# Dell Storage Center

## SC100 and SC120 Expansion Enclosure

# Owner's Manual

# Notes, Cautions, and Warnings

**NOTE:** A NOTE indicates important information that helps you make better use of your computer.

**CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.**

**WARNING: A WARNING indicates a potential for property damage, personal injury, or death.**

# Contents

# About this Guide

This guide describes how to perform service and maintenance on the SC100/SC120 expansion enclosure.

## Revision History

Document Number: DWWC8

| Revision | Date | Description |
|----------|------|-------------|
| A00 | April 2015 | Initial release |
| A01 | July 2015 | Updated to include correct version of Expansion Enclosure Overview |
| A02 | June 2016 | Updated pre-replacement procedures and clarified requirements |

## Audience

The information provided in this guide is intended for use by Dell end users.

## Contacting Dell

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services might not be available in your area.

To contact Dell for sales, technical support, or customer service issues, go to www.dell.com/support.

- For customized support, type your system service tag on the support page and click **Submit**.
- For general support, browse the product list on the support page and select your product.

## Related Publications

The following documentation is available for the SC100/SC120 expansion enclosure.

- *Dell Storage Center SC100 and SC120 Expansion Enclosure Getting Started Guide*
  Provides information about an SC100/SC120 expansion enclosure, such as installation instructions and technical specifications.
- *Dell Storage Center SCv2000 Series Virtual Media Update Instructions*
  Describes how to install Storage Center software on an SCv2000/SCv2020 storage system using virtual media. Installing Storage Center software using the Storage Center Virtual Media option is intended for use only by sites that cannot update Storage Center using standard methods.
- *Dell Storage Center Software Update Guide*
  Describes how to upgrade Storage Center software from an earlier version to the current version.
- *Dell Storage Center Command Utility Reference Guide*

Provides instructions for using the Storage Center Command Utility. The Command Utility provides a command-line interface (CLI) to enable management of Storage Center functionality on Windows, Linux, Solaris, and AIX platforms.

- *Dell Storage Center Command Set for Windows PowerShell*

  Provides instructions for getting started with Windows PowerShell cmdlets and scripting objects that interact with the Storage Center via the PowerShell interactive shell, scripts, and PowerShell hosting applications. Help for individual cmdlets is available online.

- *Dell Storage Client Administrator's Guide*

  Provides information about the Dell Storage Client and how it can be used to manage a Storage Center.

- *Dell Enterprise Manager Administrator's Guide*

  Contains in-depth feature configuration and usage information

- *Dell TechCenter*

  Provides technical white papers, best practice guides, and frequently asked questions about Dell Storage products. Go to: http://en.community.dell.com/techcenter/storage/.

# About the SC100/SC120 Expansion Enclosure

An SC100/SC120 expansion enclosure provides expansion storage for an SCv2000/SCv2020 storage system.

The SC100/SC120 expansion enclosure connects directly to the SAS ports on the back of the storage system.An expansion enclosure can be added only to a storage system that has two storage controllers.

## SC100/SC120 Expansion Enclosure Overview

The SC100 is a 2U expansion enclosure that supports up to 12 3.5-inch hard drives installed in a four-column, three-row configuration. The SC120 is a 2U expansion enclosure that supports up to 24 2.5-inch hard drives installed vertically side by side.

An SC100/SC120 expansion enclosure ships with two redundant power supply/cooling fan modules and two redundant enclosure management modules (EMMs).

## SC100/SC120 Expansion Enclosure Monitoring and Diagnostics

The Storage Center OS generates alert messages for temperature, I/O module, fan module, disk, and power conditions for Storage Center components. Use the Dell Storage Client to view these alerts.

The SC100/SC120 also has LED indicators to notify you of possible problems with the expansion enclosure.

## SC100/SC120 Expansion Enclosure Front-Panel Features and Indicators

The SC100/SC120 front panel shows the expansion enclosure status and power supply status.
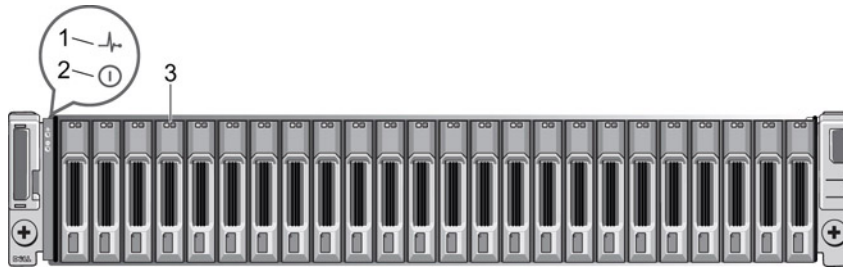


Figure 1. SC100 Front-Panel Features and Indicators

**Figure 2. SC120 Front-Panel Features and Indicators**

| Item | Name | Icon | Description |
|------|------|------|-------------|
| 1 | Expansion enclosure status indicator | ∿ | Lights when the expansion enclosure power is on. <ul><li>**Off**: No power</li><li>**On steady blue**: Normal operation</li><li>**Blinking blue**: Storage Center is identifying the expansion enclosure</li><li>**On steady amber**: Expansion enclosure is turning on or was reset</li><li>**Blinking amber**: Expansion enclosure is in the fault state</li></ul> |
| 2 | Power supply status indicator | ⏻ | Lights when at least one power supply is supplying power to the expansion enclosure. <ul><li>**Off**: Both power supplies are off</li><li>**On steady green**: At least one power supply is providing power to the expansion enclosure</li></ul> |
| 3 | Hard drives | — | Dell Enterprise Plus Drives <ul><li>**SC100**: Up to 12 3.5-inch hard drives</li><li>**SC120**: Up to 24 2.5-inch hard drives</li></ul> |

# SC100/SC120 Expansion Enclosure Back-Panel Features and Indicators

The SC100/SC120 back panel provides controls to power up and reset the expansion enclosure, indicators to show the expansion enclosure status, and connections for back-end cabling.
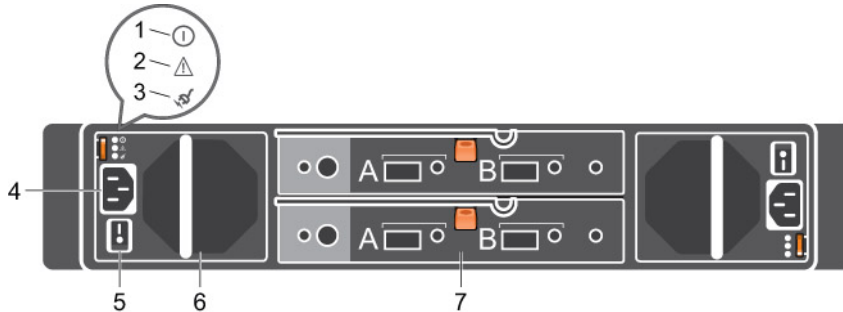


**Figure 3. SC100/SC120 Expansion Enclosure Back Panel Features and Indicators**

| Item | Name | Icon | Description |
|------|------|------|-------------|
| 1 | DC power indicator | | • **Green**: Normal operation. The power supply module is supplying DC power to the expansion enclosure<br>• **Off**: Power switch is off, the power supply is not connected to AC power, or has a fault condition |
| 2 | Power supply/cooling fan indicator | | • **Amber**: Power supply/cooling fan fault is detected<br>• **Off**: Normal operation |
| 3 | AC power indicator | | • **Green**: Power supply module is connected to a source of AC power, whether the power switch is on<br>• **Off**: Power supply module is disconnected from a source of AC power |
| 4 | Power socket (2) | — | Accepts a standard computer power cord. |
| 5 | Power switch (2) | — | Controls power for the expansion enclosure. Each power supply/cooling fan module has one switch. |
| 6 | Power supply/cooling fan module (2) | — | Contains a 700 W power supply and fans that provide cooling for the expansion enclosure. |
| 7 | Enclosure management module (2) | — | EMMs provide the data path and management functions for the expansion enclosure. |

# SC100/SC120 Expansion Enclosure EMM Features and Indicators

The SC100/SC120 includes two enclosure management modules (EMMs) in two interface slots.
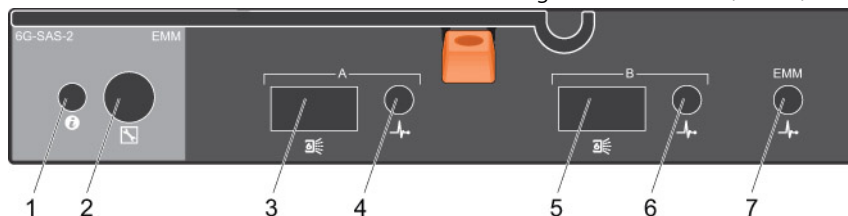


Figure 4. SC100/SC120 Expansion Enclosure EMM Features and Indicators

| Item | Name | Icon | Description |
|------|------|------|-------------|
| 1 | System status indicator | | Not used on SC100/SC120 expansion enclosures. |
| 2 | Serial port | | Not for customer use. |
| 3 | SAS port A (in) | | Connects to a storage controller or to other SC100/SC120 expansion enclosures. SAS ports A and B can be used for either input or output. However, for cabling consistency, use port A as an input port. |
| 4 | Port A link status | | • **Green**: All the links to the port are connected<br>• **Amber**: One or more links are not connected<br>• **Off**: Expansion enclosure is not connected |

| Item | Name | Icon | Description |
|------|------|------|-------------|
| 5 | SAS port B (out) | | Connects to a storage controller or to other SC100/SC120 expansion enclosures. SAS ports A and B can be used for either input or output. However, for cabling consistency, use port B as an output port. |
| 6 | Port B link status | | • **Green**: All the links to the port are connected<br>• **Amber**: One or more links are not connected<br>• **Off**: Expansion enclosure is not connected |
| 7 | EMM status indicator | | • **On steady green**: Normal operation<br>• **Amber**: Expansion enclosure did not boot or is not properly configured<br>• **Blinking green**: Automatic update in progress<br>• **Blinking amber (two times per sequence)**: Expansion enclosure is unable to communicate with other expansion enclosures<br>• **Blinking amber (four times per sequence)**: Firmware update failed<br>• **Blinking amber (five times per sequence)**: Firmware versions are different between the two EMMs |

# SC100/SC120 Expansion Enclosure Drives

Dell Enterprise hard disk drives (HDDs) and Dell Enterprise solid-state drives (SSDs) are the only drives that can be installed in SC100/SC120 expansion enclosures. If a non-Dell Enterprise drive is installed, the Storage Center prevents the drive from being managed.

The drives in an SC100 expansion enclosure are installed horizontally. The drives in an SC120 expansion enclosure are installed vertically. The indicators on the drives provide status and activity information.



**Figure 5. SC100/SC120 Expansion Enclosure Drive Indicators**

| Item | Name | Indicator Code |
|------|------|----------------|
| 1 | Drive activity indicator | • **Blinking green**: Drive activity<br>• **Steady green**: Drive is detected and there are no faults |
| 2 | Drive status indicator | • **Steady green**: Normal operation<br>• **Blinking green (on 1 sec. / off 1 sec.)**: Drive identification is enabled<br>• **Steady amber**: Drive is safe to remove<br>• **Off**: No power to the drive |

# 2

# Replacing SC100/SC120 Expansion Enclosure Components

This section describes how to remove and install components of the SC100/SC120 expansion enclosure. This information assumes that you have received the replacement component and are ready to install it.

## Safety Precautions

Always follow these safety precautions to avoid injury and damage to Storage Center equipment.

If equipment described in this section is used in a manner not specified by Dell, the protection provided by the equipment could be impaired. For your safety and protection, observe the rules described in the following sections.

> NOTE: See the safety and regulatory information that shipped with each Storage Center component. Warranty information is included within this document or as a separate document.

### Installation Safety Precautions

Follow these safety precautions:

- Dell recommends that only individuals with rack-mounting experience install the SC100/SC120 in a rack.
- Make sure the expansion enclosure is always fully grounded to prevent damage from electrostatic discharge.
- When handling the expansion enclosure hardware, use an electrostatic wrist guard (not included) or a similar form of protection.

The chassis must be mounted in a rack. The following safety requirements must be considered when the chassis is being mounted:

- The rack construction must be capable of supporting the total weight of the installed chassis. The design should incorporate stabilizing features suitable to prevent the rack from tipping or being pushed over during installation or in normal use.
- To avoid danger of the rack toppling over, slide only one chassis out of the rack at a time.

### Electrical Safety Precautions

Always follow electrical safety precautions to avoid injury and damage to Storage Center equipment.

> ⚠ WARNING: Disconnect power from the expansion enclosure when removing or installing components that are not hot-swappable. When disconnecting power, first power down the storage system using the Dell Storage Client and then unplug the power cords from the power supplies in the storage system and expansion enclosure.

- Provide a suitable power source with electrical overload protection. All Storage Center components must be grounded before applying power. Make sure that there is a safe electrical earth connection to power supply cords. Check the grounding before applying power.
- The plugs on the power supply cords are used as the main disconnect device. Make sure that the socket outlets are located near the equipment and are easily accessible.
- Know the locations of the equipment power switches and the room's emergency power-off switch, disconnection switch, or electrical outlet.
- Do not work alone when working with high-voltage components.
- Use rubber mats specifically designed as electrical insulators.
- Do not remove covers from the power supply unit. Disconnect the power connection before removing a power supply from the expansion enclosure.
- Do not remove a faulty power supply unless you have a replacement model of the correct type ready for insertion. A faulty power supply must be replaced with a fully operational module power supply within 24 hours.
- Unplug the expansion enclosure chassis before you move it or if you think it has become damaged in any way. When powered by multiple AC sources, disconnect all supply power for complete isolation.

## Electrostatic Discharge Precautions

Always follow electrostatic discharge (ESD) precautions to avoid injury and damage to Storage Center equipment.

Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. The resulting electrical discharge can damage electronic components and printed circuit boards. Follow these guidelines to protect your equipment from ESD:

- Dell recommends that you always use a static mat and static strap while working on components in the interior of the expansion enclosure chassis.
- Observe all conventional ESD precautions when handling plug-in modules and components.
- Use a suitable ESD wrist or ankle strap.
- Avoid contact with backplane components and module connectors.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.

## General Safety Precautions

Always follow general safety precautions to avoid injury and damage to Storage Center equipment.

- Keep the area around the expansion enclosure chassis clean and free of clutter.
- Place any system components that have been removed away from the expansion enclosure chassis or on a table so that they are not in the way of foot traffic.
- While working on the expansion enclosure chassis, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.
- Remove any jewelry or metal objects from your body because they are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.
- Do not lift the expansion enclosure chassis by the handles of the power supply units (PSUs). They are not designed to hold the weight of the entire chassis, and the chassis cover may become bent.
- Before moving the expansion enclosure chassis, remove the PSUs to minimize weight.
- Do not remove drives until you are ready to replace them.

**NOTE:** To ensure proper expansion enclosure cooling, hard drive blanks must be installed in any hard drive slot that is not occupied.

# Pre-Replacement Procedures

Perform the procedures described in this section before replacing a component of the SC100/SC120 expansion enclosure.

## Send Diagnostic Data Using Dell SupportAssist

Use Dell SupportAssist to send diagnostic data to Dell Technical Support.

1.  Use the Storage Client to connect to the Storage Center.
2.  In the **Summary** tab, click **Send SupportAssist Information Now**, which is located under **SupportAssist Actions** in the **Status** pane. The **Send SupportAssist Information Now** dialog box opens.
3.  Select **Storage Center Configuration** and **Detailed Logs**.
4.  Click **OK**.
    The Storage Client displays the status of the SupportAssist action. A second dialog box opens when the transfer of SupportAssist information has completed successfully.
5.  Click **OK**.

## Put the Storage Center Into Maintenance Mode

Use Dell Storage Client to put the Storage Center into maintenance mode after sending SupportAssist data to Dell Technical Support.

1.  In the **Summary** tab, click **Edit Settings**. The **Edit Storage Center Settings** dialog box opens.
2.  In the **General** tab, select **Maintenance** from the **Operation Mode** drop-down menu.
3.  Click **OK**.
    The Storage Center is put into maintenance mode.

## Shutting Down the Storage System and Expansion Enclosures

If the replacement component is not hot-swappable, use the Dell Storage Client to shut down the storage system and expansion enclosures. Shutting down the storage system and expansion enclosures results in a system outage, so plan to perform these procedures during a maintenance window.

1.  Before shutting down the storage system and expansion enclosures, make sure you identify the failed part.
2.  From the Actions menu, select **System→ Shutdown/Restart**. The **Shutdown/Restart** dialog box appears.
3.  Select **Shutdown** and click **OK**.
4.  When the storage system and expansion enclosures are shut down, switch off both power switches and unplug the power cables from the expansion enclosure.

# Replacing the Front Bezel

The front bezel is a cover for the front panel of the expansion enclosure.

**About this task**

The front bezel must be removed from the front panel when replacing hard drives.

**Steps**

1. Use the system key to unlock the keylock at the left end of the bezel.
2. Lift the release latch next to the keylock.
3. Rotate the left end of the bezel away from the front panel.
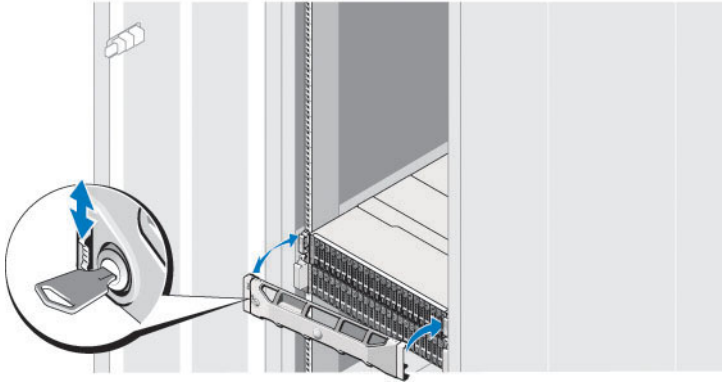4. Unhook the right end of the bezel and pull the bezel away from the expansion enclosure.



Figure 6. Replacing the Front Bezel

5. Hook the right end of the replacement bezel onto the front panel of the expansion enclosure.
6. Insert the left end of the bezel into the securing slot until the release latch locks into place.
7. Secure the bezel with the keylock.

# Replacing Power Supply/Cooling Fan Modules

The SC100/SC120 expansion enclosures support two 700 W AC hot-swappable power supply/cooling fan modules. The fans that cool the expansion enclosure and the power supplies are integrated into a module and cannot be replaced separately. If one module fails, the second module continues to provide power to the expansion enclosure.

> **NOTE:** When a power supply/cooling fan module fails, the fan speed in the remaining module increases significantly to provide adequate cooling. The fan speed decreases gradually when a new power supply/cooling fan module is installed.

## Identifying the Failed Power Supply

To determine which power supply failed, use the Dell Storage Client.

1. Start the Dell Storage Client and connect to the Storage Center that has an expansion enclosure with a failed power supply.
2. Click the **Hardware** tab.
3. In the **Hardware** tab navigation pane, select and expand the Storage Center.
4. In the **Hardware Alerts** area, find the hardware alert that identifies the expansion enclosure with the failed power supply.
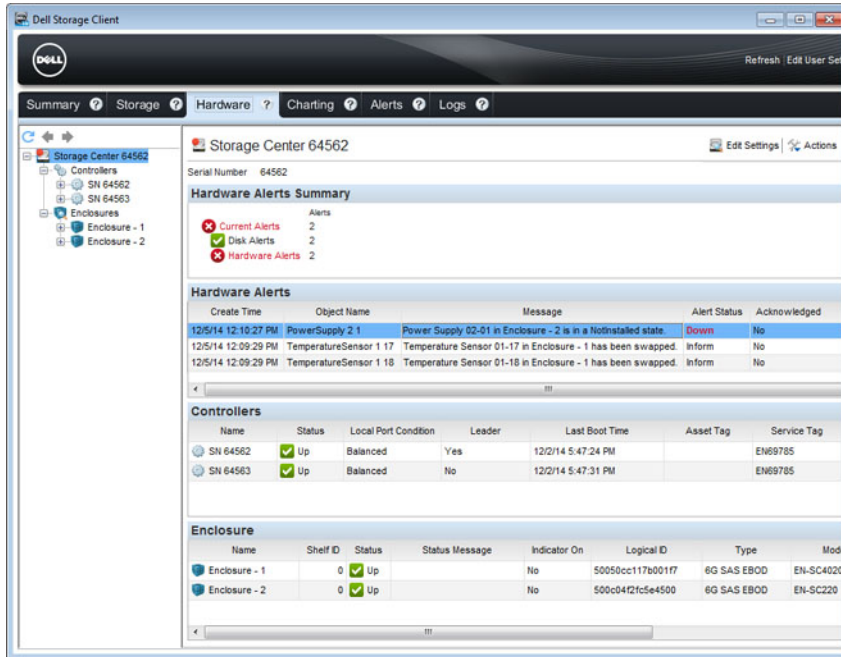
**Figure 7. Hardware Alert Identifying the Expansion Enclosure with the Failed Power Supply**

5. In the **Hardware** tab navigation pane, expand the expansion enclosure identified in the previous step.
6. Select **Power Supplies**. The status of each power supply is displayed in the **Power Supplies** tab.
7. Select the failed power supply. The location of the failed power supply is displayed in the **Power Supply View** tab.
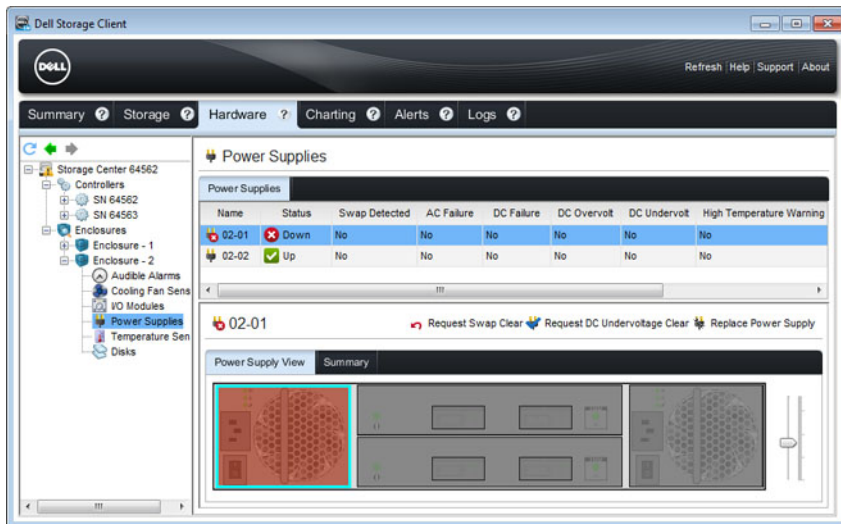


**Figure 8. Rear View of the Expansion Enclosure Showing the Failed Power Supply**

## Identifying the Failed Cooling Fan

To determine which cooling fan failed, use the Dell Storage Client.

1. Start the Dell Storage Client and connect to the Storage Center that has an expansion enclosure with a failed cooling fan.
2. Click the **Hardware** tab.
3. In the **Hardware** tab navigation pane, select and expand the Storage Center.
4. In the **Hardware Alerts** area, find the hardware alert that identifies the expansion enclosure with the failed cooling fan.
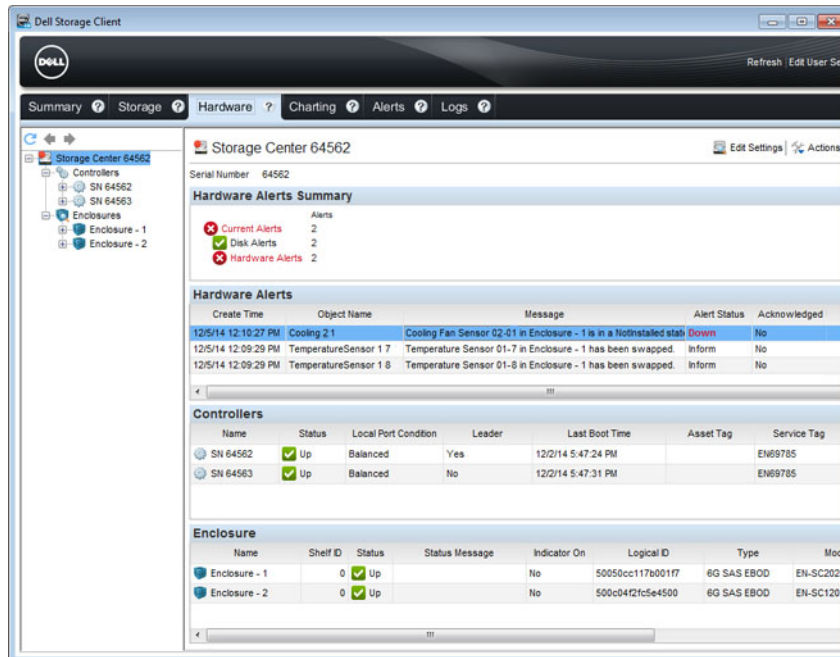


**Figure 9. Hardware Alert Identifying the Expansion Enclosure with the Failed Cooling Fan**

5. In the **Hardware** tab navigation pane, expand the expansion enclosure identified in the previous step.
6. Select **Cooling Fan Sensors**. The status of each cooling fan is displayed in the **Cooling Fans** tab.
7. Select the failed cooling fan. The location of the failed cooling fan is displayed in the **Fan View** tab.
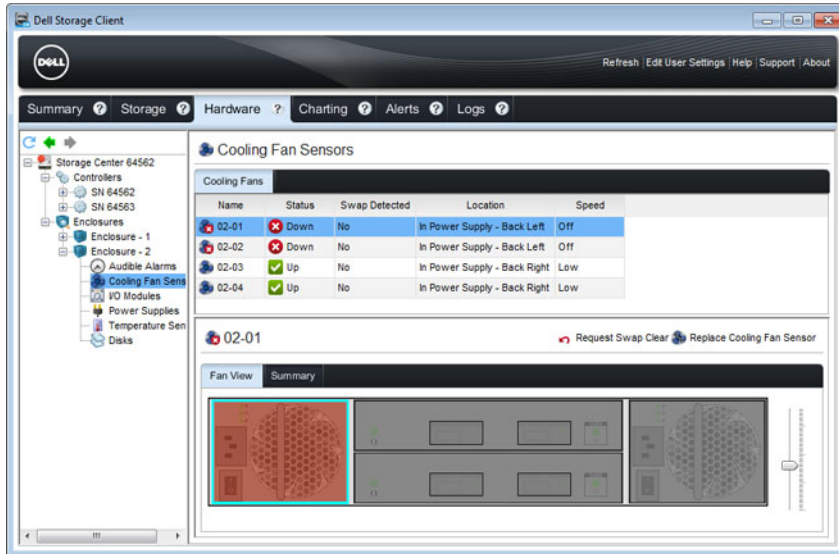
**Figure 10. Rear View of the Expansion Enclosure Showing the Failed Cooling Fan**

## Replacing a Power Supply/Cooling Fan Module

Use this procedure to replace failed power supply/cooling fan modules.

**About this task**

You can replace power supply/cooling fan modules one at a time without shutting down the expansion enclosure.
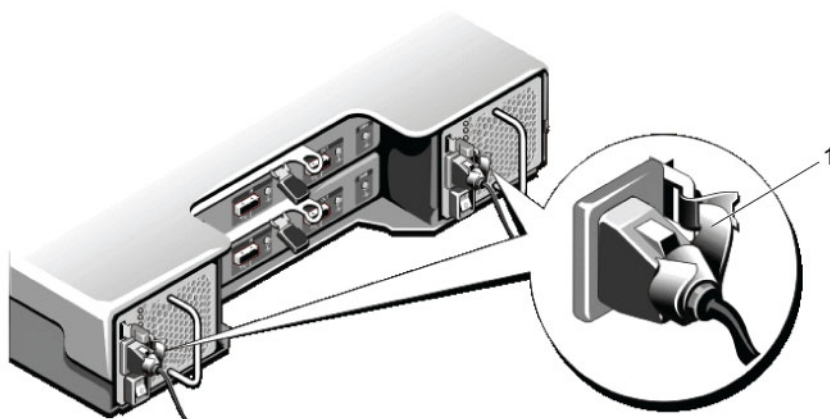
**Steps**

1. Use SupportAssist to send diagnostic data to Dell Technical Support.
2. Press the power switch on the power supply/cooling fan module to turn it off.
3. Remove the hook-and-loop strap that secures the power cable and disconnect the power cable from the power supply/cooling fan module.
4. Push the release tab on the power supply/cooling fan module to the right and slide it out of the chassis using the handle.

   ⚠ CAUTION: The power supply/cooling fan modules are heavy. To avoid injury, use both hands while removing the module.
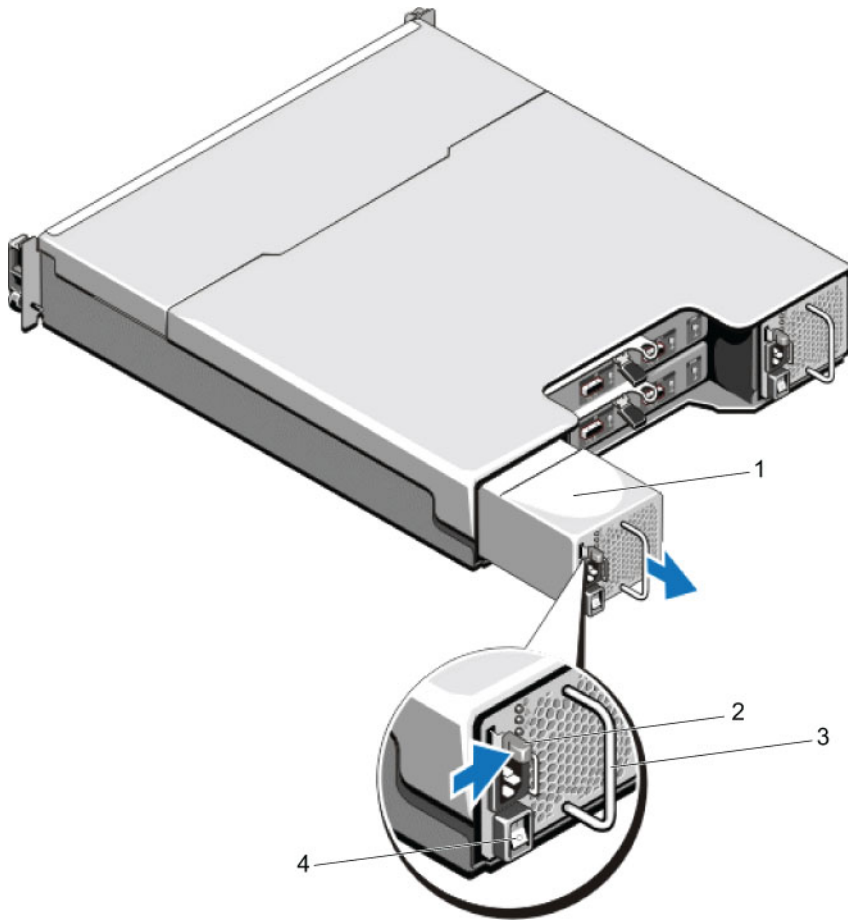
**Figure 11. Removing a Power Supply/Cooling Fan Module**

| | | | |
|---|---|---|---|
| 1. | Power supply/cooling fan module | 2. | Release tab |
| 3. | Power supply/cooling fan module handle | 4. | Power switch |

5. Slide the replacement power supply/cooling fan module into the chassis until it is fully seated and the release tab clicks into place.
6. Connect the power cable to the power supply/cooling fan module and make sure the cable is plugged into a power outlet.
7. Secure the power cable using the hook-and-loop strap.

**Figure 12. Securing the Power Cable**

    1.    Hook-and-loop strap

8. Press the power switch on the power supply/cooling fan module to turn it on.

   **NOTE:** Allow several seconds for the expansion enclosure to recognize the power supply/ cooling fan module and determine its status. When the power supply/cooling fan module is functioning properly, the AC power status indicator turns green and the power supply/cooling fan status indicator is off.

9. In the Dell Storage Client, make sure that the replacement power supply is recognized and shown as up and running.

10. Use SupportAssist to send diagnostic data to Dell Technical Support.

# Replacing Hard Drives

The SC100/SC120 expansion enclosures supports hot-swappable hard drives.

The SC100 expansion enclosure supports up to 12 3.5-inch hard drives installed in a four-column, three-row configuration. The SC120 expansion enclosure supports up to 24 2.5-inch hard drives installed vertically side-by-side. Hard drives are connected to a backplane through hard drive carriers. Hard drive blanks are installed in the hard drive bays that are not occupied.

**NOTE:** One spare drive is allocated for every 20 drives in the expansion enclosure.

## SC100/SC120 Expansion Enclosure Drive Numbering

Drives are numbered from left to right in the SC100/SC120 expansion enclosure.

The Dell Storage Client identifies drives as $XX-YY$, where XX is the unit ID of the expansion enclosure, and YY is the drive position inside the expansion enclosure.

- The SC100 holds up to 12 drives, which are numbered from left to right in rows starting from 0 at the top-left drive.



**Figure 13. SC100 Expansion Enclosure Drive Numbering**

- The SC120 holds up to 24 drives, which are numbered from left to right starting from 0.
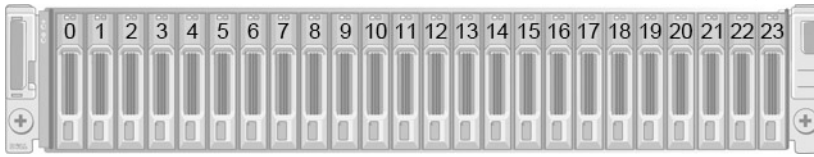


**Figure 14. SC120 Expansion Enclosure Drive Numbering**

## Identifying the Failed Hard Drive

To determine which hard drive failed, use the Dell Storage Client.

1. Start the Dell Storage Client and connect to the Storage Center that has an expansion enclosure with a failed hard drive.
2. Click the **Hardware** tab.
3. In the **Hardware** tab navigation pane, select and expand the Storage Center.
4. In the **Hardware Alerts** area, find the hardware alert that identifies the expansion enclosure with the failed hard drive.
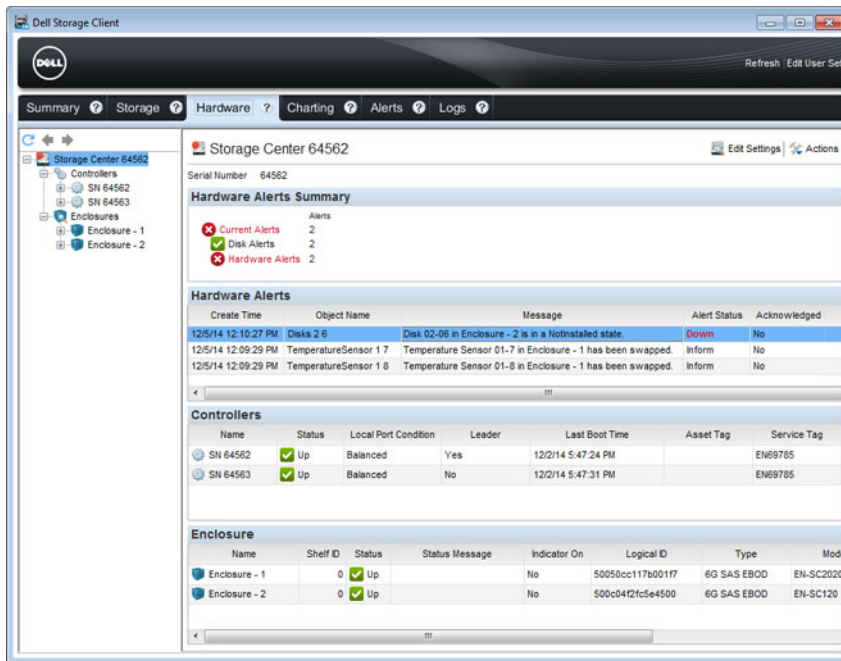


**Figure 15. Hardware Alert Identifying the Expansion Enclosure with the Failed Hard Drive**

5. In the **Hardware** tab navigation pane, expand the expansion enclosure identified in the previous step.
6. Select **Disks**. The status of each hard drive is displayed in the **Disks** tab.
7. Select the failed hard drive. The location of the failed hard drive is displayed in the **Disk View** tab.
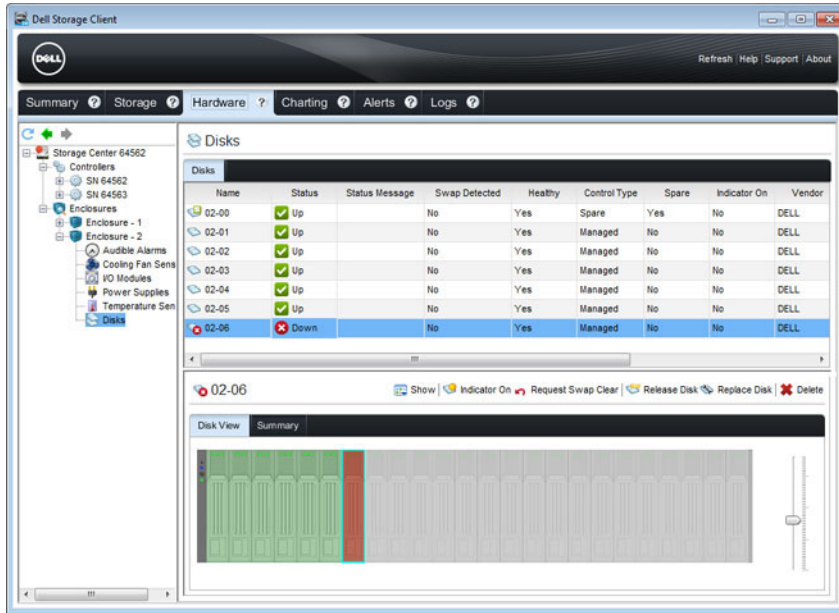
**Figure 16. Front View of the Expansion Enclosure Showing the Failed Hard Drive**

8. (Optional) To open a wizard to guide you through the replacement steps, right-click on the failed hard drive.

## Replacing a Hard Drive

Use this procedure to replace a failed hard drive.

**About this task**

Hard drives can be replaced one at a time without shutting down the expansion enclosure.

> **NOTE:** At least one powered drive must remain installed in the primary chassis when multiple disks are replaced.

**Steps**

1. Use SupportAssist to send diagnostic data to Dell Technical Support.
2. Remove the front bezel.

   A solid amber light appears next to the failed hard drive, indicating that the drive is ready to be removed.
3. Press the release button to open the hard drive carrier release handle.
4. Slide the hard drive out until it is free of the hard drive slot.
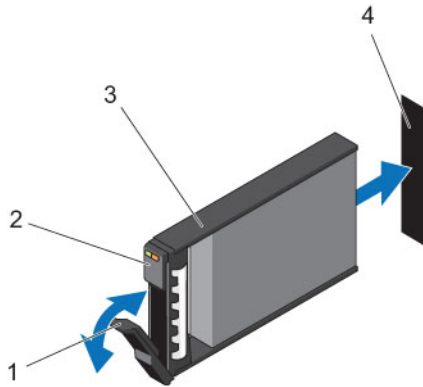
**Figure 17. Replacing a Hard Drive**

| | | | |
|---|---|---|---|
| 1. | Hard drive carrier release handle | 2. | Hard drive indicators |
| 3. | Hard drive carrier | 4. | Hard drive slot |

5. Press the release button on the replacement hard drive to open the hard drive carrier release handle.

   📝 **NOTE:** Hold the hard drive by the plastic part of the hard drive carrier or the handle.

6. Insert the hard drive carrier into the hard drive slot until the carrier make contact with the backplane.

   ⚠️ **CAUTION: Do not remove the hard drive blanks that are installed in hard drive slots that are not occupied. The hard drive blanks ensure proper cooling of the expansion enclosure.**

7. Close the hard drive carrier handle to lock the hard drive in place.

   📝 **NOTE:** Allow several seconds for the expansion enclosure to recognize the hard drive and determine its status. When the hard drive is functioning properly, the status indicator turns green. In addition, the hard drive indicator turns green in the Storage Client.

8. Replace the front bezel.
9. In the Storage Client, make sure that the replacement hard drive is recognized and shown as up and running.
10. Use SupportAssist to send diagnostic data to Dell Technical Support.

### Installing Hard Drives in an SC100/SC120 Expansion Enclosure

An SC100/SC120 expansion enclosure is shipped with drives installed and empty drive blanks are inserted in the unused slots.

**About this task**

The following instructions describe the installation of Dell Enterprise hard drives for reference only.

**Steps**

1. Open the hard drive carrier handle and insert the hard drive carrier into the hard drive slot.

   Start on the left side of the expansion enclosure with slot 0 and install drives from left to right.

2. Slide the drive into the slot until the hard drive carrier contacts the backplane.
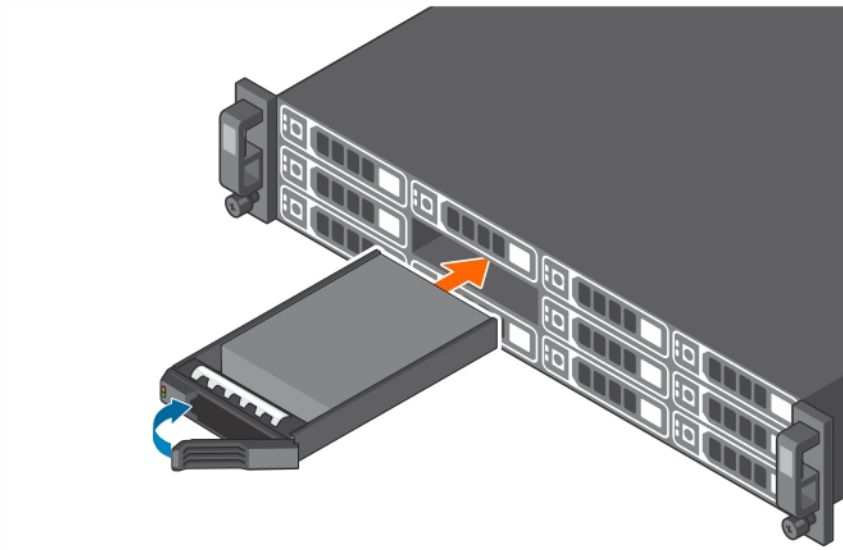
**Figure 18. Installing Dell Enterprise Hard Drives in an SC100**
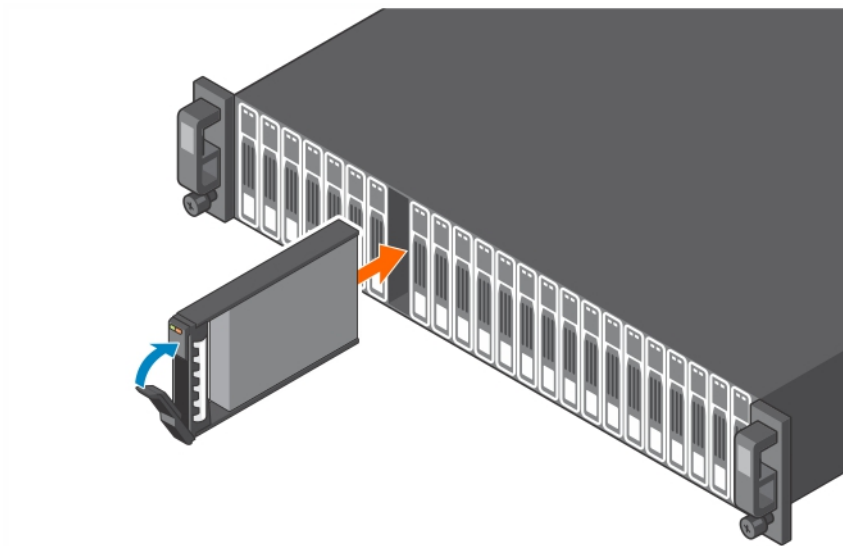


**Figure 19. Installing Dell Enterprise Hard Drives in an SC120**

3. Close the hard drive carrier handle to lock the hard drive in place.
4. Continue to push firmly until you hear a click and the hard drive carrier handle fully engages.
5. Insert drive blanks into any open slots in the expansion enclosure.
   All the drive slots in the expansion enclosure must be filled with a drive or drive blank.

# Replacing an Enclosure Management Module

The SC100/SC120 expansion enclosures support redundant hot-swappable Enclosure Management Modules (EMMs).

EMMs provide the following data path and enclosure management functions for the expansion enclosure:

- Monitoring and controlling expansion enclosure environment elements such as temperature, fan, power supplies, and expansion enclosure LEDs
- Controlling access to hard drives
- Communicating expansion enclosure attributes and states to Storage Center

## Identifying the Failed Enclosure Management Module

To determine which enclosure management module (EMM) failed, use the Dell Storage Client.

1. Start the Dell Storage Client and connect to the Storage Center that has an expansion enclosure with a failed EMM.
2. Click the **Hardware** tab.
3. In the **Hardware** tab navigation pane, select and expand the Storage Center.
4. In the **Hardware Alerts** area, find the hardware alert that identifies the expansion enclosure with the failed EMM.
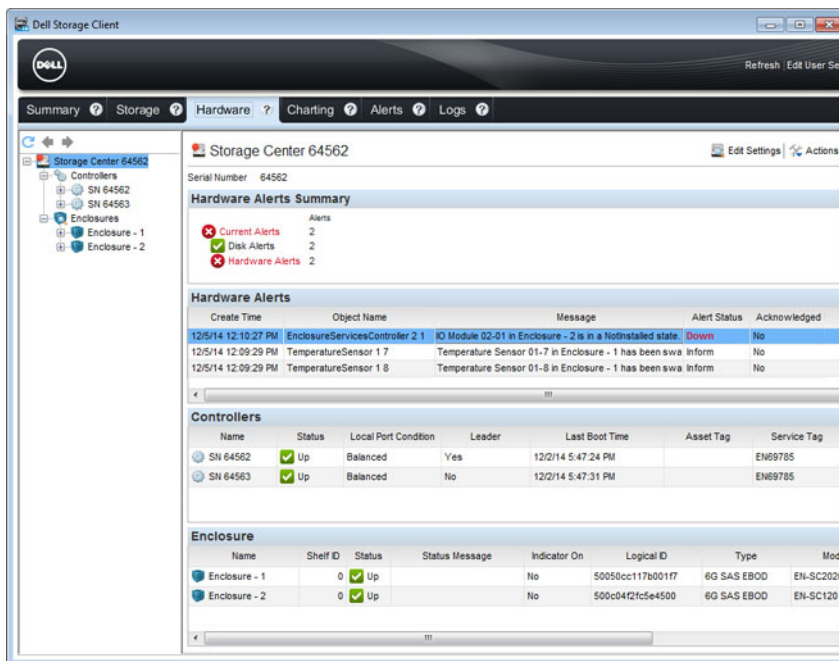


**Figure 20. Hardware Alert Identifying the Expansion Enclosure with the Failed EMM**

5. In the **Hardware** tab navigation pane, expand the expansion enclosure identified in the previous step.
6. Select **I/O Modules**. The status of each EMM is displayed in the **I/O Modules** tab.
7. Select the failed EMM. The location of the failed EMM is displayed in the **I/O Module View** tab.
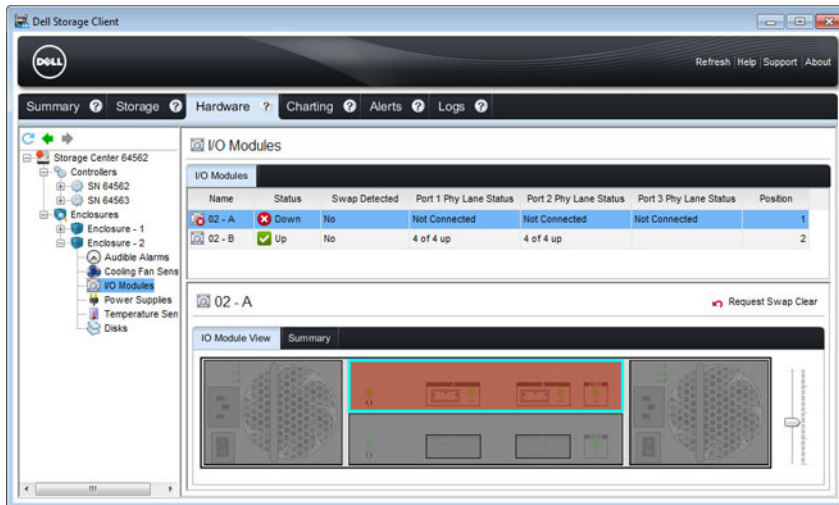
Figure 21. Rear View of the Expansion Enclosure Showing the Failed EMM

## Replacing an Enclosure Management Module

Use this procedure to replace a failed EMM.

**About this task**

EMMs can be replaced one at a time without shutting down the storage system.

**NOTE:** Make sure the cables are labeled before disconnecting them from the EMM.

**Steps**

1. Use SupportAssist to send diagnostic data to Dell Technical Support.
2. Disconnect the SAS cables connected to the EMM.
3. Push down on the release tab and pull the release lever away from the chassis.
4. Grasp the release lever and pull the EMM away from the chassis.
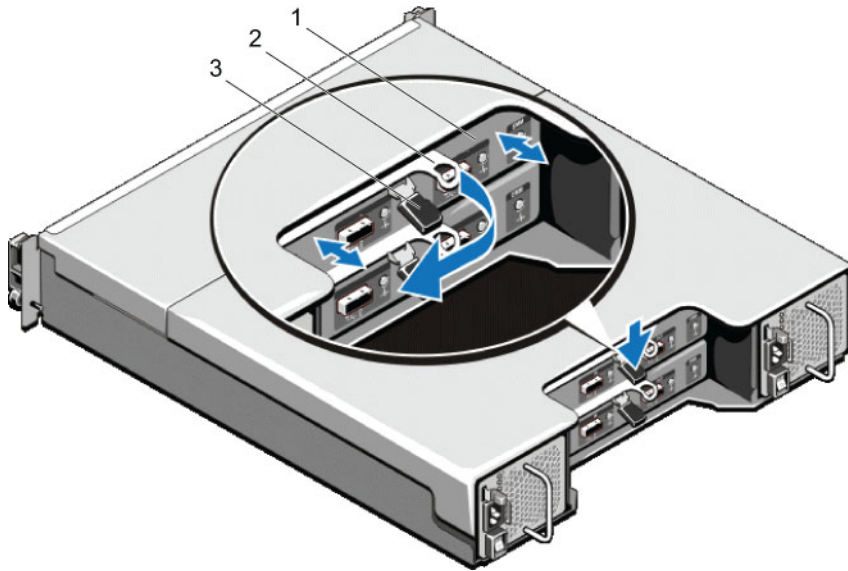
**Figure 22. Replacing an EMM**

1. EMM
2. Release lever
3. Release tab

5. Insert the replacement EMM into the bay until it is fully seated.
6. Push the release lever toward the chassis until it clicks into place.
7. Reconnect the SAS cables to the EMM.

# Replacing Rack Rails

Rack rails are used to install SC100/SC120 expansion enclosures into a rack.

**About this task**
Use this procedure to replace rack rails.

📝 **NOTE:** Replacing rack rails must be performed during a scheduled maintenance window when the Storage Center is unavailable to the network.

**Steps**

1. Use SupportAssist to send diagnostic data to Dell Technical Support.
2. Shut down the storage system and the expansion enclosure.
3. Disconnect the power cables and SAS cables from the expansion enclosure.
4. Remove the expansion enclosure from the rack rails.
5. Remove the rack rails from the rack.
6. Install the replacement rack rails in the rack.
7. Install the expansion enclosure in the rack rails.
8. Reconnect the power cables and SAS cables to the expansion enclosure.
9. Start up the storage system and the expansion enclosure.
10. Use SupportAssist to send diagnostic data to Dell Technical Support.

# Post-Replacement Procedures

Perform the procedures described in this section after replacing a component of an SC100/SC120 expansion enclosure.

## Starting Up the Storage System and Expansion Enclosures

If the storage system and expansion enclosures were previously shut down, perform this procedure to start them up.

1. Plug the power cables into the power supply/cooling fan modules of the storage system and expansion enclosures.
2. Turn on each expansion enclosure by pressing the power switches on the power supply/cooling fan modules.

   ![icon] **NOTE:** Always turn on the expansion enclosures before turning on the storage systems.
3. Turn on the storage system by pressing the power switches on the power supply/cooling fan modules.
4. Use the Dell Storage Client to make sure the replacement part is recognized and shown as up and running.

## Send Diagnostic Data Using Dell SupportAssist

Use Dell SupportAssist to send diagnostic data to Dell Technical Support.

1. Use the Storage Client to connect to the Storage Center.
2. In the **Summary** tab, click **Send SupportAssist Information Now**, which is located under **SupportAssist Actions** in the **Status** pane. The **Send SupportAssist Information Now** dialog box opens.
3. Select **Storage Center Configuration** and **Detailed Logs**.
4. Click **OK**.

   The Storage Client displays the status of the SupportAssist action. A second dialog box opens when the transfer of SupportAssist information has completed successfully.
5. Click **OK**.
6. (Optional) If the Storage Center is in maintenance mode, return it to normal operation.

3

# Troubleshooting SC100/SC120 Components

This section contains basic troubleshooting steps for components inside the SC100/SC120 expansion enclosures.

## Troubleshooting Power Supply/Cooling Fan Modules

Use these steps to troubleshoot power supply/cooling fan modules.

1. Check the status of the power supply/cooling fan module using the Dell Storage Client.
2. Determine the status of the power supply/cooling fan module LEDs.
   - If the power supply/cooling fan module fault indicator is lit, the power supply/cooling fan has failed.
   - If the AC power LED is not lit, check the power cord and power source into which the power supply is plugged:
     – Connect another device to the power source and check whether the device works.
     – Connect the power cord to a different power source.
     – Replace the power cord.
   - If the DC power LED is not lit, verify that the power switch is turned on.
3. Reseat the power supply/cooling fan module by removing and reinstalling it.

   NOTE: Allow several seconds for the expansion enclosure to recognize the power supply/cooling fan module and determine its status.

## Troubleshooting Hard Drives

Use these steps to troubleshoot hard drives.

1. Check the status of the hard drive using the Dell Storage Client.
2. Determine the status of the hard drive LEDs.
   - If the hard drive status LED blinks amber four times per second, the hard drive has failed.
   - If the hard drive status LED is not lit, proceed to the next step.
3. Check the connectors and reseat the hard drive.
   a. Remove the hard drive.
   b. Check the hard drive and the backplane to ensure that the connectors are not damaged.
   c. Reinstall the hard drive. Make sure the hard drive contacts the backplane.

# Troubleshooting Enclosure Management Modules

Use these steps to troubleshoot EMMs.

1. Check the status of the EMM using the Dell Storage Client.
2. Check the pins and reseat the EMM.
    a. Remove the EMM.
    b. Verify that the pins on the backplane and the EMM are not bent.
    c. Reinstall the EMM.
3. Determine the status of the EMM link status LEDs. If the LEDs are not green, check the cables.
    a. Shut down the storage system.
    b. Reseat the cables on the expansion enclosure and the storage system.
    c. Restart the expansion enclosure and then the storage system.
    d. Recheck the link status LEDs. If the link status LEDs are not green, replace the cables.

# Troubleshooting the Control Panel

Use these steps to troubleshoot the control panel.

1. Determine the status of the control panel LEDs. If the LEDs are not lit, and the enclosure is powered on, the control panel has failed.
2. Reseat the control panel by removing and reinstalling it.

   ⚠ CAUTION: The storage system and expansion enclosures must be shut down before reseating the control panel.

# SC100/SC120 Expansion Enclosure Technical Specifications

This section contains the technical specifications for SC100/SC120 expansion enclosures.

## Technical Specifications

The technical specifications of the SC100/SC120 expansion enclosures are displayed in the following tables.

| Drives | |
| --- | --- |
| SAS hard drives | **SC100**: Up to 12 3.5-inch SAS hot-swappable hard drives (6.0 Gbps) |
| | **SC120**: Up to 24 2.5-inch SAS hot-swappable hard drives (6.0 Gbps) |

| Enclosure Management Modules (EMMs) | |
| --- | --- |
| EMMs | Two hot-swappable IO modules |

| Connectivity | |
| --- | --- |
| Configurations | Storage Center supports up to 168 drives in one redundant-path SAS chain |
| | • An SCv2000 supports up to 13 SC100 expansion enclosures or 6 SC120 expansion enclosures |
| | • An SCv2020 supports up to 12 SC100 expansion enclosures or 6 SC120 expansion enclosures |

| Redundant Array of Independent Disks (RAID) | |
| --- | --- |
| Storage System | SCv2000/SCv2020 |
| Management | RAID management using Dell Storage Client2015 R1 |

| Back-Plane Board | |
| --- | --- |
| Connectors | **SC100**: 12 SAS hard-drive connectors |
| | **SC120**: 24 SAS hard-drive connectors |
| | • Two power supply/cooling fan module connectors |
| | • Two sets of EMM connectors |
| | • One control panel connector for front LEDs |
| Sensors | Two temperature sensors |

**Back-Panel Connectors (per EMM)**

| | |
|---|---|
| SAS connectors | SAS A and B connectors for connecting an expansion enclosure to a storage system.<br><br>**NOTE:** SAS connectors are SFF-8086/SFF-8088 compliant |
| Serial connector | One 6-pin UART mini-DIN connector<br><br>**NOTE:** Not for customer use. |

**LED Indicators**

| | |
|---|---|
| Front panel | • One two-color LED indicator for system status<br>• One single-color LED indicators for power status |
| Hard-drive carrier | • One single-color activity LED<br>• One two-color LED status indicator per drive |
| EMM | Three two-color LED status indicators, one each for the two EMM SAS ports and one for the EMM status |
| Power supply/cooling fan | Three LED status indicators for power supply status, power supply/cooling fan fault status, and AC status |

**Power Supplies**

AC power supply (per power supply)

| | |
|---|---|
| Wattage | 700 W |
| Voltage | 100−240 VAC |
| Frequency | 50/60 Hz |
| Amperage | 8.6 A at 100 V, 4.3 A at 250 V |
| Heat dissipation | **SC100**: 2,389 BTU/hr (at 700W)  1,536 BTU/hr Max<br>**SC120**: 2,389 BTU/hr (at 700W) 1,621 BTU/hr Max |
| Maximum inrush current | Under typical line conditions and over the entire system ambient operating range, the inrush current may reach 55 A per power supply for 10 ms or less |

**Available Hard Drive Power (per Slot)**

| | |
|---|---|
| Supported hard drive power consumption (continuous) | **SC100**: Up to 1.16 A at +5 V, up to 1.6 A at +12 V<br>**SC120**: Up to 1.2 A at +5 V, up to 0.5 A at +12 V |

**EMM Power (per Slot)**

| | |
|---|---|
| Maximum power consumed by EMM | **SC100**: 11 W at +12 V |

**EMM Power (per Slot)**

|  |  |
|---|---|
|  | **SC120**: 14 W at +12 V |
| Maximum available power | 100 W at +12 V |
| Maximum available power | 1 W at +5 V (standby) |

**Physical**

| | |
|---|---|
| Height | 8.7 cm (3.43 in.) |
| Width | 48.2 cm (18.98 in.) |
| Depth | **SC100**: 59.4 cm (23.39 in.)<br>**SC120**: 54.1 cm (21.3 in.) |
| Weight (maximum configuration) | **SC100**: 28.39 kg (62.6 lb)<br>**SC120**: 23.31 kg (51 lb) |
| Weight without drives | **SC100**: 8.84 kg (19.5 lb)<br>**SC120**: 8.61 kg (19 lb) |

**Environmental**

NOTE: For additional information about environmental measurements for specific configurations, see dell.com/environmental_datasheets.

**Temperature**

| | |
|---|---|
| Operating | 5° C to 40°C (41° F to 104°F) with a maximum temperature gradation of 10°C per hour<br><br>NOTE: For altitudes above 2950 feet, the maximum operating temperature is derated 1°F per 550 ft. |
| Storage | −40° C to 65°C (−40° F to 149°F) with a maximum temperature gradation of 20°C per hour |

**Relative humidity**

| | |
|---|---|
| Operating | 20% to 80% (noncondensing) with a maximum humidity gradation of 10% per hour |
| Storage | 5% to 95% (noncondensing) |

**Maximum vibration**

| | |
|---|---|
| Operating | 0.26 G at 5−350 Hz for 15 min |
| Storage | 1.88 G at 10−500 Hz for 15 min |

**Maximum shock**

| Environmental | |
| --- | --- |
| Operating | Half-sine shock 31 G +/- 5% with a pulse duration of 2.6 ms +/- 10% (in operational orientations only) |
| Storage | • Half-sine shock 71 G +/- 5% with a pulse duration of 2 ms +/- 10% (all sides) <br> • Square wave shock 27 G with a velocity change of 235 in. per sec (all sides) |

**Altitude**

| | |
| --- | --- |
| Operating | −16 m to 3048 m (−50 ft to 10,000 ft) <br><br> NOTE: For altitudes above 2950 feet, the maximum operating temperature is derated 1°F per 550 ft. |
| Storage | −16 m to 10,600 m (−50 ft to 35,000 ft) |

**Airborne Contaminant Level**

| | |
| --- | --- |
| Class | G2 or lower as defined by ISA-S71.04- 1985 |