Dell Storage Center
SC7020 Storage System
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.

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Rev. A

Contents

Preface

About This Manual

This manual describes the features and technical specifications of an SC7020 storage system.

Revision History

Document Number: 680-108-001

Revision	Date	Description
A	August 2016	Initial release

Audience

The information provided in this manual 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.

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SC7020 Storage System Hardware

The SC7020 storage system ships with Dell Enterprise drives, two redundant power supply/cooling fan modules, and two redundant storage controllers.

Each storage controller contains the front-end, back-end, and management communication ports of the storage system.

SC7020 Storage System Front-Panel Features and Indicators

The front panel of the SC7020 contains power and status indicators, and a system identification button. In addition, the hard drives are installed and removed through the front of the storage system chassis.

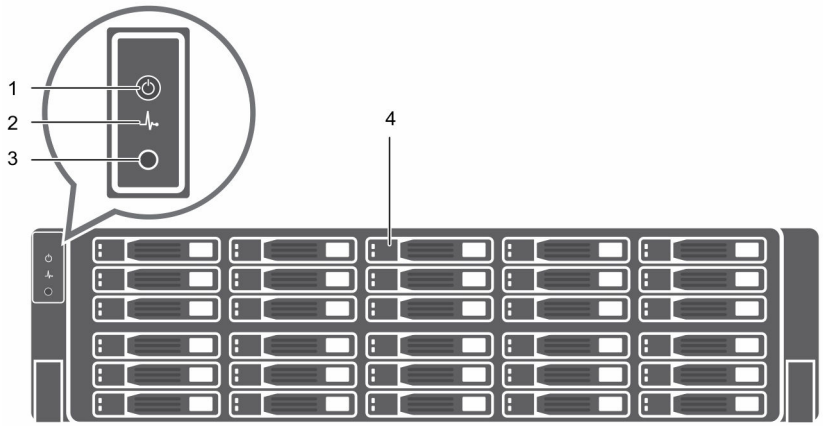

Figure 1. SC7020 Storage System Front-Panel View

Item	Name	Icon	Description
1	Power indicator		Lights when the storage system power is on • **Off** – No power • **On steady green** – At least one power supply is providing power to the storage system
2	Status indicator		Lights when at least one power supply is supplying power to the storage system • **Off** – No power • **On steady blue** – Power is on and firmware is running • **Blinking amber** – Fault detected

Item	Name	Icon	Description
3	Identification button		**Blinking blue (continuously)** – A command was sent by Dell Storage Manager to the storage system to make the LED blink so that users can identify the storage system in the rack. The identification LED blinks on the control panel of the chassis, to allow users to find the storage system when looking at the front of the rack. The identification LEDs on the storage controllers also blink, which allows users to find the storage system when looking at the back of the rack.
4	Hard drives	—	Can have up to 30 internal 2.5-inch SAS hard drives

SC7020 Storage System Back-Panel Features and Indicators

The back panel of the SC7020 contains the storage controller indicators and power supply indicators.

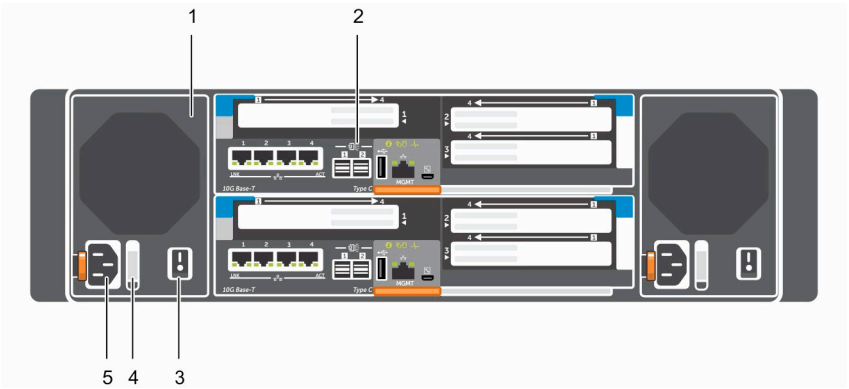

Figure 2. SC7020 Storage System Back-Panel View

Item	Name	Icon	Description
1	Power supply/ cooling fan module (PSU) (2)		Contains a 1485 W power supply and fans that provide cooling for the storage system, with AC input to the power supply of 200-240 V. An LED between the top of the handle and the bottom of the handle indicates whether the PSU has AC/input power. • **Green** – A valid power source is connected to the PSU and the power supply is operational. • **Not lit** – The PSU is off or the power source has a fault.
2	Storage controller (2)	—	Each storage controller contains: • **Mezzanine card with four SFP+ ports or four RJ45 10GBASE-T ports** – Left two ports are for file storage. – Right two ports are for block storage. • **Expansion slots for additional I/O cards**

Item	Name	Icon	Description
			– Slots for optional front-end connectivity – Fibre Channel and iSCSI I/O cards – Slots for optional back-end connectivity – SAS I/O cards • **SAS expansion ports** – Two 12 Gbps SAS ports • **USB port** – Single USB 2.0 port • **MGMT port** – Embedded Ethernet port that is typically used for system management • **Serial port** – Micro-USB serial port used for initial configuration and support-only functions
3	Power switch (2)	—	Controls power for the storage system. Each PSU has one switch.
4	Power supply/ cooling fan module LED handle	—	The handle of the PSU indicates the DC power status of the PSU and the fans. • **Not lit** – No power • **Solid green** – PSU has valid power source and is operational. • **Blinking amber** – Error condition in a PSU • **Blinking green** – Firmware is being updated. • **Blinking green then off** – Power supply mismatch
5	Power socket (2)	—	Accepts the following standard computer power cords: • IEC320-C13 for deployments worldwide • IEC60320-C19 for deployments in Japan

SC7020 Storage System Drives

The SC7020 storage system supports Dell Enterprise hard disk drives (HDDs) and Dell Enterprise solid-state drives (eSSDs) only.

The drives in the SC7020 storage system are installed horizontally. The indicators on the drives provide status and activity information.

Figure 3. SC7020 Storage System Drive Indicators

Item	Control/Feature	Indicator Code
1	Drive activity indicator	• **Blinking green** – Drive has I/O activity • **Steady green** – Drive is detected and has no faults
2	Drive status indicator	• **Steady green** – Normal operation • **Blinking green** – A command was sent by Dell Storage Manager to the disk to make the LED blink so that users can identify the disk in the rack. • **Blinking amber** – Hardware or firmware fault

SC7020 Storage System Drive Numbering

An SC7020 holds up to 30 drives, which are numbered from left to right in rows starting from 0 at the top-left drive. Drive numbers increment from left to right, and then top to bottom such that the first row of drives is numbered from 0 to 4 from left to right, and the second row of drives is numbered from 5 to 9 from left to right.

The Dell Storage Manager Client identifies drives as *XX–YY*, where XX is the number of the unit ID of the storage system and YY is the drive position inside the storage system.

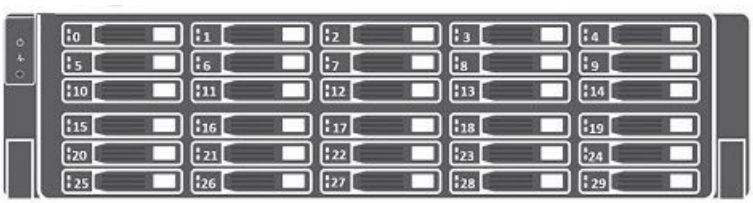

Figure 4. SC7020 Drive Numbering

SC7020 Storage Controller Features and Indicators

The SC7020 storage system includes two storage controllers in two interface slots.

SC7020 Storage Controller

The following figure shows the features and indicators on an SC7020 storage controller.

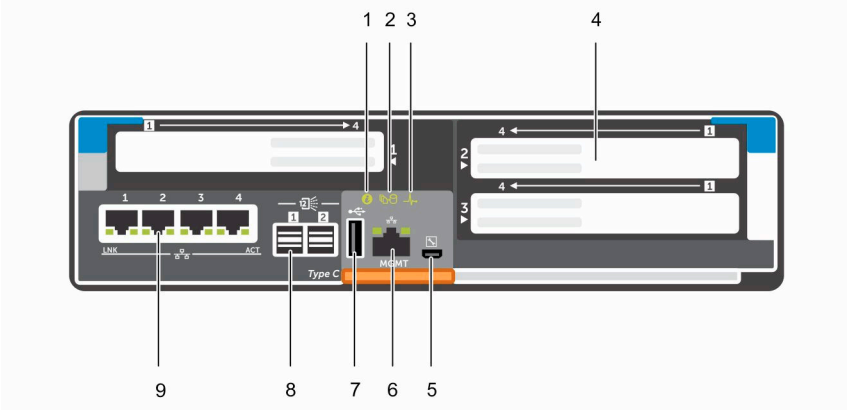

Figure 5. SC7020 Storage Controller

Item	Control/Feature	Icon	Description
1	Identification LED		**Blinking blue (continuously)** – A command was sent by Dell Storage Manager to the storage system to make the LED blink so that users can identify the storage system in the rack. The identification LED blinks on the control panel of the chassis, which allows users to find the storage system when looking at the front of the rack.

Item	Control/Feature	Icon	Description
			The identification LEDs on the storage controllers also blink, which allows users to find the storage system when looking at the back of the rack.
2	Cache to Flash (C2F)		• **Off** – Running normally • **Blinking green** – Running on battery
3	Health status		• **Off** – Unpowered • **Amber** – Powering up • **Blinking amber** – Slow blinking amber (2s on, 1s off) – Controller hardware fault was detected. Use the Dell Storage Manager UI for specific details about what is actually wrong. – Fast blinking amber (4x per second) – Power good and the pre-operating system is booting • **Blinking green** – Slow blinking green (2s on, 1s off) – Operating system is booting – Blinking green (1s on, 1s off) – System is in safe mode – Fast blinking green (4x per second) – Firmware is updating • **Solid green** – Running normal operation
4	I/O card slots		Ports for an I/O card installed in riser 1 are numbered 1 to 4 from left to right. Ports for I/O cards installed in riser 2 are numbered 1 to 4 from right to left.
5	Serial port (micro USB)		Used to initially configure a storage controller. It is also used under the supervision of Dell Technical Support to troubleshoot and support systems.
6	MGMT port	—	Ethernet port used for storage system management and access to Dell Storage Manager. Two LEDs with the port indicate link status (left LED) and activity status (right LED): • **Link and activity indicators are off** – Not connected to the network • **Link indicator is green** – The NIC is connected to a valid network at its maximum port speed. • **Link indicator is amber** – The NIC is connected to a valid network at less than its maximum port speed. • **Activity indicator is blinking green** – Network data is being sent or received.
7	USB port		One USB 2.0 connector that is used for SupportAssist diagnostic files when the storage system is not connected to the Internet.
8	Mini-SAS port B (ports 1 and 2)		Back-end expansion ports 1 and 2

Item	Control/Feature	Icon	Description
9	Mezzanine card		Two LEDs beneath each port provide connectivity information: • **Off** – No connectivity • **Steady green, left LED** – Link (full speed 10GBASE-T) • **Steady amber, left LED** – Link (degraded speed) • **Blinking green, right LED** – Activity

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Replacing SC7020 Storage System Components

This section describes how to remove and install components of the SC7020 storage system.

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 SC7020 in a rack.
- Make sure the storage system is always fully grounded to prevent damage from electrostatic discharge.
- When handling the storage system 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.

- Provide a suitable power source with electrical overload protection. All Storage Center components must be grounded before applying power. Make sure that a safe electrical earth connection can be made 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 storage system.
- 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 storage system chassis before you move it or if you think it has become damaged in any way. When powered by multiple AC sources, disconnect all power sources 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 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 storage system chassis clean and free of clutter.
- Place any system components that have been removed away from the storage system chassis or on a table so that they are not in the way of other people.
- While working on the storage system chassis, do not wear loose clothing such as neckties and unbuttoned shirt sleeves. These items can come into contact with electrical circuits or be pulled into a cooling fan.
- Remove any jewelry or metal objects from your body. These items 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 storage system 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 could become bent.
- Before moving the storage system chassis, remove the PSUs to minimize weight.
- Do not remove drives until you are ready to replace them.

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

Bezel

The front bezel is a cover for the front panel of the SC7020 storage system.

Remove the Front Bezel

Before you remove or install hard drives in the storage system, remove the front bezel.

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 storage system.

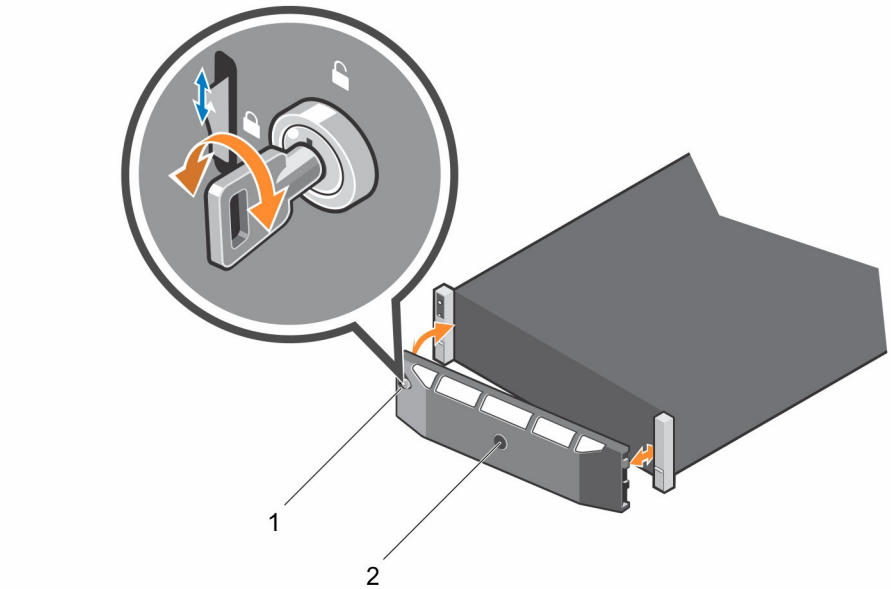

Figure 6. Installing and Removing the Bezel

1. Keylock
2. Front bezel

Install the Front Bezel

To secure the storage system, install the front bezel.

1. Hook the right end of the replacement bezel onto the front panel of the storage system.
2. Insert the left end of the bezel into the securing slot until the release latch locks into place.
3. Secure the bezel with the keylock.

Hard Drives

The SC7020 storage system supports hot-swappable hard drives.

The SC7020 storage system supports a minimum of 7 internal 2.5-inch drives up to a maximum of 30 drives. The drives are installed from left to right, and then top to bottom. The first row of drives are

numbered from 0–4 from left to right, the second row of drives are numbered from 5–9 from left to right, and so on.

The Dell Storage Manager Client identifies drives as *XX–YY*, where XX is the number of the unit ID of the storage system and YY is the drive position inside the storage system.

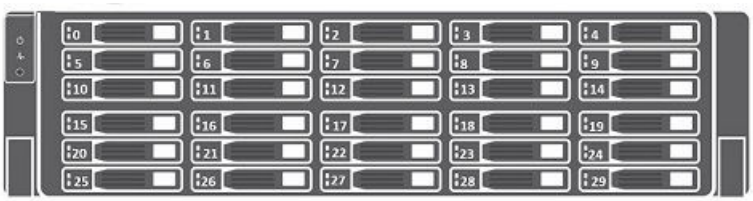

Figure 7. SC7020 Drive Numbering

Identify the Failed Drive

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

1. Click the **Hardware** tab.
2. In the **Hardware** tab navigation pane, select the **Enclosures** node.
3. Click the **Disks** tab.
4. Find the drive with the status of `Down`.
5. Record the location of the drive from the **Name** column.

Remove the Failed Drive

Use this procedure to remove a drive from the SC7020 storage system.

1. Remove the front bezel from the storage system.
2. Locate the failed hard drive in the storage system.
3. Press the release button to open the hard drive carrier release handle.
4. Slide the hard drive carrier out of the hard drive slot.

Install the Replacement Drive

Use this procedure to install a drive in the SC7020 storage system.

Steps

1. Open the release handle on the drive carrier and insert the hard drive carrier into the open drive slot.
2. Slide the drive into the slot until the drive carrier contacts the midplane.
3. Close the drive carrier handle to lock the drive in place.
4. Continue to push firmly until you hear a click and the drive carrier handle fully engages.

Next steps

Install the front bezel on the storage system.

Rack Rails

Rack rails are used to install the storage controller into a rack.

Remove the Rack Rails

Perform the following steps to remove rack rails for an SC7020 storage system.

Prerequisites

1. Use SupportAssist to send diagnostic data to Dell Technical Support.
2. Shut down the storage system using the Dell Storage Manager Client.

About this task

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

Steps

1. Make sure all the cables are labeled.
2. Disconnect all of the cables from the storage system.
3. Loosen the screws in the chassis ears that secure the chassis to the rack.

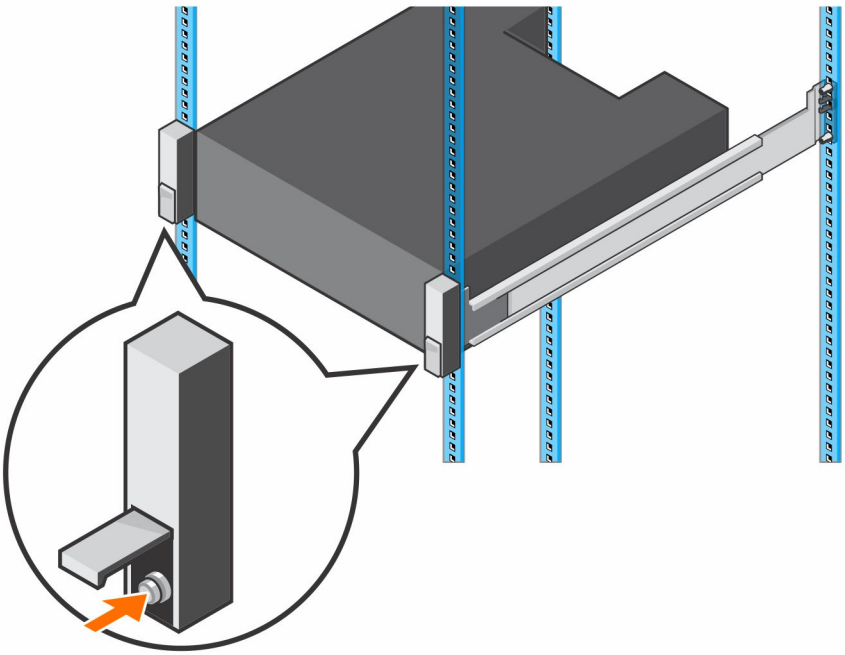

Figure 8. Loosen the Screws

4. Remove the storage system from the rack.
5. Remove the rack rails from the rack.

Install the Rack Rails

Perform the following steps to install rack rails for an SC7020 storage systems.

Steps

1. Install the replacement rack rails in the rack.
2. Install the storage system in the rack.
3. Tighten the screws in the chassis ears that secure the chassis to the rack.

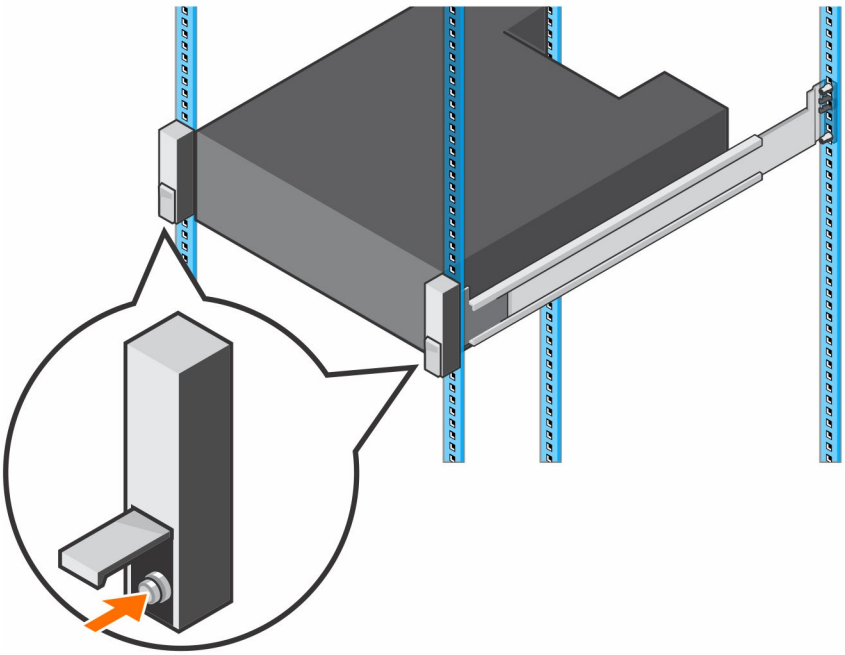

Figure 9. Tighten the Screws

4. Reconnect the cables to the storage system.
5. Start up the storage system.

Next steps

Use SupportAssist to send diagnostic data to Dell Technical Support.

Power Supply/Cooling Fan Modules

The SC7020 storage system supports two hot-swappable power supply/cooling fan modules.

The cooling fans that cool the storage system and the power supplies are integrated into the power supply/cooling fan module and cannot be replaced separately. If one power supply/cooling fan module fails, the second module continues to provide power to the storage system.

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

CAUTION: A single power supply/cooling fan module can be removed from a powered-on storage system for no more than 90 seconds. If a power supply/cooling fan module is removed for longer than 90 seconds, the storage system might shut down automatically to prevent damage.

Identify the Failed Power Supply

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

1. Click the **Hardware** tab.
2. In the **Hardware** tab navigation pane, select the **Controllers** node.
3. Click the **Power Supplies** tab.
4. Find the power supply with a status of `Down`.
5. Record the location of the failed power supply.

Identify the Failed Cooling Fan

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

1. Click the **Hardware** tab.
2. In the **Hardware** tab navigation pane, select the **Controllers** node.
3. Click the **Fans** tab.
4. Find the fan with a status of `Down`.
5. Record the location of the failed fan.

Replace 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 storage system.

Steps

1. Before replacing a power supply/cooling fan module, 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. To prevent the module from overheating, replace it within 3 minutes.
3. Remove the hook-and-loop strap that secures the power cable and disconnect the power cable from the power supply/cooling fan module.

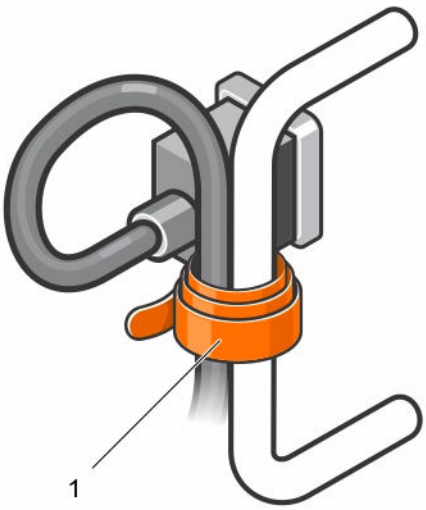

Figure 10. Removing the Hook and Loop Strap from the Power Cable

1. Hook-and-loop strap

4. Push the release tab on the power supply/cooling fan module to the right and use the handle to slide the module out of the chassis.

CAUTION: The power supply/cooling fan modules are heavy. To avoid injury, use both hands while removing the module.

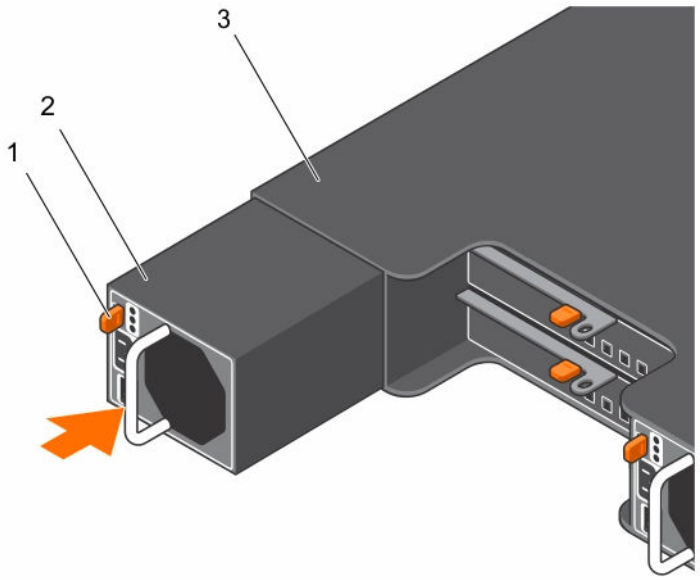

Figure 11. Removing a Power Supply/Cooling Fan Module

1. Release tab
2. Power supply/cooling fan module
3. Power supply cage

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

   NOTE: Allow several seconds for the storage system 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 Manager Client, make sure that the replacement power supply is recognized and shows as up and running.
10. After replacing a power supply/cooling fan module, use SupportAssist to send diagnostic data to Dell Technical Support.

3

SC7020 Storage System Technical Specifications

Technical Specifications

The technical specifications of the SC7020 storage systems are displayed in the following tables.

Drives	
SAS hard drives	Up to 30 2.5-inch SAS hot-swappable hard drives (12GB SAS)

Storage Controllers	
Storage controllers	Up to two hot-swappable storage controllers with one mezzanine card and three IO slots. Each storage controller has an internal battery backup unit. Write cache is mirrored between the two storage controllers. If a power failure occur, the battery backup unit provides power to the storage controller so that the write cache can be saved to an SSD within the storage controller.

Storage Connectivity	
Configurations	Storage Center supports up to 168 drives in one redundant-path SAS chain. • An SC7020 supports up to 12 SC400 expansion enclosures or 6 SC420 expansion enclosures.

Redundant Array of Independent Disks (RAID)	
Controller	Two hot-swappable storage controllers
Management	RAID management using the Dell Storage Manager Client

Back-Panel Ports Connectors (per Storage Controller)	
Fibre Channel, iSCSI, or SAS connectors	Connection to a Fiber Channel fabric, iSCSI network, and SAS
Ethernet connectors	**MGMT** - 100 Mbps, or 1 Gbps embedded Ethernet port used for Storage Center management
SAS connectors	12GB SAS connectors for additional expansion enclosures **NOTE:** SAS connectors are SFF-8086/SFF-8088 compliant.

Back-Panel Ports Connectors (per Storage Controller)	
Serial connector	NOTE: Not for customer use.

LED Indicators	
Front panel	• One two-color LED indicator for system status • One single-color LED indicator for power status • ID button with a single-color LED indicating boot status and pressed states
Hard drive carrier	• One single-color activity LED • One dual-color LED status indicator per drive
Storage controller	• Two single-color LEDs per Ethernet port indicating activity and link speed • One dual-color LED per SAS connector indicating port activity and status • One single-color LED indicating status • One single-color LED indicating fault • One single-color LED for identification
Power supply/cooling fan	Two LED status indicators for power supply status, AC fail status, DC fail status, and fan fail status

Power Supply Units (PSU)		
AC power supply (per power supply)	**PSU Type 1**	**PSU Type 2 (Japan Only)**
Maximum output power	1485 watts	1485 watts
Maximum input power	1688 watts	1707 watts
Maximum input current	8.8 amps	17.5 amps
Maximum inrush current	55 amps for 10mS or less	55 amps for 10mS or less
Nominal input voltage operating range	200–240 VAC	100–240 VAC
Nominal input frequency	50/60 Hz	50/60 Hz
Thermal output/heat dissipation	693 BTU per hour	757 BTU per hour

Available Hard Drive Power (Per Slot)	
Supported hard drive power consumption (continuous)	Up to 1.2 A at +5 V Up to 0.5 A at +12 V

Physical	
Height	13.34 cm (5.25 in.)
Width	44.50 cm (17.5 in.)
Depth	78.27 cm (31 in.)
Weight (maximum configuration)	34.4 kg (76 lb)
Weight without drives	25 kg (55 lb)

Environmental	
For additional information about environmental measurements for specific storage system configurations, see dell.com/environmental_datasheets.	
Temperature	
Operating	10°C (50°F) to 35°C (95°F) with a maximum temperature gradation of 20°C/hour (36°F/hour) Operating above 35°C could result in data loss.
Storage	–40° to 65°C (–40° to 149°F) at a maximum altitude of 12,000 m (39,370 ft)
Relative humidity	
Operating	10% to 80% (noncondensing) with 29°C (84.2°F) maximum dew point
Storage	5% to 95% (noncondensing) with 33°C (91°F) maximum dew point
Maximum vibration	
Operating	0.21 G at 5–500 Hz for 15 min
Storage	1.04 G at 2–200 Hz for 15 min
Maximum shock	
Operating	31 G +/- 5% with pulse duration of 2.6 msec +/- 10% (equivalent to 20 in/sec [51 cm/sec])
Storage	71 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 35 in/sec [89 cm/sec])
Altitude	
Operating	3,048 meters (10,000 feet) **≤35°C (95°F) Maximum Rating**–Maximum temperature is reduced by 1°C/300 meter (1°F/547 feet) above 950 meters (3,117 feet).
Storage	12,000 meters (39,370 ft)
Airborne Contaminant Level	
Class	G1 or lower as defined by ISA-S71.04-1985