

# Dell Precision Tower 3420

## Owner's Manual

Regulatory Model: D11S  
Regulatory Type: D11S001



# Notes, cautions, and warnings

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

 CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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# Working on Your Computer

## Before Working Inside Your Computer

Use the following safety guidelines to help protect your computer from potential damage and to help to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that the following conditions exist:

- You have read the safety information that shipped with your computer.
- A component can be replaced or--if purchased separately--installed by performing the removal procedure in reverse order.

 **WARNING:** Disconnect all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting to the power source.

 **WARNING:** Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at [www.dell.com/regulatory\\_compliance](http://www.dell.com/regulatory_compliance)

 **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 avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface, such as a connector on the back of the computer.

 **CAUTION:** Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

 **CAUTION:** When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

 **NOTE:** The color of your computer and certain components may appear differently than shown in this document.

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

1. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
2. Turn off your computer (see Turning Off Your Computer).

 **CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.**

3. Disconnect all network cables from the computer.
4. Disconnect your computer and all attached devices from their electrical outlets.
5. Press and hold the power button while the computer is unplugged to ground the system board.
6. Remove the cover.

 **CAUTION: Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate static electricity, which could harm internal components.**

## Turning Off Your Computer

 **CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer.**

1. Shut down the operating system:

- In Window 10:

1. Click or touch .

2. In the dropdown displayed select the  and select **Shut Down**.

- In Windows 8:

- Using a touch-enabled device:

- a. Swipe in from the right edge of the screen, opening the Charms menu and select **Settings**.

- b. Select the  and then select **Shut down**

- Using a mouse:

- a. Point to upper-right corner of the screen and click **Settings**.

- b. Click the  and select **Shut down**.

- In Windows 7:

1. Click .

2. Click **Shut Down**.

or

1. Click .

2. Click the arrow in the lower-right corner of the **Start** menu as shown below, and then click



2. Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.

## After Working Inside Your Computer

After you complete any replacement procedure, ensure that you connect any external devices, cards, and cables before turning on your computer.

1. Replace the cover.  
 **CAUTION:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.
2. Connect any telephone or network cables to your computer.
3. Connect your computer and all attached devices to their electrical outlets.
4. Turn on your computer.
5. If required, verify that the computer works correctly by running **Dell Diagnostics**.

# 2

## Removing and Installing Components

This section provides detailed information on how to remove or install the components from your computer.

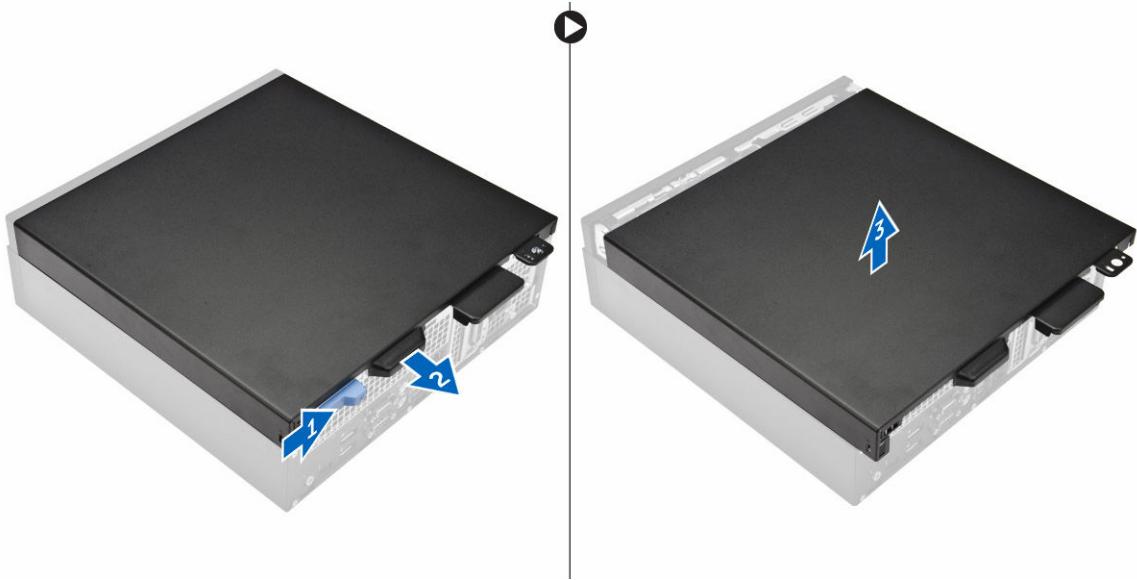
### Recommended Tools

The procedures in this document may require the following tools:

- Small flat-blade screwdriver
- Phillips screwdriver
- Small plastic scribe

### Removing the Cover

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Perform the following steps
  - a. Release the blue latch and slide the cover [1,2].
  - b. Remove the cover from the computer [3].



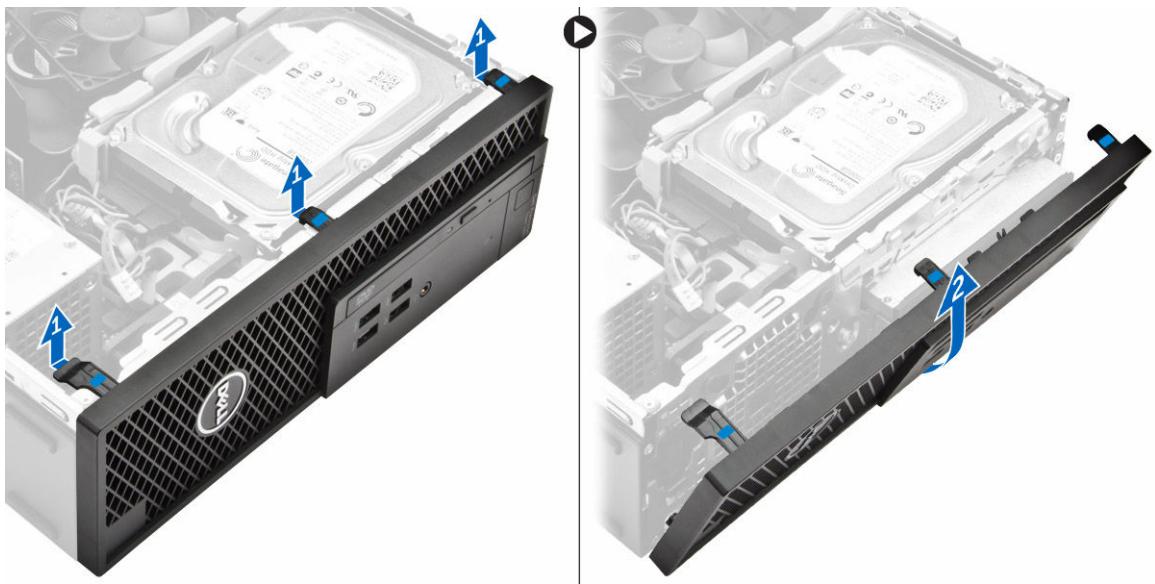
### Installing the Cover

1. Align the cover along its tabs on the chassis of the computer.
2. Push the cover until its secured by latch.

3. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the Front Bezel

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove the [cover](#).
3. Perform the following steps
  - a. Lift the retention clips and release the front bezel [1].
  - b. Lift up the front bezel to remove it from the computer [2].



## Installing the Front Bezel

1. Insert the hooks along the bottom edge of the front bezel into the slots on the chassis front.
2. Rotate the bezel toward the computer to engage the front-bezel retention clips until they click into place.
3. Install the [cover](#).
4. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the Hard Drive

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove the [cover](#).
3. Disconnect the data cable and the power cable from the back of the hard drive. And lift the hard-drive bracket out of the hard-drive bay [1,2].



- Flex the hard-drive bracket and remove the hard drive from the hard-drive bracket [1,2].



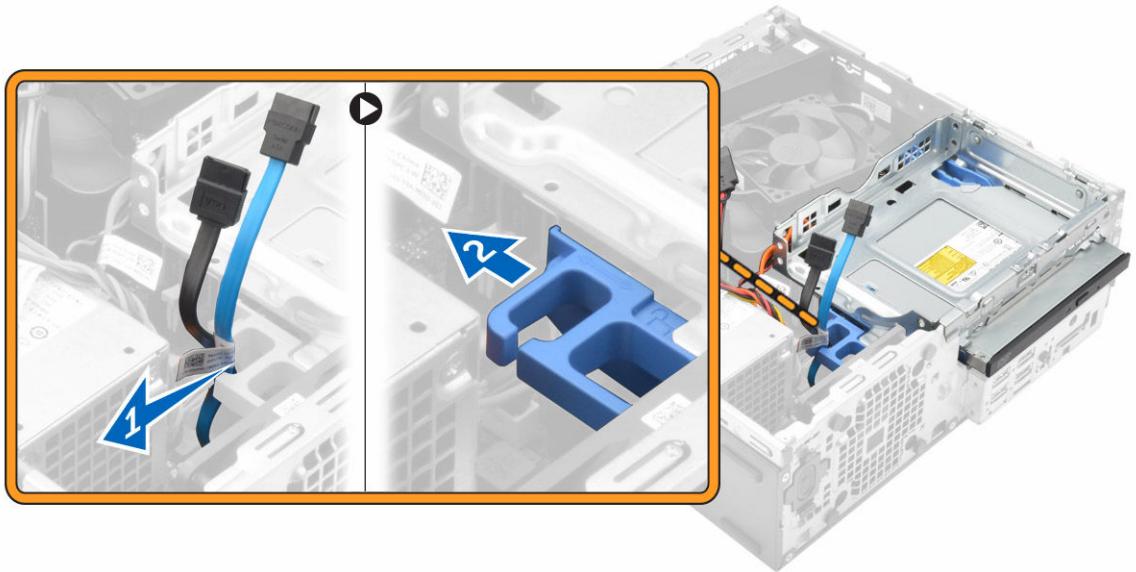
## Installing the Hard Drive

- Insert the hard drive into the hard-drive bracket.
- Press the securing brackets inward and slide the hard-drive bracket into the bay.
- Connect the data cable and the power cable to the back of the hard-drive.
- Install the [cover](#).
- Follow the procedures in [After Working Inside Your Computer](#).

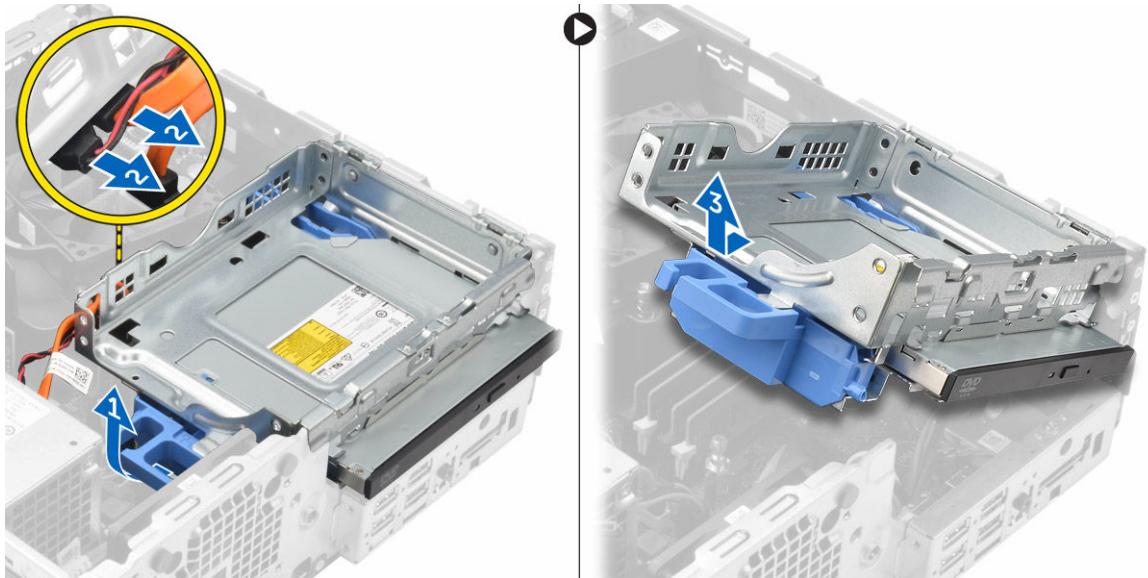
## Removing the Optical Drive

- Follow the procedures in [Before Working Inside Your Computer](#).
- Remove:
  - [cover](#)
  - [front bezel](#)
- Perform the following steps:

- a. Unroute the cable [1].
- b. Slide and hold the optical-drive latch to unlock the optical drive [2].



4. Perform the following steps:
  - a. Lift the optical drive bay [1].
  - b. Disconnect the data cable and the power cable from the back of the optical drive [2].
  - c. Slide and remove the optical drive from the computer.



5. Release the blue latch and slide the optical drive and remove from the optical drive bracket.



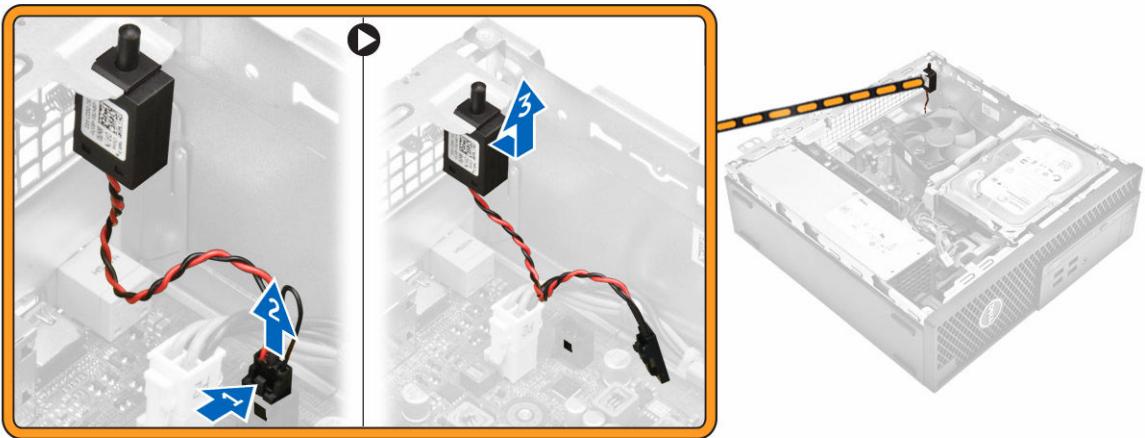
6. Repeat steps 3 and 4 to remove the second optical drive (if available).

## Installing the Optical Drive

1. Slide the optical drive into the drive bay until it snaps.
2. Place the optical drive into the computer.
3. Connect the data cable and power cable to the back of the optical drive.
4. Push the optical drive till it is secured by the optical-drive latch.
5. Route the cable.
6. Install:
  - a. [front bezel](#)
  - b. [cover](#)
7. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the Intrusion Switch

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove the [cover](#).
3. Perform the following steps:
  - a. Disconnect the intrusion-switch cable from the system board [1], [2].
  - b. Slide the intrusion switch and remove it from the computer [3].

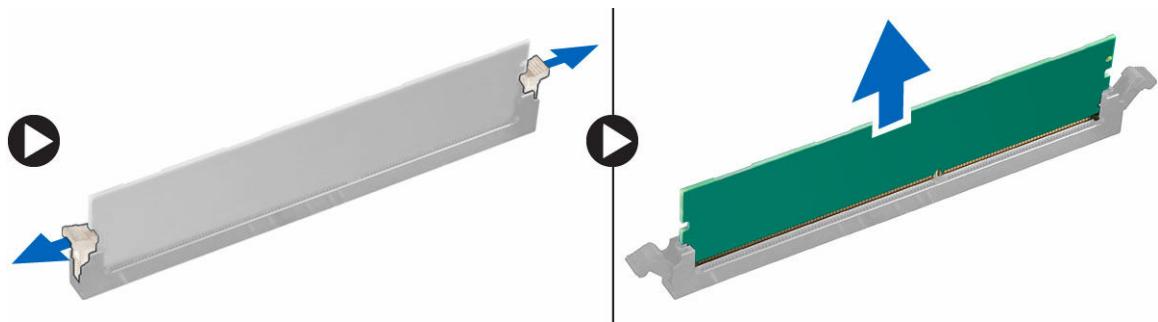


## Installing the Intrusion Switch

1. Insert the intrusion switch into its place in the chassis .
2. Connect the intrusion cable to the system board.
3. Install the [cover](#).
4. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the Memory

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove the [cover](#).
3. Press down on the memory retaining tabs on each side of the memory modules, and lift the memory modules out of the connectors on the system board.



## Installing the Memory

1. Align the notch on the memory-card with the tab in the system-board connector.
2. Press down on the memory module until the release tabs spring back to secure them in place.
3. Install the [cover](#).
4. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the PCIe SSD Card

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove the [cover](#).
3. Remove the screw that secures the PCIe SSD card..
4. Slide and lift the PCIe SSD card from the computer.
5. Lift the thermal pad from the system board.

## Installing the PCIe SSD Card

### Out of Box:

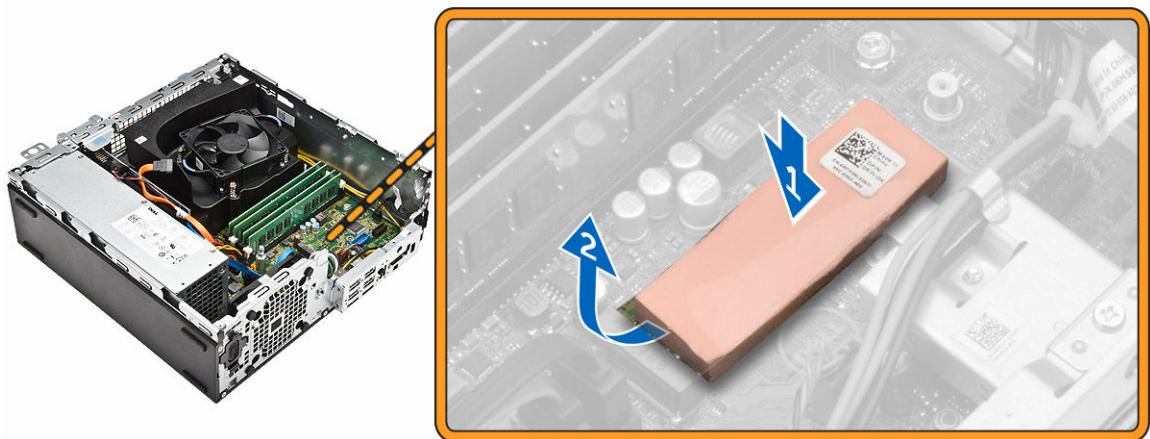
1. PCIe SSD card
2. Thermal Pad
3. Screw



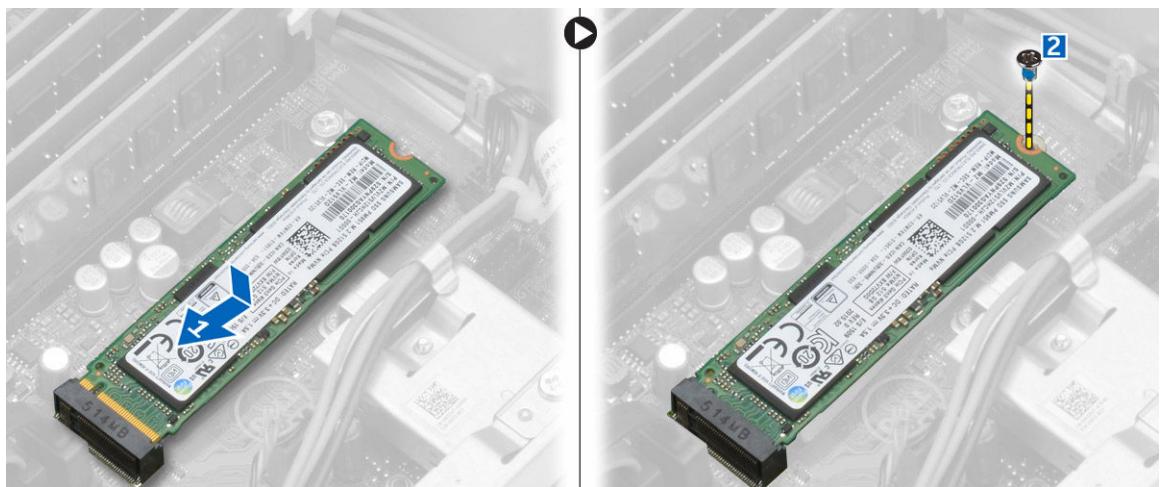
1. Remove the blue adhesive tape from the thermal pad.



2. Place the thermal pad on the system board and remove the white adhesive tape [1,2].



3. Slide the PCIe SSD card into the slot and tighten the screw to secure it [12].

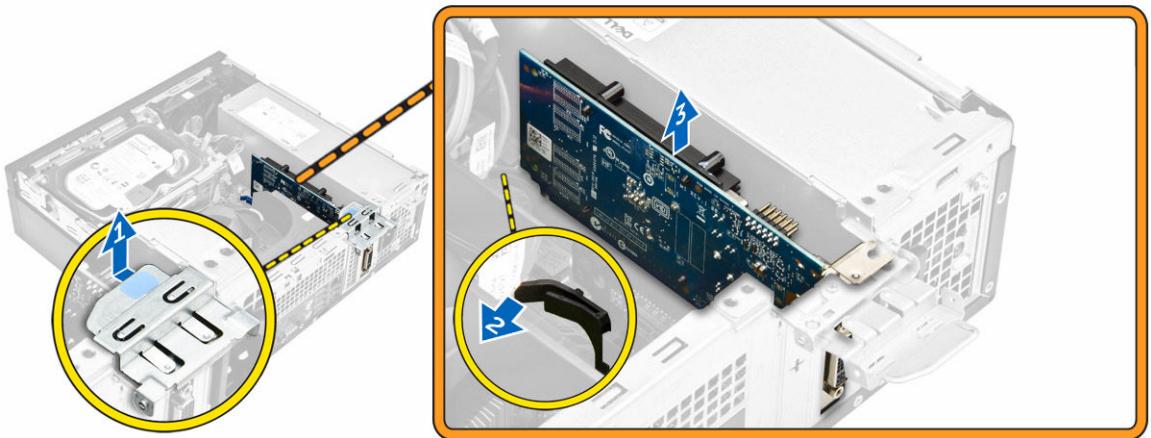


4. Install the [cover](#).

5. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the Expansion Card

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove the [cover](#).
3. Pull the release lever away from the PCI card until you release the securing tab from the dent in the card. Lift the card out of its connector and remove it from the system board [1,2].

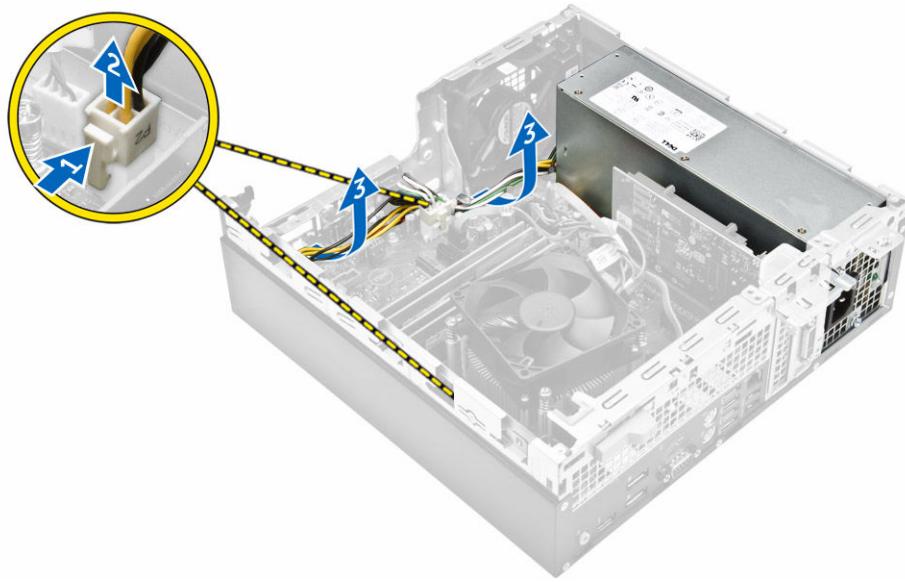


## Installing the Expansion Card

1. Insert the expansion card in the connector on the system board and press down until secured.
2. Install the [cover](#).
3. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the Power Supply

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove:
  - a. [cover](#)
  - b. [front bezel](#)
  - c. [hard drive](#)
  - d. [optical drive](#)
  - e. [heatsink fan cover](#)
3. Disconnect the 4-pin power cables from the system board and release the cable from the tab. Unroute the power cable [1,2,3].



4. Perform the following steps:
  - a. Remove the screws that secure the power supply to the back of the computer [1].
  - b. Push in on the blue release tab beside the power supply [2].
  - c. Lift and remove the power supply out of the computer [3].



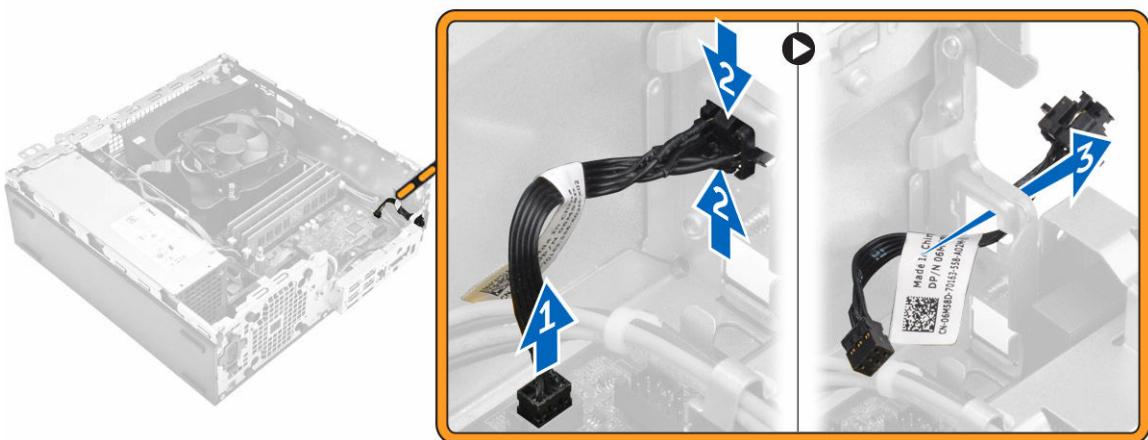
## Installing the Power Supply

1. Slide the PSU towards the back of the computer until it snaps into place.
2. Replace the screws to secure the power supply unit to the computer.
3. Route the PSU cables through the placeholder.
4. Connect the PSU cables to their connectors on the system board.
5. Install:

- a. [heatsink fan cover](#)
  - b. [optical drive](#)
  - c. [hard drive](#)
  - d. [front bezel](#)
  - e. [cover](#)
6. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the Power Switch

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove:
  - a. [cover](#)
  - b. [front bezel](#)
  - c. [hard drive](#)
  - d. [optical drive](#)
  - e. [heatsink fan cover](#)
  - f. [power supply unit](#)
3. Disconnect the power switch cable. Press the securing-bracket tabs inwards and lift the power switch out of the chassis [1,2,3].



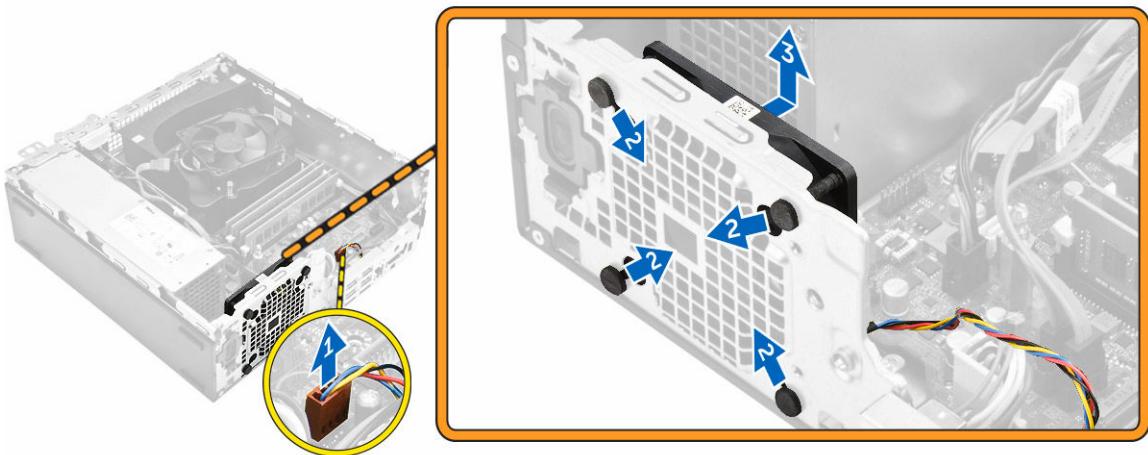
## Installing the Power Switch

1. Insert the power switch into the chassis.
2. Press the securing brackets inward and slide the power switch.
3. Connect the power switch cable.
4. Install:
  - a. [power supply unit](#)
  - b. [heatsink fan cover](#)
  - c. [optical drive](#)
  - d. [hard drive](#)
  - e. [front bezel](#)
  - f. [cover](#)

5. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the System Fan

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove:
  - a. [cover](#)
  - b. [front bezel](#)
  - c. [hard drive](#)
  - d. [optical drive](#)
3. Perform the following steps:
  - a. Disconnect the system-fan cable from the connector on the system board [1].
  - b. Pry the system fan away from the four grommets securing it to the back of the computer [2].
  - c. Lift the system fan from the computer [3].



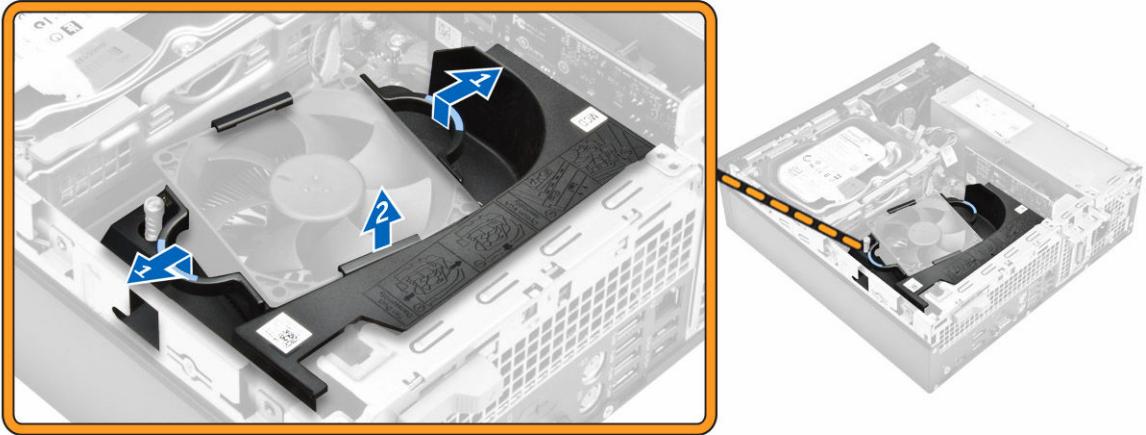
## Installing the System Fan

1. Place the system fan in the chassis.
2. Pass the four grommets through the chassis and slide outward along the groove to secure in place.
3. Connect the system-fan cable to the system board.
4. Install:
  - a. [optical drive](#)
  - b. [hard drive](#)
  - c. [front bezel](#)
  - d. [cover](#)
5. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the Heatsink Fan Cover

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove the [cover](#)
3. Perform the following steps

- a. Slide the heatsink fan cover outward direction [1].
- b. Remove the heatsink fan cover [2].

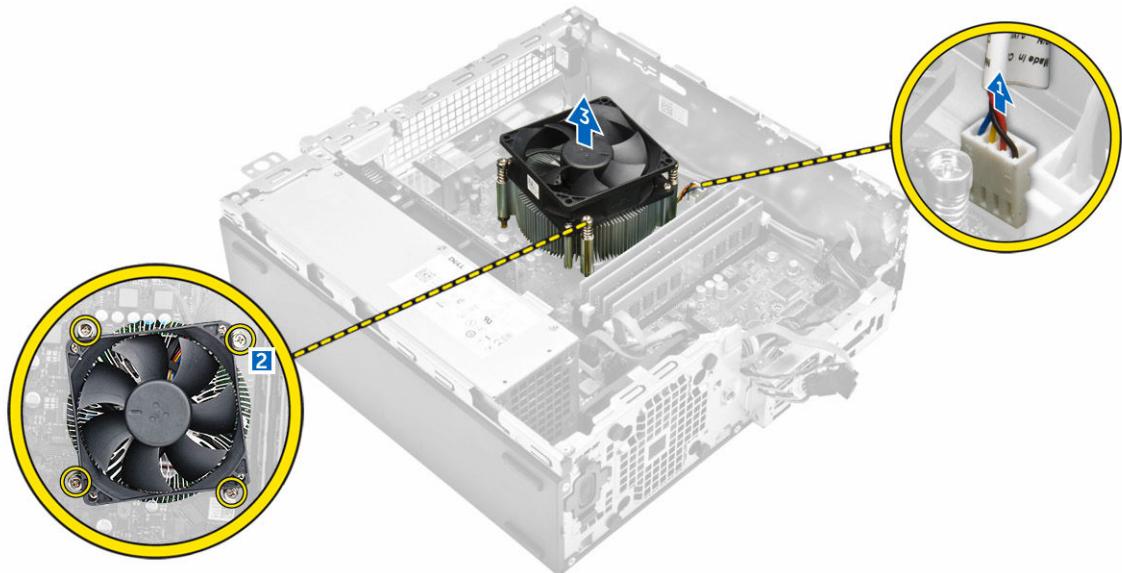


## Installing the Heatsink Fan Cover

1. Place the heatsink fan cover.
2. Press until it clicks into place.
3. Install the [cover](#).
4. Follow the procedures in [After Working Inside Your Computer](#).

## Removing the Heatsink Assembly

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove:
  - a. [cover](#)
  - b. [front bezel](#)
  - c. [hard drive](#)
  - d. [optical drive](#)
  - e. [heatsink fan cover](#)
3. Disconnect the heatsink cable from the system board. Loosen the captive screws in diagonal order and lift the heatsink assembly away from the computer [1,2,3].



## Installing the Heatsink Assembly

1. Place the heatsink assembly into the chassis.
2. Tighten the captive screws in diagonal order to secure the heatsink assembly to the computer.
3. Connect the heatsink cable to the system board.
4. Install:
  - a. [heatsink fan cover](#)
  - b. [optical drive](#)
  - c. [hard drive](#)
  - d. [front bezel](#)
  - e. [cover](#)
5. Follow the procedures in [After Working Inside Your Computer](#).

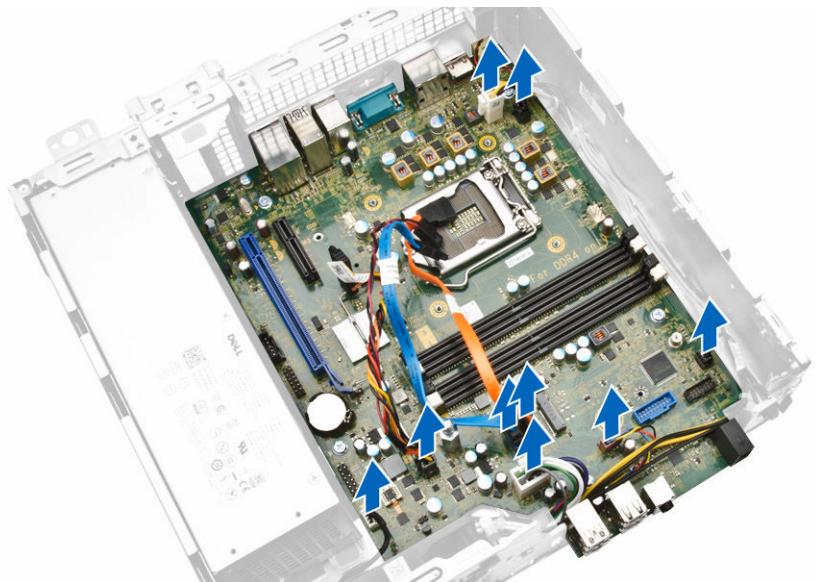
## Removing the System Board

1. Follow the procedures in [Before Working Inside Your Computer](#).
2. Remove the:
  - a. [cover](#)
  - b. [front bezel](#)
  - c. [hard drive](#)
  - d. [optical drive](#)
  - e. [heatsink fan cover](#)
  - f. [heatsink](#)
  - g. [system fan](#)
  - h. [memory](#)
  - i. [PCIe SSD](#)
3. Perform the following steps:
  - a. Remove the screw that secures the I/O panel to the chassis [1].

- b. Slide and remove the I/O panel from chassis [2].

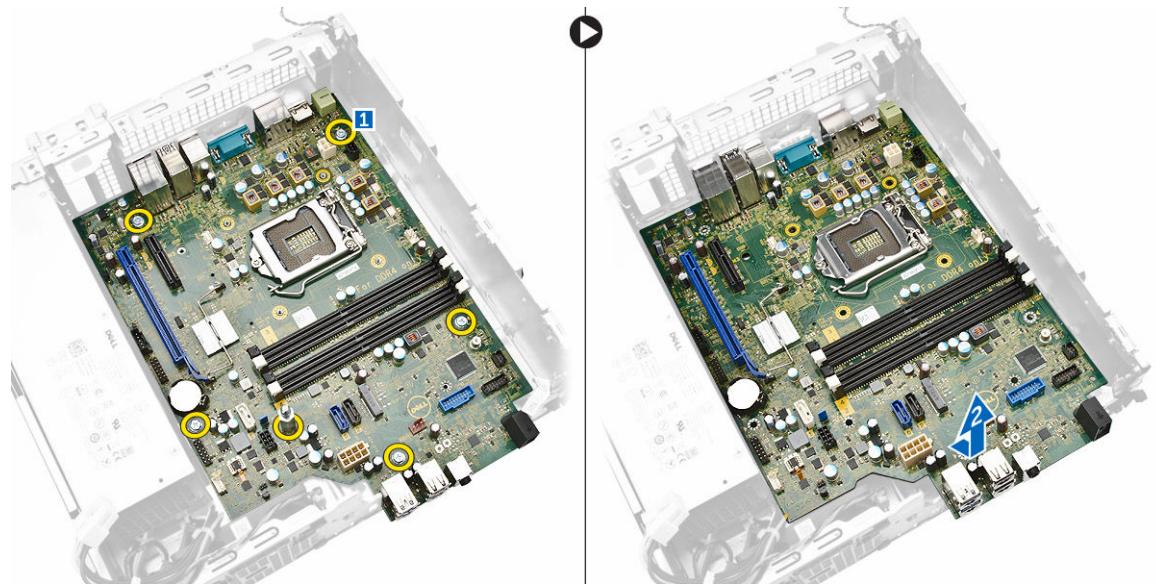


4. Disconnect the cables from the system board.



5. Perform the following steps:

- Remove the screws that secure system board to the chassis [1].
- Lift the system board from the chassis [2].



## Installing the System Board

1. Insert the system board and ensure that ports are aligned to the holes on the back panel.
2. Push the I/O panel to its original position until it snaps in.
3. Tighten the screw to secure the I/O panel to the chassis.
4. Connect the cables to the system board.
5. Install the:
  - a. [PCIe SSD](#)
  - b. [memory](#)
  - c. [system fan](#)
  - d. [heatsink](#)
  - e. [heatsink fan cover](#)
  - f. [optical drive](#)
  - g. [hard drive](#)
  - h. [front bezel](#)
  - i. [cover](#)
6. Follow the procedures in [After Working Inside Your Computer](#).

# System Board Components

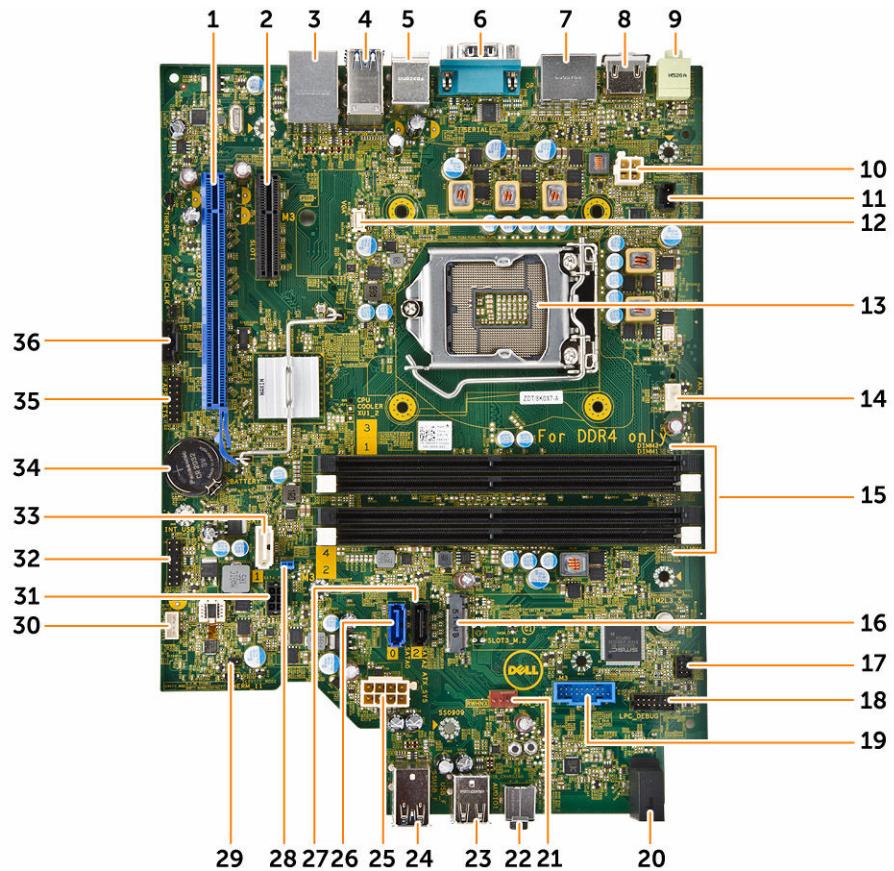


Figure 1. Components Of The System Board

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| 1. PCI Express x16 Gen 3 slot     | 2. PCI Express x4 slot              |
| 3. USB 2.0 with Network connector | 4. USB 3.0 connector                |
| 5. PS2 Keyboard/Mouse connectors  | 6. serial port connector            |
| 7. 2 x Display Port connector     | 8. HDMI connector                   |
| 9. Line-Out connector             | 10. P2 power connector              |
| 11. Intrusion switch connector    | 12. VGA connector                   |
| 13. CPU socket                    | 14. CPU fan connector               |
| 15. Memory slot                   | 16. SATA or PCIe SSD Slot           |
| 17. front power-switch connector  | 18. debug connector                 |
| 19. SD Card Reader (optional)     | 20. front panel power LED indicator |
| 21. System fan connector          | 22. Audio connector                 |
| 23. USB 2.0 connector             | 24. USB 3.0 connector               |
| 25. 8-pin power connector         | 26. SATA 0 connector (Blue color)   |
| 27. SATA 2 connector(Black color) | 28. password reset jumper           |

- 29. service mode jumper connector
- 31. SATA power connector
- 33. SATA 1 connector (White color)
- 35. Debug connector
- 30. speaker connector
- 32. Internal USB/CLINK header for Intel WiFi add-in-cards
- 34. CMOS Coin cell battery
- 36. Thunderbolt connector

# 3

## Using The System Setup Program And Boot Manager

The System Setup program is the BIOS program that enables you to manage your system hardware and specify BIOS-level options. From the System Setup program, you can:

- Change the NVRAM settings after you add or remove hardware
- View the system hardware configuration
- Enable or disable integrated devices
- Set performance and power management thresholds
- Manage system security

## Boot Sequence

Boot Sequence allows you to bypass the System Setup-defined boot device order and boot directly to a specific device (for example: optical drive or hard drive). During the Power-on Self Test (POST), when the Dell logo appears, you can:

- Access System Setup by pressing <F2> key
- Bring up the one-time boot menu by pressing <F12> key

The one-time boot menu displays the devices that you can boot from including the diagnostic option. The boot-menu options are:

**Table 1. Boot Sequence**

Option	Description
<b>Legacy Boot</b>	<ul style="list-style-type: none"><li>• PO: ST2000DM001-1ER164</li><li>• CD/DVD/CD-RW Drive</li><li>• Onboard NIC</li></ul>
<b>UEFI Boot</b>	Windows Boot Manager
<b>Other options:</b>	<ul style="list-style-type: none"><li>• BIOS Setup</li><li>• BIOS Flash Update</li><li>• Diagnostics</li><li>• Intel (R) Management Engine BIOS Extension (MEBx)</li><li>• Change Boot Mode Settings</li></ul>

The boot sequence screen also displays the option to access the System Setup screen.

## Navigation Keys

The following table displays the system setup navigation keys.

 **NOTE:** For most of the system setup options, changes that you make are recorded but do not take effect until you re-start the system.

**Table 2. Navigation Keys**

Keys	Navigation
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
<Enter>	Allows you to select a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
<Tab>	Moves to the next focus area.  <b>NOTE:</b> For the standard graphics browser only.
<Esc>	Moves to the previous page till you view the main screen. Pressing <Esc> in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.
<F1>	Displays the System Setup help file.

## System Setup Options

 **NOTE:** Depending on your computer and its installed devices, the items listed in this section may or may not appear.

**Table 3. General**

Option	Description
<b>System Information</b>	This section lists the primary hardware features of your computer. <ul style="list-style-type: none"><li>• System Information</li><li>• Memory Configuration</li><li>• PCI Information</li><li>• Processor Information</li><li>• Device Information</li></ul>
<b>Boot Sequence</b>	Allows you to change the order in which the computer attempts to find an operating system. <ul style="list-style-type: none"><li>• Diskette Drive</li><li>• USB Storage Device</li><li>• CD/DVD/CD-RW Drive</li><li>• Onboard NIC</li><li>• Internal HDD</li></ul>

Option	Description
<b>Boot List Options</b>	Allows you to change the boot list option. <ul style="list-style-type: none"><li>• Legacy</li><li>• UEFI</li></ul>
<b>Advanced Boot Options</b>	Allows you to Enable Legacy Option ROMs <ul style="list-style-type: none"><li>• <b>Enable Legacy Option ROMs</b> (Default: not enabled)</li></ul>
<b>Date/Time</b>	Allows you to set the date and time. The changes to the system date and time takes effect immediately.

**Table 4. System Configuration**

Option	Description
<b>Integrated NIC</b>	Allows you to configure the integrated network controller. The options are: <ul style="list-style-type: none"><li>• Enable UEFI Network Stack</li><li>• Disabled</li></ul> <p> <b>NOTE:</b> You can use the Disabled option, only if Active Management Technology (AMT) option is disabled.</p> <ul style="list-style-type: none"><li>• Enabled</li><li>• <b>Enabled w/PXE</b> (Default)</li><li>• Enabled w/Cloud Desktop</li></ul>
<b>Serial Port</b>	Identifies and defines the serial port settings. You can set the serial port to: <ul style="list-style-type: none"><li>• Disabled</li><li>• <b>COM1</b> (Default)</li><li>• COM2</li><li>• COM3</li><li>• COM4</li></ul> <p> <b>NOTE:</b> The operating system may allocate resources even if the setting is disabled.</p>
<b>SATA Operation</b>	Allows you to configure the internal SATA hard-drive controller. The options are: <ul style="list-style-type: none"><li>• Disabled</li><li>• AHCI</li><li>• <b>RAID On</b> (Default)</li></ul>
<b>Drives</b>	Allows you to configure the SATA drives on board. The options are: <ul style="list-style-type: none"><li>• SATA-0</li><li>• SATA-1</li><li>• SATA-2</li></ul>

Option	Description
	<ul style="list-style-type: none"> <li>• M.2 PCIe SSD-0</li> </ul>
	Default Setting: <b>All drives are enabled.</b>
<b>SMART Reporting</b>	This field controls if the hard drive errors for the integrated drives are reported during system startup. This technology is part of the SMART (Self Monitoring Analysis and Reporting Technology) specification.
	<ul style="list-style-type: none"> <li>• <b>Enable SMART Reporting</b> - This option is disabled by default.</li> </ul>
<b>USB Configuration</b>	Allows you to enable or disable the internal USB configuration. The options are:
	<ul style="list-style-type: none"> <li>• Enable Boot Support</li> <li>• Enable Front USB Ports</li> <li>• Enable rear USB Ports</li> </ul>
<b>Front USB Configuration</b>	Allows you to enable or disable the Front USB configuration. The options are:
	<ul style="list-style-type: none"> <li>• Front Port 1</li> <li>• Front Port 2</li> <li>• Front Port 3</li> <li>• Front Port 4</li> </ul>
<b>Rear USB Configuration</b>	Allows you to enable or disable the rear USB configuration. The options are:
	<ul style="list-style-type: none"> <li>• Rear Port 1</li> <li>• Rear Port 2</li> <li>• Rear Port 3</li> <li>• Rear Port 4</li> <li>• Rear Port 5</li> <li>• Rear Port 6</li> </ul>
<b>Thunderbolt</b>	Allows you to enable or disable Thunderbolt device support capability. The options are:
	<ul style="list-style-type: none"> <li>• <b>Enabled</b> (Default)</li> <li>• No Security</li> <li>• User Configuration</li> <li>• Secure Connect</li> <li>• Display Port Only</li> </ul>
<b>USB PowerShare</b>	Allows you to enable or disable USB PowerShare.
	<b>Enable USB PowerShare</b> - This option is disabled by default.
<b>Audio</b>	Allows you enable or disable the audio feature.
	<b>Enable Audio</b> (Default)

Option	Description
	<ul style="list-style-type: none"> <li>• Enable Microphone</li> <li>• Enable Internal Speaker</li> </ul>
<b>Miscellaneous devices</b>	<p>Allows you to enable or disable various on board devices.</p> <ul style="list-style-type: none"> <li>• <b>Enable Media Card</b> (Default)</li> <li>• Disable Media Card</li> </ul>

**Table 5. Video**

Option	Description
<b>Primary Display</b>	<p>Allows you to configure primary video controller when there are multiple controllers available. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Auto</b> (Default)</li> <li>• Intel HD Graphics</li> </ul>

**Table 6. Security**

Option	Description
<b>Strong Password</b>	<p>Allows you to enforce the option to always set strong passwords. Default Setting: <b>Enable Strong Password</b> is not selected.</p>
<b>Password Configuration</b>	Allows you to define the length of the Admin password. Min = 4 , Max = 32
<b>Password Bypass</b>	<p>Allows you to enable or disable the permission to bypass the System password, when it is set. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b> (Default)</li> <li>• Reboot bypass</li> </ul>
<b>Password Change</b>	<p>Allows you to enable the disable permission to the System passwords when the administrator password is set. Default Setting: <b>Allow Non-Admin Password Changes</b> is selected</p>
<b>TPM 1.2 Security</b>	<p>Allows you to control whether the Trusted Platform Module (TPM) is visible to the operating system. The options are:</p> <ul style="list-style-type: none"> <li>• <b>TPM On</b> (Default)</li> <li>• PPI Bypass for Enable Commands</li> <li>• PPI Bypass for Disable Commands</li> <li>• Disabled</li> <li>• Enabled</li> </ul>
<b>Computrace (R)</b>	<p>Allows you to activate or disable the optional Computrace software. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Deactivate</b> (Default)</li> <li>• Disable</li> <li>• Activate</li> </ul>

Option	Description
<b>Chassis Intrusion</b>	Allows you to enable or disable the chassis intrusion feature. The options are: <ul style="list-style-type: none"> <li>• <b>Disabled</b> (Default)</li> <li>• Enabled</li> <li>• On-Silent</li> </ul>
<b>CPU XD Support</b>	Allows you to enable the Execute Disable mode of the processor. <ul style="list-style-type: none"> <li>• <b>Enable CPU XD Support</b> (Default)</li> </ul>
<b>OROM Keyboard Access</b>	Allows you to determine whether users are able to enter Option ROM Configuration screens via hotkeys during boot. The options are: <ul style="list-style-type: none"> <li>• <b>Enable</b> (Default)</li> <li>• One Time Enable</li> <li>• Disable</li> </ul>
<b>Admin Setup Lockout</b>	Allows you to prevent users from entering Setup when an administrator password is set. <ul style="list-style-type: none"> <li>• <b>Enable Admin Setup Lockout</b></li> </ul> <p>Default Setting: The option is disabled.</p>

**Table 7. Secure Boot**

Option	Description
<b>Secure Boot Enable</b>	Allows you to enable or disable the Secure Boot Feature. The options are: <ul style="list-style-type: none"> <li>•</li> <li>• Disabled</li> <li>• <b>Enabled</b> (Default)</li> </ul>
<b>Expert Key Management</b>	Allows you to enable or disable Custom Mode Key Management. <ul style="list-style-type: none"> <li>• Enable Custom Mode (This option is not enabled by default)</li> </ul> <p>If Enabled, the options are:</p> <ul style="list-style-type: none"> <li>• PK</li> <li>• KEK</li> <li>• db</li> <li>• dbx</li> </ul>

**Table 8. Intel Software Guard Extensions**

Option	Description
<b>Intel SGX Enable</b>	Allows you to enable or disable Intel Software Guard Extensions. The options are: <ul style="list-style-type: none"> <li>• <b>Disabled</b> (Default)</li> </ul>

Option	Description
	<ul style="list-style-type: none"> <li>Enabled</li> </ul>
<b>Enclave Memory Size</b>	Allows you to change the Intel Software Guard Extensions Enclave Reserve Memory size. The options are: <ul style="list-style-type: none"> <li>32 MB</li> <li>64 MB</li> <li>128 MB</li> </ul>

**Table 9. Performance**

Option	Description
<b>Multi Core Support</b>	<p>This field specifies whether the processor will have one or all cores enabled. The performance of some applications will improve with the additional cores. This option is enabled by default. Allows you to enable or disable multi-core support for the processor. The options are:</p> <ul style="list-style-type: none"> <li>All (Default)</li> <li>1</li> <li>2</li> <li>3</li> </ul> <p> <b>NOTE:</b></p> <ul style="list-style-type: none"> <li>The options displayed could be different depending on the installed processor.</li> <li>The options depend on the number of cores supported by the installed processor (All, 1, 2, N-1 for N-Core Processors)</li> </ul>
<b>Intel SpeedStep</b>	<p>Allows you to enable or disable the Intel SpeedStep feature.</p> <p>Default Setting: <b>Enable Intel SpeedStep</b></p>
<b>C-States Control</b>	<p>Allows you to enable or disable the additional processor sleep states.</p> <p><b>C states</b> (This option is selected by default)</p>
<b>Limit CPUID Value</b>	<p>This field limits the maximum value the processor Standard CPUID Function will support.</p> <ul style="list-style-type: none"> <li><b>Enable CPUID Limit</b></li> </ul> <p>Default Setting: The option is disabled.</p>

**Table 10. Power Management**

Option	Description
<b>AC Recovery</b>	Specifies how the computer will respond when AC power is applied after a AC power loss. You can set the AC Recovery to: <ul style="list-style-type: none"><li>• <b>Power Off</b> (Default)</li><li>• Power On</li><li>• Last Power State</li></ul>
<b>Auto On Time</b>	Allows you to set the time at which the computer must turn on automatically. The options are: <ul style="list-style-type: none"><li>• <b>Disabled</b> (Default)</li><li>• Every Day</li><li>• Weekdays</li><li>• Select Days</li></ul>
<b>Deep Sleep Control</b>	Allows you to define the controls when Deep Sleep is enabled. <ul style="list-style-type: none"><li>• <b>Disabled</b> (Default)</li><li>• Enabled in S5 only</li><li>• Enabled in S4 and S5</li></ul>
<b>Fan Control Override</b>	Allows you to control the speed of the system fan. The options are: <ul style="list-style-type: none"><li>• <b>Fan Control Override</b></li></ul> Default Setting: The option is disabled.
<b>USB Wake Support</b>	Allows you to enable USB devices to wake the system from standby. <ul style="list-style-type: none"><li>• <b>Enable USB Wake Support</b></li></ul> Default Setting: The option is disabled.
<b>Wake on LAN/WLAN</b>	This option allows the computer to power up from the off state when triggered by a special LAN signal. Wake-up from the Standby state is unaffected by this setting and must be enabled in the operating system. This feature only works when the computer is connected to AC power supply. <ul style="list-style-type: none"><li>• <b>Disabled</b> (Default)</li><li>• LAN Only</li><li>• WLAN Only</li><li>• LAN or WLAN</li><li>• LAN with PXE Boot</li></ul>
<b>Block Sleep</b>	Allows you to block entering to sleep (S3 state) in OS Environment. Block Sleep (S3 State)  This option is disabled by default.
<b>Intel Ready Mode</b>	This option allows you to enable the capability of Intel Ready Mode Technology. Enable Intel Ready Mode (this option is disabled by default)

**Table 11. POST Behavior**

Option	Description
<b>Numlock LED</b>	Allows you to specify if the NumLock function is enabled when the system boots. This option is enabled by default.
<b>MEBx Hotkey</b>	Allows you to specify whether the MEBx Hotkey function should be enabled when the system boots. This option is enabled by default.
<b>Keyboard Errors</b>	Specifies whether keyboard related errors are reported when it boots. This option is enabled by default.

**Table 12. Virtualization Support**

Option	Description
<b>Virtualization</b>	This option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization technology. <ul style="list-style-type: none"> <li>• <b>Enable Intel Virtualization Technology</b> - This option is enabled by default.</li> </ul>
<b>VT for Direct I/O</b>	Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by Intel Virtualization technology for direct I/O. <ul style="list-style-type: none"> <li>• <b>Enable VT for Direct I/O</b> - This option is enabled by default.</li> </ul>
<b>Trusted Execution</b>	Allows you to specify whether a Measured Virtual Machine Monitor (MVMM) can utilize the additional hardware capabilities provided by Intel Trusted Execution Program. <ul style="list-style-type: none"> <li>• <b>Trusted Execution</b> - This option is disabled by default.</li> </ul>

**Table 13. Maintenance**

Option	Description
<b>Service Tag</b>	Displays the service tag of your computer.
<b>Asset Tag</b>	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.
<b>SERR Messages</b>	Allows you to control the SERR message mechanism. This option is not set by default. Some graphics cards require that the SERR message mechanism be disabled.
<b>BIOS Downgrade</b>	Allows you to control the flashing of the system firmware to previous revisions. This option is enabled by default.
<b>Data Wipe</b>	Allows you to securely erase data from all internal storage devices. The option is disabled by default.
<b>BIOS Recovery</b>	Allows you to recover from certain corrupted BIOS conditions using a recovery file. This option is enabled by default.

**Table 14. Cloud Desktop**

Option	Description
<b>Server Lookup Method</b>	Allows you to specify how the Cloud Desktop software will lookup server addresses. The options are: <ul style="list-style-type: none"> <li>• Static IP</li> </ul>

Option	Description
	<ul style="list-style-type: none"> <li>• <b>DNS</b> (default)</li> </ul>
<b>Server Name</b>	Allows you to specify the Server Name of the server.
<b>Server IP Address</b>	Specifies the primary static IP address of the Cloud Desktop Server with which the client software communicates. The default setting is 255.255.255.255
<b>Server Port</b>	Allows you to specify the primary IP port of the Cloud Desktop with which the client software communicates. The default setting is 06910.
<b>Client Address Method</b>	Allows you to specify how the client will obtain its IP address. The options are: <ul style="list-style-type: none"> <li>• Static IP</li> <li>• <b>DHCP</b> (default)</li> </ul>
<b>Client IP Address</b>	Specifies the Static IP address of the client. The default setting is 255.255.255.255
<b>Client Subnet Mask</b>	Specifies the subnet mask of the client. The default setting is 255.255.255.255
<b>Client Gateway</b>	Specifies the gateway of the client. The default setting is 255.255.255.255
<b>DNS IP Address</b>	Specifies the DNS IP address of the client. The default setting is 255.255.255.255
<b>Domain Name</b>	Specifies the Domain name of the client.
<b>Advanced</b>	Allows you to enable Verbose Mode for advanced debugging. By default this option is disabled.

**Table 15. System Logs**

Option	Description
<b>BIOS events</b>	Displays the system event log and allows you to clear the log. <ul style="list-style-type: none"> <li>• Clear Log</li> </ul>

**Table 16. Engineering Configurations**

Option	Description
<b>ASPM</b>	Allows you to set the Active State Power Management level: <ul style="list-style-type: none"> <li>• <b>Auto</b> (Default)</li> <li>• Disabled</li> <li>• L1 Only</li> </ul>

## Updating the BIOS

It is recommended to update your BIOS (system setup), on replacing the system board or if an update is available. For laptops, ensure that your computer battery is fully charged and connected to a power outlet

1. Re-start the computer.
2. Go to [dell.com/support](http://dell.com/support).
3. Enter the **Service Tag** or **Express Service Code** and click **Submit**.

 **NOTE:** To locate the Service Tag, click **Where is my Service Tag?**



**NOTE:** If you cannot find your Service Tag, click **Detect My Product**. Proceed with the instructions on screen.

4. If you are unable to locate or find the Service Tag, click the Product Category of your computer.
5. Choose the **Product Type** from the list.
6. Select your computer model and the **Product Support** page of your computer appears.
7. Click **Get drivers** and click **View All Drivers**.  
The Drivers and Downloads page opens.
8. On the Drivers and Downloads screen, under the **Operating System** drop-down list, select **BIOS**.
9. Identify the latest BIOS file and click **Download File**.  
You can also analyze which drivers need an update. To do this for your product, click **Analyze System for Updates** and follow the instructions on the screen.
10. Select your preferred download method in the **Please select your download method below** window, click **Download File**.  
The **File Download** window appears.
11. Click **Save** to save the file on your computer.
12. Click **Run** to install the updated BIOS settings on your computer.  
Follow the instructions on the screen.

## Jumper Settings

To change a jumper setting, pull the plug off its pin(s) and carefully fit it down onto the pin(s) indicated on the system board.

**Table 17. Jumper Settings**

Jumper	Setting	Description
PSWD	Default	Short: Default
		Open: Clear Password
RTCRST	Default	Open: Default
		Short: Real-time clock reset. Can be used for troubleshooting
SERVICE_MODE	Default	Open: Default
		Short: ME disable

## System and Setup Password

You can create a system password and a setup password to secure your computer.

Password Type	Description
<b>System password</b>	Password that you must enter to log on to your system.
<b>Setup password</b>	Password that you must enter to access and make changes to the BIOS settings of your computer.

-  **CAUTION:** The password features provide a basic level of security for the data on your computer.
-  **CAUTION:** Anyone can access the data stored on your computer if it is not locked and left unattended.
-  **NOTE:** Your computer is shipped with the system and setup password feature disabled.

## Assigning a System Password and Setup Password

You can assign a new **System Password** and/or **Setup Password** or change an existing **System Password** and/or **Setup Password** only when **Password Status** is **Unlocked**. If the Password Status is **Locked**, you cannot change the System Password.

-  **NOTE:** If the password jumper is disabled, the existing System Password and Setup Password are deleted and you need not provide the system password to log on to the computer.

To enter a system setup, press <F2> immediately after a power-on or re-boot.

1. In the **System BIOS** or **System Setup** screen, select **System Security** and press <Enter>. The **System Security** screen appears.
  2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.
  3. Select **System Password**, enter 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 lower case letters are valid, upper case letters are not allowed.
    - Only the following special characters are allowed: space, (,), (+), (,), (-), (.), (/), (:) (,), (\\), (|), (`).
- Re-enter the system password when prompted.
4. Type the system password that you entered earlier and click **OK**.
  5. Select **Setup Password**, type your system password and press <Enter> or <Tab>. A message prompts you to re-type the setup password.
  6. Type the setup password that you entered earlier and click **OK**.
  7. Press <Esc> and a message prompts you to save the changes.
  8. Press <Y> to save the changes.
- The computer reboots.

## Deleting or Changing an Existing System and/or Setup Password

Ensure that the **Password Status** is **Unlocked** (in the System Setup) before attempting to delete or change the existing System and/or Setup password. You cannot delete or change an existing System or Setup password, if the **Password Status** is **Locked**.

To enter the System Setup, press <F2> immediately after a power-on or reboot.

1. In the **System BIOS** or **System Setup** screen, select **System Security** and press <Enter>. The **System Security** screen is displayed.
2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.
3. Select **System Password**, alter or delete the existing system password and press <Enter> or <Tab>.
4. Select **Setup Password**, alter or delete the existing setup password and press <Enter> or <Tab>.

 **NOTE:** If you change the System and/or Setup password, re-enter the new password when prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.

5. Press <Esc> and a message prompts you to save the changes.
6. Press <Y> to save the changes and exit from the System Setup.  
The computer reboots.

## Disabling a System Password

The system's software security features include a system password and a setup password. The password jumper disables any password(s) currently in use.

 **NOTE:** You can also use the following steps to disable a forgotten password.

1. Follow the procedures in *Before Working on Your Computer*.
2. Remove the cover.
3. Identify the PSWD jumper on the system board.
4. Remove the PSWD jumper from the system board.

 **NOTE:** The existing passwords are not disabled (erased) until the computer boots without the jumper.

5. Install the cover.
6. Connect the computer to the electrical outlet and power-on the computer.
7. Power-off the computer and disconnect the power cable from the electrical outlet.
8. Remove the cover.
9. Replace the PSWD jumper on the system board.
10. Install the cover.
11. Follow the procedures in *After Working on Your Computer*.
12. Power-on the computer.
13. Go to the system setup, and assign a new system or setup password. See *Setting up a System Password*.

## Diagnostics

If you experience a problem with your computer, run the ePSA diagnostics before contacting Dell for technical assistance. The purpose of running diagnostics is to test your computer's hardware without requiring 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.

### Enhanced Pre-Boot System Assessment (ePSA) Diagnostics

The ePSA diagnostics (also known as system diagnostics) performs a complete check of your hardware. The ePSA is embedded with the BIOS and is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups 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

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

 **NOTE:** Some tests for specific devices require user interaction. Always ensure that you are present at the computer terminal when the diagnostic tests are performed.

1. Power-on the computer.
2. As the computer boots, press the <F12> key as the Dell logo appears.
3. On the boot menu screen, select the **Diagnostics** option.

The **Enhanced Pre-boot System Assessment** window is displayed, listing all devices detected in the computer. The diagnostics starts running the tests on all the detected devices.

4. If you wish to run a diagnostic test on a specific device, press <Esc> and click **Yes** to stop the diagnostic test.
5. Select the device from the left pane and click **Run Tests**.
6. If there are any issues, error codes are displayed.

Note the error code and contact Dell.

## Troubleshooting Your Computer

You can troubleshoot your computer using indicators like diagnostic lights, beep codes, and error messages during the operation of the computer.

### Power LED Diagnostics

The power button LED located on the front of the chassis also functions as a bicolored diagnostic LED. The diagnostic LED is only active and visible during the POST process. Once the operating system starts to load, it is no longer visible.

Amber LED blinking scheme – The pattern is 2 or 3 blinks followed by a short pause then x number of blinks up to 7. The repeated pattern has a long pause inserted in the middle. For example 2,3 = 2 amber blinks, short pause, 3 amber blinks followed by long pause then repeats.

**Table 18. Power LED Diagnostics**

Amber LED State	White LED State	Description
off	off	system is OFF
off	blinking	system is in sleep state
blinking	off	power supply unit (PSU) failure
steady	off	PSU is working but failed to fetch code
off	steady	system is ON

<b>Amber LED State</b>	<b>Description</b>
2,1	system board failure
2,2	system board, PSU or PSU cabling failure
2,3	system board, memory or CPU failure
2,4	coin-cell battery failure
2,5	corrupt BIOS
2,6	CPU configuration failure or CPU failure
2,7	memory modules are detected, but a memory failure
3,1	possible peripheral card or system board failure
3,2	possible USB failure
3,3	no memory modules are detected
3,4	possible system board error
3,5	memory modules are detected, but a memory configuration or compatibility error
3,6	possible system board resource and/or hardware failure
3,7	some other failure with messages on screen

## **Beep Code**

The computer can emit a series of beeps during start-up if the display does not show errors or problems. These series of beeps, called beep codes, identify various problems. The delay between each beep is 300 ms, the delay between each set of beeps is 3 sec, and the beep sound lasts 300 ms. After each beep and each set of beeps, the BIOS should detect if the user presses the power button. If so, BIOS will jump out from looping and execute the normal shutdown process and power system.

<b>Code</b>	1-3-2
<b>Cause</b>	Memory failure

## **Error Messages**

<b>Error Message</b>	<b>Description</b>
<b>Address mark not found</b>	The BIOS found a faulty disk sector or could not find a particular disk sector.
<b>Alert! Previous attempts at booting this system have failed at checkpoint [nnnn]. For help in resolving this problem, please</b>	The computer failed to complete the boot routine three consecutive times for the same error. Contact Dell and report the checkpoint code (nnnn) to the support technician

Error Message	Description
<b>note this checkpoint and contact Dell Technical Support.</b>	
<b>Alert! Security override Jumper is installed.</b>	The MFG_MODE jumper has been set and AMT Management features are disabled until it is removed.
<b>Attachment failed to respond</b>	The floppy or hard drive controller cannot send data to the associated drive.
<b>Bad command or file name</b>	Ensure that you have spelled the command correctly, put spaces in the proper place, and used the correct pathname.
<b>Bad error- correction code (ECC) on disk read</b>	The floppy or hard drive controller detected an uncorrectable read error.
<b>Controller has failed</b>	The hard drive or the associated controller is defective.
<b>Data error</b>	The floppy or hard drive cannot read the data. For the Windows operating system, run the chkdsk utility to check the file structure of the floppy or hard drive. For any other operating system, run the appropriate corresponding utility.
<b>Decreasing available memory</b>	One or more memory modules may be faulty or improperly seated. Re-install the memory modules and, if necessary, replace them.
<b>Diskette drive 0 seek failure</b>	A cable may be loose or the computer configuration information may not match the hardware configuration.
<b>Diskette read failure</b>	The floppy disk may be defective or a cable may be loose. If the drive access light turns on, try a different disk.
<b>Diskette subsystem reset failed</b>	The floppy drive controller may be faulty.
<b>Gate A20 failure</b>	One or more memory modules may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.
<b>General failure</b>	The operating system is unable to carry out the command. This message is usually followed by specific information—for example, <b>Printer out of paper</b> . Take the appropriate action to resolve the problem.
<b>Hard-disk drive configuration error</b>	The hard drive failed initialization.
<b>Hard-disk drive controller failure</b>	The hard drive failed initialization.
<b>Hard-disk drive failure</b>	The hard drive failed initialization.
<b>Hard-disk drive read failure</b>	The hard drive failed initialization.

Error Message	Description
<b>Invalid configuration information-please run SETUP program</b>	The computer configuration information does not match the hardware configuration.
<b>Invalid Memory configuration, please populate DIMM1</b>	DIMM1 slot does not recognize a memory module. The module should be re-seated or installed.
<b>Keyboard failure</b>	A cable or connector may be loose, or the keyboard or keyboard/mouse controller may be faulty.
<b>Memory address line failure at address, read value expecting value</b>	A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.
<b>Memory allocation error</b>	The software you are attempting to run is conflicting with the operating system, another program, or a utility.
<b>Memory data line failure at address, read value expecting value</b>	A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.
<b>Memory double word logic failure at address, read value expecting value</b>	A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.
<b>Memory odd/even logic failure at address, read value expecting value</b>	A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them
<b>Memory write/read failure at address, read value expecting value</b>	A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.
<b>Memory size in CMOS invalid</b>	The amount of memory recorded in the computer configuration information does not match the memory installed in the computer.
<b>Memory tests terminated by keystroke</b>	A keystroke interrupted the memory test.
<b>No boot device available</b>	The computer cannot find the floppy disk or hard drive.

Error Message	Description
No boot sector on hard-disk drive	The computer configuration information in System Setup may be incorrect.
No timer tick interrupt	A chip on the system board might be malfunctioning.
Non-system disk or disk error	The floppy disk in drive A does not have a bootable operating system installed on it. Either replace the floppy disk with one that has a bootable operating system, or remove the floppy disk from drive A and restart the computer.
Not a boot diskette	The operating system is trying to boot to a floppy disk that does not have a bootable operating system installed on it. Insert a bootable floppy disk.
Plug and play configuration error	The computer encountered a problem while trying to configure one or more cards.
Read fault	The operating system cannot read from the floppy or hard drive, the computer could not find a particular sector on the disk, or the requested sector is defective.
Requested sector not found	The operating system cannot read from the floppy or hard drive, the computer could not find a particular sector on the disk, or the requested sector is defective.
Reset failed	The disk re-set operation failed.
Sector not found	The operating system cannot locate a sector on the floppy or hard drive.
Seek error	The operating system cannot find a specific track on the floppy disk or hard drive.
Shutdown failure	A chip on the system board might be malfunctioning.
Time-of-day clock stopped	The battery might be dead.
Time-of-day not set-please run the System Setup program	The time or date stored in System Setup does not match the computer clock. The time or date stored in System Setup does not match the computer clock. The time or date stored in System Setup does not match the computer clock. The time or date stored in System Setup does not match the computer clock.
Timer chip counter 2 failed	A chip on the system board may be malfunctioning.
Unexpected interrupt in protected mode	The keyboard controller may be malfunctioning or a memory module may be loose.
WARNING: Dell's Disk Monitoring System has detected that drive [0/1] on the [primary/secondary] EIDE controller is operating outside of normal specifications. It is	During initial startup, the drive detected possible error conditions. When your computer finishes booting, immediately back up your data and replace your hard drive (for installation procedures, see "Adding and Removing Parts" for your computer type). If no replacement drive is immediately available and the drive is not the only bootable drive, enter System Setup and change the appropriate drive setting to <b>None</b> . Then remove the drive from the computer.

Error Message	Description
advisable to immediately back up your data and replace your hard drive by calling your support desk or Dell.	
<b>Write fault</b>	The operating system cannot write to the floppy or hard drive.
<b>Write fault on selected drive</b>	The operating system cannot write to the floppy or hard drive.

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## Specifications

 **NOTE:** Offerings may vary by region. For more information regarding the configuration of your computer, click Start  (Start icon) → **Help and Support**, and then select the option to view information about your computer.

**Table 19. Processor**

Feature	Specification
Processor type	<ul style="list-style-type: none"><li>• Intel Core i3 series</li><li>• Intel Core i5 series</li><li>• Intel Core i7 series</li><li>• Intel Xeon E3</li></ul>
Total Cache	Up to 8 MB cache depending on processor type

**Table 20. Memory**

Feature	Specification
Type	DDR4, NECC, and ECC
Speed	2133 MHz
Connectors	four DIMM slots
Capacity	4 GB, 8 GB, and 16 GB
Minimum Memory	4GB
Maximum memory	64GB

**Table 21. Video**

Feature	Specification
Integrated	<ul style="list-style-type: none"><li>• Intel HD Graphics 530 (Core i3/i5/i7)</li><li>• Intel HD Graphics P530 (Select Xeon)</li></ul>
Discrete	PCI Express x16 graphics adapter

**Table 22. Audio**

Feature	Specification
Integrated	two Channel High Definition Audio

**Table 23. Network**

<b>Feature</b>	<b>Specification</b>
Integrated	Intel I219LM Ethernet capable of 10/100/1000 Mb/s communication

**Table 24. System Information**

<b>Feature</b>	<b>Specification</b>
System chipset	Intel C236 chipset
DMA Channels	two 8237 DMA controllers with seven independently programmable channels
Interrupt Levels	Integrated I/O APIC capability with 24 interrupts
BIOS Chip (NVRAM)	16 MB

**Table 25. Expansion Bus**

<b>Feature</b>	<b>Specification</b>
Bus Type	PCIe gen3 (x16), USB 2.0, and USB 3.0
Bus Speed	PCI Express: <ul style="list-style-type: none"> <li>• x4-slot each direction speed – 4GB/s</li> <li>• x16-slot each direction speed – 16 GB/s</li> </ul> SATA: 1.5 Gbps, 3.0 Gbps, and 6 Gbps

**Table 26. Cards**

<b>Feature</b>	<b>Specification</b>
PCI:	
Mini-Tower	up to one full-height card
Small Form Factor	none
PCI Express x4:	
Mini-Tower	up to one full-height card
Small Form Factor	up to one low-profile card
PCI-Express x16:	
Mini-Tower	up to two full-height cards
Small Form Factor	up to one low-profile cards

**Table 27. Drives**

<b>Feature</b>	<b>Specification</b>
Externally Accessible (5.25-inch drive bay):	
Mini-Tower	two

Feature	Specification		
Small Form Factor	one slim optical drive bay		
Internally Accessible:	<b>3.5-inch SATA drive bays</b>	<b>2.5-inch SATA drive bays</b>	<b>PCIe drive bay</b>
Mini-Tower	two	four	one
Small Form Factor	one	two	one

**Table 28. External Connectors**

Feature	Specification
Audio:	
Front Panel	one universal audio jack with microphone in and headphone connector
Back Panel	one line-out connector
Network Adapter	one RJ-45 connector
Serial	one 9-pin connector; 16550 C compatible
USB 2.0:	Front Panel: two Rear Panel: two
USB 3.0:	Front Panel: two Rear Panel: four
HDMI out	one
Video	<ul style="list-style-type: none"> <li>• 15-pin VGA connector</li> <li>• two 20-pin DisplayPort connectors</li> </ul>
 <b>NOTE:</b> Available video connectors may vary based on the graphics card selected.	

**Table 29. Internal Connectors**

Feature	Specification
PCI 2.3 data width (maximum) - 32 bits	
Mini-Tower	one 120-pin connector
Small Form Factor	none
PCI Express x4 data width (maximum) - four PCI Express lane	
Mini-Tower	one 64-pin connector
Small Form Factor	one 64-pin connector
PCI Express x16 (wired as x4) data width (maximum) - four PCI Express lanes	
Mini-Tower	one 164-pin connector

<b>Feature</b>	<b>Specification</b>
Small Form Factor	none
PCI Express x16 data width (maximum) - 16 PCI Express lanes	
Mini-Tower, Small Form Factor	one 164-pin connector
Serial ATA:	
Mini-Tower	four 7-pin connectors
Small Form Factor	three 7-pin connectors
Memory	four 288-pin connectors
Internal USB:	
Mini-Tower	one 20-pin connector
Small Form Factor	one 14-pin connector
System Fan	one 4-pin connector
Front panel control:	
Mini-Tower	one 6-pin and two 20-pin connector
Mini-Tower – Thermal Sensor	one 2-pin connector
Processor	one 1150-pin connector
Processor Fan	one 4-pin connector
Service mode jumper	one 2-pin connector
Password clear jumper	one 2-pin connector
RTC reset jumper	one 2-pin connector
Internal speaker	one 4-pin connector
Intruder connector	one 3-pin connector
Power connector:	one 8-pin, one 4-pin,

**Table 30. Controls and Lights**

<b>Feature</b>	<b>Specification</b>
Front of the computer:	
Power button light	White light — Solid white light indicates power-on state; blinking white light indicates sleep state of the computer.
Drive activity light	White light — Blinking white light indicates that the computer is reading data from or writing data to the hard drive.
Back of the computer:	
Link integrity light on integrated network adapter	Green — a good 10 Mbps connection exists between the network and the computer.

<b>Feature</b>	<b>Specification</b>
	Green — a good 100 Mbps connection exists between the network and the computer.
	Orange — a good 1000 Mbps connection exists between the network and the computer.
	Off (no light) — the computer is not detecting a physical connection to the network.
Network activity light on integrated network adapter	Yellow light — A blinking yellow light indicates that network activity is present.
Power supply diagnostic light	Green light — The power supply is turned on and is functional. The power cable must be connected to the power connector (at the back of the computer) and the electrical outlet.

**Table 31. Power**

<b>Power</b>	<b>Wattage</b>	<b>Maximum Heat Dissipation</b>	<b>Voltage</b>
Mini-Tower:	290 W	989.00 BTU/hr	100 VAC to 240 VAC, 50 Hz to 60 Hz, 5.4 A
	365 W EPA	1245 BTU/hr	100 VAC to 240 VAC, 50 Hz to 60 Hz, 5.0 A
Small Form Factor	180 W /240 W EPA	614/819 BTU/hr	100 VAC to 240 VAC, 50 Hz to 60 Hz, 4.0 A
 NOTE:	Heat dissipation is calculated by using the power supply wattage rating.		
Coin-cell battery		3 V CR2032 lithium coin cell	

**Table 32. Physical Dimension**

<b>Physical</b>	<b>Height</b>	<b>Width</b>	<b>Depth</b>	<b>Weight</b>
Mini-Tower	360.00 mm (14.17 inches)	175.00 mm (6.88 inches)	435.00 mm (17.12 inches)	11.70 kg (25.70 lb)
Small Form Factor	290.00 mm (11.41 inches)	92.60 mm (3.64 inches)	292.00 mm (11.49 inches)	6.30 kg (13.88 lb)

 NOTE: The computer's weight is based on a typical configuration and may vary with different configurations.

**Table 33. Environmental**

<b>Feature</b>	<b>Specification</b>
Temperature range: Operating	5 °C to 35 °C (41 °F to 95 °F)

<b>Feature</b>	<b>Specification</b>
Storage	-40 °C to 65 °C (-40 °F to 149 °F)
Relative humidity (maximum):	
Operating	20 percent to 80 percent (non-condensing)
Storage	5 percent to 95 percent (non-condensing)
Maximum vibration:	
Operating	0.26 GRMS
Storage	2.20 GRMS
Maximum shock:	
Operating	40 G
Storage	105 G
Altitude:	
Operating	-15.2 m to 3048 m (-50 to 10,000 ft)
Storage	-15.20 m to 10,668 m (-50 ft to 35,000 ft)
Airborne contaminant level	G1 or lower as defined by ANSI/ISA-S71.04-1985

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## Contacting Dell

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

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

Go to [Dell.com/contactdell](http://Dell.com/contactdell).