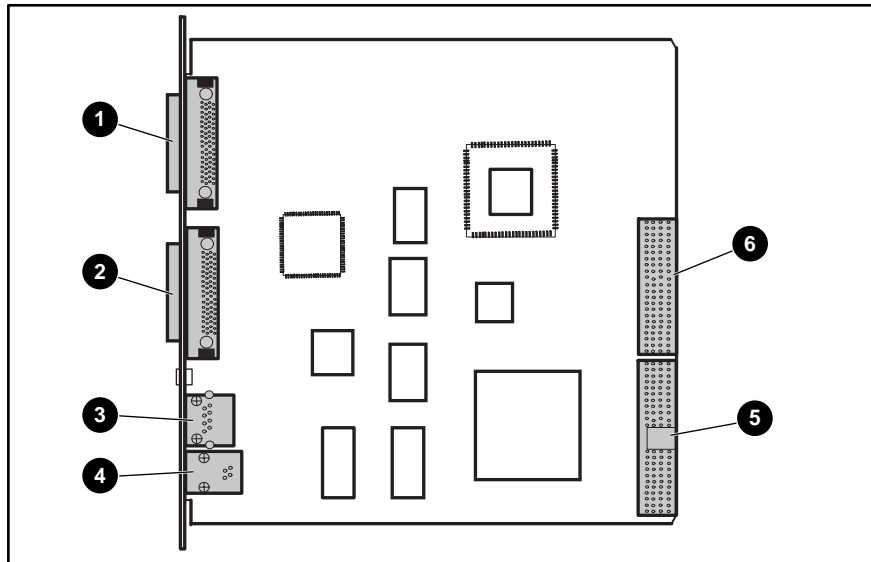


Figure 5–8: Library controller board

Table 5–8: Library Controller Board Connectors

Figure Legend	Description
①	J1 - VHDCI Library SCSI
②	J3 - VHDCI Library SCSI
③	J5 - 10BaseT Ethernet
④	J6 - RS232 Trace
⑤	J8 - Card Cage/Backplane
⑥	J4 - Card Cage/Backplane

Control Panel Board

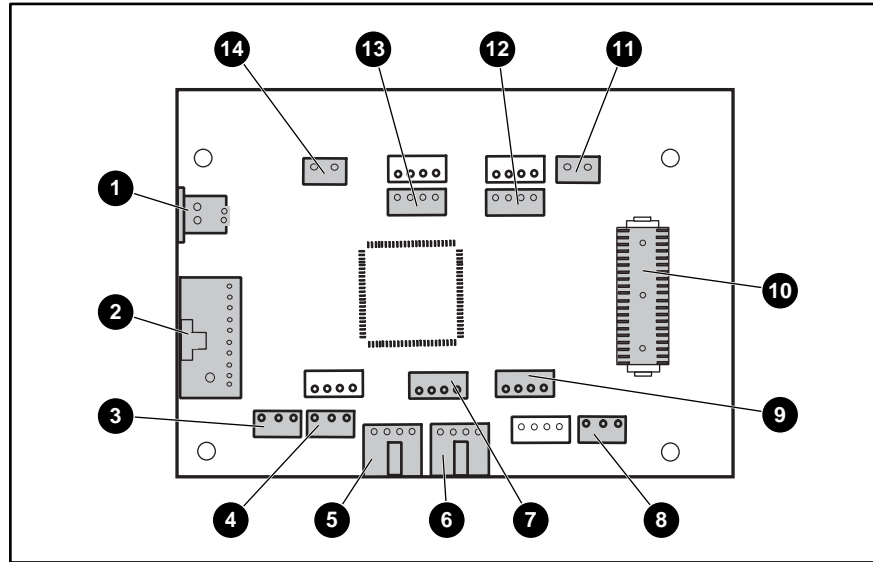


Figure 5–9: Control Panel Board

Table 5–9: Control Panel Board Connectors

Figure Legend	Description
①	J19 - Touchscreen Stiffener
②	J16 - Display
③	J18 - Lower Mail Slot Lock
④	J15 - Upper Mail Slot Lock
⑤	J14 - Left Door Solenoid
⑥	J10 - Right Door Solenoid
⑦	J9 - Upper Right Magazine Opto Sensor
⑧	J5 - Front Panel LED
⑨	J4 - Lower Right Magazine Opto Sensor
⑩	J1 - Touchscreen Serial Port Interface
⑪	J2 - Upper Magazine/Mail Slot Interlock
⑫	J6 - Lower Left Magazine Opto Sensor
⑬	J12 - Upper Left Magazine Opto Sensor
⑭	J11 - Lower Magazine/Mail Slot Interlock

Card Cage/Backplane Board

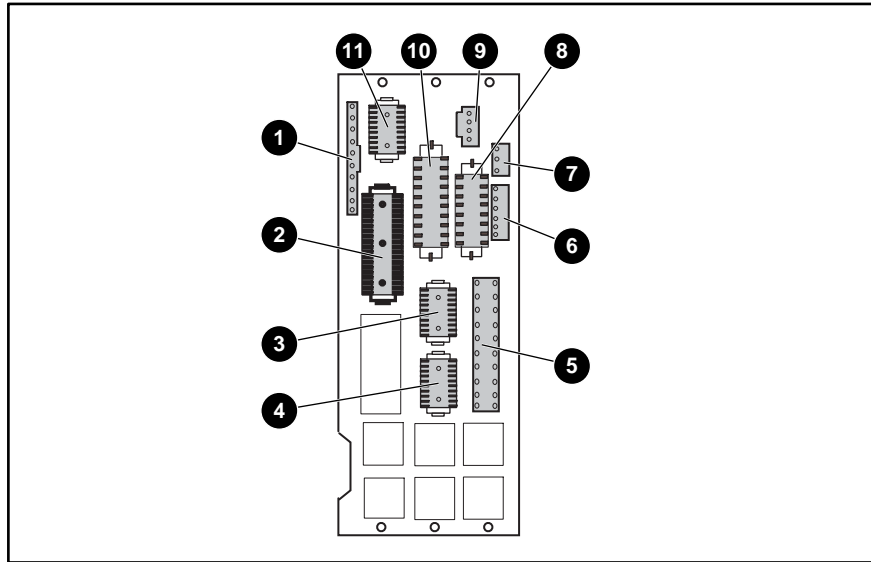


Figure 5–10: Card cage/backplane board

Table 5–10: Card Cage/Backplane Board Connectors

Figure Legend	Description
❶	J12 - Rotating Track Opto Sensor
❷	J2 - Touchscreen
❸	J10 - Drives 0/1 Serial Port Interface
❹	J9 - Drives 2/3 Serial Port Interface
❺	J4 - Main Power
❻	J8 - PTM Opto Sensor
❼	J11 - Upper Fan
❽	J7 - Power Serial Port Interface
❾	J5 - Robotics Serial Port Interface Power
❿	J1 - Vertical Axis Serial Port Interface
⓫	J6 - Robotics Serial Port Interface

Card Cage/Backplane Expansion Board

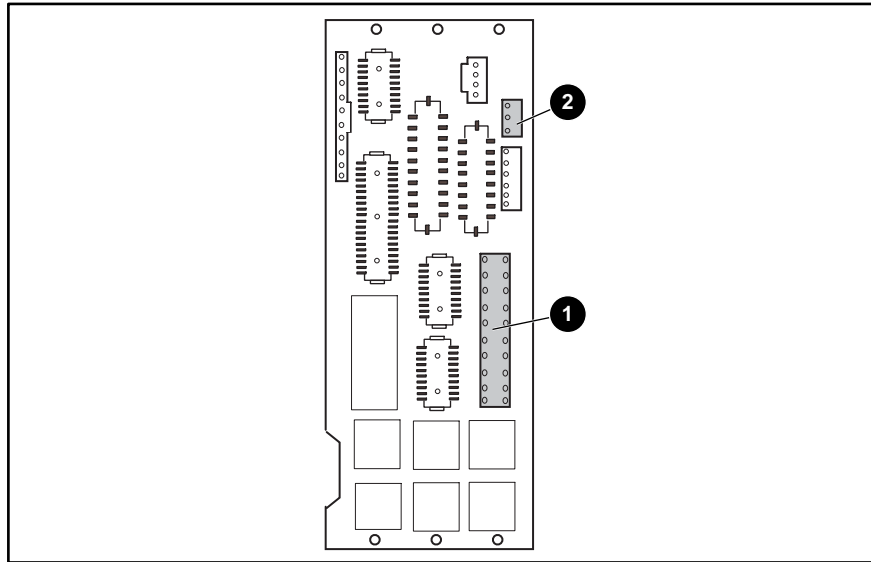


Figure 5–11: Card cage/backplane expansion board

Table 5–11: Card Cage/Backplane Expansion Board Connectors

Figure Legend	Description
❶	J4 - Main Power
❷	J11 - Lower Fan

Shuttle Assembly Board

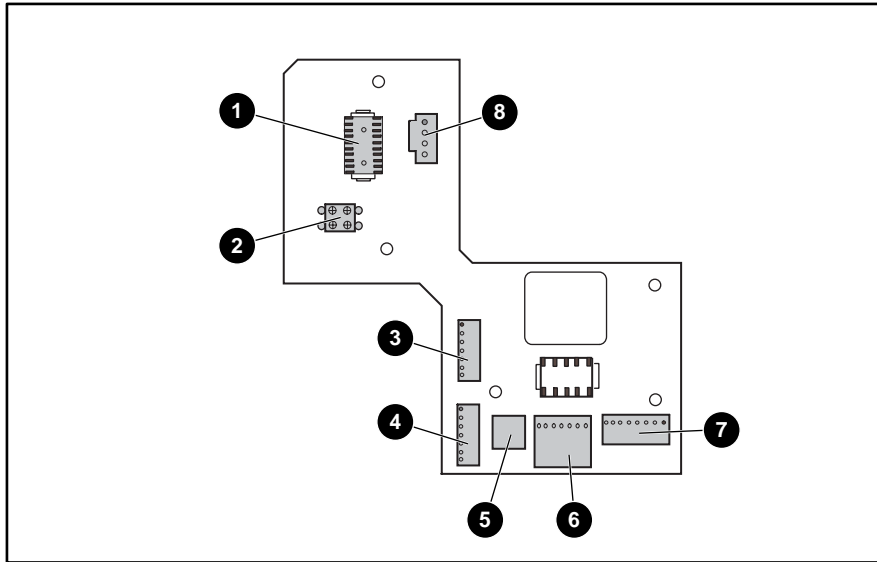


Figure 5–12: Shuttle assembly board

Table 5–12: Shuttle Assembly Board Connectors

Figure Legend	Description
❶	J3 - Flex Signal
❷	J8 - Cartridge Sensors
❸	J7 - Picker Motor
❹	J6 - Shuttle Motor
❺	J2 - Shuttle Parking Brake
❻	J5 - Barcode Reader
❼	J1 - Zone Sensors
❽	J9 - Main Power

Mono Track Interface Board

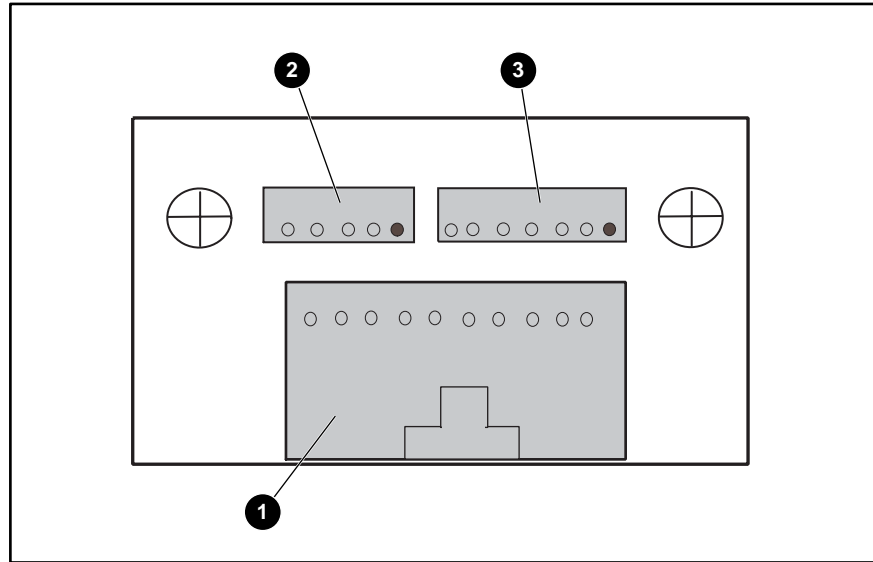


Figure 5–13: Mono track interface board

Table 5–13: Mono Track Interface Board Connectors

Figure Legend	Description
❶	J1 - Rotating Track Opto
❷	J2 - Track Rotation
❸	J3 - Rotate Home Opto Sensor

Vertical Axis Assembly Board

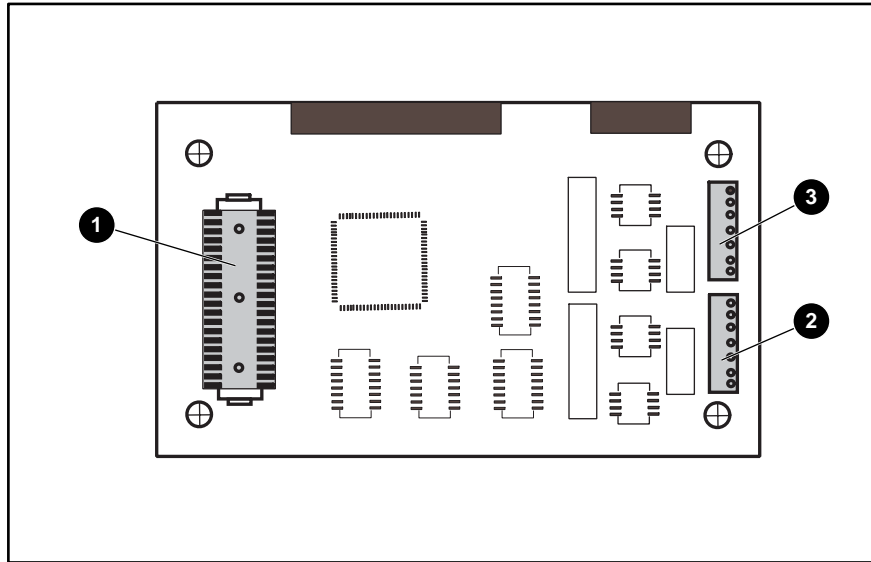


Figure 5–14: Vertical axis assembly board

Table 5–14: Vertical Axis Assembly Board Connectors

Figure Legend	Description
❶	J2 - Forward Vertical Axis Assembly
❷	J3 - Aft Vertical Axis Assembly
❸	J1 - Power

Upper and Lower SCSI I/O Boards

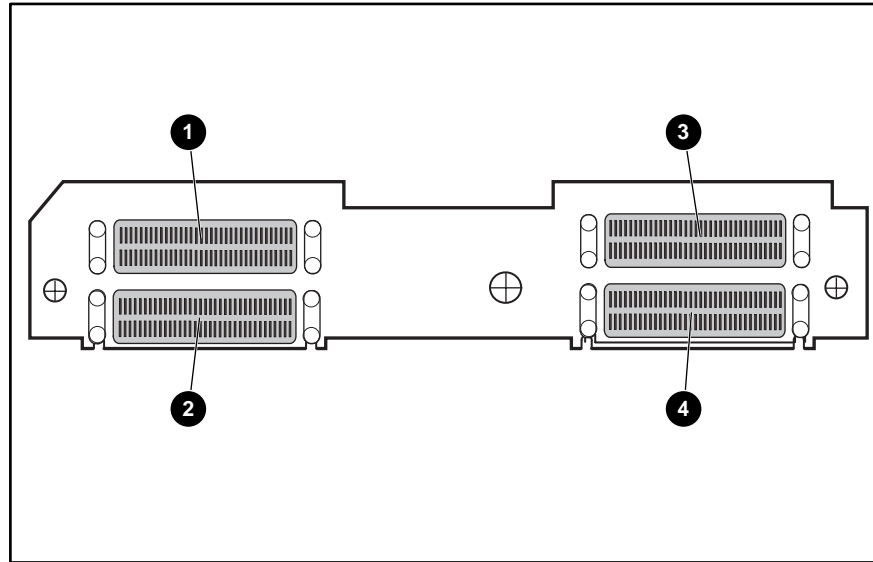


Figure 5–15: SCSI I/O board (bottom side)

Table 5–15: SCSI I/O Board Connectors (bottom side)

Figure Legend	Description
①	J2 - Drive 1 or 3 SCSI Data
②	J1 - Drive 1 or 3 SCSI Data
③	J4 - Drive 0 or 2 SCSI Data
④	J5 - Drive 0 or 2 SCSI Data

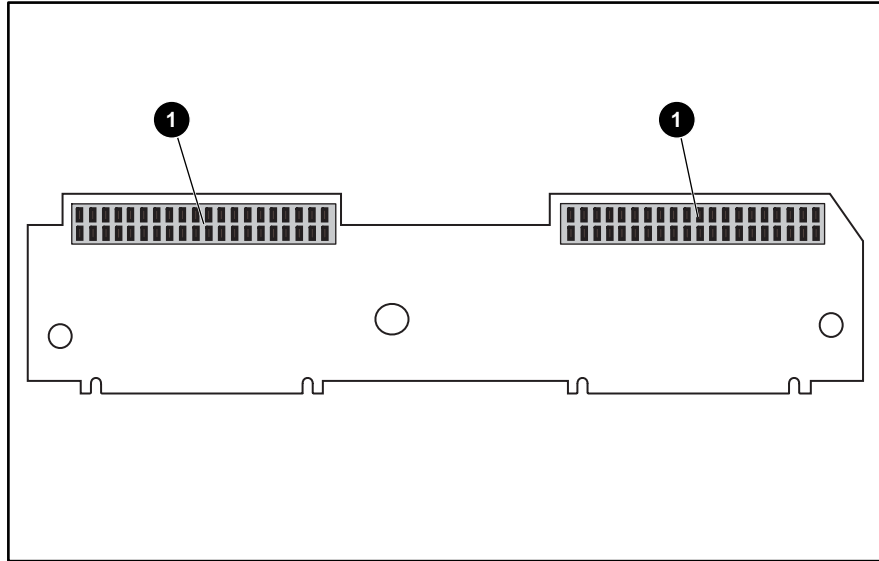


Figure 5–16: SCSI I/O board (top side)

Table 5–16: SCSI I/O Board Connectors (top side)

Figure Legend	Description
❶	J6 - Drive 0 or 2 to SCSI I/O Board
❷	J3 - Drive 1 or 3 to SCSI I/O Board

Hot Plug Library Board

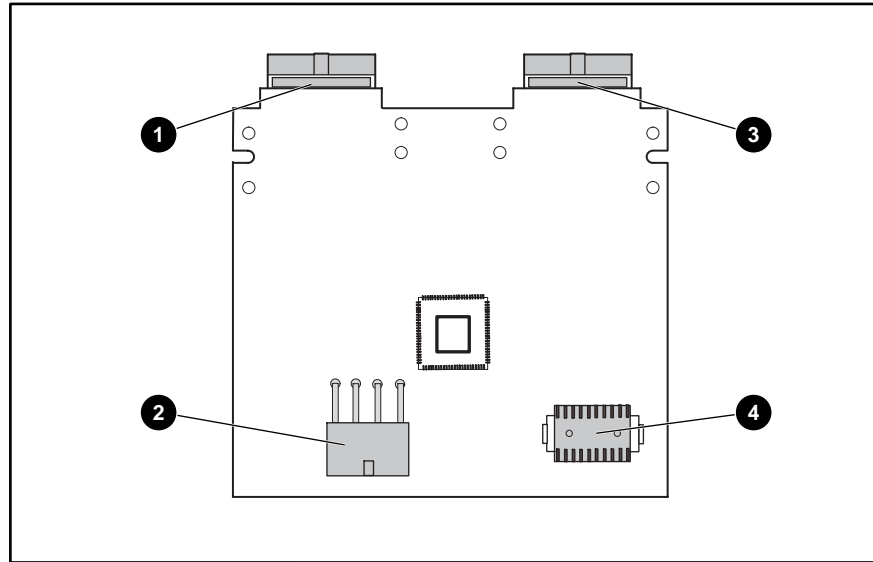


Figure 5–17: Hot plug library board

Table 5–17: Hot plug library board connectors

Figure Legend	Description
❶	J1 - Drive 0
❷	J4 - Power
❸	J2 - Drive 1
❹	J3 - Drive Control

Power Supply Switch

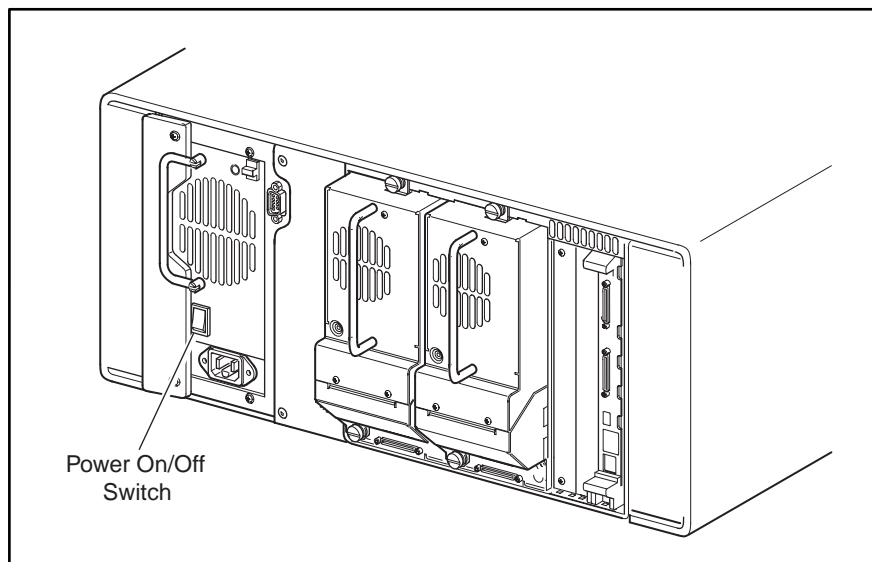


Figure 5–18: Power supply(ies) power on/off switch

LED Indicators

Power Supply(ies) Power-On LED Indicator

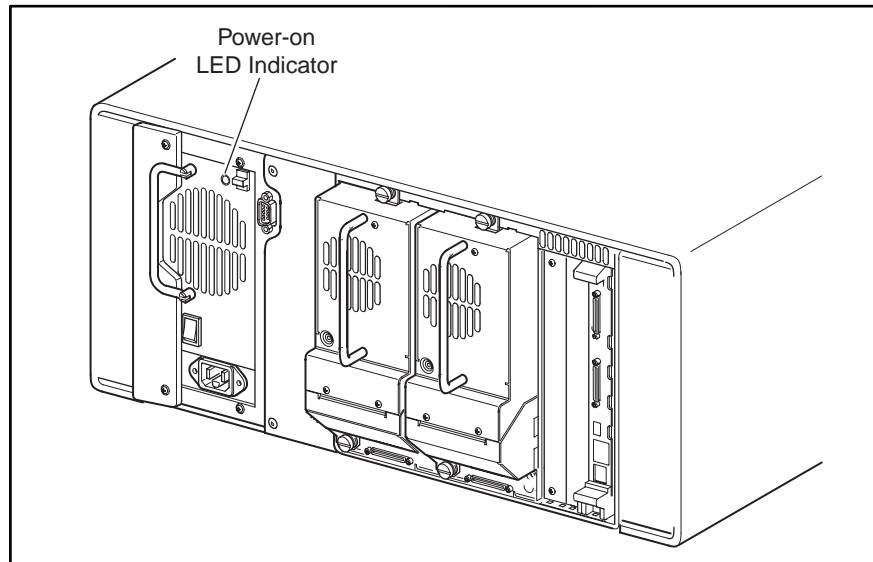


Figure 5–19: Power supply(ies) power-on LED indicator

Library Status LED Indicator

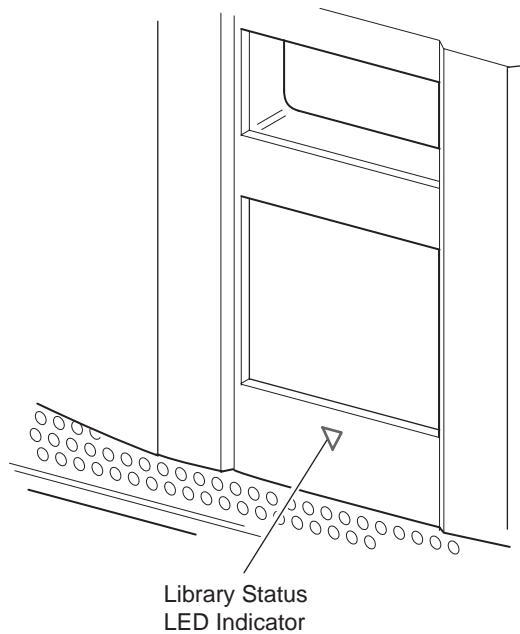


Figure 5–20: Library status LED indicator

Vertical Axis Alignment

You must perform the vertical axis alignment procedure after removing and replacing the shuttle assembly robotics, front vertical axis, or rear vertical axis assemblies.

After performing the removal and replacement procedures outlined in Chapter 3:

1. Connect the power cords to the power supply receptacles.
2. Toggle on the power switches located on the power supplies.
3. Press anywhere on the GUI touch screen to display the initialization screen.



Figure A-1: Initialization screen

4. Press Menu.

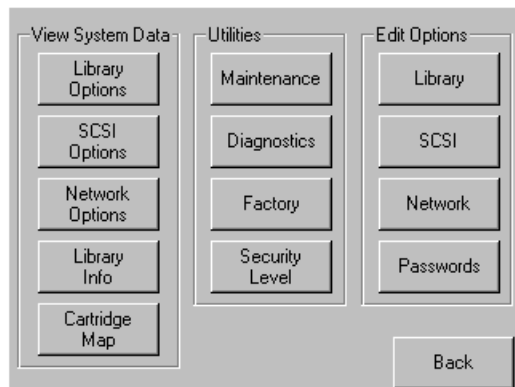


Figure A-2: Menu screen

5. Press Diagnostics.

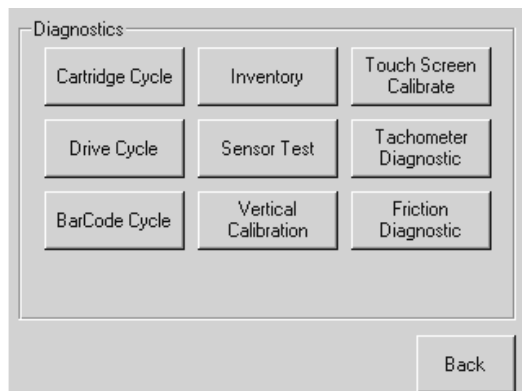


Figure A-3: Diagnostics menu

6. Press Vertical Calibration.

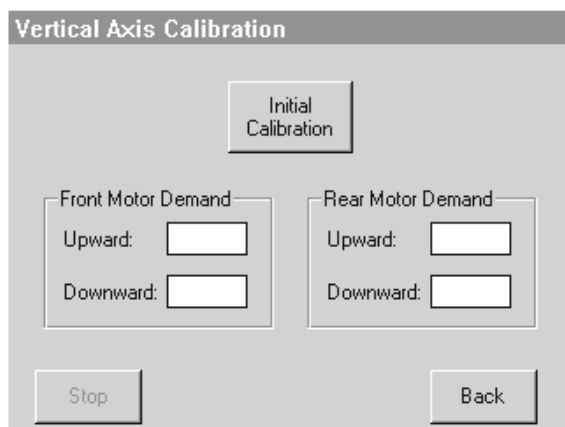


Figure A-4: Vertical axis calibration screen

7. Press Initial Calibration.

NOTE: Upon pressing Initial Calibration, the library will run for ten cycles and the Upward and Downward windows will display demand results as each cycle is completed. At the completion of this phase of the test, the Front and Rear Motor Demand windows display demand averages, and the Initial Calibration GUI button will change to Final Calibration. The Robotics Assembly will also be positioned halfway to the upper magazine track (allows easier access to tighten the screw rail foot screws).

8. Hand tighten the 4 mounting screws of each screw rail in the sequence shown. For the rear vertical axis assembly seat the flex cable carrier clamp against the screw rail when tightening screw labeled 4.
9. Torque tighten the 4 mounting screws of each screw rail in the sequence shown. For the rear vertical axis assembly seat the flex cable carrier clamp against the screw rail when tightening screw labeled 4.

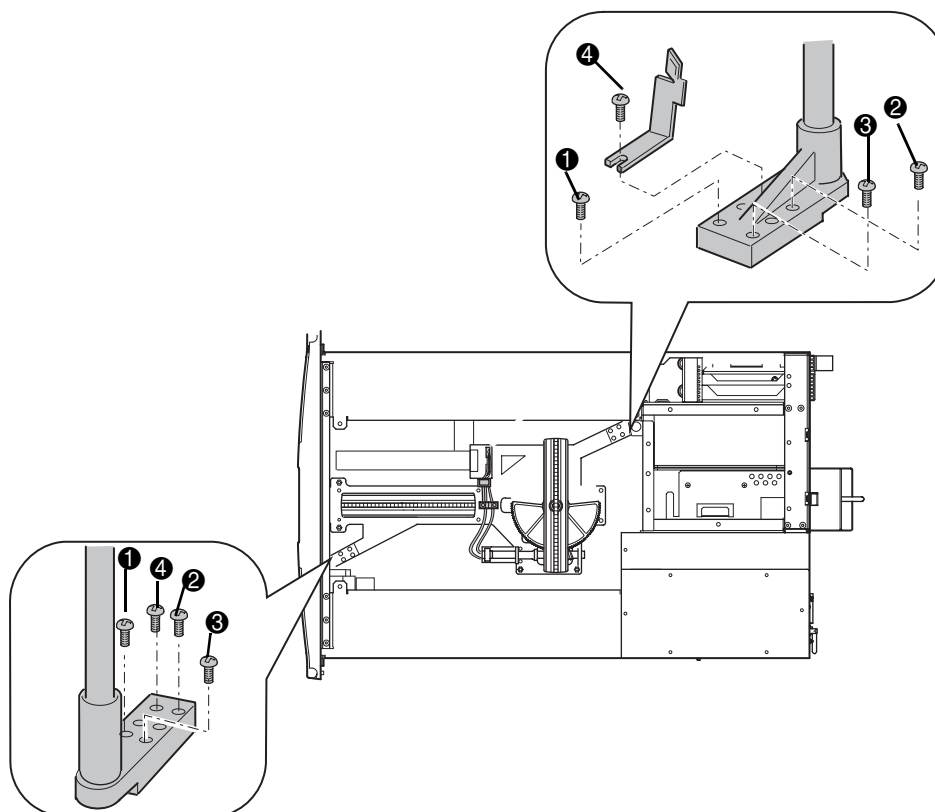


Figure A-5: Mounting screw sequence

10. Press Final Calibration

NOTE: Upon pressing Final Calibration, the library will run for ten cycles and the Upward and Downward windows will display demand results as each cycle is completed. At the completion of this phase of the test, the Front and Rear Motor Demand windows display demand averages, and the Final Calibration GUI button will revert back to Initial Calibration.

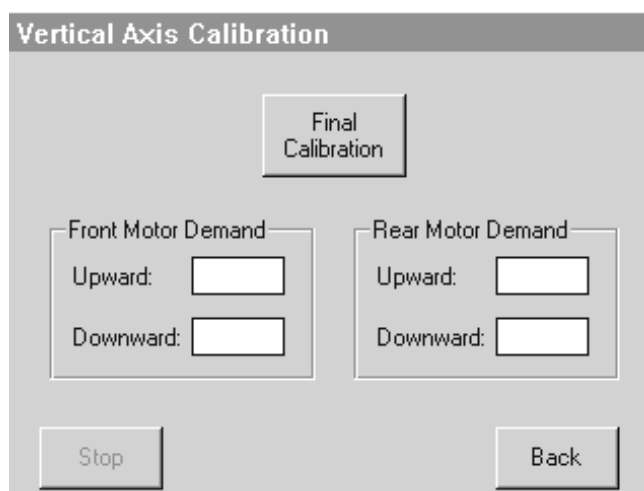


Figure A-6: Final calibration screen

11. Verify Front and Rear Motor Demand results are less than 100 in all display windows.

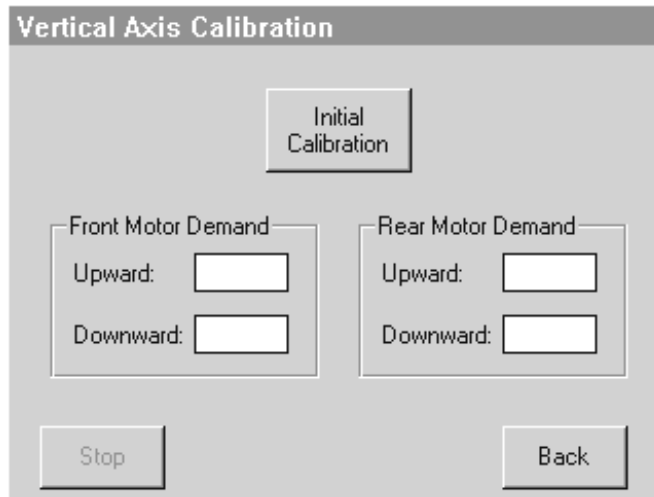


Figure A-7: Initial calibration screen

NOTE: If the motor demand results are above 100 repeat the alignment procedure (first loosen the screw rail foot screws as described in the R & R procedure before repeating the calibration test). If correct values are not attained after several calibration attempts contact Compaq Technical Support.

12. Press Back three times.
13. Replace the magazines.
14. Press Power then OK to power down the Unit.



Figure A-8: Main Screen

15. Return to the applicable Vertical Axis procedure.