

# Dell FluidFS NAS Solutions Owner's Manual

Regulatory Model: E02T and C11M  
Regulatory Type: E02T001 and C11M001



# 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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# About Your System

## Front-Panel Features And Indicators

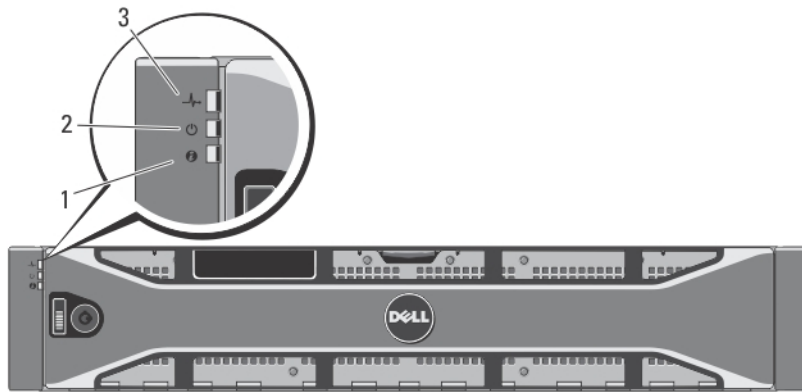


Figure 1. Front Bezel Indicators

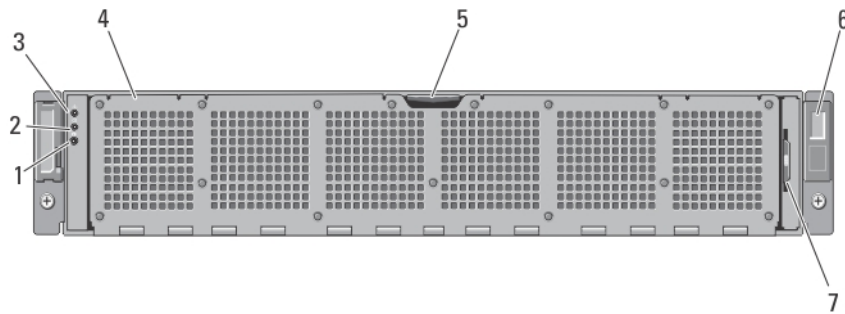





Figure 2. Front-Panel Features and Indicators

Item	Indicator, Button, or Connector	Icon	Description
1	System identification button		The identification buttons on the front and back panels can be used to locate a particular system within a rack. When one of these buttons is pressed, the system status indicator on the back flashes until one of the buttons is pressed again. Press to toggle the system ID on and off.
2	Power-on indicator		The power LED lights green when at least one power supply is connected to a power source and is supplying power to the system.
3	System health indicator		The system status LED lights only when the system power is on. <ul style="list-style-type: none"> <li>Lights blue during normal operation.</li> <li>Blinks amber when one of the controllers is reporting hardware errors, battery errors, or if one controller is missing.</li> </ul>
4	Cooling-fan access door		Encloses and protects the hot-swappable cooling fans.
5	Cooling-fan access door release latch		Press the access door release latch to expose the hot-swappable cooling fans.
6	Service tag		Displays the appliance service tag information.
7	Information tag		A slide-out label panel listing the system NIC and BMC MAC addresses for both controllers.

## Back-Panel Features And Indicators

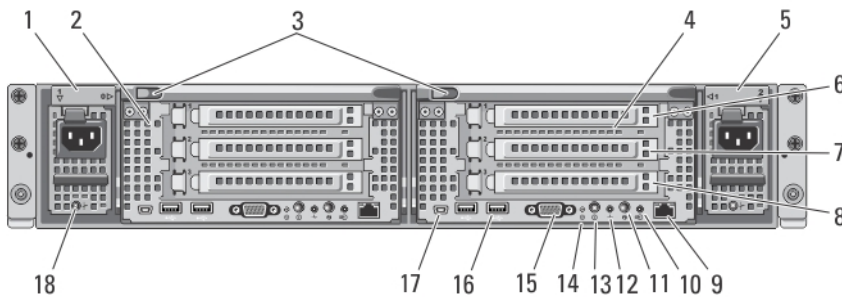







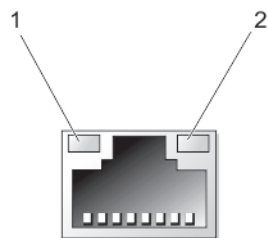
Figure 3. Back-Panel Features and Indicators

Item	Indicator, Button, or Connector	Icon	Description
1	Power supply (PSU1)		717 W
2	Controller 1		Redundant NAS processing unit.

Item	Indicator, Button, or Connector	Icon	Description
3	Release button		Press the release button to disengage the controller handle and remove the storage controller from the NAS appliance chassis.
4	Controller 2		Redundant NAS processing unit.
5	Power supply (PSU2)		717 W
6	PCIe expansion card slot (slot 1)		Contains the pre-installed expansion card based on your solution.
7	PCIe expansion card slot (slot 2)		Contains the pre-installed expansion card based on your solution.
8	PCIe expansion card slot (slot 3)		Contains the pre-installed expansion card based on your solution.
9	Ethernet connector		Reserved for future use.
10	Cache active/off-load LED		Lights when the storage controller contains cache and when the cache is being transferred from the memory to the hard drive. For more information on the cache activity LED indicator codes, see Cache Activity LED Indicator Codes.
11	System identification button		The identification buttons on the front and back panels can be used to locate a particular system within a rack. When one of these buttons is pressed, the system status indicator on the back flashes until one of the buttons is pressed again. Press to toggle the system ID on and off.
12	System health indicator		The system status LED lights only when the system power is on. <ul style="list-style-type: none"> <li>Lights blue during normal operation.</li> <li>Blinks amber when one of the controllers is reporting hardware errors, battery errors, or if one controller is missing.</li> </ul>
13	Power-on indicator, power button		The power-on indicator lights when the system power is on. The power button controls the power supply output to the system. <ul style="list-style-type: none"> <li>When the controller is powered on, if you press and release the power button the controller performs a graceful shutdown.</li> <li>When the controller is off, if you press and release the power button, the controller powers on.</li> </ul> <p> <b>NOTE:</b> Pressing and holding the power button for several seconds will not shutdown the controller immediately .</p> <p>For more information on the power button indicator codes, see Power-Button LED Indicator Codes.</p>

Item	Indicator, Button, or Connector	Icon	Description
14	Service action button		Used to troubleshoot certain errors. This button can be pressed using the end of a paper clip.  <b>NOTE:</b> You must press and hold the button for ten seconds to generate an SCI interrupt.  <b>NOTE:</b> Use this button only if directed to do so by qualified support personnel.
15	Video connector		Allows you to connect a VGA display to the system.
16	USB connectors (2)		Allows you to connect USB devices to the system. The ports are USB 2.0-compliant.
17	Serial COM port (mini USB connector)		Allows you to connect a serial device to the system.  <b>NOTE:</b> This connector is for service only. Connect to this connector only if asked to do so by Dell support.
18	PSU indicator		Indicates whether power is present or whether a power fault has occurred.

## NIC Indicator Codes



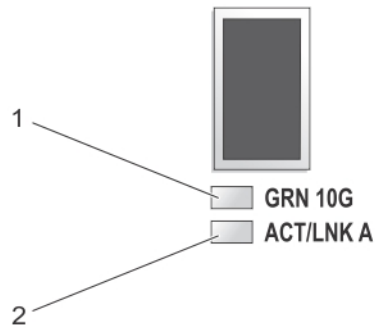
**Figure 4. NIC Indicator**

1. link indicator
2. activity indicator

Indicator	Indicator Code
<b>Link and activity indicators are off</b>	The NIC is not connected to the network.
<b>Link indicator is green</b>	The NIC is connected to a valid network at its maximum port speed (1 Gbps or 10 Gbps).
<b>Link indicator is amber</b>	The NIC is connected to a valid network at less than its maximum port speed.
<b>Activity indicator is blinking green</b>	Network data is being sent or received.



## SFP+ Indicators




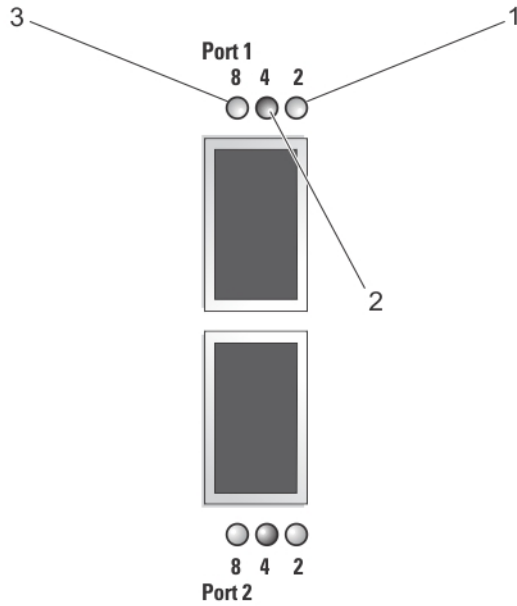
**Figure 5. SFP+ Indicators**

1. link indicator
2. activity indicator

<b>Indicator</b>	<b>Description</b>
<b>Link and activity indicators are off</b>	The SFP+ module is not connected to the network.
<b>Link indicator is green</b>	The SFP+ module is connected to a valid network.
<b>Activity indicator is blinking green</b>	Network data is being sent or received.

## Fibre Channel LED Indicators

 **NOTE:** This fibre channel LED indicator codes are specific only to the Dell Compellent FS8600 NAS Solution.



**Figure 6. fibre Channel Indicators**

1. Amber LED (2 Gbps)
2. Green LED (4 Gbps)
3. Yellow LED (8 Gbps)

Indicator	Description
<b>All LEDs off</b>	Indicates that there is no power connected to the host bus adapter.
<b>All LEDs on</b>	Indicates that the power is connected to the host bus adapter and that the firmware is not initialized.
<b>All LEDs flashing</b>	Indicates that the power is connected to the host bus adapter and that the firmware is initialized.
<b>Yellow, Green, and Amber LEDs flashing alternately</b>	Indicates a firmware error.
<b>Amber LED on</b>	Indicates that the host bus adapter is online with a 2 Gbps link.
<b>Amber LED flashing</b>	Indicates I/O activity on a 2 Gbps link.
<b>Green LED on</b>	Indicates that the host bus adapter is online with a 4 Gbps link.
<b>Green LED flashing</b>	Indicates I/O activity on a 4 Gbps link.
<b>Yellow LED on</b>	Indicates that the host bus adapter is online with an 8 Gbps link.
<b>Yellow LED flashing</b>	Indicates I/O activity on an 8 Gbps link.

# Power Indicator Codes

## Power Supply Unit LED Indicator Codes

Each AC power supply has an LED that serves as an indicator to show whether power is present or whether a power fault has occurred.



Figure 7. AC Power Supply Status Indicator

1. AC power supply status indicator


Power Indicator Pattern	Condition
-------------------------	-----------





<b>Off</b>	Power is not connected.
<b>Green</b>	Indicates that a valid power source is connected to the power supply and that the power supply is operational.
<b>Flashing amber</b>	Indicates a problem with the power supply.

## Power-Button LED Indicator Codes

The controller has a power-button LED on the back of the chassis. The power-button LED serves as an indicator to show if power is present, if a power fault has occurred, or if the controller is running on backup power supply.

Indicator	Description
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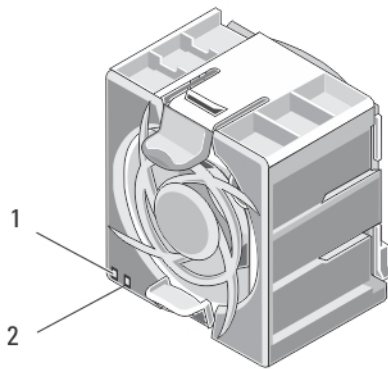
<b>Off</b>	Indicates that the controller is in power off mode.
<b>Solid amber</b>	Indicates that the controller is powered on and about to enter system power-on self test (POST). If the controller is not responding, it indicates that the controller may have a hardware failure that is not allowing the controller to get to BIOS POST.
<b>Slow blink amber</b>	Indicates that the controller is currently in BIOS POST or option ROM load stage.  <b>NOTE:</b> The LED flashes once every two seconds. If the controller is not responding, it may indicate that a failure has occurred in POST or option ROM load phase.
<b>Slow blink green</b>	Indicates that the controller is attempting to start the operating system.

Indicator	Description
	<p> <b>NOTE:</b> The LED flashes once every two seconds.</p> <p>If the controller is not responding, it may indicate that the operating system did not load correctly.</p>
<b>Solid green</b>	Indicates that the controller is clustered and fully functional.
<b>Fast blink green</b>	Indicates that the controller is in standby state and waiting to be clustered.
	<p> <b>NOTE:</b> The LED flashes five times every second.</p>
<b>Fast blink amber</b>	Indicates that the controller is currently in battery mode.
	<p> <b>NOTE:</b> The LED flashes five times every second.</p> <p> <b>NOTE:</b> The controller may run in battery mode for up to 20 to 30 mins with a new battery.</p>
<b>Blink alternating amber/green</b>	Indicates that there is a hardware mismatch or the expected hardware configuration does not match the actual hardware configuration. For example, an eight-core processor is expected, but only a four-core processor is detected on the system.

## Cooling Fan LED Indicator Codes

Each cooling fan has two LEDs:

- Power LED
- Status LED



**Figure 8. Cooling Fan Indicators**

1. power LED
2. status LED

## Power LED Indicator Codes

Indicator	Description
Off	Indicates that no power is available to the fan.
Solid green	Indicates that the power is on.

## Status LED Indicator Codes

Indicator	Description
Off	Indicates normal operating state.
Blinking amber	Indicates system fault or error condition.

## Cache Activity LED Indicator Codes

The cache activity LED lights when the storage controller contains cache and when the cache is being transferred from the memory to the hard drive.

Indicator	Indicator Codes
Off	Indicates that there is no write data in the cache. It is safe to remove the controller when the cache activity LED is off.
Solid green	Indicates that it is safe to remove the controller without loss of cached data. It is safe to remove one controller but not both the controllers.
Flashes amber	Indicates that cache is being transferred from the memory to the hard drive (moving from mirroring mode to journaling mode).

 **CAUTION: Removing the controller from the NAS appliance when the cache LED indicator is flashing amber causes loss of data.**

## Other Information You May Need

 **WARNING: See the safety and regulatory information that shipped with your system. Warranty information may be included within this document or as a separate document.**

- The *Getting Started Guide* provides an overview of setting up your system and technical specifications.
- The rack documentation included with your rack solution describes how to install your system into a rack, if required.
- The *Administrator's Guide* provides an overview of the tasks that must be completed to configure the NAS manager.
- The *Deployment Guide* provides information on hardware deployment and the initial deployment of the NAS appliance.
- The *System Placemat* provides information on how to rack your system.
- Any media that ships with your system that provides documentation and tools for configuring and managing your system, including those pertaining to the operating system, system management software, system updates, and system components that you purchased with your system.

- For the full name of an abbreviation or acronym used in this document, see the Glossary at [support.dell.com/manuals](https://support.dell.com/manuals).



**NOTE:** Always check for updates on [support.dell.com/manuals](https://support.dell.com/manuals) and read the updates first because they often supersede information in other documents.

# Installing System Components

## Recommended Tools

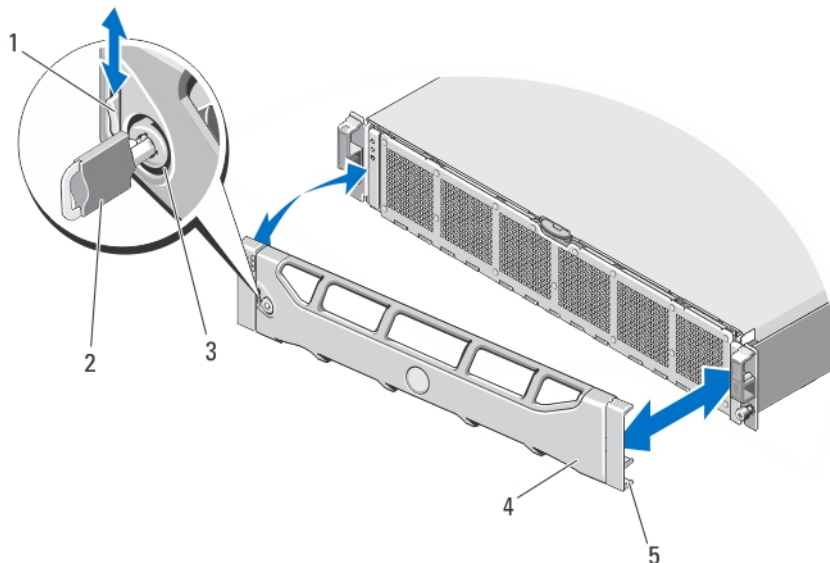
You may need the following items to perform the procedures in this section:

- Key to the system keylock
- #2 Phillips screwdriver
- T8 and T15 Torx screwdrivers
- Wrist grounding strap connected to ground

## Front Bezel

### Installing The Front Bezel

1. Hook the right end of the bezel onto the chassis.
2. Fit the free end of the bezel onto the chassis.
3. Secure the bezel with the keylock.



**Figure 9. Removing and Installing the Front Bezel**

1. release latch
2. key
3. keylock

4. front bezel
5. locking hook


## Removing The Front Bezel


1. 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 system.

## Controllers


Your NAS appliance supports two redundant hot-swappable controllers.


### Removing A Controller

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **NOTE:** This is a service only procedure.

1. Detach the controller from the cluster using the NAS manager user interface.
2. Log on to the **NAS Manager** and select **Cluster Management** → **Hardware** → **Controllers Management**.
3. Select the controller you want to detach.
4. Click **Detach**.

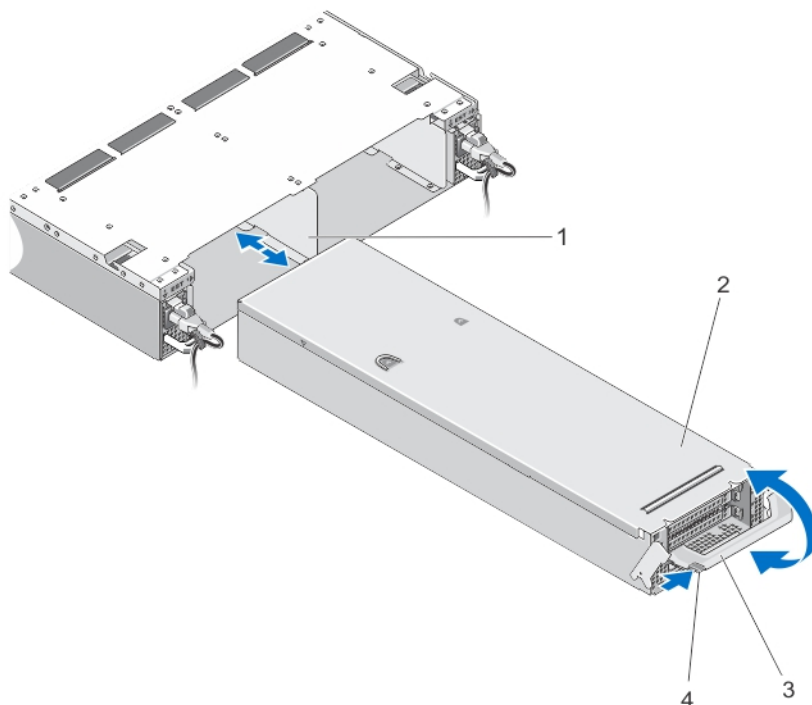
 **NOTE:** You can turn off the controller by pressing and releasing the recessed power button located at the back of the controller.

 **NOTE:** If the controller you are detaching hosts the cluster management virtual IP, you receive a message stating so and the detach process is stopped. You must power cycle the controller in order to migrate the management virtual IP to another controller.

 **CAUTION:** Label all the cables correctly before disconnecting any cables. Ensure that the cables are reconnected to the same ports when installing the controller.

5. Remove any cables connected to the back of the controller.
6. Press the release button to disengage the controller handle.
7. Push the controller handle down until the controller disengages from the NAS appliance.
8. Using the controller handle, pull the controller out of the NAS appliance.





**Figure 10. Removing and Installing a Controller From the NAS Appliance**

1. controller slot in the NAS appliance
2. controller
3. controller handle
4. release button

## Installing A Controller

**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

**NOTE:** This is a service only procedure.

1. Ensure that the controller cover is closed.
2. Align the controller with the appropriate slot in the NAS appliance.
3. Push the controller into the NAS appliance until the controller seats into place.
4. Push the handle toward the front of the NAS appliance until it locks.
5. Reconnect the network cables that were connected to the back of the controller.

**NOTE:** The controller automatically powers on if at least one power supply is connected to a power source.

6. Ensure that the power cable is securely connected to the power supply unit.
7. Attach the controller to the cluster using the NAS manager user interface.

8. Log on to the **NAS Manager** and select **Cluster Management** → **Hardware** → **Controllers Management**.
9. Select the controller you want to attach.
10. Click **Attach**.


## Power Supplies

Your system supports two hot-swappable 717 W AC power supply modules.

When two identical power supplies are installed, the power supply configuration is redundant. In redundant mode, power is supplied to the system equally from both power supplies to maximize efficiency.

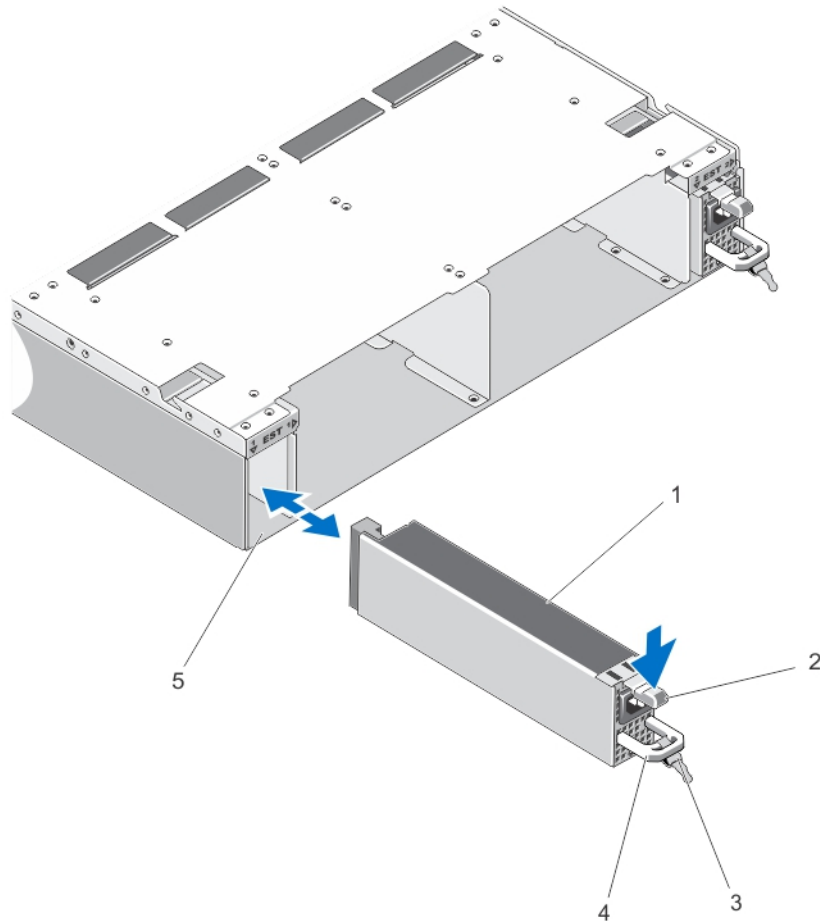
When one power supply is removed or has failed, the power supply configuration is non-redundant. Power is supplied to the system only by the single power supply.

### Removing A Power Supply

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **CAUTION:** The system requires one power supply for normal operation. Remove and replace only one power supply at a time in a system that is powered on.

1. Disconnect the power cable from the power source and the power supply you intend to remove and remove the cables from the strap.
2. Press the release latch and slide the power supply out of the NAS appliance chassis.



**Figure 11. Removing and Installing an AC Power Supply**


1. power supply
2. release latch
3. cable securing strap
4. power supply handle
5. power supply unit slot in NAS appliance chassis

## Installing A Power Supply

**⚠ CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.


1. Slide the new power supply into the chassis until the power supply is fully seated and the release latch snaps into place.
2. Connect the power cable to the power supply and plug the cable into a power outlet.

**⚠ CAUTION:** When connecting the power cable, secure the cable with the strap.


 **NOTE:** When installing or hot-swapping a new power supply, allow several seconds for the system to recognize the power supply and determine its status. The power-supply status indicator turns green to signify that the power supply is functioning properly.


## Cooling Fans


Your system supports hot-swappable cooling fans.


 **NOTE:** In the event of a problem with a particular fan, the fan number is referenced by the system's management software, allowing you to easily identify and replace the proper fan by noting the fan numbers on the inside of the cooling fan access door.

### Removing A Cooling Fan

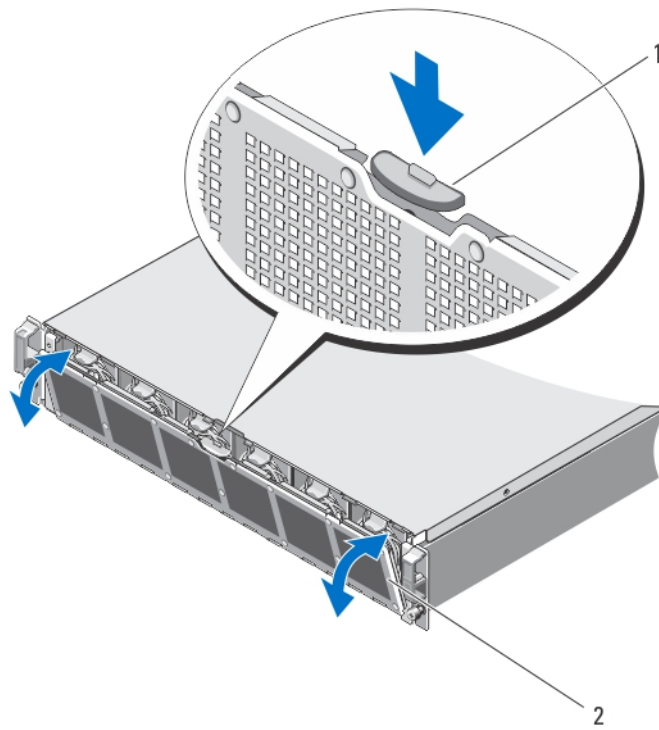
 **WARNING:** Opening or removing the NAS appliance cover when the NAS appliance is on may expose you to a risk of electric shock. Exercise utmost care while removing or installing cooling fans.

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **CAUTION:** The cooling fans are hot-swappable. To maintain proper cooling while the system is on, replace only one fan at a time.

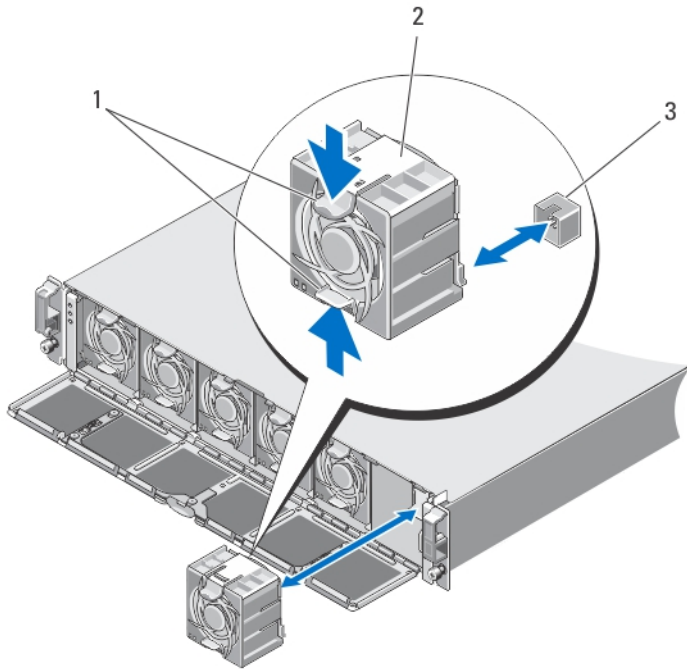
 **NOTE:** The procedure for removing each fan is identical.

1. If installed, remove the front bezel.
2. Press the cooling fan access door release latch to open the cooling fan access door.



**Figure 12. Opening and Closing the Cooling Fan Access Door**

1. cooling fan release latch
2. cooling fan access door
3. Press the fan release tabs (2) and pull the cooling fan out of the NAS appliance chassis.



**Figure 13. Removing and Installing a Cooling Fan**

1. fan release tabs (2)
2. cooling fans (6)
3. cooling-fan connectors (6)

## Installing A Cooling Fan

**⚠ CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Align the plug at the base of the cooling fan with the connector on the system board.
2. Slide the cooling fan into the securing slots until the tabs lock into place.  
Ensure that the cooling fans are properly seated in the cooling fan connectors on the system board.

**⚠ CAUTION:** For proper cooling of the NAS appliance, ensure that all the cooling fans are operational at all times.


3. Close the cooling fan access door.
4. If applicable, install the front bezel.

## Opening And Closing The NAS Appliance

**⚠ WARNING:** Whenever you need to lift the NAS appliance, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.


 **WARNING:** Opening or removing the NAS appliance cover when the system is on may expose you to a risk of electric shock.


 **WARNING:** This NAS appliance should only be opened by a certified Dell service technician as agreed to in your service contract.

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.


 **CAUTION:** Do not operate the NAS appliance without the cover for a duration exceeding five minutes.


## Opening The NAS Appliance

 **NOTE:** It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

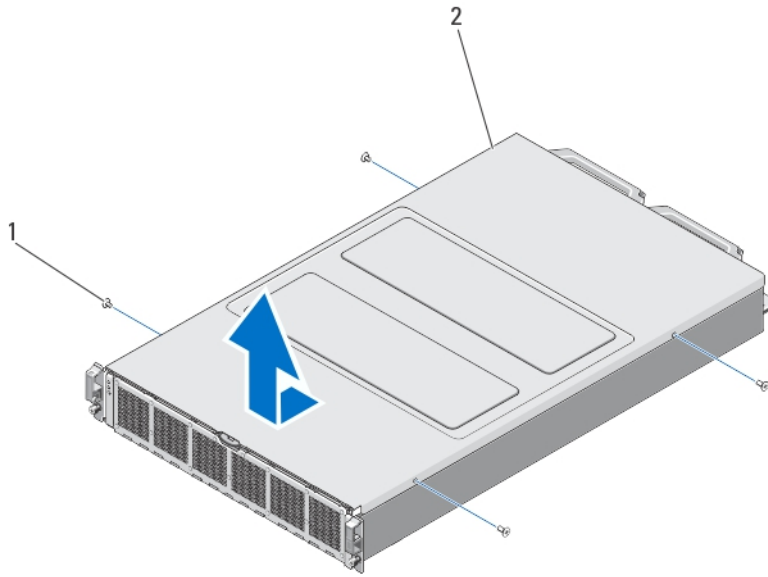
 **NOTE:** This is a service only procedure.

1. Press and release the power button on the back of each controller to power down the NAS appliance.

 **NOTE:** The cache indicator flashes amber when cache is being transferred from memory to the hard drive and is off when the transfer is complete.

 **NOTE:** Ensure that transfer of cache from the controller to the disk is complete before opening the NAS appliance cover.


2. Disconnect the power cable(s) from the power source and both the power supply units.
3. Using a Torx 8 screwdriver, remove the screws securing the cover to the NAS appliance chassis.
4. Slide the top cover toward the front of the system to disengage it.
5. Grasp the cover on both sides and carefully lift the cover away from the system.



**Figure 14. Opening and Closing the NAS Appliance**


1. screws (4)
2. NAS appliance cover


## Closing The NAS Appliance

 **NOTE:** This is a service only procedure.

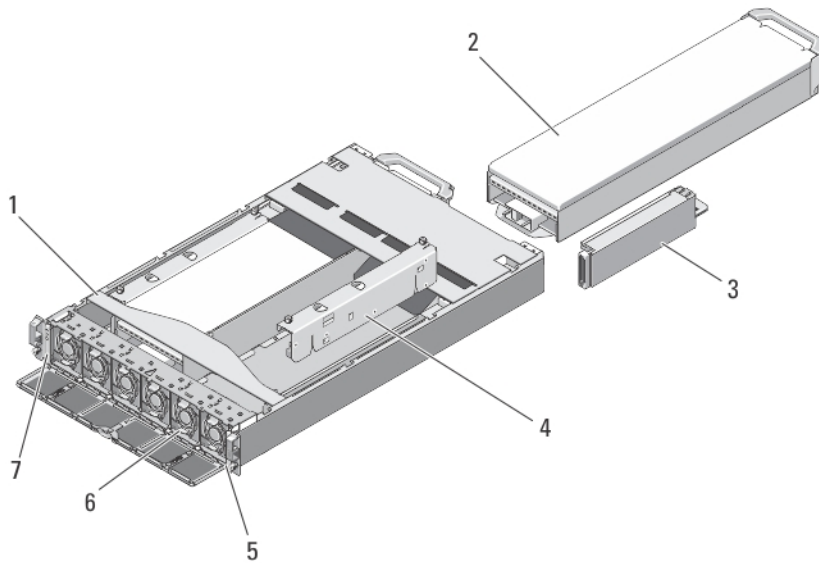
1. Offset the cover toward the front of the NAS appliance.
2. Align the notches on the edges of the chassis with the cover alignment pins on the inner sides of the cover.
3. Place the cover onto the chassis and offset the cover slightly to the front so that the cover lays flush with the chassis.
4. Slide the cover toward the back of the system so that the screw holes on the cover align with the screw holes on the NAS appliance chassis.
5. Using the Torx 8 screwdriver, replace the screws to secure the cover on the NAS appliance chassis.
6. Connect the power cable(s) to the power supply units and plug the power cable(s) into a power outlet.

## Inside The NAS Appliance

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **NOTE:** Components that are hot-swappable are marked orange and touch points on the components are marked blue.





**Figure 15. Inside the NAS Appliance**

- |                                  |                            |
|----------------------------------|----------------------------|
| 1. NAS appliance                 | 5. information tag         |
| 2. controllers (2)               | 6. cooling fans (6)        |
| 3. power supply units (2)        | 7. front LED status module |
| 4. power transmission boards (2) |                            |

## Front LED Status Module

### Removing The Front LED Status Module

**!** **WARNING:** Whenever you need to lift the NAS appliance, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

**⚠** **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

**🔧** **NOTE:** This is a service only procedure.

1. Press and release the power button on the back of each controller to power down the NAS appliance.

**🔧** **NOTE:** The cache indicator flashes amber when cache is being transferred from memory to the hard drive and is off when the transfer is complete.

**🔧** **NOTE:** Ensure that transfer of cache from the controller to the disk is complete before opening the NAS appliance cover.

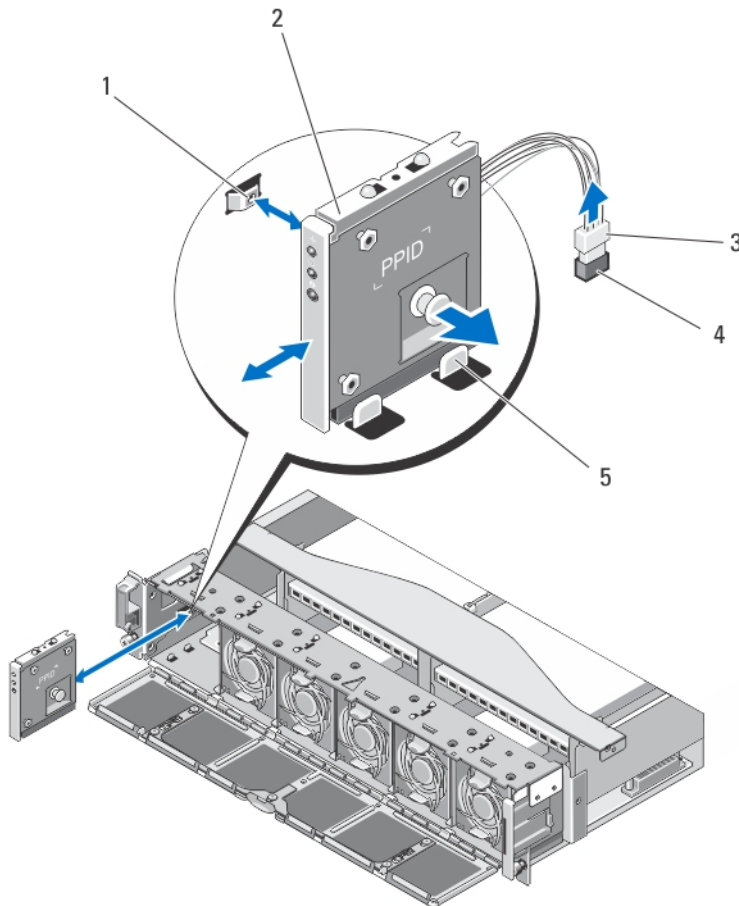
2. Disconnect the power cable(s) from the power source and both the power supply units.
3. If installed, remove the front bezel.

**CAUTION:** Label all the cables correctly before disconnecting any cables. Ensure that the cables are reconnected to the same ports when installing the controller.

4. Disconnect all the cables connected to the back of the NAS appliance.
5. Remove the controllers from the NAS appliance.
6. Remove the NAS appliance from the rack.
7. Open the NAS appliance.
8. Open the cooling fan access door and remove the cooling fan installed in fan bay 1.

**NOTE:** The fan bay numbers are marked inside the cooling fan access door.


9. Disconnect the front LED status module cable from the midplane board.
10. Pull the blue release pin and slide the front LED status module away from the chassis.





**Figure 16. Removing and Installing the Front LED Status Module**

1. notch on NAS appliance chassis side wall
2. front LED status module
3. front LED status module cable connector
4. front LED status module connector on NAS appliance midplane board
5. guides on the chassis

## Installing The Front LED Status Module

 **WARNING:** Whenever you need to lift the NAS appliance, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **NOTE:** This is a service only procedure.


1. Align the front LED status module with the guides on the top and bottom of the NAS appliance chassis.
2. Push the front LED status module into the NAS appliance chassis until the release pin clicks into place.
3. Connect the front LED status module cable to the midplane board.
4. Install the cooling fan in fan bay 1 and close the cooling fan access door.
5. Close the NAS appliance.
6. Install the NAS appliance in the rack.
7. Install the controllers in the NAS appliance.


 **CAUTION:** Label all the cables correctly before disconnecting any cables. Ensure that the cables are reconnected to the same ports when installing the controller.


8. Reconnect all the cables to the back of the NAS appliance.
9. If applicable, install the front bezel.
10. Connect the power cable(s) to the power supply units and plug the power cable(s) into a power outlet.

## Power Transmission Board Assembly


### Removing The Power Transmission Board Assembly


 **WARNING:** Whenever you need to lift the NAS appliance, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **NOTE:** This is a service only procedure.

1. Press and release the power button on the back of each controller to power down the NAS appliance.

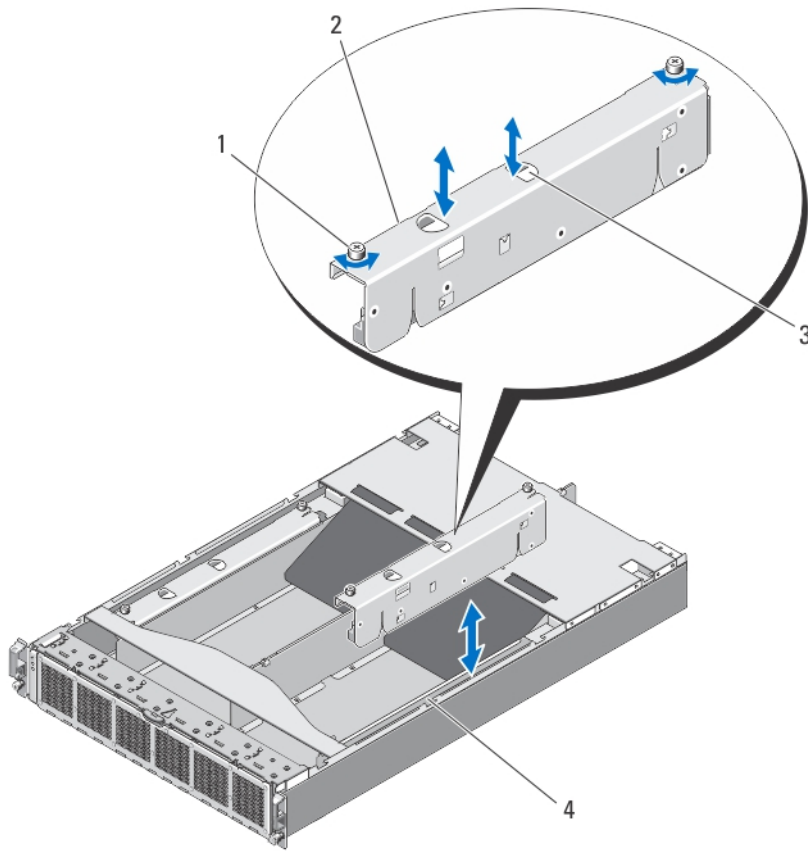
 **NOTE:** The cache indicator flashes amber when cache is being transferred from memory to the hard drive and is off when the transfer is complete.

 **NOTE:** Ensure that transfer of cache from the controller to the disk is complete before opening the NAS appliance cover.

2. Disconnect the power cable(s) from the power source and both the power supply units.
3. Remove the power supply units.

**CAUTION:** Label all the cables correctly before disconnecting any cables. Ensure that the cables are reconnected to the same ports when installing the controller.


4. Disconnect all the cables connected to the back of the NAS appliance.
5. Remove the controllers from the NAS appliance.
6. Remove the NAS appliance from the rack.
7. Open the NAS appliance.
8. Using a #2 Phillips screwdriver, loosen the two captive screws that secure the power transmission assembly to the chassis.
9. Holding the touch points, lift the power transmission assembly up until the power transmission disengages from the midplane board.
10. Lift the power transmission assembly out of the chassis.





**Figure 17. Removing and Installing the Power Transmission Assembly**

1. captive screws (2)
2. power transmission assembly
3. touch points (2)
4. NAS appliance chassis

## Installing The Power Transmission Board Assembly

 **WARNING:** Whenever you need to lift the NAS appliance, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **NOTE:** This is a service only procedure.


1. Holding the touch points, lower the power transmission assembly into the NAS appliance chassis.
2. Push the power transmission assembly until the power transmission connector seats properly on the midplane.
3. Using a #2 Philips screwdriver, replace the two captive screws that secure the power transmission assembly to the chassis.
4. Close the NAS appliance.
5. Install the NAS appliance in the rack.
6. Install the controller in the NAS appliance.


 **CAUTION:** Label all the cables correctly before disconnecting any cables. Ensure that the cables are reconnected to the same ports when installing the controller.


7. Reconnect all the cables to the back of the NAS appliance.
8. Install the power supply units.
9. Connect the power cable(s) to the power supply units and plug the power cable(s) into a power outlet.

## Midplane Board


### Removing The Midplane Board


 **WARNING:** Whenever you need to lift the NAS appliance, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **NOTE:** This is a service only procedure.

1. Press and release the power button on the back of each controller to power down the NAS appliance.

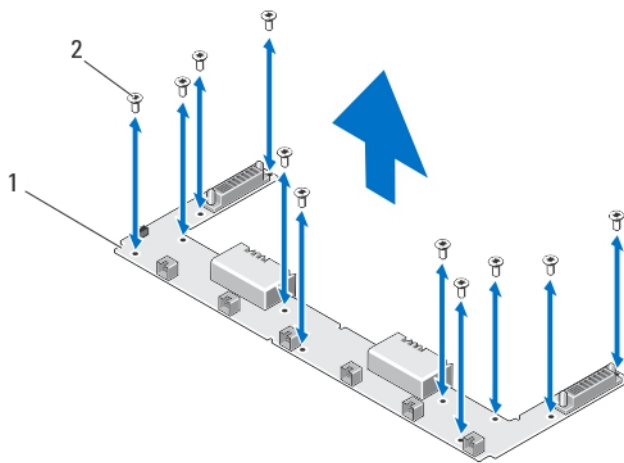
 **NOTE:** The cache indicator flashes amber when cache is being transferred from memory to the hard drive and is off when the transfer is complete.

 **NOTE:** Ensure that transfer of cache from the controller to the disk is complete before opening the NAS appliance cover.

2. Disconnect the power cable(s) from the power source and both the power supply units.

 **CAUTION:** Label all the cables correctly before disconnecting any cables. Ensure that the cables are reconnected to the same ports when installing the controller.

3. Disconnect all the cables connected to the back of the NAS appliance.
4. Remove the controllers from the NAS appliance.
5. Remove the NAS appliance from the rack.
6. Open the NAS appliance.
7. Remove the following:
  - power supply units
  - cooling fans
  - power transmission board assemblies
8. Disconnect the front LED status module cable from the midplane board.
9. Using a Torx 15 screwdriver, remove the 11 screws securing the midplane board to the NAS appliance chassis.
10. Hold the midplane board by its edges and lift it out of the chassis.



**Figure 18. Removing and Installing the midplane Board**

1. midplane board
2. screws (11)

## Installing The Midplane Board

**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

**WARNING:** Whenever you need to lift the NAS appliance, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

**NOTE:** This is a service only procedure.


1. Unpack the new midplane board.
2. Hold the midplane board by its edges and lower it into the NAS appliance chassis.
3. Align the screw holes on the midplane board with the standoffs on the chassis.

The notches on the floor of the chassis hold the midplane board in place.

4. Using the Torx 15 screwdriver, replace the 11 screws to secure the midplane board on the chassis.
5. Connect the front LED status module cable to the midplane board.
6. Install the following:
  - power transmission board assemblies
  - cooling fans
  - power supply units
7. Install the NAS appliance in the rack.
8. Install the controllers in the NAS appliance.


 **CAUTION:** Label all the cables correctly before disconnecting any cables. Ensure that the cables are reconnected to the same ports when installing the controller.


9. Reconnect all the cables to the back of the NAS appliance.
10. Close the NAS appliance.
11. Connect the power cable(s) to the power supply units and plug the power cable(s) into a power outlet.

 **NOTE:** Contact technical support to program the chassis service tag in the midplane board.

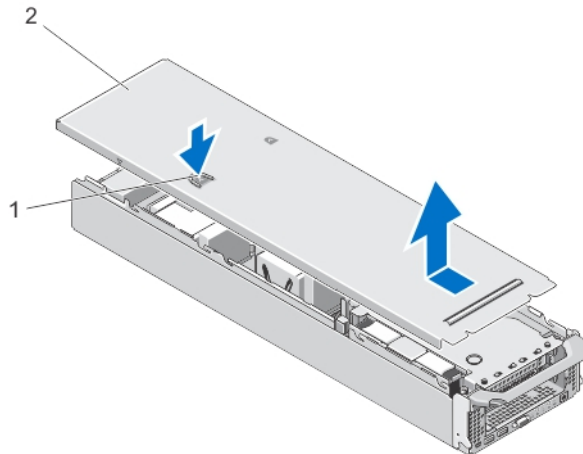
## Opening And Closing The Controller

### Opening The Controller

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **NOTE:** This is a service only procedure.

1. Remove the controller from the NAS appliance.
2. Press the release button and slide the cover toward the front of the controller.
3. Lift the cover away from the controller.



**Figure 19. Opening and Closing the Controller**

1. release button
2. controller cover

## Closing The Controller

**△ CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

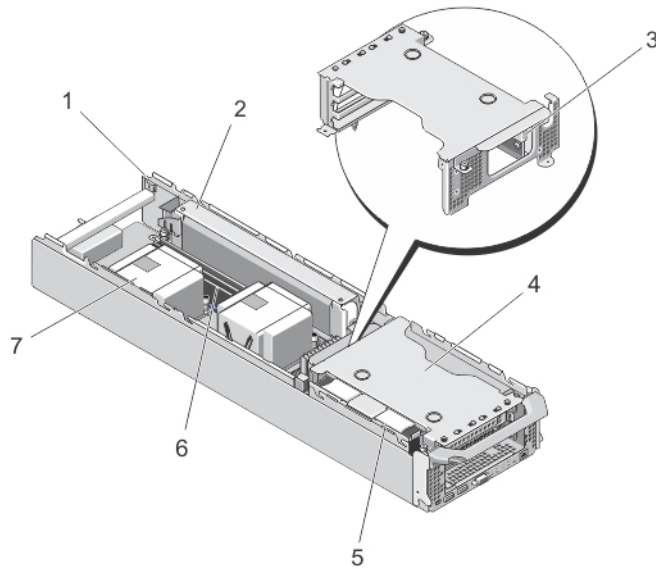
**✎ NOTE:** This is a service only procedure.

1. Align the notches on the edges of the chassis with the cover alignment pins on the inner sides of the cover.
2. Place the cover onto the controller chassis and offset the cover slightly to the front so that the cover lays flush with the chassis.
3. Slide the cover toward the back of the controller until it clicks into position.
4. Install the controller in the appropriate slot in the NAS appliance.

## Inside The Controller

**△ CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.





**Figure 20. Inside the Controller**

- |                              |                             |
|------------------------------|-----------------------------|
| 1. controller                | 5. hard-drive assembly      |
| 2. backup power supply       | 6. memory modules (6)       |
| 3. Internal USB port         | 7. processor heat sinks (2) |
| 4. expansion-card riser cage |                             |

## Expansion Cards And Expansion-Card Risers

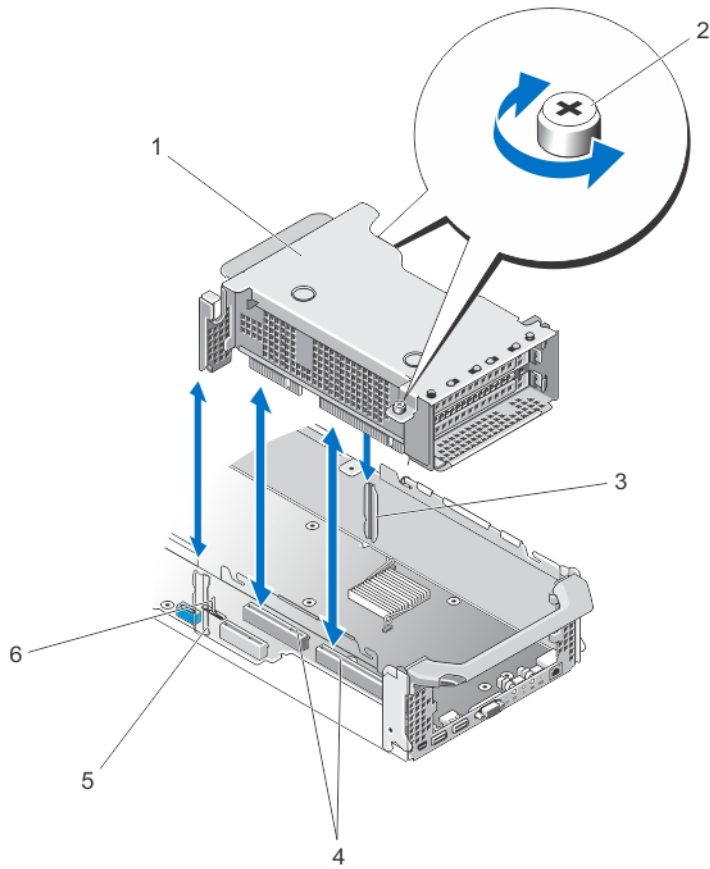
**NOTE:** A missing or an unsupported expansion-card riser logs an SEL event. It does not prevent your system from powering on and no BIOS POST message or F1/F2 pause is displayed.

### Removing The Expansion-Card Riser Cage And Expansion Cards

**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

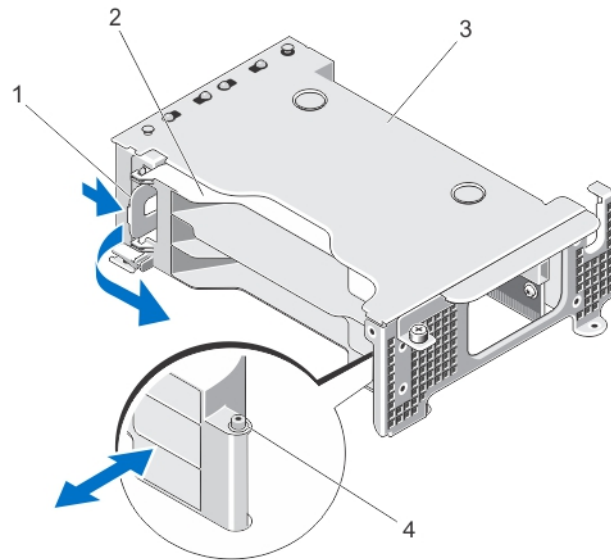
**NOTE:** This is a service only procedure.

1. Remove the controller from the NAS appliance.
2. Open the controller.
3. Using a Philips #2 screwdriver, loosen the captive screws that secure the expansion-card riser cage to the controller chassis.
4. Holding the expansion-card riser cage on its sides, lift the expansion-card riser from the riser connector on the system board.



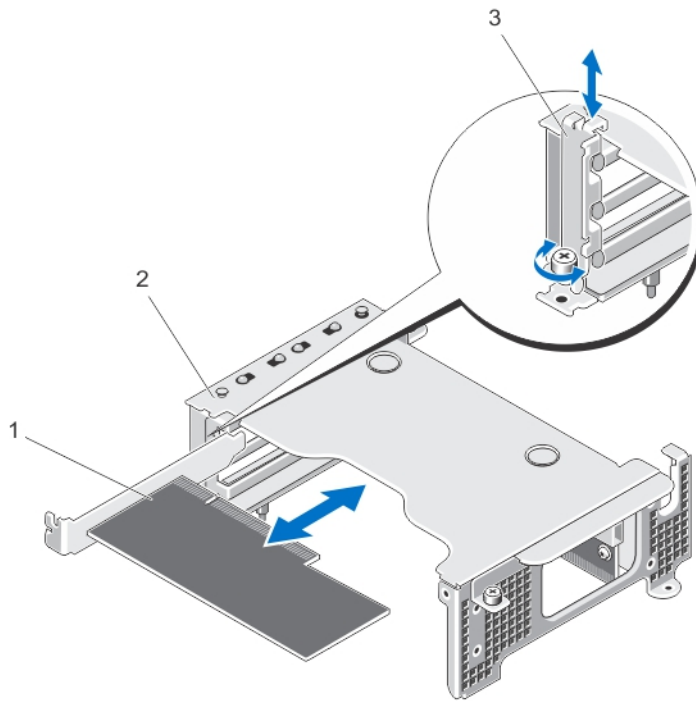
**Figure 21. Removing and Installing the Expansion Card Riser**

- |  |  |
|--|--|
| 1. expansion-card riser cage                           | 5. riser cage guide on controller chassis side wall (left) |
| 2. screws (2)  | 6. riser cage guide pin                                    |
| 3. riser guide on controller chassis side wall (right) |  |
| 4. expansion-card riser connectors on system board     |  |
5. Press the release latch on the expansion card holder, rotate and pull the expansion card holder away from the expansion card cage.



**Figure 22. Removing and Installing the Expansion-Card Holder**

1. release latch
  2. card holder
  3. expansion-card cage
  4. notch
- 
6. Using a #2 Philips screwdriver, loosen the captive screw that secures the expansion-card latch to the expansion-card riser cage.
  7. Pull the expansion-card latch out of the expansion-card riser cage.
  8. Hold the expansion card by its edges and remove it from the expansion-card connector on the riser.



**Figure 23. Removing and Installing the Expansion Card**

- 1. expansion card
- 2. expansion-card cage
- 3. expansion-card latch

## Installing The Expansion-Card Riser Cage And Expansion Cards

**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

**NOTE:** This is a service only procedure.


1. Unpack the expansion card and prepare it for installation.  
For instructions, see the documentation accompanying the card.
2. Holding the card by its edges, position the card so that the card-edge connector aligns with the expansion-card connector on the expansion-card riser.
3. Insert the card-edge connector firmly into the expansion-card connector until the card is fully seated.
4. Slide the expansion-card latch into position and using a #2 Philips screwdriver, tighten the captive screw that secures the expansion-card latch to the expansion-card cage.
5. Install the expansion-card holder.
6. Align the expansion-card riser cage with the connector guides on the controller chassis side walls and the riser guide pin on the controller system board.
7. Lower the expansion-card riser into place until the expansion-card riser is fully seated in the connector.

- 8.** Using the #2 Philips screwdriver, tighten the two captive screws that secure the expansion-card riser cage to the controller chassis.
- 9.** Close the controller.
- 10.** Install the controller in the NAS appliance.




# Troubleshooting Your System


## Safety First—For You And Your System

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

## Troubleshooting Power Supplies


 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Check the power supply LED status indicator pattern.
2. If power supply LED status indicator is not lit, it indicates a problem with either the power cable or power source. To confirm if the problem exists with the power cable or power source:
  - a) Reseat both ends of the installed power cable.
  - b) Replace the existing power cable with a known working power cable.
  - c) Connect the power cable to a different power source.
3. If the power supply LED indicator is flashing amber, re-seat the power supply by removing and reinstalling it.

 **NOTE:** After installing a power supply, allow several seconds for the system to recognize the power supply and to determine if it is working properly.

4. If the problem persists, see [Getting Help](#).

## Troubleshooting Cooling Fans

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

1. Remove the front bezel.
2. Open the cooling-fan access door.
3. Reseat the faulty fan.
4. If the fan functions properly, close the cooling-fan access door.  
If the problem is not resolved, proceed with the next step.
5. Swap the faulty cooling fan with a working cooling fan from another slot.
6. If the fan functions properly, replace the faulty fan and close the cooling-fan access door.


If the problem persists, see [Getting Help](#).



# Using System Diagnostics

If you experience a problem with your system, run the system diagnostics before contacting Dell for technical assistance. The purpose of running system diagnostics is to test your system hardware without risking data loss. If you are unable to fix the problem yourself, service and support personnel can use the diagnostics results to help you solve the problem.

## Dell Embedded System Diagnostics

 **NOTE:** Also known as Enhanced Pre-boot System Assessment (ePSA) diagnostics.


The embedded system diagnostics provides a set of options for particular device groups or devices allowing you to:

- Run tests automatically or in an interactive mode
- Repeat tests
- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

## When To Use The Embedded System Diagnostics

If a major component or device in the system does not operate properly, running the embedded system diagnostics may indicate component failure.

## Running The Embedded System Diagnostics


 **CAUTION:** Use the embedded system diagnostics to test only your system. Using this program with other systems may cause invalid results or error messages.

1. Connect a keyboard, monitor, and mouse to the controller's VGA port and USB ports.
2. To reboot the controller, press and release the power button (at the back of the controller) to shut down the controller and press and release the power button (at the back of the controller) again to turn the controller back on.
3. As the system boots, press <F10>
4. Use the arrow keys to select **System Utilities** → **Launch Dell Diagnostics** .  
The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.
5. When completed, remove the keyboard, monitor, and mouse from the controller and reboot the controller.

## System Diagnostic Controls

<b>Menu</b>	<b>Description</b>
<b>Configuration</b>	Displays the configuration and status information of all detected devices.
<b>Results</b>	Displays the results of all tests that are executed.
<b>System Health</b>	Provides the current overview of the system performance.
<b>Event Log</b>	Displays a time-stamped log of the results of all tests run on the system. This is displayed if at least one event description is recorded.

# Technical Specifications

 **NOTE:** The following specifications apply to each controller.

<b>Processor</b>	
Processor type	One or two Intel Xeon processors E5-5600 or E5-5500 product family
<b>Expansion Bus</b>	
Bus type	PCI Express Generation 2
<b>Expansion slots on the riser card:</b>	
Slot 1 riser	Half length, full height PCIe Gen2 x4 (x8 connector)
Slot 2 riser	Half length, full height PCIe Gen2 x8 (x8 connector)
Slot 3 riser	Half length, full height PCIe Gen2 x8 (x8 connector)
<b>Memory</b>	
Architecture	1066 MT/s and 1333 MT/s DDR3 registered or unbuffered DIMMs  Support for advanced ECC or memory optimized operation
Memory module sockets	Six 240-pin
<b>Drives</b>	
Hard drives	One 2.5 inch internal SATA hard drive
<b>Connectors</b>	
<b>Back</b>	
NIC	One 10/100/1000 Mbps
Serial	One mini USB, USB 2.0 compliant
USB	Two 4-pin, USB 2.0-compliant
Video	15-pin VGA
<b>Internal</b>	
USB	One 4-pin, USB 2.0-compliant

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**Video**


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Video type	Integrated Matrox G200
Video memory	16 MB shared

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**Environmental**

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 **NOTE:** For additional information about environmental measurements for specific system configurations, see [dell.com/environmental\\_datasheets](http://dell.com/environmental_datasheets).

**Temperature**

Operating	Continuous operation: 5 °C to 40 °C (41 °F to 104 °F) at 20% to 80% relative humidity (RH), with 26 °C maximum dew point. Derate maximum allowable dry bulb temperature at 1 °C/300 m above 900 m (1 °F per 550 ft).
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 **NOTE:** For information on supported expanded operating temperature range and configurations, see [support.dell.com/manuals](http://support.dell.com/manuals).

Storage	–40 °C to 60 °C (–40 °F to 140 °F) with a maximum temperature gradation of 20 °C per hour
---------	---

**Relative humidity**

Operating	8% to 85% (noncondensing) with maximum humidity gradation of 10% per hour
Storage	5% to 95% at a maximum wet bulb temperature of 38 °C (100.4 °F)

**Maximum vibration**


Operating	0.26 G <sub>rms</sub> (5 Hz to 350 Hz at 0.0002G <sup>2</sup> /Hz) in operational orientation for 5 min (Maximum)
Storage	1.04 G <sub>rms</sub> at 2 Hz to 200 Hz for 15 min (all six sides tested)

**Maximum shock**

Operating	31 G half-sine shock +/-5% with pulse duration of 2.6 ms +/-10% in the operational orientation (Maximum)
Storage	Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 30 G for up to 10 ms Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 32 G faired square wave pulse with velocity change at 270 inches/second (685 centimeters/second)

**Altitude**

Operating	–16 m to 3048 m (–50 ft to 10,000 ft)
-----------	---------------------------------------

 **NOTE:** For altitudes above 2950 ft, the maximum operating temperature is derated 1 °F/550 ft.

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**Environmental**

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Storage -305 m to 12192 m (-1000 ft to 40,000 ft)


**Airborne Contaminant Level**

Class G1 as defined by ISA-S71.04-1985



# Getting Help

## Contacting Dell

 **NOTE:** If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Visit **support.dell.com**.
2. Select your support category.
3. If you are not a U.S. customer, select your country code at the bottom of the **support.dell.com** page, or select **All** to see more choices.
4. Select the appropriate service or support link based on your need.