# E2600 Array Module

## User Guide

EH1452-0-E3, Third Edition

LSI LOGIC ®

## Document Description

Document EH1452-0-E3, Third Edition. April 2007.
This document will remain the official reference source for all revisions and releases of this product until rescinded by an update.

# Regulatory Compliance Statements

## FCC Radio Frequency Interference Statement

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

LSI Logic Corporation, is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by LSI Logic. It is the user's responsibility to correct interference caused by such unauthorized modification, substitution, or attachment.

## Laser Products Statement

This equipment uses Small Form-factor Pluggable (SFP) optical transceivers, which are unmodified Class 1 laser products pursuant to 21 CFR, Subchapter J, Section 1040.10. All optical transceivers used with this product are required to be 21 CFR certified Class 1 laser products. For outside the USA, this equipment has been tested and found compliant with Class 1 laser product requirements contained in European Normalization standard EN 60825-1 1994+A11. Class 1 levels of laser radiation are not considered to be hazardous and are considered safe based upon current medical knowledge. This class includes all lasers or laser systems which cannot emit levels of optical radiation above the exposure limits for the eye under any exposure conditions inherent in the design of the laser products.

LSI Logic Corporation is not responsible for any damage or injury caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by LSI Logic. It is the user's responsibility to correct interference caused by such unauthorized modification, substitution, or attachment.

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## Chapter 5: UPGRADING AND RELOCATING AN ARRAY MODULE

# Document Conventions

## Definitions of Safety Notices

| | | |
|---|---|---|
| ⚠ | **DANGER** | Indicates an imminently hazardous situation that will result in death or severe personal injury. |

| | | |
|---|---|---|
| ⚠ | **WARNING** | Indicates a potentially hazardous situation that could result in death or severe personal injury. |

| | | |
|---|---|---|
| ⚠ | **CAUTION** | Indicates a potentially hazardous situation that could result in moderate or minor personal injury. |

## Definitions of Informational Notices

**CAUTION**    Indicates a potentially hazardous situation that could result in data loss (or other interruption) or equipment damage.

**IMPORTANT**    Indicates information or criteria that is necessary to perform a procedure correctly.

**NOTE**    Indicates a clarification of a concept or presents a maintenance tip.

## Typographic Conventions

*Italic* indicates the title of documents, variables and placeholders in text, emphasized words, and new terms.

**Bold** indicates choices in procedures and other emphasized text.

`Monospace` indicates arguments, code examples, command-line text, command options, commands, directories, error messages, file names, folders, on-screen text, and user input.

`Monospace italic` indicates command variables in code, parameters, and placeholders and variables in code.

`Monospace bold` indicates keywords and values.

## Revision Record

| Edition or Revision | Date | Affected Pages or Remarks |
|---|---|---|
| First edition | July 2004 | New document |
| Second edition | August 2006 | Updates to power procedures and to document references |
| Third edition | April 2007 | Added Caution and Important statements regarding equipment damage. |

**Part Number:** EH1452-0-E3

# About This Document

The *E2600 Array Module User Guide* provides procedures for how to use and troubleshoot the array module.

## Intended Readers

This document is intended for end users, system operators, system administrators, and service personnel who are responsible for operating, maintaining, troubleshooting, and servicing the hardware. Readers must be familiar with computer system operation, maintenance, and repair. In addition, they should understand disk array, Redundant Array of Independent Disks (RAID), network, and Fibre Channel technologies. This document assumes that the user has basic hardware user skills for storage area networks (SANs).

## Related Publications

Related publications include the following documents. These documents can be found on the Software and Documentation CD:

- *E2600 Array Module Initial Setup Guide*
- *Hardware Cabling Guide*

E2600 Array Module User Guide

# *E2600 Array Module Overview*

This chapter describes the E2600 array module and its components.

## Array Module Description

The E2600 array module is a compact unit that provides high-capacity disk storage for Fibre Channel environments. This module supports two controllers and is available in both a deskside and a rackmount model.

The array module supports 14 drives within its enclosure, plus seven expansion drive modules, containing 14 drives each for a total of 112 drives.

Figure 1-1 and Figure 1-2 on page 1-2 show front and back views of the array module and its components.

The front of the array module consists of the following components:

- **Front bezel** – Molded frame containing drive and global indicator lights and a mute button for the optional audible alarm feature

- **Drives** – Fourteen removable disk drives

The back of the array module contains the following components:

- **Fans** – Two removable fan canisters, each containing two fans

- **Controllers** – Two removable controllers

- **Power supplies** – Two removable power supplies

Front View
**1.** Bezel
**2.** Drive

Back View
**3.** Fan
**4.** Controller
**5.** Power Supply
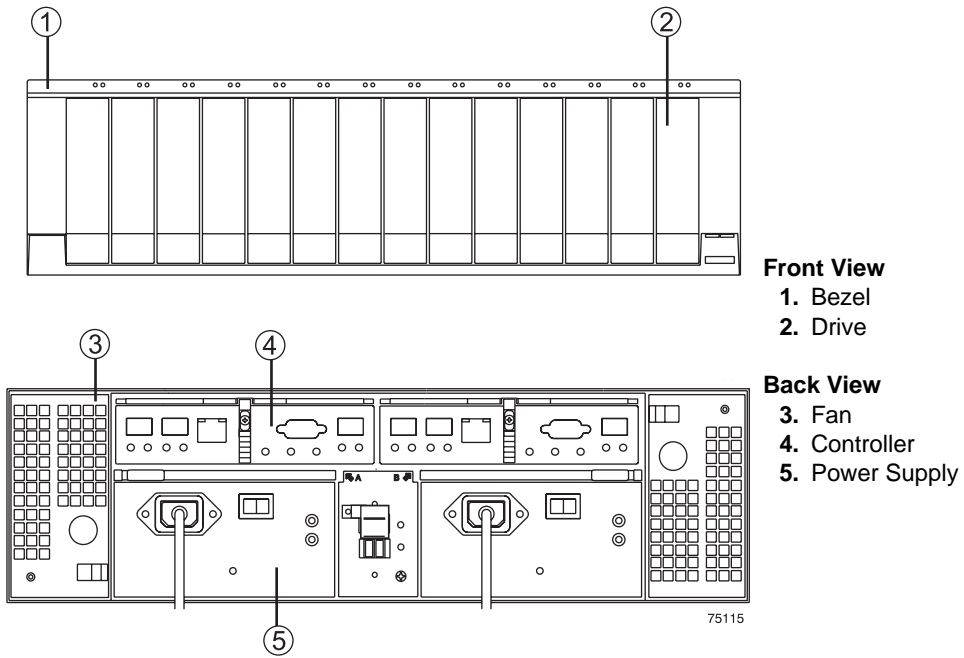
Figure 1-1  E2600 Array Module – Rackmount Model



Front View
**1.** Bezel
**2.** Drive

Back View
**3.** Fan
**4.** Controller
**5.** Power Supply
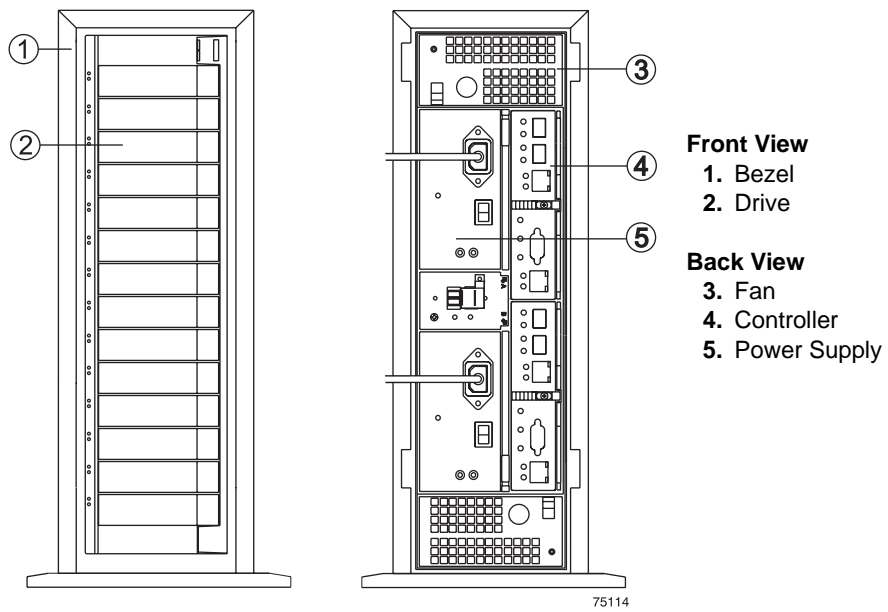
Figure 1-2  E2600 Array Module – Deskside Model

# Controllers

The array module supports two removable controllers. Each controller attaches to hosts through fiber optic interface cables, and to drive modules through fiber optic or copper cables. Each controller also supports an Ethernet connection to a host for out-of-band management.

Figure 1-3 shows a controller. Each controller slides into the back of the module and has cache memory, which requires a rechargeable battery.



**1.** Lever
**2.** Pull Ring
**3.** Latch
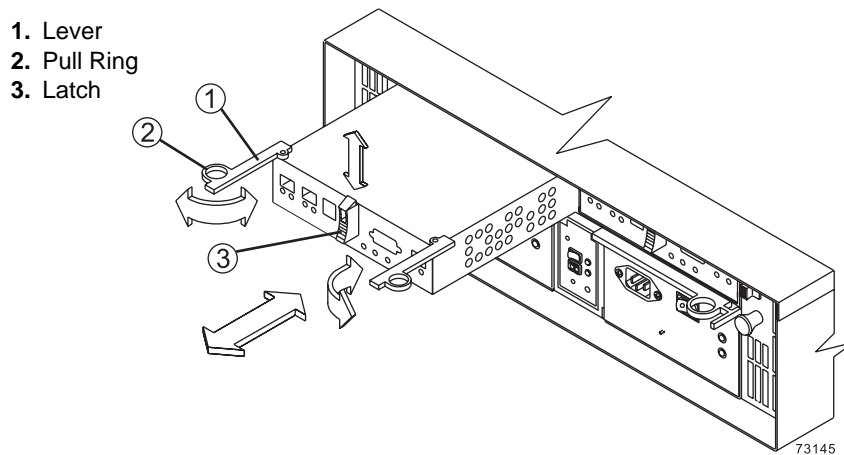
Figure 1-3  Controller

## Controller Battery

Each controller contains a sealed, rechargeable 4-volt, lead acid battery. The battery provides backup power to the cache memory for up to three days in the event of a power loss. The service life of the battery is two years. Replace the battery every two years using the procedure described in "Replacing a Controller Battery" on page 4-8.

The battery performs a self-test at startup and every 25 hours thereafter. If needed, the battery will begin recharging at that time. Data caching starts after the battery completes its startup tests.

The Battery Charging/Charged light flashes during the startup self-test and when the battery is charging. It turns on and does not flash when the battery is fully charged, and turns off if the battery fails.

Figure 1-4 shows the controller labels. Each controller has a media access control (MAC) address label, located on the top or the front of the controller, and a battery label, located on top of the controller, which lists the battery installation and expiration dates.

1. Battery Label
2. Board Serial Number and
   MAC Address Label
3. Board Serial Number
4. MAC Address
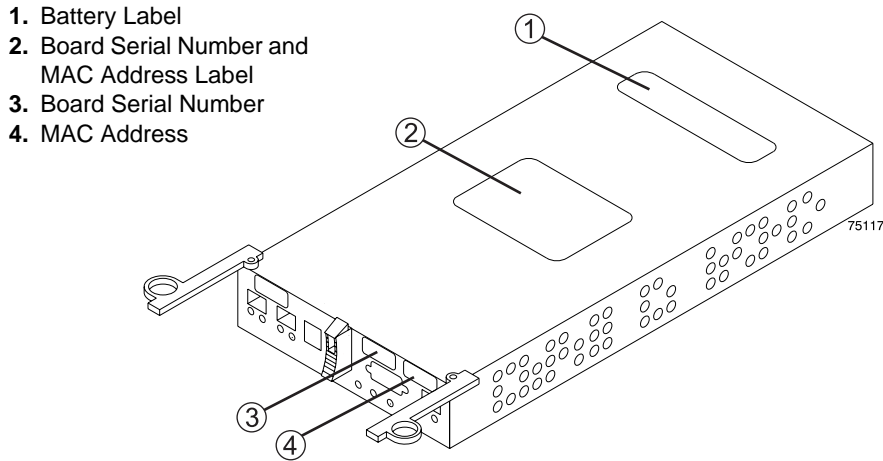
Figure 1-4  Label Locations on the Controller

## Controller Memory

**IMPORTANT**  For specific information on the controller memory, refer to the *Storage System Product Release Notes for Version 9.1*x.

Each controller has 1 GB of memory for processor memory and data cache. The processor memory is used to store application data, while the data is in cache memory.

If caching has been enabled and data is in the cache, the Cache Active light on the controller turns on but does not flash. If caching is enabled and the Cache Active light *never* turns on during I/O activity, a cache memory failure or a battery failure has occurred.

Figure 1-5 shows the Cache Active light and the Battery Charging/Charged light.

1. Battery Charging/
   Charged Light
2. Cache Active Light
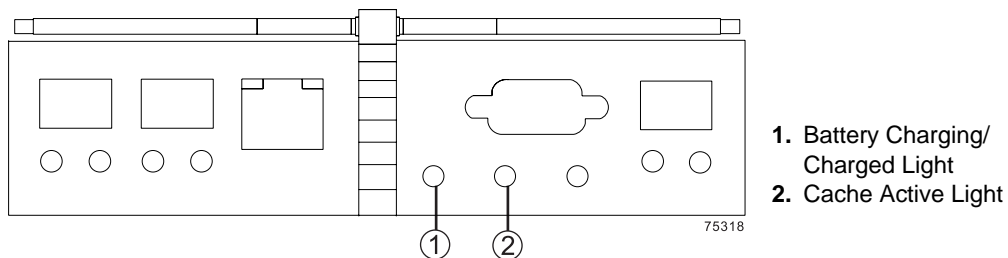
Figure 1-5  Battery Charging/Charged and Cache Active Lights

## Drives

The array module supports up to 14 removable Fibre Channel drives internally, plus up to seven expansion drive modules containing 14 drives each for a total of 112 drives.

Figure 1-6 shows the array module drive and its lights. Note that the drives in your array module may differ slightly in appearance from those shown. The variation will not affect the function of the drives.

Figure 1-7 shows the physical locations of the drives, which are numbered 1 through 14, from left to right. When a drive is installed, the drive/tray slot designation is set automatically.



1. Locking Lever
2. Active Light
3. Fault Light

75106
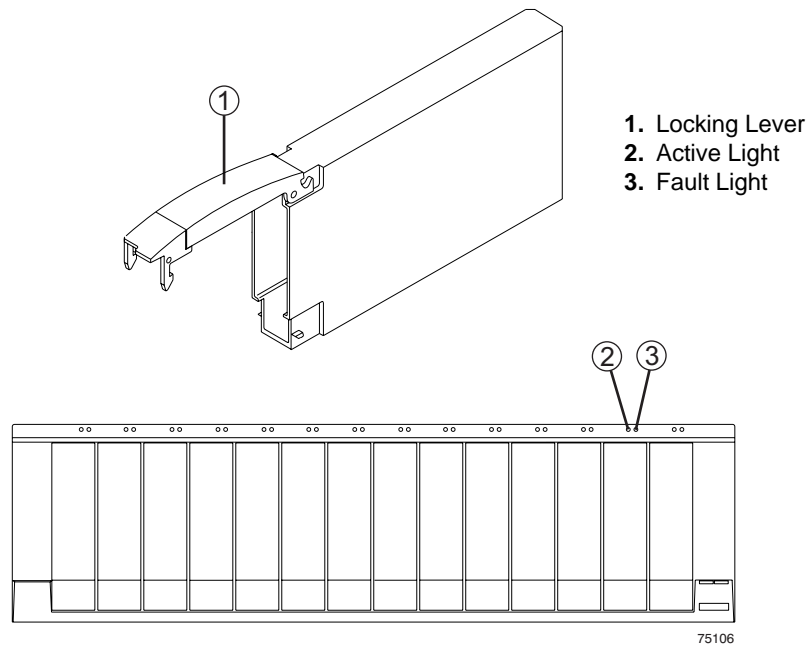
Figure 1-6  Drives and Lights



75107
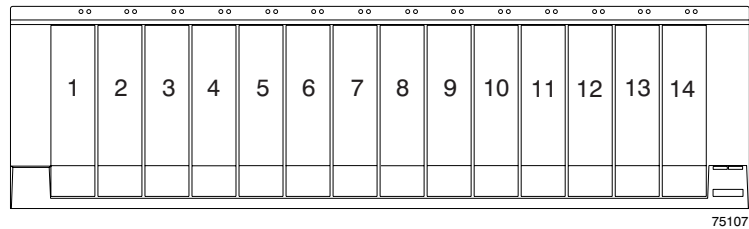
Figure 1-7  Drive Numbering – Rackmount Module

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| **CAUTION** | **Risk of equipment malfunction.** To avoid exceeding the functional and environmental limits, install only drives that have been provided or approved by the original manufacturer. Not all array modules are shipped with pre-populated drives. System integrators, resellers, system administrators, or users of the array module can install the drives. |
|---|---|

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# Fans

Each array module has two removable fan canisters. Each fan canister contains two fans. The fans provide redundant cooling, which means that if one of the fans in either fan canister fails, the remaining fans will continue to provide sufficient cooling to operate the array module.

Figure 1-8 shows a set of fans in a fan canister. The fans circulate air inside the array module by pulling air in through the vents on the front and pushing the air out the vents on the back of each fan canister.



1. Vents
2. Knob
3. Fault Light
4. Latch
5. Fans
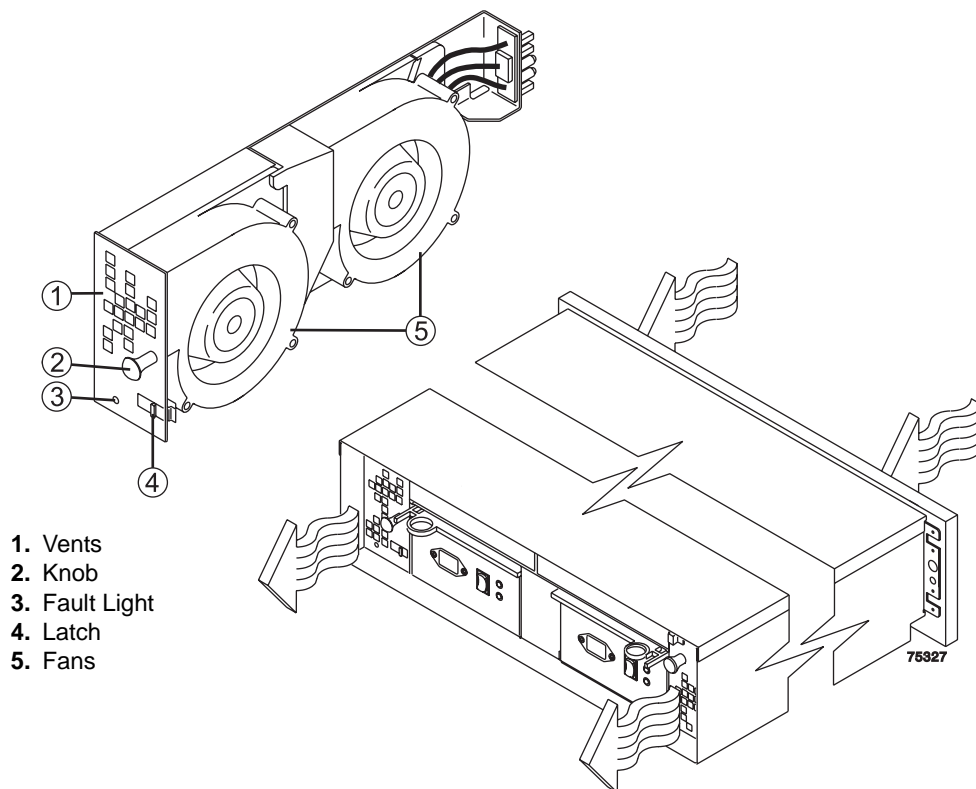
Figure 1-8  Fans and Airflow

## Power Supplies

Each array module contains two removable power supplies. The power supplies provide power to the internal components by converting incoming AC voltage to DC voltage. If one of the power supplies is turned off or malfunctions, the other power supply can maintain electrical power to the array module.

Figure 1-9 shows the power supplies, which are interchangeable by reversing the locking levers.

**1.** Locking Lever
**2.** Power Connector
**3.** Power Switch
**4.** Power Light
**5.** Fault Light
**6.** Power Supply
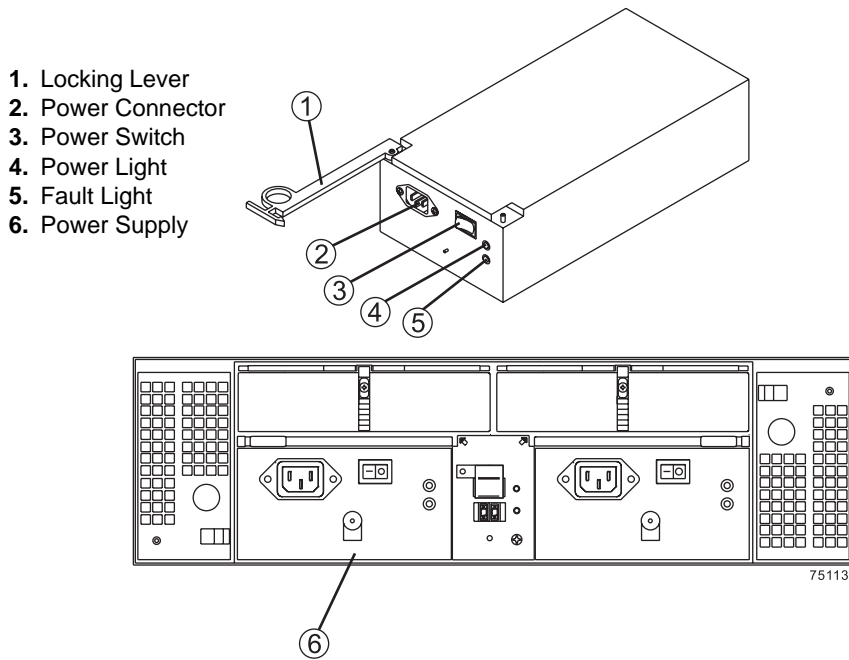
Figure 1-9  Power Supplies

## SFP Transceivers and Cables

Each array module supports either copper (for drive extension only) or fiber optic interface cables. If fiber optic cables are used, a Small Form-factor Pluggable (SFP) transceiver must be installed in each interface connector on the controller where a fiber optic cable is to be installed.

Figure 1-10 shows an SFP transceiver and a fiber optic cable. Note that the SFP transceiver shown may look different from those shipped with your unit. The differences will not affect transceiver performance.



1. Fiber Optic Cable
2. SFP Transceiver
3. Interface Connector
4. Fault Light
5. Controller
6. Expansion Port Bypass LED

75341
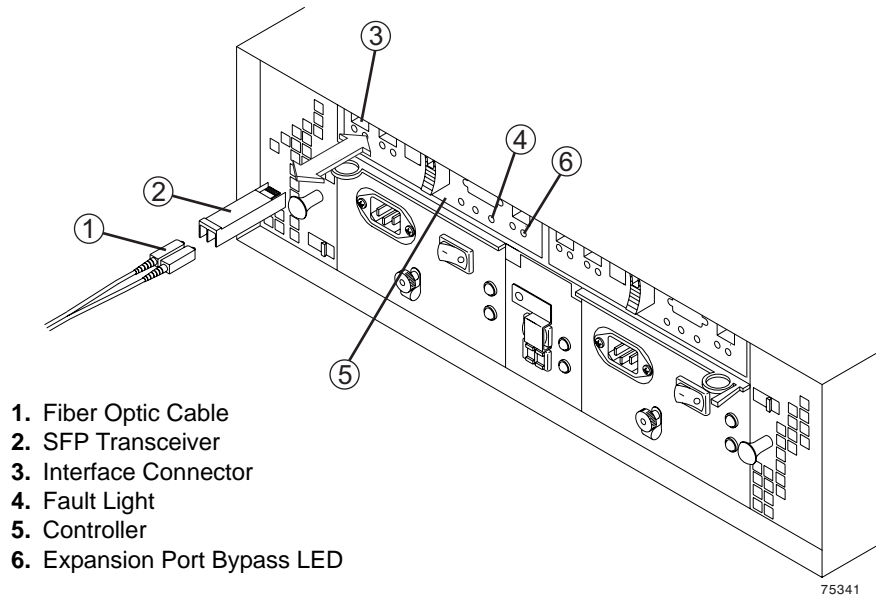
Figure 1-10  SFP Transceiver and Fiber Optic Cable

## Tray ID Switch

**IMPORTANT**  Each module in the storage array must have a unique tray ID.

The Tray ID switch is located between the power supplies. The Tray ID switch lets you assign each module a unique tray ID, which is required for proper operation of the storage array. The settings for each digit (X10 and X1) in the Tray ID range from 0 through 7. Recommended unique ID numbers range from 01 through 77.

Figure 1-11 shows the Tray ID switch. The switch is covered with a metal cover plate secured with a screw. The screw and metal plate must be removed to view or change the Tray ID switch setting.

**1.** Cover Plate
**2.** Screw
**3.** Tray ID Switch



75320
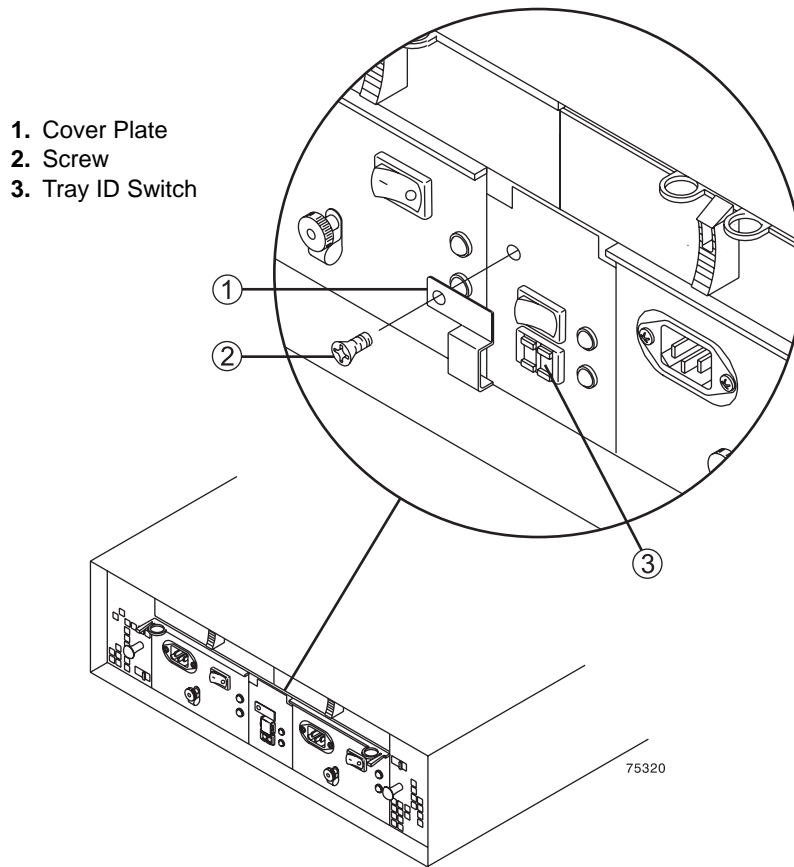
Figure 1-11  Tray ID Switch

*Chapter* 2

# *Using the E2600 Array Module*

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This chapter provides general operating procedures for the E2600 array module.

## Removing and Reinstalling the Back Cover

**CAUTION**   **Potential damage to cables.** To prevent degraded performance or damaged cables, do not bend or pinch the cables between the module and the back cover.

Back covers are available only on deskside modules. If you have a rackmount module, you must open the hinged door or remove the access panel of the rackmount cabinet. Removing the back cover lets you see the indicator lights and access the cables and module components.

To remove and reinstall the back cover, use the following procedure. Figure 2-1 on page 2-2 illustrates the procedure.

**1**   Remove the back cover.

Push the back cover up from the bottom, and pull the cover away from the module.

**2**   Reinstall the back cover.

  **a**   Hold the back cover next to the back of the array module, and carefully route all cables through the opening at the bottom of the cover.

  If the opening is too small for all cabling, route some cables through the gap between the bottom of the module and the floor.

  **b**   Align the tabs on the cover with the tab openings in the module, and then push the cover onto the module to snap it into place.

**End Of Procedure**

**1.** Tab Openings
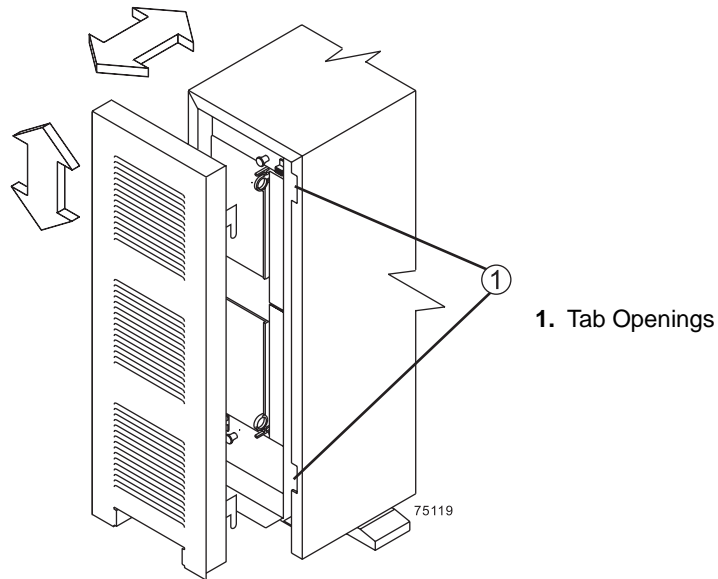
Figure 2-1  Removing and Reinstalling a Deskside Module Back Cover

# Turning On the Power

Use the following procedure to turn on the power to one or more modules in a storage array at initial startup or after a planned shutdown.

Use this procedure in either of the following two situations:

• The entire storage array has been shut down (the main circuit breakers for the cabinet are turned off).

• Some modules are being powered on while others might remain online (the main circuit breakers for the cabinet are turned on). You might encounter this situation if you are adding an additional drive module to increase storage capacity (this is called *hot scaling*).

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**CAUTION**   **Potential damage to drives.** Repeatedly turning the power off and on without waiting for the drives to spin down can damage the drives. Always wait at least 60 seconds from when you turn off the power until you turn on the power again.

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**IMPORTANT**  If you are connecting a power cord to a module, turn off both power switches on the module first. If the main circuit breaker is turned off, ensure that both power switches are turned off on each module in the cabinet before turning on the main circuit breakers.

---

You will use the storage management software later in the procedure to check the status of the modules in the storage array.

1  Are the main circuit breakers to the cabinet turned on?

- **Yes –** Turn off *both* power switches on *each* module to which you intend to connect power.

- **No –** Turn off *both* power switches on *each* module in the storage array.

2  Connect the power cords to the power supplies on each module, if necessary.

3  If the main circuit breakers are turned off, turn them on.

4  Verify that the link rate setting on the front of the array module enclosure matches the speed of the drives in the subsystem.

---

**IMPORTANT**  Turn on the power to the drive modules *before* turning on the power to the array module to ensure that the controllers acknowledge each attached drive module.

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**NOTE**  The Link Rate switch should be set to match the speed of your drives. To find the speed of your drives, use the storage management software to check the properties of the drive. Find the drive part number, and look on the vendor's web site to find the drive data rate.

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5  Turn on both power switches on the back of each drive module.

The drives will not spin up until they receive a Start Unit command from the controller. While the drive modules power on, the lights on the front and back of the drive modules blink. Wait at least 60 seconds before turning on power to the array module.

6  Turn on both power switches on the back of the array module (Figure 2-2 on page 2-4).

An array module can take up to 10 seconds to power on and can take up to 15 minutes to complete its controller battery self-test. During this time, the lights on the front and back of the array module blink.

**1.** Power Switch
**2.** Power Switch
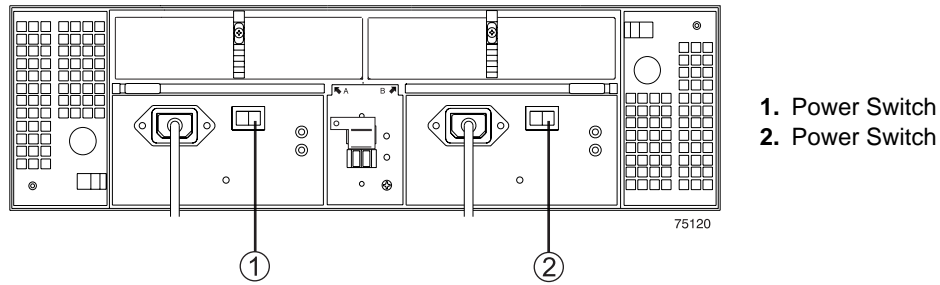
Figure 2-2  Power Switches

**7** Check the status of each module and its components.

    **a** Check the status of the lights on the front and back of each module.

    Green lights indicate a normal status. Amber lights indicate a hardware fault.

    **b** In the storage management software, open the Array Management Window for the storage array.

    **c** Select the appropriate component button for each module in the Physical View of the Array Management Window to view the status of its components.

    The status of each component is either Optimal or Needs Attention.

        **IMPORTANT** If the fault requires that you turn off the power to an attached drive module, you might need to turn off the power to all remaining modules in the storage array. Contact a Customer and Technical Support representative before turning off the power to any attached drive module.

**8** If any fault lights are on, diagnose and correct the fault.

    **a** Run the Recovery Guru by clicking the Recovery Guru toolbar button in the Array Management Window.

    **b** Complete the recovery procedure.

    If the Recovery Guru directs you to replace a failed component, use the individual lights on the modules to locate the specific failed component. For troubleshooting procedures, see Chapter 3, "Troubleshooting and Recovery."

    **c** When you have completed the recovery procedure, select Recheck in the Recovery Guru to rerun the Recovery Guru and to ensure that the problem has been corrected.

    **d** If the problem persists, contact a Customer and Technical Support representative.

**End Of Procedure**

# Turning Off the Power

Storage array modules are designed to run continuously, 24 hours a day. After you turn on power to a module, it should remain on unless you need to perform certain upgrade and service procedures.

Use the following procedure to turn off the power to one or more storage array modules for a planned shutdown.

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**CAUTION**    **Potential damage to drives** – Turning the power off and on repeatedly without waiting for the drives to spin down can damage the drives. Always wait at least 60 seconds from when you turn off the power until you turn on the power again.

---

**1**   Stop all I/O activity to each module.

**2**   Remove the front covers from the modules, if necessary.

---

   **IMPORTANT**   For the best results, always check for faults and correct all problems before turning off the power.

---

**3**   Do all modules display green lights only, and is the status Optimal for all module components in the storage management software?

   ▪   **Yes** – Go to step 5.

   ▪   **No** – Go to step 4.

**4**   To diagnose and correct the fault, see Chapter 3, "Troubleshooting and Recovery."

---

   **IMPORTANT**   To minimize recovery actions, always wait until the Cache Active light on the back of the array module turns off and all Drive Active lights stop blinking before turning off the power to the array module.

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**5**   Check the lights on each drive, and verify that all drive Active lights are on but not blinking.

   If at least one drive Active light is blinking, data is being written to or read from the disks. Wait for all drive Active lights to stop blinking, and then go to step 6 on page 2-6.

**6** Check the Cache Active light on the back of the array module, and select one of the following steps, based on the current status of the light.

- **The Cache Active light is off** – The cache contains no data. Go to step 7.

- **The Cache Active light is on** – Write-back caching is enabled, *and* data is in cache. Wait for the data to clear from cache memory and for the Cache Active light to turn off, and then go to step 7. Refer to the online help topics in the Array Management Window for information on cache memory protection and settings.

**7** Check the lights on the back of the array module, and then select one of the following actions, based on the status of the lights.

- **The Power and Loop Good lights are on; all other lights are off** – The Link or 100BT lights on the array module might be on if the module is using Ethernet connections. Go to step 8.

- **One or more amber lights are on in the array module** – *Do not* continue with the power-off procedure until you have corrected the fault. To diagnose the problem, see Chapter 3, "Troubleshooting and Recovery."

---

**IMPORTANT** Ensure that you turn off the power to the array modules before you turn off the power to the drive modules. Do not turn off the main circuit breakers to the cabinet without first turning off the power to the array modules.

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**8** Turn off the power switches on each controller in the storage array.

**9** Turn off the power switches on each drive module in the storage array.

**End Of Procedure**

# Turning off the Power during an Emergency

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**CAUTION** **Potential loss of data access** – An emergency shutdown of the storage array might not allow the server to complete its I/O to the storage array.

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In the event of an extreme emergency, power down as quickly as possible.

**1** Stop all I/O activity to the storage array.

**2** Turn off both power switches on the back of each command module and array module in the storage array.

**3** Turn off both power switches on the back of each drive module.

**4** Turn off the main circuit breakers in the cabinet.

**End Of Procedure**

# Recovering from a Power Outage

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**NOTE** If the components in the storage array do not display an Optimal status in the storage management software after you turn on the power, contact a Customer and Technical Support representative immediately.

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**1** Has the power been restored to the site?

- **Yes** – Go to step 2.

- **No –** Go to step 3.

**2** Select one of the following actions, depending on the condition:

- **The power to the modules has been turned off** – Perform the power-on procedure in "Turning On the Power" on page 2-2. Then go to "Troubleshooting the Array Module" on page 3-1. You are done with this procedure.

- **The power to the modules is still turned on** – Go to "Troubleshooting the Array Module" on page 3-1. You are done with this procedure.

**3** Turn off both power switches on each command module and array module.

**4** Turn off both power switches on each drive module.

**5** When the power has been restored, perform the power-on procedure in "Turning On the Power" on page 2-2, and go to "Troubleshooting the Array Module" on page 3-1.

**End Of Procedure**

# Responding to the Optional Audible Alarm

The array module may have an optional audible alarm. Modules with the optional alarm have an Alarm Mute button on the front bezel, below the Power and Global Fault lights. Figure 2-3 shows the locations of the indicator lights and the mute button.

When one of the following conditions occurs, the alarm sounds and the Global Fault light illuminates:

- **Hardware malfunction in an array module** – Malfunctions might include overheating conditions, missing fans, or component failures (failed drives, environmental services monitors [ESMs], controllers, power supplies, or fans).

- **Transmission failures** – Transmission failures include I/O transmission problems with the Small Form-factor Pluggable (SFP) transceivers and the interface cables.

The alarm does not affect the operation of the indicator lights or the ability of the module to report errors to the host.

Use the following procedure to turn off the alarm and to identify the problem that caused the alarm to sound. Figure 2-3 shows the location of the Alarm Mute button.

**1** Locate the module with the alarm sounding and the amber Global Fault light illuminated.

**2** Press the Alarm Mute button to turn off the alarm. If another fault occurs, the alarm will sound again.



1. Power Light
2. Global Fault Light
3. Alarm Mute Button

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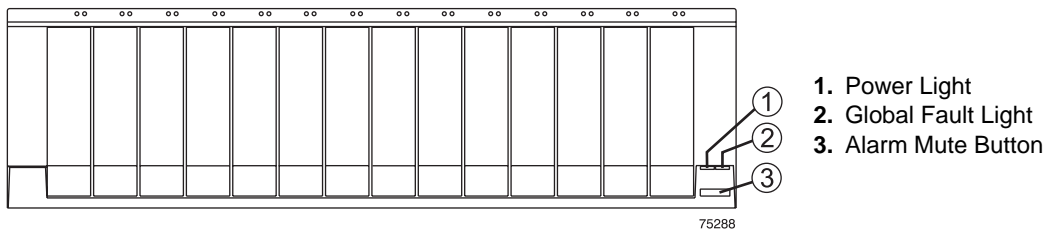
Figure 2-3  Alarm Mute Button

**3** Remove the back cover, if needed.

**4** Determine the status of each module and its components.

   **a** Note the status of the lights on the front and the back of each module.

     A green light indicates a normal status; an amber light indicates a hardware fault.

   **b** Open the Array Management Window for the storage array.

   **c** To view the status of its components, select the appropriate component button for each module in the Physical View of the Array Management Window. The status for each component will be either Optimal or Needs Attention.

**5** Does each module display green lights only, and is the status Optimal on each module component?

    **a** **Yes** – Go to step 7.

    **b** **No** – Go to step 6.

---

**IMPORTANT** If a fault requires you to turn off the power to an attached module, you may need to cycle the power on all other modules in the storage array. Contact technical support before turning off the power to any attached modules.

---

**6** Diagnose and correct the fault.

    **a** To run the Recovery Guru, select the Recovery Guru toolbar button in the Array Management Window.

    **b** Complete the recovery procedure.

       If the Recovery Guru directs you to replace a failed component, use the individual lights on the modules to locate the specific failed component. For troubleshooting procedures, refer to Chapter 3, "Troubleshooting and Recovery."

    **c** When the recovery procedure is completed, select Recheck in the Recovery Guru to re-run the Recovery Guru and to ensure that the problem has been corrected.

    **d** If the problem persists, contact technical support.

**7** Replace the back cover, if needed.

**End Of Procedure**

# *Troubleshooting and Recovery*

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This chapter provides procedures for diagnosing and correcting problems with the E2600 array module.

## Troubleshooting the Array Module

The storage management software provides the best way to monitor the modules, diagnose problems, and to recover from hardware failures. You should run the storage management software continuously and check the status of the storage array frequently.

Use the following procedure to check the status and identify problems with the array module.

1 Open the Array Management Window for this storage array.

2 Select the component button for each module in this storage array. View the status of all components.

The status for each component will be either Optimal or Needs Attention.

3 Do any components have a Needs Attention status?

- **Yes** – Go to step 4.

- **No** – All components are Optimal. Go to step 5.

| | |
|---|---|
| **IMPORTANT** | If a fault requires you to power off an attached module, you may need to cycle the power on all remaining modules in the storage array. Contact technical support before powering off any attached modules. |

4 To correct the problem, select the Recovery Guru toolbar button. Perform the procedure in the Recovery Guru to correct the problem.

The Recovery Guru might direct you to replace the failed component. If so, go to step 7 on page 3-2.

5 Check the lights on the front of the module. A green light indicates a normal status; an amber light indicates a hardware fault.

**6** Are any amber lights on?

- **Yes** – Go to step 7.

- **No** – You are finished with this procedure. If you are still experiencing a problem with this storage array, go to step 10.

**7** Remove the back cover, if needed.

**8** If needed, turn off the alarm.

**9** Check all of the lights on the front and the back of each module. Figure 3-1 on page 3-3 and Figure 3-2 on page 3-4 show the locations of indicator lights.

**10** If you are still experiencing a problem with this storage array, create, save, and print a storage array profile, and then call technical support for assistance.

The storage array profile might be helpful when troubleshooting.

**11** Replace the back cover, if needed.

**End Of Procedure**
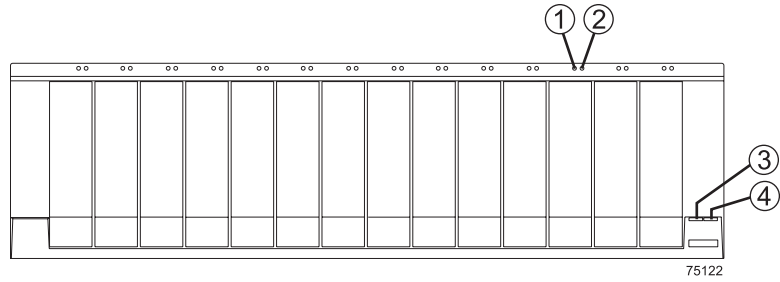
Figure 3-1  Lights on the Front of an Array Module

Table  3-1    Lights on the Front of an Array Module

| Location | Component Light | Color | Normal Status | Problem Status |
|----------|-----------------|-------|---------------|----------------|
| Drives | | | | |
| 1 | Drive Active | Green | On, not flashing - no data is being processed<br><br>Flashing - data is being processed | Off |
| 2 | Drive Fault | Amber | Off<br><br>Flashing - drive, volume, or storage array locate function | On, not flashing |
| Global | | | | |
| 3 | Global Power | Green | On | Off |
| 4 | Global Fault | Amber | Off | On |
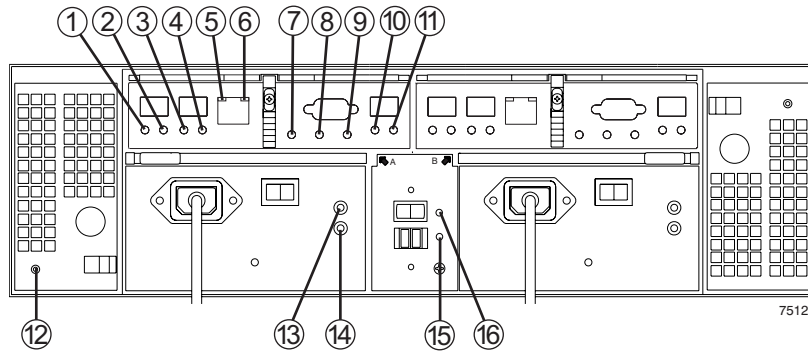
Figure 3-2  Lights on the Back of an Array Module

Table  3-2    Lights on the Back of an Array Module

| Location | Light | Color | Normal Status | Problem Status |
|---|---|---|---|---|
| Controller | | | | |
| 1 | Host Connector 1 Link Indicator | Green | On | Off |
| 2 | Host Connector 1 Speed Indicator | Green | On - 2 Gb/s data rate Off - 1 Gb/s data rate | Not Applicable |
| 3 | Host Connector 2 Link Indicator | Green | On | Off |
| 4 | Host Connector 2 Speed Indicator | Green | On - 2 Gb/s data rate Off - 1 Gb/s data rate | Not Applicable |
| 5 | Ethernet link indicator | Green | On - Connection active Off - Connection inactive | Not Applicable |
| 6 | Ethernet 100BASE-TX indicator | Green | On - 100BASE-TX connection Off - 10BASE-T (or inactive) | Not Applicable |
| 7 | Battery Charging/ Charged | Green | On -Battery charged Flashing - battery charging | Off |
| 8 | Cache Active | Green | On | Off (if cache enabled) |
| 9 | Fault | Amber | Off | On |
| 10 | Drive Link | Green | On | Off |
| 11 | Expansion Port Bypass | Amber | Off | On |

Table 3-2  Lights on the Back of an Array Module  (continued)

| Location | Light | Color | Normal Status | Problem Status |
|----------|-------|-------|---------------|----------------|
| Fan | | | | |
| 12 | Fan Fault | Amber | Off | On |
| Power Supply | | | | |
| 13 | Power | Green | On | Off |
| 14 | Fault | Amber | Off | On |
| Link Rate | | | | |
| 15 | 2 Gb/s Link Rate | Green | On | Not Applicable |
| 16 | Tray ID Conflict | Amber | Off | On - Tray IDs incorrect |

# Recovering from an Overheated Power Supply

All modules contain two power supplies, each containing a built-in temperature sensor designed to prevent the power supplies from overheating. Under normal operating conditions, with an ambient air temperature range of $5^{\circ}$ C to $40^{\circ}$ C ($40^{\circ}$ F to $104^{\circ}$ F), the fans in the module maintain a proper operating temperature inside the module.

If the internal temperature exceeds $70^{\circ}$ C ($158^{\circ}$ F), the power supplies shut down automatically. If both power supplies shut down because of overheating, the module has no power and all indicator lights are off.

The following factors can cause the power supplies to overheat:

• An unusually high room temperature

• A fan failure

• Defective circuitry in the power supply

• A blocked air vent

• A failure in another device in the storage array cabinet

If a fan failure has caused the overheating, the fan Fault lights and the power supply Fault lights turn on.

If the module temperature exceeds $45^{\circ}$ C ($113^{\circ}$ F), the storage management software displays a Needs Attention icon in the Array Management Window.

If event monitoring is enabled, and if event notification is configured, the software also issues one or both of the following critical problem notifications:

• If *one* power supply shuts down, the storage management software will display a Needs Attention status in the Array Management Window.

- If *both* power supplies shut down, the module will shut down, and the storage management software will display a Not Responding status in the Array Management Window.

Use the following procedure to resume normal operation after a power supply shutdown. Figure 3-3 on page 3-7 shows the locations of the power switches.

---

**CAUTION**    **Risk of damage from overheating.** Power supplies automatically shut down when the air temperature inside the cabinet reaches $70^{°}$ C ($158^{°}$ F). If the power supplies have shut down, immediately remove all cabinet panels to help cool the cabinet air temperature and prevent damage to the modules.

---

**1**  Remove the back cover, if needed.

**2**  If needed, turn off the alarm.

**3**  Did you use the procedure "Troubleshooting the Array Module" on page 3-1 to identify an overheating problem?

- **Yes** – Go to step 4.

- **No** – Perform the procedure on page 3-1 to verify that the power supplies have shut down because of an overheating problem. When finished, go to step 4.

**4**  Stop I/O activity to the module and all attached modules.

**5**  To alleviate the overheating problem, perform any or all of the following cooling measures:

- Immediately remove all panels from the cabinet.

- Use external fans to cool the area.

- Shut down the power to the modules in the cabinet, using the procedure described in "Turning Off the Power" on page 2-5.

**6**  Wait for the air temperature in and around the module to cool.

After the temperature inside the power supplies cools to below $70^{°}$ C ($158^{°}$ F), the module is capable of a power-up recovery without operator intervention. After the air has cooled, the power supplies should turn on automatically. If the power supplies restart automatically, the controllers reset and return to normal operation.

**7**  Did the power supplies restart automatically?

- **Yes** – Go to step 9 on page 3-7.

- **No** – Go to step 8.

**8**  Turn on both power switches on the back of each drive module connected to the array module.

The drive modules will not spin up until they receive a Start Unit command from the controller. While the drive modules power up, the lights on the front and the back of the modules will blink. Depending on your configuration, it can take between 20 seconds and several minutes for the drive modules to power up.

**9** Turn on both power switches on the back of the array module.

An array module can take 30 seconds to power up and up to 15 minutes for the battery self-test to complete. During this time, the lights on the front and the back of the modules blink.



**1.** Power Switch
**2.** Power Switch
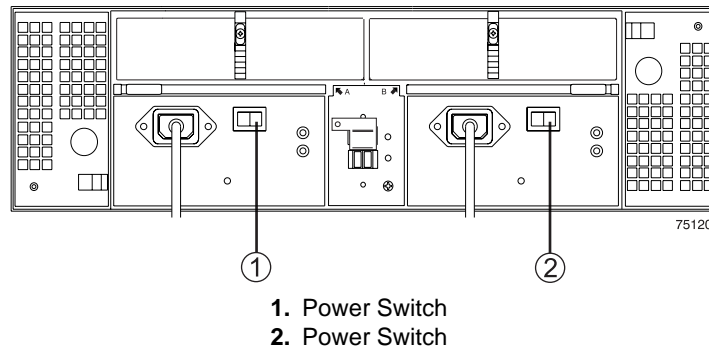
Figure 3-3  Power Switches

**10** Check the status of each module and its components.

    **a** Note the status of the lights on the front and the back of each module.

       A green light indicates a normal status; an amber light indicates a hardware fault.

    **b** Open the Array Management Window for the storage array.

    **c** Select the appropriate component button for each module in the Physical View of the Array Management Window to view the status of its components.

       The status for each component will be either Optimal or Needs Attention.

**11** Does each module display green lights only and is the status Optimal on each module component?

    ▪ **Yes** – Go to step 13 on page 3-8.

    ▪ **No** – Go to step 12 on page 3-8.

**12** Diagnose and correct the fault.

    **a** To run the Recovery Guru, select the Recovery Guru toolbar button in the Array Management Window.

    **b** Complete the recovery procedure. If the Recovery Guru directs you to replace a failed component, use the individual lights on the modules to locate the specific failed component.

       Figure 3-1 on page 3-3 and Figure 3-2 on page 3-4 show the locations of the lights. Table 3-1 on page 3-3 and Table 3-2 on page 3-4 list the interpretations of lights on the array module.

    **c** When the procedure is completed, select Recheck in the Recovery Guru to re-run the Recovery Guru and ensure that the problem has been corrected.

    **d** If the problem persists, contact technical support.

**13** Reinstall the back cover, if needed.

**End Of Procedure**

# Setting the Tray ID Switch

Use the following procedure to set the Tray ID switch if a tray ID conflict is indicated. Figure 3-4 on page 3-9 shows the location of the Tray ID switch.

---

**CAUTION**    **Electrostatic discharge damage to sensitive components.** To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling the module components.

---

---

**IMPORTANT**  Each module must have its own unique tray ID.

---

**1** Put on antistatic protection.

**2** Remove the back cover, if needed.

**3** Locate the Tray ID switch on the back of the module between the power supplies.

**4** Remove the screw and the switch cover.

**1.** Cover Plate
**2.** Screw
**3.** Tray ID Switch

75320
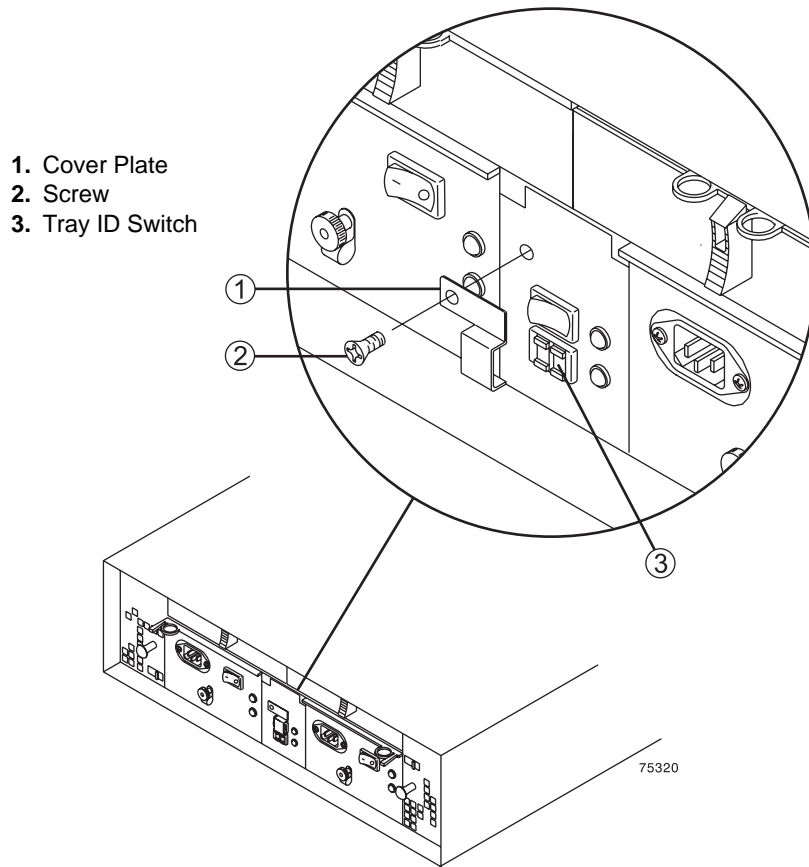
Figure 3-4  Setting the Tray ID Switch

**5** Set the Tray ID switch to the desired switch setting.

The settings for each tray ID digit (X10 and X1) range from 0 through 7.
Recommended unique IDs range from 01 through 77.

**6** Replace the switch cover and tighten the screw to secure it into place.

**7** If applicable, repeat for all other modules in the storage array.

**8** Reinstall the back cover, if needed.

**End Of Procedure**

# Verifying the Link Rate Setting

Use the following procedure to verify the link rate setting if a link rate problem is indicated. Figure 3-5 on page 3-10 shows the location of the Link Rate switch.

| | |
|---|---|
| **CAUTION** | **Electrostatic discharge damage to sensitive components.** To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling the module components. |

**1** Put on antistatic protection.

**2** Remove the back cover, if needed.

**3** Locate the Link Rate switch on the back of the module between the two power supplies. Remove the screw and the switch cover.



**1.** Cover Plate
**2.** Screw
**3.** Link Rate Switch
**4.** 2 Gb/s Link Rate Light

75112
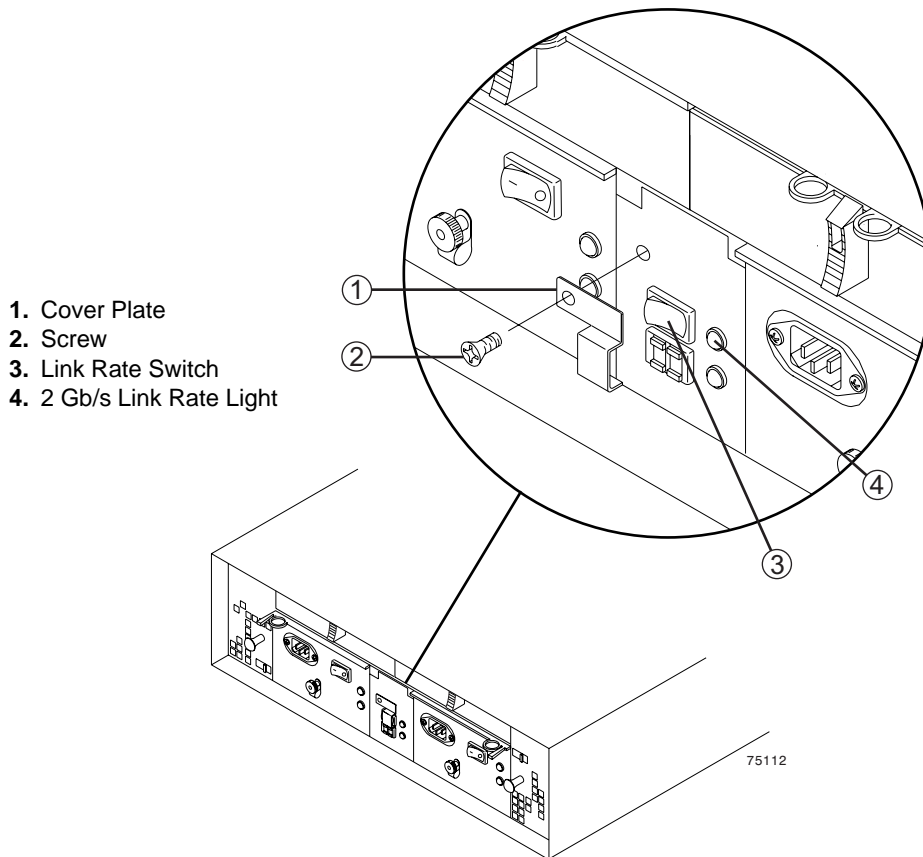
Figure 3-5  Verifying the Link Rate Setting

**4** Verify that the Link Rate switch is set to 2 Gb/s.

The Link Rate switch is not active. This switch is pre-set to 2 Gb/s at the factory.

**5** Replace the switch cover and tighten the screw to secure it into place.

**6** If applicable, repeat for all other modules in the storage array.

**7** Reinstall the back cover, if needed.

**End Of Procedure**

E2600 Array Module User Guide

*Chapter* 4

# *Replacing a Failed Component*

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

This chapter provides procedures for replacing failed components in an E2600 array module. Before using the procedures in this chapter, perform the appropriate troubleshooting steps described in Chapter 3, "Troubleshooting and Recovery," and in the Recovery Guru.

The replacement procedures described in this chapter can be performed as hot swap procedures. *Hot swap* refers to the ability to remove and replace a component of the array module while it is processing I/O activity.

In a fully-configured array module, each component is redundant except for the midplane circuit board. If any redundant component fails and the storage array has been configured for data redundancy, the component can be replaced without powering off the array module and without interrupting data processing.

## Replacing a Controller

Use the following procedure to replace a controller in an array module.

---

**IMPORTANT** To provide full functionality in dual controller configurations, the two controllers should have the same memory capacity. Although two controllers of different memories can be paired in an array module, the mismatch will cause some functions to be disabled, such as cache mirroring.

---

---

**IMPORTANT** On dual controller array modules, a controller can be replaced without interrupting data transfer from the host. On a single controller array module, data transfer from the host must be terminated before the controller can be replaced.

---

## Tools and Equipment

- Antistatic protection

- Phillips-head screwdriver

- Replacement controller

## Procedure

**1** If needed, use the storage management software to create, save, and print a new storage array profile.

**2** Did the Recovery Guru direct you to replace a failed controller?

- **Yes** – Go to step 3.

- **No** – Run the Recovery Guru to identify the failed component. Go to step 3.

**3** Remove the back cover, if needed.

**4** If needed, turn off the alarm.

---

**CAUTION**    **Electrostatic discharge damage to sensitive components.** To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling the module components.

---

**5** Put on antistatic protection.

**6** Unpack the new controller.

Set the new controller on a dry, level surface. Save all packing materials in case you need to return the controller.

**7** Check the Fault lights to locate the failed controller. On the failed controller, the amber fault light will be illuminated. Figure 4-1 on page 4-3 shows the location of the fault light.

---

**CAUTION**    **Potential degraded performance.** To prevent degraded performance or damaged cables, do not twist, fold, pinch, or step on fiber-optic cables. Do not bend the fiber-optic cables tighter than a 5-cm (2-in.) radius.

---

**8** Disconnect the SFP transceivers and all attached interface cables from the *failed* controller. Label all cables such that you can reconnect them correctly to the new controller.

**1.** Fiber Optic Cable
**2.** SFP Transceiver
**3.** Interface Connector
**4.** Fault Light
**5.** Controller

75316
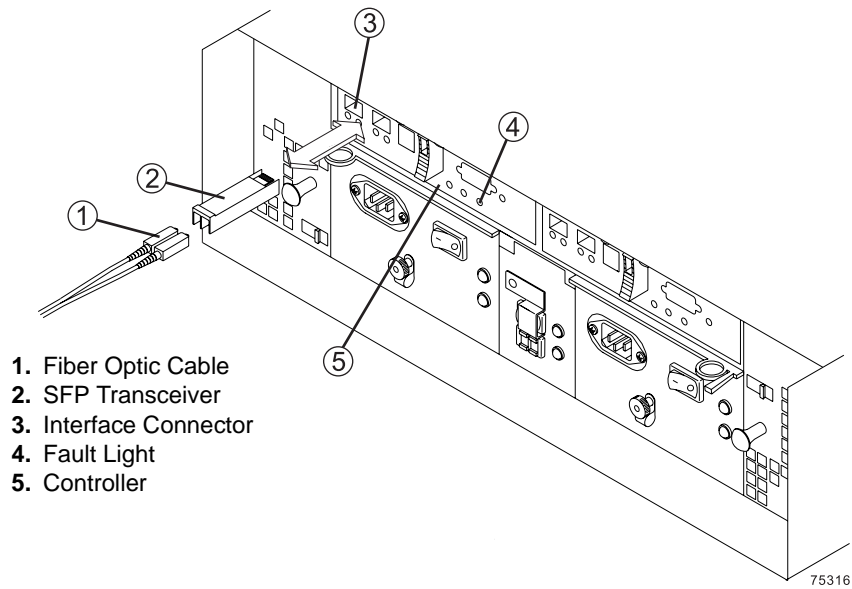
Figure 4-1  Removing an SFP Transceiver and Fiber Optic Cable

**9** Remove the failed controller. Figure 4-2 illustrates the following steps:

   **a** Push down on the latch.

   **b** Open the levers.

   **c** Remove the controller from the array module.



**1.** Lever
**2.** Pull Ring
**3.** Latch

73145
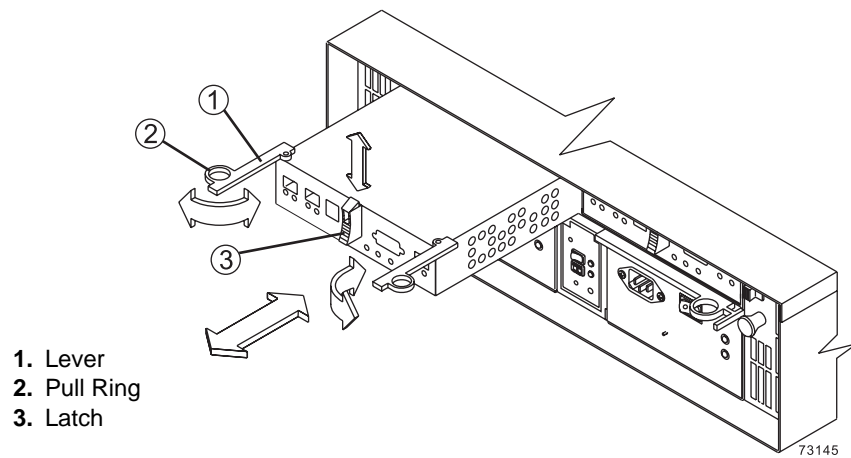
Figure 4-2  Removing and Replacing a Controller

**10** Does the replacement controller already have a battery installed?

- **Yes** – Go to step 14 on page 4-5.

- **No** – If the battery in the failed controller is still viable, you have the option of using that battery in the replacement controller. Go to step 11.

**11** Are you using the battery from the old controller?

- **Yes** – Go to step 12.

- **No** – Unpack the new battery.

   Set the new battery on a dry, level surface. Save all packing materials in case you need to return the battery, and then go to step 13 on page 4-5.

**12** Remove the battery from the failed controller.

   **a** Turn the controller upside down, remove the screws securing the controller cover, and remove the cover. Figure 4-3 shows the cover and screws.

   **b** Remove the single screw securing the battery bracket, slide the bracket sideways to clear the lugs, and lift the bracket up. Figure 4-4 on page 4-5 shows the bracket in relation to the controller.

   **c** Disconnect the battery harness from its controller board connector.

   **d** Remove the battery from the controller.

   You may need to hold the controller close above a flat surface and let the battery fall out. Do not let the battery pull on the battery harness.



1. Cover

73142
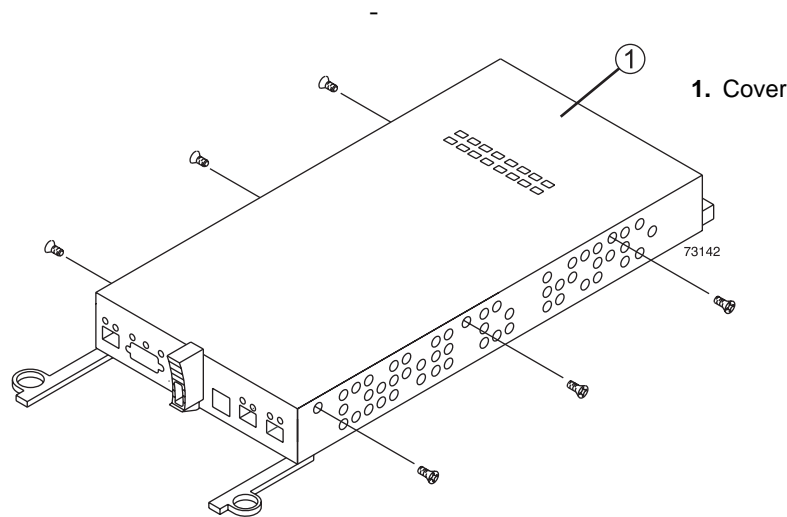
Figure 4-3  Removing the Controller Cover (Upside-Down View)

1. Battery Bracket
2. Battery
3. Cover
4. Battery Connector
5. Controller Board
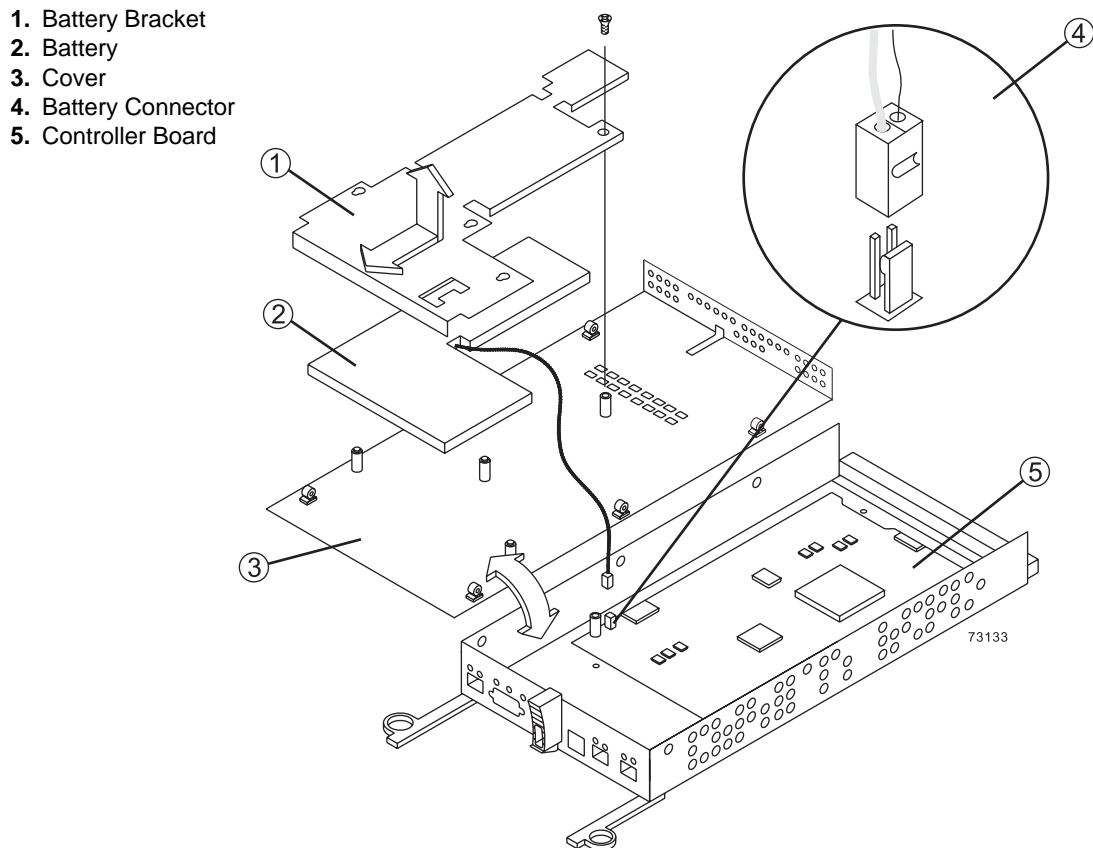


Figure 4-4  Replacing the Controller Battery

**13** Install the replacement battery in the new controller.

    **a** Connect the battery harness on the replacement battery to the connector on the controller board in the new controller. Figure 4-4 illustrates this connection.

    **b** Position the battery inside the new controller.

    **c** Replace the controller cover, and secure the screws. Figure 4-3 on page 4-4 shows these screws.

**14** Update the following information on the controller labels. Figure 4-5 on page 4-6 shows the location of the labels.

    ▪ **Date of Installation –** Enter today's date.

    ▪ **Replacement Date –** Enter the date two years from now.

    ▪ **MAC Address –** Record the MAC address for the new controller. You will need this information in step 17.

1. Battery Label
2. Board Serial Number and
   MAC Address Label
3. Board Serial Number
4. MAC Address
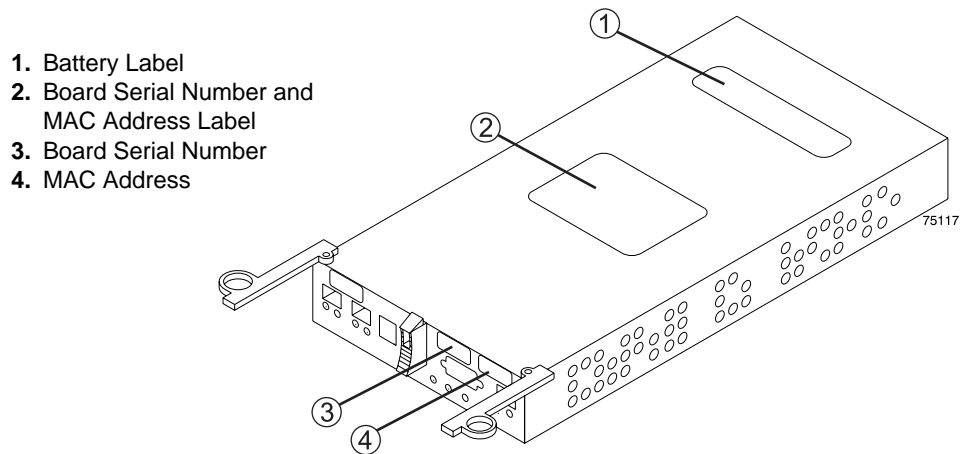
Figure 4-5  Label Locations on the Controller

**15** Slide the replacement controller all the way into the empty slot and lock the levers into place. Figure 4-2 on page 4-3 illustrates removing and inserting a controller.

**16** Reconnect the SFP transceivers and attach the host interface cables and drive interface cables to their original locations. Figure 4-1 on page 4-3 illustrates connecting an SFP transceiver.

**17** Change the bootstrap protocol (BOOTP) server configuration to the MAC address you recorded in step 14. For detailed information on the configuration procedure, refer to your specific operating system administrator's guide.

**18** Wait approximately 60 seconds for the storage management software to recognize the new controller, and then go to step 19 on page 4-7.

---

**CAUTION**     **Potential loss of data access.** If the battery age is set incorrectly, you might not be notified to change the battery at the correct time, and loss of data access might occur. Contact technical support if the battery age is mistakenly reset.

---

---

**IMPORTANT**  During the Recovery Guru procedure, you will be asked to reset the battery age to zero for the battery and controller that you just installed. If you used the battery from the failed controller, *do not* reset the age.

If you installed the new battery, be sure that you reset the age for the battery in the replacement controller. The software may display a message indicating that the battery in the new controller has failed or is nearing its expiration date. This message will disappear after you reset the battery age and the battery is fully charged.

---

**19** Complete any remaining Recovery Guru procedures for battery replacement, if needed.

**20** Based on the status of the Host Link, Drive Link, and Fault lights, select one of the following steps. Figure 4-6 shows the locations of these lights.

- **All Link lights are off** *or* **the Fault light is illuminated –** Verify that the controller has been installed correctly. Reinstall the controller, and then go to step 21.

- **All Link lights are on** *and* **the Fault light is off –** Go to step 22**.**



1. Ethernet Link Light
2. Host Connector 1 Link Light
3. Host Connector 2 Link Light
4. Fault Light
5. Drive Link Light

75319
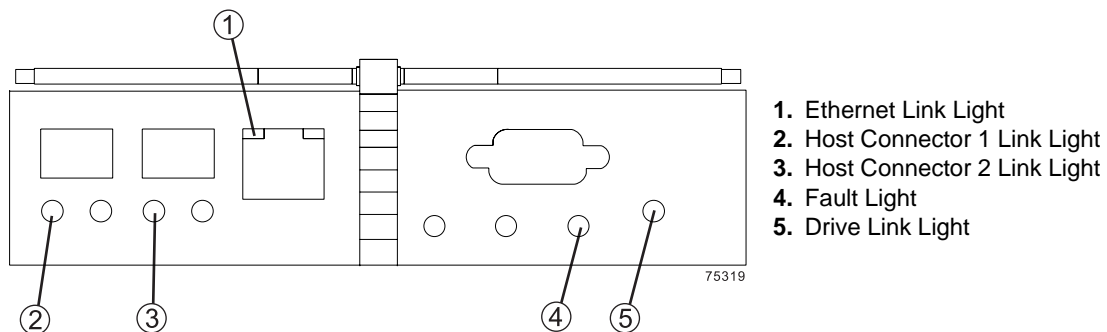
Figure 4-6  Controller Host Link, Drive Link, and Fault Lights

**21** Is the problem corrected?

- **Yes** – Go to step 22.

- **No** – Contact technical support.

**22** Remove the antistatic protection.

**23** If needed, reinstall the back cover.

**24** Use the Array Management Window to check the status of each module.

**25** Do any components have a Needs Attention status?

- **Yes** – Select the Recovery Guru toolbar button in the Array Management Window and complete the recovery procedure. If the problem persists, contact technical support.

- **No** – Go to step 26.

**26** Create, save, and print a new storage array profile.

**End Of Procedure**

# Replacing a Controller Battery

Use the following procedure to replace a controller battery.

## Tools and Equipment

- Antistatic protection

- Phillips-head screwdriver

- Replacement controller battery

## Procedure

**1** If needed, use the storage management software to create, save, and print a new storage array profile.

**2** Did the Recovery Guru direct you to replace a failed controller battery?

- **Yes** – Go to step 3.

- **No** – Run the Recovery Guru to identify the failed component, and then go to step 3.

**3** Remove the back cover, if needed.

**4** If needed, mute the alarm.

| | |
|---|---|
| **CAUTION** | **Electrostatic discharge damage to sensitive components.** To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling the module components. |

**5** Put on antistatic protection.

**6** Unpack the new battery.

Set the new battery on a dry, level surface. Save all packing materials in case you need to return the battery.

**7** Check the Fault lights to locate the failed controller battery. If a fault is detected, the amber Fault light will be illuminated. Figure 4-7 on page 4-9 shows the locations of these lights.

---

**CAUTION**    **Potential degraded performance.** To prevent degraded performance or damaged cables, do not twist, fold, pinch, or step on fiber-optic cables. Do not bend the fiber-optic cables tighter than a 5-cm (2-in.) radius.

---

**8** Disconnect the SFP transceivers and all attached interface cables from the failed controller. Label all cables such that you can reconnect them correctly to the new controller. Figure 4-7 illustrates disconnecting a cable.

**1.** Fiber Optic Cable
**2.** SFP Transceiver
**3.** Interface Connector
**4.** Fault Light
**5.** Controller



75316
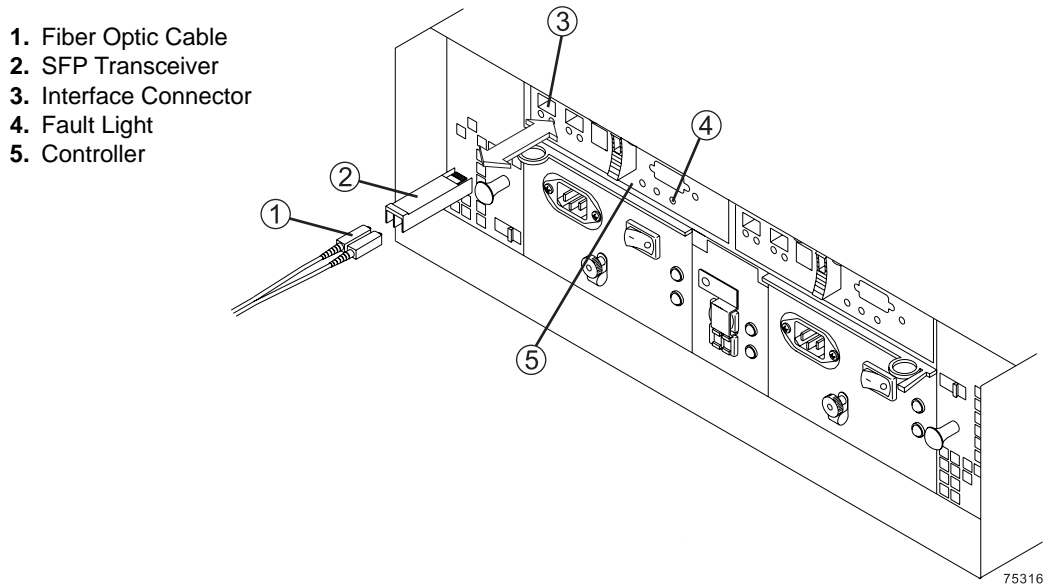
Figure 4-7  Removing the SFP Transceiver and Fiber Optic Cable

**9** Remove the failed controller. Figure 4-8 on page 4-10 illustrates the following steps:

   **a** Push down on the latch.

   **b** Open the levers.

   **c** Remove the controller.

**1.** Lever
**2.** Pull Ring
**3.** Latch
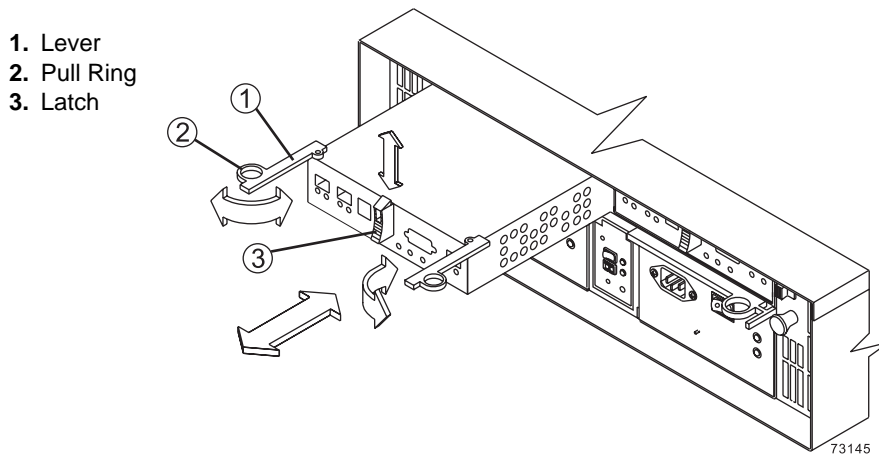
Figure 4-8  Removing and Replacing a Controller

**10** Complete the following steps to replace the controller battery:

**a** Turn the controller upside down, remove the screws securing the controller cover, and remove the cover. Figure 4-9 on page 4-11 shows the cover and screws.

**b** Remove the single screw securing the battery bracket, slide the bracket sideways to clear the lugs, and lift the bracket up. Figure 4-10 on page 4-11 shows the bracket in relation to the controller.

**c** Disconnect the battery harness from its controller board connector.

**d** Remove the battery from the controller.

You may need to hold the controller close above a flat surface and let the battery fall out. Do not let the battery pull on the battery harness.

**e** Connect the battery harness on the replacement battery to the connector on the controller board in the new controller. Figure 4-10 on page 4-11 illustrates this connection.

**f** Position the battery inside the new controller.

**g** Replace the controller cover and secure the screws. Figure 4-9 on page 4-11 shows these screws.

①  **1.** Controller Cover

73142
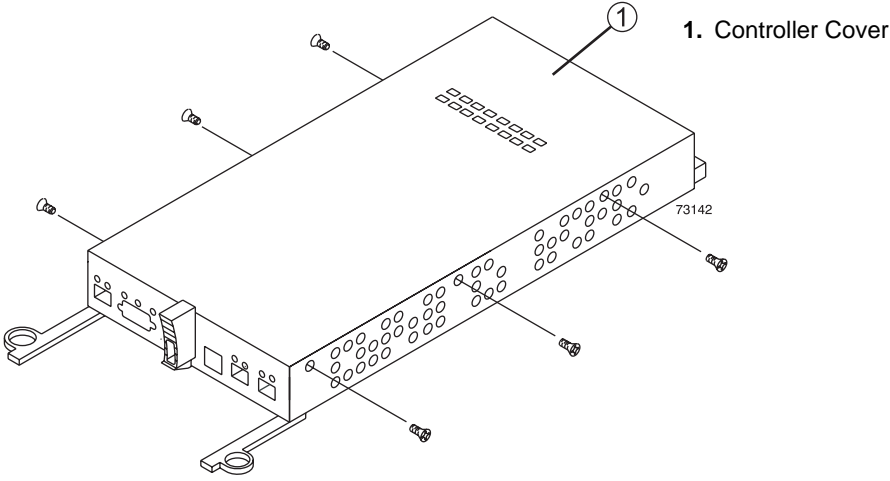
Figure 4-9  Removing the Controller Cover (Upside-Down View)

**1.** Battery Bracket
**2.** Battery
**3.** Cover
**4.** Battery and
   Controller Board
   Connectors
**5.** Controller Board

④

①

②

③

⑤

73133
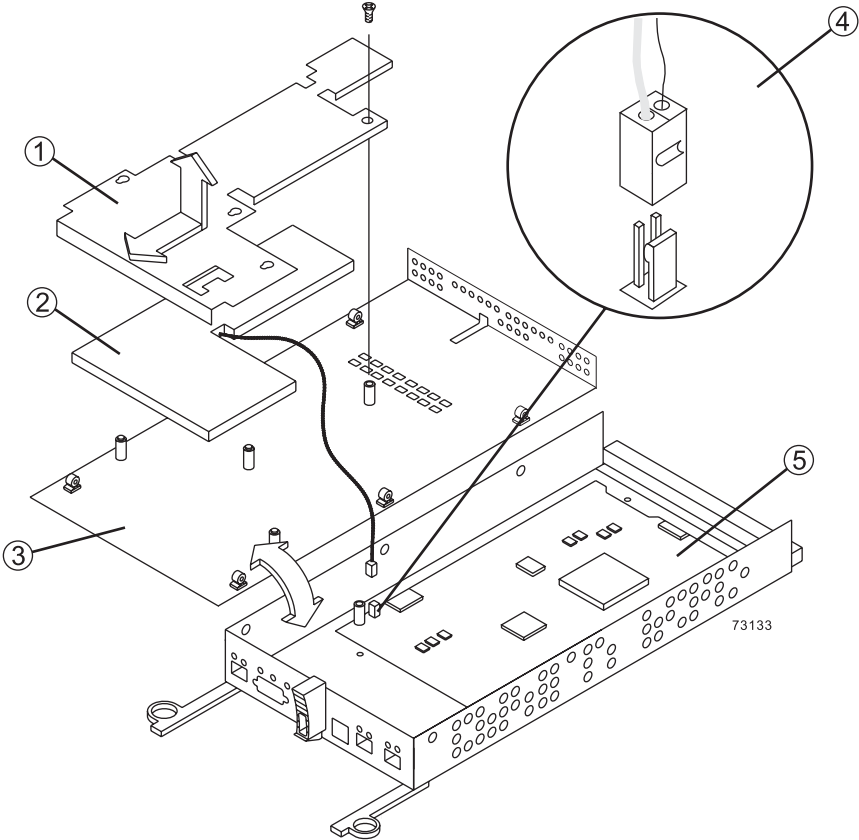
Figure 4-10  Removing and Installing the Controller Battery

**11** Update the following information on the new controller labels and attach the labels to the replacement controller. Figure 4-11 shows the locations of the labels.

- **Date of Installation –** Enter today's date.

- **Replacement Date –** If a new battery is used, enter the date two years from now. If the battery from the old controller is used, copy the date from the battery label on the old controller.

**1.** Battery Label
**2.** Board Serial Number and
   MAC Address Label
**3.** Board Serial Number
**4.** MAC Address
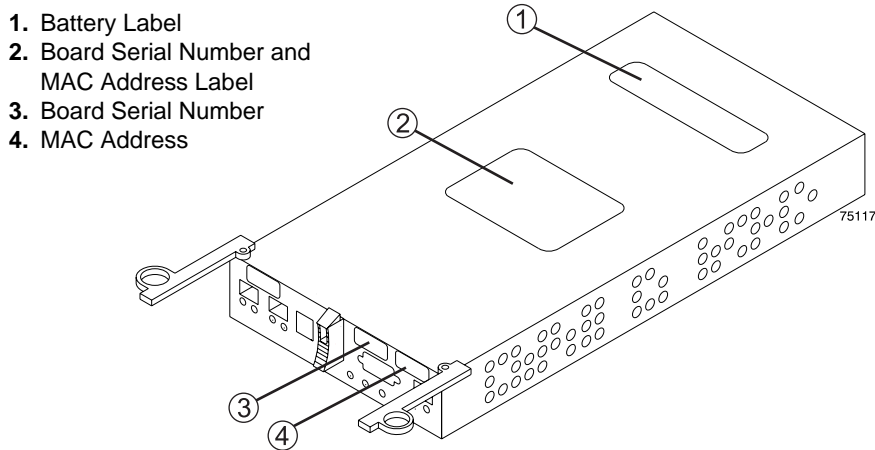


Figure 4-11  Label Locations on the Controller

**12** Slide the replacement controller all the way into the empty slot and lock the levers into place. Figure 4-8 on page 4-10 illustrates installing a controller.

**13** Reinstall the SFP transceivers to their original connectors, and attach the host and drive interface cables to their respective SFP transceivers. Figure 4-7 on page 4-9 illustrates installing an SFP transceiver and cable.

**14** Wait approximately 60 seconds for the storage management software to recognize the new controller.

**CAUTION**   **Potential loss of data access.** If the battery age is set incorrectly, you might not be notified to change the battery at the correct time, and loss of data access might occur. Contact technical support if the battery age is mistakenly reset.

**IMPORTANT**  Reset the age of the new battery to zero when asked to do so during the Recovery Guru procedure. The software may display a message indicating that the battery in the new controller has failed or is nearing its expiration date. This message will disappear after you reset the battery age and the battery is fully charged.

**15** Complete any remaining Recovery Guru procedures for the controller replacement.

**16** Select one of the following steps, based on the status of the Host Link, Drive Link, and Fault lights. Figure 4-12 on page 4-14 shows the locations of these lights.

- **All Link lights are off** *or* **the Fault light is illuminated –** Verify that the controller has been installed correctly. Reinstall the controller, and then go to step 17.

- **All Link lights are on** *and* **the Fault light is off –** Go to step 18.

**17** Is the problem corrected?

- **Yes** – Go to step 18.

- **No** – Contact technical support.

**18** Remove the antistatic protection and reinstall the back cover, if needed.

**19** Check the status of all modules.

**20** Do any components have a Needs Attention status?

- **Yes** – Select the Recovery Guru toolbar button in the Array Management Window and complete the recovery procedure. If the problem persists, contact technical support.

- **No** – Go to step 21.

**21** Create, save, and print a new storage array profile.

> **CAUTION**   (C01) **Potentially hazardous material** – The battery pack contains sealed lead acid batteries that might be considered hazardous material. If you recycle a used battery pack that is not damaged, use the proper facilities. Handle the battery pack according to all applicable regulations.

> **CAUTION**   (C02) **Potentially hazardous material** – If the used battery pack is physically damaged or is leaking, DO NOT ship the battery pack to a recycling center. Handling a damaged battery pack exposes you and others to potentially hazardous material. Dispose of the damaged battery pack according to all applicable regulations.

**22** Dispose of the used battery according to local and federal regulations, which may include hazardous material handling procedures.

**23** After 24 hours, check the Host Link, Drive Link, Fault, and Battery lights to ensure that the battery is working properly. Figure 4-12 on page 4-14 shows the locations of these lights.

If the battery has a fault, use the storage management software to check the array module status and obtain the recovery procedure.



1. Ethernet Link Light
2. Host Connector 1 Link Light
3. Host Connector 2 Link Light
4. Fault Light
5. Drive Link Light
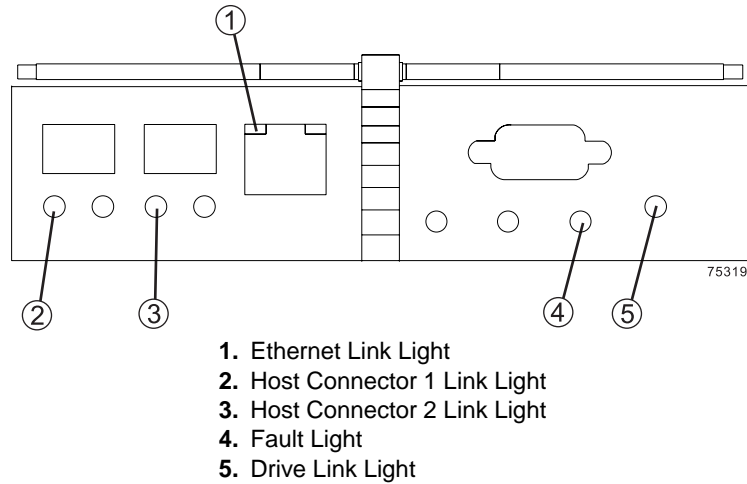
Figure 4-12  Drive Link, Host Link, and Fault Lights

**End Of Procedure**

# Replacing a Drive

Use the following procedure to replace a drive in an array module. Figure 4-13 on page 4-16 illustrates inserting and removing a drive.

## Tools and Equipment

• Antistatic protection

• Replacement drive

## Procedure

| CAUTION | **Mixed configurations speed requirements.** In configurations involving various models of command modules, array modules, or drive modules, all modules must be operating at the same speed. Refer to the *Storage System Product Release Notes for Version 9.1*x for any model-specific restrictions. |
| --- | --- |

_____

---

**IMPORTANT**  For optimum performance, never insert a drive into an array module
without first confirming the firmware level of the drive. Contact technical
support for information on supported drive firmware levels.

---

**1**  Use the storage management software to create, save, and print a new storage array
profile.

**2**  Did the Recovery Guru direct you to replace a failed drive?

- **Yes** – Go to step 3.

- **No** – Run the Recovery Guru to identify the failed component,
  and then go to step 3.

**3**  Remove the front cover, if needed.

**4**  If needed, mute the alarm.

---

**CAUTION**  **Electrostatic discharge damage to sensitive components.** To prevent
electrostatic discharge damage to the module, use proper antistatic
protection when handling the module components.

---

**5**  Put on antistatic protection.

---

**CAUTION**  **Potential damage to drives**. Bumping disk drives against another
surface can damage the drive mechanism or connectors. To prevent
damage when removing or installing a drive, always place your hand
under the drive to support its weight.

---

**6**  Unpack the new drive.

Set the new drive on a dry, level surface, away from magnetic fields. Save all packing
materials in case you need to return the drive.

---

**CAUTION**  **Risk of equipment malfunction.** To avoid exceeding the functional
and environmental limits, install only drives that have been
provided or approved by the original manufacturer. Not all drive
modules are shipped with pre-populated drives. System integrators,
resellers, system administrators, or users of the drive module can
install the drives.

---

| | |
|---|---|
| **CAUTION** | **Potential loss of data access.** Removing a drive that has not failed might cause a volume to fail. To prevent loss of access to data, remove only a failed drive that has a Fault light on or has a Failed status in the storage management software. |

**7** Check the Fault lights on the front of the module. If a fault is detected, the amber Fault light will be on.

| | |
|---|---|
| **IMPORTANT** | If you remove an active drive accidentally, wait 30 seconds and then reinstall it. Refer to your storage management software for the recovery procedure. |

**8** Lift the locking lever, and remove the failed drive.



**1.** Drive
**2.** Locking Lever
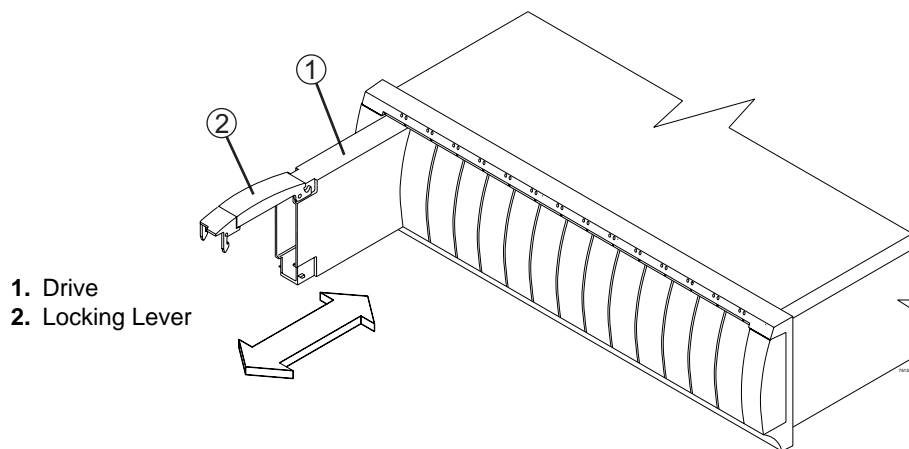
Figure 4-13  Replacing a Drive

**9** Wait 30 seconds for the storage management software to recognize that the drive has been removed.

**10** Slide the new drive all the way into the empty slot and close the drive lever.

As the drive spins up, the Fault light may flash intermittently. A flashing Active light indicates that data is being restored to the new drive.

| | |
|---|---|
| **IMPORTANT** | Depending on your storage array configuration, the storage array may automatically reconstruct data to the new drive. If the storage array uses hot spares, it may have to complete reconstruction on the hot spare before it copies the data to the replaced drive. This increases the time required to complete this procedure. |

**11** Select one of the following steps, based on the status of the Active and Fault lights:

- **Active light is off** – The drive may be installed incorrectly. Remove the drive, wait 30 seconds, and then reinstall it. When finished, go to step 12 on page 4-17.

- **Fault light is illuminated** – The new drive may be defective. Replace it with another new drive, and then go to step 12 on page 4-17.

- **Active lights are on *and* Fault lights are off** – Go to step 13 on page 4-17.

**12** Is the problem corrected?

- **Yes** – Go to step 13.

- **No** – Contact technical support.

**13** Remove the antistatic protection, and reinstall the front cover, if needed.

**14** Bring the new drive online using the storage management software.

**15** Complete any remaining Recovery Guru procedures, if needed.

**16** Check the status of all modules in the storage array.

**17** Do any components have a Needs Attention status?

- **Yes** – Select the Recovery Guru toolbar button in the Array Management Window and complete the recovery procedure. If the problem persists, contact technical support.

- **No** – Go to step 18.

**18** Create, save, and print a new storage array profile.

**End Of Procedure**

# Replacing a Fan

Use the following procedure to replace a fan in an array module. Figure 4-14 on page 4-18 illustrates inserting and removing a fan.

## Tools and Equipment

- Antistatic protection

- Replacement fan

## Procedure

**1** If needed, use the storage management software to create, save, and print a new storage array profile.

**2** Did the Recovery Guru direct you to replace a failed fan?

- **Yes** – Go to step 3.

- **No** – Run the Recovery Guru to identify the failed component, and then go to step 3.

**3** Remove the back cover, if needed.

**4** If needed, mute the alarm.

---

**CAUTION** **Electrostatic discharge damage to sensitive components.** To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling the module components.

---

**5** Put on antistatic protection.

**6** Unpack the new fan.

Set the new fan on a dry, level surface. Save all packing materials in case you need to return the fan.

**7** If the storage management software instructs you to do so, turn off both power switches on the module. Otherwise, leave the power on.

**8** Check the Fault lights to locate the failed fan. If a fan has a fault, its light will be illuminated and amber.

**9** Slide the latch left or right (up or down on a deskside model) on the failed fan to unlock the component, and then pull on the knob to remove the failed fan.
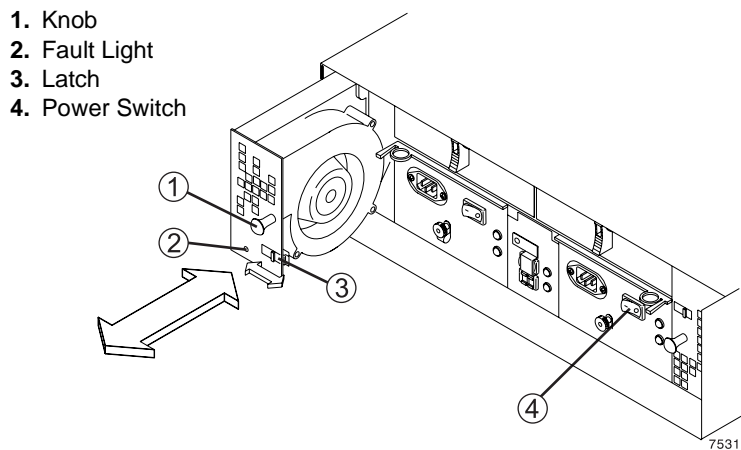


**1.** Knob
**2.** Fault Light
**3.** Latch
**4.** Power Switch

Figure 4-14  Replacing a Fan

**10** Slide the new fan all the way into the empty slot, until it snaps into place.

**11** If you turned off the power in step 7 on page 4-18, turn it on again.

**12** Based on the status of the fan Fault light, select one of the following steps:

- **Fault light is illuminated** – The fan may be installed incorrectly. Reinstall the fan and then go to step 13.

- **Fault light is off** – Go to step 14 on page 4-19.

**13** Is the problem corrected?

- **Yes** – Go to step 14.

- **No –** Contact technical support.

**14** Remove the antistatic protection, and reinstall the back cover, if needed.

**15** Complete the remaining Recovery Guru procedures, if needed.

**16** Check the status of all the modules in the storage array.

**17** Do any components have a Needs Attention status?

- **Yes** – Select the Recovery Guru toolbar button in the Array Management Window and complete the recovery procedure. If the problem persists, contact technical support.

- **No** – Go to step 18.

**18** Create, save, and print a new storage array profile.

**End Of Procedure**

# Replacing a Power Supply

Use the following procedure to replace a power supply in an array module. Figure 4-15 on page 4-21 illustrates inserting and removing a power supply.

## Tools and Equipment

- Antistatic protection
- Replacement power supply

## Procedure

**1** If needed, use the storage management software to create, save, and print a new storage array profile.

**2** Did the Recovery Guru direct you to replace a failed power supply?

- **Yes** – Go to step 3.

- **No** – Run the Recovery Guru to identify the failed component, and
  then go to step 3.

**3** Mute the alarm, and remove the back cover, if needed.

---

**CAUTION** **Electrostatic discharge damage to sensitive components.** To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling the module components.

---

**4** Put on antistatic protection.

**5** Unpack the new power supply.

Set the new power supply on a dry, level surface. Save all packing materials in case you need to return the power supply.

**6** Turn off the power switch on the new power supply.

**7** Check the Fault lights to locate the failed power supply. If a fault is detected, the light will be illuminated and amber.

---

**WARNING** (W02) **Risk of electrical shock** – Before removing or installing a power supply, turn off the power switch, and unplug the power cord.

---

**8** Turn off the power switch, and unplug the power cord from the failed power supply.

**9** Squeeze the pull ring on the failed power supply to release the lever. Open the lever and remove the power supply.

**10** Verify that the lever on the new power supply opens in the same direction as the one you just removed. If it does not, move the lever to the other pivot post.

**11** Slide the new power supply into the empty slot and close the lever.

**12** Plug in the power cord and turn on the power.

**13** Check the Power light and the Fault light on the new power supply.

**1.** Pull Ring
**2.** Locking Lever
**3.** Power Cord Connector
**4.** Power Switch
**5.** Fault Light
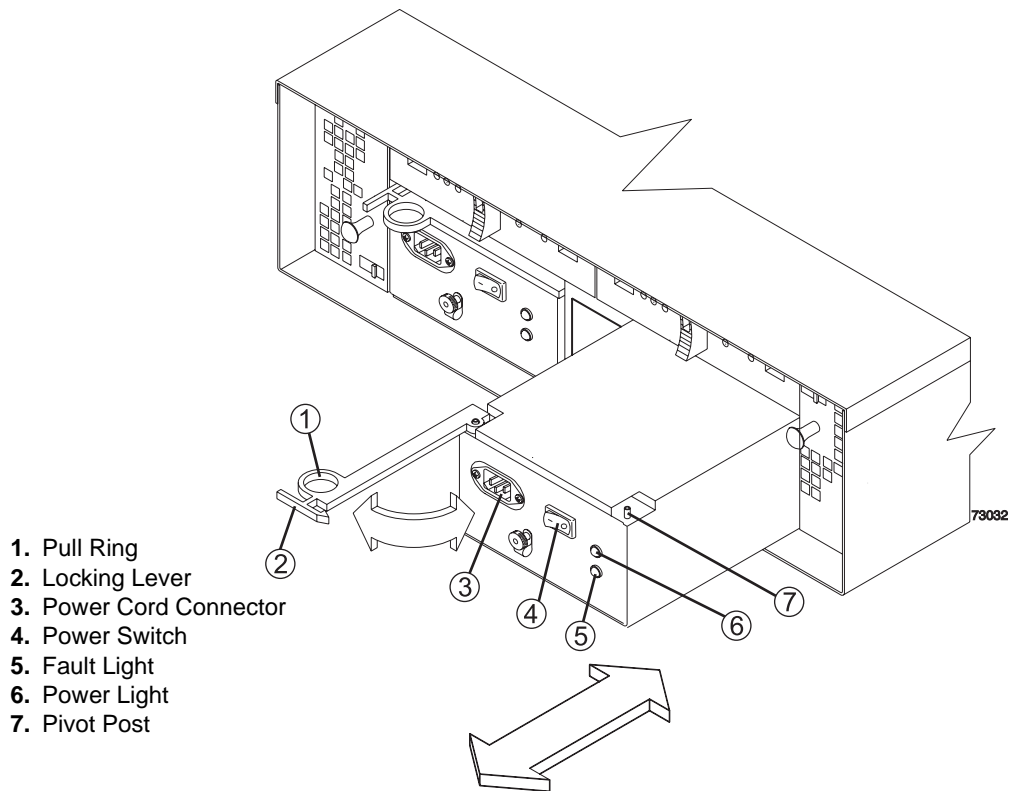**6.** Power Light
**7.** Pivot Post

Figure 4-15  Replacing a Power Supply

**14** Select one of the following steps, based on the status of the Power and Fault lights:

- **Power light is off** *or* **Fault light is illuminated –** The power supply may be installed incorrectly. Reinstall the power supply, and then go to step 15.

- **Power light is illuminated** *and* **Fault light is off –** Go to step 16.

**15** Is the problem corrected?

- **Yes** – Go to step 16.

- **No** – Contact technical support.

**16** Remove the antistatic protection, and reinstall the back cover, if needed.

**17** Complete any remaining Recovery Guru procedures, if needed.

**18** Check the status of all modules in the storage array.

**19** Do any components have a Needs Attention status?

- **Yes** – Select the Recovery Guru toolbar button in the Array Management Window and complete the recovery procedure. If the problem persists, contact technical support.

- **No** – Go to step 20.

**20** Create, save, and print a new storage array profile.

**End Of Procedure**

# Replacing an SFP Transceiver

Use the following procedure to replace a Small Form-factor Pluggable (SFP) transceiver in an array module. The SFP transceiver shown in this procedure may look different from those you are using, but the difference will not affect transceiver performance. Figure 4-16 on page 4-23 illustrates connecting an SFP transceiver and a cable.

## Tools and Equipment

- Antistatic protection

- Replacement SFP transceiver

## Procedure

**1** If needed, use the storage management software to create, save, and print a new storage array profile.

**2** Did the Recovery Guru direct you to replace a failed SFP transceiver?

- **Yes** – Go to step 3.

- **No** – Run the Recovery Guru to identify the failed component, and then go to step 3.

**3** Mute the alarm, and remove the back cover, if needed.

| | |
|---|---|
| **CAUTION** | **Electrostatic discharge damage to sensitive components.** To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling the module components. |

**4** Put on antistatic protection.

**5** Unpack the new SFP transceiver. Verify that it is the same type of transceiver you are replacing.

Set the new SFP transceiver on a dry, level surface. Save all packing materials in case you need to return the SFP transceiver.

**6** Check the Fault lights to locate the failed SFP transceiver. If a transceiver has a fault, its light will be illuminated and amber.

| CAUTION | **Potential degraded performance.** To prevent degraded performance or damaged cables, do not twist, fold, pinch, or step on fiber-optic cables. Do not bend the fiber-optic cables tighter than a 5-cm (2-in.) radius. |
|---|---|

| CAUTION | **Potential loss of data access.** To prevent loss of access to data, remove only an SFP transceiver that has a Failed status shown in the storage management software. |
|---|---|

**7** Disconnect the interface cable from the SFP transceiver.



**1.** Fiber Optic Cable
**2.** SFP Transceiver
**3.** Interface Connector
**4.** Fault Light
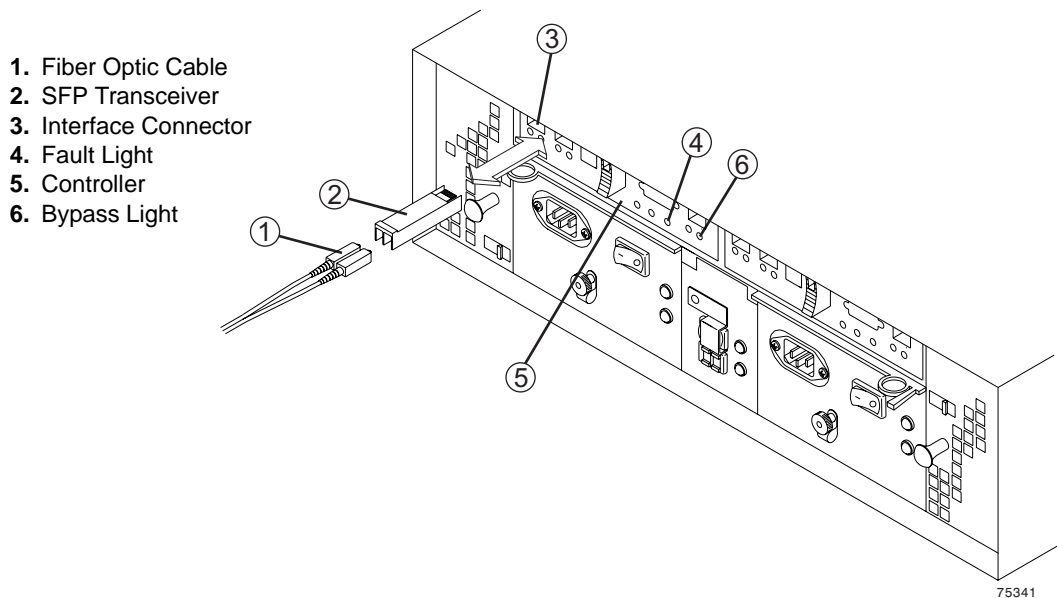**5.** Controller
**6.** Bypass Light

75341

Figure 4-16  Replacing an SFP Transceiver

**8** Remove the failed SFP transceiver from the controller.

**9** Install the new SFP transceiver into the controller.

**10** Reconnect the interface cable.

**11** Check the Bypass light and the Fault light for the new SFP transceiver.

**12** Select one of the following steps, based on the status of the Bypass and Fault lights.

- **Bypass light *or* Fault light is illuminated** –The SFP transceiver and cables may be installed incorrectly, or the cable may not be securely connected. Reinstall the SFP transceiver and cable, check the cable connection, and then go to step 13 on page 4-24.

- **Bypass light *and* Fault light are off** – Go to step 14 on page 4-24.

**13** Is the problem corrected?

- **Yes** – Go to step 14.

- **No –** Contact technical support.

**14** Remove the antistatic protection, and replace the back cover, if needed.

**15** Complete any remaining Recovery Guru procedures, if needed.

**16** Check the status of each module in the storage array.

**17** Do any components have a Needs Attention status?

- **Yes** – Select the Recovery Guru toolbar button in the Array Management Window and complete the recovery procedure. If the problem persists, contact technical support.

- **No** – Go to step 18.

**18** Create, save, and print a new storage array profile.

**End Of Procedure**

# *Upgrading and Relocating an Array Module*

This chapter provides procedures for upgrading an E2600 array module for greater storage capacity and guidelines for relocating an E2600 array module.

## Upgrade Requirements

You can upgrade an array module for greater storage capacity, but doing so requires careful planning to prevent data loss or array module failure. Consider the following cautions before starting any upgrade procedure.

| | |
|---|---|
| **CAUTION** | **Risk of equipment malfunction.** To avoid exceeding the functional and environmental limits, install only drives that have been provided or approved by the original manufacturer. Not all drive modules are shipped with pre-populated drives. System integrators, resellers, system administrators, or users of the drive module can install the drives. |

| | |
|---|---|
| **CAUTION** | **Potential loss of data access.** In configurations with modules of different speeds, all modules on a fibre loop must be operating at the same interface speed. Refer to the *Storage System Product Release Notes for Version 9.1*x for model-specific restrictions. |

| | |
|---|---|
| **IMPORTANT** | For optimum performance, never insert a drive into an array module without first confirming the firmware level of the drive. Contact technical support for information on supported drive firmware levels. |

# Upgrade Methods

You can upgrade the array module either by adding new drives or replacing existing drives. This section describes each method.

## Adding New Drives

You can increase the capacity of an array module by installing the additional drives into empty slots in the module. Additional drives can be installed while the array module is in operation. To use this upgrade method, refer to "Adding New Drives to Empty Slots" on page 5-3.

## Replace Existing Drives with Greater Capacity Drives

| CAUTION | **Potential data loss.** Using the wrong drive upgrade procedure might result in data loss. If you are upgrading drives containing RAID 0 volumes, you must use the procedure for replacing all of the drives at once. If you are upgrading a drive containing RAID 1, 3, or 5 volumes, you may use either upgrade procedure. |
|---------|---|

When replacing existing drives with greater capacity drives, two methods may be used: replacing all the drives at the same time or replacing one drive at a time. The method you select will depend on the RAID level you are using on the storage array, the amount of time you can afford to keep the array module offline, and the method that most closely matches the upgrade procedure recommended in the storage management software and this guide.

### Replace All Drives at the Same Time

If you are upgrading drives containing RAID 0 volumes, you must use this method. This method requires you to back up the array module and turn off the power to the storage array before replacing the drives. After replacing all the drives, you must reconfigure the array module and restore the data from backup media. This is the safest way to exchange drives without losing data. However, this method may take considerable time to complete because of the backup, reconfiguration, and restoration procedures. Also, other users will be unable to use the array module until you finish the procedure. To use this upgrade method, refer to "Replacing All Drives at the Same Time" on page 5-6.

### Replace One Drive at a Time

This method works only on drives containing redundant volumes, RAID 1, 3, or 5. If you are upgrading drives containing RAID 0 volumes, you must not use this method. This procedure lets you replace the drives while the array module is in operation, eliminating the necessity to shut down the array module. You manually fail each drive, replace it, and wait for the system to restore data to the new drive before installing the next drive. After installing all of the new drives, you configure them to create additional drive space.

Depending on your configuration, the reconfiguration procedure for this method may require considerable time to complete. Furthermore, you can lose data if the storage array reconfiguration or drive restoration fails. For this reason, you should back up all data on the array module before using this upgrade method. This will safeguard your data if the reconfiguration or restoration fails, or if the new drive malfunctions. To use this upgrade method, refer to "Replacing One Drive at a Time" on page 5-10.

# Adding New Drives to Empty Slots

Use the following procedure to install additional drives into empty slots in the array module. Figure 5-1 on page 5-4 illustrates removing and installing a drive. You can install additional drives while the array module is in operation.

---

**CAUTION** **Potential volume group failure.** The array module supports a maximum of eight drive modules per loop (112 drives maximum). Do not install new drives into the empty drive slots in the array module enclosure if the module is already at the maximum configuration. Doing so will exceed the Fibre Channel protocol limit and cause volume groups to fail.

---

**CAUTION** **Electrostatic discharge damage to sensitive components.** To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling the module components.

---

**CAUTION** **Potential damage to drive components.** Drives can be damaged by bumping them into other objects or surfaces. When removing or installing a drive, place your hand under the drive to support its weight. Place drives on an antistatic, cushioned surface.

---

1 Put on antistatic protection.

2 Unpack the new drives that you intend to install.

   Set the new drives on a dry, level surface, away from magnetic fields. Save all packing materials in case you need to return the drives.

**3** Remove the front cover, if needed.

**4** Locate the blank drives in the array module.

Check the Drive Active light on the front of the array module. On an active drive, a green light will be on or flashing. On a blank drive, the light will be off.

| | |
|---|---|
| **CAUTION** | **Risk of equipment malfunction.** To avoid exceeding the functional and environmental limits, install only drives that have been provided or approved by the original manufacturer. Not all drive modules are shipped with pre-populated drives. System integrators, resellers, system administrators, or users of the drive module can install the drives. |

| | |
|---|---|
| **IMPORTANT** | When replacing a blank drive with a new drive, replace the first available blank drive from the left, looking at the front of the module. Functional drives occupy the slots to the left; blank drives occupy the slots to the right. |

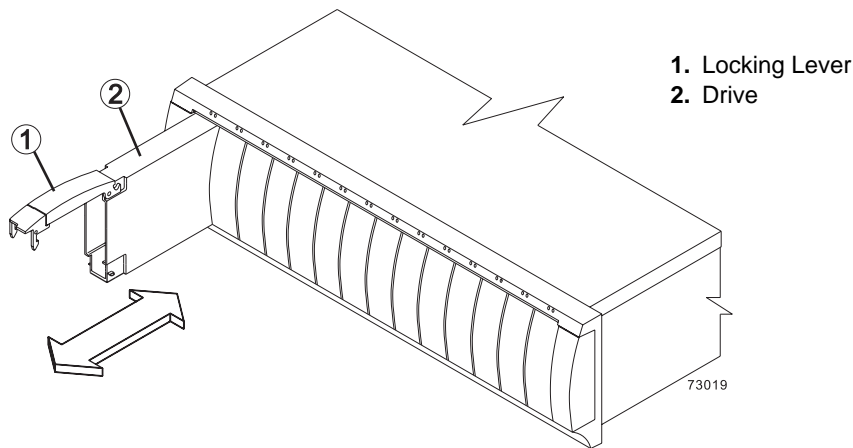| | |
|---|---|
| **IMPORTANT** | If you accidentally remove an active drive, wait at least 60 seconds, and then reinstall it. Refer to the storage management software for recovery procedures. |



**1.** Locking Lever
**2.** Drive

73019

Figure 5-1  Removing and Installing a Drive

**5** Lift the locking lever on the blank drive and remove the drive from the slot.

**6** Slide the new drive all the way into the empty slot and close the drive lever.

As the drive spins up, the Fault lights may blink. A flashing Active light indicates that data is being restored to the new drive.

**7** Repeat steps 5 and 6 to install each new drive.

**8** Based on the status of the Active and Fault lights, select one of the following steps:

- **Active lights are on while Fault lights are off** – Go to step 10.

- **Active lights are off while Fault lights are off** – The drive may be installed incorrectly. Remove the drive, wait 30 seconds, and then reinstall it. Go to step 9.

- **Fault lights are on** – The new drive may be defective. Replace it with another new drive, and then go to step 9.

**9** Did this correct the problem?

- **Yes** – Go to step 10.

- **No** – Select the Recovery Guru toolbar button in the Array Management Window and complete the recovery procedure. If the problem persists, contact technical support.

**10** Check the module status using the storage management software.

Select the appropriate component button for each module in the Physical View of the Array Management Window to view the status of its components. The status for each component will be either Optimal or Needs Attention.

**11** Does any module component have a Needs Attention status?

- **Yes** – Go to step 12.

- **No** – Go to step 14.

**12** To run the Recovery Guru, select the Recovery Guru toolbar button in the Array Management Window.

**a** Complete the recovery procedure.

If the Recovery Guru directs you to replace a failed component, use the individual lights on the modules to locate the specific failed component. For troubleshooting procedures, refer to Chapter 3, "Troubleshooting and Recovery."

**b** Select Recheck in the Recovery Guru to re-run the Recovery Guru and to ensure that the problem has been corrected.

**c** If the problem persists, contact technical support.

**13** Reinstall the front cover, if needed.

**14** Configure the new drives using the storage management software.

**15** Create, print, and save a new storage array profile.

**End Of Procedure**

# Replacing All Drives at the Same Time

Use the following procedure to replace all drives at the same time. Figure 5-2 on page 5-7 show the locations of the power switches. Figure 5-3 on page 5-8 illustrates inserting and removing a drive.

---

**CAUTION**   **Potential data loss.** Using the wrong drive upgrade procedure might result in data loss. If you are upgrading drives containing RAID 0 volumes, you *must* use this procedure for replacing all drives at once. If you are upgrading drives containing RAID 1, 3, or 5 volumes, you may use either upgrade procedure.

---

---

**CAUTION**   **Electrostatic discharge damage to sensitive components.** To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling the module components.

---

---

**CAUTION**   **Potential damage to drive components.** Drives can be damaged by bumping them into other objects or surfaces. When removing or installing a drive into the drive module, place your hand under the drive to support its weight. Place drives on an antistatic, cushioned surface.

---

**1** Put on antistatic protection.

**2** Unpack the new drives.

Set the new drives on a dry, level surface, away from magnetic fields. Save all packing materials in case you need to return the drives.

**3** Read all information provided in "Replace Existing Drives with Greater Capacity Drives" on page 5-2, particularly the paragraphs explaining the differences between the two possible upgrade procedures.

**4** Compare the *Storage System Product Release Notes for Version 9.1*x with this procedure to determine if you need to modify this procedure, based on more recent information.

**5** Remove the front cover, if needed.

**6** Determine the status of each module and its components.

   **a** Note the status of the indicator lights on the front and the back of each module. A green light indicates a normal status; an amber light indicates a hardware fault.

   **b** Open the Array Management Window for the storage array.

   **c** To view the status of all of its components, select the appropriate component button for each module in the Physical View of the Array Management Window.

   The status for each component will be either Optimal or Needs Attention.

**7** Does the module display green lights only, and is the status Optimal on each module component?

   ▪ **Yes**– Go to step 9.

   ▪ **No** – Go to step 8.

**8** Diagnose and correct the fault.

   **a** Complete the recovery procedure.

   If the Recovery Guru directs you to replace a failed component, use the individual lights on the modules to locate the specific failed component. For troubleshooting procedures, refer to Chapter 3, "Troubleshooting and Recovery."

   **b** Select Recheck in the Recovery Guru to re-run the Recovery Guru and ensure that the problem has been corrected.

   **c** If the problem persists, contact technical support.

   **CAUTION**    **Potential loss of data access**. All data on the drives is not accessible when you replace the drives by using this method. You must perform a complete backup of the drives and use the backup media to restore the data to the new drives.

**9** Perform a complete backup of the drives you are replacing. You will use the backup media to restore data to the drives later in this procedure.

**10** Stop all I/O activity to the array module.

**11** Verify that none of the Active lights above the drives are flashing.

**12** Turn off both power switches on the back of the array module.



**1.** Power Switch
**2.** Power Switch
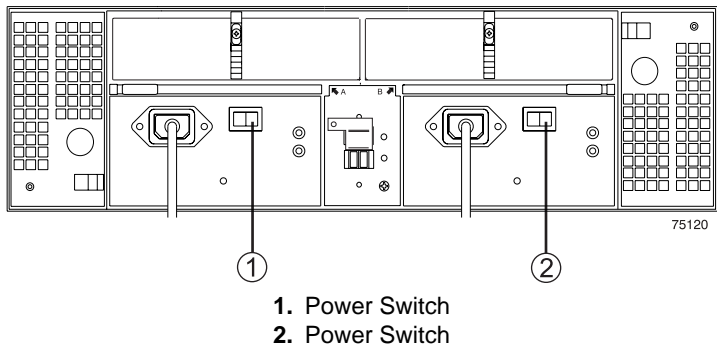
Figure 5-2  Power Switches

---

**CAUTION** **Risk of equipment malfunction.** To avoid exceeding the functional and environmental limits, install only drives that have been provided or approved by the original manufacturer. Not all drive modules are shipped with pre-populated drives. System integrators, resellers, system administrators, or users of the drive module can install the drives.

---

---

**IMPORTANT** If you accidentally remove an active drive, wait at least 30 seconds and then reinstall it. For recovery procedures, refer to your storage management software.

---

**13** Lift the locking lever on the drive that you are replacing and remove it from the slot.

**1.** Locking Lever
**2.** Drive
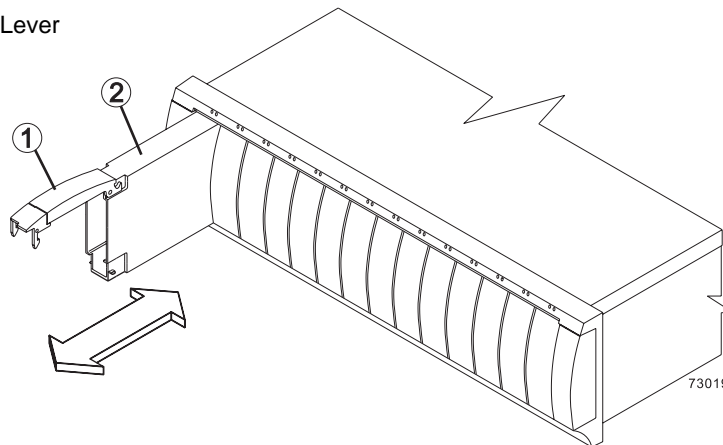


Figure 5-3  Removing and Installing a Drive

**14** Slide the new drive all the way into the empty slot and close the drive lever.

**15** Repeat steps 13 and 14 for each drive that you are replacing.

**16** After installing all of the new drives, turn on both power switches on the array module.

As the drives spin up, the Fault lights may blink. If the Active light begins to flash, data is being restored to the new drive.

**17** Select one of the following steps, based on the status of the Active and Fault lights:

- **Active lights are on while Fault lights are off –** Go to step 19 on page 5-9.

- **Active lights are off while Fault lights are off –** The drive may be installed incorrectly. Remove the drive, wait 30 seconds, and then reinstall it. Go to step 18.

- **Fault lights are on –** The new drive may be defective. Replace it with another new drive, and then go to step 18.

**18** Did this correct the problem?

- **Yes** – Go to step 19 on page 5-9.

- **No** – Select the Recovery Guru toolbar button in the Array Management Window and complete the recovery procedure. If the problem persists, contact technical support.

**19** Check the status of the array module using the storage management software.

Select the appropriate component button for each module in the Physical View of the Array Management Window to view the status of all its components. The status for each component will be either Optimal or Needs Attention.

**20** Does any module component have a Needs Attention status?

- **Yes** – Go to step 21.

- **No** – Go to step 23.

**21** To run the Recovery Guru, select the Recovery Guru toolbar button in the Array Management Window.

**a** Complete the recovery procedure.

If the Recovery Guru directs you to replace a failed component, use the individual lights on the modules to locate the specific failed component. For troubleshooting procedures, refer to Chapter 3, "Troubleshooting and Recovery."

**b** Select Recheck in the Recovery Guru to run the Recovery Guru and to ensure that the problem has been corrected.

**c** If the problem persists, contact technical support.

**22** Reinstall the front cover, if needed.

**23** Configure the new drives using the storage management software.

**24** Create, print, and save a new storage array profile.

**25** Restore the data to all drives, using the backup media created in step 9 on page 5-7.

**End Of Procedure**

# Replacing One Drive at a Time

Use the following procedure to replace one drive at a time. Figure 5-4 on page 5-12 illustrates inserting and removing a drive.

| | |
|---|---|
| **CAUTION** | **Potential data loss.** Using the wrong drive upgrade procedure might result in data loss. If you are upgrading drives containing RAID 0 volumes, you *must* use the procedure for replacing all of the drives at once. If you are upgrading drives containing RAID 1, 3, or 5 volumes, you may use either upgrade procedure. |

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|---|---|
| **CAUTION** | **Electrostatic discharge damage to sensitive components.** To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling the module components. |

| | |
|---|---|
| **CAUTION** | **Potential damage to drive components.** Drives can be damaged by bumping them into other objects or surfaces. When removing or installing a drive into the drive module, place your hand under the drive to support its weight. Place drives on an antistatic, cushioned surface. |

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|---|---|
| **IMPORTANT** | If you are upgrading drives in a storage array that contains hot spares, drive reconstruction may start on the hot spare before you insert the new drive. The data on the new drive will still be rebuilt, but the process will take longer for each drive. To prevent this delay, you can disable the assigned hot spares while you perform the upgrade procedure. Remember to reassign the hot spares when you are finished upgrading the drives. For information on hot spares, refer to the storage management software. |

| | |
|---|---|
| **NOTE** | When replacing a drive, ensure that the new drive has a storage capacity equal to or greater than the old drive. |

1  Put on antistatic protection.

2  Unpack the new drives.

Set the new drives on a dry, level surface, away from magnetic fields. Save all packing materials in case you need to return the drives.

**3**  Read all information provided in "Replace Existing Drives with Greater Capacity Drives" on page 5-2, particularly the paragraphs explaining the differences between the two possible upgrade procedures.

**4**  Read the *Storage System Product Release Notes for Version 9.1*x to determine if you need to modify these procedures based on more recent information.

**5**  Remove the front cover, if needed.

**6**  Determine the status of all modules and their components in the storage array.

   **a**  Note the status of the indicator lights on the front and the back of each module. A green light indicates a normal status; an amber light indicates a hardware fault.

   **b**  Select the appropriate component button for each module in the Physical View of the Array Management Window to view the status of all its components.

   The status for each component will be either Optimal or Needs Attention.

**7**  Does each module display green lights only, and is the status Optimal on each module component?

   ▪  **Yes**– Go to step 9.

   ▪  **No** – Go to step 8.

**8**  Diagnose and correct the fault.

   **a**  Complete the recovery procedure.

   If the Recovery Guru directs you to replace a failed component, use the individual lights on the module to locate the failed component. For troubleshooting procedures, refer to Chapter 3, "Troubleshooting and Recovery."

   **b**  To ensure that the problem has been corrected, select Recheck in the Recovery Guru to re-run the Recovery Guru.

   **c**  If the problem persists, contact technical support.

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**CAUTION**   **Risk of equipment malfunction.** To avoid exceeding the functional and environmental limits, install only drives that have been provided or approved by the original manufacturer. Not all drive modules are shipped with pre-populated drives. System integrators, resellers, system administrators, or users of the drive module can install the drives.

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**CAUTION**   **Potential loss of data access**. All data on the drives is not accessible when you replace the drives by using this method. You must perform a complete backup of the drives and use the backup media to restore the data to the new drives.

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**9** Perform a complete backup of the drives you are replacing.

**10** Use the storage management software to manually fail the first drive that you are replacing, and then verify the following conditions:

- Software shows a *Failed* status for only one drive (the one that you manually failed)

- Fault light above the failed drive is illuminated

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**CAUTION** **Potential loss of data access.** Removing a drive that has not failed might cause a volume to fail. To prevent loss of access to data, remove only a failed drive that has a Fault light on or has a Failed status in the storage management software.

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**11** Lift the locking lever on the *failed* drive, and remove the drive from the slot.



1. Locking Lever
2. Drive
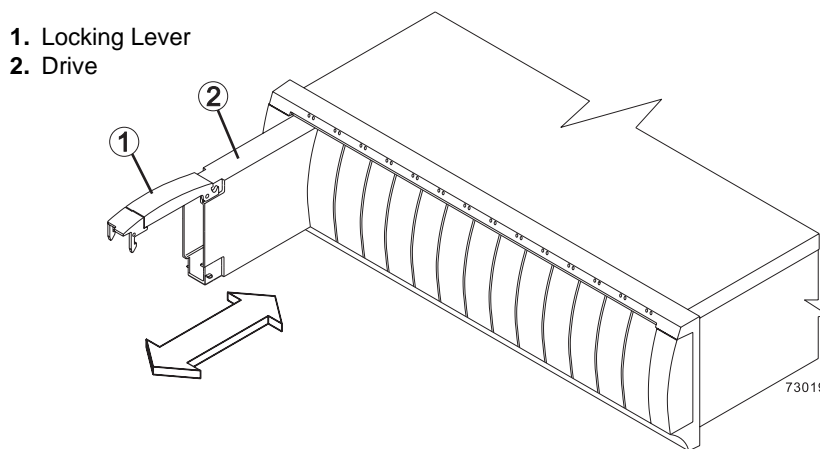
Figure 5-4  Removing and Installing a Drive

**12** Slide the new drive all the way into the empty slot and close the locking lever.

As the drive spins up, the Fault lights may blink. The new drive should begin reconstructing automatically after you install it in the drive slot. During reconstruction, the drive's Fault light may come on for a few minutes, then turn off when the Active light begins flashing. A flashing Active light indicates that data is being restored to the new drive.

**13** Repeat steps 11 and 12 for each new drive.

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**IMPORTANT**  If your storage array has active hot spares, the storage management software may not begin copying data to the new drive until it has been reconstructed on the hot spare. This increases the time required to complete the procedure.

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**14**  Wait for the new drive to spin up, and then select one of the following steps, based on the status of the Active and Fault lights:

- **Active lights are on and Fault lights are off –** Go to step 16 on page 5-13.

- **Active lights are off while Fault lights are off –** The drive may be installed incorrectly. Remove the drive, wait 30 seconds, and then reinstall it. Go to step 15 on page 5-13.

- **Fault lights are on –** The new drive may be defective. Replace it with another new drive, and then go to step 15.

**15**  Did this correct the problem?

- **Yes** – Go to step 16 on page 5-13.

- **No** – Select the Recovery Guru toolbar button in the Array Management Window and complete the recovery procedure. If the problem persists, contact technical support.

**16**  Check the status of the array module using the storage management software.

To view the status of its components, select the appropriate component button for each module in the Physical View of the Array Management Window.

The status for each component will be either Optimal or Needs Attention.

**17**  Do all module components have an Optimal status?

- **Yes** – Go to step 20.

- **No** – Go to step 18.

**18**  To run the Recovery Guru, select the Recovery Guru toolbar button in the Array Management Window.

   **a**  Complete the recovery procedure.

   If the Recovery Guru directs you to replace a failed component, use the individual lights on the modules to locate the specific failed component. For troubleshooting procedures, refer to Chapter 3, "Troubleshooting and Recovery."

   **b**  When the procedure is completed, select Recheck in the Recovery Guru to re-run the Recovery Guru and to ensure that the problem has been corrected.

   **c**  If the problem persists, contact technical support.

**19**  Reinstall the front cover, if needed.

**20** Configure the new drives using the storage management software.

**21** Create, save, and print a new storage array profile.

**End Of Procedure**

# Relocation Considerations

When relocating array module and drives from one storage array to another, use the following guidelines.

| | |
|---|---|
| **CAUTION** | **Potential data loss.** Moving a storage array or storage array component that is configured as part of a volume group might result in data loss. To prevent data loss, always consult technical support before relocating an array module. |

## Relocate Drives or Modules

| | |
|---|---|
| **CAUTION** | **Support representative supervision required.** Always contact technical support before relocating drives or modules. |

Drives, drive modules, array modules, or array modules that are part of a volume group configuration should not be moved. If you need to move storage array components, call technical support for detailed procedures. Technical support may direct you to complete several storage array preparation tasks undertaking the relocation. These tasks may include the following:

- Creating, saving, and printing a storage array profile of all storage arrays that will be affected by the relocation of drives, drive modules, array modules, or command modules

- Performing a complete backup of all the data on the drives you intend to move

- Verifying that the volume group and associated volumes on the affected storage array have an Optimal status

- Determining the location and status of any global hot spares associated with the affected storage array

## Convert an Array Module to a Drive Module

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**IMPORTANT**  For information on whether your array module can be converted, contact technical support.

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An array module containing one or more controllers can be converted into a drive module containing two environmental services monitors (ESMs). The conversion can be completed without losing the data on the drives.

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