

# Dell PowerEdge C6320

## Owner's 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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# Dell PowerEdge C6320 product overview

The **Dell PowerEdge C6320** is an ultra-dense 2U server that can support up to four independent two-socket (2S) servers. Each independent server features dual Intel Xeon E5-2600v3 or Intel Xeon E5-2600v4 series processors with up to 22 cores, C612 chipset for I/O connectivity, DDR4 memory, dual-port embedded 10 Gigabit Ethernet controllers (SFP+), and integrated iDRAC8 systems management with a dedicated RJ45 connection.

## Topics:

- [Supported configurations for PowerEdge C6320 system](#)
- [Accessing system features during startup](#)
- [Front panel features and indicators](#)
- [Hard drive indicator patterns](#)
- [Back panel features and indicators](#)
- [LAN indicator codes](#)
- [Power and system board indicator codes](#)
- [Power Supply Unit indicator codes](#)
- [Baseboard Management Controller \(BMC\) heart beat LED](#)
- [System configuration limitations by Intel Xeon processor E5-2600 v3 and E5-2600 v4 product family](#)
- [Locating your system Service Tag](#)

## Supported configurations for PowerEdge C6320 system

The Dell PowerEdge C6320 system supports the following configurations:

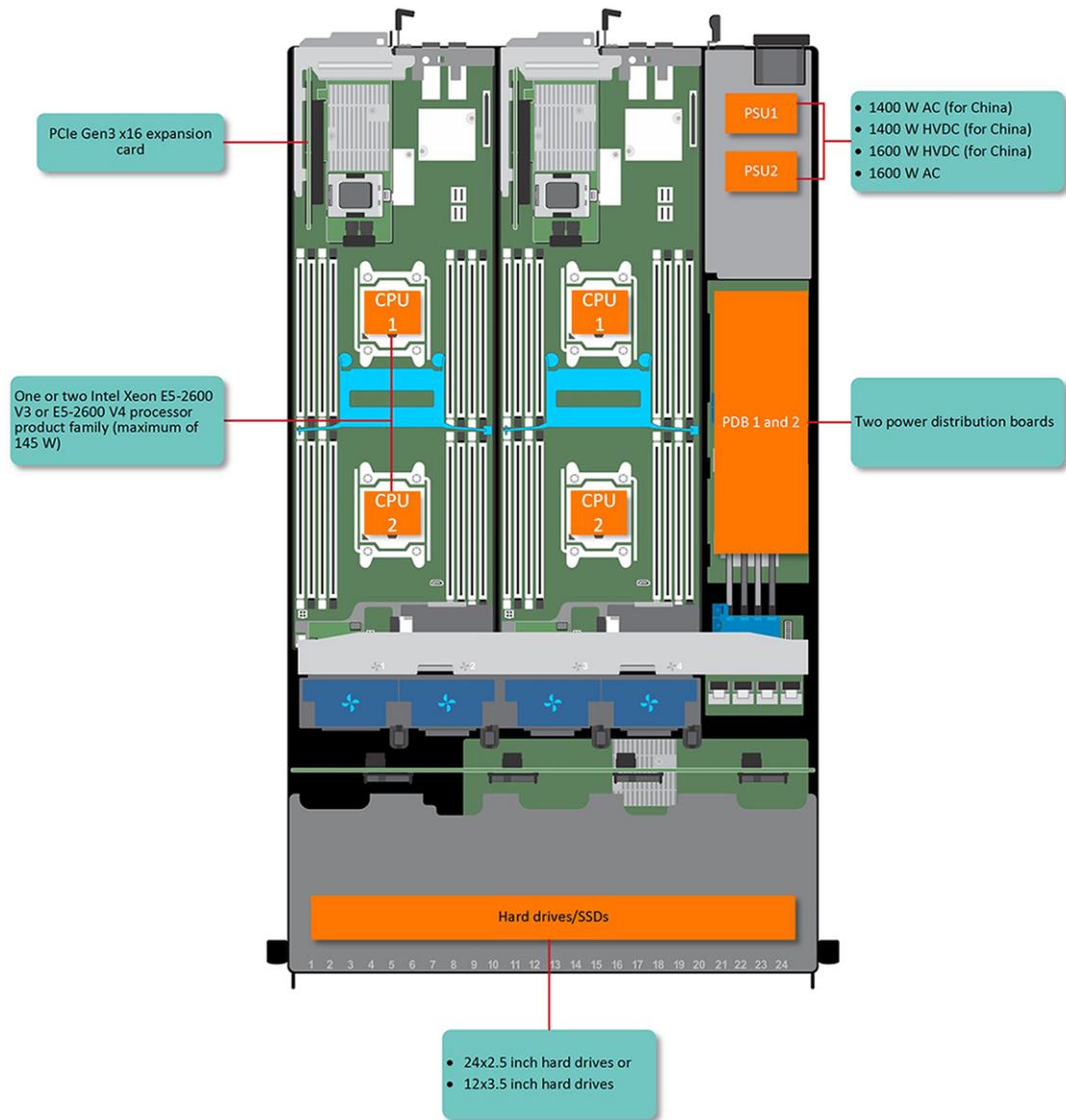


Figure 1. Supported configurations for C6320

## Accessing system features during startup

The following keystrokes provide access to system features during startup.

**NOTE:** The hot keys of SAS or SATA card or PXE support are available in BIOS boot mode only. There is no hot key to boot in the UEFI mode.

| Keystroke      | Description  |
|----------------|--|
| <b>F2</b>      | Enters the System Setup program.   |
| <b>F11</b>     | Enters the BIOS Boot Manager.  |
| <b>F12</b>     | Starts Preboot eXecution Environment (PXE)/iSCSI boot.   |
| <b>Ctrl +C</b> | Enters the LSI 2008 SAS Mezzanine Card Configuration Utility. For more information, see the SAS adapter documentation. |
| <b>Ctrl+R</b>  | Enters the PERC 9 Card Configuration Utility. For more information, see the documentation for your SAS RAID card.      |

| Keystroke | Description   |
|-----------|---|
| Ctrl+Y    | Enters the MegaPCLSI SAS RAID Management Tool.  |
| Ctrl+S    | Enters the utility to configure onboard LAN settings for PXE boot. For more information, see the documentation for your integrated LAN. |
| Ctrl+I    | Enters onboard SATA Controller's Configuration Utility.   |
| Ctrl+D    | Enters the Intel iSCSI setup menu.  |

## Front panel features and indicators

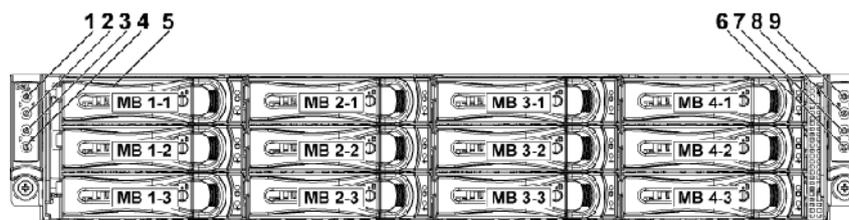


Figure 2. Front panel – 3.5-inch x12 hard drives with four system boards (C6320 RAID card and onboard SATA controller)

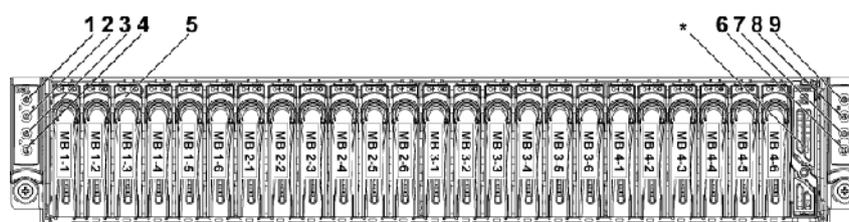


Figure 3. Front panel – 2.5-inch x24 hard drives with four system boards (C6320 RAID card and onboard SATA controller)

**NOTE:** For more information about the direction details of the 2.5-inch hard drive expander configuration support, see the HDD Zoning configuration tool at [Dell.com/support](http://Dell.com/support).

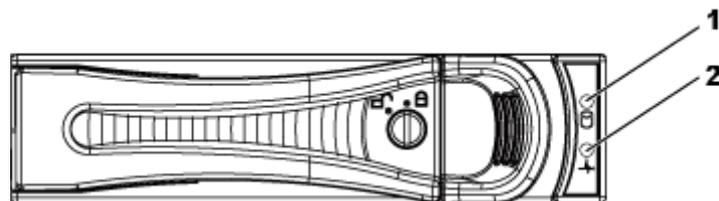
Table 1. Front panel features and indicators

| Item | Indicator, button or connector  | Icon | Description   |
|------|---|------|---|
| 1    | Power-on indicator or system state indicator or power button for system board 1 |      | <p>The power-on indicator turns to green when the system power is on.</p> <p>The power-on indicator turns to amber when the system critical event occurs.</p> <p>The power button controls the DC power supply output to the system.</p> <p><b>NOTE:</b> When turning on the system, the video monitor can take from several seconds to over two minutes to display an image, depending on the number and capacity of DIMMs installed in the system.</p> <p><b>NOTE:</b> On ACPI-compliant operating systems (OSs), turning off the system by using the power button causes the system to perform a graceful shutdown before power to the system is turned off.</p> |
| 3    | Power-on indicator or system state indicator or power button for system board 2 |      |   |
| 7    | Power-on indicator or system state indicator or power button for system board 4 |      |   |
| 9    | Power-on indicator or system state indicator or power button for system board 3 |      |   |

**Table 1. Front panel features and indicators (continued)**

| Item | Indicator, button or connector                               | Icon  | Description  |
|------|--|---|--|
|      |  |   | <b>NOTE:</b> To force an ungraceful shutdown, press and hold the power button for 5 seconds.   |
| 2    | System identification indicator or button for system board 1 |  | The identification button can be used to locate a particular system and system board within a chassis. When the button is pushed, the blue status indicator of the system on the front and rear blinks until the button is pushed again. |
| 4    | System identification indicator or button for system board 2 |   |  |
| 6    | System identification indicator or button for system board 4 |   |  |
| 8    | System identification indicator or button for system board 3 |   |  |
| 5    | Hard drives  |   | Up to 12 hot swappable 3.5-inch hard drives.<br>Up to 24 hot swappable 2.5-inch hard drives.   |
| *    | Drive cover  |   | Applicable only for 2.5-inch hard drive systems. This is not a usable drive slot.  |

## Hard drive indicator patterns



**Figure 4. 3.5-inch hard drive indicators**

1. hard drive activity indicator (green)
2. hard drive status indicator (green and amber)



**Figure 5. 2.5-inch hard drive indicators**

1. hard drive status indicator (green and amber)
2. hard drive activity indicator (green)

**Table 2. Hard drive indicator patterns**

| Controller         | Hard drive type | Function                               | Activity LED             | Status LED                             |   |
|--------------------|-----------------|--|--------------------------|--|---|
|                    |                 |  | Green                    | Green                                  | Amber                                   |
| Onboard Controller | SATA2           | Drive on-line                          | Off/Blinking when active | On                                     | Off                                     |
|                    |                 | Fail                                   | Off                      | On                                     | Off                                     |
| PERC 9/LSI 2008    | SAS/SATA2       | Slot Empty                             | Off                      | Off                                    | Off                                     |
|                    |                 | Drive on-line/<br>Access               | Blinking when active     | On                                     | Off                                     |
|                    |                 | Drive identify/<br>prepare for removal | Blinking when active     | On 250 ms<br>Off 250 ms                | Off                                     |
|                    |                 | Drive Failed                           | Off                      | Off                                    | On 150 ms<br>Off 150 ms                 |
|                    |                 | Drive Rebuild                          | Blinking when active     | On 400 ms<br>Off 100 ms                | Off                                     |
|                    |                 | Predicted Failure (SMART)              | Blinking when active     | On 500 ms<br>Off 500 ms<br>Off 1000 ms | Off 500 ms<br>On 500 ms<br>Off 1000 ms  |
|                    |                 | Rebuild Abort                          | Off                      | On 3000 ms<br>Off 9000 ms              | Off 6000 ms<br>On 3000 ms<br>Off 000 ms |

# Back panel features and indicators

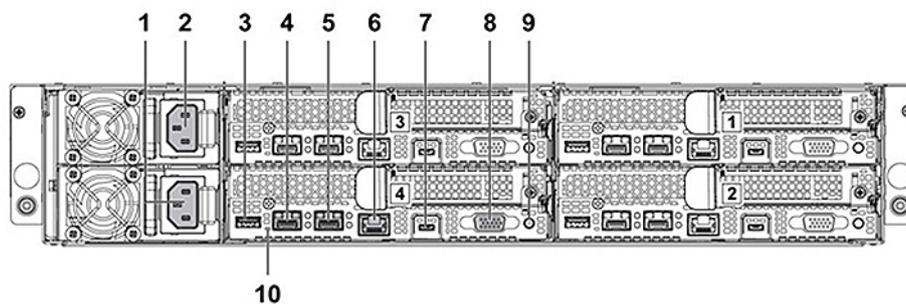


Figure 6. Back panel with four system boards

Table 3. Back panel features and indicators

| Item | Indicator, button, or connector   | Icon  | Description   |
|------|-----------------------------------|---|---|
| 1    | PSU 2                             |   | Up to 1400 W AC, 1600 W AC, or 1400 HVDC PSUs.  |
| 2    | PSU 1                             |   | Up to 1400 W AC, 1600 W AC, or 1400 HVDC PSUs.  |
| 3    | USB port                          |    | Enables you to connect USB devices to the system. The ports are USB 3.0-compliant.  |
| 4    | Ethernet connector                |  | 10G NIC 1 connector.  |
| 5    | Ethernet connector                |  | 10G NIC 2 connector.  |
| 6    | Management port                   |  | Dedicated management port.  |
| 7    | USB to serial port                |  | Connects the system to a host.  |
| 8    | VGA port                          |  | Connects a VGA display to the system.   |
| 9    | Power button/power and system LED |  | <p>The power-on indicator glows green when the system power is on.</p> <p>The power-on indicator turns amber when the system critical event occurs.</p> <p>The power button controls the DC PSU output to the system.</p> <p><b>i NOTE:</b> When turning on the system, the video monitor can take from several seconds to over two minutes to display an image, on the basis of the disk space available in the system.</p> <p><b>i NOTE:</b> On ACPI-compliant operating systems, turning off the system by using the power button causes the system to perform a</p> |

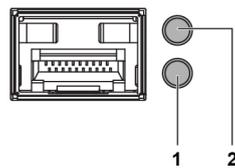
**Table 3. Back panel features and indicators (continued)**

| Item | Indicator, button, or connector | Icon | Description  |
|------|---------------------------------|------|--|
|      |                                 |      | <p>graceful shutdown before the system is turned off.</p> <p><b>NOTE:</b> To force an ungraceful shutdown, press and hold the power button for five seconds.</p>   |
| 10   | System identification indicator |      | <p>The management software of both the systems and the identification buttons on the front can cause the indicator to flash blue to identify a particular system and system board. Indicators turn amber when the system requires attention because of an issue.</p> |

## LAN indicator codes



**Figure 7. LAN indicators on the QSFP carrier card**



**Figure 8. LAN indicators**

1. activity indicator
2. link and network speed indicator

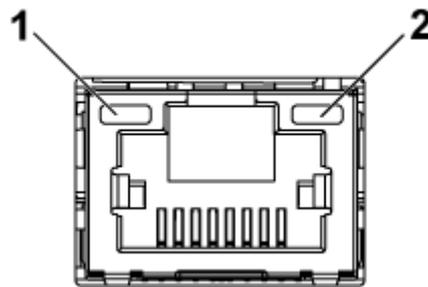
**NOTE:** The LED blink speed varies according to the traffic bandwidth.

**Table 4. LAN indicator codes**

| Component                        | Indicator   | Condition                |
|----------------------------------|-------------|--------------------------|
| Link and network speed indicator | Solid amber | Linking at 1 Gbps speed  |
|                                  | Solid green | Linking at 10 Gbps speed |

**Table 4. LAN indicator codes (continued)**

| Component          | Indicator      | Condition   |
|--------------------|----------------|---|
| Activity indicator | Blinking green | Activity is present: <ul style="list-style-type: none"> <li>• Pre OS POST</li> <li>• OS without driver</li> <li>• OS with driver</li> </ul> Blinking at speed relative to packet density. |
|                    | Off            | No link/activity present <ul style="list-style-type: none"> <li>• D0 (uninitialized)</li> <li>• D3 (cold)</li> <li>• S4 (hibernation)</li> </ul>  |



**Figure 9. LAN indicators (management port)**

1. speed indicator
2. link and activity indicator

**Table 5. LAN indicators (management port)**

| Component                   | Indicator      | Condition                    |
|-----------------------------|----------------|------------------------------|
| Speed indicator             | Solid green    | Linking at 1 Gbps speed      |
|                             | Solid amber    | Linking at 10/100 Mbps speed |
| Link and activity indicator | Off            | No access or Idle            |
|                             | Blinking green | LAN access or Link up        |

## Power and system board indicator codes

The LEDs on the system front panel and back panel display status codes during system startup and operation. For location of the LEDs on the front panel, see the Front panel features and indicators section. For location of the LEDs on the back panel, see the Back panel features and indicators section.

**Table 6. Status indicator codes**

| Component   | Indicator |          | Condition  |
|---|-----------|----------|--|
| Power-on indicator (A bi-color LED on power button) | Green     | Solid    | Power On (S0)  |
|   | Amber     | Off      |  |
|   | Green     | Off      | BMC critical condition event in Power Off mode (S4/S5) |
|   | Amber     | Blinking |  |
|   | Green     | Off      | BMC critical condition event in Power On mode (S0)     |
|   | Amber     | Blinking |  |

**Table 6. Status indicator codes (continued)**

| Component                       | Indicator     | Condition   |
|---------------------------------|---------------|---|
| System identification indicator | Steady blue   | IPMI using Chassis Identify Command On or ID Button Press ID On   |
|                                 | Blinking blue | Only IPMI using Chassis Identify Command Blink On                 |
|                                 | Off           | IPMI using Chassis Identify Command Off or ID Button Press ID Off |

**Related references**

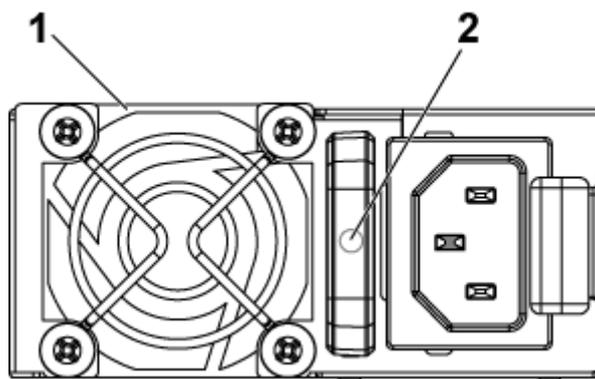
[Front panel features and indicators](#) on page 10

[Back panel features and indicators](#) on page 13

## Power Supply Unit indicator codes

Each AC power supply unit (PSU) has an illuminated translucent handle that indicates whether power is present or whether a power fault has occurred.

### 1400 W AC or HVDC Power supply units



**Figure 10. PSU status indicators**

1. PSU
2. AC power indicator

**Table 7. 1400 W AC/1400 W HVDC PSUs indicators**

| Component                | Indicator      | Indicator                 |
|--------------------------|----------------|---------------------------|
| AC or DC power indicator | Solid amber    | Fault (fault of any kind) |
|                          | Solid green    | DC_OK (power good)        |
|                          | Blinking green | AC_OK                     |

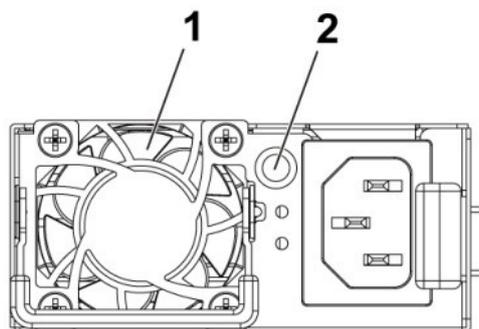
**Table 8. 1400 W AC or HVDC PSU indicators**

| Power Indicator Pattern | Condition   |
|-------------------------|---|
| Green                   | A valid power source is connected to the PSU and the PSU is operational.  |
| Flashing green          | When the PSU firmware is being updated, the PSU LED flashes green.<br><b>CAUTION: Do not disconnect the power cord or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs will not function.</b> |

**Table 8. 1400 W AC or HVDC PSU indicators (continued)**

| Power Indicator Pattern      | Condition   |
|------------------------------|---|
|                              | <p><b>You must roll back the PSU firmware by using Dell Lifecycle Controller. For more information, see Dell Lifecycle Controller User’s Guide at <a href="http://Dell.com/idracmanuals">Dell.com/idracmanuals</a>.</b></p>   |
| Flashing green and turns off | <p>When hot-adding a PSU, the PSU LED flashes green five times at 4 Hz rate and turns off. This indicates that there is a PSU mismatch with respect to efficiency, feature set, health status, and supported voltage.</p> <p><b>i NOTE:</b> Ensure that both the PSUs are of the same capacity.</p> <p><b>i NOTE:</b> Mixing PSUs from previous generations of Dell PowerEdge servers can result in a PSU mismatch condition and failure to turn the system on.</p>   |
| Flashing amber               | <p>Indicates a problem with the PSU.</p> <p><b>⚠ CAUTION:</b> When correcting a PSU mismatch, replace only the PSU with the flashing indicator. Swapping the other 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.</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> <p><b>⚠ CAUTION:</b> Combining AC and DC PSUs is not supported and triggers a mismatch.</p> |
| Not lit                      | Power is not connected.   |

## 1600 W AC or HVDC Power supply unit



**Figure 11. Power supply unit (PSU ) status indicator**

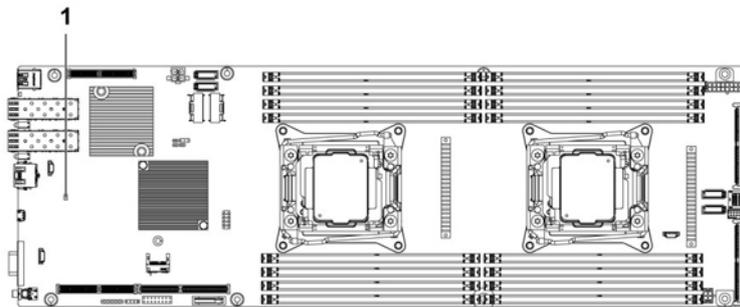
1. PSU
2. AC power indicator

**Table 9. 1600 W AC/1600 W HVDC PSU indicators**

| Component          | Indicator      | Condition   |
|--------------------|----------------|---|
| AC power indicator | Solid amber    | Standby mode with Fan Lock for 15 seconds.<br>Standby mode with OTP range<br>Active mode with +12 V DC Fault<br>Active mode with Fan Lock for 15 seconds. |
|                    | Solid green    | DC_OK (power good)  |
|                    | Blinking green | Standby mode normal   |
|                    | Off            | Unit without AC power   |

## Baseboard Management Controller (BMC) heart beat LED

The system board provides BMC heart beat LED (CR17) for BMC debugging. The BMC heart beat LED is green. When the power is connected, the LED is on. When BMC firmware is ready, the BMC heart beat LED blinks.



**Figure 12. BMC heart beat LED on the C6320 system board**

1. BMC heart beat LED

## System configuration limitations by Intel Xeon processor E5-2600 v3 and E5-2600 v4 product family

**NOTE:** Certain system hardware configurations may require reductions in the upper temperature limits.

**NOTE:** System performance may be impacted when operating above 30°C or with a fan fault.

**Table 10. Configuration restrictions with Intel Xeon processor E5-2600 v3 and E5-2600 v4 product family**

| Processor                          | 3.5-inch hard drive chassis   | 2.5-inch hard drive chassis   |
|------------------------------------|-------------------------------|-------------------------------|
| 55 W<br>E5-2630L v3<br>E5-2630L v4 | No configuration restrictions | No configuration restrictions |

**Table 10. Configuration restrictions with Intel Xeon processor E5-2600 v3 and E5-2600 v4 product family (continued)**

| Processor   | 3.5-inch hard drive chassis      | 2.5-inch hard drive chassis      |
|---|----------------------------------|----------------------------------|
| 60 W<br>E5-2650L v3   |                                  |                                  |
| 65 W<br>E5-2650L v4   |                                  |                                  |
| 85 W<br>E5-2603 v3<br>E5-2630 v3<br>E5-2620 v3<br>E5-2630 v4<br>E5-2623 v4<br>E5-2620 v4<br>E5-2609 v4<br>E5-2603 v4  |                                  |                                  |
| 90 W<br>E5-2640 v3<br>E5-2640 v4  |                                  |                                  |
| 105 W<br>E5-2660 v3<br>E5-2650 v3<br>E5-2623 v3<br>E5-2660 v4<br>E5-2650 v4   |                                  |                                  |
| 120 W<br>E5-2683 v3<br>E5-2685 v3<br>E5-2695 v3<br>E5-2680 v3<br>E5-2670 v3<br>E5-2695 v4<br>E5-2683 v4<br>E5-2680 v4 | PERC H730 is not supported       | PERC H730 is not supported       |
| 135 W (16 cores and 12 cores)<br>E5-2698 v3<br>E5-2690 v3   | PERC H730/H330 are not supported | PERC H730/H330 are not supported |
| 135 W (14 cores and 20 cores)<br>E5-2698 v4<br>E5-2690 v4   | PERC H730/330 are not supported  |                                  |

**Table 10. Configuration restrictions with Intel Xeon processor E5-2600 v3 and E5-2600 v4 product family (continued)**

| Processor  | 3.5-inch hard drive chassis   | 2.5-inch hard drive chassis     |
|--|---|---------------------------------|
| 135 W (8 cores) and 145 W<br>E5-2667 v3  | <ul style="list-style-type: none"> <li>PERC H730/H330 are not supported</li> <li>Restricted to total 8 hard drives</li> </ul> |                                 |
| 145 W (14 cores)<br>E5-2697 v3   |   |                                 |
| 145 W (18 cores)<br>E5-2699 v3   |   |                                 |
| 135W (8/6/4 cores) and 145W<br>(22/18/16 cores)<br>E5-2667 v4<br>E5-2643 v4<br>E5-2637 v4<br>E5-2699 v4<br>E5-2697 v4<br>E5-2697A v4 | <ul style="list-style-type: none"> <li>PERC H730/H330 are not supported</li> <li>Restricted to total 8 hard drives</li> </ul> | PERC H730/330 are not supported |

**Table 11. Fresh air cooling configuration restrictions**

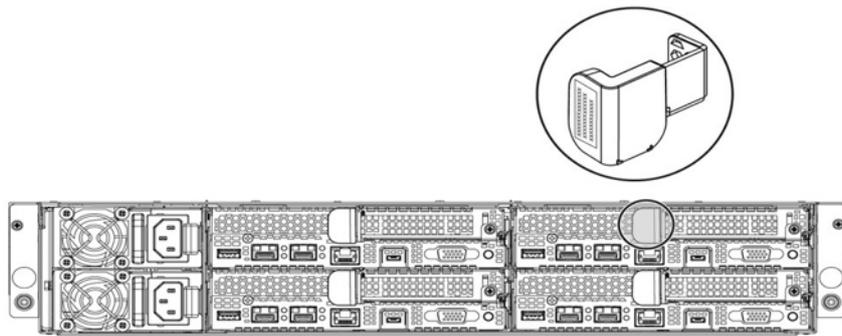
| Processor  | 3.5-inch hard drive chassis | 2.5-inch hard drive chassis |
|--|-----------------------------|-----------------------------|
| 55W<br>E5-2630L v4   | PERC H730 is not supported  | PERC H730 is not supported  |
| 65W<br>E5-2650L v4   |                             |                             |
| 85 W<br>E5-2630 v3<br>E5-2620 v3<br>E5-2603 v3<br>E5-2630 v4<br>E5-2623 v4<br>E5-2620 v4<br>E5-2609 v4<br>E5-2603 v4 |                             |                             |
| 90 W<br>E5-2640 v3<br>E5-2640 v4   |                             |                             |
| 105 W<br>E5-2660 v3<br>E5-2650 v3<br>E5-2623 v3<br>E5-2660 v4  |                             |                             |

**Table 11. Fresh air cooling configuration restrictions (continued)**

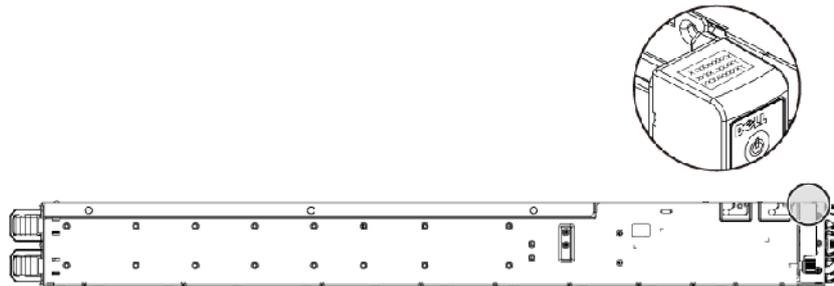
| <b>Processor</b>  | <b>3.5-inch hard drive chassis</b>                                 | <b>2.5-inch hard drive chassis</b>                                  |
|---|--|---|
| E5-2650 v4  |  |   |
| 120 W<br>E5-2695 v3<br>E5-2680 v3<br>E5-2670 v3<br>E5-2695 v4<br>E5-2683 v4<br>E5-2680 v4   | Support maximum 8x hard drives<br>PERC H730/H330 are not supported | Support maximum 12x hard drives<br>PERC H730/H330 are not supported |
| 135 W (16 cores and 12 cores)<br>E5-2698 v3<br>E5-2690 v3   | Not supported  | Not supported   |
| 135 W (20 cores and 14 cores)<br>E5-2698 v4<br>E5-2690 v4   |  |   |
| 135 W (8 cores) and 145 W<br>E5-2699 v3   |  |   |
| 145 W (14 cores)<br>E5-2697 v3  |  |   |
| 135W (8/6/4 cores) and 145W (22/18/16 cores)<br>E5-2667 v4<br>E5-2643 v4<br>E5-2637 v4<br>E5-2699 v4<br>E5-2697 v4<br>E5-2697A v4 |  |   |

## Locating your system Service Tag

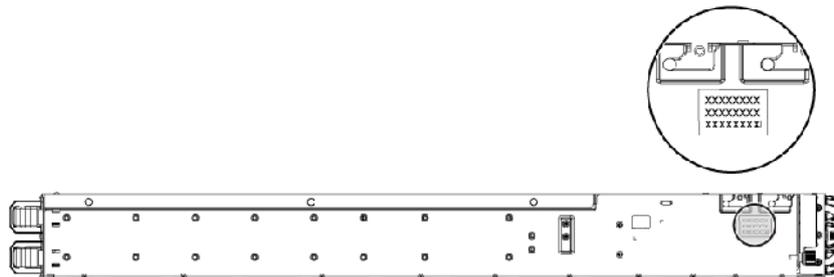
Your system is identified by a unique Express Service Code and Service Tag number. The Express Service Code is found on the front of the system and Service Tag is found on the front of the system. Alternatively, the information may be on a sticker on the chassis of the system. This information is used by Dell to route support calls to the appropriate personnel. The Service Tag locations on the chassis are as follows:



**Figure 13. Service Tag location**

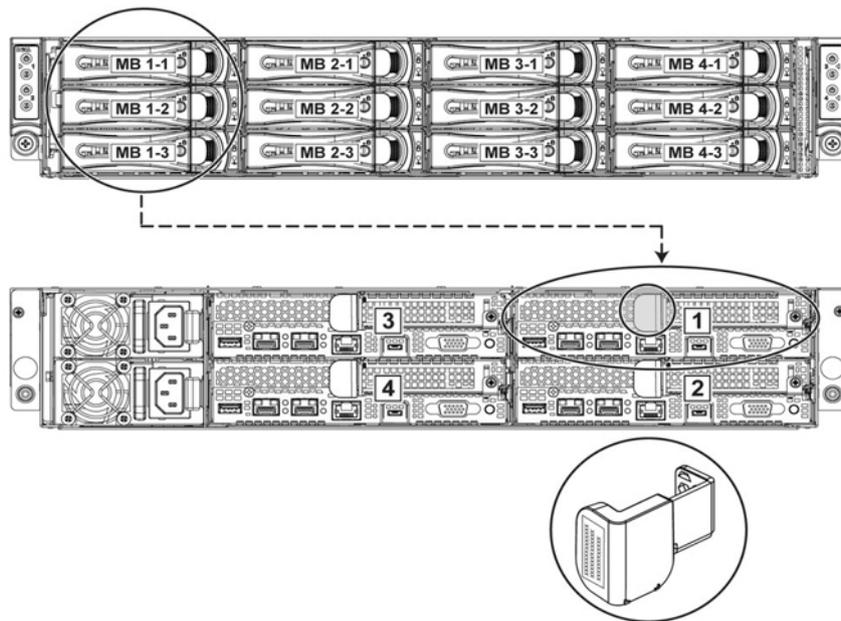


**Figure 14. Service Tag location on the left front panel**



**Figure 15. Service Tag location on the chassis**

Hard drives under warranties are linked to each node with an appropriate service tag. The linked hard drives with the node is shown in the below figure.



**Figure 16. Service Tag linkage**

**NOTE:** Hard drives that are under warranty are linked to the appropriate Service Tag of the node.

## Documentation resources

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

To view the document that is listed in the documentation resources table:

- From the Dell EMC support site:
  1. Click the documentation link that is provided in the Location column in the table.
  2. Click the required product or product version.
  3. On the Product Support page, click **Manuals & documents**.
- Using search engines:
  - Type the name and version of the document in the search box.

 **NOTE:** To locate the product name and model, see the front of your system.

**Table 12. Additional 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 or the <i>Getting Started Guide</i> document that is shipped with your system.   | <a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a> |
| Configuring your system | For information about the iDRAC features, configuring and logging in to iDRAC, and managing your system remotely, see the Integrated Dell Remote Access Controller User's Guide.<br><br>For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM CLI Guide for iDRAC.<br><br>For information about Redfish and its protocol, supported schema, and Redfish Eventing are implemented in iDRAC, see the Redfish API Guide.<br><br>For information about iDRAC property database group and object descriptions, see the Attribute Registry Guide. | <a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a> |
|                         | For information about earlier versions of the iDRAC documents, see the iDRAC documentation.<br><br>To identify the version of iDRAC available on your system, on the iDRAC web interface, click <b>? &gt; About</b> .   | <a href="http://www.dell.com/idracmanuals">www.dell.com/idracmanuals</a>         |

**Table 12. Additional documentation resources for your system (continued)**

| Task                                   | Document   | Location   |
|--|--|--|
|  | For information about installing the operating system, see the operating system documentation.   | <a href="http://www.dell.com/operatingsystemmanuals">www.dell.com/operatingsystemmanuals</a>   |
|  | For information about updating drivers and firmware, see the Methods to download firmware and drivers section in this document.                                    | <a href="http://www.dell.com/support/drivers">www.dell.com/support/drivers</a>   |
| Managing your system                   | For information about systems management software offered by Dell, see the Dell OpenManage Systems Management Overview Guide.                                      | <a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a>   |
|  | For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User's Guide.                                | <a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a> > OpenManage Server Administrator   |
|  | For information about installing, using, and troubleshooting Dell OpenManage Essentials, see the Dell OpenManage Essentials User's Guide.                          | <a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a> > OpenManage Essentials   |
|  | For information about installing, using, and troubleshooting Dell OpenManage Enterprise, see the Dell OpenManage Enterprise User's Guide.                          | <a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a> > OpenManage Enterprise   |
|  | For information about installing and using Dell SupportAssist, see the Dell EMC SupportAssist Enterprise User's Guide.   | <a href="https://www.dell.com/serviceabilitytools">https://www.dell.com/serviceabilitytools</a>  |
|  | For information about partner programs enterprise systems management, see the OpenManage Connections Enterprise Systems Management documents.                      | <a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a>   |
|  | Working with the Dell PowerEdge RAID controllers   | For information about understanding the features of the Dell PowerEdge RAID controllers (PERC), Software RAID controllers, or BOSS card and deploying the cards, see the Storage controller documentation. |
| 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/qrl">www.dell.com/qrl</a>   |
| Troubleshooting your system            | For information about identifying and troubleshooting the  | <a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a>   |

**Table 12. Additional documentation resources for your system (continued)**

| <b>Task</b> | <b>Document</b>  | <b>Location</b> |
|-------------|--|-----------------|
|             | PowerEdge server issues, see the Server Troubleshooting Guide. |                 |

# Technical specifications

The technical and environmental specifications of your system are outlined in this section.

## Topics:

- Chassis dimensions
- Processor specifications
- PSU specifications
- System battery specifications
- Memory specifications
- Environmental specifications

## Chassis dimensions

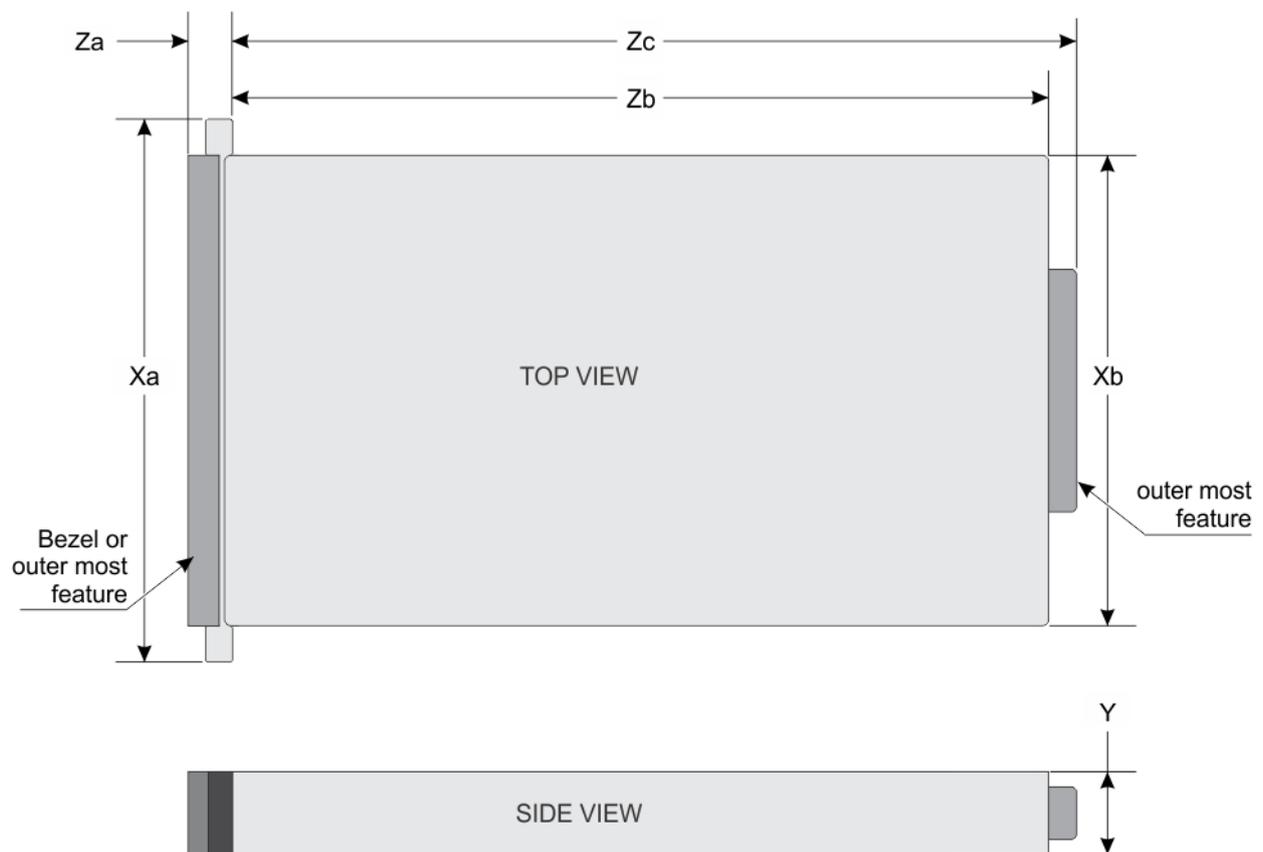


Figure 17. Chassis dimensions of PowerEdge C6300 enclosure

Table 13. Dimensions of the Dell PowerEdge C6300 enclosure

| Xa       | Xb       | Y       | Za (with bezel) | Za (without bezel) | Zb       | Zc       |
|----------|----------|---------|-----------------|--------------------|----------|----------|
| 482.3 mm | 448.0 mm | 86.8 mm | N/A             | 41.4 mm            | 762.1 mm | 795.9 mm |

## Processor specifications

Dell PowerEdge C6320 supports up to two Intel Xeon E5-2600 v3 or Intel Xeon E5-2600 v4 product family processors in four independent servers.

## PSU specifications

Dell PowerEdge C6320 system supports up to two AC or HVDC power supply units (PSUs). Dell PowerEdge C6320 does not support a mixed installation of 1400 W and 1600 W power supply units. The 1400 W and 1600 W power supply units are hot swappable, and supports hot swap in any condition if the system has the power throttling feature enabled.

**Table 14. PSU specifications**

| PSU                          | Heat dissipation (maximum) | Frequency | Voltage                      | Maximum input current | Maximum inrush current (peak)  |
|------------------------------|----------------------------|-----------|------------------------------|-----------------------|--|
| 1400 W AC                    | 5220.763 BTU/hr            | 50/60 Hz  | 200-240 V AC                 | 9 A                   | Initial inrush current cannot exceed 55 A (peak).<br>Secondary inrush current cannot exceed 25 A (peak). |
| 1600 W AC                    | 5966.586 BTU/hr            | 50/60 Hz  | 100-120 V AC<br>200-240 V AC | 12 A<br>10 A          | Initial inrush current and secondary inrush current cannot exceed 35 A (peak).                           |
| 1400 W HVDC (for China only) | 5220.763 BTU/hr            | –         | 240 V DC                     | 9 A                   | Initial inrush current cannot exceed 55 A (peak).<br>Secondary inrush current cannot exceed 25 A (peak). |

## System battery specifications

Dell PowerEdge C6320 system supports CR 2032 3.0-V lithium coin cell battery.

## Memory specifications

Dell PowerEdge C6320 system supports DDR4 registered DIMMs (RDIMMs).

**Table 15. Memory specifications**

| Memory module sockets | Architecture   | Memory capacity                  | Minimum RAM | Maximum RAM  |
|-----------------------|--|----------------------------------|-------------|--------------|
| Sixteen 288-pin       | 1600 MT/s, 1866 MT/s, 2133 MT/s, or 2400 MT/s DDR4 Registered DIMMs with support for | 8 GB, 16 GB, and 32 GB dual-rank | 16 GB       | Up to 512 GB |

**Table 15. Memory specifications**

| Memory module sockets | Architecture                               | Memory capacity | Minimum RAM | Maximum RAM |
|-----------------------|--|-----------------|-------------|-------------|
|                       | advanced ECC or memory optimized operation |                 |             |             |

## Environmental specifications

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

**Table 16. Temperature specifications**

| Temperature  | Specifications  |
|--|---|
| Storage  | -40° to 65°C (-40° to 149°F) with a maximum temperature gradation of 20°C per hour. |
| Continuous operation (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.               |
| Fresh air  | For information on fresh air, see Expanded Operating Temperature section.           |
| Maximum temperature gradient (operating and storage)           | 20°C/h (36°F/h)   |

**Table 17. Expanded operating temperature specifications**

| Expanded operating temperature   | Specifications  |
|--|---|
| <p><b>NOTE:</b> When operating in the expanded temperature range, system performance may be impacted.</p> <p><b>NOTE:</b> When operating in the expanded temperature range, ambient temperature warnings may be reported on the LCD and in the System Event Log.</p> |   |
| Continuous operation   | <p>5°C to 40°C at 5% to 85% RH with 29°C dew point.</p> <p><b>NOTE:</b> Outside the standard operating temperature (10°C to 35°C), the system can operate down to 5°C or up to 40°C.</p> <p>For temperatures between 35°C and 40°C, de-rate maximum allowable dry bulb 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 26°C dew point.</p> <p><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 dry bulb temperature by 1°C per 125 m above 950 m (1°F per 228 ft).</p> |
| Expanded operating temperature restrictions  | <ul style="list-style-type: none"> <li>Do not perform a cold startup below 5 °C.</li> <li>Maximum 120 W processor is supported.</li> <li>Maximum of eight 3.5 inch or twelve 2.5 inch hard drives are supported with 120 W processor.</li> </ul> <p>The following do not support the expanded operating temperature range:</p>  |

**Table 17. Expanded operating temperature specifications (continued)**

| Expanded operating temperature | Specifications   |
|--------------------------------|--|
|                                | <ul style="list-style-type: none"> <li>• Dell PowerEdge RAID Controller (PERC) H730/H730P cards with CPU TDP <math>\geq</math> 85 W.</li> <li>• Dell PowerEdge RAID Controller (PERC) H330 card with CPU TDP <math>\geq</math> 120 W.</li> <li>• Non Dell-qualified peripheral cards and/or peripheral cards greater than 25 W are not supported.</li> </ul> |

**Table 18. Relative humidity specifications**

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

**Table 19. Maximum vibration specifications**

| Maximum vibration | Specifications                        |
|-------------------|---------------------------------------|
| Operating         | 0.26 Grms at 5–350 Hz                 |
| Storage           | 1.88 Grms at 10–500 Hz for 15 minutes |

**Table 20. Maximum shock specifications**

| Maximum shock | Specifications   |
|---------------|--|
| Operating     | One shock pulse in the positive z axis (one pulse on each side of the system) of 31 G for 2.6 ms in the operational orientation.   |
| Storage       | <p>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</p> <p>Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 27 G faired square wave pulse with velocity change at 235 inches per second (597 centimeters per second)</p> |

**Table 21. Maximum altitude specifications**

| Maximum altitude | Specifications                          |
|------------------|---|
| Operating        | -15.2 m to 3,048 m (-50 to 10,000 ft.)  |
| Storage          | -15.2 m to 10,668 m (-50 to 35,000 ft.) |

**Table 22. Airborne contaminant level specification**

|                                    | Specifications                   |
|------------------------------------|----------------------------------|
| Airborne contaminant level (Class) | G1 as defined by ISA-S71.04-1985 |

# Initial system setup and configuration

## Topics:

- [Setting up your system](#)
- [iDRAC configuration](#)
- [Options to install the operating system](#)

## Setting up your system

Complete the following steps to set up your system:

### Steps

1. Unpack the system.
2. Install the system into the rack. For more information about installing the system into the rack, see your *Dell PowerEdge C6320 Getting Started Guide* at [Dell.com/poweredgemanuals](http://Dell.com/poweredgemanuals).
3. Connect the peripherals to the system.
4. Connect the system to its electrical outlet.
5. Turn the system on 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 EMC systems. iDRAC alerts administrators to system issues, helps them perform remote system management, and reduces the need for physical access to the system.

## Options to set up iDRAC IP address

You must configure the initial network settings based on your network infrastructure to enable the communication to and from iDRAC. You can set up the IP address by using one of the following interfaces:

| Interfaces                         | Document/Section  |
|------------------------------------|---|
| <b>iDRAC Settings utility</b>      | See <i>Dell Integrated Dell Remote Access Controller User's Guide</i> at <a href="http://Dell.com/idracmanuals">Dell.com/idracmanuals</a> |
| <b>Dell Deployment Toolkit</b>     | See <i>Dell Deployment Toolkit User's Guide</i> at <a href="http://Dell.com/openmanagemanuals">Dell.com/openmanagemanuals</a>             |
| <b>Dell Lifecycle Controller</b>   | See <i>Dell Lifecycle Controller User's Guide</i> at <a href="http://Dell.com/idracmanuals">Dell.com/idracmanuals</a>                     |
| <b>Chassis or Server LCD panel</b> | See the LCD panel section   |

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.

**NOTE:** To access iDRAC, ensure that you install the iDRAC port card or connect the network cable to the Ethernet connector 1 on the system board.

 **NOTE:** Ensure that you change the default user name and password after setting up the iDRAC IP address.

## Log in to iDRAC

You can log in to iDRAC as:

- iDRAC user
- Microsoft Active Directory user
- Lightweight Directory Access Protocol (LDAP) user

The default user name and password are `root` and `calvin`. You can also log in by using Single Sign-On or Smart Card.

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

For more information about logging in to iDRAC and iDRAC licenses, see the latest Integrated Dell Remote Access Controller User's Guide at [Dell.com/idracmanuals](https://www.dell.com/idracmanuals).

## Options to install the operating system

If the system is shipped without an operating system, install the supported operating system by using one of the following resources:

**Table 23. Resources to install the operating system**

| Resources  | Location  |
|--|---|
| Dell Systems Management Tools and Documentation media                                    | <a href="https://www.dell.com/operatingsystemmanuals">Dell.com/operatingsystemmanuals</a>   |
| Dell Lifecycle Controller  | <a href="https://www.dell.com/idracmanuals">Dell.com/idracmanuals</a>                       |
| Dell OpenManage Deployment Toolkit   | <a href="https://www.dell.com/openmanagemanuals">Dell.com/openmanagemanuals</a>             |
| Dell certified VMware ESXi   | <a href="https://www.dell.com/virtualizationsolutions">Dell.com/virtualizationsolutions</a> |
| Supported operating systems on Dell PowerEdge systems                                    | <a href="https://www.dell.com/ossupport">Dell.com/ossupport</a>                             |
| Installation and How-to videos for supported operating systems on Dell PowerEdge systems | <a href="#">Supported Operating Systems for Dell PowerEdge Systems</a>                      |

## Methods to download firmware and drivers

You can download the firmware and drivers by using any of the following methods:

**Table 24. Firmware and drivers**

| Methods  | Location  |
|--|---|
| From the Dell Support site   | <a href="#">Global Technical Support</a>  |
| Using Dell Remote Access Controller Lifecycle Controller (iDRAC with LC) | <a href="https://www.dell.com/idracmanuals">Dell.com/idracmanuals</a>   |
| Using Dell Repository Manager (DRM)                                      | <a href="https://www.dell.com/openmanagemanuals">Dell.com/openmanagemanuals</a> > OpenManage Deployment Toolkit |
| Using Dell OpenManage Essentials (OME)                                   | <a href="https://www.dell.com/openmanagemanuals">Dell.com/openmanagemanuals</a> > OpenManage Deployment Toolkit |
| Using Dell Server Update Utility (SUU)                                   | <a href="https://www.dell.com/openmanagemanuals">Dell.com/openmanagemanuals</a> > OpenManage Deployment Toolkit |
| Using Dell OpenManage Deployment Toolkit (DTK)                           | <a href="https://www.dell.com/openmanagemanuals">Dell.com/openmanagemanuals</a> > OpenManage Deployment Toolkit |

## Downloading the drivers and firmware

Dell EMC recommends that you download and install the latest BIOS, drivers, and systems management firmware on your system.

### Prerequisites

Ensure that you clear the web browser cache before downloading the drivers and firmware.

### Steps

1. Go to [Dell.com/support/drivers](https://Dell.com/support/drivers).
2. In the **Drivers & Downloads** section, type the Service Tag of your system in the **Service Tag or Express Service Code** box, and then click **Submit**.  
 **NOTE:** If you do not have the Service Tag, select **Detect My Product** to allow the system to automatically detect your Service Tag, or in **General support**, navigate to your product.
3. Click **Drivers & Downloads**.  
The drivers that are applicable to your selection are displayed.
4. Download the drivers to a USB drive, CD, or DVD.

# 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:

- [Options to manage the pre-operating system applications](#)
- [System Setup](#)
- [Dell Lifecycle Controller](#)
- [Boot Manager](#)
- [PXE boot](#)

## Options to manage the pre-operating system applications

Your system has the following options to manage the pre-operating system applications:

- System Setup
- Boot Manager
- Dell Lifecycle Controller
- Preboot Execution Environment (PXE)

### Related concepts

[System Setup](#) on page 34

### Related references

[Boot Manager](#) on page 60

[Dell Lifecycle Controller](#) on page 59

[PXE boot](#) on page 61

## System Setup

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

 **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.

### Related references

[System Setup details](#) on page 35

### Related tasks

[Viewing System Setup](#) on page 35

# 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.

### Related concepts

[System Setup](#) on page 34

### Related references

[System Setup details](#) on page 35

## System Setup details

The **System Setup Main Menu** screen details are explained as follows:

| Option                 | Description  |
|------------------------|--|
| <b>System BIOS</b>     | Enables you to configure BIOS settings.  |
| <b>iDRAC Settings</b>  | Enables you to configure iDRAC settings.<br><br>The iDRAC settings utility is an interface to set up and configure the iDRAC parameters by using UEFI (Unified Extensible Firmware Interface). You can enable or disable various iDRAC parameters by using the iDRAC settings utility. For more information about this utility, see <i>Integrated Dell Remote Access Controller User's Guide</i> at <a href="http://Dell.com/idracmanuals">Dell.com/idracmanuals</a> . |
| <b>Device Settings</b> | Enables you to configure device settings.  |

### Related concepts

[System Setup](#) on page 34

[System BIOS](#) on page 35

### Related references

[iDRAC Settings utility](#) on page 58

[Device Settings](#) on page 59

### Related tasks

[Viewing System Setup](#) on page 35

## System BIOS

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

### Related concepts

[Boot Settings](#) on page 44

- [Network Settings](#) on page 46
- [System Information](#) on page 37
- [Memory Settings](#) on page 38
- [Processor Settings](#) on page 40
- [SATA Settings](#) on page 42
- [Integrated Devices](#) on page 48
- [Serial Communication](#) on page 50
- [System Profile Settings](#) on page 52
- [Miscellaneous Settings](#) on page 57

**Related references**

- [iDRAC Settings utility](#) on page 58
- [Device Settings](#) on page 59

**Related tasks**

- [System BIOS Settings details](#) on page 36
- [Viewing System BIOS](#) on page 36

## 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**.

**Related concepts**

- [System BIOS](#) on page 35

**Related tasks**

- [System BIOS Settings details](#) on page 36

## System BIOS Settings details

**About this task**

The **System BIOS Settings** screen details are explained as follows:

| 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.                     |

| Option                         | Description  |
|--------------------------------|--|
| <b>Boot Settings</b>           | Specifies options to specify the boot mode (BIOS or UEFI). Enables you to modify UEFI and BIOS boot settings.  |
| <b>Network Settings</b>        | Specifies options to change the network settings.  |
| <b>Integrated Devices</b>      | Specifies options to manage integrated device controllers and ports and specify related features and options.  |
| <b>Serial Communication</b>    | Specifies options to manage the serial ports and specify related features and options.   |
| <b>System Profile Settings</b> | Specifies options to change the processor power management settings, memory frequency, and so on.  |
| <b>System Security</b>         | Specifies options to configure the system security settings, such as system password, setup password, Trusted Platform Module (TPM) security. It also manages the power and NMI buttons on the system. |
| <b>Miscellaneous Settings</b>  | Specifies options to change the system date, time, and so on.  |

### Related concepts

[System BIOS](#) on page 35

### Related tasks

[Viewing System BIOS](#) on page 36

## System Information

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

### Related concepts

[System BIOS](#) on page 35

### Related tasks

[System Information details](#) on page 38

[Viewing System Information](#) on page 37

## 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**.

### Related concepts

[System Information](#) on page 37

## Related tasks

[System Information details](#) on page 38

## System Information details

### About this task

The **System Information** screen details are explained as follows:

| 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.                                  |
| <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.                                    |

### Related concepts

[System Information](#) on page 37

### Related tasks

[System Information details](#) on page 38

[Viewing System Information](#) on page 37

## Memory Settings

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

### Related concepts

[System BIOS](#) on page 35

### Related tasks

[Memory Settings details](#) on page 39

[Viewing Memory Settings](#) on page 39

## 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**.

### Related concepts

[Memory Settings](#) on page 38

### Related tasks

[Memory Settings details](#) on page 39

## Memory Settings details

### About this task

The **Memory Settings** screen details are explained as follows:

| 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 memory speed.   |
| <b>System Memory Voltage</b> | Specifies the memory voltage.   |
| <b>Video Memory</b>          | Specifies the amount of video memory.   |
| <b>System Memory Testing</b> | Specifies whether the 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. The available option is <b>Optimizer Mode</b> .  |
| <b>Node Interleaving</b>     | Specifies if the Non-Uniform Memory Architecture (NUMA) is supported. If this field is set to <b>Enabled</b> , memory interleaving is supported if a symmetric memory configuration is installed. If the field is set to <b>Disabled</b> , the system supports NUMA (asymmetric) memory configurations. This option is set to <b>Disabled</b> by default. |
| <b>Snoop Mode</b>            | Specifies the Snoop Mode options. The Snoop Mode options available are <b>Home Snoop</b> , <b>Early Snoop</b> , <b>Cluster on Die</b> , and <b>Opportunist Snoop Broadcast</b> . This option is set to <b>Early Snoop</b> by default. This field is available only when the <b>Node Interleaving</b> is set to <b>Disabled</b> .                          |

### Related concepts

[Memory Settings](#) on page 38

## Related tasks

[Viewing Memory Settings](#) on page 39

# 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, and logical processor idling.

## Related concepts

[System BIOS](#) on page 35

## Related tasks

[Processor Settings details](#) on page 40

[Viewing Processor Settings](#) on page 40

# 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**.

## Related concepts

[Processor Settings](#) on page 40

## Related tasks

[Processor Settings details](#) on page 40

# Processor Settings details

## About this task

The **Processor Settings** screen details are explained as follows:

| 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>QPI Speed</b>   | Enables you to control QuickPath Interconnect data rate settings.  |
| <b>Alternate RTID (Requestor Transaction ID) Setting</b> | Modifies Requestor Transaction IDs, which are QPI resources. This option is set to <b>Disabled</b> by default.<br><b>NOTE:</b> Enabling this option may negatively impact the overall system performance.  |

| Option                                   | Description  |
|--|--|
| <b>Virtualization Technology</b>         | Enables or disables the additional hardware capabilities provided for virtualization. This option is set to <b>Enabled</b> by default.   |
| <b>Address Translation Service (ATS)</b> | Defines the Address Translation Cache (ATC) for devices to cache the DMA transactions. This option provides an interface between CPU and DMA Memory Management to a chipset's Address Translation and Protection Table to translate DMA addresses to host addresses. 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>DCU Streamer Prefetcher</b>           | Enables or disables the Data Cache Unit (DCU) streamer prefetcher. This option is set to <b>Enabled</b> by default.  |
| <b>DCU IP Prefetcher</b>                 | Enables or disables the Data Cache Unit (DCU) IP 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>Configurable TDP</b>                  | Enables you to reconfigure the processor Thermal Design Power (TDP) levels during POST based on the power and thermal delivery capabilities of the system. TDP verifies the maximum heat the cooling system is needed to dissipate. This option is set to <b>Nominal</b> by default.<br> <b>NOTE:</b> This option is only available on certain stock keeping units (SKUs) of the processors. |
| <b>X2Apic Mode</b>                       | Enables or disables the X2Apic mode.   |
| <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 64-bit Support</b>          | Specifies if the processor(s) support 64-bit extensions.   |
| <b>Processor Core Speed</b>              | Specifies the maximum core frequency of the processor.   |
| <b>Process Bus Speed</b>                 | Displays the bus speed of the processor.<br> <b>NOTE:</b> The processor bus speed option displays only when both processors are installed.  |
| <b>Processor 1</b>                       |  <b>NOTE:</b> Depending on the number of CPUs, there may be up to four 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.   |
| <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.                                    |

## Related concepts

[Processor Settings](#) on page 40

## Related tasks

[Viewing Processor Settings](#) on page 40

# SATA Settings

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

## Related concepts

[System BIOS](#) on page 35

## Related tasks

[SATA Settings details](#) on page 42

[Viewing SATA Settings](#) on page 42

## 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**.

## Related concepts

[SATA Settings](#) on page 42

## Related tasks

[SATA Settings details](#) on page 42

## SATA Settings details

### About this task

The **SATA Settings** screen details are explained as follows:

| Option                      | Description  |
|-----------------------------|--|
| <b>Embedded SATA</b>        | Enables the embedded SATA option to be set to <b>Off</b> , <b>ATA</b> , <b>AHCI</b> , or <b>RAID</b> modes. This option is set to <b>AHCI</b> by default.  |
| <b>Security Freeze Lock</b> | Sends Security Freeze Lock command to the Embedded SATA drives during POST. This option is applicable only for ATA and AHCI modes.   |
| <b>Write Cache</b>          | Enables or disables the command for Embedded SATA drives during POST.  |
| <b>Port A</b>               | Sets the drive type of the selected device. For <b>Embedded SATA settings</b> in <b>ATA</b> mode, set this field to <b>Auto</b> to enable BIOS support. Set it to <b>OFF</b> to turn off BIOS support.<br>For <b>AHCI</b> or <b>RAID</b> mode, BIOS support is always enabled. |

| <b>Option</b>     | <b>Description</b>   |               |                    |              |   |                   |  |                 |   |
|-------------------|--|---------------|--------------------|--------------|---|-------------------|--|-----------------|---|
|                   | <table border="0"> <thead> <tr> <th style="text-align: left;"><b>Option</b></th> <th style="text-align: left;"><b>Description</b></th> </tr> </thead> <tbody> <tr> <td><b>Model</b></td> <td>Specifies the drive model of the selected device.</td> </tr> <tr> <td><b>Drive Type</b></td> <td>Specifies the type of drive attached to the SATA port.</td> </tr> <tr> <td><b>Capacity</b></td> <td>Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.</td> </tr> </tbody> </table>   | <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 hard drive. This field is undefined for removable media devices such as optical drives. |
| <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 hard drive. This field is undefined for removable media devices such as optical drives.  |               |                    |              |   |                   |  |                 |   |
| <b>Port B</b>     | <p>Sets the drive type of the selected device. For <b>Embedded SATA settings</b> in <b>ATA</b> mode, set this field to <b>Auto</b> to enable BIOS support. Set it to <b>OFF</b> to turn off BIOS support.</p> <p>For <b>AHCI</b> or <b>RAID</b> mode, BIOS support is always enabled.</p> <table border="0"> <thead> <tr> <th style="text-align: left;"><b>Option</b></th> <th style="text-align: left;"><b>Description</b></th> </tr> </thead> <tbody> <tr> <td><b>Model</b></td> <td>Specifies the drive model of the selected device.</td> </tr> <tr> <td><b>Drive Type</b></td> <td>Specifies the type of drive attached to the SATA port.</td> </tr> <tr> <td><b>Capacity</b></td> <td>Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.</td> </tr> </tbody> </table> | <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 hard drive. This field is undefined for removable media devices such as optical drives. |
| <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 hard drive. This field is undefined for removable media devices such as optical drives.  |               |                    |              |   |                   |  |                 |   |
| <b>Port C</b>     | <p>Sets the drive type of the selected device. For <b>Embedded SATA settings</b> in <b>ATA</b> mode, set this field to <b>Auto</b> to enable BIOS support. Set it to <b>OFF</b> to turn off BIOS support.</p> <p>For <b>AHCI</b> or <b>RAID</b> mode, BIOS support is always enabled.</p> <table border="0"> <thead> <tr> <th style="text-align: left;"><b>Option</b></th> <th style="text-align: left;"><b>Description</b></th> </tr> </thead> <tbody> <tr> <td><b>Model</b></td> <td>Specifies the drive model of the selected device.</td> </tr> <tr> <td><b>Drive Type</b></td> <td>Specifies the type of drive attached to the SATA port.</td> </tr> <tr> <td><b>Capacity</b></td> <td>Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.</td> </tr> </tbody> </table> | <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 hard drive. This field is undefined for removable media devices such as optical drives. |
| <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 hard drive. This field is undefined for removable media devices such as optical drives.  |               |                    |              |   |                   |  |                 |   |
| <b>Port D</b>     | <p>Sets the drive type of the selected device. For <b>Embedded SATA settings</b> in <b>ATA</b> mode, set this field to <b>Auto</b> to enable BIOS support. Set it to <b>OFF</b> to turn off BIOS support.</p> <p>For <b>AHCI</b> or <b>RAID</b> mode, BIOS support is always enabled.</p> <table border="0"> <thead> <tr> <th style="text-align: left;"><b>Option</b></th> <th style="text-align: left;"><b>Description</b></th> </tr> </thead> <tbody> <tr> <td><b>Model</b></td> <td>Specifies the drive model of the selected device.</td> </tr> <tr> <td><b>Drive Type</b></td> <td>Specifies the type of drive attached to the SATA port.</td> </tr> <tr> <td><b>Capacity</b></td> <td>Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.</td> </tr> </tbody> </table> | <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 hard drive. This field is undefined for removable media devices such as optical drives. |
| <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 hard drive. This field is undefined for removable media devices such as optical drives.  |               |                    |              |   |                   |  |                 |   |
| <b>Port E</b>     | <p>Sets the drive type of the selected device. For <b>Embedded SATA settings</b> in <b>ATA</b> mode, set this field to <b>Auto</b> to enable BIOS support. Set it to <b>OFF</b> to turn off BIOS support.</p> <p>For <b>AHCI</b> or <b>RAID</b> mode, BIOS support is always enabled.</p> <table border="0"> <thead> <tr> <th style="text-align: left;"><b>Option</b></th> <th style="text-align: left;"><b>Description</b></th> </tr> </thead> <tbody> <tr> <td><b>Model</b></td> <td>Specifies the drive model of the selected device.</td> </tr> <tr> <td><b>Drive Type</b></td> <td>Specifies the type of drive attached to the SATA port.</td> </tr> <tr> <td><b>Capacity</b></td> <td>Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.</td> </tr> </tbody> </table> | <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 hard drive. This field is undefined for removable media devices such as optical drives. |
| <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 hard drive. This field is undefined for removable media devices such as optical drives.  |               |                    |              |   |                   |  |                 |   |
| <b>Port F</b>     | <p>Sets the drive type of the selected device. For <b>Embedded SATA settings</b> in <b>ATA</b> mode, set this field to <b>Auto</b> to enable BIOS support. Set it to <b>OFF</b> to turn off BIOS support.</p> <p>For <b>AHCI</b> or <b>RAID</b> mode, BIOS support is always enabled.</p>  |               |                    |              |   |                   |  |                 |   |

| Option            | Description   |
|-------------------|---|
| <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 hard drive. This field is undefined for removable media devices such as optical drives. |

#### Related concepts

[SATA Settings](#) on page 42

#### Related tasks

[Viewing SATA Settings](#) on page 42

## Boot Settings

You can use the **Boot Settings** screen to set the boot mode to either **BIOS** or **UEFI**. It also enables you to specify the boot order.

#### Related concepts

[System BIOS](#) on page 35

#### Related references

[Choosing the system boot mode](#) on page 45

#### Related tasks

[Boot Settings details](#) on page 45

[Viewing Boot Settings](#) on page 44

[Changing the boot order](#) on page 46

## 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**.

#### Related concepts

[Boot Settings](#) on page 44

#### Related references

[Choosing the system boot mode](#) on page 45

## Related tasks

[Boot Settings details](#) on page 45

[Changing the boot order](#) on page 46

## Boot Settings details

### About this task

The **Boot Settings** screen details are explained as follows:

| Option                      | Description   |
|-----------------------------|---|
| <b>Boot Mode</b>            | <p>Enables you to set the boot mode of the system.</p> <p> <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.</p> <p>If the operating system supports UEFI, you can set this option to <b>UEFI</b>. Setting this field to <b>BIOS</b> allows compatibility with non-UEFI operating systems. This option is set to <b>BIOS</b> by default.</p> <p> <b>NOTE:</b> Setting this field to <b>UEFI</b> disables the <b>BIOS Boot Settings</b> menu. Setting this field to <b>BIOS</b> disables the <b>UEFI Boot Settings</b> menu.</p> |
| <b>Boot Sequence Retry</b>  | <p>Enables or disables the Boot Sequence Retry feature. If this option is set to <b>Enabled</b> and the system fails to boot, the system reattempts the boot sequence after 30 seconds. This option is set to <b>Enabled</b> by default.</p>  |
| <b>Hard-Disk Failover</b>   | <p>Specifies the hard drive that is booted in the event of a hard 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 hard drive in the list is attempted to boot. When this option is set to <b>Enabled</b>, all hard drives are attempted to boot in the order selected in the <b>Hard-Disk Drive Sequence</b>. This option is not enabled for UEFI Boot Mode.</p>  |
| <b>Boot Option Settings</b> | <p>Configures the boot sequence and the boot devices.</p>   |
| <b>BIOS Boot Settings</b>   | <p>Enables or disables BIOS boot options.</p> <p> <b>NOTE:</b> This option is enabled only if the boot mode is BIOS.</p>   |
| <b>UEFI Boot Settings</b>   | <p>Enables or disables UEFI Boot options. The Boot options include <b>IPv4 PXE</b> and <b>IPv6 PXE</b>. This option is set to <b>IPv4</b> by default.</p> <p> <b>NOTE:</b> This option is enabled only if the boot mode is UEFI.</p>   |

### Related concepts

[Boot Settings](#) on page 44

### Related references

[Choosing the system boot mode](#) on page 45

### Related tasks

[Viewing Boot Settings](#) on page 44

[Changing the boot order](#) on page 46

## Choosing the system boot mode

System Setup enables you to specify one of the following boot modes for installing your operating system:

- BIOS boot mode (the default) is the standard BIOS-level boot interface.
- Unified Extensible Firmware Interface (UEFI) (the default) boot mode is an enhanced 64-bit boot interface. If you have configured your system to boot to UEFI mode, it replaces the system BIOS.

1. From the **System Setup Main Menu**, click **Boot Settings**, and select **Boot Mode**.

2. Select the boot mode you want the system to boot into.

 **CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.**

3. After the system boots in the specified boot mode, proceed to install your operating system from that mode.

 **NOTE:**

- Operating systems must be UEFI-compatible to be installed from the UEFI boot mode. DOS and 32-bit operating systems do not support UEFI and can only be installed from the BIOS boot mode.
- For the latest information about supported operating systems, go to [Dell.com/ossupport](https://Dell.com/ossupport).

### Related concepts

[Boot Settings](#) on page 44

### Related tasks

[Boot Settings details](#) on page 45

[Viewing Boot Settings](#) on page 44

## Changing the boot order

### About this task

You may have to change the boot order if you want to boot from a USB key or an optical drive. The following instructions may vary if you have selected **BIOS** for **Boot Mode**.

### Steps

1. On the **System Setup Main Menu** screen, click **System BIOS > Boot Settings**.
2. Click **Boot Option Settings > Boot Sequence**.
3. Use the arrow keys to select a boot device, and use the plus (+) and minus (-) sign keys to move the device down or up in the order.
4. Click **Exit**, and then click **Yes** to save the settings on exit.

### Related concepts

[Boot Settings](#) on page 44

### Related tasks

[Boot Settings details](#) on page 45

[Viewing Boot Settings](#) on page 44

## Network Settings

You can use the **Network Settings** screen to modify PXE device settings. The network settings option is available only in the UEFI mode.

 **NOTE:** The BIOS does not control network settings in the BIOS mode. For the BIOS boot mode, the optional Boot ROM of the network controllers handles the network settings.

### Related concepts

[UEFI iSCSI Settings](#) on page 48

[System BIOS](#) on page 35

### Related references

[UEFI iSCSI Settings details](#) on page 48

### Related tasks

[Network Settings screen details](#) on page 47

[Viewing Network Settings](#) on page 47

[Viewing UEFI iSCSI Settings](#) on page 48

## Viewing Network Settings

To view the **Network 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 **Network Settings**.

### Related concepts

[Network Settings](#) on page 46

### Related tasks

[Network Settings screen details](#) on page 47

## Network Settings screen details

The **Network Settings** screen details are explained as follows:

### About this task

| Option                                   | Description   |
|--|---|
| <b>PXE Device n (n = 1 to 4)</b>         | Enables or disables the device. When enabled, a UEFI boot option is created for the device. |
| <b>PXE Device n Settings(n = 1 to 4)</b> | Enables you to control the configuration of the PXE device.                                 |

### Related concepts

[Network Settings](#) on page 46

### Related tasks

[Viewing Network Settings](#) on page 47

## UEFI iSCSI Settings

You can use the iSCSI Settings screen to modify iSCSI device settings. The iSCSI Settings option is available only in the UEFI boot mode. BIOS does not control network settings in the BIOS boot mode. For the BIOS boot mode, the option ROM of the network controller handles the network settings.

### Related concepts

[UEFI iSCSI Settings](#) on page 48

### Related references

[UEFI iSCSI Settings details](#) on page 48

### Related tasks

[Viewing UEFI iSCSI Settings](#) on page 48

## Viewing UEFI iSCSI Settings

To view the **UEFI iSCSI 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 **Network Settings**.
5. On the **Network Settings** screen, click **UEFI iSCSI Settings**.

### Related concepts

[UEFI iSCSI Settings](#) on page 48

## UEFI iSCSI Settings details

The **UEFI iSCSI Settings** screen details are explained as follows:

| Option                      | Description  |
|-----------------------------|--|
| <b>iSCSI Initiator Name</b> | Specifies the name of the iSCSI initiator (iqn format).  |
| <b>iSCSI Device1</b>        | Enables or disables the iSCSI device. When disabled, a UEFI boot option is created for the iSCSI device automatically. |

## 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.

### Related concepts

[System BIOS](#) on page 35

## Related tasks

[Integrated Devices details](#) on page 49  
[Viewing Integrated Devices](#) on page 49

## 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**.

### Related concepts

[Integrated Devices](#) on page 48

### Related tasks

[Integrated Devices details](#) on page 49

## Integrated Devices details

### About this task

The **Integrated Devices** screen details are explained as follows:

| Option                           | Description   |
|----------------------------------|---|
| <b>USB 3.0 Setting</b>           | Enables or disables the USB 3.0 support. Enable this option only if your operating system supports USB 3.0. If you disable this option, devices operate at USB 2.0 speed. USB 3.0 is enabled by default.  |
| <b>User Accessible USB Ports</b> | Enables or disables the USB ports. Selecting <b>All Ports On</b> enables the front USB ports, selecting <b>All Ports Off</b> disables all USB ports. The USB keyboard and mouse operate during boot process in certain operating systems. After the boot process is complete, the USB keyboard and mouse do not work if the ports are disabled.   |
| <b>Internal USB Port 1</b>       | Enables or disables the internal USB port.  |
| <b>Internal USB Port 2</b>       | Enables or disables the internal USB port.  |
| <b>Embedded NIC1 and NIC2</b>    |  <b>NOTE:</b> The Embedded NIC1 and NIC2 options are only available on systems that do not have <b>Integrated Network Card 1</b> .<br><br>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. |
| <b>I/OAT DMA Engine</b>          | Enables or disables the I/OAT option. Enable only if the hardware and software support the feature.   |

| Option  | Description   |
|---|---|
| <b>I/O Snoop Holdoff Response</b>                 | Selects the number of cycles PCI I/O can withhold snoop requests from the CPU, to allow time to complete its own write to LLC. This setting can help improve performance on workloads where throughput and latency are critical.  |
| <b>Embedded Video Controller</b>                  | Enables or disables the <b>Embedded Video Controller</b> option. This option is set to <b>Enabled</b> by default.   |
| <b>Current State of Embedded Video Controller</b> | 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>Disabled</b> . |
| <b>SR-IOV Global Enable</b>                       | Enables or disables the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. This option is set to <b>Disabled</b> by default.  |
| <b>OS Watchdog Timer</b>                          | 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.   |
| <b>Memory Mapped I/O above 4 GB</b>               | Enables or disables the support for PCIe devices that need large amounts of memory. This option is set to <b>Enabled</b> by default.  |
| <b>Slot Disablement</b>                           | Enables or disables the available PCIe slots on your system. The slot disablement feature controls the configuration of 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, both the Option ROM and UEFI drivers are disabled.   |

#### Related concepts

[Integrated Devices](#) on page 48

#### Related tasks

[Viewing Integrated Devices](#) on page 49

## Serial Communication

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

#### Related concepts

[System BIOS](#) on page 35

#### Related tasks

[Serial Communication details](#) on page 51

[Viewing Serial Communication](#) on page 50

## 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**.

#### Related concepts

[Serial Communication](#) on page 50

#### Related tasks

[Serial Communication details](#) on page 51

## Serial Communication details

### About this task

The **Serial Communication** screen details are explained as follows:

| 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 option is set to <b>Serial Device 1=COM2, Serial Device 2=COM1</b> by default.<br> <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.<br> <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 Serial Device 1, Serial Device 2, or the Remote Access Device by using this option.<br> <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.<br> <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 must not be 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>VT 100/VT 220</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.  |

### Related concepts

[Serial Communication](#) on page 50

### Related tasks

[Viewing Serial Communication](#) on page 50

# System Profile Settings

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

### Related concepts

[System BIOS](#) on page 35

### Related tasks

[System Profile Settings details](#) on page 52

[Viewing System Profile Settings](#) on page 52

## 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
```

 **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**.

### Related concepts

[System Profile Settings](#) on page 52

### Related tasks

[System Profile Settings details](#) on page 52

## System Profile Settings details

### About this task

The **System Profile Settings** screen details are explained as follows:

| Option                      | Description  |
|-----------------------------|--|
| <b>System Profile</b>       | Sets the system profile. If you set the <b>System Profile</b> 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.<br> <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> . |
| <b>CPU Power Management</b> | Sets the CPU power management. This option is set to <b>System DBPM (DAPC)</b> by default.   |
| <b>Memory Frequency</b>     | Sets the speed of the memory. You can select <b>Maximum Performance</b> , <b>Maximum Reliability</b> , or a specific speed.  |
| <b>Turbo Boost</b>          | Enables or disables the processor to operate in the turbo boost mode. This option is set to <b>Enabled</b> by default.   |

| Option  | Description   |
|---|---|
| <b>Energy Efficient Turbo</b>                             | Enables or disables the <b>Energy Efficient Turbo</b> option.<br>Energy Efficient Turbo (EET) is a mode of operation where a processor's core frequency is adjusted to be within the turbo range based on workload.   |
| <b>C1E</b>  | 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.  |
| <b>C States</b>   | Enables or disables the processor to operate in all available power states. This option is set to <b>Enabled</b> by default.  |
| <b>Collaborative CPU Performance Control</b>              | Enables or disables the CPU power management option. When set to <b>Enabled</b> , the CPU power management is controlled by the OS DBPM and the System DBPM (DAPC). This option is set to <b>Disabled</b> by default.   |
| <b>Memory Patrol Scrub</b>                                | Sets the memory patrol scrub frequency. This option is set to <b>Standard</b> by default.   |
| <b>Memory Refresh Rate</b>                                | Sets the memory refresh rate to either 1x or 2x. This option is set to <b>1x</b> by default.  |
| <b>Uncore Frequency</b>                                   | Enables you to select the <b>Processor Uncore Frequency</b> option.<br>Dynamic mode 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.   |
| <b>Energy Efficient Policy</b>                            | Enables you to select the <b>Energy Efficient Policy</b> option.<br>The CPU uses the setting to manipulate the internal behavior of the processor and determines whether to target higher performance or better power savings.  |
| <b>Number of Turbo Boot Enabled Cores for Processor 1</b> |  <b>NOTE:</b> If there are two processors installed in the system, you see an entry for <b>Number of Turbo Boost Enabled Cores for Processor 2</b> .<br>Controls the number of turbo boost enabled cores for processor 1. The maximum number of cores is enabled by default.   |
| <b>Monitor/Mwait</b>                                      | 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.<br> <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> .<br> <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. |
| <b>Write Data CRC</b>                                     | When set to enabled, DDR4 data bus issues are detected and corrected during <code>write</code> operations. Two extra cycles are required for Cyclic Redundancy Check bit generation which impacts system performance. This option is set to <b>Read-Only</b> unless system profile is set to Custom by default.   |

#### Related concepts

[System Profile Settings](#) on page 52

#### Related tasks

[Viewing System Profile Settings](#) on page 52

# 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.

### Related concepts

[System BIOS](#) on page 35

### Related references

[Operating with a setup password enabled](#) on page 57

### Related tasks

[System Security Settings details](#) on page 54

[Viewing System Security](#) on page 54

[Creating a system and setup password](#) on page 55

[Using your system password to secure your system](#) on page 56

[Deleting or changing system and setup password](#) on page 56

## 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**.

### Related concepts

[System Security](#) on page 54

### Related tasks

[System Security Settings details](#) on page 54

## System Security Settings details

### About this task

The **System Security Settings** screen details are explained as follows:

| Option                 | Description   |
|------------------------|---|
| <b>Intel 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.  |

| Option                                  | Description   |
|---|---|
| <b>TPM Security</b>                     | <p> <b>NOTE:</b> The TPM menu is available only when the TPM module is installed.</p> <p>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 Intel TXT 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>.</p> |
| <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>                      | <p> <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.</p> <p>Clears all the contents of the TPM. The <b>TPM Clear</b> option is set to <b>No</b> by default.</p>   |
| <b>Intel 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.   |
| <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>NMI Button</b>                       | Enables or disables the NMI button on the front of the system. This option is set to <b>Disabled</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 (60s to 240s)</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>             | 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>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 Policy Summary</b>       | Specifies the list of certificates and hashes that secure boot uses to authenticate images.   |

#### Related concepts

[System Security](#) on page 54

#### Related tasks

[Viewing System Security](#) on page 54

## 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 System board jumper settings 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.

Use the following guidelines to assign the system password:

- A password can have up to 32 characters.
- The password can contain the numbers 0 through 9.
- Only the following special characters are allowed: space, ("), (+), (.), (-), (.), (/), (;), ([), (\), (]), (`).

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.

### Related concepts

[System Security](#) on page 54

## Using your system password to secure your system

### About this task

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.

### Related concepts

[System Security](#) on page 54

## 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.

### Related concepts

[System Security](#) on page 54

## Operating with a 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:

```
Password Invalid. Number of unsuccessful password attempts: <x> Maximum number of password attempts exceeded.System halted.
```

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 screen 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.

### Related concepts

[System Security](#) on page 54

## 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.

### Related concepts

[System BIOS](#) on page 35

### Related tasks

[Miscellaneous Settings details](#) on page 58

[Viewing Miscellaneous Settings](#) on page 57

## 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**.

### Related concepts

[Miscellaneous Settings](#) on page 57

### Related tasks

[Miscellaneous Settings details](#) on page 58

## Miscellaneous Settings details

### About this task

The **Miscellaneous Settings** screen details are explained as follows:

| 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.<br> <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> | Enables you to determine whether the system BIOS loads the legacy video (INT 10H) option ROM from the video controller. Selecting <b>Enabled</b> in the operating system does not support UEFI video output standards. This field is available only for UEFI boot mode. You cannot set the option to <b>Enabled</b> if <b>UEFI Secure Boot</b> mode is enabled. |

### Related concepts

[Miscellaneous Settings](#) on page 57

### Related tasks

[Viewing Miscellaneous Settings](#) on page 57

## iDRAC Settings utility

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

 **NOTE:** Accessing some of the features on the iDRAC settings utility needs the iDRAC Enterprise License upgrade.

For more information about using iDRAC, see *Dell Integrated Dell Remote Access Controller User's Guide* at [Dell.com/idracmanuals](http://Dell.com/idracmanuals).

### Related concepts

[System BIOS](#) on page 35

### Related references

[Device Settings](#) on page 59

[Changing the thermal settings](#) on page 59

### Related tasks

[Entering the iDRAC Settings utility](#) on page 59

## Entering the iDRAC Settings utility

### Steps

1. Turn on or restart the managed system.
2. Press F2 during Power-on Self-test (POST).
3. On the **System Setup Main Menu** page, click **iDRAC Settings**.  
The **iDRAC Settings** screen is displayed.

### Related references

[iDRAC Settings utility](#) on page 58

## Changing the thermal settings

The iDRAC settings utility enables you to select and customize the thermal control settings for your system.

1. Click **iDRAC Settings > Thermal**.
2. Under **SYSTEM THERMAL PROFILE > Thermal Profile**, select one of the following options:
  - Default Thermal Profile Settings
  - Maximum Performance (Performance Optimized)
  - Minimum Power (Performance per Watt Optimized)
3. Under **USER COOLING OPTIONS**, set the **Minimum Fan Speed**, and **Custom Minimum Fan Speed**.
4. Click **Back > Finish > Yes**.

### Related references

[iDRAC Settings utility](#) on page 58

## Device Settings

**Device Settings** enables you to configure device parameters.

### Related concepts

[System BIOS](#) on page 35

## Dell Lifecycle Controller

Dell Lifecycle Controller (LC) provides advanced embedded system management capabilities including system deployment, configuration, update, maintenance, and diagnosis. LC is delivered as part of the iDRAC out-of-band solution and Dell EMC system embedded Unified Extensible Firmware Interface (UEFI) applications.

### Related references

[Embedded systems management](#) on page 59

## 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.

 **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, and deploying the operating system, see the Dell Lifecycle Controller documentation at [Dell.com/idracmanuals](https://www.dell.com/idracmanuals).

## Related references

[Dell Lifecycle Controller](#) on page 59

# Boot Manager

The **Boot Manager** screen enables you to select boot options and diagnostic utilities.

## Related concepts

[Boot Manager main menu](#) on page 60

[System BIOS](#) on page 35

## Related tasks

[Viewing Boot Manager](#) on page 60

## 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.

## Related concepts

[Boot Manager main menu](#) on page 60

## Related references

[Boot Manager](#) on page 60

## 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.  |

## Related references

[Boot Manager](#) on page 60

## Related tasks

[Viewing Boot Manager](#) on page 60

## One-shot BIOS boot menu

**One-shot BIOS boot menu** enables you to select a boot device to boot from.

## Related references

[Boot Manager](#) on page 60

## System Utilities

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

- Launch Diagnostics
- BIOS/UEFI Update File Explorer
- Reboot System

 **NOTE:** Depending on the boot mode selected, you might have BIOS or UEFI Update File Explorer.

## Related references

[Boot Manager](#) on page 60

## PXE boot

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

 **NOTE:** To access the **PXE boot** option, boot the system and then press F12. The system scans and displays the active networked systems.

# Installing and removing system components

## Topics:

- Safety instructions
- Before working inside your system
- After working inside your system
- Recommended tools
- System cover
- Inside the system
- Cooling fans
- Hard drives
- SSD and SSD holder
- SATADOM
- Power supply units
- System board tray
- System board assembly
- Cooling shroud
- Heat sinks
- Processors
- Expansion card assembly and expansion card
- PCI-E slot priority
- PERC cards
- Riser card
- Optional mezzanine cards
- Mezzanine card bridge board
- System memory
- System battery
- System board
- Trusted Platform Module
- Power distribution boards
- Midplanes
- Hard drive backplanes
- 2.5-inch hard drive expander configuration
- Control panel
- Sensor board

## 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.

 **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.

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

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

To avoid injury to yourself or damage to the system, follow these guidelines:

- Always disconnect the system from the power outlet whenever you are working inside the system.
- If possible, wear a grounded wrist strap as you work inside the system. Or discharge any static electricity by touching the bare metal chassis of system case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Do not flex or stress the circuit board.
- Leave all components inside the static-proof packaging until you are ready to use the component for the installation.

## Before working inside your system

### Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

### Steps

1. Turn off the system, including any 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 *Dell PowerEdge C6320 Getting Started Guide* at [Dell.com/poweredgemanuals](https://Dell.com/poweredgemanuals).

4. Remove the system cover.

### Related references

[Safety instructions](#) on page 62

### Related tasks

[Removing the system cover](#) on page 64

## After working inside your system

### Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

### Steps

1. Install the system cover.
2. If applicable, install the system into the rack.  
For more information, see the *Dell PowerEdge C6320 Getting Started Guide* at [Dell.com/poweredgemanuals](https://Dell.com/poweredgemanuals).
3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Turn on the system, including any attached peripherals.

### Related tasks

[Installing the system cover](#) on page 65

## Recommended tools

You need the following tools to perform the removal and installation procedures:

- Phillips #1 screwdriver
- Phillips #2 screwdriver
- Torx #T20 screwdriver
- Clamper
- Wrist grounding strap

## System cover

The system cover protects the components inside the system and helps in maintaining air flow inside the system.

## Removing the system cover

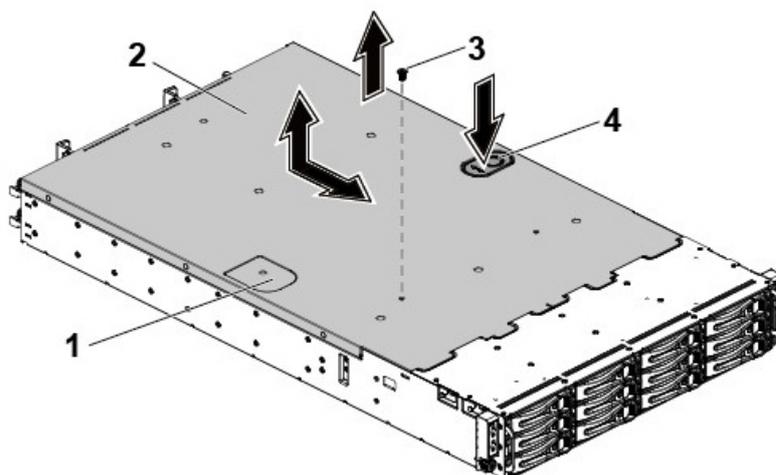
### Prerequisites

**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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off each sled in the system, including all the attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Keep the Phillips #2 screwdriver ready.

### Steps

1. Remove the securing screw from the system cover.
2. Press the cover release latch lock.
3. Hold the system cover on both the sides with your palm on the traction pad, and slide out the system cover.
4. Lift the cover away from the system.



**Figure 18. Removing and installing the system cover**

- |                   |                             |
|-------------------|-----------------------------|
| 1. traction pad   | 2. system cover             |
| 3. securing screw | 4. cover release latch lock |

### Next steps

Install the system cover.

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Installing the system cover](#) on page 65

# Installing the system cover

## Prerequisites

 **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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Keep the Phillips #2 screwdriver ready.

## Steps

1. Place the system cover on the chassis, and slide it to the front of the chassis until it snaps into place.
2. Secure the system cover in place with a screw.

## Next steps

1. Reconnect the system to the electrical outlet.
2. Turn on each sled in the system, including all the attached peripherals.

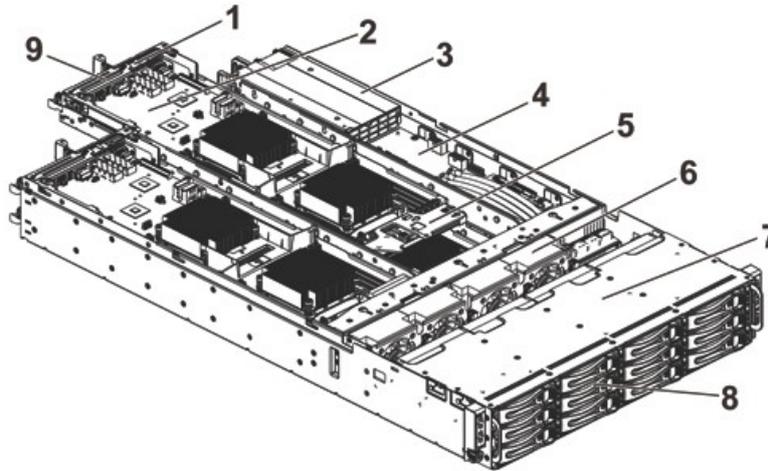
## Related references

[Safety instructions](#) on page 62

# Inside the system

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

 **CAUTION:** This system must be operated with the system cover installed to ensure proper cooling.



**Figure 19. Inside the system**

- |                                      |                                 |
|--------------------------------------|---------------------------------|
| 1. mezzanine card bracket            | 2. system board assembly (4)    |
| 3. power supply unit (2)             | 4. power distribution board (2) |
| 5. Battery backup unit (BBU) bracket | 6. cooling fan (4)              |
| 7. hard-drive bay                    | 8. hard drive (12)              |
| 9. riser card bracket                |                                 |

## Cooling fans

Servers use a lot of power to function, and that in turn generates a lot of heat. That heat, without a cooling system in place to dissipate it, can destroy the electronic and mechanical parts of the server. In most cases, the simplest and most efficient way to dissipate this heat is through the use of fans.

## Removing a cooling fan

### Prerequisites

**⚠ WARNING:** Do not attempt to operate the system without the cooling fans.

**⚠ WARNING:** The cooling fan can continue to spin for some time after the system has been powered down. Allow time for the fan to stop spinning before removing it from the system.

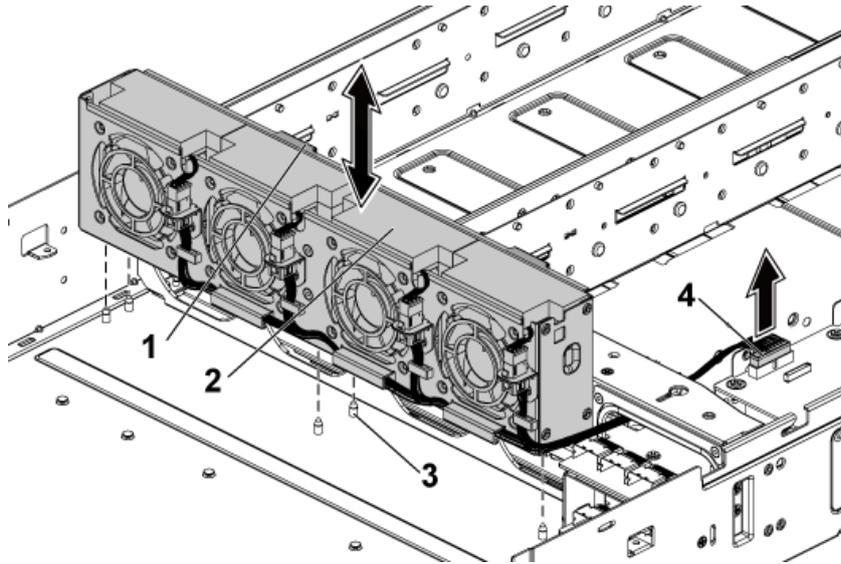
**⚠ CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by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

**ℹ NOTE:** Observe the routing of the cables when removing them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

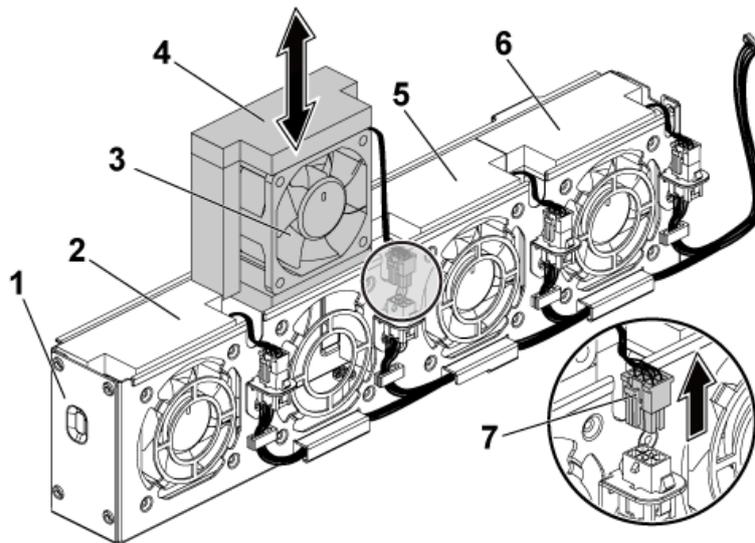
### Steps

1. Disconnect the fan's power cable from the power distribution board 1.
2. Lift the cooling fan cage out of the chassis.



**Figure 20. Removing and installing a cooling fan cage**

- |                      |                     |
|----------------------|---------------------|
| 1. locking clips (2) | 2. cooling fan cage |
| 3. locating pin (6)  | 4. power connector  |



**Figure 21. Removing and installing a cooling fan**

- |                     |                  |
|---------------------|------------------|
| 1. cooling-fan cage | 2. cooling fan 1 |
| 3. cooling fan 2    | 4. sponge        |
| 5. cooling fan 3    | 6. cooling fan 4 |
| 7. fan cable        |                  |

**Next steps**

**Related references**

[Safety instructions](#) on page 62

**Related tasks**

[Removing the system cover](#) on page 64

[Before working inside your system](#) on page 63

# Installing a cooling fan

## Prerequisites

**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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

## Steps

1. Align the cooling fan with the sponge and slide it in the cooling fan cage until the cooling fan is firmly seated.

**NOTE:** The fan blades should face the control panel of the system.

2. Connect the fan cable to the connector on the cooling fan cage.

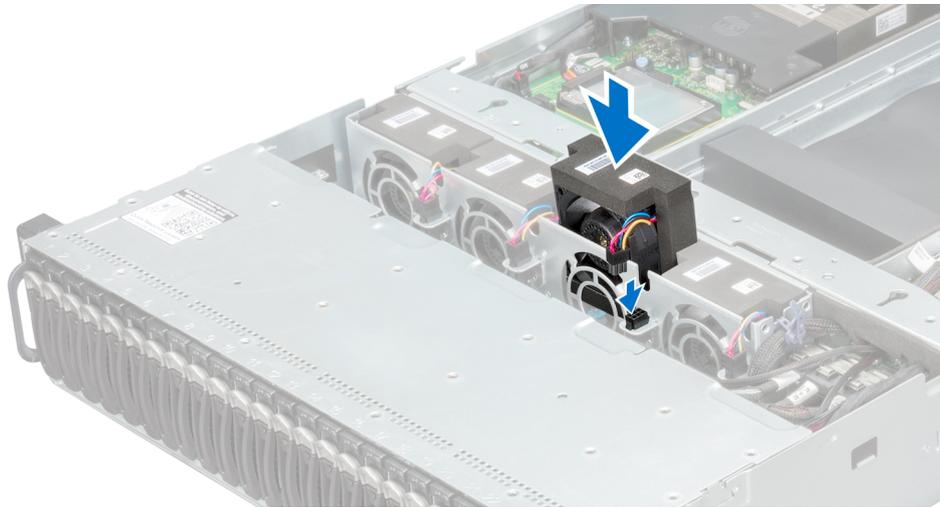


Figure 22. Installing a cooling fan

3. Align the cooling fan cage with the locating pins on the chassis, and place it into the chassis until it is firmly seated.
4. Connect the fan's power cable to the connector on the power distribution board 1.  
Route these cables properly through the ties to prevent them from being pinched or crimped.

## Next steps

1. Follow the procedure listed in the After working inside your system section.
2. Check the management software to see if the fan is rotating at the optimal speed.

## Related references

[Safety instructions](#) on page 62

## Related tasks

[After working inside your system](#) on page 63

# Hard drives

A hard drive is a data storage device used for storing and retrieving digital information.

**CAUTION:** Use only hard drives that have been tested and approved for use with the SAS/SATA backplane.

The following are the guidelines for installing a mix of SAS hard drives, SATA hard drives and SSDs:

- Each sled supports six 2.5-inch hard drives or Solid State Drives.
- Only two drive types can be mixed per node.
- Drives 0 and 1 must be of the same type.
- The remaining drives must be the same type.
- SAS hard drive support is based on the add-on card and the the onboard configuration supports only SATA hard drives.

## Removing a 3.5-inch hard drive blank

### Prerequisites

**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.

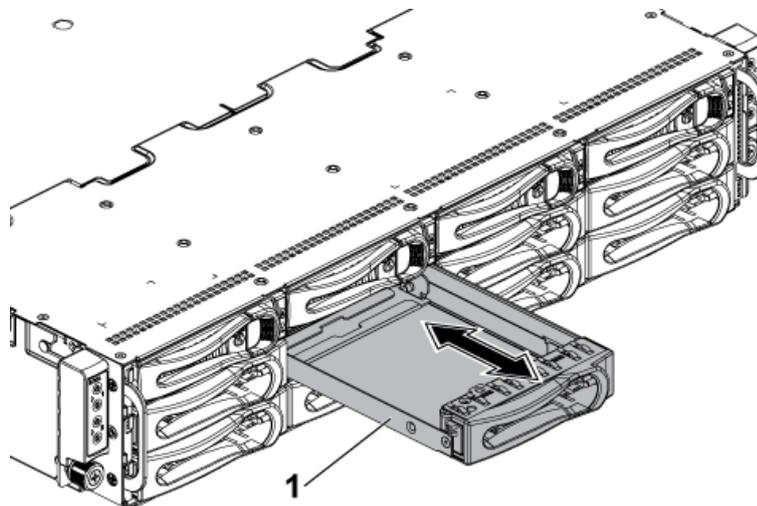
**CAUTION:** To maintain proper system cooling, all empty hard drive bays must have drive blanks installed.

**NOTE:** This section is applicable to systems with hot swappable hard drives only.

Follow the safety guidelines listed in the Safety instructions section.

### Steps

Pull the hard drive blank out of the hard drive bay.



**Figure 23. Removing or installing a 3.5-inch hard drive blank**

- a. 3.5-inch hard drive blank

### Related references

[Safety instructions](#) on page 62

## Installing a 3.5-inch hard drive blank

### Prerequisites

**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.

Follow the safety guidelines listed in the Safety instructions section.

### Steps

Slide the hard drive blank into the drive bay until the hard drive blank is seated in place.

### Related references

[Safety instructions](#) on page 62

## Removing a 2.5-inch hard drive blank

### Prerequisites

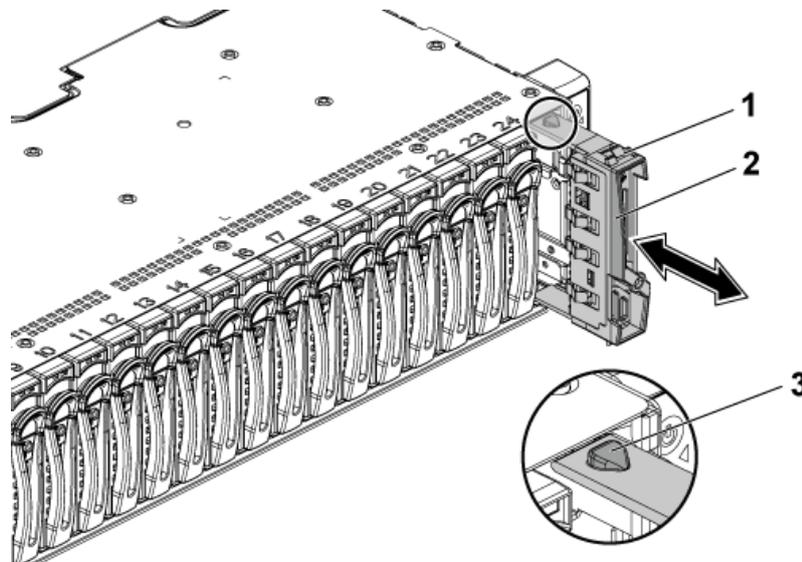
**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

**CAUTION:** To maintain proper system cooling, all empty hard drive bays must have hard drive blanks installed.

Follow the safety guidelines listed in the Safety instructions section.

### Steps

Pull the handle on the 2.5-inch hard drive blank to remove the 2.5-inch hard drive blank out of the hard drive bay.



**Figure 24. Removing or installing a 2.5-inch hard drive blank**

- a. 2.5-inch hard drive blank
- b. handle
- c. latch

### Next steps

Install a 2.5-inch hard drive blank.

### Related references

[Safety instructions](#) on page 62

## Installing the 2.5-inch hard drive blank

### Prerequisites

**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.

Follow the safety guidelines listed in the Safety instructions section.

### Steps

1. With the latch facing up, slide the latch into the hard drive bay.
2. Push the a 2.5-inch hard drive blank with a slight inclination into the bay until the a 2.5-inch hard drive blank clicks into place.

### Related references

[Safety instructions](#) on page 62

## Removing a hard drive carrier

The installation and removal procedures for the 3.5-inch hard drive and the 2.5-inch hard drive are similar.

### Prerequisites

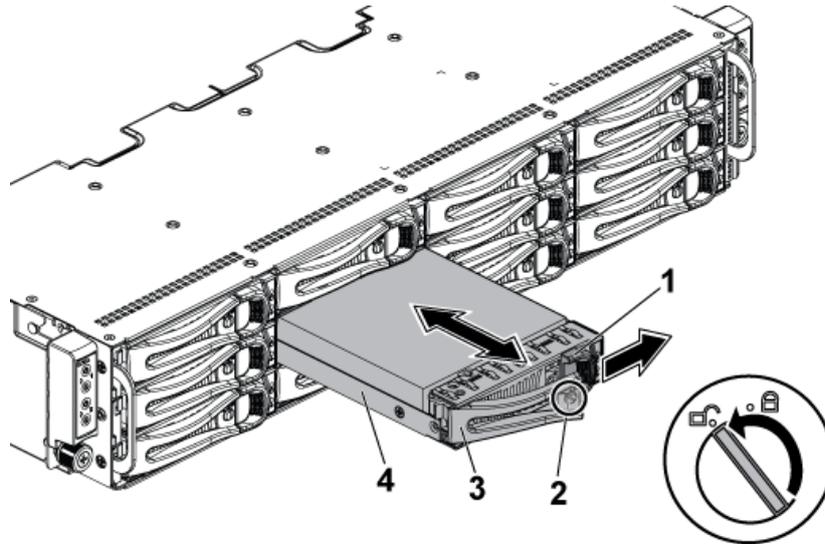
**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

**CAUTION:** To maintain proper system cooling, all empty hard drive bays must have hard drive blanks installed.

Follow the safety guidelines listed in the Safety instructions section.

### Steps

1. Turn the lock lever counterclockwise until it points to the unlock symbol.
2. Slide the release button to open the release handle.
3. Using the release handle, pull the hard drive carrier out of the hard drive bay.



**Figure 25. Removing and installing a hard drive carrier**

- |                   |                       |
|-------------------|-----------------------|
| 1. release button | 2. lock lever         |
| 3. release handle | 4. hard drive carrier |

### Next steps

Install the hard drive carrier.

### Related references

[Safety instructions](#) on page 62

## Installing a hard drive carrier

### Prerequisites

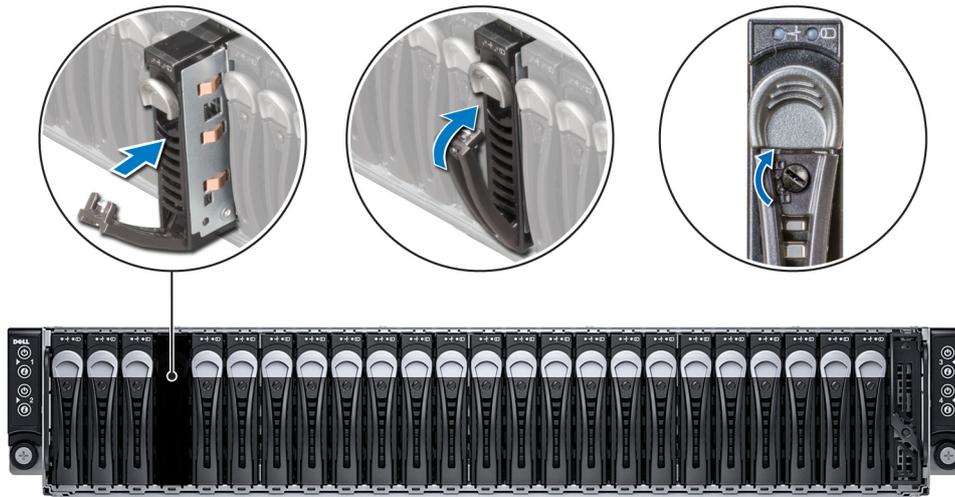
**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

**CAUTION:** To maintain proper system cooling, all empty hard drive carrier bays must have hard drive carrier blanks installed.

Follow the safety guidelines listed in the Safety instructions section.

### Steps

1. Open the release lever on the hard drive carrier and slide the hard drive carrier into the hard drive bay until the hard drive connector engages with the backplane.
2. Push the release handle to lock the hard drive carrier in place.
3. Turn the lever lock clockwise to the lock symbol.



**Figure 26. Installing a hard drive carrier**

### Next steps

1. To check the status of the hard drive, see the hard drive activity and status indicators.
2. To verify the status of the installed hard drive, check the management software.

### Related references

[Safety instructions](#) on page 62

[Hard drive indicator patterns](#) on page 11

## Removing a hard drive from a hard drive carrier

### Prerequisites

**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.

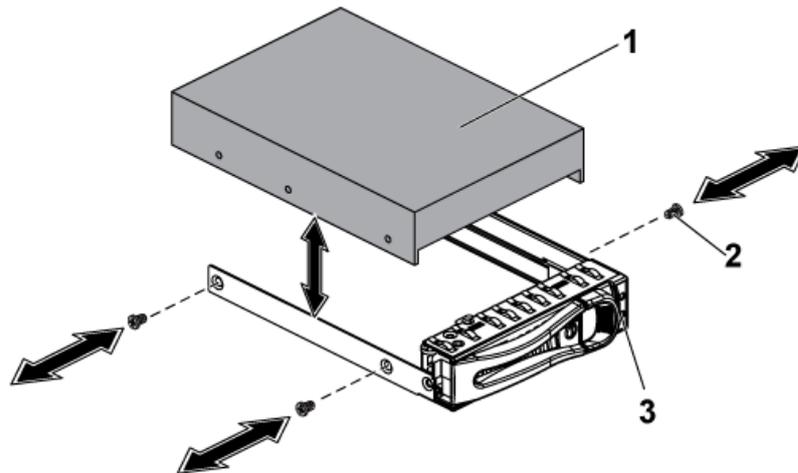
**CAUTION:** When installing a hard drive carrier, ensure that the adjacent drives are fully installed. Inserting a hard drive carrier and attempting to lock its handle next to a partially installed carrier can damage the partially installed carrier's shield spring and make it unusable.

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Remove the hard drive carrier from the system.
3. Keep the Phillips #2 screwdriver ready.

### Steps

1. Remove the screws securing the hard drive to the chassis.
2. Lift the hard drive out of the hard drive carrier.



**Figure 27. Removing and installing a hard drive from the hard drive carrier**

- a. hard drive
- b. screw (4)
- c. hard drive carrier

#### Next steps

1. Install the hard drive into the hard drive carrier.
2. Install the hard drive carrier into the hard drive bay.

#### Related references

[Safety instructions](#) on page 62

## Installing a hard drive into a hard drive carrier

#### Prerequisites

**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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Remove the hard drive carrier from the system.
3. If installed, remove the hard drive blank. The procedure for removing a blank is the same as removing a hard drive carrier.
4. Keep the Phillips #2 screwdriver ready.

#### Steps

1. Place the hard drive into the hard drive carrier.
2. Secure the hard drive to the hard drive carrier with screws.



**Figure 28. Installing a hard drive into a hard drive carrier**

**NOTE:** Ensure that the hard drive is installed with the label facing up. This is to ensure that the hard drive connector is aligned with the connector on the backplane.

#### Next steps

1. Install the hard drive carrier into the hard drive bay.
2. To check the status of the hard drive, see the hard drive activity and status indicators.
3. To verify the status of the installed hard drive, check the management software.

#### Related references

[Safety instructions](#) on page 62

## Installing a 2.5-inch SSD into a 3.5-inch hard drive carrier

#### Prerequisites

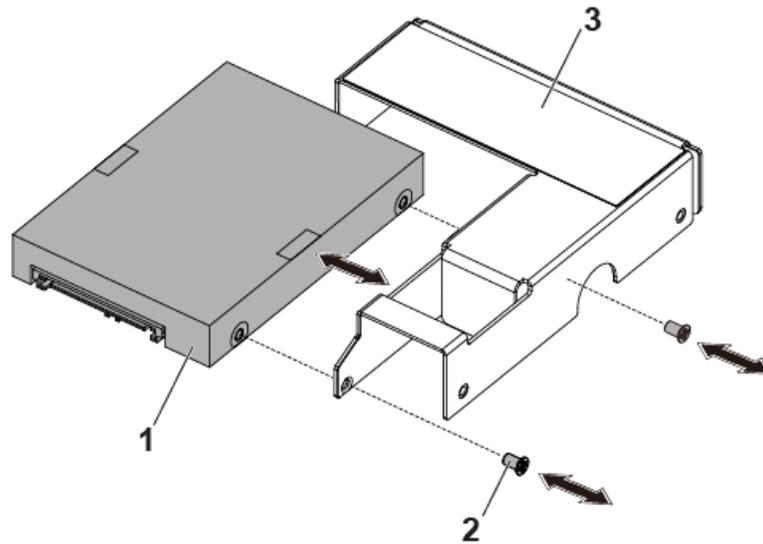
**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

**CAUTION:** This removal and installation procedure is only for 2.5-inch SSD. Installing a 2.5-inch hard disk drive into the adapter can cause performance issue.

Follow the safety guidelines listed in the Safety instructions section.

#### Steps

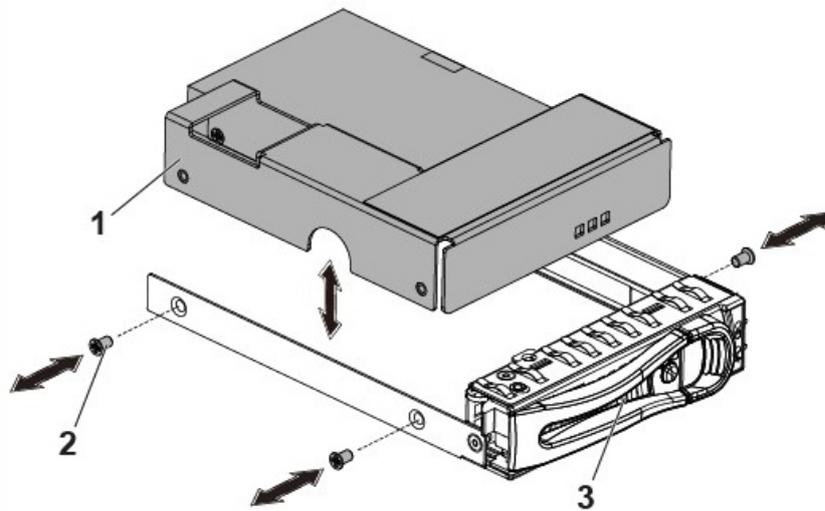
1. Place the 2.5-inch SSD into the 2.5-inch adapter bracket.
2. Secure the 2.5-inch SSD to the 2.5-inch adapter bracket with M3 screws.



**Figure 29. Removing and installing a 2.5-inch SSD from the 2.5-inch adapter bracket**

- a. 2.5-inch SSD
- b. M3 screw (2)
- c. 2.5-inch adapter

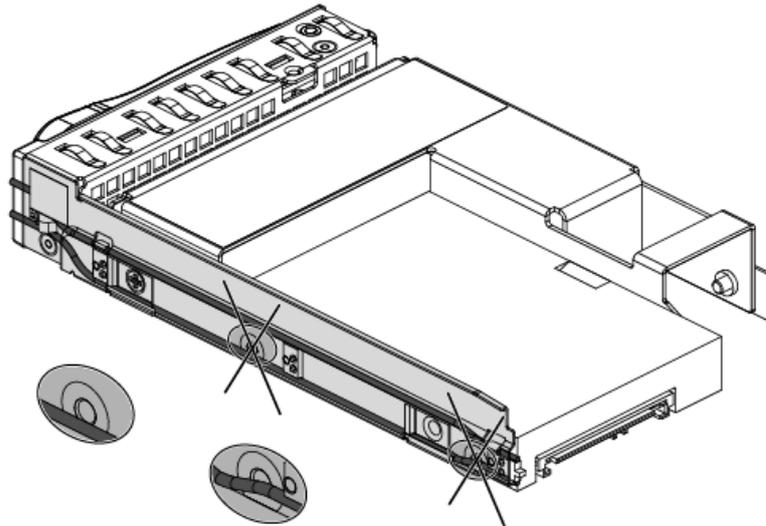
3. Place the adapter assembly into the 3.5-inch hard drive carrier.
4. Secure the adapter assembly to the 3.5-inch hard drive carrier with screws.



**Figure 30. Removing and installing an adapter assembly from the hard drive carrier**

- a. adapter assembly
- b. screw (3)
- c. hard drive carrier

**(i) NOTE:** Do not install screws in the screw holes on the side of SSD, which are occupied by the light pipe.



**Figure 31. Screw holes on the side of SSD occupied by the light pipe**

#### Related references

[Safety instructions](#) on page 62

## SSD and SSD holder

A solid-state drive (SSD, also known as a solid-state disk although it contains neither an actual disk nor a drive motor to spin a disk) is a solid-state storage device that uses integrated circuit assemblies as memory to store data persistently. SSDs have no moving (mechanical) components. SSDs are typically more resistant to physical shock, run silently, have lower access time, and less latency.

## Removing the SSD and SSD Holder

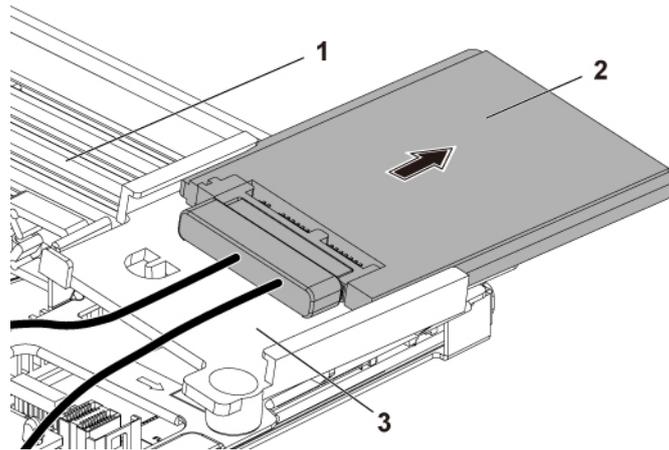
#### Prerequisites

**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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

#### Steps

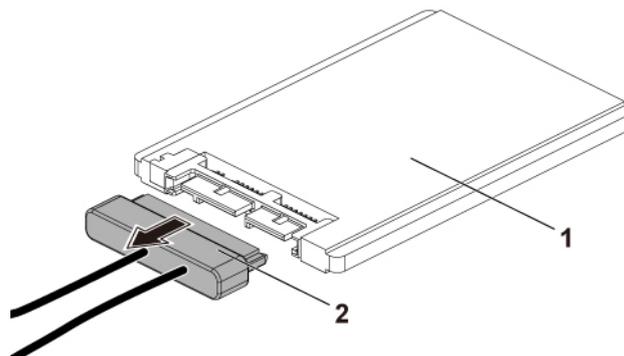
1. Disconnect the MicroSATA cables from the system board.
2. Slide the SSD with the MicroSATA cable out of the SSD holder.



**Figure 32. Removing the SSD with MicroSATA cable**

- a. system-board assembly
- b. SSD with MicroSATA cable
- c. SSD holder

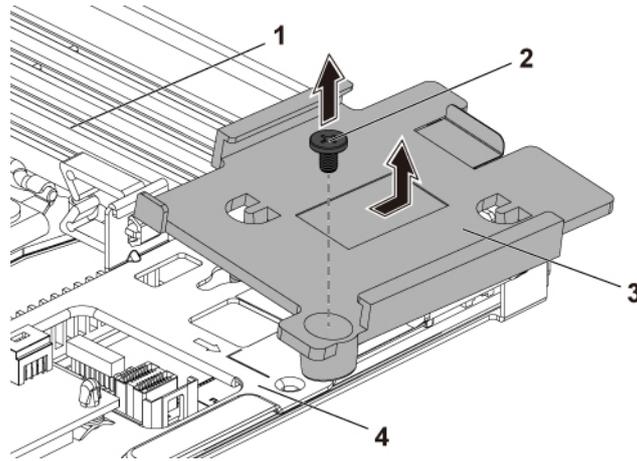
3. Disconnect the MicroSATA cable from the SSD.



**Figure 33. Removing the MicroSATA cable**

- a. SSD
- b. MicroSATA cable

4. Remove the screw that secures the SSD holder to the battery backup unit (BBU) bracket.  
 5. Remove the SSD holder from the BBU bracket.



**Figure 34. Removing the SSD Holder**

- |                          |                |
|--------------------------|----------------|
| 1. system-board assembly | 2. screw       |
| 3. SSD holder            | 4. BBU Bracket |

### Related references

[Safety instructions](#) on page 62

### Related tasks

[Removing a sled](#) on page 87

## Installing the SSD and SSD holder

### Prerequisites

**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.

Follow the safety guidelines listed in the Safety instructions section.

### Steps

1. Place the SSD holder on the battery backup unit (BBU) bracket.
2. Replace the screw that secures the SSD holder to the BBU bracket.
3. Connect the MicroSATA cable to the SSD.
4. Slide the SSD with the MicroSATA cable into the SSD holder.
5. Reconnect all the cables.

### Next steps

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

### Related references

[Safety instructions](#) on page 62

## Related tasks

[Installing a sled](#) on page 89

# DC to DC board

DC to DC board is a power regulating board that supplies power to the 1.8 inch SSD.

## Removing the DC to DC board

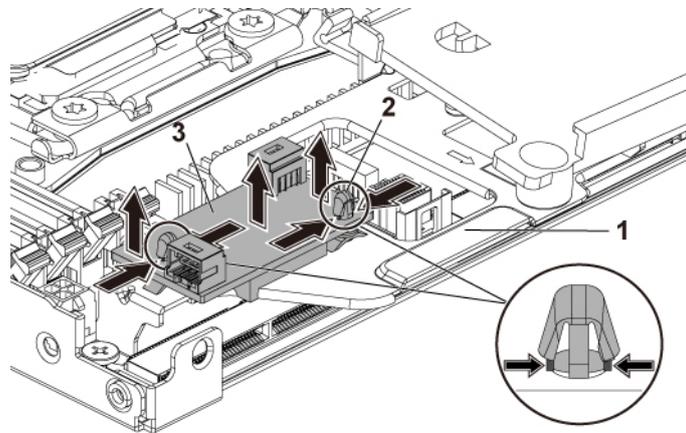
### Prerequisites

**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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

### Steps

1. Disconnect all the cables.
2. Press the space support by using clumper, and lift one side of the DC to DC board.
3. Repeat step 2 for the other space support, and lift the other side of the DC to DC board.
4. Remove the DC to DC board out of the BBU bracket.



**Figure 35. Removing the DC to DC board**

- a. BBU Bracket
- b. Space support (2)
- c. DC to DC board

## Installing the DC to DC board

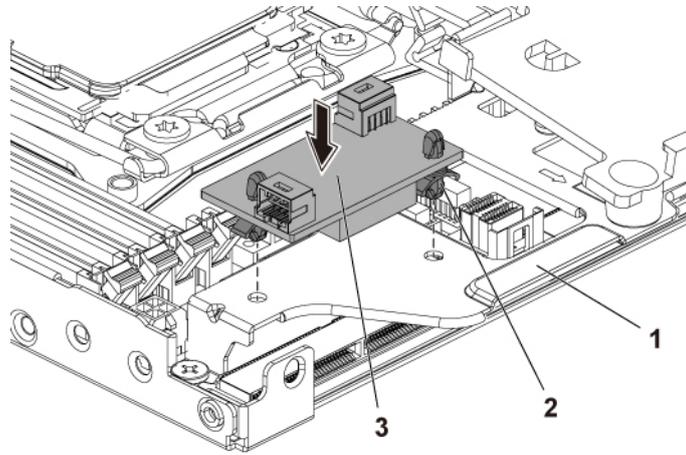
### Prerequisites

**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.

Follow the safety guidelines listed in the Safety instructions section.

**Steps**

1. Align the space supports with the holes on the BBU bracket, and press the DC to DC board until the retaining clips flip.



**Figure 36. Installing the DC to DC board**

- a. BBU Bracket
- b. space support (2)
- c. DC to DC board

2. Reconnect all the cables.

**Next steps**

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

## Cable routings for SSD and DC to DC board and LSI 2008

**About this task**

**Table 25. Cable routings for SSD and DC to DC Board and LSI 2008**

| Item | Cable           | From (LSI 2008 SAS Mezzanine card)                              | To (System board)                            |
|------|-----------------|---|--|
| 1    | Mini-SAS cable  | Mini-SAS connector 4-7 (J4)<br>On LSI 2008 SAS Mezzanine Card   | SAS/SATA connectors 4&5                      |
| 2    |                 | Mini-SAS connector 0 - 3 (J3)<br>On LSI 2008 SAS Mezzanine Card | Mini-SAS HD Connector 0-3                    |
| 3    | MicroSATA cable | 1.8-inch SSD  | Onboard SATA Connector 5 on the system board |
| 4    |                 | 1.8-inch SSD  | DC to DC board (J2)                          |
| 5    | 1x4 power cable | DC to DC to DC board (J1)                                       | High Power Connector on the system board     |

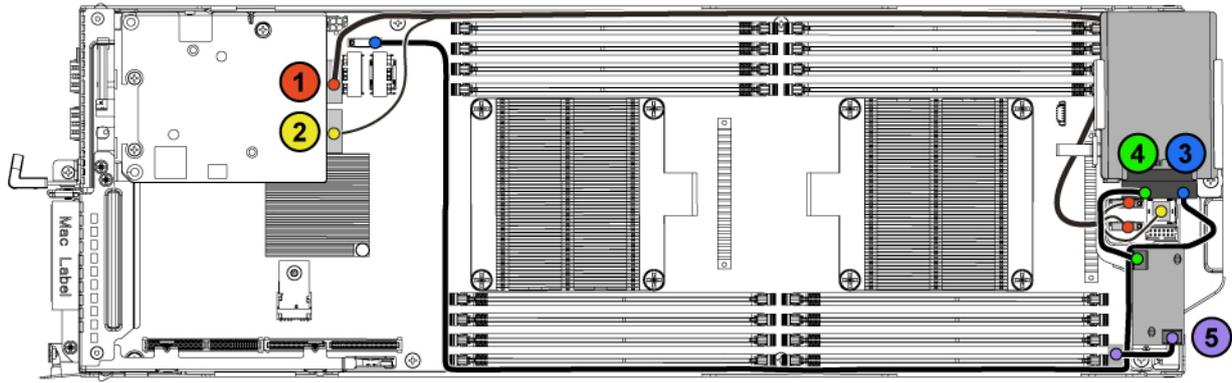


Figure 37. Cable routings for SSD and DC to DC Board and LSI 2008

Table 26. Cable routings for SSD and DC to DC Board and LSI 2008

| Item | Cable           | From (LSI 2008 SAS Mezzanine card)                            | To (System board)                            |
|------|-----------------|---|--|
| 1    | Mini-SAS cable  | Mini-SAS connector 4-7 (J4)<br>On LSI 2008 SAS Mezzanine Card | SAS/SATA connectors 4&5                      |
| 2    |                 | Mini-SAS connector 0-3 (J3)<br>On LSI 2008 SAS Mezzanine Card | Mini-SAS HD Connector 0-3                    |
| 3    | MicroSATA cable | 1.8-inch SSD  | Onboard SATA Connector 5 on the system board |
| 4    |                 | 1.8-inch SSD  | DC to DC board (J2)                          |
| 5    | 1x4 power cable | DC to DC to DC board (J1)                                     | High Power Connector on the system board     |

# SATADOM

## Removing the SATADOM

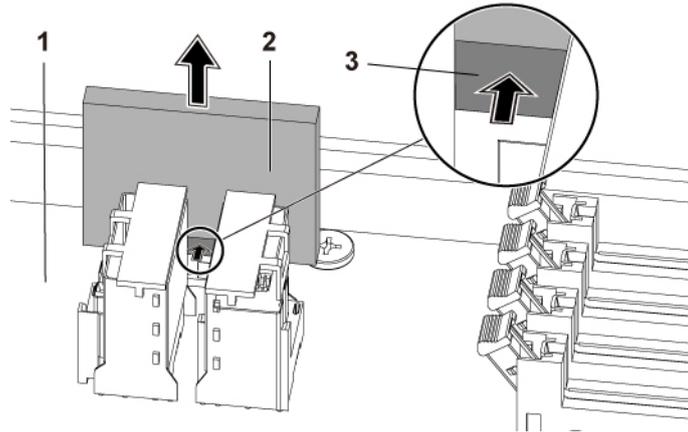
### Prerequisites

**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.

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

### Steps

1. Disconnect the power cable from the SATADOM and the system board.
2. Using a screwdriver, press the metal latch to release the SATADOM.
3. Holding the SATADOM by its edges, pull the SATADOM until the card edge connector disengages from the onboard SATA connector 5 on the system board.



**Figure 38. Removing the SATADOM**

- a. system board assembly
- b. SATADOM
- c. metal latch

**Related references**

[Safety instructions](#) on page 62

**Related tasks**

[Removing a sled](#) on page 87

## Installing the SATADOM

**Prerequisites**

**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.

Follow the safety guidelines listed in the Safety instructions section.

**Steps**

1. Holding the SATADOM by its edges, position it so that the card edge connector aligns with the onboard SATA connector 5 on the system board.
2. Press the SATADOM with your thumbs until it is fully seated.
3. Reconnect all the cables.

**Next steps**

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

**Related references**

[Safety instructions](#) on page 62

**Related tasks**

[Installing a sled](#) on page 89

## Cable routing for SATADOM and LSI 2008

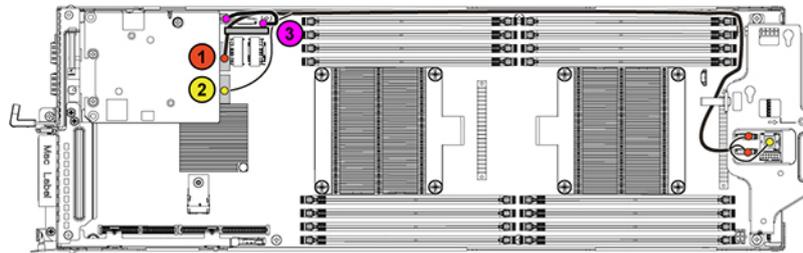


Figure 39. Cable Routing for SATADOM and LSI 2008

Table 27. Cable Routing for SATADOM and LSI 2008

| Item | Cable               | From (LSI 2008 SAS Mezzanine Card)                            | To (System Board)                       |
|------|---------------------|---|---|
| 1    | Mini-SAS cable      | Mini-SAS connector 4-7 (J4)<br>On LSI 2008 SAS Mezzanine Card | SAS/SATA connectors 4&5                 |
| 2    |                     | Mini-SAS connector 0-3 (J3)<br>On LSI 2008 SAS Mezzanine Card | Mini-SAS HD Connector 0-3               |
| 3    | SATADOM power cable | SATADOM   | HDD Power Connector on the system board |

## Power supply units

**NOTE:** Using configurations higher than indicated in the table may change the power supply units (PSU) mode to non-redundant. In non-redundant mode, if the power requirement exceeds the installed system power capacity, the BIOS will throttle the processors performance. Also, when **Processor Power Capping** is enabled, processor throttling occurs on configurations that exceed the cap value.

**NOTE:** Both the PSUs are hot swappable if the system has the power throttling feature enabled.

The following table lists the maximum supported configurations where power supply unit (PSU) redundancy is guaranteed:

Table 28. PSUs configuration

| PSU    | Four systems boards   |
|--------|---|
| 1400 W | Up to two 120 W processor per system board, three hard drives per system board, and four memory modules per system board  |
| 1600 W | Up to two 120 W processor per system board, three hard drives per system board, and eight memory modules per system board |

## Removing a power supply unit

### Prerequisites

**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.

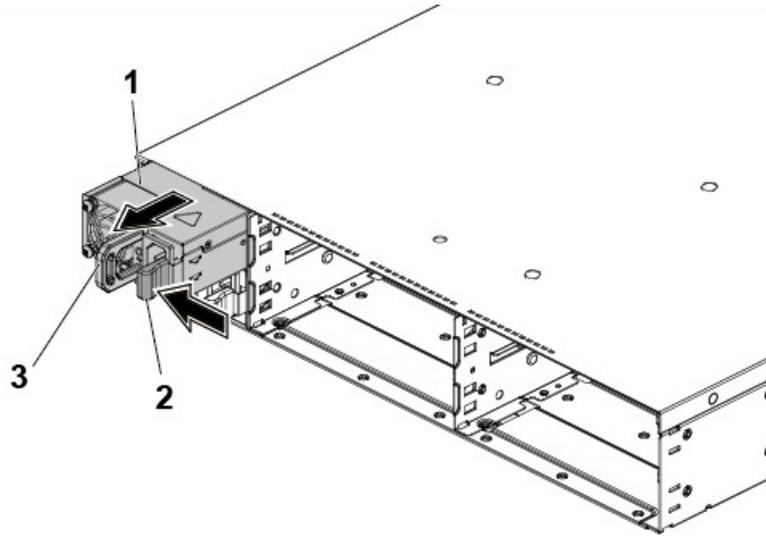
**CAUTION:** The system requires at least one working power supply unit (PSU) to operate.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Disconnect the power cable from the power source and the PSU, and disconnect the peripherals.

### Steps

Press the release lever and by using the handle, slide the PSU out of the system.

**NOTE:** Removing the PSU may require considerable force.



**Figure 40. Removing and installing a PSU**

- a. PSU
- b. release lever
- c. handle

### Next steps

1. Install the PSU.
2. Reconnect all disconnected cables and peripherals.
3. Follow the procedure listed in the After working inside your system section.

### Related references

[Safety instructions](#) on page 62

## Installing a power supply unit

### Prerequisites

**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:** The system requires at least one power supply unit (PSU) to operate normally.

**NOTE:** When installing a new PSU in a system with two PSUs, allow several seconds for the system to recognize the PSU and determine its status.

**NOTE:** The maximum output power is printed on the PSU label.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Verify that both PSUs are of the same type and have the same maximum output power.

### Steps

Slide the PSU into the chassis until the PSU is fully seated and the release lever locks into place.

### Next steps

Follow the procedure listed in the After working inside your system section.

### Related references

[Safety instructions](#) on page 62

## System board tray

### Removing the system board tray

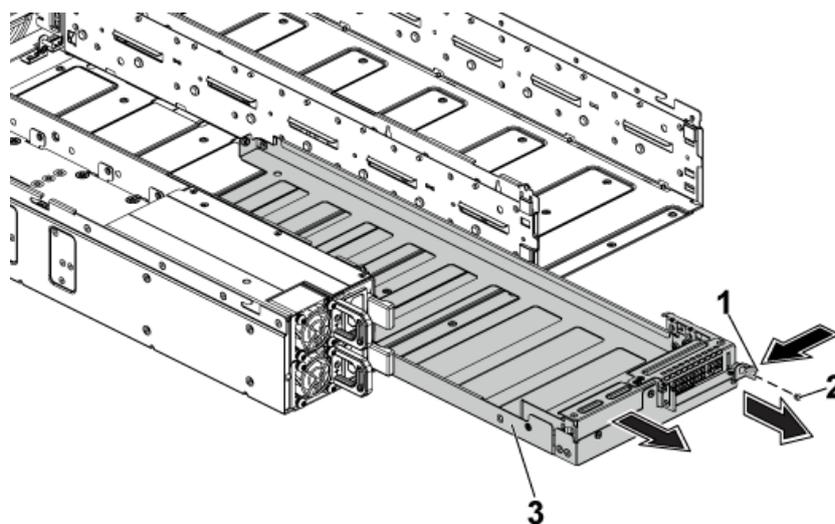
#### Prerequisites

**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.

Follow the safety guidelines listed in the Safety instructions section.

#### Steps

1. Remove the screw that secures the retaining latch.
2. Press the retaining latch and slide the system board tray out of the chassis.



**Figure 41. Removing and installing a system board tray**

- a. retaining latch
- b. screw
- c. system board tray

## Related references

[Safety instructions](#) on page 62

# Installing the system board tray

## Prerequisites

**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.

Follow the safety guidelines listed in the Safety instructions section.

## Steps

1. Slide the system board tray into the chassis until it snaps into place.
2. Replace the screw that secures the retaining latch.

## Related references

[Safety instructions](#) on page 62

# System board assembly

## Removing a sled

## Prerequisites

**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.

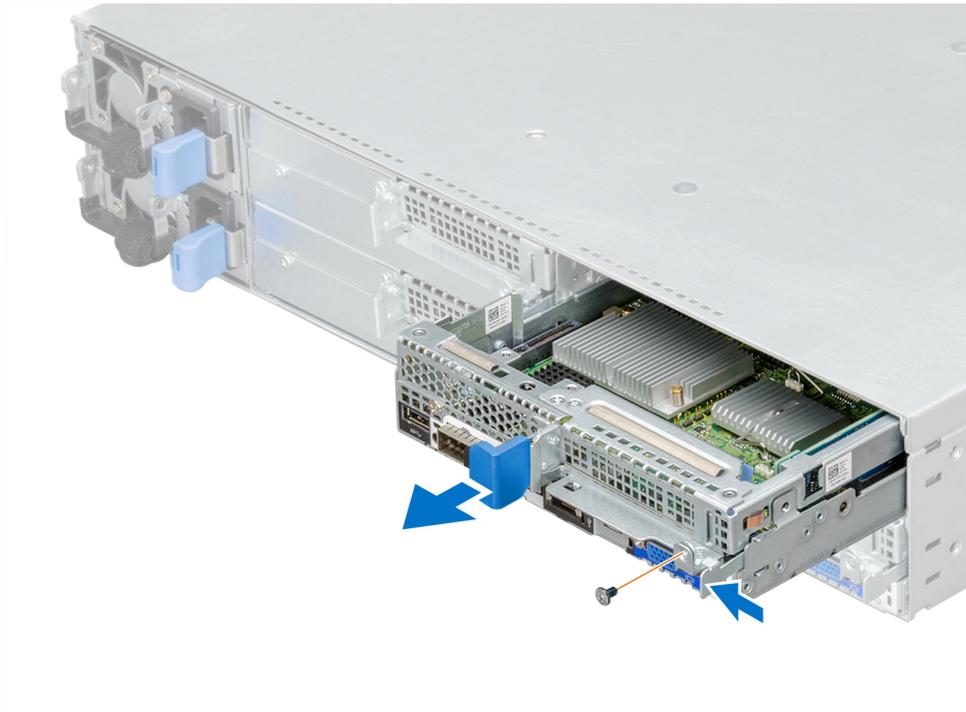
1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the Phillips #2 screwdriver ready.

**NOTE:** If the sled is not being replaced immediately, a sled blank needs to be installed to ensure proper cooling of the system.

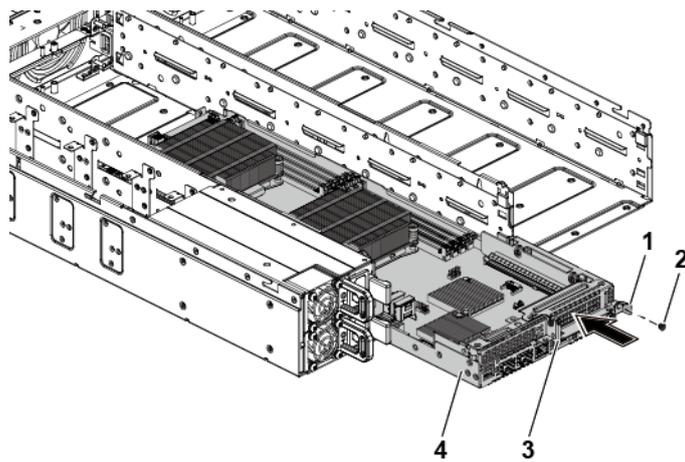
**NOTE:** The process of removing a sled blank is the same as the sled.

## Steps

1. Remove the screw that secures the retaining latch.
2. Press the retaining latch and by using the handle, slide the sled out of the enclosure.



**Figure 42. Removing a sled**



**Figure 43. Removing and installing a system board assembly**

- |                    |                          |
|--------------------|--------------------------|
| 1. retaining latch | 2. screw                 |
| 3. handle          | 4. system board assembly |

**Next steps**

1. Install the sled or sled blank into the enclosure.
2. Follow the procedure listed in the After working inside your system section.

**Related references**

[Safety instructions](#) on page 62

# Installing a sled

## Prerequisites

**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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If installed, remove the sled blank from the enclosure.  
**NOTE:** The process to remove the sled blank is the same as removing a sled.
4. Keep the Phillips #2 screwdriver ready.

## Steps

1. Slide the sled into the enclosure until it locks into place.
2. Replace the screw that secures the retaining latch.

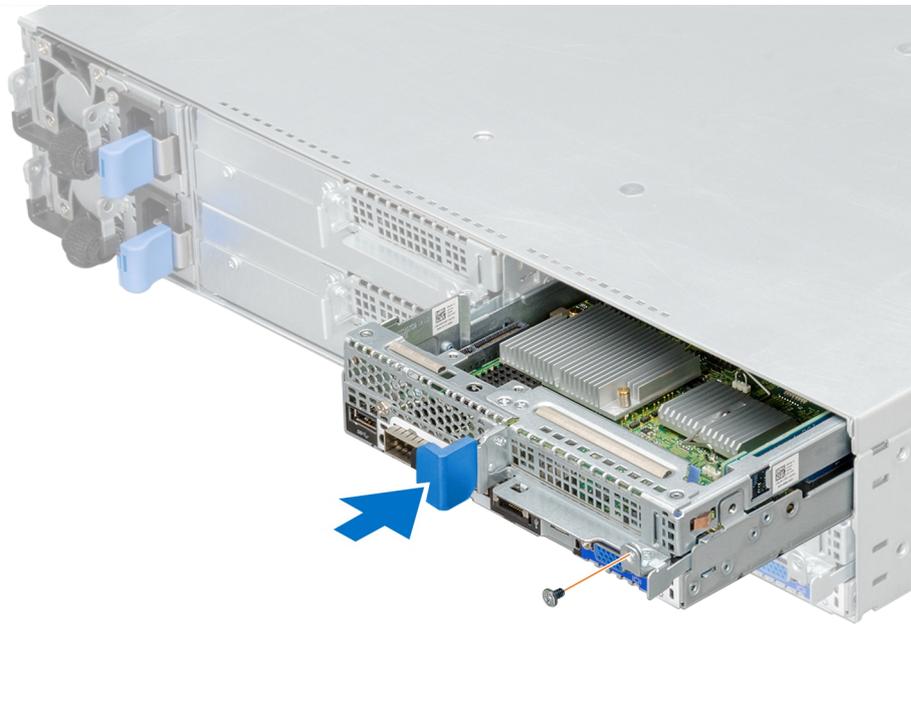


Figure 44. Installing a sled

## Next steps

Follow the procedure listed in the After working inside your system section.

**NOTE:** To add the Service Tag of the system board to match the Service Tag of the physical node, contact Dell Technical Support.

## Related references

[Safety instructions](#) on page 62

# Cooling shroud

The cooling shroud aerodynamically directs the airflow across the entire system. The airflow passes through all the critical parts of the system, where the vacuum pulls air across the entire surface area of the heat sink, thus allowing increased cooling.

## Removing the cooling shroud

### Prerequisites

**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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.

### Steps

1. Pressing the locks on either side of the cooling shroud, lift the cooling shroud out of the sled.

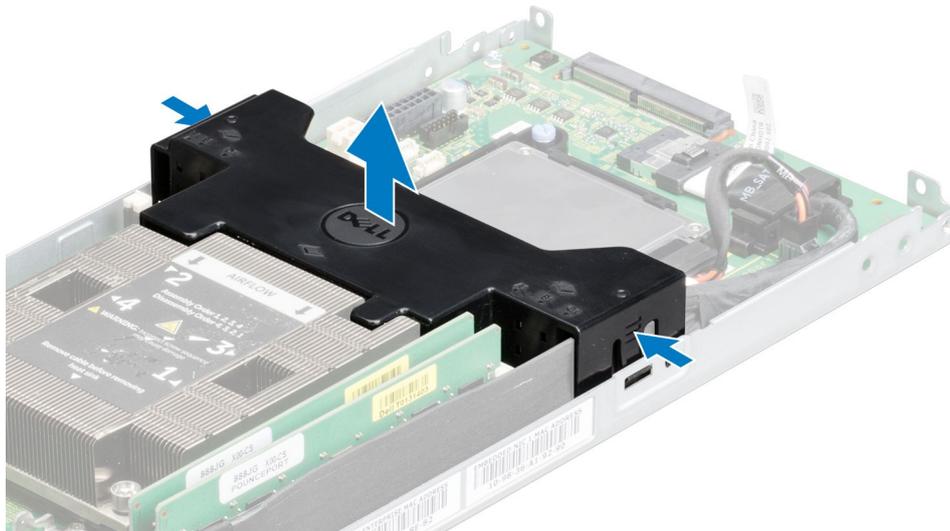
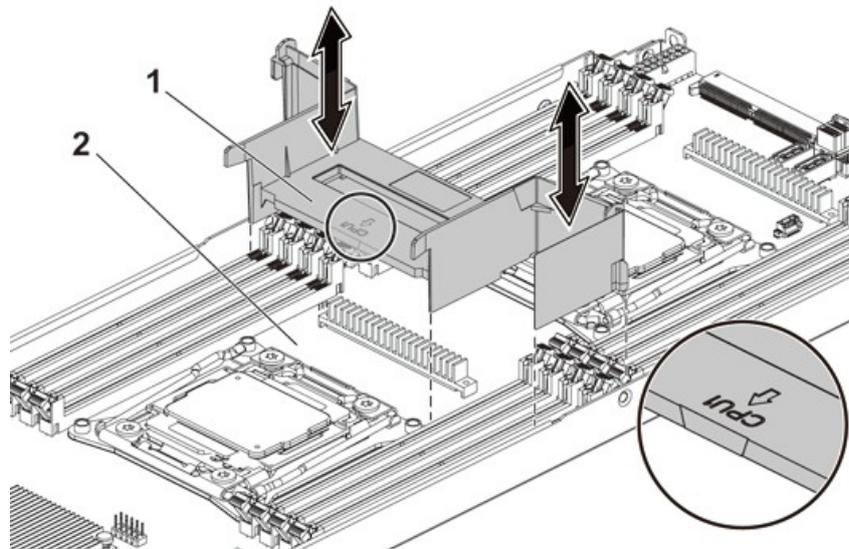


Figure 45. Removing the cooling shroud

2. Press the four latches along the direction of the arrows, and then lift the cooling shroud out of the system board assembly.



**Figure 46. Removing the cooling shroud**

- a. cooling shroud
- b. system board assembly

#### Next steps

1. Install the cooling shroud.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

#### Related references

[Safety instructions](#) on page 62

#### Related tasks

[Removing a sled](#) on page 87

## Installing the cooling shroud

#### Prerequisites

**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.

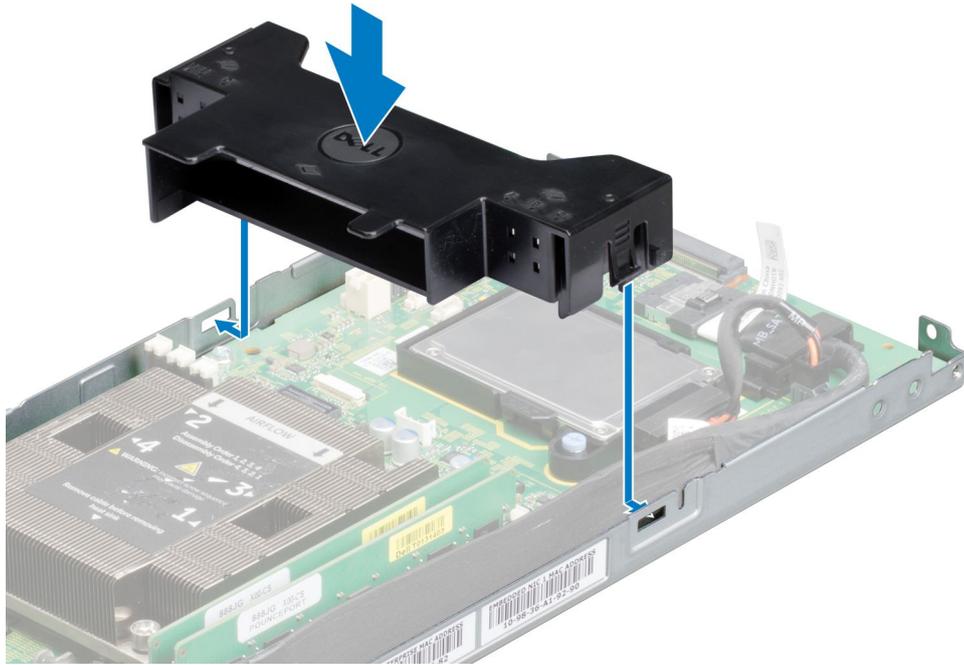
1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

#### Steps

1. Insert the cooling shroud into the sled, aligning the latches with the lock slots on the sled chassis.

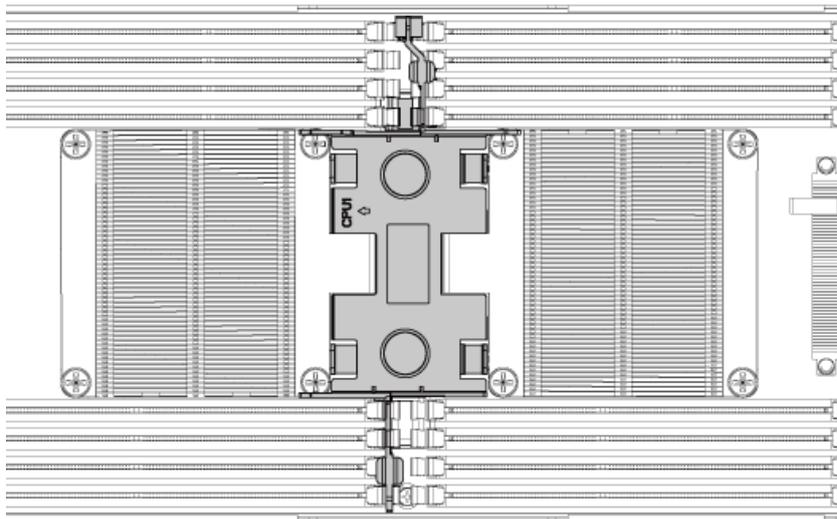
**NOTE:** Ensure that the SATA cable is routed through the cooling shroud cable guide slot.

2. Press the cooling shroud until the locks click into place.



**Figure 47. Installing the cooling shroud**

3. Replace the cooling shroud into the system board assembly. Make sure that the four latches are properly engaged with the heat sink bases and the latches click in place.
- NOTE:** When installing the cooling shroud, make sure the arrow of the mark on the cooling shroud points to processor 1, and keep the flat surface of the cooling shroud horizontal.



**Figure 48. The top view of the installed cooling shroud**

**Next steps**

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

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Installing a sled](#) on page 89

# Heat sinks

The heat sink transfers heat away from the processor as the processor is unable to dissipate sufficient heat to moderate this temperature. The heat sink is designed to maximize its surface area in contact with the cooling medium surrounding it, such as the air. Thermal grease improves the heat sink's performance by filling air gaps between the heat sink and the heat spreader on the processor.

## Removing the heat sink

### Prerequisites

 **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.

 **NOTE:** Place the foolproof pins of two processor heat sinks facing inside.

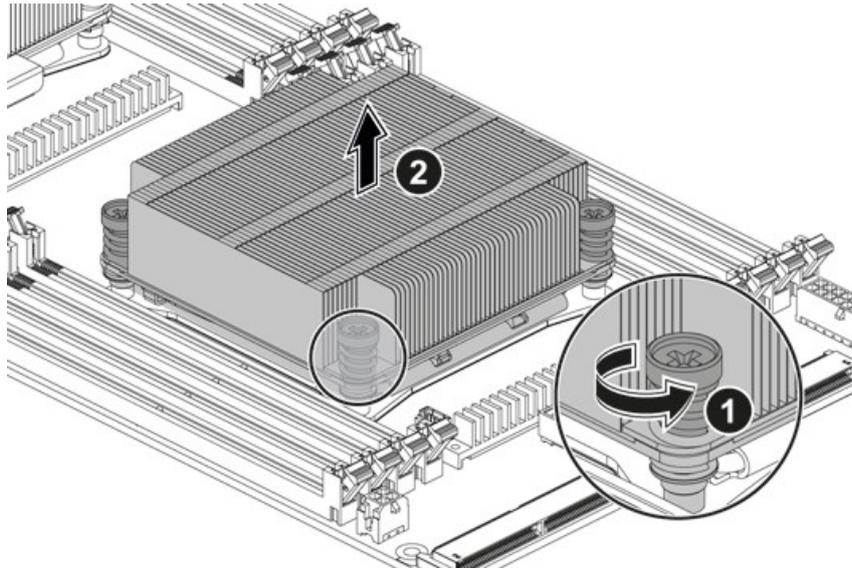
1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

 **WARNING:** The heat sink may be hot to touch for some time after the system has been powered down. Allow the heat sink to cool before removing it.

 **CAUTION:** Never remove the heat sink from a processor unless you intend to remove the processor. The heat sink is necessary to maintain proper thermal conditions.

### Steps

1. Using a Phillips screwdriver, loosen one of the heat sink retention screws. Wait for 30 seconds for the heat sink to loosen from the processor.
2. Remove the other heat sink retention screws.
3. Lift the heat sink off the processor and set the heat sink aside with thermal grease side facing up.



**Figure 49. Removing and installing the heat sink**

- a. screw (4)
- b. heat sink

#### Related references

[Safety instructions](#) on page 62

#### Related tasks

[Removing a sled](#) on page 87

## Installing the heat sink

#### Prerequisites

**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.

Follow the safety guidelines listed in the Safety instructions section.

#### Steps

1. Using a clean lint-free cloth, remove the thermal grease from the heat sink.
2. Apply new thermal grease evenly to the center of the top of the new processor.

**CAUTION:** Using excess thermal grease can cause grease to contact the processor shield, which can cause contamination of the processor socket.

3. Place the heat sink on the processor.
4. Using a Phillips screwdriver, tighten the heat sink retention screws.

#### Next steps

Replace the system board assembly.

#### Related references

[Safety instructions](#) on page 62

## Related tasks

[Installing a sled](#) on page 89

# Processors

The processor contains memory, peripheral interfaces, and other components of the system. It may have multiple cores. The system may have multiple processors present. The C6320 system board supports the E5-2600 v3 and E5-2600 v4 processor series.

## Removing a processor

### Prerequisites

**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.

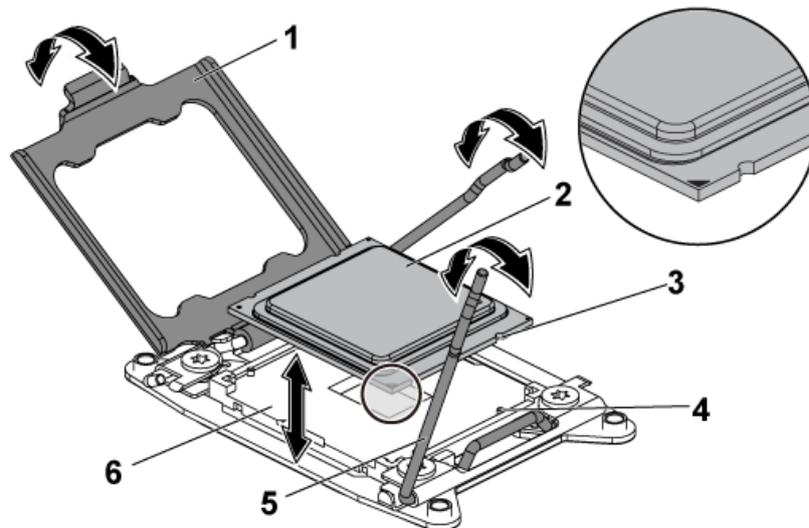
1. Follow the safety guidelines listed in the Safety instructions section.
2. Remove the system board assembly.
3. Remove the heat sink.

**CAUTION:** The processor is held in its socket under strong pressure. The release lever can spring up suddenly if not firmly grasped.

### Steps

1. Position your thumbs firmly over the processor socket release levers and release the levers from the locked position. Rotate the levers 90 degrees upward until the processor is released from the socket.
2. Rotate the processor shield upward and out of the way.
3. Lift the processor out of the socket and leave the socket release levers up so that the socket is ready for the new processor.

**CAUTION:** Be careful not to bend any of the pins on the CPU socket when removing the processor. Bending the pins can permanently damage the system board. Be sure to properly align the processor notch to the socket and insert straight down. Do not move from side to side.



**Figure 50. Removing and installing a processor**

- |                           |                   |
|---------------------------|-------------------|
| 1. processor shield       | 2. processor      |
| 3. notch in processor (4) | 4. socket key (4) |

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Removing a sled](#) on page 87

[Removing the heat sink](#) on page 93

# Installing a processor

## Prerequisites

**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.

**NOTE:** When installing only one processor, the processor must be installed in the processor 0 (for the socket location, see the System board connectors section).

**NOTE:** If you are upgrading your processors, prior to upgrading your system, download and install the latest system BIOS version from [Dell.com/support/home](http://Dell.com/support/home). Follow the instructions included in the file download to install the update on your system.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Unpack the processor if it has not been used previously.
  - NOTE:** If the processor has already been used, remove any thermal grease from the top of the processor by using a lint-free cloth.
3. Remove the system board assembly.

## Steps

1. Align the processor with the socket keys on the CPU socket.

**CAUTION:** Positioning the processor incorrectly can permanently damage the system board or the processor. Be careful not to bend the pins in the CPU socket.

2. With the release lever on the processor socket in the open position, align the processor with the socket keys and set the processor lightly in the socket.

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

3. Close the processor shield.
4. Rotate the socket release lever down until it snaps into place.
5. Using a clean lint-free cloth, remove the thermal grease from the heat sink.
6. Apply thermal grease evenly to the center of the top of the new processor.

**CAUTION:** Using excess thermal grease can cause grease to contact the processor shield, which can cause contamination of the processor socket.

7. Place the heat sink on the processor.
8. Using a Phillips screwdriver, tighten the heat sink retention screws.

## Next steps

1. Replace the system board assembly.

2. Reconnect the system to its electrical outlet and turn on the system, including any attached peripheral devices.
3. Press F2 to enter the System Setup program, and check that the processor information matches the new system configuration. See the System setup options at boot section.

### Related concepts

[System Setup](#) on page 34

### Related references

[Safety instructions](#) on page 62

[C6320 system board connectors](#) on page 162

### Related tasks

[Removing a sled](#) on page 87

[Installing the heat sink](#) on page 94

[Installing a sled](#) on page 89

## Expansion card assembly and expansion card

The expansion card in the system is a printed circuit board that can be inserted into an expansion slot on the system board riser card to add functionality to the system through the expansion bus.

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

## Removing the expansion card

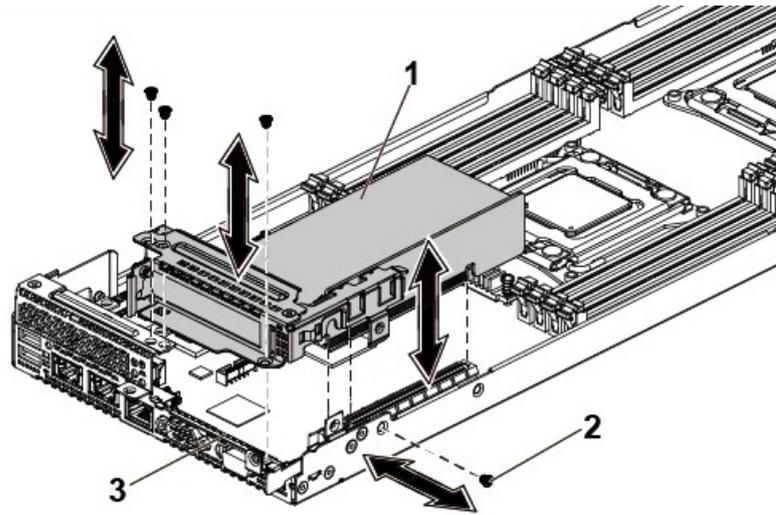
### Prerequisites

 **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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

### Steps

1. Remove the screws that secure the expansion card assembly.
2. Lift the expansion card assembly out of the system board assembly.



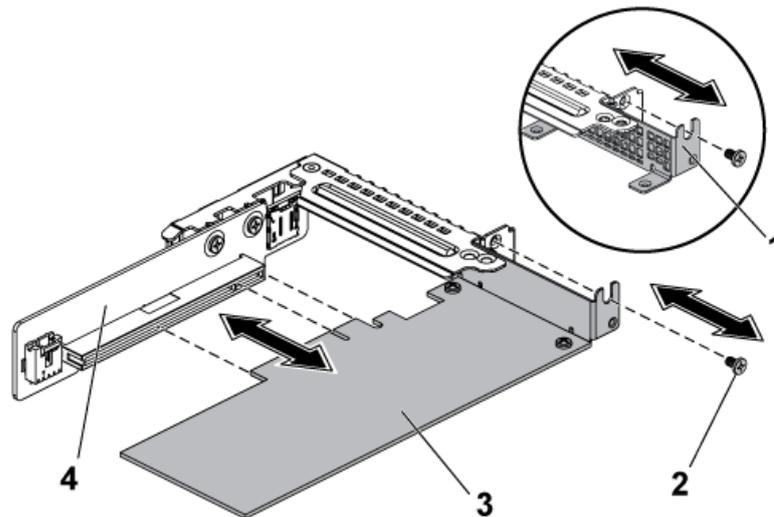
**Figure 51. Removing the expansion card assembly**

- a. expansion card assembly
- b. screw (4)
- c. system board assembly

3. Remove the screw that secures the expansion card.
4. Hold the expansion card by its edges, and carefully remove it from the riser card.

**i** **NOTE:** If you are removing the card permanently, install an expansion card slot cover over the empty expansion slot opening, and close the expansion card latch.

**i** **NOTE:** You must install a filler bracket over an empty expansion slot to maintain Federal Communications Commission (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.



**Figure 52. Removing the expansion card**

- 1. expansion card slot cover
- 2. screw
- 3. expansion card
- 4. riser card

**Related references**

[Safety instructions](#) on page 62

## Related tasks

[Removing a sled](#) on page 87

# Installing the expansion card

## Prerequisites

**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:** Expansion cards can only be installed in the slots on the expansion card riser. Do not attempt to install expansion cards directly into the riser connector on the system board.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Unpack the expansion card and prepare it for installation. For instructions, see the documentation accompanying the card.

## Steps

1. Remove the screws that secure the expansion card assembly.
2. Lift the expansion card assembly away from the system board assembly.
3. Remove the screw that secures the filler bracket.
4. Hold the filler bracket by its edges, and carefully remove it from the riser card.
  - NOTE:** Retain this bracket in case you need to remove the expansion card. Filler brackets must be installed over empty expansion cards slots 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.
5. Holding the card by its edges, position the card so that the card edge connector aligns with the riser card on the riser card.
6. Insert the card edge connector firmly into the riser card until the card is fully seated.
7. Replace the screw that secures the expansion card.
8. Place the expansion card assembly into the system board assembly.
9. Install the screws that secure the expansion card assembly.

## Next steps

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

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Removing a sled](#) on page 87

[Installing a sled](#) on page 89

# PCI-E slot priority

There is no slot priority for PowerEdge C6320 as the C6320 system board has only one PCI-E Gen 3 x8 mezzanine card slot. For the system with 1U C6320 system board assembly, only one PCI-E card can be installed in the PCI-E Gen3 x16 slot 1.

# PERC cards

Dell PowerEdge C6320 supports H330 and 12 Gbps SAS HBA cards. Dell PowerEdge C6320 also supports H730 with processor under 105 W for thermal restrictions.

## Removing the PERC card

### Prerequisites

 **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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

### Steps

1. Locate the PERC card on the system board.
2. To disconnect the storage controller cable:
  - a. Remove the screws that secure the cable to the card.
  - b. Hold the cable on both sides of the cable connector, and pull the cable away from the PERC card.
3. Angle the card so that the other end of the card disengages from the storage-controller card holder on the system board.

### Related references

[Safety instructions](#) on page 62

### Related tasks

[Before working inside your system](#) on page 63

[Installing the PERC card](#) on page 100

## Installing the PERC card

### Prerequisites

 **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.

Follow the safety guidelines listed in the Safety instructions section.

### Steps

1. Locate the PERC card connector on the system board and align one end of the card with the card holder on the system board.

 **CAUTION:** To prevent damage to the card, you must hold the card by its edges only.

2. Lower the other end of the card into the card holder on the system board.
3. Connect the storage controller cable:
  - a. Hold the cable on both sides of the cable connector, and connect to the PERC card.
  - b. Attach the screws to secure the cable to the card.
4. Connect the SAS data cable connector to the card.
5. Route the SAS data cable through the clip on the card and through the channel on the inner side of the chassis.

6. Attach the connector labeled "SAS A" to connector SAS A on the backplane, and attach the connector labeled "SAS B" to connector SAS B on the backplane.

### Next steps

Follow the procedure listed in the After working inside your system section.

## Riser card

### Optional riser cards

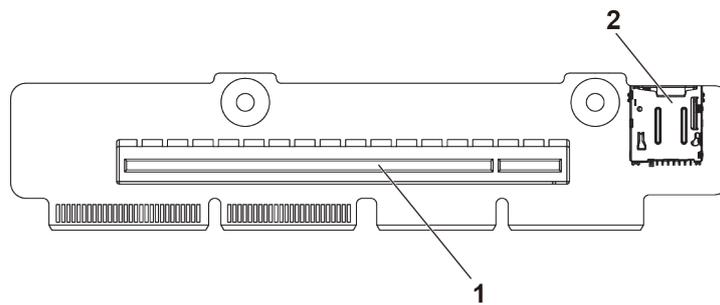


Figure 53. 1U riser card for 1U node

1. PCI-E Gen 3 x16
2. microSD card socket

## Removing the riser card

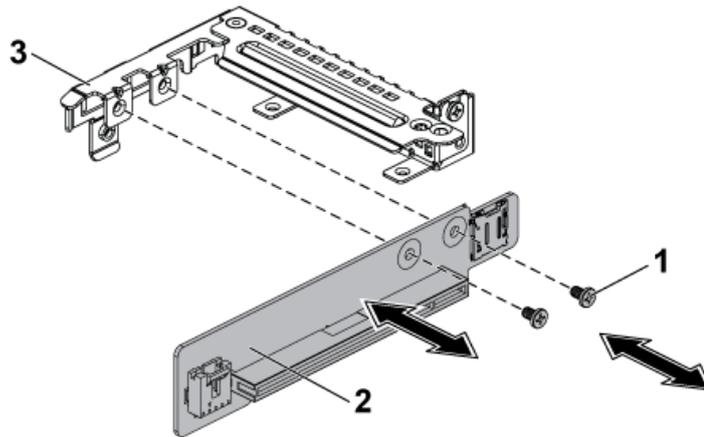
### Prerequisites

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1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. If installed, remove the expansion card.
6. Keep the Phillips #2 screwdriver ready.

### Steps

1. Remove the screws that secure the riser card to the expansion card bracket.
2. Lift the riser card away from the expansion card bracket.



**Figure 54. Removing and installing the riser card**

- a. screw (2)
- b. riser card
- c. expansion card bracket

#### Next steps

1. Install the riser card.
2. If removed, install the expansion card.
3. Install the expansion card riser assembly.
4. Install the sled into the enclosure.
5. Follow the procedure listed in the After working inside your system section.

#### Related references

[Safety instructions](#) on page 62

#### Related tasks

[Removing a sled](#) on page 87

[Removing the expansion card](#) on page 97

## Installing the riser card

#### Prerequisites

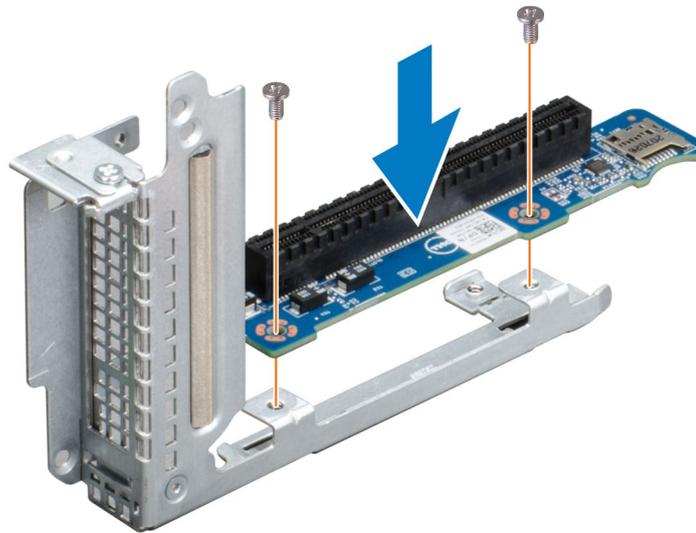
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1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. If installed, remove the expansion card.
6. Keep the Phillips #2 screwdriver ready.

#### Steps

1. Place the riser card into the expansion card bracket.

2. Replace the screws that secure the riser card to the expansion card bracket.



**Figure 55. Installing the riser card**

**Next steps**

1. If removed, install the expansion card.
2. Install the expansion card riser assembly.
3. Install the sled into the enclosure.
4. Follow the procedure listed in the After working inside your system section.

**Related references**

[Safety instructions](#) on page 62

**Related tasks**

[Installing the expansion card](#) on page 99

[Installing a sled](#) on page 89

## Optional mezzanine cards

The optional Mezzanine cards supported on C6320 are:

**Table 29. Supported mezzanine cards**

| Type            | Card                  |
|-----------------|-----------------------|
| HBA/RAID        | LSI 2008 mezzanine    |
| Dual Port 1GbE  | Powerville            |
| Dual Port 10GbE | Twinville             |
| Single port FDR | ConnectX3 VPI         |
| Dual Port QSFP+ | ConnectX3 VPI         |
| Dual Port SFP+  | ConnectX3-Pro         |
| Dual Port 10GbE | Intel 82599 mezzanine |
| Dual Port QSFP+ | ConnectX4 VPI         |

**Table 29. Supported mezzanine cards (continued)**

| Type              | Card          |
|-------------------|---------------|
| Single Port QSFP+ | ConnectX4 VPI |
| Dual Port SFP     | ConnectX4 LX  |

## Removing the optional LSI 2008 SAS mezzanine card

### Prerequisites

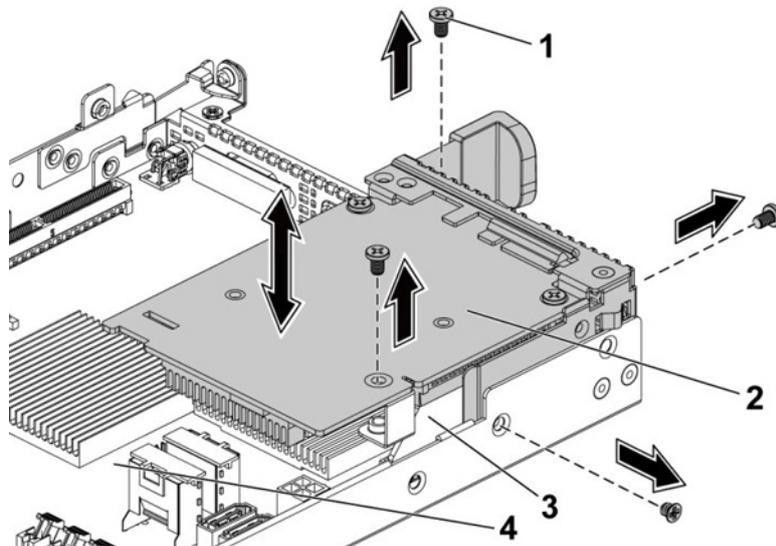
**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

**NOTE:** The LSI 2008 SAS mezzanine card is seated in PCI-E Gen3 x8 mezzanine slot 3 on the system board, which is not active in 1-processor configuration. See the C6320 system board connectors section.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

### Steps

1. Disconnect all the cables from the mezzanine card.
2. Remove the screws that secure the LSI 2008 SAS mezzanine card.
3. Lift the mezzanine card out of the system-board assembly.



**Figure 56. Removing and installing the LSI 2008 SAS mezzanine card**

1. screw (3)
2. LSI 2008 SAS mezzanine card
3. card bridge card
4. system board assembly

### Related references

[Safety instructions](#) on page 62

[C6320 system board connectors](#) on page 162

# Installing the optional LSI 2008 SAS mezzanine card

## Prerequisites

**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.

Follow the safety guidelines listed in the Safety instructions section.

## Steps

1. Place the LSI 2008 SAS mezzanine card on the system board assembly.
2. Install the screws that secure the LSI 2008 SAS mezzanine card.
3. Reconnect all the cables to the LSI 2008 SAS mezzanine card.

## Next steps

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

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Installing a sled](#) on page 89

# Cable routing for LSI 2008 SAS mezzanine card

## Steps

1. Connect the mini-SAS/SGPIO cable to the LSI 2008 SAS Mezzanine card, and connect the other end of the cable to the corresponding connectors on the system board.
2. Connect the mini-SAS cable to the LSI 2008 SAS Mezzanine card, and connect the other end of the cable to the corresponding connector on the system board.

**NOTE:** The SGPIO cable must be connected before the LSI 2008 SAS Mezzanine card is installed.

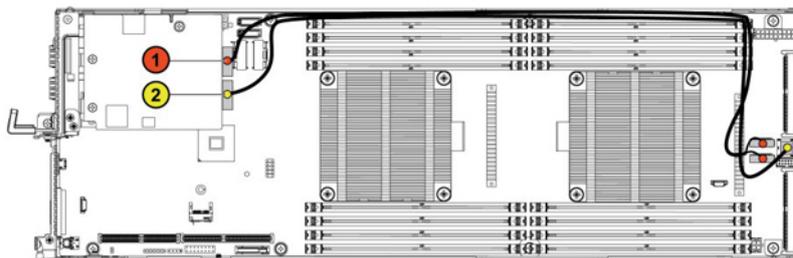
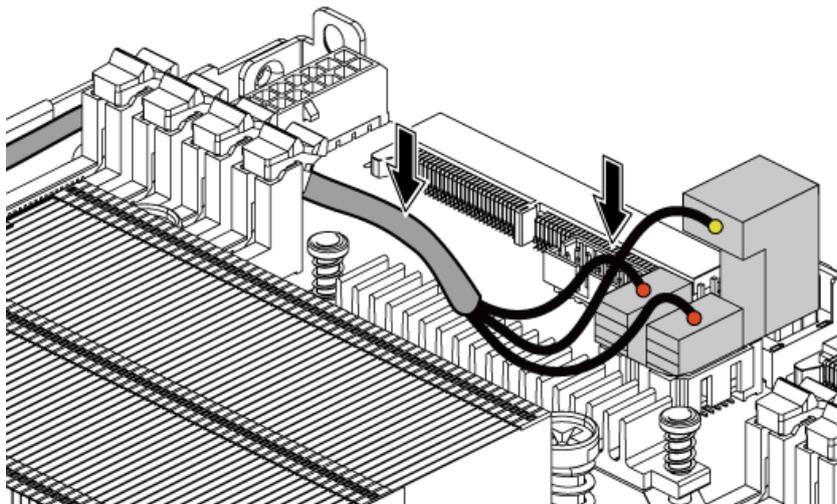


Figure 57. Cable routing for LSI 2008 SAS mezzanine card

**Table 30. Cable routing for LSI 2008 SAS mezzanine card**

| Item | Cable                | From (LSI 2008 SAS mezzanine card) | To (system board)   |
|------|----------------------|------------------------------------|---|
| 1    | Mini-SAS/SGPIO cable | Mini-SAS connector 4-7 (J4)        | SAS/SATA input connector 4 and SAS/SATA input connector 5 |
| 2    | Mini-SAS cable       | Mini-SAS connector 0-3 (J3)        | Mini SAS HD connector 0-3                                 |

3. Press down on the cables, and ensure the cables are routed lower than the height of the CPU heat sinks.



**Figure 58. Cable routing down for LSI 2008 SAS mezzanine card (1U node)**

## Removing the 1GbE mezzanine card

### Prerequisites

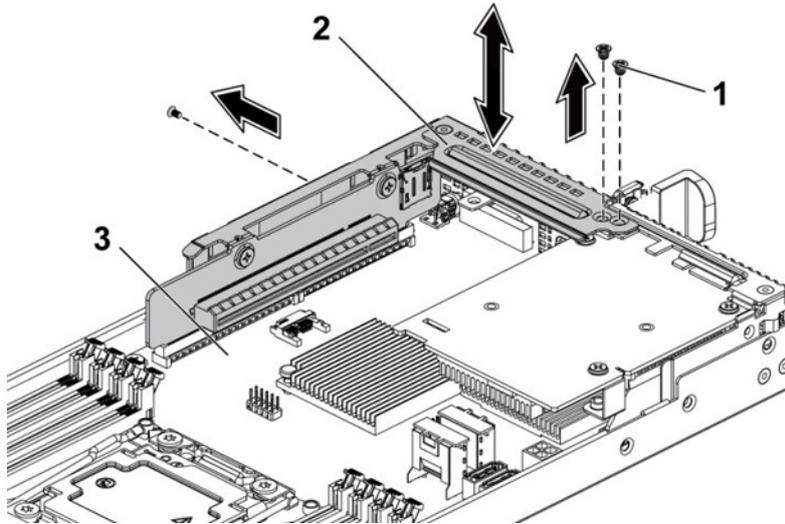
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**NOTE:** The 1GbE mezzanine card is seated in PCI-E Gen3 x8 mezzanine slot 3 on the system board, which is not active in a one processor configuration. See the C6320 system board connectors section.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.
5. Disconnect all the cables from the 1GbE mezzanine card.

### Steps

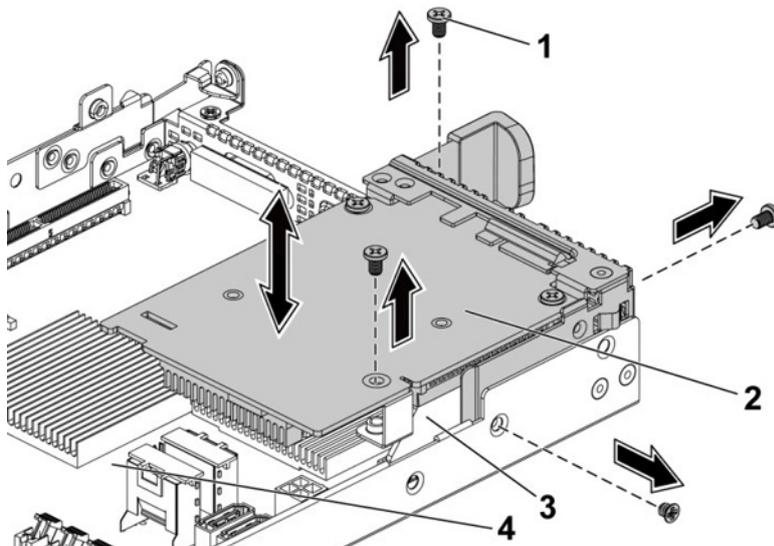
1. Remove the screws that secure the expansion card bracket.
2. Lift the expansion card bracket out of the system board assembly.



**Figure 59. Removing and installing the expansion card bracket**

- a. screw (3)
- b. expansion card bracket
- c. system board assembly

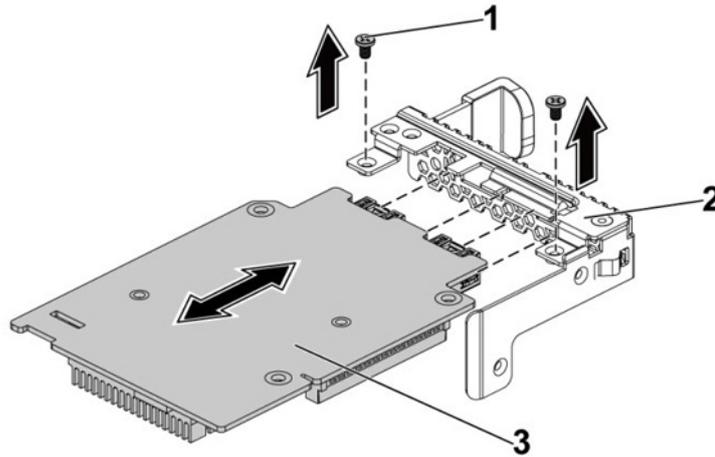
3. Remove the screws that secure the 1GbE mezzanine card assembly.
4. Lift the 1GbE mezzanine card assembly away from the card bridge board on the system board.



**Figure 60. Removing and installing the 1GbE mezzanine card assembly**

- 1. screw (4)
- 2. 1GbE mezzanine card assembly
- 3. mezzanine card bridge board
- 4. system board assembly

5. Remove the screws that secure the 1GbE mezzanine card to the bracket.
6. Remove the 1GbE mezzanine card from the bracket.



**Figure 61. Removing and installing the 1GbE mezzanine card**

- a. screw (2)
- b. mezzanine card bracket
- c. 1GbE mezzanine card

#### Related references

[Safety instructions](#) on page 62

[C6320 system board connectors](#) on page 162

#### Related tasks

[Removing a sled](#) on page 87

## Installing the 1GbE mezzanine card

#### Prerequisites

**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.

Follow the safety guidelines listed in the Safety instructions section.

#### Steps

1. Attach the 1GbE mezzanine card to the bracket by aligning the four ports to the corresponding port slots on the bracket.
2. Install the screws to secure the 1GbE mezzanine card to the bracket.
3. Install the 1GbE mezzanine card assembly to the card bridge board on the system board assembly.
4. Install the screws to secure the 1GbE mezzanine card assembly to the system board assembly.
5. Place the expansion card bracket into the system board assembly.
6. Replace the screws that secure the expansion card bracket.

**NOTE:** For more information about setting VLAN in VMware for 1GbE mezzanine card, see [VMware\\* vSphere ESX 5.x iSCSI Boot Support with VLANs](#).

#### Next steps

1. Reconnect all the cables to the 1GbE mezzanine card.
2. Replace the system board assembly.

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

### Related references

[Safety instructions](#) on page 62

### Related tasks

[Installing a sled](#) on page 89

## Removing the 10GbE mezzanine card

### Prerequisites

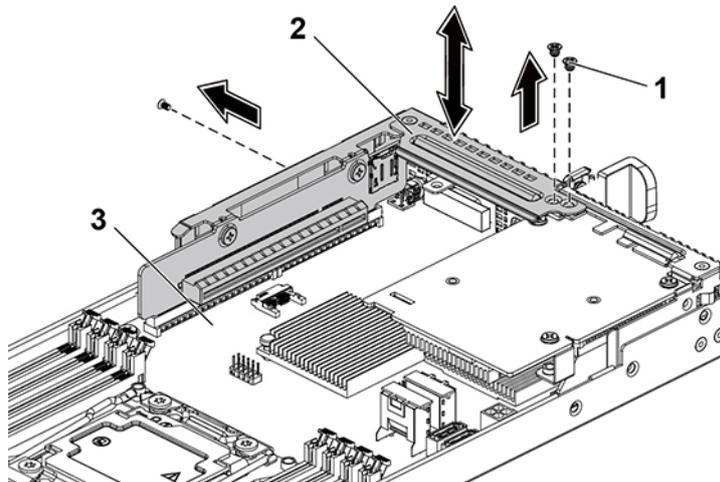
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**NOTE:** The 10GbE mezzanine card is seated in PCI-E Gen3 x8 mezzanine slot 3 on the system board, which is not active in 1-processor configuration. See the C6320 system board connectors section.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

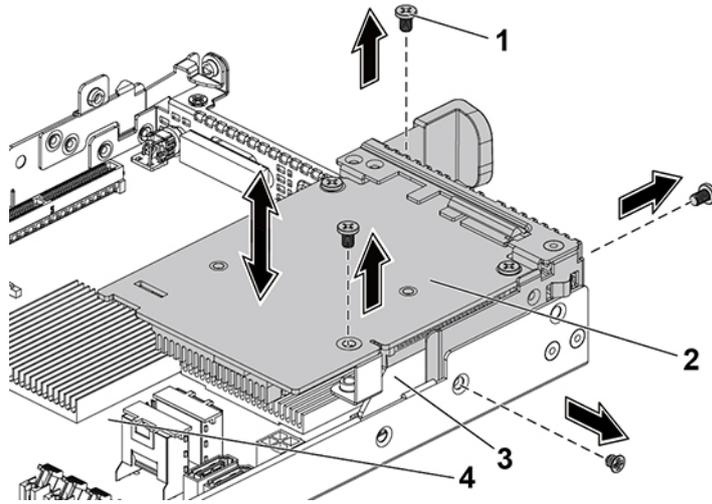
### Steps

1. Disconnect all the cables from the 10GbE mezzanine card.
2. Remove the screws that secure the expansion card bracket.
3. Lift the expansion card bracket out of the system board assembly.



**Figure 62. Removing and installing the expansion card bracket**

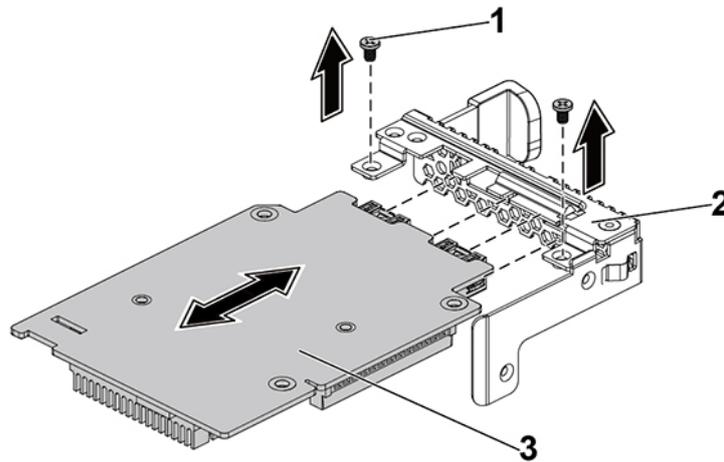
- a. screw (3)
  - b. expansion card bracket
  - c. system board assembly
4. Remove the screws that secure the 10GbE mezzanine card assembly.
  5. Lift the 10GbE mezzanine card assembly away from the card bridge board on the system board.



**Figure 63. Removing and installing the 10GbE mezzanine card assembly**

- |                                |                                  |
|--------------------------------|----------------------------------|
| 1. screw (4)                   | 2. 10GbE mezzanine card assembly |
| 3. mezzanine card bridge board | 4. system board assembly         |

6. Remove the screws that secure the 10GbE mezzanine card to the bracket.
7. Remove the 10GbE mezzanine card from the bracket.



**Figure 64. Removing and installing the 10GbE mezzanine card**

- a. screw (2)
- b. mezzanine card bracket
- c. 10GbE mezzanine card

#### Related references

[Safety instructions](#) on page 62  
[C6320 system board connectors](#) on page 162

#### Related tasks

[Removing a sled](#) on page 87

# Installing the 10GbE mezzanine card

## Prerequisites

 **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.

Follow the safety guidelines listed in the Safety instructions section.

## Steps

1. Attach the 10 GbE mezzanine card to the bracket by aligning the four ports to the corresponding port slots on the bracket.
2. Install the screws to secure the 10GbE mezzanine card to the bracket.
3. Install the 10 GbE mezzanine card assembly to the card bridge board on the system-board assembly.
4. Install the screws to secure the 10 GbE mezzanine card assembly to the system-board assembly.
5. Place the expansion-card bracket into the system board assembly.
6. Install the screws that secure the expansion card bracket.

 **NOTE:** For more information about setting VLAN in VMware for 10 GbE mezzanine card, see [VMware\\* vSphere ESX 5.x iSCSI Boot Support with VLANs](#).

## Next steps

1. Reconnect all the cables to the 10 GbE mezzanine card.
2. Install the system board assembly.
3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Turn on the system, including any attached peripherals.

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Installing a sled](#) on page 89

# Mezzanine card bridge board

## Removing the mezzanine card bridge board

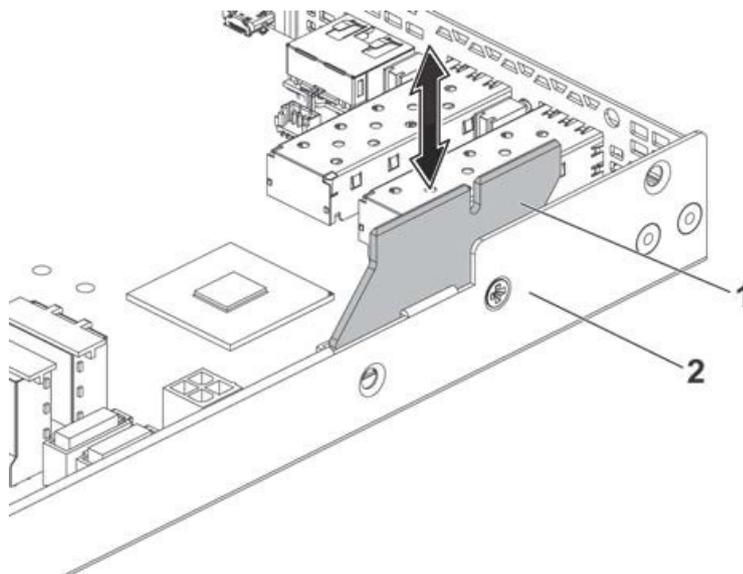
### Prerequisites

 **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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.
5. Remove the mezzanine card.

### Steps

Pull the mezzanine card bridge board away from the mezzanine card slot on the system board.



**Figure 65. Removing and installing the mezzanine card bridge board**

- a. system board assembly
- b. mezzanine card bridge board

**Next steps**

1. Install the mezzanine card bridge board.
2. Install the mezzanine card.
3. If a mezzanine card is not used, install the mezzanine bracket.
4. Install the expansion card riser assembly.
5. Install the sled into the enclosure.
6. Follow the procedure listed in the After working inside your system section.

**Related references**

[Safety instructions](#) on page 62

**Related tasks**

[Removing a sled](#) on page 87

[Removing the optional LSI 2008 SAS mezzanine card](#) on page 104

[Removing the 1GbE mezzanine card](#) on page 106

[Removing the 10GbE mezzanine card](#) on page 109

## Installing the mezzanine card bridge board

**Prerequisites**

**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.

Follow the safety guidelines listed in the Safety instructions section.

**Steps**

Insert the mezzanine card bridge board into the mezzanine slot on the system board.

### Next steps

1. Install the mezzanine card.
2. Install the system board assembly.
3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Turn on the system, including any attached peripherals.

### Related references

[Safety instructions](#) on page 62

### Related tasks

[Installing the optional LSI 2008 SAS mezzanine card](#) on page 105

[Installing the 1GbE mezzanine card](#) on page 108

[Installing the 10GbE mezzanine card](#) on page 111

[Installing a system board](#) on page 121

[Installing a sled](#) on page 89

## System memory

System memory holds the instructions that the processor executes. Each system board has sixteen DDR4 memory module sockets for the installation of up to sixteen registered DDR4-2400 MHz (2400 MHz at 2 memory modules per channel) memory modules to support processor 1 and processor 2. For the location of the memory modules, see the C6320 system board connectors section.

### Related references

[C6320 system board connectors](#) on page 162

## Memory slot features

- Support 8 channels, 16 DDR4 registered DIMMs (RDIMMs)
- Speed up to 2400 MT/s
- Maximum capacities: 512 GB with 32 GB RDIMM
- Supports DDR4
- Supports Error Correction Code (ECC)

 **NOTE:** Memory modules of different speeds and capacities cannot be mixed.

 **NOTE:** Linux operating system does not support the S4 (hibernation) mode.

## Supported memory module configuration

For the sequence of the 16 memory-module sockets, the system requires at least one memory module installed on processor 1's DIMM slot 1 in order to boot up. When you insert the memory modules, always start with CHA\_A1. The optimized memory module installation sequence is 1, 2, 3, 4, 5, 6, 7, and 8.

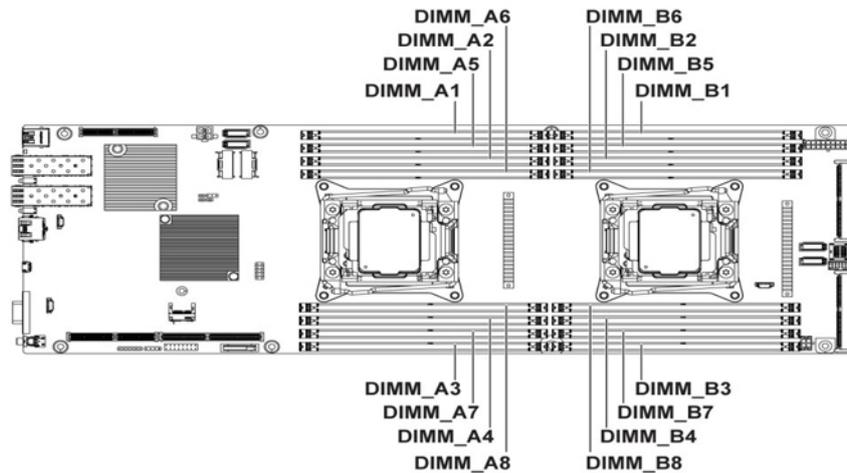


Figure 66. DIMM slot locations

Table 31. Memory module configurations for single processor

| Memory modules | Processor 1 |    |     |    |     |    |     |    |
|----------------|-------------|----|-----|----|-----|----|-----|----|
|                | CHA         |    | CHB |    | CHC |    | CHD |    |
|                | A1          | A5 | A2  | A6 | A3  | A7 | A4  | A8 |
| 1              | √           | –  | –   | –  | –   | –  | –   | –  |
| 2              | √           | –  | √   | –  | –   | –  | –   | –  |
| 3              | √           | –  | √   | –  | √   | –  | –   | –  |
| 4              | √           | –  | √   | –  | √   | –  | √   | –  |
| 6              | √           | √  | √   | √  | √   | –  | √   | –  |
| 8              | √           | √  | √   | √  | √   | √  | √   | √  |

Table 32. Memory module configurations for dual processors

| Memory modules | Processor 1 |    |     |    |     |    |     |    |
|----------------|-------------|----|-----|----|-----|----|-----|----|
|                | CHA         |    | CHB |    | CHC |    | CHD |    |
|                | A1          | A5 | A2  | A6 | A3  | A7 | A4  | A8 |
| 2              | √           | –  | –   | –  | –   | –  | –   | –  |
| 6              | √           | –  | √   | –  | √   | –  | –   | –  |
| 8              | √           | –  | √   | –  | √   | –  | √   | –  |
| 12             | √           | √  | √   | √  | √   | –  | √   | –  |
| 16             | √           | √  | √   | √  | √   | √  | √   | √  |

Table 33. Memory module configurations for dual processors

| Memory modules | Processor 2 |    |     |    |     |    |     |    |
|----------------|-------------|----|-----|----|-----|----|-----|----|
|                | CHA         |    | CHB |    | CHC |    | CHD |    |
|                | B1          | B5 | B2  | B6 | B3  | B7 | B4  | B8 |
| 2              | √           | –  | –   | –  | –   | –  | –   | –  |
| 6              | √           | –  | √   | –  | √   | –  | –   | –  |

**Table 33. Memory module configurations for dual processors (continued)**

|    | Processor 2 |   |   |   |   |   |   |   |
|----|-------------|---|---|---|---|---|---|---|
| 8  | √           | – | √ | – | √ | – | √ | – |
| 12 | √           | √ | √ | √ | √ | – | √ | – |
| 16 | √           | √ | √ | √ | √ | √ | √ | √ |

## Removing the memory modules

### Prerequisites

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

 **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.

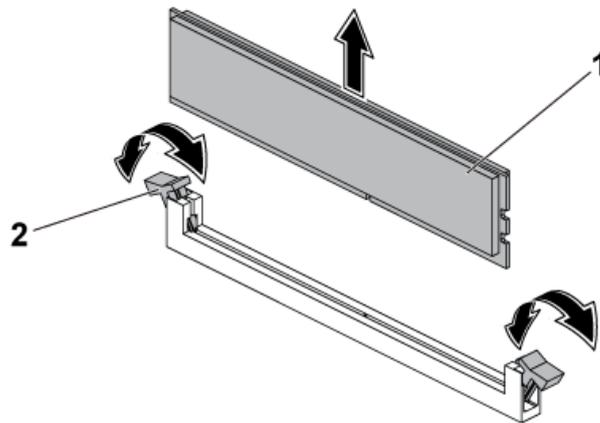
1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Turn off the system, including any attached peripherals.
5. Disconnect the system from the electrical outlet and disconnect the peripherals.
6. Remove the system board assembly.
7. Remove the cooling shroud.

### Steps

1. Locate the appropriate memory module socket.

 **CAUTION:** Handle each memory module only on either card edge, ensuring not to touch the middle of the memory module. To avoid damaging components on the memory module, remove only one memory module at a time.

2. To release the memory module from the socket, simultaneously press the ejectors on both ends of the memory module socket.
3. Lift the memory module out of the socket by holding the memory module only by its edges.



**Figure 67. Removing a memory module**

- a. memory module
- b. memory module socket ejector (2)

#### Related references

[Safety instructions](#) on page 62

#### Related tasks

[Removing a sled](#) on page 87

[Removing the cooling shroud](#) on page 90

## Installing the memory modules

#### Prerequisites

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

**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.

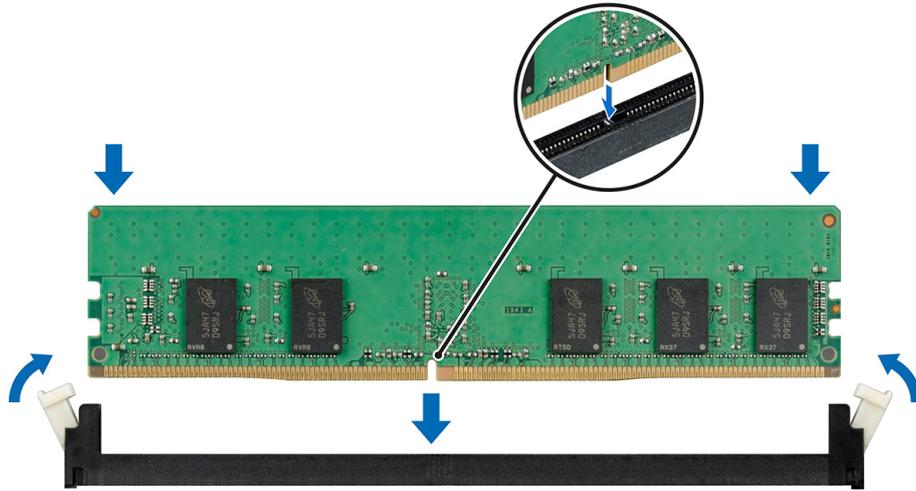
1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the chassis.
4. Remove the cooling shroud.

#### Steps

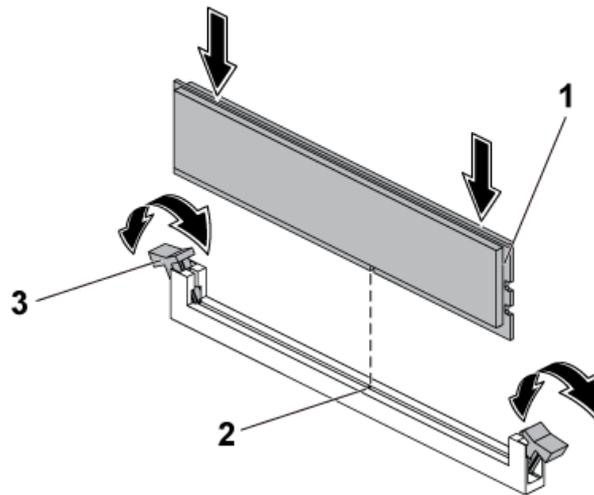
1. Locate the appropriate memory module socket.
2. Push out the ejectors on each end of the memory module socket.
3. Align the memory module correctly with the alignment key of the memory module socket.
4. Simultaneously press down firmly on both ends of the memory module with your thumbs until the module snaps into place.

**CAUTION:** Even pressure during insertion must be applied at both ends of the module simultaneously to prevent damage to the socket. No pressure should be applied to the center of the module.

5. Complete the latching of the module into the socket by applying inward pressure to the socket ejectors to ensure that the ejectors are in a locked position. When the memory module is properly seated in the socket, the ejectors on the memory module socket align with the ejectors on other identical sockets that have memory modules installed.



**Figure 68. Installing a memory module**



**Figure 69. Installing a memory module**

- a. memory module
- b. alignment key
- c. memory module socket ejector (2)

### Next steps

1. Install the cooling shroud.
2. Follow the procedure listed in the After working inside your system section.
3. Install the system board assembly.
4. To enter **System Setup**, press F2 and check the **System Memory** setting.
5. If the value is incorrect, one or more of the memory modules may not be installed properly. Ensure that the memory modules are firmly seated in the sockets.
6. Run the system memory test in the system diagnostics.

### Related references

[Safety instructions](#) on page 62

## Related tasks

[Installing the cooling shroud](#) on page 91

[Installing a sled](#) on page 89

# System battery

The system battery is used to power the real-time clock and storing the BIOS settings of the system.

## Replacing the system battery

### Prerequisites

 **WARNING:** 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. See your safety information for additional information.

 **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.

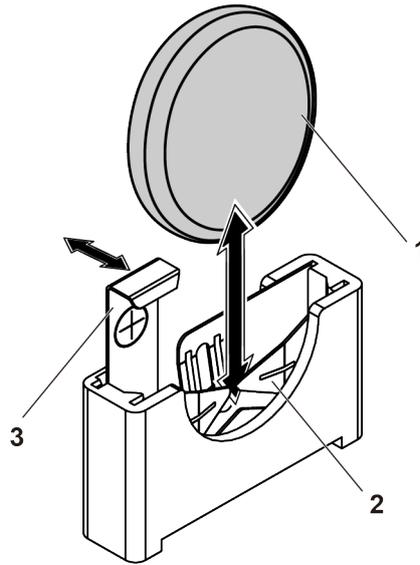
1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and peripherals.
4. Remove the system board assembly.
5. Remove the cooling shroud.
6. Remove the expansion card assembly.

### Steps

1. Push the battery latch and lift the battery out of the connector.

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

2. Hold the new battery with the "+" facing the positive side of battery connector.
3. Insert the battery into the battery holder until it is seated in place.



**Figure 70. Replacing the system battery**

- a. system battery
- b. negative side of battery connector
- c. battery latch

#### Next steps

1. Replace the system board assembly.
2. Reconnect the system to the electrical outlet.
3. Turn on the system, including any attached peripherals.
4. Enter **System Setup** to confirm that the battery is operating properly. See the System setup section.
5. In **System Setup**, enter correct time and date in the **Time** and **Date** fields.
6. Exit **System Setup**.

#### Related concepts

[System Setup](#) on page 34

#### Related references

[Safety instructions](#) on page 62

#### Related tasks

[Removing a sled](#) on page 87

[Removing the cooling shroud](#) on page 90

[Removing the expansion card](#) on page 97

[Installing a sled](#) on page 89

## System board

### Removing a system board

#### Prerequisites

**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:** Do not attempt to remove the TPM plug-in module from the system board. Once 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, and it cannot be reinstalled or installed on another system board.

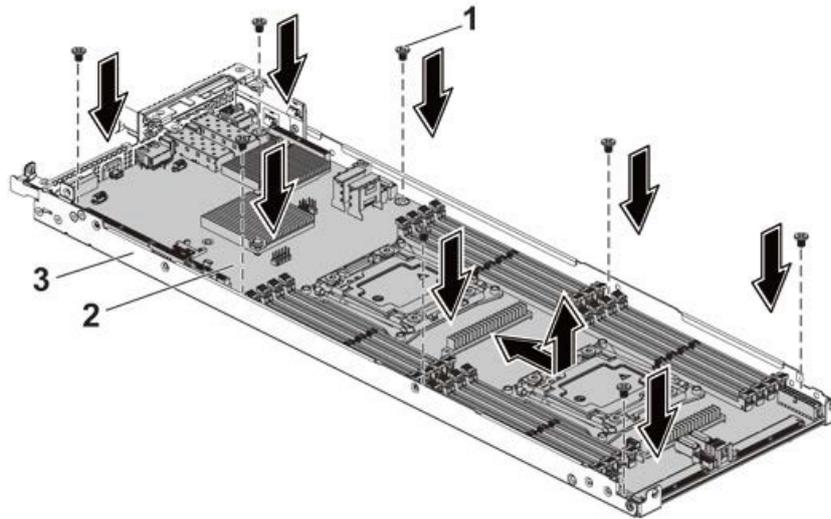
1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the chassis.
4. Remove the air shroud.
5. Remove the expansion card riser assembly.
6. Remove the heat sinks.
7. Remove the memory modules.
8. If installed, remove the mezzanine card.
9. Disconnect all the cables from the system board.
10. Keep the Phillips #1 screwdriver ready.

### Steps

1. Remove the screws that secure the system board to the sled assembly.

**CAUTION:** Do not lift the system board by holding a memory module slot, any other connector, or component.

2. Hold the system board by the edges, and lift the system board away from the system board assembly.



**Figure 71. Removing and installing the system board**

- a. screw (8)
- b. system board
- c. system board assembly

### Next steps

1. If the system board is being replaced, reuse the SAS connector protector from the old system board.  
**NOTE:** The SAS connector protector is not available on a new or replacement system board. Do not return the old system board with the SAS connector protector.
2. Install the system board.
3. Install all the removed components and cables.
4. Follow the procedure listed in the After working inside your system section.

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Removing a sled](#) on page 87

[Removing the cooling shroud](#) on page 90

[Removing the expansion card](#) on page 97

[Removing the heat sink](#) on page 93

[Removing the memory modules](#) on page 115

[Removing the optional LSI 2008 SAS mezzanine card](#) on page 104

[Removing the 1GbE mezzanine card](#) on page 106

[Removing the 10GbE mezzanine card](#) on page 109

# Installing a system board

## Prerequisites

 **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.

Follow the safety guidelines listed in the Safety instructions section.

## Steps

1. Holding the system board by the edges, slide the system board into the system board assembly.
2. Install the screws to secure the system board to the system board assembly.

## Next steps

1. Install the Trusted Platform Module (TPM). For information how to install the TPM, see the Installing the Trusted Platform Module section. For more information on the TPM, see the Trusted Platform Module section.  
 **NOTE:** The TPM plug-in module is attached to the system board and cannot be removed. A replacement TPM plug-in module will be provided for all system board replacements where a TPM plug-in module was installed.
2. Transfer the processors to the new system board.
3. Remove the memory modules and transfer them to the same locations on the new board.
4. Replace the heat sinks.
5. Install the expansion card assembly.
6. If applicable, install the SAS mezzanine card, 1 GbE mezzanine card, or 10 GbE mezzanine card.
7. Connect all the cables to the system board.
8. Install the cooling shroud.
9. Follow the procedure listed in the After working inside your system section.
10. Import your new or existing iDRAC Enterprise license. For more information, see Integrated Dell Remote Access Controller User's Guide, at [Dell.com/esmmanuals](http://Dell.com/esmmanuals).
11. 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 system Service Tag manually. For more information, see the Entering the system Service Tag section.
  - c. Update the BIOS and iDRAC versions.
  - d. Re-enable the Trusted Platform Module (TPM). For more information, see the Re-enabling the Trusted Platform Module (TPM) section.

## Related references

[Safety instructions](#) on page 62

## Related tasks

- [Removing a processor](#) on page 95
- [Installing a processor](#) on page 96
- [Removing the memory modules](#) on page 115
- [Installing the memory modules](#) on page 116
- [Installing the heat sink](#) on page 94
- [Installing the expansion card](#) on page 99
- [Installing the optional LSI 2008 SAS mezzanine card](#) on page 105
- [Installing the 1GbE mezzanine card](#) on page 108
- [Installing the 10GbE mezzanine card](#) on page 111
- [Installing the cooling shroud](#) on page 91
- [Installing a sled](#) on page 89

## Entering the system Service Tag by using System Setup

### Steps

1. Turn on the system.
2. Press F2 to enter System Setup.
3. Click **Service Tag Settings**.
4. Enter the Service Tag.

 **NOTE:** You can enter the Service Tag only when the **Service Tag** field is empty. Ensure that you enter the correct Service Tag. After the Service Tag is entered, it cannot be updated or changed.

5. Click **OK**.

## Restoring the Service Tag by using the Easy Restore feature

By using the Easy Restore feature, you can restore your Service Tag, license, UEFI configuration, and the system configuration data after replacing the system board. All data is automatically backed up in a backup flash device. If BIOS detects a new system board and the Service Tag in the backup flash device, BIOS prompts the user to restore the backup information.

### Steps

1. Turn on the system.  
If BIOS detects a new system board, and if the Service Tag is present in the backup flash device, BIOS displays the Service Tag, the status of the license, and the **UEFI Diagnostics** version.
2. Perform one of the following steps:
  - Press **Y** to restore the Service Tag, license, and diagnostics information.
  - Press **N** to navigate to the Dell Lifecycle Controller based restore options.
  - Press F10 to restore data from a previously created **Hardware Server Profile**.

After the restore process is complete, BIOS prompts to restore the system configuration data.

3. Perform one of the following steps:
  - Press **Y** to restore the system configuration data.
  - Press **N** to use the default configuration settings.

After the restore process is complete, the system restarts.

## Cable routing for onboard SATA cables (1U node)

### Steps

1. Connect the onboard SATA cables to the system board, and connect the other end of the cable to the corresponding connectors on the system board.

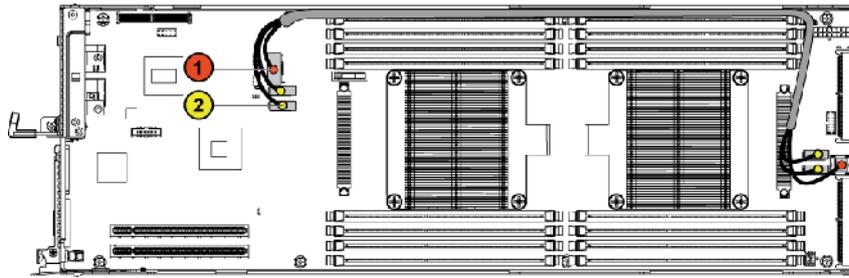


Figure 72. Cable routing for onboard SATA cables (1U node)

Table 34. Cable routing for onboard SATA cables (1U node)

| Item | Cable              | From (system board)             | To (system board)             |
|------|--------------------|---------------------------------|-------------------------------|
| 1    | Onboard SATA cable | Onboard SATA output connector 0 | SAS/SATA input connector 0    |
| 2    | Onboard SATA cable | Onboard SATA connectors 4&5     | SAS/SATA input connectors 4&5 |

2. Press down on the cables, and ensure the cables are routed lower than the height of the processor heat sinks.

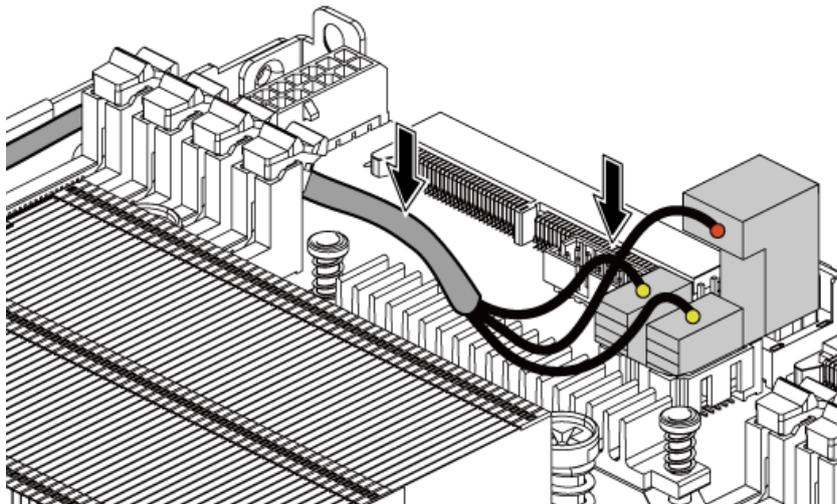


Figure 73. Cable routing down for onboard SATA cables (1U node)

## Trusted Platform Module

Trusted Platform Module (TPM) is a dedicated microprocessor designed to secure hardware by integrating cryptographic keys into devices. A software can use a Trusted Platform Module to authenticate hardware devices. As each TPM chip has a unique and secret RSA key burned in as it is produced, it can perform the platform authentication.

**CAUTION:** Do not attempt to remove the Trusted Platform Module (TPM) from the system board. After the TPM is installed, it is cryptographically bound to that specific system board. Any attempt to remove an installed TPM breaks the cryptographic binding, and it cannot be re-installed or installed on another system board.

**NOTE:** This is a Field Replaceable Unit (FRU). Removal and installation procedures must be performed only by Dell certified service technicians.

# Installing the Trusted Platform Module

## Prerequisites

**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.

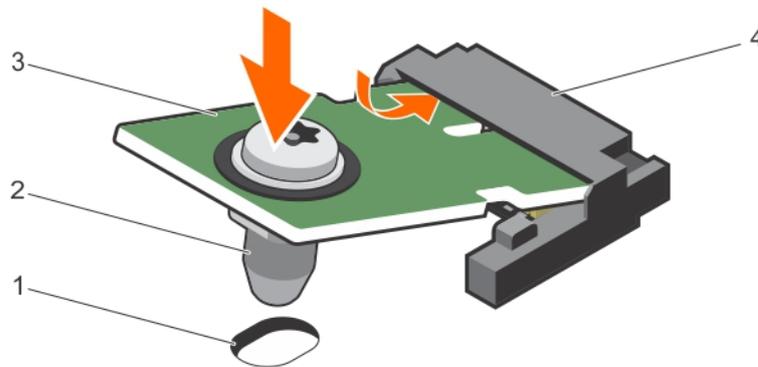
1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

## Steps

1. Locate the TPM connector on the system board.

**NOTE:** To locate the TPM connector on the system board, see the System board connectors section.

2. Align the edge connectors on the TPM with the slot on the TPM connector.
3. Insert the TPM into the TPM connector such that the plastic rivet aligns with the slot on the system board.
4. Press the plastic rivet until the rivet snaps into place.



**Figure 74. Installing the TPM**

- |                                   |                  |
|-----------------------------------|------------------|
| 1. rivet slot on the system board | 2. plastic rivet |
| 3. TPM                            | 4. TPM connector |

## Next steps

1. Install the system board.
2. Follow the procedure listed in the After working inside your system section.

# Initializing the TPM for BitLocker users

## Steps

Initialize the TPM.

For more information about initializing the TPM, see <https://technet.microsoft.com/en-us/library/cc753140.aspx>.

The **TPM Status** changes to **Enabled, Activated**.

## Initializing the TPM 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**.

## Power distribution boards

The power distribution board (PDB) is a board that connects the redundant power supply units to the system board. The Fan Control Board is a part of the PDB1. A PDB is only available in systems that support redundant power supply units. This system has two PDBs. The procedure to remove and install both the PDBs is similar. Remove PDB 1, to access PDB 2.

## Removing the power distribution board 1

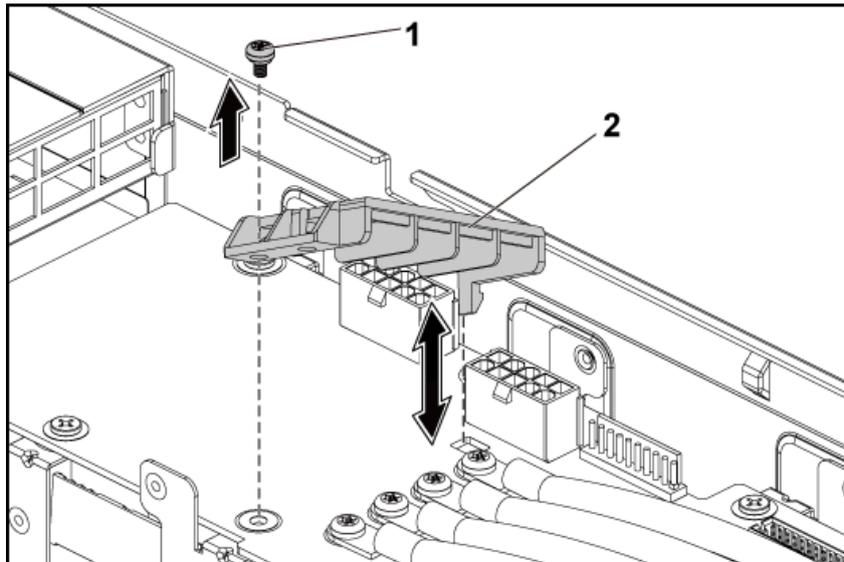
### Prerequisites

 **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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the power supply units (PSUs).
4. Keep the Philips #2 and the Torx T20 screwdrivers ready.

### Steps

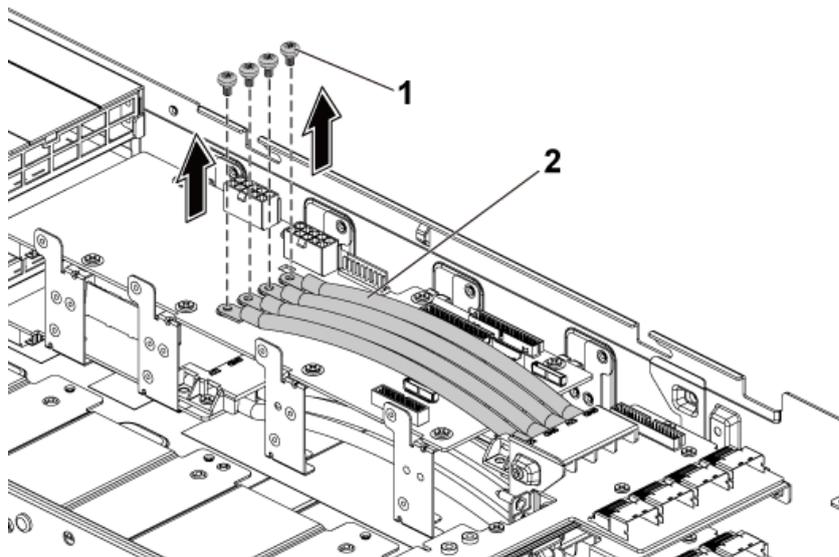
1. Disconnect all the cables from the power distribution board 1 (PDB 1).  
Observe the routing of the cable on the chassis as you remove them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.
2. Remove the screw that secures the power cable cover to PDB 1.
3. Lift the power cable cover up straight from the locking hole on PDB 1. Then, lift it out of PDB 1.



**Figure 75. Removing and installing the power cable cover**

- a. screw
- b. power cable cover

4. Remove the screws that secure the power cables to PDB 1.

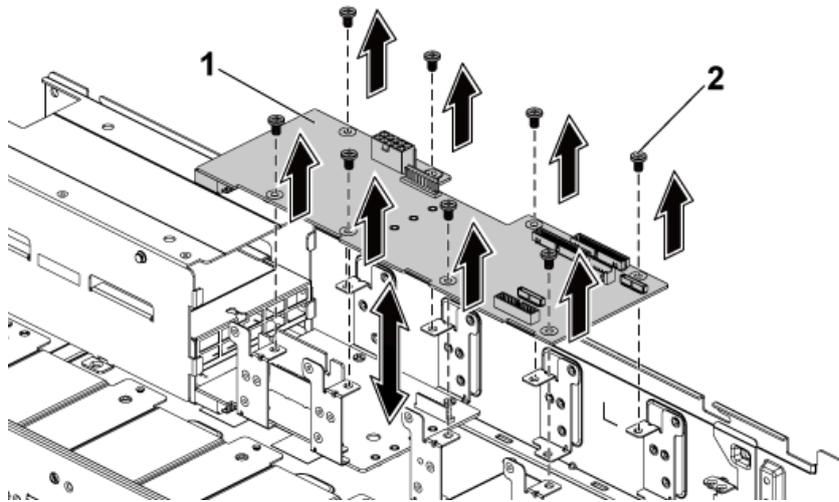


**Figure 76. Removing and installing the power cables**

- a. screw (4)
- b. power cables (4)

5. Remove the screws that secure PDB 1 to the system.

6. Lift PDB 1 away from the system.



**Figure 77. Removing and installing the PDB 1**

- a. PDB 1
- b. screw (8)

7. Lift the PDB connector bridge board from the system.
8. Disconnect all the cables from PDB 2.
9. Remove the screw that secures the power cable cover to PDB 2.
10. Lift power cable cover up straight from the locking hole on PDB 2. Then, lift it out of PDB 2.
11. Remove the screws securing the four power cables from PDB 2
12. Remove the four power cables from PDB 2.
13. Remove the screws that secure PDB 2 to the system.
14. Lift PDB 2 out of the system.

#### Next steps

1. Install the PDBs.
2. Install the PSUs.
3. Follow the procedure listed in the After working inside your system section.

#### Related references

[Safety instructions](#) on page 62

#### Related tasks

[Before working inside your system](#) on page 63

[Removing the system cover](#) on page 64

[Installing the power distribution board 1](#) on page 129

## Removing the power distribution board 2

#### Prerequisites

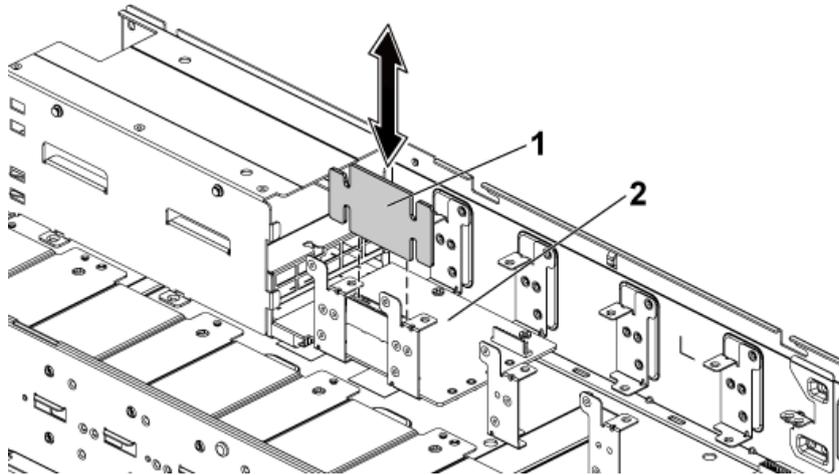
**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

1. Follow the safety guidelines listed in the Safety instructions section.

2. Follow the procedure listed in the Before working inside your system section.
3. Remove the power supply units.
4. Remove the power distribution board 1 (PDB 1)

**Steps**

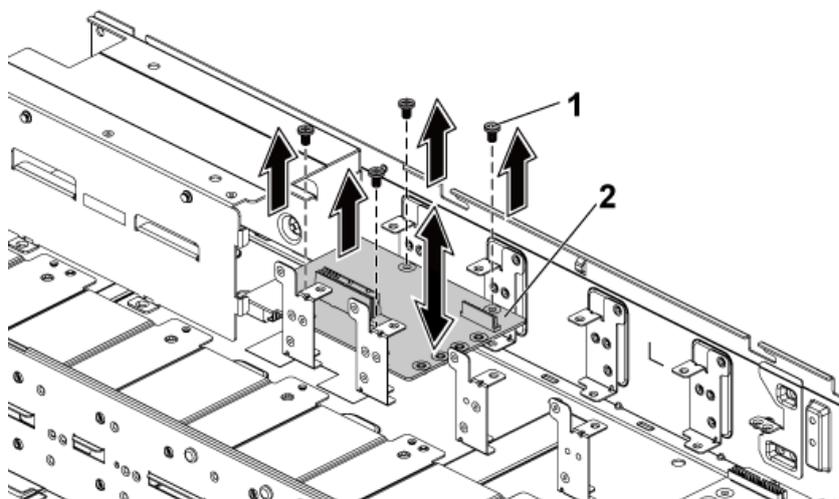
1. Lift the PDB connector from the system.



**Figure 78. Removing and installing the PDB connector**

- a. PDB connector
- b. PDB 2

2. Disconnect all the cables from the PDB 2.
3. Remove the screw that secures the power cable cover to the PDB.
4. Remove the power cable cover from the PDB 2.
5. Remove the screws that secure the power cables to the PDB 2
6. Remove the screws that secure the PDB 2 to the system.
7. Lift the PDB 2 out of the system.



**Figure 79. Removing and installing a PDB 2**

- a. screw (4)
- b. PDB 2

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Before working inside your system](#) on page 63

[Removing the system cover](#) on page 64

[Removing the power distribution board 2](#) on page 127

# Installing the power distribution board 2

## Prerequisites

 **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:** If removed, you must replace the power distribution board 2 (PDB 2) and the power distribution board-connector before replacing the power distribution board 1 (PDB 1).

Follow the safety guidelines listed in the Safety instructions section.

## Steps

1. Align the screw holes on the PDB 2 with the holes on the chassis.

 **NOTE:** To install the PDB 2, angle the board during installation.

2. Install the screws that secure the PDB 2 to the system.
3. Install the power distribution board connector.
4. Connect the power cables to the PDB 2 by using screws.
5. Connect all the other cables to the PDB 2.

You must route these cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

## Next steps

Install the PDB 1

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Installing the power distribution board 1](#) on page 129

[After working inside your system](#) on page 63

# Installing the power distribution board 1

## Prerequisites

 **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:** If removed, you must replace the power distribution board 2 (PDB 2) and the power distribution board-connector before replacing the power distribution board 1 (PDB 1).

Follow the safety guidelines listed in the Safety instructions section.

### Steps

1. Lower the PDB 1 such that the slot at the bottom of the PDB 1 inserts into the PDB connector on the PDB 2.  
When the slot at the bottom of the PDB 1 inserts into the PDB connector on the PDB 2, the screw holes align with the holes on the chassis.
2. Install the screws that secure the PDB 1 to the system.
3. Secure the power cables to the PDB 1 by using the screws.
4. Connect all the cables to the PDB 1.  
You must route these cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

### Next steps

1. Install the power supply units.
2. Follow the procedure listed in the After working inside your system section.

### Related references

[Safety instructions](#) on page 62

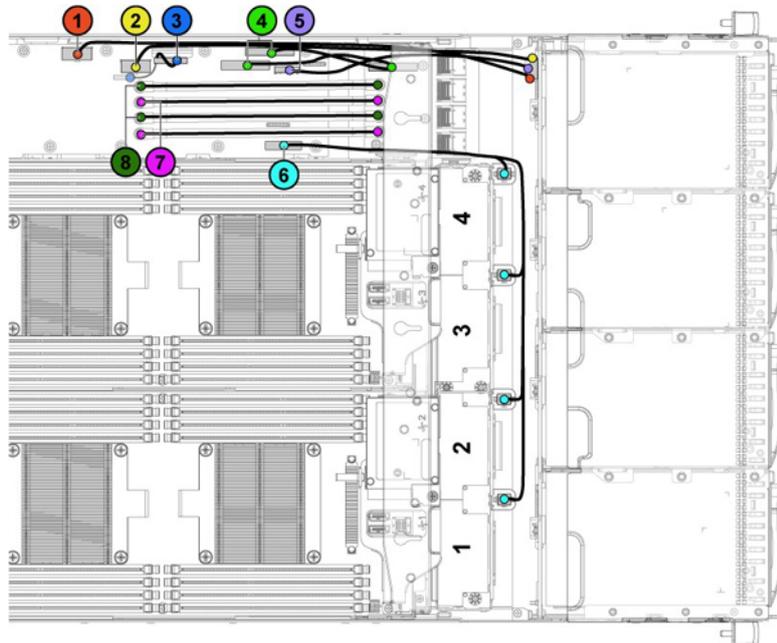
### Related tasks

[Installing the system cover](#) on page 65

[After working inside your system](#) on page 63

## Cable routing of the power distribution boards

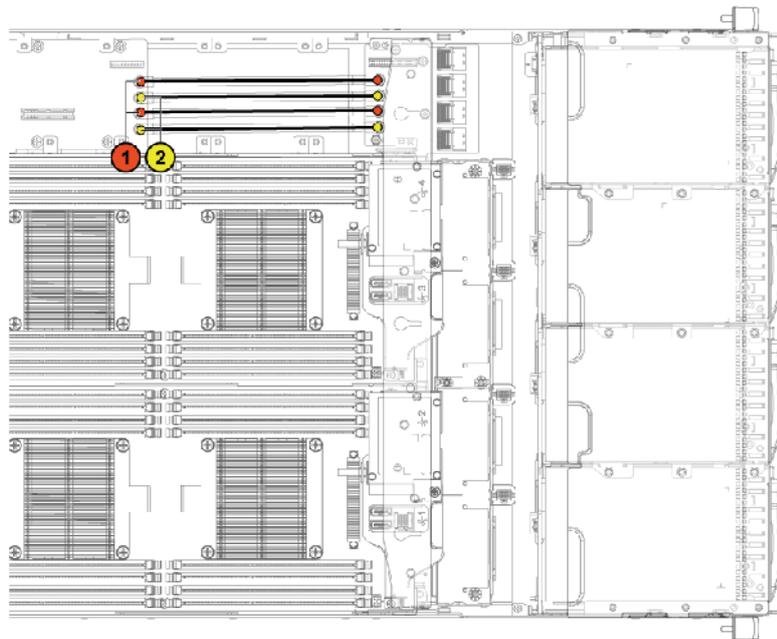
### About this task



**Figure 80. Cable routing—power distribution board 1 (top view)**

**Table 35. Cable routing–power distribution board 1 (top view)**

| Item | Cable                            | From (power distribution boards)             | To                         |
|------|----------------------------------|--|----------------------------|
| 1    | Hard-drive backplane power cable | Hard-drive backplane power connector (J84)   | Backplane                  |
| 2    | Hard-drive backplane power cable | Hard-drive backplane power connector (J29)   | Backplane                  |
| 3    | Power distribution board cable   | Control connector (J31)                      | Power distribution board 2 |
| 4    | I2C cables                       | System board control connectors (J5&J6)      | Midplanes                  |
| 5    | Backplane control cable          | Hard-drive backplane control connector (J17) | Backplane                  |
| 6    | System fan cable                 | System fan connector (J9)                    | Cooling fans               |
| 7    | 12 V power cables                | Power distribution board 1/2                 | Midplanes                  |
| 8    | Ground power cables              | Power distribution board 1/2                 | Midplanes                  |



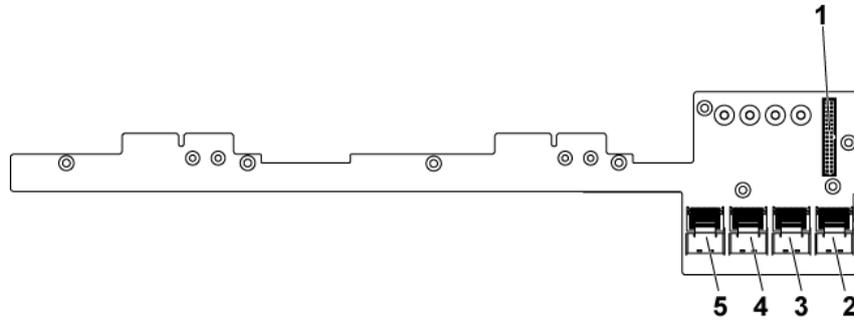
**Figure 81. Cable routing–power distribution board 2 (bottom)**

**Table 36. Cable routing–power distribution board 2 (bottom)**

| Item | Cable               | From (power distribution board 2) | To        |
|------|---------------------|-----------------------------------|-----------|
| 1    | Ground power cables | Power distribution board 1/2      | Midplanes |
| 2    | 12V power cables    | Power distribution board 1/2      | Midplanes |

# Midplanes

In a 3.5 inch hard drive configuration, two midplanes connect the system board to the 3.5 inch hard drive backplane. In a 2.5 inch hard drive configuration, two midplanes connect the system boards the 2.5-inch hard drive backplane for expander configuration.



**Figure 82. Midplane connectors**

1. 2x17pin control connector for power distribution board 1
2. mini-SAS connector for system board 3 and 4 (hard drive 5 and 6)
3. mini-SAS connector for system board 3 and 4 (hard drive 1, 2, 3 and 4)
4. mini-SAS connector for system board 1 and 2 (hard drive 5 and 6)
5. mini-SAS connector for system board 1 and 2 (hard drive 1, 2, 3 and 4)

## Removing the midplanes

### Prerequisites

**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.

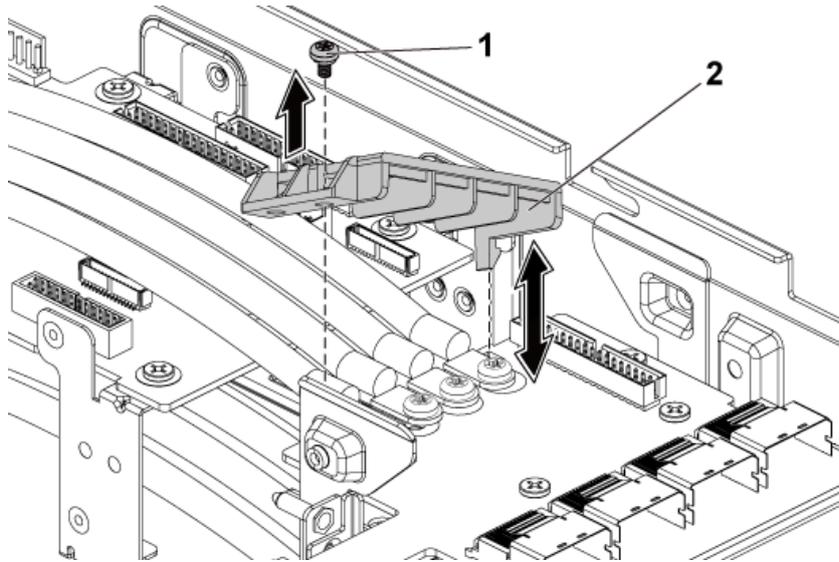
1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the system boards.
4. Remove the cooling fan cage.
5. Keep the Philips #2 and the Torx T20 screwdrivers ready.

### Steps

1. Remove the screws that secure the middle wall bracket and lift the bracket out of the chassis.
2. Disconnect all the cables from the upper midplane.

**NOTE:** Observe the routing of the cable on the chassis as you remove them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.

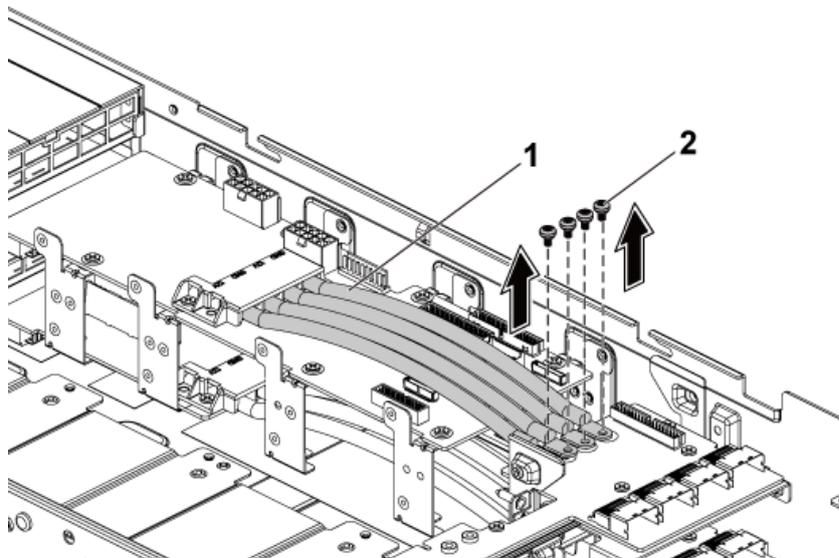
3. Remove the screw that secures the power cable cover to the upper midplane and lift the power cable out.



**Figure 83. Removing and installing the power cable cover**

- a. screw
- b. power cable cover

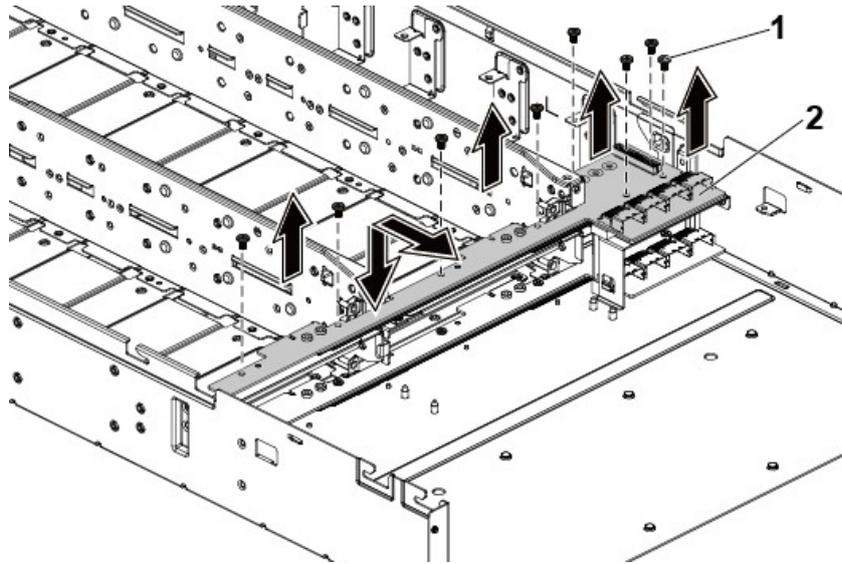
4. Remove the screws that secure the power cables to the upper midplane.



**Figure 84. Removing and installing the power cables**

- a. power cables (4)
- b. screw (4)

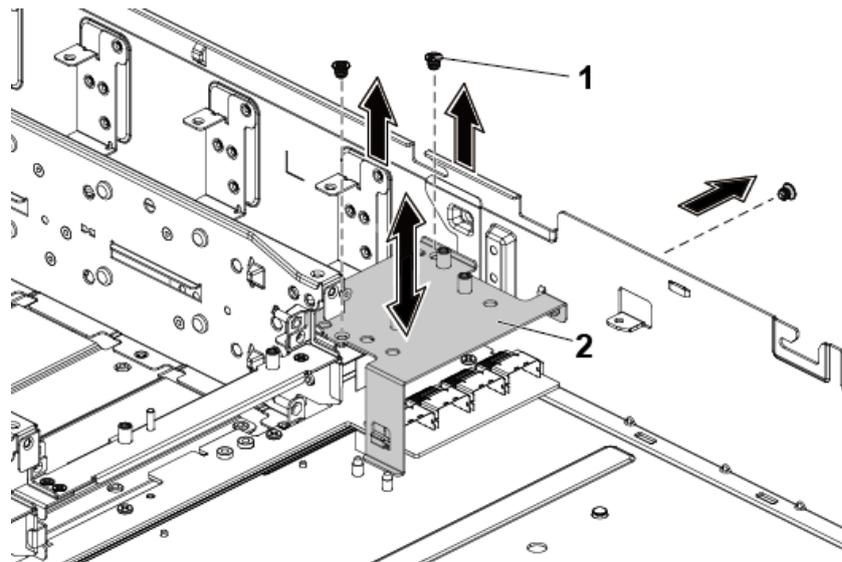
- 5. Remove the screws that secure the upper midplane to the midplane holder.
- 6. Lift the upper midplane out.



**Figure 85. Removing and installing the upper midplane**

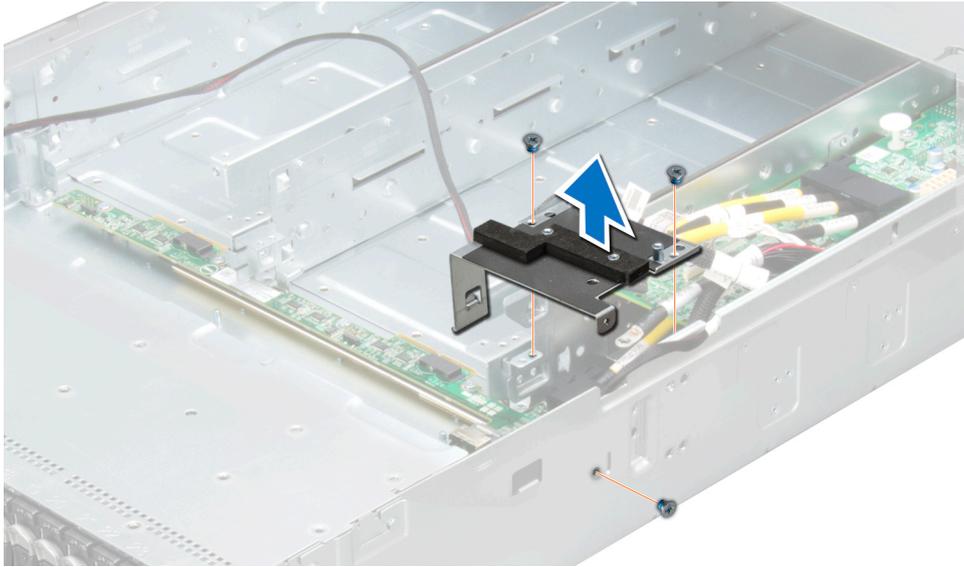
- a. screw (8)
- b. upper midplane

7. Remove the screws that secure the midplane holder support to the chassis.
8. Lift the midplane holder support out of the chassis.



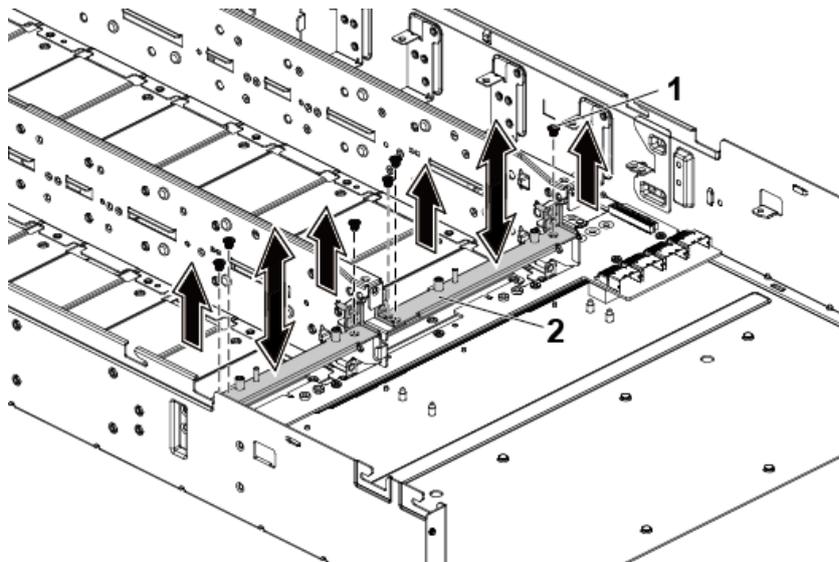
**Figure 86. Removing and installing the midplane holder support**

- a. screw (3)
- b. midplane holder support



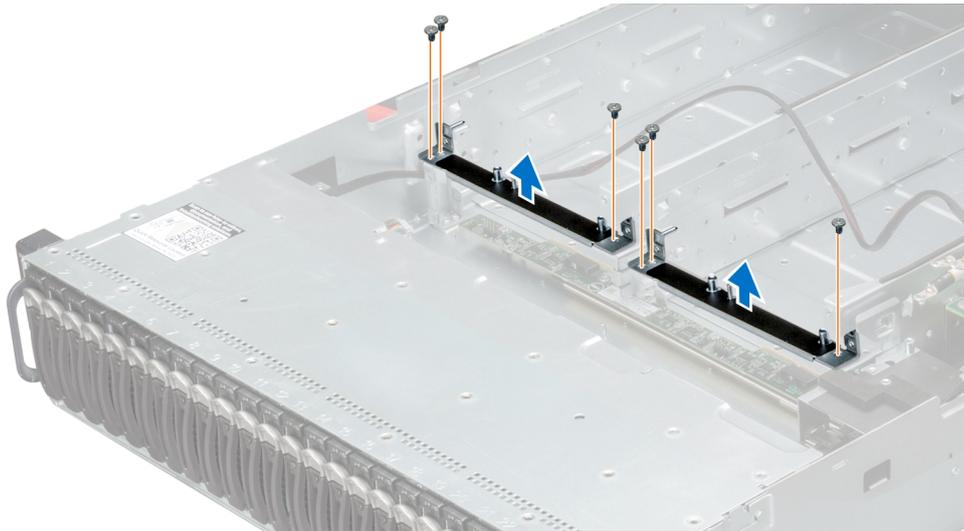
**Figure 87. Removing the midplane holder support**

9. Remove the screws that secure the midplane holder to the chassis.
10. Lift the midplane holder out of the chassis.



**Figure 88. Removing and installing the midplane holder**

- a. screw (6)
- b. midplane holder

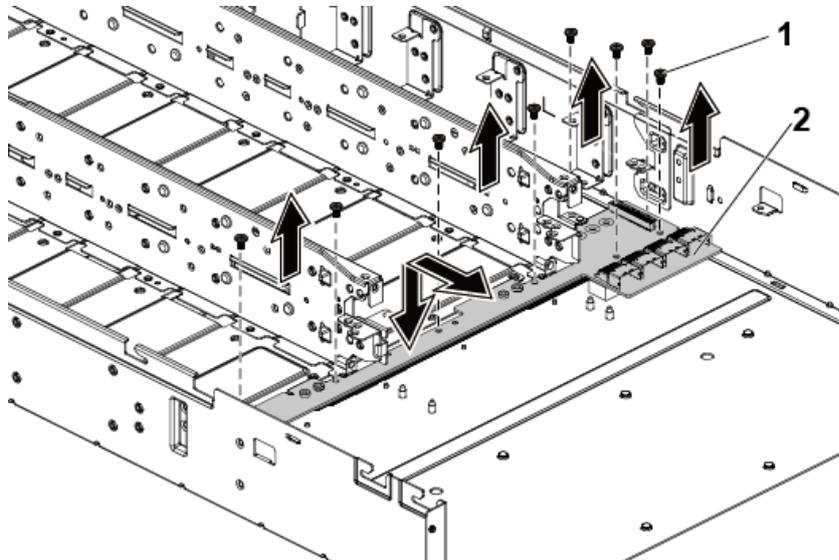


**Figure 89. Removing the midplane holder**

11. Disconnect all the cables from the lower midplane.

**NOTE:** Note the routing of the cable on the chassis as you remove them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.

12. Remove the screw that secures the power cable cover on the lower midplane.
13. Remove the power cable cover from the lower midplane.
14. Remove the screws that secure the power cables on the lower midplane.
15. Remove the four power cables from the lower midplane.
16. Remove the screws that secure the lower midplane to the chassis.
17. Lift the lower midplane out of the chassis.



**Figure 90. Removing and installing the lower midplane**

- a. screw (8)
- b. lower midplane

**Next steps**

1. Install the midplanes.
2. Install the cooling fan cage.
3. Replace the system boards.

4. Follow the procedure listed in the After working inside your system section.

### Related references

[Safety instructions](#) on page 62

### Related tasks

[Before working inside your system](#) on page 63

[Removing the system cover](#) on page 64

[Removing a sled](#) on page 87

[Removing a cooling fan](#) on page 66

## Installing the midplanes

### Prerequisites

**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.

**NOTE:** The procedure to remove the lower midplane is similar to removing the upper midplane.

**NOTE:** You must route the cables properly on the chassis to prevent them from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the system boards.
4. Remove the cooling fan cage.
5. Keep the Philips #2 and the Torx T20 screwdrivers ready.

### Steps

1. Place the lower midplane into the chassis.
2. Replace the screws that secure the lower midplane to the chassis.
3. Connect all the cables to the lower midplane.
4. Secure the screws that secure the power cables to the lower midplane.
5. Replace the power cable cover to the lower midplane.
6. Secure the power cable cover with a screw.
7. Place the midplane holder into the chassis.
8. Replace the screws that secure the midplane holder to the chassis.
9. Place the midplane holder support into the chassis.
10. Replace the screws that secure the midplane holder support to the chassis.
11. Place the upper midplane on the midplane holder.
12. Replace the screws that secure the midplane to the midplane holder.
13. Connect all the cables to the upper midplane.
14. Secure the power cables to the upper midplane with screws.
15. Replace the power cable cover to the upper lower midplane.
16. Secure the power cable cover with a screw.
17. Place the middle wall bracket into the chassis.
18. Replace the screws that secure the middle wall bracket to the chassis.
19. Replace the cooling fan cage.  
Replace the cooling fans.

### Next steps

1. Replace the system boards.
2. Follow the procedure listed in the After working inside your system section.

### Related references

[Safety instructions](#) on page 62

### Related tasks

[Installing a cooling fan](#) on page 68

[Installing a sled](#) on page 89

[Installing the system cover](#) on page 65

[After working inside your system](#) on page 63

## Cable routing—midplane to the hard drive backplane

### About this task

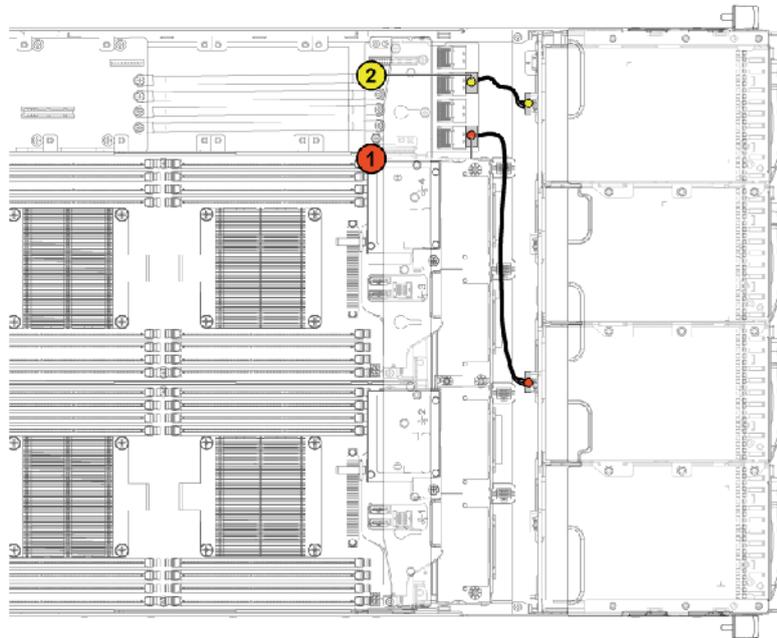


Figure 91. Cable routing—top midplane to backplane for 12 x3.5-inch hard drive configuration

Table 37. Cable routing—top midplane to backplane for 12 x3.5-inch hard drive configuration

| Item | Cable                      | From (top midplane)   | To (backplane)   |
|------|----------------------------|---|--|
| 1    | Hard drive backplane cable | mini-SAS connector for system board 1 (hard drive 1, 2, 3 and 4) (J1) | SATA2 hard drive connectors 1, 2 and 3 for system board 1 (from top to bottom) |
| 2    | Hard drive backplane cable | mini-SAS connector for system board 3 (hard drive 1, 2, 3 and 4) (J3) | SATA2 hard drive connectors 1, 2 and 3 for system board 3 (from top to bottom) |

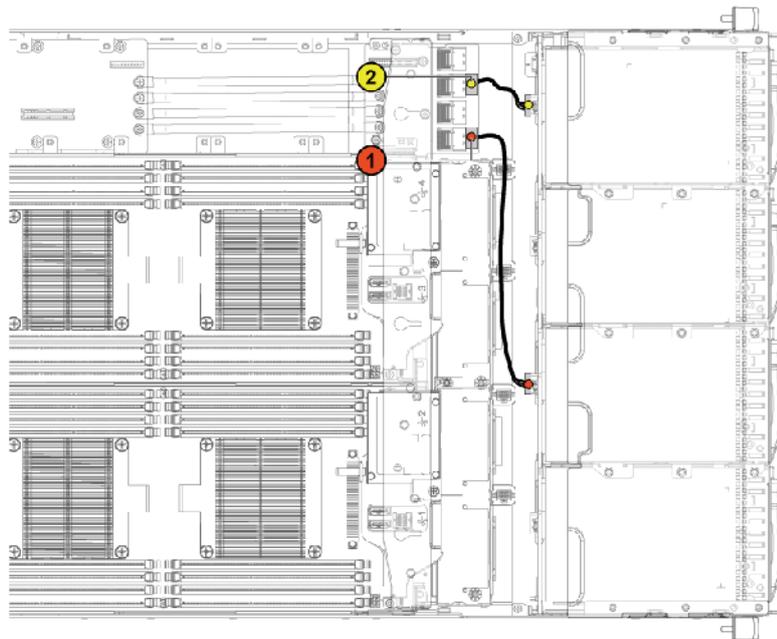


Figure 92. Cable routing—bottom midplane to backplane for 12 x3.5-inch hard drive configurations

Table 38. Cable routing—bottom midplane to backplane for 12 x3.5-inch hard drive configurations

| Item | Cable                      | From (bottom midplane)  | To (backplane)  |
|------|----------------------------|---|---|
| 1    | Hard drive backplane cable | mini-SAS connector for system board 2 (hard drive 1, 2, 3 and 4) (J1) | SATA2 hard drive connectors 1, 2 and 3 for system board 2 (from top to bottom)  |
| 2    | Hard drive backplane cable | mini-SAS connector for system board 4 (hard drive 1, 2, 3 and 4) (J3) | SATA2 hard drive connectors 1, 2, and 3 for system board 4 (from top to bottom) |

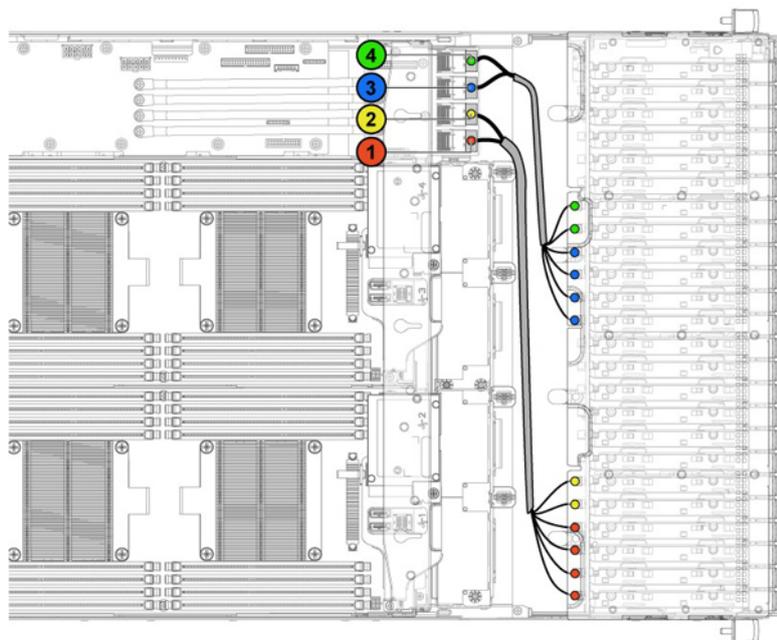
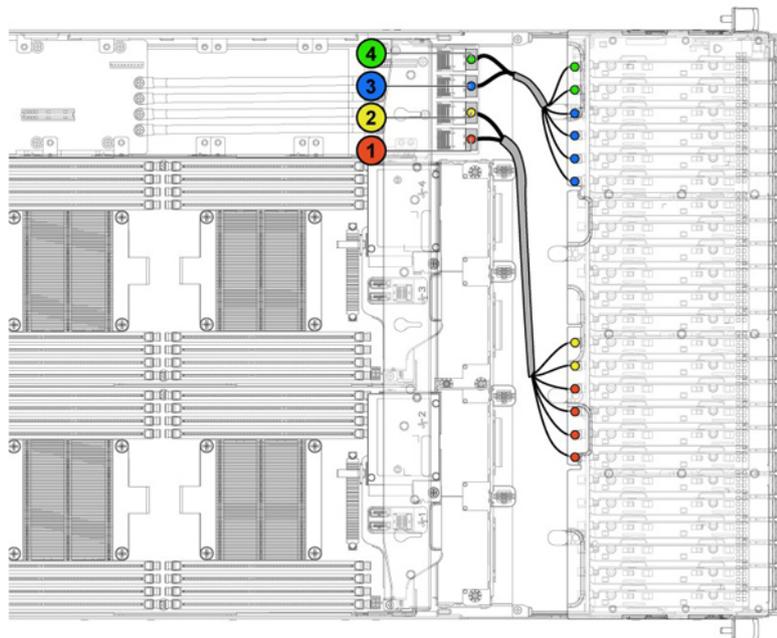


Figure 93. Cable routing—top midplane to backplane for 24 x2.5-inch hard drive configuration

**Table 39. Cable routing–top midplane to backplane for 24 x2.5-inch hard drive configuration**

| Item | Cable                      | From (top midplane)   | To (backplane)   |
|------|----------------------------|---|--|
| 1    | Hard drive backplane cable | Mini-SAS connector for system board 1 (hard drive 1, 2, 3 and 4) (J1) | SATA2 hard drive connectors 1 to 4 for system board 1 (from right to left) |
| 2    | Hard drive backplane cable | Mini-SAS connector for system board 1 (hard drive 5 and 6) (J2)       | SATA2 hard drive connectors 5 to 6 for system board 1 (from right to left) |
| 3    | Hard drive backplane cable | Mini-SAS connector for system board 3 (hard drive 1, 2, 3 and 4) (J3) | SATA2 hard drive connectors 1 to 4 for system board 3 (from right to left) |
| 4    | Hard drive backplane cable | Mini-SAS connector for system board 3 (hard drive 5 and 6) (J4)       | SATA2 hard drive connectors 5 to 6 for system board 3 (from right to left) |



**Figure 94. Cable routing–bottom midplane to backplane for 24 x2.5-inch hard drive configuration**

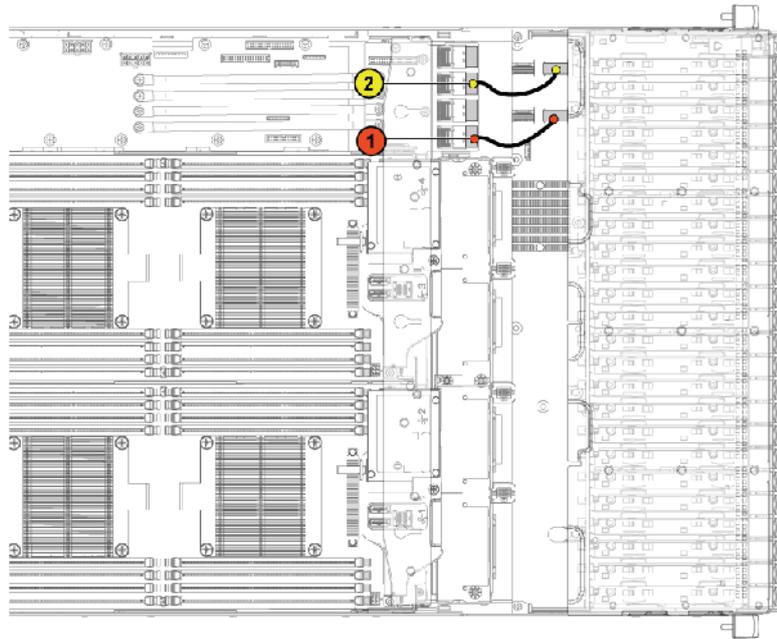
**Table 40. Cable routing–bottom midplane to backplane for 24 x2.5-inch hard drive configuration**

| Item | Cable                      | From (bottom midplane)  | To (backplane)   |
|------|----------------------------|---|--|
| 1    | Hard drive backplane cable | Mini-SAS connector for system board 2 (hard drive 1, 2, 3 and 4) (J1) | SATA2 hard drive connectors 1 to 4 for system board 2 (from right to left) |
| 2    | Hard drive backplane cable | Mini-SAS connector for system board 2 (hard drive 5 and 6) (J2)       | SATA2 hard drive connectors 5 to 6 for system board 2 (from right to left) |
| 3    | Hard drive backplane cable | Mini-SAS connector for system board 4 (hard drive 1, 2, 3 and 4) (J3) | SATA2 hard drive connectors 1 to 4 for system board 4 (from right to left) |

**Table 40. Cable routing–bottom midplane to backplane for 24 x2.5-inch hard drive configuration (continued)**

| Item | Cable                      | From (bottom midplane)  | To (backplane)   |
|------|----------------------------|---|--|
| 4    | Hard drive backplane cable | Mini-SAS connector for system board 4 (hard drive 5 and 6) (J4) | SATA2 hard drive connectors 5 to 6 for system board 4 (from right to left) |

## Cable routing for middle plane to 2.5-inch hard drive backplane for expander configuration



**Figure 95. Cable routing–top middle plane to 2.5-inch hard drive for expander configuration**

**Table 41. Cable routing–top middle plane to 2.5-inch hard drive for expander configuration**

| Item | Cable                      | From (top middle plane)                    | To (expander card)                           |
|------|----------------------------|--|--|
| 1    | Hard drive backplane cable | Mini-SAS connector for system board 1 (J3) | Mini-SAS connector ( 0-3) for system board 1 |
| 2    | Hard drive backplane cable | Mini-SAS connector for system board 3 (J5) | Mini-SAS connector (8-11) for system board 3 |

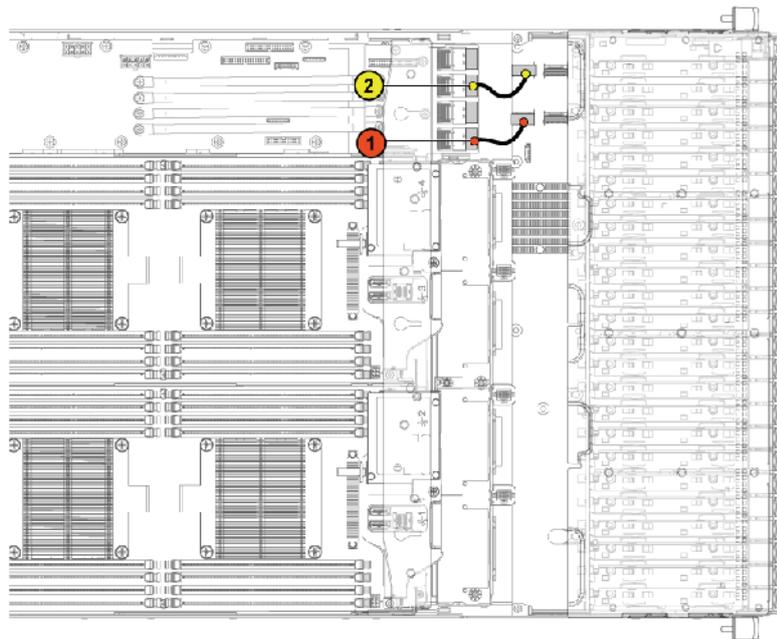


Figure 96. Cable routing—bottom middle plane to 2.5-inch hard drive for expander configuration

Table 42. Cable routing—bottom middle plane to 2.5-inch hard drive for expander configuration

| Item | Cable                      | From (bottom middle plane)                 | To (expander card)                            |
|------|----------------------------|--|---|
| 1    | Hard drive backplane cable | Mini-SAS connector for system board 2 (J4) | Mini-SAS connector (4-7) for system board 2   |
| 2    | Hard drive backplane cable | Mini-SAS connector for system board 4 (J6) | Mini-SAS connector (12-15) for system board 4 |

## Hard drive backplanes

Servers use a backplane to attach hot swappable hard drives. A backplane has pins that pass directly into hard drive sockets without cables. They may have single connector to connect one disk array controller or multiple connectors that can be connected to one or more controllers.

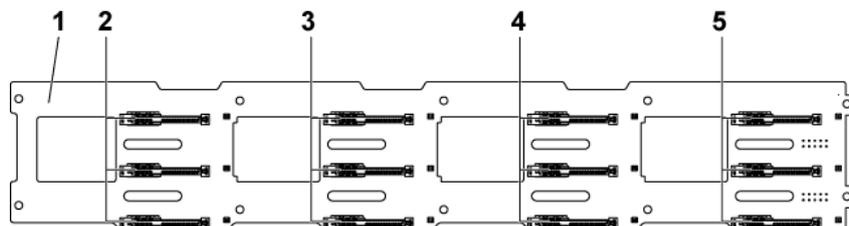
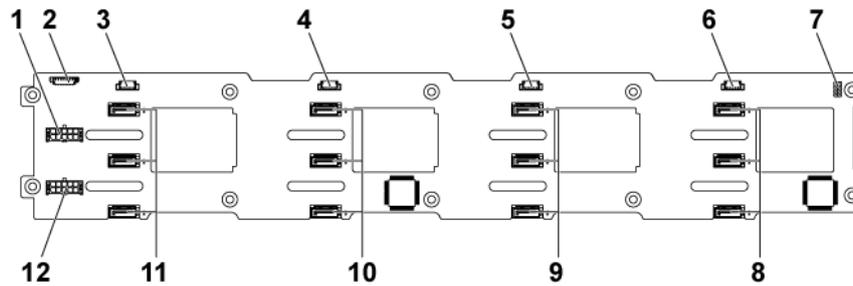


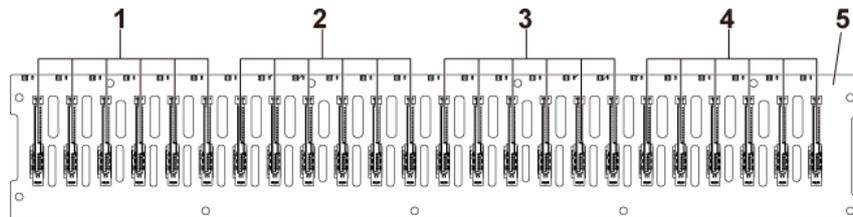
Figure 97. Front view of the 3.5 inch hard drive backplane

- 3.5 inch backplane
- hard drive connectors 1, 2 and 3 for system board 1 (from top to bottom)
- hard drive connectors 1, 2 and 3 for system board 2 (from top to bottom)
- hard drive connectors 1, 2 and 3 for system board 3 (from top to bottom)
- hard drive connectors 1, 2 and 3 for system board 4 (from top to bottom)



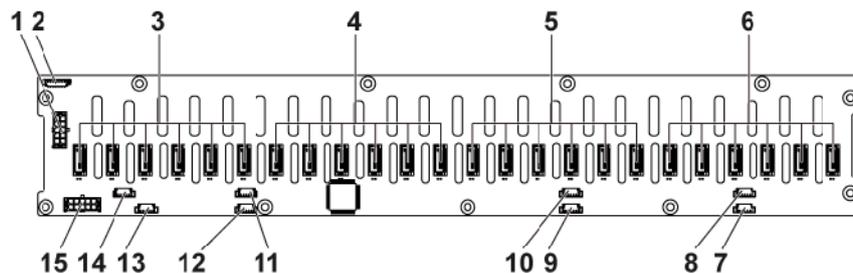
**Figure 98. Back view of the 3.5 inch hard drive backplane**

- |   |   |
|---|---|
| 1. backplane power connector for power supply unit 1                            | 2. 1x8pin fan controller board connector  |
| 3. SGPIO connector 4 for system board 4   | 4. SGPIO connector 3 for system board 3   |
| 5. SGPIO connector 2 for system board 2   | 6. SGPIO connector 1 for system board 1   |
| 7. backplane jumper   | 8. SATA2 and SAS connectors 1, 2 and 3 for system board 1 (from top to bottom)  |
| 9. SATA2 and SAS connectors 1, 2 and 3 for system board 2 (from top to bottom)  | 10. SATA2 and SAS connectors 1, 2 and 3 for system board 3 (from top to bottom) |
| 11. SATA2 and SAS connectors 1, 2 and 3 for system board 4 (from top to bottom) | 12. backplane power connector for power supply unit 2                           |



**Figure 99. Front view of the 2.5 inch hard drive backplane**

- |   |   |
|---|---|
| 1. hard drive connectors 1 to 6 for system board 1 (from left to right) | 2. hard drive connectors 1 to 6 for system board 2 (from left to right) |
| 3. hard drive connectors 1 to 6 for system board 3 (from left to right) | 4. hard drive connectors 1 to 6 for system board 4 (from left to right) |
| 5. 2.5-inch backplane   |   |



**Figure 100. Back view of the 2.5 inch hard drive backplane**

- |  |  |
|--|--|
| 1. backplane power connector for power supply 1                            | 2. system fan board connector  |
| 3. SATA2 and SAS connectors 1 to 6 for system board 4 (from right to left) | 4. SATA2 and SAS connectors 1 to 6 for system board 3 (from right to left) |
| 5. SATA2 and SAS connectors 1 to 6 for system board 2 (from right to left) | 6. SATA2 and SAS connectors 1 to 6 for system board 1 (from right to left) |
| 7. SGPIO connector A for system board 1                                    | 8. SGPIO connector B for system board 1                                    |
| 9. SGPIO connector A for system board 2                                    | 10. SGPIO connector B for system board 2                                   |
| 11. SGPIO connector A for system board 3                                   | 12. SGPIO connector B for system board 3                                   |
| 13. SGPIO connector A for system board 4                                   | 14. SGPIO Connector B for system board 4                                   |
| 15. backplane power connector for power supply 2                           |  |

# Removing the hard drive backplane

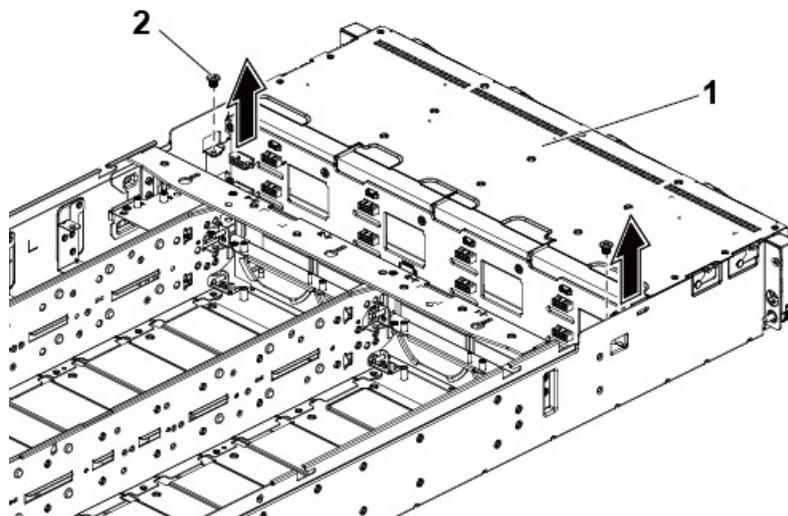
## Prerequisites

- 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 prevent damage to the drives and backplane, you must remove the hard drives from the system before removing the backplane.
- CAUTION:** You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.
- NOTE:** The removal procedure for 2.5-inch of SATA2 and SAS backplane is similar to the backplane for 3.5-inch hard drive systems.
- NOTE:** Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Keep the Phillips #2 screwdriver ready.

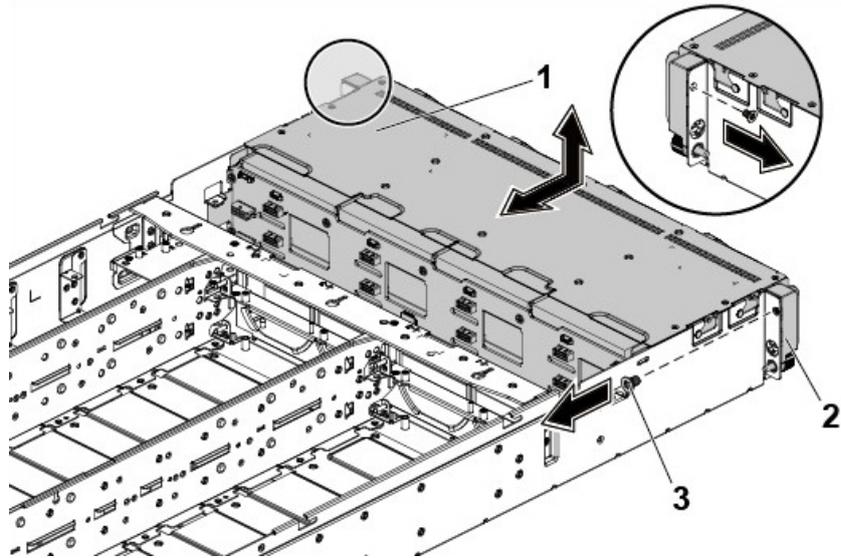
## Steps

1. Disconnect the control panel cables from the power distribution board.
2. Remove the screws that secure the hard drive cage to the chassis.



**Figure 101. Removing and installing the backplane**

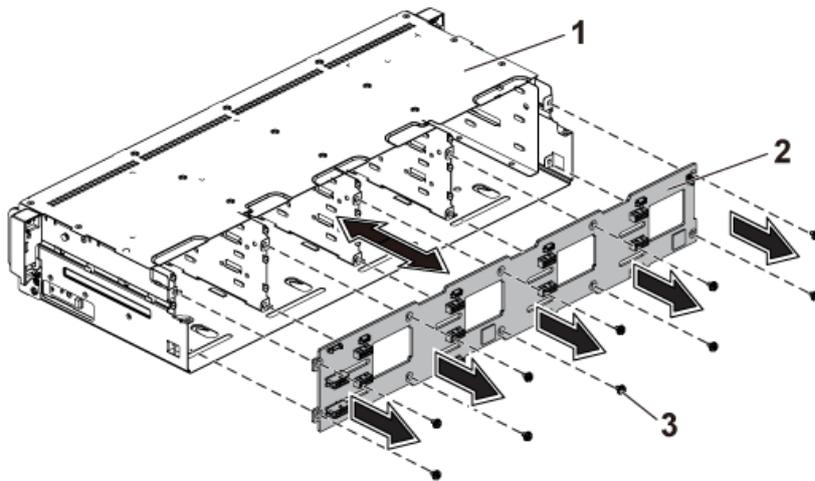
- a. hard drive cage
  - b. screw (2)
3. Remove the screws that secure the control panel to the chassis.
  4. Remove the hard drive cage from the chassis.



**Figure 102. Removing and installing the hard drive cage**

- a. hard drive cage
- b. control panel assembly (2)
- c. screw (2)

5. Disconnect all the cables connected to the hard drive backplane.
6. Remove the screws that secure the backplane to the hard drive cage.
7. Remove the backplane from the hard drive cage.



**Figure 103. Removing and installing the backplane from the hard drive cage**

- a. hard drive cage
- b. 3.5-inch backplane
- c. screw (10)

**Next steps**

1. Install the hard drive backplane.
2. Install the hard drives.
3. Follow the procedure listed in the After working inside your system section.

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Before working inside your system](#) on page 63

[Removing a hard drive carrier](#) on page 71

[Removing the system cover](#) on page 64

# Installing the hard drive backplane

## Prerequisites

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

**CAUTION:** You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.

**NOTE:** You must route the cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Keep the Phillips #2 screw driver ready.

## Steps

1. Install the backplane into the hard drive cage.
2. Install the screws that secure the backplane to the hard drive cage.
3. Connect all the cables to the backplane.
4. Install the screws that secure the hard drive cage to the chassis.
5. Install the screws that secure the control panel to the chassis.
6. Reconnect the cables to the midplanes and PDB 1.

## Next steps

1. Install the hard drives.
2. Follow the procedure listed in the After working inside your system section.

## Related references

[Safety instructions](#) on page 62

## Related tasks

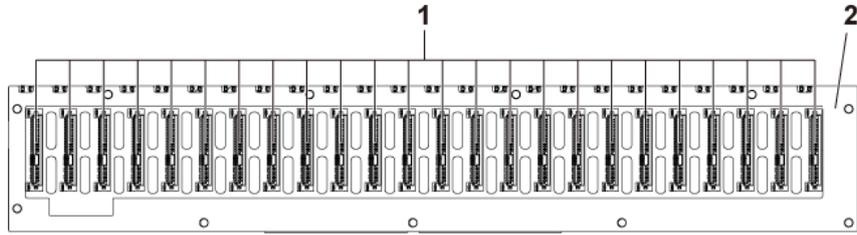
[Installing the system cover](#) on page 65

[Installing a hard drive into a hard drive carrier](#) on page 74

[After working inside your system](#) on page 63

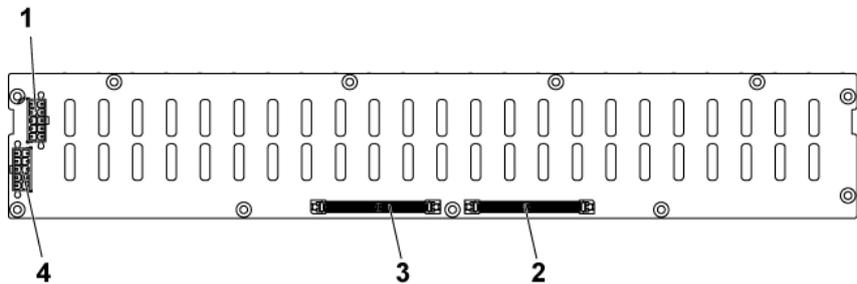
# 2.5-inch hard drive expander configuration

In a 2.5 inch hard drive configuration, an expander card connects the system boards to the 2.5-inch hard drive backplane through the midplane.



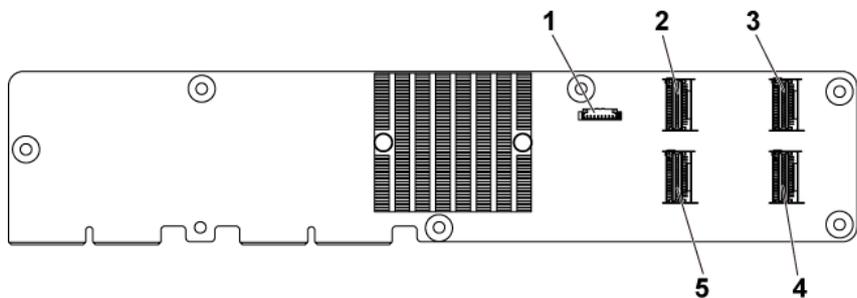
**Figure 104. Front view of the backplane**

- 1. hard drive connectors 1 to 24 (from left to right)
- 2. 2.5 inch backplane for expander configuration



**Figure 105. Back view of the backplane**

- 1. backplane power connector for power supply 1
- 2. expander-card connector 1
- 3. expander-card connector 2
- 4. backplane power connector for power supply 2



**Figure 106. Top view of the 2.5-inch hard drive expander card**

- 1. power control connector
- 2. mini-SAS connector (4-7)
- 3. mini-SAS connector (12-15)
- 4. mini-SAS connector (8-11)
- 5. mini-SAS connector (0-3)

Following is the replacement procedure of SATA2 and SAS backplane for the 2.5-inch hard drive expander configuration. The configuration is applicable for up to four system boards and supports up to 24 hard drives. For more information, see the HDD Zoning configuration tool under **Drivers & downloads** at [Dell.com/support](http://Dell.com/support).

# Removing the 2.5-inch hard drive backplane for expander configuration

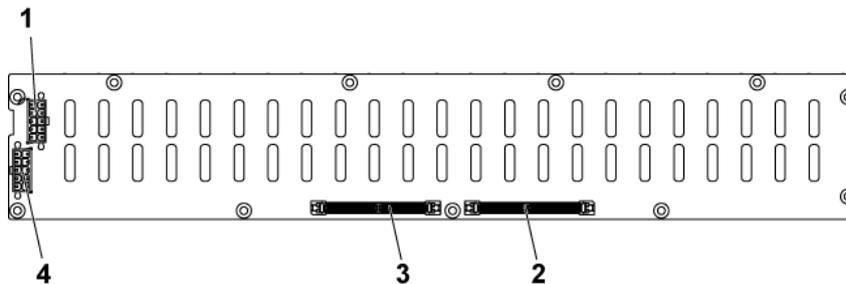
## Prerequisites

- 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 prevent damage to the drives and backplane, you must remove the hard drives from the system before removing the backplane.
- CAUTION:** You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.
- NOTE:** Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.

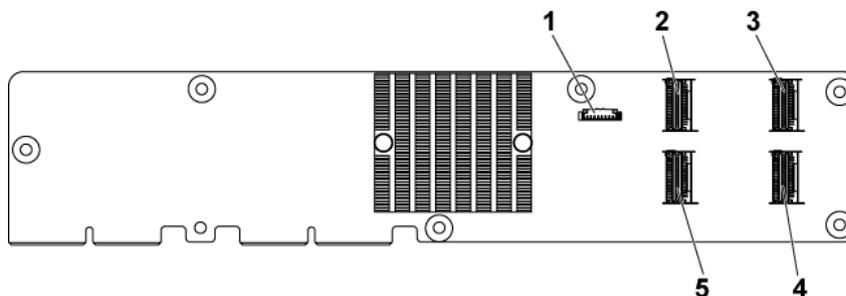
## Steps

1. Disconnect all the cables from the backplane and expander card.



**Figure 107. Back view of the 2.5-inch hard drive backplane for expander configuration**

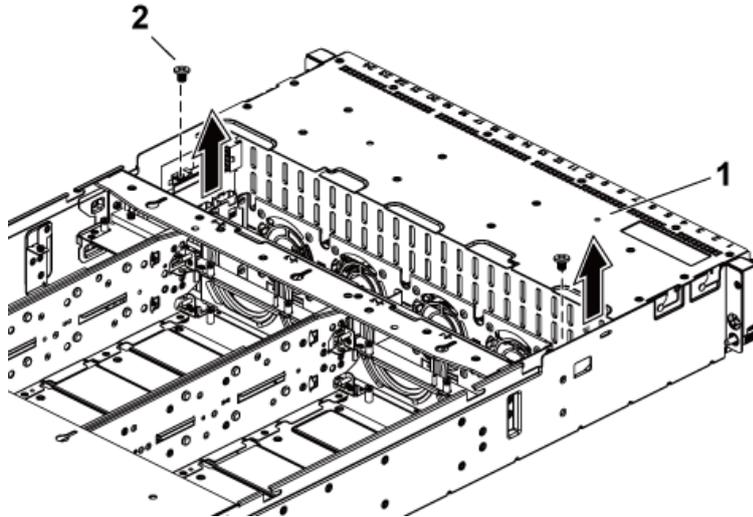
- |   |   |
|---|---|
| 1. backplane power connector for power supply 1 | 2. Expander-card connector 1                    |
| 3. Expander-card connector 2                    | 4. backplane power connector for power supply 2 |



**Figure 108. Top view of the expander card**

- |                               |                              |
|-------------------------------|------------------------------|
| 1. power control connector    | 2. mini-SAS connector (4-7)  |
| 3. mini-SAS connector (12-15) | 4. mini-SAS connector (8-11) |
| 5. mini-SAS connector (0-3)   |                              |

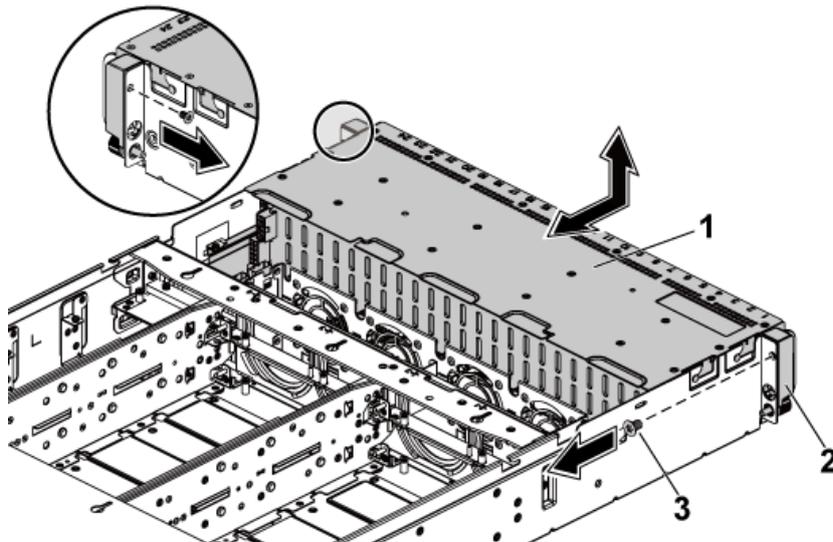
2. Disconnect control panel cables from the power distribution board.
3. Remove the screws that secure the hard drive cage to the chassis.



**Figure 109. Removing and installing the 2.5-inch hard drive backplane for expander configuration**

- a. hard drive cage
- b. screw (2)

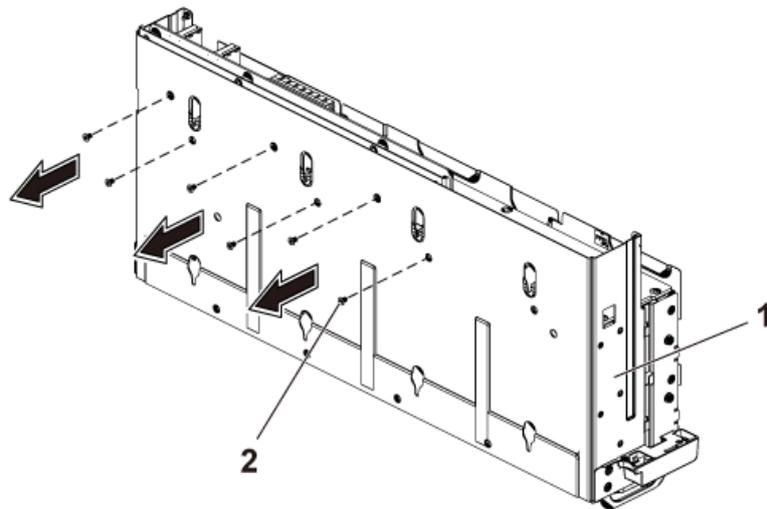
4. Remove the screws that secure the control panel to the chassis.
5. Remove the hard drive cage from the chassis.



**Figure 110. Removing and installing the 2.5-inch hard drive cage for expander configuration**

- a. hard drive cage
- b. control panel assembly (2)
- c. screw (2)

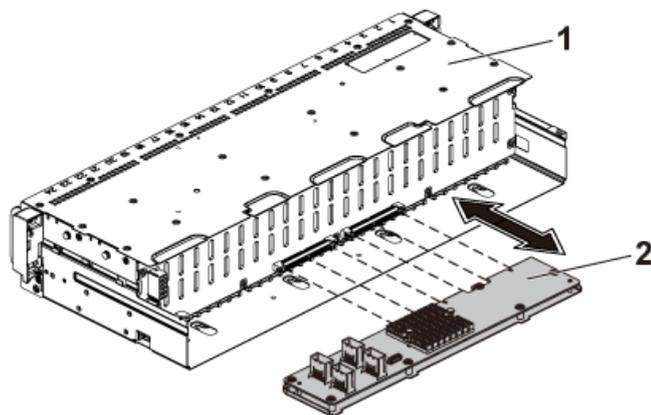
6. Remove the screws that secure the expander card assembly to the hard drive cage.



**Figure 111. Removing and installing the screws that secure the expander card assembly to the hard drive cage**

- a. hard drive cage
- b. screw (6)

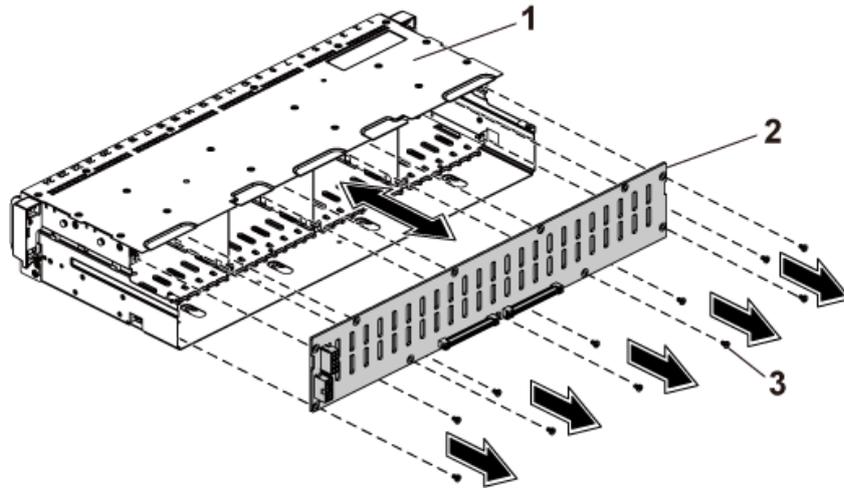
7. Remove the expander card assembly from the hard drive cage.



**Figure 112. Removing and installing the 2.5-inch hard drive expander card assembly from the hard drive cage**

- a. hard drive cage
- b. expander card assembly

8. Remove the screws that secure the backplane for expander configuration to the hard drive cage.  
 9. Remove the backplane for expander configuration from the hard drive cage.



**Figure 113. Removing and installing the backplane for expander configuration from the hard drive cage**

- a. hard drive cage
- b. 2.5-inch hard drive backplane for expander configuration
- c. screw (11)

#### Related references

[Safety instructions](#) on page 62

#### Related tasks

[Before working inside your system](#) on page 63

[Removing a hard drive carrier](#) on page 71

[Removing the system cover](#) on page 64

## Installing the 2.5-inch hard drive backplane for expander configuration

#### Prerequisites

**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.

**NOTE:** You must route these cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

Follow the safety guidelines listed in the Safety instructions section.

#### Steps

1. Install the backplane for expander configuration to the hard drive cage.
2. Install the screws that secure the backplane for expander configuration to the hard drive cage.
3. Install the expander card assembly to the hard drive cage.
4. Install the screws that secure the expander card assembly to the hard drive cage.
5. Install the hard drive cage into the chassis.
6. Install the screws that secure the control panel assemblies to the chassis.
7. Connect all the cables to the backplane for expander configuration and expander card.

8. Connect control panel cables to the power distribution board.
9. Replace the screws that secure the hard drive cage.

### Next steps

1. Install the hard drives.
2. Follow the procedure listed in the After working inside your system section.

### Related references

[Safety instructions](#) on page 62

### Related tasks

[Installing the system cover](#) on page 65

[Installing a hard drive into a hard drive carrier](#) on page 74

[After working inside your system](#) on page 63

## Control panel

A control panel allows you to manually control the inputs to the server. Normally the control panel has USB and VGA ports, along with the NMI button, power button, and an optional LCD display unit or diagnostic indicators.

## Removing the control panel

### Prerequisites

**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.

**NOTE:** Observe the routing of the cable on the enclosure as you remove them. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Disconnect all the cables from the backplane.
5. Disconnect control panel cables from the power distribution board.
6. Remove the hard drive cage from the enclosure. The procedure to remove the hard drive cage is similar to Removing the backplane.
7. Keep the Phillips #1 screwdriver ready.

### Steps

1. Remove the screws that secure the control panel assemblies to the enclosure.
2. Remove the screws that secure the control panel assembly to the hard drive cage.
3. Remove the control panel assembly from the hard drive cage.

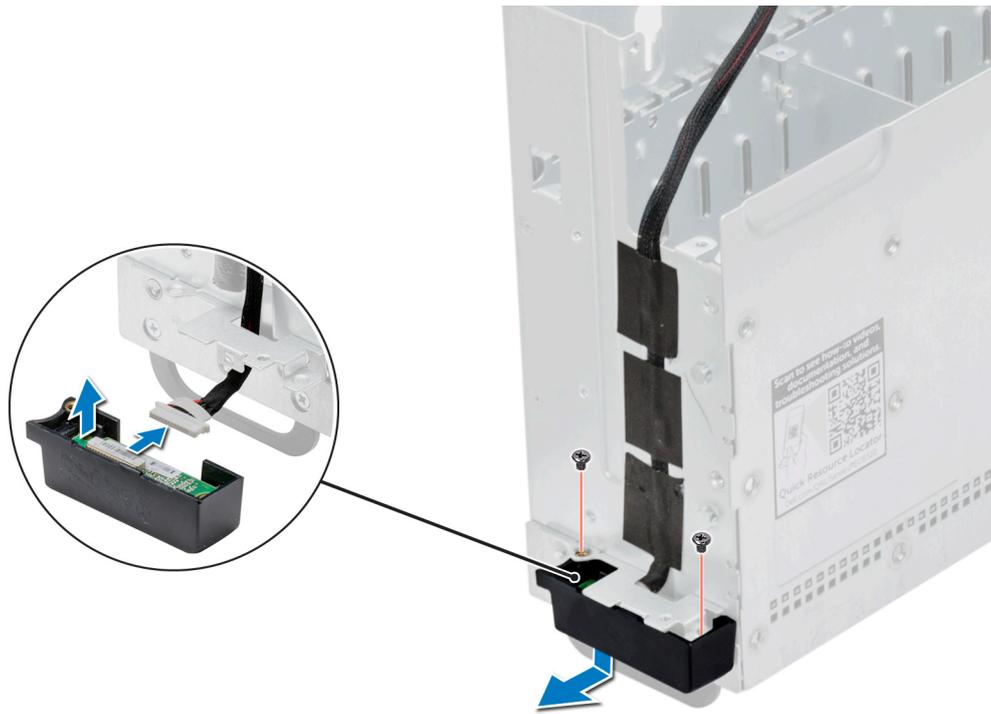


Figure 114. Removing the left control panel assembly

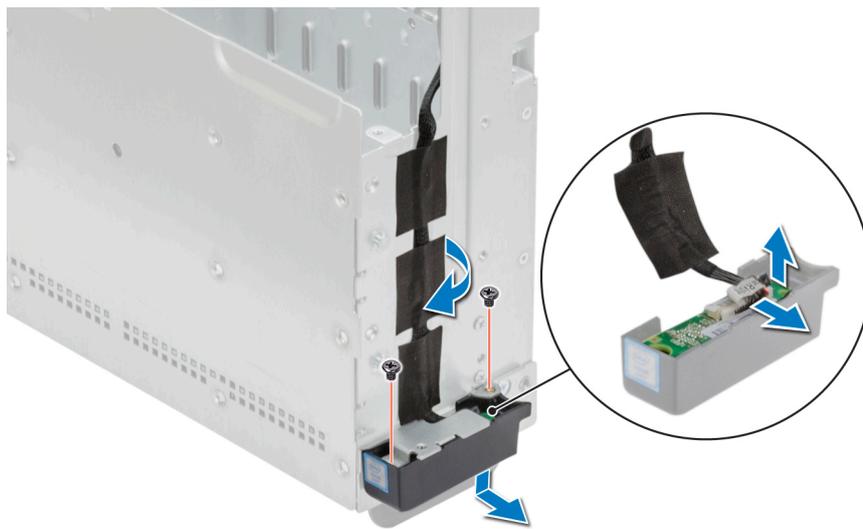
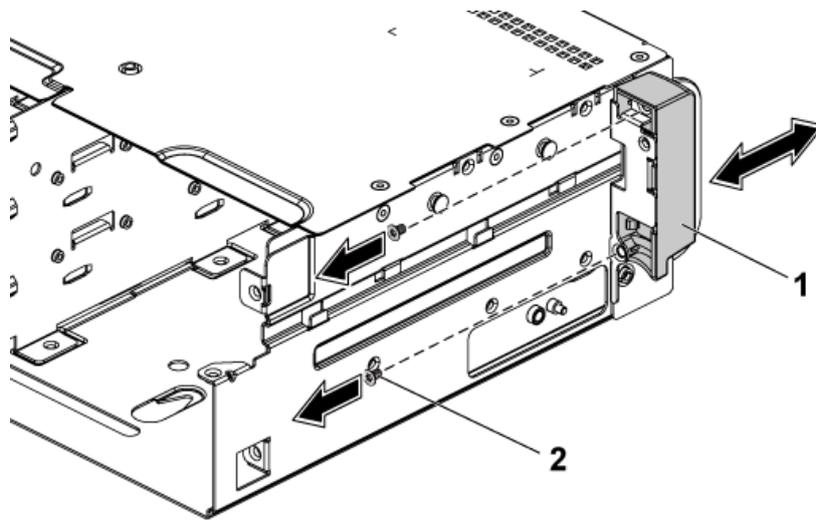


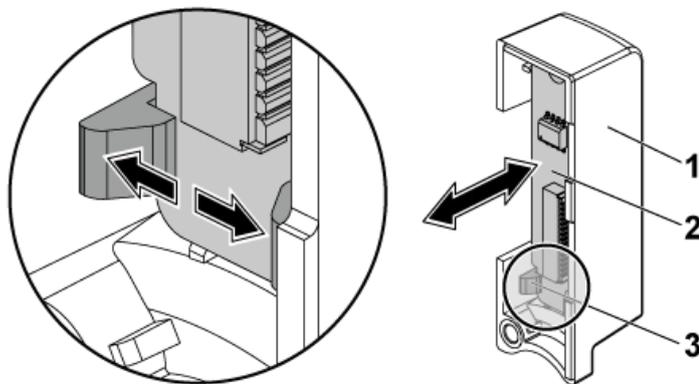
Figure 115. Removing the right control panel assembly



**Figure 116. Removing and installing a control panel assembly**

- a. control panel assembly
- b. screw (2)

4. Push aside the retention hooks on the control panel assembly.
5. Remove the control panel from the control panel assembly.
6. Disconnect the control panel cable.



**Figure 117. Removing and installing a control panel**

- a. control panel assembly
- b. control panel
- c. retention hooks

**Next steps**

1. Install the control panel assembly.
2. Install the hard drive cage into the enclosure. The procedure to install the hard drive cage is similar to Installing the backplane.
3. Reconnect the disconnected cables.
4. Install all the removed hard drives.
5. Follow the procedure listed in the After working inside your system section.

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Before working inside your system](#) on page 63

[Removing a hard drive carrier](#) on page 71

[Removing the system cover](#) on page 64

# Installing the control panel

## Prerequisites

**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.

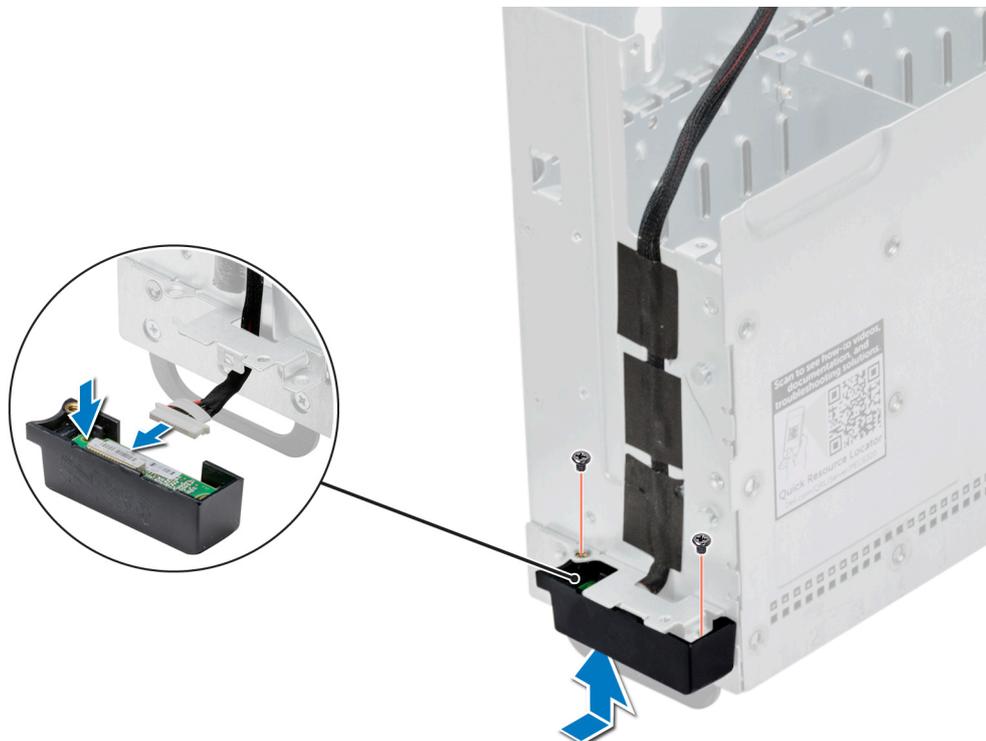
**NOTE:** Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

**NOTE:** Additional tape maybe required to secure the cables.

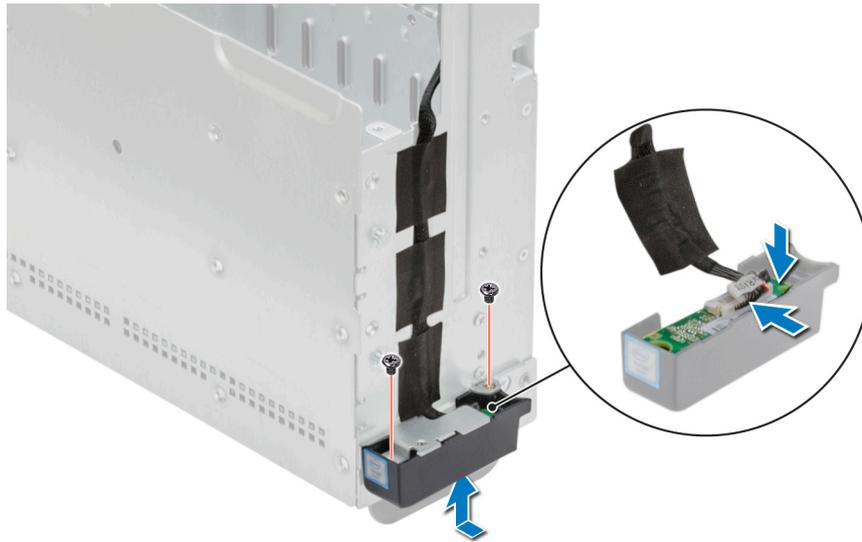
1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the control panel.
4. Keep the Phillips #1 screwdriver ready.

## Steps

1. Connect the control panel cable to the control panel.
2. Push aside the retention hooks on the control panel assembly and place the control panel into the control panel assembly.
3. Install the control panel assembly into the hard drive cage.



**Figure 118. Installing the left side control panel**



**Figure 119. Installing the right side control panel**

4. Install the screws that secure the control panel assembly to the hard drive cage.
5. Install the screws that secure the control panel assemblies to the chassis.

#### Next steps

1. Install the hard drive cage into the enclosure.
2. Connect all the cables to the backplane.
3. Connect the control panel cables to the power distribution board.
4. Install all the removed hard drives.
5. Follow the procedure listed in the After working inside your system section.

#### Related references

[Safety instructions](#) on page 62

#### Related tasks

[Installing the system cover](#) on page 65

[Installing a hard drive into a hard drive carrier](#) on page 74

[After working inside your system](#) on page 63

## Sensor board

The thermal sensor board is used to monitor the ambient temperature around the enclosure.

## Removing the sensor board for 3.5-inch hard drive system

#### Prerequisites

**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.

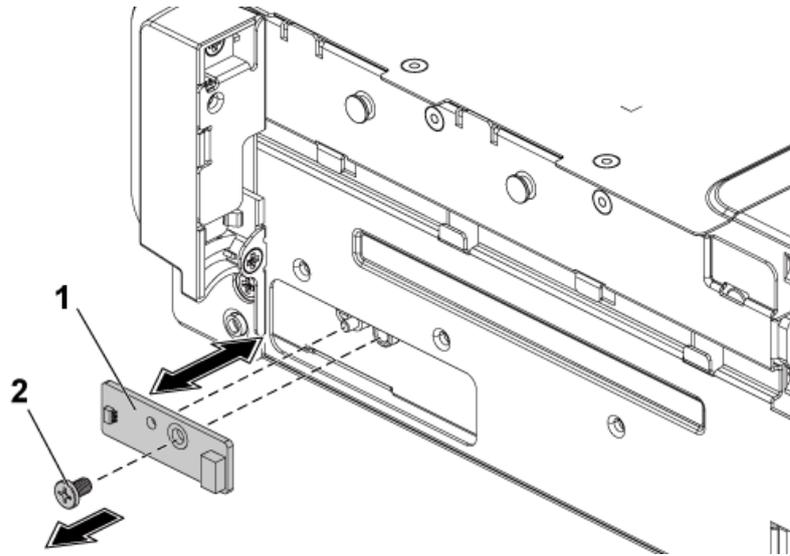
**NOTE:** Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.

2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Disconnect all the cables from the backplane.
5. Disconnect front panel cables from the power distribution board.

### Steps

1. Remove the hard drive cage from the chassis.
2. Disconnect the cable from the sensor board.
3. Remove the screw that secures the sensor board to the hard drive cage.
4. Remove the sensor board from the hard drive cage.



**Figure 120. Removing and installing the sensor board**

- a. sensor board
- b. screw

### Related references

[Safety instructions](#) on page 62

### Related tasks

[Before working inside your system](#) on page 63

[Removing a hard drive carrier](#) on page 71

[Removing the system cover](#) on page 64

## Installing the sensor board for 3.5-inch hard drive system

### Prerequisites

**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.

**NOTE:** You must route these cables properly on the chassis to prevent them from being pinched or crimped.

Follow the safety guidelines listed in the Safety instructions section.

### Steps

1. Install the sensor board into the hard drive cage.
2. Install the screw that secures the sensor board to the hard drive cage.
3. Connect the sensor board cable to the sensor board.

### Next steps

1. Install the hard drive cage into the chassis.
2. Install the screws that secure the hard drive cage to the chassis.
3. Connect all the cables to the backplane.
4. Connect front panel cables to the power distribution board.
5. Install the hard drives.
6. Follow the procedure listed in the After working inside your system section.

### Related references

[Safety instructions](#) on page 62

### Related tasks

[Installing the system cover](#) on page 65

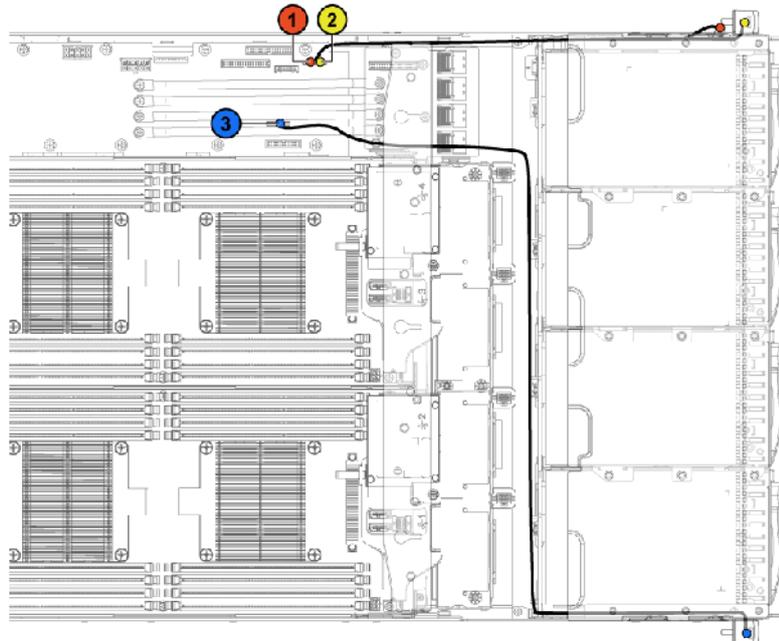
[Installing a hard drive into a hard drive carrier](#) on page 74

[After working inside your system](#) on page 63

## Cable routing for sensor board and control panel for 3.5-inch hard drive system

### Steps

1. Connect the Y-shaped cable for sensor board and control panel 2 to the connector on the power distribution board 1, and connect the other two ends of the cable to the connectors on the sensor board and the control panel 2 respectively.
2. Connect the control panel cable to the connector on the power distribution board 1, and connect the other end of the cable to the connector on the control panel 1.



**Figure 121. Cable routing—sensor board and control panel**

**Table 43. Cable routing for sensor board and control panel for 3.5-inch hard drive system**

| Item | Cable              | From (power distribution board)   | To (sensor board and control panels) |
|------|--------------------|-----------------------------------|--------------------------------------|
| 1    | Sensor board cable | Sensor board power connector (J1) | Sensor board                         |
| 2    | Front panel cable  | Front panel connector (J16)       | Front panel 2                        |
| 3    | Front panel cable  | Front panel connector (J18)       | Front panel 1                        |

## Removing the sensor board for 2.5-inch hard drive system

### Prerequisites

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

**CAUTION:** You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.

**NOTE:** Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Disconnect all the cables from the backplane.
5. Disconnect control panel cables from the power distribution board.
6. Remove the hard drive cage from the chassis.
7. Keep the Phillips #2 screwdriver ready.

### Steps

1. Remove the screw that secures the sensor board assembly to the hard drive cage.
2. Disconnect the cable from the sensor board assembly.
3. Remove the sensor board assembly from the hard drive cage.
4. Remove the screw that secures the sensor board to the sensor board holder.
5. Remove the sensor board from the sensor board holder.

### Next steps

1. Install the sensor board
2. Install the hard drive cage.
3. Reconnect all the disconnected cables.
4. Install the hard drives
5. Follow the procedure listed in the After working inside your system section.

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Before working inside your system](#) on page 63

[Removing a hard drive carrier](#) on page 71

[Removing the system cover](#) on page 64

# Installing the sensor board for 2.5-inch hard drive system

## Prerequisites

 **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.

 **NOTE:** You must route these cables properly on the chassis to prevent them from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Remove the hard drive cage.
5. Disconnect all the cables connected to the backplane and sensor board.
6. Keep the Phillips #1 screwdriver ready.

## Steps

1. Install the sensor board into the sensor board holder and secure it with the screw.
2. Connect the sensor board cable to the sensor board.
3. Install the sensor board assembly into the hard drive cage.
4. Insert the screws that secure the sensor board to the hard drive cage.

## Next steps

1. Replace the hard drive cage into the chassis.
2. Connect all the cables to the backplane.
3. Connect the control panel cables to the power distribution board.
4. Install the hard drives.
5. Follow the procedure listed in the After working inside your system section.

## Related references

[Safety instructions](#) on page 62

## Related tasks

[Installing the system cover](#) on page 65

[Installing a hard drive into a hard drive carrier](#) on page 74

[After working inside your system](#) on page 63

# Cable routing for sensor board and control panel for 2.5-inch hard drive system

## Steps

1. Connect the Y-shaped cable for the sensor board and control panel 2 to the connector on the power distribution board 1, and connect the other two ends of the cable to the connectors on the sensor board and the control panel 2 respectively.
2. Connect the control panel cable to the connector on the power distribution board 1, and connect the other end of the cable to the connector on the control panel 1.

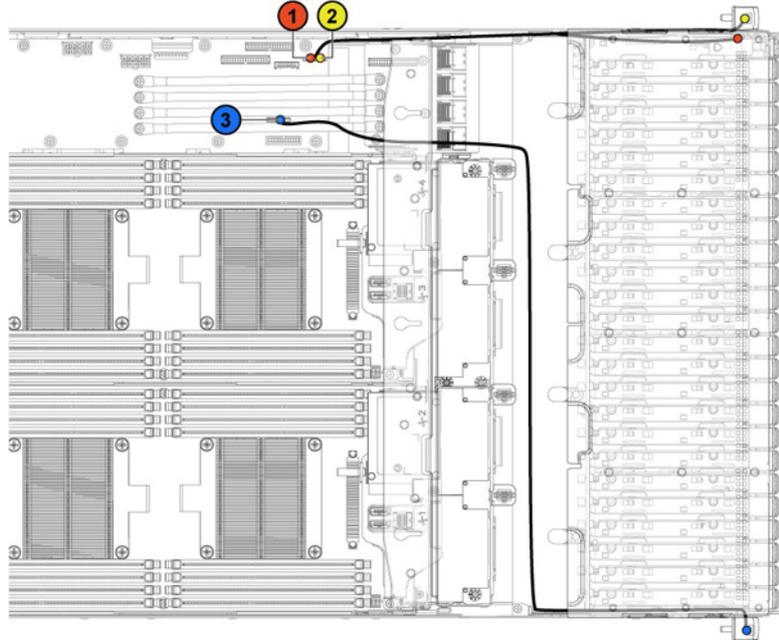


Figure 122. Cable routing—sensor board and control panel

Table 44. Cable routing—sensor board and control panel

| Item | Cable              | From (power distribution board)   | To (sensor board and control panels) |
|------|--------------------|-----------------------------------|--------------------------------------|
| 1    | Sensor board cable | Sensor board power connector (J1) | Sensor board                         |
| 2    | Front panel cable  | Front panel connector (J16)       | Front panel 2                        |
| 3    | Front panel cable  | Front panel connector (J18)       | Front panel 1                        |

# Jumpers and connectors

This topic 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:

- [C6320 system board connectors](#)
- [LSI 2008 SAS mezzanine card connectors](#)
- [Powerville dual port 1GbE](#)
- [Twinville dual port 10GbE](#)
- [Power distribution board 1 connectors](#)
- [Power distribution board 2 connectors](#)
- [Sensor board connectors](#)
- [Jumper settings](#)

## C6320 system board connectors

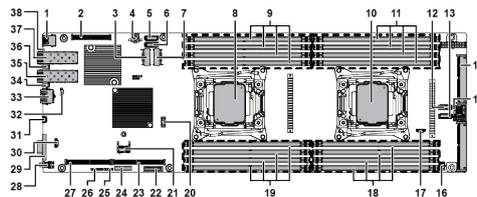


Figure 123. C6320 system board connectors

Table 45. System board connectors

| Item | Connector                          | Description                                  |
|------|------------------------------------|--|
| 1    | USB1                               | Rear USB connector 1                         |
| 2    | PCIE_G3_X8 (CPU1)                  | PCI-E Gen3 x8 mezzanine slot 3 (processor 1) |
| 3    | miniSAS0-3                         | Mini-SAS connector 0-3                       |
| 4    | HDD POWER CON                      | Hard drive power connector                   |
| 5    | SATA4                              | Onboard SATA connector 4                     |
| 6    | SATA5                              | Onboard SATA connector 5                     |
| 7    | miniSAS6-9                         | Mini-SAS connector 6-9                       |
| 8    | CPU1                               | Processor 1                                  |
| 9    | DIMM_A1, DIMM_A5, DIMM_A2, DIMM_A6 | DIMM sockets for processor 1                 |
| 10   | CPU2                               | Processor 2                                  |
| 11   | DIMM_B1, DIMM_B5, DIMM_B2, DIMM_B6 | DIMM sockets for processor 2                 |
| 12   | SATA5                              | SAS/SATA connector 5                         |
| 13   | SATA4                              | SAS/SATA connector 4                         |
| 14   | CONTROL_PANEL                      | Middle plane connector                       |

**Table 45. System board connectors (continued)**

| Item | Connector                          | Description  |
|------|------------------------------------|--|
| 15   | miniSAS0-3                         | Mini-SAS HD connector 0-3                                    |
| 16   | HI_PWR_CONN                        | High-power connector   |
| 17   | SGPIO                              | Serial General Purpose Input/Output (SGPIO) connector        |
| 18   | DIMM_B8, DIMM_B4, DIMM_B7, DIMM_B3 | DIMM sockets for processor 2                                 |
| 19   | DIMM_A8, DIMM_A4, DIMM_A7, DIMM_A3 | DIMM sockets for processor 1                                 |
| 20   | J106                               | Internal USB connector 2 (left) and USB connector 3 (right)  |
| 21   | TPM                                | Trusted Platform Module (TPM) connector                      |
| 22   | BHI                                | System battery   |
| 23   | PCIE_G3_X16 (CPU1)                 | PCI-e Gen3 x16 slot 1 (processor 1)                          |
| 24   | CPLD_DBG                           | CPLD debug connector   |
| 25   | UART                               | Universal Asynchronous Receiver/Transmitter (UART) connector |
| 26   | CPLD_JTAG                          | Complex Programmable Logic Device (CPLD) JTAG connector      |
| 27   | PCIE_G3_X16 (CPU1)                 | PCI-E Gen3 x16 Slot 2 (processor 1)                          |
| 28   | SW2                                | Power button   |
| 29   | VGA1                               | VGA port   |
| 30   | INT_TTL                            | Internal TTL COM connector                                   |
| 31   | USB_DBG1                           | USB to serial port   |
| 32   | MGMT                               | LAN management connector                                     |
| 33   | LAN3(BMC)                          | Management port  |
| 34   | CR21                               | LAN 2 LED  |
| 35   | LAN2                               | LAN 2 port   |
| 36   | CR20                               | LAN 1 LED  |
| 37   | LAN1                               | LAN 1 port   |
| 38   | CR3                                | UID LED  |

**Related tasks**

[System memory](#) on page 113

# LSI 2008 SAS mezzanine card connectors

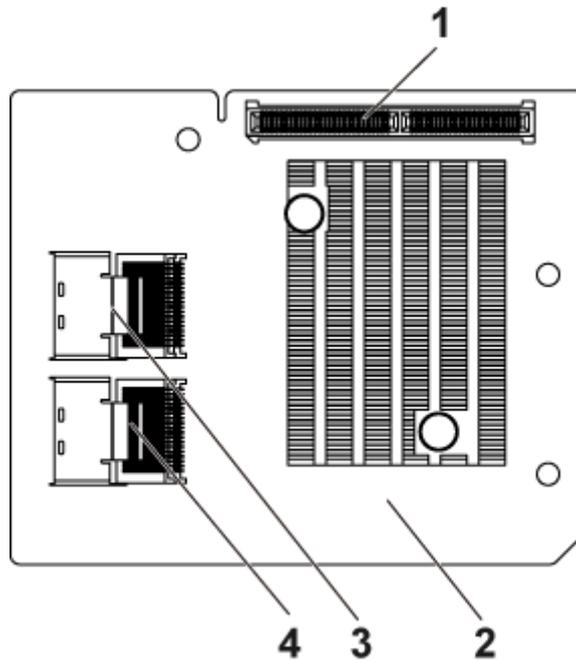


Figure 124. LSI 2008 SAS mezzanine card connectors

- 1. mezzanine card connectors
- 2. LSI 2008 mezzanine card
- 3. mini-SAS connector (port 4-7)
- 4. mini-SAS connector (port 0-3)

# Powerville dual port 1GbE

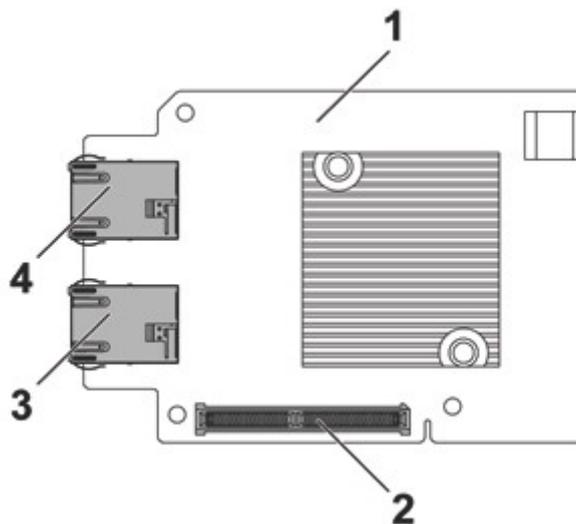
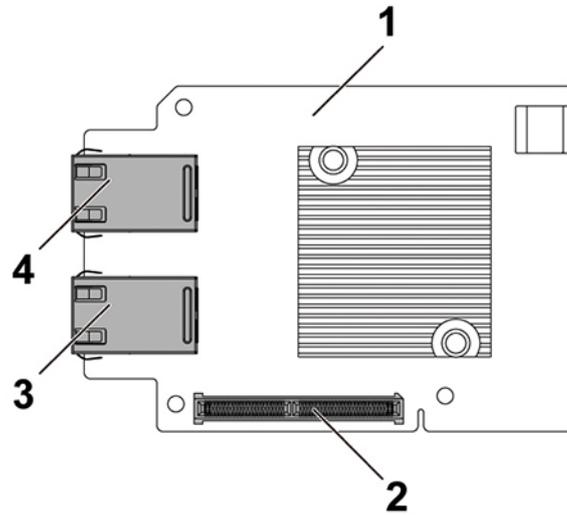


Figure 125. Powerville dual port 1GbE connectors

- 1. Powerville dual port 1GbE card
- 2. mezzanine card connector
- 3. NIC 1 connector
- 4. NIC 2 connector

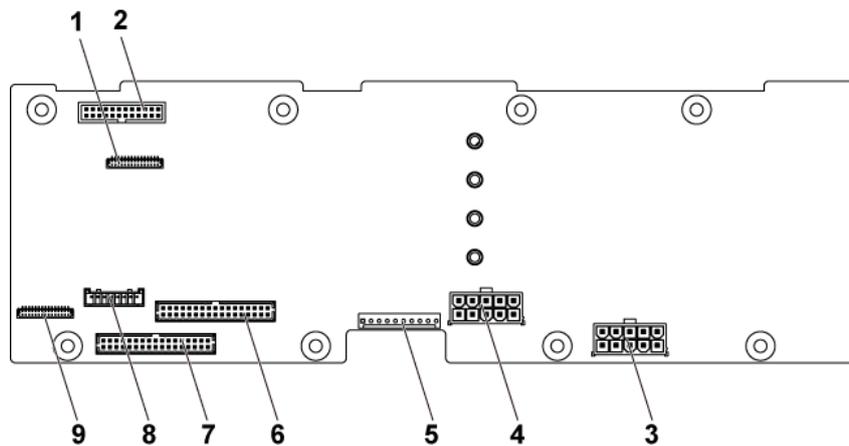
# Twinville dual port 10GbE



**Figure 126. Twinville dual port 10GbE connectors**

- 1. Twinville dual port 10GbE card
- 2. mezzanine card connector
- 3. NIC 1 connector
- 4. NIC 2 connector

# Power distribution board 1 connectors



**Figure 127. Power distribution board 1 connectors**

- 1. control panel connector for system board 1 and 2
- 2. system fan connector
- 3. hard drive backplane power connector 1
- 4. hard drive backplane power connector 2
- 5. one 10pin control connector
- 6. two 17pin control connector for system board 2 and 4
- 7. two 17pin control connector for system board 1 and 3
- 8. one 8pin control connector to hard drive backplane
- 9. control panel connector for system board 3 and 4

## Power distribution board 2 connectors

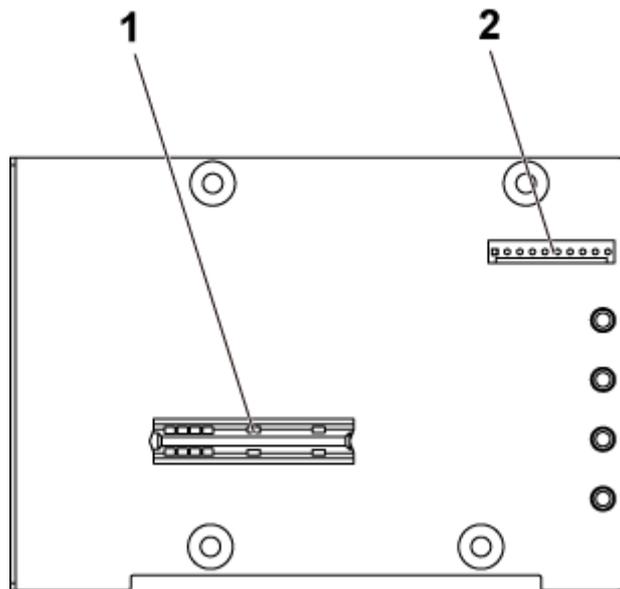


Figure 128. Power distribution board 2 connectors

1. bridge card connector
2. one 10pin control connector

## Sensor board connectors

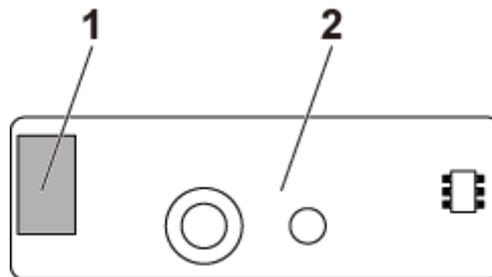


Figure 129. Sensor board connectors

1. power connector
2. sensor board

## Jumper settings

### Jumper settings on the PowerEdge C6320 system board

The function of system configuration jumpers installed on each PowerEdge C6320 system board is shown below:

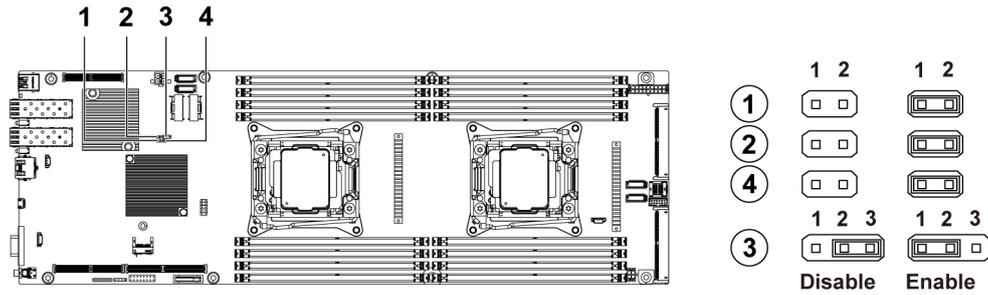


Figure 130. System configuration jumpers on the C6320 system board

Table 46. System configuration jumper on the C6320 system board

| Jumpers | Function       | Disabled (Default state) | Enabled |
|---------|----------------|--------------------------|---------|
| 1       | BIOS Recovery  | No pin                   | Pin 1-2 |
| 2       | NVRAM Clear    | No pin                   | Pin 1-2 |
| 3       | PWRD_EN        | Pin 1-2                  | Pin 2-3 |
| 4       | ME_FM Recovery | No pin                   | Pin 1-2 |

## Backplane jumper settings

**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.

The function of jumpers installed on 3.5-inch hard drive backplane and 2.5-inch hard drive backplane is the same. Following is an example using the jumpers installed on 3.5-inch HDD backplane.

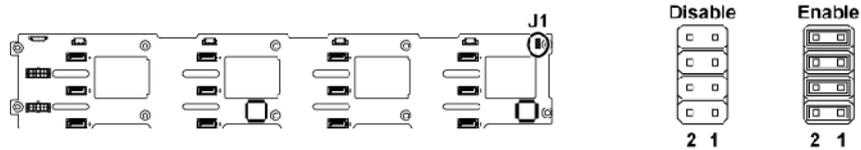


Figure 131. Backplane jumper settings

Table 47. Jumpers installed on backplane

| Jumper       | Function                      | Off     | On     |
|--------------|-------------------------------|---------|--------|
| SW1 (pin1-2) | Reserved                      | Disable | Enable |
| SW2 (pin3-4) | Reserved                      | Disable | Enable |
| SW3 (pin5-6) | SGPIO I <sup>2</sup> C Select | Disable | Enable |
| SW4 (pin7-8) | MFG Test                      | Disable | Enable |

**NOTE:** By default, the jumpers on the backplane are disabled.

# Troubleshooting your system

## Safety first — for you and your system

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

**NOTE:** Solution validation was performed by using the factory shipped hardware configuration.

### Topics:

- [Installation Problems](#)
- [Minimum configuration to POST](#)
- [Troubleshooting system startup failure](#)
- [Troubleshooting external connections](#)
- [Troubleshooting the video subsystem](#)
- [Troubleshooting a USB device](#)
- [Troubleshooting a serial input and output device](#)
- [Troubleshooting a NIC](#)
- [Troubleshooting a wet system](#)
- [Troubleshooting a damaged system](#)
- [Troubleshooting the system battery](#)
- [Troubleshooting power supply units](#)
- [Troubleshooting cooling problems](#)
- [Troubleshooting cooling fans](#)
- [Troubleshooting system memory](#)
- [Troubleshooting a drive or SSD](#)
- [Troubleshooting a storage controller](#)
- [Troubleshooting expansion cards](#)
- [Troubleshooting processors](#)

## Installation Problems

Perform the following checks when you troubleshoot installation problems:

- Check all cable and power connections (including all rack cable connections).
- Unplug the power cord and wait for one minute. Then reconnect the power cord and try again.
- If the network is reporting an error, verify that the system has enough memory and disk space.
- Remove all added peripherals, one at a time, and try to turn on the system. If after removing a peripheral the system works, it may be a problem with the peripheral or a configuration problem between the peripheral and the system. Contact the peripheral vendor for assistance.
- If the system does not power on, check the LED display. If the power LED is not on, you may not be receiving AC power. Check the AC power cord to make sure that it is securely connected.

## Minimum configuration to POST

The three components mentioned below are the minimum configuration to POST:

- One power supply unit

- One Processor (CPU) in socket CPU1 (minimum for troubleshooting)
- One Memory Module (DIMM) installed in the socket A1

**NOTE:** When PCI-E slot 1 and Mezzanine slot are to be used, processor 1 must be installed; when PCI-E slot 3 is to be used, both processor 1 and processor 2 must be installed.

## Troubleshooting system startup failure

If you boot the system to the BIOS boot mode after installing an operating system from the UEFI Boot Manager, the system stops responding. To avoid this issue, you must boot to the same boot mode in which you installed the operating system.

For all other startup issues, note the system messages that appear on the screen.

## Troubleshooting external connections

Before troubleshooting any external devices, ensure that all external cables are securely attached to the external connectors on your system.

- Compare the technical specification of the system with the external device to check the compatibility.
- Check the external device functionality with some other similar system so that we are sure that the device is working fine.
- Check any other similar external device with this system so that we are sure that the system port is working fine.

For any further queries contact, [Global Technical Support](#).

## Troubleshooting the video subsystem

### Prerequisites

**NOTE:** Ensure that the **Local Server Video Enabled** option is selected in the iDRAC Graphical User Interface (GUI), under **Virtual Console**. If this option is not selected, local video is disabled.

**NOTE:** The VGA ports are not hot-pluggable.

### Steps

1. Check the cable connections (power and display) to the monitor.
2. Check the video interface cabling from the system to the monitor.

### Results

If the tests run successfully, the problem is not related to video hardware.

### Next steps

If the tests fail, see the Getting help section.

### Related references

[Getting help](#) on page 180

## Troubleshooting a USB device

### Prerequisites

**NOTE:** Follow steps 1 to 6 to troubleshoot a USB keyboard or mouse. For other USB devices, go to step 7.

## Steps

1. Disconnect the keyboard and/or mouse cables from the system and reconnect them.
2. If the problem persists, connect the keyboard and/or mouse to another USB port on the system.
3. If the problem is resolved, restart the system, enter System Setup, and check if the non-functioning USB ports are enabled.

 **NOTE:** Older operating systems may not support USB 3.0.

4. Check if USB 3.0 is enabled in System Setup. If enabled, disable it and see if the issue is resolved.
5. In **iDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
6. If the problem is not resolved, replace the keyboard and/or mouse with a known working keyboard or mouse.  
If the problem is not resolved, proceed to step 7 to troubleshoot other USB devices attached to the system.  
If the problem is not resolved, proceed to troubleshoot other USB devices attached to the system.
7. Turn off all attached USB devices, and disconnect them from the system.
8. Restart the system.
9. If your keyboard is functioning, enter System Setup, verify that all USB ports are enabled on the **Integrated Devices** screen. If your keyboard is not functioning, use remote access to enable or disable the USB options.
10. Check if USB 3.0 is enabled in System Setup. If it is enabled, disable it and restart your system.
11. If the system is not accessible, reset the NVRAM\_CLR jumper inside your system and restore the BIOS to the default settings. See the System board jumper setting section
12. In the **iDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
13. Reconnect and turn on each USB device one at a time.
14. If a USB device causes the same problem, turn off the device, replace the USB cable with a known good cable, and turn on the device.

## Next steps

If all troubleshooting fails, see the Getting help section.

# Troubleshooting a serial input and output device

## Prerequisites

## Steps

1. Turn off the system and any peripheral devices connected to the serial port.
2. Swap the serial interface cable with a known working cable, and turn on the system and the I/O serial device.  
If the problem is resolved, replace the interface cable with a known working cable.
3. Turn off the system and the I/O serial device, and swap the serial device with a compatible device.
4. Turn on the system and the I/O serial device.

## Next steps

If the problem persists, see the Getting help section.

## Related references

[Getting help](#) on page 180

# Troubleshooting a NIC

## Prerequisites

 **NOTE:** Network Daughter Card (NDC) slot is not hot-pluggable.

## Steps

1. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section for the available diagnostic tests.
2. Restart the system and check for any system messages pertaining to the NIC controller.
3. Check the appropriate indicator on the NIC connector:
  - If the link indicator does not glow, the cable connected might be disengaged.
  - If the activity indicator does not glow, the network driver files might be damaged or missing. Install or replace the drivers as necessary. For more information, see the NIC documentation.
  - Try another known good network cable.
  - If the problem persists, use another connector on the switch or hub.
4. Ensure that the appropriate drivers are installed and the protocols are bound. For more information, see the NIC documentation.
5. Enter System Setup and confirm that the NIC ports are enabled on the **Integrated Devices** screen.
6. Ensure that all the NICs, hubs, and switches on the network are set to the same data transmission speed and duplex. For more information, see the documentation for each network device.
7. Ensure that all the NICs and switches on the network are set to the same data transmission speed and duplex. For more information, see the documentation for each network device.
8. Ensure that all network cables are of the proper type and do not exceed the maximum length.

## Next steps

If the problem persists, see the Getting help section.

## Related references

[LAN indicator codes](#) on page 14

[Getting help](#) on page 180

## Related tasks

[Integrated Devices details](#) on page 49

# Troubleshooting a wet system

## Prerequisites

 **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.

## Steps

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Remove the following components (if installed) from the system:
  - Power supply unit(s)
  - Optical drive

- Hard drives
- Hard drive backplane
- Hard drive tray
- Cooling shroud
- Expansion card risers (if installed)
- Expansion cards
- Cooling fan assembly (if installed)
- Cooling fan(s)
- Memory modules
- Processor(s) and heat sink(s)
- System board

4. Let the system dry thoroughly for at least 24 hours.
5. Reinstall the components you removed in step 3 except the expansion cards.
6. Install the system cover.
7. Turn on the system and attached peripherals.

If the problem persists, see the Getting help section.

8. If the system starts properly, turn off the system, and reinstall all the expansion cards that you removed.
9. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

### Next steps

If the tests fail, see the Getting help section.

### Related references

[Getting help](#) on page 180

## Troubleshooting a damaged system

### Prerequisites

**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.

### Steps

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Ensure that the following components are properly installed:
  - cooling shroud
  - expansion card risers (if installed)
  - expansion cards
  - power supply unit(s)
  - cooling fan assembly (if installed)
  - cooling fan(s)
  - processor(s) and heat sink(s)
  - memory modules
  - drive carriers or cage
  - drive backplane
4. Ensure that all cables are properly connected.
5. Install the system cover.
6. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

### Next steps

If the problem persists, see the Getting help section.

### Related references

[Getting help](#) on page 180

## Troubleshooting the system battery

### Prerequisites

 **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.

 **NOTE:** Some software may cause the system time to speed up or slow down. If the system seems to operate normally except for the time set in System Setup, the problem may be caused by a software, rather than by a defective battery.

### Steps

1. Re-enter the time and date in System Setup.
2. Turn off the system, and disconnect it from the electrical outlet for at least an hour.
3. Reconnect the system to the electrical outlet, and turn on the system.
4. Enter System Setup.

If the date and time displayed in System Setup are not correct, check the System Error Log (SEL) for system battery messages.

### Next steps

If the problem persists, see the Getting help section.

### Related concepts

[System Setup](#) on page 34

### Related references

[Getting help](#) on page 180

## Troubleshooting power supply units

### Prerequisites

 **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.

The following sections provide information on troubleshooting power source and power supply units problems.

 **NOTE:** Power Supply Units (PSUs) are hot-pluggable.

## Troubleshooting power source problems

### Steps

1. Press the power button to ensure that your system is turned on. If the power indicator does not glow when the power button is pressed, press the power button firmly.
2. Plug in another working power supply unit to ensure that the system board is not faulty.
3. Ensure that no loose connections exist.  
For example, loose power cables.
4. Ensure that the power source meets applicable standards.
5. Ensure that there are no short circuits.
6. Have a qualified electrician check the line voltage to ensure that it meets the needed specifications.

### Results

 **NOTE:** Some power supply units require 200-240V AC to deliver their rated capacity. For more information, see the system Technical Specifications section in the Installation and Service Manual available at [www.dell.com/poweredgemanuals](http://www.dell.com/poweredgemanuals).

### Related references

[Getting help](#) on page 180

## Power supply unit problems

### Steps

1. Ensure that no loose connections exist.  
For example, loose power cables.
2. Ensure that the power supply unit (PSU) handle or LED indicates that the PSU is working properly.  
For more information about PSU indicators, see the Power indicator codes section.
3. If you have recently upgraded your system, ensure that the PSU has enough power to support the new system.
4. If you have a redundant PSU configuration, ensure that both the PSUs are of the same type and wattage.  
You may have to upgrade to a higher wattage PSU.
5. Ensure that you use only PSUs with the Extended Power Performance (EPP) label on the back.
6. Reseat the PSU.

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

If the problem persists, see the Getting help section.

### Related references

[Power Supply Unit indicator codes](#) on page 16

[Power supply units](#) on page 84

[Getting help](#) on page 180

## Troubleshooting cooling problems

 **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.

Ensure that the following conditions exist:

- System cover, cooling shroud, EMI filler panel, or back filler bracket is not removed.

- Ambient temperature is not higher than the system specific ambient temperature.
- External airflow is not obstructed.
- A cooling fan is not removed or has not failed.
- The expansion card installation guidelines have been followed.

Additional cooling can be added by one of the following methods:

From the iDRAC web GUI:

1. Click **Hardware > Fans > Setup**.
2. From the **Fan Speed Offset** drop-down list, select the cooling level that is required or set the minimum fan speed to a custom value.

From F2 System Setup:

1. Select **iDRAC Settings > Thermal**, and set a higher fan speed from the fan speed offset or minimum fan speed.

From RACADM commands:

1. Run the command `racadm help system.thermalsettings`

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

### Related references

[Getting help](#) on page 180

## Troubleshooting cooling fans

### Prerequisites

**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.

**NOTE:** The fan number is referenced by the management software of the system. In the event of a problem with a particular fan, you can easily identify and replace it by noting down the fan numbers on the cooling fan assembly.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

### Steps

1. Reseat the fan or the fan's power cable.
2. Restart the system.

### Next steps

1. Follow the procedure listed in the After working inside your system section.
2. If the problem persists, see the Getting help section.

### Related references

[Getting help](#) on page 180

## Troubleshooting system memory

### Prerequisites

**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.**

 **NOTE:** Memory slots are not hot-pluggable.

 **NOTE:** NVDIMM-N battery is not hot-pluggable.

## Steps

1. If the system is operational, run the appropriate diagnostic test. See the Using system diagnostics section for the available diagnostic tests.  
If the diagnostic tests indicate a fault, follow the corrective actions that are provided by the diagnostic tests.
2. If the system is not operational, turn off the system and attached peripherals, and unplug the system from the power source. Wait at least for 10 seconds, and then reconnect the system to the power source.
3. Turn on the system and attached peripherals, and note the messages on the screen.  
If an error message is displayed indicating a fault with a specific memory module, go to step 12.
4. Enter System Setup, and check the system memory setting. Make any changes to the memory settings, if needed.  
If the memory settings match the installed memory but the problem still persists, go to step 12.
5. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
6. Remove the system cover.
7. Check the memory channels and ensure that they are populated correctly.  
 **NOTE:** See the system event log or system messages for the location of the failed memory module. Reinstall the memory device.
8. Reseat the memory modules in their sockets.
9. Install the system cover.
10. Enter System Setup, and check the system memory setting.  
If the problem is not resolved, proceed with step 11.
11. Remove the system cover.
12. If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module with a known working memory module.
13. To troubleshoot an unspecified faulty memory module, replace the memory module in the first DIMM socket with a module of the same type and capacity.  
If an error message is displayed on the screen, this may indicate a problem with one or more installed DIMM types, incorrect DIMM installation, or defective DIMMs. Follow the on-screen instructions to resolve the problem.
14. Install the system cover.
15. As the system boots, observe any error message that is displayed and the diagnostic indicators on the front of the system.
16. If the memory problem persists, repeat step 12 through step 15 for each memory module installed.

## Next steps

If the problem persists, see the Getting help section.

## Related references

[Getting help](#) on page 180

# Troubleshooting a drive or SSD

## Prerequisites

 **CAUTION:** This troubleshooting procedure can erase data stored on the drive. Before you proceed, back up all files on the drive.

**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.

### Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.  
Depending on the results of the diagnostics test, proceed as required through the following steps.
2. If your system has a RAID controller and your drives are configured in a RAID array, perform the following steps:
  - a. Restart the system and press F10 during system startup to run the Dell Lifecycle Controller, and then run the Hardware Configuration wizard to check the RAID configuration.  
See the Dell Lifecycle Controller documentation or online help for information about RAID configuration.
  - b. Ensure that the drives are configured correctly for the RAID array.
  - c. Take the drive offline and reseal the drive.
  - d. Exit the configuration utility and allow the system to boot to the operating system.
3. Ensure that the needed device drivers for your controller card are installed and are configured correctly. For more information, see the operating system documentation.
4. Restart the system and enter the System Setup.
5. Verify that the controller is enabled and the drives are displayed in the System Setup.

### Next steps

If the problem persists, see the Getting help section.

### Related references

[Getting help](#) on page 180

[Hard drive indicator patterns](#) on page 11

### Related tasks

[Removing a hard drive carrier](#) on page 71

[Installing a hard drive carrier](#) on page 72

## Troubleshooting a storage controller

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

**NOTE:** When troubleshooting a controller, see the documentation for your operating system and the controller.

**NOTE:** Mini-PERC socket is not hot-pluggable.

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Verify that the installed expansion cards are compliant with the expansion card installation guidelines.
5. Ensure that each expansion card is firmly seated in its connector.
6. Install the system cover.
7. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
8. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
9. Remove the system cover.
10. Remove all expansion cards installed in the system.

11. Install the system cover.
12. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
13. Run the appropriate diagnostic test. See the Using system diagnostics section.

If the tests fail, see the Getting help section.

14. For each expansion card you removed in step 10, perform the following steps:
  - a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
  - b. Remove the system cover.
  - c. Reinstall one of the expansion cards.
  - d. Install the system cover.
  - e. Run the appropriate diagnostic test. See the Using system diagnostics section.

If the problem persists, see the Getting help section.

## Troubleshooting expansion cards

### Prerequisites

 **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.

 **NOTE:** When troubleshooting an expansion card, you also have to see the documentation for your operating system and the expansion card.

 **NOTE:** Riser slots are not hot-pluggable.

### Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that each expansion card is firmly seated in its connector.
5. Install the system cover.
6. Turn on the system and attached peripherals.
7. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
8. Remove the system cover.
9. Remove all expansion cards installed in the system.
10. Install the system cover.
11. Run the appropriate diagnostic test. See the Using system diagnostics section.

If the tests fail, see the Getting help section.

12. For each expansion card you removed in step 8, perform the following steps:
  - a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
  - b. Remove the system cover.
  - c. Reinstall one of the expansion cards.
  - d. Install the system cover.
  - e. Run the appropriate diagnostic test. See the Using system diagnostics section.

### Next steps

If the problem persists, see the Getting help section.

# Troubleshooting processors

## Prerequisites

 **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.

 **NOTE:** Processor sockets are not hot-pluggable.

## Steps

1. Run the appropriate diagnostics test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that the processor and heat sink are properly installed.
5. Install the system cover.
6. Run the appropriate diagnostic test. See the Using system diagnostics section.
7. If the problem persists, see the Getting help section.

## Related references

[Getting help](#) on page 180

# Getting help

## Topics:

- [Contacting Dell EMC](#)
- [Documentation feedback](#)
- [Accessing system information by using QRL](#)
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## 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 [www.dell.com/support/home](http://www.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. Click [Global Technical Support](#).
  - b. The **Contact Technical Support** page is displayed with details to call, chat, or e-mail the Dell EMC Global Technical Support team.

## Documentation feedback

You can rate the documentation or write your feedback on any of our Dell EMC documentation pages and click **Send Feedback** to send your feedback.

## Accessing system information by using QRL

You can use the Quick Resource Locator (QRL) located on the information tag in the front of the system, to access the information about the PowerEdge system. The QRL is located on the top of the system cover.

### Prerequisites

Ensure that your smartphone or tablet has the 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
- Your system service tag to quickly access your specific hardware configuration and warranty information
- A direct link to Dell to contact technical assistance and sales teams

#### Steps

1. Go to [www.dell.com/qrl](http://www.dell.com/qrl) and navigate to your specific product or
2. Use your smartphone or tablet to scan the model-specific Quick Resource (QR) code on your system or in the Quick Resource Locator section.

## Quick Resource Locator for C6320



**Quick Resource Locator**  
[Dell.com/QRL/Server/PEC6320](http://Dell.com/QRL/Server/PEC6320)