

# PowerVault NX440 Network Attached Storage System

Installation and Service Manual

## Notes, cautions, and warnings

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

 **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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# System overview

The NX440 NAS system is a 1U rack-mount Windows Storage Server system that supports up to:

- One Intel Xeon scalable processor
- Four DIMM slots supporting up to 16 GB of memory
- Two AC power supply units
- Four SAS or SATA hard drives

## Topics:

- [Front view of the system](#)
- [Rear view of the system](#)
- [Inside the system](#)
- [Locating the information tag of your system](#)
- [NX440 System Information label](#)

## Front view of the system

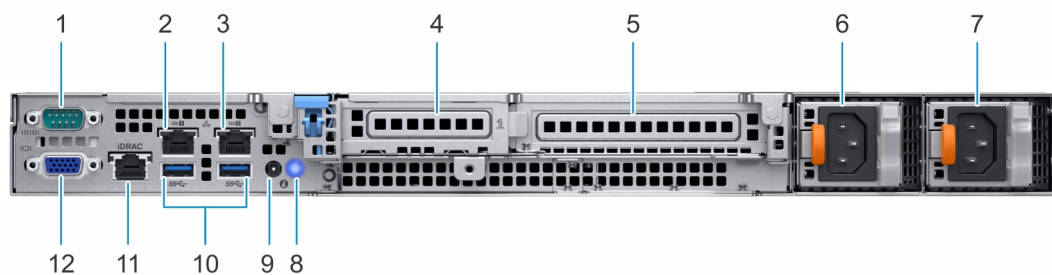


**Figure 1. Front view of the NX440 system**

- |                        |                             |
|------------------------|-----------------------------|
| 1. Left control panel  | 2. Optical drive (optional) |
| 3. Right control panel | 4. Information tag          |
| 5. Drives (4)          |                             |

For more information about the ports, see [Technical specifications](#).

## Rear view of the system



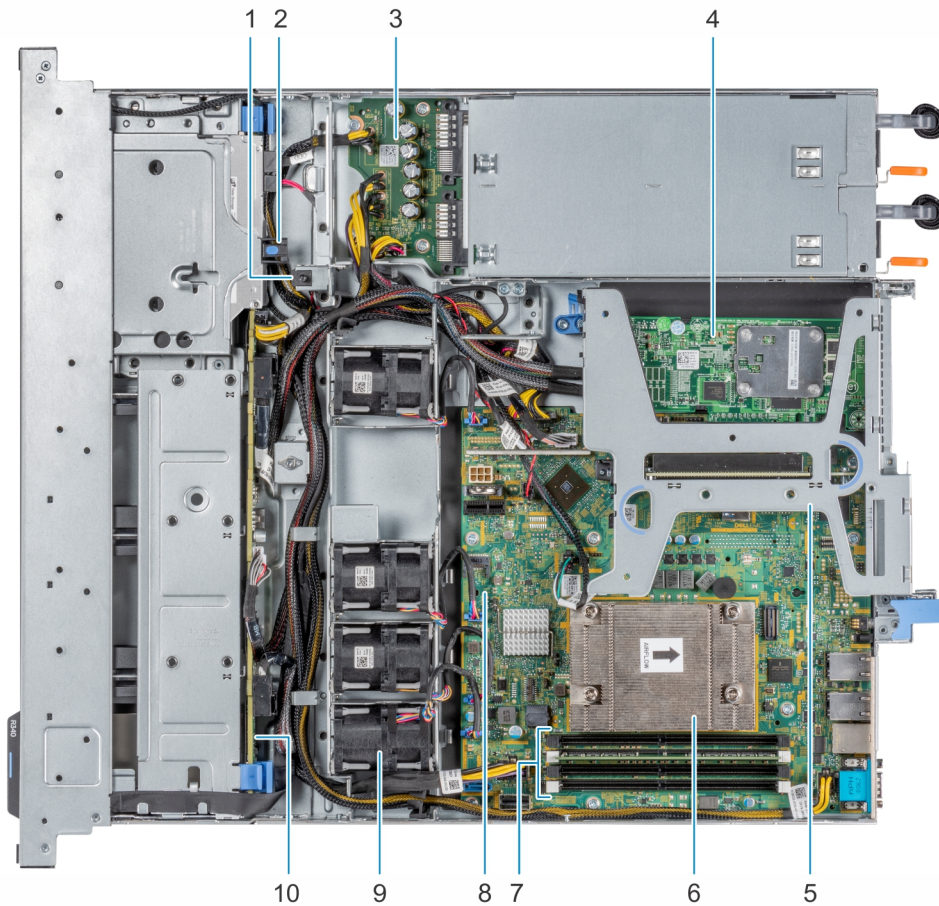
**Figure 2. Rear view of the system**

- |   |   |
|---|---|
| 1. Serial port                          | 2. NIC port (GB 1)                      |
| 3. NIC port (GB 2)                      | 4. Half-height PCIe expansion card slot |
| 5. Full-height PCIe expansion card slot | 6. Power supply unit 1                  |

- 7. Power supply unit 2
- 8. System identification button
- 9. System status indicator cable port (CMA)
- 10. USB 3.0 port (2)
- 11. iDRAC9 dedicated network port
- 12. VGA port

For more information about the ports and connectors, see [Technical specifications](#).

## Inside the system

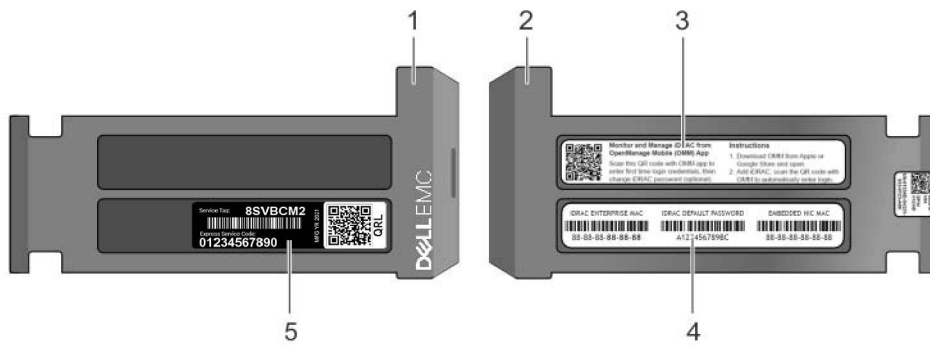


**Figure 3. Inside the system**

- 1. Intrusion switch
- 2. Optical drive
- 3. Power distribution board
- 4. PERC card
- 5. Expansion card riser
- 6. Heat sink
- 7. Memory module sockets
- 8. System board
- 9. Fan (4)
- 10. Drive backplane

## Locating the information tag of your system

A unique Express Service Code and Service Tag provides specific information about the system. Pull out the information tag located in front of the system to view the Express Service Code and Service Tag. Alternatively, the information may be on a sticker on the back of the system chassis. The mini Enterprise Service Tag (EST) is found on the back of the system chassis. Dell support uses this information to route support calls to the appropriate personnel.

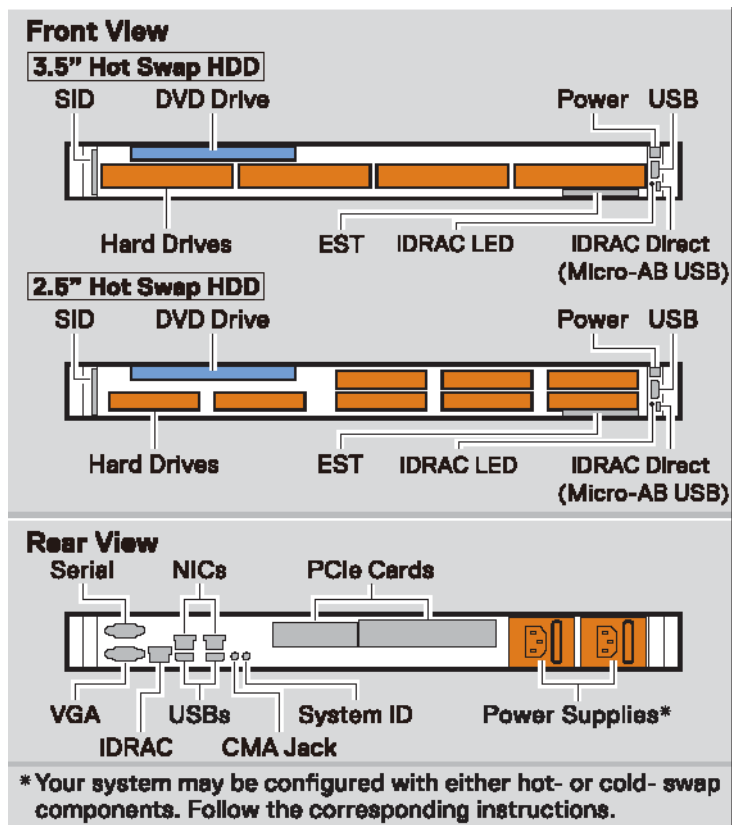


**Figure 4. Locating the information tag of your system**

1. Information tag (Top view)
2. Information tag (Bottom view)
3. OpenManage Mobile (OMM) label
4. iDRAC MAC address and iDRAC secure password label
5. Service Tag

## NX440 System Information label

Labels on the system provide configuration and part replacement instructions.



**Figure 5. Front and rear view configuration**






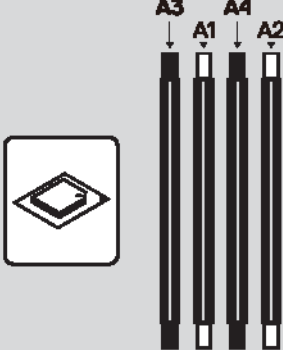
Jumper Settings		
Jumper	Setting	Description
PWRD_EN	 (default)	BIOS password is enabled.
		BIOS password is disabled. iDRAC local access is unlocked at next AC power cycle.
	 (default)	BIOS configuration settings retained at system boot.
NVRAM_CLR		BIOS configuration settings cleared at system boot.

Figure 6. Jumper settings

### Memory Information

**⚠ Caution:** Memory (DIMMs) and CPUs may be hot during servicing.



#### Memory Population

Configuration	Sequence
Memory-Optimized	1, 2, 3, 4

Memory Sparing details are documented in the *Installation and Service Manual*.

Figure 7. Memory information

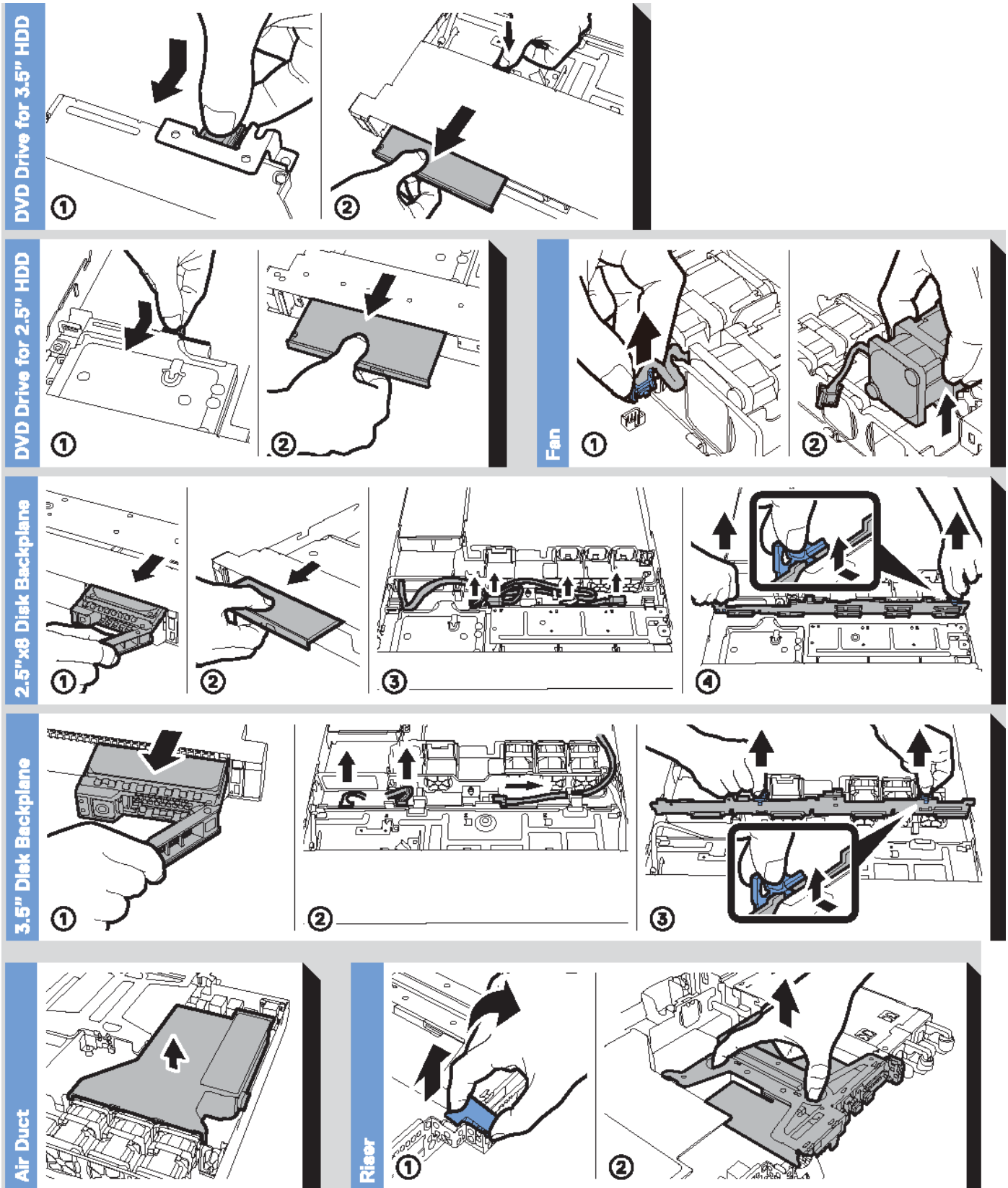


Figure 8. System information

## Electrical Overview

### System Board Information

- |                                     |                               |
|-------------------------------------|-------------------------------|
| <b>1</b> Internal Storage Connector | <b>13</b> FAN 2               |
| <b>2</b> Riser Connector            | <b>14</b> ID Button           |
| <b>3</b> Internal USB               | <b>15</b> TPM                 |
| <b>4</b> Jumper                     | <b>16</b> IDSDM + vFlash      |
| <b>5</b> CPU Power                  | <b>17</b> Battery             |
| <b>6</b> DIMMs                      | <b>18</b> HDD/ODD Power       |
| <b>7</b> CPU                        | <b>19</b> FAN 1               |
| <b>8</b> SATA 0-3                   | <b>20</b> Control Panel       |
| <b>9</b> SATA ODD                   | <b>21</b> PIB Connector       |
| <b>10</b> System Power              | <b>22</b> Backplane Signal    |
| <b>11</b> FAN 4                     | <b>23</b> Intrusion Connector |
| <b>12</b> FAN 3                     |                               |

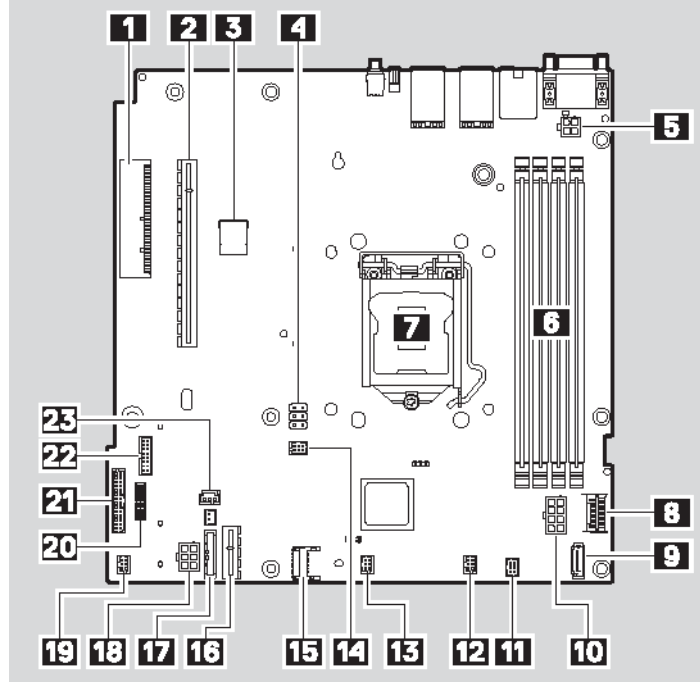


Figure 9. Electrical overview

# Technical specifications

## Topics:

- Physical specifications
- Processor specifications
- Power specifications
- Cooling fan specifications
- System battery specifications
- Expansion bus specifications
- Memory specifications
- Storage controller specifications
- Drive specifications
- Ports and connectors specifications
- Environmental specifications

## Physical specifications

This section describes the dimensions and weight of the system.

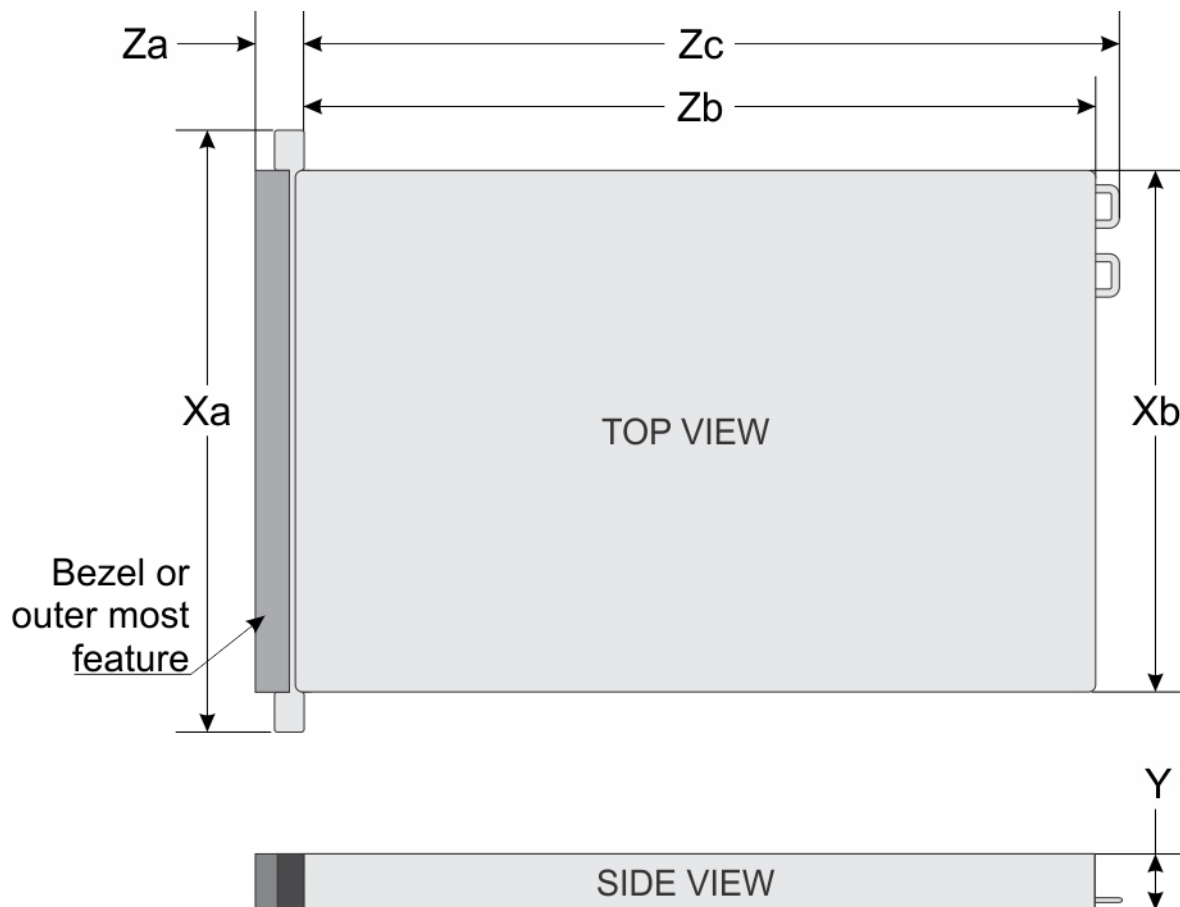


Figure 10. NX440 Chassis dimensions

Description	Dimension
<b>Physical dimensions</b>	
Xa	482.0 mm (18.98 inches)
Xb	434.0 mm (17.08 inches)
Y	42.8 mm (1.68 inches)
Za (with bezel)	35.64 mm (1.4 inches)
Za (without bezel)	22.0 mm (0.87 inches)
Zb	534.5 mm (21.04 inches)
Zc	573.6 mm (22.58 inches)
<b>Weight</b>	
Maximum weight (with all drives)	13.2 kg (29.10 lb)


## Processor specifications

Supported processor	Number of processors supported
Intel Xeon E-2124 3.3GHz, 4C, 8M Cache	One

## Power specifications


The NX440 system supports two redundant power supply units. The following specifications are for each PSU.

Power Supply Unit (PSU)	
Maximum output power	350 W
Maximum input current	4.8-2.4 A
Nominal input voltage operating range	100–240 VAC
Nominal input frequency	50/60 Hz
Heat dissipation (maximum)	1340 BTU/hr

 **NOTE:** This system is also designed to connect to the IT power systems with a phase-to-phase voltage not exceeding 230 V.

## Cooling fan specifications

The NX440 supports the following cooling fans.

 **NOTE:** When selecting or upgrading the system configuration verify the system power consumption with the Dell Energy Smart Solution Advisor available at [Dell.com/ESSA](https://www.dell.com/ESSA) to ensure optimum power usage.

Front storage	PSU type	Fan 1	Fan 2	Fan 3	Fan 4
4 x 3.5-inch	Redundant 350 W	Required, if the PERC card and/or expansion riser is installed	Required	Required	Required

# System battery specifications

The NX440 contains one CR 2032 3.0-V lithium coin cell battery.

# Expansion bus specifications

The NX440 NAS system supports up to two PCI express (PCIe) generation 3 cards.

PCIe slot	Riser	PCIe slot height	PCIe slot length	Slot width
Slot 1	x8 PCIe	Low-profile	Half-length	x4
Slot 2	x16 PCIe	Low-profile/Full height	Half-length	x8

# Memory specifications

The NX440 supports up to four 288-pin UDIMMS with a speed of either 3200 MT/s or 2666 MT/s.

## Memory

DIMM type	DIMM rank	DIMM capacity	Minimum RAM	Maximum RAM
UDIMM	Single rank	8 GB	8 GB	8 GB
	Single rank	16 GB	16 GB	16 GB


# Storage controller specifications

The NX440 contains one internal storage controller card and supports external storage using a SAS HBA.

- Internal controller — PERC H730P mini
- External storage — 12 Gb SAS Host Bus Adapter card

# Drive specifications

The NX440 system supports SAS and SATA drives and an optical DVD.

Internal drives	
4 x 3.5-inch hot-swappable	SAS or SATA
 <b>NOTE:</b> Solid State Drives (SSDs) are supported, but must be ordered in a separate kit.	
External storage	
MD1400, MD1420	12 Gb JBOD
ME484	12 Gb JBOD
ML3	Tape
ML3E	Tape
Optical LTO external drive, PV114x, TL1000 Tape	
One DVD-ROM drive or DVD +/-RW drive	SATA


# Ports and connectors specifications

The NX440 system supports USB ports, NIC ports, VGA ports, and a serial connector.

## USB ports

The NX440 supports both USB 2.0 and USB 3.0-compliant ports.

Location	Type	Quantity
Front panel	USB 2.0-compliant port	One
Front panel	Micro USB 2.0-compliant port for iDRAC Direct	One
Back panel	USB 3.0-compliant port	Two
Internal	USB 3.0-compliant port	One

 **NOTE:** The micro USB 2.0-compliant port on the front panel can only be used as an iDRAC Direct or a management port.

## NIC ports

The NX440 system supports two 1 GbE/10 GbE Network Interface Controller (NIC) ports on the back panel.

## Serial connector

The NX440 system supports one serial connector on the back panel. The serial port is a 9-pin connector, Data Terminal Equipment (DTE), 16550-compliant.

## VGA ports

The Video Graphic Array (VGA) port enables you to connect the system to a VGA display. The NX440 system supports one 15-pin VGA port on the back panel.

## Video specifications

The NX440 system supports the Integrated Matrox G200 graphics controller with 16 MB of video frame buffer.

Resolution	Refresh Rate (Hz)	Color Depth (bit)
640 x 480	60, 70	8, 16, 24
800 x 600	60, 75, 85	8, 16, 24
1024 x 768	60, 75, 85	8, 16, 24
1152 x 864	60, 75, 85	8, 16, 24
1280 x 1024	60, 75	8, 16, 24

# Environmental specifications

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

### Temperature

Operating (Continuous, for altitude less than 950 m or 3117 ft)	10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment.
Storage	–40° to 65°C (–40° to 149°F) at a maximum altitude of 12,000 m (39,370 ft)
Fresh Air	For information on fresh air, see Expanded Operating Temperature section.
Maximum temperature gradient (operating and storage)	20°C/h (68°F/h)
<b>Relative humidity</b>	
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
<b>Maximum vibration</b>	
Operating	0.26 G <sub>rms</sub> at 5–350 Hz (all operation orientation)
Storage	1.88 G <sub>rms</sub> at 10–500 Hz for 15 min (all six sides tested)
<b>Maximum shock</b>	
Operating	Six consecutively executed shock pulses in the positive and negative x, y, and z axes of 40 G for up to 2.3 ms
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 71 G for up to 2 ms
<b>Altitude</b>	
Operating	3,048 m (10,000 ft)
Storage	12,000 m (39,370 ft)
<b>Operating temperature de-rating</b>	
Up to 35 °C (95 °F)	Maximum temperature is reduced by 1°C/300 m (33.8°F/984.25 ft) above 950 m (3,117 ft)
35 °C to 40 °C (95 °F to 104 °F)	Maximum temperature is reduced by 1°C/175 m (1°F/574.14 ft) above 950 m (3,117 ft).
40 °C to 45 °C (104 °F to 113 °F)	Maximum temperature is reduced by 1°C/125 m (1°F/410.1 ft) above 950 m (3,117 ft)

## Expanded operating temperature

Expanded operating temperature	Specifications
Continuous operation	<p>5°C to 40°C at 5% to 85% RH with 29°C dew point.</p> <p><b>i</b> <b>NOTE:</b> Outside the standard operating temperature (10°C to 35°C), the system can operate continuously in temperatures as low as 5°C and as high as 40°C.</p> <p>For temperatures between 35°C to 40°C, de-rate maximum allowable temperature by 1°C per 175 m above 950 m (1°F per 319 ft).</p>
≤ 1% of annual operating hours	<p>–5°C to 45°C at 5% to 90% RH with 29°C dew point.</p> <p><b>i</b> <b>NOTE:</b> Outside the standard operating temperature (10°C to 35°C), the system can operate down to –5°C or up to 45°C for a maximum of 1% of its annual operating hours.</p> <p>For temperatures between 40°C and 45°C, de-rate maximum allowable temperature by 1°C per 125 m above 950 m (1°F per 228 ft).</p>

**i** **NOTE:** When operating in the expanded temperature range, system performance may be impacted.

**NOTE:** When operating in the expanded temperature range, ambient temperature warnings may be reported in the System Event Log.

## Expanded operating temperature restrictions

- Do not perform a cold startup below 5°C.
- The operating temperature specified is for a maximum altitude of 3050 m (10,000 ft).
- 150 W/8 core, 165 W/12 core and higher wattage processor [Thermal Design Power (TDP)>165 W] are not supported.
- Redundant power supply unit is required.
- Non-Dell EMC qualified peripheral cards and/or peripheral cards greater than 25 W are not supported.
- Tape backup unit is not supported.

## Particulate and gaseous contamination specifications

This section defines the limitations that help avoid any equipment damage or failure from particulate and gaseous contamination. If the levels of particulate or gaseous pollution exceed the specified limitations and result in equipment damage or failure, you may need to rectify the environmental conditions. Remediation of environmental conditions is the responsibility of the customer.

Particulate contamination	Specifications
Air filtration	Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit. <b>NOTE:</b> The ISO Class 8 condition applies to data center environments only. This air filtration requirement does not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor. <b>NOTE:</b> Air entering the data center must have MERV11 or MERV13 filtration.
Conductive dust	Air must be free of conductive dust, zinc whiskers, or other conductive particles. <b>NOTE:</b> This condition applies to data center and non-data center environments.
Corrosive dust	<ul style="list-style-type: none"> <li>• Air must be free of corrosive dust.</li> <li>• Residual dust present in the air must have a deliquescent point less than 60% relative humidity.</li> </ul> <b>NOTE:</b> This condition applies to data center and non-data center environments.

**Table 1. Gaseous contamination specifications**

Gaseous contamination	Specifications
Copper coupon corrosion rate	<300 Å/month per Class G1 as defined by ANSI/ISA71.04-2013.
Silver coupon corrosion rate	<200 Å/month as defined by ANSI/ISA71.04-2013.

**NOTE:** Maximum corrosive contaminant levels measured at ≤50% relative humidity.

# Initial system setup and configuration

This section describes how to install your system, configure it using iDRAC, and how to reinstall the NAS operating system.

## Topics:

- [Setting up your system](#)
- [iDRAC configuration](#)

## Setting up your system

Follow these procedures to set up the system and configure the iDRAC IP address for system management.

1. Unpack the system.
2. If applicable, install the system into the rack.
3. Connect any peripherals to the system. For more information about installing the system into the rack, see the Setting up your System poster for your system located at [www.dell.com/storagemanuals](http://www.dell.com/storagemanuals).
4. Connect the system to its electrical outlet.
5. Turn on the system by pressing the power button or by using iDRAC.
6. Turn on the attached peripherals.

## iDRAC configuration

The Integrated Dell Remote Access Controller (iDRAC) is designed to make system administrators more productive and improve the overall availability of Dell systems. iDRAC alerts administrators about system issues and enables them to perform remote system management. This reduces the need for physical access to the system.

## Options for setting up an iDRAC IP address

To enable communication between your system and iDRAC, you must first configure the network settings based on your network infrastructure.

You can set up the iDRAC IP address using one of the following interfaces:

- iDRAC Settings utility
- Lifecycle Controller
- Dell Deployment Toolkit

For more information, see the *Integrated Dell Remote Access Control User's Guide* located at [www.dell.com/idracmanuals](http://www.dell.com/idracmanuals).

You must use the default iDRAC IP address 192.168.0.120 to configure the initial network settings, including setting up DHCP or a static IP for iDRAC.

**i** **NOTE:** To access iDRAC, ensure that you connect the ethernet cable to the dedicated NIC port. You can also access iDRAC through the shared LOM mode, if you have opted for a system that has the shared LOM mode enabled.

## Log in to iDRAC

You can log in to iDRAC using one of the following:

- an iDRAC local user account
- a Microsoft Active Directory user account
- as a Lightweight Directory Access Protocol (LDAP) user account
- Single sign-on or a Smart Card

Use the iDRAC secure default password available on the system Information tag.

 **NOTE:** You must have iDRAC credentials to log in to iDRAC

For more information, see the *Integrated Dell Remote Access Control User's Guide* located at [www.dell.com/idracmanuals](http://www.dell.com/idracmanuals).

You can also access iDRAC using RACADM. For more information, see the *RACADM Command Line Interface Reference Guide* located at [www.Dell.com/idracmanuals](http://www.Dell.com/idracmanuals).

# Reinstalling the operating system using a DVD

If you are reinstalling the NAS operating system onto new OS drives, you need to partition the new drives. This section describes both how to repartition the new OS drives and how to reinstall the NAS operating system.

**CAUTION:** Back up the internal disk drives on your system before reinstalling or upgrading the NAS Operating System. The DVD reinstall process formats or deletes the OS disks (virtual disk 0) resulting in loss of any data or installed applications. The DVD reinstall process does not install RASR USB Recovery application.

The standard RAID configuration for the NX440 system is:

- OS-only - RAID 5

Refer to your configuration as-shipped from Dell for details about your specific RAID configuration.

## Topics:

- [Recovering an OS partition](#)
- [Deploying the OS using Dell Lifecycle Controller](#)

## Recovering an OS partition

Follow this procedure to recover your OS partition if becomes corrupt.

### Prerequisites

- Failed OS drives have been replaced with new, blank HDDs.

**CAUTION:** Do not remove or delete the original partitions on the data drives or their associated physical drives.

### Steps

1. Turn on or restart your system, and press **F2** to boot into **System Setup**.
2. Click **Device Settings**.
3. Click **Integrated RAID Controller 1: Dell PERC <PERC H730P Mini> Configuration Utility**.
4. In the **Configuration Utility** menu, click **Virtual Disk Management**.
5. Verify the following:
  - Your original Data partition or partitions are shown
  - No OS partition is listed
6. Click **Back** without making any changes to the data partitions.
7. In the **Configuration Utility**, click **Create Virtual Disk**.
8. In the **Create Virtual Disk** dialog box, select the **RAID Level** and **Capacity** options.
  - **Select RAID Level** — See the standard RAID configurations above.
  - **Select Physical Disks From** — Unconfigured Capacity.
9. Click **Select Physical Disks**, choose the drives to configure for RAID.
10. Click **Apply Changes**.
11. Wait for the **Success** screen to display **The operation has been performed successfully**, and then click **OK**.
12. Under **Create Virtual Disk Parameters** set the following options and leave remaining options set to their default settings:
  - **Virtual Disk Name** — enter a unique name such as **OS**
  - **Virtual Disk Size** — in GB (currently this partition is 140GB).
  - **Default Initialization** — Fast (for example)


13. Click **Create Virtual Disk**.
14. In the Warning screen, select **Confirm** and click **Yes**.
15. When the message appears that the virtual disk was created successfully, click **OK**.
16. Click **Back** two times to return to the **Configuration Utility** Main Menu.
17. Click **Virtual Disk Management**.
18. Verify that both the newly-created OS partition and the existing data partitions are present.
19. Click **Back** to return to the **Configuration Utility** Main Menu.
20. Click **Controller Management**.
21. For **Select Boot Device** select **OS Partition**.
22. Click **Back** to return to the **Configuration Utility** Main Menu and click **Finish**.
23. Click **Finish** again and reboot the system.
24. During the restart, press **F2** to boot into **System Setup**.
25. On the **System Setup Main Menu**, click **System BIOS**.
26. In the System BIOS options, select **Boot Settings > BIOS Boot Settings**.
27. Verify that the Integrated RAID Controller 1: PERC H730P Mini is present and is selected as the Boot Option.
28. Back-out of the BIOS, saving any changes as needed.
29. Restart the system and press **F10=Lifecycle Controller** to proceed to deploying the OS.

## Deploying the OS using Dell Lifecycle Controller

Follow this procedure to deploy the OS using Dell Lifecycle Controller.


### Prerequisites

- OS drives are installed and have been partitioned.
- External USB DVD ROM is available.
- Windows Storage Server 2016 product key is available. This should be attached to the system cover.

 **NOTE:** When you open the LifeCycle Controller for the first time, the Initial Setup Wizard starts. Before deploying the OS as described below, follow the prompts in the wizard to configure the Lifecycle Controller.

### Steps

1. If not completed already, restart the system and press **F10=Lifecycle Controller**.
2. In the left navigation pane, select **OS Deployment**.  
The OS Deployment wizard starts.
3. On the **Select Deployment path** page select **Go directly to OS Deployment** and click **Next**.
4. On the **Select an Operating System** page accept the default settings:
  - **Boot Mode** — BIOS
  - **Secure Boot** — Disabled
  - **Secure Boot Policy** — Standard
  - **Available Operating Systems** — Microsoft Windows Server 2016
5. Click **Next**.  
The system assembles the OS drivers. This process takes less than five minutes.
6. On the **Select Installation Mode** page, select **Manual Install** and click **Next**.  
The **OS Media** page is displayed.
7. Insert the DVD Reinstall media disk for Windows Storage Server 2016 (Workgroup or Standard) into the external drive and click **Next**.  
The system performs an OS media validation and opens the **Reboot the System** page.
8. Verify the selections and click **Finish**.
9. When prompted, press any key to boot to the operating system media.  
The system reboots and starts the operating system installation wizard.
10. On the language selections page select the applicable language and click **Next**.
11. Select **Install Now** and click **Next**.
12. On the product activation page enter your product key and click **Next**.

13. On the license acceptance page select **I accept the license terms** and click **Next**.
14. On the next page select **Custom: Install the newer version of Storage Server only (advanced)**.
15. In the **Where do you want to install Storage Server?** option, select the 140 GB drive that was created in the OS partition recovery steps.  
 **NOTE:** Do **not** select an existing data drive for OS installation. Make sure the drive selected is the new OS drive created for this purpose.
16. In the **OS Target-Drive** option select **Unallocated Space** (the default) and click **Next**.  
The installation begins and takes 60 - 90 minutes to complete.
17. Finish the installation by completing the initial configuration steps described in the product Installation and Service Guide.  
Go to [dell.com/support](http://dell.com/support) to download drivers and OpenManage Server Administrator software as needed.

# Diagnostics and indicators

The following sections contain information about the indicator codes for the NX440 and instructions for running the Embedded System Diagnostics program.

## Topics:

- [Chassis LEDs](#)
- [System diagnostics](#)

## Chassis LEDs

The following pages contain the information about the chassis LEDs.

### Drive indicator codes

Each drive carrier has an activity LED indicator and a status LED indicator. The indicators provide information about the current status of the drive. The activity LED indicator indicates whether the drive is currently in use or not. The status LED indicator indicates the power condition of the drive.



**Figure 11. Drive indicators**

1. Drive activity LED indicator
2. Drive status LED indicator
3. Drive capacity label

Drive status indicator code	Condition
Flashes green twice per second	Identifying drive or preparing for removal
Off	Drive ready for removal <b>i</b> <b>NOTE:</b> The drive status indicator remains off until all drives are initialized after the system is turned on. Drives are not ready for removal during this time.
Flashes green, amber, and then turns off	Predicted drive failure
Flashes amber four times per second	Drive failed

Drive status indicator code	Condition
Flashes green slowly	Drive rebuilding
Solid green	Drive online
Flashes green for three seconds, amber for three seconds, and then turns off after six seconds	Rebuild stopped

## System health and system ID indicator codes

The system health and system ID indicator is located on the left control panel of your system.



Figure 12. System health and system ID indicators

System health and system ID indicator code	Condition
Solid blue	Indicates that the system is turned on, system is healthy, and system ID mode is not active. Press the system health and system ID button to switch to system ID mode.
Blinking blue	Indicates that the system ID mode is active. Press the system health and system ID button to switch to system health mode.
Solid amber	Indicates that the system is in fail-safe mode. If the problem persists, see the Getting help section.
Blinking amber	Indicates that the system is experiencing a fault. Check the System Event Log or the LCD panel, if available on the bezel, for specific error messages. For information about the event and error messages generated by the system firmware and agents that monitor system components, go to <a href="http://qrl.dell.com">qrl.dell.com</a> > <b>Look Up&gt;Error Code</b> , type the error code, and then click <b>Look it up</b> .

## NIC indicator codes

Indicators on each NIC provide information about the activity and link status. The activity LED indicator indicates if data is flowing through the NIC, and the link LED indicator indicates the speed of the connected network.

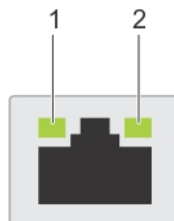


Figure 13. NIC indicator codes

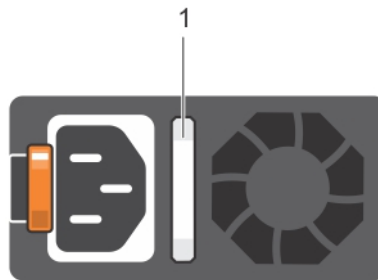
1. link LED indicator

## 2. activity LED indicator

Status	Condition
Link and activity indicators are off	The NIC is not connected to the network.
Link indicator is green and activity indicator is blinking green	The NIC is connected to a valid network at its maximum port speed and data is being sent or received.
Link indicator is amber and activity indicator is blinking green	The NIC is connected to a valid network at less than its maximum port speed and data is being sent or received.
Link indicator is green and activity indicator is off	The NIC is connected to a valid network at its maximum port speed and data is not being sent or received.
Link indicator is amber and activity indicator is off	The NIC is connected to a valid network at less than its maximum port speed and data is not being sent or received.
Link indicator is blinking green and activity is off	NIC identify is enabled through the NIC configuration utility.

## Power supply unit indicator codes



An illuminated translucent handle on the AC power supply units (PSUs) serves as a status indicator. The indicator shows whether power is present or if a power fault has occurred.



**Figure 14. AC PSU status indicator**

### 1. AC PSU status indicator/handle

Power indicator codes	Condition
Green	A valid power source is connected to the PSU and the PSU is operational.
Blinking amber	Indicates a problem with the PSU.
Not illuminated	Power is not connected to the PSU.
Blinking green	When the firmware of the PSU is being updated, the PSU handle blinks green. <b>CAUTION: Do not disconnect the power cord or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs do not function.</b>
Blinking green and turns off	When hot-plugging a PSU, the PSU handle blinks green five times at a rate of 4 Hz and turns off. This indicates a PSU mismatch with respect to efficiency, feature set, health status, or supported voltage. <b>CAUTION: If two PSUs are installed, both the PSUs must have the same type of label; for example, Extended Power Performance (EPP) label. Mixing PSUs from previous generations of NAS systems is not supported, even if the PSUs have the same power rating. This results in a PSU mismatch condition or failure to turn the system on.</b> <b>CAUTION: When correcting a PSU mismatch, replace only the PSU with the blinking indicator. Swapping the PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a high output configuration to a low output configuration or vice versa, you must turn off the system.</b>

Power indicator codes	Condition
	<p> <b>CAUTION:</b> AC PSUs support both 240 V and 120 V input voltages with the exception of Titanium PSUs, which support only 240 V. When two identical PSUs receive different input voltages, they can output different wattages, and trigger a mismatch.</p> <p> <b>CAUTION:</b> If two PSUs are used, they must be of the same type and have the same maximum output power.</p>

## iDRAC Direct LED indicator codes

The iDRAC Direct LED indicator lights up to indicate that the port is connected and is being used as a part of the iDRAC subsystem.


iDRAC Direct LED indicator is located below the iDRAC Direct port on the right control panel. You can configure iDRAC Direct using a USB to micro USB (type AB) cable, which you can connect to your laptop or tablet. The following table describes iDRAC Direct activity when the iDRAC Direct port is active:

iDRAC Direct LED indicator code	Condition
Solid green for two seconds	Indicates that the laptop or tablet is connected.
Flashing green (on for two seconds and off for two seconds)	Indicates that the laptop or tablet that is connected is recognized.
Turns off	Indicates that the laptop or tablet is unplugged.

## 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 using additional equipment or 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:** The Dell Embedded System Diagnostics is 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

## Running the Embedded System Diagnostics from Boot Manager

Run the Embedded System Diagnostics (ePSA) if your system does not boot.

### Steps

1. When the system is booting, press F11.
2. Use the up arrow and down arrow keys to select **System Utilities > Launch Diagnostics**.
3. Alternatively, when the system is booting, press F10, select **Hardware Diagnostics > Run Hardware 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.

# Running the Embedded System Diagnostics from the Dell Lifecycle Controller

## Steps

1. As the system boots, press F10.
2. Select **Hardware Diagnostics** → **Run Hardware 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.

## System diagnostic controls

Menu	Description
<b>Configuration</b>	Displays the configuration and status information of all detected devices.
<b>Results</b>	Displays the results of all tests that are run.
<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.

# Pre-operating system management applications

You can manage basic settings and features of a system without booting to the operating system by using the system firmware.


## Topics:

- [System Setup](#)
- [Dell Lifecycle Controller](#)
- [Boot Manager](#)
- [PXE boot](#)

## System Setup

By using the **System Setup** screen, you can configure the BIOS settings, iDRAC settings, and device settings of your system.

These settings have already been pre-configured per solution requirements. Contact Dell EMC before you change these settings.

 **NOTE:** Help text for the selected field is displayed in the graphical browser by default. To view the help text in the text browser, press F1.

You can access system setup by using two methods:

- Standard graphical browser—The browser is enabled by default.
- Text browser—The browser is enabled by using Console Redirection.


## Viewing System Setup

To view the **System Setup** screen, perform the following steps:

### Steps


1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

 **NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

## System Setup details

The **System Setup Main Menu** screen provides the following options.

 **NOTE:** The NX Series systems support only BIOS mode. Do not change the boot mode to UEFI because the system will not load the appliance OS when in UEFI mode.

Option	Description
<b>System BIOS</b>	Enables you to configure BIOS settings.
<b>iDRAC Settings</b>	Enables you to configure the iDRAC settings.

Option	Description
	<p>The iDRAC settings utility is used to set up and configure the iDRAC parameters. You can enable or disable various iDRAC parameters using the iDRAC settings utility.</p> <p>For more information, see the <i>Integrated Dell Remote Access Control User's Guide</i> located at <a href="http://www.dell.com/idracmanuals">www.dell.com/idracmanuals</a>.</p>
<b>Device Settings</b>	Enables you to configure device settings.

## System BIOS

You can use the **System BIOS** screen to edit specific functions such as boot order, system password, setup password, set the SATA RAID mode, and enable or disable USB ports.

### Viewing System BIOS

To view the **System BIOS** screen, perform the following steps:

#### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

**NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.

### System BIOS Settings details

The **System BIOS Settings** screen provides the following options.

**NOTE:** The NX Series systems support only BIOS mode. Do not change the boot mode to UEFI because the system will not load the appliance OS when in UEFI mode.

Option	Description
<b>System Information</b>	Specifies information about the system such as the system model name, BIOS version, and Service Tag.
<b>Memory Settings</b>	Specifies information and options related to the installed memory.
<b>Processor Settings</b>	Specifies information and options related to the processor such as speed and cache size.
<b>SATA Settings</b>	Specifies options to enable or disable the integrated SATA controller and ports.
<b>Boot Settings</b>	Specifies options to choose the Boot mode and allows you to modify the boot settings.
<b>Network Settings</b>	Specifies options to manage the network settings and boot protocols. Legacy network settings are managed from the <b>Device Settings</b> menu.
<b>Integrated Devices</b>	Specifies options to manage integrated device controllers and ports, specifies related features and options.
<b>Serial Communication</b>	Specifies options to manage the serial ports, its related features and options.
<b>System Profile Settings</b>	Specifies options to change the processor power management settings, memory frequency.

Option	Description
<b>System Security</b>	Specifies options to configure the system security settings, such as system password, setup password, and Trusted Platform Module (TPM) security. This option also manages the power button on the system.
<b>Redundant OS Control</b>	Sets the redundant OS info for redundant OS control
<b>Miscellaneous Settings</b>	Specifies options to change the system date and time.

## System Information

You can use the **System Information** screen to view system properties such as Service Tag, system model name, and the BIOS version.

### Viewing System Information

To view the **System Information** screen, perform the following steps:

#### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

**NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Information**.

### System Information details

The **System Information** screen provides the following options.

**NOTE:** The NX Series systems support only BIOS mode. Do not change the boot mode to UEFI because the system will not load the appliance OS when in UEFI mode.

Option	Description
<b>System Model Name</b>	Specifies the system model name.
<b>System BIOS Version</b>	Specifies the BIOS version installed on the system.
<b>System Management Engine Version</b>	Specifies the current version of the Management Engine firmware.
<b>System Service Tag</b>	Specifies the system Service Tag.
<b>System Manufacturer</b>	Specifies the name of the system manufacturer.
<b>System Manufacturer Contact Information</b>	Specifies the contact information of the system manufacturer.

Option	Description
<b>System CPLD Version</b>	Specifies the current version of the system complex programmable logic device (CPLD) firmware.
<b>UEFI Compliance Version</b>	Specifies the UEFI compliance level of the system firmware.

## Memory Settings

You can use the **Memory Settings** screen to view all the memory settings and enable or disable specific memory functions, such as system memory testing and node interleaving.

### Viewing Memory Settings

To view the **Memory Settings** screen, perform the following steps:

#### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

**NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Memory Settings**.

### Memory Settings details

The **Memory Settings** screen provides the following information.

Option	Description
<b>System Memory Size</b>	Specifies the memory size in the system.
<b>System Memory Type</b>	Specifies the type of memory installed in the system.
<b>System Memory Speed</b>	Specifies the system memory speed.
<b>System Memory Voltage</b>	Specifies the system memory voltage.
<b>Video Memory</b>	Specifies the amount of video memory.
<b>System Memory Testing</b>	Specifies whether the system memory tests are run during system boot. Options are <b>Enabled</b> and <b>Disabled</b> . This option is set to <b>Disabled</b> by default.
<b>Memory Operating Mode</b>	Specifies the memory operating mode. This option is set to <b>Optimizer Mode</b> by default. <b>NOTE:</b> The <b>Memory Operating Mode</b> option can have different default and available options based on the memory configuration of your system.
<b>Current State of Memory Operating Mode</b>	Specifies the current state of the memory operating mode.

## Processor Settings

You can use the **Processor Settings** screen to view the processor settings, and perform specific functions such as enabling virtualization technology, hardware prefetcher, logical processor idling, and opportunistic self-refresh.

### Viewing Processor Settings

To view the **Processor Settings** screen, perform the following steps:

#### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

**NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Processor Settings**.

### Processor Settings details

The **Processor Settings** screen details provides the following options:

Option	Description
<b>Logical Processor</b>	Enables or disables the logical processors and displays the number of logical processors. If this option is set to <b>Enabled</b> , the BIOS displays all the logical processors. If this option is set to <b>Disabled</b> , the BIOS displays only one logical processor per core. This option is set to <b>Enabled</b> by default.
<b>Virtualization Technology</b>	Enables or disables the virtualization technology for the processor. This option is set to <b>Enabled</b> by default.
<b>Adjacent Cache Line Prefetch</b>	Optimizes the system for applications that need high utilization of sequential memory access. This option is set to <b>Enabled</b> by default. You can disable this option for applications that need high utilization of random memory access.
<b>Hardware Prefetcher</b>	Enables or disables the hardware prefetcher. This option is set to <b>Enabled</b> by default.
<b>Logical Processor Idling</b>	Enables you to improve the energy efficiency of a system. It uses the operating system core parking algorithm and parks some of the logical processors in the system which in turn allows the corresponding processor cores to transition into a lower power idle state. This option can only be enabled if the operating system supports it. It is set to <b>Disabled</b> by default.
<b>x2APIC Mode</b>	Enables or disables the x2APIC mode. This option is set to <b>Disabled</b> by default.
<b>Number of Cores per Processor</b>	Controls the number of enabled cores in each processor. This option is set to <b>All</b> by default.
<b>Processor Core Speed</b>	Specifies the maximum core frequency of the processor.
<b>Processor n</b>	<b>NOTE:</b> Depending on the number of CPUs, there might be up to two processors listed.

The following settings are displayed for each processor installed in the system:

Option	Description
<b>Family-Model-Stepping</b>	Specifies the family, model, and stepping of the processor as defined by Intel.
<b>Brand</b>	Specifies the brand name.

Option	Description
<b>Option</b>	<b>Description</b>
<b>Level 2 Cache</b>	Specifies the total L2 cache.
<b>Level 3 Cache</b>	Specifies the total L3 cache.
<b>Number of Cores</b>	Specifies the number of cores per processor.
<b>Microcode</b>	Indicates the Microcode update signature.

## SATA Settings

You can use the **SATA Settings** screen to view the SATA settings of SATA devices and enable SATA and PCIe RAID mode on your system.

### Viewing SATA Settings

To view the **SATA Settings** screen, perform the following steps:

#### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

**NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **SATA Settings**.

### SATA Settings details

The **SATA Settings** screen details provides the following options.

Option	Description
<b>Embedded SATA</b>	Enables the embedded SATA option to be set to <b>Off</b> , <b>AHCI</b> , or <b>RAID</b> modes. This option is set to <b>AHCI Mode</b> by default.
<b>Security Freeze Lock</b>	Sends <b>Security Freeze Lock</b> command to the embedded SATA drives during POST. This option is applicable only for AHCI Mode. This option is set to <b>Enabled</b> by default.
<b>Write Cache</b>	Enables or disables the command for the embedded SATA drives during POST. This option is set to <b>Disabled</b> by default.
<b>Port n</b>	Sets the drive type of the selected device. For <b>AHCI Mode</b> or <b>RAID Mode</b> , BIOS support is always enabled.
<b>Option</b>	<b>Description</b>
<b>Model</b>	Specifies the drive model of the selected device.
<b>Drive Type</b>	Specifies the type of drive attached to the SATA port.
<b>Capacity</b>	Specifies the total capacity of the drive. This field is undefined for removable media devices such as optical drives.

## Boot Settings

You can use the **Boot Settings** screen to set the boot mode to **BIOS** and to specify the boot order.


### Viewing Boot Settings

To view the **Boot Settings** screen, perform the following steps:

#### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:



```
F2 = System Setup
```

 **NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Boot Settings**.

### Boot Settings details

The **Boot Settings** screen provides the following options.

Option	Description
<b>Boot Mode</b>	Enables you to set the boot mode of the system.  <b>CAUTION:</b> Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.
<b>Boot Sequence Retry</b>	Enables or disables the <b>Boot Sequence Retry</b> feature. If this option is set to <b>Enabled</b> and the system fails to boot, the system re-attempts the boot sequence after 30 seconds. This option is set to <b>Enabled</b> by default.
<b>Hard-Disk Failover</b>	Specifies the drive that is booted in the event of a drive failure. The devices are selected in the <b>Hard-Disk Drive Sequence</b> on the <b>Boot Option Setting</b> menu. When this option is set to <b>Disabled</b> , only the first drive in the list is attempted to boot. When this option is set to <b>Enabled</b> , all drives are attempted to boot in the order selected in the <b>Hard-Disk Drive Sequence</b> . This option is set to <b>Disabled</b> by default.
<b>Generic USB boot</b>	Enables or disables generic USB boot.
<b>Hard-disk Drive Placeholder</b>	Enables or disables Hard-disk Drive Placeholder.
<b>BIOS Boot Settings</b>	Enables or disables BIOS boot options.  <b>NOTE:</b> This option is enabled only if the boot mode is BIOS.

## Integrated Devices

You can use the **Integrated Devices** screen to view and configure the settings of all integrated devices including the video controller, integrated RAID controller, and the USB ports.

### Viewing Integrated Devices

To view the **Integrated Devices** screen, perform the following steps:

#### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

**NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Integrated Devices**.

### Integrated Devices details

The **Integrated Devices** screen contains the following options.

**NOTE:** The NX Series systems support only BIOS mode. Do not change the boot mode to UEFI because the system will not load the appliance OS when in UEFI mode.

Option	Description
<b>User Accessible USB Ports</b>	<p>Configures the user accessible USB ports. Selecting <b>Only Back Ports On</b> disables the front USB ports; selecting <b>All Ports Off</b> disables all front and back USB ports; selecting <b>All Ports Off (Dynamic)</b> disables all front and back USB ports during POST and front ports can be enabled or disabled dynamically by authorized user without resetting the system.</p> <p>The USB keyboard and mouse still function in certain USB ports during the boot process, depending on the selection. After the boot process is complete, the USB ports will be enabled or disabled as per the setting.</p> <p><b>NOTE:</b> Selecting <b>Only Back Ports On</b> and <b>All Ports Off</b> disables the USB management port and also restricts access to the iDRAC features.</p>
<b>Internal USB Port</b>	<p>Enables or disables the internal USB port. This option is set to <b>On</b> or <b>Off</b>. This option is set to <b>On</b> by default.</p>
<b>iDRAC Direct USB Port</b>	<p>The iDRAC Direct USB port is managed by iDRAC exclusively with no host visibility. This option is set to <b>ON</b> or <b>OFF</b>. When set to <b>OFF</b>, iDRAC does not detect any USB devices installed in this managed port. This option is set to <b>On</b> by default.</p>
<b>Embedded NIC1 and NIC2</b>	<p><b>NOTE:</b> The Embedded NIC1 and NIC2 options are only available on systems that do not have <b>Integrated Network Card 1</b>.</p> <p>Enables or disables the Embedded NIC1 and NIC2 options. If set to <b>Disabled</b>, the NIC may still be available for shared network access by the embedded management controller. The embedded NIC1 and NIC2 options are only available on systems that do not have Network Daughter Cards (NDCs). The Embedded NIC1 and NIC2 option is mutually exclusive with the Integrated Network Card 1 option. Configure the Embedded NIC1 and NIC2 option by using the NIC management utilities of the system.</p>
<b>I/OAT DMA Engine</b>	<p>Enables or disables the I/O Acceleration Technology (I/OAT) option. I/OAT is a set of DMA features designed to accelerate network traffic and lower CPU utilization. Enable only if the hardware and software support the feature.</p>

Option	Description
<b>Embedded Video Controller</b>	<p>Enables or disables the use of Embedded Video Controller as the primary display. When set to <b>Enabled</b>, the Embedded Video Controller will be the primary display even if add-in graphic cards are installed. When set to <b>Disabled</b>, an add-in graphics card will be used as the primary display. BIOS will output displays to both the primary add-in video and the embedded video during POST and pre-boot environment. The embedded video will then be disabled right before the operating system boots. This option is set to <b>Enabled</b> by default.</p> <p><b>NOTE:</b> When there are multiple add-in graphic cards installed in the system, the first card discovered during PCI enumeration is selected as the primary video. You might have to re-arrange the cards in the slots in order to control which card is the primary video.</p>
<b>Current State of Embedded Video Controller</b>	<p>Displays the current state of the embedded video controller. The <b>Current State of Embedded Video Controller</b> option is a read-only field. If the Embedded Video Controller is the only display capability in the system (that is, no add-in graphics card is installed), then the Embedded Video Controller is automatically used as the primary display even if the <b>Embedded Video Controller</b> setting is set to <b>Enabled</b>.</p>
<b>OS Watchdog Timer</b>	<p>If your system stops responding, this watchdog timer aids in the recovery of your operating system. When this option is set to <b>Enabled</b>, the operating system initializes the timer. When this option is set to <b>Disabled</b> (the default), the timer does not have any effect on the system.</p>
<b>Memory Mapped I/O above 4 GB</b>	<p>Enables or disables the support for the PCIe devices that require large amount of memory. Enable this option only for 64-bit operating systems. This option is set to <b>Enabled</b> by default.</p>
<b>Slot Disablement</b>	<p>Enables or disables the available PCIe slots on your system. The slot disablement feature controls the configuration of the PCIe cards installed in the specified slot. Slots must be disabled only when the installed peripheral card prevents booting into the operating system or causes delays in system startup. If the slot is disabled, the Option ROM drivers are disabled. Only slots that are present on the system will be available for control.</p> <ul style="list-style-type: none"> <li>• <b>Slot 1</b> — Enables or disables the PCIe slot 1. This option is set to <b>Enabled</b> by default.</li> <li>• <b>Slot 2</b> — Enables or disables or only the boot driver is disabled for the PCIe slot 2. This option is set to <b>Enabled</b> by default.</li> </ul>

## Serial Communication

You can use the **Serial Communication** screen to view the properties of the serial communication port.

### Viewing Serial Communication

To view the **Serial Communication** screen, perform the following steps:

#### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

**NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Serial Communication**.

## Serial Communication details

The **Serial Communication** screen provides the following options.

Option	Description
<b>Serial Communication</b>	Selects serial communication devices (Serial Device 1 and Serial Device 2) in BIOS. BIOS console redirection can also be enabled, and the port address can be specified. This option is set to <b>Auto</b> by default.
<b>Serial Port Address</b>	Enables you to set the port address for serial devices. This field sets the serial port address to either COM1 or COM2 (COM1=0x3F8, COM2=0x2F8). This option is set to <b>Serial Device1=COM2 or Serial Device 2=COM1</b> by default. <b>i</b> <b>NOTE:</b> You can use only Serial Device 2 for the Serial Over LAN (SOL) feature. To use console redirection by SOL, configure the same port address for console redirection and the serial device. <b>i</b> <b>NOTE:</b> Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert the serial MUX setting to the default setting of Serial Device 1.
<b>External Serial Connector</b>	Enables you to associate the External Serial Connector to <b>Serial Device 1, Serial Device 2,</b> or the <b>Remote Access Device</b> by using this option. This option is set to <b>Serial Device 1</b> by default. <b>i</b> <b>NOTE:</b> Only Serial Device 2 can be used for Serial Over LAN (SOL). To use console redirection by SOL, configure the same port address for console redirection and the serial device. <b>i</b> <b>NOTE:</b> Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert this setting to the default setting of Serial Device 1.
<b>Failsafe Baud Rate</b>	Specifies the failsafe baud rate for console redirection. The BIOS attempts to determine the baud rate automatically. This failsafe baud rate is used only if the attempt fails, and the value is not changed. This option is set to <b>115200</b> by default.
<b>Remote Terminal Type</b>	Sets the remote console terminal type. This option is set to <b>VT100/VT220</b> by default.
<b>Redirection After Boot</b>	Enables or disables the BIOS console redirection when the operating system is loaded. This option is set to <b>Enabled</b> by default.

## System Profile Settings

You can use the **System Profile Settings** screen to enable specific system performance settings such as power management.

### Viewing System Profile Settings

To view the **System Profile Settings** screen, perform the following steps:

#### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```





**i** **NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.

4. On the **System BIOS** screen, click **System Profile Settings**.

## System Profile Settings details

The **System Profile Settings** screen provides the following options.

Option	Description
<b>System Profile</b>	<p>Sets the system profile. If you set the System Profile option to a mode other than <b>Custom</b>, the BIOS automatically sets the rest of the options. You can only change the rest of the options if the mode is set to <b>Custom</b>. This option is set to <b>Performance Per Watt Optimized (DAPC)</b> by default. DAPC is Dell Active Power Controller.</p> <p> <b>NOTE:</b> All the parameters on the system profile setting screen are available only when the <b>System Profile</b> option is set to <b>Custom</b>.</p>
<b>CPU Power Management</b>	<p>Sets the CPU power management. This option is set to <b>OS DBPM</b> by default.</p>
<b>Memory Frequency</b>	<p>Sets the speed of the system memory. You can select <b>Maximum Performance</b>, <b>Maximum Reliability</b>, or a specific speed. This option is set to <b>Maximum Performance</b> by default.</p>
<b>Turbo Boost</b>	<p>Enables or disables the processor to operate in the turbo boost mode. This option is set to <b>Enabled</b> by default.</p>
<b>C1E</b>	<p>Enables or disables the processor to switch to a minimum performance state when it is idle. This option is set to <b>Enabled</b> by default.</p>
<b>C States</b>	<p>Enables or disables the processor to operate in all available power states. This option is set to <b>Enabled</b> by default.</p>
<b>Memory Refresh Rate</b>	<p>Sets the memory refresh rate to either 1x or 2x. This option is set to <b>1x</b> by default.</p>
<b>Uncore Frequency</b>	<p>Enables you to select the <b>Processor Uncore Frequency</b> option.</p> <p><b>Dynamic mode</b> enables the processor to optimize power resources across the cores and uncore during runtime. The optimization of the uncore frequency to either save power or optimize performance is influenced by the setting of the <b>Energy Efficiency Policy</b> option.</p>
<b>Number of Turbo Boost Enabled Cores for Processor 1</b>	<p> <b>NOTE:</b> If there are two processors installed in the system, you will see an entry for <b>Number of Turbo Boost Enabled Cores for Processor 2</b>.</p> <p>Controls the number of turbo boost enabled cores for Processor 1. The maximum number of cores is enabled by default.</p>
<b>Monitor/Mwait</b>	<p>Enables the Monitor/Mwait instructions in the processor. This option is set to <b>Enabled</b> for all system profiles, except <b>Custom</b> by default.</p> <p> <b>NOTE:</b> This option can be disabled only if the <b>C States</b> option in the <b>Custom</b> mode is set to <b>disabled</b>.</p> <p> <b>NOTE:</b> When <b>C States</b> is set to <b>Enabled</b> in the <b>Custom</b> mode, changing the Monitor/Mwait setting does not impact the system power or performance.</p>
<b>PCI ASPM L1 Link Power Management</b>	<p>Enables or disables the PCI ASPM L1 Link Power Management. This option is set to <b>Enabled</b> by default.</p>

## System Security

You can use the **System Security** screen to perform specific functions such as setting the system password, setup password and disabling the power button.


### Viewing System Security

To view the **System Security** screen, perform the following steps:

#### Steps

1. Turn on or restart your system.
2. Press F2 immediately after you see the following message:



```
F2 = System Setup
```




 **NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Security**.

### System Security Settings details

The **System Security Settings** screen provides the following options.


Option	Description
<b>CPU AES-NI</b>	Improves the speed of applications by performing encryption and decryption by using the Advanced Encryption Standard Instruction Set (AES-NI). This option is set to <b>Enabled</b> by default.
<b>System Password</b>	Sets the system password. This option is set to <b>Enabled</b> by default and is read-only if the password jumper is not installed in the system.
<b>Setup Password</b>	Sets the setup password. This option is read-only if the password jumper is not installed in the system.
<b>Password Status</b>	Locks the system password. This option is set to <b>Unlocked</b> by default.
<b>TPM Security</b>	 <b>NOTE:</b> The TPM menu is available only when the TPM module is installed.  Enables you to control the reporting mode of the TPM. The <b>TPM Security</b> option is set to <b>Off</b> by default. You can only modify the TPM Status TPM Activation, and the Intel SGX fields if the <b>TPM Status</b> field is set to either <b>On with Pre-boot Measurements</b> or <b>On without Pre-boot Measurements</b> .
<b>TPM Information</b>	Changes the operational state of the TPM. This option is set to <b>No Change</b> by default.
<b>TPM Status</b>	Specifies the TPM status.
<b>TPM Command</b>	Controls the Trusted Platform Module (TPM). When set to <b>None</b> , no command is sent to the TPM. When set to <b>Activate</b> , the TPM is enabled and activated. When set to <b>Deactivate</b> , the TPM is disabled and deactivated. When set to <b>Clear</b> , all the contents of the TPM are cleared. This option is set to <b>None</b> by default.  <b>CAUTION:</b> Clearing the TPM results in the loss of all keys in the TPM. The loss of TPM keys may affect booting to the operating system.  This field is read-only when <b>TPM Security</b> is set to <b>Off</b> . The action requires an additional reboot before it can take effect.
<b>Intel(R) TXT</b>	Enables or disables the Intel Trusted Execution Technology (TXT) option. To enable the <b>Intel TXT</b> option, virtualization technology and TPM Security must be enabled with Pre-boot measurements. This option is set to <b>Off</b> by default.  When TPM 2.0 is installed, <b>TPM 2 Algorithm</b> option is available. It enables you to select a hash algorithm from those supported by the TPM (SHA1, SHA256). <b>TPM 2 Algorithm</b> option must be set to <b>SHA256</b> , to enable TXT.

Option	Description
<b>Intel(R) SGX</b>	Enables or disables the Intel Software Guard Extension (SGX) option. This option is set to <b>Software</b> by default.  <b>NOTE:</b> The SGX menu is available, only when E-2186G/E-2176G/E-2174G CPU is installed
<b>SGX Launch Control Policy</b>	Allows controlling the Launch Control Policy (LCP) of Software Guard Extensions (SGX) technology. This option is set to <b>Unlocked</b> by default.
<b>Power Button</b>	Enables or disables the power button on the front of the system. This option is set to <b>Enabled</b> by default.
<b>AC Power Recovery</b>	Sets how the system behaves after AC power is restored to the system. This option is set to <b>Last</b> by default.
<b>AC Power Recovery Delay</b>	Sets the time delay for the system to power up after AC power is restored to the system. This option is set to <b>Immediate</b> by default.
<b>User Defined Delay (60 s to 240 s)</b>	Sets the <b>User Defined Delay</b> option when the <b>User Defined</b> option for <b>AC Power Recovery Delay</b> is selected.
<b>UEFI Variable Access</b>	 <b>NOTE:</b> The NX440 system does not support UEFI mode. This option cannot be used.  Provides varying degrees of securing UEFI variables. When set to <b>Standard</b> (the default), UEFI variables are accessible in the operating system per the UEFI specification. When set to <b>Controlled</b> , selected UEFI variables are protected in the environment and new UEFI boot entries are forced to be at the end of the current boot order.
<b>In-Band Manageability Interface</b>	When set to <b>Disabled</b> , this setting will hide the Management Engine's (ME), HECI devices, and the system's IPMI devices from the operating system. This prevents the operating system from changing the ME power capping settings, and blocks access to all in-band management tools. All management should be managed through out-of-band. This option is set to <b>Enabled</b> by default.  <b>NOTE:</b> BIOS update requires HECI devices to be operational and DUP updates require IPMI interface to be operational. This setting needs to be set to <b>Enabled</b> to avoid updating errors.
<b>Secure Boot</b>	Enables Secure Boot, where the BIOS authenticates each pre-boot image by using the certificates in the Secure Boot Policy. Secure Boot is set to <b>Disabled</b> by default.
<b>Secure Boot Policy</b>	When Secure Boot policy is set to <b>Standard</b> , the BIOS uses the system manufacturer's key and certificates to authenticate pre-boot images. When Secure Boot policy is set to <b>Custom</b> , the BIOS uses the user-defined key and certificates. Secure Boot policy is set to <b>Standard</b> by default.
<b>Secure Boot Mode</b>	Configures how the BIOS uses the Secure Boot Policy Objects (PK, KEK, db, dbx). If the current mode is set to <b>Deployed Mode</b> , the available options are <b>User Mode</b> and <b>Deployed Mode</b> . If the current mode is set to <b>User Mode</b> , the available options are <b>User Mode</b> , <b>Audit Mode</b> , and <b>Deployed Mode</b> . <ul style="list-style-type: none"> <li>• <b>User Mode</b> — In <b>User Mode</b>, PK must be installed, and BIOS performs signature verification on programmatic attempts to update policy objects. The BIOS allows unauthenticated programmatic transitions between modes.</li> <li>• <b>Audit Mode</b> — In <b>Audit mode</b>, PK is not present. The BIOS does not authenticate programmatic updates to the policy objects, and transitions between modes. <b>Audit Mode</b> is useful for programmatically determining a working set of policy objects. BIOS performs signature verification on pre-boot images and logs results in the image Execution Information Table, but executes the images whether they pass or fail verification.</li> <li>• <b>Deployed Mode</b> — <b>Deployed Mode</b> is the most secure mode. In <b>Deployed Mode</b>, PK must be installed and the BIOS performs signature verification on programmatic attempts to update policy objects. <b>Deployed Mode</b> restricts the programmatic mode transitions.</li> </ul>
<b>Secure Boot Policy Summary</b>	Specifies the list of certificates and hashes that secure boot uses to authenticate images.
<b>Secure Boot Custom Policy Settings</b>	Configures the Secure Boot Custom Policy. To enable this option, set the Secure Boot Policy to <b>Custom</b> option.

## Creating a system and setup password


### Prerequisites

Ensure that the password jumper is enabled. The password jumper enables or disables the system password and setup password features. For more information, see the [Jumpers and connectors](#) section.

 **NOTE:** If the password jumper setting is disabled, the existing system password and setup password are deleted and you need not provide the system password to boot the system.

### Steps

1. To enter System Setup, press F2 immediately after turning on or rebooting your system.
2. On the **System Setup Main Menu** screen, click **System BIOS > System Security**.
3. On the **System Security** screen, verify that **Password Status** is set to **Unlocked**.
4. In the **System Password** field, type your system password, and press Enter or Tab. A message prompts you to reenter the system password.
5. Reenter the system password, and click **OK**.
6. In the **Setup Password** field, type your setup password and press Enter or Tab. A message prompts you to reenter the setup password.
7. Reenter the setup password, and click **OK**.
8. Press Esc to return to the System BIOS screen. Press Esc again. A message prompts you to save the changes.

 **NOTE:** Password protection does not take effect until the system reboots.

## Using your system password to secure your system


If you have assigned a setup password, the system accepts your setup password as an alternate system password.

### Steps

1. Turn on or reboot your system.
2. Type the system password and press Enter.


### Next steps

When **Password Status** is set to **Locked**, type the system password and press Enter when prompted at reboot.

 **NOTE:** If an incorrect system password is typed, the system displays a message and prompts you to reenter your password. You have three attempts to type the correct password. After the third unsuccessful attempt, the system displays an error message that the system has stopped functioning and must be turned off. Even after you turn off and restart the system, the error message is displayed until the correct password is entered.

## Deleting or changing system and setup password

### Prerequisites

 **NOTE:** You cannot delete or change an existing system or setup password if the **Password Status** is set to **Locked**.

### Steps

1. To enter System Setup, press F2 immediately after turning on or restarting your system.
2. On the **System Setup Main Menu** screen, click **System BIOS > System Security**.
3. On the **System Security** screen, ensure that **Password Status** is set to **Unlocked**.
4. In the **System Password** field, alter or delete the existing system password, and then press Enter or Tab.
5. In the **Setup Password** field, alter or delete the existing setup password, and then press Enter or Tab.

If you change the system and setup password, a message prompts you to reenter the new password. If you delete the system and setup password, a message prompts you to confirm the deletion.

6. Press Esc to return to the **System BIOS** screen. Press Esc again, and a message prompts you to save the changes.

## Operating with setup password enabled

If **Setup Password** is set to **Enabled**, type the correct setup password before modifying the system setup options.

If you do not type the correct password in three attempts, the system displays the following message:

```
Invalid Password! Number of unsuccessful password attempts: <x> System Halted! Must power down.
```

Even after you turn off and restart the system, the error message is displayed until the correct password is typed. The following options are exceptions:

- If **System Password** is not set to **Enabled** and is not locked through the **Password Status** option, you can assign a system password. For more information, see the [System Security Settings details](#) on page 40 section.
- You cannot disable or change an existing system password.

**NOTE:** You can use the password status option with the setup password option to protect the system password from unauthorized changes.

## Redundant OS Control

You can use the **Redundant OS Control** screen to set the redundant OS info for redundant OS control. It enables you to set up a physical recovery disk on your system.

## Viewing Redundant OS Control

To view the **Redundant OS Control** screen, perform the following steps:

### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```



**NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Redundant OS Control**.

## Redundant OS Control screen details

The **Redundant OS Control** screen provides the following options.

Option	Description
<b>Redundant OS Location</b>	Enables you to select a backup disk from the following devices: <ul style="list-style-type: none"><li>• <b>None</b></li><li>• <b>IDSDM</b></li><li>• <b>SATA Ports in AHCI mode</b></li><li>• <b>BOSS PCIe Cards (Internal M.2 Drives)</b></li><li>• <b>Internal USB</b></li></ul>
<b>Redundant OS State</b>	<b>NOTE:</b> This option is disabled if <b>Redundant OS Location</b> is set to <b>None</b> .

Option	Description
	When set to <b>Visible</b> , the backup disk is visible to the boot list and OS. When set to <b>Hidden</b> , the backup disk is disabled and is not visible to the boot list and OS. This option is set to <b>Visible</b> by default.  <b>NOTE:</b> BIOS will disable the device in hardware, so it cannot be accessed by the OS.
<b>Redundant OS Boot</b>	 <b>NOTE:</b> This option is disabled if <b>Redundant OS Location</b> is set to <b>None</b> or if <b>Redundant OS State</b> is set to <b>Hidden</b> . When set to <b>Enabled</b> , BIOS boots to the device specified in <b>Redundant OS Location</b> . When set to <b>Disabled</b> , BIOS preserves the current boot list settings. This option is set to <b>Enabled</b> by default.

## Miscellaneous Settings

You can use the **Miscellaneous Settings** screen to perform specific functions such as updating the asset tag and changing the system date and time.


## Viewing Miscellaneous Settings

To view the **Miscellaneous Settings** screen, perform the following steps:

### Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:


```
F2 = System Setup
```


 **NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Miscellaneous Settings**.

## Miscellaneous Settings details

The **Miscellaneous Settings** screen provides the following options.

 **NOTE:** The NX440 system does not support UEFI mode.

Option	Description
<b>System Time</b>	Enables you to set the time on the system.
<b>System Date</b>	Enables you to set the date on the system.
<b>Asset Tag</b>	Specifies the asset tag and enables you to modify it for security and tracking purposes.
<b>Keyboard NumLock</b>	Enables you to set whether the system boots with the NumLock enabled or disabled. This option is set to <b>On</b> by default.  <b>NOTE:</b> This option does not apply to 84-key keyboards.
<b>F1/F2 Prompt on Error</b>	Enables or disables the F1/F2 prompt on error. This option is set to <b>Enabled</b> by default. The F1/F2 prompt also includes keyboard errors.
<b>Load Legacy Video Option ROM</b>	N/A
<b>Dell Wyse P25/P45 BIOS Access</b>	Enables or disables the Dell Wyse P25/P45 BIOS Access. This option is set to <b>Enabled</b> by default.

Option	Description
<b>Power Cycle Request</b>	Enables or disables the Power Cycle Request. This option is set to <b>None</b> by default.

## iDRAC Settings utility

The iDRAC settings utility is an interface to set up and configure the iDRAC parameters. You can enable or disable various iDRAC parameters by using the iDRAC settings utility available with iDRAC Enterprise License.

**i** **NOTE:** The NX Series systems support only BIOS mode. Do not change the boot mode to UEFI because the system will not load the appliance OS when in UEFI mode.

For more information, see the *Integrated Dell Remote Access Control User's Guide* located at [www.dell.com/idracmanuals](http://www.dell.com/idracmanuals).

## Device Settings

Use **Device Settings** to configure device parameters.

## Dell Lifecycle Controller

Dell Lifecycle Controller provides advanced embedded systems management capabilities including system deployment, configuration, update, maintenance, and diagnosis. Lifecycle Controller is delivered as part of the iDRAC solution.

## Embedded systems management

The Dell Lifecycle Controller provides advanced embedded systems management throughout the lifecycle of the system. The Dell Lifecycle Controller can be started during the boot sequence and can function independently of the operating system.

**i** **NOTE:** Certain platform configurations may not support the full set of features provided by the Dell Lifecycle Controller.

For more information about setting up the Dell Lifecycle Controller, configuring hardware and firmware, deploying the operating system, and platform support see the documentation available at the [www.dell.com/idracmanuals](http://www.dell.com/idracmanuals).

## Boot Manager

Use the **Boot Manager** screen to select boot options and diagnostic utilities.

## Viewing Boot Manager

To enter Boot Manager:


### Steps

1. Turn on or restart your system.
2. Press F11 when you see the following message:

```
F11 = Boot Manager
```

If your operating system begins to load before you press F11, allow the system to complete the booting, and then restart your system and try again.

## Boot Manager main menu

Menu item	Description
<b>Continue Normal Boot</b>	The system attempts to boot to devices starting with the first item in the boot order. If the boot attempt fails, the system continues with the next item in the boot order until the boot is successful or no more boot options are found.
<b>One-shot Boot Menu</b>	Enables you to access boot menu, where you can select a one-time boot device to boot from.
<b>Launch System Setup</b>	Enables you to access System Setup.
<b>Launch Lifecycle Controller</b>	Exits the Boot Manager and invokes the Dell Lifecycle Controller program.
<b>System Utilities</b>	Enables you to launch System Utilities menu such as System Diagnostics and UEFI shell.  <b>NOTE:</b> The NX440 system does not support UEFI mode.

## One-shot BIOS boot menu

Use the **One-shot BIOS boot menu** to select the device from which to boot.

## System Utilities

**System Utilities** contains the following utilities that can be launched:

- Launch Diagnostics
- BIOS Update File Explorer
- Reboot System

## PXE boot

You can use the Preboot Execution Environment (PXE) option to boot and configure the networked systems, remotely.

To access the **PXE boot** option, boot the system and then press F12 during POST instead of using standard Boot Sequence from BIOS Setup. It does not pull any menu or allows managing of network devices.

# Jumpers and connectors

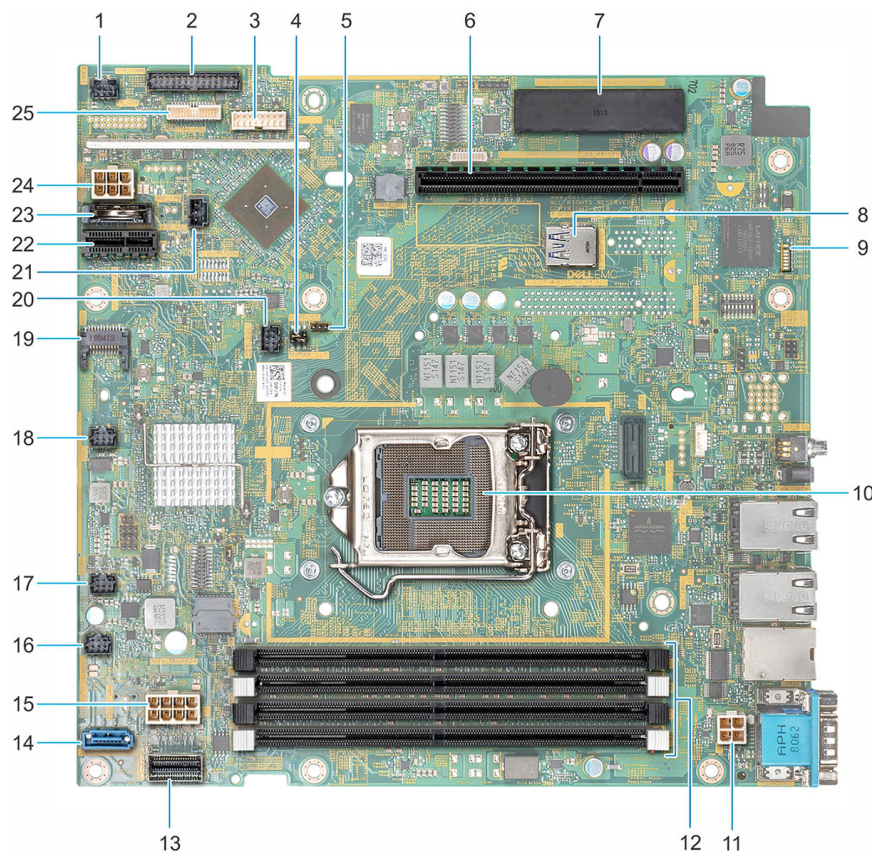
This section provides specific information about the jumpers. It also provides some basic information about jumpers and switches and describes the connectors on the various boards in the system. Jumpers on the system board help to disable the system and setup passwords. You must know the connectors on the system board to install components and cables correctly.

## Topics:

- [System board connectors](#)
- [System board jumper settings](#)
- [Disabling forgotten password](#)

## System board connectors

The system board inside the NX440 contains the connectors shown in the following diagram.



**Figure 15. System board connectors**





Item	Connector	Description
1	FAN1	Fan 1 connector
2	PIB_CONN	Power distribution board signal connector
3	BP_SIG	Backplane signal connector
4	NVRAM_CLR	Clear NVRAM jumper

Item	Connector	Description
5	PWRD_EN	Reset BIOS password jumper
6	RISER_PCIE	Expansion riser PCIe x8 socket
7	PERC_PCIE	PERC PCIe x8 socket
8	INT_USB_3.0	Internal USB connector
9	LED's	System board diagnostic LED indicators
10	CPU	Processor socket
11	P2	Power distribution board power connector 2
12	A3, A1, A4, A2	Memory module sockets
13	SATA0-3	SATA signal
14	SATA_ODD-HDD4	SATA connector—Optical drive SATA connector
15	P1	Power distribution board power connector 1
16	FAN4	Fan 4 connector
17	FAN3	Fan 3 connector
18	FAN2	Fan 2 connector
19	TPM	TPM connector
20	LEFT_LED	Left control panel connector
21	R_INTRUSION	Intrusion switch connector
22	IDSDM.vFlash	IDSDM/ vFlash connector
23	BATTERY	CMOS coin cell battery socket
24	HDD/ODD_PWR	Optical drive power connector
25	CTRL_PNL	Right control panel connector

## System board jumper settings

For information on resetting the password jumper to disable a password, see the [Disabling forgotten password](#) on page 49 section.

**Table 2. System board jumper settings**

Jumper	Setting	Description
PWRD_EN	 2 4 6 (default)	The BIOS password feature is enabled.
	 2 4 6	The BIOS password feature is disabled. iDRAC local access is unlocked at next AC power cycle. iDRAC password reset is enabled in F2 iDRAC settings menu.
NVRAM_CLR	 1 3 5 (default)	The BIOS configuration settings are retained at system boot.
	 1 3 5	The BIOS configuration settings are cleared at system boot.

# Disabling forgotten password

The software security features of the system include a system password and a setup password. The password jumper enables or disables password features and clears any password(s) currently in use.

## Prerequisites

**NOTE:** 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 EMC is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.

## Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the [system cover](#).
3. Move the jumper on the system board jumper from pins 2 and 4 to pins 4 and 6.
4. Install the [system cover](#).

The existing passwords are not disabled (erased) until the system boots with the jumper on pins 4 and 6. However, before you assign a new system and/or setup password, you must move the jumper back to pins 2 and 4.

**NOTE:** If you assign a new system and/or setup password with the jumper on pins 4 and 6, the system disables the new password(s) the next time it boots.

5. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
6. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
7. Remove the [system cover](#).
8. Move the jumper on the system board jumper from pins 4 and 6 to pins 2 and 4.
9. Install the [system cover](#).
10. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
11. Assign a new system and/or setup password.


# Installing and removing system components

The following sections contain procedures for removing and replacing system components.

## Topics:


- Safety instructions
- Before working inside your system
- After working inside your system
- Front bezel
- Hard Drives
- System cover
- Cooling fans
- Intrusion switch
- System memory
- Expansion cards and expansion card riser
- Storage controller card
- Replacing the system battery
- Replacing the optional internal USB memory key
- Optical drive
- Processor and heat sink
- Drive backplane
- Power supply unit
- Power distribution board
- System board
- Trusted Platform Module
- Control panels


## Safety instructions


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

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

 **CAUTION:** Do not operate the system without the cover for a duration exceeding five minutes. Operating the system without the system cover can result in component damage.

 **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 are shipped with your product.

 **CAUTION:** To ensure proper operation and cooling, all bays in the system and system fans must be always populated with a component or a blank.

 **NOTE:** It is recommended that you always use an antistatic mat and antistatic strap while working on components inside the system.

# Before working inside your system

## Prerequisites

Follow the safety guidelines listed in [Safety instructions](#).

## Steps

1. Power off the system and all attached peripherals.
2. Disconnect the system from the electrical outlet, and disconnect the peripherals.
3. If applicable, remove the system from the rack.  
For more information, see the *Rail Installation Guide* at [www.Dell.com/support](http://www.Dell.com/support).
4. Remove the system cover.

# After working inside your system

## Prerequisites

Follow the safety guidelines listed in [Safety instructions](#) on page 50.

## Steps

1. Install the system cover.
2. If applicable, install the system into the rack.  
For more information, see the *Rail Installation Guide* on [www.Dell.com/support](http://www.Dell.com/support).
3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Power on the attached peripherals and then power on the system.

# Front bezel

The metal bezel mounted on the front of the system displays the system branding. A lock on the bezel protects unauthorized access to the drives.

# Removing the front bezel

To remove the front bezel:

## Prerequisites

Follow the safety guidelines listed in [Safety instructions](#).

## Steps

1. Unlock the bezel using the bezel key.
2. Press the release button, and pull the left end of the bezel.
3. Unhook the right end, and remove the bezel.


 **NOTE:** The images shown here are for representation only and the actual configuration of your system may vary.



Figure 16. Removing the front bezel

## Installing the front bezel

To install the front bezel:

### Prerequisites

Follow the safety guidelines listed in [Safety instructions](#).

### Steps

1. Locate and remove the bezel key.
2. Align and insert the right end of the bezel onto the system.
3. Press the bezel until the button clicks in place and fit the left end of the bezel onto the system.
4. Lock the bezel using the key.

**NOTE:** The images shown here are for representation only and the actual configuration of your system may vary.



Figure 17. Installing the front bezel

# Hard Drives

The NX440 system supports up to four 3.5 inch, hot swappable SAS, SATA hard drives.

## Removing a drive blank

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. If installed, remove the front bezel.

**CAUTION:** To maintain proper system cooling, drive blanks must be installed in all empty drive slots.

**CAUTION:** Mixing drive blanks from previous generations of storage systems is not supported.

### Steps

Press the release button and slide the drive blank out of the drive slot.

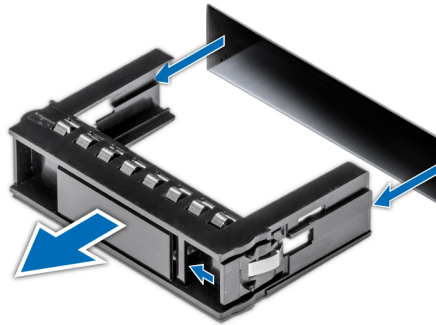


Figure 18. Removing a drive blank

### Next steps

1. Install a drive or a drive blank.

## Installing a drive blank

### Prerequisites

Follow the safety guidelines listed in [Safety instructions](#).

**CAUTION:** Mixing drive blanks from previous generations of storage systems is not supported.

### Steps

Insert the drive blank into the drive slot, and push the blank until the release button clicks into place.

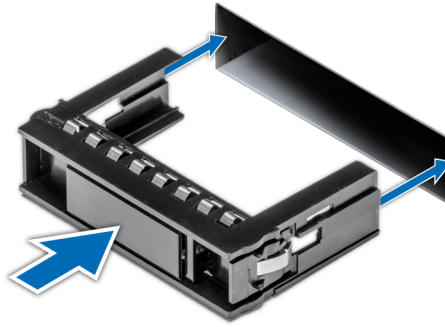


Figure 19. Installing a drive blank

### Next steps

If removed, install the front bezel.

## Removing a drive carrier

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. If applicable, remove the front bezel.
3. Use the management software to prepare the drive for removal.

If the drive is online, the green activity or fault indicator flashes while the drive is turning off. When the drive indicators are off, the drive is ready for removal. For more information, see the documentation for the storage controller.

**CAUTION:** Before attempting to remove or install a drive while the system is running, see the documentation for the storage controller card to ensure that the host adapter is configured correctly to support drive removal and insertion.

**CAUTION:** Mixing drives from previous generations of storage systems is not supported.

**CAUTION:** To prevent data loss, ensure that your operating system supports drive installation. See the documentation supplied with your operating system.

### Steps

1. Press the release button to open the drive carrier release handle.
2. Hold the handle and slide the drive carrier out of the drive slot.



Figure 20. Removing a drive carrier

### Next steps

1. Install a drive carrier.
2. If you are not replacing the drive immediately, insert a drive blank in the empty drive slot to maintain proper system cooling.

## Installing a drive carrier

### Prerequisites

- ⚠ **CAUTION:** Before attempting to remove or install a drive while the system is running, see the documentation for the storage controller card to ensure that the host adapter is configured correctly to support drive removal and insertion.
- ⚠ **CAUTION:** Mixing drives from previous generations of storage systems is not supported.
- ⚠ **CAUTION:** Combining SAS and SATA drives in the same RAID volume is not supported.
- ⚠ **CAUTION:** When installing a drive, ensure that the adjacent drives are fully installed. Inserting a drive carrier and attempting to lock its handle next to a partially installed carrier can damage the partially installed carrier's shield spring and make it unusable.
- ⚠ **CAUTION:** When a replacement hot swappable drive is installed and the system is powered on, the drive automatically begins to rebuild. Ensure that the replacement drive is blank or contains data that you wish to overwrite. Any data on the replacement drive is immediately lost after the drive is installed.

1. Follow the safety guidelines listed in [Safety instructions](#).
2. If applicable, remove the drive blank.

### Steps

1. Press the release button on the front of the drive carrier to open the release handle.
2. Insert the drive carrier into the drive slot and slide until the drive connects with the backplane.
3. Close the drive carrier release handle to lock the drive in place.



Figure 21. Installing a drive carrier

#### Next steps

If applicable, install the front bezel.

## Removing the drive from the drive carrier

#### Prerequisites

**CAUTION:** Mixing drives from previous generations of storage systems is not supported.

#### Steps

1. Remove four screws from the side rails on the drive carrier.
2. Lift the drive out of the drive carrier.



Figure 22. Removing the drive from the drive carrier

#### Next steps

If applicable, install the drive into the drive carrier.

## Installing a drive into the drive carrier

### Prerequisites

**CAUTION:** Mixing drive carriers from other generations of storage systems is not supported.

### Steps

1. Insert the drive into the drive carrier with the connector end of the drive towards the back of the carrier.
2. Align the screw holes on the drive with the screws holes on the drive carrier.  
When aligned correctly, the back of the drive is flush with the back of the drive carrier.
3. Secure the drive to the drive carrier with screws.



Figure 23. Installing a drive into the drive carrier

## System cover

The system cover provides security for the entire system and also helps in maintaining proper air flow inside the system.

## Removing the system cover

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.

### Steps

1. Using a 1/4 inch flat head or a Phillips #2 screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

**NOTE:** The images shown here are for representation only and the actual configuration of your system may vary.



**Figure 24. Removing the system cover**

## Installing the system cover

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Ensure that all internal cables are routed correctly and connected, and no tools or extra parts are left inside the system.

### Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.  
The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a 1/4 inch flat head or Phillips #2 screwdriver, rotate the latch release lock clockwise to the locked position.

**NOTE:** The images shown here are for representation only and the actual configuration of your system may vary.



**Figure 25. Installing the system cover**

#### **Next steps**

1. Reconnect the peripherals and connect the system to the electrical outlet.
2. Turn on the system, including any attached peripherals.

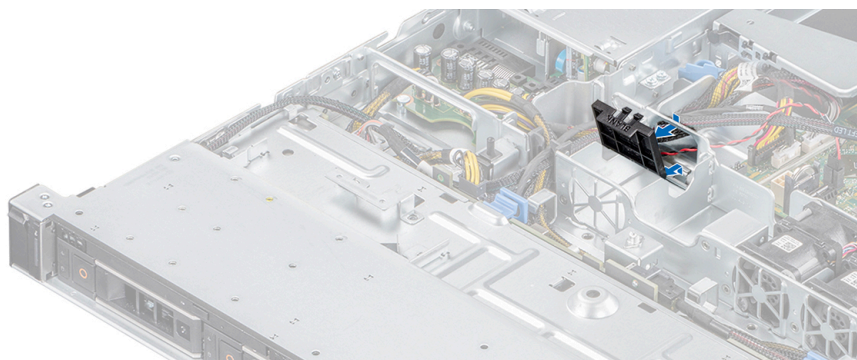
## **Cooling fans**

The cooling fan components include a cooling fan blank and the cooling fan. Both parts are replaceable.

### **Removing the cooling fan blank**

#### **Steps**

1. Press the release tab to disengage the blank from the cooling fan cage.
2. Lift the cooling fan blank out of the fan cage.



**Figure 26. Removing a fan blank**

## Installing the cooling fan blank

### Steps

1. Hold the release tab and insert the fan blank into the slots on the cooling fan cage.
2. Press the fan blank until it clicks into place.

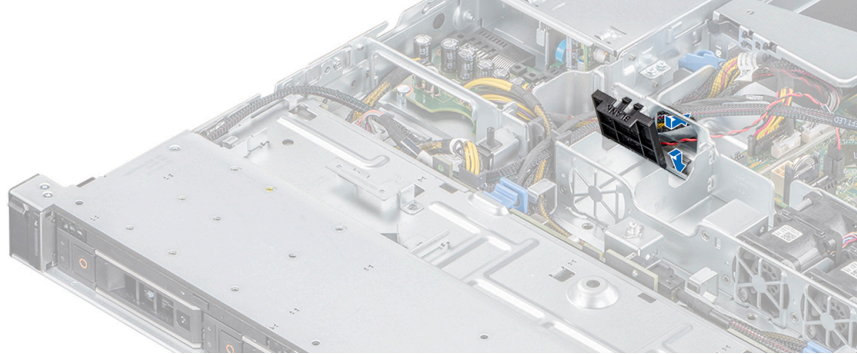


Figure 27. Installing a fan blank

## Removing a cooling fan

### Prerequisites

- Follow the safety guidelines listed in [Safety instructions](#).
- Follow the procedures in [Before working inside your system](#).
- Remove the air shroud.

### Steps

1. Press the release tabs on the fan cable connector and disconnect the cable from the system board.

**NOTE:** Observe the routing of the cable as you remove it from the system.

2. Lift the cooling fan out of the cooling fan cage.

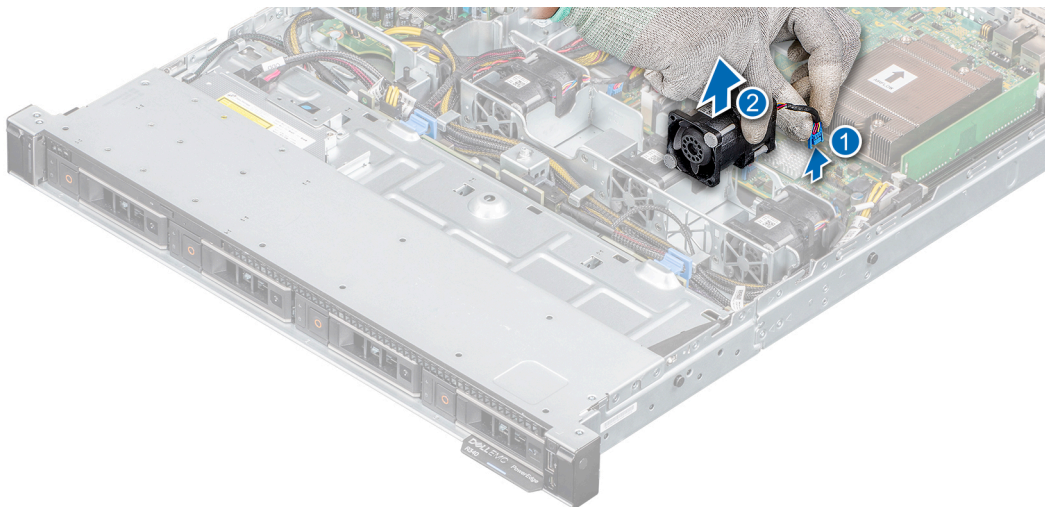


Figure 28. Removing a cooling fan

### Next steps

1. Install the cooling fan or install the cooling fan blank
2. Install the air shroud

## Installing a cooling fan

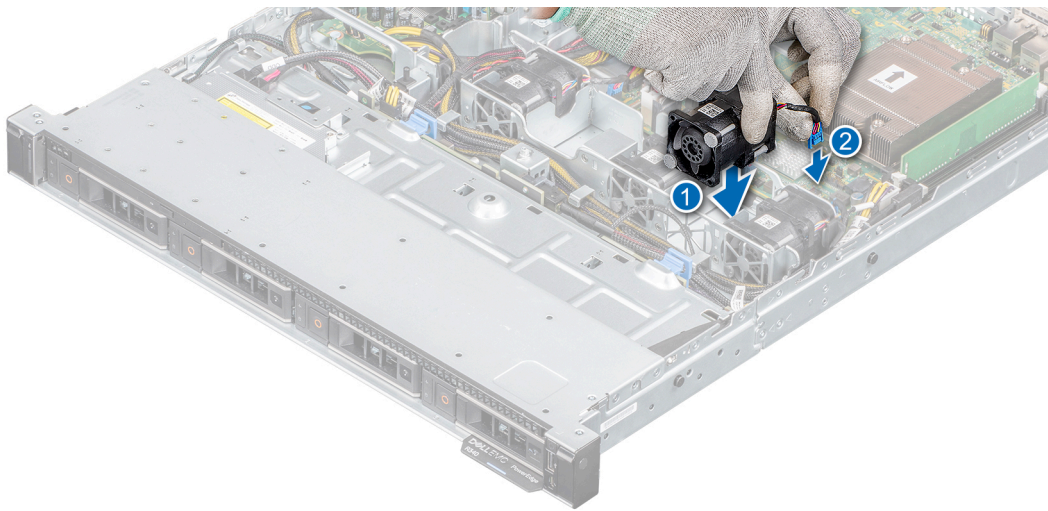
### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).

### Steps

1. Lower the cooling fan into the cooling fan cage.
2. Press the release tabs on the fan cable connector and connect the cable from the system board.

**i** **NOTE:** Route the cable properly to prevent the cable from being pinched or crimped.



**Figure 29. Installing a cooling fan**

### Next steps

1. Install the air shroud.
2. Follow the procedures in [After working inside your system](#).

## Intrusion switch

### Removing the intrusion switch

### Prerequisites

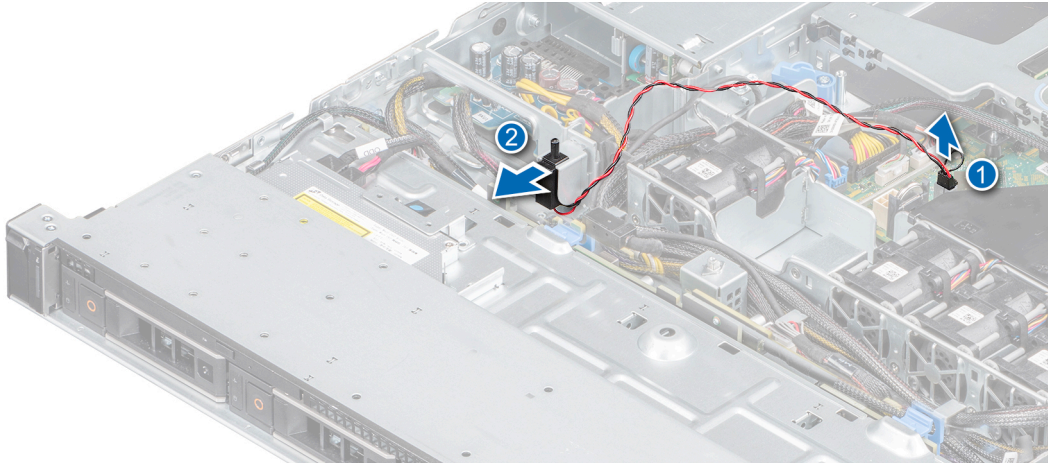
1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Keep the plastic scribe ready.

### Steps

1. Disconnect and remove the intrusion switch cable.

**NOTE:** Observe the routing of the cable as you remove it from the system.

- Using a plastic scribe, slide the intrusion switch out of the intrusion switch slot.



**Figure 30. Removing the intrusion switch**

### Next steps

- Install the intrusion switch

## Installing the intrusion switch

### Prerequisites

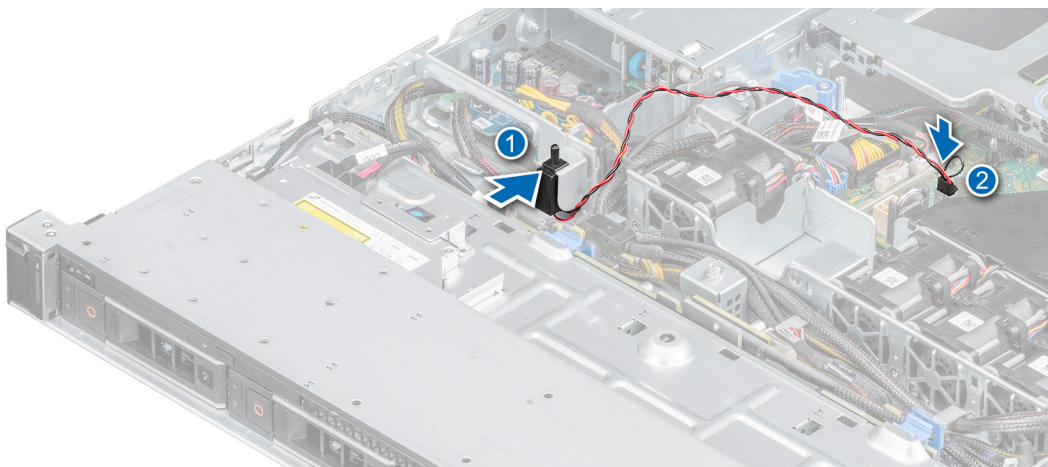
- Follow the safety guidelines listed in [Safety instructions](#).
- Follow the procedures in [Before working inside your system](#).

### Steps

- Align and insert the intrusion switch in the slot until it locks in the slot on the chassis.

**NOTE:** Route the cable through the cable routing tab when you replace it to prevent the cable from being pinched or crimped.

- Connect the intrusion switch cable to the connector on the system board.



**Figure 31. Installing the intrusion switch**

### Next steps

1. Follow the procedures in [After working inside your system](#).

## System memory

The NX440 contains four memory sockets organized into two channels. In each channel, the first socket is marked white and the second socket black.

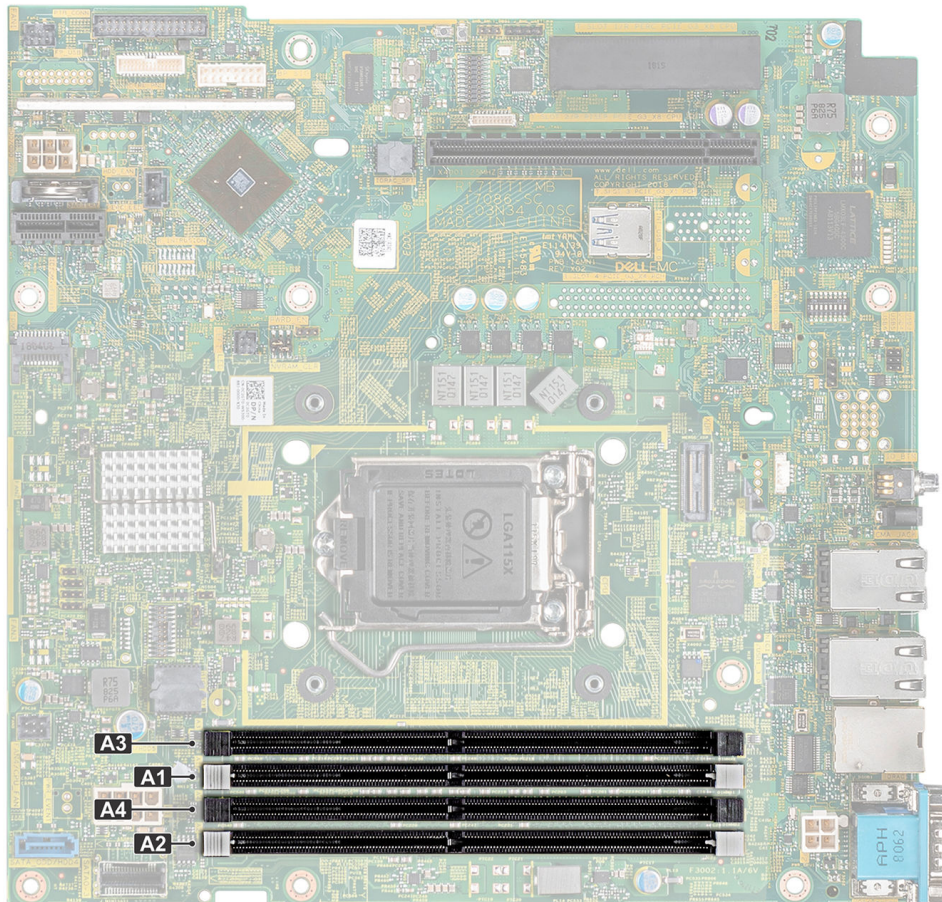


Figure 32. Memory socket locations

## Memory locations and configuration

Memory channels are organized as follows:

Table 3. Memory channels

Channel 0	Channel 1
Slot A1 and A3	Slot A2 and A4

Table 4. Memory population

DIMM Type	DIMMs Populated/ Channel	Voltage	Operating Frequency	Maximum DIMM Rank/ Channel
UDIMM	1	1.2 V	3200 MT/s or 2666 MT/s	Single rank

The following memory configurations are currently available and supported for this system.

**NOTE:** 1R and 2R in the following table indicate single and dual-rank memory modules respectively.

**Table 5. Memory configurations**

Populated system capacity (in GB)	Memory module size (in GB)	Number of memory modules	Memory module rank, organization, and frequency	Memory module slot population
8	8	1	1R, x8, 3200 MT/s or 2666 MT/s	A1
16	16	1	1R, x16, 3200 MT/s or 2666 MT/s	A1

## General memory module installation guidelines

To ensure optimal performance of your system, observe the following general guidelines when configuring your system memory. If your system memory configuration does not follow these guidelines, your system might not boot, it might stop responding during memory configuration, or it might operate with reduced memory.

The system supports Flexible Memory Configuration, enabling the system to be configured and run in any valid chipset architectural configuration. The following are the recommended guidelines for installing memory modules:

- All DIMMs must be DDR4.
- A maximum of two different ranked DIMMs can be populated in a channel regardless of rank count.
- If memory modules with different speeds are installed, they will operate at the speed of the slowest installed memory module(s).
- Populate memory module sockets only if a processor is installed. For single-processor systems, sockets A1 to A4 are available.
- In **Optimizer Mode**, the DRAM controllers operate independently in the 64-bit mode and provide optimized memory performance.

**Table 6. Memory population rules**

Processor	Configuration	Memory population	Memory population information
Single processor	Optimizer (Independent channel) population order	1, 2, 3, 4	Odd amount of DIMMs per processor allowed.

- Populate all the sockets with white release tabs first, followed by the black release tabs.
- When mixing memory modules with different capacities, populate the sockets with memory modules with the highest capacity first.

For example, if you want to mix 8 GB and 16 GB memory modules, populate 16 GB memory modules in the sockets with white release tabs and 8 GB memory modules in the sockets with black release tabs.

- Memory modules of different capacities can be mixed provided other memory population rules are followed.  
For example, 8 GB and 16 GB memory modules can be mixed.
- Mixing of more than two memory module capacities in a system is not supported.
- Unbalanced memory configurations will result in a performance loss so always populate memory channels identically with identical DIMMs for best performance.
- To ensure proper system cooling, memory module blanks must be installed in memory sockets that are not occupied.

## Removing a memory module

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the air shroud.

**i** **NOTE:** The memory modules are hot to touch for some time after the system has been powered down. Allow the memory modules to cool before handling them. Handle the memory modules by the card edges and avoid touching the components or metallic contacts on the memory module.

## Steps

1. Locate the appropriate memory module socket.
2. To release the memory module from the socket, simultaneously press the ejectors on both ends of the memory module socket.

**CAUTION:** Handle each memory module only by the card edges, ensuring not to touch the middle of the memory module or metallic contacts.

3. Lift the memory module away from the system.

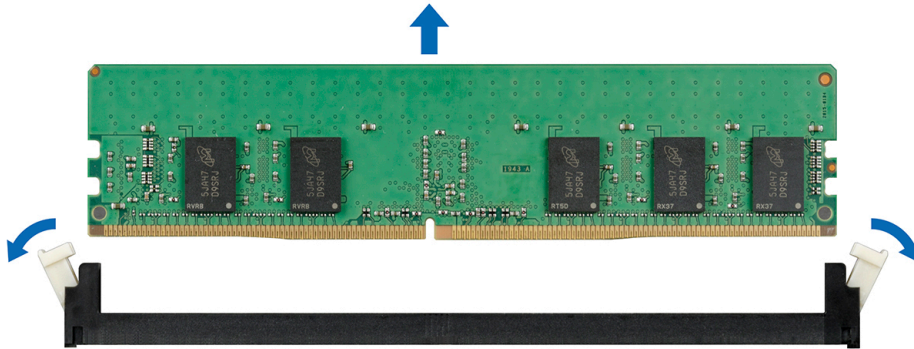


Figure 33. Removing a memory module

## Next steps

1. Install the memory module, or if you are removing a memory module permanently, install a memory module blank.  
**NOTE:** The procedure to install a memory module blank is similar to the procedure to install a memory module.

## Installing a memory module

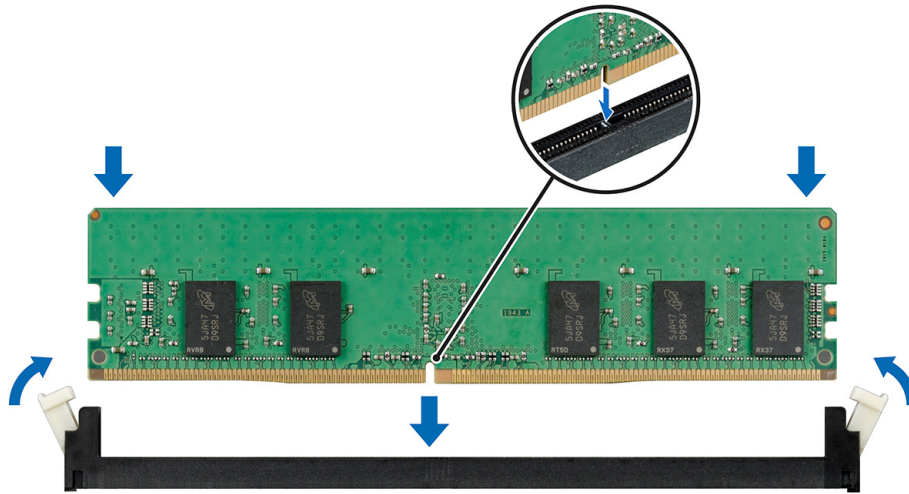
### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the air shroud.
4. If installed, remove a memory module blank.  
**NOTE:** The procedure to remove a memory module blank is similar to the procedure to remove a memory module.  
**NOTE:** Retain the removed memory module blank(s) for future use.

## Steps

1. Locate the appropriate memory module socket.  
**CAUTION:** To prevent damage to the memory module or the memory module socket during installation, do not bend or flex the memory module; insert both ends of the memory module simultaneously.
2. If a memory module or a memory module blank is installed in the socket, remove it.
3. Align the edge connector of the memory module with the alignment key of the memory module socket, and insert the memory module in the socket.  
**NOTE:** The memory module socket has an alignment key that enables you to install the memory module in the socket in only one orientation.  
**CAUTION:** Do not apply pressure at the center of the memory module; apply pressure at both ends of the memory module evenly.
4. Press the memory module with your thumbs until the socket levers firmly click into place.

When the memory module is properly seated in the socket, the levers on the memory module socket align with the levers on the other sockets that have memory modules installed.



**Figure 34. Installing a memory module**

#### Next steps

1. Install the air shroud.
2. Follow the procedures in [After working inside your system](#).
3. Press F2 to enter System Setup, and check the **System Memory** setting.

The **System Memory Size** indicates the installed memory.

4. If the **System Memory Size** is incorrect, one or more of the memory modules may not be installed properly. Ensure that the memory modules are firmly seated in their sockets.
5. Run the system memory test in the system diagnostics.

## Expansion cards and expansion card riser

An expansion card can be inserted into an expansion slot on the system board or into a card riser to add enhanced functionality to the system through the expansion bus.

**i** **NOTE:** A System Event Log (SEL) event is logged if an expansion card riser is not supported or missing. It does not prevent your system from turning on and no BIOS POST message or F1/F2 pause is displayed.

## Air shroud

The air shroud directs the airflow across the system. It prevents the system from overheating and is used to maintain uniform airflow inside the system.

## Removing the air shroud

#### Prerequisites

**⚠ CAUTION:** Never operate your system with the air shroud removed. Without the air shroud, the system may overheat, resulting in shutdown of the system and loss of data.

1. Follow the safety guidelines listed in [Safety instructions](#).

## Steps

Using the blue touch points, lift the air shroud out of the system.

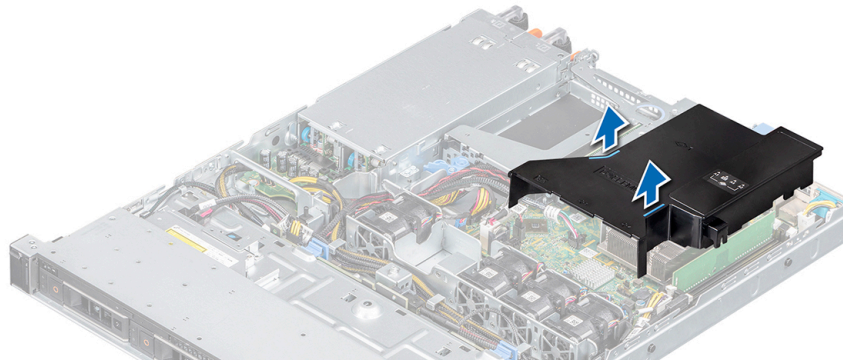


Figure 35. Removing the air shroud

## Installing the air shroud

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).

### Steps

1. Align the slot on the air shroud with the standoff on the chassis.

**NOTE:** Route the cable properly to prevent the cable from being pinched or crimped.

2. Lower the air shroud into the system until it is firmly seated.

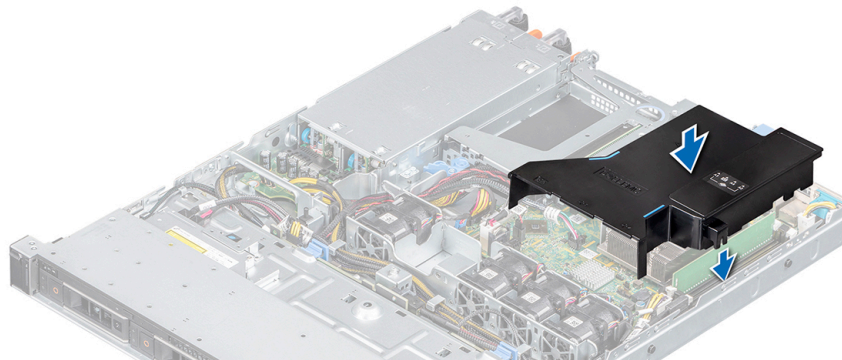


Figure 36. Installing the air shroud

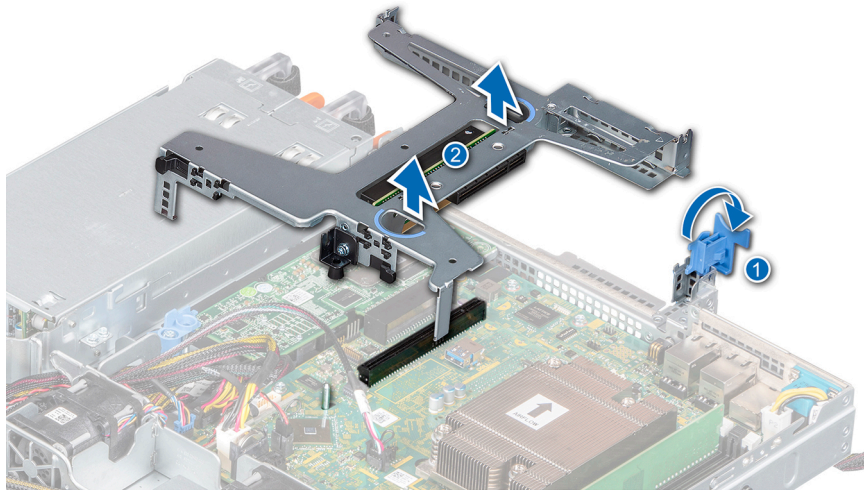
## Removing the expansion card riser

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the air shroud.

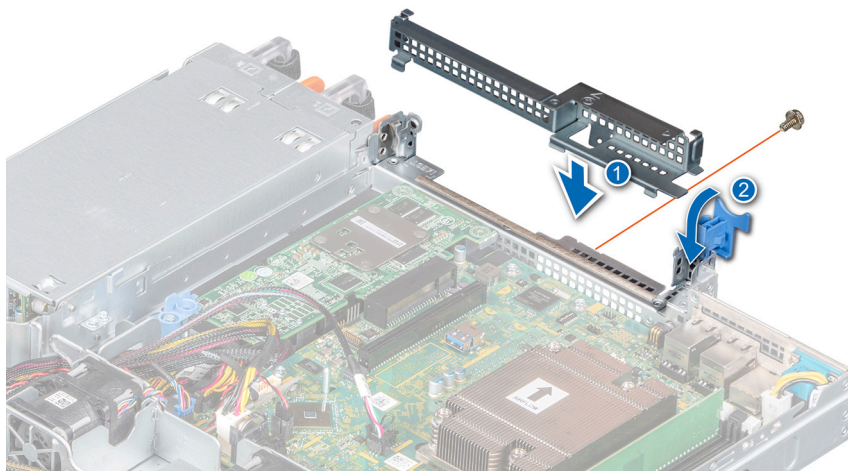
### Steps

1. Open the expansion card riser latch.
2. Holding the blue touch points, lift the expansion card riser from the system.



**Figure 37. Removing the expansion card riser**

3. If you are removing the riser permanently, install a filler bracket in the empty expansion slot and close the expansion card latch.
4. Using a Philips #2 screw driver, tighten the screw to secure the filler bracket to the system.



**Figure 38. Installing the expansion card riser filler**

### Next steps

1. Install the expansion card riser.

## Installing the expansion card riser

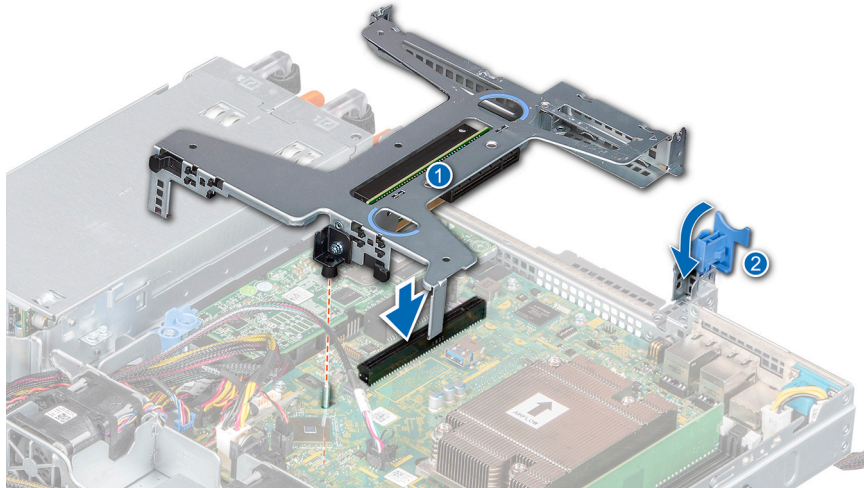
### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. [Remove the air shroud](#)
4. If removed, [Install the expansion card into the riser](#)
5. Open the expansion card riser latch

### Steps

1. Align the guide on the expansion card riser with the guide pin on the system board and lower the riser until it is firmly seated.

2. Close the expansion card riser latch.



**Figure 39. Installing the expansion card riser**

#### Next steps

1. Follow the procedures in [After working inside your system](#).

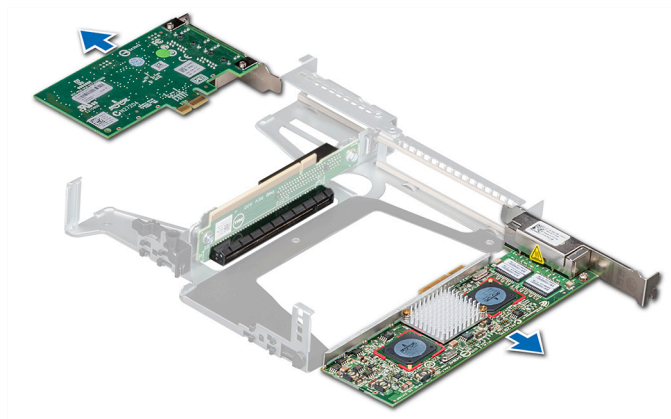
## Removing an expansion card from the expansion card riser

#### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Disconnect any cables connected to the expansion card or expansion card riser.
4. [Remove the expansion card riser](#).

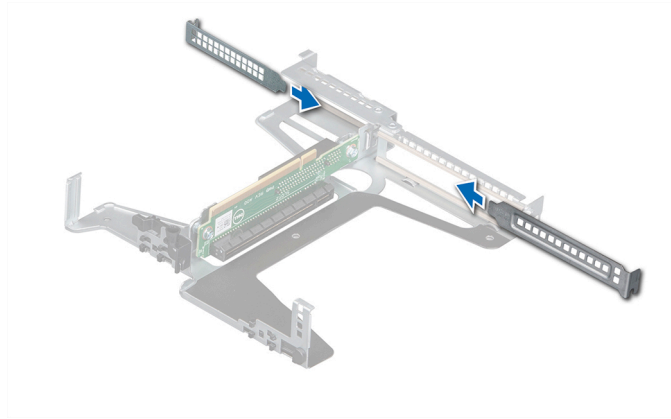
#### Steps

1. Flip the expansion card riser to locate the connectors on the riser.
2. Holding the card by its edges, remove the expansion card from the expansion card riser.



**Figure 40. Removing the expansion card from the expansion card riser**

3. If you are removing the card permanently, install a filler bracket in the empty expansion card slot.



**Figure 41. nstalling the expansion card filler**

### Next steps

1. Install the expansion card into the expansion card riser.

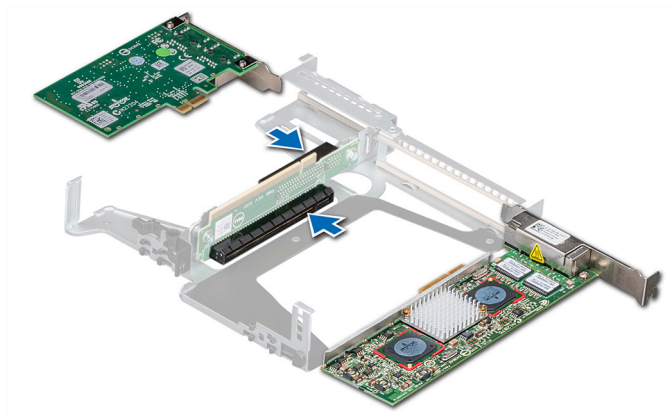
## Installing an expansion card into the expansion card riser

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the expansion card riser.
4. If installed, remove the filler bracket.

### Steps

1. Flip the expansion card riser to locate the connectors on the riser.
2. Holding the card by its edges, align and insert the expansion card in the connector on the expansion card riser.
3. If applicable, connect the cables to the expansion card.



**Figure 42. Installing the expansion card in the expansion card riser**

### Next steps

1. Install the expansion card riser.
2. Follow the procedures in [After working inside your system](#).

# Storage controller card

The NX440 contains PERC H730P internal storage controller card.

## Removing the PERC card

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the expansion card riser.

### Steps

1. Remove the screw securing the blue release latch.
2. Rotate the blue release latch to disengage it from the PERC card.
3. Push the blue release latch until the tab clicks into the slot on the system.
4. Hold the PERC card by the edges and pull it to disengage it from the PERC card slot.
5. Flip the PERC card and disconnect the cable from the PERC card.

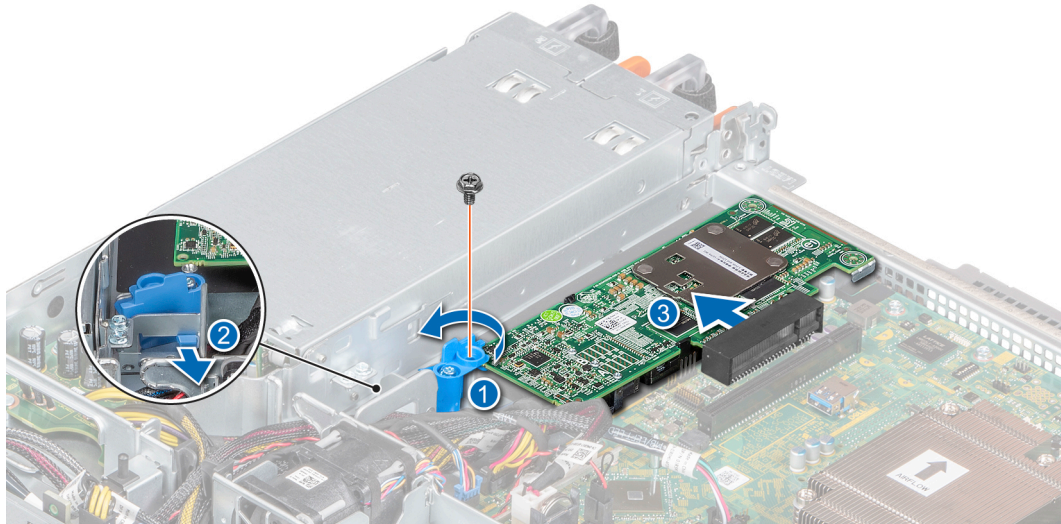


Figure 43. Removing the PERC card

### Next steps

1. Install the PERC card

## Installing the PERC card

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the expansion card riser.

### Steps

1. Connect the PERC cable to the PERC card.
2. Flip and insert the PERC card in the PERC card slot.

3. Press the tab on the blue release latch to disengage it from the slot on the system.
4. Rotate the blue release latch until it locks with the PERC card.
5. Secure the blue release latch with a screw.

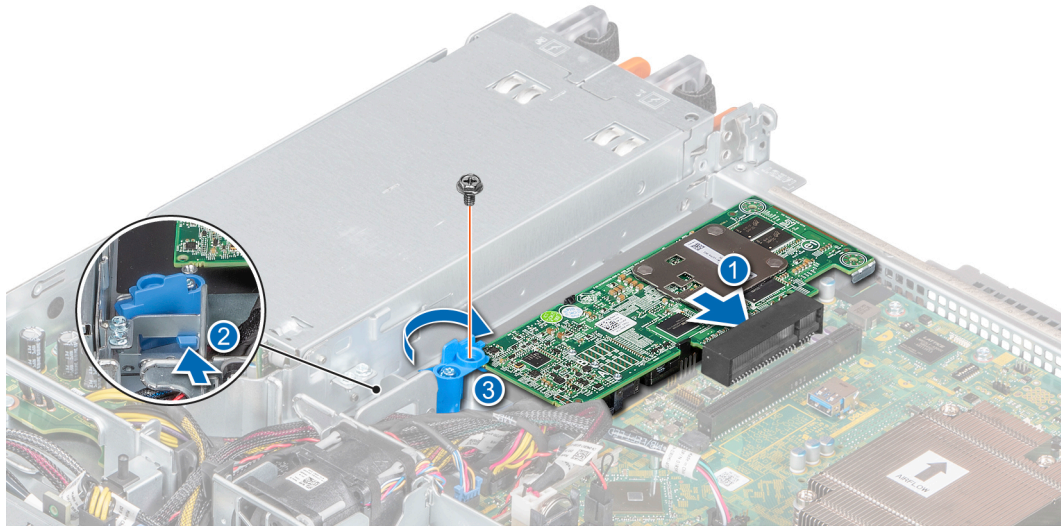


Figure 44. Installing the PERC card

#### Next steps

1. Install the expansion card riser.
2. Follow the procedures in [After working inside your system](#).

## Replacing the system battery

#### Prerequisites

**NOTE:** There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

- Follow the safety guidelines listed in [Safety instructions](#).
- Follow the procedures in [Before working inside your system](#).

#### Steps

1. Locate the battery socket. For more information, see the [system board connections](#) section.
2. Tilt the battery partially to release it from the battery holder.

**CAUTION:** To avoid damage to the battery connector, you must firmly support the connector while installing or removing a battery.

3. Pull the battery from the battery holder.



**Figure 45. Removing the system battery**

4. To install a new system battery, hold the battery with the positive side facing outwards and push the battery into the holder until it clicks into place.

#### Next steps

- Follow the procedures in [After working inside your system](#).

## Replacing the optional internal USB memory key

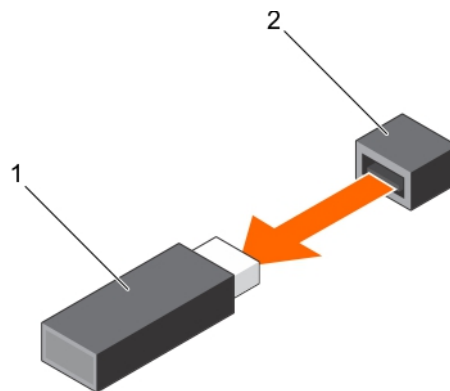
#### Prerequisites

**CAUTION:** To avoid interference with other components in the system, the maximum permissible dimensions of the USB memory key are 15.9 mm wide x 57.15 mm long x 7.9 mm high.

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove expansion card riser.

#### Steps

1. Locate the USB port or USB memory key on the system board.  
To locate the USB port, see the [system board connectors](#) section.
2. If installed, remove the USB memory key from the USB port.



**Figure 46. Removing the internal USB memory key**

- a. USB memory key
  - b. USB port
3. Insert the replacement USB memory key into the USB port.

#### Next steps

1. Install the expansion card riser.
2. Follow the procedures in [After working inside your system](#).

# Optical drive

## Removing the optical drive

The procedure for removing an optical drive and optical drive blank is the same.

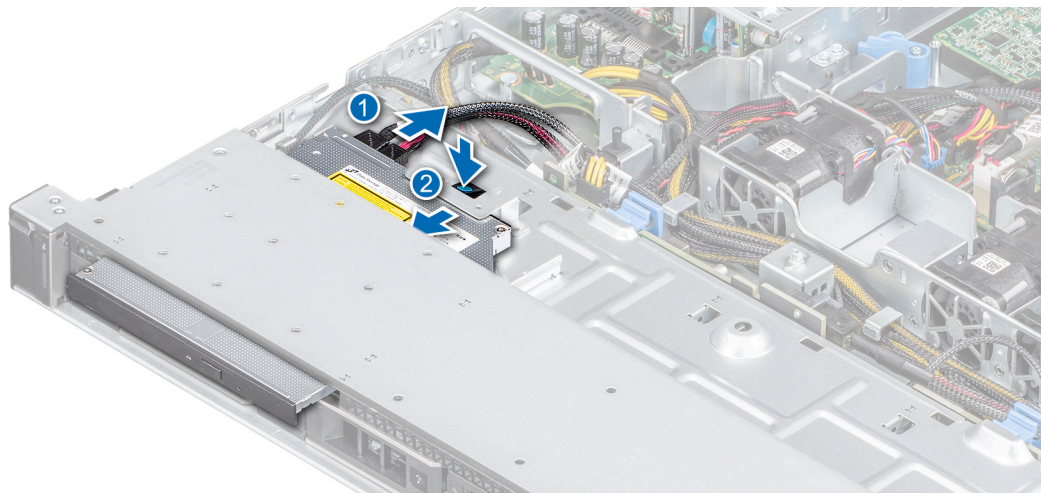
### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).

**i** **NOTE:** Observe the routing of the cable as you remove it from the system.

### Steps

1. Disconnect the power and signal cables from the optical drive.
2. To release the optical drive, press and push the release tab towards the front of the system.
3. Slide the optical drive out of the system.



**Figure 47. Removing the optical drive**

### Next steps

1. [Install the optical drive or optical drive blank](#).

**i** **NOTE:** Blanks must be installed on empty optical drive slot to maintain FCC certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

## Installing the optional optical drive

The procedure for installing an optical drive and optical drive blank is similar to the procedure to install an optical drive.

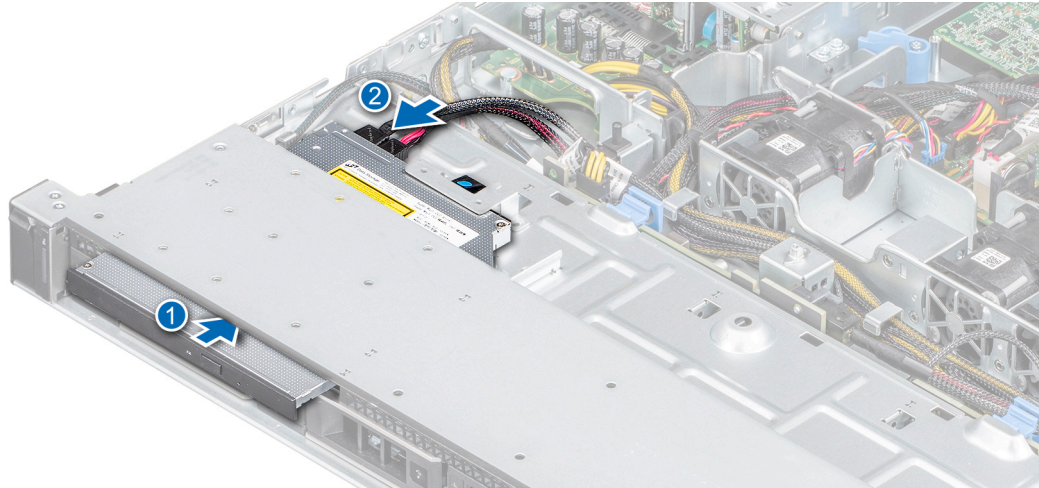
### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. If installed, remove the optical drive blank by pressing the blue release tab at the back of the blank and pushing the blank out of the system.

**i** **NOTE:** Route the cable properly when you replace it to prevent the cable from being pinched or crimped.

### Steps

1. Align and insert the optical drive until the blue release tab locks in the slot on the system.
2. Connect the power and data cable to the appropriate ports on the optical drive.  
**i** **NOTE:** Route the cable properly to prevent the cable from being pinched or crimped.
3. Connect the power and data cables to the connectors on the system board.



**Figure 48. Installing the optical drive**

### Next steps

1. Follow the procedures in [After working inside your system](#).

## Processor and heat sink

To replace the processor, first remove the heat sink to gain access to the processor.

### Removing the heat sink

#### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the air shroud.

**i** **NOTE:** The heat sink and processor are too hot to touch for some time after the system has been powered down. Allow the heat sink and processor to cool down before handling them.

#### Steps

1. Using a Philips #2 screwdriver, loosen the screws on the heat sink in the order mentioned below:
  - a. Loosen the first screw three turns.
  - b. Loosen the screw diagonally opposite to the screw you loosened.
2. Repeat the procedure for the remaining two screws.
3. Return to the first screw to loosen it.
4. Lift the heat sink from the system.

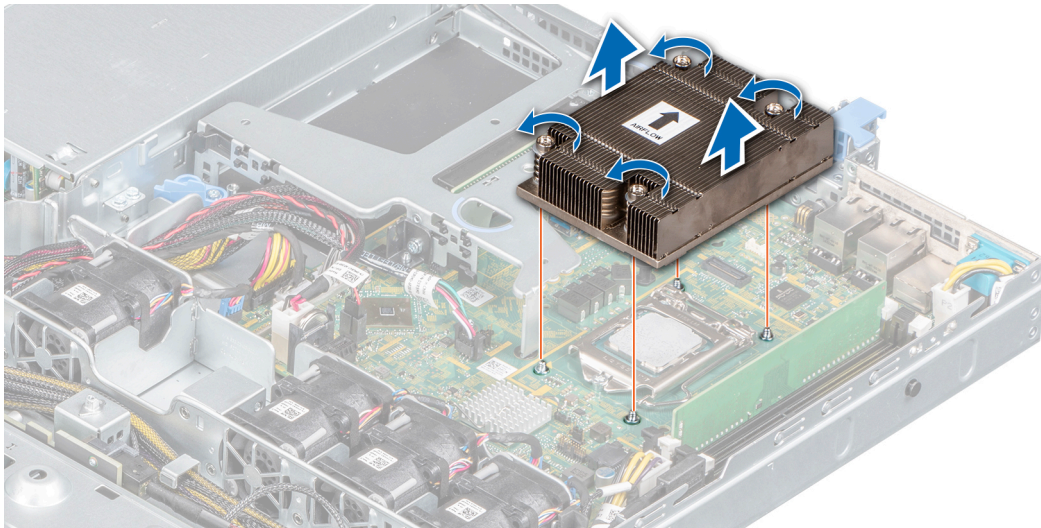


Figure 49. Removing the heat sink

### Next steps

1. If you are removing a faulty heat sink, replace the heat sink, if not, remove the processor.

## Removing the processor

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the air shroud.
4. Remove the heat sink.

### Steps

1. Release the socket lever by pushing the lever down and out from under the tab on the processor shield.
2. Lift the lever upward to lift the processor shield.

**CAUTION:** Do not touch the processor socket pins, they are fragile and can be permanently damaged. Be careful not to bend the pins in the processor socket when removing the processor out of the socket.

3. Lift the processor from the socket.

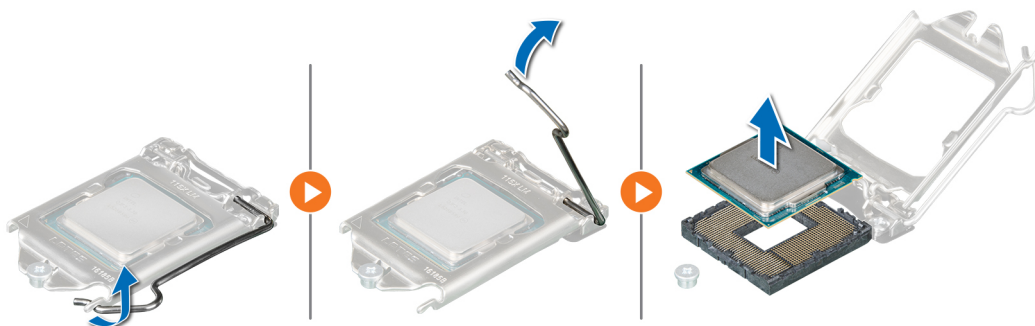


Figure 50. Removing the processor

### Next steps

1. Install the processor.


## Installing the processor

### Prerequisites

1. Follow the procedures in [Before working inside your system](#).
2. Remove the air shroud.
3. Remove the heat sink.

### Steps

1. Align the pin-1 indicator of the processor with the triangle on the system board.

 **CAUTION: Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.**

2. Place the processor in the socket.
3. Close the processor shield by sliding it under the retention screw.
4. Lower the socket lever and push it under the tab to lock it.

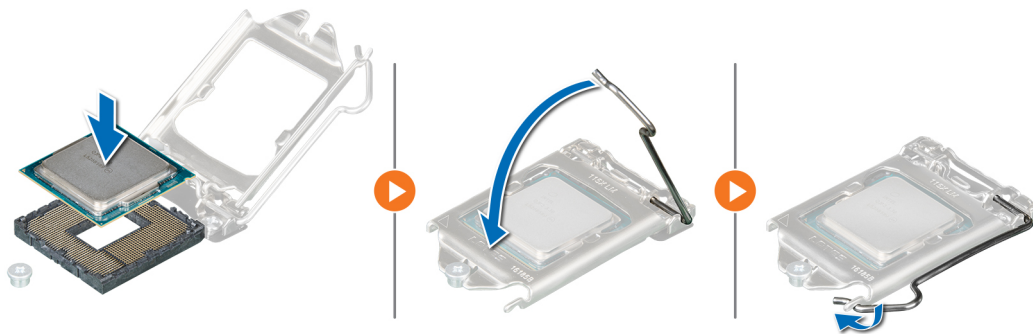


Figure 51. Installing the processor

### Next steps

1. Install the heat sink.
2. Install the air shroud.
3. Follow the procedures in [After working inside your system](#).

## Installing the heat sink

### Prerequisites

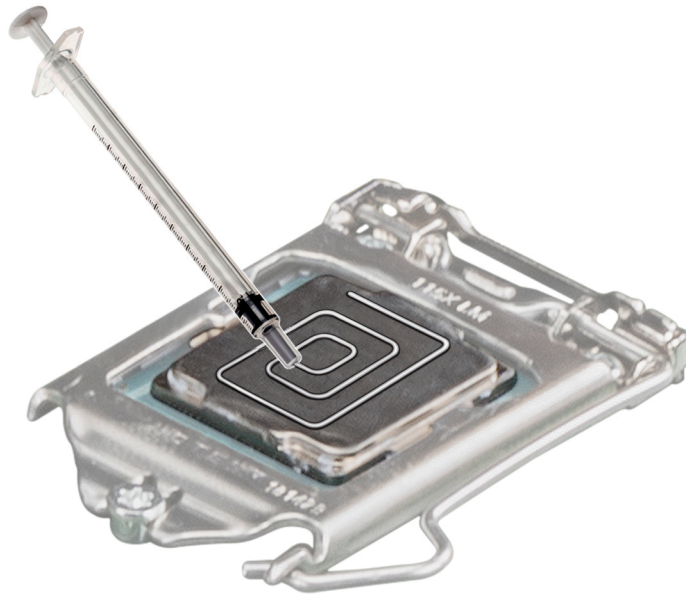
1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the air shroud.

### Steps

1. If you are using an existing heat sink, remove the thermal grease from the heat sink using a clean lint-free cloth.
2. Use the thermal grease syringe included with your processor kit to apply the grease in a thin spiral on the top of the processor.

 **CAUTION: Applying too much thermal grease can result in excess grease coming in contact with and contaminating the processor socket.**

**NOTE:** The thermal grease syringe is intended for one-time use only. Dispose the syringe after you use it.

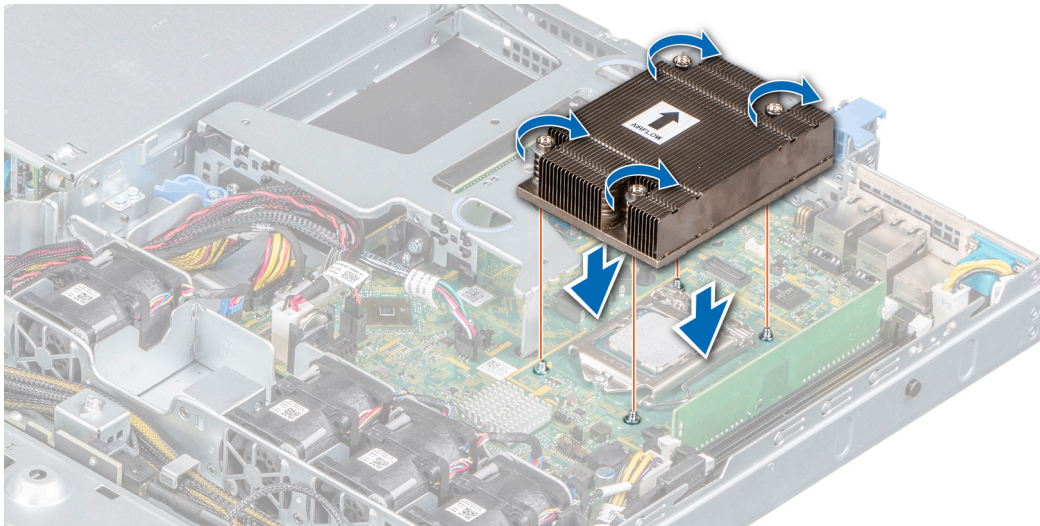


**Figure 52. Applying thermal grease on top of the processor**

3. Align the heat sink with the standoff screws on the system board.

**CAUTION:** When installing the heat sink, ensure that the airflow arrow label is pointed towards the rear of the system.

4. Using a Phillips #2 screwdriver, tighten the screws to secure the heat sink to the system board.
  - a. Partially tighten the first screw three turns.
  - b. Tighten the screw that is diagonally opposite to it.
5. Repeat the procedure for the remaining screws.



**Figure 53. Installing the heat sink**

#### Next steps

1. Install the heat sink.
2. Install the air shroud.
3. Follow the procedures in [After working inside your system.](#)

# Drive backplane

## Removing the drive backplane

### Prerequisites

**CAUTION:** To prevent damage to the drives and backplane, you must remove the drives from the system before removing the backplane.

**CAUTION:** Note the number of each drive and temporarily label them before removal so that you can replace them in the same drive slots.

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. [Remove the drives](#).
4. Disconnect the following cables from the backplane:
  - a. Backplane signal cable
  - b. Backplane power cable
  - c. PERC cable

**NOTE:** Observe the routing of the cable as you remove it from the system.

### Steps

1. Press the blue release tabs to disengage the drive backplane from the hooks on the system.
2. Lift the drive backplane out of the system.

**NOTE:** To avoid damaging the backplane, ensure that you move the control panel cables from the cable routing clips before removing the backplane.

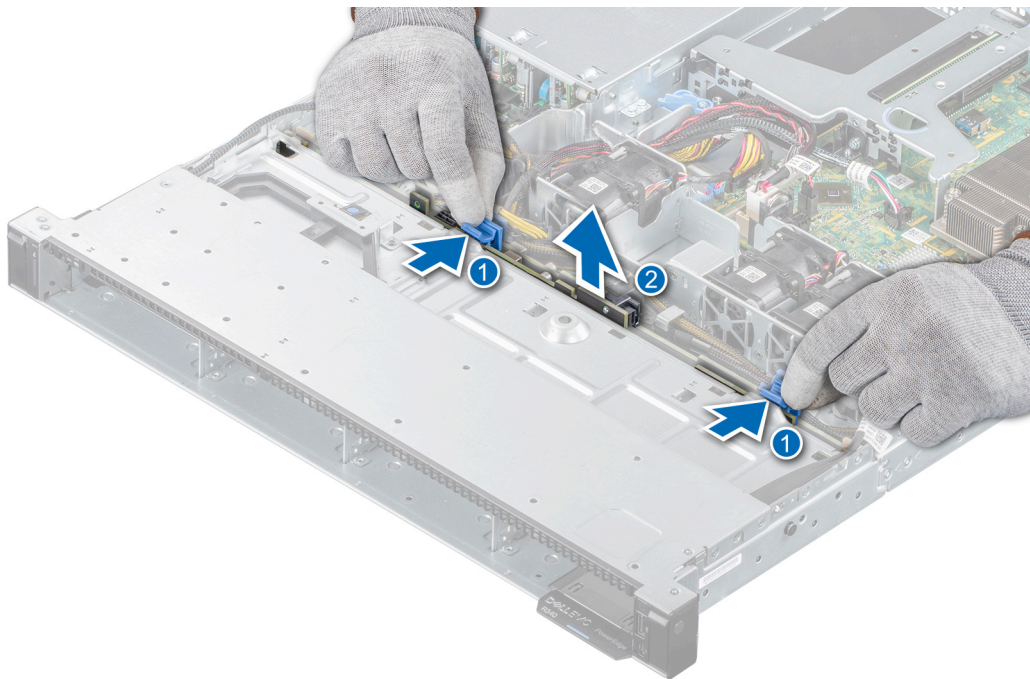


Figure 54. Removing the drive backplane

# Installing the drive backplane

## Prerequisites

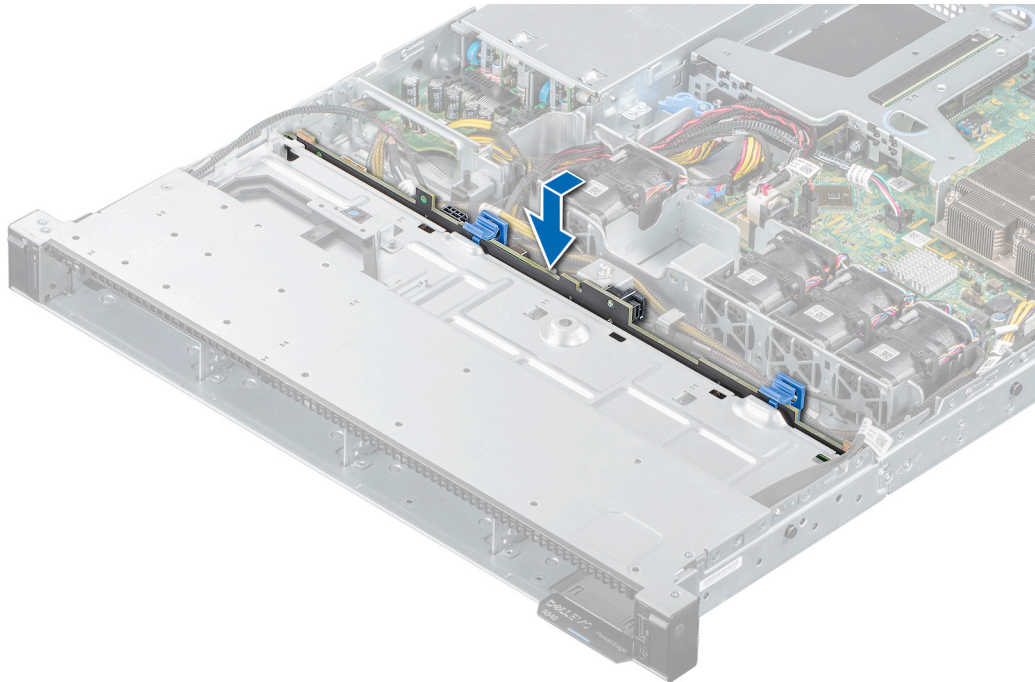
1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the drives.

**NOTE:** To avoid damaging the backplane, ensure to move the control panel cables from the cable routing clips before removing the backplane.

**NOTE:** Route the cable properly when you replace it to prevent the cable from being pinched or crimped.

## Steps

1. Align the slots on the backplane with the hooks on the system.
2. Lower the backplane until the blue release tabs click into place.



**Figure 55. Installing the drive backplane**

## Next steps

1. Connect the following cables to the backplane:
  - a. Backplane signal cable
  - b. Backplane power cable
  - c. PERC cable
2. [Install the drives](#) in their original locations.
3. Follow the procedures in [After working inside your system](#).

# Power supply unit

## Removing a power supply unit blank

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).

### Steps

Pull the blank out of the system.

**CAUTION:** To ensure proper system cooling, the power supply unit blank must be installed in the second power supply unit bay in a non-redundant configuration. Remove the power supply unit blank only if you are installing a second power supply unit.

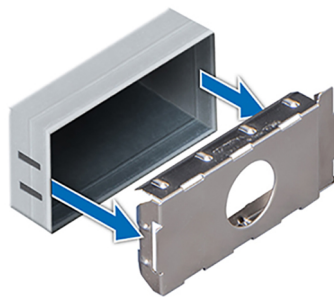


Figure 56. Removing a power supply unit blank

### Next steps

1. [Install the power supply blank](#) or [Install the power supply unit](#)

## Installing a power supply unit blank

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).

**NOTE:** Install the power supply unit (PSU) blank only in the second PSU bay.

### Steps

Align the PSU blank with the PSU slot and push it into the PSU slot until it clicks into place.

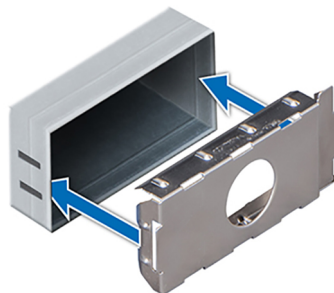


Figure 57. Installing a power supply unit blank

# Removing a power supply unit

## Prerequisites

**CAUTION:** The system needs one power supply unit (PSU) for normal operation. On power-redundant systems, remove and replace only one PSU at a time in a system that is powered on.

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Disconnect the power cable from the power source and from the PSU you intend to replace.
3. Remove the cable from the strap on the PSU handle.
4. Unlatch and lift the optional cable management arm if it interferes with the PSU removal.

For information about the cable management arm, see the related rack documentation at [www.dell.com](http://www.dell.com).

## Steps

1. Press the release latch to disengage the PSU from the system.
2. Hold the PSU handle and slide the PSU out of the system.

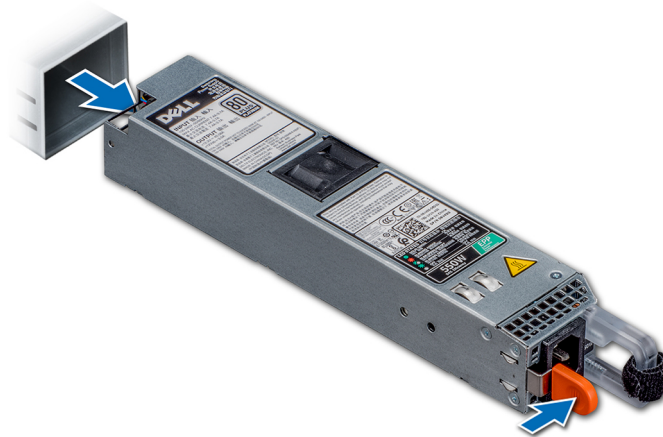


Figure 58. Removing a power supply unit

## Next steps

1. [Install the power supply units](#)

# Installing a power supply unit

## Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. For systems that support redundant PSU, ensure that both the PSUs are of the same type and have the same maximum output power.

**NOTE:** The maximum output power (shown in watts) is listed on the PSU label.

## Steps

Push the PSU into the slot on the system until the release latch snaps into place.



**Figure 59. Installing a power supply unit**

### Next steps

1. If you have unlatched the cable management arm, relatch it. For information about the cable management arm, see the related rack documentation at [www.dell.com](http://www.dell.com).
2. Connect the power cable to the PSU, and plug the cable into a power outlet.
  - i** **NOTE:** When connecting the power cable to the PSU, secure the cable to the PSU with the strap.
  - i** **NOTE:** When you install or hot-swap a new PSU, wait for 15 seconds for the system to recognize the PSU and determine its status. The PSU redundancy may not occur until discovery is complete. Wait until the new PSU is discovered and enabled before you uninstall the other PSU. The PSU status indicator turns green to signify that the PSU is functioning properly.

## Power distribution board

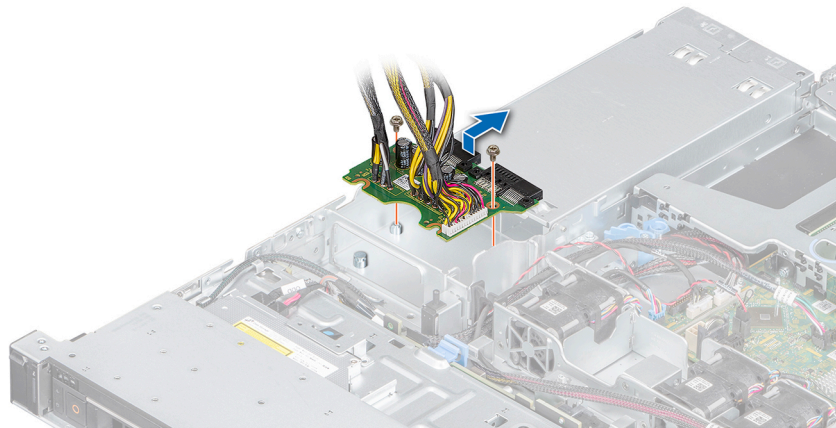
### Removing the power distribution board

#### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. [Remove the power supply units](#).

#### Steps

1. Disconnect the cables from the system board and the backplane.
  - i** **NOTE:** Observe the routing of the cable as you remove it from the system.
2. Using a Philips #2 screwdriver, remove the screws securing the power distribution board (PDB) to the system.
3. Slide the PDB toward the rear of the system to disengage it from the standoffs.
4. Lift the PDB from the system.



**Figure 60. Removing the power distribution board**

### Next steps

1. Install the power distribution board.

## Installing the power distribution board

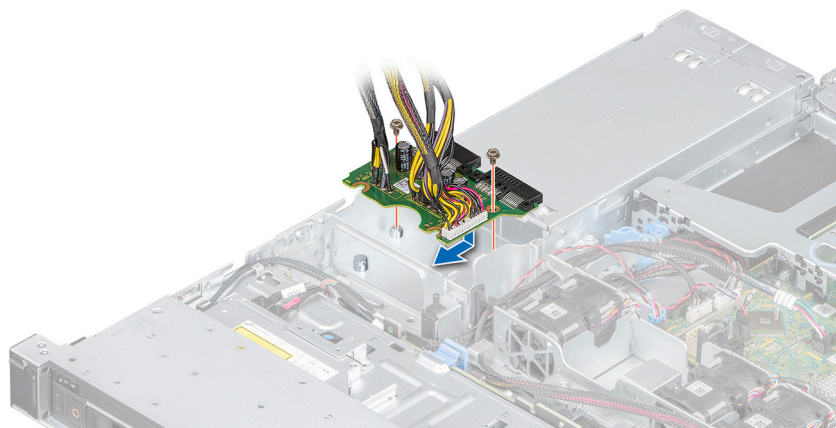
### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).

### Steps

1. Align the power distribution board (PDB) with the standoffs on the system.
2. Using a Philips #2 screwdriver, tighten the screws that secure the PDB to the system.
3. Connect the cables to the system board and the drive backplane.

**NOTE:** Route the cable properly when you replace it to prevent the cable from being pinched or crimped.



**Figure 61. Installing the power distribution board**


### Next steps

1. [Install the power supply units](#).
2. Follow the procedures in [After working inside your system](#).

# System board

## Removing the system board

### Prerequisites

 **CAUTION:** If you are using the Trusted Platform Module (TPM) with an encryption key, you may be prompted to create a recovery key during program or System Setup. Be sure to create and safely store this recovery key. If you replace this system board, you must supply the recovery key when you restart your system or program before you can access the encrypted data on your drives.

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).
3. Remove the following components:
  - a. [Air shroud](#)
  - b. [Memory Modules](#)
  - c. Disconnect the fan cable
  - d. [Expansion card riser](#)
  - e. [Storage controller card](#)
  - f. [Heat sink and processor](#)

 **CAUTION:** To prevent damage to the processor socket when replacing a faulty system board, ensure that you cover the processor socket with the processor dust cover.

- g. [Internal USB](#), if installed
- h. If applicable, Internal Dual SD module

### Steps

1. Disconnect all the cables from the system board.

 **CAUTION:** Take care not to damage the system identification button while removing the system board from the system.

 **CAUTION:** Do not lift the system board by holding a memory module, processor, or other components.

2. Using a Phillips #2 screwdriver, remove the screws securing the system board to the chassis.

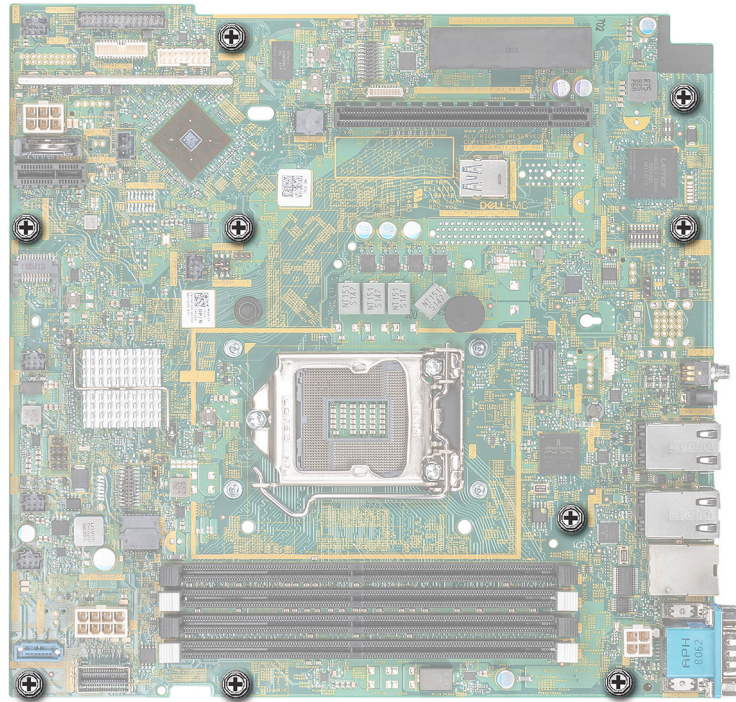


Figure 62. System board screws

3. Using the system board holder, slightly lift the system board, and then slide it toward the front of the chassis.
4. Lift the system board out of the chassis.

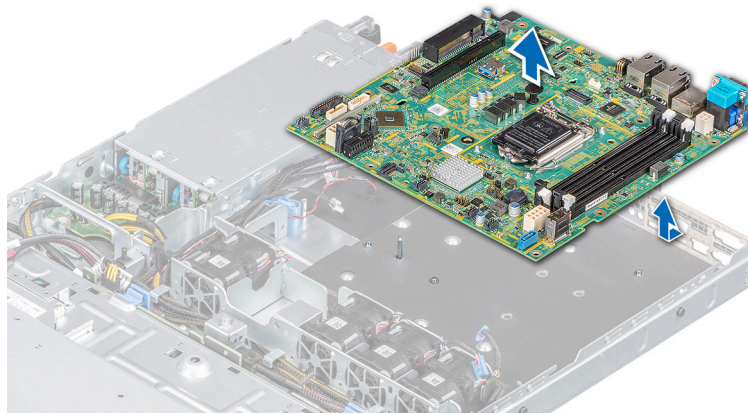


Figure 63. Removing the system board

### Next steps

1. Install the system board.

## Installing the system board

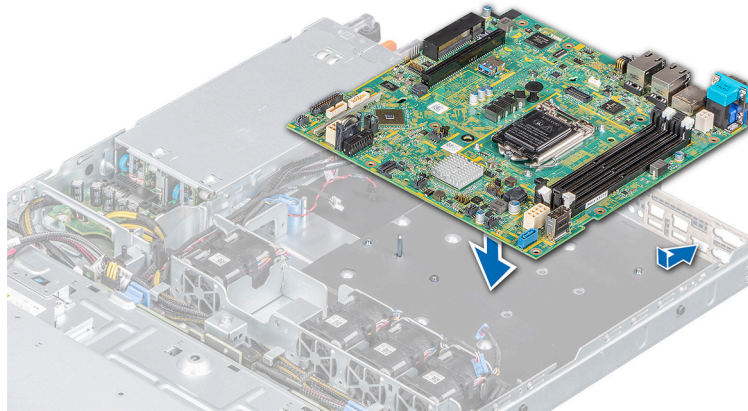
### Prerequisites

**NOTE:** Before replacing the system board, replace the old iDRAC MAC address label in the Information tag with the iDRAC MAC address label of the replacement system board.

1. If you are replacing the system board, remove all the components that are listed in the removing the system board section.

## Steps

1. Hold the system board holder and lower the system board it into the system.
2. Hold the system board at an angle and align the connectors with the slots on the rear of the chassis.
3. Slide the system board towards the rear of the chassis until the connectors are firmly seated in the slots.



**Figure 64. Installing the system board**

4. Using a Philips #2 screwdriver, tighten the screws that secure the system board to the chassis.

## Next steps

1. Replace the following:
  - a. [TPM Module](#)  
**i** **NOTE:** The TPM Module must be replaced only while installing new system board.
  - b. [Storage controller card](#)
  - c. [Internal USB key](#) (if applicable)
  - d. [Expansion card and riser](#)
  - e. [Processor and heat sink](#)
  - f. [Memory modules](#)
  - g. [Air shroud](#)
2. Reconnect the cables to the system board.  
**i** **NOTE:** Ensure that the cables inside the system are routed along the chassis wall and secured using the cable securing bracket.
3. Follow the procedures in [After working inside your system](#).
4. Ensure that you:
  - a. Use the Easy Restore feature to restore the Service Tag. For more information, see the Easy restore section.
  - b. If the Service Tag is not backed up in the backup flash device, enter the Service Tag manually. For more information, see the Restoring the Service Tag by using the Easy Restore feature section.
  - c. Update the BIOS and iDRAC versions.
  - d. Enable the Trusted Platform Module (TPM). For more information, see the Replacing the Trusted Platform Module section.
5. Import your new or existing iDRAC Enterprise license.

For more information, see the *Integrated Dell Remote Access Control User's Guide* located at [www.dell.com/idracmanuals](http://www.dell.com/idracmanuals).

## Trusted Platform Module

Trusted Platform Module (TPM) is a dedicated microprocessor designed to secure hardware by integrating cryptographic keys into devices. Software can use a TPM to authenticate hardware devices. Because each TPM chip has a unique and secret RSA key which is embedded during the manufacture of the TPM, it is capable of performing platform authentication operations.

# Upgrading the Trusted Platform Module

## Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).

**NOTE:** The NX440 system does not support UEFI mode.

**CAUTION:** If you are using the Trusted Platform Module (TPM) with an encryption key, you may be prompted to create a recovery key during program or System Setup. Work with the customer to create and safely store this recovery key. When replacing this system board, you must supply the recovery key when you restart your system or program before you can access the encrypted data on your hard drives.

**CAUTION:** After the TPM plug-in module is installed, it is cryptographically bound to that specific system board. Any attempt to remove an installed TPM plug-in module breaks the cryptographic binding, the removed TPM cannot be reinstalled or installed on another system board.

## NOTE:

- Ensure that your operating system supports the version of the TPM module being installed.
- Ensure that you download and install the latest BIOS firmware on your system.
- Ensure that the BIOS is configured to enable UEFI boot mode.

## Steps

1. Locate the TPM connector on the system board.
2. Press to hold the module down and remove the screw using the security Torx 8-bit shipped with the TPM module.
3. Slide the TPM module out from its connector.
4. Push the plastic rivet away from the TPM connector and rotate it 90° counterclockwise to release it from the system board.
5. Pull the plastic rivet out of its slot on the system board.

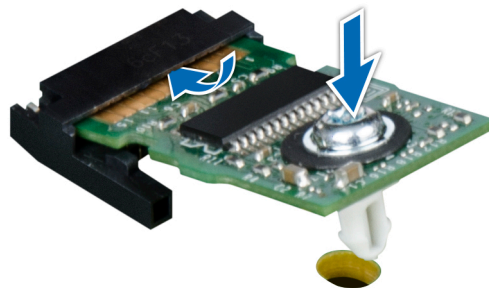


Figure 65. Installing the TPM

## Next steps

1. Install the system board.
2. Follow the procedures in [After working inside your system](#).

# Initializing the TPM 1.2 for TXT users

## Steps

1. While booting your system, press F2 to enter System Setup.
2. On the **System Setup Main Menu** screen, click **System BIOS > System Security Settings**.
3. From the **TPM Security** option, select **On with Pre-boot Measurements**.

4. From the **TPM Command** option, select **Activate**.
5. Save the settings.
6. Restart your system.
7. Enter **System Setup** again.
8. On the **System Setup Main Menu** screen, click **System BIOS > System Security Settings**.
9. From the **Intel TXT** option, select **On**.

## Initializing the TPM 2.0 for TXT users

### Steps

1. While booting your system, press F2 to enter System Setup.
2. On the **System Setup Main Menu** screen, click **System BIOS > System Security Settings**.
3. From the **TPM Security** option, select **On**.
4. Save the settings.
5. Restart your system.
6. Enter **System Setup** again.
7. On the **System Setup Main Menu** screen, click **System BIOS > System Security Settings**.
8. Select the **TPM Advanced Settings** option.
9. From the **TPM2 Algorithm Selection** option, select **SHA256**, then go back to **System Security Settings** screen.
10. On the **System Security Settings** screen, from the **Intel TXT** option, select **On**.
11. Save the settings.
12. Restart your system.


## Control panels

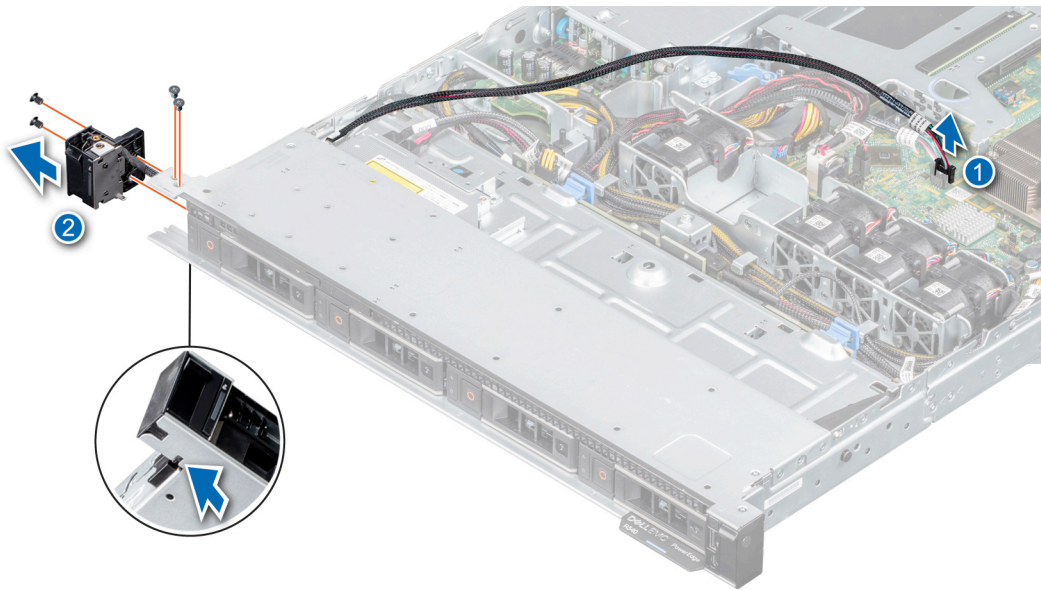
### Removing the left control panel

#### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).

#### Steps

1. Disconnect the control panel cable from the system board connector.  
 **NOTE:** Observe the routing of the cable as you remove it from the system.
2. Using the appropriate screwdriver, loosen the screws that secure the left control panel.
3. Hold the left control panel assembly and remove it from the system.



**Figure 66. Removing the left control panel**

#### **Next steps**

1. [Install the left control panel](#)
2. Follow the procedures in [After working inside your system.](#)

## **Installing the left control panel**

#### **Prerequisites**

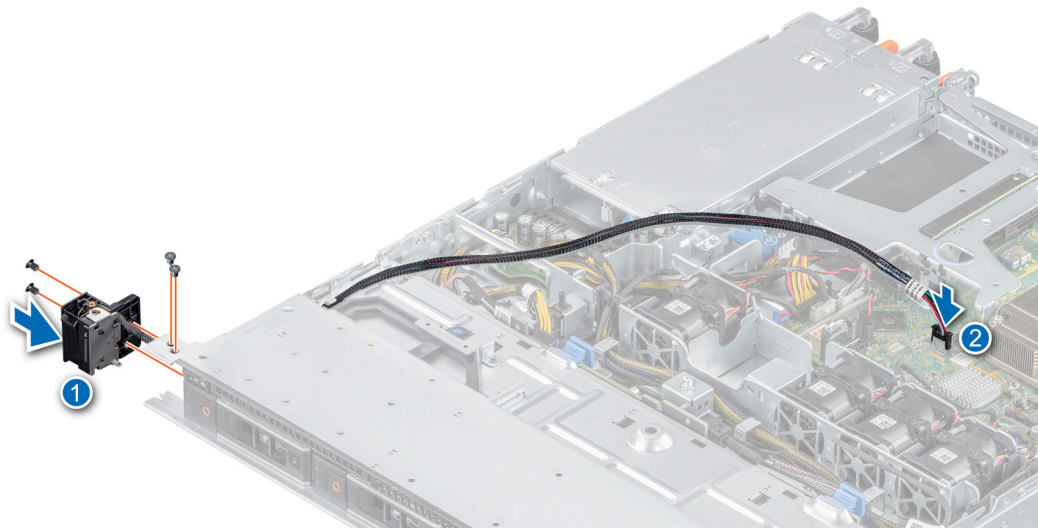
1. Follow the safety guidelines listed in [Safety instructions.](#)
2. Follow the procedures in [Before working inside your system.](#)

#### **Steps**

1. Route the control panel cable through the side wall and the guide slots in the system and connect it to the system board.

**i** **NOTE:** Route the cable properly to prevent the cable from being pinched or crimped.

2. Align and insert the left control panel assembly in the slot on the system.
3. Using the appropriate screwdriver, tighten the screws that secure the left control panel.



**Figure 67. Installing the left control panel**

### Next steps

1. Follow the procedures in [After working inside your system](#).

## Removing the right control panel

### Prerequisites

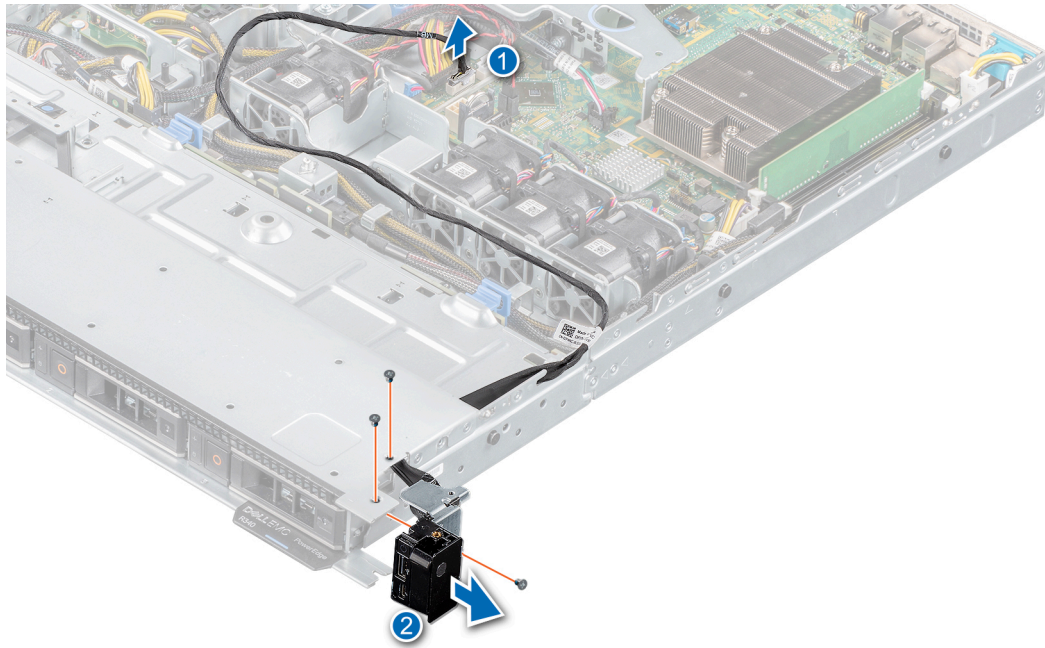
1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedures in [Before working inside your system](#).

### Steps

1. Disconnect the control panel cable from the connector on the system board.

**NOTE:** Observe the routing of the cable as you remove it from the system.

2. Using the appropriate screwdriver, remove the screws that secure the right control panel.
3. Hold the right control panel assembly and remove it from the system.



**Figure 68. Removing the right control panel**

#### Next steps

1. [Install the right control panel](#)

## Installing the right control panel

#### Prerequisites

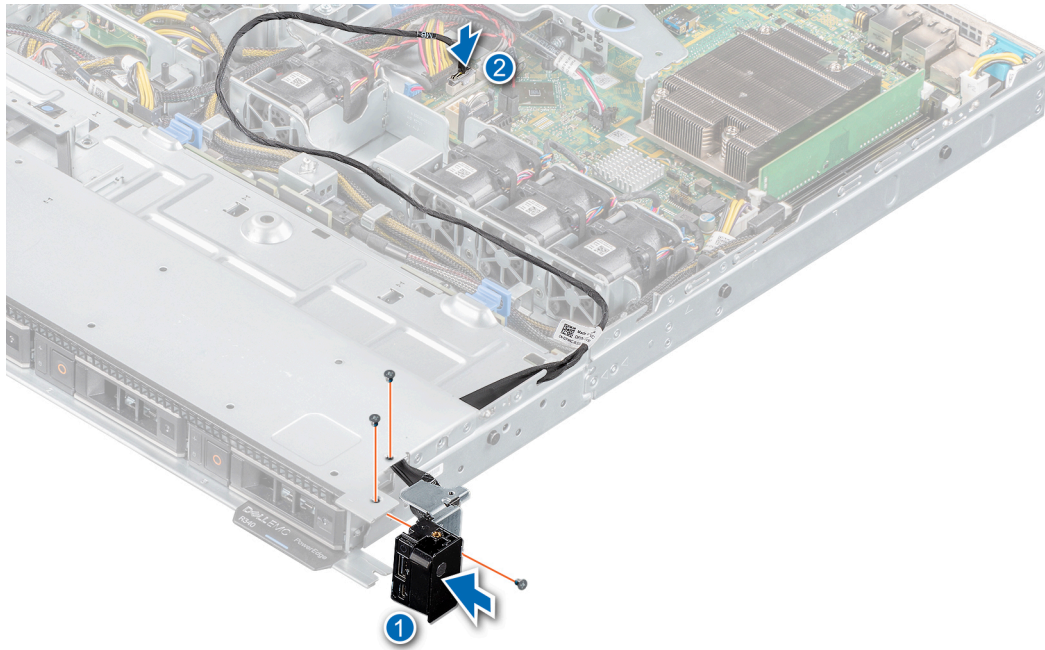
1. Follow the safety guidelines listed in [Safety instructions](#).

#### Steps

1. Route the control panel cable through the side wall and the guide slots in the system.

**NOTE:** Route the cable properly to prevent the cable from being pinched or crimped.

2. Align and insert the right control panel assembly in the slot on the system.
3. Using the appropriate screwdriver, tighten the screws that secure the right control panel.
4. Connect the control panel cable to the connector on the system board.



**Figure 69. Installing the right control panel**

**Next steps**

1. Follow the procedures in [Before working inside your system.](#)

# Getting help

This section provides information about how to contact Dell technical support, how to access information using the system QR code, and documentation resources available from Dell.

## Topics:

- [Contacting Dell EMC](#)
- [Accessing system information using the QRL](#)
- [Receiving automated support with SupportAssist](#)

## Contacting Dell EMC

Dell EMC provides several online and telephone based support and service options. If you do not have an active internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell EMC product catalog. Availability varies by country and product, and some services may not be available in your area. To contact Dell EMC for sales, technical assistance, or customer service issues:

### Steps

1. Go to **Dell.com/support/home**.
2. Select your country from the drop-down menu on the lower right corner of the page.
3. For customized support:
  - a. Enter your system Service Tag in the **Enter your Service Tag** field.
  - b. Click **Submit**.  
The support page that lists the various support categories is displayed.
4. For general support:
  - a. Select your product category.
  - b. Select your product segment.
  - c. Select your product.  
The support page that lists the various support categories is displayed.
5. For contact details of Dell EMC Global Technical Support:
  - a. Go to **Dell.com/support/incidents-online**.
  - b. The **Contact Technical Support** page is displayed with details to call, chat, or e-mail the Dell EMC Global Technical Support team.

## Accessing system information using the QRL

You can use the Quick Resource Locator (QRL) to get immediate access to information about your system. The QRL is located on the top of the system cover and provides access to generic information about your system. To find information specific to your system, such as configuration and warranty, access the QR code located on the system Information tag.

### Prerequisites

Ensure that your mobile device has a QR code scanner installed.

The QRL includes the following information about your system:

- How-to videos
- Reference materials, including the Installation and Service Manual, LCD diagnostics, and mechanical overview
- A direct link to Dell to contact technical support and sales teams

## Steps

1. Go to <https://QRL.dell.com> and Browse to your specific product or,
2. Use your mobile device to scan the QR code on your system or use the QR code that is shown in the following figure:



Figure 70. QR code for NX440

## Receiving automated support with SupportAssist

Dell EMC SupportAssist is an optional Dell EMC Services offering that automates technical support for your Dell EMC system, storage, and networking devices. By installing and setting up a SupportAssist application in your IT environment, you can receive the following benefits:

- Automated issue detection — SupportAssist monitors your Dell EMC devices and automatically detects hardware issues, both proactively and predictively.
- Automated case creation — When an issue is detected, SupportAssist automatically opens a support case with Dell EMC Technical Support.
- Automated diagnostic collection — SupportAssist automatically collects system state information from your devices and uploads it securely to Dell EMC. This information is used by Dell EMC Technical Support to troubleshoot the issue.
- Proactive contact — A Dell EMC Technical Support agent contacts you about the support case and helps you resolve the issue.

The available benefits vary depending on the Dell EMC Service entitlement purchased for your device. For more information about SupportAssist, go to [Dell.com/SupportAssist](https://Dell.com/SupportAssist).

## Documentation resources

This section provides information about the documentation resources for your system.

Task	Document	Location
Setting up your system	For information about installing the system into a rack, see the Rack documentation included with your rack solution.  . For information about setting up your system, see the <i>Getting Started Guide</i> document that is shipped with your system	<a href="http://www.dell.com/storagemanuals">www.dell.com/storagemanuals</a>
Configuring your system	For information about configuring, managing, updating, and restoring the system, see the <i>PowerVault Network Attached Storage System using Windows Storage Server 2016 Administrator's Guide</i> .  For information about the iDRAC features, configuring and logging in to iDRAC, and managing your system remotely, see the <i>Integrated Dell Remote Access Controller User's Guide</i> .  For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the <i>RACADM Command Line Reference Guide for iDRAC</i> .  For information about updating drivers and firmware.	<a href="http://www.dell.com/storagemanuals">www.dell.com/storagemanuals</a>  <a href="http://www.dell.com/idracmanuals">www.dell.com/idracmanuals</a>  <a href="http://www.dell.com/idracmanuals">www.dell.com/idracmanuals</a>  <a href="http://www.dell.com/support/drivers">www.dell.com/support/drivers</a>
Managing your system	For information about the features of the Dell OpenManage Systems Management, see the <i>Dell OpenManage Systems Management Overview Guide</i> .  For information about setting up, using, and troubleshooting OpenManage, see the <i>Dell OpenManage Server Administrator User's Guide</i> .  For information about installing, using, and troubleshooting Dell OpenManage Enterprise, see the <i>Dell OpenManage Enterprise User's Guide</i> .  For information about installing and using Dell SupportAssist, see the <i>Dell EMC SupportAssist Enterprise User's Guide</i> .  For understanding the features of Dell Lifecycle Controller, see the <i>Dell Lifecycle Controller User's Guide</i> .  For information about enterprise systems management partner programs, see the <i>OpenManage Connections Enterprise Systems Management documents</i> .	<a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a> >OpenManage Enterprise  <a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a> >OpenManage Server Administrator  <a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a> >OpenManage Enterprise  <a href="http://www.dell.com/serviceabilitytools">www.dell.com/serviceabilitytools</a>  <a href="http://www.dell.com/idracmanuals">www.dell.com/idracmanuals</a>  <a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a>

<b>Task</b>	<b>Document</b>	<b>Location</b>
	For information about connections and client systems management, see the OpenManage Connections Client Systems Management documentation.	<a href="http://www.dell.com/dellclientcommandsuite/manuals">www.dell.com/dellclientcommandsuite/manuals</a>
Working with the Dell EMC PowerEdge RAID controllers	For information about understanding the features of the Dell PowerEdge RAID controllers (PERC) and deploying the PERC cards, see the Storage controller documentation.	<a href="http://www.dell.com/storagecontroller/manuals">www.dell.com/storagecontroller/manuals</a>
Understanding event and error messages	For information about the event and error messages that are generated by the system firmware and agents that monitor system components, see the Error Code Lookup.	<a href="http://www.dell.com/qr1">www.dell.com/qr1</a>
Troubleshooting your system	For information about troubleshooting the hardware issues, see the <i>PowerVault Network Attached Storage Systems using Windows Storage Server 2016 Troubleshooting Guide</i> .	<a href="http://www.dell.com/storage/manuals">www.dell.com/storage/manuals</a>