Dell PowerEdge R730xd
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.
Chapter 1: Dell PowerEdge R730xd system overview................................................................................................. 8
  Supported configurations for the PowerEdge R730xd system.................................................................................. 8
  Front panel................................................................................................................................................................. 10
    24 x 2.5-inch hard drive/SSD chassis.................................................................................................................. 10
    12 x 3.5-inch hard drive...................................................................................................................................... 11
    8 x 3.5-inch hard drive and 18 x 1.8-inch SSD.................................................................................................. 13
  Back panel................................................................................................................................................................. 14
  Diagnostic indicators on the front panel.................................................................................................................. 15
    Hard drive indicator codes................................................................................................................................. 17
    uSATA SSD indicator codes............................................................................................................................... 18
    NIC indicator codes............................................................................................................................................... 19
    Power supply unit indicator codes.................................................................................................................. 19
    iDRAC Direct LED indicator codes.................................................................................................................. 21
    Quick Sync indicator codes............................................................................................................................... 23
  Locating service tag of your system....................................................................................................................... 23

Chapter 2: Documentation resources.......................................................................................................................... 24

Chapter 3: Technical specifications.............................................................................................................................. 26
  Chassis dimensions.................................................................................................................................................. 26
  Chassis weight.......................................................................................................................................................... 27
  Processor specifications.......................................................................................................................................... 27
  PSU specifications................................................................................................................................................... 27
  System battery specifications................................................................................................................................. 27
  Expansion bus specifications.................................................................................................................................. 27
  Memory specifications............................................................................................................................................. 28
  Drive specifications.................................................................................................................................................. 28
    Hard drives.......................................................................................................................................................... 28
  Ports and connectors specifications....................................................................................................................... 29
    USB ports........................................................................................................................................................... 29
    NIC ports............................................................................................................................................................ 29
    Serial connector.................................................................................................................................................. 29
    VGA ports.......................................................................................................................................................... 29
    Internal Dual SD Module................................................................................................................................... 29
  Video specifications.................................................................................................................................................. 29
  Environmental specifications.................................................................................................................................. 30
    Particulate and gaseous contamination specifications ....................................................................................... 31
    Standard operating temperature....................................................................................................................... 31
    Expanded operating temperature.................................................................................................................... 32
    Expanded operating temperature restrictions................................................................................................ 32

Chapter 4: Initial system setup and configuration..................................................................................................... 33
  Setting up your system.......................................................................................................................................... 33
  iDRAC configuration............................................................................................................................................. 33
Chapter 5: Pre-operating system management applications ................................................................. 36

Chapter 6: Installing and removing system components ........................................................................ 65
Chapter 7: Using system diagnostics

Dell Embedded System Diagnostics

When to use the Embedded System Diagnostics

Running the Embedded System Diagnostics from Boot Manager

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

System diagnostic controls
Chapter 8: Jumpers and connectors.............................................................................................................. 195
  System board jumper settings.................................................................................................................. 195
  System board jumpers and connectors.................................................................................................... 195
  Disabling forgotten password.................................................................................................................. 197

Chapter 9: Troubleshooting your system.................................................................................................... 199
  Troubleshooting system startup failure.................................................................................................. 199
  Troubleshooting external connections.................................................................................................... 199
  Troubleshooting the video subsystem..................................................................................................... 200
  Troubleshooting a USB device................................................................................................................ 200
  Troubleshooting iDRAC Direct - USB XML configuration.................................................................... 201
  Troubleshooting iDRAC Direct - Laptop connection............................................................................. 201
  Troubleshooting a serial input and output device.................................................................................. 202
  Troubleshooting a NIC............................................................................................................................. 202
  Troubleshooting a wet system................................................................................................................ 203
  Troubleshooting a damaged system........................................................................................................ 203
  Troubleshooting the system battery....................................................................................................... 204
  Troubleshooting power supply units....................................................................................................... 205
    Troubleshooting power source problems......................................................................................... 205
    Troubleshooting power supply unit problems.................................................................................. 205
  Troubleshooting cooling problems........................................................................................................ 206
  Troubleshooting cooling fans................................................................................................................ 206
  Troubleshooting system memory............................................................................................................ 207
  Troubleshooting an internal USB key.................................................................................................... 208
  Troubleshooting a micro SD card............................................................................................................ 208
  Troubleshooting a drive or SSD.............................................................................................................. 209
  Troubleshooting a storage controller..................................................................................................... 209
  Troubleshooting expansion cards.......................................................................................................... 210
  Troubleshooting processors................................................................................................................... 211
  System messages.................................................................................................................................. 212
    Warning messages............................................................................................................................ 212
    Diagnostic messages.......................................................................................................................... 212
    Alert messages.................................................................................................................................. 212

Chapter 10: Getting help.............................................................................................................................. 213
  Contacting Dell EMC.............................................................................................................................. 213
  Documentation feedback....................................................................................................................... 213
  Accessing system information by using QRL......................................................................................... 213
    Quick Resource Locator for PowerEdge R730 and R730xd systems................................................. 214
The Dell PowerEdge R730xd systems are 2U rack servers that support up to two Intel Xeon E5-2600 v3 or Xeon E5-2600 v4 processors, up to 24 DIMMs, and 28 hard drives or solid state drives (SSDs).

Topics:

- Supported configurations for the PowerEdge R730xd system
- Front panel
- Back panel
- Diagnostic indicators on the front panel
- Locating service tag of your system

Supported configurations for the PowerEdge R730xd system

The Dell PowerEdge R730xd system supports the following configurations:
Figure 1. Supported configurations for the PowerEdge R730xd system

- 12 x 3.5" HDD and 2 x 2.5" rear SSD/HDD (optional)
- 12 x 3.5" HDD, 2 x 2.5" SSD (optional) and 4 x 3.5" HDD in the middle hard drive tray
- 24 x 2.5" HDD and 2 x 2.5" rear SSD/HDD (optional)
- 20 x 2.5" HDD, 4 x 2.5" Express Flash devices (PCIeSSD) and 2 x 2.5" rear SSD/HDD (optional)
- 18 x 1.8" SSD, 8 x 3.5" HDD, and 2 x 2.5" rear SSD/HDD

**

24 x 2.5" SAS/SATA backplane, which supports flexible zoning using 2 x PERC H730p controllers:
- 12 + 12 drives split mode
- 4 + 20 drives split mode
- 8 + 16 drives split mode
- 16 + 8 drives split mode
- 20 + 4 drives split mode
Front panel

24 x 2.5-inch hard drive/SSD chassis

Figure 2. 24 x 2.5-inch hard drive/SSD chassis

1. System identification button
2. Power button
3. NMI button
4. Information tag
5. Hard drives
6. USB management port/iDRAC Direct
7. Video connector
8. Quick Sync

Table 1. Front panel of the 24 x 2.5-inch hard drive/SSD PowerEdge R730xd chassis

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator, Button, or Connector</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System identification button</td>
<td>�到账</td>
<td>Enables you to locate a particular system within a rack. The identification buttons are located on the front and back panels. Press the system identification button to turn the system ID on or off.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>NOTE:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• If the system stops responding during POST, press and hold the system ID button (for more than five seconds) to enter BIOS progress mode.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• To reset the iDRAC (if not disabled in F2 iDRAC setup), press and hold the button (for more than 15 seconds).</td>
</tr>
<tr>
<td>2</td>
<td>Power button</td>
<td>🔥</td>
<td>Enables you to know the power status of the system. The power indicator turns on when the system power is on. The power button controls the power supply output to the system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>NOTE:</strong> On ACPI compliant operating systems, when the power button is used to shutdown the system, the operating system performs a graceful shut down the system power is turned off.</td>
</tr>
<tr>
<td>3</td>
<td>NMI button</td>
<td>🗝️</td>
<td>Enables you to troubleshoot software and device driver errors when running certain operating systems. This button can be pressed by using the end of a paper clip.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>NOTE:</strong> Use this button only if directed to do so by qualified support personnel or by instructions in the operating system's documentation.</td>
</tr>
</tbody>
</table>
### Table 1. Front panel of the 24 x 2.5-inch hard drive/SSD PowerEdge R730xd chassis (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator, Button, or Connector</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Information tag</td>
<td></td>
<td>Contains system information such as service tag, NIC, MAC address for your reference. The information tag is a slide-out label panel.</td>
</tr>
<tr>
<td>5</td>
<td>Hard drives</td>
<td></td>
<td>Up to twenty four 2.5 inch hot-swappable hard drives or solid state drives (SSD).</td>
</tr>
<tr>
<td>6</td>
<td>USB management port/iDRAC Direct</td>
<td></td>
<td>The USB management port is USB 2.0 compliant. Enables you to connect USB devices to the system or provides access to the iDRAC Direct features. For more information, see the Integrated Dell Remote Access Controller User’s Guide at <a href="Dell.com/idracmanuals">Dell.com/idracmanuals</a>.</td>
</tr>
<tr>
<td>7</td>
<td>Video connector</td>
<td></td>
<td>Enables you to connect a display to the system.</td>
</tr>
<tr>
<td>8</td>
<td>Quick Sync (optional)</td>
<td></td>
<td>Indicates a Quick Sync enabled system. The Quick Sync feature is optional and needs a Quick Sync bezel. This feature allows management of the system by using mobile devices. This feature aggregates hardware or firmware inventory and various system level diagnostic and error information that can be used in troubleshooting the system. For more information, see the Integrated Dell Remote Access Controller User’s Guide at <a href="Dell.com/idracmanuals">Dell.com/idracmanuals</a>.</td>
</tr>
</tbody>
</table>

### 12 x 3.5-inch hard drive

#### Figure 3. 12 x 3.5-inch hard drive chassis

1. System identification button
2. Power button
3. NMI button
4. Information tag
5. Hard drives
6. USB management port/iDRAC Direct
7. Video connector
8. Quick Sync

#### Table 2. Front panel of the 12 x 3.5-inch hard drive PowerEdge R730xd chassis

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator, Button, or Connector</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System identification button</td>
<td></td>
<td>Enables you to locate a particular system within a rack. The identification buttons are located on the front and back panels. Press the system identification button to turn the system ID on or off.</td>
</tr>
</tbody>
</table>

**NOTE:**
<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator, Button, or Connector</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2    | Power button                  | ![Power Icon] | Enables you to know the power status of the system. The power indicator turns on when the system power is on. The power button controls the power supply output to the system.  

**NOTE:** On ACPI compliant operating systems, when the power button is used to shutdown the system, the operating system performs a graceful shut down when the system power is turned off. |
| 3    | NMI button                    | ![NMI Icon] | Enables you to troubleshoot software and device driver errors when running certain operating systems. This button can be pressed by using the end of a paper clip.  

**NOTE:** Use this button only if directed to do so by qualified support personnel or by instructions in the operating system’s documentation. |
| 4    | Information tag               |      | Contains system information such as service tag, NIC, MAC address for your reference. The information tag is a slide-out label panel. |
| 5    | Hard drives                   |      | Up to twelve 3.5 inch hot-swappable hard drives. |
| 6    | USB management port/iDRAC Direct | ![USB Icon] | The USB management port is USB 2.0 compliant. Enables you to connect USB devices to the system or provides access to the iDRAC Direct features. For more information, see the Integrated Dell Remote Access Controller User’s Guide at Dell.com/idracmanuals. |
| 7    | Video connector               | ![Video Icon] | Enables you to connect a display to the system. |
| 8    | Quick Sync (optional)         | ![Quick Sync Icon] | Indicates a Quick Sync enabled system. The Quick Sync feature is optional and needs a Quick Sync bezel. This feature allows management of the system by using mobile devices. This feature aggregates hardware or firmware inventory and various system level diagnostic and error information that can be used in troubleshooting the system. For more information, see the Integrated Dell Remote Access Controller User’s Guide at Dell.com/idracmanuals. |
8 x 3.5-inch hard drive and 18 x 1.8-inch SSD

Figure 4. 8 x 3.5-inch hard drive and 18 x 1.8-inch SSD chassis

1. System identification button
2. Power button
3. NMI button
4. Information tag
5. Hard drives
6. USB management port/iDRAC Direct
7. Video connector
8. Quick Sync

Table 3. Front panel of the 8 x 3.5-inch hard drive and 18 x 1.8-inch SSD chassis PowerEdge R730xd chassis

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator, Button, or Connector</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1        | System identification button    | 🔄   | Enables you to locate a particular system within a rack. The identification buttons are located on the front and back panels. Press the system identification button to turn the system ID on or off. \n\n**NOTE:**
- If the system stops responding during POST, press and hold the system ID button (for more than five seconds) to enter BIOS progress mode.
- To reset the iDRAC (if not disabled in F2 iDRAC setup) press and hold the button (for more than 15 seconds). |
| 2        | Power button                    | ⚡   | Enables you to know the power status of the system. The power indicator turns on when the system power is on. The power button controls the power supply output to the system. \n\n**NOTE:** On ACPI compliant operating systems, when the power button is used to shutdown the system, the operating system performs a graceful shut down the system power is turned off. |
| 3        | NMI button                      | 🦴   | Enables you to troubleshoot software and device driver errors when running certain operating systems. This button can be pressed by using the end of a paper clip. \n\n**NOTE:** Use this button only if directed to do so by qualified support personnel or by instructions in the operating system’s documentation. |
| 4        | Information tag                 | 📜   | Contains system information such as service tag, NIC, MAC address for your reference. The information tag is a slide-out label panel. |
| 5        | Hard drives                     | 🎈   | Up to eight 3.5 inch hot-swappable hard drives and eighteen 1.8 inch hot-swappable uSATA SSDs.                                                  |
Table 3. Front panel of the 8 x 3.5-inch hard drive and 18 x 1.8-inch SSD chassis PowerEdge R730xd chassis (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator, Button, or Connector</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>USB management port/iDRAC Direct</td>
<td>📈</td>
<td>The USB management port is USB 2.0 compliant. Enables you to connect USB devices to the system or provides access to the iDRAC Direct features. For more information, see the Integrated Dell Remote Access Controller User’s Guide at Dell.com/idracmanuals.</td>
</tr>
<tr>
<td>7</td>
<td>Video connector</td>
<td>📸</td>
<td>Enables you to connect a display to the system.</td>
</tr>
<tr>
<td>8</td>
<td>Quick Sync (optional)</td>
<td>📦</td>
<td>Indicates a Quick Sync enabled system. The Quick Sync feature is optional and needs a Quick Sync bezel. This feature allows management of the system by using mobile devices. This feature aggregates hardware or firmware inventory and various system level diagnostic and error information that can be used in troubleshooting the system. For more information, see the Integrated Dell Remote Access Controller User’s Guide at Dell.com/idracmanuals.</td>
</tr>
</tbody>
</table>

Back panel

Figure 5. Back panel features

1. System identification button
2. System identification connector
3. iDRAC8 Enterprise port
4. Half-height PCIe expansion card slot
5. Serial connector
6. Video connector
7. USB port
8. Full-height PCIe expansion card slot
9. Ethernet connector
10. Power supply unit 1
11. Power supply unit 2
12. vFlash media card slot
13. Hard drive

Table 4. Back panel features

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator, button, or connector</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System identification button</td>
<td>🕵️</td>
<td>The identification buttons on the front and back panels can be used to locate a particular system within a rack. When one of these buttons is pressed, the system status indicator on the back flashes until one of the buttons is pressed again. Press to toggle the system identification (ID) on or off.</td>
</tr>
</tbody>
</table>
Table 4. Back panel features (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator, button, or connector</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>System identification connector</td>
<td><img src="image" alt="Icon" /></td>
<td>If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode. To reset iDRAC (if not disabled in F2 iDRAC setup) press and hold the button for more than 15 seconds.</td>
</tr>
<tr>
<td>3</td>
<td>iDRAC8 Enterprise port</td>
<td><img src="image" alt="Icon" /></td>
<td>Dedicated management port.</td>
</tr>
<tr>
<td>4</td>
<td>Half-height PCIe expansion card slot (3)</td>
<td><img src="image" alt="Icon" /></td>
<td>Enables you to connect up to three half-height PCI Express expansion cards.</td>
</tr>
<tr>
<td>5</td>
<td>Serial connector</td>
<td><img src="image" alt="Icon" /></td>
<td>Enables you to connect a serial device to the system.</td>
</tr>
<tr>
<td>6</td>
<td>Video connector</td>
<td><img src="image" alt="Icon" /></td>
<td>Enables you to connect a VGA display to the system.</td>
</tr>
<tr>
<td>7</td>
<td>USB port (2)</td>
<td><img src="image" alt="Icon" /></td>
<td>Enables you to connect USB devices to the system. The ports are USB 3.0-compliant.</td>
</tr>
<tr>
<td>8</td>
<td>Full-height PCIe expansion card slot (3)</td>
<td><img src="image" alt="Icon" /></td>
<td>Enables you to connect up to three full-height PCI Express expansion cards.</td>
</tr>
</tbody>
</table>
| 9    | Ethernet connector (4)          | ![Icon](image) | Four integrated 10/100/1000 Mbps Network Interface Card (NIC) connectors or Four integrated connectors that include:  
  - Two 10/100/1000 Mbps NIC connectors  
  - Two 100 Mbps/1 Gbps/10 Gbps SFP+/10 GbE T connectors |
| 10   | Power supply unit (PSU1)        | ![Icon](image) | AC 495 W, 750 W, or 1100 W or DC 750 W or 1100 W |
| 11   | Power supply unit (PSU2)        | ![Icon](image) | |
| 12   | vFlash media card slot          | ![Icon](image) | Enables you to insert a vFlash media card. |
| 13   | Hard drive (2) (back)           | ![Icon](image) | Up to two hot-swappable 2.5-inch hard drives. |

Diagnostic indicators on the front panel

**NOTE:** No diagnostic indicators are lit when the system is turned off. To start the system, plug it into a working power source and press the power button.

Table 5. Diagnostic indicators

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
<th>Condition</th>
<th>Corrective action</th>
</tr>
</thead>
</table>
| ![Icon](image) | Health indicator | The indicator turns solid blue if the system is in good health. The indicator flashes amber:  
  - When the system is turned on. | None required. |
| ![Icon](image) | Health indicator | The indicator turns off to indicate that the system is in a critical state. | Check the System Event Log or system messages for the specific issue. For more information about error messages, see the Dell Event and Error Messages |
### Table 5. Diagnostic indicators (continued)

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
<th>Condition</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>![ ]</td>
<td>Hard drive indicator</td>
<td>The indicator flashes amber if there is a hard drive error.</td>
<td>Check the System Event Log to determine the hard drive that has an error. Run the appropriate Online Diagnostics test. Restart the system and run embedded diagnostics (ePSA). If the hard drives are configured in a RAID array, restart the system and enter the host adapter configuration utility program.</td>
</tr>
<tr>
<td>![ ]</td>
<td>Electrical indicator</td>
<td>The indicator flashes amber if the system experiences an electrical error (for example, voltage out of range, or a failed power supply unit (PSU) or voltage regulator).</td>
<td>Check the System Event Log or system messages for the specific issue. If it is due to a problem with the PSU, check the LED on the PSU. Reseat the PSU. If the problem persists, see the Getting help section.</td>
</tr>
</tbody>
</table>
| ![ ]  | Temperature indicator        | The indicator flashes amber if the system experiences a thermal error (for example, the ambient temperature is out of range or fan failure). | Ensure that none of the following conditions exist:  
  - A cooling fan has been removed or has failed.  
  - System cover, cooling shroud, EMI filler panel, memory module blank, or back filler bracket is removed.  
  - Ambient temperature is too high.  
  - External airflow is obstructed.  
  See the Getting help section. |
| ![ ]  | Memory indicator             | The indicator flashes amber if a memory error occurs.                     | Check the system event log or system messages for the location of the failed memory. Reseat the memory module. If the problem persists, see the Getting help section. |

**Related References**

- [Getting help](#) on page 213
- [Expansion card installation guidelines](#) on page 114
Hard drive indicator codes

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

![Diagram of hard drive indicators]

NOTE: If the hard drive is in the Advanced Host Controller Interface (AHCI) mode, the status indicator (on the right side) does not turn on.

Table 6. Hard drive indicator codes

<table>
<thead>
<tr>
<th>Drive-status indicator pattern</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashes green twice per second</td>
<td>Identifying drive or preparing for removal.</td>
</tr>
<tr>
<td>Off</td>
<td>Drive ready for insertion or removal.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The drive status indicator remains off until all hard drives are initialized after the system is turned on. Drives are not ready for insertion or removal during this time.</td>
</tr>
<tr>
<td>Flashes green, amber, and then turns off</td>
<td>Predicted drive failure</td>
</tr>
<tr>
<td>Flashes amber four times per second</td>
<td>Drive failed</td>
</tr>
<tr>
<td>Flashes green slowly</td>
<td>Drive rebuilding</td>
</tr>
<tr>
<td>Steady green</td>
<td>Drive online</td>
</tr>
<tr>
<td>Flashes green for three seconds, amber for three</td>
<td>Rebuild stopped</td>
</tr>
<tr>
<td>seconds, and then turns off after six seconds</td>
<td></td>
</tr>
</tbody>
</table>

Figure 6. Hard drive indicators on the hard drive and the hard drive tray backplane

1. Hard drive activity indicator
2. Hard drive status indicator
3. Hard drive backplane on hard drive tray
4. Hard drive

Table 6. Hard drive indicator codes

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<td>Off</td>
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<td><strong>NOTE:</strong> The drive status indicator remains off until all hard drives are initialized after the system is turned on. Drives are not ready for insertion or removal during this time.</td>
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<tr>
<td>Flashes green, amber, and then turns off</td>
<td>Predicted drive failure</td>
</tr>
<tr>
<td>Flashes amber four times per second</td>
<td>Drive failed</td>
</tr>
<tr>
<td>Flashes green slowly</td>
<td>Drive rebuilding</td>
</tr>
<tr>
<td>Steady green</td>
<td>Drive online</td>
</tr>
<tr>
<td>Flashes green for three seconds, amber for three seconds, and then turns off after six seconds</td>
<td>Rebuild stopped</td>
</tr>
</tbody>
</table>
uSATA SSD indicator codes

**Figure 7. uSATA SSD indicators**

1. uSATA SSD activity indicator
2. uSATA SSD status indicator
3. uSATA SSD

**NOTE:** If the SSD is in the Advanced Host Controller Interface (AHCI) mode, the status indicator (on the right side) does not function and remains off.

**Table 7. Drive status indicator codes**

<table>
<thead>
<tr>
<th>Drive-status indicator pattern</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashes green twice per second</td>
<td>Identifying drive or preparing for removal.</td>
</tr>
<tr>
<td>Off</td>
<td>Drive ready for insertion or removal.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The drive status indicator remains off until all hard drives are initialized after the system is turned on. Drives are not ready for insertion or removal during this time.</td>
</tr>
<tr>
<td>Flashes green, amber, and turns off</td>
<td>Predicted drive failure</td>
</tr>
<tr>
<td>Flashes amber four times per second</td>
<td>Drive failed</td>
</tr>
<tr>
<td>Steady green</td>
<td>Drive online</td>
</tr>
<tr>
<td>Flashes green for three seconds, amber for three seconds, and turns off after six seconds</td>
<td>Rebuild aborted</td>
</tr>
</tbody>
</table>
NIC indicator codes

The NIC on the back panel has an indicator that provides information about the network activity and link status. The activity LED indicates whether the NIC is currently connected or not. The link LED indicates the speed of the connected network.

![NIC Indicator Codes](image)

Table 8. NIC indicators

<table>
<thead>
<tr>
<th>Convention</th>
<th>Status</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Link and activity indicators are off.</td>
<td>The NIC is not connected to the network.</td>
</tr>
<tr>
<td>B</td>
<td>Link indicator is green.</td>
<td>The NIC is connected to a valid network at its maximum port speed (1 Gbps or 10 Gbps).</td>
</tr>
<tr>
<td>C</td>
<td>Link indicator is amber</td>
<td>The NIC is connected to a valid network at less than its maximum port speed.</td>
</tr>
<tr>
<td>D</td>
<td>Activity indicator is flashing, green</td>
<td>Network data is being sent or received.</td>
</tr>
</tbody>
</table>

Power supply unit indicator codes

AC power supply units (PSUs) have an illuminated translucent handle that serves as an indicator and DC PSUs have an LED that serves as an indicator. The indicator shows whether power is present or a power fault has occurred.
### Figure 9. AC PSU status indicator

1. AC PSU status indicator/handle

### Table 9. AC PSU status indicators

<table>
<thead>
<tr>
<th>Convention</th>
<th>Power indicator pattern</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Green</td>
<td>A valid power source is connected to the PSU and the PSU is operational.</td>
</tr>
<tr>
<td>B</td>
<td>Flashing green</td>
<td>When the firmware of the PSU is being updated, the PSU handle flashes green.</td>
</tr>
</tbody>
</table>
| C          | Flashing green and turns off | When hot-adding a PSU, the PSU handle flashes green five times at 4 Hz rate and turns off. This indicates a PSU mismatch with respect to efficiency, feature set, health status, and supported voltage.  
**NOTE:** Ensure that both the PSUs are of the same capacity.  
**CAUTION:** For AC PSUs, use only PSUs with the Extended Power Performance (EPP) label on the back.  
**NOTE:** Mixing PSUs from previous generations of Dell PowerEdge servers can result in a PSU mismatch condition or failure to turn the system on. |
| D          | Flashing amber          | Indicates a problem with the PSU.  
**CAUTION:** When correcting a PSU mismatch, replace only the PSU with the flashing indicator. Swapping the PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a high output configuration to a low output configuration or vice versa, you must turn off the system.  
**CAUTION:** AC PSUs support both 220 V and 110 V input voltages with the exception of Titanium PSUs, which support only 220 V. When two identical PSUs receive different input voltages, they can output different wattages, and trigger a mismatch.  
**CAUTION:** If two PSUs are used, they must be of the same type and have the same maximum output power.  
**CAUTION:** Combining AC and DC PSUs is not supported and triggers a mismatch. |
| E          | Not lit                 | Power is not connected. |
Table 10. DC PSU status indicators

<table>
<thead>
<tr>
<th>Convention</th>
<th>Power indicator pattern</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Green</td>
<td>A valid power source is connected to the PSU and that the PSU is operational.</td>
</tr>
<tr>
<td>B</td>
<td>Flashing green</td>
<td>When hot-adding a PSU, the PSU indicator flashes green. This indicates that there is a PSU mismatch with respect to efficiency, feature set, health status, and supported voltage. Ensure that both the PSUs are of the same capacity.</td>
</tr>
<tr>
<td>C</td>
<td>Flashing amber</td>
<td>Indicates a problem with the PSU.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▲ <strong>CAUTION:</strong> When correcting a PSU mismatch, replace only the PSU with the flashing indicator. Swapping the PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must turn off the system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▲ <strong>CAUTION:</strong> AC PSU support both 220 V and 110 V input voltages with the exception of Titanium PSU, which support only 220 V. When two identical PSU receive different input voltages, they can output different wattages, and trigger a mismatch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▲ <strong>CAUTION:</strong> If two PSU are used, they must be of the same type and have the same maximum output power.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▲ <strong>CAUTION:</strong> Combining AC and DC PSU is not supported and triggers a mismatch.</td>
</tr>
<tr>
<td>D</td>
<td>Not lit</td>
<td>Power is not connected.</td>
</tr>
</tbody>
</table>

**iDRAC Direct LED indicator codes**

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

▶ **NOTE:** The iDRAC Direct LED indicator does not turn on when the USB port is used in the USB mode.
Figure 11. iDRAC Direct LED indicator codes

1. iDRAC Direct status indicator

The iDRAC Direct LED indicator table describes iDRAC Direct activity when configuring iDRAC Direct by using the management port (USB XML Import).

Table 11. iDRAC Direct LED indicators

<table>
<thead>
<tr>
<th>Convention</th>
<th>iDRAC Direct LED indicator pattern</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Green</td>
<td>Turns green for a minimum of two seconds to indicate the start and end of a file transfer.</td>
</tr>
<tr>
<td>B</td>
<td>Flashing green</td>
<td>Indicates file transfer or any operation tasks.</td>
</tr>
<tr>
<td>C</td>
<td>Green and turns off</td>
<td>Indicates that the file transfer is complete.</td>
</tr>
<tr>
<td>D</td>
<td>Not lit</td>
<td>Indicates that the USB is ready to be removed or that a task is complete.</td>
</tr>
</tbody>
</table>

The following table describes iDRAC Direct activity when configuring iDRAC Direct by using your laptop and cable (Laptop Connect):

Table 12. iDRAC Direct LED indicator patterns

<table>
<thead>
<tr>
<th>iDRAC Direct LED indicator pattern</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid green for two seconds</td>
<td>Indicates that the laptop is connected.</td>
</tr>
<tr>
<td>Flashing green (on for two seconds and off for two seconds)</td>
<td>Indicates that the laptop connected is recognized.</td>
</tr>
<tr>
<td>Turns off</td>
<td>Indicates that the laptop is unplugged.</td>
</tr>
</tbody>
</table>
Quick Sync indicator codes

![Quick Sync indicator codes](image)

**Table 13. Quick Sync indicator codes**

<table>
<thead>
<tr>
<th>Quick Sync indicator pattern</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow blink</td>
<td>Quick Sync is waiting to be configured from iDRAC.</td>
</tr>
<tr>
<td>Solid</td>
<td>Quick Sync is ready to transfer.</td>
</tr>
<tr>
<td>Blinks three times rapidly and then turns off</td>
<td>Quick Sync feature is disabled from iDRAC.</td>
</tr>
<tr>
<td>Blinks continuously when the mobile device touches antenna</td>
<td>Indicates data transfer activity.</td>
</tr>
<tr>
<td>Blinks rapidly continuously when the activation button is pressed</td>
<td>Quick Sync hardware is not responding properly.</td>
</tr>
<tr>
<td>Turns off</td>
<td>Indicates that the Quick Sync feature is turned off. Use the activation button to activate it. If pressing the activation button does not turn on the LEDs, it indicates that power is not delivered to the Quick Sync bezel.</td>
</tr>
</tbody>
</table>

**Locating service tag of your system**

Your system is identified by a unique Express Service Code and Service Tag number. The Express Service Code is and Service Tag are found on the front of the system by pulling out the information tag. 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.
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.

  \[\text{\textbf{NOTE: To locate the product name and model, see the front of your system.}}\]

- Using search engines:
  - Type the name and version of the document in the search box.

### Table 14. Additional documentation resources for your system

<table>
<thead>
<tr>
<th>Task</th>
<th>Document</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting up your system</td>
<td>For more information about installing and securing the system into a rack, see the Rail Installation Guide included with your rack solution. For information about setting up your system, see the Getting Started Guide document that is shipped with your system.</td>
<td><a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a></td>
</tr>
<tr>
<td>Configuring your system</td>
<td>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. For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM CLI Guide for iDRAC. For information about Redfish and its protocol, supported schema, and Redfish Eventing are implemented in iDRAC, see the Redfish API Guide. For information about iDRAC property database group and object descriptions, see the Attribute Registry Guide. For information about earlier versions of the iDRAC documents, see the iDRAC documentation. To identify the version of iDRAC available on your system, on the iDRAC web interface, click ? &gt; About.</td>
<td><a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a></td>
</tr>
<tr>
<td>Task</td>
<td>Document Description</td>
<td>Location</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Managing your system</strong></td>
<td>For information about systems management software offered by Dell, see the Dell OpenManage Systems Management Overview Guide.</td>
<td><a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a></td>
</tr>
<tr>
<td></td>
<td>For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User’s Guide.</td>
<td><a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a> &gt; OpenManage Server Administrator</td>
</tr>
<tr>
<td></td>
<td>For information about installing, using, and troubleshooting Dell OpenManage Essentials, see the Dell OpenManage Essentials User’s Guide.</td>
<td><a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a> &gt; OpenManage Essentials</td>
</tr>
<tr>
<td></td>
<td>For information about installing, using, and troubleshooting Dell OpenManage Enterprise, see the Dell OpenManage Enterprise User’s Guide.</td>
<td><a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a> &gt; OpenManage Enterprise</td>
</tr>
<tr>
<td></td>
<td>For information about installing and using Dell SupportAssist, see the Dell EMC SupportAssist Enterprise User’s Guide.</td>
<td><a href="https://www.dell.com/serviceabilitytools">https://www.dell.com/serviceabilitytools</a></td>
</tr>
<tr>
<td></td>
<td>For information about partner programs enterprise systems management, see the OpenManage Connections Enterprise Systems Management documents.</td>
<td><a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a></td>
</tr>
<tr>
<td><strong>Understanding event and error messages</strong></td>
<td>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.</td>
<td><a href="http://www.dell.com/storagecontrollermanuals">www.dell.com/storagecontrollermanuals</a></td>
</tr>
<tr>
<td><strong>Troubleshooting your system</strong></td>
<td>For information about identifying and troubleshooting the PowerEdge server issues, see the Server Troubleshooting Guide.</td>
<td><a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a></td>
</tr>
</tbody>
</table>
The technical and environmental specifications of your system are outlined in this section.

**Topics:**
- Chassis dimensions
- Chassis weight
- Processor specifications
- PSU specifications
- System battery specifications
- Expansion bus specifications
- Memory specifications
- Drive specifications
- Ports and connectors specifications
- Video specifications
- Environmental specifications

**Chassis dimensions**

This section describes the physical dimensions of the system.

![Chassis dimensions](image)

*Figure 13. Chassis dimensions of the PowerEdge R730xd system*
Table 15. Dimensions of the Dell PowerEdge R730xd system

<table>
<thead>
<tr>
<th>Xa</th>
<th>Xb</th>
<th>Y</th>
<th>Za (with bezel)</th>
<th>Za (without bezel)</th>
<th>Zb</th>
<th>Zc</th>
</tr>
</thead>
<tbody>
<tr>
<td>482.4 mm</td>
<td>444.0 mm</td>
<td>87.3 mm</td>
<td>32.0 mm</td>
<td>18.0 mm</td>
<td>684.0 mm</td>
<td>723.0 mm</td>
</tr>
</tbody>
</table>

**Chassis weight**

This section describes the weight of the system.

**Table 16. Chassis weight**

<table>
<thead>
<tr>
<th>System</th>
<th>Maximum weight (with all hard drives/SSDs)</th>
</tr>
</thead>
</table>
| PowerEdge R730xd  | • 30.4 kg (67.02 lb) (2.5-inch hard drive systems)  
                    • 36.5 kg (80.47 lb) (3.5-inch hard drive systems)  
                    • 33.2 kg (73.19 lb) (3.5 inch with 1.8-inch hard drive systems) |

**Processor specifications**

The PowerEdge R730xd system supports up to two Intel Xeon E5-2600 v3 or Intel Xeon E5-2600 v4 product family processors.

**PSU specifications**

The PowerEdge R730xd system supports up to two AC or DC redundant power supply units (PSUs).

**Table 17. PSU specifications**

<table>
<thead>
<tr>
<th>PSU</th>
<th>Class</th>
<th>Heat dissipation (maximum)</th>
<th>Frequency</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>495 W AC</td>
<td>Platinum</td>
<td>1908 BTU/hr</td>
<td>50/60 Hz</td>
<td>100–240 V AC, autoranging</td>
</tr>
<tr>
<td>750 W AC</td>
<td>Platinum</td>
<td>2891 BTU/hr</td>
<td>50/60 Hz</td>
<td>100–240 V AC, autoranging</td>
</tr>
<tr>
<td></td>
<td>Titanium</td>
<td>2843 BTU/hr</td>
<td>50/60 Hz</td>
<td>200–240 V AC, autoranging</td>
</tr>
<tr>
<td>1100 W AC</td>
<td>Platinum</td>
<td>4100 BTU/hr</td>
<td>50/60 Hz</td>
<td>100–240 V AC, autoranging</td>
</tr>
<tr>
<td>750 W DC (for China only)</td>
<td>Platinum</td>
<td>2902 BTU/hr</td>
<td></td>
<td>100–240 V AC and 240 V DC</td>
</tr>
<tr>
<td>1100 W DC</td>
<td>N/A</td>
<td>4416 BTU/hr</td>
<td>N/A</td>
<td>–(48–60) V DC</td>
</tr>
</tbody>
</table>

**NOTE:** Heat dissipation is calculated using the PSU wattage rating.

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

**System battery specifications**

The PowerEdge R730xd system supports CR 2032 3.0-V lithium coin cell system battery.

**Expansion bus specifications**

The PowerEdge R730xd system supports PCI express (PCIe) generation 3 expansion cards, which need to be installed on the system board using expansion card risers. This system supports three types of expansion card risers. The following table provides the expansion card riser specifications:
Table 18. Expansion card riser specifications

<table>
<thead>
<tr>
<th>Expansion card riser</th>
<th>PCIe slots on the riser</th>
<th>Height</th>
<th>Length</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riser 1</td>
<td>Slot 1</td>
<td>half-height</td>
<td>low-profile</td>
<td>x8</td>
</tr>
<tr>
<td>Riser 1</td>
<td>Slot 2</td>
<td>half-height</td>
<td>low-profile</td>
<td>x8</td>
</tr>
<tr>
<td>Riser 1</td>
<td>Slot 3</td>
<td>half-height</td>
<td>low-profile</td>
<td>x8</td>
</tr>
<tr>
<td>Riser 2</td>
<td>Slot 4</td>
<td>full-height</td>
<td>full-length</td>
<td>x16</td>
</tr>
<tr>
<td>Riser 2</td>
<td>Slot 5</td>
<td>full-height</td>
<td>full-length</td>
<td>x8</td>
</tr>
<tr>
<td>Riser 3 (alternate)</td>
<td>Slot 6</td>
<td>full-height</td>
<td>full-length</td>
<td>x16</td>
</tr>
</tbody>
</table>

**NOTE:** When using slots 1 through 4 on the riser, ensure that both the processors are installed on the system.

### Memory specifications

The PowerEdge R730xd system supports DDR4 registered DIMMs (RDIMMs) and load-reduced DIMMs (LRDIMMs). Supported memory bus frequencies are 1333MT/s, 1600 MT/s, 1866 MT/s, 2133MT/s, or 2400 MT/s.

Table 19. Memory specifications

<table>
<thead>
<tr>
<th>Memory module sockets</th>
<th>Memory capacity</th>
<th>Minimum RAM</th>
<th>Maximum RAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twenty-four 288–pin</td>
<td>• 64 GB or 128 GB quad rank (LRDIMMs)</td>
<td>• 4 GB with single processor</td>
<td>• LRDIMM up to 1,536 GB with a single processor</td>
</tr>
<tr>
<td></td>
<td>• 4 GB or 8 GB single rank (RDIMMs)</td>
<td>• 8 GB with dual processors (minimum one memory</td>
<td>• LRDIMM up to 3,072 GB with dual processors</td>
</tr>
<tr>
<td></td>
<td>• 8 GB, 16 GB, or 32 GB dual rank (RDIMMs)</td>
<td>module per processor)</td>
<td>• RDIMM up to 384 GB with a single processor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• RDIMM up to 768 GB with a dual processor</td>
</tr>
</tbody>
</table>

### Drive specifications

### Hard drives

The PowerEdge R730xd system supports SAS, SATA, Nearline SAS hard drives and Solid State Drives (SSDs).

Table 20. Supported hard drive and SSD options for the PowerEdge R730xd system

<table>
<thead>
<tr>
<th>Drives</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fourteen hard drive systems</td>
<td>Up to twelve 3.5-inch hard drives and two optional 2.5-inch back-accessible hard drives.</td>
</tr>
<tr>
<td>Eighteen hard drive systems</td>
<td>Up to twelve 3.5-inch hard drives, two optional 2.5-inch back-accessible hard drives and four 3.5-inch hard drives in the middle hard drive tray.</td>
</tr>
<tr>
<td>Twenty six hard drive systems</td>
<td>Up to twenty-four 2.5-inch hard drives and two optional 2.5-inch back-accessible hard drives.</td>
</tr>
<tr>
<td>Twenty eight hard drive systems</td>
<td>Up to twenty 2.5-inch hard drives, up to four 2.5-inch Dell PowerEdge Express Flash devices (PCIe SSD) and up to two optional 2.5-inch back-accessible hard drives.</td>
</tr>
<tr>
<td></td>
<td>Up to eighteen 1.8-inch hard drives, up to eight 3.5-inch hard drives, and up to two 2.5-inch back-accessible hard drives.</td>
</tr>
</tbody>
</table>
Table 20. Supported hard drive and SSD options for the PowerEdge R730xd system (continued)

<table>
<thead>
<tr>
<th>Drives</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twenty four hard drive</td>
<td>Up to twenty 2.5-inch SAS/SATA drives + four 2.5-inch NVMe drives in slots 0 to 19 + slots 20 to 23</td>
</tr>
<tr>
<td>systems</td>
<td></td>
</tr>
</tbody>
</table>

## Ports and connectors specifications

### USB ports

The PowerEdge R730xd system supports:

- USB 2.0-compliant ports on the front panel
- USB 3.0-compliant ports on the back panel
- Internal USB 3.0-compliant port

The following table provides more information about the USB specifications:

Table 21. USB specifications

<table>
<thead>
<tr>
<th>System</th>
<th>Front panel</th>
<th>Back panel</th>
<th>Internal</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerEdge R730xd</td>
<td>One USB management port/ iDRAC Direct</td>
<td>Two 9-pin, USB 3.0-compliant ports</td>
<td>One 9-pin, USB 3.0-compliant port</td>
</tr>
</tbody>
</table>

### NIC ports

The PowerEdge R730xd system supports four Network Interface Controller (NIC) ports on the back panel, which is available in one of the following three NIC configurations:

- Four RJ45 ports that support 1Gbps.
- Two RJ45 ports that support up to 1Gbps and two SFP+ ports that support up to 10Gbps.
- Two RJ45 ports that support up to 1Gbps and two RJ45 ports that support up to 10Gbps.

### Serial connector

The serial connector connects a serial device to the system. The PowerEdge R730xd system supports one serial connector on the back panel, which is a 9-pin connector, Data Terminal Equipment (DTE), 16550-compliant.

### VGA ports

The Video Graphic Array (VGA) port enables you to connect the system to a VGA display. The PowerEdge R730xd system supports two 15-pin VGA ports on the front and back panels.

### Internal Dual SD Module

The PowerEdge R730xd system supports two optional flash memory card slots with an internal dual SD module.

**NOTE:** One card slot is dedicated for redundancy.

### Video specifications

The PowerEdge R730xd system supports Matrox G200eR2 graphics card with 16 MB capacity.
Table 22. Supported video resolution options

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Refresh rate (Hz)</th>
<th>Color depth (bits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>640x480</td>
<td>60, 70</td>
<td>8, 16, 32</td>
</tr>
<tr>
<td>800x600</td>
<td>60, 75, 85</td>
<td>8, 16, 32</td>
</tr>
<tr>
<td>1024x768</td>
<td>60, 75, 85</td>
<td>8, 16, 32</td>
</tr>
<tr>
<td>1152x864</td>
<td>60, 75, 85</td>
<td>8, 16, 32</td>
</tr>
<tr>
<td>1280x1024</td>
<td>60, 75</td>
<td>8, 16, 32</td>
</tr>
<tr>
<td>1440x900</td>
<td>60</td>
<td>8, 16, 32</td>
</tr>
</tbody>
</table>

Environmental specifications

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

Table 23. Temperature specifications

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>–40°C to 65°C (–40°F to 149°F)</td>
</tr>
<tr>
<td>Continuous operation (for altitude less than 950 m or 3117 ft)</td>
<td>10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment.</td>
</tr>
<tr>
<td>Fresh air</td>
<td>For information about fresh air, see Expanded Operating Temperature section.</td>
</tr>
<tr>
<td>Maximum temperature gradient (operating and storage)</td>
<td>20°C/h (68°F/h)</td>
</tr>
</tbody>
</table>

Table 24. Relative humidity specifications

<table>
<thead>
<tr>
<th>Relative humidity</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>5% to 95% RH with 33°C (91°F) maximum dew point. Atmosphere must be non-condensing at all times.</td>
</tr>
<tr>
<td>Operating</td>
<td>10% to 80% relative humidity with 29°C (84.2°F) maximum dew point.</td>
</tr>
</tbody>
</table>

Table 25. Maximum vibration specifications

<table>
<thead>
<tr>
<th>Maximum vibration</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating</td>
<td>0.26 G&lt;sub&gt;rms&lt;/sub&gt; at 5 Hz to 350 Hz (all operation orientations).</td>
</tr>
<tr>
<td>Storage</td>
<td>1.88 G&lt;sub&gt;rms&lt;/sub&gt; at 10 Hz to 500 Hz for 15 min (all six sides tested).</td>
</tr>
</tbody>
</table>

Table 26. Maximum shock specifications

<table>
<thead>
<tr>
<th>Maximum vibration</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating</td>
<td>Six consecutively executed shock pulses in the positive and negative x, y, and z axes of 40 G for up to 2.3 ms.</td>
</tr>
<tr>
<td>Storage</td>
<td>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.</td>
</tr>
</tbody>
</table>

Table 27. Maximum altitude specifications

<table>
<thead>
<tr>
<th>Maximum altitude</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating</td>
<td>30482000 m (10,0006560 ft)</td>
</tr>
<tr>
<td>Storage</td>
<td>12,000 m (39,370 ft)</td>
</tr>
</tbody>
</table>
## Operating temperature de-rating specifications

<table>
<thead>
<tr>
<th>Operating temperature de-rating</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 35°C (95°F)</td>
<td>Maximum temperature is reduced by 1°C/300 m (1°F/547 ft) above 950 m (3,117 ft).</td>
</tr>
<tr>
<td>35°C to 40°C (95°F to 104°F)</td>
<td>Maximum temperature is reduced by 1°C/175 m (1°F/319 ft) above 950 m (3,117 ft).</td>
</tr>
<tr>
<td>40°C to 45°C (104°F to 113°F)</td>
<td>Maximum temperature is reduced by 1°C/125 m (1°F/228 ft) above 950 m (3,117 ft).</td>
</tr>
</tbody>
</table>

## Particulate and gaseous contamination specifications

The following table defines the limitations that help avoid any equipment damage or failure from particulates and gaseous contamination. If the levels of particulates or gaseous pollution exceed the specified limitations and result in equipment damage or failure, you may need to rectify the environmental conditions. Re-mediation of environmental conditions is the responsibility of the customer.

### Particulate contamination specifications

Table 29. Particulate contamination specifications

<table>
<thead>
<tr>
<th>Particulate contamination</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air filtration</td>
<td>Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> This condition applies to data center environments only. Air filtration requirements do not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Air entering the data center must have MERV11 or MERV13 filtration.</td>
</tr>
</tbody>
</table>

| Conductive dust           | Air must be free of conductive dust, zinc whiskers, or other conductive particles. |
|                          | **NOTE:** This condition applies to data center and non-data center environments. |

| Corrosive dust            | • Air must be free of corrosive dust. |
|                          | • Residual dust present in the air must have a deliquescent point less than 60% relative humidity. |
|                          | **NOTE:** This condition applies to data center and non-data center environments. |

### Gaseous contamination specifications

Table 30. Gaseous contamination specifications

<table>
<thead>
<tr>
<th>Gaseous contamination</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper coupon corrosion rate</td>
<td>&lt;300 Å/month per Class G1 as defined by ANSI/ISA71.04-1985.</td>
</tr>
<tr>
<td>Silver coupon corrosion rate</td>
<td>&lt;200 Å/month as defined by ASHRAE TC9.9.</td>
</tr>
</tbody>
</table>

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

## Standard operating temperature

### Standard operating temperature specifications

Table 31. Standard operating temperature specifications

<table>
<thead>
<tr>
<th>Standard operating temperature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous operation (for altitude less than 950 m or 3117 ft)</td>
<td>10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment.</td>
</tr>
</tbody>
</table>
Table 31. Standard operating temperature specifications

<table>
<thead>
<tr>
<th>Standard operating temperature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔄 NOTE: The 2.5-inch hard drive chassis supports a maximum of 145 W processors.</td>
<td></td>
</tr>
</tbody>
</table>

Expanded operating temperature

Table 32. Expanded operating temperature specifications

<table>
<thead>
<tr>
<th>Expanded operating temperature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous operation</td>
<td>5°C to 40°C at 5% to 85% RH with 29°C dew point. 🔄 NOTE: Outside the standard operating temperature (10°C to 35°C), the system can operate continuously in temperatures as low as 5°C and as high as 40°C. For temperatures between 35°C and 40°C, de-rate maximum allowable temperature by 1°C per 175 m above 950 m (1°F per 319 ft).</td>
</tr>
<tr>
<td>≤ 1% of annual operating hours</td>
<td>−5°C to 45°C at 5% to 90% RH with 29°C dew point. 🔄 NOTE: 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. For temperatures between 40°C and 45°C, de-rate maximum allowable temperature by 1°C per 125 m above 950 m (1°F per 228 ft).</td>
</tr>
</tbody>
</table>

Brian: When operating in the expanded temperature range, system performance may be impacted.

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

Expanded operating temperature restrictions

- Do not perform a cold startup below 5°C.
- The operating temperature specified is for a maximum altitude of 3050 m (10,000 ft).
- 160 W or higher wattage processor is not supported.
- Redundant power supply units are required.
- Non-Dell qualified peripheral cards and/or peripheral cards greater than 25 W are not supported.
- The 3.5-inch hard drive chassis supports a maximum of 120 W processor.
- The 2.5-inch hard drive chassis supports a maximum of 145 W processor.
- Only SSDs are allowed in the hard drive slots at the back of the 3.5-inch hard drive chassis.
- Mid drive configurations, eight 3.5-inch and eighteen 1.8-inch SSD configurations are not supported.
- GPU is not supported.
- Tape backup unit (TBU) is not supported.
Initial system setup and configuration

Topics:

- Setting up your system
- iDRAC configuration
- Options to install the operating system
- Manage your 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 system Rack Installation Placemat at 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:

<table>
<thead>
<tr>
<th>Interfaces</th>
<th>Document/Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>iDRAC Settings utility</td>
<td>See Dell Integrated Dell Remote Access Controller User's Guide at Dell.com/idracmanuals</td>
</tr>
<tr>
<td>Dell Deployment Toolkit</td>
<td>See Dell Deployment Toolkit User’s Guide at Dell.com/openmanagemanuals</td>
</tr>
<tr>
<td>Dell Lifecycle Controller</td>
<td>See Dell Lifecycle Controller User’s Guide at Dell.com/idracmanuals</td>
</tr>
</tbody>
</table>

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.

1. **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.

1. **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](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>
<thead>
<tr>
<th>Resources</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell Systems Management Tools and Documentation media</td>
<td><a href="https://www.dell.com/operatingsystemmanuals">https://www.dell.com/operatingsystemmanuals</a></td>
</tr>
<tr>
<td>Dell Lifecycle Controller</td>
<td><a href="https://www.dell.com/idracmanuals">https://www.dell.com/idracmanuals</a></td>
</tr>
<tr>
<td>Dell OpenManage Deployment Toolkit</td>
<td><a href="https://www.dell.com/openmanagemanuals">https://www.dell.com/openmanagemanuals</a></td>
</tr>
<tr>
<td>Dell certified VMware ESXi</td>
<td><a href="https://www.dell.com/virtualizationsolutions">https://www.dell.com/virtualizationsolutions</a></td>
</tr>
<tr>
<td>Supported operating systems on Dell PowerEdge systems</td>
<td><a href="www.dell.com/ossupport">www.dell.com/ossupport</a></td>
</tr>
<tr>
<td>Installation and How-to videos for supported operating systems on Dell PowerEdge systems</td>
<td><a href="https://www.youtube.com/playlist?list=PLE5xhhyFjDPfTCaDRFlB_VsoLpL8x84G">https://www.youtube.com/playlist?list=PLE5xhhyFjDPfTCaDRFlB_VsoLpL8x84G</a></td>
</tr>
</tbody>
</table>

**Methods to download firmware and drivers**

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

<table>
<thead>
<tr>
<th>Methods</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>From the Dell Support site</td>
<td>Global Technical Support</td>
</tr>
<tr>
<td>Using Dell Remote Access Controller Lifecycle Controller (iDRAC with LC)</td>
<td><a href="Dell.com/idracmanuals">Dell.com/idracmanuals</a></td>
</tr>
<tr>
<td>Using Dell Repository Manager (DRM)</td>
<td>[Dell.com/openmanagemanuals &gt; OpenManage Deployment Toolkit](Dell.com/openmanagemanuals &gt; OpenManage Deployment Toolkit)</td>
</tr>
<tr>
<td>Using Dell OpenManage Essentials (OME)</td>
<td>[Dell.com/openmanagemanuals &gt; OpenManage Deployment Toolkit](Dell.com/openmanagemanuals &gt; OpenManage Deployment Toolkit)</td>
</tr>
<tr>
<td>Using Dell Server Update Utility (SUU)</td>
<td>[Dell.com/openmanagemanuals &gt; OpenManage Deployment Toolkit](Dell.com/openmanagemanuals &gt; OpenManage Deployment Toolkit)</td>
</tr>
<tr>
<td>Using Dell OpenManage Deployment Toolkit (DTK)</td>
<td>[Dell.com/openmanagemanuals &gt; OpenManage Deployment Toolkit](Dell.com/openmanagemanuals &gt; OpenManage Deployment Toolkit)</td>
</tr>
</tbody>
</table>

**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](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.

---

### Manage your system

This section provides the information about server management software.

<table>
<thead>
<tr>
<th>Server Management Software</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OpenManage</strong></td>
<td>The Dell OpenManage Server Administrator provides a comprehensive one-to-one systems management solution for both local and remote servers and their storage controllers and Direct Attached Storage (DAS). For information about OpenManage documents, see <a href="Dell.com/openmanagemanuals">Dell.com/openmanagemanuals</a>.</td>
</tr>
<tr>
<td><strong>OpenManage Essentials</strong></td>
<td>Dell OpenManage Essentials is the newest one-to-many management console for managing Dell PowerEdge servers and direct-attached storage as it provides a simple and easy interface for system administrators to maximize the uptime and health of Dell systems. For information about OpenManage documents, see <a href="Dell.com/openmanagemanuals">Dell.com/openmanagemanuals</a>.</td>
</tr>
<tr>
<td><strong>Remote Access Controller with Dell Lifecycle Controller (iDRAC with LC)</strong></td>
<td>iDRAC with Dell Lifecycle Controller allows administrators to deploy, update, monitor, and manage Dell servers from any location without the use of agents in a one-to-one or one-to-many method. This out-of-band management allows the updates to be sent from Dell or appropriate third-party consoles directly to iDRAC with Dell Lifecycle Controller on a Dell PowerEdge server, regardless of the operating system that may or may not be running. For information about Remote Enterprise Systems Management documents, see <a href="Dell.com/idracmanuals">Dell.com/idracmanuals</a>.</td>
</tr>
<tr>
<td><strong>Partner Programs</strong></td>
<td>For information about OpenManage Connections Enterprise Systems Management documents, see <a href="Dell.com/omconnectionsenterprisesystemsmanagement">Dell.com/omconnectionsenterprisesystemsmanagement</a>.</td>
</tr>
<tr>
<td><strong>OpenManage Connections</strong></td>
<td>For information about OpenManage Connections Client Systems Management documents, see <a href="Dell.com/dellclientcommandssuitemanuals">Dell.com/dellclientcommandssuitemanuals</a>.</td>
</tr>
</tbody>
</table>

---

Initial system setup and configuration
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 36
- Boot Manager on page 62
- Dell Lifecycle Controller on page 62
- PXE boot on page 64

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 37

Related tasks
- Viewing System Setup on page 37
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 36

Related References

System Setup details on page 37

System Setup details

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System BIOS</td>
<td>Enables you to configure BIOS settings.</td>
</tr>
<tr>
<td>iDRAC Settings</td>
<td>Enables you to configure iDRAC settings.</td>
</tr>
<tr>
<td></td>
<td>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 Integrated Dell Remote Access Controller User’s Guide at Dell.com/idracmanuals.</td>
</tr>
<tr>
<td>Device Settings</td>
<td>Enables you to configure device settings.</td>
</tr>
</tbody>
</table>

Related concepts

System Setup on page 36

Related tasks

Viewing System Setup on page 37

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

Secure Boot Custom Policy Settings on page 45

Related References

System BIOS Settings details on page 38
Boot Settings on page 39
Network Settings on page 41
System Information on page 47
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 References
- System BIOS on page 37
- System BIOS Settings details on page 38

System BIOS Settings details

About this task
The System BIOS Settings screen details are explained as follows:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Information</td>
<td>Specifies information about the system such as the system model name, BIOS version, and Service Tag.</td>
</tr>
<tr>
<td>Memory Settings</td>
<td>Specifies information and options related to the installed memory.</td>
</tr>
<tr>
<td>Processor Settings</td>
<td>Specifies information and options related to the processor such as speed and cache size.</td>
</tr>
<tr>
<td>SATA Settings</td>
<td>Specifies options to enable or disable the integrated SATA controller and ports.</td>
</tr>
<tr>
<td>Boot Settings</td>
<td>Specifies options to specify the boot mode (BIOS or UEFI). Enables you to modify UEFI and BIOS boot settings.</td>
</tr>
<tr>
<td>Network Settings</td>
<td>Specifies options to change the network settings.</td>
</tr>
<tr>
<td>Integrated Devices</td>
<td>Specifies options to manage integrated device controllers and ports and specify related features and options.</td>
</tr>
<tr>
<td>Serial Communication</td>
<td>Specifies options to manage the serial ports and specify related features and options.</td>
</tr>
<tr>
<td>System Profile Settings</td>
<td>Specifies options to change the processor power management settings, memory frequency, and so on.</td>
</tr>
</tbody>
</table>
### System Security
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.

### Miscellaneous Settings
Specifies options to change the system date, time, and so on.

### 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.

### Viewing Boot Settings
To view the Boot Settings screen, perform the following steps:

**Steps**

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

   $F2 = System Setup$

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

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

### Boot Settings details
About this task

The Boot Settings screen details are explained as follows:
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot Mode</td>
<td>Enables you to set the boot mode of the system. <strong>CAUTION:</strong> Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.</td>
</tr>
<tr>
<td></td>
<td>If the operating system supports UEFI, you can set this option to <strong>UEFI</strong>. Setting this field to <strong>BIOS</strong> allows compatibility with non-UEFI operating systems. This option is set to <strong>BIOS</strong> by default.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Setting this field to UEFI disables the BIOS Boot Settings menu. Setting this field to BIOS disables the UEFI Boot Settings menu.</td>
</tr>
<tr>
<td>Boot Sequence</td>
<td>Enables or disables the Boot Sequence Retry feature. If this option is set to <strong>Enabled</strong> and the system fails to boot, the system reattempts the boot sequence after 30 seconds. This option is set to <strong>Enabled</strong> by default.</td>
</tr>
<tr>
<td>Retry</td>
<td></td>
</tr>
<tr>
<td>Hard-Disk Failover</td>
<td>Specifies the hard drive that is booted in the event of a hard drive failure. The devices are selected in the <strong>Hard-Disk Drive Sequence</strong> on the <strong>Boot Option Setting</strong> menu. When this option is set to <strong>Disabled</strong>, only the first hard drive in the list is attempted to boot. When this option is set to <strong>Enabled</strong>, all hard drives are attempted to boot in the order selected in the <strong>Hard-Disk Drive Sequence</strong>. This option is not enabled for UEFI Boot Mode.</td>
</tr>
<tr>
<td>Boot Option</td>
<td>Configures the boot sequence and the boot devices.</td>
</tr>
<tr>
<td>Settings</td>
<td></td>
</tr>
<tr>
<td>BIOS Boot</td>
<td>Enables or disables BIOS boot options. <strong>NOTE:</strong> This option is enabled only if the boot mode is BIOS.</td>
</tr>
<tr>
<td>Settings</td>
<td></td>
</tr>
<tr>
<td>UEFI Boot</td>
<td>Enables or disables UEFI Boot options. The Boot options include <strong>IPv4 PXE</strong> and <strong>IPv6 PXE</strong>. This option is set to <strong>IPv4</strong> by default. <strong>NOTE:</strong> This option is enabled only if the boot mode is UEFI.</td>
</tr>
<tr>
<td>Settings</td>
<td></td>
</tr>
</tbody>
</table>

**Related References**

- **Boot Settings** on page 39  
- **Choosing the system boot mode** on page 40

**Related tasks**

- **Viewing Boot Settings** on page 39  
- **Changing the boot order** on page 41

**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.

**Related References**

- **Boot Settings** on page 39
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.

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 tasks
Boot Settings details on page 39
Viewing Boot Settings on page 39

Related References
Boot Settings on page 39

Related concepts
UEFI iSCSI Settings on page 42

Related References
Network Settings screen details on page 42
UEFI iSCSI Settings details on page 43
System BIOS on page 37

Related tasks
Viewing Network Settings on page 41
Viewing UEFI iSCSI Settings on page 42

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.

Related References
Network Settings on page 41
Network Settings screen details on page 42

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

About this task

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXE Device n (n = 1 to 4)</td>
<td>Enables or disables the device. When enabled, a UEFI boot option is created for the device.</td>
</tr>
<tr>
<td>PXE Device n Settings(n = 1 to 4)</td>
<td>Enables you to control the configuration of the PXE device.</td>
</tr>
</tbody>
</table>

Related References
Network Settings on page 41

Related tasks
Viewing Network Settings on page 41

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 References
UEFI iSCSI Settings details on page 43
UEFI iSCSI Settings on page 42

Related tasks
Viewing UEFI iSCSI Settings on page 42

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.
5. On the Network Settings screen, click UEFI iSCSI Settings.
UEFI iSCSI Settings details
The UEFI iSCSI Settings screen details are explained as follows:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISCSI Initiator</td>
<td>Specifies the name of the iSCSI initiator (iqn format).</td>
</tr>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>ISCSI Device n (n = 1 to 4)</td>
<td>Enables or disables the iSCSI device. When disabled, a UEFI boot option is</td>
</tr>
<tr>
<td></td>
<td>created for the iSCSI device automatically.</td>
</tr>
</tbody>
</table>

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
Secure Boot Custom Policy Settings on page 45

Related References
Operating with a setup password enabled on page 47
System BIOS on page 37

Related tasks
System Security Settings details on page 44
Viewing System Security on page 43
Creating a system and setup password on page 45
Using your system password to secure your system on page 46
Deleting or changing system and setup password on page 46

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.

Related References
System Security on page 43

Related tasks
System Security Settings details on page 44
System Security Settings details

About this task

The System Security Settings screen details are explained as follows:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel AES-NI</td>
<td>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 Enabled by default.</td>
</tr>
<tr>
<td>System Password</td>
<td>Sets the system password. This option is set to Enabled by default and is read-only if the password jumper is not installed in the system.</td>
</tr>
<tr>
<td>Setup Password</td>
<td>Sets the setup password. This option is read-only if the password jumper is not installed in the system.</td>
</tr>
<tr>
<td>Password Status</td>
<td>Locks the system password. This option is set to Unlocked by default.</td>
</tr>
<tr>
<td>TPM Security</td>
<td><strong>NOTE:</strong> The TPM menu is available only when the TPM module is installed.</td>
</tr>
<tr>
<td></td>
<td>Enables you to control the reporting mode of the TPM. The TPM Security option is set to Off by default. You can only modify the TPM Status, TPM Activation, and Intel TXT fields if the TPM Status field is set to either On with Pre-boot Measurements or On without Pre-boot Measurements.</td>
</tr>
<tr>
<td>TPM Information</td>
<td>Changes the operational state of the TPM. This option is set to No Change by default.</td>
</tr>
<tr>
<td>TPM Status</td>
<td>Specifies the TPM status.</td>
</tr>
<tr>
<td>TPM Command</td>
<td><strong>CAUTION:</strong> 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.</td>
</tr>
<tr>
<td></td>
<td>Clears all the contents of the TPM. The TPM Clear option is set to No by default.</td>
</tr>
<tr>
<td>Intel TXT</td>
<td>Enables or disables the Intel Trusted Execution Technology (TXT) option. To enable the Intel TXT option, virtualization technology and TPM Security must be enabled with Pre-boot measurements. This option is set to Off by default.</td>
</tr>
<tr>
<td>Power Button</td>
<td>Enables or disables the power button on the front of the system. This option is set to Enabled by default.</td>
</tr>
<tr>
<td>NMI Button</td>
<td>Enables or disables the NMI button on the front of the system. This option is set to Disabled by default.</td>
</tr>
<tr>
<td>AC Power Recovery</td>
<td>Sets how the system behaves after AC power is restored to the system. This option is set to Last by default.</td>
</tr>
<tr>
<td>AC Power Recovery Delay</td>
<td>Sets the AC Power Recovery Delay option when the User Defined Delay option for AC Power Recovery Delay is selected.</td>
</tr>
<tr>
<td>UEFI Variable Access</td>
<td>Provides varying degrees of securing UEFI variables. When set to Standard (the default), UEFI variables are accessible in the operating system per the UEFI specification. When set to Controlled, 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.</td>
</tr>
<tr>
<td>Secure Boot Policy</td>
<td>When Secure Boot policy is set to Standard, the BIOS uses the system manufacturer’s key and certificates to authenticate pre-boot images. When Secure Boot policy is set to Custom, the BIOS uses the user-defined key and certificates. Secure Boot policy is set to Standard by default.</td>
</tr>
<tr>
<td>Secure Boot Policy Summary</td>
<td>Specifies the list of certificates and hashes that secure boot uses to authenticate images.</td>
</tr>
</tbody>
</table>

Related References

System Security on page 43

Related tasks

Viewing System Security on page 43
**Secure Boot Custom Policy Settings**

Secure Boot Custom Policy Settings is displayed only when Secure Boot Policy is set to Custom.

**Related References**

Secure Boot Custom Policy Settings details on page 45

**Related tasks**

Viewing Secure Boot Custom Policy Settings on page 45

Viewing Secure Boot Custom Policy Settings

To view the Secure Boot Custom Policy 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.

Secure Boot Custom Policy Settings details

The Secure Boot Custom Policy Settings screen details are explained as follows:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform Key</td>
<td>Imports, exports, deletes, or restores the platform key (PK).</td>
</tr>
<tr>
<td>Key Exchange Key Database</td>
<td>Enables you to import, export, delete, or restore entries in the Key Exchange Key (KEK) Database.</td>
</tr>
<tr>
<td>Authorized Signature Database</td>
<td>Imports, exports, deletes, or restores entries in the Authorized Signature Database (db).</td>
</tr>
<tr>
<td>Forbidden Signature Database</td>
<td>Imports, exports, deletes, or restores entries in the Forbidden Signature Database (dbx).</td>
</tr>
</tbody>
</table>

**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.
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, (''), (+), (.), (.), (\r), (\n), (\t).

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 References
System Security on page 43

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 References
System Security on page 43

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.
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 References
System Security on page 43

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:

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

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

- If System Password is not set to Enabled and is not locked through the Password Status option, you can assign a system password. For more information, see the System Security Settings 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 References
System Security on page 43

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 References
System Information details on page 47
System BIOS on page 37

Related tasks
Viewing System Information on page 47

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 References
System Information on page 47

System Information details

About this task

The System Information screen details are explained as follows:
### Option Description

**System Model Name**
- Specifies the system model name.

**System BIOS Version**
- Specifies the BIOS version installed on the system.

**System Management Engine Version**
- Specifies the current version of the Management Engine firmware.

**System Service Tag**
- Specifies the system Service Tag.

**System Manufacturer**
- Specifies the name of the system manufacturer.

**System Manufacturer Contact Information**
- Specifies the contact information of the system manufacturer.

**System CPLD Version**
- Specifies the current version of the system complex programmable logic device (CPLD) firmware.

**UEFI Compliance Version**
- Specifies the UEFI compliance level of the system firmware.

### Related References
- System Information on page 47
- System Information details on page 47

### Related tasks
- Viewing System Information on page 47

### 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 References
- Memory Settings details on page 49
- System BIOS on page 37

### Related tasks
- Viewing Memory Settings on page 48

### 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 References
Memory Settings on page 48
Memory Settings details on page 49

Memory Settings details

About this task
The Memory Settings screen details are explained as follows:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Memory Size</td>
<td>Specifies the memory size in the system.</td>
</tr>
<tr>
<td>System Memory Type</td>
<td>Specifies the type of memory installed in the system.</td>
</tr>
<tr>
<td>System Memory Speed</td>
<td>Specifies the memory speed.</td>
</tr>
<tr>
<td>System Memory Voltage</td>
<td>Specifies the memory voltage.</td>
</tr>
<tr>
<td>Video Memory</td>
<td>Specifies the amount of video memory.</td>
</tr>
<tr>
<td>System Memory Testing</td>
<td>Specifies whether the memory tests are run during system boot. Options are Enabled and Disabled. This option is set to Disabled by default.</td>
</tr>
<tr>
<td>Memory Operating Mode</td>
<td>Specifies the memory operating mode. The options available are Optimizer Mode, Advanced ECC Mode, Mirror Mode, Spare Mode, Spare with Advanced ECC Mode, Dell Fault Resilient Mode and Dell NUMA Fault Resilient Mode. This option is set to Optimizer Mode by default.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The Memory Operating Mode option can have different default and available options based on the memory configuration of your system.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The Dell Fault Resilient Mode option establishes an area of memory that is fault resilient. This mode can be used by an operating system that supports the feature to load critical applications or enables the operating system kernel to maximize system availability.</td>
</tr>
<tr>
<td>Node Interleaving</td>
<td>Specifies if the Non-Uniform Memory Architecture (NUMA) is supported. If this field is set to Enabled, memory interleaving is supported if a symmetric memory configuration is installed. If the field is set to Disabled, the system supports NUMA (asymmetric) memory configurations. This option is set to Disabled by default.</td>
</tr>
<tr>
<td>Snoop Mode</td>
<td>Specifies the Snoop Mode options. The Snoop Mode options available are Home Snoop, Early Snoop, and Cluster on Die. This option is set to Early Snoop by default. This field is available only when the Node Interleaving is set to Enabled.</td>
</tr>
</tbody>
</table>

Related References
Memory Settings on page 48

Related tasks
Viewing Memory Settings on page 48

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 References
Processor Settings details on page 50
System BIOS on page 37
Related tasks

Viewing Processor Settings on page 50

**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 References**

Processor Settings on page 49
Processor Settings details on page 50

**Processor Settings details**

**About this task**

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical Processor</td>
<td>Enables or disables the logical processors and displays the number of logical processors. If this option is set to <strong>Enabled</strong>, the BIOS displays all the logical processors. If this option is set to <strong>Disabled</strong>, the BIOS displays only one logical processor per core. This option is set to <strong>Enabled</strong> by default.</td>
</tr>
<tr>
<td>QPI Speed</td>
<td>Enables you to control QuickPath Interconnect data rate settings.</td>
</tr>
<tr>
<td>Alternate RTID (Requestor Transaction ID) Setting</td>
<td>Modifies Requestor Transaction IDs, which are QPI resources. This option is set to <strong>Disabled</strong> by default. <strong>NOTE:</strong> Enabling this option may negatively impact the overall system performance.</td>
</tr>
<tr>
<td>Virtualization Technology</td>
<td>Enables or disables the additional hardware capabilities provided for virtualization. This option is set to <strong>Enabled</strong> by default.</td>
</tr>
<tr>
<td>Address Translation Service (ATS)</td>
<td>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 <strong>Enabled</strong> by default.</td>
</tr>
<tr>
<td>Adjacent Cache Line Prefetch</td>
<td>Optimizes the system for applications that need high utilization of sequential memory access. This option is set to <strong>Enabled</strong> by default. You can disable this option for applications that need high utilization of random memory access.</td>
</tr>
<tr>
<td>Hardware Prefetcher</td>
<td>Enables or disables the hardware prefetcher. This option is set to <strong>Enabled</strong> by default.</td>
</tr>
<tr>
<td>DCU Streamer Prefetcher</td>
<td>Enables or disables the Data Cache Unit (DCU) streamer prefetcher. This option is set to <strong>Enabled</strong> by default.</td>
</tr>
<tr>
<td>DCU IP Prefetcher</td>
<td>Enables or disables the Data Cache Unit (DCU) IP prefetcher. This option is set to <strong>Enabled</strong> by default.</td>
</tr>
<tr>
<td>Execute Disable</td>
<td>Enables you to run the disable memory protection technology. This option is set to <strong>Enabled</strong> by default.</td>
</tr>
<tr>
<td>Logical Processor Idling</td>
<td>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...</td>
</tr>
</tbody>
</table>
### Option Description

Transition into a lower power idle state. This option can only be enabled if the operating system supports it. It is set to **Disabled** by default.

### Configurable TDP

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 **Nominal** by default.

**NOTE:** This option is only available on certain stock keeping units (SKUs) of the processors.

### X2Apic Mode

Enables or disables the X2Apic mode.

### Dell Controlled Turbo

Controls the turbo engagement. Enable this option only when **System Profile** is set to **Performance**.

**NOTE:** Depending on the number of installed CPUs, there may be up to four processor listings.

### Number of Cores per Processor

Controls the number of enabled cores in each processor. This option is set to **All** by default.

### Processor 64-bit Support

Specifies if the processor(s) support 64-bit extensions.

### Processor Core Speed

Specifies the maximum core frequency of the processor.

**NOTE:** 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:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family-Model-Stepping</td>
<td>Specifies the family, model, and stepping of the processor as defined by Intel.</td>
</tr>
<tr>
<td>Brand</td>
<td>Specifies the brand name.</td>
</tr>
<tr>
<td>Level 2 Cache</td>
<td>Specifies the total L2 cache.</td>
</tr>
<tr>
<td>Level 3 Cache</td>
<td>Specifies the total L3 cache.</td>
</tr>
<tr>
<td>Number of Cores</td>
<td>Specifies the number of cores per processor.</td>
</tr>
</tbody>
</table>

### SATA Settings

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

### Related References

- **Processor Settings** on page 49
- **System BIOS** on page 37

### Related tasks

- **Viewing Processor Settings** on page 50
- **Viewing SATA Settings** on page 52
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 References
SATA Settings on page 51

Related tasks
SATA Settings details on page 52

SATA Settings details

About this task
The SATA Settings screen details are explained as follows:

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Specifies the drive model of the selected device.</td>
</tr>
<tr>
<td>Drive Type</td>
<td>Specifies the type of drive attached to the SATA port.</td>
</tr>
<tr>
<td>Capacity</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>

Port B
Sets the drive type of the selected device. For Embedded SATA settings in ATA mode, set this field to Auto to enable BIOS support. Set it to OFF to turn off BIOS support. For AHCI or RAID mode, BIOS support is always enabled.

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

Option | Description
--- | ---
Model | Specifies the drive model of the selected device.
Drive Type | Specifies the type of drive attached to the SATA port.
Capacity | Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port I | Sets the drive type of the selected device. For Embedded SATA settings in ATA mode, set this field to Auto to enable BIOS support. Set it to OFF to turn off BIOS support. For AHCI or RAID mode, BIOS support is always enabled.

Option | Description
--- | ---
Model | Specifies the drive model of the selected device.
Drive Type | Specifies the type of drive attached to the SATA port.
Capacity | Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port J | Sets the drive type of the selected device. For Embedded SATA settings in ATA mode, set this field to Auto to enable BIOS support. Set it to OFF to turn off BIOS support. For AHCI or RAID mode, BIOS support is always enabled.

Option | Description
--- | ---
Model | Specifies the drive model of the selected device.
Drive Type | Specifies the type of drive attached to the SATA port.
Capacity | Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Related References
SATA Settings on page 51

Related tasks
Viewing SATA Settings on page 52

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 References
System BIOS on page 37

Related tasks
Integrated Devices details on page 55
Viewing Integrated Devices on page 55
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]

   1) **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 References
Integrated Devices on page 54

Related tasks
Integrated Devices details on page 55

Integrated Devices details

About this task
The Integrated Devices screen details are explained as follows:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB 3.0 Setting</td>
<td>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.</td>
</tr>
<tr>
<td>User Accessible USB Ports</td>
<td>Enables or disables the USB ports. Selecting Only Back Ports On disables the front USB ports, selecting All Ports Off 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. 1) <strong>NOTE:</strong> Selecting Only Back Ports On and All Ports Off disables the USB management port and also restricts access to iDRAC features.</td>
</tr>
<tr>
<td>Internal USB Port</td>
<td>Enables or disables the internal USB port. This option is set to Enabled by default.</td>
</tr>
<tr>
<td>Integrated RAID Controller</td>
<td>Enables or disables the integrated RAID controller. This option is set to Enabled by default.</td>
</tr>
<tr>
<td>Integrated Network Card 1</td>
<td>Enables or disables the integrated network card.</td>
</tr>
<tr>
<td>Embedded NIC1 and NIC2</td>
<td>Enables or disables the Embedded NIC1 and NIC2 options. If set to Disabled, 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. 1) <strong>NOTE:</strong> The Embedded NIC1 and NIC2 options are only available on systems that do not have Fixed Network Card 1.</td>
</tr>
<tr>
<td>I/OAT DMA Engine</td>
<td>Enables or disables the I/OAT option. Enable only if the hardware and software support the feature.</td>
</tr>
<tr>
<td>I/O Snoop Holdoff Response</td>
<td>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.</td>
</tr>
</tbody>
</table>

Pre-operating system management applications 55
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Embedded Video Controller</strong></td>
<td>Enables or disables the Embedded Video Controller option. This option is set to Enabled by default.</td>
</tr>
<tr>
<td><strong>Current State of Embedded Video Controller</strong></td>
<td>Displays the current state of the embedded video controller. The Current State of Embedded Video Controller 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 Embedded Video Controller setting is set to Disabled.</td>
</tr>
<tr>
<td><strong>SR-IOV Global Enable</strong></td>
<td>Enables or disables the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. This option is set to Disabled by default.</td>
</tr>
<tr>
<td><strong>OS Watchdog Timer</strong></td>
<td>If your system stops responding, this watchdog timer aids in the recovery of your operating system. When this option is set to Enabled, the operating system initializes the timer. When this option is set to Disabled (the default), the timer does not have any effect on the system.</td>
</tr>
<tr>
<td><strong>Memory Mapped I/O above 4 GB</strong></td>
<td>Enables or disables the support for PCIe devices that need large amounts of memory. This option is set to Enabled by default.</td>
</tr>
<tr>
<td><strong>Slot Disablement</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Slot Bifurcation</strong></td>
<td>Enables you to control the bifurcation of the specified slot. Only slots that are present in your system are available for control. The configuration for a x16 slot is default (x16), x8x8, or x4x4x4x4. The configuration for a x8 slot is default (x8) or x4x4.</td>
</tr>
</tbody>
</table>

### Slots

<table>
<thead>
<tr>
<th>Slot 1 Bifurcation</th>
<th>Controls the bifurcation of PCIe cards installed in the specified slot.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• When set to default, the slot operates at the default bifurcation for that slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to x4x4 the slot bifurcates to two links.</td>
</tr>
<tr>
<td>Slot 2 Bifurcation</td>
<td>Controls the bifurcation of PCIe cards installed in the specified slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to default, the slot operates at the default bifurcation for that slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to x4x4 the slot bifurcates to two links.</td>
</tr>
<tr>
<td>Slot 3 Bifurcation</td>
<td>Controls the bifurcation of PCIe cards installed in the specified slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to default, the slot operates at the default bifurcation for that slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to x4x4 the slot bifurcates to two links.</td>
</tr>
<tr>
<td>Slot 4 Bifurcation</td>
<td>Controls the bifurcation of PCIe cards installed in the specified slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to default, the slot operates at the default bifurcation for that slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to x8x8 or x4x4x4x4, the slot bifurcates to either two or four links depending on the slot capability.</td>
</tr>
<tr>
<td>Slot 5 Bifurcation</td>
<td>Controls the bifurcation of PCIe cards installed in the specified slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to default, the slot operates at the default bifurcation for that slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to x4x4 the slot bifurcates to two links.</td>
</tr>
<tr>
<td>Slot 6 Bifurcation</td>
<td>Controls the bifurcation of PCIe cards installed in the specified slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to default, the slot operates at the default bifurcation for that slot.</td>
</tr>
<tr>
<td></td>
<td>• When set to x8x8 or x4x4x4x4, the slot bifurcates to either two or four links depending on the slot capability.</td>
</tr>
</tbody>
</table>

Related References

[Integrated Devices](#) on page 54
Related tasks
Viewing Integrated Devices on page 55

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

Related References
System BIOS on page 37

Related tasks
Serial Communication details on page 57
Viewing Serial Communication on page 57

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.

Related References
Serial Communication on page 57

Related tasks
Serial Communication details on page 57

Serial Communication details

About this task
The Serial Communication screen details are explained as follows:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Communication</td>
<td>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 Auto by default.</td>
</tr>
<tr>
<td>Serial Port Address</td>
<td>Enables you to set the port address for serial devices. This option is set to Serial Device 1=COM2, Serial Device 2=COM1 by default.</td>
</tr>
</tbody>
</table>

    (NOTE: 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.)

    (NOTE: 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.)
Option | Description
--- | ---
External Serial Connector | Enables you to associate the External Serial Connector to Serial Device 1, Serial Device 2, or the Remote Access Device by using this option.

**NOTE:** 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.

**NOTE:** 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.

Failsafe Baud Rate | 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 115200 by default.

Remote Terminal Type | Sets the remote console terminal type. This option is set to VT 100/VT 220 by default.

Redirection After Boot | Enables or disables the BIOS console redirection when the operating system is loaded. This option is set to Enabled by default.

Related References
- Serial Communication on page 57

Related tasks
- Viewing Serial Communication on page 57

**System Profile Settings**

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

Related References
- System BIOS on page 37

Related tasks
- System Profile Settings details on page 59
- Viewing System Profile Settings on page 58

**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 References
- System Profile Settings on page 58
Related tasks
System Profile Settings details on page 59

System Profile Settings details

About this task
The System Profile Settings screen details are explained as follows:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Profile</td>
<td>Sets the system profile. If you set the System Profile option to a mode other than Custom, the BIOS automatically sets the rest of the options. You can only change the rest of the options if the mode is set to Custom. This option is set to Performance Per Watt Optimized (DAPC) by default. DAPC is Dell Active Power Controller. <strong>NOTE:</strong> All the parameters on the system profile setting screen are available only when the System Profile option is set to Custom.</td>
</tr>
<tr>
<td>CPU Power Management</td>
<td>Sets the CPU power management. This option is set to System DBPM (DAPC) by default.</td>
</tr>
<tr>
<td>Memory Frequency</td>
<td>Sets the speed of the memory. You can select Maximum Performance, Maximum Reliability, or a specific speed.</td>
</tr>
<tr>
<td>Turbo Boost</td>
<td>Enables or disables the processor to operate in the turbo boost mode. This option is set to Enabled by default.</td>
</tr>
<tr>
<td>Energy Efficient Turbo</td>
<td>Enables or disables the Energy Efficient Turbo option.</td>
</tr>
<tr>
<td>C1E</td>
<td>Enables or disables the processor to switch to a minimum performance state when it is idle. This option is set to Enabled by default.</td>
</tr>
<tr>
<td>C States</td>
<td>Enables or disables the processor to operate in all available power states. This option is set to Enabled by default.</td>
</tr>
<tr>
<td>Collaborative CPU Performance Control</td>
<td>Enables or disables the CPU power management option. When set to Enabled, the CPU power management is controlled by the OS DBPM and the System DBPM (DAPC). This option is set to Disabled by default.</td>
</tr>
<tr>
<td>Memory Patrol Scrub</td>
<td>Sets the memory patrol scrub frequency. This option is set to Standard by default.</td>
</tr>
<tr>
<td>Memory Refresh Rate</td>
<td>Sets the memory refresh rate to either 1x or 2x. This option is set to 1x by default.</td>
</tr>
<tr>
<td>Uncore Frequency</td>
<td>Enables you to select the Processor Uncore Frequency option.</td>
</tr>
<tr>
<td>Energy Efficient Policy</td>
<td>Enables you to select the Energy Efficient Policy option.</td>
</tr>
<tr>
<td>Number of Turbo Boost Enabled Cores for Processor 1</td>
<td><strong>NOTE:</strong> If there are two processors installed in the system, you see an entry for Number of Turbo Boost Enabled Cores for Processor 2.</td>
</tr>
<tr>
<td>Monitor/Mwait</td>
<td>Enables the Monitor/Mwait instructions in the processor. This option is set to Enabled for all system profiles, except Custom by default. <strong>NOTE:</strong> This option can be disabled only if the C States option in the Custom mode is set to disabled. <strong>NOTE:</strong> When C States is set to Enabled in the Custom mode, changing the Monitor/Mwait setting does not impact the system power or performance.</td>
</tr>
</tbody>
</table>
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 References
System Profile Settings on page 58

Related tasks
Viewing System Profile Settings on page 58

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 References
Miscellaneous Settings on page 60

Related tasks
Miscellaneous Settings details on page 60
Viewing Miscellaneous Settings on page 60

Miscellaneous Settings details

About this task

The Miscellaneous Settings screen details are explained as follows:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Time</td>
<td>Enables you to set the time on the system.</td>
</tr>
<tr>
<td>System Date</td>
<td>Enables you to set the date on the system.</td>
</tr>
<tr>
<td>Asset Tag</td>
<td>Specifies the asset tag and enables you to modify it for security and tracking purposes.</td>
</tr>
<tr>
<td>Keyboard</td>
<td>Enables you to set whether the system boots with the NumLock enabled or disabled. This option is set to <strong>On</strong> by default.</td>
</tr>
<tr>
<td>NumLock</td>
<td><strong>NOTE:</strong> This option does not apply to 84-key keyboards.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>F1/F2 Prompt on Error</strong></td>
<td>Enables or disables the F1/F2 prompt on error. This option is set to Enabled by default. The F1/F2 prompt also includes keyboard errors.</td>
</tr>
<tr>
<td><strong>Load Legacy Video Option ROM</strong></td>
<td>Enables you to determine whether the system BIOS loads the legacy video (INT 10H) option ROM from the video controller. Selecting Enabled 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 Enabled if UEFI Secure Boot mode is enabled.</td>
</tr>
<tr>
<td><strong>In-System Characterization</strong></td>
<td>Enables or disables In-System Characterization. This option is set to Disabled by default. The two other options are Enabled and Enabled - No Reboot. NOTE: The default setting for In-System Characterization is subject to change in future BIOS releases.</td>
</tr>
</tbody>
</table>

When enabled, In-System Characterization (ISC) executes during POST upon detecting relevant changes in system configuration to optimize system power and performance. ISC takes about 20 seconds to execute, and system reset is needed for ISC results to be applied. The Enabled - No Reboot option executes ISC and continues without applying ISC results until the next time system reset occurs. The Enabled option executes ISC and forces an immediate system reset so that ISC results can be applied. It takes the system longer to be ready due to the forced system reset. When disabled, ISC does not execute.

**Related References**

- Miscellaneous Settings on page 60

**Related tasks**

- Viewing Miscellaneous Settings on page 60

**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.

**Related concepts**

- Device Settings on page 62

**Related References**

- System BIOS on page 37

**Related tasks**

- Entering the iDRAC Settings utility on page 61
  - Changing the thermal settings on page 62

**Entering the iDRAC Settings utility**

**Steps**

1. Turn on or restart the managed system.
3. On the System Setup Main Menu page, click iDRAC Settings. The iDRAC Settings screen is displayed.

**Related References**

- iDRAC Settings utility on page 61
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)
4. Click Back > Finish > Yes.

Related References
iDRAC Settings utility on page 61

Device Settings
Device Settings enables you to configure device parameters.

Related References
System BIOS on page 37

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 62

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.

Related References
Dell Lifecycle Controller on page 62

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

Related References
Boot Manager main menu on page 63
System BIOS on page 37
Related tasks
Viewing Boot Manager on page 63

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 References
Boot Manager on page 62
Boot Manager main menu on page 63

Boot Manager main menu

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue Normal Boot</td>
<td>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.</td>
</tr>
<tr>
<td>One-shot Boot Menu</td>
<td>Enables you to access boot menu, where you can select a one-time boot device to boot from.</td>
</tr>
<tr>
<td>Launch System Setup</td>
<td>Enables you to access System Setup.</td>
</tr>
<tr>
<td>Launch Lifecycle Controller</td>
<td>Exits the Boot Manager and invokes the Dell Lifecycle Controller program.</td>
</tr>
<tr>
<td>System Utilities</td>
<td>Enables you to launch System Utilities menu such as System Diagnostics and UEFI shell.</td>
</tr>
</tbody>
</table>

Related References
Boot Manager on page 62

Related tasks
Viewing Boot Manager on page 63

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 62

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 62

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
• Front bezel (optional)
• System cover
• Inside the system
• Cooling shroud
• Hard drive tray assembly
• Cooling fans
• Cooling fan assembly
• System memory
• Processors and heat sinks
• PCIe card holder
• Cable retention bracket
• Integrated storage controller card
• Expansion cards and expansion card riser
• IDSDM
• Network daughter card
• Internal USB memory key (optional)
• System battery
• Power supply units (PSU)
• System board
• Trusted Platform Module
• Hard drives
• Hard drive backplane
• SD vFlash card (optional)
• Control panel assembly

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.

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 installed, remove the front bezel.
4. If applicable, remove the system from the rack.
   For more information, see the Rack Installation placemat at Dell.com/poweredgemanuals.
5. Remove the system cover.

Related tasks
Removing the optional front bezel on page 67
Removing the system cover on page 70

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 Rack Installation placemat at Dell.com/poweredgemanuals.
3. If removed, install the front bezel.
4. Reconnect the peripherals and connect the system to the electrical outlet.
5. Turn on the system, including any attached peripherals.

Related tasks
Installing the system cover on page 71
Installing the optional front bezel on page 68

Recommended tools
You need the following tools to perform the removal and installation procedures:
• Key to the bezel lock.
  The key is needed only if your system includes a bezel.
• Phillips #1 screwdriver
• Phillips #2 screwdriver
• Torx #T6, #T8, #T10, and #T15 screwdrivers
• Wrist grounding strap
You need the following tools to assemble the cables for a DC power supply unit.
• AMP 90871-1 hand-crimping tool or equivalent
• Tyco Electronics 58433-3 or equivalent
Wire-stripper pliers to remove insulation from size 10 AWG solid or stranded, insulated copper wire.

**NOTE:** Use alpha wire part number 3080 or equivalent (65/30 stranding).

**Front bezel (optional)**

The front bezel is attached to the front side of the system and prevents accidents while removing the hard drive or when pressing the reset or power button. The front bezel can also be locked for additional security.

**Removing the optional front bezel**

**Prerequisites**

Follow the safety guidelines listed in the Safety instructions section.

**Steps**

1. Locate and remove the bezel key.

   **NOTE:** The bezel key is attached to the back of the bezel.

2. Unlock the bezel by using the key.
3. Slide the release latch up, and pull the left end of the bezel.
4. Unhook the right end, and remove the bezel.

![Figure 14. Removing the optional front bezel](image)

- a. release latch
- b. bezel lock
- c. front bezel
Installing the optional front bezel

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

Steps
1. Locate and remove the bezel key.
   
   | NOTE: The bezel key is attached to the back of the bezel. |

2. Hook the right end of the bezel onto the chassis.
3. Fit the free end of the bezel onto the system.
4. Lock the bezel by using the key.
Figure 16. Installing the optional front bezel
a. bezel lock
b. front bezel

Figure 17. Installing the Quick Sync bezel
a. bezel lock
b. Quick Sync bezel
System cover

The system cover protects the components inside the system and helps in maintaining air flow inside the system. Removing the system cover activates the intrusion switch.

Removing the system cover

Prerequisites

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. If installed, remove the optional bezel.

Steps

1. Rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch toward the back of the system.
   The system cover slides back and the tabs on the system cover disengage from the slots on the chassis.
   
   **NOTE:** The position of the latch may vary depending on the configuration of your system.

3. Hold the cover on both sides, and lift the cover away from the system.

   ![Figure 18. Removing the system cover](image)

   a. system cover
   b. latch
   c. latch release lock

Next steps

1. Install the system cover.
Installing the system cover

Prerequisites
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. Ensure that all internal cables are connected and placed out of the way, and no tools or extra parts are left inside the system.

Steps
1. Align the slots on the system cover with the tabs on the chassis.
2. Push the system cover latch down.
   The system cover slides forward and the slots on the system cover engage with the tabs on the chassis. The system cover latch locks into place when the system cover is completely engaged with the tabs on the chassis.
3. Rotate the latch release lock clockwise to the locked position.

Next steps
1. If removed, install the front bezel.
2. Reconnect the peripherals and connect the system to the electrical outlet.
3. Turn on the system, including any attached peripherals.
4. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Installing the optional front bezel on page 68

Inside the system

Figure 20. Inside the system

1. cooling fan in the cooling fan assembly (6)
2. processor (2)
3. DIMMs (24)
4. internal USB port
5. hard drive backplane (back)
6. vFlash media slot
7. hard drive (2) (back)
8. power supply unit (2)
9. expansion card riser 3
10. network daughter card
11. expansion card riser 2
12. expansion card riser 1
13. hard drive backplane
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.

**NOTE:** Systems that support the internal hard drive tray require low-profile heat sinks and do not require or support a cooling shroud.

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.

⚠️ **CAUTION:** Never operate your system with the air shroud removed. The system may get overheated quickly, resulting in shutdown of the system and loss of data.

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 full-length PCIe card.

**Steps**

Holding the touch points, lift the cooling shroud away from the system.

![Figure 21. Removing the cooling shroud](image)

- **a.** cooling shroud
- **b.** touch point (2)

**Next steps**

1. Install the cooling shroud.
2. If required, install the full-length PCIe card.
3. Follow the procedure listed in the After working inside your system section.

**Related References**

- [Safety instructions](#) on page 65
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.
3. If applicable, route the cables inside the system along the chassis wall and secure the cables by using the cable-securing bracket.

Steps

1. Align the tabs on the cooling shroud with the securing slots on the chassis.
2. Lower the cooling shroud into the chassis until it is firmly seated.

Next steps

1. If removed, install the full-length PCIe card.
2. Follow the procedure listed in the After working inside your system section.

Related References

Safety instructions on page 65

Related tasks

Before working inside your system on page 66
Installing an expansion card into the expansion card riser 2 or 3 on page 115
Installing the cooling shroud on page 74
Installing an expansion card into the expansion card riser 1 on page 119
Hard drive tray assembly

The hard drive tray is located behind the cooling fan assembly. It supports four 3.5 inch hard drives.

**NOTE:** The hard drive tray is supported only on certain configurations of the 3.5 inch (x12) systems.

**NOTE:** Systems that support the internal hard drive tray require low-profile heat sinks and do not require or support a cooling shroud.

Removing the hard drive 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.

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

⚠️ **CAUTION:** The hard drive tray is hot to touch for some time after the system has been powered down. Allow time for the hard drive tray to cool before handling it.

**Steps**

1. Disconnect the SAS, power, and signal cables from the hard drive backplane.
2. Lift the hard drive tray handles 90 degrees upward.
3. Hold the hard drive tray handles and lift the hard drive tray out of the chassis.

**Figure 23. Removing the hard drive tray**

1. hard drive tray handle (2)
2. hard drive (4)
3. hard drive indicator
4. SAS cable
5. backplane signal cable
6. backplane power cable
7. guide pin on the chassis (4)
Next steps
1. Install the hard drive tray. See the Installing the hard drive tray section.
2. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Installing the hard drive tray on page 76
After working inside your system on page 66

Installing the hard drive tray

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

**NOTE:** Systems that support the internal hard drive tray support low-profile heat sinks and do not support a cooling shroud.

Steps
1. Lift the hard drive tray handles to the 90-degree angle position.
2. Hold the hard drive tray handles and align the slots on the hard drive tray with the guide pins on the chassis.
3. Slide the hard drive tray into the chassis.
4. Lower the hard drive tray handles to lock the hard drive tray in place.
5. Connect the SAS, power, and signal cables to the backplane.

![Figure 24. Installing the hard drive tray](image)

1. hard drive tray handle (2)
2. hard drive (4)
3. hard drive indicator
4. SAS cable
5. backplane signal cable
6. backplane power cable
7. guide pin on the chassis (4)
Removing a hard drive blank from a hard drive carrier

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

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 slots must have hard drive blanks installed.

Steps
1. Push out at the edges of the carrier to disengage the tabs on the hard drive carrier from the slots on the hard drive blank.
2. Lift the hard drive carrier away from the hard drive blank.

Figure 25. Removing the hard drive blank from a hard drive carrier
- a. hard drive blank
- b. tab on the hard drive carrier (4)
- c. hard drive carrier

Next steps
Follow the procedure listed in the After working inside your system section.
Installing a hard drive blank 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. Follow the procedure listed in the Before working inside your system section.

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

Steps

1. Align the tabs on the hard drive carrier with the slots on the hard drive blank.
2. Pull the edges of the carrier to fit over the hard drive blank.
3. Lower the hard drive carrier onto the hard drive blank to secure it.

![Figure 26. Installing a hard drive blank into a hard drive carrier](image)

- **a.** hard drive blank
- **b.** tab on the hard drive carrier (4)
- **c.** hard drive carrier

Next steps

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

Related References

Safety instructions on page 65
Removing a hard drive carrier from the hard drive 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 came with the 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. From the management software, prepare the hard drive for removal. Wait until the indicators on the hard drive carrier signal that the hard drive can be removed safely. For more information, see the documentation for the storage controller at Dell.com/storagecontrollermanuals.

If the hard drive is online, the green activity/fault indicator flashes as the drive is turned off. When the hard drive indicators are off, the hard drive is ready for removal.

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

Steps

1. Lift the hard drive carrier handle upward.
2. Press the release tab on the hard drive tray and lift the hard drive carrier handle upward to disengage the hard drive from the backplane.
3. Hold the hard drive carrier handle and lift the hard drive carrier out of the hard drive tray.

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

4. If you are not replacing the hard drive immediately, insert a hard drive blank in the empty hard drive slot.

⚠️ NOTE: Install the hard drive blanks in the hard drive carrier before installing the hard drive carrier into the hard drive tray.

Figure 27. Removing a hard drive carrier from the hard drive tray

a. release tab on the hard drive tray
Installing a hard drive carrier into the hard drive 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.

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

⚠️ CAUTION: Use only hard drives that have been tested and approved for use with the hard drive backplane.

⚠️ CAUTION: When installing a hard drive, 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-swap drive installation. See the documentation supplied with your operating system.

⚠️ CAUTION: When a replacement hot swappable drive is installed and the system is powered on, the drive automatically begins to rebuild. Ensure that the replacement drive is blank or contains data that you wish to overwrite. Any data on the replacement drive is immediately lost after the drive is installed.

Steps

1. Lift the hard carrier handle.
2. If a hard drive blank is installed in the hard drive slot, remove it.
3. Insert the hard drive carrier into the hard drive tray.
4. Lower the hard drive carrier handle to engage the hard drive to the connector on the backplane and lock the hard drive in place.
Installing a hard drive carrier into the hard drive tray

a. release tab on the hard drive tray
b. hard drive carrier handle
c. hard drive carrier

Related References
Safety instructions on page 65

Related tasks
Removing a hard drive blank from a hard drive carrier on page 77
Before working inside your system on page 66

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.

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

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

Steps

1. Push out at the edges of the carrier to disengage the tabs on the hard drive carrier from the slots on the hard drive.
2. Lift the hard drive carrier away from the hard drive.
Figure 29. Removing the hard drive from a hard drive carrier

a. hard drive
b. tab on the hard drive carrier (4)
c. hard drive carrier

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

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
After working inside your system on page 66

Installing a hard drive into a hard drive carrier

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

⚠️ 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. Align the tabs on the hard drive carrier with the slots on the hard drive.
2. Pull the edges of the carrier to fit over the hard drive.
3. Lower the hard drive carrier onto the hard drive to secure it.
Figure 30. Installing a hard drive into a hard drive carrier

- a. hard drive
- b. tab on the hard drive carrier (4)
- c. hard drive carrier

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

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
After working inside your system on page 66

Removing the hard drive backplane from the hard drive 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.

⚠️ 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.

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 all the cables from the backplane.
4. Remove all the hard drive carriers.
5. Remove the hard drive tray from the system.
Steps
Press the release tabs and lift the backplane out of the hard drive tray.

Figure 31. Removing the 3.5 inch (x4) hard drive backplane
1. release tab (2) 2. hard drive indicators
3. hard drive connector (4) 4. guide pin
5. hard drive backplane

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing a hard drive carrier from the hard drive tray on page 79
Removing the hard drive tray on page 75

Installing the hard drive backplane in the hard drive tray

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

⚠️ **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
Align the hard drive backplane with the guide pin on the chassis and lower the hard drive backplane on the chassis until it is firmly seated.

Next steps
1. Install the hard drives carriers into the hard drive tray.
2. Install the hard drive tray into the chassis.
3. Follow the procedure listed in the After working inside your system section.
Cooling fans

Your system supports six hot-swappable cooling fans.

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

Removing a cooling fan

Prerequisites

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

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

NOTE: The procedure for removing each fan is identical.

Steps

Press the fan release tab and lift the cooling fan out of the cooling fan assembly.
Figure 32. Removing a cooling fan
1. cooling fan assembly
2. cooling fan connector (6)
3. fan release tab (6)
4. cooling fan (6)
5. cooling fan connector on the system board (6)

Next steps
1. Install the cooling fan.
2. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Installing a cooling fan on page 86
After working inside your system on page 66

Installing a cooling fan

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

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

Steps
1. Align the connector at the base of the cooling fan with the connector on the system board.
2. Slide the cooling fan into the securing slot until the tab locks into place.

Next steps
Follow the procedure listed in the After working inside your system section.
Cooling fan assembly

The cooling fan assembly ensures that the key components of the server such as the processors, hard drives, and memory get adequate air circulation to keep them cool. A failure in the server’s cooling system can result in the server overheating and may lead to damage.

Removing the cooling fan assembly

Prerequisites

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

⚠️ 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. Unlock the cooling fan assembly from the chassis by lifting the release levers.
2. Lift the cooling fan assembly out of the chassis.

Figure 33. Removing the cooling fan assembly

1. cooling fan assembly
2. cooling fan (6)
3. release lever (2)
4. guide pin on the system board (2)
Next steps

1. Install the cooling fan assembly.
2. Follow the procedure listed in the After working inside your system section.

Related References

Safety instructions on page 65

Related tasks

Before working inside your system on page 66
Installing the cooling fan assembly on page 88
After working inside your system on page 66

Installing the cooling fan assembly

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

⚠️ CAUTION: Ensure that the cables are correctly installed and retained by the cable retention bracket before installing the cooling fan assembly. Incorrectly installed cables may get damaged.

Steps

1. Align the slots on the cooling fan assembly with the guide pins on the chassis.
2. Slide the cooling fan assembly into the chassis.
3. Lock the cooling fan assembly into the chassis by lowering the release levers until firmly seated.
Figure 34. Installing the cooling fan assembly

1. cooling fan assembly
2. cooling fan (6)
3. release lever (2)
4. guide pin on the system board (2)
5. cooling fan connector (6)
6. guide pin on the chassis (6)

Next steps

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

Related References

Safety instructions on page 65

Related tasks

Before working inside your system on page 66
After working inside your system on page 66

System memory

The system supports DDR4 registered DIMMs (RDIMMs) and load reduced DIMMs (LRDIMMs). System memory holds the instructions that are executed by the processor.

**NOTE:** MT/s indicates DIMM speed in MegaTransfers per second.

Memory bus operating frequency can be 1866 MT/s, 2133 MT/s, or 2400 MT/s depending on the following factors:
- DIMM type (RDIMM or LRDIMM)
- Number of DIMMs populated per channel
- System profile selected (for example, Performance Optimized, Custom, or Dense Configuration Optimized)
- Maximum supported DIMM frequency of the processors

Your system contains 24 memory sockets split into two sets of 12 sockets, one set per processor. Each 12-socket set is organized into four channels. In each channel, the release tabs of the first socket are marked white, the second socket black, and the third socket green.
Figure 35. Memory socket locations

Memory channels are organized as follows:

**Table 35. Memory channels**

<table>
<thead>
<tr>
<th>Processor</th>
<th>Channel 0</th>
<th>Channel 1</th>
<th>Channel 2</th>
<th>Channel 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor 1</td>
<td>Slots A1, A5, and A9</td>
<td>Slots A2, A6, and A10</td>
<td>Slots A3, A7, and A11</td>
<td>Slots A4, A8, and A12</td>
</tr>
<tr>
<td>Processor 2</td>
<td>Slots B1, B5, and B9</td>
<td>Slots B2, B6, and B10</td>
<td>Slots B3, B7, and B11</td>
<td>Slots B4, B8, and B12</td>
</tr>
</tbody>
</table>

The following table shows the memory populations and operating frequencies for the supported configurations:

**Table 36. Memory population**

<table>
<thead>
<tr>
<th>DIMM Type</th>
<th>DIMMs Populated/Channel</th>
<th>Voltage</th>
<th>Operating Frequency (in MT/s)</th>
<th>Maximum DIMM Rank/Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDIMM</td>
<td>1</td>
<td>1.2 V</td>
<td>2400, 2133, 1866</td>
<td>Dual rank or single rank</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1.2 V</td>
<td>2400, 2133, 1866</td>
<td>Dual rank or single rank</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>1866</td>
<td>Dual rank or single rank</td>
</tr>
<tr>
<td>LRDIMM</td>
<td>1</td>
<td>1.2 V</td>
<td>2400, 2133, 1866</td>
<td>Quad rank</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1.2 V</td>
<td>2400, 2133, 1866</td>
<td>Quad rank</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>2133, 1866</td>
<td>Quad rank</td>
</tr>
</tbody>
</table>
General memory module installation guidelines

**NOTE:** Memory configurations that fail to observe these guidelines can prevent your system from booting, stop responding during memory configuration, or operating with reduced memory.

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

- RDIMMs and LRDIMMs must not be mixed.
- x4 and x8 DRAM based memory modules can be mixed. For more information, see the Mode-specific guidelines section.
- Up to three dual- or single-rank RDIMMs can be populated per channel.
- Up to three LRDIMMs can be populated per channel regardless of rank count.
- If memory modules with different speeds are installed, they will operate at the speed of the slowest installed memory module(s) or slower depending on system D1MM configuration.
- Populate memory module sockets only if a processor is installed. For single-processor systems, sockets A1 to A12 are available. For dual-processor systems, sockets A1 to A12 and sockets B1 to B12 are available.
- Populate all the sockets with white release tabs first, followed by the black release tabs, and then the green release tabs.
- When mixing memory modules with different capacities, populate the sockets with memory modules with highest capacity first. For example, if you want to mix 4 GB and 8 GB memory modules, populate 8 GB memory modules in the sockets with white release tabs and 4 GB memory modules in the sockets with black release tabs.
- In a dual-processor configuration, the memory configuration for each processor should be identical. For example, if you populate socket A1 for processor 1, then populate socket B1 for processor 2, and so on.
- Memory modules of different capacities can be mixed provided other memory population rules are followed (for example, 4 GB and 8 GB memory modules can be mixed).
- Mixing of more than two memory module capacities in a system is not supported.
- Populate four memory modules per processor (one DIMM per channel) at a time to maximize performance.

Mode-specific guidelines

Four memory channels are allocated to each processor. The allowable configurations depend on the memory mode selected.

**Advanced Error Correction Code**

Advanced Error Correction Code (ECC) mode extends SDDC from x4 DRAM based DIMMs to both x4 and x8 DRAMs. This protects against single DRAM chip failures during normal operation.

The installation guidelines for memory modules are as follows:

- Memory modules must be identical in size, speed, and technology.
- DIMMs installed in memory sockets with white release levers must be identical and the same rule applies for sockets with black release levers. This ensures that identical DIMMs are installed in matched pair —for example, A1 with A2, A3 with A4, A5 with A6, and so on.

**Memory optimized independent channel mode**

This mode supports Single Device Data Correction (SDDC) only for memory modules that use x4 device width. It does not impose any specific slot population requirements.

**Memory sparing**

**NOTE:** To use memory sparing, this feature must be enabled in System Setup.

In this mode, one rank per channel is reserved as a spare. If persistent correctable errors are detected on a rank, the data from this rank is copied to the spare rank, and the failed rank is disabled.

With memory sparing enabled, the system memory available to the operating system is reduced by one rank per channel. For example, in a dual-processor configuration with sixteen 4 GB single-rank memory modules, the available system memory is: 3/4 (ranks/channel) × 16 (memory modules) × 4 GB = 48 GB, and not 16 (memory modules) × 4 GB = 64 GB.

**NOTE:** Memory sparing does not offer protection against a multi-bit uncorrectable error.

**NOTE:** Both Advanced ECC/Lockstep and Optimizer modes support memory sparing.
Memory mirroring

Memory mirroring offers the strongest memory module reliability mode compared to all other modes, providing improved uncorrectable multi-bit failure protection. In a mirrored configuration, the total available system memory is one half of the total installed physical memory. Half of the installed memory is used to mirror the active memory modules. In the event of an uncorrectable error, the system switches over to the mirrored copy. This ensures SDDC and multi-bit protection.

The installation guidelines for memory modules are as follows:
- Memory modules must be identical in size, speed, and technology.
- Memory modules installed in memory module sockets with white release levers must be identical and the same rule applies for sockets with black and green release tabs. This ensures that identical memory modules are installed in matched pairs—for example, A1 with A2, A3 with A4, A5 with A6, and so on.

Table 37. Processor configuration

<table>
<thead>
<tr>
<th>Processor</th>
<th>Configuration</th>
<th>Memory population rules</th>
<th>Memory population information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single CPU</td>
<td>Memory population order</td>
<td>{1,2}, {3,4}</td>
<td>See Memory mirroring note</td>
</tr>
</tbody>
</table>

Sample memory configurations

The following tables show sample memory configurations for one and two processor configurations that follow the appropriate memory guidelines.

**NOTE:** 1 R, 2 R, 4 R and 8 R in the following tables indicate single, dual, and quad-rank DIMMs respectively.

Table 38. Memory configurations—single processor

<table>
<thead>
<tr>
<th>System capacity—in GB</th>
<th>DIMM size—in GB</th>
<th>Number of DIMMs</th>
<th>DIMM rank, organization, and frequency</th>
<th>DIMM slot population</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4</td>
<td>1</td>
<td>1 R, x8, 2400 MT/s 1 R, x8, 2133 MT/s</td>
<td>A1</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>2</td>
<td>1 R, x8, 2400 MT/s 1 R, x8, 2133 MT/s</td>
<td>A1, A2</td>
</tr>
<tr>
<td>16</td>
<td>4</td>
<td>4</td>
<td>1 R, x8, 2400 MT/s 1 R, x8, 2133 MT/s</td>
<td>A1, A2, A3, A4</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>2</td>
<td>1 R, x8, 2400 MT/s 1 R, x8, 2133 MT/s</td>
<td>A1, A2</td>
</tr>
<tr>
<td>24</td>
<td>4</td>
<td>6</td>
<td>1 R, x8, 2400 MT/s 1 R, x8, 2133 MT/s</td>
<td>A1, A2, A3, A4, A5, A6</td>
</tr>
<tr>
<td>48</td>
<td>4</td>
<td>12</td>
<td>1 R, x8, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>6</td>
<td>1 R, x8, 2400 MT/s 1 R, x8, 2133 MT/s</td>
<td>A1, A2, A3, A4, A5, A6</td>
</tr>
<tr>
<td>96</td>
<td>8</td>
<td>12</td>
<td>1 R, x8, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12</td>
</tr>
<tr>
<td>16</td>
<td>6</td>
<td>6</td>
<td>2 R, x8, 2400 MT/s 2 R, x8, 2133 MT/s</td>
<td>A1, A2, A3, A4, A5, A6</td>
</tr>
<tr>
<td>128</td>
<td>16</td>
<td>8</td>
<td>2 R, x8, 2400 MT/s 2 R, x8, 2133 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8</td>
</tr>
</tbody>
</table>
### Table 38. Memory configurations—single processor (continued)

<table>
<thead>
<tr>
<th>System capacity—in GB</th>
<th>DIMM size—in GB</th>
<th>Number of DIMMs</th>
<th>DIMM rank, organization, and frequency</th>
<th>DIMM slot population</th>
</tr>
</thead>
<tbody>
<tr>
<td>144</td>
<td>8</td>
<td>10</td>
<td>1 R, x8, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A11*</td>
</tr>
<tr>
<td>16</td>
<td>10</td>
<td></td>
<td>2 R, x8, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A11*</td>
</tr>
<tr>
<td>256</td>
<td>32</td>
<td>8</td>
<td>2 R, x4, 2400 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 R, x4, 2133 MT/s</td>
<td></td>
</tr>
<tr>
<td>384</td>
<td>32</td>
<td>12</td>
<td>2 R, x4, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12</td>
</tr>
<tr>
<td>512</td>
<td>64</td>
<td>8</td>
<td>4 R, x4, 2133 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8</td>
</tr>
<tr>
<td>768</td>
<td>64</td>
<td>12</td>
<td>4 R, x4, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12</td>
</tr>
<tr>
<td>1536</td>
<td>128</td>
<td>12</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12</td>
<td></td>
</tr>
</tbody>
</table>

* 16 GB DIMMs must be installed in slots numbered A1, A2, A3, A4, A5, A6, A7, and A8 and 8 GB DIMMs must be installed in slots A9 and A11.

**NOTE:** If all 3 slots in the channel are populated with 128 GB LRDIMMs, the clock speed drops to 2133MHz.

### Table 39. Memory configurations—2 processors

<table>
<thead>
<tr>
<th>System capacity—in GB</th>
<th>DIMM size—in GB</th>
<th>Number of DIMMs</th>
<th>DIMM rank, organization, and frequency</th>
<th>DIMM slot population</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>4</td>
<td>4</td>
<td>1 R, x8, 2400 MT/s</td>
<td>A1, A2, B1, B2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 R, x8, 2133 MT/s</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>4</td>
<td>8</td>
<td>1 R, x8, 2400 MT/s</td>
<td>A1, A2, A3, A4, B1, B2, B3, B4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 R, x8, 2133 MT/s</td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>4</td>
<td>16</td>
<td>1 R, x8, 2400 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 R, x8, 2133 MT/s</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>8</td>
<td>1 R, x8, 2400 MT/s</td>
<td>A1, A2, A3, A4, B1, B2, B3, B4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 R, x8, 2133 MT/s</td>
<td></td>
</tr>
<tr>
<td>96</td>
<td>4</td>
<td>24</td>
<td>1 R, x8, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>12</td>
<td>1 R, x8, 2400 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 R, x8, 2133 MT/s</td>
<td></td>
</tr>
<tr>
<td>128</td>
<td>8</td>
<td>16</td>
<td>1 R, x8, 2400 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 R, x8, 2133 MT/s</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>8</td>
<td>8</td>
<td>2 R, x8, 2400 MT/s</td>
<td>A1, A2, A3, A4, B1, B2, B3, B4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 R, x8, 2133 MT/s</td>
<td></td>
</tr>
</tbody>
</table>
Table 39. Memory configurations—2 processors (continued)

<table>
<thead>
<tr>
<th>System capacity— in GB</th>
<th>DIMM size —in GB</th>
<th>Number of DIMMs</th>
<th>DIMM rank, organization, and frequency</th>
<th>DIMM slot population</th>
</tr>
</thead>
<tbody>
<tr>
<td>160</td>
<td>8</td>
<td>20</td>
<td>1 R, x8, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12</td>
</tr>
<tr>
<td>192</td>
<td>8</td>
<td>24</td>
<td>1 R, x8, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12</td>
</tr>
<tr>
<td>16</td>
<td>12</td>
<td></td>
<td>2 R, x8, 2400 MT/s, 2 R, x8, 2133 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6</td>
</tr>
<tr>
<td>256</td>
<td>16</td>
<td></td>
<td>2 R, x8, 2400 MT/s, 2 R, x8, 2133 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8</td>
</tr>
<tr>
<td>384</td>
<td>16</td>
<td>24</td>
<td>2 R, x8, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12</td>
</tr>
<tr>
<td>32</td>
<td>12</td>
<td></td>
<td>2 R, x4, 2400 MT/s, 2 R, x4, 2133 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6</td>
</tr>
<tr>
<td>512</td>
<td>32</td>
<td>16</td>
<td>2 R, x4, 2400 MT/s, 2 R, x4, 2133 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, B1, B2, B3, B4, B5, B6, B7, B8</td>
</tr>
<tr>
<td>64</td>
<td>8</td>
<td></td>
<td>4 R, x4, 2400 MT/s, 4 R, x4, 2133 MT/s</td>
<td>A1, A2, A3, A4, B1, B2, B3, B4</td>
</tr>
<tr>
<td>768</td>
<td>32</td>
<td>24</td>
<td>2 R, x4, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12</td>
</tr>
<tr>
<td>1024</td>
<td>64</td>
<td>16</td>
<td>4 R, x4, 2133 MT/s, 4 R, x4, 2400 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8</td>
</tr>
<tr>
<td>1536</td>
<td>64</td>
<td>24</td>
<td>4 R, x4, 1866 MT/s</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12</td>
</tr>
<tr>
<td>3072</td>
<td>128</td>
<td>24</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12</td>
<td></td>
</tr>
</tbody>
</table>

* 16 GB DIMMs must be installed in slots numbered A1, A2, A3, A4, B1, B2, B3, and B4 and 8 GB DIMMs must be installed in slots A5, A6, B5, and B6.

**NOTE:** If all 3 slots in the channel are populated with 128 GB LRDIMMs, the clock speed drops to 2133MHz.

Removing memory modules

**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 cooling shroud.
4. If installed, remove the cooling fan assembly.

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

**CAUTION:** To ensure proper system cooling, memory module blanks must be installed in any memory socket that is not occupied. Remove memory module blanks only if you intend to install memory modules in those sockets.

**Steps**

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

2. To release the memory module from the socket, simultaneously press the ejectors on both ends of the memory module socket.
3. Lift and remove the memory module from the system.

![Figure 36. Removing the memory module](image)

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

**Next steps**

1. Install the memory module.

   **NOTE:** If you are removing the memory module permanently, install a memory module blank.

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

**Related References**

- Safety instructions on page 65

**Related tasks**

- Before working inside your system on page 66
Installing memory modules

Prerequisites

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

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. Removing the cooling fan assembly.
4. Remove the cooling shroud.

Steps

1. Locate the appropriate memory module socket.

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

2. Open the ejectors on the memory module socket outward to allow the memory module to be inserted into the socket.
3. Align the edge connector of the memory module with the alignment key of the memory module socket, and insert the memory module in the socket.

   CAUTION: Do not apply pressure at the center of the memory module; apply pressure at both ends of the memory module evenly.

   NOTE: The memory module socket has an alignment key that enables you to install the memory module in the socket in only one orientation.

4. Press the memory module with your thumbs until the socket levers firmly click into place.

   When the memory module is properly seated in the socket, the levers on the memory module socket align with the levers on the other sockets that have memory modules installed.
Figure 37. Installing the memory module

- memory module
- alignment key
- 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. Press F2 to enter System Setup, and check the System Memory setting.
   - The system should have already changed the value to reflect the installed memory.
4. If the value is incorrect, one or more of the memory modules may not be installed properly. Ensure that the memory module is firmly seated in the memory module socket.
5. Run the system memory test in system diagnostics.

Related References

- Safety instructions on page 65

Related tasks

- Before working inside your system on page 66
- Removing the cooling shroud on page 73
- Removing the cooling fan assembly on page 87
- After working inside your system on page 66

Processors and heat sinks

Use the following procedures when:

- Removing and installing a heat sink
- Installing an additional processor
- Replacing a processor

**NOTE:** To ensure proper cooling, you must install a processor blank in any empty processor socket.
Removing a heat sink

Prerequisites

⚠️ **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.

⚠️ **WARNING:** The heat sink is hot to touch. Allow the heat sink to cool for some time after powering down the system.

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 full-length PCIe card(s).
4. Remove the cooling shroud.
5. Keep the Phillips #2 screwdriver ready.

Steps

1. Loosen one of the screws that secure the heat sink to the system board.
   Allow some time (approximately 30 seconds) for the heat sink to loosen from the processor.
2. Remove the screw diagonally opposite to the screw that you first removed.
3. Repeat step 1 and 2 for removing the remaining two screws.
4. Remove the heat sink.

![Figure 38. Removing a heat sink](image)

1. retention screw (4)
2. heat sink
3. processor shield
4. retention screw slot (4)

Next steps

1. Replace the heat sink(s) and processor(s).
2. Replace the processor and heat sink.
3. Follow the procedure listed in the After working inside your system section.

Related References

- Safety instructions on page 65

Related tasks

- Before working inside your system on page 66
- Removing an expansion card from expansion card riser 2 or 3 on page 115
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.

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

NOTE: If you are upgrading your system, download the latest system BIOS version from Dell.com/support and follow the instructions included in the compressed download file to install the update on your system.

NOTE: You can update the system BIOS by using the Dell Lifecycle Controller.

NOTE: To ensure proper system cooling, you must install a processor blank in any empty processor socket.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
4. If installed, remove the full-length PCIe card(s).
5. Remove the cooling shroud.

WARNING: The processor is hot to touch for some time after the system has been powered down. Allow the processor to cool before removing it.

⚠️ CAUTION: The processor is held in its socket under strong pressure. Be aware that the release lever can spring up suddenly if not firmly grasped.

Steps

1. Release the open first socket lever near the unlock icon by pushing the lever down and out from under the tab.
2. Release the close first socket release lever near the lock icon by pushing the lever down and out from under the tab. Lift the lever 90 degrees upward.
3. Lower the open first socket-release lever to lift the processor shield.
4. Hold the tab on the processor shield and lift the processor shield until the open first socket-release lever lifts up.

⚠️ CAUTION: The socket pins are fragile and can be permanently damaged. Be careful not to bend the pins in the socket when removing the processor out of the socket.

5. Lift the processor out of the socket and leave the open first socket-release lever up.

NOTE: If you are permanently removing the processor, you must install a socket protective cap in the vacant socket to protect the socket pins and keep the socket free of dust.

NOTE: After removing the processor, place it in an anti-static container for reuse, return, or temporary storage. Do not touch the bottom of the processor. Touch only the side edges of the processor.
Figure 39. Processor shield

1. close first socket release lever
2. lock icon
3. processor
4. open first socket release lever
5. unlock icon
Figure 40. Removing a processor

1. close first socket-release lever
2. pin-1 indicator of processor
3. processor
4. slot (4)
5. processor shield
6. open first socket-release lever
7. socket
8. socket keys (4)

Next steps
1. Replace the processor(s).
2. Install the heat sink.
3. Reinstall the cooling shroud.
4. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing an expansion card from expansion card riser 2 or 3 on page 115
Removing the cooling shroud on page 73
Removing a heat sink on page 98
Installing a processor on page 102
Installing a heat sink on page 104
Installing the cooling shroud on page 74
Installing an expansion card into the expansion card riser 2 or 3 on page 116
After working inside your system on page 66
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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
4. If you are upgrading your system, download the latest system BIOS version from Dell.com/support and follow the instructions included in the compressed download file to install the update on your system.
   🔄 NOTE: You can also update the system BIOS by using the Dell Lifecycle Controller.
5. Remove the cooling shroud.
   🔄 NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
6. If connected, disconnect the cables from expansion card(s).
7. If installed, remove the expansion card riser.
   🔄 NOTE: The heat sink and processor are too hot to touch for some time after the system has been powered down. Allow the heat sink and processor to cool down before handling them.
   ⚠️ 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.
   🔄 NOTE: If you are installing a single processor, it must be installed in socket CPU1.

Steps

1. Unpack the new processor.
   🔄 NOTE: If the processor has previously been used in a system, remove any remaining thermal grease from the processor by using a lint-free cloth.
2. Locate the processor socket.
3. If applicable, remove the socket protective cap.
4. Release the open first socket-release lever near the unlock icon by pushing the lever down and out from under the tab.
5. Similarly, release the close first socket-release lever near the lock icon by pushing the lever down and out from under the tab. Lift the lever 90 degrees upward.
6. Hold the tab near the lock symbol on the processor shield and lift it up and out of the way.
   ⚠️ CAUTION: Positioning the processor incorrectly can permanently damage the system board or the processor. Be careful not to bend the pins in the socket.
   ⚠️ CAUTION: While removing or reinstalling the processor, wipe your hands of any contaminants. Contaminants on the processor pins such as thermal grease or oil can damage the processor.
7. Align the processor with the socket keys.
   ⚠️ CAUTION: Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.
8. Align the pin-1 indicator of the processor with the triangle on the system board.
9. Place the processor on the socket such that the slots on the processor align with the socket keys.
10. Close the processor shield.
11. Lower the close first socket-release lever near the lock icon and push it under the tab to lock it.
12. Similarly, lower the open first socket-release lever near the unlock icon and push it under the tab to lock it.

**Figure 41. Installing a processor**

1. socket-release lever 1  
2. pin−1 corner of the processor  
3. processor  
4. slot (4)  
5. processor shield  
6. socket-release lever 2  
7. processor socket  
8. tab (4)

**Next steps**

**NOTE:** Ensure that you install the heat sink after you install the processor. The heat sink is necessary to maintain proper thermal conditions.

1. Install the heat sink.
2. If removed, reinstall the PCIe expansion card riser.
3. If disconnected, reconnect the cables to the expansion card(s).
4. Follow the procedure listed in the After working inside your system.
5. While booting, press F2 to enter System Setup and verify that the processor information matches the new system configuration.
6. Run the system diagnostics to verify that the new processor operates correctly.

**Related References**

Safety instructions on page 65

**Related tasks**

Before working inside your system on page 66  
Removing an expansion card from expansion card riser 2 or 3 on page 115  
Removing an expansion card from the expansion card riser 1 on page 118  
Removing the cooling shroud on page 73  
Removing a heat sink on page 98
Installing a 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.

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 cooling shroud.
4. Install the processor.
5. Keep the Phillips #2 screwdriver ready.

Steps

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

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

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

Figure 42. Applying thermal grease on the top of the processor

a. processor
b. thermal grease
c. thermal grease syringe

3. Place the heat sink onto the processor.
4. Tighten one of the four screws to secure the heat sink to the system board.
5. Repeat the procedure for the remaining two screws.

![Figure 43. Installing the heat sink](image)

1. retention screw (4)  
2. heat sink  
3. processor shield  
4. retention screw slot (4)

Next steps
1. Follow the procedure listed in the After working inside your system section.
2. While booting, press F2 to enter System Setup and verify that the processor information matches the new system configuration.
3. Run the system diagnostics to verify that the new processor operates correctly.

## PCIe card holder

The PCIe card holder can be extended to support a full length PCIe card. This will prevent any damage to the card that may occur due to its length.

### Removing the PCIe card holder

**Prerequisites**
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 full-length PCIe card.

⚠️ **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 use your system without the PCIe card holder installed. The PCIe card holder is necessary to ensure proper system cooling.

**Steps**
1. Press the release tab and slide the card holder toward the back of the chassis to release the PCIe card holder from the chassis.
2. Lift the PCIe card holder out of the chassis.

**NOTE:** To ensure proper system cooling, you must replace the PCIe card holder.

![Figure 44. Removing the PCIe card holder](image)

- a. PCIe card holder
- b. release tab

**Next steps**

1. Replace the PCIe card holder.
2. If removed, install the full-length PCIe card.
3. Follow the procedure listed in the After working inside your system section.

**Related References**

- Safety instructions on page 65

**Related tasks**

- Before working inside your system on page 66
- Removing an expansion card from expansion card riser 2 or 3 on page 115
- Installing the PCIe card holder on page 106
- Installing an expansion card into the expansion card riser 2 or 3 on page 116
- After working inside your system on page 66

## Installing the PCIe card holder

**Prerequisites**

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

⚠️ **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 use your system without the PCIe card holder installed. The PCIe card holder is necessary to ensure proper system cooling.

**Steps**

1. Align the PCIe card holder with the notches and tabs on the power supply unit cage.
2. Press the release tab and slide the PCIe card holder toward the front of the chassis until firmly seated.
Figure 45. Installing the PCIe card holder

- PCIe card holder
- Release tab

Next steps
1. If applicable, replace the full-length PCIe card.
2. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Installing an expansion card into the expansion card riser 2 or 3 on page 116
After working inside your system on page 66

Opening and closing the PCIe card holder latch

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

⚠️ 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. To open the PCIe card holder latch, press the release tab.
2. To close the PCIe card holder latch, rotate the latch clockwise until it locks.

⚠️ NOTE: Before installing a full-length PCIe card, the PCIe card holder latch must be closed. When the full-length PCIe card is installed, open the PCIe card holder latch. Before removing the full-length PCIe card, you must close the PCIe card holder latch.
Next steps
Follow the procedure listed in the After working inside your system section.

Cable retention bracket
Cable retention bracket provides support to the installed cables. The cable retention bracket also helps to prevent the cables from moving out of place, which may result in loose connections and reduced air flow inside the server.

Removing the cable retention bracket

Prerequisites
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 cooling shroud.
4. Remove the PCIe card holder.
5. Remove all cables routed through the cable retention bracket.

⚠️ 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. Pull the tab to release it from the notch and slide the cable retention bracket toward the front of the chassis to release it from the chassis.
2. Lift the cable retention bracket out of the chassis.

![Image](image.png)

**Figure 48. Removing the cable retention bracket**
- a. alignment pin (2)
- b. tab
- c. cable retention bracket

Next steps
1. Install the cable retention bracket and reconnect all cables routed through the cable retention bracket.
2. If removed, install the PCIe card holder.
3. If removed, install the cooling shroud.
4. Follow the procedure listed in the After working inside your system section.

Related References
- Safety instructions on page 65

Related tasks
- Before working inside your system on page 66
- Removing the cooling shroud on page 73
- Removing the PCIe card holder on page 105
- Installing the cable retention bracket on page 109
- Installing the cooling shroud on page 74
- Installing the PCIe card holder on page 106
- After working inside your system on page 66

Installing the cable retention bracket

Prerequisites
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 cooling shroud.
4. Remove the PCIe card holder.

⚠️ **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.
Steps

1. Align the cable retention bracket with the alignment pins on the chassis.
2. Slide the cable retention bracket along the chassis wall until the tab clicks and locks the keyhole slots.
3. Place all cables to be routed in the cable retention bracket.

![Image of cable retention bracket installation](image)

**Figure 49. Installing the cable retention bracket**

1. alignment pin (2)  
2. keyhole slot  
3. tab  
4. cable retention bracket

Next steps

1. Install the PCIe card holder.
2. Install the cooling shroud.
3. Follow the procedure listed in the After working inside your system section.

Related References

- **Safety instructions** on page 65
- **Before working inside your system** on page 66
- **Removing the cooling shroud** on page 73
- **Removing the PCIe card holder** on page 105
- **Installing the cooling shroud** on page 74
- **Installing the PCIe card holder** on page 106
- **After working inside your system** on page 66

**Integrated storage controller card**

Your system includes a dedicated expansion card slot on the system board for an integrated storage controller card. The integrated storage controller card provides the integrated storage subsystem for the internal hard drives in your system. The controller supports SAS and SATA hard drives and also enables you to set up the hard drives in RAID configurations. The RAID configurations depend on the version of the storage controller included with your system. The controller supports SAS hard drives.
Removing the integrated storage controller 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.
3. Remove the cooling shroud.
4. Remove the expansion card riser 1.
5. Keep the Phillips #2 screwdriver ready.

Steps

1. Loosen the screws that secure the integrated storage controller cable to the integrated storage controller card connector on the system board.
2. Lift the integrated storage controller cable away from the integrated storage controller.
3. Lift one end of the card and angle it to disengage the card from the integrated storage controller card holder on the system board.
4. Lift the card out of the system.

![Image of removing the integrated storage controller card]

**Figure 50. Removing the integrated storage controller card**

1. integrated storage controller cable
2. integrated storage controller card
3. integrated storage controller card connector on the system board
4. integrated storage controller card holder

Next steps

1. Install the expansion card riser 1.
2. Install the cooling shroud.
3. Installing the integrated storage controller card.
4. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing the cooling shroud on page 73
Removing expansion card risers on page 125
Installing expansion card risers on page 128
Installing the cooling shroud on page 74
After working inside your system on page 66

Installing the integrated storage controller 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.
3. Remove the cooling shroud.
4. Remove the expansion card riser 1.
5. Keep the Phillips #2 screwdriver ready.

Steps
1. Align the end of the integrated storage controller card with the controller card connector on the system board.
2. Lower the connector side of the integrated storage controller card into the integrated storage controller card connector on the system board.
   ⚠️ NOTE: Ensure that the tabs on the system board align with the screw holes on the integrated storage controller card.
3. Align the screws on the integrated storage controller card cable with the screw holes on the connector.
4. Tighten the screws to secure the integrated storage controller card cable with the integrated storage controller card connector on the system board.
Figure 51. Installing the integrated storage controller card

1. integrated storage controller cable
2. integrated storage controller card
3. integrated storage controller card connector on the system board
4. integrated storage controller card holder

Next steps
1. Install the expansion card riser 1.
2. Install the cooling shroud.
3. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing the cooling shroud on page 73
Removing expansion card risers on page 125
Installing expansion card risers on page 128
Installing the cooling shroud on page 74
After working inside your system on page 66

Expansion cards and expansion card riser

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

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

Depending on your system configuration, the following PCI Express (PCIe) generation 3 expansion cards are supported:

Table 40. Supported expansion cards

<table>
<thead>
<tr>
<th>PCIe slot</th>
<th>Riser</th>
<th>Processor connection</th>
<th>Height</th>
<th>Length</th>
<th>Link width</th>
<th>Slot width</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Processor 2</td>
<td>Low Profile</td>
<td>Half Length</td>
<td>x8</td>
<td>x16</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Processor 2</td>
<td>Low Profile</td>
<td>Half Length</td>
<td>x8</td>
<td>x16</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Processor 2</td>
<td>Low Profile</td>
<td>Half Length</td>
<td>x8</td>
<td>x16</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>Processor 2</td>
<td>Full Height</td>
<td>Full Length</td>
<td>x16</td>
<td>x16</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>Processor 1</td>
<td>Full Height</td>
<td>Full Length</td>
<td>x8</td>
<td>x16</td>
</tr>
<tr>
<td>6</td>
<td>3 (alternate)</td>
<td>Processor 1</td>
<td>Full Height</td>
<td>Full Length</td>
<td>x16</td>
<td>x16</td>
</tr>
</tbody>
</table>

**NOTE:** To use PCIe slots 1 through 4 on the risers 1 and 2, both the processors must be installed.

**NOTE:** The expansion card slots are not hot-swappable.

The following table provides guidelines for installing expansion cards to ensure proper cooling and mechanical fit. The expansion cards with the highest priority should be installed first using the slot priority indicated. All the other expansion cards should be installed in the card priority and slot priority order.

Table 41. Expansion card installation order

<table>
<thead>
<tr>
<th>Card priority</th>
<th>Card type</th>
<th>Slot priority</th>
<th>Max allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PCIe Bridge</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>RAID H730P (low profile)</td>
<td>3, 2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>RAID H830</td>
<td>6, 4, 5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>RAID H830 (low profile)</td>
<td>3, 2</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>100G Intel Omni-Path Architecture (OPA) Host Channel Adapters (HCA)</td>
<td>4, 6</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>14 Gb InfiniBand, Fourteen Data Rate (FDR) HCA</td>
<td>3, 2, 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>40 Gb NICs (full height)</td>
<td>4, 6, 5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>40 Gb NICs (low profile)</td>
<td>3, 2, 1</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>FC16 HBA (full height)</td>
<td>4, 6, 5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>FC16 HBA (low profile)</td>
<td>2, 3, 1</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>10 Gb NICs (full height)</td>
<td>4, 6, 5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>10 Gb NICs (low profile)</td>
<td>2, 3, 1</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>FC8 HBA (full height)</td>
<td>4, 6, 5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>FC8 HBA (low profile)</td>
<td>2, 3, 1</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>1 Gb NICs (full height)</td>
<td>4, 6, 5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1 Gb NICs (low profile)</td>
<td>2, 3, 1</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>12 Gb SAS (low profile)</td>
<td>3, 2, 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>12 Gb SAS (full height)</td>
<td>6, 4, 5</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Integrated RAID</td>
<td>integrated slot</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>NDC</td>
<td>integrated slot</td>
<td>1</td>
</tr>
</tbody>
</table>
NOTE: Ensure that the 100 G OPA x16 card is installed in slot 6 (x16 PCIe) on the alternate riser 3.

Removing an expansion card from expansion card riser 2 or 3

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. When removing a card from riser 3, ensure that the PCIe holder latch is closed.

Steps

1. Disconnect any cables connected to the expansion card.
2. Lift the expansion card latch out of the guide slot.
3. Hold the expansion card by its edges, and remove it from the expansion card connector.
4. If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening and close the expansion card latch.

NOTE: You must install a filler bracket over an empty expansion card 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. The filler bracket is necessary to maintain proper thermal conditions.

5. Install the expansion card latch into the slot.
6. Close the expansion card locking tabs.
1. **expansion card**
2. **expansion card latch**
3. **expansion card riser**
4. **power connector (for GPU cards)**
5. **expansion card connector**

**Next steps**

1. Install an expansion card into the expansion card riser.
2. Follow the procedure listed in the After working inside your system section.

**Related References**

- Safety instructions on page 65

**Related tasks**

- Before working inside your system on page 66
- Installing an expansion card into the expansion card riser 2 or 3 on page 116
- After working inside your system on page 66

**Installing an expansion card into the expansion card riser 2 or 3**

**Prerequisites**

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

⚠️ **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.
Steps

1. Unpack the expansion card and prepare it for installation. For instructions, see the documentation accompanying the card.
2. Lift the expansion card latch and remove the filler bracket.
3. Holding the card by its edges, position the card so that the connector on the expansion card aligns with the expansion card connector on the riser.
4. Insert the card-edge connector firmly into the expansion card connector until the card is fully seated.
5. Press the touch points to open the expansion card locking tabs.
6. Close the expansion card latch.

7. If applicable, connect the cables to the expansion card.

Next steps

1. Follow the procedure listed in the After working inside your system section.
2. Install any device drivers required for the card as described in the documentation for the card.

Related References

Safety instructions on page 65
Removing an expansion card from the expansion card riser 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. Disconnect any cables connected to the expansion card.
4. Remove the expansion card riser.

**NOTE:** The expansion card riser 1 can be used only when both the processors are installed.

Steps

1. Press tab A and rotate the latch clockwise.
2. Press tab B and rotate the latch downward.
3. Remove the expansion card from the expansion card riser 1.
4. If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening, and then close the expansion card latch.

**NOTE:** You must install a filler bracket over an empty expansion card 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. The filler bracket is necessary to maintain proper thermal conditions.

5. Close the latches of tab A and tab B.

![Figure 54. Removing an expansion card from expansion card riser 1](image)

1. tab A
2. expansion card riser 1 cage
Next steps
1. Install the expansion card.
2. Install the expansion card riser.
3. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing expansion card risers on page 125
Installing an expansion card into the expansion card riser 1 on page 119
Installing expansion card risers on page 128
After working inside your system on page 66

Installing an expansion card into the expansion card riser 1

Prerequisites
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 expansion card riser.

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 expansion card riser 1 can be used only when both the processors are installed.

Steps
1. Unpack the expansion card and prepare it for installation.
   For instructions, see the documentation accompanying the card.
2. Press tab A and rotate the latch clockwise.
3. Press tab B and rotate the latch down.
4. Holding the card by its edges, position the card so that the card-edge connector aligns with the expansion card connector.
5. Insert the card-edge connector firmly into the expansion card connector until the card is fully seated.
6. Close the latches of tab A and tab B.
Figure 55. Installing an expansion card into the expansion card riser 1

1. tab A
2. expansion card riser 1 cage
3. expansion card connector
4. tab B
5. latch
6. expansion card

Next steps
1. Install the expansion card riser.
2. If applicable, connect any cables to the expansion card.
3. Follow the procedure listed in the After working inside your system section.
4. Install any device drivers required for the card as described in the documentation for the card.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing expansion card risers on page 125
Installing expansion card risers on page 128
After working inside your system on page 66

Removing an NVMe expansion card from expansion card riser

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. When removing a card from riser 2, ensure that the PCIe holder latch is closed.

**Steps**

1. Disconnect any cables connected to the expansion card.
2. Lift the expansion card latch out of the guide slot.
3. Push the locking tab and hold the expansion card by its edges, and remove it from the expansion card connector.
4. If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening and close the expansion card latch.

**NOTE:** You must install a filler bracket over an empty expansion card 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. The filler bracket is necessary to maintain proper thermal conditions.

5. Install the expansion card latch into the slot.
6. Close the expansion card locking tabs.

**Figure 56. Removing an NVMe expansion card from expansion card riser**

1. Expansion card connector
2. Expansion card
3. Expansion card release latch
4. Expansion card riser
5. Power connector
6. Expansion card riser locking latch

**Next steps**

1. Install an expansion card into the expansion card riser.
2. Follow the procedure listed in the *After working inside your system* section.
Installing an NVMe expansion card into the expansion card riser

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

⚠️ **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. Unpack the expansion card, and prepare it for installation.
   For instructions, see the documentation accompanying the card.
2. Lift the expansion card latch, and remove the filler bracket.
3. Holding the card by its edges, position the card so that the connector on the expansion card aligns with the expansion card connector on the riser.
4. Insert the card-edge connector firmly into the expansion card connector until the card is fully seated.
5. Press the touch points to open the expansion card locking tabs.
6. Close the expansion card latch.

![Diagram of installing an expansion card into the expansion card riser](image)

Figure 57. Installing an expansion card into the expansion card riser

- Expansion card connector
- Expansion card
- Expansion card release latch
- Expansion card riser

122  Installing and removing system components
Next steps
1. Follow the procedure listed in the After working inside your system section.
2. Install any device drivers required for the card as described in the documentation for the card.

Removing the riser 1 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.

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 expansion card riser.

Steps

Press the tabs on the riser 1 blank and push the riser 1 blank out of the chassis.

![Figure 58. Removing the riser 1 blank](image)

**Figure 58. Removing the riser 1 blank**

a. Slot on the chassis
b. Tab (2)
c. Riser 1 blank

Next steps
1. Install the expansion card risers.
2. Follow the procedure listed in the After working inside your system section.
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

To install the riser 1 blank, align the blank with the slot on the chassis and insert it into the chassis until it clicks into place.

Figure 59. Installing the riser 1 blank

a. slot on the chassis
b. tab (2)
   c. riser 1 blank

Next steps

1. Install the expansion card risers.
2. Follow the procedure listed in the After working inside your system section.

Related References

Safety instructions on page 65
Removing expansion card risers

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 any expansion card installed on risers 2 and 3.

⚠️ **NOTE:** The expansion card riser 1 can be used only when both the processors are installed.

Steps

1. Holding the slots on the expansion card riser, lift the riser from the riser connector on the system board.
2. To remove expansion card risers 2 and 3, hold the edges of the expansion card riser, and lift the riser from the riser connector on the system board.

⚠️ **NOTE:** To ensure proper cooling, the riser 1 blank must be installed in the riser 1 slot. Remove the riser 1 blank only if you are installing riser 1.

---

**Figure 60. Removing the expansion card riser 1**

1. expansion card riser 1 cage
2. expansion card riser 1
3. riser guide-back (right)
4. riser guide-back (left)
5. expansion card riser 1 connector
6. riser guide-front
Figure 61. Identifying connectors on the expansion card riser 1
a. expansion card slot 1
b. expansion card slot 2
c. expansion card slot 3

Figure 62. Removing the expansion card riser 2
1. power connector (for GPU cards) 2. expansion card riser 2
3. riser guide-back 4. expansion card riser 2 connector
5. riser guide-front
Figure 63. Identifying connectors on the expansion card riser 2

a. expansion card slot 4
b. expansion card slot 5
c. power connector (for GPU cards)

Figure 64. Removing the expansion card riser 3

1. riser guide-front
2. power connector (for GPU cards)
3. expansion card riser 3
4. riser guide-back
5. expansion card riser 3 connector
Figure 65. Identifying connectors on the expansion card riser 3

a. expansion card slot 6
b. power connector (for GPU cards)

Next steps
1. If removed, install an expansion card on the riser.
2. If applicable, replace the expansion card riser.
3. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing an expansion card from expansion card riser 2 or 3 on page 115
Removing an expansion card from the expansion card riser 1 on page 118
Installing an expansion card into the expansion card riser 1 on page 119
Installing an expansion card into the expansion card riser 2 or 3 on page 116
After working inside your system on page 66

Installing expansion card risers

Prerequisites
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 removed, install the expansion card(s) into the expansion card riser 1.

⚠️ 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. Align the expansion card riser with the connectors and the riser guides on the system board.
2. Lower the expansion card riser into place until the expansion card riser is fully seated in the connector.
Figure 66. Installing the expansion card riser 1
1. expansion card riser 1 cage
2. expansion card riser 1
3. riser guide-back (right)
4. riser guide-back (left)
5. expansion card riser 1 connector
6. riser guide-front

Figure 67. Installing the expansion card riser 2
1. power connector (for GPU cards)
2. expansion card riser 2
3. riser guide-back
4. expansion card riser 2 connector
5. riser guide-front
Figure 68. Installing the expansion card riser 3

1. riser guide-front
2. power connector (for GPU cards)
3. expansion card riser 3
4. riser guide-back
5. expansion card riser 3 connector

Next steps

1. Install the expansion card(s) into the expansion card risers 2 or 3.
2. Follow the procedure listed in the After working inside your system section.
3. Install any device drivers required for the card as described in the documentation for the card.

IDSDM

The Internal Dual SD module (IDSDM) provides you with a redundant SD card solution. You can configure the IDSDM for storage or as the OS boot partition. The IDSDM card offers the following features:

- Dual card operation — maintains a mirrored configuration by using SD cards in both the slots and provides redundancy.

**NOTE:** When the Redundancy option is set to Mirror Mode in the Integrated Devices screen of System Setup, the information is replicated from one SD card to another.

- Single card operation — single card operation is supported, but without redundancy.

Removing an internal SD card

Prerequisites

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

**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: Temporarily label each SD card with its corresponding slot number before removal. Reinstall the SD card(s) into the corresponding slots.

Steps
Locate the SD card slot on the internal dual SD module, and press the card to release it from the slot.

Figure 69. Removing an internal SD card
1. IDSDM
2. SD card 1
3. SD card 2
4. SD card slot 2
5. SD card slot 1

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

Related References
Safety instructions on page 65
Prerequisites
1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

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.
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:** To use an SD card with your system, ensure that the Internal SD Card Port is enabled in System Setup.

**NOTE:** Temporarily label each SD card with its corresponding slot number before removal. Re-install the SD card(s) into the corresponding slots.

**Steps**

1. Locate the SD card connector on the internal dual SD module. Orient the SD card appropriately and insert the contact-pin end of the card into the slot.
   
   **NOTE:** The slot is keyed to ensure correct insertion of the card.

2. Press the card into the card slot to lock it into place.

---

**Figure 70. Installing an internal SD card**

1. IDSDM
2. SD card 2
3. SD card 1
4. SD card slot 1
5. SD card slot 2

**Next steps**

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

**Related References**

- Safety instructions on page 65

**Related tasks**

- Before working inside your system on page 66
- After working inside your system on page 66
Removing the optional internal dual SD 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.
3. If installed, remove the SD cards.

**NOTE:** Temporarily label each SD card with its corresponding slot number before removal. Reinstall the SD cards into the corresponding slots.

Steps

1. Locate the internal dual SD module (IDSDM) on the system board. To locate the internal dual SD module connector, see the System board connectors section.
2. Holding the pull tab, lift the IDSDM out of the system.

![Figure 71. Removing the internal dual SD module (IDSDM)](image)

a. IDSDM
b. pull tab
c. IDSDM connector

The following table describes the IDSDM indicator codes:

**Table 42. IDSDM indicator codes**

<table>
<thead>
<tr>
<th>Convention</th>
<th>IDSDM indicator code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Green</td>
<td>Indicates that the card is online.</td>
</tr>
<tr>
<td>B</td>
<td>Flashing green</td>
<td>Indicates rebuild or activity.</td>
</tr>
<tr>
<td>C</td>
<td>Flashing amber</td>
<td>Indicates card mismatch or that the card has failed.</td>
</tr>
<tr>
<td>D</td>
<td>Amber</td>
<td>Indicates that the card is offline, has failed, or is write protected.</td>
</tr>
<tr>
<td>E</td>
<td>Not lit</td>
<td>Indicates that the card is missing or is booting.</td>
</tr>
</tbody>
</table>
Next steps
1. Install the IDSDM.
2. If removed, install the SD cards.
3. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65
System board jumpers and connectors on page 196

Related tasks
Before working inside your system on page 66
Removing an internal SD card on page 130
Installing the optional internal dual SD module on page 134
After working inside your system on page 66

Installing the optional internal dual SD 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.
   
   🔄 NOTE: Temporarily label each SD card with its corresponding slot before removal.

Steps
1. Locate the internal dual SD module (IDSDM) connector on the system board. To locate the IDSDM connector, see the System board connectors section.
2. Align the IDSDM with the connector on the system board.
3. Push the IDSDM until it is firmly seated on the system board.

Next steps
1. Install the SD cards.
   
   🔄 NOTE: Re-install the SD cards into the same slots based on the labels you had marked on the cards during removal.
2. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Installing an internal SD card on page 131
After working inside your system on page 66
Network daughter card

The Network daughter card (NDC) is a small, removable mezzanine card. The NDC provides you with the flexibility of choosing different network connectivity options, for example—4 x 1GbE, 2 x 10GbE and 2 x Converged Network Adapter.

Removing the network daughter card

Prerequisites

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 expansion card riser 2.
4. Keep the Phillips #1 screwdriver ready.

⚠️ **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. Loosen the captive screws that secure the network daughter card (NDC) to the system board.
2. Hold the NDC by the edges on either side of the touch point, and lift the card to disengage it from the connector on the system board.
3. Slide the NDC away from the back of the system until the Ethernet connectors are clear of the slot in the back panel.
4. Lift the NDC out of the chassis.

![Figure 72. Removing the NDC](image-url)

1. captive screw socket (2)
2. connector on the system board
3. captive screw (2)
4. touch point (2)
Next steps
1. Install the NDC.
2. If removed, install the expansion card riser 1.
3. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Installing an expansion card from expansion card riser 2 or 3 on page 115
Installing an expansion card into the expansion card riser 2 or 3 on page 116
Installing the network daughter card on page 136
After working inside your system on page 66

Installing the network daughter card

Prerequisites
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 applicable, remove the expansion card riser 1.
4. Keep the Phillips #1 screwdriver ready.

⚠️ 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. Orient the network daughter card (NDC) so that the Ethernet connectors fit through the slot in the back panel.
2. Align the captive screws on the card with the captive screw sockets on the system board.
3. Press the touch points on the card until the card connector is firmly seated on the system board connector.
4. Tighten the captive screws to secure the NDC to the system board.
Figure 73. Installing the NDC
1. captive screw socket (2)
2. connector on the system board
3. captive screw (2)
4. touch point (2)
5. network daughter card (NDC)
6. back panel slot for Ethernet connectors

Next steps
1. If applicable, install the expansion card(s) in the expansion card riser 2.
2. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing an expansion card from expansion card riser 2 or 3 on page 115
Installing an expansion card into the expansion card riser 2 or 3 on page 116
After working inside your system on page 66

Internal USB memory key (optional)

An optional USB memory key installed inside your system can be used as a boot device, security key, or mass storage device.

To boot from the USB memory key, configure the USB memory key with a boot image and then specify the USB memory key in the boot sequence in System Setup.

The internal USB port must be enabled in Internal USB Port option in the Integrated Devices screen of System Setup.
NOTE: To locate the internal USB port (INT_USB) on the system board, see the System board jumpers and connectors section.

Replacing the optional internal USB memory key

Prerequisites
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 USB port or USB memory key on the system board.
   To locate the USB port, see the System board jumpers and connectors section.
2. If installed, remove the USB memory key from the USB port.

Figure 74. Removing the internal USB memory key
a. USB memory key
b. USB port
3. Insert the replacement USB memory key into the USB port.

Figure 75. Installing the internal USB memory key
a. USB memory key
b. USB port

Next steps
1. Follow the procedure listed in the After working inside your system section.
2. While booting, press F2 to enter System Setup and verify that the system detects the USB memory key.

Related References
Safety instructions on page 65
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

**NOTE:** There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. For more information, see the safety information that shipped with 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.

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 cooling shroud.

Steps

1. Locate the battery socket. For more information, see the Jumpers and connectors section.
   
   **CAUTION:** To avoid damage to the battery connector, you must firmly support the connector while installing or removing a battery.

2. Place your finger between the securing tabs at the negative side of the battery connector, and lift the battery out of the socket.

3. To install a new system battery, hold the battery with the "+" facing up and slide it under the securing tabs.
4. Press the battery into the connector until it snaps into place.
Figure 77. Installing the system battery
   a. system battery
   b. system battery slot

Next steps
1. Install the cooling shroud.
2. Follow the procedure listed in the After working inside your system section.
3. While booting, press F2 to enter System Setup and ensure the battery is operating properly.
4. Enter the correct time and date in the System Setup **Time** and **Date** fields.
5. Exit System Setup.

Related References
Safety instructions on page 65
System board jumpers and connectors on page 196

Related tasks
Before working inside your system on page 66
Removing the cooling shroud on page 73
Installing the cooling shroud on page 74
After working inside your system on page 66

Power supply units (PSU)

Your system supports one of the following:
- Two 495 W, 750 W, or 1100 W AC power supply units (PSUs)
- Two 1100 W DC PSUs
- Two 750 W mixed mode PSUs
- Two 750 W or 1100 W AC power supply units (PSUs)

⚠️ **CAUTION:** For AC PSUs, use only PSUs with the Extended Power Performance (EPP) label on the back. Mixing PSUs from previous generations of systems can result in a PSU mismatch condition or failure to turn on.

⚠️ **NOTE:** Titanium PSU is nominally rated for 200 V AC to 240 V AC input only.

⚠️ **NOTE:** When two identical PSUs are installed, power supply redundancy (1+1 – with redundancy or 2+0 – without redundancy) is configured in system BIOS. In redundant mode, power is supplied to the system equally from both PSUs when Hot Spare is disabled. When Hot Spare is enabled, one of the PSUs will be put into standby when system utilization is low to maximize efficiency.

⚠️ **NOTE:** If two PSUs are used, they must be of the same maximum output power.
Hot spare feature

Your system supports the hot spare feature that significantly reduces the power overhead associated with power supply unit (PSU) redundancy.

When the hot spare feature is enabled, one of the redundant PSUs is switched to the sleep state. The active PSU supports 100 percent of the load, thus operating at higher efficiency. The PSU in the sleep state monitors output voltage of the active PSU. If the output voltage of the active PSU drops, the PSU in the sleep state returns to an active output state.

If having both PSUs active is more efficient than having one PSU in the sleep state, the active PSU can also activate the sleeping PSU.

The default PSU settings are as follows:

- If the load on the active PSU is more than 50 percent, then the redundant PSU is switched to the active state.
- If the load on the active PSU falls below 20 percent, then the redundant PSU is switched to the sleep state.

You can configure the hot spare feature by using the iDRAC settings. For more information about iDRAC settings, see the Integrated Dell Remote Access Controller User’s Guide available at Dell.com/idracmanuals.

Removing the power supply unit blank

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

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

If you are installing a second power supply unit (PSU), remove the PSU blank in the bay by pulling the blank outward.

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

Figure 78. Removing the PSU blank

a. PSU blank
b. PSU bay

Next steps

Install the PSU or PSU blank.
Installing the power supply unit blank

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

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.

Steps

Align the power supply unit blank with the power supply unit slot and push it into the power supply unit slot until it clicks into place.

Figure 79. Installing the PSU blank

a. PSU blank
b. PSU bay

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

If applicable, unlatch and lift the optional cable management arm if it interferes with the power supply unit (PSU) removal. For information about the cable management arm, see the system’s rack documentation.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Disconnect the power cable from the power source and from the PSU you intend to remove, and then remove the cables from the strap.
2. Press the release latch and slide the PSU out of the chassis by using the PSU handle.
Next steps

- If applicable, install the AC PSU.
- If applicable, install the PSU blank.

Installing an AC 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.

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. For systems that support redundant power supply units (PSUs), ensure that both the PSUs are of the same type and have the same maximum output power.
3. If installed, remove the PSU blank.

Steps

1. Slide the PSU into the chassis until the PSU is fully seated and the release latch snaps into place.
2. If applicable, relatch the cable management arm.
   For information about the cable management arm, see the rack documentation of your system.
3. Connect the power cable to the PSU, and plug the cable into a power outlet.

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

NOTE: When installing, hot swapping, or hot-adding a new PSU, wait for 15 seconds for the system to recognize the PSU and determine its status. The PSU redundancy may not occur until discovery is complete. Wait until the new PSU is discovered and enabled before you remove the other PSU. The PSU status indicator turns green to signify that the PSU is functioning properly.
Wiring instructions for a DC power supply unit

Your system supports up to two –(48–60) V DC power supply units (PSUs).

**NOTE:** For equipment using –(48–60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.

**CAUTION:** Wire the unit with copper only, unless otherwise specified, use only 10 American Wire Gauge (AWG) wire rated minimum 90 ºC for source and return. Protect the –(48–60) V DC (1 wire) with a branch circuit over-current protection rated 50 A for DC with a high interrupt current rating.

**CAUTION:** Connect the equipment to a –(48–60) V DC supply source that is electrically isolated from the AC source (reliably grounded –(48–60) V DC SELV source). Ensure that the –(48–60) V DC source is efficiently secured to earth (ground).

**NOTE:** A readily accessible disconnect device that is suitably approved and rated shall be incorporated in the field wiring.

**Input requirements**

- Supply voltage: –(48–60) V DC
- Current consumption: 32 A (maximum)

**Kit contents**

- Dell part number 6RYJ9 terminal block or equivalent (1)
- #6-32 nut equipped with lock washer (1)

**Required tools**

Wire-stripper pliers capable of removing insulation from size 10 AWG solid or stranded, insulated copper wire

**NOTE:** Use alpha wire part number 3080 or equivalent (65/30 stranding)
**Required wires**

- One UL 10 AWG, 2 m maximum (stranded) black wire [–(48–60) V DC]
- One UL 10 AWG, 2 m maximum (stranded) red wire (V DC return)
- One UL 10 AWG, 2 m maximum green/yellow, green with a yellow stripe, stranded wire (safety ground)

**Assembling and connecting the safety ground wire**

**Prerequisites**

*NOTE: For equipment using –(48–60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.*

**Steps**

1. Strip the insulation from the end of the green or yellow wire, exposing approximately 4.5 mm (0.175 inch) of copper wire.
2. Using a hand-crimping tool (Tyco Electronics, 58433-3 or equivalent), crimp the ring-tongue terminal (Jeeson Terminals Inc., R5-4SA or equivalent) to the green or yellow wire (safety ground wire).
3. Connect the safety ground wire to the grounding post on the back of the system by using a #6-32 nut equipped with a locking washer.

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**Figure 82. Assembling and connecting the safety ground wire**

1. #6-32 nut
2. spring washer
3. grounding post
4. safety ground wire

**Figure 83. Removing the safety ground wire**

1. #6-32 nut
2. spring washer
Assembling the DC input power wires

Prerequisites

NOTE: For equipment using –(48–60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.

Steps

1. Strip the insulation from the ends of the DC power wires, exposing approximately 13 mm (0.5 inch) of copper wire. **NOTE:** Reversing polarity when connecting DC power wires can permanently damage the power supply or the system.

2. Insert the copper ends into the mating connectors and tighten the captive screws at the top of the mating connector by using a Phillips #2 screwdriver. **NOTE:** To protect the power supply from electrostatic discharge, the captive screws must be covered with the rubber cap before inserting the mating connector into the power supply.

3. Rotate the rubber cap clockwise to fix it over the captive screws.

4. Insert the mating connector into the PSU.

Figure 84. Assembling the DC Input Power Wires

1. DC wire RTN
2. DC power connector
3. captive screw (2) 4. rubber cap
4. DC power socket 5. DC wire –48 V
5. DC wire –48 V

Installing and removing system components
Figure 85. Removing the DC Input Power Wires

1. wire RTN
2. DC power connector
3. captive screw (2)
4. rubber cap
5. DC power socket
6. wire –48 V

Removing a DC power supply unit

Prerequisites

**NOTE:** For equipment using –(48–60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.

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

**NOTE:** You may have to unlatch and lift the optional cable management arm if it interferes with power supply removal. For information about the cable management arm, see the rack documentation of your system.

Steps

1. Disconnect the power wires from the power source and the connector from the PSU you intend to remove.
2. Disconnect the safety ground wire.
3. Press the release latch and slide the PSU out of the chassis by using the PSU handle.
Installing a DC power supply unit

Prerequisites

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 PSU blank.
4. Verify that both the PSUs are of the same type and have the same maximum output power.

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

Steps

1. Slide the PSU into the chassis until the PSU is fully seated and the release latch snaps into place.

**NOTE:** If you have unlatched the cable management arm, relatch it. For information about the cable management arm, see the rack documentation.

2. Connect the safety ground wire.
3. Install the DC power connector in the PSU.

**CAUTION:** When connecting the power wires, ensure that you secure the wires with the strap to the PSU handle.

4. Connect the wires to a DC power source.

**NOTE:** When installing, hot-swapping, or hot-adding a new PSU, wait for 15 seconds for the system to recognize the PSU and determine its status. The PSU status indicator turns green to signify that the PSU is functioning properly.
**System board**

A system board (also known as the motherboard) is the main printed circuit board in the system with different connectors used to connect different components or peripherals of the system. A system board provides the electrical connections to the components in the system to communicate.

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

⚠️ **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 re-installed 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 following:
   a. Cooling shroud
   b. Cooling fan assembly
   c. Hard drive tray (if installed)

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**Next steps**

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

**Figure 87. Installing a DC PSU**

1. release latch
2. power supply status indicator
3. PSU
4. power connector
5. PSU handle

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**Installing and removing system components**

149
d. Power supply unit(s)
e. All expansion card risers
f. Integrated storage controller card
g. Internal dual SD module
h. Internal USB key (if installed)
i. PCIe card holder
j. Cable retention bracket
k. Heat sink(s)/heat sink blank(s)
l. Processors(s)/processor blank(s)

⚠️ **CAUTION:** To prevent damage to the processor pins when replacing a faulty system board, ensure that you cover the processor socket with the processor protective cap.
m. Memory modules and memory module blanks
n. Network daughter card

**Steps**

1. Disconnect all cables from the system board.

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

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

2. Hold the system board holder, lift the blue release pin, lift the system board, and then slide it toward the front of the chassis. Sliding the system board toward the front of the chassis disengages the connectors from the back of the chassis slots.

3. Lift the system board out of the chassis.
Figure 88. Removing the system board

a. release pin
b. system board
c. system board holder

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

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing the cooling shroud on page 73
Removing the cooling fan assembly on page 87
Removing the hard drive tray on page 75
Removing an AC power supply unit on page 142
Removing a DC power supply unit on page 147
Installing the system board

Prerequisites

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

⚠️ 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. Unpack the new system board assembly.
   ⚠️ CAUTION: Do not lift the system board by holding a memory module, processor, or other components.
   ⚠️ CAUTION: Take care not to damage the system identification button while placing the system board into the chassis.

2. Hold the touch points and lower the system board into the chassis.
3. Push the system board toward the back of the chassis until the board clicks into place.
Figure 89. Installing the system board

1. Install the Trusted Platform Module (TPM). For information about 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. Replace the following:
   a. Cable retention bracket
   b. PCle card holder
   c. Hard drive tray (if applicable)
   d. Integrated storage controller card
   e. Internal USB key (if applicable)
   f. Internal dual SD module
   g. All expansion card risers
   h. Heat sink(s)/heat sink blank(s) and processors(s)/processor blank(s)
   i. Memory modules and memory module blanks
j. Network daughter card
k. Cooling fan assembly
l. Cooling shroud
m. Power supply unit(s)

3. Reconnect all cables to the system board.

   NOTE: Ensure that the cables inside the system are routed along the chassis wall and secured using the cable securing bracket.

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

5. Import your new or existing iDRAC Enterprise license. For more information, see Integrated Dell Remote Access Controller User's Guide, at Dell.com/esmmanuals.

6. Ensure that you:
   a. Use the Easy Restore feature to restore the Service Tag. For more information, see the Easy restore section.
   b. If the Service Tag is not backed up in the backup flash device, enter the Service Tag manually. For more information, see the Entering the 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 tasks
Installing the cable retention bracket on page 109
Installing the PCIe card holder on page 106
Installing the hard drive tray on page 76
Installing the integrated storage controller card on page 112
Replacing the optional internal USB memory key on page 138
Installing the optional internal dual SD module on page 134
Installing expansion card risers on page 128
Installing a heat sink on page 104
Installing a processor on page 102
Installing memory modules on page 96
Installing the network daughter card on page 136
Installing the cooling fan assembly on page 88
Installing the cooling shroud on page 74
Installing an AC power supply unit on page 143
Installing a DC power supply unit on page 148

Entering the system Service Tag by using System Setup
If Easy Restore fails to restore the Service Tag, use System Setup to enter the Service Tag.

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.
6. Import your new or existing iDRAC Enterprise license.

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.

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.

⚠️ CAUTION: Do not attempt to remove the Trusted Platform Module (TPM) from the system board. Once 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.

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 90. 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.

Related References
Safety instructions on page 65
System board jumpers and connectors on page 196

Related tasks
Before working inside your system on page 66
Installing the system board on page 152
After working inside your system on page 66

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.  
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.  
9. From the Intel TXT option, select On.
Hard drives

Your system supports entry hard drives and enterprise-class hard drives. Entry hard drives are designed for 5x8 operating environment with less workload rating to drives and enterprise-class drives are designed for 24x7 operating environment. Selecting the correct drive class will enable the critical areas of quality, functionality, performance, and reliability to be optimized for the target implementation.

**NOTE:** Do not mix enterprise-class hard drives with entry hard drives.

Choosing the right drive type depends on the usage pattern. Improper use of entry hard drives (workload rating exceeds 55TB/year) will lead to significant risk and increase the drives failure rate.

For more information on these hard drives, see the [512e and 4Kn Disk Formats whitepaper](https://www.dell.com/poweredgemanuals) and [4K Sector HDD FAQ document](https://www.dell.com/poweredgemanuals) at Dell.com/poweredgemanuals.

All hard drives are connected to the system board through the hard drive backplane. Hard drives are supplied in hot-swappable hard drive carriers that fit in the hard drive slots.

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

⚠️ **CAUTION:** Do not turn off or restart your system while the hard drive is being formatted. Doing so can cause a hard drive failure.

Use only hard drives that have been tested and approved for use with the hard drive backplane.

When you format a hard drive, allow enough time for the formatting to be complete. Be aware that high-capacity hard drives can take a long time to format.

## Removing a 2.5-inch hard drive blank

### Prerequisites

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

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. If installed, remove the bezel.

### Steps

Press the release button and slide the hard drive blank out of the hard drive slot.
Figure 91. Removing a 2.5-inch hard drive blank
a. hard drive blank  
b. release button

Related References
Safety instructions on page 65

Related tasks
Removing the optional front bezel on page 67  
Installing the optional front bezel on page 68

Installing a 2.5-inch hard drive blank

Prerequisites
1. Follow the safety guidelines listed in the Safety instructions section.  
2. If installed, remove the front bezel.

Steps
Insert the hard drive blank into the hard drive slot until the release button clicks into place.

Figure 92. Installing a 2.5-inch hard drive blank
a. hard drive blank

Next steps
If removed, install the front bezel.

Related References
Safety instructions on page 65
Removing a 2.5 inch hard drive blank (rear)

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 came with the product.

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

Follow the safety guidelines listed in safety instructions section.

Steps

Pull the hard drive blank out until it is free of the hard drive slot.

Figure 93. Removing and installing a 2.5 inch hard drive blank (rear)

a. hard drive blank (rear)

Related References

Safety instructions on page 65

Installing a 2.5 inch hard drive blank (rear)

Prerequisites

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

Steps

Insert the hard drive blank into the hard drive slot until it clicks into place.
Figure 94. Installing a 2.5 inch hard drive blank (rear)

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

Related References
Safety instructions on page 65

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 came with the product.

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. If installed, remove the front bezel.

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

Figure 95. Removing a 3.5-inch hard drive blank
a. hard drive blank
b. release button
Next steps
If applicable, install the front bezel.

Related References
Safety instructions on page 65

Related tasks
Removing the optional front bezel on page 67
Installing the optional front bezel on page 68

Installing a 3.5-inch hard drive blank

Prerequisites
1. Follow the safety guidelines listed in the Safety instructions section.
2. If installed, remove the front bezel.

Steps
Insert the hard drive blank into the hard drive slot until the release button clicks into place.

Figure 96. Installing a 3.5-inch hard drive blank
a. hard drive blank

Next steps
If applicable, install the front bezel.

Related References
Safety instructions on page 65

Related tasks
Removing the optional front bezel on page 67
Installing the optional front bezel on page 68

Removing a hot swappable hard drive or solid state drive

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 came with the 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 applicable, remove the bezel.
4. If applicable, remove the system cover to remove hot-swappable drives inside your system.
5. Using the management software, prepare the hard drive for removal. If the hard drive is online, the green activity or fault indicator flashes while the drive is turning off. When the hard drive indicators are off, the hard drive is ready for removal.

   For more information, see the documentation for the storage controller.

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

**Steps**

1. Press the release button to open the hard drive or SSD carrier release handle.
2. Slide the hard drive or SSD carrier out of the hard drive slot.

   ▶️ **CAUTION:** To maintain proper system cooling, all empty hard drive or SSD slots must have hard drive or SSD blanks installed.

3. If you are not replacing the hard drive or SSD immediately, insert a hard drive or SSD blank in the empty hard drive slot.

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**Figure 97. Removing a hot swappable hard drive or SSD**

- a. release button
- b. hard drive or SSD carrier
- c. hard drive or SSD carrier handle
Installing a hot swappable hard drive or solid state drive

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:** Use only hard drives that have been tested and approved for use with the hard drive backplane.

⚠️ **CAUTION:** When installing a hard drive, 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:** Combining SAS and SATA hard drives in the same RAID volume is not supported.

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

⚠️ **CAUTION:** When a replacement hot swappable drive is installed and the system is powered on, the drive automatically begins to rebuild. Ensure that the replacement drive is blank or contains data that you wish to overwrite. Any data on the replacement drive is immediately lost after the drive is installed.

Steps

1. If a hard drive blank is installed in the hard drive slot, remove it.
2. Install a hard drive in the hard drive carrier.
3. Press the release button on the front of the hard drive carrier and open the hard drive carrier handle.
4. Insert the hard drive carrier into the hard drive slot until the carrier connects with the backplane.
5. Close the hard drive carrier handle to lock the hard drive in place.

**Figure 99. Installing a hot-swappable hard drive or SSD**

a. release button
b. hard drive or SSD carrier
c. hard drive or SSD carrier handle

**Figure 100. Installing a 1.8 inch hot-swappable uSATA SSD carrier**

a. release button
b. SSD carrier
c. SSD carrier handle

**Related tasks**

Removing a 3.5-inch hard drive blank on page 160
Removing a 2.5-inch hard drive blank on page 157
Installing a hard drive or solid state drives into a hard drive carrier on page 165
Removing a hard drive or a solid state drive from a hard drive carrier

Prerequisites
1. Keep the Phillips #1 screwdriver ready.
2. Remove the hot swappable hard drive carrier from the system.

Steps
1. Remove the screws from the slide rails on the hard drive carrier.
2. Lift the hard drive out of the hard drive carrier.

Figure 101. Removing a hard drive from a hard drive carrier
a. screw (4)
b. hard drive
c. hard drive carrier

Related video

Next steps
If applicable, install a hard drive into the hard drive carrier.

Related tasks
Removing a hot swappable hard drive or solid state drive on page 161
Installing a hot swappable hard drive or solid state drive on page 163

Installing a hard drive or solid state drives into a hard drive carrier

Prerequisites

Steps
1. Insert the hard drive into the hard drive carrier with the connector end of the hard drive toward the back of the carrier.
2. Align the screw holes on the hard drive with the screws holes on the hard drive carrier.
   When aligned correctly, the back of the hard drive is flush with the back of the hard drive carrier.
3. Attach the screws to secure the hard drive to the hard drive carrier.
Installing a hard drive into a hard drive carrier

- screw (4)
- hard drive
- hard drive carrier

Next steps
Install the hot swappable hard drive carrier.

Removing a 1.8-inch hard drive blank

Prerequisites
1. Follow the safety guidelines listed in the Safety instructions section.
2. If installed, remove the front bezel.

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

Steps
Press the release button and slide the hard drive blank out of the hard drive slot.
Next steps
If applicable, install the front bezel.

Related References
Safety instructions on page 65

Related tasks
Removing the optional front bezel on page 67
Installing the optional front bezel on page 68

Installing a 1.8-inch hard drive blank

Prerequisites
1. Follow the safety guidelines listed in the Safety instructions section.
2. If installed, remove the front bezel.

Steps
Insert the hard drive blank into the hard drive slot until the release button clicks into place.

Next steps
If applicable, install the front bezel.

![Figure 104. Installing a 1.8-inch hard drive blank](image)

1. hard drive blank

Related References
Safety instructions on page 65

Related tasks
Removing the optional front bezel on page 67
Installing the optional front bezel on page 68

Removing a 1.8-inch hard drive from a hard drive carrier

Prerequisites
1. Follow the safety guidelines listed in the Safety instructions section.
2. Remove the hard drive carrier from the system.

Steps
1. Turn the hard drive carrier.
2. Pull the rails of the hard drive carrier and lift the hard drive out of the hard drive carrier.

![Figure 105. Removing a 1.8-inch hard drive into a hard drive carrier](image)

a. hard drive carrier
b. hard drive

**Related References**

Safety instructions on page 65

---

**Installing a 1.8-inch 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.

**Steps**

Insert the hard drive into the hard drive carrier with the connector end of the hard drive toward the back. When aligned correctly, the back of the hard drive is flush with the back of the hard drive carrier.

![Figure 106. Installing a 1.8-inch hard drive into a hard drive carrier](image)

a. hard drive carrier
b. hard drive

---

**Hard drive backplane**

Depending on your system configuration:
Table 43. Supported hard drives supported options for PowerEdge R730xd systems

<table>
<thead>
<tr>
<th>System Model</th>
<th>Supported hard drives options</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerEdge R730</td>
<td>2.5 inch (x24) SAS/SATA backplane or 2.5-inch (x24) SAS/SATA backplane, which supports flexible zoning using dual PERC H730p controllers with 12 and 12 drives split mode, 4 and 20 drives split mode, 8 and 16 drives split mode, 16 and 8 drives split mode and 20 and 4 drives split mode, or 2.5 inch (x24) SAS/SATA, which includes 2.5 inch (x4) Dell PowerEdge Express Flash (PCIe SSD) backplane and 2.5 inch (x2) SAS/SATA backplane (back), or 2.5 inch (x24) SAS/SATA, which includes 2.5 inch (x4) Dell PowerEdge Express Flash (PCIe SSD) backplane, or 3.5 inch (x12) SAS/SATA backplane, or 3.5 inch (x12) SAS/SATA backplane, 3.5 inch (x4) SAS/SATA backplane on the hard drive tray and 2.5 inch (x2) SAS/SATA backplane (back) or 3.5 inch (x12) SAS/SATA backplane, and 2.5 inch (x2) SAS/SATA backplane (back), or 1.8 inch (x18) uSATA SSD backplane, 3.5 inch (x8) SAS/SATA backplane and 2.5 inch (x2) SAS/SATA backplane (back)</td>
</tr>
</tbody>
</table>

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.

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 cooling shroud.
4. Remove the cooling fan assembly.
5. Remove all hard drives.

Steps

1. Disconnect the SAS/SATA data, signal, and power cable(s) from the backplane.
2. Press the release tabs and lift the backplane upward and slide it toward the back of the chassis.

⚠️ NOTE: To prevent damage to the control panel flex cable, unlatch the blocking tab on the connector before removing the flex cable. Do not bend the flex cable at the connector. To unlatch the blocking tab for the x12 backplane, pull the locking tab up. For the x18 and x2 backplanes, rotate the locking tab 90 degrees clockwise.
Figure 107. Removing the 2.5 inch \(\times 24\) SAS/SATA backplane

1. release tab (2)
2. left ear control panel cable
3. backplane power cable
4. hard drive backplane expander
5. backplane signal cable
6. hard drive backplane assembly
7. backplane power cable
8. mini SAS cable connector (2)
9. SAS cable (3)
10. control panel cable
11. USB cable
12. right ear control panel flex cable
13. hard drive backplane connectors (24)
Figure 108. Cabling diagram—2.5 inch (x24) SAS/SATA backplane (option 1)

1. hard drive backplane expander
2. backplane signal connector 0
3. backplane signal connector 1
4. system board
5. integrated storage controller card
6. hard drive backplane
Figure 109. Cabling diagram—2.5 inch (x24) SAS/SATA backplane (option 2)

1. hard drive backplane expander
2. hard drive backplane
3. backplane signal connector 1
4. system board
5. integrated storage controller card
6. SAS A1 connector
7. SAS B1 connector
Figure 110. Cabling diagram—2.5 Inch (x24) SAS/SATA backplane (option 3)

1. hard drive backplane expander
2. hard drive backplane
3. system board
4. backplane signal connector 0
5. backplane signal connector 1
6. SSD/PCIe SSD controller card
7. integrated storage controller card
Figure 111. Removing the 3.5 inch (x12) SAS/SATA backplane

1. release tab (2)
2. SAS cable A2
3. SAS cable A1
4. left ear control panel cable
5. backplane signal cable
6. backplane power cable (2)
7. SAS cable A0/B0
8. USB cable
9. control panel cable
10. right ear control panel flex cable
11. hard drive backplane
12. hard drive backplane connector (12)
Figure 112. Cabling diagram—3.5 inch (x12) SAS/SATA backplane (option 1)

1. hard drive backplane
2. system board
3. backplane signal connector 0
4. backplane signal connector 1
5. integrated storage controller card
Figure 113. Cabling diagram—3.5 inch (x12) SAS/SATA backplane (option 2)

1. hard drive backplane
2. system board
3. backplane signal connector 0
4. backplane signal connector 1
5. hard drive mid plane
6. integrated storage controller card
7. backplane signal connector 2
Figure 114. Removing the 1.8 Inch (x18) SAS/SATA backplane

1. release pin
2. left ear control panel cable
3. SAS A2 cable
4. backplane signal cable
4. control panel cable
5. backplane power cable
6. mini SAS connector (2)
7. USB cable
8. hard drive backplane expander
9. SAS cable (2)
10. right ear control panel flex cable
11. hard drive backplane assembly
12. hard drive backplane connector (18)
13. control panel connector
14. backplane power connector
15. SAS A2 connector
16. hard drive backplane connector (18)
Figure 115. Cabling diagram—1.8 Inch (x18) SAS/SATA backplane

1. hard drive backplane expander
2. system board
3. backplane signal connector 0
4. backplane signal connector 1
5. integrated storage controller card
6. hard drive backplane

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

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing a hot swappable hard drive or solid state drive on page 161
Removing the cooling shroud on page 73
Removing the cooling fan assembly on page 87
Installing the hard drive backplane on page 179
Installing the hard drive backplane

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

⚠️ **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 control panel flex cable, do not bend the control panel flex cable after it is inserted into the connector.

Steps
1. Use the hooks on the chassis as guides to align the hard drive backplane.
2. Lower the hard drive backplane until the release tabs snap into place.
3. Connect the SAS/SATA SSD data, signal, and power cable(s) to the backplane.

---

**Figure 116. Installing the 2.5 inch (x24) SAS/SATA backplane**

1. release tab (2)
2. left ear control panel cable
3. backplane power cable
4. hard drive backplane expander
5. backplane signal cable
6. hard drive backplane assembly
7. backplane power cable
8. mini SAS cable connector (2)
9. SAS cable (3)
10. control panel cable

---
Figure 117. Installing the 1.8 Inch (x18) SAS/SATA backplane

1. release pin
2. left ear control panel cable
3. SAS A2 cable
4. backplane signal cable
5. control panel cable
6. backplane power cable
7. USB cable
8. mini SAS connector (2)
9. SAS cable (2)
10. right ear control panel flex cable
11. hard drive backplane assembly
12. hard drive backplane expander
13. control panel connector
14. backplane power connector
15. SAS A2 connector
16. hard drive backplane connector (18)

Next steps
1. Replace the cooling fan assembly.
2. Replace the cooling shroud.
3. Install the hard drives in their original locations.
4. Follow the procedure listed in the After working inside your system section.
Removing the optional hard drive backplane (rear)

Prerequisites
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 both hard drives.

⚠️ 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.

Steps
1. Disconnect all the cables from the backplane.
2. Lift the release pin and slide the backplane toward the front of the chassis.
3. Lift the backplane to remove it from the chassis.
Figure 118. Removing the optional 2.5 inch (x2) hard drive backplane

1. SAS cable 2. release pin
3. hard drive connector (2) 4. power cable
5. backplane signal cable

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing a hot swappable hard drive or solid state drive on page 161
After working inside your system on page 66

Installing the optional hard drive backplane (rear)

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

⚠️ 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. Align the notches on the backplane with the notches on the chassis.
2. Lift the release pin and slide the backplane toward the back of the chassis until firmly seated.
3. Release the release pin to lock the backplane to the chassis.
4. Reconnect all the cables to the backplane.

Figure 119. Installing the optional 2.5 inch (x2) hard drive backplane
1. SAS cable
2. release pin
3. hard drive connector (2)
4. power cable
5. backplane signal cable

Next steps
1. Install both the hard drives in their original location.
2. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
After working inside your system on page 66
SD vFlash card (optional)

An SD vFlash card is a Secure Digital (SD) card that plugs into the SD vFlash card slot in the iDRAC port card. It provides persistent on-demand local storage and a custom deployment environment that enables automation of server configuration, scripts, and imaging. It emulates USB device(s). For more information, see the Integrated Dell Remote Access Controller User’s Guide at Dell.com/idracmanuals.

Replacing an optional SD vFlash media card

Steps

1. Locate the SD vFlash media slot on the system.
   The SD vFlash media card is located on the back panel of the system.

2. To remove the SD vFlash media card, push the card inward to release it, and pull the card from the card slot.

   Figure 120. Removing the SD vFlash media card
   a. SD vFlash media card
   b. SD vFlash media card slot

3. To install an SD vFlash media card, with the label side facing up, insert the contact-pin end of the SD vFlash media card into the card slot on the module.
   NOTE: The slot is keyed to ensure correct insertion of the card.

4. Press the card inward to lock it into the slot.

   Figure 121. Installing the SD vFlash media card
   a. SD vFlash media card
   b. SD vFlash media card slot
Removing the vFlash media unit

Prerequisites
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 #1 screwdriver ready.

⚠️ 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. Remove the screw securing the vFlash media unit to the chassis.
2. Remove the cable from the vFlash media unit and the backplane.
3. Slide the vFlash media unit toward the front of chassis and lift it out of the system.

![Figure 122. Removing the vFlash media unit](image)

1. cable
2. screw
3. vFlash media unit
4. vFlash media slot
5. standoff

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

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Installing the vFlash media unit

Prerequisites

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 #1 screwdriver ready.

⚠️ 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. Slide the vFlash media unit in and align it with the vFlash media slot on the back of the chassis.
2. Connect the cable to the vFlash media unit.
3. Insert and tighten the screw securing the vFlash media unit to the chassis.

---

Related References

Safety instructions on page 65
Control panel assembly

Removing the control panel

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

⚠️ 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 use excessive force when removing the control panel cable as it can damage the connectors.

Steps
1. Disconnect the control panel cable from the hard drive backplane by pulling on the plastic pull tab.
2. Remove the screws that secure the control panel to the chassis.
3. Fold the plastic pull tab close to the connector.
4. Pull out the control panel cable as you guide the connector and the plastic pull tab through the channel on the chassis.

![Figure 124. Removing the control panel](image)

1. screw (3)  
2. control panel  
3. hard-drive backplane  
4. connector  
5. plastic pull tab
Next steps
1. Replace the control panel.
2. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Installing the control panel on page 188
After working inside your system on page 66

Installing the control panel

Prerequisites
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 T15 Torx screwdriver handy.

⚠️ 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. Fold the PPID label around the cable.
2. Fold the pull tab close to the connector and guide the connector and pull tab into the channel.
3. Push the cable until the cable passes completely through the channel.
4. Tighten the screws to secure the control panel to the chassis.

⚠️ NOTE: You must route the cable properly to prevent it from being pinched or crimped.
5. Connect the cable connector to the hard drive backplane by pushing on the center of the connector.
Figure 125. Installing the control panel
1. screw (3) 2. control panel
3. hard-drive backplane 4. connector
5. plastic pull tab

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

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
After working inside your system on page 66

Removing the I/O panel

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

⚠️ 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 I/O cable, you must release the locking tab before removing or installing the I/O cable from the connector on the hard drive backplane.
Steps
1. Rotate the locking tab on the I/O cable connector clockwise 90 degrees to release the lock.
   For more information on the locking tab, see the Removing the hard drive backplane section.
2. Disconnect the I/O cable from the backplane.
3. Remove the screws securing the I/O panel to the chassis.
4. Pull out the I/O panel cable through the channel on the chassis.

**Figure 126. Removing the I/O panel**
1. I/O panel cable
2. hard drive backplane
3. screw (3)
4. I/O panel
5. chassis

Next steps
1. Replace the I/O panel.
2. Follow the procedure listed in the After working inside your system section.

Related References
Safety instructions on page 65

Related tasks
Before working inside your system on page 66
Removing the hard drive backplane on page 169
Installing the I/O panel on page 190
After working inside your system on page 66

Installing the I/O panel

Prerequisites
1. Follow the safety guidelines listed in safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
Keep the T15 Torx screwdriver ready.

**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. Fold the PPID label around the cable.
2. Push the cable until the cable passes completely through the channel.
   
   **CAUTION:** To prevent damage to the I/O cable, you must release the locking tab before removing or installing the I/O cable from the connector on the hard drive backplane.

3. If locked, rotate the locking tab on the I/O cable connector clockwise 90 degrees to release the lock.
4. Connect the I/O panel cable to the connector on the hard drive backplane.
5. Rotate the locking tab on the I/O cable connector counter clockwise 90 degrees to secure the lock.
6. Tighten the screws to secure the control panel to the chassis.

   **NOTE:** You must route the cable properly to prevent it from being pinched or crimped.

**Figure 127. Installing the I/O panel**

1. I/O panel cable
2. hard drive backplane
3. screw (3)
4. I/O panel
5. chassis

**Next steps**

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

**Related References**

[Safety instructions](#) on page 65
Related tasks

Before working inside your system on page 66
After working inside your system on page 66
Using system diagnostics

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

NOTE: For more information about OEM diagnostic event messages, see the Event and Error Message Reference Guide for 13th Generation Dell PowerEdge Servers Version 1.2

Topics:
- Dell Embedded System Diagnostics

Dell Embedded System Diagnostics

NOTE: The Dell Embedded System Diagnostics is also known as Enhanced Pre-boot System Assessment (ePSA) diagnostics.

The Embedded System Diagnostics provides a set of options for particular device groups or devices allowing you to:
- Run tests automatically or in an interactive mode
- Repeat tests
- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

When to use the Embedded System Diagnostics

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

Running the Embedded System Diagnostics from Boot Manager

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

Steps
1. When the system is booting, press F10.
2. Use the up arrow and down arrow keys to select System Utilities > Launch Diagnostics.
   The ePSA Pre-boot System Assessment window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

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

The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

## System diagnostic controls

<table>
<thead>
<tr>
<th>Menu</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>Displays the configuration and status information of all detected devices.</td>
</tr>
<tr>
<td>Results</td>
<td>Displays the results of all tests that are run.</td>
</tr>
<tr>
<td>Systemhealth</td>
<td>Provides the current overview of the system performance.</td>
</tr>
<tr>
<td>Event log</td>
<td>Displays a time-stamped log of the results of all tests run on the system.</td>
</tr>
<tr>
<td></td>
<td>This is displayed if at least one event description is recorded.</td>
</tr>
</tbody>
</table>
Jumpers and connectors

Topics:
- System board jumper settings
- System board jumpers and connectors
- Disabling forgotten password

System board jumper settings

For information on resetting the password jumper to disable a password, see the Disabling a forgotten password section.

Table 44. System board jumper settings

<table>
<thead>
<tr>
<th>Jumper</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWRD_EN</td>
<td><img src="default" alt="PWRD_EN" /></td>
<td>The password reset feature is enabled (pins 2–4). BIOS local access is unlocked at the next AC power cycle.</td>
</tr>
<tr>
<td>NVRAM_CLR</td>
<td><img src="default" alt="NVRAM_CLR" /></td>
<td>The password reset feature is disabled (pins 4–6).</td>
</tr>
</tbody>
</table>

![PWRD_EN](default)

The configuration settings are retained at the next system boot (pins 3–5).

Related tasks

Disabling forgotten password on page 197
### System board jumpers and connectors

#### Figure 128. System board jumpers and connectors

#### Table 45. System board connectors and jumpers

<table>
<thead>
<tr>
<th>Item</th>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>J_BP_SIG1</td>
<td>Backplane signal connector 1</td>
</tr>
<tr>
<td>2</td>
<td>J_PS_2</td>
<td>PSU 2 connector</td>
</tr>
<tr>
<td>3</td>
<td>J_BP_SIG0</td>
<td>Backplane signal connector 0</td>
</tr>
<tr>
<td>4</td>
<td>J_BPO</td>
<td>Backplane power connector 0</td>
</tr>
<tr>
<td>5</td>
<td>J_SATA_CD</td>
<td>Optical drive SATA connector</td>
</tr>
<tr>
<td>6</td>
<td>J_SATA_TBU</td>
<td>Tape backup unit SATA connector</td>
</tr>
<tr>
<td>7</td>
<td>J_TBU</td>
<td>Tape backup unit power connector</td>
</tr>
<tr>
<td>8</td>
<td>J_PS_1</td>
<td>PSU 1 connector</td>
</tr>
<tr>
<td>9</td>
<td>J_IDSDM</td>
<td>Internal dual SD module connector</td>
</tr>
<tr>
<td>10</td>
<td>J_NDC</td>
<td>Network daughter card connector</td>
</tr>
<tr>
<td>11</td>
<td>J_USB</td>
<td>USB port</td>
</tr>
<tr>
<td>12</td>
<td>J_VIDEO_REAR</td>
<td>Video connector</td>
</tr>
<tr>
<td>13</td>
<td>J_COM1</td>
<td>Serial connector</td>
</tr>
<tr>
<td>14</td>
<td>J_IDRAC_RJ45</td>
<td>iDRAC8 connector</td>
</tr>
<tr>
<td>15</td>
<td>J_CYC</td>
<td>System identification connector</td>
</tr>
</tbody>
</table>
Table 45. System board connectors and jumpers (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>CYC_ID</td>
<td>System identification button</td>
</tr>
<tr>
<td>17</td>
<td>J_TPM_MODULE</td>
<td>Trusted Platform Module connector</td>
</tr>
<tr>
<td>18</td>
<td>J_RISER_2AX</td>
<td>Riser 3 connector</td>
</tr>
<tr>
<td>19</td>
<td>J_RISER_1AX</td>
<td>Riser 1 connector</td>
</tr>
<tr>
<td>20</td>
<td>J_RISER_2BX</td>
<td>Riser 2 connector</td>
</tr>
<tr>
<td>21</td>
<td>J_RISER_1BX</td>
<td>Riser 1 connector</td>
</tr>
<tr>
<td>22</td>
<td>J_RISER_3AX</td>
<td>Riser 3 connector</td>
</tr>
<tr>
<td>23</td>
<td>J_QS</td>
<td>Quick Sync bezel connector</td>
</tr>
<tr>
<td>24</td>
<td>J_RISER_3BX</td>
<td>Riser 3 connector</td>
</tr>
<tr>
<td>25</td>
<td>J_SATA_B</td>
<td>Internal SAS connector</td>
</tr>
<tr>
<td>26</td>
<td>J_STORAGE</td>
<td>Mini PERC connector</td>
</tr>
<tr>
<td>27</td>
<td>J_USB_INT</td>
<td>Internal USB port</td>
</tr>
<tr>
<td>28</td>
<td>J_SATA_A</td>
<td>Internal SAS connector</td>
</tr>
<tr>
<td>29</td>
<td>BAT</td>
<td>Battery connector</td>
</tr>
<tr>
<td>30</td>
<td>CPU 2</td>
<td>Processor 2 socket</td>
</tr>
<tr>
<td>31</td>
<td>J_BP3</td>
<td>Backplane power connector 3</td>
</tr>
<tr>
<td>32</td>
<td>B10, B6, B2, B9, B5, B1</td>
<td>Memory module sockets</td>
</tr>
<tr>
<td>33</td>
<td>J_BP_SIG2</td>
<td>Backplane signal connector 2</td>
</tr>
<tr>
<td>34</td>
<td>J_FAN2U_6</td>
<td>Cooling fan connector</td>
</tr>
<tr>
<td>35</td>
<td>J_FAN2U_5</td>
<td>Cooling fan connector</td>
</tr>
<tr>
<td>36</td>
<td>J_BP2</td>
<td>Backplane power connector 2</td>
</tr>
<tr>
<td>37</td>
<td>B3, B7, B11, B4, B8, B12</td>
<td>Memory module sockets</td>
</tr>
<tr>
<td>38</td>
<td>J_FAN2U_4</td>
<td>Cooling fan connector</td>
</tr>
<tr>
<td>39</td>
<td>A10, A6, A2, A9, A5, A1</td>
<td>Memory module sockets</td>
</tr>
<tr>
<td>40</td>
<td>J_FAN2U_3</td>
<td>Cooling fan connector</td>
</tr>
<tr>
<td>41</td>
<td>J_BP1</td>
<td>Backplane power connector</td>
</tr>
<tr>
<td>42</td>
<td>J_FAN2U_2</td>
<td>Cooling fan connector</td>
</tr>
<tr>
<td>43</td>
<td>A3, A7, A11, A4, A8, A12</td>
<td>Memory module sockets</td>
</tr>
<tr>
<td>44</td>
<td>J_FAN2U_1</td>
<td>Cooling fan connector</td>
</tr>
<tr>
<td>45</td>
<td>J_CTRL_PNL</td>
<td>Control panel signal connector</td>
</tr>
<tr>
<td>46</td>
<td>CPU 1</td>
<td>Processor 1 socket</td>
</tr>
<tr>
<td>47</td>
<td>J_FP_USB</td>
<td>Front panel USB port</td>
</tr>
</tbody>
</table>

Disabling forgotten password

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

Prerequisites
Steps

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

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

   **NOTE:** If you assign a new system and/or setup password with the jumper on pins 2 and 4, the system disables the new password(s) the next time it boots.

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

ℹ️ **NOTE:** Solution validation was performed by using the factory shipped hardware configuration.

Topics:

- Troubleshooting system startup failure
- Troubleshooting external connections
- Troubleshooting the video subsystem
- Troubleshooting a USB device
- Troubleshooting iDRAC Direct - USB XML configuration
- Troubleshooting iDRAC Direct - Laptop connection
- 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 an internal USB key
- Troubleshooting a micro SD card
- Troubleshooting a drive or SSD
- Troubleshooting a storage controller
- Troubleshooting expansion cards
- Troubleshooting processors
- System messages

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 213

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.

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.

**Related References**

Getting help on page 213
System board jumper settings on page 195

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## Troubleshooting iDRAC Direct - USB XML configuration


### Steps

1. Ensure that your USB storage device is connected to the front USB Management Port, identified by icon.
2. Ensure that your USB storage device is configured with an NTFS or an FAT32 file system with only one partition.
3. Verify that the USB storage device is configured correctly. For more information about configuring the USB storage device, see *Integrated Dell Remote Access Controller User's Guide* at [www.dell.com/poweredgemanuals](http://www.dell.com/poweredgemanuals).
4. In the iDRAC Settings Utility, ensure that USB Management Port Mode is configured as Automatic or iDRAC Direct Only.
5. Ensure that the iDRAC Managed: USB XML Configuration option is either Enabled or Enabled only when the server has default credential settings.
6. Remove and reinser the USB storage device.
7. If import operation does not work, try with a different USB storage device.

---

**Next steps**

If all troubleshooting fails, see the Getting help section.

**Related References**

Getting help on page 213

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## Troubleshooting iDRAC Direct - Laptop connection


### Steps

1. Ensure that your laptop is connected to the front USB Management Port, identified by icon with a USB Type A/A cable.
2. On the iDRAC Settings Utility screen, ensure that USB Management Port Mode is configured as Automatic or iDRAC Direct Only.
3. If the laptop is running Windows operating system, ensure that the iDRAC Virtual USB NIC device driver is installed.
4. If the driver is installed, ensure that you are not connected to any network through WiFi or cabled ethernet, as iDRAC Direct uses a non-routable address.

---

**Next steps**

If all troubleshooting fails, see the Getting help section.

**Related References**

Getting help on page 213
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 213

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
Getting help on page 213
Using system diagnostics on page 193
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
   - USB memory key
   - 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 213
Using system diagnostics on page 193

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 213
Using system diagnostics on page 193

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.

ℹ️ NOTE: If the system is turned off for long periods of time (for weeks or months), the NVRAM may lose the system configuration information. This situation is caused by a defective battery.

ℹ️ 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 References

Getting help on page 213
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.

ℹ️ 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

ℹ️ 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.

Troubleshooting power supply unit problems

Steps

1. Ensure that no loose connections exist.
   For example, loose power cables.
2. Ensure that the power supply handle LED indicates that the power supply is working properly.
3. If you have recently upgraded your system, ensure that the power supply unit has enough power to support the new system.
4. If you have a redundant power supply configuration, ensure that both the power supply units are of the same type and wattage.
   If the LED You may have to upgrade to a higher wattage power supply unit.
5. Ensure that you use only power supply units with the Extended Power Performance (EPP) label on the back.
6. Reseat the power supply unit.

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

If the problem persists, see the Getting help section.

Related References

Getting help on page 213
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

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 213
Safety instructions on page 65

Related tasks

Before working inside your system on page 66
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.

11. If the problem is not resolved, proceed with step 11.

12. Remove the system cover.

13. 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.

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 213
Using system diagnostics on page 193
Troubleshooting an internal USB key

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. Enter System Setup and ensure that the USB key port is enabled on the Integrated Devices screen.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Locate the USB key and reseat it.
5. Install the system cover.
6. Turn on the system and attached peripherals, and check if the USB key is functioning.
7. If the problem is not resolved, repeat step 2 and step 3.
8. Insert a known working USB key.
9. Install the system cover.

Next steps

If the problem persists, see the Getting help section.

Related References

Getting help on page 213

Troubleshooting a micro SD card

Prerequisites

⚠️ NOTE: Certain micro SD cards have a physical write-protect power on the card. If the write-protect switch is turned on, the micro SD card is not writable.

⚠️ NOTE: IDSDM and vFlash slots are not hot-pluggable.

Steps

1. Enter System Setup, and ensure that the Internal SD Card Port is enabled.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
   - NOTE: When an SD card failure occurs, the internal dual SD module controller notifies the system. On the next restart, the system displayed a message indicating the failure. If redundancy is enabled at the time of SD card failure, a critical alert is logged and chassis health will degrade.
4. Replace the failed micro SD card with a new micro SD card.
5. Install the system cover.
6. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
7. Enter System Setup, and ensure that the Internal SD Card Port and Internal SD Card Redundancy modes are set to the needed modes.
   - Verify that the correct SD slot is set as Primary SD Card.
8. Check if the micro SD card is functioning properly.
9. If the Internal SD Card Redundancy option is set to Enabled at the time of the SD card failure, the system prompts you to perform a rebuild. 

**NOTE:** The rebuild is always sourced from the primary SD card to the secondary SD card.

## 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 reseat 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 213
- [Using system diagnostics](#) on page 193

## 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.

Related References
Getting help on page 213
Using system diagnostics on page 193
Safety instructions on page 65

Related tasks
Removing the system cover on page 70
Removing an expansion card from expansion card riser 2 or 3 on page 115
Installing an expansion card into the expansion card riser 2 or 3 on page 116
Installing the system cover on page 71

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.

Related References
Getting help on page 213
Using system diagnostics on page 193
Safety instructions on page 65

Related tasks
Removing the system cover on page 70
Removing an expansion card from expansion card riser 2 or 3 on page 115
Installing an expansion card into the expansion card riser 2 or 3 on page 116
Installing the system cover on page 71

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 213
Using system diagnostics on page 193

Related tasks
Removing the system cover on page 70
System messages

For information about the event and error messages generated by the system firmware and agents that monitor system components, go to qrl.dell.com > Look Up > Error Code, type the error code, and then click Look it up.

Warning messages

A warning message alerts you to a possible problem and prompts you to respond before the system continues a task. For example, before you format a hard drive, a message warns you that you may lose all data on the hard drive. Warning messages usually interrupt the task and need you to respond by typing y (yes) or n (no).

NOTE: Warning messages are generated by either the application or the operating system. For more information, see the documentation that shipped with the operating system or application.

Diagnostic messages

The system diagnostic utility generates messages if there are errors detected when you run diagnostic tests on your system. For more information about system diagnostics, see the documentation that shipped with the operating system.

Alert messages

The systems management software generates alert messages for your system. Alert messages include information, status, warning, and failure messages for drive, temperature, fan, and power conditions. For more information, see the systems management software documentation links listed in the Documentation resources section of this manual.
Getting help

Topics:
- Contacting Dell EMC
- Documentation feedback
- Accessing system information by using QRL

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
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. Enter your system Service Tag in the Enter your Service Tag field on the Contact Us webpage.

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.

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 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 PowerEdge R730 and R730xd systems

<table>
<thead>
<tr>
<th>Removal topic</th>
<th>Related video</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removing the system cover</td>
<td><a href="http://www.Dell.com/QRL/Server/PER730/Cover">http://www.Dell.com/QRL/Server/PER730/Cover</a></td>
</tr>
<tr>
<td>Removing a cooling fan</td>
<td><a href="http://www.Dell.com/QRL/Server/PER730/Fans">http://www.Dell.com/QRL/Server/PER730/Fans</a></td>
</tr>
<tr>
<td>Removing the cooling fan assembly</td>
<td><a href="http://www.Dell.com/QRL/Server/PER730/Fans">http://www.Dell.com/QRL/Server/PER730/Fans</a></td>
</tr>
<tr>
<td>Removing memory modules</td>
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</tr>
<tr>
<td>Removing a hot swappable hard drive or SSD</td>
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